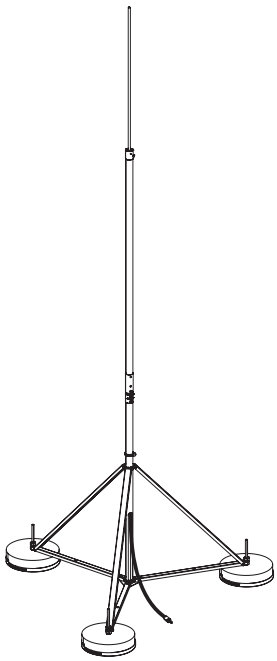
isCon® lightning protection
System instructions



Building Connections

07/2018 EN

OBO isCon® lightning protection

System instructions

Inhaltsverzeichnis

1 About these instructions

1.1 Target group

These mounting instructions are intended for specialists, who are qualified to erect lightning protection systems, e.g. lightning protection specialists. These specialists must know the lightning protection standards applicable at the mounting location, as well as the generally recognised rules of technology.

1.2 Using these instructions

- These instructions are based on the standards valid at the time of compilation (July 2018).
- Before commencing work, read these instructions through once completely. In particular, please observe the safety instructions.
- Keep all the documents supplied with the isCon® system safe, so that the information is available should you need it.
- We will not accept any warranty claims for damage caused through non-observance of these instructions.
- Regional and seasonal factors were not taken into account.
- To find out more about planning and installation of the OBO isCon® system, we recommend a comprehensive training course.

1.3 Types of safety information

Type of risk!
Shows a possibly hazardous situation. If the situation is not avoided, then death or serious injury may result.

Type of risk!
Shows a possibly hazardous situation. If the situation is not avoided, then light or minor injury or damage to property may result.

Type of risk!
Shows a possibly damaging situation. If the situation is not avoided, then damage to the product or the surroundings may occur.

Note! *Indicates important information or assistance!*

1.4 Correct use

The OBO isCon® system is a lightning protection system for the external lightning protection of buildings and systems, which, in the case of direct lightning strikes, can conduct the lightning surge currents into the earth, thus protecting the building, the system and people against the impacts of the lightning strike, e.g. fires, mechanical building damage and possibly lethal voltages and current pulses.

The system is not designed for any other purpose than the one described here. If the system is installed and used for another purpose, any liability, warranty or damage claims shall be rendered null and void.

If you require information on the use of the OBO isCon® system for something other than under the conditions of use described here, please speak to your OBO contact.

1.5 Declaration of conformity

Lightning protection components are not subject to an EU directive. Instead, OBO makes the manufacturer's declarations of conformity available for the appropriate components of the lightning protection systems. These declarations of conformity certify the agreement with the named standards and stored documents, but do not, however, contain any guarantee of properties.

You can find individual proofs for lightning protection components on the OBO web pages (*www.obo-bettermann.com*).

1.6 Basic standards

Comply with the following standards*, amongst others, during the planning, mounting, maintenance and repair of lightning protection systems:

- DIN EN 62305-1 ED2 (IEC 62305-1, VDE 0185-305-1), Protection against lightning Part 1: General principles
- DIN EN 62305-2 ED2 (IEC 62305-2, VDE 0185-305-2), Protection against lightning Part 2: Risk management
- DIN EN 62305-3 ED 2(IEC 62305-3, VDE 0185-305-3), Protection against lightning – Part 3: Protection of structural facilities and persons
- DIN EN 62305-4 ED 2 (IEC 62305-4, VDE 0185-305-4), Protection against lightning – Part 4: Electrical and electronic systems within structures
- DIN EN 62561-1 ED 2 (IEC 62561-1, VDE 0185-561-1), Lightning protection system components – Part 1: Requirements for connection components
- DIN EN 62561-2 ED2 (IEC 62561-2, VDE 0185-561-2), Lightning protection system components – Part 2: Requirements for conductors and earth electrodes
- DIN EN 62561-4 ED2 (IEC 62561-4, VDE 0185-561-4), Lightning protection system components – Part 4: Requirements for conductor fasteners
- DIN 18014, Foundation earthers
- IEC TS 62561-8:1-2018, Lightning Protection System Components (LPSC) – Part 8: Requirements for components for isolated LPS
- DIN 18531-1, Waterproofing of roofs, balconies and walkways – Part 1: Non-utilised and utilised roofs – Requirements and principles for execution and design
- IEC 60332-1-2, Tests on electric and optical fibre cables under fire conditions – Part 1–2: Test for vertical flame propagation for a single insulated wire or cable

* Status of standards: July 2018

2 General safety information

Observe the following general safety information on handling the OBO isCon® system:

- The work may only be carried out by lightning protection specialists who have been trained for the installation of standard-conformant lightning protection systems.
- If there is a lightning strike, lethal currents can flow through the lightning protection system. Never work on the elements of the lightning protection system during a thunderstorm or if there is the risk of one.
- Lethal voltages can occur during the handling of electrical resources. Therefore, never work on parts through which power is flowing. Wear suitable protective clothing and comply with all the required safety guidelines!
- To install the OBO isCon® system, use only components of the OBO product range, as otherwise there is no guarantee that safe installation is possible.
- The jacketing of the grey isCon® conductor may be painted a different colour. It does not possess any electrical properties which could be at risk from paint. This does not apply when the conductor is used as protection against touch voltages.
- The production method means that metallic objects may have areas with sharp edges. Wear suitable protective gloves to avoid cutting injuries.
- When erecting systems for maintaining electrical functionality, take the necessary fire protection regulations into account. These instructions do not mention any fire protection standards which are to be complied with. Read the OBO fire protection guide (order no.: 9134859) for more information.
- The arresting system and any possible fire insulation must be matched.

3 Product description

3.1 Basic principles

Without any additional countermeasures, the high voltage pulses which occur when there is a direct lightning strike will cause arcing to insulation surfaces. This effect is termed a creep flashover. When the so-called creep discharge inception voltage has been exceeded, surface discharge is initiated, which can bridge a gap of several metres. To avoid dangerous arcing between conductive parts (electrical systems, pipelines, etc.), the maintenance of the separation distance is a key requirement when planning and implementing a lightning protection system.

These days, the roof level of building complexes is used as an installation area for air-conditioning, ventilation, transmission and energy collection systems, meaning that the structural features may be in the way of the required spacing between the air-termination systems and the electrical installations.

The isCon® insulated lightning protection system is used to maintain the required separation distance. Depending on the design, after the first potential connection behind the connection element on the air-termination rod, the isCon® conductor reflects an equivalent separation distance of up to 0.45–0.9 metres in the air or double that in solid matter. This means that installation is possible directly on metallic and electrical structures. If there is a direct lightning strike, the incoming energy is arrested through the isCon® conductor to the building's earthing system. There is no direct arcing between the conductor and the building to be protected.

The isCon® system is tested according to IEC TS 62561-8 and has an arresting capacity of 150–200 kA lightning surge current (10/350 µs), depending on the conductor. It primarily consists of the following components:

– isCon® conductor
– Insulated air-termination rods
– System accessories for fastening (air-termination rod stand, support and holder)
– System accessories for connection

3.2 isCon® conductor

According to DIN EN 62305-3/VDE 0185-305-3/IEC 62305-3, the insulated isCon® conductor implements a separation distance of 0.45–0.9 metres in the air and 0.9–1.8 metres in the case of solid materials, depending on the product design. The isCon® conductor is equipped with an external semi-conductive jacket, allowing it to limit high lightning voltage pulses against a reference potential, by creating a connection between the external semi-conductive jacket and the building's equipotential bonding, which is not energised with lightning current, in the area of the connection element.

The isCon® conductor is flame-resistant according to DIN EN 60332-1-2, weather-resistant and halogen-free. It is suitable for routing in external areas and can be routed on roofs, in walls, in concrete, in facade installations or in buildings.

The isCon® conductor is sold by the metre and in five variants:

Conductor type	Characteristic	Article no.
isCon PR 90 SW (Premium)	Black	5408 018
isCon Pro 75 SW	Black	5408 008
isCon Pro+ 75 SW	Black	5408 002, 5408 004, 5408 006
isCon Pro+ 75 GR	Grey	5407 995, 5407 997
isCon BA 45 SW (Basic)	Black	5408 014

Tab. 1: Product variants, isCon® conductor

The grey isCon® conductor is also suitable for routing in the earth. The conductor was tested according to VDE 0185-305-3 (IEC/EN 62305-3) with a pulse voltage of min. 100 kV (1.2/50 µs) in rain and can be used up to a length of max. 5 m for protection against touch voltages. If the conductor is not used as protection against touch voltages, then coloured painting, e.g. with facade paint, is also possible. As the external grey jacket is non-conductive, it must be removed in the contact areas.

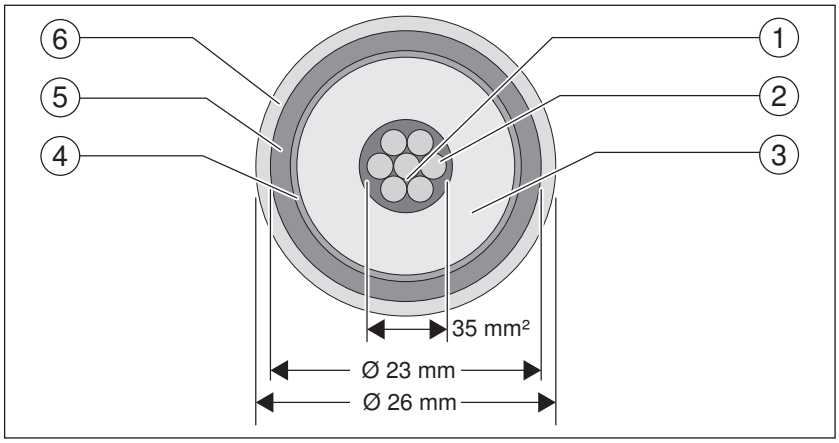


Fig. 1: Schematic diagram of the isCon® conductors Pro+ 75 SW and Pro+ 75 GR

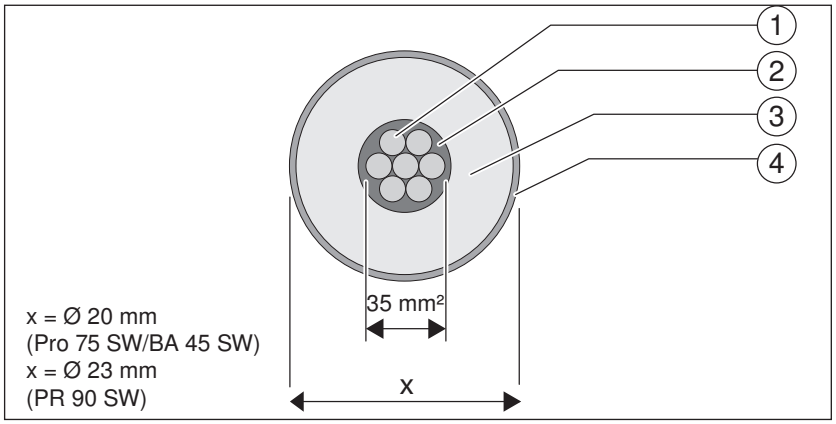


Fig. 2: Schematic diagram of the isCon® conductors Pro 75 SW, BA 45 SW and PR 90 SW

Legend:

1. Round conductor, multi-wire, 35 mm², Cu
2. Inner conductive layer
3. Insulation
4. Black, weakly conductive layer

⑤ Protective jacket

⑥ External jacket, grey

The isCon® conductor may only be connected to air-termination rods or forwarding systems using system-tested OBO connection elements (see also “5.2 Mounting the connection elements isCon connect, isCon con 2 and isCon con PRE” on page 30).

Type	isCon BA 45 SW	isCon Pro 75 SW	isCon Pro+ 75 SW	isCon Pro+ 75 GR	isCon PR 90 SW
Colour	Black	Black	Black	Grey	Black
Equivalent separation distance, air (cm)	≤ 45	≤ 75	≤ 75	≤ 75	≤ 90
Equivalent separation distance, solid materials (cm)	≤ 90	≤ 150	≤ 150	≤ 150	≤ 180
Equivalent separation distance, mixed materials	See EN 62305-3				
External diameter	~ 20 mm	~ 20 mm	~ 23 mm	~ 26 mm	~ 23 mm
Round conductor, multi-wire, Cu	35 mm^2				
Cable weight	~ 0.570 kg/m	~ 0.570 kg/m	~ 0.694 kg/m	~ 0.868 kg/m	~ 0.666 kg/m
Temperature range for routing	min. –5 °C, max. 40 °C				
Operating temperature	min. –30 °C, max. 70 °C				
Bend radius	min. 200 mm	min. 200 mm	min. 230 mm	min. 260 mm	min. 230 mm
Maximum tensile load	1,750 N				
Routing in the earth	No	No	No	Yes	No
Can be painted	No	No	No	Yes (does not apply when used as protection against touch voltages)	No
Protection against touch voltages	No	No	No	Yes	No
Weathering resistance (UV-stabilised)	Ozone resistant according to DIN EN 60811-2-1 Section 8 Sunlight Resistance Test according to UL 1581 Section 1200 Coldness impact resistance according to-DIN EN 60811-1-4 Section 8.5				
Fire load (kWh/m)	3.3		4.3	5.1	4.2
Fire behaviour Self-extinguishing	n/a	n/a	Yes	Yes	n/a
Lightning current carrying capacity (class/limp (kA)	H1/150	H1/150	H1/150		H2/200
Testing certificate according to IEC TS 62561-8	Yes				
Halogen-free	Yes				
Softener	None				

Tab. 2: Technical data of the isCon® conductors

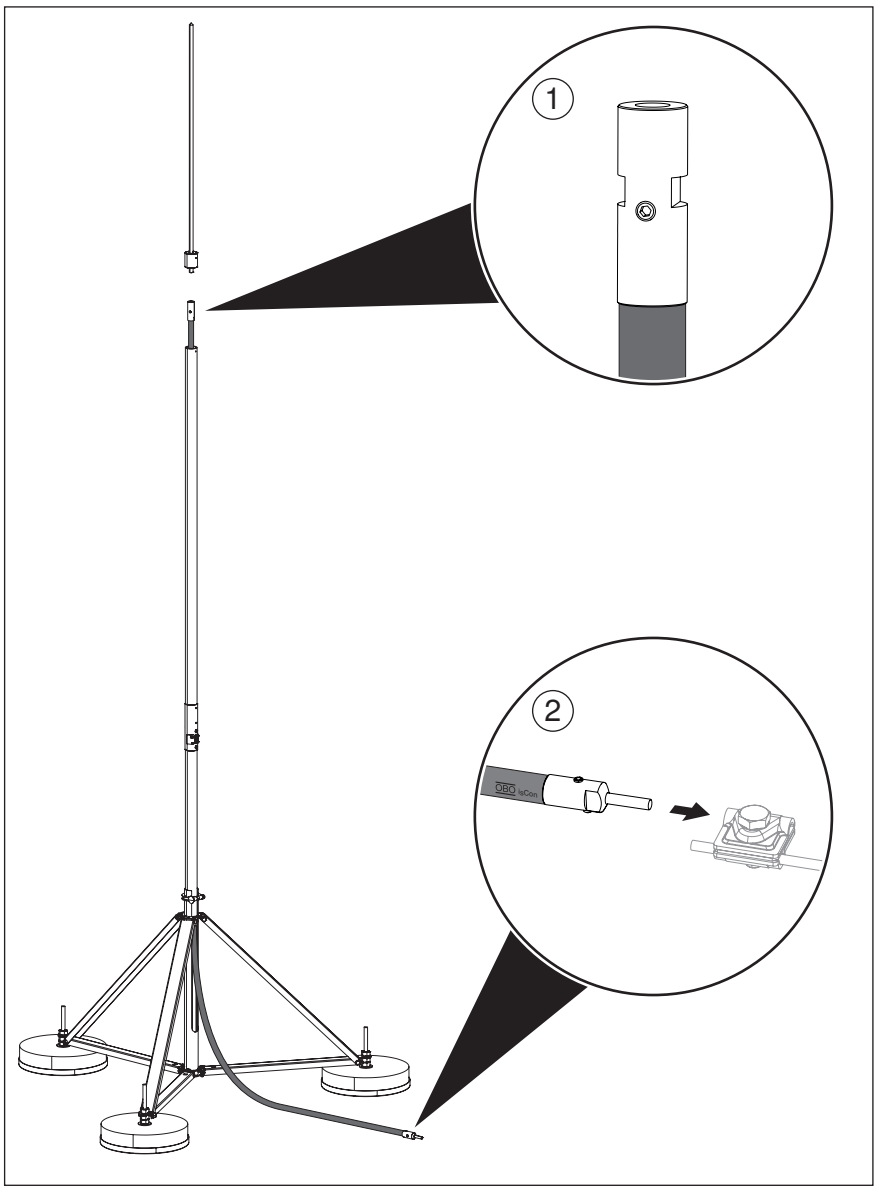


Fig. 3: isCon® conductor in the air-termination rod with internal connection element ① (type isCon IN connect, isCon IN con PRE, isCon IN con 2) and isCon® connection element ② (type isCon connect, isCon con PRE, isCon con 2)

3.3 Insulated air-termination rods

The insulated air-termination rods of the isCon® system come in three parts and consist of the air-termination rod (length 1,000 mm), the insulated central rod (length 1,500 mm) and the retaining rod.

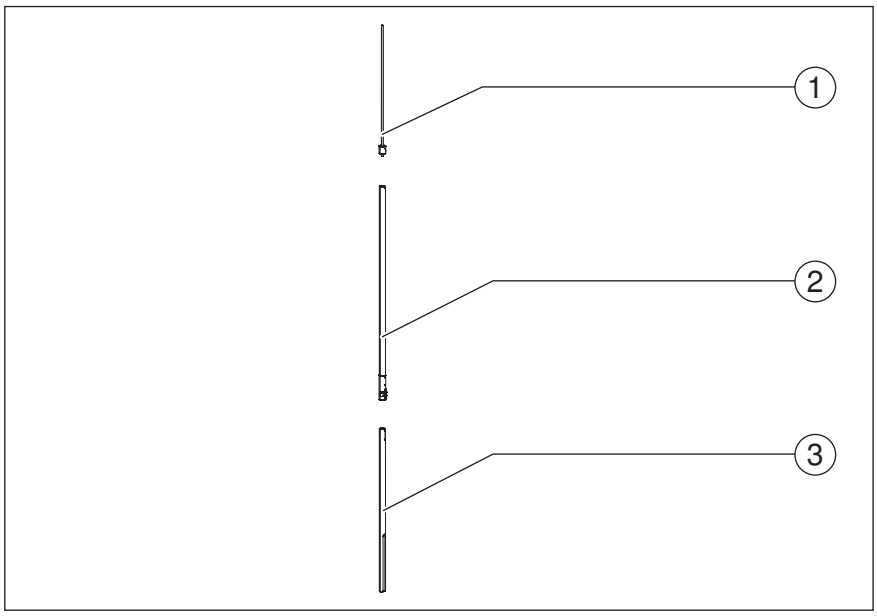


Fig. 4: Air-termination rod components

Legend:

(1) Air-termination rod

(2) Insulated central rod

(3) Retaining rod

The metallic components of the rods are made of aluminium of stainless steel (V2A). The insulated central rod is made of glass-fibre reinforced plastic (GRP) and allows sufficient spacing of the arresting components (connection element at the bottom end of the air-termination rod) to all roof structures. In addition, it guarantees a sufficient distance of 1,500 mm to the equipotential bonding, which is connected at the bottom end of the insulated rod (see also Fig. 13 No. (5)).

The system comprises three types of air-termination rods (see Fig. 5). This means it can be used in different mounting situations.

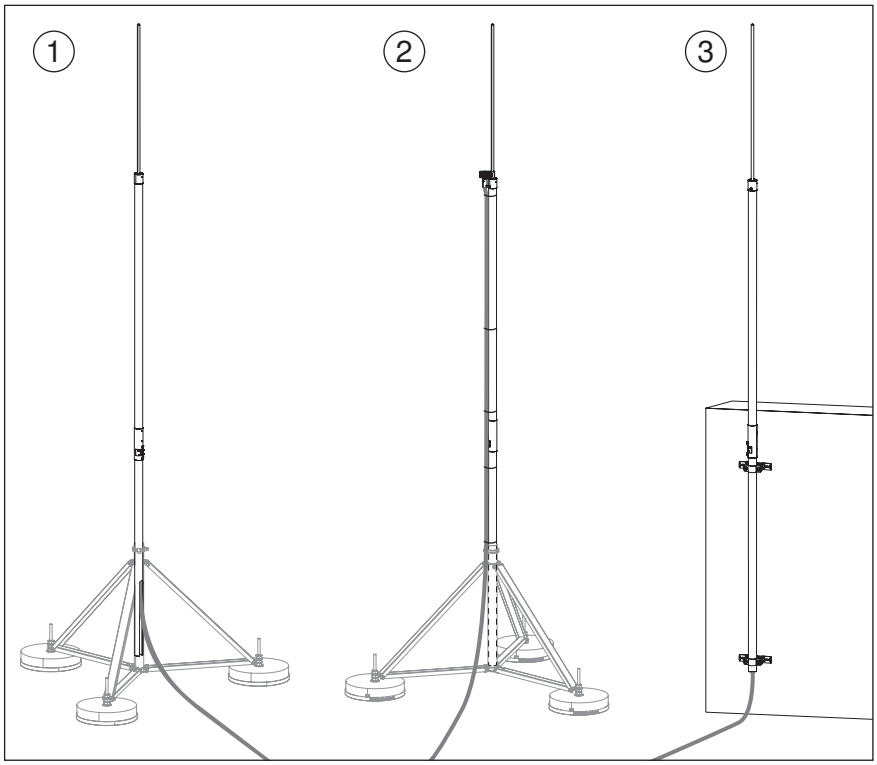


Fig. 5: Three air-termination rod types (without potential connection)

Legend:

(1) Air-termination rod with internal isCon® conductor and side exit
(2) Air-termination rod with external isCon® conductor
(3) Air-termination rod with internal isCon® conductor and bottom exit

Type	Article no.	Overall length mm	Diameter mm	Material	Type (Fig. 4)	Corresponding air-termination rod stand
isFang IN-A L4	5408 874	4,000	50	Alu/GRP	(1)	isFang 3B-100-A
isFang IN-A L6	5408 876	6,000	50	Alu/GRP		isFang 3B-150-A
isFang IN-A L8	5408 878	8,000	50	Alu/GRP		isFang 3B-250-A
isFang IN-A L10	5408 880	10,000	50	Alu/GRP		isFang 3B-250-A
isFang 4000 AL	5408 943	4,000	40	Alu/GRP	(2)	isFang 3B-100 AL
isFang 6000 AL	5408 947	6,000	40	Alu/GRP		isFang 3B-150 AL
isFang 4000	5408 942	4,000	40	V2A/GRP		isFang 3B-100
isFang 6000	5408 946	6,000	40	V2A/GRP		isFang 3B-150
isFang IN L4	5408 854	4,000	50	Alu/GRP	(3)	*to be fastened with support system*
isFang IN L6	5408 856	6,000	50	Alu/GRP		
isFang IN L8	5408 858	8,000	50	Alu/GRP		
isFang IN L10	5408 860	10,000	50	Alu/GRP		

Tab. 3: Technical data of the isCon® air-termination rods

Contact OBO Customer Service about other air-termination rod variants.

3.4 System accessories for fastening

Air-termination rod stands (see section 3.4.1) or supports for wall or pipe mounting (see section 3.4.2) can be used to fasten the isCon® air-termination rods. In addition, the system offers special holders for the isCon® conductor (see section 3.4.3).

3.4.1 Air-termination rod stand

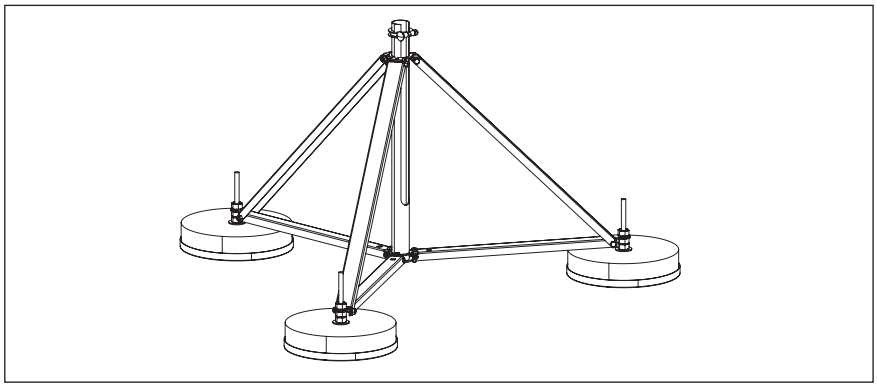


Fig. 6: Air-termination rod stand with concrete blocks

The isCon® system contains folding air-termination rod stands of different sizes to allow the isFang air-termination rods to be mounted on flat roofs, for example. The tripod air-termination rod stands allow the erection of the air-termination rods without penetrating the building structure with bolts/anchors.

Instead, the air-termination rod stands are weighed down with FangFix concrete blocks. The number of blocks required is dependent on the height of the air-termination rod and the wind speed zone.

Note! *You can find further information on wind speed zones in the OBO TBS lightning protection guide (order no.: 9131970) and national directives.*

The air-termination rod stand can compensate for a slope in the roof surface of up to 5° (see also Fig. 49 on page 45). To protect the roof surface, it may be wise to place a protective film under the concrete blocks of the air-termination rod stand. We recommend contacting the roofer about this.

Scope of delivery of the air-termination rod stand:

– Tripod air-termination rod stand
– Crossbar for potential connection with bolt, nut and lock washer
– Brief instructions

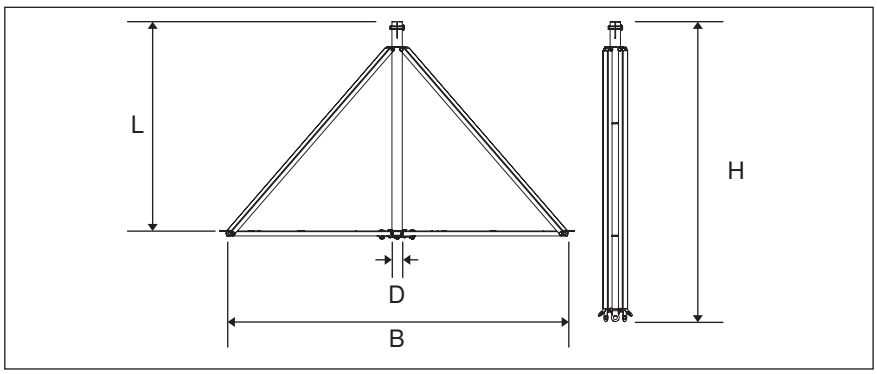


Fig. 7: For the dimensions of the air-termination rod stand, see Tab. 4

Type	Article no.	Dimension B mm	Dimension D mm	Dimension L mm	Dimension H mm	Material
With side exit for internal isCon® conductor						
isFang 3B-100-A	5408 930	1,026	50	600	885	V2A
isFang 3B-150-A	5408 932	1,500	50	900	1,275	V2A
isFang 3B-250-A	5408 902	2,900	50	1,450	2,055	V2A
With bottom exit or for external isCon® conductor						
isFang 3B-100 AL	5408 966	1,000	40	600	885	Al
isFang 3B-150 AL	5408 967	1,500	40	900	1,275	Al
isFang 3B-100	5408 968	1,000	40	600	885	V2A
isFang 3B-150	5408 969	1500	40	900	1,275	V2A

Tab. 4: Technical data of the air-termination rod stand

The isCon® concrete blocks weigh approx. 16 kg and are screwed to the bottom of the unfolded air-termination rod stand. The blocks can be stacked to increase the stand weight (e.g. for increased wind speeds) (see Fig. 8). Additional blocks can mounted internally in the air-termination rod stands of diameter 1,500 mm (unfolded).

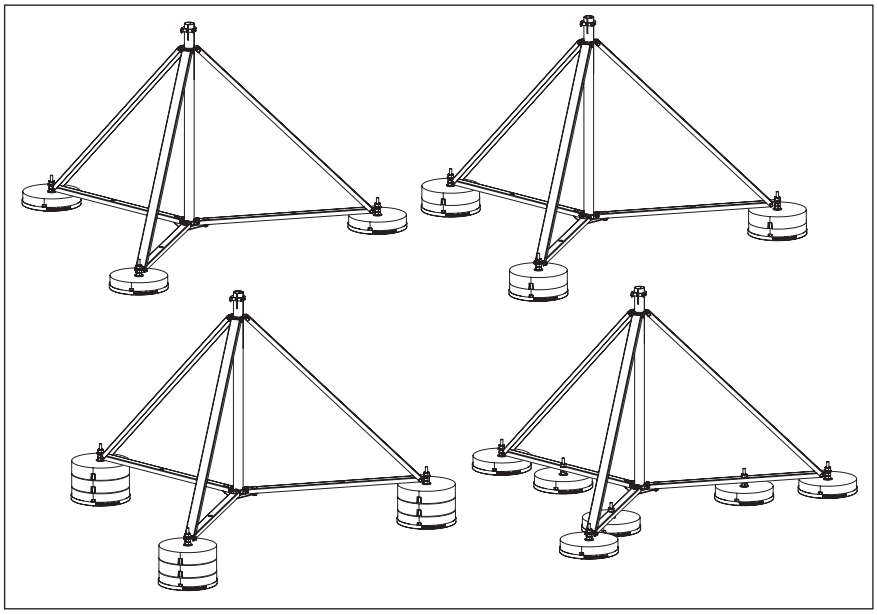


Fig. 8: Increasing the stand weight by stacking the concrete blocks

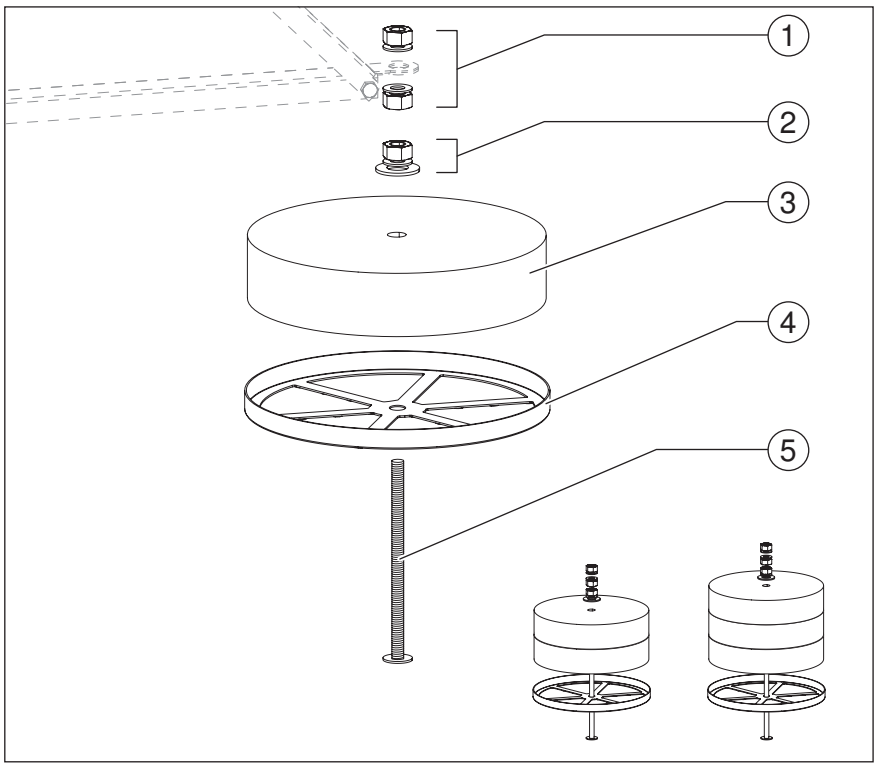


Fig. 9: Concrete block with fastenings

Legend:

(1) Hexagonal nuts (with washers) for height compensation

(2) Lock nut (with washer and plate)

(3) Concrete block

(4) Edge protection

(5) Threaded rod

Product	Type	Article no.	Features	Material
FangFix concrete block	F-FIX-S16	5403 227	Weight: 16 kg; Ø 365 mm; stackable	Concrete, frost-resistant
Edge protection for concrete block 16 kg	F-FIX-B16 3B	5403 238	Edge protection with gland hole	Polyamide
Threaded rod	isFang 3B-G1	5408 971	270 mm, for 1 concrete block[1)]	V2A
Threaded rod	isFang 3B-G2	5408 972	340 mm, for 2 concrete blocks[1)]	V2A
Threaded rod	isFang 3B-G3	5408 973	430 mm, for 3 concrete blocks[1)]	V2A
Threaded rod	isFang 3B-G4	5408 905	500 mm, for 4 concrete blocks[1)]	V2A

Tab. 5: Technical data of the concrete blocks with accessories

[1)] Number of concrete blocks for mounting on flat surface. For height compensation in an inclined position, select a longer threaded rod if necessary (see Fig. 49 on page 45).

Nuts and washers are included in the scope of delivery of the threaded rods.

3.4.2 Air-termination rod support for isFang mounting

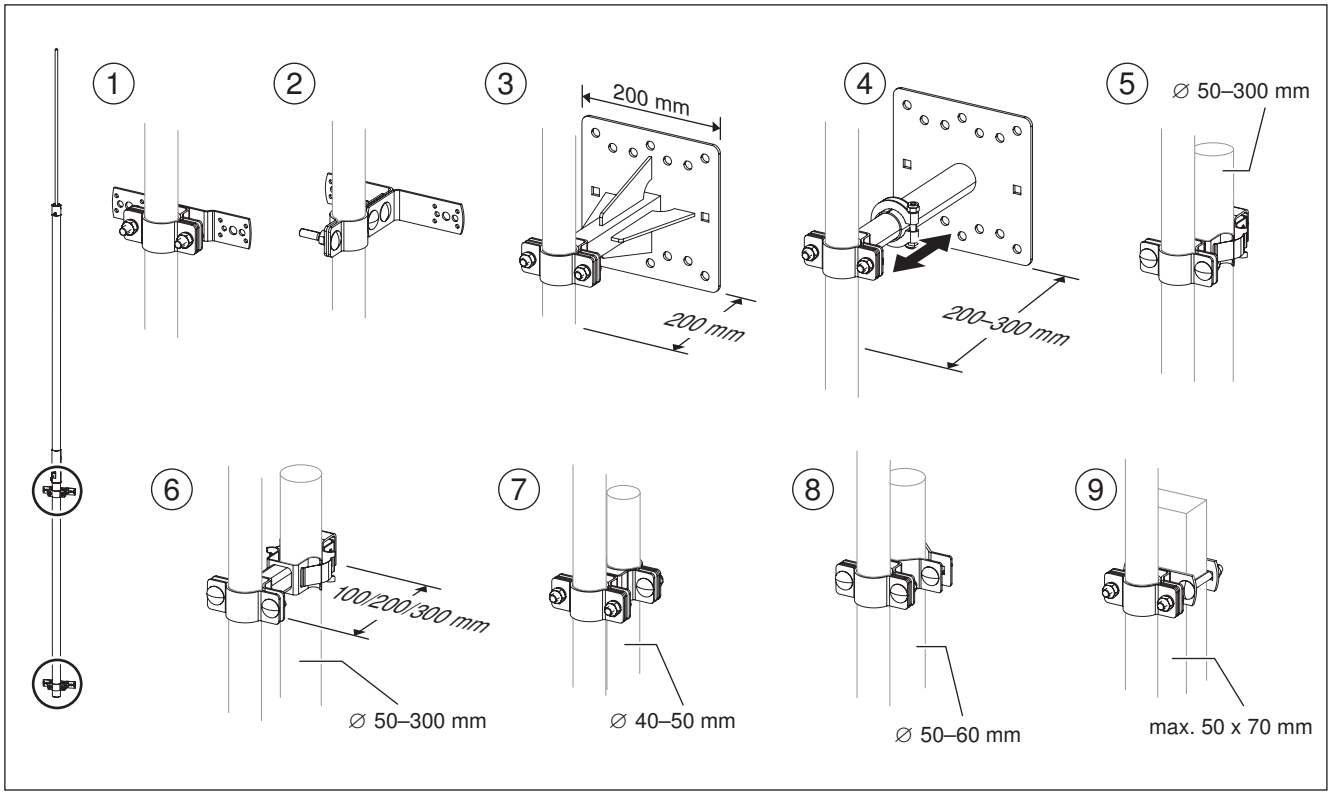


Fig. 10: Support for wall or pipe mounting of the isFang air-termination rods

Fig no.	Type	Article number	Ø isCon® air-termination rod (mm)	Features	Material
①	isFang TW30	5408 952	40/50	Surface mounting, distance from wall 30 mm	V2A
②	isFang TW80	5408 950	40/50	Surface mounting, distance from wall 80 mm	V2A
③	isFang TW200 12	5408 910	40/50	Surface mounting, distance from wall 200 mm	V2A
④	isFang TW200	5408 954	40/50	Surface mounting, variable distance from wall 200–300 mm	V2A
⑤	isFang TR100	5408 956	40/50	Tightening strap clip for round construction pipes of Ø 50–300 mm; distance to pipe 40 mm	V2A
⑤	isFang TR100 100	5408 955	40/50	Tightening strap clip for round construction pipes of Ø 50–300 mm; distance to pipe 100 mm	V2A
⑤	isFang TR100 200	5408 957	40/50	Tightening strap clip for round construction pipes of Ø 50–300 mm; distance to pipe 200 mm	V2A
⑥	isFang TR100 300	5408 959	40/50	Tightening strap clip for round construction pipes of Ø 50–300 mm; distance to pipe 300 mm	V2A
⑦	isFang TS40-50	5408 958	40/50	Pipe strip clip for round construction pipes of Ø 40–50 mm; distance to pipe 40 mm	V2A
⑧	isFang TS50-60	5408 960	40/50	Pipe strip clip for round construction pipes of Ø 50–60 mm; distance to pipe 30 mm	V2A
⑨	isFang TS50x50	5408 964	40/50	Pipe strip clip for round construction pipes of max. 50 x 70 mm; distance to pipe 30 mm	V2A

Tab. 6: Technical data of the isCon® supports

3.4.3 Bracket for the isCon® conductors

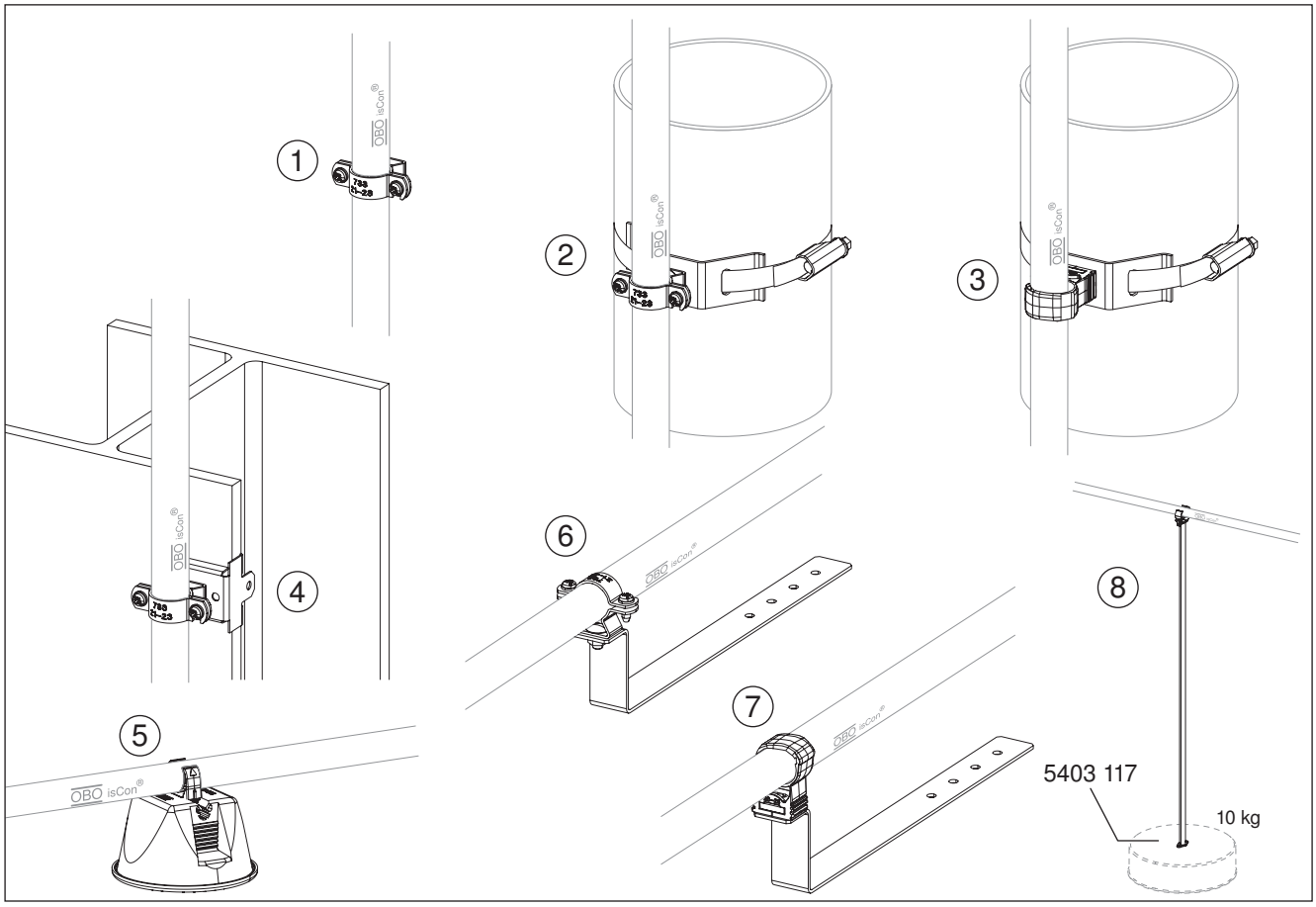


Fig. 11: Bracket for the isCon® conductor

Fig no.	Product	Type	Article no.	Features
①	Conductor bracket for isCon® conductor	733 21 VA isCon H VA isCon H 26 VA	1362 046 5408 056 5408 064	Ø 20 mm; V2A Ø 23 mm; V2A Ø 26 mm; V2A
②	VA conductor bracket with tightening strap	isCon HS VA isCon HS 26 VA	5408 052 5408 068	Ø 23 mm; V2A; 2 m tightening strap Ø 26 mm; V2A; 2 m tightening strap
③	PA conductor bracket with tightening strap	isCon HS PA isCon HS 26 PA	5408 054 5408 066	Ø 23 mm; PA black; 2 m tightening strap Ø 26 mm; PA grey; 2 m tightening strap
④	Terminal for steel support with ①, bolt M16x6 and washer	TKI 13-6	1483 587	Galvanised terminal with M6 internal thread to fasten an isCon H VA conductor bracket with M16x6 bolt
⑤	Roof conductor bracket with adapter and M-Quick conductor bracket	165 MBG-8 165 MBG UH M-Quick M25 SW M-Quick M25 LGR	5218 691 5218 882 2153 787 2153 734	PA/PE roof conductor bracket, filled with frost-resistant concrete. Clamping range of M-Quick conductor bracket ...SW: 20–25 mm, for ...LGR: 25–32 mm
⑥	VA roof conductor holder for sloping roof	isCon H280 VA isCon H280 26 VA	5408 047 5408 074	Ø 23 mm; V2A Ø 26 mm; V2A
⑦	PA roof conductor holder for sloping roof	isCon H280 PA isCon H280 26 PA	5408 049 5408 072	Ø 23 mm; PA black Ø 26 mm; PA grey
⑧	Spacer for stand-off routing of the isCon® conductor	isCon DH	5408 043	Material: GRP; clamping range Ø 23–26 mm; height 1,000 mm, can be shortened; for mounting on FangFix concrete block, 10 kg, with edge protection

Tab. 7: Technical data of the brackets for the isCon® conductor

3.5 System accessories for connection

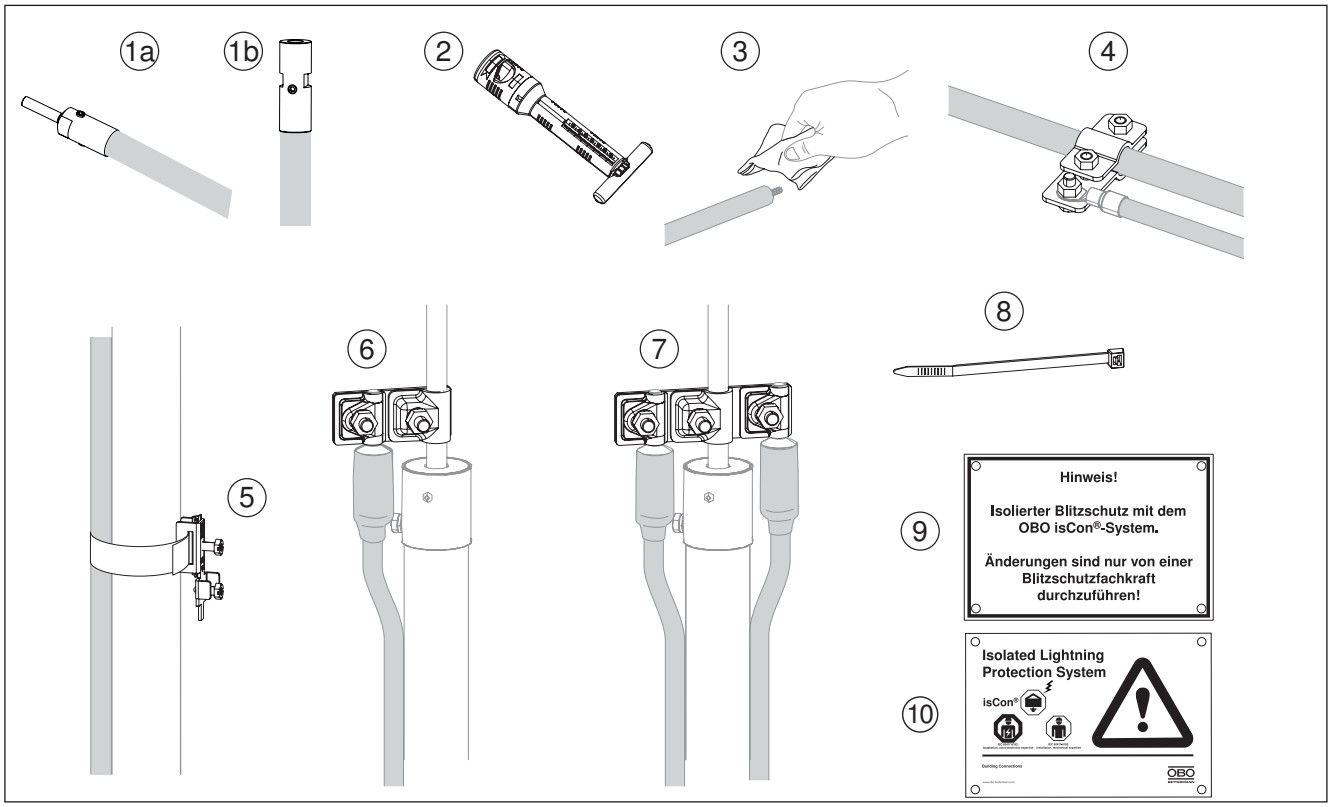


Fig. 12: Accessories for connecting the isCon® conductor

Fig no.	Product	Type	Article no.	Features
⑴a	Connection element	isCon connect isCon con 2 isCon con PRE	5408 022 5408 021 5408 023	See „5.2 Mounting the connection elements isCon connect, isCon con 2 and isCon con PRE“ on page 30
⑴b	Connection element, internal	isCon IN connect isCon IN con 2 isCon IN con PRE	5408 024 5408 019 5408 020	See „6.1 Air-termination rod with internal isCon® conductor“ on page 33
⑵	Stripping tool	isCon stripper 2	5408 013	To remove the insulation of the isCon® conductor (see section 5.1.2 on page 29)
⑶	Cleaning cloth	isCon EPPA 004	5408 060	Cellulose polypropylene paper with abrasive sections, doused with impregnation solution, for cleaning the external jacket of the OBO isCon® conductor (see Fig. 22 on page 31)
⑷	Potential connection terminal	isCon PAE	5408 036	Potential connection of the isCon® conductor; seat Ø 17–25 mm, V2A
⑸	Potential connection clip	927 2 6-K	5057 599	Potential connection on the air-termination rod for external isCon® conductor; seat 3/8–4", V2A
⑹	Connection plate for one isCon® conductor	isCon AP1-16 VA	5408 026	16x 8–10 mm, V2A
⑺	Connection plate for two isCon® conductors	isCon AP2-16 VA	5408 028	16x 8–10 mm, V2A
⑻	Strip clip	555 7.6x380 SWUV	2332 784	Black; weatherproof, length approx. 380 mm
⑼	Information sign for labelling of the lightning protection system	isCon HWS	5408 058	Self-adhesive, with 4 fastening holes Ø 6.5 mm
⑽	Information sign for labelling of the lightning protection system	isCon HWS EN	5408 059	Self-adhesive, with 4 fastening holes Ø 6.5 mm

Tab. 8: System accessories for connection

4 Planning an installation

When planning the lightning protection of buildings, we recommend taking the following aspects and possible activities into account:

– Determine the protection area, the required height and the arrangement of the air-termination rods, according to DIN EN 62305-3 (IEC 62305-3, VDE 0185-305-3).
– Calculate the necessary separation distance (see “4.2 Calculating, checking and maintaining the separation distance” on page 23).
– Calculate the number of isCon® conductors and air-termination systems according to the lightning protection class and required conductor length (see “4.3 Conductor lengths and lightning protection classes” on page 23).
– Additional measures are required for installations in potentially explosive areas (see “4.4 Installation in potentially explosive areas” on page 25) and on soft-covered roofs (see “4.5 Soft-covered roofs” on page 27).
– When erecting air-termination rods, take the appropriate wind speed zones into account. You can find further information in the OBO TBS lightning protection guide and national directives.
– Ensure that there is equipotential bonding (see “6.6 Attaching the potential connection” on page 50).

Note! *You can find additional detailed planning aids on lightning and surge protection systems in the OBO TBS lightning protection guides (order no.: 9131970).*

Note! *To guarantee the functionality of the isCon® lightning protection system, tested components of the OBO delivery range must be used.*

4.1 Schematic diagram of the isCon® system using the example of the isCon Pro+ 75 SW

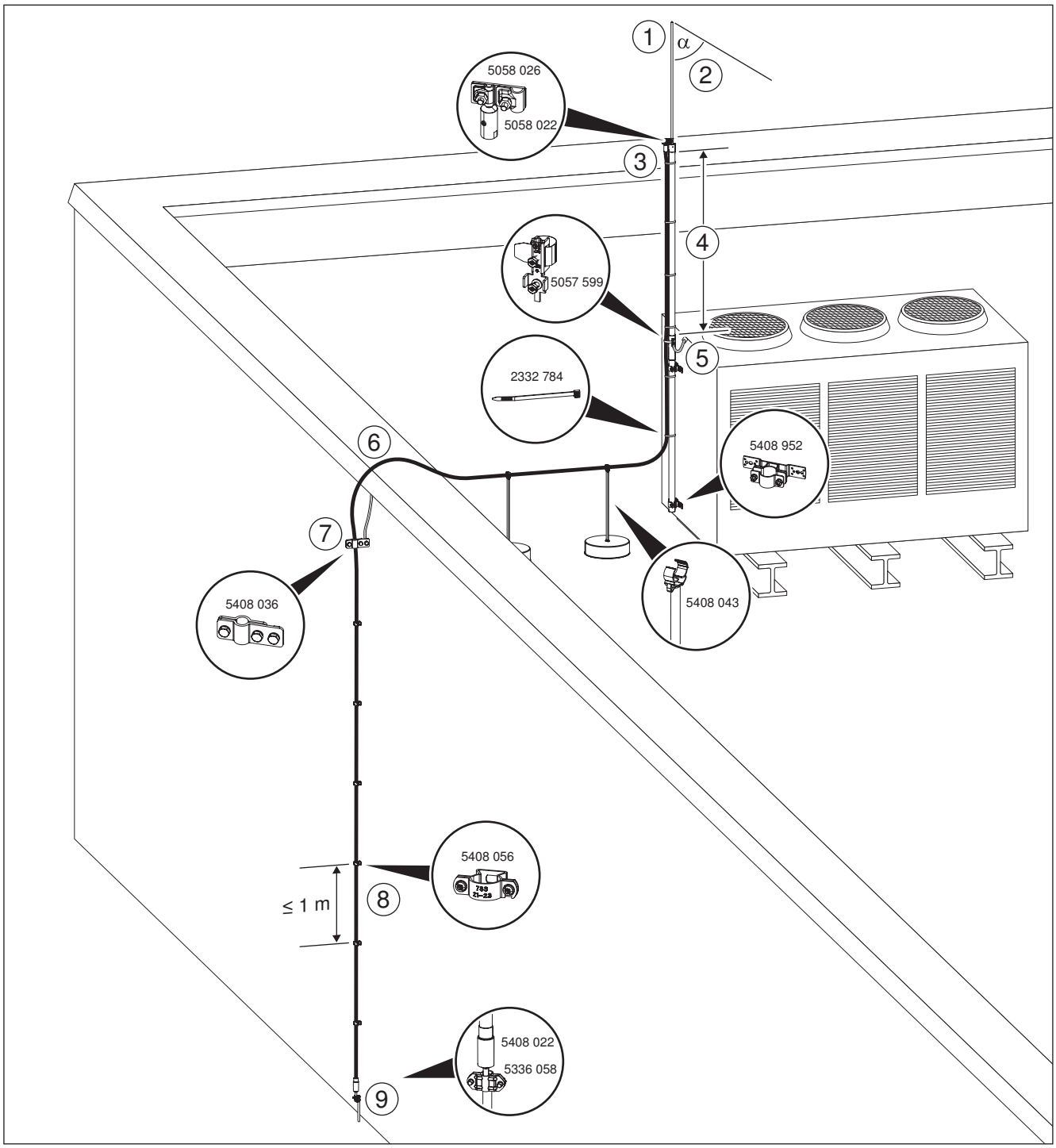


Fig. 13: Installation of the isCon® system using the example of the Pro+ 75 SW conductor

Legend:

① **Air-termination system**
DIN EN 62305-3 (IEC 62305-3, VDE 0185-305-3) Section 5.2 must be taken into account when planning the design of the air-termination system. The height and arrangement of the air-termination system must be designed in such a way that the objects to be protected are located in the protection area.

② **Protection area**
Along the whole of its length, the conductor must be located in the protection area of the air-termination system. α = Protective angle according to DIN EN 62305 (IEC 62305, VDE 0185-305-3).

③ **Connection element**
The connection element may only be connected to the air-termination system or forwarding conductor of the external lightning protection.

④ **Required separation distance to first potential connection**
No electrically conductive or earthed parts may be located in the area of the potential connection within the radius of the calculated separation distance. These include metallic construction parts, conductor brackets and reinforcements.

⑤ **Potential connection**
The potential connection must be installed in the manner described in “6.6 Attaching the potential connection” on page 50. The potential connection element must be connected to the equipotential bonding with ≥ 6 mm² Cu or an equal conductivity.

⑥ **Bend radius**
When routing conductors, do not go below the minimum radii.

⑦ **Additional potential connections**
After the first potential connection using the potential connection element, the isCon® conductor can be connected multiple times with the earthed components of the structure, through which the lightning current does not flow. See also “6.6.4 Installing additional potential connections” on page 55.

⑧ **Conductor fastening**
The isCon® conductor must be fastened using the installation material indicated. The maximum distance between the fastenings is 1 metre.

⑨ **Separation distance of s ≤ 17.5 cm in air**
A potential connection is not required for a calculated separation distance of s ≤ 17.5 cm in air.

Note! *Before designing the lightning protection system, obtain information on the function, general design and location of the structure.*

Note! *During routing in buildings, pay attention to the specified protection measures, e.g. division into fire sections. Read the OBO fire protection guide (order no.: 9134859) for more information.*

4.2 Calculating, checking and maintaining the separation distance

Note! *If the approval authorities, the insurance company or the customer have not yet specified whether the appropriate building should be protected by a lightning protection system, we recommend that the planner carry out a risk evaluation according to DIN EN 62305-2/IEC 62305-2, which will indicate whether a lightning protection system is required or not.*

- Calculate the separation distance at the connection point of the isCon® conductor according to DIN EN 62305-3 (VDE 0185-305-3)/ IEC 62305-3 Section 6.3. Measure the distance (l) from the connection point of the isCon® conductor to the next level of the lightning protection equipotential bonding, e.g. earthing system, metal parapet of construction with electrically connected metal facade or steel reinforcement (high-rise building).
- Check whether the calculated separation distance (s) is less than or equal to the specified equivalent separation distance of the isCon® conductor.
- If the specified equivalent separation distance is exceeded, then you must install additional conductors:
  - The current is split up if you install multiple insulated conductors in parallel. The reduced current division coefficient k_c thus also reduces the calculated separation distance (s).
  - We recommend installing the conductors at least 20 cm apart. This keeps the magnetic fields to a minimum, preventing the conductors from influencing each other.
  - When conductors are routed directly beside one another, the inductivity of the total arrangement is not reduced by the factor n, and the current division coefficient k_c is not reduced accordingly.
  - Install the conductors as far apart from each other as possible, if the installation conditions permit this. Ideally, the second conductor should be run to the ground on the other side of the building.

4.3 Conductor lengths and lightning protection classes

The possible length of an isCon® conductor can be calculated using the following formula, according to the calculated separation distance (s), the lightning protection class (k_i), the number of conductors used (k_c) and the electrical insulation (k_m) (see DIN EN 62305-3):

$$L(m) = \frac{s \bullet k_m}{k_c \bullet k_i}$$

The following Tab. 9 offers an example of the maximum possible lengths of the isCon® conductor at a separation distance s = 0.75 m in air. Should the conductor lengths shown there be insufficient for the construction project, we recommend having a lightning protection specialist carry out a detailed calculation of the factor k_c using the building data. The above formula shows that longer conductor lengths are possible with a greater number of conductors and thus the reduction of the factor k_c.

			Basic	Pro Pro+	Premium
LPS – lightning protection class*	Max. lightning current peak value	Number of conductors	Length for s ≤ 0.45 m in air	Length for s ≤ 0.75 m in air	Length for s ≤ 0.90 m in air
I	200 kA	1	-	–	11.25 m
		2	8.52 m	14.20 m	17.05 m
		3 and more	12.78 m	21.31 m	25.57 m
II	150 kA	1	7.50 m	12.50 m	15.00 m
		2	11.36 m	18.94 m	22.73 m
		3 and more	17.05 m	28.41 m	34.09 m
III + IV	100 kA	1	11.25 m	18.75 m	22.50 m
		2	17.05 m	28.41 m	34.09 m
		3 and more	25.57 m	42.61 m	51.14 m

Tab. 9: Maximum length of the isCon® conductors in air

* LPS lightning protection classes according to DIN EN 62305 / VDE 0185-305 / IEC 62305

Note! *The values in the table apply to all type B earthers and for type A earthers, in which the earth resistance of the neighbouring earthing electrodes differs by less than a factor of 2. If the earther resistance of individual electrodes deviates by more than a factor of 2, k_c = 1 should be assumed (Source: DIN EN 62305-3:2011, Tab. 12).*

Installation for lightning protection class II

As the isCon Pro, isCon Pro+ and isCon Basic systems have a tested arresting capacity of 150 kA lightning surge current (10/350 µs), a lightning protection system of lightning protection class II can run the lightning current safely from the air-termination system to another arresting system with a single isCon® conductor (depending on the required conductor length, see Tab. 9).

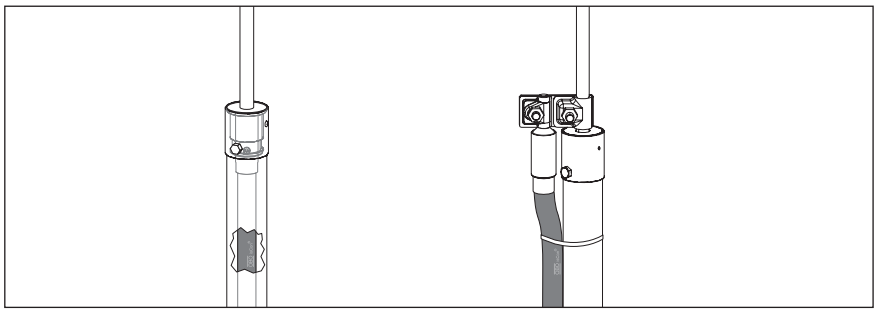


Fig. 14: One isCon® conductor for lightning protection class II/I

Installation for lightning protection class I

In a lightning protection system of lightning protection class I, one isCon® Premium conductor can be used from the air-termination unit up to the arresting system to implement the separation spacing (depending on the required conductor length, see Tab. 9).

4.4 Installation in potentially explosive areas

The isCon Pro+ conductor is ignition-free and can thus be used in lightning protection systems, which are to be located in potentially explosive areas. Here, the isCon® Pro+ conductor may be run through the areas of Ex zone 1/2 and 21/22.

If necessary, an appropriate DEKRA test report can be obtained from your OBO contact.

Note! *The system operator must divide a structure into Ex zones (see IEC 60079-10-1 and 2).*

When planning and running a lightning protection system through Ex zones, the following rules must particularly be taken into account:

- DIN EN 62305-3 – Appendix D – “Additional information for lightning protection systems for structures in areas with the risk of explosion”
- VDE 0185-305-3 – Supplementary sheet 2 – “Additional information for special structures”

According to this, planners, craftspeople and testers of lightning protection systems must meet the following requirements and levels of knowledge in potentially explosive areas:

- General principles of explosion protection
- General principles of protection ratings and device labelling
- Technical rules for hazardous substances (TRGS 800,751)
- Technical rules for operational safety (TRBS 2152)
- Testing, maintenance and repair requirements and knowledge of the appropriate technologies and devices
- Meaning of work permission systems and safe electrical separation in potentially explosive areas of explosion protection

For Ex systems with Ex zone 2 and 22, Supplementary sheet 2 (VDE 0185-305-3, Point 4.3) states that a potentially explosive atmosphere will only occur in rare, unforeseen circumstances. Therefore, it is possible to position air-termination units in Ex zones 2 and 22, taking Appendix D in DIN EN 62305-3 (VDE 0185-305-3) into account.

In the case of installations in potentially explosive areas, you must connect the isCon® Pro+ conductor beyond the potential connection to the equipotential bonding at regular intervals. See “6.6.5 Creating additional equipotential bonding for isCon Pro+ in potentially explosive areas” on page 56 for more information.

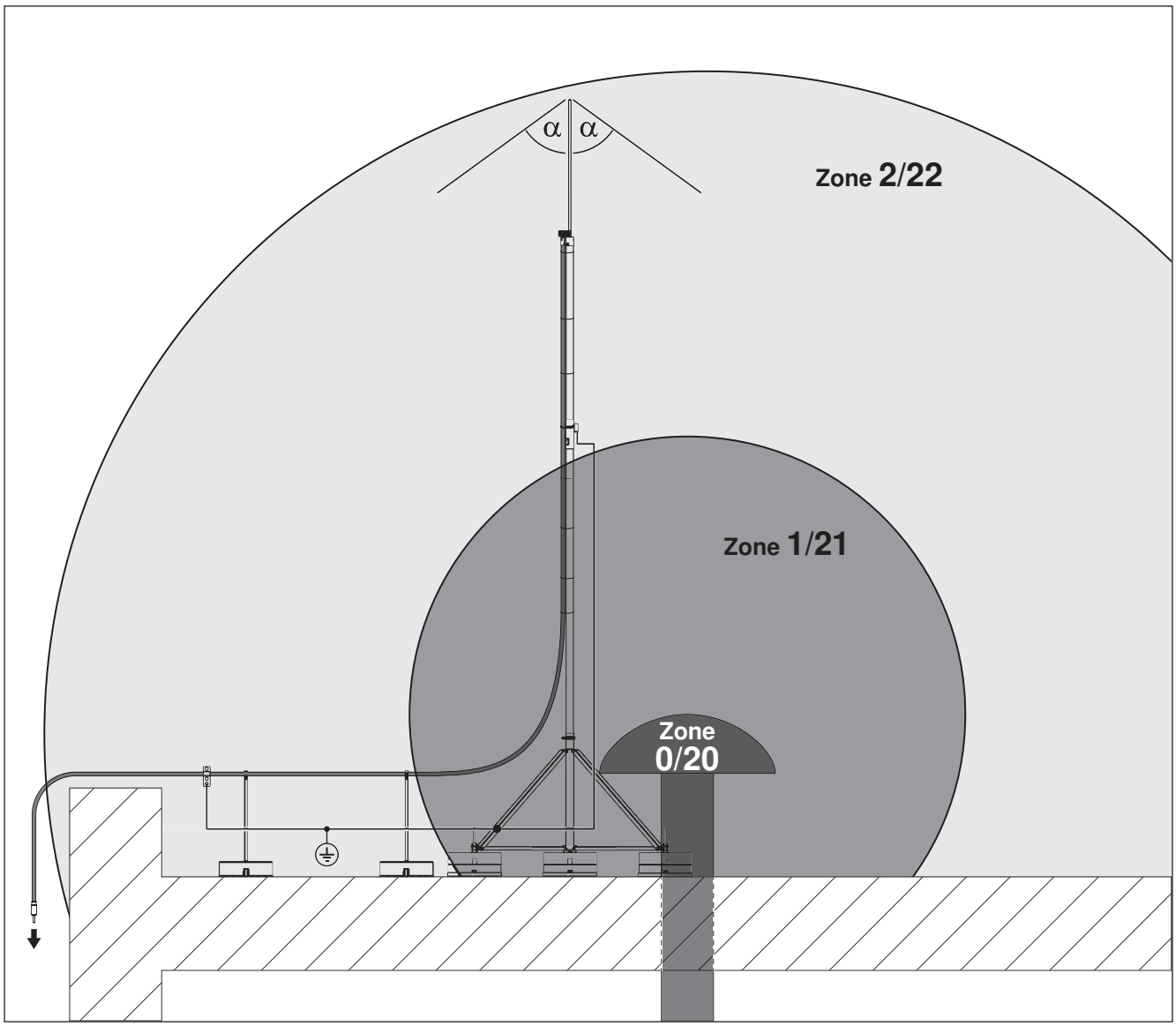


Fig. 15: Example of the installation of the isCon Pro+ conductor in the Ex zones of a potentially explosive area

4.5 Soft-covered roofs

Soft-covered roofs, e.g. straw, reed or thatched roofs, are particularly at risk of fire and require increased protection against lightning strikes. Here, the isCon® system, e.g. with internal arrestor (type isFang IN), can be included discreetly in the building's appearance as an air-termination system. The grey variant of the isCon® conductor guarantees a high degree of protection and can be routed safely under the soft roof.

Consult a roofer in order to have the insulated air-termination rod routed in a waterproof manner. Fasten the insulated air-termination rod to the roof structure using suitable supports (type isFang TW..).

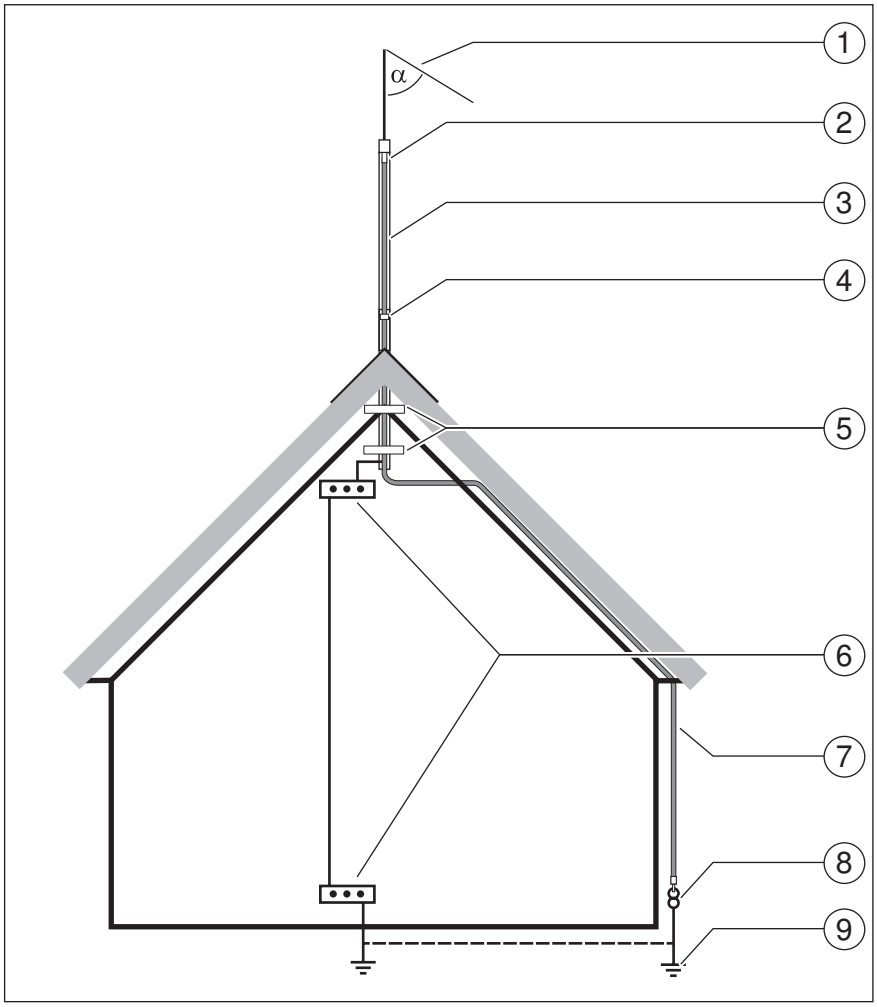


Fig. 16: Installation example: Soft-covered roof

Legend:

1. Air-termination rod
2. isCon® connection element
3. Insulated air-termination rod for internal isCon® conductor
4. isCon® potential connection
5. Support for wall mounting
6. Equipotential busbar
7. isCon® conductor
8. Separator
9. Earthing system

5 Installing the isCon® system

WARNING

Risk of electric shock!
If there is a lightning strike in the lightning protection system, lethal voltages can occur in the system.
Do not work on the lightning protection system during a thunderstorm or if there is the risk of one, and do not install air-termination masts in the immediate vicinity of high-voltage cables.

5.1 Cutting and stripping the isCon® conductor

The isCon® conductor is sold by the metre and in five variants:

Conductor type	Article no.
isCon PR 90 SW	5408 018
isCon Pro 75 SW	5408 008
isCon Pro+ 75 SW	5408 002, 5408 004, 5408 006
isCon Pro+ 75 GR	5407 995, 5407 997
isCon BA 45 SW	5408 014

Tab. 10: Product variants of the isCon® conductor

The grey isCon® conductor is also suitable for routing in the earth and can be used for protection against touch voltages up to a length of max. 5 m. If the conductor is not used as protection against touch voltages, then coloured painting, e.g. with facade paint, is also possible. As the external grey jacket is non-conductive, it must be removed in the contact areas.

- Shorten the isCon® conductor on-site to the required length using standard cable cutters or saw.

5.1.1 Removing the grey external jacket (isCon Pro+ 75 GR)

In the case of the isCon Pro+ 75 GR conductor, before attaching elements for potential connection, remove the grey external jacket in the contact area, so that the connection comes into contact with the protective jacket.

ATTENTION

Risk of damage!
The black, weakly conductive layer may not be removed, as otherwise the connection to the building's equipotential bonding can be interrupted.
Observe the cutting depth of the grey external jacket of 1.5 mm.

When mounting the isCon® connection elements:

- Remove 50 mm of the grey external jacket with a cable knife.

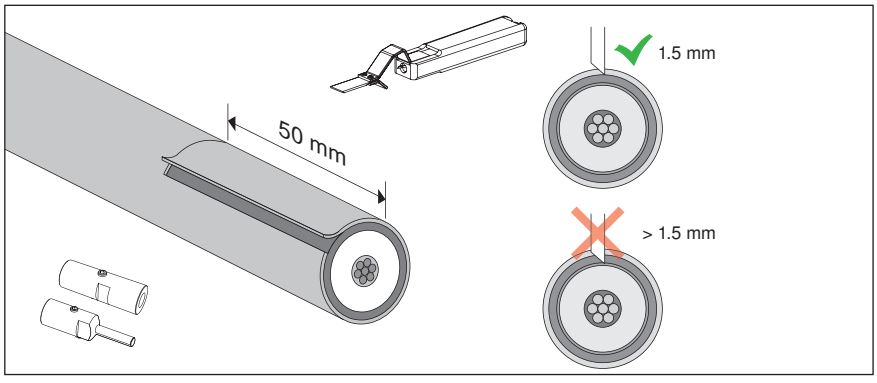


Fig. 17: Cutting and removing the grey outer jacket in the contact area

When mounting equipotential bonding elements (clips, clamps):

- Using a cable knife, remove the grey external jacketing in the contact area along a length of 100 mm.

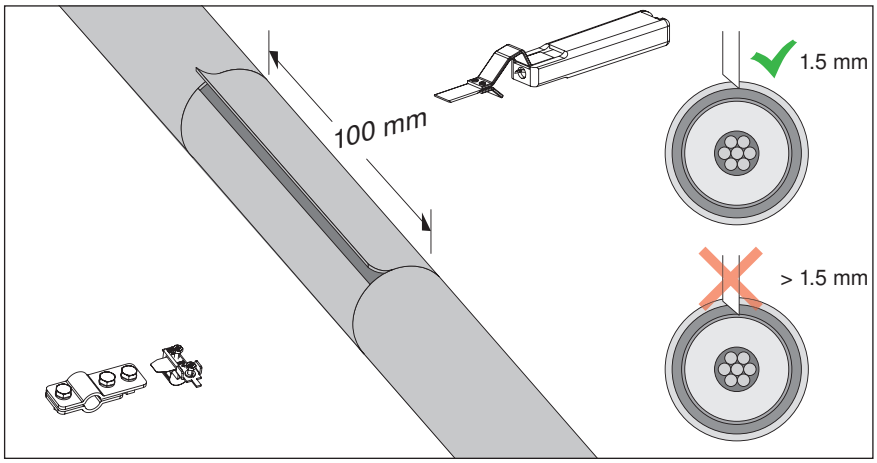


Fig. 18: Releasing the grey outer jacketing within the cable routing

5.1.2 Revealing the copper core for connection

CAUTION

Risk of injury!
Sharp blades in the cutting head of the stripping tool isCon stripper 2.
Do not reach into the cutting head of the stripping tool isCon stripper 2!

- Using the stripping tool isCon stripper 2, adjust the stripping length to 25 mm.

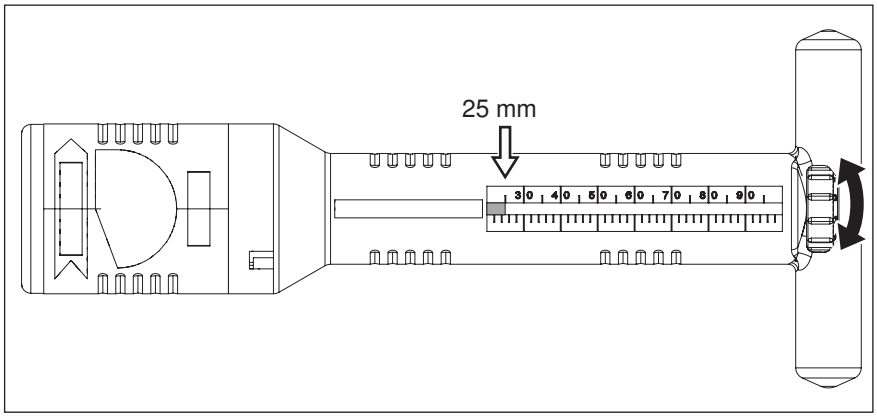


Fig. 19: Adjusting the stripping length

- Insert the isCon® conductor into the cutting head and, with slight pressure, turn the handle in a clockwise direction until the preset length of the insulation has been cut off.

WARNING

Risk of function loss!
If there is a lightning strike, connection faults can lead to devices being destroyed, fires triggered and human lives being endangered.
After stripping, ensure an even cut edge.
Remove excesses by hand.

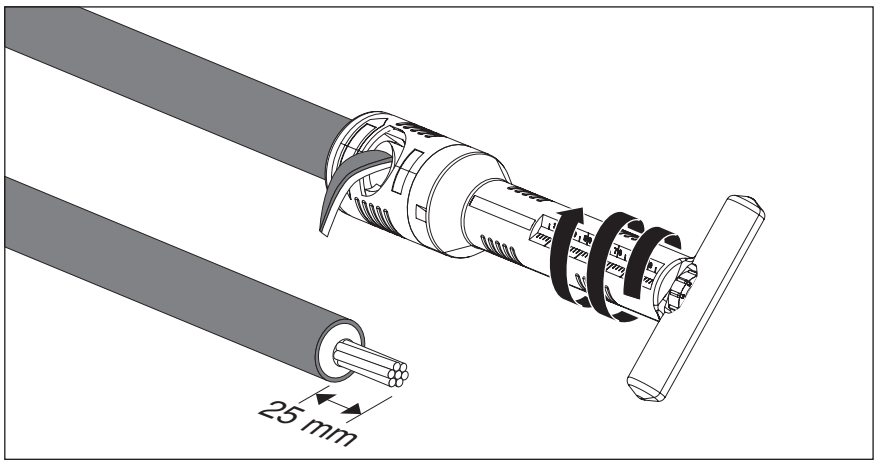


Fig. 20: Cutting the insulation

5.2 Mounting the connection elements isCon connect, isCon con 2 and isCon con PRE

Using the screw-on connection element isCon connect, isCon con 2 and isCon con PRE, you can connect OBO isCon® conductors to forwarding systems, e.g. to the insulated OBO isFang air-termination rod system or to a separate ring conductor or earthing system using a connection terminal. At the same time, an electrical connection is created between the copper core and the black, weakly conductive layer or protective jacket of the isCon® conductor. The grub screws in the connection element are pre-coated with a reactive screw lock made of two components. The components of the coating react automatically on turning in and stick down the grub screws. If the screws are released once more, the components are separated again and the grub screws are locked again the next time they are screwed in. The screw lock is fully hardened after six hours.

Scope of delivery (per packaging unit): 2 connection elements, 2 heat-shrinkable sleeves, Allen key.

- Remove the two grub screws from the connection element using the Allen key.

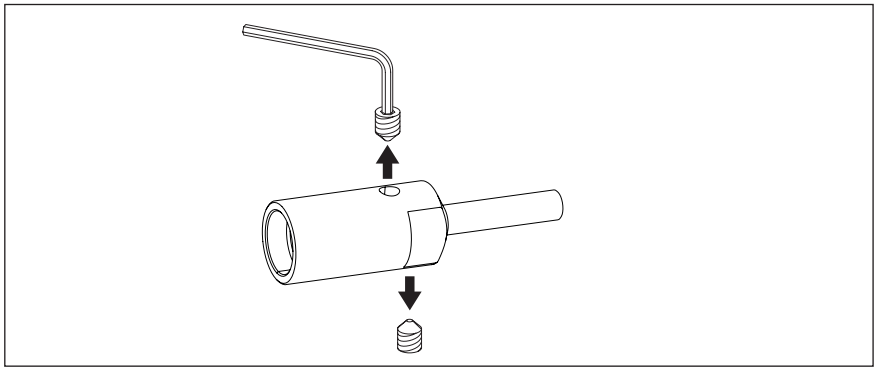


Fig. 21: Removing the grub screws

- Free the front area of the black, weakly conductive layer or protective jacket from impurities and grease (e.g. OBO art. no. 5408060).

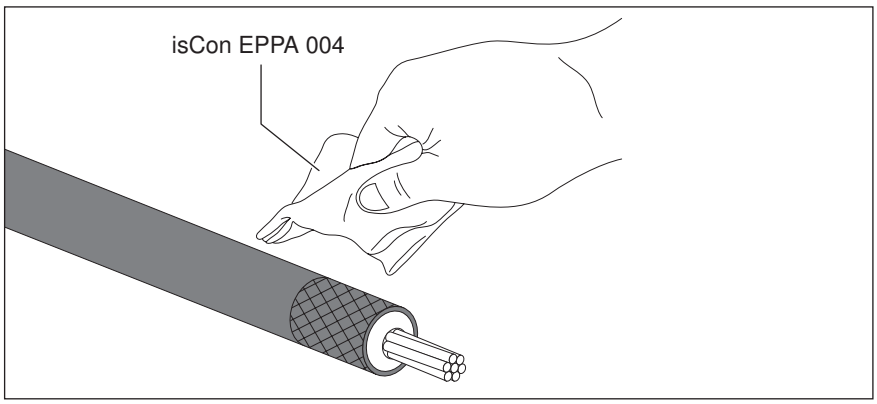


Fig. 22: Using a cleaning cloth

- Using a fork wrench (WAF 19 mm), screw the connection element onto the isCon® conductor, until the copper core can be seen completely in the two screw holes.

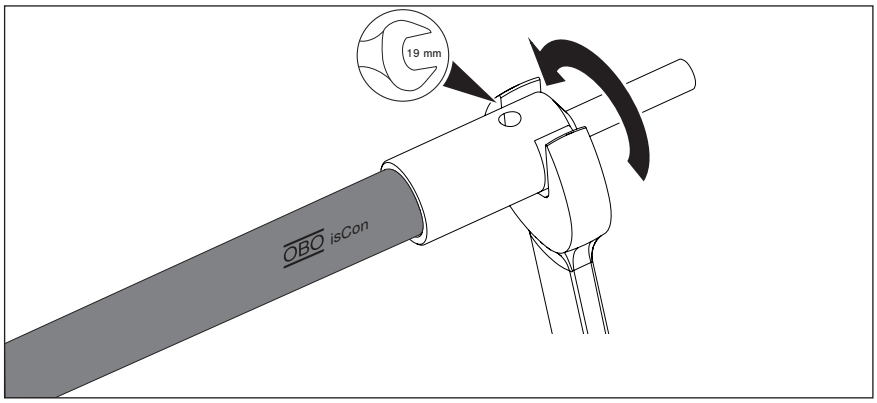


Fig. 23: Screwing on the connection element

- Tighten both grub screws with approx. 10 Nm.

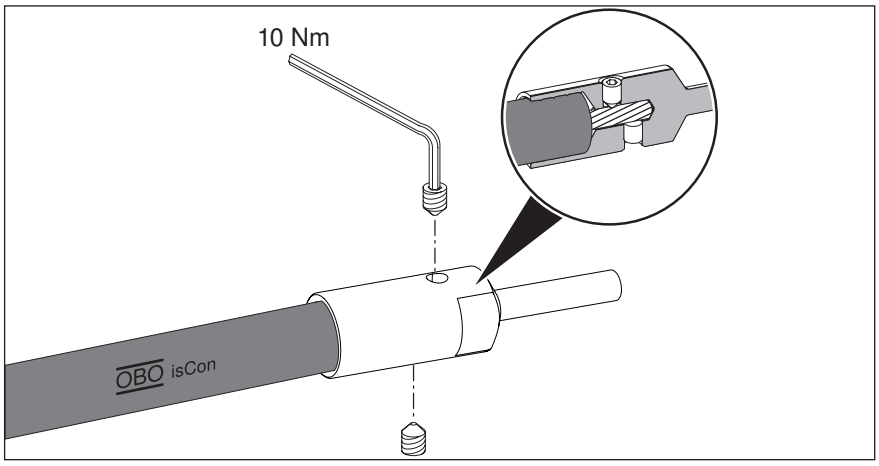


Fig. 24: Tightening the grub screws

- Pull the heat-shrinkable sleeve on in such a way that the connection element and conductor transition are enclosed completely. Using a gas torch or hot air at approx. 120 °C, shrink the heat-shrinkable sleeve and let it cool.

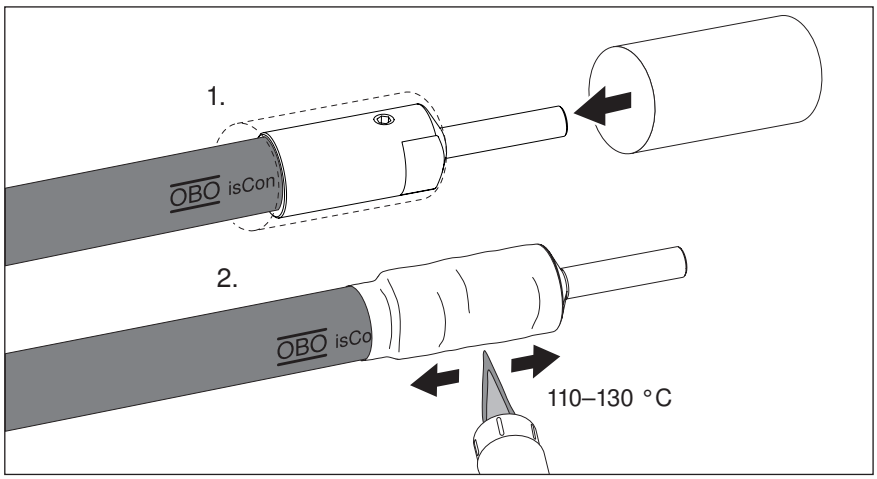


Fig. 25: Shrinking the heat-shrinkable sleeve

Note! *The yellow, reactive screw lock of the grub screws in the connection element requires approx. 6 hours to harden fully. Only when the screw lock has fully hardened is an increased releasing torque required to release the screws again.*

6 Assembling the air-termination rod

6.1 Air-termination rod with internal isCon® conductor

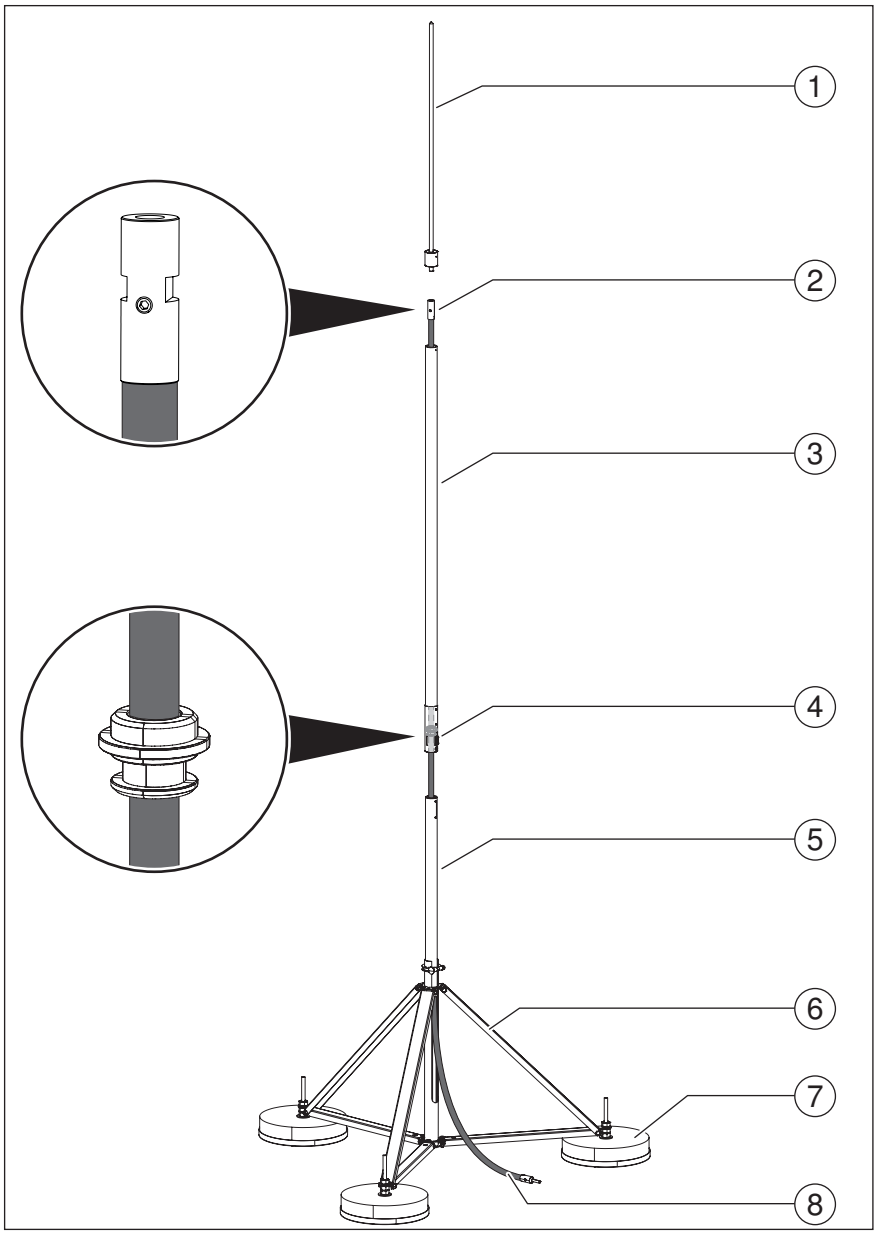


Fig. 26: isFang air-termination rod with internal isCon® conductor

Legend:

1. Air-termination rod
2. Internal connection element
3. Isolated central rod
4. Potential connection with potential connection element
5. Retaining mast with side exit
6. Air-termination rod stand with side exit
7. Concrete base with edge protection
8. Internally routed isCon® conductor with connection element

Preparing the isCon® conductor

- When using the isCon Pro+ 75 GR conductor:
  Using a cable knife, remove the grey external jacket to a length of 50 mm (see also “5.1 Cutting and stripping the isCon® conductor” on page 28).

WARNING

Risk of function loss!
If there is a lightning strike, connection faults can lead to devices being destroyed, fires triggered and human lives being endangered.
After stripping, ensure an even cut edge.
Remove excesses by hand.

CAUTION

Risk of injury!
Sharp blades in the cutting head of the stripping tool isCon stripper 2.
Do not reach into the cutting head of the stripping tool isCon stripper 2!

- Using a stripping stool, e.g. isCon stripper 2, reveal the copper core along a length of 25 mm.

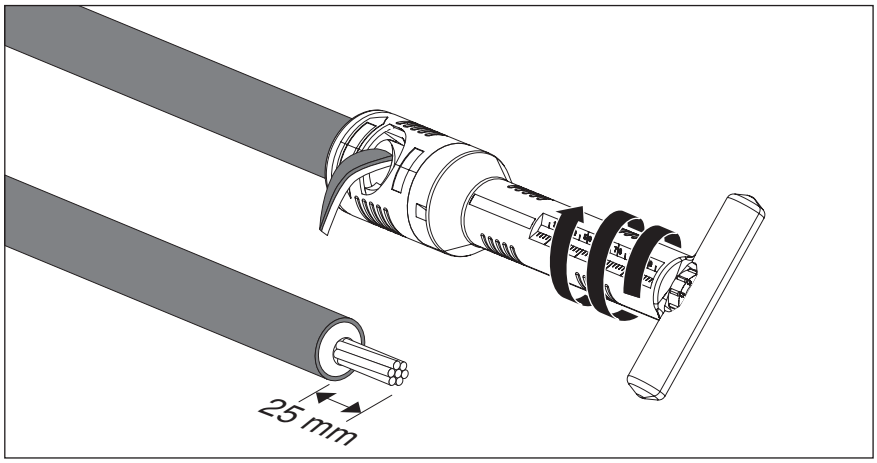


Fig. 27: Cutting the insulation

- Free the front area of the black, weakly conductive layer or protective jacket from impurities and grease (e.g. OBO art. no. 5408060).

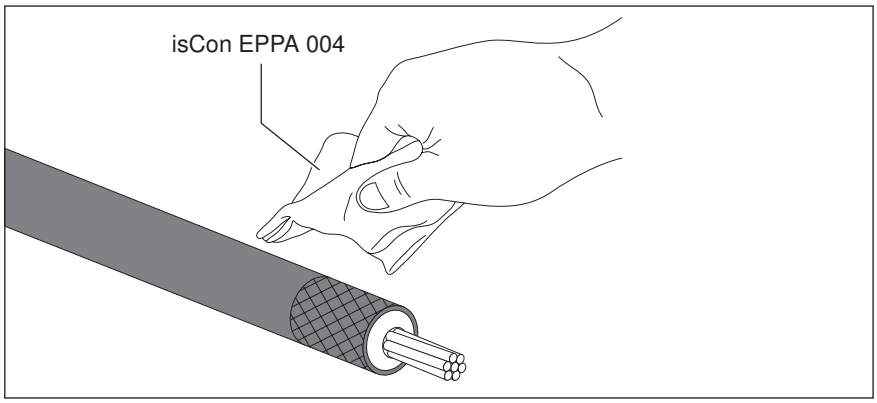


Fig. 28: Using a cleaning cloth

- Remove the grub screws from the connection element.

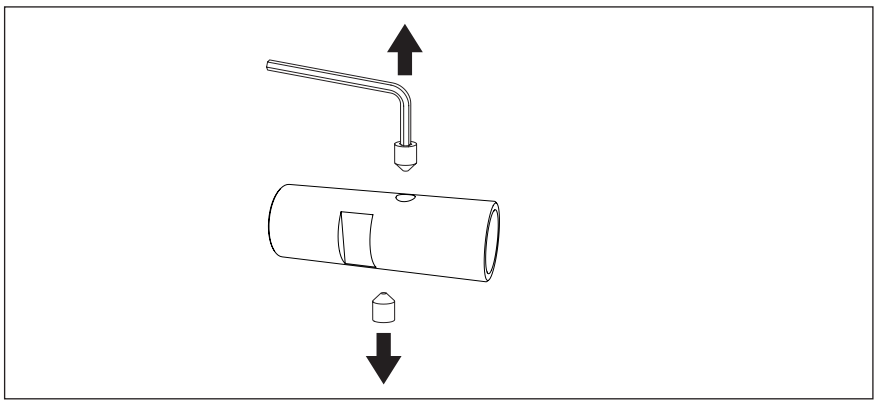


Fig. 29: Removing the grub screws

- Using a fork wrench (WAF 19 mm), screw the isCon IN connect, isCon IN con 2 or isCon IN con PRE connection element onto the isCon® conductor, until the copper core can be seen completely in the two screw holes.

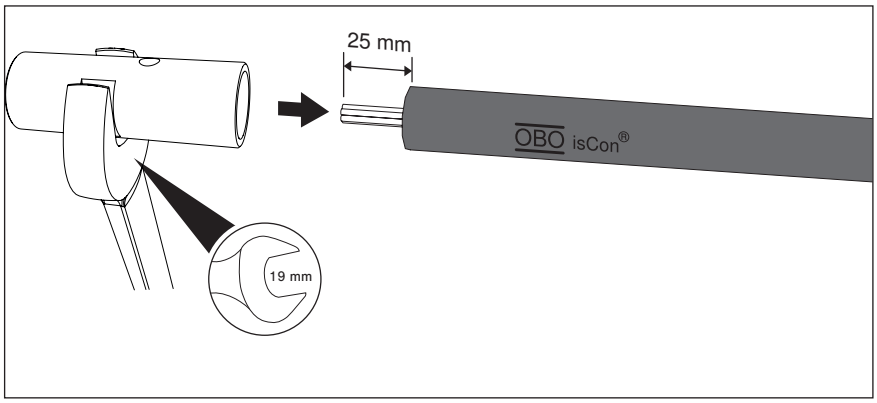


Fig. 30: Screwing on the connection element

- Tighten both grub screws with approx. 10 Nm.

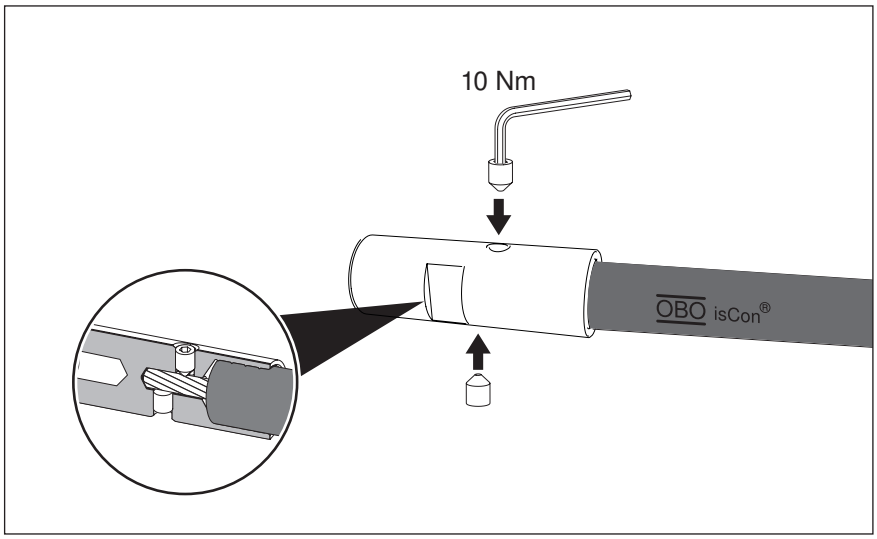


Fig. 31: Tightening the grub screws

Only for the grey isCon® conductor Pro+ 75 GR:

To connect the potential connection element, the grey external jacket in the contact area must be removed before you push the conductor into the air-termination rod.

ATTENTION

Risk of damage!
The black, weakly conductive layer may not be removed, as otherwise the connection to the building's equipotential bonding can be interrupted. In the case of the grey external jacket, maintain a maximum cutting depth of 1.5 mm.

- Measure 1,500 mm from the bottom edge of the isCon® connection element.
- Remove 50 mm of the grey external jacket with a cable knife.

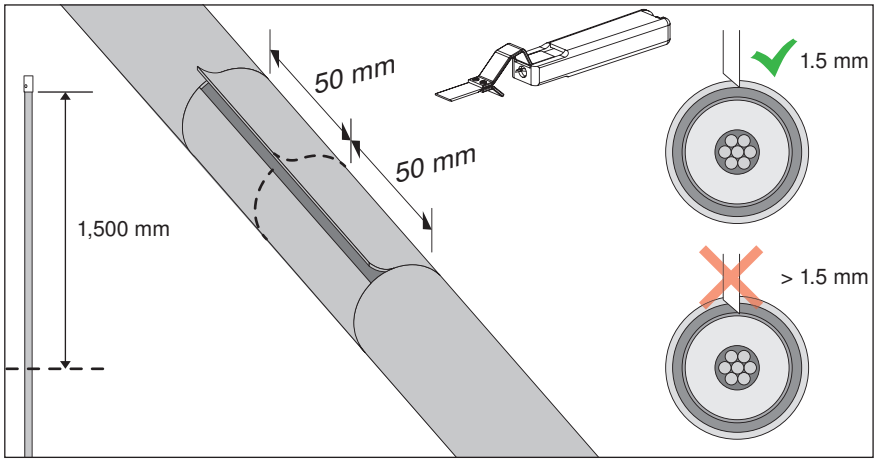


Fig. 32: Removing the grey external jacket

Assembling the air-termination rod

- Lay all three parts of the air-termination rod on the ground.
- From below, run the isCon® conductor through the retaining rod and the central rod.

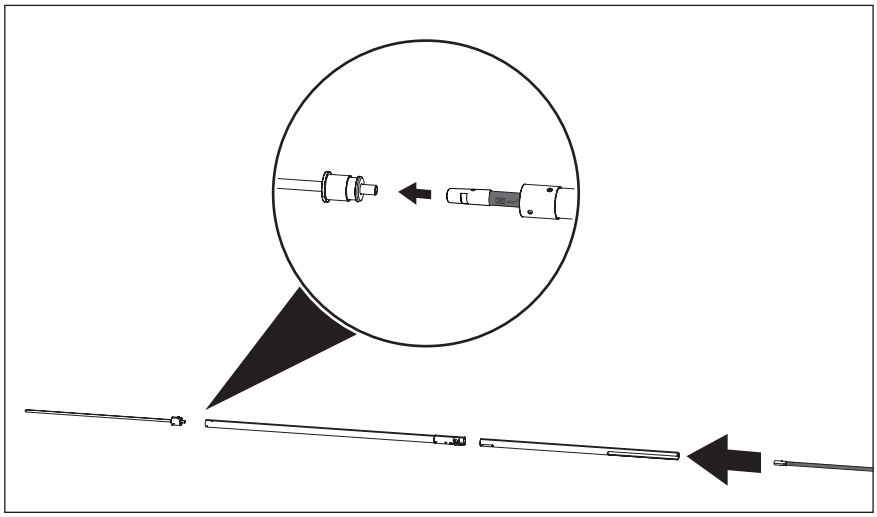


Fig. 33: Pushing the isCon® conductor through the air-termination rod

- Fix the connection element with a fork wrench (WAF 19 mm) and screw the air-termination rod tight to the connection element.

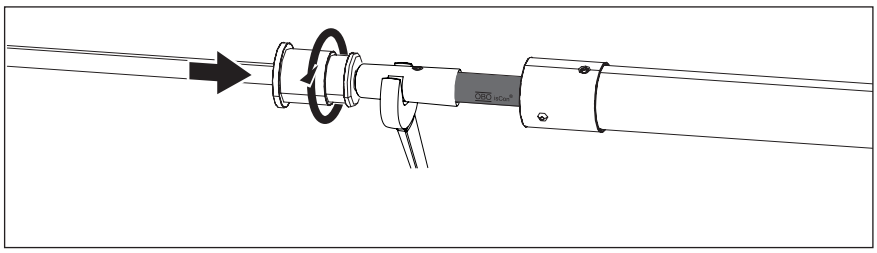


Fig. 34: Screwing the air-termination rod to the connection element

The internal potential connection element consists of two half shells. These must be located in such a way that they surround the isCon® conductor and one of the half shells is located centrally beneath the screw holes, so that it can be pressed using the side screw (see Fig. 38).

- Place the two half shells of the potential connection element on the conductor and push them into the retaining pipe.

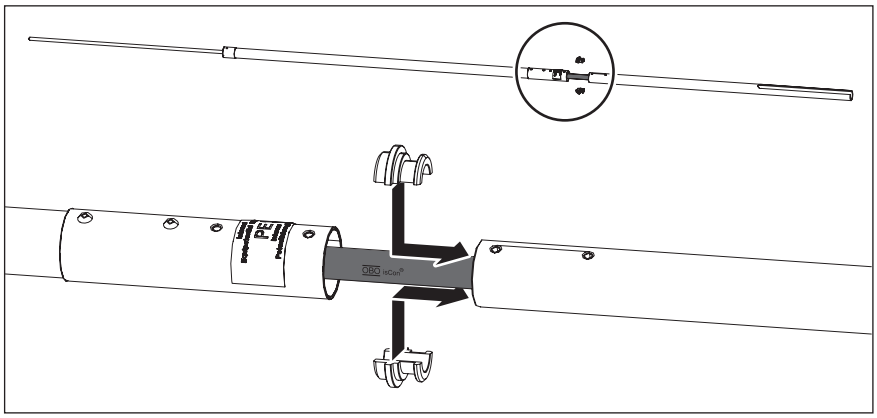


Fig. 35: Attaching the internal potential connection element

- Push the retaining rod as far as it will go into the central rod. In so doing, the opening for the left copper screw (see Fig. 38) may not point to the gap between the half shells of the potential connection, but centrally to one of the half shells. If necessary, turn the half shells accordingly.

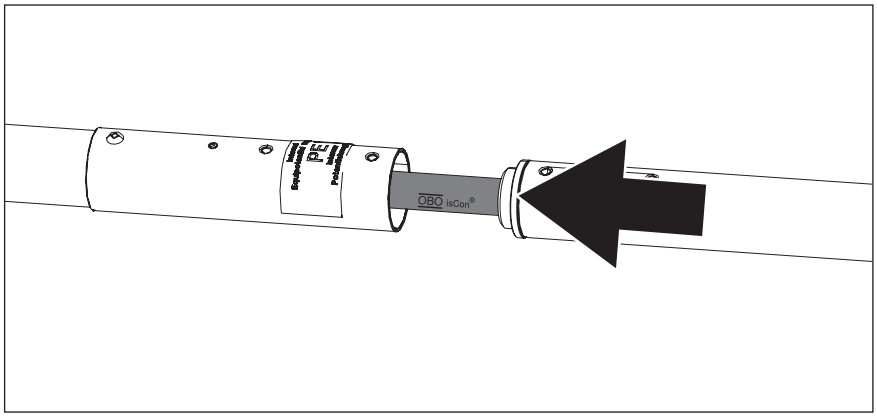


Fig. 36: Pushing the retaining rod into the central rod

- Insert the bottom part of the air-termination rod into the central mast and fix with the side screw (20 Nm).

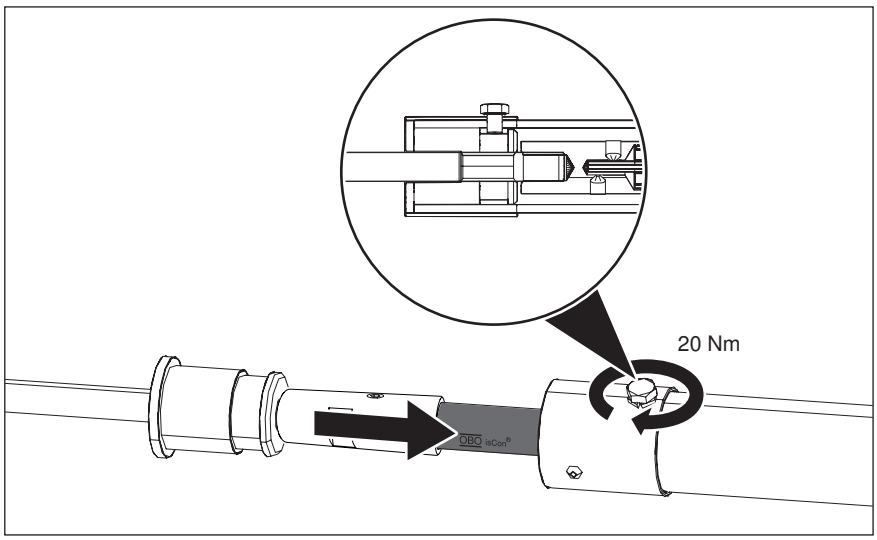


Fig. 37: Fixing the air-termination rod in the central mast

- Tighten the screws at the connection point of the central rod and the retaining rod (20 Nm).

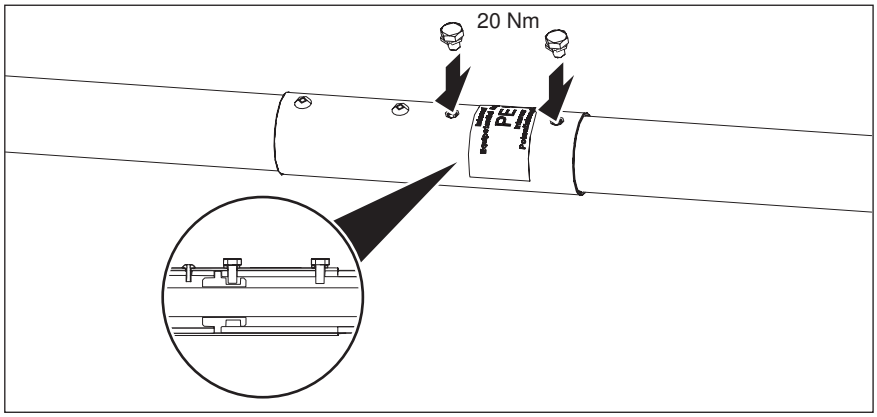


Fig. 38: Connecting the insulated central rod and the retaining rod

Next steps:

– “6.3 Fastening the air-termination rod in the air-termination rod stand” on page 43 or “6.4 Fastening the air-termination rod to pipes, a wall or T support” on page 48
– “6.5 Routing the isCon® conductor” on page 49
– “6.6 Attaching the potential connection” on page 50

6.2 Air-termination rod with external isCon® conductor

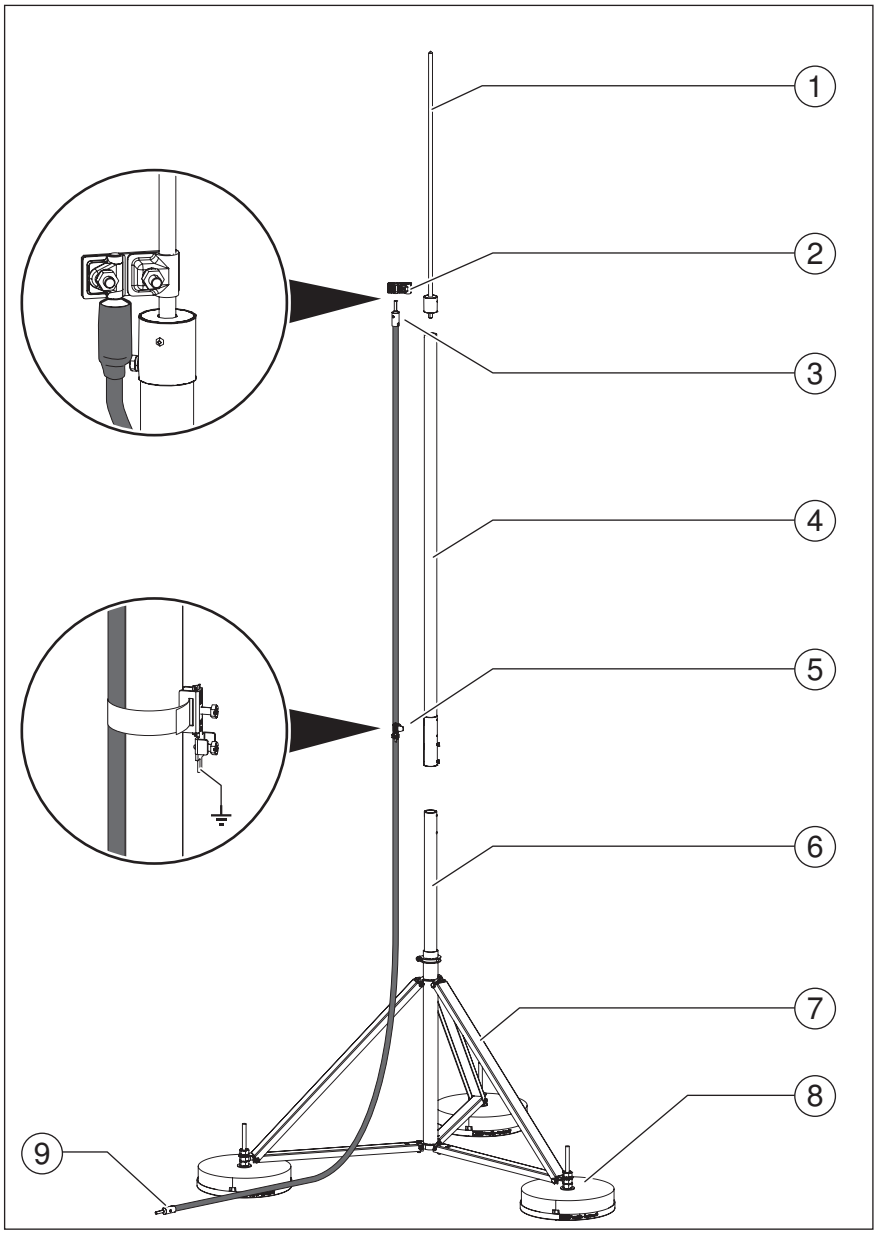


Fig. 39: isFang air-termination rod with external isCon® conductor

Legend:

1. Air-termination rod
2. Connection plate
3. Top connection element
4. Insulated central rod
5. Potential connection with potential connection clip
6. Retaining rod
7. Air-termination rod stand
8. Concrete base with edge protection
9. isCon® conductor with connection element

Preparing the isCon® conductor

- When using the isCon Pro+ 75 LGR:
  Using a cable knife, remove the grey external jacket to a length of 50 mm (see also “5.1 Cutting and stripping the isCon® conductor” on page 28).
- Mount the connection element (Fig. 39 No. ③) on the isCon® conductor as described in sections “5.1.2 Revealing the copper core for connection” on page 29 and “5.2 Mounting the connection elements isCon connect, isCon con 2 and isCon con PRE” on page 30.

Only for the grey conductor isCon Pro+ 75 GR:

To connect the potential connection element, the grey external jacket in the contact area must be removed.

ATTENTION

Risk of damage!
The black, weakly conductive layer may not be removed, as otherwise the connection to the building's equipotential bonding can be interrupted. In the case of the grey external jacket, maintain a maximum cutting depth of 1.5 mm.

- Measure 1,500 mm from the bottom edge of the isCon® connection element.
- Remove 50 mm of the grey external jacket with a cable knife.

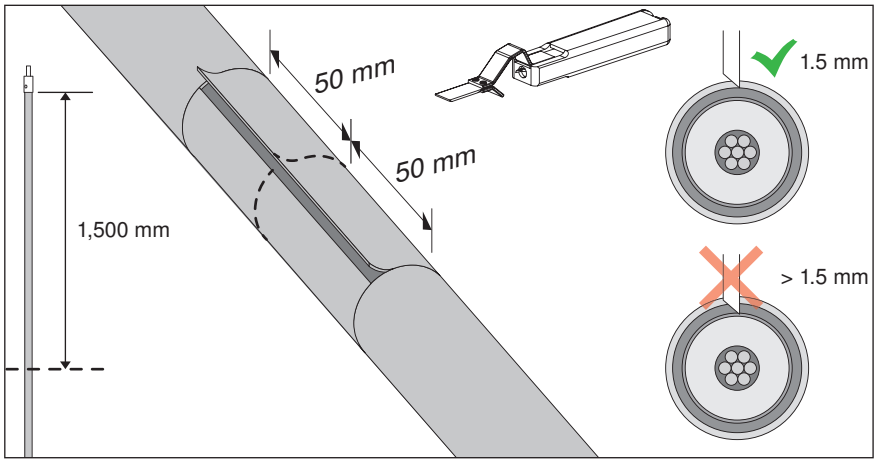


Fig. 40: Removing the grey external jacket

Fastening the isCon® conductor on the air-termination rod

For one isCon® conductor:

- Mount the connection plate (type isCon AP1-16 VA) at the bottom end of the air-termination rod, as shown in Fig. 41. Tightening torque: 24 Nm
- Mount the connection element of the isCon® conductor on the connection plate. Tightening torque: 24 Nm.

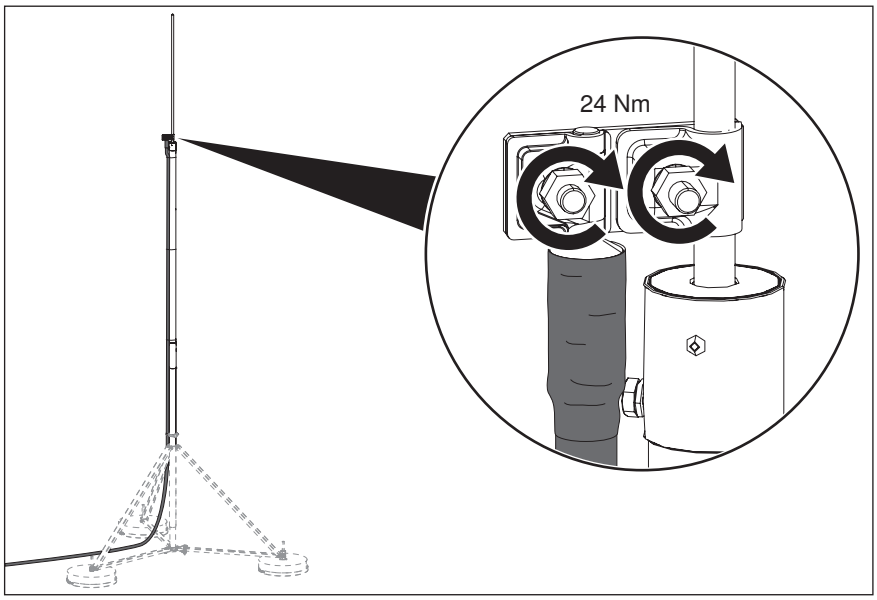


Fig. 41: Mounting the connection plate for one isCon® conductor on the air-termination rod

For multiple isCon® conductors

- For 2 isCon conductors, use the connection plate for 2 conductor (type isCon AP2-16 VA). When connecting 4 conductors, mount 2 connection plates over each other (see Fig. 42).
- Mount the connection element of the isCon® conductor on the connection plate. Tightening torque: 24 Nm.
- Run the conductors downwards on the air-termination rod, ideally opposite one another (see Fig. 42).
- Install the conductors as far apart from each other as possible, if the installation conditions permit this.

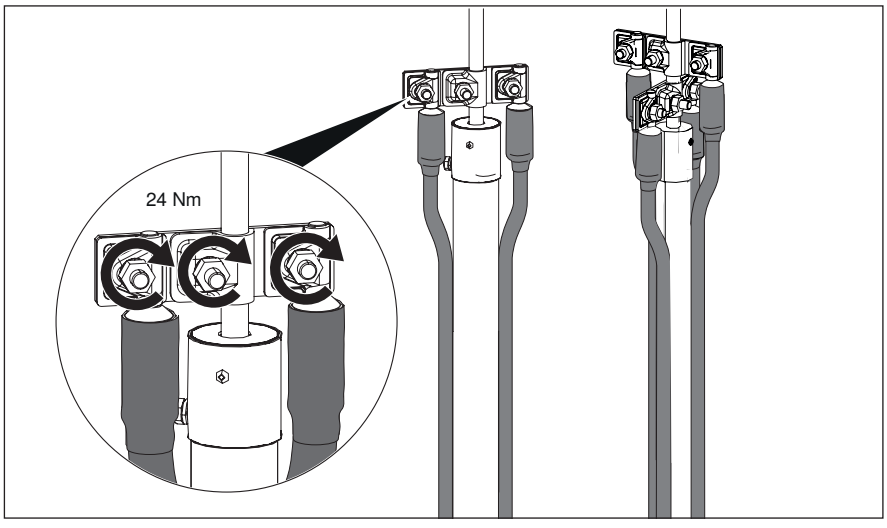


Fig. 42: Fastening multiple isCon® conductors on the mast

- In addition, fasten the isCon® conductor to the air-termination rod at a maximum distance of 1 metre through non-metallic strip clips (cable ties, type 555 7.6x380 SWUV).

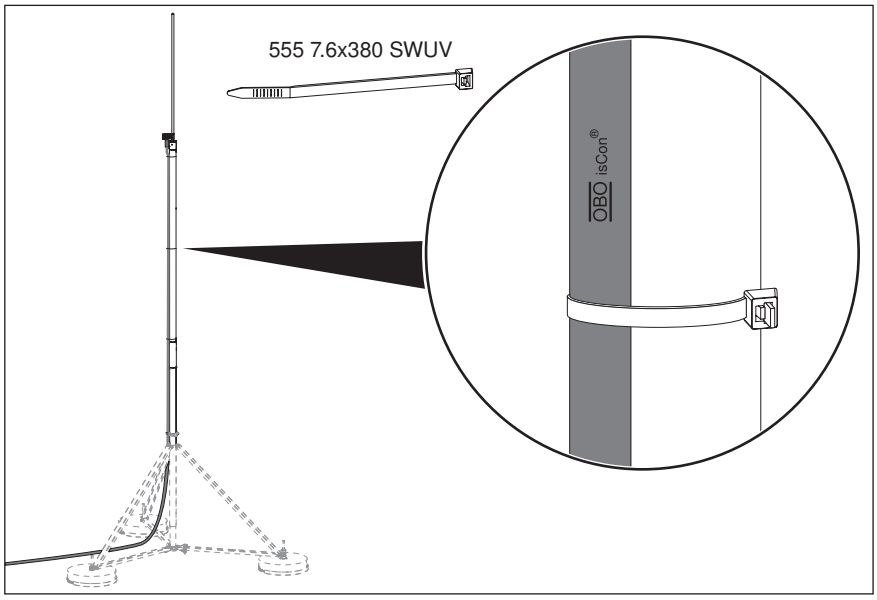


Fig. 43: Fastening the isCon® conductor on the air-termination rod using strip clips

- Fasten the potential connection clip (type 927 2 6-K) to the metallic element at the lower end of the insulated central rod.

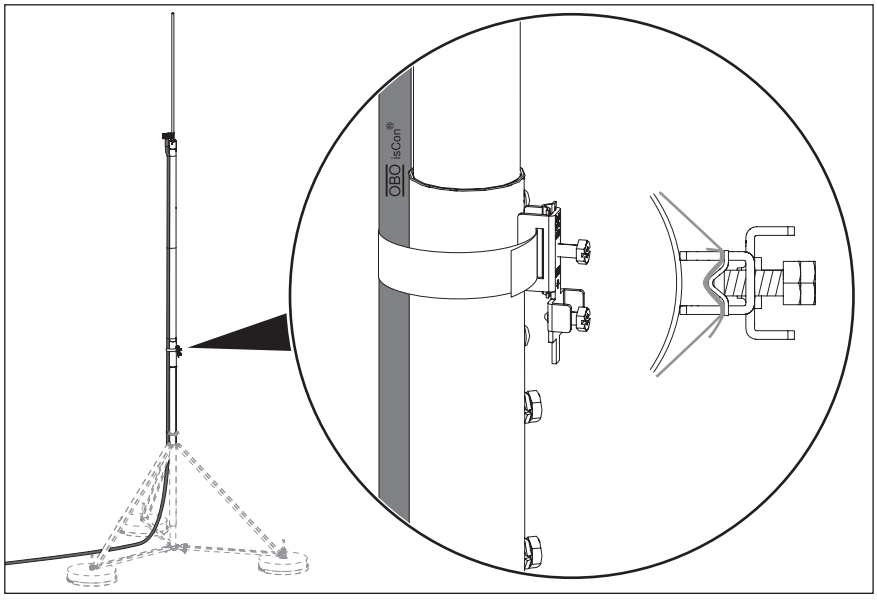


Fig. 44: Fastening the potential connection clip to the air-termination rod

Next steps:

– “6.3 Fastening the air-termination rod in the air-termination rod stand” on page 43 or “6.4 Fastening the air-termination rod to pipes, a wall or T support” on page 48
– “6.5 Routing the isCon® conductor” on page 49
– “6.6 Attaching the potential connection” on page 50

6.3 Fastening the air-termination rod in the air-termination rod stand

6.3.1 Mounting the concrete base

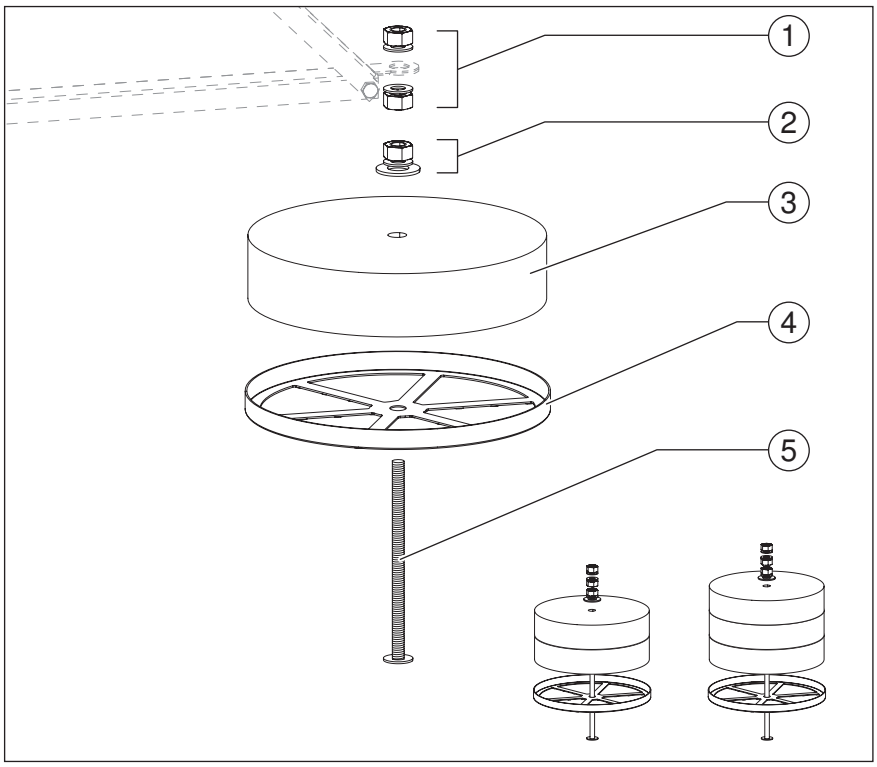


Fig. 45: Concrete base with fastenings

Legend:

1. Hexagonal nuts (with washers) for height compensation
2. Lock nut (with washer and plate)
3. Concrete base
4. Edge protection
5. Threaded rod

- From below, push the threaded rod through the opening of the edge protection and the concrete base and fix it with the lock nut.

6.3.2 Erecting the air-termination rod stand

See also “3.3 Insulated air-termination rods” on page 12.

CAUTION

Risk of crushing when erecting the air-termination rod stand!
When erecting the air-termination rod stand, hands and other limbs may be crushed by moving parts.
When erecting the air-termination rod stand, do not reach between moving parts!

ATTENTION

Risk of damage!
When multiple concrete bases are used, the heavy weight can lead to damage to the substrate.
If necessary, place protective mats under the concrete base.

Note! *To determine how many concrete bases must be used in the isFang air-termination rod system, we recommend asking a planning office to carry out the static calculations. You can find further information on wind speed zones in the OBO TBS lightning protection guide and national directives.*

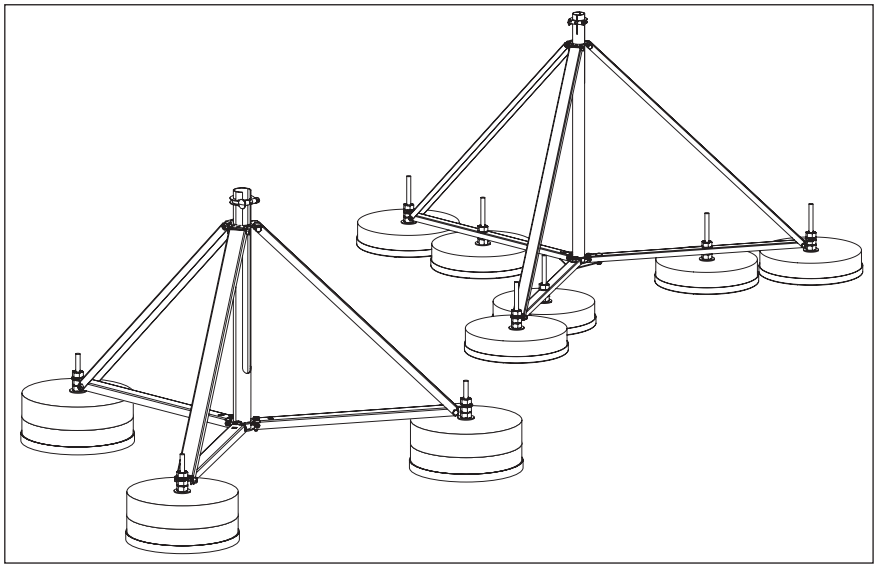


Fig. 46: Mounted concrete base

- Remove the lock nuts on the threaded rods.
- Unfold the air-termination rod stand.
- Fix the air-termination rod stand by screwing in the three locking screws and the spring washers.
- Check that all the screws on the hinges fit tightly, and retighten as necessary.

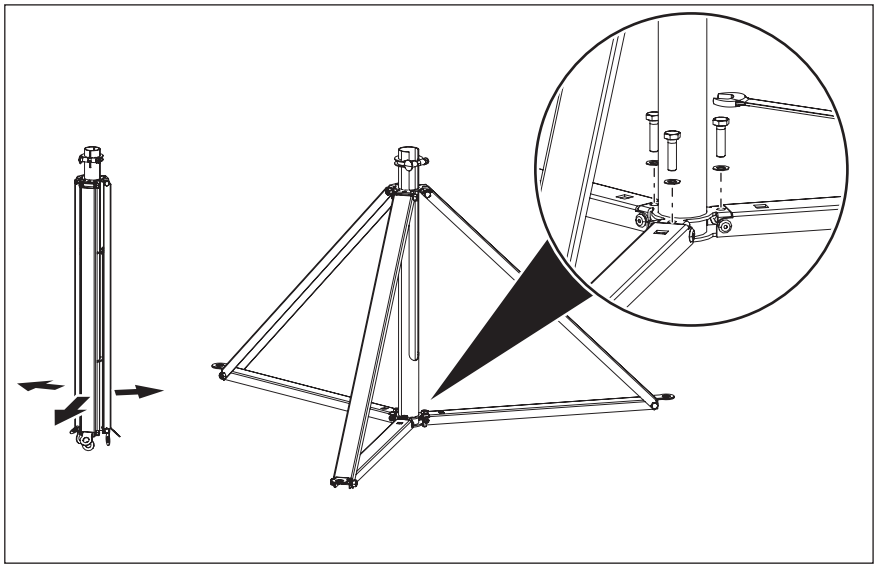


Fig. 47: Unfolding and fixing the air-termination rod stand

- Position the air-termination rod stand on the concrete bases.

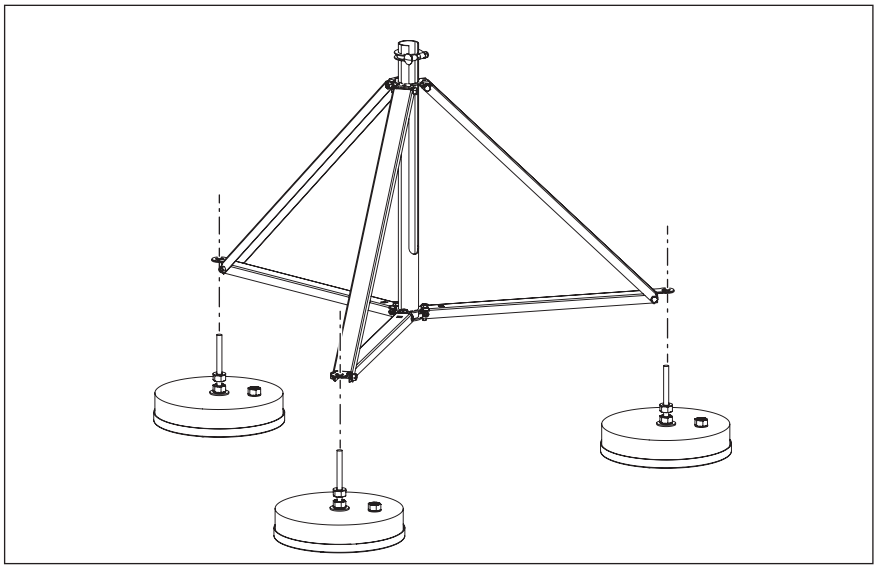


Fig. 48: Positioning the air-termination rod stand

- Determine the inclination of the air-termination rod stand (depending on the slope of the roof) using a spirit level.
- Compensate for the inclination of the air-termination rod stand using the hexagonal height compensation nuts (max. 5 degrees).
- Tighten the lock nuts.

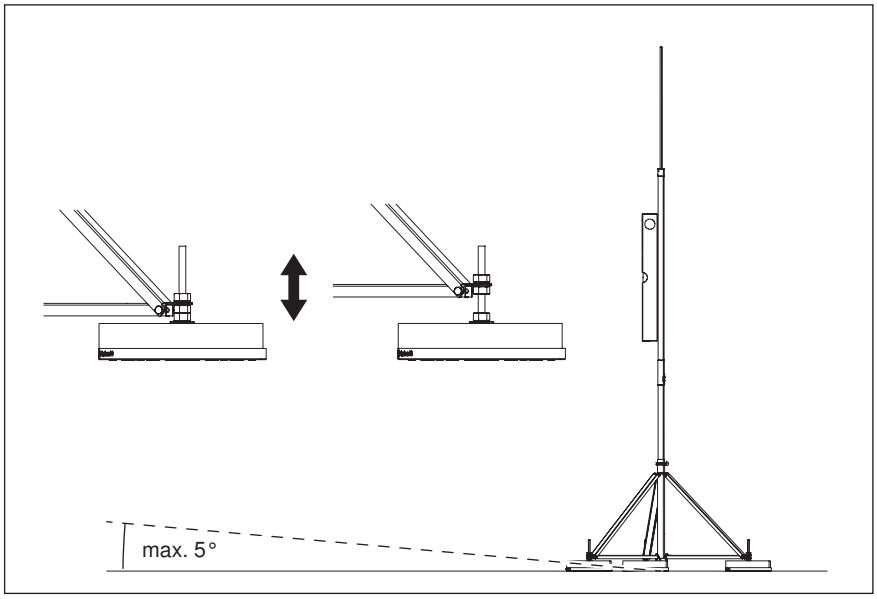


Fig. 49: Compensating for the roof slope

6.3.3 Fastening the air-termination rod in the air-termination rod stand

Air-termination rod with internal isCon® conductor

- Insert the air-termination rod into the air-termination rod stand from above.

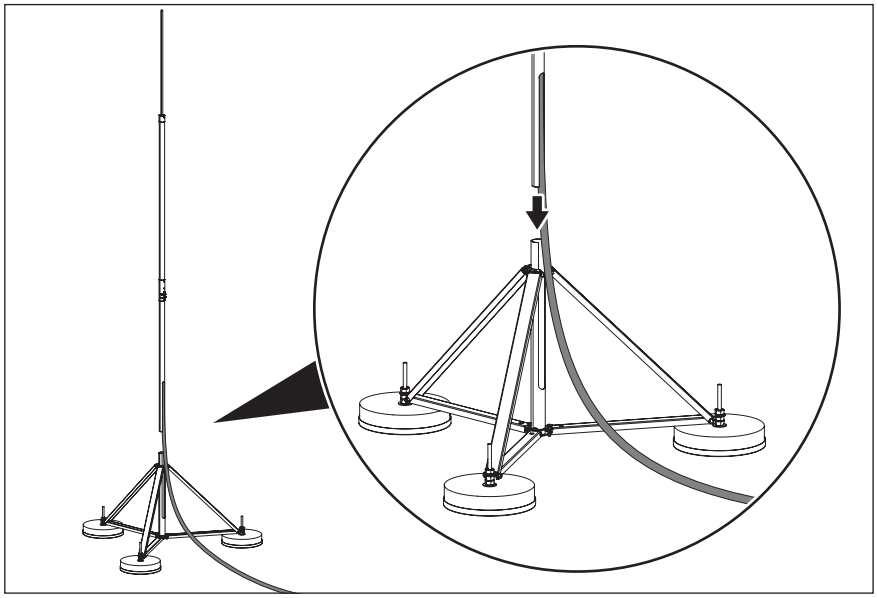


Fig. 50: Inserting the air-termination rod in the air-termination rod stand

- Tighten the clamp clip, thus fixing the air-termination rod.

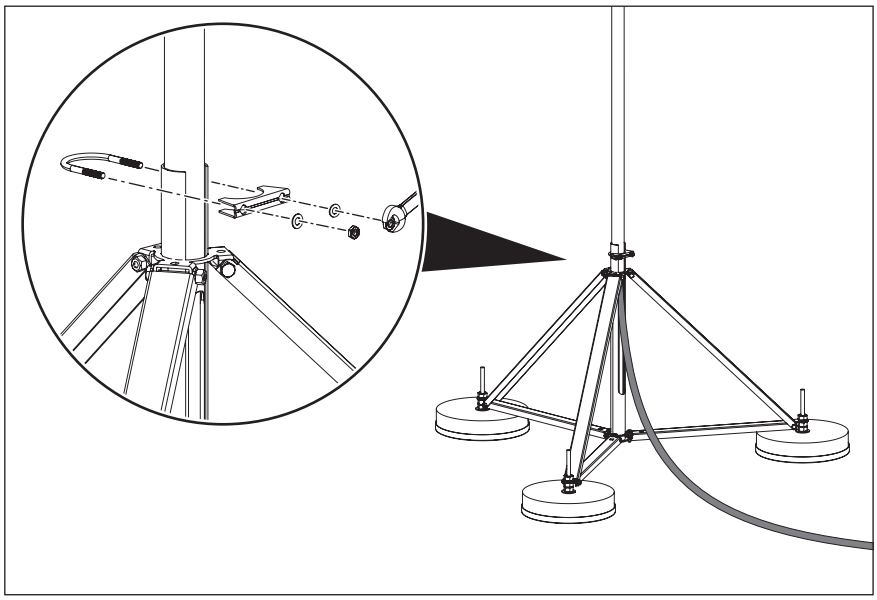


Fig. 51: Fastening the air-termination rod in the air-termination rod stand

Air-termination rod with external isCon® conductor

- Insert the air-termination rod into the air-termination rod stand from above.
- Tighten the clamp clip, thus fixing the air-termination rod.

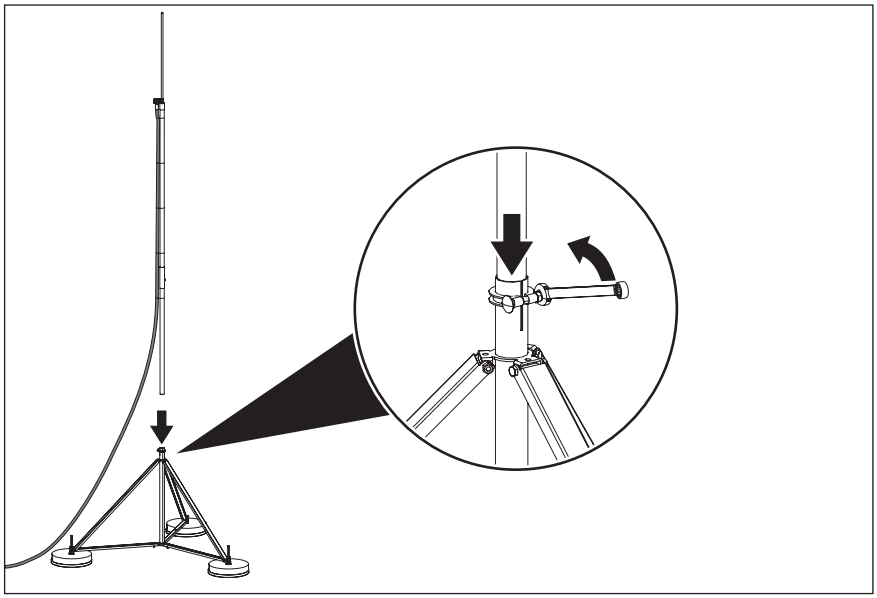


Fig. 52: Fixing the air-termination rod in the air-termination rod stand

- In addition, fasten the isCon® conductor to the air-termination rod stand using strip clips (cable ties), whilst maintaining the minimum bend radius (see Tab. 2 on page 10) of the isCon® conductor to the ground.

6.4 Fastening the air-termination rod to pipes, a wall or T support

The isCon® system can offer supports for fastening to pipes, walls or T supports for mounting isFang air-termination rods with air-termination rod stands (see “3.4.2 Air-termination rod support for isFang mounting” on page 17). This applies to air-termination rods with openings at the side or the bottom, as well as to rods with an external isCon® conductor.

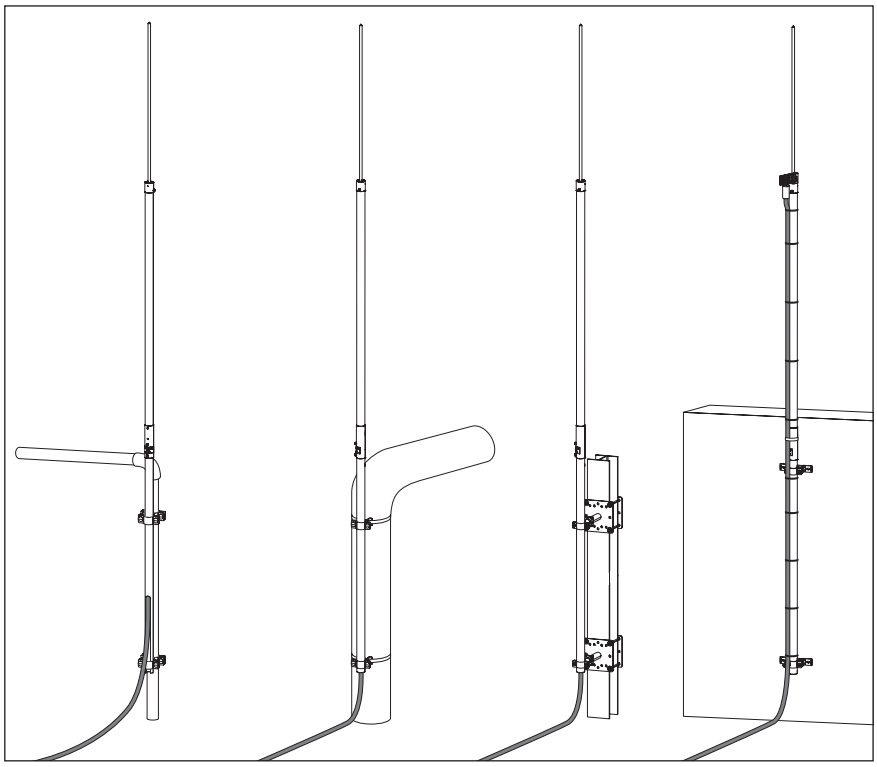


Fig. 53: Fastening air-termination rods to pipes, walls or T supports

Please note:

– Fasten the air-termination rod to the building structure using the supports listed in Tab. 6 on page 17 and suitable fastening materials.
– In the case of a non-metallic building structure, connect the equipotential bonding directly to the equipotential bonding of the air-termination rod (see “6.6 Attaching the potential connection” on page 50).

Note! *In the case of a metallic, earthed building structure, the equipotential bonding is created using the metallic fastening clips of the air-termination rod. No additional connection is required.*

6.5 Routing the isCon® conductor

When routing the isCon® conductor to the forwarding conductor system, observe the following information:

– The complete isCon® conductor must be located in the protection area of the lightning protection system.
– The black conductors may not be routed in the earth. They may not be painted. Instead, use the grey isCon Pro+ 75 GR conductor.
– Only use the accessories for fastening (see section 3.4.3 on page 18).
– The isCon® conductor may only be connected onward using the OBO connection elements of the appropriate isCon® variant.
– An isCon® conductor may not be extended.
– When making route changes, maintain the minimum bend radius (see Tab. 2 on page 10).
– Route the isCon® conductor in such a way that it cannot be damaged by sharp-edged objects.
– If the isCon® conductor is damaged, the entire section must be replaced, as otherwise the correct function cannot be guaranteed. This does not apply to the isCon® conductors Pro+ 75. The Pro+ 75 variants may exhibit any damage to the grey external jacket and/or protective jacket, if they are not used as protection against touch voltages. However, the protective jacket must also be continuously present, even in cases of damage, and have a thickness of 0.2 mm. The black, weakly conductive layer may not be damaged or interrupted.
– Ensure that the conductor is connected to the equipotential bonding of the structure as described in section 6.6. Create additional equipotential bonding for metallic objects which cross or run in parallel (see section 6.6.4 on page 55).
– Special measures must be complied with for routing in potentially explosive areas (see “4.4 Installation in potentially explosive areas” on page 25).
– No point of the protective jacket or black, weakly conductive layer of the isCon® conductor may come into contact with parts carrying lightning current.
– Elements fastening the isCon® conductor may be spaced a maximum of 1 metre apart.

6.6 Attaching the potential connection

If there is a direct lightning strike to the air-termination rod, the incoming energy is run through the connected isCon® conductor to the building's lightning arrestor system. To prevent surface discharge moving away along the surface, the isCon® conductor must be connected to the equipotential bonding of the structure in the area of the two connection points.

The potential connection can be made via metallic and earthed roof structures, via generally earthed parts of the building structure and via the protective conductor of the low-voltage system.

Risk of function loss!
Metallic chips from the connection area of the conductor could cause a short circuit between the connection element and potential connection if there is a lightning strike.
This can disrupt the arresting function of the insulated conductor. Floating discharges may occur.
After installation, clean the connection area of metallic chips.

Danger of lightning currents entering the building!
If, during a thunderstorm, a lightning strike runs lightning currents into the building, the coupled currents can destroy devices, cause fires and endanger lives.
If there is a lightning strike, the equipotential bonding must not carry lightning current and must be in the protection angle of the lightning protection system.

Note! *If you use the grey isCon® conductor, you must remove the grey external jacket before connecting the potential connection (see "5.1.1 Removing the grey external jacket (isCon Pro+ 75 GR)" on page 28).*

Note! *Before attaching a potential connection element (e.g. clip), clean the black, weakly conductive layer or the protective jacket of the isCon® conductor from grease and other impurities to improve the electrical conductivity, using a cleaning cloth type isCon EPPA 004 (art. no. 5408 060).*

6.6.1 Installing the potential connection on an insulated air-termination rod

Note! *The isCon® conductor of type isCon Basic 45 does not require equipotential bonding on the internal or external potential connection element.*

With a calculated separation distance of s ≤ 0.75 metres, a distance of x = 1.5 metres must be maintained between the top connection element and the following connection for the equipotential bonding (see Fig. 13 on page 21, No. ④). The design of the isFang air-termination rod provides this distance through its 1.5 metre-long central rod.

The potential connection on the insulated air-termination rod must be designed differently for air-termination rods with internal and external conductor.

Internal isCon® conductor
In the case of isFang air-termination rods with an internal isCon® conductor, the potential connection must be connected via the potential connection element, which is located internally (see also Fig. 35 and Fig. 38). The potential connection must be brought into contact with the potential connection element via the bottom screw and also with the black, weakly conductive layer or the protective jacket of the isCon® conductor.

- Slacken the bottom screw as shown in Fig. 54.
- Connect the protective equipotential bonding of the building to be protected with the internal potential connection element, e.g. with a cable lug.
- Tighten the bottom screw again (20 Nm).

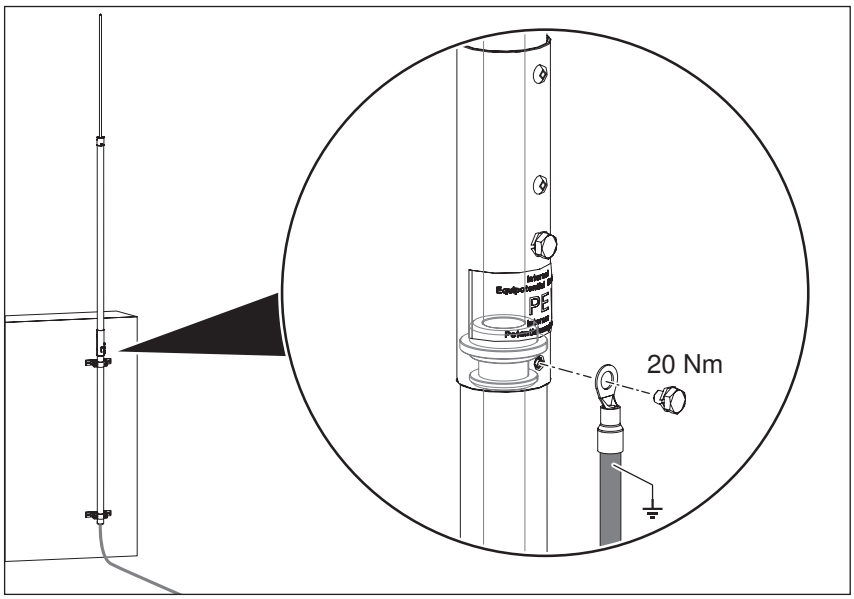


Fig. 54: Connecting the potential connection to the air-termination rod using a cable lug

External isCon® conductor

In the case of isFang air-termination rods with an external isCon® conductor, the potential connection must be created using the potential connection clip, type 927 2 6-K. The potential connection clip is used both to fix the conductor and to earth it, as well as to earth the air-termination rod and the air-termination rod stand.

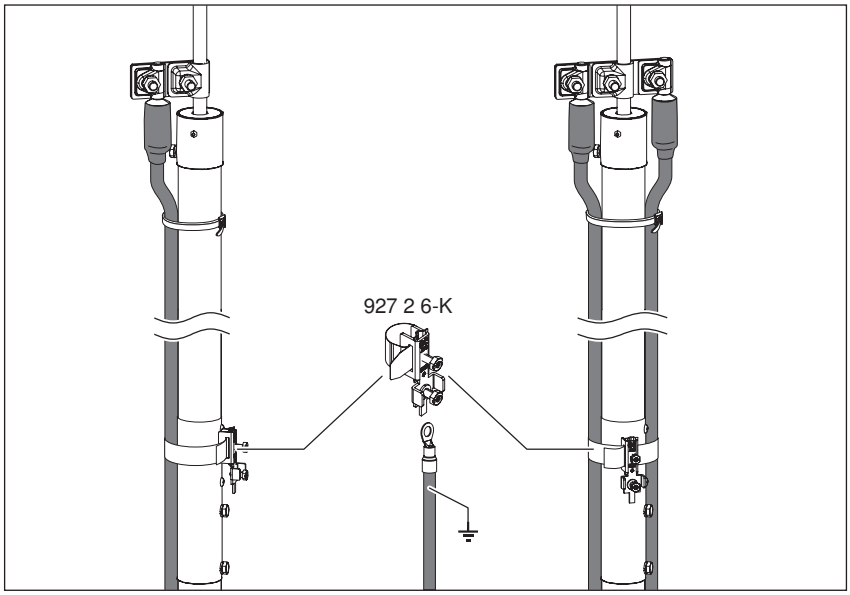


Fig. 55: Creating equipotential bonding on the air-termination rod with external isCon® conductor

6.6.2 Installing the potential connection on the end of the isCon® conductor

The black, weakly conductive layer of the isCon® conductor must be included in the protective equipotential bonding of the building to be protected (see Fig. 56 No. ①). It is important that a specific minimum distance (x) is maintained between the connection element of the isCon® conductor ② on the conductor carrying the lightning current ③ and the upstream potential connection terminal ④, in order to prevent surface discharge along the high-voltage-resistant isCon® conductor.

Note! *When the isCon Basic 45 conductor is installed, there is no equipotential bonding connection on the air-termination rod ⑤ (see "6.6.1 Installing the potential connection on an insulated air-termination rod" on page 50).*

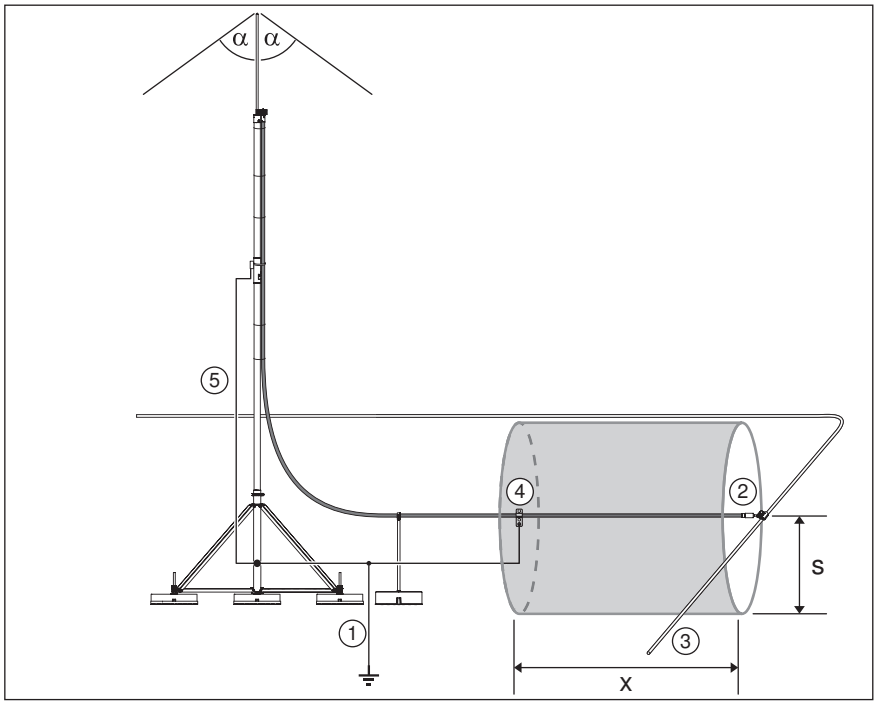


Fig. 56: Minimum distance (x) between the connection element and the equipotential bonding

Note! *The minimum distance (x) can be derived from the calculated separation distance (see "4.2 Calculating, checking and maintaining the separation distance" on page 23). Use the* **formula x = s * 2***, in order to calculate the minimum distance (x) necessary (see also Fig. 57).*

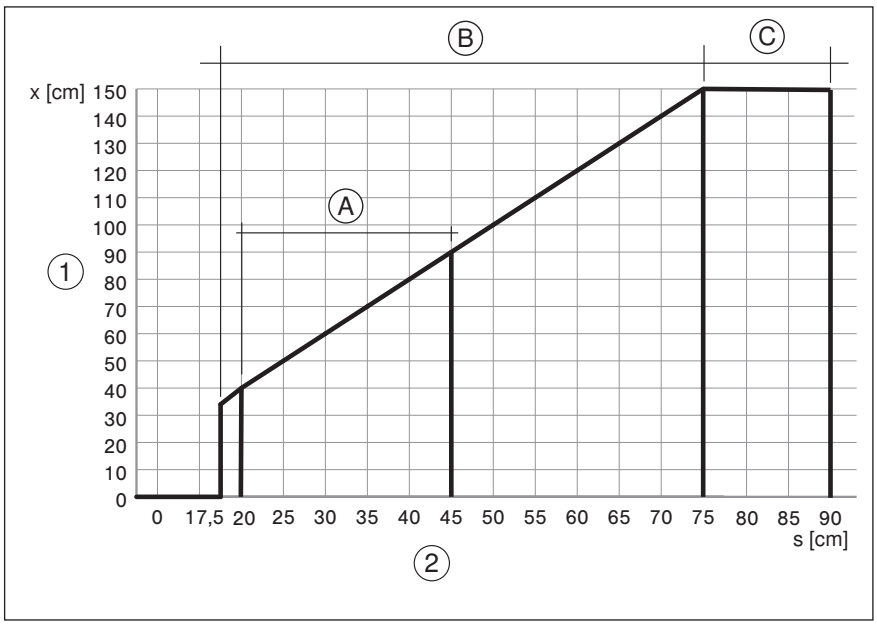


Fig. 57: Minimum required distance between the connection element and the potential connection terminal in air

Legend for Fig. 57:

① Clip distance (x) from the potential connection terminal to the connection element in centimetres

② Calculated separation distance (s) in centimetres

Ⓐ isCon BA 45 SW

Ⓑ isCon Pro+ 75 SW/GR and isCon Pro 75 SW

Ⓒ isCon PR 90 SW

Example:

If the calculated separation distance is 60 cm, then you can use the variants isCon Pro, Pro+ or Premium. Install the potential connection terminal 120 cm in front of the connection element.

Note! *If the calculated separation distance is less than the appropriate tested equivalent separation distance in air, you can reduce the distance between the potential connection terminal and the connection element (x) accordingly.*

If the calculated separation distance ② is less than 17.5 centimetres (Pro, Pro+, Premium) and 20 centimetres (Basic), then no additional potential connection is required in front of the rear connection element.

Note! *The conductor type isCon BA 45 SW (Basic) can be routed with or without potential connection. If the conductor is routed without a potential connection, observe “Mounting variant 2 for isCon BA 45 SW” on page 54.*

In addition, observe the following when connecting the equipotential bonding:

– Do not locate any electrically conductive or earthed parts within the calculated separation distance s in the area between the potential connection and the connection element (see Fig. 56). These include, for example, metallic construction parts, conductor brackets and assemblies.

– Connect the potential connection terminal to the equipotential bonding with ≥ 6 mm² Cu or a material with identical conductivity (see Fig. 58).

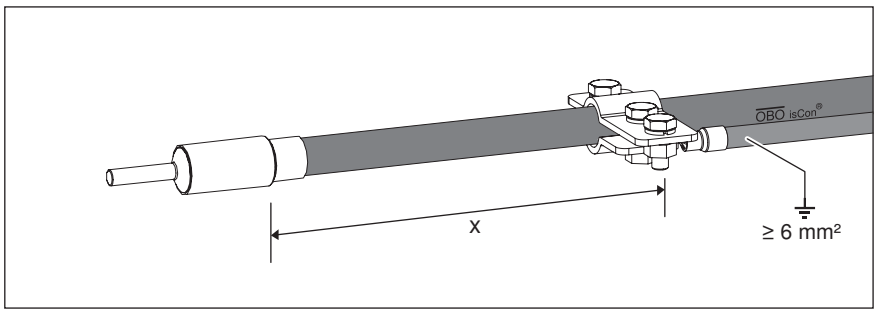


Fig. 58: Distance between the connection element and the potential connection terminal

With metallic, earthed substrates, use the metallic conductor bracket. When screwed directly to the substrate, it also provides equipotential bonding.

Note! *When using the grey isCon® conductor, the light grey external jacket must be removed in the area of the conductor bracket (see "5.1.1 Removing the grey external jacket (isCon Pro+ 75 GR)" on page 28).*

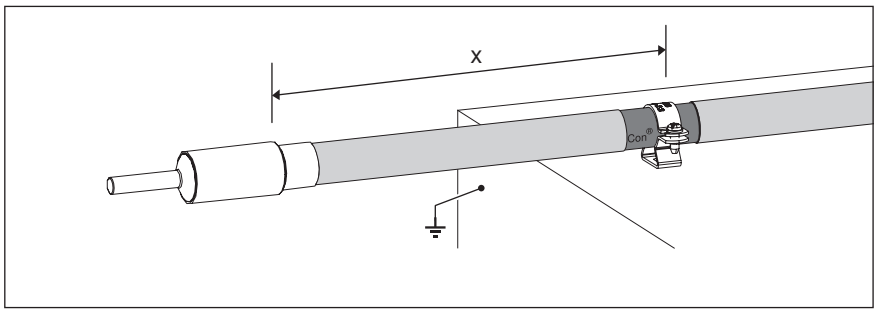


Fig. 59: Equipotential bonding using isCon H VA conductor bracket on metallic substrate, grey external jacket removed in contact area.

Mounting variant 2 for isCon BA 45 SW

The conductor type isCon BA 45 SW can also be routed without a potential connection. When mounted without a potential connection, the minimum distance (x) must be complied with in both directions, starting from the last insulated spacer. There may be no electrically conductive parts within the perimeter of the calculated separation distance (s) (see Fig. 60).

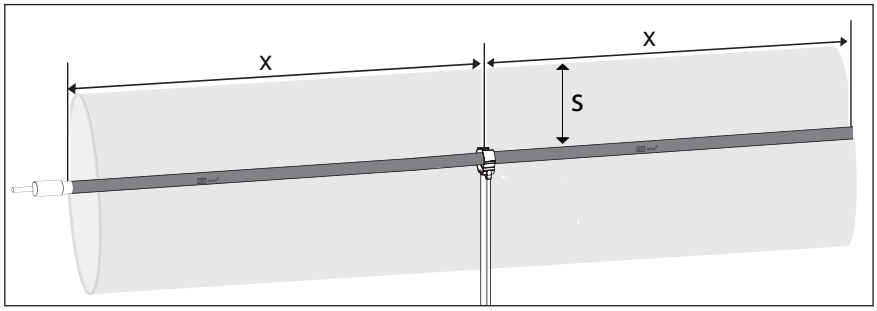


Fig. 60: Mounting variant for the isCon BA 45 SW conductor without potential connection

6.6.3 Including the air-termination rod stand in the functional equipotential bonding

- Fasten the crossbar (included in scope of delivery) to the air-termination rod and connect a round conductor Rd 8-10 to the equipotential bonding of the building.

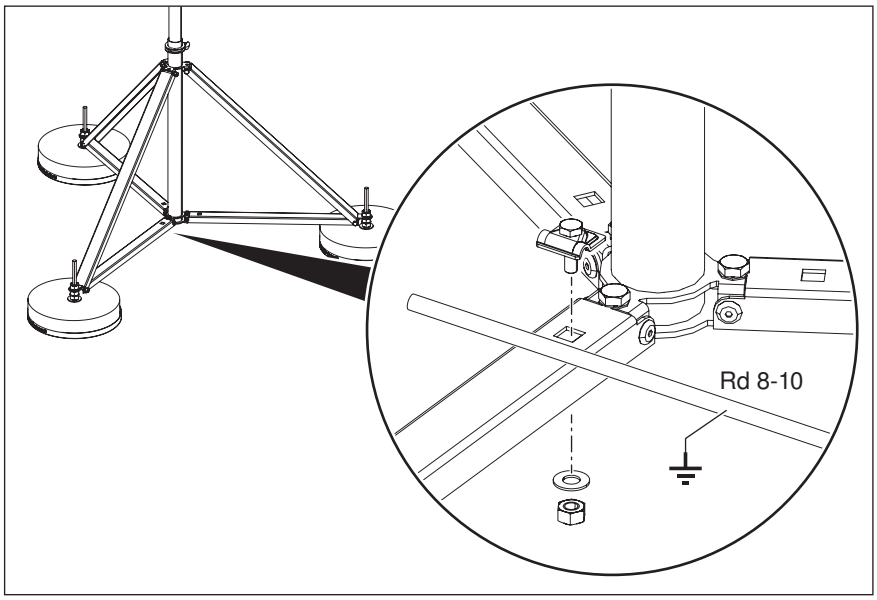


Fig. 61: Connection of the equipotential bonding to the insulated air-termination rod stand

6.6.4 Installing additional potential connections

If the isCon® conductor crosses earthed, metallic installations, or is run in parallel to them, then we recommend additional measures to improve the equipotential bonding.

To do this, connect the isCon® conductor multiple times with these installations, e.g. cable racks, pipelines or parapet plates, after the first potential connection using the potential connection element.

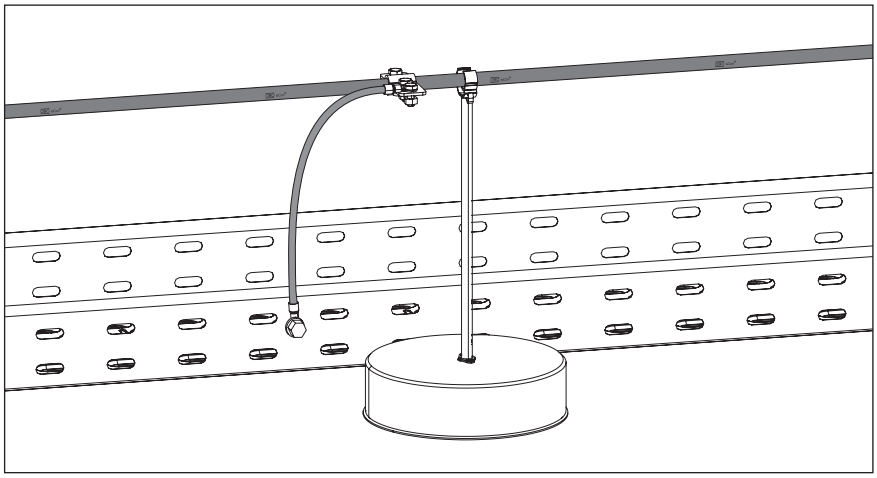


Fig. 62: Creating additional equipotential bonding

6.6.5 Creating additional equipotential bonding for isCon Pro+ in potentially explosive areas

The following information explains the creation of the equipotential bonding of installations in potentially explosive areas. See also “4.4 Installation in potentially explosive areas” on page 25.

In Ex zones 1 and 21, connect the isCon® conductor to the equipotential bonding at regular intervals (≤ 0.5 metres). To do this, bring the protective jacket into contact with metallic conductor brackets, e.g. isCon H VA or PAE.

Routing on earthed, metallic building structures

For routing along an earthed, metallic building structure (e.g. electrically conductive connected metal facades, steel structures or mesh structures):

- Use the metallic conductor bracket to fasten the conductor to the building structure.
- Connect the metallic building structure with the equipotential bonding or with the earthing system.

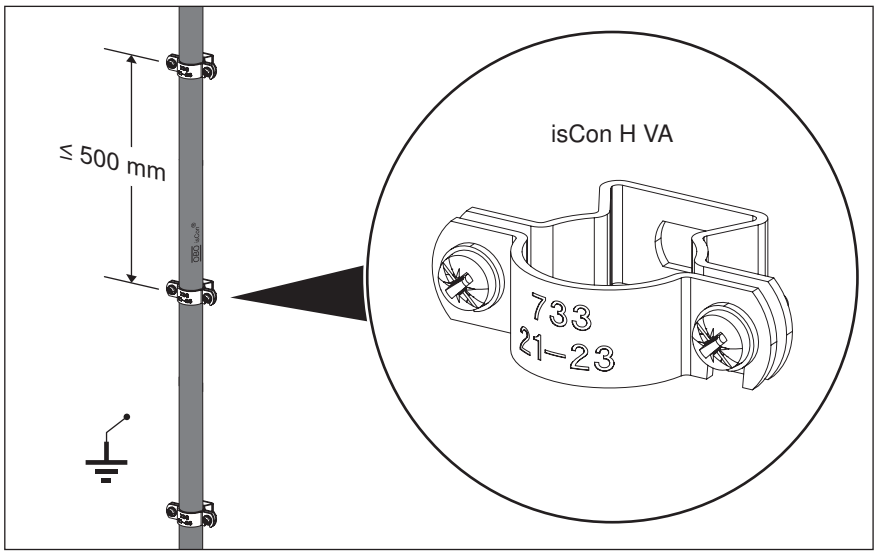


Fig. 63: Equipotential bonding of the isCon® conductor on a metallic surface in a potentially explosive area

Routing on non-conductive building structures

When routed along a non-conductive building structure (e.g. stone, concrete or wood):

- Route electrically conductive connection rails (e.g. flat conductor, type 5052 V2A 30x3.5) in parallel to the isCon® conductor, which connect it with the functional equipotential bonding of the building.
- Fasten the metallic isCon H VA conductor bracket for the isCon® conductor to it.

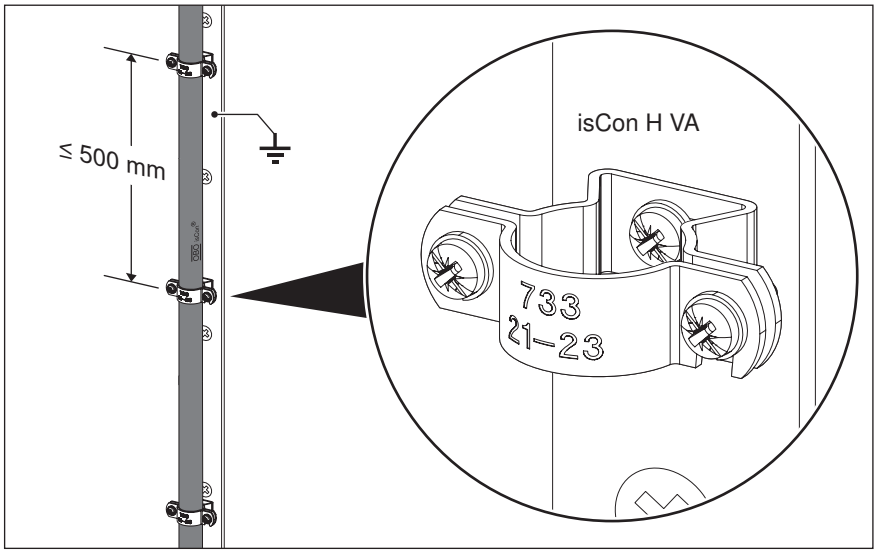


Fig. 64: isCon® conductor in potentially explosive area with isCon H VA conductor bracket mounted on flat conductor

Routing along metallic pipes

- Connect the potential connection element to metal pipes routed in parallel (equipotential bonding conductors) and connected to the building's equipotential bonding at regular intervals.

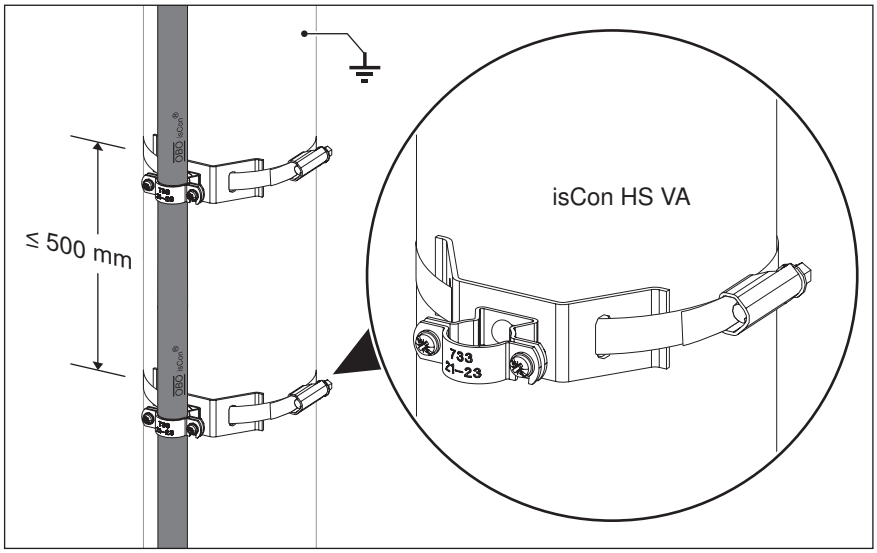


Fig. 65: Running the isCon® conductor on an earthed pipe in a potentially explosive area

7 Mounting variants

7.1 Separate lightning protection ring conductor

In the following example, the isCon® conductor ① is to be connected to a stand-off lightning protection ring conductor ②. For this, we recommend the air-termination rod stand with external isCon® conductor. This is shortened to the right height using spacers ③ (type isCon® DH), run to the ring conductor and connected, e.g. using Vario quick connectors.

The potential is connected to the protective equipotential bonding on the air-termination rod via the potential connection clip ④ (type 927 2 6-K). Alternatively, the potential can be connected at the air-termination rod stand ⑤, provided that the potential connection clip ④ is mounted, creating the electrical connection between the black, weakly conductive layer or the protective jacket of the isCon® conductor and the air-termination rod.

At the end of the isCon® conductor, the potential is connected with a potential connection terminal ⑥ (type isCon® PAE) to the lightning protection ring conductor in front of the connection element ⑦. The distance x (= separation distance s multiplied by two) between the potential connection terminal ⑥ and the rear connection element ⑦ should be noted.

Note! *The conductor type isCon BA 45 SW (Basic) can be routed with or without potential connection. If the conductor is routed without a potential connection, observe “Mounting variant 2 for isCon BA 45 SW” on page 54.*

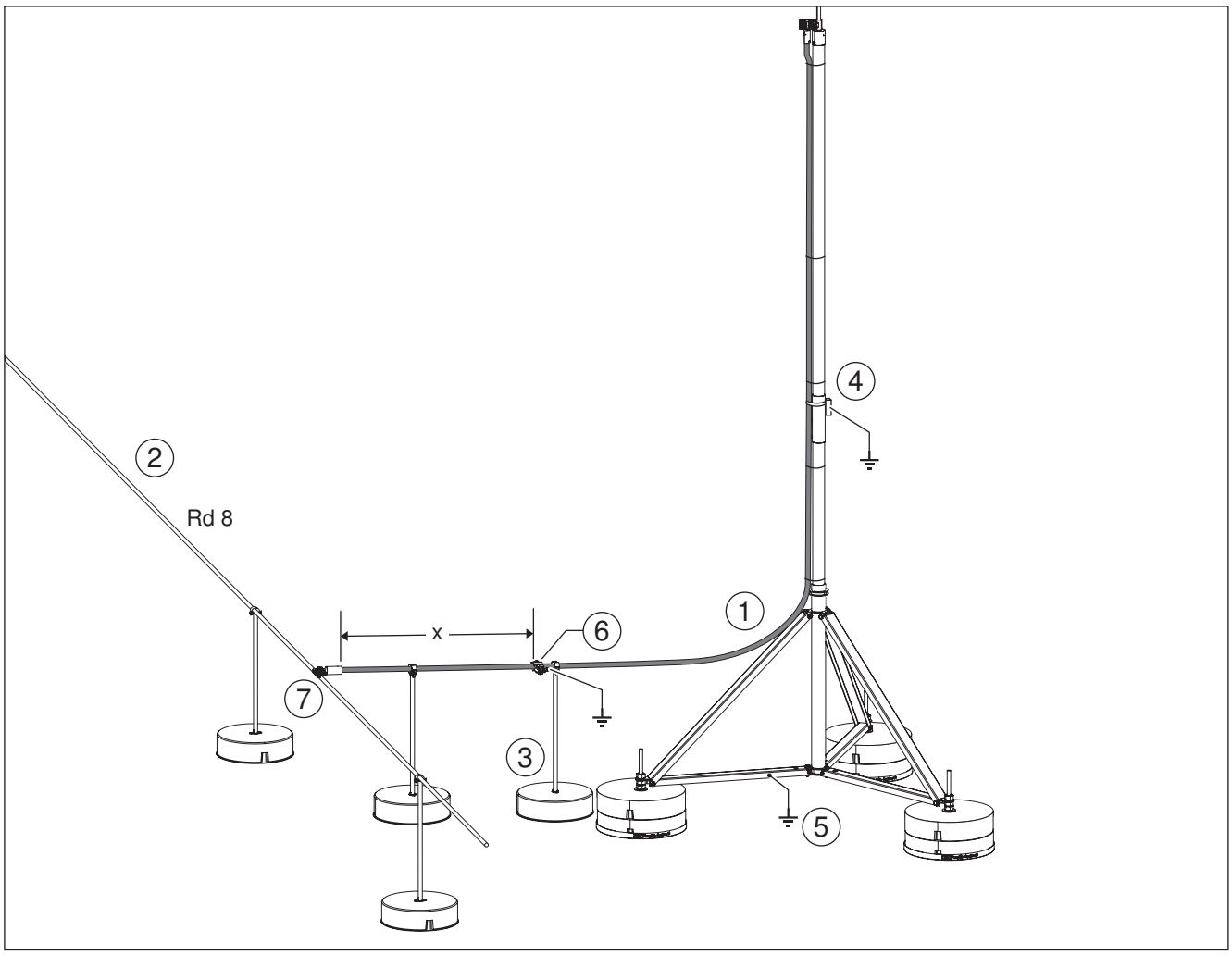


Fig. 66: isCon® conductor connected to stand-off ring conductor

7.2 Metallic roof parapet

If there is a metallic roof parapet ① which is used as a natural component of the lightning protection system, the isCon® conductor can be connected to it using a suitable OBO connection component ②.

The potential is connected to the protective equipotential bonding on the air-termination rod via the potential connection clip ③ (type 927 2 6-K). Alternatively, the potential can be connected at the air-termination rod stand ④, provided that the potential connection clip ③ is mounted, creating the electrical connection between the black, weakly conductive layer or the protective jacket of the isCon® conductor and the air-termination rod.

The distance x (= separation distance s multiplied by two) between the potential connection terminal ⑤ and the rear connection element ⑥ should be noted.

Note! *The conductor type isCon BA 45 SW (Basic) can be routed with or without potential connection. If the conductor is routed without a potential connection, observe "Mounting variant 2 for isCon BA 45 SW" on page 54.*

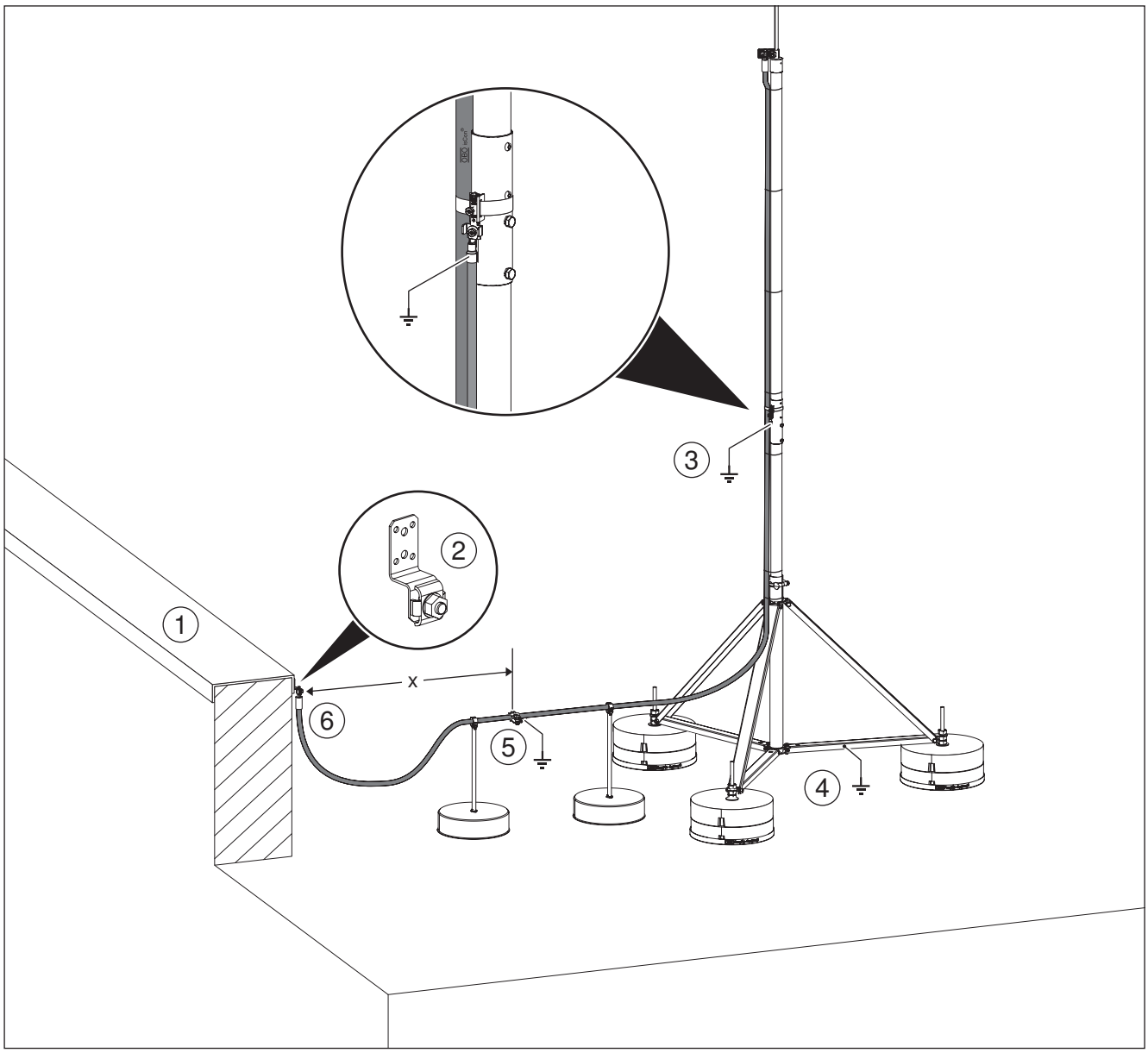


Fig. 67: isCon® conductor connected to metallic parapet

7.3 Internal and external isCon® conductor

The mounting example shows the use of an isFang air-termination rod with internal isCon® conductor ①, to which a second, external isCon® conductor ② is connected.

Note! *If you use the grey isCon® conductor, you must remove the grey external jacket before connecting the potential connection (see "5.1.1 Removing the grey external jacket (isCon Pro+ 75 GR)" on page 28).*

The potential connection clip ③ (type 927 2 6-K) must be mounted, in order to create an electrical connection between the black, weakly conductive layer or protective jacket of the external isCon® conductor and the air-termination rod. The potential is connected here. The internal potential connection element then means that the internal isCon® conductor is also connected with the potential connection. Alternatively, the potential can be connected at the air-termination rod stand ④, provided that the potential connection clip ③ is mounted.

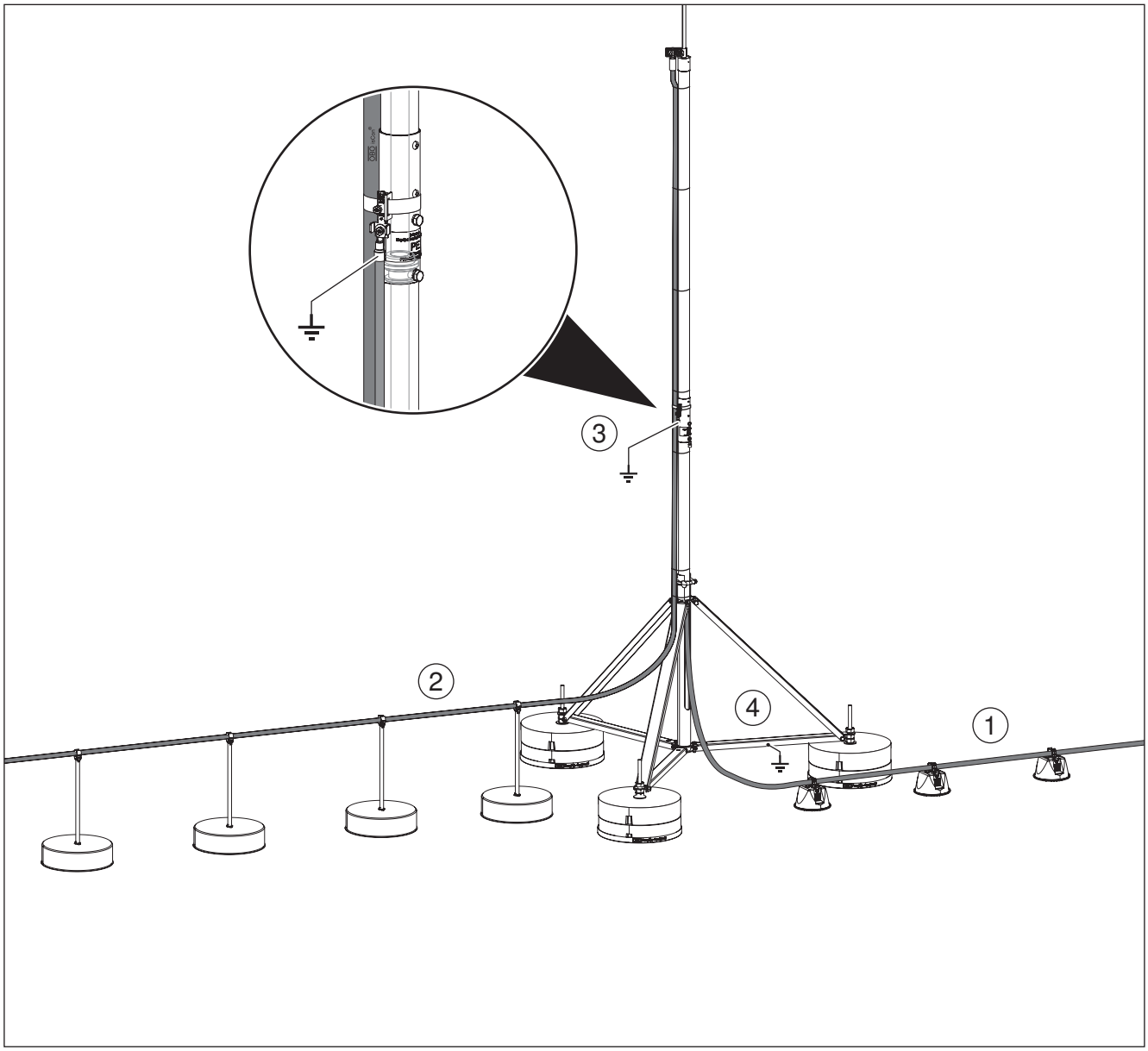


Fig. 68: Internal and external isCon® conductor

7.4 Lightning protection class I

The mounting example shows a better division of the lightning current to two isCon® conductors through the use of an isFang air-termination rod with two external conductors ① and ②. The isCon® conductors are run on two separated ring conductors ③ and ④, which are run on opposite sides of the building. Alternatively, the air-termination system can be implemented with a single isCon® Premium conductor in lightning protection class 1.

The potential connection clip ⑤ (type 927 2 6-K) must be mounted, in order to create an electrical connection between the black, weakly conductive layer or protective jacket of the external isCon® conductor and the air-termination rod. The potential is connected here. Alternatively, the potential can be connected at the air-termination rod stand ⑥, provided that the potential connection clip ⑤ is mounted.

The distance x (= separation distance s multiplied by two) between the potential connection terminals and the rear connection elements should be noted.

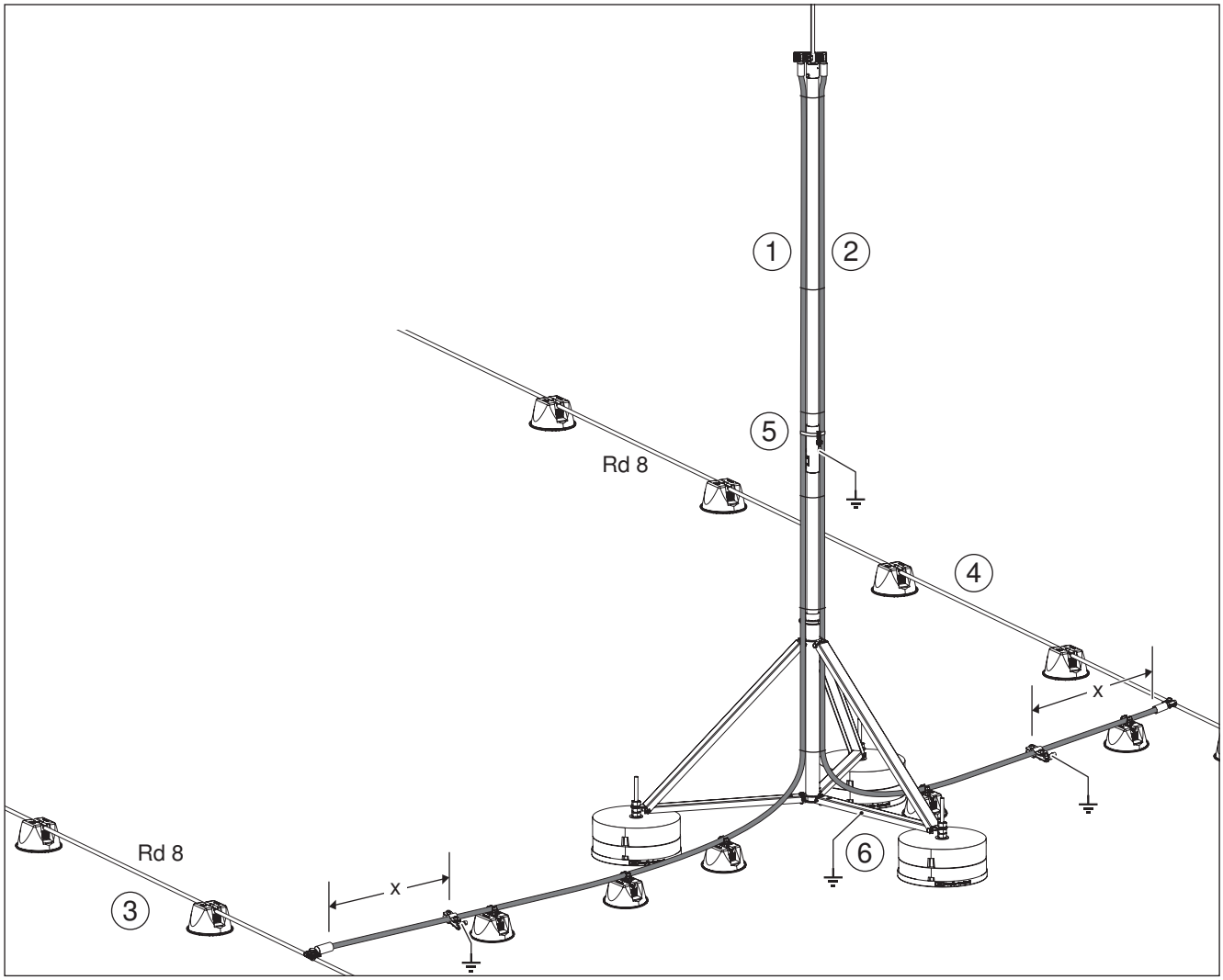


Fig. 69: Current division to two isCon® conductors, e.g. for lightning protection class I

7.5 isCon® conductor included in the ring conductor

In areas in which a conventional ring conductor would be difficult to install whilst maintaining the required separation distance (s) (e.g. to roof structures) (see Fig. 70 No. ②), the isCon® conductor ① can be integrated into the mesh, provided that the calculated separation distance is less than or equal to the equivalent separation distance of the isCon® conductor used.

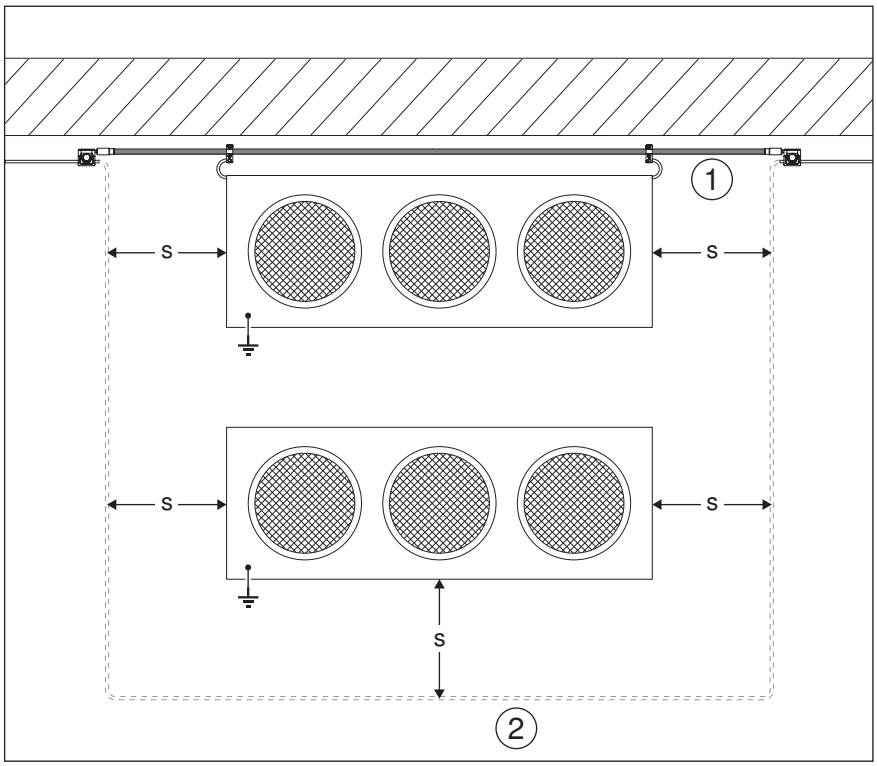


Fig. 70: Including the isCon® conductor in a conventional ring conductor

Legend

① isCon® conductor

② Conventional ring conductor with separation distance s

7.6 Protection against touch voltages

The isCon® conductor Pro+ 75 GR can be used as protection against dangerous contact voltage. This is particularly required in areas with groups of people. The isCon® conductor Pro+ 75 GR was tested up to a length of max. 5 m with a pulse voltage of min. 100 kV (1.2/50 µs) in rain and fulfils the requirements for protection against touch voltages according to VDE 0185-305-3 (IEC/EN 62305-3).

WARNING

Risk of electric shock!
Energised parts
Replace metallic rain gutters, in direct proximity to the isCon® conductor Pro+ 75 GR, with plastic pipes.

ATTENTION

Risk of damage!
When used as protection against contact voltage:
- The grey external jacket may not be damaged.
- Painting (e.g. with facade paint) of the grey external jacket is not permitted.

Installation of the protection against touch voltages

Always route the isCon® conductor Pro+ 75 GR so that it is vertical and remove any soiling on the conductor.

1. In the area to be protected, route the isCon® conductor Pro+ 75 GR to a length of at least 2.5 m plus the separation distance (s). This corresponds to a length of approx. 3–5 m.

Note! *With an increasing length of the isCon® conductor Pro+ 75 GR, the contact voltage occurring in the earth also increases.*

2. Remove the grey external jacket 0.5 m below the connector (see “5.1.1 Removing the grey external jacket (isCon Pro+ 75 GR)” on page 28) and fasten the first conductor bracket (type isCon H VA) directly to solid masonry.

   If a direct connection to solid masonry is not possible, a separate potential connection must be made using an earthed rain gutter or parapet.
3. Attach all further conductor brackets (type isCon H 26 VA) at a distance of ≤ 1 m.
4. Maintain the minimum bend radius of 260 mm.

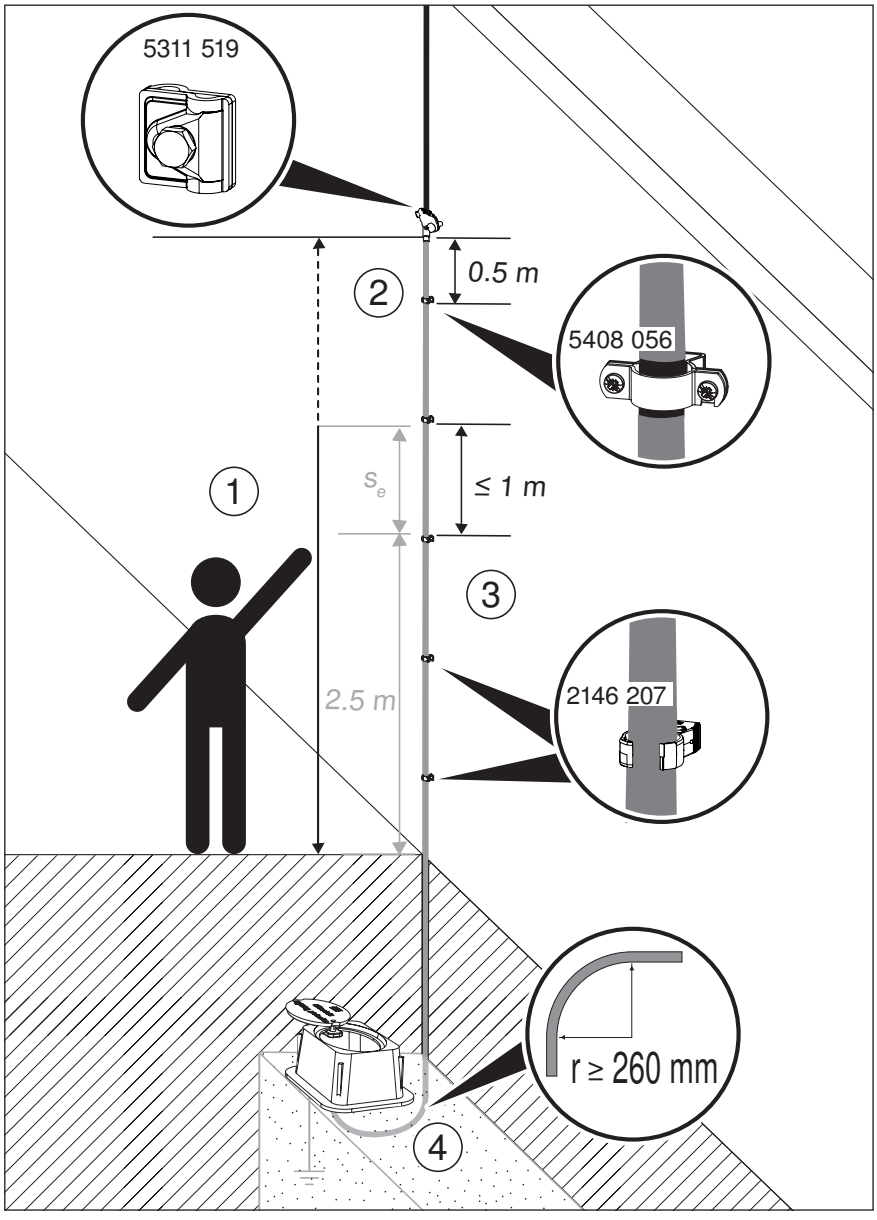


Fig. 71: Installation of the isCon® conductor Pro+ 75 GR as protection against touch voltages

8 Checking the lightning protection system

The entire lightning protection system must be tested according to DIN EN 62305-3 (IEC 62305-3) and DIN EN 62305-3, Supplementary Sheet 5.

Protection class	Visual inspection	Comprehensive test	Comprehensive test in critical situations [1]
I and II	Annually	Every 2 years	Annually
III and IV	Every 2 years	Every 4 years	Annually

[1] Critical situations include structures containing sensitive systems, or office and commercial buildings or places in which a large number of people meet.

Note! *In the case of lightning protection systems in structures at risk of explosion, we recommend carrying out a visual inspection every 6 months.*

Carrying out a visual inspection

- Check that the black, weakly conductive layer of the isCon® conductor is undamaged. An interruption of this layer will prevent the conductor from functioning. In this case, replace the isCon® conductor.
- When using the isCon® Pro+ 75 GR conductors as protection against touch voltages, check that the grey external jacket is undamaged. Damage to this layer will prevent the conductor from functioning. In this case, replace the isCon® Pro+ 75 GR conductors.
- Check that the protective jacket of the isCon® Pro+ conductors is continuously present and has a material thickness of at least 0.2 mm. In this case, replace the isCon® Pro+ conductor. The grey external jacket may be interrupted and damaged. The protective jacket may be damaged but must be continuously present.
- Check that the potential connection cables and all connection components, in particular the potential connection elements, are undamaged. There must be a low-resistance connection between all the elements. If necessary, restore the flow.
- Check that the function of the holders and other mounting elements is not impaired. If necessary, retighten the screws.
- Check that only products of the isCon® system, such as connection elements, are used during mounting. Replace the parts which are not components of the isCon® system with appropriate products of the system.
- When using the isCon® Pro+ 75 GR conductor as protection against touch voltages, check whether it is soiled. If this is the case, remove it.

9 Testing report for the OBO isCon® system

Tested building:

Last name

Contact

Street/no.

Postcode/town

Telephone

1. Were all the connection elements installed correctly according to the mounting instructions?	☐
2. Is the entire routed OBO isCon® conductor in the protected area of the air-termination system?	☐
3. In the Basic, Pro and Premium types, is the black, weakly conductive layer of the conductor free of damage/cracks?	☐
4. Was the separation distance calculated for the location to be protected according to VDE 0185-305-3 (IEC 62305-3)?	☐
5. Is the equivalent separation distance maintained?	☐
6. Is the protective jacket (type Pro+) continuous with a material thickness of at least 0.2 mm?	☐
7. Is the separation distance maintained in the area between the connection element and the first potential connection of the OBO isCon® conductor?	☐
8. Is the potential connection connected to the local equipotential bonding of the system to be protected using isCon® PAE with a conductor of at least 6 mm²?	☐
9. Is the minimum bend radius maintained?	☐
10. With a stand-off installation, is the separation distance to the roof area maintained in the area up to the first equipotential bonding clip?	☐
11. Is the area up to the first equipotential bonding clip (distance of the calculated separation distance to the conductor) free of metallic parts/conductor brackets, etc.?	☐
12. Are test certificates according to IEC TS 62561-8 available?	☐
13. Were only tested components of the OBO supply range used?	☐

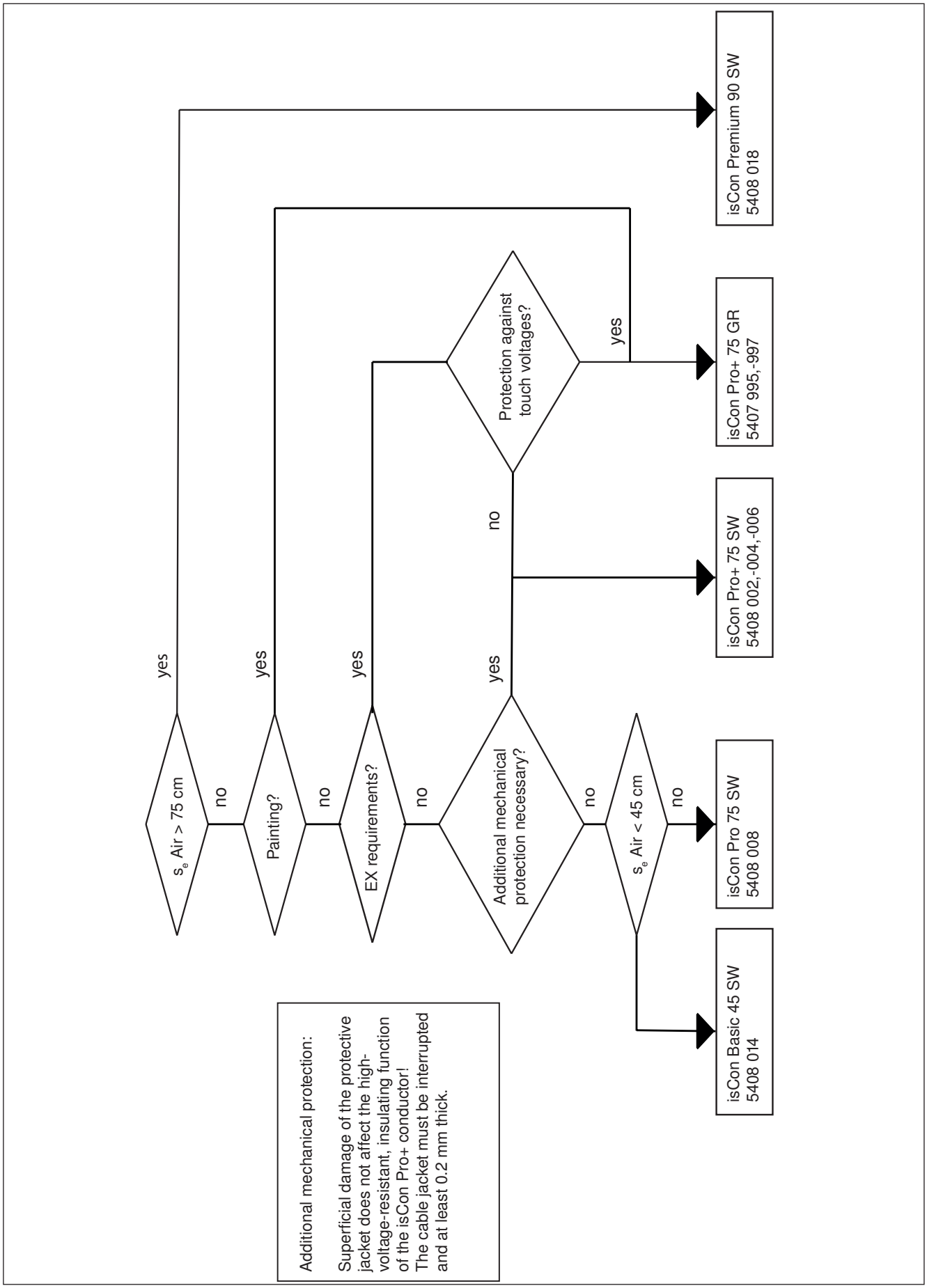
Only if all the questions were answered positively are the requirements of the manufacturer for installation fulfilled.

Tester

Place/date

Signature

10 Selection aid



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Building Connections