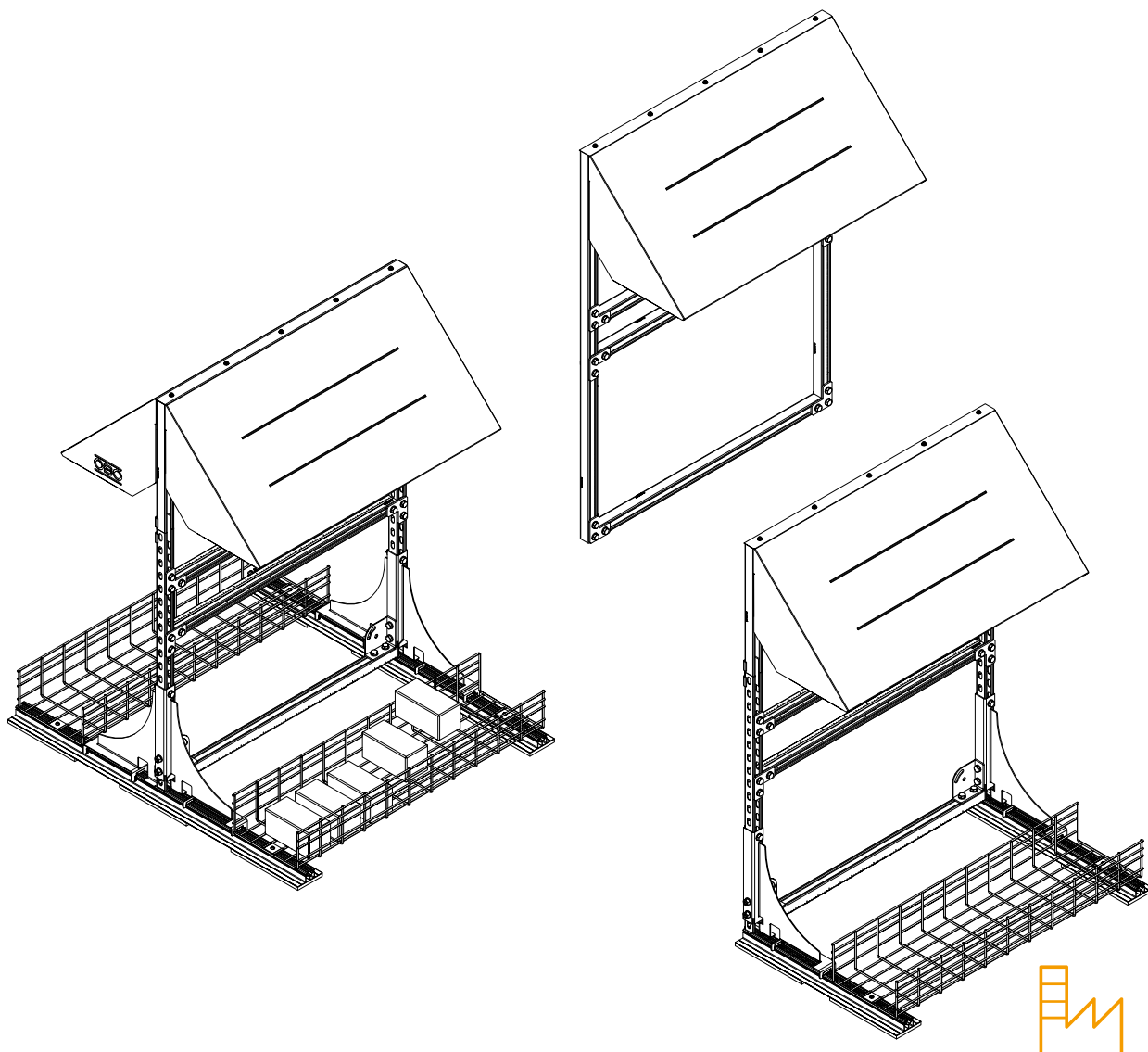




Mounting instructions

Magic PV Mount

Inverter frame for flat-roof/free-standing PV mounting systems

Inverter frame for PV mounting systems on flat roofs
Mounting instructions

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1 About these instructions

1.1 Target group



- These instructions are intended for specialists and/or instructed technical personnel (e.g. roofers, solar panel installers, engineers, architects, construction managers, mounting engineers, installation engineers), who have been trained in the mounting of photovoltaic systems and have been charged with the mounting of PV mounting systems.
- Only have electrical work, such as the connection and earthing of the systems, carried out by specialist personnel with electrical training.

1.2 Relevance of these instructions



These instructions are based on the standards valid at the time of compilation (July 2026).

Please read the instructions carefully before commencing 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.

1.3 Types of warning information



Type of risk!

Shows a risky situation. If the warning information is not observed, then medium or minor injuries may occur.



Type of risk!

Shows a risky situation. If the warning information is not observed, then damage to the product or the surroundings may occur.

Note! *Indicates important information or assistance.*

1.4 Basic standards and regulations

- EN 62305 (VDE 0185-305)
- DIN VDE 0100-712
- EN 61643-32

1.5 Applicable documents

- The declarations of conformity are linked to the products at www.obo-bettermann.com.
- Mounting instructions Magic PV Flat Basic

- Mounting instructions Magic PV Flat Basic Pro
- Mounting instructions Magic PV Flat Basic Glue

2 Intended use

Inverter frames are used for the protected installation of inverters for flat-roof and free-standing PV systems. They can also be used to mount connection boxes, battery modules, energy storage or equipotential bonding rails and earthing bars. The inverter frame is mounted on the wall or free-standing on the ground, depending on the type. The free-standing frames can be equipped on one or two sides, depending on the type. The free-standing frames are weighed down using standard blocks on mesh cable trays.

The inverter frames are not designed for any purpose other than that described here. If the inverter frames are used for another purpose, then this shall render all liability, warranty and replacement claims null and void.

3 Safety

3.1 General safety information

Observe the following general safety information:

- It must be ensured that the planned PV system, including inverter frame, is intended for the load capacity of the roof. If necessary, consult a statics expert.
- The ballasting required for the inverter frames must be matched to the local wind and snow load zones. Design only according to the planning using the OBO Construct app or a technical planner.
- The construction site must be protected against falling objects.
- Mounting must be carried out by at least two people.
- The people working must be protected as there is a risk of falling when working high above the ground.
- When working on the roof, care must be taken to avoid damaging the roof skin and insulation of the roof.
- Contact with electrical current can lead to an electric shock. Electrical work may only be performed by qualified specialists.
- Protective clothing must be worn as there is a danger of cutting from sharp profile edges and a risk of injuries to the eyes from flying chips when working with the angle grinder.

3.2 Personal protective equipment

List of personal protective equipment to be used:



Use hand protection



Wear safety shoes

4 Necessary tools

List of tools to be used:

- Torque spanner (WAF17/WAF19)
- Battery-operated screwdriver (Torx 40, Inbus 8 mm)
- Spirit level

5 System overview

5.1 System description

The inverter frames are used to support inverters as well as other electronic components requiring weather protection. There are free-standing inverter frames in single and double versions (for equipment on both sides) as well as frames for wall mounting, for different ambient conditions. All frames are equipped with a roof to protect the inverter and all other electronic components from sun exposure and humidity. The inverter frames are available in the widths 1,000 mm and 1,500 mm. The free-standing frames have a height of 1,554 mm. The free-standing inverter frames can be weighed down with standard blocks in mesh cable trays. The ballasting depends on the wind and snow load as well as the weight of the installed equipment. Refer to the planning of the PV system for details on ballasting. The basis for calculation and an example calculation can be found in chapter „11 Ballasting calculation“ on page 36. The mesh cable trays are also used for cable routing.

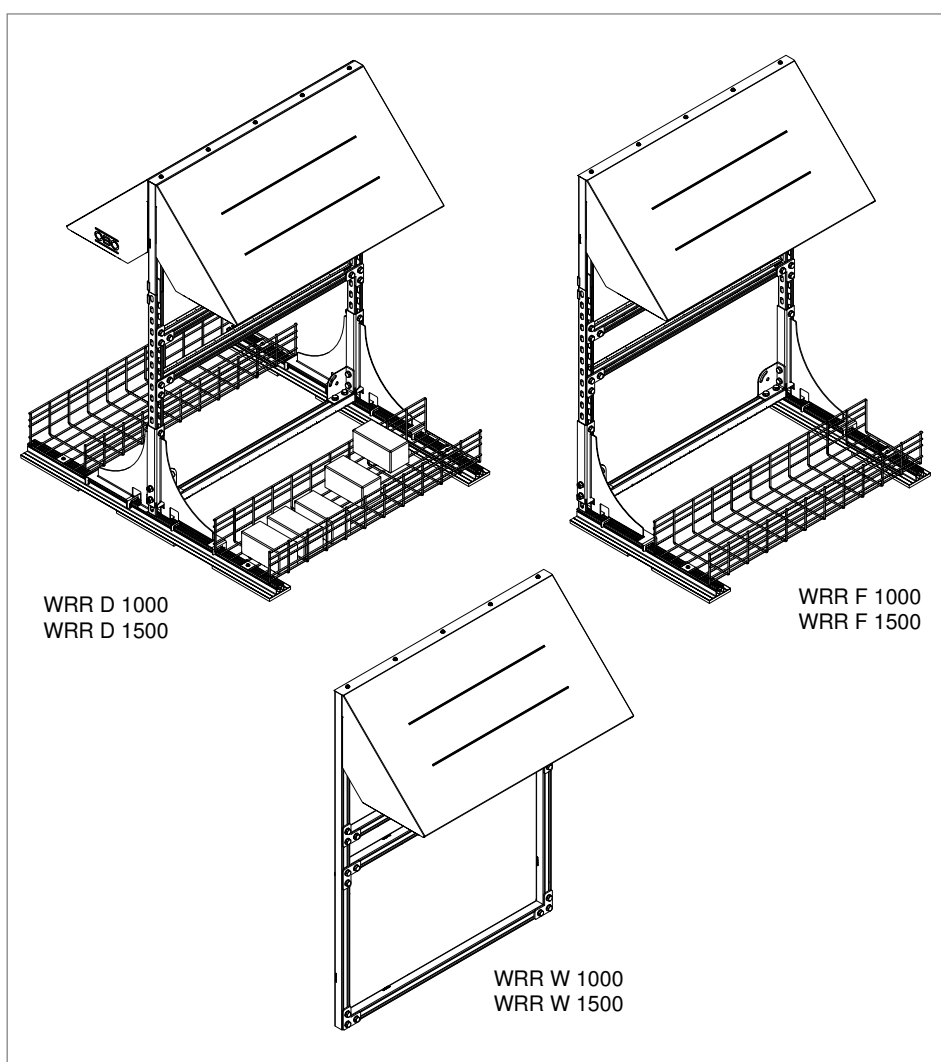


Fig. 1: Inverter frame overview

5.1.1 Inverter frame, free-standing, double-sided WRR D (width 1,000 and 1,500 mm)

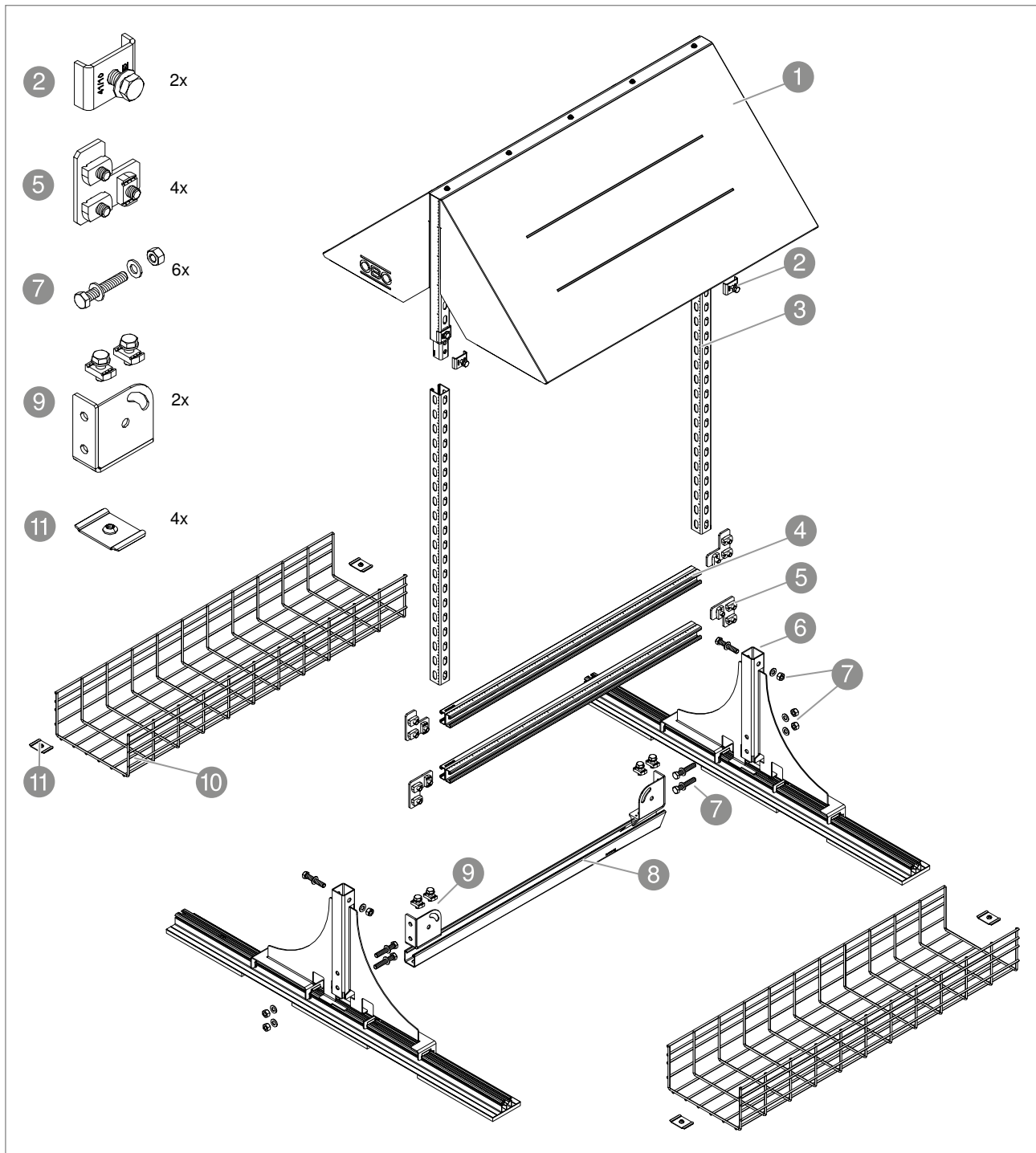


Fig. 2: Overview of components – double inverter frame

	Designation	Function
1	Frame roof	Protects the equipment from weather influences
2	Connectors	Fasten frame roof to vertical stand profiles
3	Vertical stand profiles	Connect frame roof and stands
4	Transverse profiles	Support inverters/equipment
5	Flat angle with slide nuts	Fasten transverse profiles
6	Stand	
7	Hexagonal bolts/washers/nuts	Fasten connection profile in stands
8	Connection profile for stand	Connect and reinforce stand
9	Angle with slide nuts/hexagonal bolts/washers	Connection profile mounting
10	Mesh cable tray section	Support for ballasting/cable routing
11	Fastening kit BF GR	Fasten mesh cable tray on support profile/stand

Tab. 1: Overview of components – double inverter frame

5.1.2 Inverter frame, free-standing, single-sided WRR F (width 1,000 and 1,500 mm)

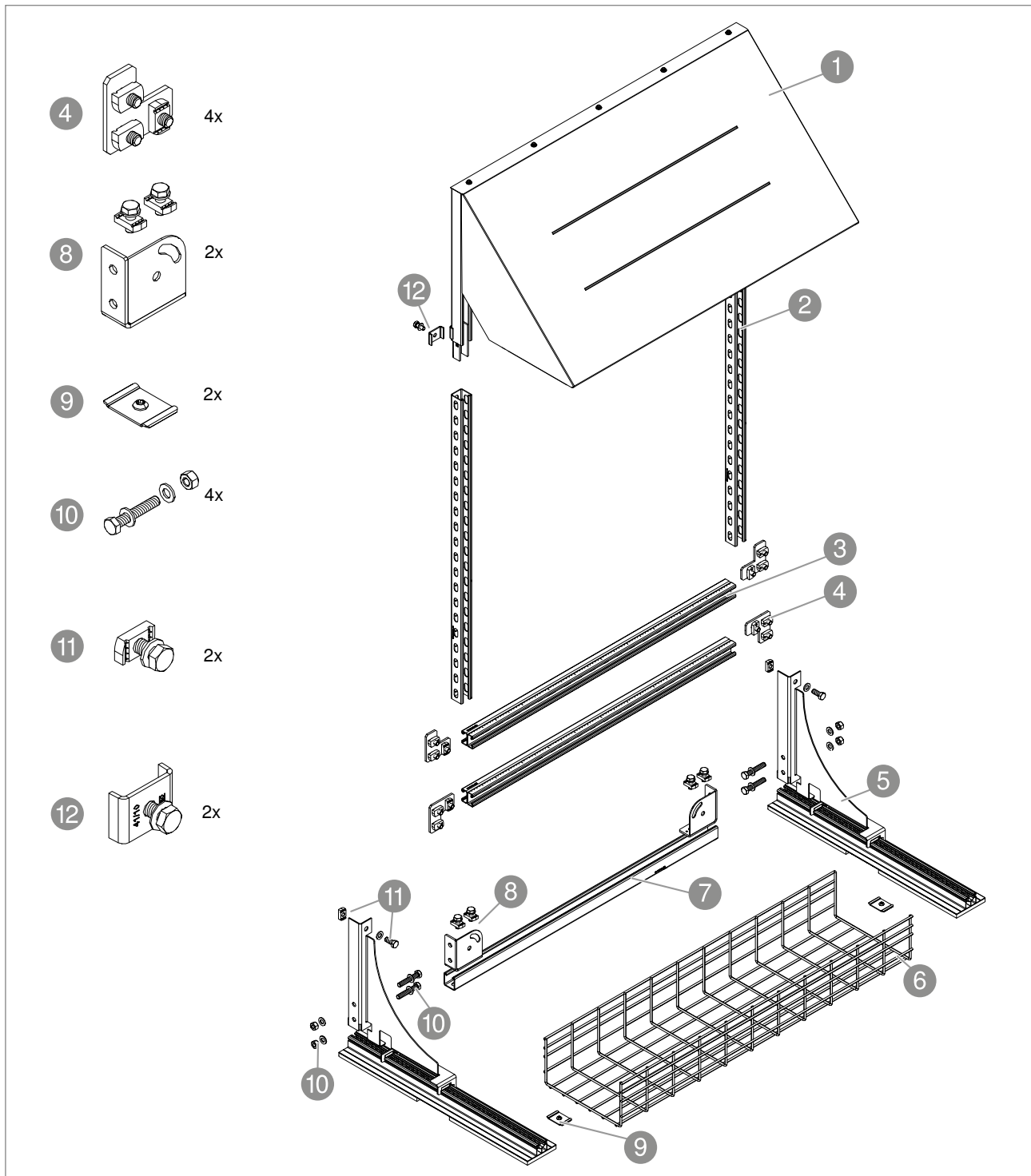


Fig. 3: Overview of components – single inverter frame

	Designation	Function
1	Frame roof	Protects the equipment from weather influences
2	Vertical stand profiles	Connect frame roof and stands
3	Transverse profiles	Support inverters/equipment
4	Flat angle with slide nuts	Fasten transverse profiles
5	Stand	
6	Mesh cable tray section	Support for ballasting/cable routing
7	Connection profile for stand	Connect and reinforce stand
8	Angle with slide nuts/hexagonal bolts/washers	Connection profile mounting
9	Fastening kit BF GR	Fasten mesh cable tray on support profile/stand
10	Hexagonal bolts/washers/nuts	Fasten connection profile on stands
11	Slide nut/hexagonal bolt/washer	Fasten vertical stand profiles to stands
12	Connectors	Fasten frame roof to vertical stand profiles

Tab. 2: Overview of components – single inverter frame

5.1.3 Inverter frame for wall mounting WRR W (width 1,000 and 1,500 mm)

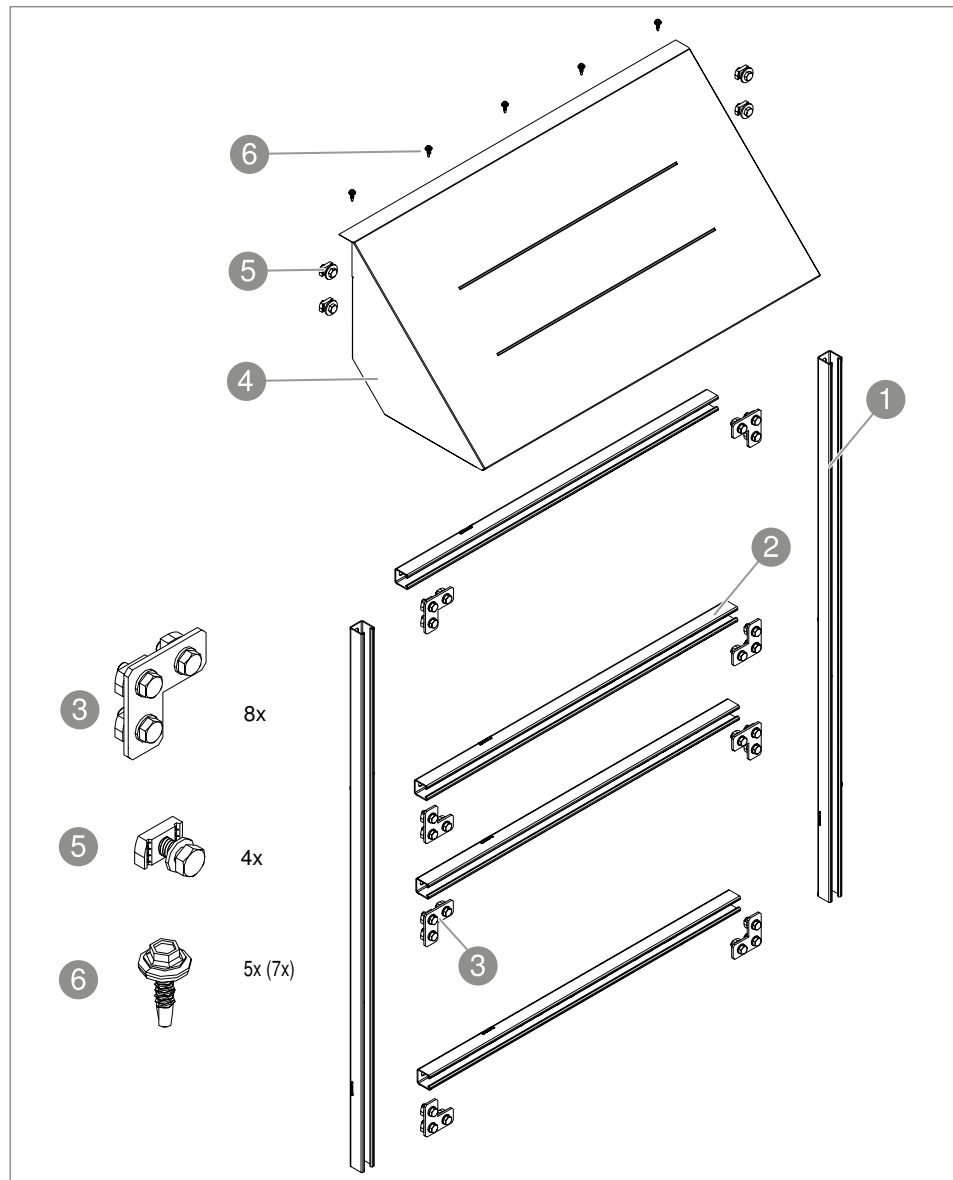


Fig. 4: Overview of components – inverter frame for wall mounting

	Designation	Function
1	Vertical frame profiles	Frame construction
2	Transverse profiles	Frame construction, supports inverters/ equipment
3	Flat angle with slide nuts	Fasten frame profiles and transverse profiles
4	Frame roof	Protects the equipment from weather influences
5	Slide nut/hexagonal bolt/washer	Fasten frame roof to frame profile
6	Self-tapping screws	Fasten frame roof to frame profile

Tab. 3: Overview of components – inverter frame for wall mounting

6 Mounting the inverter frame

6.1 Mounting inverter frame WRR D

6.1.1 Mounting stands

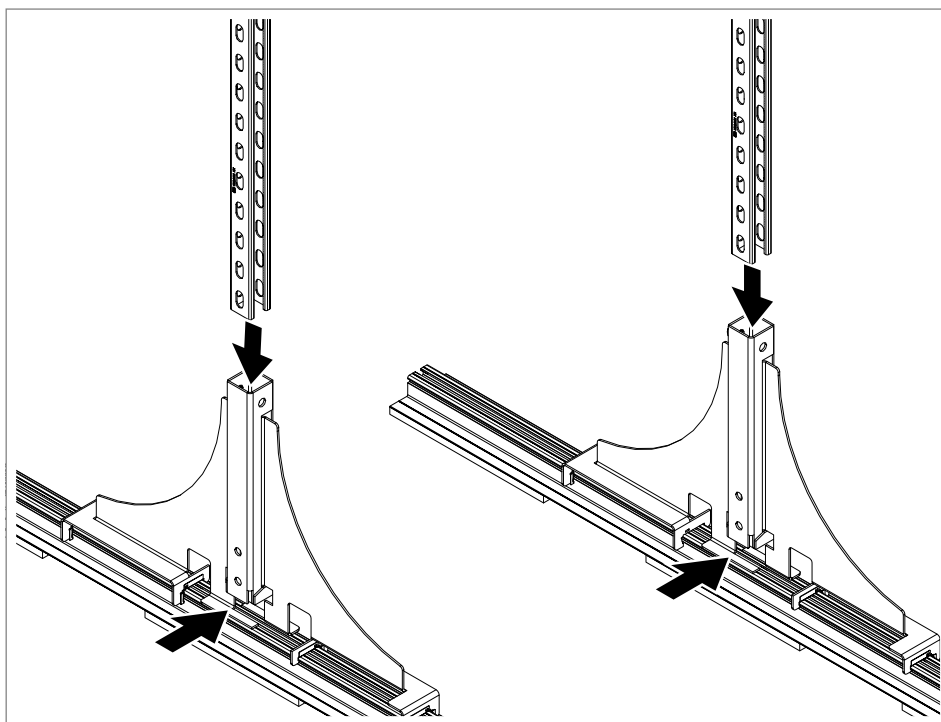


Fig. 5: Inserting stand profiles in stand

1. Insert vertical stand profiles into the stand support profiles all the way to the ground.

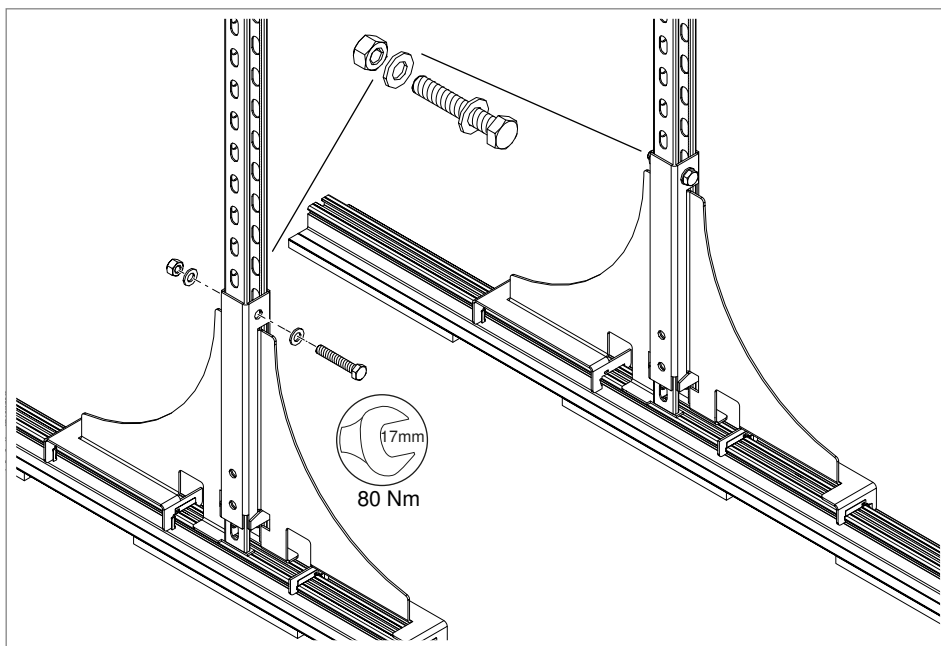


Fig. 6: Fastening stand profiles to stands

2. Screw the vertical stand profiles on using hexagonal bolts, washers and locknuts. Tightening torque 80 Nm.

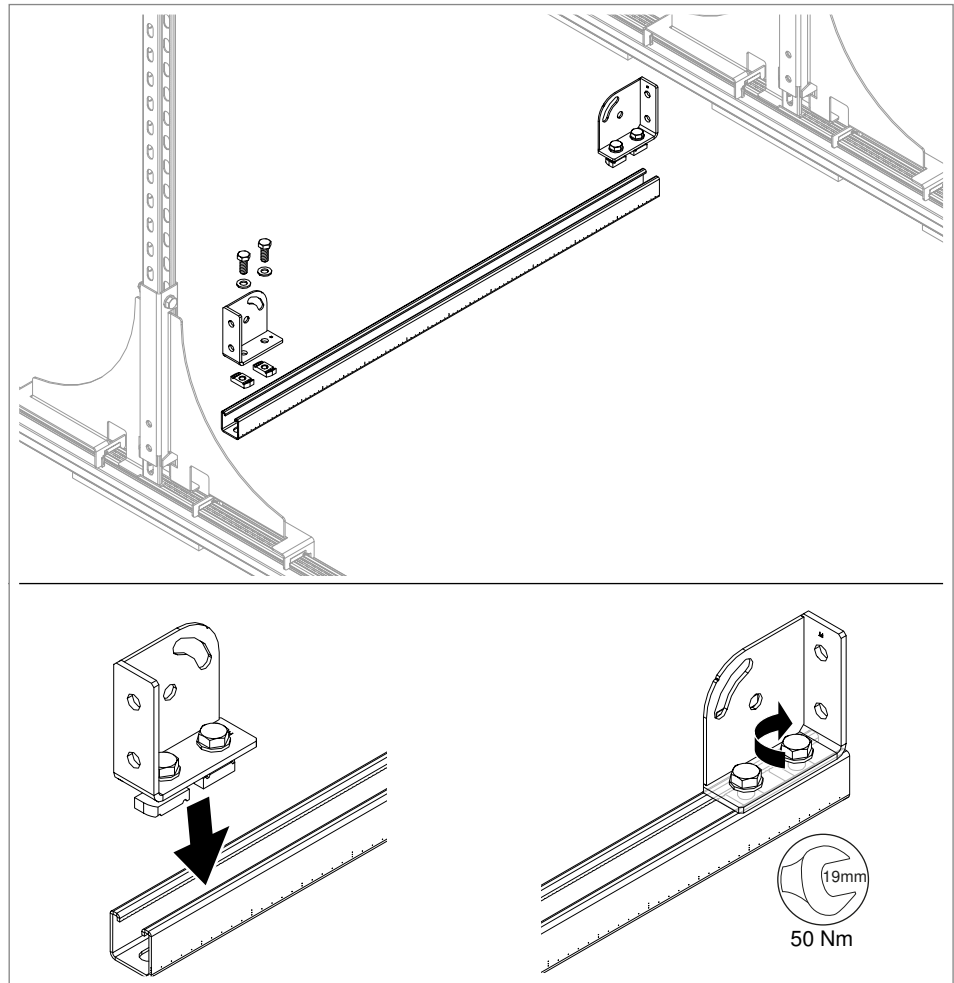


Fig. 7: Fastening angle to connection profile

3. Loosely install the slide nuts with washers and hexagonal bolts on the angle.
4. Insert the slide nuts in the connection profile for stands. The angle is flush with the profile end.
5. Tighten the hexagonal bolts until the slide nuts engage in the profile. Tightening torque 50 Nm.

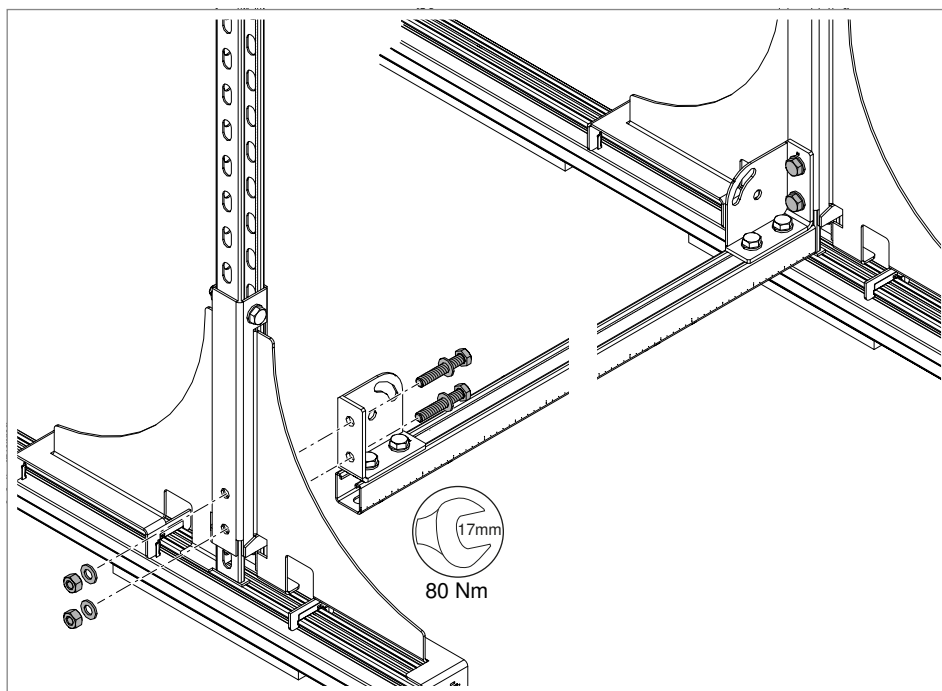


Fig. 8: Fastening the connection profile to stands

6. Screw the connection profile to the stand using hexagonal bolts, washers and locknuts. Tightening torque 80 Nm.

6.1.2 Mounting transverse profiles for inverters

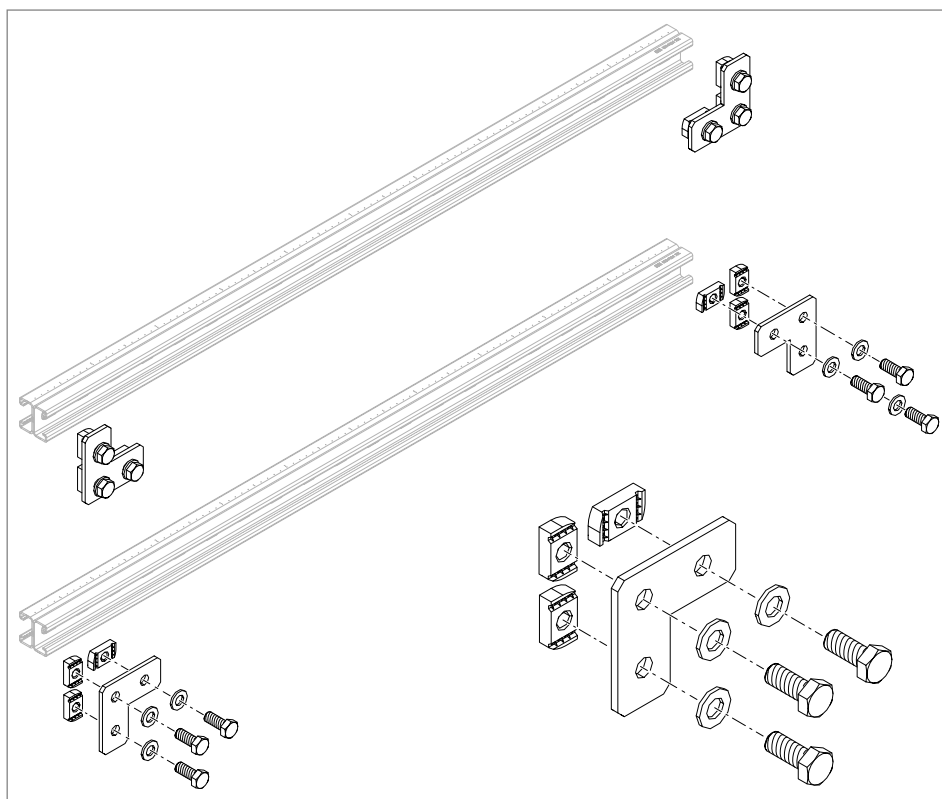


Fig. 9: Mounting a flat angle for transverse profiles

1. Loosely screw the slide nuts with hexagonal bolts and washers on the flat angle.

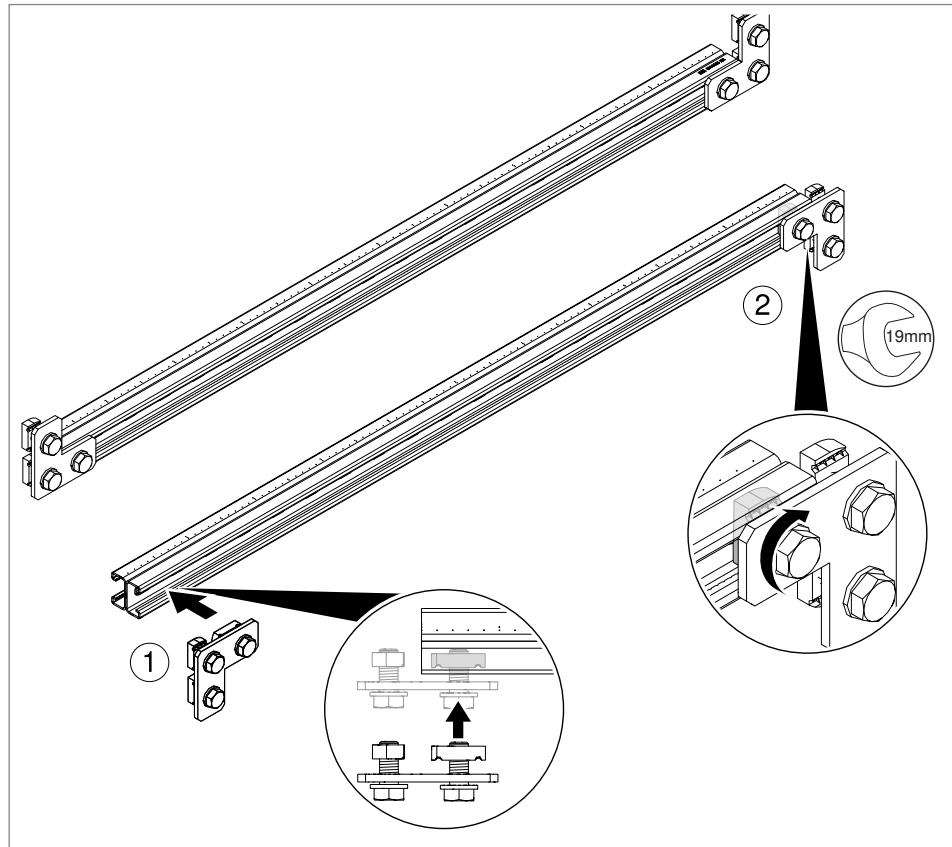


Fig. 10: Fastening a flat angle to transverse profiles

2. Insert the flat angle into the transverse profile with a slide nut ①.
3. Tighten the hexagonal bolts to hand tightness until the slide nuts engage in the profile, but can still be moved ②.

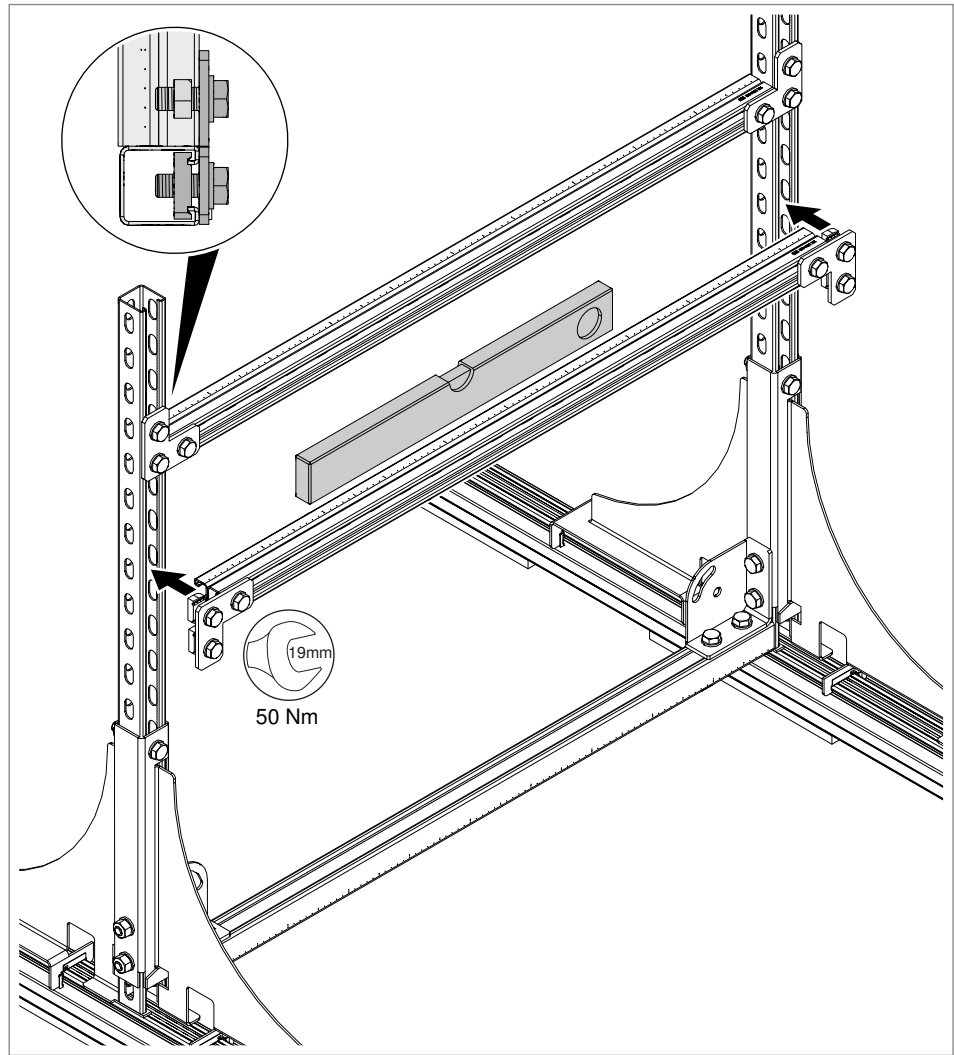


Fig. 11: Fastening transverse profiles to stands

4. Position the transverse profiles between the stand profiles, inserting the slide nuts of the pre-mounted flat angles in profile channels.
5. Tighten the hexagonal bolts to hand tightness until the slide nuts engage in the profile, but can still be moved.
6. Align the transverse profiles horizontally using a spirit level.
7. Tighten the hexagonal bolts. Tightening torque 50 Nm.

6.1.3 Mounting the frame roof, double

The frame roof is fastened to the closed side of the vertical stand profiles using a connector.

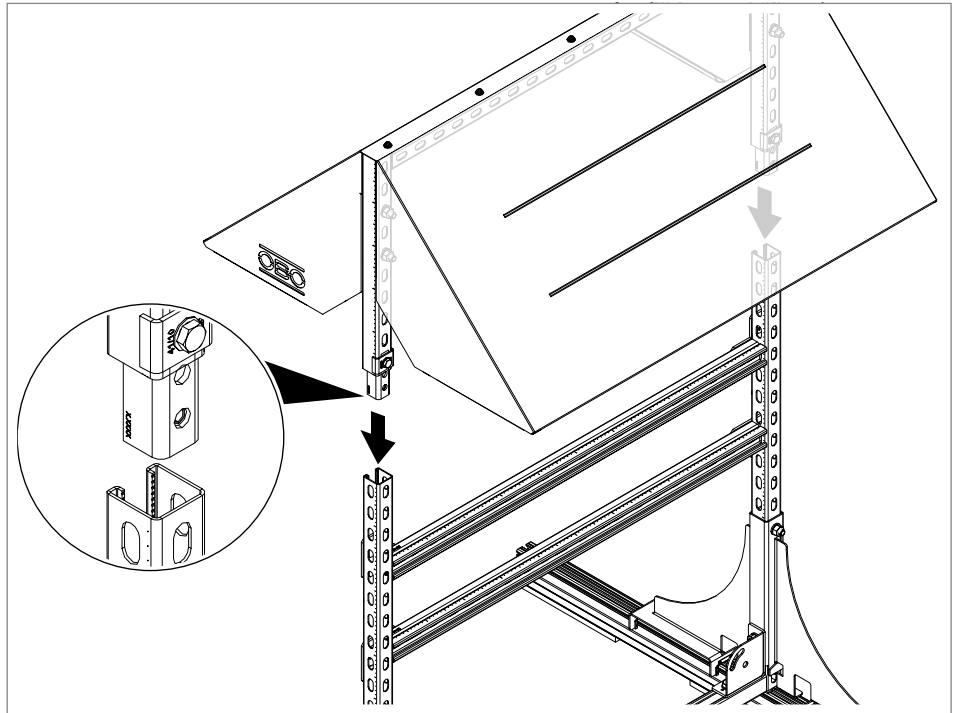


Fig. 12: Inserting the frame roof

1. Insert the vertical profiles of the frame roof into the vertical stand profiles.

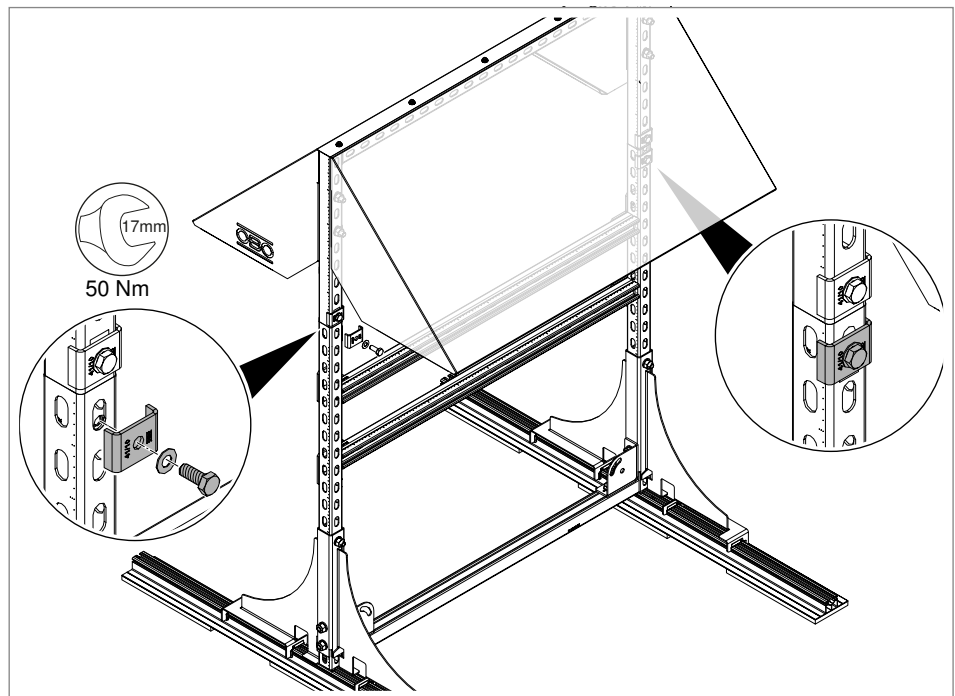


Fig. 13: Screwing on the frame roof

2. Screw the profiles together using connectors. Tightening torque 50 Nm (a locknut is pre-mounted in the vertical profile of the frame roof).

6.1.4 Mounting the mesh cable tray

The mesh cable trays are mounted with the BF GR fastening set.

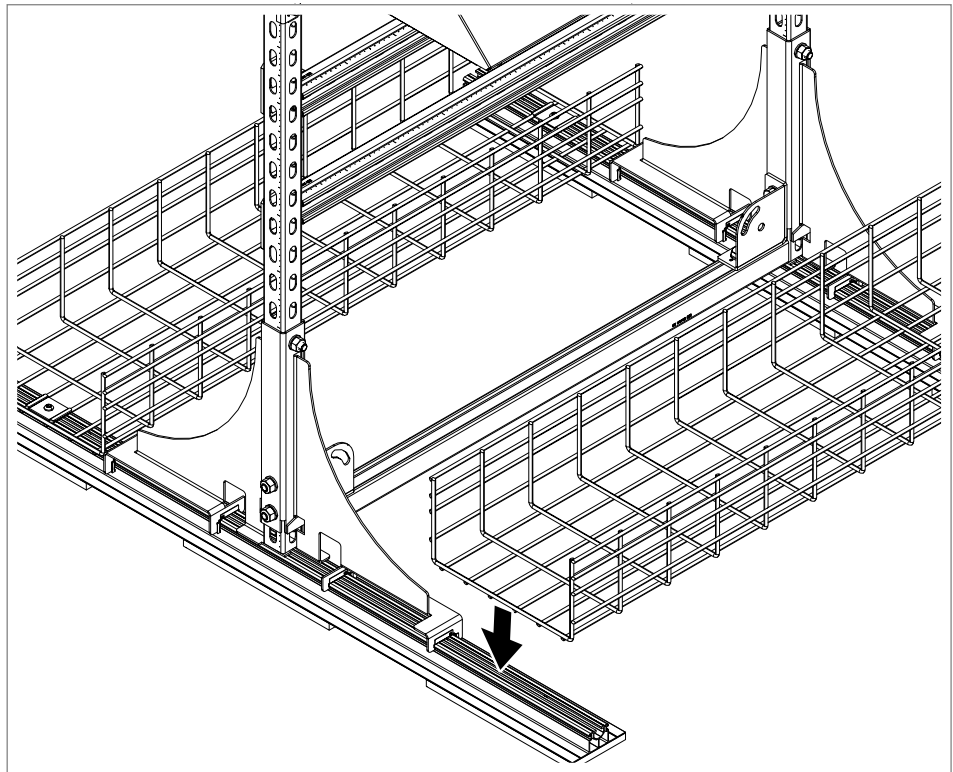


Fig. 14: Placing the mesh cable tray

1. Place the mesh cable tray on the support profiles of the stands.

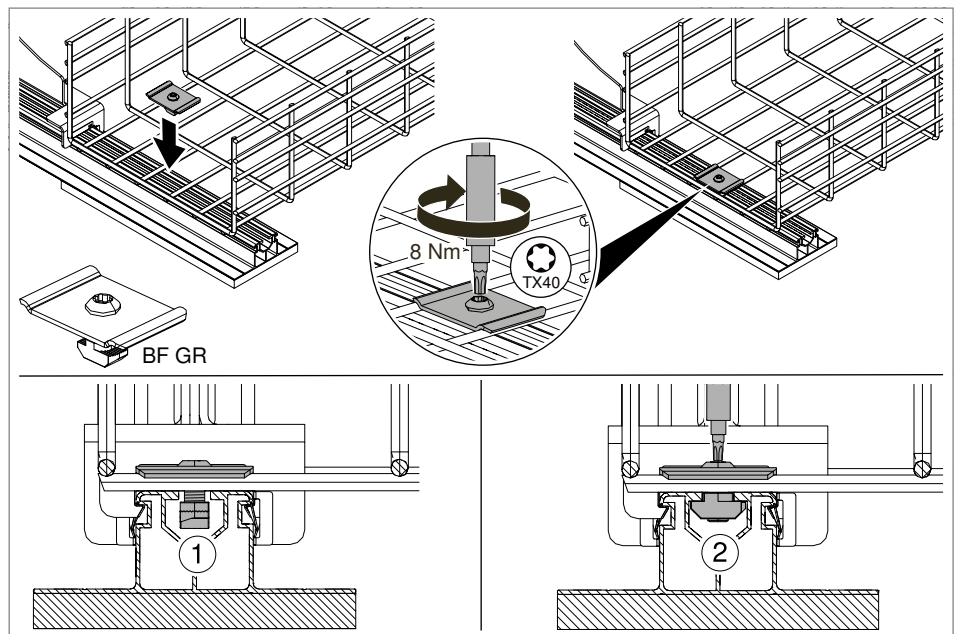


Fig. 15: Screwing on the mesh cable tray

1. Insert the slide nut from the fastening set into the support profile ①.
2. Tighten the screw from the fastening set with 8 Nm until the slide nut seizes, while clamping the straight wires of the mesh cable tray ②.

6.1.5 Ballasting stands

The inverter frame can be ballasted using standard blocks. Refer to the planning for the number of blocks.

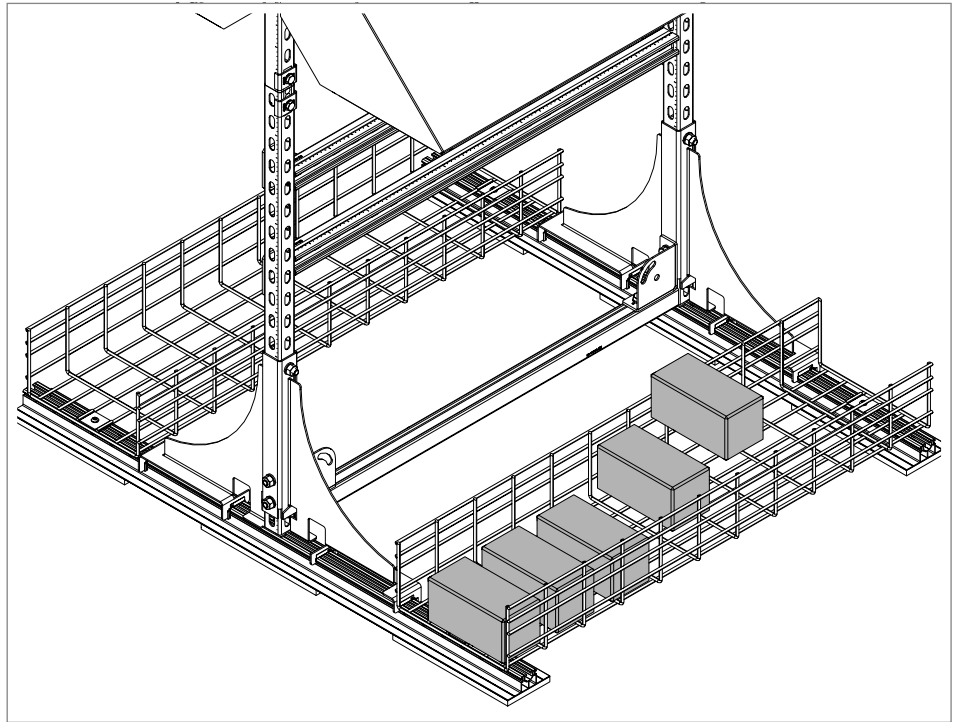


Fig. 16: Mesh cable tray ballasting

1. Place the ballasting in the mesh cable tray.

6.2 Mounting inverter frame WRR F

6.2.1 Mounting stands

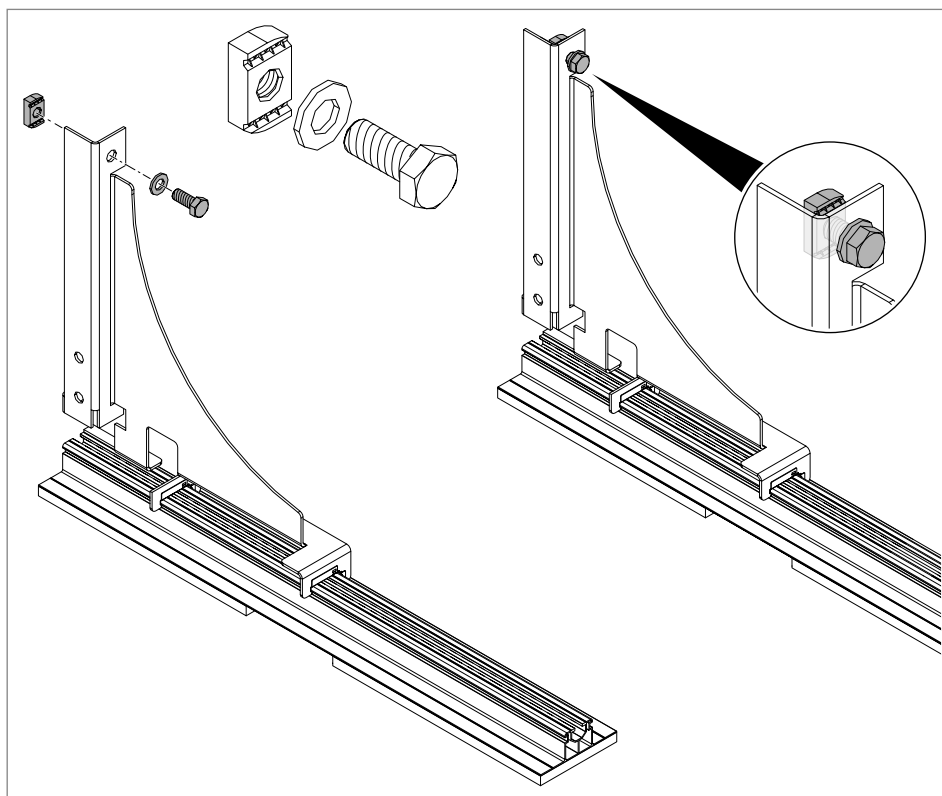


Fig. 17: Screwing on slide nuts

1. Loosely screw the slide nuts on the stand.

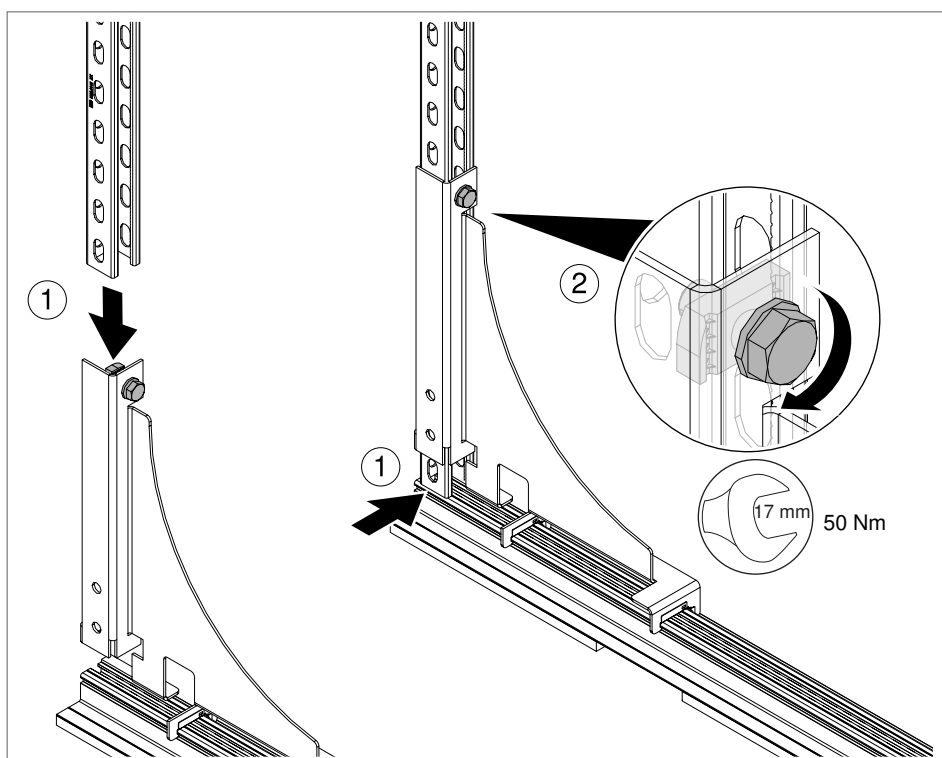


Fig. 18: Fastening stand profiles to stands

2. Insert vertical stand profiles into the stand support profiles all the way to the ground ①.
3. Tighten the hexagonal bolts until the slide nuts engage in the profile ②. Tightening torque 50 Nm.

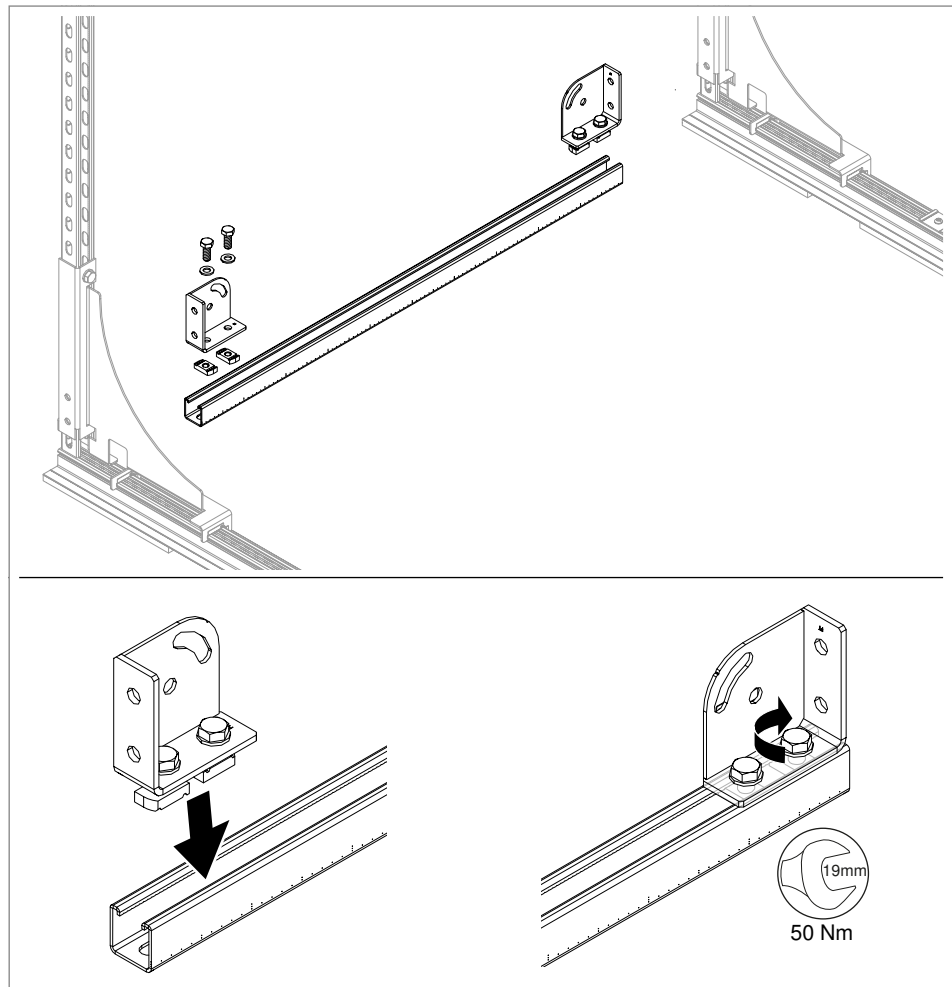


Fig. 19: Fastening angle to connection profile

4. Loosely install the slide nuts with washers and hexagonal bolts on the angle.
5. Insert the slide nuts in the connection profile for stands. The angle is flush with the profile end.
6. Tighten the hexagonal bolts until the slide nuts engage in the profile. Tightening torque 50 Nm.

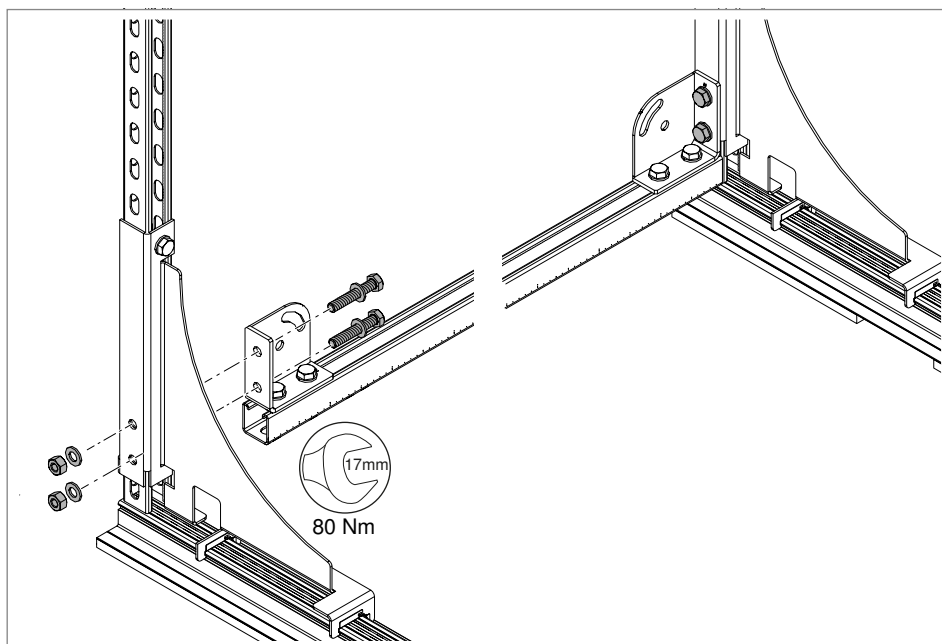


Fig. 20: Fastening connection profile to stands

7. Screw the connection profile to the stand using hexagonal bolts, washers and locknuts. Tightening torque 80 Nm.

6.2.2 Mounting transverse profiles for inverters

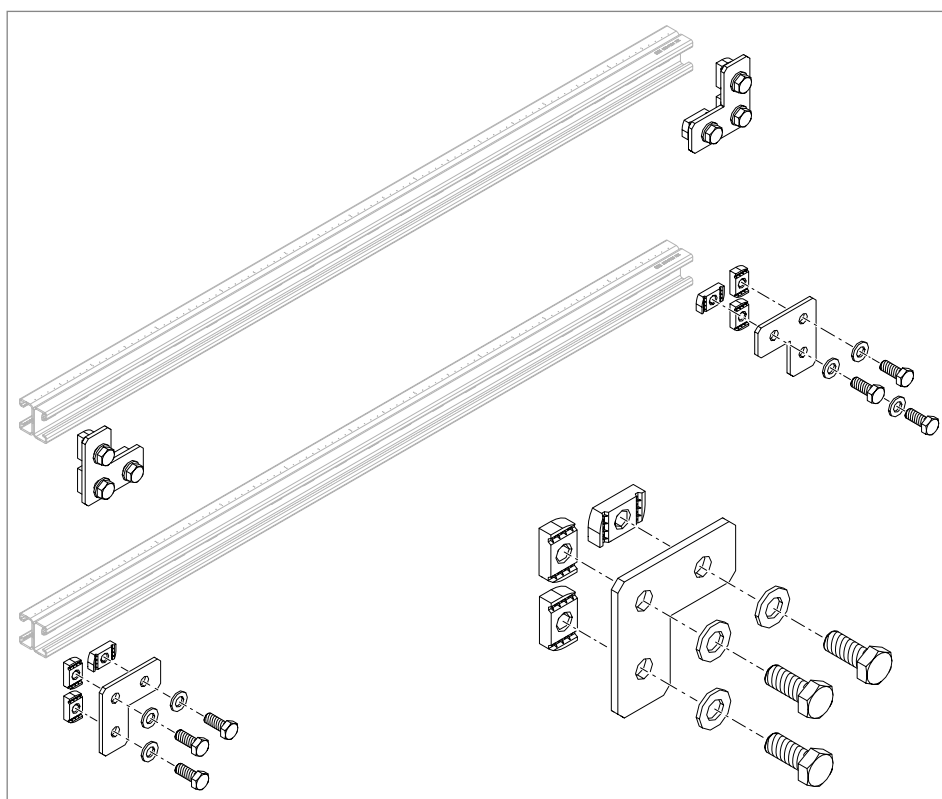


Fig. 21: Mounting a flat angle for transverse profiles

1. Loosely screw the slide nuts with hexagonal bolts and washers on the flat angle.

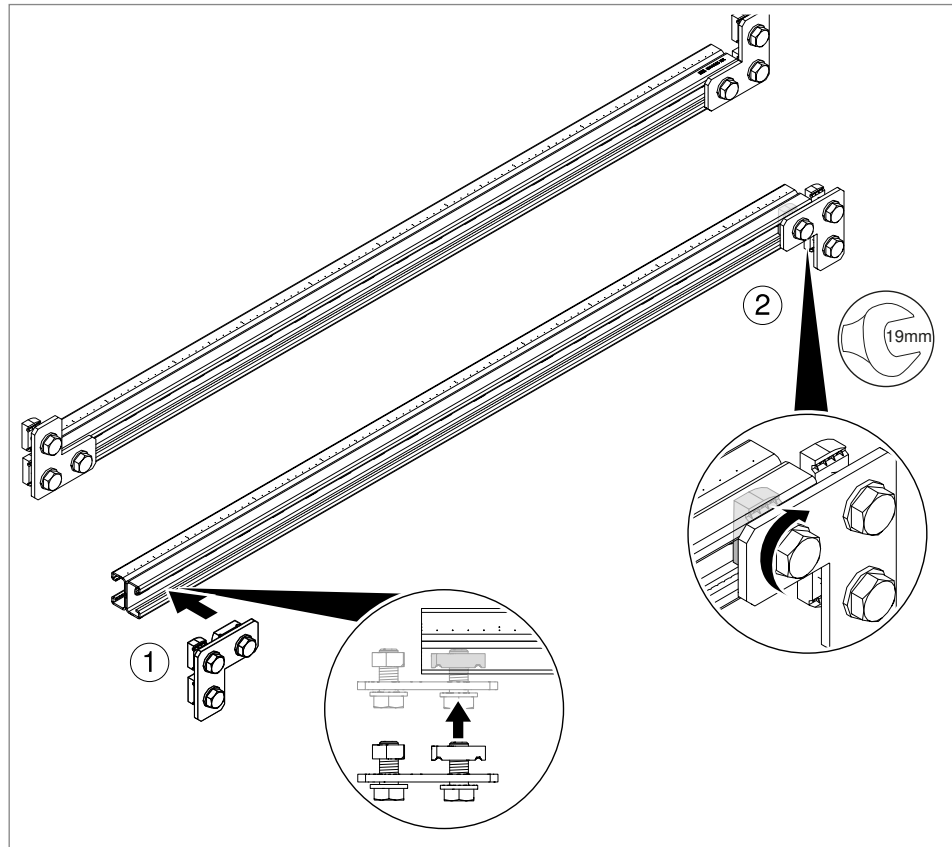


Fig. 22: Fastening a flat angle to transverse profiles

2. Insert the flat angle into the transverse profile with a slide nut ①.
3. Tighten the hexagonal bolts to hand tightness until the slide nuts engage in the profile, but can still be moved ②.

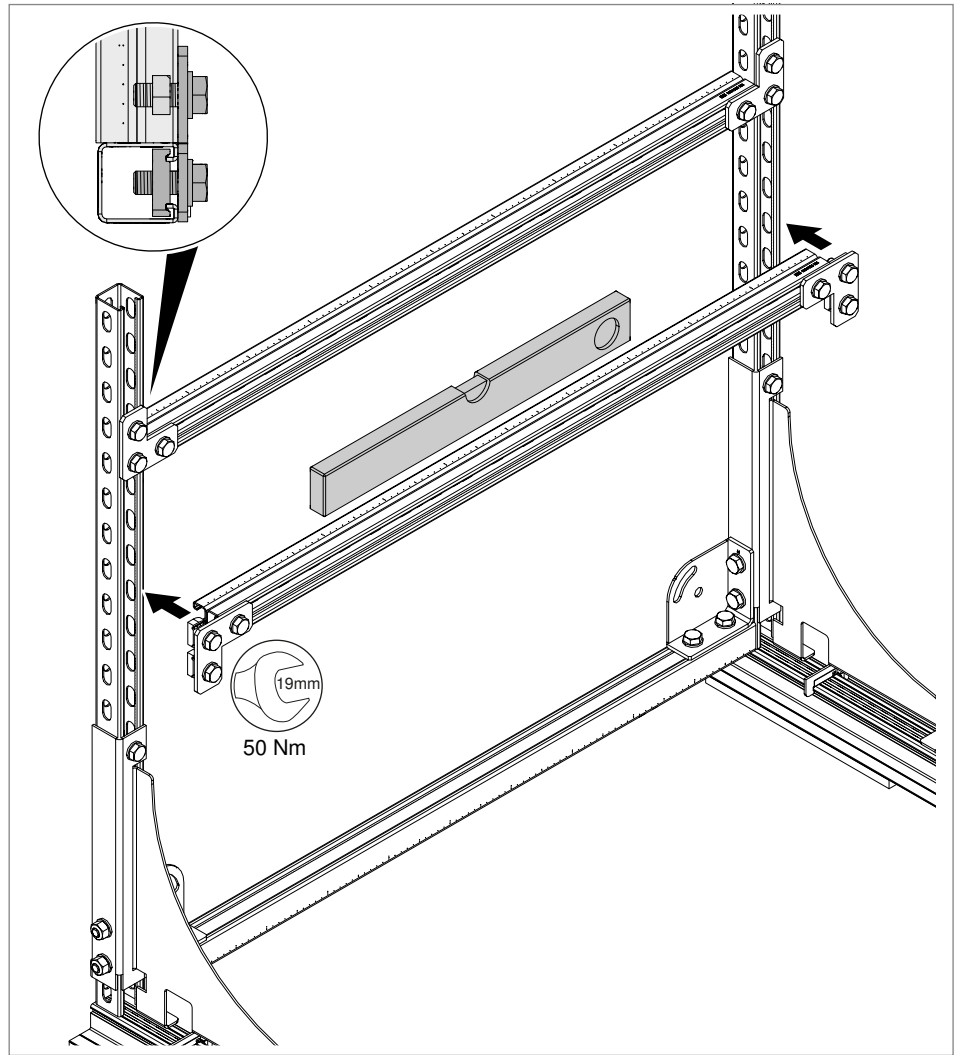


Fig. 23: Fastening transverse profiles to stands

4. Position the transverse profiles between the stand profiles, inserting the slide nuts of the pre-mounted flat angles in profile channels.
5. Tighten the hexagonal bolts to hand tightness until the slide nuts engage in the profile, but can still be moved.
6. Align the transverse profiles horizontally using a spirit level.
7. Tighten the hexagonal bolts. Tightening torque 50 Nm.

6.2.3 Mounting the frame roof, single

The frame roof is fastened to the closed side of the stand profiles using a connector.

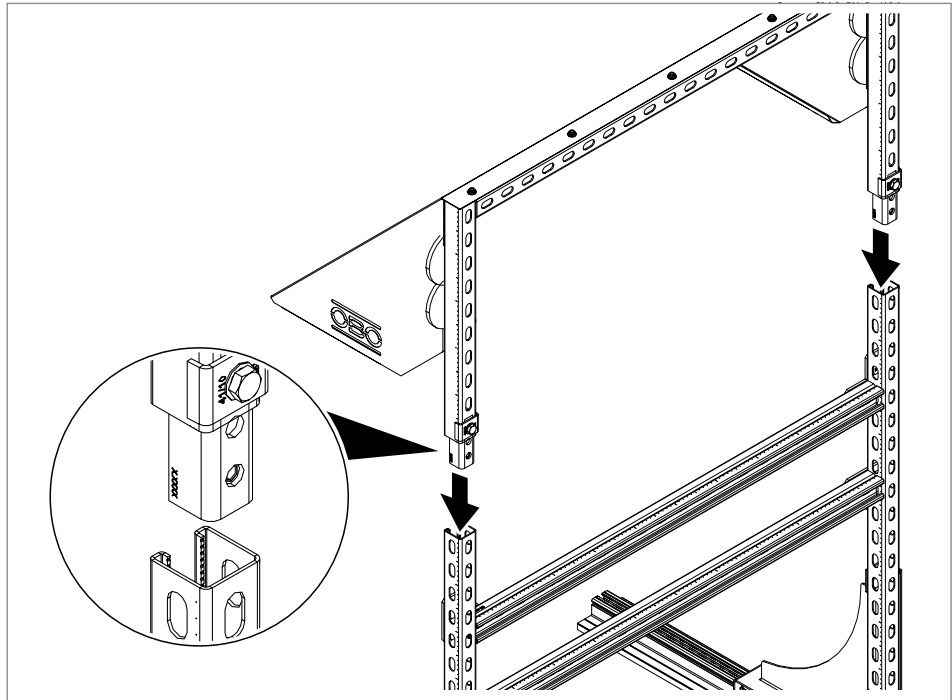


Fig. 24: Inserting the frame roof

1. Insert the vertical profiles of the frame roof into the vertical stand profiles.

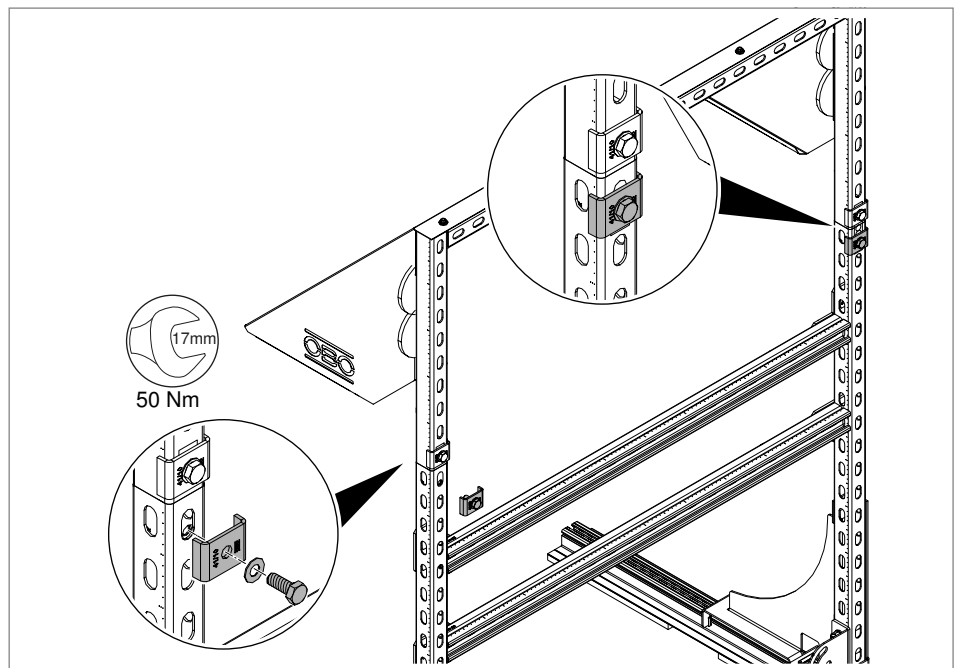


Fig. 25: Screwing on the frame roof

2. Screw the profiles together using connectors. Tightening torque 50 Nm (a locknut is pre-mounted in the vertical profile of the frame roof).

6.2.4 Mounting the mesh cable tray

The mesh cable tray is mounted with the BF GR fastening set.

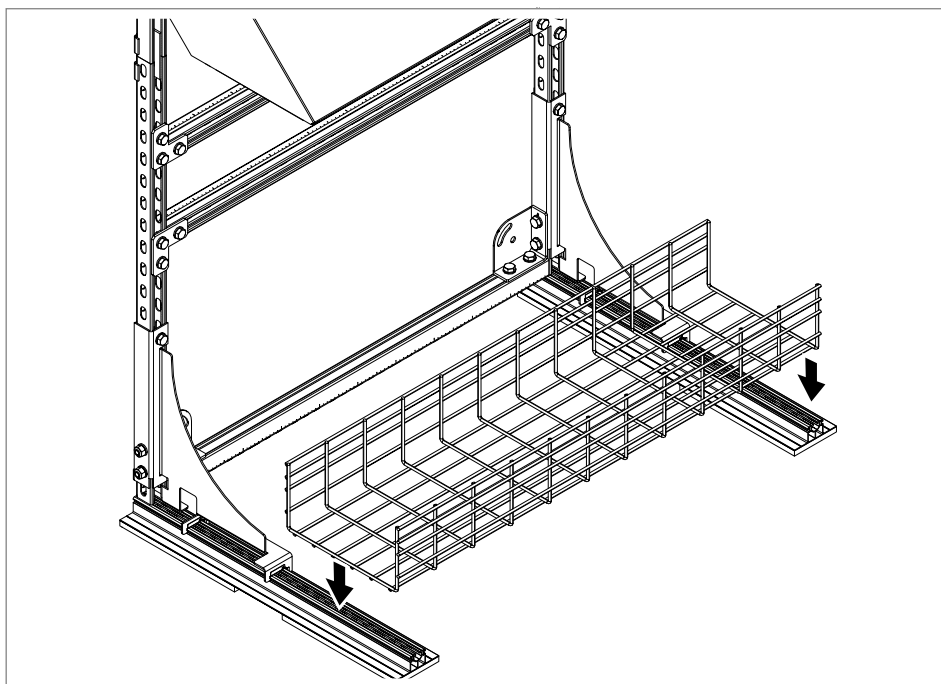


Fig. 26: Placing the mesh cable tray

1. Place the mesh cable tray on the support profiles of the stands.

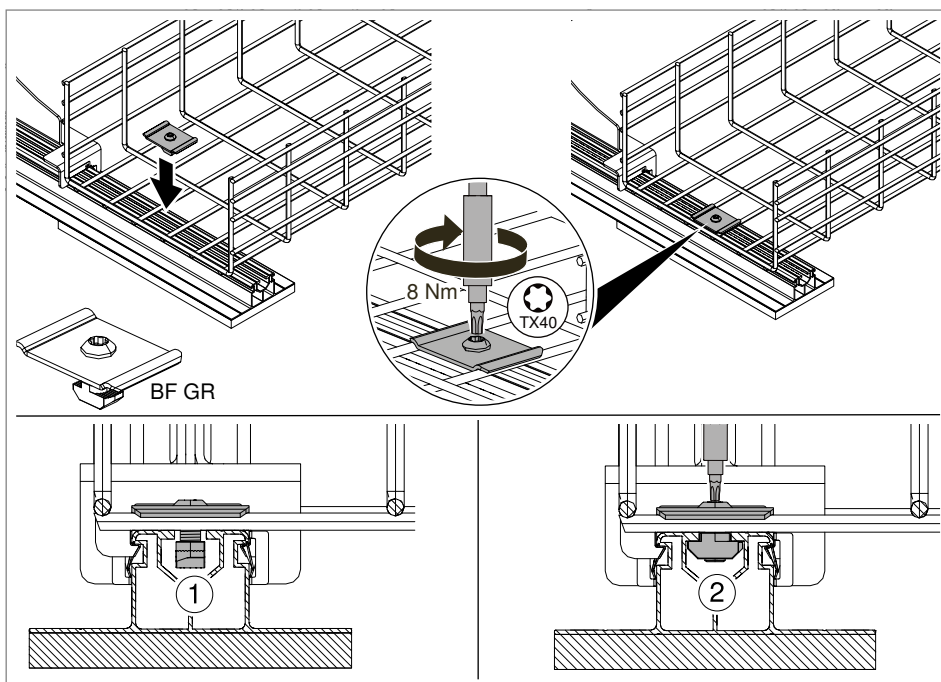


Fig. 27: Screwing on the mesh cable tray

1. Insert the slide nut from the fastening set into the support profile ①.
2. Tighten the screw from the fastening set with 8 Nm until the slide nut seizes, while clamping the straight wires of the mesh cable tray ②.

6.2.5 Ballasting stands

The inverter frame can be ballasted using standard blocks. Refer to the planning for the number of blocks.

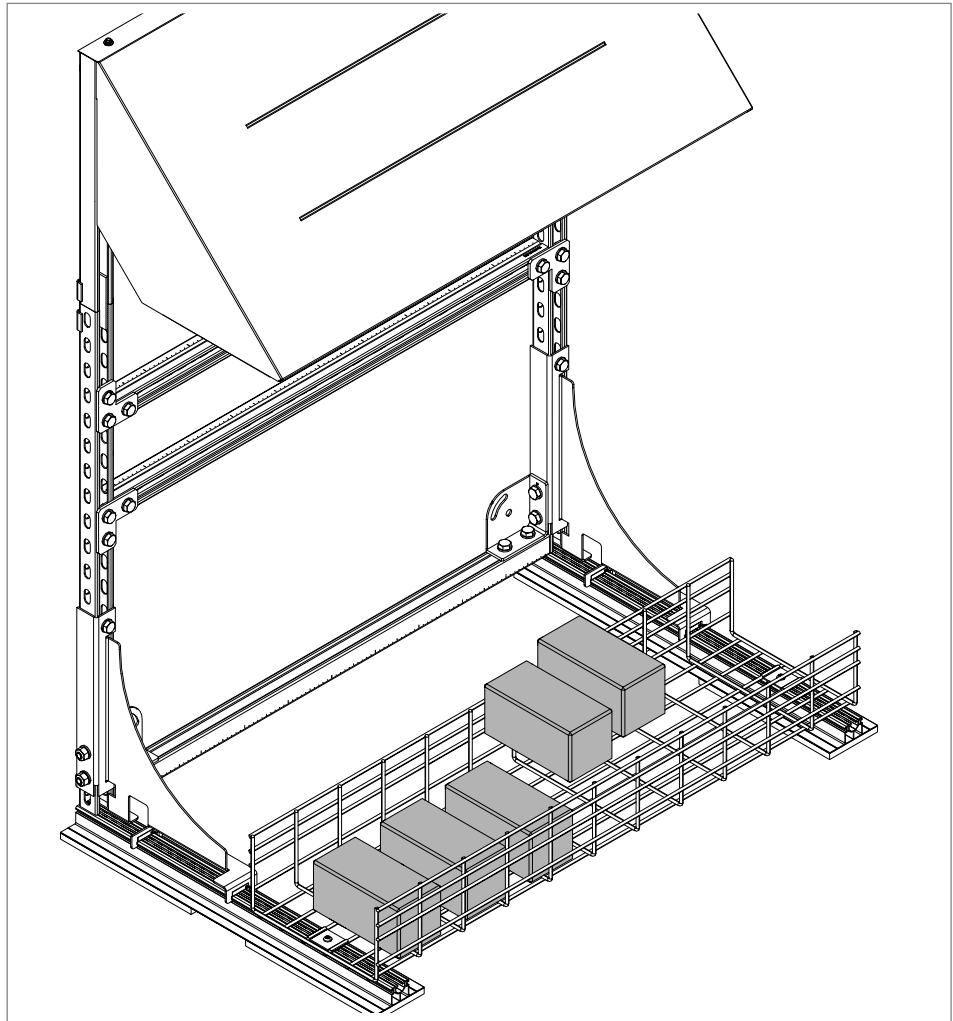


Fig. 28: Mesh cable tray ballasting

1. Place the ballasting in the mesh cable tray.

6.3 Mounting inverter frame WRR W

6.3.1 Mounting frame profiles

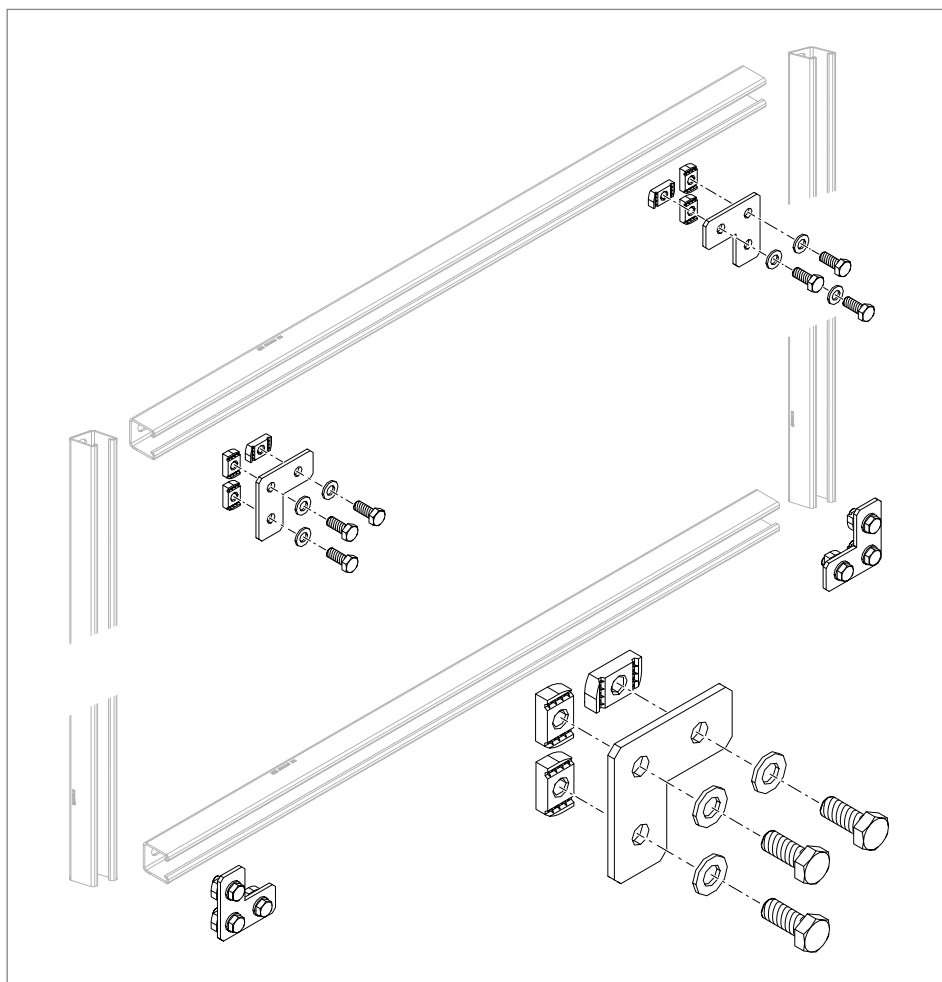


Fig. 29: Mounting a flat angle for frame profiles

1. Loosely screw the slide nuts with hexagonal bolts and washers on the flat angle.

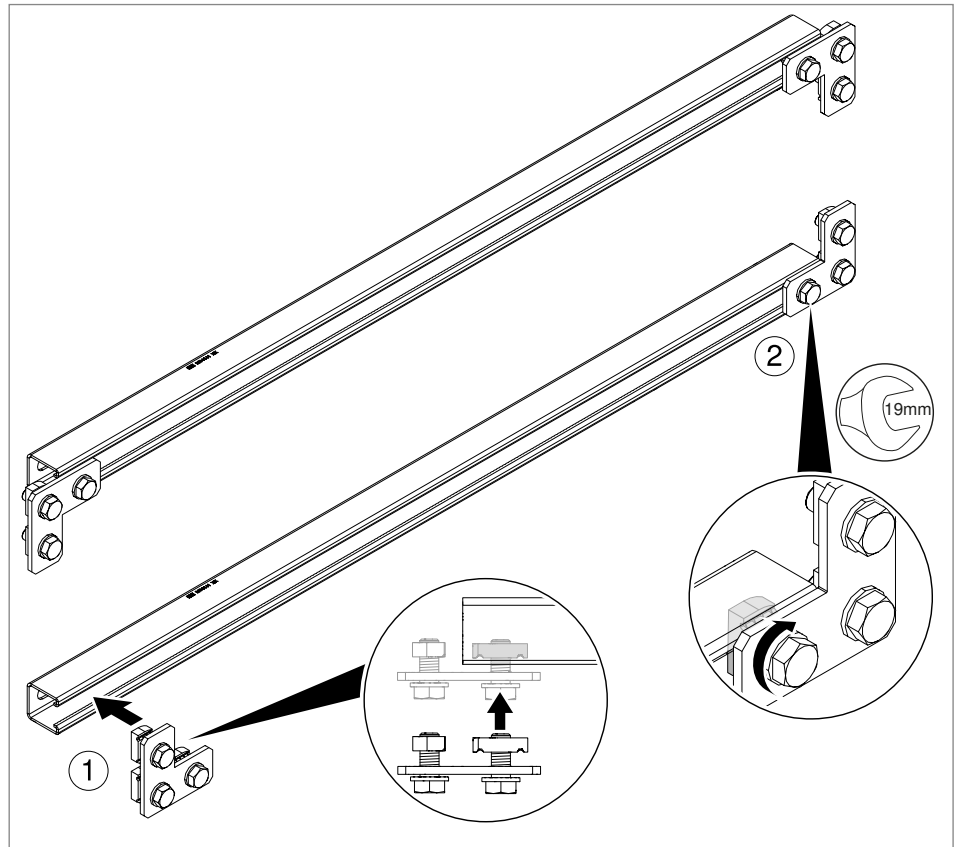


Fig. 30: Inserting a flat angle in transverse profiles

2. Insert the flat angle into the transverse profile with a slide nut ①.
3. Tighten the hexagonal bolts to hand tightness until the slide nuts engage in the profile, but can still be moved ②.

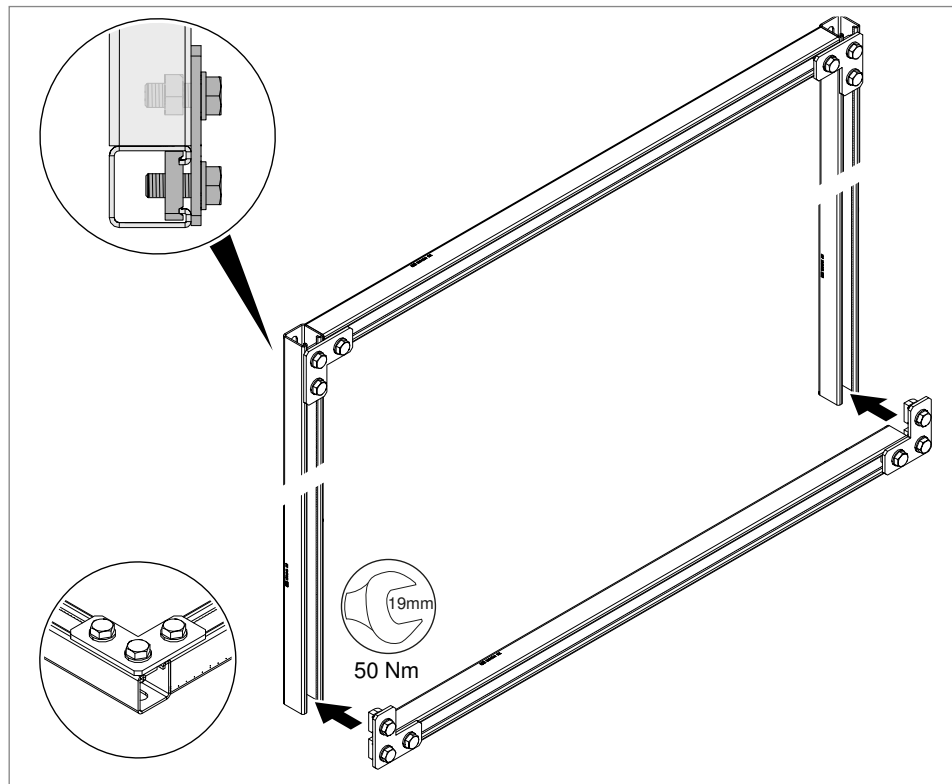


Fig. 31: Mounting frame profiles

4. Position the transverse profiles between the vertical profiles, inserting the slide nuts of the pre-mounted flat angles in vertical profiles.
5. Tighten the hexagonal bolts until the slide nuts engage in the profile. Tightening torque 50 Nm.

6.3.2 Mounting the frame roof

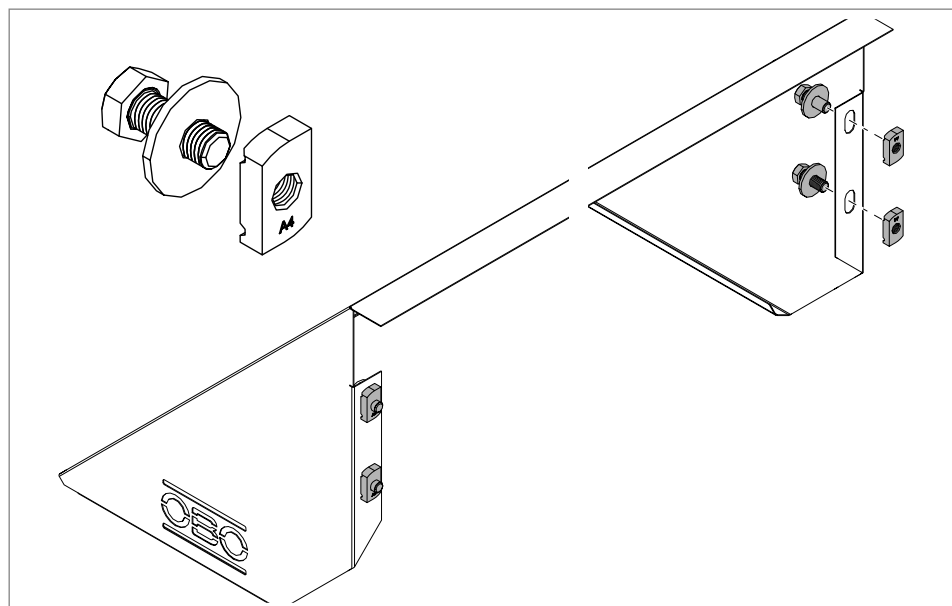


Fig. 32: Screwing slide nuts on the roof

1. Loosely screw the slide nuts with hexagonal bolts and large washers in the wall frame roof perforation.

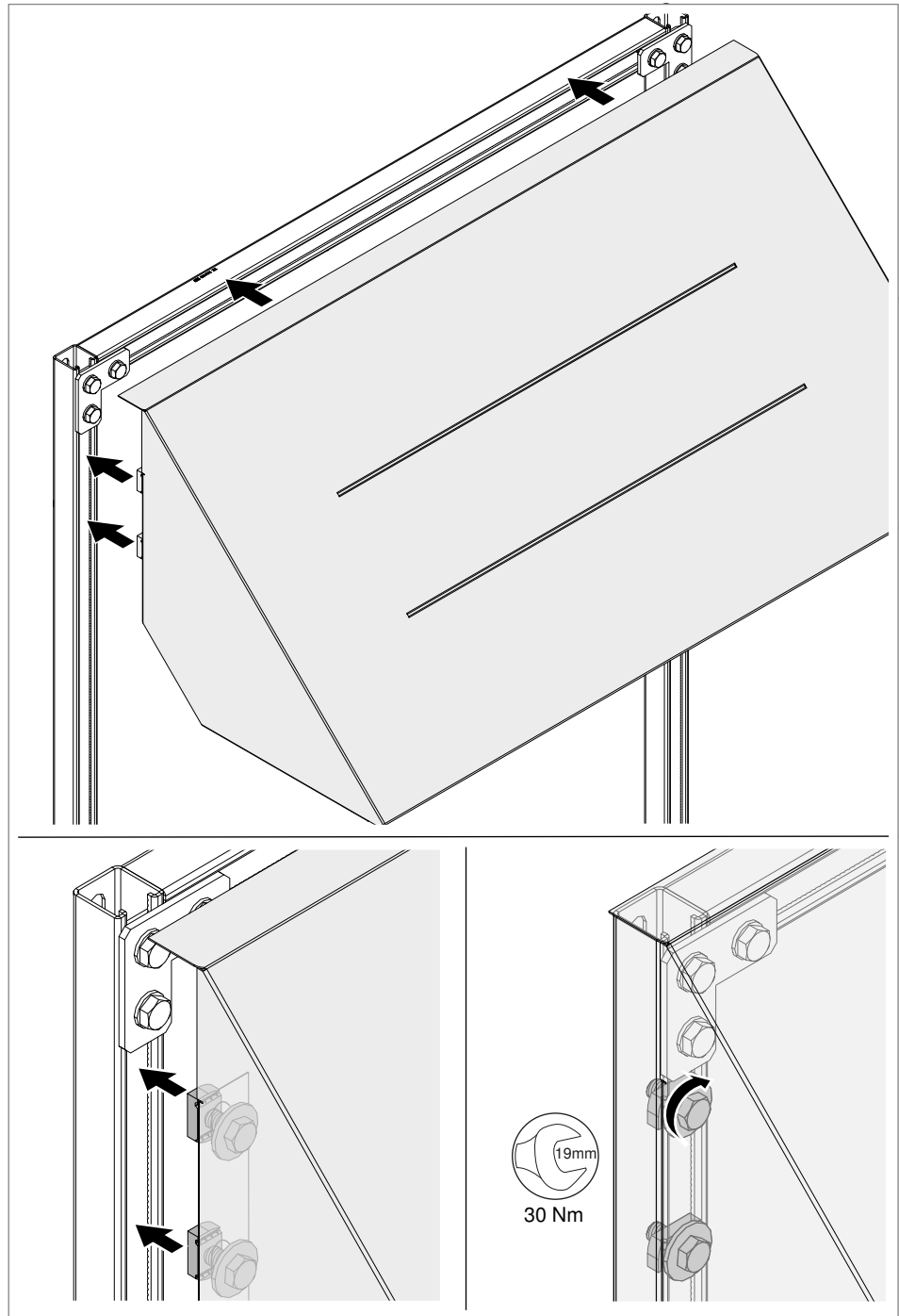


Fig. 33: Fastening roof using slide nuts

1. Position the roof against the profile frame, inserting the slide nuts in the vertical profiles and resting the top edge of the roof on the transverse profile.
2. Tighten the hexagonal bolts until the slide nuts engage in the profile. Tightening torque 30 Nm.

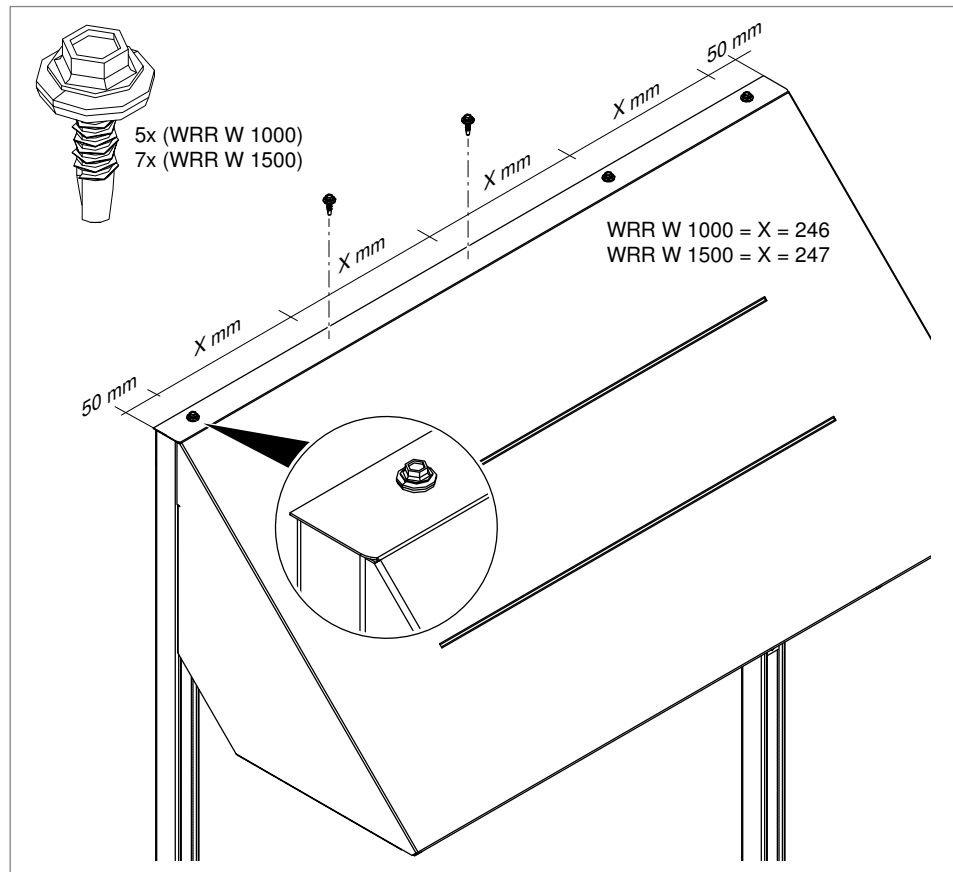


Fig. 34: Fastening roof using threaded screws

3. Mark screw spacings X on the top edge of the roof.
4. Screw the top edge of the roof to the top transverse profile using self-tapping threaded screws.

6.3.3 Mounting transverse profiles for inverters

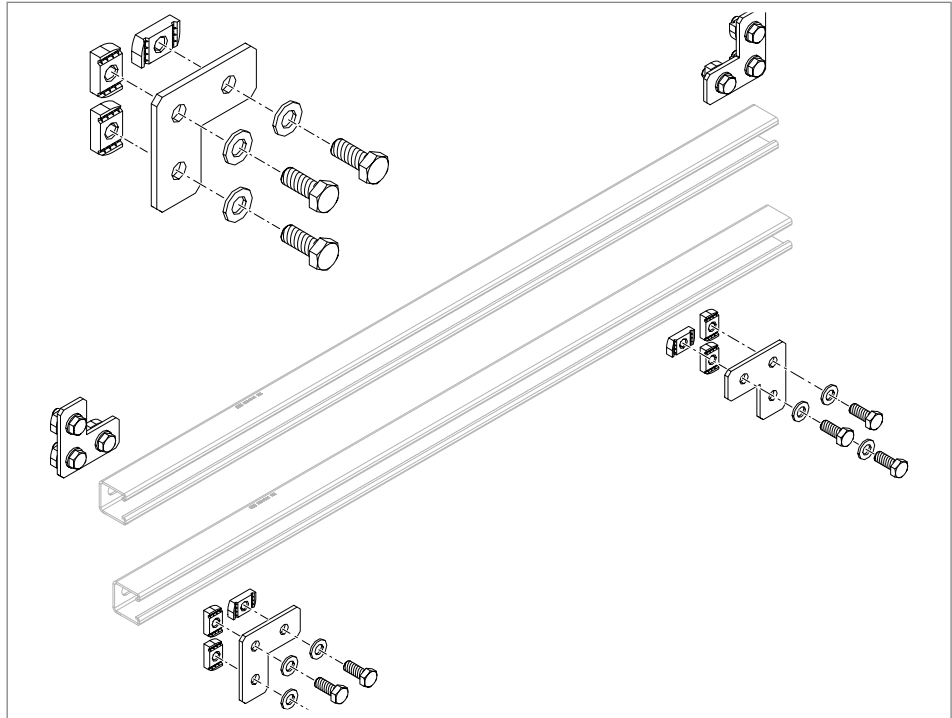


Fig. 35: Mounting a flat angle for transverse profiles

1. Loosely screw the slide nuts with hexagonal bolts and washers on the flat angle.

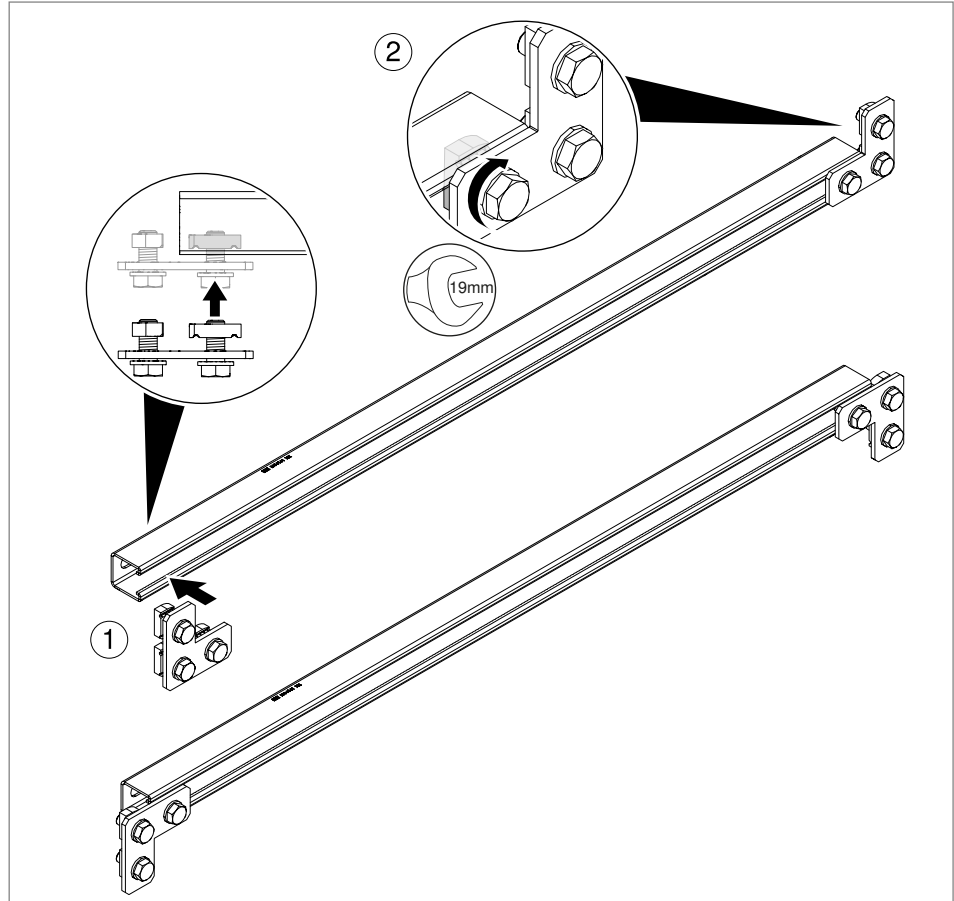


Fig. 36: Screwing a flat angle to transverse profiles

2. Insert the flat angle into the transverse profile with a slide nut ①.
3. Tighten the hexagonal bolts to hand tightness until the slide nuts engage in the profile, but can still be moved ②.

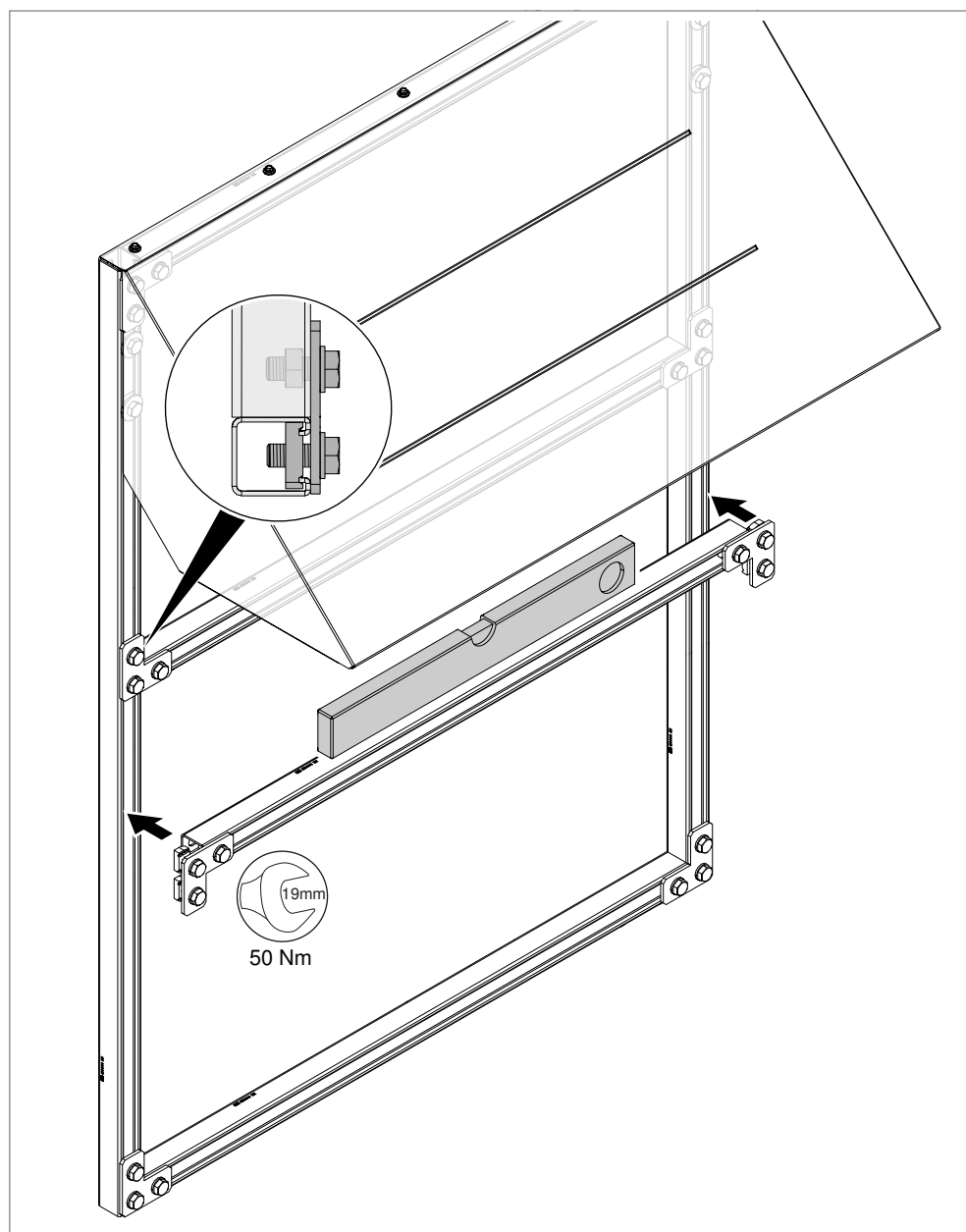


Fig. 37: Fastening transverse profiles to the frame

4. Position the transverse profiles between the vertical profiles, inserting the slide nuts of the pre-mounted flat angles in vertical profiles.
5. Tighten the hexagonal bolts to hand tightness until the slide nuts engage in the profile, but can still be moved.
6. Align the transverse profiles horizontally using a spirit level.
7. Tighten the hexagonal bolts. Tightening torque 50 Nm.

7 Inverter frame maintenance

The inverter frames do not require maintenance.

8 Dismantling the system

Dismantling of all the elements of the inverter frames takes place in the reverse order to mounting.

9 Disposing of the system

Comply with the local waste disposal regulations.

- Metallic parts: As scrap metal
- Packaging: As household waste

10 Technical data

Designation	Type	Dimensions	Surface	Item no.
Inverter frame, double-sided	WRR D1000	1,300 x 1,151 x 1,554	FT/VA	5904026
Inverter frame, double-sided	WRR D1500	1,300 x 1,651 x 1,554	FT/VA	5904029
Inverter frame, free-standing	WRR F1000	725 x 1,151 x 1,554	FT/VA	5904013
Inverter frame, free-standing	WRR F1500	725 x 1,651 x 1,554	FT/VA	5904015
Inverter frame, for wall mounting	WRR W1000	468 x 1,082 x 1,501	FT/VA	5904005
Inverter frame, for wall mounting	WRR W1500	468 x 1,582 x 1,501	FT/VA	5904007

Tab. 4: Technical data

11 Ballasting calculation

The ballasting of the free-standing inverter frames (single, double) depends on parameters such as the size and weight of the inverters used as well as the expected wind load. These parameters are used to determine specific values to calculate the ballast. The values can be found in the four „Tables for ballasting calculation“ on page 38. The tables are grouped by inverter frame with roof pitches of 30° and 45° as well as single and double equipment/configuration.

Note! *For double-sided ballasting, the ballasting must be distributed evenly on both sides.*

The following starting values are required for the calculation:

- Type of inverter frame (double, single)
- Width of the inverter frame

- Weight of the inverter
- Surface area (width x height) of the inverter front in cm² (blue area of tables)
- Number of inverters used
- Expected wind load (green area of tables)
- Table value based on the surface area of the inverter and the expected wind load (yellow area of tables)

Calculate weight (see also example below):

1. Calculate the surface area of the inverter front in cm² (width x height).
2. Refer to the table for the value (yellow) based on the surface area (blue) and the expected wind load (green). Select the column with the value closest to the calculated area.
3. Multiply the weight of the inverter with the number of planned devices.
4. Subtract the result from step 3 from the yellow table value from step 2.
5. In case of double-sided configuration, divide the result from step 4 by 2 again.

Example calculation of required ballasting

Starting values:

- Dimensions: 640 x 530 x 270 mm (front: 64 cm x 53 cm = **3,392** cm²)
- Inverter weight: 49 kg
- Inverter frame, double, roof pitch 45°
- Width 1,500 mm
- Number of inverters to be used: 2
- Inverter installation: both sides
- Wind load: 140 km/h

Calculation of the required ballasting (for value to be used, see table 5 on the next page):

$$\mathbf{297} - (2 \times 49) = 199 \text{ kg}/2 = 99.5 \text{ kg/side}$$

Tables for ballasting calculation

Inverter frame 1,500 mm width, roof pitch 45°							
Wind load		Front area in cm²					
Speed	Pres- sure	2,000 cm²	2,500 cm²	3,500 cm²	5,500 cm²	7,500 cm²	11,500 cm²
km/h	kN/m²						
80	0.31	33	38	48	68	89	129
90	0.39	61	67	80	106	132	183
100	0.48	92	100	116	148	180	243
110	0.58	127	136	156	194	233	309
120	0.69	165	176	199	245	291	(382)
130	0.82	206	219	246	300	(354)	(461)
140	0.95	250	266	297	(359)	(422)	(546)
150	1.09	298	(316)	(352)	(423)	(495)	(638)
160	1.23	(349)	(370)	(410)	(492)	(573)	(736)
170	1.39	(404)	(427)	(473)	(564)	(656)	(840)

Tab. 5: Inverter frame 1,500 mm, roof pitch 45°

Inverter frame 1,000 mm width, roof pitch 45°							
Wind load		Front area in cm²					
Speed	Pres- sure	2,000 cm²	2,500 cm²	3,500 cm²	5,500 cm²	7,500 cm²	11,500 cm²
km/h	kN/m²						
80	0.31	41	54	52	67	82	(143)
90	0.39	57	61	71	(98)	(136)	(213)
100	0.48	74	80	(101)	(149)	(196)	(292)
110	0.58	(105)	(119)	(148)	(206)	(263)	(378)
120	0.69	(148)	(165)	(199)	(268)	(336)	(473)
130	0.82	(195)	(215)	(255)	(336)	(416)	(577)
140	0.95	(245)	(269)	(315)	(409)	(502)	(688)
150	1.09	(300)	(326)	(380)	(487)	(594)	(808)
160	1.23	(358)	(388)	(449)	(571)	(693)	(936)
170	1.39	(420)	(454)	(523)	(660)	(797)	(1,072)

Tab. 6: Inverter frame 1,000 mm, roof pitch 45°

Inverter frame 1,500 mm width, roof pitch 30°							
Wind load		Front area in cm²					
Speed	Pressure	2,000 cm²	2,500 cm²	3,500 cm²	5,500 cm²	7,500 cm²	11,500 cm²
km/h	kN/m²						
80	0.31	11	16	26	46	67	107
90	0.39	33	39	52	78	104	155
100	0.48	58	66	82	113	145	209
110	0.58	85	95	114	154	191	268
120	0.69	115	126	149	195	241	(332)
130	0.82	148	161	188	242	295	(403)
140	0.95	183	198	229	292	(354)	(478)
150	1.09	221	238	274	(346)	(417)	(560)
160	1.23	261	281	(322)	(403)	(485)	(647)
170	1.39	304	(327)	(373)	(465)	(556)	(470)

Tab. 7: Inverter frame 1,500 mm, roof pitch 30°

Inverter frame 1,000 mm width, roof pitch 30°							
Wind load		Front area in cm²					
Speed	Pressure	2,000 cm²	2,500 cm²	3,500 cm²	5,500 cm²	7,500 cm²	11,500 cm²
km/h	kN/m²						
80	0.31	12	17	28	48	68	109
90	0.39	30	36	49	75	100	152
100	0.48	49	57	73	105	136	(200)
110	0.58	70	80	99	138	176	(253)
120	0.69	94	105	128	174	(219)	(311)
130	0.82	119	133	159	(213)	(267)	(374)
140	0.95	147	162	(193)	(256)	(318)	(442)
150	1.09	176	(194)	(230)	(301)	(373)	(516)
160	1.23	(208)	(228)	(269)	(350)	(431)	(594)
170	1.39	(241)	(264)	(310)	(402)	(494)	(677)

Tab. 8: Inverter frame 1,000 mm, roof pitch 30°

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