ATMOS MedizinTechnik

Operating Instructions

ATMOS® Cam 41 HD

English

CE

GA1GB.150404.0

2017-07 Index 03

Table of contents

1 Introduction

1.1 Notes on operating instructions

These operating instructions contain important notes on how to operate the ATMOS® Cam 41 HD safely, correctly and effectively.

These operating instructions serve not only for new operating personnel to be instructed in its use, but also for use as a reference manual. Any reprint - even in extracts - only after written permission from ATMOS.

These operating instructions must always be kept available near the device.

Care, period tests, regular cleaning and proper application are indispensable. They guarantee the operational safety and usability of the ATMOS® Cam 41 HD.

Maintenance, repairs and period tests may only be carried out by persons who have the appropriate technical knowledge and are familiar with the product. To carry out these measures the person must have the necessary test devices and original spare parts.

Read chapter „2 Hints for your safety“ on page 7 before using the device for the first time. This helps you avoid potentially dangerous situations.

The product ATMOS® Cam 41 HD bears CE marking CE according to the EC Directive of the council for medical products 93/42/EEC and meets the basic requirements of Appendix I of the directive.

The product ATMOS® Cam 41 HD complies with all applicable requirements of the Directive 2011/65/EC restricting the use of certain hazardous substances in electrical and electronic equipment (“RoHS”).

The declaration of conformity and our general standard terms and conditions can be obtained on our website at www.atmosmed.com.

The quality management system at ATMOS has been certified according to international standards EN ISO 13485.

These operating instructions are valid for the following devices:

- ATMOS® Cam 41 HD 507.5500.0

1.2 Explanation of pictures and symbols

In the operating instructions

⚠ DANGER

Warning of a danger which causes immediate death or serious injury. Observe the necessary measures.

⚠ WARNING

Beware of a danger which can cause death or serious injury. Observe the necessary measures.

⚠ CAUTION

Beware of a danger which can easily hurt you. Observe the necessary measures.

⚠ NOTICE

Indication of a danger where the product or other items can be damaged. Observe the necessary measures.

⚠	Warning of a danger which can cause death or serious injury.
ℹ	Information regarding possible material damage which can be caused.
☞	Useful information on the handling of the device.
1.	Action. Go step by step.
.	Result of an action.
→	Move, plug in this direction.
click	Engage, check correct fit.

On device and type plate

	Follow operating instructions (blue)		Observe operating instructions
	Manufacturer	IP20	Degree of protection
SN	Serial number	REF	Order number
CE	This product complies with the relevant requirements of the EU-Directive		Application part type BF
	Fuse		Professional disposal
	Freeze image (on camera head)		Take a picture (on camera head)
	Zoom (on camera head)		

1.3 Intended use

Name: ATMOS® CAM 41 HD

Main functions: The ATMOS® CAM 41 HD is an endoscopy camera for displaying the

examination images on a monitor, PC or laptop and for storage of the video signal on a digital recording device.

Medical indications / application: The camera is used for the examination on humans and is intended to be connected to conventional endoscopes or to a microscope or colposcope with an integrated beam splitter.

Specification of the main function: Camera head: High resolution CCD camera with high light sensitivity and depth of field. All common standard C-mount couplers can be mounted to the camera head for connection of endoscopes and for an easy endoscope exchange. The three buttons on the camera head can be individually assigned with different functions which are available on the camera control unit.

Camera control unit: Via the operating panel on the front of the camera control unit all basic functions are stored on the buttons.

Application organ: Throat, nose, ears, vagina, uterus, bladder, urethra and ureter.

Application time: Temporarily (max. of 60 minutes)

Application site: Application sites are clinics, surgery centres, outpatient clinics and practices of ENT doctors, gynaecologists or urologists. The device may only be applied by medical professionals.

Contraindications: Not intended for use in explosion-hazardous areas.

The product is: active

Sterility: The camera control unit, the connecting cable and the camera head are not sterile, in the case of application a sterile drape is pulled over the camera head in a sterile environment.

Single use product / reprocessing: No single use product

1.4 Function

The ATMOS® Cam 41 HD is a HD camera for displaying examination images on a HD ready monitor or PC (software). The camera is designed for connection to conventional endoscopes, hysteroscopes, microscopes or colposcopes with beam splitter. The ATMOS® Cam 41 HD consists of a camera head and a camera control unit with an endoscope coupler. The 3 m long connecting cable on the camera head is connected to the camera control unit. The camera head includes a 1/3 “CCD colour image sensor with microlenses for connection to commercially available endoscopes or hysteroscopes with standard ocular objectives.

The product has no essential performance characteristics.

Technical description

Single sensor, 1/3“ full HD camera, with video output via DVI-D in HD, or 2 S-video outputs or 2 composite video outputs, or an RGB output. Camera head with 3 m connecting cable to the camera control unit and 3 buttons. It may also be operated with a stroboscope.

- Full HD DVI-D
- RGB output
- Ergonomic watertight aluminium camera head with three buttons
- Presets for the majority of operations (ENT)
- Image freeze function
- Anti-moire and 4 brightness levels
- Compatible with LED cold light sources
- Presets for LED light sources that can be switched at the camera head, status display

on the monitor

- Shutter mode for stroboscopy

1.5 Intended users

The operation and use of the camera must be performed by medically trained personnel.

1.6 Scope of delivery

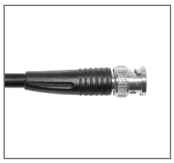
1 x camera control unit

1 x camera head with connecting cable

1 x endoscope coupler

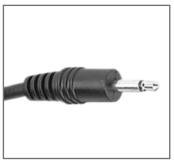
1 x lens cap

1 x mains cable

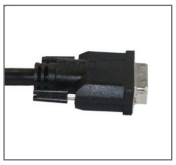


1 x BNC cable

1 x S-video cable

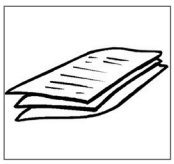


1 x 3.5 mm jack plug cable stereo



1 x DVI cable

1 x VGA cable



1 x operating instructions

1.7 Transport and Storage

Only transport the device in a shipping container, which is padded and offers sufficient protection.

If damage occurs during transport:

1. Document and report the transport damage.
2. Fill in the form QD 434 “customer complaint/return shipment”. This form is enclosed to each delivery and can be found at www.atmosmed.com.
3. Send in the device to ATMOS (chapter „6.4 Sending in the device“ on page 22).

Ambient conditions for transport and storage:

- Temperature: - 20...+ 60 ° C
- Relative humidity: 10...90 % without condensation
- Air pressure: 70...106 kPa

2 Hints for your safety

The safety of the ATMOS® Cam 41 HD complies with all the recognized rules of technology and the guidelines of the Medical Products Law.

Read and follow the safety instructions carefully before using the product.

2.1 General safety information

Only use accessories and options, which are specifically suited for combination with the product and which meet the performance and safety requirements.

If you wish to connect more than one device or application part, you must always comply their safety instructions.

Only connect the device to the mains supply when the mains voltage and mains frequency correspond to the local supply.

In the US, the device may only be operated according to Federal Law under the supervision of a physician.

2.2 Dangers for users, patients and third parties

Protect yourself against an electric shock!

Burns, cardiac arrhythmias and even death are possible.

- Check before each use if the device or the mains cable are damaged. Never operate the device if you detect any damage. In this case please clean the device and send it in to ATMOS for repair.
- Disconnect the device from the mains supply prior to cleaning or disinfection.
- Never touch the plug or mains cable with wet hands.
- Never operate the unit in high humidity environments.
- Do not allow moisture to penetrate into the device.
- Please pay attention to the period tests in chapter „6 Maintenance and Service“ on page 21.
- Only use original accessories and original spare parts from ATMOS.
- Do not modify the device without the manufacturer's permission.
- Never touch the device´s interfaces and the patient at the same time!
- Only connect the device to a supply with a protective conductor.

Explosion and fire hazard!

Burns and injuries are possible.

- Never operate the device in explosion-hazardous areas or areas which are oxygenated.

Reduce the risk of infection for you and your patients!

Deadly diseases can be transmitted.

- Clean the device after every use according to the operating instructions.
- Use a sterile drape for camera head and connecting cables, if necessary.

Only a fully functional product meets the safety requirements of users, patients and third parties. Follow the following guidelines concerning your product.

2.3 Damage to the device

Avoid sun and bright light sources.

The sensor in the camera head will be damaged.

- Attach the lens cover when you are not using the camera.
- Never hold the camera in the sun or in bright light sources.

Avoid incorrect handling, storage or transport

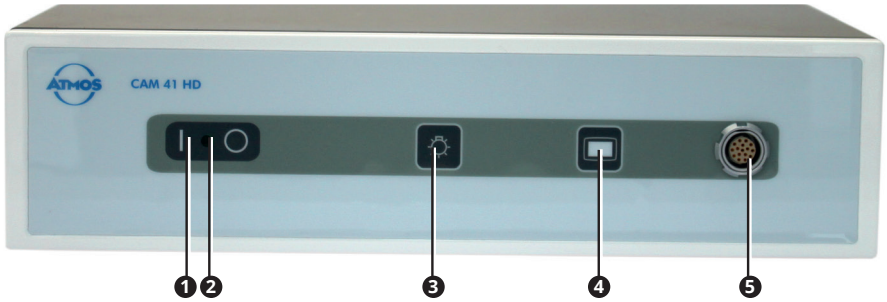
Connection cable, camera head or camera control unit could be damaged.

- Make sure that the connection cable is not pinched, squeezed, knotted or clamped off.
- Do not pull on the connection cable.
- Please observe the ambient conditions regarding transport, storage, and operation.

3 Setting up and starting up

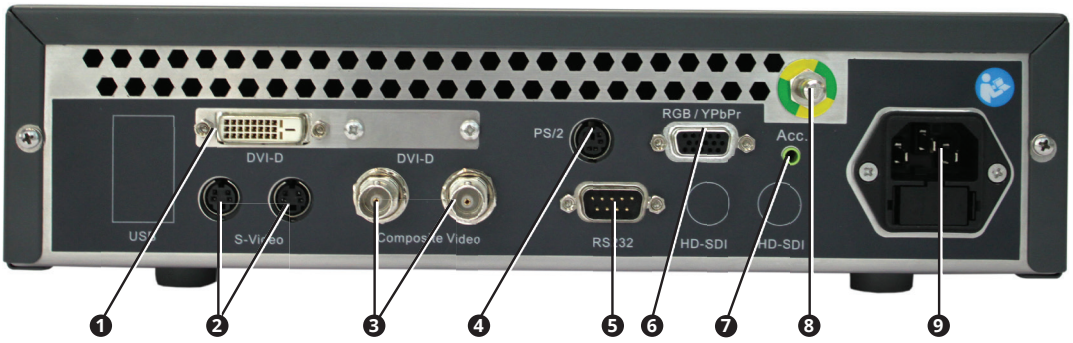
3.1 Device overview

Front view camera control unit



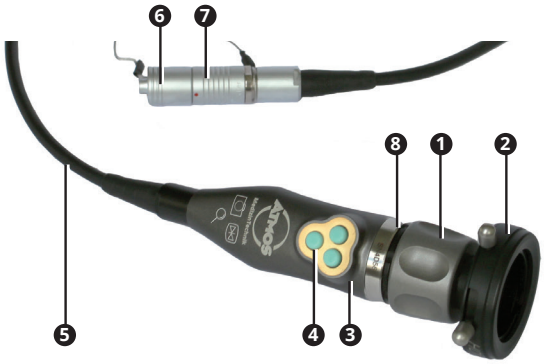
1. Button On/Off
2. Green LED
3. Button Light Sources
4. Button Menu
5. Camera head connection

Rear View camera control unit



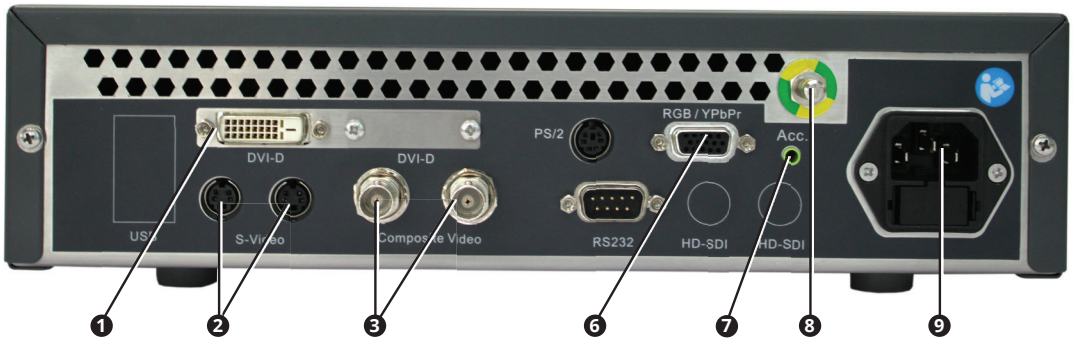
1. Video output DVI-D
2. Video signal output S-Video
3. Video signal output composite
4. No function
5. No function
6. Video signal output RGB
7. Jack for external control
8. Potential equalization
9. Mains supply

Camera head



1. Focus wheel on the endoscope coupler
2. Endoscope connection
3. Camera head
4. Camera head buttons
5. Connection cable
6. Cap for camera plug
7. Camera plug
8. Red sealing ring on the C-mount adapter

3.2 Connection diagram



No.	Labelling	Connection
1	DVI-D	Monitor
2	S-Video	Monitor or grabber
3	Composite Video	Monitor
6	RGB/YPbPr	Monitor
7	Acc.	Digital recorder
8		Potential equalization
9		Mains supply

3.3 Use with other devices

Only qualified personnel may install electrical systems. The person who installs an electrical medical system is responsible for ensuring that the performance, safety,

specifications and intended use of the ATMOS® Cam 41 HD are not affected.

Note the following when using the device in connection with other devices.

- Refer to the specifications of IEC 60601-1 on medical electrical systems.
- Note in particular the information on the patient environment, multiple sockets and leakage current.

3.4 Connecting the device

Carefully read the safety instructions in chapter „2 Hints for your safety“ on page 7 before using the product.

1. Check the device for any transport damage.
2. If the device is damaged: Document and report the transport damage. Send the device to ATMOS, see chapter „6.4 Sending in the device“ on page 22.
3. Refer to the guidelines for medical electrical systems in chapter „3.3 Use with other devices“ on page 10.
4. Connect a monitor.
5. Connect any additional components.
6. Connect the equipotential bonding if required.

☞ The equipotential bonding must be connected if the spatial environment in which the product is used requires this. Refer to the specifications of IEC 60601-1.

7. Check whether mains voltage and frequency of the device match with voltage and frequency of the supply network.

☞ The device's details can be found on the type plate.

8. If the mains voltage and mains frequency correspond: Connect the device with the supplied mains cable to a mains supply with a protective conductor.
9. Connect the camera head, see chapter „4.4 Connect and remove the camera head“ on page 12.
10. Perform a function check, see chapter „6.2 Function check“ on page 21.

4 Operation

4.1 Ambient conditions during operation

- Temperature: + 10...+ 40 ° C
- Relative humidity: 30...75 % without condensation
- Air pressure: 70...106 kPa

4.2 Switch on the device

☞ Prior to each use perform a function check, see chapter „6.2 Function check“ on page 21.

1. Press the button On / Off.

» The green LED on the on / off button illuminates.

» A white background with an ATMOS logo appears briefly on the monitor.

4.3 Switch off the device

1. Press the button On / Off.

» The green LED on the on / off button no longer illuminates.

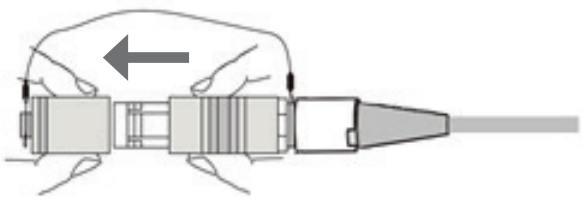
4.4 Connect and remove the camera head

Connect the camera head

1. Switch off the device.

ⓘ By forcibly pulling on the connecting wire of the cap for the camera plug it could break.

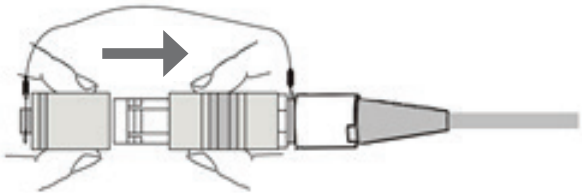
2. Remove the cap from the camera plug by pulling it firmly.



3. Insert the camera plug into the camera head with the red dot on the camera plug facing upwards.
4. If you have connected a new camera head, then perform the following:
   - White balance, see chapter „4.10 Perform white balance“ on page 16.
   - Pixel Error Correction, see chapter „4.11 Perform pixel error correction“ on page 16.

Remove the camera head

1. Switch off the device.
2. Remove the connecting cable plug from the camera head connector.
3. Attach the camera plug cap to the connecting cable:



4.5 Attach and remove the lens protection

On one side the lens protection can be screwed to the camera head. On the other side the lens protection can be attached to the endoscope connector of the endoscope coupler.

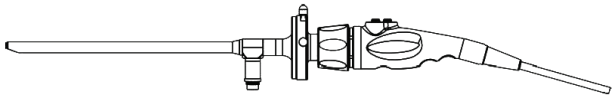
Camera head

1. Screw the lens protection to the camera head.

Endoscope connection

1. Slide the two pins on the endoscope connector together and insert the lens protection.

4.6 Connect and remove the endoscope



Connect the endoscope and endoscope coupler

☞ Once an endoscope is connected, a light source is required.

1. Remove the lens protection if applicable.
2. Check whether the camera head lens is clean and dry.
3. Check whether the glass surface of the endoscope coupler is clean and dry.
4. If the lens or glass surfaces are not clean and dry, then wash them in accordance with chapter „5.2.1 Manual cleaning and disinfection“ on page 18.
5. Screw the C-mount adapter of the endoscope coupler to the camera head.
6. Push the two pins on the endoscope connector together and insert the endoscope.
7. Release the pins.
8. Check that the endoscope is firmly and securely seated.

Remove endoscope and endoscope coupler

1. Remove the endoscope from the endoscope coupler.
2. Unscrew the endoscope coupler from the camera head.
3. Screw the lens protection to the camera head.

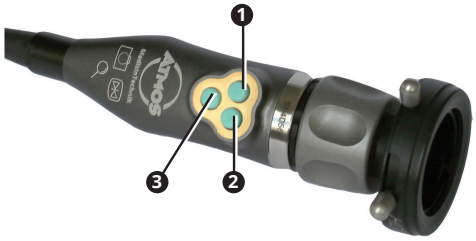
4.7 Set the buttons of the camera head

4.7.1 Factory settings

Button assignment during operation

Button	Push duration	Function
LEFT	Short	Take a picture (only if recording device is connected)
	Long	No function
RIGHT	Short	Freeze image
	Long	Rotate the image by 180 degrees
CENTRE	Short	Zoom in predetermined steps
	Long	Change endoscope profile

Button assignment in the setup menu



No.	Button	Function
❶	LEFT	Upwards
❷	RIGHT	Downwards
❸	CENTRE	Select

Restore factory settings

☞ The factory settings are only reset for the active endoscope profile.

1. Briefly press the MENU button on the front side of the camera control unit.
2. Assign any button with `Factory`, see chapter „4.7.2 Custom button assignment“ on page 14.
3. Exit the setup menu.
4. Press the button assigned to `Factory`.

» The factory settings are restored.

4.7.2 Custom button assignment

The following functions can be assigned to the buttons on the camera head:

Display setup menu	Function	Setting options
`Disabled`	Not assigned	
`Light up`	Set the display brighter	Brighter in steps from 1 - 12
`Light down`	Set the display darker	Darker in steps from 12 - 1
`Acc 1`	Take a picture (only if recording device is connected)	
`Acc 2`	No function	

Display setup menu	Function	Setting options
Gain	Amplification	Off; Min; Medium; High
AWB	White balance	
ABB	Pixel error correction	
Freeze	Freeze image	Freeze; release
Zoom up	Increase zoom level	1.0 to 2.5
Zoom down	Reduce zoom	2.5 to 1.0
Zoom Loop	Continuous zoom levels	1.0; 1.2; 1.4; 1.6
Mirror	Mirror the image horizontally	On; Off
Rotate	Rotate the image by 180 degrees	On; Off
Flip	Rotate the image by 180 degrees and flip horizontally	On; Off
Color Temp	Choose a light source	LED; XENON; HALOGEN; USER
Menu	Call up setup menu	Call up - exit
Endo. User	Change endoscope profile	10mm; 8mm; 2.7mm; FLEXIBLE; FLEX+STROBO; STROBO
Factory	Reset button assignment of the endoscope profile to factory settings	

Assign custom buttons

☞ The buttons can be set individually for each endoscope profile.

1. Briefly press the MENU button on the front side of the camera control unit.

» A menu with all buttons appears.

» An arrow appears next to the selected button.

2. Go to the desired button, by pressing the LEFT or RIGHT button.
3. Press the CENTRE button.

» Three dashes appear next to the selected button.

4. Press the LEFT or RIGHT button to select the function.
5. Press the CENTRE button.

» An arrow appears next to the selected button.

» The button is programmed with the desired function.

4.8 Adjust image

4.8.1 Select endoscope profile

1. Select the endoscope profile according to your custom button assignment.

☞ If the image is pixelated or blurry, you may have an unsuitable endoscope profile.

4.8.2 Choose a light source

☞ You can assign the selection of the light source on one of the camera head buttons.

1. Connect a light source to the endoscope.

2. Repeatedly press the LIGHT SOURCES button briefly on the front side of the camera control unit to select the light source.
3. Perform a white balance. See chapter „4.10 Perform white balance“ on page 16.

☞ If the colour temperature of the preceding light source differs greatly, you may need to perform the white balance twice.

4.8.3 Sharpen the image

1. Turn the focus wheel.

4.8.4 Zoom

1. Zoom according to your custom button assignment.

☞ If the image is out of focus, the zoom level is possibly too high.

4.9 Freeze or take pictures

You can freeze an image. If you have a recording option connected you can take pictures.

1. Proceed according to your custom button assignment.

4.10 Perform white balance

By performing a white balance you get a natural representation of the camera shot.

☞ If you have started the white balance unintentionally, you must perform another white balance.

☞ Do not perform the white balance under fluorescent light because otherwise the result may not be satisfactory.

1. Turn on the light source and wait until the light has stabilized.
2. Aim the camera head at a white surface.
3. Check if the white surface is displayed over the entire screen.
4. Press and hold the LIGHT SOURCES button.

» The text AWB appears on the monitor. The text flashes.

5. Wait approximately 2 seconds.

» The text is no longer flashing and the result is displayed:

- AWB OK: White balance has been successfully carried out.
- Error message: White balance could not be carried out.

Possible error messages

Error message	Possible cause	Remedy
AWB NOT GOOD – LEVEL LOW	Insufficient light.	1. Connect a light source.

4.11 Perform pixel error correction

1. Attach the lens protection to the endoscope connector.
2. Press and hold the MENU button.

» The text ABB appears on the monitor. The text flashes.

3. Wait approximately 2 seconds.

» The text is no longer flashing and the result is displayed:

- ABB OK: Pixel error correction performed successfully.
- Error message: Pixel error correction could not be carried out.

Possible error messages

Error message	Possible cause	Remedy
ABB NOT GOOD / CLOSE LENS	Lens protection not attached properly.	1. Attach the lens protection to the endoscope connector. 2. Perform the pixel error correction again.
ABB NOT GOOD	Pixel error correction could not be carried out.	1. Perform the Pixel error correction again.

5 Cleaning and Disinfection

We recommend that you always document all maintenance work and exchange of parts in writing.

⚠ WARNING

Risk of infection due to secretion on the device.

Deadly diseases can be transmitted.

- Always wear disposable gloves during any cleaning.
- Clean the device after every use.
- Clean and disinfect the device according to the operating instructions.

5.1 Camera control unit

NOTICE

Wrong detergent.

Damaged device surface.

- Do not use detergents, abrasives or solvents.

1. Switch off the device.

⚠ Electric shock caused by liquid inside the device. Burns, cardiac arrhythmias and even death are possible.

2. Disconnect the device from the mains supply.
3. Burns and cardiac arrhythmia and even death are possible.

⚠ Explosion hazard due to flammable disinfectant. Burns and injuries are possible.

4. If you use flammable disinfectant, then the control unit must dry for at least 1 hour before turning it on again.

5.2 Camera head

5.2.1 Manual cleaning and disinfection

NOTICE

Careless cleaning.

Camera head can be broken or scratched.

- Clean the camera head cautiously.
- Protect the glass surfaces of the camera head from mechanical contact.

Wrong disinfectant.

Damaged camera head.

- Do not use disinfectants containing peracetic acid without corrosion inhibitors, no disinfectant with phenols or chlorine components.

1. Attach the endoscope coupler to the camera head.
2. Slide the two pins on the endoscope connector together and insert the lens protection.

3. Check that the endoscope coupler fits well and the red seal on the C-mount adapter exists.
4. Rinse the camera head with connection cable and endoscope coupler under running water.
5. Rinse with deionized water.
6. Dry the camera head with connection cable and endoscope coupler with a dry cloth.
7. Dip the camera head with connection cable and endoscope coupler in disinfectant solution.
8. Rinse with deionized water.
9. Dry the camera head and the endoscope coupler with a sterile swab or cloth.
10. Clean the camera head lens and the glass surface of the endoscope coupler.

🛈 By forcibly pulling on the connecting wire of the cap for the camera plug it could break.

11. Remove the cap from the camera plug by pulling it firmly.
12. Check whether the plug is wet.
13. If the plug is wet, then rinse it off with clean water.
14. Allow the plug to dry.

Clean lens and glass surfaces

☞ Do not use cotton swabs made of metal.

1. Soak a cotton swab, wooden or plastic in alcohol.
2. Clean the lens or glass surface with the cotton swab.

☞ You can also use optical cleaning paper.

5.2.2 Automated cleaning and disinfection

1. Attach the endoscope coupler to the camera head.
2. Slide the two pins on the endoscope connector together and insert the lens protection.
3. Check that the endoscope coupler fits well and the red seal on the C-mount adapter is available.
4. Set a temperature of <= 60 ° C.
5. Perform a liquid or gas sterilization.

🛈 By forcibly pulling on the connecting wire of the cap for the camera plug it could break.

6. Remove the cap from the camera plug by pulling it firmly.
7. Check whether the plug is wet.
8. If the plug is wet, then rinse it off with clean water.
9. Allow the plug to dry.

5.3 Recommended disinfectants

Observe the operating instructions of the manufacturer of the disinfectant. Pay particular attention to the information regarding the concentration and material compatibility.

5.3.1 Instrument disinfectants

Camera head

- Kohrsolin

5.3.2 Surface disinfectant

Camera control unit

- Surface disinfectant

6 Maintenance and Service

Maintenance, repairs and period tests may only be carried out by persons who have the appropriate technical knowledge and are familiar with the product. To carry out these measures the person must have the necessary test devices and original spare parts.

ATMOS recommends: Work should be carried out by an authorized ATMOS service partner. This ensures that repairs and testing are carried out professionally, original spare parts are used and warranty claims remain unaffected.

6.1 Period tests

At least every 12 months a repeat test of the electrical safety should be performed according to IEC 62353.

ATMOS recommends an inspection according to the manufacturer's specifications.

6.2 Function check

Perform a function check before and after each use.

1. Check if the following items are obviously damaged, missing or not properly connected:
   - Camera control unit
   - Camera head
   - Accessories
   - Cable
2. Check whether the parts mentioned above are hygienically non-descript.
3. If you find any damage, please remedy it.
4. Check the connection CCU - camera head.
5. Connect an endoscope.
6. Check the connection camera head - endoscope coupler - endoscope.
7. Switch on the device.
8. Check whether the green LED on the ON / OFF button illuminates.
9. Check if the image is displayed on the monitor.
10. Focus the image.
11. Check if the image is sharp.

6.3 Replacing the fuse

1. Dry your hands.
2. Make sure that the device does not get wet.
3. Switch off the device.
4. Remove the mains cable from the device.
5. Pull the fuse holder from the mains supply.
6. Replace both fuses.
7. Attach the fuse holder.
8. Connect the device to the mains supply.

6.4 Sending in the device

1. Remove and properly dispose of consumables.
2. Clean and disinfect the product and accessories according to the operating instructions.
3. Place used accessories with the product.
4. Fill in the form QD 434 „Delivery complaint / return shipment“ and the respective **decontamination certificate**.

☞ This form is enclosed with each delivery and can be found at www.atmosmed.com.

5. The device must be well padded and packed in suitable packaging.
6. Place the form QD 434 „Delivery complaint / return shipment“ and the respective **decontamination certificate** in an envelope.
7. Affix the envelope to the outside of the package.
8. Send the product to ATMOS or to your dealer.

7 Troubleshooting

The ATMOS® Cam 41 HD was subjected to a thorough quality control in the factory. However, should an error occur, you may be able to solve this yourself.

Error indication	Possible cause	Remedy
Device is not working.	Device is not switched on.	1. Switch on the device.
	Mains cable is not connected.	1. Connect the mains cable.
	Fuse is defective.	1. Replace the fuse.
	No mains voltage.	1. Check the supply network.
No image.	No current.	1. Check mains connection.
	Monitor is not connected properly.	1. Check the monitor connection.
	Monitor settings are not correct.	1. Check monitor settings.
	Light source is not activated.	1. Connect a light source. 2. Switch on the light source.
	Camera head or camera control unit is defective.	1. Send in the device for repair.
Image interference when the connecting cable is moved.	Connecting cable is defective.	1. Send in the device for repair.
Blurred image.	Image is not sharp.	1. Focus the image.
	Glass surfaces of the endoscope coupler or the lens are dirty.	1. Clean the glass surfaces and the lens.
	Zoom is too large.	1. Select a smaller zoom factor.
Fuzzy image or smear effect.	Glass surfaces of the endoscope coupler or the lens are dirty.	1. Clean the glass surface and the lens.
Unnatural colours.	White balance is imperfect.	1. Perform a white balance.
	Light source is not suitable.	1. Select a suitable light source.
	Endoscope profile `STR0B0` selected.	1. Select a suitable endoscope profile.
White pixel.	Feature of the sensor.	1. Perform a pixel error correction.
Image mirrored or rotated.	Function `Mirror`, `Rotate` or `Flip` is active.	1. Deactivate the function.
Image is roughly rasterized.	Anti-moiré is activated when the endoscope profile `Flexible` is selected.	1. Select a suitable endoscope profile.

8 Accessories

Options	REF
MediCapture	On request
ATMOS® Strobo 21 LED	507.4700.0
ATMOSoft ENT 31 license dongle	700.0039.0
ATMOSoft ENT 41 license dongle	700.0040.0
ATMOSoft GYNE 31	700.0037.0
ATMOSoft GYNE 41	700.0038.0

Cable	REF
Connecting cable S-VHS, L = 1 m	008.0635.0
Video cable S-VHS cable monitor professional, L = 5 m	008.0882.0
Video cable FBAS monitor cable, L = 1 m	008.0844.0

9 Spare parts

Spare part	REF
Camera head	507.5501.0
Endoscope coupler	507.5502.0
Mains cable	507.0859.0

10 Disposal

Packaging

1. Please recycle the packing.

ATMOS® Cam 41 HD

Do not dispose of the device with household waste.

The ATMOS® Cam 41 HD does not contain any hazardous goods.

1. Clean and disinfect the device.
2. In Germany: Send in the device to ATMOS or your specialized dealer. They will dispose of the device professionally.
3. In other countries: Dispose of the device professionally and according to country-specific laws and regulations.

In Germany the device is excluded from the Electrical and Electronic Equipment Act (ElektroG) according to the National Register for waste electric equipment because it may be contaminated. Do not dispose of the device in the electrical waste.

Basically, the case is fully recyclable. However, please note the country-specific laws and regulations.

11 Technical data

Standard	PAL
Image sensor	1/3 type CCD
Sensor size (width x height)	5.59 mm x 4.68 mm
Minimal lighting	0,1 lx (F1.4)
Shutter speed	Auto: 1/50 s to 1/100000 s Trigger OFF: 1/50 s
Signal-to-noise ratio	50 dB
White balance	Triggering automatic white balance
Gain control	Manual
Exposure control	Manual
Video output	2 x composite video outputs (1.0 Vp-p / 75 Ohms, BNC) 2 x S-Video output (Y: 1.0 Vp-p / 75 Ohms, C: 0.3 V burst pp / 75 ohm, Mini-Din 4-pin) 1 x HD DVI output (DVI-D)
HD resolution	1080p 60 Hz
Format	16:9
Mains voltage	100 – 120 / 200 - 240 V ~
Main frequency	50/60 Hz
Power consumption	26 VA
Current consumption A	0.27 A
Fuse	2 x T 1.0 A E
Classification according to Directive 93/42/EU	Class 1
Classification of application part (camera head)	BF
Protection class according to IEC / EN 60601-1	I
Load ratio	Continuous operation
Degree of protection when used in the presence of flammable mixtures	The device is not explosion-proof
Camera head	
Dimensions camera head	30 x 32 x 74 mm
Interface for connecting the adapter	Standard C-mount
Degree of protection against ingress of water	IPX7
Weight (without connection cable and plug)	80 g
Camera control unit	
Degree of protection against ingress of water	IP20 (no protection)
Dimensions	300 x 74 x 365 mm
Weight	4.5 kg

Ambient conditions	
Transport / storage	Temperature: - 20° C - +60 °C
	Humidity: 10 % - 90 % without condensation
	Air pressure: 70 – 106 kPa
Operation	Temperature: +10 - + 40 °C
	Humidity: 30 % - 75 % without condensation
	Air pressure: 70 – 106 kPa

12 Notes on EMC

- Medical electrical equipment is subject to special precautions with regard to EMC and must be installed acc. to following EMC notes.
- Portable and mobile HF communication facilities can influence medical electrical equipment.
- The use of other accessories, other converters and cables than stated may lead to an increased emission or a reduced interference immunity of the equipment or system.
- The electrical medical device must not be stacked next to or with other devices. When operation is required close to or in combination with other equipment, the electrical medical equipment must be observed to verify its intended operation in this arrangement.

Guidance and manufacturer's declaration - electromagnetic emissions

The ATMOS® Cam 41 HD is intended for use in the electromagnetic environment specified below. The customer or user of the ATMOS® Cam 41 HD should ensure that it is used in such an environment.

Emissions Test	Compliance	Electromagnetic Environment - Guidance
HF transmission according to CISPR 11	Group 1	The ATMOS® Cam 41 HD 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.
HF transmission according to CISPR 11	Class B	The ATMOS® Cam 41 HD is suitable for use in all establishments, including domestic and those directly connected to the public low-voltage mains supply network that supplies buildings used for domestic purposes.
Harmonic emissions according to IEC 61000-3-2	Class A	
Voltage fluctuations/ flicker according to IEC 61000-3-3	Corresponds	

Guidance and manufacturer's declaration - electromagnetic immunity

The ATMOS® Cam 41 HD is intended for use in the electromagnetic environment specified below. The customer or user of the ATMOS® Cam 41 HD should ensure that it is used in such an environment.

Immunity Test	IEC 60601- Test Level	Compliance Level	Electromagnetic Environment - Guidance
Electrostatic discharge (ESD) according to IEC 61000-4-2	± 6 kV Contact ± 8 kV Air	± 6 kV Contact ± 8 kV Air	Floors should be wood, concrete, or ceramics tile. If floors are synthetic, the relative humidity should be at least 30 %.
Fast electrical transient/burst IEC 61000-4-4	± 2 kV Mains ± 1 kV I/Os	± 2 kV Mains ± 1 kV I/Os	Mains power quality should be that of a typical commercial or hospital environment.
Impulse voltage/ surges according to IEC 61000-4-5	± 1 kV common-mode ± 2 kV differential mode	± 1 kV common-mode ± 2 kV differential mode	Mains power quality should be that of a typical commercial or hospital environment.

Immunity Test	IEC 60601- Test Level	Compliance Level	Electromagnetic Environment - Guidance
Voltage dips, short interruptions and voltage variations according to IEC 61000-4-11	< 5 % U_T (> 95 % Dip of the U_T) for 0,5 Cycles 40 % U_T 60 % Dip of the U_T) for 5 Cycles 70% U_T (30 % Dip of the U_T) for 25 Cycles < 5 % U_T (>95 % Dip of the U_T) for 5 s	< 5 % UT (> 95 % Dip of the UT) for 0.5 Cycle 40 % UT (60 % Dip of the UT) for 5 Cycles 70% UT (30 % Dip of the UT) for 25 Cycles < 5 % UT (> 95 % Dip of the UT) for 5 s	Mains power quality should be that of a typical commercial or hospital environment. If the user of the ATMOS® Cam 41 HD requires continued function during interruptions of the energy supply, it is recommended to supply the ATMOS® Cam 41 HD from an uninterruptible power supply or a battery.
Magnetic field at the supply frequency (50/60 Hz) according to IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be that of a typical commercial or hospital environment.
NOTE: U_T is the AC mains voltage prior to application of the test level.			

Guidance and manufacturer's declaration - electromagnetic immunity

The ATMOS® Cam 41 HD is intended for use in the electromagnetic environment specified below. The customer or user of the ATMOS® Cam 41 HD should ensure that it is used in such an environment.

<table>
<tr><th>Immunity Test</th><th>IEC 60601-Test Level</th><th>Compliance Level</th><th>Electromagnetic Environment - Guidance</th></tr>
<tr><td>Conducted interference according to IEC 61000-4-6</td><td>3 $V_{Effective\ value}$
150 kHz to 80 MHz</td><td>3 $V_{Effective\ value}$</td><td rowspan="3">Portable and mobile communications equipment should be separated from the ATMOS® Cam 41 HD including the cables by no less than the distances calculated/ listed below.
Recommended distances:
d = 1.2*√P
d = 1.2*√P for 80 MHz to 800 MHz
d = 2.3*√P for 800 MHz to 2.5 GHz
where „P“ is the max. power in watts (W) and D is the recommended separation distance in meters (m).
Field strengths from fixed transmitters, as determined by an electromagnetic site (a) survey, should be less than the compliance level (b).
Interference may occur in the vicinity of equipment containing following symbol:
  </td></tr>
<tr><td>Radiated HF disturbances according to IEC 61000-4-3</td><td>3 V/m
80 MHz to 2.5 Hz</td><td>3 V/m</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td colspan="4">NOTE 1: With 80 MHz and 800 MHz the higher frequency range applies.
NOTE 2: These guidelines may not be applicable in every case. The emanation of electromagnetic waves is affected by absorption and reflection of buildings, objects and people.</td></tr>
<tr><td colspan="4">(A) The field strength of stationary transmitters, such as base stations of radio telephones and land mobile radio devices, amateur radio stations, AM and FM radio broadcast and TV broadcast cannot be accurately predicted theoretically. To determine the electromagnetic environment in regard to stationary transmitters, a study of the location is to be considered. If the measured field strength at the location where the ATMOS® Cam 41 HD is used exceeds the above compliance level, the ATMOS® Cam 41 HD is to be observed to verify the intended use. If abnormal performance characteristics are noted, additional measures might be necessary, e. g. a changed arrangement or another location for the ATMOS® Cam 41 HD
(B) Over the frequency range of 150 kHz to 80 MHz, field strengths should be lower than 3 V/m.</td></tr>
</table>

Recommended safety distance between portable and mobile RF Communications equipment and the ATMOS® Cam 41 HD

The ATMOS® Cam 41 HD is intended for use in electromagnetic environment in which radiated disturbances are controlled. The customer or user of the ATMOS® Cam 41 HD can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF Communications equipment and the ATMOS® Cam 41 HD as recommended below, according to the maximum output power of the communications equipment

	Safety distance, depending on transmit-frequency m		
Power of transmitter W	**150 kHz to 80 MHz** **d = 1,2 *√P**	**80 MHz to 800 MHz** **d = 1,2 *√P**	**800 MHz to 2.5 GHz** **d = 2,3 *√P**
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23
For transmitters for which the maximum nominal output is not indicated in the above table, the recommended safety distance d in meters (m) can be determined using the equation belonging to the respective column whereas P is the maximum nominal output of the transmitter in watts (W) acc. to manufacturer´s specification. NOTE 1 By 80 MHz and 800 MHz the higher frequency range applies. NOTE 2 These guidelines might not be applicable in any case. The emanation of electromagnetic waves is affected by absorption and reflection of buildings, objects and people.			

13 For your notes

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