

Service Manual

**Technical
Description and
Service Instructions**

for

XENON NOVA® 300
MODEL 201340 20

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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:

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and ask for Technical Services.

Warranty

All KARL STORZ instruments and equipment are warranted to be free from defects in workmanship and materials for **two (2) years** from date of sale, unless otherwise specified; any instruments or equipment with such defects during the applicable warranty period will be promptly repaired or replaced at no charge to the customer.

KARL STORZ shall not be liable, expressly or implicitly, for:

- Any damages which might arise or be caused, whether by the customer or by any of the users of the instrument or equipment, as a result of:
 - misuse, mishandling, and/or improper operation,
 - repairs, modifications and/or alterations performed other than by KARL STORZ or a KARL STORZ authorized repair facility, or
 - use in combination with adaptors and/or equipment, or use in any manner or medical procedure, other than those for which it is designed; and
- Any special, indirect and/or consequential damages of any kind and however caused arising from the sale or use of the instrument and/or equipment.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED, AND/OR STATUTORY, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY, FITNESS, AND/OR OF SUITABILITY FOR A PARTICULAR PURPOSE, AND OF ALL OTHER OBLIGATIONS OR LIABILITIES ON KARL STORZ'S PART.

KARL STORZ neither assumes nor authorizes any person to assume for it any other liabilities in connection with the sale of said instrument and equipment. To insure proper use, handling, and care of instruments and equipment, consult the applicable product literature, catalog, brochure, instruction manual, teaching film and other materials which are included with the product and/or otherwise available from KARL STORZ, at no charge, upon request.

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.



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.*

Always unplug the equipment before performing any repairs.

Safety Testing based on IEC 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

Direction Sign:

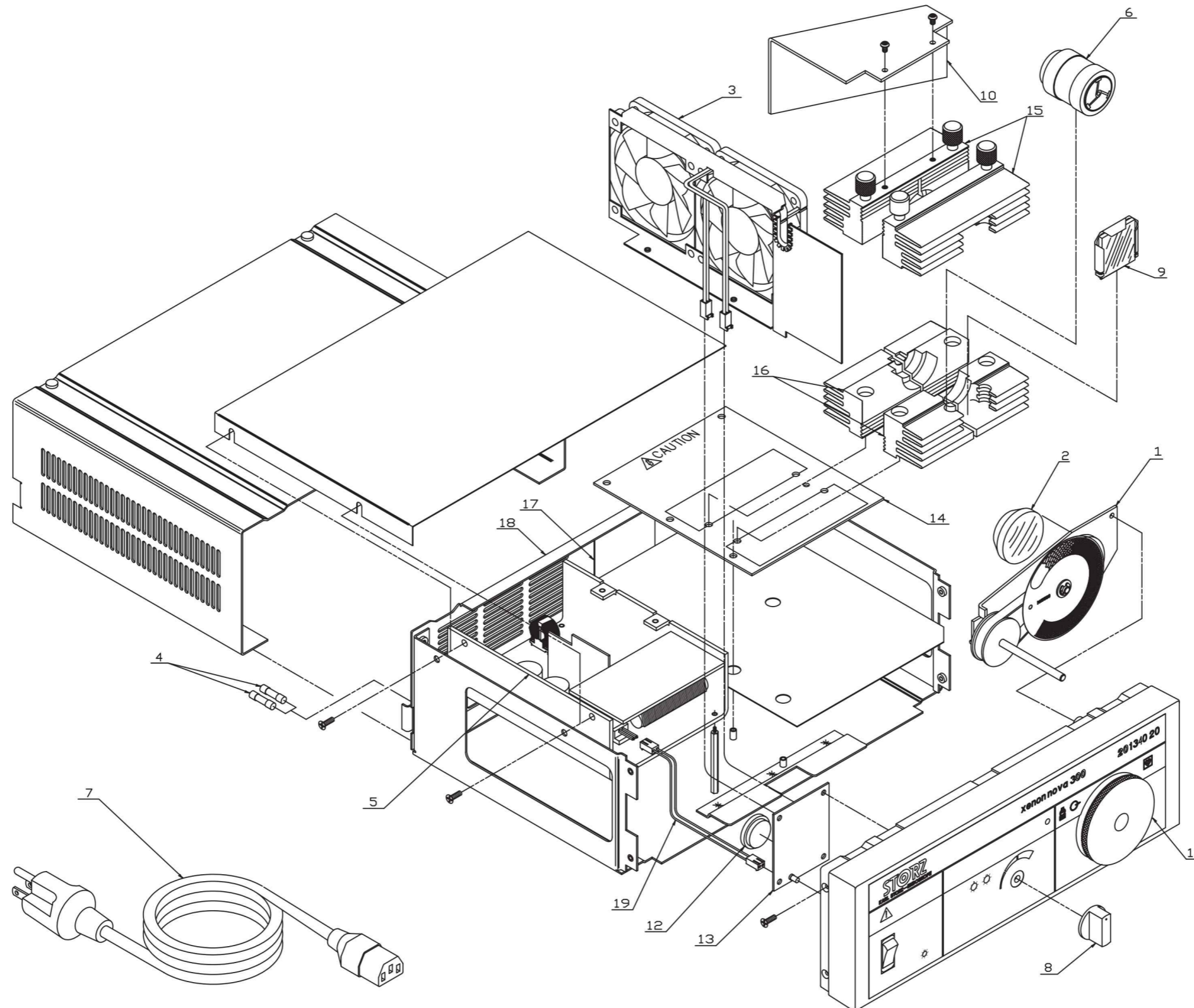
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2.1 Exploded views of the XENON NOVA® 300

2.1.1 Exploded view of the XENON NOVA® 300 (up to serial no. LF0611982)



2.1.2 Spare parts of the XENON NOVA® 300 (up to serial no. LF0611982)

Position	Item description	Order no.
1	Attenuator assembly, without attenuator disc M19288	20131586
–	Attenuator disc, only	M19288
–	Fixation ring to fix attenuator disc M19288 at axle	M19431
2	Condenser lens	20131581
3	Fan assembly (with connector and mounting rivets)	20134085
4	Fuse 2 x T 3.15 AL / 250 V [220 VAC ... 240 VAC]	1069600
	Fuse 2 x T 6.3 AL / 250 V [100 VAC ... 125 VAC]	2027890
5	Power supply unit	20134084
6	Xenon lamp, 300 W	20133028
7	Power cord (with ground lead)	400A
	Power cord "hospital grade" (USA)	400B
8	Brightness control knob (with screw)	20131582
9	Hot mirror assembly	20134083
10	Baffle	20134090
11	Adapter with screwed joint	20134080
12	Battery, timer	20131587
13	Lamp timer board	20134091
14	Lamp board	20134092
15	Heatsink top, front	20134081
	Heatsink top, rear	20134082
16	Heatsink bottom, front	20134086
	Heatsink bottom, rear	20134087
17	Nomex barrier	20134093
18	Rear panel assembly	20134088
19	Jumper cable p.s. to lamp timer board	20134089
–	Front panel	M18365
–	Power switch	1163890
–	Housing cover	M13283
–	Standoff for power supply	Z07624

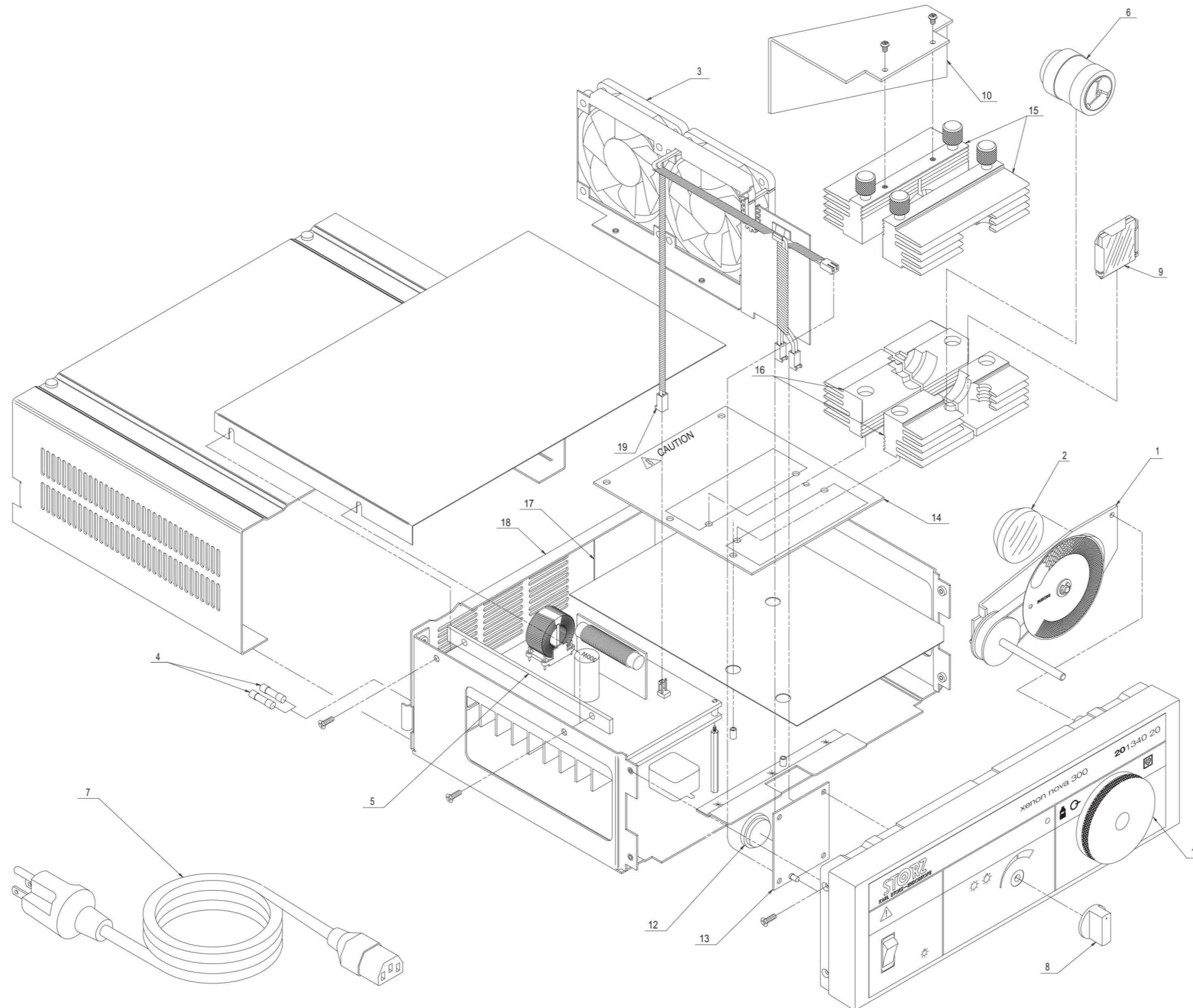
Important note:

When ordering replacement parts always provide the following data

Item description

Order no.

2.1.3 Exploded view of the XENON NOVA® 300 (as from serial no. LF0611983)



2.1.4 Spare parts of the XENON NOVA® 300 (as from serial no. LF0611983)

Position	Item description	Order no.
1	Attenuator assembly, without attenuator disc M19288	20131586
–	Attenuator disc, only	M19288
2	Condenser lens	20131581
3	Fan assembly (with connector and mounting rivets)	20134085
4	Fuse 2 x T 3.15 AL / 250 V [220 VAC ... 240 VAC] ¹⁾	1069600
	Fuse 2 x T 6.3 AL / 250 V [100 VAC ... 125 VAC] ¹⁾	2027890
	Fuse 2 x T 2.5 AL / 250 V [220 VAC ... 240 VAC] ²⁾	1059700
	Fuse 2 x T 5.0 AL / 250 V [100 VAC ... 125 VAC] ²⁾	1222890
5	Power supply unit	Z07854
6	Xenon lamp, 300 W	20133028
7	Power cord (with ground lead)	400A
	Power cord "hospital grade" (USA)	400B
8	Brightness control knob (with screw)	20131582
9	Hot mirror assembly	20134083
10	Baffle	20134090
11	Adapter with screwed joint	20134080
12	Battery, timer	20131587
13	Lamp timer board	20134091
14	Lamp board	20134092
15	Heatsink top, front	20134081
	Heatsink top, rear	20134082
16	Heatsink bottom, front	20134086
	Heatsink bottom, rear	20134087
17	Nomex barrier	20134093
18	Rear panel assembly	20134088
19	Jumper cable p.s. to lamp timer board	20134089
–	Front panel	M18365
–	Power switch	1163890
–	Housing cover	M13283
–	Standoff for power supply	Z07624

Important note:

When ordering replacement parts always provide the following data

Item description

Order no.

1) Valid up to serial no. BC0627707.

2) Valid as from serial no. BC0627829.

Section 3.

Descriptions of Operation and Circuit Diagrams

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3.1 Description of operation of the XENON NOVA® 300

3.1.1 General description

The 201340 20 XENON NOVA® 300 is a 300 W Xenon light source designed for use in general endoscopic surgery, especially where high light levels may be needed, and where cine, video, or still photographic documentation may be required.

The Xenon lamp color temperature approximates bright sunlight and is considered unmatched for visual and photographic color rendition. Full intensity is reached almost immediately without a warm-up period.

The XENON NOVA® 300 operates at a constant power level (about 300 W) while the brightness is manually adjusted by an opto-mechanical attenuator. This assures the greatest range of light-to-dark without arc instability problems.

Refer to the *Section 1. Instruction Manual* for operating warnings and cautions.

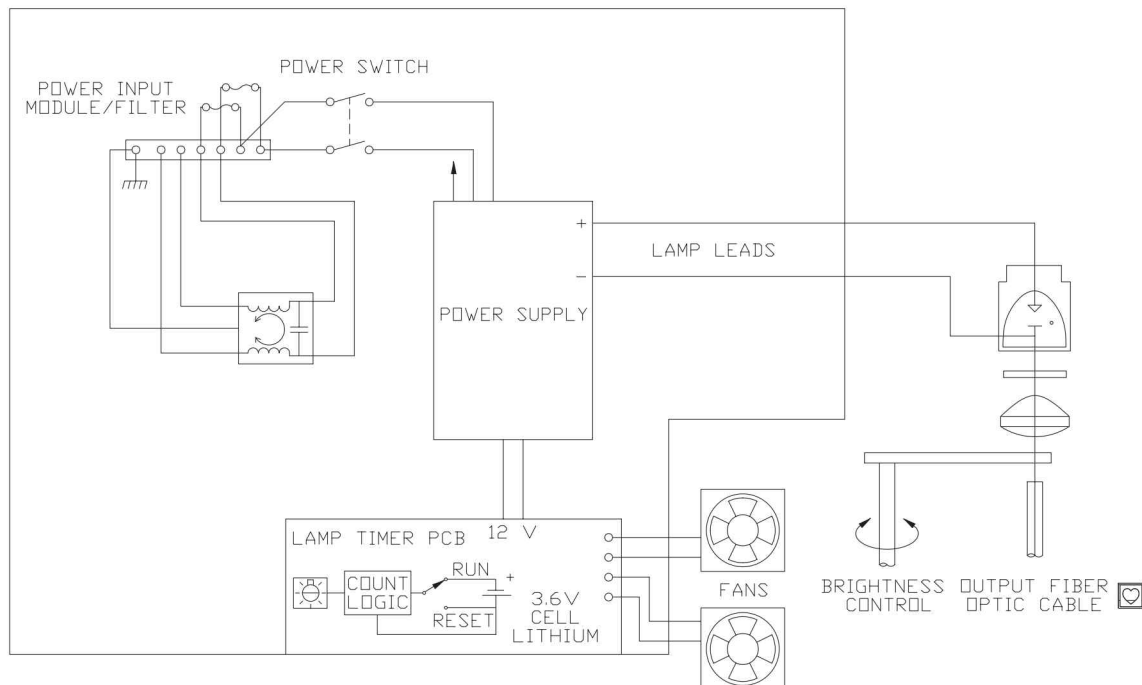
3.1.2 Basic features

3.1.2.1 Manual brightness control

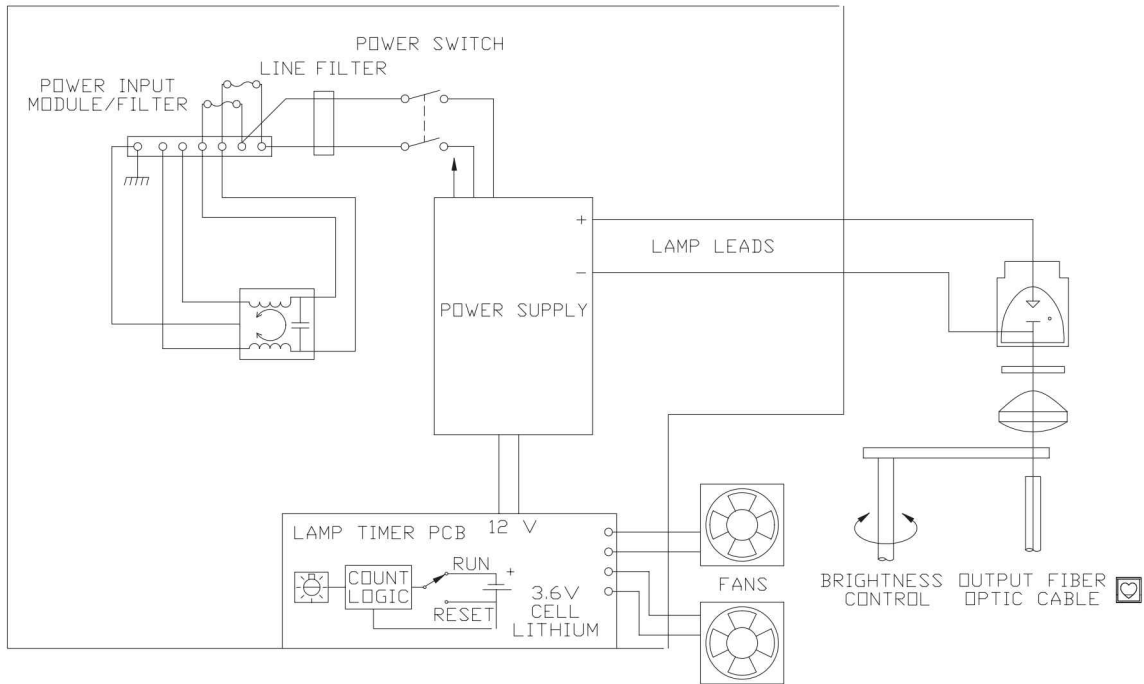
The brightness can be manually adjusted using a brightness control knob.

3.1.3 Block diagrams of the XENON NOVA® 300

3.1.3.1 Block diagram of the XENON NOVA® 300 (up to serial no. LF0611982)



3.1.3.2 Block diagram of the XENON NOVA® 300 (as from serial no. LF0611983)



3.2 Detailed description of operation

3.2.1 Fans

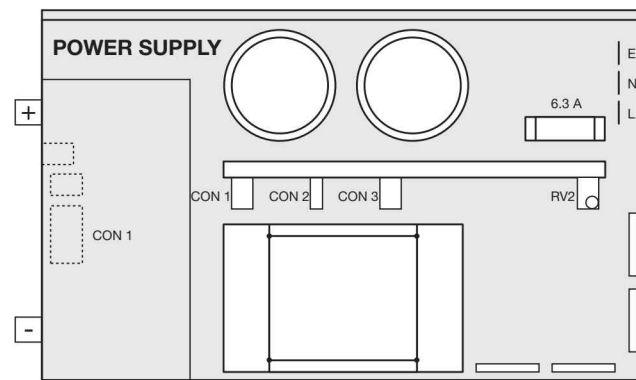
The fans are 12 V DC fans, with power supplied by the power supply.

3.2.2 Power supply unit

3.2.2.1 Power supply unit (up to serial no. LF0611982)

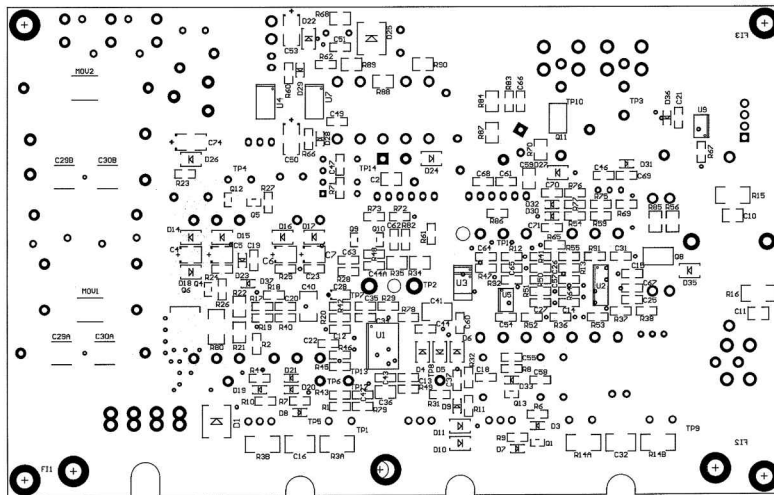
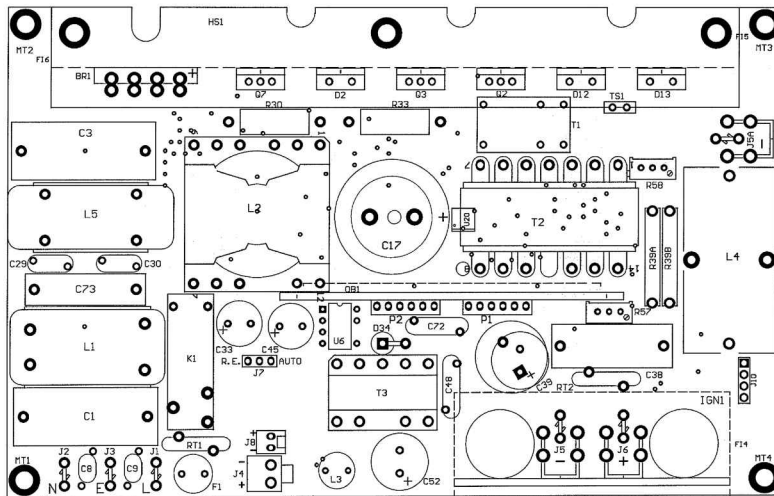
A 300 W power supply unit (order no. 201340 84) is used for the power supply to the electronics. This type PS300-11 power supply unit is authorized for use in medical devices. The conformity is documented with the following test numbers:

- CE, UL2601-1/IEC60601-1, CSA 22-2 No. 601-1
(UL File #EL 93746, Project 99 SC 47645)
- Medical Electrical Equipment, Part 1: General Requirements for Safety

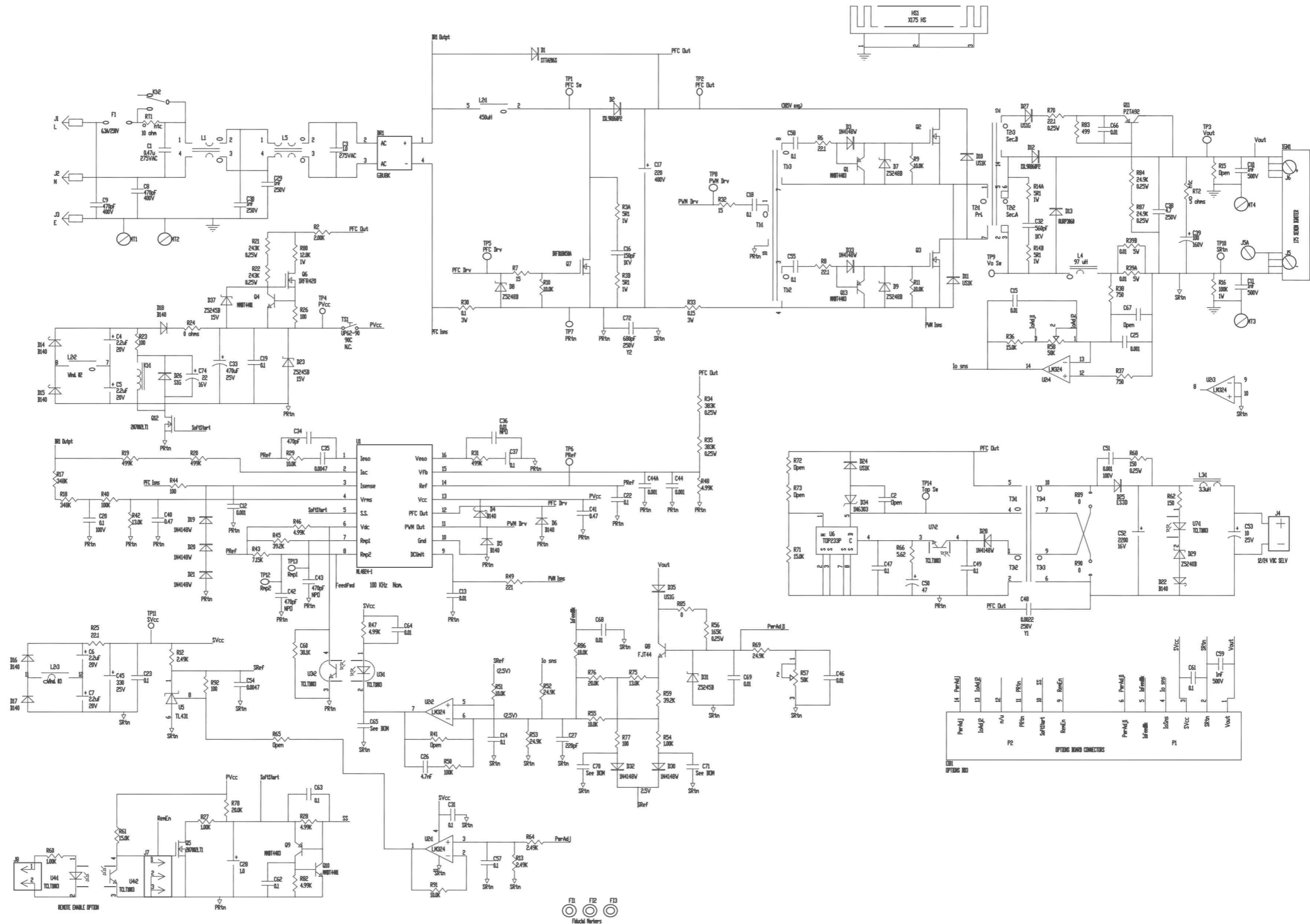


3.2.2.2 Power supply unit (as from serial no. LF0611983)

A 300 W power supply unit (order no. Z07854) is used for the power supply to the electronics. This power supply unit is authorized for use in medical devices.



3.2.2.3 Circuit diagram of the power supply unit (as from serial no. LF0611983)



3.2.3 Lamp timer circuit

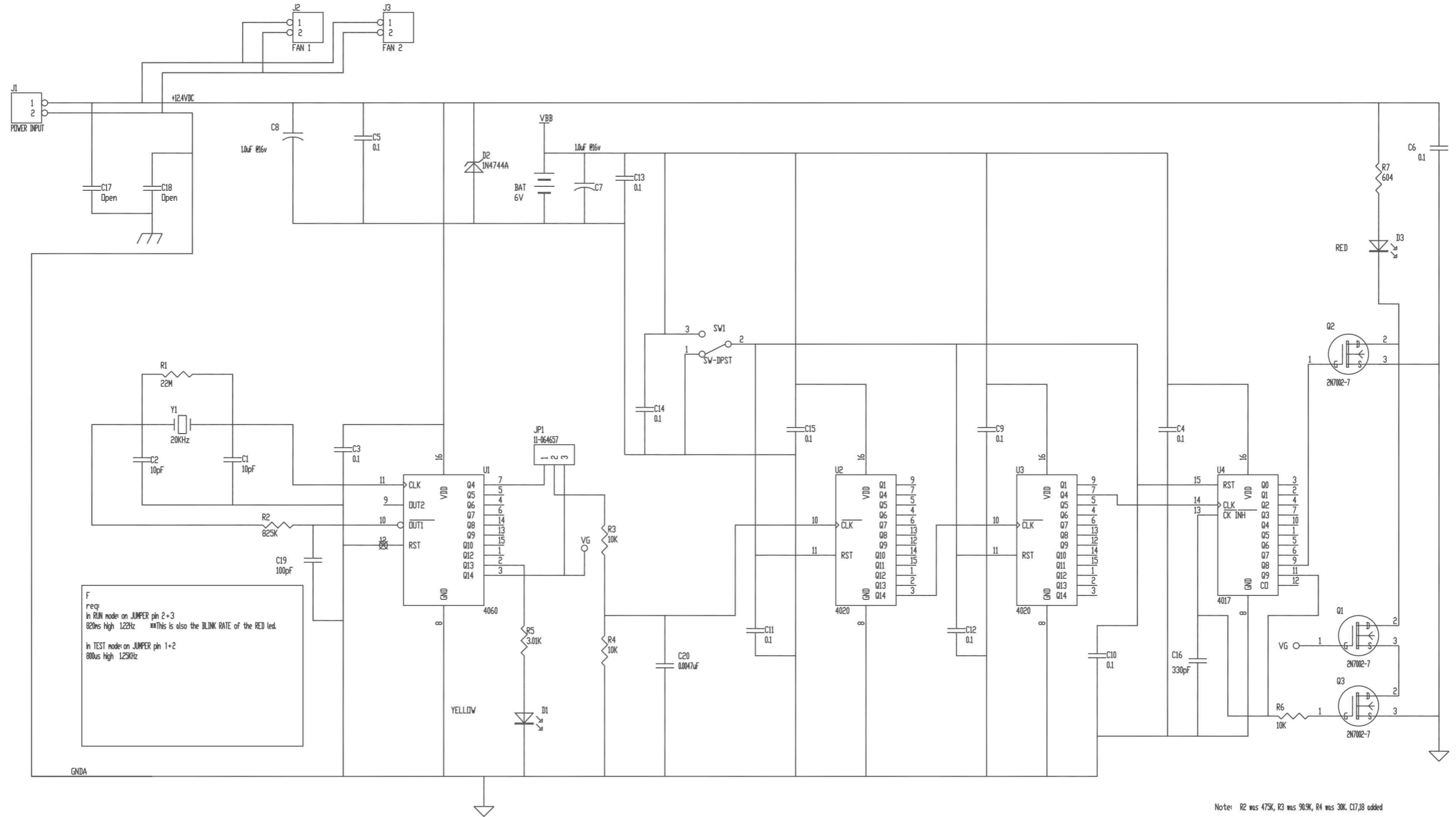
The lamp timer circuit keeps track of lamp usage in hours, and warns the operator that a scheduled lamp change is approaching or overdue. The red LED (D902) on the front panel will light at approximately 450 hours (90% of the lamp's expected life) and start blinking at around 500 hours to indicate a lamp change is imperative. Upon changing the lamp, the user must manually reset the timer by pressing the reset switch located inside the light source on the front panel. The circuit power is maintained by a lithium battery when the light source is not in use. The battery must be replaced every 10 years to insure continued operation.

The first stage of the lamp timer circuit consists of a CD4060 binary counter (U1) driven by a 20 kHz crystal (Y1). The CD4060 counter divides the 20 kHz crystal frequency down to a 1.22 Hz square wave at U1-3, which provides clocking for the next stage of the counter. When the light source is in use, the yellow LED (D1) will blink to indicate the circuit is running. A test jumper is also provided to reduce the overall 500 hour count to about 30 minutes for testing purposes. This section of the circuitry is powered by the +12 V bias supply output and is only active when the light source is in use.

The second stage of the lamp timer circuit consists of two CD4020 binary counters, a CD4017 decade counter, a lithium battery (BAT) and a reset switch (SW). These counters are driven by the 1.22 Hz square wave from the first stage of the counter circuit and keep track of lamp usage hours. Pins 9 and 11 of the CD4017 decade counter (U4) provide the logic signals that activate the FET's that control the replace lamp LED (D3). The lithium battery powers this section of the circuitry at all times, whether the light source is on or not. When pressed, the reset switch sets all three counters back to zero.

The final stage of the lamp timer circuit consists of 3 FET's (Q1-Q3), the replace lamp LED (D3), and the LED current-limiting resistor (R7). At approximately 450 hours U4-9 goes high and activates the Q2 FET which turns on the replace lamp LED (D902). At approximately 500 hours U903-9 goes low and U903-11 goes high, activating Q3. Since Q3 is in series with Q1, and Q1 is continuously clocked by U1-3 at a 1.22 Hz rate, the replace lamp LED will start to blink. In addition, when U4-11 goes high, it disables pin 13 of the CD4017 which is the count-enable pin, preventing any additional counting of the CD4017 counter (U4). This holds the count at 500 hours until the SW RESET switch is pressed. Since this stage of the circuit is powered by the +12 V bias supply output, the replace lamp LED and associated circuitry do not draw power from the lithium battery.

3.2.3.1 Circuit diagram of the lamp timer board



3.3 Troubleshooting

3.3.1 Troubleshooting the XENON NOVA® 300

Device won't power up

- Check the power cord and connections. Replace if necessary.
- Check for blown power fuse. See *Fuse blown*.
- Check power source. See *Power source*.

Device suddenly shut down

- Make sure the fans are working and vents are unobstructed. If the fans are not working, see *Fans will not run*.
- Measure the lamp wattage, see *General complaint of low brightness*. If it is not between 235 W ... 300 W, replace the lamp power supply.

Fuse blown

- Indication of a power supply component failure (probably the FETS).

Fans will not run

- Check the fans itself. Replace if necessary.
- Check the 12 VDC output from the power supply and all connections.

Lamp will not start or stay lit

- Replace the lamp with a known good one.

Note: *There is not necessarily a visible indication of age or noticeable difference between a Xenon lamp that is new and one with thousands of hours on it. It is good practice to discard old Xenon lamps rather than to keep them around as spares. Old lamps may cause erratic starting, flickering, and generally poor operation.*

- Check for blown power fuse. See *Fuse blown*.
- Check the power supply.

Light cannot be dimmed properly

- Check the light attenuator mechanism for jammed or broken parts. Replace if necessary.

General complaint of low brightness (up to serial no. LF0611982)

- Examine all other parts in the optical system, including the light guide cable, the endoscope, the video camera and lenses.
- Measure the power (in W) required by the lamp. Measure the voltage across the RV2 resistor and multiply the value by 100. Measure the voltage across the lamp. Multiply these two values together to find the lamp power. The power requirement should be at least 235 W, but not more than 300 W. If the lamp power is 235 W ... 300 W, and the light output is too low, replace the lamp.
- Replace the lamp.
- Replace the power supply.



Caution: *Lamps are high pressure vessels and must be handled with care. When handling the lamp wear safety glasses and face shields to protect the face and gloves to prevent skin oil transfer. Never touch the porcelain insulator on the lamp with bare hands. When working with an operating lamp, wear eye and face protection to prevent blindness or UV damage.*



Caution: *Connect the voltmeter only when the lamp is already started; otherwise, the high-voltage starting pulse will damage or destroy the voltmeter. Do not restart the device when making measurements.*

General complaint of low brightness (as from serial no. LF0611983)

- Examine all other parts in the optical system, including the light guide cable, the endoscope, the video camera and lenses.
- Measure the power (in W) required by the lamp. Measure the voltage across the RV2 resistor and multiply the value by 100. Measure the voltage across the lamp. Multiply these two values together to find the lamp power. The power requirement should be at least 235 W, but not more than 300 W. If the lamp power is 235 W ... 300 W, and the light output is too low, replace the lamp.



Caution: *Lamps are high pressure vessels and must be handled with care. When handling the lamp wear safety glasses and face shields to protect the face and gloves to prevent skin oil transfer. Never touch the porcelain insulator on the lamp with bare hands. When working with an operating lamp, wear eye and face protection to prevent blindness or UV damage.*



Caution: *Connect the voltmeter only when the lamp is already started; otherwise, the high-voltage starting pulse will damage or destroy the voltmeter. Do not restart the device when making measurements.*

Replace lamp indicator lights before 450 hours have elapsed

- Check to see if the counters have been reset.

Light-cable input-end burning

- Check for inadequate cleaning of the cable, or use of a previously burned cable.
- Unsuitable light-guide; that is, a light-guide only suitable for low power use.

3.3.2 Component courses of action

Lamp

- If the lamp fails before 500 hours, look for the following items to ensure no other problems were responsible. Replace the lamp.
 - Check for marked discoloration inside the lamp (usually caused by a seal leak).
 - Check for a cracked window (caused by thermal shock).
 - Check for a crazed or burned reflector. This can be caused by overheating or overcurrent, and is indicative of problems elsewhere.

Light attenuator


- Check for a jammed attenuator wheel or a broken part. Replace if necessary.
- Lamp timer circuit
A problem may be evident either through the non-operation of the front panel LED or a gross error in the timing (e.g., the replace lamp timer board).
 - If the replace lamp indicator lights before 450 hours have elapsed, inspect U4.

3.4 Technical data of the XENON NOVA® 300

XENON NOVA® 300	201340 20
Supply voltage	100 VAC ... 125 VAC / 220 VAC ... 240 VAC, ±10%
Power frequency	50 Hz ... 60 Hz
Power consumption	700 VA ³⁾ / 450 VA ⁴⁾
Power fuses ³⁾	2 x T 3.15 AL / 250 V (220 VAC ... 240 VAC) 2 x T 6.3 AL / 250 V (100 VAC ... 125 VAC)
Power fuses ⁴⁾	2 x T 2.5 AL / 250 V (220 VAC ... 240 VAC) 2 x T 5.0 AL / 250 V (100 VAC ... 125 VAC)
Lamp type	Xenon lamp, 300 W
Lamp voltage	14 VDC (nominal)
Lamp current	21 A, ±2 A
Wattage	300 W (nominal)
Color temperature	6000 K (initial)
Operating temperature	10 °C ... 40 °C (50 °F ... 104 °F)
Dimensions (w x h x d)	305 mm x 101 mm x 240 mm
Weight	4.0 kg
<i>Storage and transport conditions:</i>	
Storage temperature	-10 °C ... 60 °C (14 °F ... 140 °F)
Humidity	5% ... 95%, rel. humidity, non-condensing
Atmospheric pressure	500 hPa ... 1080 hPa

Standard compliance

According to IEC 60601-1, IEC 60601-2-18, UL 60601-1, CAN/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 

According to IEC 60601-1-2:2001:



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

Directive compliance

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.



³⁾ Valid up to serial no. BC0627707.

⁴⁾ Valid as from serial no. BC0627829.

Section 4.

Replacement of Individual Assemblies

Direction Sign:

- 1 ⇐ Instruction Manual
- 2 ⇐ Physical Design
- 3 ⇐ Descriptions of Operation and Circuit Diagrams
 - Testing and Adjustments ⇒ 5
 - Maintenance and Safety Checks ⇒ 6
 - Modifications and Supplements ⇒ 7
 - Appendix ⇒ 8

Contents 4. Replacement of Individual Assemblies

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4.1 Information about replacements

The device is fully adjusted and tested before it leaves the manufacturers. If the device fails, a test of the assemblies should be carried out by authorized KARL STORZ technical staff.

4.2 Tools required for replacing the individual assemblies

- **Power supply**
Phillips screwdriver, medium
Needle nose pliers
Conductive work mat, wristband, ground cable

- **Fan assembly**
Phillips screwdriver
Needle nose pliers
Standard screwdriver
Conductive work mat, wristband, ground cable

- **Lamp**
Phillips screwdriver, medium
Torx driver and assorted bits
Thermal compound
Conductive work mat, wristband, ground cable

- **Attenuator assembly**
Phillips screwdriver
Torx driver and assorted bits
Needle nose pliers
Standard screwdriver
M3 hex wrench
Conductive work mat, wristband, ground cable

- **Condenser lens**
Phillips screwdriver
Torx driver and assorted bits
Needle nose pliers
Standard screwdriver
M3 hex wrench
Conductive work mat, wristband, ground cable

- **Hot mirror assembly**
Torx driver and assorted bits
Conductive work mat, wristband, ground cable



Caution: *Always unplug the device from the power supply before carrying out any repairs on it!*

After servicing, a safety test or the leakage current and protective ground resistance measurements according to IEC 62353, IEC / UL 60601-1, CAN / CSA C22.2 NO 601.1, whichever may apply, are to be carried out.

To prevent damage to the components caused by the build-up of electrostatic charges, we recommend that you connect yourself to ground via the wristband throughout servicing.

4.3 Replacement of power supply

4.3.1 Replacement of power supply (201340 84)

Refer to Section 4.9 Figures for replacements – figures 1 and 2.

- a. Disconnect the light source from its power source.
- b. Remove the outer cover by sliding the interlock slide to the right, removing the four screws on the bottom of the case, and sliding the cover back.
- c. Remove the power supply cover by removing the screws holding it in place.
- d. Remove the front panel assembly by removing the four screws with the T10 driver and pulling the front panel assembly forward.
- e. Disconnect the input wires and the lamp leads.
- f. Remove the screws holding the power supply on the bottom and the side of the device.
- g. Unplug the lamp timer board.
- h. Carefully lift the power supply out of the case.
- i. Unplug the fan connector from the power supply.
- j. Replace the power supply and reassemble in reverse order of disassembly.



Caution: *Make sure that the top and bottom halves of the heat sink are aligned so that the lamp can be fitted free of distortion.*

4.3.2 Replacement of power supply (Z07854)

Refer to Section 4.9 Figures for replacements – figures 1 and 2.

- a. Disconnect the light source from its power source.
- b. Remove the outer cover by sliding the interlock slide to the right, removing the four screws on the bottom of the case, and sliding the cover back.
- c. Remove the power supply cover by loosen the screws holding it in place.
- d. Remove the front panel assembly by removing the four screws and pulling the front panel assembly forward.
- e. Disconnect the input wires and the lamp leads.
- f. Remove the screws holding the power supply on the bottom of the device.
- g. Unplug the lamp timer board.
- h. Carefully lift the power supply out of the case.
- i. Unplug the fan connector from the power supply.
- j. Transfer the standoffs to the new power supply.
- k. Replace the power supply and reassemble in reverse order of disassembly.



Caution: *Make sure that the top and bottom halves of the heat sink are aligned so that the lamp can be fitted free of distortion.*

4.4 Replacement of fan assembly

Refer to Section 4.9 Figures for replacements – figure 1.

- a. Disconnect the lamp leads from the power supply.
- b. Unplug the fan wires from the lamp timer board.
- c. Remove the two screws at the bottom of the device holding the fan assembly.
- d. Remove the screws holding the rear panel and pull the panel back slightly from the device.
- e. Remove the fan assembly.
- f. Replace the fan and reassemble in reverse order of disassembly.



Caution: *Switch the device off and disconnect it from the electrical power line before undertaking any work on the device.*

4.5 Replacement of lamp

Refer to *Section 4.9 Figures for replacements – figures 1 and 2.*

- a. Disconnect the light source from its power source.
- b. Remove the outer cover by sliding the interlock slide to the right, removing the four screws on the bottom of the case, and sliding the cover back.
- c. Lift the lamp insulator and fold it back.
- d. Unscrew the four heat sink thumbscrews.
- e. Carefully remove the upper half of each heatsink. Remove the old lamp.



Caution: *Lamps are high pressure vessels and must be handled with care. When handling the lamp wear safety glasses and face shields to protect the face and gloves to prevent skin oil transfer. Never touch the porcelain insulator on the lamp with bare hands.*

- f. Apply a thin coating of thermal joint compound around the inside circumference of the heatsinks (both anode and cathode) as well as on the anode end surface.
- g. Reassemble in reverse order of disassembly.

Note: *It is recommended that new lamps be used for eight hours in the light source prior to clinical use if purchased from a source other than KARL STORZ.*

4.6 Replacement of attenuator assembly

Refer to *Section 4.9 Figures for replacements – figures 1 and 3.*

- a. Disconnect the light source from its power source.
- b. Remove the outer cover by sliding the interlock slide to the right, removing the four screws on the bottom of the case, and sliding the cover back.
- c. Remove the front panel assembly by removing the four screws with the T10 driver and pulling the front panel forward.
- d. Remove the brightness control knob by removing the set screw with an M3 hex wrench.
- e. Remove the two retaining screws holding the attenuator assembly to the posts and remove the assembly, sliding the post for the knob out of its hole.
- f. Replace the attenuator assembly and reassemble in reverse order of disassembly.

4.7 Replacement of condenser lens

Refer to *Section 4.9 Figures for replacements – figures 1 and 3.*

- a. Remove the attenuator assembly as described in *Section 4.6 Replacement of attenuator assembly.*
- b. Remove the three retaining screws holding the lens.
- c. Replace the condenser lens and reassemble in reverse order of disassembly. Tighten the retaining screws a little at a time, moving in a circular pattern in order to keep the correct orientation of the lens. Avoid overtightening the screws.

4.8 Replacement of the hot mirror assembly

Refer to *Section 4.9 Figures for replacements – figures 1 and 2.*

- a. Disconnect the light source from its power source.
- b. Remove the outer cover by sliding the interlock slide to the right, removing the four screws on the bottom of the case, and sliding the cover back.
- c. Lift the lamp insulator and fold it back.
- d. Unscrew the thumbscrews on the heat sinks.
- e. Carefully remove the upper half of the heatsinks and the lamp as described in *Section 4.6 Replacement of attenuator assembly.*
- f. Remove the nuts holding the bottom front heatsink.
- g. Bend tabs holding the hot mirror assembly in place.

- h. Lift the hot mirror assembly out of the lower heat sink slot and replace with the new hot mirror assembly.

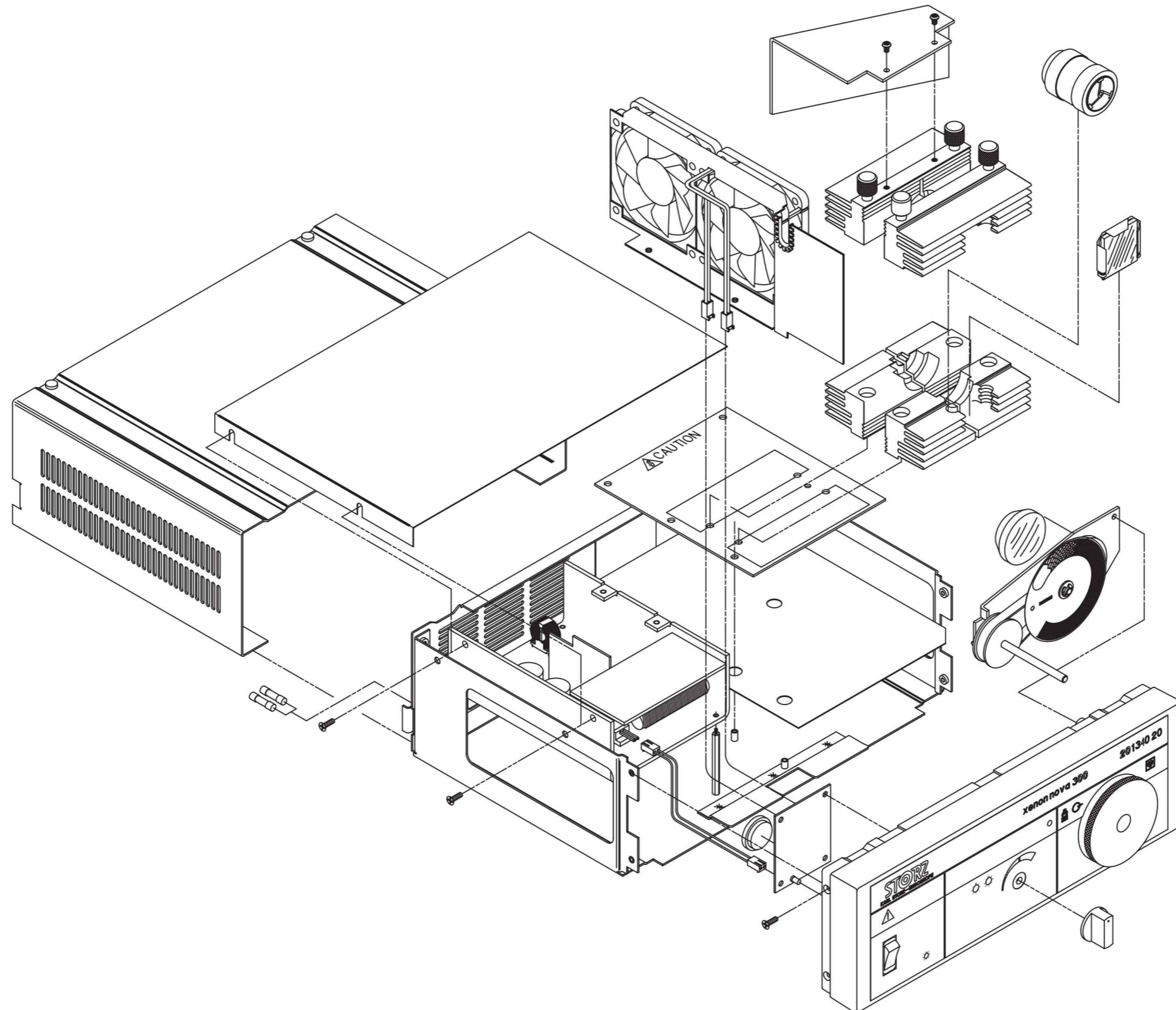


Caution: *The hot mirror assembly is secured against falling out by two retaining clips in the bottom part of the heat sink. Bend back the retaining clips at the front and remove the filter.*

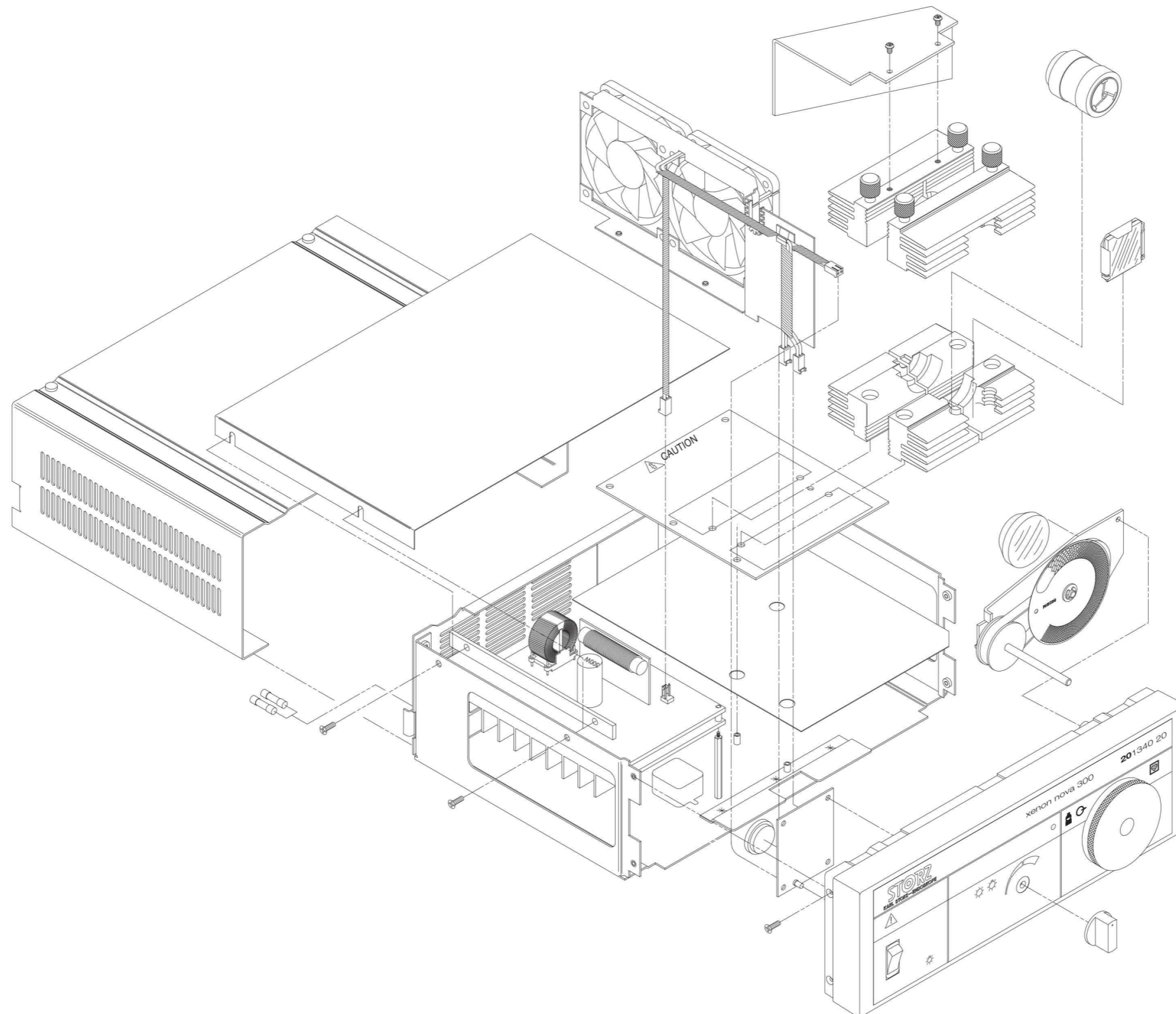
- i. Reassemble in reverse order of disassembly.

4.9 Figures for replacements

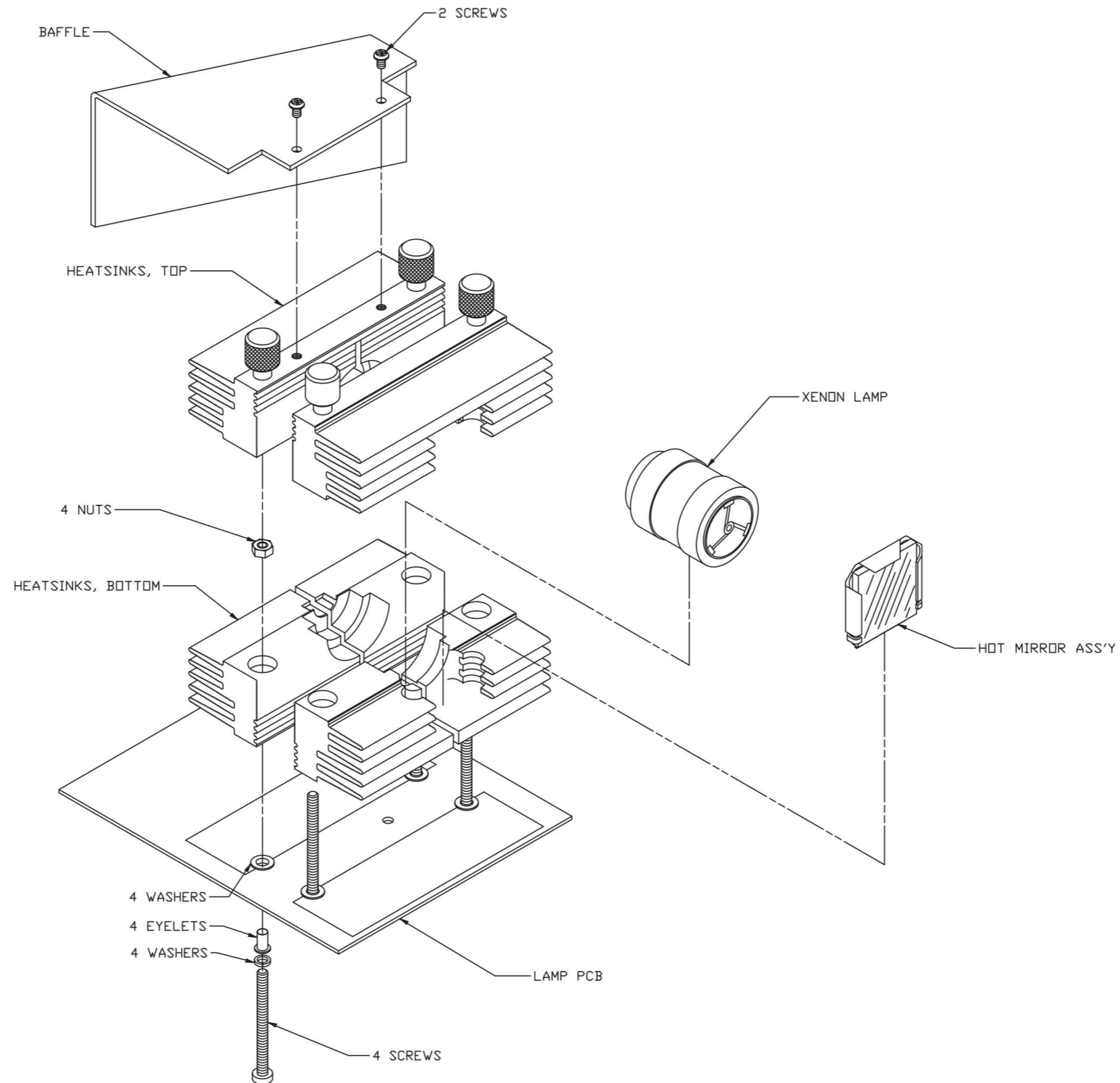
4.9.1 Figure 1 (up to serial no. LF0611982)



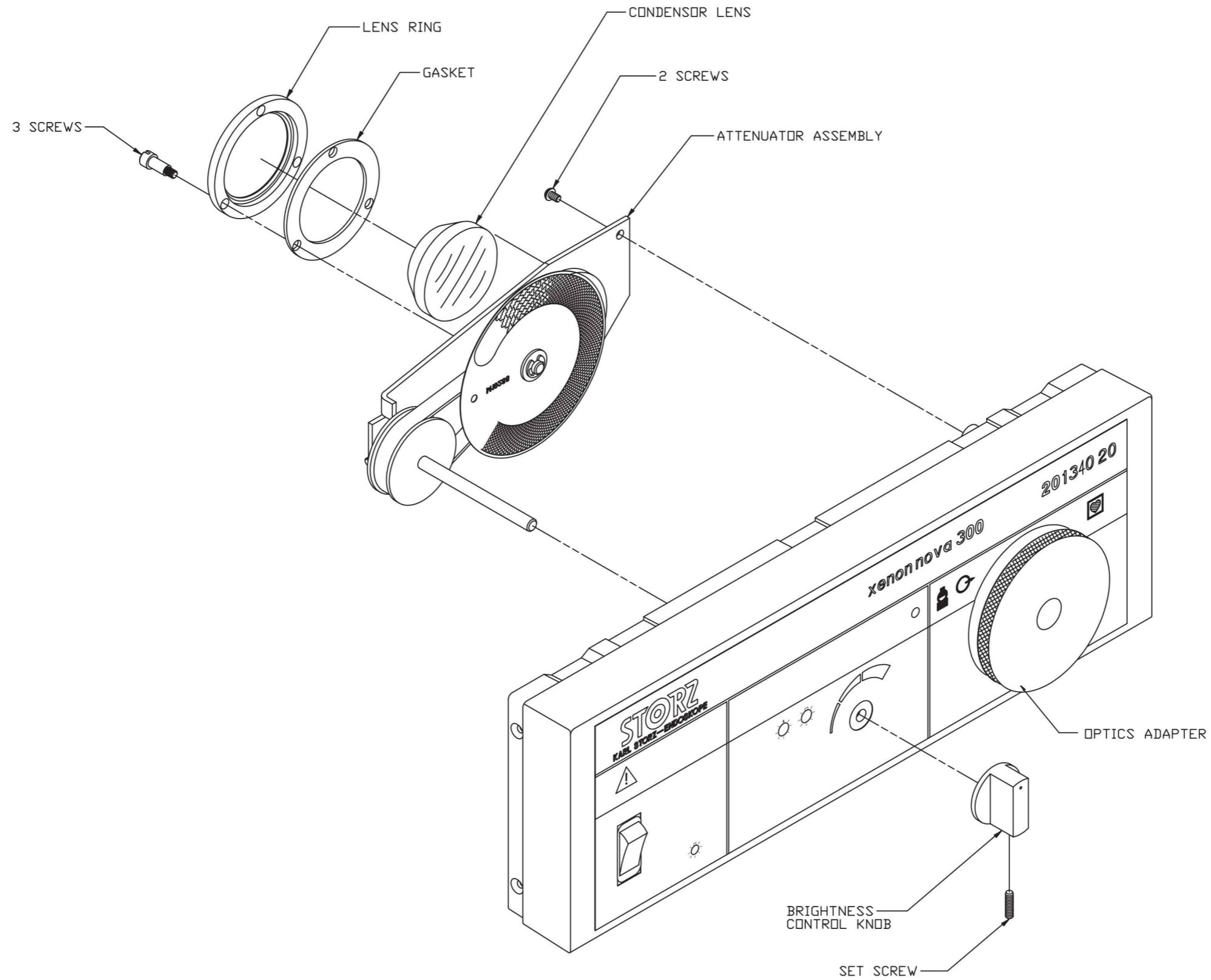
4.9.2 Figure 1 (as from serial no. LF0611983)



4.9.3 Figure 2



4.9.4 Figure 3



Section 5.

Testing and Adjustments

Direction Sign:

- 1 ⇐ Instruction Manual
- 2 ⇐ Physical Design
- 3 ⇐ Descriptions of Operation and Circuit Diagrams
- 4 ⇐ Replacement of Individual Assemblies
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5.4	Testing and adjusting the lamp current (as from serial no. LF0611983)	5-3
5.5	Focusing the lamp	5-3

5.1 Equipment required for the individual settings

Note: *The device is fully adjusted and tested by the manufacturer. Readjustments should be performed by qualified personnel only. Opening the equipment or performance of any repairs or modifications of the equipment by unauthorized persons shall relieve KARL STORZ GmbH & Co. KG of any liability for its performance. Any such opening, repair, or modification performed during the warranty period shall void all warranty.
Lamp current is the only recommended adjustment and may be performed when a new lamp is installed, but is normally necessary only after repairing the power supply.*

5.2 Test instruments required for the individual adjustment procedures

- Digital voltmeter (DVM)
- Small flat blade screwdriver
- Torx screwdriver with assorted bits
- Current probe

5.3 Testing and adjusting the lamp current (up to serial no. LF0611982)

- a. Disconnect the power cord from the light source.
- b. Remove the outer cover by sliding the interlock slide to the right, removing the four screws on the bottom of the case, and sliding the cover back.
- c. Lift the lamp insulator and fold it back.
- d. Reconnect the power cord and turn the device power on.



Caution: *Do not look into the lamp or light cable. Do not allow light from either the light source or the light-cable to shine directly on hands or other areas of the body; burns may occur.*



Caution: *Lamps are high pressure vessels and must be handled with care. When handling the lamp wear safety glasses and face shields to protect the face and gloves to prevent skin oil transfer. Never touch the porcelain insulator on the lamp with bare hands. When working with an operating lamp, wear eye and face protection to prevent blindness or UV damage.*



Caution: *Connect the voltmeter only when the lamp is already started; otherwise, the high-voltage starting pulse will damage or destroy the voltmeter. Do not restart the device when making measurements.*

- e. Connect the DVM across the lamp. Measure and record the lamp voltage.
- f. Lamp power (the product of current and voltage) should be around 300 W. Set the current probe to 10 mV/A, place current probe on lamp return (-) wire and adjust the lamp current to 0.19 V (± 0.01) / 19 A or to a value that would result the 300 W power requirement. The current adjustment potentiometer is RV2 on the power supply.
- g. Remove the DVM from the circuit and turn off the power.
- h. Reassemble in reverse order of disassembly.



Caution: *Always unplug the device from the power supply before carrying out any repairs on it!*

After servicing, a safety test or the leakage current and protective ground resistance measurements according to IEC 62353, IEC / UL 60601-1, CAN / CSA C22.2 NO 601.1, whichever may apply, are to be carried out.

To prevent damage to the components caused by the build-up of electrostatic charges, we recommend that you connect yourself to ground via the wristband throughout servicing.

5.4 Testing and adjusting the lamp current (as from serial no. LF0611983)

- a. Disconnect the power cord from the light source.
- b. Remove the outer cover by sliding the interlock slide to the right, removing the four screws on the bottom of the case, and sliding the cover back.
- c. Lift the lamp insulator and fold it back.
- d. Reconnect the power cord and turn the device power on.



Caution: *Do not look into the lamp or light cable. Do not allow light from either the light source or the light-cable to shine directly on hands or other areas of the body; burns may occur.*



Caution: *Lamps are high pressure vessels and must be handled with care. When handling the lamp wear safety glasses and face shields to protect the face and gloves to prevent skin oil transfer. Never touch the porcelain insulator on the lamp with bare hands. When working with an operating lamp, wear eye and face protection to prevent blindness or UV damage.*



Caution: *Connect the voltmeter only when the lamp is already started; otherwise, the high-voltage starting pulse will damage or destroy the voltmeter. Do not restart the device when making measurements.*

- e. Connect the DVM across the lamp. Measure and record the lamp voltage.
- f. Lamp power (the product of current and voltage) should be around 300 W. Set the current probe to 10 mV/A, place current probe on lamp return (-) wire and adjust the lamp current to 0.19 V (\pm 0.01) / 19 A or to a value that would result the 300 W power requirement. The current adjustment potentiometer is R58 on the power supply.
- g. Remove the DVM from the circuit and turn off the power.
- h. Reassemble in reverse order of disassembly.

5.5 Focusing the lamp

- a. The focus of the XENON NOVA® 300 is fixed at the factory; no adjustment is necessary.

Section 6.

Maintenance and Safety Checks

Direction Sign:

- 1 ⇐ Instruction Manual
- 2 ⇐ Physical Design
- 3 ⇐ Descriptions of Operation and Circuit Diagrams
- 4 ⇐ Replacement of Individual Assemblies
- 5 ⇐ Testing and Adjustments
- Modifications and Supplements ⇐ 7
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Contents 6. Maintenance and Safety Checks

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6.2	Safety devices	6-3
6.3	Maintenance operations	6-3
6.3.1	Lamp replacement	6-3
6.3.2	Battery replacement	6-3
6.3.3	Interior cleaning	6-3
6.4	Servicing and repair	6-4
6.5	Fuse replacement	6-4
6.6	Cleaning and disinfection	6-4

6.1 Safety checks

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

Note: To document the result of the safety check use a test report, see Section 8. Appendix.

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 - Power fuses⁵⁾ - Fuse label <p>■ Test for proper operation</p> <ul style="list-style-type: none"> - Power switch - Power supply - Lamp replacement - Light cable - Manual intensity control - Fans <p>■ Electric safety measurements (IEC 62353)</p> <ul style="list-style-type: none"> - Protective ground resistance: (with power cord) $\leq 0.3 \Omega$ - Earth leakage current: $\leq 1.00 \text{ mA}$ - Touch current: $\leq 0.50 \text{ mA}$ - Patient leakage current: $\leq 0.05 \text{ mA}$ - Patient leakage current: $\leq 0.05 \text{ mA}$ (line voltage on the applied part) 	<p>no external damage</p> <p>correct, legible, clean, wipeable, securely attached</p> <p>fixed to the housing</p> <p>present</p> <p>correct ratings, undamaged, securely positioned</p> <p>applied next to fuse holder, correct fuse ratings</p> <p>functions perfectly within the stated voltage range (100 VAC ... 125 VAC / 220 VAC ... 240 VAC)</p> <p>easy to perform</p> <p>can be inserted easily into the corresponding socket, engages easily into detented position</p> <p>brightness adjustment knob</p>

⁵⁾ For correct fuse ratings see Section 3.4 Technical data of the XENON NOVA® 300.

6.2 Safety devices



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

6.3 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.

6.3.1 Lamp replacement

When the lamp has operated for 450 hours (90% of the warranted life of 500 hours) a red "lamp warning" indicator will light on the front panel. At 500 hours, the lamp warning indicator will blink continuously until the lamp hours counter is reset. For lamp replacement instructions, see *Section 4.5 Replacement of lamp*. It is recommended that new lamps purchased from a source other than KARL STORZ GmbH & Co. KG should be operated for eight hours in the light source prior to clinical use.

6.3.2 Battery replacement

Disassemble the light source as necessary, until the battery may be accessed, see *Section 4.6 Replacement of attenuator assembly*.

Remove the lamp timer board. The battery connections are soldered in place and must be unsoldered to be replaced. Alternatively replace the lamp timer board.

Reassemble in the reverse order.

6.3.3 Interior cleaning

Depending on the cleanliness of the operating environment, removal of dust from the interior of the device may be required periodically. Remove the outer cover and power supply cover as described in *Section 4.3.1 Replacement of power supply (201340 84)* or *Section 4.3.2 Replacement of power supply (Z07854)*. Blow dust from the device using compressed air, taking care not to direct air at the fan blades or the attenuator screen. Reinstall the covers.

6.4 Servicing and repair

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

Third party substitutions may result in noncompliance 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 telescopes, you receive a guarantee of 1 year, and for instruments 6 months.

For fiberoptic equipment, individual repair is necessary. Usually to bridge the repair period, you will receive a device on loan which you then return to KARL STORZ as soon as you receive the repaired device.

In Germany you can refer repairs direct to our service hotline

Phone: +49 (0)7461 708-980

Fax: +49 (0)7461 708-404

or

KARL STORZ GmbH & Co. KG
Repair Service Dept.
Dr. Karl-Storz-Str. 34
D-78532 Tuttlingen

In other countries please contact your local KARL STORZ branch or authorized dealer.

6.5 Fuse replacement



For detailed information please see instruction manual.

6.6 Cleaning and disinfection



For detailed information please see instruction manual.

Section 7.

Modifications and Supplements

Direction Sign:

- 1 ⇐ Instruction Manual
- 2 ⇐ Physical Design
- 3 ⇐ Descriptions of Operation and Circuit Diagrams
- 4 ⇐ Replacement of Individual Assemblies
- 5 ⇐ Testing and Adjustments
- 6 ⇐ Maintenance and Safety Checks
- Appendix ⇐ 8

Section 8.

Appendix

Direction Sign:

- 1 ⇐ Instruction Manual
- 2 ⇐ Physical Design
- 3 ⇐ Descriptions of Operation and Circuit Diagrams
- 4 ⇐ Replacement of Individual Assemblies
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- 6 ⇐ Maintenance and Safety Checks
- 7 ⇐ Modifications and Supplements

Test report - Safety Check

Article number

Serial number

Visual inspection

Housing and accessories

Labeling

Identification plate data

Power fuses⁵⁾

Fuse label

Electrical safety

Protective ground resistance
(with power cord)

≤ 0.30 Ω

Earth leakage current

≤ 1.00 mA

Touch current

≤ 0.50 mA

Patient leakage current

≤ 0.05 mA

Patient leakage current
(line voltage at applied part)

≤ 0.05 mA

Proper operation

Power switch

Power supply

100 VAC ... 125 VAC /
220 VAC ... 240 VAC

Light cable

Manual intensity control

Fans

Date

Checked by

Signature



Caution: After servicing, a safety test or the leakage current and protective ground resistance measurements according to IEC 62353, IEC / UL 60601-1, CAN / CSA C22.2 NO 601.1, whichever may apply, are to be carried out.

⁵⁾ For correct fuse ratings see Section 3.4 Technical data of the XENON NOVA® 300.

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