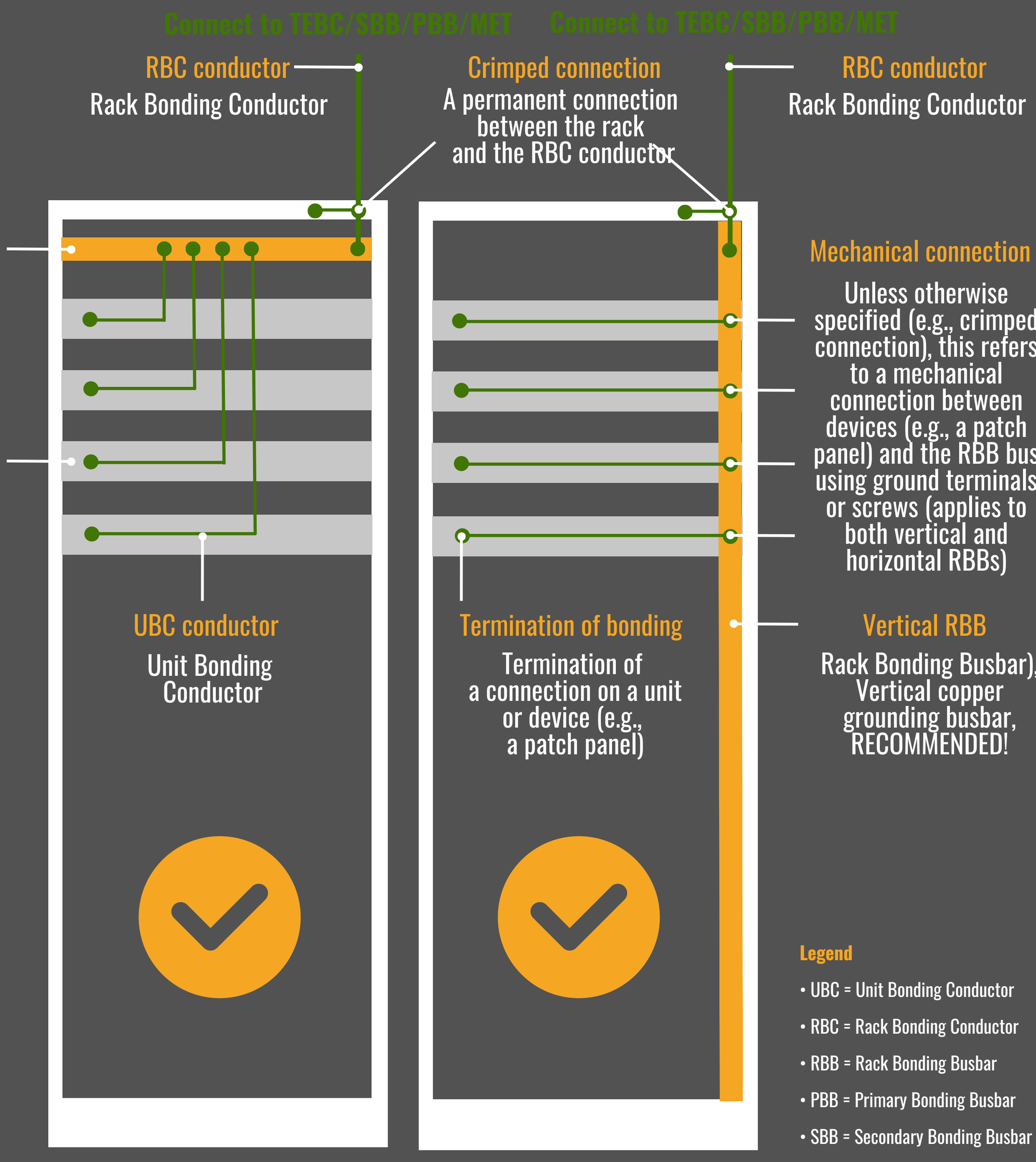
# SOLARIXPEDIA

## How-to: Bonding Patch panels in a Rack

- The requirements for bonding in telecommunications systems within buildings and other structures are addressed in EN 50310*.
- Compliance with the requirements of this standard is essential for safety (protection of both people and equipment) and the reliable operation of the entire IT infrastructure, including both its passive components (cabling) and active products.
- Proper bonding and the functionality of this system are also essential for the trouble-free operation of shielded cabling.

## METHODS OF BONDING ACCORDING TO EN 50310




EXAMPLE 1

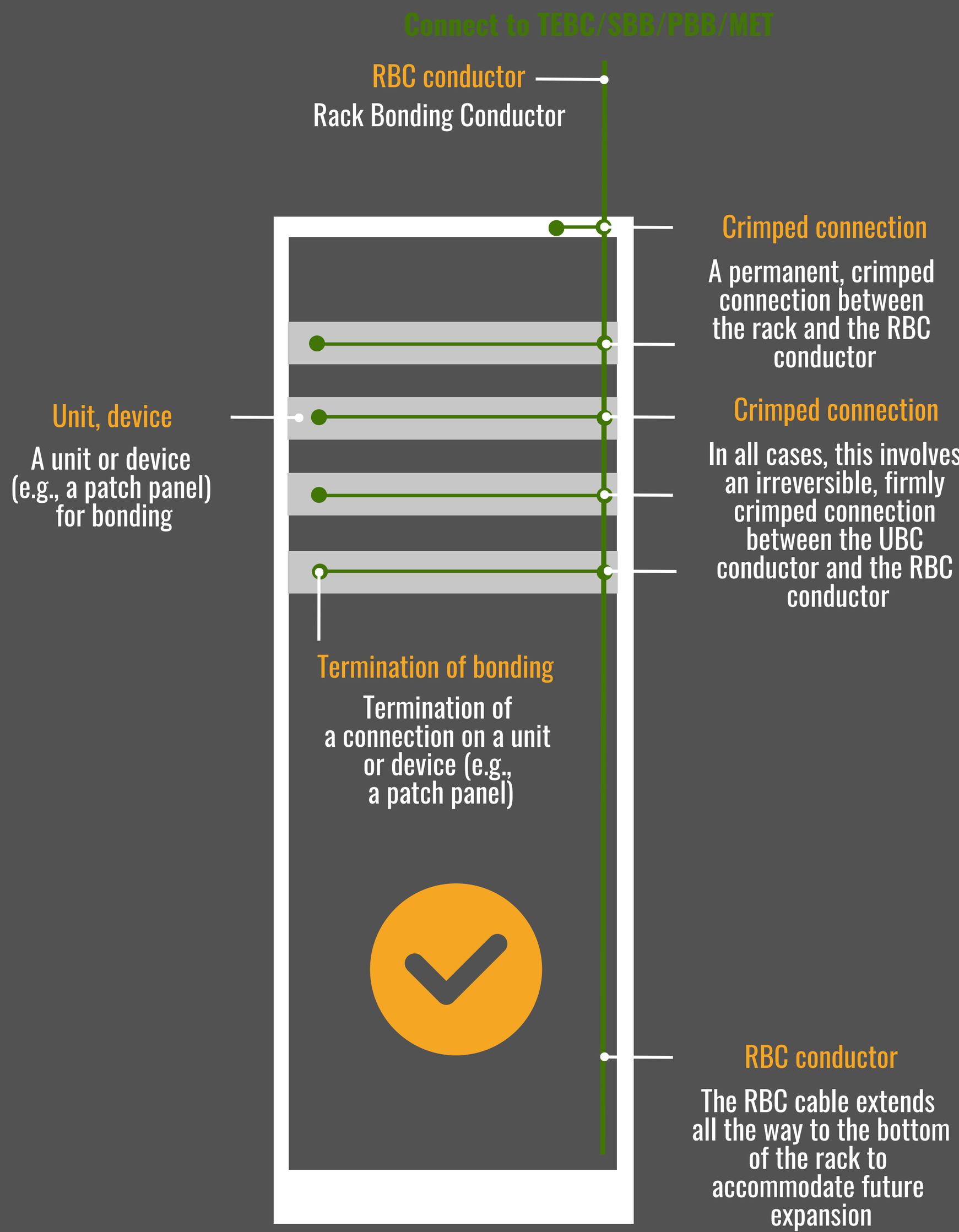
EXAMPLE 2

**Legend**

- UBC = Unit Bonding Conductor
- RBC = Rack Bonding Conductor
- RBB = Rack Bonding Busbar
- PBB = Primary Bonding Busbar
- SBB = Secondary Bonding Busbar
- MET = Main Earthing Terminal
- TEBC = Telecommunications Equipment Bonding Conductor

www.solarix.cz

# METHODS OF BONDING ACCORDING TO EN 50310




EXAMPLE 3

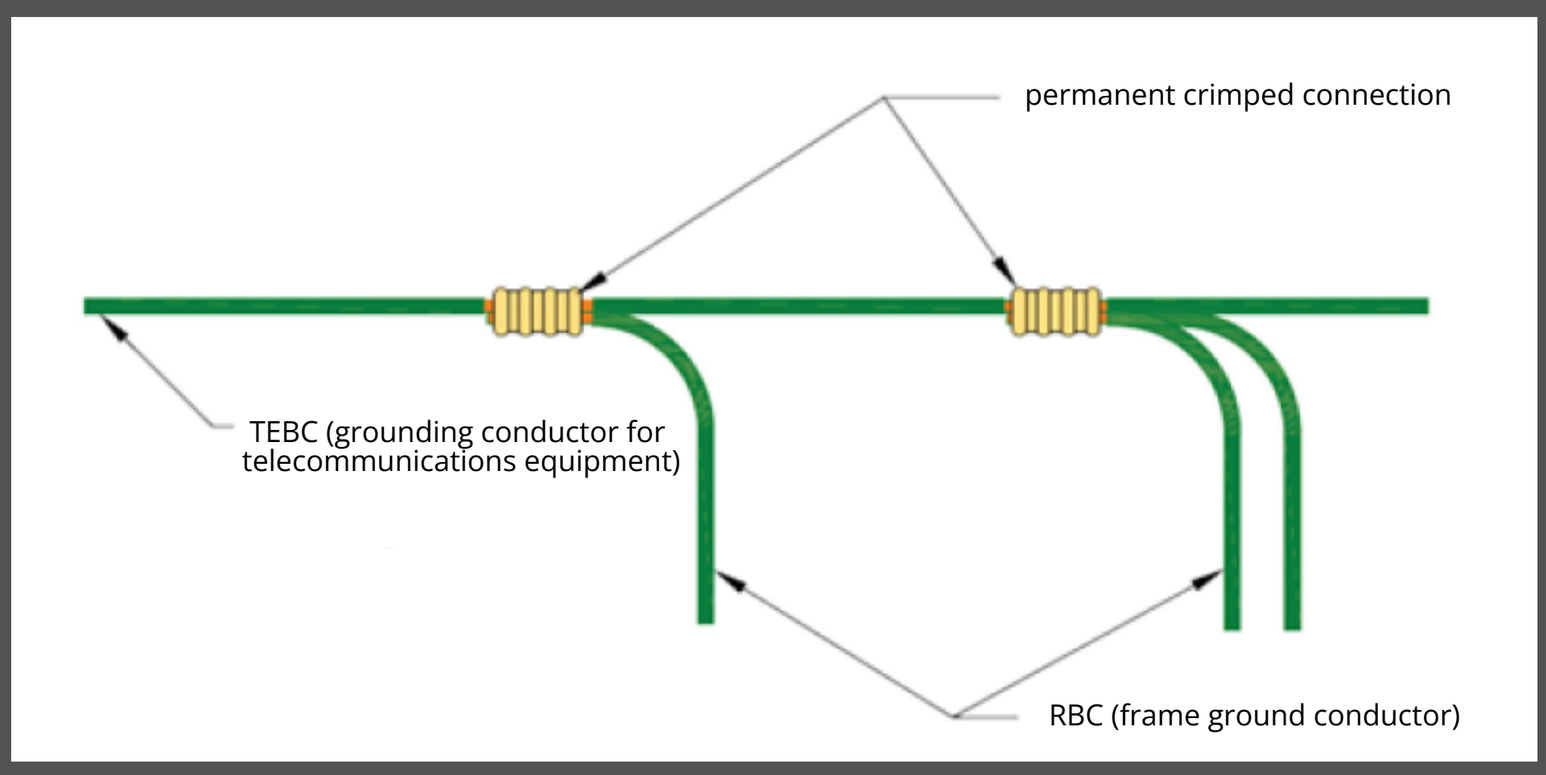
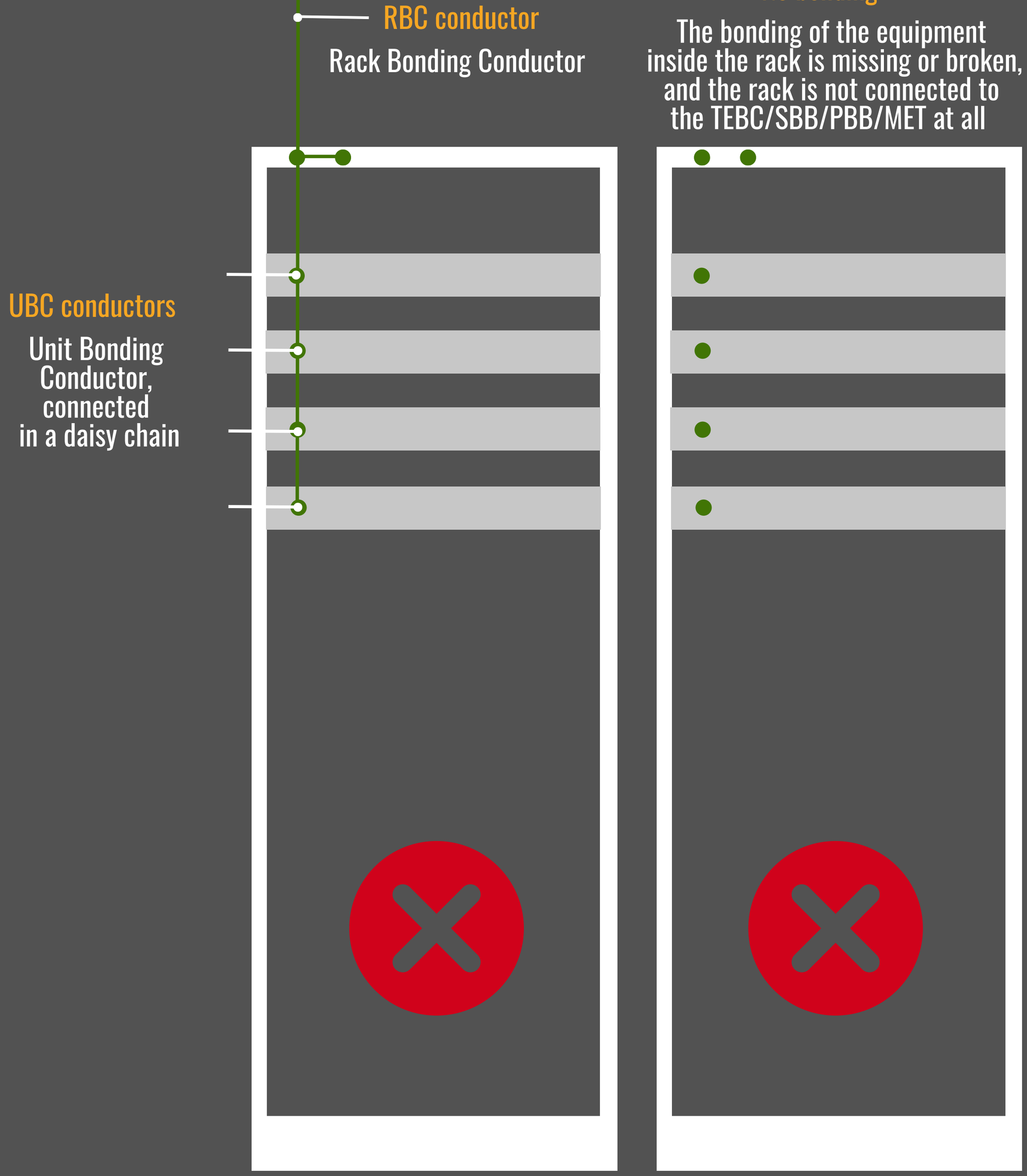



Figure - Example of a permanent and irreversible crimped connection for Example 3 (source: EN 50310, Figure 15, page 34)

- All UBC connections should be as short as possible (maximum length recommended 0.5 m, see EN 50310, part 7.6.3.2). The UBC conductor gauge is either specified by the manufacturer or, according to EN 50310, part 7.5.3.1, should have at least 4 $mm^2$.
  Many manufacturers recommend 2.5 $mm^2$; in Solarix patch panels, this conductor has 4 $mm^2$.
- Requirements for other conductors in the bonding system are specified in EN 50310 in Table 6 and Chapters 7 through 11. The minimum conductor size between the SBB and PBB (Secondary and Primary Bonding Busbar) with a length of up to 4 m is 16 $mm^2$. Conductors in other parts of the bonding system should also be as short as possible.
- The conductor material must be copper with a conductivity of more than 95%. If the conductor is insulated, the insulation must comply with HD 60364-5-54.
- All bonding conductors should be bent as little as possible and routed as straight as possible.
  They must not be coiled or folded over themselves, and in no section should they be routed through a metal conduit.
- All connections must be mechanically stable and must not be subject to oxidation.
- According to EN 50310, the DC resistance between all points of the bonding system reserved for telecommunications be max. 1.67 mΩ/m (see parts 6.3.2.2, 6.3.2.3, and 6.3.3). The DC contact resistance of the connecting elements themselves (terminals, connectors) should be less than 0.1 mΩ.
- Racks and frames should be equipped with horizontal or vertical RBB busbars (Rack Bonding Busbar, see EN 50310, part 7.5.1.2) as shown in Examples 1 and 2.
- Racks and frames in a row (i.e., side by side) should not be connected in a daisy chain. Each RBC conductor of each rack (or its vertical or horizontal RBB busbar) should be directly and separately connected to the nearest TEBC, SBB, PBB, or MET point (the layout and availability of these points depend on the size of the building and the topology of the bonding system, see EN 50310).
  The length of the conductor to the nearest SBB, PBB, or MET point should not exceed 3 m, but should never be longer than 6 m. If this cannot be met, additional bonding conductors must be installed (see EN 50310 part 10.2.2).

# NON-COMPLIANT METHODS OF BONDING ACCORDING TO EN 50310

- Example 4 shows daisy chaining, which is not recommended and should not be used. This is not a reliable method for bonding individual devices in the data rack.
- In Example 5, there is no bonding in the rack, or it may have been disconnected during operation or modifications in the data rack.




EXAMPLE 4 EXAMPLE 5

# IMPORTANT SAFETY INSTRUCTIONS

- For safety reasons, every metal component in the data rack, frame etc., must be bonded and properly grounded, even in the case of unshielded cabling or fiber-optic cabling (metal FO patch panels).
- For the bonding system to be functional, the entire building system must comply with the requirements of the EN 50310 and all related standards. This must always be verified before the design phase of the cabling.
- The components of the bonding system must be installed in the building in accordance with HD 60364-4-41, HD 60364-4-444, HD 60364-5-54, and EN 61140 (requirements for installations in buildings).
- Be aware of potential differences between individual grounding points; these must not exceed 1V. If this condition is not met and these points are connected (e.g., via the installed cabling), additional interference will occur and the connection will not be reliable or safe. Potential equalization must be performed.
- We recommend clearly labeling all the main grounding points of the cabling with a tag "Cabling Grounding, Do Not Disconnect" to prevent potential issues in the future.
- Do not forget to ground conductive cable routes as well, using the shortest possible cables and do so at irregular intervals (see EN 50174-2).
- To interconnect cable shielding with components, use a grounding conductor (for shielded CAT5E, CAT6, and CAT6A cables) or the braid (for shielded CAT7, CAT7A, and CAT8 cables) in combination with the aluminum foil in F/UTP, U/FTP, F/FTP as well as S/FTP cables. This is the only way to ensure proper shielding functionality and proper connection of the cable and components.

* ) This document addresses only certain sections of the EN 50310 standard, specifically examples of the proper connection of copper cabling components (patch panels) in a data rack. This standard (and the related documents cited therein) contains much more important information, compliance with which is absolutely essential for the proper protection and trouble-free operation of IT infrastructure (both passive and active). We therefore recommend keeping the standard available and strictly adhering to it. Compliance with the conditions for proper interconnection, installation, maintenance, etc., as specified in the documents above, is an important criterion for ensuring the proper functionality of all Solarix products used.

IMPORTANT: The content of this document is updated regularly. Therefore, always use the latest version downloaded from this page.

www.solarix.cz

If you have any packaging or parts of packaging left over after installing Solarix products, be sure to dispose of them properly.

## NEED SOME ADVICE?

If you need advice with installing Solarix products, please contact us at info@solarix.cz or by phone at +420 840 505 555. This document serves as a user manual.

**Výrobce/Producer/Producent/Výrobca:**
**INTELEK LTD**
Ericha Roučky 1291/4, Brno, 627 00, CZ
+420 840 505 555
www.solarix.info • info@solarix.info