# Instructions for use
# Display 17″, 20″

Always on the safe side.

KaVo. Dental Excellence.

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CE

# Table of contents

# 1 User instructions

## 1.1 User guide

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

### 1.1.1 Abbreviations

| Short form | Explanation |
|---|---|
| GA | Instructions for use |
| PA | Care instructions |
| MA | Assembly instructions |
| TA | Technical instructions |
| STK | Safety check |
| IEC | International Electrotechnical Commission |
| RA | Repair instructions |
| EMC | Electromagnetic compatibility |

### 1.1.2 Symbols

| | |
|---|---|
|  | See the section Safety/Warning Symbols |
|  | Important information for users and technicians |
|  | CE mark (Communauté Européenne). A product with this mark meets the requirements of the corresponding European directive, i.e., the applicable European standard. |
| ▶ | Action required |

## 1.2 Target group

This document is for dentists and office personnel.

## 1.3 Service

Service hotline:
+49 7531 56-2700
Service.Multimedia@kavo.com
Please indicate the product serial number in all requests.
Additional information can be obtained at: www.kavo.com

### 1.3.1 Technical customer service

The technical support for KaVo products is primarily offered by the dental supplier.

Technicians of the dental supplier and KaVo customer service technicians continuously participate in courses and special training sessions at the plant.

To guarantee constant readiness for use and maintenance of value of the KaVO products, the products must be regularly serviced.

## 1.4 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.

## 1.5 Transportation and storage

### 1.5.1 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..

### 1.5.2 Transportation damage

#### In Germany

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.
2. Leave the product and packaging unchanged.
3. Do not use the product.
4. Report damage to the shipping company.
5. Report damage to KaVo.
6. A damaged product cannot be returned before talking with KaVo.
7. Send the signed notice of delivery to KaVo.

If the product is damaged and there is no discernable damage to the packaging upon delivery, proceed as follows:
1. Report damage immediately or at least 7 days after the delivery to the delivery company. .
2. Report damage to KaVo.
3. Leave the product and packaging unchanged.
4. 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 ADSp. Art. 28)..

### 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.

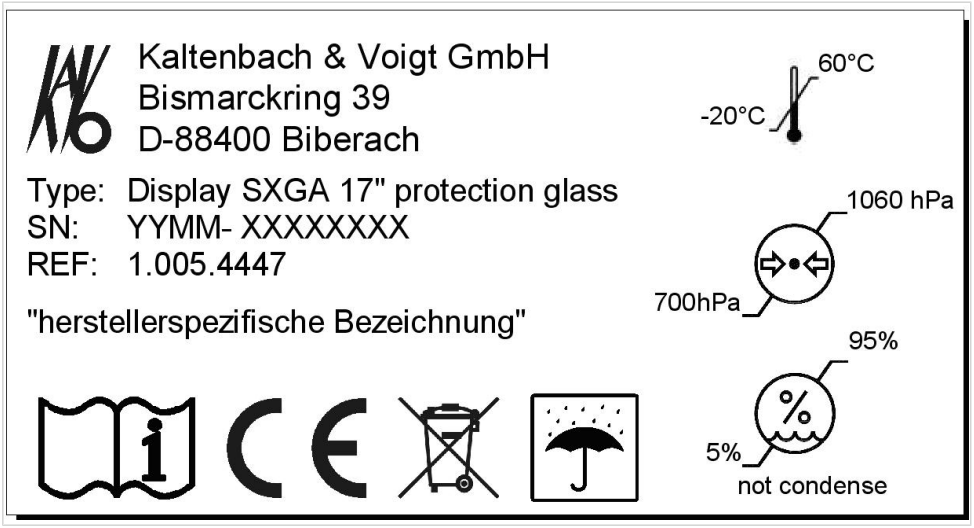
If the product is damaged and there is no discernable damage to the packaging upon delivery, proceed as follows:
1. Report the damage immediately or at least 7 days after the delivery to the delivery company .
2. Leave the product and packaging unchanged.
3. Do not use a damaged product.

**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).

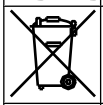
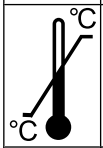
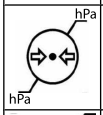
## 1.5.3 Storage

**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:




Transport sign for 17" display

| | |
|---|---|
|  | Follow instructions for use. |
|  | CE mark according to 93/42/EEC medical devices |
|  | Disposal instructions<br>See also: Proper use |
|  | Protect against moisture! |
|   | Temperature range. |
|   | Air pressure. |
|  | Humidity |

# 2 Safety

## 2.1 Description of safety instructions

### 2.1.1 Warning symbol

| | |
|---|---|
|  | Warning symbol |

### 2.1.2 Structure


DANGER

**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.

### 2.1.3 Description of dangerous steps

Safety instructions with these three hazard levels in this document will help you avoid property damage and injury.


CAUTION

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


WARNING

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


DANGER

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

## 2.2 Proper use

### 2.2.1 General information

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

This KaVo product is intended only for use in the field of dentistry. It is impermissible to use the product for a purpose for which it was not intended.
"Proper use" includes following all the instructions for use and ensuring that all inspections and service tasks are performed.

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.

Responsibility is accepted for the safety, reliability and performance of the components supplied by KaVo provided:
- installation, upgrades, adjustments, changes or repairs are carried out by technicians trained by KaVo or third parties authorised by KaVo, or by the personnel of authorised distributors.
- The unit is operated in accordance with the instructions for use, care and installation.
- The IT components supplied by the operator meet the technical requirements in these instruction for use for hardware and software, and they are installed and set up according to the descriptions of these components.
- The device is an electrical item of medical equipment and is covered by the precautions relating to EMC. It may only be operated when it has been installed according to the EMC instructions in the instructions for use and installation.
- If it is repaired, the requirements of VDE 0751-1 "Repeat tests and tests before start-up of electrical items of medical equipment and systems - general regulations" must be met in full.

The user must observe the following:
- - only use properly operating equipment.
- protect himself or herself and third parties from danger.
- avoid contamination from the product.

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

To ensure that KaVo products maintain their value and are always ready for use, they must be serviced once a year as recommended.
The safety checks must be performed every two years.

Authorised to repair and service the KaVo product:
- The technicians of KaVo branches.
- Technicians of authorised dealers specially trained by KaVo.

In Germany, the operator, person responsible for the device and user must operate their devices in accordance with the provisions of the Medical Device Law.

These service tasks include all testing tasks that are stipulated in the Operator Ordinance (MPBetreiber V) § 6.

**Note**
The product must be cleaned and serviced according to instructions if it is not to be used for a long period.

**Note**
Only those accessories may be used that are approved for the device.

**Note**
The device must be cleaned and serviced according to instructions if it is not to be used for a long period.

### Disposal

**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.

### Disposal of electronics

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

## 2.2.2 Product-specific

The display is only used to portray multimedia content from external image and audio sources. Accessories to a medical device in a dental practice near the patient, class of protection 1.
The display meets the requirements for imaging devices for determining findings from digital dental x-rays corresponding to the requirements in the German quality assurance guidelines (QS-RL) of November 20, 2003. If the display is used for diagnosing from x-rays, it must undergo an acceptance according to applicable national regulations.

## 2.3 Safety instructions

### 2.3.1 General information

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

WARNING

**Injury or damage from damaged functional parts.**
When functional parts are damaged, it can cause additional damage or personal injury.
- When operating parts are damaged: Stop working and eliminatethe damage, or notify a service technician.
- Check the electrode lines and accessories for damage to the insulation.

CAUTION

**Malfunctions from electromagnetic fields.**
The product meets the applicable requirements regarding electromagnetic fields. Given the complex interactions between equipment and cell phones, the product may be influenced by a cell phone that is in use.
- Do not use cell phones in medical offices, hospitals, or laboratories.
- Turn off electronic devices such as computer storage media, hearing aids, etc. during operation .

CAUTION

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

CAUTION

**Damage due to liquids**
Malfunctions in electrical or mechanical components.
- Only clean and disinfect the display when it is cold.
- Protect product openings from penetration of liquids.

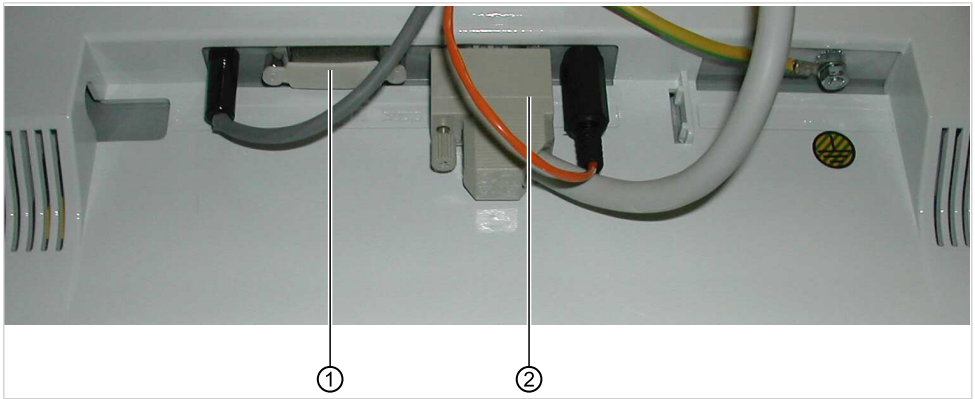
Authorised to repair and service the KaVo product:
- The technicians of KaVo branches.
- Technicians of authorised dealers specially trained by KaVo.

### 2.3.2 Product-specific

WARNING

**Electrical voltage**
Electrical shock
- Observe EN 60601-1-1 when installing or combining with other devices!
- Only operate the display with IEC equipment.
- Tightly connect the protective conductor to the display housing.
- Before connecting the display, turn off the supply voltage to the device.
- Stop working if the display is damaged.
- Only use the display together with devices and power supplies that meet applicable IEC standards.
- The performance data of the voltage supply must be suitable according to the performance data of the connected display.
- The voltage supply of the ERGOcom light/ ERGOcom 3 is not intended for use with the 20" display.
- Assign or cover the two signal inputs of the display.

**Note**
Mounted 17" and 20" display:
Both the VGA and DVI sockets must be covered either by connected plugs or by the provided blanking plate. At the signal-side unused display input, the screwed on cover may not be removed or must be screwed on.




Mounted in 17" display:Both VGA and DVI sockets should be covered with a plug (or a cover). Do not remove the cover or screw it back on on the signal-side unused display input.

WARNING

**Danger from incorrect accessories.**
Damage or malfunction of the display.
- Only move the display with the provided handful.

WARNING

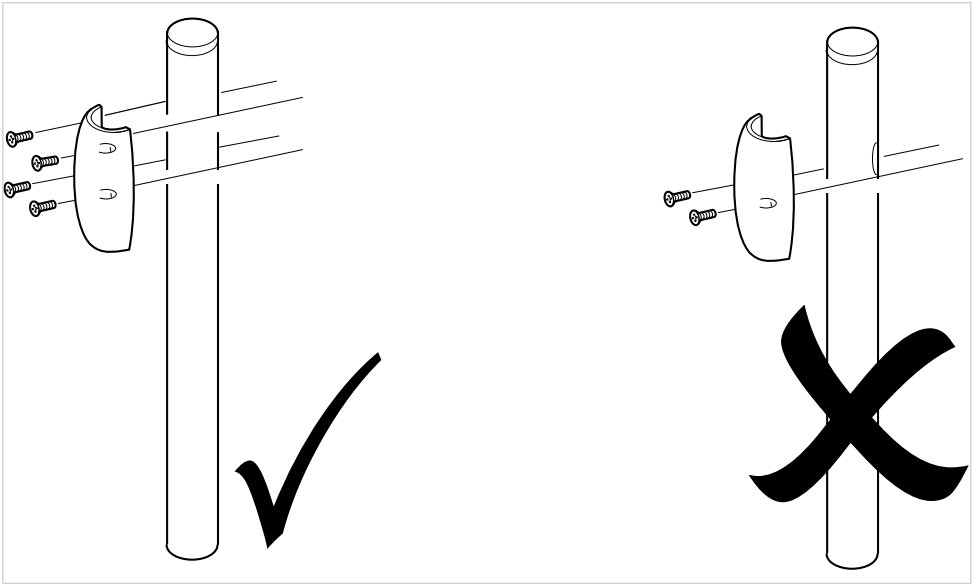
**Hazard from covering the air vents in the housing.**
Overheating the device.
- The ventilation slots in the housing should never be covered.

## Hazard from falling bodies when unsuitable accessories are used.

WARNING

**Danger from falling objects.**
Danger of injury to the patient and user.
- Only use suitable accessories that are permissible for mounting the display.

**Note**
Only the combination with the new adapter (four screws) may be used for fastening to the lamp mounting pole.
The 17" and 20" displays with the adapter may not be affixed with two screws.



# 3 Product description

## 3.1 17" display

The 17" display comes in the following designs:

- with protective glass
- Standard

## 3.2 20" display

The 20" display comes in the following designs:

- with protective glass

## 3.3 Scope of delivery

### 3.3.1 Scope of delivery 17"

- 17" display with mounted handle
- Display cover
- Extra-low voltage plug
- VGA Blind plug
- DVI blind plug

### 3.3.2 Scope of delivery 20"

- 20" display with handle
- Display cover

## 3.4 Recommended accessories

**Mat. No. 1.003.1506** display support arm

**Mat. No. 1.003.1799** BS Arm display with support arm 400

**Mat. No. 1.003.1800** BS arm display with support arm

WARNING

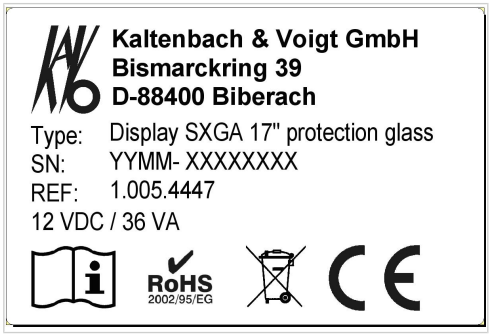
**Danger from falling objects.**
Danger of injury to the patient and user.
- Only use suitable accessories that are permissible for mounting the display.

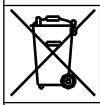
**Note**
Only the combination with the new adapter (four screws) may be used for fastening to the lamp mounting pole.
The 17" and 20" displays with the adapter may not be affixed with two screws.

## 3.5 Rating plates

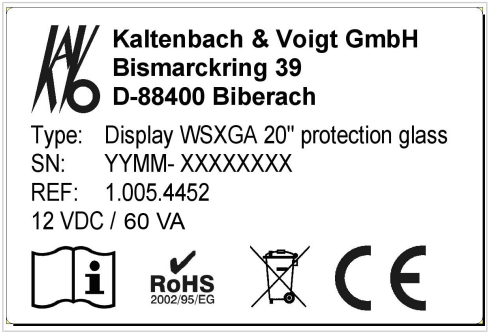
The rating plate is on the back of the display.

### 3.5.1 Rating plate 17"




| | |
|---|---|
| Type: | 17“ display protection glass |
| SN: | Year of manufacture - month of manufacturer - serial number |
| REF: | **Mat. No. 1.005.4447** |
|  | Follow instructions for use. |
|  | In conformance with RoHS according to 2002/95/EC |
|  | Disposal instructions<br>**See also:** Proper use |
|  | CE mark according to 93/42/EEC medical devices |

### 3.5.2 Rating plate 20"




| | |
|---|---|
| Type: | 20“ display protection glass |
| SN: | Year of manufacture - month of manufacturer - serial number |
| REF: | **Mat. No. 1.005.4452** |
| | Follow instructions for use. |
| RoHS 2002/95/EG | In conformance with RoHS according to 2002/95/EC |
| | Disposal instructions<br>**See also:** Proper use |
| CE | CE mark according to 93/42/EEC medical devices |

## 3.6 Technical data for the 17" display

**Note**
The indicated data apply after a minimum warm-up time of 30 minutes.

| | |
|---|---|
| Module type | 17 inch SXGA-TFT LCD, diagonal / 431.80 mm |
| Display area | 337.92 mm horizontal x 270.33 mm vertical |
| Resolution | optimum 1280x 1024 pixels |
| Pixel size | 0.264 mm x 0.264 mm |
| Response time | 25 ms (typical at 25°C) |
| Displayable colours | 262.144 |
| Viewing angle | 80° / 80° horizontal, 80° / 80° vertical |
| Contrast ratio | 800:1 typical |

### Brightness

| | |
|---|---|
| with protective glass | 245 cd/m$^2$ |

### Analog Input Signal

| | |
|---|---|
| Voltage level | 0.7 Vpp / 75 Ohm |
| Signals | Separate and Composite TTL level |
| H. frequency | 30 ~ 92 KHz |
| V. frequency | 50 ~ 85 Hz (SXGA: 50 ~ 60 Hz) |
| Line synchronisation | Sync on Green (SOG) |
| Synchronisation | Composite Sync |

### Signals

| | |
|---|---|
| Input signal | DVI single link |

### Supply

| | |
|---|---|
| Flat screen power supply | 12 V DC (36 W active/7 W standby) |
| Power management | complies with VESA DPMS 17/43 |

### Dimensions/weight

| | |
|---|---|
| Dimensions | 317.5 mm x 378 mm x 48.6 mm without handle and cover |
| Weight | 6.0 kg (with safety glass) |

## Audio

| | |
|---|---|
| Loudspeaker with amplifier | 1 Watt |

## Environmental conditions while operating

| | |
|---|---|
| Temperature | + 10°C to +40°C |
| Humidity | 20% to 80% (non-condensing) |

## Transportation and storage conditions

| | |
|---|---|
| Temperature | 20°C to + 60°C |
| Humidity | 5 % to 95 % (non-condensing) |

## 3.7 Technical data for the 20" display

**Note**
The indicated data apply after a minimum warm-up time of 30 minutes.

| | |
|---|---|
| Module type | 20.1 inch WSXGA+-TFT LCD, diagonal 51.054 |
| Display area | 433.44 mm horizontal x 270.90 mm vertical |
| Resolution | optimum 1680 x 1050 pixels |
| Pixel size | 0.258 mm x 0.258 mm |
| Response time | 16 ms typical (at 25°C) |
| Displayable colours | 16.7 million |
| Viewing angle | 89° / 89° horizontal, 89° / 89° vertical |
| Contrast ratio | 750:1 typical |

### Brightness

| | |
|---|---|
| with protective glass | 245 cd/m$^2$ |

### Analog Input Signal

| | |
|---|---|
| Voltage level | 0.7 Vpp / 75 Ohm |
| Signals | Separate and Composite TTL level |
| H. frequency | 30 ~ 92 KHz |
| V. frequency | 50 ~ 85 Hz (UXGA: 50 ~ 60 Hz) |
| Line synchronisation | Sync on Green (SOG) |
| Synchronisation | Composite Sync |

### Signals

| | |
|---|---|
| Input signal | DVI single link |

### Supply

| | |
|---|---|
| Flatscreen supply | 12 DC = (55 W active/ 8 W standby) |
| Power management | complies with VESA DPMS |

## Dimensions/weight

| | |
|---|---|
| Dimensions H/W/D | 318 mm (without handle) / 370 mm (with handle) x 485 mm x 61 mm (without cover) |
| Weight | 8.75 kg (with protective glass) |

## Audio

| | |
|---|---|
| Loudspeaker with amplifier | 2 x 1 Watt |

## Environmental conditions while operating

| | |
|---|---|
| Temperature | + 10°C to +40°C |
| Humidity | 20% to 80% (non-condensing) |

## Transportation and storage conditions

| | |
|---|---|
| Temperature | 20°C to + 60°C |
| Humidity | 5 % to 95 % (non-condensing) |

# 4 First use

**Note**
When updating or converting an existing ERGOcom 2m affix the plug for the voltage supply accompanying the display according to the conversion instructions.

**See also:** 4.2.1 Conversion instructions for the 17" display with an old display supply line, Page 30

## 4.1 Mounting the display

CAUTION

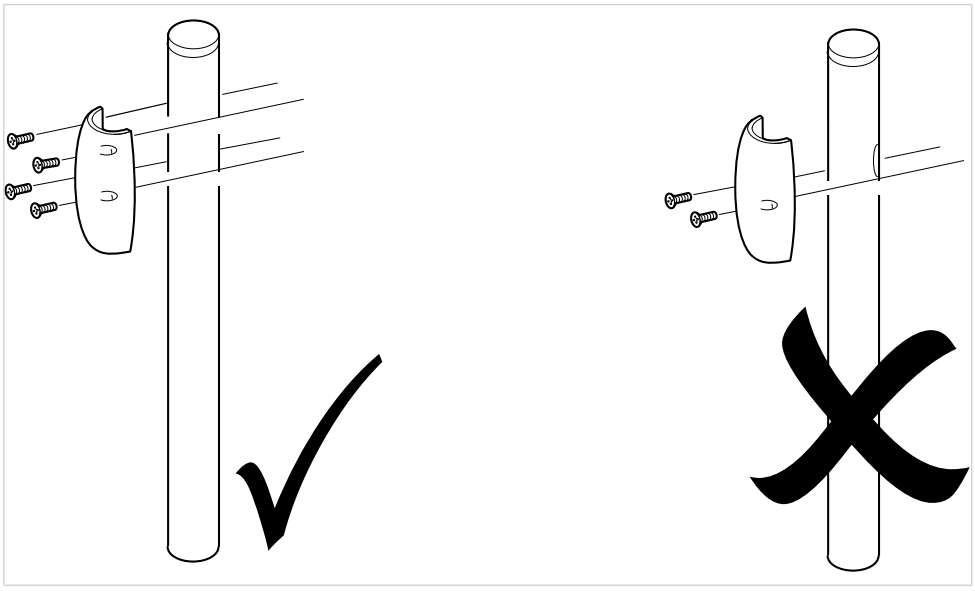
**Hazards due to external influences.**
Heat, moisture, strong light sources and direct sunlight may lead to damage.
- Select an appropriate installation point.

WARNING

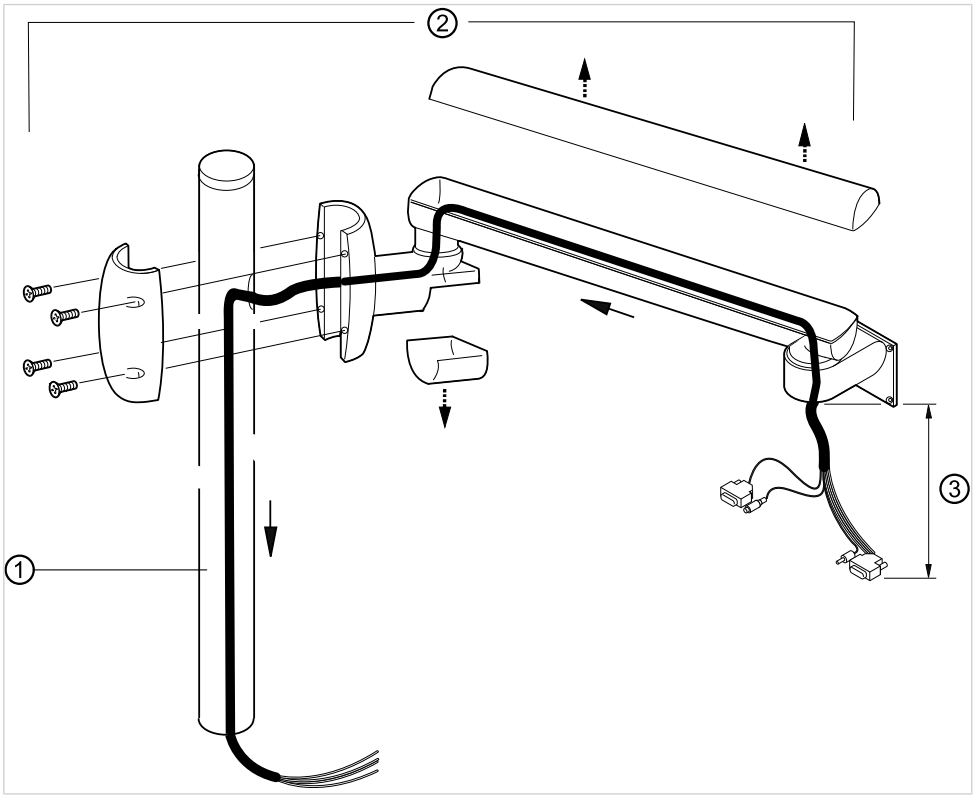
**Danger from falling objects.**
Danger of injury to the patient and user.
- Only use suitable accessories that are permissible for mounting the display.

- Set up the display at a dry, stationary and ergonomic location.

**Note**
Only the combination with the new adapter (four screws) may be used for fastening to the lamp mounting pole.
The 17" and 20" displays with the adapter may not be affixed with two screws.



### 4.1.1 Fit bracket and display



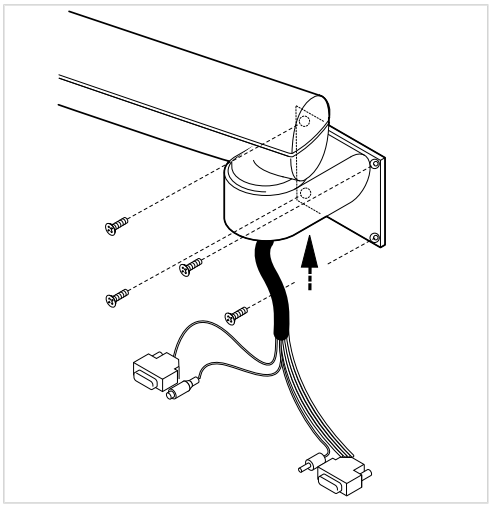

- Fit mounting pole ① as per the machine instructions.
- Fit bracket ② to the mounting pole using four fastening screws.

**Note**
The bracket ② must be positioned in the 12.00 hours position.

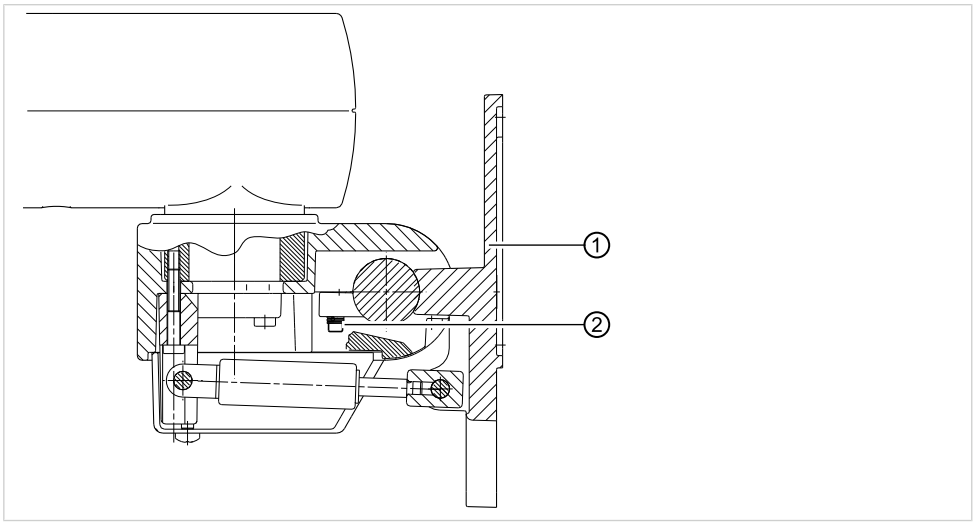
- Pull the connecting lines for the display through the support arm and the lamp mounting pole.

**Note**
Max. remaining cable length ③ to the display (bottom edge joint to the end of the plug):
17 inch display: 270 mm
Excess wire length can be pushed back into the bracket.

- Fit the display on the support arm using four fastening screws.

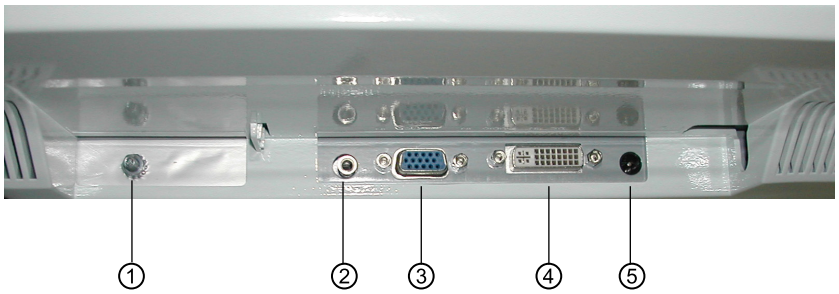


**Note**
Dependent on the weight of the display the brake in the bracket joint must be adjusted using the two socket head cap screws.



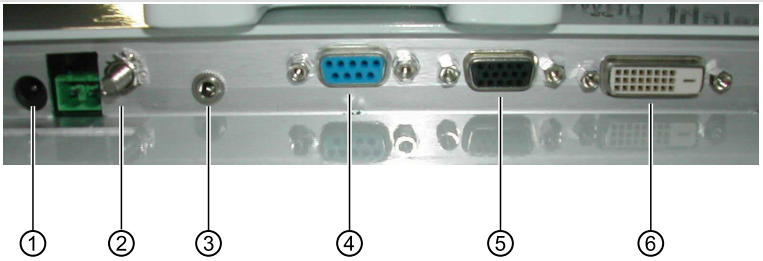

① Display ② Brake screw

## 4.1.2 Connect display




17“ display connections

① Connection for potential equalisation line
② Audio In
③ VGA in
④ DVI in
⑤ Power 12 V




Connections to the 20" display

① Audio In
② DVI In
③ Power 12 V
④ Connection for the protective conductor

WARNING

**Electrical voltage**
Electrical shock
- Two sockets must be assigned.

**Note**
Mounted 17" and 20" display:
Both the VGA and DVI sockets must be covered either by connected plugs or by the provided blanking plate. At the signal-side unused display input, the screwed on cover may not be removed or must be screwed on.

- Connect the connecting lines to the display.
- Firmly connect the potential equalisation line.
- Mount the cable cover.
- Assign or cover the signal inputs of the display.

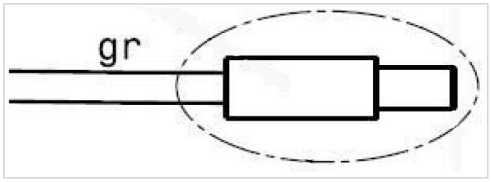
## 4.2 Use the correct low-voltage plug

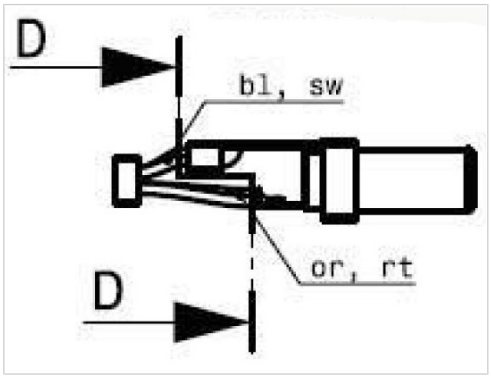
Only use the 17" display and 20" display with a low-voltage plug with the following specifications:
Outer diameter of the contact surface: 5.5 mm
Inner diameter of hole: 2.1 mm

### 4.2.1 Conversion instructions for the 17" display with an old display supply line

When retrofitting a 17" display on an existing ERGOcom2/3 system, exchange the low-voltage plug of the "supply line for the display" with the accompanying low-voltage plug:

In this regard:
1. Screw off the sleeve of the mounted low-voltage plug.
2. Unsolder the lines.
3. Dispose of the removed low-voltage plug
4. Solder the lines onto the provided low-voltage plug corresponding to an assignment.
5. Screw off the sleeve.




Soldering view

or, rd (12VDV)
bl, bk (GND)

## 4.3 Display settings

### 4.3.1 Set resolution

- Check the resolution of the grabber card of the connected computer.

The optimum resolution for the 17" display is 1280 x 1024 pixels.
The optimum resolution for the 20" display is 1680 x 1050 pixels.

### 4.3.2 Synchronize

- Run the "Auto" function in the "Illustration" tab of the OSD menu.

**See also:** 5.3.2 Image tab, Page 38

### 4.3.3 Select language

- Set the language for the specific country.

### 4.3.4 DVI/VGA selection

**Note**
The input is independently recognised by the display.

## 4.4 Safety checks

WARNING

**Electrical voltage**
Electrical shock
- The installation is only a complete when the safety checks have been successful according to the instructions for use.

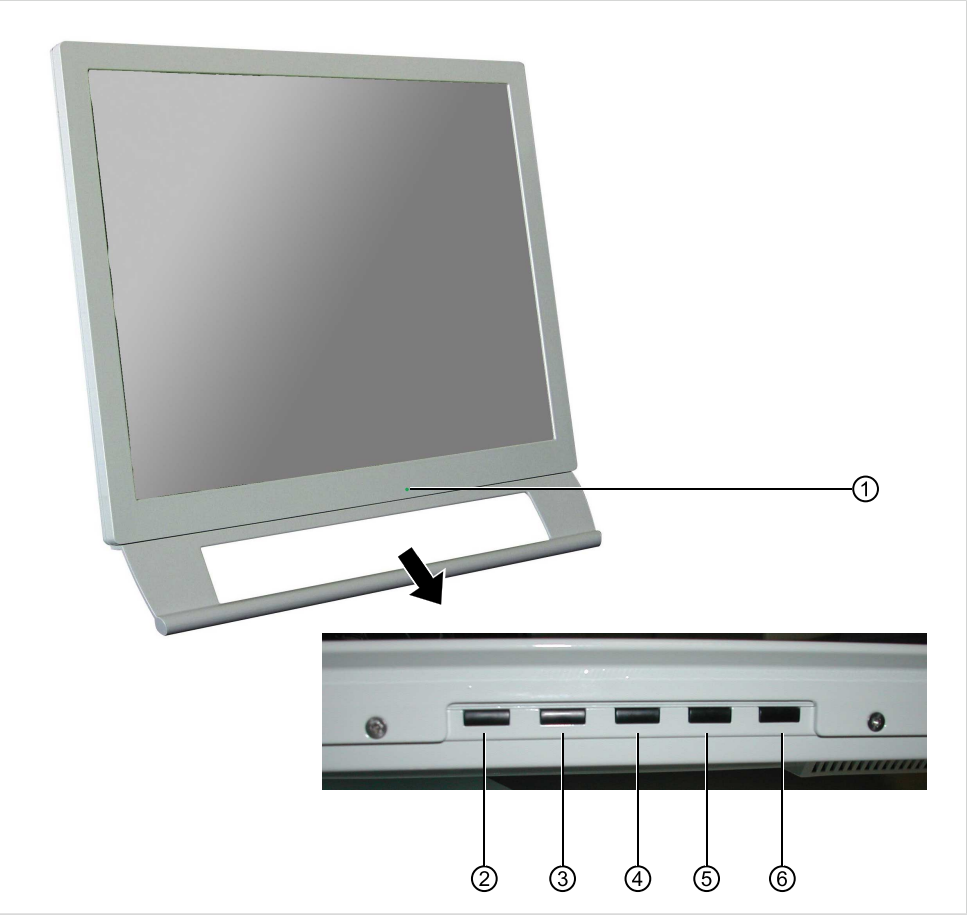
- Do safety checks.

**See also:** 8 Do safety checks, Page 45

# 5 Operation

## 5.1 Controls

20" display




17" display

① "Mode" display
② "Menu/Enter" key
③ "Left" key
④ "Right" key
⑤ "Menu off" key
⑥ "On/Off" key

## 5.2 Turn display on/off

The display is turned on and off with the main switch or the ERGOcom3 system. When the device is turned on, the display cannot be turned on and off separately.

### 5.2.1 Turn 17" display on/off

#### Turn on the 17" display

**Requirement**
The LED on the display does not shine.

- Press the "On/Off" key.
  The display is ready for operation. The LED shines green.

#### Turn 17" display off

**Requirement**
The LED on the display shines green.

- Press the "On/Off" key.
  The display is turned off. The LED does not shine.

## 5.3 Using the OSD menu

### 5.3.1 Using the OSD menu of the 20" display

The OSD menu of the display can be adjusted with the ERGOcom4 using the KiD software.

**See also:** Instructions for use **KiD - KaVo integrated desktop**

**Note**
If the display is controlled via DVI, these settings with the OSD menu are not necessary. The volume of the display can be adjusted by the audio level in the operating system.

### 5.3.2 Using the OSD menu of the 17" display

**Note**
During startup, a technician makes the settings in the OSD menu and harmonizes them with the ERGOcom.

The OSD menu is navigated with the keys "Menu/Enter", "Left", "Right", and "Menu Off".

Open the OSD menu with the "Menu/Enter" key.

Exit the OSD menu with the "Menu off" key. When leaving the OSD menu, all the settings are automatically saved.

**Note**
If a key is not pressed within five seconds, the set values are saved, and the OSD menu closes.

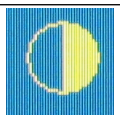
There are eight tabs in the OSD menu
1. Signal selection
2. Video
3. Audio
4. Colour
5. Figure
6. Language
7. Tools
8. Close

Icons indicate the function as graphic symbols in the OSD menu. The function is explained in a short text.

## Signal selection tab

| ICON | Brief text | Operation |
|---|---|---|
|  | VGA | The signal source that comes from the VGA cable is selected. |
|  | DVI | The signal source that comes from the DVI cable is selected. |
|  | End | The signal selection OSD menu is ended. |

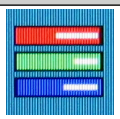
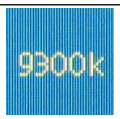
## Video tab

| ICON | Short text | operation |
|---|---|---|
|  | Brightness | The luminance in the image can be adjusted. Brightness: 0 to 100 |
|  | Contrast | The luminance, the difference between the light and dark areas of the image, can be adjusted. Contrast: 0 to 100 |
|  | Close. | OSD menu video is closed. |

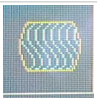
## Audio tab

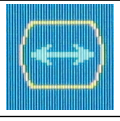
| ICON | Short text | operation |
|---|---|---|
|  | Volume | The speaker volume can be adjusted. |
|  | Close | OSD menu audio is closed. |

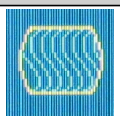
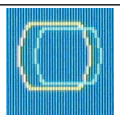
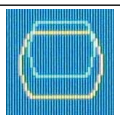
## Colour/colour temperature tab

| ICON | Brief text | Operation |
|---|---|---|
|  | Setting the colour | The RGB amplification can be adapted. |
|  | 6500 K | Colour temperature up to 6500 °K is selected. |
|  | 9300 K | Colour temperature up to 9300 °K is selected. |
|  | End | The colour temperature OSD menu is ended. |
|  | End | The colour OSD menu is ended. |

## Image tab



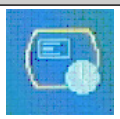
| ICON | Short text | operation |
|---|---|---|
|  | Auto | The geometry of the image is automatically adapted. The horizontal and vertical size, the horizontal and vertical position, the frequency and phase are automatically set. |
|  | H. width | The horizontal size of the image can be adapted. |

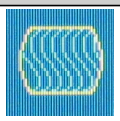
| ICON | Short text | operation |
|---|---|---|
|  | H. phase | The wave phase of the image can be adapted. |
|  | H. position | The horizontal position of the image can be adapted. |
|  | V. position | The vertical position of the image can be adapted. |
|  | Close | OSD menu image is closed. |

## Language tab

| ICON | Brief text | Operation |
|---|---|---|
| | Language | The language of the OSD menu can be changed. |

## Tools/OSD menu control tab

| ICON | Brief text | Operation |
|---|---|---|
|  | OSD timer | The display time of the OSD menu can be set. |
|  | H.OSD position | The horizontal position of the OSD menu can be adapted. |
|  | V.OSD position | The vertical position of the OSD menu can be adapted. |
|  | End | The OSD menu control is ended. |
|  | Undo | The display is returned to the default setting. |

| ICON | Brief text | Operation |
|---|---|---|
|  | Sharpness | The image display can be adapted. |
|  | End | The tool OSD menu is ended. |

## Close tab

| ICON | Short text | operation |
|---|---|---|
|  | Close | OSD menu is closed. |

# 6 Preparation methods DIN EN ISO 17664

## 6.1 Cleaning

### 6.1.1 Manual cleaning

The wide variety of drugs and chemicals used in dental practice 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 on the reaction times of these substances, it is essential for any spilled substances to be wiped away immediately using a damp cloth.

KaVo recommends the following products for manual cleaning:
- AF liquid
- S&M Microcide
- Dürr FD 322

The following cleaning agents may not be used:
1. Strong alkaline washing solutions
2. Acids
3. Cleaning agents containing fluoride
4. Cleaning agents containing ammonia
5. Abrasives of any kind


CAUTION

**Damage due to liquids**
Malfunctions in electrical or mechanical components.
- ▸ Only clean and disinfect the display when it is cold.
- ▸ Protect product openings from penetration of liquids.

- ▸ Turn off display.
- ▸ Let the display cool off.
- ▸ Spray liquid cleaner on a soft cloth and clean the surface.

### 6.1.2 Machine cleaning

Not applicable.

## 6.2 Disinfection

Recommended disinfectants:
- Schülke & Mayr Microcide
- Incidine liquid (ECOLAB)
- Dürr FD 322 (Dürr Dental)
- Metrix Cavicide (Metrix)

### 6.2.1 Manual disinfection


CAUTION

**Damage due to liquids**
Malfunctions in electrical or mechanical components.
- ▸ Only clean and disinfect the display when it is cold.
- ▸ Protect product openings from penetration of liquids.

- ▸ Turn off display.
- ▸ Let the display cool off.
- ▸ Disinfect the surface by wiping using a soft cloth.

## 6.3 Maintenance

The product does not require regular user maintenance.

# 7 Glossary

| Term | Description |
|---|---|
| Display | Display that is installed on the lamp mounting pole of the treatment unit. |
| OSD menu | On Screen Display: Specific menu for configuring the display. |

# 8 Do safety checks

## 8.1 Bases

The following requirements apply in accordance with VDE 0751-1:
- Perform a safety check every two years and during startup.
- Protection class I
- Device: Fixed.
- Measurement of replacement device leakage current
- Visual inspection of patient unit

KaVo offers a medical device book for keeping an inventory and recording essential master data on the medical device. The medical device book is only required in Germany and is therefore only in German (**Mat. No. 0.789.0480**).

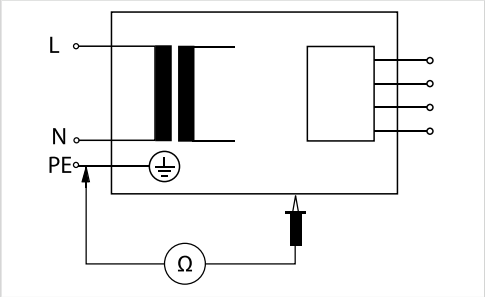
The following measurements must be documented, for example in the medical device book.

- Check the ratings of fuses that are accessible from outside.
- Visually inspect the medical device and accessories
- Protective conductor test according to VDE 0751-1
- Leakage current measurement according to VDE 0751-1
- Medical device function test with reference to accompanying documentation

Should the device be connected into a system, the system manufacturer will determine the system type 2a or 2b and the repeat period for safety checks. The system must be documented and the measuring points added. VDE 0751-1 is to be taken into consideration in its full scope.

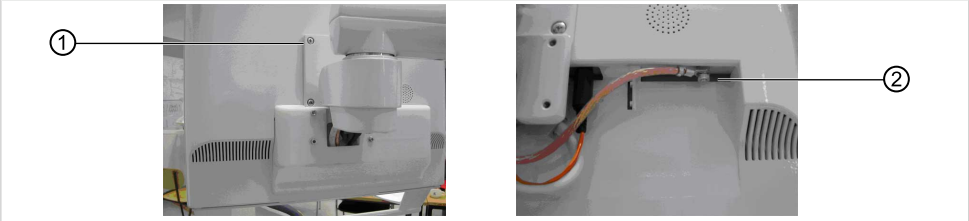
## 8.2 Measurement replacement devices leakage current

### 8.2.1 Measuring the protective conductor resistance




**Note**
Threshold 0.3 Ω

**Requirement**
- The main device switch must be turned on.
- According to EN 606001-1-1 and EN 60601-1, the Signal GND must be additionally connected to the potential equalisation with a line having a cross-section ≥ 4 mm².
- The line with a cross-section of ≥ 4 mm² must be connected to the device-side potential equalisation strip ②.

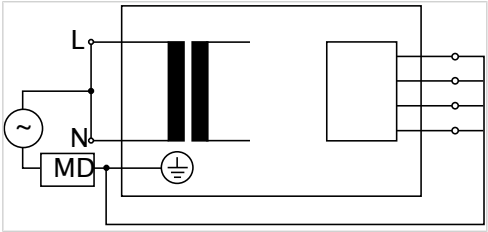



- ▸ Remove the cover on the rear of the display to access the potential equalisation connection.

**or**

- ▸ Sample the measuring point ② after removing the display cover.

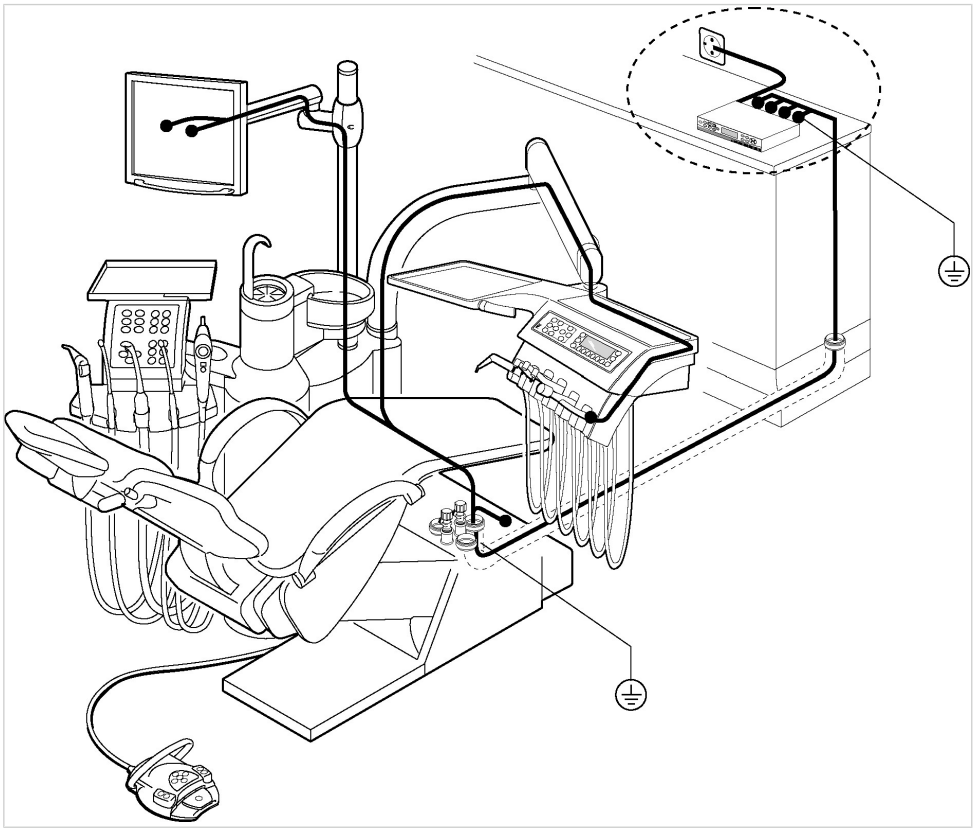
### 8.2.2 Measurement of replacement devices leakage current




**Note**
Threshold 10 mA

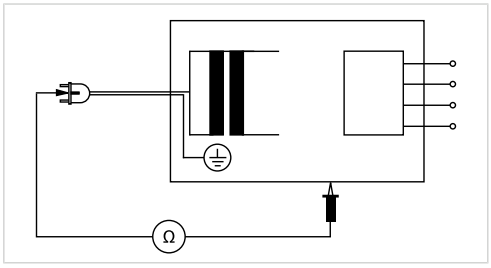
- Disconnect L + N device-side from the mains.
- Connect L and N to the test device.

## 8.3 Measurement of equivalent patient leakage current



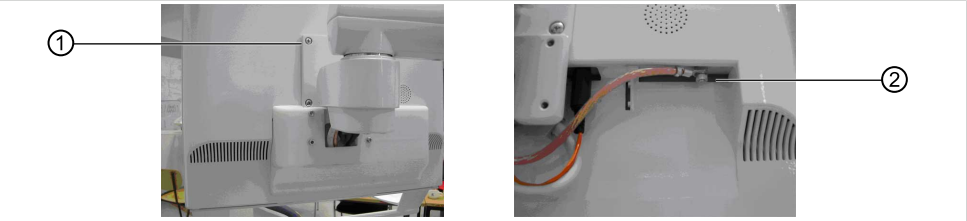
ERGOcom-System as an example of the display supply.

### 8.3.1 Measuring the protective conductor resistance




**Note**
Threshold without the power cable 0.2 Ω
Threshold with the power cable 0.3 Ω

**Requirement**
- The main device switch must be turned on.
- According to EN 606001-1-1 and EN 60601-1, the Signal GND must be additionally connected to the potential equalisation with a line having a cross-section ≥ 4 mm$^2$.
- The line with a cross-section of ≥ 4 mm$^2$ must be connected to the device-side potential equalisation strip ②.

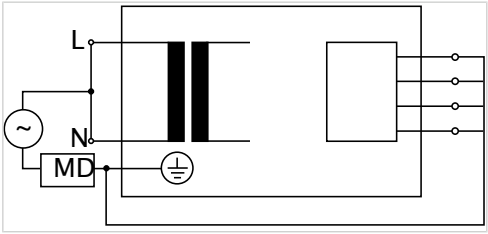



- Remove the cover on the rear of the display to access the potential equalisation connection.

**or**

- Sample the measuring point ② after removing the display cover.

### 8.3.2 Measurement of replacement device leakage current




**Note**
Threshold 1 mA

- Disconnect L + N device-side from the mains.
- Connect L and N to the test device.

## 8.4 Visually inspect the medical device

- Check the display cover for damage.
- Check the display housing for cracks and damage.

**Note**
If the display its damaged, stop working and notify the KaVo Customer Service Center in Warthausen.

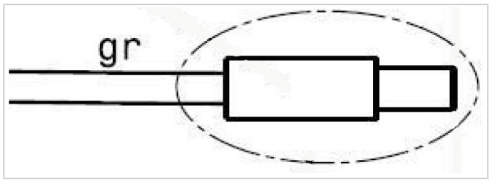
## 8.5 Danger from voltage

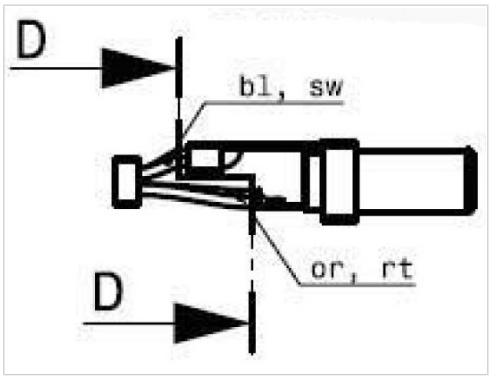
### 8.5.1 Use the correct low-voltage plug

Only use the 17" display and 20" display with a low-voltage plug with the following specifications:
Outer diameter of the contact surface: 5.5 mm
Inner diameter of hole: 2.1 mm

### 8.5.2 Conversion instructions for the 17" display with an old display supply line

When retrofitting a 17" display on an existing ERGOcom2/3 system, exchange the low-voltage plug of the "supply line for the display" with the accompanying low-voltage plug:




Soldering view

or, rd (12VDV)
bl, bk (GND)

# 9 Data on electromagnetic compatibility according to EN60601-1-2

## 9.1 Electromagnetic Transmissions

The display is for use in an environment like the one cited below. The customer or user of the display should ensure that it is used in the correct environment.

| Measurements of noise transmissions | Conformance | Electromagnetic environment - hints |
|---|---|---|
| HF-transmissions according to CISPR 11 | Group 1 | The display 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. |
| HF transmission according to CISPR 11 | Class B | The display is for use in all facilities including residential ones, and facilities that are directly connected to a public power supply that also supplies residential buildings. |
| Transmissions of harmonics according to IEC 61000-3-2 | Class A | The display is for use in all facilities including residential ones, and facilities that are directly connected to a public power supply that also supplies residential buildings. |
| Transmissions of voltage fluctuations or flicker according to IEC 61000-3-3 | Conforms | The display is for use in all facilities including residential ones, and facilities that are directly connected to a public power supply that also supplies residential buildings. |

## 9.2 Resistance to electromagnetic interference

The display is for use in an environment like the one cited below. The customer or user of the display should ensure that it is used in the correct environment.

| Immunity tests | IEC 60601 test level | Conformance level | Electromagnetic environment - guidelines |
|---|---|---|---|
| Electrostatic discharge (ESD) according to IEC 61000-4-2 | ± 6 kV contact discharge<br>± 8 kV atmospheric discharge | ± 2/4/6 kV contact discharge<br>± 2/4/8 kV atmospheric discharge | 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%. |
| Fast transient electrical disturbances/ Bursts according to IEC 61000-4-4 | ± 2 kV for power lines<br>± 1 kV for input and output lines | ± 2 kV for power lines | The quality of the supply voltage should correspond to that of a typical business or hospital environment. |
| Surges according to IEC 61000-4-5 | ± 1 kV Push-pull voltage<br>± 2 kV common mode voltage | ± 1 kV Push-pull voltage<br>± 2 kV common mode voltage | The quality of the supply voltage should correspond to that of a typical business or hospital environment. |
| Voltage interruptions, short-term interruptions and fluctuations of the supply voltage according to IEC 61000-4-11 | < 5% $U_T$<br>(>95% interruption)<br>for 1/2 period<br>40 % $U_T$<br>(60% interruption)<br>for 5 periods<br>70 % $U_T$<br>(30 % interruption)<br>for 25 periods<br>< 5% $U_T$<br>(>95% interruption)<br>for 5 s<br>(250 periods) | < 5% $U_T$<br>(>95% interruption)<br>for 1/2 period<br>40 % $U_T$<br>(60% interruption)<br>for 5 periods<br>70 % $U_T$<br>(30 % interruption)<br>for 25 periods<br>< 5% $U_T$<br>(>95% interruption)<br>for 5 s<br>(250 periods) | The quality of the supply voltage should correspond to that of a typical business or hospital environment. When the user of the display needs continued operation even when the power supply is interrupted, it is recommended to supply the display from an uninterrupted power supply or a battery. |
| Magnetic field with a supply frequency (50/60 Hz) according to IEC 61000-4-8 | 3 A/m | 3 A/m | Magnetic fields at the mains frequency should correspond to typical values in a business and hospital environment. |

Note: $V_t$ is the alternating mains voltage before the test level is used.

## 9.3 Resistance to electromagnetic interference

The display is for use in an environment like the one cited below. The customer or user of the display should ensure that it is used in the correct environment.

| Immunity tests | IEC 60601 test level | Conformance level | Electromagnetic environment - guidelines |
|---|---|---|---|
| Conducted HF disturbances according to IEC 61000-4-6<br>Radiated HF disturbances according to IEC 61000-4-3 | 3 $V_{eff}$<br>150 MHz to 80 MHz<br>Outside ISM bands[a]<br>3 V/m<br>80 MHz to 2.5 GHz | 3 $V_{eff}$<br>3 V/m | Portable and mobile radio devices should not be used closer to the display including the wires, than the recommenced safe distance calculated using the equation for the transmission frequency.<br>Recommended safe distance:<br>$d = 1.17\sqrt{P}$<br>$d = 1.17\sqrt{P}$ for 80 MHz to 800 MHz<br>$d = 2.33\sqrt{P}$ for 800 MHz to 2.5 MHz<br>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).<br>[b]The field strength of stationary radio transmitters should be less than the conformance level at all frequencies in an on-site check[c].<br>[d]Disturbances are possible close to devices that have the following symbol.  |

Comment 1: At 80 MHz and 800 MHz, the higher frequency range applies.
Comment 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 location on which the display is used, exceeds the conformity level, the display should be watched to ensure that it is functioning as per the correct usage. Should unusual performance features be observed, additional measures may be required, such as e.g. a different alignment or another location for the display.

[d] Within the frequency range of 150 kHz to 80 MHz, the field strength should be less than $3V_{eff}$ V/m.

## 9.4 Recommended safe distance between portable and mobile HF telecommunications equipment and the display

The display is intended for use in an electromagnetic environment in which HF disturbances are controlled. The customer or the user of the display can help prevent electromagnetic disturbances by maintaining the minimum distance between portable and mobile HF telecommunications devices (transmitters) and the display depending on the output of the communication device as indicated below.
Safe distance depending on the transmission frequency:

| Rated power of the transmitter in W | 150 kHz to 80 MHz<br>$d=1.17\sqrt{P}$ m | 80 MHz to 800 MHz<br>$d=1.17\sqrt{P}$ m | 800 MHz to 2.5 GHz<br>$d=2.33\sqrt{P}$ m |
|---|---|---|---|
| 0,01 | 0,1 | 0,1 | 0,2 |
| 0,1 | 0,4 | 0,4 | 0,7 |
| 1 | 1,2 | 1,2 | 2,3 |
| 10 | 3,7 | 3,7 | 7,4 |
| 100 | 11,7 | 11,7 | 23,3 |

For transmitters whose maximum rated power is not in the above table, the recommended safe distance d in meters (m) can be calculated using the equation for the respective gap, where P is the maximum rated power of the transmitter in Watts (W) according to the manufacturer's information.
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.

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