Connecting Strength



K2 Systems recommendation

Equipotential Bonding and Lightning Protection

for PV mounting systems

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General notes

Basic information

- Below you will find recommendations on how to establish equipotential bonding and lightning current carrying connections for various mounting systems from K2 Systems.
- K2 Systems GmbH expressly points out that the use of the components mentioned is only a recommendation. Alternatively, lightning protection components from other manufacturers can also be used.
- An existing lightning protection system must not be impaired in its effect by a PV system. In any case, the lightning protection concept must be coordinated with a lightning protection planning office or a lightning protection specialist.
- A lightning protection system to be installed must be designed in such a way that it fulfils its function even without a PV system.
- When planning and executing the connections between cables and the mounting system, permanently suitable materials must be selected, taking into account the electrochemical voltage series, in order to avoid contact corrosion. The components listed below are required in addition to the articles of the mounting system. Alternatively, additional or different connection terminals can be obtained directly from specialist suppliers.
- With regard to planning and execution, the national and local standards must be observed. We would like to point out that the recommendation was prepared on the basis of German standards.
- Requirements with regard to planning can be found in the relevant standards.
- Recommendations or installation instructions of the module manufacturer must be observed.
- Normatively, module frame earthing is not required. Exceptions exist if the module manufacturer specifies frame earthing, which is increasingly the case. We therefore recommend checking the installation instructions of the module. If necessary, each module frame must be included in the equipotential bonding!
- Equipotential bonding should ideally be installed in such a way that modules can be removed from the layout in the event of service without the equipotential bonding losing its function.

General notes

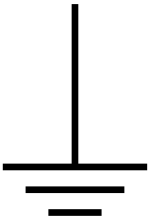
Equipotential bonding & earthing

- If points are conductively interconnected to varying potentials, the potential difference between them is balanced out. The electrical voltage between the points can no longer be measured, thus establishing equipotential bonding.
- The connection of a point on the electrical system to the ground is called earthing. This can fulfil certain tasks, such as Protection against the direct and indirect effect of an electric shock (personal protection).
- Lightning protection
  - Ensuring electromagnetic compatibility
  - Protective or functional earthing of certain equipment, such as power inverters
- Equipotential bonding and an earthing system complement each other to form an effective protection system.
- Equipotential bonding must always be added to PV systems in accordance with VDE 0100. This applies to all conductive and exposed components.

Equipotential bonding



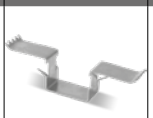
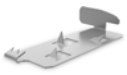
Earthing



Equipotential bonding / TerraGrif earthing components

- Equipotential bonding/TerraGrif earthing system: Simple and fast module earthing solution for all K2 mounting systems
- Attention: For technical reasons, an equipotential bonding/TerraGrif cannot be used again after it has been used once and removed again.
- Please also observe the equipotential bonding assembly instructions k2-systems.com/equipotential-bonding

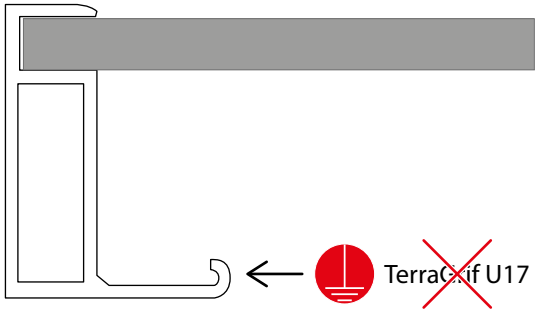
Overview of equipotential bonding/TerraGrif variants

	K2SZ	U17	QL	PL	K2MI Duo 18	K2PA	S	Cross Connector Clip
Image								
Compatibility								
K2 Clamp	●*	○	●	○	○	○	○	○
XS Clamp	●	○	○	○	○	○	○	○
FacadeClamp	○	○	●	○	○	○	○	○
AddOn assembly	○	○	○	○	○	●	○	○
Dome Clamp	○	○	○	○	●	○	○	○
Dome 6 Connector ***	○	○	○	●	○	○	○	○
InsertionRail 2.0	○	●	○	●	○	○	○	●**
InsertionRail***	○	○	○	○	○	○	●	○
Bottom edge of module frame	○	●	○	○	○	○	○	○
Item number	2001881	2000056	2004231	2004102	2003542	2000055	2002397***	2004916**
Std. tolerance value	Norm DIN 2095 grade 2							ISO 8015
Material	Stainless steel 301 TA							1.4310 C1300
Norm	NFA 35573							DIN 6930-2m
Weight [g]	3.2	1.8	4.2	1.15	3.6	2.4	1.5	2.64
Dim. W × H × D [mm]	10 × 16 × 60	20 × 5.8 × 17	17.5 × 9 × 45	22 × 10 × 8	40 × 11.7 × 36	10 × 31.7 × 12	10 × 13.5 × 21	44.5 × 8.1 × 23
Thickness [mm]	0.5							

● Compatible ○ Not compatible

* Only with K2 Clamp MC
** Only compatible when used together with CrossConnector T
*** Phase out item

When using a **TerraGrif U17**, check the geometry of the module frame beforehand. If the underside of the module frame is rounded (see illustration on the right), the TerraGrif U17 cannot be used. If it is unclear which TerraGrif you need to use, please contact Technical Support at the e-mail address: service@k2-systems.com



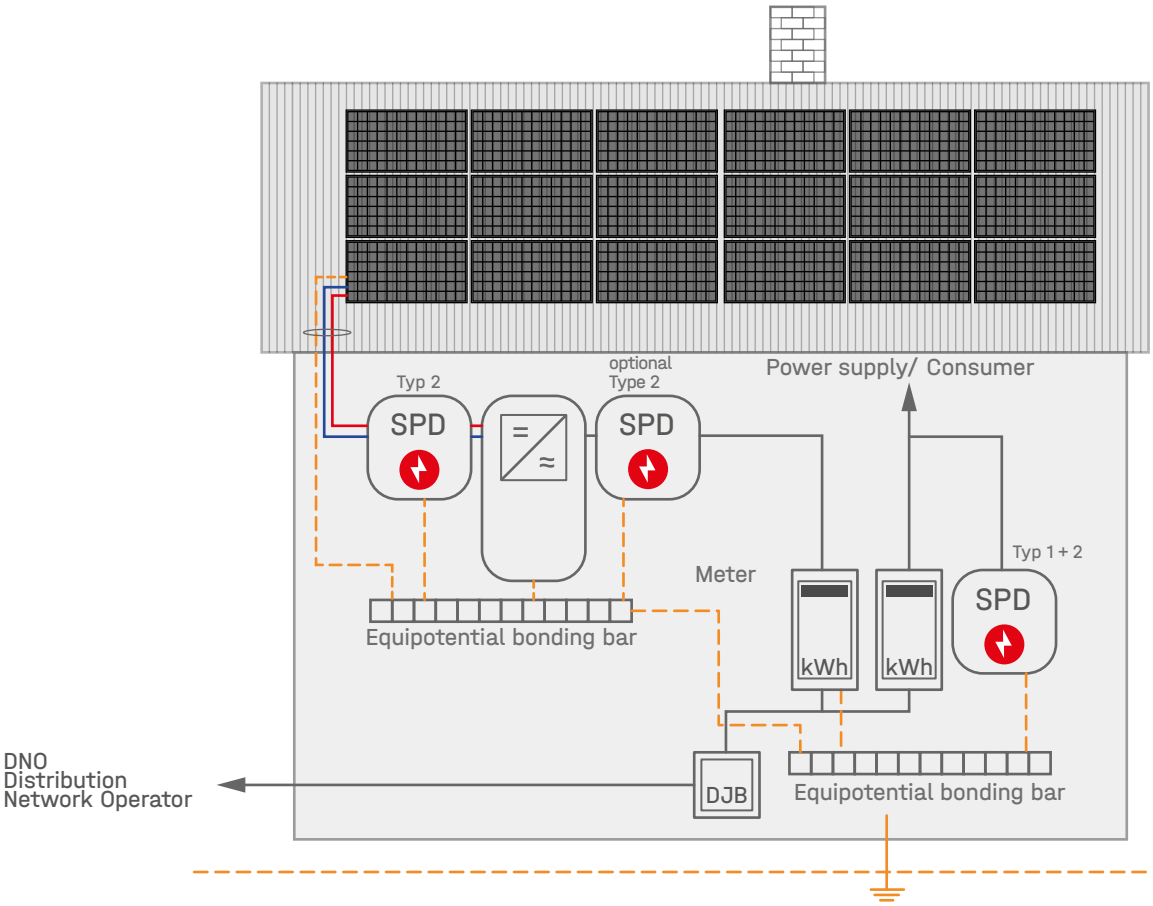
General notes

Lightning protection

- A lightning protection system is deemed to be precautions against the adverse effects of lightning strikes on buildings.
- Due to its strong electromagnetic field, the lightning can also indirectly affect electrical cables or metal parts, such as pipes within a building, and cause damage.
- A lightning strike can cause fires.
- A lightning protection system cannot provide absolute protection.
- External lightning protection: External lightning protection provides protection against lightning strikes that would directly hit the system to be protected. It consists of interception devices, lightning conductors (lightning conduction system) and an earthing system.
- Internal lightning protection: The overvoltage protection, which constitutes the internal lightning protection, consists of measures against overvoltage of all kinds. The effects of a lightning strike up to about 1.5 km away are also transferred to installations as well as electrical and electronic systems within the physical structure. Internal lightning protection also protects against effects from the mains.
- Protection of property (objects) and persons

Lightning protection example 1

- If external lightning protection is not available, no lightning protection needs to be established for the PV system.
- The choice of overvoltage protection devices should be made in accordance with DIN EN 62305-33



DJB = Domestic junction box

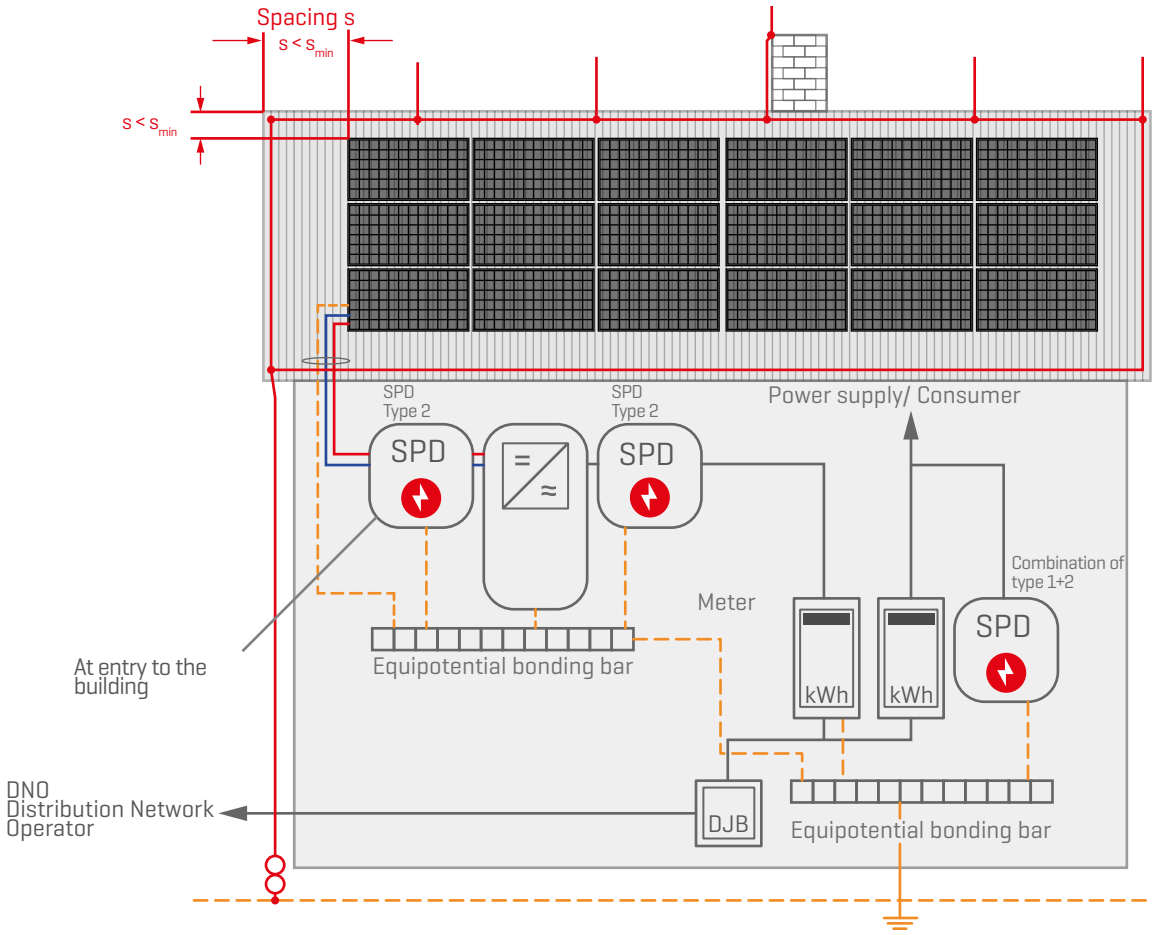
SPD = Overvoltage protection, SPD (Surge Protective Device)

= Power inverter

General notes

Lightning protection example 2

- External lightning protection is available, but the spacing "s" can be observed. The system is not integrated!
- Note the requirements for overvoltage protection (mains entry) in accordance with DIN EN 62305-3!



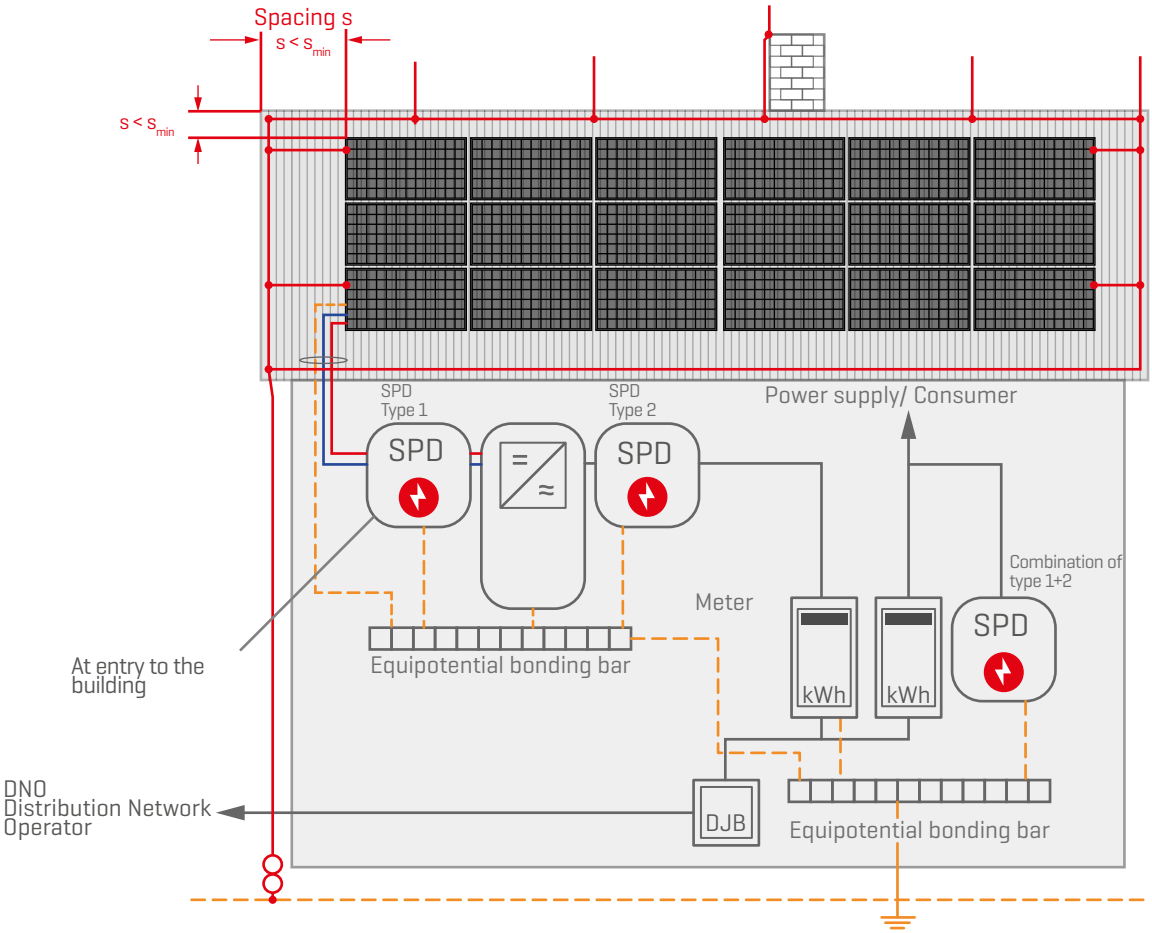
DJB = Domestic junction box

SPD = Overvoltage protection, SPD (Surge Protective Device)

= Power inverter

Lightning protection example 3

- External lightning protection is available, but the spacing "s" cannot be observed. The system is integrated!
- Note the requirements for overvoltage protection (mains entry & building entry) in accordance with DIN EN 62305-3!



DJB = Domestic junction box

SPD = Overvoltage protection, SPD (Surge Protective Device)

= Power inverter

General notes

Lightning protection spacing

Spacing:

- The spacing ''s'' is calculated using the following formula in accordance with DIN EN 62305-3. It is not a standard value!
- Typical values for ''s'' are between 30 and 70 cm. The empirical formula ''s'' = 50 cm cannot be used safely!
- Typical error in calculating ''s'': The material factor for solid materials on the roof covering is $k_m = 0.5$
- Software can be used for the calculation, e.g. DEHN Distance Tool
- If the spacing is to be observed, all parts of the PV system must comply with this (modules, frame, cables, earthing))

$$s = k_i \times \frac{k_c}{k_m} \times l(m)$$

s = spacing

k_i = induction factor (depending on the lightning protection class).

k_c = current distribution coefficient: $k_C = \frac{1}{2n} + 0{,}1 + 0{,}2 \times \sqrt[3]{c}$

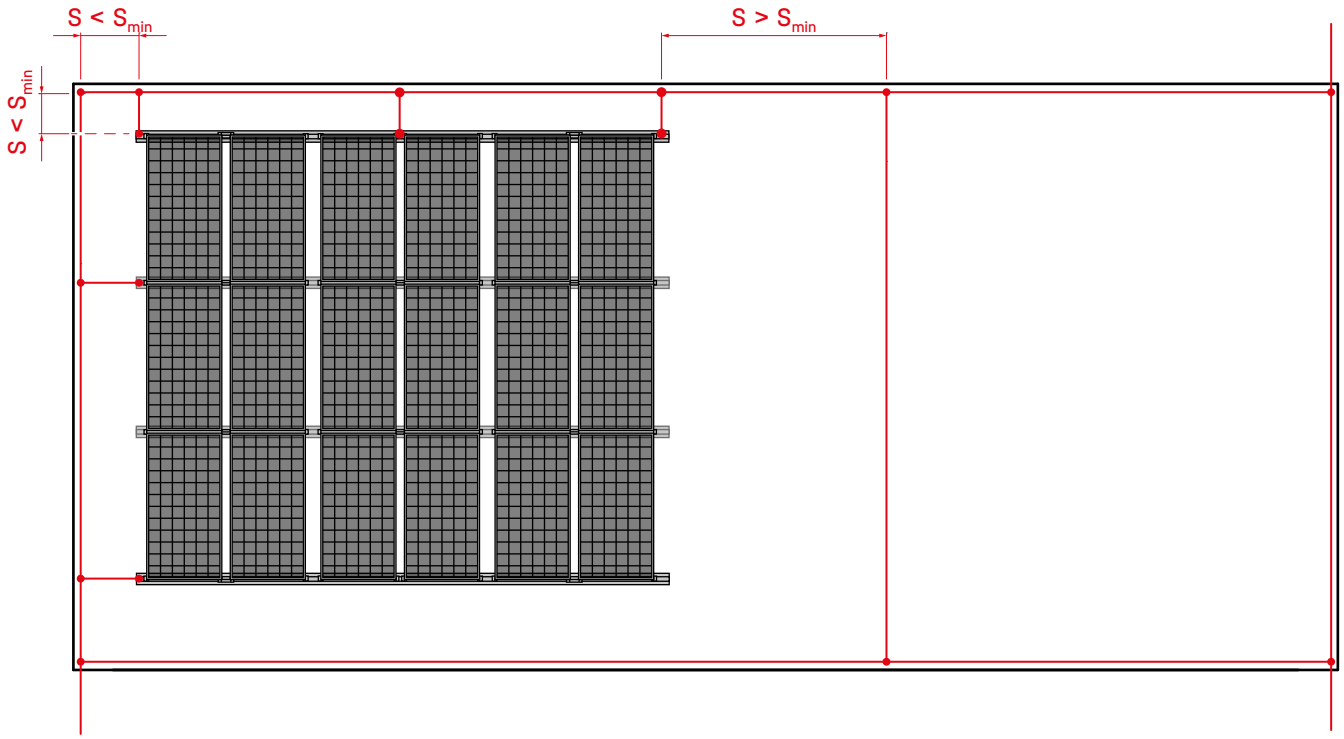
k_m = material factor: insulation properties of the environment

l(m) = distance from the point of proximity, usually the distance to the foundations (''minimum distance'')

Literary reference for the calculation: DEHN Lightning Planner, Wagner & Co. Lightning Protection Guide

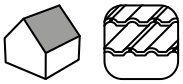
Lightning current capacity of mounting systems

- If a mounting system is integrated into a building's existing external lightning protection, the connection to the mounting system must be designed in such a way that it is capable of carrying lightning current. However, as the mounting system is not used as a power output, it does not need to be capable of carrying lightning current because the existing lightning protection takes on this function.
- A mounting system is only required to have lightning current carrying capacity if the mounting system replaces part of the external lightning proection system and so must then perform lightning discharge functions. In the case of flat roofs, this can occur with larger roofs (new construction); in the case of pitched roofs, this is not to be expected!
- It is essential that the planning to integrate the system into the existing external lightning protection and therefore also the number of connections for the external lightning must be carried out by a lightning protection specialist.
- It is important to ensure that the power input and output are designed with different cross-sections depending on the function.
- We recommend a minimum cross-section of ≥ 6 mm² copper or ≥ 16 mm² aluminium for the electrical connection of the equipotential bonding.
- We recommend a minimum cross-section of ≥ 16 mm² copper or ≥ 25 mm² aluminium for the electrical connection to the lightning protection.

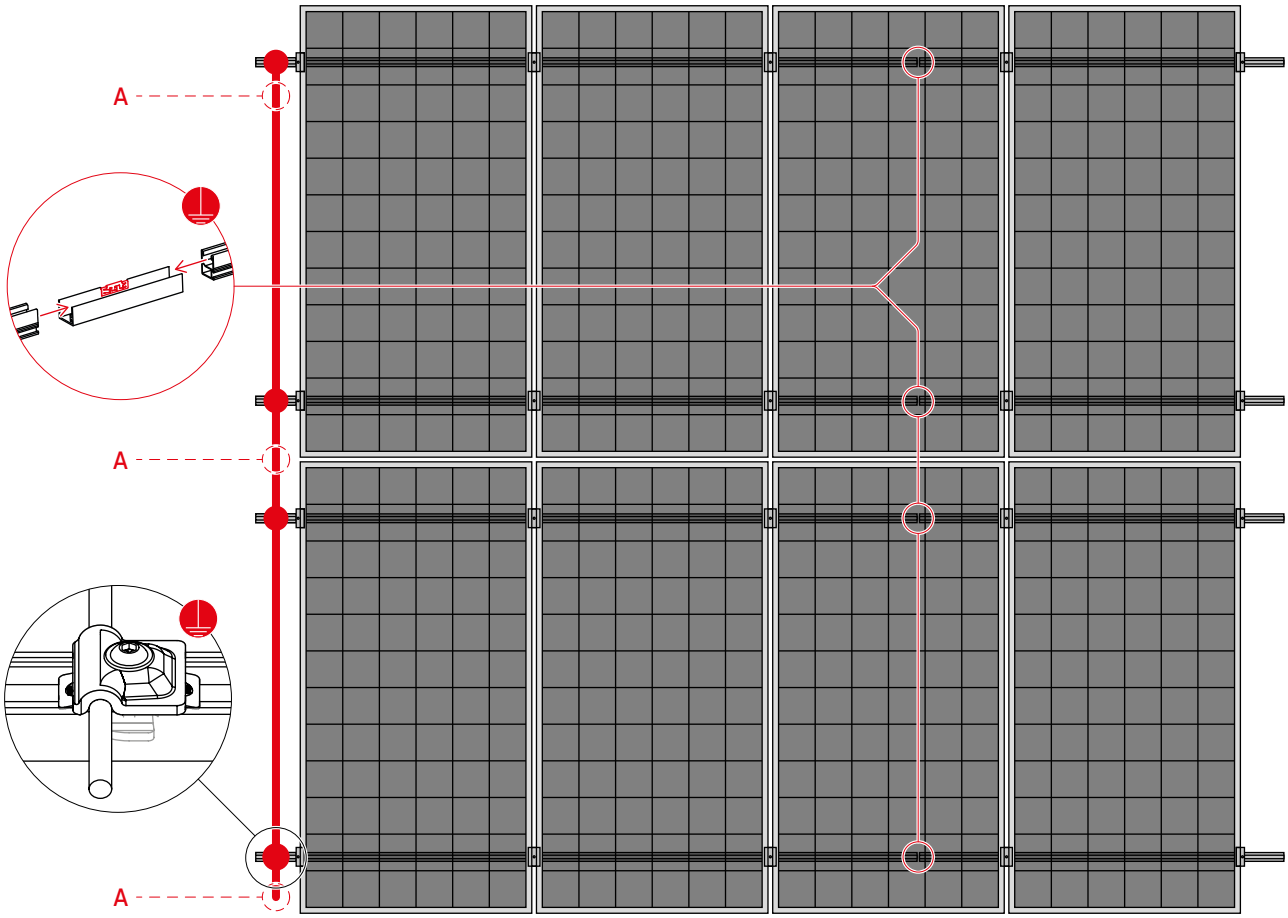


Pitched roofs

Tiled roof cover: Roof hooks with SingleRail/SolidRail



Standard case



(A) Example of connection points for equipotential bonding conductors, or, alternatively, lightning protection.

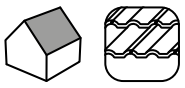
Lightning protection and equipotential bonding

- We recommend connecting the rails per module block with a round aluminium wire.
- The connection with lightning protection terminal and aluminium round wire can be capable of carrying lightning current if required.
- The conductive connection must be checked; if necessary, the oxide layer of the aluminium must be removed or penetrated.
- Suitable cable lugs must be use for the conductive connection, taking into account the electrochemical (galvanic) series.
- Module frame earthing is not shown in this example.

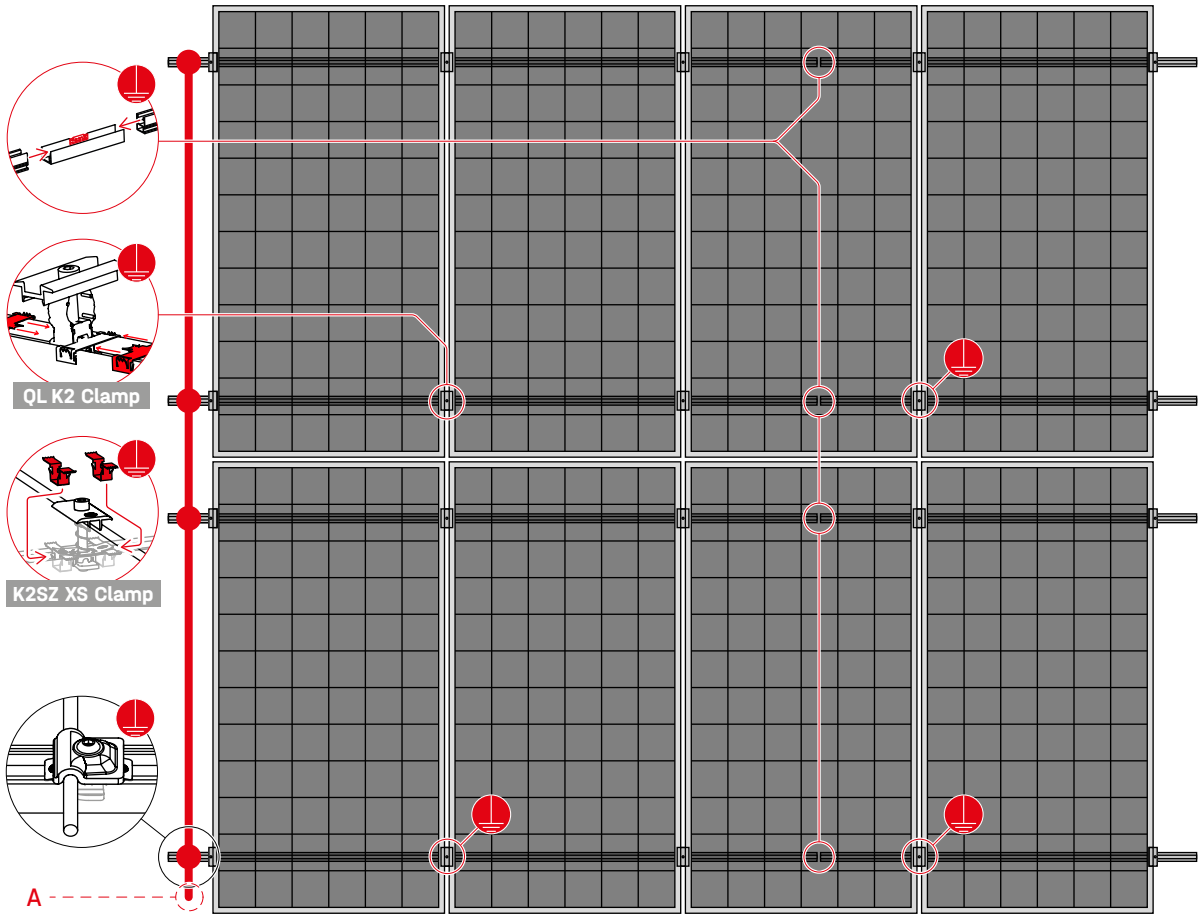
Materials needed:

- **K2 Lightning protection clamp 8 mm Set** consists of:
  - Lightning protection clamp
  - MK2 insert nut
  - Pan head screw M8 × 25
- **Round wire**

Tiled roof cover: Roof hooks with SingleRail/SolidRail



With the prescribed frame earthing



(A) Example of connection points for equipotential bonding conductors, or, alternatively, lightning protection.

Lightning protection and equipotential bonding

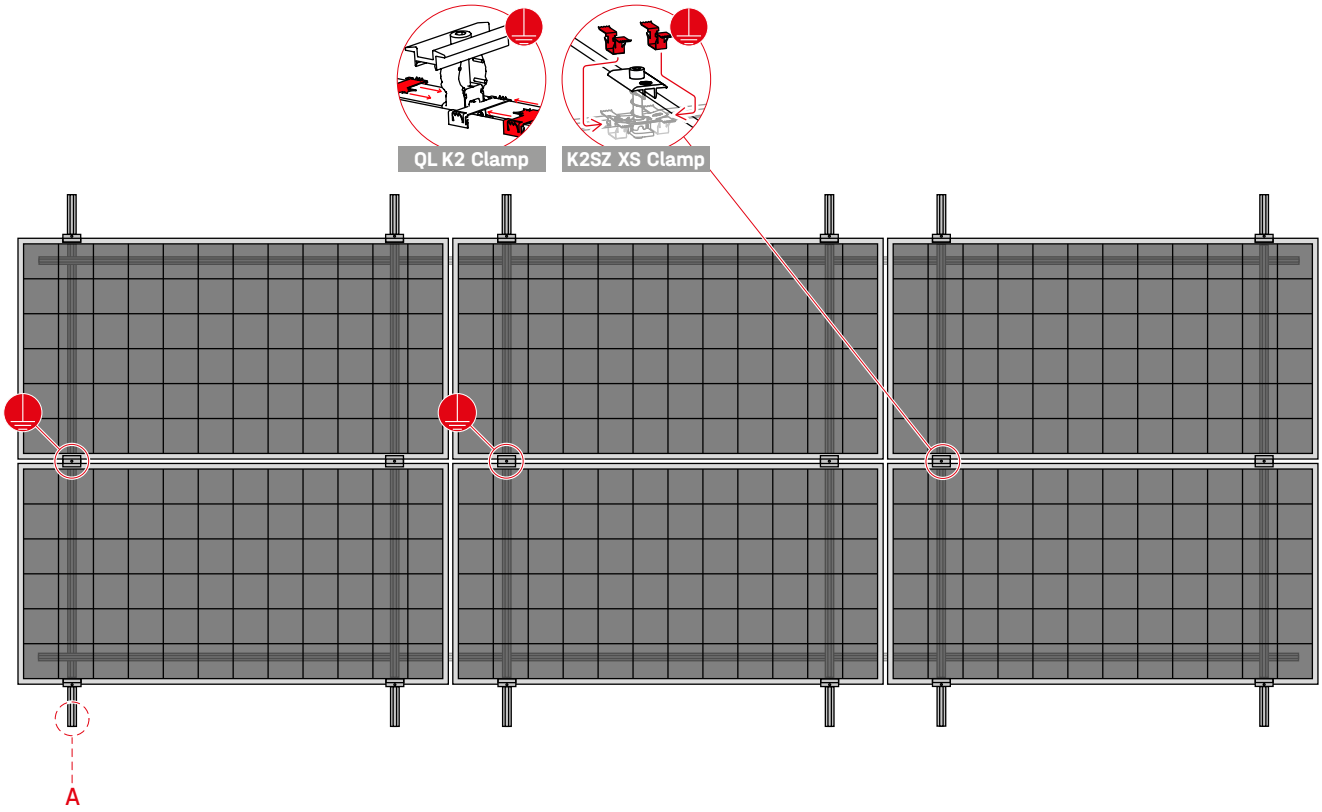
- If the module manufacturer specifies frame earthing, we recommend using the equipotential bonding/TerraGrif.
- They can be placed underneath the module clamp on the left or right.
- At least one bond/TerraGrif per module is required.
- Please note the assembly instructions for equipotential bonding k2-systems.com/equipotential-bonding
- When using the K2 Clamp, the TerraGrif QL is required. When using the XS Clamp, TerraGrif K2SZ is required.

Materials needed:

- **K2 Lightning protection clamp 8 mm Set** consists of:
  - Lightning protection clamp
  - MK2 insert nut
  - Pan head screw M8 × 25
- **Round wire**
- **TerraGrif QL/TerraGrif K2SZ**

Second rail layer systems





(A) Example of connection points for equipotential bonding conductors, or, alternatively, lightning protection.

Lightning protection and equipotential bonding

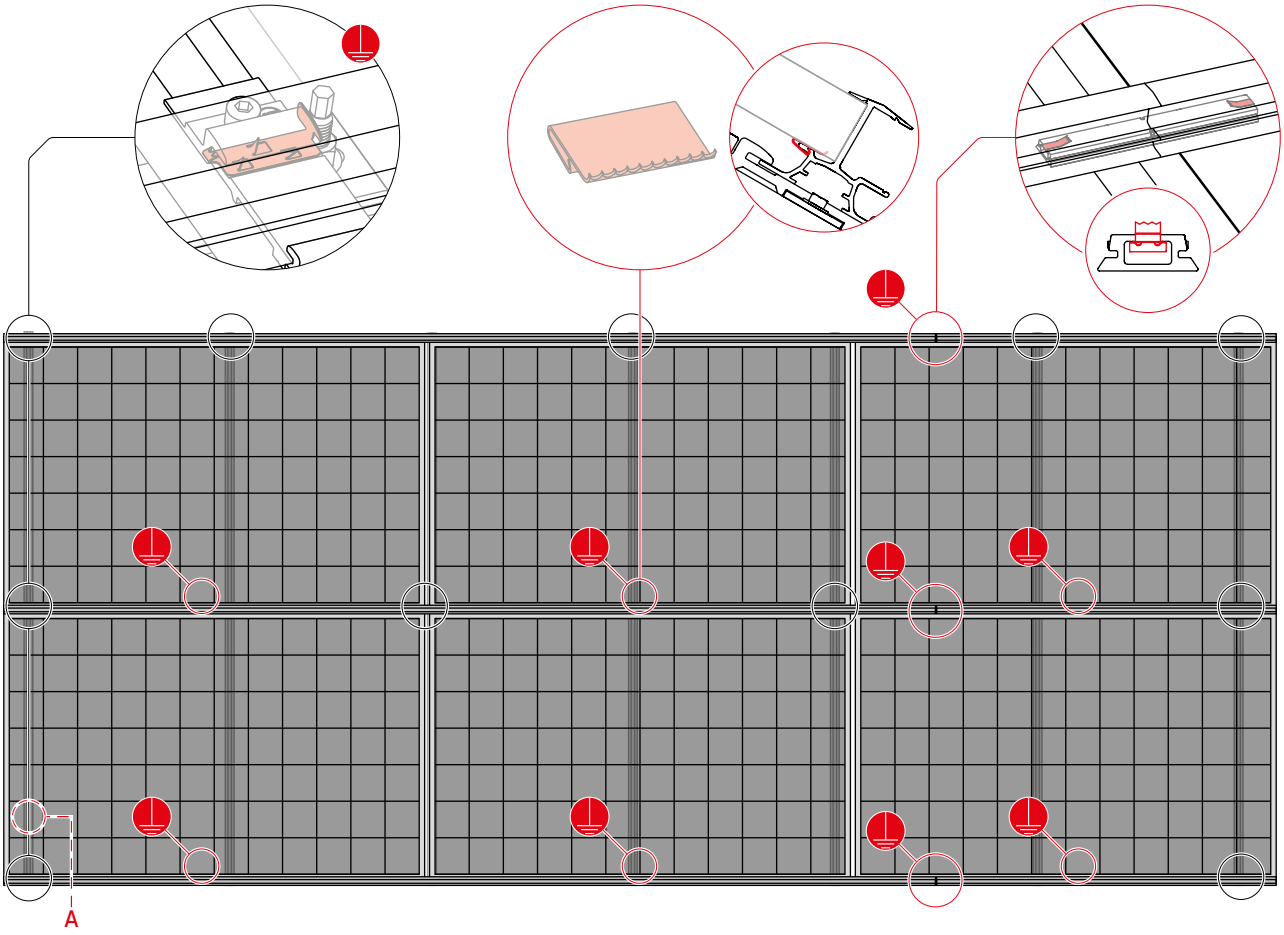
- With a cross-connection or two-layer rail system, an additional conductive connection of the rails can be dispensed with. However, the conductive connection of the rail layers must be ensured by removing the oxide layer at the crossing points of the rails.
- TerraGrif, as shown in the illustration, is used according to the need for module frame earthing.
- Black anodized rails require special care when establishing an electrical connection. The feasibility of the equipotential bonding solutions must be evaluated on a case-by-case basis. They are not applicable to every situation.
- If module frame earthing is mandatory, one equipontential bond/ TerraGrif per module is required
- When using the K2 Clamp, the TerraGrif QL is required. When using the XS Clamp, TerraGrif K2SZ is required.

Materials needed:

- **TerraGrif QL/TerraGrif K2SZ**

Pitched roof: SingleRail/SolidRail with InsertionRail





(A) Example of connection points for equipotential bonding conductors, or, alternativel, lightning protection.

Lightning protection and equipotential bonding

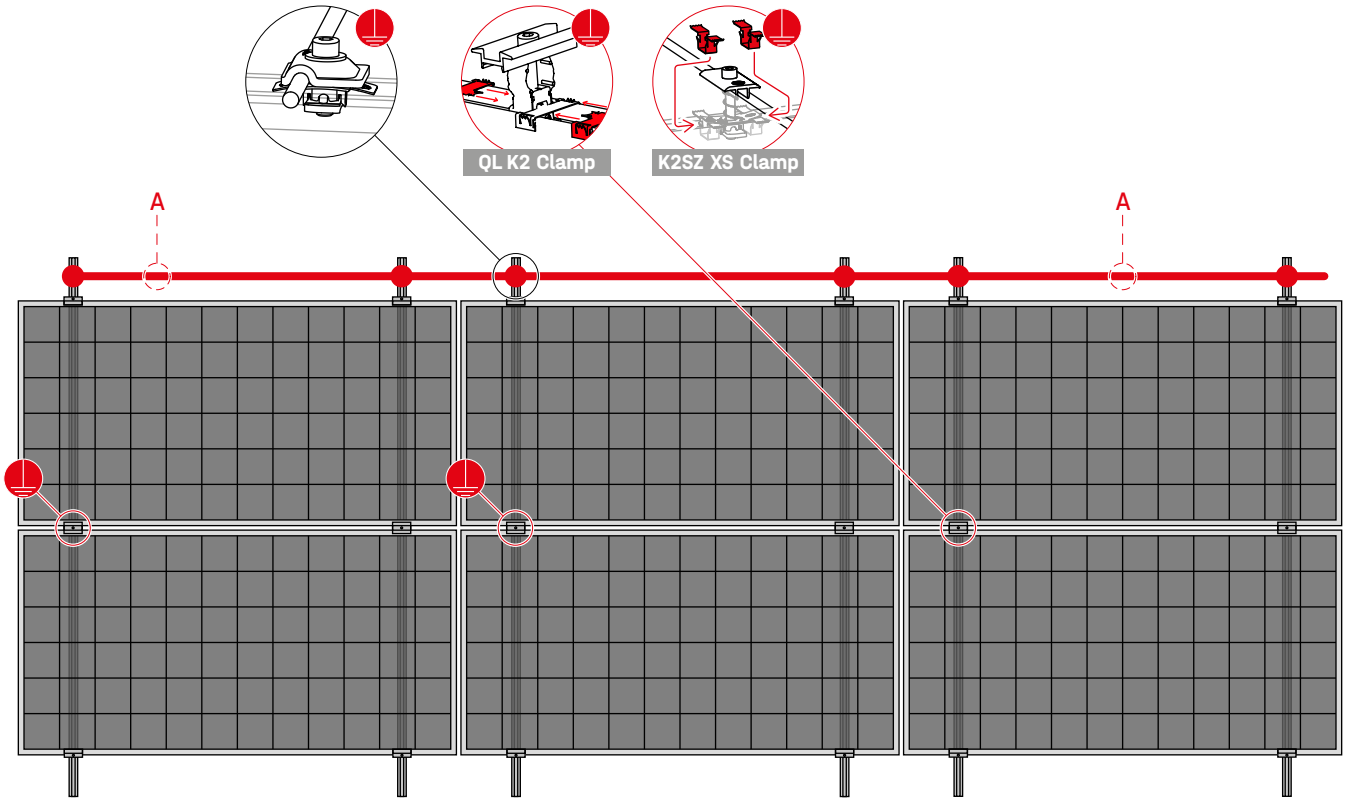
- Module frame earthing using the TerraGrif U17 is shown in the illustration. One TerraGrif U17 is required per module.
- Equipotential bonding between the base rail (SingleRail/SolidRail) and the InsertionRail is established using the CrossConnector T and the CrossConnector Clip.
- Equipotential bonding across the rails is achieved through the rail connectors. For the base rails (SingleRail/SolidRail). the SingleRail 36/50 RailConnector and the SolidRail Connector Set are sufficient. For the InsertionRail, the TerraGrif PL must be used in combination with the InerstionRail 2.0 RailConnector.

Materials needed:

- **TerraGrif U17**
- **CrossConnector Clip**
- **TerraGrif PL**

Corrugated fibre cement/sheet metal or trapezoidal sheet metal/ sandwich panels: Hanger bolts/solar fasteners with SingleRail/SolidRail





(A) Example of connection points for equipotential bonding conductors, or, alternatively, lightning protection.

Lightning protection and equipotential bonding

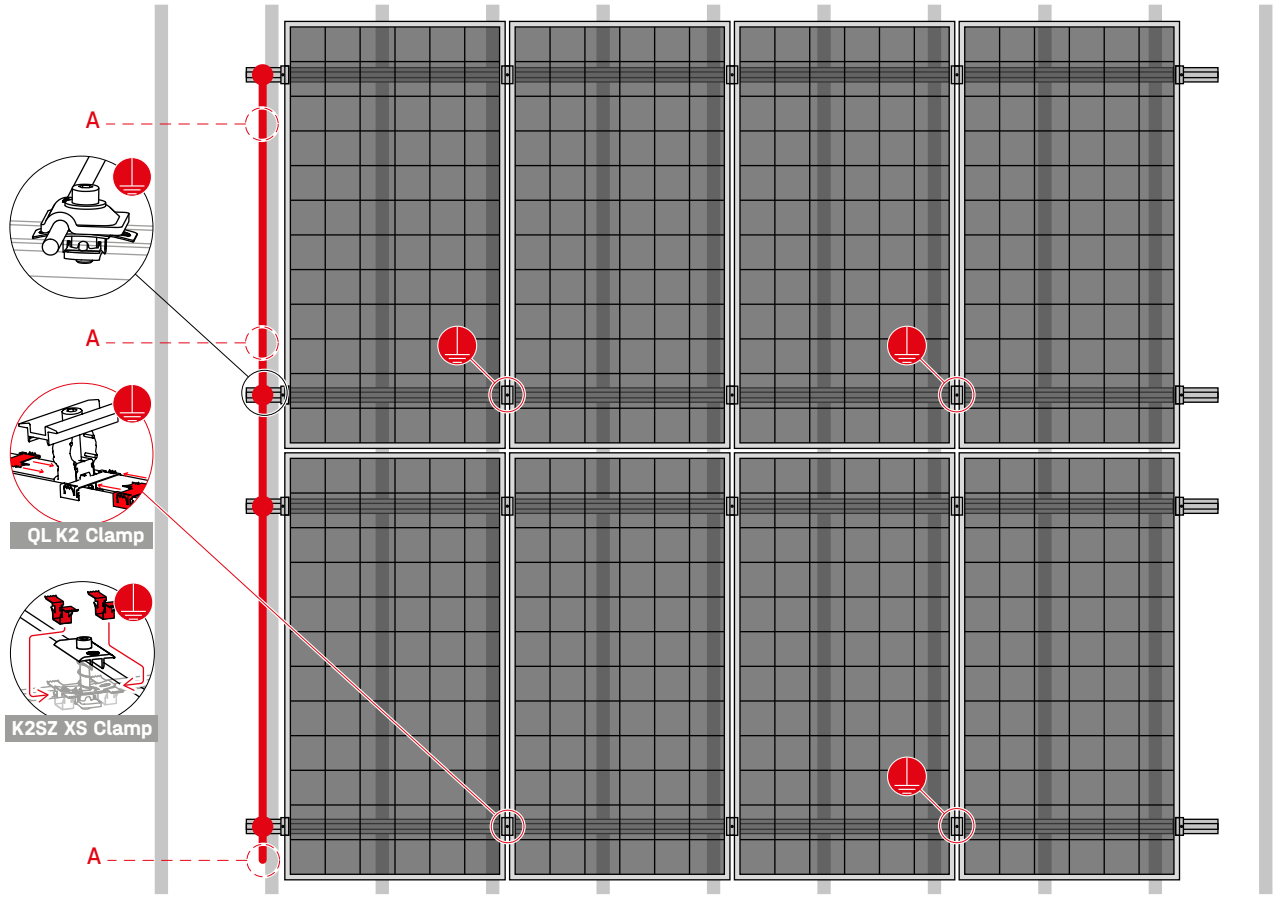
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Materials needed:

- **K2 Lightning protection clamp 8 mm Set** consists of:
  - Lightning protection clamp
  - MK2 insert nut
  - Pan head screw M8 × 25
- **Round wire**
- **TerraGrif QL/TerraGrif K2SZ**

Trapezoidal metal sheet roof covers: BasicRail





(A) Example of connection points for equipotential bonding conductors, or, alternatively, lightning protection.

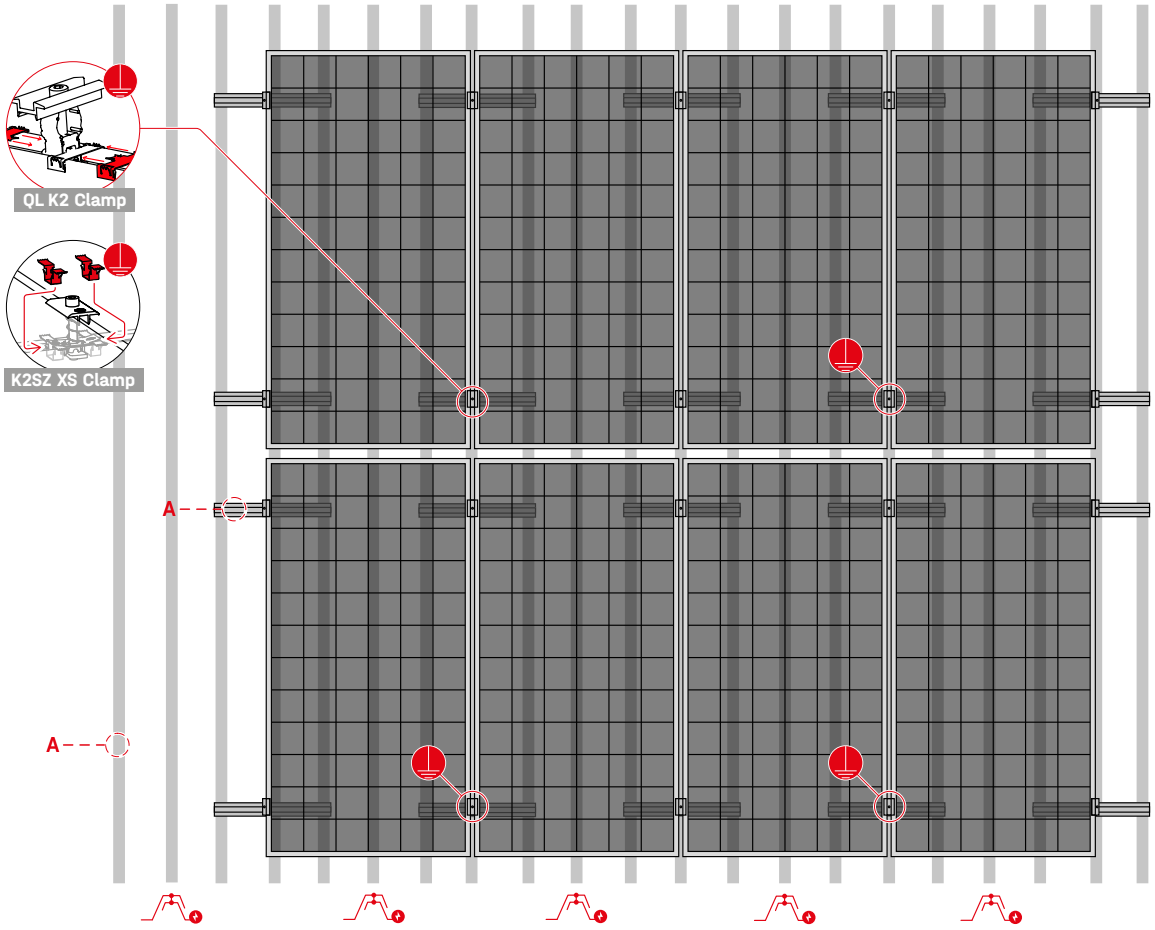
Lightning protection and equipotential bonding

- With the BasicRail system, as with a tiled roof, there is no conductive connection via the trapezoidal sheet metal to the rails.
- We recommend connecting the rails per module block with a round aluminium wire.
- A connection using a lightning protection clamp and 8 mm round aluminium wire is capable of carrying lightning current.
- This illustration shows the use of equipotential bonding/TerraGrif where module frame earthing is required.
- When using the K2 Clamp, the TerraGrif QL is required. When using the XS Clamp, TerraGrif K2SZ is required.

Materials needed:

- **K2 Lightning protection clamp 8 mm Set** consists of:
  - Lightning protection clamp
  - MK2 insert nut
  - Pan head screw M8 × 25
- **Round wire**
- **TerraGrif QL/TerraGrif K2SZ**

Trapezoidal metal sheet roof covers: MiniRail MK2



The trapezoidal sheets must be conductively connected to each other!

(A) Example of connection points for equipotential bonding conductors, or, alternatively, lightning protection.

Lightning protection and equipotential bonding

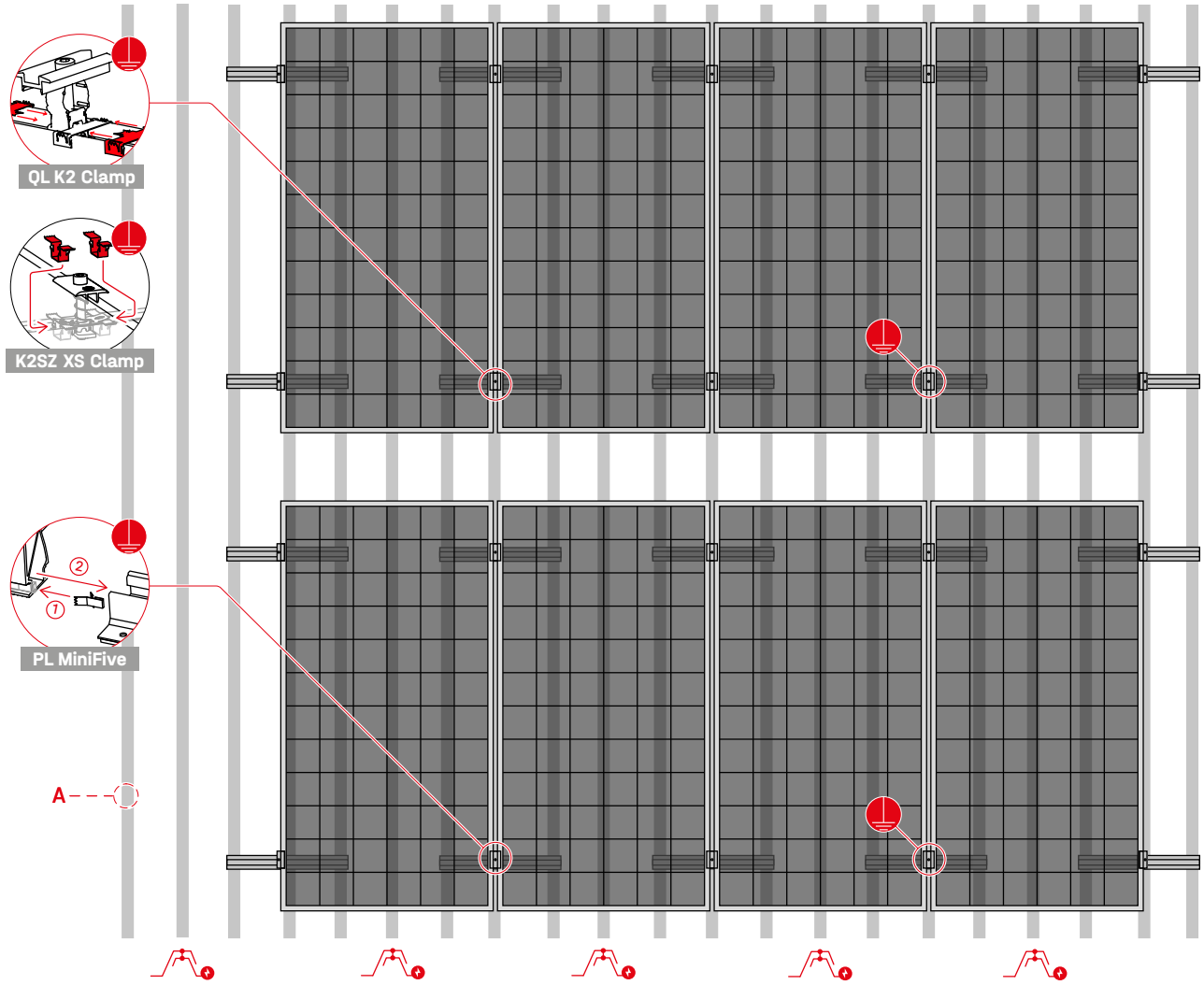
- The drill holes in the MiniRail MK2 are selected in such a way that the thread-forming metal screw 6 × 25 will inevitably work their way into the aluminium to such an extent that a conductive connection between the sheet metal and the MiniRail MK2 is created.
- Make sure that the individual trapezoidal profiles are also conductively connected to each other.
- In this way, potential equalisation is guaranteed via the trapezoidal sheet metal.
- If a building with a metal roof is equipped with an external lightning protection system, we recommend using BasicRail.
- This illustration shows the use of equipotential bonding/TerraGrif where module frame earthing is required.
- When using the K2 Clamp, the TerraGrif QL is required. When using the XS Clamp, TerraGrif K2SZ is required.

Materials needed:

- **TerraGrif QL/TerraGrif K2SZ**

Trapezoidal metal sheet roof covers: MiniRail MK2 with MiniFive MK2

The example shows a MiniRail MK2 with MiniFive MK2, TerraGrif PL, incl. module frame earthing with TerraGrif K2SZ or TerraGrif QL.



The trapezoidal sheets must be conductively connected to each other!

(A) Example of connection points for equipotential bonding conductors, or, alternatively, lightning protection.

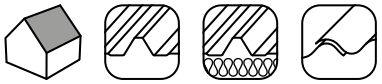
Lightning protection and equipotential bonding

- The drill holes in the MiniRail MK2 are selected in such a way that the thread-forming metal screw 6 × 25 will inevitably work their way into the aluminium to such an extent that a conductive connection between the sheet metal and the MiniRail MK2 is created.
- Equipotential bonding to MiniFive is provided via TerraGrif PL.
- A TerraGrif PL per MiniFive Front and MiniFive End is required.
- Module frame earthing is done as required.
- When using the K2 Clamp, the TerraGrif QL is required. When using the XS Clamp, TerraGrif K2SZ is required.
- If a building with a metal roof is equipped with an external lightning protection system, we recommend using BasicRail.

Materials needed:

- **TerraGrif QL/TerraGrif K2SZ**
- **TerraGrif PL**

Trapezoidal metal sheet/Corrugated sheet metal roof covers:
MultiRail and MultiRail CSM



The trapezoidal/corrugated sheets must be conductively connected to each other!

(A) Example of connection points for equipotential bonding conductors, or, alternatively, lightning protection.

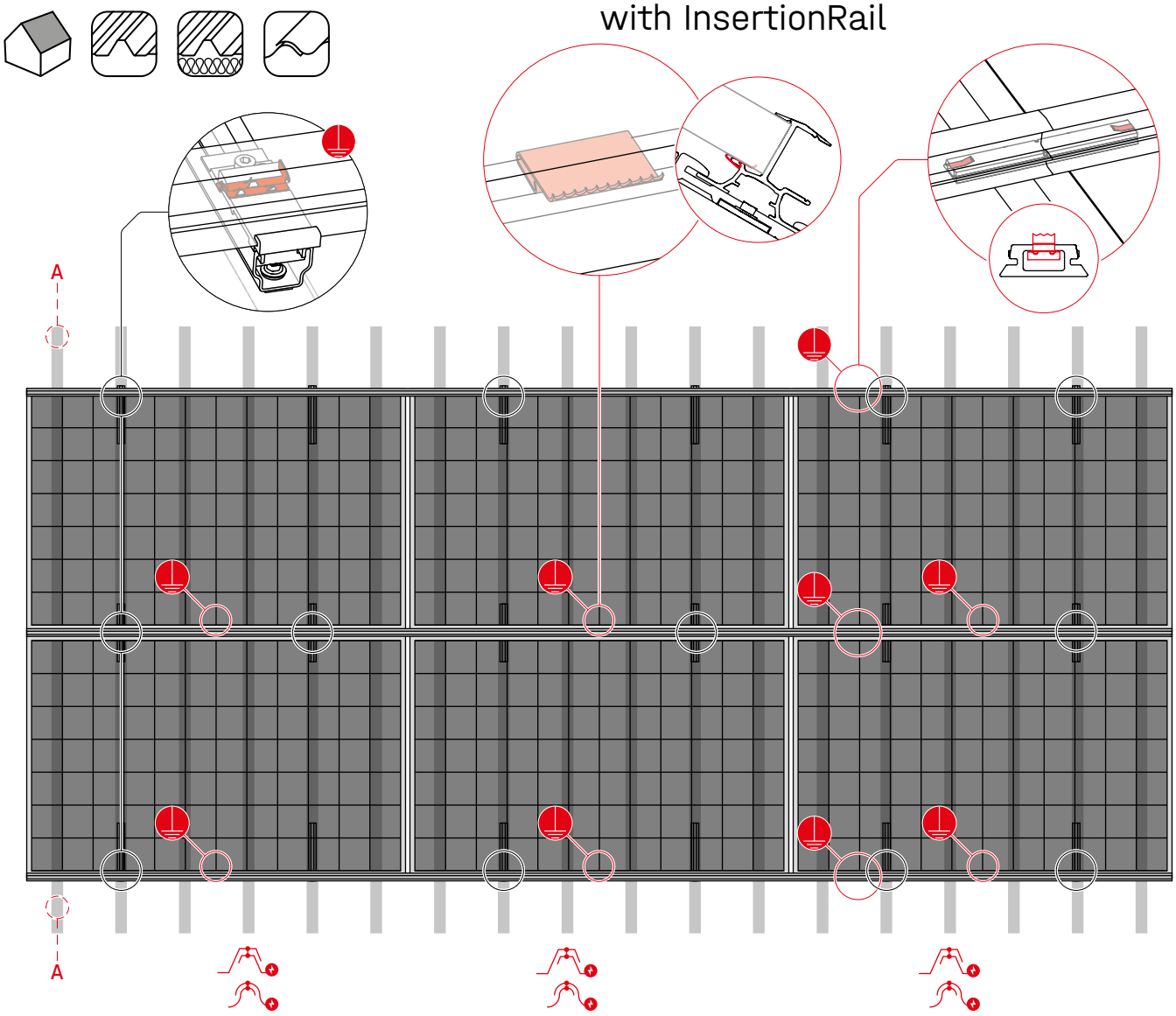
Lightning protection and equipotential bonding

- The drill holes in the MultiRail have been chosen in such a way that the thread-forming metal screw 6 × 25 will inevitably work their way into the aluminium to such an extent that a conductive connection is created between the sheet metal and the MultiRail.
- The individual sheet metal profiles must also be conductively connected to each other. In this way, equipotential bonding is guaranteed via the trapezoidal/corrugated sheet. This applies to all MultiRail systems, CSM, RailUp, elevated and cross-connected systems.
- If a building with a metal roof is equipped with an external lightning protection system, we recommend using BasicRail.
- This illustration shows the use of equipotential bonding/TerraGrif where module frame earthing is required.
- When using the K2 Clamp, the TerraGrif QL is required. When using the XS Clamp, TerraGrif K2SZ is required.

Materials needed:

TerraGrif QL/TerraGrif K2SZ

Trapezoidal/corrugated roof covers: MultiRail/MultiRail CSM with InsertionRail



The trapezoidal/corrugated sheets must be conductively connected to each other!

(A) Example of connection points for equipotential bonding conductors, or, alternativel, lightning protection.

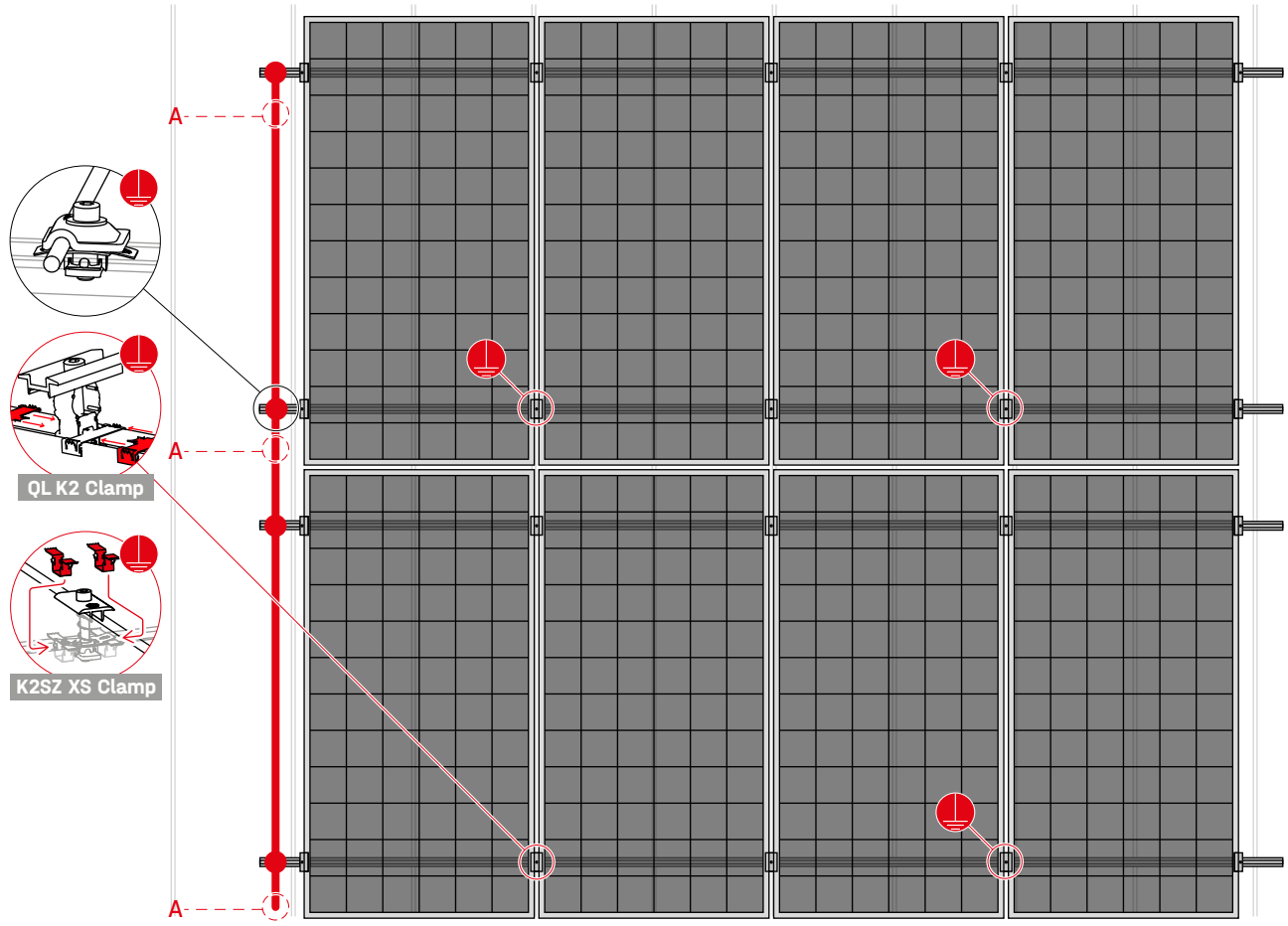
Lightning protection and equipotential bonding

- The drill holes in the MultiRail have been chosen in such a way that the thread-forming metal screw 6 × 25 will inevitably work their way into the aluminium to such an extent that a conductive connection is created between the sheet metal and the MultiRail.
- The connection between MultiRail/MultiRail CSM and InsertionRail is established using the CrossConnector T and the CrossConnector Clip.
- In the direction of the rail, the conductive connection between the InsertionRails is established via the rail connector in combination with the TerraGrif PL.
- If required, module frame earthing is provided using the TerraGrif U17. One TerraGrif is required per module.
- The mounting system variants with InsertionRail have not been tested for lightning current carrying capacity.

Materials needed:

- **TerraGrif U17**
- **TerraGrif PL**
- **CrossConnector Clip**

Standing seam roof covers



(A) Example of connection points for equipotential bonding conductors, or, alternativel, lightning protection.

Lightning protection and equipotential bonding

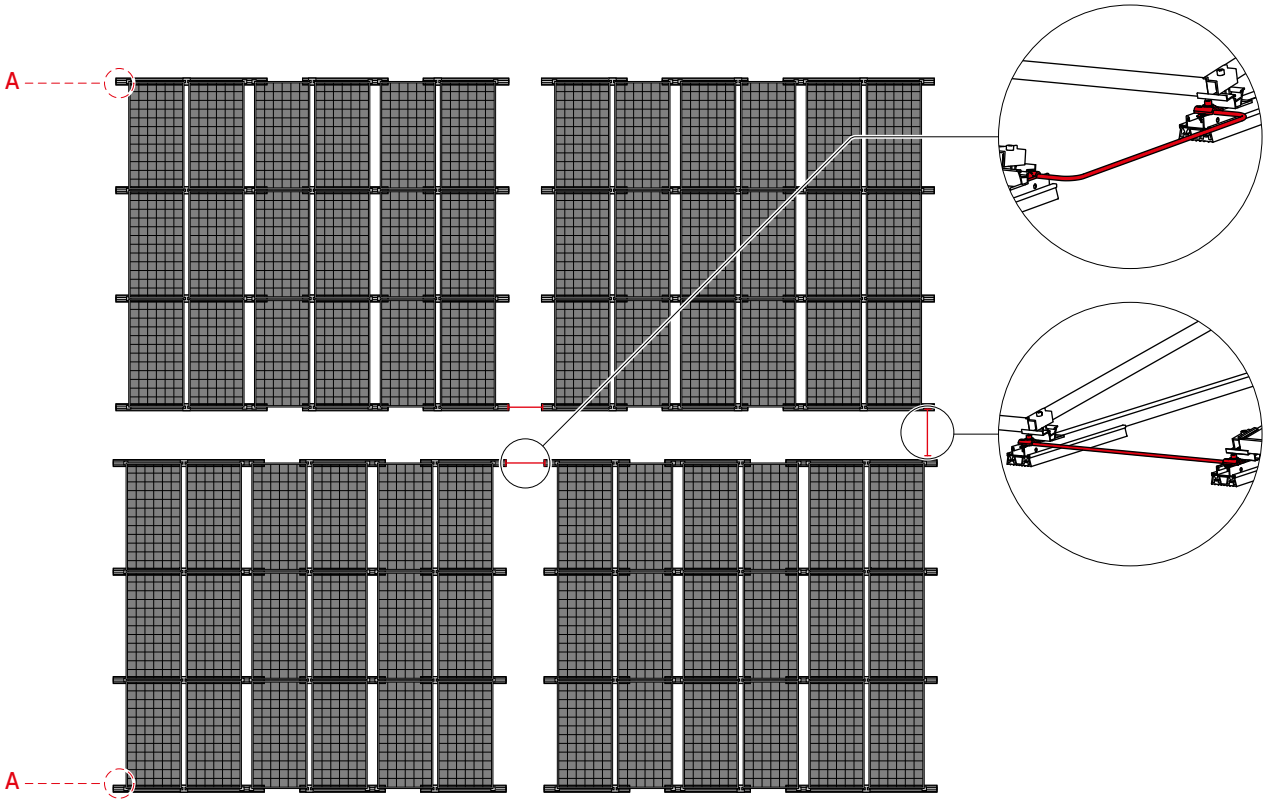
- With sheet metal seam roofs, a conductive connection via the roof sheet cannot be guaranteed. Too many sheet metal types are surface-coated.
- We recommend connecting the rails per module block with an aluminium round wire.
- A connection using a lightning protection clamp and 8 mm round aluminium wire is capable of carrying lightning current.
- This illustration shows the use of equipotential bonding/TerraGrif where module frame earthing is required.
- If module frame earthing is mandatory, one equipontential bond/ TerraGrif per module is required.
- When using the K2 Clamp, the TerraGrif QL is required. When using the XS Clamp, TerraGrif K2SZ is required.

Materials needed:

- **K2 Lightning protection clamp 8 mm Set** consists of:
  - Lightning protection clamp
  - MK2 insert nut
  - Pan head screw M8 × 25
- **Round wire**
- **TerraGrif QL/TerraGrif K2SZ**

Flat roofs

General notes

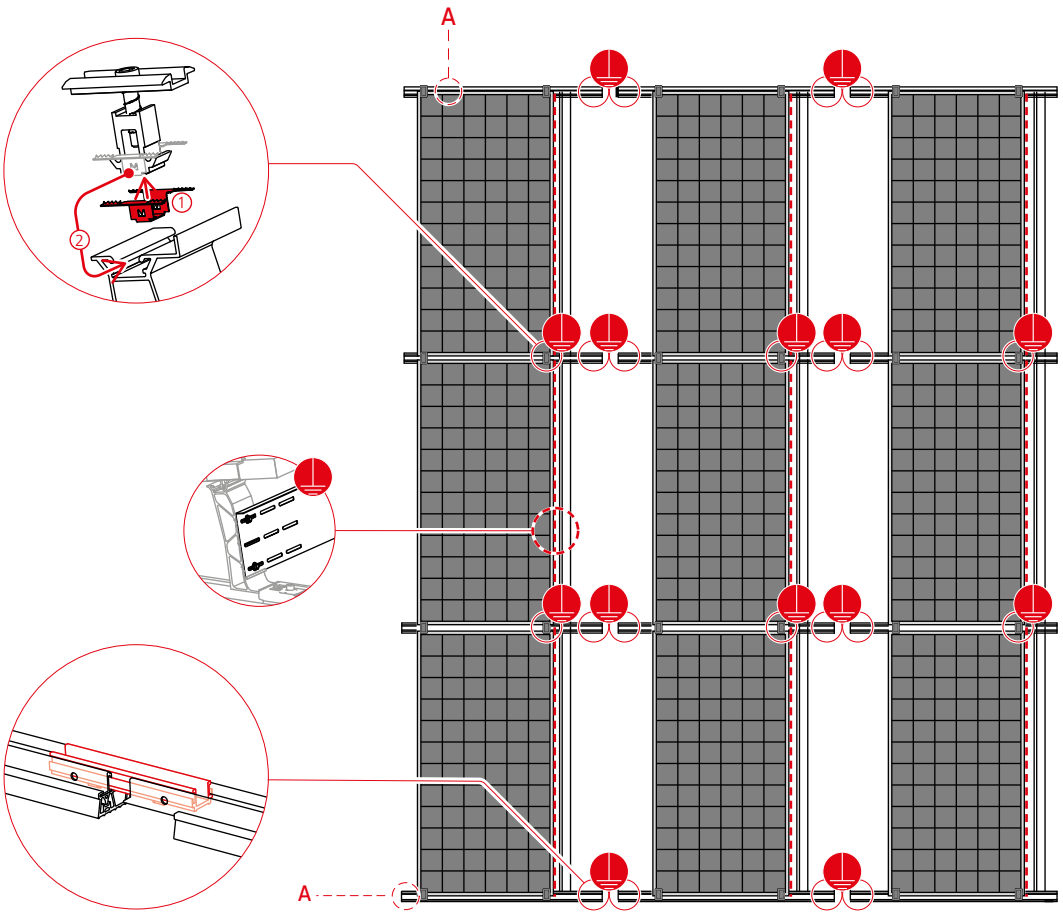


- We recommend using round aluminium wire for the connection within and between individual module blocks.
- The connection (A) shows a possible connection point on the building's equipotential bonding!
- Where gaps exist within the module layout, ensure that all components are incorporated into the equipotential bonding and/or lightning protection system.

Flat roofs

S-Dome 6 Xpress: Lightning protection and equipotential bonding

The example illustrates the equipotential bonding of the mounting system in the module direction via the Windbreaker and in the rail direction via the Dome 6 Xpress Connector. Module frame earthing is shown via the TerraGrif K2MI.



(A) Example of connection points for equipotential bonding conductors, or, alternatively, lightning protection.

Lightning protection and equipotential bonding

- Equipotential bonding in the direction of the module is ensured via the windbreaker/wind deflector sheet. This connection is capable of carrying lightning current.
- For equipotential bonding in rail direction, we recommend using Dome 6 Xpress Connector. The connection via the Dome 6 Express Connector is capable of carrying lightning current!
- If module frame earthing is required, each module must be connected using TerraGrif K2MI. For module frame earthing, we recommend a factor of 0.8 to 1 TerraGrif per module.

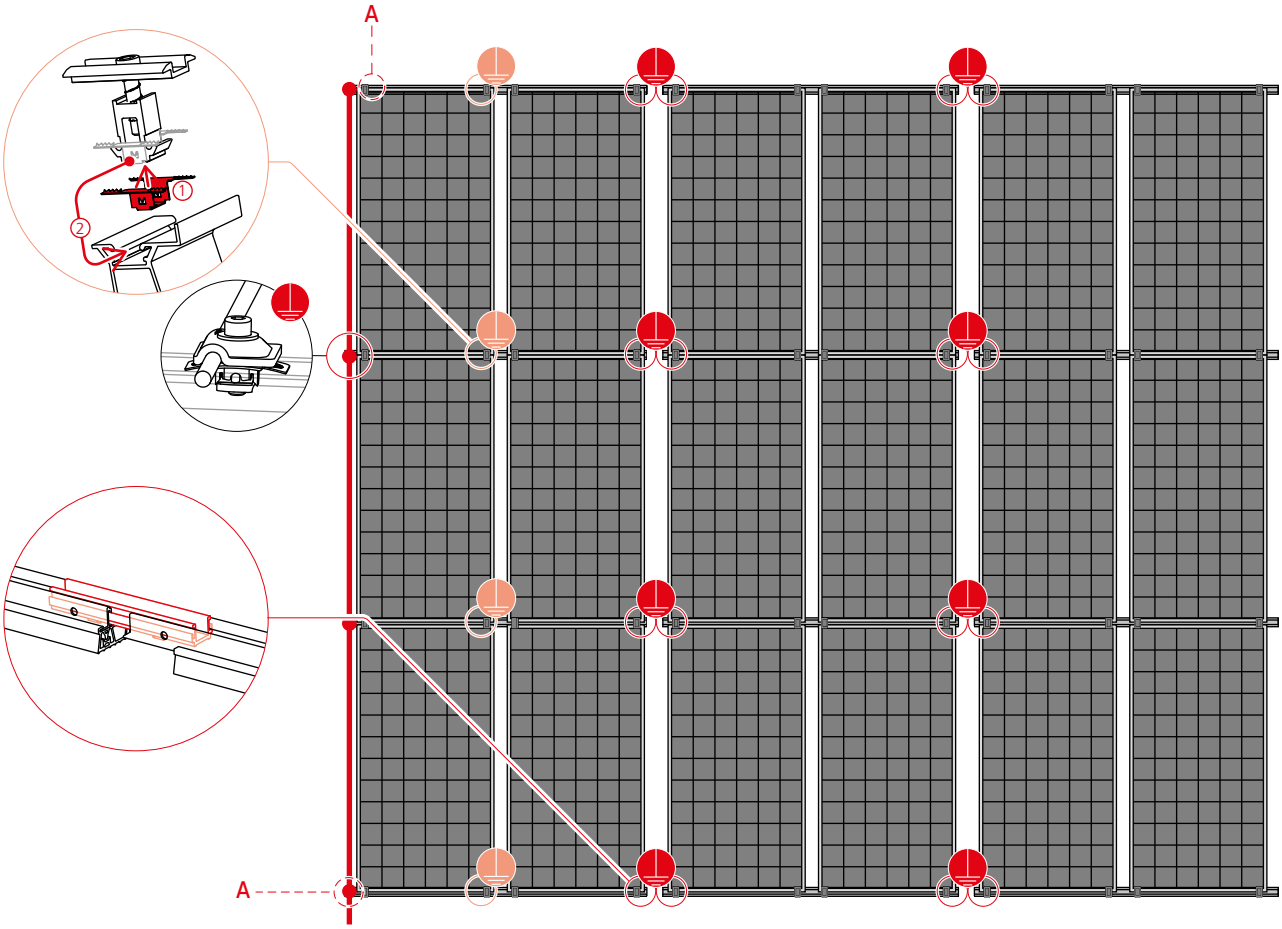
Materials needed:

- **Dome 6 Xpress Connector**
- **TerraGrif K2MI**

Flat roofs

D-Dome 6 Xpress: Lightning protection and equipotential bonding

The example illustrates the equipotential bonding of the mounting system in the module direction using aluminium round wire (or as an alternative, using TerraGrif K2MI), and in the rail direction using the Dome 6 Xpress Connector. Module frame earthing is not shown in this illustration.



(A) Example of connection points for equipotential bonding conductors, or, alternatively, lightning protection.

Lightning protection and equipotential bonding

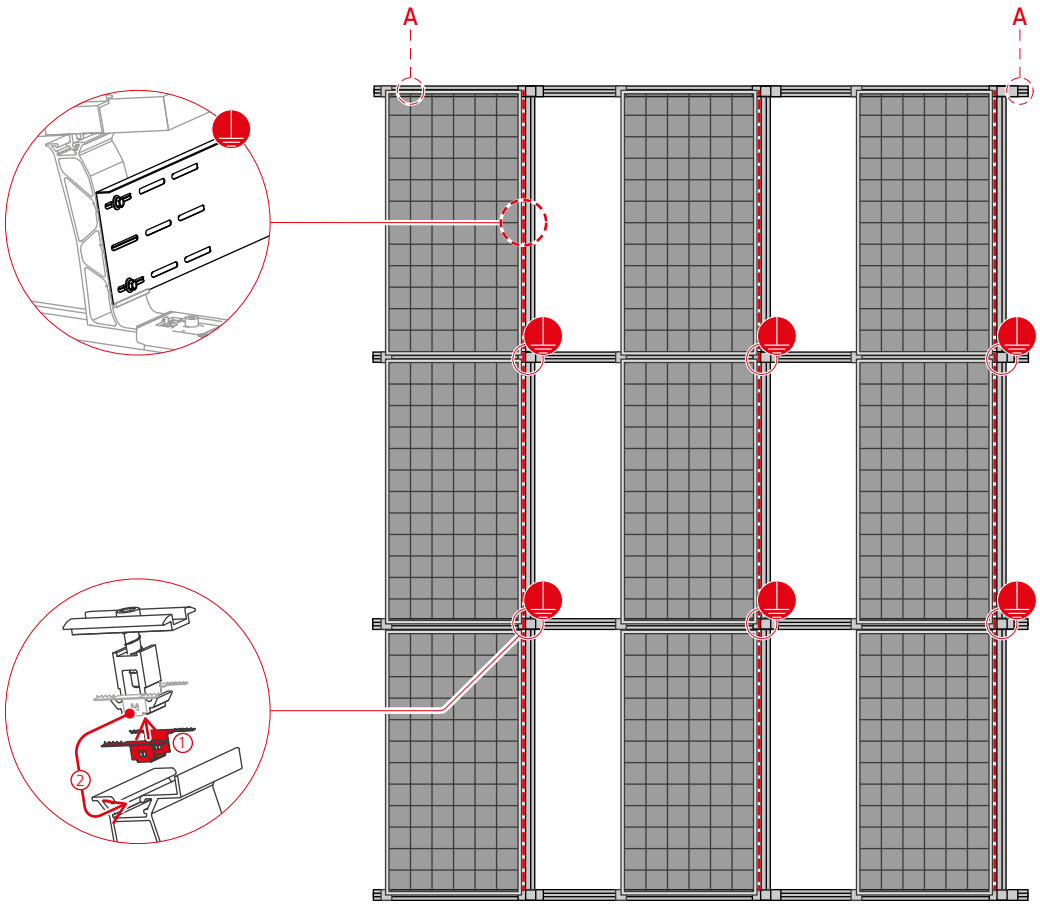
- For equipotential bonding in the direction of the module, we recommend making a connection with aluminium round wire. Alternatively, for equipotential bonding purposes, a connection can be established via the module frame using TerraGrif K2MI. However, only the connection made with round aluminum wire is capable of carrying lightning current.
- For equipotential bonding in rail direction, we recommend using Dome 6 Xpress Connector. The connection via the Dome 6 Express Connector is capable of carrying lightning current!
- If module frame earthing is required, each module must be connected using TerraGrif K2MI. For module frame earthing, we recommend a factor of 0.8 to 1 TerraGrif per module.
- If the system uses TerraGrif for the equipotential bonding, the factor of TerraGrif per module changes to 1.
- The integration of the PV system with an existing external lightning protection system – including the calculation of connections between the lightning protection and PV system – must be carried out by a qualified lightning protection specialist. We recommend using round aluminum wire (≥ 25 mm²) for the connection and discharge lines.

Materials needed:

- **K2 Lightning protection clamp 8 mm Set** consists of:
  - Lightning protection clamp
  - MK2 insert nut
  - Pan head screw M8 × 25
- **Round wire**
- **TerraGrif K2MI**
- **TerraGrif PL**
- **Dome 6 Xpress Connector**

S-Dome 6 Classic: Lightning protection and equipotential bonding

The example illustrates the equipotential bonding of the mounting system in the module direction using the windbreaker. Module frame earthing is shown via TerraGrif K2MI.



(A) Example of connection points for equipotential bonding conductors, or, alternatively, lightning protection.

Lightning protection and equipotential bonding

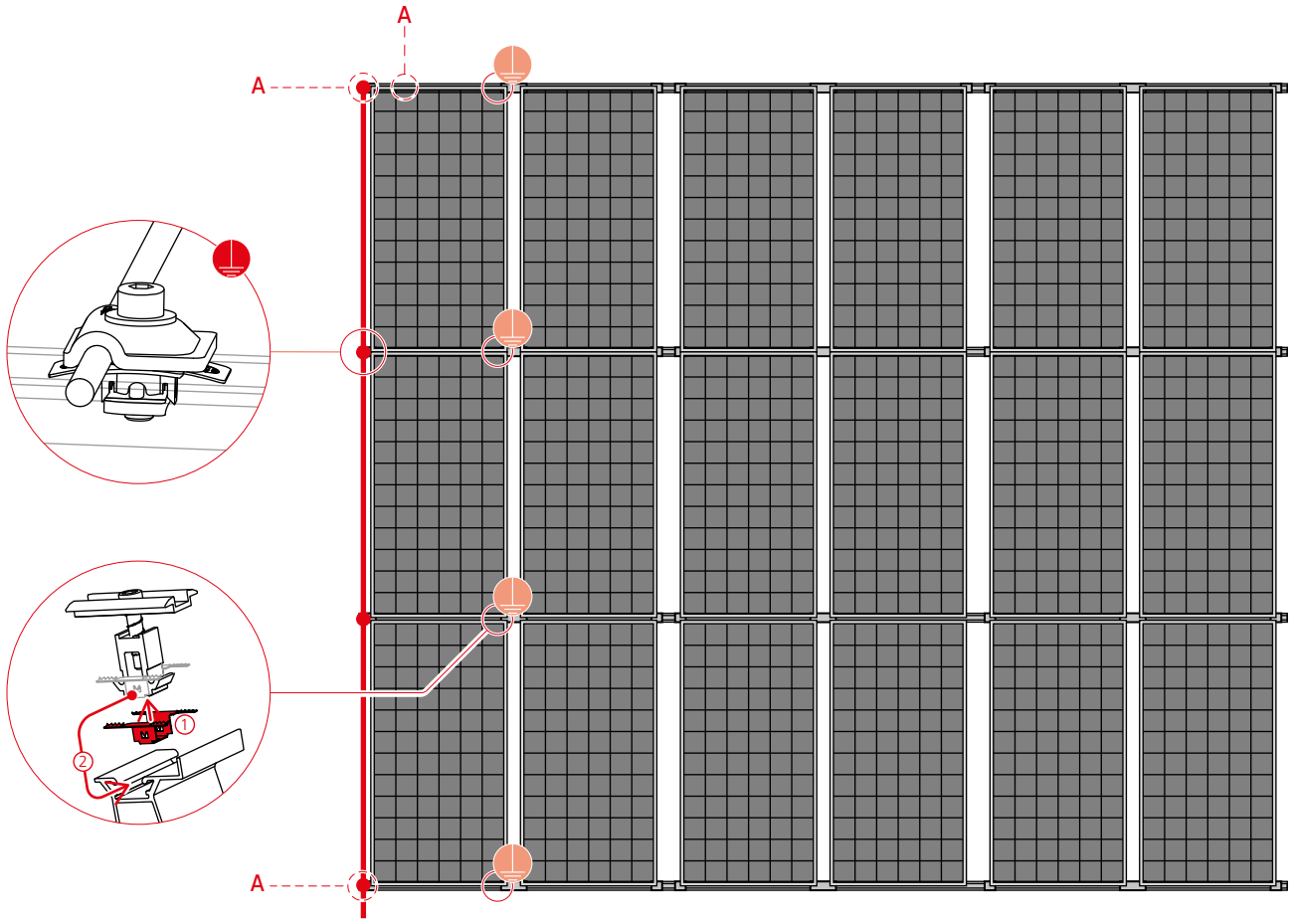
- Equipotential bonding in the direction of the module is ensured via the windbreaker/wind deflector sheet. This connection is capable of carrying lightning current.
- In the direction of the rail, the FlatConnector provides a lightning current-carrying connection (not shown in illustration).
- If module frame earthing is required, each module must be connected using TerraGrif K2MI. For module frame earthing, we recommend a factor of 0.8 to 1 TerraGrif per module.

Materials needed:

- **TerraGrif K2MI**

D-Dome 6 Classic: Lightning protection and equipotential bonding

The example illustrates the equipotential bonding of the mounting system in the module direction using aluminium round wire (or as an alternative, using TerraGrif K2MI). Module frame earthing is not shown in this illustration.



(A) Example of connection points for equipotential bonding conductors, or, alternativel, lightning protection.

Lightning protection and equipotential bonding

- For equipotential bonding in the direction of the module, we recommend making a connection with aluminium round wire. Alternatively, for equipotential bonding purposes, a connection can be established via the module frame using TerraGrif K2MI. However, only the connection made with round aluminum wire is capable of carrying lightning current.
- In the direction of the rail, the FlatConnector provides a lightning current-carrying connection (not shown in illustration).
- Module frame earthing is carried out as required. If required, each module must be connected using TerraGrif K2MI. For module frame earthing, we recommend a factor of 0.8 to 1 TerraGrif/module.
- If the system uses TerraGrif for the equipotential bonding, the factor of TerraGrif per module changes to 1.
- The integration of the PV system with an existing external lightning protection system – including the calculation of connections between the lightning protection and PV system – must be carried out by a qualified lightning protection specialist. We recommend using round aluminum wire (≥ 25 mm²) for the connection and discharge lines.

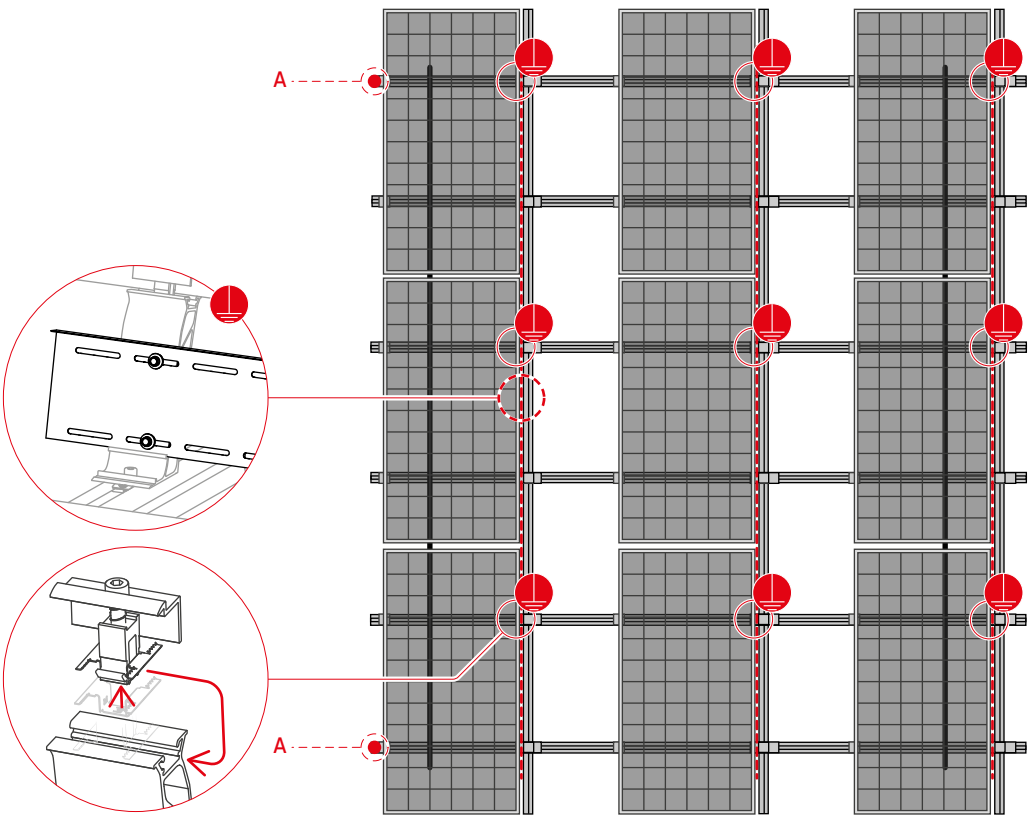
Materials needed:

- **K2 Lightning protection clamp 8 mm Set** consists of:
  - Lightning protection clamp
  - MK2 insert nut
  - Pan head screw M8 × 25
- **Round wire**
- **TerraGrif K2MI**

Flat roofs

S-Dome 6 Classic LS: Lightning protection and equipotential bonding

The example illustrates the equipotential bonding of the mounting system in the module direction using the windbreaker. Module frame earthing is shown via TerraGrif K2MI.



(A) Example of connection points for equipotential bonding conductors, or, alternatively, lightning protection.

Lightning protection and equipotential bonding

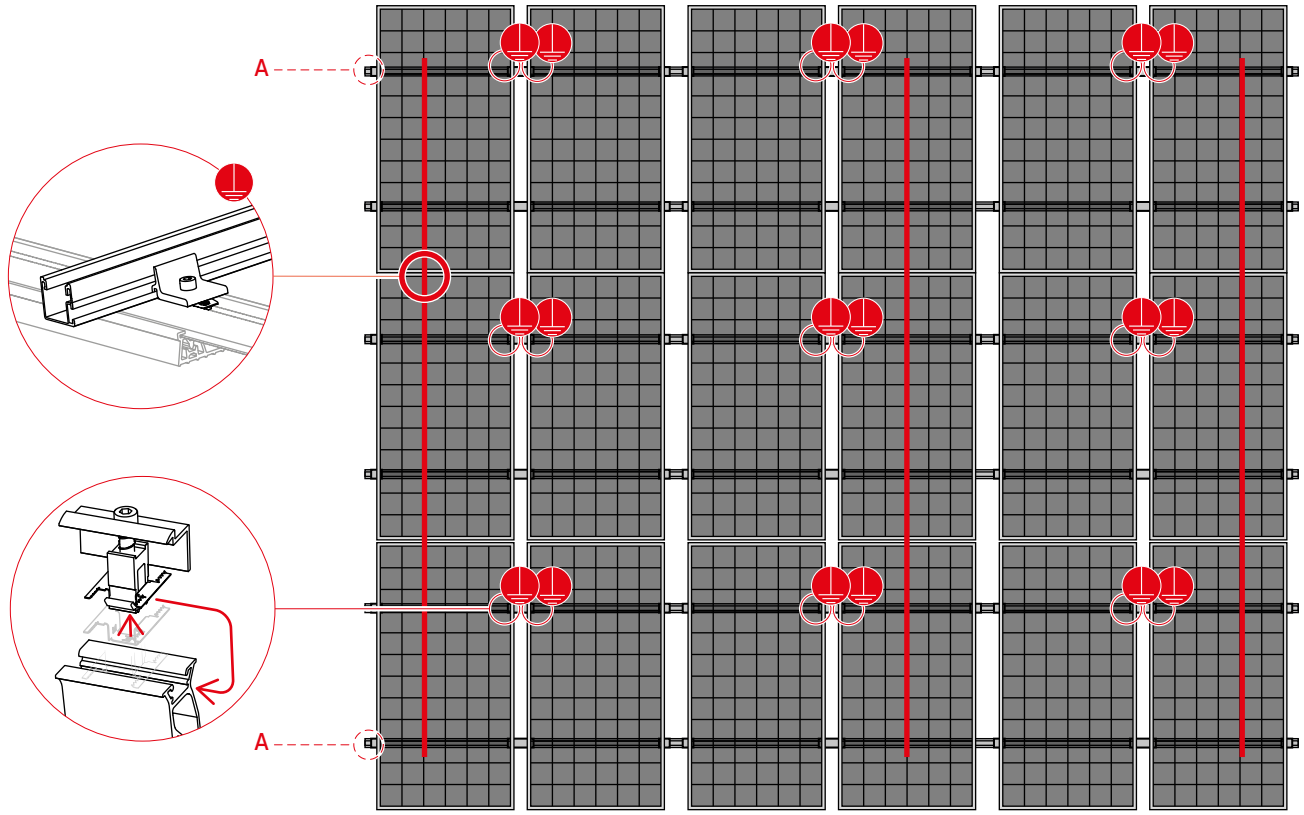
- A connection capable of carrying lightning current/equipotential bonding is ensured in the direction of the module via the windbreaker/ wind deflector plate.
- If module frame earthing is required, each module must be connected using TerraGrif K2MI. For module frame earthing, we recommend a factor of 1 TerraGrif per module.
- The integration of the PV system with an existing external lightning protection system – including the calculation of connections between the lightning protection and PV system – must be carried out by a qualified lightning protection specialist.
- If the system is to be integrated into an existing lightning protection system, lightning current-carrying connections to the mounting system must be made. We recommend using round aluminum wire (≥ 25 mm²) for the connection and discharge lines.

Materials needed:

- **TerraGrif K2MI**

D-Dome 6 Classic LS: Lightning protection and equipotential bonding

The example illustrates the equipotential bonding of the mounting system in the module direction through the cross bracing. Module frame earthing is shown via TerraGrif K2MI.



(A) Example of connection points for equipotential bonding conductors, or, alternatively, lightning protection.

Lightning protection and equipotential bonding

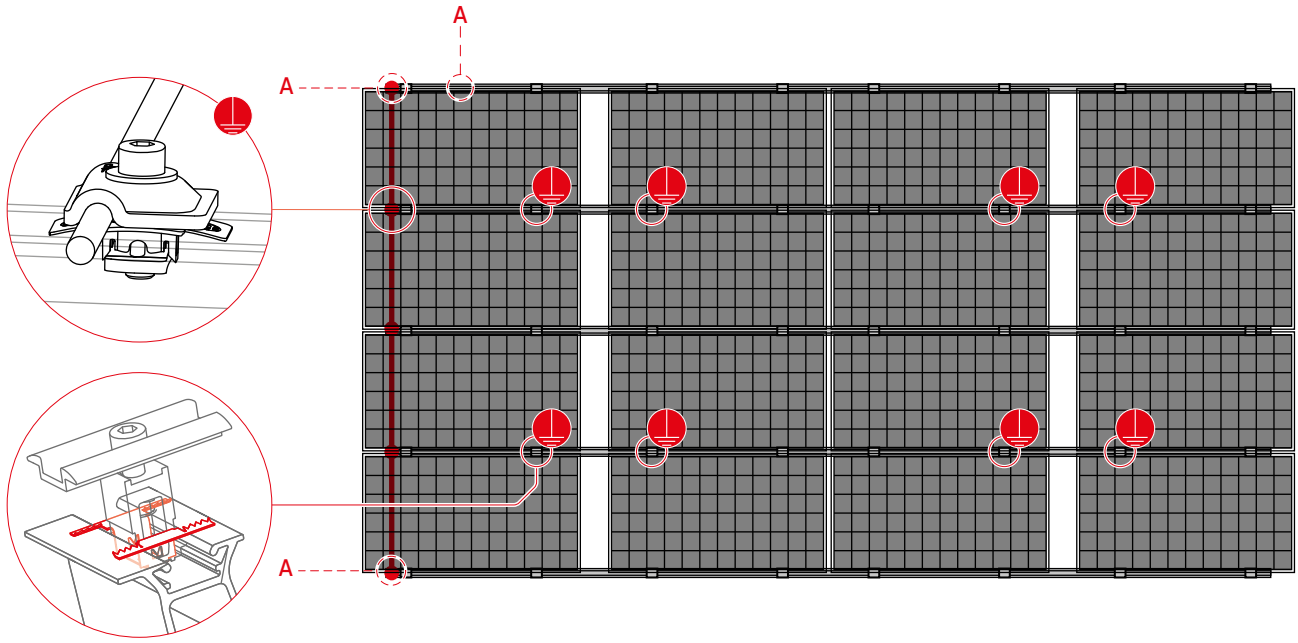
- A conductive connection in the module direction is ensured via the cross bracing. For a verified lightning current-carrying connection, an aluminium round wire must be installed in the same manner.
- If module frame earthing is required, each module must be connected using TerraGrif K2MI. For module frame earthing, we recommend a factor of 1 TerraGrif per module.
- The integration of the PV system with an existing external lightning protection system – including the calculation of connections between the lightning protection and PV system – must be carried out by a qualified lightning protection specialist.
- If the system is to be integrated into an existing lightning protection system, lightning current-carrying connections to the mounting system must be made. We recommend using round aluminum wire (≥ 25 mm^2) for the connection and discharge lines.
- The equipotential bonding is ensured independently of the lightning protection grounding via the cross bracing.

Materials needed:

- **TerraGrif K2MI**

D-Dome 6.07 Portrait Classic:
Equipotential bonding and lightning protection

The example illustrates equipotential bonding of the mounting system using aluminium round wire. Module frame earthing is shown using TerraGrif K2MI.



(A) Example of connection points for equipotential bonding conductors, or, alternativel, lightning protection.

Lightning protection and equipotential bonding

- For equipotential bonding we recommend using an aluminium round wire. Alternatively, a connection can be established via the module frames using the TerraGrif K2MI. However, only the connection using round aluminium wire is capable of carrying lightning current.
- The integration of the PV system with an existing external lightning protection system – including the calculation of connections between the lightning protection and PV system – must be carried out by a qualified lightning protection specialist. No verification of the system's lightning current carrying capacity is available.
- If module frame earthing is required, each module must be connected using TerraGrif K2MI. For module frame earthing, we recommend a factor of 0.8 to 1 TerraGrif per module.

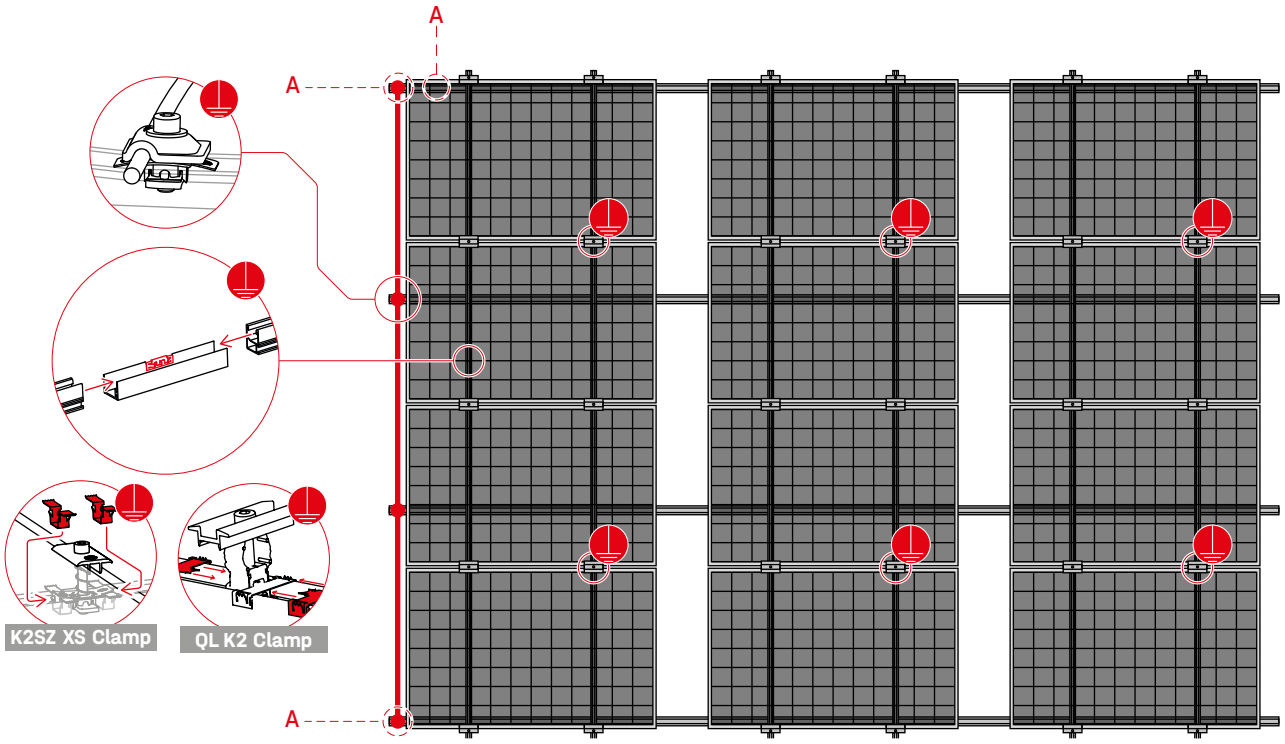
Materials needed:

- **K2 Lightning protection clamp 8 mm Set** consists of:
  - Lightning protection clamp
  - MK2 insert nut
  - Pan head screw M8 × 25
- **Round wire**
- **TerraGrif K2MI**

GreenRoof 2.0/GreenRoof Vento:

Equipotential bonding and lightning protection

The example illustrates a lightning protection connection in the direction of the SingleRail 36 using a round aluminium wire. Alternatively, an equipotential bonding connection is made through the SingleRail 36, and the SingleRail 36/50 Rail Connector. In the BasicRail direciton, this connection is made using the DomeFlat Connector. Module frame earthing is achieved with either the TerraGrif QL or the TerraGrif K2SZ, depending on the type of clamp used.



(A) Example of connection points for equipotential bonding conductors, or, alternativel, lightning protection.

Lightning protection and equipotential bonding

- Equipotential bonding in the direction of the SingleRail is achieved via the SingleRail 36/50 RailConnector, and in the direction of the BasicRail via the DomeFlat Connector.
- A connection between the BasicRails using round aluminium wire is also capable of carrying lightning current.
- The integration of the PV system with an existing external lightning protection system – including the calculation of connections between the lightning protection and PV system – must be carried out by a qualified lightning protection specialist. No verification of the system's lightning current carrying capacity is available.
- If module frame earthing is required, each module must be connected using TerraGrif K2MI or TerraGrif K2SZ, depending on the type of clamp used. For module frame earthing, we recommend a factor of 1 TerraGrif per module.

Materials needed:

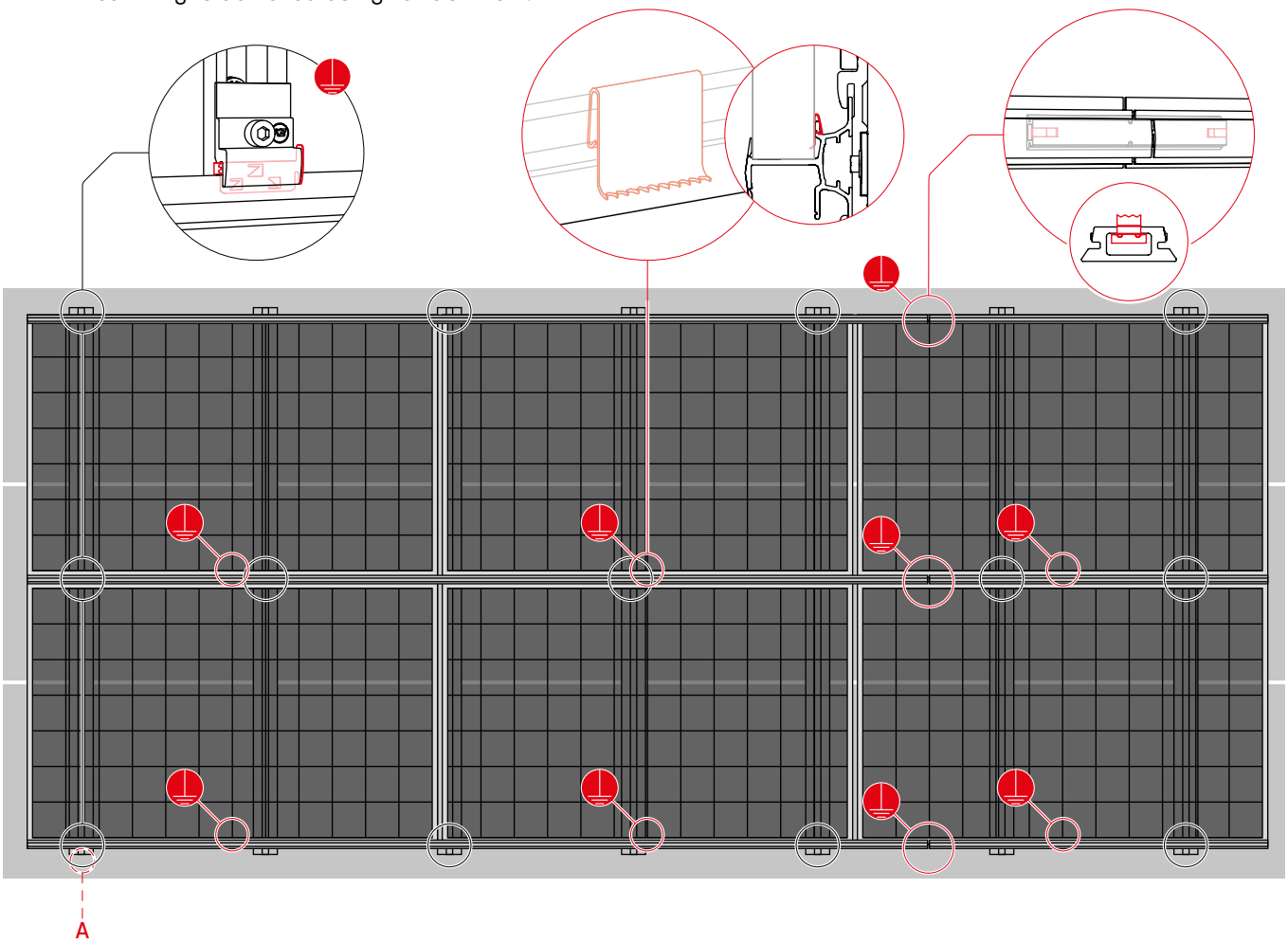
- **K2 Lightning protection clamp 8 mm Set** consists of:
  - Lightning protection clamp
  - MK2 insert nut
  - Pan head screw M8 × 25
- **Round wire**
- **TerraGrif QL/TerraGrif K2SZ**

Facade

Sandwich panels

CarrierRail with InsertionRail

The example illustrates the equipotential bonding along the InsertionRrail using TerraGrif PL, and the bonding between CarrierRail and InsertionRail using the CrossConnector Clip. Module frame earthing is achieved using TerraGrif U17.



(A) Example of connection points for equipotential bonding conductors, or, alternativel, lightning protection.

Equipotential bonding

- Module frame earthing, if required, is achieved using the TerraGrif U17.
- In the rail direction, the connection for the InsertionRail is established using the TerraGrif PL.
- The connection between the CarrierRail and the InsertionRail is made using the CrossConnector T and the CrossConnector Clip.

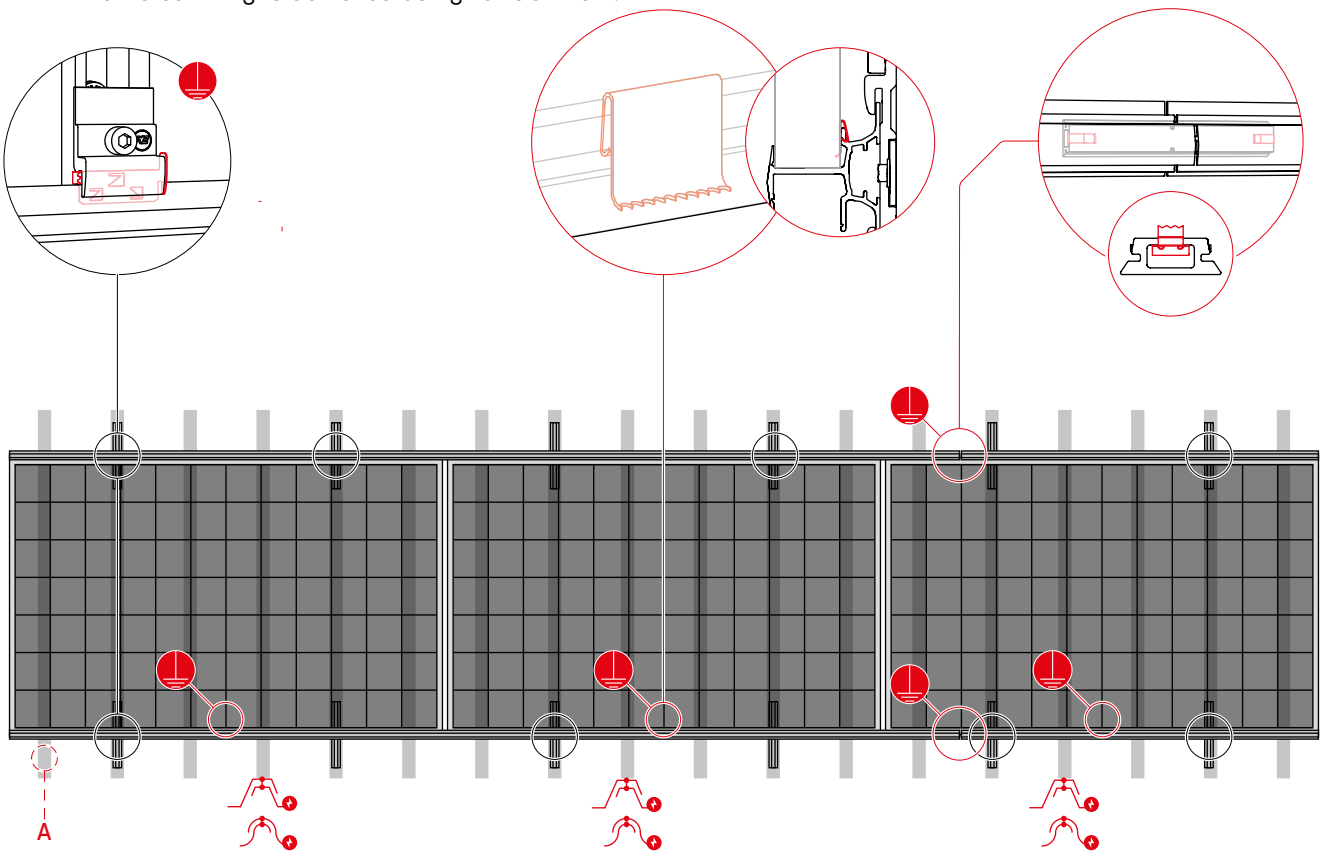
Materials needed:

- **TerraGrif U17**
- **TerraGrif PL**
- **CrossConnector Clip**

Trapezoidal sheet metal/corrugated sheet metal

MultiRail with InsertionRail

The example illustrates the equipotential bonding along the InsertionRrail using TerraGrif PL, and the bonding between MultiRail and InsertionRail using the CrossConnector Clip. Module frame earthing is achieved using TerraGrif U17.



The trapezoidal/corrugated sheets must be conductively connected to each other!

(A) Example of connection points for equipotential bonding conductors, or, alternativel, lightning protection.

Equipotential bonding

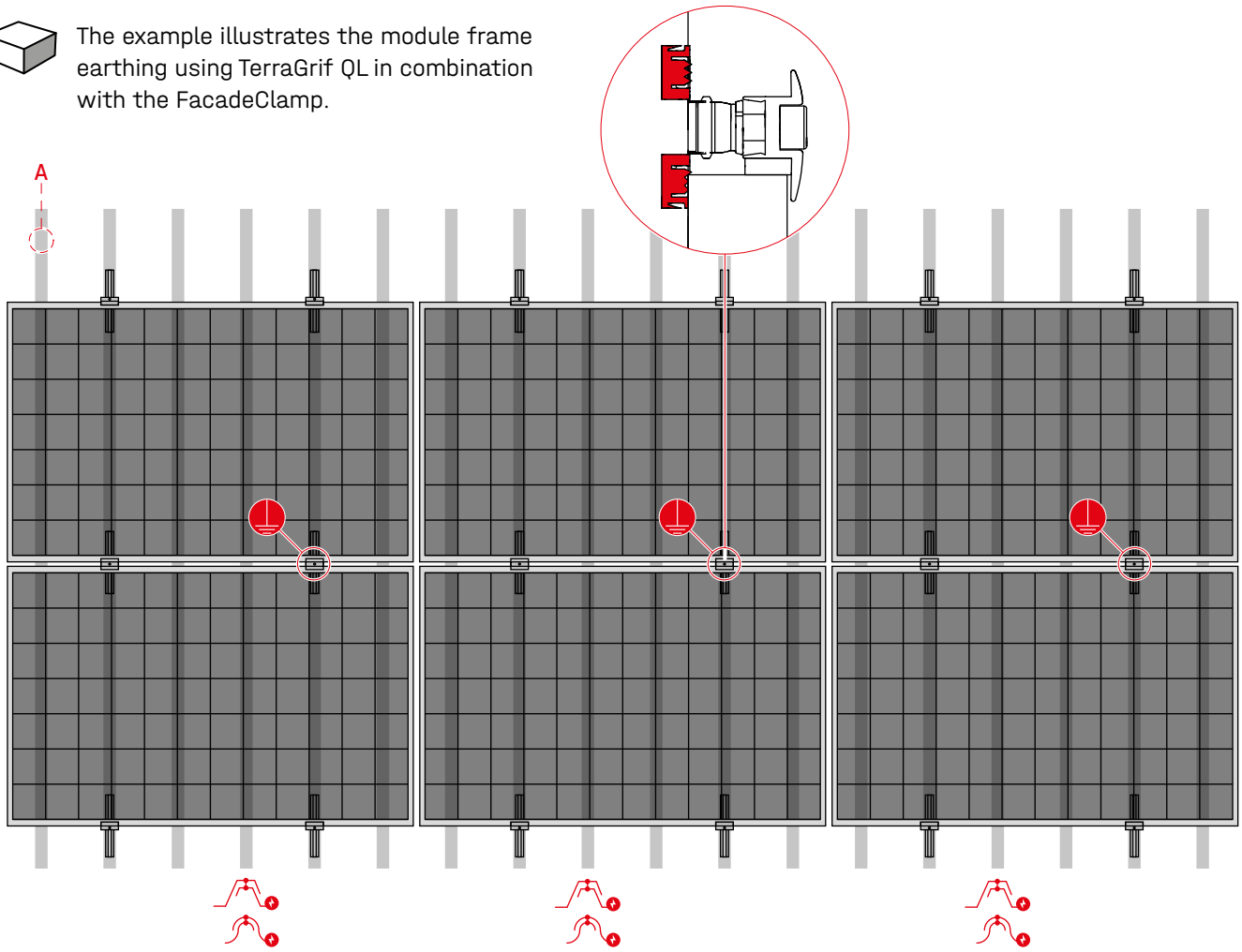
- Module frame earthing, if required, is achieved using the TerraGrif U17.
- In the rail direction, the connection for the InsertionRail is established using the TerraGrif PL.
- The connection between the MultiRail and the InsertionRail is made using the CrossConnector T and the CrossConnector Clip.
- The base rails are electrically connected via the façade element (see MultiRail Pitched Roof).
- Conductive continuity beween the facade elements must be present.

Materials needed:

- **TerraGrif U17**
- **TerraGrif PL**
- **CrossConnector Clip**

Trapezoidal sheet metal/corrugated sheet metal
MultiRail with FacadeClamp

The example illustrates the module frame earthing using TerraGrif QL in combination with the FacadeClamp.



The trapezoidal/corrugated sheets must be conductively connected to each other!

(A) Example of connection points for equipotential bonding conductors, or, alternativel, lightning protection.

Equipotential bonding

- The MultiRails are conductively connected to one another via the façade elements (see MultiRail pitched roof).
- Module frame earthing, if required, can be implemented using the TerraGrif QL. For this, conductive continuity between the facade elements must be present.

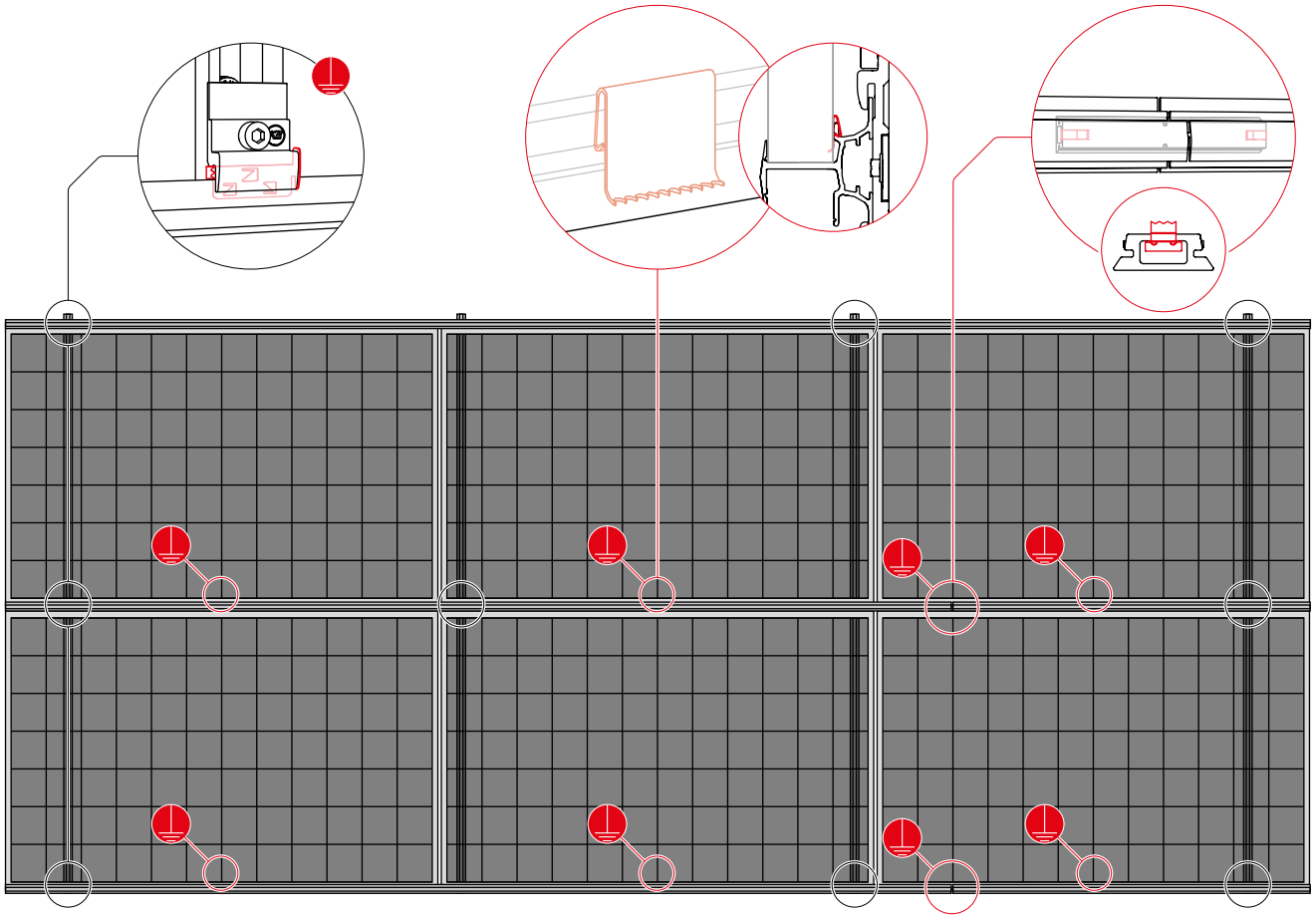
Materials needed:

- **TerraGrif QL**

Concrete/solid brick

PerfoRail/FacadeRail with InsertionRail

The example illustrates the equipotential bonding along the InsertionRrail using TerraGrif PL, and the bonding between base rail (PerfoRail/FacadeRail) and InsertionRail using the CrossConnector Clip. Module frame earthing is achieved using TerraGrif U17.



Equipotential bonding

- Module frame earthing, if required, is achieved using the TerraGrif U17.
- In the rail direction, the connection for the InsertionRail is established using the TerraGrif PL.
- The connection between the base rail (PerfoRail/FacadeRail) and the InsertionRail is made using the CrossConnector T and the CrossConnector Clip.

Materials needed:

- **CrossConnector Clip**
- **TerraGrif PL**
- **TerraGrif U17**

Components

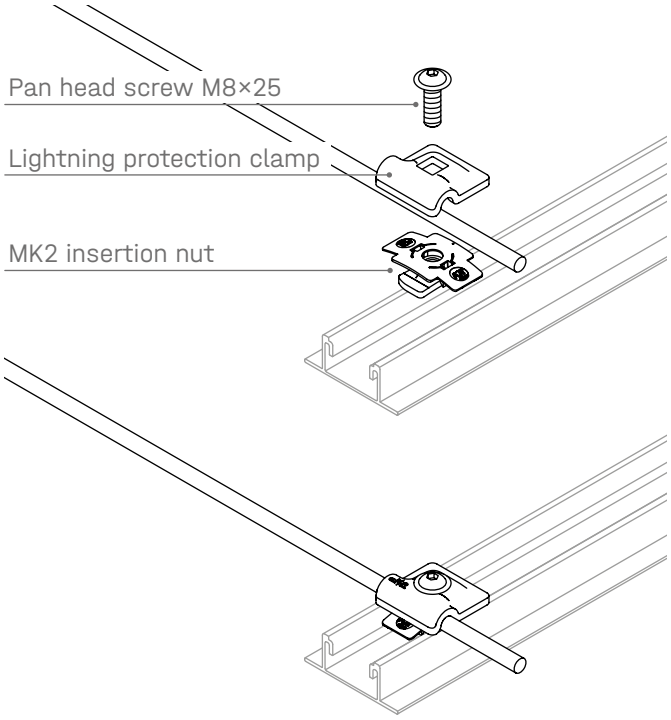
K2 lightning protection elements

for aluminium round wire 8 mm

Lightning protection clamp 8 mm Set (2004922)

Set consists of:

- Lightning protection clamp
- MK2 insertion nut
- Pan head screw M8×25

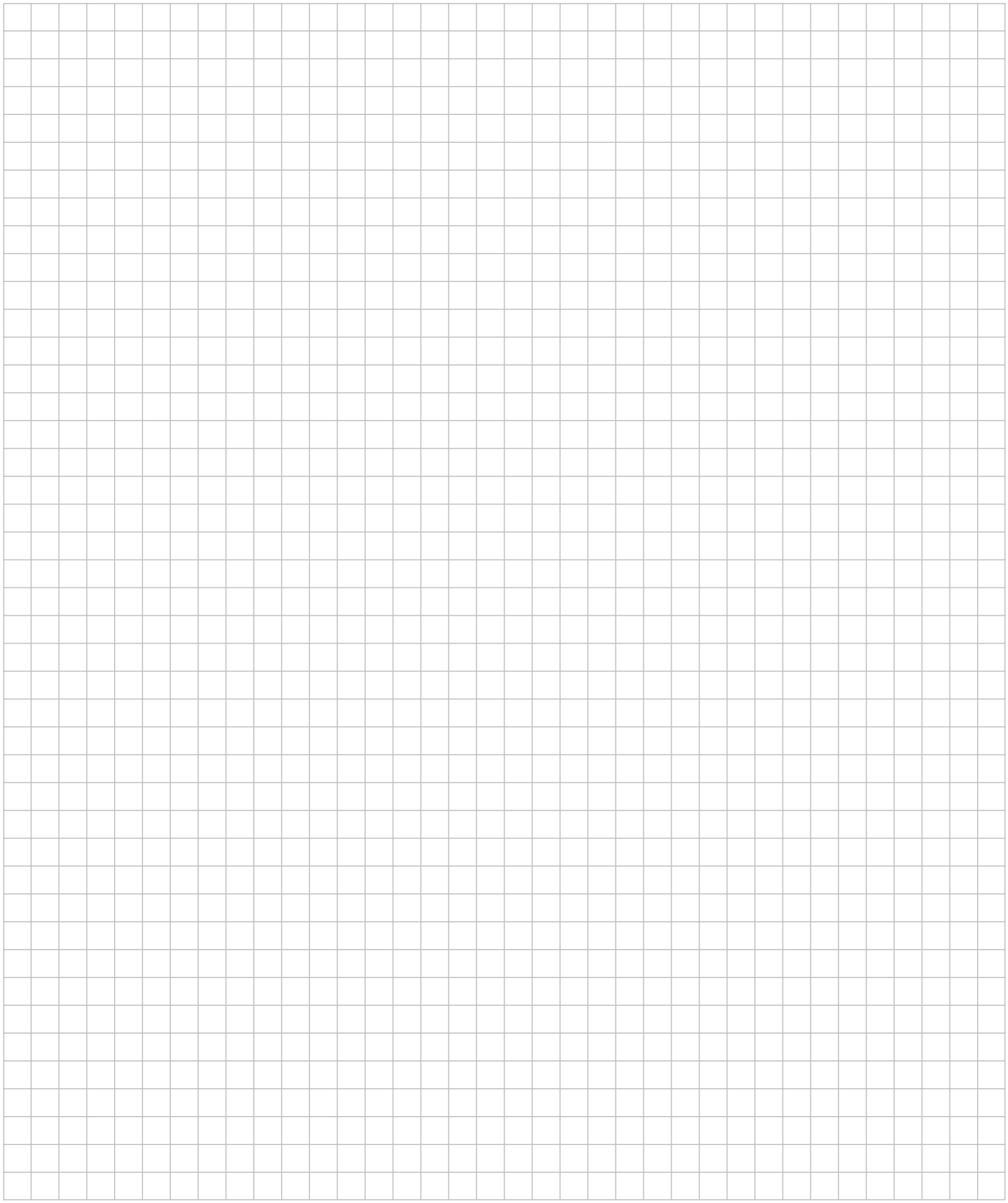


General notes

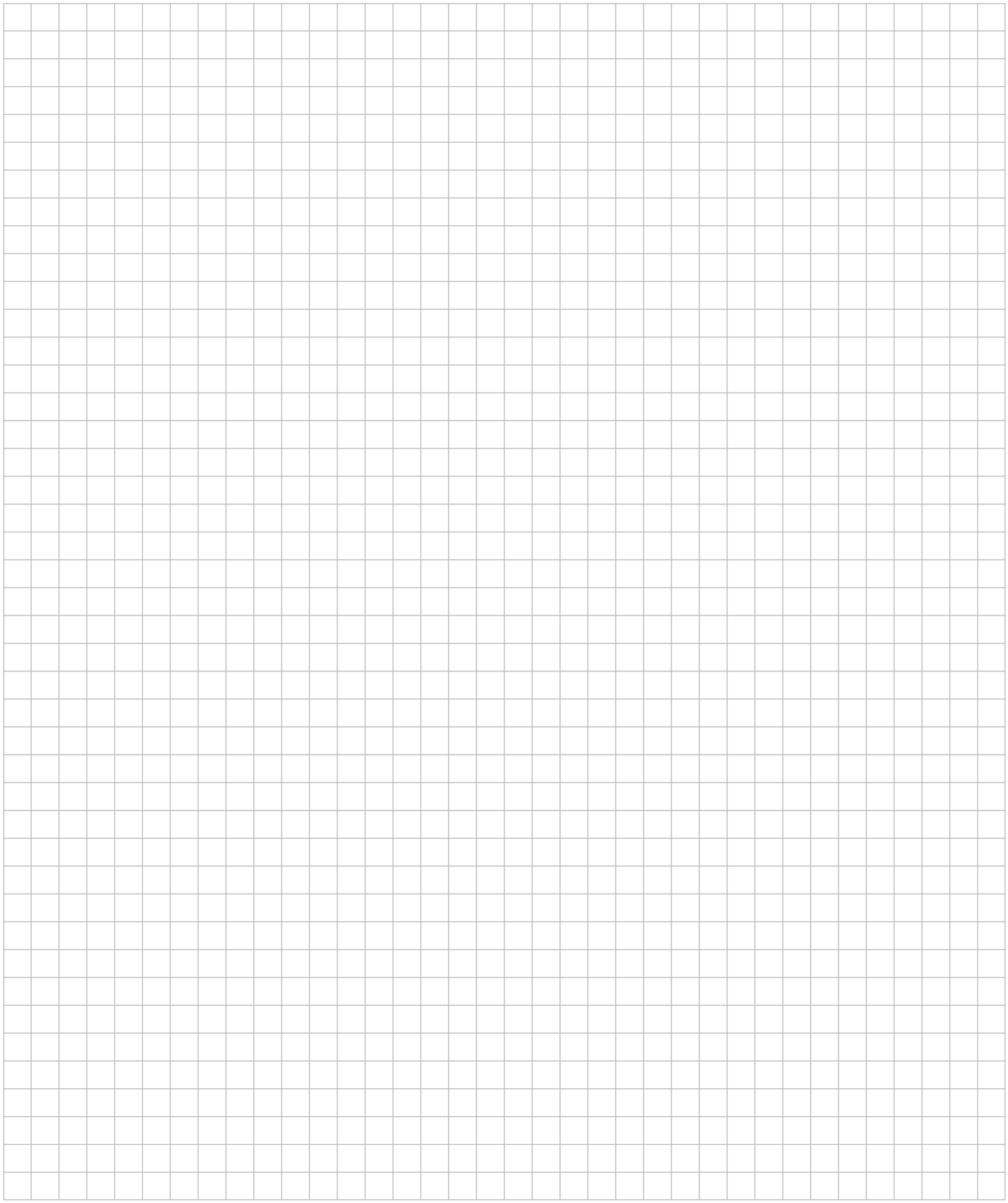
Different components are needed to connect the mounting system to existing lightning protection. We recommend using suitable components for the lightning protection. The connections must be permanently suitable when connecting different materials, taking account of the electrochemical voltage series:

- Cross connections
- Parallel connections
- Earthing

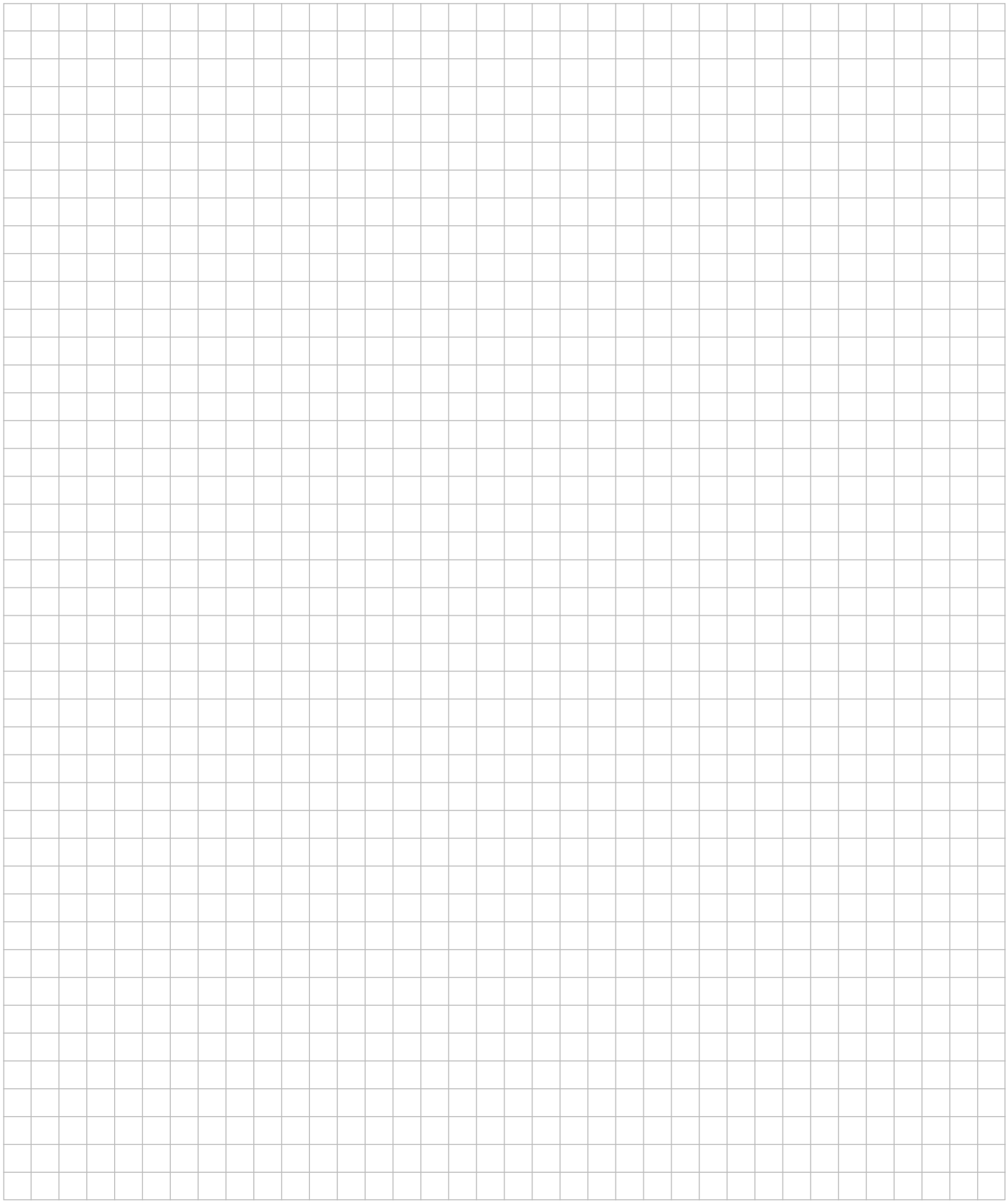
Notes



Notes



Notes



Connecting Strength

Thank you for choosing a K2 mounting system.

Mounting sytems from K2 Systems are quick and easy to install. We hope these instructions have helped. Please contact us with any questions or suggestions for improvement. Our contact data:

- **k2-systems.com/en/contact**
- **Service Hotline: +49 (0)7159 42059-0**

Our General Terms of Business apply. Please refer: k2-systems.com

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Equipotential bonding and lightning protection manual EN V8 | 1026 · Subject to change
Product illustrations are exemplary and may differ from the original.