

# Mounting instructions

BKRS walkable cable tray systems and conveyor system trays for VW AG  
according to VASS V6

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**BKRS walkable cable tray systems and conveyor system trays for VW AG**  
*Mounting instructions*

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# 1 General information

## 1.1 Target group

These instructions are intended for specialists and/or instructed technical personnel (e.g. engineers, architects, heads of construction and mounting and installation engineers) charged with the installation of the BKRS walkable cable tray system.

## 1.2 Relevance of these instructions

These instructions are based on the standards valid at the time of compilation (August 2024).

Please read the instructions carefully before starting mounting. We will not accept any warranty claims for damage and liability caused through non-observance of these instructions.

Any images are intended merely as examples. Mounting results may look different.

In these instructions, cables and lines are referred to simply as cables.

## 1.3 Types of warning information



### Type of risk!

Shows a possibly risky situation. If the situation is not avoided, then death or serious injury may result.

**Note!** *Indicates important information or assistance.*

## 1.4 Intended use

The BKRS cable tray systems are used as walkable cable trays. The conveyor system trays are not walkable. Both types of trays are used to install and protect power and data cables in industrial areas.

The BKRS cable tray systems and conveyor system trays are suitable for use at ambient temperatures of  $-20\text{ °C}$  to  $+120\text{ °C}$ . At temperatures below  $-20\text{ °C}$ , the metal will become brittle and may not be processed further.

## 1.5 Basic standards

- The BKRS cable tray systems and the conveyor system trays correspond to the standards:
- IEC 61537 – Cable management
- Based on EN 50085-2-2 – Cable trunking systems and cable ducting systems for electrical installations
- EN 50174 – Information technology – Cabling installation (EMC)

- DIN 51130 – Testing of floor coverings – Determination of the anti-slip property – Workrooms and fields of activities with slip danger – Walking method – Ramp test

## 2 General safety information

Observe the following general safety information:

- Protective gloves must be worn during all mechanical mounting work.
- The BKRS walkable cable tray systems must be included in the protection measures and/or the equipotential bonding.
- The inclusion in the equipotential bonding of the overall system must be performed by specialist personnel.

## 3 Product description

### 3.1 Product features

The BKRS walkable cable tray systems and the non-walkable conveyor system trays are characterised by the following product features:

#### **BKRS walkable cable tray systems:**

- Two installation options: mounting on MS4121 FS profile rails or on support brackets for additional installation space
- Walkable thanks to the solid cover
- Cover type DBKR made of strip galvanised chequered sheet steel with increased anti-slip protection: Fastening with flexibly mounted turn buckles in pre-marked break-out openings or fastening with cover clamps
- Walkable and non-slip thanks to chequering
- With bottom perforation for ventilation, as water drainage and for more flexible mounting
- Resistant to dirt and drip-tight through dust protection elements
- EMC-compatible separation of power and data cables through barrier strips
- Side heights 100 mm and 110 mm
- Self-supporting, no screwing with machines required

#### **Conveyor system trays:**

- Mounting on MS4121 FS profile rails

- Solid cover
- Cover type DBKR made of strip galvanised chequered sheet steel with increased anti-slip protection: Fastening with flexibly mounted turn buckles in pre-marked break-out openings or fastening with cover clamps
- Walkable and non-slip thanks to chequering
- With bottom perforation for ventilation, as water drainage and for more flexible mounting
- Resistant to dirt and drip-tight through dust protection elements
- EMC-compatible separation of power and data cables through barrier strips
- Side heights 100 mm and 110 mm

### 3.2 Product overview: BKRS walkable cable tray systems

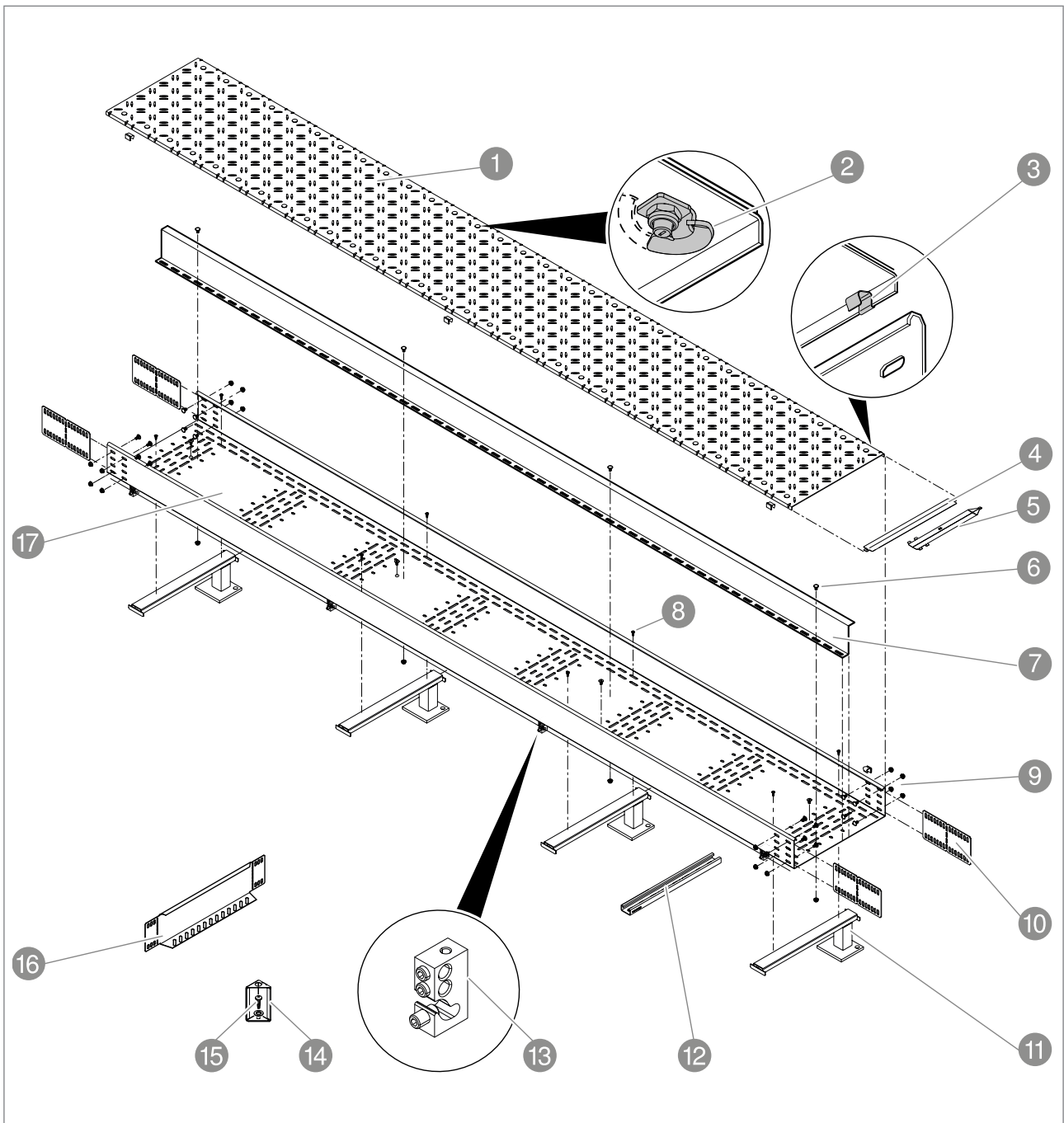


Abb. 1: BKRS system components



Item	Designation	Function
1	Cover, type DBKR, made of strip galvanised, chequered sheet steel with increased slip protection	Walkable cover of the cable tray
2	Turn buckle Fastening of the DBKR cover to the cable tray	Fastening of the DBKR cover to the cable tray
3	Cover clamp	Fastening of the DBKR cover to the cable tray
4	Dust protection element	Protection against dirt and moisture from above
5	Variable dust protection element	Extension of dust protection element for angled joints
6	Truss-head bolt with hexagonal nut	Mounting of barrier strips
7	Z-shaped barrier strip	Cover support for cable tray widths of > 200 mm With perforation for the installation of earthing terminals
8	Flat-head screw FKS 6x12	Fastening of additional support and connection terminal to the cable tray
9	Truss-head bolt and hexagonal nut with flange	Connection of the cable trays with straight and angle connectors, reducers/stop-ends
10	Straight and angle connector	Connection of cable trays
11	Support bracket type STA	Raised cable tray mounting (enabling additional media to be routed under the cable tray)
12	MS 4121 L FT profile rail	Near-floor mounting of the cable tray
13	Connection terminal for conductor cable, single	Connection of the cable tray system with the protective equipotential bonding of the overall system
14	Cover support	Support of covers and fitting covers in cross-over areas
15	BS BKS KP drilling screw	Fastening of cover support to the cable tray
16	Reducer/stop-end 100 mm and 110 mm	Closure of open points, if cable trays of different widths are connected, as well as closure of cable tray ends
17	Cable tray	Acceptance of the power and data cables

### 3.3 Product overview: conveyor system trays

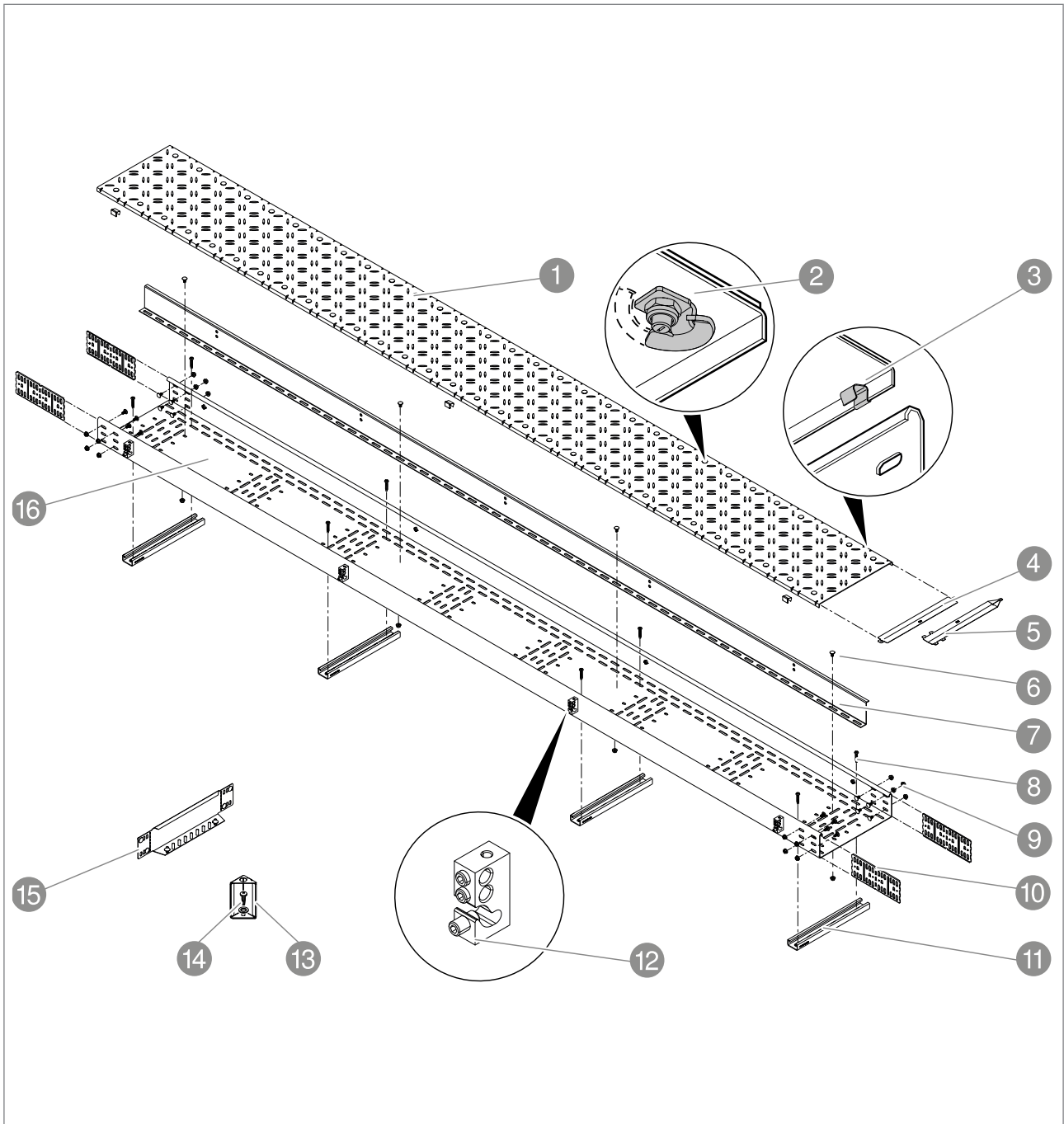


Abb. 2: System components for non-walkable conveyor system trays

Item	Designation	Function
①	Cover, type DBKR, made of strip galvanised, chequered sheet steel with increased slip protection	Conveyor system tray cover
②	Turn buckle Fastening of the DBKR cover to the cable tray	Fastening of the DBKR cover to the conveyor system tray
③	Cover clamp	Fastening of the DBKR cover to the conveyor system tray
④	Dust protection element	Protection against dirt and moisture from above
⑤	Variable dust protection element	Extension of dust protection element for angled joints
⑥	Truss-head bolt with hexagonal nut	Mounting of barrier strips
⑦	Z-shaped barrier strip	Cover support for conveyor system tray widths of > 200 mm With perforation for the installation of earthing terminals
⑧	MMS+ mounting rail tie	Mounting of conveyor system tray on floor with MS 4124 profile rail
⑨	Truss-head bolt and hexagonal nut with flange	Connection of the conveyor system tray with straight and angle connectors, reducers/stop-ends
⑩	Straight and angle connector	Connection of conveyor system trays
⑪	MS 4121 L FT profile rail	Near-floor mounting of the conveyor system tray
⑫	Connection terminal for conductor cable, single	Connection of the cable tray system with the protective equipotential bonding of the overall system
⑬	Cover support	Support of covers and fitting covers in cross-over areas
⑭	BS BKS KP drilling screw	Fastening of the cover support to the conveyor system tray
⑮	Reducer/stop-end 100 mm and 110 mm	Closure of open points, if conveyor system trays of different widths are connected, as well as closure of conveyor system tray ends
⑯	Conveyor system tray	Acceptance of the power and data cables

## 4 Mounting

The trays are suitable for mounting on MS 4112 profile rails or on support brackets.

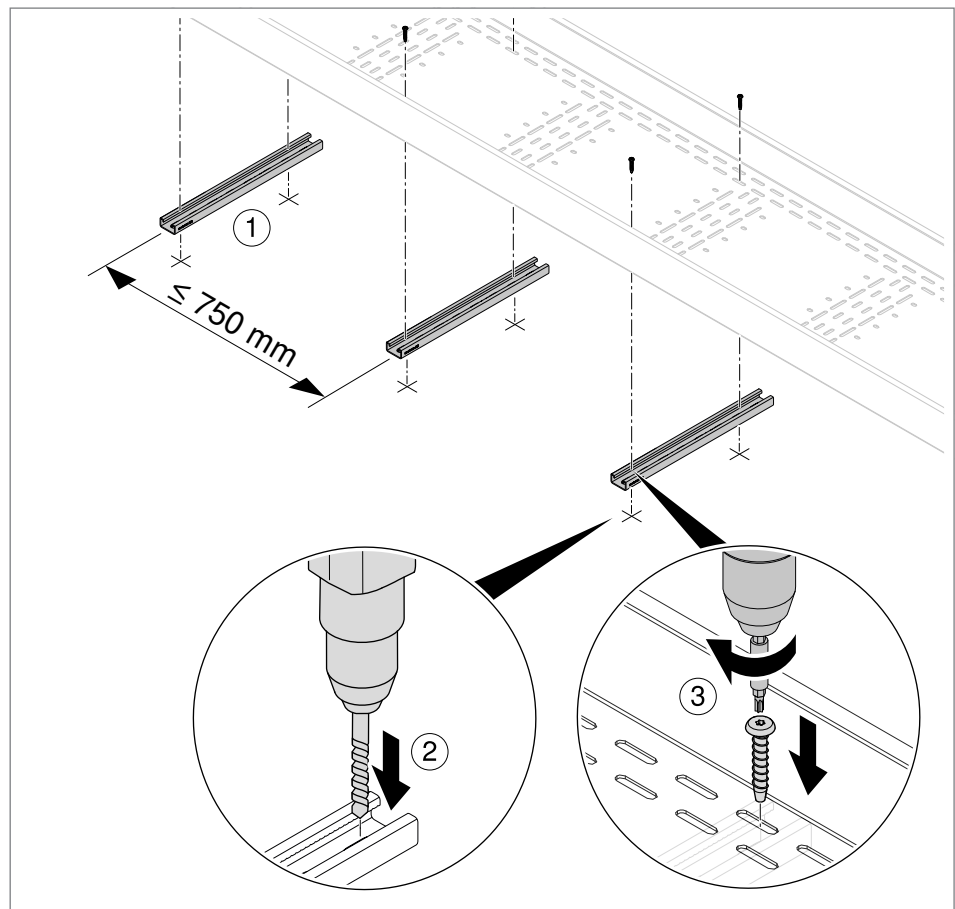
The maximum spacing of the support brackets or profile rails must be 750 mm if the stated load limits are to be achieved (approved loads under “BKRS cable tray” at [www.obo.de](http://www.obo.de)).

**Note!** *The order of mounting steps may change, depending on the conditions on the construction site!*

### 4.1 Mounting the cable tray/conveyor system tray on MS 4121 profile rails

**Note!** *When mounting the profile rails, it is helpful to use the bottom perforation of the tray.*

The MS 4121 profile rails are mounted to the floor with concrete screws. The trays are mounted directly through the slots in the tray base with the profile rail and the mounting rail ties.



**Fig. 3:** Profile rail mounting

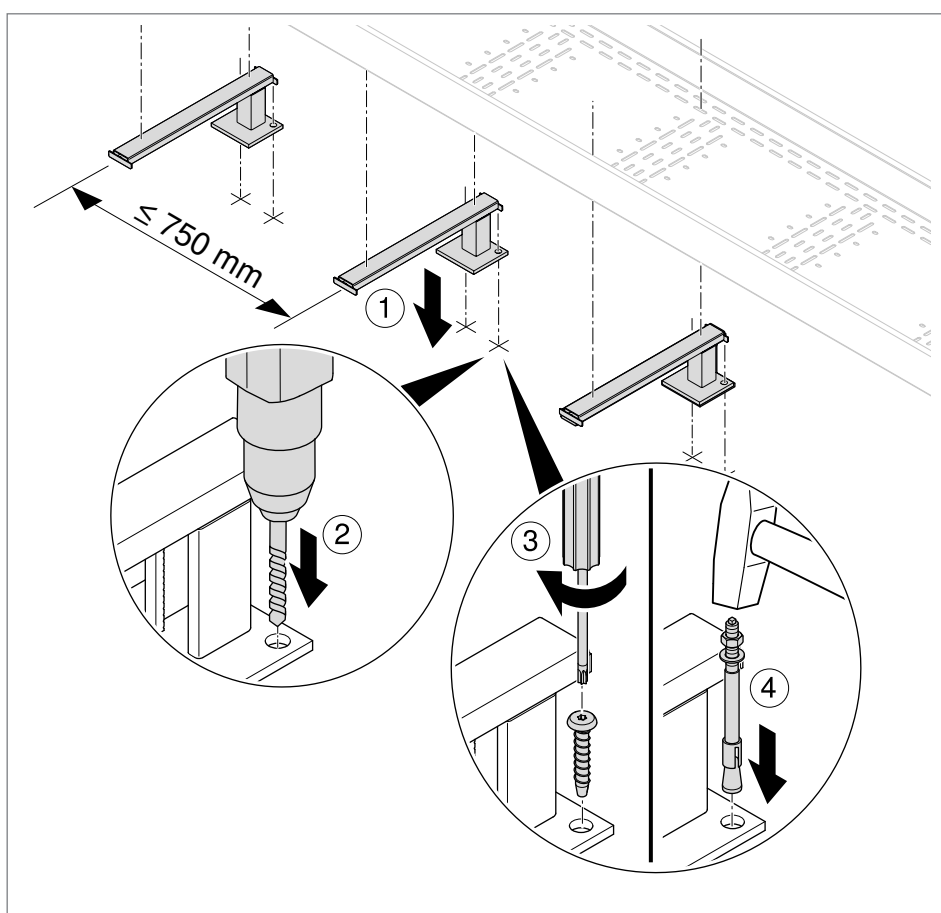
1. Align the profile rail so that it is suitable for floor mounting (①).
2. Drill the hole for the mounting rail tie (②).

- Position the tray and turn in the mounting rail tie (③).

## 4.2 Mounting the cable tray on support brackets

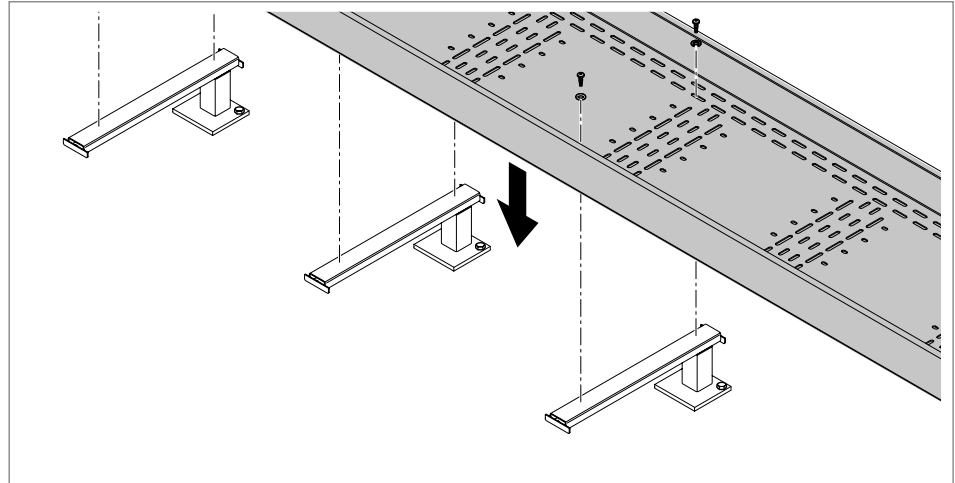
**Note!** *When mounting the support brackets, it is helpful to use the bottom perforation of the cable tray.*

The support brackets are mounted to the floor with concrete screws or bolt ties with washers and nuts. The cable trays are mounted on the support brackets through the slots in the base of the cable trays with drilling screws and washers.



**Fig. 4:** Mounting of support brackets

- Align the support brackets so that they are suitable for floor mounting (①).
- Drill the hole for the concrete screw or bolt tie through the corner hole of the baseplate of the support bracket (②).
- Screw in the concrete screw (③) or knock the bolt tie in with a hammer (④) and screw the support bracket tight with a nut.



**Fig. 5:** Mounting on support brackets

4. Mount the cable tray.

### 4.3 Connecting the trays

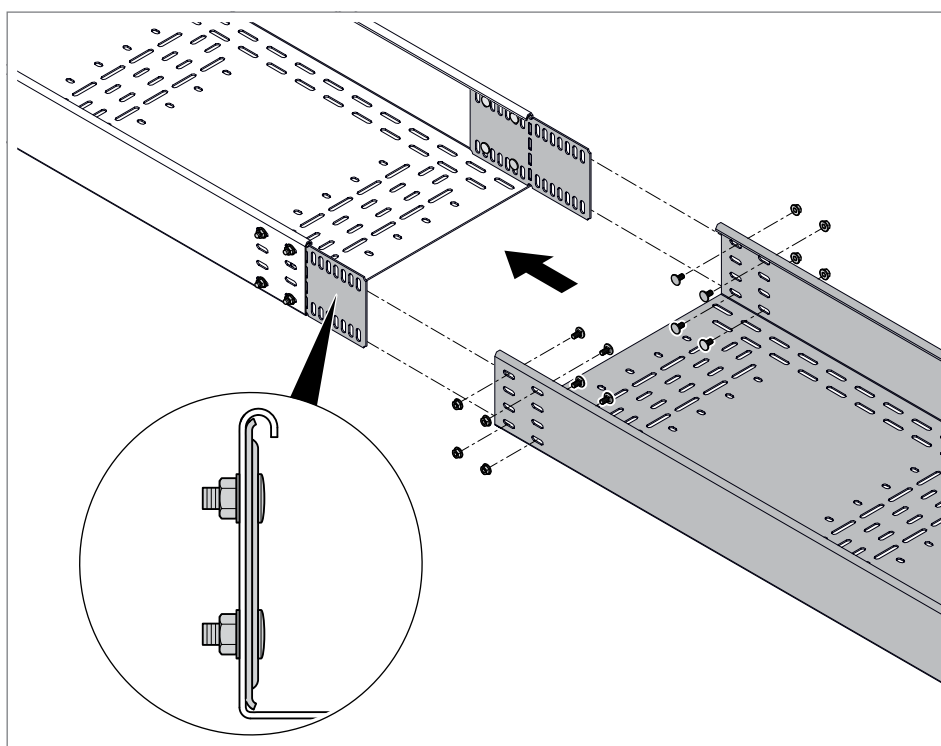
The trays are connected using straight and angle connectors.

The straight and angle connectors are screwed to the sides of the trays using the supplied fastening material.

Connect the trays so that they abut.

**Note!** *The straight and angle connectors are mounted on the inside. The nuts are screwed on to the outside.*

#### 4.3.1 Connecting cable trays in lengthwise direction



**Fig. 6:** Straight connection

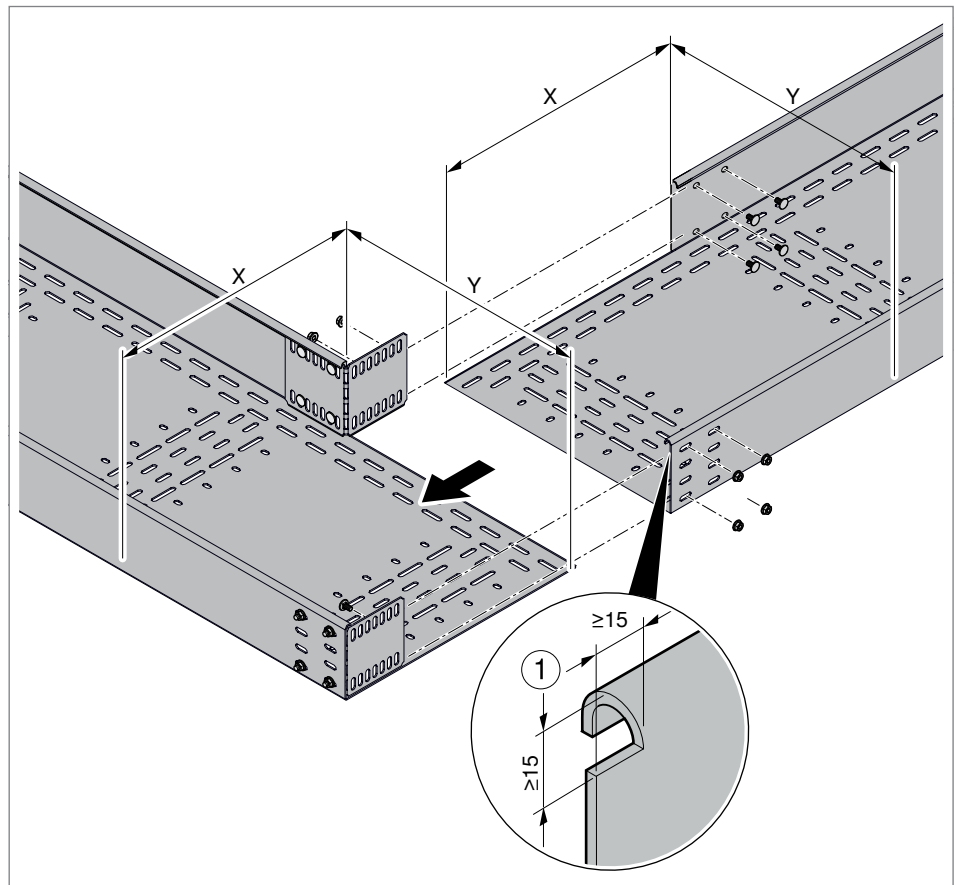
1. If necessary, create fastening holes (4x  $\varnothing 8$  mm) for the connectors on the side sections of the trays.

**Note!** *The DH DBKR cover lifter with integrated drill template can be used to create the connector holes.*

2. Screw two straight and two angle connectors to the first tray.
3. Push the second tray over the straight and angle connectors of the first tray.
4. Screw the second tray to the straight and angle connectors.

### 4.3.2 Connecting the trays as corners

**Note!** *With corner connections, the trays are mounted so that they overlap.*

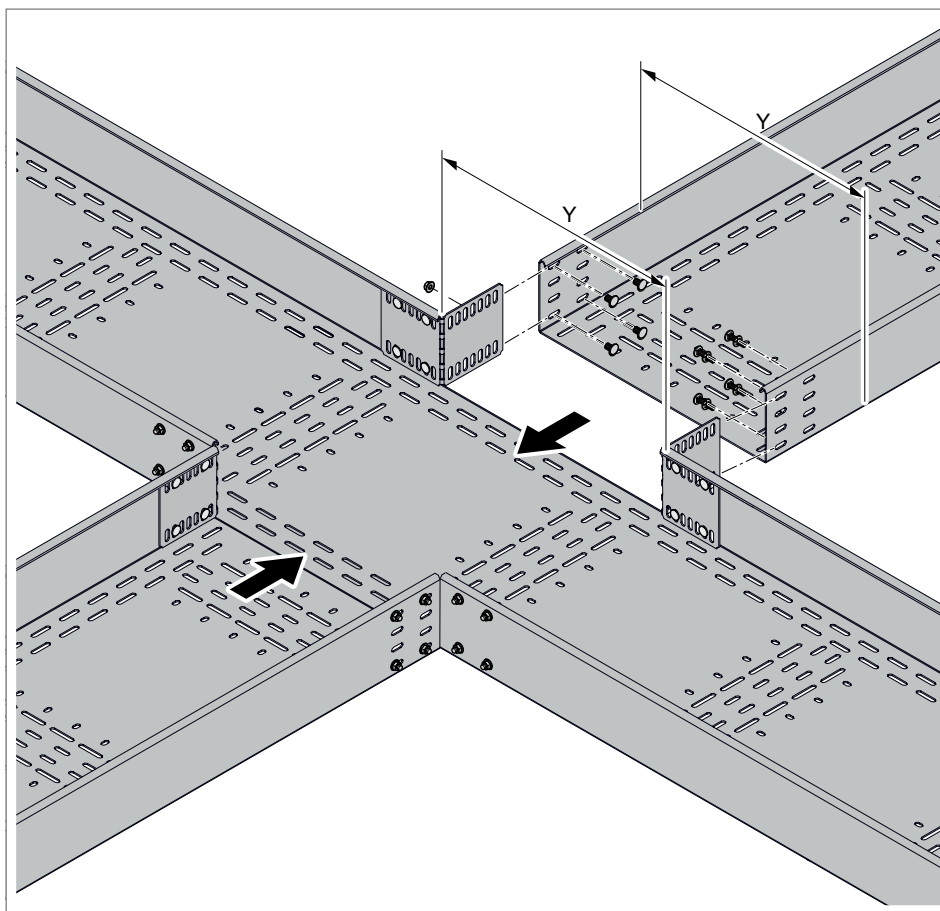


**Fig. 7:** Corner connection

1. Cut out the side parts of the trays by the dimensions x and y.
2. Notch out the corner (①).
3. Deburr cut edges to avoid cable damage.
4. If necessary, create fastening holes (4x  $\varnothing 8$  mm) for the connectors.
5. Bend the straight and angle connector in a 90° angle.
6. Screw the angle connector to the first tray.
7. Push the second tray over the straight and angle connectors of the first tray.
8. Screw the straight and angle connectors to the second tray.



### 4.3.3 Connecting the trays as cross-overs

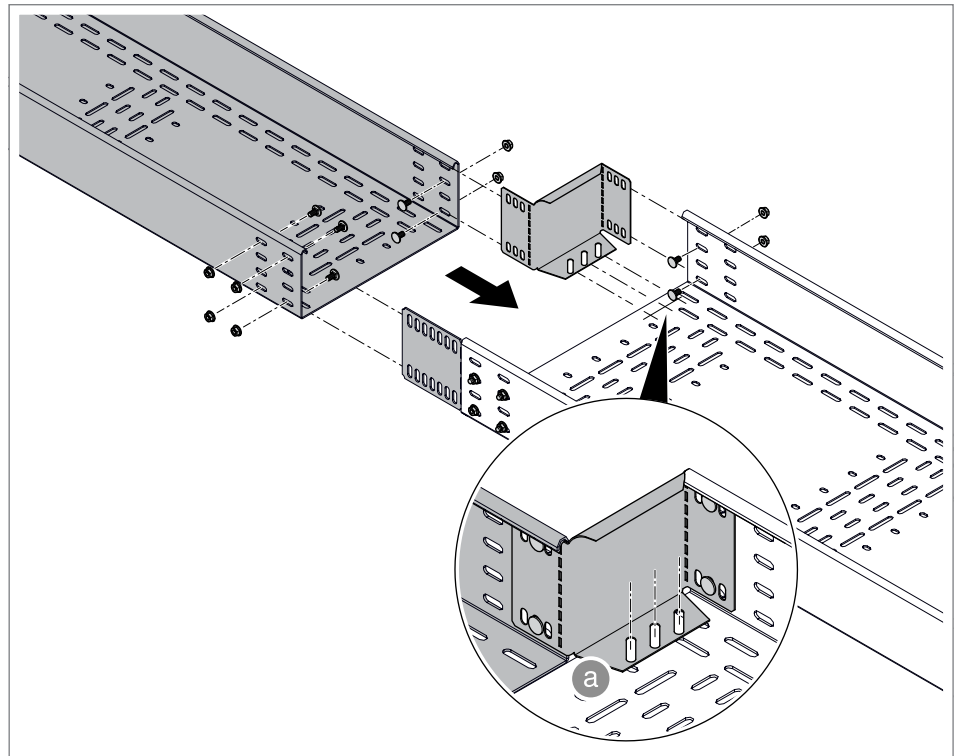


**Fig. 8:** Cross-connection

1. Cut out the side parts of the trays.
2. Deburr cut edges to avoid cable damage.
3. If necessary, create fastening holes (4x  $\varnothing 8$  mm) for the connectors.
4. Bend the straight and angle connector in a  $90^\circ$  angle.
5. Screw the angle connector to the first tray.
6. Push the second tray over the straight and angle connectors of the first tray.
7. Screw the straight and angle connectors to the second tray.

#### 4.3.4 Changing the tray width

If two trays with different widths are connected, then a straight and angle connector is replaced by a reducer/stop-end.



**Fig. 9:** Changing the tray width

1. Screw the first tray to the straight and angle connector on one side.
2. Bend the straps of the reducer/stop-end through a 90° angle.

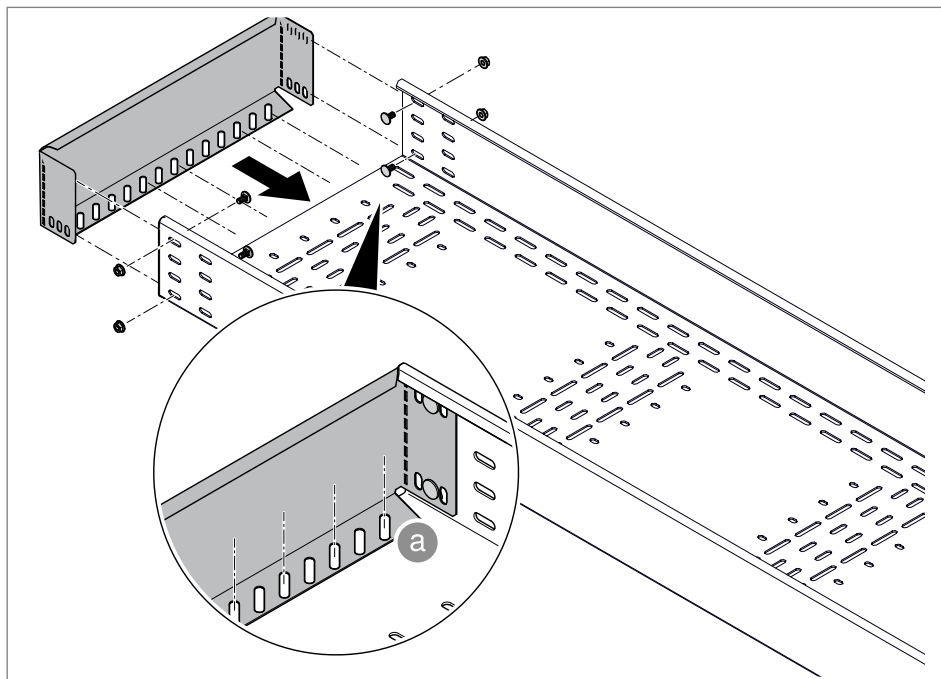
**Note!** *The lower flange (a) points into the tray during mounting.*

**Note!** *At widths above 150 mm, reducers/stop-end for 110 mm trays have a perforation in the lower flange, which can be used for screwing to the tray.*

3. Screw the reducer/stop-end to the first tray.
4. Push the second tray over the straight and angle connector and the reducer/stop-end of the first tray and screw it tight.
5. If necessary, screw the base of the tray to the lower flange of the reducer/stop-end.

### 4.3.5 Closing the open ends of trays

The open ends of trays are closed with a reducer/stop-end.



**Fig. 10:** Closure of open ends

1. If necessary, create fastening holes (2x  $\varnothing$  8 mm per side) for the connectors.
2. Bend the straps of the reducer/stop-end through a 90° angle.

**Note!** *The lower flange (a) points into the tray during mounting.*

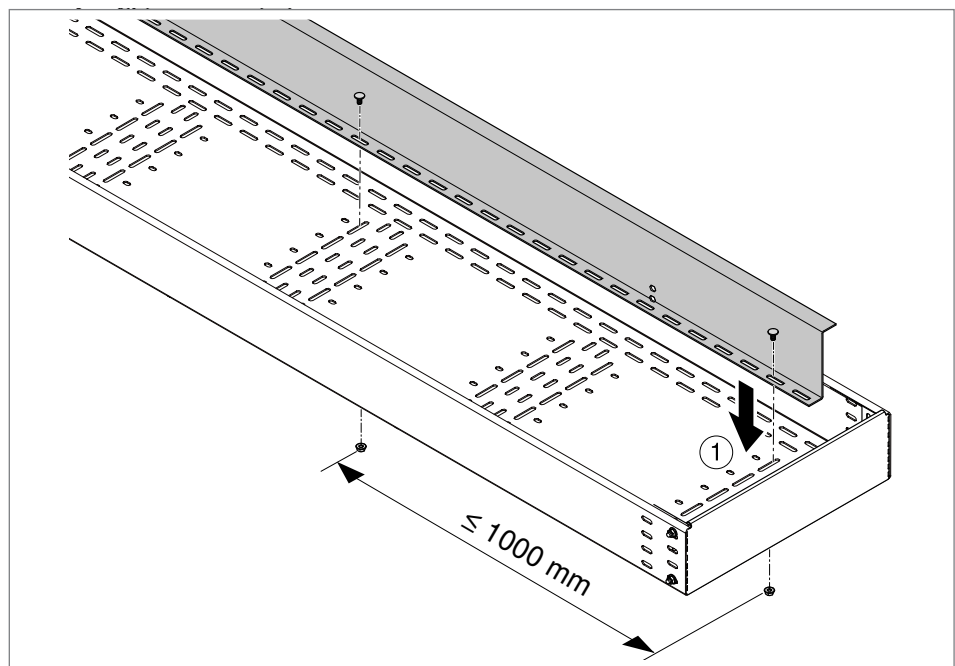
3. Push the reducer/stop-end into the tray.
4. Screw the reducer/stop-end to the tray.
5. If necessary, screw the base of the tray to the lower flange of the reducer/stop-end.

#### 4.4 Mounting Z-shaped barrier strips

In order to achieve the maximum permitted load, Z-shaped barrier strips must be placed in trays with a width > 200 mm. The distance between the barrier strips and the side wall or the next barrier strip may not exceed 200 mm.

The barrier strips can be shortened to any length.

**Note!** *The tray is divided asymmetrically by the barrier strips.*



**Fig. 11:** Barrier strip mounting

1. If necessary, cut the barrier strips to size.
2. Screw on the barrier strips through the bottom perforation at the start of the tray (①) using truss-head bolts and hexagonal nuts.
3. Screw on an additional truss-head bolt with hexagonal nut at least every 1,000 mm (at least 3 per tray length).

## 4.5 Creating protective equipotential bonding

Protective equipotential bonding must be realised in accordance with the VASS standard of VW AG. Protective equipotential bonding is created with conductor cable and connection terminals of type AKL 35 E DM. Depending on the mounting environment (chassis construction, mounting, conveyor systems) and the mounting type to the floor, the connection terminal is fastened with screw FKS M6x12 G as follows:

Unit	Stand-off mounting	Mounting on profile rail
Chassis construction	Underside of cable tray base	-
Installation	Underside of cable tray base	Internal side, edge of cable tray
Conveyor system	-	Outer side, edge of cable tray

**Tab. 1:** Connection terminal fastening points



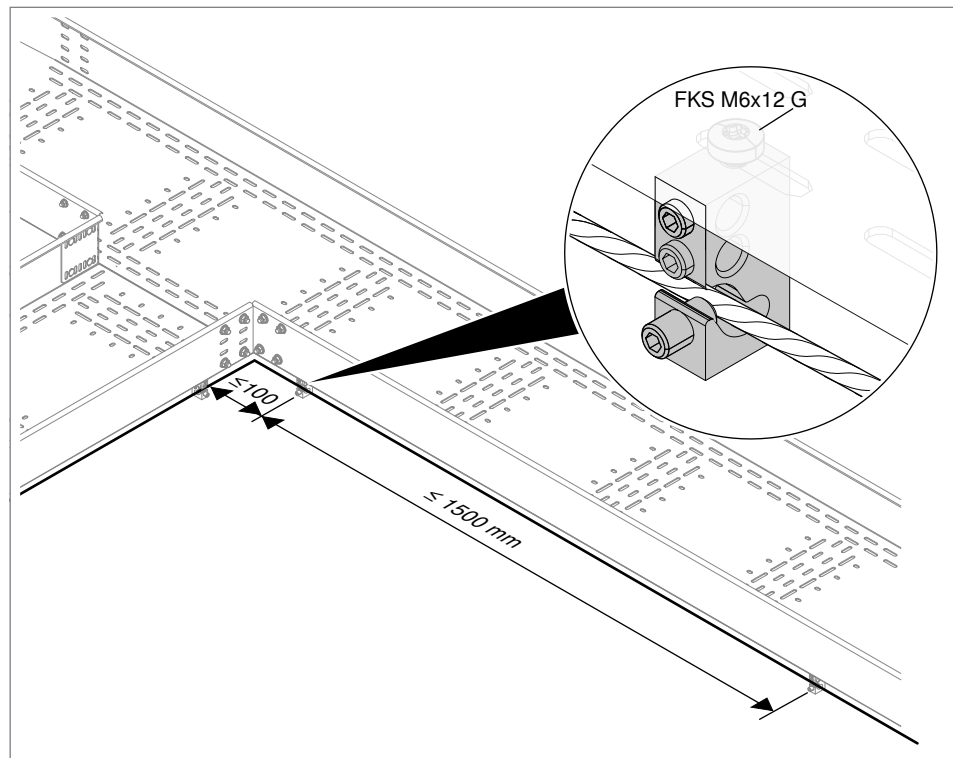
### Risk of electric shock!

Contact with electrical current can lead to an electric shock. Fatal or serious injuries are possible. Work on the electrical system may only be performed by electrical specialists.

**Note!** *The system must be connected to the protective equipotential bonding of the overall system at least once.*

**Note!** *A connection terminal must be fastened to the cable tray at least every 1,500 mm. For branches from 1°, a connection terminal must be fastened each 100 mm before and after the change of direction.*

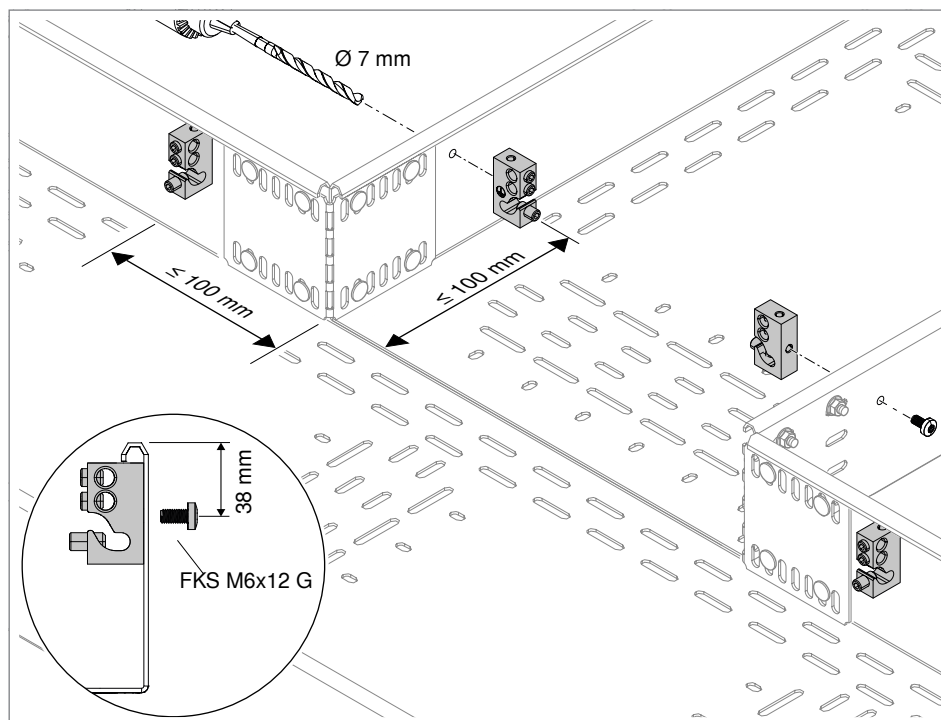
## “Chassis construction/mounting” protective equipotential bonding, stand-off



**Fig. 12:** Fastening the connection terminal, stand-off system

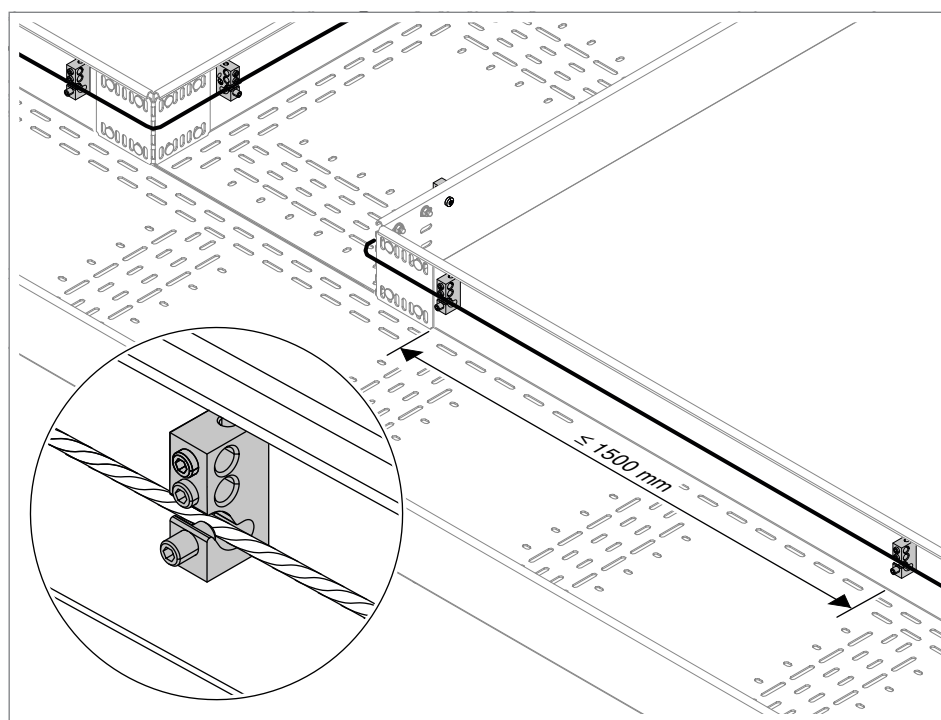
1. From above, push the FKS screw through the cable tray base.
2. Fasten the connection terminal to the underside of the cable tray base with the FKS screw.

### “Mounting” protective equipotential bonding on profile rail



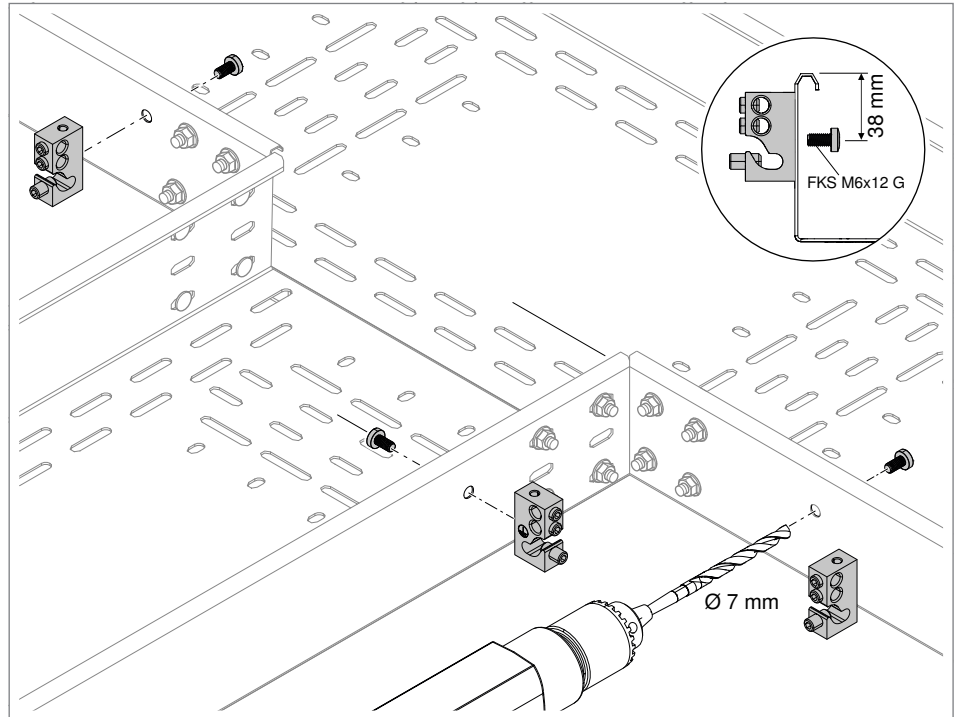
**Fig. 13:** Fastening the connection terminal, system to profile rail (“mounting”)

1. Drill a Ø 7 mm hole for FKS screw, distance from centre of drill hole to top edge of cable tray 38 mm.
2. Fasten the connection terminal to the internal side of the cable tray with the FKS screw.



**Fig. 14:** Distance of the connection terminal, system to profile rail (“mounting”)

“Conveyor system” protective equipotential bonding on profile rail

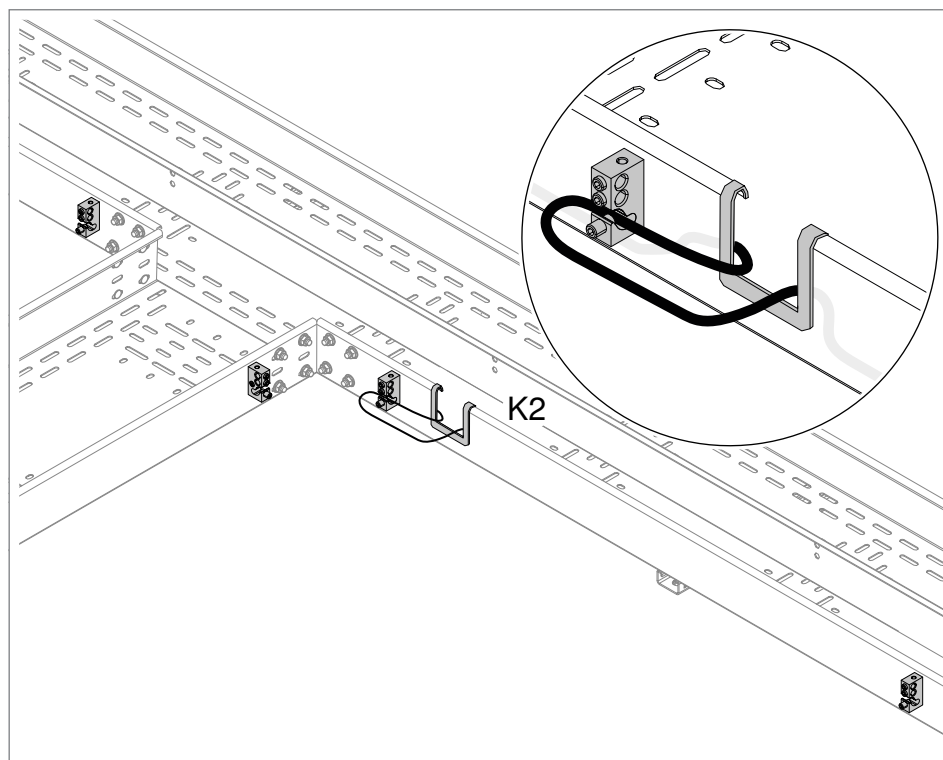


**Fig. 15:** Fastening the connection terminal, system to profile rail (“conveyor system”)

1. Drill a  $\text{Ø } 7 \text{ mm}$  hole for FKS screw, distance from centre of drill hole to top edge of conveyor system tray 38 mm.
2. Fasten the connection terminal to the outer side of the conveyor system tray with the FKS screw.



**Note!** *The conductor cable is laid within the cable tray in chamber 2 (K2). If a connection to a device or component is necessary, or if a branch is created, the conductor cable is run out of the cable tray via a cut-out. It is connected to the connection terminal and pulled back into the tray (see also the VASS standard of VW AG on equipotential bonding).*



**Fig. 16:** Distance of the connection terminal, system to profile rail ("conveyor system")

## 4.6 Mounting covers

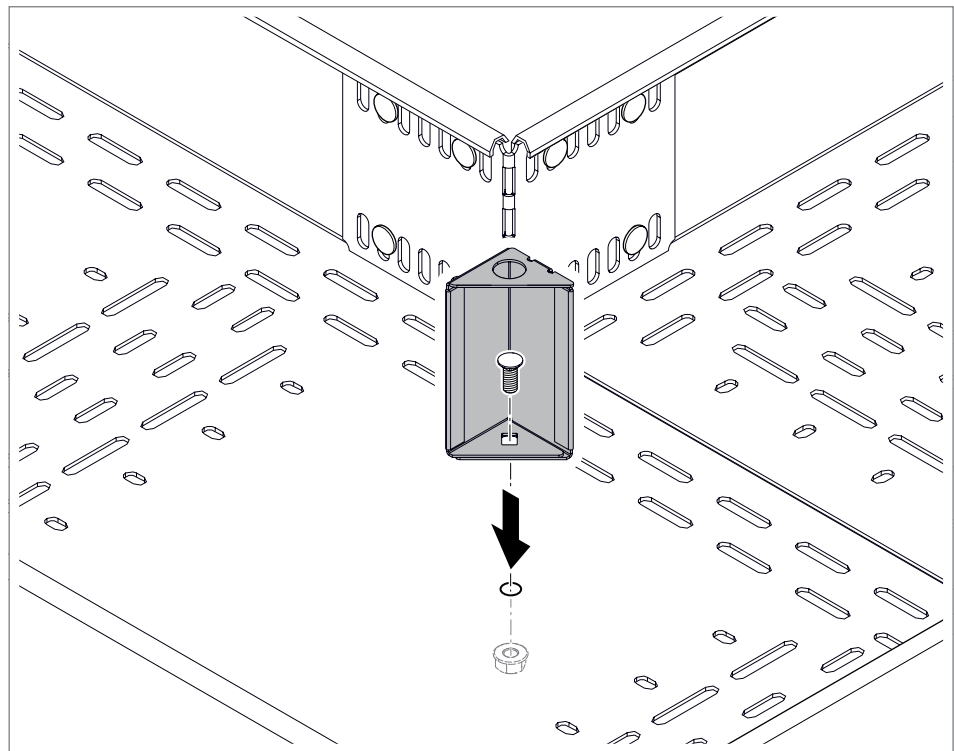
The covers can be shortened to any length.

The cover, type DBKR, is mounted to the tray either with cover clamps or turn buckles, which are inserted in the cover at a later time.

A dust protection element is used at the joints of two covers. If covers are positioned next to each other at a mitre, the variable dust protection element is also used.

### 4.6.1 Mounting the cover support

In cross-over and corner areas, cover supports must be mounted instead of the missing barrier strips. One or more cover supports are mounted corresponding to the number of barrier strips, depending on the tray width. With a width of up to 400 mm, one cover support is enough and is mounted in the centre of the cross-over or corner area. From a width of 400 mm, at least two cover supports are required.



**Fig. 17:** Installation of cover support

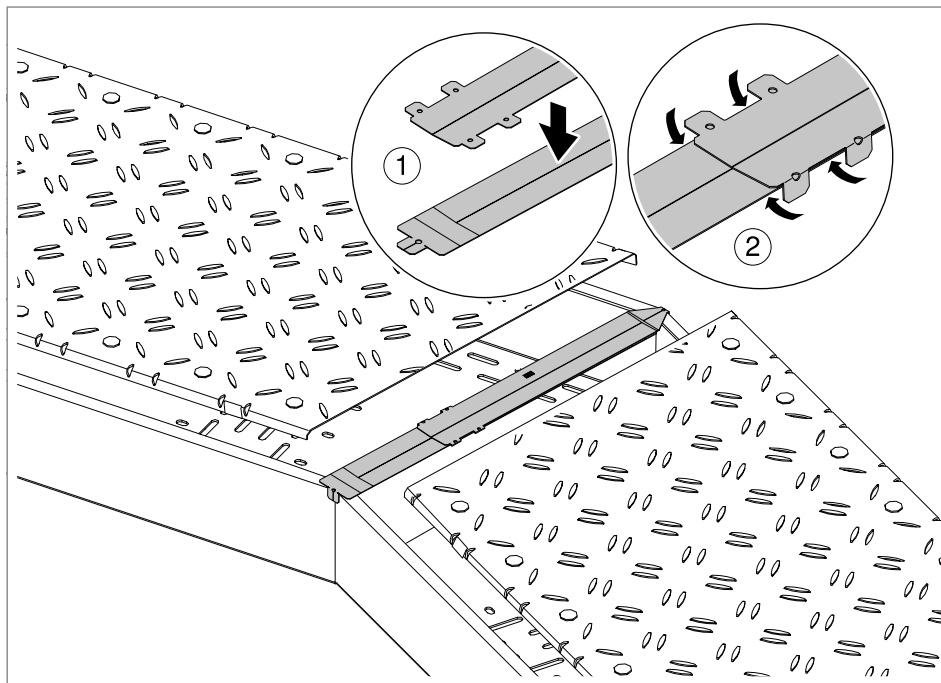
1. Drill hole in the base of the tray for FRSB M6x16 truss-head bolt.
2. Screw the cover support to the base of the tray with a truss-head bolt and combined nut.

**Note!** *The metal plate of the cover support is double-folded at the edges, to protect the cables from damage when being pulled through or laid.*

#### 4.6.2 Extending the dust protection element

If trays are cut with a mitre, the dust protection element must be extended with the variable dust protection element in order to ensure protection along the entire mitre.

**Note!** *From a tray division > 200 mm in width created by a barrier strip, the dust protection element must be supported with one or more cover supports or barrier strips.*



**Fig. 18:** Mounting the dust protection element with extension

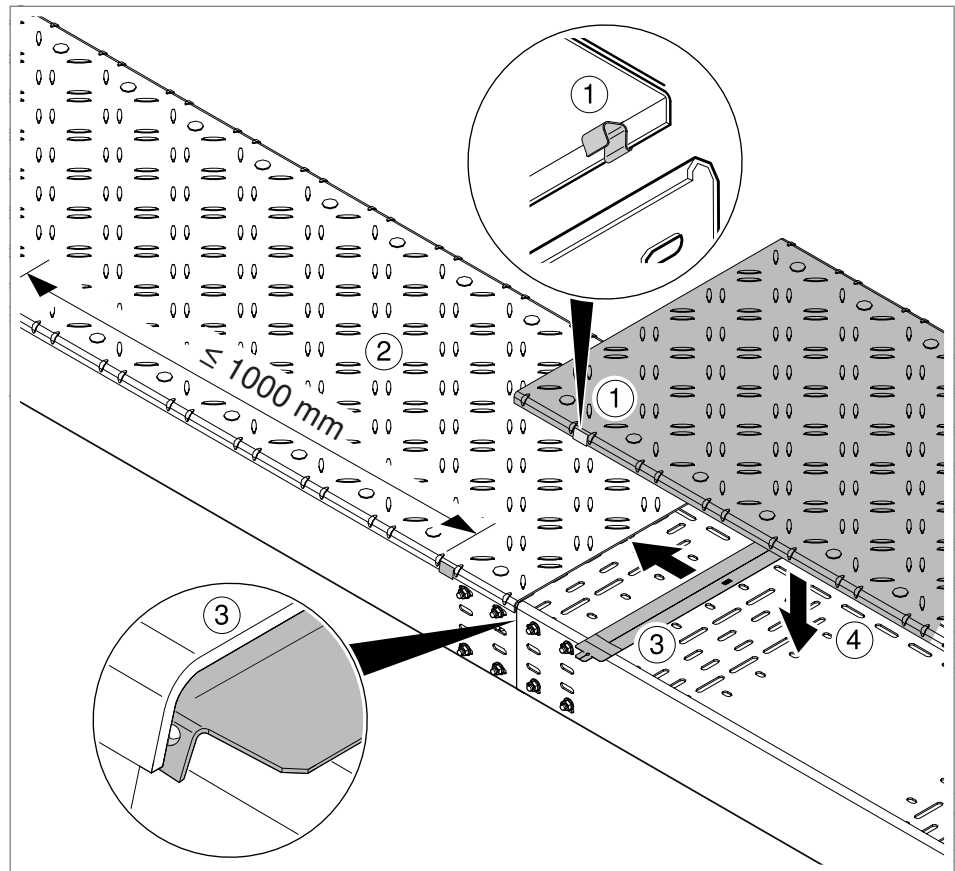
1. Place the variable dust protection element on the dust protection element.

**Note!** *The beading of the two dust protection elements points downwards so that the dust can gather in the recess.*

2. Bend the straps on the variable dust protection element by 180° to connect the two elements.

### 4.6.3 Mounting the cover with cover clamps

The cover clamps are mounted at the edge of the cover between two ribs of a pair of corrugations.



**Fig. 19:** Mounting the cover, type DBKR, with cover clamps

1. Fasten the cover clamp at the start of the cover (①).
2. Mount an additional cover clamp at least every 1,000 mm (at least 3 supports per cover side).
3. Fasten the first cover to the tray with cover clamps (②).
4. Fold the dust protection element at the ends and push it up to half-way under the cover joint (③).
5. Fasten the next cover to the tray with cover clamps (④).

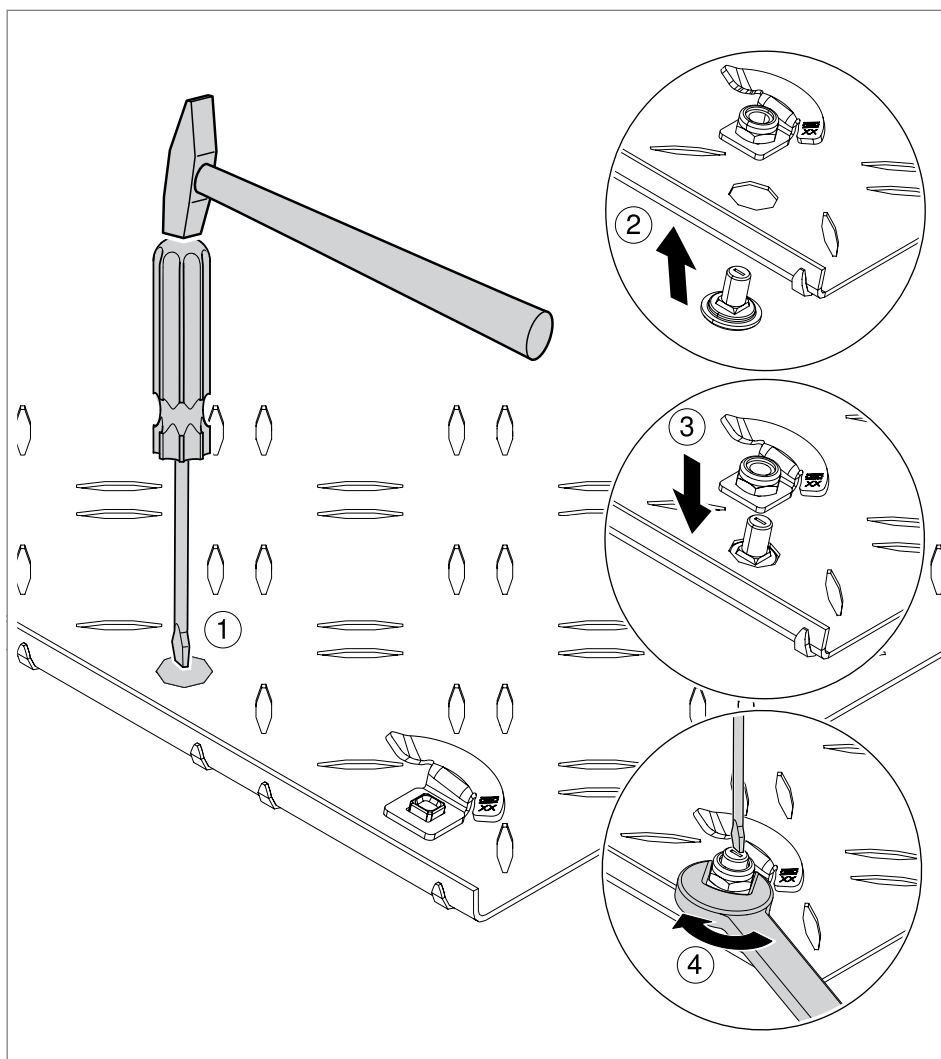
**Note!** *The last cover at end of each system is also fixed to the cover clamps, e.g. with a turn buckle, to prevent it from slipping when walked on.*

**Note!** *Edges of covers must abut the barrier strips to prevent a trip hazard due to lowering when walked on.*

#### 4.6.4 Mounting the cover with turn buckles

##### Mounting the turn buckle, type DRL H S FT

The turn buckle, type DRL H S FT, is screwed to the cover.



**Fig. 20:** Mounting the turn buckle, type DRL H S FT

1. Knock out the break-out opening on the cover using a flattener (16–20 mm) or screwdriver (①).
2. Insert the turn buckle button to the top side of the cover (②).
3. From below, place the helical shape against the turn buckle button (③).
4. Lock the nut on the helical shape (④).
5. Mount an additional turn buckle at least every 900–1,000 mm (at least 3 supports per tray side).

Fastening the cover with turn buckles

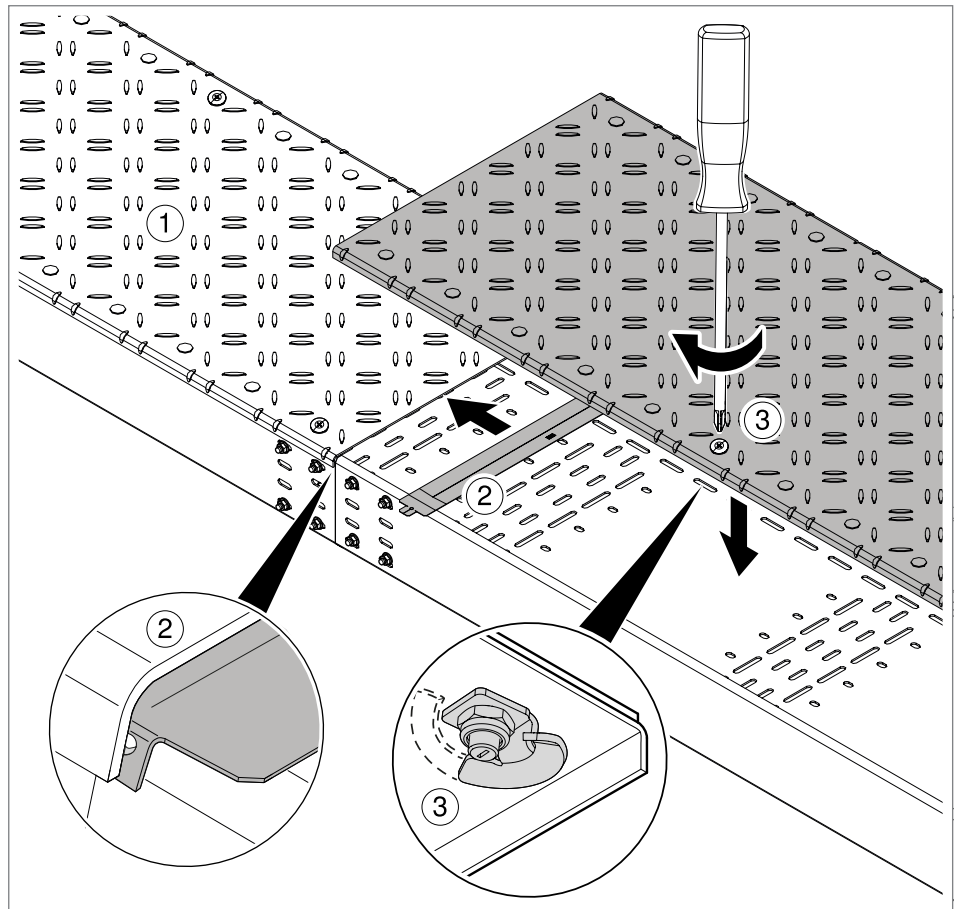
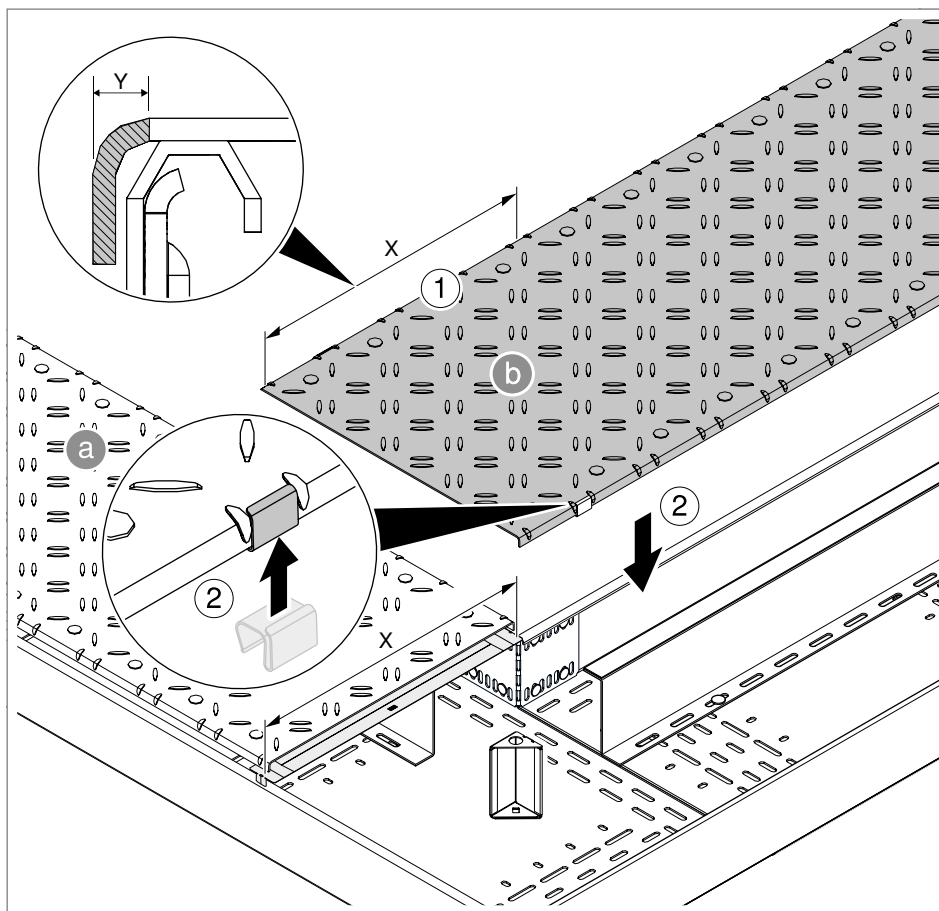


Fig. 21: Mounting of cover type DBKR with turn buckle

1. Attach the first cover (①).
2. Fold the dust protection element at the ends and push it up to half-way under the cover butt (②).
3. Fasten the turn buckle of the cover to the cable tray (③).
4. Fasten the next cover to the cable tray with turn buckles.

## 4.6.5 Mounting the cover on a corner connection



**Fig. 22:** Mounting the cover on a corner connection

1. If necessary, cut the cover to size.
2. Fold the dust protection element at the ends and place at the joint.
3. Position the cover **a** and fasten it to the tray with cover clamps or turn buckles.
4. Notch out the joint edge of the cover **b** along length  $x$  and width  $y$  (①).
5. Deburr cut edges to avoid cable damage.
6. Fasten the cover to the tray with cover clamps or turn buckles (②).

4.6.6 Mounting the cover on a cross-connection

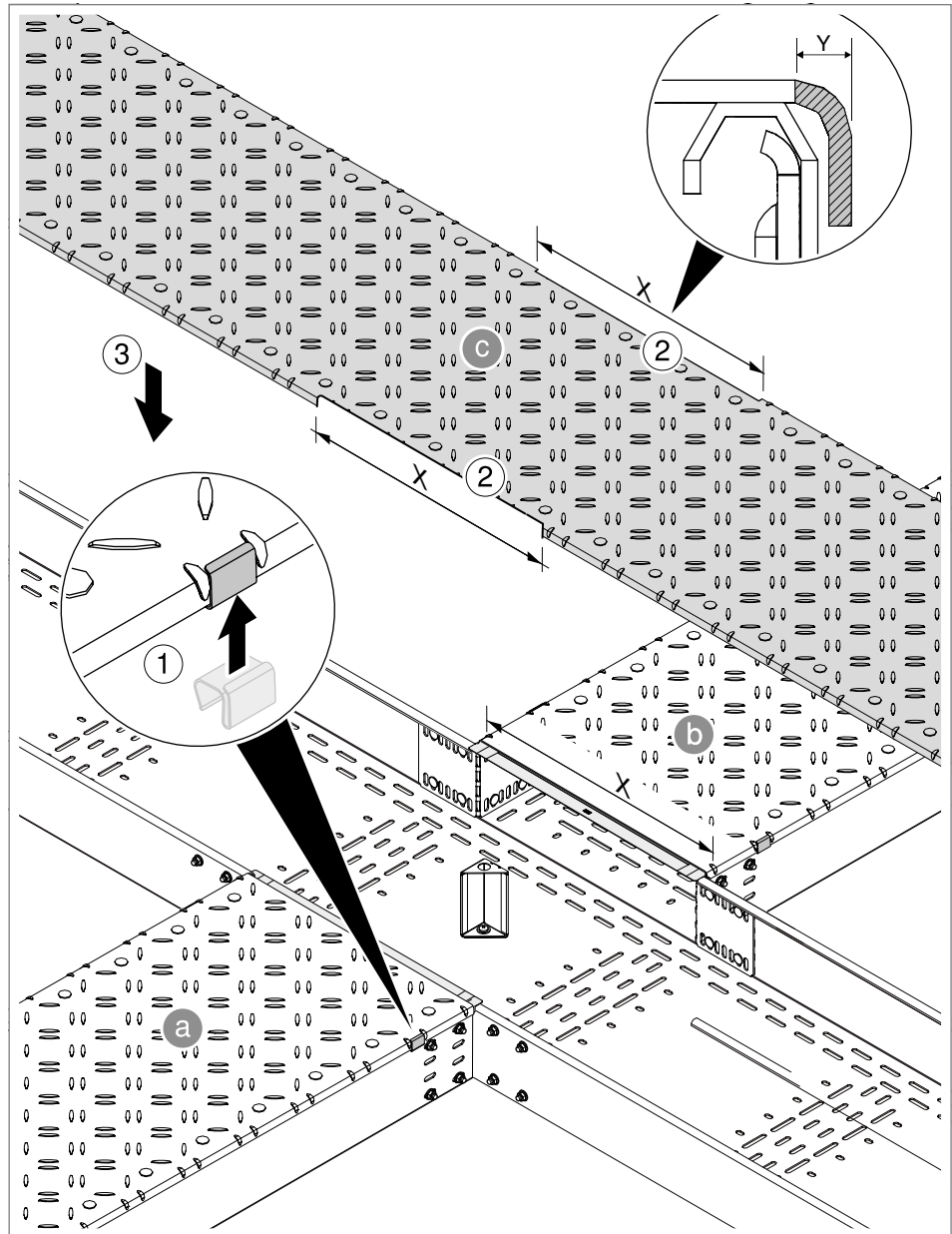


Fig. 23: Mounting the cover on a cross-connection

1. If necessary, cut the cover to size.
2. Fold the dust protection elements at the ends and place them at the joints.
3. Fasten covers **a** and **b** to the tray with cover clamps (1) or turn buckles.
4. Notch out the joint edges of the cover **c** along length  $x$  and width  $y$  (2).
5. Deburr cut edges to avoid cable damage.
6. Fasten the cover **c** to the tray with cover clamps or turn buckles (3).



## 5 Maintenance

The stability and function of the BKRS walkable cable tray systems and the conveyor system trays can be impaired by external influences, such as damage or machine vibrations.

Loose connection elements must be retightened and damaged parts replaced. In addition, we recommend regular checks to see if the connection to the overall equipotential bonding is still intact.

## 6 Dismantling

The BKRS walkable cable tray systems and conveyor system trays are dismantled in the reverse order to mounting.

## 7 Disposal

1. Residual metal: As scrap metal
2. Packaging: As household waste

Comply with the local waste disposal regulations.

**OBO Bettermann Holding GmbH & Co. KG**

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**Building Connections**

