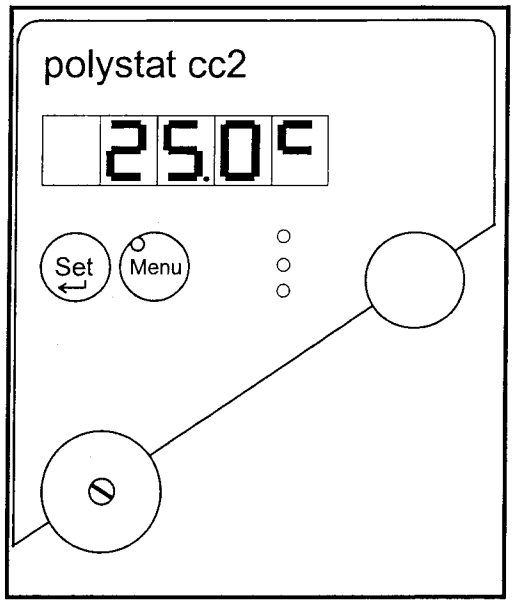
huber

hochgenau temperieren

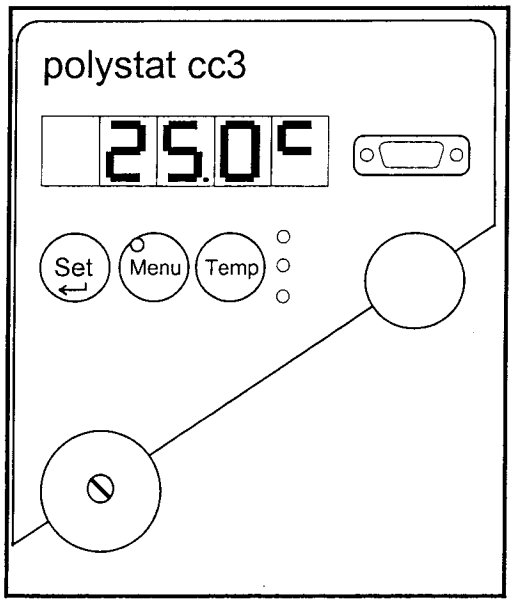
OPERATING INSTRUCTIONS

Version 3.7

polystat compatible control 2



polystat compatible control 3



PETER HUBER KÄLTEMASCHINENBAU GMBH · Werner-von-Siemens-Strasse 1 · D-77656 Offenburg · Tel. +49-781-9603-0 · Fax +49-781-57211
Internet: www.huber-online.com · E-Mail: info@huber-online.com · Erfüllungsort und Gerichtsstand 77656 Offenburg · Amtsgericht Offenburg
HRB 917 · Steuernummer: 14044/00050, Finanzamt Offenburg · USt-IdNr.: DE 811286033 · Geschäftsführer: Peter Huber, Daniel Huber
Bankverbindungen: Sparkasse Offenburg-Ortenau (BLZ 664 500 50) Konto-Nr. 5 092 · BW-Bank Offenburg (BLZ 664 200 20) Konto-Nr. 4 502 725 700

7286 - 1

Table of Contents
as of Software Version V3.07B

V3.7/ 10.00
polystat compatible control 2 from serial No. 00760P2
polystat compatible control 3 from serial No. 00671P3

Foreword: Please read carefully!

Product description

Polystat cc2 (62) and Polystat cc3 (63) are compact, microprocessor control units for Huber's Polystat Compatible Control circulation baths. These contain a programming unit, a master controller with an external sensor, an RS232 digital interface, a RS485 half-duplex digital interface and an 4...20mA analogue interface. The set-point limits, the alarm limits, the alarm mode, the compressor automatic controls and the °C or °F display can also be set. The controller can be calibrated to comply with ISO9000ff. All important data is stored in a permanent memory. Data entry is controlled by the operator and supports alpha-numeric characters.

Safety Advice Regarding Overtemperature protection device

The overtemperature protection (see §G.8) device is an independent safety device which must be set by the user. When setting this unit, allow for the flash-point of the heat transfer fluid and the flash-point of other media which are used in the application as well as the temperature limits for the application apparatus, i.e., the connecting hoses.
Regularly (e.g., every 4 weeks) check the operation of the overtemperature protection device at a non-critical temperature. The user is responsible for ensuring that the setting of the overtemperature protection device is correct.

Safety Advice Regarding Controller Replacement

Electrical hazards must never be underestimated. For this reason, always switch off the circulator bath and disconnect the mains power supply before replacing the controller (21). Ensure that the mains power is not reconnected. Remove the fastening screws (22), take out the controller (21)forward. Ensure foreign bodies do not enter the control unit slot once the control unit has been removed from the circulator bath. Do not touch the control unit or the circulator bath contacts under any circumstances. Examine the replacement control unit contacts before installing the unit. The contract strip must not be dirty.
When inserting the replacement control unit, ensure it is not tilted and do not use excessive force under any circumstances. Re-insert the fastening screws (22). The circulator bath can now be re-commissioned.

The data entry modes are divided into two levels.

1. Feature selection:
The set-point value adjustment, alarm limits, etc., features are selected using the **set**-key and **menu**-key. The display does **not** flash during these operations. The selected feature can be accessed using the set-key, thereby permitting entry to the 2nd programming level.

2. Data entry mode:
The adjuster is used to set a numerical value, e.g., the set-point value or to select a programme option, e.g., Auto, On or Off for the compressor automatic controls. The display flashes during this operation. The value or the option must then be confirmed using the set-key. The controller initially stores the data in a non-volatile memory. The control unit will annul the data entry and return to the default status (displaying the actual value) unless the data entry is confirmed within 4 minutes.

New functions from V3.04

From software version V3.04, a few additional functions have been incorporated in the operating software.The thermostat is now fitted with a programmable automatic cutout. The user can determine the activation conditions himself. Only when the automatic cutout is switched on does the thermostat start the temperature control when the power is connected or after a power failure. If the automatic cutout is switched off, the user has to start the temperature control when tUrn is displayed by turning the rotary knob (see §3.20).

In addition to the offset calibration of the external Pt100 sensor, it is now possible to perform offset calibration of the internal Pt100 sensor (shift). For this, the two-step calibration and the entry of the calibration temperatures have been combined in the function menu under the menu point *CAL*. See §3.5
Depending upon the controller mode, the external or internal Pt100 may be provided with an offset (shift) as described in §3.5 and §3.6.

It is now possible to save the user-defined settings in the permanent memory so they may be reloaded if required. Access to this function is a complicated process in order to prevent it from being called up unintentionally (see §3.21).

Another innovation is the saving of the calibration settings. The user-saved calibration data or the factory calibration data may be loaded if required. Access to this function is a complicated process in order to prevent it from being called up unintentionally (see §3.21).

To prevent unintentional changes to the equipment settings, user levels have been defined. These specify the functions to which the user has access.
In user level 1, only the set value may be set. All other functions are blocked.
In user level 2, in addition to level 1 function, all alarm, programming and setup functions are accessible. All interface settings for the analog interface, the RS232 and the RS485 interface are blocked. In user level 3, the complete range of functions are available. Access to the user level-function is a complicated process to prevent it from being called up unintentionally (see §3.20).

With external temperature control, it may be necessary to know the temperature of the internal bath. Similarly, with internal temperature control, the external Pt100 sensor may be connected and used for measurements. This second actual value can then be displayed (see §1.3).
To improve external ventilatioin, a ventilation function has now been installed. This enables the pump to be operated in alternating mode. (see §1.4).

The programmer has been expanded by the option of connecting the acoustic sensor at the end of the program (see §3.9.1 and §3.9.7). The option of jumping the current segmentis a new feature (see §3.9.6).

Some new commands for the digital interfaces have been incorporated (see §6.2.1ff).

G. Description of unit

The Polystat is a temperature control unit with Plug & Play technology featuring microprocessor control and straightforward operation with an angular sensor and a digital display. High-pressure pump, coated components manufactured from stainless steel or plastic which is highly resistant to chemical attack. All models with 3 year guarantee for electronic components. Selection of 3 Models:

Polystat cc1, with level safety device (float switch) and adjustable overtemperature protection device for long-term unattended operation with flammable and non-flammable fluids (FL). Additional safety through maximum and minimum set-point value.
Max. Temperature 200°C*.
Polystat 61, as Polystat cc1, however alternatively with or without overtemperature protection. The version without overtemperature protection is only allowed to be used with non-flammable liquids (NFL). Max. Temperature 100°C.

Polystat cc2 (62), as Polystat cc1 (61), however with program controller (5 steps), master control unit for external temperature control, 3 set-point temperatures and straightforward ramp feature. Max. temperature 200°C*.

Polystat cc3 (63), as Polystat cc2 (62), however with the entire range of features from the Compatible Control circulation baths: Program controller (50 steps can be divided into 10 programmes), RS232, RS 485 and analogue interfaces (4...20mA) for two-way communication. Connection for serial printer, Max. temperature 200°C*.

The **Polystat as an immersion temperature control unit** with a 2000 watt heater output which provides the features of an immersion circulation bath or a refrigerated circulation bath when combined with an immersion bath or a refrigerated bath. The pump permits temperature control of sealed equipment, e.g., photometers when used in conjunction with the pump adapter.
The **Polystat as a bath thermostat** (Heating thermostat). Maximum operating temperature see nameplate. For works at room temperature the cooling coil can be operated with water. With lower temperatures a seperate cooling is needed.

G.1 Application

Temperature range and safety classification.

Immersion Temperature Control Units	Min. Temp.	Max. Temp.	Safety Classification	
Polystat CC 1 (61)	-30°C	200°C (100°C)	FL (NFL)	S
Polystat CC 2 (62)	-30°C	200°C	FL	S
Polystat CC 3 (63)	-30°C	200°C	FL	S
Heated Temperature Control Units				
Polystat 201	-30°C	200°C	FL	S
Polystat 202	-30°C	200°C	FL	S
CC 302	-20°C	300°C	FL	D
CC 303	-20°C	300°C	FL	D
Heated/ Refrigerated Temperature Control Units				
Polystat K6	-25°C	150°C	FL	S
Polystat K12	-20°C	120°C	FL	S
Polystat K15	-20°C	200°C	FL	S
Polystat K20	-30°C	200°C	FL	S
Polystat K25	-30°C	200°C	FL	S
Intelligent Chiller (-H), Unichiller UC (-H)	see nameplate	40°C (80°C)	NFL (FL)	D

S = Float switch, D = Flow indicator

* The temperature range can be extended up to 300 °C in conjunction with a CC302, CC303.

	Min. Temp.	Max. Temp.
Polycarbonate baths A5 up to A18	-30°C	100°C
Stainless steel baths insulated with PUR housing E8, E12, E20	-30°C	120°C
Stainless steel baths insulated with stainless steel housing E15, E25	-30°C	200°C
Refrigerated baths: Polystat K6 Polystat K12 Polystat K15 Polystat K20 Polystat K25	 -25°C -20°C -20°C -30°C -30°C	 (80°C) / 150°C (50°C) / 120°C (50°C) / 200°C (50°C) / 200°C (50°C) / 200°C

(50°C) = Maximum working temperature with refrigeration unit switched on.

For polycarbonate and stainless steel vessels: A water-filled refrigeration coil is required to cool the fluid below its inherent temperature. An external mechanical refrigeration system is must be fitted where even lower fluid temperatures are required. There are basically two options for external refrigeration: 1st an immersion refrigeration unit with refrigeration unit sensor located directly temperature-controlled bath or 2nd a pipework refrigeration unit located at the pump adapter.

G.2 Preparation

Note the following information before commissioning

- Supply voltage and fusing - see name plate.
- Maximum working temperature - see tables in § G.1. In addition, observe the working temperatures of the heat transfer fluid (viscosity and flash-point).
- A immersion temperature control unit is fastened to the temperature control vessel using the clamping bolt (20). This can be adjusted according to the application. To do this, remove the three fastening bolts for the bolted clamp and fasten the bolted clamp in the desired position.
- Max. bath filling level = 15mm below the top edge of the bath
  Please note: Allow for an volumetric expansion of approx. 15% when heating the heat transfer oil from 20 °C up to 200 °C.
- Connect the external equipment to the pump adapter (accessory at present) or seal the equipment using the closure bolts. An SW19 open-ended spanner is required for the union nut - counterhold using an SW 17 open-ended spanner. Always counterhold when connecting or disconnecting the equipment!
- Connect the coolant water hose if the fluid temperature has to be regulated to a temperature below its inherent temperature. An immersion refrigeration unit can be used to achieve colder temperatures, e.g., HUBER TC40. An equivalent refrigeration effect can be achieved using a pipework refrigeration unit, e.g., HUBER DC30. This is connected to the pump adapter (15 + 16). The return line from the equipment is routed via the pipework refrigeration unit if external temperature control is used.

G.3 Commissioning

Check the level of the bath and all hose connections. Connect the mains power supply. Activate the temperature control unit using the mains power switch (2). *HELLO* will appear on the display (5) followed by the temperature control unit identification. Consult the following sections for information regarding operation of the controller.

G.4 Level alarm

The float switch (9) breaks the circuit before the fluid level falls below a level which is critical for the heater (12). The message *Float* will appear on the display (5) and the temperature control unit will deactivate. The *Float* message will is retained, even if the cause of the message is rectified (refilling with heat transfer liquid). See § 3.7.2 for information regarding cancelling the message or deactivate and then reactivate the temperature control unit.
Max. bath filling level = 15 mm below the top edge of the bath. Please note the interlock temperature of the volume.

G.5 Electrical thermostat within pump motor

If the pump motor overheats, the motor's internal electrical thermostat will trip out. This may result from excessive heat transfer fluid viscosity. A message will appear on the display.

With units with float switch the message *pump* appears: the thermostat switches off.

With units with flow indicator the message *float* appears: because of failure of the pump motor the pressure switch responsed.

The message will be retained even once the pump motor has cooled down. This can process take some time, depending on the bath temperature. See § 3.7.2 for information regarding cancelling the message or deactivate and then reactivate the temperature control unit.

G.6 Overtemperature protection device

If the bath temperature exceeds the value set for the overtemperature protection device, the *Temp* message will appear on the display and the temperature control unit will deactivate. The *Temp* message will be retained even once the bath has cooled down. This procedure can take some time, depending on the bath temperature. See § 3.7.2 for information regarding cancelling the message or deactivate and then reactivate the temperature control unit.

G.7 Heat transfer fluid

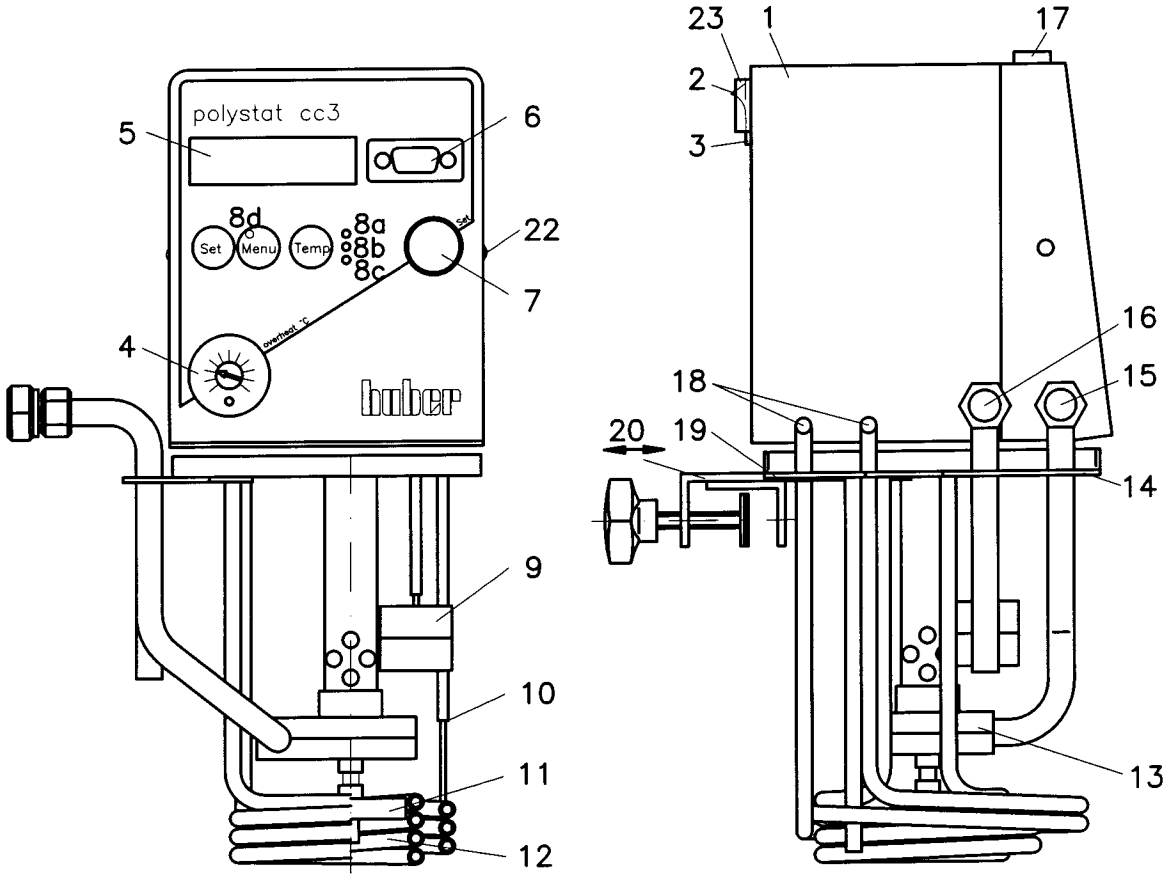
Ensure the heat transfer liquid used for temperature control is either water or one of the fluids specified in our price list.
If using water as a heat transfer fluid, ensure that the freezing point of water is accounted for.
Compare the minimum and maximum permissible temperatures for the heat transfer fluid against your desired range of working temperatures. The maximum working temperature should remain at least 5K below the flash-point of the heat transfer fluid. Please note that the viscosity of the heat transfer fluid increases as its temperature is reduced. With the minimum operating temperature the viscosity of the thermo fluid must not exceed 50 mm^2/s. The freezing point should stay 10-20K below the operating temperature.
Likewise, check the controller settings (set-point limits §3.4, alarm limits §3.7.3).

Use of the following fluids is not permitted:
- demineralised or destilled water
- mineral-enriched water or sea water
- CaCl2 salt solution
- thermoregulation fluids containing ether, ester and amine. These admixtures are in some sorts of glycol as these heat transfer fluids can damage the 1.4301 stainless steel construction material.

Please close the pump sockets with screw plugs, resp. with external application connect the tubes. The tube material must be suited to the requested operating temperature range. Verify pump sockets to density.

G.8 Unit Diagram

1 Hood
2 Mains power switch
3 Mains power connection
4 Overtemperature protection device
5 Display
6 Interface (only Polystat cc3 (63)
7 Adjuster
8a Power LED
8b Heating LED
8c External LED
8d Program LED
9 Float (level)
10 Control sensor
11 Stirrer
12 Heater
13 High-pressure pump
14 Fastening for 15-16
15 Pump adapter pressure connection 6 (accessories)
16 Pump adapter return connection (accessories)
17 Sensor bush
18 Cooling coil pipework connection (accessories)
19 Fastening for 18
20 Bolted clamp
21 Controller
22 Fastening screw
23 6pole connector



G.9 Type recognition

Device type recognition and sensor type recognition first featured on the Polystat. As a result, this permitted the use of parameters which are specific to the device and the controller. The currently defined devices and controllers are described in the following table. The TYPERror fault message is displayed if a controller with a unrecognised device type. The device table can be revised by updating the software. The *HELLO* display indicates that a device has been recognised.

G.9.1 Table of Device Types

Device	Display		Note
Polystat NFL	HELLO	P_100	Without overtemperature protection device, -30°C... +100°C
Polystat FL	HELLO	P_200	With overtemperature protection device, -30°C... +200°C
Polystat 300°C	HELLO	P_300	With overtemperature protection device, -30°C... +300°C
Intelligent Chiller Unichiller UC	HELLO	IC1....4	Without overtemperature protection device, -25°C... +40°C
IC...-H Unichiller UC...-H	HELLO	IC1-H...4-H	With overheating protection device, -25°C... +80°C

G.9.2 Table of Controller Types

Controller	Display	Note
Polystat CC1 (61)	Contr. 1/ Contr. 4	Set-point value limit / extended temperature range
Polystat CC2 (62)	Contr. 2	As Poly CC1 (61) plus external circuit temperature controller, 3 user temperatures, small programme controller, straightforward ramp procedure
Polystat CC3 (63)	Contr. 3	As Poly CC2 (62) but 10 user temperatures, larger program controller plus RS232 interface, RS485 interface, 4..20mA analogue interface

G.10 Operation of Refrigerated Baths K6, K12, K15, K20, K25

Water baths without approaching possibility of regulator : With these water bathes no 6-pole connector at the rear of the bath.

Connect the mains power supply using the heater unit plug on the back of the housing.
One of two temperature control unit operation modes can be selected.
- Cooling is not required or the operating temperature is higher than the maximum working temperature of the cooling machine:
Move the black rocker switch to the 0 position (located above the voltage supply unit on the back of the housing). Activate the temperature control unit using the mains power switch (2). The circulation pump and the temperature control unit are activated.
- Cooling is required:
The commissioning procedure is performed as described above, however the refrigeration unit is also activated using the black rocker switch on the back of the housing. Please note that the refrigeration unit can only be operated up to the maximum working temperature (see table §G1).
The refrigeration unit must be deactivated for bath temperatures above the maximum value using the black rocker switch on the back of the housing.
Please ensure that the bath temperature and the set-point value are indicated on the LED display once the Polystat is activated.

Water baths with approaching possibility of regulator : With these water bathes a 6-pole connector is at the rear of the bath.
Connect the data to the regulator. Use the delivered connection cable. Set up the power supply with the high temperature plug at the rear of the unit. Only change the rocker switch at the rear of the water bath to position 1 if the bath is working without data control. Then continue as described above. If not the rocker switch has to be in position 0.
You have the possibility to choose between two ways of operation of the thermostat.

- You do not need a cooling capacity or the operating temperature is higher than the maximum working temperature of the cooling machine.

Switch on the thermostat with the main switch (2).The circulation pump and the tempering

have started. Switch off the cooling machine with the compressor automation (see §3.11)

- You need cooling capacity and the operating temperature is lower than the maximum working temperature of the cooling machine:

For installation see above, however the automation of compressing can be switched to AUTO or ON (see §3.11) Please see that the operation of the cooling machine is possible only up to a maximum working temperature (see table §G1). With bath temperatures above the maximum working temperature the cooling machine has to be switched off through the compressor automation (see §3.11).

In case of simultaneous operation of cooling bath (compressor) and polystat (heating), the heating capacity has to be limited to a maximum of 75% in order not to exceed the maximum current absorption of 10A.

Therefore, the function *Heat* has been introduced in the function menu. With this function, the maximum heating capacity can be set on 25%, 50%, 75% or 100% (see §3.12).

⚠ If the heating capacity is not limited, the fuse integrated in the cooling bath's bush is activated. The bush is at the cooling bath's back.

G.10.1 Service, maintenance

Ensure there is an approx. 10 mm gap on both sides of the unit.
Clean condenser regularly. Remove the cover plate by releasing both of the fastening bolts and clean the condenser with compressed air.

G.10.2 Transport

The thermostats do have to be secured for transport, however the contents of the bath should be drained completely. The temperature control unit should not be tilted or placed on its side when transported.
Ensure the unit is well packaged and mark the packaging with the correct vertical transportation orientation.

1. Features of the set-key

The set key is for choosing the setpoint function and, in general, for confirming an input.

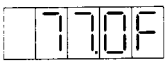
⚠ **Safety first!**

The set-point value limit should be adjusted when commissioning the unit and each time the temperature regulation liquid is replaced.
The set-point value limit is software-controlled and separate from the high-temperature and high-level safety devices whose activation does is not controlled by the control system electronics.
The setpoint limit is no overtemperature protection.
Limit the upper set-point value to 5K below the flash-point of the temperature regulation liquid (e.g., 25°C when ethanol is used).

Limit the lower set-point value according to the viscosity or freezing point of the temperature regulation liquid (e.g. 5°C with water).

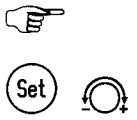
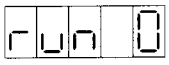
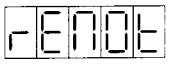
See section §3.4 for the relevant procedure.

1.1 Reading the set-point value

☞ Set	Press the set-key once, then release
	The adjusted set-point value is displayed in the units selected (°C/°F) and flashes. The adjusted set-point value applies to the internal temperature regulation liquid circuit or the external circuit temperature regulation liquid circuit depending on the setting for the type of control (§3.2)
	e.g.: 25.0° Centigrade or
	or 77.0 ° Fahrenheit After approx. 4 minutes the actual value is displayed.

ⓘ To view the actual value immediately - press the Set and Menu key simultaneously (escape function) or press the set-key.

1.2 Adjusting the set-point value

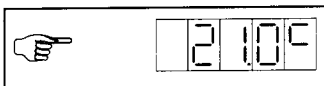
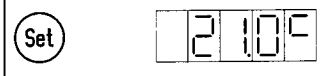
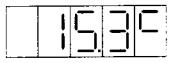
	Press the set-key once. The previously saved set-point is displayed flashing. Use the rotary knob to raise or lower the set-point value, as required. The set-point value will initially change in steps of 0.1 K up to the next full degree Centigrade and then in steps of 1 K. Press the set-key once to confirm the set-point value. If the set-point value is not confirmed within 4 minutes, the data entry mode will be terminated and the adjusted set-point value will not be saved.
	The set-point value cannot be adjusted and *An_In* is displayed. This indicates that the analogue interface is activated (see §3.13)
	The set-point value cannot be adjusted and run 0 is displayed. This indicates that program 0 is currently running and the program control unit is determining the set-point value (see §3.9).
	The set-point value cannot be adjusted and rEMOt for Remote is displayed. The digital interface is activated and the control unit is receiving its set-point value from the digital interface. (see §3.15).

⚠ If the adjusted set-point value (flashing display) is not confirmed within 4 minutes, or the escape-feature is not activated by pressing the Set and Menu key simultaneously, the data entry mode will be terminated and the adjusted set-point value will not be saved.

1.3 Displaying the second actual value

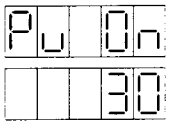
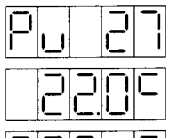
The current actual value is dependent on the control mode selected. Refer to §3.2 for the selection of the control mode.

With internal control, the bath temperature is the current actual value, the external Pt100 sensor measures the second actual value. With external control, it is the other way round, the external Pt100 sensor measures the current actual value, the bath temperature is the second actual value.

	The display shows the current actual value
	Press the Set key and keep pressed. The set point appears flashing.
	After 5 seconds, the display changes to the second actual value. The superscript C flashes.
	When the Set key is released, the current actual value appears again.

1.4 The ventilation function

With external applications, an alternating pump operation during the ventilation may be very beneficial. With the ventilation function, the ON and OFF periods of the pump may be input one after the other.

☞ Set & power on. 	Before connecting the power, press the Set key and keep pressed.
Set	*Pu On* appears on the display for the ON period.
	Use the rotary knob to set the desired ON period for the pump and confirm with the Set key. The ON period may be set within the range 3 - 90 seconds.
Set 	*PuOff* appears on the display for the OFF period. Use the rotary knob to set the desired OFF period for the pump and confirm with the Set key. The OFF period may be set within the range 3- 90 seconds.
 Set 	During the ON time, the display alternately shows the actual value and *PU xx*, with xx standing for the remaining ON time. The Power LED is off.
	During the OFF time, the display alternately shows the actual value and *Offxx*, with xx standing for the remaining OFF time.
Set	The Set key is used to terminate the ventilation function, the temperature control starts and the Power LED comes on.

2 Functions of the Menu key

After having pressed the menu key, you reach the function menu. In this menu you can leaf through the different functions using the rotary knob. According to the condition and equipment of the controller, you cannot always reach all the functions, e.i. not all the functions mentioned in §2.1 are displayed when leafing through. In §2.1 the different functions are described and the restrictions are listed.

2.1 The different menu functions

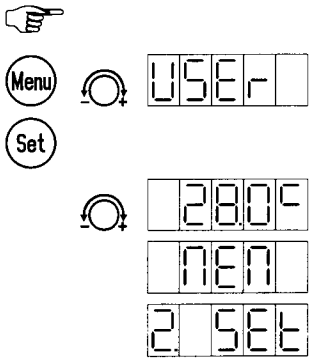
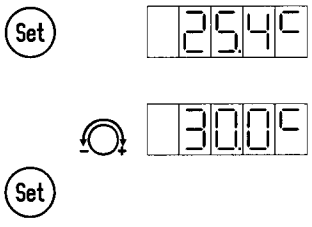
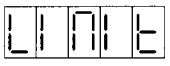
Display	Function	See	CC2(62)	CC3(63)	Remarks
USEr	Fix temperatures	§ 3.1	3	10	
Contr	Control mode	§ 3.2	I & E	I & E	Only in case of connected Pt100
dEG	Temperature unit	§ 3.3	C & F	C & F	
LIMIt	Setpoint limit	§ 3.4	x	x	Depends on the unit
SHIFt	Pt100-internal calibration	§ 3.5	x	x	Depends on the controller mode
OFSEt	Pt100-external calibration	§ 3.6	x	x	Depend on the controller mode
ALArM	Alarm functions	§ 3.7	x	x	
Mode	Alarm mode	§ 3.7.1	x	x	Depends on the unit's condition
CLEAr	Delete alarm	§ 3.7.2	x	x	Depends on the unit's condition
LO_AL	Alarm limits	§ 3.7.3	x	x	Depends on the unit
Print	Print functions	§ 3.8		x	

Display	Function	See	CC2(62)	CC3(63)	Remarks
dAtA	Manual print	§ 3.8.1		x	
Lo_Pr	Automatical print	§ 3.8.2		x	
bAUdS	Baud-rate, Software record	§ 3.8.3		x	
IdEnt	Unit-Identification	§ 3.8.4		x	
PrOG	Programmer function	§ 3.9	1 / 5	10/50	Programme(s)/ Programme steps
rAMP	Ramp function	§ 3.9.1	x	x	
StArt	Start programme	§ 3.9.2	x	x	
PAUSE	Interrupt programme	§ 3.9.3	x	x	
run	Continue programme	§ 3.9.4	x	x	
StoP	End programme	§ 3.9.5	x	x	
JUMP	Jumping a segment	§ 3.9.6	x	x	
Edit	Enter programme	§ 3.9.7	x	x	
StEP	Free programme steps	§ 3.9.8	x	x	
CLEAr	Delete programme	§ 3.9.9	x	x	
LiSt	Print programme store	§3.9.10		x	
rON	Software version	§ 3.10	x	x	
COMP	Automatic compressor control	§ 3.11	x	x	
HEAt	Set Max. Heating Capacity	§ 3.12	x	x	
An_In	Analogue input	§ 3.13		x	
AnOut	Analogue output	§ 3.14		x	
diGi	Digital Interface	§ 3.15		x	
CAL	Two-step calibration program	§ 3.16	x	x	
InIt	Factory-set parameters	§ 3.17	x	x	
bEEP	Acoustical signal release	§ 3.18	x	x	
P_UP	The automatic cutout	§ 3.19	x	x	
USEr	Set user level	§ 3.20	x	x	CC2 = 1 + 2, CC3 = 1...3
SAFE	Backup memory	§ 3.21	x	x	
LUSEr	Load user data	§ 3.21	x	x	
SUSEr	Save user data	§ 3.21	x	x	
L_CAL	Load calibration data	§ 3.21	x	x	
S_CAL	Save calibration data	§ 3.21	x	x	
rEtAL	Load factory-set calibration	§ 3.21	x	x	
quit	Exit backup memory	§ 3.21	x	x	
quit	Leaving the setup menu	§3.22	x	x	

3 Description of the Menu Functions

3.1 USEr Reading or setting temperature set-point values / Setting the 2nd set-point value

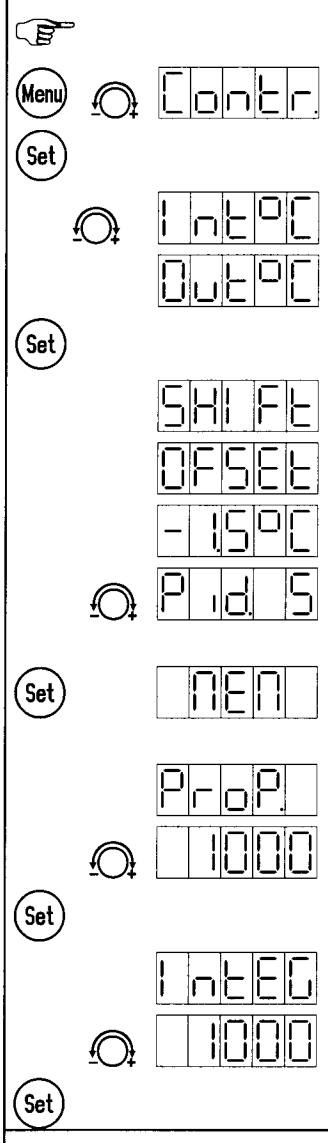
10 frequently used set-point values can be saved as temperature set-points in a table. A new set-point temperature can be stored in the memory while MEM is displayed.
Entering more than 3/10 set-point values will erase the value first saved.
The temperature set-point values are used for calling up a set-point quickly and can, for example, be used for performing manual programming operations.

	Press the Menu key Turn the rotary knob until *User* is displayed. Press the set key in order to select the functions.
	Page through the temperature set-point values using the rotary knob. If Mem (memory) is displayed, a new temperature set-point value can be saved. If no temperature set-point value has been saved, only *Mem* (memory) and *2. Set* (second set-point value) is displayed.
	If the set-key is depressed, the currently displayed temperature set-point value is assumed as the current set-point value. Confirmation of the display Mem (using the set-key) permits a new temperature set-point value to be entered. The current actual value will be assumed as the set-point value. The new temperature set-point value can now be adjusted using the rotary knob. Depressing the set-key registers the adjusted temperature set-point value as the set-point value and saves it in the table along with the other temperature set-point values. Confirmation of the display *2. Set* permits the 2nd set-point value to be entered instead of the user temperature. The 2nd set-point value is for error-processing at the analog input (see §3.1.3) and for the watchdog function of the serial interface (see §6.2.1.4).
	If Limit is displayed, the temperature set-point value entered is outside the permissible set-point value range (see §3.4). The entered temperature set-point value will be saved, however the set-point value will be restricted to the set-point value limit.

⚠ The data input mode can be terminated at any time by using the escape feature (depress both the Set and Menu key simultaneously).
The adjusted temperature set-point value will not saved and the set-point value will not be altered.

3.2 Contr. Activating internal or external circuit control modes

An external circuit Pt100 sensor can be connected to the 4-pole NAMUR jack. The external circuit control mode must be activated during this operation.
The external circuit LED indicates that external circuit control is active.
For the Polystat cc-Controllers the activated external circuit control mode is indicated by the external circuit LED illuminating.

	**External circuit Pt100 sensor is connected** Press the menu key. Turn the rotary knob until *Contr.* appears. Select the functions via the set key. The controller mode is displayed. *Int°C/Int°F* indicates internal circuit temperature control. *Out°C/Out°F* indicates external circuit temperature control. Select the desired control mode using the rotary knob. Press the set-key to confirm the settings. The confirmed control mode will be immediately saved. Afterwards, *Shift* resp. *Offset* is displayed (for setting the *Shift* see §3.5, *Offset* see §3.6 The selected parameter setting is subsequently displayed. Select a pre-defined parameter set (PID0..PID8) using the enconder. If the parameter setting PID 9 is selected, the freely programmable parameters are taken over. If *Mem* is selected, the parameters for PID 9 (proportional band and integral time parameters) can be set using the Set key. After *Mem*, *Prop* for proportional coefficient will appear on the display. Now set the proportional coefficient using the rotary knob. Confirm the settings by pressing the set-key. *Integ* for integral coefficient will appear on the display. Now set the integral coefficient using the enconder. Confirm using the set-key.
	External circuit Pt100 sensor is not connected If no external sensor is connected, *Int* and *Out* are not displayed, *Shift* is immediately displayed.

The data entry mode can be terminated using the escape-feature (press Set and Menu keys simultaneously). The control mode is saved once it is confirmed. The parameter settings are only saved once they have been entered correctly. If the escape-feature is used before saving the changes, the previous settings are retained.

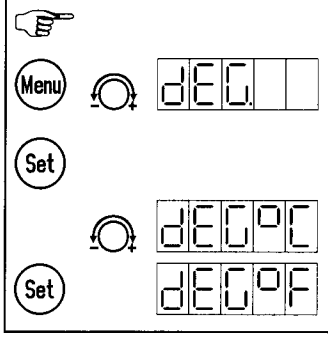
Predefined parameters for external circuit control mode:

Pid.	0	1	2	3	4	5	6	7	8	9
Prop.	75	150	300	600	1500	3000	150	300	600	50...30000
Integr.	35	75	150	300	750	1500	50	100	200	0...30000

Predefined parameters for internal circuit control mode:

Pid.	0	1	2	3	4	5	6	7	8	9
Prop.	5000	3000	10000	5000	200	200	500	3000	5000	50...30000
Integr.	1000	1000	1000	500	200	0	0	0	0	0...30000

3.3 dEG. Setting the temperature-unit to Celsius or Fahrenheit



Press the menu key.
Turn the rotary knob until *Deg.* is displayed.
Select the function with the Set key.

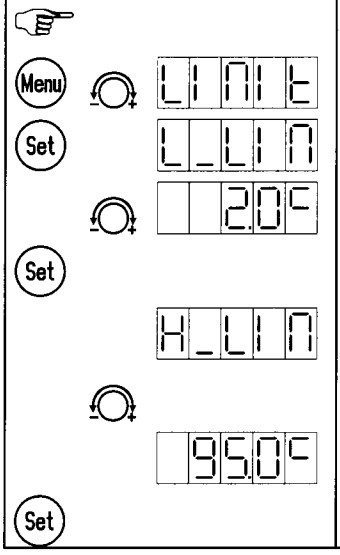
Switch over between *Deg °C* and *Deg °F* using the rotary knob.
Confirm the temperature measurement unit setting using the set-key.
The current actual value will then be displayed in the selected temperature measurement unit.

⚠ The data entry mode can be terminated at any time using the escape-feature (press Set and Menu keys simultaneously). The temperature measurement unit setting is not saved.

3.4 LIMIt Setting set-point value limits

ⓘ Set the maximum set-point value to at least 5 K below the flash-point or boiling point (water). Set the minimum set-point value to at least 3 K above the freezing point of the temperature regulation liquid and taking account of its viscosity.
Generally, increased viscosity results in reduced heat transfer rate and thereby reduced system efficiency.

⚠ The upper and lower limits of the set-point value should be redefined each time the temperature regulation liquid is replaced in order to ensure operation within a suitable temperature range and also accounting for the flash-point and viscosity. If flammable liquids are used (e.g., alcohol), the upper limit must be 5K below the flash-point.



Press the Menu key. Turn the rotary knob until *Limit* is displayed. Once the set key is pressed *L-Lim* will be initially displayed. The lower set-point value limit can now be adjusted using the rotary knob.

Example: The lower limit is 2°C

Confirm the temperature setting using the set-key.

H-Lim is displayed. The upper set-point value limit can now be adjusted using the arrow-keys.

Example: The upper set-point value limit is 95°C.
Once the settings are confirmed using the set-key, the values will be saved and the actual value will be displayed.

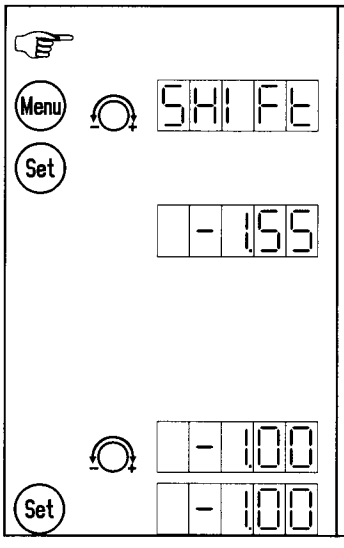
The set-point value limit affects both the internal circuit temperature control unit and the external circuit temperature control unit when using the external circuit control mode (see §3.2). This implies that the predefined set-point value output from the external circuit control unit to the internal circuit control unit is compared against the set-point limit value and reset if necessary. Consequently, the internal circuit bath temperature is never below the low-limit value and never exceeds the high-limit value.
The set-point value limit likewise affects the set-point of the program controller and therefore limits the bath temperature.

⚠ The data entry mode can be terminated at any time by using the escape-feature (press the set and menu keys simultaneously). The confirmed entries are saved and the unconfirmed entries are discarded.

3.5 SHIFt Pt100 internal Offset (Shift) circuit calibration program

ⓘ This program only starts when the internal circuit control mode is activated (see §3.2).

The internal circuit Pt100 sensor can be calibrated using the keyboard thus permitting calibration of the microprocessor control unit and the circulator bath for conformance with ISO 9000 ff. or for quality assurance requirements. The internal circuit sensor is calibrated at any point within the temperature range of the device. The Shift calibration can be adjusted a maximum of +/-5K.



The internal circuit control mode is activated.

Press the menu key, turn the rotary knob until *Shift* is displayed. Call up the Shift program using the set key.

The current Shift is displayed, e.g., *-1.55K*

The Shift is added to the temperature value. E.i. the indicated temperature rises in case of a positive shift and goes down in case of a negative shift.

Use the rotary knob keys to adjust the Shift. Confirm the entry using the set-key.
Finally, the shift setting is displayed for 2 seconds.

⚠ At any time you can terminate the message with the help of the escape feature (press set and manu keys simultaneously) without memorizing the set value.

3.6 OfSEt Pt100 offset calibration

This program only starts when the external circuit control mode is activated (see §3.2).

The external circuit Pt100 sensor can be calibrated using the keyboard thus permitting calibration of the microprocessor control unit and the circulator bath for conformance with ISO 9000 ff. or for quality assurance requirements. The external circuit sensor is calibrated at any point within the temperature range of the device. The Offset calibration can be adjusted a maximum of +/-5K.

	The external circuit control mode is activated, an external Pt100 is connected.
Menu, OFSEt, Set	Press the menu key, turn the rotary knob until *Ofset* is displayed. Call up the Offset program using the set key.
-1.55	The current Offset is displayed, e.g., *-1.55K*
	The Offset is added to the temperature value. E.i. the indicated temperature rises in case of a positive shift and goes down in case of a negative shift.
-1.00	Use the rotary knob keys to adjust the Offset. Confirm the entry using the set-key.
Set, -1.00	Finally, the offset setting is displayed for 2 seconds.

At any time you can terminate the message with the help of the escape feature (press set and manu keys simultaneously) without memorizing the set value.

3.7 ALArM Alarm functions

A summation check is performed on the control unit every time the mains power is switched on. The unit's functions are continuously monitored during operation.
The microprocessor's alarm mode can indicate various malfunctions or when values exceed the user's predefined tolerance ranges.

The circulator bath trips out automatically if:
- there is an electronic malfunction (immediately)
- overtemperature protection device has been activated (immediately) - see operating instructions for equipment
- the level in the bath is too low (after 3 seconds) - see operating instructions for bath- and circulation circulator baths
- the alarm mode *Stop* is activated and the temperature has fallen below the lower alarm limit within the predefined time (see §3.7.1)
- the alarm mode *Stop* is activated and the temperature has exceeded the upper alarm limit within the predefined time (see §3.7.1)
- a fatal error has occurred (immediately)

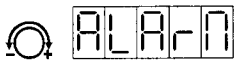
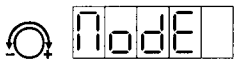
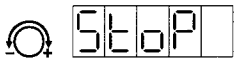
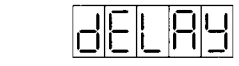
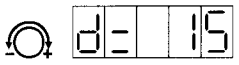
Alarm messages see §5 Alarm Messages of the Polystat-Controller

3.7.1 ModE Setting the alarm mode

⚠ The alarm mode can only be activated if the device if the unit is not in an alarm status. If the unit is in an alarm status, the alarm reset feature is automatically activated (see §3.7.2). The alarm mode is set for conditions which are above and below alarm threshold values. (see §3.7.3)

Status - no alarm:

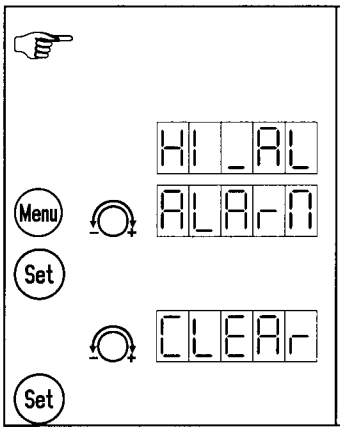
If the actual temperature is above the lower alarm limit and below the upper alarm limit and no other features are malfunctioning, the unit will not have an alarm status.
The potential-free contact remains active as long as the unit does not have an alarm status. The contact open-circuits if power supply is interrupted. The relay contact rating is 30V / 100mA.

☞	Alarm should deactivate the unit after a predefined interval.
Menu 	Press the menu key and turn the rotary knob until *Alarm* is displayed.
Set 	Confirm with set key. Adjust *Mode* (at the display) with the rotary knob and confirm with set key.
Set 	Select the *Stop* mode using the rotary knob and confirm the setting using the set-key. The unit will now be deactivated when an alarm is activated.
Set 	When *Delay* appears, set the time-out interval using the rotary knob.
	The time-out interval can be set between 15 seconds and 60 seconds. The display *D = 15* denotes a time-out interval of 15 seconds following activation of the alarm status. Confirm the setting using the set-key.
Set	
☞	Alarm should not deactivate the device.
	Using the rotary knob, select *Run* mode instead of *Stop* mode and confirm using the set-key. Alarm condition displays a message but does not deactivate the device
Set	

3.7.2 CLEAr Delete alarm messages

Status - alarm:

If the actual temperature is below the lower alarm limit or above the upper alarm limit, the unit will have an alarm status - even if all other features are in order. The potential-free contact will open circuit and an alarm will be issued.



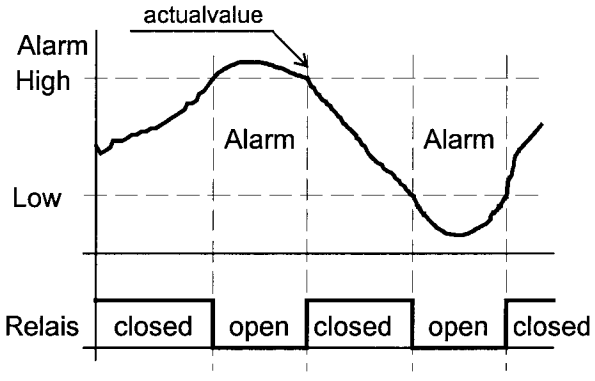
If the cause of the alarm signal, which lead to the deactivation of the unit, is rectified the alarm signal can be cancelled without deactivating the unit.
An alarm signal will be displayed, e.g., *HI_AL* for High-Alarm. The temperature has dropped in the meantime.
Press the menu key. Turn the rotary knob until *Alarm* is displayed. Confirm the alarm using the set key.

Set the display *Clear* with the rotary knob. Confirm the message with the set key, the unit will be restarted.

3.7.3 LO-AL Setting the upper and lower alarm limits

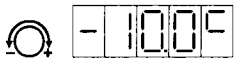
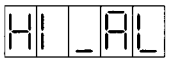
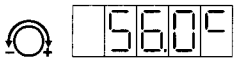
The upper/lower alarm response can be set to either deactivate the unit or continue operation.
This setting is independent of the mechanical overtemperature protection device which operates as specified in DIN 12879.

The potential-free contact is connected at the MFB jack (§7.2). This is a „normally open„ contact which is activated (switch is made) when the mains power supply is switched on and which is deactivated (switch is broken) when the mains power supply is switched off and in the event of an alarm.



The LOW LEVEL ALARM must always be lower than the HIGH LEVEL ALARM. If this is not so, the control unit will interchange the two alarm values.

The difference between the LOW LEVEL ALARM and the HIGH LEVEL ALARM must be at least 1K. If the settings do not comply with this requirement, the control unit will reset the HIGH LEVEL ALARM to a value 1K above the LOW LEVEL ALARM.

Menu 	First press the menu key and then turn the rotary knob until *Alarm* will be displayed. Confirm the settings using the set key.
Set	
	Turn the rotary knob until *LO_AL* is displayed, meaning LOW ALARM.
Set 	The set key activates the lower alarm limit. Set the lower alarm limit using the rotary knob. Confirm the settings using the set-key.
Set	
	*Hi-AL* will be displayed, meaning HIGH ALARM.
	The rotary knob activates the upper alarm limit. Set the above alarm limit using the rotary knob. Confirm the settings using the set-key.
Set	

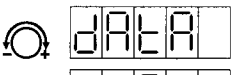
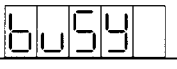
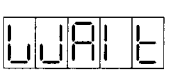
⚠ The escape feature is available at any time to exit the data entry mode (depress set and menu keys simultaneously). Unconfirmed entries are then not saved.

3.8 Print Functions

When printing the first time, or if a page is full complete, a header is printed. The unit, date, test-name or user's name can be entered in this header. The page numbers from 1 to 250 are also printed. After page 250, the numbering restarts with page 1.
In the subsequent lines, the unit identification number (see §3.8.4), the actual value, the set-point and if necessary a comment (error or alarm) and the time since the last print-out (in seconds) are printed. No time is indicated when printing manually.

3.8.1 dAtA Manual print-out

i The print-key feature can only be activated if the unit is operated using a software protocol printer or file. For the setting of the software record see §3.8.3.

Menu 	Press the menu key. Turn the rotary knob until *Print* is displayed.
Set 	Confirm with set key. Set the display *Data* with the rotary knob. Start the printing process via the set key.
Set 	*Busy* is displayed during the printing procedure.
	The *Wait* message is displayed if the digital interface is occupied with performing other control operations. Repeat the data entry at a later time.

i The printing format can be programmed. The data can be transferred either directly to a printer or via PC to a spreadsheet program such as MS-EXCEL. (see §3.8.3).

3.8.2 LO-Pr Automatic print-out

Printing can be performed manually or an automatic printing interval can be set. The latter offers the advantage of supplying the user circulator bath readings at predefined intervals in the form of verifiable documentation.
The printing interval can be set at 5 - 7200 seconds ... or OFF.

3 types of printing interval can be set:
- an interval for if the lower alarm limit is passed
- an interval for if the upper alarm interval is passed
- an interval for if there is no alarm status.

Example:
- lower alarm limit = 15.00°C
- upper alarm limit = 55.30°C

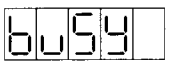
- Printing interval 1 (every 5 seconds) if the actual temperature is < = 15.0°C,
- Printing interval 2 (every 3600 seconds) if there is no alarm status
- Printing interval 3 (every 20 seconds) if the actual temperature is > = 55.3°C

A print-out is performed every hour if there is no alarm status, every 5 seconds if the lower alarm limit activated and every 20 seconds if the upper alarm limit is activated.

Automatic printing

Menu, Set	Press the menu key. Turn the rotary knob until *Print* is displayed. Confirm with set key.
	Turn the rotary knob until *Lo_Pr* is displayed, indicating Low_Print. The printing interval *Lo_Pr* is activated if the actual temperature is less than or equal to the lower alarm limit.
Set	Confirm the setting using the set key. The current *Lo_Pr* is displayed and can be changed using the rotary knob. Deactivate the printing interval using the *L_Off* feature. The current *Lo_Pr* value must be confirmed using the set-key.
Set	
	Mi_Pr, indicating Middle_Print, is displayed. The printing interval *Mi_Pr* is activated if the actual temperature is higher than the lower alarm limit and lower than the upper alarm limit.
	Confirm the setting using an arrow-key. The current *Mi_Pr* value is displayed and can be changed using the rotary knob. The printing interval is deactivated using the *M_OFF* feature. The current *Mi_Pr* value must be confirmed using the set-key.
Set	
	Hi_Pr, indicating High_Print, is displayed. The printing interval *Hi_Pr* is activated if the actual temperature is greater than or equal to the upper alarm limit.
	The current *Hi_Pr* value is displayed and can be changed using the rotary knob. The printing interval is deactivated using the *H_Off* feature. The current *Hi_Pr* value must be confirmed using the set-key.
Set	

⚠ The data entry mode can be terminated at any time by using the escape feature (press set and menu keys simultaneously). Any unconfirmed inputs will not be saved.
The printing intervals depend on the upper and lower alarm limit values.
The upper and lower alarm limit values can be set in the function menu (see §3.7.3).
The printing interval settings are retained even if the device is switched off.
If the printing interval is set to OFF there will be no print-out.

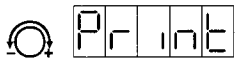
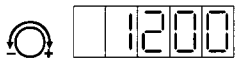
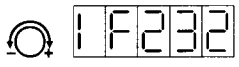
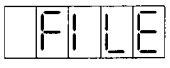
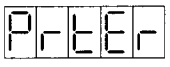
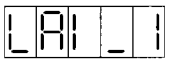
	If a printing interval setting has been exceeded, the current temperatures and the fault status will be transmitted via the digital interface. *Busy* will be displayed..

3.8.3 bAUdS Set baud rate and software record

ⓘ The baud rate can be set to 1200, 2400, 4800 or 9600.
The parameter settings are fixed, such as: Start (1 Bit), Data (8 Bits), Parity (none), Stop (1 Bit). All data is transmitted in ASCII format.

The software protocol for the data is programmed once the baud rate has been set,.
ASCII data can be formatted for use with EXCEL, printers or Huber IF232 equipment.

EXCEL format is compatible with most spreadsheets applications.
Files in Printer format are provided for printers with serial interfaces:
Data in Huber IF232 is compatible with IF232 PC program controller software.

☞ Menu 	Press menu key. Turn the rotary knob until *Print* is displayed. Confirm with set key.
Set 	Set the display *Bauds* with the rotary knob. Confirm with set key.
Set 	The current baud rate is displayed and can be changed using the rotary knob. The value displayed is confirmed using the rotary knob.
Set 	The following displays appear: *IF232* for Huber IF232, not for PC-control
	*FiLE* for EXCEL file, or PC-control
	*Pnter* for Printer. *LAI-1* for laboratory applications Select the protocol using the rotary knob:
Set 	Confirm the protocol using the set-key

⚠ The data entry mode can be terminated at any time by using the escape feature (press set and manu keys simultaneously). Any unconfirmed entries will not be saved.

3.8.4 IdEnt Setting the device ID number

The circulator bath can be assigned an ID number between 0 and 99 using the keyboard. The ID number will then be included in the print-out.

Menu	Press the menu key. Turn the rotary knob until *Print* is displayed.
Set	Confirm with set key.
	Turn the rotary knob until the message *Ident* appears.
Set	Confirm with set key.
	The current value is displayed, e.g. *ID = 3*.
Set	Use the rotary knob to change the value.
	Confirm the value using the set-key.

The data entry mode can be terminated at any time by using the escape feature, (press set and manu keys simultaneously). Any unconfirmed entries will not be saved.

3.9 ProG Programmer function

General Information

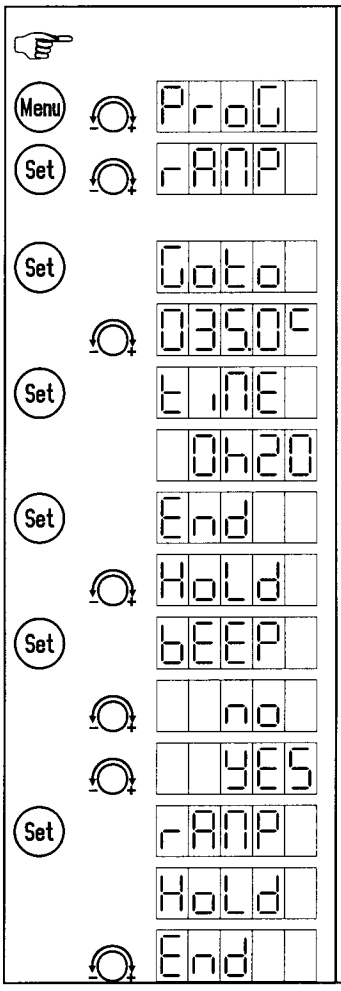
The inbuilt programmer may be used to program temperature profiles and then to run them using a temperature priority. The set value cannot be changed during a program run.
The MasterClear function (see §A1.3.3) may be used to terminate a running temperature control program.

From software version 3.04, it is possible to activate the acoustic sounder at the end of the temperature control program or ramp. It is switched back off by turning the rotary knob.

3.9.1 rAMP Ramp function

Information on the ramp function
This ramp function may be used to quickly and easily program a ramp from the current bath temperature to a new temperature. The behaviour in connection to the ramp may also be programmed. The new bath temperature, the time in which this temperature is to be reached and the final mode should be entered one after the other.

At the end of the ramp, the thermostats set the temperature to the final ramp value. The sensor issues a sound depending upon the programming. By turning the rotary knob one terminates the ramp and switches the sensor off. On *End,* when the ramp has ended, the thermostat sets the temperature back to the set value which was set before the ramp. On *Hold* the thermostat sets the temperature to the final ramp value after the end of the ramp.



Press the menu key. Turn the rotary knob until *Prog* is displayed.
Confirm with set key.
Turn the rotary knob until *Ramp* is displayed.
Confirm with set key.

Goto is displayed.
Set the new bath temperature with the rotary knob. e.g. *35.0°C*

Confirm with set key.
Time is displayed.
Set the time in which the new bath temperature should be reached with the rotary knob, e.g. *0h20* .

Now, use the rotary knob to select the final mode *End* or *Hold* and confirm with the Set key.

Beep appears on the display.

Use the rotary knob to set *Yes* for sensor at the ramp end ON or *no* for sensor at ramp end OFF and confirm with the Set key.

The Prog. LED comes on, the programmed ramp is executed. The current actual value and *Ramp* appear one after the other on the display. When the new bath temperature is reached it is retained. Now, the current actual value and *Hold* or *End*, depending upon the preselected final mode, appear one after the other on the display. The ramp is terminated by turning the rotary knob.

3.9.2 StArt Start Programe

General information:

A programme consists of:
- a programme number
- a start temperature
- one or more temperature ramps
- a final temperature
- acoustic signal ON or OFF (from V3.04).

Program controller features:

- 50 programme steps can be distributed as required over 10 programs for the polystat cc3 controller
- 5 programme steps for 1 programme for the polystat cc2 controller
- Choice between Hold/End/Cycle modes
- Reading or changing an existing program
- Deleting programs or program steps
- Interrupting and restarting a program

The set-point value calculated by the program controller is compared against the set-point limit and if necessary restricted to the set-point limit value. As a result the actual temperature profile can deviate from the programmed temperature profile. The set-point limit values should be checked before starting a program (see §3.4)
As exceeding the alarm temperatures can lead to deactivation of the circulator baths, it is advisable to check the alarm temperatures and the alarm mode before starting a program (see §3.7.1 and §3.7.3).
Hold-mode indicates that the set-point for the last segment will be retained after the last segment time has expired until the program is terminated (see 3.9.5).
End-mode indicates that once a program has been executed the set-point value set prior to starting the program will be retained. *End* is displayed, the Prog-LED is extinguished. The *End* message must be terminated in the function menu (see §3.9.5).

If a programme with two or more cycles is programmed or started, the number of remaining cycles appears alternately with the display of programme- and step number from the second cycle on.
During the run of a programme or ramp, it is not possible to write, to edit or to cancel another programme. In case of a ramp programme, the message *run-r* is shown, in case of a temperatur programme the message. *run-0* is displayed. The figure indicates the number of the activated programme.

From software version 3.04, it is possible to activate the acoustic sounder at the end of the temperature control program. For this, *Beep* is displayed after the final mode *Hold* or *End*. Use the rotary knob to choose *Yes* for sounder at program end ON or *no* for sensor at program end OFF and confirm with the Set key. If the sounder is activated, it comes on automatically at the program end. If there are several cycles, this is after the last cycle. It is switched off again by turning the rotary knob.

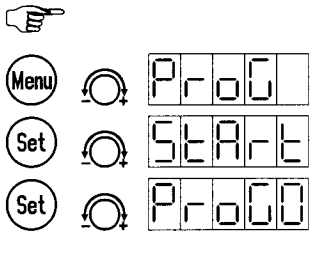
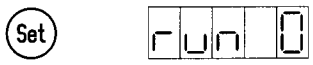
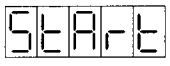
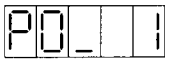
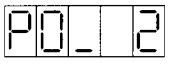
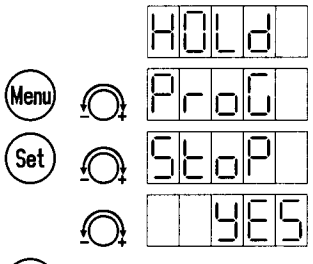
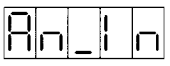
Default program:

The compatible control system is supplied with a default program which is saved as Program 0. This program can be overwritten to implement any desired changes.

The program specifies a temperature increase (a ramp) of 20°C to 30°C in a period of 12 minutes. Once the program is completed, the final temperature of 30°C is retained as the set-point (hold-mode).

3.9.2.1 Start Default program 0:

⚠ All other programs must be deactivated. The program LED (see § G8) will be extinguished. See§3.9.3 or §3.9.4.
The analogue input is deactivated (see §3.13).
A program number must be entered (see §3.9.7).

	Press the menu key. Turn the rotary knob until *Prog* appears. Confirm with set key. Turn the rotary knob until *Start* is displayed. Confirm with set key. Select the required programme with the rotary knob, e.g. *0*. (For the polystat cc2 controller only programme 0 is indicated)
	The *Run 0* message will be displayed, the program will be started and the prog-LED will illuminate.
	*Start* will flash on the display until the actual temperature corresponds to the start temperature. The tolerance for activation of the program is +- 1K The ramping procedure will start when the actual temperature equals 20°C ±1K.
	The *P0_1* message will be displayed - thus indicating Program 0 and Step 1. This message will be displayed for 1 second followed by the actual temperature for 4 seconds.
	When the temperature reaches 25°C after 10 minutes the *P0_2* message will be displayed, indicating Program 0, Step 2.
	If the hold-mode has been programmed, the *Hold* message will be displayed. The set-point temperature will remain at 25°C. After selection of *Prog* in the function menu, *Stop* will be displayed. Confirm this display with the set key. Select *Yes* using the rotary knob and confirm using the set-key. The controller regulates on the set-point set before the programme start.
	Instead of *Start, An_In* is displayed. The analogue Interface is switched on (see §3.13).
	Instead of *Start, Empty* is displayed. The memory does not contain any executable programs. A program number must be entered before starting a program (see §3.9.7).

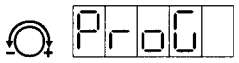
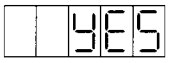
⚠ When a program is active, the set-point cannot be changed, no set-point temperature can be defined and the activated program can neither be read nor written nor changed. However, you can:
- read the set-point calculated by the program (set-key)
- set a pause in the program or clear it completely

3.9.3 PAUSE Interrupt Programme

Pausing the program is useful for analysing certain faults, process monitoring or performing necessary changes to the peripheral devices.

Examples:
- breakage of a connecting hose
- replacing temperature regulation fluid
- definition of a fixed temperature.

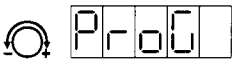
2 steps must be performed to activate the pause feature. This is a precaution, designed to prevent unintentional activation of the pause feature. The program cannot be paused if it is in its start-up phase, only terminated (see §3.9.5).

Menu 	Press the menu key. Turn the rotary knob until *Prog* is displayed. Confirm with set key.
	Turn the rotary knob until the message *Pause* is displayed.
Set 	**Security step 1:** This message must be confirmed within 4 minutes using the set key, otherwise the actual temperature will be displayed again. **Security step 2:** *Yes* will appear on the display following this confirmation. This display must be confirmed using the set-key, in order to activate the pause feature. The Pause message will be displayed for 1s, and then the actual temperature will be displayed for 4s. The prog-LED will flash. The control unit will regulate to the last calculated program set-point, until the pause feature is deactivated again (see §3.9.4).

⚠ The data entry mode can be terminated at any time by using the escape feature (press the set and menu keys simultaneously). The program then remains activated.

3.9.4 run Continue Programme

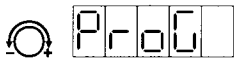
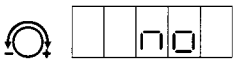
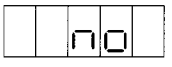
When the pause feature is deactivated the program restarts at the point at which it was interrupted.

Menu 	The running programme is interrupted, the LED flashes. Press the Menu key. Turn the rotary knob unil *Prog* is displayed. Confirm with Set key.
Set 	Turn the rotary knob until the message *Run 0* is displayed (programme 0). Confirm the setting using the set-key. The prog-LED illuminates continuously.

⚠ An interrupted program can be resumed by deactivating the pause feature. A program can be terminated using the stop feature.

3.9.5 Stop programme

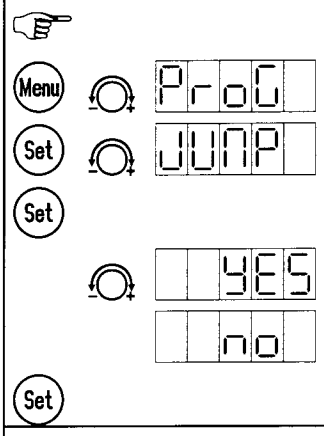
The program must be active. It is not possible to quit the program while the pause feature is activated.
4 security steps must be performed to stop a program. This precaution prevents a program being terminated unintentionally. If the program is in its starting phase or hold mode, the *Stop* message will be displayed immediately, without first displaying the *Pause* message.

Menu 	Press the Menu key. Turn the rotary knob until *Prog* is displayed. Confirm with Set key.
	Turn the rotary knob until the message *Pause* is displayed.
Set	**Security step 1:** This message must be confirmed within 4 minutes using the set-key, otherwise the actual temperature will be displayed again.
	The *Yes* option will be suggested.
	**Security step 2:** Select the *No* option using the rotary knob. Confirm this setting using the set-key. If this does not occur within 4min, the entry will be automatically terminated and the program remains activated.
	The *Stop* message is displayed.
	**Security step 3:** This message must be confirmed within 4 minutes using the rotary knob otherwise the actual temperature will be displayed again.
	The *No* option is displayed.
	**Security step 4:** Select the *Yes* option using the rotary knob. Confirm this setting using the set-key. If this does not occur within 4 minutes, the entry will be automatically terminated and the program will remain activated. The program is terminated when the setting is confirmed. The prog-LED is extinguished.
Set	

The data entry mode can be terminated at any time by using the escape feature (press Set and Menu keys simultaneously). The program will remain activated.

3.9.6 Jumping a segment

If very long pauses are programmed in a temperature control program, it may be useful to terminate the segment prematurely. This may optimise the processing time.
This is possible using to the following function. This function may also be used to jump the starting temperature. The temperature control program then processes the first segment immediately.

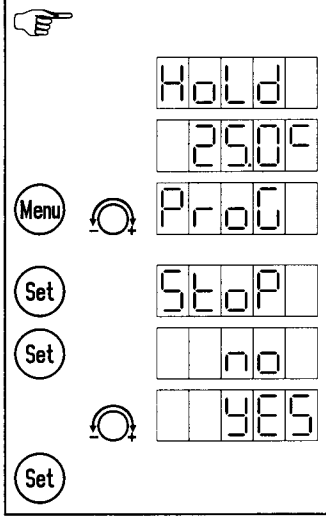
	Press the menu key. Turn the rotary knob until *Prog* is displayed. Confirm with set key. Turn the rotary knob until *Jump* appears on the display. Use the set key to call up the function. If the option *Yes* is selected, the program moves to the next segment. If no jump is to be performed, select the option *no*. Confirm the option confirm with the Set key.
	If after confirmation with the Set key, *bath* appears on the display, the function was called up at a time at which a jump was not allowed. For example, this is the case with the last program segment or if no program is activated.

If the option set (flashing display) is not confirmed within 4 minutes or the break function is called up by simultaneously pressing the Set and the Menu key, the entry is terminated without performing the jump.

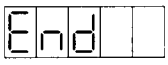
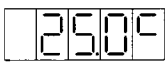
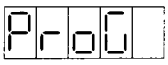
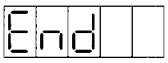
3.9.7 Terminating programms

The display of the regulator after working with the programme changes depending on the programmes end mode.

Hold-Mode:

	After working with the last programm segment the display shows *Hold* or the actual temperature at the display. The Prog LED stays illuminated. To terminate the programme press Prog-button once and turn the button to menu Prog. Confirm with Set-key. Display showing *Stop* press Set-key again and choose option *YES* with Set-key. The Prog LED extinguishes and the regulator regulates to the set value that was valid before starting of programme

End-Mode:

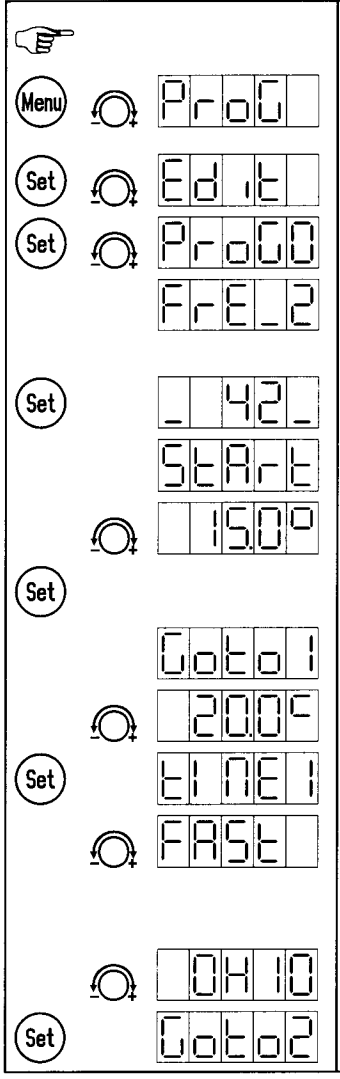
  	After working with the last segments of the programme the display shows *End* or the actual temperature on the display. The Prog LED has extinguished, the regulator regulates to the set value that was valid before starting of the programme.
  	To delete the End-display, press menu and turn the button to menu *Prog*.
	Confirm with Set-key.
 	Turn button to option *End* and confirm with Set-key. The display *End* no longer appears.
	

3.9.8 Edit Enter Programme

If working with a polystat cc3, up to 10 programs can be stored in the memory (0 to 9).
If working with a polystat cc2 only 1 program (*Prog 0*) can be stored in the memory.
The data entry time-out feature is deactivated while the program controller is being programmed. The data entry procedure is not time limited. Existing programs are displayed as *Prog* + Number, e.g., *Prog 0*.
Unassigned program numbers are displayed as *Free* + number, e.g., Fre_1.
The programming procedure can only be performed if no programs are activated.

The default program 0 should be as follows:
from 15°C to 20°C in 10 minutes,
from 20°C to 10°C in 21 minutes,
The end-mode should be activated after 3 cycles.

The *Full* message will be displayed and the write program will be terminated if there are no further program steps available (see also §3.9.8).



Press the Menu-key. Turn the rotary knob until *Prog* is displayed. Confirm with Set-key.

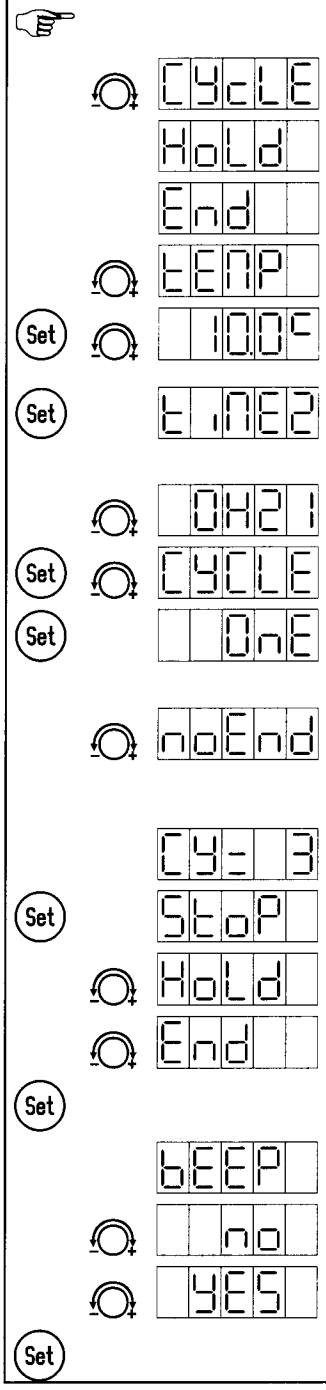
Turn the rotary knob until *Edit* is displayed. Confirm with Set-key.

Turn the rotary knob until the desired program number is displayed, e.g., *Prog0* for an assigned program number or, e.g., *Fre_2* for a vacant program number. Confirm the entry using the set-key.

The number of free program steps is displayed for approx. 2 seconds, e.g. 42.
The *Start* message is displayed.
Set the start temperature using the rotary knob, e.g. 15.0°C. Confirm the setting using the set-key.
If a program is recorded for the first time, the actual and start temperatures are set to the same value.

The *Goto1* message is displayed after approx. 2 seconds, indicating the first set-point in the first program step.
Set 20°C using the rotary knob and confirm the setting using the set-key. The *Time1* message is displayed, indicating the ramping interval in the first program step.
Turn the rotary knob. The display will indicate either *Fast* - representing maximum speed or will indicate HH MM - for setting the desired ramp time.

Set *0H10* using the rotary knob and confirm using the set-key.
The *Goto2* message will be displayed indicating the set-point in the second program step.



The mode options Temp/Hold/End/Cycle can be activated as of the second program step.
Turn the rotary knob to display the messages: *Hold, End, Temp, Cycle* respectively.

Select *Temp* using the rotary knob for another temperature segment.
Set 10°C using the rotary knob.

The *time2* message is displayed after approx. 2 seconds, indicating the ramping time in the second program. Press the arrow-keys to display either *Fast* - indicating maximum speed or HH MM - indicating a time setting for the segment.

Set 0H21 using the rotary knob.

Select the *Cycle* using the rotary knob. and confirm with Set key.

The message *One* is displayed.

Set the number of cycles using the rotary knob.
The *NoEnd* message indicates an infinite number of cycles.
The *One* message indicates one cycle.
The *CY=xx* message indicates xx times cycle.

Set *CY=3* using the rotary knob.

The *StoP* message will be displayed.

Enter *End* using the rotary knob. Confirm with set key.

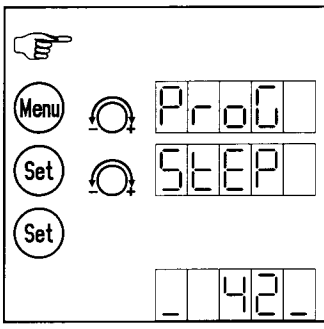
Beep appears on the display.

Use the rotary knob to choose *Yes* for sensor at program end ON or *no* for sensor at program end OFF and confirm with the Set key.

The programming procedure is complete.

⚠ Any existing program can subsequently extended or shortened as long as program steps remain available (see §3.9.8). The data entry mode can be terminated at any time by using the escape-function (Set and Menu key simultaneously). Unconfirmed entries are not considered.

3.9.9 StEp Read free Programme Steps



Press the menu key. Turn the rotary knob until *Prog* is displayed.
Confirm with Set key.

Turn the rotary knob until *Step* is displayed.
Confirm with Set key.
The number of free programme steps is displayed for 2s:

e.g. 42 freely programmable steps.

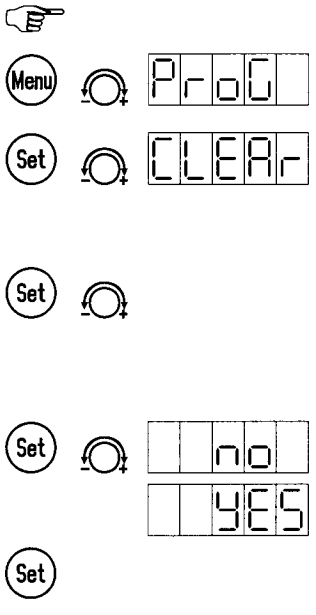
⚠ The _ *O*_ message indicates that no further program steps are available.
Existing programs can nevertheless be overwritten or modified as long as the number of program steps remains identical.

Example: All the program steps are occupied. Program 0 is to be changed with a number of program steps remaining unaltered:

Before:			After:		
Start	=	20.0°C	Start	= 25.0°C	overwrite,
Goto1	=	30.0°C	Goto1	= 10.0°C	overwrite,
Time1	=	0H12	Time1	= 1H52	overwrite,
Goto2	=	Hold	Goto2	= End	overwrite

3.9.10 CLEAr Deleting programme

ⓘ **3 steps** must be performed to use the delete feature. This is to prevent programs being unintentionally deleted.



Press the menu key. Turn the rotary knob until *Prog* is displayed.
Confirm with Set key.

Turn the rotary knob until *Clear* is displayed. Confirm with Set key.

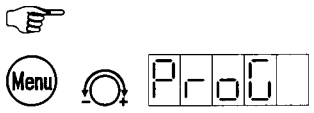
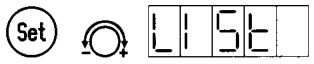
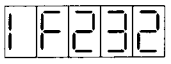
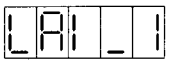
Security step 1:
If no button is pressed within 4 minutes, the program will remain activated and the actual temperature will be displayed. Select the program to be deleted using the rotary knob. Confirm this selection using the set-key.

Security step 2:
The No message is displayed. Select the *Yes* option within 4 minutes using the rotary knob. Otherwise the selected program will not be deleted.

Security step 3:
Confirm the *Yes* option using the set-key.
The selected program will then be deleted.

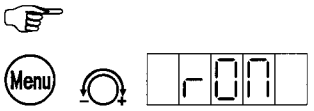
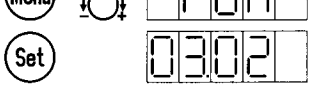
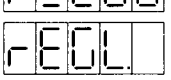
⚠ Any activated programs must be stopped before a program can be deleted. If all of the programs are empty, the Empty message will appear. The data entry mode can be terminated at any time by using the escape feature (press Set and Menu keys simultaneously).

3.9.11 LISt Print Programme Store

	Press the menu key. Turn the rotary knob until *Prog* is displayed. Confirm with set key.
	Turn the rotary knob until *List* for Listing is displayed.
	Confirm the program using the set key. The entire contents of the memory for the programmable control unit are listed via the digital interface. The Busy message will be displayed during the printing procedure. Data from the default program 0 Program Listing 1 ProG 0 1 StArt 20.0°C 2 25.0°C 0H10 3 Hold 4 Free END OF LISTING If several programs are saved in the memory, the other programs will be listed.
 	The message *IF232* is displayed instead of *Busy* or *LAI_1*. A wrong protocol format is set (see §3.8.3)
	The *Wait* message is displayed if the digital interface is occupied by other control function requirements. Repeat the entry some time later.

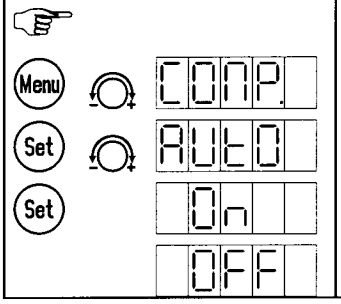
⚠ The protocol format must be set to correspond to the printer or file. No data is available in the IF232 format.
An individual program cannot be printed out. All saved programs are printed by using this command.

3.10 rOM Read Software version

	Press the menu key. Turn the rotary knob until *Rom* is displayed. Confirm with set key.
	Successively, the following is displayed: - the software version e.g. *03.02*,
	- the type of device e.g. *P_200*
	- the message *Regl.* for controller
	and finally the controller type, e.g. 2

3.11 COMP. Set Automatic Compressor Control

Also see §8 Automatic Compressor Control

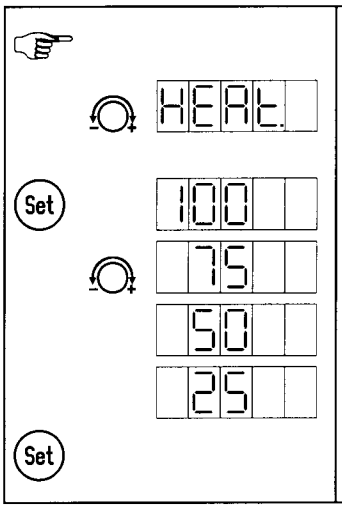


Press the menu key. Turn the rotary knob until *Comp.* is displayed.
Confirm with set key.

Choose the required compressor mode using the rotary knob.
Auto for automatic compressor control
On for compressor continuous operation
Off for switching off the compressor
Confirm with set key.

⚠ If the chosen option (flashing display) is not confirmed within 4 minutes, or the escape-function called up by pressing simultaneously the Set and Menu key, the data entry is terminated without having stored the option.

3.12 HEAt Set Maximum Heating Capacity



Press the menu key.
Turn the rotary knob until the message *Heat* appears.
Confirm with set key.

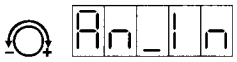
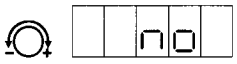
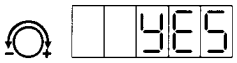
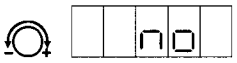
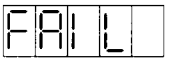
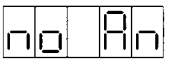
Set the required maximum heating capacity using the rotary knob.
100 for maximum 100% heating capacity
75 for maximum 75% heating capacity
50 for maximum 50% heating capacity
25 for maximum 25% heating capacity
See §G.10 Operation of Refrigerated Baths.

Confirm with set key.

⚠ If the chosen option (flashing display) is not confirmed within 4 minutes, or the escape-function called up by pressing simultaneously the Set and Menu key, the data entry is terminated without having stored the option.

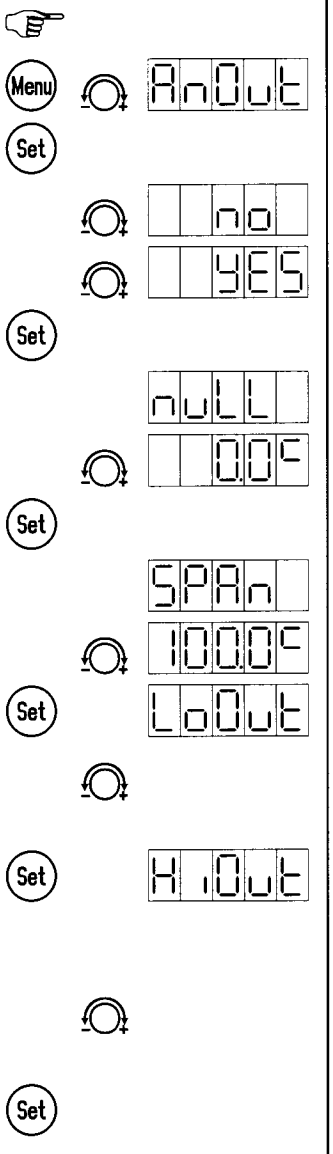
3.13 An_In Set Analogue input

Also see §6.1.1

☞ Menu 	Press the menu key. Turn the rotary knob until *An_In* is displayed. Confirm with set key.
Set 	The current status of the analogue input will be displayed. *No* indicates that the analogue is not activated as a set-point source. Select the *Yes* option using the rotary knob in order to activate the analogue input as the set-point source. Confirm the selected option using the set-key.
	
Set 	If the analog input is switched on with the option *Yes*, the following display is C*ut*. Select the option *No* with the help of the rotary knob if, in case of a faulty analog input signal, the temperature should adjust to the 2nd set-point value (see §3.1). Select the option *Yes*, if, in case of a faulty analog input signal, the thermosat should be switched off. Confirm the selected option with the help of the Set-key
	
Set 	The *nuLL* message (zero) will be displayed. The escape feature is still available at this point. Set the corresponding temperature for the zero line for the analogue interface using the rotary knob. Confirm with set key.
Set 	The *SPAn* message will then be displayed. The escape feature is no longer available at this point. Enter the temperature corresponding to the limit value setting of the analogue interface using the rotary knob.
Set 	Confirm with set key. The *Lo_In* message will be displayed. The escape feature is available at this point. This indicates that the analogue input must be supplied with the signal which corresponds to the previously set zero line, e.g., 4mA. Use the set-key to escape as soon as this value is set.
Set 	The *Hi_In* message will be displayed. This indicates that the analogue input must be supplied with the signal which corresponds to the end limit set previously, e.g., 20mA. The escape feature is not available. Use the set-key to escape as soon as this value is set. The analogue input is now set.
	The difference between *Lo_In* and *Hi_In* must be at least 5mA. If this value is not attained, the FAIL message will be displayed and the currents level setting procedure for *Lo_In* and *Hi_In* will have to be repeated.
	The message No-*An* is displayed if the analog input is to be activated, but no input current or an over-high input current was measured.

3.14 AnOut Set Analogue output

Also see §6.1.2



Press the menu key. Turn the rotary knob until *An_Out* is displayed.

Confirm with set key.
The status of the analogue output is displayed.
Use the rotary knob to select *No* for deactivated or Yes for activated.
Confirm this setting using the set-key.
If the *No* option is selected, the current level output will correspond to the current level setting for the zero line (*LoOut*).

If the *Yes* option is selected, the *Null* message (zero) will be displayed.
Use the rotary knob to enter the corresponding temperature for the zero line of the analogue interface and confirm the setting using the set-key.

The *SPAn* message will be displayed. Enter the temperature corresponding to the limit value setting of the analogue interface using the rotary knob.
The *LoOut* message will be displayed. The current level at the analogue output will correspond to the previously defined zero line setting.

This current level can be changed using the rotary knob.

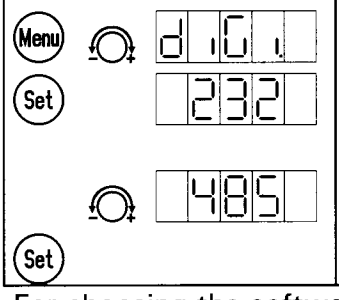
If the current corresponds to the desired value, e.g. 4mA, use the set-key to confirm this setting.
The *HiOut* message is displayed. At the analogue interface the current level output corresponds to the previously defined limit value setting.

This current level can be modified using the rotary knob.

If the current corresponds to the value desired, e.g. 20mA, use the set-key to confirm this setting.
The analogue output is now set-up.

3.15 diGi. Set Digital Interface

You have the choice between two hardware configurations. The RS232 Interface is for point-to-point connections, the RS485 Interface is for connection of several units to the PC. For connection assignments see §7.2. Only the chosen Interface is allowed to be connected, as otherwise errors could arise.



Press the menu key. Turn the rotary knob until *digi.* is displayed.

Confirm with set key.
The current hardware configuration of the digital Interface is displayed, e.g. *232* for RS232.

You can change the hardware configuration with the rotary knob. *232* for RS232, *485* for RS485.
Confirm the choice with set key.

For choosing the software record see §3.8.3
For the descriptions of the software records see §6.2

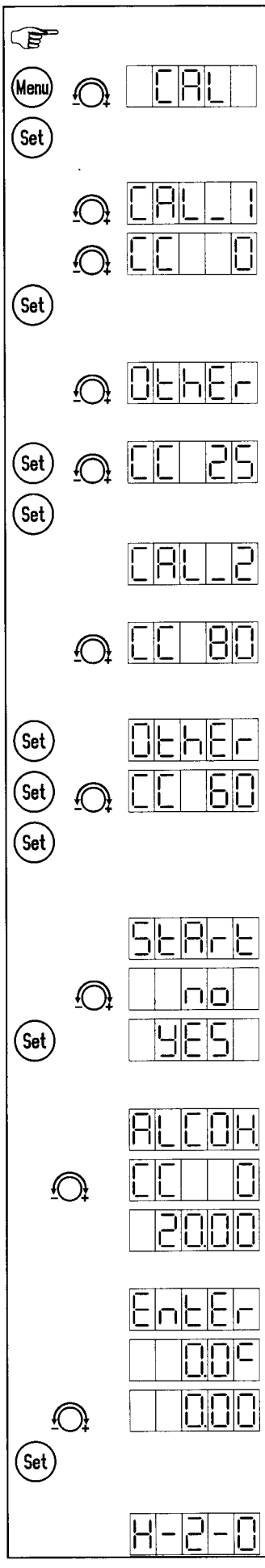
3.16 CAL two-step calibration program

This program only starts with internal control (see §3.2).

The internal Pt100 sensor may be calibrated is via the keyboard, so that the microprocessor controller and hence the bath and circulating thermostat may be calibrated according to the ISO 9000 series of standards or for quality assurance purposes. After the calibration, the settings are stored. The controller is calibrated when the thermostats are delivered. With replaceable controllers, the accuracy should be checked.

Before the calibration of the controller, the calibration temperatures must be defined. The calibration temperatures should be based on the temperature control medium used and the working area. The first calibration temperature must always be lower than the second calibration temperature. The difference between the two calibration temperatures must be more than 10 Kelvin and must not exceed 250 Kelvin. Before the calibration, the set value limits and the alarm values should also be set so that there can be no conflict with the calibration temperatures (see §3.4 and §3.7.3).

The displays for the temperature control medium are dependent upon the calibration temperatures. With a calibration temperature of $<20°C$, *Alcoh.* is displayed, between 20°C and 94°C *H-2-O* is displayed for water and with a calibration temperature of $>=95°C$, *Oil* is shown on the display. These defaults are only suggestions. The correct temperature control medium must always be determined by the user.
The following describes calibration of the internal sensor at 0°C with alcohol and at 80°C with water.



The internal temperature control mode must be activated.
Fill the bath with alcohol and switch the thermostat on.
Press the menu key.
Turn the rotary knob until *Cal* is dispalyed and confirm with set key.

Cal_1 appears on the display.

To input the first calibration temperature turn the rotary knob.

The rotary knob may be used to select from a table with predefined calibration temperatures, e.g. CC0 for 0°C.

With the display *Other,* there is an option of entering any calibration temperature.
Confirm the table value or the option *Other* with the Set key.
Only with the option *Other*:
Use the rotary knob to set any calibration temperature and confirm with the Set key.

To enter the second calibration temperature turn the rotary knob when the display shows *CAL_2*.

The rotary knob may be used to select from a table with predefined calibration temperatures, e.g. CC80 for 80°C.

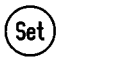
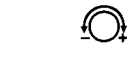
With the display *Other,* there is an option of entering any calibration temperature.
Confirm the table value or the option *Other* with the Set key.
Only with the option *Other*:
Use the rotary knob to set any calibration temperature and confirm with the Set key.

Start appears on the display.
To start the calibration program, select the option *Yes* with the rotary knob and confirm with set key.
With the option *no*, the function is left.
After the option *Yes*, the display *Alcoh* appears.

Acknowledge with the rotary knob. The program *CC 0* starts automatically, the controller specifies a set value of 0°C.
The display *CC 0* appears for about 1s and alternates for 2s with the actual temperature eg: *20.00(°C)*.

If 0°C is measured and the bath temperature is stable for a certain time, the message *Enter* appears. Until this time, the calibration may be interrupted with the break function without changing the calibration data. Check the stability of the bath temperature on the reference thermometer. If this is stable, set the temperature shown on the reference thermometer with the rotary knob. The displayed value may be corrected by ±5°K. Pressing the Set key confirms the entered temperature.

The display *H-2-O* for water appears.

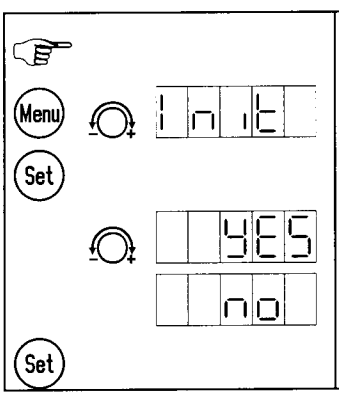
	Switch off the thermostat, empty the bath, fill with water, switch on the thermostat.
	Press the Menu key, choose program Cal with the rotary knob and call it up with the set key.
	
	Using the Set key, confirm the 1st and 2nd calibration temperature. Start the calibration program. Acknowledge the display *Alcoh.* with the Set key. This jumps the 1st calibration temperature and calibration is only performed with the 2nd calibration temperature.
	
	
	The display *H-2-O* for water appears.
	Acknowledge by turning the rotary knob. If the calibration temperatures are set so that there is no need to change the temperature control fluid, the 2nd display for the temperature control fluid may be acknowledged by turning the rotary knob and the calibration is then performed for the 2nd calibration temperature. The program *CC 80* starts automatically, the controller specifies the set value 80°C.
	The display *CC 80* appears for about 1s and alternates for 2s with the actual temperature eg: *56.00(°C)*.
	If 80°C are measured and the bath temperature is stable for a certain time, the message *Enter* appears.
	Use the rotary knob to set the temperature displayed on the reference thermometer. Pressing the Set key confirms the entered temperature.
	The message *Good* appears on the display, the correct data are saved.
	In the event of a poor calibration, *bad* is displayed.
	In the event of non-calibrated controllers, *Uncal* is displayed

If the set calibration temperature (flashing display) is not confirmed within 4 minutes, the entry is terminated without storing the calibration temperature. The break function is not accessible.

⚠ The calibration cannot be interrupted with the break function.
If the calibration is not completed correctly, the data up to now are lost. The thermostat is no longer calibrated. The message *UnCal* is displayed.

3.17 Init Set factory-set unit parameters

In case of factory-set parameters, the programmes of the progrmmer, the user temperatures, the thermoregulation mode, the alarmlimits, the print settings, the control parameters, the set-point limits and the AIF-settings are cleared.



Press the menu key. Turn the rotary knob until *Init* is displayed.
Confirm with set key.

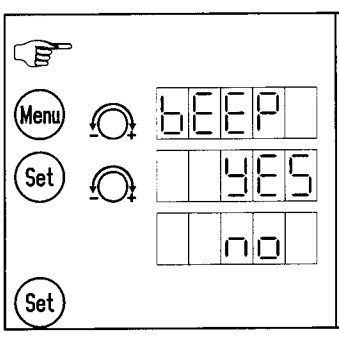
Yes is displayed.
In order to set the factory-set parameters, confirm with set key.

If you do not whish to change the parameters, set the display *No* with the rotary knob and confirm with set key.

⚠ If the chosen option (flashing display) is not confirmed within 4 minutes, or the escape function called up by pressing simultaneously the Set and Menu key, the entry is terminated without initialization of the unit parameters.

3.18 bEEP Set Acoustical Signal Release

If the acoustical signal release is switched on, a security switch off is also indicated with an acoustical message.



Press the menu key. Turn the rotary knob until *Beep* is displayed.

Confirm with set key.

Choose between the options *Yes* or *No* with the rotary knob.

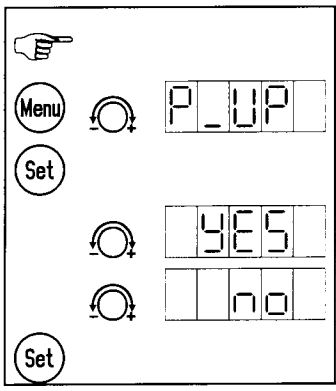
Confirm the choice with set key.

⚠ If the chosen option (flashing display) is not confirmed within 4 minutes, or the escape function called up by pressing simultaneously the Set and Menu key, the entry is terminated without storing the option.

3.19 The automatic cutout

⚠ The automatic cutout determines the behaviour of the thermostats when the power is switched on or after a power outage. If the automatic cutout is activated, the thermostat starts the temperature control when it is switched on at the mains switch. The thermostat also starts the temperature control again automatically after a power outage.

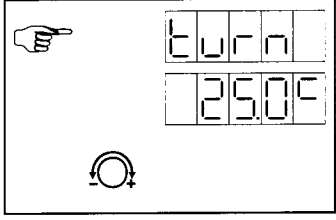
For safety reasons, it may be necessary for the thermostat to remain switched off after a power outage. In such a case, the automatic cutout must be switched off.



Press the menu key. Turn the rotary knob until P_UP is displayed. Confirm with set key.

Use the rotary knob to set the option *Yes* for automatic cutout ON, or the option *no* for automatic cutout OFF.

Confirm the entry with the Set key.

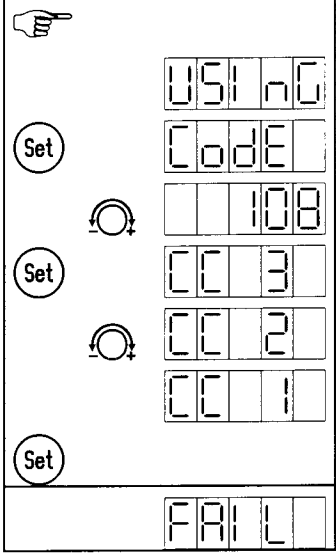


When the automatic cutout is switched off, the thermostat does not automatically start the temperature control. After the starting phase when the display shows *HELLO* and the type display, the display alternates between the current actual value and the reference *turn*. If the rotary knob is now turned, the thermostat starts the temperature control. The reference *turn* no longer appears on the display.

3.20 USInG The user level

To prevent an unintentional change to the equipment setting, user levels have been defined. These are to define the functions to which the user has access.
In user level 1, it is only possible to set the set value. All other functions are blocked.
In user level 2, all alarm, programming and setup functions are also accessible. All interface settings for the analog interface, the RS232 and the RS485 interface are blocked.
In user level 3, the entire range of functions is available.

The access to the user level-function is a complicated process to prevent it from being called up unintentionally.



Press the menu key. Turn the rotary knob until *Using* is displayed. Confirm with set key.
The reference *Code* is displayed.

Use the rotary knob to set the password *108* and confirm with the Set key.

Use the arrow keys the desired user level.
CC 3 stands for user level 3,
CC 2 stands for user level 2,
CC 1 stands for user level 1.

Confirm with the Set key.

The message *Fail* appears if an incorrect password is entered.

Only the operation is restricted by user levels 1 and 2. The functions are retained. This means that a temperature control program started in user level 2 continues to run, even if a switch is made to user level 1. However, it is then no longer possible to suspend or terminate the program. Or, if the analog interface is activated in user level 3, this setting is also retained in user level 1 and user level 2, but it is no longer possible to reconfigure the analog Interface. For this, it is necessary to switch back to user level 3.

If the set user level (flashing display) is not confirmed within 4 minutes or the break function called up by simultaneously pressing the Set and Menu key, the entry is terminated without storing the user levels.

3.21 SAFE The backup memory for equipment configuration and calibration data

The access to this function is a complicated process to prevent it from being called up unintentionally. It is now possible to save the user-defined settings in the permanent memory so that it may be reloaded if required. This is displayed by the menu points *L.USER* and *S.USER*. All settings and programming operations are saved and loaded.

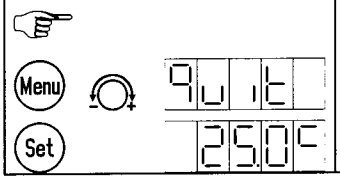
Another innovation is the saving or reloading of the calibration settings. The user-saved calibration data are saved under the menu point *S_CAL* and reloaded under the menu point *L_CAL*. The factory calibration data may be loaded under the menu point *ReCAL* if required. Access to the load function is protected with a *Yes/No* question to prevent it from being called up unintentionally.

The calibration data should only be reloaded if the user is aware of the content of the backup copy. If false data are backed up, loading this data may degrade the accuracy.

☞	To obtain access to the backup memory for the equipment configuration and the calibration data, press the menu key and turn the rotary knob until *Safe* is dispalyed. Confirm with set key.
Menu, Set	The reference *Code* appears on the display.
Use the rotary knob to sent the password *108* and confirm with the Set key.	
Set	Use the rotary knob to set the desired backup option.
L.User stands for load user data (equipment configuration),	
S.User stands for backup user data (equipment configuration),	
L_CAL stands for load user calibration data,	
S_CAL stands for backup user calibration data,	
ReCAL stands for load factory calibration,	
When the display shows *Quit*, the menu may be left without changing the data.	
Set	If *L.User* is confirmed with the Set key, *POP U* appears on the display. The last equipment configuration saved is loaded from the backup memory.
If *S.User* is confirmed with the Set key, *PushU* appears on the display. The current equipment configuration is loaded into the backup memory.	
If *L_CAL* is confirmed with the Set key, *Sure* appears on the display.	
Use the rotary knob to set *Yes* and confirm with the Set key.	
Set	*POP C* appears on the display, the last saved calibration data are loaded from the backup memory into the main memory.
If *S_CAL* is confirmed with the Set key, *PushC* appears on the display. The current calibration data are loaded into the backup memory.	
If *ReCAL* is confirmed with the Set key, *Sure* appears on the display.	
Use the rotary knob to set *Yes* and confirm with the Set key.	
Set	*ReCAL* appears on the display, the factory calibration data are loaded from the backup memory into the main memory.

⚠ If the set option (flashing display) is not confirmed within 4 minutes or the break function called up by simultaneously pressing the Set and Menu key the entry is terminated without the executing the option.

3.22 Leaving the function menu



In order to leave the menu without any changes, press the Set key when *Quit* is displayed.

The actual value is displayed.

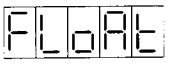
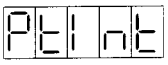
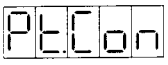
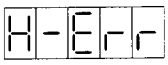
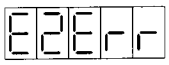
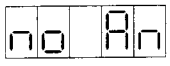
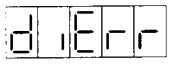
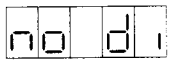
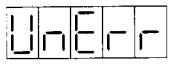
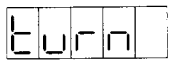
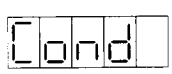
4 Functions of the temp key

You can switch on or off thermoregulation (heating, cooling and circulation) with the temp key. The thermoregulation status is memorized and is maintained even after switching off the mains switch. The LED-power shows the thermoregulation status. The actual value display remains switched on even in case of a switched-off thermoregulation.

⚠ In order to separate the thermostat from the power supply, the mains switch (2) has to be used.

5 Alarm messages of the polystat controller:

- Alarm messages of heating thermostats
(polystat cc 1-3 ; Ax-x ; Bx-x; Kx-x ; CC 30x-x ; CC 30x BX-x,
X standing for the exact type name)

	Level in bath too low.
	Mech. overtemperature protection device has tripped
	Winding thermostat of the pump motor has responded.
	Internal circuit Pt100 sensor faulty or not connected
	External circuit Pt100 sensor faulty or not connected
	Condensation sensor faulty or not connected
	The control unit is installed in a module which is not recognised by the control unit.
	Error in controller hardware. Inform Service. ☎
	Value dropped below lower alarm limit
	Value exceeds upper alarm limit.
	EEPROM error, notify Service ☎.
	Analog error. The analog input receives a set value which is too high or too low. The cause could be an interruption to the power supply, failure of the set-point transmitter or the input overload. The thermostat has swichted off (see § 3.13).
	Warning, analog input signal off the admissible range. The cause could be an interruption to the power supply, an input overload or the failure of the set-point transmitter. The thermostat adjusts to the 2nd set-point value (see §3.1)
	No digital file transfer. The watchdog function (see §6.2.1.4) has switched off the thermostat.
	No digital file transfer. The watchdog function (see §6.2.1.4) has switched over to the 2nd set-point value. The thermostat adjusts to the 2nd set-point value (see §3.1).
	Unplug the unit, notify Service ☎. Exchange Polystat Compatible Control
	Automatic cutout not activated. Turn the rotary knob to start it.
	An attempt is being made to call up a function which is not accessible in the current user level.
	In addition, the *Cond* message is displayed as soon as the condensation temperature exceeds 50°C. The cooling capacity is reduced. The alarm does not lead to deactivation of the unit.

- Alarm messages of the polystat controller for other units:
The alarm messages of the polystat controller for other units, e.g. for circulation coolers can be found in the separate operating instructions.

6 Interface

6.1 Analogue Interface

6.1.1 Analogue input

The temperature increase (ramp) of the bath can be controlled using an analogue signal whose magnitude represents the set-point. The corresponding temperature range can be set by the user (e.g., -25 to 120°C or 0 to 100°C, etc.). The temperature range is valid for the analogue input as well as for the analogue output.

⚠ If the analogue interface is activated, the initial level of current determines the set-point and it is not possible to enter a set-point using the keyboard.
It is however possible to check the set-point (see §1.1).
The master-clear feature can be used to terminate the set-point output via the analogue interface. It is then modulated to the set-point value which was set prior to the activation of the analogue interface (see also §A 1.3.3). The data entry mode cannot be terminated at any time using the escape feature (set and menu key simultaneously), e.g., during the data entry procedure for the zero line and the limit value setting. As a result both values must be entered and the automatic data entry check can come into effect (see also §3.13).

6.1.2 Analogue output

The indicated temperature (internal or external circuit) can be transmitted via the interface jack. This does not depend on the source of the set-point (keyboard, digital or analogue interface). The corresponding temperature range can be defined by the user (e.g., 25°C to 120°C or 0°C to 100°C, etc.). The temperature range is valid for both the analogue input and output.

6.1.3 Notes

⚠ The temperature differential between the Null and Span values must be at least 10K, but are not permitted to exceed 320K.

E.G.: nuLL = 0°C, Span = 10°C = minimal difference.
nuLL = -20°C, Span = 300°C = minimal difference.

The analogue interface has been designed for current levels of 4...20mA. Higher currents levels must be avoided as this could damage the control unit module. Ensure the polarity is correct for the same reason.
The analogue interface is supplied as a current interface. If the analogue input is to be used as a voltage input, it is supplied with a feature which permits the input resistance to be increased. To do this jumper 1 must be plugged into position U. The permissible supply voltage is then 1....5V. See §7.4 regarding jumper positioning.

6.2 Digital Interface

General information:

The controller is equipped with a bi-directional RS232 interface and an RS485 semi-duplex interface. The hardware can be changed over in the menu using the sub-program diGi. Use the option 232 for RS232 and the option 485 for RS485 (see §3.15).

Observe the following procedure when commissioning via the digital interface.
1. Ensure both the PC and the circulation bath are switched off. The connection cable can now be plugged into the PC and the circulation bath.
2. Firstly switch on the circulation bath,
3. Then switch on the PC
4. The data transmission can be started.

The following software protocols are possible. The setup procedure for the software protocol is described under §3.8.3.

6.2.1 Printer Software Protocol (RS232)

In order to simplify the instructions:
- Upper and lower case letters are not differentiated. SET = set = Set = sET.
- All temperatures are displayed in °C, even if °F is displayed
- The character is factorial, i.e., +25 = 25
- All temperatures can be written without a decimal point, i.e., without „0„ 15 represents 15.0, and -25 = -25.0

⚠ Any instruction which is incorrectly entered or unrecognised will be indicated as follows:

This message will be displayed even if the interface mode IF232 is activated. In this case enter the mode *Printer* or *File* (s. § 3.8.3).
The pause between every character of a instruction must not exceed 2 seconds, otherwise the whole instruction will be erased and the above message will be displayed. The interval between any two instructions should exceed 3 seconds.

If the analogue input is defined as the set-point source in the menu, this set-point overrides the set-point transmitted via the digital interface to the control unit.

The keyboard cannot be used when the unit is in the remote-mode. There is only one exception to this rule - the so called MasterClear key feature (pressing Menu + Temp simultaneously). This command terminates the remote-mode, permitting use of the keyboard to operate the control unit. At the same time, the control unit set-point defined prior to the instruction REMOTE <CR> <LF> is reactivated (user-defined default set-point).
Alternatively, if the remote-mode is terminated using the instruction LOCAL <CR><LF>, the last set-point transmitted via the interface is retained (continuous control).

The following operating modes are available:
Activating REMOTE mode

REMOTE<CR><LF>	none	
Keyboard disabled, printer protocol commands may be used, autoprint functions blocked. Set value control possible.	permanent	no

Activating LOCAL mode

LOCAL<CR><LF>	none	
Keyboard free, printer protocol commands not usable, autoprint functions released. Default after Power ON.	permanent	no

The following line formats are available in the REMOTE mode.

[1] Set value in °C with one decimal place from the PC to the controller
-###.# # stands for a digit 0 - 9,
- stands for a negative prefix (+ optional).
eg 12.5, +1.3, .5, -1.9, -12.3 , -100.0, 100.0

[2] Set value in 1/100K from the PC to the controller
-##### # stands for a digit 0-9,
- stands for a negative prefix (+ optional).
eg +1000 (10°C), -123 (-1.23°C), +12345 (123.45°C)

[3] Set value in °C with a decimal place from the controller to the PC
±%%#.# # stands for a digit 0...9,
% stands for a digit 0...9 or a space,
± stands for a prefix + or -
eg + 12.5, + 1.3,+ 0.5,- 1.9, - 12.3, -100.0, +100.0

[4] Set value or actual value in 1/100K from the controller to the PC
±##### # stands for a digit 0...9,
± stands for a prefix + or -
eg +01000 (10°C), -00123 (-1.23°C), +12345 (123.45°C)

[5] Actual value in °C with a decimal place from the controller to the PC
§##.#C # stands for a digit 0...9,
§ stands for a negative prefix or for a digit 0...9
eg 12.5C, 1.3C, 0.5C, -1.9C, -12.3C, -99.9C, 100.0C

[6] Whole numbers from the PC to the controller or from the controller to the PC
%%%%% % stands for a digit 0...9 or a space,
eg 1000, 20, 15000.

The description of commands corresponds to the chart:

Description

Command [number format]	Response [number format]	
Comments, Examples	Storage	Compatible

A flexible command interpreter was used for some commands. This enables the programmer to use a command in a different way. These commands are marked with a @ (for echo) after the command. These commands may be used as setting commands, interrogation commands or setting commands with echo commands. An example:

SP@ -#####<CR><LF> [2]	SP ±#####<CR><LF> [4]	
Set set value with echo	volatile	yes

This command may be used in three variants

Set value from the PC to the controller.

SP -#####<CR><LF> [2]	none	
Are given in 1/100K, eg SP 10000<CR><LF> for +100°C, SP -120<CR><LF> for -1.2°C	volatile	yes

Set value from the controller to the PC

SP?<CR><LF>	SP ±#####<CR><LF> [4]	
In 1/100K with prefix and leading zeros, eg SP -00123 for 1.23°C.	-	yes

Set value from the PC to the controller, echo from the controller to the PC.

SP@ -#####<CR><LF> [2]	SP ±#####<CR><LF> [4]	
Set set value with echo	volatile	yes

The following commands described as compatible are also available in the Unistat Control from V3.6. This makes it possible to write programs which can function both on all CC thermostats from V3.04 and all unistates from V3.6. However, here the different time response of the thermostats should be taken into account. For example, the power up operation takes different lengths of time and so the response to the command *KM?* *<CR><LF>* is not identical. A test run on both equipment types is essential.

6.2.1.1 Set value and set value restrictions, actual values

Set value from the PC to the controller.

SET -###.#<CR><LF> [1]	none	
SET 100.0<CR><LF>, SET -12.3<CR><LF>	volatile	no

Set value from the controller to the PC

SETPOINT? <CR><LF>	±%%#.#<CR><LF> [3]	
+ 12.3, - 0.1 (leading space).	-	no

Set value from the PC to the controller, echo from the controller to the PC.

SP@ -#####<CR><LF> [2]	SP ±#####<CR><LF> [4]	
Set set value with echo	volatile	yes

2nd set-point value from the PC to the controller, echo from the controller to the PC.

SP2@ -#####<CR><LF> [2]	SP2 ±#####<CR><LF> [4]	
Set set point with echo	permanent	yes

Insert new set value in the user table. The eleventh set value deletes the oldest table value.

ADD USER -###.#<CR><LF> [1]	none	
ADD USER -15.6<CR><LF>	permanent	no

Deletes the set value-user table.

CLEAR USER<CR><LF>	none	
	permanent	no

Set value restrictions from the PC to the controller.

LO_LIMIT -###.#<CR><LF> [1]	none	
LO_LIMIT 5.0<CR><LF> For low-limit 5°C	volatile	no

HI_LIMIT -###.#<CR><LF> [1]	none	
HI_LIMIT +95.2<CR><LF> for high-limit 95.2°C	volatile	no

Set value restrictions from the PC to the controller, echo from the controller to the PC.

LL@ -#####<CR><LF> [2]	LL ±#####<CR><LF> [4]	
LL@ 500<CR><LF> For low-limit 5°C	volatile	yes

LH@ -#####<CR><LF> [2]	LH ±#####<CR><LF> [4]	
LH@ 09520<CR><LF> For high-limit 95.2°C	volatile	yes

Internal temperature from the controller to the PC.

INTERN?<CR><LF>	§##.#C<CR><LF>	[5]
In °C, eg 12.5C, -0.5C, 125.0C, -12.4C (leading space).	-	no

TI? <CR><LF>	TI ±#####<CR><LF>	[4]
In 1/100K with prefix and leading zeros, eg TI +00100<CR><LF> for 1.0°C	-	yes

External temperature from the controller to the PC

EXTERN?<CR><LF>	§##.#C<CR><LF>	[5]
In °C, eg 12.5C, -0.5C, 125.0C, -12.4C (leading space).	-	no

TE?<CR><LF>	TE ±#####<CR><LF>	[4]
In 1/100K with prefix and leading zeros, eg TI -00100<CR><LF> for -1.0°C	-	yes

Change external set value to interface

With the „CETM„-command the source of the external actual value of the Pt100 can be changed to the serial interface. After switching on every 5 seconds a new external actual value has to be transmitted with activated external regulation. This happens through „RTE„-command.

CETM_ON@ <CR><LF> CETM_OFF@ <CR><LF>	CETM ON<CR><LF> or CETM OFF<CR><LF>	
CETM_ON<CR><LF> = switch on TempMove without echo CETM_OFF@<CR><LF> = switch off TempMove with echo CETM? <CR><LF> = interrogation of TempMove-Status	volatile	yes

Command to transfer the external temperature through the serial interface. With activated external regulation every 5 seconds a new external actual value has to be transmitted, if not the warning „noOut„ is diplayed , the regulation is changed to internal and the CETM-Mode is switched off.

RTE@ -#####<CR><LF> [2]	RTE ±#####<CR><LF> [4]	
RTE@ 00100<CR><LF> = setting the external temperature to 1°C with Echo RTE 01000<CR><LF> = setting the external temperature to 10°C without echo. RTE? <CR><LF> = interrogation of temperature .	volatile	yes

6.2.1.2 Alarm temperatures, alarm messages and alarm treatment

Lower alarm temperature from the PC to the controller

LO_ALARM -###.#<CR><LF> [1]	none	
LO_ALARM -10<CR><LF> for low-alarm -10°C	volatile	no

Upper alarm temperature from the PC to the controller

HI_ALARM -###.#<CR><LF> [1]	none	
HI_ALARM 120.5<CR><LF> for high-alarm 120.5°C	volatile	no

Request device status

ERROR?<CR><LF>	ERROR #<CR><LF>		
# = 0 = no error, # > 0 = error		-	yes

Deleting an alarm message

ALARM<CR><LF>	none		
The cause of the error must be rectified before using this command (see §2.4).		-	no

6.2.1.3 Control mode

Set internal temperature control mode

INTERN!<CR><LF>	none	
see also §1.3	volatile	no

INTERN@<CR><LF>	INTERN ON<CR><LF>	
Set and request temperature control mode. INTERN? see above	volatile	yes

Set external temperature control mode

EXTERN!<CR><LF>	none	
Only with connected Pt100, otherwise ineffective.	volatile	no

EXTERN@<CR><LF>	EXTERN ON<CR><LF>	
Only with connected Pt100, otherwise Response = INTERN ON<CR><LF>. EXTERN? see above	volatile	yes

Request temperature control mode

TEMP?<CR><LF>	INTERN<CR><LF> EXTERN<CR><LF>	
Response dependent on the temperature control mode (see §1.3)	-	yes

6.2.1.4 Miscellaneous

Change temperature display

DEGRE C<CR><LF>	none	
LED-display in °C	volatile	no

DEGRE F<CR><LF>	none	
LED-display in °F	volatile	no

Define controller number

IDENT %#<CR><LF>	none	
Defines the device ID number (see §3.4)	permanent	no

IDENT?	ID = %#<CR><LF>	
Returns the device ID number.	-	no

Read out device code

With this command the device code is read out.
The command „DSPY 49<CR><LF>„ is basically compatible to unistats, the answer however depends on the unit.

DSPY 49<CR><LF>	33Byte<CR><LF>	see below
Read out device code .		yes

Desciption of answer with CC-thermostats. Please see manual for Unistat Control.
The answer always consists of 33byte plus <CR><LF>.
The first byte always is a FormFeed (0x0d).
Followed by 16 byte consisting of

6 byte for regulation groupe , like „UNI CC„, „POLYCC„, „MINICC„ or „ICC „(three space characters).
1 byte space character.
max. 6 byte identification. This identification is shown with first switch on.
min. 3 byte space characters

Another 16 byte with temperature limits of thermostat.

6 byte for min temperature
4 byte space characters
6 byte max temperature

Last 2 byte <CR><LF>

The watchdog

The watchdog is a security installation which allows the surveillance of the communication between thermostat and PC. In order to activate the watchdog, a WDx-command together with a time indication has to be sent to the thermostat. Within this time, the command has to be refreshed, otherwise, the watchdog executes his action. Taking the WD1-command, the watchdog switches off thermoregulation, an error message is displayed. Taking the WD2-command, the watchdog replaces the set value by the 2nd set value, to which the thermostat then adjusts. A warning is displayed. A WDx-command with time = 0 deactivates the watchdog.

Watchdog in mode 1 = set switch off.

WD1@ %%%%%<CR><LF> [6]	WD1 +#####<CR><LF> [4]		
Set watchdogmode 1 (switch off) with echo		volatile	yes

Watchdog in mode 2 = set 2nd set-point value.

WD2@ %%%%%<CR><LF> [6]	WD2 +#####<CR><LF> [4]		
Set watchdogmode 1 (switch off) with echo		volatile	yes

6.2.1.5 Status interrogations

STATUS0<CR><LF>	S0 §##.#C RMINCKZ vvvvvvU<CR><LF>		
R = Remote, A = analog M = No alarm, H = High, L = Low alarm I = Internal, e = External, G = OFF N = No error, T = Overtemp., F = Level or Error, B = both errors C = Calibrated, U = Uncal, J = IntCal, O = ExtCal K = Compressor automatics, D = ON, P = OFF Z = No Open, X = PtOut, Y = PtInt, W = PtOut + PtInt v = Software version U = Unistat CC, M = Ministat CC, P = Polystat CC		-	no

STATUS1<CR><LF>	S1 §##.#C§##.#C%%%%%s%%%%% s%%%%%sU<CR><LF>		
§##.# = Low-alarm in °C with a decimal place §##.# = High-alarm in °C with a decimal place %%%%% = Low-print in seconds %%%%% = Middle-print in seconds %%%%% = High-print in seconds U = Unistat CC, M = Ministat CC		-	no

STATUS2<CR><LF>	S2 §##.#C §##.#C §##.#C §##.#C U<CR><LF>		
§##.# = Low-limit in °C with a decimal place §##.# = High-limit in °C with a decimal place §##.# = Min-range in °C with a decimal place §##.# = Max-range in °C with a decimal place U = Unistat CC, M = Ministat CC		-	no

6.2.1.6 Control parameters

P-factor internal controller

PINT@ %%%%%<CR><LF> [6]	PINT %%%%%<CR><LF> [6]		
Set and request P factor (50...30000)		permanent	no

I-factor internal controller

IINT@ %%%%%<CR><LF> [6]	IINT %%%%%<CR><LF> [6]		
Set and request I factor (0...30000)		permanent	no

P-factor external controller

PEXT@ %%%%%<CR><LF> [6]	PEXT %%%%%<CR><LF> [6]		
Set and request P factor (50...30000)		permanent	no

I-factor external controller

IEXT@ %%%%%<CR><LF> [6]	IEXT %%%%%<CR><LF> [6]		
Set and request I factor (0...30000)		permanent	no

6.2.1.7 Switching temperature control on and off

With the Polystat CC, the heating and the pump are switched on or off, the compressor continues to run.

Switching on temperature control

KM_ON<CR><LF>	none		
Only switching on.		Volatile	yes

KM_ON@<CR><LF>	ON<CR><LF>		
Switching on and echo.		volatile	yes

Switching off temperature control

KM_OFF<CR><LF>	none		
Only switching off		volatile	yes

KM_OFF@<CR><LF>	OFF<CR><LF>		
Switching off and echo.		volatile	yes

Requesting temperature control

KM?<CR><LF>	ON<CR><LF> OFF<CR><LF>		
Only echo.		-	yes

6.2.1.8 Handling the floating contact (POKO)

To switch the floating contact via the RS-interface, it is first necessary to set the POKORS mode to ON with the POKORS commands. In POKORS mode OFF, the POKO commands are ignored, but the POKO? command returns the current POKO status. When the power is switched on, the POKO remains in the current status, when it is switched off the controller determines the POKO status.

Determining POKORS mode

POKORS_ON<CR><LF>	none		
Handling POKO via the interface		volatile	yes

POKORS_ON@<CR><LF>	POKORS ON<CR><LF>		
Handling POKO via the interface with echo.		volatile	yes

POKORS_OFF<CR><LF>	none		
Handling POKO from the controller		volatile	yes

POKORS_OFF@<CR><LF>	POKORS OFF<CR><LF>		
Handling POKO from the controller with echo		volatile	yes

POKORS?<CR><LF>	POKORS ON<CR><LF> POKORS OFF<CR><LF>		
Request POKORS mode.		-	yes

Handling POKO

POKO_ON<CR><LF>	none		
Switching POKO on		volatile	yes

POKO_ON@<CR><LF>	POKO ON<CR><LF> POKO OFF<CR><LF>		
Switching POKO on with echo		volatile	yes

POKO_OFF<CR><LF>	none		
Switching POKO off		volatile	yes

POKO_OFF@<CR><LF>	POKO ON<CR><LF> POKO OFF<CR><LF>		
Switching POKO off with echo		volatile	yes

POKO?<CR><LF>	POKO ON<CR><LF> POKO OFF<CR><LF>		
Request POKO		-	yes

6.2.1.9 Handling the programmer

To start a single ramp via the interface, it is first necessary to select the single ramp type PROG_SELECT. Then, the new bath temperature and the time in which it is to be reached should be sent to the controller with PROG_TEMP and PROG_TIME.
Use the PROG_STATUS command to start the single ramp.

Setting single ramp data

PROG_SELECT@ %%<CR><LF> [6]	PROG_SELECT = %%<CR><LF> [6]	
Select single ramp with echo 99 = at ramp end HOLD 98 = at ramp end END 97 = at ramp end HOLD and sensor ON 96 = at ramp end END and sensor ON	volatile	no

PROG_TEMP@ -#####<CR><LF> [2]	PROG_TEMP = -#####<CR><LF> [2]	
Set new bath temperature in 1/100K with echo	volatile	no

PROG_TIME@ %%%%%<CR><LF> [6]	PROG_TIME = %%%%%<CR><LF> [6]	
Set ramp time in seconds with echo	volatile	no

Temperature control programs from the controller memory may also be selected, started, suspended and terminated via the interface. It is also possible to jump a segment.

Selecting temperature control program

PROG_SELECT@ #<CR><LF> [6]	PROG_SELECT = %#<CR><LF> [6]	
Select temperature control program 0- 9 with echo. (see §4.2.1)	permanent	no

Selecting, starting, suspending and terminating a temperature control program

PROG_STATUS@ #<CR><LF> [6]	PROG_STATUS = %#<CR><LF> [6]	
0 = terminate program, terminated 1 = suspend program, suspended 2 = start program, started 3 = continue program, runs 4 = single ramp runs 5 = HOLD or END at program end See also §4.	permanent	no

Jumping a segment

PROG_SEGMENT@ 1<CR><LF>	PROG_SEGMENT = %%<CR><LF> [6]	
These command corresponds to the *Jump* (see §4.2.1.1) %% = Program segment number 0 = Start segment 99 = single ramp		

6.2.2 LAI Software Protocol

Two command groups are located under the protocol designation LAI_1: The LAI command group and two tecon-compatible commands.

6.2.2.1 The LAI Command Group

General: the master unit transmits to the slave unit and always receives an answer (echo). No slave unit transmits unless prompted.

This procedure is upper and lower case sensitive.
Numerical values are transmitted as hexadecimal numbers in two's complement notation. As a result each Byte is represented by 2 ASCII characters. The decimal number 100 corresponds to the hexadecimal number 64h therefore the ASCII characters '6' and '4' are transmitted. The decimal number -100 corresponds to the hexadecimal number 9Ch therefore the ASCII

characters '9' and 'C' are transmitted.
Temperatures are transmitted with a resolution of 0.01K, i.e., +100°C corresponds to the decimal number 10000 and the hexadecimal number 2710h therefore the ASCII characters '2', '7', '1', '0' are transmitted. The temperature -100°C corresponds to the decimal number -10000 and the hexadecimal number D8F0h therefore the ASCII characters 'D', '8', 'F', '0' are transmitted.
The ASCII characters '0'...'9' and 'A'...'F' are used when transmitting numerical and temperature values.

A request from the master to the slave is constructed according to the following assignment:
'**[mssilld...dpp\r**'.
This includes:

[	Start character 5Bh	1 Byte
m	Transmitter ID M = Master 4Dh	1 Byte
ss	Slave address 00..99	2 Byte
i	Data group identifier	1 Byte
ll	Length of the data field	2 Byte
d...d	Data group	0...50 Byte
pp	Checksum	2 Byte
\r	End character CR 0Dh	1 Byte

An answer from the slave to the master is constructed according to the following assignment:
'**[mssilld...dpp\r**'.
This includes:

[	Start character 5Bh	1 Byte
m	Transmitter ID S = Slave 53h	1 Byte
ss	Slave address 00..99	2 Byte
i	Data group identifier	1 Byte
ll	Data field length	2 Byte
d...d	Data groups	0...50 Byte
pp	Checksum	2 Byte
\r	End character CR 0Dh	1 Byte

Characters which precede the checksum are described as the data field.
Characters following the 7th Byte and preceding the checksum are described as the data group. The actual data is contained within the data groups. The meaning of the data is indicated using an identifier. The commands are designated according to the ID in the following.
A checksum is transmitted in order to improve data security. The checksum is the 1-Byte sum of all hexadecimal values from the start character up to the last character before the checksum.

Example: The master transmits: '**[M01V07C6\r**'

		ASCII	Hex	Meaning
1st	Byte	[	5Bh	Start character
2nd	Byte	**M**	4Dh	Transmitter ID M = Master
3rd	Byte	**0**	30h	Slave address 01
4th	Byte	**1**	31h	Slave address 01
5th	Byte	**V**	56h	Data group identifier
6th	Byte	**0**	30h	Length of the data field 07 Byte
7th	Byte	**7**	37h	Length of the data field 07 Byte
8th	Byte	**C**	43h	Checksum C6
9th	Byte	**6**	36h	Checksum C6
10th	Byte	**\r**	0Dh	End character CR

The length of the data field is the number of Bytes preceding the checksum. The checksum is created using these Bytes.

5Bh + 4Dh + 30h + 31h + 56h + 30h + 37h = 1C6h --> 1Byte-Summe = C6h.

Protocol setting for the LAI commands
Baud rate 1200, 2400, 4800, 9600 asynchronous
Start bit 1
Data bits 8
Parity none
Stop bit 1

The following commands are valid for all HUBER controllers with an RS232/RS485 interface. In the examples, slave 01 is always the subject of interrogation.

'V' Verify	Provided to check if a slave is present. The command is not assigned a data group. **Master enquiry:** '**[M01V07C6\r**' The master enquires whether the Slave 01 is connected to the bus. **Slave reply:** '**[S01V0EMINI CCAD\r**' Slave 01 is connected to the bus and the device is a ministat CC. The command has the data group '**MINI CC**'. This is 7 Byte long. These 7 Bytes added to the 7 Bytes from the data group result in a data field length of 14 Bytes = 0Eh Bytes.

'G' General	This command communicates the most important temperatures and status information. A modified set-point value is not stored in the permanent memory, i.e., this value is lost when the power supply is disconnected. **Master enquiry : '[M01G0Dsattttpp\r'** s = Temperature control mode: 'C' = Circulation activated. Is ignored by every CC thermostats. 'E' = Activate external temperature control. 'I' = Activate internal temperature control. 'O' = Off, Deactivate temperature control. Is ignored by CC thermostats. '*' = Do not change the current status. a = Reset alarm '0' = No alarm reset. '1' = Any activated alarm is reset. '*' = Do not change the current status. tttt = Set-point in the temperature format described above. '****' = No change of the set-point. pp = Checksum in the format described above. \r End character CR. **Slave Reply: '[S01G15satttiiiieeeepp\r'** s = Temperature control mode 'C' = Circulation activated. Not feasible for CC thermostats. 'E' = External temperature control activated. 'I' = Internal temperature control activated. '*' = Only permitted if the status cannot be determined. a = Alarm status '0' = No alarm. '≠ 0' = A numerical value which does not equal 0 indicates an alarm. tttt = Set-point in the temperature format described above. iiii = Internal actual value in the temperature format described above. eeee = External actual value is in the temperature format described above. pp = Checksum in the format described above. \r End character CR.

'L' Limit	This command communicates the set-point limits (see §1.5 Setting the Internal Set-point Limit). **Master enquiry:** **'[M01L0Fllllhhhhpp\r'** llll = Low limit, lower set-point limit in the above temperature format. **** = no change of the lower set-point limit. hhhh = High limit, upper set-point limit in the above temperature format. **** = no change of the upper set-point limit. pp = Checksum in the format described above. \r End character CR. **Slave reply:** **'[S01L17llllhhhhuuuuoooopp\r'** llll = Low limit, lower set-point limit in the temperature format described above. hhhh = High-Limit, upper set-point limit in the temperature format described above. uuuu = Lower working range. This limit is specific to the device and cannot be modified. The lower set-point limit is not permitted to be lower than the lower working range limit. oooo = Upper working range limit. This limit is specific to the device and cannot be modified. The upper set-point limit is not permitted to exceed the upper working range limit. pp = Checksum in the format described above. \r End character CR.
'I' Ident	This command changes the slave address (see §3.4 Setting device ID.). Important! The slave address is stored in the permanent memory. This is limited to 100,000 overwrite cycles as a result of the components used. When programming, ensure that these memory addresses are not overwritten too frequently. **Master enquiry:** **'[M01I09nnpp\r'** nn = New slave address '00'...'99'. ** no change of the slave address. pp = Checksum in the format described above. \r End character CR. **Slave reply:** **'[S01I09nnpp\r'** nn = New slave address. This address is valid after the reply is transmitted. Was entered as new slave address ** the previous slave address is returned. pp = Checksum in the format described above. \r End character CR.

The following commands are valid for all HUBER-Compatible Controllers with an RS232/RS485 interface.

'A' Alarm	This command communicates the alarm temperatures (see §2.3 Setting Alarm Values). **Master enquiry : '[M01A0Fllllhhhhpp\r'** llll = Low-alarm, lower alarm value in the temperature format described above. **** = No change of the lower alarm value. hhhh = High-alarm, upper alarm value in the temperature format described above. **** = No change of the upper alarm value. pp = Checksum in the format described above. r End character CR. **Slave reply: '[S01A0Fllllhhhhpp\r'** llll = Low-alarm, lower alarm value in the temperature format described above. hhhh = High-alarm, upper alarm value in the temperature format described above. pp = Checksum in the format described above. \r End character CR.

'S' Status	This command communicates status information regarding the device status. **Master enquiry : '[M01S080F4\r'** A '0' must be entered in the data group. This is the defining ID 0. Currently only this defining ID is occupied. \r End character CR. **Slave reply: '[S01S1A0aabcdeffgVxxxxxxyypp\r'** aa = Set-point source: 'A0' = analogue set-point, 'R2' = RS232, 'R4' = RS485. b = Alarm status: 'H' = High-alarm, 'L' = Low-alarm, 'M' = No alarm c = Temperature control mode: 'E' = External temperature control, 'I' = internal temperature control, 'G' = Controller status = off. d = Error status: 'T' = Overtemperature on the mini CC, 'F' = Level on the mini CC or error on the uni CC, 'B' = Both errors simultaneously on the mini CC, 'N' = No error. e = Calibration status: 'C' = Internal and external systems calibrated, 'U' = Internal and external systems not calibrated, 'J' = Only internal system calibrated, 'O' = Only external system calibrated. ff = Compressor automatic controls -Status: 'D1' = Compressor automatic controls ON, 'P0' = Compressor automatic controls OFF, 'K1' = Compressor automatic controls have activated the compressor 'K0' = Compressor automatic controls have deactivated the compressor. g = Sensor status: 'X' = External sensor leaking, 'Y' = Internal sensor leaking, 'Z' = Both sensors OK, 'W' = Both sensors leaking. V = Version ID xxxxxx = Version number as a string, e.g., '03.01A' or '03.10A' yy = PCB status with hardware ID 'M1' = mini CC hardware 1 'U1' = uni CC hardware 1 'P3' = Polystat CC Hardware 1 pp = Checksum in the format described above. \r End character CR.

6.2.2.2 Tecon compatible Command group

General: The master transmits to the slave and always receives an answer (echo). No slave transmits unless prompted.

This procedure is upper and lower case sensitive.
Temperatures are transmitted with a resolution of 0.1K, i.e., +100°C corresponds to the decimal number 1000 and the hexadecimal number 00003E8h. The ASCII characters '0','0','0','0','0','3','E','8' are therefore transmitted. The temperature -100°C corresponds to the decimal number -1000 and the hexadecimal number FFFFFC18h. The ASCII characters 'F','F','F','F','F','C','1','8'are therefore transmitted.
The ASCII characters '0'...'9' and 'A'...'F' are therefore used to transmit temperature values.
A request from the master to the slave is constructed according to the following assignment:

'#ssmmzlld...dpp\r'.

This includes:

#	Start character 23h	1 Byte
ss	Slave address	2 Byte
mm	Master address	2 Byte
z	Data set ID	1 Byte
ll	Data set ID number	2 Byte
d...d	Data character	0...50 Byte
pp	Checksum	2 Byte
\r	End character CR 0Dh	1 Byte

A reply from the slave to the master is constructed according to the following assignment:

'<mmss=d...dpp\r'.

This includes:

<	Start character 3Ch	1 Byte
mm	Master address	2 Byte
ss	Slave address	2 Byte
=	Message acknowledged	1 Byte
d...d	Data character	0...50 Byte
pp	Checksum	2 Byte
\r	End character CR 0Dh	1 Byte

The meaning of the data is indicated by the data set ID. The commands are designated according to the data set ID in the following. A checksum is also transmitted to improve data security. The checksum is the 1-Byte sum of all of the hexadecimal values from the start character up to the character preceding the checksum.

Example: The master transmits: **'#0100v00\r'**

ASCII	Hex	Meaning	
1st Byte	**#**	23h	Start character
2nd Byte	**0**	30h	Slave address 01
3rd Byte	**1**	31h	Slave address 01
4th Byte	**0**	30h	Master address 00
5th Byte	**0**	30h	Master address 00
6th Byte	**v**	76h	Data set ID
7th Byte	**0**	30h	Data set ID number
8th Byte	**0**	30h	Data set ID number
9th Byte	**B**	42h	Checksum BA
10th Byte	**A**	41h	Checksum BA
11th Byte	**\r**	0Dh	End character CR

The checksum is derived from these Bytes.
23h + 30h + 31h + 30h + 30h + 76h + 30h + 30h = 1BAh --> 1Byte-Summe = BAh.

Protocol setting for the tecon commands

Baud rate	1200, 2400, 4800, 9600 asynchronous
Start bit	1
Data bits	7
Parity bit	1
Stop bit	1
Parity	odd

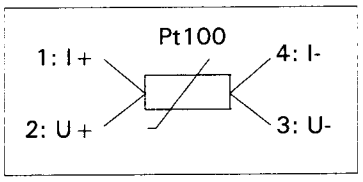
'v'	Provided to check if a slave is present. **Master enquiry :** **'#0100v00pp\r'** The master enquires if slave 01 is connected to the bus. **Slave reply:** **'<0001=UNI-0001pp\r'** Slave 01 is connected to the bus and is a Huber unit.
'C'	Transfer of the set-point and actual values **Master enquiry :** **'#0100C00tttttttt**********pp\r'** The master unit 00 transmits the set-point value **tttttttt** to the slave 01 in the temperature format described above. If the set-point does not have to be modified, the temperature ''********' must be transmitted instead. **Slave reply:** **'<0001=tttttttt********iiiiiiieeeeeeee******** 0x0y******pp\r'** **tttttttt** = Set-point in the temperature format described above. For internal temperature control: **iiiiiii** = Internal actual value in the temperature format described above. **eeeeeeee** = External actual value in the temperature format described above. If no sensor is connected, ''********' is transmitted. For external temperature control: **iiiiiii** = External actual value is in the temperature format described above. **eeeeeeee** = Internal actual value is in the temperature format described above. **x** = Alarm status: '0' = No alarm, '1' = Alarm. **y** = Controller status: '0' = Controller off, '4' = Controller on.

6.2.3 The IF232 Command group

The software protocol IF232 is designed for communicating with the software of the Huber IF232 interface.

7. Pin assignment

7.1 Connection assignment Pt100 sensor bush

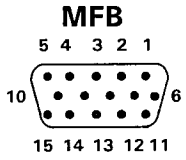


Contact 1: I+
Contact 2: U+
Contact 3: U-
Contact 4: I-

Pt100 Sensor, 1,5m cable	**Order No.**
Protection tube closed, ∅6 mm, 180 mm long	6138
Protection tube closed, ∅6 mm, 200 mm long with hand grip	6105
Protection tube open, ∅8 mm, 170 mm long	6205
plug for external Pt100 sensor	3086
other parts see catalog	

7.2 Connection assignment of the multi-function bush MFB (HD15DSub)

The RS 232 interface can be used to connect the unit to a PC or a printer. Please note:

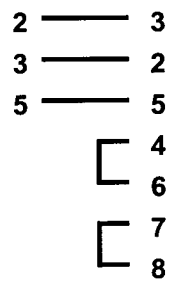


Contacts 4, 8 and 9 are reserved. Please do not use these contacts.
Contact 1 connection resistance 120 Ω RS485
Contact 2 RxD/ RS232 (colour white)
Contact 3 TxD/ RS232 (green)
Contact 5 DNGD (brown)
Contact 6 volt-free contact (yellow)
Contact 7 connection resistance 120Ω RS485
Contact 10 volt-free contact (pink)
Contact 11 A/ RS485
Contact 12 analogue output (red)
Contact 13 analogue ground AGND (grey)
Contact 14 analogue input (blue)
Contact 15 B/RS485

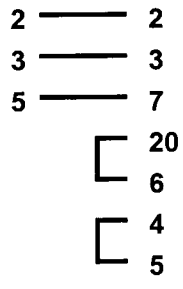
In order to activate the terminal resistance of the RS485, contact 1 must be cross-connected to contact 7.
The colours indicated in brackets are the wire colours for the control cable (Order No. 6218).

Cabel for PC-control

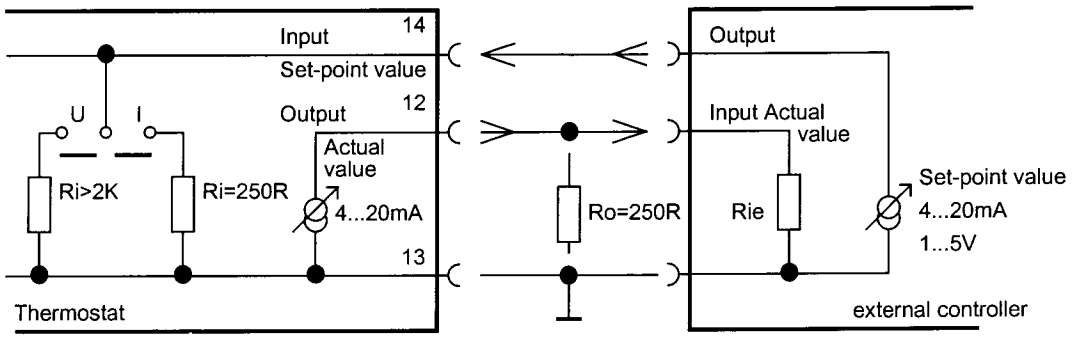
MFB PC-Com 9 pole



MFB PC-Com 25 pole



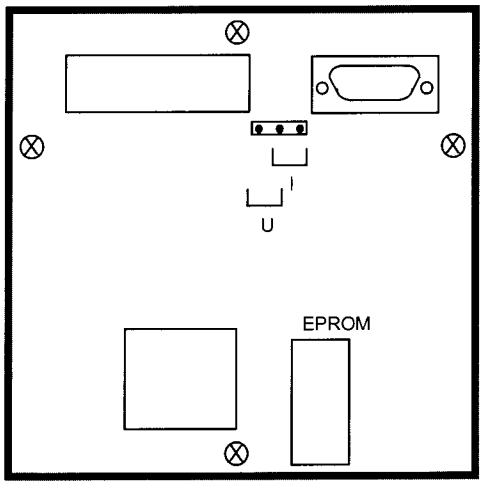
7.3 Diagram of the analogue interface (AIF)



Analogue input		4...20mA with jumper in position I	$R_i = 250\Omega$
		1....5V with jumper in position U	$R_i >= 2k\Omega$
Analogue output	with Ro	1...5V	$R_{iE} > 10\Omega$
	without Ro	4...20mA	R_{iE} max. 250Ω

7.4 Position of the AIF Jumpers

- Switch off the unit, pull off the mains plug
- Take off the controller
- Remove cover of MFB
- Remove the knob of the rotary selector
- Remove the 4 fixing screws marked with „X„
- Take out the bar sheet from the controller housing
- Put the jumper in the required position



- Remount the bar sheet
- Put the controller on the unit
- Put the unit into operation

8. Automatic compressor control

8.1 Activate automatic compressor control

By pressing the menu key you reach the function menu (see §2.1). Set the function Comp. with the rotary knob and choose the function with the set key (see §3.11). Now you can choose the mode of the automatic compressor control using the rotary knob.
ON represents continuous operation of the chiller - the cooling capacity power adjustment feature remains activated.
OFF represents deactivation of the chiller, the cooling capacity power adjustment feature is also deactivated.
AUTO represents activated automatic compressor control, the cooling capacity power adjustment is also activated. This mode achieves good results for most of the application cases.

8.2 Description of automatic compressor control

The automatic compressor control assesses three states of temperature control.
1. The set-point is set to a value below 20°C. In this case, the chiller is continuously activated.

2. The set-point jump.
If the set-point jumps to a temperature which is more than 5 K higher than the previous set-point, the chiller will be deactivated (if necessary) as long as this complies with the chiller duty factor requirements. If this pre-condition is not met the chiller will only be deactivated when the minimum duty period is exceeded.
If the set-point jumps to a temperature which is more than 2 K below the previous set-point, the chiller will be activated (if necessary).

3. Continuous monitoring of heating capacity.
The monitoring of the heating capacity will be started once the set-point jump has been equalised. The chiller will be deactivated if the required heating capacity exceeds the deactivation threshold of the automatic controls. This prevents unnecessary conflict between the circulation bath and the chiller. This also considers the minimum duty period for the chiller. The chiller will be activated if the required heating capacity falls below the activation threshold for the automatic controls in the course of normal operation.
This prevents the bath temperature drifting slowly. The automatic controls also regulate the switching frequency of the chiller. If the chiller is activated on several occasions at the same set-point, the chiller will remain activated.

Program data table:

Program number		?	Starting temp.		20°C		1st Memory address
1. Segment	Goto	20°C	Time	h	20	min	2nd Memory address
2. Segment	Goto	30°C	Time	h	20	min	3rd Memory address
3. Segment	Goto	30°C	Time	h	30	min	4th Memory address
4. Segment	Goto	0°C	Time	1 h	0	min	5th Memory address
5. Segment	Goto	0°C	Time	h	40	min	6th Memory address
6. Segment	Goto	30°C	Time	h	Fast	min	7th Memory address
7. Segment	Goto	30°C	Time	h	40	min	8th Memory address
Cycles		0					no Memory address
Hold ☐?		End ☐?					9th Memory address

A segment memory is assigned for the each of the following: the program number, the start temperature the program end mode and the number of cycles (if necessary), i.e., the above program is assigned to segment memory address 9.

A2.2 Status of the program controller

The green LED located above the prog-key indicates the status of the program controller.

1. Continuously illuminated = Program controller activated
2. Flashing = Pause feature active
3. LED off = Program controller deactivated.

The program controller cannot be deactivated when it is paused. The program controller must be reactivated first (see §3.9.4).

A Appendix

A1 Additional information for using:

A1.1 The Compatible Control as a replacement control unit.

By pressing the menu key you reach the function menu. Set the function *Rom* with the rotary knob, and choose the function with set key (see §3.10). The software version is indicated for 2 seconds.

A1.2 Adjusting the factory-set unit parameters.

By pressing the menu key you reach the function menu. Set the function *Init* with the rotary knob and choose the function with set key (see §3.17). Choose the option YES using the rotary knob and confirm the option with set key. All user-specific settings are cleared as soon as the DONE message is displayed (e.g. the program controller programs, user temperatures, temperature mode, alarm values, print values, set-point limits, control parameters, AIF-settings...).

A1.3 Feature keys

A1.3.1 Escape feature:

Pressing set and menu keys simultaneously terminates the current data entry mode. The current entries are not saved.
This escape feature is not always available, i.e., during the calibration program (see §3.5).

A1.3.2 Enter feature

The set-key is used as an enter-key during the data entry mode. Pressing this key confirms the current entry.

A1.3.3 MasterClear feature

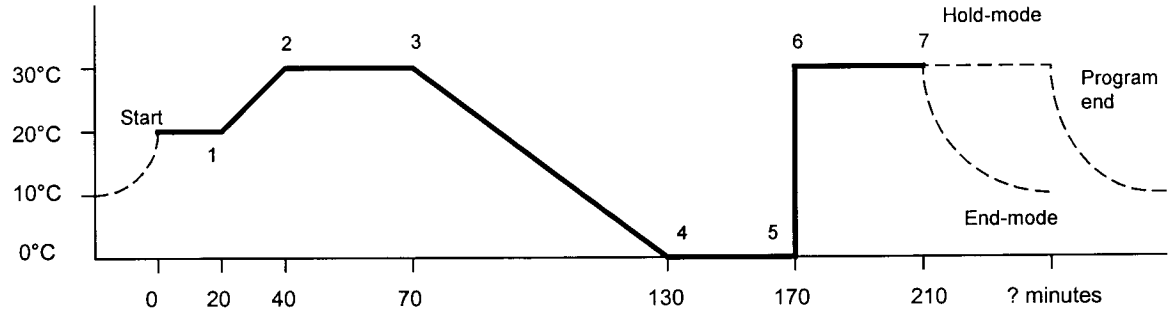
Pressing the menu key and the temp-key simultaneously can: terminate an active temperature control program, deactivate the analogue interface or changing the digital interface from remote mode to local mode.

A2 Additional Information Regarding the Program Controller

A2.1 Programming

In order simplify the programming of the programmer it is advisable to first draw the sketch of the temperature profile.
Using this sketch, the segment data can be noted in the table at the end of this appendix.

Example: Sketch



Program data table

Program number :.....

Starting temperature :.....

1.	Segment	Goto	:.....	Time	:.....h.....min
2.	Segment	Goto	:.....	Time	:.....h.....min
3.	Segment	Goto	:.....	Time	:.....h.....min
4.	Segment	Goto	:.....	Time	:.....h.....min
5.	Segment	Goto	:.....	Time	:.....h.....min
6.	Segment	Goto	:.....	Time	:.....h.....min
7.	Segment	Goto	:.....	Time	:.....h.....min
8.	Segment	Goto	:.....	Time	:.....h.....min
9.	Segment	Goto	:.....	Time	:.....h.....min
10.	Segment	Goto	:.....	Time	:.....h.....min
11.	Segment	Goto	:.....	Time	:.....h.....min
12.	Segment	Goto	:.....	Time	:.....h.....min
13.	Segment	Goto	:.....	Time	:.....h.....min
14.	Segment	Goto	:.....	Time	:.....h.....min
15.	Segment	Goto	:.....	Time	:.....h.....min
16.	Segment	Goto	:.....	Time	:.....h.....min
17.	Segment	Goto	:.....	Time	:.....h.....min
18.	Segment	Goto	:.....	Time	:.....h.....min
19.	Segment	Goto	:.....	Time	:.....h.....min
20.	Segment	Goto	:.....	Time	:.....h.....min
21.	Segment	Goto	:.....	Time	:.....h.....min
22.	Segment	Goto	:.....	Time	:.....h.....min
23.	Segment	Goto	:.....	Time	:.....h.....min
24.	Segment	Goto	:.....	Time	:.....h.....min
25.	Segment	Goto	:.....	Time	:.....h.....min
26.	Segment	Goto	:.....	Time	:.....h.....min
27.	Segment	Goto	:.....	Time	:.....h.....min
28.	Segment	Goto	:.....	Time	:.....h.....min
29.	Segment	Goto	:.....	Time	:.....h.....min
30.	Segment	Goto	:.....	Time	:.....h.....min
31.	Segment	Goto	:.....	Time	:.....h.....min
32.	Segment	Goto	:.....	Time	:.....h.....min
33.	Segment	Goto	:.....	Time	:.....h.....min
34.	Segment	Goto	:.....	Time	:.....h.....min
35.	Segment	Goto	:.....	Time	:.....h.....min
36.	Segment	Goto	:.....	Time	:.....h.....min
37.	Segment	Goto	:.....	Time	:.....h.....min
38.	Segment	Goto	:.....	Time	:.....h.....min
39.	Segment	Goto	:.....	Time	:.....h.....min
40.	Segment	Goto	:.....	Time	:.....h.....min
41.	Segment	Goto	:.....	Time	:.....h.....min
42.	Segment	Goto	:.....	Time	:.....h.....min
43.	Segment	Goto	:.....	Time	:.....h.....min
44.	Segment	Goto	:.....	Time	:.....h.....min
45.	Segment	Goto	:.....	Time	:.....h.....min
46.	Segment	Goto	:.....	Time	:.....h.....min
47.	Segment	Goto	:.....	Time	:.....h.....min
48.	Segment	Goto	:.....	Time	:.....h.....min

Cycles :.....

Hold ☐ End ☐

huber

Digital Thermostat
constant temperature bath

polystat CC1, CC2, CC3

Einhängethermostate mit Plug & Play Technologie - Mikroprozessorgesteuert, einfache Bedienung mit Drehgeber und Digitalanzeige. Starke Druckpumpe, benetzte Teile aus Edelstahl oder hochwiderstandsfähigem Kunststoff. Alle Modelle mit 3 Jahren Garantie auf die Elektronik. 3 Modelle zur Auswahl:

Polystat cc1, mit Niveauschutz (Schwimmerschalter) und einstellbarem Übertemperaturschutz für unbeaufsichtigten Dauerbetrieb mit brennbaren und nicht brennbaren Flüssigkeiten (FL). Zusätzliche Sicherheit durch maximalen und minimalen Sollwert. Max. Temperatur 200°C.
Polystat cc2 (62), wie Polystat cc1, jedoch mit Programmgeber (5 Schritte), Führungsregler für externe Temperierung, 3 Fixtemperaturen und einfacher Rampenfunktion. Max. Temperatur 200°C.
Polystat cc3 (63), wie Polystat cc2, jedoch mit dem kompletten Funktionsumfang der Compatible Control Thermostate: Programmgeber (50 Schritte aufteilbar auf 10 Programme), Schnittstellen RS232, RS485 und analog (4...20mA) für bidirektionale Kommunikation. Anschluss für seriellen Drucker. Max. Temperatur 200°C.

New Immersion Circulators with Plug & Play Technology - microprocessor controlled, easy handling with encoder and digital display. Powerful force pump, moistened parts in stainless steel or high-resistant plastics. All models with 3 years warranty for electronic. 3 models available:

Polystat cc1, with level protection (float switch) and adjustable overtemperature protection for continuous operation without personal assistance for using flammable and non-flammable liquids (FL). Maximum and minimum setpoint for additional safety. Max. temperature 200°C.
Polystat cc2 (62), similar to Polystat cc1, but with programmer (5 steps), temperature sequence controller for external thermoregulation, 3 fixtemperatures and easy ramping function. Max. temperature 200°C.
Polystat cc3 (63), similar to Polystat cc2, but with all functions of the Compatible Control Thermostats: Programmer (50 steps, divisible into 10 programmes) and interfaces RS232, RS485 and analog (4...20mA) for bidirectional communication. Serial printer output. Max. temperature 200°C.

Technische Daten	**Technical Data**	**Polystat cc1**	**cc2 (62)**	**cc3 (63)**
Arbeitstemperaturbereich	Operating temperature range		25...200°C	
mit Wasserkühlung	with water cooling		20...200°C	
mit Kühlgerät	with refrigeration chiller		-30..200°C	
Temperaturkonstanz bei 70°C (15l)	Temperature stability at 70°C (15 l bath)		0,02 K (DIN 58966)	
Temperatureinstellung	Temperature adjustment		digital	
Temperaturanzeige	Temperature indication		digital	
Absolutgenauigkeit	absolute accuracy	kalibrierbar / setup for calibration		
Temperaturfühler	Temperature sensor		Pt100	
Anschluss externer Fühler	connection external sensor	---	Pt100	Pt100
externer Programmeingang	external program input	---	---	4-20mA
Schreiber Ausgang	Recorder output	---	---	4-20mA
Sicherheitsklasse	Safety classification		FL	
Heizleistung	Heating capacity		2,0 kW	
Druckpumpe Anschluss 12mm	Force pump adapter nom 12 mm		10 l/min max.	
Anschluss 8 mm	adapter nom 8 mm		7 l/min max.	
Förderhöhe (Druck)	Pressure		0,2 bar max.	
Pumpenanschluss	Pump connection		M16x1	
Pumpenanschluss für Schlauch	Pump connections for hose		NW8/ NW12	
Abmessungen B x T x H	Overall dimension w x l x h		120 x 135 x 300 mm	
Eintauchtiefe	immersion depht		150 mm	
Gewicht, netto	Net weight		4,0 kg	
Netzanschluss	Power supply requirement		208-240 V 1~ 50/60 Hz	
Leistungsaufnahme/Absicherung	Power input / fuse		2100 Watt 10 A	
Bestell-Nr.	**Order-No.**	**688.0001**	**688.0002**	**688.0003**
ab Fert.Nr.	**from serial no.**	**49714**	**49714**	**49714 V1.2**

Zubehör und Peripherie: Kühlschlange für Wasserkühlung, Pumpenadapter für externe Temperierung, Schlauchstutzen NW 8/ NW 12, Blindstopfen und Überwurfmuttern M16x1, Mikroverschraubungen, Verbindungsschläuche, Verbindungskabel*. Temperierbehälter aus Polycarbonat und Edelstahl und Einsätze für Küvetten und Laborglas.
*im Lieferumfang enthalten

Accessoires and periphery: Cooling coil for water cooling, pump adapter for external thermoregulation, adapter nom. dia 8 mm/ 12 mm, dummy plugs and sleeve nuts thread M16x1, micro boltings, connection tubes, connection cable*.
Waterbathes in polycarbonat and stainless steel and units for cells and glasses.
*standard equipment

Peter Huber Kältemaschinenbau GmbH Werner-von-Siemens-Str. 1 D-77656 Offenburg Tel 0781/96030 Fax 0781/57211

huber

Digital Thermostat
constant temperature bath

polystat 61

Einhängethermostate mit Plug & Play Technologie - Mikroprozessorgesteuert, einfache Bedienung mit Drehgeber und Digitalanzeige. Starke Druckpumpe, benetzte Teile aus Edelstahl oder hochwiderstandsfähigem Kunststoff. Alle Modelle mit 3 Jahren Garantie auf die Elektronik.

Polystat cc61, mit Niveauschutz (Schwimmerschalter), wahlweise mit oder ohne einstellbarem Übertemperaturschutz. Die Version mit Übertemperaturschutz für unbeaufsichtigten Dauerbetrieb mit brennbaren Flüssigkeiten (FL), die Version ohne Übertemperaturschutz darf nur mit nicht brennbaren Flüssigkeiten (NFL) eingesetzt werden. Zusätzliche Sicherheit durch maximalen und minimalen Sollwert. Max. Temperatur 100°C.

New Immersion Circulators with Plug&Play Technology - microprocessor controlled, easy handling with encoder and digital display. Powerful force pump, moistened parts in stainless steel or high-resistant plastics. All models with 3 years warranty for electronic.

Polystat cc61, with level protection (float switch), alternatively with or without adjustable overtemperature protection. The version with overtemperature protection for continuous operation without personal assistance if using flammable liquids (safety classification FL), the version without overtemperature protection is only allowed to be used with non-flammble liquids (safety classification NFL). Maximum and minimum setpoint for additional safety. Max. temperature 100°C.

Technische Daten	**Technical Data**	**polystat 61**
Arbeitstemperaturbereich	Operating temperature range	25...100°C
mit Wasserkühlung	with water cooling	20...100°C
mit Kühlgerät	with refrigeration chiller	-30...100°C
Temperaturkonstanz bei 70°C	Temperature stability at 70°C	0,02 K (DIN 58966)
Temperatureinstellung	Temperature adjustment	digital
Temperaturanzeige	Temperature indication	digital
Absolutgenauigkeit	absolute accuracy	kalibrierbar / setup for calibration
Temperaturfühler	Temperature sensor	Pt100
externer Programmeingang	external program input	4-20mA
Schreiber Ausgang	Recorder output	4-20mA
Sicherheitsklasse	Safety classification	NFL
Heizleistung	Heating capacity	2,0 kW
Druckpumpe Anschluss 12mm	Force pump (adapter nom 12 mm)	10 l/min max.
Anschluss 8 mm	(adapter nom 8 mm)	7 l/min max.
Förderhöhe (Druck)	Pressure	0,2 bar max.
Pumpenanschluss	Pump connection	M16x1
Pumpenanschluss für Schlauch	Pump connections for hose	NW8/ NW12
Abmessungen B x T x H	Overall dimension w x l x h	120 x 135 x 300 mm
Eintauchtiefe	immersion depht	150 mm
Gewicht, netto	Net weight	4,0 kg
Netzanschluss	Power supply requirement	230 V ~ N 50 Hz
Leistungsaufnahme/Absicherung	Power input / fuse	2100 Watt 10 A

Bestell-Nr.	**Order-No.**	**NFL**	**688.0004**	**85924**
Bestell-Nr.	**Order-No.**	**FL**	**688.0010**	**85925**
ab Fert.Nr.	**from serial no.**		**35289**	**V1.1**

Zubehör* und Peripherie: Kühlschlange für Wasserkühlung, Pumpenadapter für externe Temperierung, Schlauchstutzen NW 8/ NW 12, Blindstopfen und Überwurfmuttern M16x1, Mikroverschraubungen, Verbindungsschläuche, Verbindungskabel*. Temperierbehälter aus Polycarbonat und Edelstahl und Einsätze für Küvetten und Laborglas.
*im Lieferumfang enthalten

Accessoires* and periphery: Cooling coil for water cooling, pump adapter for external thermoregulation, adapter nom. dia 8 mm/ 12 mm, dummy plugs and sleeve nuts thread M16x1, micro boltings, connection tubes, connection cable*. Waterbathes in polycarbonat and stainless steel and units for cells and glasses.
*standard equipment

Peter Huber Kältemaschinenbau GmbH Werner-von-Siemens-Str. 1 D-77656 Offenburg Tel 0781/96030 Fax 0781/57211

huber

Digitaler Wärme-Thermostat
Circulator bath

polystat 201

Umwälzthermostate mit Plug & Play Technologie - Mikroprozessorgesteuert, einfache Bedienung mit Drehgeber und Digitalanzeige. Starke Druckpumpe, benetzte Teile aus Edelstahl oder hochwiderstandsfähigem Kunststoff. Alle Modelle mit 3 Jahren Garantie auf die Elektronik. Kühlschlange für Wasserkühlung. Max. Temperatur 200°C. 3 Modelle zur Auswahl:

Polystat 201-1, mit Niveauschutz (Schwimmerschalter) und einstellbarem Übertemperaturschutz für unbeaufsichtigten Dauerbetrieb mit brennbaren und nicht brennbaren Flüssigkeiten (FL). Zusätzliche Sicherheit durch maximalen und minimalen Sollwert.
Polystat 201-2, wie Polystat 201-1, jedoch mit Programmgeber (5 Schritte), Führungsregler für externe Temperierung, 3 Fixtemperaturen und einfacher Rampenfunktion.
Polystat 201-3, wie Polystat 201-2, jedoch mit dem kompletten Funktionsumfang der Compatible Control Thermostate: Programmgeber (50 Schritte aufteilbar auf 10 Programme), und Schnittstellen RS232, RS485 und Analog (4...20mA) für bidirektionale Kommunikation (FL). Anschluss für seriellen Drucker.

New Circulators with Plug&Play Technology - microprocessor controlled, easy handling with encoder and digital display. Powerful force pump, moisted parts in stainless steel or high-resistant plastics. All models with 3 years warranty for electronic. Cooling coil for (tap) water. Max. temperature 200°C. 3 models available:

Polystat 201-1, with level protection (float switch) and adjustable overtemperature protection for continuous operation without personal assistance for using flammable and non-flammable liquids (FL). Maximum and minimum setpoint for additional safety..
Polystat 201-2, similar to Polystat 201-1, but with programmer (5 steps), temperature sequence controller for external thermoregulation, 3 fixtemperatures and easy ramping function.
Polystat 201-3, similar to Polystat 201-2, but with all functions of the Compatible Control Thermostats: Programmer (50 steps, divisible into 10 programmes) interfaces RS232, RS485 and analog (4...20mA) for bidirectional communication (FL). Serial printer output.

Technische Daten	**Technical Data**	**polystat 201-1**	**201-2**	**201-3**
Arbeitstemperaturbereich	Operating temperature range		70...200°C	
mit Wasserkühlung	with water cooling		20...200°C	
mit Kühlgerät	with refrigeration chiller		-30..200°C	
Temperaturkonstanz bei 70°C (15 l)	Temperature stability at 70°C (15 l)		0,05 K (DIN 58966)	
Temperatureinstellung	Temperature adjustment		digital	
Temperaturanzeige	Temperature indication		digital	
Absolutgenauigkeit	absolute accuracy	kalibrierbar / setup for calibration		
Temperaturfühler	Temperature sensor		Pt100	
externer Temperaturfühler	external Temperature sensor	---	Pt100	Pt100
externer Programmeingang	external program input	---	---	4-20mA
Schreiber Ausgang	Recorder output	---	---	4-20mA
Sicherheitsklasse	Safety classification		FL	
Heizleistung	Heating capacity		2,0 kW	
Druckpumpe Anschluß 12mm	Force pump (adapter nom 12 mm)		10 l/min max.	
Anschluß 8 mm	(adapter nom 8 mm)		7 l/min max.	
Förderhöhe (Druck)	Pressure		0,2 bar max.	
Pumpenanschluss	Pump connection		M16x1	
Pumpenanschluss für Schlauch	Pump connections for hose		NW8/ NW12	
Füllvolumen max.	Bath capacity max.		1,8 lit.	
Badöffnung Durchmesser / Tiefe	Bath opening diameter / depth		25 mm / 150 mm	
Abmessungen B x T x H	Overall dimension w x l x h		150 x 215 x 350 mm	
Arbeitshöhe Bad	Heith of bath opening		190 mm	
Gewicht, netto	Net weight		6,5 kg	
Netzanschluss	Power supply requirement		230 V ~ N 50 Hz	
Leistungsaufnahme/Absicherung	Power input / fuse		2100 Watt 10 A	
Bestell-Nr.	**Order-No.**	**685.0001**	**685.0002**	**685.0002**
ab Fert.Nr.	**from serial no.**	**35212**	**35212**	**35212 V1.1**

Zubehör* und Peripherie: Schlauchstutzen NW 8*/ NW12*, Blindstopfen* und Überwurfmuttern M16x1*, Verbindungsschläuche, Verbindungskabel.
*im Lieferumfang enthalten
Accessoires* and periphery: adapter nom. dia 8 mm*/ 12 mm*, dummy plugs* and sleeve nuts thread M16x1*, connection tubes, connection cable.
*standard equipment

Peter Huber Kältemaschinenbau GmbH Werner-von-Siemens-Str. 1 D-77656 Offenburg Tel 0781/96030 Fax 0781/57211

huber

Digitaler Wärme-Thermostat
Circulator bath

polystat 202

Umwälzthermostate mit Plug & Play Technologie - Mikroprozessorgesteuert, einfache Bedienung mit Drehgeber und Digitalanzeige. Starke Druckpumpe, benetzte Teile aus Edelstahl oder hochwiderstandsfähigem Kunststoff. Alle Modelle mit 3 Jahren Garantie auf die Elektronik. Kühlschlange für Wasserkühlung. Max. Temperatur 200°C. 3 Modelle zur Auswahl:

Polystat 202-1, mit Niveauschutz (Schwimmerschalter) und einstellbarem Übertemperaturschutz für unbeaufsichtigten Dauerbetrieb mit brennbaren und nicht brennbaren Flüssigkeiten (FL). Zusätzliche Sicherheit durch maximalen und minimalen Sollwert.
Polystat 202-2, wie Polystat 202-1, jedoch mit Programmgeber (5 Schritte), Führungsregler für externe Temperierung, 3 Fixtemperaturen und einfacher Rampenfunktion.
Polystat 202-3, wie Polystat 202-2, jedoch mit dem kompletten Funktionsumfang der Compatible Control Thermostate: Programmgeber (50 Schritte aufteilbar auf 10 Programme), Führungsregler für externe Temperierung und Schnittstellen RS232, RS485 und Analog (4...20mA) für bidirektionale Kommunikation (FL). Anschluss für seriellen Drucker.

New Circulators with Plug&Play Technology - microprocessor controlled, easy handling with encoder and digital display. Powerful force pump, moisted parts in stainless steel or high-resistant plastics. All models with 3 years warranty for electronic. Cooling coil for (tap) water. Max. temperature 200°C. 3 models available:

Polystat 202-1, with level protection (float switch) and adjustable overtemperature protection for continuous operation without personal assistance for using flammable and non-flammable liquids (FL). Maximum and minimum setpoint for additional safety.
Polystat 202-2, similar to Polystat 202-1, but with programmer (5 steps), temperature sequence controller for external thermoregulation, 3 fixtemperatures and easy ramping function.
Polystat 202-3, similar to Polystat 202-2, but with all functions of the Compatible Control Thermostats: Programmer (50 steps, divisible into 10 programmes), interfaces RS232, RS485 and analog (4...20mA) for bidirectional communication (FL). Serial printer output.

Technische Daten	**Technical Data**	**polystat 202-1**	**202-2**	**202-3**
Arbeitstemperaturbereich	Operating temperature range		70...200°C	
mit Wasserkühlung	with water cooling		20...200°C	
mit Kühlgerät	with refrigeration chiller		-30..200°C	
Temperaturkonstanz bei 70°C	Temperature stability at 70°C		0,05 K (DIN 58966)	
Temperatureinstellung	Temperature adjustment		digital	
Temperaturanzeige	Temperature indication		digital	
Absolutgenauigkeit	absolute accuracy	kalibrierbar / setup for calibration		
Temperaturfühler	Temperature sensor		Pt100	
externer Temperaturfühler	external Temperature sensor	---	Pt100	Pt100
externer Programmeingang	external program input	---	---	4-20mA
Schreiber Ausgang	Recorder output	---	---	4-20mA
Sicherheitsklasse	Safety classification		FL	
Heizleistung	Heating capacity		2,0 kW	
Druckpumpe Anschluß 12mm	Force pump (adapter nom 12 mm)		10 l/min max.	
Anschluß 8 mm	(adapter nom 8 mm)		7 l/min max.	
Förderhöhe (Druck)	Pressure		0,2 bar max.	
Pumpenanschluss	Pump connection		M16x1	
Pumpenanschluss für Schlauch	Pump connections for hose		NW8/ NW12	
Füllvolumen	Bath capacity		4,5 lit.	
mit Verdrängereinsatz	with displacement rack		3,1 lit.	
Badöffnung B x T/ Tiefe	Bath opening w x l/ depth		105 x 90 mm / 150 mm	
Abmessungen B x T x H	Overall dimension w x l x h		150 x 285 x 350 mm	
Arbeitshöhe Bad	Heith of bath opening		190 mm	
Gewicht, netto	Net weight		8,3 kg	
Netzanschluss	Power supply requirement		230 V ~ N 50 Hz	
Leistungsaufnahme/ Absicherung	Power input / fuse		2100 Watt 10 A	
Bestell-Nr.	**Order-No.**	**686.0001**	**686.0002**	**686.0003**
ab Fert.Nr.	**from serial no.**	**35228**	**35228**	**35231 V1.1**

Zubehör* und Peripherie: Schlauchstutzen NW 8*/ NW12*, Blindstopfen* und Überwurfmuttern M16x1*, Verbindungsschläuche, Verbindungskabel.
*im Lieferumfang enthalten
Accessoires* and periphery: adapter nom. dia 8 mm*/ 12 mm*, dummy plugs* and sleeve nuts thread M16x1*, connection tubes, connection cable.
*standard equipment

Peter Huber Kältemaschinenbau GmbH Werner-von-Siemens-Str. 1 D-77656 Offenburg Tel 0781/96030 Fax 0781/57211

huber

Compatible Control Thermostat CC303

Bad- und Umwälzthermostat mit umschaltbarer Heizleistung: 3 kW (230V) oder 4 kW (400V). Gehäuse, Bad und alle flüssigkeitsbenetzten Teile aus Edelstahl. Mit Kühlschlange für Wasserkühlung, Druck- und Saugpumpe, Niveauschutz (Schwimmerschalter) und einstellbarem Übertemperaturschutz.
PLUG & PLAY Technologie: Mikroprozessorgesteuerte COMPATIBLE CONTROL Regler mit 3 Jahren Garantie. Alle Regler sind über Kreuz tauschbar und kalibrierfähig. 3 Modelle zur Auswahl:
CC303-1, einfachste Bedienung für unbeaufsichtigten Dauerbetrieb mit brennbaren und nicht brennbaren Flüssigkeiten (FL). Zusätzliche Sicherheit durch maximalen und minimalen Sollwert.
CC303-2, wie CC303-1, jedoch mit Programmgeber (5 Schritte), Führungsregler für externe Temperierung, 3 Fixtemperaturen und einfacher Rampenfunktion.
CC303-3, wie CC303-2, jedoch mit dem kompletten Funktionsumfang der COMPATIBLE CONTROL Thermostate: Programmgeber (50 Schritte aufteilbar auf 10 Programme), Schnittstellen RS232, RS485 und analog (4...20mA) für bidirektionale Kommunikation. Anschluß für seriellen Drucker.

Bath- and circulation-thermostat. Switch-over heating: 3 kW (230V) or 4 kW (400V). Housing, bath and all moistened parts in stainless steel. With cooling coil for water-cooling, pressure- and suction pump, level protection (float switch) and adjustable overtemperature protection.
PLUG & PLAY Technology: Microprocessor controller COMPATIBLE CONTROL with 3-year warranty. The controllers are interchangeable crosswise and can be calibrated. 3 models are available.
CC303-1, with level protection (float switch) and adjustable overtemperature protection for continuous operation without personal assistance for using flammable and non-flammable liquids (FL). Maximum and minimum setpoint for additional safety.
CC303-2, similar to CC303-1, but with programmer (5 steps), temperature sequence controller for external thermoregulation, 3 fixtemperatures and easy ramping function.
CC303-3, similar to CC303-2, but with all functions of the Compatible Control Thermostats: Programmer (50 steps, divisible into 10 programmes) and interfaces RS232, RS485 and analog (4...20mA) for bidirectional communication. Serial printer output.

Technische Daten	**Technical Data**	**CC303-1**	**CC303-2**	**CC303-3**
Arbeitstemperaturbereich	Operating temperature range		55...300°C	
mit Wasserkühlung	with water cooling		20...300°C	
mit Kühlgerät	with refrigeration chiller		-20...300°C	
Temperaturkonstanz bei 70°C	Temperature stability at 70°C		0,02 K (DIN 58966)	
Temperatureinstellung	Temperature adjustment		digital	
Temperaturanzeige	Temperature indication		digital	
Temperaturfühler	Temperature sensor		Pt100	
externer Temperaturfühler	external Temperature sensor	---	Pt100	Pt100
Schnittstelle (seriell)	interface (serial)	---	---	RS232,RS485
Sicherheitsklasse	Safety classification		FL	
Heizleistung	Heating capacity		0,75-3 kW / 1-4 kW automat.	
Druckpumpe	Force pump		18 l/min max.	
Förderhöhe (Druck)	Pressure		0,5 bar max.	
Saugpumpe	Suction pump		15 l/min max.	
Saughöhe (Sog)	Suction		0,4 bar max.	
Pumpenanschluß	Pump connection		M16x1	
Füllvolumen	Bath capacity		15 lit.	
mit Verdränger-Einsatz	with displacement rack		8,5 lit.	
Badöffnung B x T / Badtiefe	Bath opening w x d /bath depth		270 x 145 / 200 mm	
Abmessungen B x T x H	Overall dimension w x d x h		335 x 385 x 430 mm	
Arbeitshöhe Bad	Heith of bath opening		230 mm	
Gewicht, netto	Net weight		20 kg	
Netzanschluss umschaltbar	Power supply requirement switch-over		230 V ~ N 50/60 Hz	
oder	or		230 V 3 ~ 50/60 Hz	
oder	or		400 V 2 ~ N 50/60 Hz	
Absicherung	fuse		3x16 Amp.	
Bestell-Nr.	**Order-No.**	**684.0001**	**684.0002**	**684.0003**
ab Fert. Nr.	**from Serial No.**	**36181-50959**	**37741-50944**	**36181 V1.1**

Zubehör und Peripherie: Schlauchstutzen NW 8/12*, Blindstopfen*, Überwurfmuttern M16x1*, Schlauchstutzen NW 8, Mikroverschraubungen, Verbindungsschläuche, Verdrängereinsatz zur Reduzierung des Badvolumens und Führungsregler für externe Temperierung, digitale Programmgeber, serielles Interface und Stromspannungsschnittstellen. * im Lieferumfang enthalten

Accessoires and periphery: Adapter nom. dia 8/12 mm*, dummy plugs* and sleeve nuts thread M16x1*, adapter nom. dia 8 mm, micro boltings, connection tubes, displacement rack for reducement of the bath volume and temperature sequence control for external thermoregulation, digital programmers, serial interface and current voltage converter. * standard equipment

Leistungsangaben gelten bei: Wassereintritt 15°C 3 bar, Umgebungstemperatur 20°C

Peter Huber Kältemaschinenbau GmbH Werner-von-Siemens-Str. 1 D-77656 Offenburg Tel 0781/96030 Fax 0781/57211

huber — Compatible Control Thermostat — CC302

Bad- und Umwälzthermostat. Gehäuse, Bad und alle flüssigkeitsbenetzten Teile aus Edelstahl. Mit Kühlschlange für Wasserkühlung, Druck- und Saugpumpe, Niveauschutz (Schwimmerschalter) und einstellbarem Übertemperaturschutz.

PLUG & PLAY Technologie: Mikroprozessorgesteuerte COMPATIBLE CONTROL Regler mit 3 Jahren Garantie. Alle Regler sind über Kreuz tauschbar und kalibrierfähig. 3 Modelle zur Auswahl:
CC302-1, einfachste Bedienung für unbeaufsichtigten Dauerbetrieb mit brennbaren und nicht brennbaren Flüssigkeiten (FL). Zusätzliche Sicherheit durch maximalen und minimalen Sollwert.
CC302-2, wie CC302-1, jedoch mit Programmgeber (5 Schritte), Führungsregler für externe Temperierung, 3 Fixtemperaturen und einfacher Rampenfunktion.
CC302-3, wie CC302-2, jedoch mit dem kompletten Funktionsumfang der COMPATIBLE CONTROL Thermostate: Programmgeber (50 Schritte aufteilbar auf 10 Programme), Schnittstellen RS232, RS485 und analog (4...20mA) für bidirektionale Kommunikation. Anschluß für seriellen Drucker.

Bath- and circulation-thermostat. Housing, bath and all moisted parts in stainless steel. With cooling coil for water-cooling, pressure- and suction pump, level protection (float switch) and adjustable overtemperature protection.

PLUG & PLAY Technology: Microprocessor controller COMPATIBLE CONTROL with 3-year warranty. The controllers are interchangeable crosswise and can be calibrated. 3 models are available.
CC302-1, with level protection (float switch) and adjustable overtemperature protection for continuous operation without personal assistance for using flammable and non-flammable liquids (FL). Maximum and minimum setpoint for additional safety.
CC302-2, similar to CC302-1, but with programmer (5 steps), temperature sequence controller for external thermoregulation, 3 fixtemperatures and easy ramping function.
CC302-3, similar to CC302-2, but with all functions of the Compatible Control Thermostats: Programmer (50 steps, divisible into 10 programmes) and interfaces RS232, RS485 and analog (4...20mA) for bidirectional communication. Serial printer output.

Technische Daten	**Technical Data**	**CC302-1**	**CC302-2**	**CC302-3**
Arbeitstemperaturbereich	Operating temperature range		60...300°C	
mit Wasserkühlung	with water cooling		20...300°C	
mit Kühlgerät	with refrigeration chiller		-20..300°C	
Temperaturkonstanz bei 70°C	Temperature stability at 70°C		0,02 K (DIN 58966)	
Temperatureinstellung	Temperature adjustment		digital	
Temperaturanzeige	Temperature indication		digital	
Absolutgenauigkeit	absolute accuracy		kalibrierbar / setup for calibration	
Temperaturfühler	Temperature sensor		Pt 100	
externer Programmeingang	external program input	---	---	4-20mA
Schreiber Ausgang	Recorder output	---	---	4-20mA
Sicherheitsklasse	Safety classification		FL	
Heizleistung	Heating capacity		2,0 kW	
Druckpumpe Anschluß 12mm	Force pump (adapter nom 12 mm)		18 l/min max.	
Anschluß 8 mm	(adapter nom 8 mm)			
Förderhöhe (Druck)	Pressure		0,5 bar max.	
Saugpumpe	Suction pump		15 l/min max.	
Saughöhe (Sog)	Suction		0,4 bar max.	
Pumpenanschluß	Pump connection		M16x1	
Füllvolumen max.	Bath capacity max.		8,5 lit.	
mit Verdrängereinsatz	with displacement rack		5,2 lit.	
Badöffnung B x T / Tiefe	Bath opening w x l / depth		180 x 120 / 155 mm	
Abmessungen B x T x H	Overall dimension w x l x h		230 x 365 x 405 mm	
Arbeitshöhe Bad	Heith of bath opening		190 mm	
Gewicht, netto	Net weight		18,2 kg	
Netzanschluß	Power supply requirement		230 V ~ 50 Hz	
Absicherung	fuse		10 A	
Bestell-Nr.	**Order-No.**	**683.0001**	**683.0002**	**683.0003**
ab Fert.Nr.	**from serial no.**		**36180**	**V1.0**

Zubehör und Peripherie: Schlauchstutzen NW 12*, Blindstopfen*, Überwurfmuttern M16x1*, Schlauchstutzen NW 8, Mikroverschraubungen, Verbindungsschläuche, Verdrängereinsatz zur Reduzierung des Badvolumens und Führungsregler für externe Temperierung, digitale Programmgeber, serielles Interface und Stromspannungsschnittstellen. * im Lieferumfang enthalten

Accessoires and periphery: Adapter nom. dia 12 mm*, dummy plugs* and sleeve nuts thread M16x1*, adapter nom. dia 8 mm, micro boltings, connection tubes, displacement rack for reducement of the bath volume and temperature sequence control for external thermoregulation, digital programmers, serial interface and current voltage converter. * standard equipment

Leistungsangaben gelten bei: Wassereintritt 15°C 3 bar, Umgebungstemperatur 20°C
Output data go for: water inlet 15°C 3 bar, room temperature 20°C

Peter Huber Kältemaschinenbau GmbH Werner-von-Siemens-Str. 1 D-77656 Offenburg Tel 0781/96030 Fax 0781/57211

huber

Kältebäder
cooling baths

K12/ K15/ K20/ K25

Die Kältebäder sind Wasserbäder mit luftgekühlter Kältemaschine. Gehäuse und Wanne aus Edelstahl. Die Kältemaschine läuft im Dauerbetrieb.
*In Kombination mit Einhängethermostaten sind die Kältebäder bis 200°C einsetzbar (K12 bis 120°C). Die Kältemaschine kann bis 50°C arbeiten.

The cooling baths are water baths with air-cooled refrigerating unit. Housing and tank of stainless steel. The refrigerating unit works continiously.
*Together with the immersion thermostats can the cooling baths be used up to 200°C (K12 up to 120°C). The cooling unit can operate up to 50°C.

Technische Daten			**Technical Data**			**Kältebad K12**	
Arbeitstemperaturbereich			Operating temperature range			-20...(50) 200°C*	
Kälteleistung	bei	0°C	Cooling capacity	at	0°C	0,18 kW	
	bei	-10°C		at	-10°C	0,10 kW	
Kältemittel			Refrigerent			R134a	
Füllvolumen min.-max.			Bath capacity from - to			12 lit.	
Badöffnung B x T / Badtiefe			Bath opening w x l / bath depth			295 x 320 / 150 mm	
Abmessungen B x T x H			Overall dimension w x l x h			350 x 558 x 125 mm	
Gewicht, netto			Net weight			20 kg	
Netzanschluss			Power supply requirement			208-240 V 1~ 50/60 Hz	
Leistungsaufnahme / Absicherung			Power input / fuse			326 Watt 10 Amp.	
Bestell-Nr.			**Order-No.**			**653.0020**	
ab Fert.Nr.			**from Serial No.**			**52176**	**V1.3/02**

Technische Daten			**Technical Data**			**Kältebad K15**	
Arbeitstemperaturbereich			Operating temperature range			-20...(50) 200°C*	
Kälteleistung	bei	0°C	Cooling capacity	at	0°C	0,20 kW	
	bei	-10°C		at	-10°C	0,12 kW	
Kältemittel			Refrigerent			R134a	
Füllvolumen min.-max.			Bath capacity from - to			11 - 15 l	
Badöffnung B x T / Badtiefe			Bath opening w x l / bath depth			295 x 320 / 200 mm	
Abmessungen B x T x H			Overall dimension w x l x h			355 x 558 x 240 mm	
Gewicht, netto			Net weight			19 kg	
Netzanschluss			Power supply requirement			208-240 V 1~ 50/60 Hz	
Leistungsaufnahme / Absicherung			Power input / fuse			326 Watt 10 Amp.	
Bestell-Nr.			**Order-No.**			**645.0021**	
ab Fert.Nr.			**from Serial.No.**			**52646**	**V1.3/02**

Technische Daten			**Technical Data**			**Kältebad K20**	
Arbeitstemperaturbereich			Operating temperature range			-30...(50) 200°C*	
Kälteleistung	bei	0°C	Cooling capacity	at	0°C	0,35 kW	
	bei	-10°C		at	-10°C	0,30 kW	
	bei	-20°C		at	-20°C	0,21 kW	
Kältemittel			Refrigerent			R290	
Füllvolumen min.-max.			Bath capacity from - to			12 - 20 l	
Badöffnung B x T / Badtiefe			Bath opening w x l / bath depth			295 x 500 / 150 mm	
Abmessungen B x T x H			Overall dimension w x l x h			355 x 555 x 380 mm	
Gewicht, netto			Net weight			33 kg	
Netzanschluss			Power supply requirement			208-240 V 1~ 50/60 Hz	
Leistungsaufnahme / Absicherung			Power input / fuse			360 Watt 10 Amp.	
Bestell-Nr.			**Order-No.**			**646.0021**	
ab Fert.Nr.			**from Serial.No.**			**51043**	**V1.3/02**

Technische Daten			**Technical Data**			**Kältebad K25**	
Arbeitstemperaturbereich			Operating temperature range			-30...(50) 200°C*	
Kälteleistung	bei	0°C	Cooling capacity	at	0°C	0,35 kW	
	bei	-10°C		at	-10°C	0,30 kW	
	bei	-20°C		at	-20°C	0,21 kW	
Kältemittel			Refrigerent			R290	
Füllvolumen min.-max.			Bath capacity from - to			17 - 25 l	
Badöffnung B x T / Badtiefe			Bath opening w x l / bath depth			295 x 500 / 200 mm	
Abmessungen B x T x H			Overall dimension w x l x h			355 x 555 x 420 mm	
Gewicht, netto			Net weight			35 kg	
Netzanschluss			Power supply requirement			208-240 V 1~ 50/60 Hz	
Leistungsaufnahme / Absicherung			Power input / fuse			360 Watt 10 Amp.	
Bestell-Nr.			**Order-No.**			**647.0021**	
ab Fert.Nr.			**from Serial.No.**			**52715**	**V1.3/02**

Zubehör	**Accessoires:**	**K12**	**K15**	**K20**	**K25**
Steuerkabel Kältebad-Polystat 640mm	control cable Cooling bath-Polystat	6535	6535	6535	6535
Entleerungshahn	drain cock	6026	6026	6026	6026
Badbrücke	bath bridge	6015	6015	6016	6016
variabl. Stellboden	var. Bottom	6297	6297	6298	6298
Bad-Deckel vorn	bath cover front	6023	6023	6023	6023
Bad-Deckel hinten	bath cover back			6024	6024
Bad-Deckel einteilig	bath cover 1-piece			6025	6025
verschiedene Testglaseinsätze	test tube racks				

Peter Huber Kältemaschinenbau GmbH Werner-von-Siemens-Str. 1 D-77656 Offenburg Tel 0781/96030 Fax 0781/57211

huber

Digital Thermostat constant temperature bath

polystat A5, A6, A7, A11, A18

Polystat Badthermostat bestehend aus Einhängerthermostat polystat cc, durchsichtigem Badgefäß und Badbrücke. Badgefäß aus Polycarbonat mit Temperaturbereich bis max. 100°C. Badbrücken für A11 und A18 mit Öffnung für Kühlsonde (z.B. für HUBER Eintauchkühler TC40 - TC100E).
Benennung:
Beispiel: A5-2 durchsichtiges Bad mit 5 Ltr. Füllvolumen, kombiniert mit polystat cc2
A11-3 durchsichtiges Bad mit 11 Ltr. Füllvolumen, kombiniert mit polystat cc3

Polystat bath thermostat consisting of immersion circulators polystat cc, transparent baths and bath bridge. Baths made of polycarbonate with temperature range up to 100°C. Bath bridge for A11 and A18 with bore hole for cooling probe (e.g. for HUBER immersion cooler TC40-TC100E).
name:
example: A5-2 tansparent bath with 5 l bath capacity, in combination with polystat cc2
A11-3 tansparent bath with 11 l bath capacity, in combination with polystat cc3

Technische Daten	**Technical Data**	**A5-1**	**A5-2**	**A5-3**
Füllvolumen.	Bath capacity		5 lit.	
Badöffnung B x T / Badtiefe	Bath opening w x l / bath depth		120 x 110 / 150 mm	
Abmessungen B x T x H	Overall dimension w x l x h		132 x 275 x 320 mm	
Gewicht, netto	Net weight		4 kg	
Testglaseinsätze Typ A bis H	tube racks typ A to H		1 St.	
Bestell-Nr.	**Order-No.**	**688.0011**	**688.0012**	**688.0013**

Technische Daten	**Technical Data**	**A6-1**	**A6-2**	**A6-3**
Füllvolumen.	Bath capacity		6 lit.	
Badöffnung B x T / Badtiefe	Bath opening w x l / bath depth		120 x 210 / 150 mm	
Abmessungen B x T x H	Overall dimension w x l x h		132 x 375 x 320 mm	
Gewicht, netto	Net weight		4 kg	
Testglaseinsätze Typ A bis H	tube racks typ A to H		2 St.	
Bestell-Nr.	**Order-No.**	**688.0014**	**688.0015**	**688.0016**

Technische Daten	**Technical Data**	**A7-1**	**A7-2**	**A7-3**
Füllvolumen	Bath capacity		7 lit.	
Badöffnung B x T / Badtiefe	Bath opening w x l / bath depth		120 x 310 / 150 mm	
Abmessungen B x T x H	Overall dimension w x l x h		132 x 475 x 320 mm	
Gewicht, netto	Net weight		4,5 kg	
Testglaseinsätze Typ A bis H	tube racks typ A to H		3 St.	
Bestell-Nr.	**Order-No.**	**688.0017**	**688.0018**	**688.0019**

Technische Daten	**Technical Data**	**A11-1**	**A11-2**	**A11-3**
Füllvolumen.	Bath capacity		11 lit.	
Badöffnung B x T / Badtiefe	Bath opening w x l / bath depth		292 x 165 / 150 mm	
Abmessungen B x T x H	Overall dimension w x l x h		308 x 331 x 325 mm	
Gewicht, netto	Net weight		6,5 kg	
Testglaseinsätze Typ 1 oder 2	tube racks typ 1 or 2		2 St.	
Bestell-Nr.	**Order-No.**	**688.0020**	**688.0021**	**688.0022**

Technische Daten	**Technical Data**	**A18-1**	**A18-2**	**A18-3**
Füllvolumen	Bath capacity		18 lit.	
Badöffnung B x T / Badtiefe	Bath opening w x l / bath depth		292 x 325 / 150 mm	
Abmessungen B x T x H	Overall dimension w x l x h		308 x 491 x 325 mm	
Gewicht, netto	Net weight		7,5 kg	
Testglaseinsätze Typ 1 oder 2	tube racks typ 1 or 2		4 St.	
Bestell-Nr.	**Order-No.**	**688.0023**	**688.0024**	**688.0025**

Zubehör	**Accessoires:**	**A5**	**A6**	**A7**	**A11**	**A18**
Entleerungshahn	drain cock	6026	6026	6026	6026	6026
Badbrücke	bath bridge	6309	6309	6309	6310	6310

Testglaseinsätze / Test tube racks
aus Acryl für Polycarbonat-Bad A5-A7 max Temperatur 60°C / made of acryl for Polycarbonat bath A5-A7 max temperature 60°C

Typ / Type	**Bohrungen / Bore holes**	**Eintauchtiefe / Depth [mm]**	**Best.Nr. / Order.No.**
A	12 x ø22	60	6028
B	20 x ø17	60	6029
C	20 x ø17	95	6030
D	30 x ø13	55 (Hämolyse)	6031
E	6 x ø30	60	6032
F	36 x ø10	25 (Eppendorf)	6033
G	8 x ø20, 8 x ø13	50	6034
H	6 Küvetten und 8x ø23, 2 x ø34 6 cuvettes and 8x ø23, 2 x ø34	50	6036
aus Edelstahl für Bad A11-A18 / made of staliness steel for bath A11-A18			
1	36 x ø17	100	6037
2	45 x ø13	70	6038

Peter Huber Kältemaschinenbau GmbH Werner-von-Siemens-Str. 1 D-77656 Offenburg Tel 0781/96030 Fax 0781/57211

huber

Digital Thermostat constant temperature bath

polystat B8, B12, B15, B20, B25

Polystat Badthermostat bestehend aus Einhängerthermostat polystat cc, isoliertem Edelstahlbad mit PUR-Gehäuse (B8, B12, B20), bzw. mit Edelstahlmantel (B15, B25) und Badbrücke. Badbrücken mit Öffnung für Kühlsonde (z.B. für HUBER Eintauchkühler TC40 - TC100E).
Benennung:
Beispiel: B8-2 Edelstahlbad mit 8 Ltr. Füllvolumen, kombiniert mit polystat cc2
B25-3 Edelstahlbad mit 25 Ltr. Füllvolumen, kombiniert mit polystat cc3

Polystat bath thermostat consisting of immersion circulators polystat cc, insulated stainless steel bath with PUR-housing (B8,B12,B20), resp. with housing made of stainless steel (B15, B25) and bath bridge. Bath bridge with bore hole for cooling probe (e.g. for HUBER immersion cooler TC40-TC100E), and
name:
example: B8-2 stainless steel bath with 8 l bath capacity, in combination with polystat cc2
B25-3 stainless steel bath with 25 l bath capacity, in combination with polystat cc3

Technische Daten	**Technical Data**	**B8-1**	**B8-2**	**B8-3**
Arbeitstemperaturbereich	Operating temperature range		max 120°C	
Füllvolumen.	Bath capacity		8,5 lit.	
Badöffnung B x T / Badtiefe	Bath opening w x l / bath depth		235 x 168 / 150 mm	
Abmessungen B x T x H	Overall dimension w x l x h		290 x 350 x 375 mm	
Gewicht, netto	Net weight		11 kg	
Bestell-Nr.	**Order-No.**	**688.0026**	**688.0027**	**688.0028**

Technische Daten	**Technical Data**	**B12-1**	**B12-2**	**B12-3**
Arbeitstemperaturbereich	Operating temperature range		max 120°C	
Füllvolumen	Bath capacity		12 lit.	
Badöffnung B x T / Badtiefe	Bath opening w x l / bath depth		300 x 193 / 150 mm	
Abmessungen B x T x H	Overall dimension w x l x h		355 x 380 x 375 mm	
Gewicht, netto	Net weight		15 kg	
Testglaseinsätze Typ 1 bis 4	tube racks typ 1 to 4		2 St.	
Bestell-Nr.	**Order-No.**	**688.0029**	**688.0030**	**688.0031**

Technische Daten	**Technical Data**	**B15-1**	**B15-2**	**B15-3**
Arbeitstemperaturbereich max	Operating temperature range max		200°C	
Füllvolumen.	Bath capacity		15 lit.	
Badöffnung B x T / Badtiefe	Bath opening w x l / bath depth		300 x 193 / 200 mm	
Abmessungen B x T x H	Overall dimension w x l x h		355 x 380 x 415 mm	
Gewicht, netto	Net weight		16 kg	
Testglaseinsätze Typ 1 bis 4	tube racks typ 1 to 4		2 St.	
Bestell-Nr.	**Order-No.**	**688.0032**	**688.0033**	**688.0034**

Technische Daten	**Technical Data**	**B20-1**	**B20-2**	**B20-3**
Arbeitstemperaturbereich max	Operating temperature range max		120°C	
Füllvolumen.	Bath capacity		20 lit.	
Badöffnung B x T / Badtiefe	Bath opening w x l / bath depth		300 x 370 / 150 mm	
Abmessungen B x T x H	Overall dimension w x l x h		355 x 558 x 375 mm	
Gewicht, netto	Net weight		17 kg	
Testglaseinsätze Typ 1 bis 4	tube racks typ 1 to 4		4 St.	
Bestell-Nr.	**Order-No.**	**688.0035**	**688.0036**	**688.0037**

Technische Daten	**Technical Data**	**B25-1**	**B25-2**	**B25-3**
Arbeitstemperaturbereich max	Operating temperature range max		200°C	
Füllvolumen.	Bath capacity		25 lit.	
Badöffnung B x T / Badtiefe	Bath opening w x l / bath depth		300 x 370 / 200 mm	
Abmessungen B x T x H	Overall dimension w x l x h		355 x 558 x 415 mm	
Gewicht, netto	Net weight		19 kg	
Testglaseinsätze Typ 1 bis 4	tube racks typ 1 to 4		4 St.	
Bestell-Nr.	**Order-No.**	**688.0038**	**688.0039**	**688.0040**

Zubehör	**Accessoires:**	**B8**	**B12**	**B15**	**B20**	**B25**
Entleerungshahn	drain cock	6026	6026	6026	6026	6026
Badbrücke	bath bridge	6303	6308	6308	6308	6308
variabl. Stellboden	var. Bottom		6297	6297	6298	6298
Bad-Deckel vorn	bath cover front	6214	6023	6023	6023	6023
Bad-Deckel hinten	bath cover back				6024	6024
Bad-Deckel einteilig	bath cover 1-piece				6025	6025

Testglaseinsätze / Test tube racks
aus Edelstahl für Bad B12-B25 / made of staliness steel for bath B12-B25

Typ / Type	**Bohrungen / Bore holes**	**Eintauchtiefe / Depth [mm]**	**Best.Nr. / Order.No.**
1	36 x ø17	100	6037
2	45 x ø13	70	6038
3	46 x ø17	100	6039
4	58 x ø13	70	6040

Peter Huber Kältemaschinenbau GmbH Werner-von-Siemens-Str. 1 D-77656 Offenburg Tel 0781/96030 Fax 0781/57211

huber

Digital Thermostat
constant temperature bath

polystat
K6-1, K6-2, K6-3

Bad- und Umwälzthermostat mit luftgekühlter Kältemaschine. Plug & Play Technologie - Mikroprozessorgesteuert, einfache Bedienung mit Drehgeber und Digitalanzeige. Starke Druckpumpe, benetzte Teile aus Edelstahl oder hochwiderstandsfähigem Plastik. Alle Modelle mit 3 Jahren Garantie auf die Elektronik. Max. Temperatur 150°C. 3 Modelle zur Auswahl:

Polystat K6-1, mit Niveauschutz (Schwimmerschalter) für unbeaufsichtigten Dauerbetrieb mit nicht brennbaren Flüssigkeiten (FL). Zusätzliche Sicherheit durch maximalen und minimalen Sollwert.
Polystat K6-2, wie Polystat cc1 jedoch mit einstellbarem Übertemperaturschutz (FL), Programmgeber (5 Schritte), 3 Fixtemperaturen und einfacher Rampenfunktion.
Polystat K6-3, mit dem kompletten Funktionsumfang der Compatible Control Thermostate: Programmgeber (50 Schritte aufteilbar auf 10 Programme), Führungsregler für externe Temperierung und Schnittstellen RS232, RS 485 und Analog (4...20mA) für bidirektionale Kommunikation (FL). Anschluss für seriellen Drucker.

Circulator bath with air-cooled refrigeration unit. Plug & Play Technology - microprocessor controlled, easy handling with encoder and digital display. Powerful force pump, moisted parts in stainless steel or high-resistant plastics. All models with 3 years warranty for electronic. Max. temperature 150°C. 3 models available:

Polystat K6-1, with level protection (float switch) for continuous operation without personal assistance if using non-flammable liquids (FL). Maximum and minimum setpoint for additional safety.
Polystat K6-2, similar to Polystat cc1, but with adjustable overtemperature protection (FL), programmer (5 steps), 3 fixtemperatures and easy ramping function.
Polystat K6-3, with all functions of the Compatible Control Thermostats: Programmer (50 steps, divisible into 10 programs) temperature sequence controller for external thermoregulation and interfaces RS 232, RS 485 and analog (4...20mA) for bidirectional communication (FL). Serial printer output.

Technische Daten	**Technical Data**	**K6-1**	**K6-2**	**K6-3**
Arbeitstemperaturbereich	Operating temperature range	-25...150°C	-25...150°C	-25...150°C
max. Temperatur des Kühlgerätes	max. temperature the cooling units	80°C	80°C	80°C
Temperaturkonstanz bei 70°C	Temperature stability at 70°C		0,02 K (DIN 58966)	
Temperatureinstellung	Temperature adjustment		digital	
Temperaturanzeige	Temperature indication		digital	
Absolutgenauigkeit	absolute accuracy	kalibrierbar / setup for calibration		
Temperaturfühler	Temperature sensor		Pt 100	
externer Programmeingang	external program input	---	---	4-20mA
Schreiber Ausgang	Recorder output	---	---	4-20mA
Sicherheitsklasse	Safety classification		FL	
Heizleistung	Heating capacity		2,0 kW	
Kälteleistung bei 0°C	Cooling capacity at 0°C		0,15 kW	
bei -10°C	at -10°C		0,10 kW	
bei -20°C	at -20°C		0,05 kW	
Kältemittel	Refrigerent		R134a	
Füllvolumen max.	Bath capacity max		4,5 l	
Badöffnung B x T / Badtiefe	Bath opening w x l / bath depth		150 x 140 / 150 mm	
Abmessungen B x T x H	Overall dimension w x l x h		200 x 370 x 535 mm	
Druckpumpe Anschluß 12mm	Force pump (adapter nom 12 mm)		10 l/min max.	
Anschluß 8 mm	(adapter nom 8 mm)		7 l/min max.	
Förderhöhe (Druck)	Pressure		0,2 bar max.	
Pumpenanschluss	Pump connection		M16x1	
Pumpenanschluss für Schlauch	Pump connection for tuse		M16x1	
Gewicht, netto	Net weight		19 kg	
Netzanschluss	Power supply requirement		230 V ~ 50 Hz	
Leistungsaufnahme/ Absicherung	Power input / fuse		1550 Watt 16 A	
Bestell-Nr.	**Order-No.**	**666.0011**	**666.0012**	**666.0013**
ab Fert.Nr.	**from serial no.**		**39092**	**V2.0**

Zubehör und Peripherie: Pumpenadapter für externe Temperierung*, Schlauchstutzen NW 8, Blindstopfen und Überwurfmuttern M16x1*, Schlauchstutzen NW 12*, Mikroverschraubungen, Verbindungsschläuche.
* im Lieferumfang enthalten

Accessoires and periphery: pump adapter for external thermoregulation*, adapter nom. dia 8 mm, dummy plugs and sleeve nuts thread M16x1*, adapter nom. dia 12 mm*, micro boltings.
* standard equipment

Leistungsangaben gelten bei: Umgebungstemperatur 20°C
Output data go for: room temperature 20°C

Peter Huber Kältemaschinenbau GmbH Werner-von-Siemens-Str. 1 D-77656 Offenburg Tel 0781/96030 Fax 0781/57211

688.0001 polystat cc1
688.0002 polystat cc2
688.0003 polystat cc3

Ersatzteilliste

ab Fert.Nr. 35079 – 53500

St.	Ident.Nr.	Bezeichnung	Type
1	3817	Übertemperaturschutz	
1	5562	Drehknopf - ÜT	
1	5543	Geräteschalter 10A	
1	5544	Entstörfilter	F022 - 947/007
1	5573	Entstörmodul	VG-A/230
1	5844	Pumpenmotor vormontiert	
1	0298	Edelstahlschwimmer	
1	1655	Schnappschalter	DB 2 C - A1LD
1	5376	Fühler	Pt100
1	5538	Heizung	220V/2kW
1	5537	Drehknopf-Regler	
1	0182	Netzkabel	
1	5594-98	AC-Board-Platine	
1	5594-99	AC-Board-Platine polystat 61 NFL	
1	6401	Regler polystat cc1	
1	6402	Regler polystat cc2	
1	6403	Regler polystat cc3	

List of spare parts

from serial-no. 35079 - 53500

Qut.	O.No.	Name	Type
1	3817	overtemperature protection	
1	5562	knob - overtemperature	
1	5543	appliance switch 10A	
1	5544	interferance filter	F022 - 947/007
1	5573	interferance modul	VG-A/230
1	5844	pump motor pre-assembled	
1	0298	stainless steel float	
1	1655	snap switch	DB 2 C - A1LD
1	5376	sensor	Pt100
1	5538	heating	220V/2kW
1	5537	knob controller	
1	0182	power supply cable	
1	5594-98	AC-board	
1	5594-99	AC-board polystat 61 NFL	
1	6401	controller polystat cc1	
1	6402	controller polystat cc2	
1	6403	controller polystat cc3	

Wärmethermostat CC303 / Heating Thermostat CC303

ab Fert.Nr. 37741 **Ersatzteilliste**

bis 47579

St.	A.Nr.	Benennung	Type
1	3817	Übertemperaturschutz	
1	5562	Drehknopf - ÜT	
1	5544	Entstörfilter	F022-947/007
1	4957	Kleinschütz	MC1A-310
1	5827	Sicherungsautomat	B16A 1polig
2	5828	Sicherungsautomat	B10A 1polig
1	3239	Solid State Relais	H12WD 4890
1	5376	Fühler	Pt100
1	5594-97	AC-Board-Platine	P300
1	2352	Anlasskondensator	4µF
1	3480	Pumpenmotor	M2E068
2	0309	Heizung	230V/2kW
1	1329	Wippschalter	
	0421	Verschlußschraube	M12x1.5
	0422	O-Ring	
	6088	Dichtscheibe	
	6089	Überwurfmutter	M16x1
	6086	Schlauchstutzen	NW8
	6087	Schlauchstutzen	NW12

from Serial-No. [illegible] **List of spare parts**

37741 - 47579

Qut.	O.No.	Name	Type
1	3817	overtemperature protection	
1	5562	knob - overtemperature	
1	5544	interferance filter	F022-947/007
1	4957	small contactor	MC1A-310
1	5827	automatic cut-out	B16A 1polig
2	5828	automatic cut-out	B10A 1polig
1	3239	Solid State Relais	H12WD 4890
1	5376	sensor	Pt100
1	5594-97	AC-board	P300
1	2352	starting condenser (capacitor)	4 µF
1	3480	pump motor	M2E068
2	0309	heating	230V/2kW
1	1329	luffing switch	
	0421	screw plug	M12x1.5
	0422	O-seal	
	6088	seal disk	
	6089	sleeve nuts	M16x1
	6086	hose adapter	NW8
	6087	hose adapter	NW12

683.0001	**CC303-1**	
1	6401	Regler CC1 / controller CC1
683.0002	**CC303-2**	
1	6402	Regler CC2 / controller CC2
683.0003	**CC303-3**	
1	6403	Regler CC3 / controller CC3

Wärmethermostat CC302 / Heating Thermostat CC302

ab Fert.Nr. 36180 - 46487 **Ersatzteilliste**

St.	A.Nr.	Benennung	Type
1	3817	Übertemperaturschutz	
1	5562	Drehknopf - ÜT	
1	5543	Geräteschalter	10A
1	5544	Entstörfilter	F022-947/007
1	5376	Fühler	Pt100
1	5594-97	AC-Board-Platine	P300
1	2352	Anlasskondensator	4 µF
1	3480	Pumpenmotor	M2E068
1	2158	Heizung	230V/2kW
	0421	Verschlußschraube	M12x1.5
	0422	O-Ring	
	6088	Dichtscheibe	
	6089	Überwurfmutter	M16x1
	6086	Schlauchstutzen	NW8
	6087	Schlauchstutzen	NW12

from Serial-No. 36180 - 46487 List of spare parts

Qut.	O.No.	Name	Type
1	3817	overtemperature protection	
1	5562	knob - overtemperature	
1	5543	appliance switch	10A
1	5544	interferance filter	F022-947/007
1	5376	sensor	Pt100
1	5594-97	AC-board	P300
1	2352	starting condenser(capacitor)	4 µF
1	3480	pump motor	M2E068
1	2158	heating	230V/2kW
	0421	screw plug	M12x1.5
	0422	O-seal	
	6088	seal disk	
	6089	sleeve nuts	M16x1
	6086	hose adapter	NW8
	6087	hose adapter	NW12

683.0001 CC302-1

1	6401	Regler CC1 / controller CC1

683.0002 CC302-2

1	6402	Regler CC2 / controller CC2

683.0003 CC302-3

1	6403	Regler CC3 / controller CC3

polystat K6

ab Fert. Nr. 35211 - 4688 **Ersatzteilliste**

Stck.	Id.Nr.	Benennung	Type
1	5081	Kompressor	GD36AA
1	0146	Verflüssiger	
1	1922	Lüfter	Typ 4650 N
1	0912	Trockner	2 x 4
4	3820	Gerätefüße	
1	1328	Wippschalter	
	0421	Verschlußschraube	M12x1.5
	0422	O-Ring	
	6088	Dichtscheibe	
	6089	Überwurfmutter	M16x1
	6086	Schlauchstutzen	NW8
	6087	Schlauchstutzen	NW12

from Serial No. 35211-4683 **Spare Parts List**

Pc.	Order.No.	Description	Type
1	5081	compressor	GD36AA
1	0146	condenser	
1	1922	fan	Typ 4650 N
1	0912	dryer	2 x 4
4	3820	device feet	
1	1328	rocker switch	
	0421	screw plug	M12x1.5
	0422	O-seal	
	6088	seal disc	
	6089	sleeve nut	M16x1
	6086	adapter	NW8
	6087	adapter	NW12

666.0011 **polystat K6-1**
1 6401 Regler CC1 / controller CC1

666.0012 **polystat K6-2**
1 6402 Regler CC2 / controller CC2

666.0013 **polystat K6-3**
1 6403 Regler CC3 / controller CC3

Kältebad K12 / Cooling Bath K12

653.0010 Ersatzteilliste
ab Fert. Nr. 47334 - 52175

Stck.	Id.Nr.	Benennung
1	1690	Kompressor
1	4648	Anlassrelais
1	0144	Anlasskondensator 60 µF
1	7110	Verflüssiger
1	1922	Lüfter
1	4695	Lüftergitter
1	0912	Trockner 2 x 4
4	0338	Gummistollen
2	6017	Auflageschiene 12
4	1627	Rändelmutter M4
1	0203	Printrelais
1	6535	Steuerkabel
1	0381	Netz-Verbindungskabel
1	1328	Wippschalter
1	0421	Verschlussschraube
1	0422	O-Ring

653.0010 List of Spare Parts
from Serial-No. 47334 - 52175

Qut.	O.No.	Description
1	1690	compressor
1	4648	starting relais
1	0144	starting condenser 60 µF
1	7110	condenser
1	1922	fan
1	4695	fan lattice
1	0912	dryer 2 x 4
4	0338	rubber cleat
2	6017	bearing rail 12
4	1627	knurled nut M4
1	1328	luffing switch
1	0203	printer relay
1	6535	control cable
1	0381	power cable
1	0421	screw plug
1	0422	O-seal

Kältebad K15 / Cooling Bath K15

645.0021 **Ersatzteilliste**
ab Fert. Nr. 47410-52645

Stck.	Id.Nr.	Benennung
1	1690	Kompressor
1	4648	Anlaßrelais
1	0144	Anlaßkondensator 60 µF
1	1923	Lüfter
1	0912	Trockner 2 x 4
4	0338	Gummistollen
2	6017	Auflageschiene 12
4	1627	Rändelmutter M4
1	1328	Wippschalter
1	0421	Verschlußschraube M12x1,5
1	0422	O-Ring
1	7939	Relaisplatine
1	6535	Steuerkabel
1	0381	Netz-Verbindungskabel

645.0021 **List of Spare Parts**
from Serial-No. 47410-52645

Qut.	O.No.	Description
1	1690	compressor
1	4648	starting relais
1	0144	starting condenser 60 µF
1	1923	fan
1	0912	dryer 2 x 4
4	0338	rubber cleat
2	6017	bearing rail 12
4	1627	knurled nut M4
1	1328	luffing switch
1	0421	screw plug M12x1,5
1	0422	O-seal
1	7939	controller board
1	6535	control cable
1	0381	power cable

Kältebad K20 / Cooling Bath K20

646.0021 **Ersatzteilliste**
ab Fert. Nr. 47883 -5/042

Stck.	Id.Nr.	Benennung
1	5878	Kompressor
1		Anlassrelais
1	0449	Anlasskondensator 80 µF
2	1923	Lüfter
1	0703	Trockner 2 x 6
1	1328	Wippschalter
1	0421	Verschlussschraube M12x1,5
1	0422	O-Ring
2	6018	Auflageschiene 20
4	1627	Rändelmutter M4
1	7939	Relaisplatine
1	6535	Steuerkabel
1	0381	Netz-Verbindungskabel

646.0021 **List of Spare Parts**
from Serial-No. 47883 -5/042

Qut.	O.No.	Description
1	5878	compressor
1		starting relais
1	0449	starting condenser 80 µF
1	1923	fan
1	0703	dryer 2 x 6
1	1328	luffing switch
1	0421	screw plug M12x1,5
1	0422	O-seal
2	6018	Auflageschiene 20
4	1627	Rändelmutter M4
1	7939	controller board
1	6535	control cable
1	0381	power cable

Kältebad K25 / Cooling Bath K25

647.0021 **Ersatzteilliste**
ab Fert. Nr.38654
n.s 52714

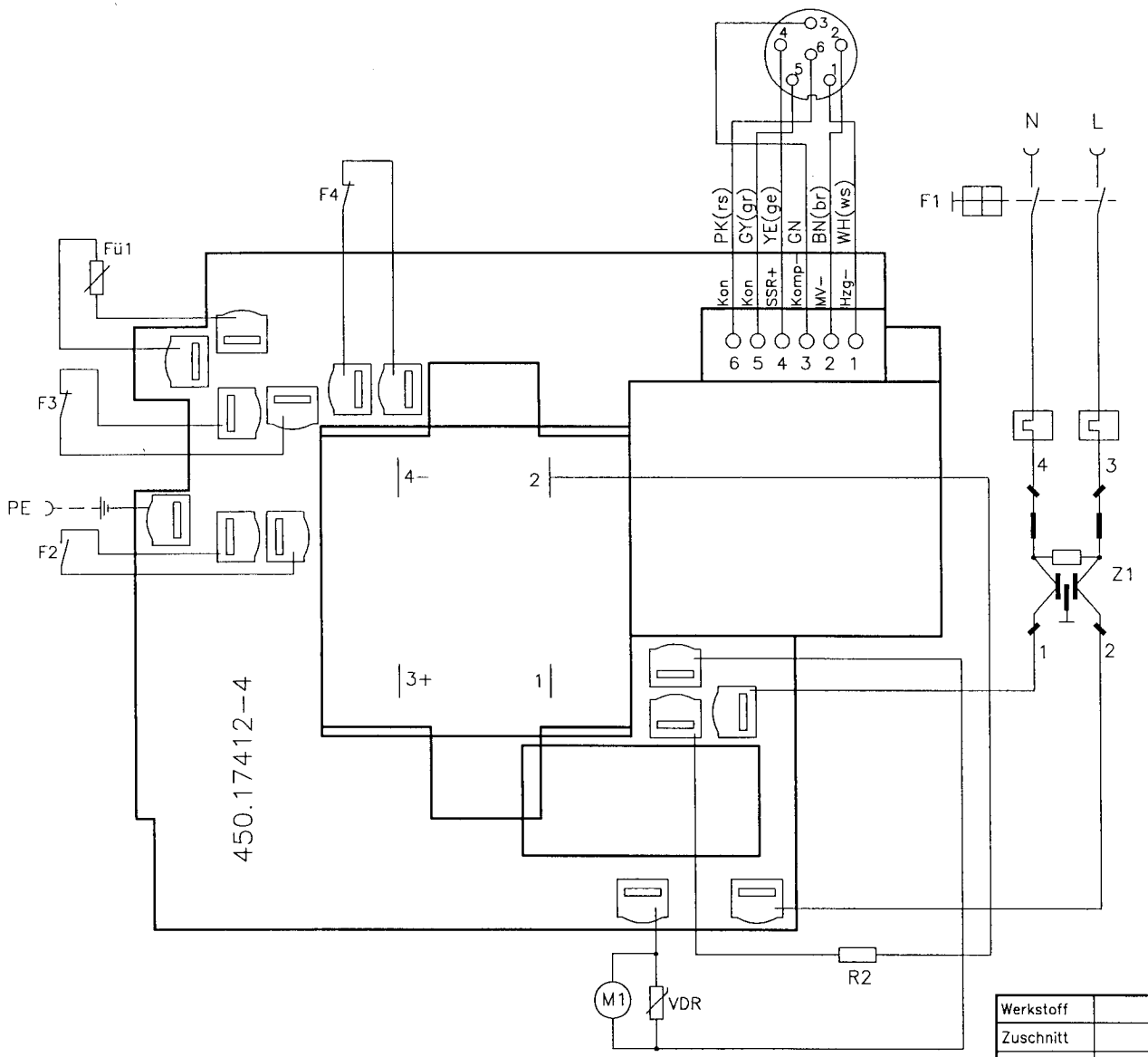
Stck.	Id.Nr.	Benennung	Type
1	5878	Kompressor	SC10GX
1		Anlassrelais	-6002-
1	0449	Anlasskondensator	80 µF
2	1923	Lüfter	5950
1	0703	Trockner	2 x 6
1	1328	Wippschalter	
1	0421	Verschlussschraube	M12x1,5
1	0422	O-Ring	
2	6018	Auflageschiene 20	
4	1627	Rändelmutter M4	

647.0021 **List of Spare Parts**
from Serial-No. 38654
b 52714

Qut.	O.No.	Name	Type
1	5878	compressor	SC10BX
1		starting relais	-6002-
1	0449	starting condenser	80 µF
2	1923	fan	5950
1	0703	dryer	2 x 6
1	1328	luffing switch	
1	0421	screw plug	M12x1,5
1	0422	O-seal	
2	6018	support rail 20	
4	1627	knurled nut M4	

huber

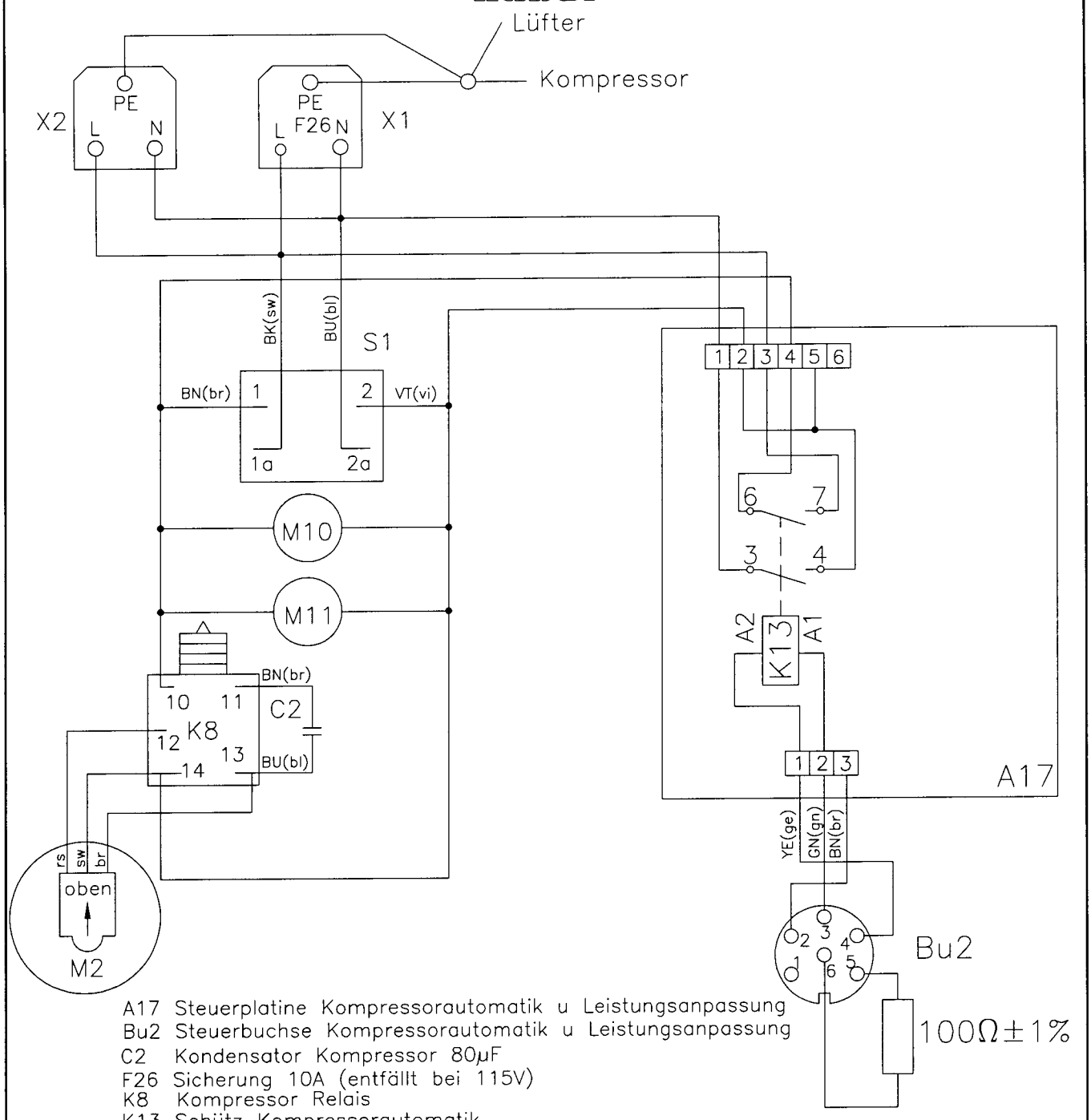
Steuerbuchse (6polig)



F1 Überstromschutzschalter 10A
F2 Niveauschalter (Schwimmer)
F3 Übertemperaturschutz
F4 Wicklungsthermostat
Fü1 Regelfühler Pt100
M1 Pumpenmotor
R2 Heizung 2000W
Z1 Netzfilter

Werkstoff		gez.	06.11.00/eg	007491	Peter Huber Kältemaschinenbau GmbH
Zuschnitt		gepr.	07.11.00	Rieder	D – 77656 Offenburg-Elgersweier
ab Fert.Nr.	45201	Ersatz für	688.1		Bezeichnung: Schaltplan
bis Fert.Nr.		Ersetzt durch			Nr.: 688.4
Diese Zeichnung darf ohne die Genehmigung der Geschäftsleitung weder kopiert, noch Dritten zugängig gemacht werden.				M	Verwendung für: polystat 62, 63, cc1, cc2, cc3 polystat 201– , 202–

huber



A17 Steuerplatine Kompressorautomatik u Leistungsanpassung
Bu2 Steuerbuchse Kompressorautomatik u Leistungsanpassung
C2 Kondensator Kompressor 80µF
F26 Sicherung 10A (entfällt bei 115V)
K8 Kompressor Relais
K13 Schütz Kompressorautomatik
M10 Lüfter
M11 Lüfter (entfällt bei K6,K12,K15)
M2 Kompressor
S1 Netzschalter
X1 Netzanschlußbuchse (entfällt bei 115V)
X2 Netzanschlußbuchse für polystat
bei K6 Netzstecker

Pos.	kommt vor	Anweisung	Änderung	Datum	Name	Gepr.

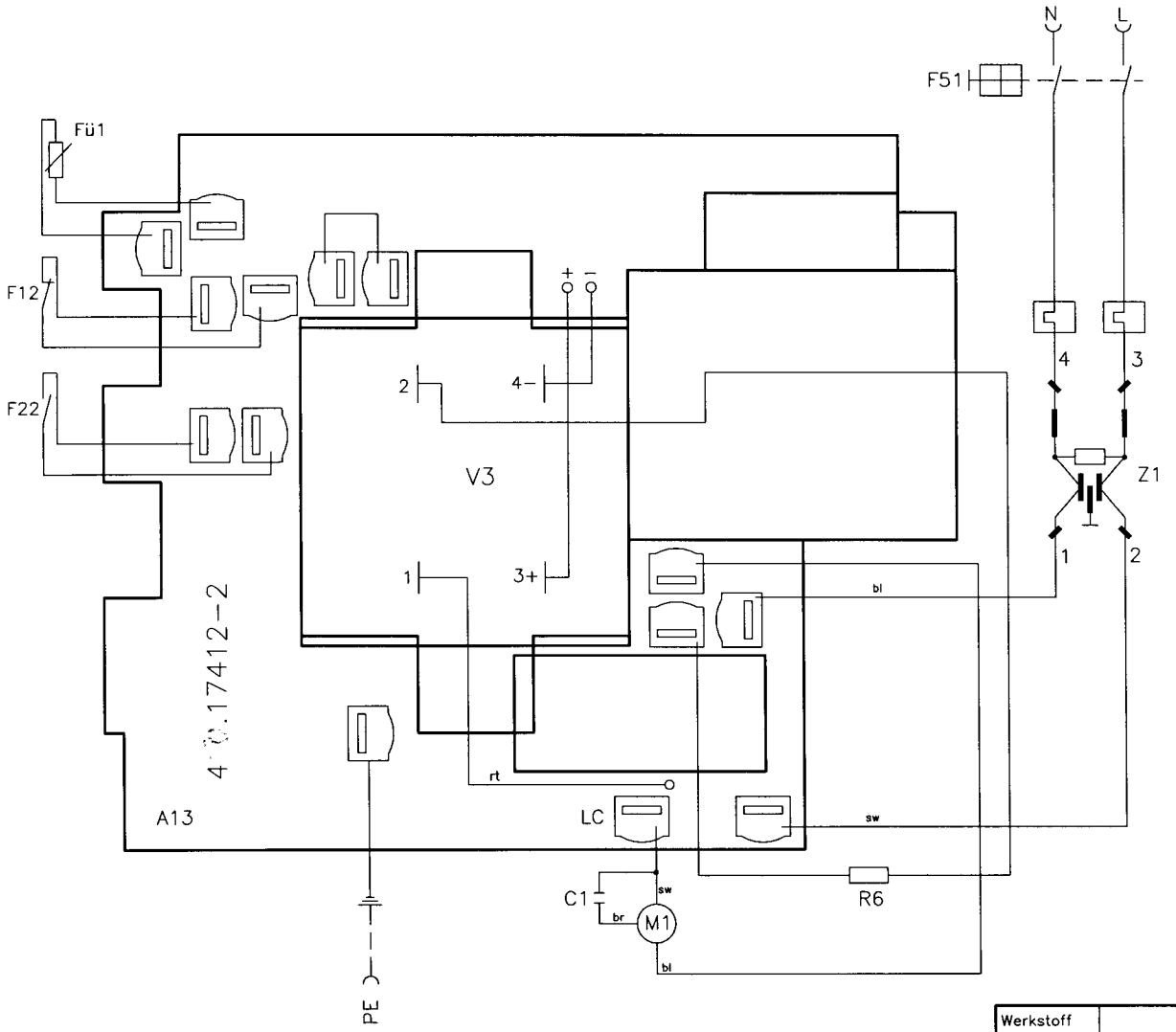
Werkstoff		gez.	28.03.01/se	00
Zuschnitt		gepr.	28.03.01	Boschert
ab Fert.Nr.	46720	Ersatz für	653.2, 653.3	
bis Fert.Nr.		Ersetzt durch		

M 1:1

Peter Huber Kältemaschinenbau GmbH
D – 77656 Offenburg–Elgersweier

Bezeichnung	Schaltplan
Nr.	653.4
Verwendung für	K6,K12,K15,K20,K25 230V,115V

huber



A13 AC–Bord Poly cc Regler
C1 Kondensator Pumpe 4µF
F12 Übertemperaturschutz
F22 Niveauschalter
F51 Überstromschutzschalter 10A
Fü1 Fühler intern Pt100
M1 Pumpenmotor mit int.Wicklungsschutz
R6 Heizung 2000W
V3 Opto Hauptheizung
Z1 Netzfilter

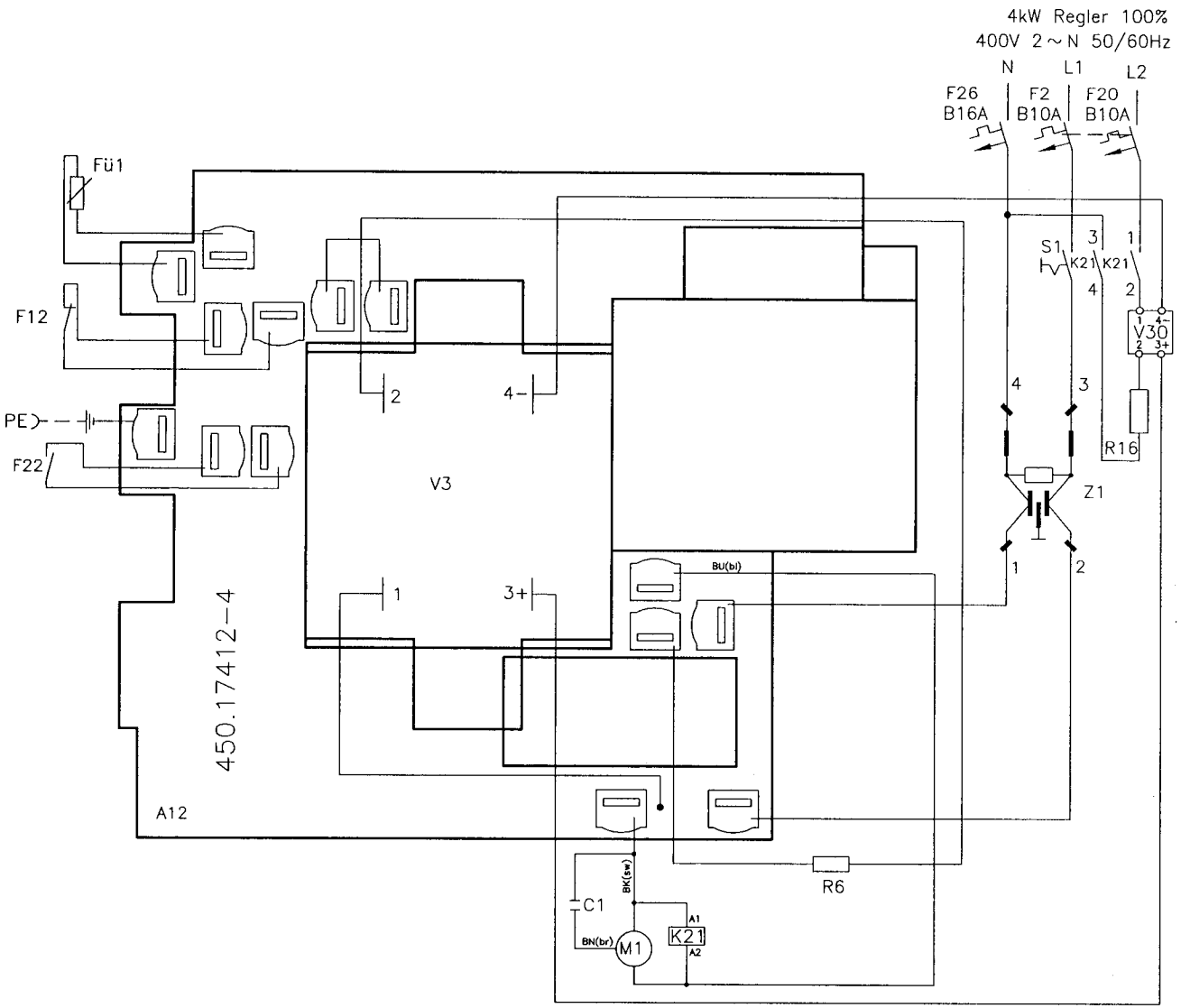
Werkstoff		gez.	20.03.01/bü	00
Zuschnitt		gepr.	20.03.01	Boschert
ab Fert.Nr.	46488	Ersatz für	683.1	
bis Fert.Nr.		Ersetzt durch		

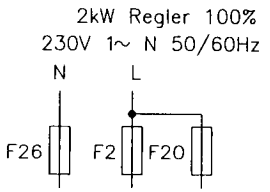
M

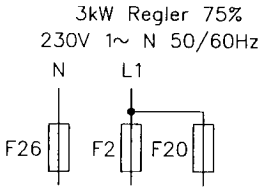
Peter Huber Kältemaschinenbau GmbH
D – 77656 Offenburg–Elgersweier

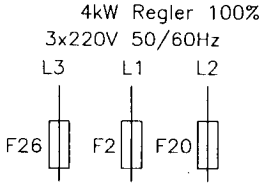
Bezeichnung	Schaltplan
Nr.	683.2
Verwendung für	CC302

huber





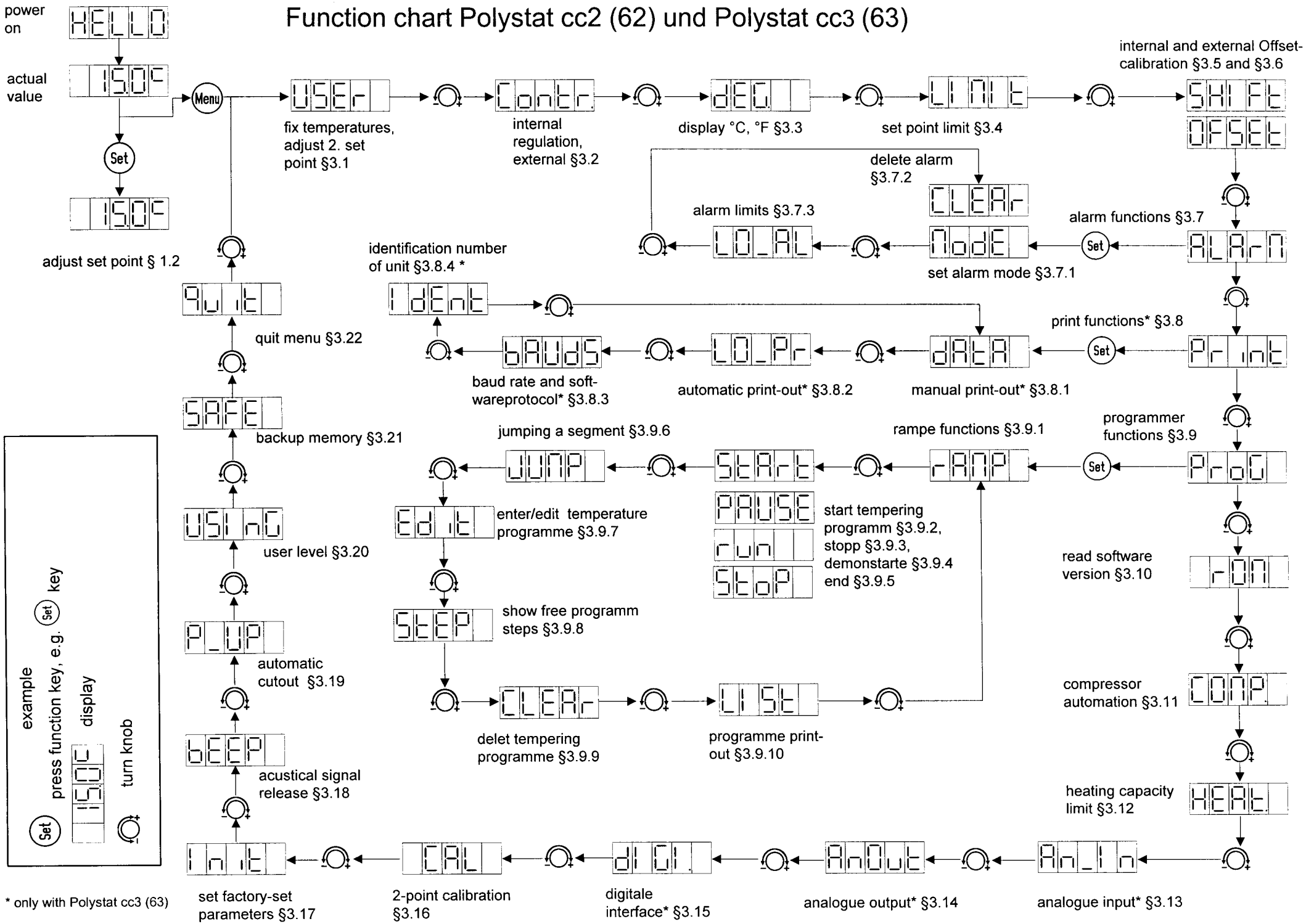




A13 AC–Bord
C1 Kondensator Pumpe 4µF
F2,F20 Sicherung B 10A
F12 Übertemperaturschutz
F22 Niveauschalter
F26 Gerätesicherung B 16A
Fü1 Regelfühler Pt100
K21 Schütz Heizung
M1 Pumpenmotor mit int.Wicklungsschutz
R6,R16 Heizung 2000W
S1 Geräteschalter
V3,V30 Solid State Relais
Z1 Netzfilter

Werkstoff		gez.	18,06.01/bü	00	Peter Huber Kältemaschinenbau GmbH
Zuschnitt		gepr.	18.06.01	Bsch	D – 77656 Offenburg–Elgersweier
ab Fert.Nr.	47579	Ersatz für	684.2		Bezeichnung: Schaltplan
bis Fert.Nr.		Ersetzt durch			Nr.: 684.3
Diese Zeichnung darf ohne die Genehmigung der Geschäftsleitung weder kopiert, noch Dritten zugängig gemacht werden.				M	Verwendung für: CC303

Function chart Polystat cc2 (62) und Polystat cc3 (63)



* only with Polystat cc3 (63)

Short manual Polystat cc2 (62), cc3 (63)

(from Software V3.04)

Features of the set-key

The set key is for choosing the set point function or the menu function and, in general, for confirming an input. Changes and new settings have to be confirmed resp. memorized.
In case of a flashing display, the Set key serves as Enter key.

Enter = (Set) when display is blinking

Functions of the Menu key

After having pressed the menu key, you reach the function menu. In this menu you can leaf through the different functions using the encoder. According to the condition and equipment of the controller, you cannot always reach all the functions, e.i. not all the functions mentioned in §2.1 are displayed when leafing through. In §2.1 the different functions are described and the restrictions are listed.

Functions of the temp key (only polystat cc3(63))

You can switch on or off thermoregulation (heating, cooling and circulation) with the temp key. The thermoregulation status is memorized and is maintained even after switching off the mains switch. The LED-power shows the thermoregulation status. The actual value display remains switched on even in case of a switched-off thermoregulation.

Setting Parameters

With the help of the  (encoder) the chosen function can be activated.

Break

'Break' interrupts an active function. As there is no physical key for this, 'Break' is simulated by pressing the Set and Menu keys simultaneously. 'Break' stops parameter changes being saved.

Break = (Set) & (Menu) together

MasterClear feature (only polystat cc3(63))

Pressing the menu key and the temp-key simultaneously can: terminate an active temperature control program, deactivate the analogue interface or changing the digital interface from remote mode to local mode.

MasterClear = (Menu) **&** (Temp) **together**