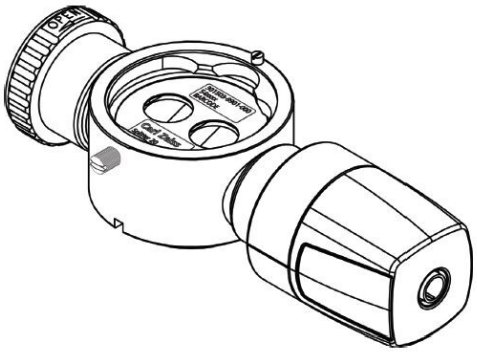
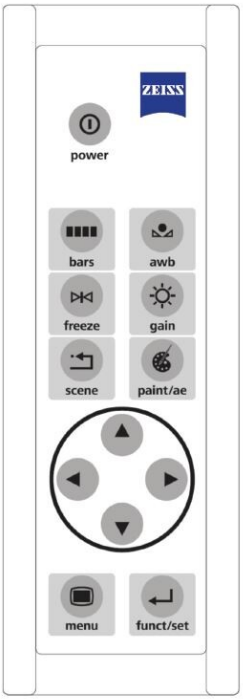
1Chip HD Camera

Instructions for Use





1 Notes on the instructions for use

1.1 Device name

1Chip HD Camera is referred to as "device" in these Instructions for Use.

1.2 Scope

These Instructions for Use apply to the 1Chip HD Camera in the following areas of application:

- 1Chip HD Camera for S7 / OPMI PROergo and S7 / OPMI Sensera
- 1Chip HD Camera for OPMI Lumera i

1.3 Purpose and storage of the documentation

These Instructions for Use explain the safety features, functions and performance parameters of the device. They contain instructions on the safe use of the device and identify measures for its care and maintenance.

Correct operation of the device is imperative for its safe and successful function.

Action

- ▶ Read these Instructions for Use before setting up and using the device the first time.
- ▶ Keep the Instructions for Use accessible for all users at all times.
- ▶ Pass the Instructions for Use to future owners of the device.

1.4 Questions and comments

Action

- ▶ If you have any questions or comments concerning these Instructions for Use or the device itself, please contact ZEISS Service.

You can find the ZEISS representative for your country online on the following website: www.zeiss.com/med

1.5 Conventions in this document

Certain types of information are specially marked in this document for better recognition.

1.5.1 Conventions in all text areas

- This is a list.
  - This is a second level list.

This is a cross-reference: Conventions in this document [▶ 3].

This is **bold type**.

This is `software code` or `program text`.

Names of software dialogs, fields or menus and software messages are marked by quotation marks:

- "View" menu.
- "Do you want to save the settings?"

The steps in menu and file paths are separated by slashes:

- "File / Save as"
- "My documents / Documents"

Keys, buttons, knobs, levers and other operating controls are marked by square brackets:

- [START] key
- [Next] button

1.5.2 Conventions in a course of action

⚠ WARNING!

This is warning information about hazards that can cause death or severe injuries if not avoided.

The warning message names the possible consequences.

▶ This is a measure with which hazards can be prevented.

⚠ CAUTION!

This is warning information about hazards that can cause injuries if not avoided.

The warning message names the possible consequences.

▶ This is a measure with which hazards can be prevented.

NOTE

This is warning information about hazards that can cause property damage if not avoided.

The warning message names the possible consequences.

▶ This is a measure with which hazards can be prevented.

Prerequisite

☑ This is a requirement that must be met before the start of a sequence of actions.

Action

1. This is a command.
2. **CAUTION! This is a warning message about hazards that can occur during a single action.** This is a command.

   ⇨ This is the result of a sequence of actions.

2 Safety notes

2.1 Target group

These Instructions for Use are intended for qualified personnel who have been trained and briefed in how to prepare and handle this medical device using these Instructions for Use. Certain fields of application for this medical electrical device may require the operator to obtain additional qualifications in corresponding areas of expertise.

2.2 Area of use

2.2.1 Use for the intended purpose

The 1Chip HD Camera is used to visualize and document surgical procedures and can be connected to a ZEISS surgical microscope via standard interfaces.

The 1Chip HD camera consists primarily of an HD video camera, a camera cable, and a camera control unit (CCU). The CCU controls the 1Chip HD camera. The 1Chip HD Camera is activated automatically as soon as the CCU is activated.

Recording devices and monitors can be connected to the video output ports of the CCU.

The product has an anticipated service life of 8 years.

At the end of its service life, the 1Chip HD Camera must be disposed of as an electronic device in accordance with national laws.

2.2.2 Area of application

Combining the 1Chip HD Camera with devices with which it is not compatible may result in injury to the patient. The 1Chip HD Camera may therefore only be used with devices that have been tested and approved by ZEISS:

- Lumera i on floor stand
- S7 / OPMI PROergo
- S7 / OPMI Sensera

2.3 Responsibilities and duties of the responsible organization

Operating personnel

The device may be operated only by properly instructed and trained persons.

- ▶ Ensure that the operating personnel have been trained and instructed in its use.
- ▶ Make sure that the operating personnel have read and understood the instructions for use.
- ▶ Keep the Instructions for Use available at all times for the operating personnel.
- ▶ To facilitate access for the entire operating personnel, request additional copies of the instructions for use from ZEISS.
- ▶ Specify the competencies for handling the device and state who is authorized for what tasks.
- ▶ Define rules for reporting errors and damage, and ensure these rules are known (see Notification to manufacturers and authorities [▷ 7]).
- ▶ Provide the necessary protective clothing.
- ▶ Regularly check compliance with the national laws and regulations concerning accident prevention and occupational health.

Safety inspections

- ▶ To prevent any reduction in device safety due to aging and wear, have regular safety inspections performed in accordance with the applicable national regulations for this device.

The safety inspections may only be performed by the manufacturer or qualified personnel.

- ▶ Keep within the prescribed deadlines.
- ▶ Carry out checks according to the extent specified.

The safety inspections of the device should at least comprise the following points:

- Checking to make sure the Instructions for Use are available
- Visual inspection of system and accessories for damage and legibility of labels
- Leakage current test
- Protective ground conductor check
- Function and wear test of the brakes
- Functional test of all switches, buttons, connectors, and indicator lamps on the device

- ▶ Contact the ZEISS Service team or authorized service personnel as soon as a change occurs in the device.

Maintenance and inspection

- To ensure that the device is safe to operate and reaches its expected service life: observe the maintenance and inspection intervals specified in these Instructions for Use (Maintenance).

Device modifications

NOTE

Unauthorized interference with the device

This device must not be modified without the manufacturer's approval. If the system is modified after consultation with the manufacturer, suitable inspections and testing by the ZEISS Service team or authorized specialist personnel must be completed to ensure subsequent safe use. The manufacturer is not liable for damage caused by unauthorized persons modifying the system. This also invalidates all claims under the guarantee.

Accessories and additional equipment

- If you wish to connect accessories or additional equipment to the device: Contact your ZEISS representative [▷ 3].

Additional equipment connected to medical electrical devices must demonstrably comply with the corresponding IEC or ISO standards (e.g. IEC 60950 for data processing equipment).

Furthermore, any configurations must comply with the requirements stipulated in the standards for medical systems (see IEC 60601-1).

If you connect additional devices to medical electrical systems, you are considered to be a system configurer and are thus responsible for ensuring that the system complies with the normative requirements for systems.

Local legislation has priority over the above normative requirements.

2.3.1 Messages to manufacturer and authorities

If a serious incident occurs in connection with this medical device, which affects the operator or another person, the operator (or person responsible) must report this serious incident to the manufacturer or seller of the medical product. Within the European Union, the operator must also report this serious incident to the responsible authority in the country in question.

2.4 Responsibilities and duties of the user

Electrical safety

- Always switch off the device before connecting it to or disconnecting it from the power supply if you intend to clean its surface or if it will not be used for a prolonged period of time.
- Only connect the device to a power supply that complies with the values specified on the rating plate.
- Do not use power strips!
- Do not use extension cables!
- Do not touch the device if your body is electrostatically charged and the device is not grounded.
- Connect the device via the potential equalization connection (compliant with IEC 60601-1) to other active devices with the same ground potential or connect it to a protective ground connection.
- Please note the information on electromagnetic compatibility (EMC).
- Remove the batteries from the battery-operated components (e.g. foot control panel) if they are not going to be used for a prolonged period of time.

The device contains freely accessible live components. If you remove the housing, you are exposed to the risk of an electric shock.

- Never open the device!

Environmental conditions

Using the device in unsuitable ambient conditions may lead to damage, malfunction or injury.

- ▶ Make sure that the installation conditions and the operation of the device comply with the surgical requirements:
- Low vibration
- Clean environment
- Avoid extreme mechanical stress
- ▶ Do not operate the devices included in the scope of supply that are electrically operated
- in explosive atmospheres,
- at a distance of less than 25 cm from flammable anesthetics or volatile solvents such as alcohol, benzine or similar substances.
- ▶ Do not store or use the instrument in damp rooms. Do not expose the instrument to water splashes, dripping water, or sprayed water.
- ▶ Make sure that no fluids can penetrate into the device.
- ▶ Operate the device only within the limits of the ambient conditions stipulated.
- ▶ Store and transport the device only within the limits of the ambient conditions stipulated.

Excessive temperature changes can lead to the condensation of moisture in the air and thus to the formation of dew on the lamp.

- ▶ Avoid moving the device between rooms with large temperature differences.

Symbols and labels

- ▶ Observe the symbols and labels attached to the device!

Transport

- ▶ The device may only be transported over long distances (e.g. relocation, return for repair) in its original packaging or special return packaging.
- ▶ Contact your dealer or ZEISS Service.

Handling Instructions

Small, loose objects (e.g. screws) can damage the device if they get into it.

- ▶ Do not place small, loose objects on the device.

Patient information

- Make sure that all residual risks related to the use of the medical device or accessory, including all foreseeable and undesired incidents or side effects, are communicated to the patient. Thereby, take into account all contraindications, safety notes, warning messages and restrictions.

2.5 Other applicable documents

Document type	Document title	Doc. ref.
IFU	Lumera i on floor stand	G-30-1720
IFU	S7 / OPMI PROergo	G-30-1435
IFU	S7 / OPMI Sensera	G-30-1434

2.6 Additional information

These Instructions for Use contain detailed information on the use of the 1Chip HD Camera.

Not for diagnosis purposes

You must not use stored video sequences, video clips (extracted sequences), single images, and live images for diagnostic purposes. Since the video cameras and monitors have not been calibrated, the visualized video sequences, video clips, and single images may include deviations in scale, color, and shape. Transmission to other monitors, in particular, may change the display of the images. Incorrect data might be used as a basis for subsequent treatment. This could lead to unnecessary or incorrect surgery.

- Make sure that stored video sequences, video clips, single images, and live images are never used for diagnostic purposes.

Prior to the very first use

ZEISS Service or a person authorized by ZEISS will install the system. Please make sure that the following requirements continue to be met for further operation:

- The connecting components have been properly connected. The screw connections have been firmly tightened.
- All cables and connectors are in perfect condition, i.e., they do not display any wear, kinks or other defects.

3 Description of the device

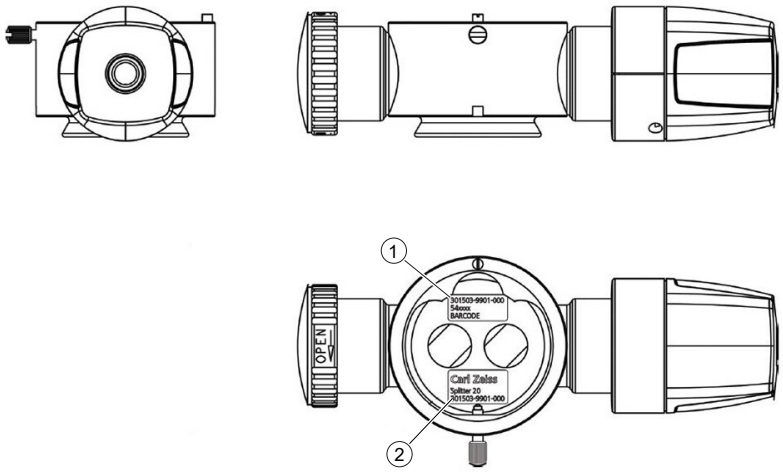
3.1 Device marking

3.1.1 Beam splitter (Splitter 20)

NOTE

Observe the labels!

- Should you notice that any of the following labels are missing from your device or have become illegible, please contact us or one of our authorized representatives. We will provide you with replacements.



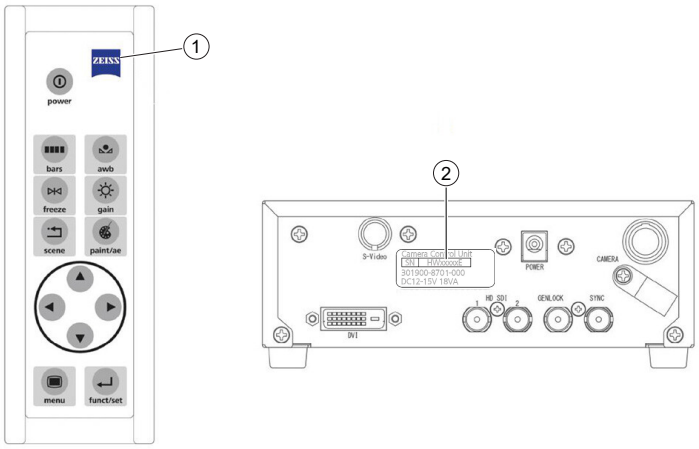
Item	Key	Name	Explanation
1	301503-9901-000 54xxxx BARCODE	Catalog code label	Splitter 20
2	Carl Zeiss Splitter 20 301503-9901-000	Identifi-cation label	"Splitter 20" beam splitter

3.1.2 Camera control unit (CCU)

NOTE

Observe the labels!

- Should you notice that any of the following labels are missing from your device or have become illegible, please contact us or one of our authorized representatives. We will provide you with replacements.



Item	Key	Name	Explanation
1	ZEISS		Brand / Logo
2	Camera Control Unit SN HWxxxxxE 301900-8701-000 DC12-15V 18VA	Rating plate	The rating plate contains the following information:
		Device type	■ Camera control unit
		Serial number,	■ SN HWxxxxxE
		Order number	■ 301900-8701-000
		Current type	■ DC
		Rated voltage	■ 12–15 V
		Connected load	■ 18 VA

3.2 Structure of the device

3.2.1 1Chip HD Camera with beam splitter

Normally the 1Chip HD Camera is located on the right side as viewed from the main eyepieces. The beam splitter (Splitter 20 or Splitter 50) can also be installed on the body of the microscope at a rotation of 180° in order to place the 1Chip HD Camera on the left side. Assembly [▷ 36]

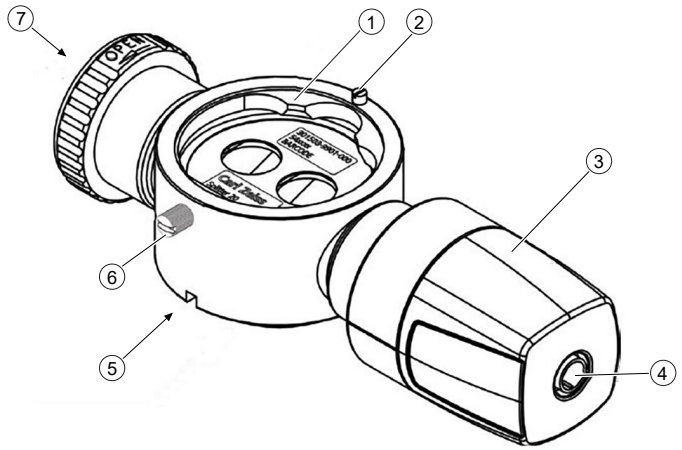


Figure 1: 1Chip HD Camera with beam splitter

1	Tube mount A binocular tube can be attached to this mount, permitting the picture of the surgical field to be viewed both in the binocular tube and on the monitor screen.	2	Slotted shoulder screw For aligning the binocular tube.
3	1Chip HD Camera ZEISS Service connects the 1Chip HD Camera permanently to the splitter.	4	Connector socket for the camera cable.
5	Dovetail ring For attaching the 1Chip HD Camera to the body of the microscope.	6	Locking screw For locking the binocular tube in position.
7	Available connection point, e.g. for a coobservation tube.		

3.2.2 1Chip HD Camera with angled lens

Normally the 1Chip HD Camera is located on the right side as viewed from the main eyepieces. If you would like to change the orientation of the 1Chip HD Camera on the angled lens (000000-1079-239), refer to the information provided in the Instructions for Use for the surgical microscope in question, in

particular the information regarding additional accessories available for that particular surgical microscope. It is not advisable to mount the angled lens on the microscope body at a rotation of 180°.

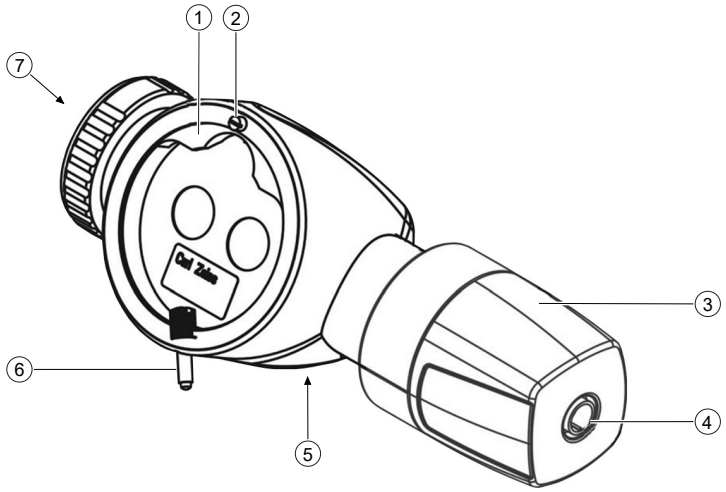


Figure 2: 1Chip HD Camera with angled lens

1	Tube mount A binocular tube can be attached to this mount, permitting the picture of the surgical field to be viewed both in the binocular tube and on the monitor screen.	2	Slotted shoulder screw For aligning the binocular tube.
3	1Chip HD Camera ZEISS Service connects the 1Chip HD Camera permanently to the angled lens.	4	Connector socket for the camera cable.
5	Dovetail ring For fastening the angled lens with the 1Chip HD Camera to the microscope body.	6	Locking screw For locking the binocular tube in position.
7	Available connection point, e.g. for a coobservation tube.		

3.2.3 Camera Control Unit (CCU) connector panel

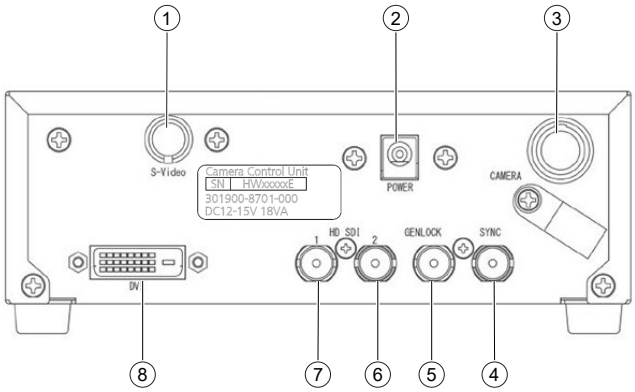


Figure 3: Camera Control Unit (CCU) connector panel

1	S-Video S-Video port, out	2	POWER Power supply input (DC voltage from the stand power supply)
3	CAMERA Special camera cable port	4	SYNC (COAX port) Output for sending a synchronization signal to another device
5	GENLOCK (COAX port) Input for receiving a synchronization signal from another device	6	HD SDI 2 (COAX port) HD-SDI output 2
7	HD SDI 1 (COAX port) HD-SDI output 1	8	DVI DVI-D output

3.3 Control elements and displays

3.3.1 Camera Control Unit (CCU) control panel

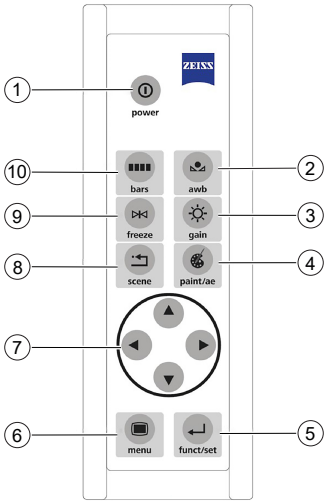


Figure 4: Camera Control Unit (CCU) control panel

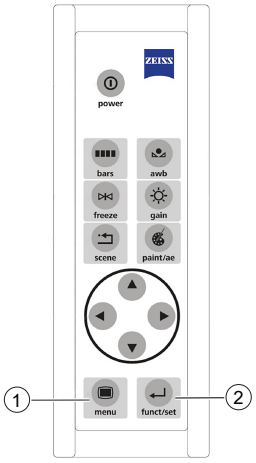
1	[power] button Switches the CCU on and off.	2	[awb] (Auto White Balance) button Performs a white balance.
3	[gain] button Adjusts the camera gain.	4	[paint/ae] button Adjusts the red and blue intensity of the picture.
5	[funct/set] button Sets and confirms settings inside the Setup menu.	6	[menu] button Opens the Setup menu.
7	Arrow buttons Allow you to navigate the Setup menu.	8	[scene] button Allows you to select a pre-configured camera setting.
9	[freeze] button Freezes the live video picture.	10	[bars] button Opens the test image.

3.4 Software description

3.4.1 Using the CCU to configure the 1Chip HD Camera

3.4.1.1 Operating instructions for the Setup menu

You can use the CCU "Setup menu" to change the preconfigured camera settings.



▶ To open the "Setup menu", press the [menu] button (1).
⇨ The Setup menu opens with the following menu items:

Setup Menu
Video Adjust
AE Mode
Detail
Video Setting
Picture Setting
Scene File
Foot Switch
White Balance
Miscellanaeous
Version Information

- To navigate: Press the ▲ and ▼ arrow buttons.
  The currently selected item is highlighted in green.
  If you reach the end of the list by pressing the arrow buttons, the selection will restart at the other end of the list.
- To open a submenu: Press the [funct/set] button (2).
  The submenus provide additional information or settings options. When you open a submenu, "Quit" is selected by default.
- To change a setting: Press the ◀ and ▶ arrow buttons.
- To save your settings: Press the [menu] button (1).
  The settings are saved, and the Setup menu closes.

[Foot Switch]: This menu item has no function.

3.4.1.2 Preconfigured camera settings

The camera is delivered with the following preconfigured settings:

Setting	Scenes 1 and 3	Scenes 2 and 4
Video settings		
Pedestal	0	0
Video Level	0	0
Gain Offset Red and Blue	0	0
White Shading	OFF	OFF
Auto White Shading	READY	READY
D-Range Expansion	NORMAL	NORMAL
Flare Control	0	0

Setting	Scenes 1 and 3	Scenes 2 and 4
AE Mode		
Shutter Control	AUTO	AUTO
Manual Shutter	OFF	OFF
Auto Shutter Limit	1\10000	1\10000
AE Level	0	0
AE Speed	MID	MID
Peak Ratio	-128	-128
Area Select	FULL	FULL
Gain Control	AUTO	AUTO
ACG Gain Range	18 dB	18 dB
Normal Gain	-3 dB	-3 dB
High Sensitivity	OFF	OFF
Line Mix	OFF	ON

Setting	Scenes 1 and 3	Scenes 2 and 4
Detail		
Detail	ON	ON
Detail Gain	-64	-64
Boost Frequency	20 MHz	20 MHz
Detail Mode	NORMAL	NORMAL

Setting	Scenes 1 and 3	Scenes 2 and 4
Video Setting		
Format	50 Hz[1)]	50 Hz[1)]
SDI Setting	1080i	1080i
DVI Setting	1080i	1080i
Gamma	ON	ON
Master Gamma	0	0
Color Saturation	ON	ON
Color Saturation Gain	40	40
Genlock Mode	AUTO	AUTO
Genlock H Phase	0	0
Genlock V Phase	0	0

Setting	Scenes 1 and 3	Scenes 2 and 4
Picture Setting		
DNR	ON	ON
DNR Level	8	8
H-Flip	OFF[2)]	OFF[2)]
V-Flip	ON[2)]	ON[2)]
Digital Zoom	x1.0	x1.0
Picture Shift H and V	0	0
R-DPC	OFF	OFF

Setting	Scenes 1 and 3	Scenes 2 and 4
White Balance		
White Balance Mode	AWB	AWB
Manual Gain Red	-64	-64
Manual Gain Blue	-64	-64

Setting	Scenes 1 and 3	Scenes 2 and 4
Miscellaneous		
Center Marker	OFF	OFF
Menu Lock	OFF	OFF

[1)] Setting depends on the relevant video standard, PAL: 50 Hz, NTSC: 59.94 Hz.

[2)]Setting depends on where the 1Chip HD Camera is installed on the surgical microscope [▷ 28].

3.4.1.3 Configuring the video settings

Video Adjust	
Quit	
Pedestal	0
Video Level	0
Gain Offset Red	0
Gain Offset Blue	0
White Shading	OFF
Auto White Shading	READY
D-Range Expansion	NORMAL
Flare Control	0

In the "Video Adjust" menu, you can adjust the color enhancements of the HD camera.

- To navigate: Press the ▲ and ▼ arrow buttons.
- To change a setting: Press the ◀ and ▶ arrow buttons.

Setting	Value range	Description
Pedestal	-80–80	Adjusts the black value. When the value increases, the dark areas of the picture are displayed lighter.
Video Level	-64–63	Adjusts the picture signal. When the value increases, the picture becomes lighter.
Gain Offset Red	-128–127	Adjusts the red value. This setting is identical to the fine adjustment on the front of the CCU.
Gain Offset Blue	-128–127	Adjusts the blue value. This setting is identical to the fine adjustment on the front of the CCU.
White Shading	ON	-
	OFF	Default setting
Auto White Shading	READY	Default setting
	START	-

Setting	Value range	Description
D-Range Expansion	NORMAL	Default setting
	EXPAND	-
Flare Control	0 - 32	Default setting = 0

Table 1: Value ranges

3.4.1.4 Configuring the AE mode

AE Mode	
Quit	
Shutter Control	AUTO
Manual Shutter	OFF
Auto Shutter Limit	1/10000
AE Level	0
AE Speed	MID
Peak Ratio	-128
Area Select	FULL
Gain Control	AUTO
AGC Gain Range	18 dB
Normal Gain	- 3 dB
High Sensitivity	OFF
Line Mix	OFF

In the "AE Mode" menu, you can adjust the electronic shutter and sensitivity of the HD camera.

- To navigate: Press the ▲ and ▼ arrow buttons.
- To change a setting: Press the ◀ and ▶ arrow buttons.

Setting	Value range	Description
Shutter Control	Automatic adjustment of the exposure time.	
	AUTO	Automatic adjustment of the exposure time in relation to the picture brightness.
	FIX	Manual adjustment of the exposure time. The exposure times of the manual shutter settings are used.
Manual Shutter	Controls the exposure time if Shutter Control is set to "FIX".	
	OFF	1/60 second exposure time
	1/100–1/10000	The exposure time can be adjusted manually.

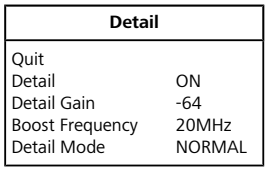
Setting	Value range	Description
Auto Shutter Limit	1/100–1/4000	When the "Shutter Control" function is set to "AUTO", the upper exposure time limit can be adjusted here.
AE Level	-128 to 127	When "Shutter Control" or "Gain Control" is set to "AUTO", it is possible to adjust the exposure time. If the screen is too dark, the value will be increased, and if the screen is too bright, the value will be decreased.
AE Speed	Controls the exposure speed when "Shutter Control" or "Gain Control" is set to "AUTO".	
	MID	Standard speed
	SLOW	Slower than MID
	FAST	Faster than MID
Peak Ratio	-128–127	The light metering setting when "Shutter Control" or "Gain Control" are set to "Auto". +127 is the peak light metering, -128 is the average light metering. If the background area is almost completely dark and the photographic subject is bright, select peak light metering. If the brightness change is low for the entire screen, select average light metering.
Area Select	Type of exposure measurement.	
	MID	The exposure is measured over an area (40%) at the center of the picture.

Setting	Value range	Description
	WIDE	The exposure is measured over an area (60%) at the center of the picture.
	FULL	Exposure measurement is performed across the full video image.
	USER	The exposure measurement is set individually by the user.
	NARROW	The exposure is measured over an area (10%) at the center of the picture.
Gain Control	Automatic gain (sensitivity to light)	
	AUTO	The gain is adjusted automatically with reference to the brightness of the picture so that the output level remains constant.
	FIX	No automatic gain.
AGC Gain Range	3–18 dB	Adjustment of the maximum gain when "Gain Control" is set to "Auto".
Normal Gain	-6–6 dB	Normal gain adjustment. This setting is always used regardless of the "Gain Control" setting. The greater the value, the brighter the picture.
High Sensitivity	Increases the sensitivity. Although the sensitivity increases by a factor of two, the horizontal resolution is somewhat lower.	
	ON	Sensitivity is activated.
	OFF	Sensitivity is deactivated.

Setting	Value range	Description
Line Mix	Increases the sensitivity. Although the sensitivity increases by a factor of two, the vertical resolution is somewhat lower.	
	ON	Sensitivity is activated.
	OFF	Sensitivity is deactivated.

Table 2: Value ranges

3.4.1.5 Configuring the details



In the "Detail" menu you can configure additional settings for the HD camera.

- To navigate: Press the ▲ and ▼ arrow buttons.
- To change a setting: Press the ◀ and ▶ arrow buttons.

Setting	Value range	Description
Detail	Controls the contour enhancement. When contour enhancement is activated, the picture is sharper. This function should normally be left ON.	
	ON	Contour enhancement is activated.
	OFF	Contour enhancement is deactivated.
Detail Gain	Contour enhancement setting options.	
	-128–127	Increasing this value produces a sharper picture.
Boost Frequency	Controls the boost frequency for contour enhancement.	
	2–28 MHz	The lower the value, the easier it is to perform contour enhancement on the entire screen.
Detail Mode	NORMAL	Default setting
	STRONG	-

Table 3: Value ranges

3.4.1.6 Video Setting

Video Setting	
Quit	
Format	50 Hz
SDI Setting	1080i
DVI Setting	1080i
Gamma	ON
Master Gamma	0
Color Saturation	ON
Color Saturation Gain	40
Genlock Mode	AUTO
Genlock H Phase	0
Genlock V Phase	0

In the "Video Setting" menu you can adjust the color enhancements of the HD camera.

- To navigate: Press the ▲ and ▼ arrow buttons.
- To change a setting: Press the ◀ and ▶ arrow buttons.

Setting	Value range	Description
Format	Adjusts the black value. When the value increases, the dark areas of the picture are displayed lighter.	
	59.94 Hz	NTSC signal output (59.94 Hz)
	50 Hz	PAL signal output (50 Hz)
SDI Setting	SDI resolution	
	1080p	-
	1080i	Default setting
DVI Setting	DVI resolution	
	1080p	Progressive signal output
	1080i	Interface signal output
Gamma	Displays darker parts of the picture brighter. This function should normally be left ON.	
	ON	Gamma correction is activated.
	OFF	Gamma correction is deactivated.
Master Gamma	The gamma correction angle setting. When set to 0, the gamma correction angle is y=0.45.	
	-128 to 127	The lower the value, the brighter the dark parts of the picture will be.

Setting	Value range	Description
Color Saturation	Controls the color saturation	
	ON	Color saturation is activated.
	OFF	Color saturation is deactivated.
Color Saturation Gain	The color saturation setting	
	-64 to 63	The greater the value, the more intense the color will be. The lower the value, the more faded the color will be. At a value of -64 everything is monochromatic.
Genlock Mode	AUTO	Default setting
	OFF	-
Genlock H Phase	-128 to 127	Controls the horizontal phase of the Genlock input.
Genlock V Phase	-128 to 127	Controls the vertical phase of the Genlock input.

Table 4: Value ranges

3.4.1.7 Configuring the picture settings

Picture Setting	
Quit	
DNR	ON
DNR Level	8
H Flip	OFF
V Flip	ON
Digital Zoom	x1.0
Picture Shift H	0
Picture Shift V	0
R-DPC	OFF

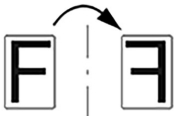
In the "Picture Setting" menu you can configure the picture signals.

- To navigate: Press the ▲ and ▼ arrow buttons.
- To change a setting: Press the ◀ and ▶ arrow buttons.

Setting	Value range	Description
DNR	The noise reduction setting	
	OFF	Noise reduction is deactivated.

Setting	Value range	Description
	LOW > MID > HIGH	Noise reduction can be set in the order of LOW > MID > HIGH.
DNR Level	0–32	Default setting = 8
H Flip	Controls the horizontal flipping of the picture. (See below for an explanation regarding flipping the picture.)	
	ON	Flips the picture horizontally.
	OFF	Rotates the horizontally flipped picture back to its normal position.
V Flip	Controls the horizontal flipping of the picture. (See below for an explanation regarding flipping the picture.)	
	ON	Flips the picture vertically.
	OFF	Rotates the vertically flipped picture back to its normal position.
Digital Zoom	Magnification setting for electronic zoom.	
	x1.0–x4.0	The zoom is increased in increments of 0.1.
Picture Shift H	-32–32	The horizontal display position of the screen is set in 1 pixel units.
Picture Shift V	-8–8	The horizontal display position of the screen is set in 1 pixel units.
R-DPC	ON	-
	OFF	Default setting

Table 5: Value ranges

Setting	Value range	Description	
			Picture in normal position.
H Flip	ON		Picture is flipped horizontally.

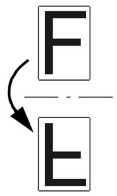
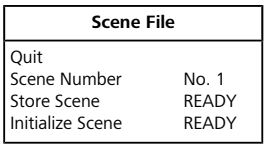
Setting	Value range	Description	
H Flip	OFF		Horizontally flipped picture is rotated back to its normal position.
V Flip	ON		Picture is flipped vertically.
V Flip	OFF		Vertically flipped picture is rotated back to its normal position.

Table 6: Explanations about flipping the camera picture

3.4.1.8 Saving the camera settings



In the "Scene File" menu you can manage the settings for the 1Chip HD Camera. Four camera settings can be saved in the files "Scene File 1" to "Scene File 4".

- ▶ To navigate: Press the ▲ and ▼ arrow buttons.
- ▶ To change a setting: Press the ◀ and ▶ arrow buttons.

Settings	Description
Scene Number	Select and load a scene file.
Store Scene	Saves the current camera setting in a "scene file". ▶ Select the number of the "scene file" to which you would like to save the camera setting. ▶ Press the [SET] button.
Initialize Scene	▶ Select the "scene file" to be initialized (No. 1 to No. 4). ▶ Press the [SET] button. ▶ If you select "ALL", all the scene files will be initialized.

Table 7: Value ranges

3.4.1.9 Foot Switch

Foot Switch	
Quit	
Foot Switch 1	FREEZE
Foot Switch 2	ROTATE
Foot Switch 3	FREEZE
Foot Switch 4	FREEZE

In the "Foot Switch" menu you can configure the foot control panel.

- To navigate: Press the ▲ and ▼ arrow buttons.
- To change a setting: Press the ◀ and ▶ arrow buttons.

Setting	Value range	Description
Foot Switch 1	FREEZE	Default setting
Foot Switch 1	ROTATE	Default setting
Foot Switch 1	FREEZE	Default setting
Foot Switch 1	FREEZE	Default setting

Table 8: Value ranges

3.4.1.10 Configuring the white balance

White Balance	
Quit	
WB Mode	AWB
Manual Gain Red	-64
Manual Gain Blue	-64

In the "White Balance" menu you can determine whether the white balance is to be performed automatically or using the values that you have set.

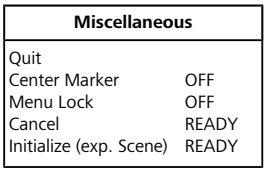
- To navigate: Press the ▲ and ▼ arrow buttons.
- To change a setting: Press the ◀ and ▶ arrow buttons.

Setting	Value range	Description
WB Mode	White Balance	
	AWB	Automatic white balance.
	MANUAL	Manual white balance. The Manual Gain Red and Manual Gain Blue values will be used.
Manual Gain Red	Red value gain	
	-128–127	
Manual Gain Blue	Blue value gain	

Setting	Value range	Description
	-128–127	

Table 9: Value ranges

3.4.1.11 Miscellaneous



In the "Miscellaneous" menu you can configure additional HD camera functions.

- To navigate: Press the ▲ and ▼ arrow buttons.
- To change a setting: Press the ◀ and ▶ arrow buttons.

Setting	Value range	Description
Center Marker	Center marker function	
	ON	Center marker function is shown.
	OFF	Center marker function is hidden.
Menu Lock	Menu lock	
	ON	Menu lock is activated. No settings can be configured. A red lock symbol will appear in the upper right corner of the screen when the menu is locked.
	OFF	Menu lock is deactivated. All settings can be configured.
Cancel	READY	Default setting
Initialize (exp. Scene)	READY	Default setting

Table 10: Value ranges

3.4.1.12 Version information

Version Information	
Quit	
CCU Firmware	vX.XX
CCU FPGA	vX.XX
Head FPGA	vX.XX

The "Version Information" menu displays the version numbers of the HD camera's hardware and software components.

▶ To navigate: press the ▲ and ▼ arrow buttons.

3.4.1.13 Changing the orientation of the camera

Normally the 1Chip HD Camera is located on the right side as viewed from the main eyepieces. The factory settings for the camera picture reflect this arrangement.

You can make the following changes yourself or request ZEISS Service to make them for you:

- The Splitter 20 (301503-9901-000) and Splitter 50 (301513-9902-000) can also be installed on the body of the microscope at a rotation of 180° in order to place the 1Chip HD Camera on the left side.
- If you would like to change the orientation of the 1Chip HD Camera on the angled lens (000000-1079-239), you can request this from ZEISS Service.
- The iris diaphragm for video lenses on the 1Chip HD Camera allows for quick modifications on the surgical microscope. You can attach and remove the 1Chip HD Camera to/from the beam splitter, and thus change the output ports of the beam splitter (left/right sides).

In the "Picture Setting" menu you can configure the picture signals.

▶ To navigate: Press the ▲ and ▼ arrow buttons.

▶ To change a setting: Press the ◀ and ▶ arrow buttons.

Picture Setting		
	Default-Einstellung, für Kamera rechts	Kamera von rechts nach links gedreht
Quit		
DNR	High	High
H Flip	ON	OFF
V Flip	OFF	ON
Digital Zoom	x1.0	x1.0
Picture Shift H	0	0
Picture Shift V	0	0

Additional configuration options can be found under "Configuring the picture settings" [▷ 26].

3.5 Functional description

3.5.1 Components of the 1Chip HD Camera option

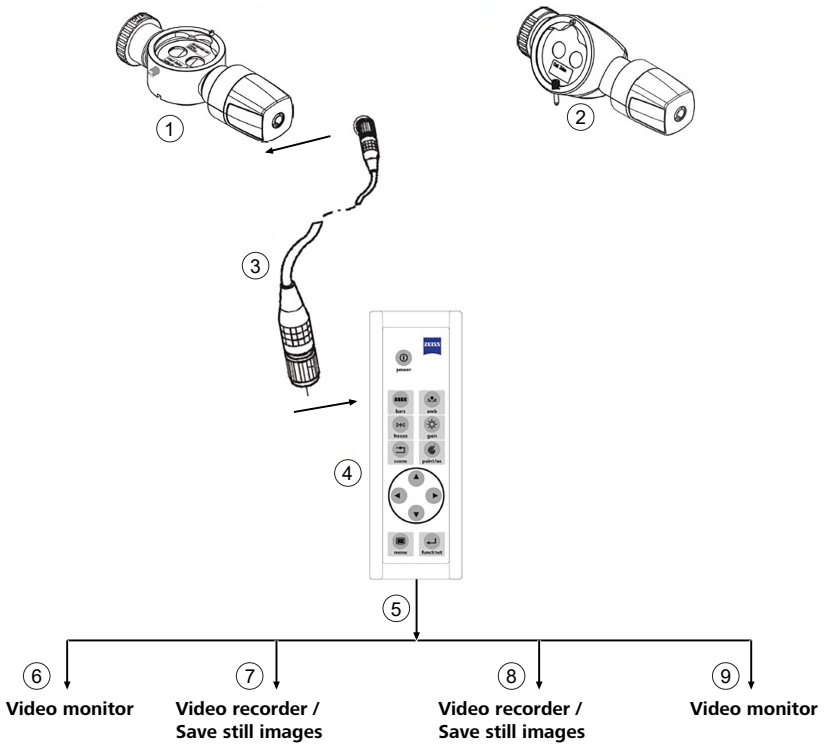


Figure 5: Possible device combinations

Position	Description
1	1Chip HD Camera on the splitter
The 1Chip HD Camera can be installed on ZEISS surgical microscopes by inserting the beam splitter between the microscope body and the binocular tube. The beam splitter distributes the picture generated by the surgical microscope to the 1Chip HD Camera and the binocular tube.	
2	1Chip HD Camera on angled lens
Alternatively, the 1Chip HD Camera can be installed on ZEISS surgical microscopes by inserting the angled lens between the microscope body and the binocular tube. The angled lens distributes the image generated by the surgical microscope to the 1Chip HD Camera and the binocular tube.	
3	Camera cable (installed permanently in the stand)
-	
4	Camera control unit (CCU)
The CCU (camera control unit) is the control unit for the 1Chip HD Camera. The CCU is used to operate the 1Chip HD Camera. The CCU has four different video outputs to which you can connect recording and display devices.	
5	Cable connections to external devices
No illustration	

Position	Description
External recording and display devices can be connected to the CCU to form a complete HD video system. The illustration below shows a possible combination of devices:	
6	Video monitor
No illustration	
7	Video recorder / save freeze frame
No illustration	
8	Second video monitor
No illustration	

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4 Installation

4.1 Cable connections for 1Chip HD Camera

⚠ WARNING!

Risk of electric shock caused by inadmissible or defective accessories!

Unapproved or faulty accessories can cause increased leakage current. The user and patient may suffer an electric shock if the video output ports are touched.

- ▶ When configuring your system, please make sure to comply with the requirements of IEC 60601-1.

⚠ CAUTION!

Risk of tripping over cables lying on the floor!

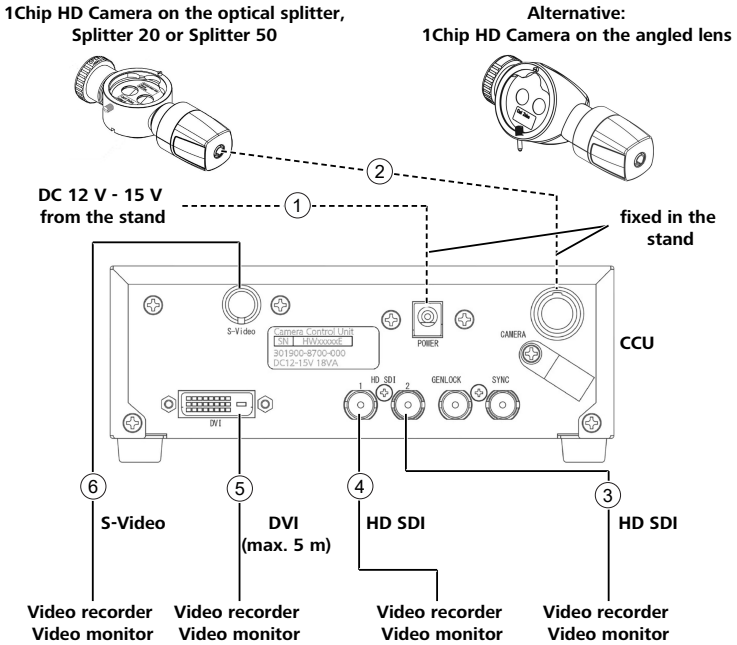
If cables are installed inappropriately on the floor, this presents an increased tripping hazard and interferes with the flow of work. Users who trip and fall may suffer tissue trauma.

- ▶ If possible, cables should only be laid outside of the area of movement.

NOTE

Do not connect or disconnect cables while the system is switched on!

- ▶ Ensure that all the of the devices in your system are switched off before connecting or disconnecting cables.



The following cable connections are required to operate the 1Chip HD Camera:

1	Power supply cable
Connects to the POWER port to supply the CCU with electrical power (DC 12–15 V); this is a permanently installed cable connection from the stand electronics to the CCU.	
2	Camera cable
Connects the 1Chip HD Camera (camera port) to the CCU ("Camera" port). The camera cable is permanently routed through the stand. If you wish to remove the beam splitter (Splitter 20, Splitter 50, angled lens) together with the 1Chip HD Camera from the surgical microscope, you must manually disconnect the plug-in connection of the camera cable from the 1Chip HD Camera.	
3	COAX cable, HD SDI 2
Connector port for a video recorder or video monitor that has an HD SDI interface.	
4	COAX cable, HD SDI 1
Connector port for a video recorder or video monitor that has an HD SDI interface.	
5	DVI cable
5 m maximum cable length; connector port for a video recorder or video monitor.	
6	S-Video cable
Connector port for a video recorder or video monitor.	

4.2 Install 1Chip HD Camera

⚠ CAUTION!

Risk of infection due to sagging camera cable!

If the beam splitter and the permanently connected 1Chip HD Camera are removed from the surgical microscope, and the non-sterile camera cable is left hanging down from the surgical microscope, the camera cable could under certain circumstances contaminate the sterile area with pathogens. This may cause infections.

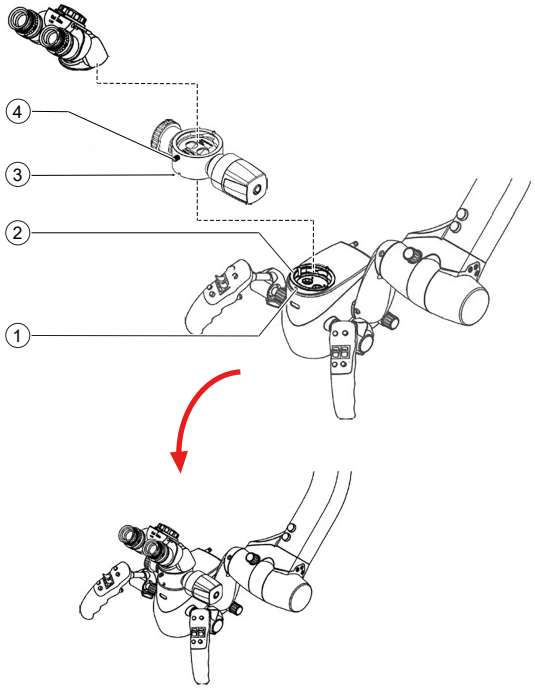
- ▶ Make sure that the remaining camera cable is not hanging down from the surgical microscope.

NOTE

Picture quality impaired due to white balance not being performed

If a 1Chip HD Camera with beam splitter (Splitter 20, Splitter 50, angled lens) is moved from one surgical microscope to another, it is advisable to perform a white balance to ensure an optimal picture display.

Install the beam splitter with the permanently attached 1Chip HD Camera on the surgical microscope as follows:



- Give the locking screw (1) for the binocular tube on the surgical microscope a few turns to loosen it.
- Remove the (originally) installed binocular tube.
- Insert the beam splitter with the dovetail ring (3) into the dovetail mount (2) on the surgical microscope.
- Make sure the locking screw (1) is firmly tightened.
- Check manually whether the beam splitter is securely locked in position.
- Give the locking screw (4) on the beam splitter a few turns to loosen it.
- Insert the binocular tube with the dovetail ring into the dovetail mount on the beam splitter.
- Firmly tighten the locking screw (4) on the beam splitter.
- Check manually whether the binocular tube is securely locked in position.
- After modifying the system, check the orientation of the camera picture and correct it if necessary, (see Configuring the picture settings [▷ 26]).

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5 Operation

5.1 Preparation safety

⚠ CAUTION!

Risk of burns due to high light intensity!

Due to the use of an additional beam splitter (Splitter 20, Splitter 50, angled lens) in the main observer beam path, less light is available to the user in the eyepieces. In order to obtain the same brightness level in the image as provided without the additional beam splitter, the user can increase the light intensity of the lighting equipment.
The patient will be exposed to increased illumination intensity. This can result in first-degree burns.

- ▶ To minimize the loss of light for the main viewer, where possible only use a beam splitter with a splitting ratio of 80:20 for the camera.
- ▶ Set the illumination intensity as low as possible.
- ▶ Do not allow the patient to be exposed to high light intensities for more than a few moments.

- To prevent accessories from falling down, before each use check that the accessories are securely locked in position and the locking screws are firmly tightened.
- Never attempt to forcefully connect any electrical connectors (plugs, sockets). If connection is not readily possible, check again whether the plug fits the socket. If any of the connectors are damaged, have the ZEISS Service team repair them.
- Always route cables so that they do not hinder the user.
- Go through the checklist [▷ 42] under "Operation".
- If you operate the device in a sterile area, make sure that you use the corresponding sterile accessories for the device.

5.2 Powering system up/down

⚠ CAUTION!

Increased leakage current!

There is a risk of the user and the patient sustaining an electric shock.

- ▶ Never touch the contacts of connectors during contact with the patient.
- ▶ Do not connect any defective or unapproved accessories to the contacts of connectors.

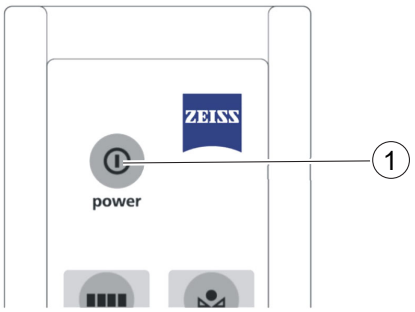
After all the video and control cable connections and all the required connectors have been properly connected to the power supply, you can switch the device on.

Switching on the device (surgical microscope)

- ▶ Switch the surgical microscope on. Refer to the applicable Instructions for Use.

Switching on the CCU

- ▶ Press the power button (1) on the front of the device.
  - ⇨ The CCU is on when the power button lights up green.



Switching off the CCU

- ▶ Press the power button (1) on the front of the device again.
  - ⇨ The CCU is off when the power button is not illuminated.

5.3 Preparations for use

If you order the 1Chip HD Camera option when you purchase your surgical microscope, the camera will be installed permanently on your stand. You can also request ZEISS Service to retrofit your existing surgical microscope with the 1Chip HD Camera option on site.

⚠ WARNING!

Risk of injury to the patient caused by incompatible system combinations!

This product is to be used exclusively with systems tested and approved by ZEISS.

⚠ WARNING!

Risk of serious injury from unauthorized modification!

You must not modify this device without the permission of the manufacturer. The manufacturer is not liable for damage caused by unauthorized persons modifying the system. Unauthorized modifications to the device may result in severe, irreversible injuries to users and/or patients.

- ▶ If you modify the device after consultation with the manufacturer, you must conduct the appropriate inspections and tests to ensure that it can still be used safely.

⚠ CAUTION!

Risk of injury caused by falling components and accessories!

Falling components and accessories may injure the patient.

- ▶ As a standard practice, change the components and accessories before surgery, when the patient is not present.
- ▶ Before each use and after modifying the system, make sure that the modules are securely locked in position and that all locking screws are firmly tightened!
- ▶ Always re-balance the surgical microscope after modifying the system.

⚠ CAUTION!

Risk of tilting and lowering of overloaded surgical microscope!

When attaching accessories and components, the surgical microscope may tilt and the suspension arm may move downward inadvertently. The user may suffer tissue trauma as a result.

- ▶ Always make sure that the maximum permissible load on the surgical microscope and the suspension arm is not exceeded. The maximum permissible load is specified in the respective Instructions for Use for the surgical microscope and the stand.

NOTE

Before putting the product into use, only connect and operate peripheral devices!

The 1Chip HD Camera installed on a beam splitter (Splitter 20, Splitter 50, angled lens) normally remains mounted on the surgical microscope. The CCU is installed permanently on the stand. The cables for the camera and power supply of the CCU are installed permanently in the stand. This means that before the 1Chip HD Camera option is used, only the peripheral devices (monitors and recorders) are to be connected and operated.

- ▶ Switch off the CCU before plugging in or unplugging devices.
- ▶ Check the 1Chip HD Camera option and all the peripheral devices before each use (while the patient is not present).
- ▶ Configure the 1Chip HD Camera option correctly.

NOTE

Configuration during surgery is not possible!

The 1Chip HD Camera option cannot be configured under sterile conditions during a surgical procedure.

NOTE

Loss of warranty

The manufacturer is not liable for damage caused by unauthorized modifications to the device! This also invalidates all claims under the guarantee.

This device must not be modified without the manufacturer's approval.

- ▶ If the device has been modified, appropriate examinations and tests must be performed to guarantee the use of the device.

5.4 Checklist

⚠ CAUTION!

Video images not for diagnostic purposes!

You must not use stored video sequences, video clips (extracted sequences), single images, and live images for diagnostic purposes. Since the video cameras and monitors have not been calibrated, the visualized video sequences, video clips, and single images may include deviations in scale, color, and shape. Transmission to other monitors, in particular, may change the display of the images. Incorrect data might be used as a basis for subsequent treatment. This could lead to unnecessary or incorrect surgery.

- ▶ Make sure that stored video sequences, video clips, single images, and live images are never used for diagnostic purposes.

Always check the following items prior to surgery (while the patient is not present):

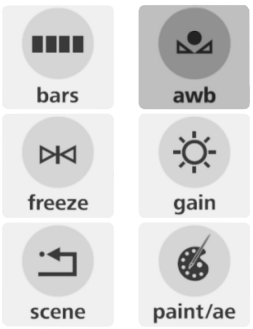
- The 1Chip HD Camera is properly installed on the surgical microscope:
  - The locking screws (1) and (2) are firmly tightened (see Installing the 1Chip HD Camera [▷ 36]).
  - The electrical connections have been established (see Cable connections for 1Chip HD Camera [▷ 35]).
- The 1Chip HD Camera has been configured via the CCU:
  - A white balance has been performed (see Performing an automatic white balance).
  - A preconfigured camera setting has been loaded (see Loading preconfigured camera settings).
- The 1Chip HD Camera is working.

Also check the other products attached to the device using their respective Instructions for Use.

- The surgical microscope illumination is set to a level that will not injure the patient.

5.5 Configuring the 1Chip HD Camera via the CCU

5.5.1 Performing an automatic white balance



When you use the 1Chip HD Camera for the first time or replace the light source of the surgical microscope, you must perform an automatic white balance of the 1Chip HD Camera to prevent color casts.

In the automatic white balance procedure, the device adjusts the video signal in such a way that white areas in the surgical field are also white in the video picture.

▶ Place a sheet of white paper under the surgical microscope.

▶ Press the [awb] button to start the white balance.

⇨ The [awb] button lights up green during the white balance.

CCU messages displayed on the monitor:

Error message	Description
AWB BUSY	Displayed while the automatic white balance is running.
AWB COMPLETED	Displayed when the automatic white balance has been completed successfully.
AWB ERROR	Displayed if the automatic white balance was not successful. ▶ Check the settings described above. ▶ Increase or decrease the light intensity. ▶ Repeat the automatic white balance.

When the automatic white balance is finished, the [awb] button will no longer be illuminated.

5.5.2 Automatic light sensitivity adjustment

The automatic adjustment of the camera's sensitivity to light is also referred to as "auto gain".

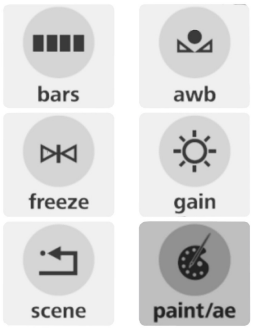
Pressing the [gain] button enables the HD camera's auto gain function.

- ▶ To enable auto gain, press the [gain] button.
  - ⇨ The [gain] button lights up green.
- ▶ To disable auto gain, press the [gain] button again.
  - ⇨ The [gain] button is not illuminated.

5.5.3 Setting the red and blue values

NOTE

When the CCU is switched off, modified settings are reset to their original values.



The red and blue values of the 1Chip HD Camera can be finely adjusted by using the [paint/ae] button. The red and blue values have an influence on the colors of the 1Chip HD Camera even after the white balance procedure.

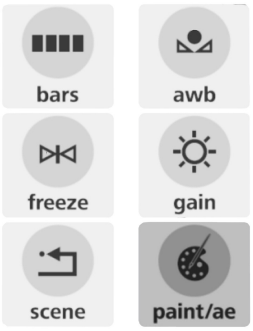
Make sure that the camera has been successfully white balanced.

- ▶ Press the [paint/ae] button.
  - ⇨ The [paint/ae] button lights up green.
- ▶ To increase the red value, press the ▲ arrow button. To decrease it, press the ▼ arrow button.
- ▶ To increase the blue value press the ▶ arrow button. To decrease it, press the ◀ arrow button.

5.5.4 Correcting the automatic exposure

NOTE

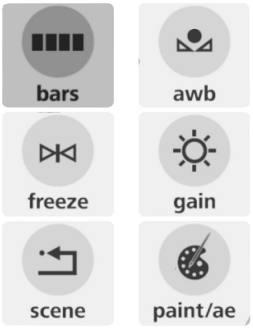
When the CCU is switched off, modified settings are reset to their original values.



If the picture display is too dark or too light, you can correct the camera's automatic exposure values.

- If the [paint/ae] button is enabled, disable it. The [paint/ae] button should not be illuminated.
- If the picture display is too dark, press the ▲ or ▶ button to increase the AE level. Both arrow buttons have the same function.
- If the picture display is too bright, press the ▼ or ◀ arrow button to decrease the AE level. Both arrow buttons have the same function.

5.5.5 Displaying the test image

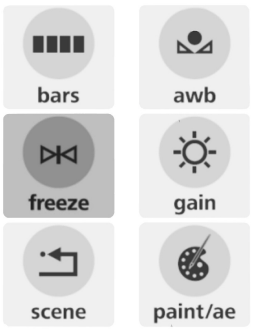


You can display a test image by pressing the [bars] button. If you press the [bars] button again, the test image will no longer be displayed.

You can use the test image to adjust settings such as brightness and contrast so as to optimally calibrate the HD camera to the monitor.

- ▶ Press the [bars] button.
  - ⇨ The test image is displayed.
  - ⇨ The [bars] button lights up green.
- ▶ Press the [bars] button again.
  - ⇨ The test image is no longer displayed.
  - ⇨ The [bars] button is no longer illuminated.

5.5.6 Freezing the live video picture



The live video picture can be frozen and used as a still image.

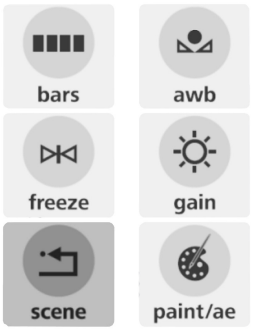
To freeze the live video picture (i.e. to display a still image):

- ▶ Press the [freeze] button.
  - ⇨ The live video picture freezes.
  - ⇨ The [freeze] button lights up green.

To return to the live video picture:

- ▶ Press the [freeze] button.
  - ⇨ The current live video picture is displayed again.
  - ⇨ The [freeze] button is no longer illuminated.

5.5.7 Loading preconfigured camera settings



Four individually created profiles for the camera settings can be saved in the files "Scene File 1" to "Scene File 4".

You can use the [scene] button to open preconfigured camera settings.

- ▶ To open the "Scene File" menu, press the [scene] button.
  - ⇨ The [scene] button lights up green.
- ▶ Select the camera setting (Scene File). To do this, press one of the following arrow buttons:
  Scene File 1 = ▲
  Scene File 2 = ▶
  Scene File 3 = ▼
  Scene File 4 = ◀
  - ⇨ The arrow button of the selected camera setting lights up green.
- ▶ The selected camera setting is displayed immediately.

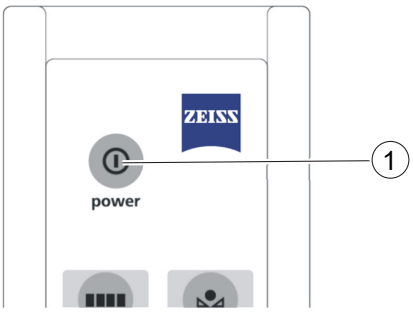
5.6 Safety during operation

- Cables which are not appropriately routed may lead to an increased risk of tripping during operation of the system. Always route cables so that they do not hinder the user.
- Defective or unidentified accessories may lead to increased leakage current on the device and injure the patient. Never connect any defective or unfamiliar accessories and never touch the video interfaces while in contact with the patient.
- If there is a malfunction, and you are unable resolve the issue by referring to the section "What to do in the event of malfunctions [▷ 55]", attach an "Out of order" sign to the device and contact ZEISS Service.

5.7 Switch off the device

Always switch off the 1Chip HD Camera when you are not using it.

- ▶ Press the power button (1) on the front of the device.
  - ⇨ The CCU is off when the power button is not illuminated.



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6 Cleaning and disinfection

6.1 Safety when cleaning and disinfecting the device

⚠ CAUTION!

Risk of infection caused by improper cleaning or disinfection!

Cleaning or disinfecting the device in an insufficient, incorrect or improper manner that does not comply with these Instructions for Use may expose the patient or medical staff to a considerable risk of infection.

6.2 Contamination of the device

Dust can penetrate into the internal optics of the device or its individual components.

Action

- ▶ Always close all openings that are not in use with the covers provided (e.g. openings for eyepieces, tube outlets or the lateral co-observation outlets).
- ▶ Always store tubes, eyepieces and accessories in dust-free cases when they are not being used.
- ▶ After use, cover the device with the supplied dust cover to protect it from dust.
- ▶ Clean used accessories directly after use.

6.3 Cleaning and disinfecting agent

6.3.1 Cleaning agents

	Unit	Order number
Optics cleaning kit	1 piece	000000-2096-685
Microfiber cleaning cloth	1 piece	000000-1439-266
Optical lens wipes	Available from specialized dealers	

6.4 Cleaning

Clean the device before the first use and after every use.

NOTE

Improper cleaning agents and disinfectants!

Using detergents and disinfectants improperly, or using the wrong detergents and disinfectants, can damage the device. Doing so will result in the device not being disinfected properly, among other things, and can cause the spread of pathogens. If moisture penetrates the device, it can be rendered unusable.

- ▶ Use an aldehyde and/or alcohol-based disinfectant. The addition of quaternary compounds is acceptable.
- ▶ To prevent surface damage, use only the disinfecting components and accessories specified in these Instructions for Use.

6.4.1 Cleaning mechanical surfaces

All mechanical surfaces of the system can be cleaned by wiping them with a damp cloth.

Action

- ▶ Do not use any aggressive or abrasive cleaning agents.
- ▶ Clean off any residue using a mixture of 50% ethyl alcohol and 50% distilled water to which a dash of household dish-washing liquid has been added.

6.4.2 Cleaning optical surfaces

The multi-layer T* coating of the optical components (e.g. eyepieces, objective lenses) ensures optimal image quality. Even slight contamination of the optics or a fingerprint impairs the image quality. Clean the exterior surfaces of the optical components (eyepieces, objective lenses) only when necessary:

Action

- ▶ Do not use any chemical agents.
- ▶ Use a clean and grease-free brush to remove dust.

TIP: For the regular cleaning of surgical microscope's objective lenses and eyepieces, we recommend the optics cleaning set and Cleaning agents [▷ 49] available from ZEISS.

6.4.3 Prevention of fogging

We recommend using an anti-fogging agent to prevent fogging of optical surfaces. Anti-fogging agents like the ones offered by opticians for applications with eyeglasses are also suitable for optical surfaces from ZEISS.

Action

- ▶ Please observe the Instructions for Use supplied with each anti-fogging agent.

Anti-fogging agents not only ensure fog-free eyepiece optics, they also clean the eyepiece optics and protect them from dirt, grease, dust, lint and fingerprints.

6.5 Disinfection

6.5.1 Disinfecting the mechanical surfaces

The maximum concentrations are:

- For alcohol (tested with isopropyl alcohol): 60%
- For aldehyde (tested with glutaraldehyde): 2%
- For quaternary compounds (tested with DDAC): 0.2%

Disinfectants with an alcohol concentration higher than 70% can be used to achieve maximum disinfection. There is a chance that long-term use of such disinfectants may cause the device's surfaces to become dull or matte, or may loosen the adhesive labels on the device without causing them to fall off. However, the use of such disinfectants will never impair device performance or endanger patients.

NOTE

Surface damage caused by use of wrong disinfectants!

Performing disinfection with the wrong disinfectants may result in damage to the surfaces of the device.

- ▶ Use an aldehyde- and/or alcohol-based disinfectant. The addition of quaternary connections is acceptable.
- ▶ In order to prevent surface tensions, you may use only the disinfectants specified above.

Prerequisite

☑ Please observe the information provided in the Instructions for Use of the disinfectant.

Action

- ▶ Disinfect all of the required surfaces.

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7 Maintenance

7.1 Performing technical safety checks

▶ Perform the safety checks according to the maintenance intervals of the respective surgical microscope.

To prevent any impairment of the safety of the device as a result of aging, wear etc., the system operator must ensure, in accordance with the applicable national regulations, that the regular technical safety checks defined for this device are performed on schedule and to the extent prescribed.

The safety checks must be performed only by the manufacturer or qualified personnel. The scope of the safety checks of the device should comprise at least the following points:

- Checking to make sure the Instructions for Use are available
- Visual inspection of system and accessories for damage and legibility of labels
- Perform a leakage current test
- Perform a protective ground conductor check
- Functional test of all switches, buttons, connectors, and indicator lamps on the device

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8 Troubleshooting

8.1 Service information

You can find the ZEISS representative for your country online on the following website: www.zeiss.com/med

8.2 Safety during troubleshooting

If there is a failure and you cannot get any help from the chapter "What to do in the event of malfunctions", attach a sign "Out of order" to the system and contact ZEISS service representative.

8.3 What to do in the event of malfunctions

Fault	Possible cause	Corrective measure
No function at all	The device is off.	Use the power switch to turn the device on.
	The CCU is off.	Use the [power] button to turn on the CCU.
	The CCU power cable is not plugged in.	Plug in the power cable [▷ 35].
	Power failure	Contact the in-house electrician.
White balance cannot be performed. "AWB ERROR" message	White balance aborted because of insufficient light.	Increase the light intensity on the surgical microscope and perform the white balance again.
	White balance aborted because of excessive light.	Decrease the light intensity on the surgical microscope and perform the white balance again.
Video picture is flickering or not displaying on the video monitor	Video settings are incorrect.	Adjust the PAL and NTSC video settings [▷ 20].
No picture, LED on CCU not illuminated:	The CCU is not switched on	Use the [power] button to turn on the CCU.
	The CCU power cable is not plugged in.	Plug in the power cable [▷ 35].
	Power failure	Contact the in-house electrician.

Fault	Possible cause	Corrective measure
No video picture - only color bars:	1Chip HD Camera not connected	Connect the 1Chip HD Camera [▶ 35].
No video picture:	Video cable not connected correctly	Check all connections [▶ 35].
Poor video picture: White objects do not appear white. Black areas appear gray	Camera has not been white balanced If the 1Chip HD Camera and CCU are interchanged, we recommend performing a white balance procedure on reconnection.	■ Perform a white balance. [▶ 29] ■ Set the black level. ■ Reset the camera to factory settings.
Poor video picture:	Incorrect picture mode selected	Adjust the DVI settings [▶ 20].
	The display device (monitor, video recorder, etc.) is connected to an unsuitable port.	Connect the display device to the ports intended for it [▶ 35].
Video picture interference from DVI output:	Monitor unsuitable for HD video camera's vertical frequency (50 Hz with PAL, 60 Hz with NTSC)	Use a suitable monitor.
Picture orientation reversed or inverted	Incorrect picture setting selected.	Adjust the picture settings [▶ 26].

Table 11: 1Chip HD Camera faults

9 Technical specifications

9.1 Essential performance

Component	Properties	
Video lens	f=41.3 mm	
Image sensor	1/3 type, CMOS sensor (rolling shutter)	
Resolution	1920 x 1080 pixels, effective	
Color space	RGB method	
Scanning method	Progressive scan	
Aspect ratio	16:9	(horizontal:vertical)
Video output signal	HD-SDI (2 lines):	0.8 Vp-p / 75 Ω
HD output	DVI (1 line):	1920 - 1080P 59.94/50
		1920 - 1080I 59.94/50
Video output signal	SD - Y/C (1 line):	Y: 1.0 Vp-p / 75 Ω
SD output port		C: 0.286 Vp-p / 75 Ω
S/N ratio		
Signal-to-noise ratio	50 dB (gamma and detail OFF)	
Rated sensitivity	≥ 2000 lux F7/3200 K	
Dimensions	Width x height x depth 31 mm x 31 mm × 39 mm	
Weight	Approx. 0.06 kg	

Table 12: 1Chip HD Camera

9.2 Specifications of the CCU for the 1Chip HD Camera

Component	Properties
Rated voltage	DC 12–15 V
Power consumption	18 VA

Component	Properties
Dimensions	Width x height x depth 170 mm x 58 mm × 200 mm
Weight	Approx. 1.1 kg

Table 13: CCU for the 1Chip HD Camera

9.3 Ambient requirements for transport and storage

Properties	Admissible range
Temperature	-20°C–+70°C
Rel. humidity	10–90% (without condensation)
Atmospheric pressure	500–1060 hPa

10 Accessories and components

These Instructions for Use also describe accessories and components that are not necessarily included in the individual delivery scope. A current accessories and components list can be obtained from your ZEISS contact person.

You can find the ZEISS representative for your country online on the following website: www.zeiss.com/med

Only use accessories and components authorized by ZEISS for this device. Device safety during operation cannot be guaranteed if accessories and components that are not authorized by ZEISS are used.

10.1 Ordering data

Only operate the device with the accessories and components included in the scope of delivery and recommended and approved by ZEISS. Your country-specific contact for orders can be found online at the following website:

www.meditec.zeiss.com

10.1.1 1Chip HD Camera for OPMI Lumera i

Description	Order number
Beam splitter for the 1Chip HD Camera	
Splitter 20 (beam splitter 20)	301503-9901-000
Upgrade for OPMI Lumera i with 1Chip HD Camera:	
UC 1Chip HD Camera - OPMI Lumera i	301900-8400-500
System cable DVI-D, 5 m	302681-8767-000
Beam splitters for the 1Chip HD Camera (if not available at customer's):	
Splitter 20 (beam splitter 20)	301513-9901-000

Table 14: Catalog information, 1Chip HD Camera option for the OPMI Lumera i

10.1.2 1Chip HD Camera for S7 / OPMI PROergo

Description	Order number
Beam splitters for the 1Chip HD Camera:	
Splitter 20 (beam splitter 20)	301503-9901-000
Splitter 50 (beam splitter 50)	301513-9902-000
Angled lens with lateral output port for documentation accessories	000000-1079-239

Description	Order number
Angled lens with lateral output port for documentation accessories (with rotatable adapter):	
Angled lens with lateral output port for documentation accessories	000000-1079-239
Rotatable dovetail for binocular tubes	301007-0000-000
Iris diaphragm for video lenses	301675-0000.000
Upgrade for S7 / OPMI PROergo with 1Chip HD Camera:	
UC 1Chip HD Camera - S7 / OPMI PROergo and S7 / OPMI Sensera	301900-8200-500
System cable DVI-D, 5 m	302681-8767-000
Beam splitters for the 1Chip HD Camera (if not available at customer's):	
Splitter 20 (beam splitter 20)	301503-9901-000
Splitter 50 (beam splitter 50)	301513-9902-000
Angled lens with lateral output port for documentation accessories	000000-1079-239

Table 15: Catalog information, 1Chip HD Camera for S7 / OPMI PROergo

10.1.3 1Chip HD Camera for S7 / OPMI Sensera

Description	Order number
Beam splitters for the 1Chip HD Camera:	
Splitter 20 (beam splitter 20)	301503-9901-000
Splitter 50 (beam splitter 50)	301513-9902-000
Upgrade for S7 / OPMI Sensera with 1Chip HD Camera:	
UC 1Chip HD Camera - S7 / OPMI PROergo and S7 / OPMI Sensera	301900-8200-500
System cable DVI-D, 5 m	302681-8767-000
Beam splitters for the 1Chip HD Camera (if not available at customer's):	
Splitter 20 (beam splitter 20)	301503-9901-000
Splitter 50 (beam splitter 50)	301513-9902-000

Table 16: Catalog information 1Chip HD Camera option for S7 / OPMI Sensera

11 Disposal

11.1 Disposal of the device

- ▶ Keep packing material in the event of a relocation or repair.
- ▶ If you would like to dispose of the original packing material, send it in for recycling via a recognized collection system.

The device contains electronic components with integrated batteries.

- ▶ Dispose of the device and integrated batteries correctly, in accordance with national legislation.

In accordance with applicable EU guidelines and national regulations at the time at which the product was brought onto the market, the product specified on the consignment note is not to be disposed of via the domestic waste disposal system or communal waste disposal facilities.

- ▶ For more information on disposing of the device, contact the ZEISS contact partner in your country.

You can find the ZEISS representative for your country online on the following website: www.zeiss.com/med

- ▶ If you resell the device or its components: Inform the buyer that the device is to be disposed of in accordance with the currently applicable regulations.

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Glossary

AE

AE (Application Entity) is the name of a DICOM node

AE

Automatic exposure

AWB

Auto White Balance

CCU

Camera control unit

DC

Direct current

HD

High Definition

HD-SDI

HD-SDI (High Definition Serial Digital Interface) is a connection used to transmit uncompressed video signals.

IEC

International Electrotechnical Commission

VA

Volt-ampere

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Index

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G-30-1946-en - 2.0 - 2024-03-15