



Maintenance Manual

Maquet PowerLED II

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Subject to technical changes.

The illustrations and technical specifications provided in this manual may, on account of future product developments, differ slightly from the actual product supplied.

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1 Introduction

1.1 Preface

Dear Installers:

- Technician must be trained and accredited by Getinge.
- This document is the property of the Getinge company, and may not be reproduced, in whole or in part, without our permission. This document was produced with the assistance of the company's technical department in France. It may be improved thanks to your remarks, and extended for the different installations you encounter, to produce an up-to-date reference document for servicing.

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Given the confidential nature of the information in this document, it is distributed exclusively to customers and installers of Getinge products.

- Make sure that you have the latest versions of these documents. Check with the Getinge network to confirm this is correct.
- Make sure that your subcontractor is qualified for this task and ask for written proof of certification. Perform regular inspections at the subcontractor's premises and verify for your own organisation the compliance of the maintenance performed.
- Getinge may not be held liable for any damage or injury resulting from failure to follow these recommendations.

1.2 Liability

Modifications to the product

The product must not be modified in any way without the prior written consent of Getinge.

Compatibility with other medical devices

Only medical devices approved in accordance with IEC 60601-1 or UL 60601-1 should be installed on the system.

The compatible accessories and their technical specifications (e.g., maximum weight, etc.) are detailed in the corresponding chapter.

1.3 Other documents relating to this product

- Maquet PowerLED II Installation Recommendations (Ref. ARD01816)
- Maquet PowerLED II Installation Instructions (Ref. ARD01814)
- Maquet PowerLED II Instructions For Use (Ref. ARD01811)
- Maquet PowerLED II Repair Instructions (Ref. ARD01812)
- Maquet PowerLED II Decommissioning Instructions (Ref. ARD01815)

1.4 Symbols used in this manual

1.4.1 Cross-references

References to other pages of the manual are identified by the “▶” symbol.

1.4.2 Reference numbers

Reference numbers in illustrations and text are shown in a square box 1.

1.4.3 Actions and results

Actions to be performed by the user are listed with sequence numbers; the “▶” symbol is used to show the result of an action.

Example:

Prerequisites:

- The sterilisable handle must be compatible with the product.
1. Fit the handle to the mount.
 - ▶ A click is heard.
 2. Turn the handle until it locks into place with a second click.

1.4.4 Menus and buttons


Menu and button names are shown in **bold**.

Example:

1. Press the **Save** button.
 - ▶ The changes are saved and the **Favourites** menu is displayed.


1.4.5 Hazard levels

The text in safety instructions describes types of risk and how to avoid them. Safety instructions are classified into the following three levels:

Symbol	Hazard level	Meaning
	DANGER!	Indicates a direct and immediate risk that may be fatal or cause very serious injuries potentially leading to death.
	WARNING!	Indicates a potential risk that may cause injuries, health hazards or serious material damage leading to injuries.
	CAUTION!	Indicates a potential risk that may cause material damage.



















Tab. 1: Hazard levels of safety instructions

1.4.6 Indications

Symbol	Indication type	Meaning
	NOTICE	Additional assistance or useful information not resulting in the risk of injuries or the risk of material damage.

Tab. 2: Types of indications in the document

1.5 Symbols used on the product

	Follow the instructions for use (IEC 60601-1:2012)		Standby
	Follow the instructions for use (IEC 60601-1:2005).		CE marking (Europe)
	Follow the instructions for use (IEC 60601-1:1996).		UL mark (Canada and United States)
	Manufacturer + manufacturing date		UR marking (Canada and United States)
	Product code		Medical Device (MD) marking
	Product serial number		Unique device identification
	AC input		Laser radiation.
	DC input		Do not discard with conventional waste
	DC output		Hand-pinching hazard

1.6 Revision history

- Update of the inspection recording
- General update of the Maintenance Instructions
- Addition of the estimated maintenance time
- 4K camera integration
- Update of the safety warnings
- Integration of the Valia spring arms
- Inspection of safety labels in the maintenance protocol

2 Safety instructions



WARNING!

Risk of electric shock

Anyone not trained in installation, maintenance or decommissioning operations is exposed to the risk of injury or electric shock.

Installation, maintenance and decommissioning of the device or components of the device must be performed by a Getinge technician or a Getinge-trained service technician.



WARNING!

Risk of infection

A servicing or cleaning operation may result in contamination of the surgical site.

Do not perform servicing or cleaning operations when the patient is present.



WARNING!

Risk of infection

If no decontamination is carried out on the device before servicing work, there is a risk of infection for anyone handling the device or any of its components.

Make sure that the device is fully decontaminated before any servicing work is conducted.



WARNING!

Risk of burns

During maintenance operations, certain accessible parts may be hot immediately after use of the device.

Allow the device to cool down before performing any service.



WARNING!

Risk of injury

Parts (e.g. tools, screws and colts) are liable to fall during a technical procedure.

Please limit your presence under the device during technical procedures, and use the appropriate safety equipment (e.g. safety hat, safety glasses).



WARNING!

Risk of infection

Lightweight parts from the device may fall onto the surgical site.

Check that all fastenings, covers, cover plates and bumpers on the device are properly in place.



WARNING!

Risk of injury

A wrong handling of XHD1 screen holder may result in a hand injury.

Respect safety indications on the product.

**WARNING!**

Risk of electric shock or injury

The use of screws or spare parts other than those supplied by the manufacturer may damage the device.

Use only screws and spare parts supplied by the manufacturer.

**CAUTION!**

Risk of equipment damage

If adjustments are made incorrectly or not at all, the lighthouse or installed equipment may drift.

Make all adjustments (balance, stop and brakes) during installation and then after all maintenance operations.

3 Technical specifications

The technical specifications can be viewed in:

- Installation Instructions (<https://swp-linkone.getingegroup.local/>):

Mechanical systems (Mechanism, Tightening torques), Electrical systems for installation.

- Instructions for Use (<https://eifu.getinge.com/fr/>):

Optical, Electrical, Mechanical, Video systems of the product in operation.

3.1 WPS power supply connection diagrams

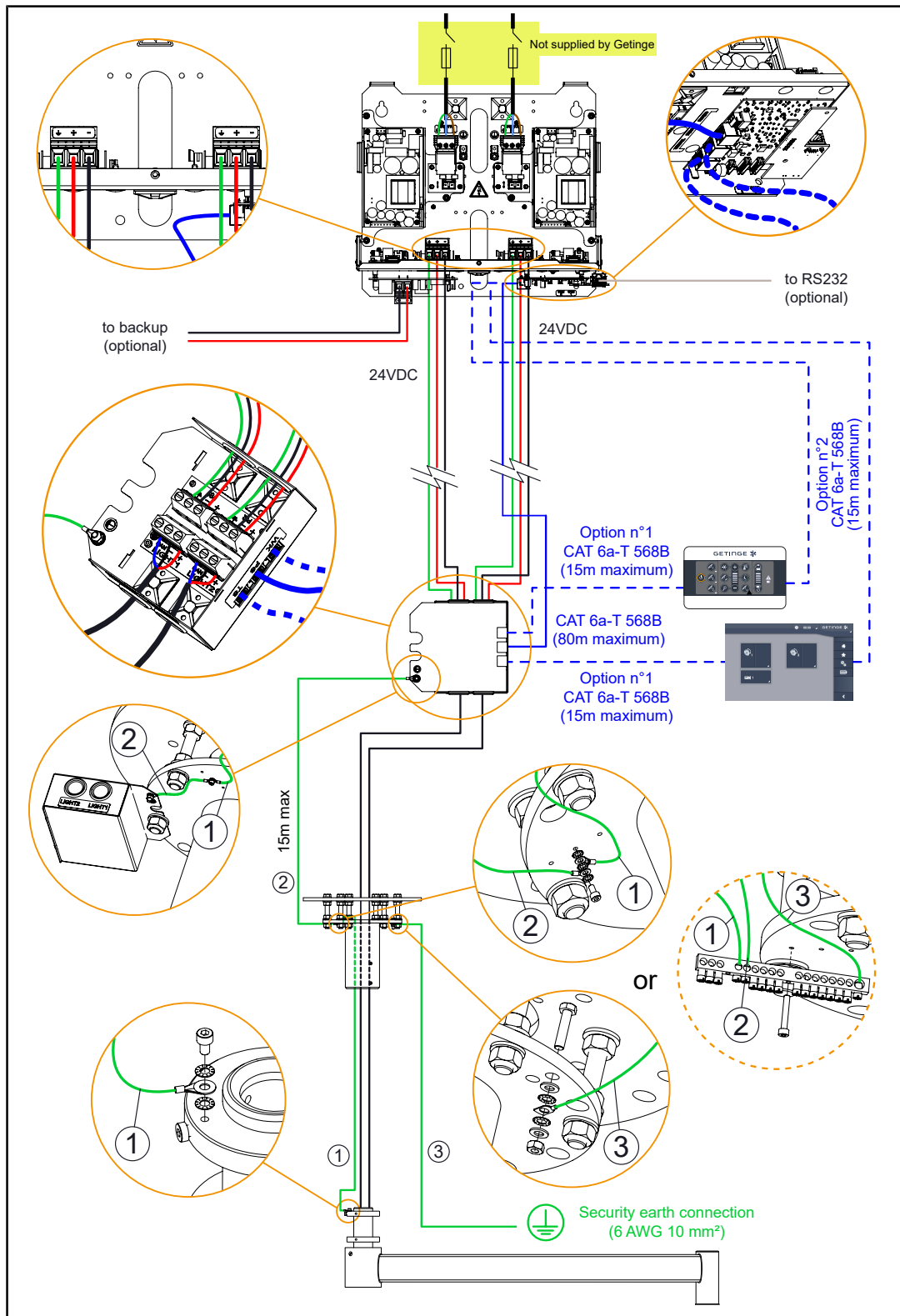


Fig. 1: Overall electrical connection diagram

3 Technical specifications

WPS power supply connection diagrams

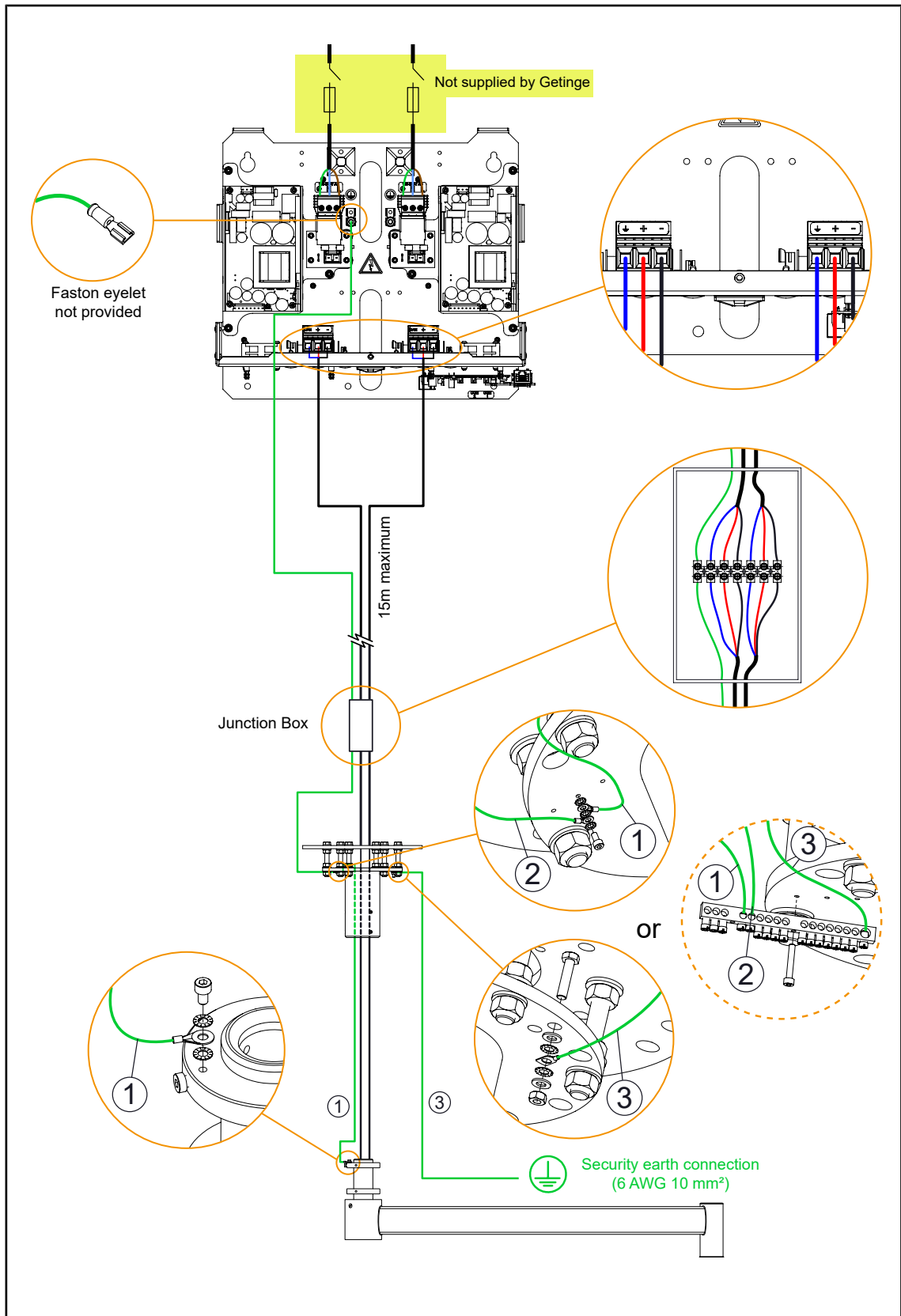


Fig. 2: Electrical diagram for U power supply without termination box

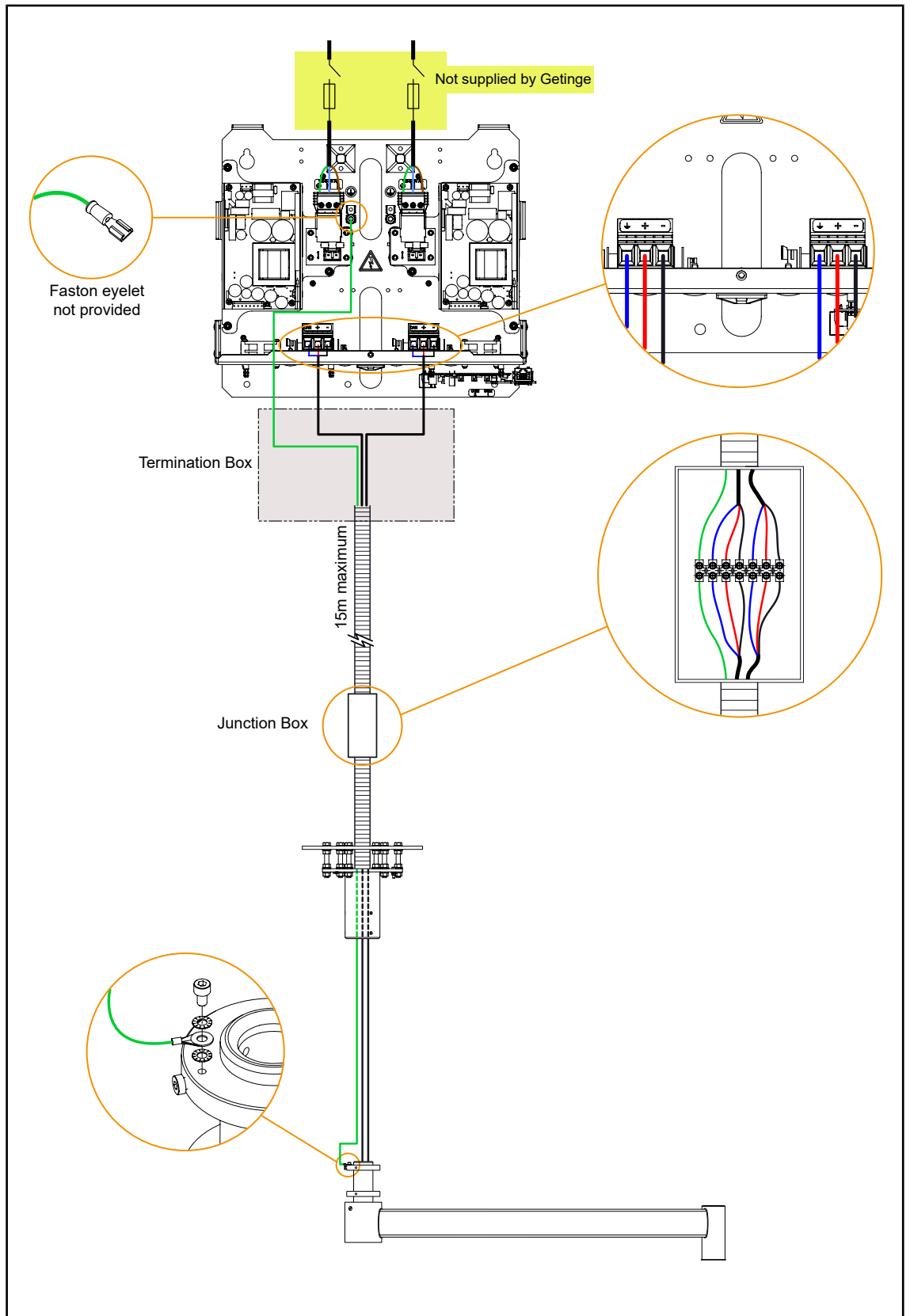


Fig. 3: Electrical connection diagram for U power supply with termination box

3 Technical specifications

WPS power supply connection diagrams

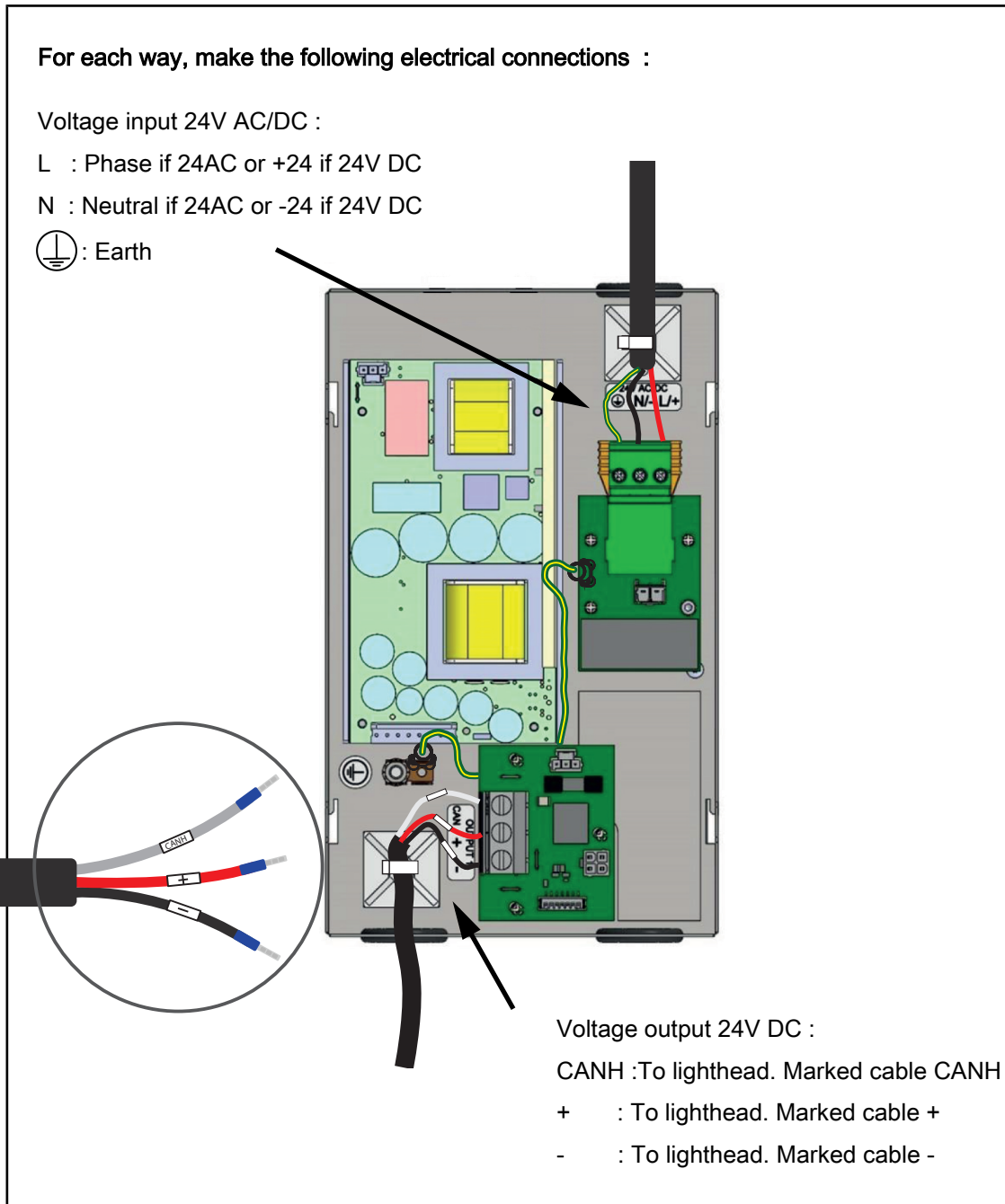


Fig. 4: 24V AC-DC / 24V DC version without remote control

4 Maintenance procedures


4.1 Tools required for maintenance



NOTICE

After-sales service kits are available on the spare parts platform

The LinkOne platform is accessible on the GetingeOnline portal:
<https://swp-linkone.getingegroup.local/>

Part No.	Description
ARD572034999	OPM 039 - LUXMETER + SENSOR
ARD572059999	OPM 051 - METRIX MX MULTIMETER (54-59HD)
N/A	- IEC 62353-compatible electrical insulation and continuity tester -
N/A	2-10 Nm torque wrench 10-50 Nm torque wrench 40-200 N.m torque wrench
ARD687000011	 OPM 085 - INSULATED ANGLED PLIERS
N/A	Set of Allen screwdrivers
N/A	Set of Torx screwdrivers
N/A	Set of open-end wrenches
N/A	Set of flat-bladed screwdrivers
N/A	Set of Philips screwdrivers
N/A	Adjustment rod for Acrobat 2000 arm
ARD659000011	Grease in can
ARD659000016	Aerosol grease
ARD368904555	VA - TUBE OF GREASE, 5 ML

4.2 Periodic maintenance

4.2.1 Periodic replacement cycles

To ensure safety and performance, please follow the recommendations below.

For SB, SA and SAT suspensions

Items	Frequency
All brakes	Every year
Suspension mounting screws (tighten the screws to the recommended tightening torque)	Every 6 years
Adapter mounting screws (tighten the screws to the recommended tightening torque)	Every 6 years
Acrobat 2000 or Ondaspace spring arm snap ring	Every 6 years
Batteries	Every 3 years

For SAX and SATX suspensions

Items	Frequency
All brakes	Every year
Suspension mounting screws (tighten the screws to the recommended tightening torque)	Every 10 years
Adapter mounting screws (tighten the screws to the recommended tightening torque)	Every 10 years
Valia spring arm snap ring	Every 10 years
Batteries	Every 3 years

4.2.2 Replacing the batteries



WARNING!

Risk of burns

If unsuitable batteries are used, they may explode due to the emission of gases or liquids.

Always use batteries supplied by Getinge during installation and when replacing defective batteries.



WARNING!

Risk of electric shock or injury

The use of screws or spare parts other than those supplied by the manufacturer may damage the device.

Use only screws and spare parts supplied by the manufacturer.



WARNING!

Risk of burns

A metal object falling onto the two poles of the battery simultaneously risks short-circuiting the battery.

Handle the batteries with care to avoid causing a short circuit.



WARNING!

Risk of burns

Improper storage of batteries after removal may trigger a fire.

The terminals of used batteries must be insulated.

4.2.2.1 On the WPS power supply



WARNING!

Risk of electric shock

The product on which the technician is to work may still be connected to a power source.

Before performing any maintenance, turn off the device and lock out the electrical supply.



NOTE

For a **one-hour** battery backup, you will find 2 pairs of red and black wires.

For a **three-hour** battery backup, you will find **4 pairs of red and black wires**.

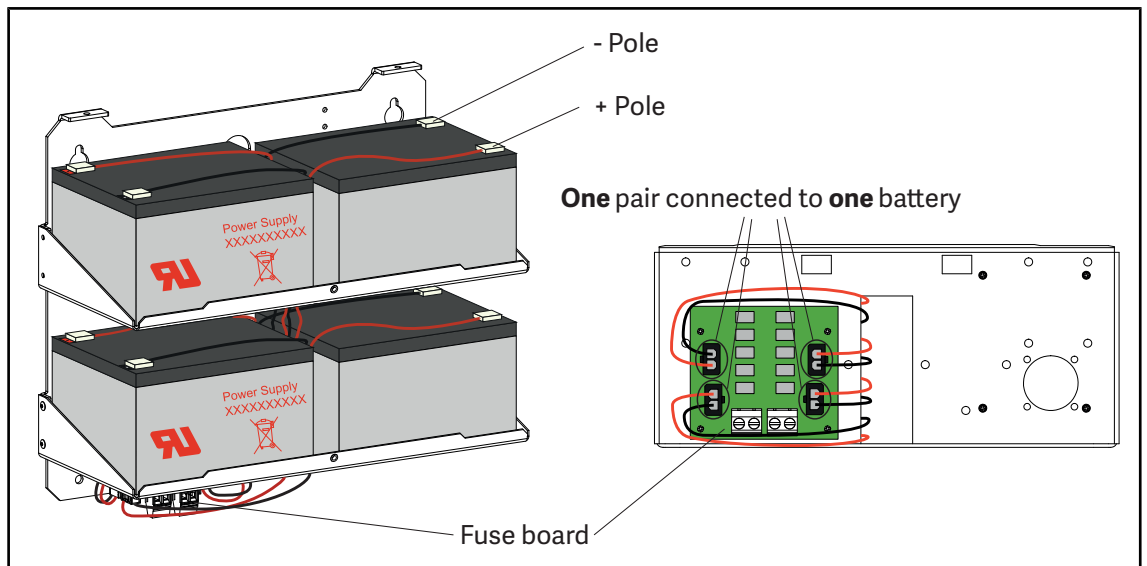


Fig. 5: Replacing the WPS power supply batteries

- Switch off the power supply.
- Unplug the connectors from the fuse board.
- Remove the lugs from the battery terminals

4

Maintenance procedures

Operations to be performed on the touchscreen

- Replace the batteries.
- Reconnect the lugs on the battery terminals.
 - Each battery has a positive and a negative **terminal**, marked **red and black, respectively**.
 - Each cable pair must be connected to the terminals by matching colours.
 - The **red terminal** is on the “+” side of the battery and connects to the red wire.
 - The **black terminal** is on the “-” side of the battery and connects to the black wire.
- Reconnect the connectors of the fuse board.

4.3 Operations to be performed on the touchscreen



Fig. 6: Entry of maintenance date

- At the end of the maintenance, enter the date of maintenance in the touchscreen menu.
- Press the **Getinge logo** [1] twice to display the password entry window.
- Enter the password **8311** on the keyboard [2] then press OK [3].
- On the maintenance page, press **Maintenance Date** [4] then enter the date of the maintenance performed.
- Press Cancel [5] to reinitialise the maintenance and remove the orange key.
- Quit the menu by pressing the **Getinge logo** [1] again.

5 Adjustments



NOTICE

Ensure that the weight of the lighthead is the same whether being raised or lowered and that it is stable in any position.

5.1 Lubrication

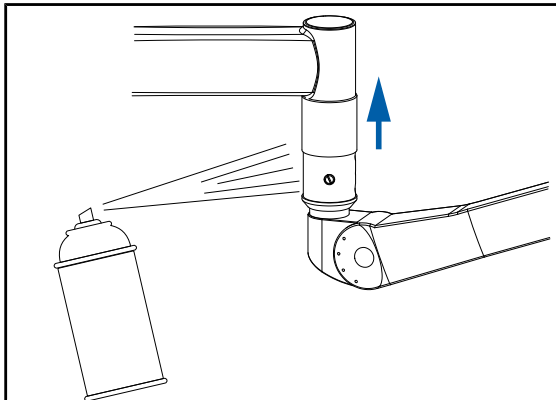


Fig. 7: Suspension lubrication

Lubricating the suspension under the safety ring

1. Remove the mounting screw and lift the safety ring.
2. Spray lubricating grease at the location of the safety ring.
3. Lower the safety ring and refit the mounting screw.

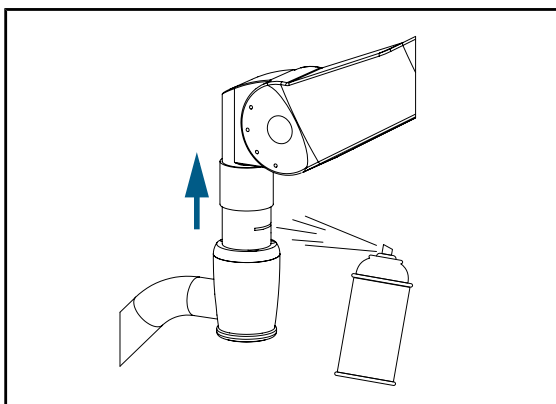


Fig. 8: Spring-arm lubrication

Lubricating the spring arm under the safety ring

1. Remove the mounting screw and lift the safety ring.
2. Spray lubricating grease at the location of the safety ring.
3. Lower the safety ring and refit the mounting screw.

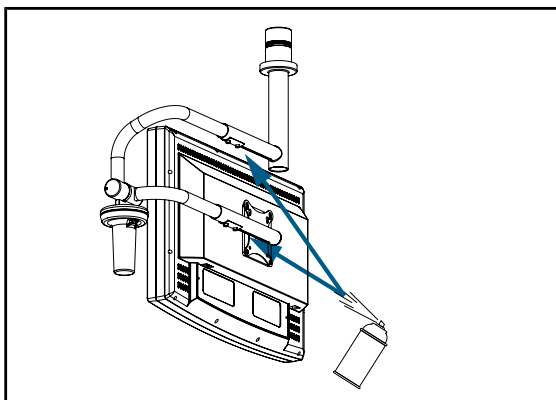


Fig. 9: Lubricating the XS-XD sliding tubes

Lubricating the XS-XD sliding tubes

1. Remove the mounting screws and anchor plate.
2. Spray lubricating grease at the location of the anchor plate; slide the tubes in and out.
3. Refit the anchor plate and mounting screws.

5.2 Adjusting the Acrobat 2000 and Ondaspace spring arms

Adjusting the balance of the SF/DF spring arms

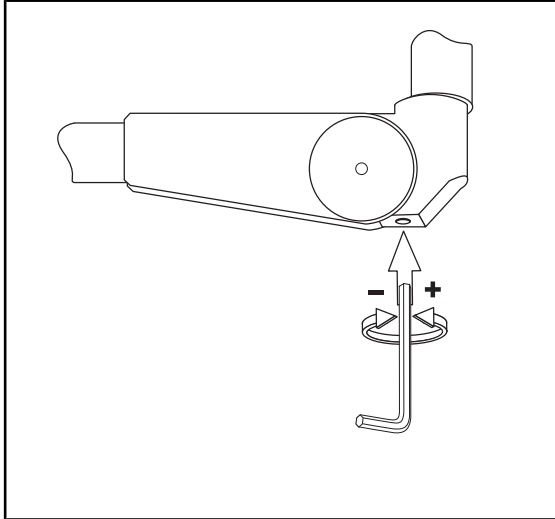


Fig. 10: Adjusting the balance

- For the ONDASPACE range, unscrew the protective cap.
- Insert a 5-mm Allen key in the opening.
- Raise the spring arm higher than the horizontal position.
- If the lighthouse goes down: unscrew (turn towards the “+”) to increase the force of the spring arm.
- If the lighthouse goes up, Turn screw (turn towards the “-”) to decrease the force of the spring arm.
- For the ONDASPACE range, screw in the protective cap.

Adjusting the top stop on the DF spring arm

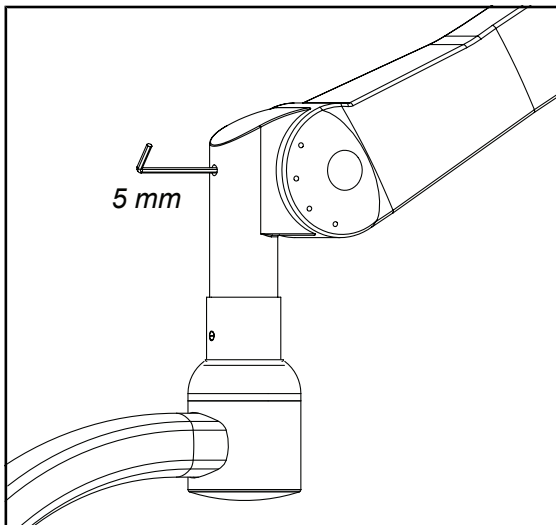


Fig. 11: Stop adjustments

- For the Acrobat 2000 range:
- Tighten to lower the stop.
- Loosen to raise the stop.

Adjusting the top stop (SF spring arm)

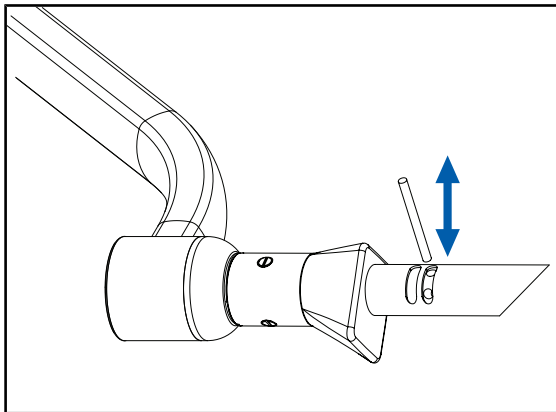


Fig. 12: Ring motion

- Raise the ring using the adjustment rod to lower the stop.
- Lower the ring using the adjustment rod to raise the stop.

5.3 Adjusting the Valia spring arms

SF version

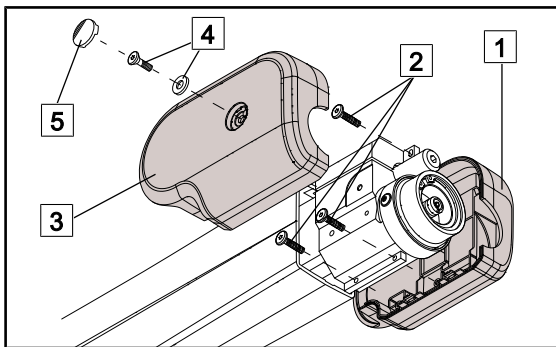


Fig. 13: Removing the front flanges

- Remove the screw cover [5].
- Remove the washer with the M4x10 screw [4].
- Remove the flange [3].
- Unscrew the three PT M3x12 screws [2] then remove the flange [1].

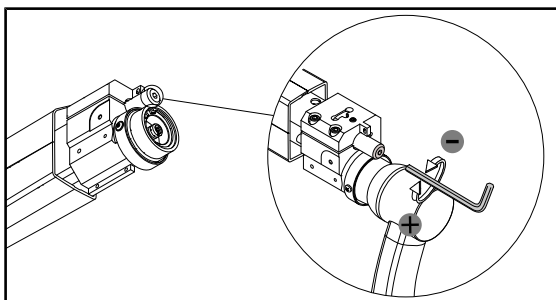


Fig. 14: Adjusting the top stop

- Insert a 5-mm Allen key.
- Tighten to raise the stop to + 20 degrees.
- Tighten to lower the stop to 0 degrees.



NOTE

TIP: To make the adjustment easier, pull the arm slightly downwards to release the adjustment screw

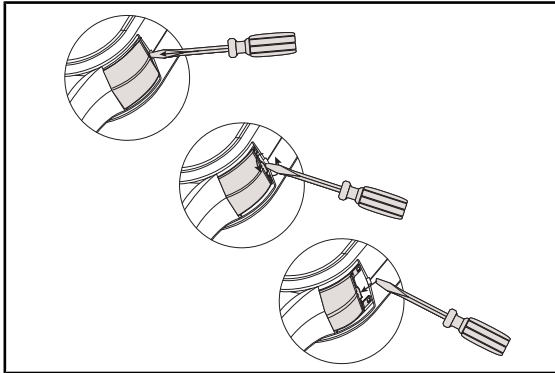


Fig. 15: Opening the tabs

- Insert a flat head screwdriver into the cover notch and tab.
- Rotate to release the stop from the tab.
- Push the tab back.

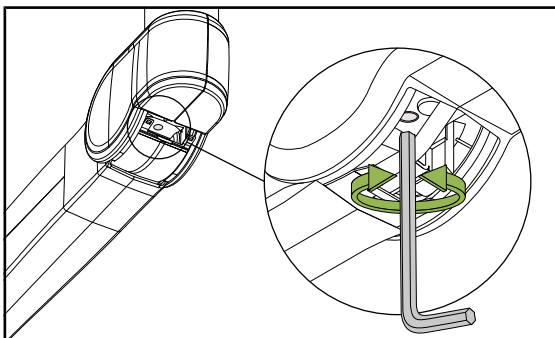


Fig. 16: Adjusting the tension

- Position horizontally and push back the tab halfway to access the adjustment screw.
- Insert a 5-mm Allen key.
- Tighten to decrease the tension.
- Loosen to increase the tension.

**WARNING!****Risk of injury**

If a snap ring is missing or installed incorrectly, a component or part may fall from the device.

Check that all snap rings are properly installed.

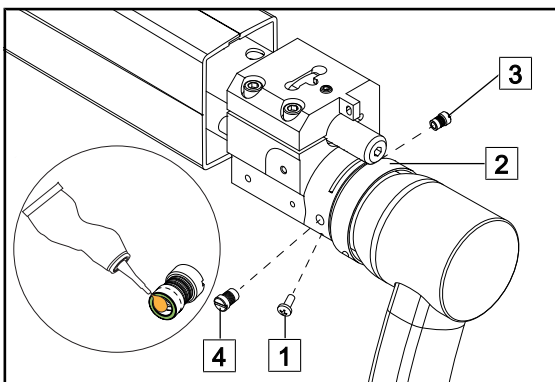


Fig. 17: Adjusting the spring arm brakes

- Remove the M4x10 screw [1] and insert the safety ring [2].
- Remove the brake screw [3], for the LCH 17 spring arm, or both brake screws [3] and [4], for the LCH 19 spring arm.
- Place a drop of paste, supplied with the spring arm, on the wear area of the brake screws.
- Adjust the brake screw [3], for the LCH 17 spring arm, or both brake screws [3] and [4], for the LCH 19 spring arm.
- Check that the snap ring is in place.
- Slide the safety ring [2] back in position then refit the M4x10 screw [1].

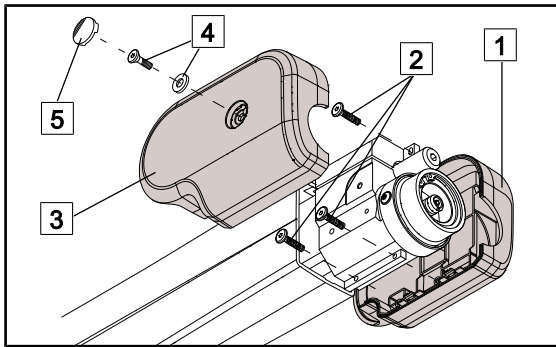


Fig. 18: Refitting the front flanges

- Fit the flange **1**, then fit the three M3x12 PT screws **2** until they make contact.
- Fit the flange **3**.
- Fit the washer with the M4x10 screw **4**; tighten until it makes contact, without forcing.
- Fit the screw cover **5**.

DF version

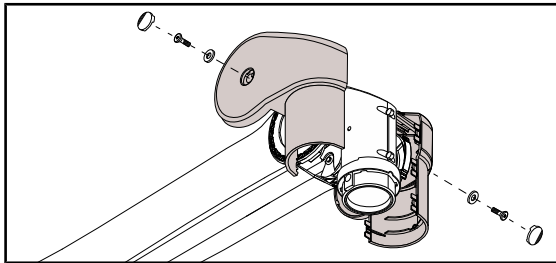


Fig. 19: Removing the front flanges

- Remove the screw covers.
- Unscrew the two M4x10 screws and remove the two washers.
- Unhook the two flanges.

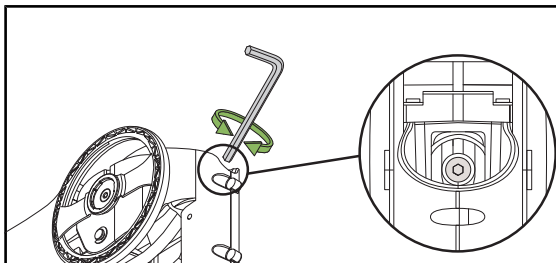


Fig. 20: Adjusting the top stop

- Insert a 5-mm Allen key.
- Tighten to raise the stop.
- Loosen to lower the stop.

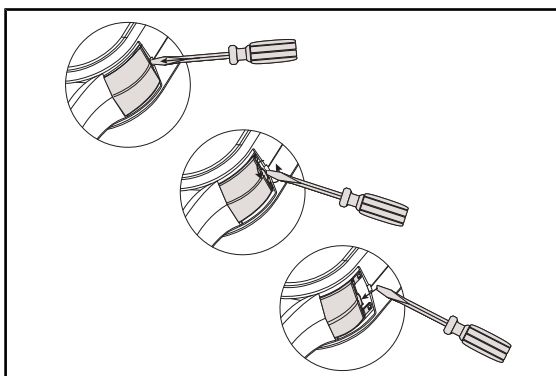


Fig. 21: Opening the tabs

- Insert a flat head screwdriver into the cover notch and tab.
- Rotate to release the stop from the tab.
- Push the tab back.

5

Adjustments

Adjusting the Valia spring arms

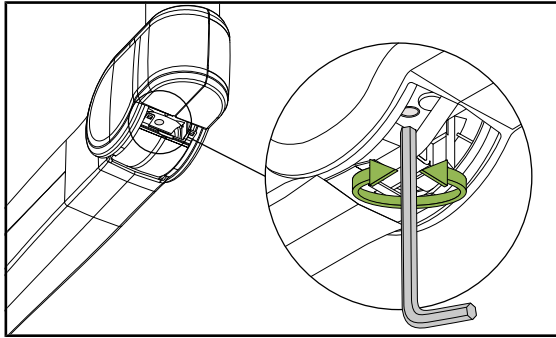


Fig. 22: Adjusting the tension

- Position horizontally and push back the tab halfway to access the adjustment screw.
- Insert a 5-mm Allen key.
- Tighten to decrease the tension.
- Loosen to increase the tension.

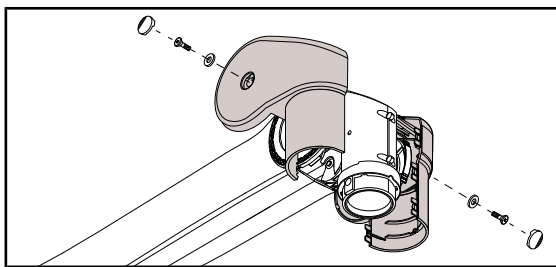


Fig. 23: Fitting the front flanges

- Clip on the two flanges.
- Fit the two washers with the two M4x10 screws; tighten until they make contact.
- Fit the screw covers.

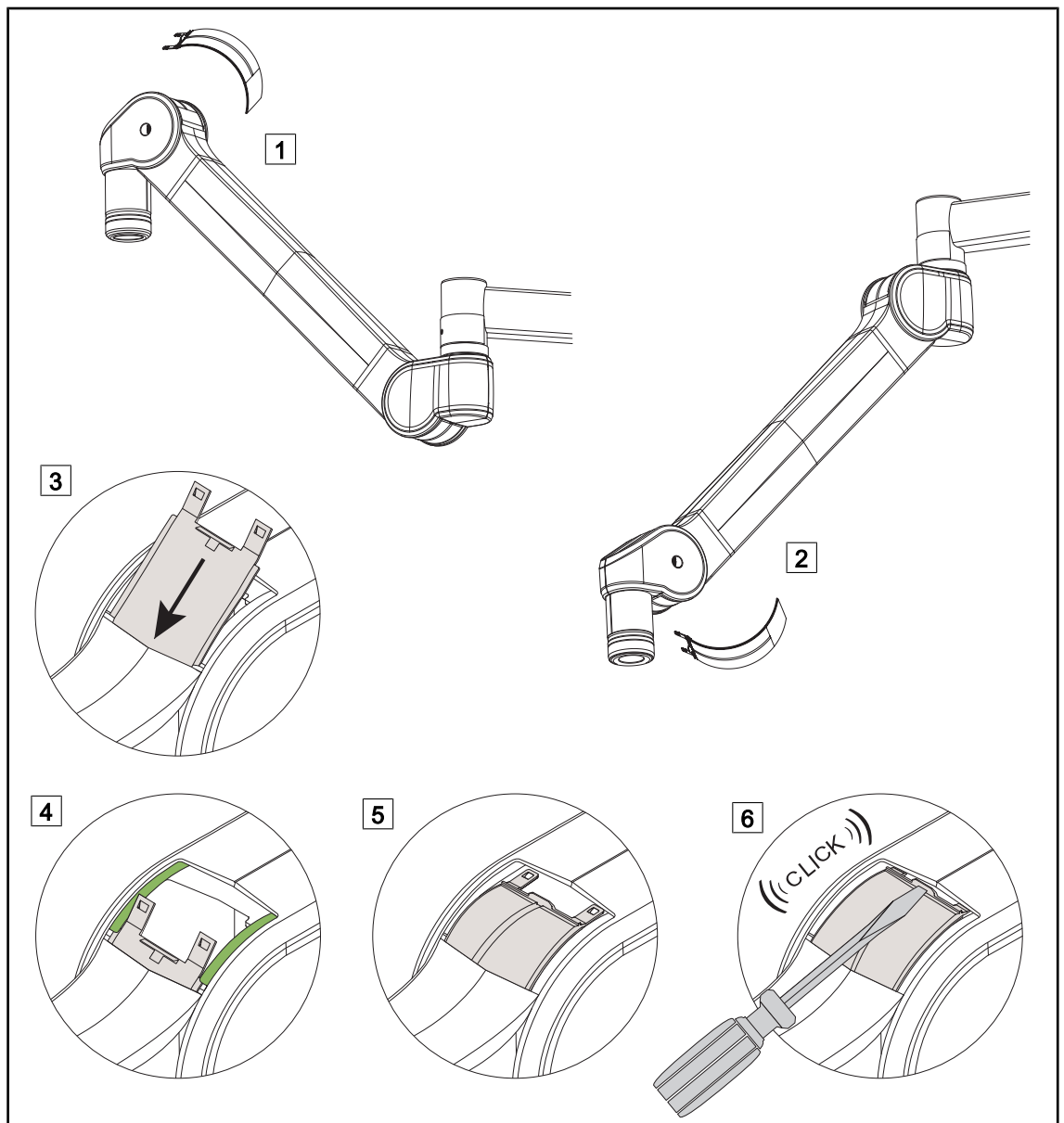


Fig. 24: Fitting the tabs

- Check that the matt inner surface and shiny outer surface of the tabs are correctly positioned to ensure correct mounting in the grooves.
- Position the spring arm in the high position **1** to insert the first two tabs.
- Insert the tab in the grooves **3**.
- Raise the tab **4** back into its housing.
- Lock the tab by pushing it into its housing using a flat screwdriver, until it clicks **5**.
- Position the spring arm in the low position **2**, then proceed in the same way to install the second tab.
- Move the arm up and down to check that the tabs slide without coming out of their grooves.

5.4 Adjusting the brakes



CAUTION!

Risk of equipment damage

If adjustments are made incorrectly or not at all, the lighthouse or installed equipment may drift.

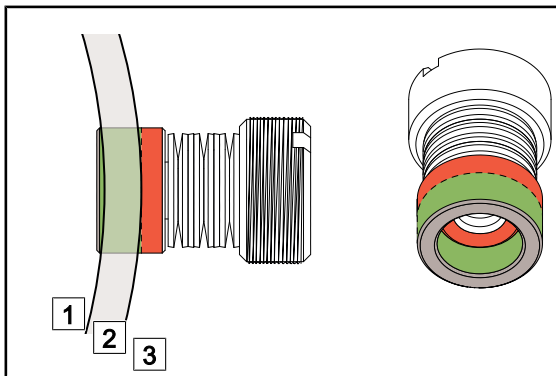
Make all adjustments (balance, stop and brakes) during installation and then after all maintenance operations.

5.4.1 Adjusting the PWDII suspension brakes



NOTICE

It is normal for a newly installed brake to require readjustment after two to six months of use in order to compensate for wear.



- Break-in zone 1
- Useful zone 2
- Wear zone 3

Fig. 25: Brake wear

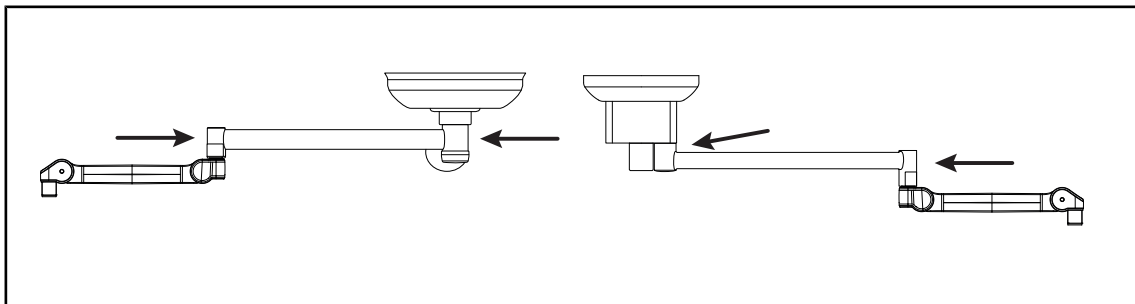


Fig. 26: Suspension brake adjustments

- Tighten screw to increase braking.
- Loosen screw to reduce braking.

5.4.2 Lighthouse brakes

SF version

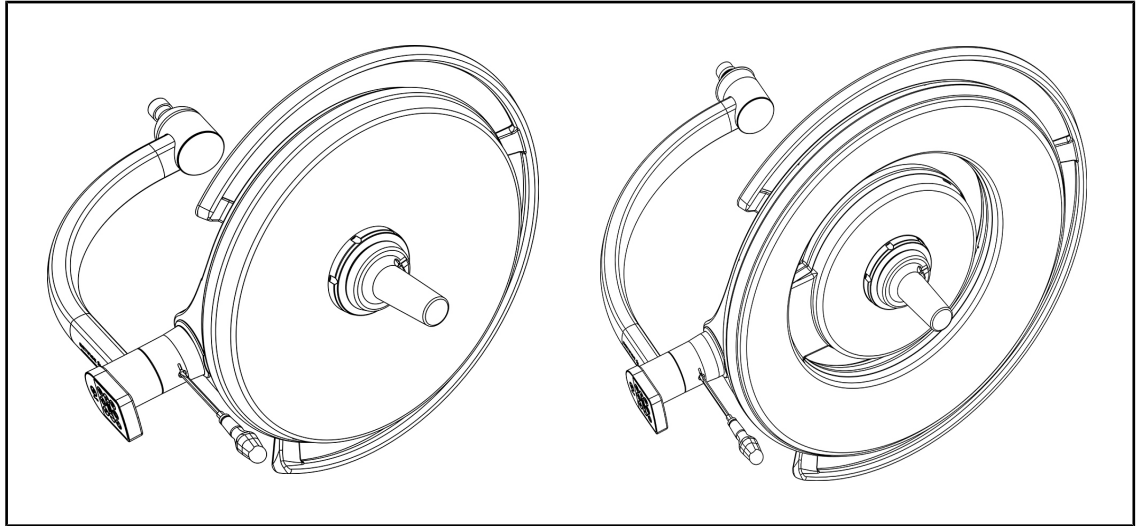


Fig. 27: Adjusting the SF lighthouse brake on PowerLED II 500 and 700 units

- Use a flat-bladed screwdriver to adjust the lighthouse brake:
 - Tighten screw to increase braking.
 - Loosen screw to reduce braking.

DF version

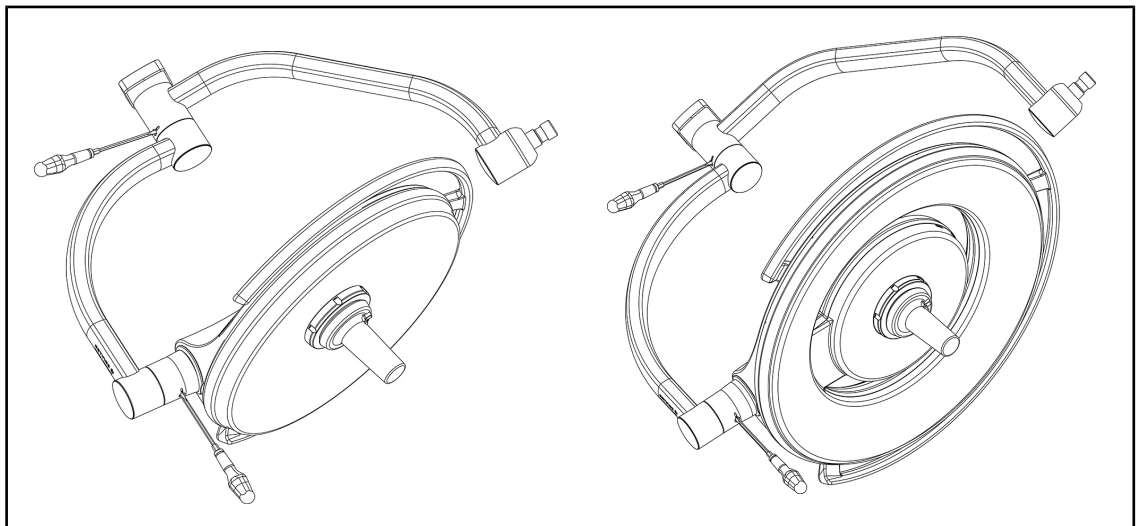


Fig. 28: Adjusting the DF lighthouse brake on PowerLED II 500 and 700 units

- Use a flat-bladed screwdriver to adjust the lighthouse brake:
 - Tighten screw to increase braking.
 - Loosen screw to reduce braking.

5.4.3 Adjusting the XHS0 monitor mount tilt brake

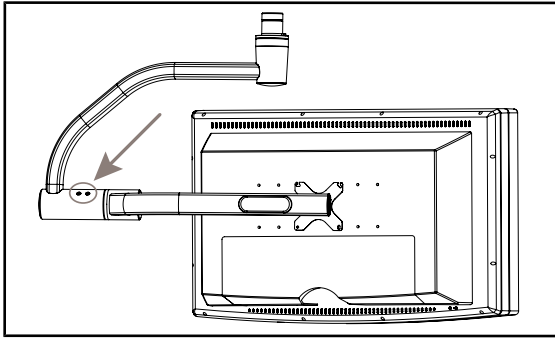


Fig. 29: XHS0 monitor mount

- Adjust the two brake screws by screwing in to increase the braking, or by unscrewing to reduce the braking.

5.4.4 Adjusting the XS/XD monitor mount brakes

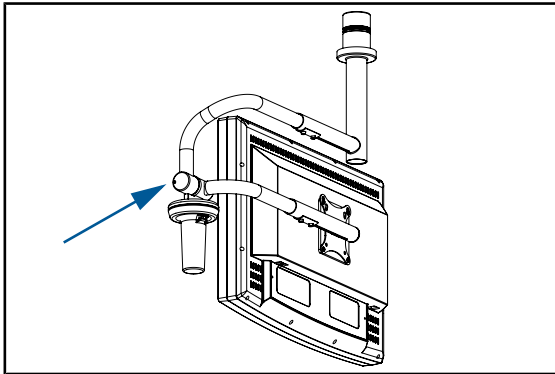


Fig. 30: XS/XD monitor mount

- Adjust the brake screws (single (XS) or dual (XD) monitor mount) to adjust the rigidity of the rotation of the monitor on its mount.
- Tighten the screw using a 3-mm Allen key to make the mount more rigid, or loosen the screw for a more flexible mount.

5.4.5 Adjusting the XS32 monitor mount tilt brakes

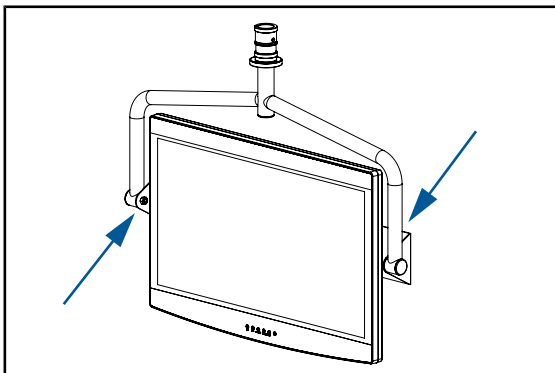


Fig. 31: XS32 monitor mount

- Adjust the two screws by screwing in to increase the braking, or by unscrewing to reduce the braking.

5.4.6 Adjusting the brakes on SC07-SC05 camera mount

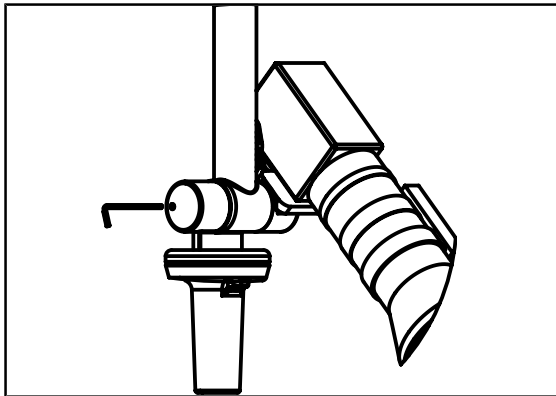


Fig. 32: SC07 camera mount

Using a 3-mm Allen key, tighten or loosen the screw on the horizontal rotary joint of the camera mount:

- Tighten screw to increase braking.
- Loosen screw to reduce braking.

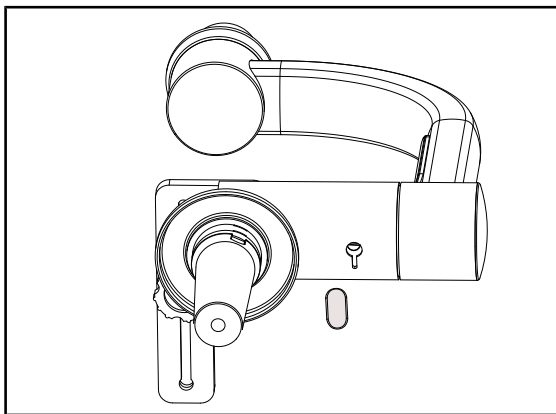


Fig. 33: SC05 brake adjustment

- Remove the cap to uncover the brake screw.
- Tighten screw to increase braking.
- Loosen screw to reduce braking.
- Refit the cap over the brake screw.

6 Inspections

6.1 Mechanical inspections

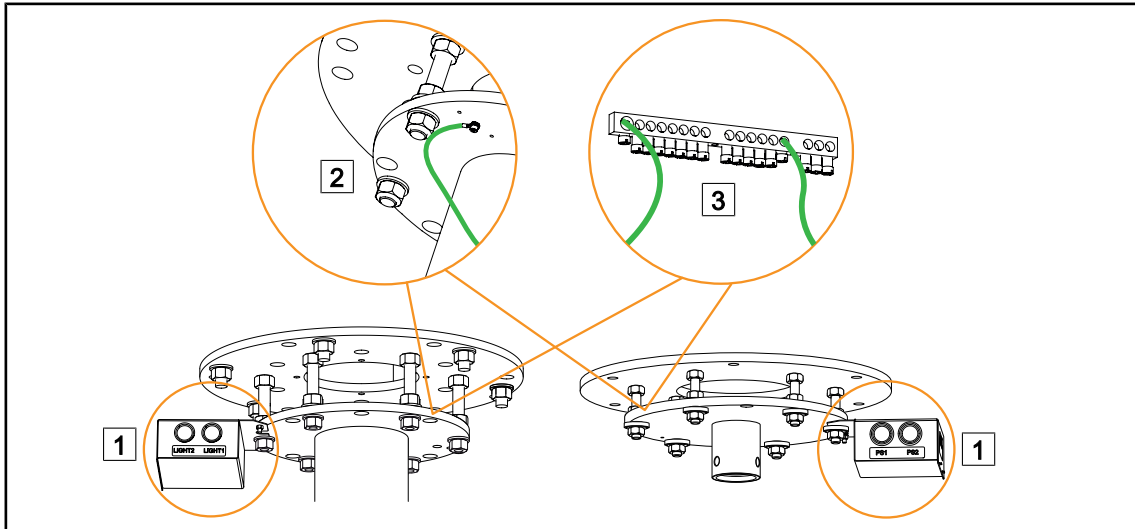


Fig. 34: Anchor point

- Check the tightening of the anchoring and connections on the terminals [2] [3] and the connection boxes [1].
- Check the ground connections [2] or [3].

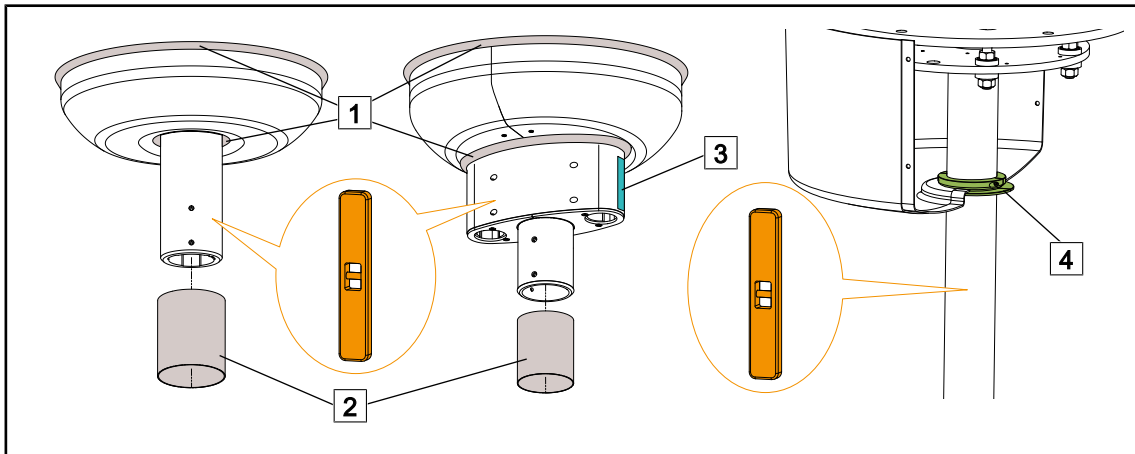


Fig. 35: Suspension tube and ceiling cover

- Check the rigidity of the suspension by shaking the assembly.
- Verify the verticality of the tube.
- SAT and SATX tube: Check the tightening of the screws of the half-plates on shafts 2 and 3.
- SB tube: Check the tightening of the cover split-rings [4].
- Check that the cover and the retention and upper seals [1] are secure.
- Check the resistance of the silicone sleeve [2] and, for the modified SAT tube, the screw cover labels [3] for shaft 2 and 3.

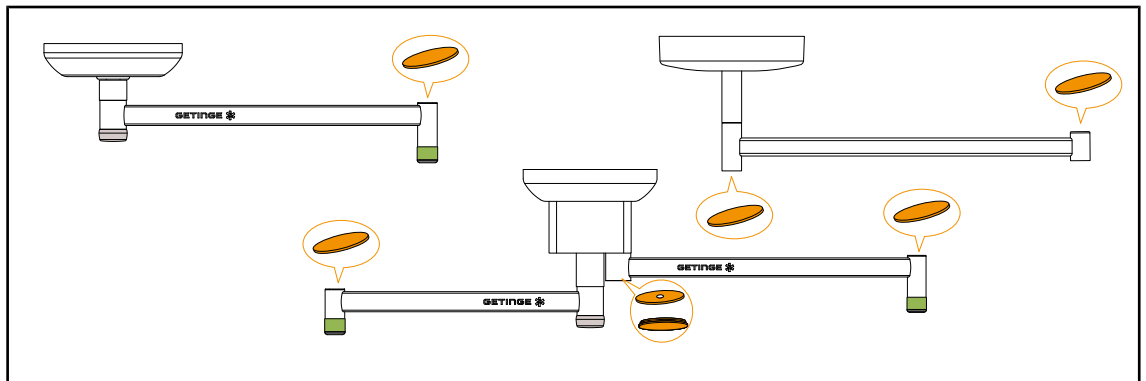
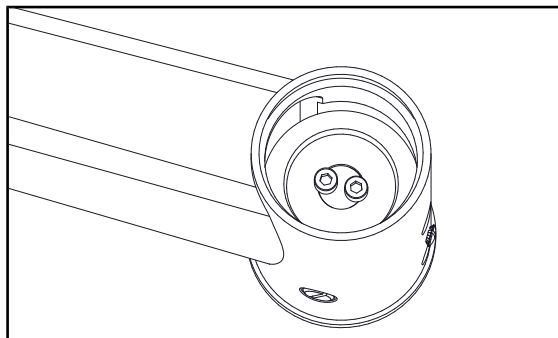


Fig. 36: Suspension arm

- Check the presence of the tube suspension's linking screws and the replacement periodicity. (Do not re-tighten these screws during maintenance as there is a risk of fracture. If screws appear loosened, replace them)
- Check that the adjustment of the brake screws has been performed.
- Check the presence of the safety rings with holding screw.
- Check the presence of the bumpers and caps.
- Check the presence of the discs inside the caps of shafts 2 and 3 SATX.



- Check that the XO cap, if present, is fastened securely.

Fig. 37: Checking the XO cap



WARNING!

Risk of injury
The metal half-rings can be sharp.

The metal half-rings on the spring arm should be handled with care to avoid any risk of cuts.

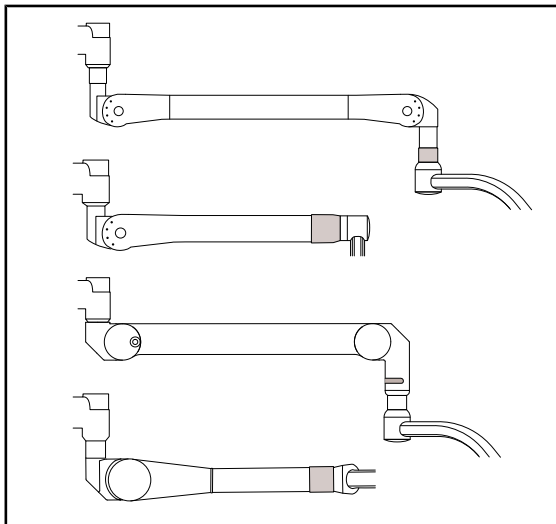


Fig. 38: Acrobat or Ondaspace spring arm

- Check that the vertical stop is properly adjusted.
- Check the balance.
- AC2000: Check the presence of the snap ring and the replacement periodicity for the DF version, and the presence of the two stop screws for the SF version.
- AC2000: Check that the safety ring is in place with its mounting screw.
- ONDASPACE: Check the presence of the snap ring and the replacement periodicity.
- ONDASPACE SF: Check that the safety ring is in place with its mounting screw.
- ONDASPACE DF: Check that the safety plate is in place with its two mounting screws.
- Check the correct installation of the covers and tightening of the screws.
- Check the condition, position and sliding of the tabs.

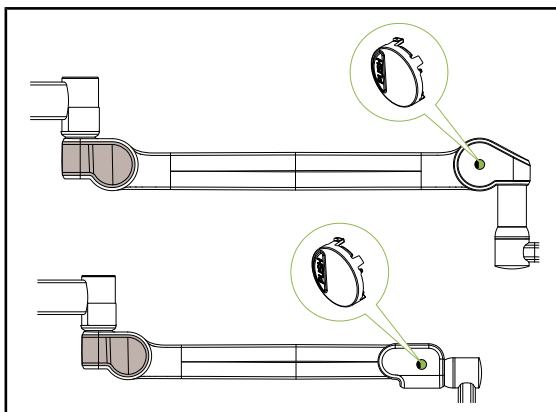


Fig. 39: Valia spring arm

- Check that the vertical stop is properly adjusted.
- Check the balance.
- VALIA SF: Check the presence of the snap ring and the replacement periodicity.
- VALIA DF: Check the presence of the snap ring and the replacement periodicity.
- VALIA: Check the correct installation of the covers, flanges, and the tightening of the screws.
- VALIA: Check the presence of the flange covers and screw covers.
- VALIA: Check that the spring arm tabs are correctly positioned and that there is no friction noise on the cables.
- Check the position and sliding of the tabs.

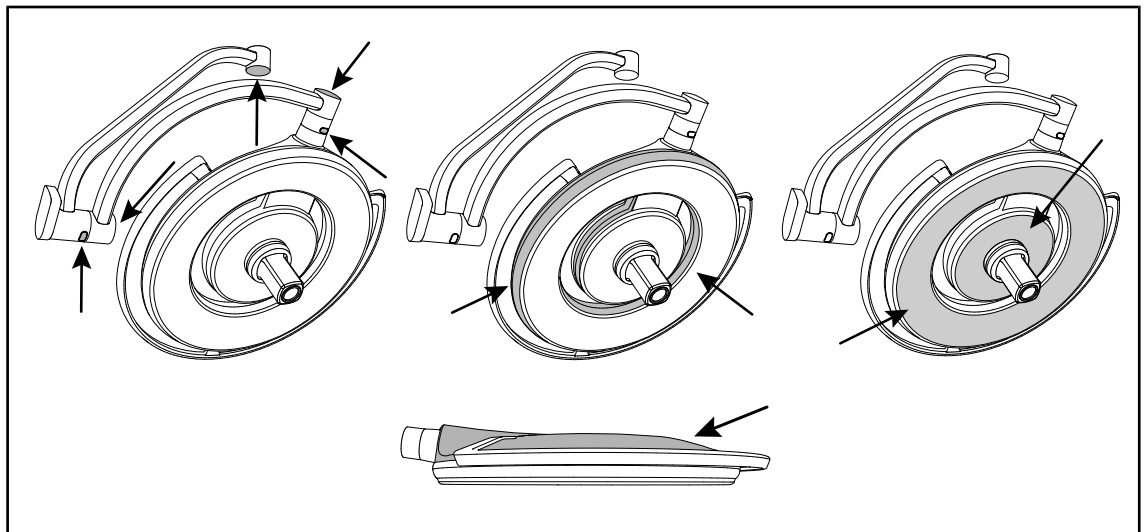


Fig. 40: Lighthouse

- Check that the silicone covers, seals and cover are not loose.
- Check that there are no cracks or scratches on the underside.

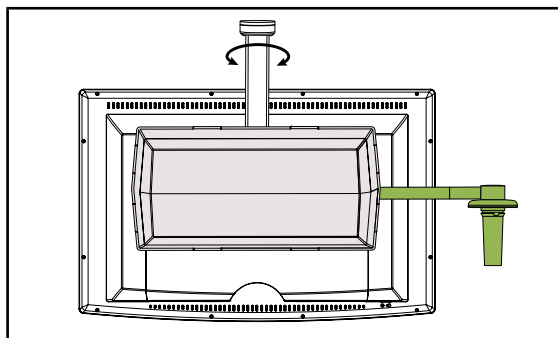


Fig. 41: Monitor mount

- Check the position of the stops for the orientation angles.
- Check that the handle mount is firmly attached.
- Check that the VESA interface is firmly attached to the mount and monitor.
- Check that the Rear Box and its contents are securely fastened.
- Check that the caps are fully inserted.
- Check that the adjustment of the brake screws has been performed.

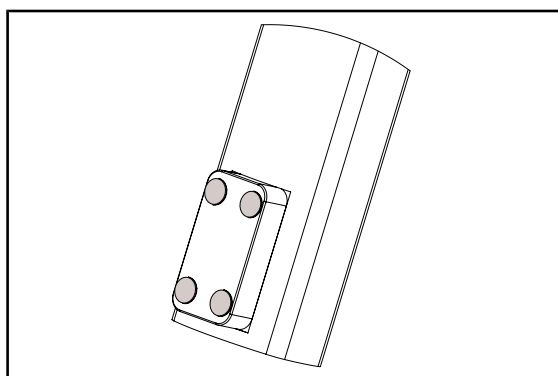


Fig. 42: MHS0 cable guide

- If a cable guide solution is fitted, check that the clips are fastened securely.



WARNING!

Risk of injury

A wrong handling of XHD1 screen holder may result in a hand injury.

Respect safety indications on the product.

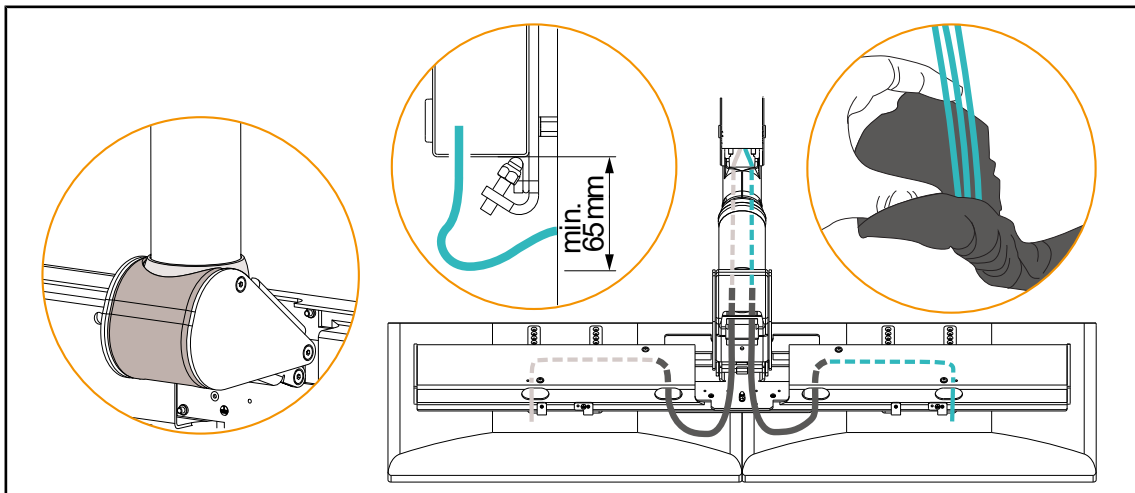
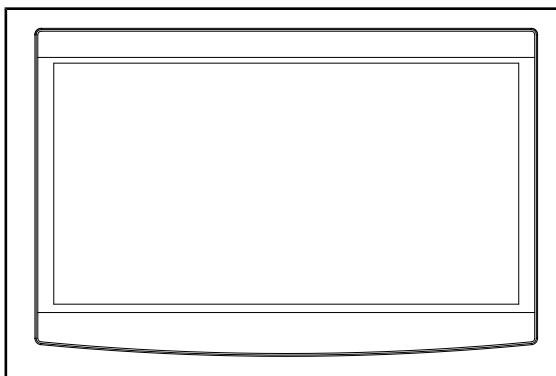


Fig. 43: XHD1 monitor mount

- XHD1: Check that the slip ring is lowered all the way.
- XHD1: Check that the cable protective sheath is installed properly and with the required 65-mm minimum clearance.
- XHD1: Check that the grey cover is closed.
- XHD1: Check that the caps at each end of the rail are fully inserted.
- XHD1: Check the ground connections.



- Check that there are no cracks or scratches.

Fig. 44: Monitor

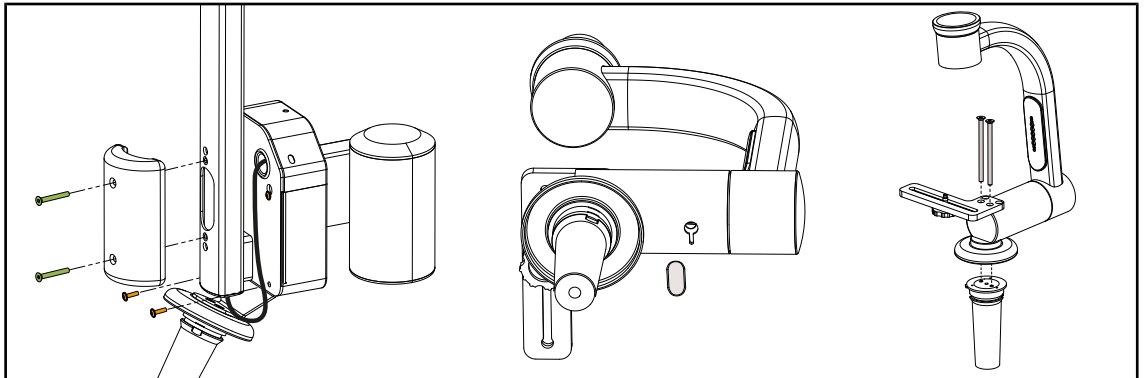


Fig. 45: Camera mount

- Check the position of the stops for the orientation angles.
- Check that the handle mount is firmly attached.
- FHS0: Check that the camera mount is firmly attached to the FHS0 mount.
- SC05/07: Check that the adjustment of the brake screws has been performed.
- SC05/07: Check that the camera mount and Kodak screw are fastened securely.
- Check that the caps are fully inserted.

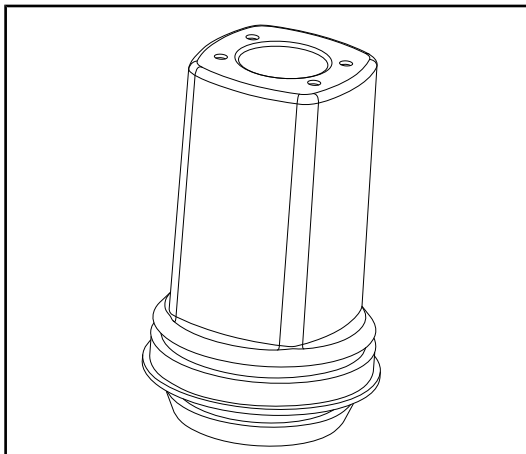


Fig. 46: Camera

- Check the condition of the connector.
- Check the rotation with no image loss.
- Check the general condition of the system.

6.2 Electrical inspections

6.2.1 Electrical evaluation

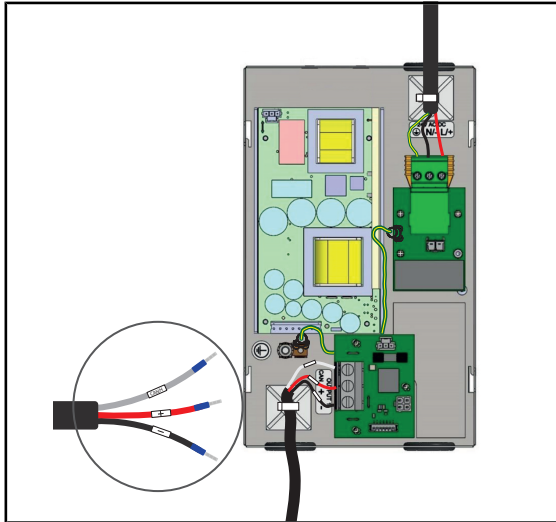


Fig. 47: Ceiling-mounted power supply

- Check the tightening of the connections.
- Check the ground connections.
- Check the general condition of the power supply.

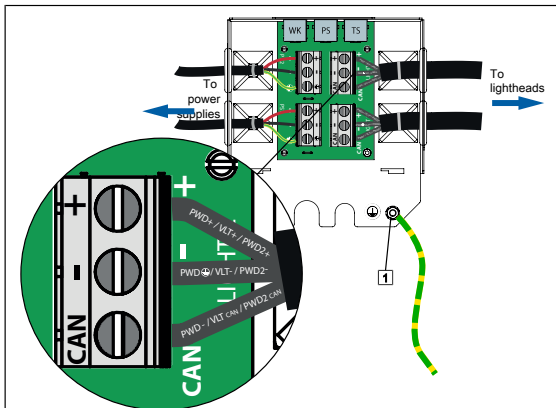


Fig. 48: Connection box

- Check the tightening of the connections.
- Check the ground connections.

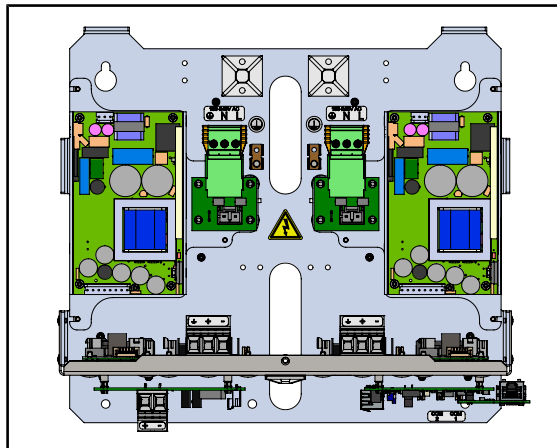


Fig. 49: Wall-mounted power supply

- Check the tightening of the connections.
- Check the ground connections.
- Check the general condition of the power supply.

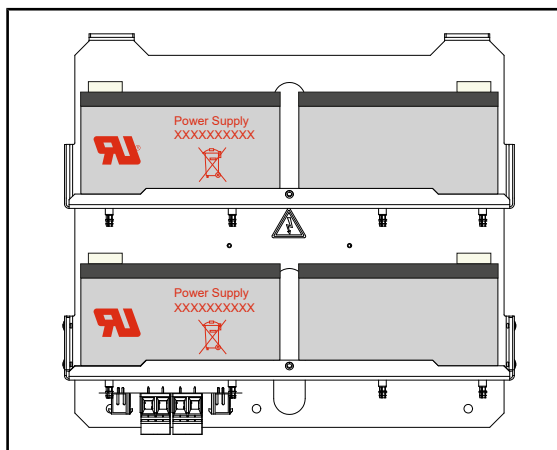


Fig. 50: Backup

- Check the tightening of the connections.
- Check the ground connections.
- Verify the output voltage of the batteries (12 V per battery, difference of voltage between batteries <0.1 V).
- Check the general condition of the backup, the batteries, the absence of swelling, leaks, oxidation.

6.2.2 Performing battery tests



WARNING!

Risk of injury

A battery lifetime test fully discharges the batteries.

Do not perform an operation immediately after a battery lifetime test. Allow time for the batteries to charge.

6.2.2.1 From the wall-mounted control keypad

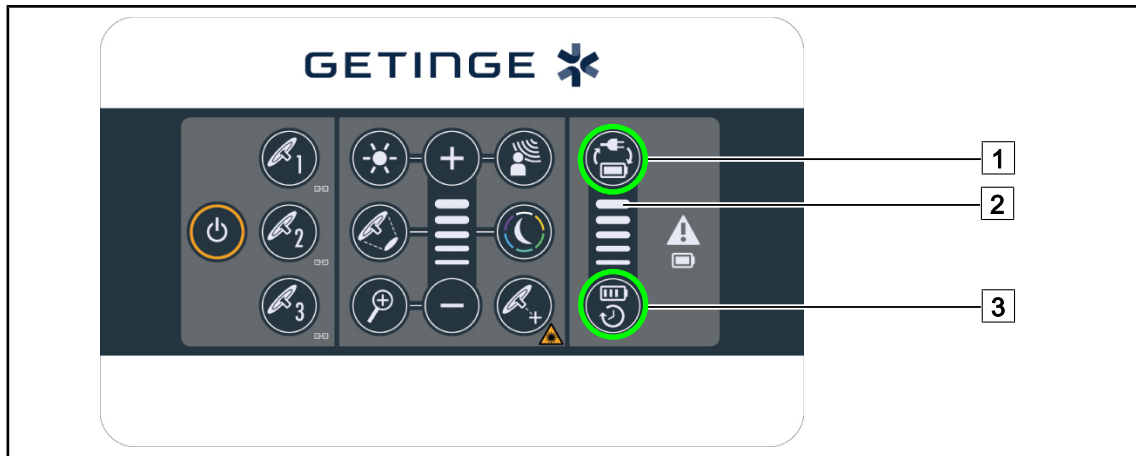


Fig. 51: Battery tests from the wall-mounted keypad

Running a battery backup test

1. Turn off the light.
2. Press **Battery backup test** [1].
 - If the test is successful, the battery level indicator [2] flashes green. If the test fails, the battery level indicator [2] flashes red.
3. If the test fails, contact the Getinge technical service department.
4. Press **Battery backup test** [1] again.
 - The battery level indicator [2] stops flashing. The light is on and ready for use.

Running a battery lifetime test (only with a Getinge backup)

1. Turn off the light.
2. Press **Battery lifetime test** [3].
 - If the test is successful, the battery level indicator [2] flashes green. If the test fails, the battery level indicator [2] flashes red.
3. If the test fails, contact the Getinge technical service department.
 - The light turns off when the test is complete.
4. Press **Battery lifetime test** [3] again.
 - The battery level indicator [2] stops flashing.



NOTE

The battery lifetime test can be stopped at any time by pressing **Battery lifetime test** [3] again until the lighthoods turn off.

6.2.2.2 From the touchscreen control panel



Fig. 52: Battery test

Running a battery backup test

1. Turn off the light.
2. Press **Battery Tests** [1] in the menu bar.
 - The battery tests page is displayed.
3. Press **Battery backup test** [2] to start the test.
 - The date of the most recent battery backup test [6] is updated and a green tick is displayed if the test was successful. If the test fails, however, a red cross and a **Maintenance Information** [4] button are displayed.
4. If the test fails, press **Maintenance information** [4] to access the maintenance information page, and then call the Getinge technical service department.

Running a battery lifetime test (only with a Getinge backup)

1. Turn off the light.
2. Press **Battery Tests** [1] in the menu bar.
 - The battery tests page is displayed.
3. Press **Battery lifetime test** [3] to start the test.
 - The date of the most recent battery lifetime test [7] and the battery lifetime [8] are updated, and a green tick is displayed if the test was successful. If the test fails, however, a red cross and a **Maintenance Information** [4] button are displayed.
4. If the test fails, press **Maintenance information** [4] to access the maintenance information page, and then call the Getinge technical service department.



NOTE

The battery lifetime test can be stopped at any time by pressing the cross [5].

6.2.3 Electrical safety tests



NOTE

Electrical safety measurements must be carried out using an IEC 62353-compatible electrical safety tester. The earth resistance should be less than or equal to 300 mΩ.

Maquet PowerLED II lighthoods

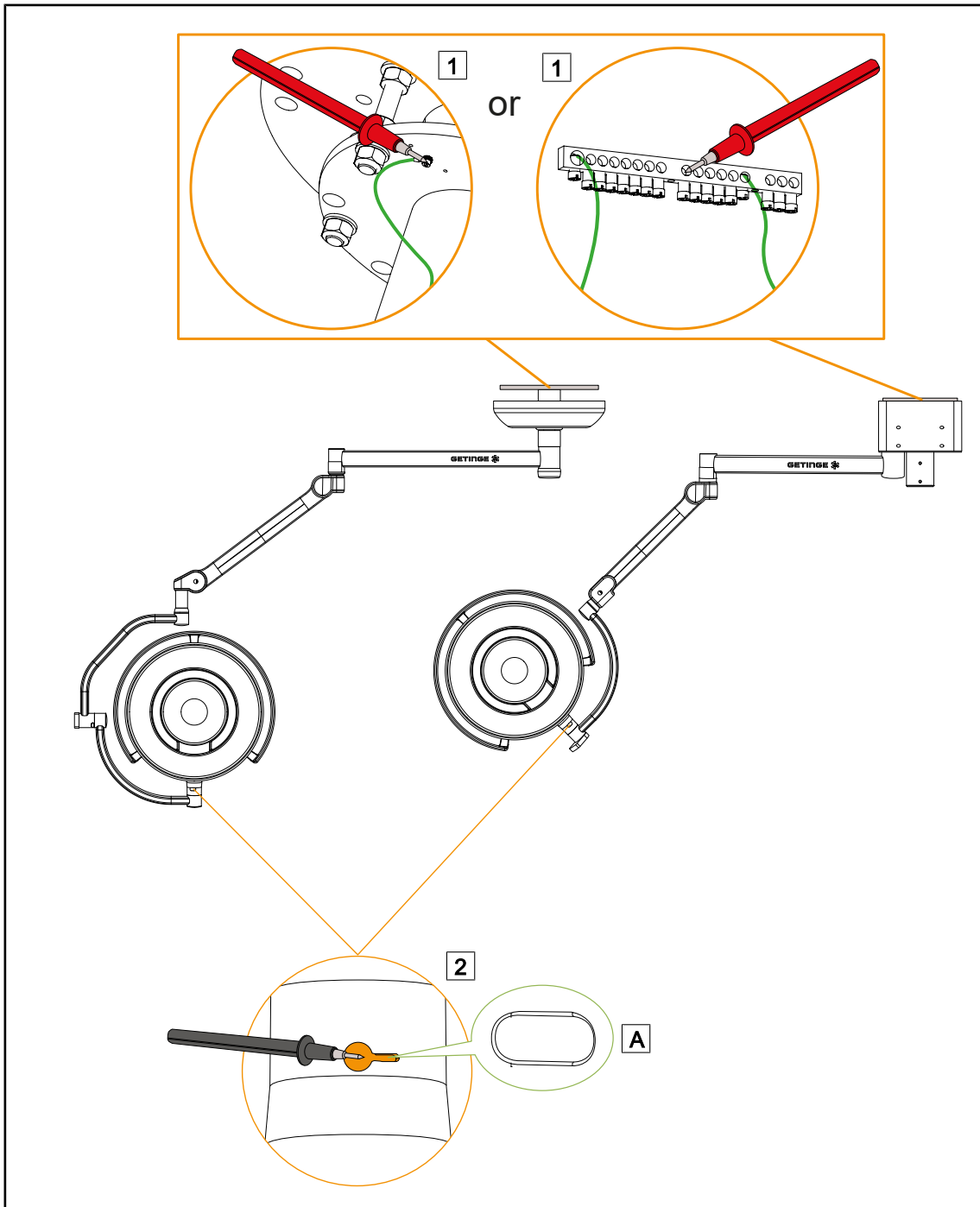


Fig. 53: Electrical safety test for Maquet PowerLED II lighthoods

The protective earth resistance should be measured between the flange **1** and the lighthouse hub **2** (not the brake screw). First remove the silicone cover **A** from the lighthouse. Once the measurement is complete, replace the silicone cover **A**.

FHS0/MHS0/MHD2 monitor mounts

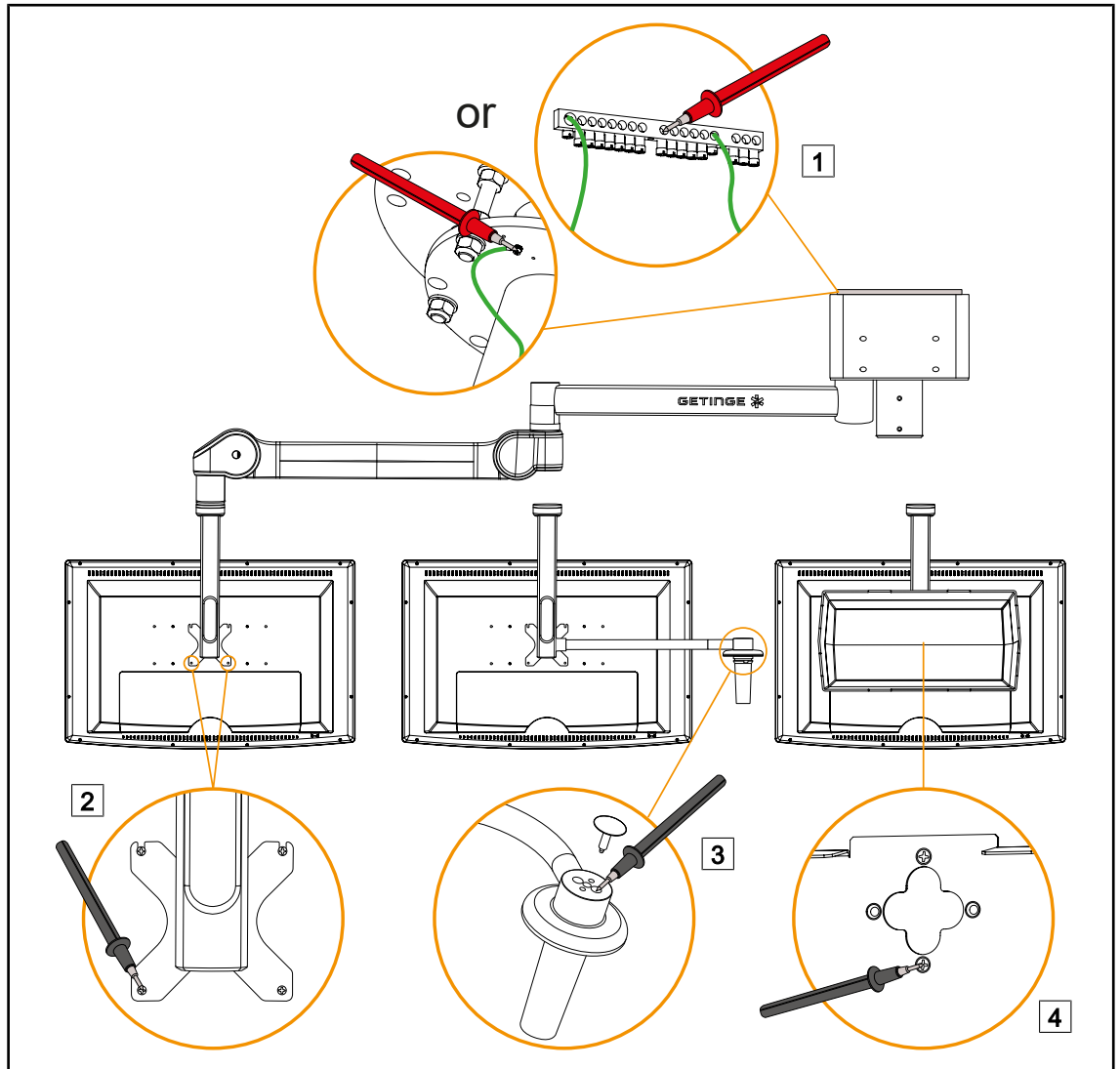


Fig. 54: FHS0/MHS0/MHD2 electrical safety test

- If the monitor mount does not include any accessories, the measurement should be made between the flange **1** and one of the monitor mounting screws **2**.
- If the monitor mount includes a handle option, the measurement should be made between the flange **1** and one of the handle mount mounting screws **3**. Once the measurement is made, push the cap in fully using a mallet.
- If the monitor mount includes a Rear Box option, the measurement should be made between the flange **1** and one of the case mounting screws **4**, with case cover removed. Once the measurement is complete, replace the cover.

XHS0 monitor mount

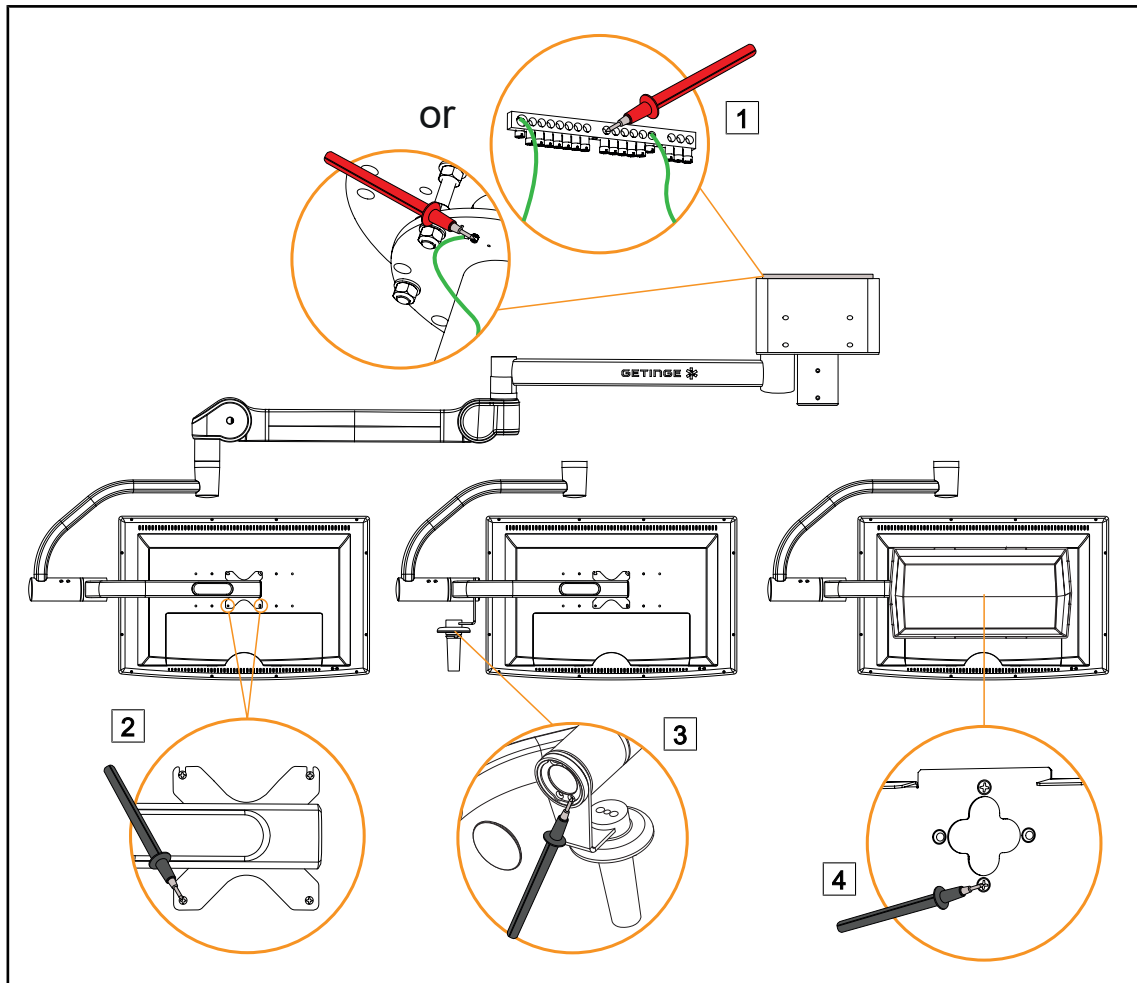


Fig. 55: XHS0 electrical safety test

- If the monitor mount does not include any accessories, the measurement should be made between the flange **1** and one of the monitor mounting screws **2**.
- If the monitor mount includes a handle option, the measurement should be made between the flange **1** and one of the handle mount mounting screws **3**. Once the measurement is complete, replace the cap.
- If the monitor mount includes a Rear Box option, the measurement should be made between the flange **1** and one of the case mounting screws **4**, with case cover removed. Once the measurement is complete, replace the cover.

XHD1 monitor mount

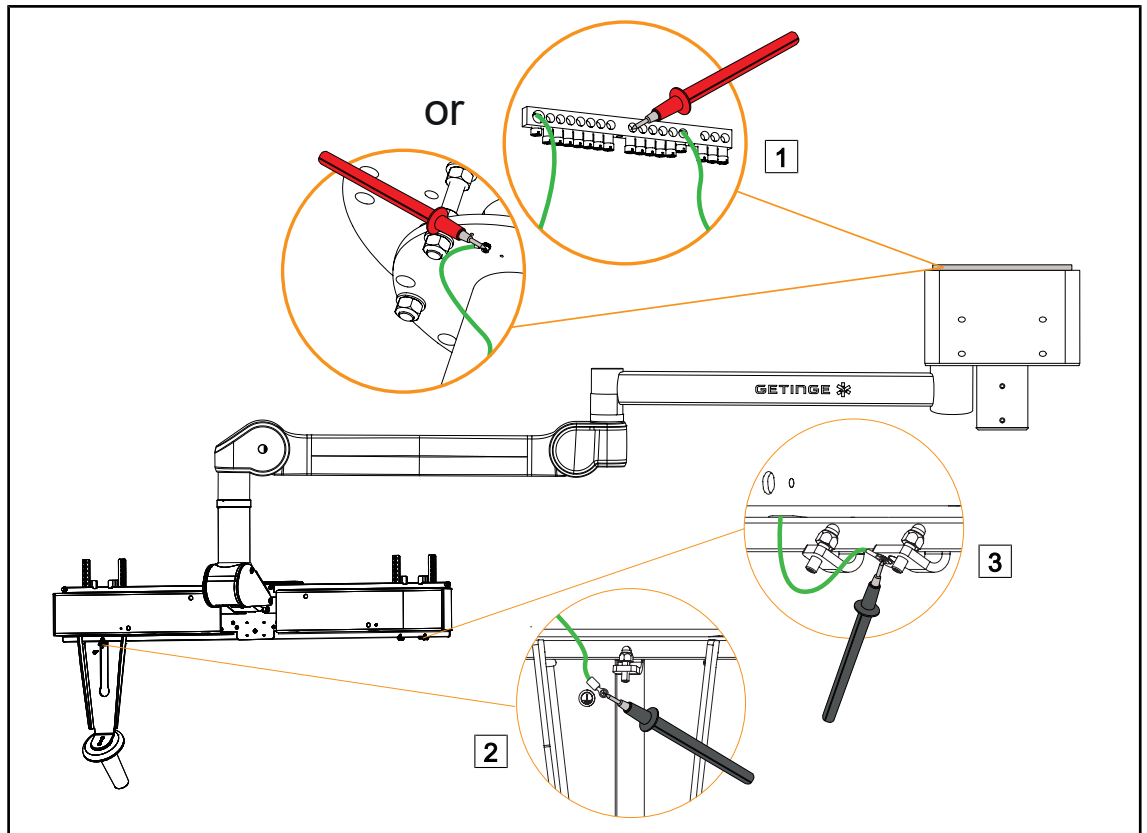


Fig. 56: XHD1 electrical safety test

- If the monitor mount does not include a handle option, the measurement should be made between the flange [1] and the earth wire connection on the VESA block [3].
- If the monitor mount includes a handle option, the measurement should be made between the flange [1] and the earth wire connection on the handle [2].

XS32 monitor mount

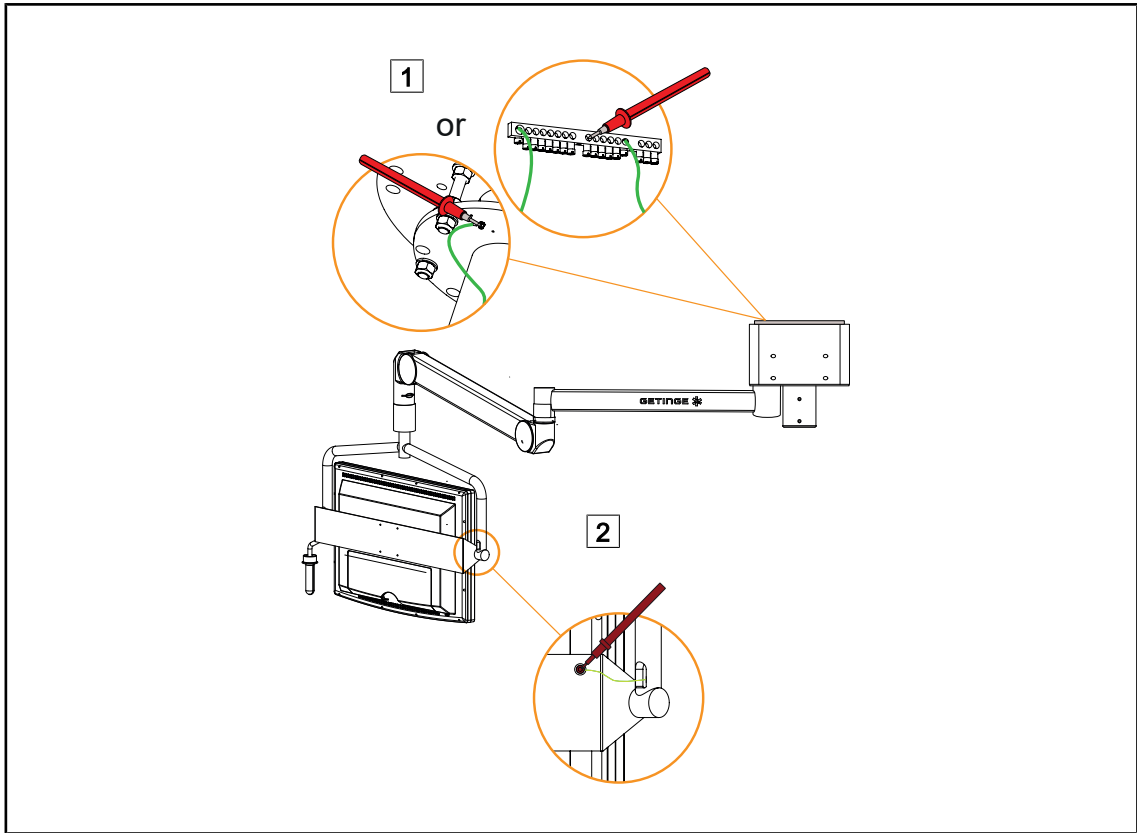


Fig. 57: XS32 electrical safety test

- The measurement should be made between the flange **1** and the earth wire connection on the mount **2**.

XS-XD monitor mount

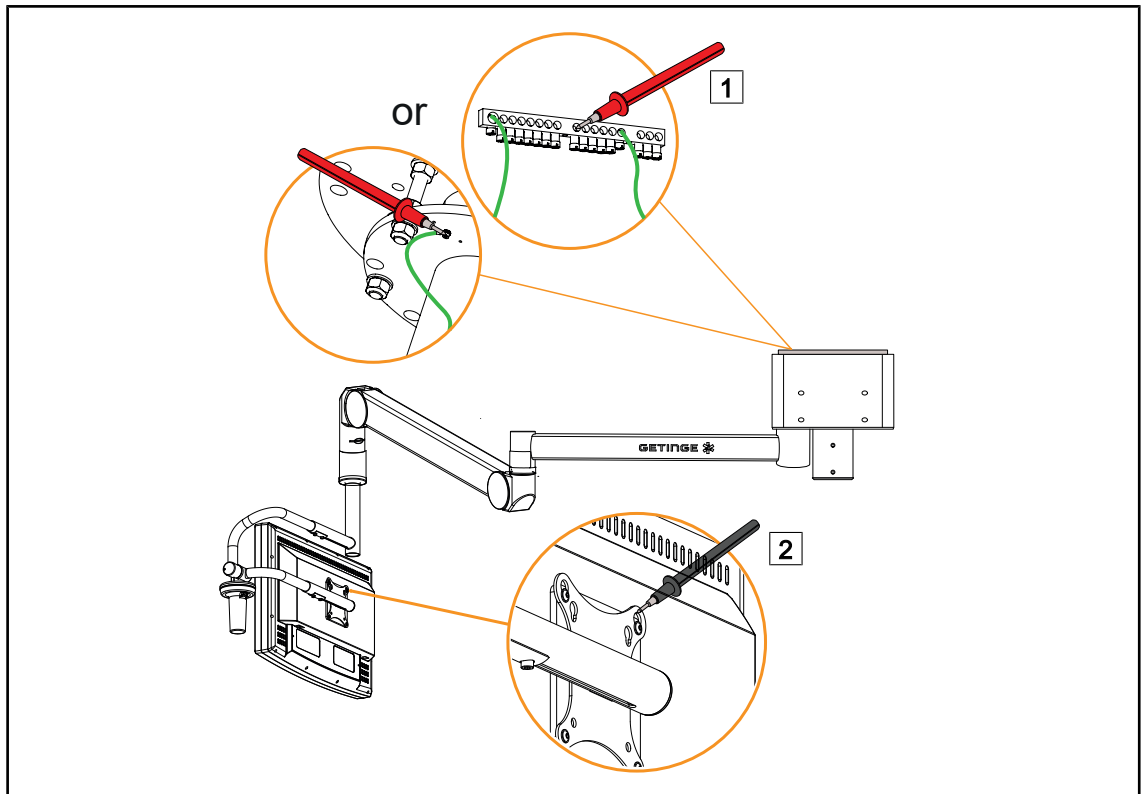


Fig. 58: XS-XD electrical safety test

- The measurement should be made between the flange **1** and the masked paint on the VESA block **2**.

SPC12 monitor mount

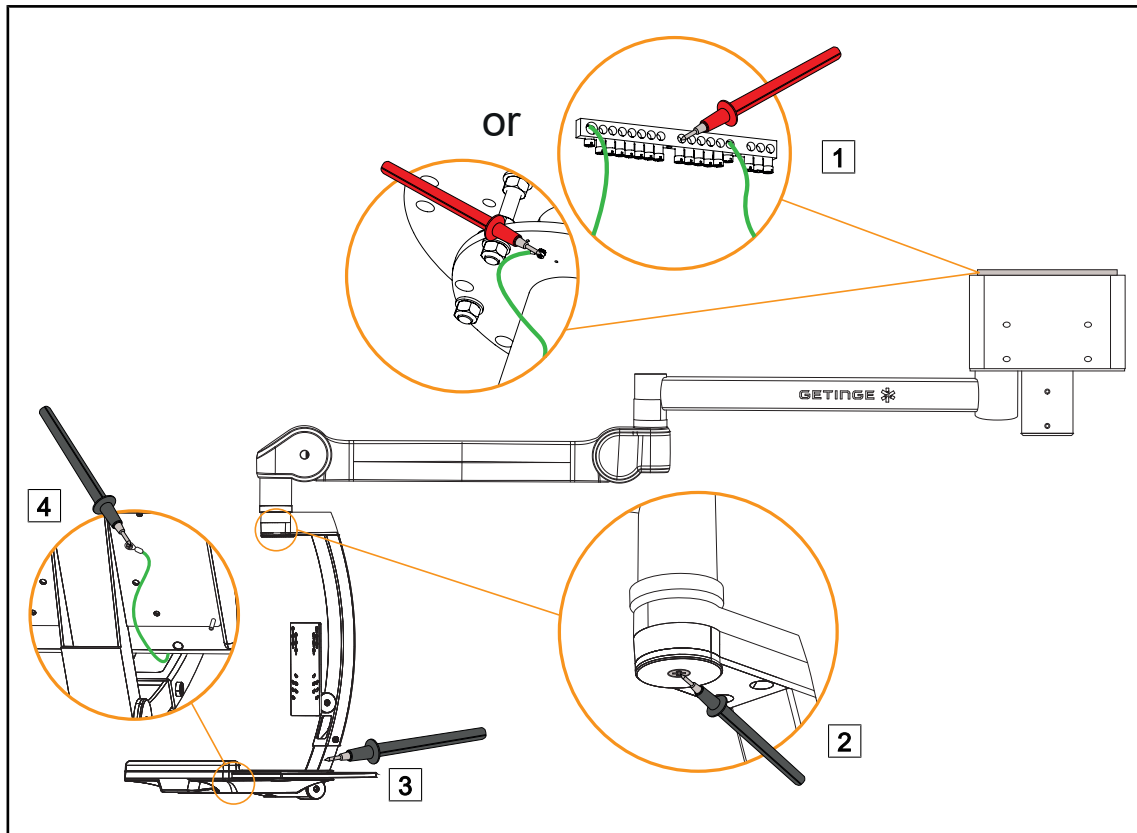


Fig. 59: SPC12 electrical safety test

- The measurement should be made between the flange **1** and cup mounting screw **2**, then between the flange **1** and strips **3**, and finally between the flange **1** and earth wire mounting screw on the tray **4**.

Camera mounts

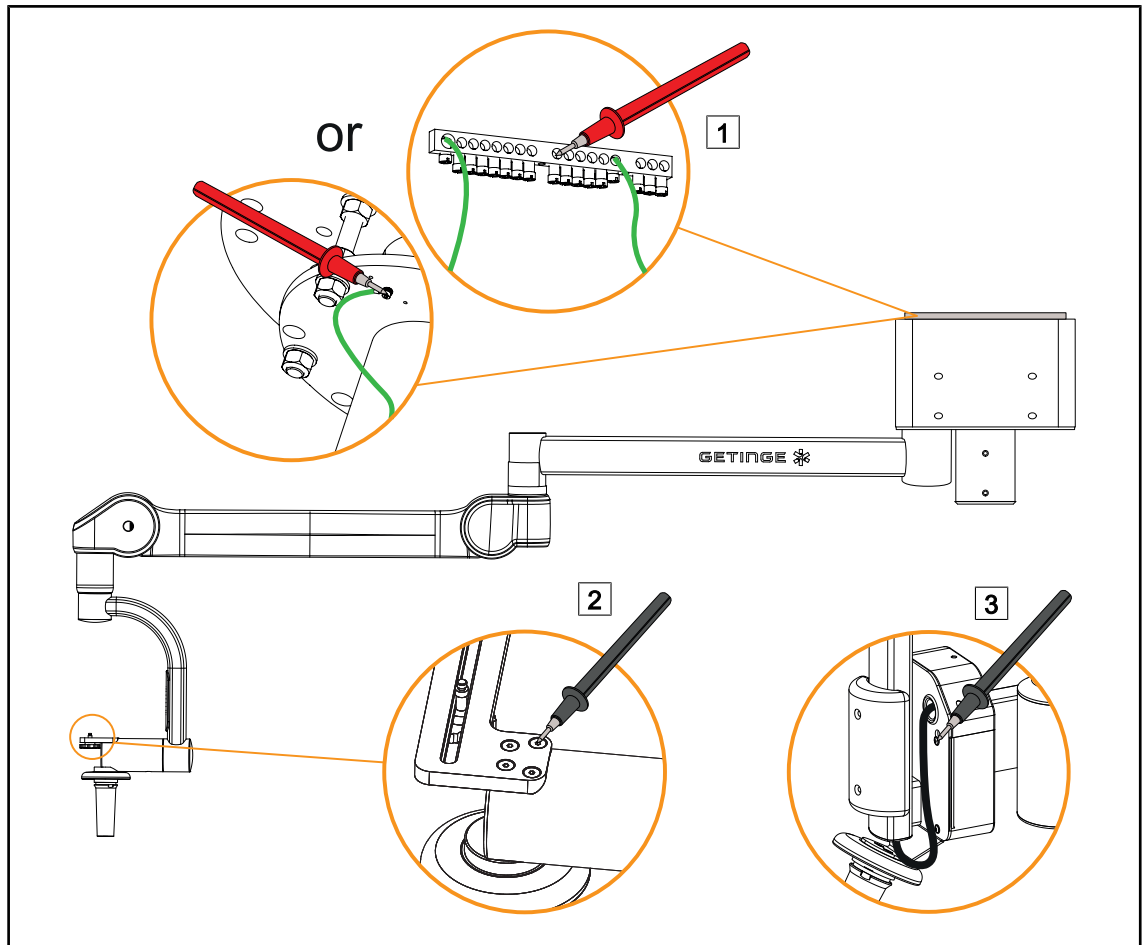


Fig. 60: Electrical safety test of the camera mounts

- For an SC05 camera mount, the measurement should be made between the flange [1] and the screws located on top of the camera mount [2].
- For a camera mount installed on an FHS0 monitor mount, the measurement should be made between the flange [1] and the monitor mount mounting screws [3].

6.3 Functional tests



NOTICE

Protective goggles [minimum UV Class 2 (EN 170) – Optical Class 1 – Orange shade] are recommended during installation and maintenance work on surgical lights.

- All LEDs operate correctly
- Check that all lighthead keypad functions are working correctly.
- Check that all wall-mounted keypad functions are working correctly
- Check that all touchscreen functions are working correctly
- The camera, if installed, is working properly (video and zoom)
- Switch over to battery mode and back to mains.

6.4 Recording the inspection

See also

 SW Service Protocol PM OR Lights PowerLED II-F-EN [] 49]

SW Service Protocol Preventive maintenance



Surgical Lighting Maquet PowerLED II



1. Customer

Address	Contact Name	Telephone number	Order number

Installation date	Location (department, room number, etc.)

2. Product

Configuration P/N	Configuration S/N	Description
Lighthouse 1 P/N	Lighthouse 1 S/N	Description
Lighthouse 2 P/N	Lighthouse 2 S/N	Description
Lighthouse 3 P/N	Lighthouse 3 S/N	Description
Equipment 1 P/N	Equipment 1 S/N	Description

The work time for all the service operations described in this documentation is estimated be 1 hour per lighthouse/equipment.

3. Periodic replacements

To ensure safety and performance please follow the below recommendations.

SB, TUB, TUB SAT, SA arm, SAT arm and A2000 & ONDASPACE spring arm ranges.

Items	Frequency	Replaced	Not replaced	N/A
All brake screws	Every year			
Suspension mounting screws (Tighten the screws to the recommended tightening torque)	Every 6 years			
Adapter mounting screws (Tighten the screws to the recommended tightening torque)	Every 6 years			
Spring-arm snap rings	Every 6 years			

Refer to the repair manual and appendices for detailed instructions.

TUBX, TUBX SATX ranges, SAX arm, SATX arm, and VALIA L+LCH+MD spring arms.

Items	Frequency	Replaced	Not replaced	N/A
All brake screws	Every year			
Suspension mounting screws (Tighten the screws to the recommended tightening torque)	Every 10 years			
Adapter mounting screws (Tighten the screws to the recommended tightening torque)	Every 10 years			
Spring-arm snap rings	Every 10 years			

Batteries

Items	Frequency	Replaced	Not replaced	N/A
Batteries	Every 3 years			

4. Other components replaced or to be replaced

Part No.	Description	Qty	Replaced	To be replaced

5. Calibrated tooling

Description	Registration number	Validity date (DD/MMM/YYYY)

6. Lubrication

OK NOK N/A

When needed only, lubrication of the lighthouse fork pin and arm shaft with the MAQUET-recommended grease, P/N ARD659000011			
Lubrication of the spring arm and suspension slip rings with the grease recommended by MAQUET, P/N ARD659000016			
Lubrication of the spring arm sliding parts with the grease recommended by MAQUET, P/N ARD659000016			

7. Mechanical assessment

OK NOK N/A

Anchor point			
Check the tightening of mountings and connectors, terminals and connection boxes.			
Check the ground connections.			
Suspension tube and ceiling cover			
Check the rigidity of the suspension by shaking the assembly.			
Verify the verticality of the tube.			
SAT and SATX tube: Check the tightening of the screws of the half-plates on shafts 2 and 3.			
SB tube: Check the tightening of the cover split rings.			
Check that the cover and retaining and upper seals are secure.			
Check that the silicone sleeve is secure and for the SAT tube the presence of the screw cover labels for shaft 2 and 3.			
Suspension arm			
Check that the suspension linking screws are present on the tube and the periodicity of replacement. (Do not re-tighten these screws during maintenance as there is a risk of fracture. If screws appear loosened, replace them)			
Check that the adjustment of the brake screws has been performed.			
Check the presence of the safety rings with holding screw.			
Check the presence of the discs inside the caps of shafts 2 and 3 SATX.			
Check that the XO cap, if present, is fastened securely.			
Check the presence of the bumpers and caps.			
Spring arm			
Check that the vertical stop is properly adjusted.			
Check the balance.			
AC2000: Check that the safety ring is in place with its mounting screw.			

ONDASPACE DF: Check that the safety plate is in place with its two mounting screws.			
ONDASPACE SF: Check that the safety ring is in place with its mounting screw.			
Check the correct installation of the covers and tightening of the screws.			
VALIA: Check the correct installation of the covers, flanges, and the tightening of the screws.			
VALIA: Check the presence of the flange covers and screw covers.			
VALIA: Check that the spring arm tabs are correctly positioned and that there is no friction noise on the cables.			
Check the condition, position and sliding of the tabs.			
Lighthouse			
Check that the adjustment of the brake screws has been performed.			
Check that the silicone covers, seals and cover are not loose.			
Check that there are no cracks or scratches on the underside.			
Check that the handle mount is firmly attached.			
Monitor mount			
Check the position of the stops for the orientation angles.			
Check that the handle mount is firmly attached.			
Check that the VESA interface is firmly attached to the mount and monitor.			
MHS0: If a cable guide solution is fitted, check that the four white clips are pushed in securely.			
XHD1: Check that the slip ring is lowered all the way.			
XHD1: Check that the cable protective sheath is installed properly and with the required 65-mm minimum clearance.			
XHD1: Check that the grey cover is closed.			
XHD1: Check that the caps at each end of the rail are fully inserted.			
XHD1: Check the ground connections.			
Check that the Rear Box and its contents are securely fastened.			
Check that the caps are fully inserted.			
Check that the adjustment of the brake screws has been performed.			
Monitor			
Check that there are no cracks or scratches.			
Camera mount			

Check the position of the stops for the orientation angles.			
Check that the handle mount is firmly attached.			
FHS0: Check that the camera mount is firmly attached to the FHS0 mount.			
SC05/07: Check that the adjustment of the brake screws has been performed.			
SC05/07: Check that the camera mount and Kodak screw are fastened securely.			
Check that the caps are fully inserted.			
Camera			
Check the condition of the connector.			
Check the rotation with no image loss.			
Check the general condition of the system.			
Configuration			
Check the legibility of all identifications and safety markings.			
Check the manoeuvrability of the configuration.			
Check that there is no corrosion or chipped paint.			

8. Electrical assessment

OK **NOK** **N/A**

Ceiling or wall power supply			
Check the tightening of the connections.			
Check the ground connections.			
Check the general condition of the power supply.			
Backup			
Check the tightening of the connections.			
Check the ground connections.			
Verify the output voltage of the batteries. (Record the value)			
Check the general condition of the backup, batteries, absence of swelling, leaks, oxidation.			

9. Optical assessment

Illumination	Acceptable values (klx)	Measured value (klx)	OK	NOK	N/A
Ec Max Lighthouse 1	98 < Ec < 160				
Ec Max Lighthouse 2	98 < Ec < 160				
Ec Max Lighthouse 3	98 < Ec < 160				

Measure the illumination at the centre, at 1 meter, in small light field (with dimmer at max setting or in Boost mode).
 The IEC 60601-2-41 standard indicates the limits between 40 000 lux minimum & 160 000 lux maximum.
 The minimum acceptable value was calculated based on the nominal value - 30%.

10. Electrical Safety Tests (IEC 62353)

	Limit (mΩ)	Measured values (mΩ)	OK	NOK	N/A
Lighthouse 1 protective earth resistance	≤ 300 mΩ				
Lighthouse 2 protective earth resistance	≤ 300 mΩ				
Lighthouse 3 protective earth resistance	≤ 300 mΩ				
Equipment 1 protective earth resistance	≤ 300 mΩ				

If available, test records should be attached to this report for possible future use.

11. Functional test

	OK	NOK	N/A
All LEDs operate correctly			
Check that all lighthouse keypad functions are working correctly			
Check that all wall-mounted keypad functions are working correctly			
Check that all touchscreen functions are working correctly			
Check that the camera operates correctly (video and zoom) and check the quality of the image on the screen.			
Switch to battery mode and back to AC mains mode			

12. Cleaning

Degrease and clean the external parts of the configuration	
--	--

13. Final assessment

Device fully operational.	
Free from direct risk but deficiencies detected. Possibility of short-term correction.	
Device shall not be used until all deficiencies are corrected.	
Device no longer safe. Taking out of service is recommended.	

Comments

14. Performed by

Name / Title	Date			Signature
	<i>DD</i>	<i>MMM</i>	<i>YYYY</i>	


15. Facility (Required)

Name / Title	Date			Signature
	<i>DD</i>	<i>MMM</i>	<i>YYYY</i>	

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