Instructions for use
HealOzone 2130 C

Always be on the safe side.
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1 User notes

1.1 Service

Service hotline:
++ 49 (0) 7351 56-2500
Service.Einrichtungen@kavo.com
Please indicate the product serial number in all requests.
Additional information can be obtained at: www.kavo.com
1.2 User guidelines

**Requirement**
Read these instructions before the initial startup to prevent misuse and damage.

### 1.2.1 Abbreviations

<table>
<thead>
<tr>
<th>Short form</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>GA</td>
<td>Instructions for use</td>
</tr>
<tr>
<td>PA</td>
<td>Care instructions</td>
</tr>
<tr>
<td>MA</td>
<td>Assembly instructions</td>
</tr>
<tr>
<td>TA</td>
<td>Technician's instructions</td>
</tr>
<tr>
<td>STK</td>
<td>Safety check</td>
</tr>
<tr>
<td>IEC</td>
<td>International Electrotechnical Commission</td>
</tr>
<tr>
<td>RA</td>
<td>Repair instructions</td>
</tr>
<tr>
<td>EMC</td>
<td>Electromagnetic compatibility</td>
</tr>
</tbody>
</table>

### 1.2.2 Target group

This document is for dentists and office personnel.
1.3 Warranty terms and conditions

For the product cited in the transfer protocol, KaVo warrantees the end customer that the product will function properly, have no material or manufacturing flaws for 12 months from the date of purchase under the following conditions:

In the case of valid complaints due to defects or a short delivery, KaVo will make good its warranty by replacing the product free of cost or repairing it according to your wishes. All other claims of any kind are excluded, especially claims for damages. In case of delayed performance, gross negligence or criminal intent, this shall apply only if there are no compelling legal regulations to the contrary.

KaVo is not liable for defects and their consequences that arise from natural wear, improper cleaning or servicing, the non-observance of instructions for use, servicing or connection, scale formation or corrosion, impurities in the air and water supply, or chemical or electrical influences that are unusual or impermissible according to the manufacturer’s specifications.

The warranty does not generally extend to lamps, glassware, rubber parts and the colour fastness of plastic parts.

No liability is assumed when defects or their consequences can arise from manipulations or changes to the product by the customer or a third party.

Claims from this warranty can only be asserted when the transfer protocol (copy) belonging to the product has been sent to KaVo, and the original can be presented by the operator or user.
1.4 Transportation and storage

1.4.1 Packaging ordinance of August 28, 1998

Note
Only applicable for the Federal Republic of Germany.

KaVo transport packaging must be disposed of and recycled by local disposal service providers and recycling companies in accordance with Dual System requirements.
For more information about disposal and recycling, and an up-to-date list of local disposal service providers and recycling companies, please visit the following Internet sites:
http://www.umweltdatenbank.de
http://www.quality.de
KaVo will bring KaVo transport packaging returned by the customer at the customer’s own cost to the appropriate recycling companies without reimbursement.

1.4.2 Transportation damage

Outside of Germany

Note
KaVo is not liable for damage arising from transportation.
Immediately inspect the delivery after receipt!

If external damage to the packaging is visible upon delivery, follow the procedure below:
1. The recipient must record the loss or damage in the notice of delivery. The recipient and employee of the transportation firm must sign the notice of delivery. The recipient can only assert damages against the transportation company based on these records.
2. Leave the product and packaging unchanged.
3. Do not use the product.

If the product is damaged and there is no discernable damage to the packaging upon delivery, proceed as follows:
1. Report the damage immediately or at least 7 days after the delivery to the delivery company.
2. Leave the product and packaging unchanged.
3. Do not use a damaged product.

Note
If the recipient does not follow one of the above instructions, the damage will be held to have occurred after the delivery (according to CMR law, section 5, Art. 30).
### 1.4.3 Storage

**Note**

Keep the packaging for returning the product for service or repairs.

The symbols printed on the outside are for transportation and storage, and have the following meaning:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Transport upright" /></td>
<td>Transport upright with the arrows pointing upwards</td>
</tr>
<tr>
<td><img src="image" alt="Fragile" /></td>
<td>Fragile - protect against knocks</td>
</tr>
<tr>
<td><img src="image" alt="Keep dry" /></td>
<td>Keep dry</td>
</tr>
<tr>
<td><img src="image" alt="Maximum permitted stacking load" /></td>
<td>Maximum permitted stacking load</td>
</tr>
<tr>
<td><img src="image" alt="Temperature range" /></td>
<td>Temperature range</td>
</tr>
<tr>
<td><img src="image" alt="Humidity" /></td>
<td>Humidity</td>
</tr>
<tr>
<td><img src="image" alt="Air pressure" /></td>
<td>Air pressure</td>
</tr>
</tbody>
</table>
2 Safety

2.1 Explanation of safety symbols

2.1.1 Warning symbol

The introduction describes the type and source of the hazard. This section describes the potential consequences of non-observance. The optional step contains necessary measures for avoiding hazards.

2.1.2 Structure

CAUTION indicates a hazardous situation that can lead to property damage or minor to moderate injury.

WARNING indicates a hazardous situation that can lead to serious injury or death.

DANGER indicates a maximum hazardous situation that can directly cause serious injury or death.

2.1.3 Description of hazardous steps

Safety instructions with three hazard levels are used in this document for avoiding personal and property damage.
2.2 Intended purpose

2.2.1 Electromagnetic transmissions

The HealOzone 2130 C is for use in an environment like the one cited below. The operator of the HealOzone 2130 C must ensure that it is operated in such an environment.

<table>
<thead>
<tr>
<th>Measurements of noise transmissions</th>
<th>Conformance</th>
<th>Electromagnetic environment - guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF transmissions according to CISPR 11</td>
<td>Group 1</td>
<td>The HealOzone 2130 C uses HF energy only for its internal operation. Its HF transmission is therefore very low, and it is improbable that neighbouring electronic devices will be disturbed.</td>
</tr>
<tr>
<td>HF transmissions according to CISPR 11</td>
<td>Class B</td>
<td>Die HealOzone 2130 C is for use in all facilities included residential ones, and facilities that are directly connected to a public power supply that also supplies residential buildings.</td>
</tr>
<tr>
<td>Transmission of harmonics according to IEC 61000-3-2</td>
<td>Class A</td>
<td>dito</td>
</tr>
<tr>
<td>Transmission of voltage fluctuations or flicker according to IEC 61000-3-3</td>
<td>Conforms</td>
<td>dito</td>
</tr>
</tbody>
</table>
## Table 2

<table>
<thead>
<tr>
<th>Immunity tests</th>
<th>IEC 60601 test level</th>
<th>Conformance level</th>
<th>Electromagnetic environment - guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrostatic discharge (ESD) according to IEC 61000-4-2</td>
<td>± 6 kV contact discharge ± 8 kV air discharge</td>
<td>± 3 kV contact discharge ± 8 kV air discharge</td>
<td>Floors should be made of wood or concrete or have ceramic tiles. When the floor is made of synthetic material, the relative humidity must be at least 30%.</td>
</tr>
<tr>
<td>Fast transient electrical disturbances/ Bursts according to IEC 61000-4-4</td>
<td>± 2 kV for power lines ± 1 kV for input and output lines</td>
<td>± 2 kV for power lines</td>
<td>The quality of the supply voltage should correspond to that of a typical business or hospital environment.</td>
</tr>
<tr>
<td>Surges according to IEC 61000-4-5</td>
<td>± 1 kV normal mode voltage ± 2 kV common-mode voltage</td>
<td>± 1 kV push-pull voltage ± 2 kV common-mode voltage</td>
<td>The quality of the supply voltage should correspond to that of a typical business or hospital environment.</td>
</tr>
<tr>
<td>Voltage interruptions, short-term interruptions and fluctuations of the supply voltage according to IEC 61000-4-11</td>
<td>&lt; 5% V (&gt; 95% drop in the VT for ½ period 40% V (60% drop in the VT for 5 periods 70% V(30% drop in the VT for 25 periods &lt; 5% V(&gt; 95% drop in the VT for 5 s (250 periods)</td>
<td></td>
<td>The quality of the supply voltage should correspond to that of a typical business or hospital environment. When the user of the HealOzone 2130 C needs continued operation even when the power supply is interrupted, it is recommended to supply the HealOzone 2130 C from an uninterrupted power supply or a battery.</td>
</tr>
<tr>
<td>Magnetic field with a supply frequency (50/60 Hz) according to IEC 61000-4-8</td>
<td>3 A/m</td>
<td></td>
<td>Magnetic fields at the mains frequency should correspond to typical values in a business and hospital environment.</td>
</tr>
</tbody>
</table>

NOTE: VT is the alternating mains voltage before the test level is used.
### 2 Safety | 2.2 Intended purpose

#### Table 3

<table>
<thead>
<tr>
<th>Immunity tests</th>
<th>IEC 60601 test level</th>
<th>Conformance level</th>
<th>Electromagnetic environment - guidelines</th>
</tr>
</thead>
</table>
| Conducted HF disturbances according to IEC 61000-4-6| 3 V\text{eff} 150 kHz to 80 MHz outside of ISM bands\(^a\) | 10 V\text{eff}  | Portable and mobile radio devices should not be used closer to the HealOzone 2130 C including the electrical lines than the recommended safe distance calculated using the equation for the transmission frequency. Recommended safe distance: \(d=0.35 \sqrt{P}\) for 80 MHz to 800 MHz, \(d=0.70 \sqrt{P}\) for 800 MHz to 2.5 GHz with \(P\) as the maximum rated power of the transmitter in Watts (W) according to the transmitter manufacturer, and \(d\) as the recommended safe distance in meters (m).\(^b\) The field strength of stationary radio transmitters should be less than the conformance level at all frequencies in an on-site check\(^a\).\(^c\) Disturbances are possible close to devices that have the following symbol.\(^d\) NOTE: At 80 MHz and 800 MHz, the higher frequency range applies. NOTE 2: These guidelines may not be applicable in every case. The spread of electromagnetic waves is absorbed and reflected by buildings, objects and people. \(^a\)The ISM frequency bands (for industrial, scientific and medical applications) between 150 kHz and 80 MHz are 6.765 MHz to 6.795 MHz; 13.553 MHz to 13.567 MHz; 26.957 MHz to 27.283 MHz and 40.66 MHz to 40.70 MHz. \(^b\)The conformance levels in the ISM frequency bands between 150 kHz and 80 MHz and the frequency range of 80 MHz and 2.5 GHz are intended to reduce the probability that mobile and portable communications equipment will produce disturbances when they are unintentionally brought near the patient. For this reason, the additional factor of 10/3 is used when calculating the recommended safe distances within these frequency ranges. \(^c\)The field strength of stationary transmitters such as base stations of mobile telephones and land mobile radio devices, amateur radio stations, AM and FM, radio and television broadcasters cannot be theoretically predetermined. To determine the electromagnetic environment of stationary transmitters, a study of the location should be considered. When the measured field strength at the site where the HealOzone 2130 C is used exceeds the above conformance level, the HealOzone 2130 C should be monitored to demonstrate proper function. When unusual performance features are observed, additional measures may be necessary such as realigning or moving the HealOzone 2130 C. \(^d\)Within the frequency range of 150 kHz to 80 MHz, the field strength should be less than 3V\text{eff} V/m.
2.2.2 General

The user must ensure that the device works properly and is in a satisfactory condition before each use.

During use, national legal regulations must be observed, in particular:
- the applicable health and safety regulations.
- the applicable accident prevention regulations.

Apply and meet the overarching guidelines and/or national laws, national regulations and the rules of technology for medical devices applicable for startup and use of the KaVo product for the intended purpose.

Note
The waste that arises must be recycled or disposed of in a manner safe for humans and the environment. Observe the applicable national regulations. Please direct all questions regarding the proper disposal of KaVo products to the nearest KaVo branch.
2.2.3 Product-specific

**Risks from electromagnetic fields.**
The functions of implanted systems (such as pacemakers) can be influenced by
electromagnetic fields.
▶ Ask patients before treatment.

HealOzone is intended for the treatment of tooth substance. HealOzone treatment
disables bacteria on teeth, inside dentine and in the root canal.

Indications:
• Fissure caries
• Root caries, smooth caries, hypersensitive cervical areas
• Open, carious lesions in connection with additional conservative measures
• Prophylactic measures for fissures and smooth surfaces
• Endodontic treatments

See also: Application manual for Healozone.

For up-to-date information about research and clinical use, please visit

**Note**
According to the EC Directive 2002/96 concerning electrical and electronic used
devices, this product is subject to the cited directive and must be disposed accord‐
ingly within Europe.

Before disassembling and disposing of the product, it must be completely proces‐
sed (disinfected, sterilised) according to the section "Preparation methods".
Additional information can be obtained from KaVo (www.kavo.com) or your dental
supplier.

**Electromagnetic compatibility**

**Note**
Based on EN 60601-1-2:2001 concerning the electromagnetic compatibility of
electromedical devices, we need to point out that:
• Medical electrical devices are subject to special measures regarding electroma-
gnetic compatibility and must be operated in accordance with KaVo assembly
instructions.
• Portable and mobile high-frequency communications devices can influence med-
dical electronics.
• More information on the technical description of EMC can be obtained upon re-
quest.
Damage from unsuitable accessories
The use of other accessories, transformers and lines than those indicated (with the exception of transformers and lines that KaVo sells as replacement parts for internal components) can increase transmission or reduce the electromagnetic immunity of the product.

- Only use accessories recommended by KaVo.

Note
KaVo cannot guarantee that accessories, lines and transformers not delivered by KaVo will correspond with EMC requirements of EN 60601-1-2:2001.

Contraindications
The treatment of open wounds in soft tissue with exposed pulp has not been clinically investigated and is therefore not permitted.

See also: Application manual for Healozone.
2.3 Safety instructions

2.3.1 Product-specific

The KaVo product is not permitted to be used in areas subject an explosion hazard.

Ozone is a colourless gas with a pungent odour. A low level of ozone is generated by photocopiers and laser printers during normal usage. The human nose can detect it in fresh air at a concentration of less than 0.01ppm. Research has shown that long-term exposure of the respiratory tracts to a 0.1ppm concentration of ozone represents a health hazard.

Note
If the device is damaged, for example by falling, it may on be used again after a technician authorised by KaVo has checked it. This also holds true even when the housing is not damaged.

Proper maintenance and servicing of the HealOzone unit will ensure that the respiratory tracts are not exposed to ozone. Proper use of the unit will ensure that neither the dentist nor the patient is exposed to an excessive concentration of ozone.

If a strong ozone smell arises from the device, the treatment must be stopped immediately, and the device must be checked by a KaVo technician or a special technician trained by KaVo.

Danger to health from inhaling large amount of ozone
Respiratory difficulty and arrest can occur.
- Immediately bring the affected person into fresh air.
- If breathing stops, provide artificial respiration.
- When breathing is difficult, properly trained personal must supply the affected person with 100% oxygen.
- Keep the victim warm and calm.
- Consult a doctor as soon as possible.

Note
Treatment with KaVo HealOzone has no known side effects.
3 Product description

3.1 HealOzone 2130 C

① HealOzone unit
   Mat. no. 1.000.0100
② Straight handpiece 2131 C plus
   Mat. no. 1.002.5320
③ Footswitch
   Mat. no. 1.000.2356
④ Instrument tubing
   Mat. no. 1.002.7070
⑤ Mains cable (country-specific)

Note
Starting with software version 3.10, the KaVo HealOzone can be used for endodontic treatment.

See also: 5.2.1 Start sequence, Page 33
3.2 Straight handpiece 2131 C plus

① Handpiece ② Endodontics cannula
3.3 Rating plate

---

**Approved for USA/Canada**

**CE mark according to 93/42/EEC medical device**

*Note: observe accompanying documents and safety instructions*

**Application part: type B**

**Nemko mark of conformity**

**Mode: exposure mode**

- Operating time: 3 minutes
- Pause time: 7 minutes

**Fuse rated value**

<table>
<thead>
<tr>
<th>30VA</th>
<th>Degree of protection IP 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>115V: 100-120V 50/60Hz</td>
<td>Device supply voltages</td>
</tr>
<tr>
<td>230V: 230V 50/60Hz</td>
<td></td>
</tr>
<tr>
<td>REF: 1.000.0100</td>
<td>Mat. number</td>
</tr>
<tr>
<td>SN: XXXXXX</td>
<td>Serial number</td>
</tr>
<tr>
<td>Type: 2130 C</td>
<td>Device type</td>
</tr>
<tr>
<td>2006-04</td>
<td>Date of manufacture</td>
</tr>
</tbody>
</table>
### 3.4 Technical data

#### Dimensions and weights

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>260 mm</td>
</tr>
<tr>
<td>Depth</td>
<td>270 mm</td>
</tr>
<tr>
<td>Height</td>
<td>370 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>8 kg</td>
</tr>
</tbody>
</table>

#### Electricity supply

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>100 - 120 V</td>
</tr>
<tr>
<td></td>
<td>230 V</td>
</tr>
<tr>
<td>Power rating</td>
<td>30 VA</td>
</tr>
<tr>
<td>Frequency</td>
<td>50/60 Hz</td>
</tr>
</tbody>
</table>

#### Ambient conditions during treatment

<table>
<thead>
<tr>
<th>Condition</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permissible for interior use</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature range</td>
<td>10 - 40°C</td>
</tr>
<tr>
<td>Max. relative humidity</td>
<td>80 %</td>
</tr>
</tbody>
</table>

#### Operating mode

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating time</td>
<td>3 min</td>
</tr>
<tr>
<td>Interval</td>
<td>7 min</td>
</tr>
</tbody>
</table>

#### Classification

<table>
<thead>
<tr>
<th>Classification</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection class</td>
<td>I</td>
</tr>
<tr>
<td>Application part</td>
<td>Type B</td>
</tr>
<tr>
<td>Protection category</td>
<td>IP 20</td>
</tr>
</tbody>
</table>

#### Fuse

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>250 V</td>
</tr>
<tr>
<td>Rated current</td>
<td>0.63 A</td>
</tr>
<tr>
<td>Trigger characteristics</td>
<td>T</td>
</tr>
<tr>
<td>Breaking capacity</td>
<td>L</td>
</tr>
</tbody>
</table>
### Transportation and storage conditions

<table>
<thead>
<tr>
<th></th>
<th>min.: - 30°C, max.: +80°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td></td>
</tr>
<tr>
<td>Humidity</td>
<td>min.: 5%, max.: 95%</td>
</tr>
<tr>
<td>Air pressure</td>
<td>min.: 700, max.: 1060 hPa</td>
</tr>
</tbody>
</table>
3.5 Purpose and Applications

Ozone is a special gas produced by the HealOzone unit. It is highly effective at killing the bacteria that cause caries both on the surface of the tooth and inside it.

![Diagram of HealOzone system components]

- ① Ozone generator
- ② Differential pressure sensor
- ③ Air dryer cartridge
- ④ Vacuum pump
- ⑤ Ozone neutraliser
- ⑥ Moisture trap
- ⑦ Hose
- ⑧ Handpiece
- ⑨ Silicone cap

The HealOzone treatment system is a medical electronic device. It consists of an ozone generator ① and a handpiece ⑧ with a disposable sealing cap ⑨ that is connected via an instrument hose ⑦ to the device. It was developed to apply ozone via the handpiece to the surface of the carious tooth to treat the carious lesions. In clinical tests, it has been demonstrated that the HealOzone system can reverse fissure caries and primary root caries lesions.
The HealOzone unit required high voltage to generate ozone from the air that has been previously guided through the air drier ③. A vacuum conducts the ozone through the handpiece into the silicone cap. The ozone is drawn out of the silicone cap and led through an ozone neutraliser ⑤ that converts the ozone into oxygen. A liquid pH balancer is subsequently applied.

3.5.1 pH balancer

Cut off the tip of the pH balancer ampoule Mat. no. 1.002.3718, apply a few drops on the site treated with ozone, and then let it act for 10 seconds. The pH balancer contains citric acid for conditioning the surface and creating the optimum pH. This prepares the surface for applying the fluoride that is another ingredient. Xylitol, another ingredient, has a bactericidal effect.

3.5.2 Patient Kit

To encourage remineralisation, there is a Patient Kit ⑫ Mat. no. 1.002.1547 for patients to use at home.
4 Commissioning

Note
Save the box and all other packaging material - you will need it when sending the equipment away for servicing.

4.1 Preparations

4.1.1 Install air dryer

The HealOzone unit needs dry air to create ozone. Desiccant is used to dry the ambient intake air. An air dryer is supplied with the system as standard.

Note
Desiccant is available from dental suppliers.

- Remove stopper ① from the air dryer and dispose of it.

Note
The arrow ② must be pointing in the direction of flow (towards air dryer).

- Pour the supplied desiccant into the air drier.

See also: 7.2.3 Replace desiccant, Page 48

- Snap air dryer into holder ③.

- Fit the end of the tubing ④ onto the lower connection piece.
4.1.2 Install moisture trap

Saliva and other liquids collect in the moisture trap that are drawn by the system vacuum into the handpiece. The prevents the ozone neutraliser from soiling.

**Note**
Ten moisture traps are supplied with the system as standard. Extra moisture traps are available from dental suppliers.

- Remove moisture trap from packaging and fasten the screw cap on the end of the tubing onto the thread marked ①.

- Fit the other tubing end on the connection piece marked ②.
4.2 Connections

4.2.1 Connect up the handpiece and instrument tubing

The handpiece and instrument tubing are equipped with a quick coupling.

**Note**
The coupling at the end of the tubing is identical and can be connected in both directions.

- Make sure there is an O-ring on the coupling and that it is undamaged.
- Grease the coupling O-ring with silicone grease Mat. no. 1.000.6403.
- Fit handpiece onto coupling, making sure that it snaps in place.
- Give the handpiece a gentle tug to check it is securely in place.
4.2.2 Connect the instrument tubing to the unit

**Note**
Make sure there is an O-ring on the coupling and that it is undamaged.

- Push the tubing connector into the quick coupling of the console until it snaps in place.

- Give the tubing a gentle tug to check it is securely in place.
4.2.3 Attach silicone cup

Note
The silicone cap must be seated precisely in the groove to provide the seal required for treatment.

- Before commencing treatment, fit the silicone cap over the groove on the head of the handpiece.
### 4.2.4 Connect footswitch

**Note**
The footswitch is optional. The unit can be operated without it.

- Insert the footswitch flex into the plug-fit connection on the reverse of the unit.
4.2.5 Electrical connection

**Note**
The unit is supplied with a country-specific mains cable as standard.

▶ Check the configured mains input voltage.

The voltage selector is on the rear of the device. The possible settings on the voltage selector are 115 V and 230 V. The device is set in the factory to a mains voltage of 230 VAC, 50/60 Hz. Check this setting and change it to the existing supply voltage if necessary.

▶ Plug in inlet connector at the reverse of the HealOzone unit.

▶ Plug end of cable into a socket.

**Note**
The socket outlet must be properly grounded and meet the respective national guidelines. For North America, a hospital grade socket outlet is required.

The system is now ready for use and can be switched on at the unit's main switch.
4.2.6 Service interface

Use of the service interface ① is permitted for KaVo-trained personnel only.
5 Operation

5.1 Functional description

When the unit is switched on, it first runs through a start sequence which includes a self test on the start screen. If a fault is detected, an error message will appear, informing you of this. If this occurs, treatment cannot be carried out. If a warning message is displayed, the problem must be remedied as swiftly as possible. To continue using the unit, you must acknowledge the warning. If the self test completes without errors, the system switches to the main menu (Waiting for start).

In the main menu, the device waits until the start button is pressed or the footswitch is used to start the device. After the start has been triggered, the pump is turned on. In this state, the system waits until the flow sensor is active, i.e., until the air circuit is closed and the actual treatment can start. If a seal cannot be established, the process is terminated after a set period. A warning is emitted. The warning can be acknowledged by pressing any button or the footswitch so that the system can be restarted.

If a closed air circuit cannot be recognised after the pump starts, the devices switches to the “dry” status. When the flow is active, the current moisture is checked. Any moisture in the system components is removed. If drying takes a while, it is shown on the display and reported acoustically with a double buzzer tone. If the assigned moisture level is not reached within a specific timeframe, the pump turns off. The warning “Desiccant used up” is displayed.

See also:
7.2.2 Sensor/counter mode, Page 47
7.2.3 Replace desiccant, Page 48
If the measured current moisture is below the assigned moisture level, the device switches directly to "Treatment" status. For treatment, the ozone generator is turned on, and the setpoint for the generator is output. If it takes a while to generate ozone, "Generate ozone" is shown on the display and reported acoustically with a double buzzer tone. If ozone cannot be generated within 60 seconds, the warning "Ozone generation not successful" is output. The message can be acknowledged with any button, and the treatment process can be restarted. If the ozone is successfully generated, treatment is started. The treatment time is counted backwards in seconds and shown on the display. A buzzer sounds every second during treatment. Once the treatment time is over, the device switches to rinse status. The end of treatment is reported by a long buzzer tone.
5.2 The treatment procedure

**Note**
The cycle can be stopped at any point by pressing the stop button or footswitch.

### 5.2.1 Start sequence

When the unit is switched on, it first runs through a start sequence which takes approximately five seconds. Once this is complete, the main menu appears automatically.

**Screen information:**
- Device name
- Software version and date
- Set drier servicing
  - S = sensor monitoring
  - C = counter monitoring

### 5.2.2 Main menu

The treatment time can be changed in incremental steps within the set thresholds using the plus or minus button.

<table>
<thead>
<tr>
<th>Increments:</th>
<th>10 seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum:</td>
<td>20 seconds</td>
</tr>
<tr>
<td>Maximum:</td>
<td>60 seconds</td>
</tr>
</tbody>
</table>

To start treatment, press the Start button or the footswitch.

**Screen information:**
- Treatment time
- Ready to start

### 5.2.3 Choose operating mode

- In the main menu, press the Set button.
  Operating mode toggles between Normal and Endo.

### 5.2.4 User menu

Press the SET key for a while (approx. 2 seconds) in the main menu to switch to the user menu. You can select different language settings with the PLUS and MINUS buttons.

**Screen information:**
- Current language
5.2.5 Dryer maintenance

There are two different modes for identifying if the desiccant is used up. Use the PLUS and MINUS buttons to switch back and forth between the two modes.

Sensor mode (factory setting)
- Dryer maintenance
- Sensor mode
- Change mode
- Continue

Counter mode
- Dryer maintenance
- Counter mode
- Change mode
- Continue

5.2.6 Treatment start

The treatment process has been activated. The unit waits until a vacuum has been created. The "Seal cup" line starts flashing. You can press the stop button or the footswitch to stop the process. Treatment time can be changed at any point up to the start of treatment. If an airtight seal is not created within 60 seconds, treatment is cancelled. A warning message appears on screen.

Screen information:
- Treatment time
- Seal silicone cup

5.2.7 Dry

If the humidity reading is less than or equal to the allocated humidity level, the unit immediately switches to treatment mode.

Screen information:
- Treatment time
If the measured moisture level lies above the range of the assigned moisture level, this status is shown in the display. The start of drying is reported acoustically by a double buzzer tone.

- Treatment time
- Drying process running

If the flow sensor becomes inactive during the drying process, the unit displays message "Waiting for treatment". You can choose the Stop button to cancel and it will switch directly to rinse mode.

### 5.2.8 Treatment

An airtight seal has been created. Ozone is produced from this point on. The unit counts down the seconds for the remainder of the treatment time. Once the treatment time has come to an end, the unit switches to rinse mode. It is no longer possible to change the treatment time.

You can press the stop button or the footswitch to stop the process. If the process is stopped, the unit switches directly to rinse mode.

Screen information:
- Remaining treatment time
- Ozone application

### 5.2.9 Ozone generation

If it takes a while to generate ozone, "Generate ozone" is shown on the display and reported acoustically with a double buzzer tone.

Screen information:
- Treatment time
- Ozone is being generated

Once the ozone starts being generated, the device switches immediately to treatment status.

If ozone cannot be generated within 60 seconds, the warning "Ozone generation not successful" is output.

The message can be acknowledged with any button, and the treatment process can be restarted.

### 5.2.10 Vacuum lost

If the airtight seal over the tooth is broken during treatment, ozone production is stopped and air is blown through the ducts to clear them. The unit waits until the vacuum has been recreated. The "Seal cup" line starts flashing. The treatment time cannot be changed. If the airtight seal cannot be recreated within 60 seconds, treatment is cancelled. A warning message appears on screen. To stop the process, press the stop button or footswitch. If you do this, the unit switches directly to rinse mode.
5.2 The treatment procedure

Screen information:
- Remaining treatment time
- Seal silicone cap

5.2.11 Treatment stopped

If treatment is stopped via the stop button or footswitch, ozone production is stopped and air is blown through the ducts to clear them. The unit displays message 'Treatment stopped/please repeat' and returns to the main menu.

Screen information:
- Treatment stopped
- Please repeat

5.2.12 Rinse

When ozone production has come to an end or when treatment is cancelled by pressing the stop button or footswitch, the unit switches directly to rinse mode. Air is sprayed through the ozone ducts for a period of 10 seconds in order to clear them.

Screen information:
- Remaining rinsing time
- Rinsing

5.2.13 End of treatment

Following successful treatment, the message 'Treatment complete' appears on screen. The system then returns to the main menu a new treatment can be commenced.

Screen information:
- Treatment complete
5.3 Endo mode

**Note**
For endodontic treatments, always insert a dental dam to keep from harming the patient. Sterilise the cannulas before first use.

**Danger caused by improper use**
Potential 'needle stick' injuries as a result of inserting cannula by hand.
- Always use the key to insert and remove cannulae.

- Ensure that the O-ring is not worn, damaged or deformed. Replace if necessary.
- Using the key, push in the cannula as far as it will go.
- Make sure the cannula is positioned securely in the handpiece.

- Fit silicone cup onto the handpiece head.

See also: 4.2.3 Attach silicone cup, Page 27

After the root canal has been conventionally prepared, you can continue treatment with the KaVo HealOzone. A sterile cannula is inserted into the root canal. The cannula is made of a very flexible and yielding material so that it can follow the course of the root canal. The cannula penetrates as far as possible toward the apex. Depending on the remaining tooth substance, the silicone cap seals the crown edge or gingiva as will all other treatments.

**Notes on operator error**

If the cannula can penetrate into the root canal, clogging can occur.
If ozone is not applied even though the cap is sealed, the cannula may be plugged.

Screen information:
- Treatment time
- Seal cap/cannula plugged? (alternately)
If the operating mode "Normal/Endo" does not correspond with the attachment on the handpiece "without cannula/ with cannula", the device displays the message "Check cannula". Solution: select corresponding mode.

**Recommendations for Using HealOzone in Endodontics**

The following treatment sequence provides a recommendation on how ozone (KaVo HealOzone) can be used for endodontic treatment.

The procedure was taken from daily practice and consists of 10 steps.

Steps 1 to 10:
1. Removal of surface caries with a round burr.
2. Disinfection in the zone of bacteria with the HealOzone (no cannula, 40 seconds)
3. Complete removal of caries with a round burr and cleaning with PROPHYflex and PROPHYpearls
4. Extripation, rinsing (NaOCl 3%)
5. Electrical measurement of length and x-ray measurement (forensics)
6. Preparation (mechanical/manual, for example with ProTaperm ProFile, RaCe)
   - EDTA 17% = lubricant
   - NaOCl 3% = tissue degradation
7. Ozone application in NaOCl in channel or in dry channel (with cannula, 60 seconds/channel).
   - Cleaning, disinfection, destruction of biofilm
8. General drying (with paper points)
9. Disinfection and drying (with cannula, 40 seconds/channel)
10. Obturation (lateral cond., vertical cond., thermoplastic)
6.1 Cleaning

6.1.1 Clean unit

The wide variety of drugs and chemicals used in dental practices means that damage may occur to painted surfaces or plastics if anything is allowed to drip onto them. Tests have shown that surfaces cannot be protected entirely against all substances available on the market. As damage to surfaces is very much dependent upon the reaction times of these substances, it is essential for any spilled substances to be wiped away immediately using a damp cloth.

The following cleansers may not be used:
- Strongly alkaline washing solutions
- Acids
- Ammonia-containing cleaning agents
- Abrasives of any kind
- Solvents on plastic parts

⚠️ **CAUTION**

**Damage from liquids.**
Malfunctions of electrical components.
- Cover openings in the product to prevent the penetration of liquids.
- Remove liquids from the interior of the device.

- Switch off the instrument's main switch.
- Clean surface with a soft cloth and a mild cleaning fluid.

**Note**
If there is any dirt or contamination on the unit that you are unable to remove, the unit should be inspected and cleaned by a KaVo Service Technician or KaVo-trained service technician.
6.1.2 Clean handpiece

- Disinfect or sterilise handpiece before first use.
- A new silicone cup must be used for every patient.
- Silicone cups are disposable and cannot be disinfected; they must therefore be used for treating one patient only.
- The handpiece must be cleaned and disinfected before each use and between every application.

Manual cleaning of the exterior

- Clean the exterior of the product by brushing it off under flowing water until there is no more visible soiling.

Interior cleaning by hand

- Connect up the handpiece and instrument tubing.
- Place handpiece in a drip pan or basin ①.
- Fit adapter ③ onto quick coupling ② and rinse for 15 seconds using a water gun with cold tap water.
  or
- Attach a standard 50ml infusion syringe and perform ten 50ml rinses.

Automated external and internal cleaning

Using a Miele thermodisinfector, for instance. Use in accordance with manufacturer's user instructions. Dry immediately afterwards to ensure product remains fully functional.
6.1.3 Clean plugged endodontics cannula

- Push a port spike in and out of both ends of the cannula, then blow compressed air through cannula.

![Image of cannula cleaning](image)

6.1.4 Clean tubing

**Note**
Do not place the tubing in ultrasound cleaning units – this could cause malfunction.

- Disinfect tubing before cleaning. Disinfect again after cleaning if necessary.

**Manual cleaning of the exterior**

- Clean the exterior of the product by brushing it off under flowing water until there is no more visible soiling.

**Interior cleaning by hand**

- Connect up the handpiece and instrument tubing.
- Place handpiece in a drip pan or basin ①.
- Fit adapter ③ onto quick coupling ② and rinse for 15 seconds using a water gun with cold tap water.
  
or
- Attach a standard 50ml infusion syringe and perform ten 50ml rinses.
6.2 Disinfection

6.2.1 Unit disinfection

▶ Use alcoholic disinfectants such as KaVo ELASTOclean 2 or Ecolab Incidin Liquid to disinfect by wiping.

6.2.2 Handpiece disinfection

**CAUTION**

Malfunction caused by ultrasound cleaning units.
Potential product damage.
▶ Do not place product in ultrasound cleaning units.

Manual external disinfection

▶ Clean the exterior of the handpiece with chemical disinfectants (wipe disinfection) corresponding to manufacturer's instructions for use such as with KaVo ELASTOclean 2 or Ecolab Incidin Liquid.

Interior disinfection by hand

▶ Connect the handpiece and instrument sleeve.
or
▶ Place the adapter on the quick coupling and rinse for 5 seconds with Spiriclens (Ecolab) or 3 times with 70% isopropanol (0.2 µm sterile filtered) from the infusion syringe.
or
▶ Fill with Ecolab Sekusept Plus (0.5%) and let lie for 15 minutes in a water bath, then rinse out for 15 seconds with a water pistol.

Mechanical external and internal disinfection

Using a Miele thermodisinfector, for instance. Use in accordance with manufacturer's user instructions. Dry immediately afterwards to ensure product remains fully functional.
6.2.3 Tubing disinfection

**CAUTION**

Malfunction caused by ultrasound cleaning units. Potential product damage.
▶ Do not place product in ultrasound cleaning units.

Manual external disinfection

▶ Clean the exterior of the hose with chemical disinfectants (wipe disinfection) corresponding to manufacturer's instructions for use such as with KaVo ELASTOCLEAN 2 or Ecolab Incidin Liquid.

Mechanical external disinfection

Using a Miele thermodisinfector, for instance. Use in accordance with manufacturer's user instructions. Dry immediately afterwards to ensure product remains fully functional.
6.3 Sterilisation

6.3.1 Handpiece sterilisation

**Damage caused by improper sterilisation.**
Danger from contact corrosion.
▷ Remove product from steriliser immediately after the sterilisation cycle!

▷ Before sterilisation, detach handpiece from instrument tubing.

▷ Remove the endodontics cannula with the wrench from the handpiece.

▷ Sterilise the handpiece without the endodontics cannula.

▷ Always sterilise the endodontics cannula in the wrench.

▷ For the following procedures, sterilise the product in vapour-permeable paper or material (Stericlav bag, KaVo).

<table>
<thead>
<tr>
<th>Method</th>
<th>Time</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triple prevacuum</td>
<td>at least 3 min</td>
<td>134 ± 1°C</td>
</tr>
<tr>
<td>Gravity</td>
<td>at least 10 min</td>
<td>134 ± 1°C</td>
</tr>
<tr>
<td>Gravity</td>
<td>at least 60 min</td>
<td>121 ± 1°C</td>
</tr>
<tr>
<td>Drying time</td>
<td>&gt; 10 min</td>
<td></td>
</tr>
</tbody>
</table>

▷ Spray the endodontics cannula an O-ring after sterilisation with KaVo spray Mat. no. 0.411.9630.

6.3.2 Tubing sterilisation

**Damage caused by improper sterilisation.**
Danger from contact corrosion.
▷ Remove product from steriliser immediately after the sterilisation cycle!

▷ Before sterilisation, detach handpiece from instrument tubing.

▷ For the following procedures, sterilise the product in vapour-permeable paper or material (Stericlav bag, KaVo).

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</tr>
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<td>&gt; 10 min</td>
<td></td>
</tr>
</tbody>
</table>
7 Maintenance

7.1 Care and maintenance

7.1.1 Handpiece care and maintenance

▷ Clear the air duct using compressed air, then wipe.

▷ Detach the handpiece from the instrument tubing and grease the coupling O-rings with silicone grease.

7.1.2 Tubing care and maintenance

▷ Clear the air duct using compressed air, then wipe.
7.2 Maintenance

7.2.1 Replace O-ring

- Using a probe, replace the O-ring.
7.2.2 Sensor/counter mode

Sensor mode

Sensor mode is the factory default. Sensor mode continuously checks the moisture level and reports when the moisture level is too high and the desiccant is used up. Treatment can continue after the desiccant is changed.

See also: 7.2.3 Replace desiccant, Page 48

Counter mode

Adverse environmental conditions and climatic influences can in certain circumstances lead to frequent warnings regarding the moisture level. If this should occur in rare instances, the user can change the counter mode. The counter mode checks the operating hours (600 hours are programmed) and the number of treatments (1000 treatments are programmed). If one of the programmed values is exceeded, the warning message "Desiccant used up" appears. With this setting, the user can be sure that the device is fully functional without exchanging the desiccant too early.

After the maximum operating hours or treatments are reached, the warning message "Desiccant used up" appears.

- Change desiccant.
  See also: 7.2.3 Replace desiccant, Page 48

- Press SET button.

The device changes to the display "Ozone concentration can only be ensured once the desiccant is changed."

- Press SET button.

The query "New desiccant" appears to confirm the desiccant change.

- Change the displayed value "No" to "Yes" with the PLUS and MINUS buttons.
- Press the SET button to confirm the desiccant change.

Note
If the desiccant change was not confirmed with "yes" in counting mode, the warning message "Desiccant used up" appears after each treatment.
7.2.3 Replace desiccant

The HealOzone unit needs dry air to generate ozone. The suctioned air is dried by the desiccant. The system is supplied with an air drier. The desiccant is obtainable from your HealOzone authorised dealer. The device shows that the desiccant has been changed.

- Pull the end of the tubing ① out of the lower connection piece and remove the air dryer ③.
- Remove stopper ④ from the air dryer.
- Take out the used desiccant and dispose of in accordance with local and national waste disposal regulations.
- Place funnel over air dryer and pour in the new desiccant to fill the air dryer.
- Seal the air drier with a plug ④ and snap it into the holder ②.
- Fit the end of the tubing ① onto the lower connection piece.

Note
After the desiccant has been replaced, the unit must complete a test run.
7.2.4 Replace moisture trap

**Note**
When the liquid trap is filled half way with liquid, it needs to be exchanged.

Saliva and other liquids collect in the moisture trap that are drawn by the HealOzone vacuum into the handpiece. The prevents the ozone neutraliser from soiling. The system is supplied with an 10 moisture traps. Additional moisture traps can be obtained from the authorised dealer.

- Pull the end of the hose off of the connector ⑥.
- Unfasten the screw cap on the other end tubing end from the thread ⑤.
- Dispose of the moisture trap ④ in accordance with local and national regulations governing the disposal of contaminated waste.
- Remove new moisture trap ③ from packaging and fasten the screw cap on the end of the tubing onto the thread marked ②.
- Fit the other tubing end on the connection piece marked ①.

**Note**
Make sure tubing does not buckle or twist.
7.2.5 Ozone neutraliser

Each device is equipped with an internal ozone neutraliser that breaks down the ozone into oxygen and prevents ozone from leaving the device. The patient and operator are thereby prevented from excess ozone exposure.

The ozone neutraliser is exchanged at each service interval. A warning is generated for premature consumption. The device needs to be sent in for servicing.

7.2.6 Service intervals

The unit must be sent away once a year for servicing. Service Technicians are required to record all servicing activities on a servicing record located on the interior of the door.

<table>
<thead>
<tr>
<th>Next maintenance</th>
<th>Date</th>
<th>Unterschrift</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Wartung</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Wartung</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Wartung</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Wartung</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Wartung</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Wartung</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Wartung</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Wartung</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Wartung</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Wartung</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Safety checks (SFC) are completed in accordance with VDE 0751-1 every two years as part of the standard servicing activities.
8 Troubleshooting

8.1 Warnings

Note
Warning messages are displayed to advise the user on correct usage; they do not, however, prevent use of the unit. Depending on the type of warning, the unit will either return to normal mode automatically or the user will have to press a button to acknowledge the warning.

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warning: 1</td>
<td>If an airtight seal cannot be created at the tooth, the ozone generator cannot start. Treatment is cancelled after 60 seconds.</td>
<td>▶ Continue with any button. Restart treatment. Attempt to close the air circuit within 60 seconds.</td>
</tr>
<tr>
<td></td>
<td>Moisture trap has reached the end of its service life. Treatment is cancelled after 60 seconds.</td>
<td>▶ Replace moisture trap. See also: 4.1.2 Install moisture trap, Page 24</td>
</tr>
<tr>
<td></td>
<td>Blockage in cannula, handpiece or tubing. Faulty O-ring on tubing or handpiece.</td>
<td>▶ Clean handpiece. Replace O-ring. See also: 6.1 Cleaning, Page 39</td>
</tr>
<tr>
<td>Warning: 2</td>
<td>Treatment time invalid.</td>
<td>▶ Press any key to continue. Amend treatment time, ensuring it is within the designated thresholds. See also: 5.2.8 Treatment, Page 35</td>
</tr>
<tr>
<td>Sensor mode</td>
<td>After switching on/self test: Average humidity is ≥ the 7% threshold that was set. Desiccant is used up</td>
<td>▶ Change desiccant. Continue with any button. See also: 7.2.3 Replace desiccant, Page 48</td>
</tr>
<tr>
<td>Counter mode</td>
<td>After switching on/self test: Counter shows that the programmed threshold of 600 hours operating time or 1,000 treatments has been exceeded. Desiccant is used up.</td>
<td>▶ Confirm change of desiccant with SET button, and confirm &quot;New desiccant&quot; with &quot;Yes&quot;. The counter is reset to zero. If the change of desiccant is confirmed with &quot;Yes&quot;, the message reappears after the next use. See also: 7.2.2 Sensor/counter mode, Page 47</td>
</tr>
<tr>
<td>Warning: 4</td>
<td>Unit requires servicing: total permissible treatment time reached. Xxx indicates the number of treatments remaining. An error message is displayed once this number is reached.</td>
<td>▶ Press any key to continue.</td>
</tr>
<tr>
<td>Warning: 5</td>
<td>Unit requires servicing: total permissible treatment time reached. Xxx indicates the number of treatments remaining. An error message is displayed once this number is reached.</td>
<td>▶ Press any key to continue.</td>
</tr>
<tr>
<td>Sensor mode</td>
<td>The allocated humidity level is not reached within the specified timeframe.</td>
<td>▶ Change desiccant. Continue with any button.</td>
</tr>
<tr>
<td>Malfunction</td>
<td>Cause</td>
<td>Remedy</td>
</tr>
<tr>
<td>-------------</td>
<td>-------</td>
<td>--------</td>
</tr>
</tbody>
</table>
| **Please replace**  
Continue with button | The initial humidity reading is > 10%. Desiccant is used up. | See also: 7.2.3 Replace desiccant, Page 48 |
| **Desiccant is not connected.** | ▶ Check whether desiccant is connected. |
| **Counter mode**  
Warning: 6  
Desiccant used up  
Please replace  
Press <SET> | The allocated humidity level is not reached within the specified time-frame.  
The initial humidity reading is > 20%. Desiccant is used up. | ▶ Confirm change of desiccant with SET button, and confirm "New desiccant" with "Yes".  
The counter is reset to zero.  
If the change of desiccant is confirmed with "Yes", the message reappears after the next use.  
See also: 7.2.2 Sensor/counter mode, Page 47 |
| **Desiccant is not connected.** | ▶ Check whether desiccant is connected. |
| **Sensor mode**  
Warning: 7  
Desiccant used up  
Please replace  
Continue with button | After the current treatment  
Average humidity is ≥ the 7% threshold that was set.  
Desiccant is used up | ▶ Confirm the change of desiccant with the SET button.  
or  
▶ Continue with any button. |
| **Counter mode**  
Warning: 7  
Desiccant used up  
Please replace  
Confirm <SET> | After the current treatment:  
Counter shows that the programmed threshold of 600 hours operating time or 1,000 treatments has been exceeded.  
Desiccant is used up. | ▶ Confirm change of desiccant with SET button, and confirm "New desiccant" with "Yes".  
The counter is reset to zero.  
If the change of desiccant is confirmed with "Yes", the message reappears after the next use.  
See also: 7.2.2 Sensor/counter mode, Page 47 |
## 8.2 Error Messages

**Note**
Comprehensible error messages are not displayed. Only an error number is displayed. Depending on the message, it may be possible to remedy the error yourself or require sending in for servicing.

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>02</td>
<td>ERROR_ANZAHLBEHANDLUNGEN The maximum number of treatments permitted since the last servicing has been exceeded.</td>
<td>▶ Inform technical service.</td>
</tr>
<tr>
<td>03</td>
<td>ERROR_BEHANDLUNGSZEITEN The threshold for accumulative treatment times has been exceeded.</td>
<td>▶ Inform technical service.</td>
</tr>
<tr>
<td>04</td>
<td>ERROR_LCD Monitor fault.</td>
<td>▶ Inform technical service.</td>
</tr>
<tr>
<td>05</td>
<td>ERROR_TIMER Quartz oscillator fault.</td>
<td>▶ Inform technical service.</td>
</tr>
<tr>
<td>06</td>
<td>ERROR_TASTEN Button error.</td>
<td>▶ Inform technical service.</td>
</tr>
<tr>
<td>07</td>
<td>ERROR_FUSS Footswitch error.</td>
<td>▶ Inform technical service.</td>
</tr>
<tr>
<td>08</td>
<td>ERROR_CS Check Sum (CS) program code error.</td>
<td>▶ Inform technical service.</td>
</tr>
<tr>
<td>09</td>
<td>ERROR_DATA Data error in SRAM.</td>
<td>▶ Inform technical service.</td>
</tr>
<tr>
<td>10</td>
<td>ERROR_FLUSS_MIN_ABGLEICH Flow sensor error; minimum flow level not reached during calibration.</td>
<td>▶ Inform technical service.</td>
</tr>
<tr>
<td>11</td>
<td>ERROR_FLUSS_MAX_BETRIEB Flow sensor error; maximum flow level exceeded during operation.</td>
<td>▶ Inform technical service.</td>
</tr>
<tr>
<td>12</td>
<td>ERROR_FLUSS_RICHTUNG Flow sensor error; flow direction incorrect.</td>
<td>▶ Inform technical service.</td>
</tr>
<tr>
<td>13</td>
<td>ERROR_FLUSS_OFFSET Flow sensor error; offset error.</td>
<td>▶ Inform technical service.</td>
</tr>
<tr>
<td>14</td>
<td>ERROR_SENSOR_KOMM Sensor communication error.</td>
<td>▶ Inform technical service.</td>
</tr>
<tr>
<td>15</td>
<td>ERROR_TEMPERATUR Sensor temperature error.</td>
<td>▶ Inform technical service.</td>
</tr>
<tr>
<td>16</td>
<td>ERROR_FEUCHTE Sensor humidity error.</td>
<td>▶ Inform technical service.</td>
</tr>
<tr>
<td>17</td>
<td>ERROR_12V_MIN Voltage too low.</td>
<td>▶ Inform technical service.</td>
</tr>
<tr>
<td>18</td>
<td>ERROR_12V_MAX Voltage too high.</td>
<td>▶ Inform technical service.</td>
</tr>
<tr>
<td>19</td>
<td>ERROR_12V_TRIGGER Safety switch trigger function faulty.</td>
<td>▶ Inform technical service.</td>
</tr>
<tr>
<td>20</td>
<td>ERROR_STROM_OFFSET Offset for current above threshold.</td>
<td>▶ Inform technical service.</td>
</tr>
<tr>
<td>Malfunction</td>
<td>Cause</td>
<td>Remedy</td>
</tr>
<tr>
<td>-------------</td>
<td>-------</td>
<td>--------</td>
</tr>
</tbody>
</table>
| 21          | ERROR_OG_SW  
Ozone generator switch function faulty. | ▶ Inform technical service. |
| 22          | ERROR_OG_PWM  
Ozone generator desired value faulty. | ▶ Inform technical service. |
| 23          | ERROR_OG_I_MAX  
Max. ozone generator power consumption level exceeded. | ▶ Inform technical service. |
| 24          | ERROR_OG_I_MIN  
Ozone generator power consumption below minimum level. | ▶ Inform technical service. |
| 25          | ERROR_PUMPE_SW  
Pump switch function faulty. | ▶ Inform technical service. |
| 26          | ERROR_PUMPE_I_MAX  
Max. pump power consumption level exceeded. | ▶ Inform technical service. |
| 27          | ERROR_PUMPE_I_MIN  
Pump power consumption below minimum level. | ▶ Inform technical service. |
| 28          | ERROR_LUEFTER_SW  
Ventilator switch function faulty. | ▶ Inform technical service. |
| 29          | ERROR_LUEFTER_I_MAX  
Max. ventilator power consumption level exceeded. | ▶ Inform technical service. |
| 30          | ERROR_LUEFTER_I_MIN  
Ventilator power consumption below minimum level. | ▶ Inform technical service. |
| 31          | ERROR_EE_READ  
EEPROM data read error. | ▶ Inform technical service. |
| 32          | ERROR_EE_WRITE  
EEPROM write error. | ▶ Inform technical service. |
| 33          | ERROR_EE_ACK  
EEPROM communication error. | ▶ Inform technical service. |
| 34          | ERROR_EE_ABGLEICH  
EEPROM calibration data error. | ▶ Inform technical service. |
| 35          | ERROR_EE_SETUP  
EEPROM setup data error. | ▶ Inform technical service. |
| 36          | ERROR_EE_BETRIEB  
Operating data in EEPROM faulty. | ▶ Inform technical service. |
| 37          | ERROR_EE_BEHANDLUNG  
Handling data in EEPROM faulty. | ▶ Inform technical service. |
9 Safety checks

9.1 Basics

Note
You are required to comply with all safety information provided in the User instructions under section 2 Safety.

According to VDE 0751-1:
▪ Safety checks every two years
▪ Device type IIa
▪ Protection class I
▪ Portable device
▪ Type B general
▪ Measurement in accordance with EGA

KaVo supplies a medical device record in which you make an inventory listing and record the main master data of the medical device. www.kavo.com/De/produkte/praxis_einrichtungen/

The following readings and measurements must be documented:
▪ Visual inspection of medical device and accessories
▪ Nominal data checks on externally accessible fuses.
▪ Earthen conductor checks in accordance with VDE 0751
▪ Leakage current measurements in accordance with VDE 0751
▪ Functional test of the medical device taking into account accompanying documents

Note
The main unit switch must be switched on during measurement.
9.2 Method

9.2.1 Earth wire impedance measurement

The following thresholds must not be exceeded: < 0.3 Ω with mains cable and < 0.2 Ω without.

- Using a test probe, sample the rear panel of the casing.

9.2.2 Replacement device leakage current measurement

Must not fall below the < 1 mA threshold.
## 10 Additional equipment

<table>
<thead>
<tr>
<th>number of units</th>
<th>Description</th>
<th>Mat. no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Instructions for use</td>
<td>Mat. no. 1.002.7841</td>
</tr>
<tr>
<td>100</td>
<td>Ampoules of pH balancer</td>
<td>Mat. no. 1.002.3718</td>
</tr>
<tr>
<td>50</td>
<td>Silicone cap 3 mm</td>
<td>Mat. no. 1.002.1633</td>
</tr>
<tr>
<td>50</td>
<td>Silicone cap 4x5 mm</td>
<td>Mat. no. 1.002.1634</td>
</tr>
<tr>
<td>50</td>
<td>Silicone cap 5x6 mm</td>
<td>Mat. no. 1.002.1635</td>
</tr>
<tr>
<td>50</td>
<td>Silicone cap 6x8 mm</td>
<td>Mat. no. 1.002.1636</td>
</tr>
<tr>
<td>50</td>
<td>Silicone cap ax mm</td>
<td>Mat. no. 1.002.1637</td>
</tr>
<tr>
<td>25</td>
<td>Silicone cap double length, 4 mm</td>
<td>Mat. no. 1.004.2053</td>
</tr>
<tr>
<td>25</td>
<td>Silicone cap double length, 6 mm</td>
<td>Mat. no. 1.004.2055</td>
</tr>
<tr>
<td>25</td>
<td>Silicone cap double length, 8 mm</td>
<td>Mat. no. 1.004.2056</td>
</tr>
<tr>
<td>1</td>
<td>Desiccant pearls</td>
<td>Mat. no. 1.002.7782</td>
</tr>
<tr>
<td>1</td>
<td>Funnel</td>
<td>Mat. no. 1.002.7184</td>
</tr>
<tr>
<td>10</td>
<td>Moisture trap</td>
<td>Mat. no. 1.002.1638</td>
</tr>
<tr>
<td>6</td>
<td>Patient kit</td>
<td>Mat. no. 1.002.1547</td>
</tr>
<tr>
<td>6</td>
<td>Cannulas with O-rings (long -20 mm)</td>
<td>Mat. no. 1.003.7388</td>
</tr>
<tr>
<td>6</td>
<td>Cannulas with O-rings (medium -13 mm)</td>
<td>Mat. no. 1.004.4716</td>
</tr>
<tr>
<td>6</td>
<td>Cannulas with O-rings (short -10 mm)</td>
<td>Mat. no. 1.004.4715</td>
</tr>
<tr>
<td>1</td>
<td>Cleaning needle/nozzle needle</td>
<td>Mat. no. 0.410.0911</td>
</tr>
<tr>
<td>1</td>
<td>Wrench</td>
<td>Mat. no. 1.003.6467</td>
</tr>
<tr>
<td>1</td>
<td>Silicone grease</td>
<td>Mat. no. 1.000.6403</td>
</tr>
</tbody>
</table>