

Service Manual

**Technical
Description and
Service Instructions**

for

**IMAGE1 S
TC200, TC300, TC301, TC302**

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0. General

Thank you for your expression of confidence in the KARL STORZ brand name. Like all of our other products, this product is the result of years of experience and great care in manufacture. You and your organization have decided in favor of a modern, high-quality piece of equipment from KARL STORZ. KARL STORZ instruments and equipment are for use only by qualified medical personnel who are trained in their use. All electrical installations at the location of use should meet applicable national and local electrical codes.

Refer servicing to duly authorized KARL STORZ service personnel. Always use genuine replacement parts from KARL STORZ. To determine which replacement parts are required please refer to the enclosed replacement parts list. Repair and calibration of this device requires special tools and gauges; certain internal adjustments must not be altered.

For further information, please consult this service manual or contact:

*KARL STORZ GmbH & Co. KG
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Maintenance and Repair

KARL STORZ recommends that all equipment be checked and inspected once a year by KARL STORZ, or by an authorized agent. All services such as modifications, repairs, calibrations, and/or readjustments may only be performed by KARL STORZ or by an authorized agent.



WARNING: *Always unplug the equipment before performing any repairs.*



WARNING: *All devices must be disinfected prior to repair.*



WARNING: *Repairs may only be performed by qualified technicians trained in electrical or electronic engineering, in compliance with the relevant occupational, safety and accident prevention regulations.*



CAUTION: *Safety Testing based on IEC EN 62353, IEC / UL 60601-1, whichever may apply, must be performed after servicing has been completed.*

By making the enclosed technical information available, KARL STORZ does not authorize any service or repair by unauthorized service personnel. Tampering with the instruments or equipment, or unauthorized service or repair of the device nullifies and voids the warranty.

Reservation of Rights

This documentation is the sole and exclusive property of KARL STORZ and may neither be copied nor passed on to third parties without the express written authorization and approval of KARL STORZ.

KARL STORZ reserves the right to make engineering modifications in the interest of promoting technological progress and generating performance improvements without obligation on the part of KARL STORZ to submit prior notice thereof.

Section 1.

Instruction Manual

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Section 2.

Physical Design

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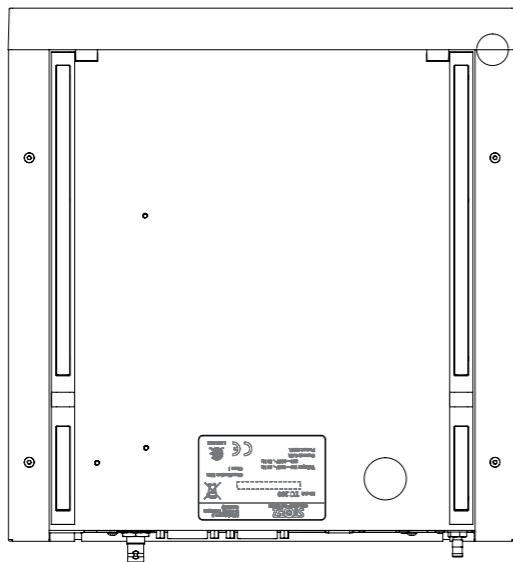
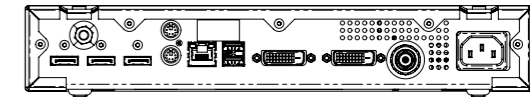
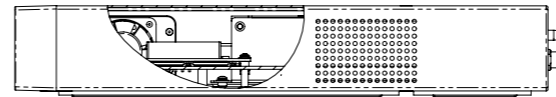
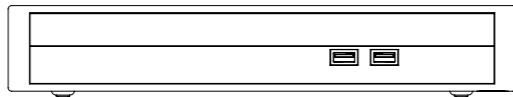
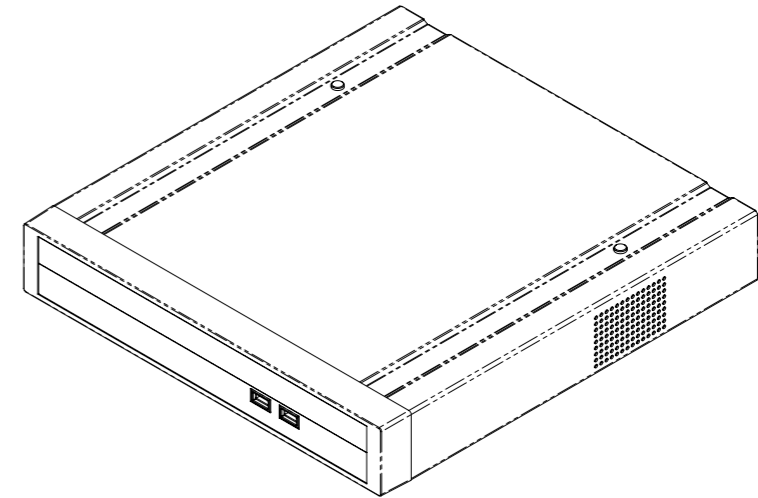
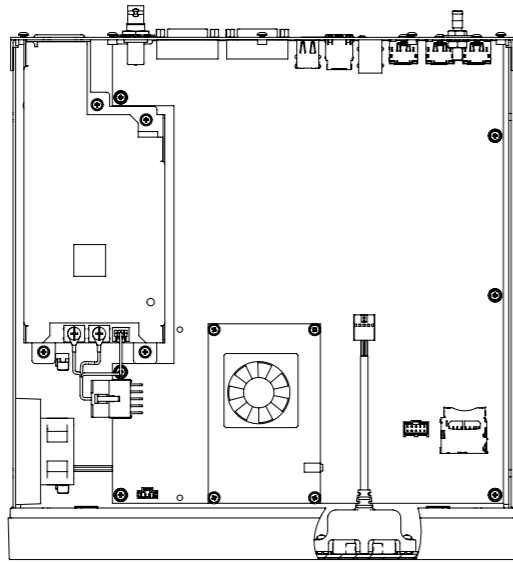
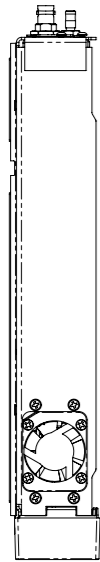
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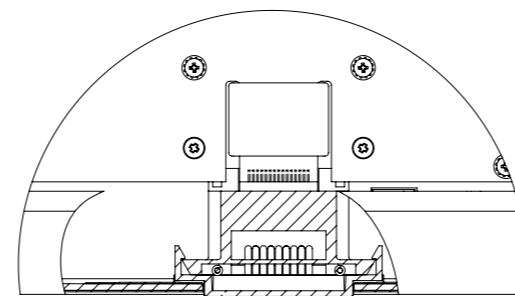
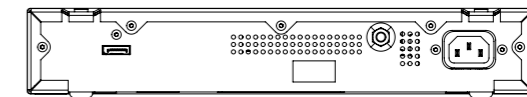
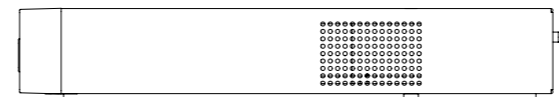
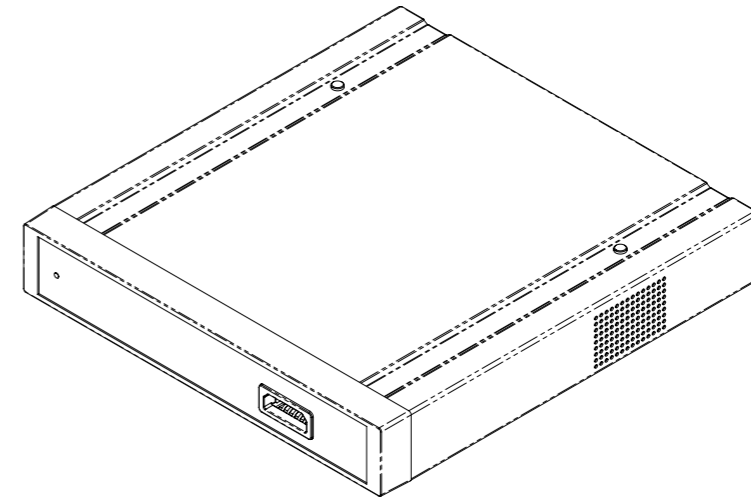
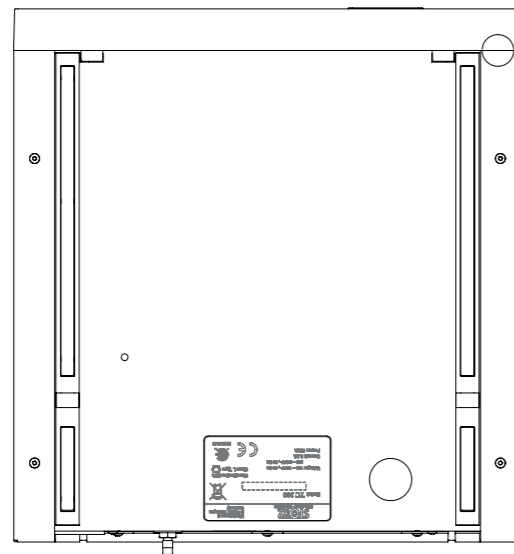
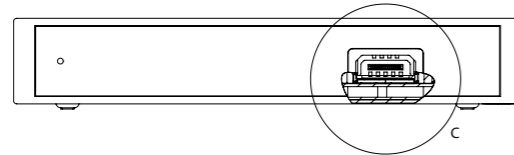
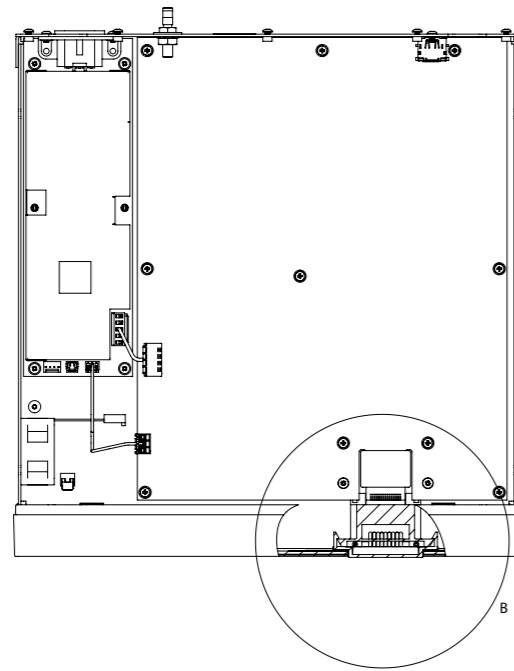
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2.1 Drawings of the IMAGE1 S

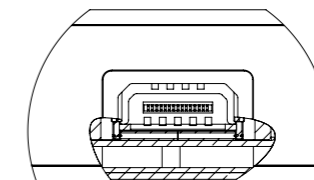
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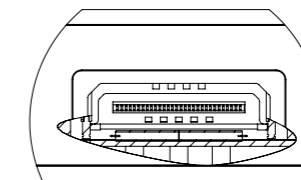
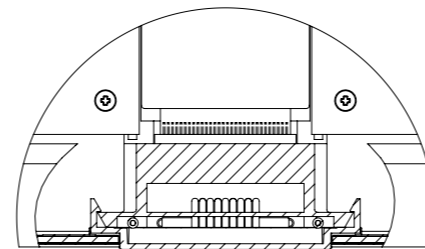
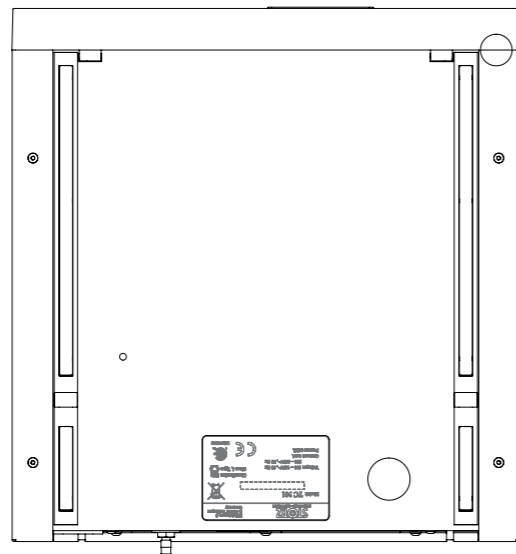
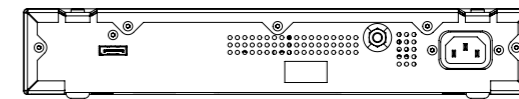
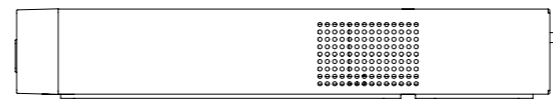
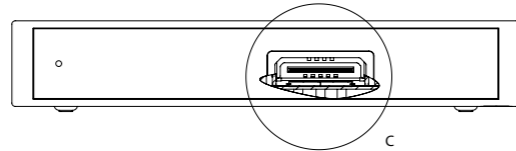
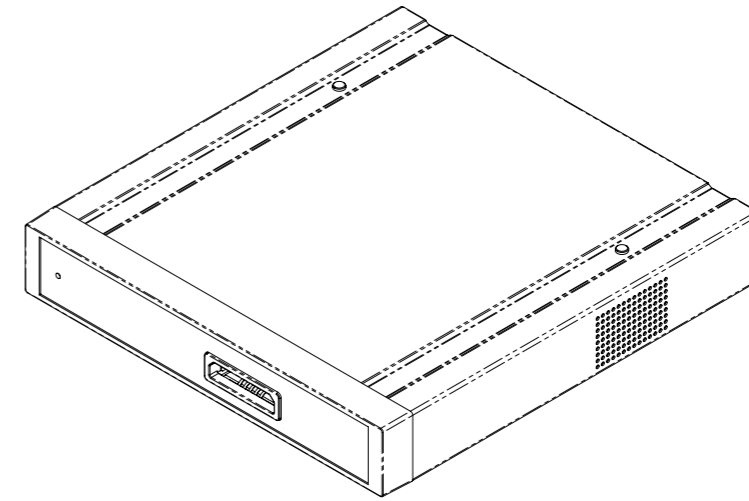
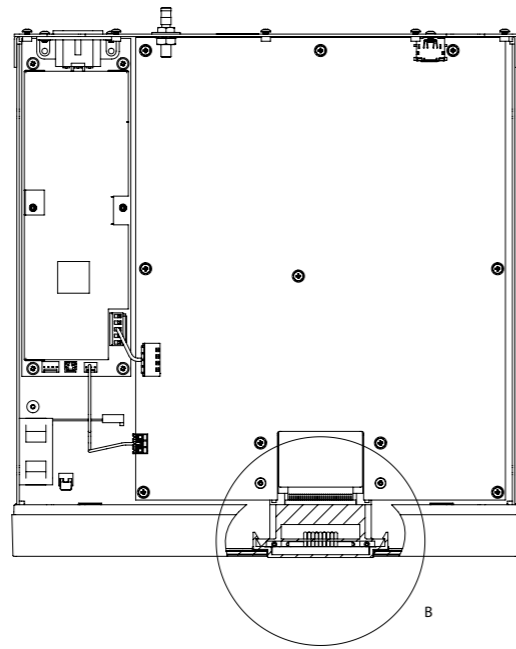
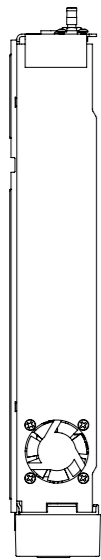


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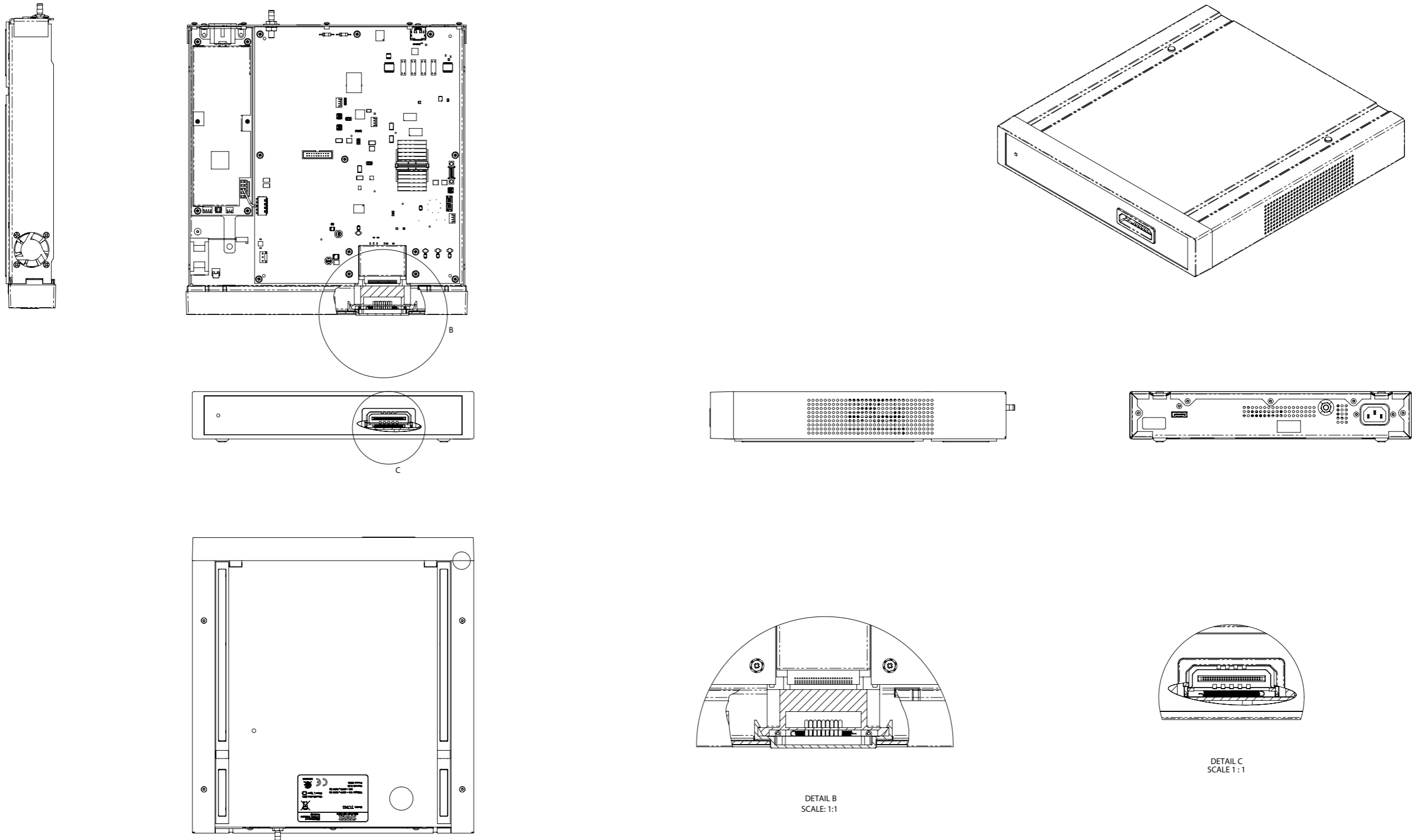


DETAIL C
SCALE 1:1

2.1.3. Drawing of the IMAGE1 X-LINK™ TC301



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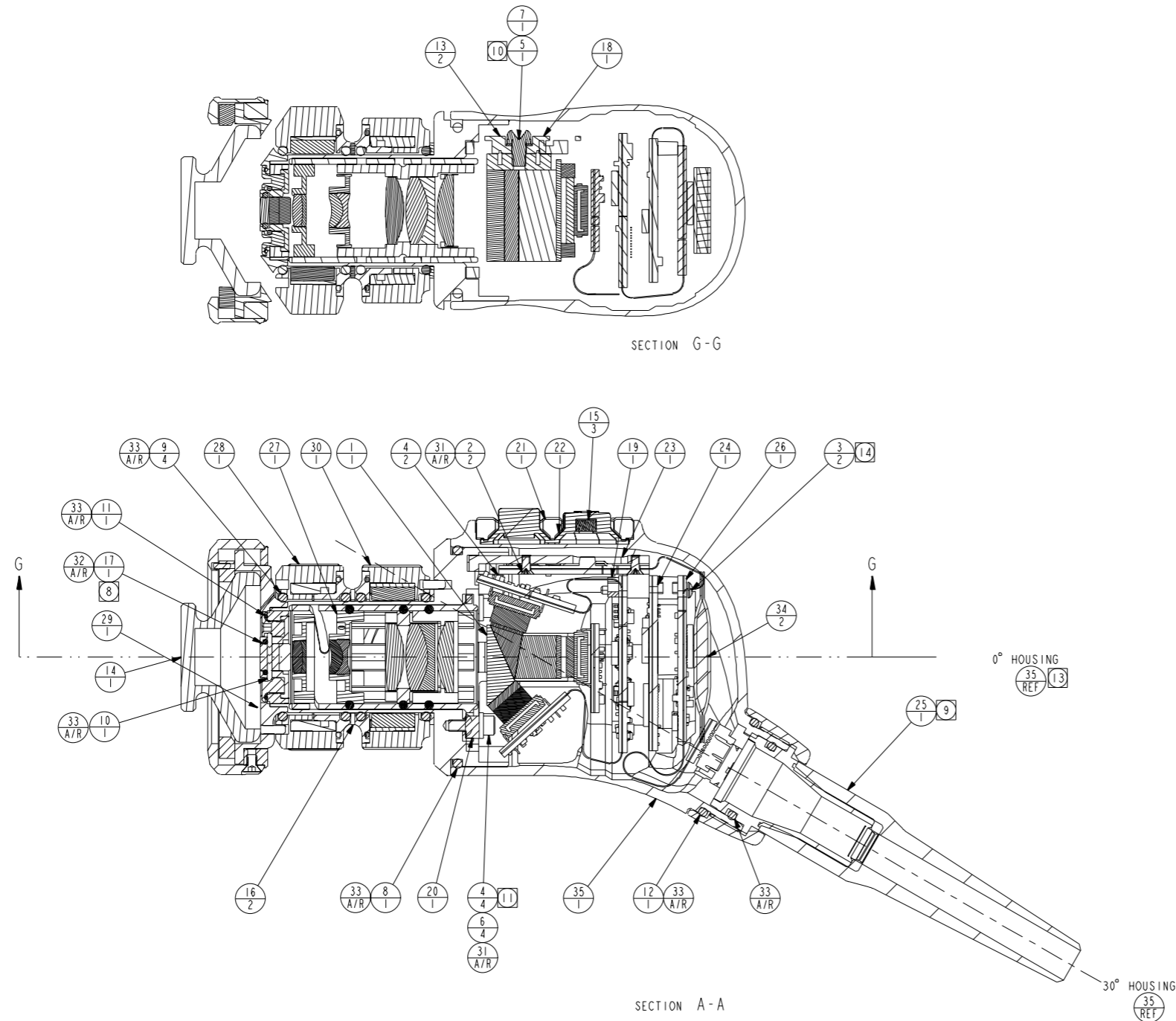


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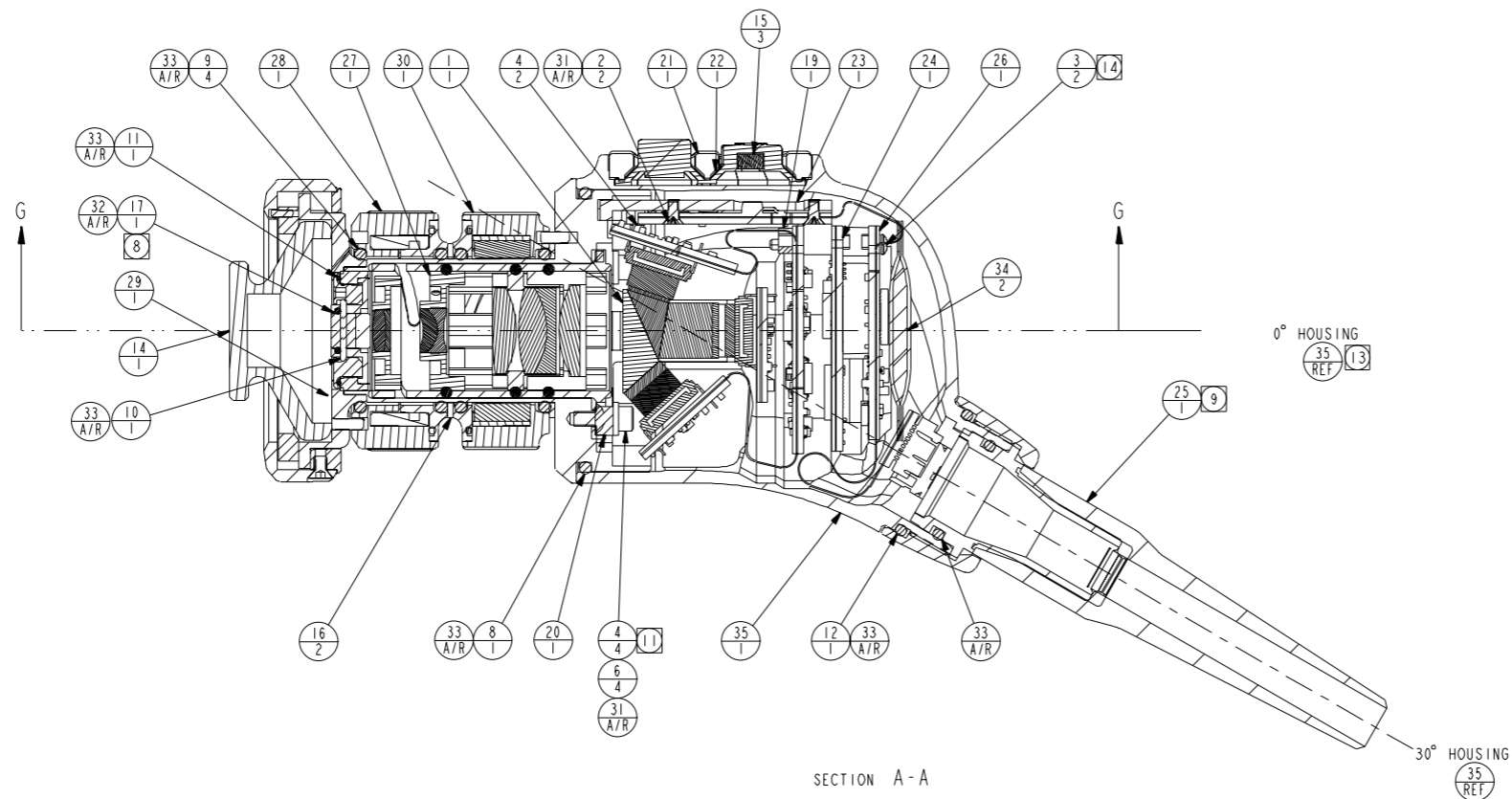
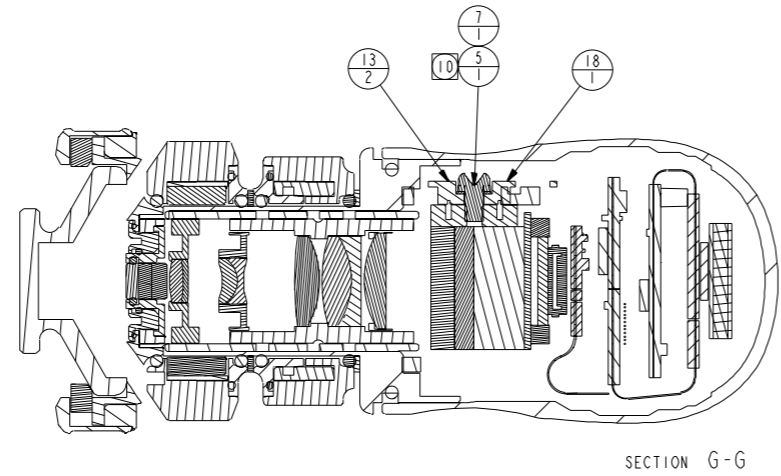
2.2 Drawings of the IMAGE1 S camera heads

2.2.1. Sectional view of the IMAGE1 S H3-Z camera head TH100



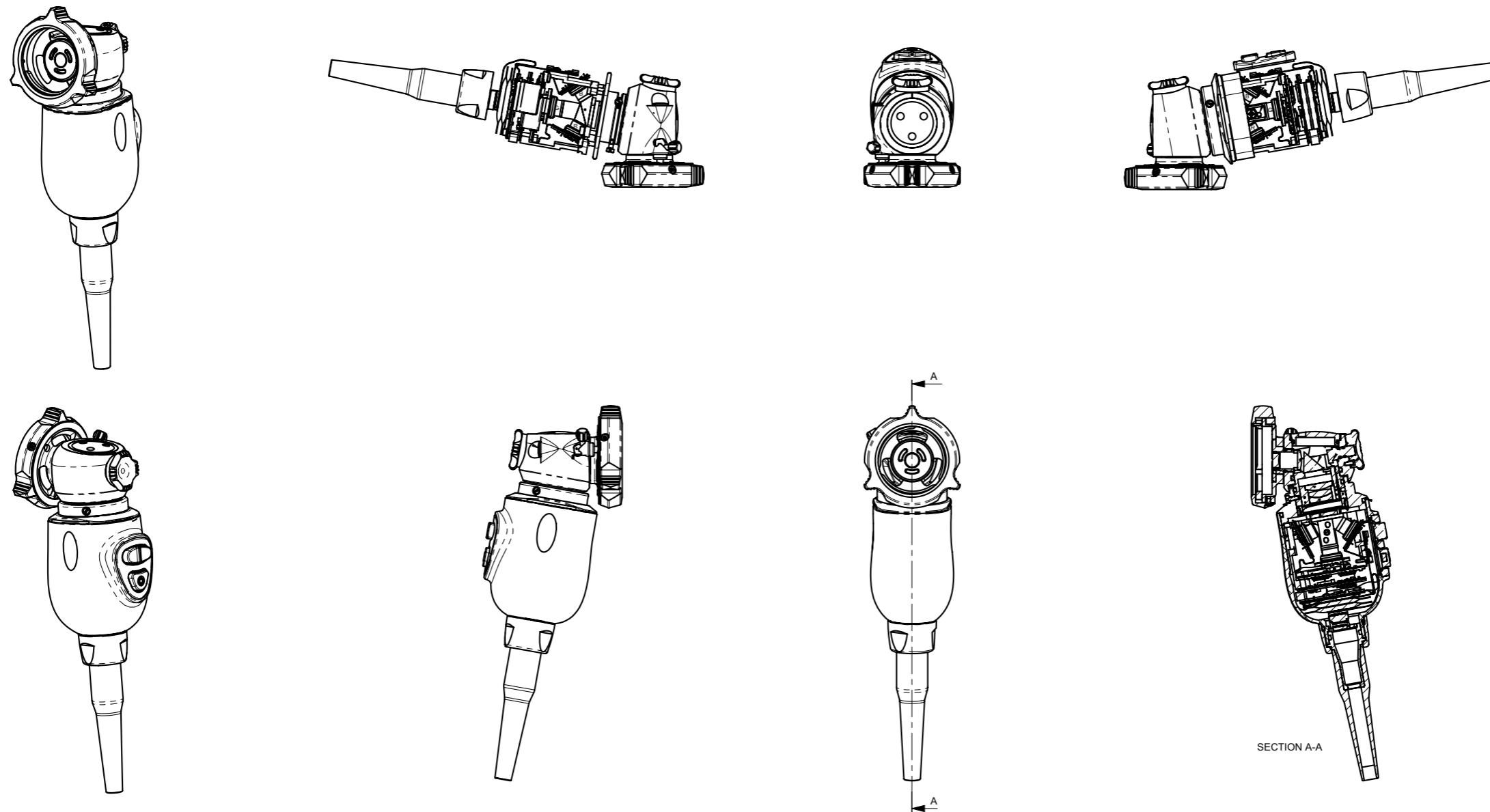
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- 34 CHEM, DESICCANT, MOLECULAR SEIVE, PILLOW
- 33 CHEM, UNIFLOR #8981
- 32 CHEMICAL, LOCTITE REMOVABLE #242
- 31 CHEMICAL, LOCTITE, SMALLSCREW 222
- 30 ASM, ZOOM, KNOB, IMAGE 1, H3A, H3Z
- 29 ASM, GRASPING MECH, HDZ
- 28 ASM, FOCUS, KNOB, IMAGE 1, H3Z, H3A
- 27 ASM, OPTICAL, ZOOM, H3Z
- 26 ASM, PWB, IMAGE 1, H3Z
- 25 ASM, CABLE, IMAGE 1, H3Z
- 24 PLATE, L-SPACER, PWB, H3Z
- 23 MOUNT, PWB, BUTTON, H3Z
- 22 KEYPAD, IMAGE 1, H3Z
- 21 BEZEL, IMAGE 1, H3Z
- 20 MOUNT, SENSOR, IMAGE 1 H3Z
- 19 PLATE, THRD, PWB, H3
- 18 RETAINER, SENSOR, H3
- 17 RETAINER, GRASP MECH, HD-1
- 16 RING, SPACER, ZOOM, H3
- 15 MAGNET, BUTTON, NCA AUTOCLAVE
- 14 DUST CAP, GRSPNG MECH
- 13 DOWEL PIN, .0783X3/16LG, SS
- 12 O-RING, .693 ID X .063 W, 70 EP
- 11 O-RING, .571 ID X .024 W, 70EP
- 10 O-RING, .284 ID X .036 W, 70EP
- 9 O-RING, .801 ID X .070 W, TEFLON
- 8 O-RING 2-02B 1.364 ID X .070 W, 70EP
- 7 WASHER, FLAT, #3, SS, .107 ID X .185 ODX .016 THK
- 6 WASHER, #2, TYPE B, NARROW .031 THK, SS
- 5 SCREW, M2.6 X 0.45 X 5mm, SEMS, PHMS, PHLP
- 4 SCRW, 2-56 X 1/8, SS, SHCS
- 3 SCREW, 0-80 X 5/8, PAN PHIL, SS
- 2 SCREW, 0-80 X 1/8, SS, FH, PHIL
- 1 PRISM, H3-Z, 1/3" CCD

2.2.2. Sectional view of the IMAGE1 S H3-ZI camera head TH101

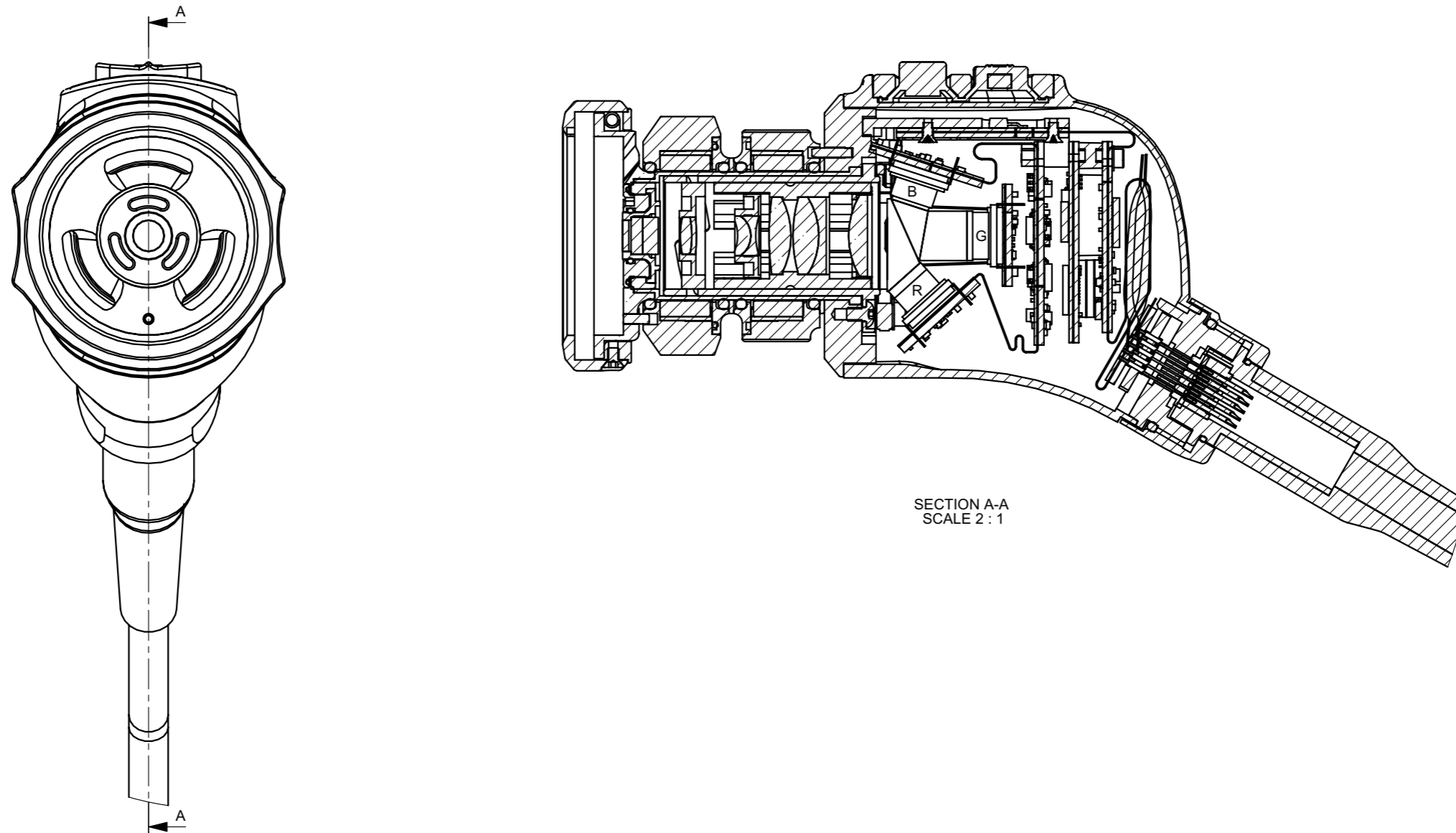


- 35 ASM, HOUSING, IMAGE 1, H3Z
- 34 CHEM, DESICCANT, MOLECULAR SEIVE, PILLOW
- 33 CHEM, UNIFLOR #8981
- 32 CHEMICAL, LOCTITE REMOVABLE #242
- 31 CHEMICAL, LOCTITE, SMALLSCREW 222
- 30 ASM, ZOOM, KNOB, IMAGE 1, H3A, H3Z
- 29 ASM, GRASPING MECH, HDZ
- 28 ASM, FOCUS, KNOB, IMAGE 1, H3Z, H3A
- 27 ASM, OPTICAL, ZOOM, H3Z
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- 23 MOUNT, PWB, BUTTON, H3Z
- 22 KEYPAD, IMAGE 1, H3Z
- 21 BEZEL, IMAGE 1, H3Z
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- 4 SCR, 2-56 X 1/8, SS, SHCS
- 3 SCREW, 0-80 X 5/8, PAN PHIL, SS
- 2 SCREW, 0-80 X 1/8, SS, FH, PHIL
- 1 PRISM, H3-Z, 1/3" CCD

2.2.3. Sectional view of the IMAGE1 S H3-P camera head TH103



2.2.4. Sectional view of the IMAGE1 S H3-ZA camera head TH104



Section 3.

Descriptions of Operation and Circuit Diagrams

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3.1 Description of Operation

IMAGE1 S (KARL STORZ Professional Image Enhancement System) is a camera control unit (CCU) for use with camera heads or videoendoscopes for visualization, image recording and documentation during general endoscopic and microscopic procedures.

The IMAGE1 S comprises the IMAGE1 CONNECT™ (TC200) and a minimum of one and maximum of three additional LINK modules. The IMAGE1 S H3-LINK™ (TC300), IMAGE1 S X-LINK™ (TC301) and IMAGE1 S D3-LINK (TC302) are available as LINK modules.

The modular design principle of the IMAGE1 S allows the user to create a system which is tailored to their needs. The IMAGE1 CONNECT™ module is at the heart of the IMAGE1 S and acts as a communication interface between the image and documentation devices.

For use, one IMAGE1 CONNECT™ plus at least one LINK module is required which receives and forwards the signal. The Light Source Control and Visualization Modes for image optimization provide users with even more comprehensive support. An intuitive user interface assures simple and quick access as well as rapid understanding of menu navigation.

The system offers features as:

- IMAGE1 S image visualization modes to assist the user via contrast enhancement and/or more even brightness perception
- Light Source Control for automatic brightness control
- Integrated image and video capture for simple documentation

3.2 Troubleshooting


Symptom	Possible cause	Remedy
Camera system will not switch on.	No power from power line.	Check that there is electricity to the wall outlet.
	Power cord is not properly connected to power cord connector.	Push power cord firmly into power cord connector.
No picture.	No connection between video output of CCU and monitor.	Check video cable connection, and if necessary, change cables.
	Defect in camera electronics.	Send camera/CCU in for repair.
	Defective monitor.	Check monitor.
Dark picture.	Too little light due to: – Soiled lens – Defective light cable / broken fibers in videoscope light cable.	Clean the endoscope. Exchange endoscope.
Blurred picture, streaks, smears etc.	Optics or lens of the endoscope or camera soiled.	Clean with cotton swab and alcohol solution.
Color distortions.	White balance adjustment faulty.	Repeat white balance adjustment.
	Color adjuster on monitor is not adjusted properly.	Readjust color adjuster/inspect monitor using instruction manual.
	Defective monitor or camera.	Send equipment in for repair.
Color reproduction changes.	Endoscope video cable is broken.	Send equipment in for repair to have camera head cable replaced.
Inaccurate color reproduction	White balance adjustment faulty.	Repeat white balance adjustment.
	Color adjuster on monitor is not adjusted properly.	Inspect monitor using instruction manual.
	Defective monitor or camera.	Send equipment in for repair.

3.3 Technical data

IMAGE1 S	TC200 in connection with TC300, TC301 and TC302
Power supply voltage	100 VAC ... 240 VAC
Power frequency	50 Hz ... 60 Hz
Current consumption	150 ... 200 VA
Power fuse	2 x T 4.0 AH/250 V
Operating temperature	0 °C ... 40 °C (32 °F ... 104 °F)
Operating rated altitude	3000 m
HD video output – ports	2 x DVI-D, 1 x 3G-SDI
Video output format	1920 x 1080p, 50/60 Hz
LINK input ports	3 x
Service interface	RJ45
USB port	4 x USB, (2 x front, 2 x back)
Image format	JPEG
Video format	MPEG 4
SCB interface	2 x 6 pin Mini DIN
Dimensions (W x H x D)	305 mm x 54 mm x 320 mm
Weight	
IMAGE1 CONNECT™	2.1 kg
IMAGE1 H3-LINK	1.86 kg
IMAGE1 X-LINK™	1.86 kg
Storage/transport conditions	
Storage temperature	-10 °C ... 60 °C (14 °F ... 140 °F)
Relative air humidity	20% ... 95%, non-condensing
Atmospheric pressure	500 hPa ... 1080 hPa

Standard compliance

**According to IEC 60601-1 + A1 + A2, IEC 60601-2-18,
UL 60601-1, CSA C22.2 No. 601.1-M90:**

Type of protection against electric shocks:	Protection Class I
Degree of protection against electric shocks:	Applied part of type CF 
Type of protection against moisture:	IPX 0

According to IEC 60601-1-2:



Please read the Electromagnetic Compatibility Information in the appendix of the instruction manual.

**Directive compliance IMAGE1 CONNECT™ (TC200), IMAGE1 H3-LINK™ (TC300),
IMAGE1 X-LINK™ (TC301) and IMAGE1 D3-LINK™ (TC302)**

According to Medical Device Directive (MDD):

Medical device in Class I

This medical device bears the CE mark according to MDD 93/42/EEC. A code number after the CE mark indicates the responsible notified body.



Section 4.

Maintenance and Safety Checks

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4.1 Safety checks

We recommend carrying out safety checks at least once a year.



CAUTION: Repairs may only be performed by qualified technicians trained in electrical or electronic engineering, in compliance with the relevant occupational, safety and accident prevention regulations.

Work to be carried out	Remark
<p>■ Visual inspection</p> <ul style="list-style-type: none"> – Housing and accessories – Inscriptions, manufacturer’s identification plate data – CE mark, KARL STORZ inspection label – Instruction manual – Camera cable jack – Camera connection cable – Instrument coupling – Lens system <p>■ Test for proper operation</p> <ul style="list-style-type: none"> – Power switch – Buttons – Outputs: Video out, Y/C out, RGB, Sync – Color reproduction and picture quality – Keyboard <p>■ Electric safety measurements (IEC 62353)</p> <ul style="list-style-type: none"> – Protective ground resistance: (with power cord) – Earth leakage current: – Touch current: – Patient leakage current: – Patient leakage current: (line voltage on the applied part) 	<p>check for outer damage correct, legible, secure, clean, wipeable</p> <p>attached to the housing present correct value, undamaged, securely attached applied above the fuse holder, correct fuse ratings</p> <p>no film on lenses</p> <p>“Auto Exposure”, “Manual Exposure”, “White Balance” signal transmission</p> <p>$\leq 0.3 \Omega$</p> <p>$\leq 1.0 \text{ mA}$</p> <p>$\leq 0.5 \text{ mA}$</p> <p>$\leq 0.5 \text{ mA}$</p> <p>$\leq 0.05 \text{ mA}$</p>

4.2 Safety devices



For further information about safety devices and instructions please see instruction manual.

4.3 Maintenance operations

Performance of preventive maintenance is not essential. Regular maintenance can, however, contribute to identifying potential problems before they become serious, thus enhancing the instrument's reliability and extending its useful operating life.

Maintenance services can be obtained from your local representative or from the manufacturer.

Regardless of the accident prevention regulations or testing intervals for medical instruments prescribed in different countries, we recommend a safety check of the device at least once a year.

4.4 Servicing and repair

Defective equipment must be serviced and repaired by factory trained technicians and replacement parts must be ordered from KARL STORZ.

Third party substitutions may result in non-compliance of this product with its original specifications.

KARL STORZ maintains a repair and replacement warehouse which is normally adequate to ensure prompt replacement of damaged telescopes and instruments. Under the repair and replacement plan, you receive an identical as-new instrument and are only charged the repair costs for the defective instrument.

For equipment and videoscopes, individual repair is possible.

In Germany you can refer repairs direct to

KARL STORZ GmbH & Co. KG
Repair Service Dept.
Take-off Gewerbepark 83
D-78579 Neuhausen
Phone: +49 (0)7461 708-980
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In other countries please contact your local KARL STORZ branch or authorized dealer.

4.5 Fuse replacement



For detailed information please see instruction manual.

4.6 Cleaning and disinfection



For detailed information please see instruction manual.

Section 5.

Modifications and Supplements

Direction Sign:

- 1 ⇐ Instruction Manual
- 2 ⇐ Physical Design
- 3 ⇐ Descriptions of Operation and Circuit Diagrams
- 4 ⇐ Maintenance and Safety Checks
- Appendix ⇐ 6

Section 6.

Appendix

Direction Sign:

- 1 ↩ Instruction Manual
- 2 ↩ Physical Design
- 3 ↩ Description of Operation and Circuit Diagrams
- 4 ↩ Maintenance and Safety Checks
- 5 ↩ Modifications and Supplements

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