NUFER·MEDICAL

HEAT RADIATOR CERATHERM 600-2

SERVICE MANUAL

CE 0123

NUFER·MEDICAL

INDEX

1. Precautions

The heat radiator must not be used in rooms where there is a risk of explosion, i.e. in the immediate vicinity of anaesthetic gases.

The distance between the surface at which the patient lies and the lower edge of the radiator must not be less than 80cm. If this instruction is not followed, prolonged exposure to the heat radiation may cause burns.

Contact with the protective grating and the reflector should be avoided:
„Danger of burns“

The protective grating on the upper side of the radiator must always be free in order to ensure adequate removal of heat. Do not place sheets or flammable materials on the protective grating.
„Danger of fire“

If the underlay is changed, for example by the use of dark sheets, heating cushions, etc., the support surface may reach excessively high temperatures and thus influence the body temperature of the infant or patient.

After the radiator has been switched on, an acoustic and visual alarm is given after 15 minutes. This can be reset for a further 15 minutes with the red button.

The infant or patient must never be left unattended under the operating heat radiator.

It is recommended that the use of the radiant warmer is restricted to trained medical personnel who are aware of the general risks when using radiant warmers.

It is vital that an independent temperature check of the infant or patient is carried out at regular intervals by supervising personnel.

Use of the radiant warmer can notably increase fluid loss by the infant or patient.

When using the heat radiator over incubators, care must be taken to ensure that there is sufficient space between the lower edge of the radiator and heat-sensitive material, such as perspex or acrylic glass. The distance must not be less than 50cm. Set the heating power to max. level 3 (75%).

If the radiator housing is removed, there is a danger of an electric shock. The mains cable has to be removed from the radiator before every opening of the radiator housing. Maintenance and service work must be carried out only by trained personnel.

The temperature for the storage of the radiator has to be between –20°C to + 60°C.

Concerning the disposal we recommend to send back the radiator either to the supplier or to the respective trader or the radiator has to be disposed according the respective disposal regulations.

2. Definitions and Symbols

Note, Important, Caution and Warning

Note:
The remark „Note“ is used in the text to indicate procedures or conditions which might otherwise be overlooked or incorrectly understood. A note may also be used to clarify apparently contradictory or confusing situations.

Important:
Similar to Note, but used when greater emphasis is necessary.

Caution:
The remark „Caution“ is used to draw attention to a procedure which must be followed exactly in order to avoid damaging or destroying the instrument.

Warning: The remark „Warning“ is used in the text to draw attention to dangerous situations in connection with the operation, cleaning or maintenance of the instrument if there is a possibility of injury or danger of death to the operator or to the patient.

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Attention: consult accompanying documents

CE 0123

Indicates this device in compliance with EU-Directive 93/42/EEC/Annex II.3. 0123 is the Notified Body Number. All radiators with this signification are with regard to the production supervised from TÜV Product Service.

Danger! High Voltage!

AC Power

Attention Hot surface

Power ON

Power OFF

Equipotential plug

Type

The following types of mains cables are recommended for using:

Power Cord for Europe: (CEE 7/7 SCHUKO)

Power Cord for United Kingdom (BS 1363-Requires A BSI 1362 Fuse Rated At 13 Amps In the Plug)

Power Cord for Australia & China (AS-3112)

Power Cord for Switzerland (SEV 1011)

Power Cord for Italy (CEI 23-16/VIII)

Power Cord for Denmark (Afsnit 107-2-01)

Power Cord for Israel (SI 32)

3. General

3.1 Introduction

This Manual contains instructions for the erection, use and maintenance by the operator . Nufer Medical is not liable for the proper functioning of the heat radiator if it is not operated according to the instructions, if the maintenance recommendations in th is Manual are not followed or if repairs are carried out using non-approved components.

Calibration and repairs should be per formed only by trained personnel. 6 Maintenance documents are obtainable th rough your local dealer or from Nufer Medical.

The personnel who work with this heat radiator should read this Manual carefully and should fully understand all instructions contained therein. The Manual should be kept so that it can be easily inspected; it is advisable to store it in an easily accessible plac e. If you do not understand something, contact a Nufer Medical agent in order to obtain further information.

3.2 Technical data

The technical data of the Ceratherm 600-2 heat radiant are shown in Table A. All technical data may be changed without prior notice.

Table A

Current requirement		220-240 V AC 50/60 Hz 630W
Protection class	I	
Degreee of protection		B IP 20
Test provision		IEC 601-2 TUV / CE
Size		Width 21cm Length 55cm Height 90cm
Weight	4,9kg	heat radiator only
Trolley		Width 61cm Lenght 82cm Height 10cm
Upright tube		170 / 195 max. Height
Height adjustment	25cm	
Swivel range of the arm		45°

4. Operating Instructions

4.1 Structure and use

The radiator is intended for warming baby changing tables and for maintaining the body temperature of in fants. The built-in ceramic radiator has very good radiation properties and generates invisible infrared radiation in the region of 3 micro/M. The skin very readily absorbs this radiation spectrum and the patients' skin colour is not altered.

4.2 General description

These output settings are indicat ed by the yellow indicator's (🗀 - 🗐). Only one heat output settings can be active during operation. The choice of output setting is made by pressing the reverse button (🎛) or the forward button (⧖).The heating indicator ( ) lights when the element is being heated. When the radiant warmer unit is switched on, a time interval begins. After 15 minutes a 5 second audible alarm and a continuous flashing red alarm indicator / cancel are triggered. 8 seconds later, the heat output of the r adiator reduces to a pre-set value (the safety setting), with a corresponding change in the duty cycle* of heating monitor indicator. If the alarm is cancelled by pressing button 🖮, the time interval starts again and the heat r adiator returns to the original heat output setting. Alarm cancellation also deac tivates the flashing red alarm.

Refer to the front & rear diagrams on page 11:

The Ceratherm 600-2 heat radiator has 4 heat output settings, which can be individually set in the range 20%-99%.

These output settings are indicat ed by the yellow indicator's (🗀 - 🗐). Only one heat output settings can be active during operation. The choice of output setting is made by pr essing the reverse button (🎛) or the forward button (⧖).The heating indicator ( ) lights when the element is being heated. When the radiant warmer unit is switched on, a time interval begins. After 15 minutes a 5 second audible alarm and a continuous flashing red alarm indicator / cancel are triggered. 8 seconds later, the heat output of the radiator reduces to a pre-set value (the safety setting), with a corresponding change in the duty cycle* of heating monitor indicator. If the alarm is cancelled by pressing button 🖮, the time interval starts again and the heat radiator retu rns to the original heat output setting. Alarm cancellation also deac tivates the flashing red alarm.

(*) Duty Cycle: the relative lengt h of time when the heating monitor indicator is lit compared to the length of time when it is unlit.

4.3 Wall mounting

After removing the packaging, compare the instrument data on the type plate with the available connection data. Electrical connection is via a 220V AC 50/60 Hz mains socket and a 6A connected load.

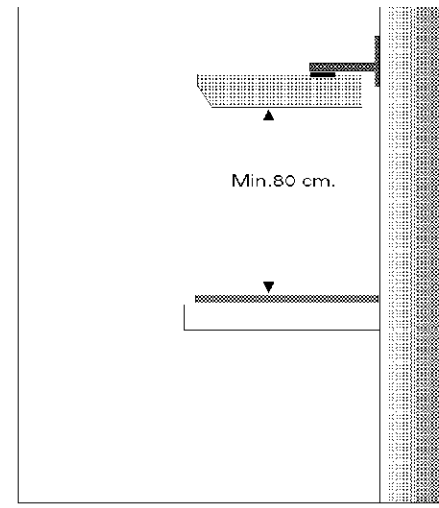
The wall holder (fixed or movable) must be fastened in solid masonry (chalky sandstone, brickwork or concrete) with suitable wall plugs and screws.

Mount the radiator in such a way that there is a distance of at least 80cm and not more than 100cm between the surface on which the patient lies and the lower edge of the radiator.

WARNING

The distance between the surface on which the patient lies and the lower edge of the radiator must not be less than 80cm. If this instruction is not observed, prolonged exposure to heat radiation may cause burns.

Ceratherm 600-2
Wall mouting



Mounting possibilities

Wall mounting with fixed holder
Wall mounting with movable arm
Ceiling stand with rotatable extension arm
Wall stand with pivotable extension arm
Special version

4.4 Start-up

1. Switch radiant warmer on / off switch to ON. The heater is now switched on.

2. Using the forward and reverse buttons {(<) + (>)}, set the desired heat output to level 🗀 to 🗐. The current heat output setting is shown by a lit yellow indicator 🗀, 🗎, 🗏 or 🗐. After about 5 – 10 minutes, the treatment surface will have been preheated.

Note: The heat output of the radiator is set to zero when the reverse button
(<) is repeatedly pressed until all yellow indicators (🗀 – 🗐) are extinguished.

3. Set the light on / off switch to ON.
The non dazzling halogen light is used for illuminating the treatment area.

4.5 Setting the heating power

The heating output can be set in accordance with actual requirements using the four heat output settings (🗀 – 🗐). The factory adjustment corresponds to the following local settings:

Level 🗀 = 25% Level 🗎 = 50% Level 🗏 = 75% Level 🗐 = 99%

The heating output of the individual steps 🗀 - 🗐 can be individually adjusted for special applications, e.g.:

Level 🗀 = 20% Level 🗎 = 40% Level 🗏 = 60% Level 🗐 = 80%

4.6 LED heating indicator

When the heating indicator is lit, the radiator element is being heated. When high heat levels are selected, the heating indicator is lit for a longer period of time than when lower heat levels are selected. The relative amount of time that the heating indicator is on compared to when it is off, reflects the level of heat being generated by the radiator.

4.7 Alarm monitoring

When the radiant warmer unit is switched on, a time interval begins. After 15 minutes triggers an audible alarm for 5 seconds and a continuous visual alarm in the form of a flashing alarm indicator / cancel button.

The alarm can be cancelled by pressing the alarm indicator / cancel button which causes the alarm indicator to extinguish and the audible alarm signal to stop (if cancellation is carried out within the 5 second audible alarm period). If the alarm is not cancelled within 8 seconds, the heat output of the radiator is reduced to a pre-set value (the safety-factory set to 20%). The red alarm indicator flashes continuously.

WARNING!

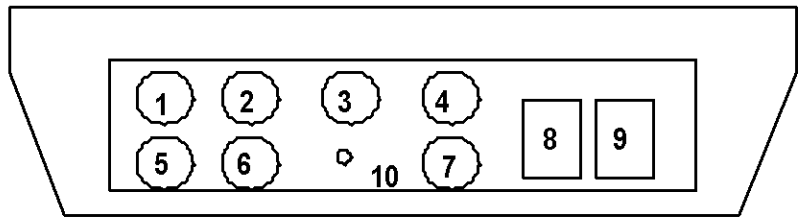
The child must not be left unattended on the bed with the radiator switched on.

The various power levels can be used as follows:

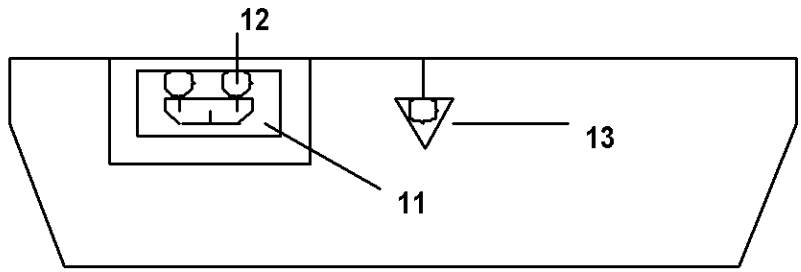
Level 🗀: To keep the support surface warm for continuous operation
Level 🗎: For normal operation on changing and examination areas
Level 🗏: Additional warmth for resuscitation, the labour room or for the operating theatre.
Level 🗐: For increased heat in the operating theatre, during anaesthesia or for adults.

4.8 Controllers, displays and connections

This section of the manual describes the controllers, displays and connections of the Cerat herm 600-2 heat radiator.



Front



Rear

Table B

Part no.	Designation	Function
1-4	LED yellow	Display of selected output setting
5+6	Forward/reverse button	Button for selecting output setting
7	Alarm button	Display and reset button for alarm
8	Lighting switch	Switching on halogen lamp
9	Main switch	Switching unit on and off
10	LED heating monitor	Display indicating that heating active
11	Unit supply socket	Socket for 220-240V / 50Hz connection
12	Fuses	Main fuse 2 x 3,15 Ampère
5 / 6 /7	Buttons	These buttons are used together for programming the individual output settings

5. Ceratherm 600-2 Mobile Heat Radiator

5.1 Scope of delivery for standard export version

The delivery consists of the following individual parts:

- Trolley with 3 castors
- Bottom tubular stand with fastening flange
- Top tubular stand with articulated arm, locking device, mains cable and fastening flange

Ceratherm 600-2 heat radiator completely assembled and ready for use.

5.2 Structure and use

The mobile radiator is used for warming baby changing tables and resuscitation stations and for additional heat supply in incubators and for adults in the operating theatre and during anaesthesia. The built-in ceramic radiator has very good radiation properties and generates invisible infrared radiation in the region of 3 micro/M. The skin very readily absorbs this radiation spectrum and the patients' skin colour is not altered.

The radiation intensity can be adjusted in four stages from 25% to 99% by using the forward and reverse selectors {(<) + (>)}, selecting heat output settings shown by lit indicators 🗀 - 🗐.

5.3 Assembling the mobile version

After removing the packaging, check the individual parts for any damage occurring during transport and compare with the packing list.

1. Mount the lower tubular stand (Item C) with the flange and the four bolts facing downward on the trolley (Item A). The tube reinforcement should be at the back.

2. Screw the four nuts on the lower side of the trolley (Item A) onto the four bolts and tighten with appropriate socket spanner.

3. Now turn the securing screw (Item 5) and the star grip for locking fully (Item 4) outward by turning to the left.

4. Then insert the already mounted upper tubular stand (Items 9 + 1) into the lower tubular stand. Ensure that the milled nut is fitted in on the side of the securing screw.

5. The securing screw (Item 5) can now be tightened. The tubular stand (Item 9) must now only be moved within the groove lenght. It is essential to check whether the tubular stand is limited at the highest position and cannot be pulled out further. Tighten the tubular stand in the lowest position with the star grip.

6. Fasten the radiator on the flange of the stand arm with four hexagon socket screws.

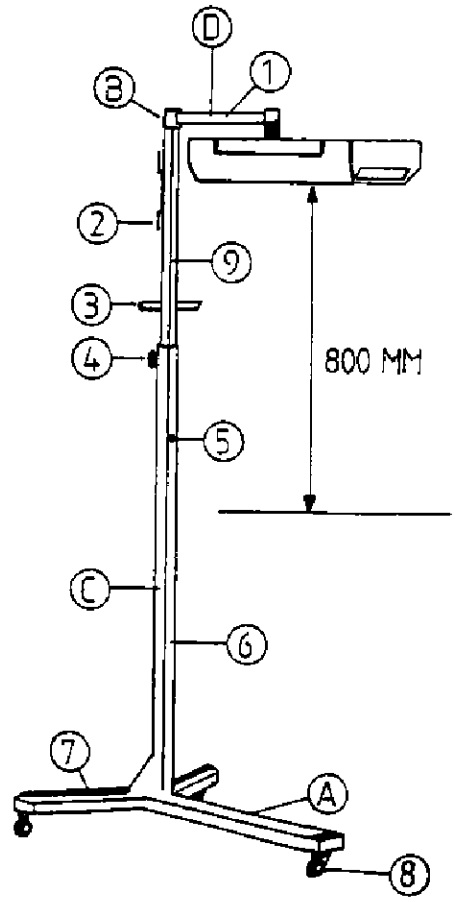
7. Insert instrument plug on 220V AC mains cable into the socket on the back of the radiator.

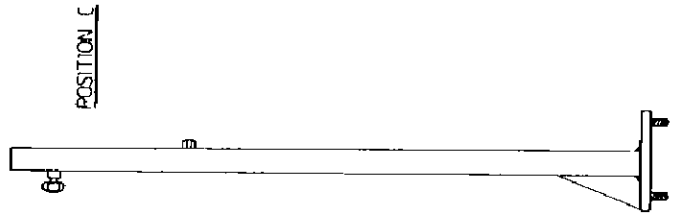
8. After assebmly, the mechanical and electrical functioning of the instrument should be checked.

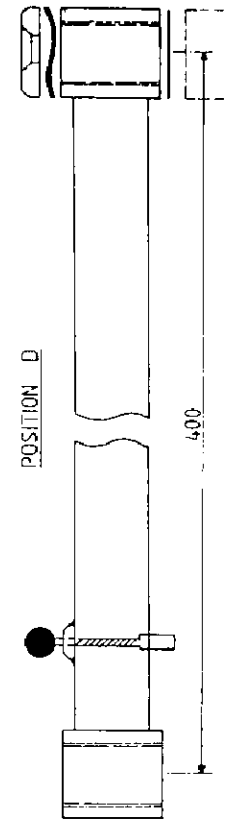
9. The heat radiator is started up according to Section 3.1 of the Operating Instructions.

WARNING!

Care should be taken to ensure that the mains cable does not become trapped between the articulated arm and the lateral movement limit pin.




POSITION C
B
B


POSITION D
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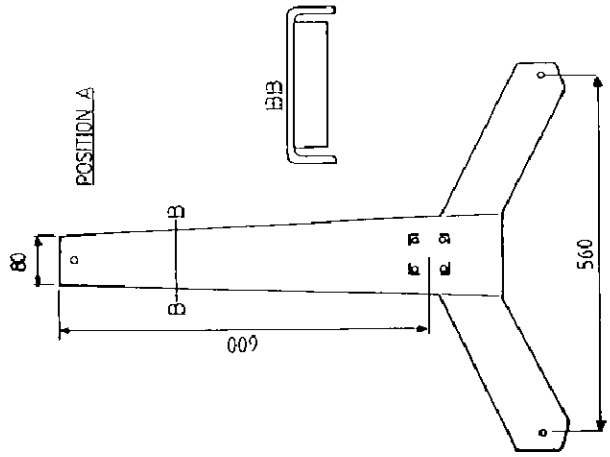
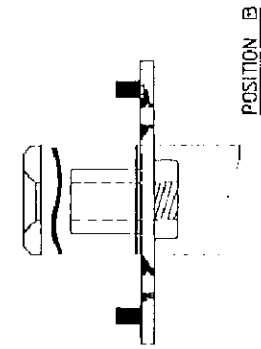
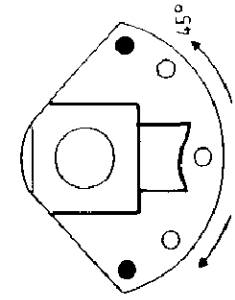

POSITION A
B
B
B
B
80
600
560


POSITION B


45°

6. Repair And Maintenance

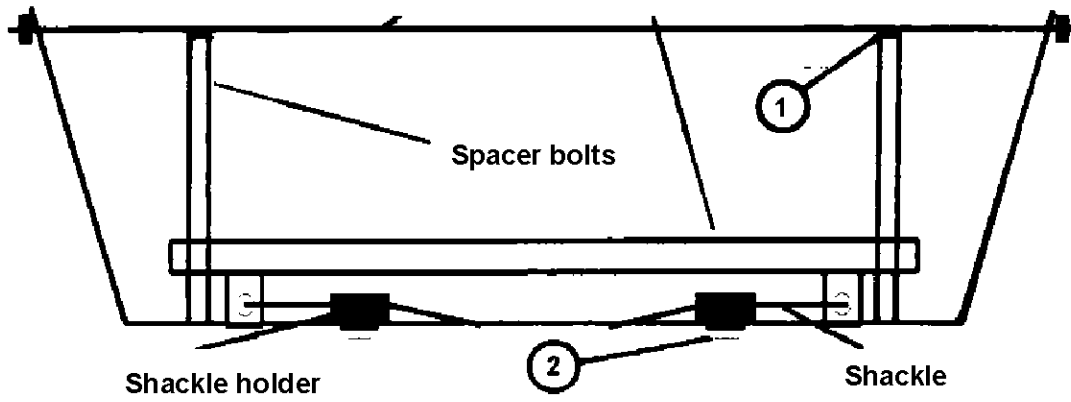
6.1 Heating

If the ceramic heating element becomes defective, the housing must be dismantled from the chassis. For that purpose, release the housing screws (6x).

WARNING!

The ceramic heating element may be hot. Do not touch the exposed element. Wait 15 minutes for the heating element to cool down before touching the surface.

Reflector with ceramic radiator



Then release the socket head screws (item 1) which carry the reflector on the spacer bolts. The heating element leads, which are secured to the ceramic terminals, must also be detached. After removing the earthing cable, release the two socket head screws (item 2) to separate the shackle holder from the reflector.The heating element can then be removed vertically from the reflector. Replace the heating element.

Reassembling

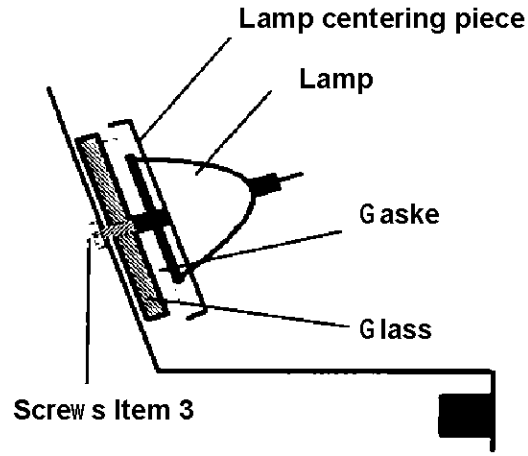
The shackles must first be secured onto the heating element, the shackle holders placed on the shackles and the element inserted carefully into the reflector and mounted in position.

Caution: The screws (item 2) must not touch the heating element!

The reflector is now placed on the spacer bolts and mounted in position. Push the earthing plug onto the reflector and connect up the two heating element leads again. Now reassemble the housing. To switch the heating radiator on again, proceed as indicated in Section 4.3 of the operating instructions.

6.2 Lighting

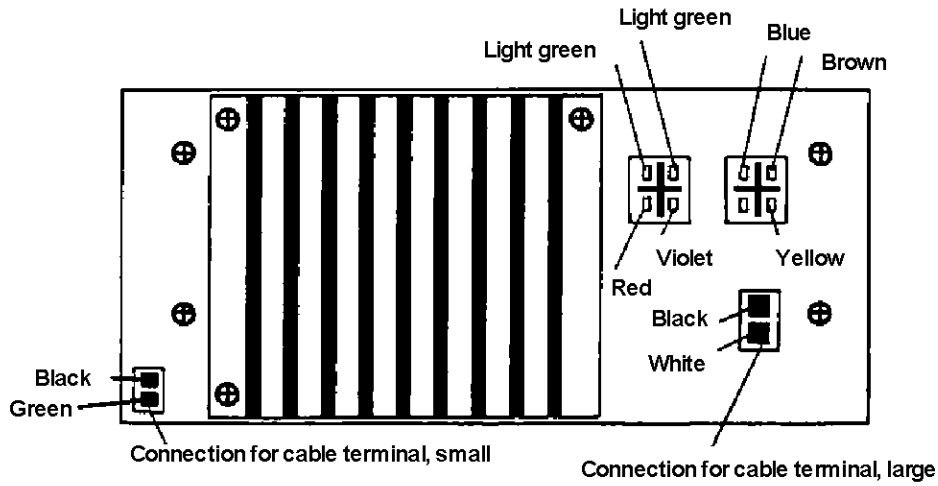
After removing the housing, access to the mounting on which the lamp is fitted is simple. Detach the two screws (item 3) and carefully remove the lamp centering piece with its contents. To enable the lamp to be detached from the lamp centering piece, the lamp socket must also be removed. The new lamp can now be fitted as shown in the drawing. When reassembling, make sure that the lamp glass is in the correct position.



6.3 Electronic control

If the control becomes defective, the housing must be dismantled. To change the control unit, all the AMP plugs must be removed from the heating and light switch, together with the two cable clips. Then release the socket head screws (3x at front) to enable the front to be removed from the chassis. The complete control unit with the front can now be exchanged. When reassembling, check the cable terminals to make sure that a good contact is obtained.

Control connection diagram (rear view) n)



6.4 Fuses

After each repair, the fuses on the in strument socket must be checked and if necessary replaced. There ar e two slow-acting 3.15 A fuses.

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6.5 Safety technical control

Radiator: Heat Radiator Hospital:

Item #:

Date: Signature:

Position	Description	Desired Value	Actual Value	OK	Remark
	Mechanical Condition				
1	Case (Chassis)				
2	Switch / Poti				
3	Rolls				
4	Chassis able to consolidate and adjustable in hight				
5	Shock Absorber Test (available since 2003)				
	Function Test				
6	Values of temperature (according drawing)				
7	Heating (4 Levels)				
8	Halogen lamp				
	Heater Alarm				
9	Acoustically after	15 min	min		
10	Visually after	15 min	min		
	Electrical Safety				
11	Connections controlled				
12	Safety test according IEC 601-1				
	Various/Cleaning				
13	Radiator dusted, cleaned				
14	Service label (settlement date)				

Remarks:

6.6 Temperatures measured values Ceratherm 600-2

	Measuring Point	1	2	3	4	5
Level						
1 (25%)		26.9 °C	27.3 °C	27.7 °C	27.3 °C	27.0 °C
2 (50%)		29.9 °C	30.9 °C	31.5 °C	31.3 °C	30.3 °C
3 (75%)		32.1 °C	34.6 °C	35.8 °C	34.0 °C	32.4 °C
4 (99%)		36.9 °C	38.6 °C	39.5 °C	38.5 °C	37.0 °C

Important

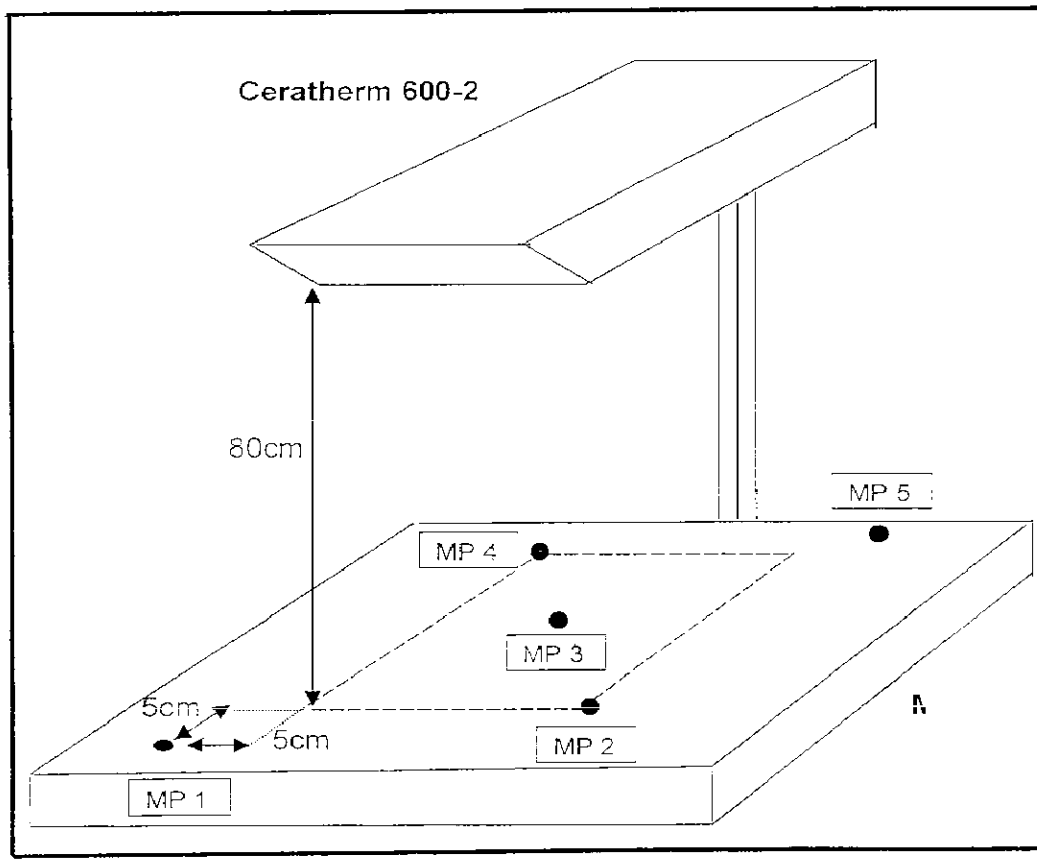
The values were taken with a surrounding temperature of 22° C and with a humidity of 25 %.

Depending on the ambient temperature and humidity, the measurements can vary.

6.7 Cleaning and disinfection

The surfaces should be cleaned with a moist cloth and a cleaning agent or disinfectant. Liquids which enter the instrument may cause damage. After cleaning the surfaces, rub with a dry cloth.

Disinfection should be carried out using only agents which do not attack plastic and aluminium parts. Observe the recommendations of the disinfectantmanufacturer.


Ceratherm 600-2
80cm
MP 5
MP 4
MP 3
5cm
5cm
MP 2
MP 1

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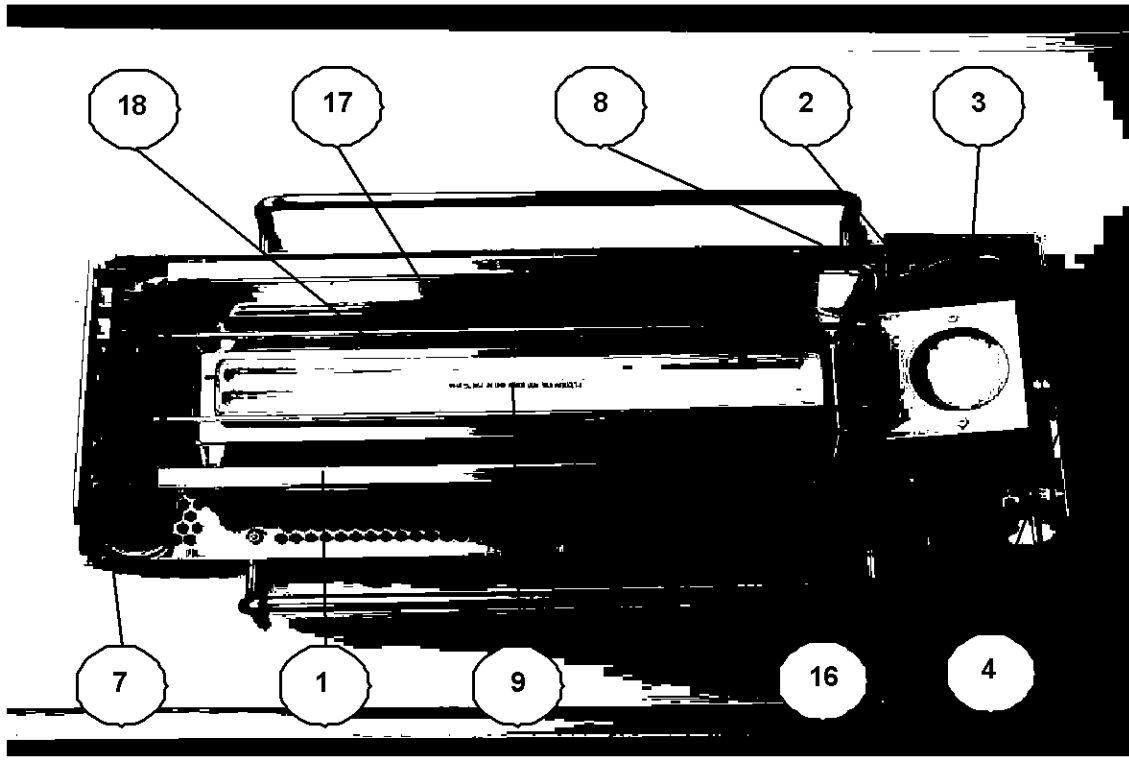
7. Spare Parts List Ceratherm 600-2

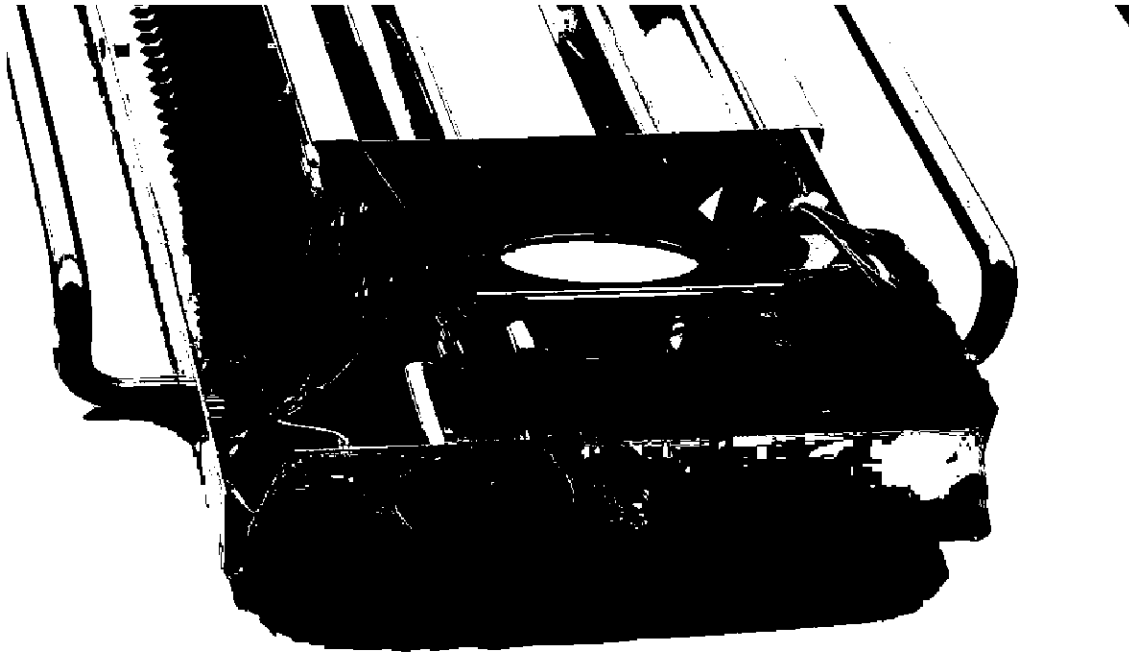
Position	Quantity	Article No.	Item
1	1	521-338001	Chassis with reflector
2	1	521-175001	Cable tree, complete
3	1	521-175502	Transformer 36 VA
4	1	521-175503	Mains input plug
5	2	521-175002	Fuse 3.15 AT
6	4	521-965001	Spacer bolt
7	1	521-185001	Electrical control with front
8	2	521-175003	Ceramic terminals, 3 pole
9	1	521-753011	Ceramic heating element 600 W
10	1	521-177002	Halogen lamp 12V 20W
11	1	521-965002	Flat gasket for lamp
12	1	521-355001	Protective glass
13	1	521-175004	Lamp socket with cable
14	1	521-965504	Plastic housing
15	2	521-935001	Sticker (side)
16	2	521-338002	Handle
17	2	521-330220	Shackle
18	2	521-330200	Shackle holder
19	1	521-935000	Front foil
20	1	007-40057	Equipotential plug
21	1	521-6003068	Shock absorber

Ceratherm 600-2 Electric Wall Heater- Chassis

Detail A

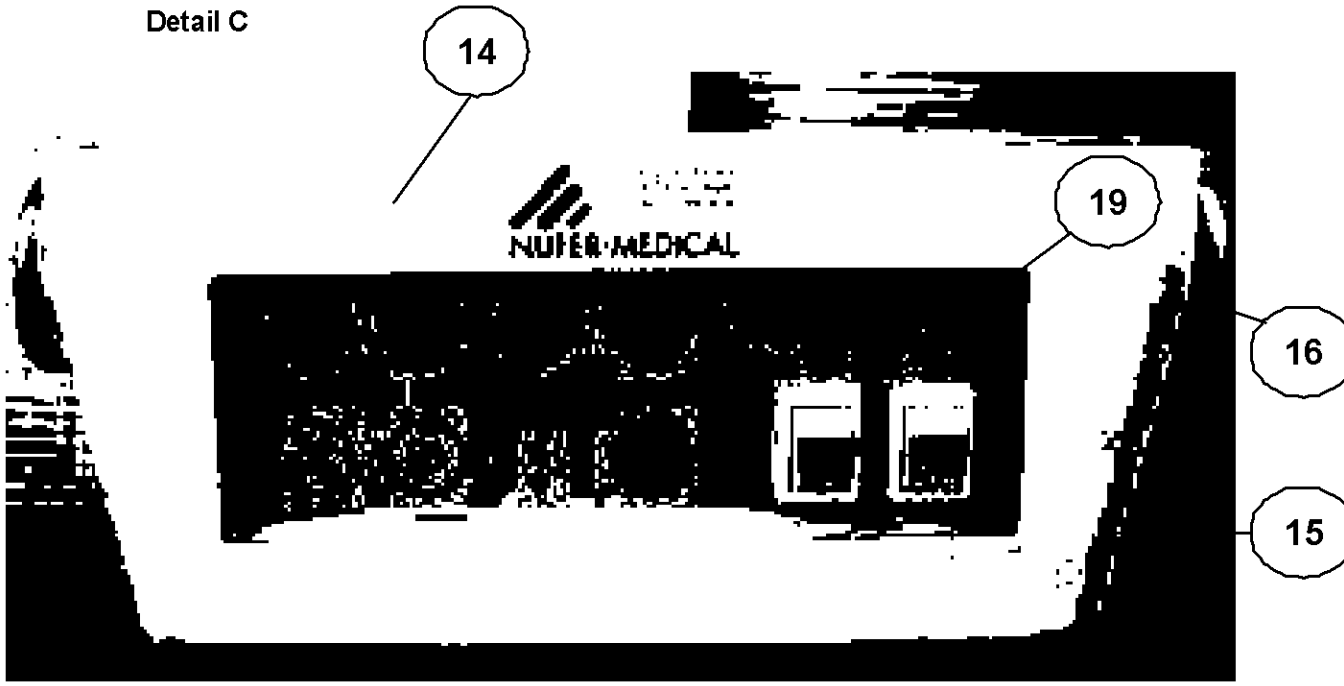


Detail B



Ceratherm 600-2 Housing Front

Detail C



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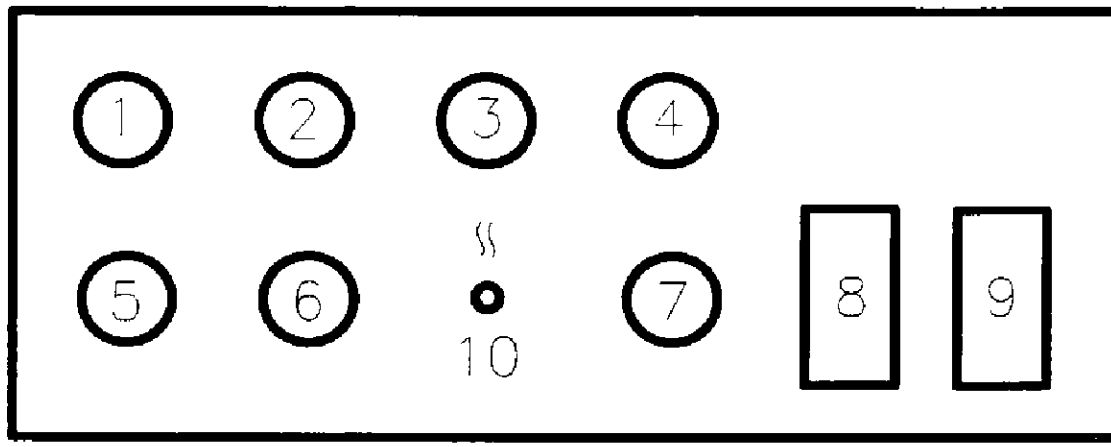
8. Programming 1st stage and 2nd/3rd/4th stages

Overview Front Sheet



General Description

Ther radiator CERATHERM 600-2 has 4 heat output settings, which can be individually set in the range 20% - 99%, plus an additional Level O, which turns the radiator inactive.

These output settings are indicated by the yellow indicator's (-). Only one heat output settings can be active during operation. The choice of output setting is made by pressing the reverse button ( ) or the forward button ( ).The heating indicator ( ) lights when the element is being heated. When the radiant warmer unit is switched on, a time interval begins. After 15 minutes a 5 second audible alarm and a continuous flashing red alarm indicator / cancel are triggered. 8 seconds later, the heat output of the radiator reduces to a pre-set value (the safety setting), with a corresponding change in the duty cycle* of heating monitor indicator. If the alarm is cancelled by pressing button , the time interval starts again and the heat radiator re turns to the original heat output setting. Alarm cancellation also deactivates the flashing red alarm.

1. Switch on the unit with switch (9)>> all LED's light for about 1 sec. Alarm
   tone for about 1 sec.

2. Repeatedly press button (5) until Step 1 is reached.

3. Keep button (7) depressed (approx. 8 secs.) until alarm tone and flashing LED active.

4. Output settings in 10% steps.

Using buttons (5+6), select se ttings in tens (e.g. 1>>1x10>>10%, 2>>2x10>>20% etc.)

For settings in tens>>40%, the places lighting up are added.

Example: To set an output of 20%, continue pressing the buttons until the LED (2) lights.

If no entries are made within 8 seconds, a return is made to normal operating mode with no entry saved!

5. Output settings in 1% steps

   Switch to settings in uni ts with button (7) (press once).

   Using buttons (5+6), select settings in units (e.g. 1>>1%, 2>>2% etc.)
   For settings in units>>4%, the places lighting up are added.

Example: To set an output of 5%, conti nue pressing the buttons until LED (1) and LED (4) light.

6. Store new setting

   Using button (7), store the newly set values within 8 seconds (press once) >>normal operating mode.

7. Result in example: output setting1= 25%

Programming steps 2/3/4 is carried out in the same sequence.

Programming the safety power (version 2.2 onwards)

1. Switch the device on by means of the switch (9)
   -> all LEDs light up for about 1 sec.
   the alarm sounds for about 1 sec.

2. Press key (7) and hold down until the alarm sounds and the flashing LED is activated. Then continue to hold the key until the alarm sounds again.

3. Setting the decade safety power

   Use keys (5 & 6) to select the decade power
   (e.g. 1 -> 1 x 10 -> 10%, 2 -> 2 x 10 -> 20%, etc.

For decade powers > 40%, the illuminated digits are added together.

Example: to set a decade power of 20%, continue to press the key until LED (2) lights up.

If no inputs are made within 8 seconds, the system reverts to the normal operating mode without memorizing any data.

4. Setting the units digit safety power

   Use key (7) to switch to units digit power (press once).

   Use keys (5) and (6) to select units digit power
   (e.g. 1 -> 1%, 2 -> 2%, etc. For units digit powers > 4%, the numbers which light up are added together.

   Example: To set a units digit power of 0%, the keys must be actuated until no LED lights up.

   If no inputs are made within 8 seconds, the system reverts to the normal operating mode without memorizing any data.

5. Memorizing new safety power settings

   Memorize the newly set values within 8 seconds by means of key (7) (press once) -> normal operating mode.

6. Result in the example: safety stage = 20%.

Note: The values set in these examples correspond to the default values on delivery of the unit.

Programming alarm activation (version 2.2 onwards)

Note: if stage 0 is active, the alarm cannot be activated!

1. Switch the device on by means of the switch (9)
   -> all LEDs light up for about 1 sec.
   -> the alarm sounds for about 1 sec.

2. Press key (7) and hold down until the alarm sounds and the flashing LED is activated. Then continue to hold the key until the alarm sounds again and wait until the alarm is activated for the 3rd time.

3. Decade power alarm setting

   Use keys (5 & 6) to select the decade power
   (e.g. 1-> 1 x 10 -> 10%, 2 -> 2 x 10 -> 20%, etc.)

For decade powers > 40%, the illuminated digits are added together.

Example: to set alarm activation from a decade power of 20% (active only above 21%), the keys must be actuated until LED (2) lights up.

If no inputs are made within 8 seconds, the system reverts to the normal operating mode without memorizing any data.

Units digit power alarm setting

Use key (7) to switch over to units digit power (press once only).

Select units digit power with keys (5) and (6)
(e.g. 1 -> 1%, 2 -> 2%, etc.)
For units digit powers > 4%, the illuminated numbers are added together.

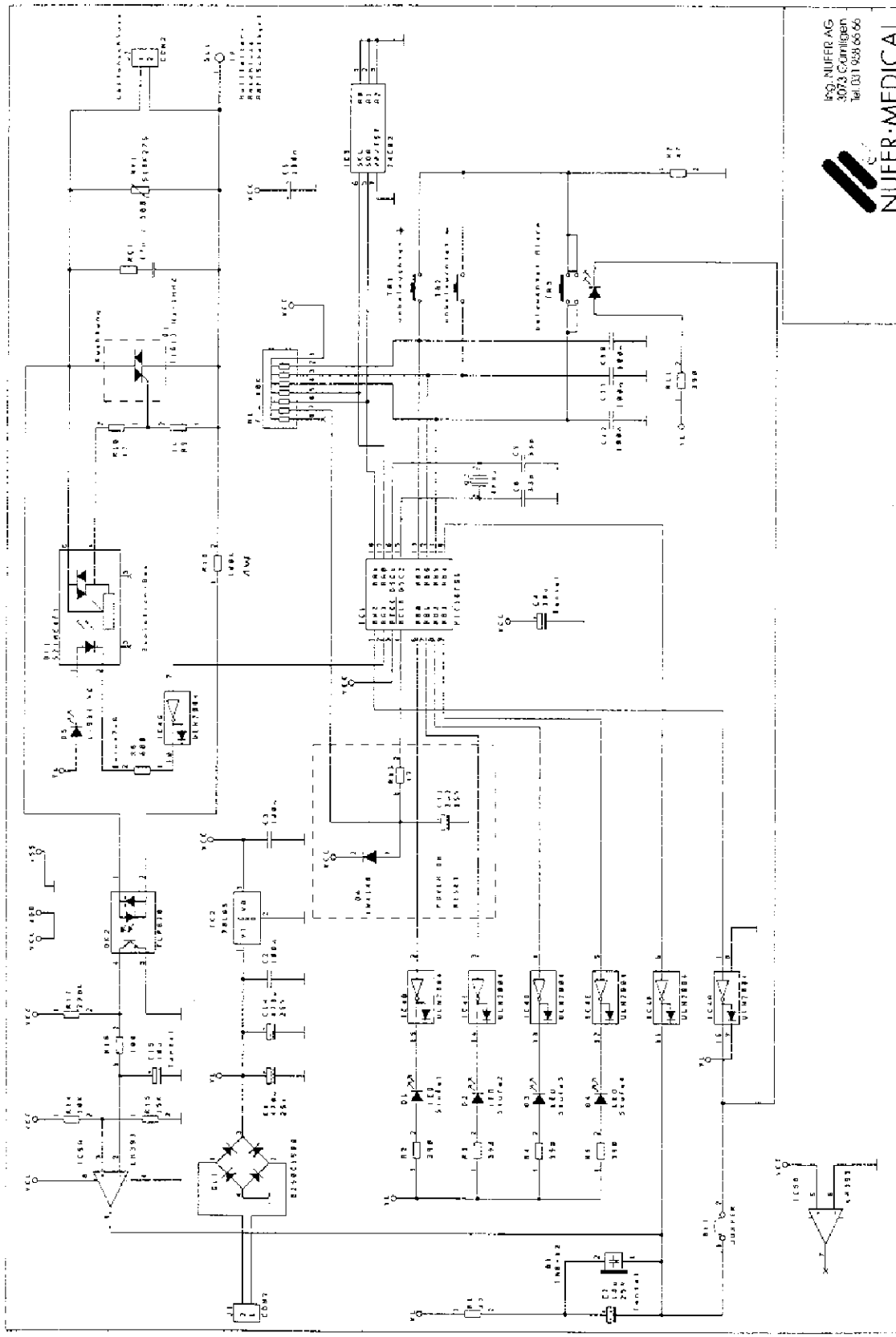
Example: To set alarm activation from units digit power of 0% (active only above 1%), the keys must be actuated until no LED lights up.

If no inputs are made within 8 seconds, the system reverts to the normal operating mode without memorizing any data.

4. Memorizing the new setting for the alarm activation power

   Use key (7) to memorize the newly set values within 8 seconds (press once) -> normal operating mode.

5. Result in example: alarm activated above 21% power (after 15 min.).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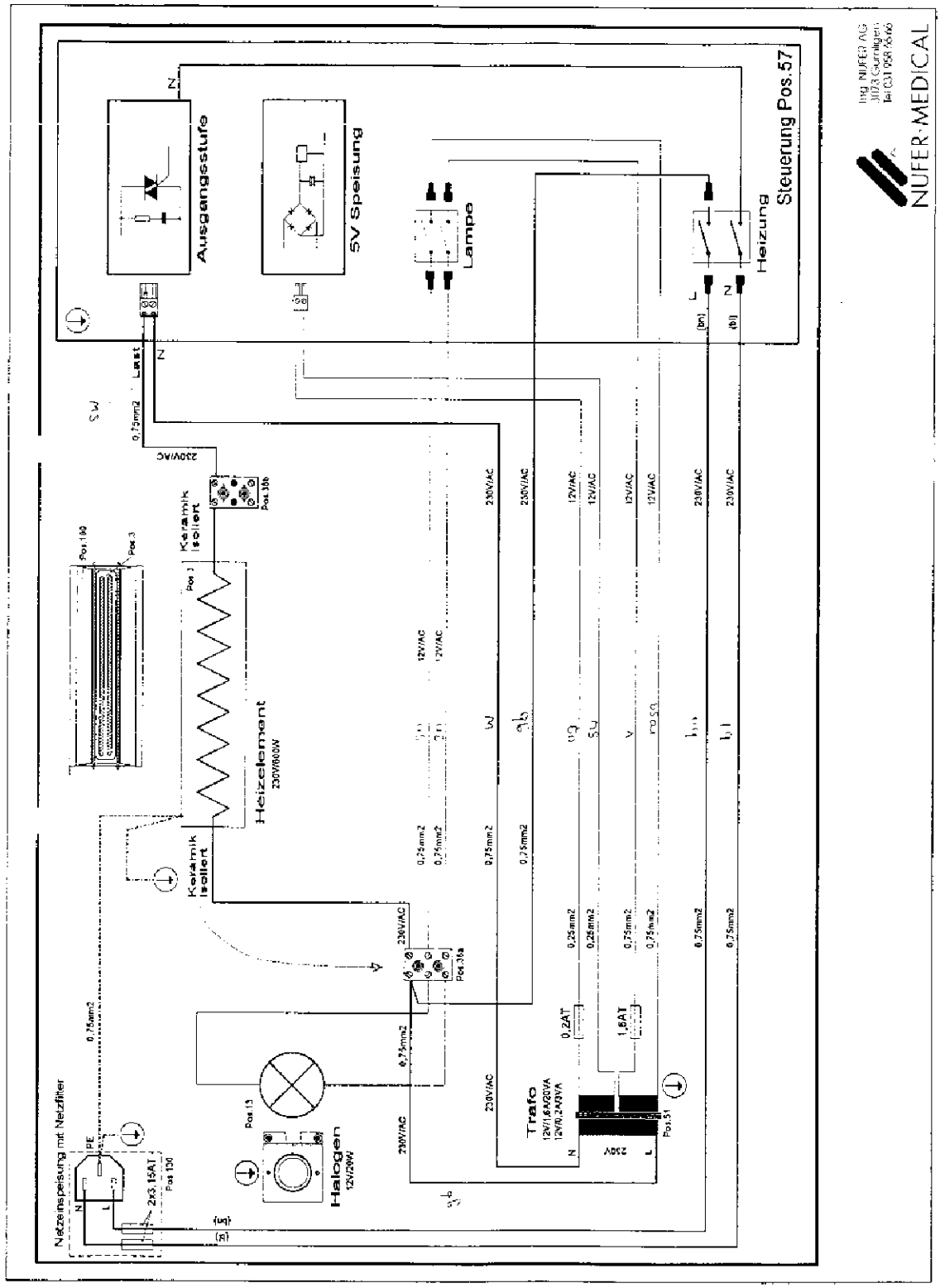
Steuerung Pos.57
Ausgangsstufe
5V Speisung
Lampe
Heizung
Last
Keramik Isolier
Heizelement
230V/800W
Halogen
12V/20W
Trafo
12V/1,6A/20VA
12V/0,24VA
Netzeinspeisung mit Netzfilter
2x3,15AT
0,2AT
1,6AT
230V/AC
12V/AC
0,75mm2
0,25mm2
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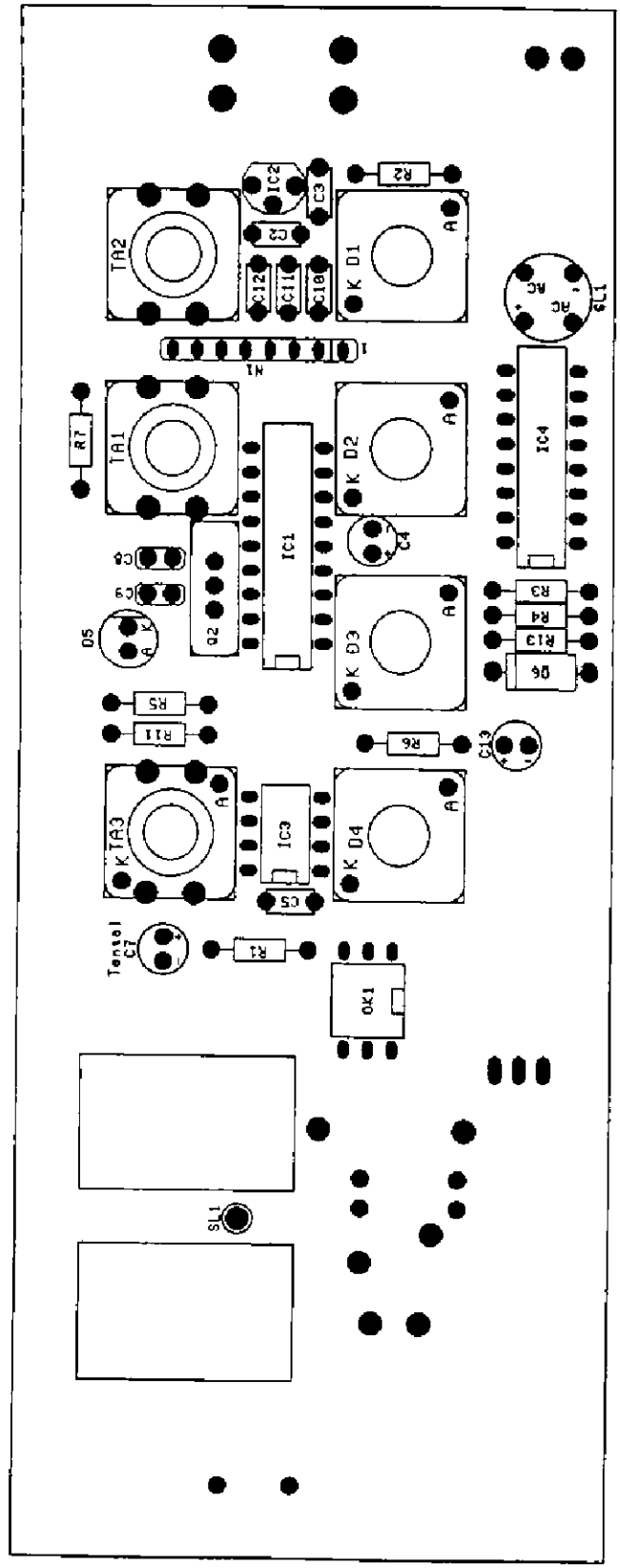
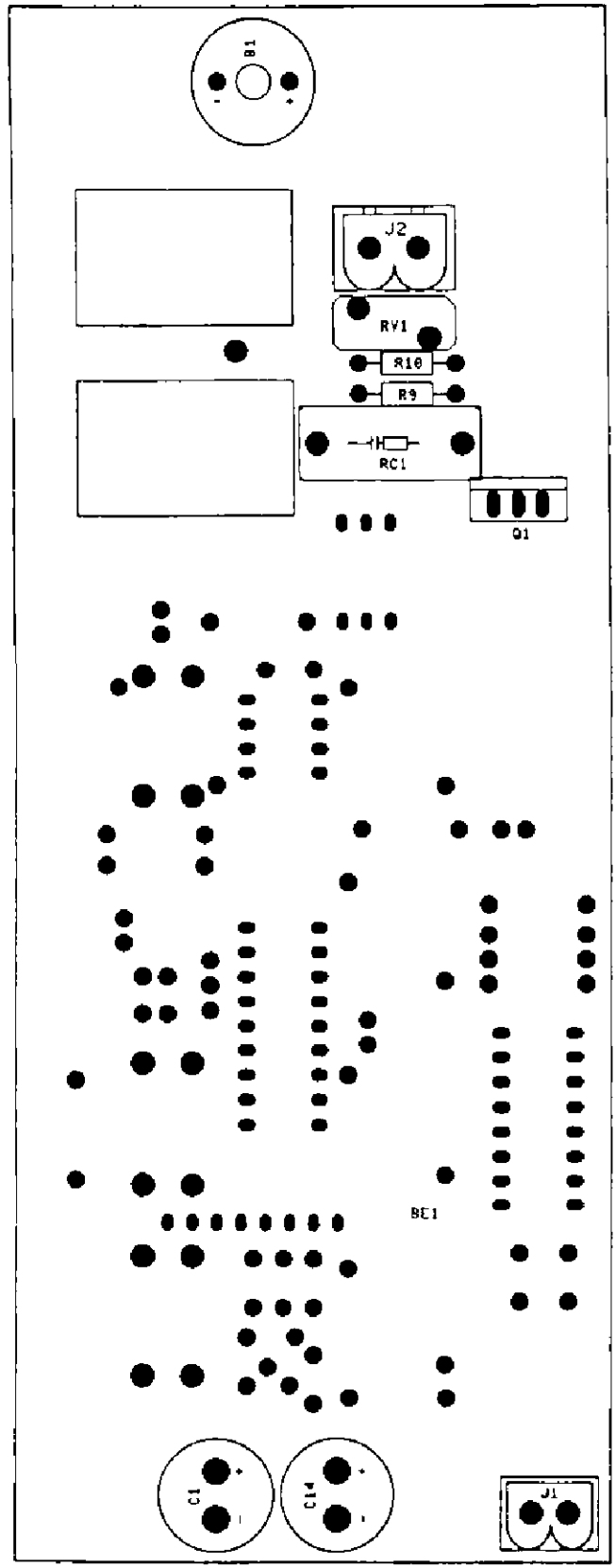
Schematic electronic control board (top-view)



Schematic electronic control board (bottom-view)



9. Contact adress

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