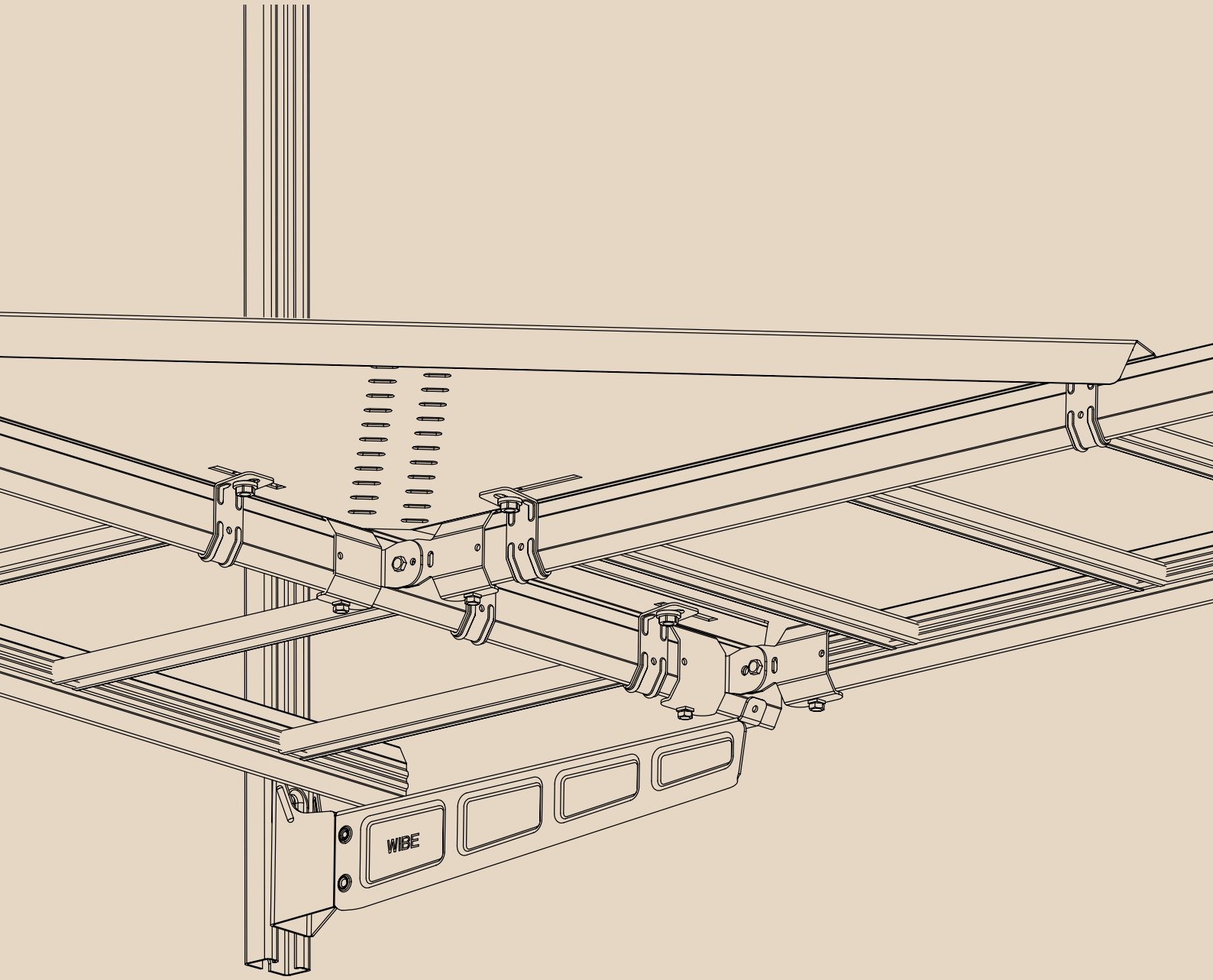
# WIBE CABLE LADDERS

## Technical Information




wibe®
powered by wibe group

# Standards and Quality

**Wibe Cable ladder system meets the following standards:**

IEC 61537
NEMA VE 1/CSA 22.2
DIN 4102-12 for fire resistance E30-E90

| Tests and Certificates | Test made by |
|---|---|
| Test concerning fire resistance according to E30-E90.<br>Certificate nº: ABP P-3233/499/11-MPA BS.<br>Certificate nº: ABP-2400/702/18-MPA BS. | IBMB, Germany |
| EMC performance- Shielding test.<br>Report nº RE-10273-17181. | EMC Services Elmiljöteknik AB, Sweden |
| Seismic load test.<br>Report nº P603276. | SP, Sweden |
| Short circuit test.<br>Report nº 992531-4 & 20001215-7. | British short circuit testing station BS/F 1265 - 1268 |
| Wibe cable ladder is tested<br>according to Underwriters Laboratories,<br>UL E-212854 Sec.1. | UL, USA & Canada |
| Wibe cable ladder is approved by Det Norske Veritas (DNV) for offshore and ship-yard use.<br>Certificate nº TAE00000MM. | DNV, Norway |

**Management system - Quality and Environment**
Wibe Group has a third-party certified management system for quality and environment in accordance with OHSASISO 50001:2011, ISO 45001:2018, ISO 9001:2015 and ISO 14001:2015.

**CE-marking of products**
The CE-marking of products is placed on the product or on the packing according to "Declaration of Conformity" (DOC), applicable to Wibe Group Cable Support System.

**Low voltage directive 2014/35/EU**
Wibe Group fullfils the demands according to harmonized standard EN 61537.

# Use and installation

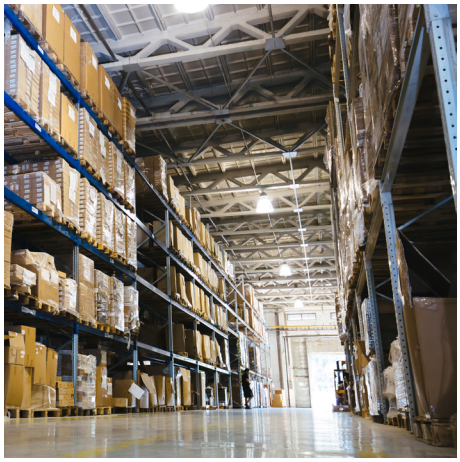
# The right surface treatment – crucial for a successful outcome

A cable support installation is considered to be a long-lasting solution and the life expectancy is dependent on the environment in which it is placed. A thorough investigation of the setting in terms of corrosion, pollution, humidity, salt, sanitary regulations etc will help you make the best choice. Our range of cable ladders and accessories covers all types of surface treatments, enabling a reliable, cost-efficient and long-lasting cable support solution.

## C1 Electro-galvanized

**Indoor environments: Schools, shops, hotels, offices, sports halls etc.**

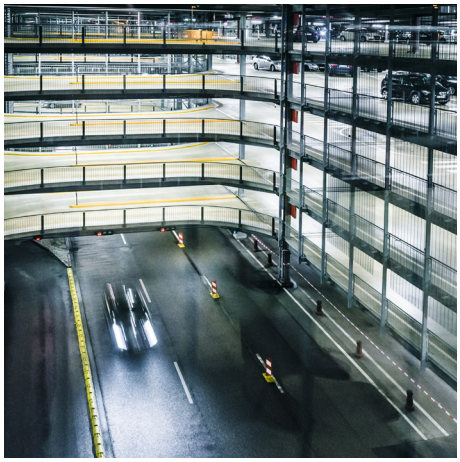
- Very low environmental corrosion.
- Heated areas.
- Arid atmosphere.
- Insignificant quantities of pollutant.
- ISO 2081.



## C2 Pre-galvanized

**Partly outdoor environments: Industries, sports halls, warehouses, shops, rural outdoor areas etc.**

- Low environmental corrosion.
- Non-heated areas with fluctuating levels of temperature and humidity.
- Few instances of condensation and low levels of airborn pollution.
- SS-EN 10346



## C3 Hot-dip galvanized

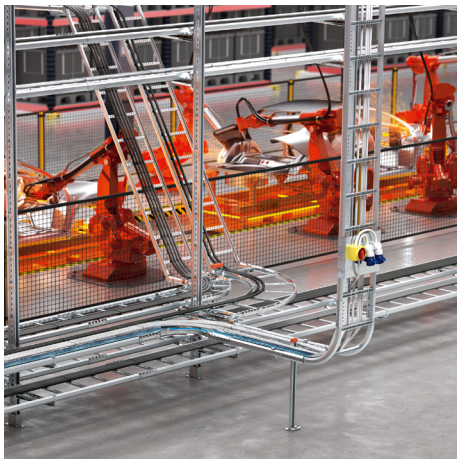
**Indoor- and outdoor environments: Urban and light industrial areas, breweries, dairies, laundries etc.**

- Average environmental corrosion.
- Areas with average levels of humidity and some airborn pollution caused by production processes.
- Atmospheres containing some salt or average levels of airborne pollution.
- EN-ISO1461/EN 10346 (Z+)

## C4 Hot-dip galvanized

**Indoor- and outdoor environments: Chemical plants, industrial and coastal areas, swimming pools, farms, dockyards etc.**

- High environmental corrosion.
- Areas with high levels of humidity and considerable airborn pollution.
- Atmospheres with average salt content or discernible levels of airborne pollution.
- EN-ISO1461



## C5 Zinkpox® (Hot dip galv. + powder coated) Stainless steel AISI 304

**Indoor- and outdoor environments: Chemical and heavy industries, tunnels, swimming pools, dockyards etc.**

- Very high (industrial) environmental corrosion.
- Areas with almost permanent condensation, large quantities of airborn pollution, high levels of humidity and aggressive atmospheres
- EN 1.4301 acc. to EN 10088/AISI 304

## CX Stainless steel AISI 316L

**Indoor- and outdoor environments: Heavy industries, coastal and offshore areas, purifying plants etc.**

- Very high (marine) environmental corrosion.
- Areas with almost permanent condensation and large quantities of airborn pollution. Atmospheres with high salt content.
- EN 1.4404 acc. to EN 10088/AISI 316L

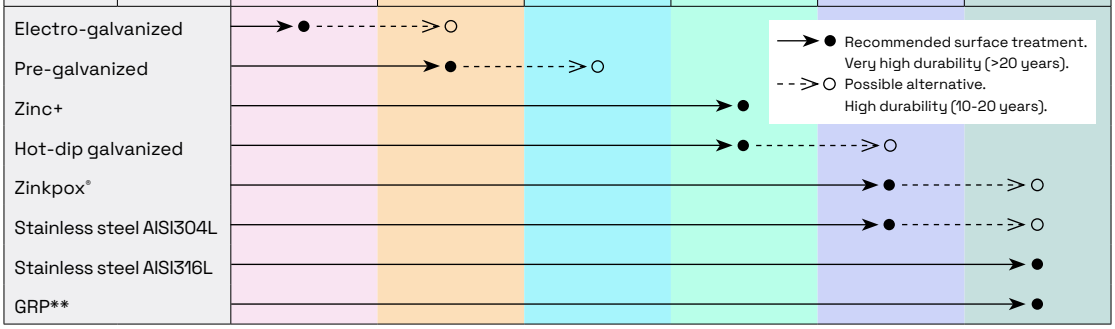
# Corrosion Classes

The life expectancy of a cable support system is dependent on the environment in which it is placed. Therefore, it is important to establish the corrosive properties of an environment to ensure that the right treatment and the right material are chosen. Do not use components finish above of the corrosion class targeted. The table below shows various corrosion classes. As a guide, we have included the surface treatment recommended by Wibe Group for the different classes.

On the next page, we briefly outline the various surface treatments and materials.
As regards environmental corrosion, a steel design component can usually be assigned to one of the corrosion classes (C1 to CX) as shown in table A.
Reference values for the average level of corrosion in steel and zinc are given in table B.
The corrosion classes comply with those stipulated in SS-EN ISO 12944-2.

**Table A**
Corrosion classes as stipulated by SS-EN ISO 12944-2 with atmospheric corrosion levels and examples of the environment in which they are most suitable for use.

| **Corrosion class** | | C1 | C2 | C3 | C4 | C5 | CX |
|---|---|---|---|---|---|---|---|
| **Environmental corrosion** | | Very low | Low | Average | High | Very high | Extremely high |
| **Examples of typical environments in temperate climates (informative)** | **Outdoors** | – | Atmospheres with low levels of airborne pollution. Rural areas. | Atmospheres containing some salt or average levels of air-borne pollution. Urban and light industrial areas. Areas affected by coastal conditions. | Atmospheres with average salt content or discernible levels of airborne pollution. Industrial and coastal areas. | Industrial areas with high humidity and aggressive atmosphere, and coastal areas with high salinity. | Offshore areas with high salinity, industrial areas with extreme humidity, and aggressive atmospheres, sub-tropical or tropical atmospheres. |
| | **Indoors** | Heated areas with arid atmosphere and insignificant quantities of pollutant, e.g. offices, shops, schools and hotels. | Non-heated areas with fluctuating levels of temperature and humidity. Few instances of condensation and low levels of airborne pollution, e.g. sports halls and warehouses. | Areas with average levels of humidity and some airborne pollution resulting from production processes, e.g. breweries, dairies, laundries. | Areas of high humidity and considerable airborne pollution as the result of production processes, e.g. chemical plants, swimming pools and dockyards. | Buildings with almost permanent condensation and with high pollution. | Industrial buildings with extreme humidity and aggressive atmosphere. |




* Can be modified due to local environment and product life expectancy.
** See catalogue Mita Flex for GRP offer

**Table B**
Mass losses for zinc in various corrosion classes

| | **Mass loss per surface unit and thickness reduction (1 year of exposure)[1]** | |
|---|---|---|
| **Corrosion class** | **Mass loss (g/m²)** | **Thickness reduction (µm)** |
| C1 | ≤ 0.7 | ≤ 0.1 |
| C2 | > 0.7 to 5 | > 0.1 to 0.7 |
| C3 | > 5 to 15 | > 0.7 to 2.1 |
| C4 | > 15 to 30 | > 2.1 to 4.2 |
| C5 | > 30 to 60 | > 4.2 to 8.4 |
| CX | > 60 to 180 | > 8.4 to 25 |

[1] Corrosion speed is generally higher when the material is first exposed

# Surface treatments

**Wibe Cable Ladders - Technical and material data**

| Specification | |
|---|---|
| Cold formed steel:<br>Structural steels: | DX5xD acc. to EN 10346, DC0x acc. to EN 10130, DD1x acc. to EN 10111<br>S235 and S355 acc. to EN 10025-2 AISI 316L acc. to EN ISO10088-2 |
| Density: | 7.7-7.85 kg/m³ |
| Surface treatment: | • Pre galvanized (>20 µm): EN 10346<br>• Hot-dip galvanized (55-70 µm): EN ISO 1461<br>• Zinc+ (>25 µm): EN 10346<br>• Zinkpox, hot-dip galvanized (55-70 µm) + polyester coating, white RAL9010<br>• Pickled (Stainless steel), except KHZSP ladder range |
| Resistance to impact: | 20 J (IEC 61537) |
| Temperature range: | From –40°C to +120°C. |

**Electro-galvanized**
Products are manufactured in accordance with ISO 2081. Such products are intended for use only in warm, dry areas with negligible pollutant levels.

**Pre-galvanized**
Products are manufactured from Z 275 pre-galvanized sheet steel in accordance with SS-EN 10346. Under normal conditions, surface sections created during cutting and drilling will repair themselves, providing superb anti-corrosion protection.

**Hot-dip galvanized**
Wibe Group has one of the most modern hot-dip galvanization plants in the Nordic countries. The hot-dip process is continuous, guaranteeing a high and even quality. The manufactured products are hot-dip galvanized in accordance with EN-ISO 1461:2009 whilst nuts and bolts are hot-dip galvanized in accordance with SS-EN ISO 10684. This form of galvanization affords very good value-for-money anti-corrosion protection in atmospheres with a pH value of between 6 and 13. However, in acidic environments where pH levels fall below 6 and in alkaline environments where the pH value exceeds 13, the protective zinc layer breaks down relatively quickly. When cuts/perforations or other kind of operation that damage or remove coating in HDG items suitable to be installed in aggressive corrosion class, must be repaired with a zinc rich paint.

**Zinc+**
Zinc+ surface treatment for some accessories (EN 10346) with a metallic Zinc-based coating containing aluminium and magnesium that offers ultimate corrosion resistance in aggressive environments (e.g. chloride & highly alkaline). In many cases a good alternative to hot-dip galvanization. Excellent surface finish with self-repairing protection of cut edges (galvanic protection).

**Zinkpox®**
The Zinkpox® method involves applying a homogenous polyester coating to the zinc layer. Besides resisting light-initiated degeneration and weathering, this powder coating has excellent mechanical properties as regards impact resistance and adhesion. It is also resistant to most chemicals. Compared to hot-dip galvanizing, applying a polyester coating to the zinc layer more than doubles the service life of treated components. The zinc layer prevents the development of filiform corrosion. This might otherwise degrade the coating. Consequently, the polyester coating is subject only to atmospheric attack and thus protects the zinc layer. The certified coating plant that treats our components uses a modern and environment-friendly process. Before powder coating, the galvanized components undergo meticulous pre-treatment. This ensures superb adhesion. In addition to extremely good corrosion protection, the Zinkpox® method also offers a choice of colours. Powder coating is a very environment-friendly way of achieving a coloured surface. Because the coating contains no solvents, it has largely replaced solventbased liquid coatings. Where installations are visible, cable ladders and fittings can be finished in a coating that matches the surrounding décor.

**Stainless steel**
Products manufactured in accordance with AISI 304 acc. to ASTM / 1.4301 acc.to EN 10088-3 or /AISI 316L acc. to ASTM / 1.4404 acc. to EN 10088-3 are designed for use in highly aggressive en-
vironments, either indoors or outdoors, on industrial sites where there are high levels of potent airborne pollution such as in certain chemical industries, cellulose-related industries, refineries or artificial fertilizer factories, high humidity tunnels, etc. Stainless steel products are also ideal for use in environments where special hygiene requirements are in force, such as dairies, abattoirs, other food industries and pharmaceutical factories.

**Stainless steel AISI 304 or AISI 316L**
The deciding factor in choosing between stainless steel AISI 304 or AISI 316L is the aggressiveness of the environment in which it is to be used, and for this atmospheric chlorine content plays a significant role. Environments with a high chlorine content, coastal areas being a prime example, are aggressive and usually require the use of AISI 316L materials. When assessing the needs of factories, consideration should be given to the materials previously used to suspend equipment such as pipe tubing, and from this determine whether stainless steel AISI 304 or AISI 316L material is required.

**To consider when installing Stainless Steel Cable Laddes**
**1. Transport/handling:** Make sure that no iron objects come into contact with the stainless steel products.
**2. Storing:** Never store stainless steel products close to where iron products are machined, for example close to cutting and grinding operations
**3. Welding:** Welding during installation should be avoided where possible. If welding must be performed, make sure that only methods suitable for stainless steel are used.
**4. Tools:** When cutting or grinding, always use cutting wheels and grinding tools which are free from iron. Do not use tools that have been previously used for cutting or grinding products containing iron. When drilling, use an HSS-drill. To maximize the useful life of the drill, employ a cooling fluid during drilling. When installing, conventional assembly tools can be used. However, when using a nut tightener, ensure that the thread is first lubricated to prevent jamming.

**Never mix untreated or galvanized products with stainless steel.**

**5. Measures:** If a blue annealing appears when cutting, grinding or drilling, re-move it with pickling paste, making sure that the paste is then carefully washed away with water. If selective corrosion appears it can be removed by:

a) Washing away with water (high-pressure if possible).

b) Polishing with a cleaning cloth or a fine emery paper (wet or dry) and washing with water.

c) Grinding with a fine-grained wheel and washing with water.

d) Pickling with pickling paste, making sure that the pickling paste is then carefully washed away with water.

**6.** When using pickling paste or similar products, always study the safety code for the product prior to use.

# Installation regulations

**Installation of cables on a cable ladder**
The installation of cables on cable ladders lies within the IEC 60364-5-52 standard for power cable installation only. Because Wibe cable ladders have rungs which occupy less than 10% of the plan area under the cables, the installation is defined as cables in “free air”. Cable spaces do not require any de-rating factor for installation. Cables touching must be de-rated in accordance with the table below.

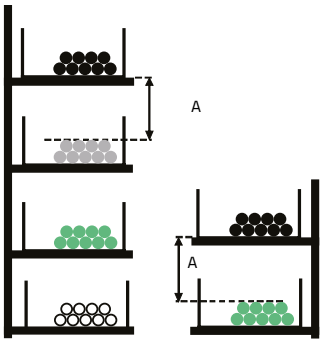
| Method of installation | Correction Factor Cg Number of circuits of multicare cables | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Single layer multicare touching on ladder supports | 0,87 | 0,82 | 0,80 | 0,80 | 0,79 | 0,79 | 0,78 | 0,78 |

For installation of a combination of power and communication cables on a cable ladder the separating distances should be according to EN 50174-2, see table below.

| Communication cable type | Number of power circuits (1-phase 20A, 230V) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1-3 | 4-6 | 7-9 | 10-12 | 13-15 | 16-30 | 31-45 | 46-60 | 61-75 | >75 |
| | Minimum separation distance (mm), see figure A below this table | | | | | | | | | |
| Category 5e/6 unshielded | 20 | 40 | 60 | 80 | 100 | 200 | 300 | 400 | 500 | 600 |
| Category $5e/6/6_A$ shielded | 10 | 20 | 30 | 40 | 50 | 100 | 150 | 200 | 250 | 300 |
| Category $7_A$ shielded | 2 | 4 | 6 | 8 | 10 | 20 | 30 | 40 | 50 | 60 |

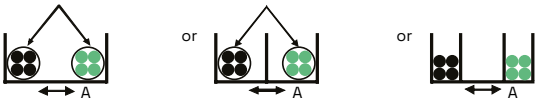
**Minimum separation distance (mm), figure A**

Recommended cable management




Not recommended

Recommended cable management on common cable ladder




The cables need to be fixed to the ladder or bundled

No fixing or bunlding needed.

- Power cables
- Data cables
- Control cables
- Sensitive cables like instrumentation cables
- A Separation distance

**Installation of cable ladder**
Full design data is given according to EN 61537 in the Range part in this catalogue showing all maximum and recommended loadings. Graphs are given in this catalogue to show the deflection against loading for various support distances. Any support system which is supported at intervals and loaded will deflect between the support intervals. Test model II is used for all ladder ranges.

**Installation recommendations for cable ladders**
The cable ladders should be installed in such a way that, as often as possible, the cables can be laid directly in place rather than being pulled through. Ladders for current carrying cables along the ceiling should be installed in such a way that the distance from the top of the ladder to the ceiling is not less than 300 mm. The free vertical distance between parallel ladders shall be at least 200 mm. Ladders near walls should be installed with a minimum free distance of 50 mm to the wall, so that cables can pass between the ladders and the wall. Ladders along partition walls should be installed with a minimum free distance of 100 mm to the wall. Sharp edges and screw ends on ladders should be removed before the cables can be installed. Expansion bolts for the installation of brackets/fixings should be installed with such a distance between them, that the designated load for ladders will not be exceeded. When selecting the distance between cantilever arms or brackets/fixings, the bearing strength and designated load of the ladders must be taken into consideration.

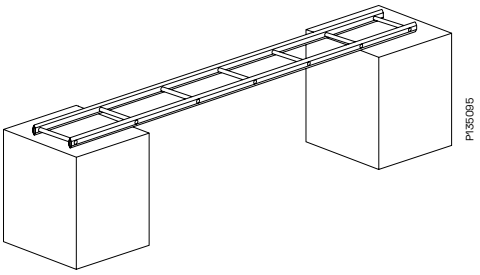
# Electro-magnetic compatibility EMC

**Electromagnetic Compatibility**

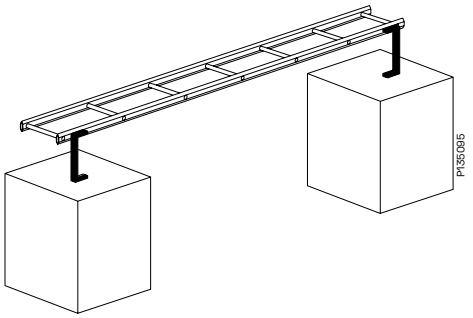
Wibe Group has performed measurements at EMC Services in Gothenburg regarding EMC requirements, report RE-10273-17181.
The results show that the shielding performance of both incoming and emitted fields is good concerning Wibe cable ladders.

When correctly installed Wibe cable ladders products work as a protective earth structure.
This means that Wibe Group products can be used to achieve good engineering practice in accordance with the EMC directive 2004/108/EG.

**Recommended installation examples**

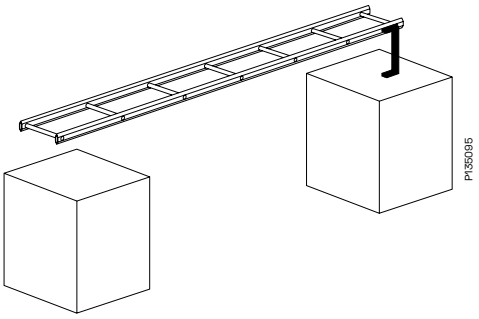



Metal against metal connection
- the ultimate installation

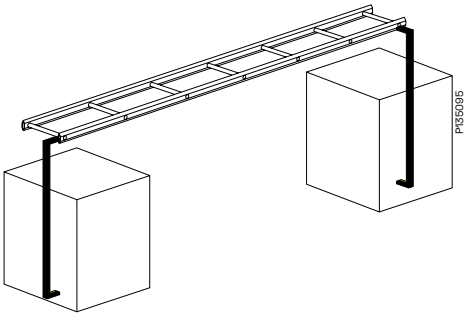



Short double connection
- realistic installation

**Not recommended installation examples**




Single connection
- poor installation




Long double connection
- in best case EMC neutral

# Potential balancing

**Electrical continuity and earthing**
The standard EN 61537 establishes that for cable ladders with electrical continuity characteristics (metal), this continuity should be guaranteed by means of an equipotential connection and one or several connections to earth in accordance with the use of the ladder system.

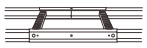
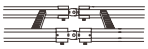
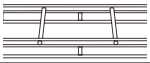
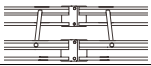
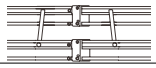
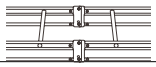
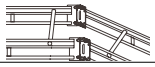
The impedance must not exceed:
- 50 mΩ through the joint.
- 5 mΩ x metre of cable ladders.(*)

(*) Currently this valour is studied through document IEC/SC23A/WG12, CLC/TC213/WG-5 – 765. It will be changed to 50 mΩ x metre.

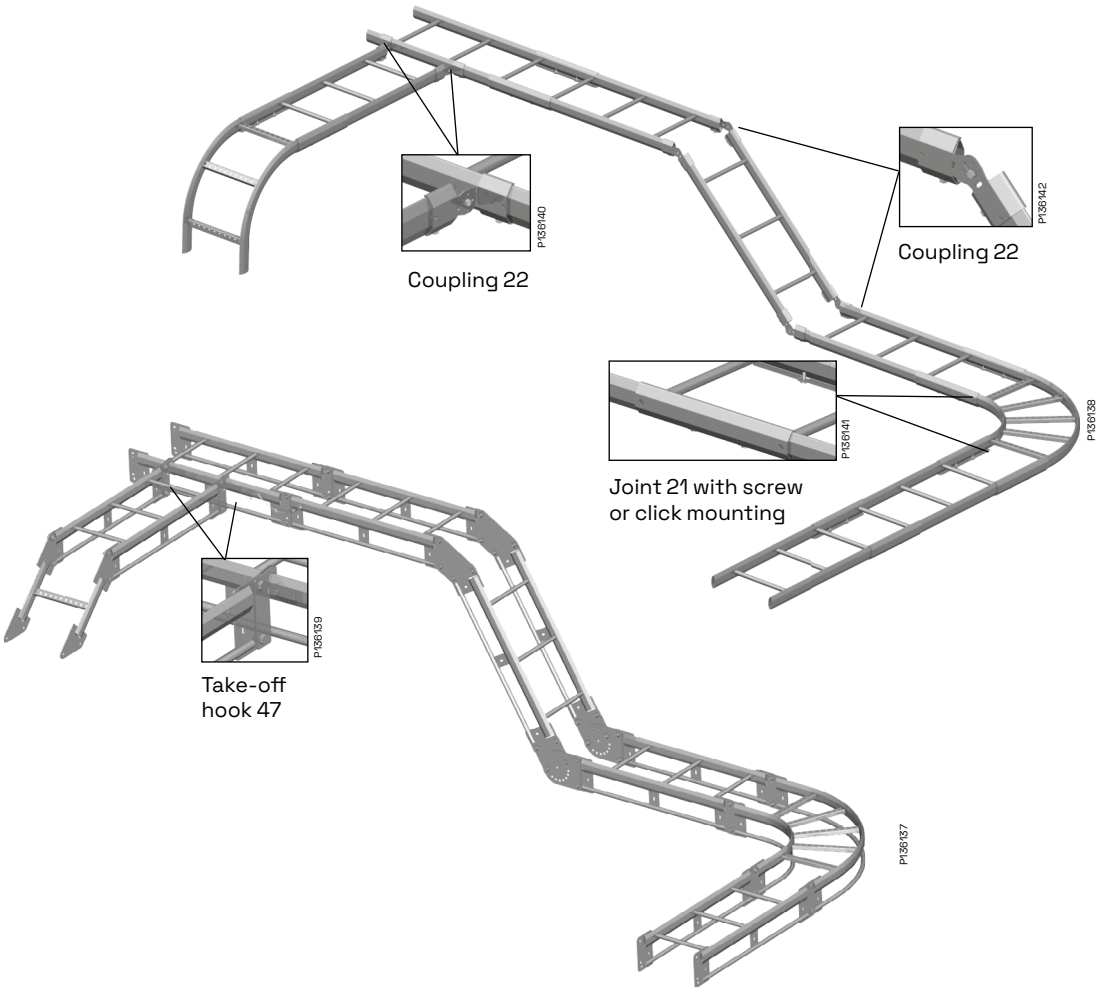
The metre length and joining systems for the different sections that Wibe Group has, as well as the joints of the different accessories supplied, comply with the electrical continuity test established in the aforementioned standard, guaranteeing the impedance established. To guarantee these impedance values tightening torque values of no less than 5 Nm are recommended, always using the joins recommended for each ladder type, and taking sizes into account.

To guarantee a safe installation, Wibe Group recommends a proper earthing of all the elements that make up the system (sections and accessories), using the accessories designed specifically for this purpose.
Ensure that all connections are well fixed and proper values are matching according to local legislation

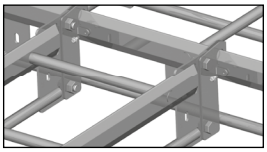
WIBE GROUP RECOMMENDS NOT TO USE THE LADDER AS EARTH OR NEUTRAL CONDUCTORS. Wibe Group IS NOT RESPONSIBLE OF ANY DAMAGE IF YOU USE ACCESSORIES FROM OTHER MANUFACTURERS.

| Product | | Ohm/m |
|---|---|---|
| Cable Ladder KHZSP without joint, pre-galvanized |  | 0.00089 |
| Cable Ladder KHZSP with Joint 21, pre-galvanized |  | 0.00100 |
| Cable Ladder KHZSP with Joint 21 click-fix, Z+ |  | 0.00150 |
| Cable Ladder KHZSP with Coupling 22, pre-galvanized |  | 0.00160 |
| Cable Ladder KHZ/KHZP without joint, hot-dip galvanized |  | 0.00050 |
| Cable Ladder KHZ/KHZP with Joint 21, hot-dip galvanized |  | 0.00040 |
| Cable Ladder KHZ/KHZP with Coupling 22, hot-dip galvanized |  | 0.00073 |
| Cable Ladder KHZV without joint, hot-dip galvanized |  | 0.00038 |
| Cable Ladder KHZV joined with Screw set M12, hot-dip galvanized |  | 0.00039 |
| Cable Ladder KHZV with Joint 45, against welded joint, hot-dip galvanized |  | 0.00057 |
| Cable Ladder KHZV with Joint 45, (without welded joint), hot-dip galvanized |  | 0.00083 |
| Cable Ladder KHZV with Coupling 44, hot-dip galvanized |  | 0.00043 |

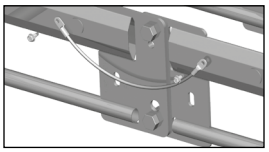
**For pre-galv, hot-dip galv and stainless steel AISI 316L**
Resistance testing of Wibe Cable Ladders has been performed and approved according to norm IEC61537 for cable ladders in pre-galv, Hot-dip galv and Stainless steel AISI 316L.



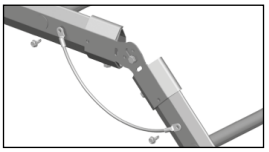

**For zinkpox coating**
Installation of cable ladders with Zinkpox coating



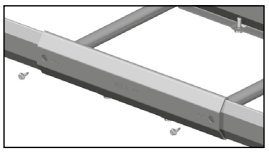

Take-off hook 47 is mounted with self-drilling screw 4.8x13




For installation of joints, couplings, junctions and bends self-drilling screw 4.8x13 and ground wire, cable area ≥10 mm², must be used.

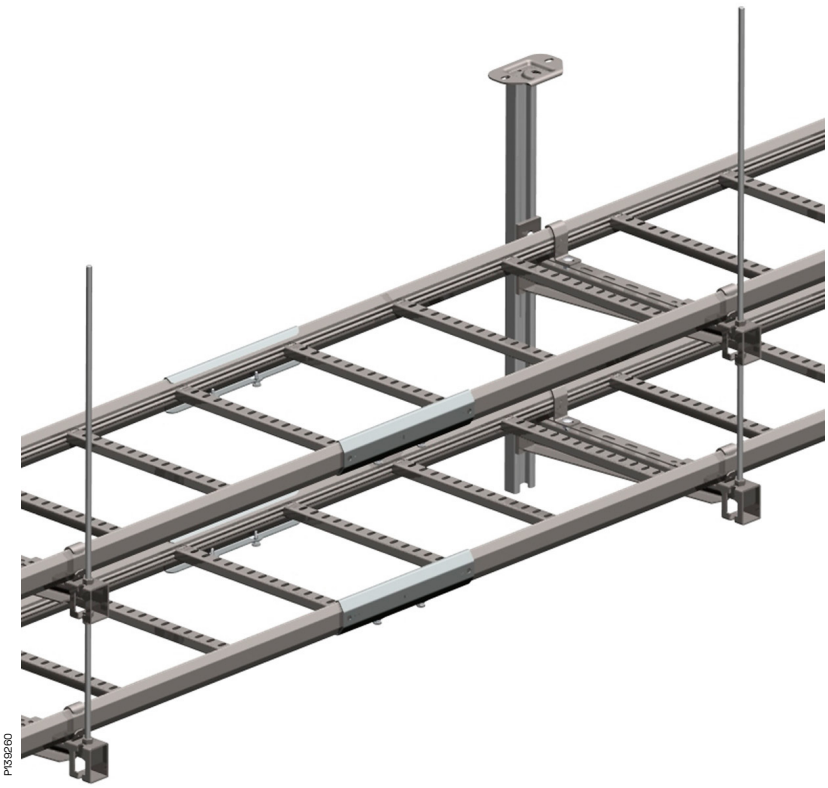



Self-drilling screw 4.8x13 and ground wire, cable area ≥10 mm², are used for installation of Coupling 22.



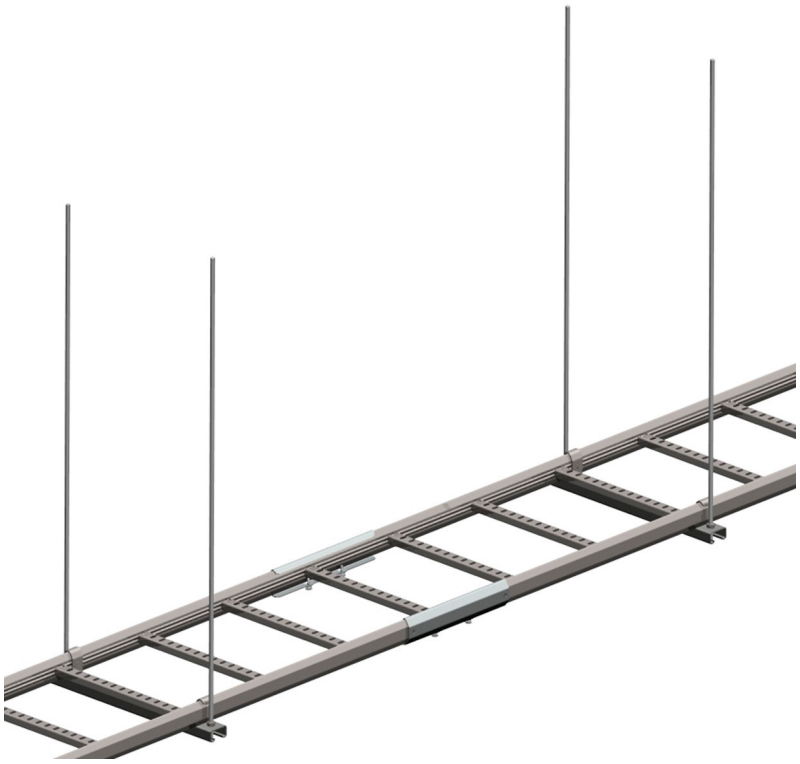

Joint 21 is mounted with self-drilling screw 4.8x13 in the grounding holes. When joining KHZ ladders Joint 21 must be moved approx. 20 mm from centre.

# E-30 and E-90 fire test




**Ceiling suspended, vertical piece, cantilver arm**

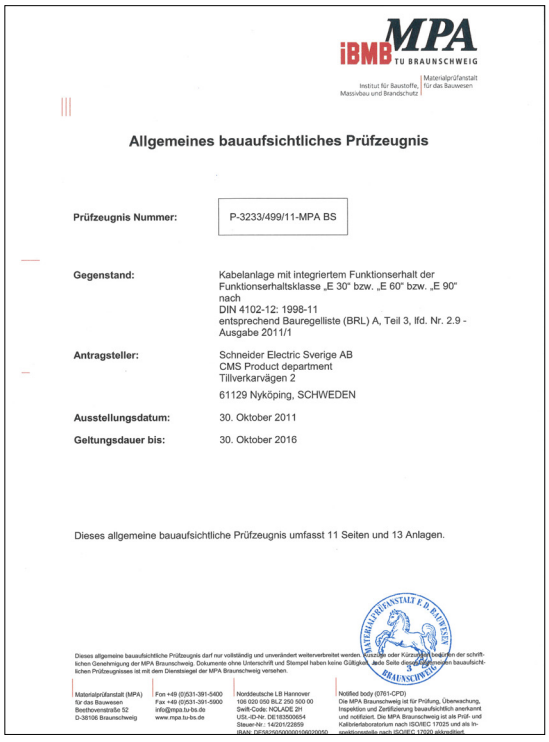
| | |
|---|---|
| Cable ladder KHZPS-150, 6 m | 725350 |
| Cable ladder KHZPS-200, 6 m | 725351 |
| Cable ladder KHZPS-300, 6 m | 725352 |
| Cable ladder KHZPS-400, 6 m | 725353 |
| Joint 21 | 791196 |
| Joint 21 ZM | CSU795051 |
| Cantilever arm 50-150 | 723433 |
| Cantilever arm 50-200 | 723434 |
| Cantilever arm 50-300 | 723436 |
| Cantilever arm 50-400 | 723437 |
| Profile clamp 42 | CSU795240 |
| Vertical piece 2F-280 | 717196 |
| Vertical piece 2F-370 | 717197 |
| Vertical piece 2F-505 | 717198 |
| Vertical piece 2F-640 | CSU794202 |
| Vertical piece 2F-730 | 717199 |
| Rod bracket 82 | 786768 |
| Threded rod W76-1000 | 725079 |
| Threded rod W76-2000 | 716792 |
| Nut M10 | 723938 |
| Nut M10 | 1149464 |
| Screw set 22S | 713694 |
| Bolt MVBF M8-50 | CSU795132 |
| Nut M6MF M8 | CSU794715 |



P1392261

## Ceiling suspended, support bracket, threded rod

| | |
|---|---|
| Cable ladder KHZPS-150, 6 m | 725350 |
| Cable ladder KHZPS-200, 6 m | 725351 |
| Cable ladder KHZPS-300, 6 m | 725352 |
| Cable ladder KHZPS-400, 6 m | 725353 |
| Joint 21 | 791196 |
| Joint 21 ZM | CSU795051 |
| Support bracket HSO-150 | 791063 |
| Support bracket HSO-200 | 791064 |
| Support bracket HSO-300 | 791065 |
| Support bracket HSO-400 | 791066 |
| Profile clamp 42 | CSU795240 |
| Threded rod W76-1000 | 725079 |
| Threded rod W76-2000 | 716792 |
| Nut M10 | 723938 |
| Nut M10 | 1149464 |



iBMB MPA TU BRAUNSCHWEIG

Institut für Baustoffe, Massivbau und Brandschutz | Materialprüfanstalt für das Bauwesen

**Allgemeines bauaufsichtliches Prüfzeugnis**

**Prüfzeugnis Nummer:** P-3233/499/11-MPA BS

**Gegenstand:** Kabelanlage mit integriertem Funktionserhalt der Funktionserhaltsklasse „E 30" bzw. „E 60" bzw. „E 90" nach DIN 4102-12: 1998-11 entsprechend Bauregelliste (BRL) A, Teil 3, lfd. Nr. 2.9 - Ausgabe 2011/1

**Antragsteller:** Schneider Electric Sverige AB
CMS Product department
Tillverkarvägen 2
61129 Nyköping, SCHWEDEN

**Ausstellungsdatum:** 30. Oktober 2011

**Geltungsdauer bis:** 30. Oktober 2016

Dieses allgemeine bauaufsichtliche Prüfzeugnis umfasst 11 Seiten und 13 Anlagen.

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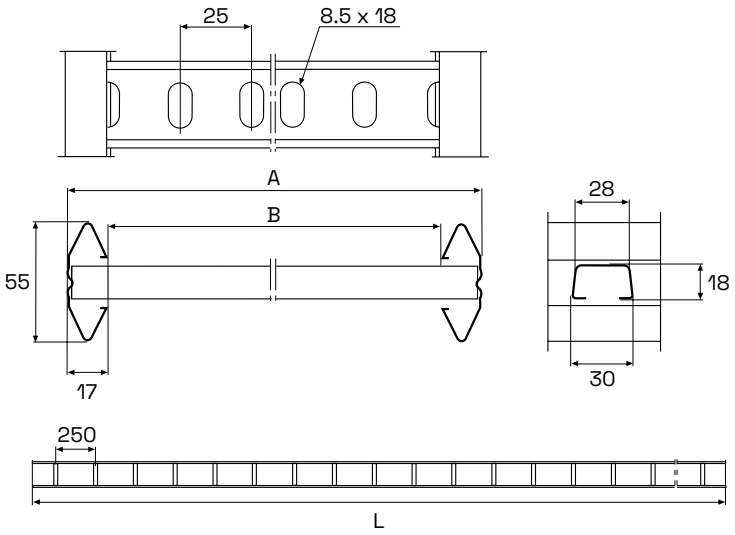
Materialprüfanstalt (MPA) für das Bauwesen Beethovenstraße 52 D-38106 Braunschweig | Fon +49 (0)531-391-5400 Fax +49 (0)531-391-5900 info@mpa.tu-bs.de www.mpa.tu-bs.de | Norddeutsche LB Hannover 106 020 000 BLZ 250 500 00 Swift-Code: NOLADE 2H USt.-ID-Nr. DE183500654 Steuer-Nr.: 14/201/22859 IBAN: DE56250500000106020050 | Notified body (0761-CPD) Die MPA Braunschweig ist für Prüfung, Überwachung, Inspektion und Zertifizierung bauaufsichtlich anerkannt und notifiziert. Die MPA Braunschweig ist als Prüf- und Kalibrierlaboratorium nach ISO/IEC 17025 und als Inspektionsstelle nach ISO/IEC 17020 akkreditiert.

## Test conditions

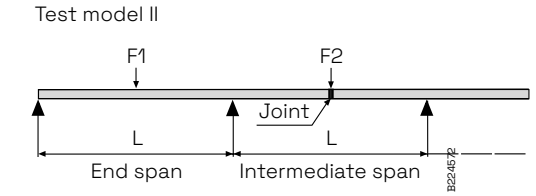
- E30 and E90 according to DIN 4102-12
- IBMB test institute
- Dätwyler Pyrofil KERAM cables
- Load 20 kg/m
- Support distance 1,5 m

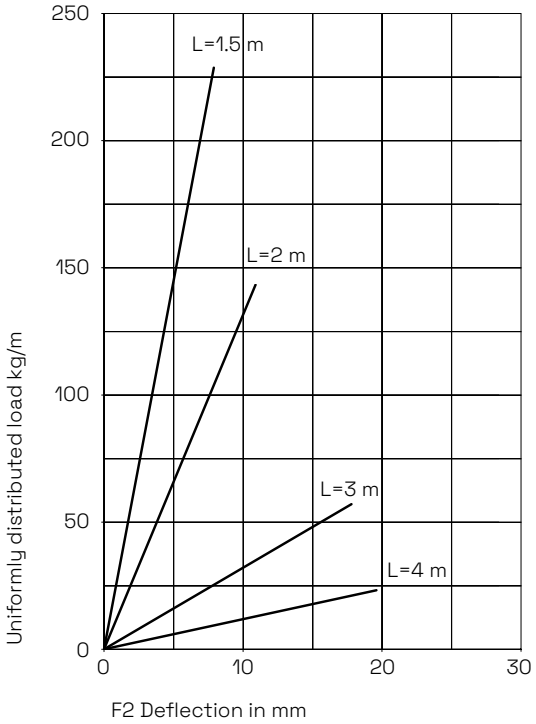
# Use and installation


## KHZSP/ KHZSPZ+




**Test model II**



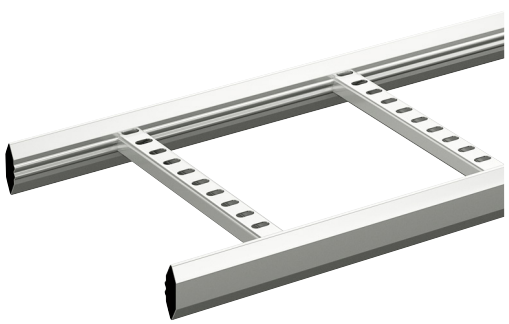

| Type | L m | A mm | B mm |
|---|---|---|---|
| KHZSP 200 | 3, 4, 6 | 198 | 164 |
| KHZSP 300 | 3, 4, 6 | 298 | 264 |
| KHZSP 400 | 3, 4, 6 | 398 | 364 |
| KHZSP 500 | 3, 4, 6 | 498 | 464 |
| KHZSP 600 | 3, 4, 6 | 598 | 564 |
| | | | |
| KHZSPZ+ 200 | 4, 6 | 198 | 164 |
| KHZSPZ+ 300 | 4, 6 | 298 | 264 |
| KHZSPZ+ 400 | 4, 6 | 398 | 364 |
| KHZSPZ+ 500 | 4, 6 | 498 | 464 |
| KHZSPZ+ 600 | 4, 6 | 598 | 564 |

**Loadings**
The ladders are tested according to IEC 61537, test model II - a joint in the intermediate span (F2).

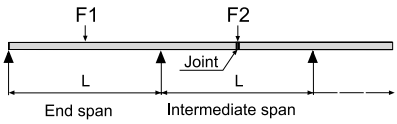
**Guaranteed load**
Guaranteed uniformly distributed load includes a minimum safety factor of 1.7 towards rupture. The diagram shows the deflection with Joint 21 for all ladder widths.

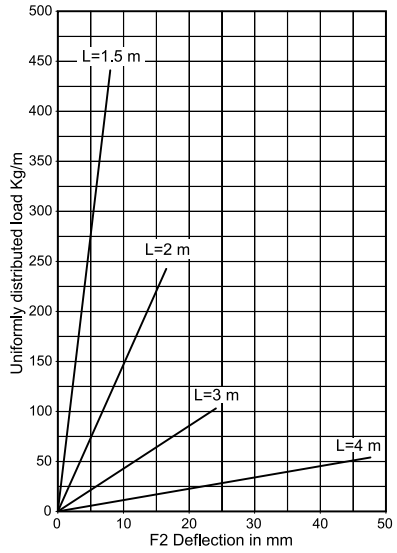
The cable ladders must not be used as walkways.

# Use and installation

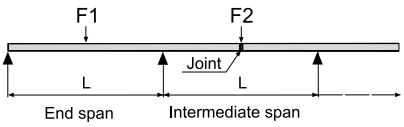


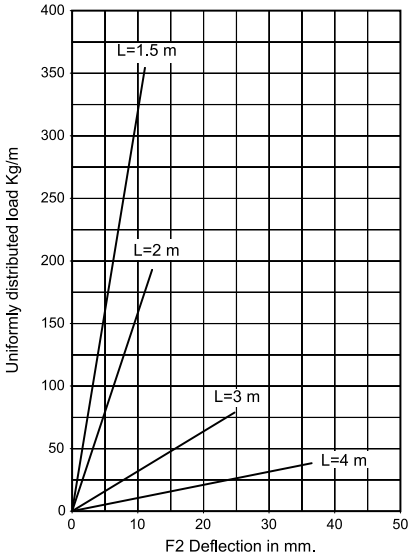

**KHZP Test model II**



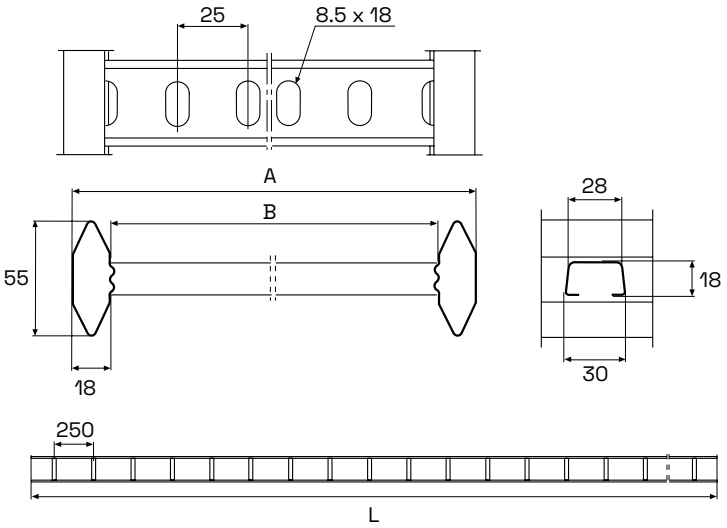




**KHZPS Test model II**




## KHZP / KHZPS



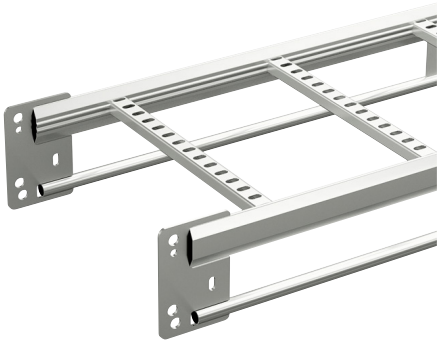

| Type | L m | A mm | B mm |
|---|---|---|---|
| KHZP/KHZPS 150 | 6 | 147 | 111 |
| KHZP/KHZPS 200 | 6 | 197 | 161 |
| KHZP/KHZPS 300 | 6 | 297 | 261 |
| KHZP/KHZPS 400 | 6 | 397 | 361 |
| KHZP/KHZPS 500 | 6 | 497 | 461 |
| KHZP/KHZPS 600 | 6 | 597 | 561 |
| KHZP/KHZPS 800 | 6 | 797 | 761 |
| KHZP/KHZPS 1000 | 6 | 997 | 961 |
| | | | |
| KHZP 150 | 3 | 147 | 111 |
| KHZP 200 | 3 | 197 | 161 |
| KHZP 300 | 3 | 297 | 261 |
| KHZP 400 | 3 | 397 | 361 |
| KHZP 500 | 3 | 497 | 461 |
| KHZP 600 | 3 | 597 | 561 |
| KHZP 800 | 3 | 797 | 761 |
| KHZP 1000 | 3 | 997 | 961 |

**Loadings**
The ladders are tested according to IEC 61537, test model II - a joint in the intermediate span (F2).

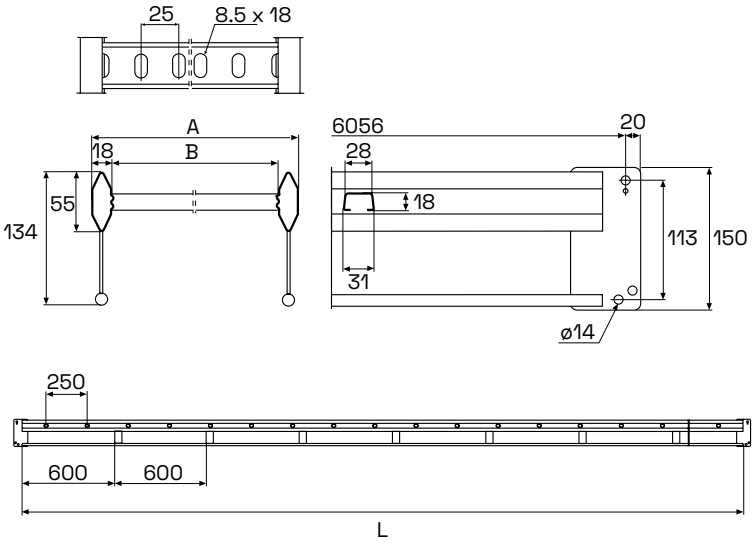
**Guaranteed load**
Guaranteed uniformly distributed load includes a minimum safety factor of
1.7 towards rupture. The diagrams shows the deflection with Joint 21 for all ladder widths.

The cable ladders must not be used as walkways.

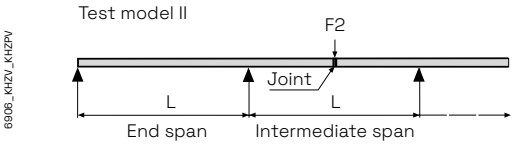
# Use and installation

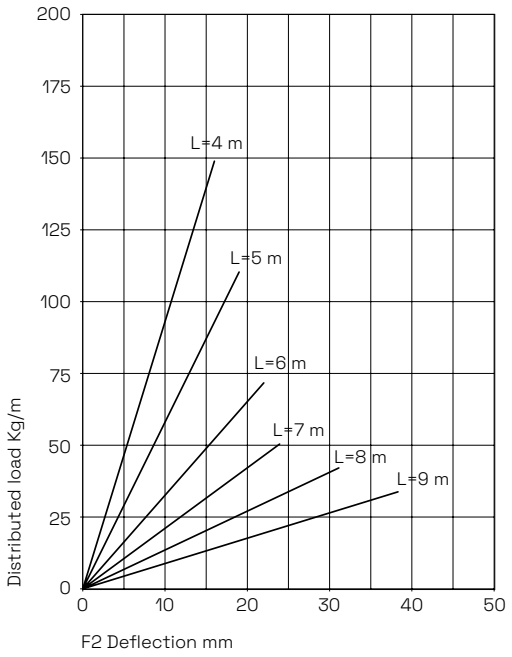



## KHZPV




| Type | L m | A mm | B mm |
|---|---|---|---|
| KHZPV 200 | 6 | 197 | 161 |
| KHZPV 300 | 6 | 297 | 261 |
| KHZPV 400 | 6 | 397 | 361 |
| KHZPV 500 | 6 | 497 | 461 |
| KHZPV 600 | 6 | 597 | 561 |
| KHZPV 1000 | 6 | 997 | 961 |




**Loadings**
The ladders are tested according to IEC 61537, test model II - a joint in the intermediate span (F2).

**Guaranteed load**
Guaranteed uniformly distributed load includes a minimum safety factor of 1.7 towards rupture. The diagrams shows the deflection for cable ladder widths up to 600 mm.

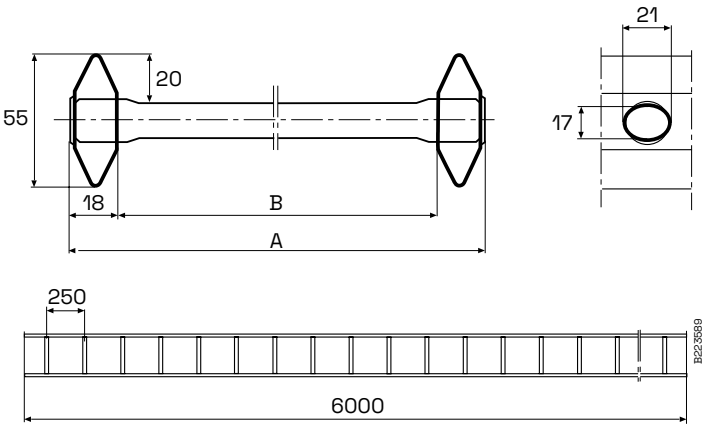
For widths greater than 600 mm contact Wibe Group or distributor.

The cable ladders must not be used as walkways.

# Use and installation

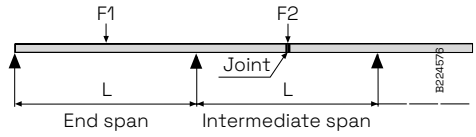

**KHZ closed**

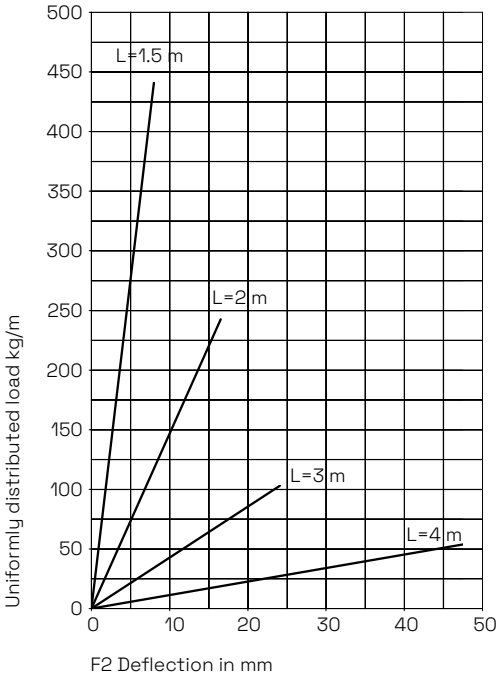
## KHZ




| Type | L<br>m | A<br>mm | B<br>mm |
|---|---|---|---|
| KHZ 150 | 6 | 147 | 111 |
| KHZ 200 | 6 | 197 | 161 |
| KHZ 300 | 6 | 297 | 261 |
| KHZ 400 | 6 | 397 | 361 |
| KHZ 500 | 6 | 497 | 461 |
| KHZ 600 | 6 | 597 | 561 |

Test model II



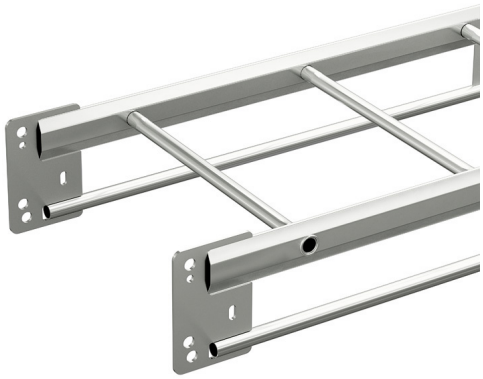




**Loadings**
The ladders are tested according to IEC 61537, test model II - a joint in the intermediate span (F2).

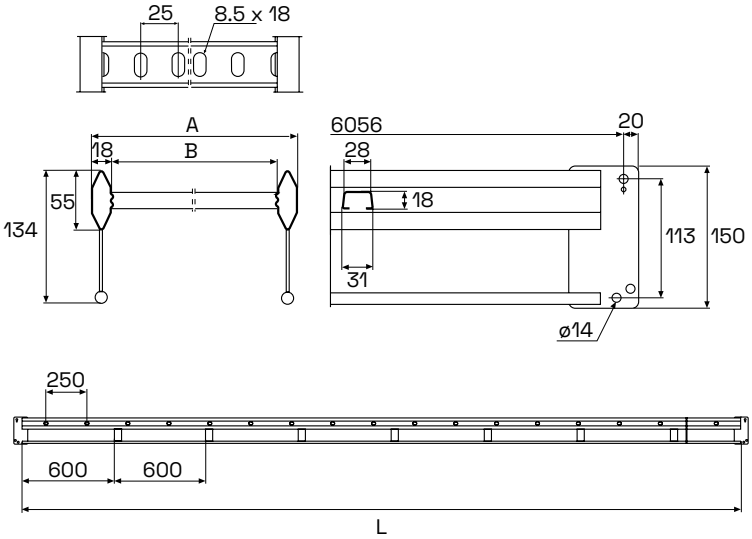
**Guaranteed load**
Guaranteed uniformly distributed load includes a minimum safety factor of 1.7 towards rupture. The diagrams shows the deflection with Joint 21 for cable ladder widths up to 600 mm. For widths greater than 600 mm contact Wibe Group or distributor.

The cable ladders must not be used as walkways.

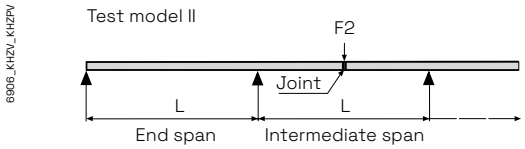
# Use and installation

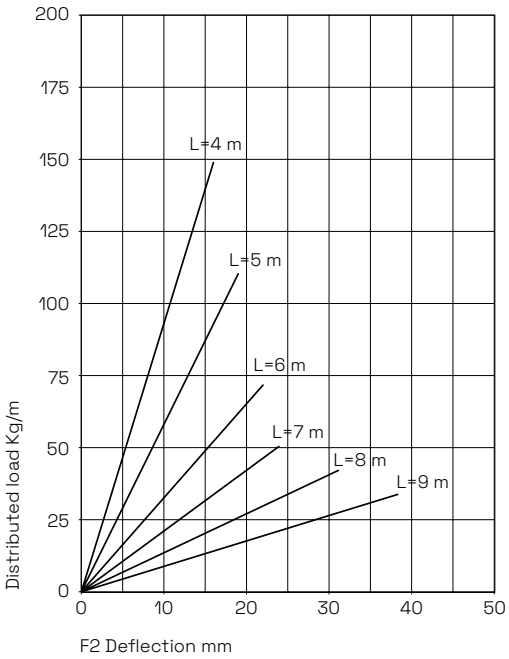



## KHZV




| Type | L m | A mm | B mm |
|---|---|---|---|
| KHZV 200 | 6 | 197 | 161 |
| KHZV 300 | 6 | 297 | 261 |
| KHZV 400 | 6 | 397 | 361 |
| KHZV 500 | 6 | 497 | 461 |
| KHZV 600 | 6 | 597 | 561 |



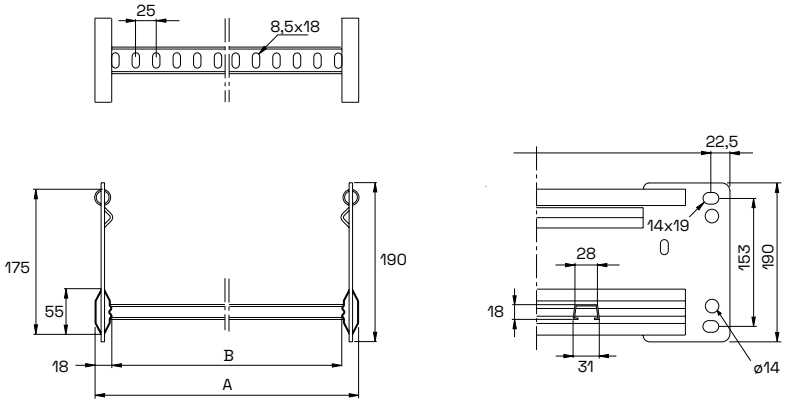

**Loadings**
The ladders are tested according to IEC 61537, test model II - a joint in the intermediate span (F2).

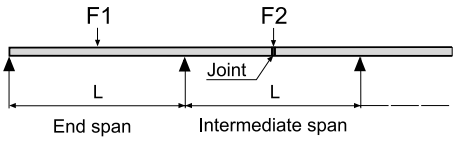
**Guaranteed load**
Guaranteed uniformly distributed load includes a minimum safety factor of 1.7 towards rupture. The diagrams shows the deflection for cable ladder widths up to 600 mm.

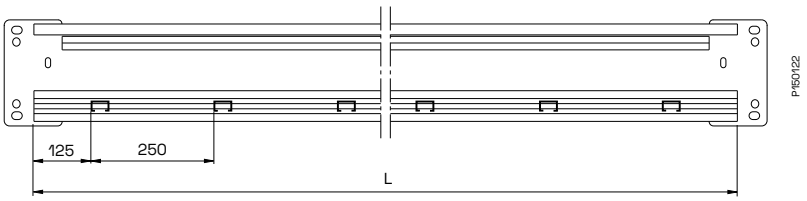
The cable ladders must not be used as walkways.

# Use and installation

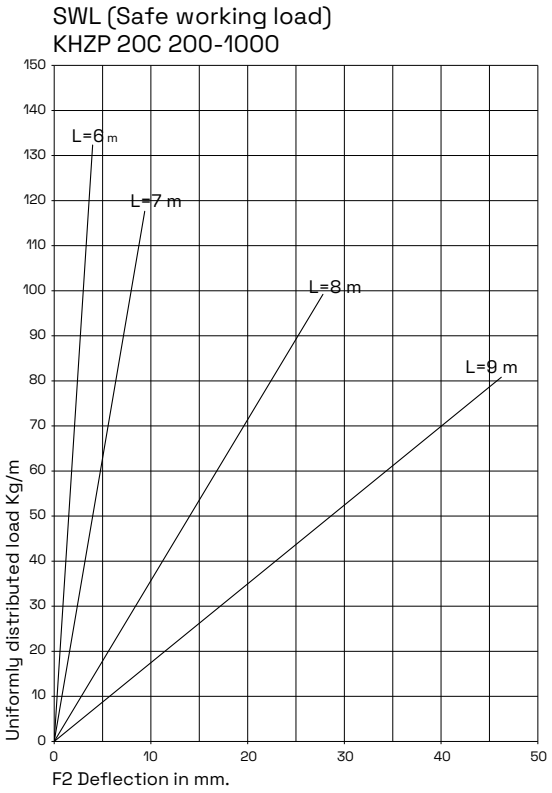
## KHZP-20C


**Test model II**




| Type | L m | A mm | B mm |
|---|---|---|---|
| KHZP 20C-200 | 6 | 197 | 161 |
| KHZP 20C-300 | 6 | 297 | 261 |
| KHZP 20C-400 | 6 | 397 | 361 |
| KHZP 20C-500 | 6 | 497 | 461 |
| KHZP 20C-600 | 6 | 597 | 561 |
| KHZP 20C-800 | 6 | 797 | 761 |
| KHZP 20C-1000 | 6 | 997 | 961 |

To be able to take the load requirements the system shall be supported close to all transition points like Bends, T-junctions, Risers, Take-off hooks, Angle plates and Couplers.

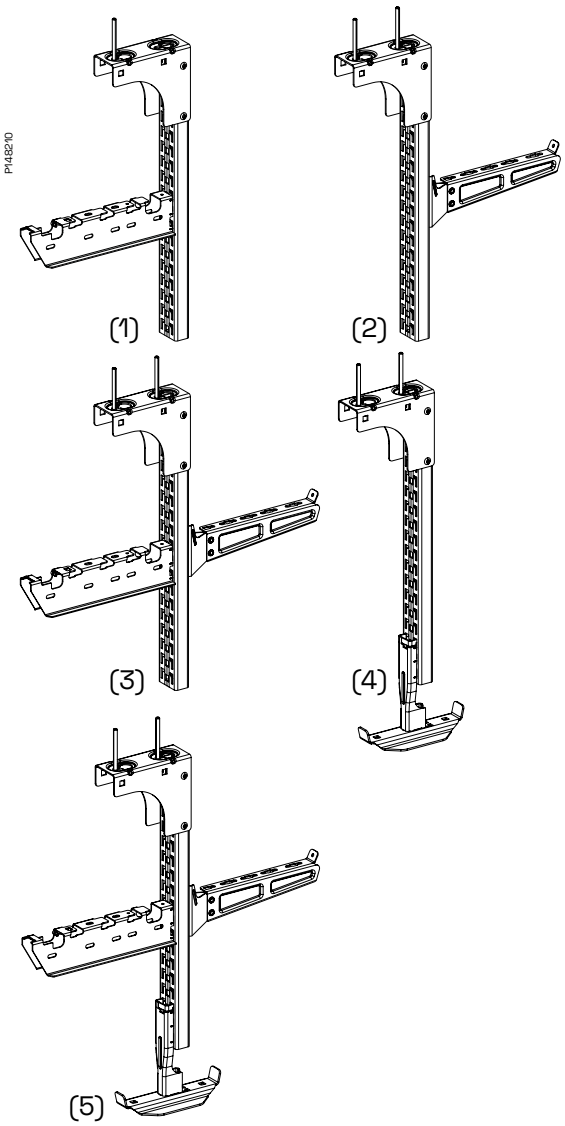
**Loadings IEC 61537**
The ladders are tested according to IEC 61537, test model II.

**Guaranteed load**
Guaranteed uniformly distributed load supported includes a minimum safety factor of 1.7 towards rupture. The diagram shows the deflection for ladder widths.

**Loadings according NEMA V1 20C**
Test result at 6 meter support distance 173 kg/m
(safety factor of 1.5).

The cable ladders must not be used as walkways.

# Use and installation CLX³ Click suspension



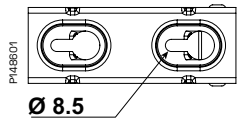

## CLX³ General information

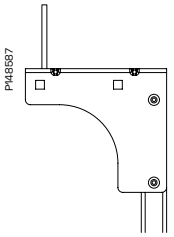
### Standards
CLX³ installation system is tested and following the classification according to the IEC 61537.

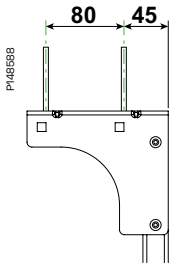
### Usage of gloves
According to IEC 61537 it is always recommended to use protective gloves when handling and manipulating cable support systems.

### Handling and storage
- Store in dry and covered places.
- Avoid moisture and pollutants.
- Do not remove the packing until installation.
- Take care when storing and handling so that the CLX³ components are well protected from damage.

### CLX³ Single-sided pendant loading configurations
CLX³ pendant is primarily designed for installation of the CLX³ support system, but can also be used for T-bolt installation.
The system can be installed in different configurations:
- Click direction (**1**): the cantilever and the ceiling plate are in the same direction
- T-bolt direction (**2**): a cantilever is fixed with a T-bolt to the rail, in the opposite direction of the ceiling plate
- T installation (**3**): combination of the first 2 installations
- Central suspension (**4**): the pendant is completed by a central suspension bracket
- T and central suspension (**5**).




### Fixation to the celling for single sided pendant

**Keyhole design**
The installation of the single pendant on the ceiling is easier with the key holes, allowing to pre-fix bolt. For concrete ceiling, use bolts IMT38051.
For non-concrete ceiling, M8 bolts with washer >Ø16 should be use

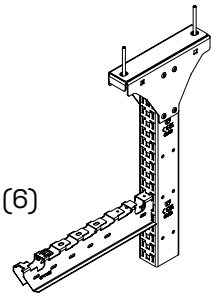
**Bolt fixation**
Only for click direction installation CLX³ Cantilever arm (1), the customer can use a single bolt, in the outer hole position of the ceiling plate.
For T-bolt suspension, central suspension, T installation and T and Central suspension installation (2)(3)(4)(5), the customer should always install 2 bolts.

For single side CLX pendant, the bolts should be at 80mm (axis to axis) and the first one at >45mm from the wall.

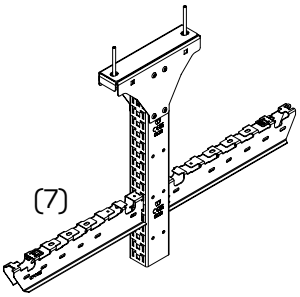
If the ceiling is not perfectly horizontal, the customer should use the angle adaptor (for single side pendant only).

# Use and installation CLX³ Click suspension

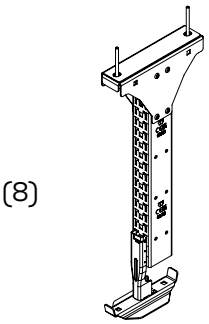
(6)



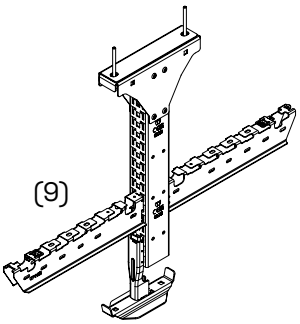
(7)



(8)

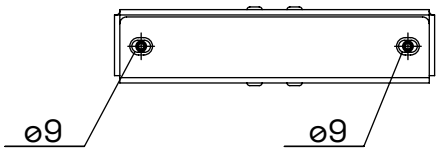


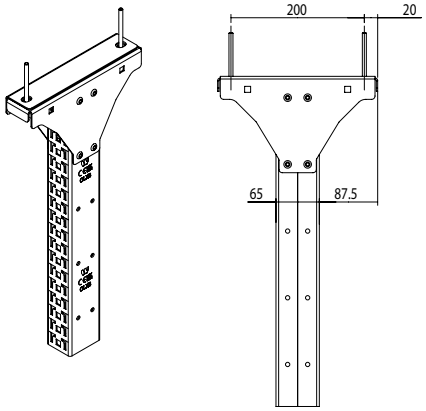
(9)



## CLX³ Double sided pendant loading configurations

CLX³ pendant allowed to install the system in different configuration:
- Single-sided (assymetric) installation (**6**): One or more levels of cantilever arms placed on the same side of the pendant.
- Double-sided (symetric or assymetric) installation (**7**): One or more levels of cantilever arms placed on both sides of the pendant.
- Central suspension (**8**): the pendant is completed by a central suspension bracket
- Central suspension and cantilever arm(s) (**9**): the pendant is completed by a central suspension bracket and one or more cantilever arms.




## Fixation to the celling for double sided pendant

Double sided pendant always requires 2 bolts.
For concrete ceiling, use bolts IMT38051.
For non-concrete ceiling, M8 bolts with washer >Ø16 should be use.
The bolts should be at 200mm (axis to axis) and the first one at >20mm from the wall.

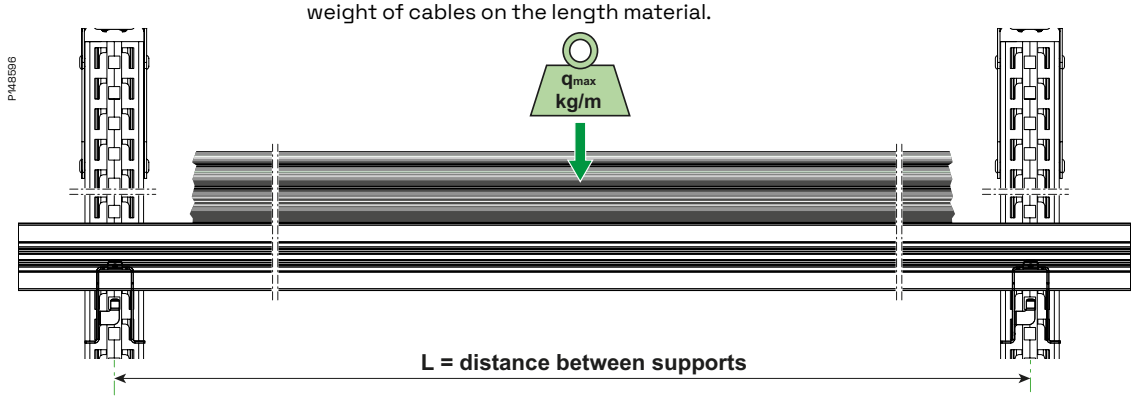
# Use and installation CLX³ Click suspension

## Pendant load calculation

To verify that the load applied to each pendant is within performance, it is necessary to calculate and consolidate the total **tensile load force** and the total **moment-force** on each pendant and for each cantilever and after that compare the calculated values with the defined loading limitations to ensure a safe installation.

### Total tensile force Ft calculation method

This is calculated as the sum of all forces applied to the pendant from the weight of cables on the length material.

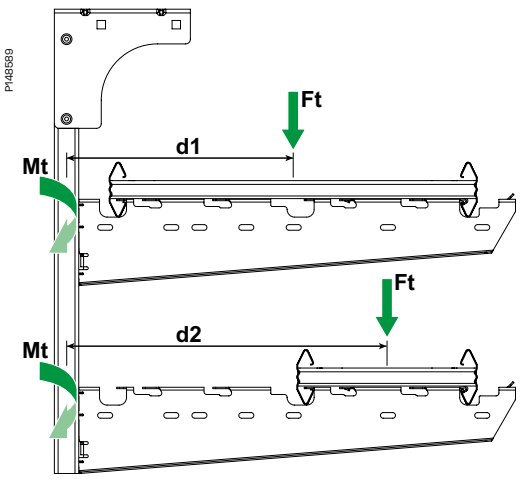



**Ft** (total load in N) **= L** (span or supports distance in meters) x **qmax** (load in kg/m) **x 10**.

**In case of several layers are installed on the pendant then the sum of the Ft tensile load from all layers shall be calculated.**

### Total momentum force Mt calculation method

This is calculated as the sum of all the torsion forces applied to the pendant from the weight of cables on the length material and the offset distance created by the cantilever arm.




**Mt** (momentum in N.m) **= Ft** (N) x **d** (distance between axis center and point load in meters)

**"d"** depends of the position of the length material on the cantilever arm.

The distance **d** can be different depending on installation method.
When the length material is installed on the full width of the cantilever, use **d1**.
For length material that are installed at the outer end of the arm, use **d2**.

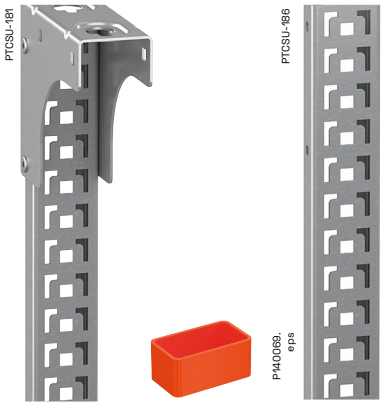
| Model | PG | d1 (m) | d2 (m) |
|---|---|---|---|
| CLX³ cantilever arm 200[1 2] | CSU795873 | 0.140 | NA |
| CLX³ cantilever arm 300[1 2] | CSU795874 | 0.190 | |
| CLX³ cantilever arm 400[1] | CSU795649 | 0.240 | 0.340 |
| CLX³ cantilever arm 400[2] | CSU795875 | 0.240 | 0.340 |
| CLX³ cantilever arm 500[1] | CSU795650 | 0.290 | 0.440 |
| CLX³ cantilever arm 500[2] | CSU795876 | 0.290 | 0.440 |
| CLX³ cantilever arm 600[1] | CSU795651 | 0.340 | 0.490 |
| CLX³ cantilever arm 600[1] | CSU795877 | 0.340 | 0.490 |

1) Can be used for installation of Defem mesh trays
2) Can be used for installation of Performa mesh trays

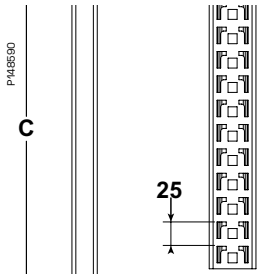
**In case of several layers are installed on the pendant then the sum of the Mt momentum force from all layers shall be calculated.**

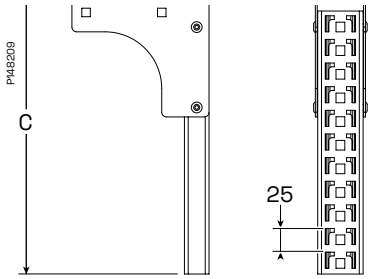
**Ensure that the installation is designed so that ΣMt and ΣFt are under the limits.**

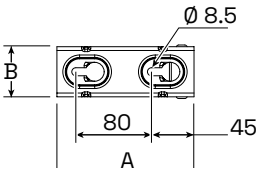
# Use and installation CLX³ Click suspension




End Plug 28E




## CLX³ Pendant 24/48

Vertical piece with a perforated pattern to be used for installation of CLX³ cantilever arms or CLX³ central suspension adapter. The open side of the rail can be used for installation of cantilever arms and brackets together with T-bolt. Can be joined to CLX³ Rail 24/48 with pendant joint 2FJ.

| Model | PG | High (mm) A | Width (mm) B | Length (mm) C |
|---|---|---|---|---|
| **CLX³ pendant** | | | | |
| CLX³ pendant 24/48 300 mm PG | CSU795632 | 145 | 53 | 295 |
| CLX³ pendant 24/48 400 mm PG | CSU795633 | | | 395 |
| CLX³ pendant 24/48 500 mm PG | CSU795634 | | | 495 |
| CLX³ pendant 24/48 700 mm PG | CSU795635 | | | 695 |
| CLX³ pendant 24/48 1000 mm PG | CSU795636 | | | 995 |
| CLX³ pendant 24/48 1500 mm PG | CSU795638 | | | 1495 |
| **CLX³ rail** | | | | |
| CLX³ rail 24/48 300 mm PG | CSU795640 | 26 | 48 | 280 |
| CLX³ rail 24/48 1000 mm PG | CSU795641 | | | 980 |
| CLX³ rail 24/48 3000 mm PG | CSU795637 | | | 2980 |

### Pendants Safe Working Load (SWL)

**SWL for bending moment of the pendant Mt.**

| Model | PG | Moment (N.m) Click side | Deflection (mm) |
|---|---|---|---|
| CLX³ pendant 24/48 300 mm PG | CSU795632 | 235 | 2 |
| CLX³ pendant 24/48 400 mm PG | CSU795633 | | 4 |
| CLX³ pendant 24/48 500 mm PG | CSU795634 | | 7 |
| CLX³ pendant 24/48 700 mm PG | CSU795635 | | 15 |
| CLX³ pendant 24/48 1000 mm PG | CSU795636 | | 30 |
| CLX³ pendant 24/48 1500 mm PG | CSU795638 | 200 | 30 |

Tested according to IEC 61537 standard.

**SWL bending moment for Adjustable ceiling plate Mt.**

| Model | PG | Moment (N.m) Click side |
|---|---|---|
| CLX³ adjustable ceiling plate | CSU795639 | 235 |

**SWL pendant tensile strength Ft.**

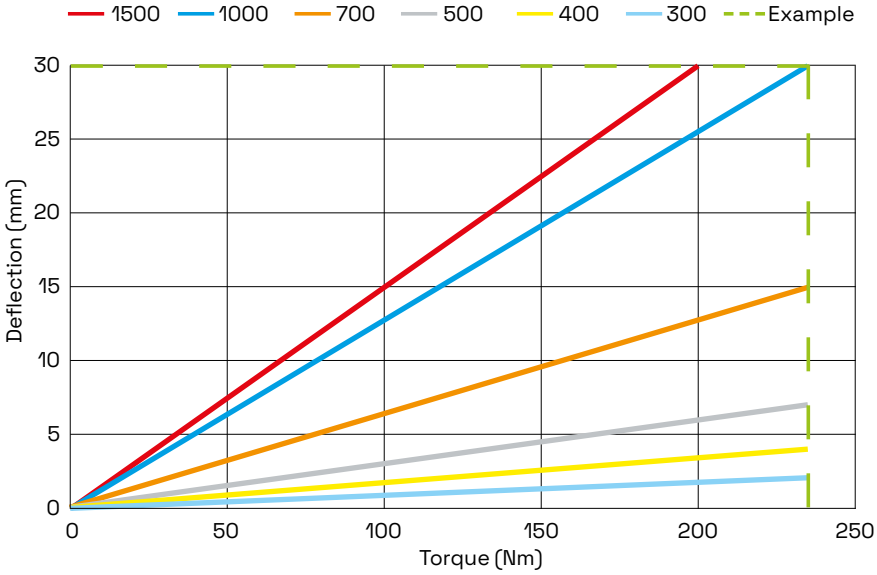
| Model | PG | Tensile load SWL (N) 1 bolt CLX³ | Tensile load SWL (N) 2 bolts CLX³ |
|---|---|---|---|
| CLX³ pendant 24/48 300 mm PG | CSU795632 | 2000 | 5000 |
| CLX³ pendant 24/48 400 mm PG | CSU795633 | | |
| CLX³ pendant 24/48 500 mm PG | CSU795634 | | |
| CLX³ pendant 24/48 700 mm PG | CSU795635 | | |
| CLX³ pendant 24/48 1000 mm PG | CSU795636 | | |
| CLX³ pendant 24/48 1500 mm PG | CSU795638 | | |

# Use and installation CLX³ Click suspension

## Pendant limits, torque and deflection

In the diagram below it is possible to check if **ΣMt** is below the momentum limitation of the pendant (end of line). It is also possible to see the deflection on the pendant at max **ΣMt** and all values below.

### Torque / Deflection
### Single-sided pendant




### Calculation example

For a cantilever size 600, full size ladder installation, 3 m span, load of 23 kg/m on a 1000 mm pendant.

1) **ΣF**: 3 m (span) x 23 kg/m (load) x10 = 690 N will be the load for each pendant system.

2) **ΣMt**: 690 (N) x 0.34 (m) = 234 N.m.

**ΣF** = 690 N ≤ 2000 N and **ΣMt** = 234 Nm ≤ 235 N.m.

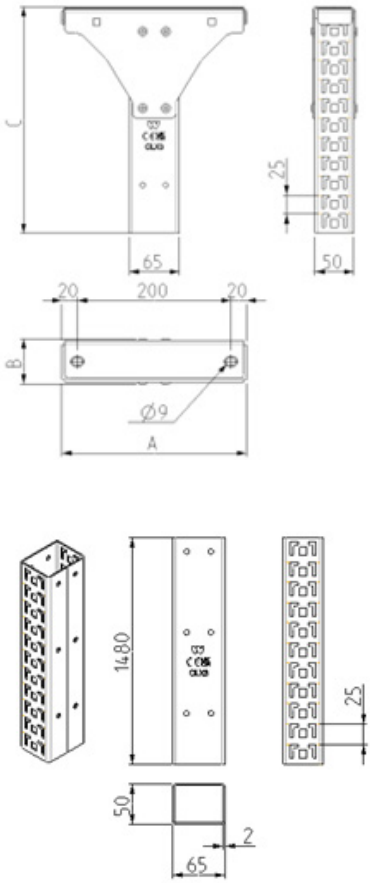
3) Drawing of the lines on the graph: for 234 N.m, the deflexion on the pendant is **30 mm**.

## CLX³ Double-sided pendant

Vertical piece/pendant, double sided to be used for ceiling suspended mounting. Perforated pattern on both sides to be used with CLX³ cantilever arm. Use for double sided mounting, or for heavy asymmetric loads.
Material: Steel, pre-galvanized.

| Model | PG | High (mm) A | Width (mm) B | Length (mm) C | Weight /100pc (Kg) |
|---|---|---|---|---|---|
| **CLX³ double-sided pendant** | | | | | |
| 300 mm PG | CSU795937 | 240 | 59 | 295 | 180 |
| 500 mm PG | CSU795938 | | | 495 | 241 |
| 700 mm PG | CSU795939 | | | 695 | 300 |
| 1000 mm PG | CSU795940 | | | 995 | 390 |
| 1500 mm PG | CSU795941 | | | 1495 | 542 |
| **CLX³ double-sided rail** | | | | | |
| 1500 mm PG | CSU795942 | 65 | 50 | 1480 | 448 |

# Use and installation CLX³ Click suspension




## Pendants Safe Working Load (SWL)

**SWL for bending moment of the double-sided pendant Mt.**

| Model | PG | Moment (N.m) Click side | Moment N.m. ECA application |
|---|---|---|---|
| 300 | CSU795937 | 1250 | 725 |
| 500 | CSU795938 | | |
| 700 | CSU795939 | | |
| 1000 | CSU795940 | | |
| 1500 | CSU795941 | | |

Tested according to IEC 61537 standard.
With double side Joint, the bending Moments of pendant are reduced of 50%

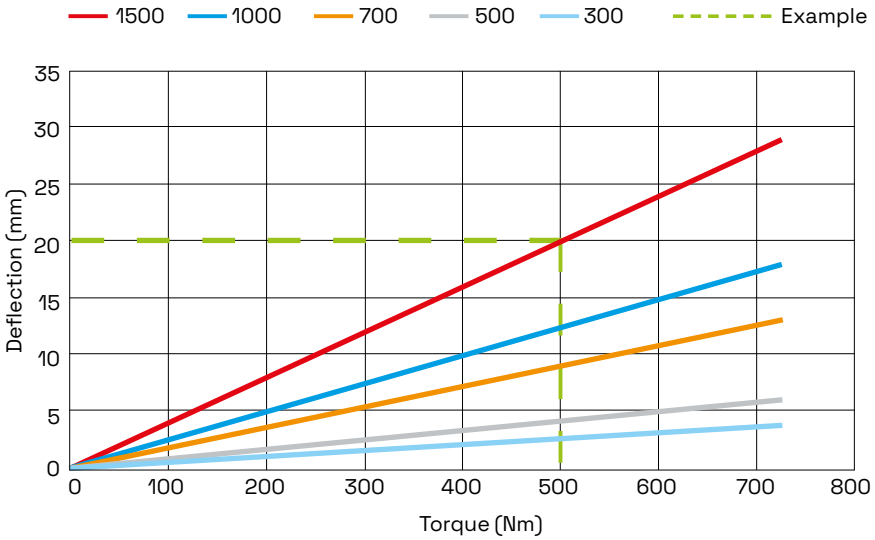
**SWL pendant tensile strength Ft.**

| Model | PG | Tensile load SWL (N) 2 bolts |
|---|---|---|
| 300 | CSU795937 | 10800 |
| 500 | CSU795938 | |
| 700 | CSU795939 | |
| 1000 | CSU795940 | |
| 1500 | CSU795941 | |

## Pendant limits, torque and deflection

In the diagram below it is possible to check if **ΣMt** is below the momentum limitation of the pendant (end of line). It is also possible to see the deflection on the pendant at max **ΣMt** and all values below.

Torque / Deflection
Double-sided pendant




### Calculation example

For on 2 Cantilevers size 600, full size ladder installation, 3 m span, load of 23 kg/m on a 1000 mm pendant

1) **ΣF:** 1x 3 m (span) x 23 kg/m (Load) x10 = = 690 N will be the load for each arm, so 1380 on each pendant system

2) **ΣMt**: 2 x 690 (N) x 0,34 (m) = 469 N.m

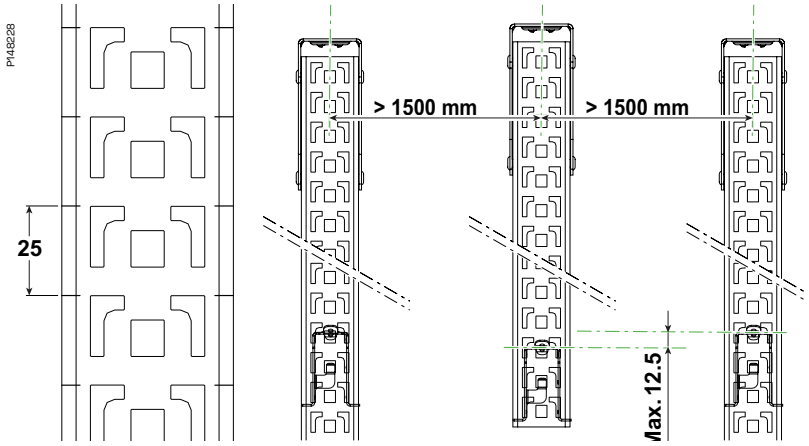
**ΣF** = 1380 N ≤ 10800 N and **ΣMt** = = 469 Nm ≤ 725 Nm

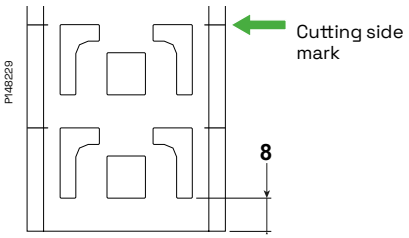
3) Drawing of the lines on the graph: For 469 Nm, the deflection on the pendant is **19 mm**

# Use and installation CLX³ Click suspension

## Distance between rails and offset

CLX³ rail have a pitch between the patterns of 25 mm.
The support distance between the pendants should be at least than 1.5 m. If the length material can't be installed on the exact same level, the length material should be installed on the closest offset- pitch and never at more than 12.5 mm vertically from the previous pattern.



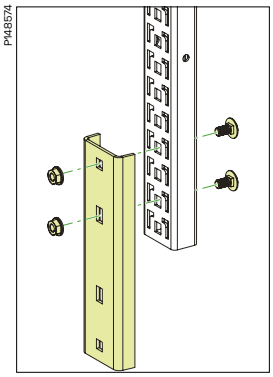




## Cutting of the pendant or rail

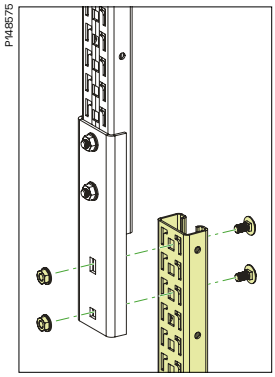
Cutting of the rail or the pendant should be made at 8 mm under the last pattern needed, as the side marks are showing. This to assure that there is enough material below the bottom pattern to secure proper fixation of the cantilever arm.

## Installation of the rail joint

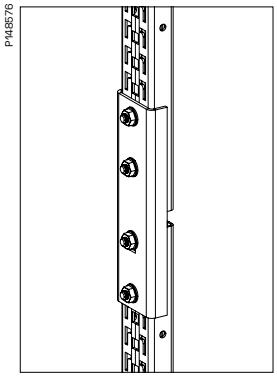
CLX³ rails can be joined together with pendant joint 2FJ.




Place the joint on the rail in place, make sure the 2 top holes are in front of slots to install the included bolts and nuts.




Install the second rail as high as possible and install the other bolts and nuts.



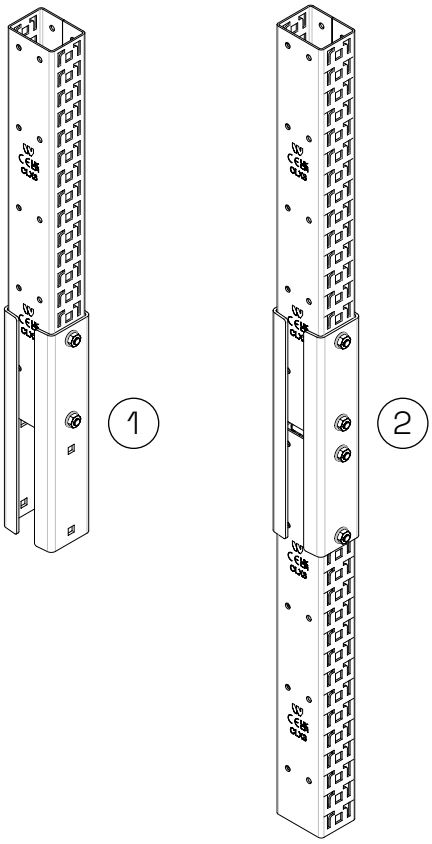

Torque of the nuts **11 N.m.**

Note: extending the pendant with the rail joint will decrease the load capacity of the pendant. For SWL information when extending the pendants, contact Technical support.

# Use and installation CLX³ Click suspension

## Joint for CLX³ double-sided rail

Pendant joint to be used for joining CLX double pendant with CLX double rail. Two joining brackets with screw M8x80 and nuts included.
Tightening force of the screw set minimum torque 11 N.m.
Material: Steel, pre-galvanized.



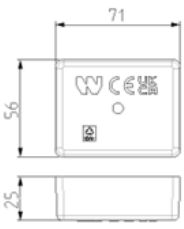

### Installation of the Rail joint for double sided pendant

CLX³ double sided rails can be joined together with the Joint double-sided CLX³ rail kit CSU795943

1: Place the brackets inwards on the rail in place, make sure the 2 top holes are in front of square holes to install 2 of the included bolts and nuts, without tightening them.

2: Install the second rail as high as possible and install the other bolts and nuts. Recommended torque of the nuts: 11 Nm

Note: extending the pendant with the rail joint will decrease the load capacity of the pendant 50% less bending moment. For SWL information when extension, contact Technical support.




## End cap for CLX³ double-sided rail

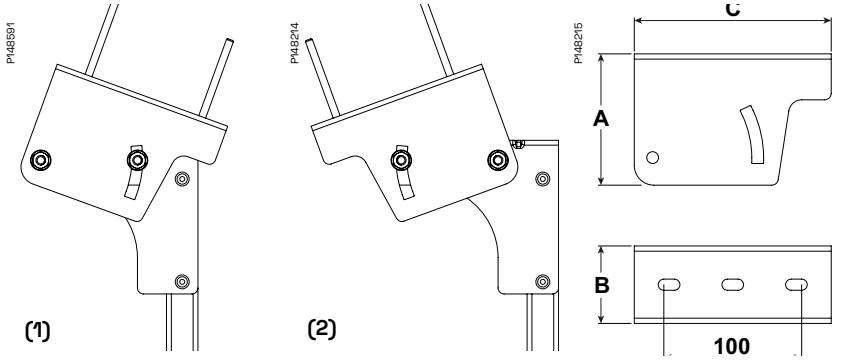
End plug to be mounted on CLX double side pendant ends to provide protection against personal injury and to make the ends of the profile more clearly visible.
Non flame propagating and Halogen free material.
Material: PP/TPE, orange.

# Use and installation CLX³ Click suspension

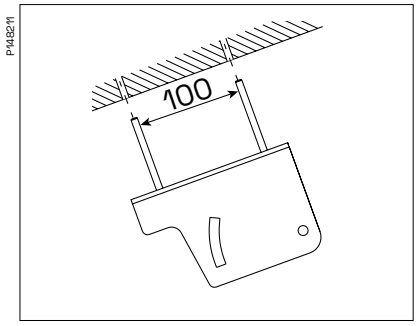
## CLX³ Adjustable ceiling plate

Adjustable ceiling plate is used together with CLX³ pendant to allow for angle correction up to 25°. The adjustable ceiling plate is fixed to the CLX³ pendant with 4 screw set 22S to be ordered separately. The pendant can be fixed to the adjustable ceiling plate in both possible directions (**1**) and (**2**).

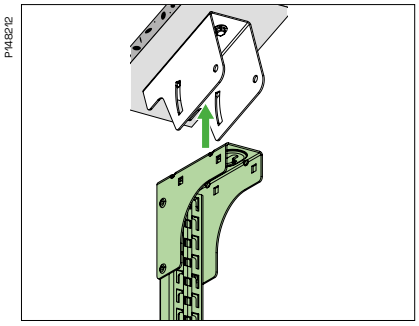
| Model | PG | High (mm) A | Width (mm) B | Length (mm) C |
|---|---|---|---|---|
| CLX³ adjustable ceiling plate PG | CSU795639 | 100 | 59 | 150 |



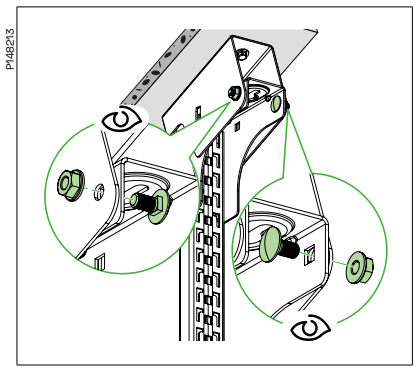

### Installation of the adjustable ceiling plate (For Single sided pendants only)

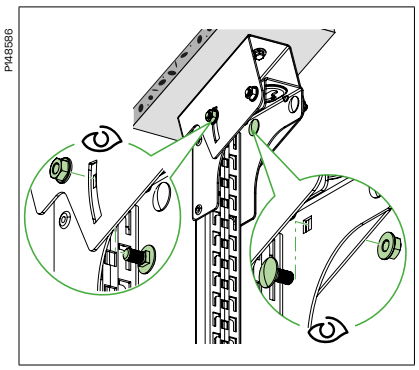



Fix the adjustable ceiling plate to the ceiling with 2 bolts. (c-c: 100 mm).



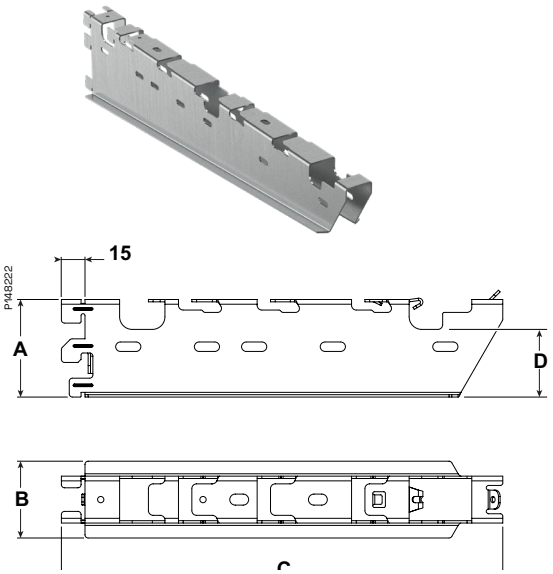

Insert the pendant into the adjustable ceiling plate.




Fix the pendant to the adjustable ceiling plate with 4 bolt sets 22S and align the pendant to the vertical plane before tightening the bolts.
**Recommended torque 20 N.m.**

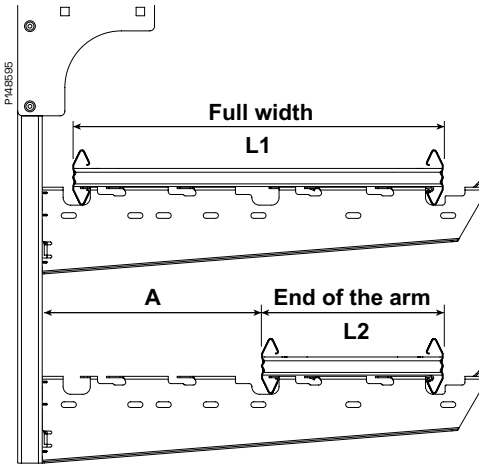
# Use and installation CLX³ Click suspension




## CLX³ Cantilever arm

The CLX³ cantilever arm is a screw-less cantilever that clicks into the pattern in the CLX³ pendant and rail. The cantilever arm is used to fix either the KHZSP ladder, the Defem mesh tray or the Stago height 60 trays. It can also be used for the Performa mesh trays together with fixation bolts.

| Model | PG | High (mm) A | Width (mm) B | Length (mm) C | Height below ladder (mm) D |
|---|---|---|---|---|---|
| CLX³ cantilever arm 200 PG | CSU795647 | 62 | 49 | 280 | 43 |
| CLX³ cantilever arm 300 PG | CSU795648 | 62 | 49 | 380 | 43 |
| CLX³ cantilever arm 400 PG | CSU795649 | 92 | 49 | 480 | 73 |
| CLX³ cantilever arm 500 PG | CSU795650 | 92 | 49 | 580 | 73 |
| CLX³ cantilever arm 600 PG | CSU795651 | 92 | 49 | 680 | 73 |




### Cantilever arm size compatibility

The click pattern on the cantilever arm is in some cases fitting more than one ladder width to make it possible to avoid pillars or obstacles on the wall.
See the table and illustration below.

The table also clarifies which cantilever arm to use for each with of Defem mesh tray.

| Model | PG | Compatible ladder (offset) | | Space to the offset ladder (mm) | Defem size compati-bility |
|---|---|---|---|---|---|
| | | L1 | L2 | A | |
| CLX³ cantilever arm 200 PG | CSU795647 | 200 | NA | NA | 220 |
| CLX³ cantilever arm 300 PG | CSU795648 | 300 | NA | NA | 320 |
| CLX³ cantilever arm 400 PG | CSU795649 | 400 | 200 | 232 | 420 |
| CLX³ cantilever arm 500 PG | CSU795650 | 500 | 200 | 332 | 520 |
| CLX³ cantilever arm 600 PG | CSU795651 | 600 | 300 | 332 | 620 |

### Cantilever arms Safe Working Load (SWL)

**SWL of the cantilever bracket**

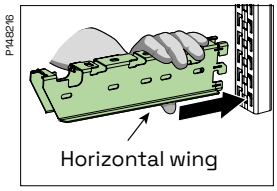
| Model | PG | Safety working load as wall bracket (full width) (N) | Safety working load as wall bracket (end of the arm) (N) |
|---|---|---|---|
| CLX³ cantilever arm 200 PG | CSU795647 | 1800 | NA |
| CLX³ cantilever arm 300 PG | CSU795648 | 1250 | |
| CLX³ cantilever arm 400 PG | CSU795649 | 1250 | 1000 |
| CLX³ cantilever arm 500 PG | CSU795650 | 1250 | 750 |
| CLX³ cantilever arm 600 PG | CSU795651 | 1000 | 700 |

Tested according to IEC 61537 standard.

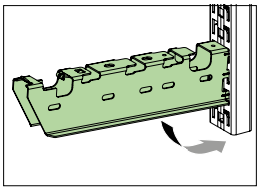
# Use and installation CLX³ Click suspension

## Installation of cantilever arms

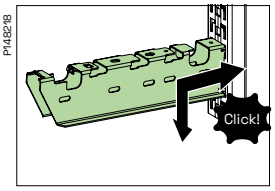
CLX³ cantilever arms are clicked to the CLX³ pendants and rails. Make sure to select a pattern allowing all hooks to grip and the full cantilever back to be supported by the rail. The horizontal wing must touch the rail.



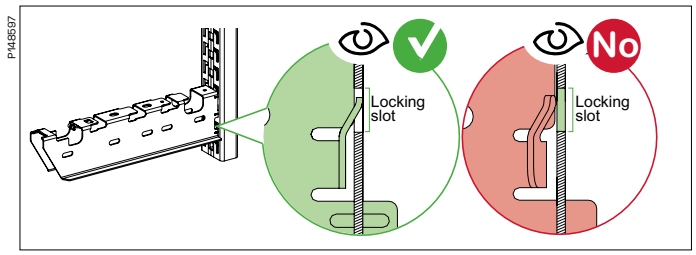

Hold the cantilever close to the hooks and insert the hooks in the rail.




Press the cantilever until the horizontal/top surface touch the rail.



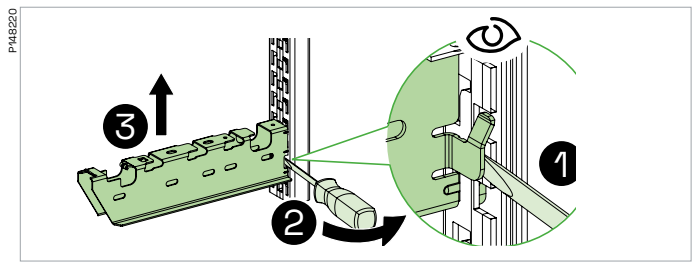

Press against the rail and pull it down until the locking lip go inside the slot in the rail.




Visually check that the cantilever arm is properly positioned and the locking lip is positioned inside of the slot of the CLX³ rail.

**Apply caution with unintended upward movements as it can cause the cantilever arm to unlock and therefore be released from the rail.**

## Uninstallation of CLX³ cantilever arm using screwdriver



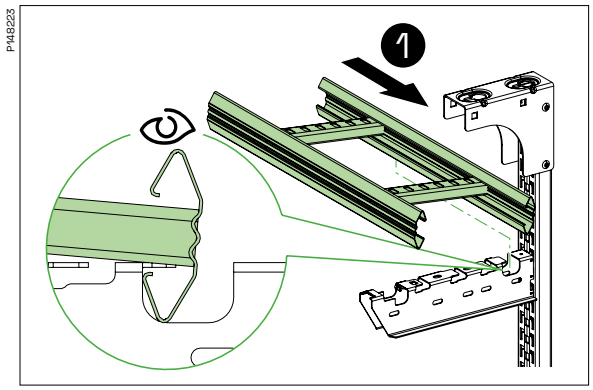

❶ Fit the head of the screwdriver between the rail and the locking lip of the cantilever.
Use the screwdriver as a lever to ❷ push the lip out of the rail. Deform the lip as little as possible and ❸ push the cantilever up to be able to unhook the cantilever arm.

**Before reinstalling a cantilever that has been removed after installation, make sure the lip is locking properly. If not, correct the lip to the initial position.**

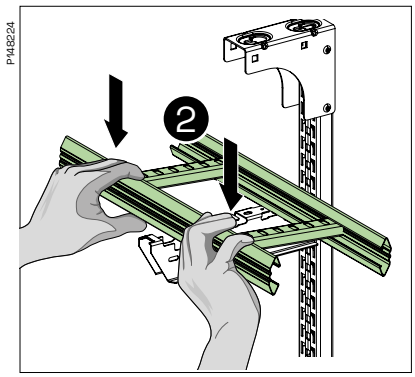
# Use and installation CLX³ Click suspension

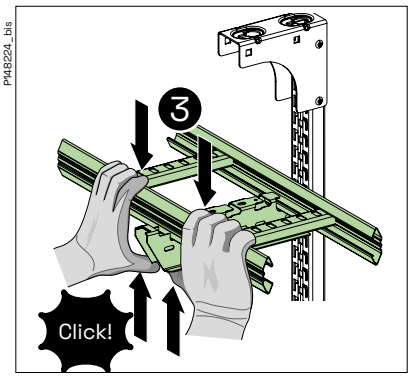
## Installation of KHSZP ladders on cantilever arms

CLX³ cantilever arms are designed to fix KHZSP ladders without need of tools or bolts.

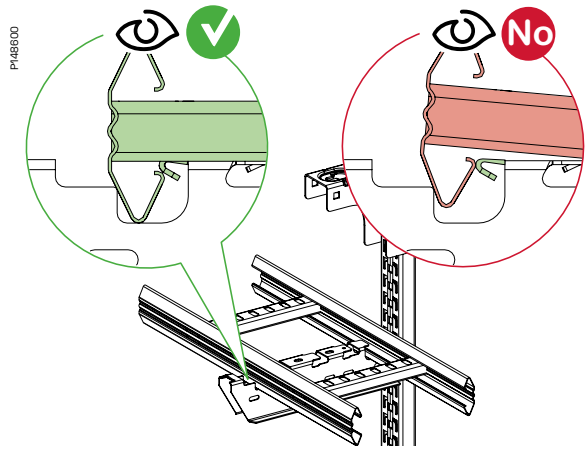



❶ Insert the ladder on the rail side.
Pull it on the outside direction to lock this side in the lip.




❷ Squeeze the free side of the ladder strongly down on the outer end of the cantilever until ❸ the ladder overpasses the locking lip.

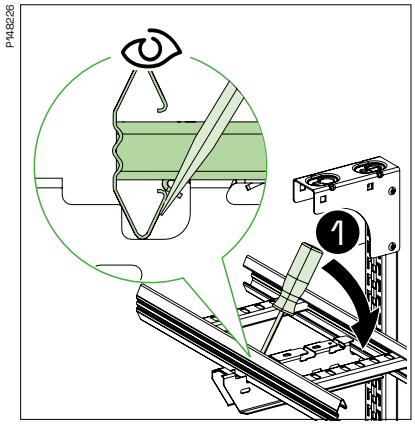



Visually check that the ladder is properly positioned, and the locking lip is positioned inside of the ladder profile.

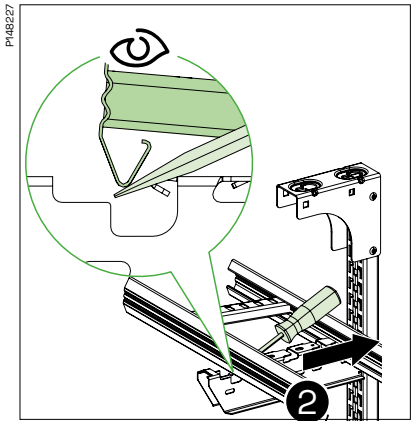
# Use and installation CLX³ Click suspension

### Uninstallation of KHSZP ladder of cantilever arms

Remove the ladder from the cantilever arm, by using a flat screwdriver.



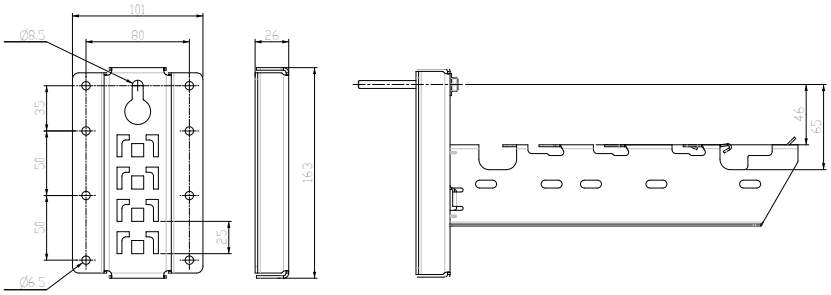

❶ Fit the head of the screwdriver between the ladder and the top surface of the cantilever as in the picture.
Use the screwdriver as a lever to pull out the ladder of the locking lip until the ladder snaps out.



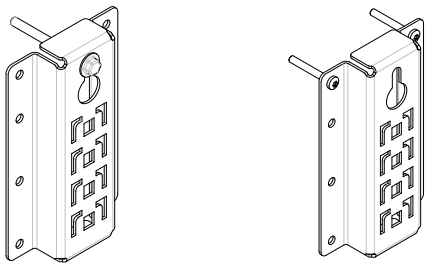

After releasing the outer side of the ladder, ❷ push the ladder in the direction of the rail to unlock the other side.

## Wall bracket

The Wall bracket is made to directly fix a Cantilever arm to a wall, without using a full-size rail. The Wall bracket doesn't reduce the SWL of the cantilever arm and the distance between the back of the cantilever and the wall is the same as with a rail.




The wall bracket can be fixed in two different ways:
With the keyhole (A) or with the lateral holes (B).

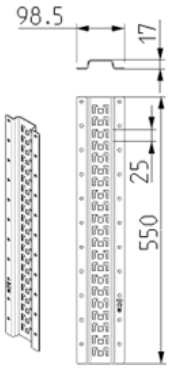


(A) (B)

The keyhole design allows to pre-fix the bolt in the wall, before installing the bracket.
**For concrete wall, use bolts IMT38051.**
**For non-concrete wall, M8 bolts with washer >ø16 should be used.**

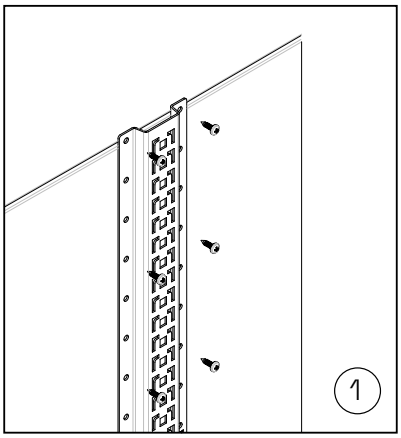
For the lateral holes, the bracket should always be fixed with at least the two top Ø6mm holes (same hight as the keyhole). The left and right bolts should be horizontally separated by 80mm (axis to axis).

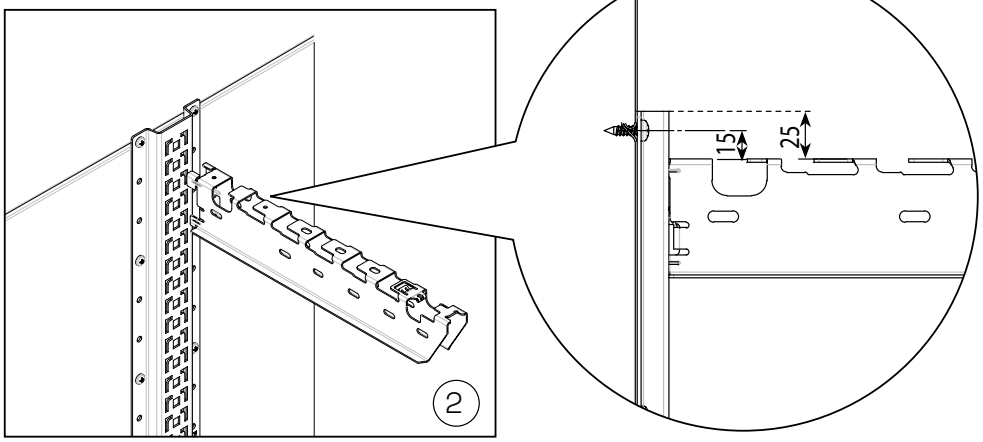
# Use and installation CLX³ Click suspension



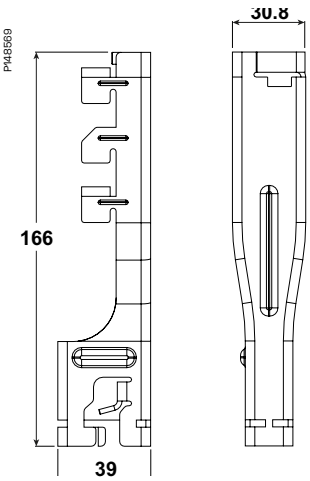

## Wall support 550 CLX³

Wall support for mounting of CLX3 cantilever arm on porous walls or sandwich wall blocks, with six keyholes for easy fixation.
Material: Steel, pre-galvanized.



# Use and installation CLX³ Click suspension


## CLX³ Central suspension adapter

The CLX³ central suspension adapter is clicked together with the central suspension brackets to create a central suspension piece that can be clicked to the rail or pendant.

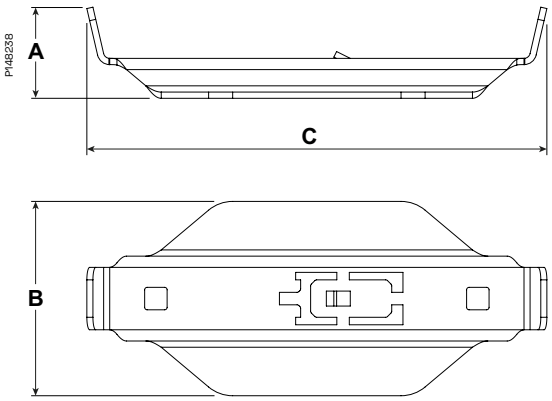
| Model | PG | High (mm) A | Width (mm) B | Length (mm) C |
|---|---|---|---|---|
| CLX³ Central suspension adapter PG | CSU795700 | 166 | 31 | 39 |


## CLX³ KHZSP ladder central suspension bracket

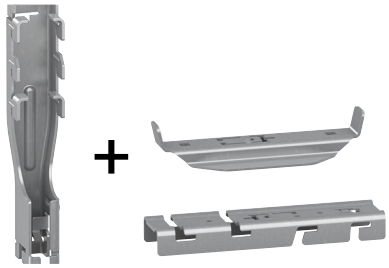
Bracket to be used for central suspension of KHZSP ladders. The bracket shall be used together with the CLX³ central suspension adapter.

| Model | PG | High mm A | Width mm B | Length mm C |
|---|---|---|---|---|
| CLX³ KHZSP central suspension bracket 200 PG | CSU795655 | 37 | 78 | 185 |
| CLX³ KHZSP central suspension bracket 300 PG | CSU795656 | 37 | 78 | 285 |
| CLX³ KHZSP central suspension bracket400 PG | CSU795657 | 37 | 78 | 385 |
| CLX³ KHZSP central suspension bracket500 PG | CSU795658 | 37 | 78 | 485 |
| CLX³ KHZSP central suspension bracket 600 PG | CSU795659 | 37 | 78 | 585 |

| Central suspension bracket | SWL symmetric load (N) |
|---|---|
| 200 | 1500 |
| 300 | 1500 |
| 400 | 1500 |
| 500 | 1250 |
| 600 | 1200 |

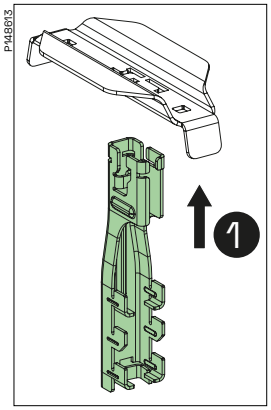


# Use and installation CLX³ Click suspension

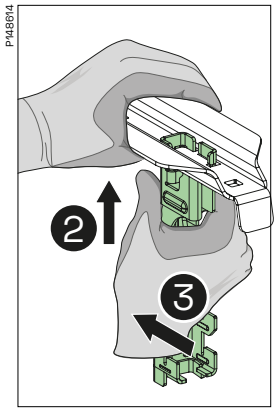


## Installation of adaptor to central suspension brackets

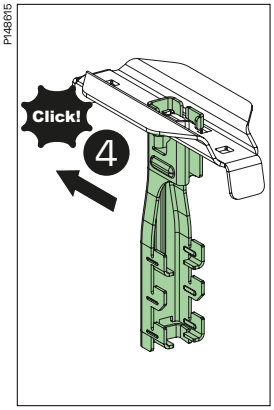
The CLX³ central suspension bracket is installed without tools by clicking it to the central suspension. The method is the same for Central suspension bracket ladder -mesh or -tray. In the illustration below, the CSB for ladder is used.

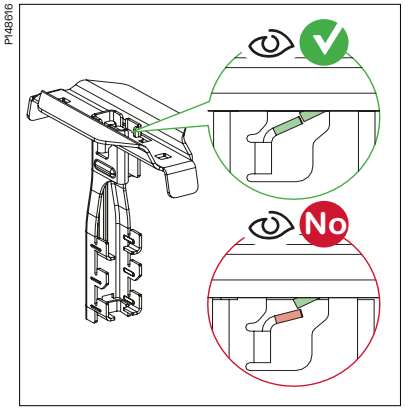



❶ Insert the adaptor in the pattern on the central suspension bracket.




❷ Press the pieces together and ❸ slide the adaptor until the click lip of the adaptor pass over the locking lip of the central suspension bracket with a ❹ click.

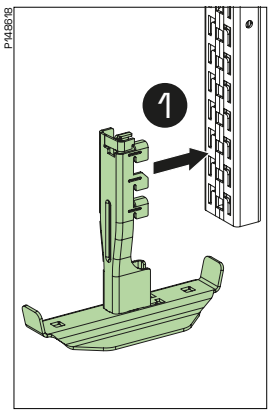


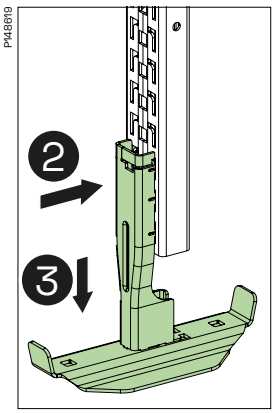

Visually check and secure that the adaptor is properly positioned, and the click lip has overpassed the locking lip.

## Installation of central suspension adapters to the CLX³ rail

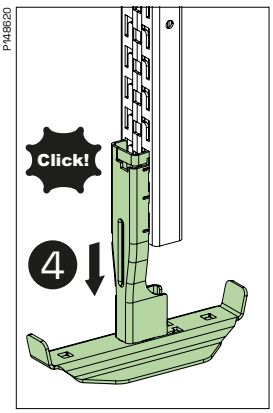
The CLX³ central suspension adaptors is installed to the rail without tools, by clicking. To ensure proper installation a hooks must be inserted in the rail:



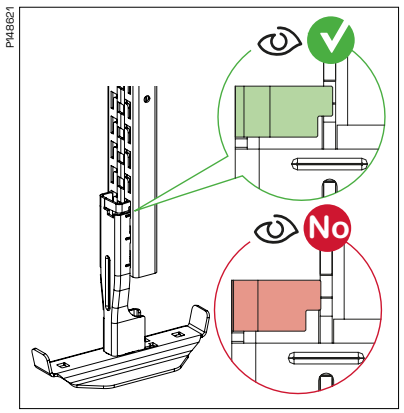

❶ Push the central suspension piece until the hooks are fully inserted in the pattern and the surface touches the rail.




❷ Press towards the rail and ❸ pull down until the click lip.




❹ Pass inside the slot in the rail.




Visually check and secure that the adaptor is properly positioned, and the click lip is properly positioned inside of the slot of the CLX³ rail.

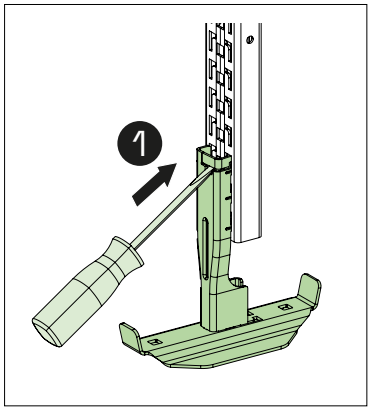
**Apply caution with unintended upward movements as it can cause the adaptor to unlock and therefore be released from the rail**

# Use and installation CLX³ Click suspension

## Uninstallation of adapter from the CLX³ rail

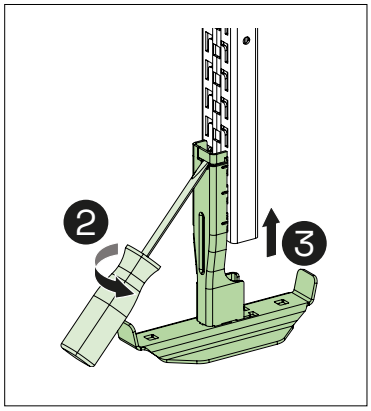
CLX³ central suspension adapters can be removed, by using a flat screwdriver.

P148623



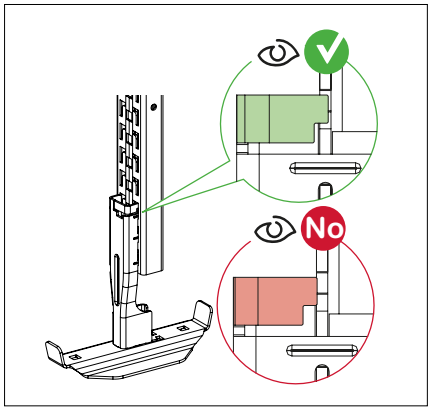

❶ Fit the screwdriver's head in the slot of the adaptor.

P148624




Use the screwdriver as a lever to ❷ gently release the click lip from the rail. Then ❸ push the adaptor up to release the L hooks from the rail.

P148621

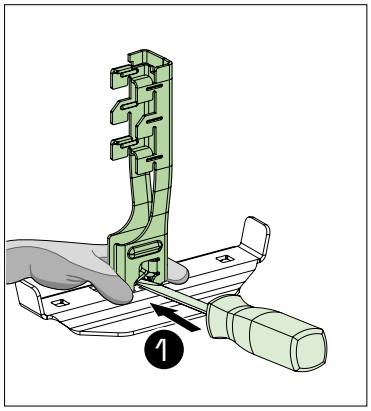



If the adapter needs to be reinstalled, correct the click lip to the initial position and make sure the click lip is locking properly.

## Uninstallation of adaptor from central suspension brackets

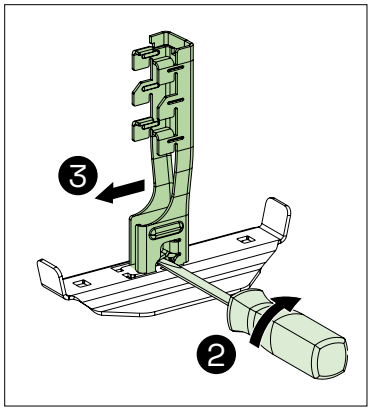
CLX³ central suspension brackets can be removed, by using a flat screwdriver.

P148626



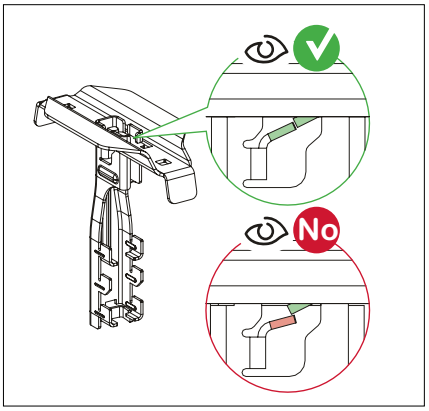

❶ Hold the bracket, fit the screwdriver's head between the adaptor lip and the bracket.

P148627



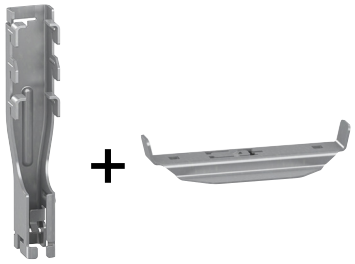

❷ Twist the screwdriver to use it as a lever on the click lip until it passes over the bracket's locking lip and ❸ pull the adaptor sideways to release it.

P148616



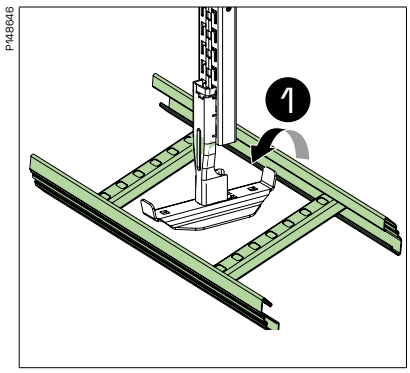

When the bracket needs to be reinstalled, correct the click lip to the initial position and make sure the click lip is locking properly.

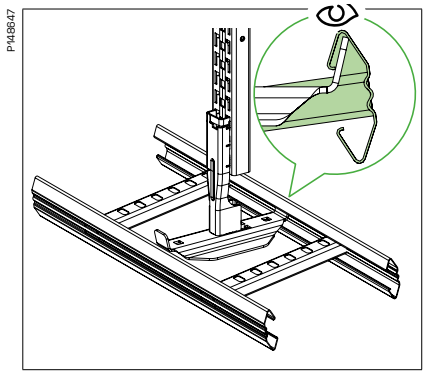
# Use and installation CLX³ Click suspension



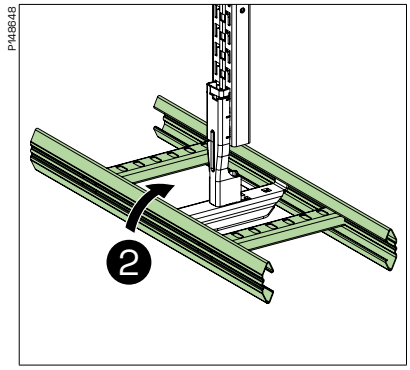
## Installation of KHZSP ladders on central suspension brackets

CLX³ brackets are made to fix ladders KHZSP without tool.

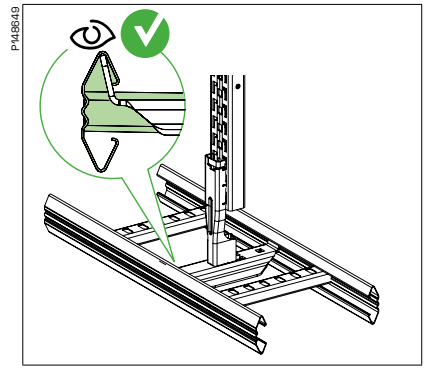



1 Insert one inside side of the ladder on one lips of the bracket.




2 Pull up the other side and snap the ladder on the other lip.

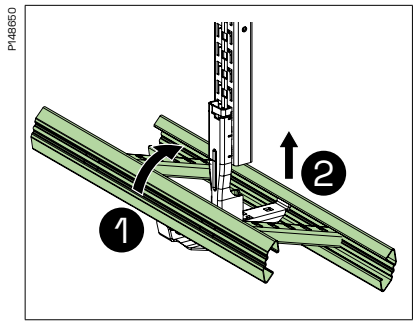



Visually check if the bracket lip is inside the ladder profile.
Profile clamp 43 can be used to fix the cable ladder to the support bracket.

**Apply caution with unintended upward movements as it can cause the bracket to unlock and therefore be released from the rail**

## Uninstallation of KHZSP ladder from the central suspension bracket

KHZSP ladder can be removed from the bracket.

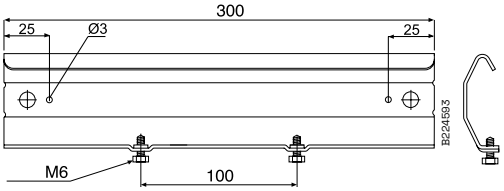


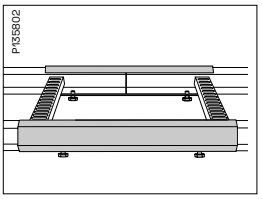

1 Push one side of the ladder up until the ladder leave the lip of the bracket.
2 Release the other side of the ladder from the lip.

# Use and installation

## Joint 21, with screws or screwless

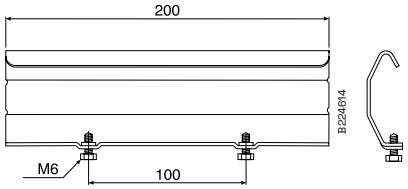
Joint to be used for straight, rigid joining of cable ladders, bends, junctions and risers. No extra earthing needed.

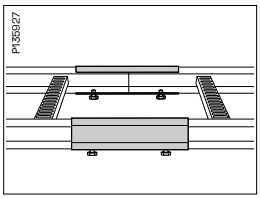





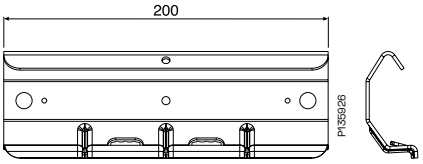
Joint 21 in stainless steel

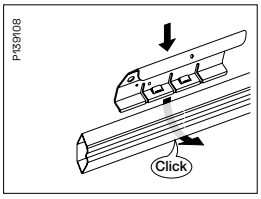


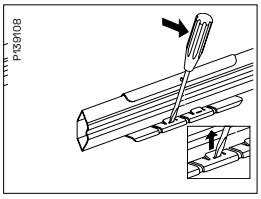



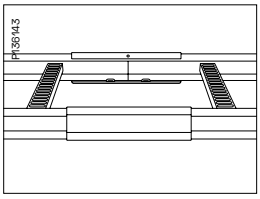


Joint 21 screwless joint



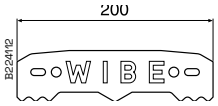



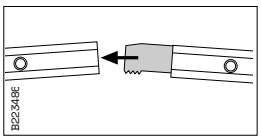




## Joint 9

Joint to be used for straight joining of cable ladders KHZ, KHZP and KHZPS. The teeth of the joint should face downwards. Under load, the ladders are prevented from slipping apart. If the joint is above a bracket, the teeth should face upwards.

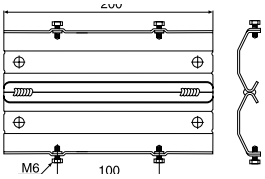



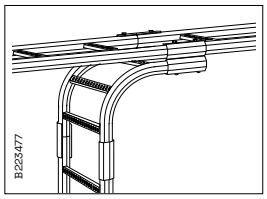

Joint 9 is used in straight joints of KHZ, KHZP and KHZPS.

NOTE! The teeth shall face downwards as shown in the figure. Under load, the ladders are prevented from slip- ping apart. If the joint is above a bracket, the teeth should face upwards.

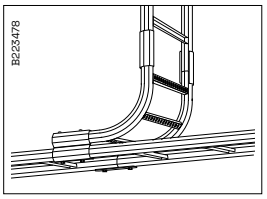
## Dropper joint 32


Dropper joint used to form vertical branches in centre posision under/on top of cable ladders.



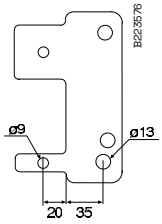

To be used together with Riser 18 to form vertical branches under Cable ladder KHZ, KHZP, KHZSP, KHZSPZ+ and KHZPS.

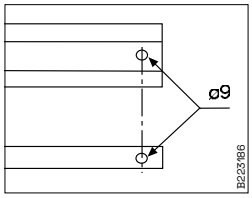



May also be used together with Riser 18 to form vertical branches on top of Cable ladder KHZ, KHZP, KHZSP, KHZSPZ+ and KHZPS.

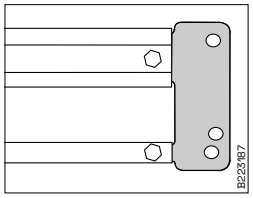
## Joint 45

Joint to be fitted as a joining plate in a cut KHZV/KHZPV ladder.

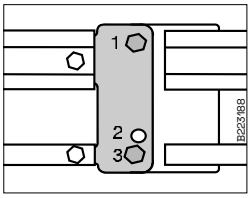



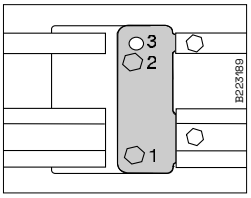

Cable ladders can be joined using separate joints.
- Cut the ends clean.
- Place the joints outside the ladders and mark where the holes shall be drilled.
- Drill 9 mm dia. holes.




- Insert the joint plates into the ladders and bolt them fast.




The holes are laterally displaced to avoid play in joints. If the ladders are mounted with arch pipes facing downwards, use holes 1 and 3.

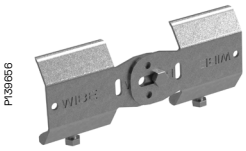


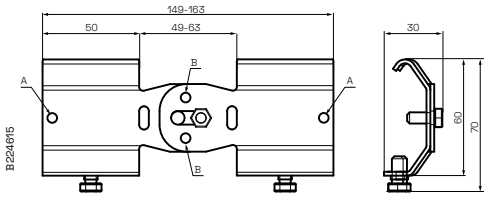

If the ladders are mounted with arch pipes facing upwards, use holes 1 and 2.

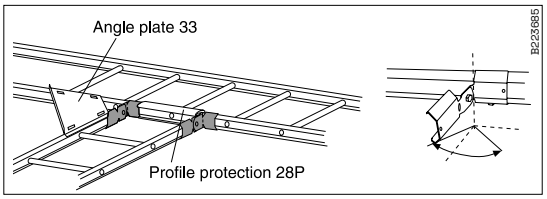
# Use and installation

## Coupling 22

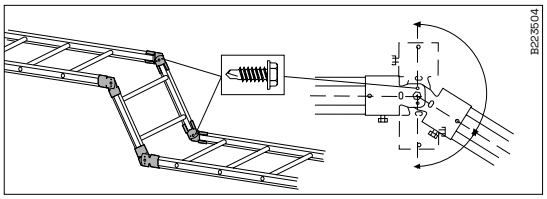
Coupling to be used for horizontal or vertical branches at any desired angle. A self tapping screw can be inserted in holes (A) to lock the position on the side profiles and in holes (B) to lock the desired angle of deflection.



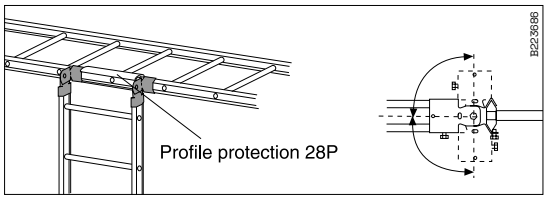



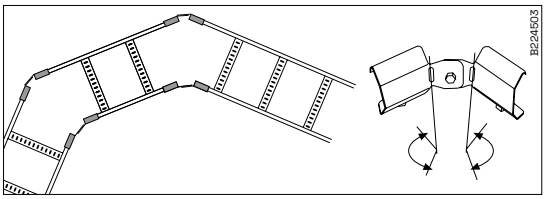

Coupling 22 is used for horizontal branching to the required angle. The cut length of the ladder ends determines the angle. Angle plate 33 is always recommended for horizontal branches. Use Profile protection 28P.



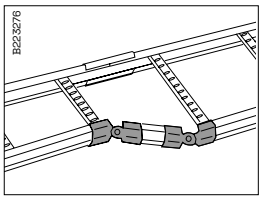

Coupling 22 is used to form vertical angles of the required size. A self tapping screw can be inserted in holes (A) to lock the position on the side profiles and in holes (B) to lock the desired angle of deflection.



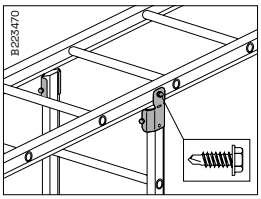

Coupling 22 is used to form vertical branches of the required angle. Mount Profile protection 28P. To be cut when required.



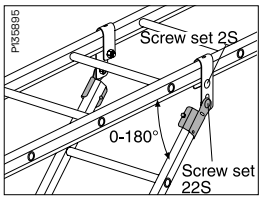

Use 4 Couplings 22 to form a horizontal bend in different angles. The cut lengths of the ladder ends determine the angle.



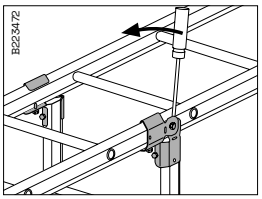

As an alternative at transition joining of KHZSP, KHZPS, KHZ and KHZP use 1 Joint 21 and 2 Couplings 22.




Vertical branching under the cable ladder with one part of Coupling 22 and plate screw.




Clamp 12 and one part of Coupling 22 can be used for branching under the cable ladder – allowing angles from 0 – 180°.

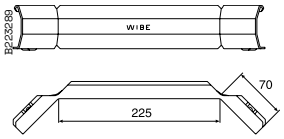


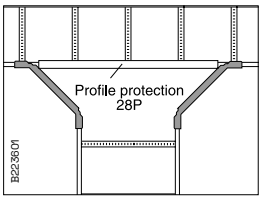

Use 2 Coupling 22 for vertical branching under the cable ladder. **Note!** The screw of Coupling 22 must be turned so that its head will be placed against the side profile of the cable ladder. Bend the coupling with a screwdriver.

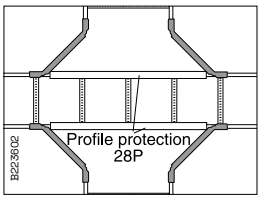
# Use and installation

## Junction coupling 14


Junction coupling to be used for T- and X-junctions. Suitable for cable ladders KHZ, KHZP, KHZSP and KHZPS, all cable widths.



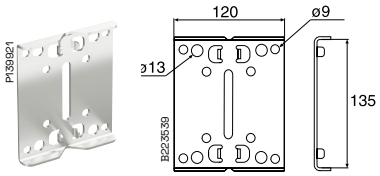



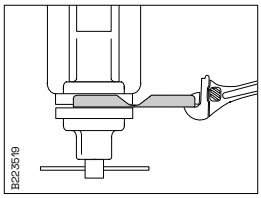




For T-junctions, use 2 Junction couplings 14.
For X-junctions, use 4 Junction couplings 14.
A bracket should be placed under the connecting ladder close to the connection. Profile protection 28P is recommended. To be cut to required length.

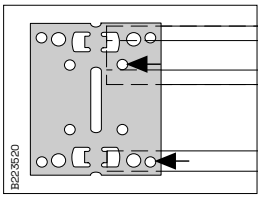
## Coupling 44

Coupling to be used for horizontal coupling of cable ladders KHZV/KHZPV. Also to be used for branches and as an end connection against a wall.

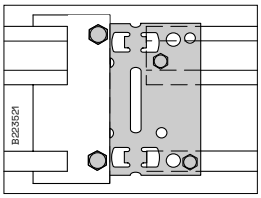


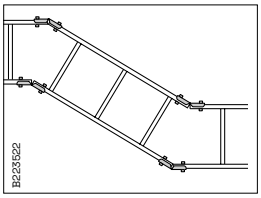

Coupling 44 may be bent to the required angle in a vice, using an adjustable spanner or similar.



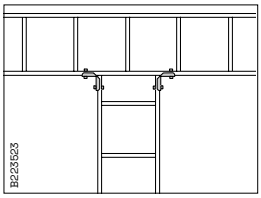

Use Coupling 44 as a drilling pattern on the cut ladder. Drill 9 mm dia. holes.



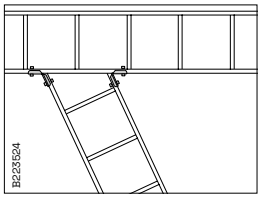

Assemble the cut and drilled ladders using M8x30 mm bolts. If the angle unit is mounted against a fixed joint plate use Screw set M12.



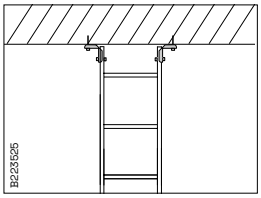

Angled cutting of the ladder ends determines the angle.




Straight branch.



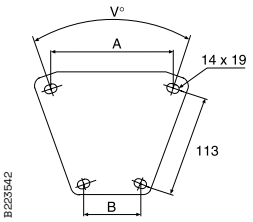

Angled branch.

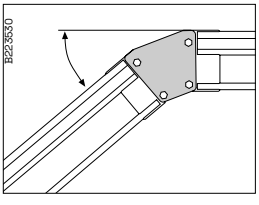



Use Coupling 44 as an end attachment for mounting ladders against walls or floors.

## Coupling plate 48


Coupling plate to be used as a self-supporting vertical angle coupling of cable ladders KHZV/KHZPV
Assembled with 2 Screw set M12.



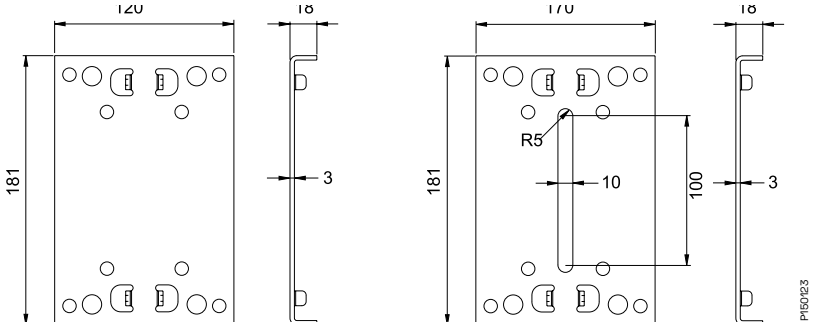

For self-supporting vertical angle adjustment use 2 Coupling plate 48 och 2 Screw set M12
Coupling plate 48/30°=25°-35°
Coupling plate 48/45°=35°-55°
Coupling plate 48/60°=55°-65°

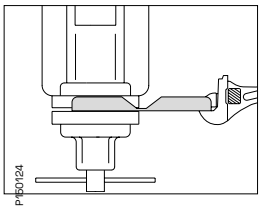
| V° | A mm | B mm |
|---|---|---|
| 30 | 115 | 55 |
| 45 | 145 | 55 |
| 60 | 180 | 65 |

# Use and installation

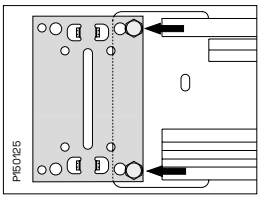

## Horizontal coupling 20C / Horizontal coupling bending 20C

Coupling to be used for horizontal connection of cable ladders KHZP 20C range.Four screws M8x30 and nuts are inlcluded.

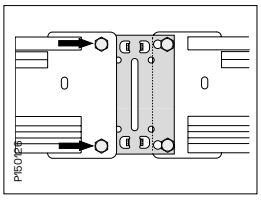



Coupling for Bending 20C may be bent to the required angle in a vice, using an adjustable spanner or similar.

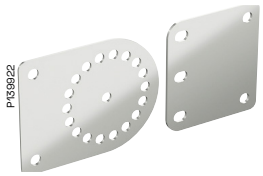



Use Coupling 44 as a drilling pattern on the cut ladder. Drill 9 mm dia. holes.

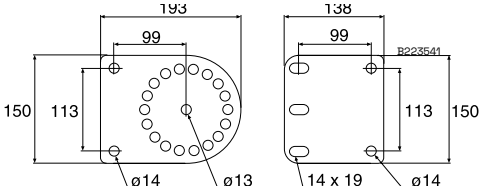



Assemble the cut and drilled ladders using M8x30 mm bolts. If the angle unit is mounted against a fixed joint plate use Screw set M12.

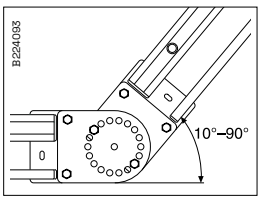
## Coupling 51



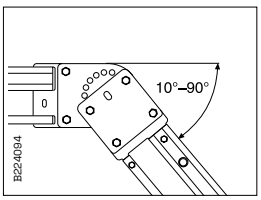

Coupling to be used as a self-supporting vertical coupling of cable ladders KHZV/ KHZPV.



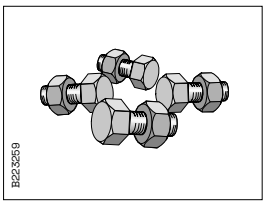

Screw set M12 for installation on the cable ladder is to be ordered separately.



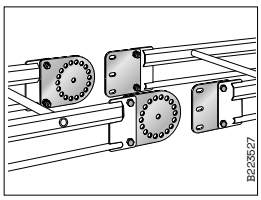

Rising. Adjustable from 10° to 90° gradually in steps of 20°.



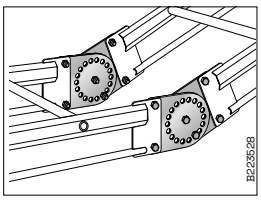

Sloping. Adjustable from 10° to 90° gradually in steps of 20°.



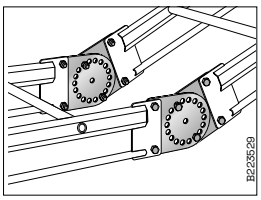

Screw set to be used for all joints with cable ladders KHZV and KHZPV.




1. Install the plates on the ladder with Screw set M12.



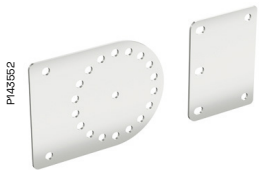

2. Assemble the ladders in the centre hole with one of the included screws/ nuts. Adjust to desired angle and fix the installation in one of the outer holes with screw/nut.



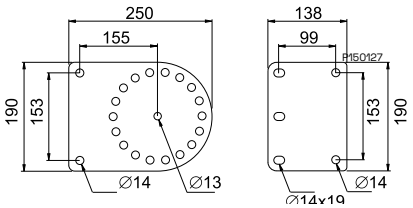

3. Move the nut in the centre hole to the opposite outer hole and tighten.

# Use and installation

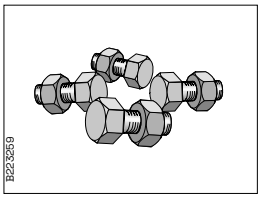
## Vertical coupling 20C



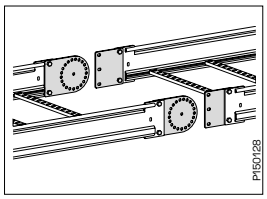

Coupling to be used as a self-supporting vertical coupling of cable ladders KHZP 20C range. Adjustable from 10° to 90° gradually in steps of 20°. Two screws M12 and nuts are included.



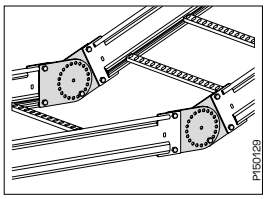

Rising and sloping adjustable from 10° to 90° gradually in steps of 20° .
Screw set M12 for installation on the cable ladder is to be ordered separately..



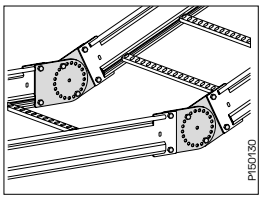

Screw set to be used for all joints with cable ladders KHZP 20C.




1. Install the plates on the ladder with Screw set M12.



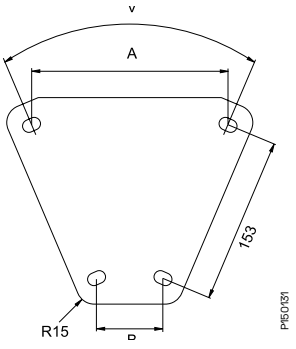

2. Assemble the ladders in the centre hole with one of the included screws/ nuts. Adjust to desired angle and fix the installation in one of the outer holes with screw/nut.

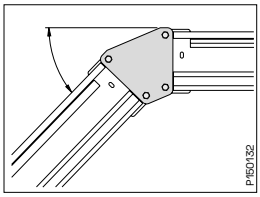



3. Move the nut in the centre hole to the opposite outer hole and tighten.

## Angle plate 20C


Angled coupling to be used for cable ladders KHZP 20C range. Four screws M12x30 and nuts are included.



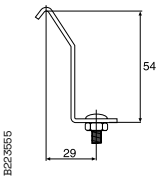



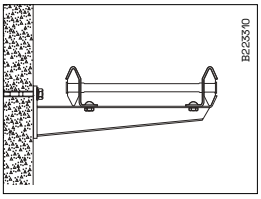

| V | A mm | B mm |
|---|---|---|
| 30 | 135 | 56 |
| 45 | 180 | 62 |
| 60 | 222 | 69 |

# Use and installation

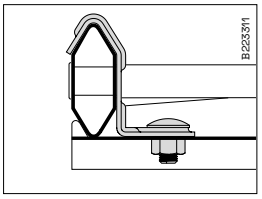
## Profile clamp 42


Profile clamp to be used for installations where the cable ladder is to be fixed to cantilever arms, support brackets, etc. For mounting against wall use wall bracket 11.

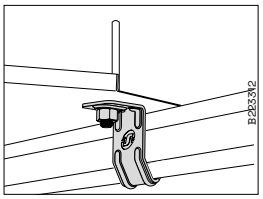


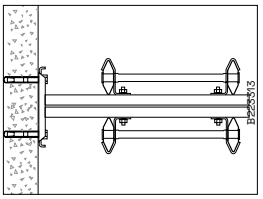

Use Profile clamp 42 for attaching KHZSP, KHZPS, KHZ and KHZP to Canti- lever arm 50 and Support bracket 3.




For installation of KHZSP, KHZPS, KHZ and KHZP on Support bracket 3, Profile clamp 42 is used.



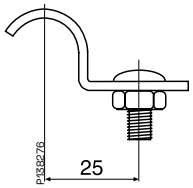

To lock Angle plate 33/2, fit 2 Profile clamp 42.

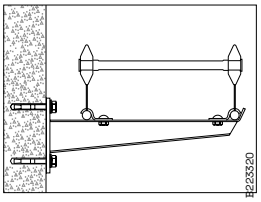



Cable ladders can be mounted directly on Vertical piece 20 or 20F with Profile clamp 42. Use T-bolt for mounting. Convenient at vertical installations in shafts.

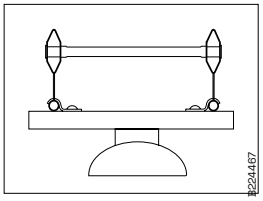
## Profile clamp 43


Profile clamp to be used for installations where the cable ladders KHZV and KHZPV are to be fixed to cantilever arms, support brackets, etc.



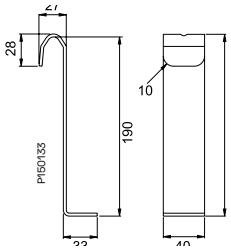

Use Profile clamp 43 to attach KHZV/KHZPV to Cantilever arm 50.

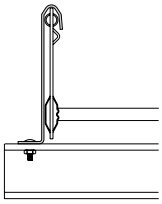


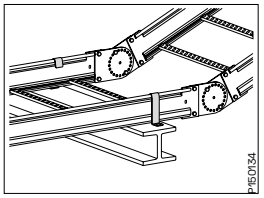

Pendant/Fixing rail 24/48, mounted under Cable ladder KHZV with Profile clamp 43, here used as carrier of lighting fittings.

## Profile clamp 20C


Profile clamp for KHZP 20 range to be used for installations where the cable ladder is to be fixed to cantilever arms, I-beams, etc. Slot for screw locking 9 x24 mm.



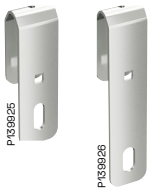



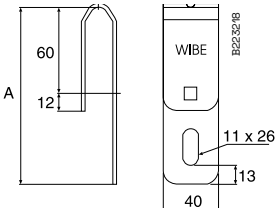


# Use and installation

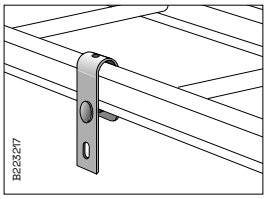
## Clamp 12

Clamp to be used on the side profile of the cable ladder for installation of accessories.



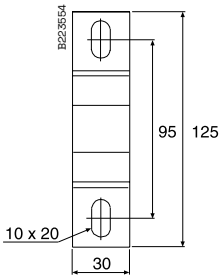

| Type | A mm |
|---|---|
| Clamp12/70 | 125 |
| Clamp 12/120 | 175 |

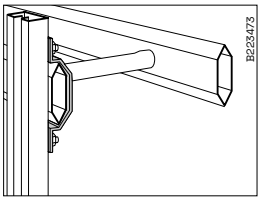



Clamp 12 can be used for installation of antenna brackets, junction boxes and so on. Bolt and nut included.

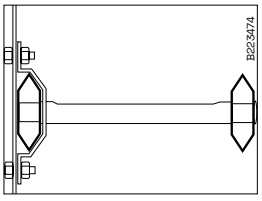
## Profile clamp 41


Profile clamp to be used to install a pendant/fixing rail or mounting plate, etc., on the cable ladder profile.

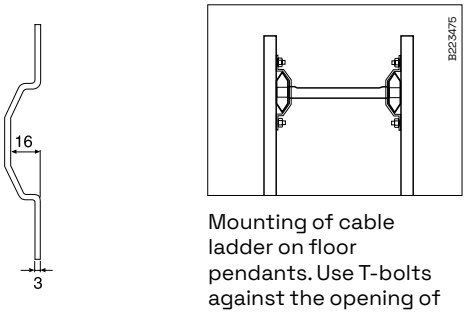


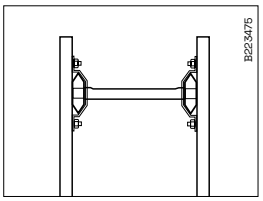




Mounting of pendant/ fixing rail on ladder profile Use Screw set 22S.

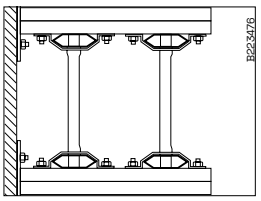



Installation of mounting plate for apparatuses. Use Screw set 22S.



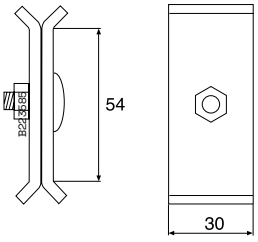

Mounting of cable ladder on floor pendants. Use T-bolts against the opening of the fixing rail.

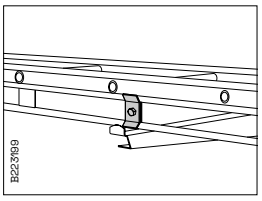



Mounting of cable ladders on wall pendants, such as in shafts. Use T-bolts against the openin of the fixing rail.

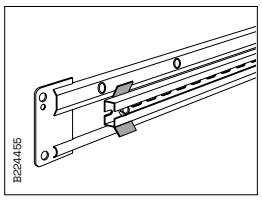
## Profile support piece 46


To be fitted between the ladder and the vault pipe when a support bracket is positi- oned between existing profile support pieces. For cable ladders KHZV and KHZPV.




If a support bracket is placed between two profile support pieces, a Profile support piece 46 must be mounted between the arch pipes and the ladder. If the load is half the permitted load, exclude the Profile support piece 46.

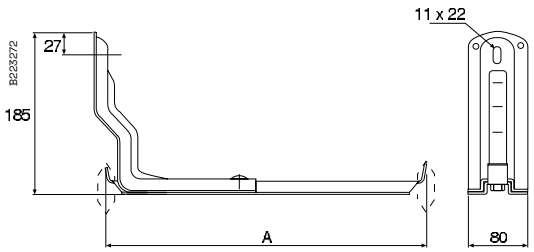



Profile support piece 46 can be installed as a fixing for different applications.

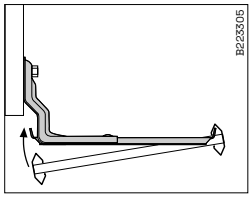
# Use and installation


## Cantilever arm 30

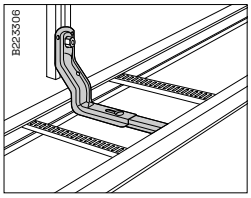
Cantilever arm for installation inside cable ladder KHZSP.



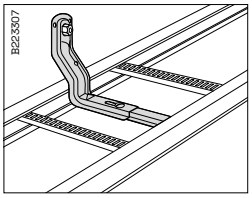

| Cantilever arm type | A mm |
|---|---|
| 30/200 | 184 |
| 30/300 | 284 |
| 30/400 | 384 |
| 30/500 | 484 |
| 30/600 | 584 |



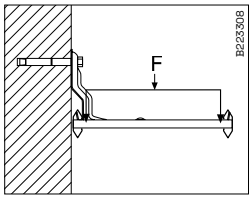

Installation of cable ladder KHZSP. Place the ladder on the outer tab and press it over the inner tab. When necessary, the ladder can be locked with a Profile clamp 43.



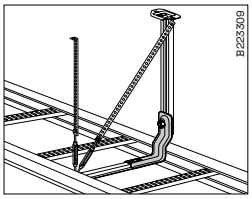

Installation on Vertical piece 2F. Cable ladder KHZSP can be adjusted max 40 mm.




Installation direct on wall. Cable ladder KHZSP is adjustable from 0–15 mm to the wall.




Breaking load for cantilever arm on wall, see table below.




When you mount cable ladders that are 500-600 mm wide it might be necessary with a reinforcement of the outer edge of the cantilever arm Installation band and stretching screw can be used for mounting in the ceiling or on a vertical piece.

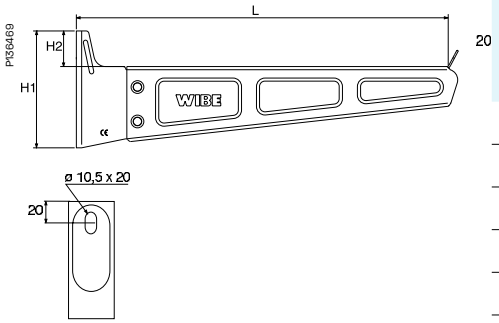
**Breaking load**

| Cantilever arm type | Max. load F on cantilever arm at a deflection of 3° kN | kg | Deflection at 3° deflection of cantilever arm mm | Breaking load kN | kg |
|---|---|---|---|---|---|
| 30/200 | 2.0 | 200 | 10 | 2.3 | 230 |
| 30/300 | 1.9 | 190 | 15 | 3.5 | 350 |
| 30/400 | 1.2 | 120 | 20 | 3.0 | 300 |
| 30/500 | 0.8 | 80 | 26 | 2.4 | 240 |
| 30/600 | 0.6 | 60 | 31 | 2.0 | 200 |

3° is equivalent to 1/20xcantilever width, according to IEC 61537.

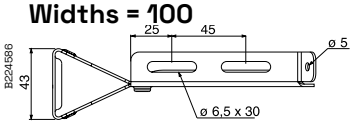
## Cantilever arm 50i

Cantilever arm to be used for lighter mountings on walls, vertical pieces or pendant/fixing rails.

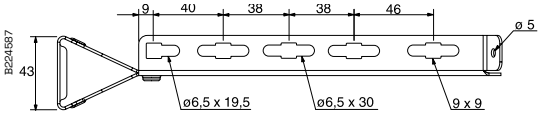




| Cantilever arm type | Size L mm | H1 mm | H2 mm |
|---|---|---|---|
| 50i-200 | 250 | 85 | 28.5 |
| 50i-300 | 350 | 110 | 33.5 |
| 50i-400 | 450 | 115 | 31.0 |
| 50i-500 | 550 | 150 | 31.0 |
| 50i-600 | 650 | 150 | 31.0 |

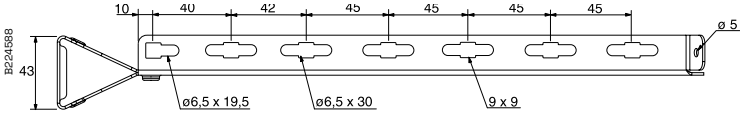
### Widths = 100



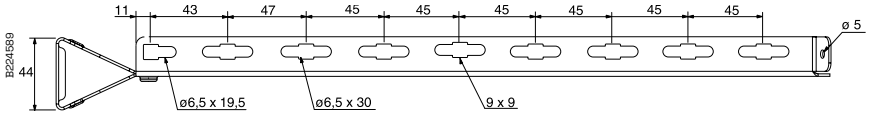

### Widths = 200



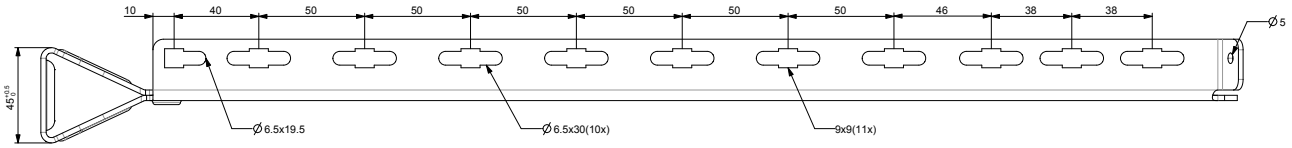

### Widths = 300



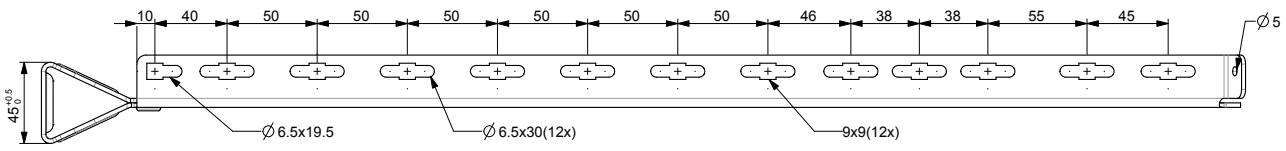

### Widths = 400



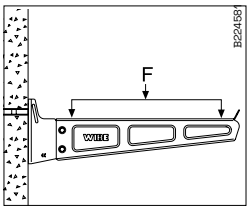

### Widths = 500



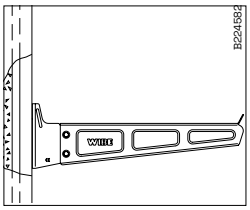

### Widths = 600



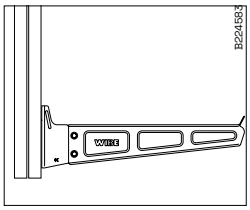
# Use and installation



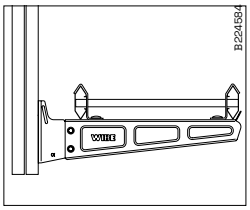

Installation of cantilever arm mounted to wall using Expansion bolt M8. Breaking load - See table below.




Installation of cantilever arm using T-bolt M8 on Fixing rail 24/26 x 53 for casting-in or Pendant/ Fixing rail wall mounted.




Installation of cantilever arm using T-bolt M8 on vertical piece. Check breaking load of the vertical piece.



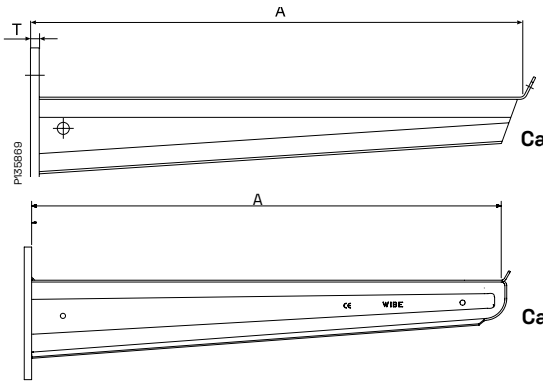

Cable ladder KHZSP mounted on Cantilever arm 50i, Profile clamp 42 is used.

| **Breaking load F - Mounted on wall** | | |
|---|---|---|
| **Type of cantilever arm** | **kN** | **kg** |
| 50i-100 | 2.3 | 230 |
| 50i-200 | 2.15 | 215 |
| 50i-300 | 2.2 | 220 |
| 50i-400 | 2.35 | 235 |
| 50i-500 | 3.0 | 300 |
| 50i-600 | 3.0 | 300 |

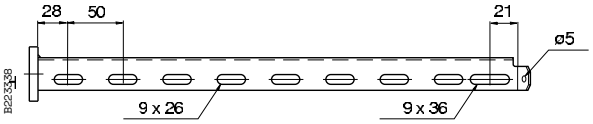
Safe working load according to IEC 61537 is breaking load divided by 1,7.

## Cantilever arm 50 and 50F

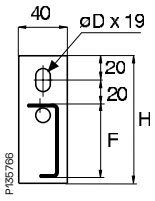
Cantilever arm for mounting on walls, pendant/fixing rails or vertical pieces.

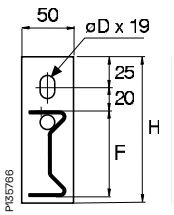

**Cantilever arm 50**



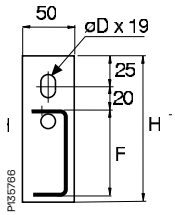

**50/100-300**




**50/400-600**

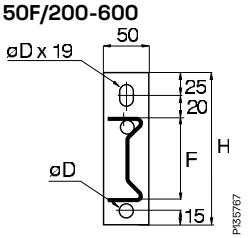



**50/700-1000**

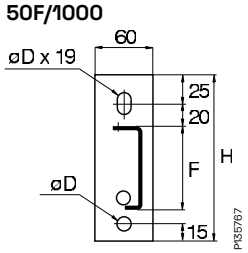


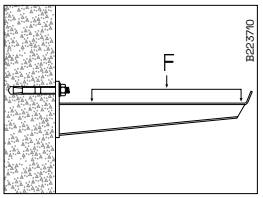

**Cantilever arm 50F**


**50F/200-600**

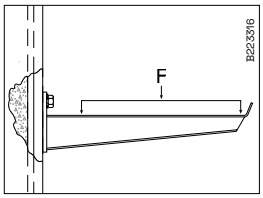



**50F/1000**

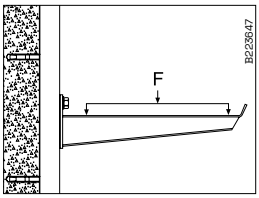


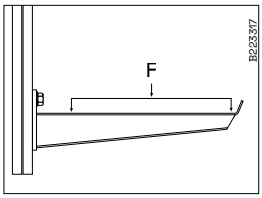

Installation of a cantilever arm to a wall using an Expansion bolt. Breaking load – see on next page.




Installation of a cantilever arm using a T-bolt on a Fixing rail 24/26 x 53 rail for casting-in or Pendant/ Fixing rails mounted on the wall. Breaking load – see on next page.

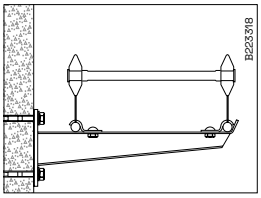



Mounting a cantilever arm using a T-bolt on a Pendant/Fixing rail mounted on a wall.

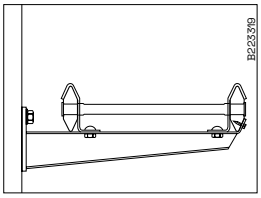



Installation of cantilever arm using T-bolt with vertical pieces. Breaking load – see on next page. Also check breaking load of the vertical piece.

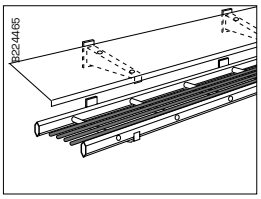
# Use and installation



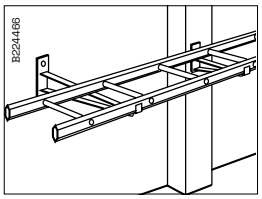

Profile clamp 43 is used for attaching a KHZV onto a Cantilever arm 50F.




For attaching a KHZSP, KHZ, KHZPS or KHZP cable ladder, mount Profile clamp 42. If it is only necessary to fix the cable ladder at the outer end of the bracket, use self-tapping sheet screws or suchlike with 5 mm dia. holes in the bracket and in the side section.

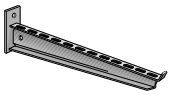


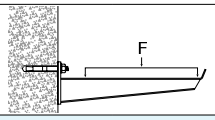

Cantilever arm 50F mounted upside down can be used for installation of tilted protective roofs.

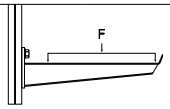



Use Cantilever arm 50/700-1000 as support when cable ladders have to pass columns etc.

**Size and Breaking load F**





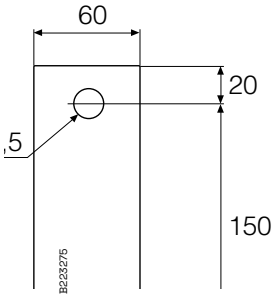

| Type | A mm | D mm | F mm | H mm | T mm | Mounted on wall kN | Mounted on wall kg | Mounted on P/F rail 24/48 with T-bolt 26U kN | Mounted on P/F rail 24/48 with T-bolt 26U kg |
|---|---|---|---|---|---|---|---|---|---|
| 50/100 | 150 | 12 | 34 | 85 | 3 | 3.0 | 300 | 3.0 | 300 |
| 50/150 | 200 | 12 | 36 | 85 | 3 | 3.0 | 300 | 3.0 | 300 |
| 50/200 | 250 | 12 | 39 | 85 | 3 | 2.5 | 250 | 2.5 | 250 |
| 50/250 | 300 | 12 | 56 | 105 | 6(1) | 4.0 | 400 | 4.0 | 400 |
| 50/300 | 350 | 12 | 60 | 105 | 6(1) | 4.0 | 400 | 4.0 | 400 |
| 50/400 | 450 | 12 | 70 | 120 | 8(1) | 6.5 | 650 | 6.5 | 650 |
| 50/500 | 550 | 12 | 77 | 140 | 8(1) | 7.0 | 700 | 7.0 | 700 |
| 50/600 | 650 | 12 | 84 | 150 | 10(1) | 7.0 | 700 | 7.0 | 700 |
| 50/700 | 750 | 12 | 90 | 150 | 10 | 6.0 | 600 | 5.5 | 550 |
| 50/800 | 850 | 12 | 95 | 160 | 10 | 5.5 | 550 | 5.2 | 520 |
| 50/900 | 950 | 12 | 100 | 160 | 10 | 5.3 | 530 | 4.8 | 480 |
| 50/1000 | 1050 | 12 | 105 | 170 | 10 | 5.0 | 500 | 4.2 | 420 |
| 50F/200 | 245 | 12 | 72 | 148 | 8 | 10.0 | 1000 | 10.0 | 1000 |
| 50F/300 | 345 | 12 | 79 | 175 | 8 | 10.0 | 1000 | 10.0 | 1000 |
| 50F/400 | 445 | 12 | 86 | 175 | 8 | 11.0 | 1100 | 9.0 | 900 |
| 50F/500 | 547 | 14 | 93 | 180 | 10 | 10.0 | 1000 | 8.0 | 800 |
| 50F/600 | 647 | 14 | 100 | 180 | 10 | 10.0 | 1000 | 8.0 | 800 |
| 50F/1000 | 1052 | 14 | 160 | 240 | 12 | 11.0 | 1100 | 8.0 | 800 (2) |

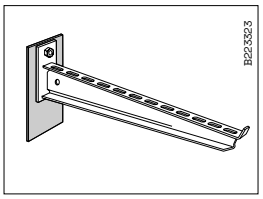
Safe working load according to IEC 61537 is breaking load divided by 1.7.
(1) Stainless steel: 50/250-300 T = 4 mm, 50/400-600 T = 5 mm.
(2) Need to fix the cantilever 50F/1000 with two T-bolts, both upper and lower holes in the backplate.

# Use and installation

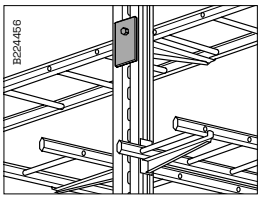
## Back plate 40


Back plate to be used for installation behind Cantilever arm 50 to reduce the surface pressure on porous walls.



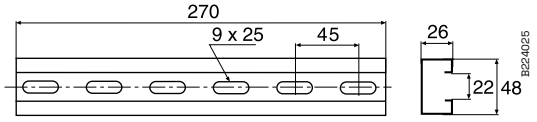

Mount Back plate 40 as shown in the illustration to reduce the surface stress on porous walls.

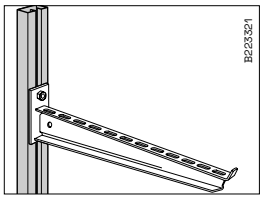



By using Back plate 40, a cantilever arm can be mounted on the side of Vertical piece 20F.

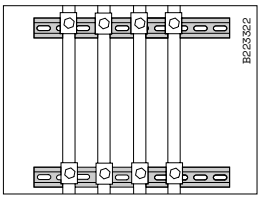
## Mounting rail 40


Mounting rail to be used for wall installation of cantilever arms on porous walls to reduce the surface pressure or to enable height adjustment of cantilever arms.




Mounting rails reduce the surface stress on porous walls. Mount the cantile- ver arm using T-bolt, which permits height adjustment.

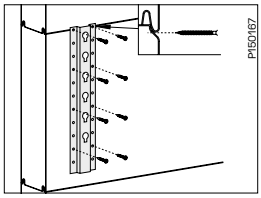


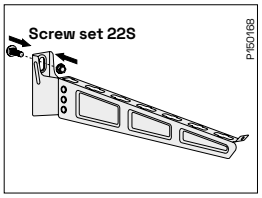

Cables may be mounted on walls using Mounting rail 40 and a suitable Cable clamp ARX.

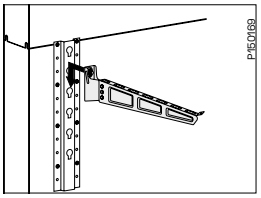
# Use and installation

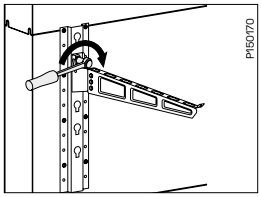
## Wall support


Wall support for mounting of cantilever arm on porous walls or sandwich wall blocks, with six keyholes for easy fixation. When mounting cantilever arm on support, use screw set 22S (M8).

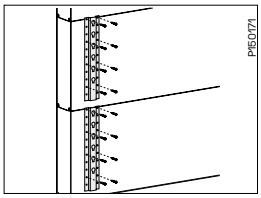


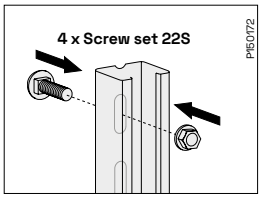



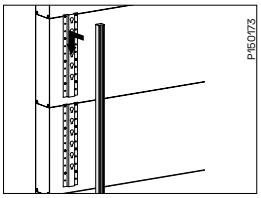



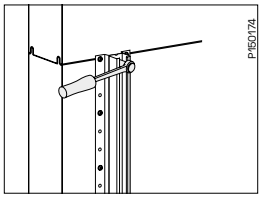



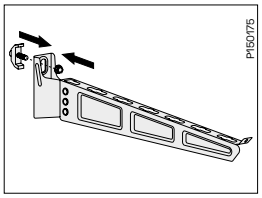

Two wall support plates can be combined with pendent rail 24/48 for extended mounting. for monting of pendent rail use screw set 22S.

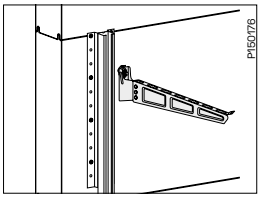


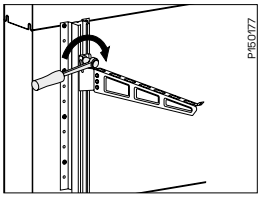



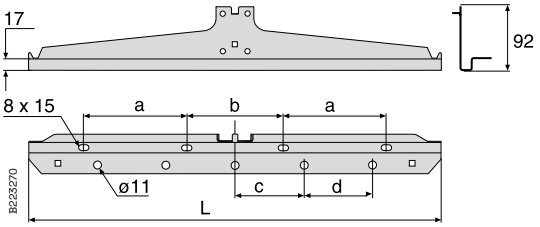




Stainless steel AISI 316L

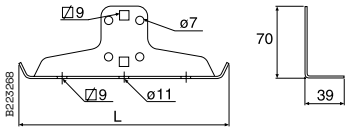
## Support bracket 3

Support bracket to be used for centre installation of cable ladders on pendant/ fixing rails and vertical pieces.

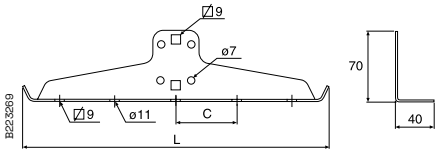



**Stainless steel AISI 316L**

**3/150-200**



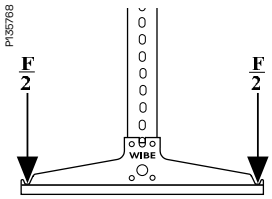

**3/300-600**




**Size**

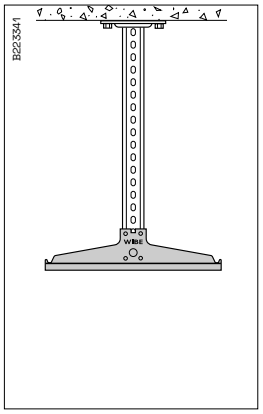
| Type | L mm | Stainless steel L mm | a mm | b mm | c mm | d mm |
|---|---|---|---|---|---|---|
| Support bracket 3/150 | 150 | 154 | – | 100 | – | – |
| Support bracket 3/200 | 200 | 204 | – | 100 | – | – |
| Support bracket 3/300 | 300 | 306 | 70 | 100 | – | – |
| Support bracket 3/400 | 400 | 406 | 70 | 100 | 100 | – |
| Support bracket 3/500 | 500 | 506 | 100 | 140 | 100 | – |
| Support bracket 3/600 | 600 | 606 | 150 | 140 | 100 | 100 |

**Breaking load for support bracket with symmetrical loading**

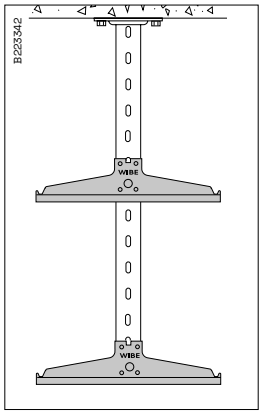



| Type | Breaking load F kN | kg |
|---|---|---|
| Support bracket 3/150 | 16 | 1600 |
| Support bracket 3/200 | 16 | 1600 |
| Support bracket 3/300 | 16 | 1600 |
| Support bracket 3/400 | 12 | 1200 |
| Support bracket 3/500 | 12 | 1200 |
| Support bracket 3/600 | 10 | 1000 |

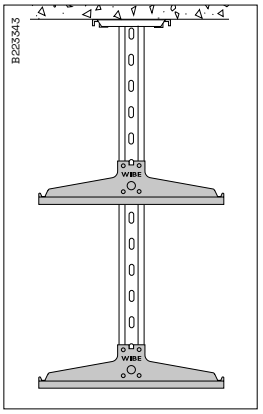
# Use and installation



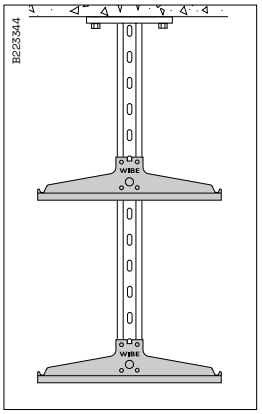

Mount Support bracket 3 on Vertical piece 2 with Screw set 22S.



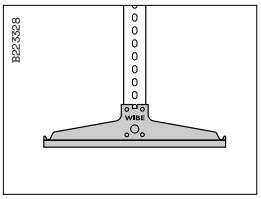

Mount Support bracket 3 on Vertical piece 2F with Screw set 22S.



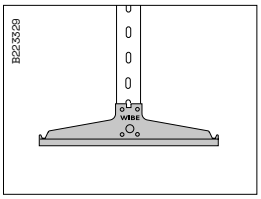

Mount Support bracket 3 on Vertical piece 20 with Screw set 20S.



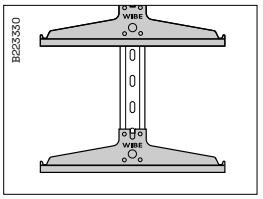

Mount Support bracket 3 on Vertical piece 20F with Screw set 2S.



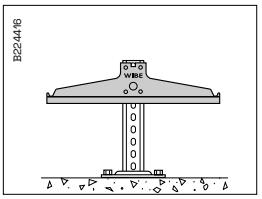

Mount Support bracket 3 on Pendant/ Fixing rail 24/34 with Screw set 22S.



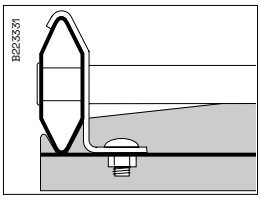

Mount Support bracket 3 on Pendant/Fixing rail 24/20 or 24/48 with Screw set 22S.



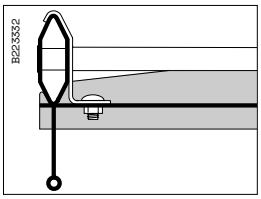

Support bracket 3 installed on Pendant/ Fixing rail 24/20F with Screw set 2S.



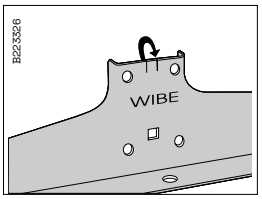

Support bracket 3 can be mounted on floor or under data floor with a suitable vertical piece.



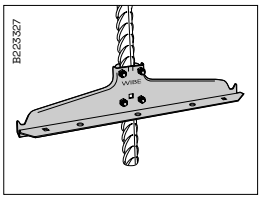

For installation of KHZSP, KHZ, KHZP and KHZPS on Support bracket 3 Profile clamp 42 is used.



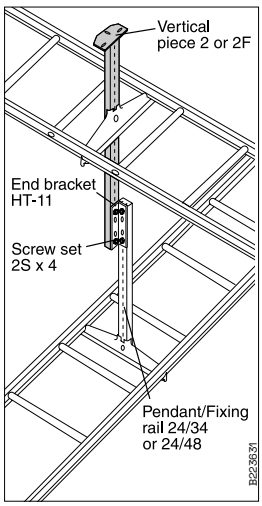

When attaching KHZV/ KHZPV to Support bracket 3, use Profile clamp 42.




When attaching Support bracket 3 using clamp set M6 the tab must be bent up using a hammer or pair of pliers.



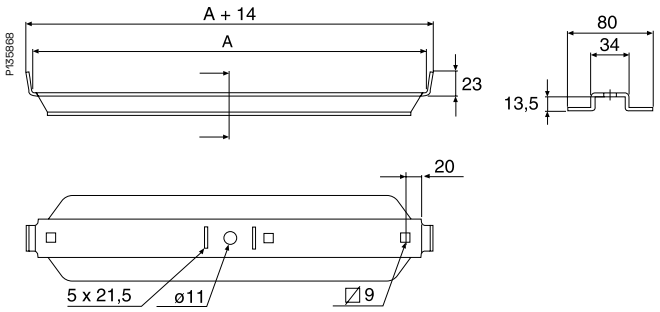

Support bracket 3 mounted on a rock bolt with Clamp set M6.




End bracket HT-11 permits the mounting of crossing cable ladders at different levels on the same pendant/fixing rail.


## Support bracket 6

Support bracket to be used for centre installation of cable ladders KHZSP.

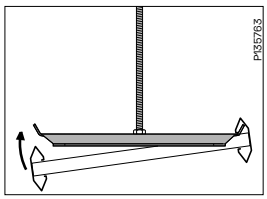



**Size**

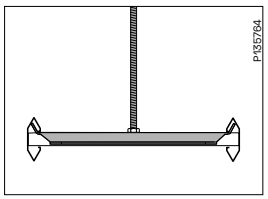
| Type | A mm |
|---|---|
| Support bracket 6/200 | 170 |
| Support bracket 6/300 | 270 |
| Support bracket 6/400 | 370 |
| Support bracket 6/500 | 470 |
| Support bracket 6/600 | 570 |

**Breaking load for Support bracket 6 – symmetrical loading**

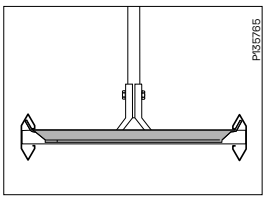
| Support bracket | Breaking load with Threaded rod W76 M10 | | Breaking load with Pendant attachment W21 | |
|---|---|---|---|---|
| | kN | kg | kN | kg |
| 6/200 | 5.0 | 500 | 3.4 | 340 |
| 6/300 | 4.8 | 480 | 3.4 | 340 |
| 6/400 | 3.0 | 300 | 3.0 | 300 |
| 6/500 | 2.2 | 220 | 2.2 | 220 |
| 6/600 | 1.7 | 170 | 1.7 | 170 |



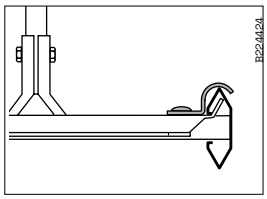

Support bracket 6 must be mounted inside cable ladder KHZSP.




Support bracket 6 mounted with Threaded rod W76 M10. Nut M10 must be used.




Support bracket 6 mounted with Pendant rail W32, Pendant attachment W21 and Screw set W37 from the Wibe Cable Tray range.

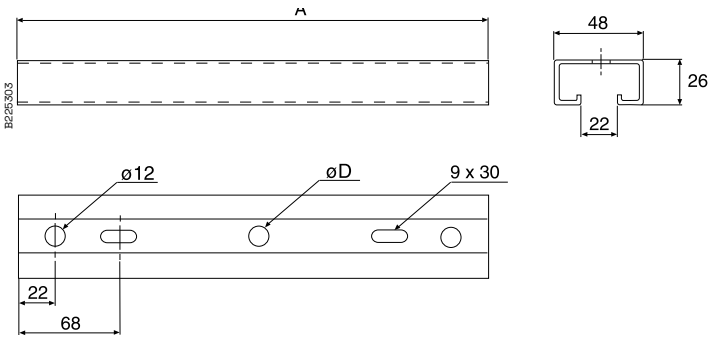



Profile clamp 43 can be used to fix the cable ladder to the support bracket.

# Use and installation

## Support bracket HSO

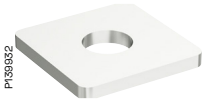

Support bracket to be mounted together with Threaded rod M10 or M16 for the installation of cable ladders.



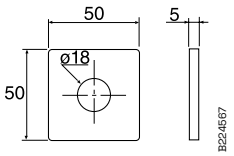

**Size**

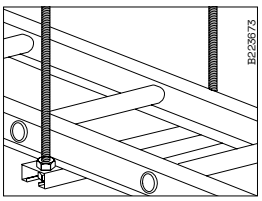
| Type | A mm | D mm |
|---|---|---|
| Support bracket HSO/150 M10 | 210 | 12 |
| Support bracket HSO/200 M10 | 260 | 12 |
| Support bracket HSO/300 M10 | 360 | 12 |
| Support bracket HSO/400 M16 | 460 | 18 |
| Support bracket HSO/500 M16 | 560 | 18 |
| Support bracket HSO/600 M16 | 660 | 18 |

## Washer HSO M16

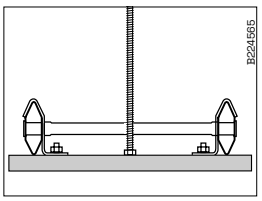



Washer to be used for centered mounting with Support bracket HSO M16 and Threaded rod M16.

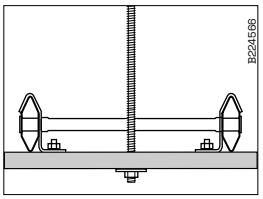


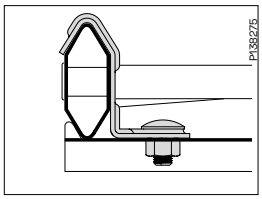

Support bracket HSO M10 installed with Threaded rod W76 M10.




Centered installation with Support bracket HSO M10, widths 150-300, Threaded rod W76 M10 and 2 Nuts M10.




Centered installation with Support bracket HSO M16, widths 400-600, Threaded rod M16, 2 Nuts M16 and Washer HSO M16.

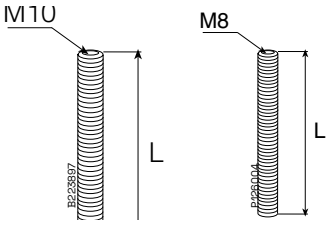



Profile clamp 42 is used to attach the cable ladder to the support bracket.

# Use and installation

## Threaded rod B41 and W76 M8, M10

Used for installation of light cable ladders.


| Diametre and Surface treatment | L= 1000mm | L= 2000mm | L= 3000mm |
|---|---|---|---|
| M8 EZ | W76 | - | - |
| M10 EZ | - | W76 | W76 |
| M8 HDG | W76 | W76 | - |
| M8 AISI | B41 | B41 | - |
| M10 AISI | B41 | B41 | - |


## Joint nut M8, M10

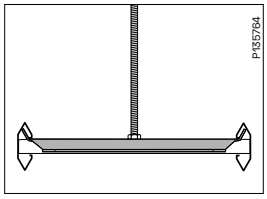
Used for joining of Threaded rod.


## Flange nut B43 M8, M10

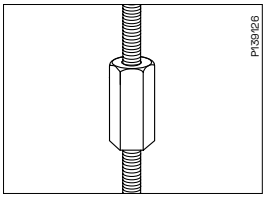
Flange nut is mounted onto Threaded rods in order to lock support brackets and ceiling brackets.


## Thread lock B50 M8, M10

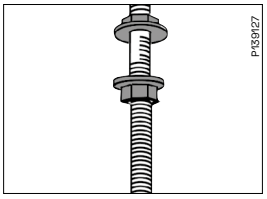
Used for joining of Threaded rod.



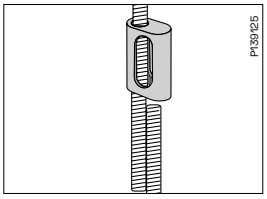

Support bracket 6 mounted with Threaded rod. Flange Nut B43 must be used.




Use Joint nut when joining 2 pieces of Threaded rod.



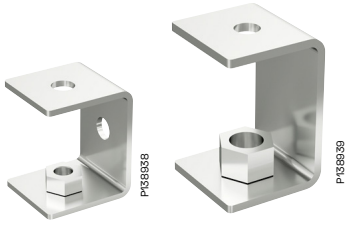

Flange nut B43 is mounted onto Threaded rod in order to lock support brackets and ceiling brackets.

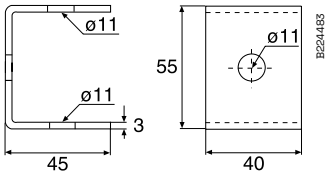


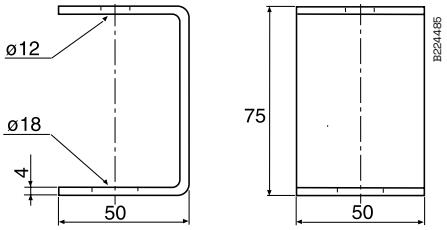

Thread lock B50 is used for the joining of Threaded rod.Max. permitted load=80kg.

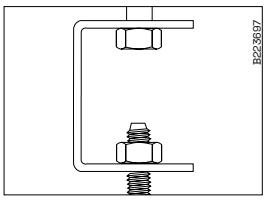
## Ceiling bracket TF-10 and TF-16

Ceiling bracket to be used for installation with Threaded rods.



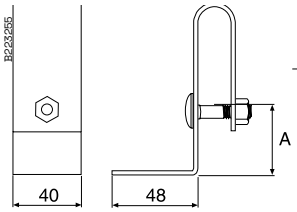




Ceiling bracket TF-10 or TF-16 installed with Threaded rod M10 or M16.

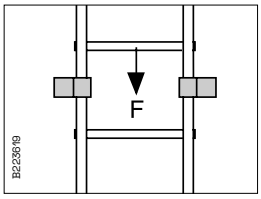
# Use and installation

## Wall bracket 11/25 and 11/75

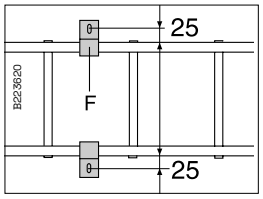

To be used for vertical or horizontal installations of cable ladders against a wall.



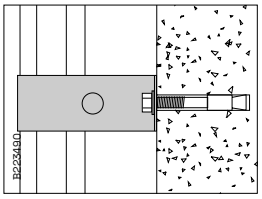

| Type | A mm |
|---|---|
| Wall bracket 11/25 | 25 |
| Wall bracket 11/75 | 75 |



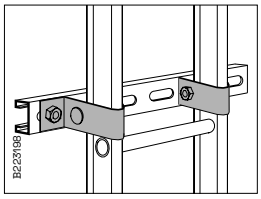

**Vertical mounting**
(max. load - F)
Wall bracket 11/25:
300 kg (3 kN)
Wall bracket 11/75:
300 kg (3 kN)
When mounting against a rung the max load is 500 kg (5 kN) for wall bracket 11/25.




**Horizontal mounting**
(max. load - F)
Wall bracket 11/25:
250 kg (2.5 kN)
Wall bracket 11/75:
100 kg (1.0 kN)



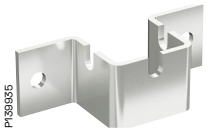

Mount wall brackets against walls using Expansion bolts.

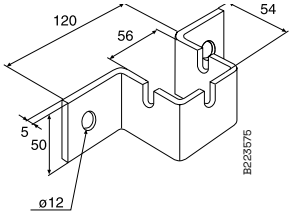


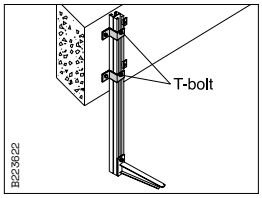

Pendant/fixing rails can be mounted on cable ladders using wall brackets for mounting equipment cubicles etc. Mount wall brackets on Pendant/fixing rails using Screw set 22S.

## Wall bracket 20

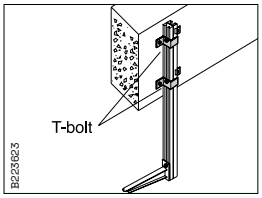
To be used at installation of Pendant/fixing rail 24/20 to ceiling beam or wall.



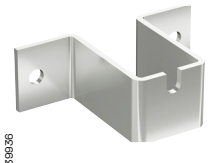




For cable ladder install-ations along a beam. Pendant/Fixing rail 24/20 must be mounted with 2 Wall brackets 20 and 2 T-bolts 26U-30 placed in the centre outlet. This installation is also used for fixing to wall. Max vertical load 700 kg (7 kN).

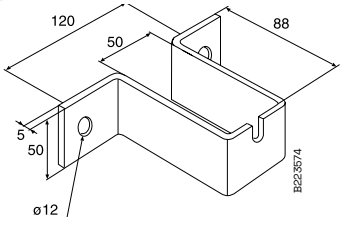


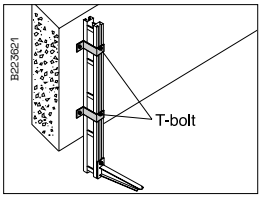

For cable ladder install- ations across a beam. Pendant/Fixing rail 24/20 shall be mounted with 2 Wall brackets 20 and 2 T-bolts 26U-30 in the side-outlets.

## Wall bracket 20F



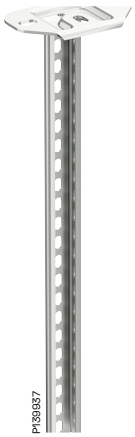

To be used at installation of Pendant/Fixing rail 20F to ceiling beam or wall.




Pendant/Fixing rail 24/20F must be mounted with 2 Wall brackets 20F and 2 T-bolts 26U-30 for cable ladders along beams. This installation is also used for fixing to wall. Max. vertical load 700 kg (7 kN).

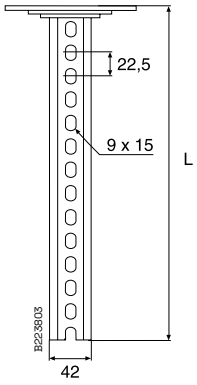
## Vertical piece 2

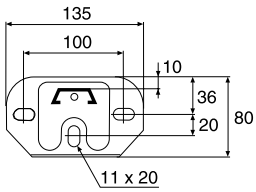




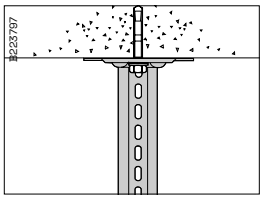
End plug
28C

Vertical piece to be used for installation of Support bracket 3, symmetrical loading. Not suitable for cable ladders KHZV and KHZPV. Can be joined to Pendant/fixing rail 24/34 with Pendant joint 2J.

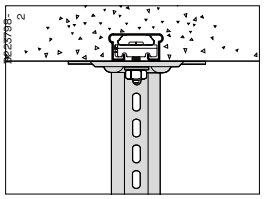


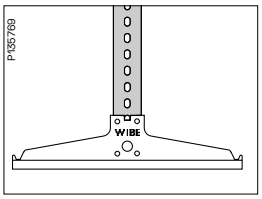

| Type | L mm |
|---|---|
| Vertical piece 2/300 | 279 |
| Vertical piece 2/400 | 392 |
| Vertical piece 2/500 | 504 |
| Vertical piece 2/700 | 729 |
| Vertical piece 2/1000 | 1022 |



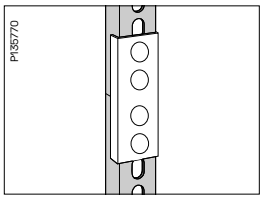

Mount Vertical piece 2 using an Expansion bolt or a concrete screw.



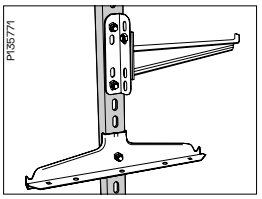

Mount Vertical piece 2 on a Fixing rail 24/26x53 for casting-in using T-bolt 26U.



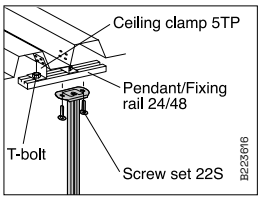

On Vertical piece 2, mount Support bracket 3 using Screw set 22S.




Vertical piece 2 can be joined to achieve the required length using Pendant/Fixing rail 24/34 and Pendant joint 2J.

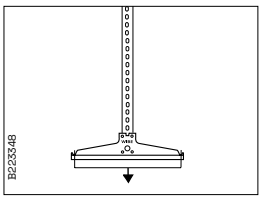



Cantilever arm 50 can, using End bracket HT-11, be mounted at 90° to the pendant/fixing rail. Only for lightweight mounting, such as data cables.

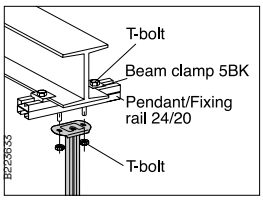



In ceilings with trapezoidal profile sheeting, mount Vertical piece 2 as shown above.

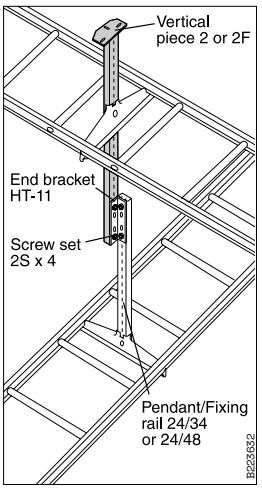
**Breaking load**




Breaking load for Vertical piece 2 with a symmetrical loading = 1400 kg (14 kN).
See also breaking load for support bracket 3.




On beams in ceilings. When the beam flange thickness does not exceed 13 mm, use Beam clamp 5BK-10 and T-bolt 26U/40.
For flange thick- nesses not excee- ding 30 mm use Beam clamp 5BK-30 and T-bolt 26U/50.




End bracket HT-11 permits the mounting of crossing cable ladders at different levels on the same pendant/fixing rail.

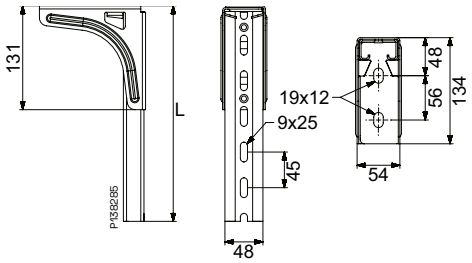
# Use and installation



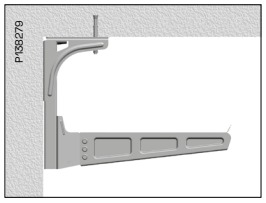
End plug 28E

## Vertical piece 2Fi

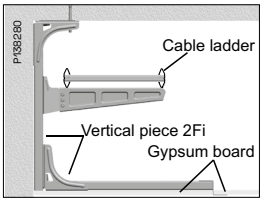
Vertical piece to be used for lighter mountings with Cantilever arm 50i and Cable ladder KHZSP.



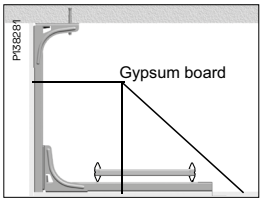

| Type | L mm |
|---|---|
| Vertical piece 2Fi-300 | 272 |
| Vertical piece 2Fi-500 | 497 |
| Vertical piece 2Fi-750 | 722 |
| Vertical piece 2Fi-1000 | 992 |



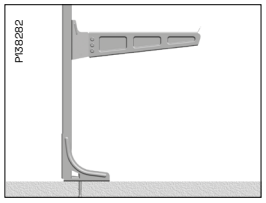

Vertical piece 2Fi can be mounted in ceiling close to wall.




Vertical piece 2Fi can be mounted horizontally on wall and on vertical piece as carrier of gypsum board.

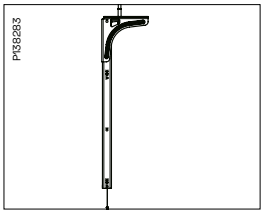



Vertical piece 2Fi can be used as carrier of gypsum boards in order to build in cable ladder passages.

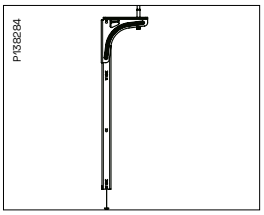



Vertical piece 2Fi is suitable for floor mounting.

**Breaking load**




Vertical piece 2Fi mounted in the inner hole. Breaking load=500 kg (5 kN) at symmetrical loading.

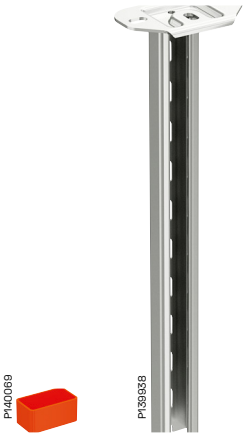



Vertical piece 2Fi mounted in the outer hole. Breaking load=100 kg (1 kN) at symmetrical loading

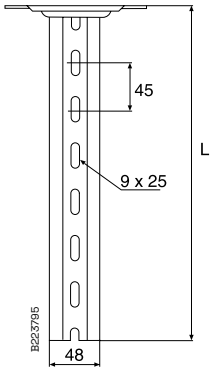
# Use and installation

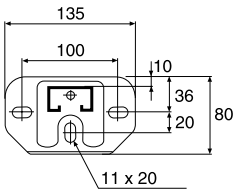
## Vertical piece 2F

Vertical piece to be used for installation of Support bracket 3 or Cantilever arm 50. Can be joined to Pendant/fixing rail 24/48 with Pendant joint 2FJ. Can be mounted from the ceiling or on the floor . Can also be installed as a cantilever arm on a wall.

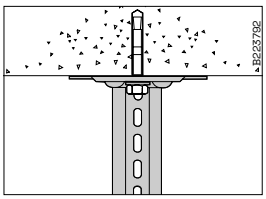



End plug
28E

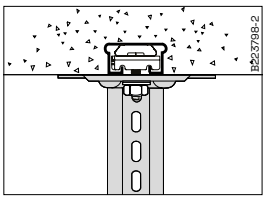


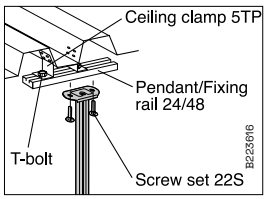

| Type | L mm |
|---|---|
| Vertical piece 2F/280 | 280 |
| Vertical piece 2F/370 | 370 |
| Vertical piece 2F/505 | 505 |
| Vertical piece 2F/640 | 640 |
| Vertical piece 2F/730 | 730 |
| Vertical piece 2F/865 | 865 |
| Vertical piece 2F/1000 | 1000 |
| Vertical piece 2F/1500 | 1495 |



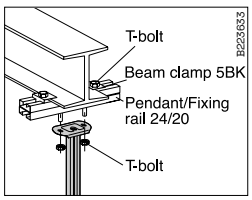

Mount Vertical piece 2F using Expansion bolt alt. Concrete screw.



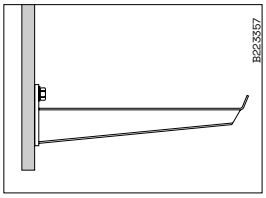

On Fixing rail forcasting-in, mount Vertical piece 2F using T-bolt.



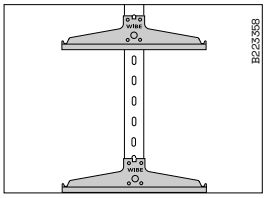

In ceilings with trapezoidal sheeting, mount Vertical piece 2F as shown above.



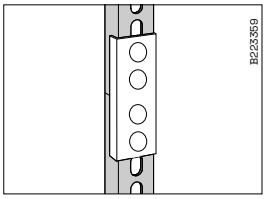

On beams in ceilings, mount Vertical piece 2F as shown in the figure above. When the beam flange thickness does not exceed 13 mm, use Beam clamp 5BK-10 and T-bolt 26U/40.
For flange thicknesses not excee- ding 30 mm use Beam clamp 5BK-30 and T-bolt 26U/50.



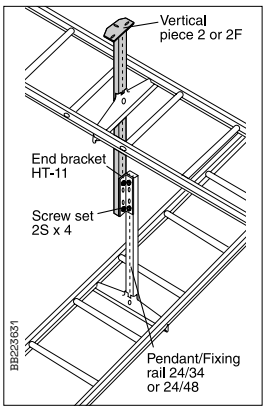

On Vertical piece 2F, mount Cantilever arm 50 using T-bolt.



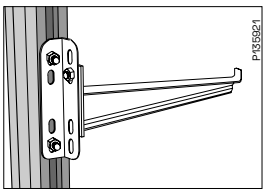

On Vertical piece 2F, mount Support bracket 3 using Screw set 22S.



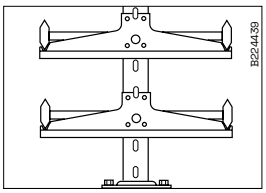

Vertical piece 2F can be joined to achieve the required length using Pendant/Fixing rail 24/48 and Pendant joint 2FJ.



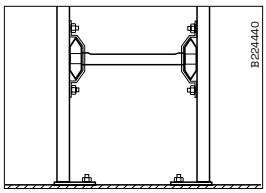

End bracket HT-11 permits mounting of crossing cable ladders on different levels on the same pendant/fixing rail.




Cantilever arm 50 can, using End bracket HT-11, be mounted at 90° to the pendant/fixing rail. Only for lightweight installation of data cable type and suchlike.



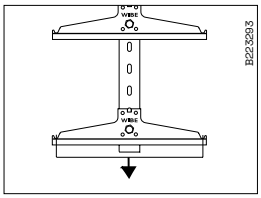

Cable ladders mounted on Vertical piece 2F and Support bracket 3 can be used for cable installations in raised access floors.




For installation on floor the cable ladders can be mounted with Vertical piece 2F, Profile clamp 41 and T-bolt.

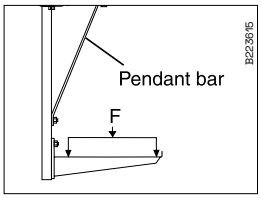
# Use and installation

**Breaking load symmetrical loading***



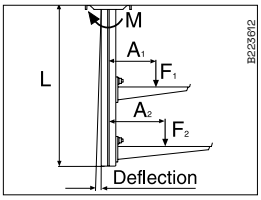
Breaking load for Vertical piece 2F (VP) = 2300 kg (23 kN) at symmetrical loading.

**VP + Pendant bar for reduction of deflection**

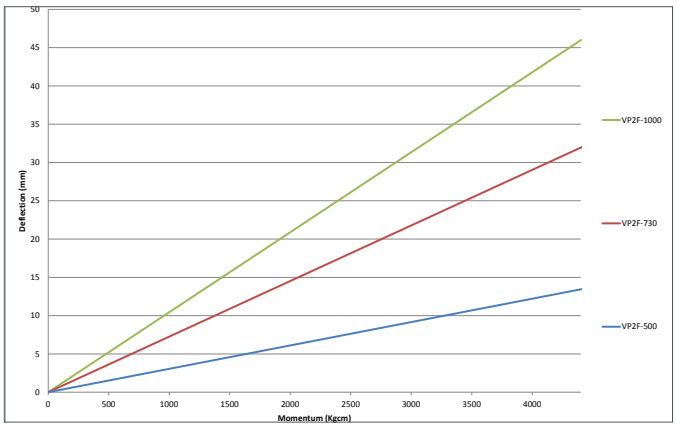



Deflection of Vertical piece 2F is reduced by installing Pendant bar 1. Loadings in accordance with chart below.

**Breaking load asymmetrical loading**




M = Σ F x A
See also max loading for Cantilever arm 50 installed on pendant/fixing rail, page Cantilever arm 50L, 50 and 50F.




For values outside diagram please contact Wibe Group.

**Example**
Conditions:
- 2 m support distance.
- 10 kg/m ladder
- Two ladders, 200 and 300 mm
- One-side loading
- VP 2F/730
- Bending?

M = ∑ F x A (kgcm)

$$M = 10 \times 2 \times \left(\frac{20}{2} + 6.5\right) + 10 \times 2 \times \left(\frac{30}{2} + 6.5\right)$$

($F_1$) ($A_1$) ($F_2$) ($A_2$)

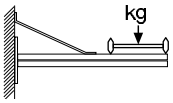
M = 760 kgcm - bending as per diagram, about 5.5 mm.

Bending torque M is total sum of F x A (kgcm).
F = Cantilever arm loading (kg)
F = Loading (kg/m) x support distance (m).
A = Distance between loading and VP centre line (cm)

$$A = \frac{\text{Ladder width}}{2} + 6.5 \text{ cm}$$

L = VP length
Break load torque 6 000 (kgcm)

**Loading table for Vertical piece 2F installed as a cantilever arm**



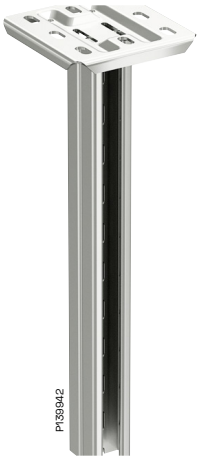

Vertical piece 2F with Pendant bar 1/300

| Pendant type | 2F/700 | 2F/1000 |
|---|---|---|
| Ladder width | Breaking load | Breaking load |
| 150 | 120 | 75 |
| 200 | 125 | 80 |
| 300 | 135 | 90 |
| 400 | 140 | 100 |
| 600 | – | 120 |

*Safe working load according to IEC 61537 is breaking load divided by 1.7.

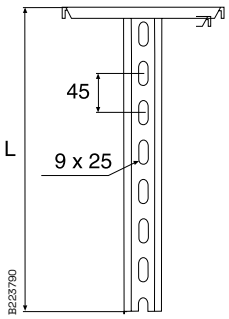
## Vertical piece 20

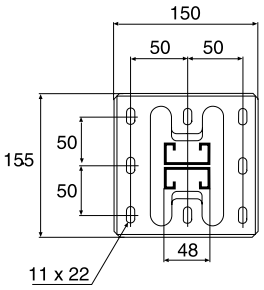
Vertical piece, two-sided, to be used for vertical installation together with Cantilever arm 50, from a ceiling or on a floor. Can also be installed as a cantilever arm on a wall.



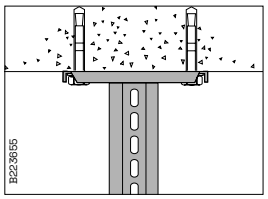


End plug 28D

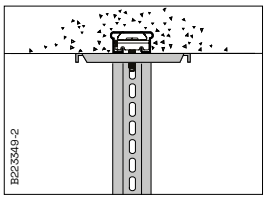


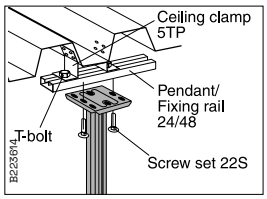

| Type | L mm |
|---|---|
| Vertical piece 20/280 | 280 |
| Vertical piece 20/370 | 370 |
| Vertical piece 20/500 | 505 |
| Vertical piece 20/640 | 640 |
| Vertical piece 20/700 | 730 |
| Vertical piece 20/865 | 865 |
| Vertical piece 20/1000 | 1000 |
| Vertical piece 20/1500 | 1495 |
| Vertical piece 20/2000 | 1990 |
| Vertical piece 20/3000 | 2980 |



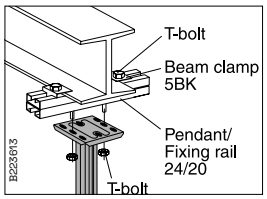

Mount Vertical piece 20 using Expansion bolt.



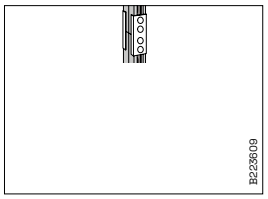

On fixing rail for casting in, mount Vertical piece 20 using T-bolts.



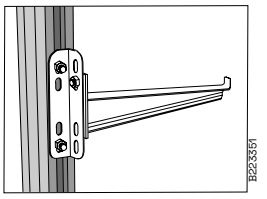

In ceilings with trapezoidal profile sheeting, mount Vertical piece 20 as shown above



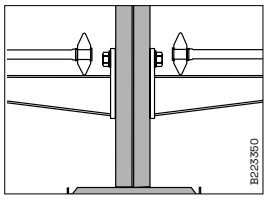

On beams in ceilings, mount Vertical piece 20 as shown in the figure above. When the beam flange thickness does not exceed 13 mm, use Beam clamp 5BK-10 and T-bolt 26U/40. For flange thicknesses not exceeding 30 mm use Beam clamp 5BK-30 and T-bolt 26U/50.



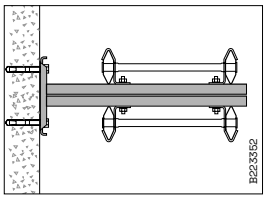

Vertical piece 20 can be joined to achieve the required length using Pendant/Fixing rail 24/20 and Pendant joint 20J.



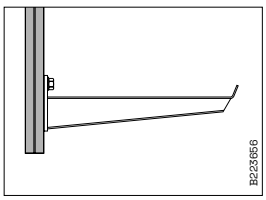

Using End bracket HT-11, Cantilever arm 50 can be mounted at 90° to the pendant/fixing rail. Only for lightweight mounting of data cable type and suchlike



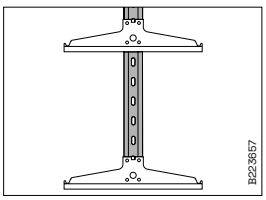

Vertical piece 20 is also suitable for floor mounting




Vertical piece 20 may be used for vertical mounting in a shaft, for example. Mount Wall bracket 11 or Profile clamp 42 using T-bolts. The vertical piece may also be mounted horizontally as a cantilever arm, such as when passing columns.



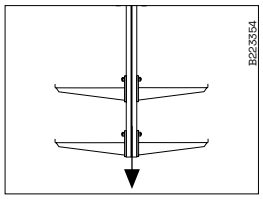

On vertical piece, mount Cantilever arm 50 using T-bolt. For loadings see Cantilever arm 50




On Vertical piece 20, mount Support bracket 3 using Screw set 20S.

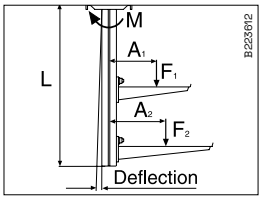
# Use and installation

**Breaking load symmetrical loading***

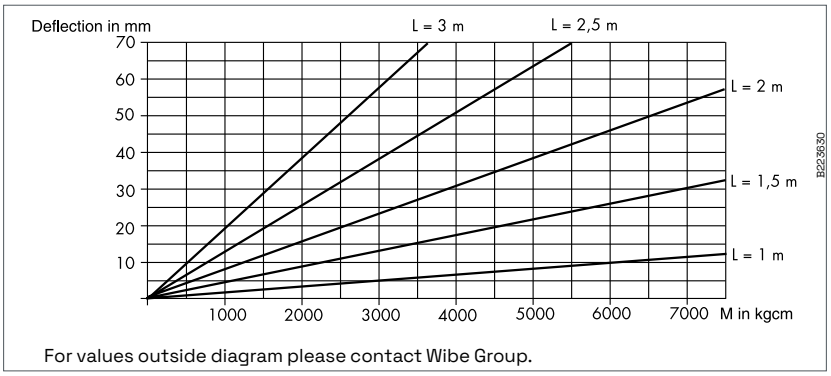



Breaking load for vertical piece (VP) = 3000 kg (30 kN).

**Breaking load asymmetrical loading**




M = Σ F x A
See also max loading for Cantilever arm 50 installed on pendant/ fixing rail, page Cantilever arm 50L, 50 and 50F.




For values outside diagram please contact Wibe Group.

**Example**
Conditions:
- 2 m support distance.
- 30 kg/m ladder
- Two ladders, 400 and 600 mm
- One-side loading
- VP 20/1000
- Bending?

M = ∑ F x A (kgcm)

$$M = 30 \times 2 \times \frac{40}{2} + 7.7) + 30 \times 2 \times \frac{60}{2} + 7.7)$$

$(F_1)$ $(A_1)$ $(F_2)$ $(A_2)$

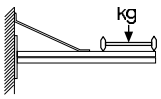
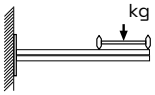
M = 3924 kgcm - bendingas per diagram, about 6 mm.

Bending torque M is total sum of F x A (kgcm).
F = Cantilever arm loading (kg)
F = Loading (kg/m) x support distance (m).
A = Distance between loading and VP centre line (cm)

$$A = \frac{\text{Ladder width}}{2} + 7.7 \text{ cm}$$

L = VP length
Break load torque 19 000 (kgcm)

**Loading table for Vertical piece 20 installed as a cantilever arm**

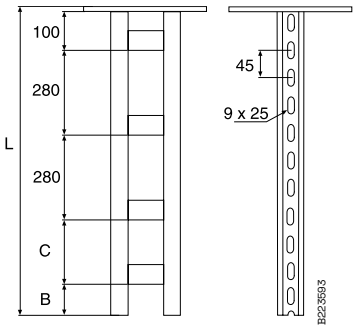
| |   Vertical piece 20 with Pendant bar 1/300 | | |   Vertical piece 20 without pendant bar | | |
|---|---|---|---|---|---|---|
| **Pendant type** | **20/700** | **20/1000** | **20/1500** | **20/700** | **20/1000** | **20/1500** |
| **Width Ladder type** | **Breaking load** | **Breaking load** | **Breaking load** | **Breaking load** | **Breaking load** | **Breaking load** |
| 150 | 380 | 210 | 155 | 230 | 165 | 115 |
| 200 | 400 | 240 | 160 | 250 | 170 | 115 |
| 300 | 425 | 270 | 165 | 280 | 175 | 120 |
| 400 | 450 | 300 | 170 | 310 | 180 | 125 |
| 600 | - | 320 | 180 | 370 | 190 | 130 |

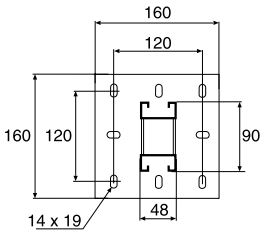
*Safe working load according to IEC 61537 is breaking load divided by 1.7.

# Use and installation

## Vertical piece 20F

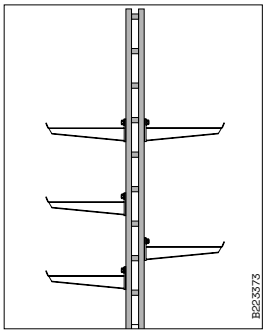
Vertical piece, two-sided, to be used for mounting from the ceiling or on the floor. Suitable for rather heavy loads.

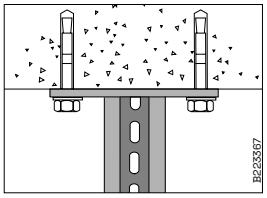




| Type | B mm | C mm | L mm |
|---|---|---|---|
| Vertical piece 20F/1000 | 50 | 280 | 995 |
| Vertical piece 20F/1500 | 70 | 195 | 1490 |
| Vertical piece 20F/2000 | 5 | 195 | 1985 |
| Vertical piece 20F/3000 | 70 | 280 | 2980 |

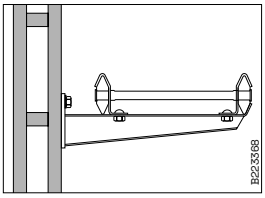

End plug 28J



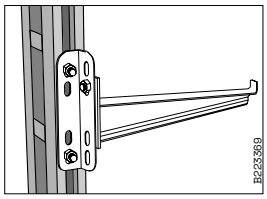

Floor mounting example.



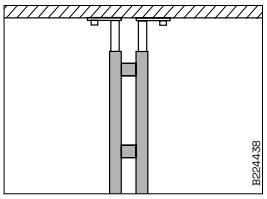

Mount Vertical piece 20F using Expansion bolt alt. Concrete screw.




Cantilever arm 50 can be mounted using T-bolt. For loads on Cantilever arm 50, see Cantilever arm 50L, 50 and 50F.

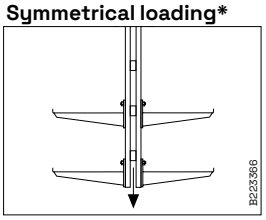



Using End bracket HT-11, Cantilever arm 50 can be mounted at 90° to the vertical piece. Only for lightweight mounting of data cable type or similar.



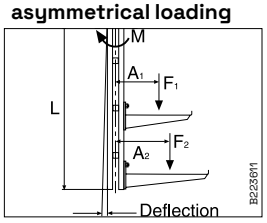

Vertical piece 20F moun- ted on floor can be fixed using Vertical piece 2 as ceiling bracket, adjustable in the pendant.

**Breaking load Symmetrical loading***

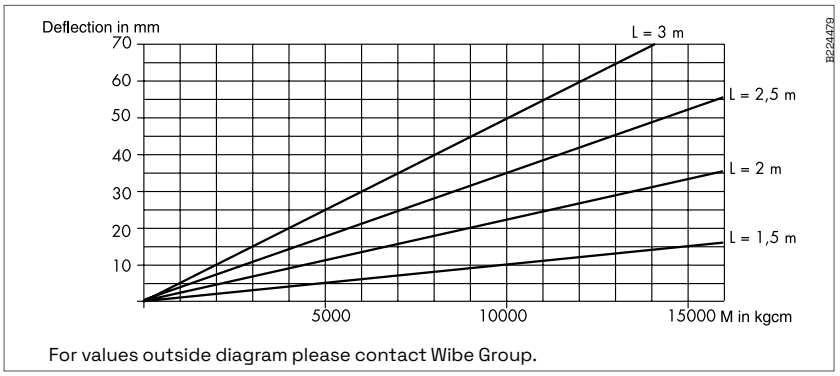



Breaking load for Vertical piece (VP) 20F = 5000 kg (50kN)

**Breaking load asymmetrical loading**




M = Σ F x A
Vertical piece 20F mounted in ceiling, see diagram.




For values outside diagram please contact Wibe Group.

**Example**
Conditions:
- 2 m support distance50 kg/m ladder
- Two ladders, 400 and 600 mm
- One-side loading
- VP 20F/1500
- Bending?

M = ∑ F x A (kgcm)

$$M = 50 \times 2 \times \left(\frac{40}{2} + 9.4\right) + 50 \times 2 \times \left(\frac{60}{2} + 9.4\right)$$

$(F_1)$ $(A_1)$ $(F_2)$ $(A_2)$

M = 6880 kgcm - bending as per diagram, about 6 mm.

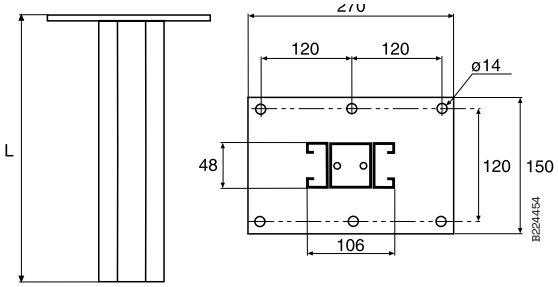
Bending torque M is total sum of F x A (kgcm).
F = Cantilever arm loading (kg)
F = Loading (kg/m) x support distance (m).
A = Distance between loading and VP centre line (cm)
A = $\frac{\text{Ladder width}}{2}$ + 9.4 cm
L = VP length
Break load torque 30 000 (kgcm)

*Safe working load according to IEC 61537 is breaking load divided by 1.7.

# Use and installation

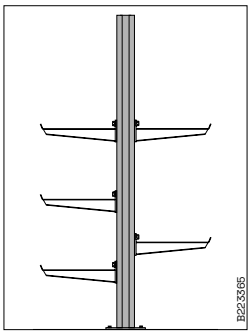
## Vertical piece 20FS

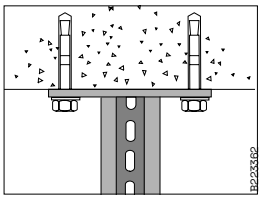
Vertical piece, two-sided, to be used for mounting from the ceiling or on the floor. Suitable for very heavy loads.

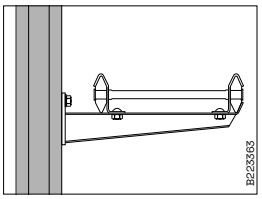

| Type | L mm |
|---|---|
| VP 20FS/1500 | 1495 |
| VP 20FS/2000 | 1990 |
| VP 20FS/2500 | 2485 |
| VP 20FS/3000 | 2980 |


End plug 28F

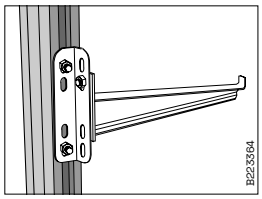



Mount Vertical piece 20FS using Expansion bolt alt Concrete screw.

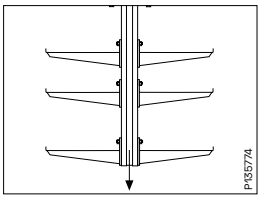



Mount Cantilever arm 50 using T-bolt. For loads on Cantilever arm 50, see Cantilever arm 50L, 50 and 50F.



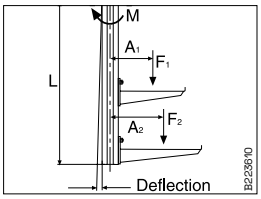

Using End bracket HT-11, Cantilever arm 50 can be mounted at 90° to the vertical piece. Only for lightweight mounting of data cable type or similar.

**Breaking load Symmetrical loading**

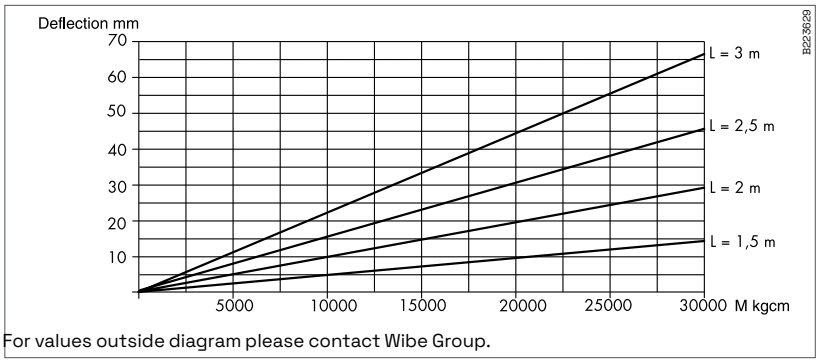



**Symmetrical loading**
Breaking load for Vertical piece (VP) 20FS = 5000 kg (50 kN)

**Breaking load asymmetrical loading**




**Asymmetrical loading**
M = Σ F x A Vertical piece 20FS mounted in ceiling, see diagram.




For values outside diagram please contact Wibe Group.

**Example**
Conditions:
- 2 m support distance75 kg/m ladder
- Two ladders, 400 and 600 mm
- One-side loading
- VP 20FS/1500
- Bending?

M = ∑ F x A (kgcm)

$$M = 75 \times 2 \times \left(\frac{40}{2} + 10.4\right) + 75 \times 2 \times \left(\frac{60}{2} + 10.4\right)$$

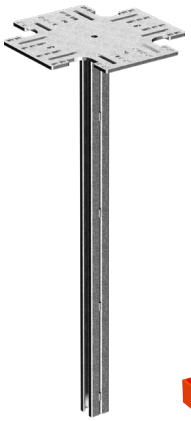
$(F_1)$ $(A_1)$ $(F_2)$ $(A_2)$

M = 10620 kgcm - bending as per diagram, about 5 mm.

Bending torque M is total sum of F x A (kgcm).
F = Cantilever arm loading (kg)
F = Loading (kg/m) x support distance (m).
A = Distance between loading and VP centre line (cm)
A = $\frac{\text{Ladder width}}{2}$ + 10.4 cm
L = VP length
Break load torque 60 000 (kgcm)

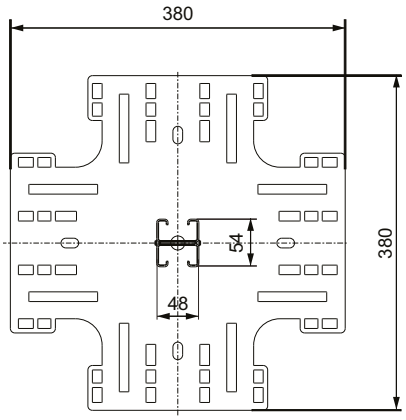
*Safe working load according to IEC 61537 is breaking load divided by 1.7.

## Vertical piece BM20



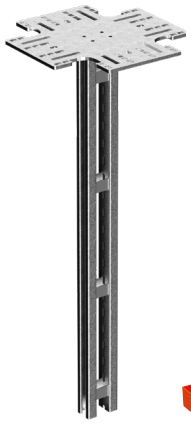
End plug
28D

Vertical piece, two-sided, to be used for vertical installation from I-beams together with Cantilever arm 50/50F. Used together with Beam clamp 6BK and bolt kits for Beam clamp, sold separately.



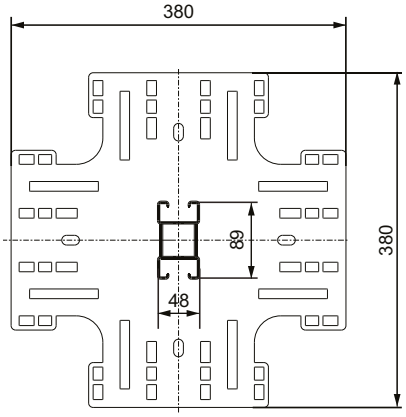

| Type | L mm |
|---|---|
| Vertical piece BM20-505 HDG | 498 |
| Vertical piece BM20-1000 HDG | 993 |
| Vertical piece BM20-1500 HDG | 1488 |
| Vertical piece BM20-2000 HDG | 1983 |
| Vertical piece BM20-3000 HDG | 2973 |
| Vertical piece BM20-4000 HDG | 4008 |
| Vertical piece BM20-5000 HDG | 4998 |
| Vertical piece BM20-6000 HDG | 5943 |

## Vertical piece BM20F



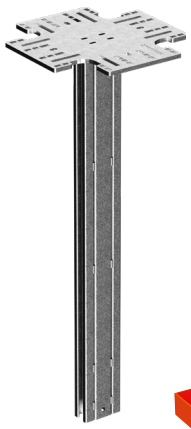
End plug
28J

Vertical piece, two-sided, to be used for vertical installation from I-beams together with Cantilever arm 50/50F. Used together with Beam clamp 6BK and bolt kits for Beam clamp, sold separately.



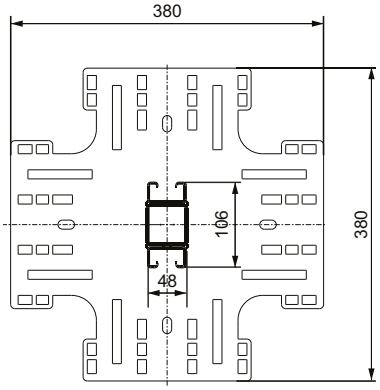

| Type | L mm |
|---|---|
| Vertical piece BM20F-1000 HDG | 993 |
| Vertical piece BM20F-1500 HDG | 1488 |
| Vertical piece BM20F-2000 HDG | 1983 |
| Vertical piece BM20F-3000 HDG | 2973 |
| Vertical piece BM20F-4000 HDG | 4008 |
| Vertical piece BM20F-5000 HDG | 4998 |
| Vertical piece BM20F-6000 HDG | 5943 |

## Vertical piece BM20FS



End plug
28F

Vertical piece, two-sided, to be used for vertical installation from I-beams together with Cantilever arm 50/50F. Used together with Beam clamp 6BK and bolt kits for Beam clamp, sold separately.




| Type | L mm |
|---|---|
| Vertical piece BM20FS-1000 HDG | 995 |
| Vertical piece BM20FS-1500 HDG | 1490 |
| Vertical piece BM20FS-2000 HDG | 1985 |
| Vertical piece BM20FS-3000 HDG | 2975 |
| Vertical piece BM20FS-4000 HDG | 4010 |
| Vertical piece BM20FS-5000 HDG | 5000 |
| Vertical piece BM20FS-6000 HDG | 5945 |

# Use and installation

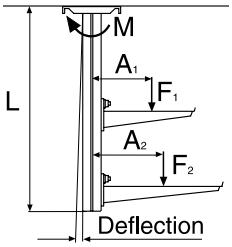
| Type | Pendant offset (m) [Po] |
|---|---|
| Vertical piece BM20 | 0,077 |
| Vertical piece BM20F | 0,094 |
| Vertical piece BM20FS | 0,104 |

## Safe working load asymmetrical loading

Bending torque M is total sum of F x A (Nm).

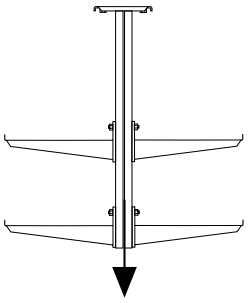
F = Cantilever arm loading (N)
F = Loading (kg/m) x support distance (m) x 9,81 N/kg.

A = Distance between loading and VP centre line (m)
A = Ladder width (m) + Pendant offset [Po] (m)
2

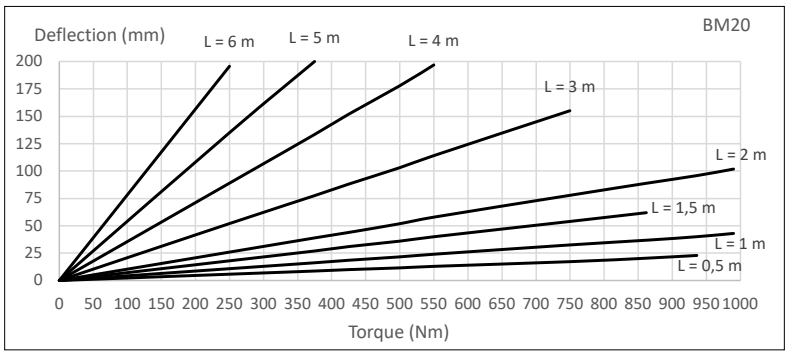



$$M = \sum_{n} F \times A$$

| Type | Safe Working Load SWL (kN) Symmetrical loading |
|---|---|
| Vertical piece BM20 | 17,6 |
| Vertical piece BM20F | 22,0 |
| Vertical piece BM20FS | 25,0 |

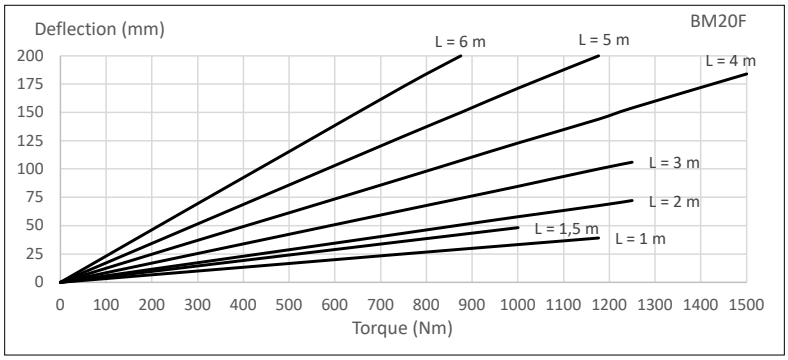


## Safe Working load symmetrical loading



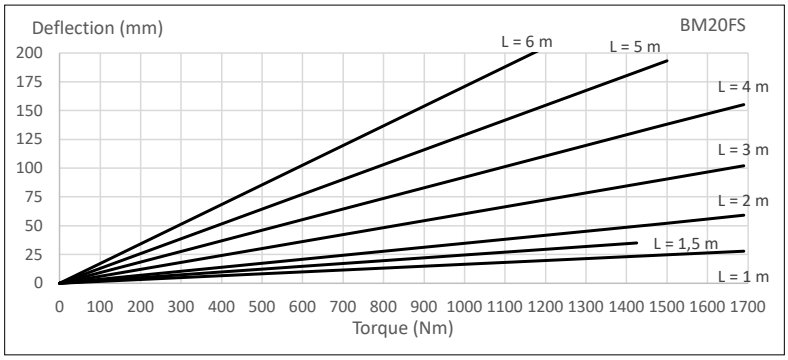

L = VP length m

For values outside diagram please contact Wibe Group.




L = VP length m

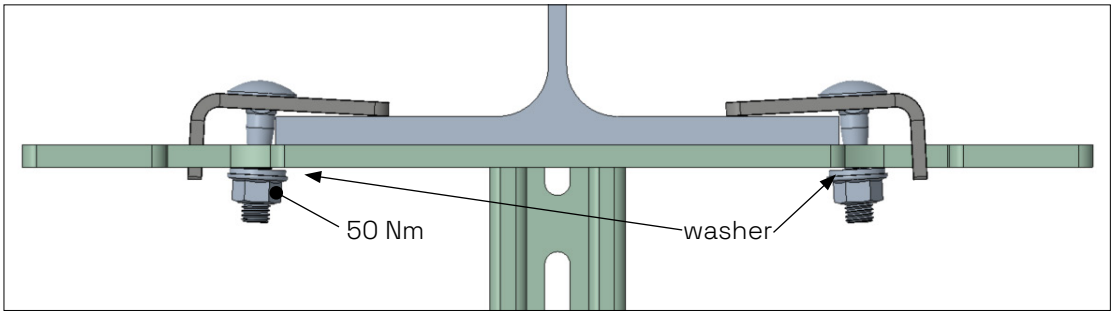
For values outside diagram please contact Wibe Group.



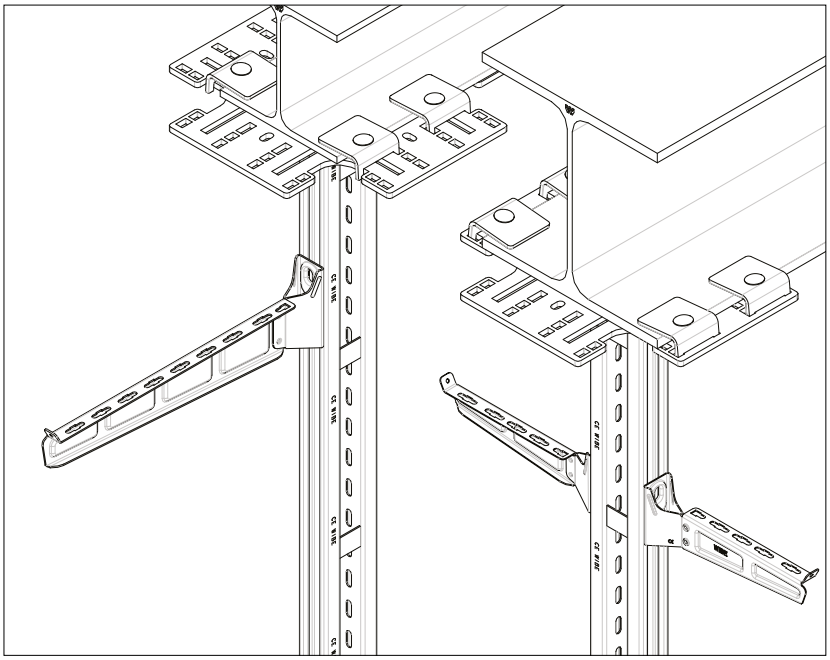

L = VP length m

For values outside diagram please contact Wibe Group.

# Use and installation

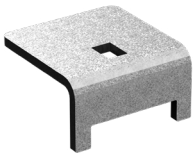



For a correct installation, the pendant need to be in the center of the beam and the bolts need to touch the side of the I-beam. Tightening torque 50Nm.

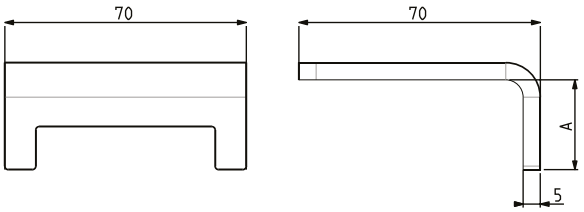


The pendant can be installed on both transversal and longitudinal direction on I-beams ranging from 200 to 300mm wide.

## Beam clamp 6BK



Beam clamp to be used for the installation of Vertical pieces BM20, BM20F or BM20FS on I-beams. For flange thickness max. 13, 20, 30 and 40 mm respectively. Bolt kits to each 6BK clamp size are sold separately.

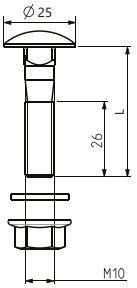



| Type | A mm | For beam flange from X to X mm |
|---|---|---|
| Beam clamp 6BK-13 HDG | 31 | 0-13 |
| Beam clamp 6BK-20 HDG | 38 | 13-20 |
| Beam clamp 6BK-30 HDG | 48 | 20-30 |
| Beam clamp 6BK-40 HDG | 58 | 30-40 |

# Use and installation

## Bolt-kits for Beam clamp 6BK

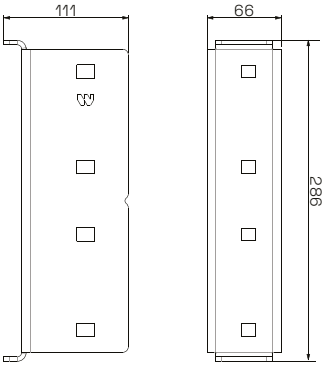
Bolt kit to be used for installation of Beam clamp 6BK to Beam pendants BM20, BM20F or BM20FS.
Set including screw MVBFM10, washer BRBM10 and nut M6MF10.

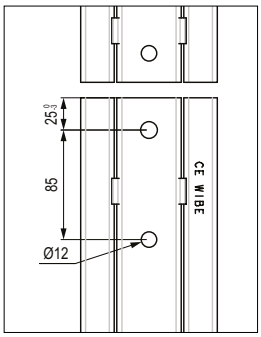



| Type | L mm |
|---|---|
| Bolt-kits for Beam clamp 6BK-13 HDG | 45 |
| Bolt-kits for Beam clamp 6BK-20 HDG | 50 |
| Bolt-kits for Beam clamp 6BK-30 HDG | 60 |
| Bolt-kits for Beam clamp 6BK-40 HDG | 70 |

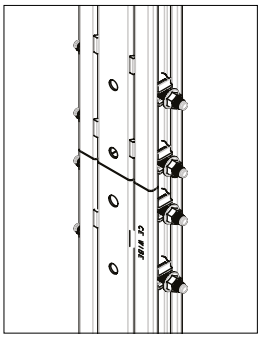
## Pendant joint 20FS

Used for joining pendant/fixing rails 20FS and vertical pieces 20FS. Used in pairs. Provided without bolts and T-bolts. The pair is to be fixed to the rail with 8 x M10 T-bolts. Also 4 x Bolt-kit CSU795924 should be used as a pin.

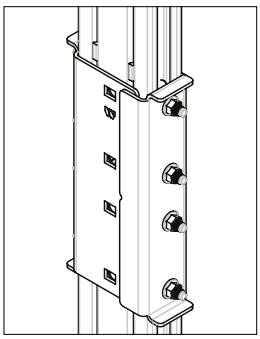


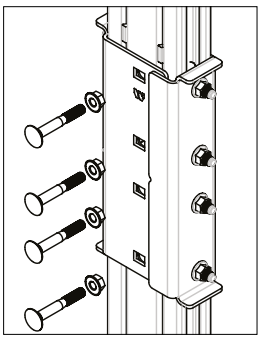

Prepare the pieces to be joined by drilling a Ø12mm hole in the center of the square tube according the drilling pattern dimensions:.



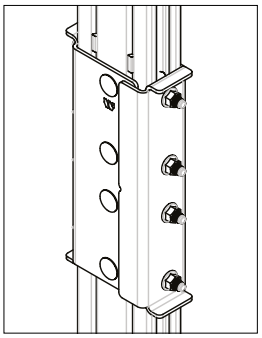
Install the 8 T-bolts M10x30 CSU795589 on the pendant and the additional rail



Place both joints in position and add the nuts. Tighten loosely



Install 4 Bolt-kits for Beam clamp 6BK-40 CSU795923 as pins.

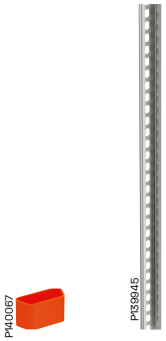


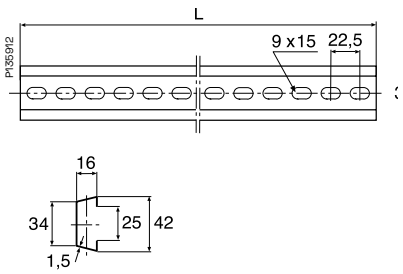
Tighten all the nuts at 25Nm torque.

# Use and installation

## Pendant/Fixing rail 24/34

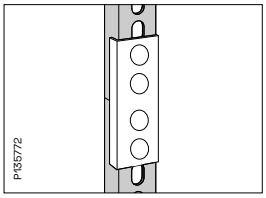
Pendant/Fixing rail for mounting of support brackets, cantilever arms, etc.



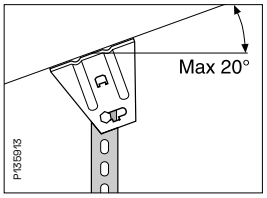



| Type | L mm |
|---|---|
| Pendant/Fixing rail 24/34 | 292.5 |
| Pendant/Fixing rail 24/34 | 382.5 |
| Pendant/Fixing rail 24/34 | 495.0 |
| Pendant/Fixing rail 24/34 | 697.5 |
| Pendant/Fixing rail 24/34 | 990.0 |
| Pendant/Fixing rail 24/34 | 2970.0 |

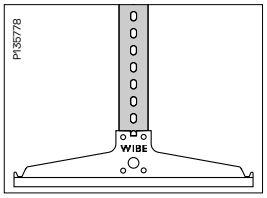

End plug
28C



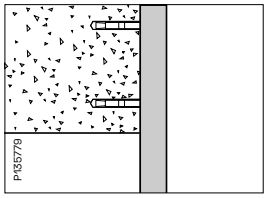

Vertical piece 2 may be joined to Pendant/Fixing rail 24/34 and Pendant joint 2J to achieve a suitable length.




Ceiling bracket 5 and 1 Screw set 22S together provide a vertical piece that can be mounted with up to 20° slope.



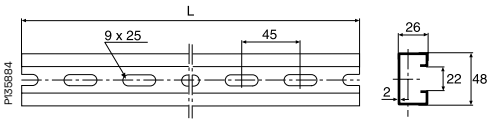

Mount Support bracket 3 using Screw set 22S.




Side mounting of pendant/ fixing rails may be done using 2 Expansion bolts alt. 2 Concrete screws.

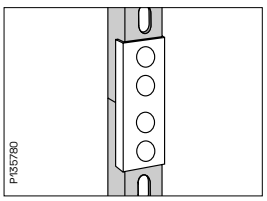
## Pendant/Fixing rail 24/48

Pendant/Fixing rail for mounting of support brackets, cantilever arms, etc.

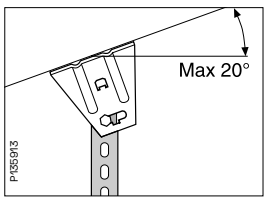



| Type | L mm |
|---|---|
| Pendant/Fix. rail 24/48 | 1000 |
| Pendant/Fix. rail 24/48 | 2970 |
| Pendant/Fix. rail 24/48 | 5940 |

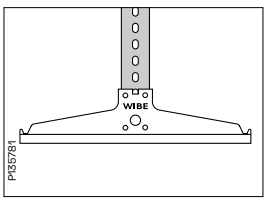

End plug
28E



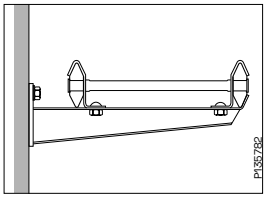

Vertical piece 2F may be joined using Pendant/ Fixing rail 24/48 and Pendant joint 2FJ to achieve the required length.



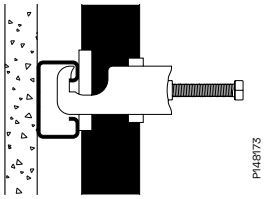

Ceiling bracket 5 and 1 Screw set 22S together provide a vertical piece that can be mounted with up to 20° slope. Only for mounting support brackets.




Mount Support bracket 3 using Screw set 22S.




Mount Cantilever arm 50 using T-bolt.

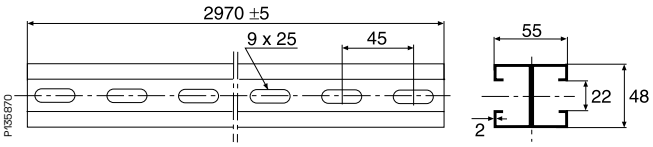



Cables are mounted on a Pendant/Fixing rail 24/48 using cable clamp ARX.

# Use and installation

## Pendant/Fixing rail 24/20

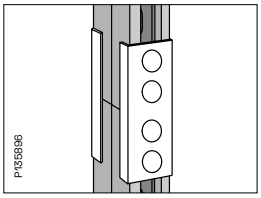
Pendant/Fixing rail for mounting of support brackets, cantilever arms, etc.

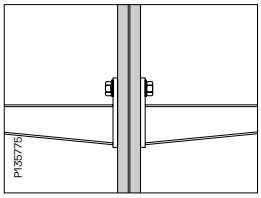




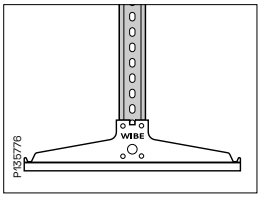
End plug
28D



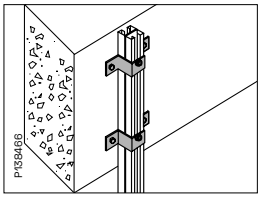

Vertical piece 20 may be joined using Pendant/ Fixing rail 24/20 and Pendant joint 20J. Only for symmetrical loading.



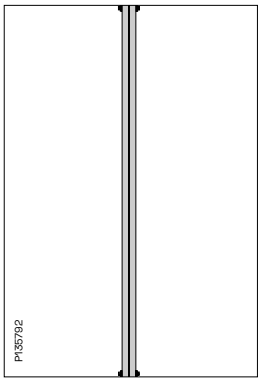

Mount Cantilever arm 50 using T-bolts.



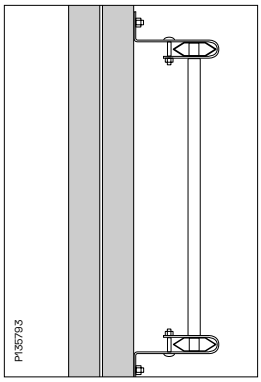

Mount Support bracket 3 using Screw set 20S.



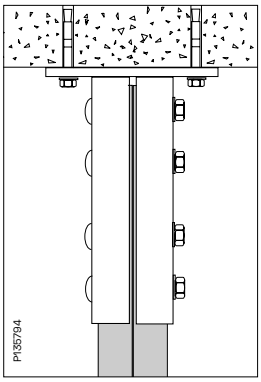

Pendant/Fixing rail can be mounted on beam or wall with Wall bracket 20.




Pendant/Fixing rail 24/20 may be mounted as a riser between the floor and ceiling using 4 Angle brackets 5L and 4 T-bolts.




Cable ladder may be mounted vertically or horizontally on Pendant/ Fixing rail 24/20 using Wall bracket 11/25 or 11/75 and T-bolt.




Pendant base plate 520 can be mounted as a ceiling or floor attachment.

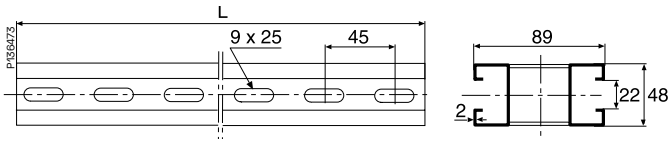
# Use and installation

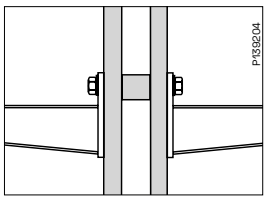
## Pendant/Fixing rail 24/20F



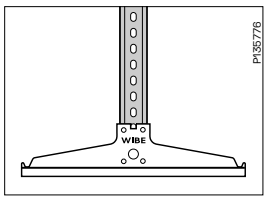
End plug 28J

Pendant/Fixing rail for mounting of support brackets, cantilever arms, etc.

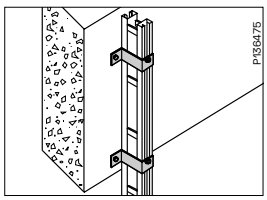



Mount Cantilever arm 50 using T-bolts.

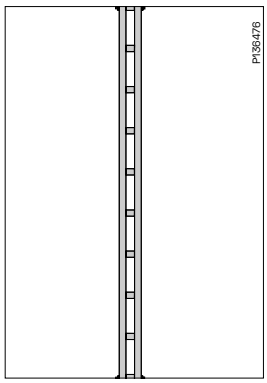



Mount Support bracket 3 using Screw set 2S.

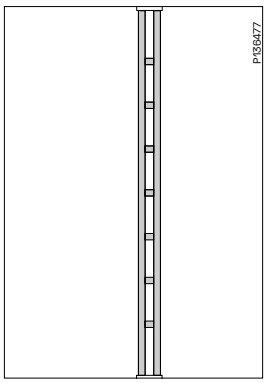



Pendant/Fixing rail 24/20F can be mounted on beam or wall with Wall bracket 20F

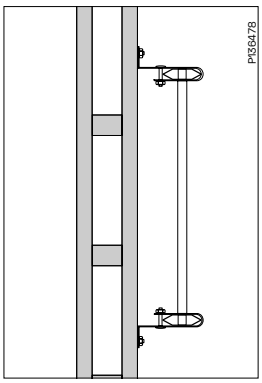
| Type | L mm |
|---|---|
| Pendant/Fixing rail 24/20F-3000 | 2970 |
| Pendant/Fixing rail 24/20F-6000 | 5940 |




Pendant/Fixing rail 24/20F can be mounted as a riser between the ceiling and floor using 4 Angle brackets 5L and 4 T-bolts.




Mount Pendant/Fixing rail 24/20F between a floor and ceiling using 2 Rail fixing supports.



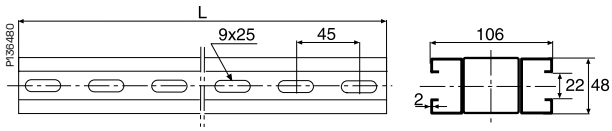

Cable ladder can be mounted vertically or hori- zontally on Pendant/ Fixing rail 24/20F using Wall bracket 11/25 or 11/75.

## Pendant/Fixing rail 24/20FS

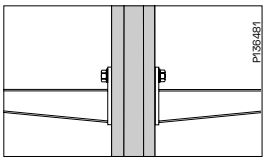


End plug 28F

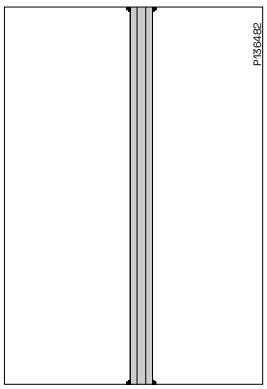
Pendant/Fixing rail for mounting of support brackets, cantilever arms, etc.



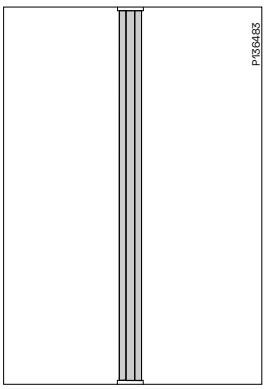

**L = 5940 mm**



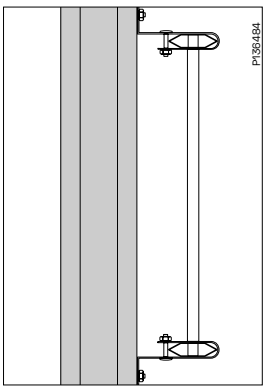

Mount Cantilever arm 50 using T-bolts.




Pendant/Fixing rail 24/ 20FS can be mounted as a riser between the ceiling and floor using 4 Angle brackets 5L and 4 T-bolts.




Mount Pendant/Fixing rail 24/20FS between floor and ceiling using 2 Rail fixing supports.

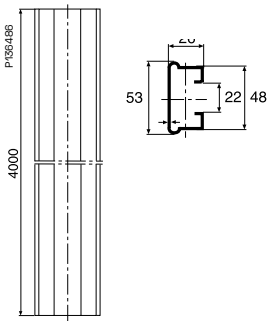


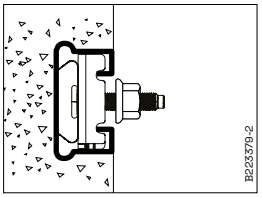

Cable ladders can be mounted vertically or horizontally on Pendant/ Fixing rail 24/20FS using Wall bracket 11/25 or 11/75 and T-bolt.

# Use and installation

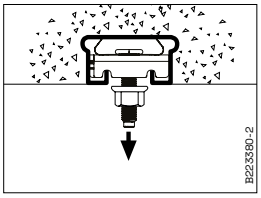
## Fixing rail 24/26x53 for casting-in

Fixing rail for casting-in in wall and ceilings.

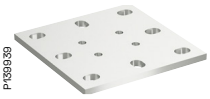

Fixing rail 24/26 x 53 for casting-in in walls and ceilings. Mount cantilever arms with T-bolt 26U.

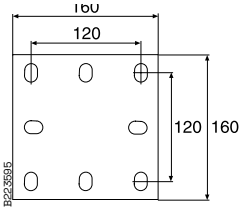


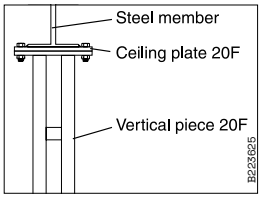

Max. pull-out load: 1000 kg/0.5 m of casting-in fixing rail (Concrete class K200).

## Ceiling plate 20F

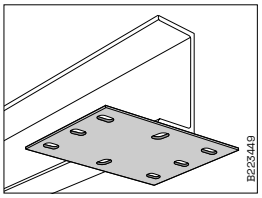
Ceiling plate to be used as a pre-drilled attachment for Vertical piece 20F to a steel member. The ceiling plate is welded in position.



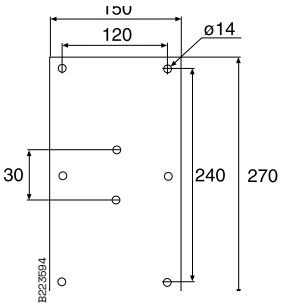

The ceiling plate is weld- ed to the steel member. Permission to weld on the steel member is required. Remove all zinc at the weld. Post- treat using anti-corrosive repair paint.

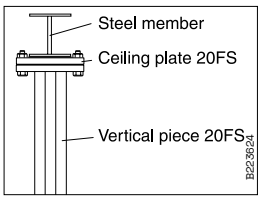



Use Ceiling plate 20F as a fully drilled attachment for Vertical piece 20F against a steel member. Secure the ceiling plate by welding. Remove all zinc at the weld. Post-treat using anti-corrosive repair paint.

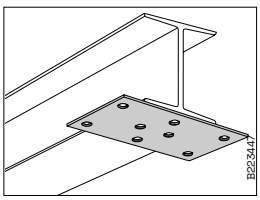
## Ceiling plate 20FS

Ceiling plate 20F is used as a pre-drilled attachment for Vertical piece 20F to a steel member. The ceiling plate is welded in position.


The ceiling plate is welded to the steel member. Permission to weld on the steel member is required. Remove all zinc at the weld. Post-treat using anti-corrosive repair paint.

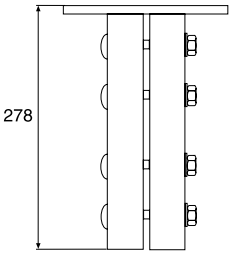


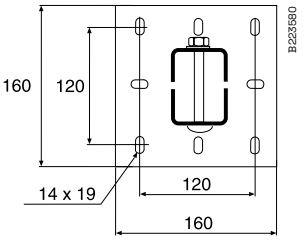

Use Ceiling plate 20FS as a fully drilled attachment for Vertical piece 20FS against a steel member. Secure the ceiling plate by welding. Remove all zinc at the weld. Post-treat using anti-corrosive repair paint.

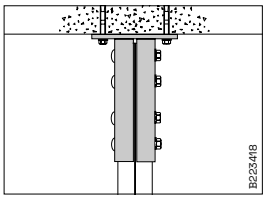
# Use and installation

## Pendant base plate 520

Pendant base plate to be used as a ceiling or floor base plate for Pendant/Fixing rail 24/20 in any desired length.

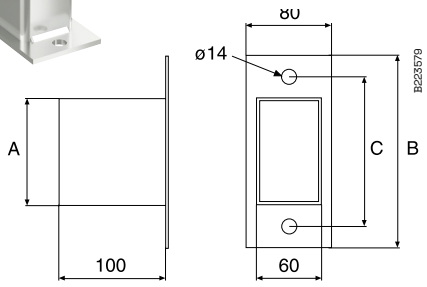



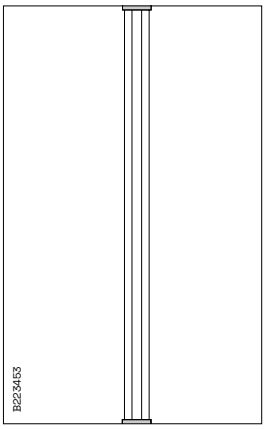

Vertical pieces of the required length can be mounted using Pendant base plate 520 and Pendant/Fixing rail 24/20.

## Rail fixing support 24/20F, 24/20FS

Rail fixing support to be used with Pendant/fixing rails 24/20F and 24/20FS respectively, for mounting between floor and ceiling.





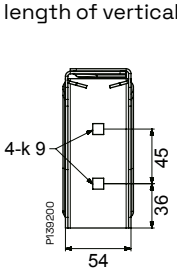



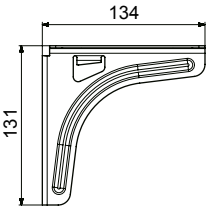

| Type | A mm | B mm | C mm |
|---|---|---|---|
| Rail fix. support 24/20F | 100 | 165 | 135 |
| Rail fix. support 24/20FS | 120 | 185 | 155 |

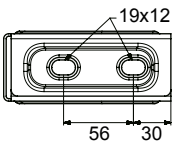
1. Mount one of the rail fixing supports in the ceiling.
2. Adjust the pendant length.
3. Mount the rail fixing support for floor mounting on the pendant.
4. Insert the pendant in the rail fixing support in the ceiling.
5. Attach the bottom rail fixing support securely to the floor.

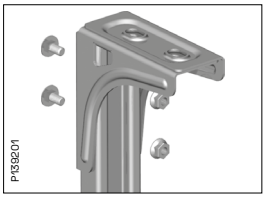
## Ceiling bracket 2Fi

Ceiling bracket to be used on Pendant/fixing rail 24/48 to achieve the desired length of vertical pieces.

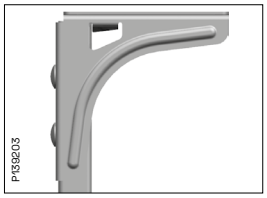





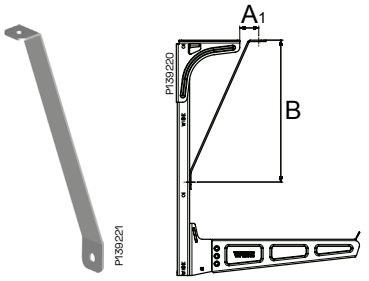



Ceiling bracket 2Fi and Pendant/Fixing rail 24/48, mounted together with 2 Screw sets 22S, are used when other lengths are required than those available for Vertical piece 2Fi.

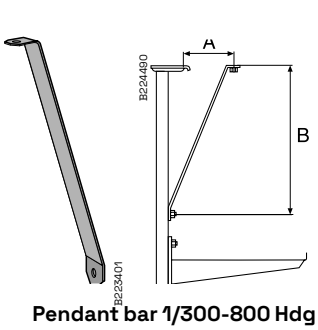
# Use and installation

## Pendant bar 1

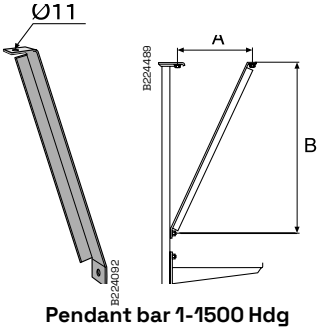
Pendant bar to be installed in order to reduce the deflection of heavily loaded vertical pieces. Installed with T-bolt and Expansion bolt.




**Pendant bar 1/300-800 Pre-galv.**

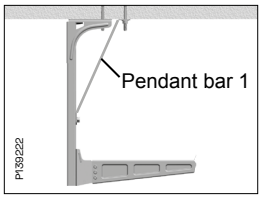



**Pendant bar 1/300-800 Hdg**

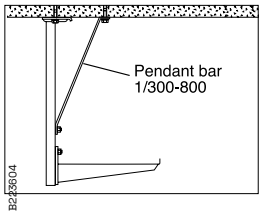



**Pendant bar 1-1500 Hdg**

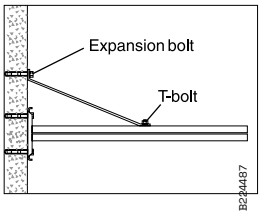
| Type | A mm[1] | A mm | B mm |
|---|---|---|---|
| 1/300 | 40 | 80 | 300 |
| 1/500 | 40 | 130 | 500 |
| 1/800 | 125 | 215 | 800 |
| 1/1500 | Varies | Varies | Varies |



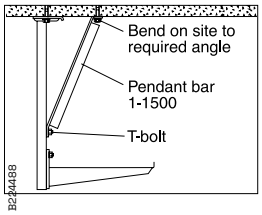

To reduce deflection of Vertical piece 2Fi at heavy loads on Cantilever arm 50i the Pendant bar 1 can be used. Install with T-bolt and Expansion bolt.




To reduce deflection of Vertical piece 2F at heavy loads on Cantilever arm 50 the Pendant bar 1 can be used. Install with T-bolt and Expansion bolt.



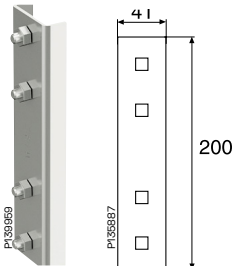

To be mounted to strengthen Vertical piece 20 when mounted horizontally. Use T-bolt and Expansion bolt.



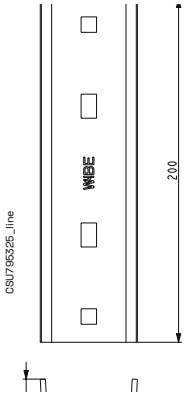

Mount this stay to reduce deflection of long Vertical pieces 2F, 20 and 20F.

## Pendant joint 2J, 2FJ and 20J

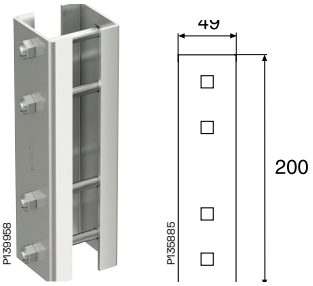
Pendant joint to be used for joining pendant/fixing rails and vertical pieces.



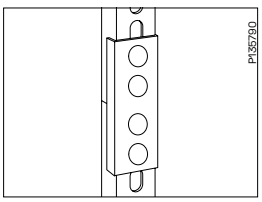

**Pendant joint 2J**



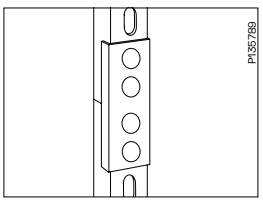

**Pendant joint 2FJ**



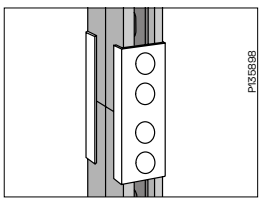

**Pendant joint 20J**




Pendant joint 2J, used for joining of Vertical piece 2 and Pendant/ Fixing rail 24/34.




Pendant joint 2FJ, used for joining of vertical piece 2F.



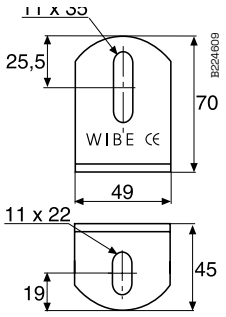

Pendant joint 20J, used for joining of Vertical piece 20 and Pendant/ Fixing rail 24/20. Only for symmetrical loading.

## Angle bracket 5L and 5LS

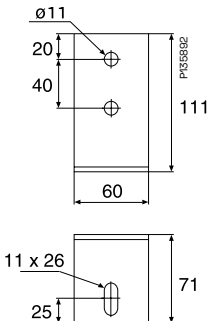
Angle brackets used when assembling pendant/fixing rails to frames for switching cabinets and elecrical control centres and for fixing an upright between floor and ceiling. Assembled with a T-bolt. Angle bracket 5L is also used for steel wire install- ation in ceilings.


**Angle bracket 5L**

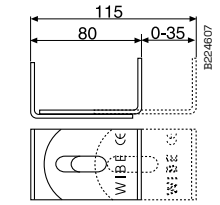

**Angle bracket 5LS**



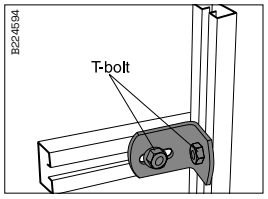

**Angle bracket 5L**

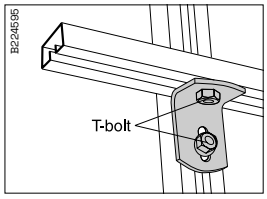



**Angle bracket 5LS**

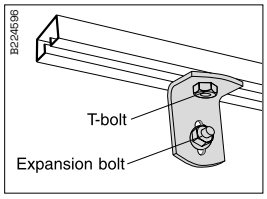



**Adjustability 5L**

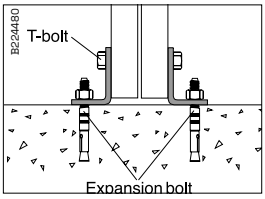


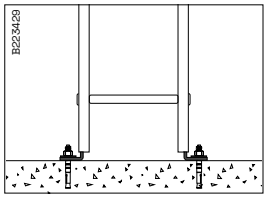

Installation examples for installation of pendant/ fixing rails to different frameworks for installation of control panels, electric distribution boards, etc. Angle bracket **5L** is used.



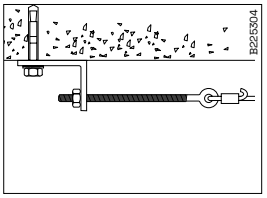

Mounting of a pendant/ fixing rail on a wall. Use Angle bracket **5L** or **5LS**.



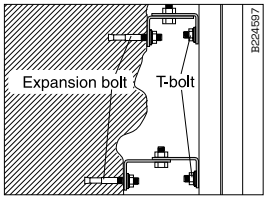

Mounting of a pendant/ fixing rail against floor with Angle bracket **5L** or **5LS**.




Angle bracket **5L** can be mounted inside the ladder profile and thus be used as an end connection against wall or floor.




Angle bracket **5L** is installed in ceiling with Expansion bolt or concrete screw. Max. permitted loading 600 kg (6 kN).

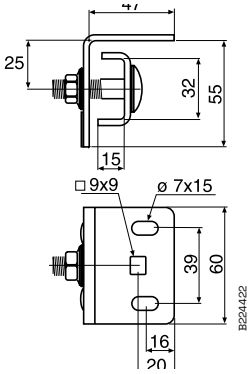



**5LS** can also be mounted as support behind pen- dant/ fixing rails to com- pensate for irregularities in, for example, con-crete or mountain walls.

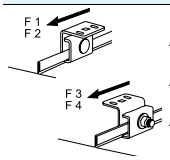
# Use and installation

## Combi bracket 53


Combi bracket to be used for the mounting of cable ladders and trays on seamed roofing sheets, etc. To be combined with plastic insulating plate 54.

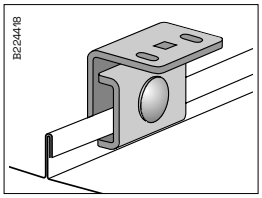



**Breaking load***

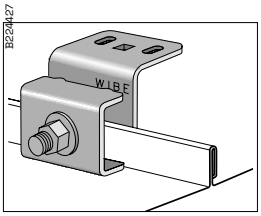
| | Type of roofing sheet | Insulating plate | Permitted load |
|---|---|---|---|
|   | Bandsheet Prelac | No | F1=100 kg |
| | Copper sheeting | Yes | F2=50 kg |
| | Bandsheet Prelac | No | F3=100 kg |
| | Copper sheeting | Yes | F4=50 kg |

* Loading values and fixing of roof sheet - follow the supplier's recommendations

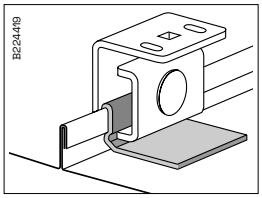
**Test have been made of:**
Bandsheet Prelaq BLX t=0.6 SSAB tunnplåt Copper sheeting annealed SS 5015-80 t=0.6 Tightening torque at test=60Nm



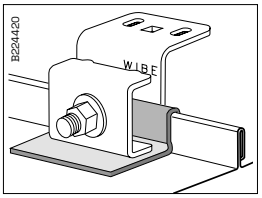

Combi bracket 53 mounted on seamed roofing sheet.



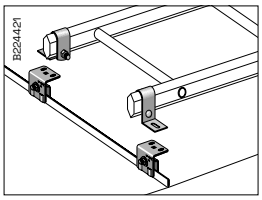

Alternative mounting of Combi bracket 53.



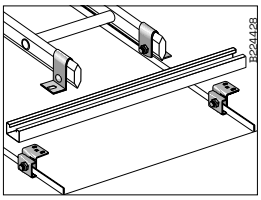

In order to avoid contact between Combi bracket 53 and copper sheeting, Insulating plate 54 must be used.



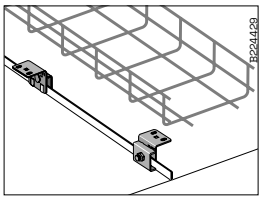

Alternative mounting of Combi bracket 53 and Insulating plate 54.



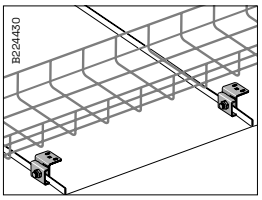

Cable ladder mounted across the seams of the roofing sheets with Combi bracket 53, Wall bracket 11/25 and Screw set 22S.




Cable ladder mounted along the seams of the roofing sheets with Combi bracket 53, Wall bracket 11/25, Screw set 22S, Pendant/ Fixing rail 24/48 and T-bolt 26U.



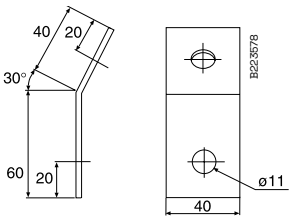

Mesh tray mounted along the seams of the roofing sheets with Combi bracket 53 and accessories from the Mesh tray programme.

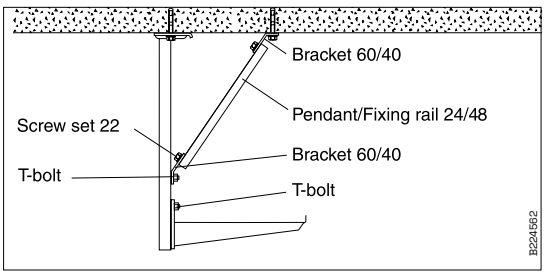



Mesh tray mounted across the seams of the roofing sheets with Combi bracket 53 and accessories from the Mesh tray programme.

## Bracket 60/40


Bracket to be used together with Pendant/fixing rail 24/48 to reduce the deflection of long vertical pieces.

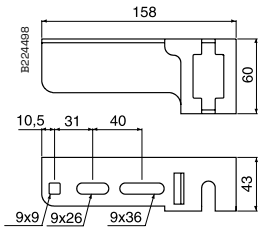


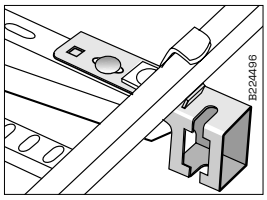




Use Bracket 60/40 together with Pendant/Fixing rail 24/48 to reduce the deflection of long Vertical pieces 2F, 20, 20F or 20FS. Cut the pendant/fixing rail to a suitable length on site.

## Rod bracket 82


Rod bracket to be used together with Cantilever arm 50, in combination with threaded rod support.

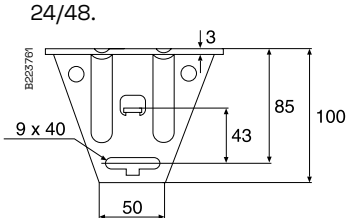


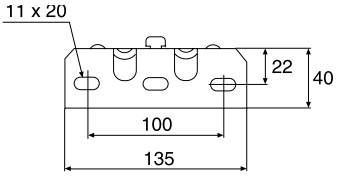



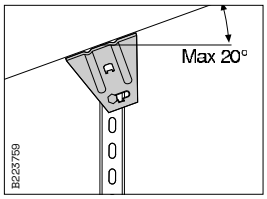

Rod bracket 82 mounted on Cantilever arm 50. Screw set 22S and Profile clamp 42 are to be used.

## Ceiling bracket 5

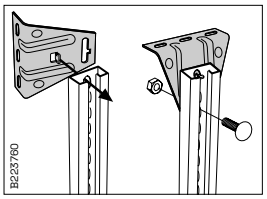

Ceiling bracket to be used for installations with Pendant/Fixing rails 24/34 and 24/48.



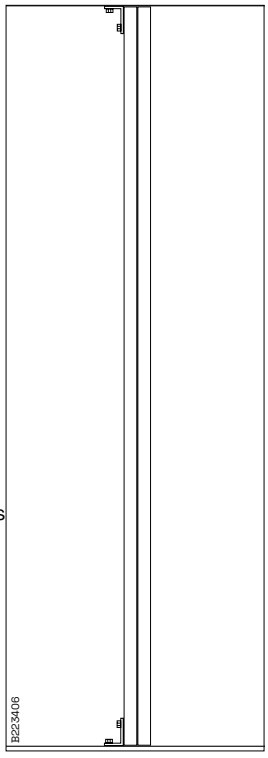



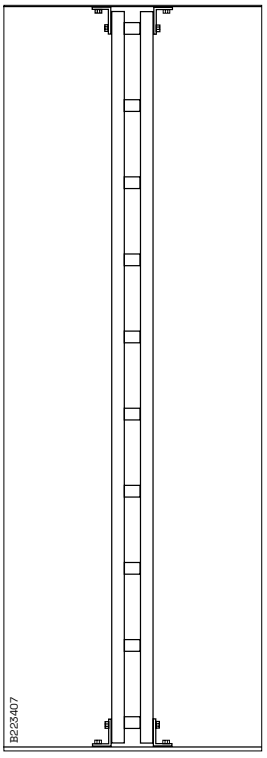

Using Pendant/Fixing rail 24/34 or 24/48, 1 Ceiling bracket 5 and 1 Screw set 22S it is possible to make a vertical piece that can be installed at an angle of up to 20°. Breaking load for rail 34 = 1000 kg (10 kN). Breaking load for rail 48 = 1200 kg (12 kN).




Mount Ceiling bracket 5 to the back of the pendant/ fixing rail by turning the ceiling bracket 90° and inserting the tab into the hole in the rail. Then turn the ceiling bracket back and lock it in the required position using 1 Screw set 22S. When mounting it at a horizontal ceiling, lock the screw in the slot recess for better lateral stability. Ceiling bracket 5 can be tilted max. 20°.




Pendant/Fixing rail 24/20 can, using 2 Ceiling brackets 5 and 2 T-bolts, be mounted between floor and ceiling (see also Angle bracket 5L).

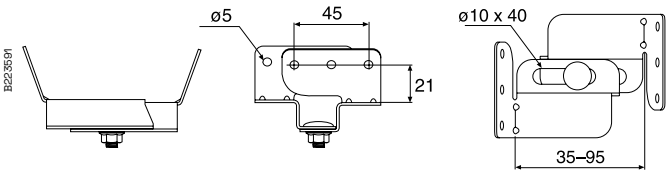


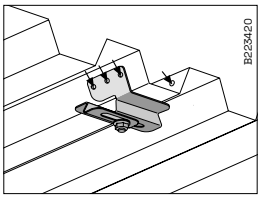

Pendant/Fixing rail 24/20F can, using 4 Ceiling brackets 5 and 4 T-bolts, be mounted between floor and ceiling (see also Angle bracket 5L).

# Use and installation

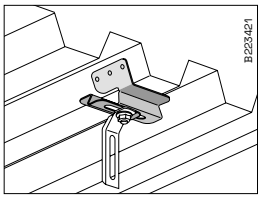
## Ceiling bracket 5TPA


Ceiling bracket with telescopic function, to be used for mounting of various sizes of trapezoid plates.

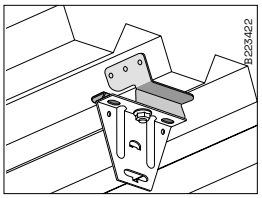



Ceiling bracket 5TPA can be mounted in trapezoid plate with blind rivets or suitable screws. The bracket is adjustable from 35 to 95 mm.

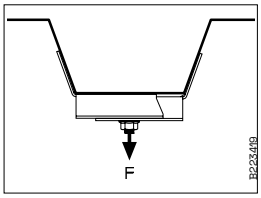



Pendant attachment W21 or Tube pendant attachment W73 (Wibe Cable Tray) can be mounted in Ceiling bracket 5TPA with the existing screw.

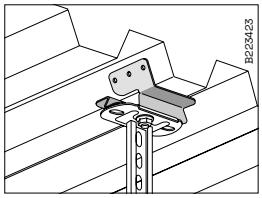



Ceiling bracket 5 or Ceiling attachment W31 can be mounted with the existing screw.

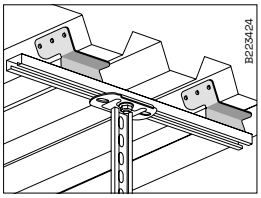
**Breaking load**



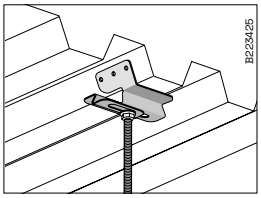

Ceiling bracket 5TPA can be loaded with F=150 kg without deformation. For loading figures for thin plate or fixing elements, follow suppliers recommendations.




Vertical piece 2 or 2F can be mounted with the existing screw.



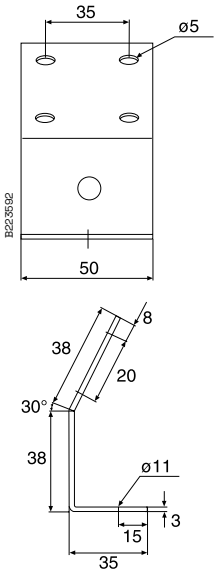

Install Mounting rail 40 between 2 Ceiling brackets 5TPA if the vertical piece must be adjusted sideways.

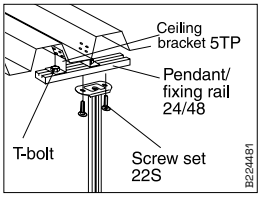



Pendant W76 M8 or M10 installed in Ceiling bracket 5TPA.

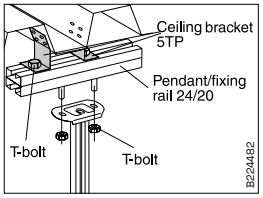
## Ceiling bracket 5TP


Ceiling bracket to be used in trapezoidal sheeting for installations of Pendant/ Fixing rail 24/48.




In ceilings with trapezoidal sheeting, mount Vertical piece 2, 2F or 20 using 2 Ceiling brackets 5TP, Pendant/ Fixing rail 24/48, 2 T-bolts and Screw set 22S.

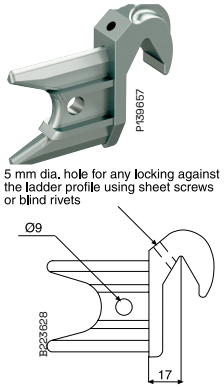



Alternatively Pendant/ Fixing rail 24/20 may be used. This will require the use of 4 T-bolts.

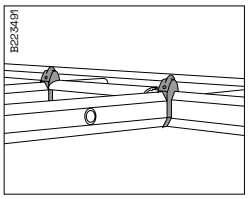
# Use and installation

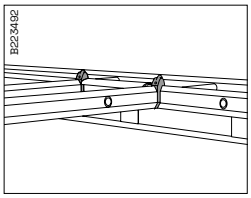
## Fixed take-off hook 4

Fixed take-off hook to be used for 90° horizontal branches.

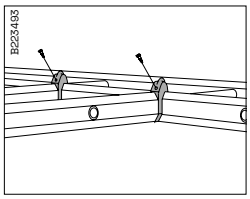



Fixed take-off hook 4 is used at 90° horizontal branches. Coupling 22 can also be used for straight angle formation.

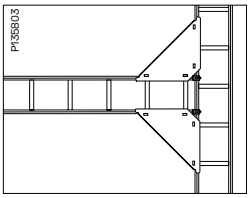



KHZSP, KHZSPZ+, KHZPS, KHZ and KHZP can also be used to form 90° angles from KHZV/KHZPV using Fixed take-off hook 4. Mount Profile protection 28P.



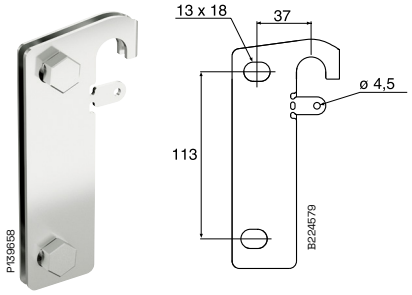

5 mm dia. hole for any locking against the section using sheet screws or blind rivets.

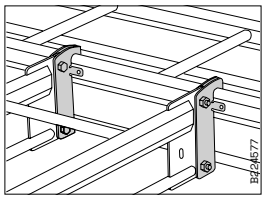



Angle plate 33 is always recommended at horizontal branches.

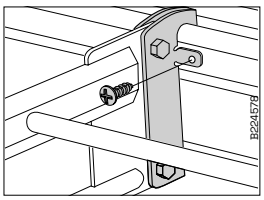
## Take-off hook 47

Take-off hook to be used on cable ladders KHZV and KHZPV to make 90° branches.



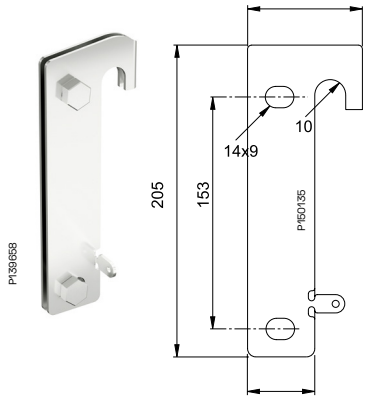

Use Take-off hook 47 to make 90° branches.

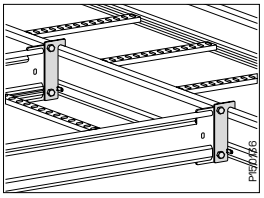



The extra hole, Ø 4.5, is to be used when earthing is demanded or if vertical locking of the ladder is needed. A self-drilling screw must be used.

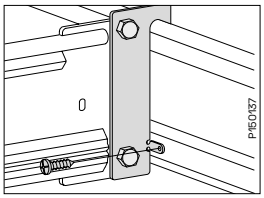
## Take-off hook 20C

Take-off hook to be used on cable ladders KHZP 20C range to make 90° branches. Screw M12 and nuts are included.



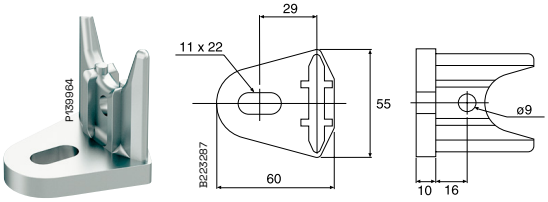

Use Take-off hook 20C to make 90° branches.

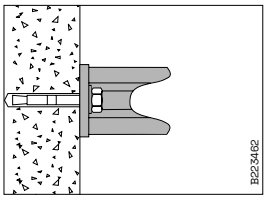



The extra hole, Ø 4.5, is to be used when earthing is demanded or if vertical locking of the ladder is needed. A self-drilling screw must be used.

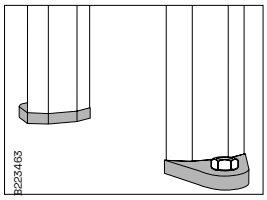
## End connection 10

End connection to be used for the connection of a ladder vertically to a floor, or horizontally to a wall.

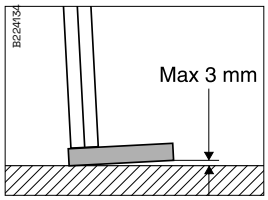



The End connection 10 is mounted at the ladder end vertically against floors or horizontally against walls.




Mount the End connection 10 using Expansion bolts.

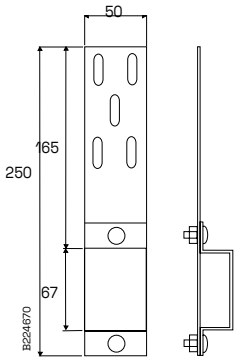


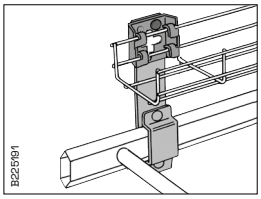

Max. tilt permitted = 3 mm before tightening the screw.

# Use and installation

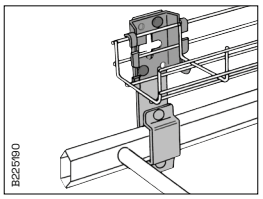
## Combi Fitting B21


Combi-fitting to be used when mounting mesh trays onto cable ladders.



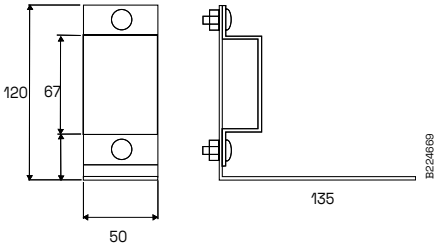

Defen Mesh tray 53 and 75 is mounted onto Combi Fitting B21 with Bracket B4 mini Bolt and Nut B13.

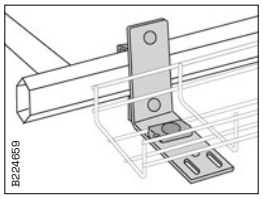



Defem Mesh tray 120 is mounted onto Combi Fitting B21 with Bracket B4 Bolt and Nut B13.

## Combi Fitting B21 90 degree

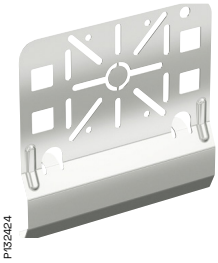

Combi-fitting to be used when mounting mesh trays onto cable ladders.

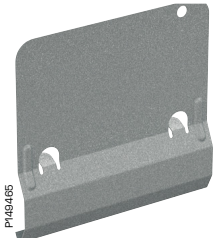


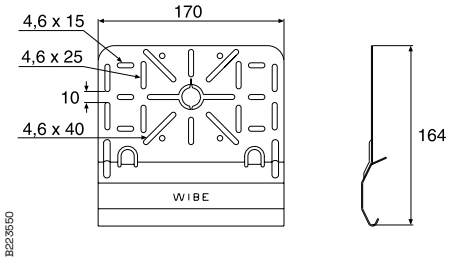

Defem Mesh tray 53, 75 and 120 is mounted onto Combi Fitting B21 90° with 1 Fitting B2.1 Bolt and Nut B13.

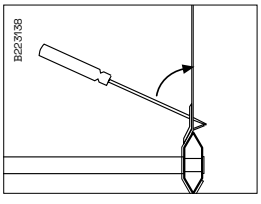
## Junction box plate 35S



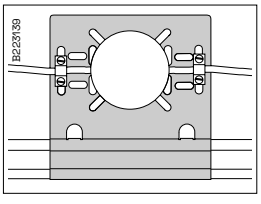




Installed upright or hanging from the profile. Locked with locking tabs.

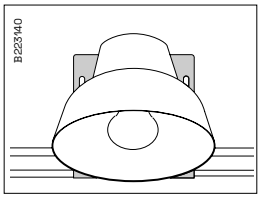



Bend the tab towards the ladder section by using a screwdriver as a lever for mounting junction box plates.

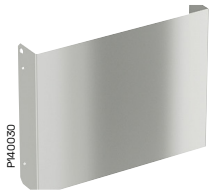



Junction box plates can be mounted in standing or hanging positions on the side sections Strain-relief may be provided using the outermost holes and clamps or strips.

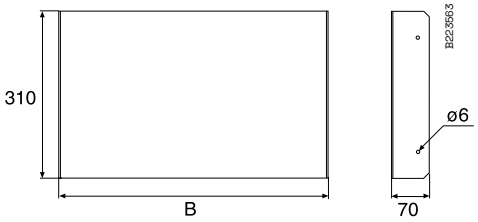


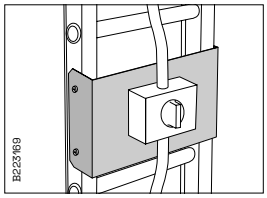

Light fittings can also be mounted on junction box plates.

## Installation plate 61




Installation plate to be used on vertical cable ladder installations for mounting of terminal boxes, contact breakers, etc.

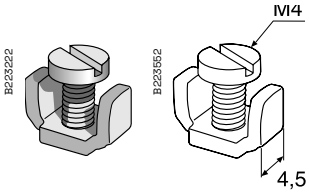


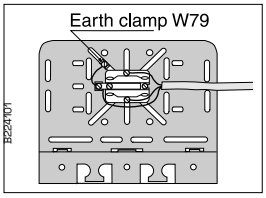

Used on vertical cable ladder installations for mounting of terminal boxes, contact breakers etc. Mount with selftapping screw ST4.2 in the side profile.

| Type | B mm |
|---|---|
| Installation plate 61-200 | 200 |
| Installation plate 61-300 | 300 |
| Installation plate 61-400 | 400 |
| Installation plate 61-500 | 500 |
| Installation plate 61-600 | 600 |

## Earth clamp W79



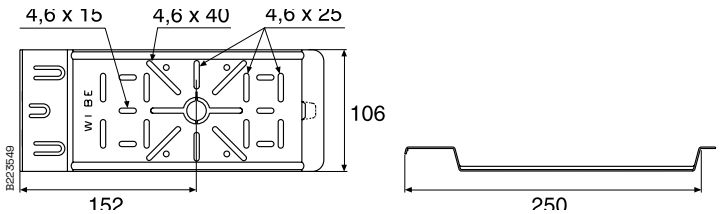

The earth clamp is used when protective earthing of the junction box plate is required.

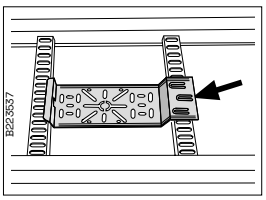



Earth clamps are designed for use when protective earthing of the mounting plate is required for mounting apparatuses as per relevant heavy current directives. The oblong holes in the junction box plate (mounting plate) permit movement of the earth clamp so that it always comes under the casing of the apparatus. If the apparatus's earth clamp is not approved for joining protective earth conductors, it must pass unbroken through the apparatus's earth clamp to the junction box earth clamp (see the fig.).

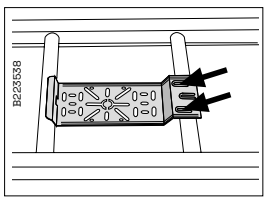
## Junction box plate 35P


Junction box plate with holes, to be installed between rungs. Locked with appropriate locking tabs for each ladder. For junction boxes, electric light fittings, etc.



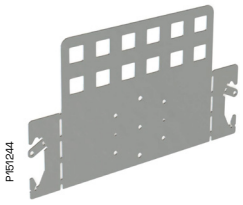

Mount junction box plates between the ladder rungs. On KHZSP, KHZSPZ+, KHZPS, KHZP and KHZPV attach junction box plates by bending the central tab into the rung perforation using a screwdriver or suchlike.

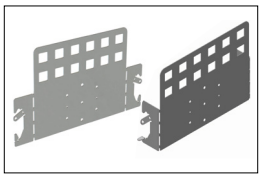



Mount junction box plates on KHZ and KHZV by bending the two outer tabs towards the round rung using a screwdriver or suchlike

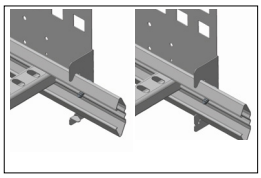
# Use and installation

## Junction box plate 12xRJ45 Actassi S-one

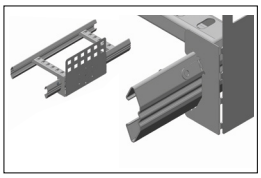


Junction box plate delivered flat, to be bended on site.



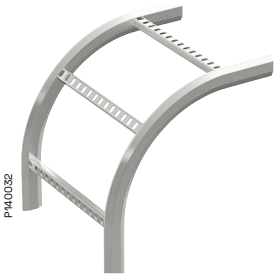
Bend the ladder beam interface part 90° to the inside. Bend the optional fixation lips to the outside to easily position the junction box plate on the ladder beam.

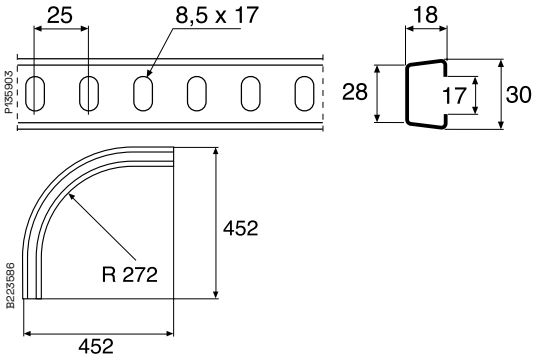


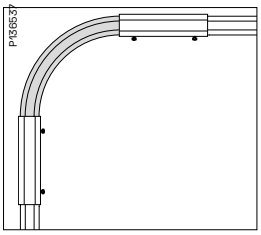
Optional the junction box plate can be fixed to the ladder beam by using self drilling screws.

## Riser 18

Riser piece to be fitted to the cable ladders by using Joint 21.



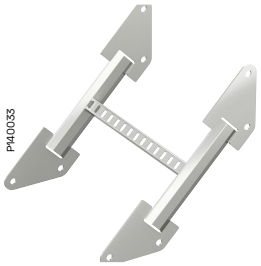



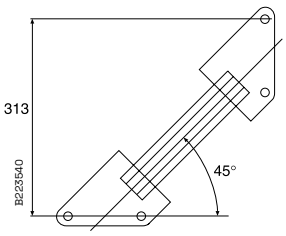



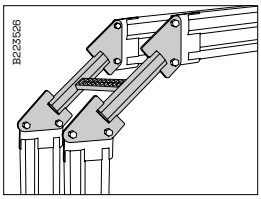

Join the cable ladders to Riser 18 using Joint 21.

## Riser coupling 49

Coupling to be used as a self-supporting vertical coupling of cable ladders KHZV/KHZPV. Two screws M12 and nuts are needed.



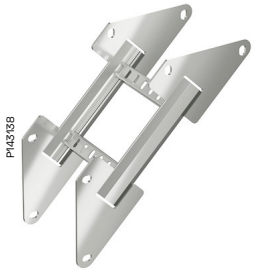



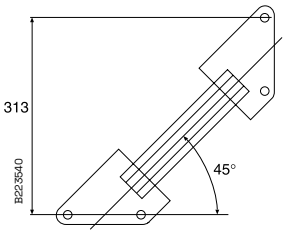



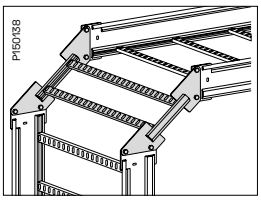

Mount Riser coupling 49 to form a 90° branch on KHZV/KHZPV using 2 Screw sets M12. This provides a large radius for cables.

## Riser coupling 20C

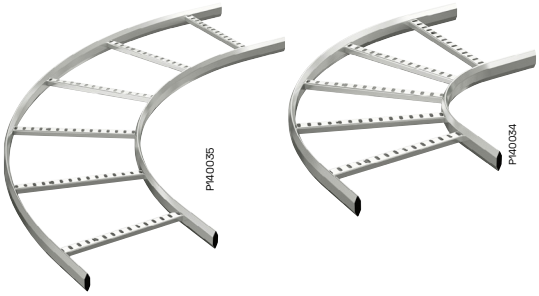
Coupling to be used as a self-supporting vertical coupling of cable ladders KHZP 20C range. Two screw sets M12 are needed.



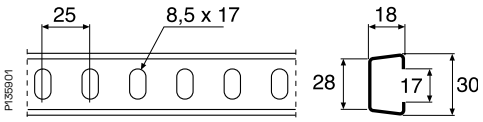



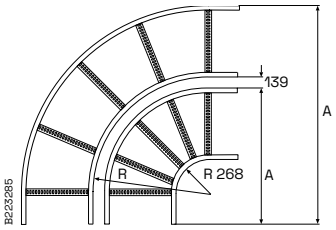

Mount Riser coupling 20C to form a 90° branch on KHZP 20C using 2 Screw sets M12. This provides a large radius for cables.

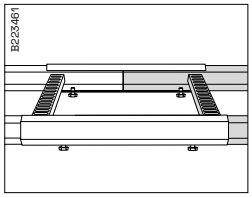



## 90° bend 15, interior and exterior

Interior bend piece to be fitted to the cable ladders by using Joint 21, creating a 90° bend. Inner radius 268 mm.
Exterior bend piece to be fitted to the cable ladders by using Joint 21, creating a 90° bend.



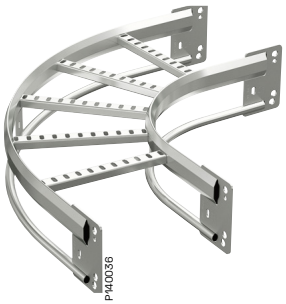




Join cable ladders to 90° bend using Joint 21.

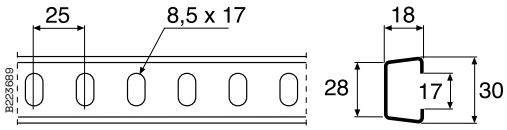
| Type | R mm | A mm |
|---|---|---|
| **Interior** | | |
| 90° bend 15/150 | 268 | 547 |
| 90° bend 15/200 | 268 | 597 |
| 90° bend 15/300 | 268 | 697 |
| 90° bend 15/400 | 268 | 797 |
| 90° bend 15/500 | 268 | 897 |
| 90° bend 15/600 | 268 | 997 |
| 90° bend 15/800 | 268 | 1197 |
| 90° bend 15/1000 | 268 | 1397 |

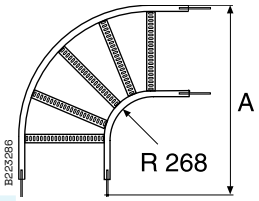
| Type | R mm | A mm |
|---|---|---|
| **Exterior** | | |
| 90° bend 15/150 | 554 | 703 |
| 90° bend 15/200 | 604 | 933 |
| 90° bend 15/300 | 704 | 1133 |
| 90° bend 15/400 | 804 | 1333 |
| 90° bend 15/500 | 904 | 1533 |
| 90° bend 15/600 | 1004 | 1733 |
| 90° bend 15/800 | 1204 | 2133 |
| 90° bend 15/1000 | 1404 | 2533 |

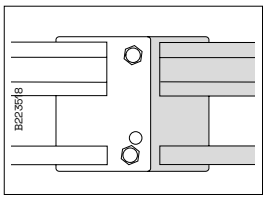



## 90° bend 55 interior

Interior bend piece to be fitted to cable ladders KHZV and KHZPV, creating a 90° horizontal bend.



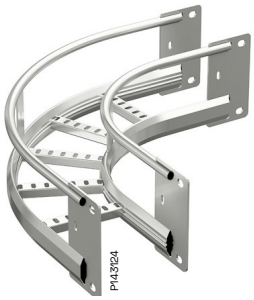




For joining to KHZV and KHZPV, use Screw set M12

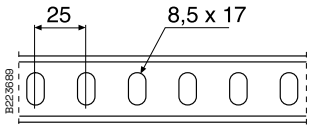
| Type | A mm |
|---|---|
| 90° bend 55/200 | 625 |
| 90° bend 55/300 | 725 |
| 90° bend 55/400 | 825 |
| 90° bend 55/500 | 925 |
| 90° bend 55/600 | 1025 |
| 90° bend 55/800 | 1225 |
| 90° bend 55/1000 | 1425 |

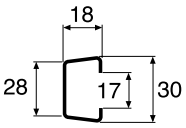
# Use and installation

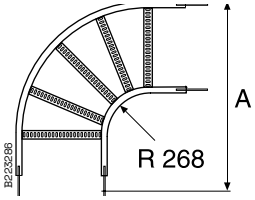
## 90° bend 20C, interior

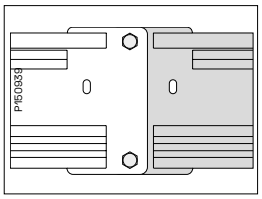



Interior bend piece to be fitted to cable ladders KHZP 20C range, creating a 90° horizontal bend.



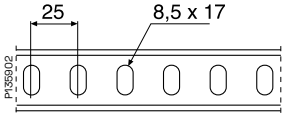



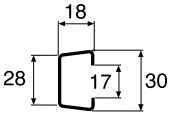

For joining to KHCP 20C/KHZV and KHZPV, use Screw set M12

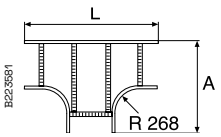
| Type | A mm |
|---|---|
| 90° bend 20C/200 | 625 |
| 90° bend 20C/300 | 725 |
| 90° bend 20C/400 | 825 |
| 90° bend 20C/500 | 925 |
| 90° bend 20C/600 | 1025 |
| 90° bend 20C/800 | 1025 |
| 90° bend 20C/1000 | 1425 |

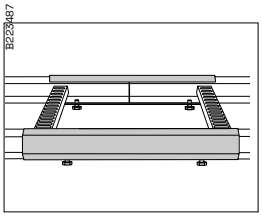
## T-junction 16


T-junction piece to be fitted to the cable ladders by using Joint 21.



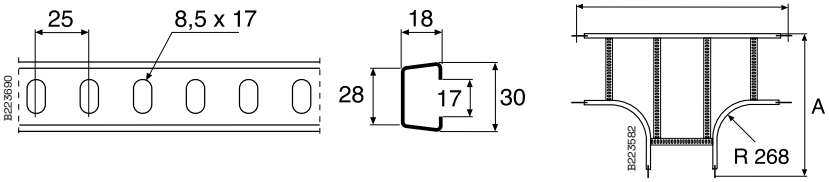



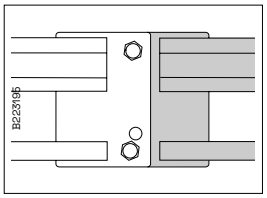

Join the cable ladders to T-junction 16 using Joint 21.

| Type | A mm | L mm |
|---|---|---|
| T-junction 16/150 | 547 | 944 |
| T-junction 16/200 | 597 | 997 |
| T-junction 16/300 | 697 | 1097 |
| T-junction 16/400 | 797 | 1197 |
| T-junction 16/500 | 897 | 1297 |
| T-junction 16/600 | 997 | 1397 |
| T-junction 16/800 | 1197 | 1597 |
| T-junction 16/1000 | 1397 | 1797 |


## T-junction 56

T-junction piece to be fitted to the cable ladder KHZV or KHZPV by using screw set M12.



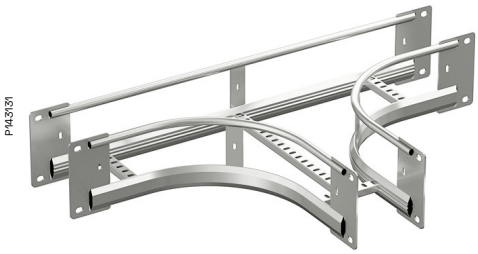



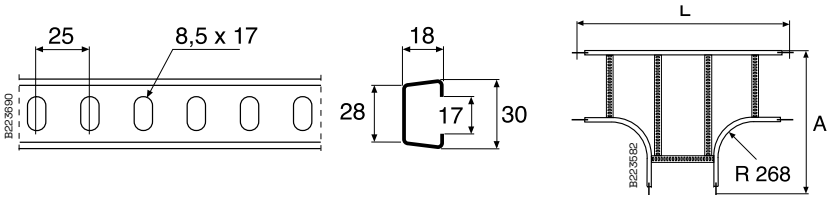

For joining to KHZV and KHZPV, use Screw set M12.

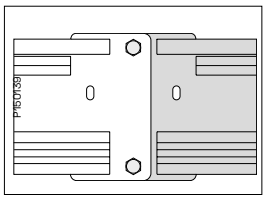
| Type | A mm | L mm |
|---|---|---|
| T-junction 56/200 | 625 | 1050 |
| T-junction 56/300 | 725 | 1150 |
| T-junction 56/400 | 825 | 1250 |
| T-junction 56/500 | 925 | 1350 |
| T-junction 56/600 | 1025 | 1450 |
| T-junction 55/800 | 1225 | 1650 |
| T-junction 56/1000 | 1425 | 1850 |

## T-junction 20C

T-junction piece to be fitted to the cable ladder KHZP 20C range by using screw set M12.



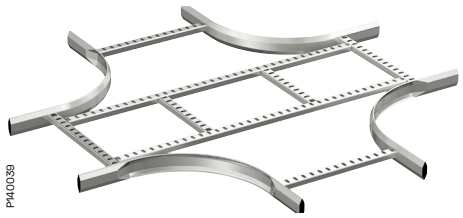




For joining to KHCP 20C/KHZV and KHZPV, use Screw set M12.

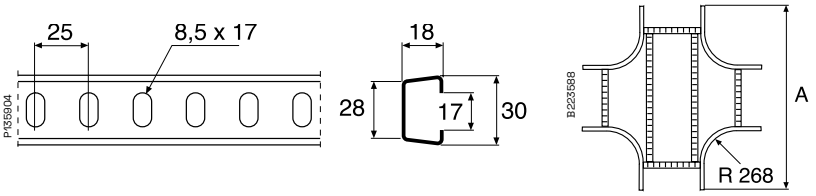
| Type | A mm | L mm |
|---|---|---|
| T-junction 20C/200 | 625 | 1050 |
| T-junction 20C/300 | 725 | 1150 |
| T-junction 20C/400 | 825 | 1250 |
| T-junction 20C/500 | 925 | 1350 |
| T-junction 20C/600 | 1025 | 1450 |
| T-junction 20C/800 | 1225 | 1650 |
| T-junction 56/1000 | 1425 | 1850 |

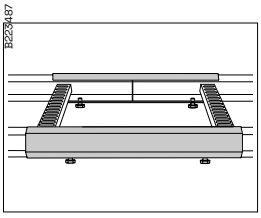
# Use and installation




## X-junction 17

X-junction piece to be fitted to the cable ladders by using Joint 21.



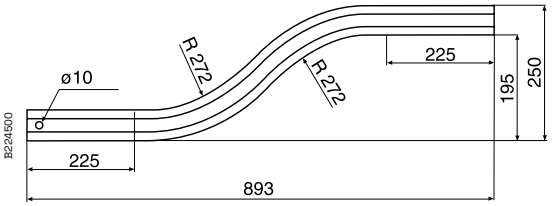



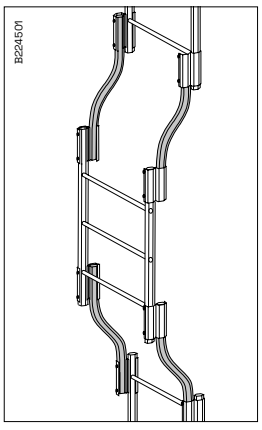

Join the cable ladders to X-junction 17 using Joint 21.

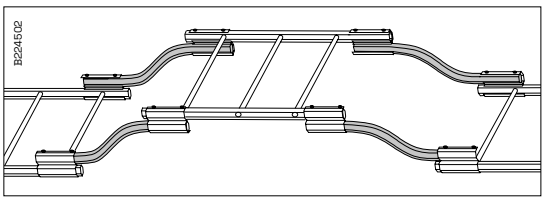
| Type | A mm |
|---|---|
| X-junction 17/150 | 547 |
| X-junction 17/200 | 997 |
| X-junction 17/300 | 1097 |
| X-junction 17/400 | 1197 |
| X-junction 17/500 | 1297 |
| X-junction 17/600 | 1397 |
| X-junction 17/800 | 1597 |
| X-junction 17/1000 | 1797 |

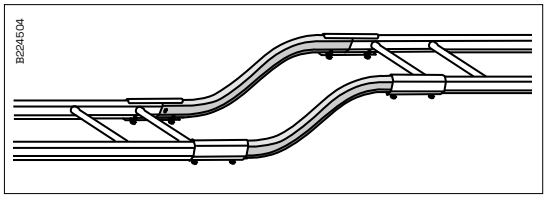

## S-bend 67

S-bend piece to be used as a transition between cable ladders mounted on different levels. Can be mounted both vertically and horizontally.

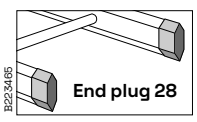


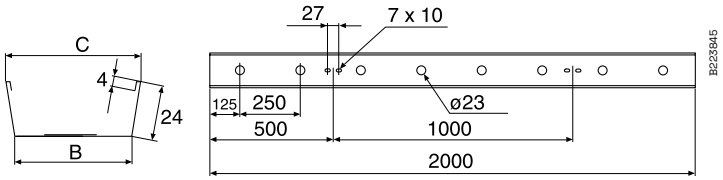




S-bend 67 can be mounted vertically or horizontally between cable ladders by using Dropper joint 32 or Joint 21.

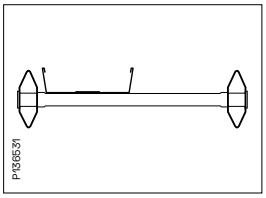


## Tele-conduit 36 with knock-out holes

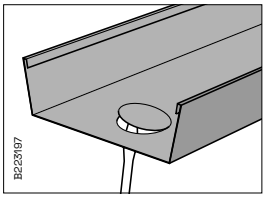
Tele-conduit to be used where a separate tray is required for low-tension cables. Knock-out holes in the bottom of the channel permit the cables to pass through.

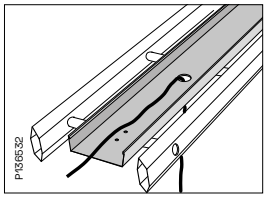

| Type | B mm | C mm |
|---|---|---|
| Tele-conduit 36/50 | 42 | 50 |
| Tele-conduit 36/100 | 92 | 100 |
| Tele-conduit 36/200 | 192 | 200 |



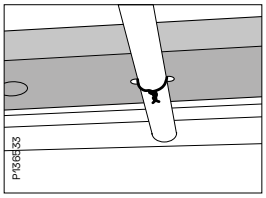

Mount Tele-conduit 36 whenever a special channel is required for low tension lines.



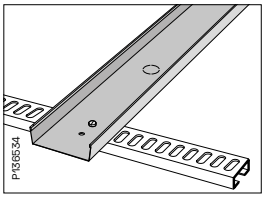

Whenever you wish to make a hole to let a cable through, press the knock- out piece from below using a screwdriver or suchlike




In the event of special needs, a sealing sleeve 22.5 or corresponding may be mounted in the hole.



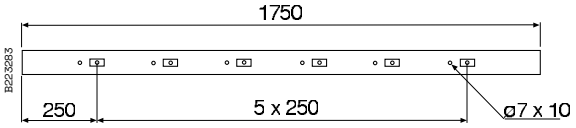

Attach Tele-conduit 36 onto KHZ and KHZV by tying with wire round rungs.

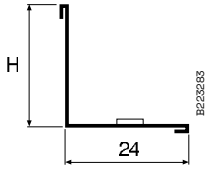



Attach Tele-conduit 36 to KHZSP, KHZSPZ+, KHZPS, KHZP and KHZPV using Screw set W34 through the rung perforations.

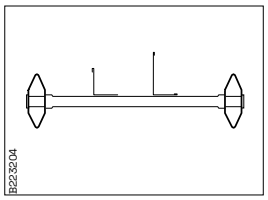
## Dividing strip 39

Dividing strip to be used to separate low-voltage and high-voltage cables.

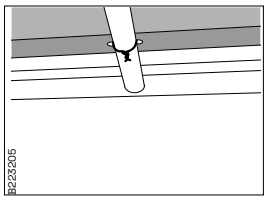



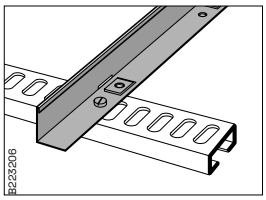

| Type | H mm |
|---|---|
| Dividing strip 39/24 | 24 |
| Dividing strip 39/55 | 55 |



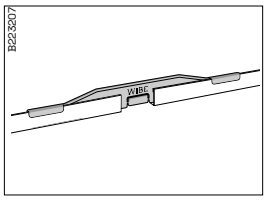

Mount one or more Dividing strips 39 to separate low and high tension cables.




Attach Dividing strip 39 to KHZ and KHZV by lashing around the rungs.




Attach Dividing strip 39 to KHZSP, KHZSPZ+, KHZPS, KHZP and KHZPV using Screw set W34 through the rung perforations.

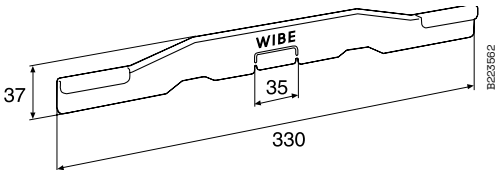


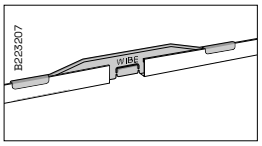

It is advisable to join dividing strips using Distance piece W39.

# Use and installation

## Distance piece W39

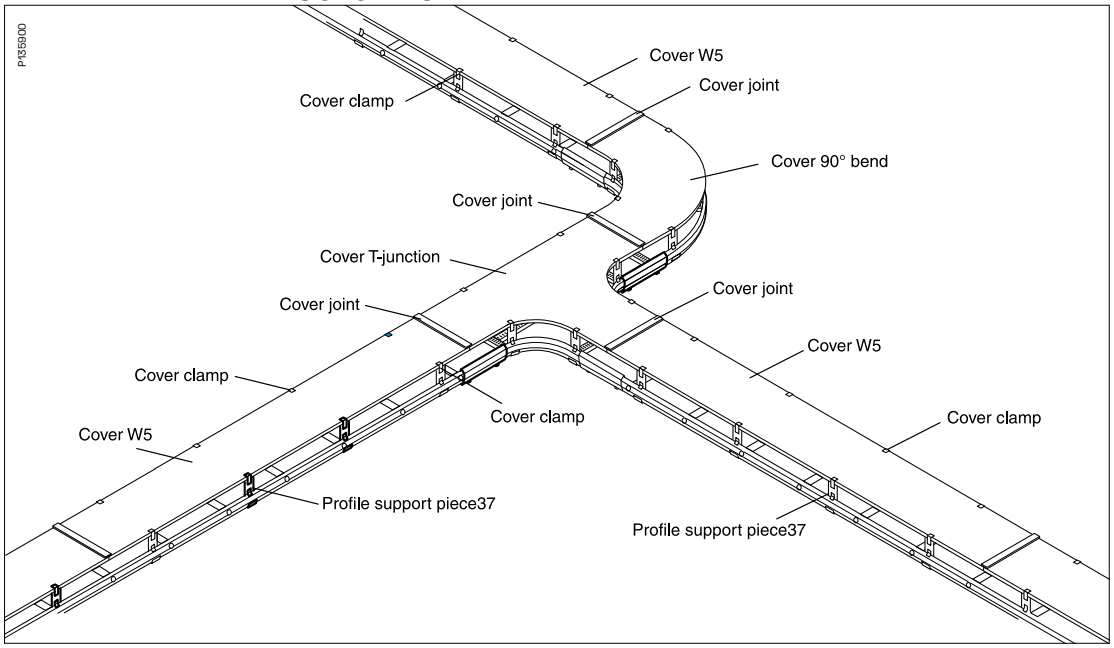

Distance piece to be used for the joining of Dividing strips 39.



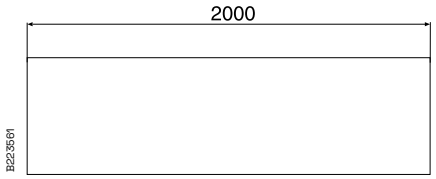

Mount one or more Dividing strips 39 to separate low and high tension cables.

## Cover W5

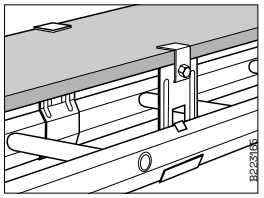




Cover to be used to protect the cable runs from dust, dirt, liquids, etc. Outdoors, it protects against rain and sun. Suitable for all cable ladders.




| Type | Ladder width mm | B mm |
|---|---|---|
| Cover W5 - 150 | 150 | 151 |
| Cover W5 - 200 | 200 | 201 |
| Cover W5 - 300 | 300 | 301 |
| Cover W5 - 400 | 400 | 401 |
| Cover W5 - 500 | 500 | 501 |
| Cover W5 - 600 | 600 | 601 |
| Cover W5 - 800 | 800 | 801 |
| Cover W5 - 1000 | 1000 | 1001 |

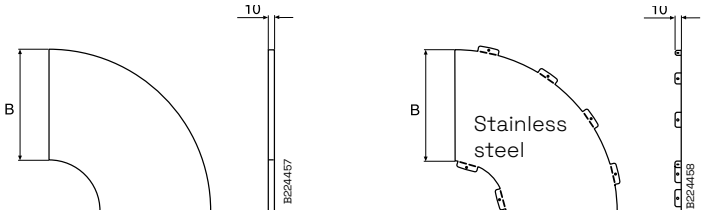



Mount covers to protect the cable routes from dust, waste, liquids, etc. Outdoors, covers protect against rain and sun. All Wibe cable ladders can be fitted with covers. Mount covers using Profile support piece 37 and Cover clamp.

# Use and installation

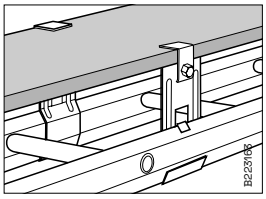
## Cover 90° bend


Cover to be used for 90⁰ interior bends. To be installed with a Profile support piece 37, Cover clamp and Cover joint.

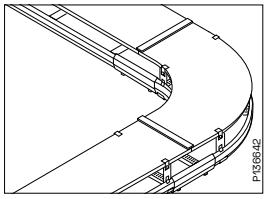



| Type | Ladder width mm | B mm |
|---|---|---|
| 90° bend - 150 | 150 | 151 |
| 90° bend - 200 | 200 | 201 |
| 90° bend - 300 | 300 | 301 |
| 90° bend - 400 | 400 | 401 |
| 90° bend - 500 | 500 | 501 |
| 90° bend - 600 | 600 | 601 |
| 90° bend - 800 | 800 | 801 |
| 90° bend - 1000 | 1000 | 1001 |

| Stainless steel Type | Ladder width mm | B mm |
|---|---|---|
| 90° bend - 150 | 150 | 147 |
| 90° bend - 200 | 200 | 197 |
| 90° bend - 300 | 300 | 297 |
| 90° bend - 400 | 400 | 397 |
| 90° bend - 500 | 500 | 497 |
| 90° bend - 600 | 600 | 597 |
| 90° bend - 800 | 800 | 797 |
| 90° bend - 1000 | 1000 | 997 |



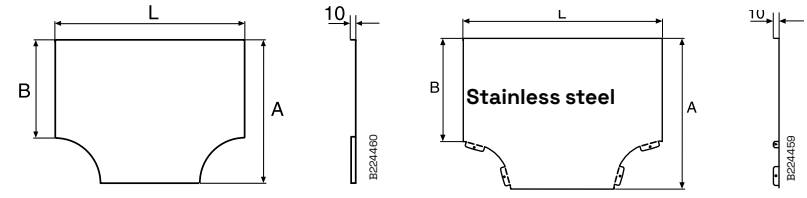

Fasten cover to Profile support piece 37 using Cover clamp.




Mount with Profile support pieces 37, Cover clamps and Cover joints.

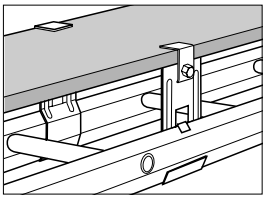
## Cover T-junction

Cover to be used for T-junctions. To be installed with a Profile support piece 37, Cover clamp and Cover joint.

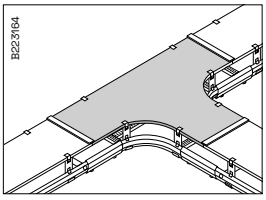




| Type + ladder width | A mm | B mm | L mm |
|---|---|---|---|
| T-junction - 150 | 400 | 151 | 651 |
| T-junction - 200 | 450 | 201 | 701 |
| T-junction - 300 | 550 | 301 | 801 |
| T-junction - 400 | 650 | 401 | 901 |
| T-junction - 500 | 750 | 501 | 1001 |
| T-junction - 600 | 850 | 601 | 1101 |
| T-junction - 800 | 1050 | 801 | 1301 |
| T-junction - 1000 | 1240 | 1001 | 1501 |

| Type + ladder width Stainless steel | A mm | B mm | L mm |
|---|---|---|---|
| T-junction - 150 | 402 | 147 | 657 |
| T-junction - 200 | 452 | 197 | 707 |
| T-junction - 300 | 552 | 297 | 807 |
| T-junction - 400 | 652 | 397 | 907 |
| T-junction - 500 | 752 | 497 | 1007 |
| T-junction - 600 | 852 | 597 | 1107 |
| T-junction - 800 | 1052 | 797 | 1307 |
| T-junction - 1000 | 1242 | 997 | 1507 |




Fasten cover to Profile support piece 37 using Cover clamp.

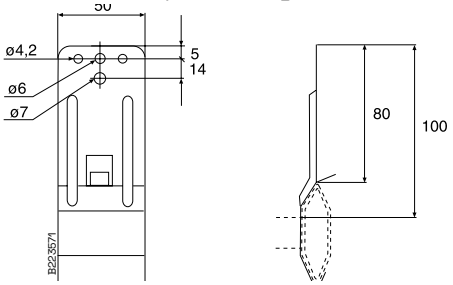


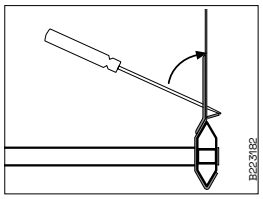

Mount with Profile support pieces 37, Cover clamps and Cover joints.

# Use and installation

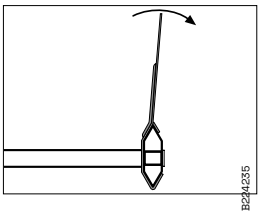
## Profile support piece 37


Profile support piece to be used when installing covers. To be mounted on approximately every 0.5 m along both sides of the cable ladder. Used together with cover clamp for locking covers.

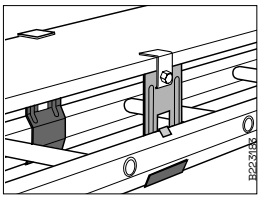


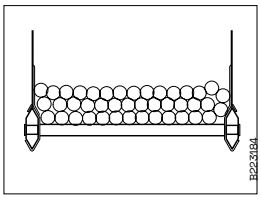

Mount Profile support piece 37 on the inside of the hexagonal section. Bend the tab towards the ladder section using a screwdriver as a lever.




Profile support piece 37 can be bent to fit the cover width.




Lock the cover on the Profile support piece 37 using Cover clamps.

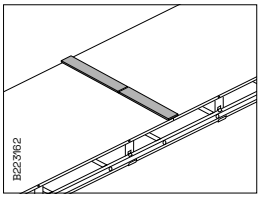



Profile support pieces 37 can be mounted as cable supports. Mount the attachments at about 0.5 m centres on both sides of the ladder.

## Cover joint


Cover joint to be inserted between covers.

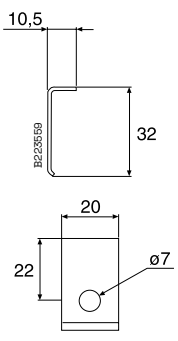

| Type | Ladder width mm | B mm |
|---|---|---|
| Cover joint 150 | 10 | 125 |
| Cover joint 200 | 200 | 175 |
| Cover joint 300 | 300 | 275 |
| Cover joint 400 | 400 | 375 |
| Cover joint 500 | 500 | 475 |
| Cover joint 600 | 600 | 575 |

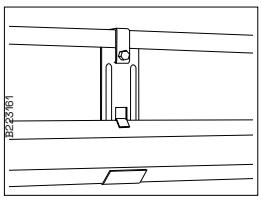



For width 800 or 1000 mm, use a combination of two smaller joints (e.g. 400+ 600 mm). Insert joints between covers.

## Cover clamp

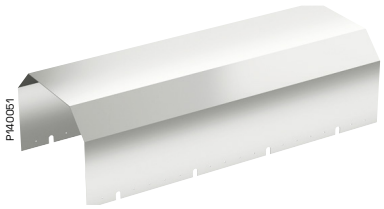

Cover clamps to be used when installing a cover on a Profile support piece 37.



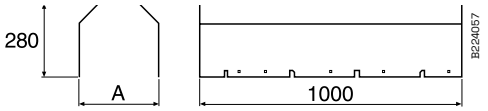




Cover clamps are required for mounting covers on Profile support piece 37.

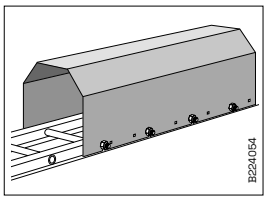
## Protecting cover



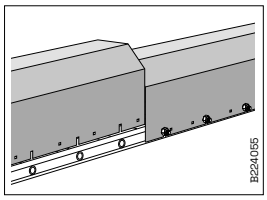

Cover to be used to protect the cable runs agains ice and snow.
Suitable for all cable ladder widths 300 and 400 respectively.



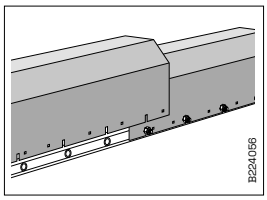

| Type | A mm |
|---|---|
| Protecting cover 300 | 300 |
| Protecting cover 400 | 400 |




To be mounted on ladder KHZ with Intermediate connection bolt 29. When mounted on other ladders or when needed, drilling screw Æ 4.2 is used.



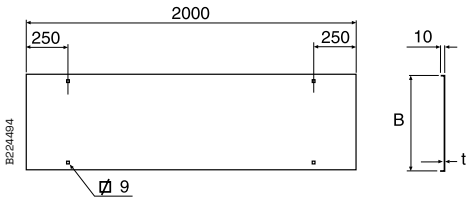

The covers can be mounted edge to edge.



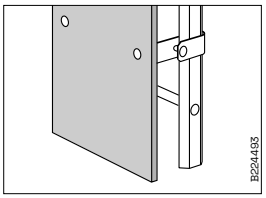

The covers can be mounted with overlap. The assymmetric hole pattern can be used to achieve a good fit.

## Cover 64


Cover to be used for vertically mounted cable ladders.



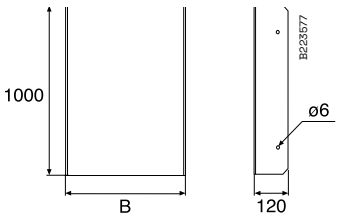

| Type | B mm |
|---|---|
| Cover 64-150 | 151 |
| Cover 64-200 | 201 |
| Cover 64-300 | 301 |
| Cover 64-400 | 401 |
| Cover 64-500 | 501 |
| Cover 64- 600 | 601 |
| Cover 64- 800 | 801 |
| Cover 64- 1000 | 1001 |



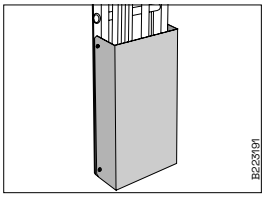

Cover 64 is to be mounted on the cable ladder with Wall bracket 11/25 or Wall bracket 11/75 and Screw set 22S. The covers are to be joined with Cover joints.

## Cover plate 65


Cover plate to be used on vertical cable ladder installations as protection of cables near the floor. To be mounted in the side profile with self-tapping screw ST4.2.




| Type | B mm |
|---|---|
| Cover 65-200 | 200 |
| Cover 65-300 | 300 |
| Cover 65-400 | 400 |
| Cover 65-500 | 500 |
| Cover 65- 600 | 600 |

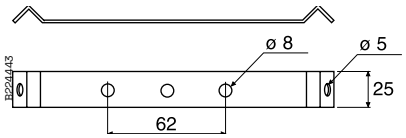


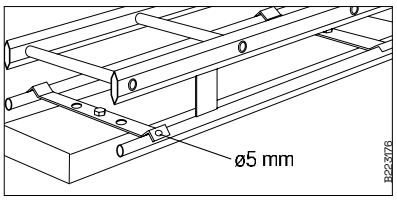

Used on vertical cable ladder installations as protection of cables near the floor.Mounted in the side profile with self-tapping screw ST4.2.

# Use and installation


## Lighting bracket 200

Lighting bracket to be used for the installation of lighting fittings beneath cable ladders KHZV and KHZPV 200.



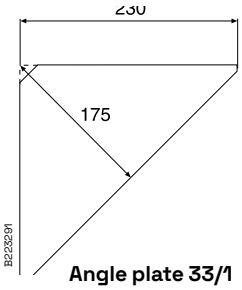

Mount Lighting bracket 200 for KHZV/ KHZPV between the two lower tubes. If necessary, 5 mm dia. holes can be used for locking against the arch tube by means of blind rivets or sheet screws.

Angle plate 33/2

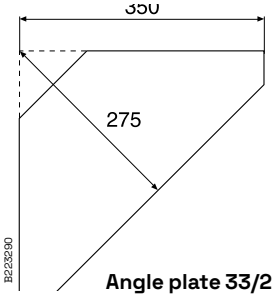

Angle plate 33/1


## Angle plate 33/1 and 33/2

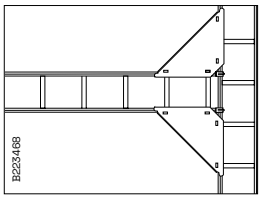
Angle plate to be used together with 90° horizontal T-junctions. Recommended for all cable ladders.



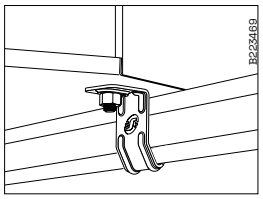

**Angle plate 33/1**




**Angle plate 33/2**

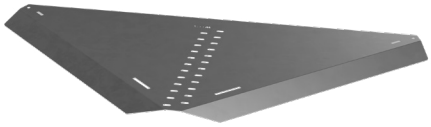



Angle plates are always recommended at 90° horizontal junctions.

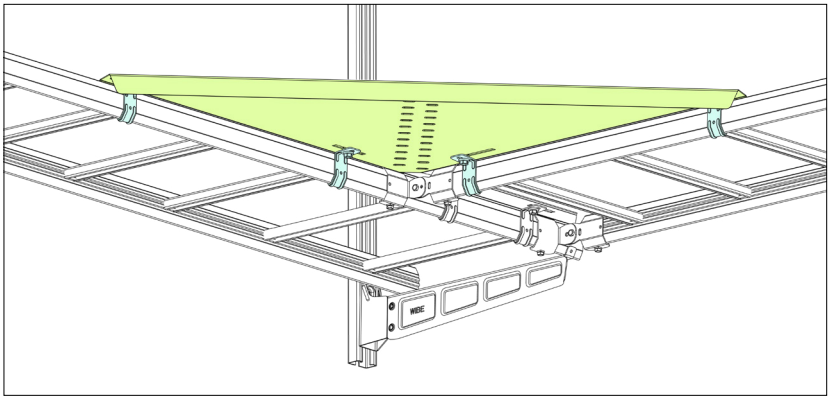



To lock Angle plate 33/2, fit Profile clamp 42.

## Corner inner radius



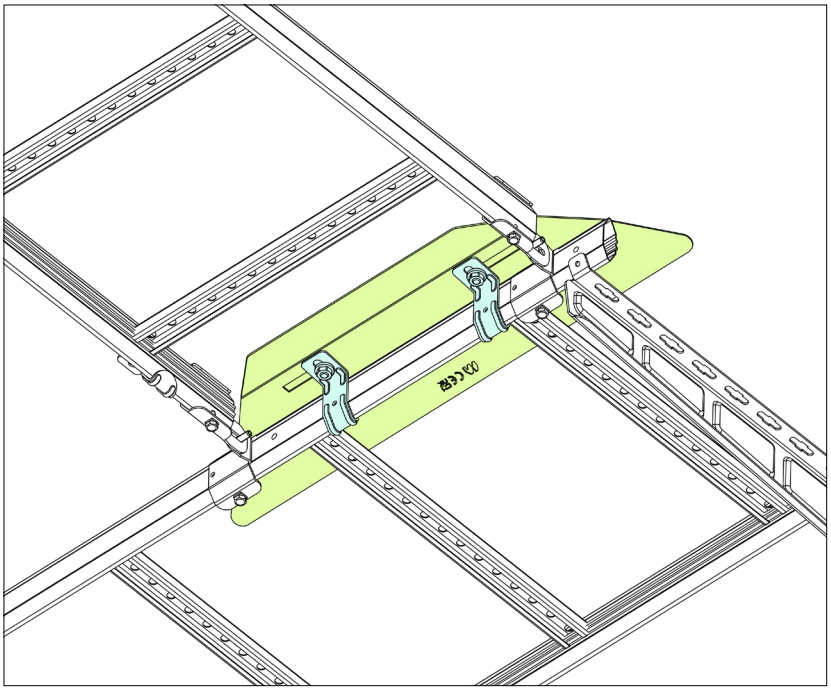
Corner inner radius to be used together with 90° horizontal junctions to allow ≤600mm or ≤1000m radius of the cable. Recommended for all Wibe cable ladders. To be fixed with 4 clamps 42.



| Model | Surface Treatment | Weight 100pcs (Kg) |
|---|---|---|
| Corner inner radius max 600 | Z+ | 265 |
| Corner inner radius max 1000 | | 516 |

## Profile protection plate

Profile protection to be used to increase the contact surface of the cables, when pulled over the side profile of the ladder. To be used in combination of the Corner inner radius. To be fixed with 2 clamps 42.

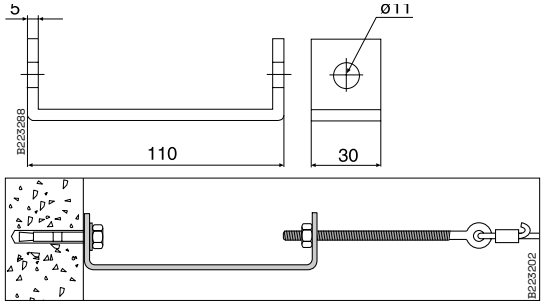


| Model | A (mm) | Surface Treatment | Weight 100pcs (Kg) |
|---|---|---|---|
| Profile protection plate 400 | 532 | Z+ | 78,2 |
| Profile protection plate 500 | 632 | | 96,4 |
| Profile protection plate 600 | 732 | | 1,16 |

# Use and installation

## Wall bracket HT-14

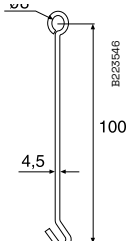

Bracket for wall installation

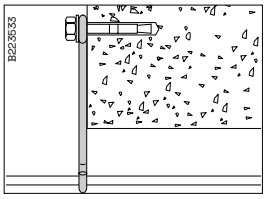



Wall bracket HT-14 is installed on wall with Expansion bolt or concrete screw.

## Carrying bracket HT-31


Carrying bracket to be used for ceiling installations. To be installed with Expansion bolt or concrete screw.

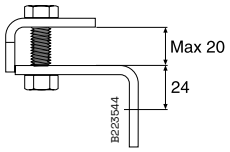


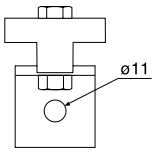



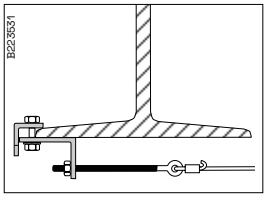

Carrying bracket HT-31 is installed on ceiling beam with Expansion bolt or concrete screw .

## Carrying bracket HT-152


Carrying bracket to be used for easy I-beam installations.

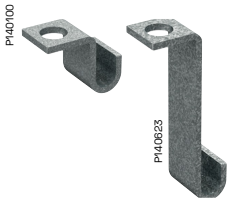


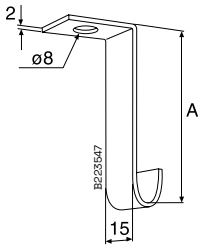




Carrying bracket is easily installed on I-beam.

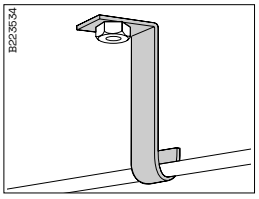
## Carrying bracket HT-33/34




Carrying bracket to be used for ceiling installations.
To be installed with Expansion bolt or concrete screw.

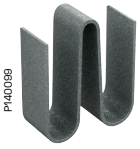



| Type | A mm |
|---|---|
| HT-33 | 14 |
| HT-34 | 38 |

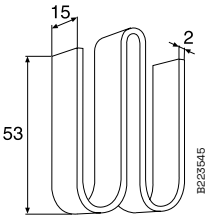


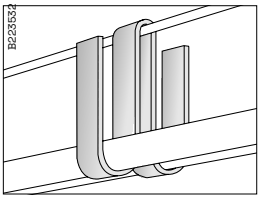

Carrying bracket is in- stalled in ceiling with Expansion bolt or concrete screw.

## Carrying sling HT-51



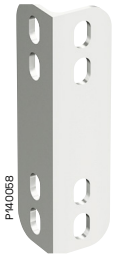

Carrying slings for cables.

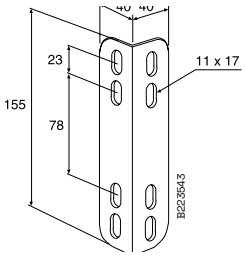


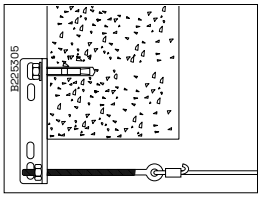

Carrying sling with space for 6 cables max. diam. 16 mm.

## End bracket HT-11

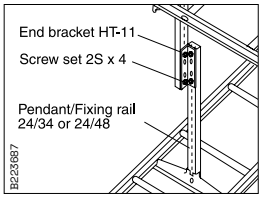


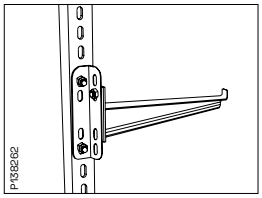

Used for assembling pendant/fixing rails to frames for switching cabinets and electrical control centres. Also suitable for assembling pendant rails for crossing cable runs. Also used as End Bracket for ceiling beam installation.



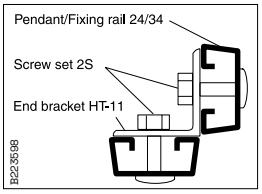

End bracket HT-11 is installed on ceiling beam with Expansion bolt or concrete screw.



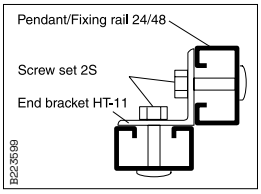

End bracket HT-11 permits mounting of crossing cable ladders in various planes on the same vertical piece.



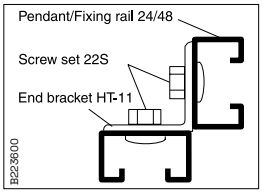

Cantilever arm 50 may, using End bracket HT-11, be mounted at 90° to the vertical piece. Only for lightweight mounting of data cable type or suchlike.




The HT-11 can be used when mounting together 2 Pendant/ Fixing rail 24/34, for example when assembling a stand.



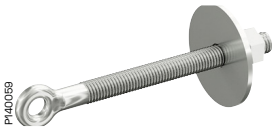

The HT-11 can be used when mounting together 2 Pendant/ Fixing rail 24/48 with the opening towards the attachment, for example when assembling a stand.



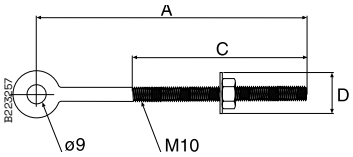

The HT-11 can be used when mounting together 2 Pendant/ Fixing rail 24/48, with the rear towards the attachment.

# Use and installation

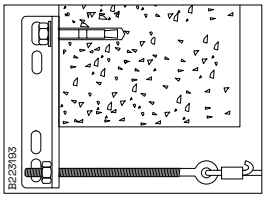
## Tightening loop HT



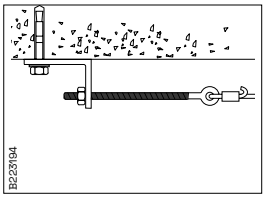

Tightening loop to be installed at the ends of steel wires.



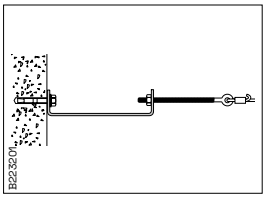

| Type | A mm | C mm | D mm |
|---|---|---|---|
| Tightening loop HT-611 | 125 | 100 | 22 |
| Tightening loop HT-621 | 270 | 100 | 50 |
| Tightening loop HT-631 | 400 | 150 | 50 |




Tightening loop is instal- led in End bracket HT-11 for installation on ceiling beam.



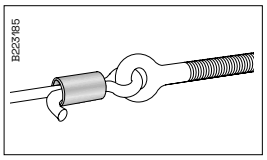

Tightening loop is instal- led in Angle bracket 5L for installation in ceiling.




Tightening loop is instal- led in Wall bracket HT-14 for installation on wall.

## Pipe HT-68 and HTR-68


Pipe for easy locking of wires. Ø 15 mm Length 25 mm.

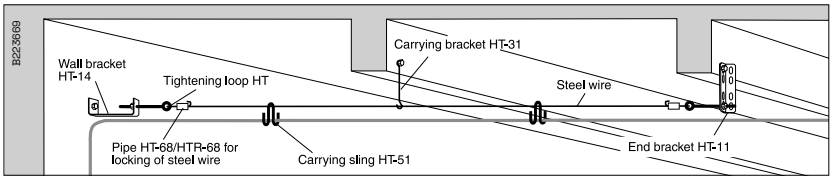



The steel cable is easily locked with the pipe.

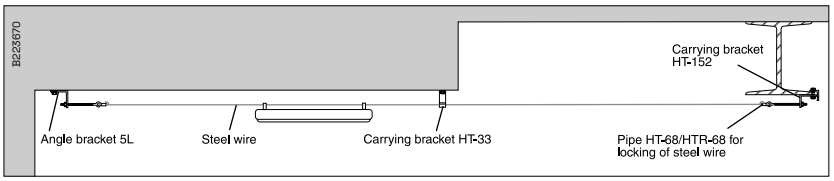
## Steel wire


Steel wire to be installed as carrier of one or more cables.

| Type | Diam. mm | Breaking load kg |
|---|---|---|
| HT-2309 | 5.00 | 700 |
| HT-2311 | 6.15 | 970 |
| HTR-2322 | 2.50 | 450 |
| HTR-2323 | 3.00 | 700 |
| HTR-2324 | 4.00 | 1200 |



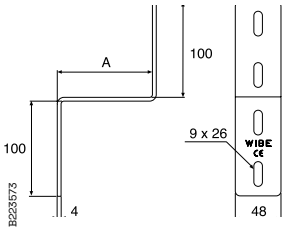

Steel wire installed in ceiling with beams.



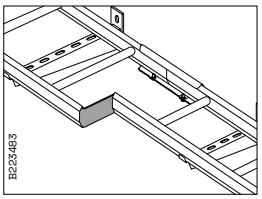

Steel wire installed in ceiling.

## Reducer 31

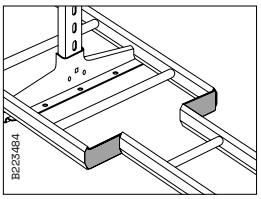
Reducer to be used for transition joining from a wide to a narrower cable ladder.


| Type | A mm |
|---|---|
| Reducer 31/100 | 100 |
| Reducer 31/200 | 200 |
| Reducer 31/300 | 300 |
| Reducer 31/400 | 400 |



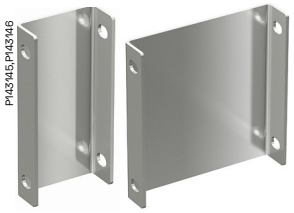

Reducer to be used for transition joining from a wide to a narrower cable ladder.

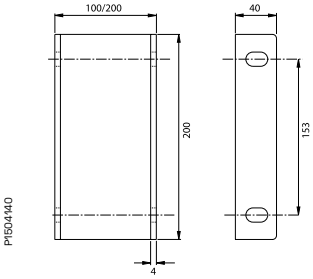



May also be used at centred transition joining

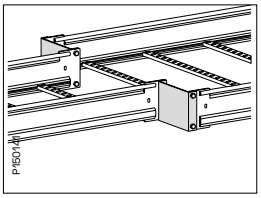
## Reducer 20C

Reducer to be used for transition joining from a wide to a narrower cable ladder.

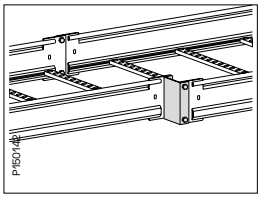



| Type | A mm |
|---|---|
| Reducer 20C/100 | 100 |
| Reducer 20C200 | 200 |

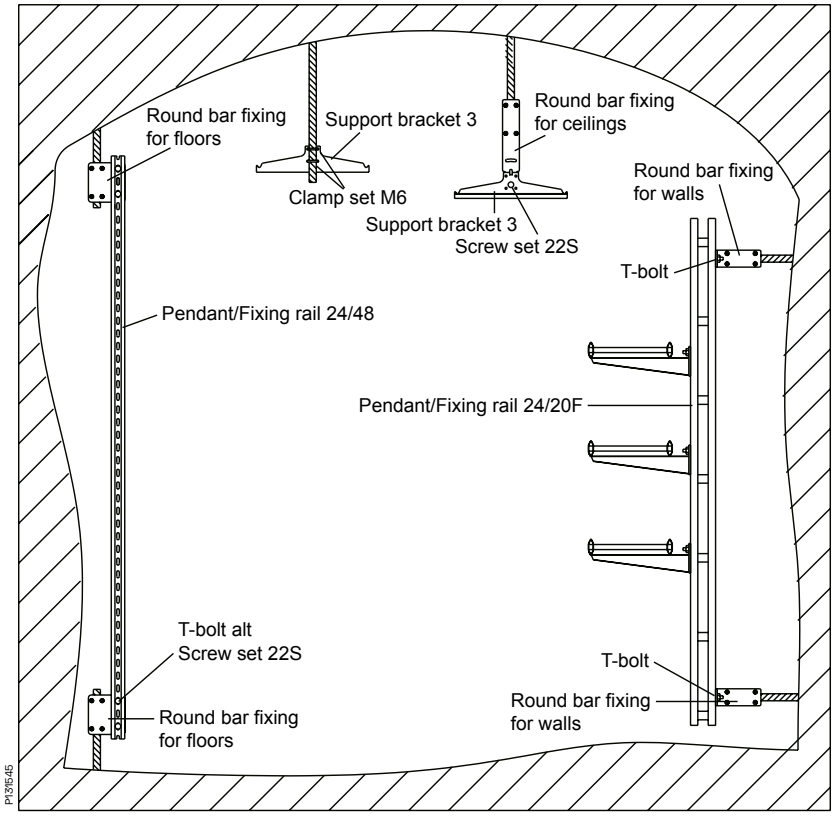



May also be used at centred transition joining




Reducer to be used for transition joining from a wide to a narrower cable ladder.

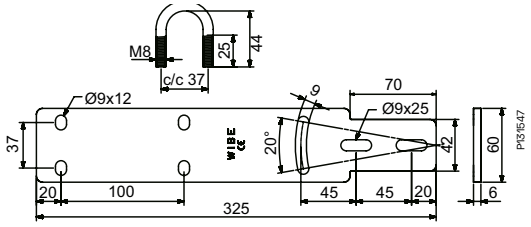
# Use and installation

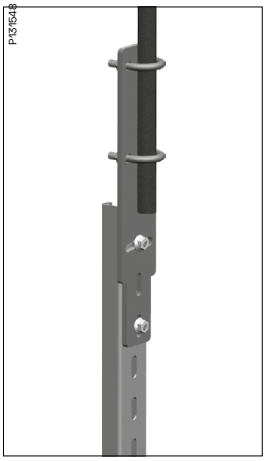




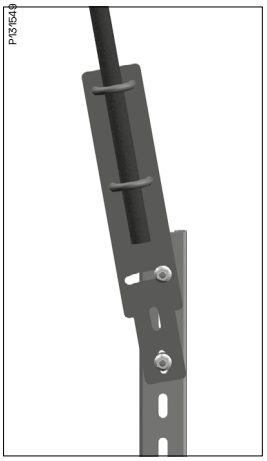
## Round bar fixing for ceilings

Round bar fixing to be used for mounting in underground cavities and tunnels.




Round bar fixing for ceilings is mounted on pendant/fixing rail 24/48 with screw set 22S. Support bracket 3 is mounted directly on the fixing with Screw set 22S.

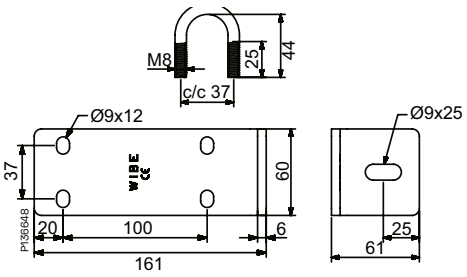


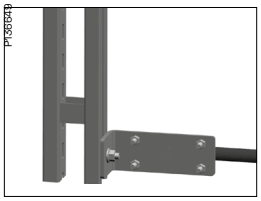

Using round bar fixing for ceilings, pendant/fixing rail 24/48 and screw set 22S it is possible to make a vertical piece that can be installed at an angle of up to 10°.

# Use and installation


## Round bar fixing for walls

Round bar fixing to be used for mounting in underground cavities and tunnels.

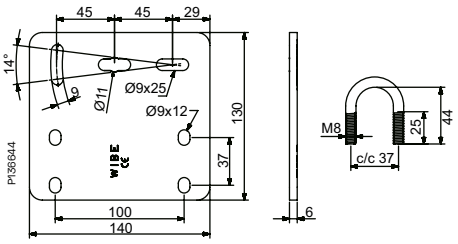


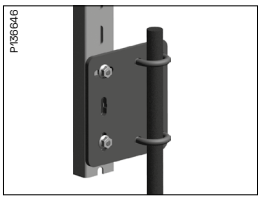




Round bar fixing for walls mounted on Pendant/ fixing rail 24/20F with T-bolt 26U.

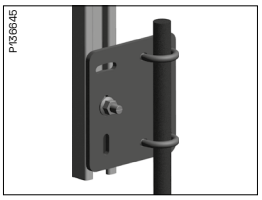

## Round bar fixing for floors

Round bar fixing to be used for mounting in underground cavities and tunnels.



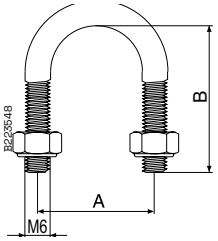

Round bar fixing for floors mounted on Pendant/fixing rail 24/48 with Screw set 22S.



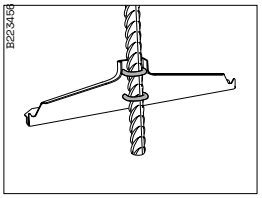

Round bar fixing for floors mounted on Pendant/ fixing rail 24/48 with T-bolt 26U.


## Clamp set M6

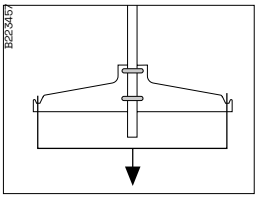
Clamp set to be used for the installation of Support bracket 3 directly on a roof bolt. The set includes two clamps and four locking nuts. M6-25 must be used for Support bracket 3 in hot-dip and pre-galvanized surface finish, whereas M6-20 must be used for Support bracket 3 in stainless steel and Installation plate 60 in all surface treatments.




| Type | Ø | A | B |
|---|---|---|---|
| M6-25 | 29 | 35 | 38 |
| M6-20 | 24 | 30 | 33 |

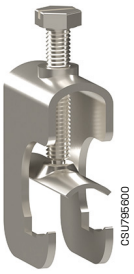



For installation of Support bracket 3 directly on ribbed bar 16-25 or fully threaded bar M16-M27.




Max. symmetrical loading 300 kg. Make sure the clamps grip the bar in a correct manner.

# Use and installation




**Cable clamp ARX1**

**Cable clamp ARX2**

## Cable clamp ARX

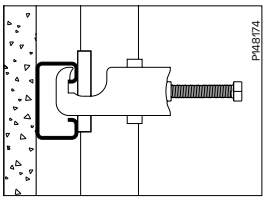
Cable clamp for fastening of cable on Pendant/Fixing rail 24/48 and on cable ladders KHZ, KHZV, KHZSP, KHZSPZ+, KHZSP85, KHZPS, KHZP and KHZPV, in combination with Insert piece EM.

**Cable clamp ARX1**

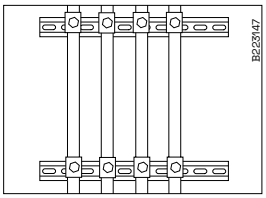
| Type | For cable mm |
|---|---|
| Cable clamp ARX1-12 Z+ | - 12 |
| Cable clamp ARX1-16 Z+ | 13 - 16 |
| Cable clamp ARX1-22 Z+ | 17 - 22 |
| Cable clamp ARX1-28 Z+ | 23 - 28 |
| Cable clamp ARX1-36 Z+ | 29 - 36 |
| Cable clamp ARX1-44 Z+ | 37 - 44 |
| Cable clamp ARX1-52 Z+ | 45 - 52 |
| Cable clamp ARX1-60 Z+ | 53 - 60 |
| Cable clamp ARX1-70 Z+ | 61 - 70 |

**Cable clamp ARX2**

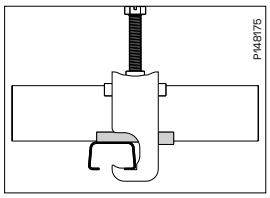
| Type | For cable mm |
|---|---|
| Cable clamp ARX2-12 Z+ | - 12 |
| Cable clamp ARX2-16 Z+ | 13 - 16 |
| Cable clamp ARX2-22 Z+ | 17 - 22 |
| Cable clamp ARX2-28 Z+ | 23 - 28 |
| Cable clamp ARX2-36 Z+ | 29 - 36 |
| Cable clamp ARX2-44 Z+ | 37 - 44 |
| Cable clamp ARX2-52 Z+ | 45 - 52 |
| Cable clamp ARX2-60 Z+ | 53 - 60 |



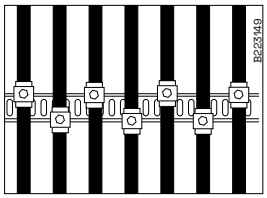

Use Cable clamp ARX to attach cables to Pendant/Fixing rail 24/48. Use Insert piece EM.



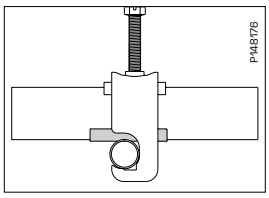

Mounting rail 40 with Cable clamp ARX.




Use Cable clamp ARX to attach cables to cable ladders KHZSP, KHZSPZ+, KHZPS, KHZPV and KHZP. Use Insert piece EM.



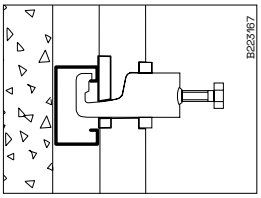

In order to avoid torsion of the rung, cable clamps can be mounted opposite each other on the rung.

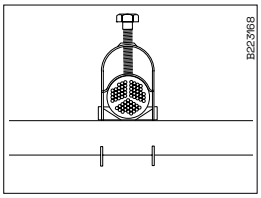



Cable clamp ARX is used for fastening cables on the cable ladders KHZ and KHZV.
Insert piece EM must be installed.


## Insert piece EM

Insert piece to be used in order to prevent pressure on the cable. The insert piece is placed between the cable and the rung from the same side where the clamp has been fastened to the rung.




Insert pieces increase the contact area of the cables.

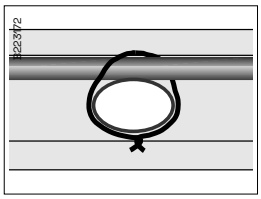
| Type | For cable mm |
|---|---|
| EM - 12 | - 12 |
| EM - 16 | 13 - 16 |
| EM - 22 | 17 - 22 |
| EM - 28 | 23 - 28 |
| EM - 36 | 29 - 36 |
| EM - 44 | 37 - 44 |
| EM - 52 | 45 - 52 |
| EM - 60 | 53 - 60 |
| EM - 70 | 61 - 70 |

## Lashing wire

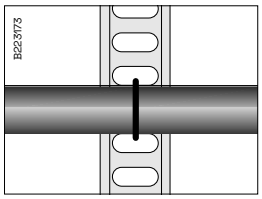


Lashing wire to be used for lashing of wires on cable ladders.

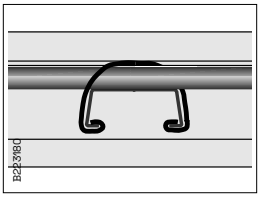
| Type | | Diam mm | Breaking load kg |
|---|---|---|---|
| HTR - 2303 | Lashing wire, stainless steel, white PVC | 1.25 | 92 |
| HTR - 2313 | Lashing wire, stainless steel, black PVC | 1.25 | 92 |
| HT - 2304 | Lashing wire, white PVC | 1.5 | 25 |
| HT - 2314 | Lashing wire, black PVC | 1.5 | 25 |



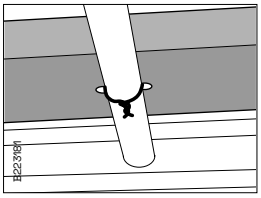

Cables are easily installed by lashing around the rungs of KHZ and KHZV.




Cables are easily installed by lashing through the perforations of the rungs or around the rungs of KHZSP, KHZSPZ+, KHZPS, KHZP and KHZPV.




Cables are easily installed on KHZSP, KHZSPZ+, KHZPS, KHZP and KHZPV by lashing in such a way that the lashing wire is pinched around the rung as shown.




Dividing strips and tele- conduits are attached to the ladder by lashing around the rungs of KHZ and KHZV

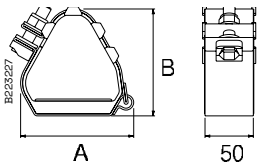
# Use and installation

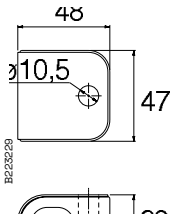
## Cable clamp ER

Cable clamp for the installation of cables on cable ladders with round or perforated rungs.


**Cable clamp ER**


**Oval rung adaptor**



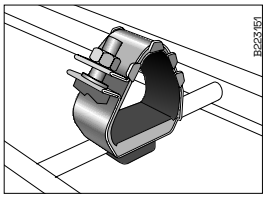

| Type | For cable mm | A mm | B mm |
|---|---|---|---|
| Cable clamp ER | 23 - 28 | 80 | 74 |
| Cable clamp ER | 27 - 32 | 82 | 81 |
| Cable clamp ER | 30 - 35 | 82 | 88 |
| Cable clamp ER | 33 - 38 | 85 | 94 |
| Cable clamp ER | 36 - 42 | 113 | 101 |
| Cable clamp ER | 40 - 46 | 115 | 108 |
| Cable clamp ER | 44 - 50 | 117 | 115 |
| Cable clamp ER | 48 - 55 | 120 | 129 |
| Cable clamp ER | 51 - 58 | 121 | 130 |
| Cable clamp ER | 55 - 62 | 156 | 138 |
| Cable clamp ER | 59 - 66 | 158 | 146 |
| Cable clamp ER | 63 - 70 | 160 | 150 |
| Cable clamp ER | 67 - 74 | 763 | 161 |
| Cable clamp ER | 71 - 78 | 165 | 168 |
| Cable clamp ER | 74 - 82 | 167 | 176 |
| Cable clamp ER | 77 - 85 | 169 | 181 |

**Tested at British short-circuit testing station.**
**Test report no. BS/F 1265**
- Wibe cable ladder KHZ-600, KHZP-300 and KHZP-600. Cable clamp ER mounted on every rung.
- Wibe cable ladder KHZ-300. Cable clamp ER mounted on every other rung.

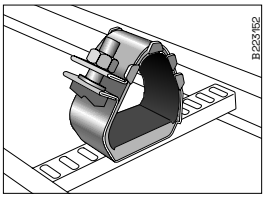
**Condition after test**
400 volt 58 kA symmetrical current (Peak 140 kA) during 0.1 second:
- All clamps remained secure
- Some slight distorsion of the ladder rungs
- The cables were splayed out between th clamps but otherwise in good order.

**Test report no. BS/F 1268**
- Wibe cable ladder KHZ-600 and KHZP-600.Cable clamp ER mounted on every other rung

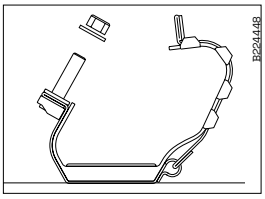
**Condition after test**
352 volt 64 kA symmetrical current (Peak 140 kA) during 0.1 second:
- All clamps remained secure
- There was distorsion of a number of the ladder rungs
- The cables were splayed out between the clamps but otherwise in good order.



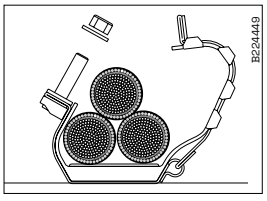

Remove the bottom plate of the clamp and mount it with Oval rung adapter on cable ladders with round rungs - KHZ and KHZV.



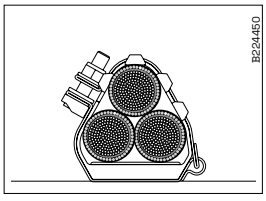

Remove the bottom plate of the clamp and mount it with 2 screw sets 74S on cable ladders with per- forated rungs - KHZP, KHZPS, KHZSP, KHZSPZ+ and KHZPV.



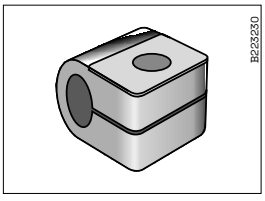

Remove the locking nut. Open the clamp.




Mount the cables.

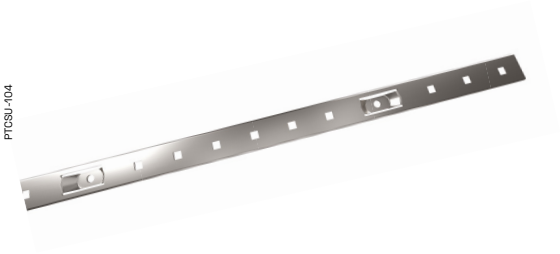



Lock the clamp with the locking nut. Turn the nut to max. 4-5 Nm. The rubber lining must touch the cables but not so tight that the cables will be deformed



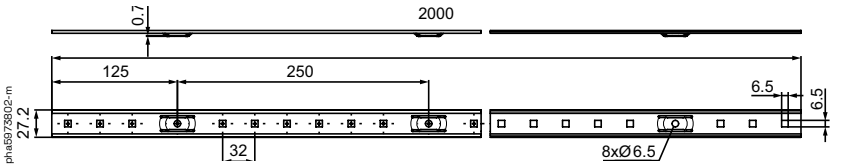

Oval rung adaptor, screw set included, to be used when mounting Cable clamp ER on oval rungs on the KHZ range.

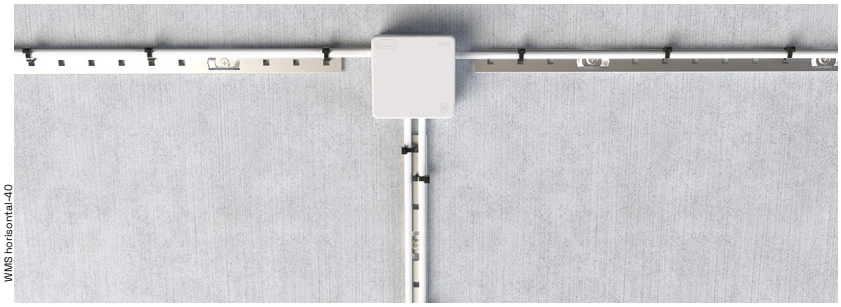
# Use and installation




## Mounting rail WMS25L

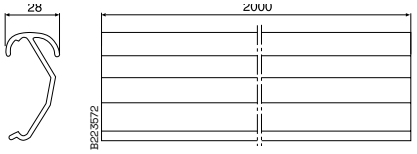
Mounting rail to be used for installation directly on wall for lashing of cables.



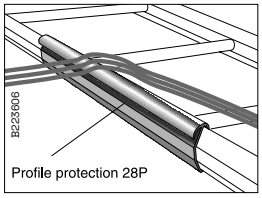




Mounting of cables with lashing wire, strips etc. The mounting rail installed directly onto wall.

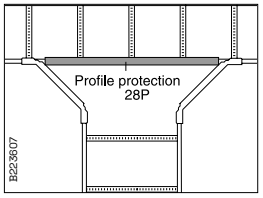
## Profile protection 28P

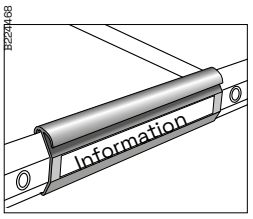




Profile protection to be used to increase the contact surface of the cables, when pulled over the side profile of the ladder.




Mount Profile protection 28P in order to increase the contact surface of the cable, when pulled over the side profile of the ladder. Cut when required.



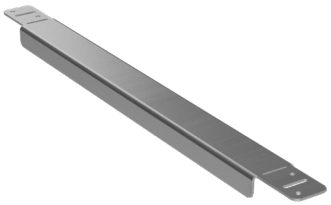




Can be cut in suitable lengths and equipped with an information label. Easy to mount on the ladder side profile.

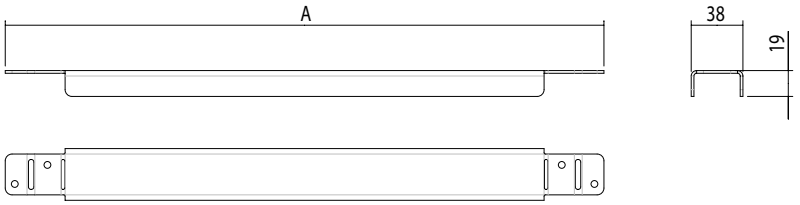
# Use and installation

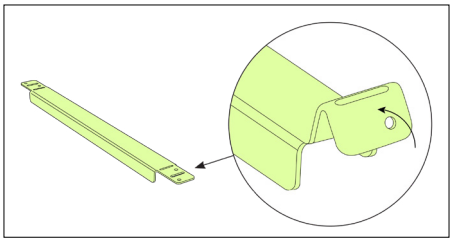
## Rung reinforcement

Rung protection are made to strengthen the ladder rung locally for installation cases where a lot of load is concentrated to one rung. Versions available for Wibe profile and for perforated rung (Wibe or LB4000).

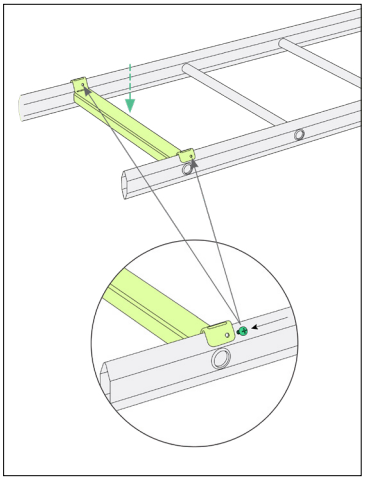


**Wibe ladder rung reinforcement**



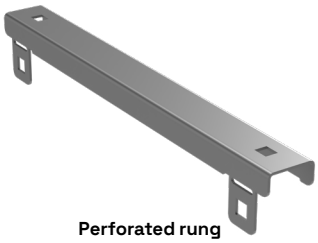



Prepare the rung reinforcement by bending the flaps.

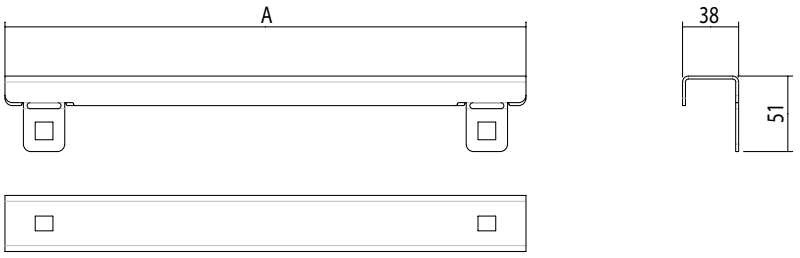


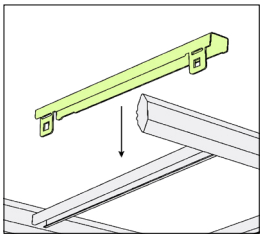
Position the rung reinforcement on top of the targeted rung.

**Optional:** Lock the rung reinforcement to the rung with 2 selfdrilling screws.

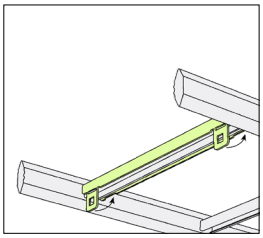


**Perforated rung reinforcement**

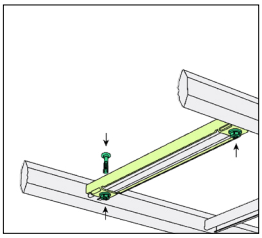


Position the rung reinforcement on top of the targeted rung.



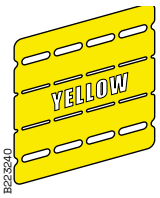
Fix the rung reinforcement in place by bending the flaps.



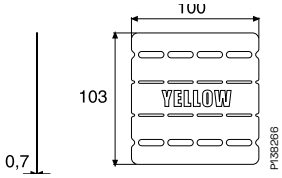
**Optional:** Lock the rung reinforcement to the rung with 2 screwset 2S.

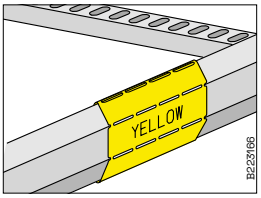
# Use and installation

## Marking plate 93




Marking plates are part of a colour marking system that is easy to use when you want to mark out the type of cable that is placed on the cable ladder

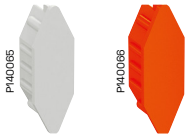



The Marking plate can be bent around the side profile on all Wibe cable ladders.

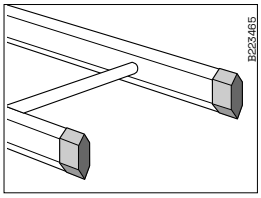
## End plug 28 and 28i


End plug 28

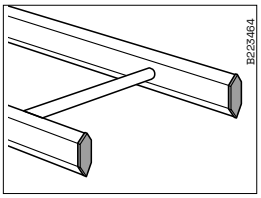



End plug 28i

End plug to be mounted on ladder ends for sealing or protection.

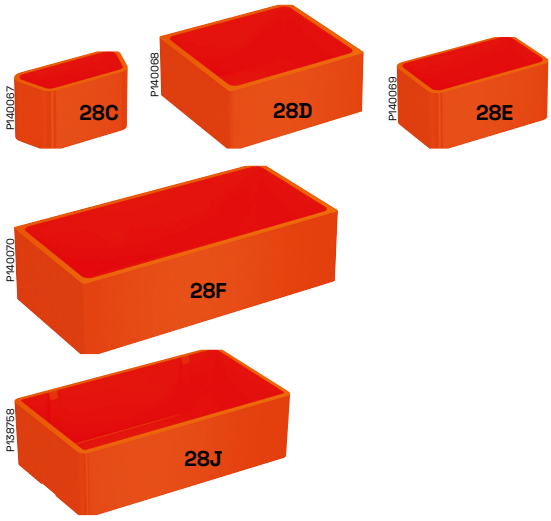



Mount End plug 28 in ladder ends as protection.

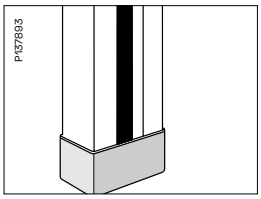



Mount End plug 28i inside the ladder ends for se- aling. Joining with Joint 19 or 21 can be made with End plug 28i left in the ladders ends.

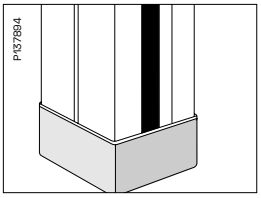
## End plug 28C, D, E, F and J




End plug to be mounted on pendant ends to provide protection against personal injury and to make the ends of the profiles more conspicuous.

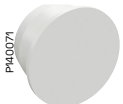



End plug **28C** fits Vertical piece 2 and Pendant/ Fixing rail 24/34.
End plug **28E** fits Vertical piece 2F and Pendant/ Fixing rail 24/48.

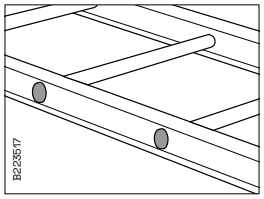



End plug **28D** fits Vertical piece 20 and Pendant/ Fixing rail 24/20.
End plug **28F** fits Vertical piece 20FS and Pendant/ Fixing rail 24/20FS.
End plug **28J** for Vertical piece 20F and Pendant/ Fixing rail 24/20F

## Cross member plug 27



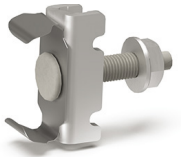

Cross member plug to be installed at the ends of the rungs of KHZ and KHZV. Used in premises with a high corrosion risk.



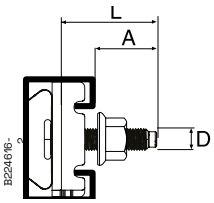

Mount Cross member plug 27 in KHZ and KHZV rung tube ends in pre- mises with high relative humidity where the risk of corrosion is high

# Use and installation

## T-bolt 26U

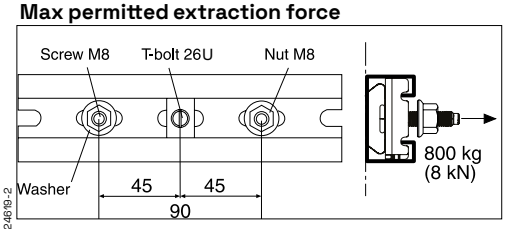


Easy to fit into the fixing rail. It is made to stick which makes it easier to mount and attach compared to a spring nut. It stays in place by itself even before it is fixed with the nut. To be used for the mounting of Cantilever arm 50 on Pendant/ Fixing rail 24/48 and all vertical pieces except Vertical piece 2.

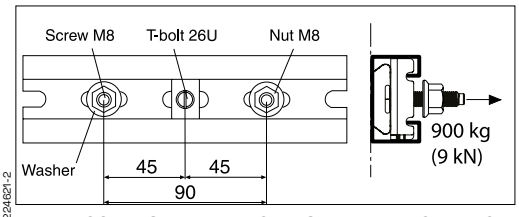



| Type | L mm | A mm |
|---|---|---|
| M8 | 34 | 23 |
| M10 | 34 | 23 |
| M10 | 44 | 33 |
| M10 | 54 | 43 |

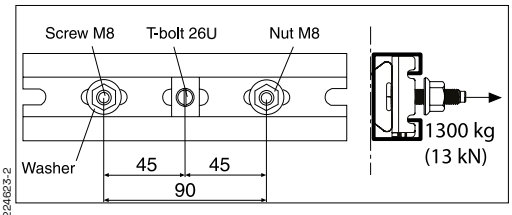
**Max permitted extraction force**




T-bolt 26U M8/M10 + P/F-rail 24/48 + Washer 8.4x19x1.5



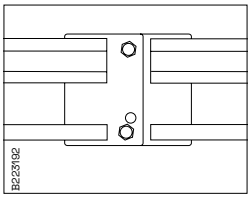

T-bolt 26U M8 + P/F-rail 24/48 + Washer 9x35x2



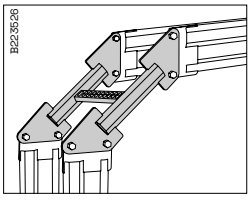

T-bolt 26U M10 + P/F-rail 24/48 + Washer 9x35x2

## Screw set M12

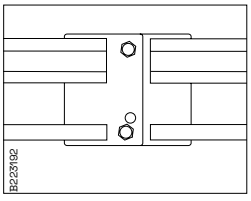
Screw set to be used for all joints with cable ladders KHZV and KHZPV.




For joining ladders.




For joints with Riser coupling 49.




For joints with 90° bend 55 and T-junctions 56.

# Use and installation

## Screw set 2S

Screw set to be used for fastening of Support bracket 3 on Pendant/fixing rail 24/20F and Angle bracket 5L to the opening on Pendant rail 24/34 and 24/48. Set including screw MVBF 8x40 and nut M6MF8.

## Screw set 20S

Screw set to be used for installation of Support bracket 3 on Pendant/fixing rail 24/20 and Vertical piece 20, Angle bracket 5L to the opening on Pendant rail 24/48 and 24/20. Set including screw MVBF 8x60 and nut M6MF8.

## Screw set 22S

Screw set to be used for installation of Support bracket 3 on Vertical piece 2 and 2F, Support bracket 3 and Ceiling bracket 5 on Pendant/fixing rails 24/34 and 24/48, Angle bracket 5L against the back of Pendant/fixing rails, Pendant/fixing rails back to back. Set including screw MVBF 8x16 and nut M6MF8.

## Screw set W34

Screw set to be used for the fastening of dividing strips on cable ladders KHZSP, KHZSPZ+, KHZPS and KHZPV. Set including screw MSCS 6x12 and nut M6MF 6.

## Screw set W37

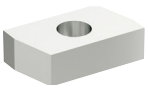
Screw set including bolt MVBF 8x35 and nut M6MF 8, to be used for the installation of Support bracket 3 on Vertical piece 20F.

## Screw set M10 x 20

Screw to be used with Spring nut M10 for the installation of Cantilever arm 50 on Pendant/fixing rail 24/48.

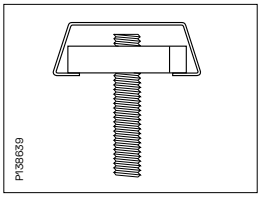
## Spring nut M8/M10

Spring nut to be used for fastening of accessories (control panels, etc.) on Pendant/fixing rail 24/48. M8 for HDG and M10 for stainless.

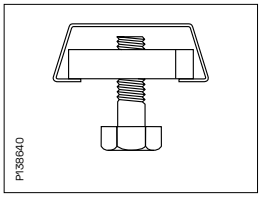


## Back nut M8

Back nut to be used for fastening of vertical pieces, etc., in the rungs of cable ladders KHZSP, KHZSPZ+, KHZP, KHZPS and KHZPV.




Mounting with Threaded rod M8 and Backnut M8 in the cable ladder rungs.




Pendants etc. are mounted with Bolt M8 and Back nut M8 in the rungs.

## Flange nut B43 M8, M10

Used for joining of Threaded rod W76 M8 and M10.

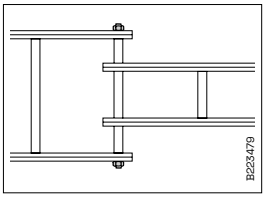
## Thread lock B50 M8, M10

Used for joining of Threaded rod W76 M8 and M10.

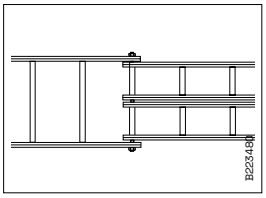

## Intermediate connection bolt 29

Intermediate connection bolt to be used at the transition from a broad to a narrower cable ladder KHZ.

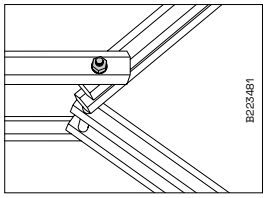
| Type | Bolt diam x length mm |
|---|---|
| Intermediate connection bolt 29/200 | M10 x 235 |
| Intermediate connection bolt 29/300 | M10 x 335 |
| Intermediate connection bolt 29/400 | M10 x 435 |
| Intermediate connection bolt 29/500 | M10 x 535 |
| Intermediate connection bolt 29/600 | M10 x 635 |



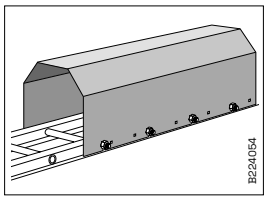

Intermediate connection bolts are used for changing from a broad to a narrower ladder. The broader ladder's last rung is cut to permit the narrower ladder to fit in. The intermediate connection bolt is mounted through the rungs of the KHZ ladder.




Intermediate connection bolts can also be used for transition from one wide ladder to two narrower ones.

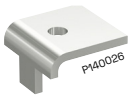



Intermediate connection bolt also permits formation of angles.

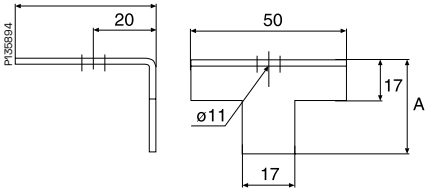



To be mounted on ladder KHZ with Intermediate connection bolt 29.

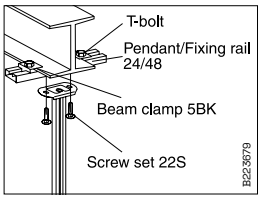
## Beam clamp 5BK



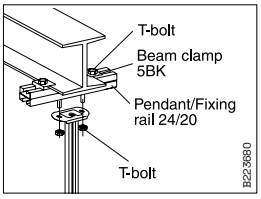

Beam clamp to be used for the installation of Vertical pieces 2, 2F or 20 on I-beams.




| Type | A mm |
|---|---|
| Beam clamp 5BK-10, for flange thickness max 13 mm | 30 |
| Beam clamp 5BK-30, for flange thickness max 14–30 mm | 50 |




On ceiling beams, mount Vertical piece 2, 2F or 20 using 2 Beam clamps 5BK, Pendant/ Fixing rail 24/48 and Screw set 22S. For Beam clamp 5BK-10, use T-bolt 26U/40. For Beam clamp 5BK-30, use T-bolt 26U/50.

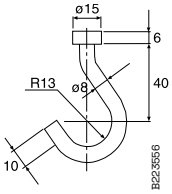


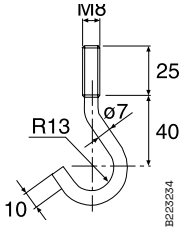

Alternatively, a Pendant/ Fixing rail 24/20 may be used. This will require 4 T-bolts.

## Hook 8

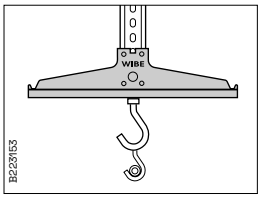

**Hot dip galv.**


**AISI 316L**

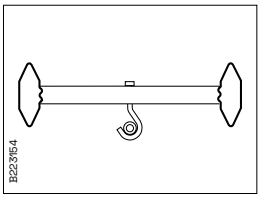



Hook to be used for the installation of cables beneath Support bracket 3. Can also be installed in perforated rungs.



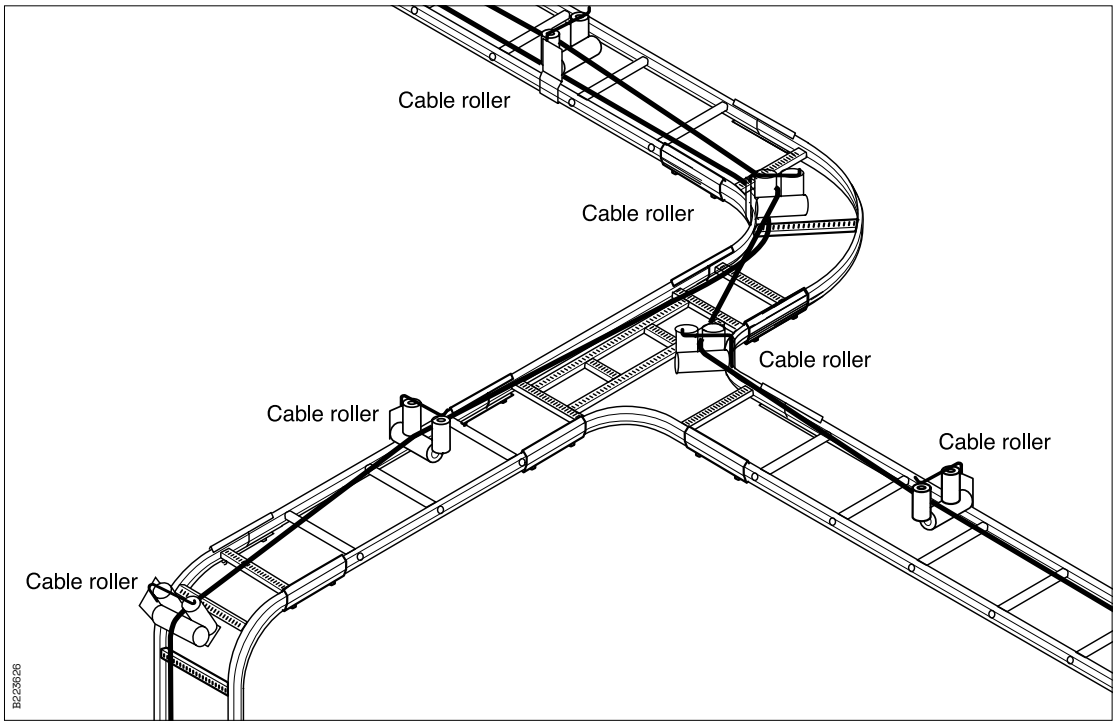

Hook 8 mounted beneath Support bracket 3 for installation of cables.



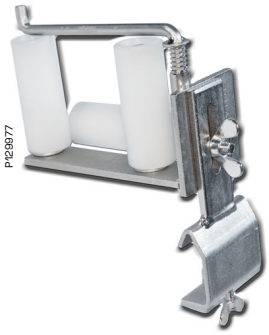

Hook 8 installed in a perforated rung.

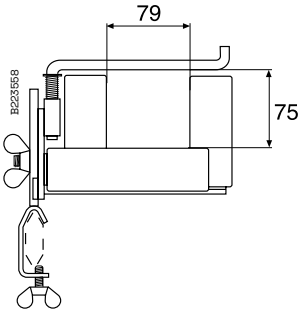
# Use and installation

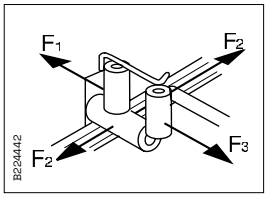
## Cable roller S




Cable roller used to facilitate the pulling of cables and lines. Easily installed on all Wibe cable ladders except the high-sided WHS ladders (outer mounting hole). Also suitable for external/internal profiles of all 900 bends, T-junctions, X-junctions and risers (inner mounting hole). With a height adjustment of 45 mm to leave room for cables to pass under the roller.

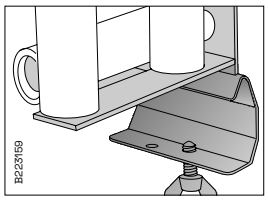


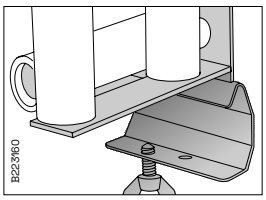




**Load**

Permitted loading $F_1$=100 kg (KHZ, KHZP, KHZV) 35 kg (KHZSP)
Permitted loading $F_2$=125 kg (KHZ, KHZP, KHZV) 35 kg (KHZSP)
Permitted loading $F_3$=100 kg (KHZ, KHZP, KHZV) 35 kg (KHZSP)



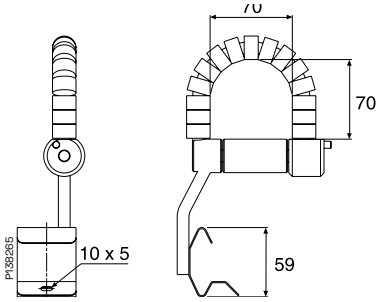

For fitting on 90°, T- and Xjunctions, use the inner mounting hole.

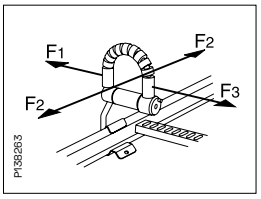



For mounting on ladders, use the outer mounting hole.

## Cable roller 38 Rig'n roll

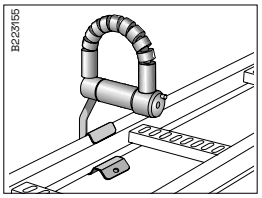

Cable roller used for mounting on Wibe cable ladders with belonging junctions and branches.



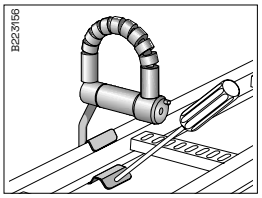




**Load**

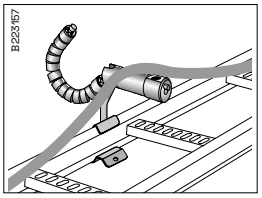
Permitted loading $F_1$= 20 kg (KHZ, KHZP, KHZV, KHZSP)
Permitted loading $F_2$= 50 kg (KHZ, KHZP, KHZV, KHZSP)
Permitted loading $F_3$= 50 kg (KHZ, KHZP, KHZV)
25 kg (KHZSP)



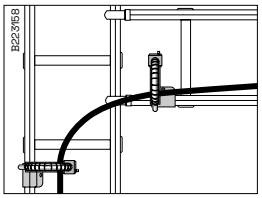

Cable roller 38 is to be mounted on the cable ladder profile.




Use a screw driver when dismantling the cable roller.




Open the cable roller by pressing the locking button and turn the loop aside.




The loop has rollers which make cable pulling over bends and junctions very easy.

## Appropriate tightening torque

| Part | Application | Tightening torque (Nm) |
|---|---|---|
| T-Bolt 26U+2F+Ca50i | Support system | M8: 15/M10: 25 |
| Screw set 2S+Pendant bar1+2F | Support system, front side of 2F | M8: 15/M10: 25 |
| Screw set 2S+Pendant bar1+2F | Support system, back side of 2F | M8: 15/M10: 25 |
| Screw set 20S+2F+(2)Ca50i | Balance application | M8: 15/M10: 25 |
| Screw set 22S+2F+Ca50i | Support system, back side of 2F | M8: 15/M10: 25 |
| 2FJ+24/48 | Extension application | M8: 15/M10: 25 |

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