

User Manual

Water Bath

with Timer

WBT 1

WBT 6

WBT 12

WBT 22

WBT 80

Prüfgerätewerk Dresden

medingen

More than 50 Years of Quality in Laboratory Technology



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Safety Instructions

The device has been produced after the valid rules of technology. It was tested extensively before leaving the production and has left the work in safety technical and function-technical faultless condition. To guarantee safe and faultless application, the user has to take the following notes and the existing regulations for accident prevention into account.

1. The device may be used for the applications confirmed by the manufacturer. Other applications should be checked back with the manufacturer.
2. The packing was carried out with greatest care to make sure that damage by transport and storage is avoided. Upon receipt both packing and device have to be checked for damages. If such damages should be noticed, please advise the manufacturer.
3. Connection and the inauguration of the device has to be made by qualified staff. The operating instructions have to be studied carefully before putting the device into operation.
4. The operating instructions should be kept at a place accessibly for everyone.
5. The staff for the operation, maintenance and inspection of the device must show the corresponding qualification for this work. The operator is responsible for the instructions of his staff, he has to take care that everybody knows and understands the contents of the operating instructions.
6. Service and maintenance has to be carried out by qualified staff only. The device has to be separated from the mains voltage before opening. After completion the work and before activating the device all safety precautions have to be checked. Any modifications of the device are forbidden. Spare parts have to be decontrolled by the manufacturer.

Any disregard of the safety regulations leads to the loss of guarantee and damage compensation entitlements.



1. Application

Our water baths serve for tempering liquids for example in beakers, test-tubes, glasses, flasks or other containers. With use of a flat cover, round-bottomed flasks can be inserted as well for evaporation processes. The devices guarantee a careful heating up and best temperature permanence. Covering with a set of water bath coverings is possible. The different accessories offered extend the applications possible of the device.

2. Operational Safety

All water baths are constructed for permanent operation under laboratory conditions.

The water baths meet the safety-related requirements following :

DIN 12876 Electrical laboratory devices – Laboratory circulators and baths
The water baths correspond to the class 1 following DIN 12876-1 and is to be operated **with inflammable thermostat liquids only.**

DIN EN 61010-1 Safety requirements for electrical equipment, control and laboratory use

- Environmental conditions between 0° C and +40° C don't affect function and safety of the device.
- The device is to be attached to an earthed socket only, please pay attention to the details on the identification plate.
- Convince yourself that liquid is in the bath before you switch it on.
- Do not transport the water bath with heated liquid inside.
- Cool down liquid before drain.
- Do not run the device in areas with potentially explosive atmosphere.
- Interruption of the protective ground can make the device dangerous.
- Maintenance and repair work of the device standing under voltage are forbidden.
- All encroachments have to be executed by specialist staff only considering appropriate regulations.
- Please use the fuses described by the manufacturer. Short circuit of the fuse holder is forbidden.

Attention: You should not run the device if strong damages are shown.

3. Unpack and Check

After unpacking the water bath and the accessories the scope of delivery has to be checked with the delivery note enclosed. In case of damages in transit please inform the carrier responsible to place a damage protocol if necessary.



4. Technical Data

	WBT1	WBT6	WBT12	WBT22	WBT80
Allow. environ. temperature: °C	1 ... 40	1 ... 40	1 ... 40	1 ... 40	1 ... 40
Temp. range: °C	25 ... 100	25 ... 100	25 ... 100	25 ... 100	25 ... 100
Temp. constancy: K	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2
Temp. homogeneity: K	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Heating time (20°C-70°C): min/l	< 7.8	< 4.5	< 2.8	< 1.8	< 1.6
Heat emission: Wh	< 35	< 65	< 80	< 100	< 125
Heat output: W	700	1000	1600	2000	2600
Power supply: V,Hz	230,50/60	230,50/60	230,50/60	230,50/60	230,50/60
Bath volume: l	app. 1 ... 2	app. 2 ... 5	app. 4 ... 10	app. 5 ... 20	app. 20 ... 80
Bath opening: mm	D = 130				
Opening w. inclined cover mm		215*230	390*230	455*230	620*420
Depth of bath: mm	120	120	120	170	300
Measurements: WxDxH cm	23*24*22	32*34*26	49*34*26	57*34*31	73*53*45
Weight (without liquid): kg	app. 5	app. 7,5	app. 10	app. 12.5	app. 33

Temperature display:	LED, digital
Thermostat:	micro-processor-controlled PID-regulator, three fixed-temperatures adjustable, unproblematic shift, adjustable lower and upper set point limiting, adjustable button interlocking, set point limiting alarm visual and/or acoustic, alarm-setting can be disabled, alarm caused by thermistor can not be disabled, temperature measurement in Celsius or Fahrenheit
Timer	three predefined times adjustable, unproblematic shift, running-times up to 99,99 minutes are adjustable
Safety function	protection against 'running dry' is integrated
Emptying:	with seal screw/drain cock

5. Description

The water baths are produced double walled with intermediary insulation. Bath container and bath cover are made of stainless steel, the housing consists of coated steel sheet.

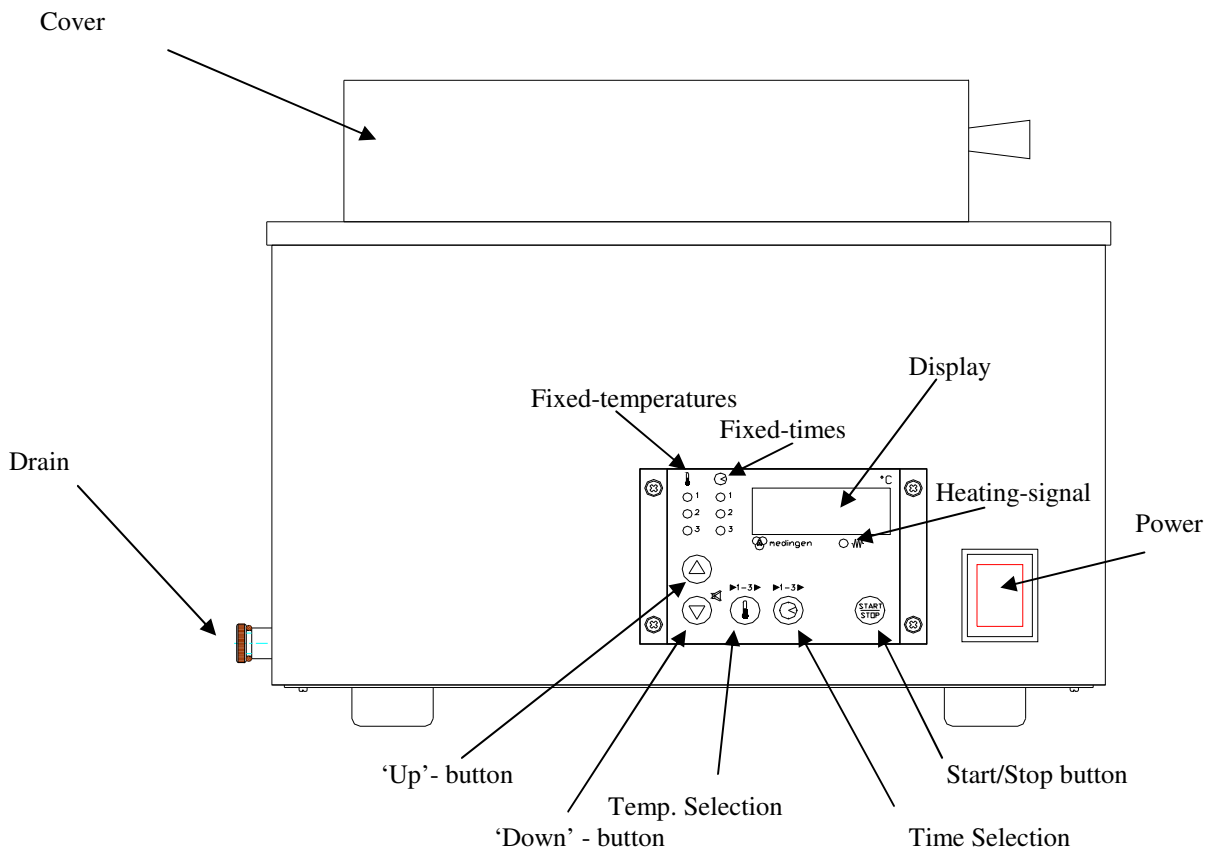
WB 1 has a round opening of 130mm, which closed with a lid. Covering with a set of water bath coverings is possible. Water baths WB 6-22 are delivered with a sloping lid. The heater at the bottom of the bath is covered with a perforated plate. Only little medium is required to work with the bath.

An electronic PID-controller with digital temperature setting guarantees high temperature permanence. Automatic temperature monitoring is possible with the timer installed. After course of the time setted, a signal is given by the timer - the water bath will hold the temperature further on.

The protection against 'running dry' integrated in the radiator cannot be adjusted. It will switch off the heater. The water bath can be switched on again after refilling liquid and a few minutes waiting time.

If you use the water bath with a flat cover, the remaining openings can be covered with water bath rings.

Note: *The device ist classified to safety class 1. This permits unmonitored operation together with inflammable liquids.*



6. Putting into operation / Emptying

- place the water bath safe against overturning
- fill up the bath with distilled or decalcified water up 20 mm over the radiator at minimum
- do not use any inflammable liquids!
- connect the device to a power supply and switch power 'on'
- set the values desired (see 7.) for your application
- before emptying the liquid should cool down. Remove drain screw or open drain cock to start water runoff

7. Operation

7.1. Operation with presetted parameters (first operation level)

The operation with presetted parameters, named first control-level, allows the operation with the three pre-adjusted temperature and time values.

Parameter	Function description	Range of Adjustment	Presettings
S1, S2, S3	Temperature setpoints (the current setpoint selected is indicated and/or adjusted)	0,0°C ... 100°C	10.0°C 10.0 °C 10.0 °C
T1, T2, T3	Timer setpoints (the current setpoint selected is indicated and/or adjusted)	0:00 ... 99:99 min.	5:00 min. 10:00 min. 15:00 min.



Adjustment options



Key: UP

Pressing this key you can increase the parameter or parameter value or scroll the parameter list.



Key: DOWN

Pressing this key you can decrease the parameter or parameter value or scroll the parameter list. In case of alarm the buzzer function can be switched off with this key.



Key: selection of temperature setpoint

With this key the temperature setpoint can be selected. If - previously - the timer display is or has been active, the controller switches to temperature display with first key pressing.



Key: selection of timer setpoint

With this key the time setpoint relevant for the timer is selected. If - previously - the temperature display is or has been active, the controller switches to timer display with first key pressing.



Key: START/STOP

With this key the selected heating time is started. The display indicates the remaining time. After course of time setted the timer gives a signals for 5 seconds. The timer can be switched off with the DOWN key. The elapsing timer has no influence on regulation - the temperature will be hold.

After any restart of the timer, it can be cancelled by pressing the key for at least 2 seconds.

With 'parameter settings' the remaining time displayed can be suppressed. In this caset he display switches to temperature display after 3 seconds and the LED of the timer flashes to indicate that it is activated.

Furthermore an additional Standby-function of this key can be activated with 'parameters settings'. In this case the controller switches to standby-mode if the key is pressed for another 3 seconds after the timer has finished. The display then shows "OFF" or "AUS". Press this key again to switch on the controller again.

7.2. Adjustment of the control parameters (second operation level)

For special applications, some parameters can be adjusted by the operator.

It is strongly recommended by the manufacturer, that these special adjustments should be done by specialist staff only to avoid malfunctions.

The one-finger-setup of the setpoint adjustment requires an exactly simultaneous pressing of the UP and DOWN key for at least 4 seconds to open a parameter list containing the control parameters. (If the setpoint adjustment failed a new attempt is possible after 5 seconds.) With the UP and DOWN keys the list of parameters can be scrolled in both directions. Pressing key 3 will give you the value of the respective parameter. Pressing also the UP or DOWN key at the same time the value can be adjusted. Return to the initial position takes place automatically if no key is pressed for 60 seconds.



Parameter	Function description	Range of Adjustment	Presettings	Remark
P1			no influence	do not adjust !
P2	Hysteresis contact K1	with PID regulator ineffective	no influence	do not adjust !
P3	Hysteresis contact K2	with PID regulator ineffective	no influence	do not adjust !
P4	Control range limitation – minimum setpoint	-99.9...P5°C	0.0°C	
P5	Control range limitation – maximum setpoint	P4...999.9°C	100°C	
P7	Proportional band	1...100 K	3, 4, 5, 6, 7 K	
P8	Reset time Tn (I-factor)	0...999 sec. (0 sec. = inactive)	0 sec.	
P9	Lead time Tv (D-factor)	0...999 sec. (0 sec. = inactive)	0 sec.	
P10*	Cycle time Tp	2...100 sec.	60 sec.	
P19	Key-lock	0: no key-lock 1: key-lock	0	
P20	Indication of actual value sensor F1	-----	-----	
P21	Actual value correction sensor F1	-20...20.0 K	0,0 K	to calibration
P30	Lower alarm value	-99,9°C/K...P31	0,0 °C	
P31	Upper alarm value	P30...999 °C/K	+100 °C	
P32	Hysteresis alarm circuit	0,1...99.9 K	1.0 K	
P35			no influence.	do not adjust !
P36			no influence	do not adjust!
P37			no influence	do not adjust!
P38			no influence	do not adjust!
P40			no influence	do not adjust!

Parameter description:

P1: The parameter doesn't have any influence.

P2: Hysteresis contact 1: The parameter doesn't have any influence.

P3: The parameter doesn't have any influence.

P4: Control range limitation – minimum setpoint

P5: Control range limitation – maximum setpoint

The adjustment range of the setpoint can be limited in both directions.



P7: Proportion range at PID regulation

With approximation of the actual value to the setpoint value the variable is reduced linearly from +-100% to 0%. The regulators are adjusted to work optimally with 70°C. If the application temperature deviates relevant the controller can be adjusted as necessary.

Temperature below 70°C - increase parameter P7 / temperature over 70°C - decrease parameter P7.

P8: Reset time Tn (Integral-portion)

The normal proportion-controller works with fix deviation of the actual value from the setpoint. The integral portion provides a complete compensation of this deviation. The reset-time is a measure for the period of time needed to adjust a remaining temperature deviation of the size of the proportional range. If a small reset time Tn is set, a fast post-adjustment will take place. At a too small reset time, however, the system may tend to vibrate

P9: Lead time Tv (Differential-portion)

The differential portion mutes temperature changes. If a long lead time Tv is set, muting is strong. At too long lead time, however, the system may tend to vibrate. At setting 0 the values are ineffective. Therefore it is possible to realise a pure PI or PD regulation.

P10: Cycle time Tp

The cycle time is the time, in which the control output runs through one switching period, i.e. once switched out and once switched on. The smaller the cycle time, the faster the regulation. By consequence, however, there is also an increased switching frequency of the exit, which can lead to a rapid wearout of relay contacts.

P19: Key-lock

The key-lock allows blocking of the control keys. In locked condition parameter adjustments with keys is not possible. At the attempt to adjust the parameters despite key-lock the message "===" appears in the display.

P20: Actual value sensor F1

The actual temperature is shown here.

P21: Actual value correction

This parameter allows the correction of actual value deviations caused for example by sensor tolerances or extremely long sensor lines. The regulation measure value is increased or decreased by the here adjusted value.

P30: Lower alarm value

P31: Upper alarm value

The exit alarm is a boundary alarm or a range alarm with one-sided or symmetrical hysteresis (see parameter P32 and A42). Both at the boundary alarm and the range alarm, limit values can be relative, i.e. going along with the setpoint, or absolute, i.e. independent of the setpoint. The operation mode is set with parameter A30. If, in case of boundary alarm and only one switching point is required the not used second switching point should be adjusted to a value above or below the operating range of the controller.



Boundary alarm function (see fig. 5):

The alarm contact is closed if the process temperature is above the upper or below the lower boundary value.

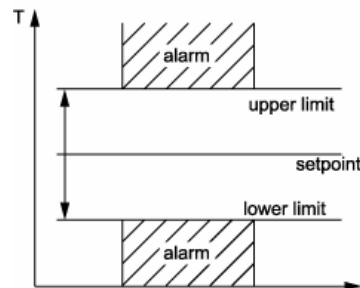


Fig. 5: Boundary alarm, rel. boundaries

Range alarm function (see fig. 6):

Opposite switching behaviour to the boundary value alarm. The alarm contact is closed if the actual value remains between the boundary values.

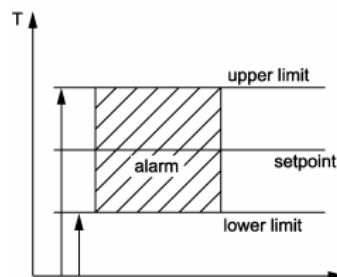


Fig 6: Range alarm, abs. boundaries

P32: Hysteresis alarm contact

The hysteresis can be set symmetrically or one-sided at the adjusted limit values. (see A40). It becomes effective depending on alarm definition. At one-sided setting and boundary alarm the hysteresis is effective above the lower and below the upper limit value. At one-sided setting and range alarm the hysteresis is effective above the upper and below the lower limit value. At symmetrical hysteresis, half of the hysteresis' value is effective below and half of the value above the switching point.

P35: The parameter doesn't have any influence.

P36: The parameter doesn't have any influence.

P37: The parameter doesn't have any influence.

P38: The parameter doesn't have any influence.

P40: The parameter doesn't have any influence.



7.3 Third operation level

Attention: The following control parameters are adjustable with support of the manufacturer only. Please take contact if necessary!

Access to the third control level is granted when selecting the last P-parameter on the second control level. Continue to press the UP key for approximately 10 seconds until “PA” appears. Continue to press the UP key and additionally press the DOWN key for about 4 seconds and the first A-parameter of the third control level is indicated.

With the keys UP and DOWN you can scroll the list in both directions. Pressing key 3 will give you the value of the respective parameter. By pressing the UP or DOWN key at the same time the value can be adjusted.

Return to the initial position takes place automatically, if no key is pressed for 60 seconds, or by simultaneously pressing the UP and DOWN key for approx. 4 seconds.

Parameter	Function description	Range of Adjustment	Standard setting	Custom setting
A1	Switch mode contact K1	0: heating contact 1: cooling contact	0	do not adjust!
A2			no influence	do not adjust!
A3	Function of contact K1 at sensor error	0: relay off 1: relay on	0	do not adjust!
A4			no influence 0	do not adjust!
A5			0	do not adjust!
A6	Control characteristics contact K1	0: thermostatic 1: PID	1	do not adjust!
A8	Display mode	0: integrals 1: resolution 0.5 K 2: resolution 0.1 K	0	
A19	Parameter lock	0: no lock 1: A-parameter locked 2: A- and P-parameter locked	0	
A30	Function alarm exit	0: Boundary alarm, relative 1: Boundary alarm, absolute 2: Range alarm, relative 3: Range alarm, absolute 4: Boundary alarm, relative inverted alarm contact 5: Boundary alarm, absolute inverted alarm contact 6: Range alarm, relative inverted alarm contact 7: Range alarm, absolute inverted alarm contact	0	
A31	Special function at boundary alarm	0: no special function 1: flashing display 2: buzzer 3: flashing display and buzzer 4: like 3, buzzer can be cancelled	0	



A32	Setpoint display	0: display shows actual value 1: display shows setpoint S1 (S1')	0	
A33	Start of the timer	0: Start with Start/Stop key	0	do not adjust!
A34	Switching input E2	0: not active	0	do not adjust!
A40	Hysteresis mode contact K1	0: symmetrically 1: one-sided	1	
A41			no influence	do not adjust!
A56	Alarm suppression after "mains on" / "standby-on"	0...999 min.	30 min.	
A60	Sensor type	21: PTC	21	do not adjust!
A70	Software filter	1: not active, or else 2...32: average value with 2...32 measuring values	8	do not adjust!
A80	Temperature scale	0: Fahrenheit ("AUS") 1: Celsius ("AUS")	1	
A87	Standby-function with key On/Off	0: no function	0	do not adjust!
A90	Output connection relay K1	1: connection to contact K1	1	do not adjust!
A91			no influence	do not adjust!
Pro	Program version		1.1	

Parameter description:

Attention: *The adjustment of the following parameters can change the equipment characteristics and are therefore to be set with utmost care.*

A1: Switch mode contact K1

The switch mode for the relays, i.e. cooling or heating function, can be programmed independently. Heating function means that the contact opens as soon as the setpoint is reached, thus power interruption. At cooling function the contact closes, if the actual value is above the required setpoint.

A2: The parameter doesn't have any influence.

A3: Function of contact K1 at sensor error

In case of 'sensor error' the selected relay falls back into the condition of pre-set. If there is a data-loss in parameter memory (display indicates "F1") both contacts K1 are switched off.

A4: The parameter doesn't have any influence.

A5: The parameter doesn't have any influence.

A6: Control characteristics contact K1

Independent choice of either PID or thermostatic characteristics for contact K1.



A8: Display mode

The value can be indicated in integrals or with decimals. In general, all parameter indications are presented with decimals.

A9: Remaining time display

A19: Parameter lock

This parameter enables locking of each parameter level. If third level is locked, only parameter A19 may be changed.

A30: Function alarm exit

The alarm exit evaluates an upper and a lower limit value (see parameters P30 and P31), whereas a selection is possible as to whether the alarm is active if the temperature lies within these two limits, or whether the alarm is released if the temperature lies beyond them. In the case of sensor error, the alarm is activated independently of this adjustment. The output can be inverted to operate as a release.

A31: Special function at boundary or alarm

With this parameter can be selected whether, in the case of an alarm, the indication to flash and/or the buzzer is to start. Sensor alarm is indicated independently by flashing display and the buzzer.

A32: Setpoint display

A32=0 indicates the actual value, A32=1 statically indicates the setpoint S1 in the display. Therefore, the current actual value can only be indicated with parameter P0.

A33: Timer function

With parameter the start-function of the timer can be determined.

A34: The parameter doesn't have any influence.

A40: Hysteresis mode contact K1 These parameters allow selection as to whether the hysteresis values which are adjustable with P2 are set symmetrically or one-sided at the respective switching point. At symmetrical hysteresis, half of the hysteresis' value is effective below and half of the value above the switching point. The one-sided hysteresis works downward with heating contact and upward with cooling contact.

A41: The parameter doesn't have any influence.

A56: Alarm suppression after "mains-On" and/or "Standby-On"

This parameter allows a switch-on delay of the alarm contact after switching on the mains voltage or standby. This delay corresponds with the time set here.

A60: Sensor type

These parameter permits selection of the sensor type, if the needed hardware prerequisites are given.

A70: Software filter

With several measuring values, it is possible to obtain an average value. This parameter can determine by how many measured values an average value is to be formed. If a sensor with a very fast reaction to external influences is used, an average value ensures a calm signal course.

A80: Temperature scale

The display can be switched between Fahrenheit and Celsius. At conversion, the parameters and setpoints maintain their numerical value and adjustment range. (Example: A controller with the desired value of 0°C is switched to Fahrenheit. The new desired value is then interpreted as 0°F, which corresponds to a temperature of -32°C).



A90: Output connection relay K1

Generally, the outputs are exchangeable with parameter adjustments, in order to achieve an optimal relation of the existing hardware with regard to contact rating, kind of contact and number of cycles. Therefore, these parameters assign the outputs to the controller function.

A91: The parameter doesn't have any influence.

Pro:

Indication of the program version.

8. Maintenance and Repair

The water bath is maintenance-free.

To guarantee a permanent faultless function we recommend to clean the parts which are in contact with the thermostat liquids periodically. Primarily parts with warmth transfer functions like radiator and temperature sensor should be cleaned.

The temperature controller has an own error monitoring with the following meaning.

Indication	Fault cause	Error elimination
F1	Sensor error, short or open circuit at sensor F1	Check sensor
EP	Data loss at parameter memory	The controller must be repaired.
Flashing display	Boundary or range alarm (if activated, triggered by temperature monitoring at sensor F1)	-----
Buzzer	Temperature alarm (see A31)	The buzzer can be stopped with the DOWN key.

Error messages are stored and can be displayed even if the fault is eliminated. Pressing the DOWN key deletes the error message.

Don't hesitate to contact our customer service if you do have any questions.

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9. Conformity Declaration und TÜV-Certificate

PD Group
P-D Industrie-
gesellschaft mbH
Prüfgerätewerk
Dresden

tüv
TÜV SÜD GMBH
Prüfung in Dresden

Conformity Declaration

The P-D Industriegesellschaft mbH Prüfgerätewerk Dresden declares the conformity the adjustment of the legal provisions of the member states for the goods described with the guidelines of the advice about the CE identification.

Thermostats	E5, E20 C5, C20
Water baths	WBT 1, WBT 6, WBT 12 WBT 22, WBT 80
Shaking water baths	SWB 20

For the evaluations of the products with regard to electromagnetic compatibility the following norms were consulted:

DIN EN 61326 Electrical equipment for measurement, control and laboratory use –EMC requirements

For the evaluations of the products with regard to the electrical safety the following norm was consulted:

DIN EN 61010 (VDE 0411)

For the evaluations of the products with regard to her usability the following norm was consulted:

DIN 12876 (product norm)

Dresden, 02.01.2007


Peter Körpert
Works Manager

TÜV CERT

CERTIFICATE

The TÜV CERT Certification Body
of TÜV Rheinland Industrie Service GmbH
certifies in accordance with
TÜV CERT procedures that

P-D Industriegesellschaft mbH
Prüfgerätewerk Dresden
Clara-Zetkin-Straße 31
D – 01159 Dresden

has established and applies a quality management system for
development, production, sale and service of
laboratory equipment and analysis measurement.

An audit was performed, Report No. 005241.
Proof has been furnished that the requirements according to
DIN EN ISO 9001:2000
are fulfilled.

The certificate is valid until **2010-01-23**.
Certificate Registration No. 01 100 005241



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