

**tedisel**medical

# ARES

## MAINTENANCE MANUAL



**CE** 0197

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## 1. Manufacturer

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## 2. Security information

Important notes in these operating instructions are marked with graphic symbols and signal words.

### 2.1. Injury risk warnings

Signal words such as DANGER, WARNING or CAUTION describe the degree of risk of injury. The different triangular symbols visually emphasise the degree of danger.



WARNING

Refers to a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

Refers to a potential hazard which, if not avoided, may result in minor or slight injury.



DANGER

Refers to an immediate danger which, if not avoided, will result in death or serious injury.



Risk of finger entrapment

### 2.2. Warnings of risk of damage

The signal word WARNING describes the degree of risk of material damage. The triangular symbol visually emphasises the degree of danger.



Damage to surfaces: warns of damage to surfaces due to unsuitable cleaning agents and disinfectants.



NOTICE

Refers to a potential hazard which, if not avoided, may cause damage to the equipment.

### 2.3. Supplementary symbols used in the safety instructions



Fire hazard



Explosion hazard: warns of ignition of explosive gas mixtures.



Dangerous voltage: warns of electric shock that can cause serious injury or death.



Failure of the roof support system



Risk of collision

### 2.4. Indication of additional information

NOTA

A NOTE provides additional information and useful tips for safe and efficient use of the device.

### 2.5. Proper use of oxygen.

#### 2.5.1. Oxygen explosion



Oxygen becomes explosive when it comes into contact with oils, greases and lubricants.

Compressed oxygen presents an explosion hazard:

- Make sure that oxygen and gas outlets are free of oil, greasy materials and lubricants!
- Do not use cleaning agents containing oil, grease or lubricants.

#### 2.5.2. fire hazard



DANGER: Escaping oxygen is combustible:

- Open fire, red-hot objects and open light are not allowed when working.

with oxygen!

- Don't smoke!

## 2.6. Patient environment

The dimensions in the figure below illustrate the minimum extent of the patient environment in an unrestricted area according to IEC 60601-1.

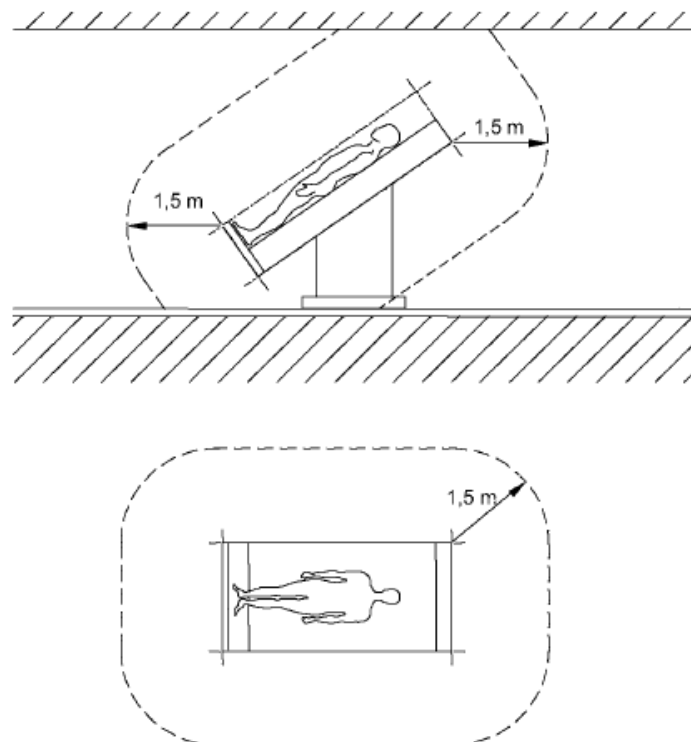


Fig. 1 Minimum extent of the PATIENT ENVIRONMENT

## 2.7. Combination with products from other manufacturers.

The suspension system is combined with the service head. To avoid dangerous overloads, which can damage or cause collapse of the service head and the pendant system, the specified maximum load capacity must be observed.



See section 6.7 of the user and cleaning manual supplied with the equipment.

Power supply packages intended to supply power to end devices must ensure electrical isolation and provide two protective measures according to IEC 60601-1.

NOTA

The party putting the device into operation is responsible for the validation of the whole system. If necessary, a conformity assessment procedure shall be performed and a declaration

of conformity with Article 22 of the Medical Devices Regulation (EU) 2017/745 shall be provided.



Read the Operating Instructions provided by the external manufacturer to obtain the necessary information for the operation of the end device.

### 3. Risks

#### 3.1. Gas explosion



Oxygen becomes explosive when it comes into contact with oils, greases and lubricants.

When in contact with oxygen in the air, medical gases may form an explosive or easily flammable gas mixture. The equipment is not suitable for use in environments containing flammable mixtures of anaesthetics with high concentrations of oxygen or nitrous oxide.

If such high concentrations of flammable mixtures of anaesthetics with oxygen or nitrous oxide occur in the environment of the device, there is a risk of ignition under certain conditions.

#### 3.2. Risk of device malfunction



CAUTION: If a device is connected to the equipment and trips the protection mechanism of the corresponding circuit in the health care facility, other devices connected to the equipment will not receive power.

#### 3.3. Fire risk



Plug-in connections for the supply of medical gases must not come into contact with oil, grease or flammable liquids.

#### 3.4. Danger of electric shock



Signal cables (network, audio, video, etc.) must be electrically isolated from equipment and building connection ends to prevent contact with currents that can cause serious injury or death.

## 4. Symbols used



Applicable part B



Earth (mass)



Equipotentiality



Protective earth (ground)



Connection point for neutral conductor



Nurse call button



Direct lighting



Indirect lighting



Operating instructions



Health Product



Waste electrical equipment





CE symbol



Product code



Unique identification code



Serial number



Manufacturer



Date of manufacture



Reference to the instruction manual



Damage to surfaces



Fire hazard



Danger of explosion



Dangerous tension



Notice

## NOTICE



Risk of finger entrapment



WARNING

Warning



CAUTION

Caution



DANGER

Danger

## 5. Product data

This manual refers to the ARES model. This model is part of the SICS family.

### 5.1. Storage conditions

The individual packaging of this type of product consists of a bubble wrap on the inside and a cardboard box on the outside. Non-stackable packaging.

Under no circumstances should the product be stored with open or damaged packaging. If the product is inspected on receipt and installation is not carried out within 1 day, the product packaging must be resealed.



NOTICE: Failure to follow these instructions may result in damage to the equipment.

Recommended temperature range: -20 °C to 60 °C

Recommended humidity range: 10 % to 75 %.

Atmospheric pressure: 500 hPa to 1,060 hPa

### 5.2. Operating conditions



NOTICE: Failure to follow these instructions may result in damage to the equipment.

Recommended temperature range: -10 °C to 40 °C

Recommended humidity range: 30 % to 75 %.

Atmospheric pressure: 700 hPa to 1,060 hPa

### 5.3. Service life

The service life of the SICS family of products is determined by the service life of the medical gas intakes it incorporates, which is 8 years.

### 5.4. Purpose of the product

These systems have three main distinct functions within the hospital:

- Medical gas services
- Electrical, voice and data services
- Lighting
- Nurse call

They consist of a chassis made of aluminium profiles, which integrates the electrical equipment, call, voice and data systems, and installation and channelling of medical gas outlets.

## 6. Maintenance

Re-inspection shall be carried out in accordance with EN 62353.

### 6.1. Training

Personnel performing maintenance must be trained and qualified by the customer. Persons who:

1. have been instructed in the maintenance of this device by means of this instruction manual as a basis.
2. are able to assess the tasks they perform on the basis of their own professional experience and training in relevant safety standards and can recognise the potential hazards involved in the work.

### 6.2. Previous actions

- Disconnect all poles of the pendant system and the Service Head from the mains and prevent reconnection.
- Ensure that all devices connected via the service header are de-energised.
- Wait until the terminal device (e.g. high frequency surgical device, flat panel display, etc.) has cooled down.

The necessary maintenance work must be carried out as specified in the inspection plan in this manual.

NOTA

Built-in components from third party manufacturers must be inspected and maintained as prescribed in the corresponding Operating Instructions.

## 6.1. Disassembly and assembly of covers

The ARES service head is supplied finished, so for on-site installation, the side walls and top covers must be removed in order to be able to connect to the downpipes and, if necessary, to fit other accessory equipment (element trolleys).



Disconnect the equipment electrically before proceeding with the disassembly of covers and end caps.

### 6.1.1. Disassembly and assembly of top covers

- Using a flat-nosed tool and taking care not to damage the paint on the top covers, remove the bottom covers of the downpipes ①, these are press-fitted. See figure 1.
- Now move the upper covers of the main body ②, which are also press-fitted, by hand, first in the direction of the main body and and, once the side wall has been cleared, by pulling them upwards. See figure 1.

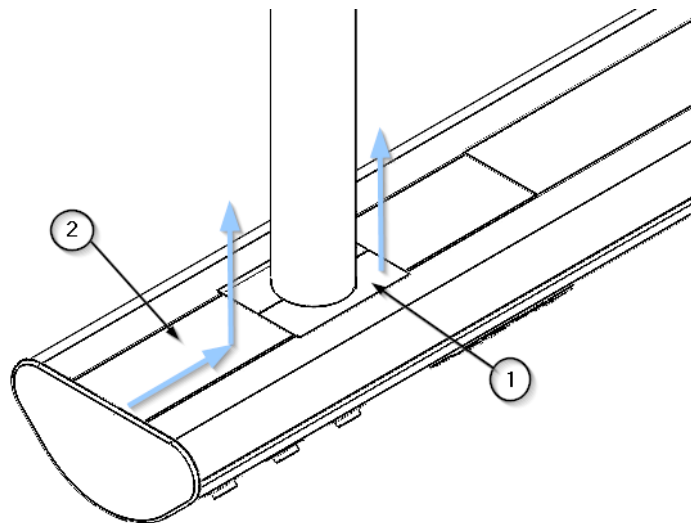


Fig. 2 Removal of main body covers

- To reassemble these covers, carry out the above steps in reverse order.
- First attach the top covers ②. You will hear a sound when the clipping is done, slide it until it makes contact with the side wall. Check that the covers are securely fastened.
- Then fit the lower downpipe covers ① and press them in until you hear them click into place. Check that they are properly secured.

### 6.1.2. Disassembly and assembly of side walls

- Remove the top cover from the main body as described in section 6.1.1 of this manual.

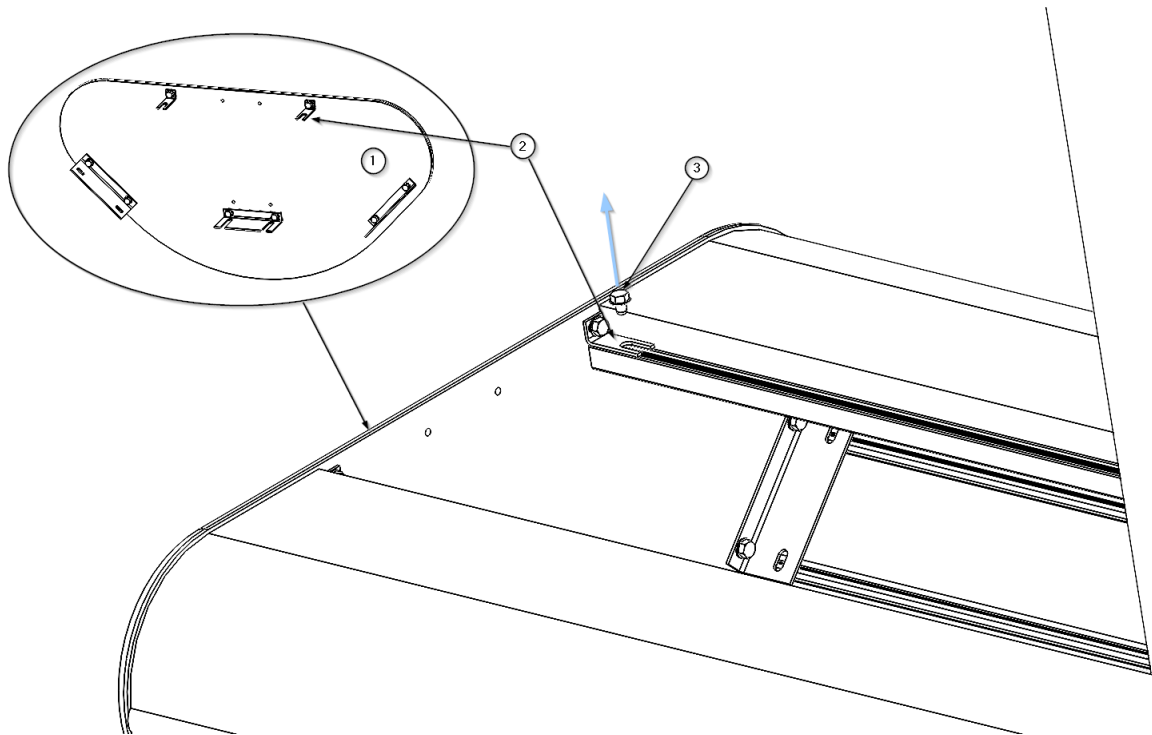


Fig. 3 Disassembly/assembly of end caps on ARES main body

- Using a hexagonal tool, remove the 8 M4 x 6 screws (3) securing the 5 side flanges (2) of the side wall (1), as shown in figure 2.
- Carefully remove the side panel (1) and place it in a safe place.
- To reassemble the end caps, carry out the above steps in reverse order.
- First attach the end cap (1) by supporting the side tabs (2) in the threaded slots of the main body and secure it with the 8 M4 x 6 screws (3).
- Check that the side wall (1) is properly fixed.

### 6.2. Replacement of LED strips and drivers in the indirect light module

If the indirect light module of the ARES system malfunctions, both the LED strips (5) and the drivers (7) must be replaced.

There are two possibilities for indirect lighting in ARES service heads, a lighting module centred on the top face (1) or a lighting module offset from the central area or asymmetrical (2) which would be placed closer to the service area. See figure 3.

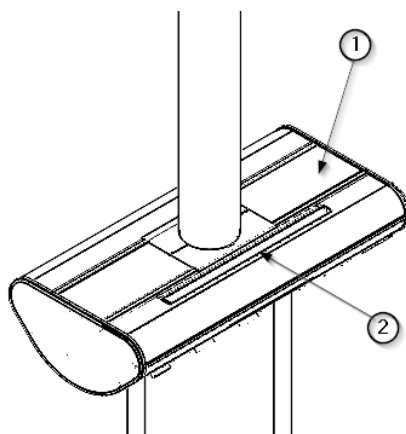


Fig.4 Position of indirect light

### 6.2.1. Replacement of LEDs and controllers in central indirect lighting



Disconnect the equipment electrically before replacement.

- Unscrew the 2 M4 x 10 countersunk screws ① DIN 935 using a Phillips screwdriver as shown in figure 4.
- Remove the polycarbonate cover ② and store it in a safe place. The lighting module is visible.
- Remove the 4 socket head cap screws M5 x 10 ③ DIN 912 using an Allen tool. The lighting module is now loose.
- Disconnect the quick connector from the LED strips ⑤. The module can now be turned over and the controllers ⑦ and their terminal strip can be seen.
- Disconnect the power supply to the controllers ⑦ from the terminal strip.
- Unscrew the M4 x16 hex screws ⑧ DIN 933 by releasing the tabs ⑥ holding the controllers ⑦.
- Fit the new controllers ⑦ and secure them with the tabs ⑥ by screwing in the hexagonal screws ⑧.
- Connect the power supply of the controllers back to the terminal strip.
- Unscrew the M4 x16 hex screws ④ DIN 933 releasing the LED strips ⑤.
- Fit the new LED strips and secure them with the hexagonal screws ④.
- Connect the power supply cable of the newly installed LED strips.

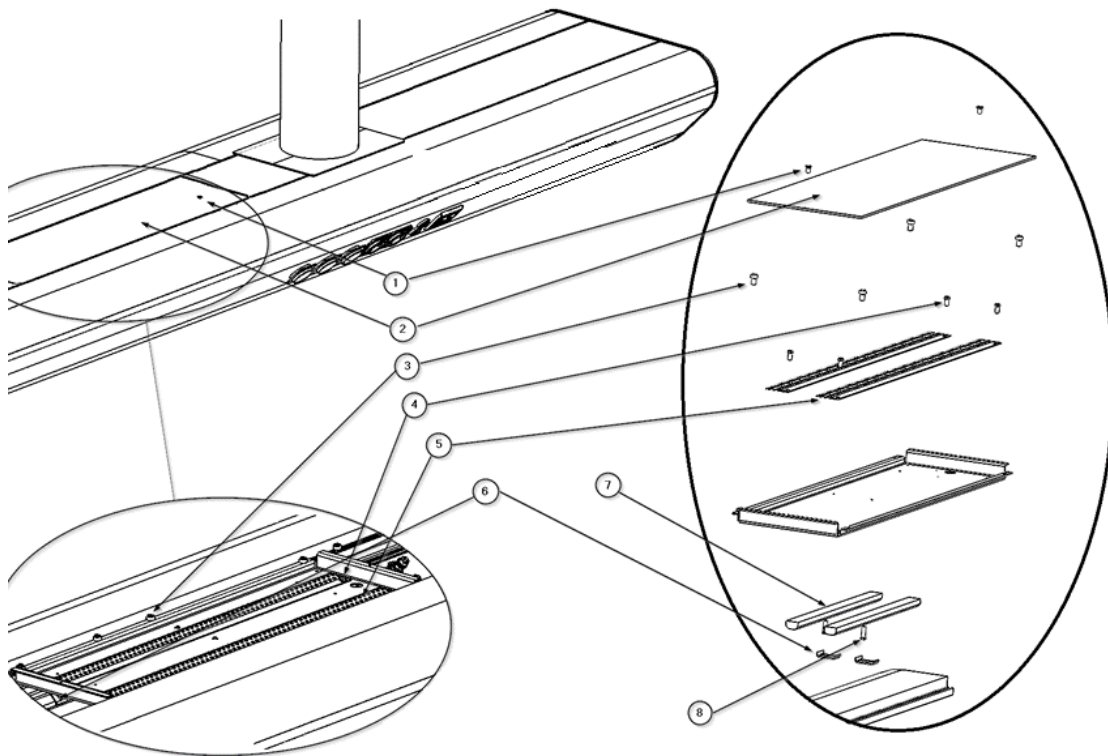


Fig.5 Substitution of indirect light

- Re-attach the module by screwing in the 4 M5 x 10 socket head cap screws (3) DIN 912 using a hexagon socket tool. Check that the lighting module is fixed in position.
- Power up the lighting circuit and perform a test run to check that the lighting module switches on and off.



Contact with live parts can cause an electric shock.

- Replace the polycarbonate cover (2) and screw in the 2 M4 x 10 countersunk screws (1) DIN 935.

### 6.2.2. Replacement of LEDs and drivers in asymmetrical indirect lighting

Figure 5 shows a picture of the service head without the side wall to clarify the situation of the lighting module.

- Remove the top cover from the main body as described in section 6.1.1 of this manual. The lighting module is visible.



See section 6.1.1 of this manual.

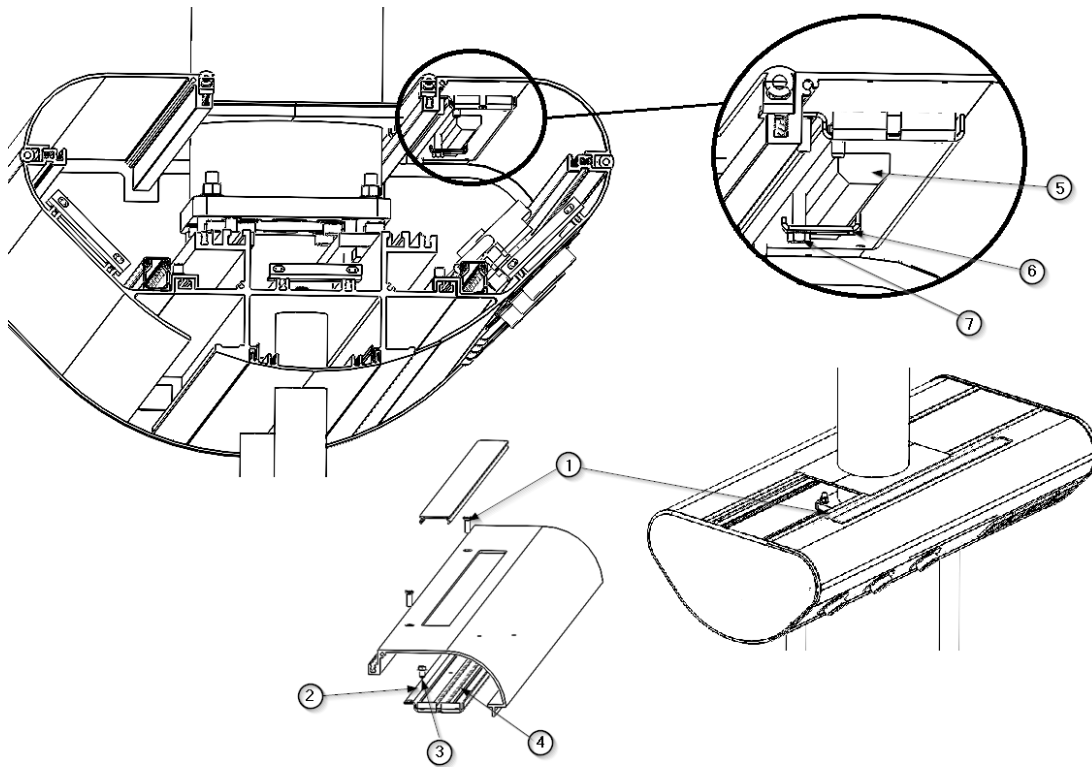


Fig.6 Replacement of LEDs and drivers in asymmetric indirect lighting

- Unscrew the 2 M4 x 10 countersunk screws ① DIN 935 as shown in figure 5 using a Phillips screwdriver.
- Disconnect the quick connector from the LED strips ④. The module can now be turned over and the controllers ⑤ and their terminal strip can be seen.
- Disconnect the power supply to the controllers ⑤ from the terminal strip.
- Unscrew the M4 x16 hex screws ⑦ DIN 933 by releasing the tabs ⑥ holding the controllers ⑤.
- Fit the new controllers ⑤ and secure them with the tabs ⑥ by screwing in the hexagonal screws ⑦.
- Connect the power supply of the controllers ⑤ back to the terminal strip.
- Unscrew the M4 x16 hex screws ③ DIN 933 releasing the LED strips ④.
- Fit the new LED strips ④ and secure them with the hexagonal screws ③.
- Connect the power supply quick connector of the newly installed LED strips ④.
- Using a star tool, reattach the bracket ② of the lighting module by screwing in the 2 M4 x 10 countersunk screws ① DIN 935.
- Check that the lighting module is fixed in position.



### 6.3. Replacement of LED strips and drivers in the direct light module

If the direct light module of the ARES system malfunctions, both the LED strips (5) and the drivers (2) must be replaced.



Disconnect the equipment electrically before replacement.

- Remove the top covers as described in section 6.1.1 of this manual. The lighting module, the drivers (2) and its terminal strip are visible.



See section 6.1.1 of this manual.

If, due to the configuration of the equipment, the indirect light module does not allow manipulation of the direct lighting module, remove it as indicated in the previous point.



See section 6.4 of this manual

- Disconnect the power supply of the controller (2) from the terminal strip.
- Unscrew the 2 M4 x 8 hexagon screws (1) DIN 7500 and release the lighting module. The LED strip (5) and its quick connector are visible. See figure 6.

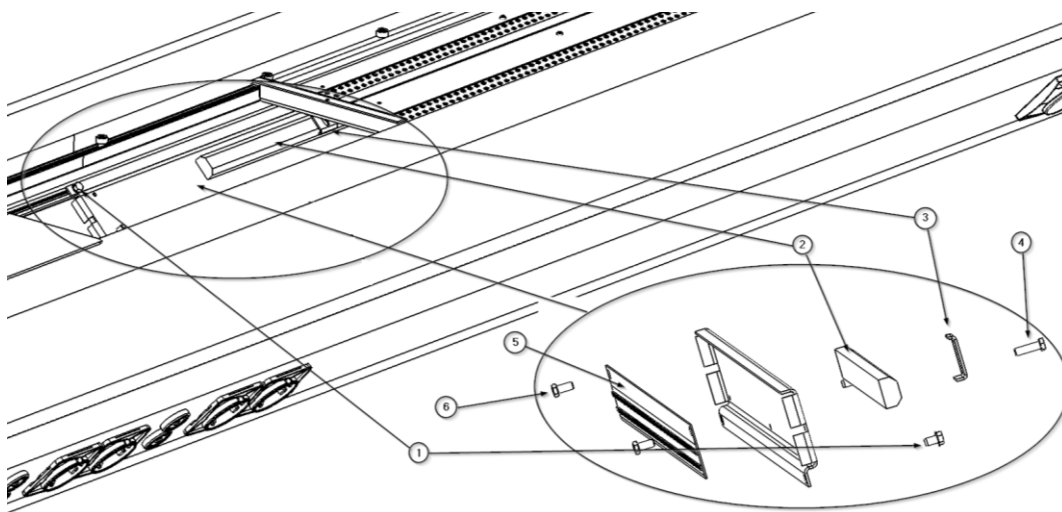


Fig.7 Substitution of direct light

- Disconnect the quick connector from the LED strip (5).
- Unscrew the M4 x10 hex screws (6) DIN 933 releasing the LED strip (5).
- Fit the new LED strip (5) and secure it with the hexagonal screws (6).
- Connect the quick connector of the LED strip (5).
- Unscrew the M4 x16 hex screw (4) DIN 933 releasing the tab (3) holding the controller (2).

- Fit the new controller ② and secure it with the tab ③ by screwing in the hexagonal screw ④.
- Re-attach the module by screwing in the 2 M4 x 8 hex screws ① DIN 7500. Check that the lighting module is fixed in position.
- Connect the power supply of the controller ② back to the terminal strip.
- Power up the lighting circuit and perform a test run to check that the lighting module switches on and off.



Contact with live parts can cause an electric shock.

- If it was necessary to remove the indirect light module, refit and reconnect it as described in point 6.2.1 of this manual.



Refit the top covers as described in section 6.1.1 of this manual.

See section 6.1.1 and 6.2.1 of this manual.

## 6.4. Structural and movement check

A complete inspection of the entire suspension system shall be carried out, adjusting all parameters that deviate from those initially foreseen.

- Carry out a visual inspection to detect if any item is not properly fixed and there is no deformation or damage to any item.
- Check the pivot stops of each pivot point and adjust them if necessary.
- Check that the pneumatic/electromagnetic brakes function correctly, i.e. that they release when the corresponding push buttons are operated.
- Check that the extension arms can be comfortably brought into the desired position.
- Check that the gas hoses are not kinked or kinked, if necessary, release and reconnect them without tension and check the system's swivel stops to ensure that they are not re-tensioned / kinked.
- Adjust, if necessary, the friction brakes of the individual pivot points.

### 6.4.1. Adjustment of the rotary stops

The extension arm and drop tube are equipped with at least 1 ball stop that prevents the internal cables from being destroyed. With 1 ball stop installed, the swivel range is restricted to a maximum of 340 degrees. With 2 ball stops installed, the swivel range can be further restricted.

NOTA

For the version with an inverted arm, 2 ball stops must always be mounted between the extension arms to prevent the extension arms from hitting each other.

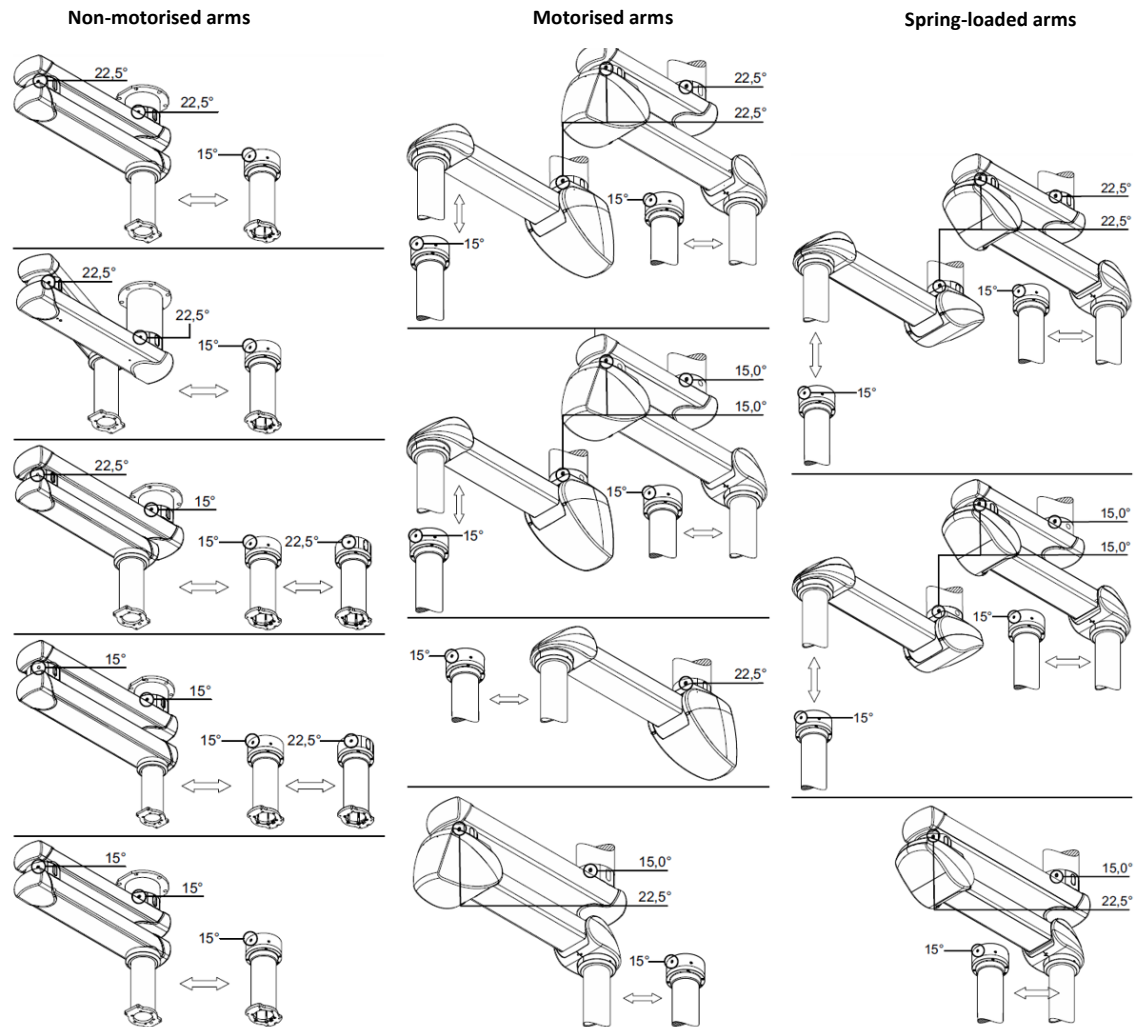


Fig.8 Adjustment of the rotary stops

The swivel ranges of the drop tube and arm versions are different:

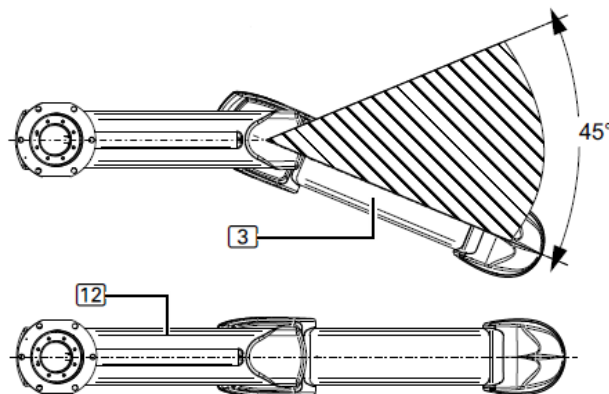
- For versions with low load capacity adjust the swivel range of the upper and lower extension arms in increments of 22.5 degrees. Use one M16 fixing screw and two  $\varnothing$  12.7 mm ball stops for each extension arm or motorised arm.
- For versions with medium load capacity set the swivel range of the upper extension arm to 15.0 degree graduations and the swivel range of the lower extension arm to 22.5 degree graduations. Use 1 M20 fixing screw and 2 ball stops  $\varnothing$  16 mm for the upper extension arm. Use 1 M16 set screw and 2 ball stops  $\varnothing$  12.7 mm for the lower extension arm.

- For high load capacity versions, set the swivel range of the upper and lower arms in 15.0 degree increments. Use 1 M20 fixing screw and 2 ball stops  $\varnothing$  16 mm for each arm.
- For versions with pneumatic and friction brake adjust the swivel range of the upper and lower extension arms in 15.0 degree increments. Use 1 M16 fixing screw and 2 ball stops  $\varnothing$  10 mm for each extension arm.
- For versions with drop tube with friction bearing unit (roller bearing) set the swivel range of the console tube in increments of 15.0 degrees. Use 1 M16 fixing screw and 2 ball stops  $\varnothing$  10 mm for each drop tube.
- For versions with electromagnetically braked drop tube, set the swivel range of the bracket tube in increments of 22.5 degrees. Use 1 M16 fixing screw and 2 ball stops  $\varnothing$  12.7 mm for each drop tube.

NOTA

A magnetic pin or similar tool is required to displace the ball stop. Telescopic magnet pick-up tool kit is available as an option.

- For double arm versions with friction bearing in between, it is recommended to fit 2 ball stops (3) (see Fig. 8). The detailed illustration shows the intermediate bearing (11) (without outer ring) and the position of the stop screw (1) in the ball stops (3).



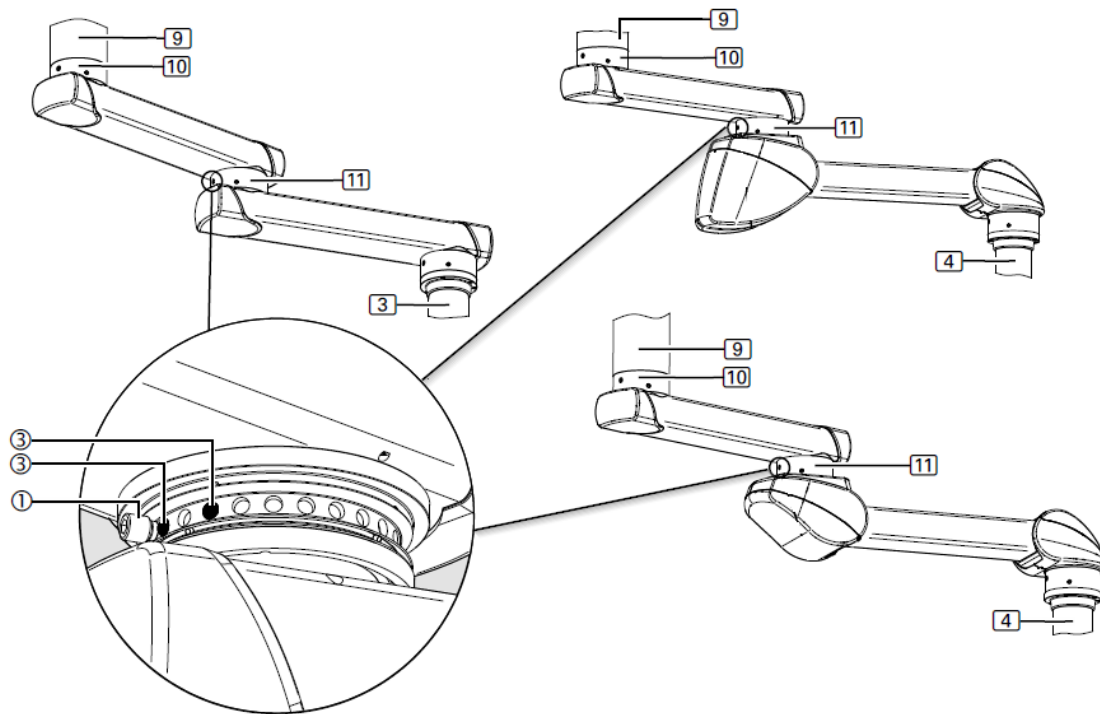


Fig.9 Double double arm system and friction bearing between arms

When adjusting the end stop as illustrated in Figure 8, the dead centre area is  $45^\circ$ . This means that the spring arm (3) has a maximum range of movement of approx.  $315^\circ$ . If the minimum setting on the end stop is not defined while adjusting the brakes on the intermediate bearing (11) and the ceiling bearing (10), it is quite difficult to bend the suspension system from the stretched position (12) and turn it on the intermediate bearing (11) of the spring arm (3).

When moving the adapter on the drop tube (4) from the extended position (12), there is a risk that the extension arm and spring arm will rotate around the ceiling bearing (10) although it would be desirable to bend in the area of the intermediate bearing (11).

#### 6.4.2. Adjustment of the mechanical brake on the arms

In case of failure of the pneumatic (compressed air operated) brakes, additional mechanical brakes (friction brakes) keep the extension arm and motor arm stable. Adjust the braking force in such a way that the motor arm or extension arm remains stable in any position and can still be adjusted conveniently.

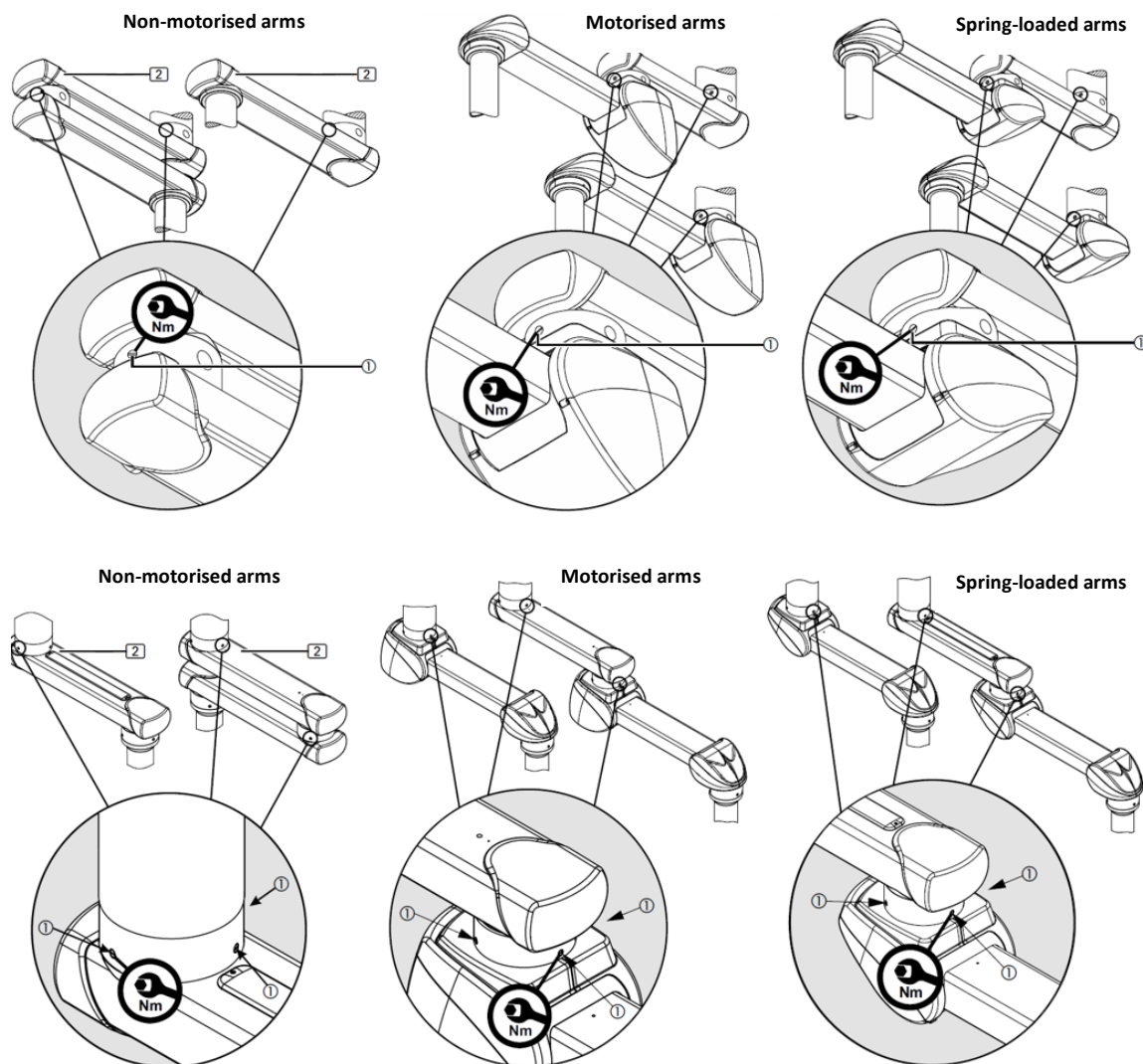


Fig.10 Friction brake adjustment

The mechanical brakes (friction brakes) hold the extension arm (2) in any set position. Adjust the braking force in such a way that the extension arm (2) remains stable in any position and can still be adjusted conveniently.



Risk of collision. If the brakes are not correctly adjusted, the extension arm may automatically move in an uncontrolled manner.

NOTA

Observe the end stop recommendation in chapter 6 and make sure to tighten the brake bolts of the Unit on the roof tube more than at the bearing point of the lower extension arm. This facilitates the bending of the lower extension arm and allows the bearing unit on the lower extension arm to rotate freely.



See section 6.4 of this manual.

Use a suitable torque spanner to adjust the brake.

- To increase the braking force, tighten the slotted brake screws (1) by turning them evenly to the right (clockwise). Tighten to 1.6 Nm.
- To reduce the braking force, unscrew the slotted brake screws (1) by turning them evenly to the left (counterclockwise).
- Carrying out a test run

#### 6.4.3. Adjustment of the mechanical brake on the drop tube (with bearing)

The brake screw (friction brake) is adjusted in the same way for all different versions of the suspension system. Adjust the braking force of the respective end device so that the end device remains stable in any set position and can still be adjusted comfortably. In the figure below you can see the adjustment scheme for the service head.

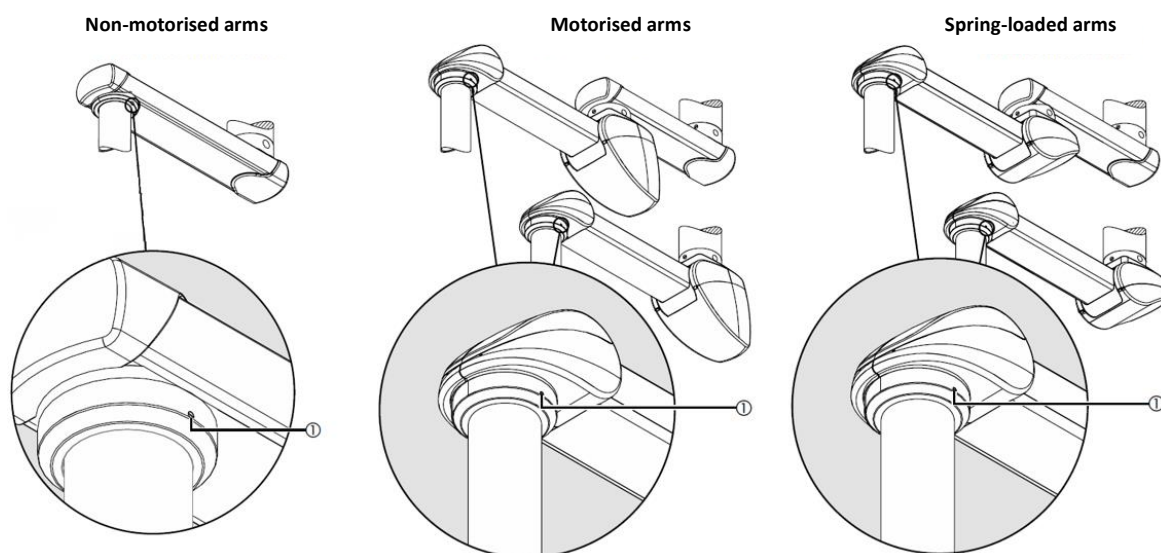


Fig.11 Friction brake adjustment on drop tube with bearing

Use a suitable flat-blade screwdriver.

- To increase the braking force, insert the flat screwdriver into the brake screws (1) and turn it clockwise to the right.
- To reduce the braking force, insert the flat screwdriver into the brake screws (1) and turn it to the left (counterclockwise).
- Carry out a test run.



#### 6.4.4. Adjustment of the mechanical brake on the drop tube (with bearing)

The brake screws (friction brakes) are adjusted in the same way for all different versions of the suspension system. In the case of the drop tube with friction bearing unit, the mechanical brakes (1) (3 friction brakes) hold the end device (e.g. the service head) in the set position. Adjust the braking force in such a way that the corresponding end device (e.g. service head) remains stable in any set position and can still be adjusted comfortably.

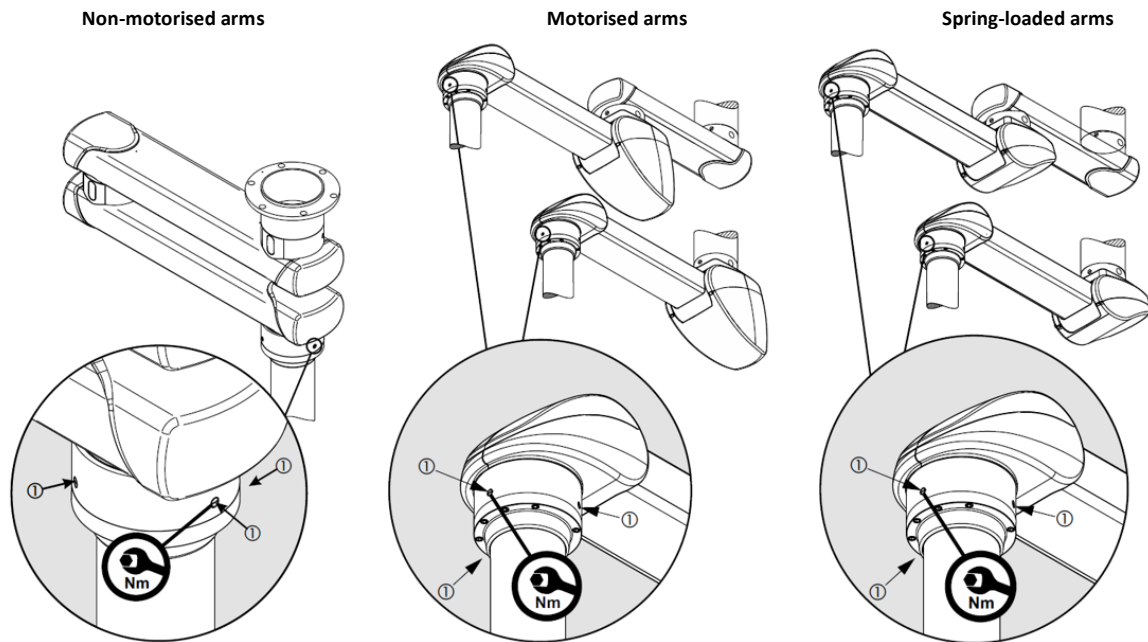


Fig.12 Adjustment of friction brake on drop tube with bearing

Use a suitable torque spanner to adjust the brake.

- To increase the braking force, tighten the slotted brake screws (1) by turning them evenly to the right (clockwise). Tighten to 1.6 Nm.
- To reduce the braking force, unscrew the slotted brake screws (1) by turning them evenly to the left (counterclockwise).
- Carrying out a test run

#### 6.4.5. Vertical lift adjustment on the motor arm

The simplified representation illustrates the extension arm and motor arm without the cables mounted. The adjustment is identical for all versions.

The motor arm has a vertical lift of + 20 degrees in the upward direction and - 30 degrees in the downward direction. The vertical lift can be restricted in both upward and downward direction.



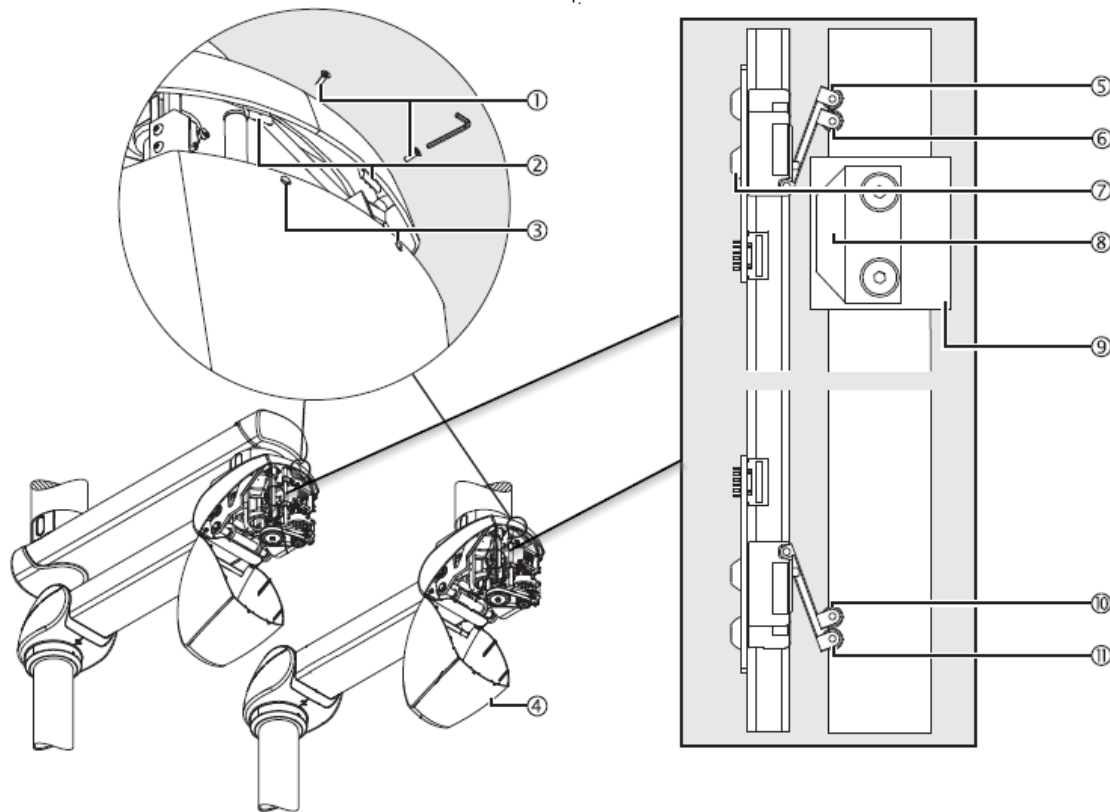


Fig.13 Opening of the lower rear cover and component details

- To adjust the height of the motor arm, the end stop (8) on the ball screw nut (9) is directed towards the 2 upper end switches (5)/(6) and 2 lower end switches (10)/(11) which switch off the motor.
- The end switch (6) or (10) actuated first by the end stop (8) ensures decelerated starting or braking (SoftStart / SoftStop) of the motor.
- The second limit switch (5) or (11) switches the engine off.
- The upper and lower vertical lifts are adjusted separately and one after the other. To adjust the vertical lift, move the motor arm to the desired upper or lower height position.



Disconnect all poles of the pendant system from the mains and prevent it from being switched on again.

- Use an Allen key (size 2.5) and unscrew 2 M4 x 6 mm countersunk Allen screws (7) - ISO 7380 - 10.9.
- Push the circuit board with the end switches (5)/(6) towards the end stop (8) until the end switch (5) or (11) audibly engages and then tighten the 2 M4 x 6 mm countersunk Allen screws (7) - ISO 7380 - 10.9.



If the motor arm moves without a properly installed limit switch, the motor arm may be damaged and must be replaced.

The vertical lift adjustment may change gradually during operation if the M4 x 6 mm countersunk Allen screws ⑦ - ISO 7380 - 10.9 have not been tightened correctly. In this case, there is a risk of the motor arm hitting the ceiling or other hanging system.



Tighten the M4 x 6 mm countersunk socket head cap screws ⑦ to 3 Nm

- Close the lower rear cover ④ as described in the following section and perform a function test.
- Repeat these steps for limit switches ⑩/⑪ if necessary.

#### 6.4.5.1. Opening / closing of the lower rear cover

To open the lower rear cover, use an Allen key (size 2).

- Unscrew the 2 M3 x 10 mm countersunk Allen screws ① from the 2 openings ③.
- Release the 2 latches ②.
- Manually direct the lower rear cover ④ all the way down until it points downwards in a completely vertical position.
- To remove the cover ④, turn it approx. 45 degrees downwards.
- Be sure to pass this position before releasing the cover ④.

To close the rear bottom cover, push it back in until the 2 latches ② snap into place.

- Check that the cover ④ sits on the side covers without gaps.
- Insert the 2 M3 x 10 mm countersunk Allen screws ① into the 2 openings ③ in the cover ④ and tighten them.

#### 6.4.6. Correcting the vertical alignment of the Service Head on a power arm

After mounting an end device (e.g. medical device, etc.), it may be necessary to vertically align this end device.

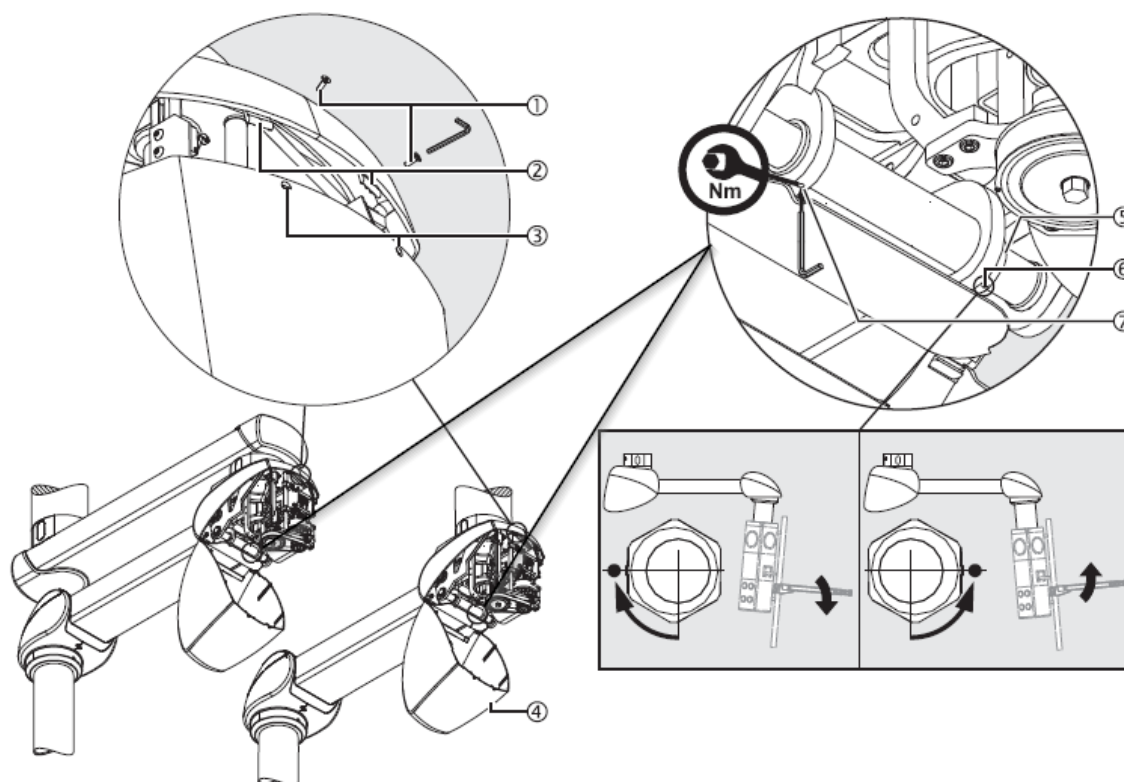


Fig.14 Adjusting the load capacity of the motor arm and closing the rear bottom cover

- Open the lower rear cover as described in point 6.3.5.1 above.
- Use an Allen key (size 4) and a spanner (size 36).
- Loosen the M4 set screw (7) - DIN 914 using the Allen key.
- Place the spanner on the hexagonal bolt (5).
- The indicator screw (6) points downwards (do not loosen this screw).
- To lower the tray in the example shown in Fig. 61, turn the hexagonal bolt (5) so that the indicator screw (6) points forwards (towards you). See Fig. 61 Detail view, bottom right.
- To lift the tray in the example shown in Fig. 61 turn the hexagonal bolt (5) so that the indicator screw (6) points backwards (away from you). See Fig. 61 Detail view, bottom right.
- Carry out a test run.
- Tighten the M4 grub screw (7) - DIN 914.

The vertical alignment can change progressively during use if the M4 fixing screw (7) - DIN 914 has not been tightened correctly. If this happens, the CEMOR service head or monitor bracket no longer remains stable in its adjusted position.



Tighten the M4 set screw ⑦ - DIN 914 to 2 Nm.

- Close the lower back cover as described in point 6.3.5.1 above.

#### 6.4.7. Adjusting the load capacity on the spring arm

The simplified representation illustrates the extension arm and the spring arm without the cables mounted. The adjustment is identical for all versions. The spring arm is equipped with 1 or 2 springs which compensate the weight of the CEMOR or the service head with the end device (e.g. flat screen, medical device, etc.).

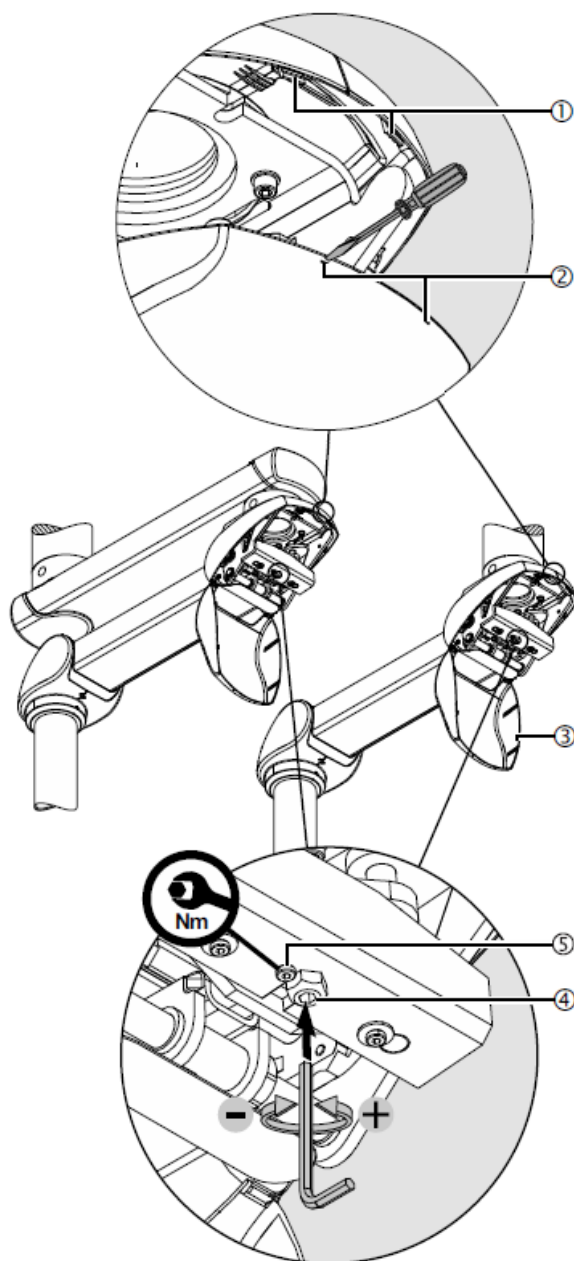


Fig.15 Adjusting the load capacity of the spring arm and the rear bottom cover lock

Adjust the load capacity of the spring arm so that the spring arm with service head or CEMOR monitor holder and the end device (e.g. flat screen, medical device, etc.) remain stationary in any set position.

NOTA

If the spring arm does not remain in position after adjusting the spring tension, the spring arm must be replaced by a service technician.

Possible versions of spring-loaded equipment: 30-60 kg, 50-80 kg, 70-110 kg, 80-135 kg, 120-180 kg.

The load capacity ranges and the maximum load capacity are indicated on the spring arm nameplate.

- Use an Allen key (size 10) and a ring spanner (size 24).
- Unscrew the socket head cap screw M8 x 16 mm ⑤ - DIN 7984 with the ring spanner.
- Insert the Allen key into the set screw ④.
- Raise the spring arm approx. 10 degrees above horizontal (0 degree position) to relieve the tension on the adjusting screw ④.
- If the spring arm moves downwards, the load capacity is too low.
- Turn the Allen key to the left (counterclockwise) as illustrated in the figure.
- If the spring arm moves upwards, the load capacity is too high.
- Turn the Allen key to the right (clockwise) as illustrated in the figure.
- Carry out a test run.
- Screw in and tighten the socket head cap screw M8 x 16 mm ⑤ - DIN 7984 with the ring spanner.

The load capacity setting can change progressively during operation if the M8 x 16 mm socket head cap screw ⑤ - DIN 7984 has not been tightened correctly. If this is the case, the spring arm no longer remains stable in its adjusted position.



Tighten the M8 x 16 mm hexagon socket screws ⑤ to 12 Nm

#### 6.4.7.1. Opening / closing of the lower rear cover

To open the lower rear cover

- Insert a suitable screwdriver into the 2 openings ② one after the other and then release the 2 latches ①.
- Fold down the rear bottom cover ③.

To close the rear bottom cover, push it back in until the 2 latches ① snap into place.

- Check that the cover ③ sits on the side covers without gaps.

#### 6.4.8. Adjusting vertical lift on a spring arm

When replacing an end device (e.g. flat panel display, medical device, etc.), the spring arm must be adjusted to a horizontal position (0 degree position).

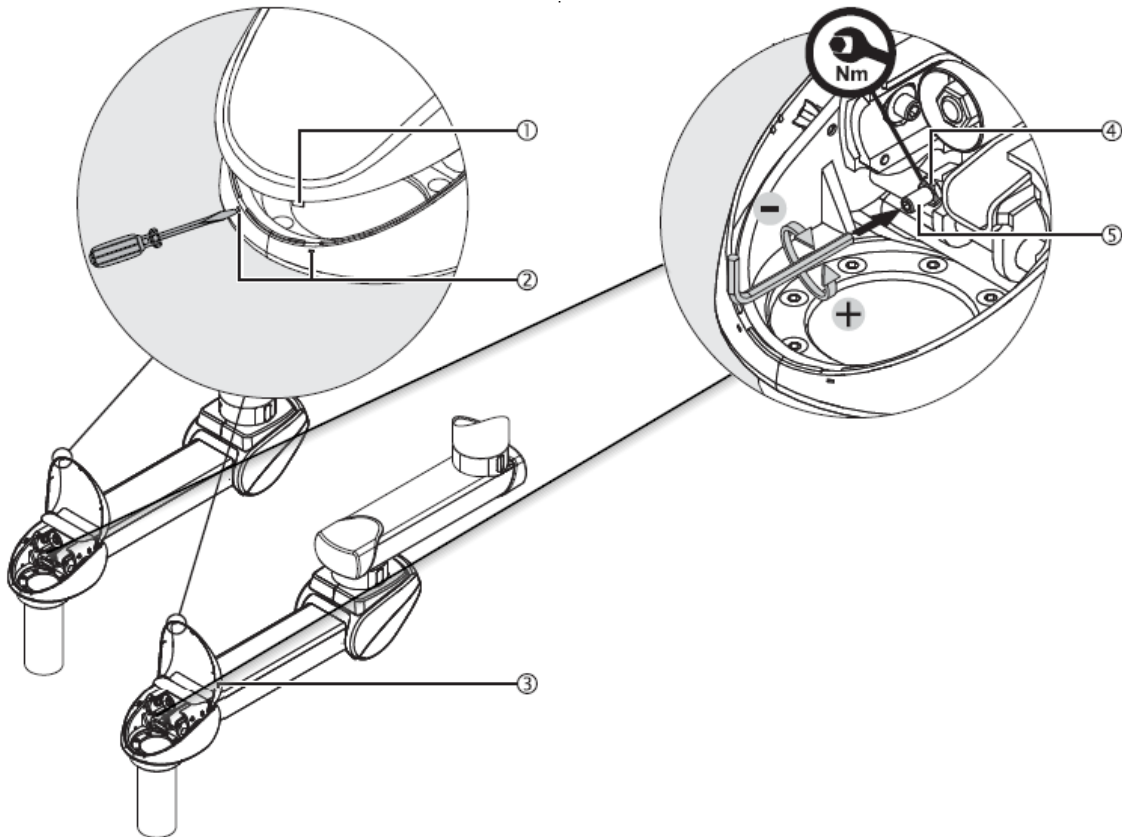


Fig.16 Adjusting the vertical lift on a spring arm

- Use an Allen key (size 10) and a ring spanner (size 18).
- Loosen and turn back the M12 hexagon nut ④ - ISO 4035.
- Insert the Allen key into the set screw ⑤.
- To reduce the vertical lift, turn the Allen key to the left (counterclockwise) as illustrated in Figure 65.
- To increase the vertical lift, turn the Allen key to the right (clockwise) as illustrated in Figure 65.
- Carry out a test run.
- Tighten the hexagon nut M12 ④ - ISO 4035.

The vertical lift may change progressively during operation if the M12 hexagon nut ④ - ISO 4035 has not been tightened correctly. In this case,



If the M12 hexagon nut ④ - ISO 4035 has not been tightened correctly, there is a risk that the spring arm will hit the ceiling or another suspension system.



Tighten the hexagon nut M12 ④ - ISO 4035 to a torque of 30 Nm.

#### 6.4.8.1. Opening/closing of the front top cover

To open the upper front cover

- Insert a suitable screwdriver into the 2 openings ② one after the other and then release the 2 latches ①.
- Lift the front top cover ③ until it clicks into place.

To close the upper front cover

- Fold down the front top cover ③ so that the 2 latches ① snap into place.
- Check that the cover ③ sits on the side panels without gaps.

#### 6.4.9. Vertical alignment correction of the CEMOR monitor bracket or the Service Head

After mounting an end device (e.g. flat screen, medical device, etc.) there is a risk that the CEMOR service head or monitor holder is no longer in an exactly vertical position due to the weight of the end device.

- Open the lower rear cover as described in 6.4.5.1 above.

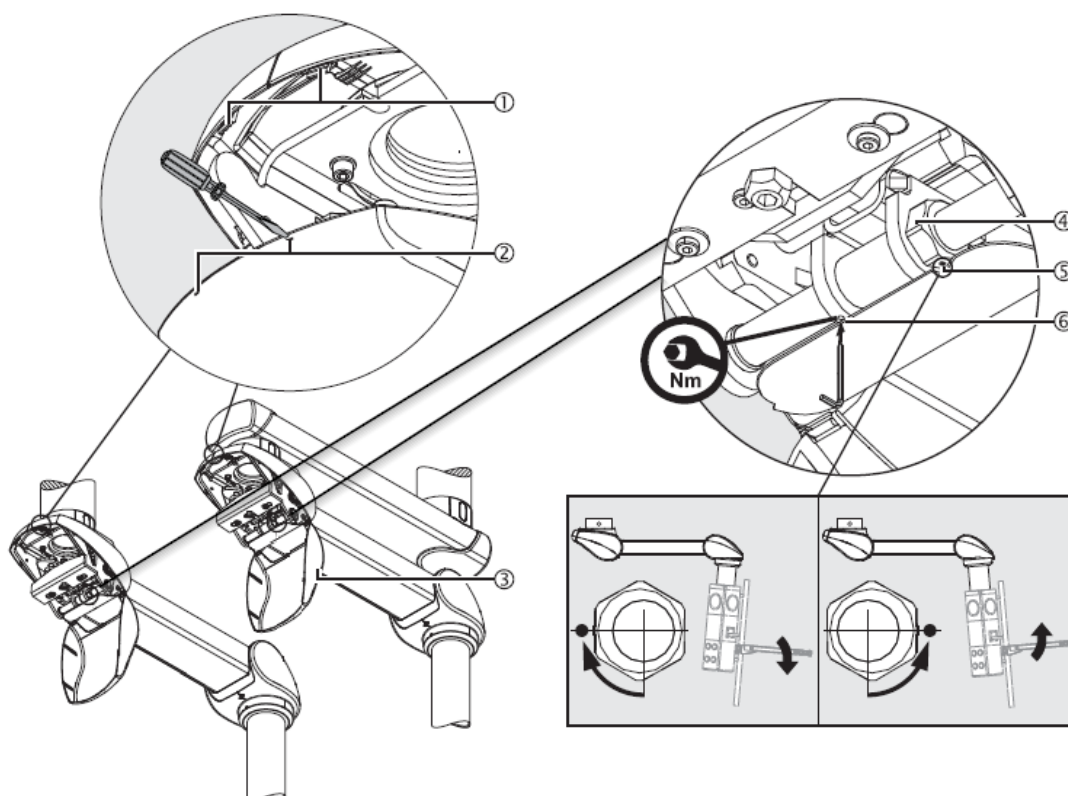


Fig.17 Correction of the vertical alignment of the CEMOR service head or monitor holder

- Use an Allen key (size 4) and a spanner (size 36).
- Loosen the M4 fixing screw ⑥ - DIN 914.
- Place the spanner on the hexagonal bolt ④.
- The indicator screw ⑤ points downwards (do not loosen this screw).
- To lower the tray in the example shown in figure 64, turn the hexagonal bolt ④ so that the indicator screw ⑤ points forwards (towards you).
- To lift the tray in the example shown in Figure 64, turn the hexagonal bolt ④ so that the indicator screw ⑤ points backwards (away from you).
- Carry out a test run.
- Tighten the M4 grub screw ⑥ - DIN 914.

The vertical alignment can change progressively during use if the M4 fixing screw ⑥ - DIN 914 has not been tightened correctly. If this happens, the CEMOR service head or monitor bracket no longer remains stable in its adjusted position.



Tighten the M4 set screw ⑥ - DIN 914 to 2 Nm.



- Close the lower rear cover as described in point 6.4.5.1 above.


## 6.5. Procedure for Inspection and Replacement of Flexible Hoses for Medical Gases



This procedure applies to:

1. Attachment via single non-motorised arm
2. Attachment via non-motorised double arm
3. Fixing via single motorised arm with rotation
4. Fixing via motorised double arm with rotation
5. Tandem
6. Fixing through rotating collar



It is recommended that the equipment be disconnected electrically before servicing.

Passage	Description	Periodicity	Tools/Supplies needed
1	<p><b>Detailed Visual Inspection:</b></p> <p>A) Open the service head by following the steps specified in <i>paragraph 6.1.1 Opening the side covers of a previously specified service head.</i></p>  <p>B) Observe every inch of the flexible hoses, paying attention to signs of discolouration, hardening, cracking, bulging or general wear and tear.</p> <p>C) Also inspect the area where the hoses connect to other components for signs of wear at the joints.</p>	Annual	Torch or spotlight, protective gloves
2	<p><b>Clamp Verification:</b></p> <p>A) Examine all ring clamps for signs of rust, wear or deformation.</p> <p>B) Check that the clamps are firmly holding the hoses and that there is no slippage.</p>	Annual	Torch or spotlight

3	<p><b>Connection Check:</b></p> <p>A) Inspect each hose connection at the grooved nipple and at the tee.</p> <p>B) Make sure that the connections are tight, with no looseness.</p> <p>C) Feel the connections to confirm that there is no slippage or unnecessary movement.</p>	Annual	Protective gloves
4	<p><b>Leak Detection:</b></p> <p>A) Prepare a soap solution in a container.</p> <p>B) Using a brush, apply the solution to the hose connections.</p> <p>C) Observe if bubbles form, indicating the presence of a leak.</p> <p>D) If a leak is detected, mark the area for later correction.</p>	Biannual	Soap solution, brush or paintbrush
5	<b>Hose replacement</b>	Every 8 years	-
5.1	<p><b>Hose Replacement</b></p> <p>See section 6.5.1 <i>Replacement of flexible hoses for medical gases.</i></p> 	-	Spare hose, adjusting tools, new clamps
5.2	<p><b>Post-Substitution Test</b></p> <p>See section 6.5.1 <i>Replacement of flexible hoses for medical gases.</i></p> 	-	Soapy solution, brush or paintbrush
6	<p><b>Maintenance Register:</b></p> <p>A) After each inspection or intervention, record in a document or management system all details, such as date, findings, actions taken, name of technician, and parts replaced.</p>	Always	Maintenance log

	B) Keep this record organised and accessible for future reference and audits.		
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**Additional note:** Be sure to follow all relevant safety regulations and recommendations. It is essential that personnel involved in these tasks are properly trained and wear personal protective equipment.

### 6.5.1. Replacement of flexible hoses for medical gases

The gas hoses are pre-assembled on the Service Head. They must be replaced every 8 years in order to guarantee the correct functioning of the equipment.

- Shut off the power supply and the medical gas supply to the equipment.
- Remove the service head covers as shown in section 6.1 of this manual.



See section 6.1 of this manual.

- Release the connections of the hoses to be replaced both at the source (interface plate) and at the terminal unit inside the service head.

To work more comfortably, remove the service head as follows:

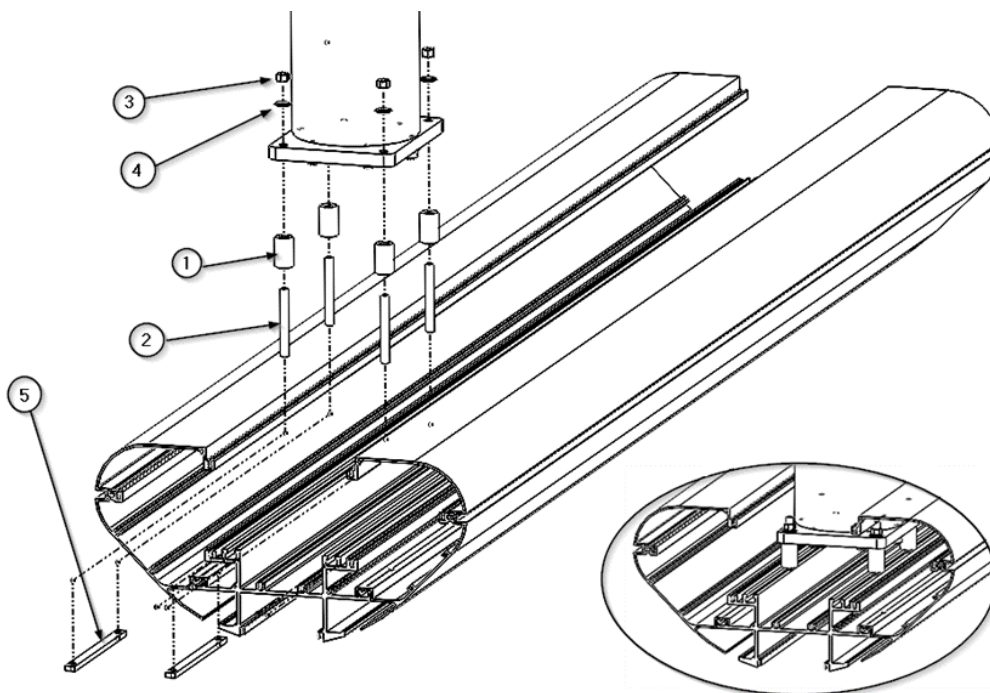


Fig. 18 Disassembly / assembly of the service head on the drop tube.

- Release the 4 threaded bolts M8 x 80 ② securing the service head.
- The service head is loose
- Remove the hoses to be replaced.
- Carefully pass the new hoses ① through the pendant system and onto the interface plate as shown in figure 16.

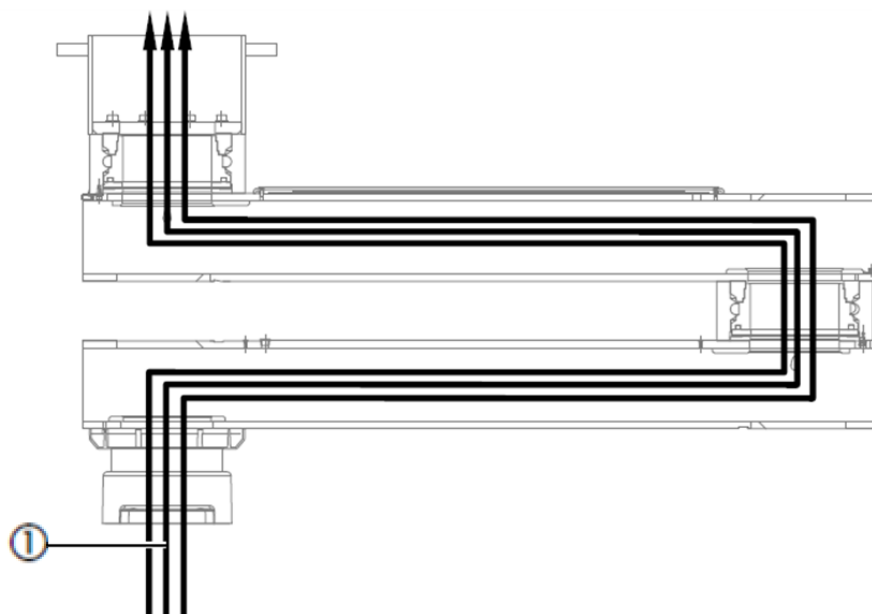


Fig. 19 Hose routing through the pendant system

- Make the connection of the new hoses at the point of origin (interface plate).

Then reassemble the service head.

- Route the service head without exerting tension on the supply hoses ①.
- Present the service head in front of the drop tube of the boom system(s) with the aid of the working platform.
- Pass the gas hoses through the upper hole of the service head.
- Fit the 4 threaded bolts M8 x 80 ② into the 4 slots provided in the drop tube bracket as shown in figure 15.
- For each M8 threaded bolt ②, fit 1 S10 lock washer ④ and 1 nut ③ (as illustrated in Figure 15) so that the flat washer is seated between the drop tube bracket and the corresponding hex nut ③.



The M8 nuts ③ - DIN EN ISO 10642 must be tightened to 40 Nm.

- Once the operation of fixing the service head has been completed, connect the gas hoses to the corresponding gas terminal unit.
- Ensure that gas types are correctly allocated

The gas type is indicated by colour on the gas supply hoses. These hoses are fitted with a sealing plug which can only be removed during installation.

- Check hoses and lines for dirt and clean them with oil-free air.
- Attach a hose clamp to the gas supply hose, remove the sealing plug and push the hose into the correct gas supply outlet.
- Up to 3 gas supply hoses and up to 2 vacuum hoses can be connected to one gas valve using Y-connectors.
- Press the hose clamp and check that it is securely in place.
- Connect and secure the anaesthetic gas suction hoses.

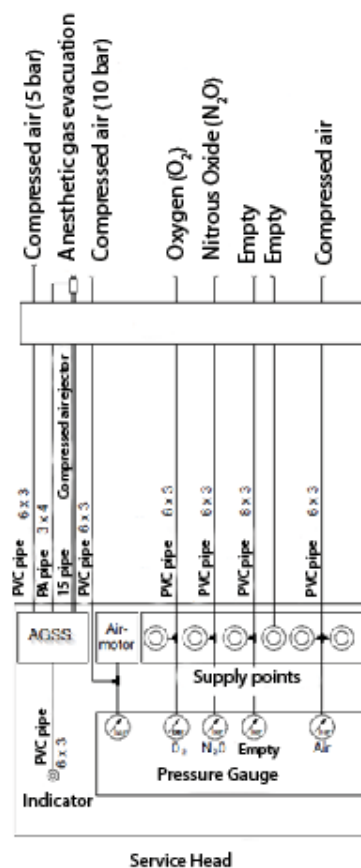


Fig. 20 Example of connection of gas hoses and anaesthesia gas evacuation systems

- Perform a gas type test by following these 5 points:

1. Gas outlets and marking according to EN ISO 9170-1 or EN ISO 9170-2
2. Leakage according to EN ISO 11197
3. Congestion according to EN ISO 7396-1 or EN ISO 7396-2
4. Solid contamination according to EN ISO 7396-1 or EN ISO 7396-2
5. Type of gas according to EN ISO 7396-1 or EN ISO 7396-2


## 6.6. Checking of medical gas supply circuits

This procedure applies to:

1. Direct ceiling fixing through downpipe



It is recommended to disconnect the equipment electrically before proceeding with the revision.





Passage	Description	Periodicity	Tools/supplies
1	<p><b>Detailed Visual Inspection:</b></p> <p>A) Remove the top covers to gain access to the inside of the equipment following the steps specified in section 6.1.1 <i>Removing and fitting the top covers</i>.</p>  <p>B) Perform a thorough visual inspection of all interior ductwork for signs of wear or damage.</p>	Annual	Screwdriver set, protective gloves, torch, torch, etc.
2	<p><b>Leak Detection:</b></p> <p>A) Prepare a soap solution in a container.</p> <p>B) With a brush or paintbrush, apply the solution to the junction points of the piping to the gas terminal units, and other soldered connections.</p> <p>C) Watch for bubbles to form, indicating the presence of a leak.</p>	Biannual	Soapy solution, brush or paintbrush

	D) If a leak is detected, mark the area for later correction.		
<b>3</b>	<p><b>Verification of gas terminal brackets:</b></p> <p>A) Physically assess the condition and integrity of the trunking supports. Check for wear or structural damage.</p> <p>B) Ensure that the brackets are firmly fixed to the profile and that there is no movement or play in the brackets.</p>	Annual	Hand tools, protective gloves
<b>4</b>	<p><b>Maintenance Register:</b></p> <p>A) After each inspection or intervention, record in a document or management system all details, such as date, findings, actions taken, name of technician, and parts replaced.</p> <p>B) Keep this record organised and accessible for future reference and audits.</p>	Always	Maintenance log









**Additional note:** Be sure to follow all relevant safety regulations and recommendations. It is essential that personnel involved in these tasks are properly trained and wear personal protective equipment.





### 6.7. Maintenance plan

Item to be inspected	Description	Periodicity	Method of inspection
<b>Plate and Structure</b>	Ensuring strength and load-bearing capacity*.	Annual	Visual inspection for signs of wear or corrosion  Check condition and robustness (1)
<b>Lowering / Neck / Arms</b>	Ensure correct connections and check gas & electrical supply passages. Check height and relative position*.	Annual	Visual inspection and robustness check (1)

<b>Service Head</b>	Ensure that the service head is held firmly in position*.	Annual	Visual inspection and stability check
<b>Trays and Drawers</b>	Ensuring functionality and cleanliness	Half-yearly	Visual inspection and dummy load (2) Check condition and robustness (1)
<b>Other accessories</b>	Inspection of dripper support and other elements	Annual	Visual inspection and dummy load (2) Check condition and robustness (1)
<b>Gas outlets</b>	Review and check of status and functionality*.	Annual	Visual inspection and functional test. Ease of connection and disconnection manoeuvres Wear and tear or damage Marking and labelling
<b>Copper gas connection I (if applicable)</b>	Overhaul and status check*.  It is recommended to disconnect the equipment electrically before proceeding with the overhaul.	Annual	Visual inspection Verification of supports See section 6.6 <i>Checking of medical gas supply circuits</i> 
<b>Copper gas connections II (if applicable)</b>	Overhaul and status check*.  It is recommended to disconnect the equipment electrically before proceeding with the overhaul.	Biannual	Leak detection See section 6.6 <i>Checking of medical gas supply circuits</i> 



<b>Flexible gas hoses I (if applicable)</b>	<p>Review and check of status and functionality*.</p> <p> It is recommended to disconnect the equipment electrically before proceeding with the overhaul.</p>	<p>Annual</p>	<p>Visual inspection.</p> <p>Verification of clamps.</p> <p>Checking connections.</p> <p>See section 6.5 <i>Inspection and Replacement Procedure for Flexible Hoses for medical gases.</i></p> <p></p>
<b>Flexible gas hoses II (if applicable)</b>	<p>Overhaul and status check*.</p> <p> It is recommended to disconnect the equipment electrically before proceeding with the overhaul.</p>	<p>Biannual</p>	<p>Leak detection.</p> <p>See section 6.5 <i>Inspection and Replacement Procedure for Flexible Hoses for medical gases.</i></p> <p></p>
<b>Replacement of flexible gas hoses (if applicable)</b>	<p>Replacement of flexible gas hoses*.</p> <p> It is recommended to disconnect the equipment electrically before proceeding with the overhaul.</p>	<p>8 years</p>	<p>See point 6.5.1 <i>Replacement of Flexible Hoses for medical gases</i></p> <p></p>
<b>Arm brakes (if applicable)</b>	<p>Functionality check and adjustment*.</p>	<p>Annual</p>	<p>Functional testing and adjustment</p> <p>See section 6.4 <i>Structural and movement checks</i></p> <p></p>
<b>Arm motor (if applicable)</b>	<p>Functionality check and adjustment*.</p>	<p>Annual</p>	<p>Functional testing and adjustment</p> <p>See point 6.4.5 <i>Adjusting the vertical lift on the motor arm</i></p> <p></p>

<b>Arm spring (if applicable)</b>	Functionality check and adjustment*.	Annual	Functional testing and adjustment  See point 6.4.7 <i>Adjustment of the load capacity on the spring arm</i>  
<b>LED lighting</b>	Testing of LED strips for indirect / direct light	Half-yearly	Visual inspection and function test  See points 6.2 and 6.3. Replacement of LED strips and drivers  
<b>Nurse call</b>	Operation of the call system	Half-yearly	Simulation of call and system response. Ensure effective communication with nursing
<b>Switches</b>	Checking of the lighting actuation	Annual	Functional test. Check operability
<b>RJ45 sockets</b>	Inspection of voice and data sockets	Annual	Connecting to devices and testing data transfer
<b>Electrical outlets</b>	Verification of equipment power supply*.	Half-yearly	Use of a multimeter to check supply voltage and continuity (3), and connection of devices
<b>Electrical and data hoses</b>	Review and check of status and functionality*.   It is recommended to disconnect the equipment electrically before proceeding with the overhaul.	Annual	Visual inspection and functional test. Check connections, and correct signalling.  Check according to applicable regulations  See paragraph 6.1.1 <i>Opening the side covers of a previously specified service head.</i>  

<b>Video &amp; audio outlets</b>	Operation of HDMI and USB sockets, etc.	Annual	Device connection and data/video/audio transfer
<b>Protection mechanisms</b>	Verification of earths and protections*.	Annual	Use of a multimeter (3) for continuity tests
<b>Treatment and finishing</b>	Check paint condition	Annual	Visual inspection and tactile test (4)

Damaged, deformed or missing components must be replaced as soon as possible. In this case, please contact the supplier of the device.

\*If one of the above points is found to be non-compliant during the inspection, the system must be shut down immediately as a precautionary measure to prevent further damage to persons and equipment. Immediately notify the System supplier.

**(1) Check condition and robustness:**

- This assessment is done through a detailed visual inspection, looking for obvious signs of damage, wear, or corrosion. To assess robustness, physical tests can be carried out, for example, by applying a manual force at different points to check its strength.
- For the specific structure or plate to be considered in good condition, it should not show visible signs of damage, excessive wear or corrosion. In addition, it should not deform or move beyond an acceptable range when force is applied to it.

**(2) Dummy load:**

- This refers to applying a weight or force that simulates the most extreme conditions of use to which the device could be subjected in practice. This load is used to assess whether the device can withstand the demands of day-to-day use in the operating theatre.
- The specific value of the load will depend on the specifications detailed in the Equipment.

**(3) Use of the multimeter:**

- It shall be used to verify that electrical outlets and related components are operating correctly. With it, values such as voltage (to ensure that the sockets are providing the correct voltage), resistance (to identify possible faults or short circuits) and continuity (to ensure that circuits are complete and there are no interruptions) can be measured.

**(4) Tactile test:**

- This refers to using touch to evaluate a surface or component. For example, by running the hand or fingers over the paint on a structure, one can determine if there are any irregularities, bumps or flaking.
- The test shall be considered successful if, to the touch, the surface is uniform, with no perceptible irregularities and no signs of flaking or deterioration.

## 7. Cleaning

Perform this operation with slightly moist cleaning instruments to ensure that no liquid enters the equipment. Since no part or component of the system is invasive, sterilisation is not necessary.



Do not use abrasive or very hard cleaning agents that may cause damage to the exterior coatings, such as disinfectants containing sodium hypochlorite, which is highly corrosive to aluminium.



WARNING: Damage to equipment may occur.

**Formaldehyde-free** disinfectants such as Saint Nebul Ald from Proder Pharma are recommended.

Method of application:

1. Dilute 4 pulses of the valve supplied by the manufacturer per 5 litres of water.
2. Spray the compound on the product and let it react for 15 minutes.
3. Remove with water or soap solution with a wrung out cloth.



Switch off the power supply

Contact with live parts can cause an electric shock.

- Always disconnect the device from the main power supply before cleaning and disinfecting it.
- Do not insert objects into the openings of the device.

## 8. Waste management

Applies WEE2012/19 and RoHS directive 2011/65/EU, amendment 2015/863/EU. The equipment has electrical and electronic components, so it cannot be disposed of as organic waste, but as electrical/electronic waste.

## 9. Regulations

### 9.1. Team ranking

According to the new **MDD** regulation **93/42/EEC** concerning medical devices, this product family is classified as:

- Class IIb, by Annex II, excluding section 4, regulation 11.
- Protection level IP20 according to IEC 60529

Equipment intended for continuous operation.

### 9.2. Reference standards

The device complies with the safety requirements of the following standards and directives:

ISO11197: Medical supply units

IEC 60601-1: Medical electrical equipment. General requirements for basic safety and essential performance.

IEC 60601-1-2: Medical electrical equipment. Part 1-2. General requirements for basic safety and essential performance. Collateral standard. Electromagnetic disturbances.

### 9.3. Electromagnetic compatibility.

According to EN 60601-1-2:2015 this equipment is intended for use in the electromagnetic environment specified below. The user of this equipment must satisfy himself that it is being used in such an environment.

Interference emission measurements	Compliance	Comment
HF emissions according to CISPR 11 standard	Group 1	The supply unit uses HF energy exclusively for its internal OPERATION. Therefore, its HF emissions are minimal and interference with devices in its vicinity is unlikely.
HF emissions according to CISPR 11 standard	Class A	The roof supply unit is suitable for use in non-domestic installations and in installations that are directly connected to the PUBLIC SUPPLY NETWORK, which also supplies residential
Harmonic emissions according to the standard IEC 61000-3-2	Class A	

Emissions of voltage fluctuations/transients in accordance with the standard IEC 61000-3-3	In accordance with	buildings.
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Interference resistance	Test level according to IEC 60601	Level of compliance	Environment/Guidelines
Static Electric Discharge (ESD) in accordance with the IEC 61000-4-2	±8 kV contact discharge 15 kV aerial discharge	±8 kV contact discharge 15 kV aerial discharge	Floors should be made of wood, concrete or ceramics. If the floor is covered with a synthetic material, the relative air humidity should be at least 30%.
Fast transient electrical interference amplitudes / bursts according to the norm IEC 61000-4-4	±2 kV for power supply cables ±1kV for input and output cables	±2 kV for power supply cables ±1 kV for incoming and outgoing cables	The quality of the supply voltage should be typical for a commercial or hospital environment.
Surges (waves) according to the standard IEC 61000-4- 5	±1 kV phase-to-phase voltage ±2 kV phase to ground voltage	±1 kV phase-to-phase voltage ±2 kV phase to ground voltage	The quality of the supply voltage should be typical for a commercial or hospital environment.
Voltage dips and fluctuations of the supply voltage according to the standard IEC 61000-4- 11	100% of $U_N$ drop for 0.5 period 100% of $U_N$ drop for 1 period 30% of $U_N$ drop for 25 periods  Remark: $U_N$ is the AC mains voltage before applying the test level.	100% $U_N$ drop for 0.5 period 100% drop in $U_N$ for 1 period 30% drop in $U_N$ for 25 periods	The quality of the supply voltage should be typical for a commercial or hospital environment.  If the user of the roof supply unit requires continuous operation even in case of power supply interruptions, it is recommended to supply the roof supply unit from a device with an uninterruptible power

			supply or a battery.
Short interruptions of the supply voltage in accordance with the standard IEC 61000-4-11	100% for 5 s  Remark: UN is the AC mains voltage before applying the test level.		The quality of the supply voltage should be typical for a commercial or hospital environment.  If the user of the roof supply unit requires continuous operation even in case of power supply interruptions, it is recommended to supply the roof supply unit from a device with an uninterruptible power supply or a battery.
Magnetic field for supply frequencies (50/60 Hz) according to the standard IEC 61000-4-8	30 A/m	30 A/m	The magnetic fields created by the mains frequency should be those of a commercial or hospital environment.

Interference resistance	Level of verification according to IEC 60601	Level of compliance	Environment/Guidelines																																																		
HF interference induced by IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz 6 Vrms ISM band	3 Vrms 6 Vrms	AM 1KHz modulation Depth 80% Depth 80% Depth 80% Depth																																																		
HF interference induced by IEC 61000-4-3	<table border="1"> <thead> <tr> <th>RANGE</th> <th>FREQUENCY</th> <th>MODULATION</th> <th>STEP</th> <th>LEVEL</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>80-1000MHz</td> <td>AM 1 kHz Prof: 80%</td> <td>LOG 1%</td> <td>10 V/m</td> </tr> <tr> <td>B</td> <td>1000-2000MHz</td> <td>AM 1 kHz Prof: 80%</td> <td>LOG 1%</td> <td>10 V/m</td> </tr> <tr> <td>C</td> <td>2000-2700MHz</td> <td>AM 1 kHz Prof: 80%</td> <td>LOG 1%</td> <td>10 V/m</td> </tr> <tr> <td>D</td> <td>385MHz</td> <td>PM 18 Hz Cycle: 50%</td> <td>-</td> <td>27 V/m</td> </tr> <tr> <td>E</td> <td>450MHz</td> <td>FM 1 kHz Desv:± 5 kHz</td> <td>-</td> <td>28 V/m</td> </tr> <tr> <td>F</td> <td>810-930MHz</td> <td>PM 18 Hz Cycle: 50%</td> <td>-</td> <td>28 V/m</td> </tr> <tr> <td>G</td> <td>1720-1970MHz</td> <td>PM 217 Hz Cycle: 50%</td> <td>-</td> <td>28 V/m</td> </tr> <tr> <td>H</td> <td>2450MHz</td> <td>PM 217 Hz Cycle: 50%</td> <td>-</td> <td>28 V/m</td> </tr> <tr> <td>I</td> <td>5240-5785MHz</td> <td>PM 217 Hz Cycle: 50%</td> <td>-</td> <td>9 V/m</td> </tr> </tbody> </table>	RANGE	FREQUENCY	MODULATION	STEP	LEVEL	A	80-1000MHz	AM 1 kHz Prof: 80%	LOG 1%	10 V/m	B	1000-2000MHz	AM 1 kHz Prof: 80%	LOG 1%	10 V/m	C	2000-2700MHz	AM 1 kHz Prof: 80%	LOG 1%	10 V/m	D	385MHz	PM 18 Hz Cycle: 50%	-	27 V/m	E	450MHz	FM 1 kHz Desv:± 5 kHz	-	28 V/m	F	810-930MHz	PM 18 Hz Cycle: 50%	-	28 V/m	G	1720-1970MHz	PM 217 Hz Cycle: 50%	-	28 V/m	H	2450MHz	PM 217 Hz Cycle: 50%	-	28 V/m	I	5240-5785MHz	PM 217 Hz Cycle: 50%	-	9 V/m		
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Transmitter power rating	Safety distance depending on emission frequency Environment/Guidelines		
	150 kHz to 80 MHz $D = 1,2 P$	80 MHz up to 800 MHz $D = 1,2 P$	800 MHz up to 2.5 GHz $D = 2, 3 P$
0,01	0,12	0,12	0,23
0,1	0,38	0,38	0,73
1	1,2	1,2	2,3
10	3,8	3,8	7,3
100	12	12	23

# ARES

## Maintenance Manual