

# Technical manual



## CLINIC-MASTER *professional*

Micro current system model  
Software version V3.00

MSTG-WL-00

4 channels

## **Technical manual**

### **CLINIC-MASTER *professional***

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### **Contra indications:**

#### **You should not assign the Clinic-Master:**

- **If the patient has a cardiac pacemaker**
- **While the patient is driving**
- **While the patient is sleeping**
- **While pregnancy**
- **If the patient has a tumor**
- **If the patient suffers from epilepsy**
- **If the patient suffers from abnormal blood pressure**

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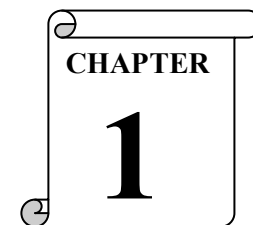
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## General descriptions

The device „Clinic-Master Professional MSTG-WL-00 (4 channel model)“ is a diagnosis and treatment system, that belongs to the category of the M.E.N.S.® - systems (**M**icro current **e**lectric **n**euro**m**uscular **s**timulation, also called **B**io-**E**lectro-**S**timulation) and is assigned in the medical treatment of pain, blood vessel, joint and spinal diseases, as well as in the cosmetic domain. The system is used in medical practices as a diagnosis and treatment system. The generation of patient chip cards by the therapists for the mobile micro current equipment "Vital Master" makes it possible for the patient to resume the therapy also at home.

The use of most modern microprocessor technology ensures high accuracy of the given parameters. In the treatment mode the dispensed currencies, are calibrated and automatically regulated on the momentary skin resistance, without you noticing this. This guarantees the real currency per impulse, independently of the attached body resistance.

The production of a initial tension of 60V for each channel galvanically separated from any other potential guarantees the optimum interference treatment (two different currencies cross in the point of pain), which is not ensured with cheap devices. The galvanic separation of the channels with tensions up to 60V and the measurement of the dispensed currencies require a very high investment of electronic resources as well as a high programming effort, whereby a device like this legitimates also its price.

On the other hand you can be safe that you can cover all requirements with this micro current equipment.

The frequencies are produced directly by a processor synchronized with 8.38 MHz, which secures an accuracy of better than 1%.

By the use of a processor with Flash program memory your device can also be taken updated with the newest software conditions, if that proves as convenient. If that is required, contact your dealer.

The measurement in the diagnostic mode corresponds to the guidelines of the standards of the international medical society for EAV (electro acupuncture after Dr. Voll) in its function. Here is the conductivity of the body is divided into a logarithmic scale from 0 to 100, whereby a value of 50 (= 95K  $\Omega$ ) represents a healthy value, while hard deviance can reason from pathological (diseased) values. Concerning details we refer to the international technical literature.

In the treatment mode the current pulses are available on 4 output channels, whose amperage, frequency, polarity and current are to a large extend individually adjustable.

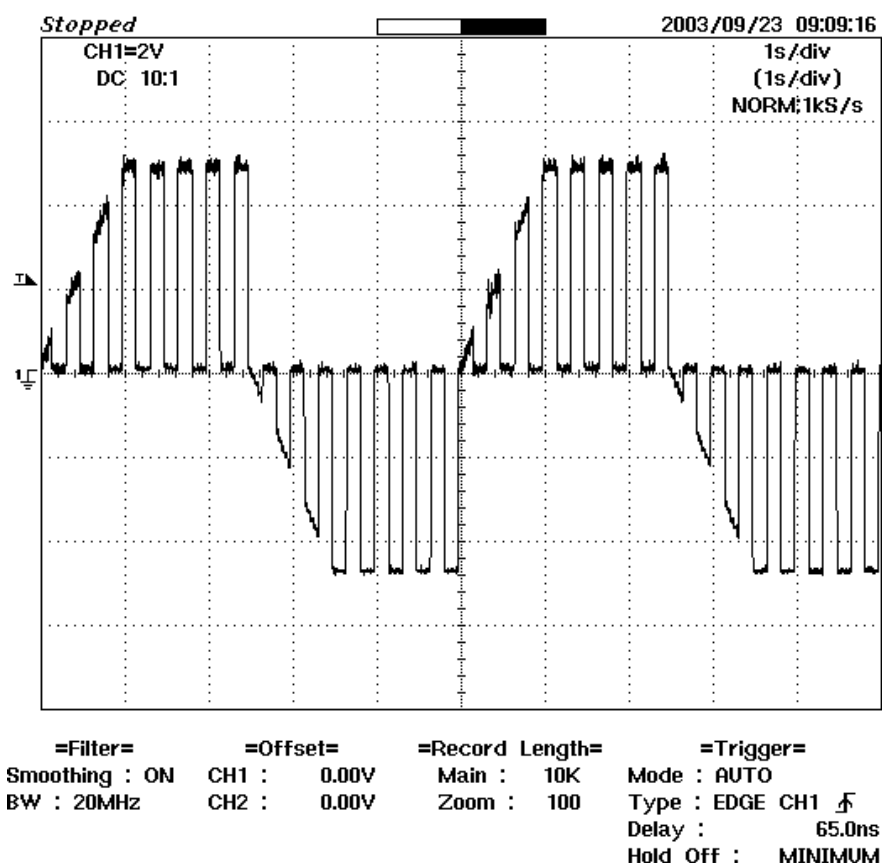
## Mode of action of the treatment

The Clinic-Master professional MSTG device works in the treatment mode with pulsed direct currents. Each treatment consists in periods of preset length (2.5 seconds), followed by a short break of 0.1 second. Subsequently, the next period begins.

One period consists in a bundle of current pulses with same pulse and break rate, whose frequency is variable. The amperage, thus the *currency* of the individual impulse can be given as well as the current rise, i.e. how fast the individual current pulse reaches its maximum value, thus the given value, within the period,.

## Form of waves in graphic illustration

This picture was taken up with a digital storage oscilloscope and shows four periods of a treatment.



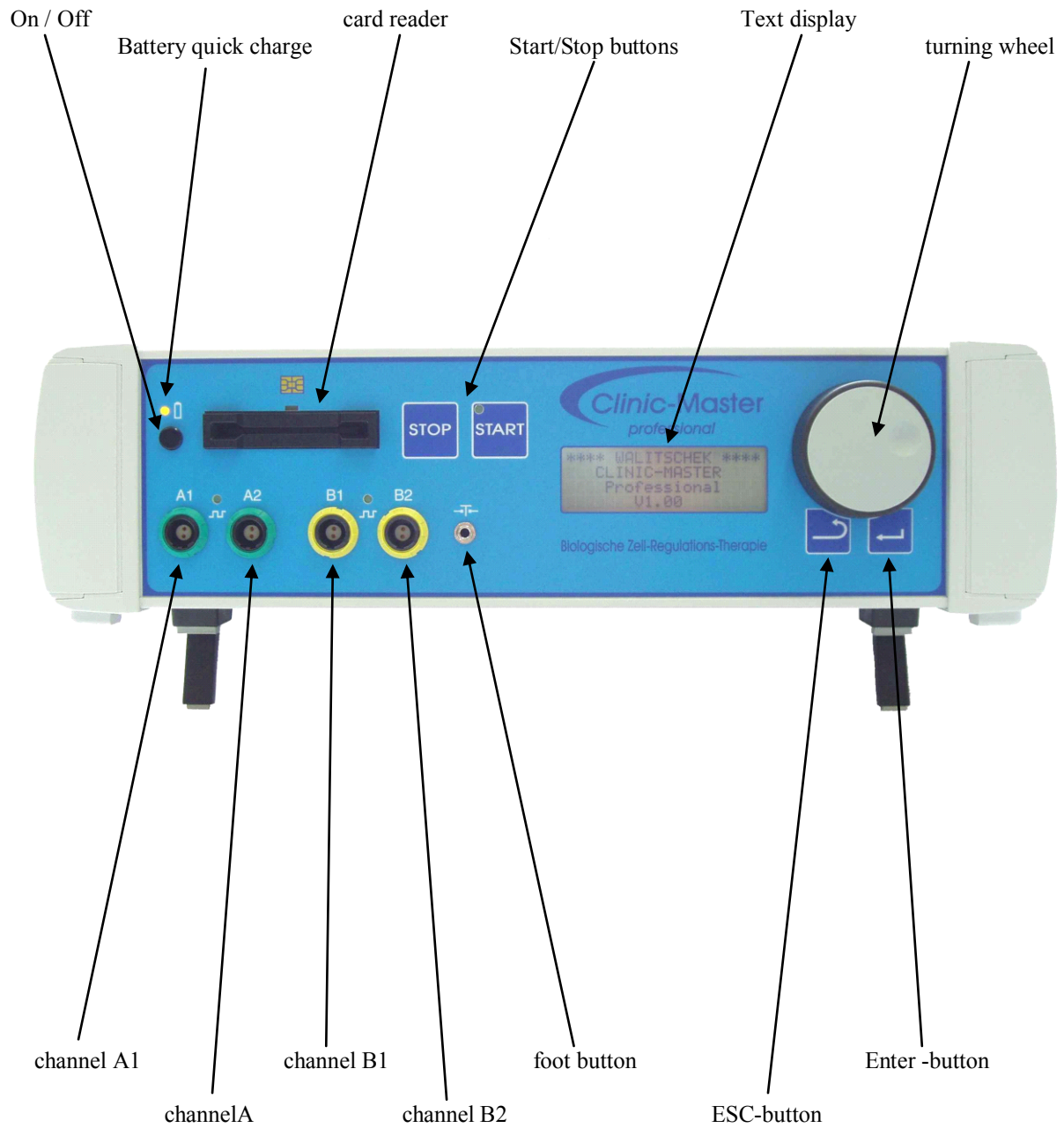
The tension at a load of 10 Kilo ohms with the following parameters was measured:

Polarity: +/- , currency: 500uA , rate of rise: 1 sec , frequency: 3 Hz

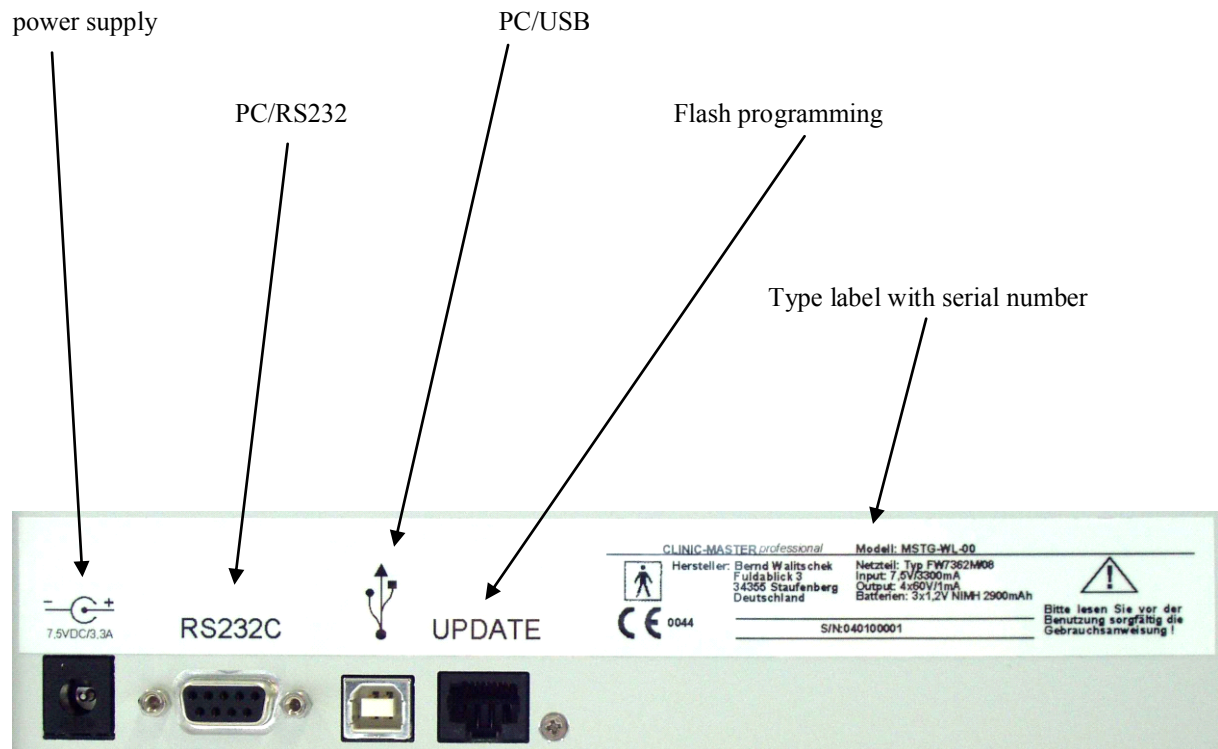
At the beginning of the period the amplitude of the impulses is zero, then it rises within 1 second to the maximum value 5 V, which it maintains up to the end of the period.

( $U=R \times I$ , also  $5V=10k\Omega \times 500uA$ )

## The front of the device



## The back side



# The electronic power supply

## Mains operation

The micro current equipment Clinic master professional MSTG is designed exclusively for the operation with the provided power pack type Friwo MPP30 Medical type 151439 and the inserted NIMH batteries.



The provided power pack possesses the permission for medical instruments and is appropriate for an input voltage section of 100-240V~ with 50-60 cycles per second. In case of use abroad the power pack can be equipped with adapters for different countries. For this please contact your dealer.

The power pack may be used in dry areas only.

At the end of the cable the power pack possesses a coaxial connector with the allocation +7,5V inside and minus outside.

The power pack provides an output voltage of 7,5V DC voltage with a max. current of 3,3A

## **WARNING !**

**One again points out for safety reasons that the micro current equipment Clinic Master professional MSTG may be operated exclusively with this power pack!**

For use of the micro current device, the coaxial connector is to be connected with the power pack socket on the back of the device, afterwards the power pack is to be connected with the plug socket. The micro current device may be connected with the power pack only in switched off condition, the same applies to the disconnection of the power pack.

While operation the green control LED at the power pack front shines.

## **Battery operation**

If there is no possibility to operate the micro current device with the power supply the Clinic Master professional MSTG can also be supplied via the inserted NIMH batteries. One points out expressly that the battery operation is a pure emergency operation, which should only find use, if e.g. by a brief power failure a line operation is not possible, under any other circumstances the equipment is not designed for continuous battery operation!

There are 3 mono cells 1,2V/2600mAh batteries used that are inserted device internal. With this batteries a period of operation of approx. 4 hours (depending on the charge of the batteries and the number of used channels) is possible. The batteries are automatically loaded if the micro current device is connected with the power pack, this also happens, if the equipment is switched off.

The intelligent automatic load controller verifies the charge of the batteries and begins with the quick charge, this indicated by lights the yellow Load LED. If the batteries are fully loaded (yellow LED off), which is with is done with nearly empty batteries in approx. 3 hours, the charging circuit changes into the preservation charge mode i.e. the self discharge of the batteries, that can amounted to approx. 2-4% per day, which is balanced by supplying a small charging current.

In rare cases the so-called "High Impedance" effect can occur during the quick charge of NIMH batteries i.e. that in the beginning of the charging process the tension sinks briefly instead of to rise by a chemical reaction inside the batteries. If the voltage of the battery sinks, this will be recognized by the automatic load controller and the quick charge will be switched off (yellow LED off), though the batteries are still almost empty. If the yellow load control LED switches off already after a short period of time during the loading process, it is an indication of this effect. To find remedy please unplug and plug the power supply again in order to start the charging process again. Now the yellow load control LED should switch off when the batteries are fully loaded (after about 3 hours).

If the device is not to be used for longer, it is advisable to fully load the batteries (yellow load LED switches off) and to separate the power pack from the mains supply.

If the micro current device Clinic Master professional MSTG is operated as fixed equipment exclusively connected to the mains supply, the batteries should be removed from the device, since the batteries in this case are never used and possible defects of the batteries are not recognized. To this please contact your dealer!

If there are defects observable (the operating time shortens considerably) the batteries must be replaced. Since the device must be opened for his, please contact your dealer.

## Switching on and off

In switched off condition the current supply to the micro current device is interrupted, only the battery charge control is active and controls the batteries. If the device is switched on with the ON/OFF button, the text display shortly shows all segments and then displays the model version. The micro currency device is now ready for operation and a function from the main menu can be chosen. If during battery operation the error message „CHARGE BATTERY“ is displayed, the voltage has sunk so far that the device can only be supplied for a short time. The operating program should be ended now and the batteries should be charged by connecting the power supply with the micro current device. In case the batteries are so discharged that a proper operation can not be assured anymore, the display will show the error message „BATTERY EMPTY STOP“. Now the device is to be switched off immediately and the batteries must be charged.

If the device is run in battery operation and is not used for for than 10 minutes, the user is asked to switch off the device with the display message „LOW POWER MODE, SWITCH OFF DEVICE“ .

## Text display

The text display with 4 lines and 20 figures that is lighted in mains operation leads you through the handling and shows warning and error messages. If switched on the display does not show any segments or is visibly damaged please contact your dealer.

## Menu selection

If switched on the micro currency device displays the name of the device and the used software version. After that a function of the first page of the main menu can be selected.

Main menu page 1:

**DIAGNOSTICS**

**INDICATIONS**

**ACUPUNCTURE**


**INDIVIDUAL THERAPY**

Main menu page 2:

**STORE ON CHIP CARD**

**LOAD FROM CHIP CARD**

**VITAL MASTER CHIP CARD**

The selection of the menu options is done by the turning wheel in turning left or right, the selected menu option flashes and can be chosen by pushing on the turning wheel. To change from menu page 1 to page 2 and back turn the wheel to the right or respectively back to the left or with the button .

### **DIAGNOSTICS:**


If the menu option „DIAGNOSTICS“ is chosen the display will show:

#### **DIAGNOSTICS**

**CHANNEL A1 A2 B1 B2**

**VALUE 000 000 000 000**

**SELECT CHANNEL**



With the turning wheel now the channel can be selected, from which wire the skin resistance is to be measured. In case of selection the selected channel flashes and by pushing on the turning wheel button the measurement is activated. The skin resistance is determined according to the scale of Dr. Voll and indicated in the respective display area "VALUE" under the selected channel. The display can show from 000 (open) over 050 (95k  $\Omega$ ) to 100 at short circuit. You can leave the menu option DIAGNOSTICS, like any other submenus, with the  button that leads back to the main menu.

### **INDICATION LIST:**

If the menu option PROGRAMS is selected, a list of the programs already saved (loaded from chip card) appears in the display of the device. By turning the wheel it is now possible to select a program and push the wheel button to load the program. The lower line shows the duration of the loaded program in hours:minutes. By pressing the turning wheel the duration time can be selected, which is indicated in flashing of the display. Now the duration can be doubled, tripled etc. up to decupled. By pushing the wheel button the settings are taken. With the START button the selected program can be started. The START LED shines as well as the channel LEDs

between the out sockets (depending on if one or two channel groups are used). The polarity of the two channel groups is indicated in a time bar that is proportional to the rise time of the signal. This time bar is only a visual control of the current output and may not be seen as a measure diagram!

The lowest line shows the duration of the loaded program in hours:minutes. Above that the amperage is displayed. After the start of the program this is always 100%. By pushing the wheel button the amperage can be changed in 1% steps. By pushing the wheel button again the adjusted currency will be taken and given out. The adjustable range is from 10% to 150%.

With the  button the polarity of the current expenditure can be commutated to channel A during the operating program, the same applies to the  button for channel B.

A started program can be interrupted by pushing the STOP button, which is indicated by a flashing START LED. The remaining time will be paused until the program is continued. By pushing the START button the program continues, pushing the STOP button again will cancel the program. In the „PROGRAM PAUSED“ mode the remaining time can be changed. One can leave the entry mode by pushing the wheel button again.

While the program is operating the skin resistance can be measured with the foot switch that can be plugged into the socket at the front of the device. By pushing the foot switch the skin resistance measurement will be displayed as described at DIAGNOSTICS. Now the channel can be chosen and the values will be displayed. Pushing the foot switch again will end the measurement of the skin resistance.

One minute after the program has started the skin resistance will be measured automatically on all channels. Depending on the values and the polarity of the first part of the program the polarities will be adjusted newly. If the remaining time is up the device will stop the current output and informs about the end of the program by a buzzer. Furthermore the device measures the skin resistance on all channels automatically and the display changes to the DIAGNOSTICS mode to show the results.

The time display runs on and shows the time since the end of the program with a prefixed PLUS figure. With the STOP button you can go back to the indication list, while the latest chosen indication flashes and is ready to be reloaded.

## **ACUPUNCTURE:**

If the menu option ACUPUNCTURE is selected, a list (loaded from chip card) of the acupuncture programs already stored in the equipment appears in the display. By turning the wheel it is now possible to select a program and load it by pushing the wheel button. The lowest line shows the duration of the loaded program in hours:minutes. By pushing the turning wheel button the duration time can be selected, which is indicated in flashing of the display. Now the duration can be doubled, tripled etc. up to decupled. By pressing the wheel the settings are taken.

With the START button the selected program can be started. The START LED shines as well as the channel LEDs between the out sockets A1 and A2 (The current output for acupuncture is only possible with channel group A).

On the display the selected acupuncture program is shown. The lowest line shows the duration of the loaded program in hours:minutes. Furthermore the amperage is displayed in %. After the start of the program this is always 100%. By pushing the wheel button the amperage can be changed in 1% steps. By pushing the wheel button again the adjusted currency will be taken and given out.

While the program is operating the skin resistance can be measured with the foot switch that can be plugged into the socket at the front of the device. By pushing the foot switch the skin resistance measurement will be displayed as described at DIAGNOSTICS. Now the value of channel A will be displayed. Pushing the foot switch again will end the measurement of the skin resistance

A started acupuncture program can be interrupted by pressing the STOP button, which indicated by a flashing START LED. The remaining time will be paused until the program is continued.

By pushing the START button the program continues, pushing the STOP button again will cancel the program.

If the remaining time is up, the device will stop the current output and informs about the end of the program by a buzzer.

## **INDIVIDUAL THERAPY:**

After selecting the menu option **INDIVIDUAL THERAPY** the submenu will appear to select an individual therapy of the following options

**LOAD IND. THERAPY (head line, not selectable)**

**STORED THERAPY**

**INDICATIONS LIST**

**ACTUAL THERAPY**

These options have the following meaning:

**STORED THERAPY**

With this option an individual therapy that was used for a former operation in the mode **INDIVIDUAL THERAPY** can be selected.


**INDICATIONS LIST**

A program from the indication list can be selected and saved on the memory for the individual therapy.

**ACTUAL THERAPY**

The latest selected program can be loaded from the individual therapy memory

After loading an individual therapy the device changes to display mode for individual therapies.

This display mode is divided into two display pages. The change from menu page 1 to page 2 occurs after entering the value on page 1 or with the  button. After selecting the menu option **INDIVIDUAL THERAPY** in the main menu the display of page 1 will appear.

Page 1:

**INDIVIDUAL THERAPY**

<b>CHANNEL:</b>	<b>A</b>	<b>B</b>	
<b>CURRENT:</b>	<b>10</b>	<b>10</b>	<b>μA</b>
<b>SLOPE:</b>	<b>0.1</b>	<b>0.1</b>	<b>s</b>

By pushing the wheel button the currency display of channel A will flash and can now be changed in the default value with the wheel. Pushing the wheel button will save the selected value and will jump further for adjusting the currency of channel B. The same is to be done for adjusting the increase. If a value is to be taken over

without change, it can be left out simply with pressure on the turning wheel. After the value for the current increase of channel B was confirmed, the menu page 2 appears in the display:

Page 2:

### **INDIVIDUAL THERAPY**

**FREQUENCY: 0.1 0.1 Hz**

**POLARITY: OFF OFF**



**TIME: 00:00 h**

Now the frequency of channel A can be changed in default value with the turning wheel. Pressure on the turning wheel saves the adjusted value and jumps on for adjusting the frequency for channel B.

During the adjustment of the polarities the following options can be selected:

PLS	currency output plus-polarity
MIN	currency output minus-polarity
P/M	currency output changes between plus and minus every 2.5 seconds
AUT	currency output polarity changes automatically depending on the skin resistance.
OFF	no currency output on this channel

After the polarity for channel B was confirmed, the duration of the therapy can be entered first in hours, then after pushing the wheel button in minutes. After the minutes are entered the constructed program can be started with the START button. The currency can be changed in 1% steps, like in other saved programs. The two upper lines of the display show the currency increase and the polarity of the currency output. The lower line shows the remaining time of the operating program.

With the  button the polarity on channel A can be changed while the program is operating, the same applies to the  button for channel B

While the program is operating the foot button can be attached to the socket in the front of the device and the skin resistance can be measured. By pushing the button the measurement of the skin resistance will be displayed as described under DIAGNOSTICS. Now the channel can be selected and the value is displayed. Pushing the button again will end the measurement.

The program can be paused with the STOP button and continued with the START button or canceled by pushing the STOP button again.

## **LEAVE the INDIVIDUAL THERAPY**

After leaving the individual therapy with the  button the display will show the following menu

**STORE IND. THERAPY (not selectable)**

**STORE THERAPY**

**REPLACE INDICATION**

**DO NOT STORE**

The menu options have the following meaning:

**STORE THERAPY**

The individual therapy is saved and can be loaded next time under the menu option INDIVIDUAL THERAPY.

**REPLACE INDICATION**

If the individual therapy was loaded from the INDICATION LIST, the content of the indication can be changed.

If the individual therapy was not loaded from the indication list, but as saved therapy or current therapy, the indication that was latest used will be replaced.

**CAUTION! Please use this possibility to save only after careful consideration, because there is the danger to change or overwrite indications by accident.**



**DO NOT STORE**


The individual therapy is not saved and will be lost after the device is switched off. The therapy that was saved before will stay saved.

## **STORE ON CHIP CARD:**

Before a new chip card is used it must be initialized with a PC program before. If an uninitiated chip card is used, the display will show the error „WRONG CHIP CARD“. After a chip card was inserted into the card reader (green LED shines) the saved programs on the device can be copied to the chip card by pushing the wheel button. The display will show „THERAPIES ARE STORED ON CHIP CARD START WITH ENTER KEY“.

Before the transfer begins the warning „ATTENTION! EXISTING THERAPIES WILL BE DESTROYED!“

Now there is the possibility to confirm the transfer with the  button or to cancel with the  button.

If confirmed with the  button the display will show „STORE DATA ON CHIP CARD“. When the data transfer was successful the card can be removed which is indicated by the display message „REMOVE CHIP CARD“.

If there was no card inserted before the transfer this will be indicated by the message „NO CHIP CARD IN SLOT“ in the display.

If an error occurs during the transfer, which will be indicated by the error message „READ ERROR“ or „WRITE ERROR“ the process should be repeated and/or the smart card should be controlled, since it is may be unsuitable for the device, put in turned or may be defective.

If the following messages are displayed, the device should be newly initialized by switching it off and on again.




SAVE ERROR

INITIALIZING REQUIRED!

SWITCH OFF DEVICE

### **LOAD FROM CHIP CARD:**

After a chip card was inserted into the card reader (green LED shines) the saved programs on the device can be copied to the chip card by pushing the wheel. The display will show „THERAPIES ARE LOADED FROM CHIP CARD START WITH ENTER KEY“. Before the transfer begins the warning „ATTENTION! EXISTING THERAPIES WILL BE DESTROYED!“

Now there is the possibility to confirm the transfer with the  button or to cancel with the  button. If confirmed with the  button the display will show „CHIP CARD IS BEING LOADED“. When the data transfer was successful the card can be removed which is indicated by the display message „REMOVE CHIP CARD“.

If there was no card inserted before the transfer this will be indicated by the message „NO CHIP CARD IN SLOT“ in the display.

If an error occurs during the transfer, which will be indicated by the error message „READ ERROR“ or „WRITE ERROR“ the process should be repeated and/or the smart card should be controlled, since it may be unsuitable for the device, put in turned or may be defective.

If the following messages are displayed, the device should be newly initialized by switching it off and on again.

STORE ERROR

INITIALIZING REQUIRED!

SWITCH OFF DEVICE

### **VITAL MASTER CHIP CARD:**

With the micro current device Clinic Master Professional MSTG-WL-00 is possible to provide a chip card with programs which can be used in the small micro current equipment Vital Master for the self-therapy. This is started after selection of the menu option VITAL MASTER CARD. This menu option can only be addressed if a chip card was inserted into the card reader (green LED over card readers shines). After selection of this menu option a further submenu with the following options appears:

**VITAL-MASTER-CARD (not selectable)**

**STORED THERAPY**

**INDICATIONS LIST**

**ACTUAL THERAPY**

These menu options correspond to loading an individual therapy and mean thus:

#### STORED THERAPY

A therapy program that was saved in mode INDIVIDUAL THERAPY used in a former operation can be selected for the transfer to the Vital Master.

#### INDICATIONS LIST

A program from the indication list is selected for the transfer to the Vital Master.

#### ACTUAL THERAPY


The latest used program is selected for the transfer to the Vital Master.

After the selection of the program source the display will show:



#### VITAL-MASTER-CARD


##### CARD NAME





Now in the 3rd line the card name is entered. The card name can have up to 20 characters and may consist of characters, numbers or additional characters. They are selected over the wheel and taken by pushing the wheel.

The entry is saved by pushing the  button.

Now the language German „D“ or English „E“ can be selected and saved by pushing the wheel button.

After that the type of card can be selected with the wheel, „0“ for Master Card, „1“ for patient lending card and „2“ for used up card. The  button will lead to the beginning of the entry. With the  button the entry is saved and the device jumps to the 2nd menu level. The display will show the name of the loaded program below the option „THERAPY NAME“.

This can be taken over with the  button or changed, as explained in card name.

Now the space must be chosen where the program is to be saved. The selection is taken with the wheel button or with the  button and the device will ask for the number of program repetitions. With the wheel the number of repetitions can be adjusted from 0-99. If the wheel is turned above 99, the display will show „< >“, which means unlimited repetition. By pushing the wheel button or the  button the entry is saved and the message „DELETE EXISTING PROGRAMS ?“, which can be answered with YES or NO (button  or  )

If confirmed with one of the buttons the device will write the program on the card which is confirmed by the message „SAVE DATAS ON CHIP CARD“. With specific selection by YES and NO the chip card can be generated with only one program or a combination of up to 60 programs.

After a successful transfer the chip card can be removed from the device, which is indicated by the message „REMOVE CHIP CARD“.

If an error occurs during the transfer, which will be indicated by the error message „READ ERROR“ or „WRITE ERROR“ the process should be repeated and/or the smart card should be controlled, since it is may be unsuitable for the device, put in turned or may be defective.

If the following messages are displayed, the device should be newly initialized by switching it off and on again.

SAVE ERROR

INITIALIZING REQUIRED!

SWITCH OFF DEVICE

**Only the chip cards available as accessories for this device may be used. If you need new chip cards, please contact your dealer!**

## Function of the illuminating diode

The yellow LED load control shows that the batteries are quick charged. After switching over to preservation charge mode the LED is off.

The green LED shines when a program is operating and flashes if the program is interrupted. Both green currency output LEDs for channel A and channel B shine, if there are currency impulses given out on the particular channels.

## PC Interface

To connect the micro currency device with a PC there are two interfaces intended on the back side of the device.

- a) RS232 (PC-COM interface) Connection over 1:1 D-Sub wire 9pol. plug/socket (available as accessories). There may be NO „null modem wire“ used.
- b) USB connection over A/B USB wire (available as accessories )

If you need software for the data transfer between the micro currency device and a PC please contact your dealer.

# Flash Interface

For a software update of the firmware of the micro currency device a suitable programming adapter can be attached to the flash interface (RJ45 – 8pol.) on the back side of the device.

**One points out expressly that a software update may take place only via the specialized trade with approved software and with the also via the manufacturer released programming devices. The connection of unapproved programming devices can cause substantial damage to the hardware of the micro current device. Likewise programming from unapproved firmware can lead to malfunctions and/or to the breakdown of the device.**

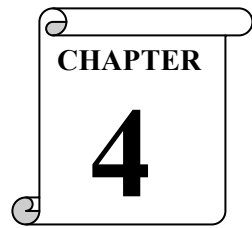
**If for your device a firmware update is necessary, please contact your dealer.**

## Plugging the pad wires

At the front of the Clinic-Master Professional MSTG-WL-00 there are two sockets for channel A1 and channel A2, to the right aside there are the sockets for channel B1 and channel B2, in which the provided pad wires are plugged.



Mind that when connecting the two plugs that they are coded with both colors and different guide grooves. So it is only possible to insert the yellow plug into the yellow socket and the green plug into the green socket. The plugs must be inducted so far so they catch noticeable. To remove the connection pull back the shell of the plug, only then the lock will disconnect and the plug can be pulled out. The negative pole of every wire is marked with a black point on the electrode push button. The electrodes should be applied as it was shown by the therapist.



## Storage

Store the device in a dry place out of the reach of children and do not use it if it is exposed to the following influences:

- Magnetic fields and/or electromagnetic radiation.
- Very high or low temperatures (above 45°C or below -15°C storage temperature. If the device was exposed to very low temperatures and is supposed to be put in operation in a warm room, please wait 1 – 2 hour of acclimation, so the condensation water can evaporate.
- High humidity
- Direct solar irradiation

Please do not put any containers with liquid on the device!

For operation the device must be put on a plain area!

## Cleaning and maintenance

Before you clean the equipment, please switch it off with the main switch and remove the power supply. The cleaning of the case and the wires can happen with water, a mild cleaning agent by means of and at the most wettest soft cloth. Please pay attention to it that no liquid occurs the openings of the micro current equipment and the power pack, and use you no spray.

Reusable electrodes and electrode pads can be cleaned after usage with water and a mild cleaning agent. If the electrodes are used for different patients they should be disinfected before use.

Check before each use the wire of the power supply and its to plugs for damages. Damaged power supplies may not be used no more! Contact your dealer.

The device may only be opened by specifically trained staff, just as substituting defective batteries should be accomplished only by the specialist. Please contact your dealer to it.

Otherwise the equipment is maintenance-free.

## Elimination of errors

Error	Possible cause	Remedy
The device can not be switched on	Empty batteries	Load batteries
	No power supply connected	Connect power supply with plug and device
	Main switch defective	Contact service
Electrodes or pads Do not work	Electrode or wire defective	Replace electrodes or wire
Pads work patchy	Pads draggled Skin oily or too dry	Clean or renew pads Clean skin, moisten pads or use gel
Error message Load batteries!	Battery currency very low	Load batteries or mains operation
Error message Battery empty Stop!	Battery empty – do not keep on using the device	Load batteries or mains operation
Error message Currency error A1/2	Error in currency output of channel group A	Restart program
Error message Currency error B1/2	Error in currency output of channel group B	Restart program
Error message Wrong chip card	Chip card is inserted wrong	Insert card with golden contacts facing up
Error message Read error	Chip card can not be read	Clean contact areas or replace defective card
Error message Write error	Chip card can not be written	Clean contact areas or replace defective card
Error message No chip card	Chip is not quite correctly inserted	Insert chip card so far until CARD LED shines green

If the points specified under remedy should not repair the malfunctioning, please do not continue to use the device, contact your dealer and describe the arisen problem as exactly as possible.

## Technical datas

Device measurement:	112 x 378 x 295 mm (height x breadth x bathos)						
Power supply measurement:	115 x 68 x 80mm (height x breadth x bathos) 2m wire						
Device weight:	approx. 5kg incl. batteries						
Power supply weight:	approx. 278g						
Charging rate:	max. 2A at active battery quick charge						
Input voltage:	7,5V direct current						
Output voltage:	max. 4 x 60 Volt						
Output current:	Impulse currency 4 x 10 bis 990uA in 10uA steps (+/- 2% an 10k $\Omega$ )						
Impulse frequencies:	0,1 Hz to 990 Hz in following steps: (+/- 1%) <table data-bbox="654 1142 925 1276"> <tr> <td>0,1 to 9,9 Hz:</td><td>0,1 Hz</td></tr> <tr> <td>10 to 99 Hz:</td><td>1 Hz</td></tr> <tr> <td>100 to 990 Hz:</td><td>10 Hz</td></tr> </table>	0,1 to 9,9 Hz:	0,1 Hz	10 to 99 Hz:	1 Hz	100 to 990 Hz:	10 Hz
0,1 to 9,9 Hz:	0,1 Hz						
10 to 99 Hz:	1 Hz						
100 to 990 Hz:	10 Hz						
Currency increase:	0,1 to 1,0 second in steps of 0,1 second						
Diagnosis:	Logarithmic measuring (+/- 5% of $\Omega$ -value)						

# Applied standards

The manufacturer announces the conformity with the European

**Guide line 93/42/EWG**



For medical devices the following standards are applied:

**EN60601-1:1996-03**

Medical electrical equipment – Part 1: General requirements for safety

**EN60601-1-2:1993**

Medical electrical equipment – Part 1: General requirements for safety;  
2. Collateral Standard: Electromagnetic compatibility – Requirements and tests