Instruction Manual

Nemectron EDiT Endovac® Model 3

Part 1

Nemectron
Electro-medical innovations

RESTRICTED DEVICE:
Federal law restricts the sale, distribution or use of this device to, by or on the lawful order of a licensed practitioner.

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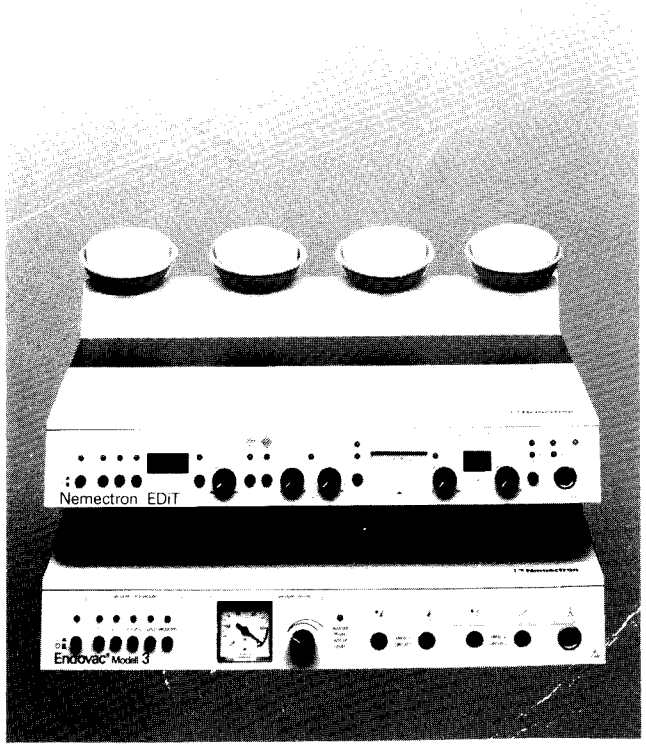

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1 BASIC ASPECTS

The unit has been developed and produced on the basis of modern microelectronics, using a microprocessor.

The unit has been given type approval complying with all safety standards in effect.

Development of the unit allows application of the four modes of therapy of

Nemectron's **E D i T** system
(Electric Differential Therapy)

These are low frequency therapy, interferential therapy, middle frequency therapy, and ENDOSAN® therapy.

1.1 Middle frequency therapy

Effects:
- Analgesia (block)
- Influence on blood flow
  - Vasoconstriction
  - Vasodilatation
- Edema reduction
- Support of regeneration processes

The middle frequency effects are chiefly produced in the region under the electrodes.

1.2 Low frequency therapy

Effects:
- Analgesia (counter-irritation)
- Muscle stimulation
  - Endurance
  - Strengthening
  - Relaxation
- Influence on blood flow
  - Vasoconstriction
  - Vasodilatation
- Edema reduction

Muscle stimulation is particularly versatile using the incorporated **stimulation time controller S 4000.**

The low frequency effects are chiefly produced in the region under the electrodes.

1.3 Interferential therapy with ENDOSCAN®

Effects:

Low frequency effects occur in the depth - or with the respective electrodes - at the surface of the tissue. Middle frequency effects are chiefly produced in the region under the electrodes.

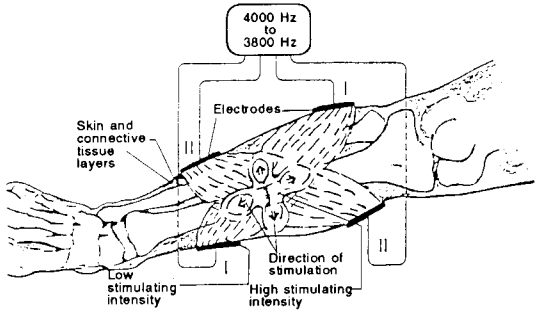
- Increased effectiveness due to use of the ENDOSCAN® mechanism

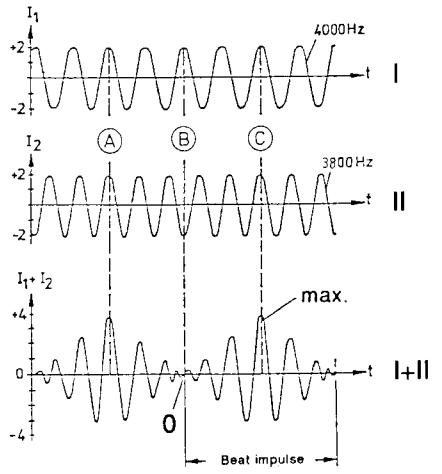
1.3.1 Classic interferential current

Nemectron EDiT generates two middle frequency currents. One of them has a frequency of 4000 Hz, the other has a frequency varying between 3800 Hz and 4000 Hz.

The two middle frequency currents are introduced into the body via four electrodes.

The electrodes are placed in such a way that the two currents intersect. In the area of intersection, the currents overlap and, according to the inferferential current prin- ciple, produce beat pulses with a repetition rate of up to 200 times per second. The therapeutically effective low frequency beat pulses are produced in the depth of the tissue with a basic frequency of about 4000 Hz.





1.3.2 ENDOSCAN®

With "classic" interference, as it was initially applied after its introduction in the early 50s,

the sites of effect
the directions of effect
the intensity of effect

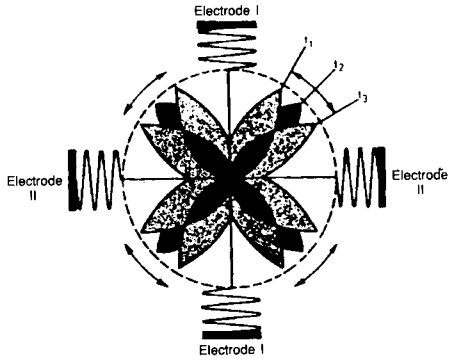
remained **constant** in the area of treatment during application of the interferential currents.

ENDOSCAN®, a patented invention (HANS-JÜRGENS), causes

the sites of effect
the directions of effect
the intensity of effect

to **change** during application.

Thus, ENDOSCAN® enlarges the area of treatment and increases the therapeutic effectiveness of the interferential currents.



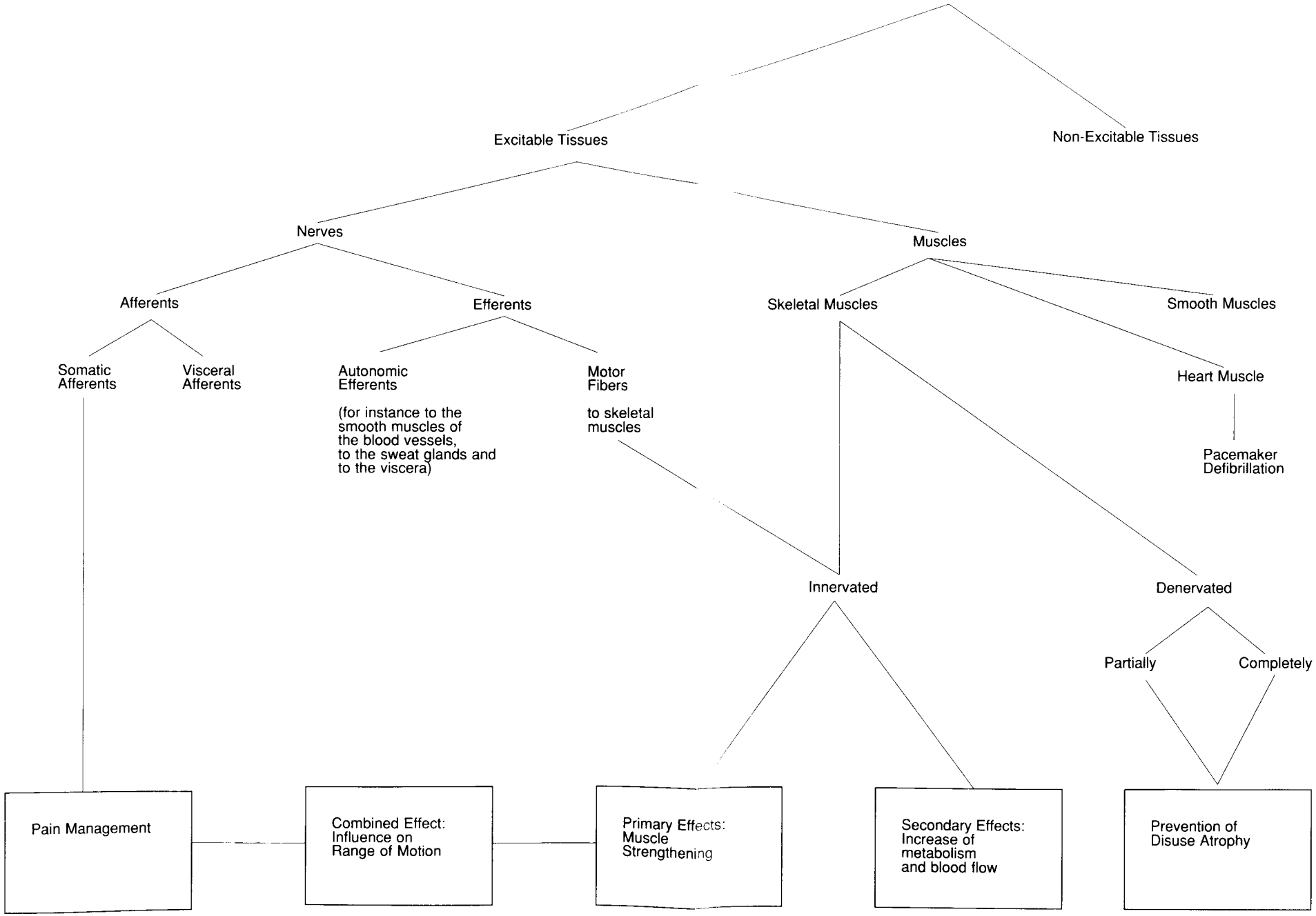
ENDOSCAN® interference

Simplified bidimensional representation of the interferential field in the area of treatment. The changes brought about in the interferential field by ENDOSCAN® are indicated at various times (t_1, t_2, t_3). In the body perfused by the current, a threedimensional interferential field is produced, with the effects occurring in the three spatial directions.

In stimulation above motor threshold using ENDOSCAN® interferential current, no muscle spasm with ischemia and premature fatigue occurs in the recommended intensity and frequency ranges. Instead, there is intensification of blood flow due to vasomotor autoregulative mechanisms with simulta-neous activation of venous backflow due to the pump function of the rhythmically activated musculature.

In most cases, the biological structures to be excited show complicated spatial distributions and varying directions of course in the tissue. This is of particular importance in treatment of e.g. irritative radicular syndromes, joints and periarticular tissues. High effectiveness of electrotherapeutic treatment is only ensured when this fact is taken into account. ENDOSCAN® does ensure high effectiveness.

1.5 Effects of Electro-Stimulation on Living tissues



General scheme to enable the therapist easily to survey the effects of electric stimulation on living tissues

1.4 ENDOSAN® therapy

Nemectron EDiT is equipped with the ENDOSAN® feature.

ENDOSAN® therapy allows an intensification of the middle frequency effects in the depth of the tissue.

As with the interferential therapy, two middle frequency currents are caused to overlap by means of the respective application of the four electrodes. In the area of superposition (area of treatment), the following effects can be taken advantage of in treatment:

- Analgesia (block)
- Influence on blood flow
  - Vasoconstriction
  - Vasodilatation
- Edema reduction
- Support of regeneration processes

ENDOSAN® therapy can be combined with ENDOSCAN®.

2.4 ENDOSAN® therapy

- two red electrode cables of circuit 1 and two white electrode cables of circuit 2, with intersected circuits -

The ENDOSAN® effect is produced in the area of superposition of the two middle frequency currents, along an imaginary line between the marked and the unmarked electrodes.

3 INDICATIONS

3.1 Pain management

- for adjunctive treatment of post-traumatic pain syndromes
- for management and symptomatic relief of chronic (long-term) intractable pain
- as an adjunctive treatment in the management of post-surgical pain problems

3.2 Muscle stimulation

- Relaxation of muscle spasms
- Prevention or retardation of tissue atrophy
- Increasing local blood circulation
- Muscle re-education
- Immediate post-surcical stimulation of calf muscles to prevent phlebothrombosis
- Maintaining or increasing range of motion

3.3 Contraindications

1. Thrombophlebitis
2. Manifest thrombosis
3. Pacemaker
4. Acute danger of hemorrhage
5. Disturbances in cardiac rhythm
6. Tetany
7. Acute local inflammatory processes caused by bacterial or viral infections (for example furuncle, phlegmon, herpes simplex, acute herpes zoster)
8. Do not stimulate over carotid sinus!
9. Do not stimulate transcerebrally!

10. Do not apply Nemectron EDiT for undiagnosed pain syndromes until etiology is established!

11. Do not use on cancer patients!

12. Do not apply electrical stimulation transthoracally!

3.4 Precautions

1. The safety of Nemectron EDiT for use in the following disorders and conditions until now has not been established:

   a) Skin diseases
   b) Epilepsy
   c) Multiple sclerosis
   d) Malignancies
   e) Osteomyelitis
   f) Pregnancy
   g) Delivery

2. Avoid too strong and long-lasting stimulations, especially in cases of painful muscle spasms during the first treatment!

3. Whithin a series of treatments of painful conditions, especially such accompanied by local muscle spasms, careful increase of stimulating current intensity is recommended: in this way undesired contrary effects (increase of painful spasm) are avoidable. Therefore begin in such cases with low current intensities.

4. In cases of calf muscle stimulation immediately after or during surgical operations to prevent phlebothrombosis, the physician should ensure very carefully that a phlebothrombosis is not yet established, because a manifested phlebothrombosis is a contraindication.

5. Treatment outcome will be influenced by the patient's psychological state and use of drugs.

6. The use and effectiveness are directly related to the patient selection.

3.5 Adverse effects

1. Patients with electrophobia and patients who are uneasy, anxious, nervous or jittery, often react extremely sensitively to electrical stimulation and feel uncomfortable even under very low intensity stimulation (in the range of sensory threshold). The physician or the therapist should try to explain the safety of this form of electrical treatment. If the patients cannot be convinced, they are not suitable for transcutaneous electrical nerve stimulation.

2. Allergic skin reactions to viscose, textile and disinfectants used for electrode materials can occur. In such cases one should try to change the suspect materials or the disinfecting fluid.

3. Isolated cases of skin irritation may occur at the site of electrode placement following long-term application.

4. In some cases petechiae can appear under the suction cups. They are not dangerous but they are avoidable by means of reduction of the pressure of the vacuum during the treatment or by change from suction cup to simple flat electrode treatments.

4 WARNINGS

1. Federal law restricts the sale, distribution, or use of this unit to, by, or on the lawful order of a licensed practitioner.

2. The safety of interferential current units for use during pregnancy or delivery has not been established.

3. Keep the units out of the reach of children.

4. In pain management, medical professionals using interferential current stimulators are accustomed to set intensity of the units above sensory and below motor threshold. In a few rare cases, the licensed practitioner might observe a motor contraction whereas the patient still will not report skin sensation. Therefore, in these cases the licensed practitioner should observe the contraction, and treat below motor threshold and be aware that in some cases reduced skin sensitivity might exist.

5. Avoid too strong pressure of the vacuum. Adjust the pressure at the minimum which is required to ensure a firm contact of the vacuum electrodes.

6. Transcutaneous electrical nerve stimulation is ineffective for pain of central origin.

7. Pay attention to contraindications, precautions and try to avoid adverse effects! (See chapter 3.5)

8. Transcutaneous electrical nerve stimulation is of no curative value.

9. Transcutaneous electrical nerve stimulation is a symptomatic treatment and as such it suppresses the sensation of pain.

10. Electronic monitoring equipment such as ECG monitors or ECG alarms will not operate properly when a transcutaneous electrical nerve stimulator is in use.

11. Operation of the unit at a distance of less than 3 m from a short-wave or microwave therapy unit may cause fluctuations of the output values.

12. Repairs and modifications of Nemectron EDiT and Endovac® Model 3 may only be carried out by Nemectron technicians or by technicians authorized by Nemectron.

Nemectron EDiT

Endovac® Model 3

5 OPERATION OF NEMECTRON EDiT

5.1 Note on operation

For operation of Nemectron EDiT, open the booklet at page 72, for operation of Endovac® Model 3, at page 73; these folded pages present illustrations of the units' front panels to facilitate operation of the units as described in the following.

On the left of the operating instructions, you will find front panel diagrams where the respective parts and indicators discussed in the text are marked in black.

The unit provides protection against electric shocks and has insulated patient-applied parts; nevertheless it should not be used for application to the heart.

5.2 Mains connection

If the unit is operated with a grounded conductor, it is a Class I unit.

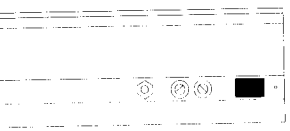
The unit is constructed for operation at 117 V/60 Hz.

Check whether the voltage specified on the unit's nameplate is the same as the mains voltage.

Nemectron EDiT can be combined with Endovac® Model 3 and Nemectroson Model 2. For instructions, see chapters 9 and 10.

Nemectron EDiT is equipped with a connection for potential equalization. To connect the unit to a potential equalization network, see chapter 8.

First connect the mains cable supplied to the plug on the back of Nemectron EDiT, then connect the mains plug to a mains socket.

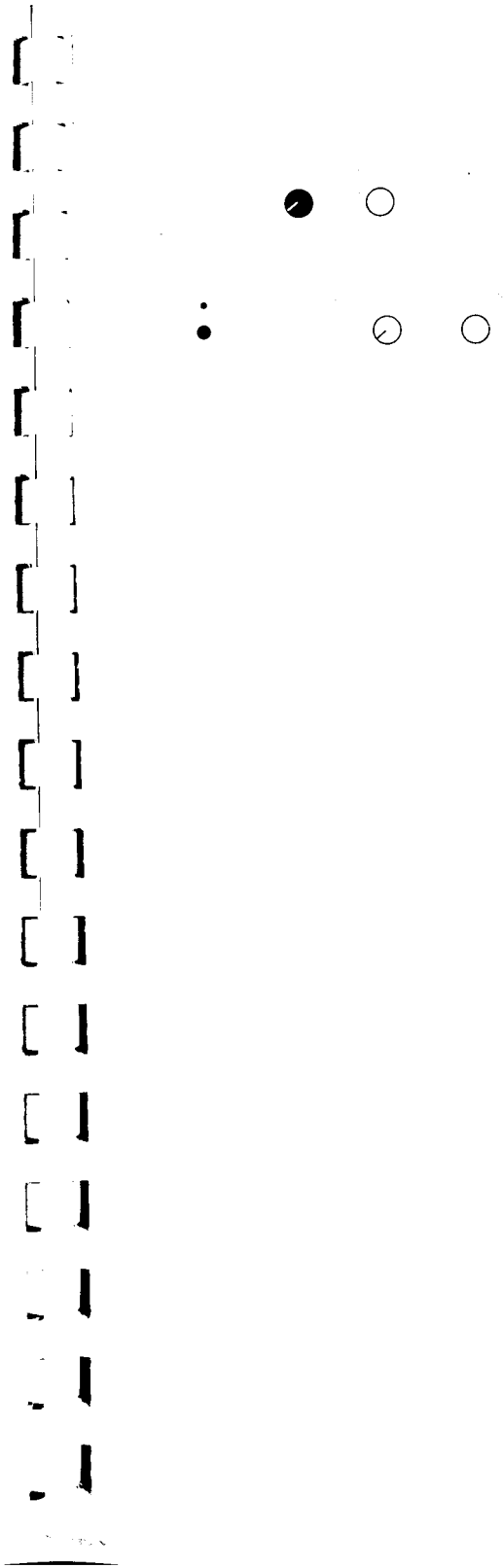


5.3 Self-check

When switching the unit on, an automatic self-check is conducted.

In case there should be a functional defect, the treatment time indicator will be blinking, and pulsed sounds will be emitted (1 s pulse duration, 1 s pause) which can only be stopped by switching the unit off again.

The unit must then be checked by an authorized technician.



5.4 Switching Nemectron EDiT on

Before switching the unit on, turn the intensity knob to position "O".

Press the green I/O button to switch the unit on. When the button is in position "I", the indicator above the button lights up.

When the unit is being switched on,

- a sound pulse of about 1 s duration will be emitted.
- all digital indicators as well as almost all indicators above the buttons will light for some seconds during the self-check. Indicators not lighting are one of the LEDs for circuits 1 and 2 and one of the therapy mode indicators. These can be checked by pressing the respective buttons.

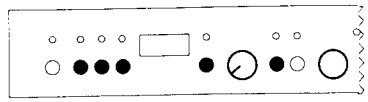
  The three indicators above the electrode socket (two green ones and a yellow one) will also not light up. The green LEDs can only be checked when a current of at least 1 mA is flowing in the two circuits (see paragraph 5.11).

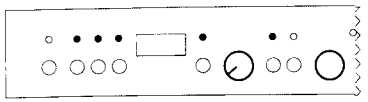
  The yellow indicator can be checked after the above indicator check by turning the intensity knob to its maximum position, **with the electrode plug not connected (neither to Nemectron EDiT, nor to units combined with Nemectron EDiT). Afterwards, the intensity knob must be turned back to "O".**

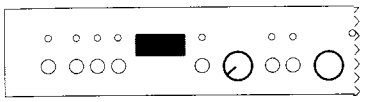
Important: If a continuous sound is being emitted when switching the unit on, switch it off again immediately and have it checked by a technician.

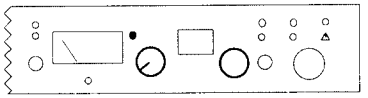
After the indicator check,

- the Multifunction program is automatically set when the therapy button is in position "MF/IF/ ENDOSAN®".
- the "CONSTANT FREQUENCY 0.5 - 200 Hz" program is automatically set when the therapy button is in position "LF".









5.5 Selecting a therapy program or treatment frequency

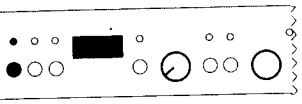
Three different automatic therapy programs as well as ENDOSAN® therapy and constant frequency can be set at Nemectron EDiT by pressing the respective buttons.

The indicator above the pressed button lights.

The respective frequency is indicated by the left digital indicator.

Important: When pressing the
- Multifunction button,
- Mobilization button,
- Pain Management button,
- "CONSTANT FREQUENCY 0.5 - 200 Hz" button, or the
- ENDOSAN®/MF button,

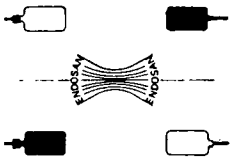
the treatment current will be cut off, except at the button already pressed. The indicator above the intensity knob will then light. In such a case, intensity must be reset as indicated in paragraph 5.11.



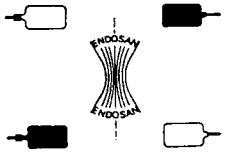
5.5.1 Multifunction program

5.5.1.1 Therapy button in position MF/IF/ENDOSAN®

This program starts with ENDOSAN®. At the first position of the triple left digital indicator, an 0 appears.



After 12 seconds, the ENDOSAN® direction of stimulation will be changed by 90° for another 12 seconds, with the 0 now appearing at the middle position of the digital indicator.



Then, the frequency changes within a range of 0.5 to 150 Hz. Afterwards, the automatic program proceeds vice versa.

This sequence will be periodically repeated until the end of treatment time.

Important: At the beginning and end of any ENDOSAN® mode, at the change from ENDOSAN® to interferential frequency, as well as from interferential frequency to ENDOSAN®, intensity is automatically reduced to zero and then gradually increased to the adjusted value.

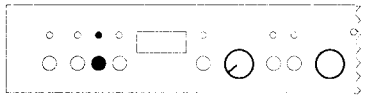
5.5.1.2 Therapy button in position "LF"

The "LF" (low frequency) therapy program starts with middle frequency. At the middle position of the left digital indicator, an 0 is indicated.

After 12 seconds, the frequency is continually changing within a range of 0.5 - 150 Hz. Afterwards, the program proceeds vice versa.

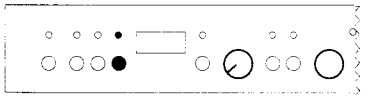
This will be periodically repeated until the end of treatment time.

Important: At the beginning and end of middle frequency, intensity is automatically reduced to zero and then gradually increased to the adjusted value.



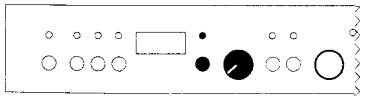
5.5.2 Mobilization program

This program differs from the Multifunction program in that intensity is dependent on frequency; in the 2 - 8 Hz frequency range, intensity is increased by 20 %.



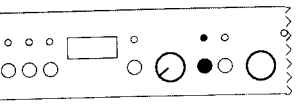
5.5.3 Pain Management program

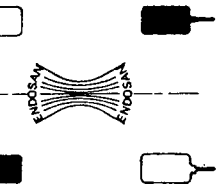
This program differs from the Multifunction program in that frequency is being changed within a range of 50 - 150 Hz.



5.5.4 Constant frequency 0.5 - 200 Hz

After pressing the "CONSTANT FREQUENCY 0.5 - 200 Hz" button, constant frequencies can be adjusted within that range using the frequency knob.





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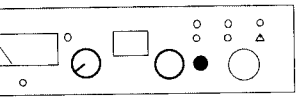
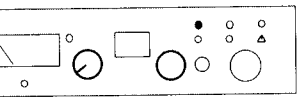
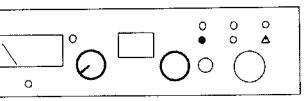






5.5.5 ENDOSAN®/MF

By pressing the ENDOSAN®/MF button, ENDOSAN® or middle frequency can be set, depending on electrode placement.

The ENDOSAN® effect is produced in the direction of an imaginary line running from the marked electrodes to the unmarked electrodes.

Important: ENDOSAN®/MF can only be applied when the therapy button is in position "MF/IF/ENDOSAN®".

5.6 Switching on low frequency therapy (LF)

Low frequency therapy can be switched on and off using the therapy button.

When the button is in position "LF", the respective indicator lights.

When the button is switched off, the MF/IF/ENDOSAN® indicator lights.

Important: When this button is being pressed during treatment, the treatment current will automatically be cut off.

5.7 Application and connection of flexible electrodes and special electrodes

For use of flexible electrodes, moisten the viscose covers to be used with tap water.

Connect the flexible electrodes to the 4-way cable (ref. no. 3163-00), then insert them into the moistened viscose covers.

Important: Make sure that the metal parts of the flexible electrodes are not in direct contact with the skin.

5.7.1 Application of the flexible electrodes for middle frequency therapy

Connect the electrodes to the red leads (circuit 1) of the 4-way cable. Then apply them as indicated in paragraph 5.7.3.

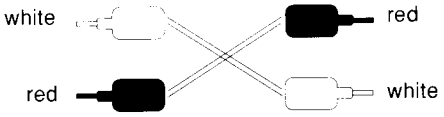
5.7.2 Application of the flexible electrodes for low frequency therapy

Connect the electrodes to the unmarked leads of the 4-way cable. Then apply them and fasten them using fixation straps.

Important: If another type of therapy is carried out afterwards, the connections must be undone.

5.7.3 Application of the flexible electrodes for interferential therapy

Apply the flexible electrodes prepared as indicated in paragraph 5.7 above in such a way that those electrodes with cables of the same colour are diagonally opposed to each other; then fasten them using fixation straps.

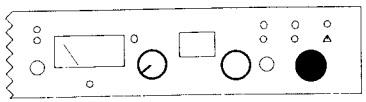


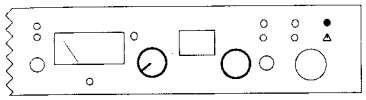
When using special electrodes, e.g. pad electrodes, four-field electrodes, etc. only moisten the electrode surfaces. But in no case wring the electrodes out. Then fix them using straps, or else by pressing them against the skin with your palms.

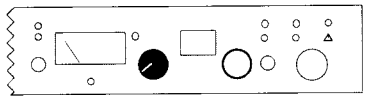
5.7.4 Application of the flexible electrodes for treatment using the impulse current cable

Connect the flexible electrodes to the impulse current cable (ref. no. 3156-13), then insert them completely into the **double** viscose covers.

The electrode connected to the red lead has positive polarity (+), the electrode connected to the white lead, negative polarity (-).







5.7.5 Connection of the flexible electrodes and the special electrodes

After applying the electrodes, connect the 5-pole plug of the 4-way cable to the 5-pole electrode jack on the unit's front panel.

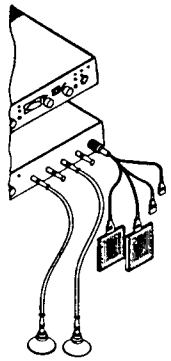
The maximum voltage occurring at the electrode socket at 500 ohms is 37.5 V (75 mA, about 4000 Hz).

If, with intensity set, the voltage at this jack may exceed 10 V, the yellow indicator will light up.

Important: Before removing or re-applying the electrodes, turn the intensity knob back to position "O".

5.7.6 Connection of two flexible electrodes and two vacuum electrodes for interferential therapy

When applying interferential current, the maximum voltage occurring at the vacuum electrode jacks at 500 ohms is 37.5 V (75 mA, about 4000 Hz).

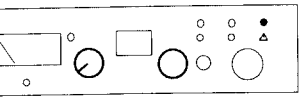


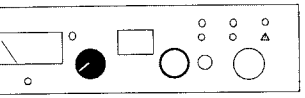
For this type of application, use the two unmarked flexible electrodes and the two vacuum electrodes with the green markings.

Plug the white and red closing pins (ref. nos. 3103-10 and 3103-28 respectively) into the two unmarked vacuum jacks.

Important: The free ends with the green markings of the 4-way cable for the flexible electrodes must not touch.

5.8 Connection of vacuum electrodes
(to Endovac® Model 3)



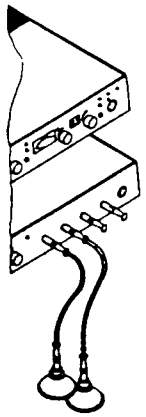


In application of interferential current, the maximum voltage occurring at the vacuum electrode jacks at 500 ohms is 37.5 V (75 mA, about 4000 Hz).

If, with intensity set, the voltage at these jacks may exceed 10 V, the yellow indicator of Nemectron EDiT will light up.

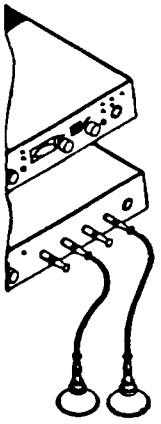
Important: Before removing or re-applying the electrodes, turn the intensity knob back to position "O".

5.8.1 Connection of the vacuum electrodes for middle frequency therapy



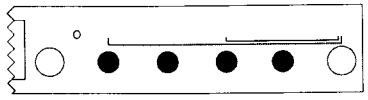
Connect the red electrode tubes to the red vacuum electrode jacks, and plug closing pins in the white jacks.

5.8.2 Connection of the vacuum electrodes for low frequency therapy

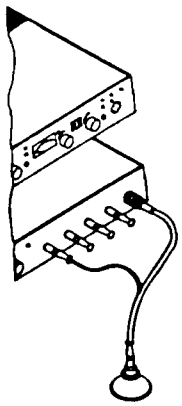


Plug the white and red closing pins (ref. nos. 3103-10 and 3103-28 respectively) in the vacuum electrode jacks marked with black dots, and connect the vacuum electrodes to the two unmarked vacuum electrode jacks.

5.8.3 Connection of the vacuum electrodes for interferential therapy



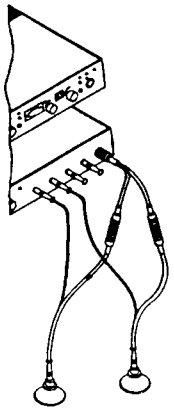
Connect the vacuum electrode plugs ac-cording to color to the red and white vacuum electrode jacks, the vacuum electrode tubes with the green markings being connected to the jacks marked with black dots.



5.8.3.1 Connection of the tetrapolar vacuum electrodes

Connect the 5-pole plug of the tetrapolar vacuum electrode cable to the 5-pole electrode jack, and the red electrode tube to the first vacuum electrode jack on the left of the front panel of Endovac® Model 3.

Plug the closing tube in the other three vacuum electrode jacks.



5.8.3.2 Connection of two tetrapolar vacuum electrodes

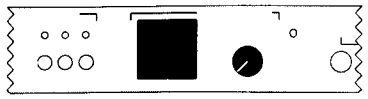
When using two tetrapolar vacuum electrodes, connect a D-red adapter (ref. no. 3121-00) to the 5-pole electrode jack so as to achieve additional depth effectiveness.

Then connect the tetrapolar vacuum electrodes to the two 5-pole couplings of this adapter.

Connect the red tubes to the red vacuum electrode sockets of Endovac® Model 3.

Plug closing pins in the two white vacuum electrode sockets.

Important: For treatment using two tetrapolar vacuum electrodes, do not switch on "VACUDYN".



5.9 Application of the vacuum electrodes

Before proceeding with the subsequent instructions, see paragraphs 5.7, 6.1, and 6.2.

Set Endovac® Model 3 at constant vacuum and turn the vacuum intensity knob in clockwise direction to the limit, as indicated in paragraphs 6.3 and 6.6.

Connect the jacks of the vacuum electrode tubes to the vacuum electrodes.

Important: Before applying the electrodes, turn the intensity knob to position "O".

Moisten the viscose sponges with tap water and put them into the vacuum electrode cups.

Important: Avoid using soakingly wet sponges (i. e. squeeze them out by hand to eliminate excessive water); do not use chemical solutions for moistening.

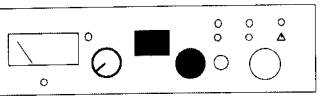
Apply the vacuum electrodes one by one to the sites intended. Make sure that no additional air is sucked in.

Important: Watch the vacuum intensity indicator when applying the electrodes for interferential therapy since vacuum intensity increases quite considerably when applying the second pair of the vacuum electrodes. Therefore reduce vacuum intensity immediately after applying all four electrodes.

5.10 Timer

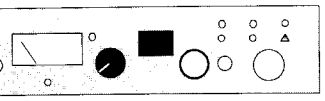
5.10.1 Setting treatment time

Important: Before setting treatment time, set the intensity knob to position "O".



Set the desired treatment time using the knob for setting treatment time. The time will be indicated on the right digital indicator.

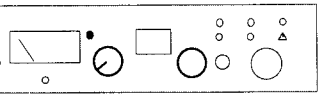
5.10.2 Treatment time



The timer starts when intensity is being increased from zero.

The right digital indicator always shows the remaining treatment time in minutes.

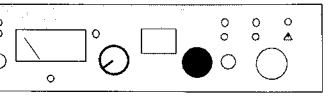
At the end of treatment time (0 minutes on the right digital indicator), intensity will automatically be reduced to zero and 10 pulsed sounds will be emitted (see paragraph 5.14.2).



The indicator above the intensity knob will light up.

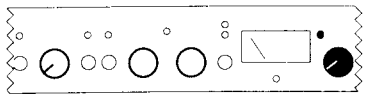
To change treatment time during treatment, proceed as outlined above.

5.10.3 Switching the timer off

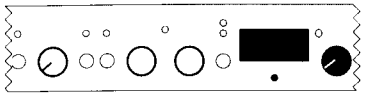


To switch the timer off, turn the knob for setting treatment time to position "∞" (right limit).

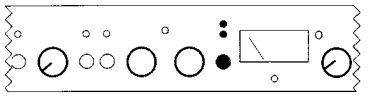
5.11 Setting intensity



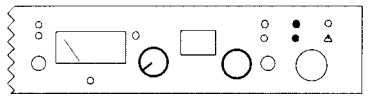
If the indicator above the intensity knob lights, the knob must be turned to position "O" before setting intensity.



Set the intensity required using the intensity knob. The intensity of the first circuit will be indicated on the scale of the measuring instrument.

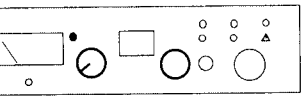


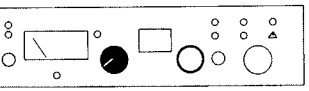
Intensity indication can be switched to the desired circuit using the button marked "CIRCUIT 1/CIRCUIT 2".



If there is a treatment current of at least 1 mA flowing, the indicator for circuit 1 or 2 above the electrode jack will light.

Important: At the beginning and end of any ENDOSAN® mode, at the change from ENDOSAN® or middle frequency to interferential frequency as well as from interferential frequency to ENDOSAN® or middle frequency, intensity is automatically reduced to zero and then gradually increased to the adjusted value.





Important: The unit has an electronic safety device which ensures that no current is flowing through the electrodes

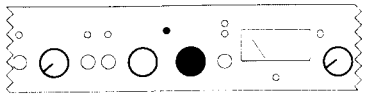
- when setting the unit into operation by plugging the mains plug in a mains socket,
- when mains voltage is available again after a voltage failure,
- when an intensity of 100 mA is being exceeded,
- when the permissible technologically caused intensity increase is being exceeded,

even if the intensity knob has not been turned back to position "O" before.

In such a case, the indicator above the intensity knob will light.

For intensity setting in such a case, turn the intensity knob back to position "O"; the indicator above the knob will go out. Then, intensity can be set as indicated above.

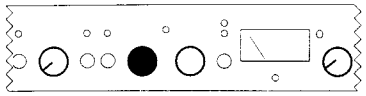
Important: In low frequency therapy, the pointer of the treatment current measuring instrument swings in the rhythm of a treatment frequency of up to 10 Hz.



5.12 Stimulation time controller S 4000

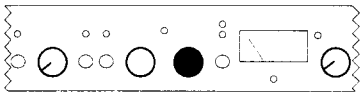
5.12.1 Switching the stimulation time controller S 4000 on and off

Switch the stimulation time controller S 4000 on or off using the knob for setting the pause. When the knob is not in position "O", S 4000 is switched on. The indicator "ON" will then light.



5.12.2 Setting stimulating time

Set the desired stimulating time at the left knob (six positions can be selected: 6, ... 30 seconds).

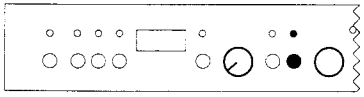


5.12.3 Setting pause

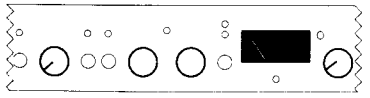
Set the desired pause at the right knob (six positions can be selected: 6, ... 54 seconds).

5.13 ENDOSCAN®

Important: ENDOSCAN® can only be switched on or off when middle frequency therapy, interferential therapy or ENDOSAN® therapy are to be applied.



Press the ENDOSCAN® button to switch the device on or off. With ENDOSCAN® switched on, the intensity set changes in the ENDOSCAN® rhythm; the indicator above the button lights.



The ENDOSCAN® rhythm is indicated by the pointer of the measuring instrument.

5.14 Acoustic signals

5.14.1 Acoustic signal when switching the unit on

When switching the unit on, a check signal sounds for 1 second.

5.14.2 Acoustic signal announcing the end of treatment time

At the end of treatment time, 10 pulsed sounds are emitted, with pulse duration 0.2 seconds and the period 2 seconds.

These sounds can be stopped by turning the intensity knob back to position "O".

5.14.3 Acoustic signal announcing intensity interruption

If intensity is interrupted, a train of two pulsed sounds will be emitted. Pulse duration and the pause between two pulses are 0.2 seconds, with a period of 2 seconds.

This train can be stopped by turning the intensity knob back to position "O".

The signal will be activated

- if an intensity of 100 mA is being exceeded,
- if the permissible technologically caused intensity deviation is being exceeded.

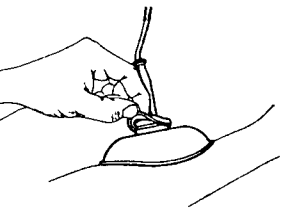
5.14.4 Acoustic signal announcing technologically caused misdosage

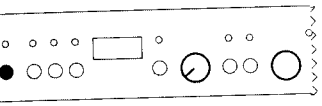
Technologically caused misdosages are announced by a continuous sound.

In such cases, the signal can**not** be stopped by turning the intensity knob back to position "O", but only by switching the unit off using the green I/O button.

5.14.5 Acoustic signal announcing defects detected during the self-check

In case a functional defect should be detected during the self-check, a pulse train is emitted (1 s pulse duration, 1 s pause) which can only be stopped by switching the unit off.





5.15 Electrode removal

Important: Before removing the electrodes, turn the intensity knob back to position "O".

5.15.1 Vacuum electrode removal

Allow air to enter the vacuum electrodes by lifting the ventilation ring, then remove the electrodes.

Important: After removing the electrodes, wait another five minutes before switching the unit off.

5.16 Switching Nemectron EDiT off

To switch the unit off, press the green mains button (position ■○). All indicators will then go out.

6 OPERATION OF ENDOVAC® MODEL 3

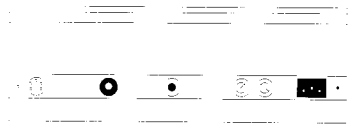
6.1 Mains connection

Endovac® Model 3 is a Class I unit.

The unit is manufactured for operation at 117 V/60 Hz.

Check whether the voltage specified on the unit's nameplate is the same as the mains voltage.

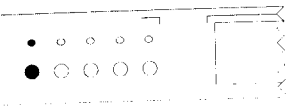
First connect the mains cable supplied to the plug on the back of the unit, then connect the mains plug to a mains socket.



6.2 Switching Endovac® Model 3 on and off

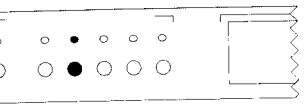
Press the green I/O button to switch the unit on and off; when the unit is switched on, the visual indicator above the button lights.

When the unit is being switched on, or when mains voltage is available again after a failure, the constant vacuum mode is automatically adjusted.



6.3 Switching on the constant vacuum

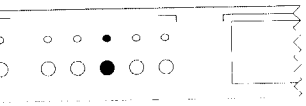
Press the button marked "⎍" to change to constant vacuum; the visual indicator above the button will light up.



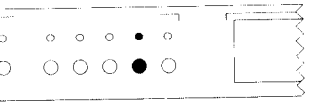
6.4 Switching on the pulsating vacuum

Press one of the buttons "", "" or "" to switch the pulsating vacuum on; the visual indicator above the respective button will light up.

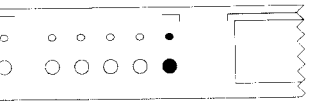
Press the button "" to switch on a pulsating frequency of 0.25 Hz (15 vacuum pulses per minute).



Press the button "" to switch on a pulsating frequency of 0.5 Hz (30 vacuum pulses per minute).

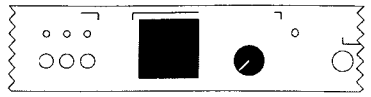


Press the button "" to switch on a pulsating frequency of 1 Hz (60 vacuum pulses per minute).



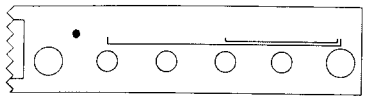
6.5 Switching VACUDYN on and off

VACUDYN cannot be switched on unless the pulsating vacuum is also switched on. To switch it on or off, press the button marked "VACUDYN". When VACUDYN is switched on, the visual indicator above the button lights.



6.6 Setting vacuum intensity

Set the vacuum intensity desired using the vacuum intensity knob. The intensity will be indicated on the scale of the measuring instrument.



6.7 Monitoring the water level indicator

Pay attention to the water level indicator both during vacuum electrode application and after discontinuation of treatment.

Blinking of the indicator during electrode application means that treatment must not be commenced. Blinking during treatment means that the latter may be continued.

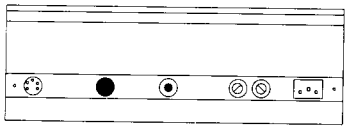
In both cases, the water drained from the sponges must be removed from the unit's container (see paragraph 6.8).

6.8 Emptying the water container

Switch the unit off as indicated in paragraph 6.2.

Turn the vacuum intensity knob in anticlockwise direction to the limit.

Put the free end of the drainage hose into a container with a volume of at least 0.5 l.



Insert the drainage hose plug into the socket on the unit's back until it locks into position, then put the drainage hose in such a position that the water may drain away.

When the water has completely drained away, move the knurled sleeve of the drainage socket towards the unit to unfasten the drainage hose.

The unit may then be put into operation again.

7 RECOMMENDED MAXIMUM INTENSITY FOR THE ELECTRODES

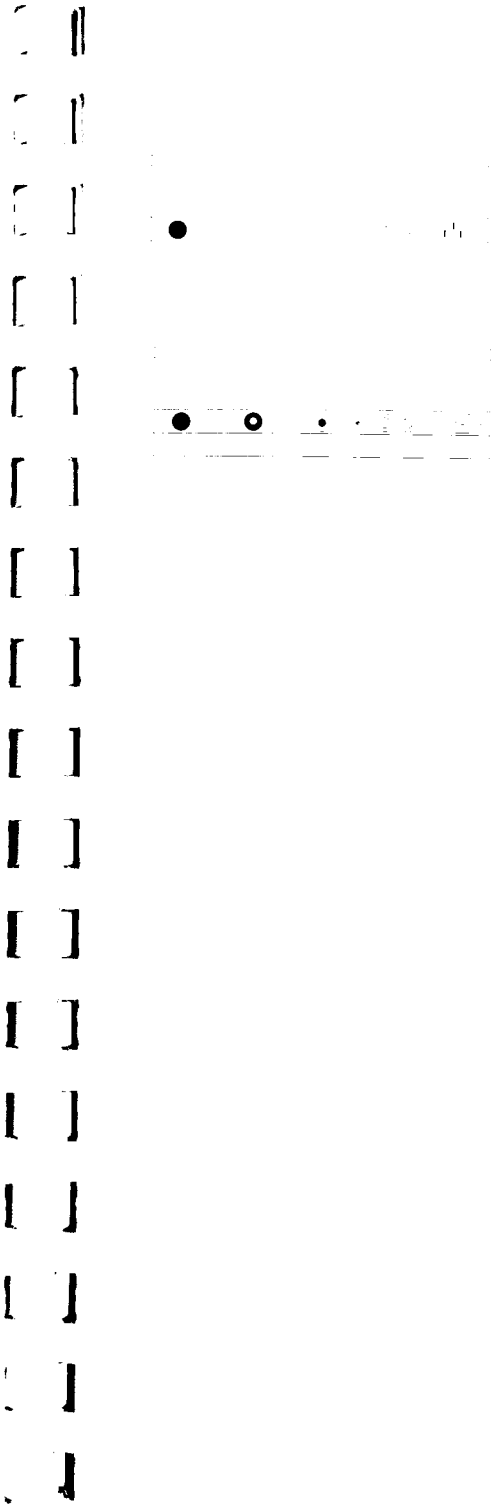
Electrode	mA
Flexible electrode size 25, 4 x 5 cm with viscose cover	80
Flexible electrode size 50, 7 x 7 cm with viscose cover	100
Flexible electrode size 100, 7 x 12.5 cm with viscose cover	100
Flexible electrode size 200, 11.5 x 17.5 cm with viscose cover	100
Flexible electrode size 400, 14.5 x 23 cm with viscose cover	100
Pad electrode 5 x 5 cm	10
Double pad electrode 5 x 5 cm	20
Pad electrode 6 x 6 cm	10
Pad electrode D-red (D = treatment in the depth)	32
Four-field electrode 18.5 x 18.5 cm	100
Four-field electrode 15 x 15 cm	100
Double four-field electrode 18.5 x 18.5 cm	100
Double two-field electrode 9.3 x 16.7 cm	100
Palmar electrode for kinesis	100
Four-point electrode	1
Vacuum electrode size 1 Ø 6 cm with viscose sponge	100
Vacuum electrode size 2 Ø 9 cm with viscose sponge	100

Electrode	mA
Vacuum electrode size 3 Ø 12 cm with viscose sponge	100
Tetrapolar vacuum electrode size 21 Ø 6 cm with viscose sponge	90
Tetrapolar vacuum electrode size 22 Ø 9 cm with viscose sponge	100
Tetrapolar vacuum electrode size 23 Ø 12 cm with viscose sponge	100

8 CONNECTION FOR POTENTIAL EQUALIZATION

Symbol for the potential equalization connection

At the back of Nemectron EDiT, there is a plug for connection to a potential equalization network. The respective socket with holding sleeve delivered with the unit is to be fixed to the connecting lead.



9 COMBINED USE OF NEMECTRON EDiT AND ENDOVAC® MODEL 3

For combined use of Nemectron EDiT and Endovac® Model 3, connect the two units to each other before connecting them to the mains.

Nemectron EDiT has a socket on its back, Endovac® Model 3, a plug.

The maximum voltage occurring at the jack of Nemectron EDiT and the plug of Endovac® Models 2/3 at a load of 500 ohms is 37.5 V (75 mA, about 4000 Hz).

To connect the two units, insert the plug of the connecting cable (ref. no. 3103-60) in the jack of Nemectron EDiT, then connect the jack of the cable to the plug on the back of Endovac® Models 2/3.

10 COMBINED USE OF NEMECTRON EDiT AND NEMECTROSON MODEL 2

To use Nemectron EDiT in combination with Nemectroson Model 2, connect the two units as indicated in the Instruction Manual for Nemectroson Model 2 before connecting them to the mains.

11 NOTE ON REPAIRS AND MALFUNCTION

Repairs and modifications of your Nemectron EDiT and Endovac® Model 3 may only be carried out by Nemectron or by persons authorized by Nemectron.

If none of the visual indicators lights, switch the unit off, pull the mains plug out of the mains socket and exchange the fuses. If still no indicator lights or if there is any other functional defect, switch the unit off again and pull the mains plug out of the mains socket. Contact your agency.

12 MAINTENANCE AND CHECKS FOR TECHNOLOGICAL SAFETY

The unit needs no maintenance. Checks for technological safety are to be made annually.

13 CLEANING

Remove dirt using a moistened tissue. To remove persistant dirt, use a soap solution.

14 INDICATION OF TECHNOLOGICALLY CAUSED MISDOSAGE

In case the safety intensity limit should be exceeded due to a technologically caused increase, intensity will automatically be switched off.

If this automatic switch-off should fail to work, a continuous sound will be emitted.

Important: Continuous sound emission announces a technologically caused misdosage.

In such a case, switch the unit off and contact your agency.

15 TECHNICAL SPECIFICATIONS OF NEMECTRON EDiT

Therapy programs:

- **Multifunction**

Automatic modification with the following parameters:

a) Therapy button in position MF/IF/ ENDOSAN®

Frequency (Hz)	Duration (s)	Frequency grades (Hz)
ENDOSAN®	12	-
ENDOSAN® with direction of stimulation turned by 90°	12	-
0.5	2 s/fr.	-
1 - 5	1 s/fr.	0.5
5 - 20	1 s/fr.	1
20 - 50	1 s/fr.	5
50 - 150	1 s/fr.	10

b) Therapy button in position LF

Frequency (Hz)	Duration (s)	Frequency grades (Hz)
Middle frequency	12	-
0.5	2 s/fr.	-
1 - 5	1 s/fr.	0.5
5 - 20	1 s/fr.	1
20 - 50	1 s/fr.	5
50 - 150	1 s/fr.	10

- **Mobilization**

Automatic modification with the following parameters, with 20 % intensity increase within the frequency range of 2 - 8 Hz (increase and decrease at 1 Hz and 9 Hz respectively):

a) Therapy button in position MF/IF/ ENDOSAN®

Frequency (Hz)	Duration (s)	Frequency grades (Hz)
ENDOSAN® ENDOSAN® with direction of stimulation turned by	12	-
90°	12	-
0.5	2 s/fr.	-
1 - 5	1 s/fr.	0.5
5 - 20	1 s/fr.	1
20 - 50	1 s/fr.	5
50 - 150	1 s/fr.	10

b) Therapy button in position LF

Frequency (Hz)	Duration (s)	Frequency grades (Hz)
Middle frequency	12	-
0.5	2 s/fr.	-
1 - 5	1 s/fr.	0.5
5 - 20	1 s/fr.	1
20 - 50	1 s/fr.	5
50 - 150	1 s/fr.	10

- **Pain Management**

Automatic modification with the following parameters:

a) Therapy button in position MF/IF/ ENDOSAN®

Frequency (Hz)	Duration (s)	Frequency grades (Hz)
ENDOSAN® ENDOSAN® with direction of stimulation turned by	12	-
90 °	12	-
50 - 150	1 s/fr.	10

b) Therapy button in position LF

Frequency (Hz)	Duration (s)	Frequency grades (Hz)
Middle frequency	12	-
50 - 150	1 s/fr.	10

- **Constant frequency 0.5 - 200 Hz**

Optional frequencies:

Frequency (Hz)	Frequency grades (Hz)
0.5	-
1 - 5	0.5
5 - 20	1
20 - 50	5

- ENDOSAN®

Mechanism for direction-defined phase relation of the middle frequency currents

ENDOSCAN®: In both circuits, simultaneous, oppositely directioned intensity modification within a range of +25 % to -50 %

Visual indicators:

One green light-emitting diode respectively for

- ON/OFF operational states
- Multifunction program
- Mobilization program
- Pain Management program
- Constant frequency 0.5 - 200 Hz
- ENDOSAN®/MF
- ENDOSCAN®
- S 4000 ON/OFF operational states
- Circuit 1/circuit 2 change-over
- Intensity knob return
- LF therapy
- MF/IF/ENDOSAN® therapies
- Circuit 1
- Circuit 2

One yellow LED for "OUTPUT VOLTAGE MAY EXCEED 10 V_{eff}"

One change-over measuring instrument for circuits 1 and 2

One triple digital frequency indicator (0 - 200 Hz)

One double digital treatment time indicator (1 - 60 min.)

Acoustic indicators:

	Number of pulsed sounds	Pulse duration (s)	Period (s)
Check sound upon switching on	1	ca. 1	/
End of treatment	10	0.2	2
Interruption of intensity	2 in sequence (with 0.2 s pause)	0.2	2
Technologically caused misdosage	1	Continuous	
Defect found during check	Uninterrupted pulse train	ca. 1	2

Buttons:

One green button for mains switch,

one black button respectively for

- Multifunction program
- Mobilization program
- Pain Management program
- Constant frequency 0.5 - 200 Hz
- ENDOSAN®/MF
- ENDOSCAN®
- Circuit 1/circuit 2 change-over
- LF and MF/IF/ENDOSAN® change-over

Knobs:	One respectively for ● Intensity setting ● Adjustment of constant frequency ● S 4000 stimulating time ● S 4000 pause ● Treatment time setting
Patient-applied parts:	BF type; two separate outputs for application of stimulating current
Output sockets:	One for electrode connection, one for connection of an Endovac® unit
Output waveforms and frequencies:	Sinusoidal middle frequency signal at each output ● Circuit 1: 4000 Hz ● Circuit 2: 3800 - 4000 Hz ● The frequencies given in the therapy programmes are the differences of the two middle frequency signals ● When using the impulse current cable: sinusoidal half-waves in direct succession (full-wave rectification) of the two middle frequency signals in series connection
Rated intensity range:	0 - 75 mA (at 500 ohms with ENDOSCAN® switched off)
Rated output power in each circuit at 500 ohms:	2.81 VA

Maximum output voltage amplitude:	From 66 V at a charge of 500 ohms To 82 V at a charge of 20 kohms When using the direct current cable: From 59 V at a charge of 500 ohms To 130 V at a charge of 20 kohms
Intensity switch-off:	With a technologically caused intensity increase by 30 % With an intensity of about 120 mA When setting the unit in operation by plugging the mains plug in a mains socket When mains voltage is available again after a mains voltage failure
Class:	I
Potential equalization:	Plug for potential equalization
Mains voltage:	117 V/60 Hz
Rated power consumption:	92 VA at rated mains voltage
Mains cable:	Length about 3.0 m
Mains fuses:	T 1.25 A
Dimensions:	Height 16.3 cm Width 50.0 cm Depth 32.4 cm
Weight:	10 kg

16 TECHNICAL SPECIFICATIONS OF ENDO-VAC® MODEL 3

New vacuum mechanism with patent pending

Fixed vacuum: Constant vacuum

Stages of vacuum pulsation:

Stage I	15 vacuum pulses per min (0.25 Hz)
Stage II:	30 vacuum pulses per min (0.5 Hz)
Stage III:	60 vacuum pulses per min (1 Hz)

VACUDYN: With VACUDYN switched off, pulsation in an opposite direction of the two vacuum electrodes of the same circuit.

With VACUDYN switched on, pulsation in the same direction of the two vacuum electrodes of the same circuit with simultaneous pulsation of the two circuits in an opposite direction.

Vacuum intensity: 0.07 - 0.4 bars

Inputs: One input socket for connection to a stimulating current device

Outputs: Four output sockets for vacuum electrodes

One output socket for flexible and special electrodes

Indicators: One visual indicator respectively for

- ON/OFF states
- Constant vacuum
- Vacuum pulsation stage I
- Vacuum pulsation stage II
- Vacuum pulsation stage III
- VACUDYN

One yellow blinking LED for water level indication

One vacuum gauge

Buttons: One green button for mains switch,

one black button respectively for

- Constant vacuum
- Vacuum pulsation stage I
- Vacuum pulsation stage II
- Vacuum pulsation stage III
- VACUDYN

Knob: One knob for setting vacuum intensity

Class: I

Mains voltage: 117 V/60 Hz

Max. power consumption: 1.35A at rated mains voltage

Mains fuses: T 2 A

Dimensions:

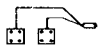
Height	16.3 cm
Width	50.0 cm
Depth	32.4 cm

Weight: 11.1 kg

17 ELECTRODES AND ACCESSORIES

Important: The units must not be operated with accessories and expendable parts other than those listed in the instruction manual.

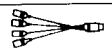
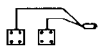
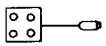
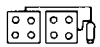
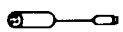
Accessories for low frequency therapy and middle frequency therapy

Ref.no.		
3163-00		4-way cable for flexible electrodes length appr. 1.50 m
3031-00		Flexible electrode size 50 7 x 7 cm
3032-08		Flexible electrode size 100 7 x 12.5 cm
3033-05		Flexible electrode size 200 11.5 x 17.5 cm
4011-02		Viscose cover size 50 minimum purchase 12 pcs
4012-00		Viscose cover size 100 minimum purchase 12 pcs
4013-07		Viscose cover size 200
3064-01		Pad electrode 6x6 cm cable appr. 1.50 m can be used in low frequency therapy

Accessories exclusively for low frequency therapy

3080-05		Palmar electrodes for electrokinesis

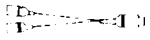
Ref. no. Accessories for interferential therapy and ENDOSAN® therapy

3163-00		4-way cable for flexible electrodes length appr. 1.5 m
3031-00		Flexible electrode size 50 7 x 7 cm
3032-08		Flexible electrode size 100 7 x 12.5 cm
3033-05		Flexible electrode size 200 11.5 x 17.5 cm
4011-02		Viscose cover size 50 minimum purchase 12 pcs
4012-00		Viscose cover size 100 minimum purchase 12 pcs
4013-07		Viscose cover size 200
3060-02		Pad electrode 5 x 5 cm cable appr. 1.50 m
3061-00		Double pad electrode 5 x 5 cm cable appr. 1.50 m
3062-07		Pad electrode 6 x 6 cm cable appr. 1.50 m
3063-04		Double pad electrode 6 x 6 cm cable appr. 1.50 m
3064-01		Pad electrode D-red 6 x 6 cm cable appr. 1.50 m (D=treatment of deep tissues)
3065-17		Four-field electrode 15 x 15 cm cable appr. 1.50 m
3066-06		Double four-field electrode 18.5 x 18.5 cm cable appr. 1.50 m
3067-03		Double two-field electrode 9.3 x 16.7 cm cable appr. 1.50 m
3068-00		Four-point electrode, exterior Ø 2.6 cm cable appr. 1.50 m

Ref.no. Accessories for direct current therapy

3156-13		Impulse current cable for direct current therapy
3031-00		Flexible electrode size 50 7 x 7 cm
3032-08		Flexible electrode size 100 7 x 12.5 cm
3033-05		Flexible electrode size 200 11.2 x 17.5 cm
3034-02		Flexible electrode size 400 14.5 x 23 cm
4032-02		Double viscose cover size 50 minimum purchase 12 pcs
4027-02		Double viscose cover size 100 minimum purchase 12 pcs
4021-09		Double viscose cover size 200
4022-06		Double viscose cover size 400

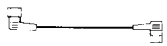
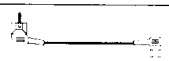
Further cables and cable accessories

3169-03		Extension cable for 4-way cable length appr. 1.75 m
3158-00		Distribution cable with 2 cables for **Nemectron EDiT-Endovac Model 3-Nemectroson Model 2**

Ref.no. Fixation straps

4060-07		Fixation strap 60/10 60 x 10 cm
4061-04		Fixation strap 90/10 90 x 10 cm
4062-01		Fixation strap 120/10 120 x 10 cm
2314-01		Fixation strap holder 5 x 80 cm

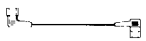
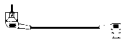
Mains cables for Nemectron EDiT

3254-57		Connecting cable for Nemectron EDiT-modality center length appr. 0.60 m
3250-74		Mains cable for Nemectron EDiT length appr. 3.0 m

Ref.no. **Further accessories for vacuum electrodes and electrode tubes**

2324-08		Angular connecting piece
2013-08		Electrode tube holder (wall fixation)

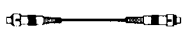
Mains cables for Endovac® Model 3

3254-57		Connecting cable for **Endovac® Model 3 - modality center** length appr. 0.60 m
3250-74		Mains cable for **Endovac® Model 3** length appr. 3.0 m

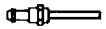
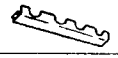
Ultrasound unit for combination with Nemectron EDiT

0280-07		**Nemectroson Model 2**

Ref.no. **Connecting cables**

3103-60		Connecting cable for **Nemectron EDiT-Endovac® Model 3**
3158-00		Connecting cable for **Nemectron EDiT-Endovac® Model 3-Nemectroson Model 2** and Distribution cable for 2 electrodes

Further accessories

2340-01		Drainage tube for **Endovac® Model 3**
2199-67		Vacuum electrode holder for **Freeline®** units
2026-05		Protective cover for **Nemectron EDiT-Endovac® Model 3**
2199-59		Vacuum electrode holder for modality center **Freeline®**

18 ELECTRODE CLEANING AND DISINFECTION

Wash the viscose sponges for the vacuum electrodes and the viscose covers for the flexible electrodes in clear running water before each treatment. We recommend that the covers and sponges be boiled from time to time if they are used frequently.

Wash the flexible electrodes in clear running water at regular intervals.

Cleaning is particularly important after direct current treatment since there is formation of acids and bases in the sponges and covers due to electrolytic processes when this type of current is used.

The pad electrodes should also be washed in running water before each treatment.

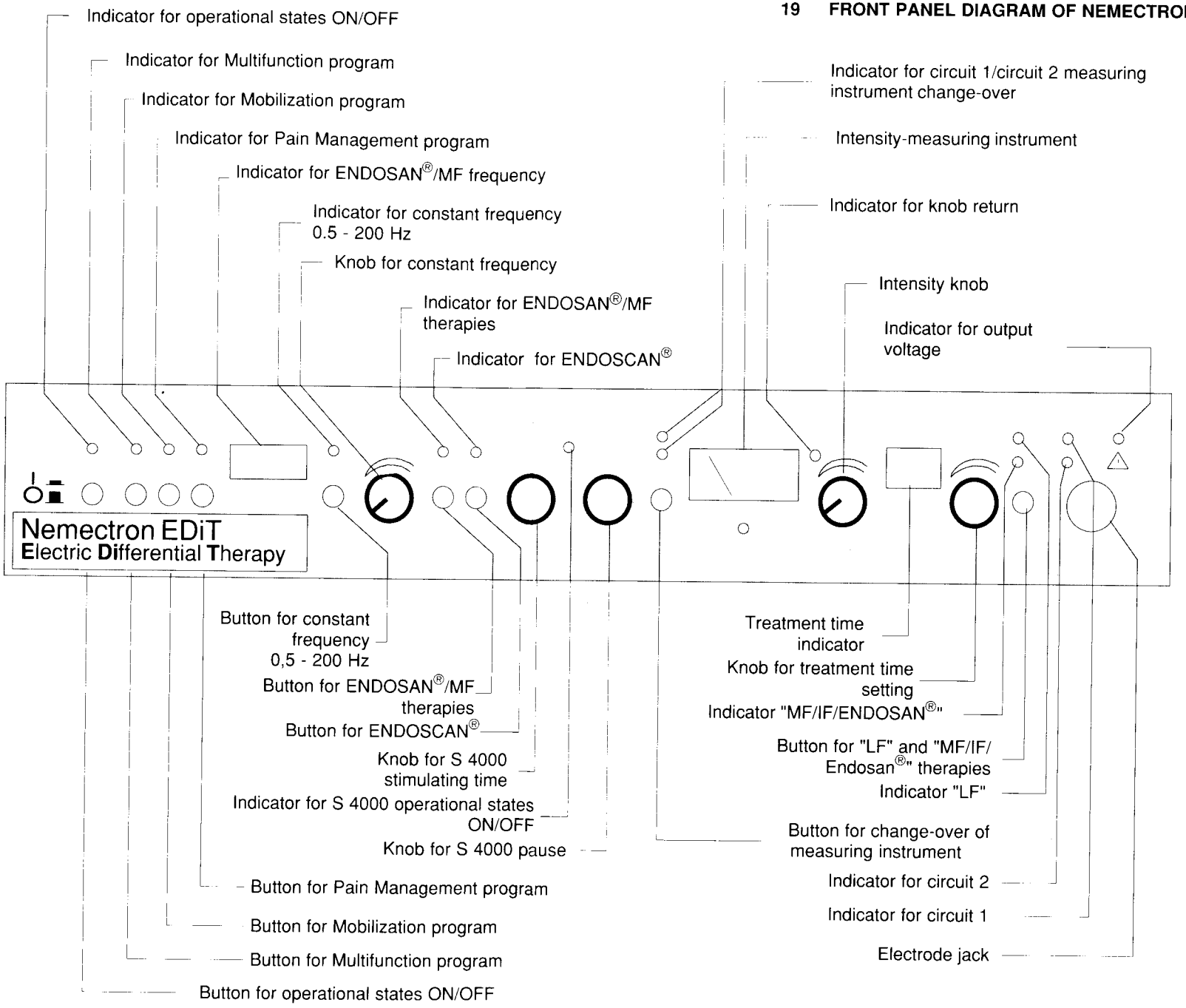
In case electrode cleaning using clear water should not be satisfactory (e.g. if there are fatty residues), we recommend washing out these residues using a washing powder for delicate fabrics. Afterwards rinse the electrodes in clear water.

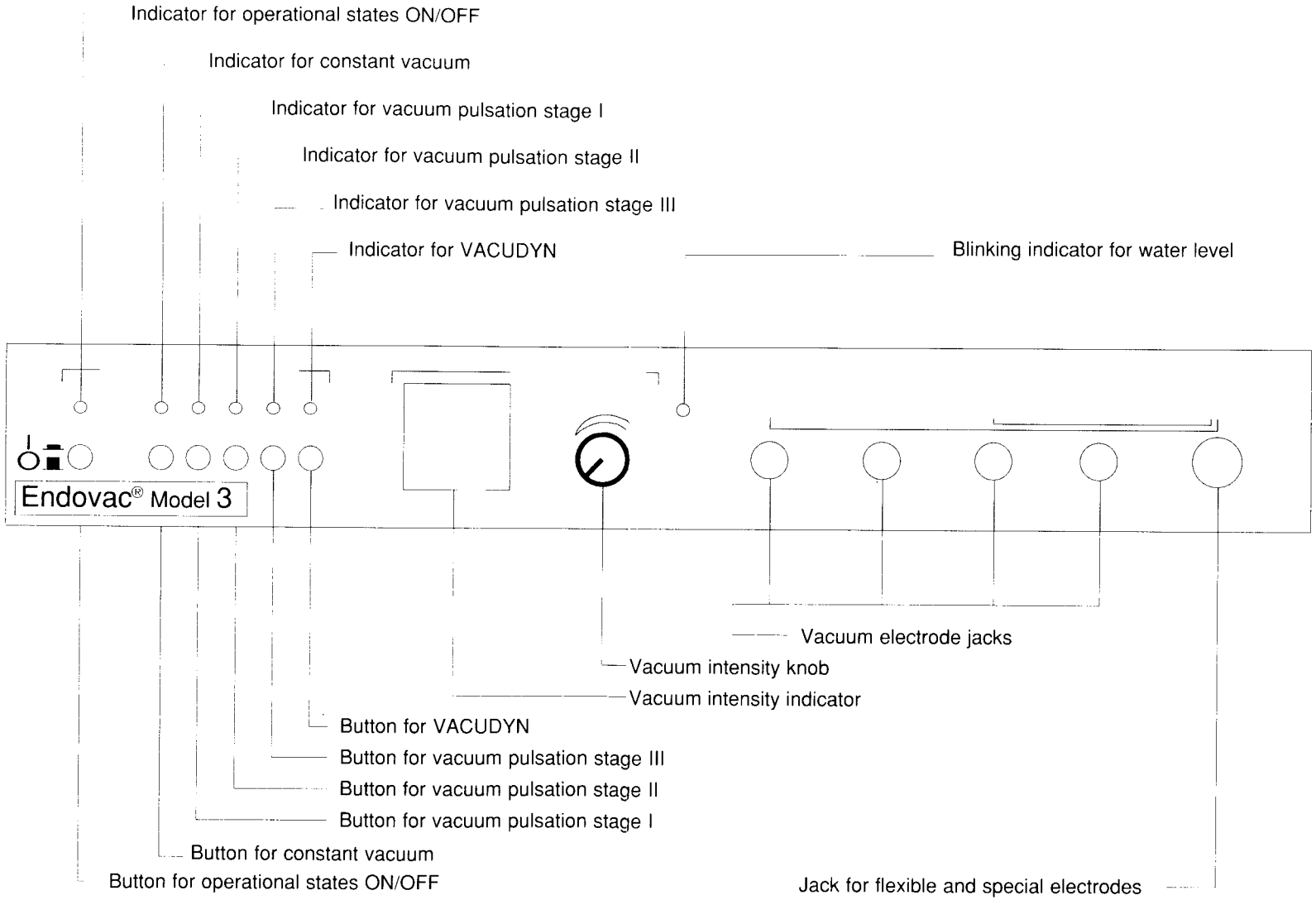
If the viscose sponges and covers are not used for longer periods, they have to be dried and kept in a dry place.

Cleaning of the pad electrodes and the palmar electrodes for kinesis using clear water is most conveniently carried out by placing the electrodes on an even surface and squeezing them out. To avoid causing damage to the electric cables inside the electrodes, do not wring out the pad electrodes.

We recommend that flexible electrodes, vacuum electrodes as well as viscose covers and sponges be disinfected.

19 FRONT PANEL DIAGRAM OF NEMECTRON EDiT




Indicator for operational states ON/OFF
Indicator for constant vacuum
Indicator for vacuum pulsation stage I
Indicator for vacuum pulsation stage II
Indicator for vacuum pulsation stage III
Indicator for VACUDYN
Blinking indicator for water level
Endovac® Model 3
Vacuum electrode jacks
Vacuum intensity knob
Vacuum intensity indicator
Button for VACUDYN
Button for vacuum pulsation stage III
Button for vacuum pulsation stage II
Button for vacuum pulsation stage I
Button for constant vacuum
Button for operational states ON/OFF
Jack for flexible and special electrodes