joimax®
Endoscopic Spine Experts

Camsource® LED

Camera & Light Source System

User Manual

Combined camera and light source system with unique camera technology

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1 Legal Notes

The manufacturer is grateful for information about any errors or inconsistencies in this document.

Due to continuous improvement of our products, we reserve the right to make technical changes that do not affect functionality and basic safety.

1.1 Liability

All procedures, notes and warnings described in this manual do not release the operator/user from his or her responsibilities regarding clinical judgment, experience and best clinical practice.

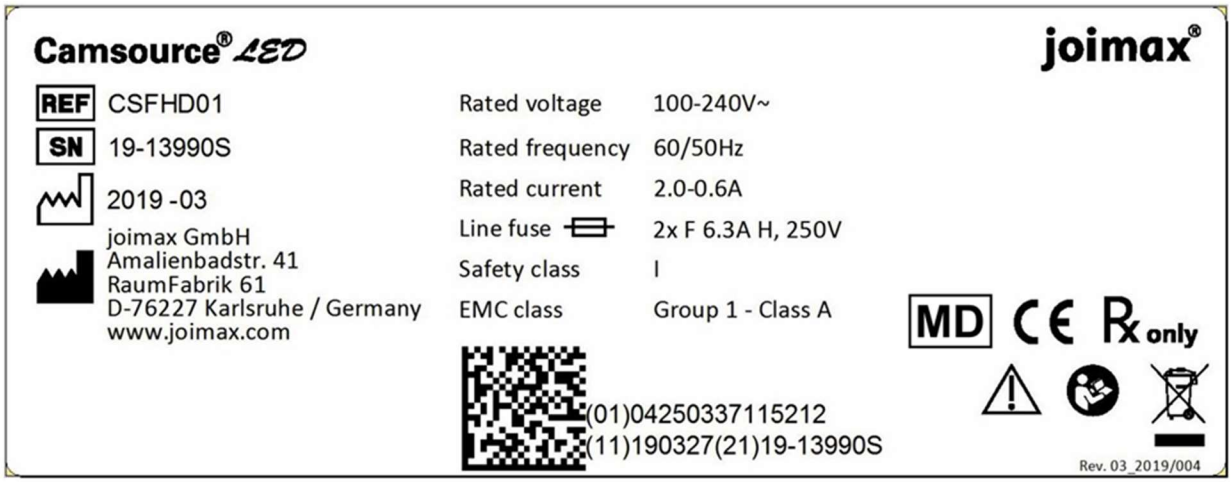
2 General Description

The Camsource® LED (Camsource® Light Emitting Diode) is a combined camera and light source device specially designed for use in endoscopic minimally invasive surgery.
It consists of a camera control unit and a camera head with a high-resolution video sensor, on which an endoscope can be connected. The camera head is connected via cable to the camera control unit which also integrates the LED light source.

3 Signs and Symbols

	Please note!
	Warning!
	Separate collection of electrical and electronic devices (in accordance with directive 2012/19/EU, WEEE)
	Applied part type BF
	CE mark of the manufacturer according to MDD 93/42/EEC
	Manufacturer
	Date of manufacture
	Follow Instructions for Use
	Item number
	Serial number
	Caution: U.S. federal law restricts this device to sale by or on the order of a physician.
	Equipotential (potential equalization)
	Temperature limitation
	Humidity limitation
	Atmospheric pressure limitation
	Keep away from rain
	Keep away from sunlight
	Non-sterile
	Medical Device

3.1 Device Label



4 Intended Purpose and Characteristics

Warning:
The device must be used only for its intended purpose described in this manual!

4.1 Intended Purpose

The Camsource® LED is intended to provide the images of a connected medical endoscope to an external device for display or storage and provide a light source for the illumination of the surgical area, especially in minimally invasive surgical procedures.

Indications for Use

The device is intended to be used in combination with compatible endoscopes during endoscopic minimally invasive surgeries, e.g. at the spine.

Contraindications

Use of the device is contraindicated if, in the opinion of an experienced physician or according to current professional literature, the use would endanger the patient, e.g. due to the general condition of the patient, or if any other contraindications exist.

Intended Patient Population

The patient population is not restricted due to the wide application possibilities of the device. The use of the Camsource® LED is at the discretion of the respective user on the basis of his training and experience.

Intended Users

The Camsource® LED is intended for use by medical professionals (e.g. surgeons).
It must be operated under the supervision of qualified and authorized personnel. Users are required to be trained and familiar with the basic principles, application rules, and risks of the device in order to reliably avoid a risk to the patient, user, and others.

Intended Use Environment

The Camsource® LED is intended for use in operating rooms.
The control unit is intended to be positioned stationary outside of the sterile patient environment, e.g. on a medical cart or table that is suitable in terms of tilting stability and weight of the device.

4.2 Characteristics

Performance Characteristics

The Camsource® LED provides high resolution imaging (up to 4K), especially in combination with the joimax® 4K endoscopes and the joimax® 4K flat screen monitors.
The integrated LED light source lasts about 30,000 hours and is maintenance-free. It provides constant high color temperature for an ideal and real color reproduction of anatomic structures.
Parameters can be set via an easy to clean touch panel and intuitive on screen display. In addition, the Camsource® LED provides an interface to the joimax® Command environment and features image capturing to an USB device directly at the device front.

Principles of Operation

The image sensor of the camera head digitizes the analog images of a connected endoscope via a CMOS image sensor and transmits them to the control unit. The control unit processes the images and generates a digital video stream (DVI, 3G/HD-SDI and 4K/FHD-HDMI) as signal output for a connected monitor or recording system.

An integrated LED light source generates light in the visible spectral range for illumination of the surgical area. The light is conducted from the camera control unit to the surgical area via fiber optical cable and fiber optics integrated in the connected endoscope.

Key Components

Control Unit	Camera Heads	Video Lens
	 Combo  Ocular with fiber optic cable	
The control unit of the system receives the digital images of the camera head and processes them to a digital video stream and provides video outputs for the connection of monitors and/or recording systems. It includes a glass front with control elements for adjustment of device and image settings. The control unit provides an integrated LED light source, which generates light in the visible spectral range. The camera can be operated with AC line voltages of 100-240 V and a frequency of 50-60 Hz.	The camera head, as the applied part of the system, digitizes the endoscopic images and transmits the video signal to the camera control unit via cable. It provides three buttons, which can be freely configured. Two types of camera heads are available: The Camsource® LED Camera Head Combo for joimax® endoscopes with combo connection (joimax® single cable technology, video cable with integrated fiber optics), and the Camsource® LED Camera Head Ocular for standard ocular endoscopes (separate video cable and fiber optic cable).	The video lens allows the endoscopic camera to be connected to an endoscope with ocular connector and the endoscope image to be focused and zoomed.

4.3 Clinical Benefits

The application of minimal invasive surgical methods is favorable compared to open surgery in terms of the following clinical benefits: help gain easy access to the pathological site thus reducing the surgical duration, smaller incision/less trauma, preservation of stabilizing structures, less scarring, less pain, faster recovery time/reduced hospitalization time and improved quality of life.

Endoscopic spinal surgery clearly profits from an endoscopic camera system in terms of the following clinical benefits: real-time visualization of the surgical area within the patient's body, convenient observation of the images captured by the endoscope on a monitor, reduced duration of the surgical intervention, the patient is less exposed to anesthetics and the surgeon is less physically demanded.

5 Scope of Delivery

After delivery of the Camsource® LED, the packaging must be checked for external damage. If any components are damaged or missing, please contact joimax® customer service.

<table>
<tr><th>Item number</th><th colspan="3">Item description</th></tr>
<tr><td>CSFHD01SC</td><td colspan="3">Camsource® LED System Combo

List of components:
<table>
<tr><th>Item number</th><th>Item description</th><th>Quantity</th></tr>
<tr><td>CSFHD01</td><td>Camsource® LED Control Unit</td><td>1</td></tr>
<tr><td>CSFHD01CC</td><td>Camsource® LED Camera Head Combo</td><td>1</td></tr>
<tr><td>JDVI0020</td><td>joimax® DVI Cable</td><td>1</td></tr>
<tr><td>JHDMI0020</td><td>joimax® HDMI Cable</td><td>1</td></tr>
<tr><td>JBNC0020</td><td>joimax® BNC Cable</td><td>1</td></tr>
<tr><td>JMUSBS10</td><td>joimax® USB Flash Drive 16GB</td><td>1</td></tr>
<tr><td>n/a</td><td>Instructions for Use</td><td>2</td></tr>
<tr><td>n/a</td><td>Device Quick Info</td><td>1</td></tr>
</table></td></tr>
<tr><td>CSFHD01SOZ</td><td colspan="3">Camsource® LED System Ocular, zoomable

List of components:
<table>
<tr><th>Item number</th><th>Item description</th><th>Quantity</th></tr>
<tr><td>CSFHD01</td><td>Camsource® LED Control Unit</td><td>1</td></tr>
<tr><td>CSFHD01CO</td><td>Camsource® LED Camera Head Ocular</td><td>1</td></tr>
<tr><td>CSFHD01COVZ</td><td>Camsource® LED Video Lens, zoomable</td><td>1</td></tr>
<tr><td>CSLC0252</td><td>joimax® Fiber Optic Cable</td><td>1</td></tr>
<tr><td>JDVI0020</td><td>joimax® DVI Cable</td><td>1</td></tr>
<tr><td>JHDMI0020</td><td>joimax® HDMI Cable</td><td>1</td></tr>
<tr><td>JBNC0020</td><td>joimax® BNC Cable</td><td>1</td></tr>
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<tr><td>n/a</td><td>Instructions for Use</td><td>2</td></tr>
<tr><td>n/a</td><td>Device Quick Info</td><td>1</td></tr>
</table></td></tr>
</table>

6 Safety and Warning Notes

6.1 General Safety and Warning Notes

Warning:
This device must be used by trained professionals only!

Warning:
Never touch the patient and any signal input or output connectors on the device at the same time!

Warning:
Installation of the device on a medical trolley with multiple socket-outlet leads to the establishment of a ME system and can lead to a reduced level of safety. The requirements regarding ME systems of IEC 60601-1 must always be observed.

Warning:
The device is not intended for use in explosive areas (e.g. in the presence of anaesthetic gas).

Warning:
Keep these instructions for use in a conspicuous place near the device!

Warning:
Read this manual carefully before first use. Protect yourself, patients, and third parties from damage by defective devices or improper operation!

Warning:
Mechanical stress, such as from falling, can damage or destroy the device!

Warning:
Never use the device with the housing open.

Warning:
Always make sure blood circulation is not impaired when positioning and sedating the patient.

6.2 Additional Notes regarding the Light Source

Warning:
Do not stare into the light source opening or onto surfaces reflecting the light beam. The intense light may cause temporary loss of vision.

Warning:
High-energy light can lead to increased temperature at the light-emitting surface of a connected endoscope. In invasive applications, direct tissue contact might lead to unintended tissue effects. Direct tissue contact is to be avoided and continuous irrigation of the surgical area is recommended.

6.3 Additional Notes regarding Electrosurgical Equipment

Warning:
If the device is used stacked in combination with electrosurgical devices, always position the device above the electrosurgical unit. Ensure that cables of active electrosurgical accessories are not positioned close to the camera control unit or the camera head cable.

Warning:
Never touch the connected endoscope with an activated electrosurgical electrode.

6.4 Additional Notes regarding MRI (Magnetic Resonance Imaging) and CT (Computer Tomography)

Warning:
Do not use the Camsource® LED during MRI or CT scans.
Due to energetic interactions of magnetic fields and X-rays with the material of the endoscope and camera heads, the optical and electrical components of the Camsource® LED may be damaged. Unforeseeable side effects and visual disturbances may occur.

6.5 Residual Risks and Undesirable Side-Effects

When using the product, residual risks exist and may lead to the following side effects for patient, user or third parties: electric shock, burns, transfer of pathogens, uncoordinated tool orientation, an abortion of the surgery, change of the technique or misinterpretation of anatomical structures.

7 Installation and Commissioning

Warning:
Examine the device, the accessories, and all electrical connections for function and damage prior to use! Defects in cables, connectors, housings or loose parts can impair performance and safety and must be rectified immediately!

***Warning*:**
The Camsource® LED and the camera head must be cleaned and disinfected before first use according to the cleaning instructions.

Warning:
This device must be installed and commissioned by authorized personnel only. Improper installation could cause damage to the user, the patient, or others, and might damage the device or other medical equipment.

Warning:
Place the device in a way that allows easy disconnection from the mains.

Warning:
The ambient temperature must not exceed 35° C (95° F) during operation.

Warning:
Place the control unit on a clean, flat surface. Ensure that you keep sufficient space behind the device for efficient airflow. Make sure that a minimum distance of 15 cm (6”) is maintained between the back of the device and other objects. All ventilation openings must not be obstructed.

The device is recommended to be installed in the joimax® endoscopic trolley.

Keep the original packaging for possible shipment of the device!

The device and all accessories must be checked immediately upon receipt for completeness and obvious damage. Damages may be claimed only if the manufacturer is notified immediately (within a 24-hour period).

7.1 Connection of the Device

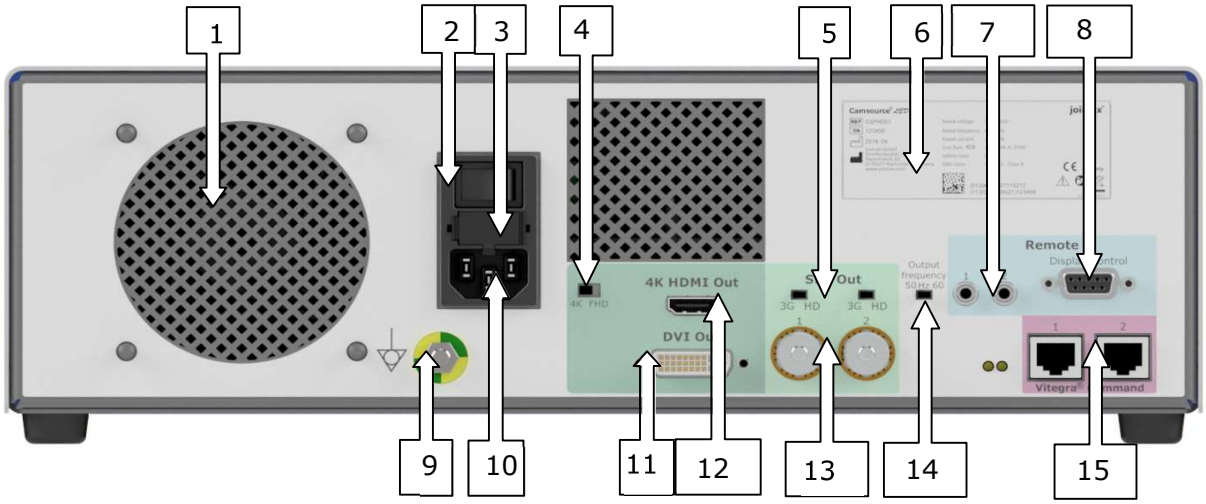
Warning:
To avoid the risk of electric shock, this equipment must always be connected to potential equalization and a power supply with protective earth!

Warning:
Only joimax® accessories (cables etc.) may be used for connection!

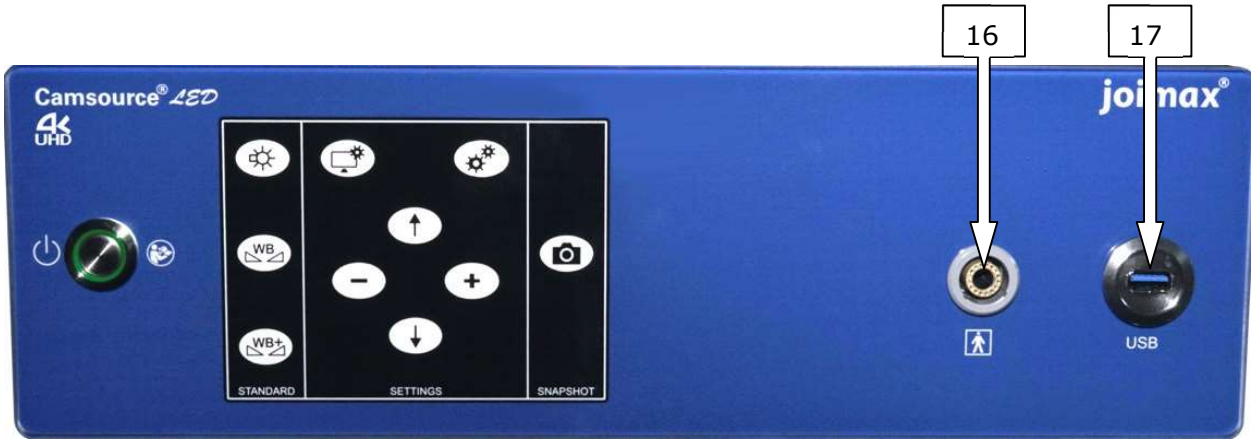
Warning:
Always keep cables out of passage areas in order to reduce the risk of stumbling.

Warning:
Make sure all connectors are free of coarse soiling before insertion.

Warning:
Before connecting and launching the system, all components must be visually inspected for integrity. Damaged parts must be replaced. This must be done by experts.



1.	Ventilation outlet	9.	POAG (equipotential bonding)
2.	Power switch	10.	Mains connection (IEC C14 connector)
3.	Fuse holder	11.	DVI video output
4.	Switch for HDMI signal mode (4K, FHD)	12.	4K HDMI video output
5.	Switches for SDI signal mode (3G, HD)	13.	SDI video outputs
6.	Device label	14.	Switch for output frequency (50Hz, 60 Hz)
7.	Remote control (via camera head buttons)	15.	Connection to joimax® Command
8.	Display control (for joimax® Command On-Screen-Display)		



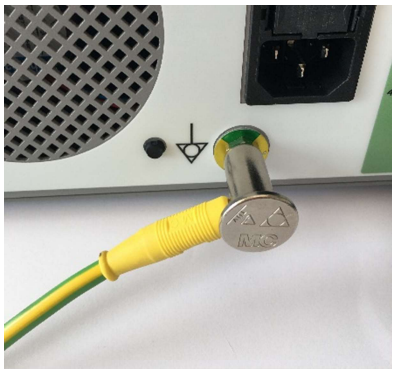
16.	Camera head connector
17.	USB port for USB storage

1. Connecting the Equipotential Grounding to the Appropriate Link

Warning:
The device must always be connected to potential equalization and a supply network with protective earth.

Respect the requirements of section 8.6.7 of IEC 60601-1 regarding medical electrical systems.

Connect the potential equalization plug to the grounding via appropriate cable.

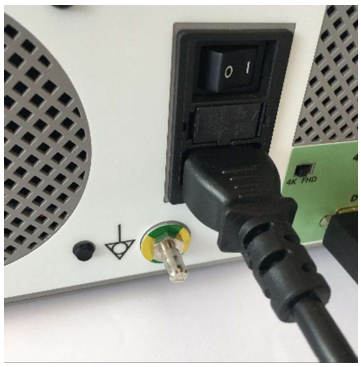


2. Connecting the Device to Mains Supply

Warning:
Always connect the device to a buffered power supply and make sure that the nominal voltage and power values are respected.
Check the power supply cable prior to use!

Use the original power cord to connect the power inlet with the mains supply. Set the appropriate output frequency.

For safe disconnection of the device from mains power supply, set the power switch at the backside of the device to position "0" and unplug the power cord from the mains connection.



3. Connecting an External Display

Connect the video cable of the display to the corresponding output connector of the control unit.

DVI video output

4K HDMI video output

Choose the HDMI signal mode. 4K is set per default.

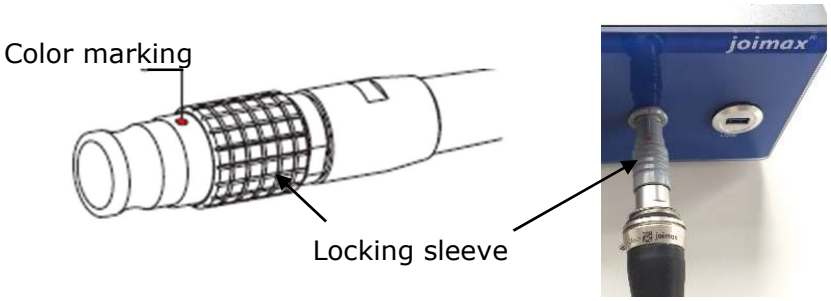
SDI video output

Choose the SDI signal mode. 3G is set per default.

4. Connecting the Camera Head Cable to the Control Unit

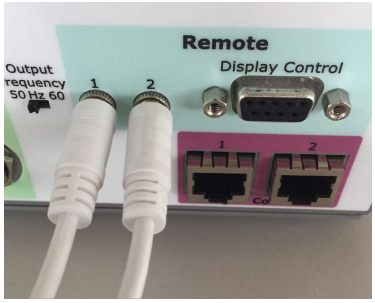
Unscrew the black sealing cap from the plug of the camera head cable. Make sure that the plug is in the correct position (red dot on plug and socket), and the locking sleeve snaps forward with an audible click and locks after insertion of the plug.

To pull the plug, the locking sleeve must be pulled backward (release the lock).



5. OPTIONAL: Connecting the Remote Cables to the Control Unit

Connect two remote cables to the corresponding remote control outputs, e.g. for remote control of the joimax® Vitegra® via the camera head buttons.



7.2 General Safety and Warning Notes

Warning:
This device must be used by trained professionals only!

Warning:
Never touch the patient and any signal input or output connectors on the device at the same time!

Warning:
Installation of the device on a medical trolley with multiple socket-outlet leads to the establishment of a ME system and can lead to a reduced level of safety. The requirements regarding ME systems of IEC 60601-1 must always be observed.

Warning:
The device is not intended for use in explosive areas (e.g. in the presence of anaesthetic gas).

Warning:
Keep these instructions for use in a conspicuous place near the device!

Warning:
Read this manual carefully before first use. Protect yourself, patients, and third parties from damage by defective devices or improper operation!

Warning:
Mechanical stress, such as from falling, can damage or destroy the device!

Warning:
Never use the device with the housing open.

Warning:
Always make sure blood circulation is not impaired when positioning and sedating the patient.

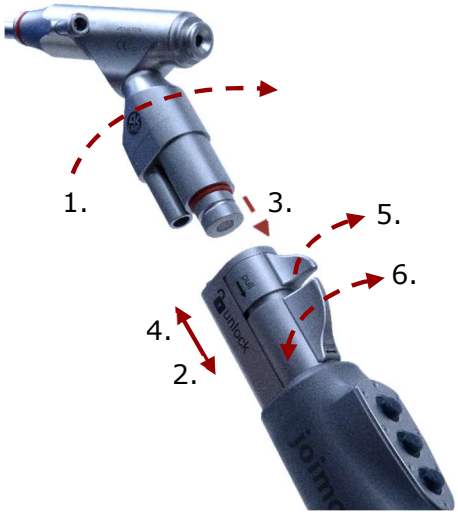
7.3 Connection of an Endoscope

Warning:
For optimal color rendering, white balance must be performed after every change of the endoscope.

joimax® Combo Connector

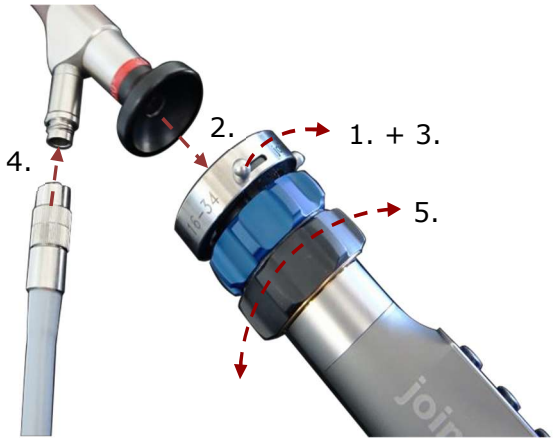
1. Align the endoscope to the camera head coupling with the light conductor pointing downwards to the small opening at the camera head.
2. Pull the bayonet lock on the camera head back (small lever) to release the lock.
3. Insert the endoscope into the camera head coupling.
4. Push the bayonet lock (small lever) forward and ensure tight locking of the coupling.
5. Turn the small lever to the right to fasten the endoscope.

6. Focus the endoscopic image manually by using the big lever.



Standard Ocular Connector

1. Open the ocular coupling.
2. Insert the endoscope into the coupling.
3. Release the ocular coupling.
4. Screw the fiber optic cable onto the light connector.
5. Focus the endoscopic image manually by using the focus ring.

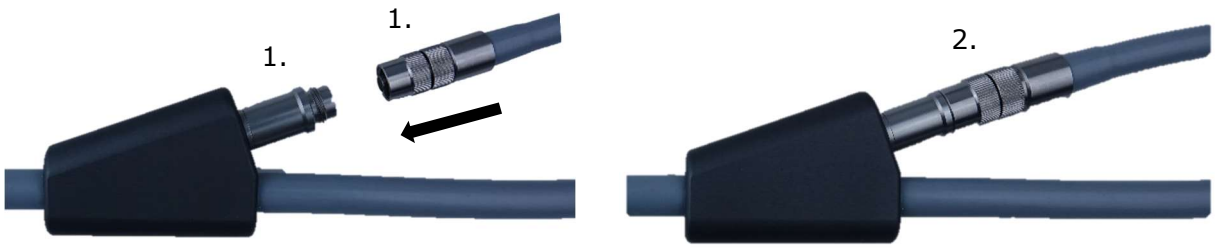


7.4 Connection of a Fiber Optic Cable

When using endoscopes with standard ocular connector, the light connector of the endoscope must be connected to a light source via fiber optic cable.

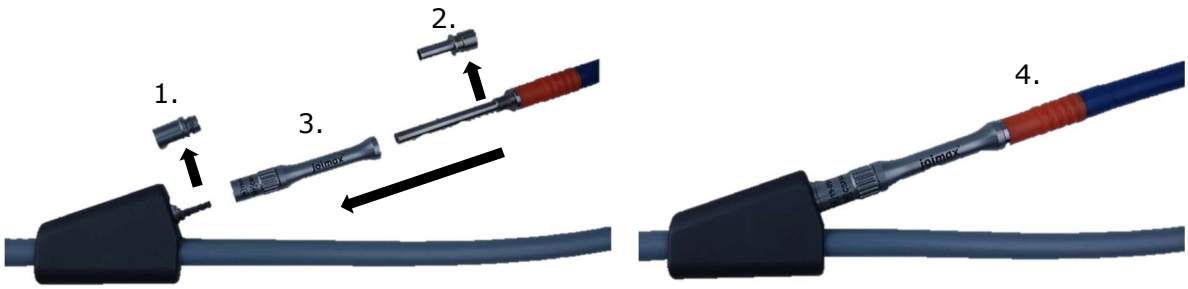
The Camsource® LED System provides a light source integrated in the control unit, which can be accessed at the Y-connector of the Camsource® LED Camera Head Ocular.

The joimax® Fiber Optic Cable (CSLC0252) can be connected to the Camsource® LED Camera Head Ocular:



1. Ensure the light adapter is screwed on the Y-connector of the camera head and the joimax® Fiber Optic Cable.
2. Screw the joimax® Fiber Optic Cable onto the Y-connector.

Any standard fiber optic cable can be connected to the Camsource® LED Camera Head Ocular by using the Fiber Optic Cable Adapter (CSFHD01COAS):



1. Unscrew the light adapter from the Y-connector of the camera head.
2. Unscrew the light adapter from the light source connector of the standard fiber optic cable.
3. Screw the Fiber Optic Cable Adapter (CSFHD01COAS) onto the Y-connector.
4. Screw the light source connector of the standard fiber optic cable onto the fiber optic cable adapter.

7.5 Sterile Preparation of the Camera Head

The Camsource® LED camera heads can be sterilized according to the reprocessing instructions in this user manual. Alternatively they can be used with a sterile cover without the need for sterilization between several consecutive applications.

Warning:
The camera head cable must be operated in a sterile condition.

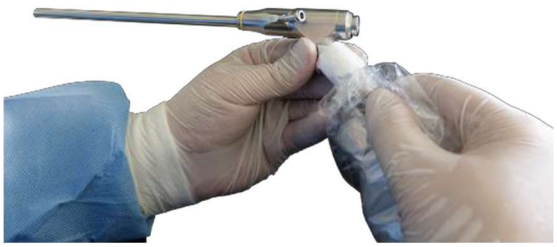
The camera head cable can be used with a sterilized cover. For this purpose, the Camsource® Camera Cable Cover (CSCC1223/CSCC1324US) is recommended.
The Camsource® Camera Cable Cover is sterilized using ethylene oxide and delivered in sterile packaging.

If the camera heads are used non-sterile with a sterile cover, joimax® recommends storing the camera heads between consecutive operations in the camera head mount attached to the endoscopic trolley or the drawer.

1. The sterile nurse inserts the hand with the endoscope into the sterile cover.

2. While the sterile nurse holds the endoscope, the non-sterile nurse attaches the camera head to the endoscope.

3. The sterile nurse now seals the cover around the endoscope via the adhesive strip.



4. The non-sterile nurse now pulls the telescopically folded cover over the camera head cable towards the control unit.

5. Check the endoscope for proper connection.

7.6 Functional Tests

After correct wiring of the control unit, start the connected display according to its respective instructions for use, then start the Camsource® LED.

Adjust the output of the Camsource® LED via the various available image settings until a satisfactory image is displayed.

Warning:
Check live image quality prior to every use.

7.5.1 Behaviour in the Event of Malfunctions

In the event of malfunction of the device or changes in its performance that may affect safety (e.g. deviations from the permissible operating conditions) have the faults corrected immediately.

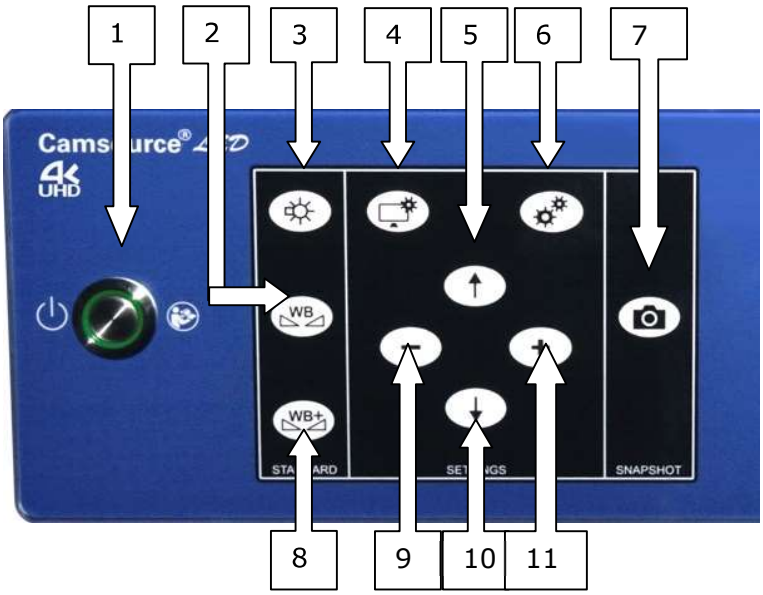
The Camsource® LED can be switched off at any time by using the power switch as an emergency stop switch.

Proceed as follows in case of malfunctions:

1. Immediately remove the endoscope from the patient.
2. Inspect the Camsource® LED and perform a functional test.
3. Contact the joimax® technical support.
4. Report any serious incident to joimax® GmbH and the competent authority having jurisdiction in your locale, see Chapter 18.

8 Operation

8.1 Control Elements



1.	Button “Standby” with status LED	7.	Button “Snapshot”
2.	Button “WB” (White Balance) with status LED	8.	Button “WB+” with status LED
3.	Button “Light On/Off” with status LED	9.	Button “Minus”
4.	Button “Image Settings” with status LED	10.	Button „Down“
5.	Button “Up”	11.	Button “Plus”
6.	Button “System Settings” with status LED		

8.2 Starting the Device

Warning:
Make sure that the device is turned on only after checking the power connector and after ensuring that the device is completely wired.

Warning:
Before each use and after every change of device settings, always make sure a live image and no still image is displayed!

The booting sequence may take a few seconds to complete.

1. Connect the power cord and turn on the power switch at the backside of the device. The device is now in standby mode.
2. Press the button "Standby” at the device front to boot the device. The LED of the “Standby” button flashes during the boot sequence. When the status LED is continuously lit green, the device is ready for use.
3. Press the “Standby” button again to return to standby mode.

8.3 Shutting Down the Device

For full disconnection from the power supply, the mains switch at the rear of the device must be switched to position "0".

1. The control unit is shut down by pressing the "Standby" button at the front of the control unit. The LED of the "Standby" button turns off.
2. Press the "Standby" button again to restart the device.

8.4 Activating / Deactivating the Light Source

Switching the light source on and off in short intervals reduces the LED life considerably. Please avoid this if possible.

1. Press the button "Light On/Off" at the device front. The light source is turned on (the button lights up when the light source is switched on).
2. Press the button "Light On/Off" again to switch the light source off.

8.5 Performing White Balance

Warning:
For optimal color rendering, white balance must be performed after every change of the endoscope.

Warning:
Make sure to keep the endoscope directed towards the white surface until the white balancing has been completed.

To find the optimal white point, it may help to vary the distance between the distal end of the endoscope and the white object while performing the white balance. The white surface should not reflect. A piece of white paper or gauze is recommended.

White balance is necessary to ensure a lifelike color reproduction in case of different lighting conditions, varying optical circumstances and generally after changing endoscopes.

1. Connect an endoscope to the camera head.
2. Switch the light source on.
3. Press the button "WB" at the device front while holding a pure white surface in front of the distal end of the endoscope at a distance of 1 – 3 cm (approx. ½ - 1¼").
4. The button flashes while the White Balance is performed by the device (about 4 seconds), and then it is continuously lit.
5. Check that a satisfactory live image is displayed.

8.6 Performing White Balance +

Warning:
For optimal color rendering, white balance must be performed after every change of the endoscope.

Warning:
Make sure to keep the endoscope directed towards the white surface until the white balancing has been completed.

To find the optimal white point, it may help to vary the distance between the distal end of the endoscope and the white object while performing the white balance. The white surface should not reflect. A piece of white paper or gauze is recommended.

WB+ automatically optimizes the endoscopic image for display on the connected monitor while performing a white balance.
The image is centered horizontally and vertically on the monitor and enlarged to the maximum size. Additionally, the white balance function is executed.

1. Connect an endoscope to the camera head.
2. Switch the light source on.
3. Press the button "WB+" at the device front while holding a pure white surface in front of the distal end of the endoscope at a distance of 1 – 3 cm (approx. ½ - 1¼").
4. The button flashes alternately with the WB button while White Balance+ is performed (about 4 seconds) and both buttons then light continuously.
5. Check that a satisfactory live image is displayed.

8.7 Changing Settings

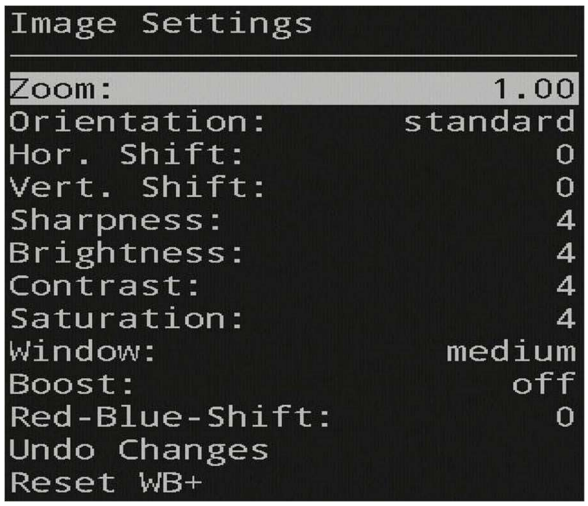
Two types of settings are available to the user.
With the "Image Settings", all parameters regarding the displayed endoscopic image on the monitor can be adjusted. The "System Settings" in contrast contain all the device-related parameters.

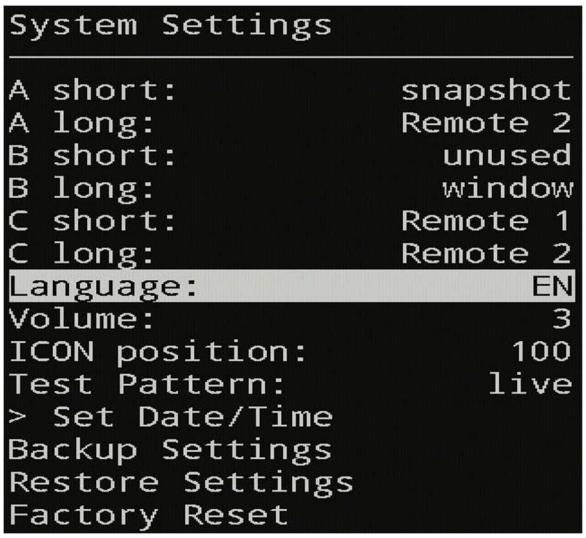
To enter a settings menu, press the corresponding settings button on the device front:

Image Settings

System Settings

The following menus are displayed on the screen:





with the following settings:

Image Settings

Zoom — **1.00 – 1.40**
Digital image zoom

Orientation — **Standard / mirror / flip / 180°**
Image orientation on the display

Hor. Shift — **-40 - 0 - +40**
Horizontal image shift

Vert. Shift — **-40 - 0 - +40**
Vertical image shift

Sharpness — **1 – 7**
Image sharpness

Brightness — **1 – 7**
Image brightness

Contrast — **1 – 7**
Image contrast

Saturation — **1 – 7**
Image saturation

Window — **small / medium / large**
Image area used for automated brightness control

Adjust, if the center of the image is heavily overexposed.

Boost — **on / off**
Brightness correction

The edges of the image are brightened and the center is darkened.

Red-Blue-Shift — **-3 - 0 - +3**
Image color shift

Undo Changes
Reset image settings

All adjustments made in the image settings until closing the menu will be reset including all adjustments made via the camera head buttons.

Reset WB+
Reset automated WB+ settings

All adjustments performed automatically by the system during the WB+ feature will be reset.

System Settings

A short / A long **B short / B long** **C short / C long** Function assignment to the three camera head buttons	**zoom / boost / sharpness± / mirror / flip / WB+ / window / WB / orientation / joimax CMD / unused / Remote 1 / Remote 2 / snapshot/ brightness± / contrast ±**

joimax® CMD activates the on screen display of the joimax® Command, Remote 1/2 triggers the external remote connectors (e.g. for remote control of the joimax® Vitegra®).

Language System language	**EN / DE / FR / ES / IT**
Volume Volume of acoustic signals	**0 - 6**
Icon position Horizontal shift of OSD icons	**0 - 100**
Test Pattern Temporarily display of a test pattern	**live / colorbar**

Set Date / Time

A submenu opens in which the system time and date can be set.

Backup Setting

Saves all settings to a USB storage connected to the device front.

Restore Settings

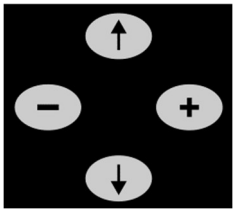
Restores settings from a USB storage connected to the device front.

Factory Reset
Reset system settings and image settings

Resets the device to the delivery state.

Individual parameters are selected via the "Up" and "Down" buttons. The selected setting can then be adjusted with "+" and "-".

To accept settings, close the menu by pressing the corresponding settings button on the device front again.



8.8 Taking a Snapshot / Documentation

The Camsource® LED does not provide any internal storage. To take a snapshot, a USB storage must be connected. The connected USB storage must be FAT32 formatted.

The camera can make a snapshot of the currently displayed endoscopic image and store it as a JPEG file directly on a connected USB storage.

The button "Snapshot" is continuously lit when a USB storage is connected and ready to use. During the saving process, the button flashes.

To save a snapshot, press the "Snapshot" button with USB storage connected and ready to use.

8.9 Assigning Camera Head Buttons

The three buttons (A/B/C) on the camera heads can be freely assigned two functions each (short keystroke and long keystroke > 1 second). The assignment is done via the system settings menu.

9 Processing

Warning:
The Camsource® LED and the camera heads must be cleaned and disinfected before first use.

Warning:
The Camsource® LED Control Unit is not suitable for sterilization!

Warning:
Before cleaning or disinfection, turn off the device and disconnect it from the power source. Also, disconnect it from all other devices connected to a power source.

Warning:
Check the device and all accessories after processing and prior to every use for damage and for proper operation.

Always respect locally applicable regulations and hygiene procedures of the hospital.

9.1 Cleaning and Disinfection of the Control Unit

Warning:
Ensure no liquid enters the Camsource® LED Control Unit during cleaning and disinfection.

Warning:
Before cleaning or disinfection, disconnect all components from the Camsource® LED Control Unit and disconnect the control unit from its power source.

Warning:
In case of severe soiling, the front panel of the control unit can be carefully cleaned with a cotton swab soaked in alcohol. Do not use any sharp objects for cleaning!

For effective wipe disinfection of the Camsource® LED Control Unit, use of Mikrozid® sensitive wipes (Schülke & Mayr) is recommended by joimax® GmbH.

Pay particular attention to the connectors at the front of the control unit and the plugs of the handpieces. Make sure to let them dry thoroughly before connecting any components.

The surfaces of the Camsource® LED Control Unit can be cleaned and disinfected with a suitable mild varnish- and plastic-friendly cleaning and disinfectant detergent using the following procedure:

1. Turn off the device.
2. Disconnect the camera head from the control unit and disconnect the control unit from the power supply.
3. Seal the USB port at the device front with the attached plug.
4. Apply the cleaning detergent onto a sponge or soft cloth and wipe the exterior surfaces of the device repeatedly.
5. Wipe off the cleaning agent with a sponge or soft cloth moistened with clean water.
6. Dry the device surface with a clean and lint free cloth.

9.2 Cleaning, Disinfection and Sterilization of the Camera Heads

Warning:
Do not clean and disinfect the Camsource® Camera Head Ocular (CSFHD01CO) with a video lens being attached. Always unscrew the video lens from the camera head and process the video lens separately.

Warning:
Ensure no liquid enters the camera head connector sealing cap during cleaning and disinfection.

Warning:
The camera heads are not suitable for ultrasonic cleaning.

Warning:
Immediately after use (within a maximum of 2 hours), coarse soiling must be removed from the camera heads with running water or a disinfectant solution.

For quick cleaning and disinfection between several consecutive applications with a sterile cover, it is recommended to perform a simple wipe disinfection or rapid disinfection following the steps below:

1. Disconnect the camera head from the control unit and from the endoscope.
2. Unscrew the video lens and the fiber optic cable (Camsource® LED Camera Head Ocular, CSFHD01CO only).
3. Screw the sealing cap tightly onto the plug of the camera head cable.
4. Apply the cleaning detergent or disinfectant onto a sponge or soft cloth and wipe the exterior surfaces of the camera head repeatedly.
5. Wipe off the cleaning agent with a sponge or soft cloth moistened with purified water.
6. Properly dry the camera head.

It is recommended to thoroughly clean and disinfect the camera heads at least once a week following the instructions below:

9.2.1 Pre-Treatment

Warning:
To remove soiling manually, use a soft brush or a clean soft cloth designed exclusively for this purpose. Never use a metal brush, steel wool or any sharp objects for cleaning.

Warning:
Do not use abrasive cleaners, waxes or solvents for cleaning.

1. Disconnect the camera head from the control unit and from the endoscope.
2. Unscrew the video lens and the fiber optic cable (Camsource® LED Camera Head Ocular, CSFHD01CO only).
3. Screw the sealing cap tightly onto the plug of the camera head cable.
4. Rinse the camera head with purified water (Temp. < 35° C/95° F). Push each button at least three times during rinsing.

9.2.2 Automated Cleaning and Disinfection

Warning:
The concentrations and exposure times specified by the manufacturer of the cleaning agents and disinfectants must be strictly adhered to.

Warning:
With chemical disinfection, there is a risk of disinfectant residues remaining on the camera heads.

For effective automated cleaning and disinfection, use of the cleaner Neosdisher MediClean forte (Chemische Fabrik Dr. Weigert) is recommended by joimax® GmbH.

When selecting the disinfector, make sure that:
- the disinfector has proven effectiveness (e.g. DGHM or FDA approval or CE marking according to DIN EN ISO 15883)
- if possible, a tested program for thermal disinfection (A0 value > 3000, i. e. at least 5 min at 90° C/194° F) is used
- the used program is suitable for the camera heads (see chapter 9.4) and contains sufficient rinsing cycles
- for rinsing only sterile or low-germ (max 10 germs/ml) and endotoxin-poor (maximum 0.25 endotoxin units/ml) water (e.g. purified water/highly purified water) is used
- the air used for drying is filtered
- the disinfector is regularly maintained and checked

When selecting the detergent, make sure that:
- it is suitable for the cleaning of medical products made of metals and plastics (see chapter 9.4)
- if thermal disinfection is not used - in addition a suitable disinfectant with tested effectiveness (e.g. VAH/DGHM or FDA approval or CE marking) is used and that it is compatible with the cleaning agent used

Procedure:
1. Disconnect the camera head from the control unit and from the endoscope.
2. Unscrew the video lens and the fiber optic cable (Camsource® LED Camera Head Ocular, CSFHD01CO only).
3. Screw the sealing cap tightly onto the plug of the camera head cable.
4. Place the camera head in the disinfector. Ensure no parts contact each other.
5. Start the program.
6. At the end of the program, remove the camera head from the disinfector.
7. Inspect and pack the camera head immediately after removal in a clean place.

9.2.3 Inspection

After cleaning and disinfection, check the camera heads for corrosion, damaged surfaces, chipping or any remaining soiling and cleaning and disinfection agents.

9.2.4 Packing

Put the camera heads in disposable packaging (single or double) and/or sterilization containers that meet the following requirements:
- DIN EN ISO/ANSI AAMI ISO 11607-1; 11607-2
- suitable for steam sterilization (temperature resistance up to at least 141° C (286° F), sufficient vapour permeability)
- adequate protection of the camera heads or sterilization packaging against mechanical damage
- regular maintenance according to the manufacturer's instructions (sterilization

container)
- cleared by the FDA (No. K953776, K973827)

9.2.5 Sterilization

Warning:
The camera heads must be sterilized before first and every use if they are used without a sterile cover.

Warning:
Only the Camsource® LED Camera Head Ocular (CSFHD01CO) is suitable for steam sterilization, the Camsource® LED Camera Head Combo (CSFHD01CC) must only be sterilized using plasma sterilization! Note the markings on the camera head.

Warning:
Only the new camera head models with closed keypad design and the respective sterilization procedure marked on the housing are suitable for sterilization. Camera head models with the old design must not be sterilized and only be used with a sterile cover.

New sterilizable design

Old non-sterilizable design

Warning:
Uncleaned camera heads must not be sterilized as the effectiveness of the sterilization is only guaranteed after cleaning and disinfection. Make sure the camera heads are clean before sterilization!

Warning:
Other autoclave settings and cycles than specified may have negative effects on the sterilization result and the function of the camera heads.

Warning:
Please note that overloading the sterilizer may reduce the sterilization result. Also, in case of overload there is the possibility of undesirable condensation, which increases the formation of corrosion on camera heads. Observe the manufacturer's instructions for maximum loading of the sterilizer.

It is the responsibility of the user to carry out the recommended sterilization procedures with regard to achieving the desired or required sterilization effect.

Applicable national legal regulations must be observed.

It is not recommended to use other sterilization methods (such as flash sterilization, hot air sterilization, radiation sterilization, formaldehyde or ethylene oxide sterilization).

The STERRAD® sterilization system may cause cosmetic changes to some video lens components.

When selecting the steam sterilizer, make sure that:

- the steam sterilizer has proven effectiveness (according to EN 13060/EN 285 or ANSI AAMI ST79, for USA: FDA clearance)
- the steam sterilizer is validated according to EN ISO 17665 (valid IQ/OQ (commissioning) and product specific performance qualification (PQ))

The Camsource® LED **Camera Head Ocular (CSFHD01CO)** can be sterilized using the following procedures:

AUTOCLAVE / STEAM STERILIZATION	PLASMA STERILIZATION
FRACTIONATED VACUUM / DYNAMIC AIR REMOVAL Temperature: 132° C / 270° F Holding time: min. 3 minutes Drying time: min. 20 minutes **GRAVITY DISPLACEMENT** Not recommended	**STERRAD® STERILIZATION SYSTEM** Comply with STERRAD® Advanced Sterilization Products instructions. The camera head is compatible with the STERRAD® 100NX DUO Cycle.

The Camsource® LED **Camera Head Combo (CSFHD01CC)** can be sterilized using the following procedures:

PLASMA STERILIZATION
STERRAD® STERILIZATION SYSTEM Comply with STERRAD® Advanced Sterilization Products instructions. The camera head is compatible with the STERRAD® 100NX DUO Cycle.

9.2.6 Storage

After sterilization, the camera heads must be stored dry and dust-free in the sterilization packaging.

9.3 Cleaning, Disinfection and Sterilization of the Video Lens and Fiber Optic Cable

Follow the instructions for reprocessing in the corresponding user manuals.

9.4 Reusability

Warning:
When selecting cleaning agents and disinfectants, make sure they do not contain the followings substances:

- *organic, mineral, and oxidizing acids (minimum admitted pH-value 5.5)*
- *lyes (maximum admitted pH-value 8.5, neutral/enzymatic cleaner recommended)*
- *organic solvents (for example: acetone, ether, alcohol, benzene)*
- *oxidizing agents (for example: peroxide)*
- *halogens (chlorine, iodine, bromine)*
- *aromatic, halogenated hydrocarbons*
- *heavy metal salts*
- *oils*
- *acids*

Warning:
Do not expose the camera heads to temperatures above 138° C/280° F.

Warning:
The lifetime of the camera heads is limited, because they are subject to natural wear and aging. Inappropriate handling, e.g. overloading, unsuitable cleaning agents, high temperatures, etc., may reduce the lifetime of the equipment.

The manufacturer recommends a preventive maintenance after 50 reprocessing cycles. If appropriate care is taken and the above procedures are used, the camera heads can be reprocessed at least 150 cycles. Any further re-use or the use of damaged and/or contaminated instruments is in the responsibility of the user.
In case of any doubt about product quality we recommend to return the camera head for inspection or for replacement to joimax®.

10 Technical Data

General	
Power supply	100 – 240 V AC , 50 / 60 Hz
Current consumption	2.0 - 0.6 A
Fuse	2 × F 6.3 A H – 250 V
Weight	11.20 kg
Dimensions	Control Unit (W/D/H): 375 × 475 × 125 mm Camera Head Combo (W/D/H/L): 28 x 135 x 39 x 3000 mm Camera Head Ocular (W/D/H/L): 28 x 199 x 31 x 3000 mm
The system is completely closed for access by the user during intended use. The Camsource® LED software is embedded into the control unit and the system does not provide any network functionality. Therefore no requirements concerning hardware or special IT security measures are necessary to run the software as intended.	
Operating conditions	
Operating temperature	+10 °C to +35 °C / +50 °F to +95 °F
Relative humidity	30% to 75%, non-condensing
Atmospheric pressure	70 – 106 kPa (0 – 3000 m)
Transport and storage conditions	
Temperature	-25 °C to +70 °C / -13 °F to +158 °F
Relative humidity	10% to 90%
Atmospheric pressure	50 – 106 kPa
Special conditions	Keep the device dry and protected from sunlight.
Safety	
Protection class	I
Applied standards	
IEC 60601-1:2012, IEC 60601-1-2:2014, IEC 60601-1-6:2013, IEC 60601-2-18:2009, IEC 62304:2015, IEC 62366-1:2016	
Camera	
Digital video output	DVI, 3G-SDI, HD-SDI, HDMI
Resolution	DVI, 3G-SDI, HD-SDI: 1920 x 1080 pixels HDMI: 3840 x 2160 pixels
Documentation	
Functions	Capture of image files
Image formats	JPEG
Storage	USB 2.0 port for USB storage
Applied part	
Classification	Type BF (according to IEC 60601-1)

11 EMC Notes

Warning:
The Camsource® LED mandates special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided.

Warning:
Use of accessories and cables other than those specified or provided by the manufacturer of this equipment may result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation.

Warning:
Use of this device adjacent to or stacked with other devices should be avoided, because it might result in improper operation. If the endoscopic camera must be used in a stacked configuration or adjacent with other electronic devices, this device and the other devices must be observed to ensure normal operation.

Warning:
This product may emit radio frequency energy and, if not installed and used according to the instructions, may cause harmful interferences to other devices in the vicinity. If this product interferes with other devices, the user is encouraged to try the following in order to correct the interference:

- *Increase the distance between interfering components.*
- *Consult the manufacturer of the other device for help.*

Warning:
Portable RF communications equipment should be used no closer than 30 cm (12”) to any part of the Camsource® LED. Otherwise, the performance of this equipment might be impaired.

This equipment has been tested and found to comply with the requirements regarding electromagnetic compatibility (EMC) according to IEC 60601-1-2:2014 (Ed.4). The customer or user of the Camsource® LED has to ensure that it is operated in such environments.

The Camsource® LED is suitable to be used in combination with RF surgical equipment. The device was tested according to IEC 60601-2-2, BB.4 and can withstand the emissions produced by such equipment.

The emissions characteristics of this equipment make it suitable for use in industrial areas and hospitals (CISPR 11 group 1, class A). If it is used in a residential environment (for which CISPR 11 class B is normally required) this equipment might not offer adequate protection to radio frequency communication services. The user might need to take mitigation measures, such as relocating or re-orienting the equipment.

The Camsource® LED is suitable for use in professional healthcare facility environments according to IEC 60601-1-2:2014 (Ed.4).

Phenomenon	Compliance	Electromagnetic environment – guidance
Conducted and radiated RF emissions	Group 1	The Camsource® LED uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
	Class A	The Camsource® LED is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic distortion	Not applicable	
Voltage fluctuations and flickers	Not applicable	

Phenomenon	Basic EMC standard or test method	Immunity test levels	Compliance levels	Electromagnetic environment – guidance
Enclosure Port				
Electrostatic discharge	IEC 61000-4-2	±8 kV contact ±2 kV, ±4 kV, ±8 kV, ±15 kV air	±8 kV contact ±2 kV, ±4 kV, ±8kV, ±15 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Radiated RF EM fields	IEC 61000-4-3	3 V/m 80 MHz - 2,7 GHz 80% AM at 1 kHz	3 V/m 80 MHz - 2,7 GHz 80% AM at 1 kHz	Portable and mobile RF communications equipment should be used no closer to any part of the Camsource® LED, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance d= 1.2√P d= 1.2√P 80 MHz to 800 MHz d= 2.3√P 800 MHz to 2.7 GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range. Interference may occur in the vicinity of equipment marked with the following symbol: 
Proximity fields from RF wireless communication equipment	IEC 61000-4-3	See table "Enclosure port immunity to RF wireless communication equipment" below		Minimum distances between the Camsource® LED and wireless communication equipment as specified in table "Enclosure port immunity to RF wireless communication equipment", must not be undercut.
Rated power frequency magnetic fields	IEC 61000-4-8	30 A/m 50 Hz or 60 Hz	30 A/m 50 Hz or 60 Hz	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

Input AC power port				
Electrical fast transients/bursts	IEC 61000-4-4	±2 kV 100 kHz repetition frequency	±2 kV 100 kHz repetition frequency	The quality of the supply voltage must be that of a typical business or hospital environment.
Surges Line-to-line	IEC 61000-4-5	±0.5 kV, ±1 kV	±0.5 kV, ±1 kV	
Surges Line-to-ground	IEC 61000-4-5	±0.5 kV, ±1 kV, ±2kV	±0.5 kV, ±1 kV, ±2kV	
Conducted disturbances induced by RF fields	IEC 61000-4-6	3 V 0.15 MHz – 80 MHz 6 V in ISM bands between 0.15 MHz and 80 MHz 80% AM at 1 kHz	3 V 0.15 MHz – 80 MHz 6 V in ISM bands between 0.15 MHz and 80 MHz 80% AM at 1 kHz	Portable and mobile RF communications equipment should be used no closer to any part of the Camsource® LED, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance d= 1.2√P d= 1.2√P 80 MHz to 800 MHz d= 2.3√P 800 MHz to 2.7 GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range. Interference may occur in the vicinity of equipment marked with the following symbol: 
Voltage dips	IEC 61000-4-11	0% U T; 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°	0% U T; 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Camsource® LED requires continued operation during power mains interruptions, it is recommended that the Camsource® LED be powered from an uninterruptible power supply or a battery.
Voltage interruptions	IEC 61000-4-11	0% U T 250/300 cycle	0% U T; 250/300 cycle	

Signal input/output parts port				
Electrostatic discharge	IEC 61000-4-2	±8 kV contact ±2 kV, ±4 kV, ±8 kV, ±15 kV air	±8 kV contact ±2 kV, ±4 kV, ±8 kV, ±15 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transients / bursts	IEC 61000-4-4	±1 kV 100 kHz repetition frequency	±1 kV 100 kHz repetition frequency	The quality of the supply voltage must be that of a typical business or hospital environment.
Surges Line-to-ground	IEC 61000-4-5	±2 kV	±2 kV	

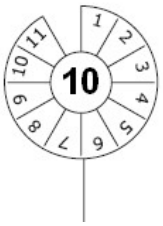
Signal input/output parts port				
Conducted disturbances induced by RF fields	IEC 61000-4-6	3 V 0.15 MHz - 80 MHz 6 V in ISM bands between 0.15 MHz and 80 MHz 80% AM at 1 kHz	3 V 0.15 MHz - 80 MHz 6 V in ISM bands between 0.15 MHz and 80 MHz 80% AM at 1 kHz	Portable and mobile RF communications equipment should be used no closer to any part of the Camsource® LED, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance $d = 1.2\sqrt{P}$ $d = 1.2\sqrt{P}$ 80 MHz to 800 MHz $d = 2.3\sqrt{P}$ 800 MHz to 2.7 GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range. Interference may occur in the vicinity of equipment marked with the following symbol: 

Enclosure port immunity to RF wireless communication equipment							
Test frequency (MHz)	**Band**	**Service**	**Modulation**	**Max. Power** (W)	**Distance** (m)	**Immunity Test Level** (V/m)	**Compliance Level** (V/m)
385	380 - 390	TETRA 400	Pulse modulation 18 Hz	1.8	0.3	27	27
450	430 - 470	GMRS 460, FRS 460	FM ± 5 kHz deviation 1 kHz sine	2	0.3	28	28
710	704 - 787	LTE Band 13, 17	Pulse modulation 217 Hz	0.2	0.3	9	9
745							
780							
810	800 - 960	GSM 800/900, TETRA 800, iDEN 820, CDMA 850, LTE Band 5	Pulse modulation18 Hz	2	0.3	28	28
870							
930							
1720	1700 - 1990	GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS	Pulse modulation 217 Hz	2	03	28	28
1845							
1970							
2450	2400 - 2570	Bluetooth, WLAN, 802.11 b/g/n, RFID 2450, LTE Band 7	Pulse modulation 217 Hz	2	03	28	28
5240	5100 - 5800	WLAN 802.11 a/n	Pulse modulation 217 Hz	0.2	0.3	9	9
5500							
5785							

12 Service / Maintenance

Warning:
Do not use the device during service activities.

joimax® GmbH recommends performing a function and safety inspection at regular intervals according to EN 62353 or to other corresponding country-specific regulation.



Next inspection

The Camsource® LED is low maintenance. Regardless of the Camsource® LED being low maintenance, regular service can contribute to early detection of defects and faults and, thus, extend the operating life of the devices.

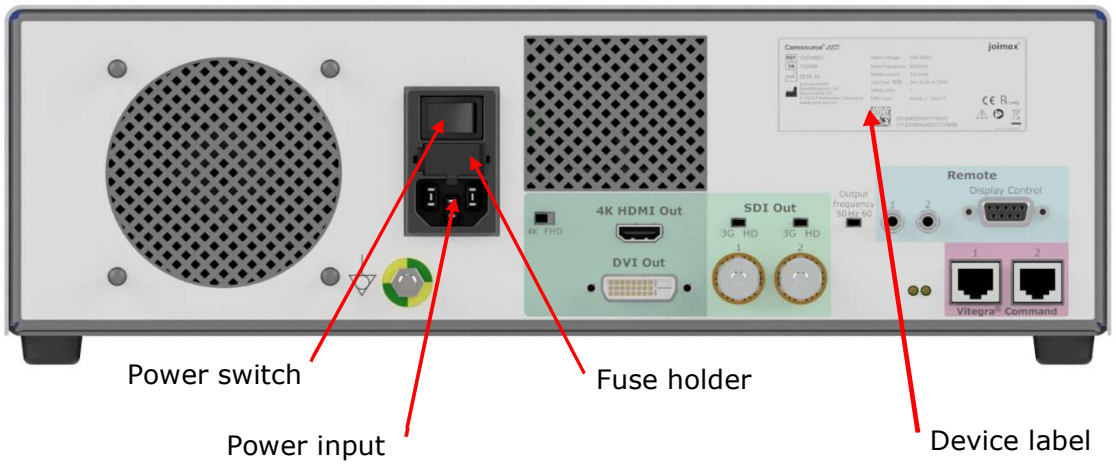
An operating life of 5 years is specified for the Camsource® LED Control Unit. Any use beyond this depends on the results of the safety inspections. The operating life of the camera heads is verified for up to 150 sterilization cycles. Any further re-use or the use of damaged and/or contaminated instruments is in the responsibility of the user. The lifetime of the video lens depends on the applied method of cleaning, disinfection and sterilization.

joimax® GmbH recommends an inspection to be performed at least once a year. The inspection should be documented with an inspection-label on the device.

12.1 Replacing the Fuse

Warning:
Always observe the specifications on the device label and follow the instructions below when replacing the fuse. Non-observance may result in malfunction of the device and possible injury.

Warning:
Always disconnect the device from the power supply when performing service activities.



1) Turn off the device via the power switch at the backside of the control unit.
2) Unplug the power cord from the control unit.
3) Open the fuse holder.
4) Check the type of replacement fuse on the device label and replace the defective fuses.
5) Plug the power cord into the control unit.
6) Turn on the device via the power switch at the backside, press the button "Standby" at the device front and check the function of the device.

13 Troubleshooting

Problem	Possible cause	Possible solution
No operation	No power supply	Check power supply connection Check main fuses
	Device is not switched on	Switch on the device
	Defective device	Contact joimax® customer service
No image	Device is not switched on	Switch on the device
	Incorrect cabling on device and monitor	Inspect correct cabling
	Incorrect monitor settings	Inspect selected input source
	Defective video cable	Inspect integrity and replace video cable
	Device is not detected by monitor	Disconnect and reconnect the camera head to the device
	Defective camera head/device/monitor/optical cable	Contact joimax® customer service
Image is dark	Endoscope/video lens/camera head lens is dirty or damaged	Clean endoscope/video lens/camera head lens
	Fiber optic cable is not properly connected	Inspect connection of fiber optic cable
	Brightness is set too low at the device/monitor	Increase the brightness of the device/monitor
	Device is overheating	Ensure rear cooling fan is not blocked
Image blurry	Endoscope/video lens/camera head is dirty	Clean endoscope/video lens/camera head lens
	Video lens is not properly focused	Check the attached endoscope and the connected video lens
		Refocus connected video lens
Color bar pattern is displayed	No camera head is connected	Connect a camera head to the control unit
	Connected camera head is defective	Contact joimax® costumer service
Picture shows an unnatural color	White balance of the camera was not performed	Perform white balance
	Color settings of the device are incorrect	Adjust colors at the device
	Color settings of the monitor are incorrect	Adjust colors on monitor
		Contact joimax® costumer service
Image artifacts during use of RF surgical equipment	RF surgical equipment cables are routed too close to the camera head cable or control unit	Increase the distance between RF surgical equipment cables and camera head cable and control unit
	RF surgical equipment is activated in direct contact with the endoscope or working tube	Only activate the RF equipment when not in contact with the endoscope or working tube
Endoscope image is not centered	The endoscope was removed from the white surface too early	Keep the endoscope directed to the white surface until the WB+ button stops flashing
	No white surface was used for white balance	Use a clear white surface for white balance
	WB+ was not executed correctly	Reset WB+ in the image settings
Others		Contact joimax® costumer service

14 Warranty

Warning:
Do not open the Camsource® LED. Unauthorized opening, repair, or modification of the device releases joimax® GmbH from any liability for the operating safety of the device and results in any claims becoming void, even during the warranty period.

Warning:
In case of return of equipment or accessories, original packaging material must always be used!

Warning:
To protect your staff and the joimax® GmbH employees, please clean the unit and its accessories and disinfect it before sending it.
Should this be impossible due to temporal constraints, please prepare the unit as much as possible and label it accordingly.

The warranty period for the Camsource® LED depends on the legal regulations of the specific country. Failure due to faulty material and/or poor processing must be rectified by the manufacturer free of charge within this period.
Transport costs and shipment risks are excluded hereof.
In addition, the details in our general terms and conditions apply.

To facilitate quick processing of service requests and repairs, we ask you to send the product with the following information:

- Model/Item number (REF)
- Serial number (SN)
- A description of the error as accurate as possible
- Invoice of the device if available
- Contact person for questions

15 Consumables / Accessories

Warning:
Only the consumables/accessories from joimax® GmbH listed below are to be used with the Camsource® LED. Use of accessories and cables other than those specified or provided by the manufacturer may result in improper operation.

Warning:
Make sure to follow the instructions for use of accessories to be used with the device (e.g. monitors, recording systems etc.).

Consumables

All consumables are provided by joimax® GmbH. Replacements for all consumables can be ordered from joimax® GmbH or via the respective local joimax® distributor.

Item number	Item description
CSCC1223	Camsource® Camera Cable Cover Disposable, telescopic folded, with perforation and adhesive tape, L 230cm / W 12.5cm
CSCC1324US	Camsource® Camera Cable Cover (US Version) Disposable, telescopic folded, with perforation and adhesive tape, L 244cm / W 13cm

Accessories

Item number	Item description
CSFHD01COAS	Fiber Optic Cable Adapter
JMUSBS10	joimax® USB Flash Drive 16GB
JMUSBS20	joimax® USB Flash Drive 4GB
JDVI0020	joimax® DVI Cable, L 200 cm
JHDMI0020	joimax® HDMI Cable
JBNC0020	joimax® BNC Cable, high-flexible, double shielded / L 200 cm
JVCC100	joimax® Vitegra® Command Cable, L 1m
JTRS0010	joimax® TRS Cable, L1m
JMCC0020	joimax® Monitor Control RS232 Cable, L 2m

16 Compatibility

Any endoscope with special joimax® Combo connector (joimax® single cable technology, video cable with integrated fiber optics) or standard DIN ocular connector can be connected to the Camsource® LED via the two available camera head cables.

Detailed information regarding joimax® endoscopes and accessories can be found in the joimax® product catalog.

For further information and new products directly contact the joimax® customer service or your joimax® representative.

17 Disposal of the Device

Warning:
This symbol indicates that medical devices must be disposed of separately from household waste. Dispose of electrical waste in accordance with the applicable national and local regulations.

Warning:
This symbol must be affixed to the waste container or the device when discarding it.

Dispose of packing material, unless it is contaminated, in accordance with national and local regulations.

According to the implementation of European law into national laws and regulations, you are obliged to properly dispose of medical devices.

Discard used and contaminated medical devices at a collection point of an appropriate disposal carrier. "Medical waste" is classified according to dangerous goods law (for transportation) by UN number UN 3291.

18 Incidents Reporting

Any serious incident that has occurred in relation to the device should be reported to joimax® GmbH and the competent authority having jurisdiction in your locale.

Please notify us at the following telephone number:

For the US	**+1 949-859-3472**	**(24-hour availability)**
For all other countries	**+49 (0)721 25514 – 999**	**(24-hour availability)**

Thank you for your support!

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