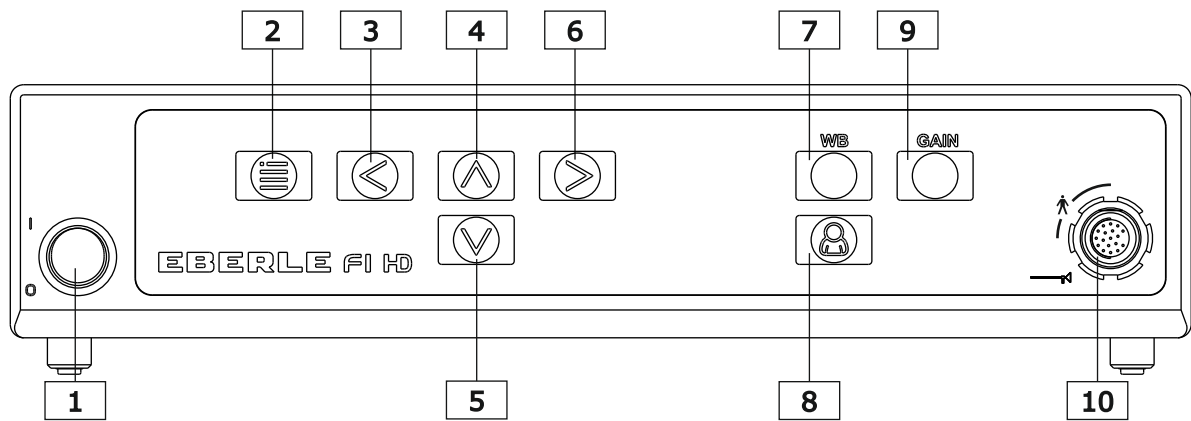
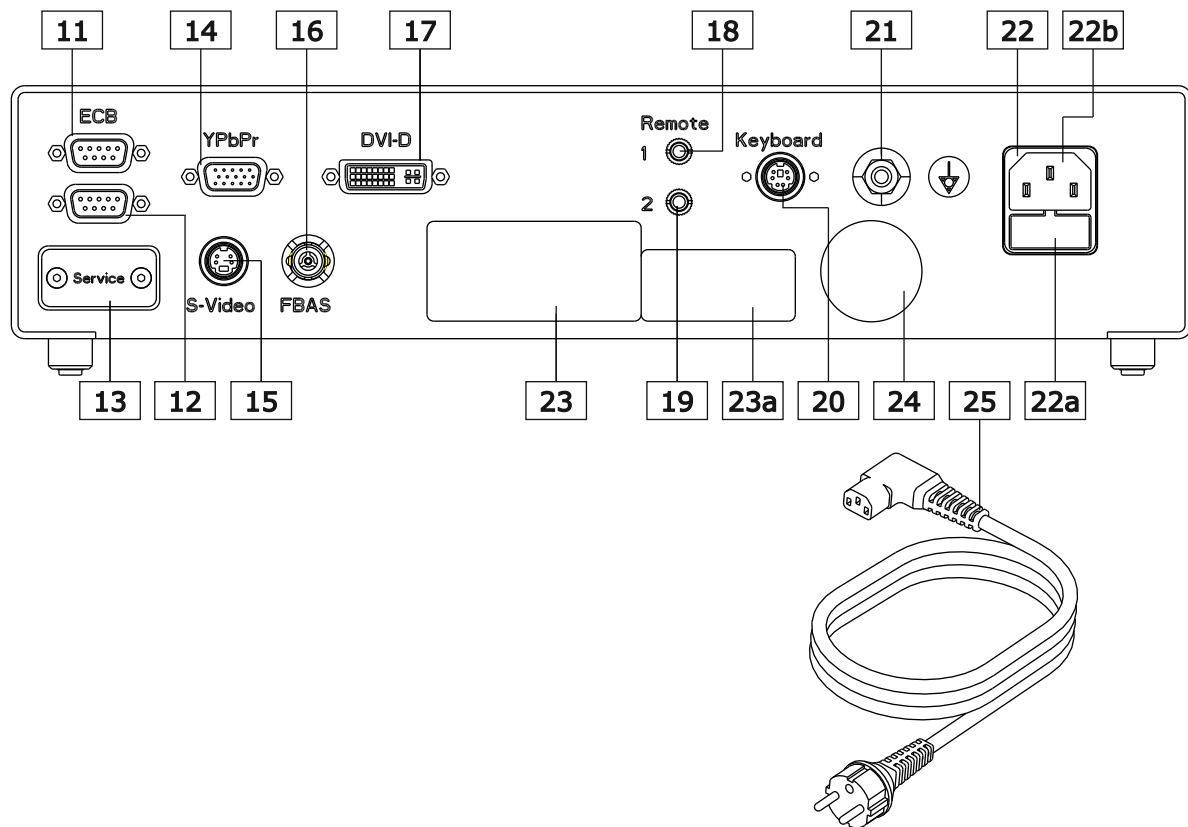




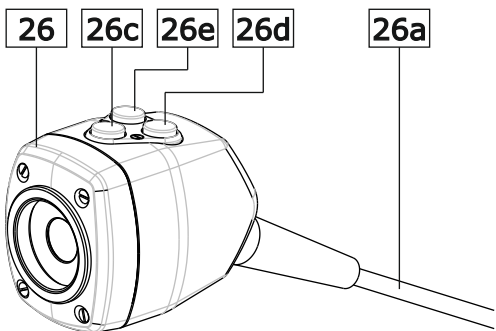


- |    |                           |
|----|---------------------------|
| 1  | Power switch              |
| 2  | Key "menu"                |
| 3  | Navigation key left       |
| 4  | Navigation key up         |
| 5  | Navigation key down       |
| 6  | Navigation key right      |
| 7  | Key WB (white balance)    |
| 8  | Key User                  |
| 9  | Key GAIN                  |
| 10 | Connector for camera head |

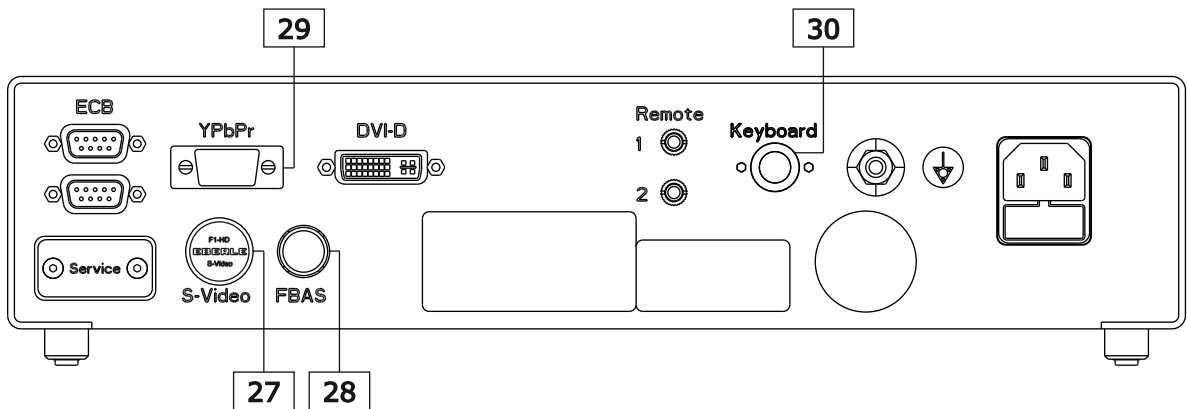


|     |                                 |
|-----|---------------------------------|
| 11  | ECB (external communication)    |
| 12  | ECB (external communication)    |
| 13  | Service port                    |
| 14  | Connection YPbPr                |
| 15  | Connection S-Video              |
| 16  | Connection FBAS (Composite)     |
| 17  | Connection DVI-D                |
| 18  | Connection Remote 1             |
| 19  | Connection Remote 2             |
| 20  | Connection Keyboard             |
| 21  | Equipotential bonding           |
| 22  | Power connector                 |
| 22a | Mains fuse box with fuse holder |
| 22b | Connector for power plug        |
| 23  | Type plate                      |
| 23a | Type plate                      |
| 24  | Certification label             |
| 25  | Mains power cable               |

**Camera Head**



|     |                                  |
|-----|----------------------------------|
| 26  | Camera head                      |
| 26a | Connecting cable                 |
| 26b | Plug                             |
| 26c | Key middle (freely programmable) |
| 26d | Key left (freely programmable)   |
| 26e | Key right (freely programmable)  |



|    |                       |
|----|-----------------------|
| 27 | Shielded cap S-Video  |
| 28 | Shielded cap FBAS     |
| 29 | Shielded cap YPbPr    |
| 30 | Shielded cap Keyboard |



The Shielded cap [27] - [30] for the connections [14], [15], [16] and [20] are to be installed on the unit if these connections are not used.

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## **1. General Information, Description, and Field of Application**

The EBERLE Endoscopic Camera System F1HD, consisting of a control unit and camera head, was developed for use in the area of endoscopy. It serves as video support during medical endoscopic procedures.



The Endoscopic Camera System F1HD shall only be used by skilled and trained expert staff, while permanently monitoring the user's application, in the designated medical facilities!

The EBERLE Endoscopic Camera System F1HD has a video camera (camera head) for fastening to rigid and flexible endoscopes or microscopes. It is not intended for any other use! Users without the appropriate training and qualification for carrying out endoscopic surgery may not use the system.

Please read these operating instructions carefully before using the camera system for the first time. They contain all necessary information to ensure correct connection and operation of the device. In addition, the required safety and cleaning instructions are mentioned and explained.

Keep these operating instructions in a safe and easily accessible place for future reference.



Applying or operating the device in non-conformance to these operating instructions can injure the patient and/or the operator and can damage the camera system!

We thank you for your confidence and wish you much success with the EBERLE Endoscopic Camera System F1HD!

## **2. Scope of Delivery**

After delivery of the camera system, at first the packaging should be checked for external damage.

The following parts are included in the delivery of the endoscopic camera system F1HD (art. no. 913033):

|   |                                                |                      |
|---|------------------------------------------------|----------------------|
| 1 | Control unit of endoscopic camera system F1HD  | article no. 913029   |
| 1 | Camera head [26] endoscopic camera system F1HD | article no. 913032   |
| 1 | DVI connecting cable                           | article no. 913037   |
| 1 | BNC connecting cable                           | article no. 913038   |
| 1 | USB/PS/2-adapter                               | article no. 71-00775 |
| 1 | S-Video connecting cable                       | article no. 913042   |
| 1 | Mains power cable 1.8m [25]                    | article no. 913035   |
| 1 | Shielded set                                   | article no. 70-00151 |
|   | Operating instructions F1HD                    |                      |

Should one or several components be damaged or found to be missing, please immediately contact an EBERLE representative or an authorized service or distribution centre.

### 3. Symbol definitions

|                                                                                     |                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | Triangular icons advise the user to important information that must be observed.                                                                                                                                      |
|    | Circular icons with a diagonal bar indicate actions that are prohibited.                                                                                                                                              |
|    | This symbol alerts the user to an information that must be observed. Failure to observe this information can result in patient or user injury and / or damage the unit.                                               |
|    | This symbol alerts the user that the instructions for use must be followed.                                                                                                                                           |
|    | This symbol alerts the user to follow the operating instructions.                                                                                                                                                     |
|    | This symbol on the packaging, instruction manuals, and / or the device indicates that this product shall not be treated as consumer waste. The correct disposal will help to prevent health or environmental impacts. |
|  | This symbol represents a device with one or several application parts of type B.                                                                                                                                      |
|  | This symbol represents a device with one or several application parts of type BF.                                                                                                                                     |
|  | This symbol on the packaging indicates the upper and lower storage temperature for the device.                                                                                                                        |
|  | This symbol on the packaging indicates the upper and lower humidity limits for the device.                                                                                                                            |
|  | This circular symbol indicates that products with damaged packaging must not be used.                                                                                                                                 |
|  | This symbol identifies products that have been sterilized in the final packaging and additional the sterilization process, in the illustrated case, the sterilization with ethylene oxide.                            |

### 3.1 Safety Instructions and Warnings

|                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | Applying or operating the camera not in accordance with these operating instructions can result in the patient and / or the operator being injured and in components of the camera being damaged!                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|    | <p>Electrical medical devices and appliances underlie special requirements, need special measures pertaining to the electrical safety and electromagnetic interferences / environment. The installation of premises and devices must correspond to the requirements of the applying standards and to the applicable national regulations (also refer to chapter 11)! The camera system is only reliably grounded, if the control unit is connected to a CEE 7/4 Schuko socket. Routinely check the plug and the cable and do not use in case of damage!</p> <p>The camera system may only be switched on, once all connecting cables have been completely connected. Prior to every application, check the camera system and with regard to damages and operational capability!</p> <p>If HF surgery is used, the "applied part" of the shaver system is to be removed from the patient. Mobile HF communication devices such as GSM telephones can also influence electrical medical devices! Do not operate these devices near electrical medical devices and keep them a distance of at least 30cm away!</p> <p>Applying HF surgery in the direct vicinity of the camera system may result in the picture dropping out and in noise!</p> <p>Place the control unit of the camera system out of the reach of the patient on a secure base.</p> <p>For the operation, please observe the permissible environmental conditions!</p> |
|  | Do not operate the camera system in an area exposed to explosion hazards. When using ignitable anaesthetic gases in the close vicinity of the light source there is a risk of explosion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|  | The device must be disconnected from the mains prior to any kind of maintenance, cleaning or disinfection procedures. The external surfaces of the camera system can be cleaned with a disinfectant and cleaning agent that preserves the varnish. Attention must be paid that no liquid enters the device!                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|  | Do not open the device! Risk of electric shock! Arbitrary opening, repairing or modifying of the device absolves us from any liability regarding the operational safety of the system and leads to expiry of any claims whatsoever during the period of warranty!                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|  | <p>The camera system serves to display an image of the surgical area on a monitor. The device does not have any significant performance features as defined by the standard aside from the clinical functions described.. In case of faults, operate the camera system separated from possibly disturbing sources. In the event the camera system malfunctions (e.g. due to excess voltage), please have a replacement unit in store! Alternatively, the surgery procedure can be continued by removing the camera head and by using the lense directly</p> <p>Avoid using the camera system in the immediate vicinity of other devices or stacked together with other devices, this may result in malfunctioning. If no other type of assembly is possible, the devices need to be monitored and proper functioning must be checked.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

|                                                                                   |                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Using incompatible third-party components and cables may result in the patient and/or the operator being endangered or injured and may influence the service capability of the camera system pertaining to electromagnetic interferences! |
|                                                                                   | The operating time of the camera system should correspond to the usual application cycle.                                                                                                                                                 |

#### 4. Connection and Start-Up of Device

All components should again be visually checked for any signs of damage before connecting and starting the device.

|                                                                                   |                                                                                                                                                               |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | A damaged packaging can lead to unsterile or damaged parts. Damaged parts and parts from damaged sterile packaging must not be used and replaced immediately! |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|

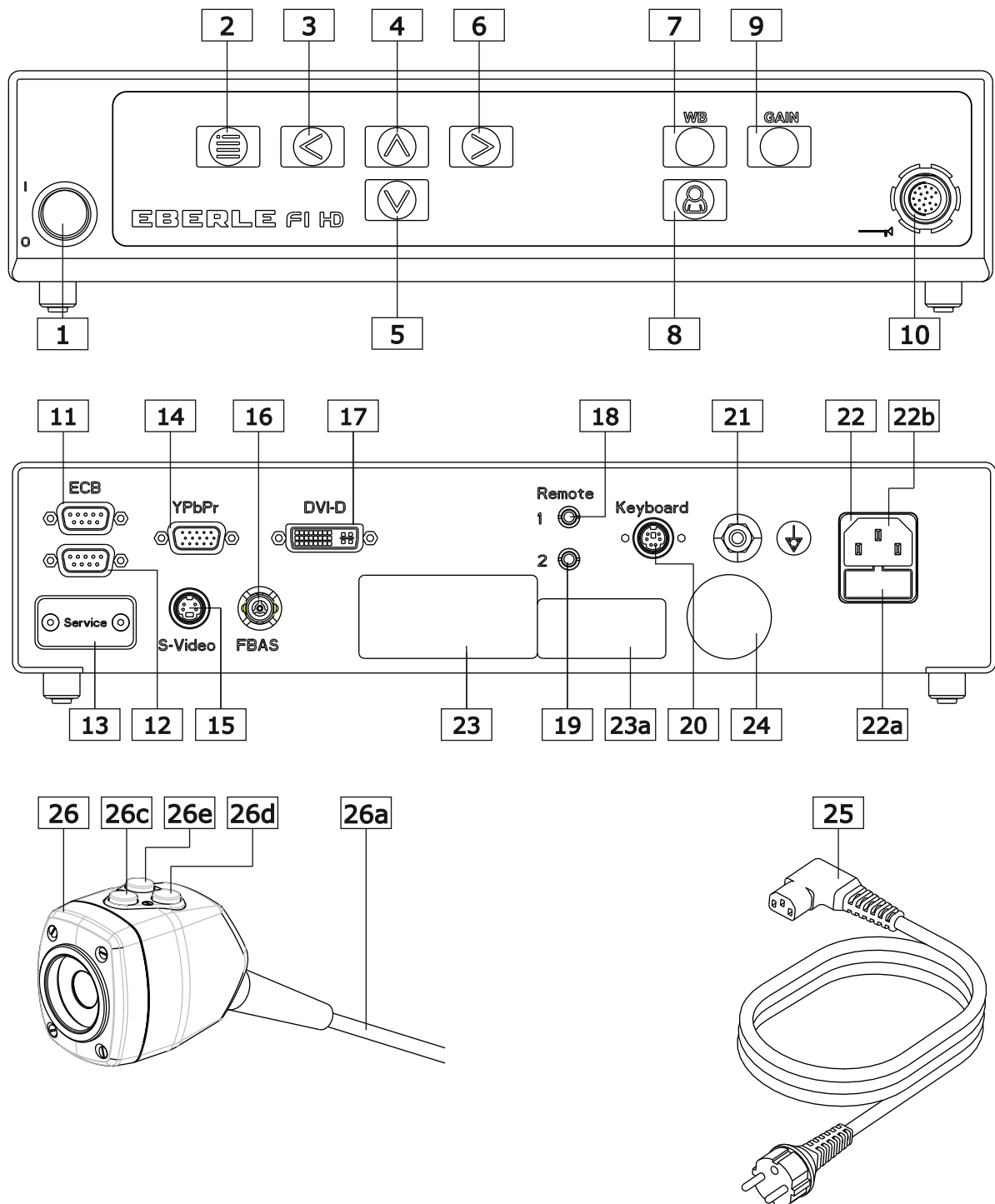
|                                                                                   |                                                                                            |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
|  | The sequence for connecting and starting the device, shown below, must always be observed. |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|

Please proceed as described below:

- Switch off power switch [1] at the front of the control unit casing (position **0**)
- Plug the mains power cable [25] into the connector [22] at the back of the device; now connect to the mains power supply.
- Connect the camera to the monitor
- If required, connect the keyboard to the back of the control unit casing (to use the integrated title generator)
- If required, connect the camera system to a recorder (for remote controlling of the recorder, use the two remote outlets [18/19] at the back of the casing)
- Establish equipotential bonding [21] (if required, by qualified personnel)
- Connect the connector plug [26b] of the camera head [26] to the connector [10] at the front of the control unit casing, please observe the markings.
- Switch on power switch [1] at the front of the control unit casing (position **I**) and check the operating controls for correct functioning.
- Now, continue with the white balance. Hold the camera head [26] with screwed on lens (all lenses equipped with C-mount screw thread can be used with the camera head [26]) against an evenly illuminated white sheet of paper and press the key WB (white balance) [7] at the front of the casing.

**The device is now ready for operation!**

## 5. Operation



### 5.1 Assignment of Keys

#### Power switch [1]

The device is switched on by pressing the power switch.  
The power switch has two switch positions:

|   |     |          |
|---|-----|----------|
| I | ON  | switched |
| O | OFF | off      |

A green indicator lamp lights up, when the device is switched on.

### Key Menu [2]

User settings can be adjusted via the **On Screen Display**. When this key is pressed for about two seconds, the menu of the camera is activated. The key lights up, when the menu has been activated.

### Navigation keys [3-6]

Menu items can be selected or settings can be applied by means of these keys.

### Key WB (white balance) [7]

The white balance of the camera is performed with the key white balance.

### Key User [8]

Switch-over between different application profiles.

### Key GAIN [9]

Decreases or increases the maximum value of the dynamic amplifier performance. The camera automatically decreases the amplifier performance, when the picture field is sufficiently illuminated.

## 5.2 Connections

|                                                                                     |                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | The devices connected to this system, such as monitors or documentation systems, and the disconnecting, modernizing, or updating of such can bear risks/hazards to the patient or operator that cannot be assessed by the manufacturer. The operator of the devices is responsible for identifying and assessing such risks. |
|  | The devices connected to this system must comply with the requirements of IEC 60601-1. The used cable connections must always have double insulation for extra-low voltage (SELV).                                                                                                                                           |
|  | Never touch the patient and the connections on the control unit at the same time!                                                                                                                                                                                                                                            |

### ECB [11/12]

Coded connection (Eberle Communication BUS)

|                                                                                     |                                                                                                                                                    |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
|  | The ECB port is used for the mutual control of Eberle devices. Only use EBERLE approved equipment and connecting cables for connection to the ECB. |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|

### Service Port [13]

Service and diagnostic port

|                                                                                     |                                                                                                                  |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
|  | The service port is for diagnostics, and may be used only by authorized personnel and for service purposes only. |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|

### YPbPr [14]

Component video signal outlet for connection to a compatible device.

**S-Video (Y/C) [15]**

For the output of an S-video signal to a compatible device.

**FBAS (Composite) [16]**

For the output of a composite video signal to a compatible device.

**DVI-D [17]**

For the output of a HD-video signal to a compatible device.

**Remote 1+2 [18/19]**

For the connection of remote cables, by means of which signals can be transmitted, from the keys [26a-c] at the camera head [26], for the operating of compatible video accessories.

**Keyboard [20]**

By means of a connected keyboard it is possible to display any text on the video image. The text remains on the image or video recording. One line with X characters is available.

The following functions are provided:

ESC hide or unhide text

**Equipotential bonding [21]**

Generally, the control unit is earthed by the 3-pin safety plug, if it is connected – as stipulated - to an earthed power cable. When this device is operated in rooms of application group 2 according to DIN VDE 0107 it is indispensable that the device is connected to the stationary equipotential bonding of the room or of the medical device cart by a corresponding cable. The device has an according plug connector for this (according to DIN 42801).

**Power connector [22]**

The plug of the power cable is connected to this inlet connector for non-heating apparatus [22]. Only use the delivered mains power cable [25]. The fuses of the device are located in the fuse holder [22a]. Please only use the fuse types that are mentioned on the type plate [23]! How to exchange the fuses is explained in the service chapter of these operating instructions.

**5.3 Menu Settings**

In the **On Screen Menu** mode it is possible to change various functions and parameters according to individual requirements. With the menu key  [2] either the adjusting field of the menu item itself is entered or it is changed directly. By means of the menu item "Exit" it is possible to exit the menu navigation.

| Menu     |                    | Function                                                             |
|----------|--------------------|----------------------------------------------------------------------|
| Picture  |                    |                                                                      |
|          | Red                | Changes the red content of the camera picture                        |
|          | Green              | Changes the green content of the camera picture                      |
|          | Blue               | Changes the blue content of the camera picture                       |
|          | Saturation         | Changes the colour saturation of the camera picture                  |
|          | Brightness         | Changes the brightness of the camera picture                         |
|          | Gamma              | Changing of the gamma value                                          |
|          | Window             | Changes the size of the measurement window<br>(small / middle / big) |
|          | Detail Enhancement | Changes the Detail Enhancement<br>(high / off / low / middle)        |
|          | Red detail         | Changes the red shade amplification<br>(low / high / off)            |
|          | moire filter       | Changes the moire filter<br>(low / middle / high / off)              |
|          | save and exit      |                                                                      |
| Language |                    |                                                                      |
|          | Deutsch            |                                                                      |
|          | English            |                                                                      |
|          | Espanol            |                                                                      |
|          | Italiano           |                                                                      |
|          | Francais           |                                                                      |
|          | Portugues          |                                                                      |
|          | save and exit      |                                                                      |
| Settings |                    |                                                                      |
|          | HD Format          | 720p<br>480p_576p<br>1080p<br>1080i                                  |
|          | Frequency          | 59,94Hz<br>50Hz                                                      |
|          | Output Format      | YPbPr422<br>YPbPr444<br>RGB                                          |
|          | RGB Output Range   | only if output format RGB                                            |
|          | SD Output Format   | Letterbox<br>Sidecut<br>Squeeze                                      |

| Menu                |                  | Function                                                                     |
|---------------------|------------------|------------------------------------------------------------------------------|
|                     | Analog Format    | RGB<br>YPbPr                                                                 |
|                     | Head Button L    | White Balance<br>Gain<br>Red detail<br>Light Intensity<br>None<br>Brightness |
|                     | Head Button M    | Main Menu<br>None                                                            |
|                     | Head Button R    | Gain<br>Red detail<br>Light Intensity<br>None<br>Brightness<br>White Balance |
|                     | Factory settings | Resets all settings back to the factory setting                              |
|                     | save and exit    |                                                                              |
| Image<br>H-Position |                  |                                                                              |
|                     | -25 <> +25       | Changes the horizontal position of the image                                 |
| Image<br>V-Position |                  |                                                                              |
|                     | -50 <> +50       | Changes the vertical position of the image                                   |
| save and exit       |                  |                                                                              |

## 6. Device-specific Symbols

|                                                                                   |                                           |
|-----------------------------------------------------------------------------------|-------------------------------------------|
|  | Key Menu [2]                              |
|  | Navigation key left [3]                   |
|  | Navigation key up [4]                     |
|  | Navigation key down [5]                   |
|  | Navigation key right [6]                  |
| WB                                                                                | Key WB (white balance) [7]                |
|  | Key User [8]                              |
| GAIN                                                                              | Key GAIN [9]                              |
| I                                                                                 | Power switch on [1]                       |
| 0                                                                                 | Power switch off [1]                      |
|  | Connector for camera head [10]            |
|  | Connection for equipotential bonding [21] |

## 7. Using the keyboard

The EBERLE Endoscopic Camera System F1HD has a PS/2 keyboard connection, which makes a series of useful additional functions possible. The functions can be actuated via a PS/2 keyboard. (Keyboard not included in the scope of delivery).

|                                                                                     |                                                                                                                                                              |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | The keyboard is not a patient application part and may therefore <b>not</b> come into contact with the patient or be put down in the patient's surroundings. |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|

Using the keyboard, the display of the date/time or stopwatch on the monitor screen can be controlled, and individual titles can be created.

In order to make the use of frequently required titles easier, up to 10 title pages can be saved and called up at will. Furthermore, the expert menu can also be operated via the keyboard.

### 7.1. Function allocation of the keys

The EBERLE Endoscopic Camera System F1HD has a PS/2 keyboard connection, which makes a series of useful additional functions possible. The functions can be actuated via a PS/2 keyboard. (Keyboard not included in the scope of delivery).

|          |                        |
|----------|------------------------|
| F1       | Show date/time         |
| Alt + F1 | Set date/time          |
| F2       | Show stopwatch         |
| F3       | Stopwatch – Start/Stop |
| Alt + F3 | Reset stopwatch        |

|                        |                                            |
|------------------------|--------------------------------------------|
| <b>F4</b>              | Show title                                 |
| <b>Alt</b> + <b>F4</b> | Create title                               |
| <b>page↑</b>           | Scroll title pages (forwards)              |
| <b>page↓</b>           | Scroll title pages (backwards)             |
| <b>F10</b>             | Save                                       |
| <b>F12</b>             | Show expert menu                           |
| <b>ESC</b>             | Exit without saving                        |
| <b>←</b>               | Navigation to the left in the expert menu  |
| <b>→</b>               | Navigation to the right in the expert menu |
| <b>↑</b>               | Navigation upward in the expert menu       |
| <b>↓</b>               | Navigation downward in the expert menu     |
| <b>Enter</b>           | Input confirmation in the expert menu      |

### Stopwatch

By pressing the **F2** key, a stopwatch can be displayed on the screen. To start or stop the stopwatch, press the **F3** key.

The stopwatch is reset by pressing the **Alt** and **F3** keys simultaneously. Pressing the **F2** key again makes the stopwatch disappear.

#### Note:

The stopwatch continues to run, even after it disappears from the display.

### Create title

With the built-in title generator, titles up to 5 lines in length with a maximum of 24 characters per line can be created. Up to 10 title pages can be saved.

To create the titles, press the **Alt** and **F4** keys simultaneously. In the top left-hand corner of the screen, a flashing cursor will appear. Using the arrow keys, the cursor can be moved to any place on the screen. Then enter the title using the letter and number keys on the keyboard.

To insert a single character in a title, place the cursor at the desired spot and enter the desired character.

To delete a single character, place the cursor at the desired spot and enter [space].

The entered text will be saved automatically if one goes to the next page or if the "Create title" operating mode is exited.

By pressing the **Bild↑** or **Bild↓** key, one can scroll forwards or backwards.

By pressing the **Alt** and **F4** keys simultaneously, the "Create title" operating mode is exited. The titles will continue to be displayed, but changes will no longer be possible.

By pressing the **F4** key, titles can be hidden, but will still remain saved.

### Multiple displays

Title, date/time and stopwatch can be displayed on the screen simultaneously by pressing the corresponding function keys.

## 8. Preparation of Device and of Accessories

Prior to the first use the device must be cleaned in accordance with the procedure described under point 8.1. It cannot be sterilized.

The cleaning, disinfection, and sterilization methods apply that are listed in these or in other instructions that may possibly be included in the delivery of the device or of the accessories. This does not apply to accordingly designated, disposable articles that come in sterile packing

Insufficient cleaning, disinfection, and/or sterilization can result in the patient and/or the operator being infected. The operator is responsible for the validation of these processes.

### 8.1. Cleaning the system

The outer surfaces of the camera system can be cleaned and disinfected with a disinfectant or cleaning agent for spray/wipe disinfection. Here, always observe the specifications of the disinfectant manufacturer, DGHM / VAH as well as RKI with regard to concentration and reaction times.

Recommended cleaning agent  
and application:

Bacillol® AF, BODE Chemie GmbH, Hamburg  
Spray and wipe disinfection  
Undiluted, 5 min.

|                                                                                     |                                                                                               |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
|  | Disconnect the device from the mains supply prior to any cleaning and disinfecting procedure! |
|  | When cleaning the device please pay attention that no liquid enters the casing!               |

### 8.2. Cleaning of the Camera Head

|                                                                                     |                                                                                                                                                                                               |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Before the first as well as every additional use, clean and disinfect the camera head. When using sterile camera covers and tubes, disinfect the camera head before using for the first time. |
|                                                                                     | If an improperly processed/protected camera head is used, there is a danger of infection!                                                                                                     |
|                                                                                     | The camera head [26] cannot withstand temperatures above 60°C and must not be autoclaved!                                                                                                     |
|                                                                                     | Do not use ultrasound for processing!                                                                                                                                                         |

**Manufacturer information for reprocessing resterilizable instruments in acc. with DIN EN ISO 17664**

These instructions describe the procedure for the cleaning or proper hygienic processing of EBERLE camera heads. The reprocessing procedure given in this is valid for all these EBERLE camera heads and was validated by an independent institute.

When processing EBERLE camera heads, please observe the national regulations valid for the reprocessing of medical products as well as the instructions/requirements of the cleaning agent and disinfectant used by you.

Fundamentally, it does not matter whether reprocessing is carried out decentrally or centrally. In decentralized departments, the responsible person is to be named or to be put under the ZSVA management. In the following descriptions, all responsible persons are subsumed under the management of ZSVA.

**Cleaning preparation**Procedure:

- TDisconnect the camera head [26] from the control unit and remove the endoscope from the lens and pass the camera head on for its processing.

Information:

- Immediately processing the EBERLE camera head after the operative procedure can minimize the drying on of operation residue and will make the subsequent cleaning and disinfection process easier.
- Please also observe the legal regulations of your country as well as your facilities to protect the user from contamination.
- Please select suitable transport packaging to protect the product from damage (return tray/bowl, etc.) and avoid overloads.

**Manual pre-cleaning**

Manual cleaning is not a component of the RKI guidelines. When carrying out cleaning, observe the valid provisions and regulations for occupational safety.

Auxiliary materials:

- pH-neutral solution
- Plastic cleaning brush
- Lint-free cloth

Procedure:

- Thoroughly rinse and clean the camera head with deionized water, possibly using a plastic cleaning brush.
- Wipe off with lint-free cloths.
- Dry

Recommendations:

- Pre-rinse and remove residues, such as blood, fat, soft tissues, secretions, etc. with a pH-neutral solution using cold, running water while using your cleaning brush.
- Prepare fresh disinfection solution taking the defined concentration, reaction time and spectrum into account according to the manufacturer specifications.
- Carry out final rinsing with fully deionized, sterile water.
- The camera head should be dried with a lint-free cloth and compressed air.

**Validated processing procedure**

The cleaning and disinfection of EBERLE camera heads must be validated by the preparing body.

A successful validation could be achieved with the following process steps.

**Disinfection**

The materials of the EBERLE camera head are resistant to most chemical compounds used in the cleaning/disinfection process, such as aldehydes, tensides, dilute acids, bases with a pH value ranging from 3 to 12.

Auxiliary materials:

- Cleaning/disinfection containers
- Sekusept Plus (from ECOLAB / mildly alkaline, pH 8-9) 4 %

Procedure:

1. Prepare disinfectant and cleaning solution with 4% concentration according to the manufacturer specifications.
2. Put the camera head in a 15-minute immersion bath.
3. Thoroughly rinse the camera head with deionized water for 2 minutes.
4. Dry the camera head using a lint-free cloth and compressed air.

Notes:

- Do not use any highly concentrated acids or bases for cleaning/disinfection as these can attack the product label and plastics.
- Do not carry out chemo-thermal processing.
- Make sure that the plug contacts [26b] are completely dry.

**Post-treatment / inspection**Auxiliary material:

- Magnifying glass

Procedure:

- Assessment / inspection of cleaning, possibly manual re-cleaning (derivation of measures)
- Check the camera head for visible residual contamination as well as visible damage, breakage, deformation or cuts on the connection cable.

Information:

- A damaged camera head can lead to faulty images or function failures and must be exchanged immediately.

**Packaging**Auxiliary materials:

- Single packaging
- Tray

Procedure:

- Pack and seal the camera head in the bag.

Alternative procedure:

- Place the head in the tray, pack the tray using a suitable method.

Information:

- With the choice of packaging for the camera head, make sure that damage due to other instruments, damage to the seal as well as recontamination are ruled out.

**General information for processing the camera head**

Always observe the valid national regulations in your country for reprocessing medical products.

On the part of the manufacturer, it is ensured that the above-named processing methods for processing EBERLE camera heads are suitable for their reprocessing. The operator of the system is responsible for carrying out reprocessing as well as validating and monitoring the process and the results. A deviation in the method given here, such as the use of other process chemicals, must be investigated and assessed by the processor for their effectiveness and any negative consequences arising from them.

The product service life of the camera head is independent of the useful life. Multiple reprocessing has no influence on the product service life of EBERLE camera heads.

**9. Service, Maintenance, Inspection, and Disposal**

Defective devices may only be repaired by authorized and qualified persons and only by using original parts.

The mains fuse can be exchanged by local qualified personnel as described below:

- Switch off power switch [1] at the front of casing (position O)
- Disconnect the power plug [25] and the equipotential bonding [21] from the device
- With a slotted screwdriver or any other suitable tool lift the mains fuse holder out of the mains fuse box [22a]
- Remove the defective fuses and insert new fuses in accordance with type plate [23]
- Insert mains fuse holder into mains fuse box [22a]
- Connect power plug [25] and equipotential bonding [21]
- Switch on power switch [1] (position I)

Regular maintenance can help to detect defects and malfunctions at an early stage and thus to possibly extend the service life of the device; however, it is not compulsory.

Independent of the country-specific safety regulations (e.g. accident prevention regulation, inspection interval regulations), we recommend a yearly function and safety inspection according to EN 62353; VDE 0751-1 by an authorized service centre. This inspection should be shown on the rear of the device by means of a sticker.

National regulations are to be observed, should it become necessary to dispose of the device. The returned device must be accompanied by a proof of disinfection.

**10. Trouble Shooting**

| <b>Symptom</b>                                                                                         | <b>Possible Cause</b>                                                                                                                        | <b>Remedy</b>                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Malfunction of device<br>- out of operation<br>- power switch on<br>- power switch light is off        | - power supply failed<br>- mains fuse defective                                                                                              | - check power supply<br>- exchange fuse of device                                                                                                        |
| No picture, monitor is dark<br>- power is supplied                                                     | - Camera cable [26a] not plugged in<br>- camera electronics defective<br>- monitor defective<br>- incorrect display source chosen at monitor | - correctly connect camera cable [26a]<br>- contact service centre<br>- contact service centre<br>- adjust display source at monitor or at camera system |
| Cloudy picture, stripes, streaks, and similar                                                          | - optics of the endoscope or of the camera lens dirty<br>- contacts of the plug control unit / camera head [26] dirty                        | - clean with cotton buds and alcoholic solution<br>- clean with cotton buds and alcoholic solution                                                       |
| Colour adulteration                                                                                    | - white balance [7] not correctly performed<br>- monitor or camera defective                                                                 | - perform white balance once again<br>- contact service centre                                                                                           |
| Colour rendering change                                                                                | - connection cable of camera [26a] broken                                                                                                    | - contact service centre                                                                                                                                 |
| Only test pattern visible                                                                              | - plug [26b] of camera head [26] not plugged in correctly                                                                                    | - insert plug [26b] correctly                                                                                                                            |
| Intermittent electrical interferences of the video image in conjunction with endoscopic electrosurgery | - electrosurgical generator                                                                                                                  | - connect the mains power cable [25] of the unit and the electrosurgical generator to different power sockets. Ensure that the cables do not cross.      |

EBERLE accepts no guarantee for the color fastness and the exact, correct representation of the image geometry by the camera system F1HD

Device failures or disturbances resulting due to the presence of electromagnetic disturbances are not to be expected (also refer to requirements chapter 3.1 / chapter 11).

### 11. Technical Data

|                                                                                 |                                                                            |                                                                                 |
|---------------------------------------------------------------------------------|----------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| <b>Safety classification, IEC 601-1</b>                                         | Protective class<br>Control unit<br>Application part starting from housing | I<br>Typ B<br>Typ BF                                                            |
| <b>Classification MDD 93/42/EEC</b>                                             | Risk class                                                                 | I                                                                               |
| <b>Electrical data</b>                                                          | Supply voltage<br>Mains frequency<br>Mains fuse<br>max. input power        | 110-240 V/AC<br>50/60 Hz<br>2xT1AH250V<br>60 VA                                 |
| <b>Protection system</b>                                                        | Dust / humidity                                                            | IP30                                                                            |
| <b>Possible EM or other interferences</b><br><br>Interference emission/immunity | IEC 60601-1-2 Group/Class<br>IEC 60601-1-2 Classification                  | I / B<br>Environment: professional med. care institutions                       |
| <b>Operating conditions</b>                                                     | Temperature<br>relative humidity<br>max. height MSL<br>min. pressure       | 15 to 30°C<br>30-75% not condensed<br>2000m<br>795hPa                           |
| <b>Storage, transport conditions</b>                                            | Temperature<br>relative humidity<br>Shelf life                             | -10 to 70°C<br>30-75% not condensed<br>Storage time without use<br>max. 2 years |
| <b>Mechanical data</b><br>Control unit<br><br>Camera head                       | dimensions: l/w/h in mm<br>weight<br>dimensions: l/w/h in mm<br>weight     | 300x350x75mm<br>4700g<br>62x44x54mm<br>125g                                     |
| <b>Packaging</b><br>(collapsible box with inlay)                                | dimensions: l/w/h in mm<br>weight corrugated cardboard<br>weight PE insert | 470x470x365mm<br>1200g<br>1100g                                                 |
| <b>TV system</b>                                                                | Television standard                                                        | PAL/NTSC                                                                        |
| <b>TV resolution</b>                                                            | Active pixel                                                               | 1920H x 1080V (Full HD)                                                         |
| <b>Application cycle</b>                                                        | 1-10 uses per day for a duration of 10–45 minutes                          |                                                                                 |
| <b>Accessories</b>                                                              | See compatibility list (page 24)                                           |                                                                                 |

#### Guidelines and Manufacturer's Declaration – Electromagnetic Emissions

The Endoscopic Camera System F1 HD is destined for operation in the electromagnetic environment mentioned below. The customer or the user of the Endoscopic Camera System F1 HD should ensure that it is used in such an environment.

| Emission measurements                                       | Conformity | Electromagnetic environment – guidelines                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HF emissions<br>pursuant to CISPR 11                        | group 1    | The Endoscopy Camera System F1 HD uses HF energy only and exclusively for its internal function. Therefore, the HF emission is extremely low, and it is very unlikely that neighbouring electronic devices will be disturbed.<br><br>The Endoscopy Camera System F1 HD is suitable for use in all establishments, including domestic establishments and those directly connected to the PUBLIC MAINS SUPPLY that supplies buildings used for domestic purposes. |
| HF emissions<br>pursuant to CISPR 11                        | class B    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Harmonic components<br>pursuant to IEC 61000-3-2            | class A    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Voltage fluctuations / flicker<br>pursuant to IEC 61000-3-3 | conforms   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

#### Guidelines and Manufacturer's Declaration – Electromagnetic Emissions

The Endoscopic Camera System F1 HD is intended for operation in environments as stated below. The customer or the user of the Endoscopic Camera System F1 HD shall ensure that it is operated in such an environment.

| Immunity test                                                                                    | IEC 60601 test level                                                                                                                                                                                                              | Compliance level                                                                                                                                                                                                                  | Electromagnetic environment - guidance                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ESD IEC 61000-4-2<br>IEC 61000-4-2                                                               | ± <b>8 kV</b> contact<br>± <b>15 kV</b> air                                                                                                                                                                                       | ± <b>8 kV</b> contact<br>± <b>15 kV</b> air                                                                                                                                                                                       | Floors shall be made out of wood or concrete or shall be covered with ceramic tiles. If the floor is covered with synthetic material the relative humidity must amount to at least 30 %.                                                                                                                                                                     |
| Bursts<br>IEC 61000-4-4                                                                          | ± <b>2 kV</b> power supply lines<br>100kHz repetition frequency<br>± <b>1 kV</b> input/output                                                                                                                                     | ± <b>2 kV</b> power supply lines<br>100kHz repetition frequency<br>± <b>1 kV</b> input/output                                                                                                                                     | The quality of the supply voltage shall correspond to a typical environment as is found in commercial or hospital locations.                                                                                                                                                                                                                                 |
| Surges<br>IEC 61000-4-5                                                                          | ± <b>1 kV</b> differential mode<br>± <b>2 kV</b> common mode                                                                                                                                                                      | ± <b>1 kV</b> differential mode<br>± <b>2 kV</b> common mode                                                                                                                                                                      | The quality of the supply voltage shall correspond to a typical environment as is found in commercial or hospital locations.                                                                                                                                                                                                                                 |
| Voltage drops,<br>short interruption and<br>fluctuations of the supply voltage<br>IEC 61000-4-11 | <b>0 %</b> UT; 0,5 Periode<br>dip in UT; 0,5 cycle<br><b>0 %</b> UT; 1 Periode<br>dip in UT; 1 cycle<br><b>70 %</b> UT; 25/30 Perioden<br>dip in UT; 25/30 cycles<br><b>0 %</b> UT; 250/300 Perioden<br>dip in UT; 250/300 cycles | <b>0 %</b> UT; 0,5 Periode<br>dip in UT; 0,5 cycle<br><b>0 %</b> UT; 1 Periode<br>dip in UT; 1 cycle<br><b>70 %</b> UT; 25/30 Perioden<br>dip in UT; 25/30 cycles<br><b>0 %</b> UT; 250/300 Perioden<br>dip in UT; 250/300 cycles | The quality of the supply voltage shall correspond to a typical environment as is found in commercial or hospital locations. If the user of the Endoscopic Camera System F1 HD requires continued functioning also in the event the power supplies are interrupted, it is advisable to energize the Endoscopic Camera System F1 HD with an USV or a battery. |
| Supply frequency magnetic fields<br>at (50/60) Hz<br>IEC 61000-4-8                               | <b>30 A/m</b>                                                                                                                                                                                                                     | <b>30 A/m</b>                                                                                                                                                                                                                     | Power frequency magnetic fields shall correspond to a typical environment as is found in commercial or hospital locations.                                                                                                                                                                                                                                   |

|                                                                                                      |                                                                                                                     |                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Conducted RF disturbances<br/>IEC 61000-4-6</p> <p>Radiated RF disturbances<br/>IEC 61000-4-3</p> | <p><b>3 V eff. *</b><br/>150 kHz – 80 Mhz<br/>(*6 V eff. in ISM bands)</p> <p><b>3 V/m</b><br/>80 MHz – 2,7 GHz</p> | <p><b>3 V eff. *</b><br/>150 kHz – 80 Mhz<br/>(*6 V eff. in ISM bands)</p> <p><b>3 V/m</b><br/>80 MHz – 2,7 GHz</p> | <p>Portable and mobile communication devices shall not be used in closer proximity to the Endoscopic Camera System F1 HD or its cables than the recommended safety distance:</p> <p><b>d = 1,17√P</b> 150 kHz – 80 Mhz<br/><b>d = 1,2√P</b> 80 MHz - 800 Mhz<br/><b>d = 2,3√P</b> 800 MHz - 2,7 Ghz</p> <p>The field strength of stationary transmitters, as determined by a field survey, shall be less than the compliance level for all frequencies. Disturbances are possible in the close proximity of devices showing the following symbol.</p>  |
|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Test determinations for INTERFERENCE IMMUNITY of ENCASEMENTS<br>against high-frequency wireless communication devices |                                    |                                                                                |                                                     |                        |               |                                               |
|-----------------------------------------------------------------------------------------------------------------------|------------------------------------|--------------------------------------------------------------------------------|-----------------------------------------------------|------------------------|---------------|-----------------------------------------------|
| Test frequency<br>Mhz                                                                                                 | Frequency band <sup>a</sup><br>Mhz | Radio service <sup>a</sup>                                                     | Modulation <sup>b</sup>                             | Maximum<br>Output<br>W | Distance<br>m | INTERFERENCE<br>IMMUNITY TEST<br>LEVEL<br>V/m |
| 385                                                                                                                   | 380 to 390                         | TETRA 400                                                                      | Pulse modulation <sup>b</sup><br>18 Hz              | 1,8                    | 0,3           | 27                                            |
| 450                                                                                                                   | 430 to 470                         | GMRS 460,<br>FRS 460                                                           | FM <sup>c</sup><br>± 5 kHz deviation<br>1 kHz sinus | 2                      | 0,3           | 28                                            |
| 710                                                                                                                   | 704 to 787                         | LTE band 13, 17                                                                | Pulse modulation <sup>b</sup><br>217 Hz             | 0,2                    | 0,3           | 9                                             |
| 745                                                                                                                   |                                    |                                                                                |                                                     |                        |               |                                               |
| 780                                                                                                                   |                                    |                                                                                |                                                     |                        |               |                                               |
| 810                                                                                                                   | 800 to 960                         | GSM 800/900,<br>TETRA 800,<br>iDEN 820,<br>CDMA 850,<br>LTE band 5             | Pulse modulation <sup>b</sup><br>18 Hz              | 2                      | 0,3           | 28                                            |
| 870                                                                                                                   |                                    |                                                                                |                                                     |                        |               |                                               |
| 930                                                                                                                   |                                    |                                                                                |                                                     |                        |               |                                               |
| 1 720                                                                                                                 | 1 700 to 1 990                     | GSM 1800;<br>CDMA 1900;<br>GSM 1900;<br>DECT;<br>LTE band 1, 3,<br>4, 25; UMTS | Pulse modulation <sup>b</sup><br>217 Hz             | 2                      | 0,3           | 28                                            |
| 1 845                                                                                                                 |                                    |                                                                                |                                                     |                        |               |                                               |
| 1 970                                                                                                                 |                                    |                                                                                |                                                     |                        |               |                                               |

| Test frequency<br>Mhz | Frequency band <sup>a</sup><br>Mhz | Radio service <sup>a</sup>                                      | Modulation <sup>b</sup>                 | Maximum<br>Output<br>W | Distance<br>m | INTERFERENCE<br>IMMUNITY TEST<br>LEVEL<br>V/m |
|-----------------------|------------------------------------|-----------------------------------------------------------------|-----------------------------------------|------------------------|---------------|-----------------------------------------------|
| 2 450                 | 2 400 to 2 570                     | Bluetooth,<br>WLAN 802.11<br>b/g/n,<br>RFID 2450,<br>LTE band 7 | Pulse modulation <sup>b</sup><br>217 Hz | 2                      | 0,3           | 28                                            |
| 5 240                 | 5 100 to 5 800                     | WLAN 802.11 a/n                                                 | Pulse modulation <sup>b</sup><br>217 Hz | 0,2                    | 0,3           | 9                                             |
| 5 500                 |                                    |                                                                 |                                         |                        |               |                                               |
| 5 785                 |                                    |                                                                 |                                         |                        |               |                                               |

NOTE: If necessary, the distance between the transmitting antenna and the ME DEVICE or ME SYSTEM may be reduced to 1 m in order to reach the INTERFERENCE IMMUNITY TEST LEVEL. The 1 m test distance is allowed according to IEC 61000-4-3

<sup>a</sup> For some radio services, only the frequencies for the radio connection from the mobile communication device to the base station (uplink) were included in the table.

<sup>b</sup> The carrier must be modulated with a square wave signal with a 50% duty cycle.

<sup>c</sup> As an alternative to frequency modulation (FM), a pulse modulation with 50 % duty cycle with 18 Hz may be used since this, if not the actual modulation as well, would constitute the worst case.

#### Recommended safety distances between portable and mobile RF telecommunication devices and the Endoscopic Camera System F1 HD

The Endoscopic Camera System F1 HD is intended for use in an electromagnetic environment, in which RF disturbances are controlled. The user (customer) of the Endoscopic Camera System F1 HD may help to prevent electromagnetic disturbances by observing the minimum distance between portable and mobile RF telecommunication devices (transmitters) and the Endoscopic Camera System F1 HD – dependent on the output power of the communication device as stated below.

| Nominal power of transmitter<br>W | Safety distance dependent on transmitter frequency<br>m |                                       |                                        |
|-----------------------------------|---------------------------------------------------------|---------------------------------------|----------------------------------------|
|                                   | 150 kHz – 80 MHz<br>$d = 1,17\sqrt{P}$                  | 80 MHz - 800 MHz<br>$d = 1,2\sqrt{P}$ | 800 MHz - 2,7 GHz<br>$d = 2,3\sqrt{P}$ |
| 0,01                              | 0,12                                                    | 0,12                                  | 0,23                                   |
| 0,1                               | 0,37                                                    | 0,38                                  | 0,73                                   |
| 1                                 | 1,17                                                    | 1,2                                   | 2,3                                    |
| 10                                | 3,70                                                    | 3,8                                   | 7,3                                    |
| 100                               | 11,7                                                    | 12                                    | 23                                     |

If the nominal power of certain transmitters is not stated in above table, the protective distance d in meters (m) can be determined using the equation given in the respective column. Here, P is the maximum nominal power of the transmitter in watt (W) according to the details given by the manufacturer of the transmitter.

Note 1: For 80 MHz and 800 MHz the higher frequency range applies.

Note 2: These guidelines may not be applicable for all cases. The propagation of electromagnetic factors is influenced by the absorption and reflection of buildings, objects, and humans.

## 12. Compatibility

Please only use the EBERLE components listed in below table for operation on the EBERLE camera F1HD!

| Artikel-Nr.                                                                                                                          | Artikel                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| 70-00151                                                                                                                             | Set of EMC plug                                          |
| 71-00775                                                                                                                             | USB-PS/2 adapter                                         |
| 900004                                                                                                                               | Arthroscope 30° 4 x 175 mm autoclavable                  |
| 900113                                                                                                                               | Arthroscope 30° 2.75 x 110 mm autoclavable               |
| 900122                                                                                                                               | Arthroscope 15° 1.7 x 60 mm autoclavable                 |
| 900202                                                                                                                               | Keyboard PS2                                             |
| 900213                                                                                                                               | TV adapter f = 21mm                                      |
| 900214                                                                                                                               | Zoom TV adapter f = 18mm - f = 35mm                      |
| 900215                                                                                                                               | TV adapter f = 18mm                                      |
| 900230                                                                                                                               | Keyboard USB                                             |
| 900256                                                                                                                               | HD Arthroscope Ø 4.0 x 175 mm, viewing direction 30°     |
| 900260                                                                                                                               | HD TV Endoscopy adapter f=21 mm with automatic-coupling  |
| 900261                                                                                                                               | HD TV Endoscopy adapter f= 18 mm with automatic-coupling |
| 900262                                                                                                                               | HD TV Zoom-Adapter f=15-36 mm with automatic-coupling    |
| 900313                                                                                                                               | Keyboard USB US/EU                                       |
| 913032                                                                                                                               | CMOS HD Camera Head with cable 3,0m                      |
| 913035                                                                                                                               | Mains power cable 1,8m                                   |
| 913036                                                                                                                               | ECB connecting cable 1,0m                                |
| 913037                                                                                                                               | DVI connecting cable 1,8m                                |
| 913038                                                                                                                               | BNC-Anschlusskabel 2,0m                                  |
| 913042                                                                                                                               | S-Video connecting cable 1,8m                            |
| Future EBERLE products may also be compatible. Detailed information regarding this can be obtained from every EBERLE representative. |                                                          |



Using non-compatible foreign accessories can endanger or injure the patient and/or the operator!

### 13. Warranty

The warranty period for the EBERLE Camera System F1HD shall be 12 months. Within this period, errors resulting from faulty material and/or inadequate workmanship will be remedied by the manufacturer free of charge.

Transport costs and shipping risks, however, will not be carried by the manufacturer. For further information, please refer to our General Terms and Conditions of Business.



Do not open the device! Arbitrary opening, repairing or modifying of the device absolves us from any liability regarding the operational safety of the system and leads to expiry of any claims whatsoever during the period of warranty!

### 14. Addresses

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