Installation Instructions Part 2 – Pendant system [EN]

Navigator ™ , Navigator ™ – Inverted, Navigator ™ XL, Navigator ™ XXL

A member of the
Medical Illumination International Group

Dear assembly operator,

please read these Installation Instructions very carefully, and in particular Chapter Safety Instructions which includes important safety information. Observe the safety instructions and requirements set out in these Installation Instructions.

Service technician qualification requirements

- These Installation Instructions are intended for trained service technicians.
- The Nuvo pendant system may only be installed by Nuvo service technicians or authorised service personnel trained by Nuvo.

Inspections to be performed prior to installation

- The load bearing capacity of the ceiling or the wall must be checked by a structural analyst and confirmed by means of an acceptance certificate.
- The electrical installations in the corresponding room must comply with the requirements of the applicable national and international regulations.

Carrying out the installation

- The electrical connection of the appliance to the mains may only be performed by a qualified electrician whilst the appliance is disconnected at all poles.
- The steps described in these Installation Instructions must be followed for installation. In the event of damage to the appliance, installation work must be discontinued.
- The safety, reliability and performance of the appliance are only assured if genuine parts from Nuvo are used.
- If you encounter specific problems not covered in sufficient detail by these Installation Instructions, please contact your supplier immediately for your own safety and the safety of your customers.

Unauthorised modifications or conversions

- Unauthorised modifications or conversions to the appliance are not permitted for safety reasons. No modification or conversion may be performed without authorization. Otherwise, the manufacturer's warranty for the appliance will be void. The manufacturer hereby rejects any liability whatsoever for damage or injury resulting from unauthorised modifications or conversions or from using spare parts from other manufacturers.
- The use of parts which were not supplied by the manufacturer or its representatives will automatically cause the warranty to become void.
  USE GENUINE SPARE PARTS ONLY!

Qualified personnel

The following persons shall be considered as qualified personnel:

- Persons who underwent special professional training in the field of medical engineering,
- persons who can assess their work and recognize the potential hazards involved on the basis of their professional experience and instruction in safety-relevant regulations.
- In States where the performance of tasks in the medical engineering sector is subject to certification, qualified personnel must have obtained the corresponding certificate.

How to contact us

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1568907, Edition 2019-04, Version 0

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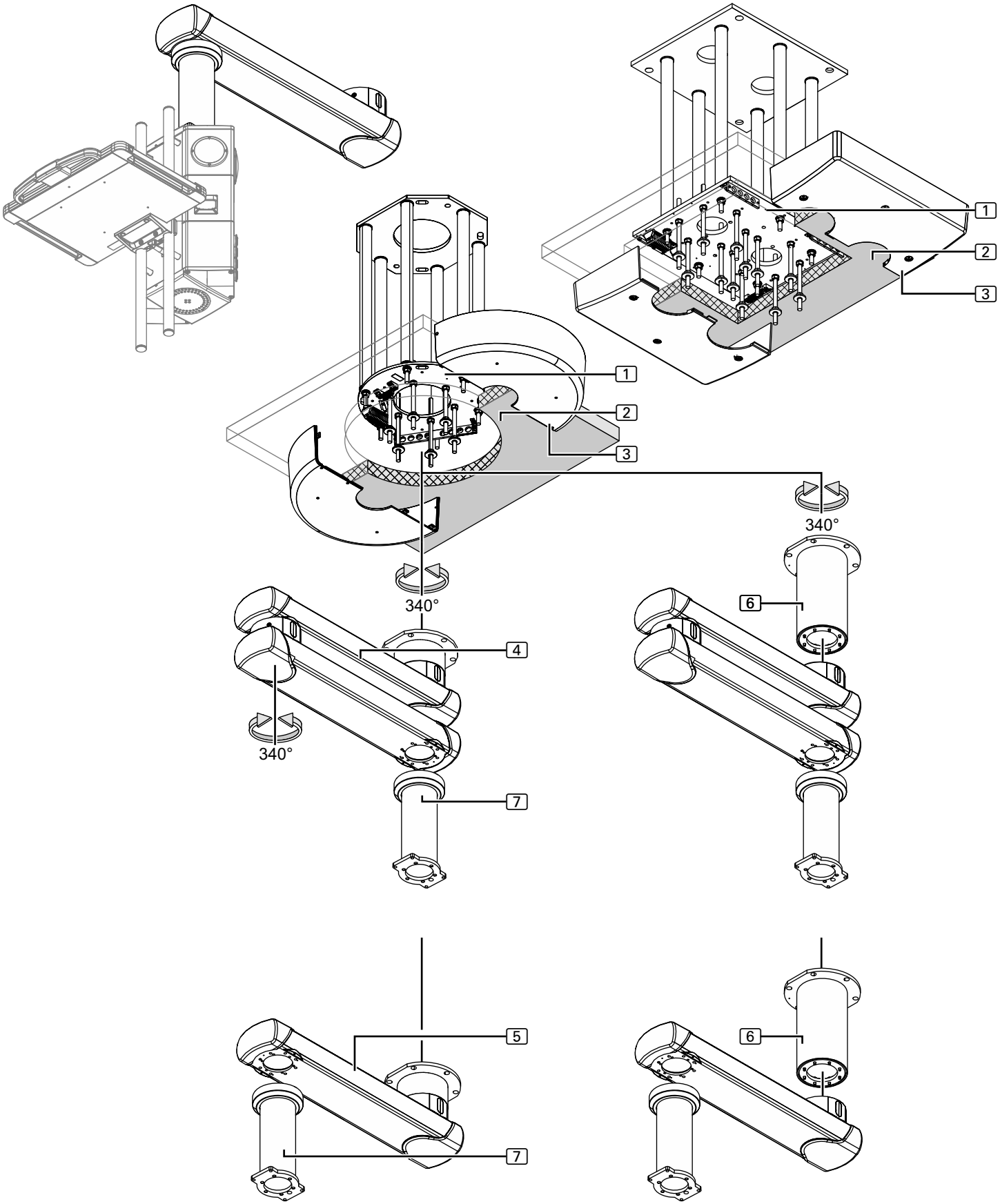
Figure 1: Scope of delivery of Navigator ™

1.1 Overview of the pendant system



See Figure 1: on page 6”

[1] Interface plate (Single / Duo) – pre-assembled
[2] Intermediate ceiling – installed by the customer on site

1.2 Scope of delivery of Navigator ™

The scope of delivery can vary depending on the individual order.

[3] Canopy (Single / Duo) (Flat / High) (depending on the version):
Installation as described in Chapter 14 on page 67
- 1 Single canopy Ø 600mm x 150mm, 1 canopy attachment 110mm high
- 1 Single canopy – 700mm x 700mm x 150mm high
- 1 Duo canopy (installation with intermediate ceiling) – 700mm x 700mm x 50mm
- 1 Duo canopy (installation with intermediate ceiling) – 700mm x 700mm x 150mm
- 1 canopy attachment – 700mm x 700mm x 120mm high

Canopy fixing elements
- 4 / 6 threaded bolts M10 x 360mm, 4 / 6 hexagonal nuts M10
- 4 / 6 metal screws, 4 / 6 cover screws and 1 sectional strip

[4] Extension arm with pre-assembled ceiling tube – Navigator ™ dual-arm variant:
Installation as described in Chapter 8.2 on page 42
- 1 Navigator ™ extension arm, 600, 800, 1000, or 1200mm long, with 1 Navigator ™ extension arm, 600, 800, 1000, or 1200mm long (pre-assembled)

Pre-assembled components
- 1 power cable
- Supply cables for electromagnetic brakes
- 1 signal cable for electromagnetic brakes (in protective tube)
- 3 earthing cables 4mm^2

Pre-assembled or loose components incl. in the scope of delivery (see Chapter 15.1 on page 70)
- 2 setscrews M16 – DIN EN ISO 4028
- 4 ball stops Ø 12.7mm
- 4 section end caps for Navigator ™ extension arm

Extension arm fixing elements
- 12 hexagonal nuts M16 and 6 spring rings, 12 flat washers, external Ø 34mm and 12 plastic insulating discs, 6 threaded bolts M16 x 330mm

[5] Extension arm with pre-assembled ceiling tube – Navigator ™ single-arm variant:
Installation as described in Chapter 8.2 on page 42
- 1 extension arm 600, 800, 1000, or 1200mm long

Pre-assembled components
- 1 power cable
- Supply cables for electromagnetic brakes
- 1 signal cable for electromagnetic brakes (in protective tube)
- 2 earthing cables 4mm^2

Pre-assembled or loose components incl. in the scope of delivery (see Chapter 15.1 on page 70)
- 1 setscrew M16 – DIN EN ISO 4028
- 2 ball stops Ø 12.7mm
- 2 section end caps for extension arm

Extension arm fixing elements
- 12 hexagonal nuts M16 and 6 spring rings
- 12 flat washers, external diameter 34mm, and 12 plastic insulating discs
- 6 threaded bolts M16 x 330mm

[6] Navigator ™ ceiling tube (for long ceiling tubes):
Pre-installation as described in Chapter 7.2 on page 38
- 1 ceiling tube (length as specified in the order)
- 1 earthing cable, 4mm^2

Loose components incl. in the scope of delivery
- 1 socket wrench extension (for 500 and 700mm ceiling tube length only)

Fixing elements for additional ceiling tube
- 8 Allen cylinder screws M10 x 25mm – 8.8 – DIN EN ISO 4762
- 8 lock washers S10

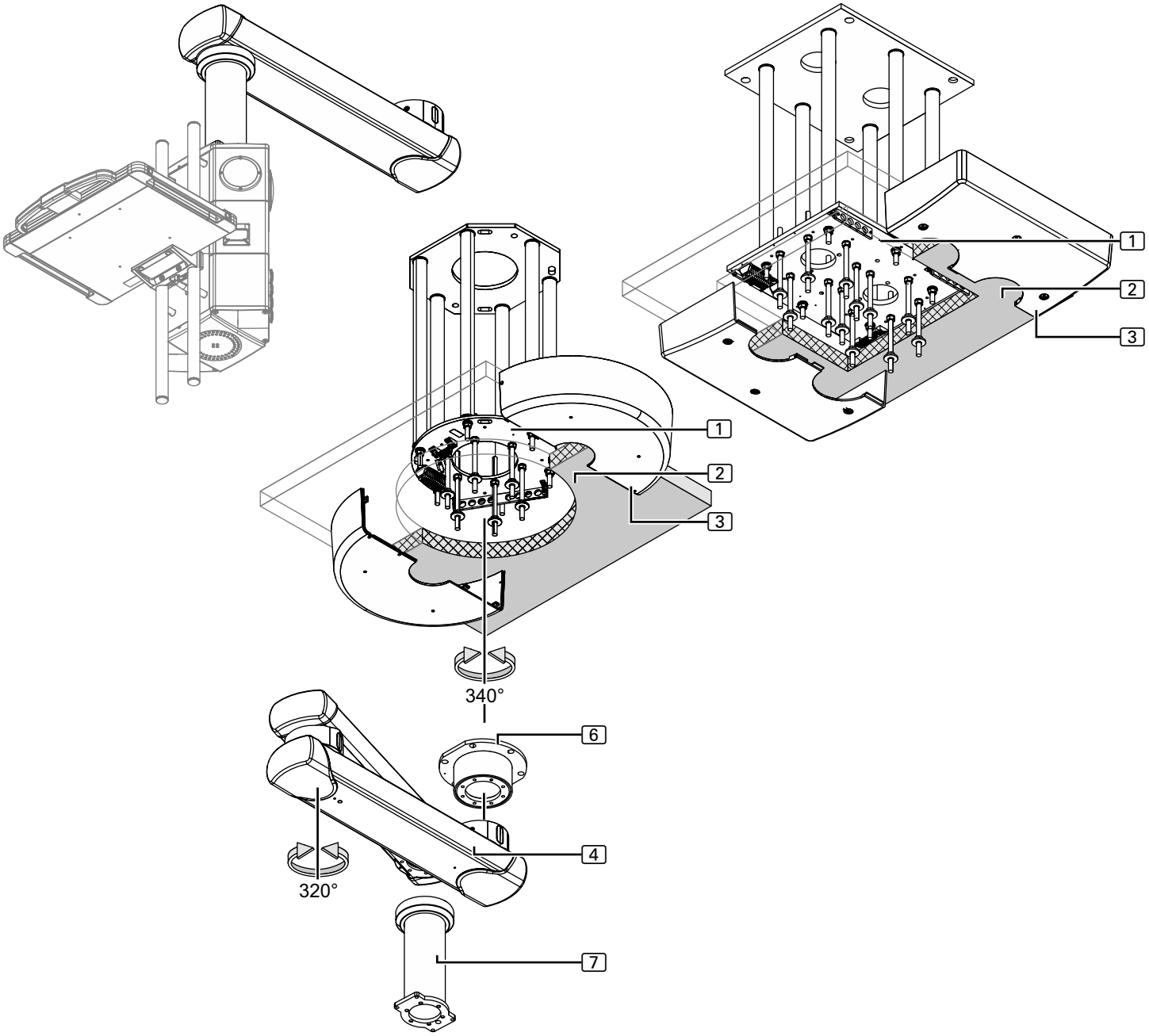
[7] Navigator ™ Drop tube:
Installation as described in Chapter 9.2 on page 46

Pre-assembled components
- 1 Drop tube (in order-specific length)
- 1 earthing cable, 4mm²

Drop tube fixing elements
- 1 fastening plate 8 x M10
- 8 Allen countersunk screws M10 x 25mm – 10.9 – DIN EN ISO 10642

Figure 2: Scope of delivery of Navigator ™ – Inverted

1.3 Overview of the pendant system



See Figure 1: on page 6”

1 Interface plate (Single / Duo) – pre-assembled
2 Intermediate ceiling – installed by the customer on site

1.4 Scope of delivery of Navigator ™ – Inverted

The scope of delivery can vary depending on the individual order.

3 Canopy (Single / Duo) (Flat / High) (depending on the version):
Installation as described in Chapter 14 on page 67
- 1 Single canopy Ø 600 mm x 150 mm, 1 canopy attachment 110 mm high
- 1 Single canopy – 700 mm x 700 mm x 150 mm high
- 1 Duo canopy (installation with intermediate ceiling) – 700 mm x 700 mm x 50 mm
- 1 Duo canopy (installation with intermediate ceiling) – 700 mm x 700 mm x 150 mm
- 1 canopy attachment – 700 mm x 700 mm x 120 mm high

Canopy fixing elements
- 4 / 6 threaded bolts M10 x 360 mm, 4 / 6 hexagonal nuts M10
- 4 / 6 metal screws, 4 / 6 cover screws and 1 sectional strip

4 Extension arm – Navigator ™ – Inverted - dual-arm variant:
Installation as described in Chapter 8.2 on page 42
- 1 Navigator ™ extension arm, 600, 800, 1000, or 1200 mm long, with
  1 Navigator ™ extension arm, 600, 800, 1000, or 1200 mm long (pre-assembled)

Pre-assembled components
- 1 power cable
- Supply cables for electromagnetic brakes
- 1 signal cable for electromagnetic brakes (in protective tube)
- 3 earthing cables 4mm^2

Pre-assembled or loose components incl. in the scope of delivery (see Chapter 15.1 on page 70)
- 2 setscrews M16 – DIN EN ISO 4028
- 4 ball stops Ø 12.7 mm
- 4 section end caps for Navigator ™ extension arm

Extension arm fixing elements
- 12 hexagonal nuts M16 and 6 spring rings, 12 flat washers, external Ø 34 mm and 12 plastic insulating discs, 6 threaded bolts M16 x 330 mm

6 Navigator ™ – Inverted ceiling tube:
Pre-installation as described in Chapter 7.2 on page 38
- 1 ceiling tube (length as specified in the order)
- 1 earthing cable, 4mm^2

Loose components incl. in the scope of delivery
- 1 socket wrench extension (for 500 and 700 mm ceiling tube length only)

Fixing elements for additional ceiling tube
- 8 Allen cylinder screws M10 x 25 mm – 8.8 – DIN EN ISO 4762
- 8 lock washers S10

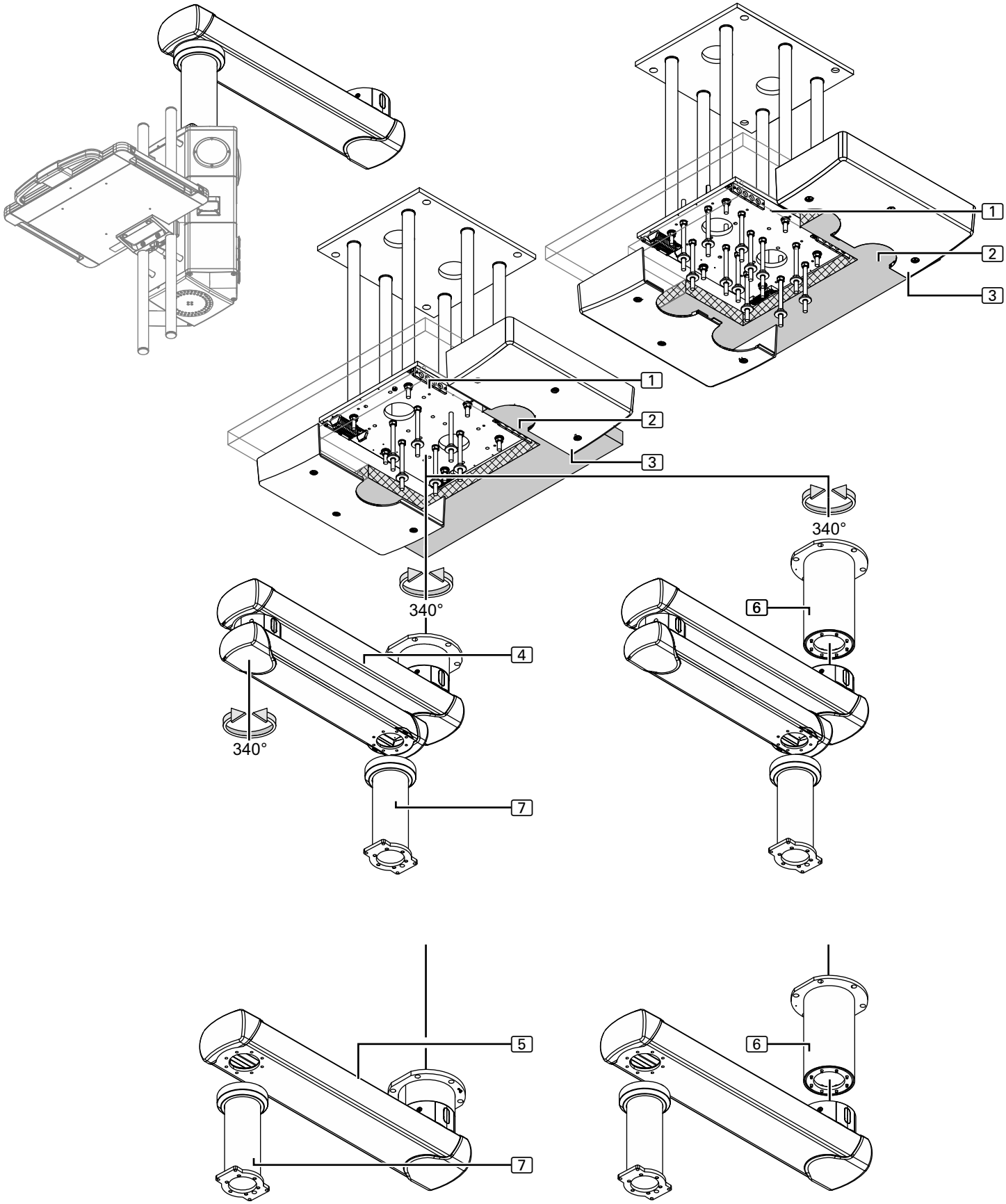
7 Navigator ™ Drop tube:
Installation as described in Chapter 9.2 on page 46
- 1 Drop tube (in order-specific length)

Pre-assembled components
- 1 earthing cable, 4 mm²

Drop tube fixing elements
- 1 fastening plate 8 x M10
- 8 Allen countersunk screws M10 x 25 mm – 10.9 – DIN EN ISO 10642

Figure 3: Scope of delivery of Navigator ™ XL

1.5 Overview of the pendant system



See Figure 3: on page 10”

[1] Interface plate (Single / Duo) – pre-assembled
[2] Intermediate ceiling – installed by the customer on site

1.6 Scope of delivery of Navigator ™ XL

The scope of delivery can vary depending on the individual order.

[3] Canopy (Single / Duo) (Flat / High) (depending on the version):
Installation as described in Chapter 14 on page 67
- 1 Single canopy – 700mm x 700mm x 150mm high
- 1 Duo canopy (installation with intermediate ceiling) – 700mm x 700mm x 50mm
- 1 Duo canopy (installation with intermediate ceiling) – 700mm x 700mm x 150mm
- 1 canopy attachment – 700mm x 700mm x 120mm high

Canopy fixing elements
- 4 / 6 threaded bolts M10 x 360mm, 4 / 6 hexagonal nuts M10
- 4 / 6 metal screws, 4 / 6 cover screws and 1 sectional strip

[4] Extension arm with pre-assembled ceiling tube – Navigator ™ XL dual-arm variant:
Installation as described in Chapter 8.2 on page 42
- 1 Navigator ™ XL extension arm, 600, 800, 1000, 1200, 1400, or 1600mm long, with 1 Navigator ™ extension arm, 600, 800, 1000, or 1200mm long (pre-assembled)

Pre-assembled components
- 1 power cable
- Supply cables for electromagnetic brakes
- 1 signal cable for electromagnetic brakes (in protective tube)
- 3 earthing cables 4mm^2

Pre-assembled or loose components incl. in the scope of delivery (see Chapter 15.1 on page 70)
- 1 setscrew M20 – DIN EN ISO 4028, 2 ball stops Ø 16mm
- 1 setscrew M16 – DIN EN ISO 4028, 2 ball stops Ø 12.7mm
- 2 section end caps each for the Navigator ™ XL and Navigator ™ extension arms

Extension arm fixing elements
- 12 hexagonal nuts M16 and 6 spring rings, 12 flat washers, external Ø 34mm and 12 plastic insulating discs, 6 threaded bolts M16 x 330mm

[5] Extension arm with pre-assembled ceiling tube – Navigator ™ XL single-arm variant:
Installation as described in Chapter 8.2 on page 42
- 1 Navigator ™ XL extension arm, 600, 800, 1000, 1200, 1400, or 1600mm long

Pre-assembled components
- 1 power cable
- Supply cables for electromagnetic brakes
- 1 signal cable for electromagnetic brakes (in protective tube)
- 2 earthing cables 4mm^2

Pre-assembled or loose components incl. in the scope of delivery (see Chapter 15.1 on page 70)
- 1 setscrew M20 – DIN EN ISO 4028
- 2 ball stops Ø16mm
- 2 section end caps for extension arm

Extension arm fixing elements
- 12 hexagonal nuts M16 and 6 spring rings, 12 flat washers, external Ø 34mm and 12 plastic insulating discs, 6 threaded bolts M16 x 330mm

[6] Navigator ™ XL ceiling tube (for long ceiling tubes):
Pre-installation as described in Chapter 7.2 on page 38
- 1 ceiling tube (length as specified in the order)
- 1 earthing cable, 4mm^2

Loose components incl.in the scope of delivery
- 1 socket wrench extension (for 500 and 700mm ceiling tube length only)

Fixing elements for additional ceiling tube
- 10 Allen cylinder screws M10 x 30mm – 8.8 – DIN EN ISO 4762
- 10 lock washers S10

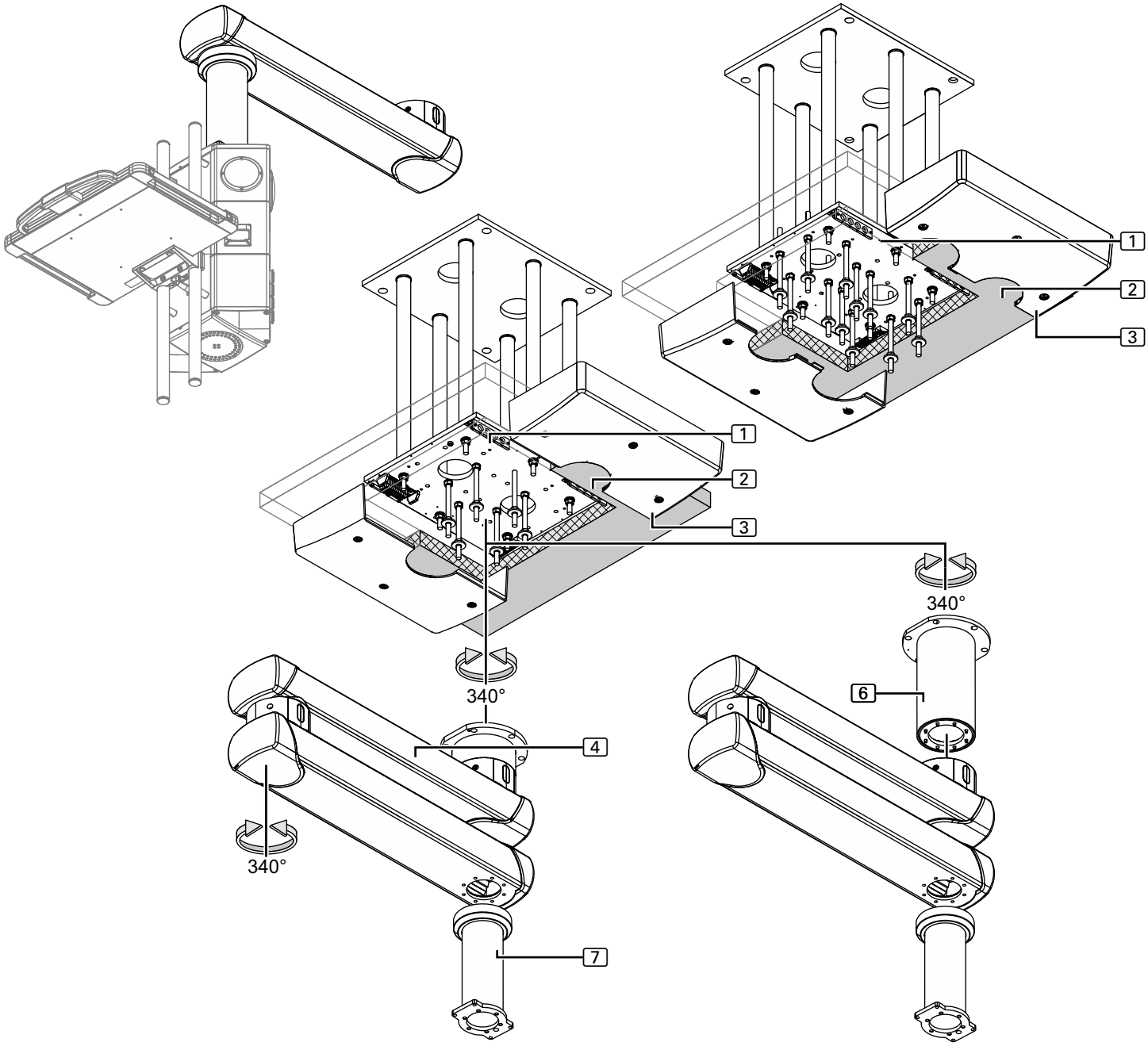
[7] Navigator ™ XL Drop tube (different for single- and dual-arm extension arms):
Installation as described in Chapter 9.2 on page 46

Pre-assembled components
- 1 Drop tube (in order-specific length)
- 1 earthing cable, 4mm^2

Drop tube fixing elements
- 1 fastening plate 8 x M10
- 8 Allen countersunk screws M10 x 25mm – 10.9 – DIN EN ISO 10642 (Navigator ™ XL – dual-arm variant)
- 8 Allen countersunk screws M10 x 30mm – 10.9 – DIN EN ISO 10642 (Navigator ™ XL – single-arm variant)

Figure 4: Scope of delivery of Navigator ™ XXL

1.7 Overview of the pendant system



See Figure 4: on page 12”

[1] Interface plate (Single / Duo) – pre-assembled
[2] Intermediate ceiling – installed by the customer on site

1.8 Scope of delivery of Navigator ™ XXL

The scope of delivery can vary depending on the individual order.

[3] Canopy (Single / Duo) (Flat / High) (depending on the version):
Installation as described in Chapter 14 on page 67
- 1 Single canopy – 700mm x 700mm x 150mm high
- 1 Duo canopy (installation with intermediate ceiling) – 700mm x 700mm x 50mm
- 1 Duo canopy (installation with intermediate ceiling) – 700mm x 700mm x 150mm
- 1 canopy attachment – 700mm x 700mm x 120mm high

Canopy fixing elements
- 4 / 6 threaded bolts M10 x 360mm, 4 / 6 hexagonal nuts M10
- 4 / 6 metal screws, 4 / 6 cover screws and 1 sectional strip

[4] Extension arm with pre-assembled ceiling tube – Navigator ™ XXL dual-arm variant:
Installation as described in Chapter 8.2 on page 42
- 2 Navigator ™ XXL extension arms, 600, 800, 1000, 1200, 1400, or 1600mm long (pre-assembled)

Pre-assembled components
- 1 power cable
- Supply cables for electromagnetic brakes
- 1 signal cable for electromagnetic brakes (in protective tube)
- 3 earthing cables 4mm^2

Pre-assembled or loose components incl. in the scope of delivery (see Chapter 15.1 on page 70)
- 2 setscrews M20 – DIN EN ISO 4028
- 4 ball stops Ø 16mm
- 4 section end caps for Navigator ™ XXL extension arm

Extension arm fixing elements
- 12 hexagonal nuts M16 and 6 spring rings, 12 flat washers, external Ø 34mm and 12 plastic insulating discs, 6 threaded bolts M16 x 330mm

[6] Navigator ™ XXL ceiling tube (for long ceiling tubes):
Pre-installation as described in Chapter 7.2 on page 38
- 1 ceiling tube (length as specified in the order)
- 1 earthing cable, 4mm^2

Loose components incl. in the scope of delivery
- 1 socket wrench extension (for 500 and 700mm ceiling tube length only)

Fixing elements for additional ceiling tube
- 10 Allen cylinder screws M10 x 30mm – 8.8 – DIN EN ISO 4762
- 10 lock washers S10

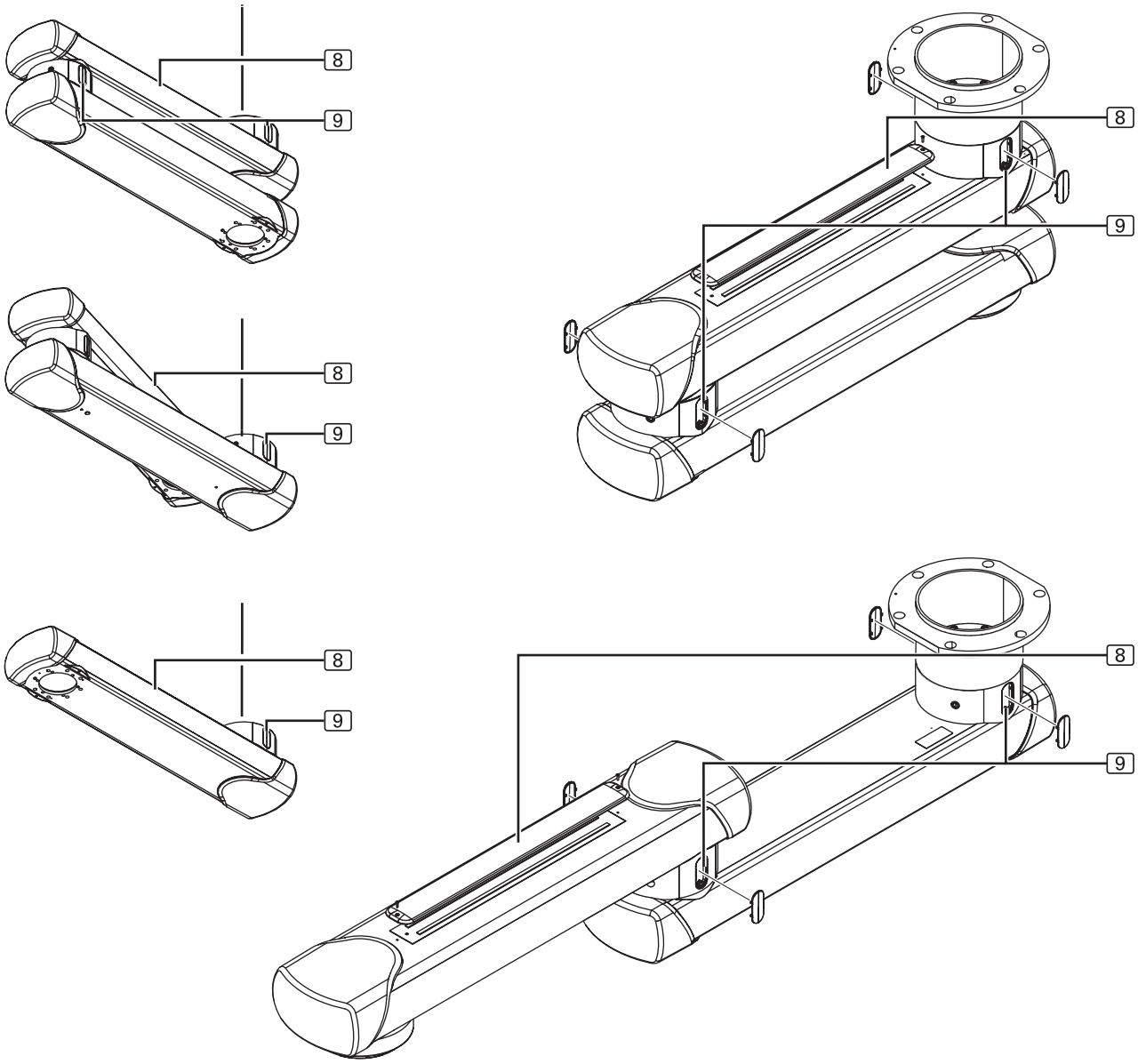
[7] Navigator ™ XXL Drop tube:
Installation as described in Chapter 9.2 on page 46
- 1 Drop tube (in order-specific length)

Pre-assembled components
- 1 earthing cable, 4mm^2

Drop tube fixing elements
- 1 fastening plate 8 x M10
- 8 Allen countersunk screws M10 x 30mm – 10.9 – DIN EN ISO 10642

Figure 5: Scope of optional accessories

1.9 Overview of optional accessories



See Figure 5: on page 14”

Upon delivery of the system from the factory the following options are already assembled:

1.10 Scope of delivery of optional accessories

[8] Indirect extension arm lighting:
For a retrofit: Installation as described in Chapter 11.4.2 on page 52
Navigator ™ : extension arms 800, 1000, 1200 mm long
Navigator ™ – Inverted: extension arms 800, 1000, 1200 mm long
Navigator ™ XL: extension arms 1000, 1200, 1400, 1600 mm long
Navigator ™ XXL: extension arms 1000, 1200, 1400, 1600 mm long

Pre-assembled components
- 1 extension arm lighting (600 mm long, input voltage DC 12V)
- 3 sealing plugs on the top side of the extension arm
- 1 basic carrier with LEDs and connecting cable
- 1 electric signal cable, with connectors on both ends
- 1 cover

Extension arm lighting fixing elements
- 2 countersunk screws M4 x 16 mm – DIN EN ISO 10642

[9] Brake indicators (for single- and dual-arm extensions):
For a retrofit: Installation as described in Chapter 10.2 on page 48

Pre-assembled components
- 2 / 4 plastic covers (pre-assembled)
- 2 / 4 lighting boards (12V DC supply voltage, 2 lighting boards each connected in series to the 24V DC power supply)
- 2 / 4 power cables

1.11 Further optional accessories

– 1 telescopic magnet pick-up tool set

2.1 Approved Nuvo adaptions

Approved adaptions

The following Nuvo products are approved for use on the pendant system:

- Nuvo products in accordance with Chapter 20, “Approved Nuvo Products”, on page 88

2.2 Combination with products of other manufacturers

Read the Installation Instructions for combined products

- The pendant system is combined with the Navigator M6. To prevent dangerous overload, which can lead to a failure or collapse of the pendant system, the maximum load bearing capacity specified in Chapter 18, “Technical Data”, on page 79 must be adhered to.
  - The party placing the appliance into operation is responsible for the validation of the overall system. A conformity assessment procedure shall be executed if required and a declaration in accordance with Article 12 of 93/42/EEC (Medical Device Directive, MDD) shall be provided.
  - For more detailed information on the installation of the Navigator M6, refer to the Installation Instructions of the Navigator M6 (Part 3: Installing the Navigator M6).
- Power packs intended for the supply of end devices must ensure electrical isolation and provide two protective measures in accordance with IEC 60601-1.

2.3 Structure of the safety instructions

2.3.1 Warnings of risk of injury

Important notes in this document are marked with graphic symbols and signal words. Signal words such as DANGER, WARNING or CAUTION describe the degree of risk of injury. The different triangle symbols visually emphasise the degree of hazard.

⚠ DANGER

DANGER refers to a potential hazard with a high degree of risk which, if not avoided, will lead to death or severe injury.

⚠ WARNING

WARNING refers to a potential hazard with a medium degree of risk which, if not avoided, can lead to death or severe injury.

⚠ CAUTION

CAUTION refers to a potential hazard with a low degree of risk which, if not avoided, can lead to minor or moderate injury.

2.3.2 Warnings of damage to property

NOTICE

NOTICE refers to a potential hazard, which, if not avoided, leads to damage to property.

2.3.3 Indication of additional information

NOTE

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

2.4 Supplementary symbols used in the safety instructions

Explosion hazard: warns of the improper use of oxygen (see Chapter 2.11 on page 21).

Danger of fire: warns of the improper use of oxygen (see Chapter 2.11 on page 21).

Electric shock hazard: warns of electric shock which can lead to severe injury or even death.

Pendant system dropping: warns of the risk of the pendant system suddenly dropping due to incorrect installation.

Tightening torque: warns of the pendant system suddenly dropping because the fastening screws have not been sufficiently tightened or not tightened at all.

2.5 Graphic symbols on the appliance and the package

Read the Installation Instructions: Read these Installation Instructions carefully prior to installation of the pendant system. This ensures that you benefit from all the advantages of the pendant system and prevents any risk of injury or damage.

Observe the maximum load bearing capacity or maximum loading capacity (payload): warns of the risk of the appliance suddenly dropping because the maximum load bearing capacity or maximum loading capacity (payload) has been exceeded. The maximum value is indicated in kg or Nm.

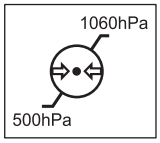
General note reminding the user of handling the pendant system with care.

Environmentally friendly disposal: warns of damage to the environment caused by improper disposal of the pendant system.

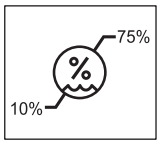
CE mark: Nuvo declares that the products comply with the relevant regulations set forth in the applicable European Directives.

CE mark with the ID number of the indicated conformity assessment body: Nuvo declares that the assessment of conformity in accordance with 93/42 EEC (Medical Device Directive) has been performed by the indicated body.

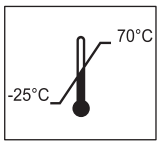
This symbol marks the product as a component approved by a „Nationally Recognized Testing Laboratory“ which complies with both Canadian and US deviations from applicable standards.



Atmospheric pressure: indicates the permissible atmospheric pressure values in a range from 500 hPa to 1060 hPa for transport and storage.



Relative humidity: indicates the permissible humidity values in a range from 10 % to 75 % for transport and storage.



Ambient temperature: indicates the permissible ambient temperature values in a range from -25 °C to 70 °C for transport and storage.

2.6 Intended purpose

These Installation Instructions apply to this model

- Navigator ™ , Navigator ™ – Inverted, Navigator ™ XL, Navigator ™ XXL pendant system
  - Single type – single- and dual-arm variants
  - Duo type and combinations – single- and dual-arm variants

- The Navigator ™ pendant system is individually equipped; depending on the version and equipment, it serves for:

– carrying and positioning medical devices in OR or intensive care rooms and medical environments;

- the conveying and extraction of fluids including:

– medical gases, vacuum and compressed air,

– electricity and data.

- The pendant system is suitable for continuous operation.

2.6.1 Incorrect use

- The maximum load bearing capacity of the pendant system and its components as specified in Chapter 18, “Technical Data”, on page 79 must not be exceeded.

Duty cycle of the electromagnetic brakes

- The maximum duty cycle of the electromagnetic brakes of the pendant system must not exceed 1 minute:

– If the electromagnetic brakes are actuated over a longer period of time, the power pack can switch off automatically as a protection measure against overheating.

– Once the power pack has switched off, it must cool down for 10 minutes and then be disconnected from the mains for 10 seconds before being switched back on again. Normal system operation can only be resumed afterwards. To prevent safety cutoffs, the maximum duty cycle should not be exceeded.

2.6.2 Contraindications

- The pendant system must not be used close to strong magnetic fields.
- No BF or CF application parts in accordance with IEC 60601-1 may be directly connected to the pendant system.

2.7 Ambient conditions

2.7.1 Ambient conditions for storage and transport

The following conditions apply to storage:

- Ambient temperature: -25 °C to 70 °C
- Relative humidity: 10 % to 75 %
- Atmospheric pressure: 500 hPa to 1,060 hPa
  Store only in indoor rooms.

2.7.2 Ambient conditions for operation

- Ambient temperature: 10 °C to 40 °C
- Relative humidity: 30 % to 75 %
- Atmospheric pressure: 700 hPa to 1,060 hPa
  This corresponds to a maximum operating altitude of 3,000m.

2.8 Information on the rating plate

(See "Figure 6")

The Figure shows rating plates of the Navigator ™ and Navigator ™ – Inverted versions as an example. The rating plates of the Navigator ™ XL and Navigator ™ XXL versions have an identical structure:

- The rating plates are attached to the top side of the extension arms.

Serial number

- The rating plate indicates the serial number (SN) of the pendant system.

Power supply

- The rating plate provides information on the power supply of the pendant system.

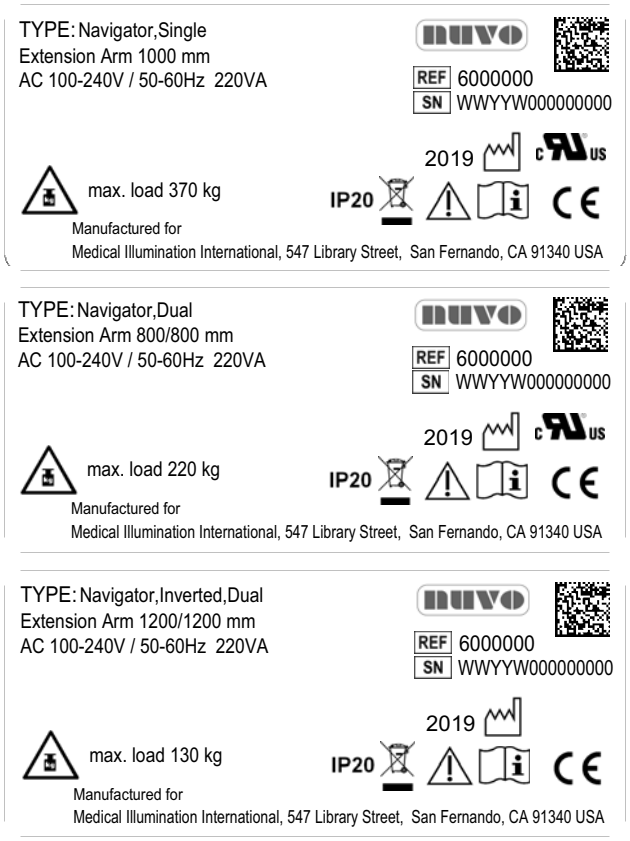
Load bearing capacity

- The value of up to 370kg or 220kg indicates the maximum permissible load bearing capacity of the extension arm.

Date of manufacture

- The digits 1 to 4 of the serial number (SN) indicate the date of manufacture of the
  pendant system.
  – The first two digits indicate the week of manufacture,
  e.g. 11 = calendar week 11.
  – The following two digits indicate the year of manufacture,
  e.g. 14 = 2014.
  – The letter in the 5th position indicates the factory, e.g. H = Hünfeld.
  – The digits following the letter indicate the serial number.
- The information and illustrations serve as examples.
- The information and illustrations on the rating plate can vary.

Figure 6: Information on the rating plate



2.9 Retrofit to an already installed ceiling mount

⚠WARNING

Risk of the ceiling mount dropping

In the case of retrofits to an already installed ceiling mount the fixing elements used must be inspected by a structural analyst and approved for the new pendant system:

- Retrofits are not permitted if this approval has not been granted.

2.10 Overview of the most important safety instructions

The safety instructions in the following chapters must be adhered to.

⚠WARNING

Electric shock hazard

To prevent the risk of electric shock, the pendant system may only be connected to a power supply network equipped with a protective conductor:

- The pendant system must be connected in such a way that it can be disconnected from the mains at all poles and at the same time.

⚠WARNING

Risk of parts falling off

Make sure that no-one is standing underneath the components of the pendant system whilst it is being installed.

⚠WARNING

Electric shock hazard

Contact with energised components presents a danger to life from electric shock. Motor-driven, mobile device components can cause injury in the case of being switched on unintentionally.
Prior to any installation and setting up work, the pendant system must be disconnected from the mains:

- Disconnect all poles of the power supply source from the mains and prevent it from being reconnected accidentally.
- Check whether the appliance is de-energised.
- Earth and short-circuit the appliance.
- Cover and shield any adjacent energised parts.

⚠WARNING

Pendant system dropping

The tightening torques are marked in these Installation Instructions:

- Observe the tightening torques indicated in these Installation Instructions.

Risk of the pendant system dropping because the maximum load bearing capacity has been exceeded

If the maximum load bearing capacity has been exceeded, there is a risk that the pendant system or components of the pendant system may disengage from the fastening device and drop:

- The maximum loading capacity on the pendant system must not be exceeded!
- Do not attach or mount any additional loads to the extension arms, adaptions and end devices.

2.11 Proper use of oxygen

⚠ DANGER

Oxygen explosion

Oxygen becomes explosive when in contact with oils, greases and lubricants. Compressed oxygen presents an explosion hazard:

- Make sure that the oxygen and gas outlet points are free from oily, greasy and lubricating materials!
- Do not use any cleaning agents containing oil, grease or lubricants.

Danger of fire

Escaping oxygen is combustible:

- Open fire, red hot objects and open light are not permitted when working with oxygen!
- Do not smoke!

2.12 Warranty

⚠ WARNING

Pendant system dropping

The pendant system and the Navigator M6 are an adapted system with regard to the maximum load bearing capacity and maximum loading capacity (payload).
Alterations to the pendant system can result in exceeding the permissible, total or maximum loading capacity of the individual components. In this case, there is a risk of the pendant system or components of the pendant system disengaging from the fastening device and dropping.
Nuvo warrants the functional reliability of the pendant system only under the condition that:

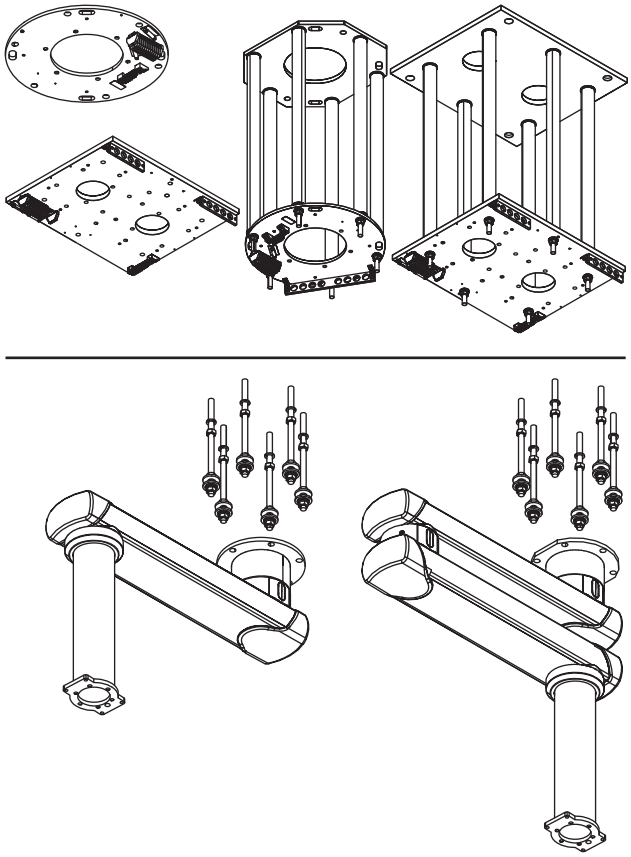
- no structural alterations are made to the pendant system. Unauthorised modifications or conversions to the pendant system are not permitted for safety reasons.
- only genuine spare parts or accessories and those defined and approved by Nuvo are used. The use of other parts may involve unknown risks and must be avoided in all cases.
- inspections and maintenance are carried out at the specified time intervals.
- Related documents for dismantling, mounting and adjustment work to be carried out on the pendant system and approved accessories are available from Nuvo on request.
- The party placing the appliance into operation is responsible for the validation of the overall system. A conformity assessment procedure shall be executed if required, and a declaration in accordance with Article 12 of 93/42/EEC (Medical Device Directive, MDD) shall be provided.

2.13 Disposal

RoHS conformity

- The pendant system complies with the requirements of the 2011/65/EC RoHS Directive (on the restricted use of certain hazardous substances in electrical and electronic equipment).
- To prevent environmental damage and personal injury, we request you to contact us or your authorised service partner if you intend to take the pendant system out of operation for the purpose of disposal.
- The pendant system must be disposed of at a suitable collection point for recyclable waste in accordance with country-specific regulations.

Figure 7: Overview of the structure of these Installation Instructions



The Installation Instructions for the entire pendant system consist of separate documents. For this reason, these Installation Instructions are only valid and complete if all the documents are available at the place of installation. The following parts must be available:

Part 01: Ceiling mount fixture
Interface plate on the raw ceiling
Intermediate ceiling set and interface plate

Part 02: Pendant system (example of Navigator ™)

Part 03: Navigator M6

- Lifting device or forklift with a permitted payload of at least 250 kg Alternatively, a hoisting winch with an admissible payload of at least 250 kg can be used if space is limited:
  – Check that the pendant system is sufficiently secured before lifting it.
  – When lifting the pendant system, make sure you avoid collisions with other pendant systems, devices, ceilings or walls and other assemblies.

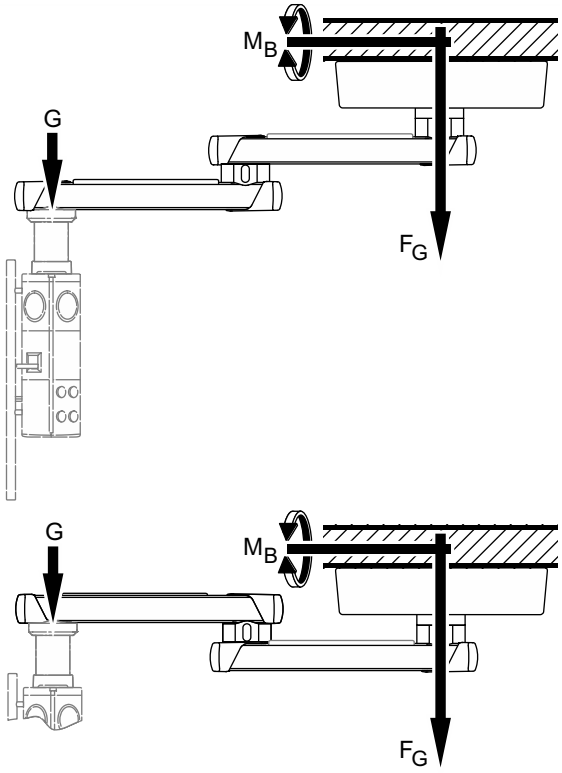
- Protective gloves

- Digital spirit level
- Torque wrench
- Multimeter
- Standard tool kit

- 1 telescopic magnet pick-up tool set

- Working platform (e.g. pedestal ladder) in accordance with country-specific occupational health and safety regulations.

Figure 8: Load data of Navigator ™ and Navigator ™ – Inverted, Single version



5.1 Load data of Navigator ™ and Navigator ™ – Inverted

5.1.1 Load data of the Single version

(See "Figure 8")

The data required for calculating the ceiling load is indicated in the tables below. When mounting the pendant system to the Intermediate ceiling set, the vertical weight force of the Intermediate ceiling set (the values correspond to the maximum load) must be added to the corresponding values of the pendant system in order to determine the ceiling load. The table indicates the values for the maximum permissible load bearing capacity of the pendant system, Single version. The load data of a Duo version can be added.

⚠WARNING

Pendant system dropping

The safety factors prescribed in the individual regions must be taken into account for calculating the maximum load data!

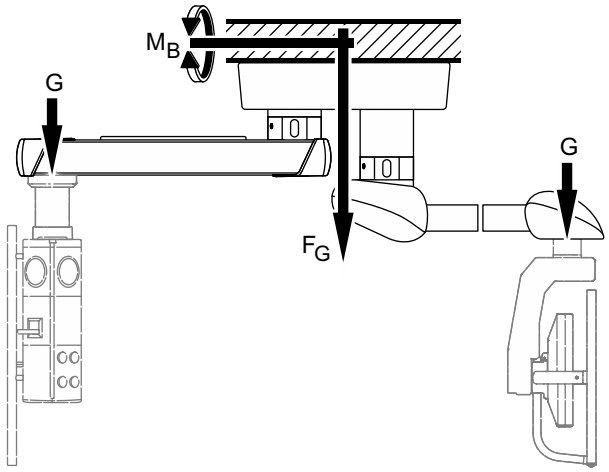
Table 01: Load data of the Navigator ™ pendant system

Single-arm variants	Vertical Weight force F_G in N	Vertical weight force of the Intermediate ceiling set F_G in N	Maximum bending Moment M_B in Nm	Carrying loads G in kg
Extension arm, 600mm	6834	1300	3815	640
Extension arm, 800mm	5196	1300	3764	470
Extension arm, 1000mm	4245	1300	3739	370
Extension arm, 1200mm	3587	1300	3680	300

Table 02: Load data Navigator ™ and Navigator ™ – Inverted pendant system

Dual-arm variants	Vertical Weight force F_G in N	Vertical weight force of the Intermediate ceiling set F_G in N	Maximum bending Moment M_B in Nm	Carrying loads G in kg
Extension arm, 600mm / 600mm	3737	1300	3761	300
Extension arm, 600mm / 800mm	3374	1300	3842	260
Extension arm, 600mm / 1000mm	3011	1300	3773	220
Extension arm, 600mm / 1200mm	2746	1300	3728	190
Extension arm, 800mm / 600mm	3374	1300	3875	260
Extension arm, 800mm / 800mm	3011	1300	3806	220
Extension arm, 800mm / 1000mm	2747	1300	3762	190
Extension arm, 800mm / 1200mm	2580	1300	3802	170
Extension arm, 1000mm / 600mm	3012	1300	3839	220
Extension arm, 1000mm / 800mm	2747	1300	3795	190
Extension arm, 1000mm / 1000mm	2580	1300	3835	170
Extension arm, 1000mm / 1200mm	2413	1300	3803	150
Extension arm, 1200mm / 600mm	2747	1300	3828	190
Extension arm, 1200mm / 800mm	2580	1300	3868	170
Extension arm, 1200mm / 1000mm	2413	1300	3836	150
Extension arm, 1200mm / 1200mm	2247	1300	3731	130

Figure 9: Load data for support arm combinations (Navigator ™ and Navigator Lift ™ 180)



5.1.2 Load data for support arm combinations

(See "Figure 9")

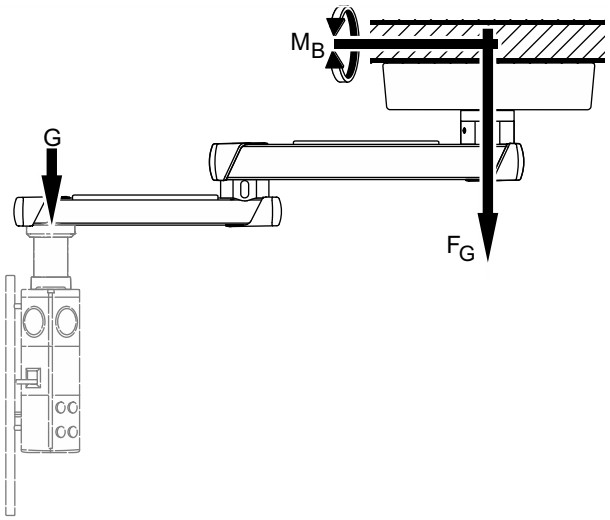
The vertical weight forces and bending moments of the various pendant systems or Duo versions can be added.

Example:
Navigator ™ (extension arm 1000 mm) on the Intermediate ceiling set combined with Navigator Lift ™ 180 (spring arm 1015 mm)

- Sum of weight forces: 4245 N + 1300 N + 2578 N = 8123 N
- Sum of bending moments: 3739 Nm + 1987 Nm = 5726 Nm

For the load data of the pendant system combined with the Navigator ™ pendant system, refer to the corresponding Installation Instructions.

Figure 10: Load data of Navigator ™ XL, Single version



5.2 Load data of Navigator ™ XL

5.2.1 Load data of the Single version

(See "Figure 10")

The data required for calculating the ceiling load is indicated in the tables below. When mounting the pendant system to the Intermediate ceiling set, the vertical weight force of the Intermediate ceiling set (the values correspond to the maximum load) must be added to the corresponding values of the pendant system in order to determine the ceiling load. The table indicates the values for the maximum permissible load bearing capacity of the pendant system, Single version. The load data of a Duo version can be added.

⚠WARNING

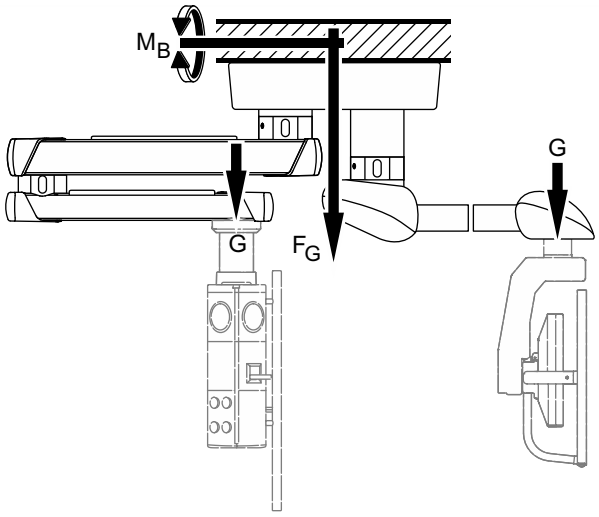
Pendant system dropping

The safety factors prescribed in the individual regions must be taken into account for calculating the maximum load data!

Table 03: Load data of the Navigator ™ XL pendant system

Single-arm variants	Vertical Weight force F_G in N	Vertical weight force of the Intermediate ceiling set F_G in N	Maximum bending Moment M_B in Nm	Carrying loads G in kg
Extension arm, 600mm	10315	1300	5953	1000
Extension arm, 800mm	8598	1300	6544	820
Extension arm, 1000mm	6980	1300	6537	650
Extension arm, 1200mm	5950	1300	6697	540
Extension arm, 1400mm	5410	1300	6886	480
Extension arm, 1600mm	4674	1300	6653	400
Dual-arm variants	**Vertical Weight force F_G in N**	**Vertical weight force of the Intermediate ceiling set F_G in N**	**Maximum bending Moment M_B in Nm**	**Carrying loads G in kg**
Extension arm, 600mm / 600mm	5943	1300	6488	530
Extension arm, 600mm / 800mm	5384	1300	6746	470
Extension arm, 800mm / 600mm	5404	1300	6795	470
Extension arm, 800mm / 800mm	4648	1300	6509	390
Extension arm, 600mm / 1000mm	4433	1300	6146	370
Extension arm, 800mm / 1000mm	4089	1300	6268	330
Extension arm, 1000mm / 600mm	4668	1300	6562	390
Extension arm, 600mm / 1200mm	3776	1300	5689	300
Extension arm, 1000mm / 800mm	4109	1300	6321	330
Extension arm, 1200mm / 600mm	4128	1300	6378	330
Extension arm, 800mm / 1200mm	3825	1300	6386	300
Extension arm, 1000mm / 1000mm	3844	1300	6439	300
Extension arm, 1000mm / 1200mm	3579	1300	6446	270
Extension arm, 1200mm / 800mm	3864	1300	6496	300
Extension arm, 1200mm / 1000mm	3599	1300	6502	270
Extension arm, 1200mm / 1200mm	3334	1300	6397	240
Extension arm, 1400mm / 600mm	3883	1300	6556	300
Extension arm, 1400mm / 800mm	3618	1300	6563	270
Extension arm, 1400mm / 1000mm	3354	1300	6458	240
Extension arm, 1400mm / 1200mm	2991	1300	5986	200
Extension arm, 1600mm / 600mm	3638	1300	6627	270
Extension arm, 1600mm / 800mm	3373	1300	6522	240
Extension arm, 1600mm / 1000mm	3010	1300	6050	200

Figure 11: Load data for support arm combinations (Navigator ™ XL and Navigator Lift ™ 180)



5.2.2 Load data for support arm combinations

(See "Figure 11")

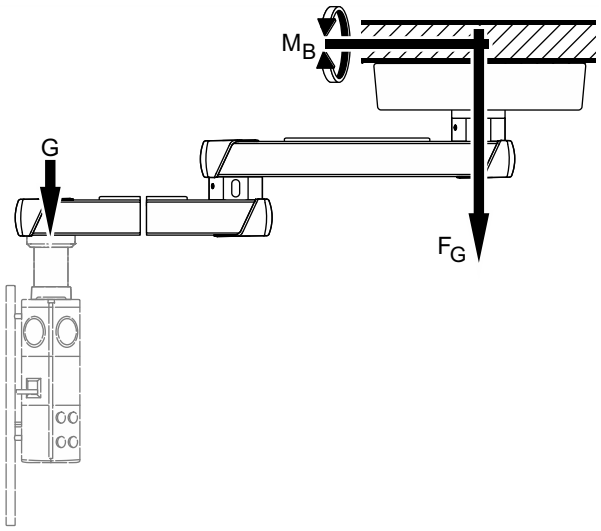
The vertical weight forces and bending moments of the various pendant systems or Duo versions can be added.

Example:
Navigator ™ XL (extension arm 1000/800 mm) on the Intermediate ceiling set
combined with Navigator Lift ™ 180 (spring arm 1015 mm)

- Sum of weight forces: 4109 N + 1300 N + 2578 N = 7987 N
- Sum of bending moments: 6321 Nm + 1987 Nm = 8308 Nm

For the load data of the pendant system combined with the Navigator ™ pendant system, refer to the corresponding Installation Instructions.

Figure 12: Load data of Navigator ™ XXL, Single version



5.3 Load data of Navigator ™ XXL

5.3.1 Load data of the Single version

(See "Figure 12")

The data required for calculating the ceiling load is indicated in the tables below. When mounting the pendant system to the Intermediate ceiling set, the vertical weight force of the Intermediate ceiling set (the values correspond to the maximum load) must be added to the corresponding values of the pendant system in order to determine the ceiling load. The table indicates the values for the maximum permissible load bearing capacity of the pendant system, Single version. The load data of a Duo version can be added.

⚠WARNING

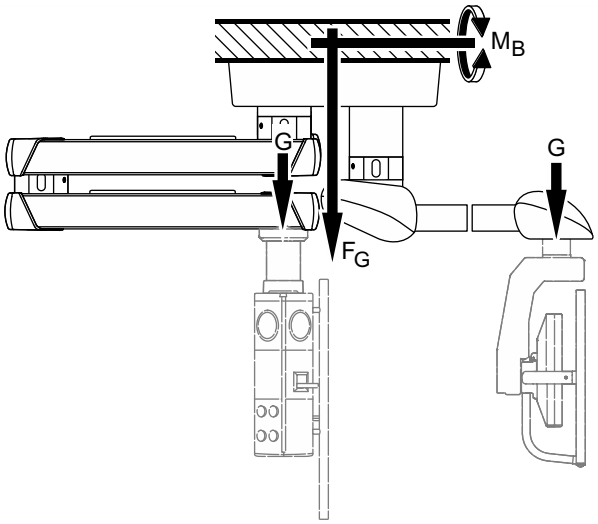
Pendant system dropping

The safety factors prescribed in the individual regions must be taken into account for calculating the maximum load data!

Table 04: Load data of the Navigator ™ XXL pendant system

Dual-arm variants	Vertical Weight force F_G in N	Vertical weight force of the Intermediate ceiling set F_G in N	Maximum bending Moment M_B in Nm	Carrying loads G in kg
Extension arm 600mm / 600mm	6196	1300	6719	540
Extension arm 600mm / 800mm	5656	1300	7023	480
Extension arm 800mm / 600mm	5656	1300	7074	480
Extension arm 800mm / 800mm	4921	1300	6839	400
Extension arm 600mm / 1000mm	4921	1300	6788	400
Extension arm 800mm / 1000mm	4381	1300	6653	340
Extension arm 1000mm / 600mm	4921	1300	6890	400
Extension arm 600mm / 1200mm	4381	1300	6602	340
Extension arm 1000mm / 800mm	4381	1300	6704	340
Extension arm 1200mm / 600mm	4381	1300	6755	340
Extension arm 800mm / 1200mm	4136	1300	6830	310
Extension arm 800mm / 1400mm	3891	1300	6899	280
Extension arm 1000mm / 1000mm	4136	1300	6881	310
Extension arm 1000mm / 1200mm	3891	1300	6950	280
Extension arm 1000mm / 1400mm	3645	1300	6911	250
Extension arm 1000mm / 1600mm	3302	1300	6510	210
Extension arm 1200mm / 800mm	4136	1300	6932	310
Extension arm 1200mm / 1000mm	3891	1300	7001	280
Extension arm 1200mm / 1200mm	3645	1300	6963	250
Extension arm 1200mm / 1400mm	3302	1300	6561	210
Extension arm 1400mm / 600mm	4136	1300	6983	310
Extension arm 1400mm / 800mm	3891	1300	7053	280
Extension arm 1400mm / 1000mm	3645	1300	7014	250
Extension arm 1400mm / 1200mm	3302	1300	6612	210
Extension arm 1600mm / 600mm	3891	1300	7104	280
Extension arm 1600mm / 800mm	3645	1300	7065	250
Extension arm 1600mm / 1000mm	3302	1300	6663	210

Figure 13: Load data for support arm combinations (Navigator ™ XXL and Navigator Lift ™ 180)



5.3.2 Load data for support arm combinations

(See "Figure 13")

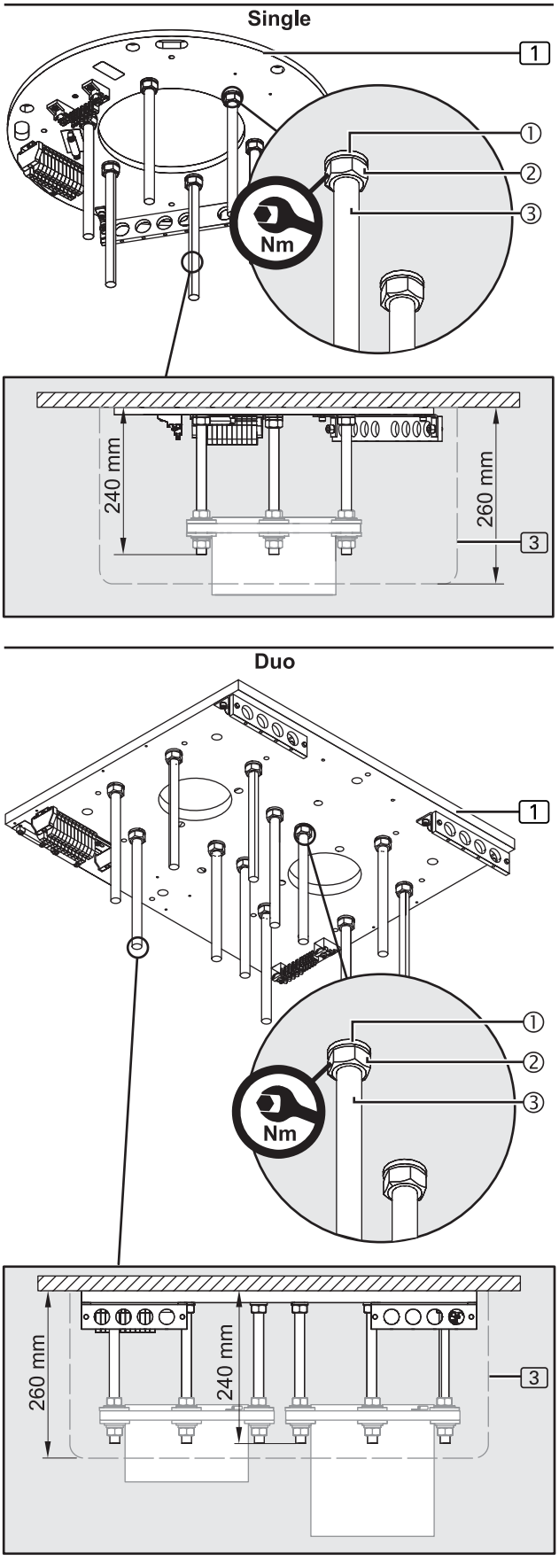
The vertical weight forces and bending moments of the various pendant systems or Duo versions can be added.

Example:
Navigator ™ XXL (extension arm 1000/1000 mm) on the Intermediate ceiling set fixture combined with Navigator Lift ™ 180 (spring arm 1015 mm)

- Sum of weight forces: 4136 N + 1300 N + 2578 N = 8014 N
- Sum of bending moments: 6881 Nm + 1987 Nm = 8868 Nm

For the load data of the pendant system combined with the Navigator ™ pendant system, refer to the corresponding Installation Instructions.

Figure 14: Cutting and installing the threaded bolts for the Single / Duo interface plate on the raw ceiling



6.1 Mounting situation: Mounting the interface plate to the raw ceiling without intermediate ceiling

6.1.1 Versions

(See "Figure 14")

The Figures illustrate the interface plate [1], Single (round shape), for installing the Navigator ™ and Navigator ™ – Inverted version. The installation steps required for the Navigator ™ XL and Navigator ™ XXL interface plate [1] (squared shape) are identical.

6.1.2 Cutting the threaded bolts to length

(See "Figure 14")

If a Single / Duo interface plate [1] is mounted to the raw ceiling, the 6 (Single version) or 12 (Duo version) threaded bolts M16 x 330 mm ③ must be cut to length.
The Single / Duo canopy [3] with attachment to be mounted later is flush with the raw ceiling and covers the ceiling tube flange.

1. For a canopy [3] which is 260 mm high the 6/12 threaded bolts M16 x 330 mm ③ must be cut to 240 mm.

2. Slightly debur the 6/12 threaded bolts M16 x 330 mm ① in order to ensure maximum thread engagement into the interface plate [1].

6.1.3 Mounting the threaded bolts

(See "Figure 14")

1. Screw 1 hexagonal nut M16 ② each onto the 6/12 threaded bolts M16 ③ and then place 1 spring ring ① each.

⚠ WARNING

Pendant system dropping

If the threaded bolts M16 ③ are not completely screwed in, they may break out of the interface plate [1] and cause the pendant system to drop:

- Make sure that all shortened threaded bolts M16 ③ are completely screwed into the interface plate [1] up to the end stop on the raw ceiling.

Pendant system dropping

The pendant system can drop if the fixing elements have not been properly tightened:

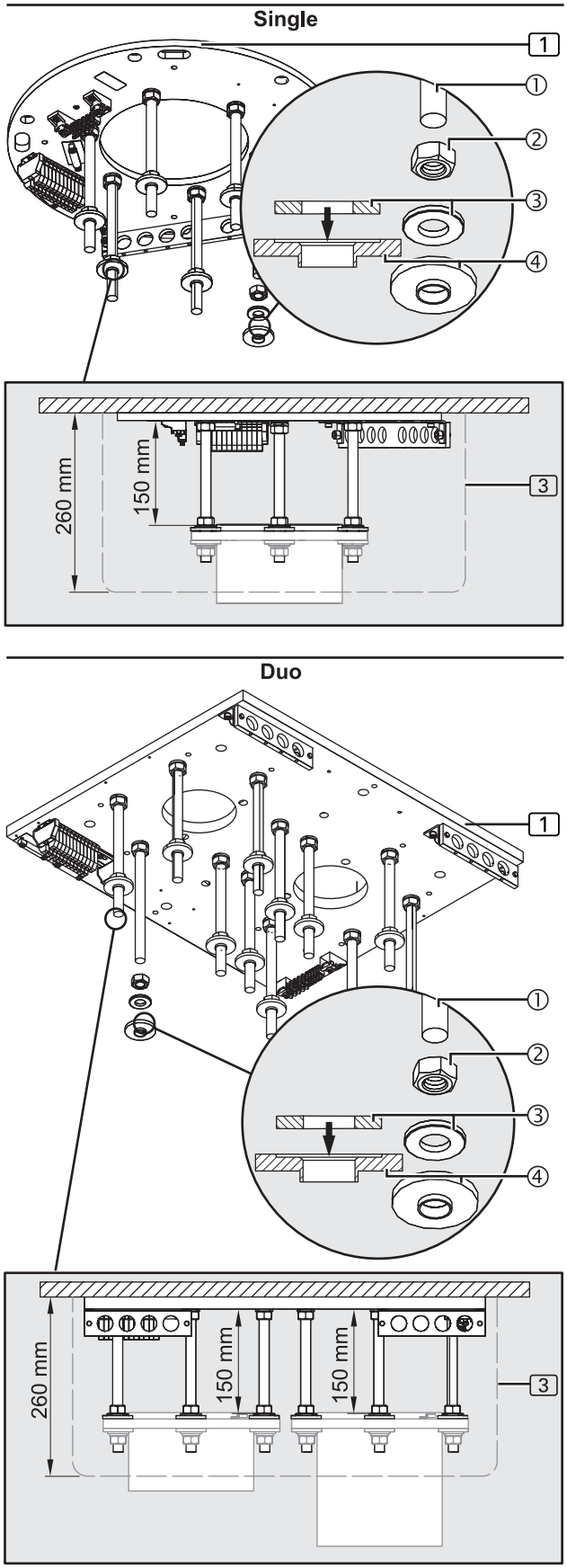
- Tighten all hexagonal nuts M16 ② with a tightening torque of 195 Nm.

2. Check that the shortened threaded bolts M16 ③ are securely in place at the correct distances to each other:

- The threaded bolts M16 ③ must be completely screwed into the interface plate [1].
- The 6/12 hexagonal nuts M16 ② must be tightened to 195 Nm.

3. Continue the installation as described in Chapter 6.1.4 on page 31.

Figure 15: Mounting the upper insulations to the threaded bolts



6.1.4 Mounting the upper insulations to the threaded bolts

(See "Figure 15")

The 6 (Single version) or 12 (Duo version) hexagonal nuts M16② must be mounted to the threaded bolts M16① at an exact distance to each other.

1. For each threaded bolt M16① screw a hexagonal nut M16② onto the threaded bolts M16①.

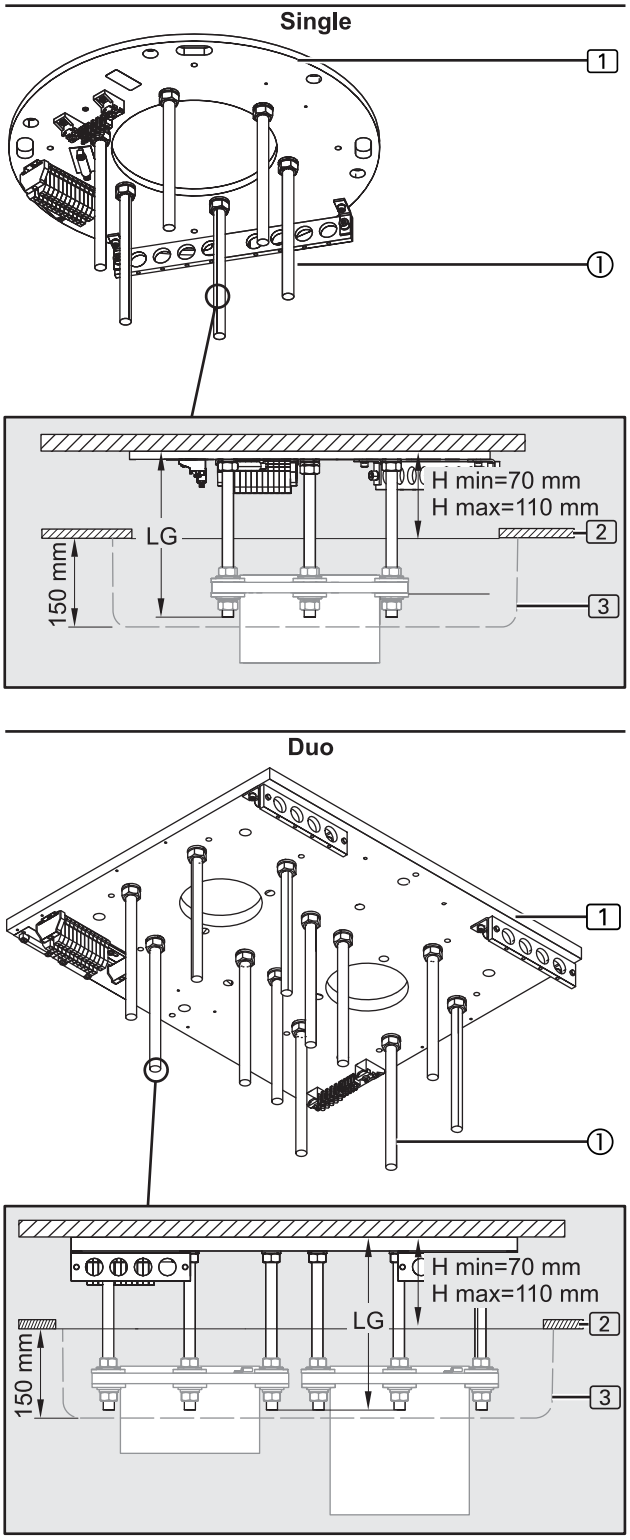
2. Adjust the distance between the hexagonal nuts M16② and the interface plate [1] to 150mm.

3. Using a digital spirit level, align the hexagonal nuts M16② in a horizontal position.

4. Place 1 flat washer with an external diameter of 34mm③.
5. Place 1 plastic insulating disc④ (as illustrated in the Figure) in such a way that the flat washer with an external diameter of 34mm③ (see arrow in the detailed representation in the Figure) sits in the plastic insulating disc④.
6. Using an adhesive or elastic tape, attach the plastic insulating disc④ to the threaded bolts M16①.

7. Continue the installation as described in Chapter 7 on page 37 or Chapter 8 on page 41.

Figure 16: Cutting the threaded bolts for the Single / Duo interface plate on the raw ceiling to length



6.2 Mounting situation: Interface plate on the raw ceiling with intermediate ceiling

6.2.1 Versions

(See "Figure 16")

The Figures illustrate the interface plate [1], Single (round shape), for installing the Navigator ™ and Navigator ™ – Inverted version. The steps required for installing the Navigator ™ XL and Navigator ™ XXL interface plate [1] (squared shape) are identical.

6.2.2 Cutting the threaded bolts to length

(See "Figure 16")

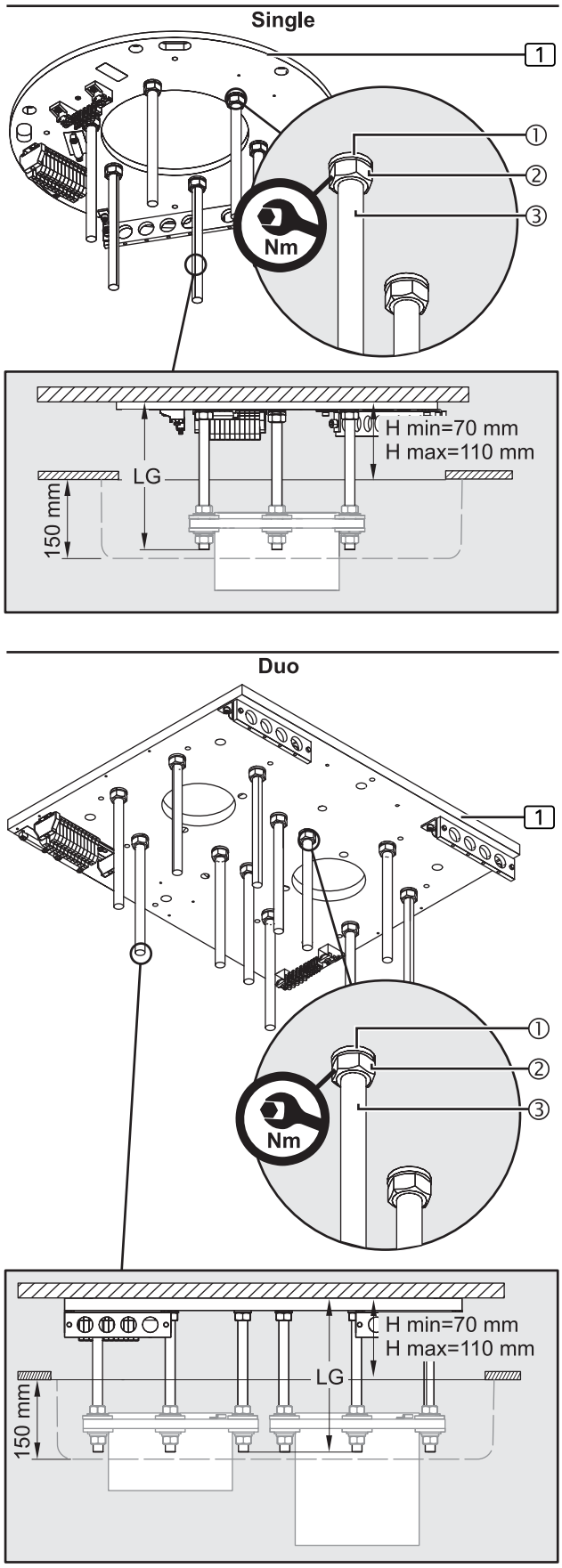
If a Single / Duo interface plate [1] is mounted to the raw ceiling with intermediate ceiling [2], the 6 (Single version) or 12 (Duo version) threaded bolts M16 x 330 mm ① must be cut to length.
The Single / Duo canopy [3] to be mounted later is flush with the intermediate ceiling [2] and covers the ceiling tube flange.

NOTE – Variable threaded bolt length

- The necessary length of the threaded bolts M16 x 330 mm ① depends on the distance H: from the raw ceiling to the bottom edge of the intermediate ceiling [2].
- Observe the minimum and maximum length of the threaded bolts M16 x 330 mm ①.

1. For a Single canopy [3], 150 mm, Duo canopy [3], 150 mm, cut the 6/12 threaded bolts M16 x 330 mm ① to length:
   - To determine the length LG of the threaded bolts ①: LG=H +135 mm (min. 205 mm / max. 245 mm)
   - Please contact Nuvo if you have any doubt.
2. Slightly debur the 6/12 threaded bolts M16 x 330 mm ① in order to ensure maximum thread engagement into the interface plate [1].
3. Continue the installation as described in Chapter 6.2.3 on page 33.

Figure 17: Mounting the upper insulations to the threaded bolts



6.2.3 Mounting the threaded bolts to the Single / Duo interface plate

(See "Figure 17")

1. Screw 1 hexagonal nut M16② each onto the 6/12 threaded bolts M16③ and then place 1 spring ring① each.

⚠WARNING

Pendant system dropping

If the threaded bolts M16③ are not completely screwed in, they may break out of the interface plate [1] and cause the pendant system to drop:

- Make sure that all shortened threaded bolts M16③ are completely screwed into the interface plate [1] up to the end stop on the raw ceiling.

Pendant system dropping

The pendant system can drop if the fixing elements have not been properly tightened:

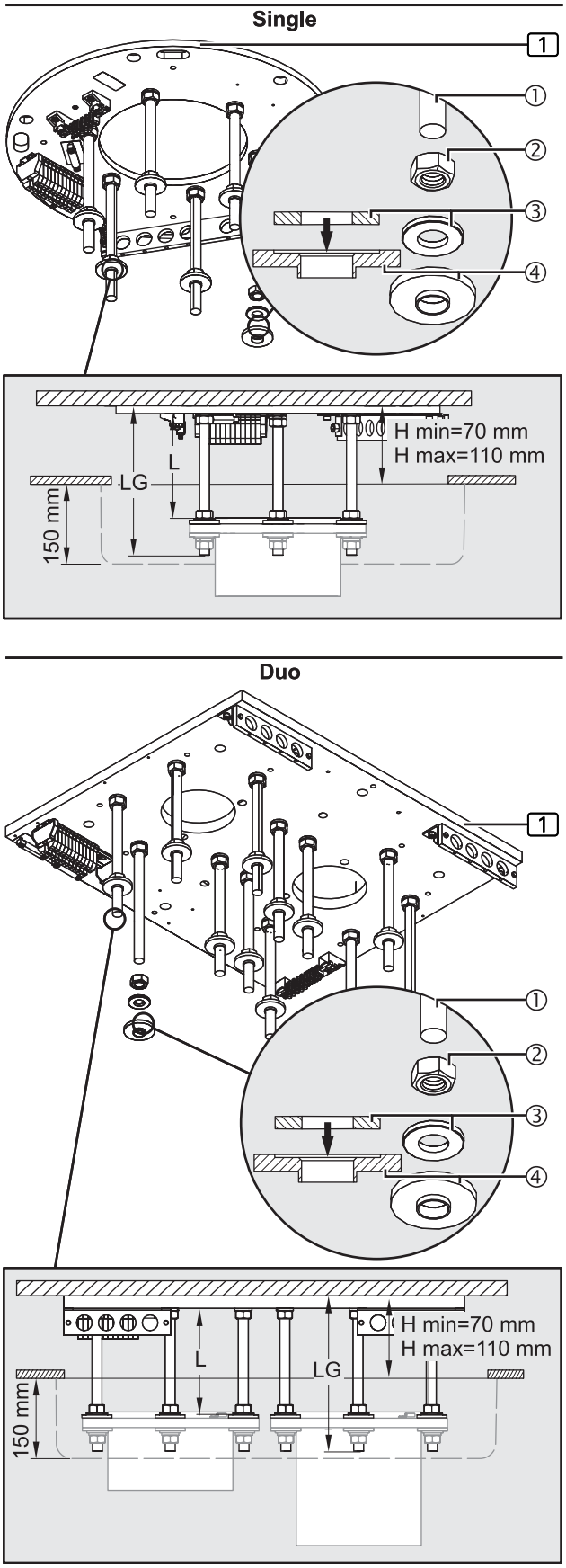
- Tighten all hexagonal nuts M16② with a tightening torque of 195Nm.

2. Check that the shortened threaded bolts M16③ are securely in place at the correct distances to each other:

- The shortened threaded bolts M16③ must be completely screwed into the interface plate [1].
- The 6/12 hexagonal nuts M16② must be tightened to 195Nm.

3. Continue the installation as described in Chapter 6.2.4 on page 34.

Figure 18: Mounting the upper insulations to the threaded bolts



6.2.4 Mounting the upper insulations to the threaded bolts

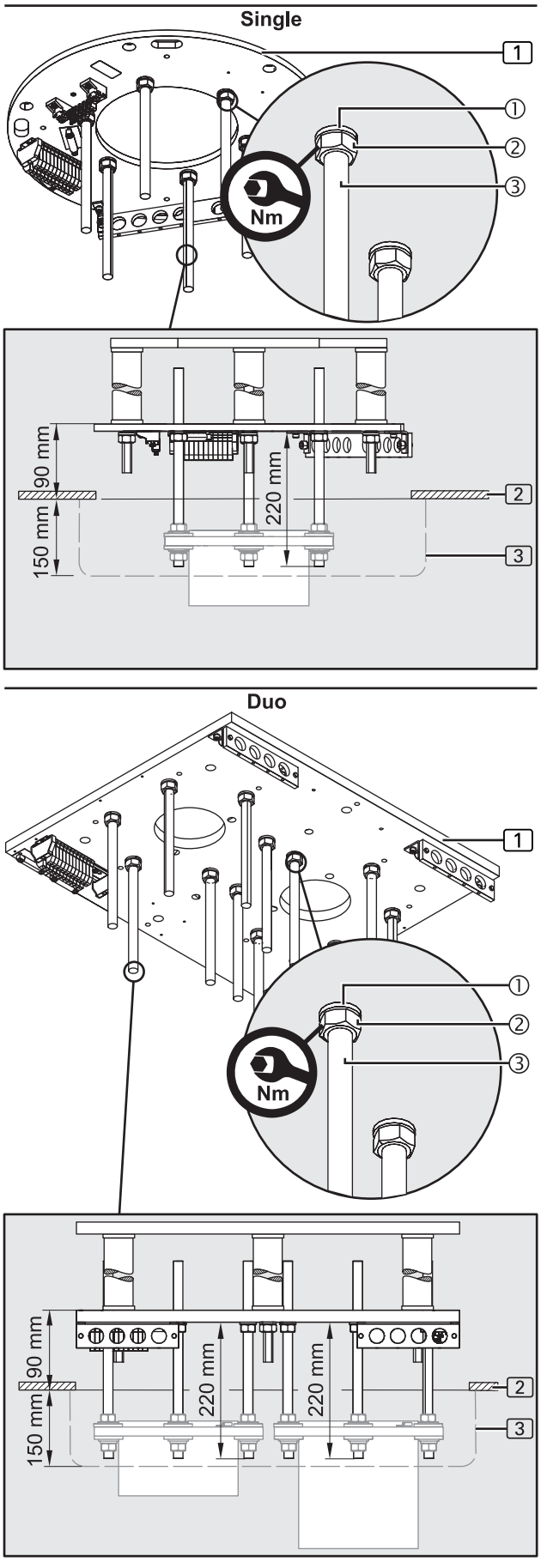
(See "Figure 18")

1. For each threaded bolt M16① screw a hexagonal nut M16② onto the threaded bolts M16①.
2. Adjust the distance between the hexagonal nuts M16② and the interface plate [1]:

- L = LG – 95mm (min.110mm / 150mm)

3. Screw the hexagonal nuts M16② onto the threaded bolts M16① at the calculated distance L.
4. Using a digital spirit level, align the hexagonal nuts M16② in a horizontal position.
5. Place 1 flat washer with an external diameter of 34mm③.
6. Place 1 plastic insulating disc④ (as illustrated in the Figure) in such a way that the flat washer with an external diameter of 34mm③ (see arrow in the detailed representation in the Figure) sits in the plastic insulating disc④.
7. Using an adhesive or elastic tape, attach the plastic insulating disc④ to the threaded bolts M16①.
8. Continue the installation as described in Chapter 7 on page 37 or Chapter 8 on page 41.

Figure 19: Mounting the threaded bolts



6.3 Mounting situation: Interface plate on the intermediate ceiling set

6.3.1 Versions

(See "Figure 19")

The Figures illustrate the interface plate [1], Single (round shape), for installing the Navigator ™ and Navigator ™ – Inverted version. The installation steps required for the Navigator ™ XL and Navigator ™ XXL interface plate [1] (squared shape) are identical.

6.3.2 Mounting the threaded bolts

(See "Figure 19")

The 6 (Single version) or 12 (Duo version) threaded bolts M16 x 330 mm ③ must protrude from the interface plate [1] at an exact distance. The Single / Duo canopy [3] to be mounted later is flush with the intermediate ceiling [2] and covers the ceiling tube flange.

⚠ WARNING

Pendant system dropping

In order to ensure sufficient strength, the threaded bolts M16 ① must not exceed a maximum length of 330 mm.

1. Screw 1 hexagonal nut M16 ② each onto the 6/12 threaded bolts M16 x 330 mm ③ and then place 1 spring ring ① each.

2. All threaded bolts M16 x 330 mm ③ must be completely screwed into the interface plate [1].
   The threaded bolts M16 x 330 mm ③ for the:
- Single version = 220 mm
- Duo version = 220 mm
  must protrude from the interface plate [1].

⚠ WARNING

Pendant system dropping

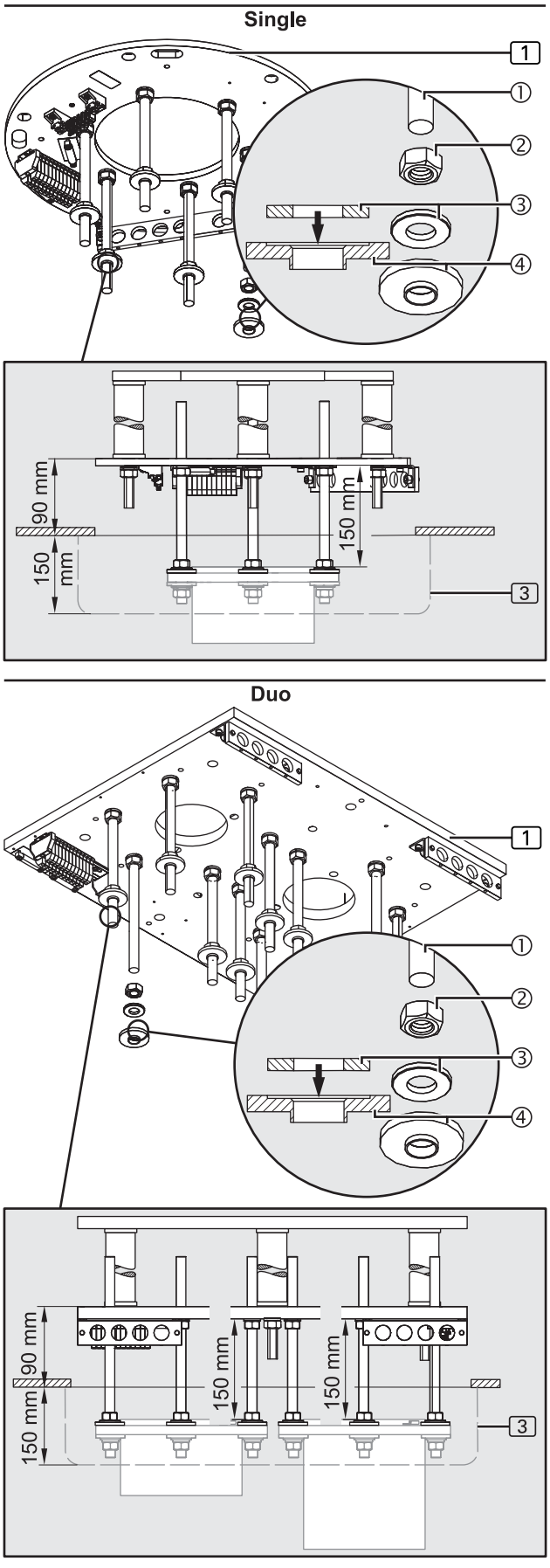
The pendant system can drop if the fixing elements have not been properly tightened:

- Tighten all hexagonal nuts M16 ② with a tightening torque of 195 Nm.

3. Check that the threaded bolts M16 x 330 mm ③ are securely in place at the correct distances:
- For the Single and Duo version, 195 mm, the threaded bolts M16 x 330 mm ③ must protrude from the interface plate [1].
- The 6/12 hexagonal nuts M16 ② must be tightened to 195 Nm.

4. Continue the installation as described in Chapter 6.3.3 on page 36.

Figure 20: Mounting the upper insulations to the threaded bolts



6.3.3 Mounting the upper insulations to the threaded bolts

(See "Figure 20")

The 6 (Single version) or 12 (Duo version) hexagonal nuts M16② must be mounted to the threaded bolts M16 x 330mm① at an exact distance to each other.

1. For each threaded bolt M16 x 330mm① screw a hexagonal nut M16② onto the threaded bolts M16 x 330mm①.

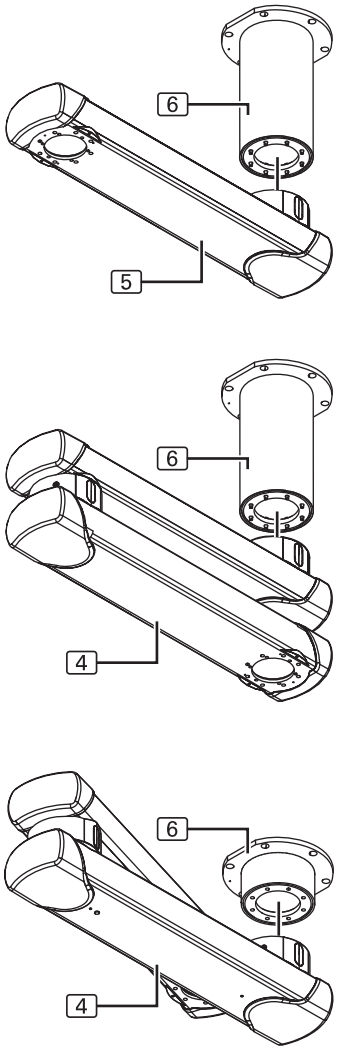
2. Adjust the distance between the hexagonal nuts M16② and the interface plate [1]:
- The distance between the hexagonal nuts M16② and the interface plate [1] must be 150mm.

3. Using a digital spirit level, align the hexagonal nuts M16② in a horizontal position.

4. Place 1 flat washer with an external diameter of 34mm③.
5. Place 1 plastic insulating disc④ (as illustrated in the Figure) in such a way that the flat washer with an external diameter of 34mm③ (see arrow in the detailed representation in the Figure) sits in the plastic insulating disc④:
- Using an adhesive or elastic tape, attach the plastic insulating disc④ to the threaded bolts M16①.

6. Continue the installation as described in Chapter 7 on page 37 or Chapter 8 on page 41.

Figure 21: Components described in this chapter



7.1 Components described in this chapter

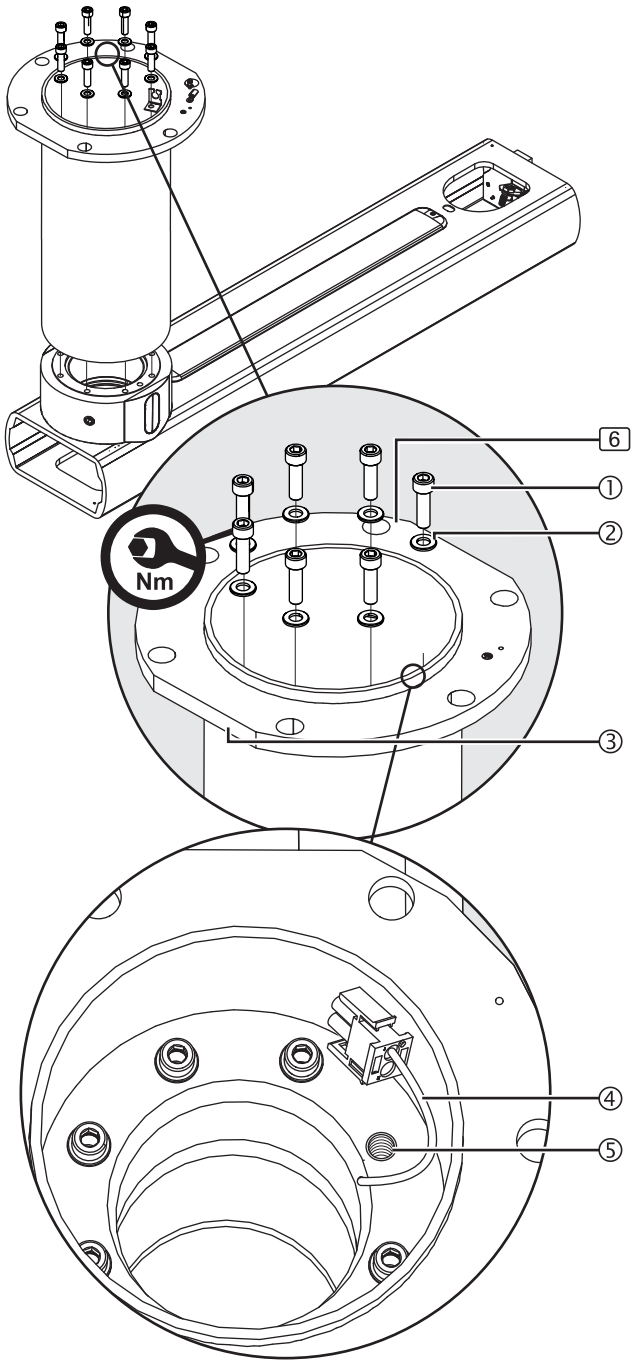
(See "Figure 21")

For long ceiling tubes or for the version Navigator ™ – Inverted the ceiling tube [6] is supplied as a separate component.

- The ceiling tube [6] illustrated in the Figure is mounted to the extension arm [4], [5] (dual- and single-arm variant).
- The Figure shows a simplified representation of the extension arm without pre-assembled cables.

- The installation is described in the following chapters and different for the different versions. Be aware of the different length and number of fastening screws for the different versions.

Figure 22: Installing the ceiling tube



7.2 Mounting the ceiling tube supplied as a separate component

7.2.1 Mounting a ceiling tube

(See "Figure 22")

The Figure shows the Navigator ™ ceiling tube [6] with 8 Allen cylinder screws M10 x 25mm ① – 8.8 – DIN EN ISO 4762 as an example. The simplified representation illustrates the extension arm without pre-assembled cables.

1. Place the ceiling tube [6] onto the extension arm [4], [5] and position it in such a way that the chamfered surface ③ is almost at right angles to the extension arm [4], [5] as illustrated in the Figure.

⚠WARNING

Pendant system dropping

The pendant system can drop if the fixing elements have not been properly tightened:

- Assign the Allen cylinder screws ① to the ceiling tube [6].

2. Assign the fastening screws to the individual ceiling tube [6] type:

- Navigator ™ and Navigator ™ – Inverted ceiling tube [6]:
  – 8 Allen cylinder screws M10 x 25mm ① – 8.8 – DIN EN ISO 4762 and 8 lock washers S10 ②.
- Navigator ™ XL and Navigator ™ XXL ceiling tube [6]:
  – 10 Allen cylinder screws M10 x 30mm ① – 8.8 – DIN EN ISO 4762 and 10 lock washers S10 ②.

3. Fit the Allen cylinder screws ① with lock washers ②.
4. At the position of the pre-assembled cable ④ leave the threaded hole ⑤ free and do not screw in an Allen cylinder screw ①.

5. Screw the ceiling tube [6] onto the extension arm [4], [5] using 7 or 9 Allen cylinder screws ① and lock washers ②:

- Use an extension tool to tighten the 7 or 9 Allen cylinder screws ①.

⚠WARNING

Pendant system dropping

The pendant system can drop if the fixing elements have not been properly tightened:

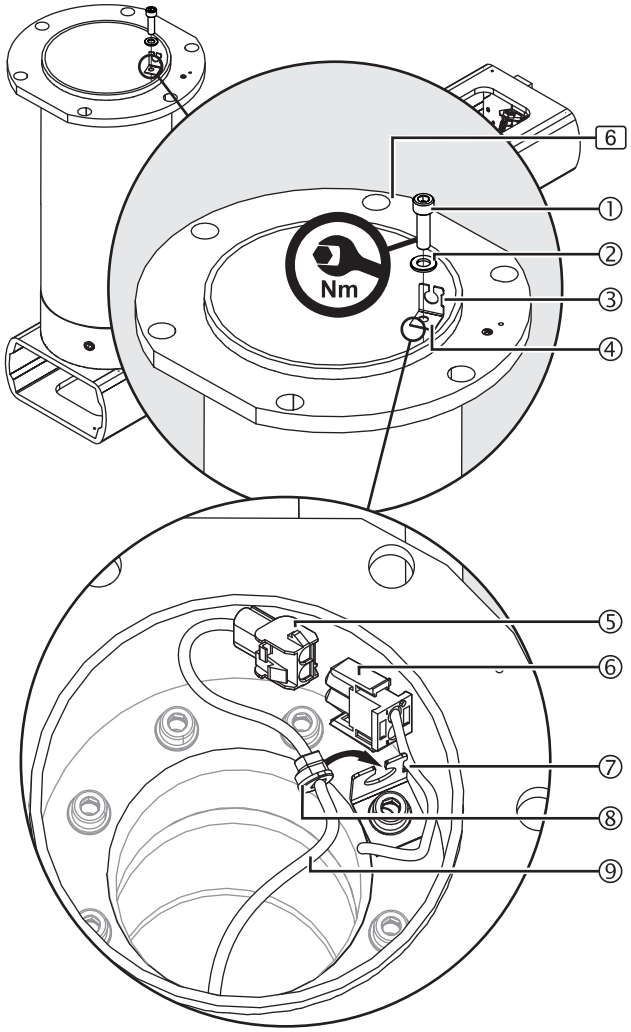
- Tighten the Allen cylinder screws ① with a tightening torque of 40Nm.

6. Check that the ceiling tube [6] is securely in place on the extension arm [4], [5]:

- The ceiling tube [6] must be level with the extension arm [4], [5].
- The 7 or 9 Allen cylinder screws ① must be fitted with lock washers ②.
- The 7 or 9 Allen cylinder screws ① must be tightened to 40Nm.

7. Mount the strain relieving mechanism in the ceiling tube [6] as described in Chapter 7.2.2 on page 39.

Figure 23: Mounting the strain relieving mechanism in the ceiling tube



7.2.2 Mounting the strain relieving mechanism in the ceiling tube

(See "Figure 23")

The Figure shows the Navigator ™ ceiling tube [6] with 8 Allen cylinder screws M10 x 25mm ① – 8.8 – DIN EN ISO 4762 as an example. The simplified representation illustrates the extension arm without pre-assembled cables.

1. Insert an Allen cylinder screw M10 x 25mm ① or an Allen cylinder screw M10 x 30mm ① and a lock washer S10 ② into the strain relief holder ④.
2. Position the strain relief holder ④ in the ceiling tube [6] in such a way that the cutout ③ of the strain relief holder ④ points towards the ceiling tube wall.
3. Place the pre-assembled cable ⑦ in the cutout ③ of the strain relief holder ④.
4. Screw the strain relief holder ④ onto the extension arm [4], [5] using the Allen cylinder screw ① and the lock washer ②:

- Make sure that the cable is not ⑦ not squeezed.

5. Establish the plug connection ⑤/⑥ with the control cable included in the scope of delivery ⑨ and then push the strain relief mechanism ⑧ into the strain relief holder ④.
6. Check that the strain relief mechanism ⑧ is securely in place:

- The control cable ⑨ must be securely strain-relieved in the strain relief mechanism ④.

7. Route the control cable ⑨ through the ceiling tube [6] and the extension arm [4], [5] towards the control board.

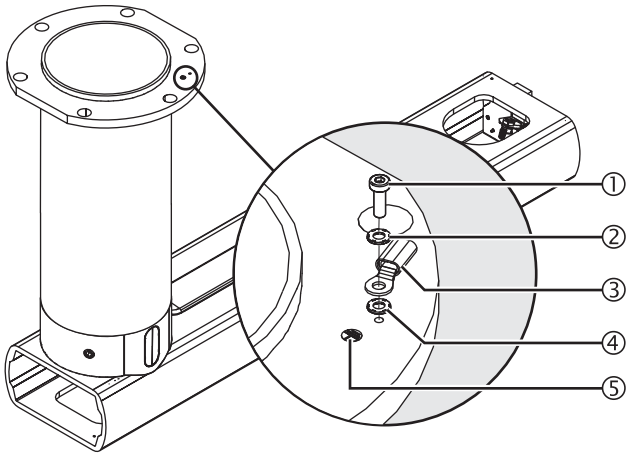
⚠ WARNING

Pendant system dropping

The pendant system can drop if the fixing elements have not been properly tightened:

- Tighten the Allen cylinder screw ① with a tightening torque of 40Nm.

Figure 24: Subsequently mounting the earthing cable to the ceiling tube



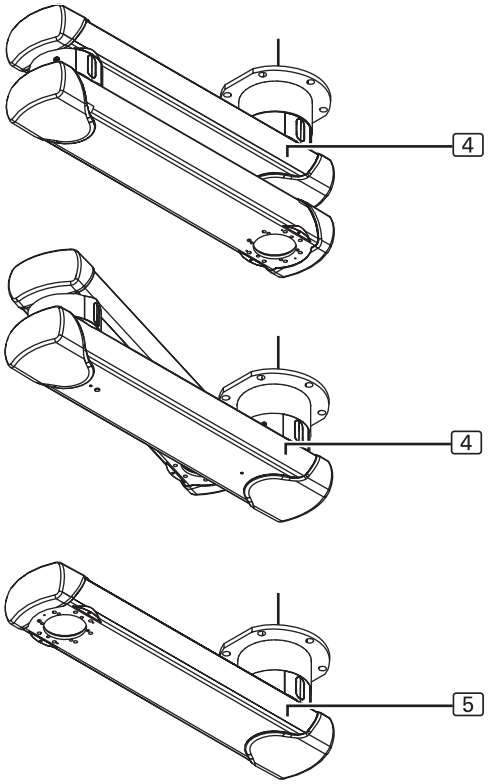
7.2.3 Subsequently mounting the earthing cable to the ceiling tube

(See "Figure 24")

The system is delivered with the earthing cable pre-assembled!

1. Fit 1 lock washer S4 ②/④ each above and below the ring cable lug ③ of the earthing cable 4 mm^2 (approx. 1 m long) included in the scope of delivery.
2. Using 1 Allen cylinder screw M4 x 12 mm – DIN 912 ① screw the ring cable lug ③ and the lock washers S4 ②/④ onto the earthing point ⑤.
3. Tighten the Allen cylinder screw M4 x 12 mm ①.
4. Continue the installation as described in Chapter 8 on page 41.

Figure 25: Components described in this chapter

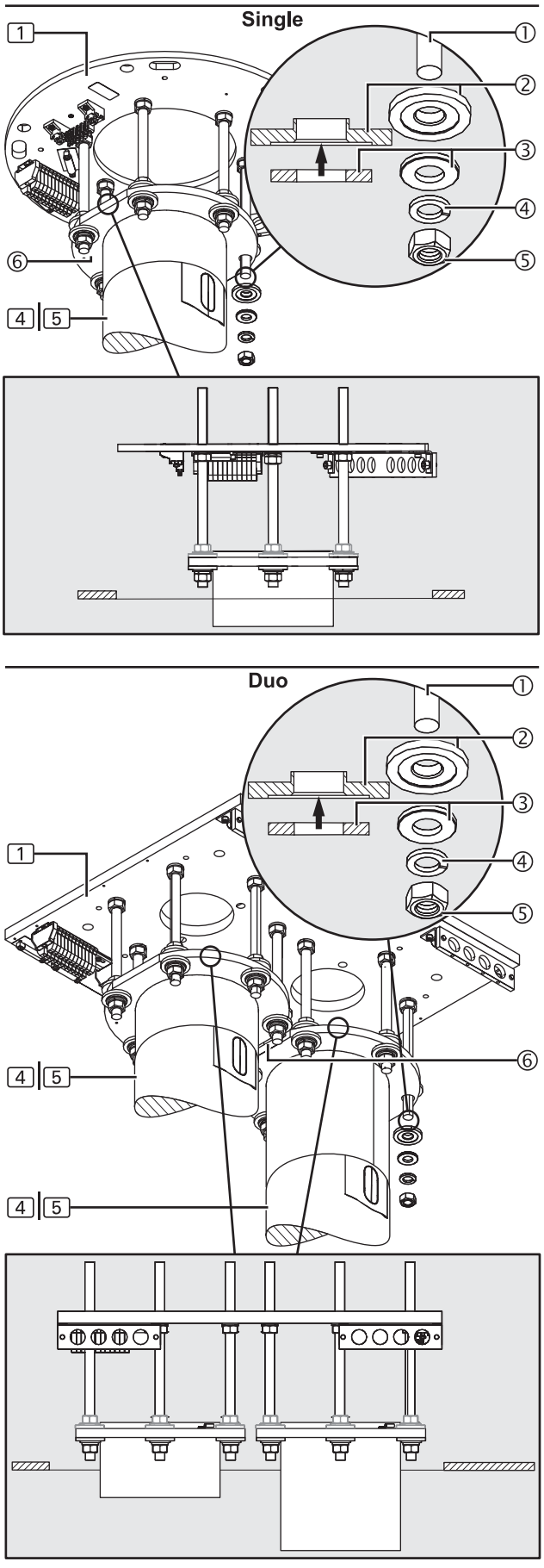


8.1 Components described in this chapter

(See "Figure 25")

- The extension arm [4], [5] illustrated in the Figure for the single- or dual-arm variants is mounted to the threaded bolts of the interface plate [1].
- The Figure shows a simplified representation with only the extension arm [4], [5] without cables.
- The installation is described in the following chapters and identical for the different versions.

Figure 26: Mounting the extension arm



8.2 Mounting the extension arm

(See "Figure 26")

8.2.1 Versions

(See "Figure 26")

The Figures illustrate the interface plate [1], Single (round shape), for installing the Navigator ™ and Navigator ™ – Inverted version. The installation steps required for the Navigator ™ XL and Navigator ™ XXL interface plate [1] (squared shape) are identical.

8.2.2 Mounting

(See "Figure 26")

The Figure only shows a simplified representation of the flange ⑥ with ceiling tube to be mounted to the threaded bolts. Further components pre-assembled to the flange ⑥, such as the extension arm, cables, etc. are not represented.

⚠WARNING

Risk of parts falling off

Make sure that no-one is standing underneath the components of the pendant system whilst it is being installed.

1. Securely fasten the flange ⑥ of the ceiling tube with the extension arm [4], [5] to a suitable lifting device and position it under the threaded bolts M16 ① of the interface plate [1].

NOTE – Position of the flanges on the Duo version

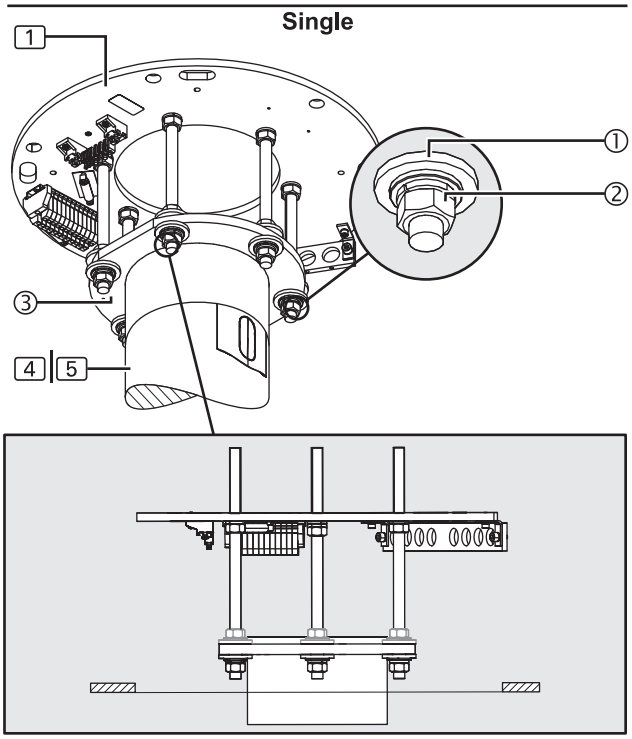
- The flanges have a chamfered surface ⑥ in order to ensure that they can be mounted at the same height.
- Mount the flanges in such a way that the chamfered surfaces ⑥ are aligned towards each other, as illustrated in the Figure.

2. Insert the ceiling tube flange ⑥ with the extension arm [4], [5] into the 6 threaded bolts M16 ① of the interface plate [1].
3. Remove the previously attached adhesive or elastic tape from the threaded bolts ①.

4. For each threaded bolt M16 ①, place 1 plastic insulating disc ① (as illustrated in the Figure) in such a way that the flat washer with an external diameter of 34 mm ③ (see arrow in the detailed representation in the Figure) sits in the plastic insulating disc ①.
5. For each threaded bolt M16 ①, place 1 flat washer with an external diameter of 34 mm ③, 1 spring disc ④ and 1 hexagonal nut M16 ⑤.

6. Component on the interface plate [1]:
- Align the Single version as described in Chapter 8.3 on page 43.
- Align the Duo version as described in Chapter 8.4 on page 44.

Figure 27: Aligning the extension arm with the interface plate, Single



8.3 Aligning the extension arm with the interface plate, Single

(See "Figure 27")

The Figure only shows a simplified representation of the flange ③ with ceiling tube to be mounted to the threaded bolts. Other components pre-assembled to the flange ③, such as the extension arm, cables, etc., are not represented.

NOTE – Positioning problems and inclination

Precise horizontal alignment is essential in order to ensure that the pendant system can be freely moved and securely positioned, and to avoid inclination.

⚠WARNING

Pendant system dropping

The pendant system can drop if the fixing elements have not been properly tightened:

- Tighten all hexagonal nuts M16 ② on the flange with a tightening torque of 100 Nm.

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

NOTICE

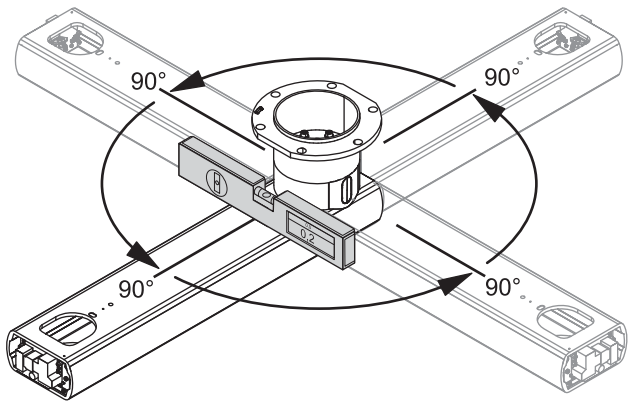
Destruction of the cables in the extension arm

There is a risk of destroying or damaging the cables in the extension arm if an extension arm is rotated more than 360 degrees:

- Do not rotate the extension arm 4, 5 more than 350 degrees.
- If required, restrict the swivel range of the extension arm 4, 5 as described in Chapter 15.2 on page 71.

3. Remove the transport lock (band) from the extension arm 4 – Dual arm type and dismantle the pre-assembled swivel stop as described in Chapter 15.2.4 on page 73 if required. Next, turn the lower extension arm into the extension of the upper extension arm.

Figure 28: Checking the horizontal alignment of the extension arms



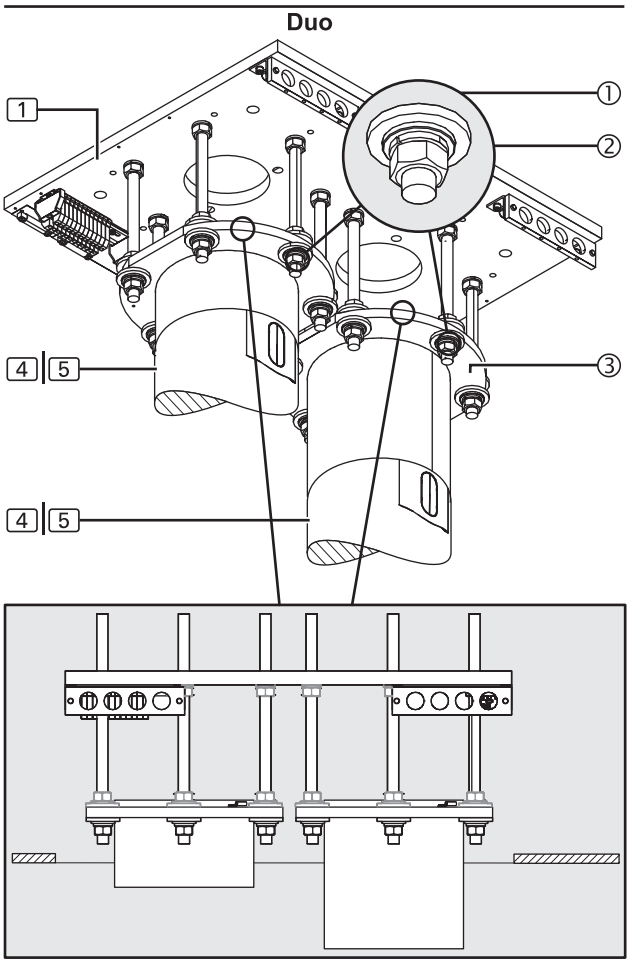
4. Check the horizontal alignment of the extension arms (see “Figure 28”)
5. Place the digital spirit level at right angles to the extension arm length onto the upper extension arm (near the flange ③).

- Rotate the extension arm 90 degrees in various directions and check the horizontal alignment.
- The deviation from the horizontal must not exceed ±0.2 degrees.
- In case of deviations by more than ±0.2 degrees the extension arm 4, 5 must be realigned. To do this, repeat the installation steps described above.

6. Check that all hexagonal nuts M16 ② are securely in place:

- The 12 hexagonal nuts M16 ② must be level with the flange ③ .
- The 12 plastic insulating discs ① above and below the flange ③ must sit in the flange ③ and must not be damaged.
- The 12 hexagonal nuts M16 ② must be tightened to 100 Nm.

Figure 29: Aligning the extension arm with the Duo interface plate



8.4 Aligning the extension arm with the Duo interface plate

(See "Figure 29")

The Figure only shows a simplified representation of the flange ③ with ceiling tube to be mounted to the threaded bolts. Further components pre-assembled to the flange ③, such as the extension arm, cables, etc., are not represented.

NOTE – Positioning problems and inclination

Precise horizontal alignment is essential in order to ensure that the pendant system can be freely moved and securely positioned, and to avoid inclination.

⚠WARNING

Pendant system dropping

The pendant system can drop if the fixing elements have not been properly tightened:

- Tighten all hexagonal nuts M16 ① on the flange with a tightening torque of 100 Nm.

1. Choose 1 of the 6 hexagonal nuts M16 ② on the first flange as a reference point.
2. Screw the 6 hexagonal nuts M16 ② under the flange ③ crosswise onto the flange ③ and tighten them to 100 Nm.
3. Repeat the steps for the second flange.

NOTICE

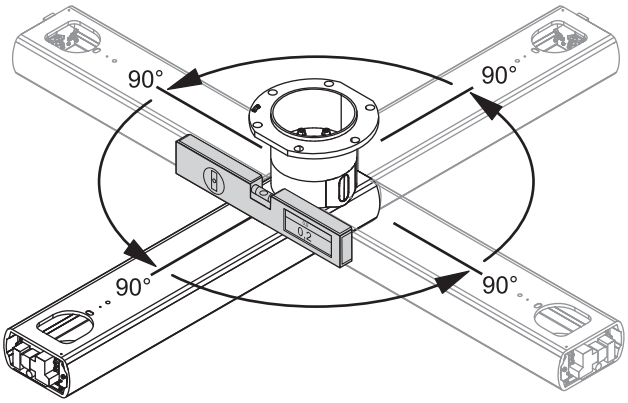
Destruction of the cables in the extension arm

There is a risk of destroying or damaging the cables in the extension arm if an extension arm is rotated more than 360 degrees:

- Do not rotate the extension arm 4, 5 more than 350 degrees.
- If required, restrict the swivel range of the extension arm 4, 5 as described in Chapter 15.2 on page 71.

4. Remove the transport lock (band) from the extension arm 4 – Dual arm type and dismantle the pre-assembled swivel stop as described in Chapter 15.2.4 on page 73 if required. Next, turn the lower extension arm into the extension of the upper extension arm.

Figure 30: Checking the horizontal alignment of the extension arms



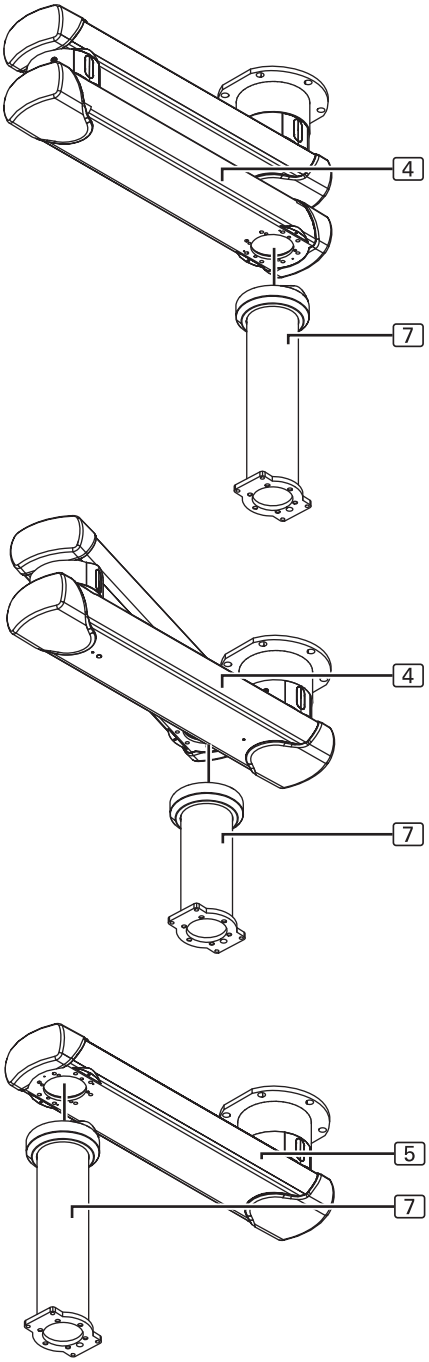
5. Check the horizontal alignment of the extension arms (see “Figure 30”)

- Place the digital spirit level at right angles to the extension arm length onto the upper extension arm (near the flange ③).
- Rotate the extension arm 90 degrees in various directions and check the horizontal alignment.
- The deviation from the horizontal must not exceed ±0.2 degrees.
- In case of deviations by more than ±0.2 degrees the extension arm 4, 5 must be realigned. To do this, repeat the installation steps described above.

6. Check that all hexagonal nuts M16 ② are securely in place:

- The 24 hexagonal nuts M16 ② must be level with the flange ③.
- The 24 plastic insulating discs ① above and below the flange ③ must sit in the flange ③ and must not be damaged.
- The 24 hexagonal nuts M16 ② must be tightened to 100 Nm.

Figure 31: Components described in this chapter



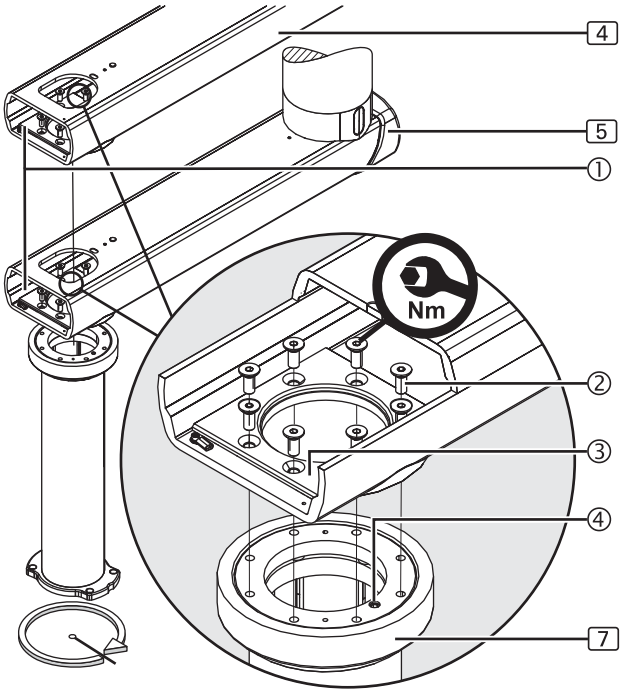
9.1 Components described in this chapter

(See "Figure 31")

- The Drop tube illustrated in the Figure is mounted to the extension arm of the single- or dual-arm variants.
- The Figure shows a simplified representation with only the extension arm [4], [5] without pre-assembled cables.

- The installation is described in the following chapters and varies for the different versions. Be aware of the different length of the fastening screws for the different versions.

Figure 32: Mounting the Drop tube to the extension arm



9.2 Mounting the Drop tube to the extension arm

(See "Figure 32")

The Figure shows a magnified sectional view of the extension arm without its top side.

1. Push the fastening plate 8 x M10 ③ from the front side ① into the extension arm [4], [5] and position it.
2. Place the Drop tube under the extension arm [4], [5] such that the end stop ④ in the Drop tube points away from the extension arm side and the fixing holes fall in line.

NOTE – Defining the swivel range

- In order to be able to swivel the Navigator M6 to the left (anti-clockwise), the Drop tube must be mounted with the end stop ④ on the right-hand side as illustrated in the Figure.
- In order to be able to swivel the Navigator M6 right (clockwise), the Drop tube must be mounted with the end stop ④ on the left-hand side.

⚠WARNING

Pendant system dropping

The pendant system can drop if the fixing elements have not been properly tightened:

- Assign the Allen countersunk screws ① to the Drop tube.

3. Assign the fastening screws to the individual Drop tube [7] type:

- Installation of the Navigator ™ and Navigator ™ – Inverted Drop tube
  – 8 Allen countersunk screws M10 x 25 mm ② – 10.9 – DIN EN ISO 10642
- Installation of the Navigator ™ XL Drop tube
  – 8 Allen countersunk screws M10 x 25 mm ② – 10.9 – DIN EN ISO 10642 (Navigator ™ XL – dual-arm variant)
  – 8 Allen countersunk screws M10 x 30 mm ② – 10.9 – DIN EN ISO 10642 (Navigator ™ XL – single-arm variant)
- Installation of the Navigator ™ XXL Drop tube
  – 8 Allen countersunk screws M10 x 30 mm ② – 10.9 – DIN EN ISO 10642

4. Route the Drop tube through the fastening plate 8 x M10 ③ and screw it onto the extension arm [4], [5] using 8 Allen countersunk screws ②.

⚠WARNING

Pendant system dropping

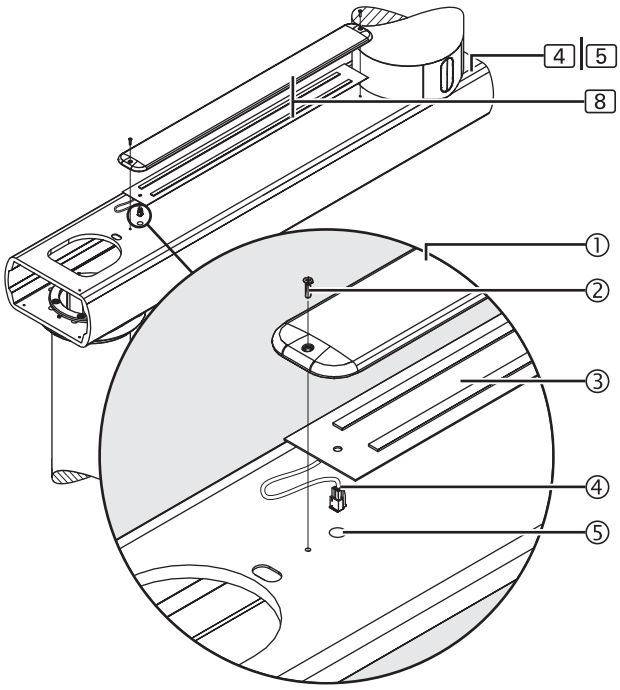
The pendant system can drop if the fixing elements have not been properly tightened:

- Tighten the 8 Allen countersunk screws ② with a tightening torque of 40 Nm.

5. Check that the Drop tube [7] is securely in place:

- The Drop tube must be level with the extension arm [4], [5].
- The 8 Allen countersunk screws ② must be tightened to 40 Nm.

Figure 33: Mounting the extension arm lighting



10.1 Mounting the extension arm lighting (for retrofit only)

(See "Figure 33")

The Figure shows the Navigator™ version. The installation steps required for Navigator ™ XL and Navigator ™ XXL versions are identical.
For the version Navigator ™ – Inverted the extension arm lighting is mounted to the front upper extension arm.

Upon delivery of the system from the factory the following options are pre-assembled:

The indirect extension arm lighting [8] is mounted to the top side of the extension arm [4], [5]. The Figure shows a simplified representation with only the extension arm [4], [5] without pre-assembled cables.

1. Dismantle the 3 sealing plugs (not illustrated) from the top side of the extension arm and dispose them in compliance with statutory regulations.

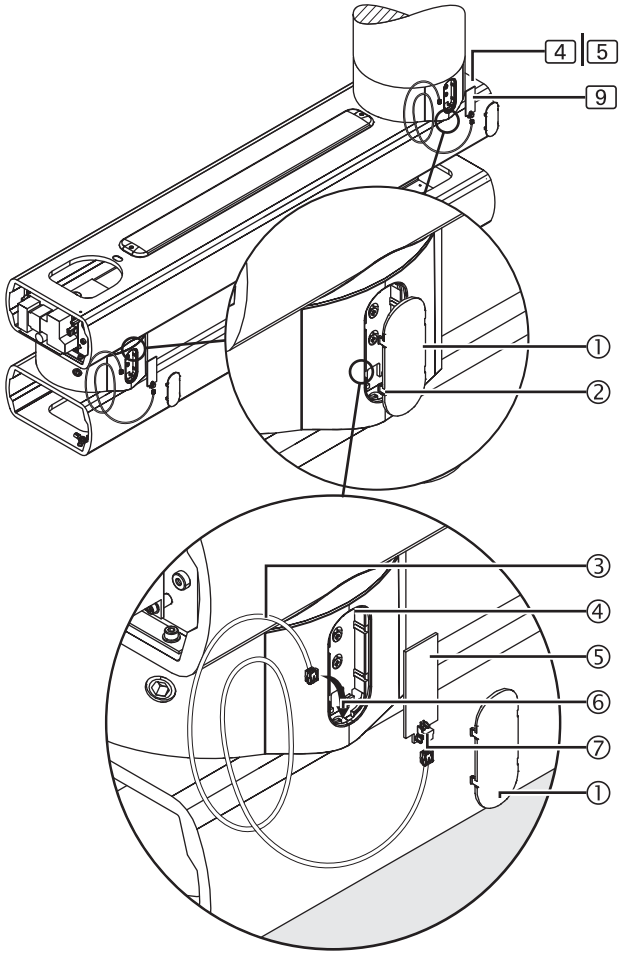
2. Route the connecting cable ④ on the basic carrier with LEDs ③ through the mounting aperture ⑤ into the extension arm [4], [5] without bending it.

3. Place the cover ① onto the basic carrier with LEDs ③ and screw it on using 2 countersunk screws M4 x 16mm ② – DIN EN ISO 10642.

4. Check that the extension arm lighting [8] is securely in place:

- The extension arm lighting [8] must be level with the extension arm [4], [5].
- The connecting cable ④ on the basic carrier with LEDs ③ must sit in the extension arm [4], [5].
- The 2 countersunk screws M4 x 16mm ② – DIN EN ISO 10642 must be screwed on.

Figure 34: Mounting the brake indicators



10.2 Mounting the brake indicators (for retrofit only)

(See "Figure 34")

The Figure shows the Navigator™ version. The installation steps required for the Navigator ™ XL and Navigator ™ XXL versions are identical.
For the version Navigator ™ – Inverted the extension arm lighting is mounted to the front upper extension arm (not illustrated).

The brake indicators [9] are mounted to the swivel or brake points of the extension arm [4], [5].
The 4 brake indicators [9] are mounted to the dual-arm variant, whereas the 2 brake indicators are mounted to the single-arm variant.
The Figure shows a simplified representation with only the extension arm [4], [5] without pre-assembled cables.

1. Gently disengage the 2 / 4 pre-assembled plastic covers ① on all 4 latches ②, remove them and keep them in a safe place.
2. Plug 1 power cable connector ③ onto the connector ⑦ of the lighting board ⑤.
   Colour code of the lighting boards ⑤:
- Upper bearing = green
- Intermediate bearing = blue
3. Route the power cable ③ through the hole ⑥ (see arrow) into the extension arm [4], [5]:
- Make sure that the plugs and power cable ③ are not damaged.
- The power cable ③ must sit entirely in the extension arm [4], [5].

4. Hook the lighting board ⑤ at the bottom side into the mounting aperture ④ and gently push it in until it audibly snaps into place:
- Do not push the lighting board ⑤ into the mounting aperture ④ with force.

5. Check that the lighting board ⑤ is securely in place:
- The lighting board ⑤ must sit in the mounting aperture ④ without being wedged.

NOTE – Colour code of the plastic covers

Navigator ™ pendant system, dual-arm variant:
- The upper plastic cover ① is green
- The lower plastic cover ① is blue

Navigator ™ pendant system, single-arm variant:
- The plastic cover ① is green

6. Gently push the 2 / 4 plastic covers ① into the mounting aperture ④ until the 4 latches ② audibly snap into place.
7. Check that the plastic covers ① are securely in place:
- The plastic covers ① must sit in the mounting aperture ④ without being wedged.

8. Position the Navigator M6 under the pendant system as described in the Installation Instructions of the Navigator M6:
- The supply cables (power and earthing cables, gas and compressed air hoses) are pre-assembled in the Navigator M6.
- Order-specific cables, including nurse call and phone cables, must be separately routed through the pendant system.

11.1 Versions

The insertion of the cables is described using the example of the Navigator ™ version. The installation steps required for the Navigator ™ XL and Navigator ™ XXL versions are identical.

11.2 Safety Instructions

⚠WARNING

Electric shock hazard

Power cables may have been laid in the pendant system. Contact with energised components presents a danger to life from electric shock. Motor-driven, mobile device components can cause injury in the case of being switched on unintentionally. Prior to any installation and adjustment work, the pendant system must be disconnected from the mains:

- Disconnect all poles of the power supply source from the mains and prevent it from being reconnected accidentally.
- Check whether the pendant system is de-energised.
- Earth and short-circuit the pendant system.
- Cover and shield any adjacent energised parts.

Damaged power cables, gas hoses and compressed air hoses

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

- Check all cables and hoses for damage. Make sure you carefully insert them without cables/hoses crossing each other, without loops and without twisting.
- Lay the cables and hoses in the pendant system in such a way that they are not exposed to tensile stress in any position.
- Cables and hoses must be routed straight upwards out of the flange in order to prevent damage (e.g. rubbing of the sheathing) and enable their free rotation.
- Protruding cables and hoses must not be placed in the Navigator M6 or on the flanges, but must be placed on the interface plate and secured against falling using cable retainers.
- Electric cables must be laid in accordance with regional regulations (in a spiral coiled tube if required).

11.3 Connecting the cables and hoses to the support arm, dual-arm variant

The supply cables and hoses are pre-assembled by Nuvo. The instructions in the paragraphs below only refer to the replacement of supply cables and hoses.

NOTE – Version Navigator ™ – Inverted

For the version Navigator ™ – Inverted the cables are routed upwards through the front upper extension arm (not illustrated).

1. Observe the safety instructions in Chapter 11.1 on page 49.

11.3.1 Checking the power pack and distributor board connections

(See "Figure 35“)

2. Check that the connecting cables are mounted with the plugs ④/⑤ and ⑭/⑮ between the power pack ① and the distributor board ③. If missing, mount the connecting cables included in the scope of delivery with the plugs ④/⑤ and ⑭/⑮ as illustrated in the Figure.

11.3.2 Connecting the electromagnetic brakes

(See "Figure 35“)

Connecting the upper brake

3. Establish the assembly connection ⑫ between the cable ⑪ and the extension cable ⑩ included in the scope of delivery as described in Chapter 7.2.2 on page 39.
4. Plug the extension cable connector ⑩ onto the corresponding distributor board socket ③ as illustrated in the Figure.

Connecting the lower brake

5. Plug the cable connector ⑥ onto the corresponding distributor board socket ③ as illustrated in the Figure.

11.3.3 Connecting the control cable of the brakes

NOTE – Shelf variants

There are 2 different variants of assembly connections ⑧ . Self variant Ⓐ (old) or 2nd Gen shelf variant Ⓑ (new). Be aware of the different plugs and slots on the distributor board ③.

6. Establish the assembly connection ⑧ of the control cable ⑦ from the Navigator M6 with the control cable ⑨ and plug it onto the corresponding distributor board socket ③ as illustrated in the Figure.

11.3.4 Mounting the power cable

(See "Figure 35“)

7. Plug the power cable ⑬ included in the scope of delivery onto the corresponding distributor board socket ③ and route it through the extension arm towards the interface plate as illustrated in the Figure.

- If required, a circuit diagram/wiring diagram can be made available by Nuvo.

Figure 35: Connecting the cables and pipes to the support arm, dual-arm variant

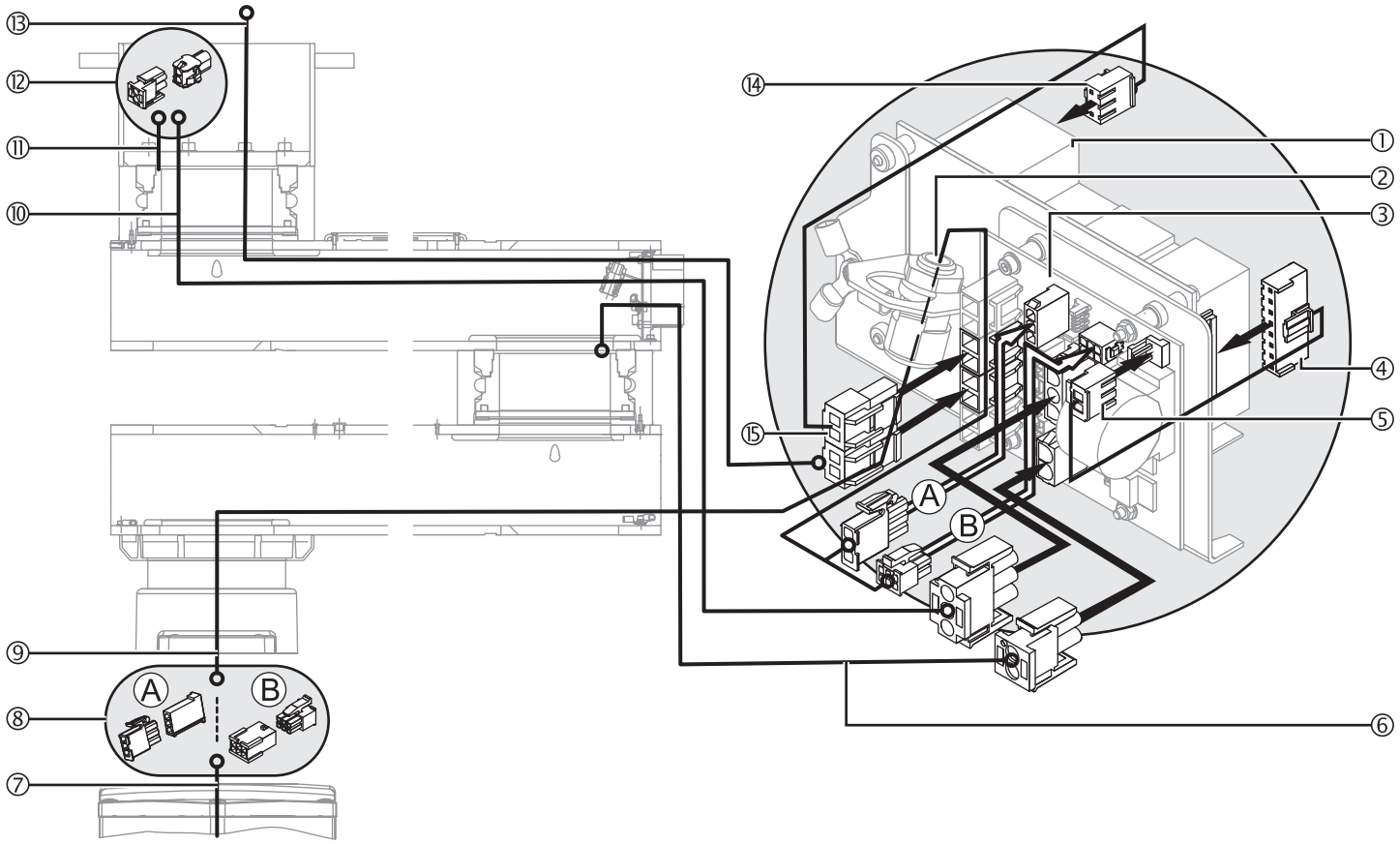


Table 05: Cable assignment of the pendant system, dual-arm variant

No. in Fig. 34	From	To	Designation	Length [mm]	Remark
⑥	Bearing unit	Distributor board	-	100	Integrated in the bearing unit
⑦	Front plate Navigator M6	Drop tube	Navigator M6/Navigator M6 socket interface cable	-	Integrated in the Navigator M6
⑨	Distributor board	Navigator M6	PCB/Navigator M6 socket cable	2600	-
⑩	Bearing point 1	Distributor board	Brake1/PCB, 2-arm cable	1100 1500	Extension arm length 1 = 600/800 Extension arm length 1 = 1000/ 1200
⑪	Bearing unit	Cable ⑩, distributor board	-	100	Integrated in the bearing unit
⑬	Mains connection	Distributor board	Mains/PCB cable	5000	-

11.4 Connecting optional accessories to the support arm, dual-arm variant

1. Observe the safety instructions in Chapter 11.1 on page 49.

NOTE – Version Navigator ™ – Inverted

For the version Navigator ™ – Inverted the extension arm lighting is mounted to the front upper extension arm (not illustrated).

11.4.1 Connecting the optional brake indicators

(See "Figure 36“)

2. Route the 2 cables ⑩ of the upper brake indicators through the extension arm and the mounting aperture ② of the power pack ① and then plug them onto the corresponding distributor board sockets ③ on the power pack ① as illustrated in the Figure.
3. Route the 2 cables ④ of the lower brake indicators through the mounting aperture ② of the power pack ① and then plug them onto the corresponding distributor board sockets ③.

11.4.2 Connecting the optional extension arm lighting

(See "Figure 36“)

4. Establish the assembly connection ⑨ between the extension arm lighting cable ⑪ and the extension cable ⑧ included in the scope of delivery, and then route it through the extension arm and the mounting aperture ② of the power pack ① and out of the Drop tube.
5. Establish the assembly connection ⑦ between the extension cable ⑧ and the control cable ⑥ out of the Navigator M6.

11.4.3 Connecting an optional sound or lighting cable

(See "Figure 36“)

6. Plug the cable connector ⑤ onto the corresponding distributor board socket ③.

Figure 36: Connecting optional accessories to the support arm, dual-arm variant

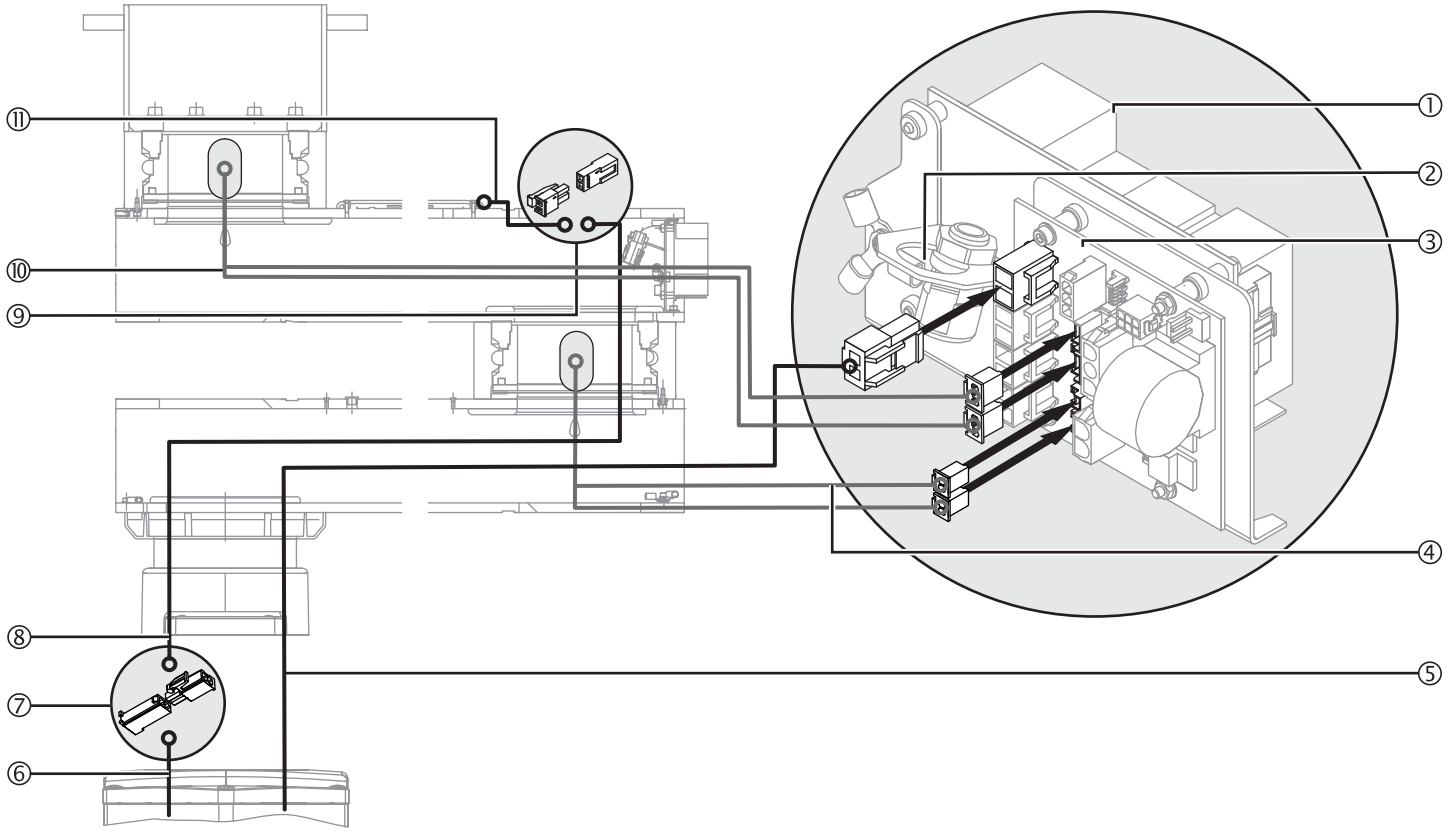


Table 06: Cable assignment of the pendant system, dual-arm variant – Options

No. in Fig. 35	From	To	Designation	Length [mm]	Remark
④	Lower brake indicator	Distributor board	Brakeguide2/PCB cable	700	
⑤	Navigator M6	Distributor board	Navigator M6, PCB 230V cable	3900	Integrated into the Navigator M6
⑥	Navigator M6	Drop tube	Extension arm lighting/ Navigator M6 cable	-	Integrated into the Navigator M6
⑧	Extension arm lighting	Navigator M6	Extension arm lighting/ Navigator M6 cable	3000	-
⑩	Upper brake indicator	Distributor board	Brakeguide1/PCB cable	1110 1510 1960	Extension arm length 1 = 1000/ 1200 Extension arm length 1 = 600/800 Extension arm length 1 (XL only) = 1400/1600
⑪	Extension arm lighting	Cable ⑧	-	100	Integrated into the extension arm lighting

11.5 Connecting the earthing cables to the support arm, dual-arm variant

(See "Figure 37“)

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

NOTE – Version Navigator ™ – Inverted

For the version Navigator ™ – Inverted the cables are routed upwards through the front upper extension arm (not illustrated).

1. Observe the safety instructions in Chapter 11.1 on page 49.

2. Lay and connect the earthing cables in the direction of the arrow illustrated in the Figure, and then route them towards the interface plate if required.
3. Route the mounted flange earthing cable ① along the ceiling tube towards the interface plate.
4. Route the earthing cables ② out of the Navigator M6 through the pendant system and towards the interface plate.

11.6 Routing the supply cables and hoses through the support arm, dual-arm variant

(See "Figure 38“)

The power cables and gas hoses are pre-assembled in the Navigator M6.
Order-specific cables, including nurse call and phone cables, must be separately routed through the pendant system.

NOTE – Version Navigator ™ – Inverted

For the version Navigator ™ – Inverted the cables are routed upwards through the front upper extension arm (not illustrated).

1. Observe the safety instructions in Chapter 11.1 on page 49.

2. Carefully route the supply cables and hoses ① through the pendant system and towards the interface plate:
- Next, route the Navigator M6 without exerting tensile stress on the supply cables and hoses ①.
- Make sure that the laid cables are not damaged or torn off.
3. Route order-specific cables (nurse call, phone, etc.) through the pendant system.
4. Mount the Navigator M6 to the pendant system as described in the Installation Instructions of the Navigator M6.

Figure 37: Connecting the earthing cables to the support arm, dual-arm variant

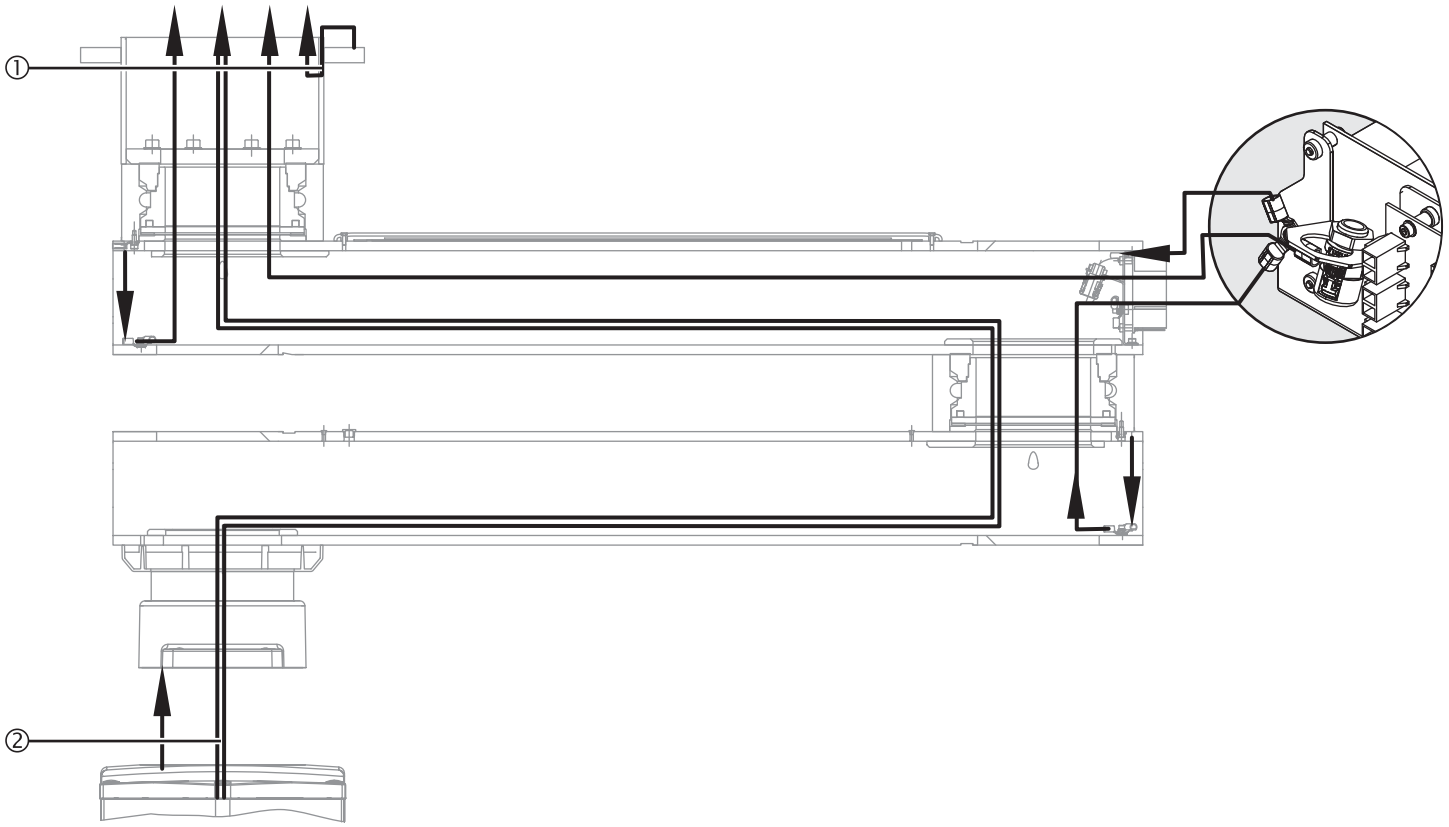
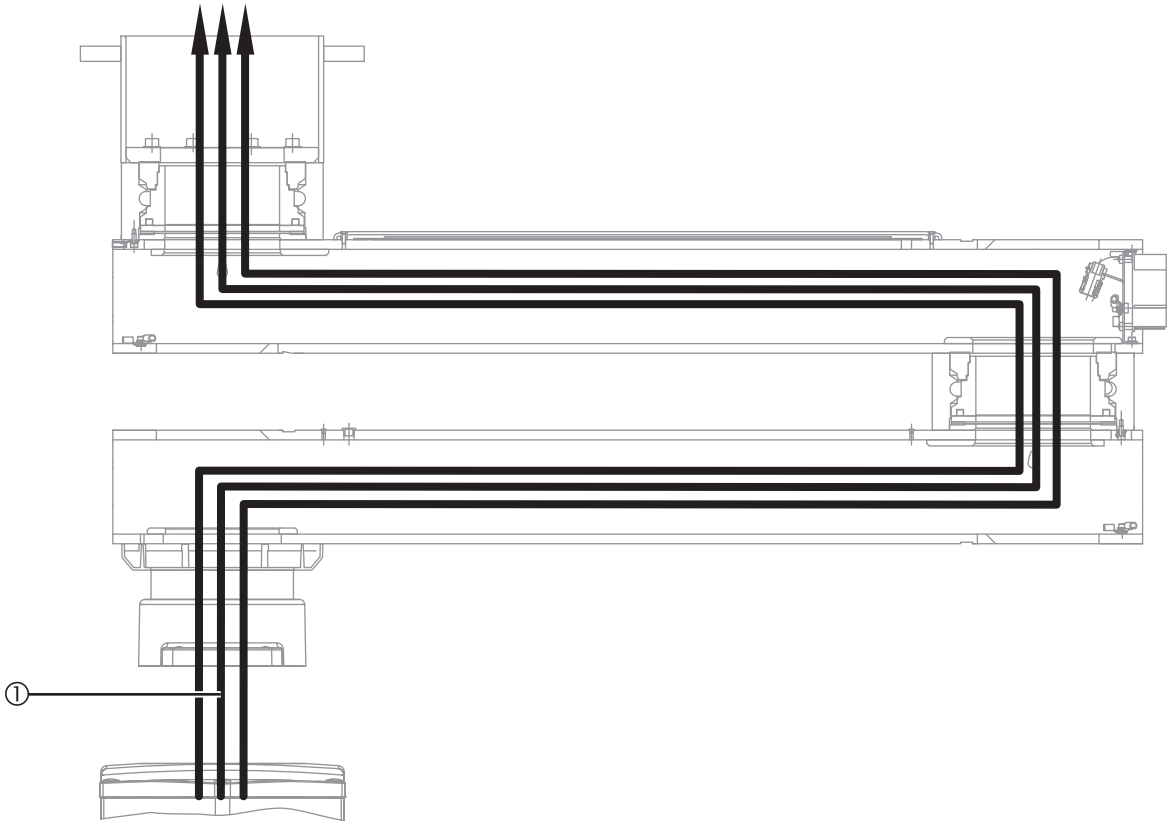


Figure 38: Routing the supply cables and hoses through the support arm, dual-arm variant



11.7 Connecting the cables and pipes to the support arm, single-arm variant

The supply cables and hoses are pre-assembled by Nuvo. The instructions in the paragraphs below only refer to the replacement of supply cables and hoses.

1. Observe the safety instructions in Chapter 11.1 on page 49.

11.7.1 Checking the power pack and distributor board connections

(See "Figure 39“)

2. Check that the supply cables are mounted with the plugs ④/⑤ and ⑬/⑭ between the power pack ① and the distributor board ③. If missing, mount the connecting cables included in the scope of delivery with the plugs ④/⑤ and ⑬/⑭ as illustrated in the Figure.

11.7.2 Connecting the electromagnetic brake

(See "Figure 39“)

Connecting the brake

3. Establish the assembly connection ⑪ between the cable ⑩ and the extension cable ⑨ included in the scope of delivery as described in Chapter 7.2.2 on page 39.
4. Plug the extension cable connector ⑨ onto the corresponding distributor board socket ③ as illustrated in the Figure.

11.7.3 Connecting the control cable of the brakes

(See "Figure 39“)

NOTE – Shelf variants

There are 2 different variants of assembly connections ⑧. Self variant Ⓐ (old) or 2nd Gen shelf variant Ⓑ (new). Be aware of the different plugs and slots on the distributor board ③.

5. Establish the assembly connection ⑦ of the control cable ⑥ from the Navigator M6 with the control cable ⑧ and plug it onto the corresponding distributor board socket ③ as illustrated in the Figure.

11.7.4 Mounting the power cable

(See "Figure 39“)

6. Plug the power cable ⑫ included in the scope of delivery onto the corresponding distributor board socket ③ and route it through the extension arm towards the interface plate as illustrated in the Figure:

- If required, a circuit diagram/wiring diagram can be made available by Nuvo.

Figure 39: Connecting the cables and pipes to the support arm, single-arm variant

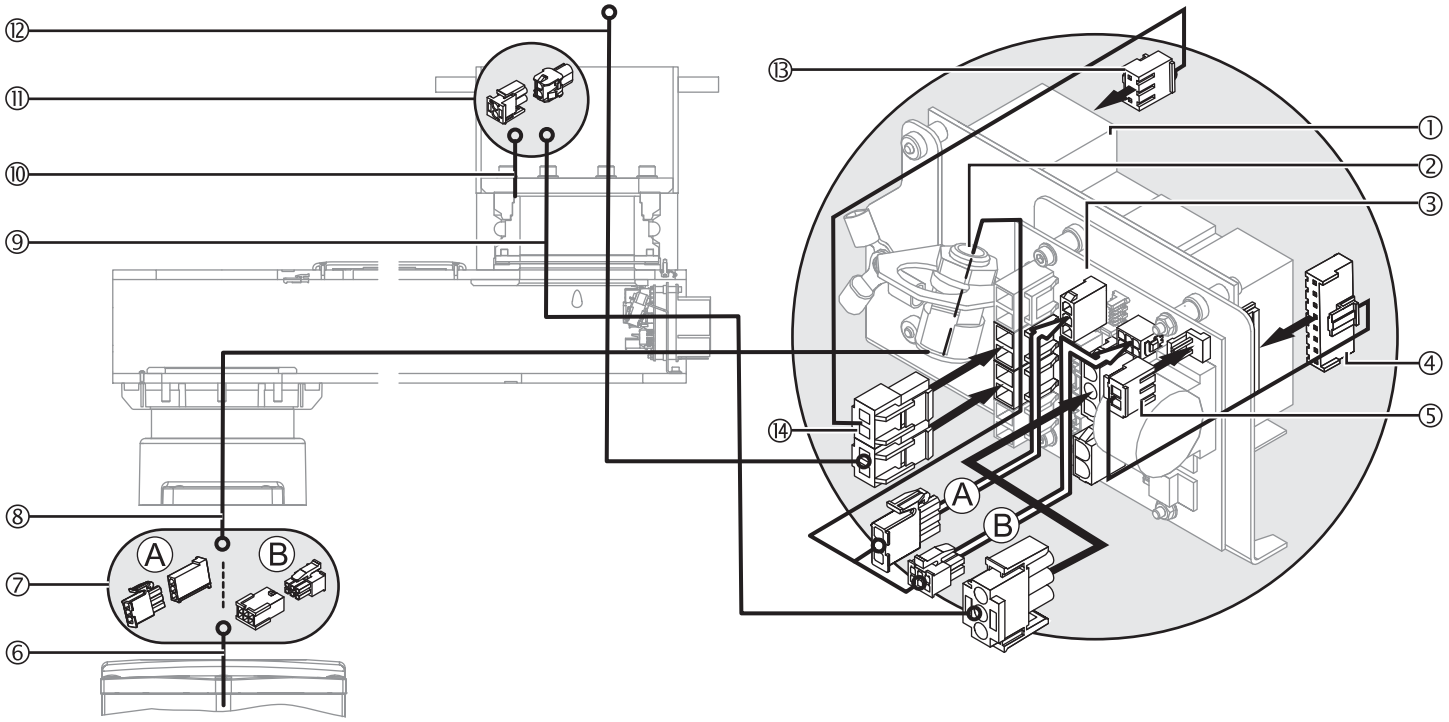


Table 07: Cable assignment of the pendant system, single-arm variant

No. in Fig. 38	From	To	Designation	Length [mm]	Remark
⑥	Front plate Navigator M6	Drop tube	Navigator M6/Navigator M6 socket interface cable	-	Integrated in the Navigator M6
⑧	Distributor board	Navigator M6	PCB/Navigator M6 socket cable	2600	-
⑨	Bearing point1	Distributor board	Brake1/PCB, 1-arm cable	400	-
⑩	Bearing unit	Cable ⑨, distributor board	-	100	Integrated in the bearing unit
⑫	Mains connection	Distributor board	Mains/PCB cable	5000	-

11.8 Connecting optional accessories to the support arm, single-arm variant

1. Observe the safety instructions in Chapter 11.1 on page 49.

11.8.1 Connecting an optional brake indicator

(See "Figure 40“)

1. Route the 2 cables ⑧ of the upper brake indicator through the extension arm and plug it onto the corresponding distributor board sockets ② on the power pack ① as illustrated in the Figure.

11.8.2 Connecting the optional extension arm lighting

(See "Figure 40“)

1. Establish the assembly connection ⑦ between the extension arm lighting cable ⑨ and the extension cable ⑥ included in the scope of delivery and then route it through the extension arm and out of the Drop tube.
2. Establish the assembly connection ⑤ between the extension cable ⑥ and the control cable ④ out of the Navigator M6.

11.8.3 Connecting an optional sound or lighting cable

(See "Figure 40“)

3. Route the cable connector ③ out of the Navigator M6 and plug it onto the corresponding distributor board socket ② on the power pack ①.

Figure 40: Connecting optional accessories to the support arm, single-arm variant

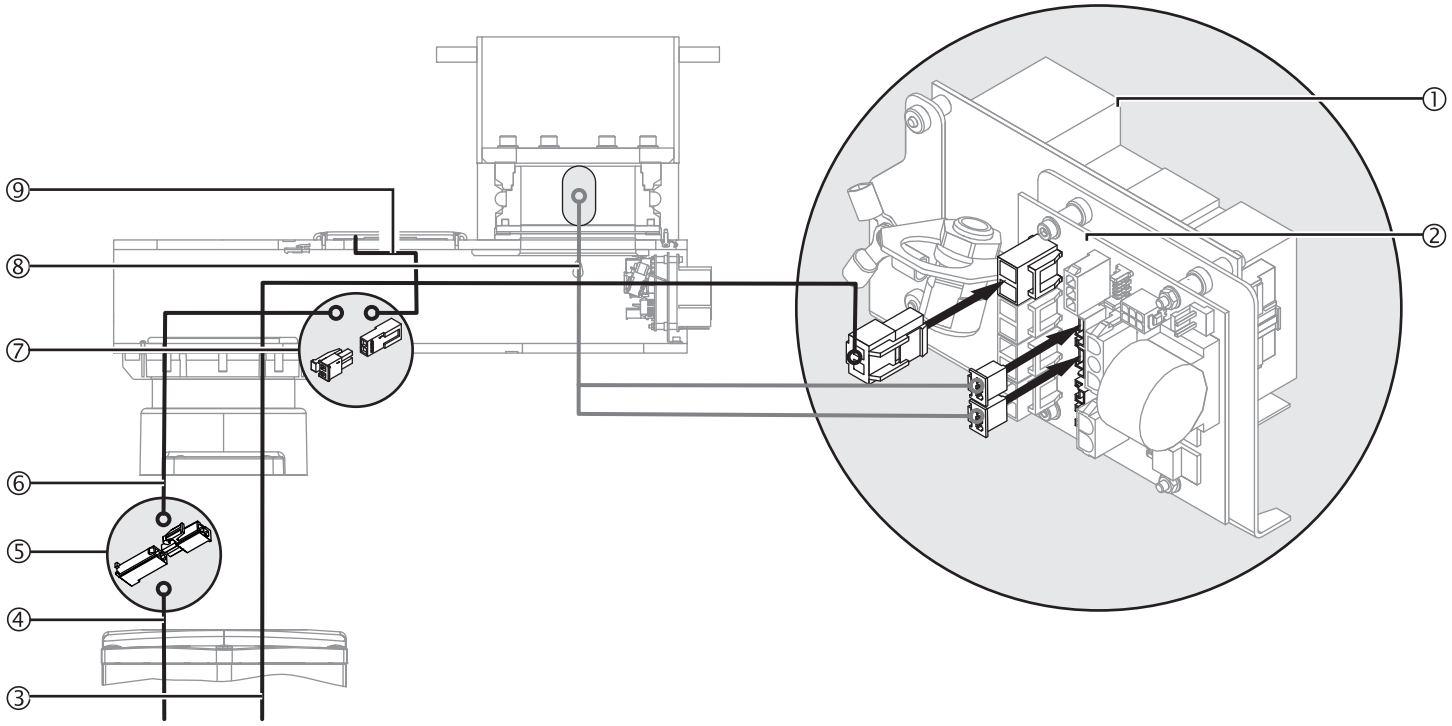


Table 08: Cable assignment of the pendant system, single-arm variant – Options

No. in Fig. 39	From	To	Designation	Length [mm]	Remark
③	Navigator M6	Distributor board	Navigator M6, PCB 230V cable	3900	Integrated in the Navigator M6
④	Navigator M6	Drop tube	Extension arm lighting/ Navigator M6 cable	-	Integrated in the Navigator M6
⑥	Extension arm lighting	Navigator M6	Extension arm lighting/ Navigator M6 cable	3000	-
⑧	Upper brake indicator	Distributor board	Brakeguide1/PCB cable	250	-

11.9 Connecting earthing cables to the support arm, single-arm variant

(See "Figure 41“)

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

1. Observe the safety instructions in Chapter 11.1 on page 49.

2. Lay and connect the earthing cables in the direction of the arrow illustrated in the Figure, and then route them towards the interface plate if required.
3. Route the mounted flange earthing cables ① along the ceiling tube towards the interface plate.
4. Route the earthing cables ② out of the Navigator M6 through the pendant system and towards the interface plate.

11.10 Routing the supply cables and hoses through the pendant system, single-arm variant

(See "Figure 42“)

The power cables and gas hoses are pre-assembled in the Navigator M6. Order-specific cables, including nurse call and phone cables, must be separately routed through the pendant system.

1. Observe the safety instructions in Chapter 11.1 on page 49.

2. Carefully route the supply cables and hoses ① through the pendant system and towards the interface plate:
- Next, route the Navigator M6 without exerting tensile stress on the supply cables and hoses ①.
- Make sure that the laid cables are not damaged or torn off.
3. Route order-specific cables (nurse call, phone, etc.) through the pendant system.

4. Mount the Navigator M6 to the pendant system as described in the Installation Instructions of the Navigator M6.

Figure 41: Connecting earthing cables to the support arm, single-arm variant

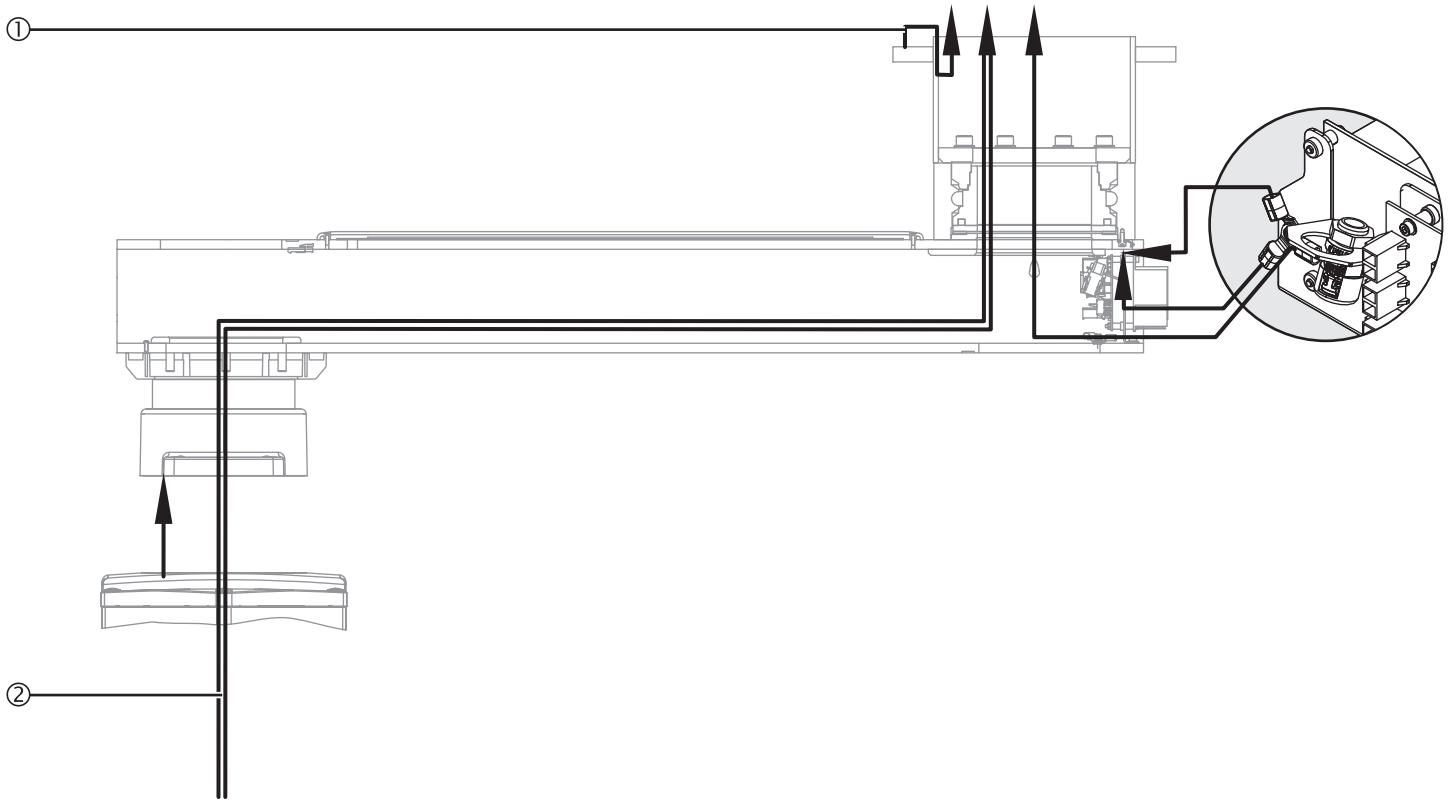
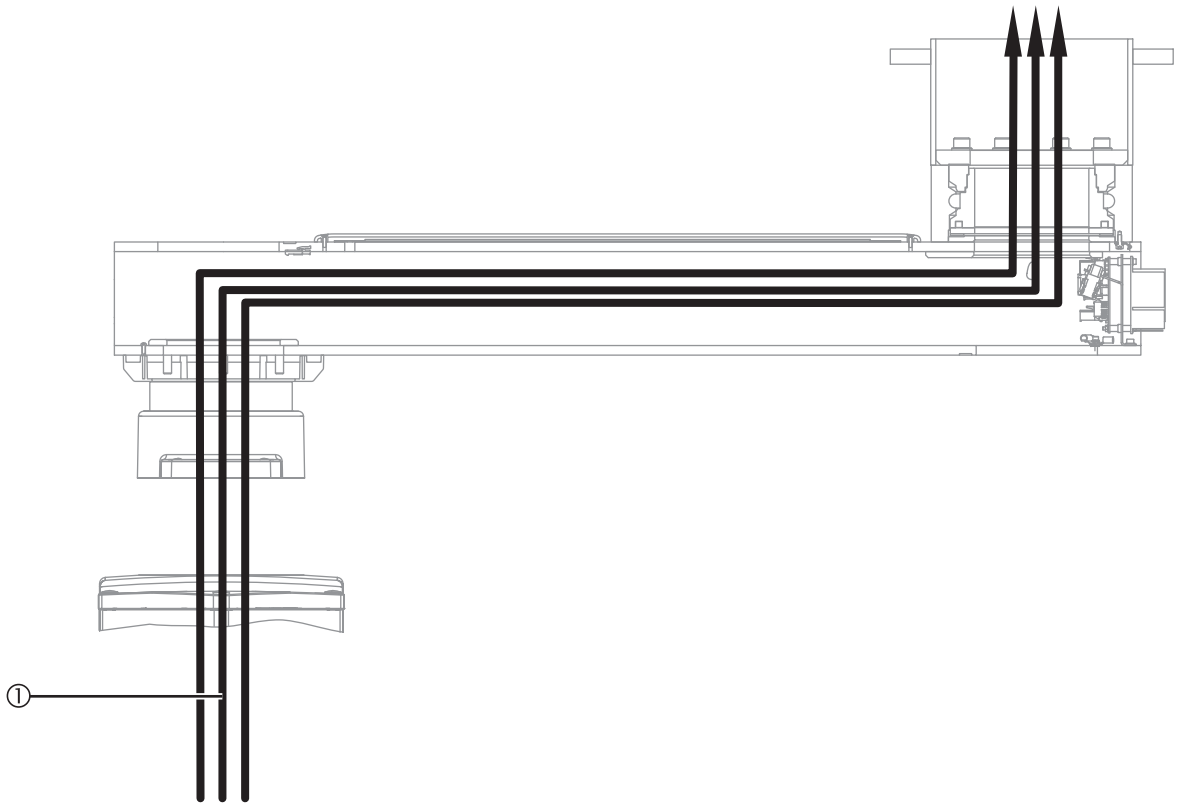


Figure 42: Routing the supply cables and hoses through the pendant system, single-arm variant



12.1 Safety Instructions

⚠WARNING

Qualification of installation personnel

The electrical connection of the pendant system and the Navigator M6 may only be performed by a qualified electrician:

- Observe the safety instructions set out in the Installation Instructions Part 1 – Ceiling Mount Fixture, Chapter "Power Supply".

The gas supply connection of the Navigator M6 may only be performed by the supplier of the central gas system:

- The supplier of the central gas supply system is responsible for carrying out leak tightness, pressure, flow, contamination and gas type tests.

Electric shock hazard

Contact with energised components presents a danger to life from electric shock. Motor-driven, mobile device components can cause injury in the case of being switched on unintentionally. Prior to any installation and setting up work, the appliance must be disconnected from the mains:

- Disconnect all poles of the power supply source / appliance from the mains and prevent it from being reconnected accidentally.
- Check whether the appliance is de-energised.
- Earth and short-circuit the appliance.
- Cover and shield any adjacent energised parts.

Electric shock hazard through defective insulation

The pendant system or the Navigator M6 can be energised if the insulation is defective:

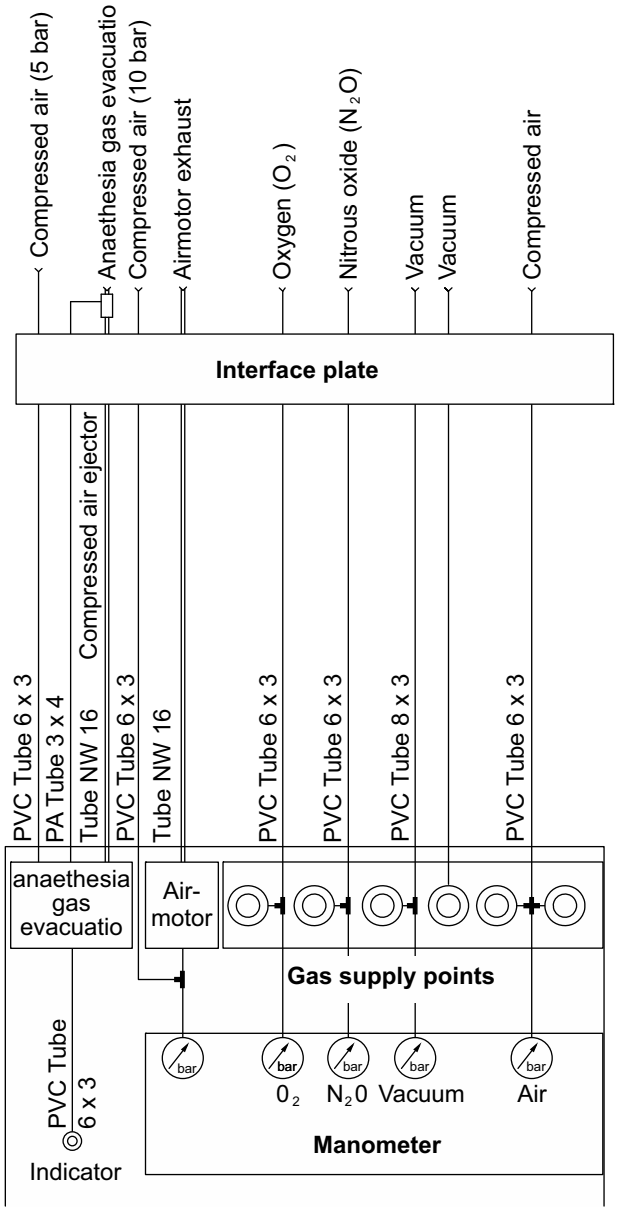
- The pendant system and the Navigator M6 must always be earthed.
- The power supply and earthing cables must be connected to the strain relieving mechanisms of the interface plate.

Damaged power cables, gas hoses and compressed air hoses

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

- Check all cables and hoses for damage. Make sure you carefully insert them without cables/hoses crossing each other, without loops and without twisting.
- Lay the cables and hoses in the extension arm in such a way that they are not exposed to tensile stress in any position.
- Cables and hoses must be routed straight upwards out of the flange in order in order to prevent damage (e.g. rubbing of the sheathing) and enable their free rotation.
- Protruding cables and hoses must not be placed in the Navigator M6 or on the flanges, but must be placed on the interface plate and secured against falling using cable retainers.
- Electric cables must be laid in accordance with regional regulations (in a spiral coiled tube if required).

Figure 43: Installing gas supply and exhaust air ducts



Navigator M6

12.2 Installing gas supply and exhaust air ducts

(See "Figure 43")

1. Observe the safety instructions in Chapter 12.1 on page 62.

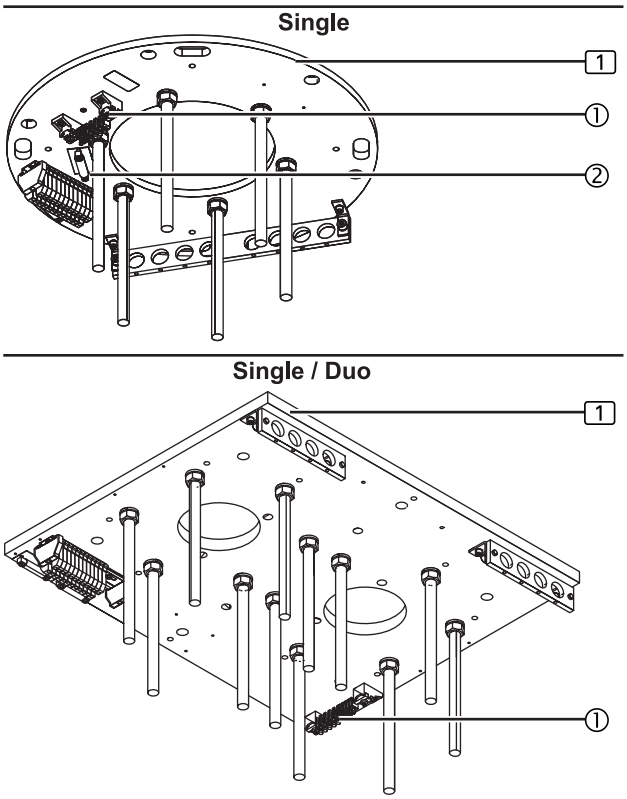
NOTE – Make sure that the gas types are correctly assigned

- The gas type is indicated on a label on the gas supply pipes and delivered with sealing plugs.
- The sealing plugs may only be removed during installation.
- Check the pipes and ducts for contamination and clean them with oil-free air.

The illustration shows the example of a gas supply pipe. Make sure that the cables and ducts are assigned to the correct supply outlet points.

1. Check the gas supply pipes for contamination and clean them with oil-free air.
2. Fit a hose clamp to the gas supply pipe, remove the sealing plug and push the pipe onto the correct gas supply outlet point:
- Up to 3 gas supply hoses and up to 2 vacuum hoses may be connected to a gas valve using Y connectors.
3. Press on the hose clamp and check that it is securely in place.
4. Connect and secure the anaesthetic gas suction hoses and the air motor exhaust air hoses.
5. Perform a gas type test as described in Chapter 13.1 on page 66.

Figure 44: Connecting the earthing cables



12.3 Connecting the earthing cables

(See "Figure 44")

The Figure illustrates the interface plate [1], Single (round shape), for installing the Navigator ™ and Navigator ™ – Inverted version. The installation steps required for the Navigator ™ XL and Navigator ™ XXL interface plate [1] (squared shape) are identical.

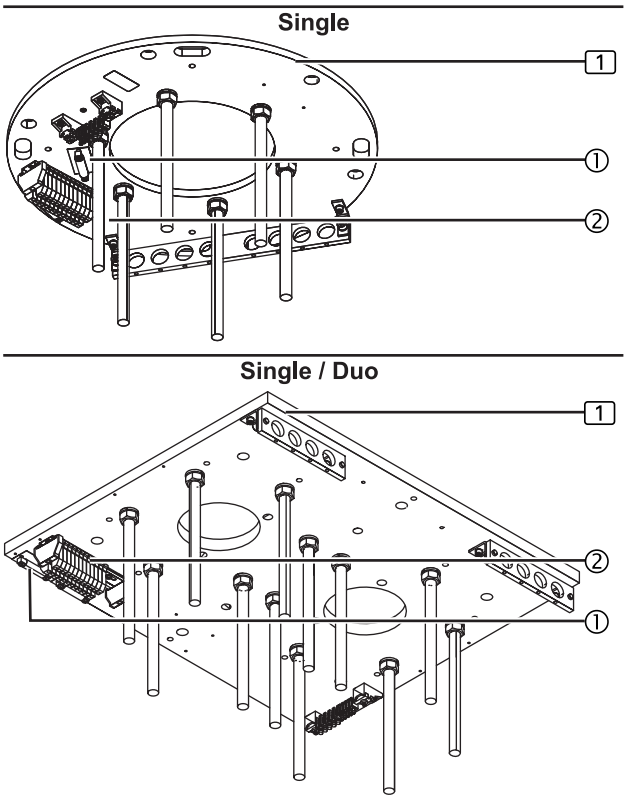
The Figure shows a simplified illustration of the interface plate [1] without extension arm and cables, etc.

1. Observe the safety instructions in Chapter 12.1 on page 62.

2. Cut all green/yellow earthing cables (2.5 mm² and 10 mm²) to the correct length.
3. Route the earthing cables through the strain relieving mechanism and connect them to the series terminals 4 mm² or 10 mm² on the earthing terminal block ① on the interface plate [1].
4. Check that the earthing cables are securely in place in the strain relieving mechanisms ②:

- All earthing cables must be securely installed in the strain relieving mechanisms ②.

Figure 45: Connecting power cables



12.4 Connecting power cables

(See "Figure 45")

The Figure illustrates the interface plate [1], Single (round shape), for installing the Navigator ™ and Navigator ™ – Inverted version. The installation steps required for the Navigator ™ XL and Navigator ™ XXL interface plate [1] (squared shape) are identical.

The Figure shows a simplified illustration of the interface plate [1] without extension arm and cables, etc.

1. Observe the safety instructions in Chapter 12.1 on page 62.

2. Route all power cables through the strain relieving mechanism ① and connect them to the terminal block ② as illustrated in the wiring diagram provided at the installation site.
3. Check that the power cables are securely in place in the strain relieving mechanisms ①:

- All power cables must be securely installed in the strain relieving mechanisms ①.

NOTE – Connection to separate electric circuit required

- If the electromagnetic brake is overcharged the power pack can switch off to protect it against overheating. To place it back into operation the pendant system must be disconnected from the mains.
- For this reason the power supply cables 230 V/120 V of the power pack must be connected to a separately switchable electric circuit.
- A fuse or line safety switch with up to 6 Ampere has to be provided for the power cable to the pendant system.

12.5 Checking the supply cables and hoses

Carefully check that the supply cables are not trapped or bent during the entire rotating motion of the extension arms.

13.1 Gas inspection

1. Gas outlets and marking according to DIN EN ISO 9170-1 or DIN EN ISO 9170-2
2. Leakage, in accordance with DIN EN ISO 11197
3. Congestion, in accordance with DIN EN ISO 7396-1 or DIN EN ISO 7396-2
4. Solid contamination, in accordance with DIN EN ISO 7396-1 or DIN EN ISO 7396-2
5. Gas type, in accordance with DIN EN ISO 7396-1 or DIN EN ISO 7396-2

13.2 Mechanical collision test

When swivelling the pendant system, check that no collision can occur with:

- other pendant systems,
- ceilings or walls,
- other assembly units.

Figure 46: Preparing the installation of the canopy

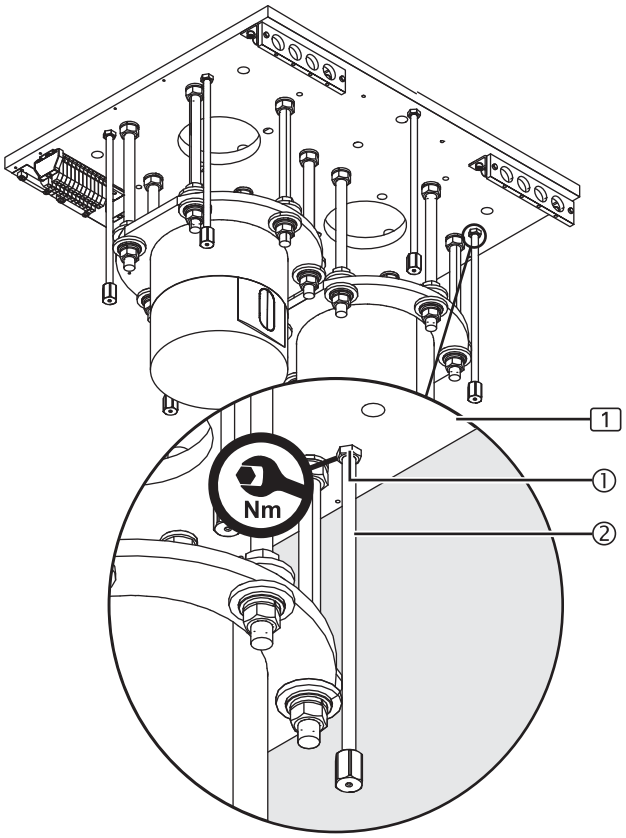
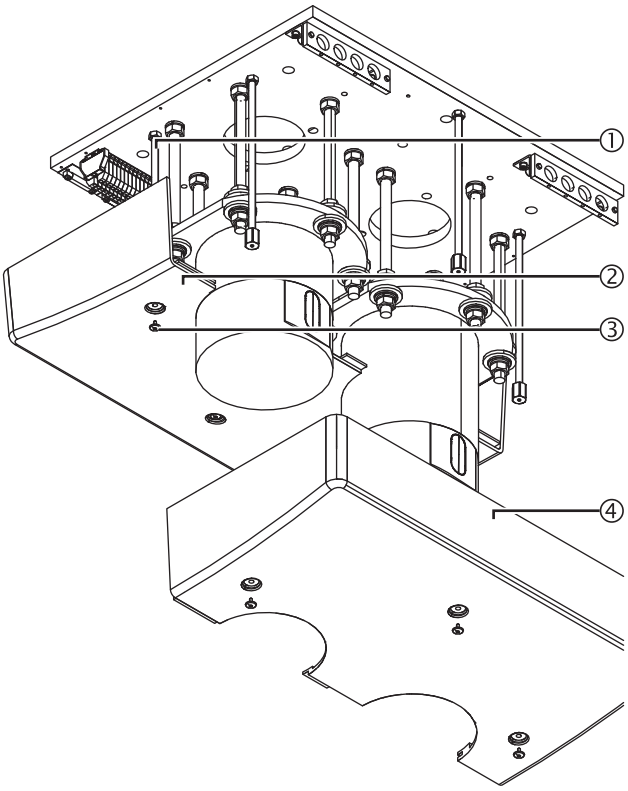


Figure 47: Mounting the canopy halves



14.1 Mounting a Single / Duo canopy

14.1.1 Preparing the installation of the canopy

(See "Figure 46")

The Figure illustrates the installation steps for the Duo canopy. The installation procedure for the Single canopy is identical. The Figure shows a simplified illustration of the interface plate without cables and without the extension arm.

1. Screw the hexagonal nuts M10 ① onto the threaded bolts M10 x 360 mm ②.
2. Screw the threaded bolts M10 x 360 mm ② into the interface plate [1] in such a way that the canopy halves mounted afterwards are flush with the intermediate ceiling / prefabricated ceiling:

- If an interface plate [1] is mounted to the raw ceiling, the threaded bolts M10 x 360 mm ② must be cut to length accordingly.

⚠ WARNING

Risk of the canopy dropping

The canopy can drop if the fixing elements have not been properly tightened:

- Tighten the 4 hexagonal nuts M10 ① to 46 Nm.

3. Check that the threaded bolts M10 x 360 mm ② are securely in place:

- The threaded bolts M10 x 360 mm ② must be mounted at the same distance to the interface plate [1].
- The 4 hexagonal nuts M10 ① must be tightened to 46 Nm.

14.1.2 Mounting the canopy halves

(See "Figure 47")

The Figure illustrates the installation steps for the Duo canopy. The installation procedure for the Single canopy is identical. The Figure shows a simplified illustration of the interface plate without cables and without the extension arm.

1. Place the sectional strip (not illustrated in the Figure) onto the first canopy half ② (the canopy can be optionally sealed with silicone).
2. Place the first canopy half ② onto the threaded bolts M10 x 360 mm ① and then screw in and tighten the 3 cover screws ③.
3. Check that the canopy half ② is flush with the intermediate ceiling / prefabricated ceiling:

- If required, readjust the 6 threaded bolts M10 x 360 mm ① as described in Chapter 14.1.1 on page 67.

4. Place the sectional strip (not illustrated in the Figure) onto the second canopy half ④ and push it into the first canopy half ① in such a way that they engage tightly with each other.
5. Place the second canopy half ④ onto the threaded bolts M10 x 360 mm ① and then screw in and tighten the 3 cover screws ③.
6. Check that the canopy halves ② / ④ are securely in place:

- The canopy halves ② / ④ must engage tightly with each other.
- The canopy must be fully flush with the intermediate ceiling / prefabricated ceiling.
- The 6 cover screws ③ must be tightened.

Figure 48: Preparing the installation of the canopy

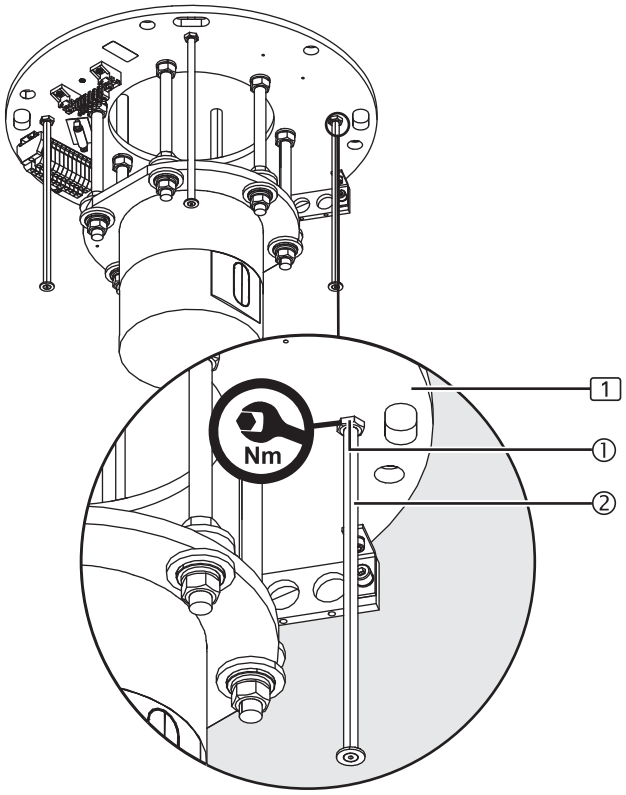
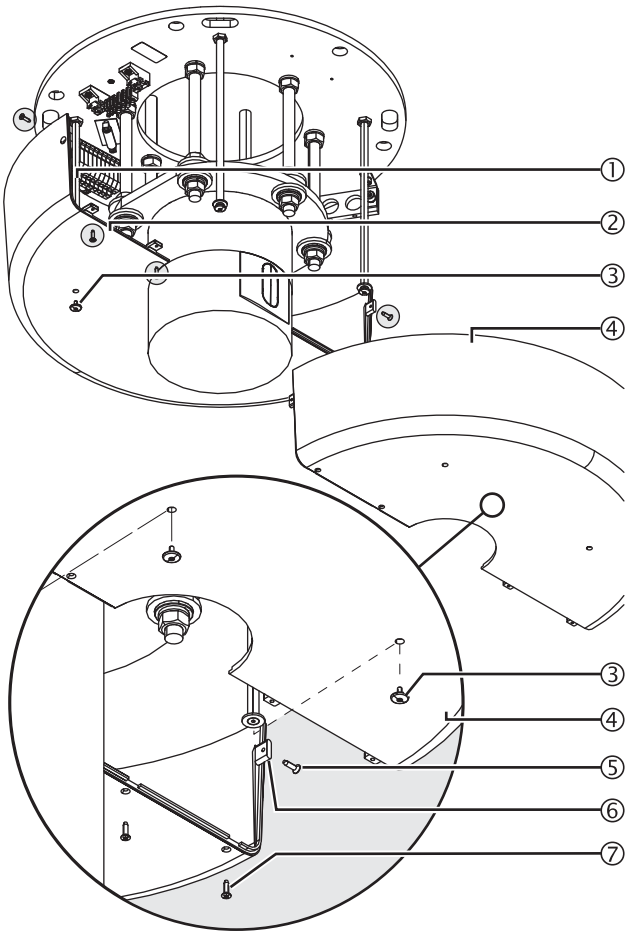


Figure 49: Mounting the canopy halves



14.2 Mounting the Single canopy (Navigator ™ only)

14.2.1 Preparing the installation of the canopy

(See "Figure 48")

The Figure shows a simplified illustration of the interface plate without cables and without the extension arm.

1. Screw the hexagonal nuts M10 ① onto the threaded bolts M10 x 360 mm ②.
2. Screw the threaded bolts M10 x 360 mm ② into the interface plate [1] in such a way that the canopy halves mounted afterwards are flush with the intermediate ceiling / prefabricated ceiling (see "Figure 20: on page 36"):

• If an interface plate [1] is mounted to the raw ceiling, the threaded bolts M10 x 360 mm ② must be cut to length accordingly.

⚠ WARNING

Risk of the canopy dropping

The canopy can drop if the fixing elements have not been properly tightened:

• Tighten the 4 hexagonal nuts M10 ① to 46 Nm.

3. Check that the threaded bolts M10 x 360 mm ② are securely in place:

• The threaded bolts M10 x 360 mm ② must be mounted at the same distance to the interface plate [1].
• The 4 hexagonal nuts M10 ① must be tightened to 46 Nm.

14.2.2 Mounting the canopy halves

(See "Figure 49")

The Figure shows a simplified illustration of the interface plate without cables and without the extension arm.

1. Place the sectional strip (not illustrated in the Figure) onto the first canopy half ② (the canopy can be optionally sealed with silicone).
2. Place the first canopy half ② onto the threaded bolts M10 x 360 mm ① and then screw in and tighten the 2 cover screws ③.
3. Check that the canopy half ② is flush with the intermediate ceiling / prefabricated ceiling:

• If required, readjust the 4 threaded bolts M10 x 360 mm as described in Chapter 14.2.1 on page 68.

4. Place the sectional strip (not illustrated in the Figure) onto the second canopy half ④ and push it into the first canopy half ② in such a way that they engage tightly with each other.
5. Place the second canopy half ④ onto the threaded bolts M10 x 360 mm ① and then screw in and tighten the 2 cover screws ③.
6. Screw 1 sheet metal screw ⑤ each into the 2 straps ⑥ on the opposite outer faces of the canopy halves ②/④.
7. Screw in and tighten 4 sheet metal screws each ⑦ to the bottom ends of the canopy halves ②/④.
8. Check that the canopy halves ① are securely in place:

• The canopy halves ②/④ must engage tightly with each other.
• The canopy must be fully flush with the intermediate ceiling / prefabricated ceiling.
• All fixing screws ③/⑤/⑦ must be tightened.

Figure 50: Mounting the coper caps

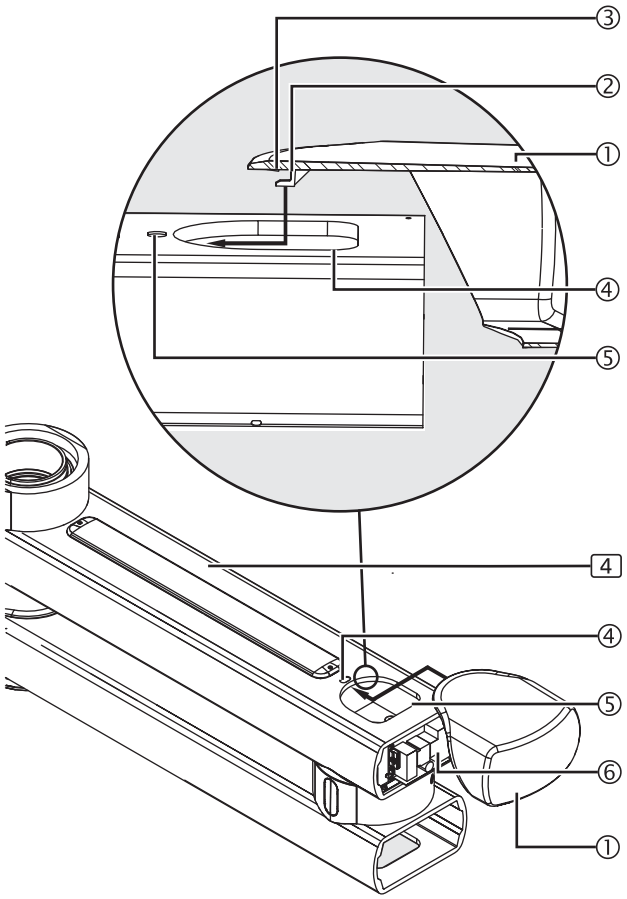
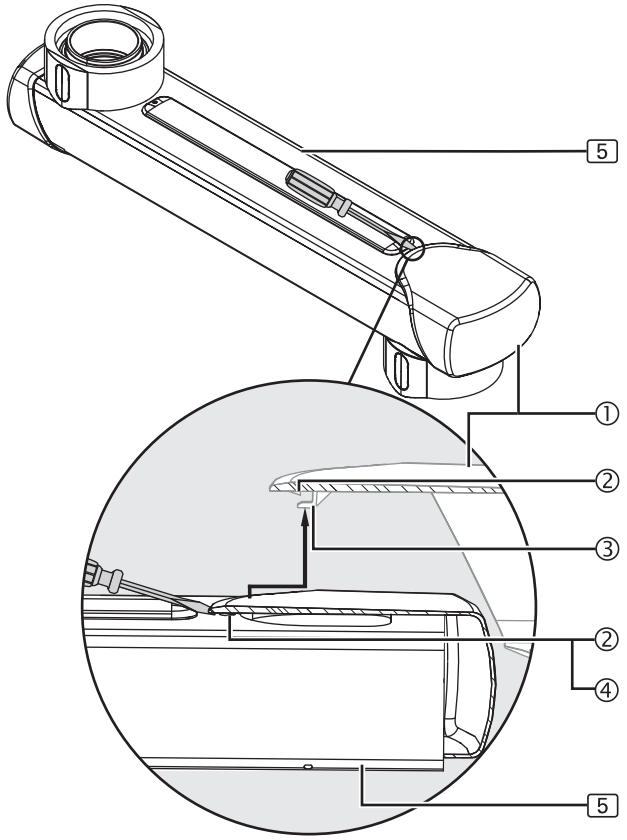


Figure 51: Dismantling the coper caps



14.3 Mounting/dismantling the cover caps to/from the extension arm

14.3.1 Mounting the coper caps

(See "Figure 50")

The Figure shows the Navigator™ version. The installation steps required for the Navigator ™ – Inverted, Navigator ™ XL and Navigator ™ XXL versions are identical.

The Figure shows a simplified illustration of the extension arms without cables. The detailed representation shows a sectional view of the cover cap ①.

1. When placing the cover cap ① onto the extension arm end, make sure that the holding down clamp ② sits in the aperture ④.
2. Push the cover cap ① onto the extension arm [4], [5] as far as it will go and make sure that the latch ③ snaps into place in the groove ⑤:

- Make sure that the power pack ⑥ and the cables in the extension arm [4], [5] are not damaged.
- If properly mounted, the cover cap ① can no longer be withdrawn from the extension arm [4], [5].

3. Check that the cover cap ① is securely in place:

- The cover cap ① muss be absolutely level with the contours of the extension arm [4], [5].

14.3.2 Dismantling the coper caps

(See "Figure 51")

The Figure shows the Navigator™ version. The installation steps required for the Navigator ™ – Inverted, Navigator ™ XL and Navigator ™ XXL versions are identical.

The Figure shows a simplified illustration of the extension arms without cables. The detailed representation shows a sectional view of the cover cap ①.

1. To dismantle the cover cap ① push a small, flat screwdriver between the cover cap ① and the extension arm [4], [5] and gently push the latch ② out of the groove ④:

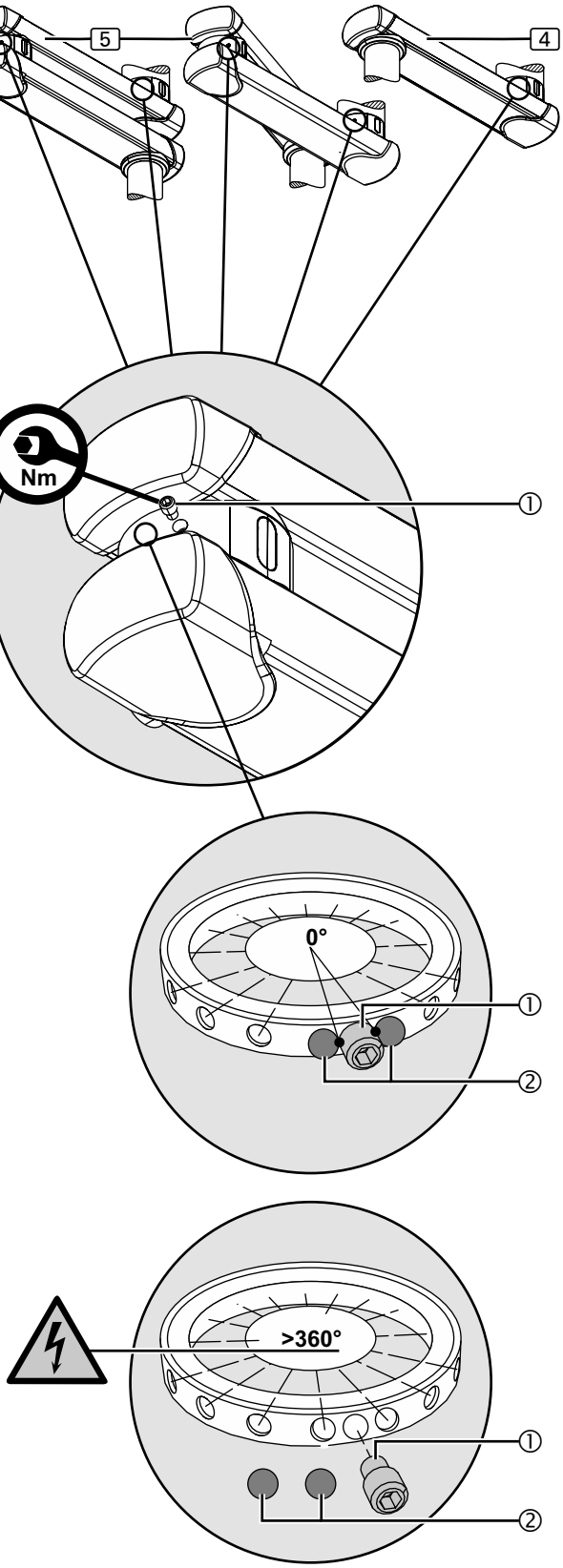
- Make sure you do not damage the latch ②.
- Make sure that the cover cap ① neither breaks nor bends.

2. Pull the cover cap ① backwards until the holding down clamp ③ no longer engages and the cover cap ① can be freely moved:

- Do not twist the cover cap ① and do remove it with force.

3. Remove the cover cap ① towards the top and keep it in a safe place.

Figure 52: Condition of the swivel stop on the extension arm supplied



15.1 Condition of the swivel stop on the extension arm supplied

15.1.1 Extension arm with pre-assembled swivel stop

(See "Figure 52")

The system is supplied by default with the 2 ball stops ② and the setscrew ① pre-assembled.
The swivel range of the extension arm [4], [5] is thus restricted to 0 degrees. This ensures that the extension arm cannot be rotated and no internal supply cables can tear off.

To adjust the swivel stops

- Dismantle the swivel stops as described in Chapter 15.2.4 on page 73.

15.1.2 Extension arm without pre-assembled swivel stop

(See "Figure 52")

In exceptional cases the 2 ball stops ② and the setscrew ① are delivered as separate components, which means that the extension arm [4], [5] can be rotated infinitely beyond 360 degrees.

⚠WARNING

Electric shock hazard

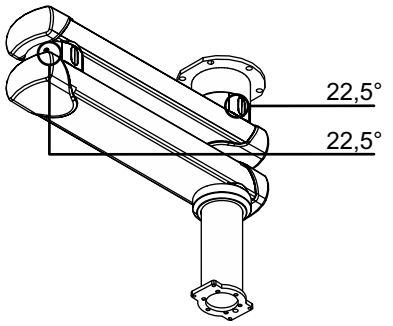
At least 1 ball stop must be mounted in order to prevent the internal supply cables twisting off. This individual ball stop serves as twist protection:

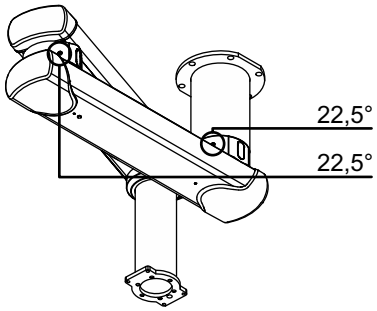
- If no swivel stops have been pre-assembled, the extension arm must not be rotated before the swivel stops have been mounted.
- Mount at least 1 ball stop as described in Chapter 15.2.3 on page 72 in order to restrict the angle of rotation of the extension arms to 340 degrees.

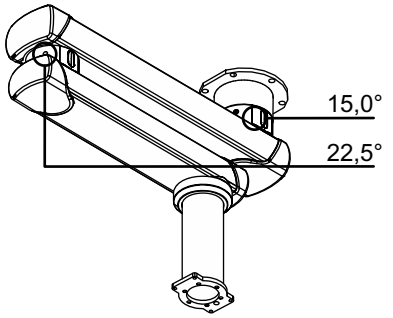
To adjust the swivel stops

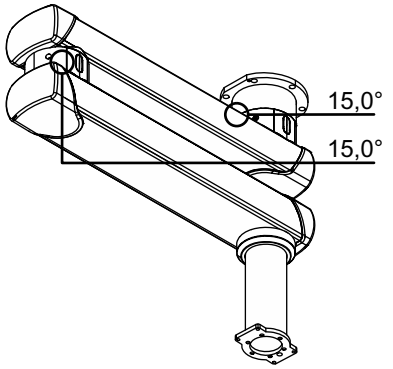
- Mount the swivel stops as described in Chapter 15.2 on page 71.

Figure 53: Adjusting the swivel stop on the Navigator ™ extension arm
(from top to bottom: Navigator ™ / Navigator ™ – Inverted / Navigator ™ XL / Navigator ™ XXL)









15.2 Adjusting the swivel stop on the extension arm

(See "Figure 53")

The swivel stops must be adjusted during installation independently of the system and application. At least 1 swivel stop must be mounted in order to prevent the supply cables being damaged or torn off. The swivel stops must be adapted to the specific characteristics of the room during installation.

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 restricted further.
For the version Navigator ™ – Inverted 2 ball stops must always be mounted between the extension arms in order to prevent the extension arms hitting each other.

⚠WARNING

Electric shock hazard

In order to prevent the internal supply cables twisting off, at least 1 ball stop must be mounted. This individual ball stop serves as twist protection:

- In order to restrict the angle of rotation of the extension arms to 340 degrees, at least 1 ball stop must be mounted as described in Chapter 15.2.3 on page 72.

15.2.1 Versions

(See "Figure 53")

The swivel ranges of the different versions vary:

- Navigator ™ on the upper and lower extension arms in graduations of 22.5 degrees.
  – Use 1 setscrew M16 – DIN EN ISO 4028 and 2 ball stops Ø 12.7 mm for each extension arm.

- Navigator ™ – Inverted on the upper and lower extension arms in graduations of 22.5 degrees.
  – Use 1 setscrew M16 – DIN EN ISO 4028 and 2 ball stops Ø 12.7 mm for each extension arm.

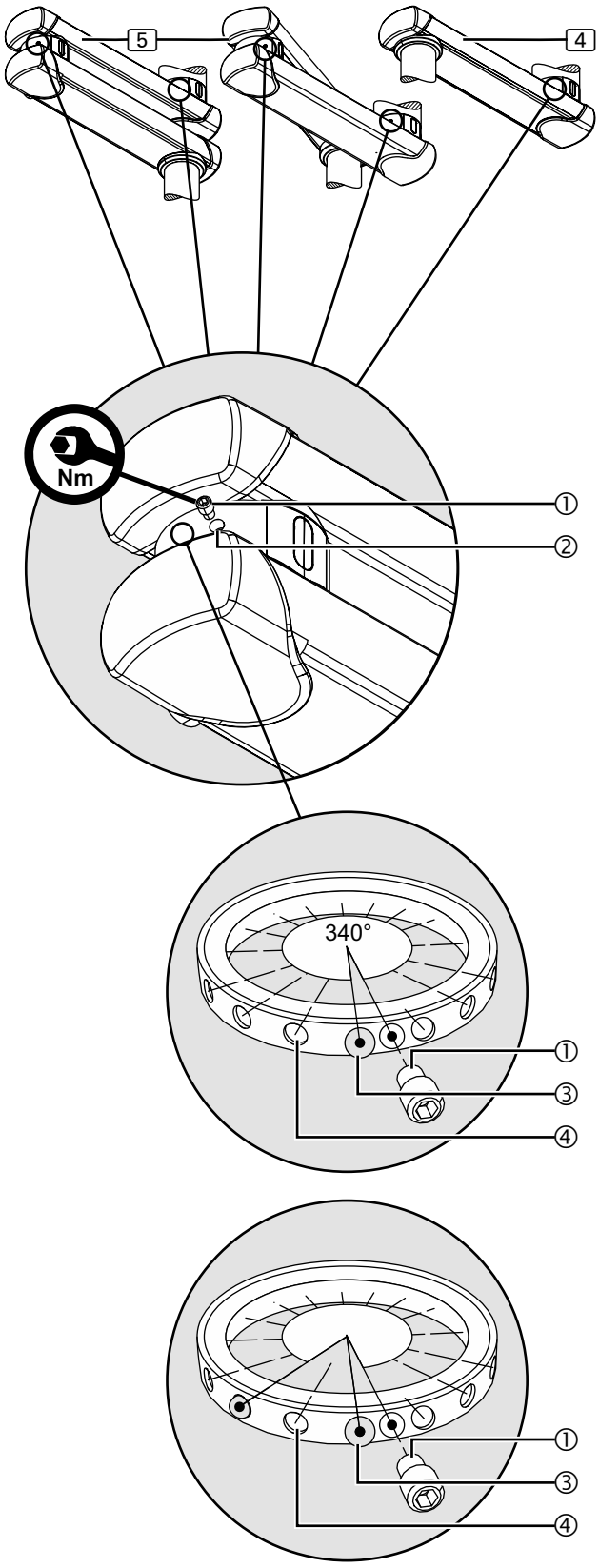
- Navigator ™ XL on the upper extension arm in graduations of 15.0 degrees and on the lower extension arm in graduations of 22.5 degrees.
  – Use 1 setscrew M20 – DIN EN ISO 4028 and 2 ball stops Ø 16 mm for the upper extension arm.
  – Use 1 setscrew M16 – DIN EN ISO 4028 and 2 ball stops Ø 12.7 mm for the lower extension arm.

- Navigator ™ XXL on the upper and lower extension arms in graduations of 15.0 degrees.
  – Use 1 setscrew M20 – DIN EN ISO 4028 and 2 ball stops Ø 16 mm for each extension arm.

15.2.2 Tool to be used

A magnetic pin or a similar tool is required in order to offset the ball stop. The telescopic magnet pick-up tool set is available from Nuvo as an option.

Figure 54: Mounting the swivel stop



15.2.3 Mounting the swivel stop

(See "Figure 54")

1. The assignment and size of the setscrew ① and the ball point ③ for the different versions of the pendant system are described in Chapter 15.2.1, “Versions”, on page 71 .

2. Rotate the extension arm [4], [5] towards the desired end stop position and then insert 1 ball stop ③ into the threaded hole ②.

NOTE – Make sure that the ball stop is securely in place

If the ball stop ③ has correctly snapped into place in one of the mounting fixtures ④ , the extension arm [4], [5] can be rotated; otherwise, it is blocked and the ball stop ③ must be pushed into one of the mounting fixtures ④ using a screwdriver whilst gently rotating the extension arm [4], [5].

⚠WARNING

Risk of contamination

Version Navigator ™ – Inverted: If the 2 ball stops are not mounted between the extension arms, the extension arms can hit each whilst rotating and chips of finish can flake off and can get into open wounds:

- For the Navigator ™ – Inverted make sure you always mount 2 ball stops between the extension arms in order to prevent the extension arms hitting each other.

3. Rotate the extension arm [4], [5] towards the desired end stop position and then insert 1 additional ball stop ③ into the threaded hole ②.
4. Slightly rotate the extension arm [4], [5] and screw the setscrew ① into the threaded hole ② as far as it will go:

- The setscrew ① now serves as an end stop for the ball stop ③ mounted and restricts the swivel range of the extension arm [4], [5].

⚠WARNING

Risk of internal supply cables twisting off

The swivel stop can fail if the fixing elements have not been properly tightened, and the supply cables can twist off.

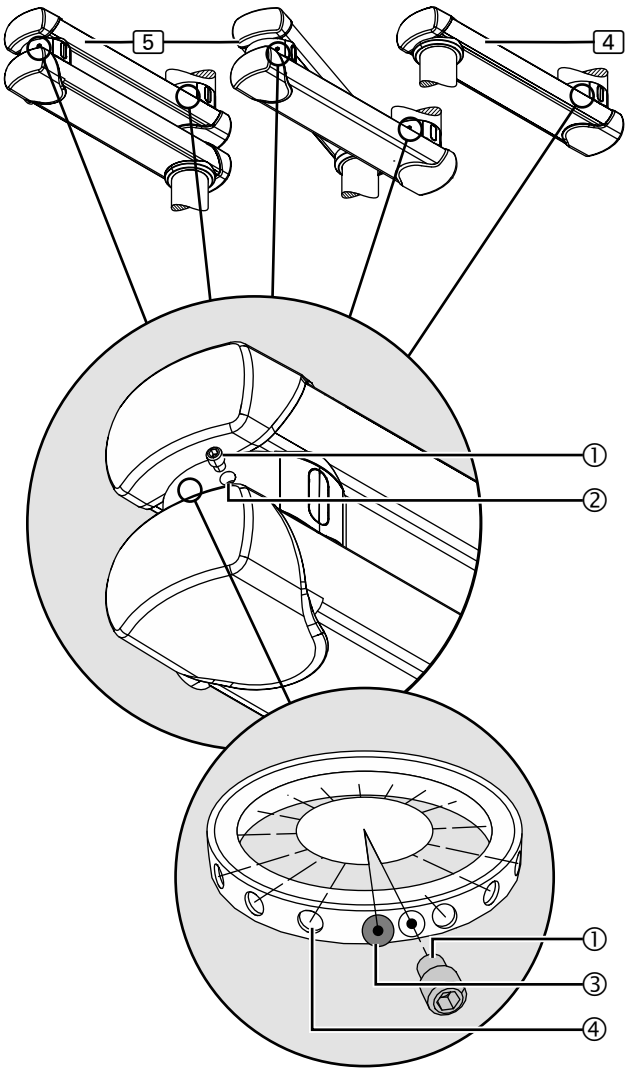
- Tighten the setscrew M16 – DIN EN ISO 4028 ① or setscrew M20 – DIN EN ISO 4028 to 40 Nm.

5. Tighten the setscrew ① to the prescribed tightening torque.
6. To check that the swivel stop functions securely:

- The swivel range of the extension arm [4], [5] must be restricted to less than 360 degrees.
- For the version Navigator ™ – Inverted 2 ball stops must always be mounted between the extension arms in order to prevent the extension arms hitting each other.

7. To change a ball stop ③ mounted, refer to Chapter 15.2.4, “Dismantling the swivel stop”, on page 73.

Figure 55: Dismantling the swivel stop



15.2.4 Dismantling the swivel stop

(See "Figure 55")

1. The assignment and size of the setscrew ① and the ball stop ③ for the different pendant system versions is described in Chapter 15.2.1, “Versions”, on page 71.

2. Unscrew a setscrew ① from the threaded hole ②.
3. Rotate the extension arm [4], [5] until the ball stop ③ in the threaded hole ② is visible.
4. Using a telescopic magnet pick-up tool, remove the ball stop ③ from the threaded hole ② and keep it in a safe place.

⚠ WARNING

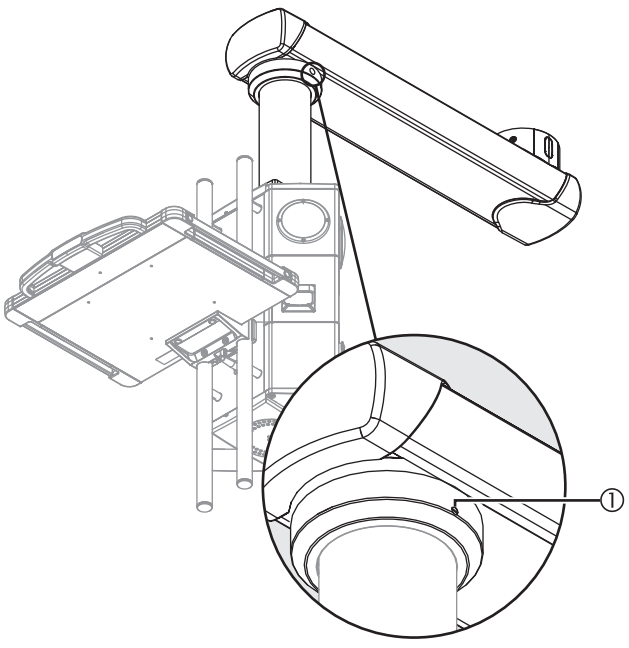
Electric shock hazard

In order to prevent the internal supply cables twisting off, at least 1 ball stop must be mounted. This ball stop serves as twist protection:

- Mount the swivel stop directly afterwards.
- In order to restrict the angle of rotation of the extension arm [4], [5] to 340 degrees, at least 1 ball stop ④ must be mounted.

5. Mount the swivel stop as described in Chapter 15.2.3 on page 72.

Figure 56: Adjusting the mechanical brake for the Navigator M6



15.3 Adjusting the mechanical brake for the Navigator M6

(See "Figure 56")

The brake screw (friction brake) is adjusted in the same way for all the different versions.

Adjusting the brake force
Adjust the brake force of the Navigator M6 (with the appliance placed on the shelf) in such a way that the Navigator M6 remains stable in any position and can still be conveniently adjusted.

To increase the brake force

- Screw the slotted brake screw ① by uniformly rotating it to the right (clockwise).

To reduce the brake force

- Unscrew the brake screw ① by uniformly rotating it to the left (anticlockwise).

Initial commissioning

1. The pendant system must be installed. Instructions for installation are included in the scope of delivery of the product.
2. For start-up following installation, proper initial commissioning must be carried out for the entire pendant system and the Navigator M6.

Functional test

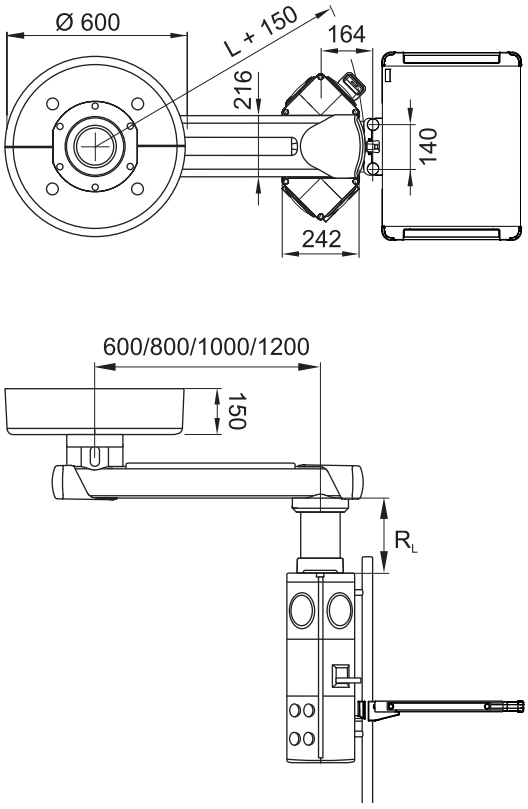
Prior to using the pendant system and the Navigator M6 on a patient for the first time, a functional test must take place at the installation site. This functional test must be carried out by the operator or a person authorised by the operator, and the persons authorised by the operator must be duly instructed.
This requirement is considered fulfilled if:

1. The functional reliability of the pendant system and the Navigator M6 is ensured.
2. The maximum permissible loading capacity (payload) has been safely determined and is indicated on a label attached to the Navigator M6.
3. The proper functioning of the appliance has been approved by the operator during initial commissioning and documented by signing a test report in accordance with Appendix G DIN EN 62353.

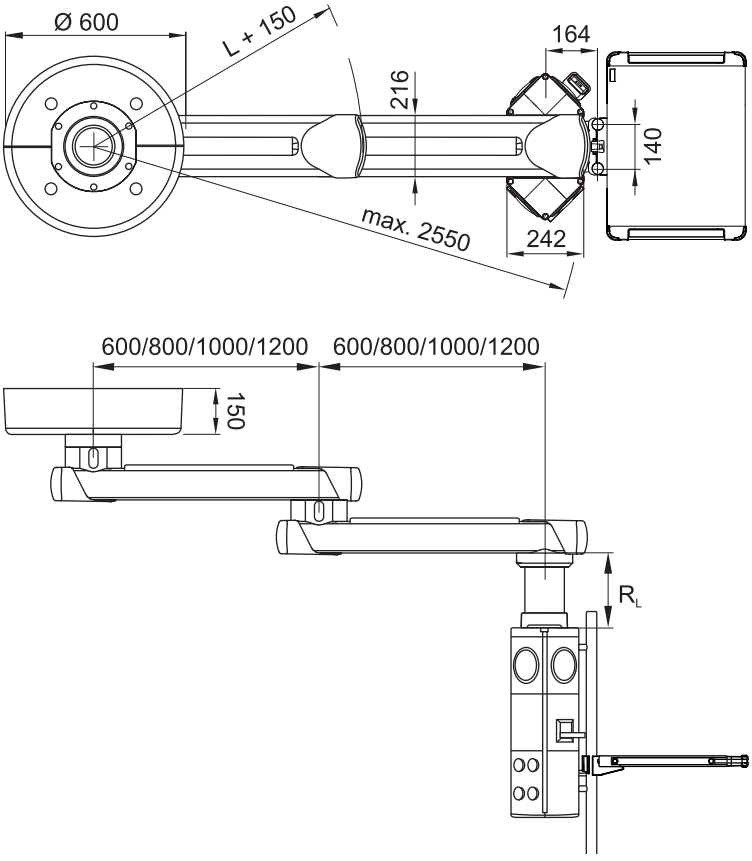
The following points must be observed during handover to the operator:

1. The pendant system and the Navigator M6 must not be handed over to the operator until they have been tested.
2. Handover must be documented in writing including confirmation by the operator.
3. On handover, the operator must be instructed in the functioning and effect of the maximum loading capacity (payload).
4. In addition, the operator must be instructed in the functioning, operation, cleaning and disinfection of the pendant system and the Navigator M6 during the handover procedure.
5. Furthermore, on handover, the operator must be instructed in the adjustments permitted according to the Operating Instructions included in the scope of delivery.
6. On completion of the instruction, an instruction certificate must be created and signed in order to document that the operator/user has understood the special operator control actions required for normal use.

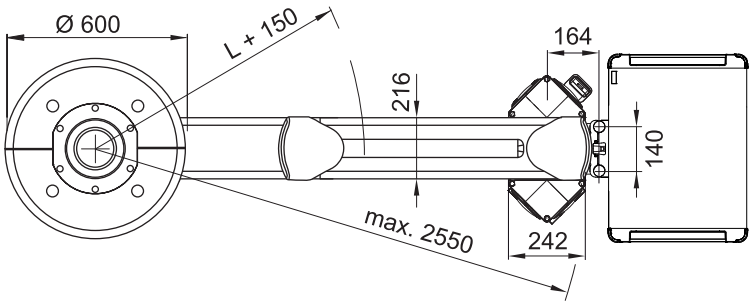
17.1 Navigator ™ – Single-arm variant

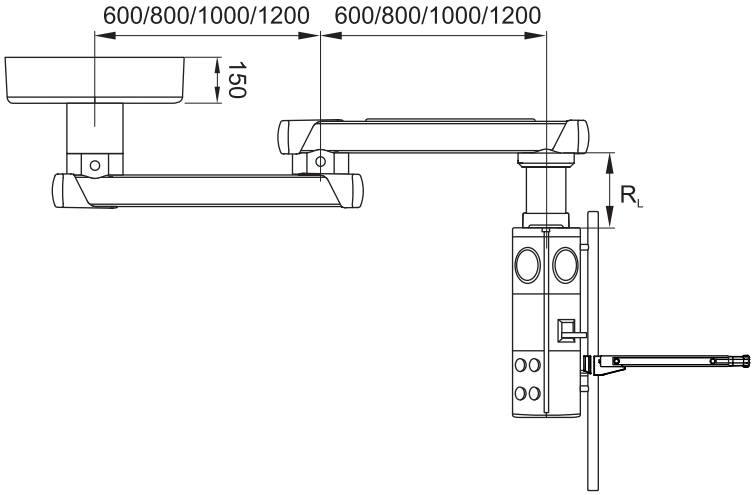


17.2 Navigator ™ – Dual-arm variant

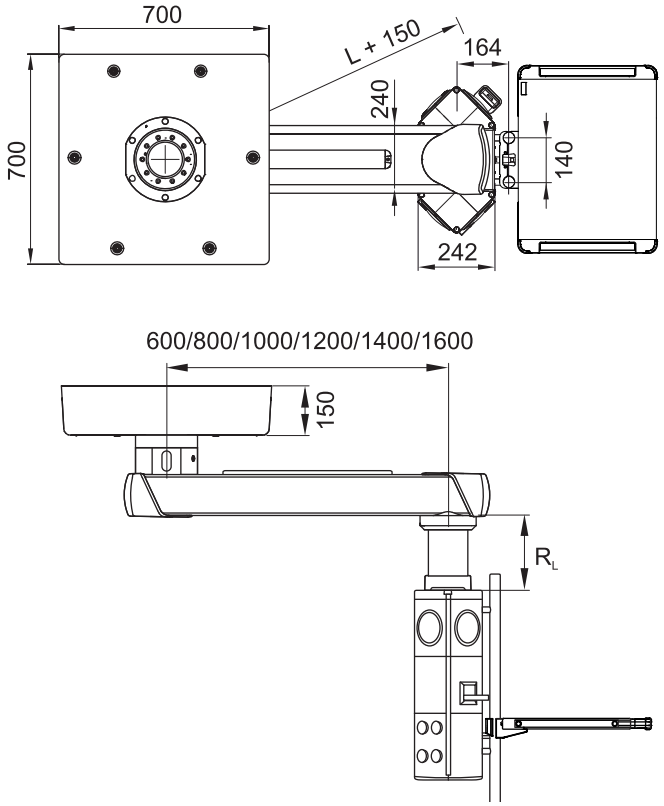


17.3 Navigator™ – Inverted – Dual-arm variant

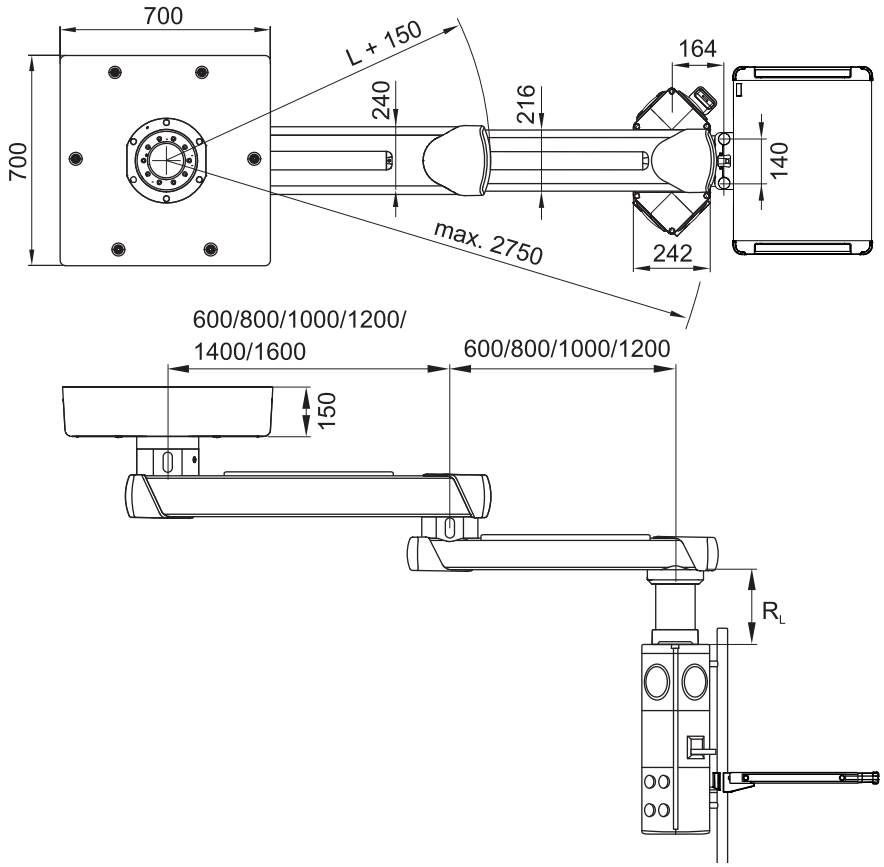




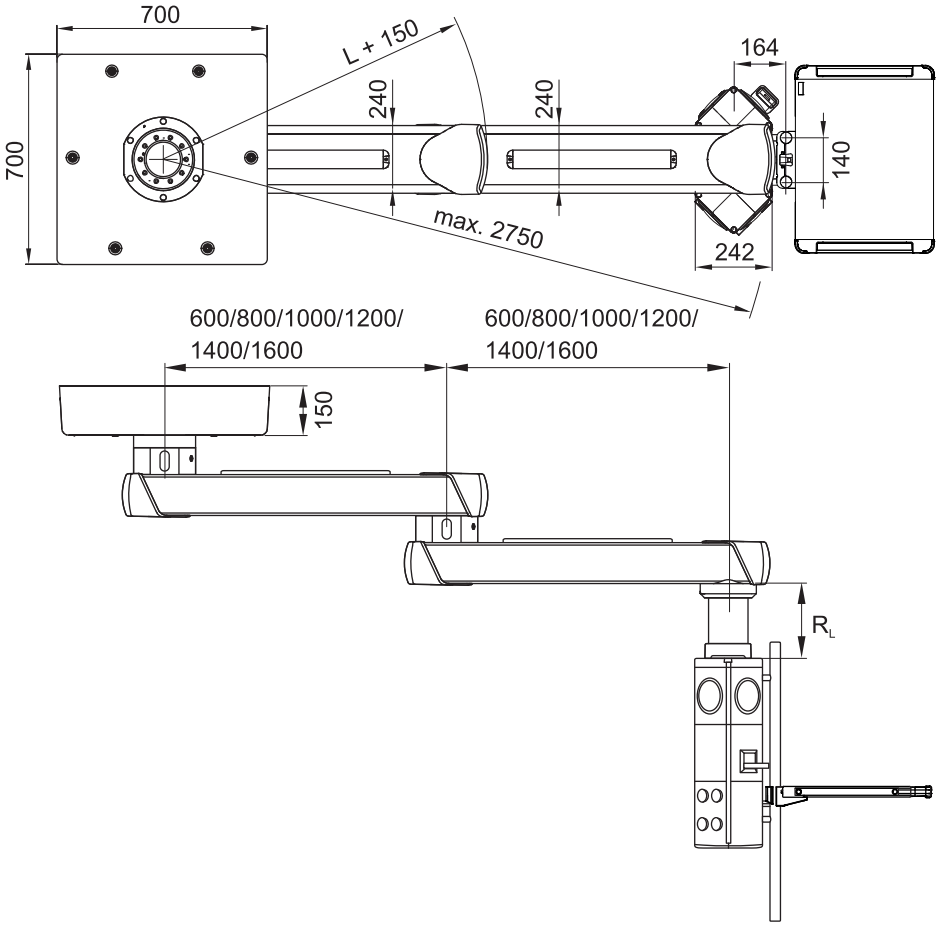
17.4 Navigator ™ XL – Single-arm variant



17.5 Navigator ™ XL – Dual-arm variant



17.6 Navigator™ XXL – Dual-arm variant



Modes of operation

- The Navigator ™ pendant system is suitable for continuous operation.

Duty cycle of the electromagnetic brakes

- The maximum duty cycle of the electromagnetic brakes must not exceed 1 minute.
- If the electromagnetic brakes are actuated over a longer period of time, the power pack can switch off automatically as a protection measure against overheating.
- Once the power pack has switched off, it must cool down for 10 minutes and then be disconnected from the mains for 10 seconds before being switched back on again. Normal system operation can only be resumed afterwards.

Rating plate

- The rating plate is attached to the upper extension arm (see Chapter 2.8 on page 19).

Dead weight of the Navigator ™ * pendant system

Single-arm variant

Extension arm 600 mm	26.0 kg
Extension arm 800 mm	29.0 kg
Extension arm 1000 mm	32.0 kg
Extension arm 1200 mm	35.0 kg

Dual-arm variant

Extension arm 600/600 mm	50.0 kg
Extension arm 600/800 mm or 800/600 mm	53.0 kg
Extension arm 800/800 mm	56.0 kg
Extension arm 1000/600 mm or 600/1000 mm	56.0 kg
Extension arm 1000/800 mm or 800/1000 mm	59.0 kg
Extension arm 1000/1000 mm	62.0 kg
Extension arm 1200/600 mm or 600/1200 mm	59.0 kg
Extension arm 1200/800 mm or 800/1200 mm	62.0 kg
Extension arm 1200/1000 mm or 1000/1200 mm	65.0 kg
Extension arm 1200/1200 mm	68.0 kg

* Without gas hoses and supply cables inserted, without ceiling or Drop tube and without optional accessories.

Dead weight of the Navigator ™ – Inverted* pendant system

Dual-arm variant

Extension arm 600/600 mm	50.0 kg
Extension arm 600/800 mm or 800/600 mm	53.0 kg
Extension arm 800/800 mm	56.0 kg
Extension arm 1000/600 mm or 600/1000 mm	56.0 kg
Extension arm 1000/800 mm or 800/1000 mm	59.0 kg
Extension arm 1000/1000 mm	62.0 kg
Extension arm 1200/600 mm or 600/1200 mm	59.0 kg
Extension arm 1200/800 mm or 800/1200 mm	62.0 kg
Extension arm 1200/1000 mm or 1000/1200 mm	65.0 kg
Extension arm 1200/1200 mm	68.0 kg

* Without gas hoses and supply cables inserted, without ceiling or Drop tube and without optional accessories.

Dead weight of the Navigator ™ XL* pendant system

Single-arm variant

Extension arm 600mm	40.1kg
Extension arm 800mm	45.1kg
Extension arm 1000mm	50.1kg
Extension arm 1200mm	55.1kg
Extension arm 1400mm	60.1kg
Extension arm 1600mm	65.1kg

Dual-arm variant

Extension arm 600/600mm	64.4kg
Extension arm 600/800mm	67.4kg
Extension arm 600/1000mm	70.5kg
Extension arm 600/1200mm	73.5kg
Extension arm 800/600mm	69.4kg
Extension arm 800/800mm	72.4kg
Extension arm 800/1000mm	75.5kg
Extension arm 800/1200mm	78.5kg
Extension arm 1000/600mm	74.4kg
Extension arm 1000/800mm	77.4kg
Extension arm 1000/1000mm	80.5kg
Extension arm 1000/1200mm	83.5kg
Extension arm 1200/600mm	79.4kg
Extension arm 1200/800mm	82.4kg
Extension arm 1200/1000mm	85.5kg
Extension arm 1200/1200mm	88.5kg
Extension arm 1400/600mm	84.4kg
Extension arm 1400/800mm	87.4kg
Extension arm 1400/1000mm	90.5kg
Extension arm 1400/1200mm	93.5kg
Extension arm 1600/600mm	89.4kg
Extension arm 1600/800mm	92.4kg
Extension arm 1600/1000mm	95.5kg

* Without gas hoses and supply cables inserted, without ceiling or Drop tube and without optional accessories.

Dead weight of the Navigator ™ XXL* pendant system

Dual-arm variant

Extension arm 600/600mm	80.2kg
Extension arm 600/800mm or 800/600mm	85.2kg
Extension arm 600/1000mm or 1000/600mm	90.2kg
Extension arm 600/1200mm or 1200/600mm	95.2kg
Extension arm 1400/600mm	100.2kg
Extension arm 1600/600mm	105.2kg
Extension arm 800/800mm	90.2kg
Extension arm 800/1000mm or 1000/800mm	95.2kg
Extension arm 800/1200mm or 1200/800mm	100.2kg
Extension arm 800/1400mm or 1400/800mm	105.2kg
Extension arm 1600/800mm	110.2kg
Extension arm 1000/1000mm	100.2kg
Extension arm 1000/1200mm or 1200/1000mm	105.2kg
Extension arm 1000/1400mm or 1400/1000mm	110.2kg
Extension arm 1000/1600mm or 1600/1000mm	115.2kg
Extension arm 1200/1200mm	110.2kg
Extension arm 1200/1400mm or 1400/1200mm	115.2kg

* Without gas hoses and supply cables inserted, without ceiling or Drop tube and without optional accessories.

Dead weight of the ceiling tube Navigator ™ and Navigator ™ – Inverted pendant system	Flange ..... 6.0 kg Steel tube ..... 24 kg/m
Dead weight of the ceiling tube of the Navigator ™ XL and Navigator ™ XXL pendant system	Flange ..... 7.5 kg Steel tube ..... 31.7 kg/m
Dead weight of the Drop tube	Bearing unit ..... 5 kg Drop tube ..... 8 kg/m
Maximum permissible load bearing capacity of the pendant system	The pendant system is suitable and approved for the maximum load bearing capacity specified in Chapter 5 on page 24. If you cannot clearly determine the maximum load bearing capacity as specified in Chapter 5 on page 24, contact Nuvo in order to prevent damage to persons or property.
Electrical data	Rated voltage ..... AC 100-240 V Rated frequency ..... 60 / 50 Hz Rated frequency ..... up to 220 W Indirect extension arm lighting ..... DC 12 V 2 / 4 lighting boards (supply voltage 12 V DC, 2 lighting boards each connected in series to 24 V DC)
Noise level	Sound energy level ..... 65 db(A) (EN ISO 3746) not exceeded
Brake torque	Brake torque with the electromagnetic brake actuated Navigator ™ ..... approx. 70 Nm Navigator ™ – Inverted ..... approx. 70 Nm Navigator ™ XL ..... approx. 150 Nm / 70 Nm Navigator ™ XXL ..... approx. 150 Nm
Manual forces	Dynamic torque with the electromagnetic brake released Depending on the position and payload ..... 3.5 to 40 Nm
Protection class / type	Protection class in accordance with IEC 60601-1 ..... I IP classification in accordance with IEC 60529 ..... IP 20
Medical Device Directive 93/42/EEC	Classification I
Applicable standards, laws and directives	• Medical Devices Act (MPG) • 93/42 EEC (Medical Device Directive) • IEC 60601-1 – Medical Electrical Equipment – Part 1: General Requirements for Basic Safety and Essential Performance
Approvals of the standard equipment	• Recognised NRTL component.

Approved adaptions

The following products are approved as adaptions to the pendant system:

- Chapter 20, “Approved Nuvo Products”, on page 88
- Chapter 21, “Optional Accessories”, on page 88

– The components are adapted to each other and safe to operate. Any other type of installation, and in particular the use of components from third-party manufacturers, is strictly prohibited because these components can be potential sources of danger.
– The combination of any other Nuvo product with the pendant system must be approved by Nuvo Surgical. If applicable, the conformity assessment must be repeated.

Read the Installation Instructions for combined medical products

- The pendant system can be equipped with adaptions and end devices of third-party manufacturers. To prevent dangerous overload, which can damage or lead to a collapse of the pendant system, the maximum load bearing capacity specified in Chapter 18, “Technical Data”, on page 79 must be adhered to:

– The party placing the appliance into operation is responsible for the validation of the overall system. A conformity assessment procedure shall be executed if required and a declaration in accordance with Article 12 of 93/42/EEC (Medical Device Directive, MDD) shall be provided.
– Read the Operating Instructions provided by the third-party manufacturer and in particular the relevant pages with information on the operation of the end device.

19.1 Guidelines and manufacturer's declarations

19.1.1 Electromagnetic emissions

The Navigator ™ is intended for use in the ELECTROMAGNETIC ENVIRONMENT specified below. The customer or the user of the Navigator ™ must ensure that it is used in such an environment.

Emission tests	Compliance	ELECTROMAGNETIC ENVIRONMENT – Guideline
RF emissions in accordance with CISPR 11	Group 1	The Navigator ™ uses RF energy only for its internal FUNCTIONING. Therefore, its RF emissions are very low and are not likely to cause any interference with electronic equipment nearby.
RF emissions in accordance with CISPR 11	Class A	The Navigator ™ is suitable for operation in professional healthcare facilities.
Harmonic emissions in accordance with IEC 61000-3-2	Class A	
Voltage fluctuations/flicker emissions in accordance with IEC 61000-3-3	Complies	

19.1.2 Electromagnetic immunity

The Navigator ™ is intended for use in the ELECTROMAGNETIC environment specified below. The customer or the user of the Navigator ™ should ensure that it is used in such an environment.

Interference immunity test	Test level in accordance with IEC 60601	Test result
Electrostatic discharge in accordance with IEC 61000-4-2	±8kV contact ±2kV, ±4kV, ±8kV, ±15kV air	passed
Electrical fast transients / bursts in accordance with IEC 61000-4-4	±2kV 100kHz repetition rate	passed
Surges Line-to-line in accordance with IEC 61000-4-5	±0.5kV, ±1kV	passed
Surges Line-to-earth in accordance with IEC 61000-4-5	±0.5kV, ±1kV, ±2kV	passed
Voltage dips in accordance with IEC 61000-4-11	0% U_T; 1/2 period at 0, 45, 90, 135, 180, 225, 270 and 315 degrees	passed
	0% U_T; 1 period and 70% U_T; 25/30 periods Single phase: at 0 degrees	passed
Voltage interruptions in accordance with IEC 61000-4-11	0% U_T; 250/300 periods	passed
Power frequency magnetic field immunity in accordance with IEC 61000-4-8	30A/m 50Hz or 60Hz	passed

Please note:
U_T is the a.c. mains voltage prior to application of the test level.

Cont.

The Navigator ™ is intended for use in the ELECTROMAGNETIC environment specified below. The customer or the user of the Navigator ™ should ensure that it is used in such an environment.

Interference immunity test	Test level in accordance with IEC 60601	Compliance level
Immunity to conducted disturbances, induced by radiofrequency fields IEC 61000-4-6	3V 0.15MHz to 80MHz 6V in ISM frequency bands from 0.15MHz to 80MHz 80% AM at 1kHz	passed
High-frequency electromagnetic fields in accordance with IEC 61000-4-3	3V/m 80MHz to 2.7GHz 80% AM at 1kHz	passed

NOTE 1
At 80 MHz and 800 MHz, the higher value applies.

NOTE 2
These guidelines may not apply in all cases. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

[a] The field strength of stationary transmitters, including the base stations of mobile phones and mobile land mobile radios, amateur radio stations, AM and FM radio and TV broadcasting transmitters, cannot be precisely predetermined theoretically. To assess the electromagnetic environment due to stationary RF transmitters, an electromagnetic site survey should be considered. If the field strength measured in the location in which the Navigator ™ is used exceeds the applicable RF compliance level above, the Navigator ™ should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the Navigator ™ .

[b] Field strengths over the 150 kHz to 80 MHz frequency range should be less than 3 V/m.

19.1.3 Test specifications

Test specifications for the INTERFERENCE IMMUNITY of ENCLOSURES against high-frequency wireless communication facilities

Test frequency MHz	Frequency band [a] MHz	Radio service [a]	Modulation [b]	Maximum power W	Distance m	IMMUNITY TEST LEVEL V/m
385	380 to 390	TETRA 400	Pulse modulation [b] 18 Hz	1.8	0.3	27
450	430 to 470	GMRS 460, FRS 460	FM [c] ± 5 kHz stroke 1 kHz sine	2	0.3	28
710	704 to 787	LTE Band 13, 17	Pulse modulation [b] 217 Hz	0.2	0.3	9
745						
780						
810	800 to 960	GSM 800/900, TETRA 800, iDEN 820, CDMA 850, LTE Band 5	Pulse modulation [b] 18 Hz	2	0.3	28
870						
930						
1720	1700 to 1998	GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS	Pulse modulation [b] 217 Hz	2	0.3	28
1845						
1970						
2450	2400 to 2570	Bluetooth, WLAN 802.11 b/g/n, RFID 2450, LTE Band 7	Pulse modulation [b] 217 Hz	2	0.3	28
5240	5100 to 5800	WLAN 802.11 a/n	Pulse modulation [b] 217 Hz	0.2	0.3	9
5500						
5785						

NOTE
To reach the IMMUNITY TEST LEVELS, the distance between the transmitting antenna and the ME DEVICE or ME SYSTEM can be reduced to 1 m if required. The 1 m test distance is permitted in accordance with IEC 61000-4-3.

[a] For certain radio services only the frequencies for the radio connection from the mobile communication device to the base station ("up-link") are indicated in the table.
[b] The carrier must be modulated with a square wave signal with a 50 % duty cycle.
[c] As an alternative to frequency modulation (FM), pulse modulation with a 50 % duty cycle at 18 Hz can be used because pulse modulation would also represent the worst case (but not the actual modulation).

⚠WARNING

Do not operate this device immediately next to or together with other devices stacked on top of each other because this could result in improper operation. If operation in the described manner is unavoidable, this device and all other devices should be monitored in order to ensure proper operation."

⚠WARNING

The use of other ACCESSORIES, other converters and other cables than those prescribed or provided by the MANUFACTURER of this device can lead to increased ELECTROMAGNETIC INTERFERENCE EMISSIONS or reduced electromagnetic immunity of the device, and thus improper operation.

⚠WARNING

PORTABLE RF communication devices (radio equipment, including ACCESSORIES such as antenna cables and external antennas) should not be used at a distance of less than 30cm (12inches) from the Navigator ™ components and cables specified by the MANUFACTURER. Be aware that the performance of the device can be reduced if this safety rule is not observed.

Designation
Navigator M6 and approved end devices in accordance with the current Operating Instructions of the Navigator M6.

21 Optional Accessories

Designation	Dead weight	Maximum payload
Indirect extension arm lighting	2.0 kg	---
Brake indicator lighting board	0.1 kg	---
Adapter Acrobat Swing 3p, L150*	1,6kg	10kg / 113Nm
Adapter Acrobat 2000 3p, L150*	2,9kg	30kg / 390Nm
Adapter Acrobat 2000 with stop, L150*	2,8kg	30kg / 390Nm
* The accessories can only be used if the extension arm has been supplied with preparation for adapter. This option can be selected for the dual-arm variant on the upper extension arm: Navigator ™ in lengths of 800mm and 1000mm Navigator ™ XL in lengths of 1000mm and 1200mm The Navigator ™ XXL cannot be ordered with preparation.		

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