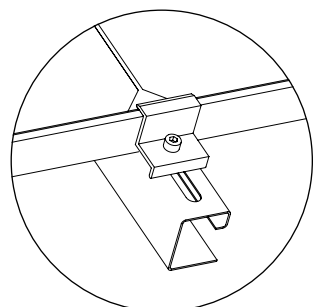
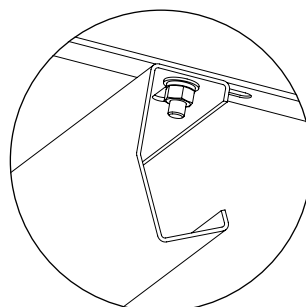
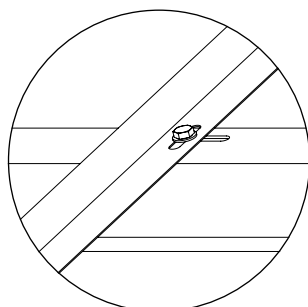
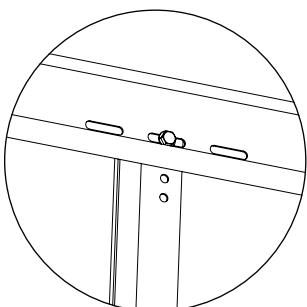
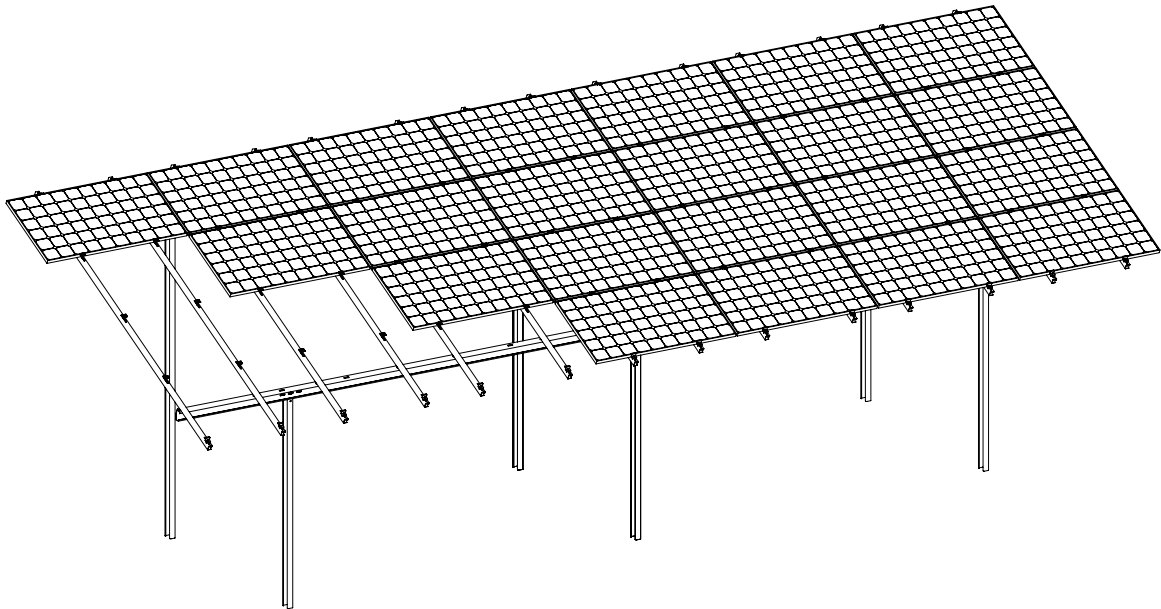


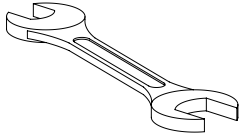
Installation instructions for the Rackta system.

**For double-support DH structures
in a horizontal arrangement of panels.**

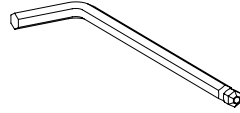


Preparation for installation

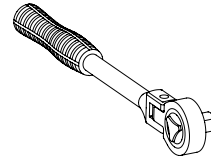
Prepare the following hand tools for proper installation of the structure:



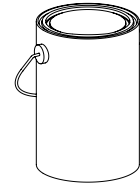
2 x SW19 open-end wrench
(pre-screwing of the
structure)



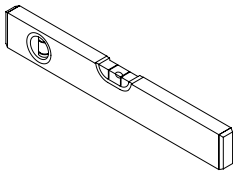
SW6 hex key
(initial screwing
of panels)



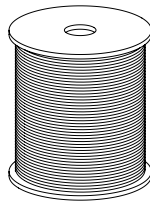
Torque wrench with SW19
and SW6 socket
(tightening)



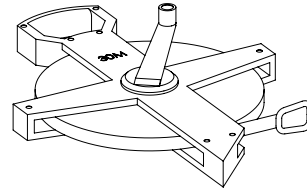
ZN-S-OF zinc paint by
Niczuk (provides corrosion
protection and maintains
warranty)



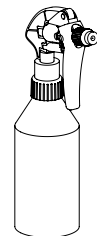
Level



String



Surveyor's tape measure



Metal degreaser

BEFORE COMMENCING WITH INSTALLATION:

- Read the health and safety recommendations for the installation instructions on page 11.
- In the presence of the courier, verify that the quantities in the delivery are compliant with the order, and check that the structural elements have no visible mechanical damage, including damage to the anti-corrosion coating, skewing and dents.
- Report all discrepancies to the manufacturer using the complaint form, which can be found at www.niczuk.eu, within 3 days of delivery.

Use a pile driver adapter with a cross section corresponding to Figure 1-1 to properly drive the pole.



Fig. 1-1 Cross-section of VS3H pole

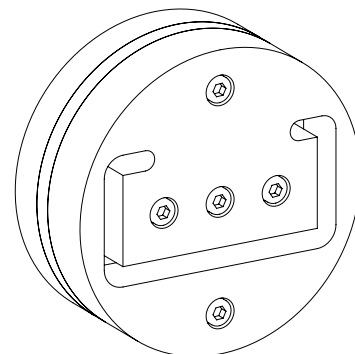


Fig. 1-2 Pile driver adapter

Components of the structure

Channels:

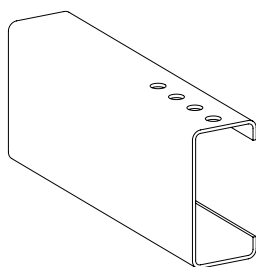


Fig. 2-1 VS3H pole

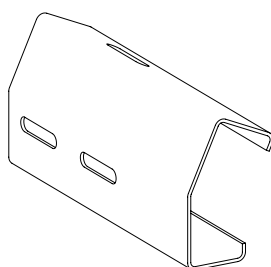


Fig. 2-2 VN3H supporting channel

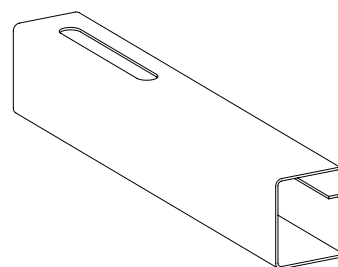


Fig. 2-3 VM15H modular channel

Component	Length [mm]
VS3H244	2440
VS3H360	3600

Component	Length [mm]
VN3H113	11300
VN3H108	10850
VN3H99	9900
VN3H80	8000
VN3H63	6300
VN3H53	5300
VN3H46	4600

Component	Length [mm]
VM15H41	4140
VM15H43	4340
VM15H45	4540
VM15H47	4740
VM15H48	4840

Channel screwing accessories.

Stainless steel bolt set G.1 VNZ includes:

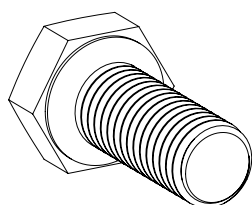


Fig. 2-4 VN8S/VN7S hex head bolt
– 1 piece.

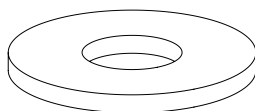


Fig. 2-5 VNPD flat washer
– 2 pcs

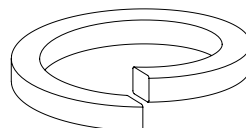


Fig. 2-6 VNPDS spring washer
– 1 piece

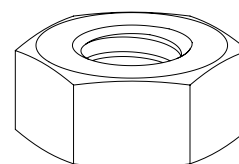


Fig. 2-7 VN8N/VN7N hex nut
– 1 piece

Accessories for the installation of photovoltaic panels:

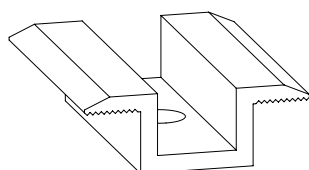


Fig. 2-8 VWA/VWC clamp

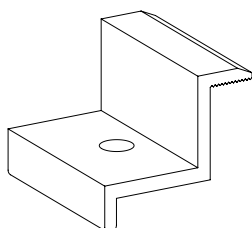


Fig. 2-9 VA/VC clamp

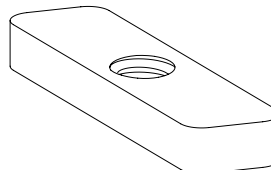


Fig. 2-10 VNNS slide nut

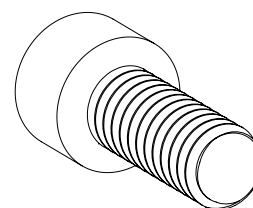


Fig. 2-11 VN8I/VN7I Allen head bolt

Assembly of the structure

1

DETERMINATION OF DISTANCE BETWEEN POLES AND PILE DRIVING

- The distance between the front and rear VS3H pole in each configuration has a fixed value – 2490 mm.
- The spacing „A” of the poles depends on the type of the supporting channel.
- Read the correct pole spacing from Table 1.
- Using a measuring tape and a string, mark out the exact locations where the poles will be driven.
- Use a specialized pile driver to drive the poles.
- In order to ensure appropriate quality of the edge of the pole when driving, use an adapter with a suitable cross section.
- Drive the poles to a depth of 1500 mm, keeping it upright (the depth of the foundation of the poles was selected taking into account the bearing soils and wind load zone 1).
- Protect the edges of the pole after driving with zinc paint to provide corrosion protection.

Supporting channel	VN3H113	VN3H108	VN3H99	VN3H80	VN3H63	VN3H53	VN3H46
Pole spacing [mm] – A	4250	4250	3300	3300	4550	3300	3300

Tabela 1 Determination of VS3H poles spacing

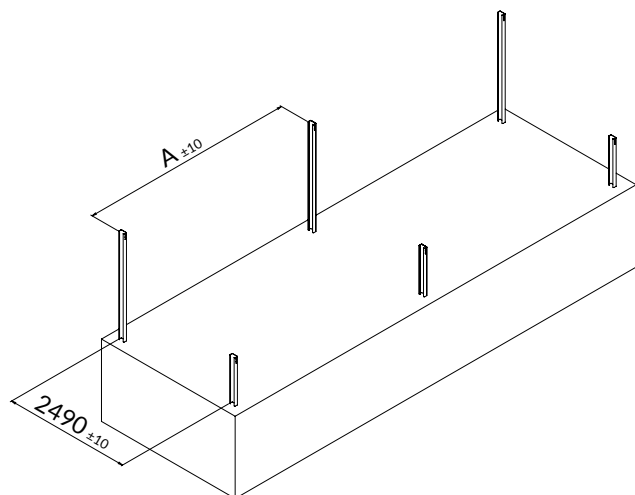


Fig. 3-1 Determination of VS3H poles spacing

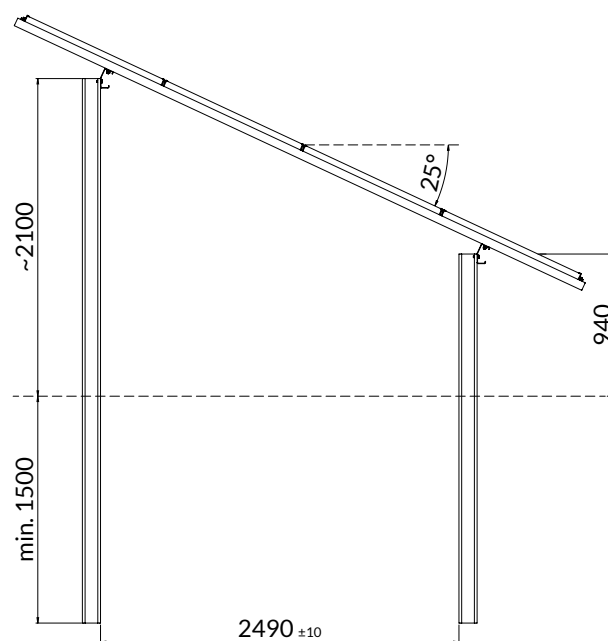


Fig. 3-2 Cross-section of DH structure

2

CONNECTING VN3H SUPPORTING CHANNEL WITH VS3H POLE

- For screwing, use the G.1 VNZ bolt set, a SW19 open-end wrench and a SW19 socket torque wrench.
- Place all the bolts in the kidney slots.
- Pre-tighten the bolts with a SW19 open-end wrench.
- Tighten all connections with a SW19 socket torque wrench with a tightening torque of 76 Nm.

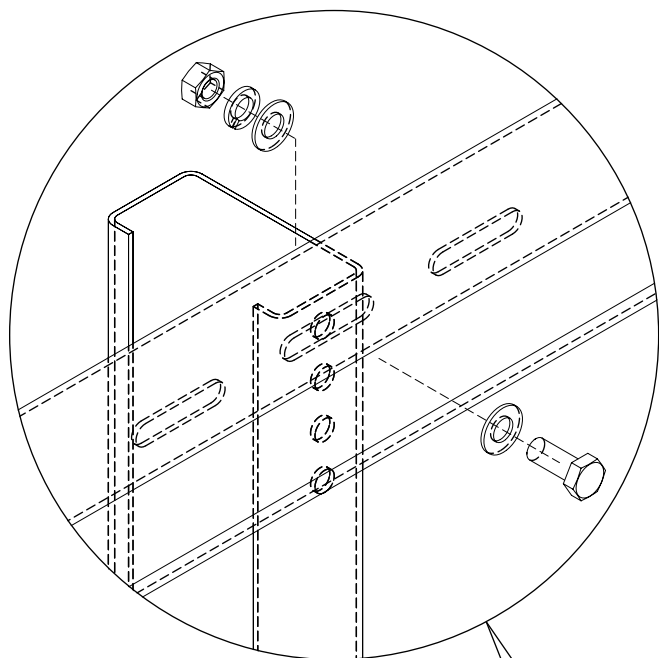


Fig. 3-3 Attaching the supporting channel to the pole with the use of G.1 VNZ bolt set

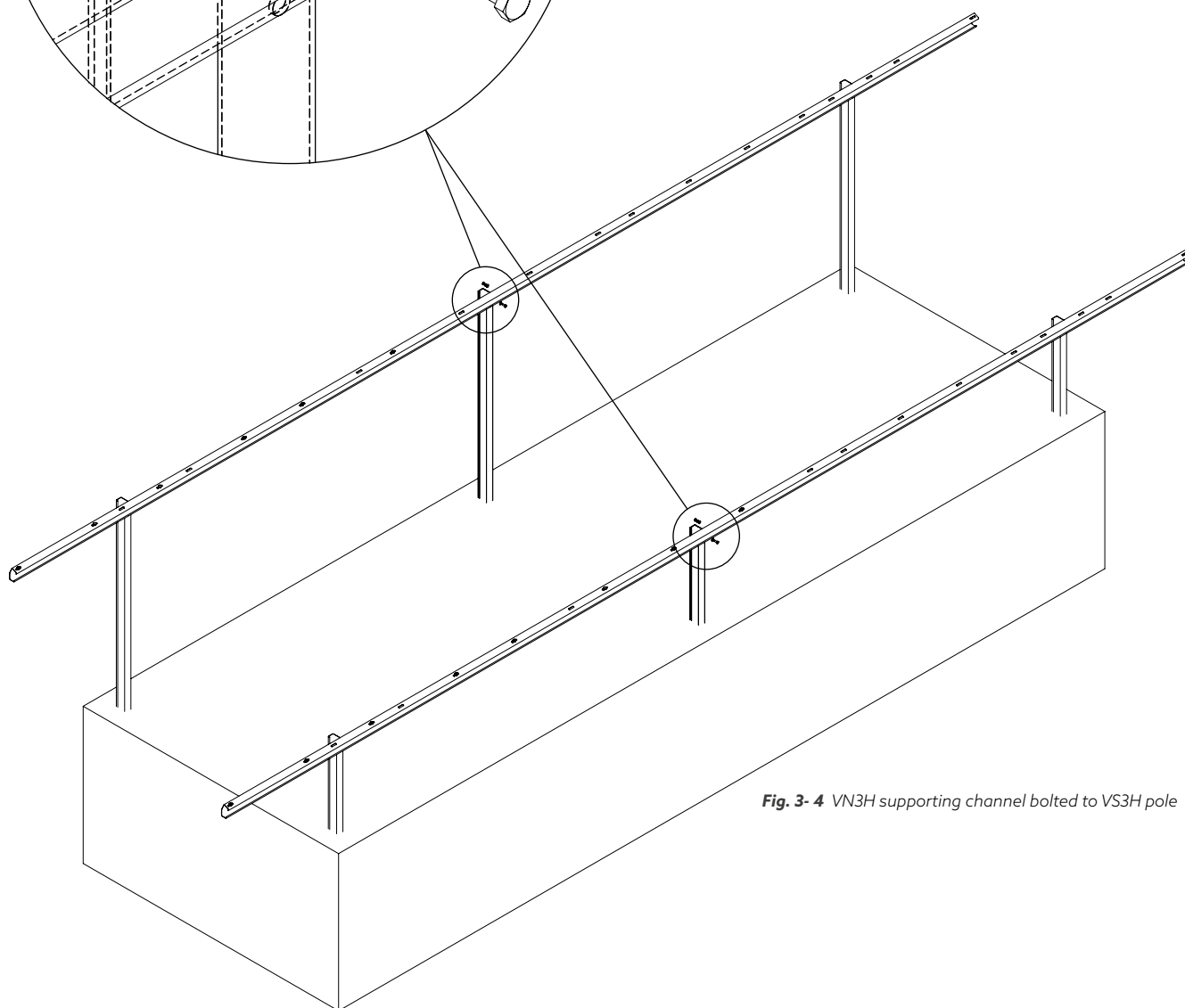


Fig. 3-4 VN3H supporting channel bolted to VS3H pole

3

CONNECTING VM15H MODULAR CHANNEL WITH VN3H SUPPORTING CHANNEL

- For screwing, use the G.1 VNZ bolt set, a SW19 open-end wrench and a SW19 socket torque wrench.
- Place all the bolts in the kidney slots.
- Pre-tighten the bolts with a SW19 open-end wrench.
- Tighten all connections with a SW19 socket torque wrench with a tightening torque of 76 Nm.

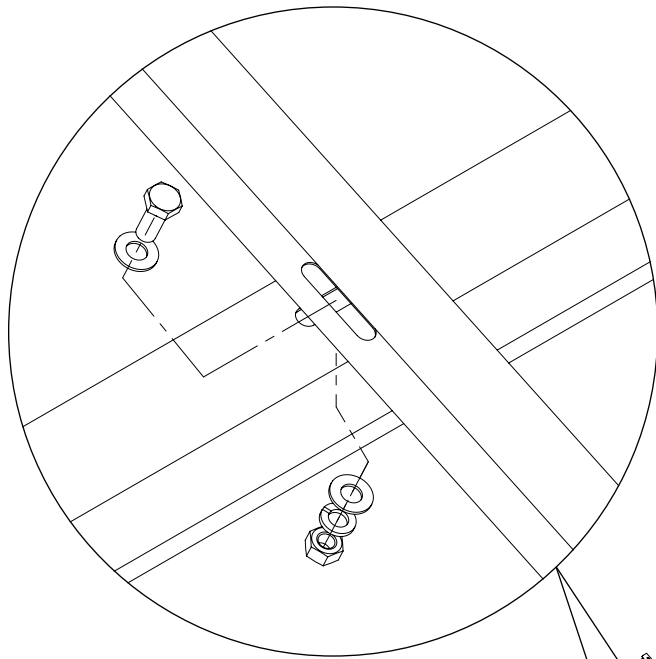


Fig. 3-5 Screwing of the VM15H modular channel to the VN3H supporting channel using the G.1 VNZ bolt set

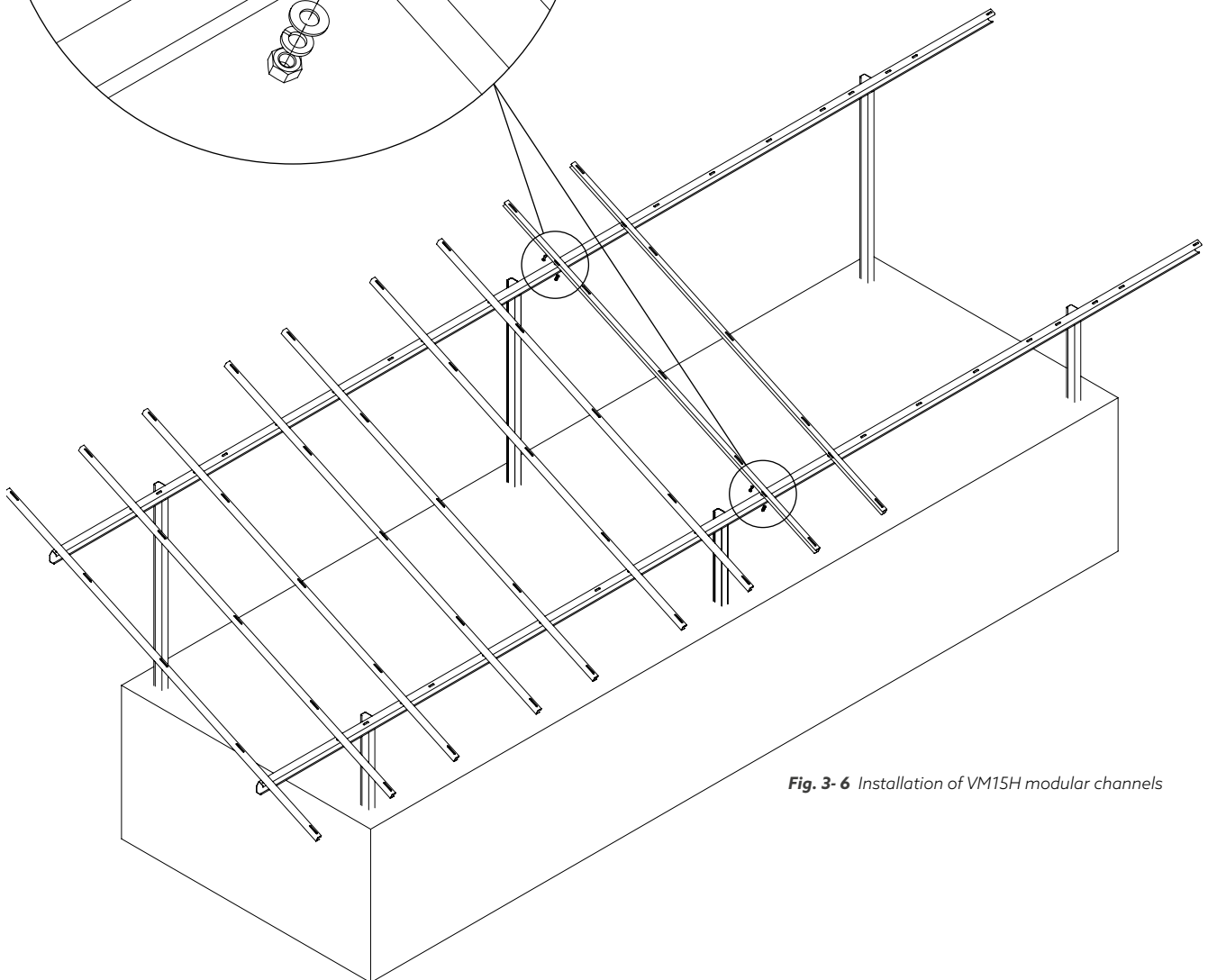


Fig. 3-6 Installation of VM15H modular channels

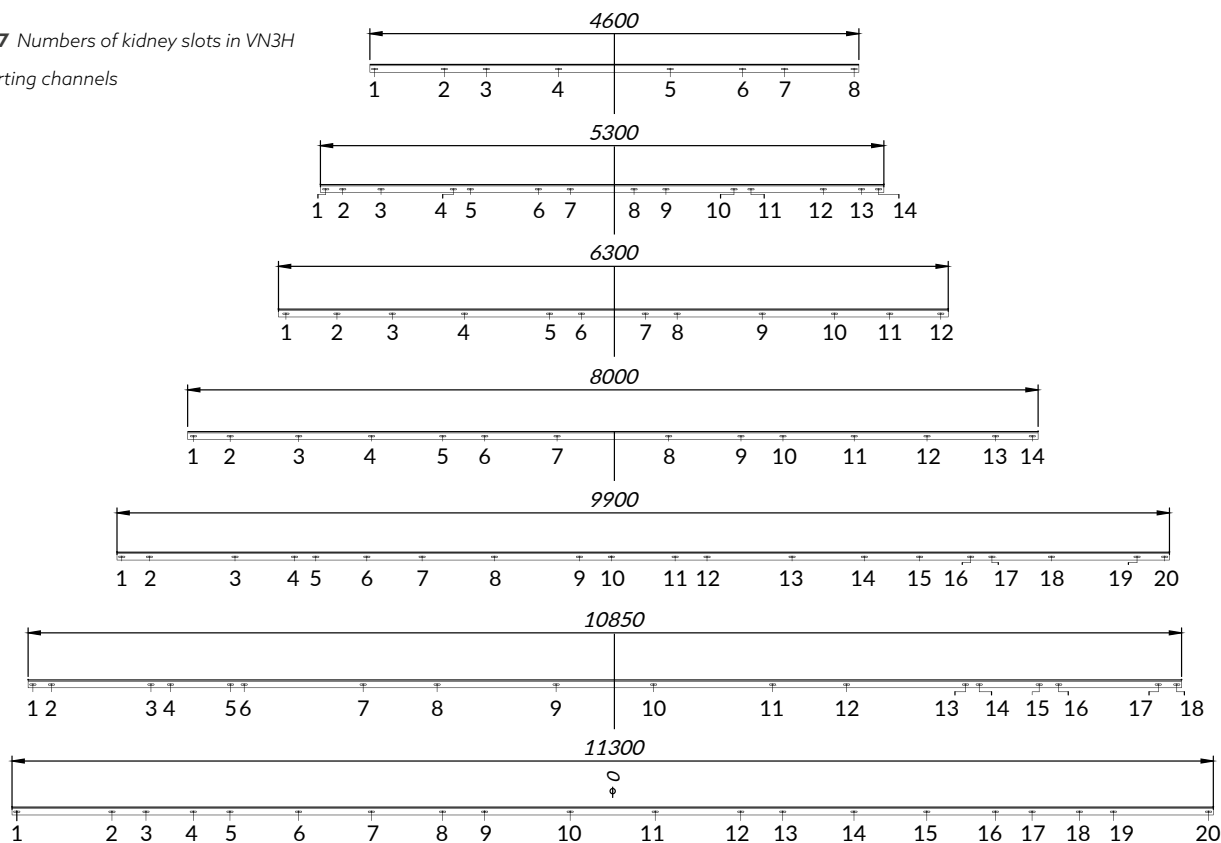
Determination of kidney slots for installation of VM15H modular channels in VN3H supporting channels

- Check the dimension of the longer side of the panel.
- Depending on the number of panels and the length of the long side of the panel – read the numbers of kidney slots (last column).

Channel	Number of panels [pcs]	Longer side of panel [mm]	Number of VM15H modular channels [pcs]	Numbers of kidney slots of VN3H supporting channel
VN3H46	12	1658-1765	6	1, 3, 4, 5, 6, 8
VN3H53	12	1939-1992	6	1, 4, 6, 9, 11, 14
	12	1765-1939	6	2, 5, 6, 9, 10, 13
VN3H63	16	1658-1765	8	1, 3, 4, 6, 7, 9, 10, 12
VN3H80	16	1939-1992	8	2, 4, 5, 7, 8, 10, 11, 13
	20	1658-1765	10	1, 3, 4, 6, 7, 8, 9, 11, 12, 14
VN3H99	20	1939-1992	10	2, 4, 6, 8, 9, 12, 13, 15, 17, 19
	24	1730-1765	12	1, 3, 4, 7, 8, 10, 11, 13, 14, 17, 18, 20
	24	1675-1730	12	1, 3, 5, 7, 8, 10, 11, 13, 14, 16, 18, 20
	24	1658-1675	12	2, 3, 5, 7, 8, 10, 11, 13, 14, 16, 18, 19
VN3H108	24	1870-1939	12	1, 3, 5, 7, 8, 9, 10, 11, 12, 14, 16, 18
	24	1793-1870	12	2, 4, 6, 7, 8, 9, 10, 11, 12, 13, 15, 17
VN3H113	24	1939-1992	12	1, 3, 5, 7, 8, 10, 11, 13, 14, 16, 18, 20
	28	1658-1705	14	1, 2, 4, 6, 7, 9, 10, 11, 12, 14, 15, 17, 19, 20

Tabela 2 Numbers of kidney slots of VN3H supporting channel

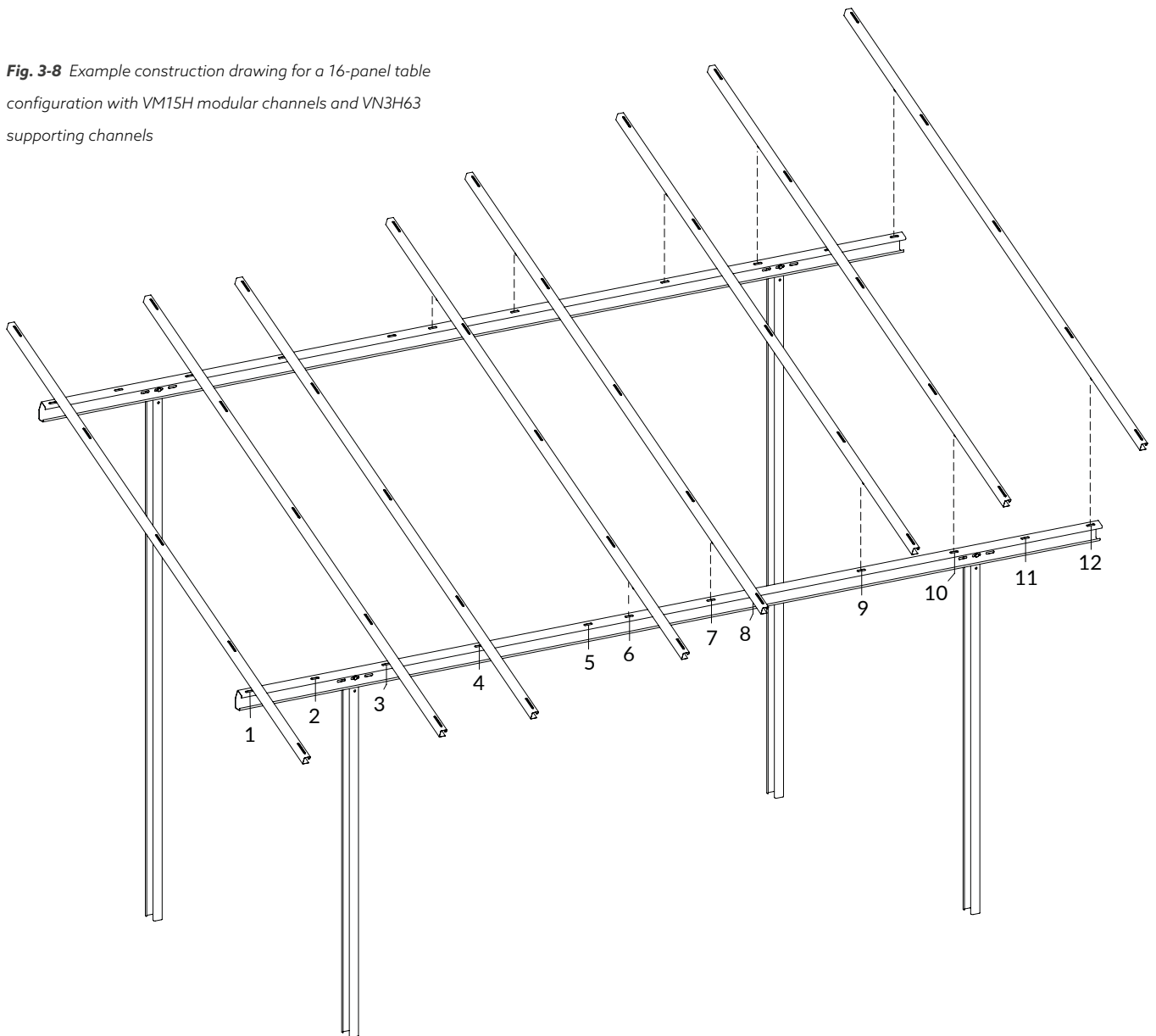
Fig. 3-7 Numbers of kidney slots in VN3H supporting channels



Determination of kidney slots for installation of VM15H modular channels in VN3H supporting channels

- Connect the modular channels (VM15H), which are the support point for the photovoltaic panels, to the supporting channel VN3H in the designated kidney slots.
- Screw the modular channels to the supporting channel using the G.1 VNZ bolt set.
- Failure to comply with the aforementioned guidelines may cause damage to the panels and void their warranty.

Fig. 3-8 Example construction drawing for a 16-panel table configuration with VM15H modular channels and VN3H63 supporting channels



- After assembling the entire structure, check potential damage areas and cover them with anti-corrosion paint. Before painting, be sure to clean the surface with a degreasing solution.

Installation of VA/VC clamps

- Install photovoltaic panels according to the panel manufacturer's installation instructions.
- Start assembling the panels from the bottom row.
- In order to streamline the work, pre-screw the components for installation of panels before continuing. The kidney slots in the VM15H modular channel make this sequence of work possible.
- Screw the VA/VC clamps with VN8I/VN7I Allen head bolt and VNNS slide nuts.
- Use a hex key and a torque wrench with a SW6 socket to tighten the clamps.
- Place all the bolts in the slots.
- Tighten all connections with a SW6 socket torque wrench with a torque specified in the photovoltaic panel manufacturer's installation instructions.

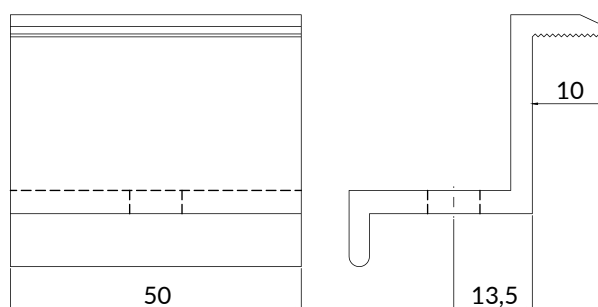


Fig. 4-1 VA/VC clamp

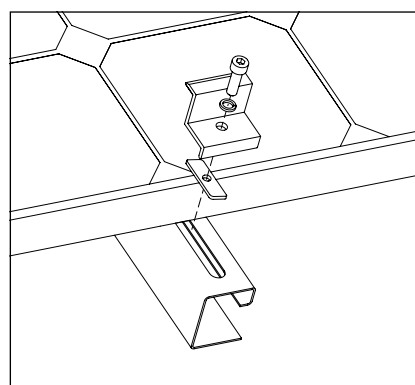


Fig. 4-2 Pre-screwing of clamps

Installation of VWA/VWC clamps

- Screw the VWA/VWC clamps using VN8I/VN7I Allen head bolt and VNNS slide nuts.
- Place all the bolts in the slots.
- Pre-tighten the bolts with a SW6 hex key.
- Tighten all connections with a SW6 socket torque wrench with a torque specified in the photovoltaic panel manufacturer's installation instructions.

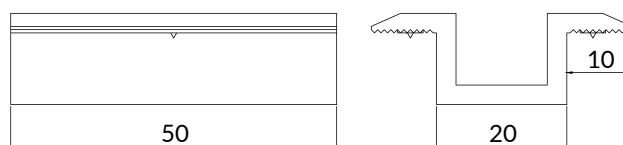


Fig. 4-3 VWA/VWC clamp

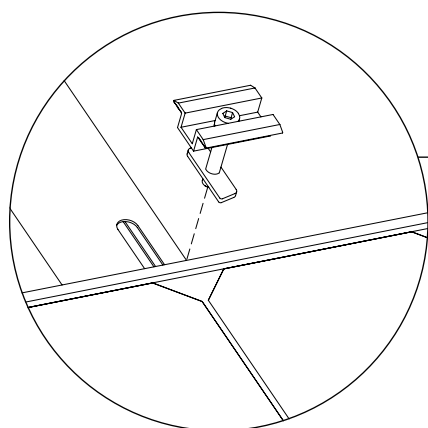


Fig. 4-4 Screwing the VWA/VWC clamp

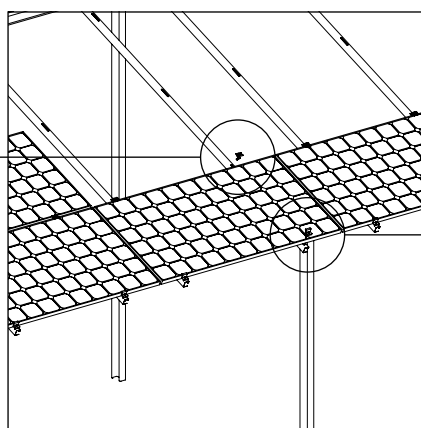


Fig. 4-5 Mounting the panels on the Rackta structure

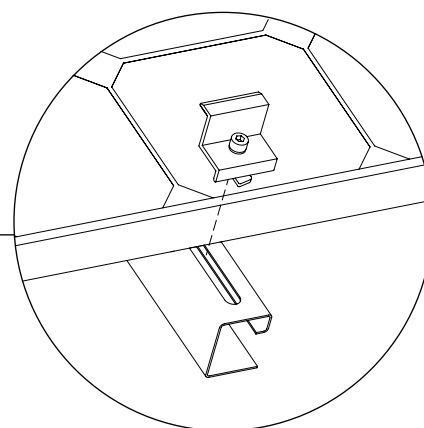
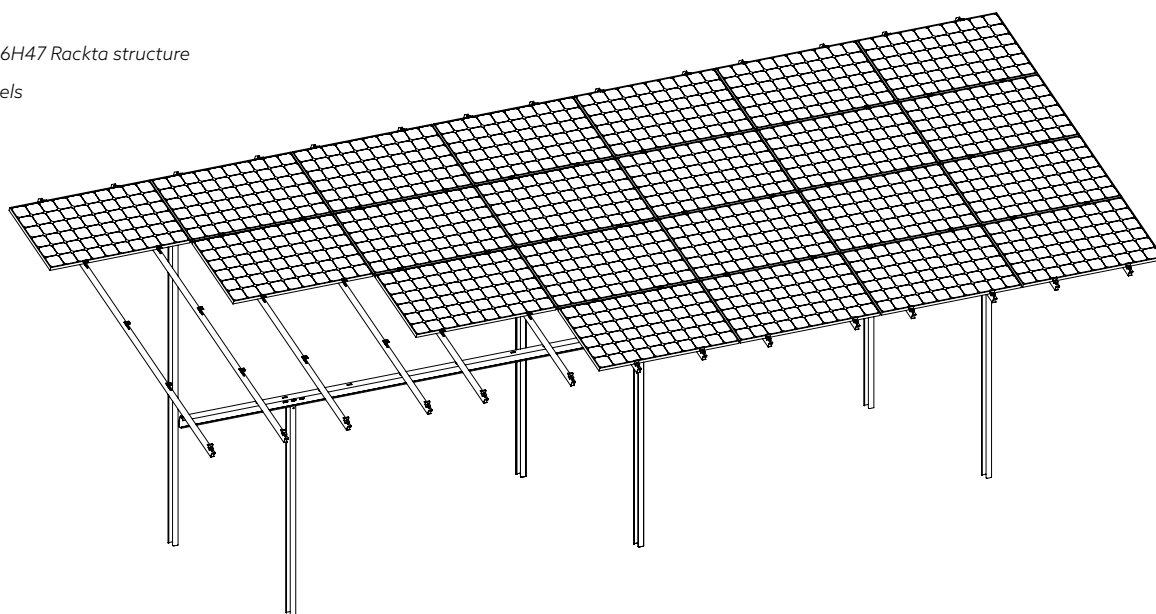


Fig. 4-6 Screwing the VA/VC clamp

Notes

1. Always follow the instructions during installation.
2. Structural components must be lifted and stacked in a way that minimizes the risk of damage – both during transportation and storage.
3. Components damaged during transportation, unloading, storage and installation should be restored to a state of compliance with requirements.
4. Assembly components must be stored in a dry environment, protected from adverse weather conditions and marked.

Fig. 4-5 D6H47 Rackta structure
for 28 panels



Health and safety recommendations during installation of DH structures

1. All works related to site preparation for installation, transportation, unloading, storage, assembly, connection and acceptance of steel structures together with photovoltaic panels and other elements included in the set, must be carried out in accordance with applicable technical and construction regulations, occupational health and safety as well as fire protection regulations.
2. The work must be carried out strictly in accordance with the installation instructions issued by the manufacturer and on the basis of other documents required by regulations referred to in point 1.
3. If there are prerequisites specified in the applicable regulations, before proceeding with the work, one should prepare the following documents and conduct the work in accordance with them:
 - safety and health protection plan (BIOZ plan),
 - instructions for safe execution of works (IBWR) specifying ways to prevent risks associated with the execution of construction works and ways of proceeding in case of hazards,
 - occupational risk assessment for individual tasks.
4. Persons employed at the various stages of work should:
 - have a state of health that allows them to perform, for example, manual handling work, work at height, operation of used machinery, equipment and tools, and to perform other necessary work, and if required by law – a medical certificate confirming this fact,
 - have completed appropriate training in occupational health and safety, if required by law,
 - have the appropriate authorizations to operate machinery and technical equipment, as well as electric power installations and equipment, as required, for example, when operating a pile driver, loader, other construction machinery, means of transport, mobile platforms, portable or mobile cranes or other necessary equipment, as well as when performing work related to connection, inspection, maintenance and repair of electrical installations and equipment,
 - be familiar with the installation instructions issued by the manufacturer and the documents referred to in point 3.
5. Persons performing the work referred to in point 1 should be equipped with working clothes, protective shoes/boots and personal protective equipment selected in accordance with the risks associated with the work activities performed (hearing protectors, anti-vibration gloves when operating a pile driver, protective gloves resistant to mechanical agents, protective gloves resistant to chemicals used during installation, protective helmet designed for work at heights, safety glasses or goggles). Work clothing and work/protective footwear must be adapted to the atmospheric conditions and footwear also to the type and condition of the soil – ground on which the work is performed.
6. The area of work should be protected from access by unauthorized persons and visibly marked.
7. When performing unloading work, when the situation requires it, safety signals – manual or verbal messages – should be used to lead people performing this work, in accordance with the requirements specified in the regulations on occupational health and safety.
8. Components and materials unloaded mechanically from means of transport must not be carried over people or over the cabin of the means of transport in which a person is present.
9. When performing handling, storage, assembly and other work in the vicinity of overhead power lines, safe distances from these lines and other safety requirements specified by law shall be observed.
10. Components to be assembled, materials, equipment and tools shall be stored on a stable leveled ground. Channels, photovoltaic panels and fasteners should be stored together with auxiliary materials, e.g. steel channels on wooden spacers and bundled with tape. Multi-level storage should be avoided. Storage of components to be assembled without auxiliary materials or in an improper manner may cause damage to the product or loss of stability during storage.
11. Work should be carried out in good visibility. If necessary, provide safely made lighting of workstations.
12. When manually lifting and carrying parts to be assembled, materials, tools or equipment, comply with the lifting standards specified by law.
13. Items with weight exceeding the permissible lifting standards, items difficult to be handed by one person or longer than 4 m shall be lifted and carried in teams.
14. Hammering into the ground of steel structure elements must be carried out while maintaining safe distances from underground installations and equipment, and the method of determining these distances must be in accordance with the applicable regulations in this regard.
15. Do not carry out installation work:
 - after dark, unless lighting is provided to ensure good visibility,
 - during dense fog, rainfall, snowfall or the occurrence of glaze,
 - during thunderstorms or winds with speeds exceeding 10 m/s.
16. When working at height, such as from platforms or work platforms, use the prescribed by law and appropriately selected fall protection equipment and protective helmets.
17. Platforms, working platforms, ladders and other equipment used in working at height must be technically sound and appropriately selected for the conditions under which the work is performed and meet the safety requirements of the law.



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