

tediselmedical

S- COLUMN

INSTALLATION MANUAL



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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 about electric shocks that can cause serious injury or death.



Failure of the roof support system



Risk of collision

2.4. Indication of additional information



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.

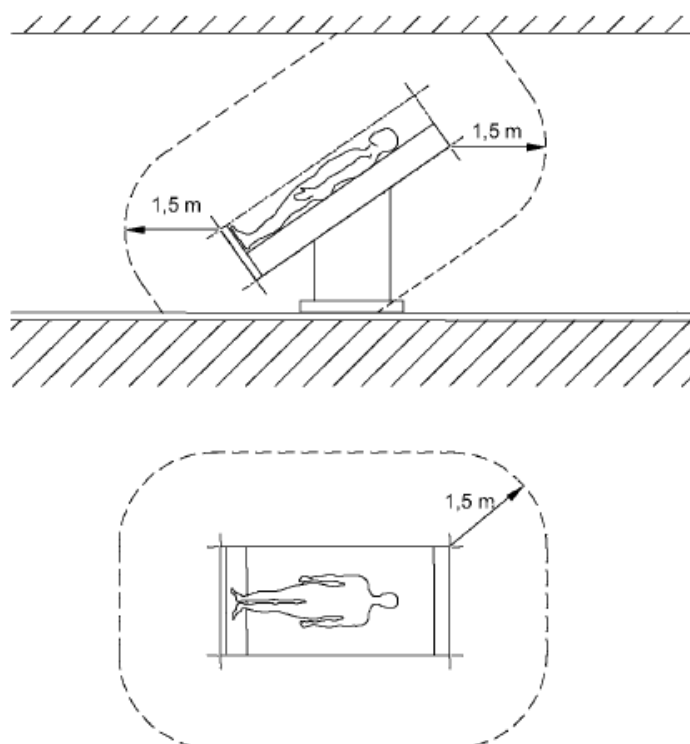


Fig. 1 Minimum extent of the PATIENT ENVIRONMENT

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. Risk of patient contamination and infection



WARNING: Parts of the pendant system and adaptations are made of plastic. Solvents can dissolve plastic materials. Strong acids, bases and agents with an alcohol content of more than 60 % can cause plastic materials to become brittle. Dislodged particles may fall into open wounds. If liquid cleaning agents are allowed to penetrate the suspension system and adaptations, excess cleaning fluid may drip into open wounds.

3.4. Fire risk



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

3.5. 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.

3.6. Risk of collision



In the event of a collision with other devices, walls or ceilings, the pendant system and service head may be damaged and important patient care systems may fail, after a collision, the service head and pendant system should be inspected for damage.

3.7. Risk of system crash due to overload



The dead weights of all attached components and the weight of the attached loads must not exceed the maximum load weight of the base support unit.



If the maximum load capacity has been exceeded, there is a risk that the suspension system or components of the suspension system may become detached from the securing device and fall.

- The maximum load capacity of the suspension system and its components must not be exceeded!



See point 6 of the user and cleaning manual supplied with the equipment.

- Do not attach or mount any additional loads on the extension arms, service head and end devices.

3.8. Risk of system crash due to poor installation



If the fasteners of the individual parts of the system are not correctly positioned or if the tightening torques of the fasteners are not observed, the suspension system may come loose from its fastenings and fall down.

4. Symbols used














Applicable part B



Earth (mass)

	Equipotentiality
	Protective earth (ground)
N	Connection point for neutral conductor
	Nurse call button
	Direct lighting
	Indirect lighting
	Operating instructions
MD	Health Product
	Waste electrical equipment
CE 0197	CE symbol
REF	Product code
UDI	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. Installation requirements

5.1. Equipment required for installation

- Lifting device or forklift with a permissible payload of at least 250 kg. Alternatively, a lifting winch with a permissible payload of at least 250 kg can be used if space is limited:



CAUTION

Check that the suspension system is sufficiently secured before lifting.



WARNING

During the lifting movement, be sure to avoid collisions with other suspension systems, devices, ceilings or walls and other assemblies.

- Protective gloves
- Digital spirit level
- Torque spanner
- Multimeter
- Standard tool kit
- Spanner 36
- 1 set of telescopic magnet pick-up tools
- Working platform (e.g. pedestal ladder) in accordance with country-specific occupational safety and health standards

5.2. Training

The personnel performing the installation must be properly trained and qualified by the customer. The equipment must only be INSTALLED by authorised personnel. Persons who:

1. have received training and are duly registered (at those levels where legal provisions make such registration necessary).
2. have been instructed in the installation of this device by means of this instruction manual as a basis.

3. 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. Installation and connection

6.1. Installation references

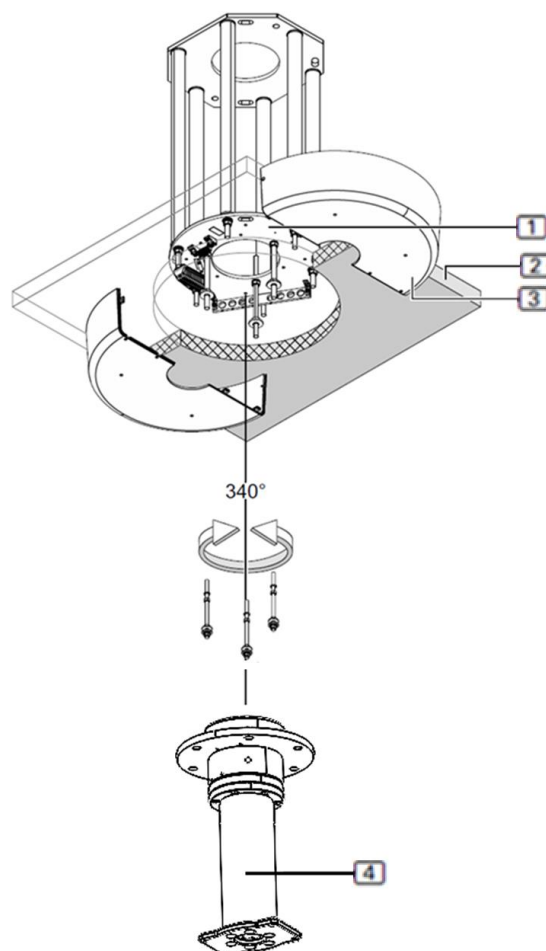



Fig. 2 S-COLUMN ROTATION

1	Interface plate (Single / Double) - pre-assembled
2	False Ceiling (own installation)
3	Roof trim (depending on version)
	See section 6.8 of this manual
Material included: <ul style="list-style-type: none"> - 4 threaded bolts M10 x 325mm DIN 975 - 4 special nuts M10 - 4 hex nuts M10 DIN 934 - 4 flat washers 	

- 6 M10 sheet metal screws (8 in the Tandem version)
- 2.85m U-strip (3.5m for Tandem version)

4 Drop tube



See section 6.5.5 of this manual.

- Material included:
- 1 drop tube CD (length specified in the order)
 - 1 grounding cable, 4mm² 1 grounding cable, 4mm² 1 grounding cable, 4mm² 1 grounding cable, 4mm
 - 6 threaded rods M16 x 315mm
 - 12 hex nuts M16
 - 12 spring rings
 - 6 discs 40 x 50 x 4mm
 - 12 flat washers 34 mm outside diameter and 12 insulating discs

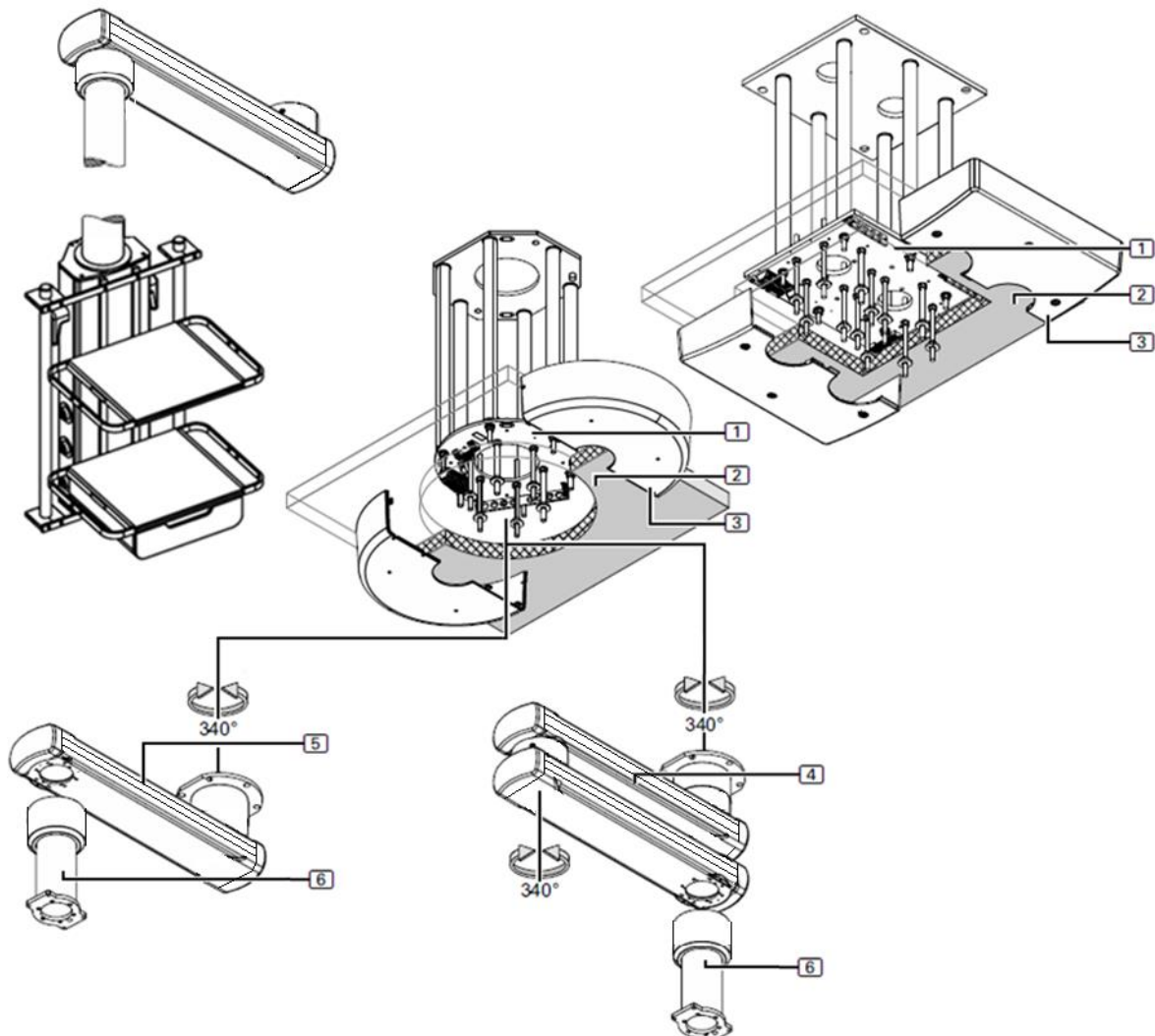






Fig. 3 S-COLUMN

1	Interface board (Single / Double) - pre-assembled
2	False Ceiling (own installation)
3	Roof trim (depending on version)
	 See section 6.8 of this manual Material included: <ul style="list-style-type: none"> - 4 threaded bolts M10 x 325mm DIN 975 - 4 special nuts M10 - 4 hex nuts M10 DIN 934 - 4 flat washers - 6 M10 sheet metal screws (8 in tandem version) - 2.85m U-strip (3.5m for Tandem version)
4	Extension arm with pre-assembled roof tube - double arm variant.
	 See section 6.4.4 and 6.7.2 of this manual. Material included: <ul style="list-style-type: none"> - 2 extension arms with pre-mounted electromagnetic brake - 6 threaded rods M16 x 315mm - 12 hex nuts M16 - 12 spring rings - 6 discs 40 x 50 x 4mm - 4 protective caps (2 halves) for extension arm (pre-assembled)
5	Extension arm with pre-assembled roof tube - single arm variant
	 See section 6.4.4 and 6.7.2 of this manual. Material included: <ul style="list-style-type: none"> - 1 extension arm with roof tube - 6 threaded rods M16 x 315mm - 12 hex nuts M16 - 12 spring rings - 6 discs 40 x 50 x 4mm - 2 protective caps (2 halves) for extension arm (pre-assembled)

6	Drop tube
	<p>See section 6.5.7 of this manual.</p> <p>Material included:</p> <ul style="list-style-type: none"> - 1 drop tube (length specified in order) - 1 fixing plate 6 x M10 - 6 socket head cap screws M10 x 35 mm DIN 912
	<ul style="list-style-type: none"> - 4 countersunk socket head cap screws M8 x 40 mm - 8.8 - DIN 912 - 4 flat washers - DIN 125 - 4 spring washers - DIN 127 - 4 nuts M8 - 8,8 - DIN 934 <p>(Included in the packaging of the service head)</p>

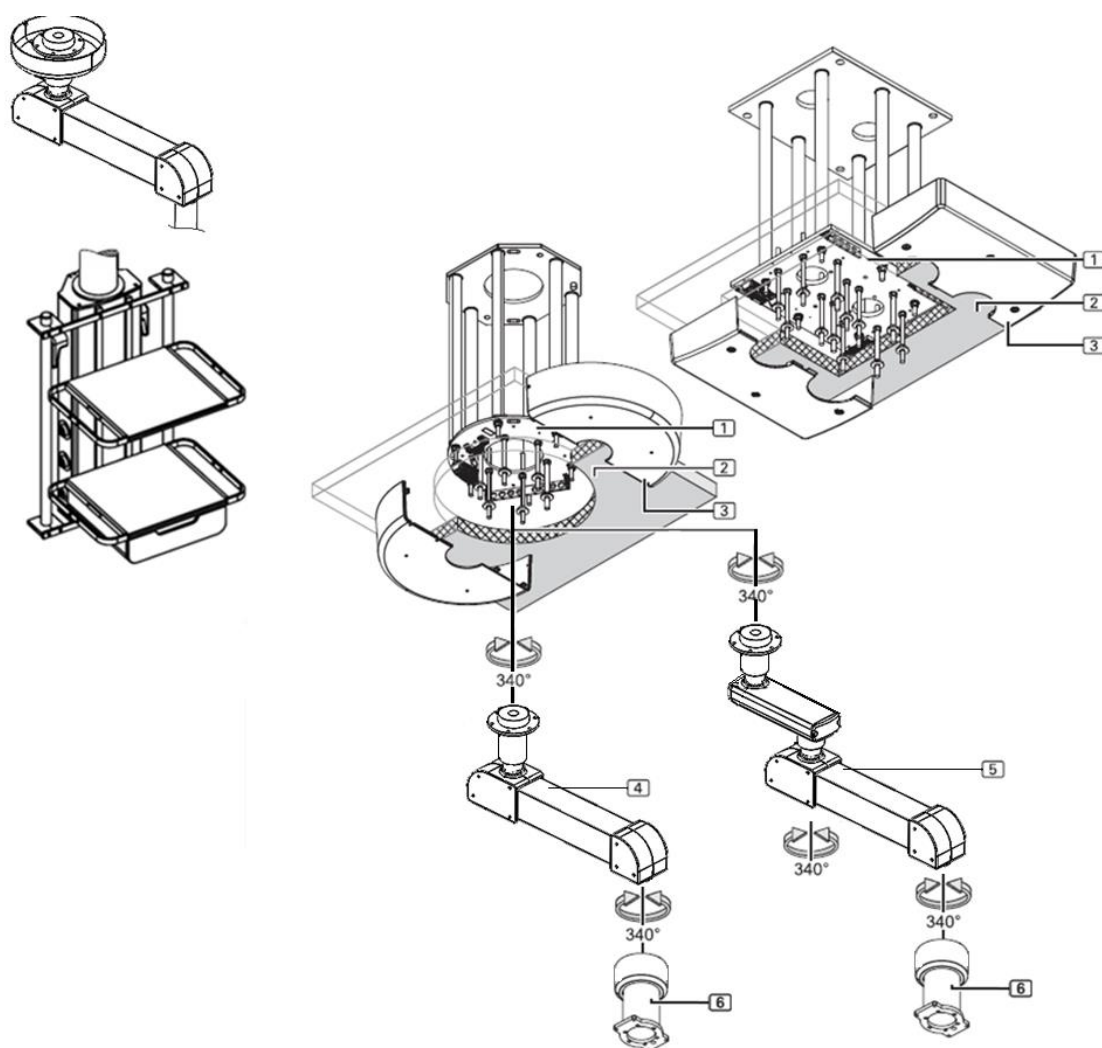





Fig. 4 S-COLUMN MOTOR

1	Interface plate (Single / Double) - pre-assembled
2	False Ceiling (own installation)
3	Roof trim (depending on version)
	 See section 6.8 of this manual Material included: <ul style="list-style-type: none"> - 4 threaded bolts M10 x 325mm DIN 975 - 4 special nuts M10 - 4 hex nuts M10 DIN 934 - 4 flat washers - 6 M10 sheet metal screws (8 in the Tandem version) - 2.85m U-strip (3.5m for Tandem version)
4	Motorised arm with pre-mounted ceiling tube - single arm variant
	 See section 6.4.4 and 6.7.2 of this manual. Material included: <ul style="list-style-type: none"> - 1 motor arm - 1 power cable - 1 power supply cable for the electromagnetic brake - 1 signal cable for electromagnetic brake (in protective tube) - 3 earthing wires, 4mm² 3 grounding wires, 4mm² 3 grounding wires, 4mm² 3 grounding wires, 4mm - 1 x Screw DIN 912 M16 for swivel stop (pre-assembled) - 2 rotary stops + 4 hexagon socket head cap screws M5x16 (pre-assembled) - 1 protective cap for roof tube (2 halves) (pre-mounted) - 1 protective cap for drop tube (2 halves) (pre-assembled)
5	Motorised arm with pre-assembled ceiling tube - double arm variant
	 See section 6.4.4 of this manual. Material included: <ul style="list-style-type: none"> - 1 extension arm with an attached motor arm - 1 power cable - 1 power supply cable for the electromagnetic brake - 1 signal cable for electromagnetic brake (in protective tube) - 3 earthing wires, 4mm² 3 grounding wires, 4mm² 3 grounding wires, 4mm² 3 grounding wires, 4mm

- 2 x Screw DIN 912 M16 for swivel stop (pre-assembled)
- 4 rotary stops + 4 hexagon socket head cap screws M5x16 (pre-assembled)
- 1 protective cap for roof tube (2 halves) (pre-mounted)
- 1 protective cap for drop tube (2 halves) (pre-assembled)
- 2 protective caps (2 halves) for extension arm (pre-assembled)

6 Drop tube



See section 6.5.7 of this manual.

- Material included:
- 1 drop tube (length specified in order)
 - 1 grounding cable, 4mm² 1 grounding cable, 4mm² 1 grounding cable, 4mm² 1 grounding cable, 4mm
 - 1 fixing plate 6 x M10
 - 6 socket head cap screws M10 x 35 mm DIN 912
 - 4 countersunk socket head cap screws M8 x 40 mm - 8.8 - DIN 912
 - 4 flat washers - DIN 125
 - 4 spring washers - DIN 127
 - 4 nuts M8 - 8,8 - DIN 934
- (Included in the packaging of the service head)

6.2. Additional instructions

The following parts should be available:

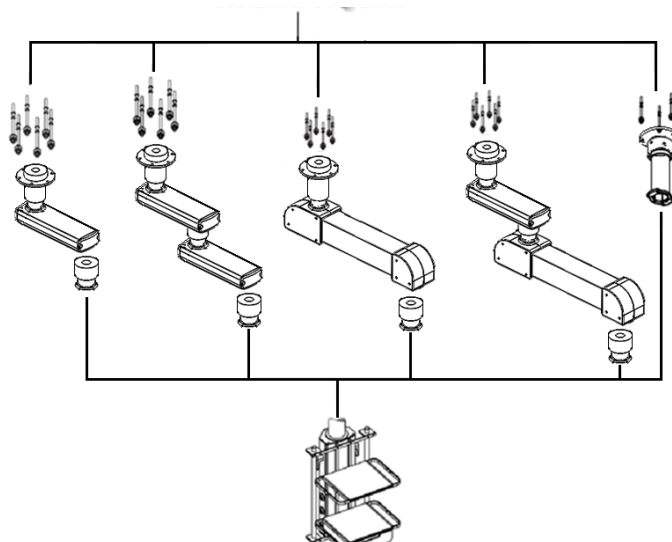
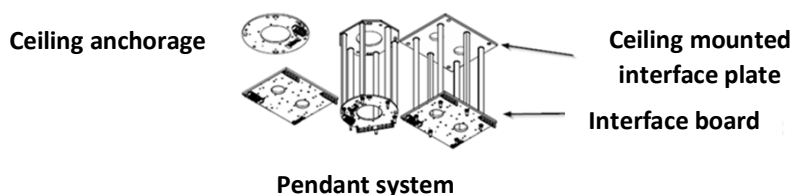


Fig. 5 Outline of instructions

6.3. Loading data

The data required for the calculation of the ceiling load are given in the following tables. When mounting the suspension system, the vertical weight force of the intermediate ceiling assembly (the values correspond to the maximum load) must be added to the corresponding values of the suspension system to determine the ceiling load.



The safety factors prescribed in the individual regions.

The table shows the values for the maximum permissible load capacity of the suspension system, single version. The load data of a tandem version can be calculated from the sum of the individual ones. Picture on the right in figure 7.

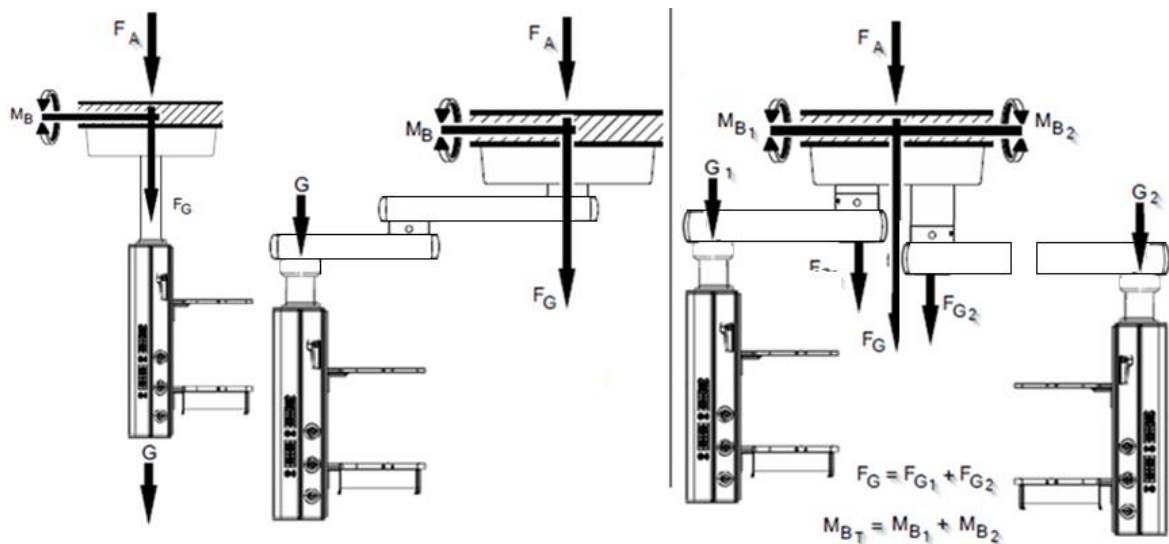


Fig. 6 Load calculation scheme

6.3.1. S-COLUMN ROTATION

Bearing downspout	Weight (FG) [N] [N]	Weight (FA) [N] Anchor kit	Max. bending moment MB [Nm] [Nm] [Nm]	Load G [kg]
Length 400mm - 1000mm	4074	1300	747	220

6.3.2. S-COLUMN

Single arm versions	Weight (FG) [N] [N]	Weight (FA) [N] Anchor kit	Max. bending moment MB [Nm] [Nm] [Nm]	Load G [kg]
Extension arm 600mm	6017	1300	3457	250
Extension arm 800mm	4477	1300	3405	220
Extension arm 1000mm	3525	1300	3300	210
Double arm versions	Weight (FG) [N] [N]	Weight (FA) [N] Anchor kit	Max. bending moment MB [Nm] [Nm] [Nm]	Load G [kg]
Extension arm 600mm / 800mm	2753	1300	3288	200
Extension arm 800mm / 600mm	2753	1300	3322	200
Extension arm 800mm / 800mm	2391	1300	3173	185
Extension arm 600mm / 1000mm	2391	1300	3140	185
Extension arm 1000mm / 600mm	2391	1300	3206	185

6.3.3. S-COLUMN MOTOR

Single arm versions	Weight (FG) [N] [N]	Weight (FA) [N] Anchor kit	Max. bending moment MB [Nm] [Nm] [Nm]	Load G [kg]
S-COLUMN MOTOR	2195	1300	1550	200
Double arm versions (Extension Arm + S-	Weight (FG) [N] [N]	Weight (FA) [N] Anchor kit	Max. bending moment MB [Nm] [Nm] [Nm]	Load G [kg]

COLUMN MOTOR)				
Extension arm 600mm	2387	1300	2800	200
Extension arm 800mm	2417	1300	3250	180

6.3.4. Service head and accessories

In this section the weights for the different service heads attachable to the pendant system are given without taking into account the electrical, communication and gas hoses. These weights must be taken into account when checking the payload given in this chapter for the different configurations of the pendant system in addition to any accessories that may be attached to the service heads.

TDSHV vertical service head (500mm)	14kg
TDSHV vertical service head (750mm)	18kg
TDSHV vertical service head (1000mm)	21kg
TDSHV vertical service head (1250mm)	25kg
TDSHV vertical service head (1500mm)	29kg
TDSHH horizontal service head (600mm)	18kg
Horizontal service head TDSHH (750mm)	20kg
Horizontal service head TDSHH (1000mm)	23kg
Tray on vertical service head	9kg
Drawer in vertical service head	16,5kg
1m 38mm diameter tube set for attachment of accessories.....	3kg
Tray on horizontal service head	6kg
Drawer in horizontal service head	14kg
Flange assembly for 38mm diameter pipe.....	0,35kg
Stainless steel double technical rail set on 38mm diameter tube (L=500mm)	1,6kg
Double technical stainless steel rail set on 38mm diameter tube (L=700mm)	2kg
Technical aluminium double rail set on 38mm diameter tube (L=500mm)	1,4kg
Technical aluminium double rail set on 38mm diameter tube (L=700mm)	1,7kg

6.4. Mounting of threaded bolts on the interface plate

6.4.1. Installation without false ceiling

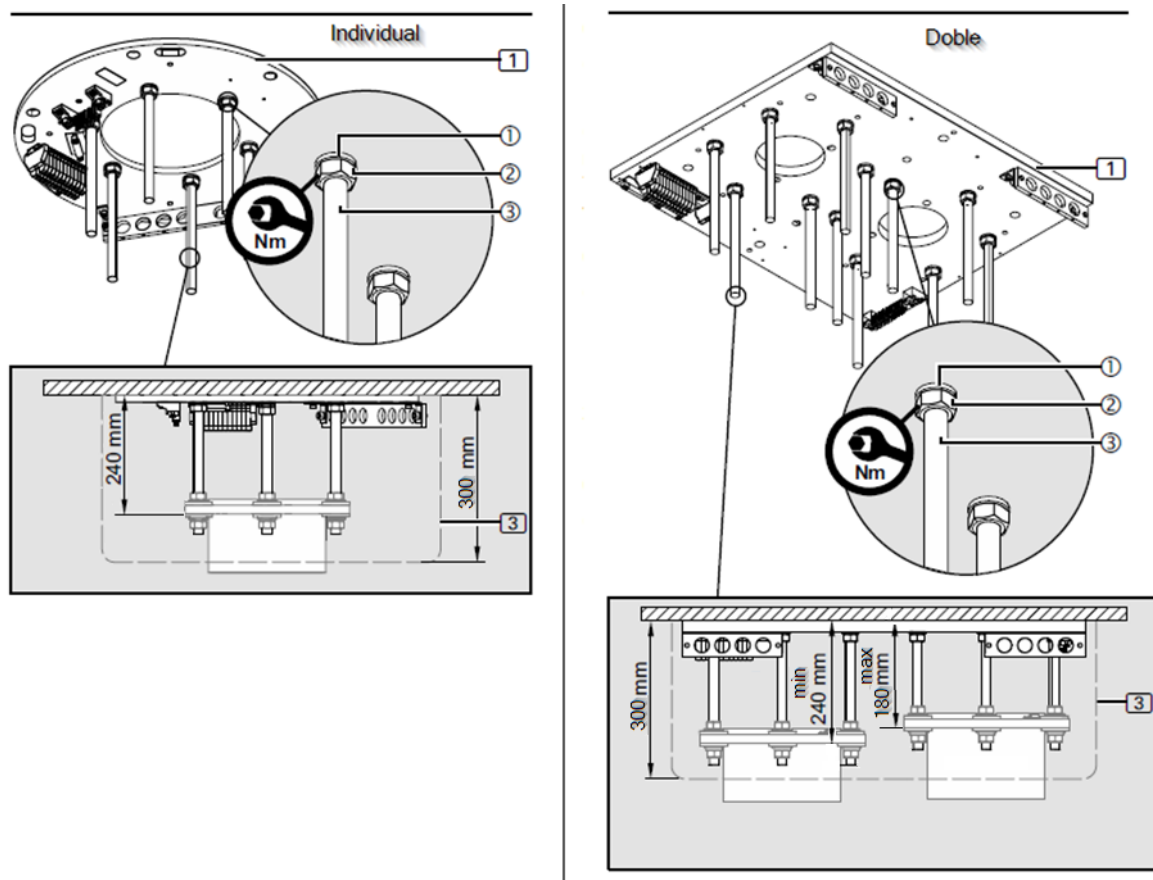


Fig. 7 Mounting of interface plate without false ceiling

- Cut the threaded bolts to length

If an interface plate (1) is mounted on the intended slab or structure, the threaded bolts M16 x 315 mm (3) (6 in the single version, 12 in the double version) must be cut to size.

- The roof trim (3) will later be mounted flush with the roof and covers the roof pipe flange.
- For the ceiling trim (3), which has a height of 300 mm, for the individual version the 6/12 M16 x 315 mm threaded bolts (3) must be cut to 240 mm. See picture on the left in figure 8.
- For the ceiling trim (3), which has a height of 300 mm, for the double (tandem) version the 6/12 M16 x 315 mm threaded bolts (3) must be cut to 240 mm minimum for one of the units and 180 mm maximum for the other. See picture on the right in figure 8.
- Lightly deburr the M16 x 315 mm threaded bolts (1) to ensure maximum thread engagement in the interface plate (1).

- Thread 1 M16 hex nut ② each onto the M16 threaded bolts ③ and then fit 1 spring washer ① each.



If the M16 threaded bolts ③ ③ are not completely screwed in, they may come out of the interface plate (1) and cause the system to fall down.

- Check that the shortened M16 threaded bolts ③ are securely fastened at the correct distance from each other and fully screwed into the interface plate 1.



The M16 hex nuts ② must be tightened to 195 Nm.

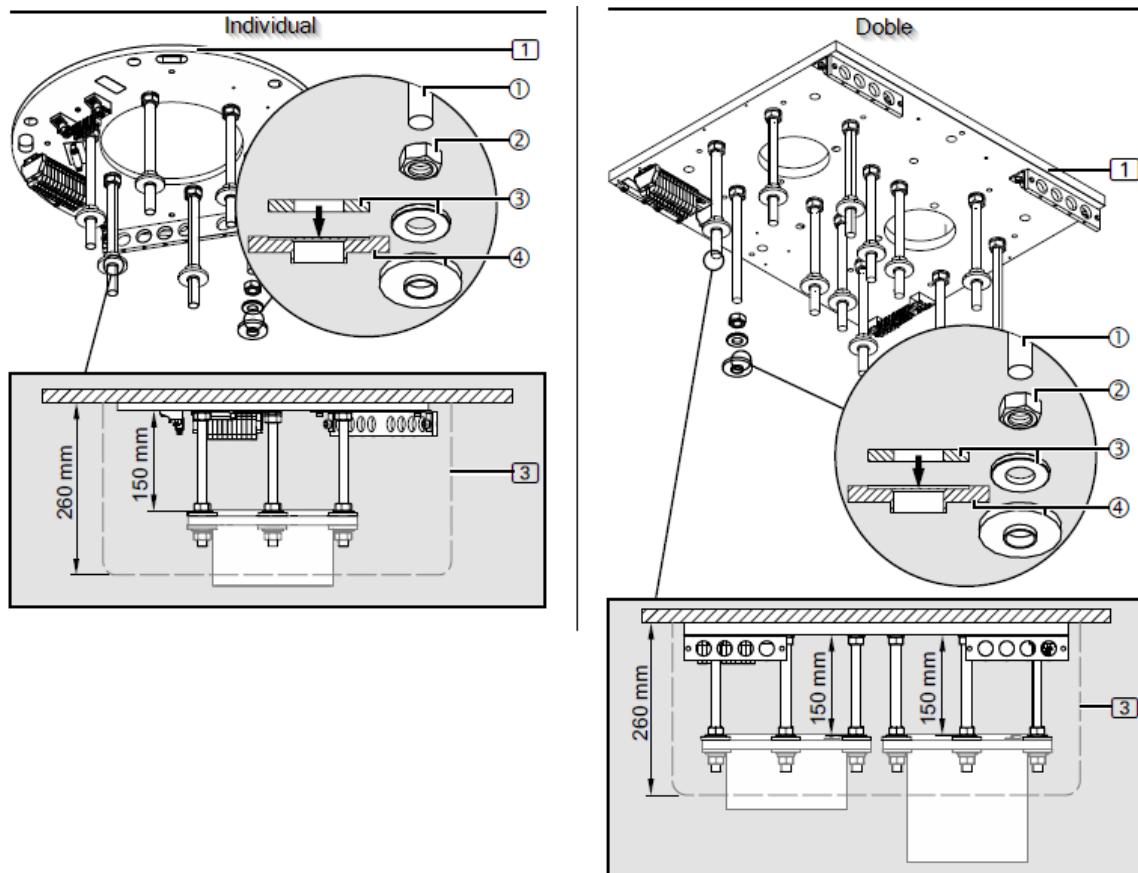


Fig. 8 Fitting of the upper insulation to the threaded bolts without a false ceiling

- For each M16 threaded bolt ① screw an M16 hexagon nut ② onto the M16 threaded bolts ①.

The M16 hexagon nuts ② (6 for single version, 12 for double version) must be mounted on the M16 threaded bolts ① at exactly the right distance from each other.

- Adjust the distance between the M16 hex nuts ② and the interface plate from 1 to 150mm.
- Using a digital spirit level, align the M16 hex nuts ② horizontally.

- Fit 1 flat washer with an outer diameter of 34 mm (3).
- Place 1 plastic insulating disc (4) (as shown in figure 9) in such a way that the flat washer with an outer diameter of 34 mm (3) sits on the plastic insulating disc (4).
- Secure the plastic insulating disc (4) to the M16 threaded bolts (1) with adhesive or elastic tape.

6.4.2. Installation with false ceiling

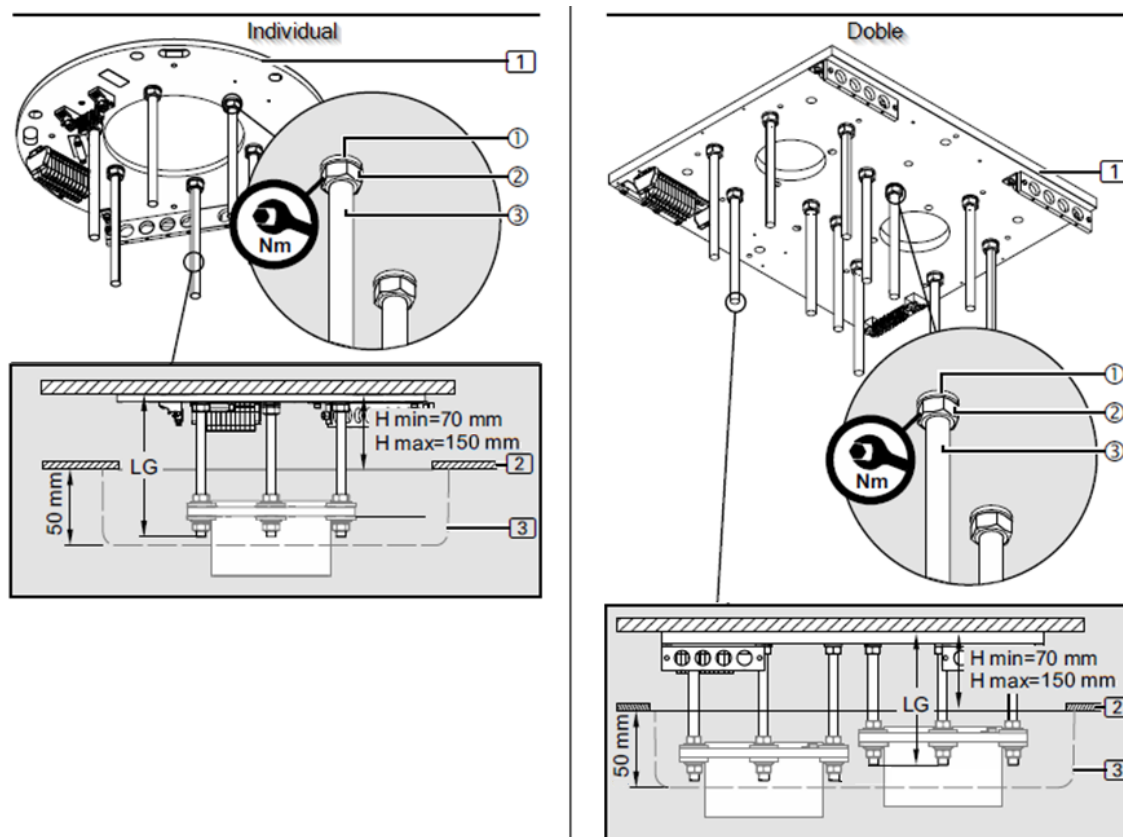


Fig. 9 Installation of interface plate with false ceiling

- Cut the threaded bolts to length

If an interface plate (1) is mounted on the intended slab or structure, the threaded bolts M16 x 315 mm (3) (6 in the single version, 12 in the double version) must be cut to size.

- The roof trim (3) will later be mounted flush with the roof and covers the roof pipe flange.
- The required length of the threaded bolts M16 x 315 mm (1) depends on the distance H: from the roof to the lower edge of the intermediate ceiling (2).
- Please note the minimum and maximum length of the threaded bolts M16 x 315 mm (1).

- For the ceiling trim (3), which has a height of 50 mm, the 6/12 M16 x 315 mm threaded bolts (3) must be cut as shown in figure 10.
- To determine the length LG of the threaded bolts (1), $LG=H+135\text{mm}$
- Lightly deburr the M16 x 330 mm threaded bolts (1) to ensure maximum thread engagement in the interface plate (1).
- Thread 1 M16 hex nut (2) each onto the M16 threaded bolts (3) and then fit 1 spring washer (1) each.



If the M16 threaded bolts (3) are not completely screwed in, they may come out of the interface plate (1) and cause the system to fall down.

- Check that the shortened M16 threaded bolts (3) are securely fastened at the correct distance from each other and fully screwed into the interface plate 1.



The M16 hex nuts (2) must be tightened to 195 Nm.

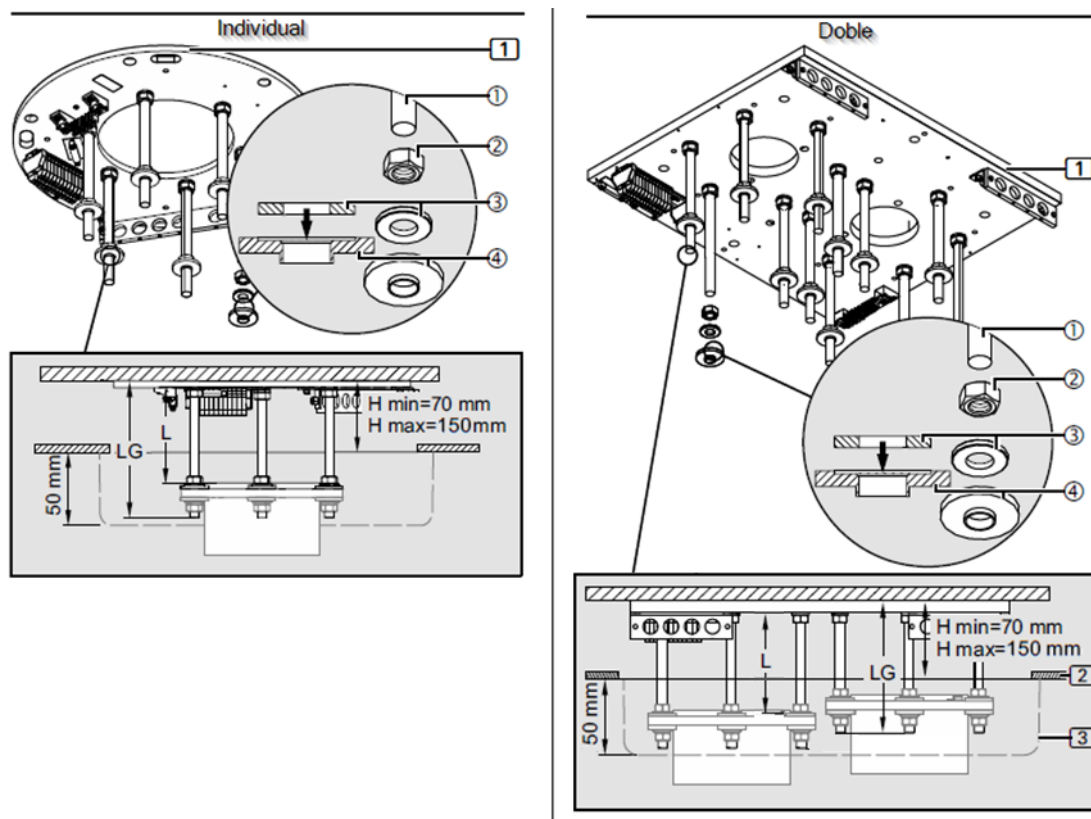


Fig. 10 Installation of the upper insulation to the threaded bolts without false ceilings

- For each M16 threaded bolt (1) screw an M16 hexagon nut (2) onto the M16 threaded bolts (1).

The M16 hexagon nuts ② (6 for single version, 12 for double version) must be mounted on the M16 threaded bolts ① at exactly the right distance from each other.

- Set the distance between the M16 hex nuts ② and the interface plate (1) to $L = LG - 95 \text{ mm}$ (min. 110 mm / 150 mm).
- Screw the hexagon nuts M16 ② onto the M16 threaded bolts ① at the calculated distance L.
- Using a digital spirit level, align the M16 hex nuts ② horizontally.
- Fit 1 flat washer with an outer diameter of 34 mm ③.
- Place 1 plastic insulating disc ④ (as shown in figure 11) in such a way that the flat washer with an outer diameter of 34 mm ③ sits on the plastic insulating disc ④.
- Secure the plastic insulating disc ④ to the M16 threaded bolts ① with adhesive or elastic tape.

6.4.3. Mounting of the interface plate on the false ceiling bracket

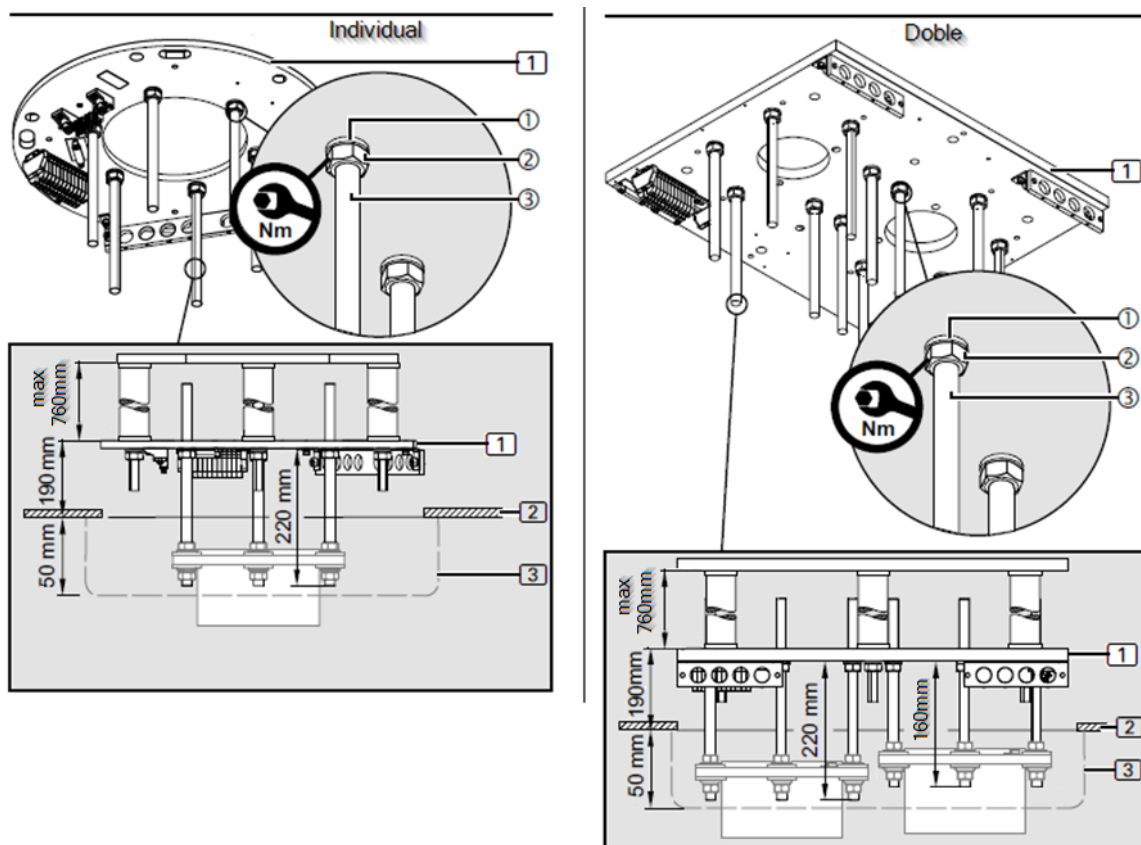


Fig. 11 Mounting of interface plate on low false ceiling structure

The threaded bolts M16 x 315 mm ③ (6 for single version, 12 for double version) must protrude from the interface plate (1).



To ensure sufficient strength, the M16 threaded bolts ① must not exceed a maximum length of 315 mm.

- Screw 1 M16 hex nut ② each onto the 6/12 M16 x 315 mm threaded bolts ③ and then fit 1 spring ring ④ each.
- All threaded bolts M16 x 315 mm ③ must be completely screwed into the interface plate 1.

The threaded bolts M16 x 315 mm ③ must protrude from the interface plate (1) 220 mm in the single version, 160 mm in the double version as shown in figure 12.

- Check that the shortened M16 threaded bolts ③ ③ are securely fastened at the correct distance from each other and fully screwed into the interface plate (1).



The M16 hex nuts ② must be tightened to 195 Nm.

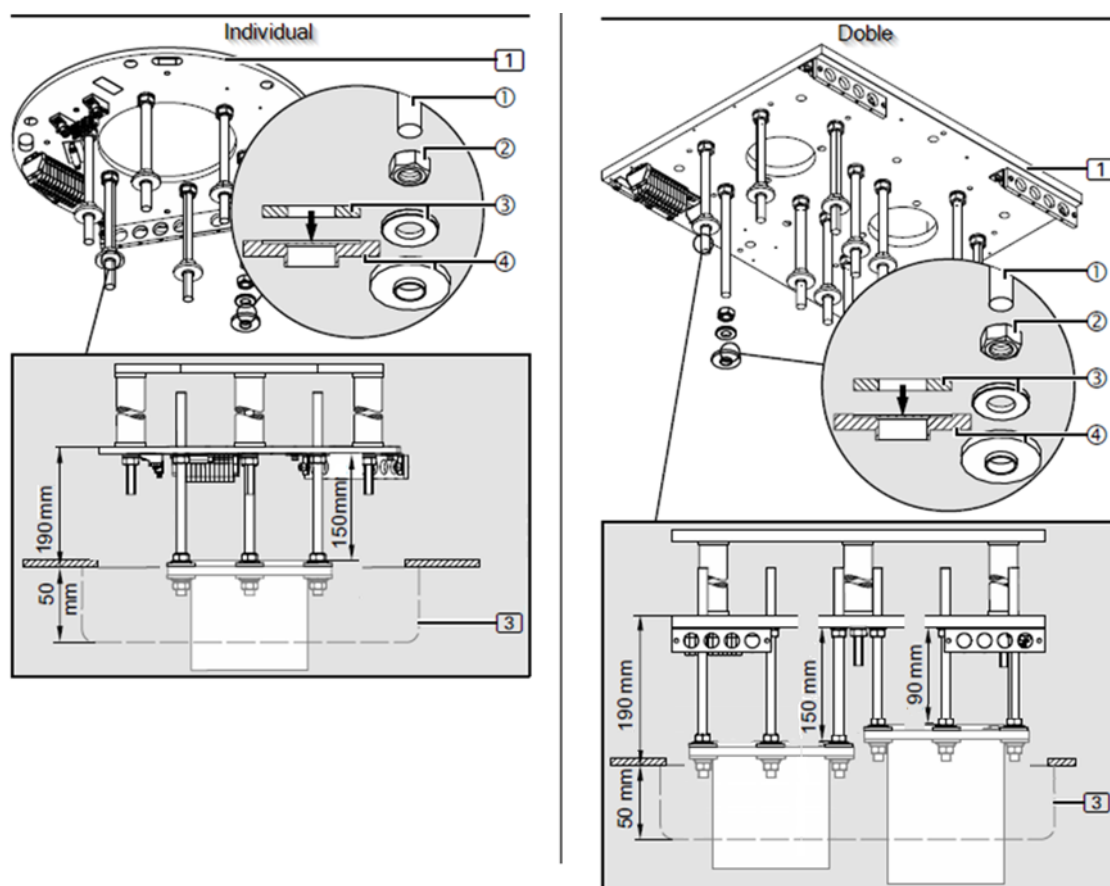


Fig. 12 Installation of the upper insulation to the threaded bolts with false ceilings

- For each M16 threaded bolt ① screw an M16 hexagon nut ② onto the M16 threaded bolts ①.

The M16 hexagon nuts ② (6 for single version, 12 for double version) must be mounted on the M16 threaded bolts ① at exactly the right distance from each other.

- Set the distance between the M16 hex nuts ② and the interface plate (1) to 150mm.
- Screw the hexagon nuts M16 ② onto the M16 threaded bolts ① at the calculated distance L.
- Using a digital spirit level, align the M16 hex nuts ② horizontally.
- Fit 1 flat washer with an outer diameter of 34 mm ③.
- Place 1 plastic insulating disc ④ (as shown in figure 13) in such a way that the flat washer with an outer diameter of 34 mm ③ sits on the plastic insulating disc ④.

6.4.4. Mounting of the arm on the threaded bolts of the interface plate

This section explains the assembly of the structural part of the equipment on the threaded bolts of the interface plate. Figure 14 shows the elements that arrive pre-assembled for an S-COLUMN system (right picture) and an S-COLUMN MOTOR system (left picture) with double arm. The assembly is identical for all other variants.

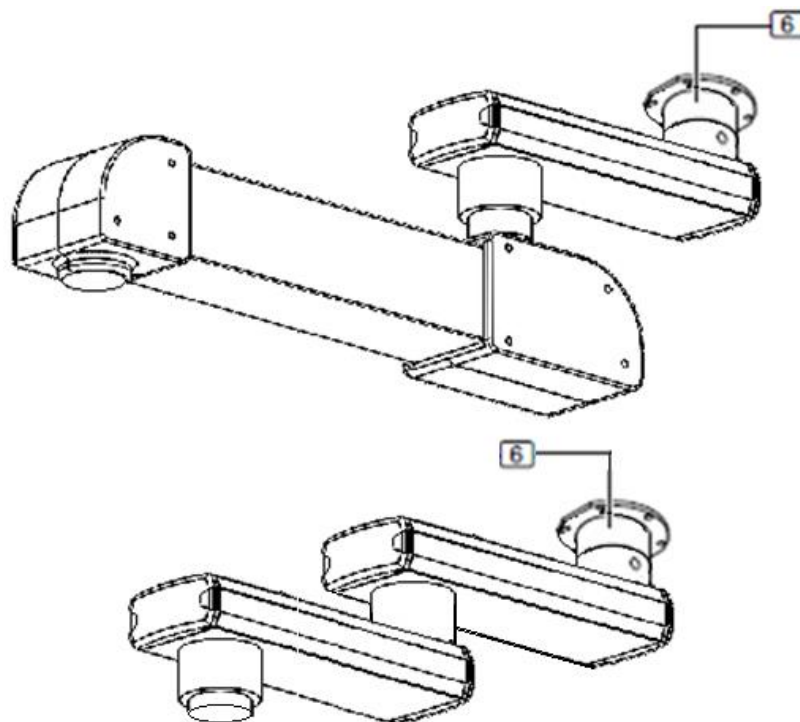


Fig. 13 S-COLUMN and S-COLUMN double-arm MOTOR

Figure 14 shows a simplified representation of the roof tube flange ⑥ for mounting on the threaded bolts. Other components such as extension arm, cables, etc. are not shown.

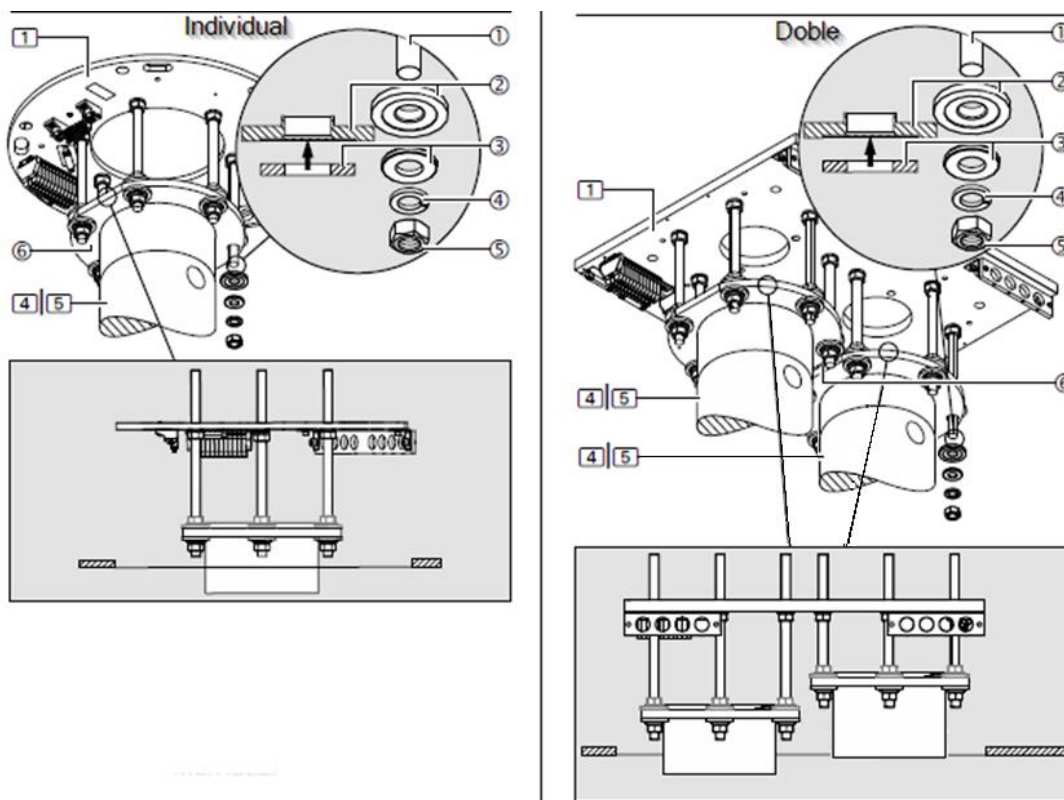


Fig. 14 Mounting of the roof tube flange on the threaded bolts



Make sure that no one is under the hanging system.

Risk of falling parts.

- Securely fasten the roof tube flange (6) or, using a suitable lifting device, place it under the M16 threaded bolts (1) of the interface plate (1).
- Insert the roof tube flange (6) into the 6 M16 threaded bolts (1) of the interface plate (1).
- Remove the previously applied adhesive or elastic tape from the threaded bolts (1).
- For each M16 threaded bolt (1), fit 1 plastic insulating disc (2) (as shown in Figure 15) so that the flat washer with an outer diameter of 34 mm (3) sits on the plastic insulating disc (2).
- For each M16 threaded bolt (1), fit 1 flat washer with an external diameter of 34 mm (3), 1 spring disc (4) and 1 M16 hexagon nut (5).

6.4.5. Alignment of the arms with the Interface plate

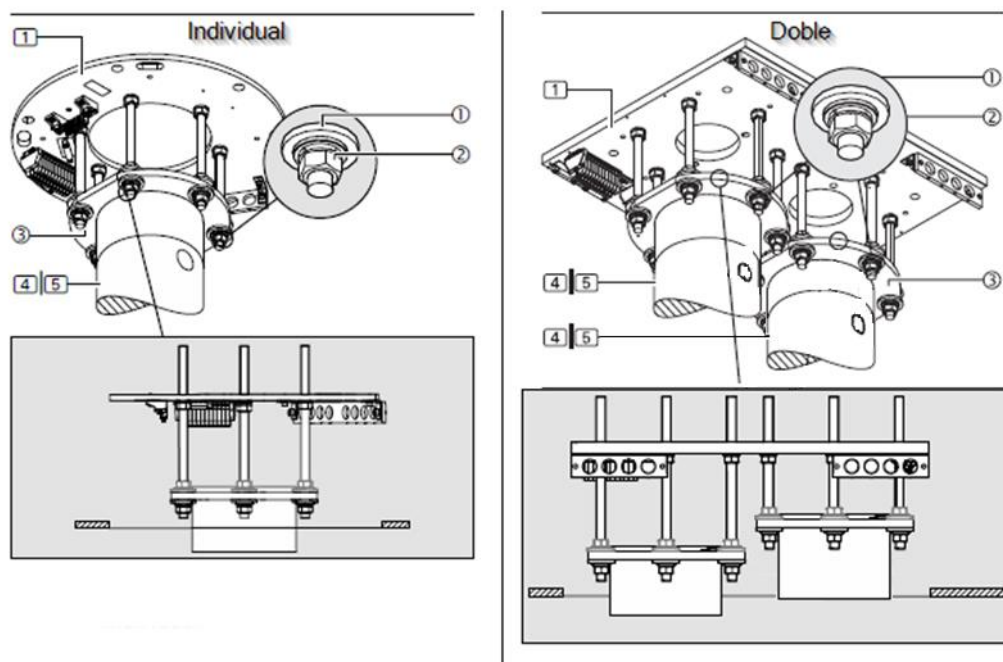


Fig. 15 Alignment of the arms with the Interface plate

- Choose 1 of the 6 M16 hex nuts (2) as a reference point.
- Screw the 6 M16 hex nuts (2) (2) under the flange (3) crosswise onto the flange (3) and tighten to 100 Nm.



Tighten the M16 hex nuts (2) on the flange to a torque of 100 Nm.

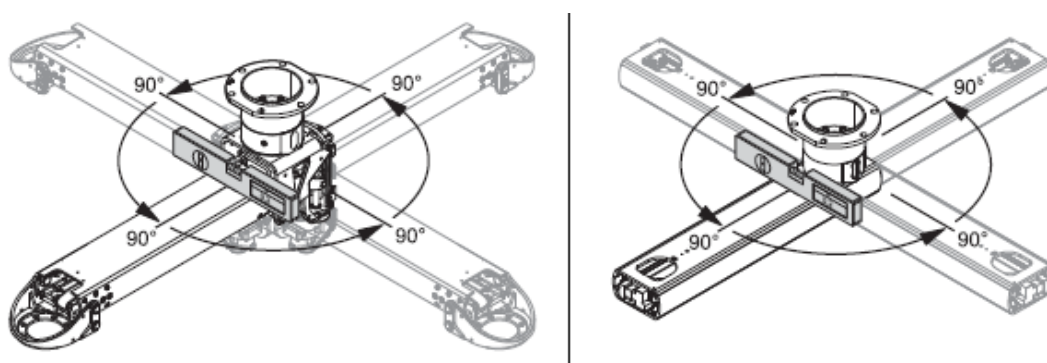


Fig. 16 Checking the horizontal alignment of the outriggers

- Check the horizontal alignment of the extension arms. Place the digital spirit level at right angles to the direction of the arm (near the flange (3)). Rotate the arm 90 degrees in various directions and check the horizontal alignment. See figure 17.

NOTA

In case of deviations of more than ± 0.2 degrees, the arms must be realigned. To do this, repeat the installation steps described above.

- Check that all M16 hex nuts ② ② are correctly positioned and tightened once the arms are properly aligned.

6.4.6. Assembly of the drop tube on the arms

Optionally, the service head can be ordered already assembled to the drop tube. In this case, the various electrical and gas hoses are routed through the drop tube. Before mounting the drop tube on the suspension system, all electrical and gas hoses must be routed through the suspension system.



See section 6.8 of this manual.

For non-powered arms. The figure shows an enlarged section view of the extension arm without its upper part.

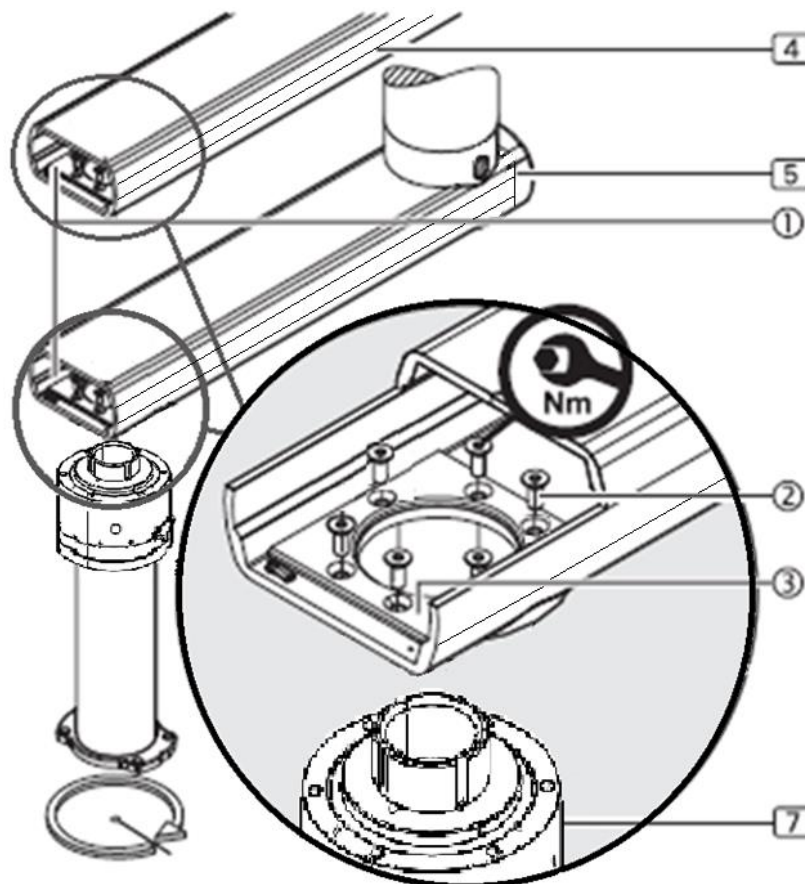


Fig. 17 Assembly of drop tube on NON-motorised arms

- Insert the fixing plate 6 x M10 ③ from the front side ① into the extension arm (4), (5) and fit it.
- Place the drop tube under the extension arm (4) / (5) so that the fixing holes are aligned.

- Fix the drop tube through the 8 x M10 fixing plate (3) and screw it to the extension arm (4), (5) with 6 Allen screws (2).



The M10 countersunk screws (2) - DIN EN ISO 10642 must be tightened to 40 Nm.

For motorised arms, figure 19 shows an enlarged view of the motorised arm without trim.

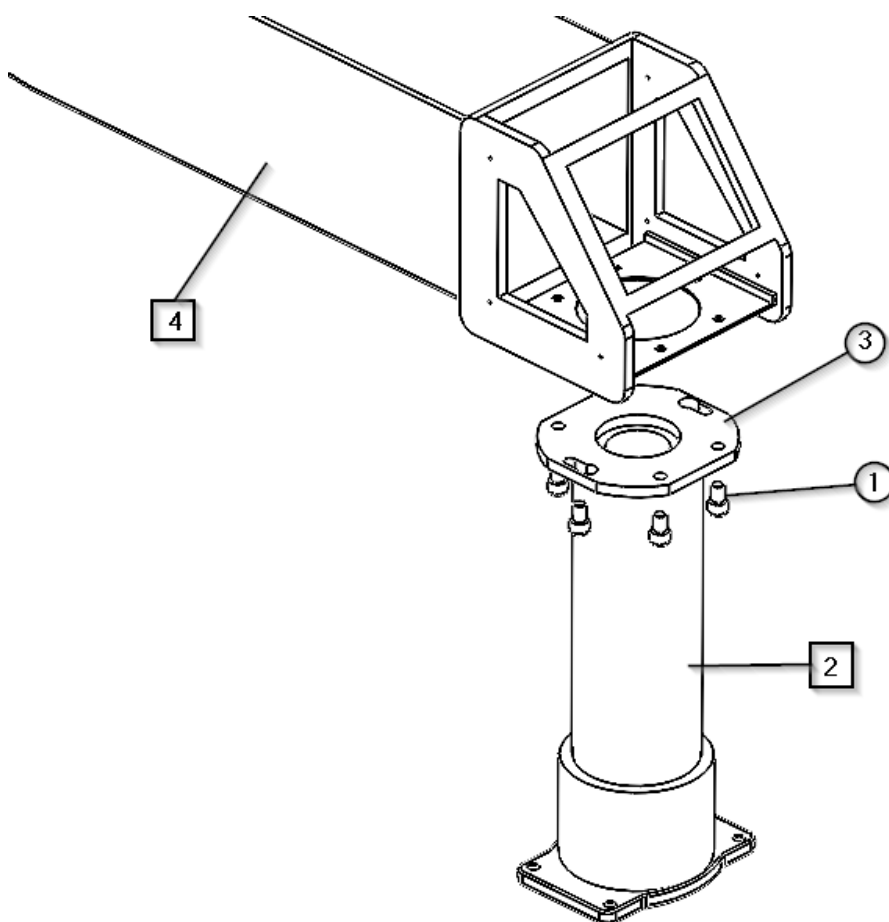


Fig. 18 Assembly of drop tube on motorised arms

- Place the drop tube (7) under the arm (4) so that the fixing holes are aligned.
- Attach the drop tube through the 6 x M10 fixing plate (3) and screw it to the extension arm (4) 6 hexagon socket screws (1).



The M10 countersunk screws (1) - DIN EN ISO 10642 must be tightened to 40 Nm.

6.5. Service head assembly

Only for orders where the service head does not come with the drop tube pre-assembled.

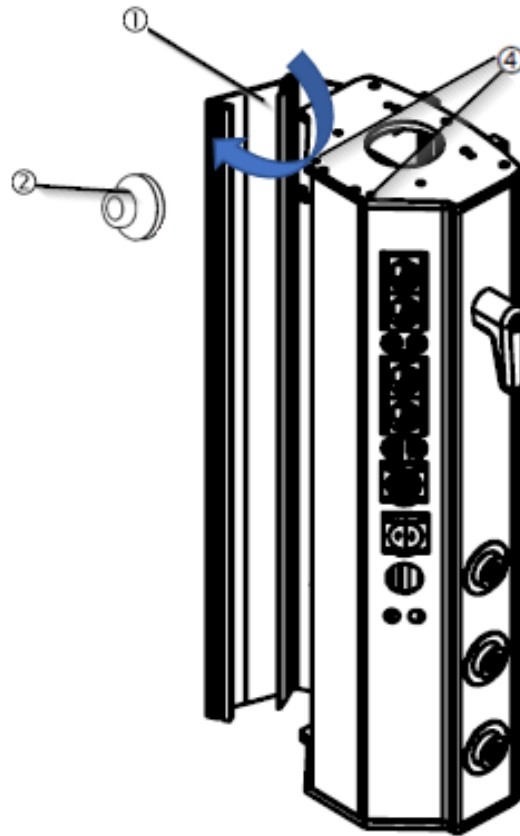


Fig. 19 Opening the service head covers.

Once the boom system has been attached to the ceiling of the system, the service head can be mounted. All the hoses for the electrical supply, for the supply and control of the brakes or motors (depending on the configuration of the suspended systems) and all the hoses for the supply of the different medical gas and/or vacuum systems are pre-assembled on the service head. It also includes a corrugated tube with a guide for the installation of the communications cables provided.

- Present the service head in front of the drop tube of the boom system(s) with the aid of the working platform.
- Route all electrical/voice and data cables and gas hoses pre-assembled in the service head through the arm/s system.



See section 6.6 of this manual.

- Open one of the side covers of the service head ① by removing the M4x16 socket head cap screws ④ at the top and bottom. The side cover can now be opened as shown in figure 20, revealing the inside of the service head.



Fold down the cover of the enclosure with the help of a plastic suction cup ②.

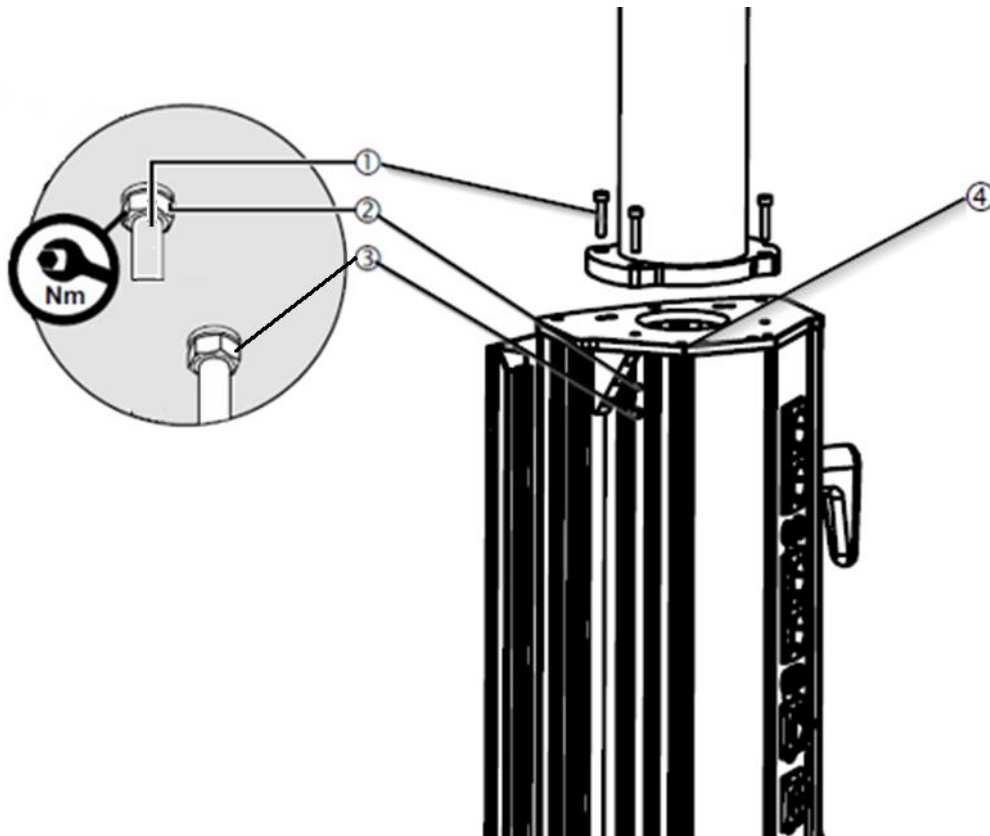


Fig. 20 Mounting the service head on the drop tube.

- Insert the 4 M8 socket head cap screws ① into the 4 recesses provided in the upper part of the service head.
- For each M8 socket head cap screw ①, place 1 S10 lock washer ② (as illustrated in Figure 21) so that the flat washer is seated between the upper seal of the service head (on the inside) and the corresponding hexagon nut ③.



The M8 socket head cap screws ① - DIN EN ISO 10642 must be tightened to 40 Nm.

- Once the service head has been secured, replace the M4x16 hexagon socket head cap screws ④ in their original position and tighten them.

6.6. Cable / hose routing



Before any installation and adjustment work, the pendant system must be disconnected from the mains.

Damaged power cables can carry 230 V (120 V) electrical voltage that energises the pendant system, and supply gases can escape from damaged supply hoses:

- Check all cables and hoses for damage. Be sure to insert them carefully without the cables/hoses crossing each other, without loops and without kinks.
- Cables and pipes must be positioned in the suspension system in such a way that they are not exposed to tensile stresses.
- Cables and hoses must be routed straight up out of the flange to prevent damage (e.g. chafing of the sheathing) and to allow free rotation.
- Protruding cables and hoses must not be routed in the service head or on the flanges, but must be routed in the interface plate and secured against falling out with cable retainers.
- Electrical cables should be routed according to regional standards (in a spiral coiled tube if necessary).

NOTA

For systems with air brakes, check air supply lines and brake valves for contamination and clean if necessary.

- Cut the brake hoses, \varnothing 4 mm, flat-parallel.
- Brake lines and air supply lines must not be bent.
- Replace damaged or bent brake lines.
- The supply pressure of the air supply ducts at the installation site must be in the range of 4 to 6 bar. The optimum operating pressure is 5 bar.

Power cables, pneumatic lines, earthing and control cables as well as gas hoses are pre-installed in the service head and must be routed through the pendant system. Order-specific cables, including telephone and nurse call cables, must be routed separately through the pendant system.

6.6.1. Connection of the earthing cables to the support arm

The earthing cables are pre-assembled on the extension arm and must be routed and connected in the direction of the arrow.

- Route and connect the grounding wires in the direction of the arrow shown in the figure and, if necessary, route them towards the interface board.
- Route the mounted grounding wires ① from the flange along the roof tube to the interface plate.
- Route the grounding wires ② out of the service head through the pendant system and into the interface plate.

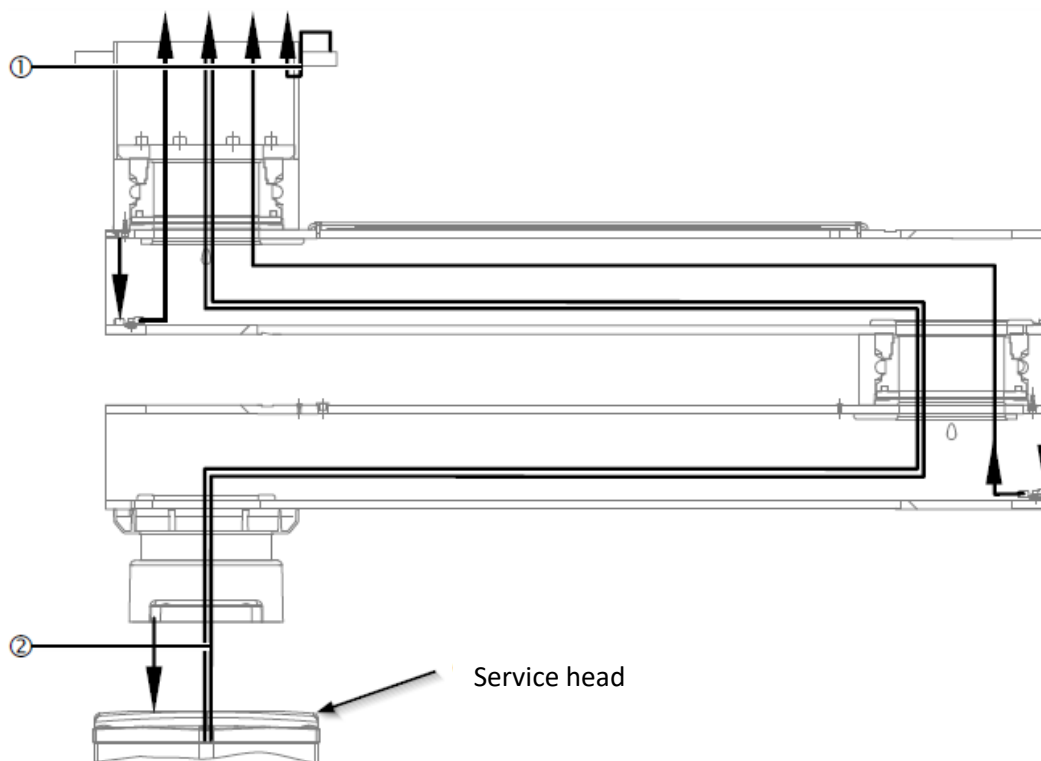


Fig. 21 Connection of earthing cables

6.6.2. Laying of power cables and hoses through the support arm

Power cables and gas hoses are pre-assembled in the Service Head. Order-specific cables, including telephone and nurse call cables, must be routed separately through the pendant system.

- Carefully route the power cables and hoses ① through the pendant system and onto the interface plate:

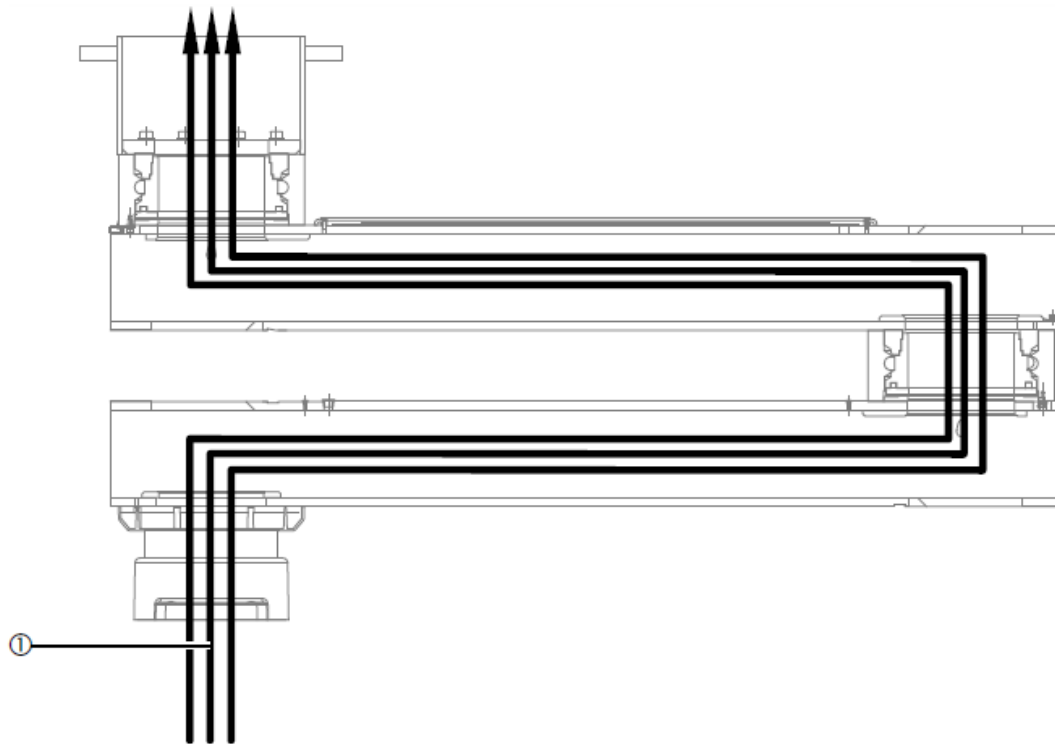


Fig. 22 Laying of the supply cables and hoses through the suspension system

- Then guide the service head without putting any strain on the supply cables and hoses ①.
- Make sure that the cables laid are not damaged or torn out.
- Route order-specific cables (nurse call, telephone, etc.) through the pendant system.
- Mount the service head on the pendant system.



See section 6.5 of this manual.

6.6.3. Installation of exhaust gas hoses and ducts

- 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.
- Ensure that the cables, hoses and conduits are assigned to the correct supply outlet points. See diagram in figure 23.

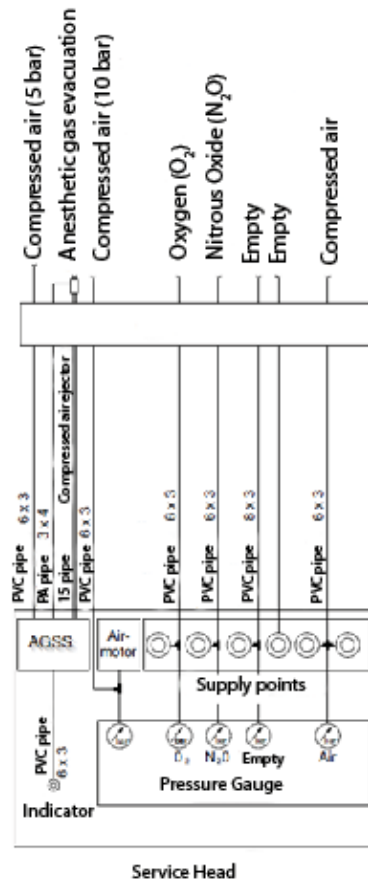


Fig. 23 Example of connection of gas hoses and anaesthesia gas evacuation systems

- Check the gas supply hoses for contamination 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 on the hose clamp and check that it is securely in place.
- Connect and secure the anaesthetic gas suction hoses and the air motor exhaust air hoses.
- 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. Gas type according to EN ISO 7396-1 or EN ISO 7396-2

6.6.4. Connection of the different electrical circuits

Figure 25 shows a simplified illustration of the interface board (1) without extension arm and cables, etc. Wiring shall always start with the equipment grounding wires.



Before any installation and adjustment work, the pendant system must be disconnected from the mains.

- Cut all green/yellow earthing wires (2.5 mm² and 10 mm²) to the correct length.

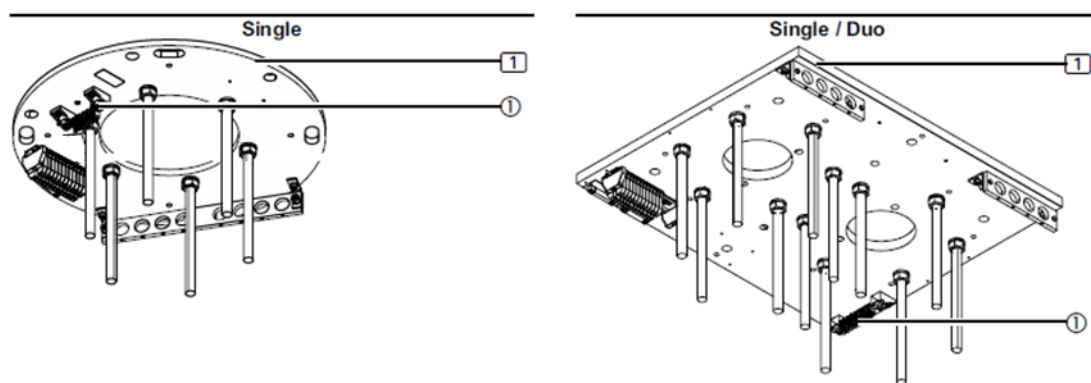


Fig. 24 Connection of the earthing cables on the interface board

- Connect them to the 4 mm² or 10 mm² series terminals on the grounding terminal block (1) on interface board 1.

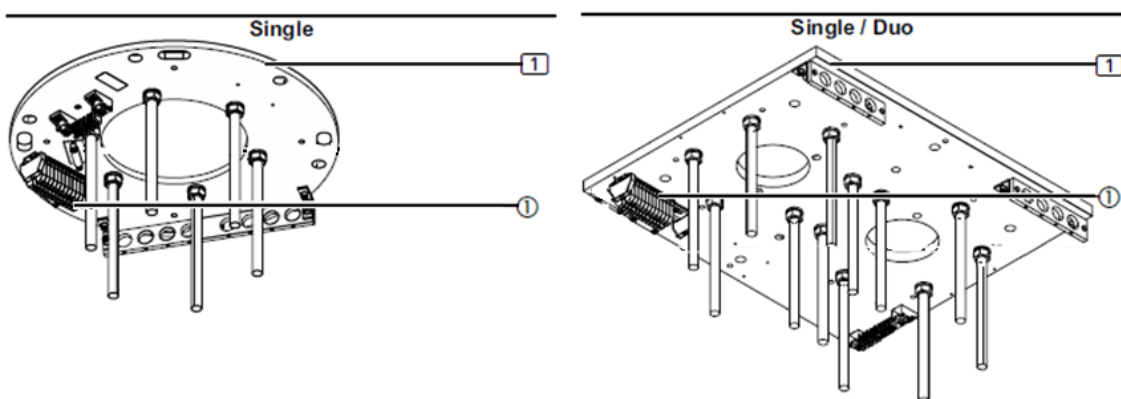


Fig. 25 Connection of the power supply cables on the interface board

Figure 26 shows a simplified illustration of the interface board 1 without extension arm and cables, etc.



Before any installation and adjustment work, the pendant system must be disconnected from the mains.

- Connect the power wires to the terminal block ① as illustrated in the wiring diagram provided at the installation site.
- Carefully check that the power cables are not trapped or bent during the entire rotational movement of the extension arms.

6.7. Fitting of trims

6.7.1. Fitting of a single / double trim

The figure shows a simplified illustration of the interface board without cables and without the extension arm.

- Screw the M10 hex nuts ① onto the M10 x 325 mm threaded bolts ②.
- Screw the M10 x 325 mm threaded bolts ② into the interface plate (1) in such a way that the canopy halves mounted below are flush with the suspended ceiling.

If an interface plate (1) is mounted directly to the forging, the threaded bolts M10 x 325 mm ② must be cut to length.

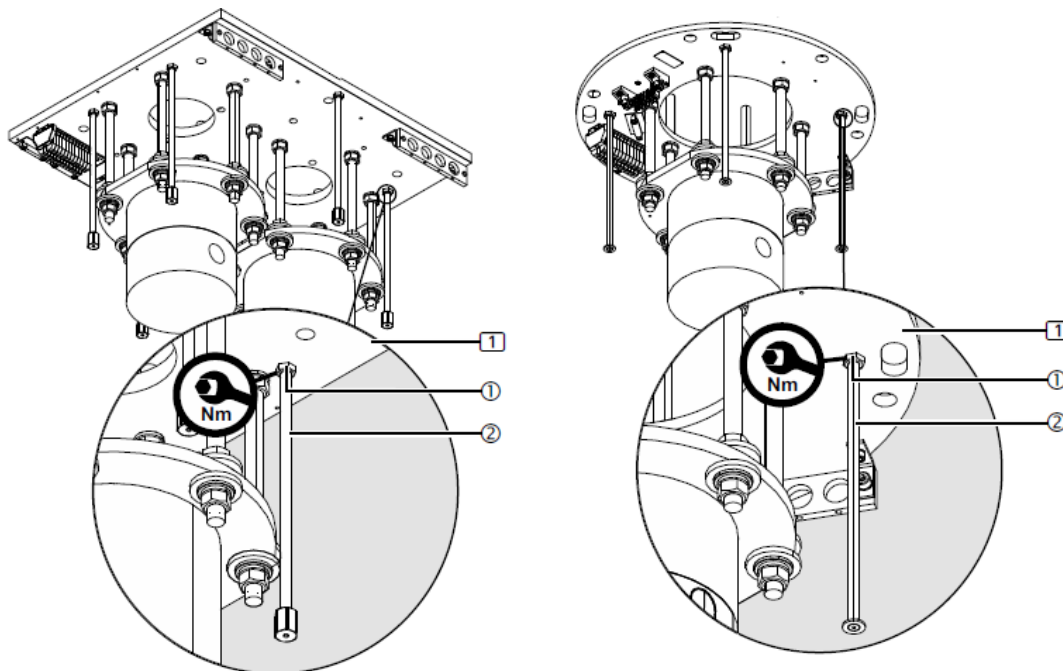


Fig. 26 Preparation of the installation



The 4 M10 hex nuts ① must be tightened to 46Nm.

- The M10 x 325 mm threaded bolts ② must be mounted at the same distance from the interface plate 1.

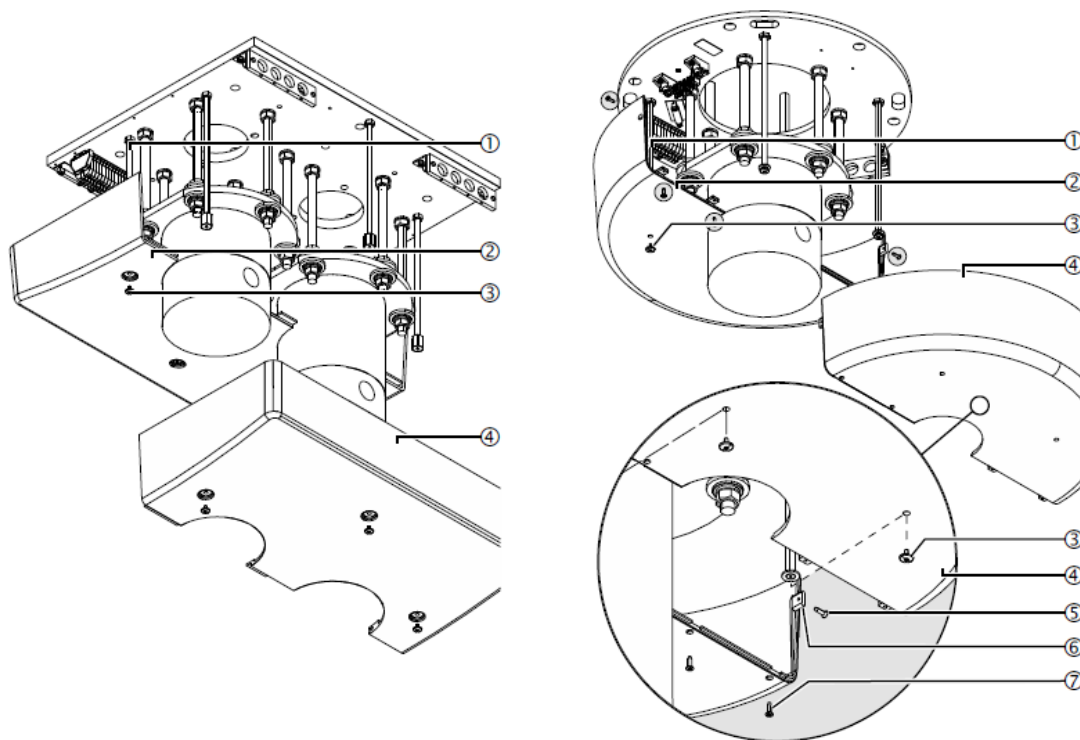


Fig. 27 Assembly of the trim halves

- Fit the U-shaped sectional strip (not shown in the figure) to the first half of the trim (2) as shown in figure 27 (optionally, the canopy can be sealed with silicone).
- Fit the first half of the trim (2) onto the M10 x 325 mm threaded bolts (1) and then screw on and tighten the cover screws (3).
- Check that the trim half (2) is flush with the false ceiling. If necessary, retighten the 4 threaded bolts M10 x 325 mm (1).
- Place the U-shaped sectional strip (not shown) over the second half of the bonnet (4) and push it onto the first half of the trim (2) so that they fit tightly together.
- Fit the second half of the trim (4) onto the M10 x 325 mm threaded bolts (1) and then screw on and tighten the cover screws (3).
- Fit and tighten the 4 special M10 nuts to cover the threaded end of the threaded bolts (1).

6.7.2. Fitting of protective covers. Covers

6.7.2.1. Assembly/disassembly of protective caps on an extension arm

The figure shows a unit with extension arm. The installation procedure for the extension arm version with motor arm is identical. A simplified representation is shown with only the extension arm without cables. The detailed representation shows a view of the cover (1).

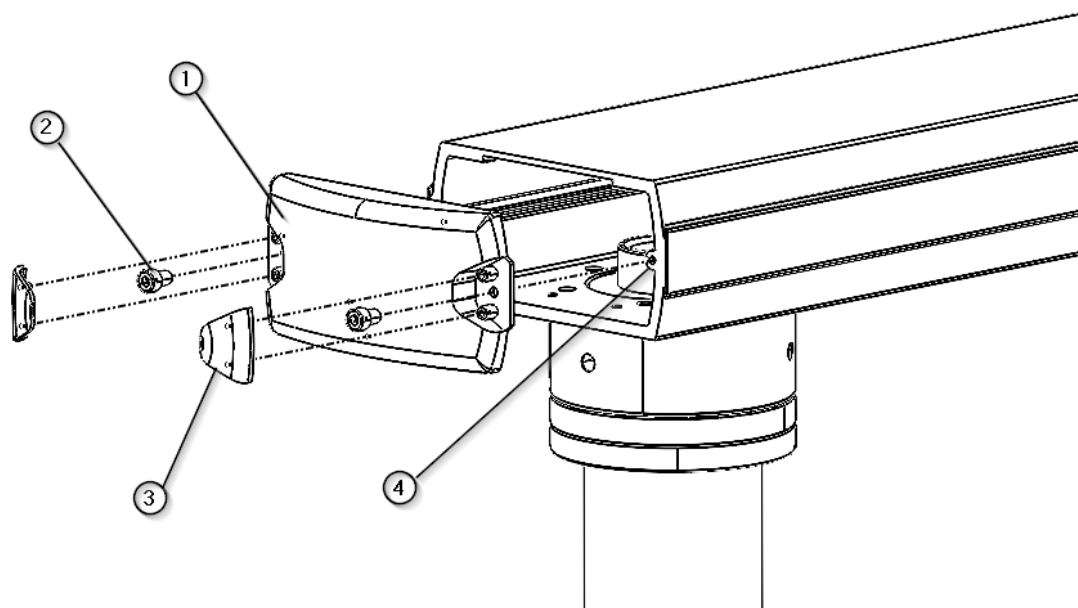


Fig. 28 Mounting / dismounting of protective caps on an extension arm

- To mount the protective cover (1), place it on the end of the extension arm, aligning the screw holes (2) with the screw holes (4) in the profile (4).
- Push the protective cover (1) over the extension arm as far as it will go and screw the screws (2) into the slot (4). Make sure that the cables are not damaged.
- If correctly mounted, the cover (1) can no longer be removed from the extension arm.
- Fit the cover cap (3) until the clipping sound is heard.
- To remove the protective cover (1), insert a small flat screwdriver between the trim cover (3) and the extension arm and push gently taking care not to damage the paint on the extension arm or the trim cover (3).
- Remove the cover cap (3) and store it in a safe place.
- Unscrew the screws (2), the protective cover (1) will be loose, remove it and store it in a safe place.

6.7.2.2. Fitting of protective caps on the drop tube of a drive arm

The figure shows a simplified representation of the motor arm without cables and hoses.

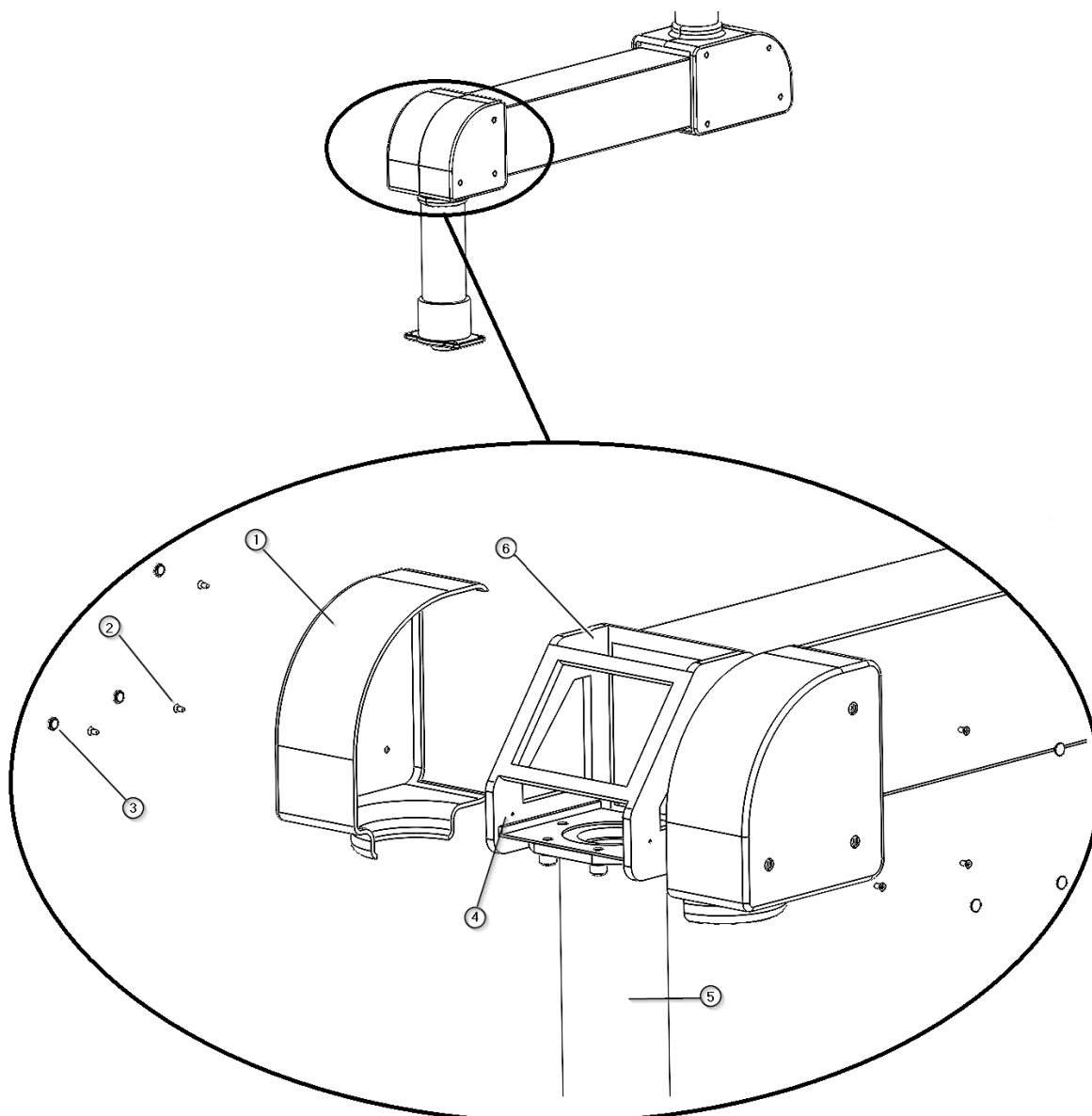


Fig. 29 Mounting / dismounting of protective caps on the drop tube of a motor arm

- To mount the side protection cover, fit the first half ① with the cylindrical part in contact with the drop tube ⑤.
- To ensure that the protective cover halves ① fit securely in place, bring them into contact in the correct position illustrated in the figure. The protective cap halves ① fit together and are connected.
- Using a Phillips-head tool, screw the 3 M4 x 10 DIN 965 screws ② into the recesses ④ provided in the metal frame ⑥. Half of the protective cover ① will be fixed in place.
- Repeat the process for the other half of the protective cap ①.
- Fit the 6 screw cover caps ③.

- To remove the protective cover ①, first remove the 6 screw cover caps ③ using a flat-nosed tool, taking care not to damage the paintwork on the arm profile or the protective cover. Store them in a safe place.
- Unscrew the 3 M4 x 10 DIN 965 screws ② from the recesses ④ provided in the metal frame ⑥ for the first half of the protective cover ⑥ using a Phillips-head tool. The first half of the protective cover ① will be loose. Store it in a safe place.
- Repeat the above two steps for the second half of the protective cap ①.

6.7.2.3. Mounting of protective cap on the roof tube of a motor arm

The figure shows a simplified representation only with a motor arm without cables. The installation procedure for the extension arm with motor arm is identical.

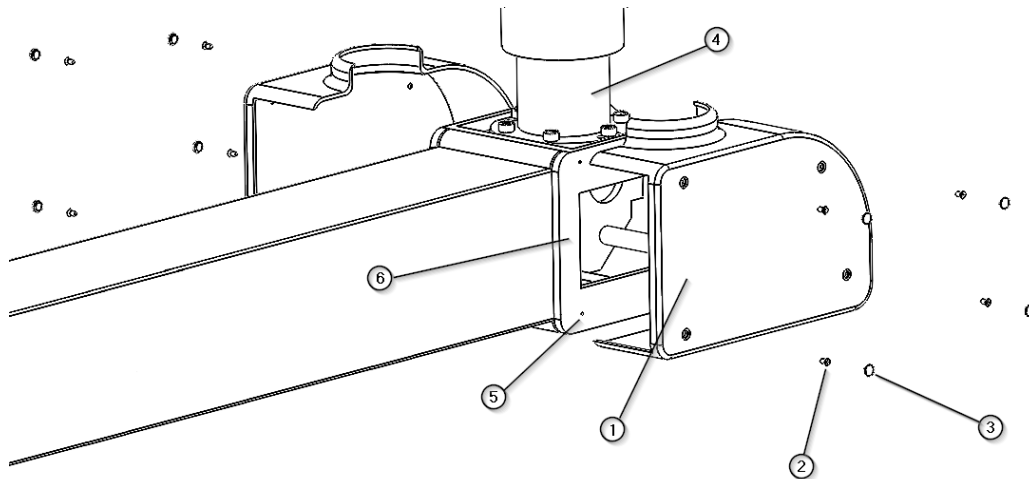


Fig. 30 Mounting / dismounting of protective caps on the roof tube of a power arm

- To fit the side protection cover, position the first half ① so that the cylindrical part contacts the roof tube ④.
- To ensure that the protective cover halves ① fit securely in place, bring them into contact in the correct position illustrated in the figure. The protective cap halves ① fit together and are connected.
- Using a Phillips-head tool, screw the 4 M4 x 10 DIN 965 screws ② into the recesses ⑤ provided in the metal frame ⑥. Half of the protective cover ① will be fixed in place.
- Repeat the process for the other half of the protective cap ①.
- Fit the 8 screw cover caps ③.
- To remove the protective cover ①, first remove the 6 screw cover caps ③ using a flat-nosed tool, taking care not to damage the paintwork on the arm profile or the protective cover. Store them in a safe place.

- Unscrew the 4 M4 x 10 DIN 965 screws (2) from the recesses (5) provided in the metal frame (6) for the first half of the protective cover (6) using a Phillips-head tool. The first half of the protective cover (1) will be loose.
- Repeat the above two steps for the second half of the protective cap (1).

6.8. Adjustments



Disconnect the equipment electrically, as well as any equipment supplied through the service head, before making adjustments to prevent live system cables leading to the equipment from coming into contact with live parts of the system.

6.8.1. 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.

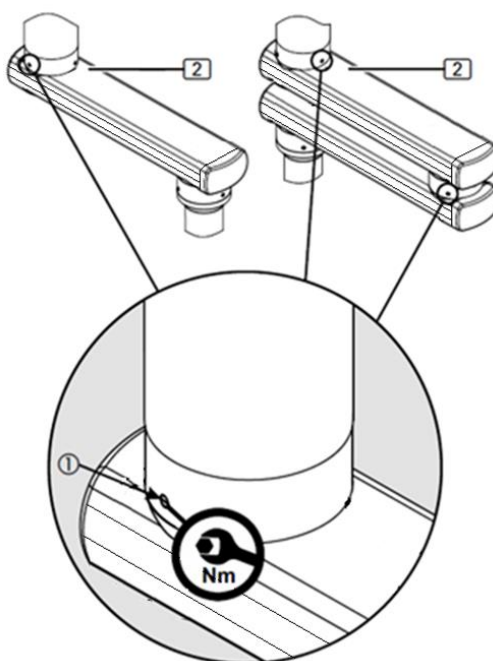


Fig.31 Adjustment of the friction brake on the arms

The mechanical 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. If the brakes are not adjusted correctly, the extension arm may automatically move in an uncontrolled manner.

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 6.9.3 of this manual.

Use a suitable torque spanner to adjust the brake.

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

6.8.2. Adjustment of the mechanical brake on the drop tube

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.

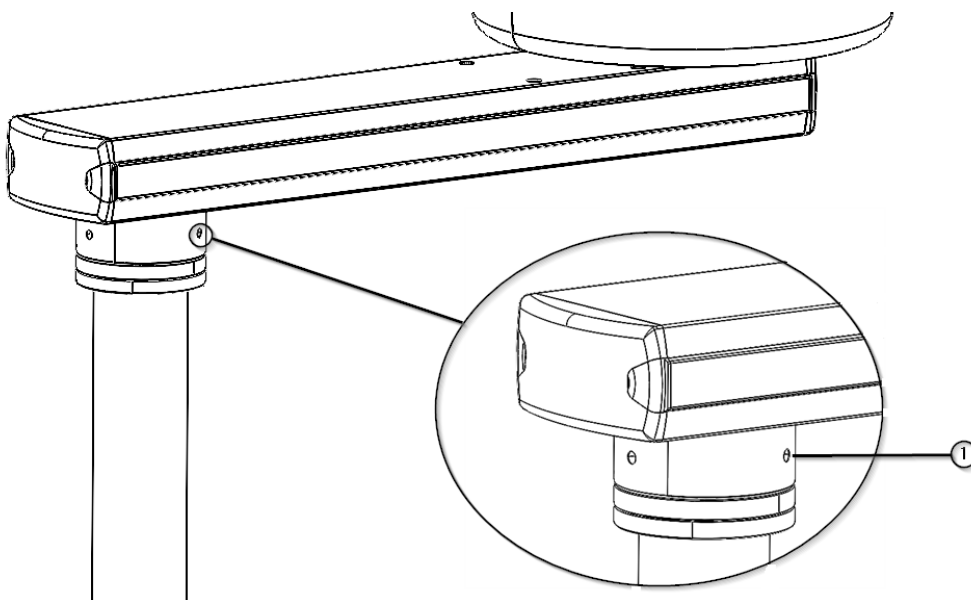


Fig.32 Adjustment of the friction brake on the drop tube

Use a suitable Allen screwdriver.

1. To increase the braking force, insert the flat screwdriver into the brake screws ① and turn it clockwise to the right.

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

6.8.3. Adjustment of the rotary stops

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

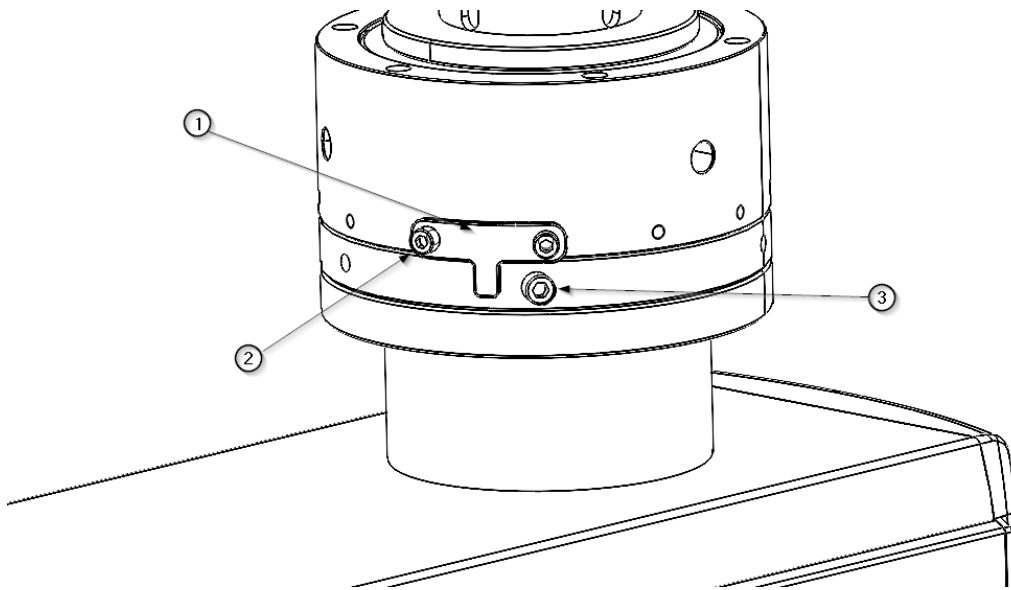


Fig.33 Adjustment of the rotary stops

1. Rotate the extension arm or console tube to the desired end stop position and then insert the pivot stop ① and secure it by means of the M5x16 DIN 912 socket head cap screws ②.

Make sure that the stop is firmly in place. The extension arm or drop tube can be rotated until the stop ① touches the limiting screw ③.

The first turning limit is already defined.

2. Rotate the extension arm or console tube to the desired position for the second end stop and then insert an additional end stop.

4. Tighten the fixing screws ② to 40 Nm.

5. Check that the swivel range of the arms is as desired.

7. Installation checks

When making adjustments to the equipment, it is necessary:

- verify that the relevant medical gas shut-off valves are properly closed and ensure that the system cannot be reopened.
- verify that the system is electrically disconnected and take measures to ensure that the system cannot be reconnected.



CAUTION: Failure to comply with this point will cause serious damage.



Before any installation and adjustment work, the pendant system must be disconnected from the mains.

7.1. Check the technical characteristics of the equipment to be installed. Weights, torques.

Before proceeding with the installation of the equipment, it must be checked that the surface on which the equipment is to be installed meets the space and resistance requirements according to the characteristics of the equipment in question.



See point 6 of the use and cleaning manual supplied with the equipment.

7.2. Check the condition of the cables and hoses in the system and the rotation of the arms.

Before installing the equipment, check that the cables and hoses of the system are not strained or kinked. There is a risk of destroying or damaging the extension arm cables if an extension arm is rotated more than 360 degrees:

- Do not rotate the extension arms more than 350 degrees.
- If necessary, limit the swing range of the arms.

The system is supplied as standard with the 2 stops and the fixing screw pre-assembled.

In exceptional cases, the 2 stops and the set screw are delivered as separate components, which means that the arm (4) or the arm (5) can be rotated infinitely more than 360 degrees.



At least 1 ball stopper must be fitted to prevent the internal power cables from twisting.

If no swivel stops have been pre-mounted, the arm (4) and/or the arm (5) must not be swivelled before the swivel stops have been mounted.

- Mount at least 1 stop as described in Chapter 6.9.3 to restrict the angle of rotation of the boom (4) and/or arm (5) to 340 degrees.

For adjusting the rotary stops:



See section 6.9.3 of this manual.

7.1. Mechanical test

It must be checked that each of the anchorage points is properly fixed to the mounting surface and that there is no displacement of the equipment.



WARNING: Personal injury may result from dropping the equipment.



See section 6.4 of this manual.

7.2. Check service head enclosure.

Check that each of the elements of the service head enclosure that has been removed to perform the installation operations described in this manual is properly fixed and secured in its intended position.

- Checking of openings, closings, foldings, displacements.



See section 6.5 of this manual.



WARNING: The use of gloves is recommended as minor personal injury may occur.

7.3. Mechanical crash test

Once the system has been installed, it must be checked to ensure that no collisions can occur with:

- other hanging systems,
- ceilings or walls,
- other equipment

7.4. Gas circuit test.

The equipment must be tested according to the current standards, EN ISO 7396-1_2016 and EN ISO 7396-2_2007 by qualified personnel.

The medical gas piping system shall be checked:

- Watertightness
- Integrity
- No crossovers between circuits.

- Good functioning of the gas intakes

These tests shall be carried out at operating pressure.



CAUTION: Danger of impact of a metallic element due to faulty disconnection, can cause serious personal injury.

7.5. Electrical circuit tests.

Once the equipment has been installed, power must be supplied to each of the circuits provided and a test must be carried out to check that all the mechanisms provided in the circuit in question, and only these, are supplied with voltage.

- Check continuity of protective earth wiring.



DANGEROUS VOLTAGE: To avoid risk of electric shock, equipment must be connected to a protective earth. Failure to do so may result in personal injury.

8. Regulations

8.1. Team ranking

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

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

Equipment intended for continuous operation.

8.2. 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.