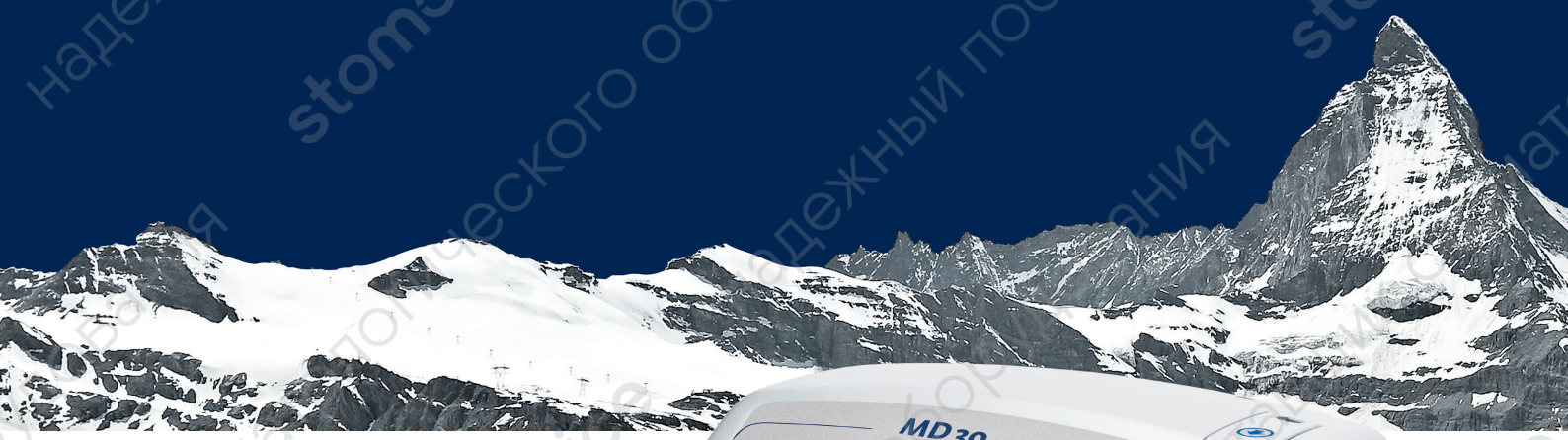
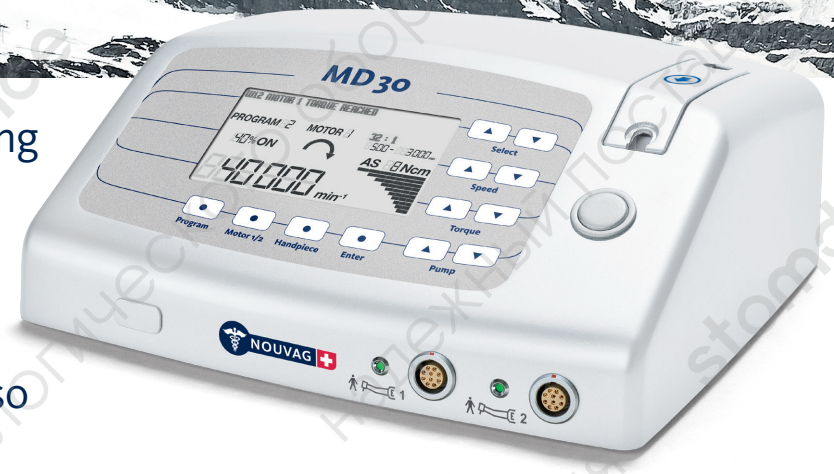
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NOUVAG

The Swiss Instruments



**DE** Bedienungsanleitung
**EN** Operation Manual
**FR** Mode d'emploi
**IT** Istruzione d'uso
**ES** Instrucciones de uso




# MD 30

Motor System for Implantology

CE 1275

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# 1 Product description

## 1.1 Intended use and operation

The MD 30 in combination with a motor and corresponding handpiece or contra angle (separate medical device) is used primarily in dental Implantology. The device can also be used for microsurgical applications as well as in oral and maxillofacial surgical procedures. The device is designed for drilling and sawing bone as well as for screw insertion into bone. An integrated peristaltic pump is provided in order to cool the rotating instruments so that damage to tissue can be prevented.

The MD 30 may only be operated by qualified and trained personnel.

It is used specifically in Implantology for:

- Milling and drilling the implant bed
- Cutting the thread for the implant
- Screwing in the implant
- Removing the fixture mount
- Placing the cover screw

## 1.2 Contraindications

Not known.

## 1.3 MD 30 technical data

Voltage: ---------- variable: 100 V~/ 115 V~/ 230 V~, 50–60 Hz
Fuse, power supply: ---------- 2 fuses T 3.15 AL 250 VAC
Power consumption: ---------- 120 VA
Applied part: ---------- Type B*
Protection class: ---------- Class I
Dimensions (W x D x H): ---------- 260 x 250 x 110 mm
Net weight control unit: ---------- 3.7 kg

**Motor:**

Motor coupling: ---------- Intra coupling ISO3964
Motor speed: ---------- 300 - 50,000 rpm
Max. Motor torque: ---------- 6 Ncm
Motor weight:---------- 0.280 kg
Motor cable length ---------- 2 m

**Pedal:**

IP code (pedal)---------- IP68

*Applied parts of Type B are the instruments attached to the motor.

## 1.4 Ambient conditions

| | **Transport and storage:** | **Operation:** |
|---|---|---|
| **Relative humidity:** | Max. 90 % | Max. 80 % |
| **Temperature:** | 0°C to 60°C | 10°C to 30°C |
| **Atmospheric pressure:** | 700 hPa to 1060 hPa | 800 hPa to 1060 hPa |

## 1.5 Warranty coverage

Purchasing the MD 30 entitles you to a 1-year warranty. If you return the warranty card for registration within four weeks of the date of purchase, warranty coverage will be extended for a further **6 months**. Consumable parts are not covered by the warranty. Improper use or repair, or failure to observe these instructions, relieve us from any obligation arising from warranty provisions or other claims.

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# 2 Explanation of symbols

| | | | |
|---|---|---|---|
|  | Important information |  | Autoclavable to maximum 135°C |
|  | Do not use if the packaging is damaged |  | Suitable for thermal disinfection |
|  | Warning |  | Sterilized using ethylene oxide |
|  | Manufacturer |  | Observe the instructions for use |
|  | Certified by the Canadian Standards Association (CSA) for Canada and the USA |  | Electrical and electronic devices that have reached the end of their service life comprise hazardous waste and may not be disposed of together with household waste. Prevailing local disposal regulations apply. |
|  | Type B applied part<br>Applied parts are the instruments |  | Protective earth |
|  | Do not reuse | REF | Symbol indicating the order number |
|  | Biohazard | SN | Symbol indicating the serial number with the date of manufacture (year/month) |
|  | Motor 1 |  | Motor 2 |
|  | Pedal | | |

# 3 Safety information

Your safety, the safety of your team, and of course that of your patients is very important to us. It is therefore essential to bear the following information in mind.

## 3.1 EMC Manufacturer's Declaration of Conformity

Please observe the information on electromagnetic compatibility provided with these operating instructions.

## 3.2 Integrated peristaltic tube pump

The integrated peristaltic pump is used to cool tissue in order to prevent damage to the tissue. It may only be operated with watery solutions, such as 0.9% Sodium Chloride irrigation solution (Art. No. 1707) or “Ringer” solution. Supplying medication using the integrated pump is expressly prohibited.

## 3.3 Modification and misuse



If modifications are made by the user/operator or a third party to the MD 30 and the accessory equipment provided, or if these items are used by these individuals for a purpose other than that for which the items were designed, an appropriate inspection must be performed by Nouvag AG in order to ensure continued safe operation.

### 3.4 Essential requirements

| | | | |
|---|---|---|---|
| ⚠ | The MD 30 may only be operated by qualified and trained personnel. Training on how to operate the system will be provided by the Nouvag distributor from whom the device was purchased. | ⚠ | Improper use or repair of the device and failure to observe these instructions relieve us from any obligation arising from warranty provisions or other claims. |
| ⚠ | The use of third-party products is the responsibility of the operator. Functionality and patient safety cannot be guaranteed with third-party accessories. | ⚠ | Prior to using the device, before startup, and before operation, the user must always ensure that the device and accessories are in good working order and are clean, sterile and operational. |
| ⚠ | The MD 30 is designed for intermittent duty operation at maximum speed of “1 min. on/3 min. off” at 4 cycles, after 15 min. brake. | ⚠ | Use Nou-Clean spray for maintenance and care of the motor, handpieces and contra angles. Using other care products can result in malfunctions and/or cause the warranty to be revoked. |
| ⚠ | Repairs may only be performed by authorized NOUVAG service technicians. | | |

### 3.5 During use

| | | | |
|---|---|---|---|
| ⚠ | The device is not sterile on delivery. All sterilizable parts must be sterilized before use (see Chapter 8 Cleaning, disinfection and sterilization). | ⚠ | To prevent injury, never touch drill bits or burrs while they are still running. |
| ⚠ | Handpieces and contra angles may only be attached when the electronic motor is not running. | ⚠ | Never operate the clamping mechanism of the handpieces or contra angles while the system is running. This could result in instrument damage. |

# 4 Scope of delivery

| Art. No. | Description | Quantity |
|---|---|---|
| 3330 | MD 30 control unit | 1 unit |
| 1510 | Vario pedal; IP68; electronic | 1 unit |
| 2097 | Electronic motor 21 incl. 2 m motor cable | 1 unit |
| 1706 | Tube set, sterile, 2 m, single-use | 1 unit |
| 1873 | Clip set (10 pieces) for tube set attachment at motor cable | 1 unit |
| 1881 | Clip set (3 pieces) for tube set attachment at handpieces and contra angles | 1 unit |
| 1707 | Irrigation fluid; 0.9 % sodium chloride/water solution, 1 litre | 1 unit |
| 1770 | Stand for irrigation fluid | 1 unit |
| 1170 | Handpiece cradle | 1 unit |
| 1974 | Spray nozzle for Nou-Clean spray; for care of electronic motor | 1 unit |
| 1958 | Spray nozzle for Nou-Clean spray; for care of instruments | 1 unit |
| 31686 | User Manual MD 30 on CD-ROM | 1 unit |

⚠ In line with regulations pertaining to hazardous materials, the following items are not delivered with the control unit and must be ordered separately:

| | | |
|---|---|---|
| 1984 | Nou-Clean maintenance and care spray | 1 unit |

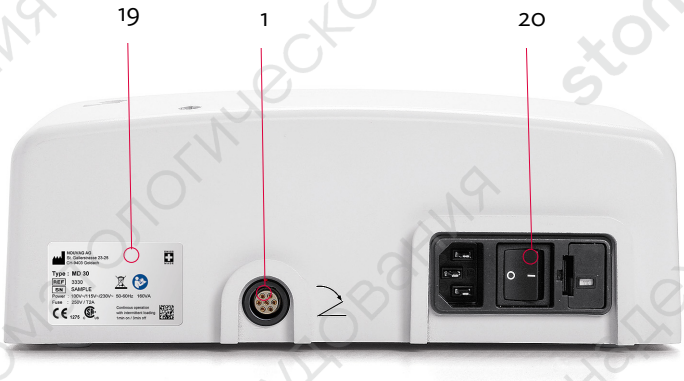
# 5 Device overview

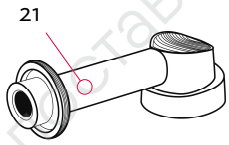
## Front view

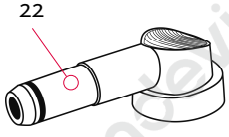



1. Pedal socket, device rear
2. Vario pedal
3. Handpiece and contra angle (not included in delivery)
4. Clip for tubing set attachment at handpieces and contra angles
5. Handpiece cradle
6. Electronic motor (delivery includes 1 motor)
7. Clip for tubing set attachment at motor cable
8. 1 indicator light for each motor
9. Display
10. Operating panel
11. Display
12. Release key for tubing set bracket
13. Peristaltic pump
14. Tubing set
15. Stand for irrigation fluid bottle
16. Drip chamber
17. Bleed valve
18. Bottle with irrigation fluid
19. Type plate with type designation, reference number, serial number, information on power supply and device fuse.
20. Power entry module with power plug socket, power switch and national voltage setting.
21. Spray nozzle for maintenance of electronic motor
22. Spray nozzle for maintenance of handpieces and contra angles.

## Rear view



# 6 Startup

## 6.1 Connection to the power supply

Before plugging the power cable into the power socket for the first time, you must check the supply voltage setting next to the power switch.

If the voltage shown does not correspond to the local mains voltage, the grey fuse holder must be set to the correct voltage:



A) Unplug the power cable.
B) Use a screwdriver to open the fuse slot.
C) Remove the fuse holder.
D) Remove the grey fuse holder and reinsert it so that the local mains voltage setting is shown in the small window.
E) Slide the grey fuse holder back in and close the fuse slot.
F) Check the mains voltage shown on the fuse slot.
G) Plug the power cable back into the device.

In order to prevent the risk of electric shock, the device may only be connected to a power network with a PE protective earth conductor.

## 6.2 Device preparation

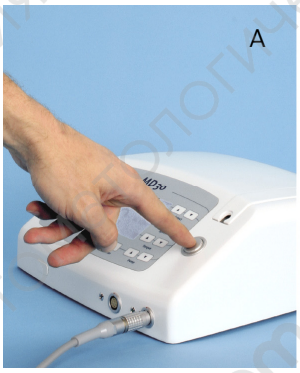
1. Sterilize the motor (the motor is not sterile on delivery). If the motor has already been sterilized: when removing the motor from the sterile packaging, ensure that the sterile packaging is not damaged and that the sterility indicator confirms sterility (if no sterility indicator is provided, the sterile packaging must at least show the date upon which the shelf life of the sterile item is due to expire).
2. Insert the stand for the irrigation fluid into the stand holder.
3. Plug the motor plug of the electronic motor into one of the motor sockets.
4. Where appropriate, plug the motor plug of a second electronic motor into a motor socket.
5. Plug the pedal plug into the pedal socket at the rear of the control unit.
6. Attach the sterilized handpiece to the electronic motor. Press the handpiece firmly onto the electronic motor until it clicks into position, check that it is secure by moving it slightly in the opposite direction.
7. Assemble the tubing set: Decide whether you will use tubing set Art. No. 1706, for the cooling of a single handpiece or if you need to use tubing set Art. No. 6025 with an integrated 3 way cock for cooling two handpieces at the same time, at the use of two motors.

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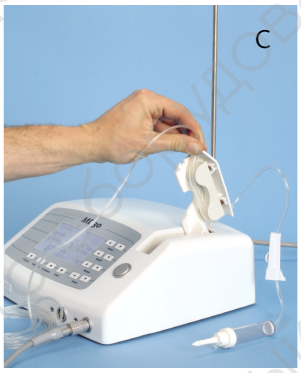
Check the expiry date of the tubing set and ensure that the packaging is not damaged. Using non-sterile tubing sets can result in serious infection, and in extreme cases, can be fatal.

When inserting the tubing set, ensure that the part of the tubing set with drip chamber and spike exits the pump to the rear so that it can be connected with the irrigation fluid bottle. This ensures the direction of flow.

Do not regulate the amount of irrigation fluid using the roller clamp on the tubing set; with the MD 30, this is regulated instead using the integrated pump. For this reason, make sure to open the roller clamp as far as it will go.










A) Press the button (on top of the control unit) to open the pump.
B) The compartment with the integrated tubing bracket opens.
C) Place the tubing set into the tubing bracket provided in such a way that the part of the tubing set with the spike exits the pump towards the rear of the device. Check that the tubing is secure.
D) With the tubing set inserted, press the compartment downwards until it clicks into place.



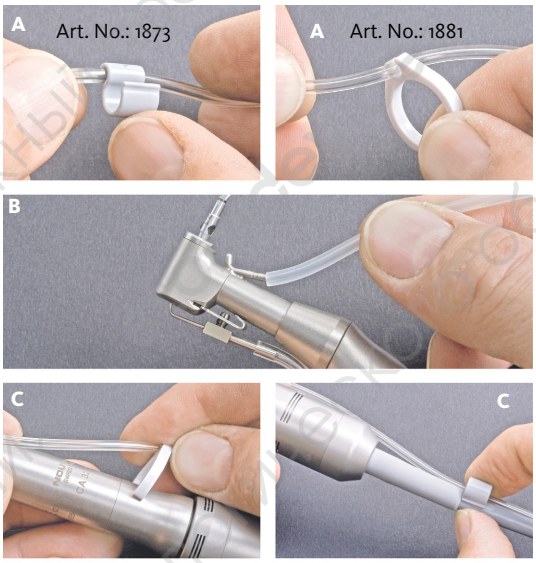





8. Insert the spike at the end of the tubing set into the irrigation fluid bottle and hang the bottle onto the stand.
9. Open the roller clamp on the tubing set as far as it will go.
10. Open the bleed valve beneath the drip chamber.
11. Connect the control unit to the power socket using the power plug.

Ensure that the operating voltage setting corresponds to the local mains voltage.

## 6.3 Assembling of external irrigation system




A) Secure motor cable clips and handpiece clips to the irrigation tube.

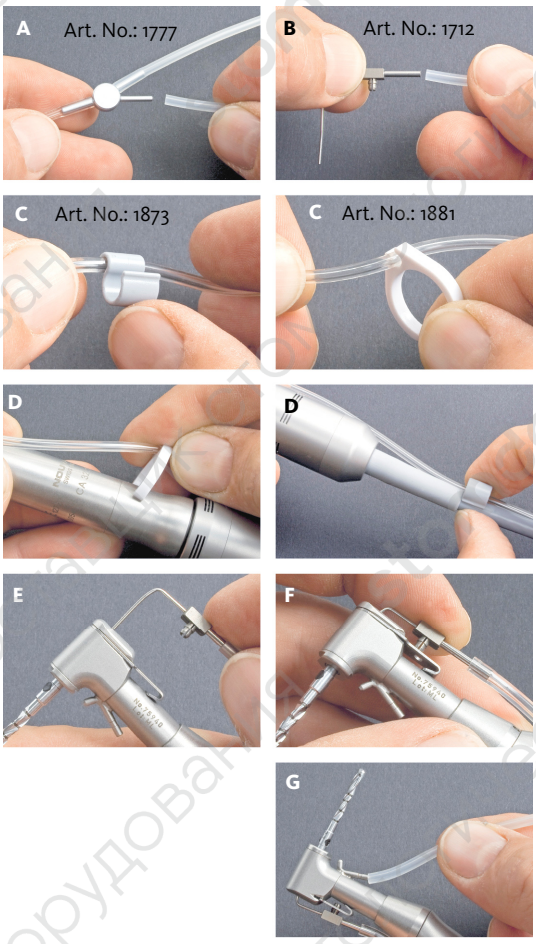
B) Connect the 6 cm section of tube (optional, Art. No.: 1773) with the cooling pipe of the handpiece for external cooling.

C) Secure clips to the contra angle and to the motor cable.

D) If required, secure additional clips to the motor cable.



## 6.4 Assembling of internal and external irrigation system




A) Graft a 6 cm tube piece (optional, Art. No.: 1773) on each of the branching pipes of the Y-Connector (optional, Art. No.: 1777).

B) Connect one of the 6 cm tube pieces that branch out of the Y-Connector with the internal cooling pipe (delivered with the handpiece, or optional, Art. No.: 1712).

C) Secure small, grey clips and the big, white clips to the tube set.

D) Secure bigger, white clips to the handpiece and the small, grey clips to the motor cable.

E) Put the internal cooling pipe with attached tube piece into the boring of the calmping mechanism of the handpiece (special drill bits are necessary with a boring for internal cooling).

F) Push the spigot of the cooling pipe into the boring of the shank of the clamping mechanism.

G) Connect the 6 cm tube piece (optional, Art. No.: 1773) with the pipe of the external cooling.

H) If needed, secure further clips to the cable of the motor or the handpiece.



## 6.5 Device setup

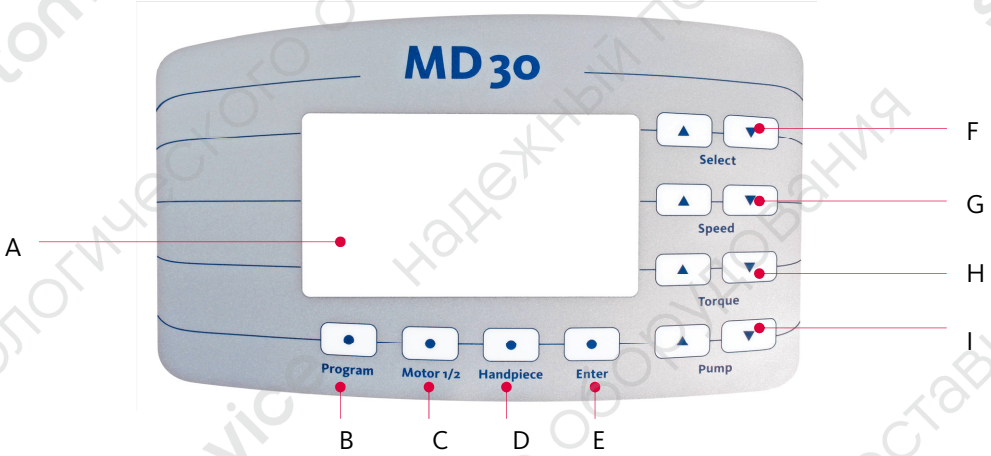
- The MD 30 and all required accessories and instruments must be placed on an even, non-slip surface.
- Do not allow the operating range of the device (including the cable and contra angle) to be compromised by limiting factors.
- The system display must be fully visible at all times.
- The pedal must be placed within stepping distance between the patient and the surgeon.
- It must be explicitly ensured that no objects can fall on the pedal.
- The power plug at the rear of the device must be accessible at all times.
- The motor ventilation slots must be kept clear in order to prevent the motor temperature from becoming excessive.

# 7 Operation

## 7.1 Switching the device on and off

The power switch “I/O” (at the rear) is used to switch the control unit on and off.
The device can be switched off at any time irrespective of any procedure for switching off the device.

## 7.2 Overview: control elements on the operating panel




A) **Display:** Shows the operating values (See chapter “7.3 Overview: Standard display”).

B) **“Program” key:** Selection of program 1 to 10 (for each of the two motors there are 10 different programs available).

C) **“Motor 1/2” key:** Switching between the connected motors (the green indicator lights beside the motor sockets show which motor is active).

D) **“Handpiece” key:** Choice of handpieces (can be individually deactivated, see chapter “7.8 Configuration menu”).

E) **“Enter” key:** Used in the configuration menu (see chapter “7.8 Configuration menu”)

F) **“Select” keys:** These are only available for basic device settings:

- By pressing the left “Select” key **“Select ▲”** the software version is shown.
- By pressing both “Select” keys at the same time **“Select ▲ + ▼”** the device will be reset to factory default settings.
- The Select keys serve in the configuration menu to change values and parameters
  “▲”: value adjustment (upwards) “▼”: value adjustment (downwards)

G) **“Speed” keys:**

- Restrict the maximum speed that can be selected using the pedal.
  “▲”: increases the maximum speed “▼”: reduces the maximum speed
- By pressing both “Speed” keys at the same time **“Speed ▲ + ▼”** the handpiece calibration will be started (see chapter “7.4.2 Calibrating handpieces”).

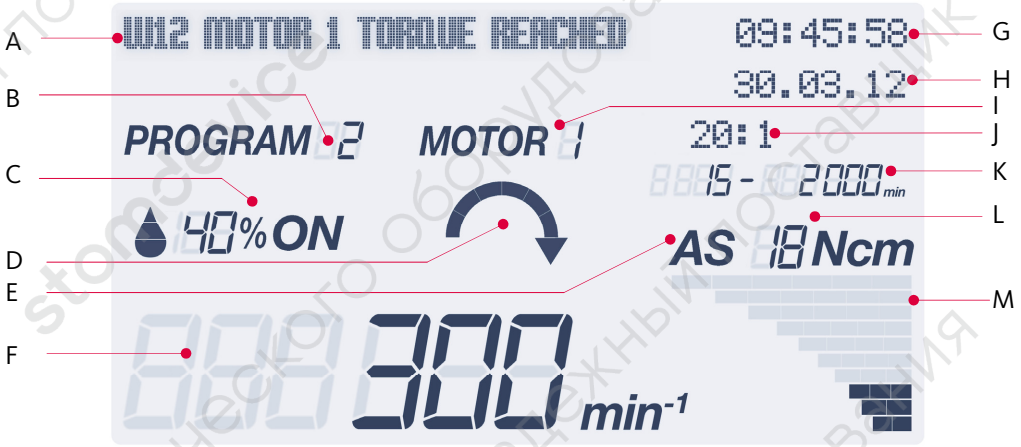
H) **“Torque” keys:**

- Restricts the maximum torque.
  “▲”: increases the maximum torque “▼”: reduces the maximum torque
- By pressing both “Torque” keys at the same time **“Torque ▲ + ▼”** the torque modes AL and AS are exchanged (see chapter “7.5 Torque limit function, AL mode (Automatic Limiter)” and chapter “7.6 Torque limit function, AS mode (Automatic Stopper)”).

I) **“Pump” keys:**

- Changing the pump flow rate that can be supplied using the pedal.
  “▲”: increases the maximum supply quantity “▼”: reduces the maximum supply quantity
- By pressing both “Pump” keys at the same time **“Pump ▲ + ▼”** the pump will be put on call, pressed again it will be switched off.

## 7.3 Overview: standard display




A) **Information Line**
Information and error messages are displayed here.

B) **Program**
Shows selected number of program for the active motor.

C) **Pump**
The numerical value shows the pump flow rate in percent and the drop symbol together with the on/off indication shows the if the pump is in stand-by mode or switched off.

D) **Rotational direction of the motor**
The arrow indicates the rotational direction set for the motor. The rotation direction can be changed by pressing the motor button "Ⓜ" on the pedal.

E) **AS/AL**
Indication of the Auto Stopper (AS) mode or the Automatic Limiter (AL) mode, (see chapter "7.5 Torque limit function, AL mode" and chapter "7.6 Torque limit function, AS mode").

F) **Current speed**
Shows current number of revolutions per minute of the motor.

G) **Clock**

H) **Date**

I) **Motor**
Shows selected motor → see also the green indicator light beside the motor sockets.

J) **Name of the handpiece or corresponding transmission ratio**
Shows name of the handpiece used or the selected transmission ratio. (See also 7.4.1, "Selecting the contra angle or transmission ratio")

K) **Speed range**
Shows speed range of the handpiece used.

L) **Maximum torque**
Shows setting of the maximum torque.

M) **Current torque**
Bar chart providing a graphical representation of the current torque.

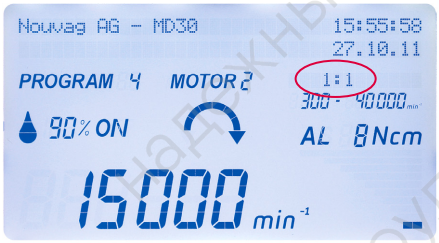
The pump does not begin to operate until the motor has been activated by pressing the pedal.

## 7.4 Adjusting the programs

Values for operation settings depend on the connected handpiece as well as the task to be performed.

### 7.4.1 Step 1: Selecting the handpiece or transmission ratio

Depending on the handpiece attached to the motor, the corresponding transmission ratio has to be adapted accordingly.




Press the “Handpiece” key repeatedly until the name of the required contra angle with the corresponding transmission ratio is shown on the display. Is the key pressed constantly the handpieces will be shown in fast forward mode.

| Name of the handpieces/contra angles with transmission ratio | Display | Speed min. rpm | Speed max. rpm | Torque min. Ncm | Torque max. Ncm | AS-range (Factory def.) rpm | Limit AS-Range rpm (*) |
|---|---|---|---|---|---|---|---|
| Drill contra angle, 1:5 | 1 : 5 | 1500 | 240,000 | 1 | 1 | No | – |
| Drill contra angle, 1:3 | 1 : 3 | 900 | 150,000 | 1 | 2 | No | – |
| Drill contra angle, 1:2 | 1 : 2 | 600 | 100,000 | 1 | 2 | No | – |
| Drill contra angle, 1:1 | 1 : 1 | 300 | 50,000 | 1 | 6 | No | – |
| Drill contra angle, 4:1 | 4 : 1 | 75 | 12,500 | 1 | 20 | up to 75 | 75 – 80 * |
| Drill contra angle, 16:1 | 16 : 1 | 20 | 3000 | 5 | 27 | up to 20 | 20 – 45 * |
| Drill contra angle, 20:1 | 20 : 1 | 15 | 2500 | 10 | 70 | up to 20 | 15 – 45 * |
| Drill contra angle, 32:1 | 32 : 1 | 10 | 1500 | 10 | 55 | up to 20 | 10 – 45 * |
| Drill contra angle, 70:1 | 70 : 1 | 5 | 700 | 10 | 55 | up to 20 | 5 – 45 * |
| Kirschner handpiece | Kirschner | 20 | 2800 | fixed 6 | | No | – |
| MSS 5000, Micro Compass Saw | Com. Saw | fixed 15,000 | | fixed 6 | | No | – |
| OMS 5000, Micro Oscillating Saw | Osc. Saw | fixed 15,000 | | fixed 6 | | No | – |
| MOS 5000, Micro Sagittal Saw | Sag. Saw | fixed 15,000 | | fixed 6 | | No | – |
| Mucotome | Mucotome | fixed 8000 | | fixed 6 | | No | – |

** The limitation of the AS-range (Automatic Stopper) can be adjusted in the configuration menu.*

Handpieces that don’t belong to ones own assortment can be deactivated in the configuration menu. That makes finding the right handpiece in the handpiece list easyer, because the list of available handpieces becomes shorter.

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### 7.4.2 Step 2: Calibrating handpieces

To make sure the displayed parameters correspond with the actual, measurable parameters of the handpiece, it is recommended to calibrate each handpiece prior use.

It's a procedure as simple as important to guarantee safety and precision of each handpiece being used.

After you took care of all prior preparations such as sterilization, maintenance and care of handpieces, device preparation and the selection of the handpiece of use, the calibration procedure can be performed.

Calibration of the handpieces guarantees for accurate torque. Due to tear and wear as well as varying lubrication of the handpieces and lack of maintenance and care the distribution of torque can vary widely.

1. Hold Motor with mounted handpiece in your hand in secure distance to your body.
2. Press both "Speed"-keys at the same time (Speed ▲ + Speed ▼).
3. Motor and handpiece start running and pass several speed cycles up to maximum speed.
4. After a tone is emitted and a message is displayed the calibration is finished.

### 7.4.3 Step 3: Setting the speed

The possible speed range depends on the attached handpiece. The maximum speed within this speed range can be restricted to the required value.
Using the pedal, the speed can be varied from the minimum speed up to the maximum speed as set.

**Setting the speed:**

Press the «Speed» keys **"▲"** to increase or **"▼"** to decrease the maximum speed. Is the key pressed constantly the speeds will be shown in fast forward mode.




The following handpieces run only with one specific speed, it cannot be changed. The specific rpm values of all handpieces are shown in the table of chapter 7.4.1.

- Micro Compass Saw MSS 5000
- Micro Oscillating Saw OMS 5000
- Micro Sagittal Saw MOS 5000
- Mucotom

### 7.4.4 Step 4: Setting the torque

Once the speed has been selected, the torque can be determined from the corresponding torque range. Depending on the speed, the torque modes AL or AS are applied.

For information on AL and AS mode, see Chapter “7.5 Speed reduction AL (Automatic Limiter)” and Chapter “7.6 Torque limit function: AS (Automatic Stopper)”

Press the “Torque” keys “▲” to increase or “▼” to decrease the maximum torque. By pressing the key continuously the torques are shown in fast forward mode.




The following handpieces run on fixed torque only (6 Ncm) and cannot be changed.

- Micro Compass Saw MSS 5000
- Micro Oscillating Saw OMS 5000
- Micro Sagittal Saw MOS 5000
- Kirschner Handpiece
- Mucotome

### 7.4.5 Step 5: Setting the pump supply quantity

Press the “Pump” keys “▲” to increase or “▼” to decrease the pump supply quantity. By pressing the key continuously the values are fast forwarded.




To activate or deactivate the pump, press both “Pump”-keys at the same time, “Pump ▲ + ▼”, or use the foot switch .

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## 7.5 Torque limit function, AL mode (Automatic Limiter)

The AL function limits the torque applied to the instrument, preventing of crack initiation and bone fracture.

The speed at the instrument remains constant until the preset torque is reached. If the applied force gets over this limit the speed will be reduced, if necessary down to a stop, but the torque remains constant. If the applied force will be reduced the speed picks up again.

On the display this procedure will be presented with a bar graph. The bars in the graph fill up to their full range, as the torque grows up to its preset value. If the bar graph shows full capacity the speed will be reduced. As soon as the force on the instrument will be reduced the torque decreases and the speed starts to pick up again as shown on the display.

The AL mode is at all speeds active, except at the speeds, where the AS mode takes effect.

## 7.6 Torque limit function, AS mode (Automatic Stopper)

The AS function limits the torque applied to the instrument. As soon as the preconfigured torque is reached, the electronic motor stops immediately. The electronic motor no longer generates any force. In order to restart the electronic motor, the treadplate must be released and pressed again.

On the display, the bar graph completes up to its full range, until the maximum torque is reached, than drops to zero.

The function “AS” is just active for certain handpieces and only in a certain speed range.

At the speed shown in the table at the right the AS-mode is activated automatically.

| Handpiece | 4:1 | 16:1 | 20:1 | 32:1 | 70:1 |
|---|---|---|---|---|---|
| Speed rpm: | 75 | 20 | 15 | 10 | 5 |

*The upper limit of the AS range can be adjusted in the configuration menu.*

In the following speed ranges the AS-mode can also be activated manually by pressing both torque keys **“Torque ▲ + ▼”** at the same time.

| Handpiece | 4:1 | 16:1 | 20:1 | 32:1 | 70:1 |
|---|---|---|---|---|---|
| From rpm: | 75 | 20 | 15 | 10 | 5 |
| To rpm: | 80 | 45 | 45 | 45 | 45 |

## 7.7 Storing various programs

With the MD 30, up to 10 different settings per motor can be set as fixed program (program 1 to program 10). Which program is currently active can be seen on the display.
At switch off, the settings made by user are automatically saved. This contains the following parameters:

- Handpiece/Transmission ratio
- Maximal speed
- Maximal torque
- Pump On/Off
- Pump performance
- AS/AL mode

To change a program go to the specific parameter and change it. At switch off the parameter is saved in that program.

The amount of storable programs can be limited in the configuration menu from 3 to 10 programs.

When the MD 30 is switched on, the display shows the prior used program and motor.

## 7.8 Configuration menu

In the configuration menu the user can customize the device after his favor. The parameters are organized in different levels. The following information and parameters are stored in there.

- Software version
- Mainboard serial number
- Date and Time
- Display illumination
- Number of programs
- Counter of operating hours MD 30
- Counter of operating hours Motor 1
- Counter of operating hours Motor 2
- Counter of operating hours of irrigation pump
- Error-messages (the last 8)
- Activation of available handpieces
- Speed limitation for each handpiece
- Range of action of AS mode
- Pump behavior
- Motor behavior for 4 different motors
- Reset to factory default

⚠ Precaution at changing parameters. Uncommon behavior of instruments, while operating, can provoke wrong reactions and jeopardize the patient.
Every setting and the new behavior of the instrument has to be verified and tested.

**Access to configuration menu:**

- Press **"Enter"**-key for 3 sec. until you hear a long tone.
  The right arrow **" > "** in the information line on the display indicates that you're in the configuration menu.
  - With **"Select ▲"** or **"Select ▼"** choose the desired parameter.
  - Push **"Enter"** to go to the sub menu.
  - To change the value press **"Select ▲"** or **"Select ▼"**
  - To confirm the changes made, press **"Enter"** for one sec., until you here a short tone.
  - To abort the made settings press **"Enter"** just shortly, the setting falls back to its previous value.
- To leave the configuration menu press **"Enter"** for 3 sec., until you hear the long tone.

## Parameter Level 1

| Group/Parameter | Rights | Factory | Definition |
|---|---|---|---|
| Software/Version | read | V1.05gP | Shows current software version |
| Hardware/Serialnumber MB | read | xxxxxxxxxx | Shows serial number of the main board |
| Date-Time/Date format US | read/write | no | Set to US Date format |
| Date-Time/Date | read/write | current | Change current date |
| Date-Time/Time | read/write | current | Change current time |
| Backlight/brightness (0. .10) | read/write | 9 | Display brightness, changeable: 0, ... , 10 |
| Programs/Number of programs | read/write | 10 | Number of activated Programs: 3, ... , 10 |
| Operating hours/MD 30 | read | 0 | Shows operating hours of MD 30 |
| Operating hours/Motor 1 | read | 0 | Shows operating hours of motor 1 |
| Operating hours/Motor 2 | read | 0 | Shows operating hours of motor 2 |
| Operating hours/Pump | read | 0 | Shows operating hours of pump |
| Error memory/ 1 – 8 | read | 0 | 8 Error messages in chronological order. |

# Parameter Level 2

**Values in Parameter Level 2 can only be adjusted after the password was entered.**
Required password: **9403** (Enter, Select ▲ or ▼, for fast forward or backward keep key pressed)

| **Handpiece activation** | Name of handpiece on display | Choice | Factory default | Definition |
|---|---|---|---|---|
| Handpiece existing/HP 01 | 1 : 5 | yes/no | no | Deselect handpieces that do not belong to your product range by switching to "no". This will later shorten the scrolling list for "Handpieces". Otherwise you will later have to scroll down the complete list of available handpieces, each time you select a handpiece.<br><br>*The password cannot be changed.* |
| Handpiece existing/HP 02 | 1 : 3 | yes/no | no | |
| Handpiece existing/HP 03 | 1 : 2 | yes/no | no | |
| Handpiece existing/HP 04 | 1 : 1 | yes/no | yes | |
| Handpiece existing/HP 05 | 4 : 1 | yes/no | yes | |
| Handpiece existing/HP 06 | 16 : 1 | yes/no | yes | |
| Handpiece existing/HP 07 | 20 : 1 | yes/no | yes | |
| Handpiece existing/HP 08 | 32 : 1 | yes/no | yes | |
| Handpiece existing/HP 09 | 70 : 1 | yes/no | no | |
| Handpiece existing/HP 10 | Com.Saw | yes/no | yes | |
| Handpiece existing/HP 11 | Osc.Saw | yes/no | yes | |
| Handpiece existing/HP 12 | Sag.Saw | yes/no | yes | |
| Handpiece existing/HP 13 | Mucotome | yes/no | yes | |
| Handpiece existing/HP 14 | Kirschner | yes/no | yes | |

| **Handpiece Max. Speed** | Name of handpiece on the display | Speed range rpm | Factory default | Definition |
|---|---|---|---|---|
| Handpiece max speed/HP 01 | 1 : 5 | 1500 – 240,000 | 200,000 | Limit the maximum speed of your handpieces according to your own experience. |
| Handpiece max speed/HP 02 | 1 : 3 | 900 – 150,000 | 150,000 | |
| Handpiece max speed/HP 03 | 1 : 2 | 600 – 100,000 | 100,000 | |
| Handpiece max speed/HP 04 | 1 : 1 | 300 – 50,000 | 50,000 | |
| Handpiece max speed/HP 05 | 4 : 1 | 75 – 12,000 | 12,000 | |
| Handpiece max speed/HP 06 | 16 : 1 | 20 – 2800 | 2800 | |
| Handpiece max speed/HP 07 | 20 : 1 | 15 – 2100 | 2100 | |
| Handpiece max speed/HP 08 | 32 : 1 | 10 – 1200 | 1200 | |
| Handpiece max speed/HP 09 | 70 : 1 | 5 – 700 | 700 | |
| Handpiece max speed/HP 10 | Com.Saw | fix 15,000 | 15,000 | |
| Handpiece max speed/HP 11 | Osc.Saw | fix 15,000 | 15,000 | |
| Handpiece max speed/HP 12 | Sag.Saw | fix 15,000 | 15,000 | |
| Handpiece max speed/HP 13 | Mucotome | fix 8000 | 8000 | |
| Handpiece max speed/HP 14 | Kirschner | 500 – 2800 | 2800 | |

| **AS-Zone for handpieces** | Handpiece on display | Speedrange ... to ... rpm | Factory default | Definition |
|---|---|---|---|---|
| Handpiece AS-Mode/HP 05 | 4 : 1 | 75 – 80 | 75 | Effective AS-range 75 – 80 rpm |
| Handpiece AS-Mode/HP 06 | 16 : 1 | 20 – 45 | 20 | Effective AS-range 20 – 45 rpm |
| Handpiece AS-Mode/HP 07 | 20 : 1 | 15 – 45 | 20 | Effective AS-range 15 – 45 rpm |
| Handpiece AS-Mode/HP 08 | 32 : 1 | 10 – 45 | 20 | Effective AS-range 10 – 45 rpm |
| Handpiece AS-Mode/HP 09 | 70 : 1 | 5 – 45 | 20 | Effective AS-range 5 – 45 rpm |

| Pump parameters | Range | Factory default | Definition |
|---|---|---|---|
| Pump/Backwards turn mode variable | No/Yes | Yes | Yes: Pump turns backwards after it's been switched off, to prevent spilling. |
| Pump/Way backwards | 1 – 100 % | 25 % | Specify how far the pump turns backwards |
| Pump/Speed backwards | 10 – 50 % | 33 % | Specify how fast the pump has to turn backwards to prevent spilling after switch off of handpiece. |
| Pump/Range 1 increment | 1 – 10 % | 5 % | Adjustment steps in section 1. |
| Pump/Range 1 end | 5 – 50 % | 10 % | Set the range where section 1 is active |
| Pump/Range 2 increment | 1 – 10 % | 5 % | Adjustment steps in section 2 |
| Pump/Range 2 end | 10 – 90 % | 50 % | Set the range where section 2 is active. |
| Pump/Range 3 increment | 1 – 10 % | 10 % | Adjustment steps in section 3 |
| Pump/Range 3 end | 20 – 100 % | 100 % | Set the range where section 3 is active. |

**The MD 30 can recognize the type of a plugged in motor. This enables the adaption of different motors and their save operation.**

| Motor type 1 | Range | Factory default | Definition |
|---|---|---|---|
| Motor type 1/Min. speed | 300 – 5000 rpm | 300 rpm | Set the min. speed of motor 2 |
| Motor type 1/Max. speed | 5000 – 50,000 rpm | 50'000 rpm | Set max. speed of motor 2 |
| Motor type 1/Start ramp | 1 – 1000 ms/10,000 rpm | 100 ms | Set acceleration time to 10'000 rpm |
| Motor type 1/Stop ramp | 1 – 1000 ms/10,000 rpm | 50 ms | Set breaking time from 10'000 – 0 rpm |

| Motor type 2 | Range | Factory default | Definition |
|---|---|---|---|
| Motor type 2/Min. speed | 300 – 5000 rpm | 300 rpm | Set the min. speed of motor 2 |
| Motor type 2/Max. speed | 5000 – 50,000 rpm | 50'000 rpm | Set max. speed of motor 2 |
| Motor type 2/Start ramp | 1 – 1000 ms/10,000 rpm | 100 ms | Set acceleration time to 10'000 rpm |
| Motor type 2/Stop ramp | 1 – 1000 ms/10,000 rpm | 50 ms | Set breaking time from 10'000 – 0 rpm |

| Motor type 3 | Range | Factory default | Definition |
|---|---|---|---|
| Motor type 3/Min. speed | 300 – 5000 rpm | 300 rpm | Set the min. speed of motor 2 |
| Motor type 3/Max. speed | 5000 – 50,000 rpm | 50'000 rpm | Set max. speed of motor 2 |
| Motor type 3/Start ramp | 1 – 1000 ms/10,000 rpm | 100 ms | Set acceleration time to 10'000 rpm |
| Motor type 3/Stop ramp | 1 – 1000 ms/10,000 rpm | 50 ms | Set breaking time from 10'000 – 0 rpm |

| Motor type 4 | Range | Factory default | Definition |
|---|---|---|---|
| Motor type 4/Min. speed | 300 – 5000 rpm | 300 rpm | Set the min. speed of motor 2 |
| Motor type 4/Max. speed | 5000 – 50,000 rpm | 50'000 rpm | Set max. speed of motor 2 |
| Motor type 4/Start ramp | 1 – 1000 ms/10,000 rpm | 100 ms | Set acceleration time to 10'000 rpm |
| Motor type 4/Stop ramp | 1 – 1000 ms/10,000 rpm | 50 ms | Set breaking time from 10'000 – 0 rpm |

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The torque maximum of the motor is for a short moment boosted at starts and at backwards turning.

| **Reverse torque** | Range | Factory default | Definition |
|---|---|---|---|
| Reverse torque/Increase | 5 – 30 % | 25 % | Increase of the selected torque at backwards turning. |
| Reverse torque/Increase time | 100 – 2000 ms | 500 ms | Time while the torque is raised. |

| **Resetting to factory default** | Choice | Factory default | Definition |
|---|---|---|---|
| Default value/Set default value | Yes/No | – | Resetting to factory defaults is performed by pressing both Select keys at the same time. “Select ▲ + ▼” |

**Attention:** With resetting to factory default all parameters will be reset to the factory default, therefore press both “Select”-keys at the same time (“Select ▲ + ▼”). Confirm by selecting “Yes”.

## 7.9 Operation using the Vario pedal




1. **Carry bracket**
   The carry bracket can be operated using your foot.
2. **Pump key**
   Pressing the key briefly: switches the pump on or off (see information on display).
   Pressing the key for longer: increases the pump speed (see information on display).
3. **Program key** Ⓟ
   Pressing the key briefly: switches the program (+1, see information on display).
   Pressing the key for longer: switches the program (-1, see information on display).
4. **Motor key** Ⓜ
   Pressing the key briefly: switches the rotational direction (see information on display).
   Pressing the key for longer: switches the motor (see also the indicator lights beside the motor sockets on the control unit).
5. **Treadplate**
   With the pedals treadplate the motor speed is variably adjusted and the pump is activated.

| Treadplate... | Motor: | Pump: |
|---|---|---|
| ... not pressed | Motor off | Pump off |
| ... pressed gently | Motor runs slowly | Pump on, if pump “On” displayed (speed as set on the control unit) |
| ... pressed all the way down | Motor runs at maximum speed (speed as set on the control unit) | Pump on, if pump “On” displayed (speed as set on the control unit) |

For safety reasons, the unit can only be operated by pedal.

The following handpieces run only with one specific speed, it cannot be changed.

- Micro Compass Saw MSS 5000
- Micro Sagittal Saw MOS 5000
- Micro Oscillating Saw OMS 5000
- Mucotom

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## 7.10 Functional check

Prior to MD 30 startup or use of accessory equipment, the user must always ensure that each individual component is in good working order, free from defects, and is clean, sterile and operational. Once the device is switched on, the most recent settings entered appear on the display and the green LED for motor 1 lights up.

### 7.10.1 Electronic motor

Use the “Speed” selection keys to set the speed of the electronic motor to 50,000 rpm. Press the pedal treadplate; the electronic motor starts up and accelerates to up to 50,000 rpm. When the treadplate is released, the electronic motor slows down again.

### 7.10.2 Pump

Press the pump key on the pedal briefly; the peristaltic pump is switched on. Press the pedal treadplate; the peristaltic pump and the electronic motor start up. Water sprays from the irrigation needle on the contra angle.

### 7.10.3 Rotational direction of the electronic motor

Press the motor key on the pedal briefly; the rotational direction of the electronic motor changes. Press the pedal treadplate; the electronic motor rotates to the left and a continuous tone is emitted. Release the treadplate; the electronic motor ceases to operate and the tone is no longer output.

### 7.10.4 Program

The required program can be set by repeatedly pressing the program key on the pedal.

# 8 Cleaning, disinfection and sterilization

The following points in particular are important with regard to caring for the material:

- Perform cleaning, disinfection and sterilization after every treatment.
- Always autoclave the material in sterilization packaging.
- Make sure that sterilization packaging is no more than 80 % full.
- Always autoclave the material at no more than 135°C.
- If sterilized material is not used immediately, the material packaging must be labeled with the sterilization date.
- Nouvag AG recommends including a sterility indicator.

## 8.1 Control unit and pedal

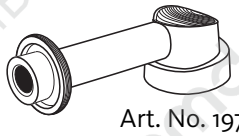
The control unit and pedal do not come into contact with the patient.
Wipe the outside using micro-biologically tested surface disinfectant or a 70 % isopropyl alcohol solution. The front plate of the control unit is sealed accordingly for this purpose and can be wiped clean.

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## 8.2 Electronic motor 21

| | |
|---|---|
| **Reprocessing restrictions** | Frequent reprocessing only has a limited impact on the electronic motor. The end of the product service life is normally determined by wear and tear and damage through use. Electronic motor 21 is designed for 250 sterilization cycles. |

| **INSTRUCTIONS** | |
|---|---|
| **At the location of use** | Remove surface soiling with a disposable cloth/paper towel. |
| **Storage and transport** | No special requirements. Due to the risk of drying and corrosion, reprocessing must be performed without undue delay. |
| **Preparation for cleaning** | Remove soiling from the electronic motor with a disposable cloth/paper towel.<br>Unscrew the motor cap, remove the cable and unscrew the handpiece carrier.<br> |
| **Automatic cleaning and disinfection** | Equipment: Washer-disinfector with a special load carrier that ensures that motors are connected to the washer-disinfector and that channels are rinsed. Rinse the motor from the front. Only use a neutral cleaning agent for this purpose.<br><br>Place the electronic motor in the load carrier (ensure that the channels can be rinsed).<br>Place the motor cap and cable, and handpiece holder, in the basket.<br>Set a cleaning cycle that offers sufficient cleaning and rinsing. Perform the final rinse with fully deionized water.<br>Perform a 10-minute rinse cycle at 93°C to facilitate thermal disinfection.<br>When removing the electronic motor, check the motor cap and cable, and handpiece holder, to verify whether soiling is still visible in the gaps and the grooves. If necessary, repeat the cycle or clean manually. |
| **Manual cleaning** | Equipment: Neutral cleaning agent, soft brush, running demineralized water (< 38°C)<br><br>Procedure:<br>Rinse off and brush away surface soiling on the electronic motor, motor cap and cable, and handpiece holder.<br>Use a brush to apply cleaning agent to all surfaces and gaps.<br>Rinse the electronic motor, motor cap and cable, and handpiece holder thoroughly under running water. |
| **Manual disinfection** | For manual disinfection, wipe the electronic motor, the motor cap and the plug and cable underneath it, and the handpiece holder with a certified non-chlorine disinfectant. |
| **Drying** | If a drying program is not provided by the washer-disinfector, the electronic motor must be dried manually or in a drying cabinet. The handpiece holder must then be screwed back onto the motor. |

| | |
|---|---|
| **Inspection and maintenance**<br><br>Art. No. 1974 | Perform a visual inspection to check for damage, corrosion, wear and tear. Connect Motor with the spray nozzle (Art. No. 1974) by screwing it on and spray motor for about 3 seconds and briefly wipe with a moist cloth (see instructions on spray can). Once thorough spraying has been completed, screw the cable and motor cap back onto the electronic motor.<br> |
| **Packaging** | Individual: Pack the electronic motor in individual packaging for sterile items. The bag must be large enough to ensure that the seal is not subject to strain. Nouvag AG recommends including a sterility indicator.<br><br>Sets: Sort electronic motors on trays intended for this purpose or place them on all-purpose sterilization trays. |
| **Sterilization**  | Autoclave in the vacuum autoclave (Class B or S as per EN 13060) at a maximum of 135°C for at least 5 minutes*. When sterilizing several instruments during one sterilization cycle, do not exceed the maximum sterilizer load. A drying cycle must be added in the case of autoclaves without a post-vacuum function. Allow the electronic motor to dry in the bag for at least 1 hour at room temperature with the paper side facing upwards.<br><br>* Temperature exposure times are based on country-specific guidelines and standards. Maximum exposure time: 25 minutes. |
| **Storage** | If the sterilized electronic motor is not used immediately after sterilization, the material packaging must be labeled with the sterilization date. Including a sterility indicator is recommended. |

The effectiveness of the sterilization instructions provided above for electronic motor 21 and the handpiece has been validated by Nouvag AG. The user is responsible for ensuring that the sterilization procedure performed achieves the required result. This requires validation and routine monitoring of the procedure. The staff member who completes the procedure bears sole responsibility for any deviation on his part from the instructions provided. Deviations require revalidation of the effectiveness of the procedure as well as of the technical resilience of the motor with regard to the modified sterilization process.

## 8.3 Tubing set, Art. No. 1706 and Art. No. 6025

Single-use tubing sets 1706 and 6025 may not be reused.
Tubing sets must be disposed of properly after use.

Sterility cannot be guaranteed by reusing and re-sterilization of tubing sets. The characteristics of the material change in a manner that can result in failure of the system. Consequences can be serious infections and worst case the death of the patient.

## 8.4 Handpiece cradle

Soiled handpiece cradles are cleaned using a household cleaning agent and then sterilized in accordance with the same instructions as for electronic motor 21.

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# 9 Maintenance

## 9.1 Replacing the control unit fuse

Users can replace faulty control unit fuses themselves. These are located at the rear of the device in the fuse slot beside the power switch:

- Unplug the power plug.
- Open the fuse slot using a screw driver.
- Replace the faulty fuse T 3.15 AL 250 V AC.
- Slide the fuse holder back in and close the fuse slot.
- Check the mains voltage shown on the fuse slot.
- Plug in the power plug again.




1. Fuse slot locking mechanism
2. Display window for voltage setting
3. Fuse slot
4. Fuse 1
5. Fuse 2

## 9.2 Safety inspections

The performance of safety inspections on medical devices is required by the legislation of several countries. The safety inspection is a regular safety check that is compulsory for those operating medical devices. The objective of this measure is to ensure that device defects and risks to patients, users or third parties are identified in good time.

An inspection interval of **2 years** applies for MD 30.

NOUVAG AG offers a safety inspection service for its customers. Please contact our technical service department.

## 9.3 Information on disposal

When disposing of the device, device parts and accessories, the regulations prescribed by law must be observed. To ensure environmental protection, old devices can be returned to the dealer or manufacturer.



Motors that have reached the end of their service life must be sterilized before disposal.



Contaminated single-use tubing sets are subject to specific disposal requirements. Please observe prevailing national disposal regulations.

# 10 Malfunctions and troubleshooting

| Malfunction | Cause | Solution | Refer to the operating instructions |
|---|---|---|---|
| **Device is not operational** | Control unit not switched on | Set the power switch “I/O” to “I” | 7.1 Switching the device on and off |
| | Power connection not established | Connect the control unit to the mains power supply | 6.1. Connection to the power supply |
| | Incorrect operating voltage | Check the mains voltage | 6.1. Connection to the power supply |
| | Faulty fuse | Replace the fuse | 9.1 Replacing the control unit fuse |
| **Motor does not run** | Motor not switched on | Switch on the motor using the treadplate | 7.9 Operation using the Vario pedal |
| | Incorrect motor active | Switching to the other motor, using the Vario pedal | 7.9 Operation using the Vario pedal |
| | Motor not connected | Connect the motor cable to the control unit | 5.0 Device overview<br>6.1 Connection to the power supply |
| | Handpiece or contra angle not correctly assembled | Press the handpiece firmly onto the electronic motor until it clicks into position and check that it is secure by moving it slightly in the opposite direction. | 6.2 Device preparation |
| **No irrigation fluid for instrument** | Peristaltic pump not switched on | Switch on the peristaltic pump | 7.9 Operation using the Vario pedal |
| | Tubing set incorrectly inserted | Insert tubing set correctly (note the direction) | 6.2 Device preparation |
| | Tubing set clogged / crusted matter visible | Replace the tubing set | 6.2 Device preparation |
| | Bottle with sodium chloride solution not ventilated | Open the ventilation filter at the drip chamber | 6.2 Device preparation |
| | Tubing set is dripping | Replace the tubing set | 6.2 Device preparation |
| | Roller clamp of tubing set is closed | Open roller clamp all the way | 6.2 Device preparation |
| **Pedal is not operational** | Pedal not connected | Connect the pedal to the control unit | 6.2 Device preparation |
| | Incorrect operation | Check operating instructions | 7.9 Operation using the Vario pedal |

*If a fault cannot be rectified, please contact your supplier or an authorized service centre. The addresses are provided on the last page of the operating instructions.*

# 11 Spare parts list with order numbers

| **Accessories** | **Art. no.** |
|---|---|
| Clip set large CL, for attachment to the handpiece, package with 3 pieces | 1881 |
| Clip set motor cable, for attachment to the motor cable, package with 10 pieces | 1873 |
| Single-use tubing set, 2 m, sterile, 10-unit pack | 1706 |
| Single-use tubing set with integrated 3 way cock, 2 m, sterile, 10-unit pack | 6025 |
| Y-connector, for branching tube set for internal and external cooling | 1777 |
| Internal cooling nozzle for drilling handpieces with latch system | 1712 |
| Internal cooling nozzle clip for drilling handpieces with push button system | 39116 |
| Irrigation fluid, 0.9 % sodium chloride, 1 liter | 1707 |
| Nou-Clean clean and care spray | 1984 |
| Spray nozzle attachment for surgical instrument e-coupling | 1958 |
| Spray nozzle attachment for electronic motor 21 | 1974 |

**To order additional parts, please contact our customer service department.**