

mini ZAP[®]

TAKE BACK YOUR POWER



Zapper

(Based on Dr. R. C. Beck)

Operating manual

V 1.0 • 11. 2007

TABLE OF CONTENTS

1. Foreword	2
2. Scope of delivery	2
3. General notes	3
4. Application	3
5. Device overview	5
6. Button functions	6
6.1 5 Min. break timer.....	6
6.2 Two hour signal.....	7
6.3 Current adjustment.....	8
6.4 Cable-test-mode.....	8
6.5 Software version.....	9
7. LCD-display	10
8. Acoustic signals	11
9. Quickstart	12
10. Error messages and -fixing	14
10.1 Low battery.....	14
10.2 Short circuit / Overload.....	15
10.3 No load.....	15
10.4 Maximum voltage reached.....	16
10.5 No quartzclock.....	16
11. Technical highlights	16
11.1 True AC voltage with 3,920 Hz.....	16
11.2 Constant current control (CCC).....	17
11.3 Display of output voltage.....	17
11.4 Operating hours counter.....	17
11.5 Intelligent error management (IEM).....	17
11.6 Gold electrodes.....	18
11.7 10 hours auto-off-timer.....	18
11.8 Future-proof through software update.....	18
12. Battery change	18
13. Maintenance / Storage	19
14. Guarantee / Repair / Disposal	20
15. Order list	21
16. Technical data	22
16.1 Measurement of output voltage.....	23
17. Notes	23

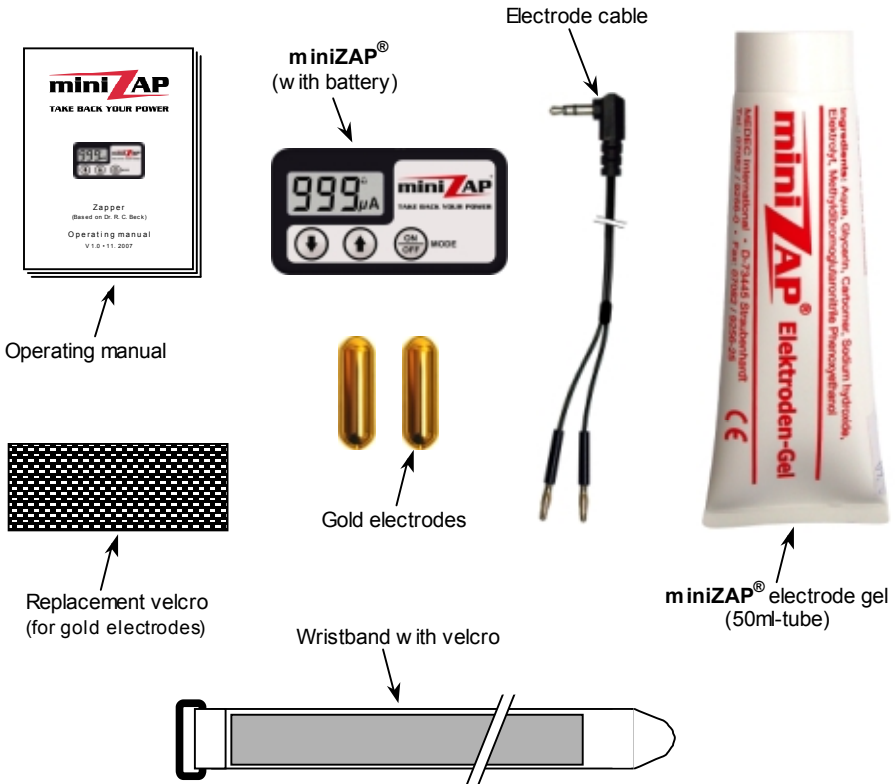
1. Foreword

Congratulations for having purchased the **miniZAP**[®], the smallest and state-of-the-art zapper on the world market, which is carried like a wristwatch. Due to its display and easy to handle carrying and operating philosophy, the **miniZAP**[®] sets a new standard. We wish you all success and pleasure while using your **miniZAP**[®] daily!

Please study the manual completely and carefully before using the **miniZAP**[®], in order to achieve the maximum advantage with the device.

2. Scope of delivery

The following parts are included in delivery with the **miniZAP**[®]:



3. General notes

In 1995 **Dr. Kaali** and **Dr. Lyman** from Albert Einstein university, New York, developed a method for blood electrification, which was applied for a patent (US-Patent Nr. 5139684). **Dr. R. C. Beck** developed this method further, so that it was usable without surgical interference and is nowadays in form of the **miniZAP**[®] for everybody very simple, convenient, and effective available.

Blood electrification with the **miniZAP**[®] is suitable for:

- Improvement of physical and mental capacity,
- Increase of overall well being and health status.

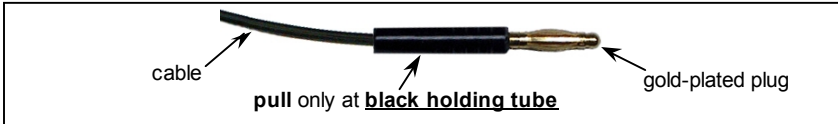
The **miniZAP**[®] can be used in combination with other therapeutic measures, as well as for prevention purposes. The **miniZAP**[®] is no medical device and therefore no replacement for a visit at your doctor or alternative practitioner.

4. Application

The **miniZAP**[®] should be used two hours daily over a period of six weeks to three months (see chapter „11.4 Operating hours counter“). This period can be extended according to your needs. In order to start immediately with the use of the **miniZAP**[®], skip to chapter „8. Quickstart“. Please consider the following notes:

- Start the usage of the **miniZAP**[®] with low current (60 μ A - 150 μ A). Increase the current slowly from session to session, until you have reached the recommended range of 200 μ A - 400 μ A. Should one of the effects occur as stated below, please follow the hints mentioned there.
- Dependent on the exact position of the Gold electrodes (e.g. directly over a nerve), the current pulses are more, less or not sensible. However, the effectivity of blood electrification is independent from feeling the current or not. Though, at less than 200 μ A the effectiveness can be reduced.
- To meet individual requirements, the **miniZAP**[®] can deliver up to 999 μ A. Please consider, that currents over 400 μ A can quicker lead to blister from burns and batterylife decreases disproportionately.
- Use the electrode gel during every session, because his not only saves battery, but helps to prevent skin irritations due to the fact, that the current pulses are less sensible, although the current intensity remains equal.
- Change the wrist from session to session to preserve your skin.
- Drink several glasses of water in the period you use the **miniZAP**[®], preferably ionised (basic). Product infos see www.aquaphaser.de.

- Should you have the feeling that the current is too strong, even at the lowest adjustment, apply electrode gel repeatedly, comminute it and let it act upon the skin for a while.
- Pull the gold-plated plug of the electrode cable only at the black holding tubes out of the gold electrodes, and not at the cable. Otherwise the copper wires inside the cable could break.



- The **miniZAP**[®] electrode gel has an extra high conductivity and is completely skin neutral. 50 ml last for more than 250 applications.
- During the use of the **miniZAP**[®] the following effects can occur at the contact area between skin and gold electrodes:
 - local redness,
 - itching,
 - blistering or blister from burns with subsequent crustification.

Reduce this secondary effects through following actions:

- a) Apply more often electrode gel,
- b) Decrease the current,
- c) Change more often between your wrists,
- d) Use skin cream which is suitable as burn ointment.

5. Device overview

1. Piezo-buzzer

Depending on the mode of operation the **miniZAP**® makes different sounds, see „8. Acoustic signals“.

2. LCD-display

With the LCD-display different operating parameters as current, output voltage, actual running time and error messages are displayed. See „7. LCD-display“ and „10. Error messages and -fixing“.

3. Output socket

The electrode cable is connected to this socket.

4. Velcro fastening

On its back side the **miniZAP**® has a velcro field with which it can be easily attached to the wristband.

5. Notch for opening battery case

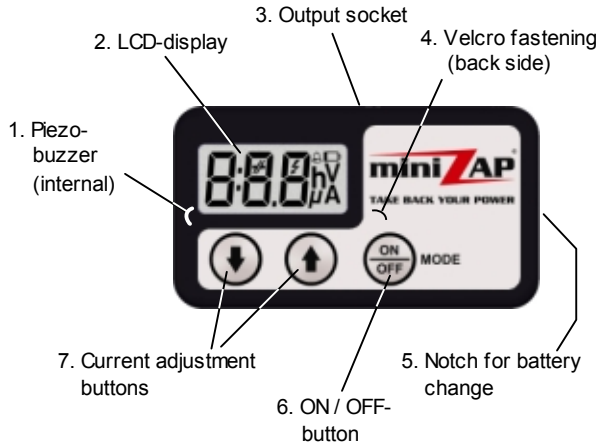
This notch makes opening the enclosure for battery change very easy (see „12. Battery change“).

6. ON / OFF-button

With this button the **miniZAP**® is switched on and off, the 5 min break-timer is started/ stopped, and the two hour signal is switched on / off. These and more functions are described at „6. Button functions“.

7. Current adjustment buttons

With this buttons the current, which flows through the gold electrodes in your body, can be adjusted. Higher current with the arrow-up-button „↑“, lower current with the arrow-down-button „↓“. Further hints at „6.3 Current adjustment“.



6. Button functions

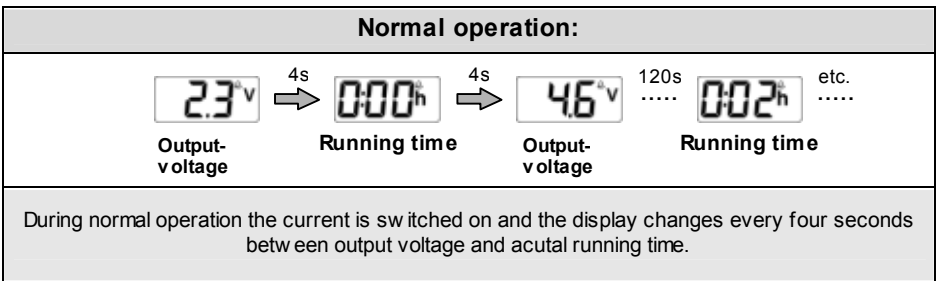
The ON / OFF-button has the following functions:

- **Switching-on:**

push the ON / OFF-button shortly to switch the **miniZAP**® on. The sound sequence „A“ (see „8. Acoustic signals“) is audible and the display shows one after another:

1.	Total operating time	in [hrs:min]	Example:
2.	Last adjusted current	in [µA]	Example:

Provided all is connected correctly, the sound sequence „B“ is audible and the **miniZAP**® starts automatically it's normal operation:



- **Switch-off:**

Keep ON / OFF-button pushed (approx. 2 sec.), until the message „OFF“ appears on the display. At the same time the sound sequence „C“ is audible. Now the **miniZAP**® is switched off.

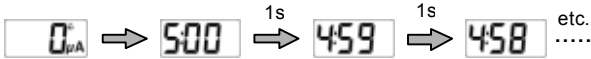
- **Interruption of an error signal:**

If the ON / OFF-button is pushed shortly during an error message, it is interrupted and „cLr“ is notified in the display. Afterwards the **miniZAP**® checks, if the error has been fixed. If “yes”, normal operation starts, else the error message is reported again.


6.1 5 Min. break timer

General:

With the 5 Min. break timer the session can be interrupted without switching the **miniZAP**® off. This has the advantage that displaying the running time and time counting for the two hour signal doesn't get lost. Activate the break timer in case of: applying fresh electrode gel, switch the current off for a period of time or change the wrist. During the break timer is running, the current is switched off and no error message will occur.

START of the 5 Min. break timer: 

Push ON / OFF-button shortly, the notify „0µA“ is displayed (current is switched off). Subsequently the display changes to „5:00“ (five minutes), which is then counted down secondwise.

STOP of the 5 Min. break timer: 

Push ON / OFF-button shortly, the display changes from the remaining time, e.g. „1:59“ to the last adjusted current (e.g. „430µA“). Afterwards the miniZAP[®] switches again to normal operation.

After the five minutes are up, the miniZAP[®] automatically switches to normal operation, provided no error has occurred.

- Hints:
- During the break timer is running, he can be restarted by pressing the ON / OFF-button **two** times in quick succession.
 - 10 seconds before the 5 minutes expire, beep-tones are audible, which signalise the soon end of the break time.

6.2 Two hour signal


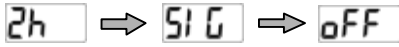
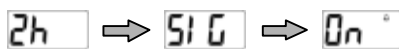
General:

For better verifying of the application time, the miniZAP[®] every two hours makes an acoustic signal (sound sequence „E“), which can be switched off if needed. After switching on the miniZAP[®] the two hour signal is always activated automatically.

ON- or OFF-switching of the 2 hour signal:


Push ON / OFF-button **three times** within one second.

The following table shows, how the change-over of the two hour signal is displayed:

2 hour signal is	LCD-display	Sound sequence	Bell-symbol 
switched OFF		„D“	OFF
switched ON		„E“	ON

6.3 Current adjustment

With the current adjustment buttons, the current intensity can be adjusted very sensitively in the range of **60 - 999 μ A** (Mikroampere) in steps of $10\mu A$. When pushed shortly, the last adjusted value is displayed for about two seconds.

Example for displayed current: 

Button	Function
↑	upper current
↓	lower current


Quicker adjustment:
keep button pressed to start automatic adjustment.

- Hints:
- The last adjusted current remains stored until the next restart of the **miniZAP**[®].
 - After each switching on of the current, it is increased softly until the adjusted value is reached (soft-start).
 - During an error message it is not possible to adjust the current.

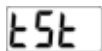
6.4 Cable-test-mode

General:

With the cable-test-mode you can test, if the electrode cable has a defective contact or a cable break, and is therefore the reason for an error message.



Activating the cable-test-mode: 

- a) Switch off the **miniZAP**[®].
- b) Fix the **miniZAP**[®] as usual on your wrist (see „9. Quickstart“). Applying electrode gel is not necessary.
- c) Push the ON / OFF-button and keep it pressed (about 4 seconds), until the switch-over in the cable-test-mode was successfully, which is confirmed by three peep-tones (sound sequence „D“) and a display content of:

 (Cable-test-mode is activated)

If the switch-over failed, the **miniZAP**[®] continues with normal operation. In this case start again at point **a**).

d) The cable-test is now activated and the test result is either **A** or **B**:

	Test result	LCD-display	Acoustic signal
A	Cable is okay (electric circuit closed)		fast pulsing beep tone (sequence „H“)
B	Cable is defective (electric circuit open)		OFF

e) Test cable for loose contact:


Even if the **miniZAP**[®] indicates an error free cable, it can be, that the cable still has a loose contact. To check this, hold the cable near the plug and move it **very slowly** rotating, bending and also pulling here and there. If the pulsing sound stops suddenly and the display changes as stated at **B**, the cable is in all probability defective. Repeat the test to get sureness and then please contact the manufacturer (see 14.2 Repair).

f) Finish the cable-test-mode by switching the **miniZAP**[®] off.

Hint: Three minutes after the last display change, the **miniZAP**[®] automatically switches off to save battery.








6.5 Software version

The actual software version of the **miniZAP**[®] is displayed, if all three buttons are pushed simultaneously when switching the **miniZAP**[®] on.

Example for displaying the Software programm version „1.0“: 

7. LCD-display

Every information that can be displayed during normal operation, is listed in the following table:

Display content	Example	Symbol	Appears when
adjusted current intensity in mikroampere		μA	current adjustment button „ \uparrow “ or „ \downarrow “ pushed
actual output voltage in Volt		V	normal operation
acutal running time in hrs. : min.		h	normal operation
total running time in hours			miniZAP [®] is sw itched on
2 hour signal is activated			normal operation
5 Min. break timer is starting		no symbol	ON / OFF-button pushed during normal operation

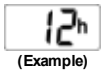
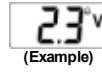


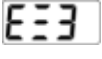
8. Acoustic signals

Every acoustic signal the **miniZAP[®]** can generate, always occurs in combination with a corresponding display content. In the following table, all acoustic signals are listed, which the **miniZAP[®]** can generate during failure-free operation. Those signals which the **miniZAP[®]** generate in case of a failure, are explained in chapter „10. Error messages and -fixing“.

For better understanding, the acoustic signals are written in acoustical language. To this an...

.. Example with the sound sequence „A“:

If the **miniZAP[®]** is switched on, it produces a quick tone sequence, which sounds like a fast spoken „Blip...Blip“.

Sound-sequence	Tone-signal (duration)	LCD-display	Meaning
A	Blip-Blip (0,3 sek.)	 (Example)	sw itching on of the miniZAP[®] , display of total operating time
B	Dulip (0,3 sek.)	 (Example)	Electric circuit okay, miniZAP[®] starts normal operation
C	Beeeeeep (1 sek.)		miniZAP[®] is sw itched off
D	Diii.....Diii.....Diii (1 sek.)	see 7.2	2 hrs. signal is deactivated / Cable-test-mode is activated
E	Diii..Duu..Diii..Duu (1 sek.)	see 7.2	2 hrs. signal / 2 hrs. signal is activated
F	Piep (0,2 sek.)	depends on operation	ON / OFF-button pushed
G	Beeeeeep...Beeeeeep...Beeeeeep (3 sek.)		miniZAP[®] sw itches off automati- cally because of continuing errors
H	Du..Du..Du..Du.. etc.		Cable-test-mode is activated, cable is okay

9. Quickstart

In five steps to apply the **miniZAP[®]**:

1st. step: Place both gold electrodes approximately in the middle of the **inner side** of the wristband (**Fig. 1**), namely in the distance of the arteries (**Fig. 2**).

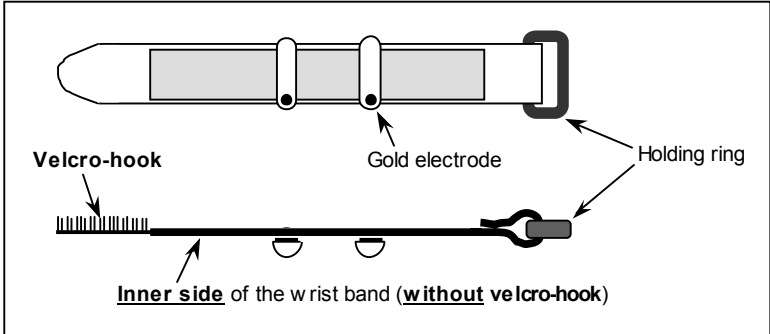


Fig. 1: Place gold electrodes at the inner side of the wrist band.

2nd. step: Apply an about pea-sized amount of electrode gel on each of the two white marked areas and levigate it. (**Fig. 2**). Keep the hatched area free of electrode gel to avoid the current flow only through the skin.

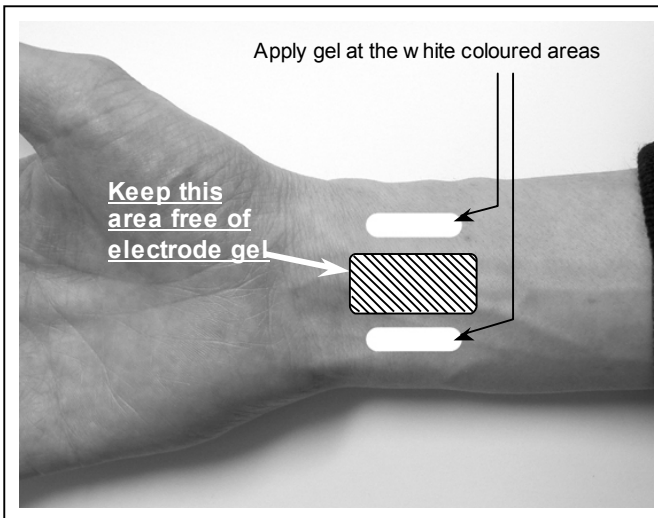


Fig. 2: The white areas show the position of the arteries.

3rd. step: Put the wristband on and take care, that the electrodes lay on the gel treated areas. Then connect the cable with the gold electrodes. The wristband shouldn't sit too tight but comfortable (**Fig. 3**).

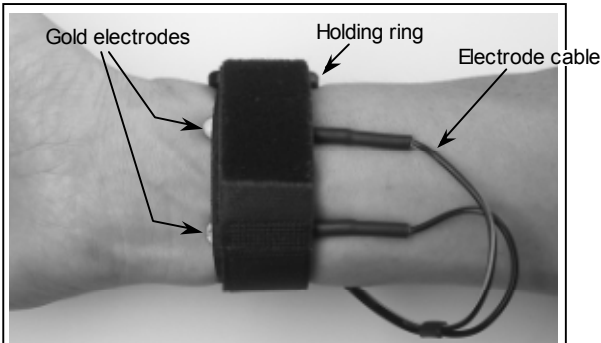


Fig. 3: Fasten wristband and connect electrode cable with both gold electrodes.

4th. step: Fix the **miniZAP**[®] on the wristband and plug the electrode cable into the output socket of the **miniZAP**[®] (**Fig. 4**).





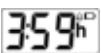
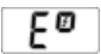



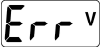

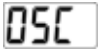
Fig. 4: Fix **miniZAP**[®] on the wristband and plug the cable into the output socket.

5th. step: Push ON / OFF-button to switch the **miniZAP**[®] on. Adjust the current through the current adjustment buttons „ \uparrow “ and „ \downarrow “ to $200\mu\text{A}$ - $400\mu\text{A}$ (= recommended range) or above. After the session switch off the **miniZAP**[®] by pressing the ON / OFF-button for about two seconds. Please pay attention to content of „4. Application“!

10. Error messages and -fixing

The miniZAP® immediately indicates, if its successful application is interrupted by an error. Therefore a reliable application is ensured, because every error is noticed quickly and can be fixed.

If one of the following error messages occur, jump to the specified chapter for further information regarding the possible reason of the error and how to fix it.

Error-message	LCD-display	Symbol	Acoustic signal	Meaning / see chapter
I			TaaaTuuu...TaaaTuuu... (2 sek.)	Low battery 10.1
	 (Example)		no signal	
K			Piep...Piep...Piep (1 sek.)	Short circuit 10.2
L			Piep.....Piep.....Piep (3 sek.)	No load 10.3
M			DuuDaaDiii...DuuDaaDiii (2 sek.)	Maximum voltage 10.4
N		no symbol	increasing interval signal (2 sek.)	No quartzclock 10.5

10.1 Low battery

With the error message „I“ (Low batt) the miniZAP® indicates, that the end of battery life has come, or if a too high current was drawn from the battery.

If the battery symbol appears, the battery is soon empty.

Meaning	Reason	Troubleshooting
battery is low	miniZAP® is many weeks in use	decrease current ¹⁾ / replace battery
very high battery consumption	high adjusted current AND very high skin resistance	decrease current ¹⁾ / apply electrode gel

¹⁾ Hint: If current adjustment has to be put below 200µA to avoid a low batt message, a new battery should be inserted.

10.2 Short circuit / Overload ⚡

If the electrodes are shorted or overload (too high current) appears, the miniZAP® generates the error message „K“.

Meaning	Reason	Troubleshooting
short circuit	cable is not inserted correctly in the output socket ¹⁾	push jack completely into output socket or pull it out
	electrodes touch each other	separate electrodes from each other
overload	skin surface too wet	dry skin / w ristband
	too much electrode gel on skin, w ristband or <u>betw een</u> electrodes	w ipe electrode gel from skin and w ristband, dry good, reapply gel

¹⁾ Hint: Because of the inner assembly of the output socket, the contacts of the electrode cable are shorted during plugging in or out, or if the jack isn't inserted in the socket completely. Is the miniZAP® switched on during plugging, he generates an error message, but this can be ignored.

10.3 No load ⚡

The miniZAP® generates the error message „L“, if the current is interrupted because of an unplugged connector, cable break or a loose contact ²⁾.

Meaning	Reason	Troubleshooting
no load	electrode cable is not connected properly	connect cable correctly
	gold electrodes have insufficient contact w ith skin surface	apply electrode gel, tighten w ristband
cable break/ loose contact	to often strongly pulled at the cable, cable w as bend too much	test cable ²⁾ / order new cable

²⁾ Loose contact:

If the electrode cable has gotten a loose contact because of excessive tensile load or bending load, this becomes noticeable as the miniZAP® generates quick one after another the error message for **No load** („L“), **Circuit okay** („B“), and possibly **Maximum voltage reached** („M“). This sounds like a quick spoken „Piep...Dulip“, which might be followed a short time later by a „DuuDaaDiii...DuuDaaDiii“. If this messages occur occasionally or more often, please test whether the cable is defective (see „6.4 Cable-test-mode“, or contact the manufacturer (see chapter „14.2 Repair“).

10.4 Maximum voltage reached Err v

When the output voltage exceeds 35 Volts because of a too high skin resistance, the **miniZAP**® generates the error message „M“.

Meaning	Reason	Troubleshooting
skin resistance too high	skin too dry / contact resistance between skin and electrodes too high	apply electrode gel
cable break / loose contact	cable was pulled too strong / cable was bent too often or too much	test cable ¹⁾ / order new cable

¹⁾ see „Loose contact“ at point „10.3 No load“.

10.5 No quartzclock DSC

The error message „N“ appears shortly after switching on the **miniZAP**®, if the quartz crystal for the microprocessor is defective and the accuracy of current frequency and time measurement has decreased by 10 percent. This error only can occur if the electronic circuit is mechanically damaged. In this case a repair by the manufacturer would be necessary (see chapter „14.2 Repair“).

11. Technical highlights

11.1 True AC voltage with 3,920 Hz

The output voltage of the **miniZAP**® is a true squarewave AC voltage, whose frequency by Dr. R. C. Beck, has quartzprecise 3,920 Hz. The addition “true” means, that it is free from any DC voltage fraction, whereby no electrolysis can take place, which can cause skin irritation.

What does electrolysis mean?

Elektrolysis is the decomposition of chemical compounds under exposure to an electric DC current. Related to the current treatment of the body, electrolysis is unwanted because of increased skin irritations like local redness, itching, stinging and swelling.

How can electrolysis be avoided?

Electrolysis only can be avoided through the combination of true AC voltage and constant current regulation, because only when the back and forth flowing of the current between the electrodes remains constant, it is also the amount of the transported ions.

11.2 Constant current control (CCC)

The CCC-funktion (**C**onstant **C**urrent **C**ontrol) of the **miniZAP**[®] guarantees, that the adjusted current intensity remains constant through the complete session, independent from any change of the skin resistance. To let the current remain constant, the **miniZAP**[®] automatically regulates its output voltage in the range of 2,3 – 35 Volts.

Why does the skin resistance changes?

Skin resistance changes permanently because it depends on many factors like sweating, thickness of horny skin, temperature, humidity, general skin constitution, state of mind (keyword: lie detector) etc.

11.3 Display of output voltage

The display of the actual output voltage provides additional informations:

- Tracking the change of skin resistance:

The output voltage is a direct measurement for the height of the skin resistance, as it changes – because of the **constant current control** of the **miniZAP**[®] – linear with the skin resistance. In other words: if the skin resistance increases, the output voltage increases too and vice versa: the lower the skin resistance, the lower the voltage.

- Estimate the moment to apply new electrode gel:

While the electrode gel dries out slowly during the session, skin resistance and output voltage increase and consequently, feeling of the current becomes more intensive. Thus, an increasing sensation of the current in combination with an increased voltage signals, that it is time to apply new electrode gel instead of reducing the current.

11.4 Operating hours counter

Directly after switching on the **miniZAP**[®], the total number of normal operation hours are displayed. With this one can check, how intensive the **miniZAP**[®] was used. Dr. Beck recommends at first application of blood electrification an amount of at least 84 hours application within 6 weeks.

Hint: From 9 hrs. and 59 minutes operating time on, only hours will be displayed.

11.5 Intelligent error management (IEM)

Through the IEM-funktion (**I**ntelligent **E**rror **M**anagement) a high fault tolerance and therefore a highest degree of operational reliability is achieved. The **miniZAP**[®] can differentiate between temporary and permanent errors. He tolerates temporary but switches off at permanent errors to save battery.

If an error occurs (e. g. short circuit) repeatedly or in short distance in the space of 10 – 30 seconds, the **miniZAP**[®] automatically switches off.

11.6 Gold electrodes

The electrodes are made from ergonomic formed brass, which is – for reasons of skin kindness and as protection against oxidation – coated with a high gloss polished gold plating. As so called diffusion barrier layer, pure silver instead of allergenic nickel was used.

11.7 10 hours auto-off-timer

After 10 hours operating time, the **miniZAP**[®] automatically switches off, that at the latest a break is made after that time.

11.8 Future-proof through software update

Should in future new cognitions emerge from the zapper research, which seem reasonable enough to change the existing function of your **miniZAP**[®], the microprocessor can be reprogrammed (for fee) to the new function. Thus your **miniZAP**[®] always is keeping up to date. Informations whether a software update is available, you can get on the homepage www.zapper.com at „support“. Check the actual software version of your **miniZAP**[®] by keypress (see 6.5).

12. Battery change

The battery of the **miniZAP**[®] can be replaced very easy. When the battery is inserted in reverse polarity, the electronic cannot be damaged.

How to replace the battery:

- (a) Switch the **miniZAP**[®] off and disconnect the electrode cable from the output socket.
- (b) Attach the blade of a screwdriver to the notch for battery change and open the cover by turning the screwdriver. Alternatively the cover can be opened without tool, by pressing both thumbnails into the groove at a long side of the enclosure, and afterwards take the enclosure in two pieces.
- (c) Careful remove the battery with your fingers or the screwdriver from the battery holder.
- (d) Insert the new battery (type CR2032) with the marking upwards in the battery holder, so that the „+“ symbol on the battery is visible.
- (e) Should the **miniZAP**[®] not automatically switch on, shortly push the ON / OFF-button. If no reaction takes place, check the battery polarity.
- (f) Put both enclosure parts on top of each other and press them until they snap in place with a “click” sound. The **miniZAP**[®] is now ready again for use.

13. Maintenance / Storage

13.1 Maintenance

- Clean the **miniZAP**[®] only with a soft and lightly moistened cloth. Ideal for cleaning the display panel are microfibre cloths, as they are used for eyeglass lenses, thus no scratch can result.
- Remove dried leftovers of electrode gel from wristband and gold electrodes from time to time with a wet sponge under lukewarm water. Don't use soap or other cleaning agents. Let the wristband dry completely before starting the next session!
- Should in the course of time dark spots have build up on the surface of the gold electrodes, this doesn't mean a decline in quality. Remove that spots if required with a Q-tip and toothpaste as abrasive. The gold plating will not nameable be cleared away, but gets its original gloss back. In no case use ordinary abrasive or the rough side of a kitchen sponge.
- If the velcro labels peel away from the gold electrodes, snip an equivalent piece off the provided replacement velcro and stick it on the bottom side of the gold electrode. The stick surface has to be free of dirt and grease. Press on hard the just now stucked velcro strip for some seconds.

13.2 Storage

- Protect the **miniZAP**[®] against humidity, dust, direct sunlight and keep it away from heating sources.
- In the off state the **miniZAP**[®] doesn't consumpt battery. Therefore he is ready for operation even after years of non-use.
- If water has poured into the **miniZAP**[®], quickly remove the battery (see chapter „12. Battery change“) to prevent it against discharge and that the electronic doesn't take any damage. Open the enclosure and let the electronic dry several hours bevor inserting the battery again.

14. Guarantee / Repair / Disposal

14.1 Guarantee

The **miniZAP**[®] is a masterpiece of german engineering and is manufactured in Germany by the latest manufacturing process. The manufacturer guarantee period is 2 years from the date of purchase (invoice). The warranty includes no accessories and quality defects which negligible affect the fitness for purpose of the device. The warranty claim expires, if the **miniZAP**[®] was damaged due to non-observance the manual, improper use or handling, leaked battery or repair attempt without authority. In case of warranty claim, please read on „14.2 Repair“.

14.2 Repair

In case of a warranty claim like incomplete shipment, damage or malfunction and any other reclamation, please **immediately and exclusively contact the manufacturer**, and consultate him, if a send in for a professional repair is needed.

If you think that your **miniZAP**[®] doesn't work correctly any longer, please check this – to prevent unnecessary requests – again with the help of the informations on the error messages, the possible reasons and their fixing given in chapter 10.

Phone and address of the manufacturer you find at „16. Technical data“. Please add a short description of failure in case of returning the **miniZAP**[®] for repair. Please note, that in case of loss on the dispatch, no liability is assumed.

14.3 Disposal



According to the german law called „Elektro- und Elektronikgerätegesetz (ElektroG) by the 16th. Mar. 2005, the manufacturer is responsible for taking back and environment friendly disposal of his electric devices. Therefore we please you, to send your **miniZAP**[®] at the end of his lifetime including all accessory back to the manufacturer. With this you preserve our environment and contribute an essential amount of dealing rational with the raw materials and resources.

According to the battery decree (BattV § 12), we are further committed to point out the following issues:

- Used batteries you can give back for free to your salesman / shopman or at a public collecting point.
- As end user you are committed to give used batteries back, or to dispose them correctly. Batteries must not be disposed through the household waste.
- The symbol of the slashed litter bin means: no disposal through household waste because these contain Hg = mercury, Cd = cadmium or Pb = lead.

15. Order list

The following spare parts can be ordered at your **miniZAP**[®] salesman. There you also can get the actual prices and time of delivery.

Order-no.:	Spare parts
0101-001	wristband with velcro
0102-001	electrode cable
0104-002	miniZAP [®] electrode gel (extra high conductivity, 50ml tube)
0104-003	2 pieces of gold electrodes
0104-005	3V lithium battery
0104-006	100mm replacement velcro for gold electrodes

16. Technical data

Model	Dr. Beck LCD
Output current (electronically regulated)	60 – 999 μ A AC
Output voltage	2,3 – 35 Volt AC
Voltage and current frequency	3,920 Hz (\pm 0,01%)
Shape of output voltage	Squarewave AC voltage
Display of output voltage	Amplitude in volts
Display tolerance of output voltage	\pm 0,2 Volt
Precision of time measurement	\pm 1 sec. / hour
Classification	BF (body floating)
Protection category	IP30
Operating mode	Continuous duty
Operating range	0°C to +45°C
Storage	-20°C to +70°C
Battery type	3V Lithium CR 2032
Expectancy of battery life	approx. 4 months at 2 hrs. daily and 250 μ A current adjustment
Dimensions in mm (L x W x H)	63 x 35 x 12
Weight (only miniZAP [®])	23 g

Manufacturer:

Mikas Elektronik Entwicklungen
 Bgm.-Grenzbach-Str. 17
 D-82343 Poecking

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 Fax: +49 (0)721 / 509 663 017
 E-Mail: info@mikas-elektronik.de



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 Fax: +49 (0)12120 / 233 153
 E-Mail: mail@nulife.de

16.1 Measurement of output voltage

Characteristic for the current regulation of the **miniZAP**[®] is, that the height of the output voltage depends on the adjusted current AND the skin resistance. To measure an output voltage of 35 Volts, it is necessary that the skin resistance (or the load resistor which is connected between the cable connectors) has at least 87,5 kOhm (max. 500kOhm) and that the current is adjusted to 400 μ A. The current intensity should be increased slowly, because when 35 volts are exceeded, the error message „M“ (maximum output voltage reached) occurs, and the output voltage is switched off until the **miniZAP**[®] restarts. Furthermore it has to take into consideration, that commercial digital multimeter will display a wrong value, because they are calibrated to sine wave signals with 50 Hz frequency when using the AC measurement range. However, the shape of the **miniZAP**[®] output voltage is a squarewave and has a frequency of 3,920Hz. Therefore, to correctly measure the voltage, a TRMS-voltage meter (TTrue Root Mean Square) with an adequate lower cut off frequency is required. For that reasons, the ideal instrument to measure the output voltage of the **miniZAP**[®] is an oscilloscope, because the amplitude is directly displayed on the screen.

17. Notes

