



Installation Manual

Inverter Rack for FENECON Industrial L

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1. Information on these installation instructions

1. Information on these installation instructions

These installation instructions are an integral part of the FENECON Industrial L electrical energy storage system and must be kept in its immediate vicinity and accessible to personnel at all times.

Personnel must have carefully read and understood these installation and service instructions before starting any work.

1.1. Manufacturer

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1.2. Formal information on the assembly instructions

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1.3. Version/revision of the instructions

Version/revision	Change to the installation instructions	Date	Name
V0	First draft	23/05/2023	FENECON GmbH
V1	Published on docs.fenecon.de	10.04.2025	FENECON PM

Table 1. Version/revision

1.4. Darstellungskonventionen

	This signal word indicates an imminent danger. If this danger is not avoided, it will result in death or serious injury.
	This signal word indicates a possible danger. If this danger is not avoided, it can lead to death or serious injury.
	This signal word indicates a potentially dangerous situation. If this dangerous situation is not avoided, it may result in minor or moderate injury.
	This signal word indicates actions to prevent damage to property. Observing these instructions prevents damage to or destruction of the system.
	Supplementary information

Table 2. Symbol conventions — Signal words

1.5. Structure of warning notices

Warnhinweise schützen bei Beachtung vor möglichen Personen- und Sachschäden und stufen durch das Signalwort die Größe der Gefahr ein.

Warnings are structured according to the SAFE method:

Signal word	Meaning
S	Signal word: (DANGER, WARNING, CAUTION or NOTE)
A	(German: Art der Gefahr): Type and source of danger: Description of the hazard and the cause of the hazard.
F	(German: Folgen der Misachtung): Consequence: Description of the possible consequences for humans, animals and the environment that may result from the hazard.
E	(German: Entkommen): Avoid: Recommendations on how hazards can be avoided.

Table 3. SAFE method

	Source of the danger Possible consequences of non-compliance. Measures to avoid/prohibit.
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1.5. Structure of warning notices

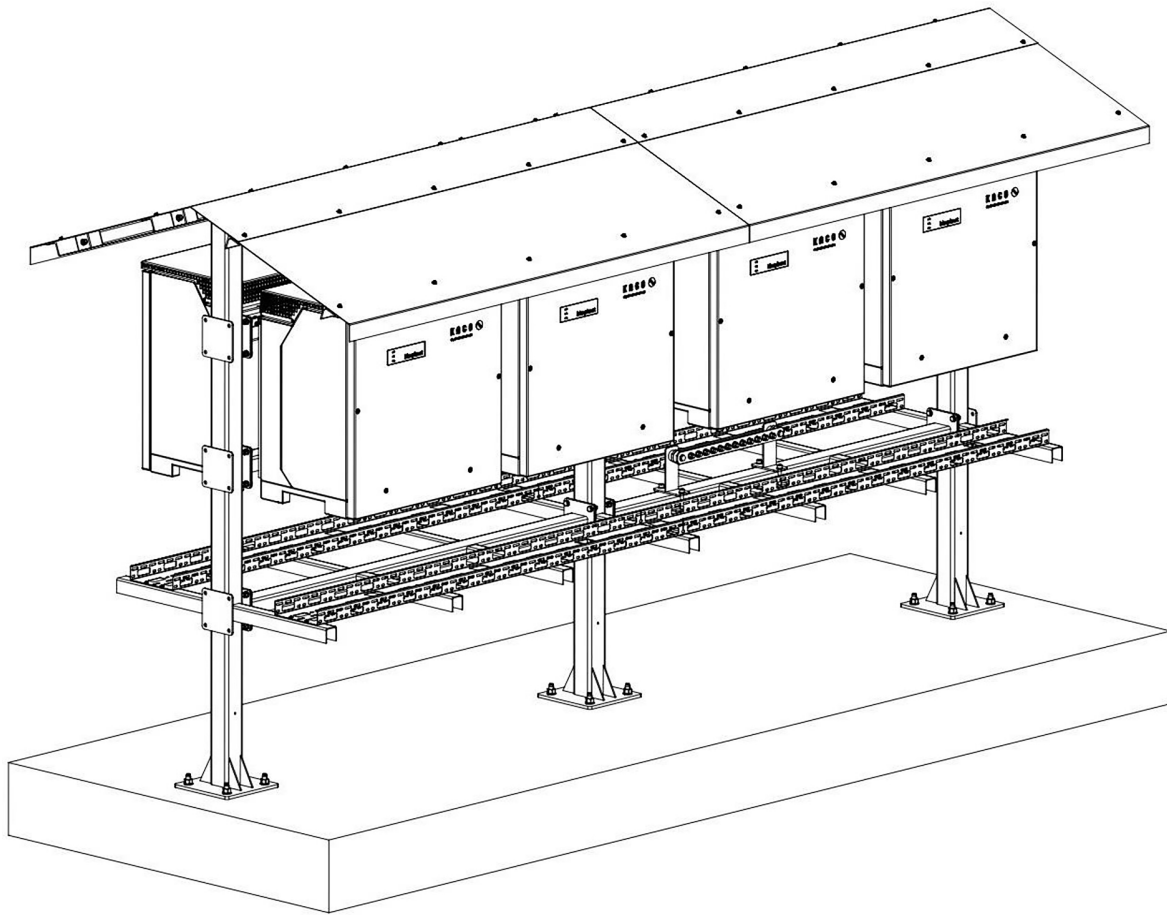


Figure 1. Inverter rack — General view

2. Scope of delivery

2.1. Standard parts

List item	Description	Amount	Item no.
01	Spring washer D10.2	72	ZUI012
02	Disc washer D10.5	154	ZUI029
03	Hexagon nut M10	76	ZUI128
04	Hexagon head bolt, fully threaded M10 x 30	48	ZUS133
05	Hexagon head bolt, fully threaded M10 x 25	24	ZUS088
06	Bolt, flattened, hexagon socket M6 x 10	28	ZUS302
07	Spring washer D8.1	32	ZUS056
08	Disc washer D8.4	64	ZUS162
09	Hexagon nut M8	32	ZUI006
10	Hexagon head bolt, fully threaded M8 x 22	32	ZUS789
11	Bolt anchor HST3-R M16 x 135 35/15	12	ZUS791
12	EJOT self-drilling screw JT6-6-5.5	40	ZUS792
13	Cylinder head bolt with hexagon socket M10 x 80	4	ZUS790
14	Hexagon head bolt, fully threaded M10 x 18	2	ZUS788
15	Cable duct 200 x 50	4	KAI057
16	Earth circuit connector	1	ZUS787



72 x ZUI012



154 x ZUI029



76 x ZUS128



48 x ZUS133



24 x ZUS088



28 x ZUS302



32 x ZUS056



64 x ZUS162



32 x ZUI006



32 x ZUS789



12 x ZUS791



40 x ZUS792



4 x ZUS790



2 x ZUS788



4 x KAI057

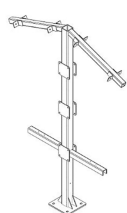


1 x ZUS787

2.2. Components

2.2. Components

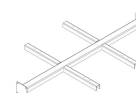
List item	Description	Amount	Item no.
17	Steel frame 01	3	GE1 (ZUI997)
18	Steel frame 02	4	GE2 (ZUI997)
19	Steel frame 03	2	GE3 (ZUI997)
20	Lid 01	8	DE1 (ZUI997)
21	Cover 02	4	DE2 (ZUI997)
22	Cover 03	4	DE3 (ZUI997)
23	Roof panel 01	2	DB1 (ZUI997)
24	Roof plate 02	2	DB2 (ZUI997)
25	Connector 01	2	PE1 (ZUI997)
26	Connector 02	2	PE2 (ZUI997)



3 x GE1



4 x GE2



2 x GE3



8 x DE1



4 x DE2



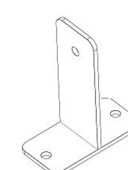
4 x DE3



2 x DB1



2 x DB2



2 x PE1



2 x PE2

3. Assembly

3.1. Residual risks



Danger to life due to fire or explosion

Fire caused by flammable or explosive material near the appliance may result in serious injury

- Do not install the appliance in potentially explosive atmospheres or in the vicinity of highly flammable substances.



Property damage caused by gases that react aggressively to surfaces in combination with weather-related humidity.

- The housing of the appliance can be severely damaged by gases in combination with weather-related humidity. (e. g. ammonia, sulphur).
 1. If the system is exposed to gases, it must be installed in a visible location.
 2. Carry out regular visual inspections.
 3. Remove moisture from the housing immediately.
 4. Ensure adequate ventilation at the installation site.
 5. Remove soiling immediately, especially from ventilation systems.

→ In the event of non-compliance, material damage to the appliance is not covered by the warranty.



Access by maintenance personnel in case of service

- Additional costs arising from unfavorable structural or installation conditions will be charged to the customer.

3.2. Foundation

3.2. Foundation

- We recommend preparing a foundation on site for the assembly of the inverter rack.
- This foundation must be provided by the customer, taking the statics into account.
- Please refer to the following illustration for the connection drilling patterns.

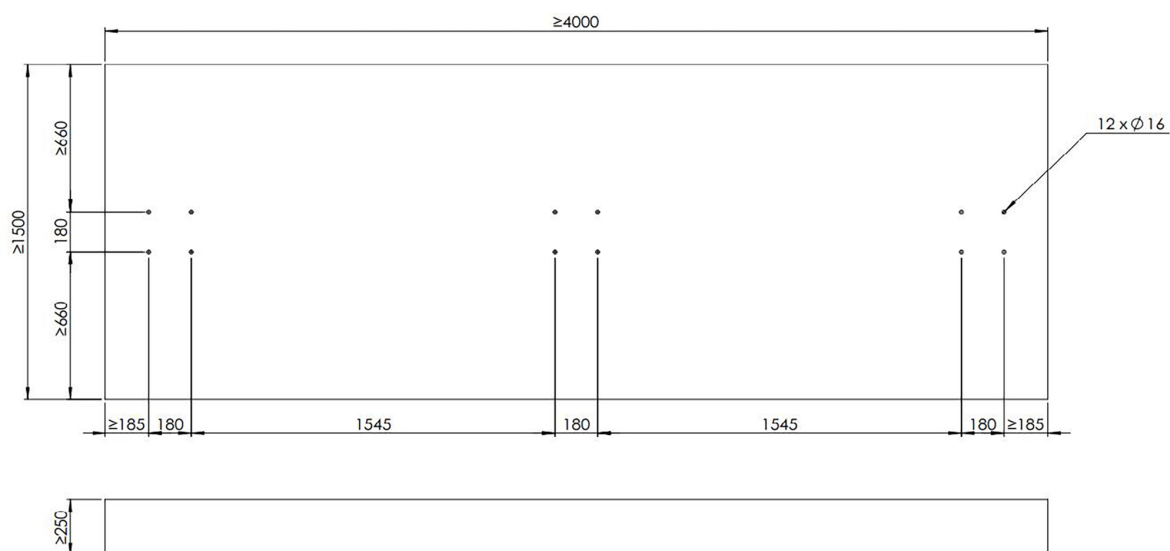


Figure 2. Drilling pattern

3.3. Ground anchor

We recommend fastening the inverter rack with ground anchors. Please use the enclosed ground anchors (list item 11 in the parts list: ZUS791).

(Hilti bolt anchor HST3-R M16 x 135 35/15 #2105876)

Please also observe the manufacturer's setting instructions.

Please also note the torque specification of the bolt anchor (ZUS791).

The recommended torque is 110 Nm.

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HST3, HST3-R, HST3 BW, HST3-R BW M16	$l_{fix, min}$	$l_{fix, max}$	$h_{nom, min}$	$h_{nom, max}$	h_{min}	h_{nom}
M16x115 15/-	15	15	78	78	120	-
M16x135 35/15	15	35	78	98	$42+h_{nom}$	
M16x145 45/25	25	45	78	98	$42+h_{nom}$	
M16x170 70/50	50	70	78	98	$42+h_{nom}$	
M16x220 120/100	25	120	78	173	$42+h_{nom}$	
M16x260 160/140	65	160	78	173	$42+h_{nom}$	
M16x300 200/180	105	200	78	173	$42+h_{nom}$	
M16x365 260/240	170	265	78	173	$42+h_{nom}$	
M16x425 320/300	230	325	78	173	$42+h_{nom}$	
M16x475 370/350	280	375	78	173	$42+h_{nom}$	

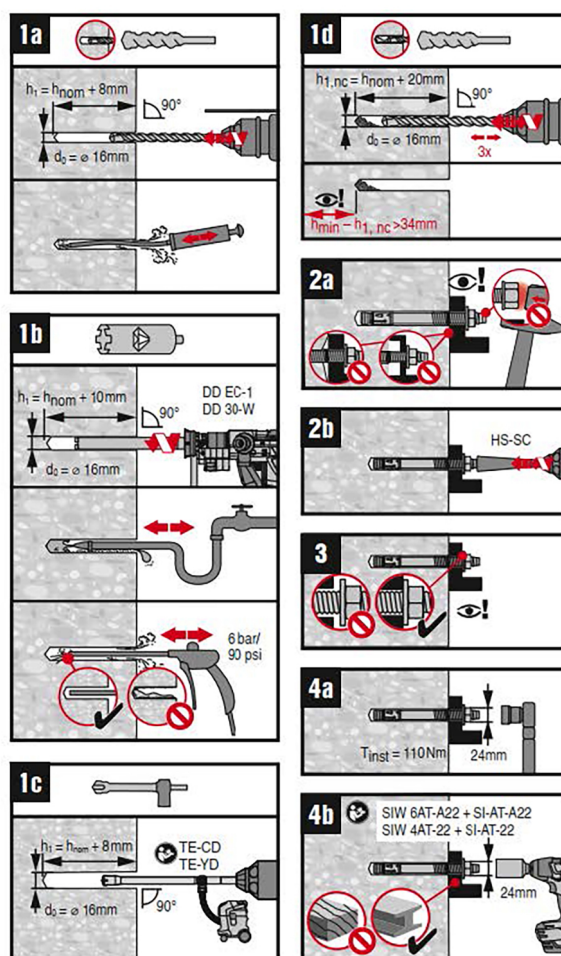
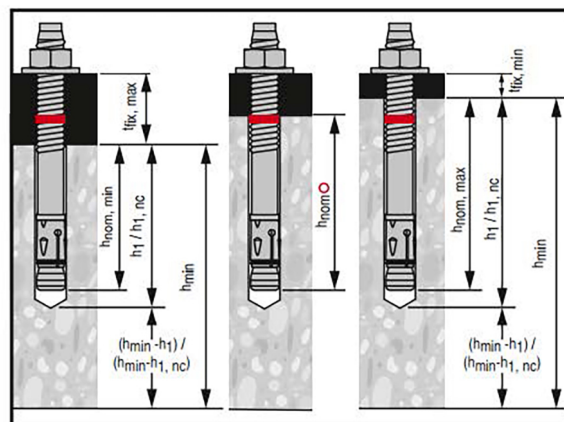


Figure 3. Bolt anchor — Instructions

3.4. Assembly of the inverter rack

3.4. Assembly of the inverter rack

Step 1:

You need:

Description	Number	Item no.
Bolt anchor HST3-R M16 x 135 35/15	8	ZUS791
Steel frame 01	2	GE1 (ZUI997)

- Anchor the first two frame elements to the foundation.
- Use 4 pieces of ZUS791 (list item 11) for each stand.
- Observe the specified torque of the bolt anchor: 110 Nm.

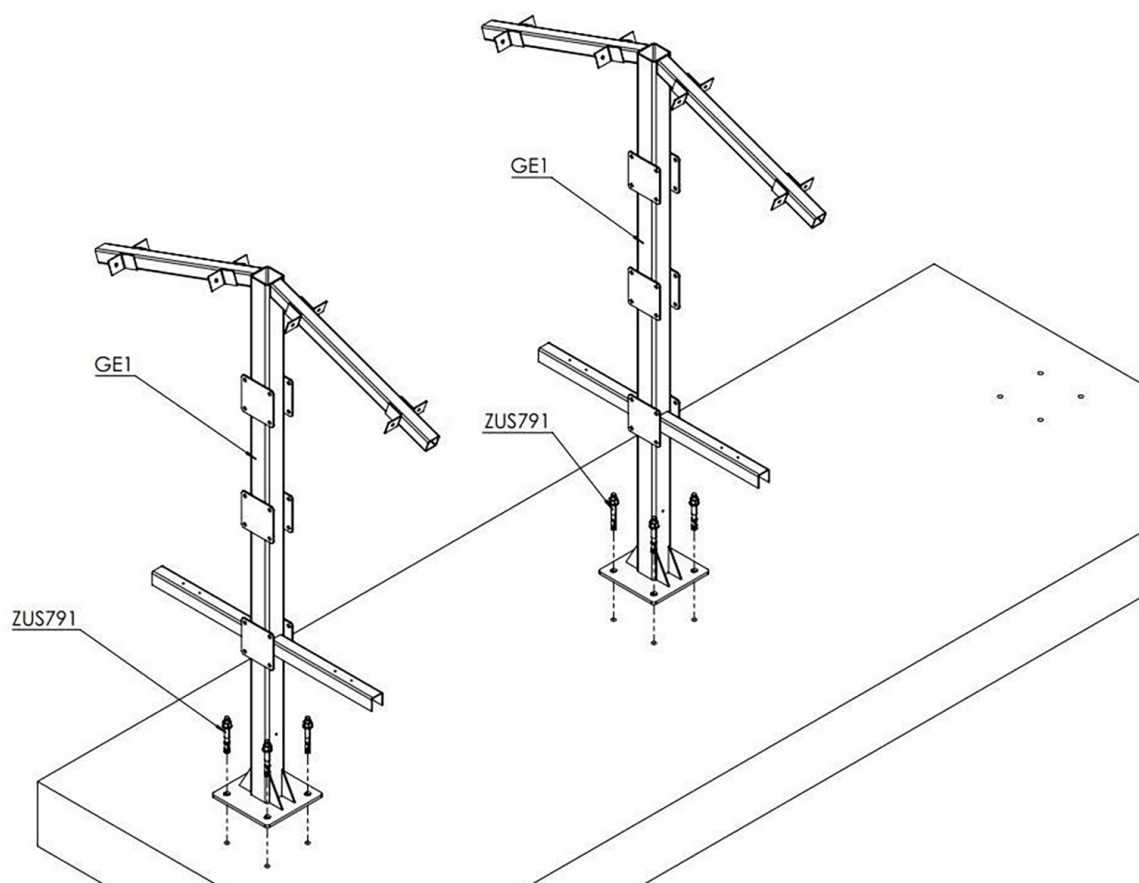


Figure 4. Assembly — Inverter rack — GE1

Step 2:

You need:

Description	Amount	Item no.
Spring washer D10.2	8	ZUI012
Disc washer D10.5	16	ZUI029
Hexagon nut M10	8	ZUS128
Hexagon head bolt, fully threaded M10 x 30	8	ZUS133
Steel frame 03	1	GE3 (ZUI997)

- Bolt the frame element GE3 to the frame elements GE1 on both sides.
- Use the components in "Detail A" of [Figure GE3, GE1 \(detailed view\)](#).
- Observe the permissible torque: 50 Nm.

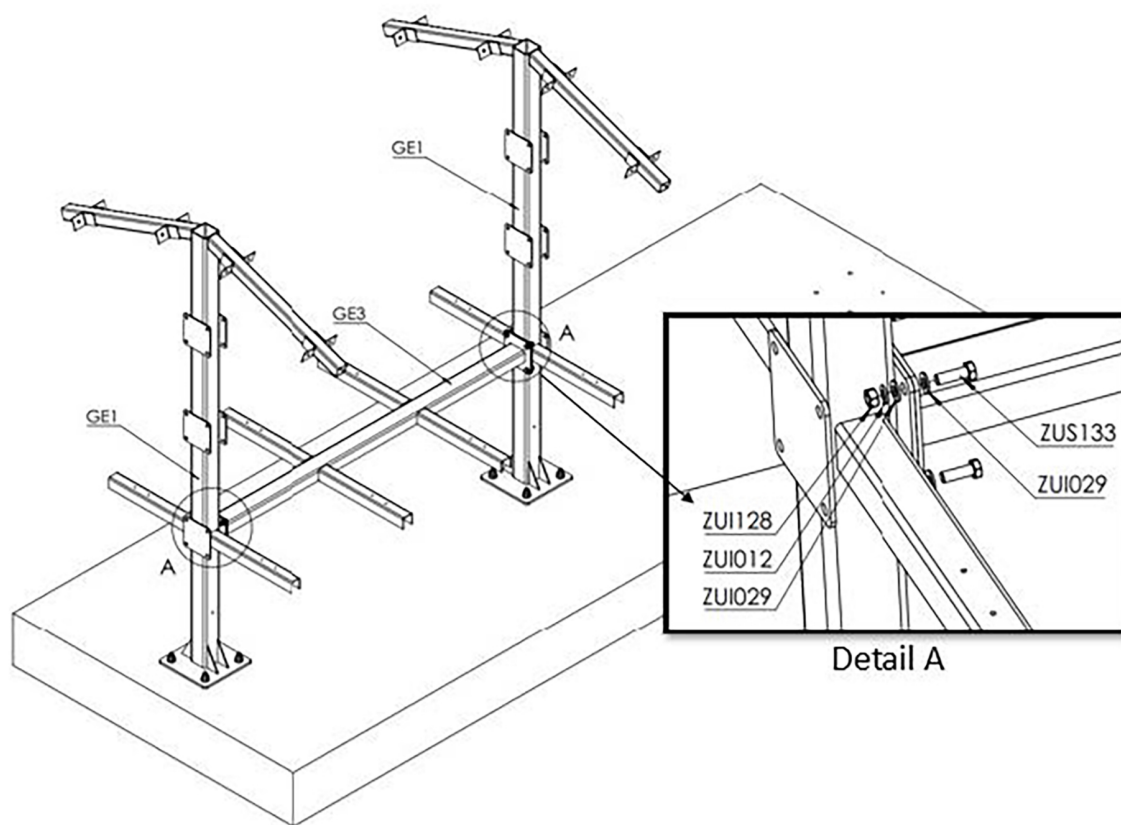


Figure 5. Assembly — Inverter rack — GE3, GE1 Detailed view

3.4. Assembly of the inverter rack

Step 3:

You need:

Description	Amount	Item no.
Spring washer D10.2	8	ZUI012
Disc washer D10.5	16	ZUI029
Hexagon nut M10	8	ZUS128
Hexagon head bolt fully threaded M10 x 30	8	ZUS133
Steel frame 02	1	GE2 (ZUI997)

- Bolt the frame element GE2 to the frame element GE1.
- To do this, use the components in "Detail A" of [Figure GE2, GE1](#).
- **Caution:** Attach the frame element GE2 with the U-profile opening facing downwards.
- Observe the permissible torque: 50 Nm.

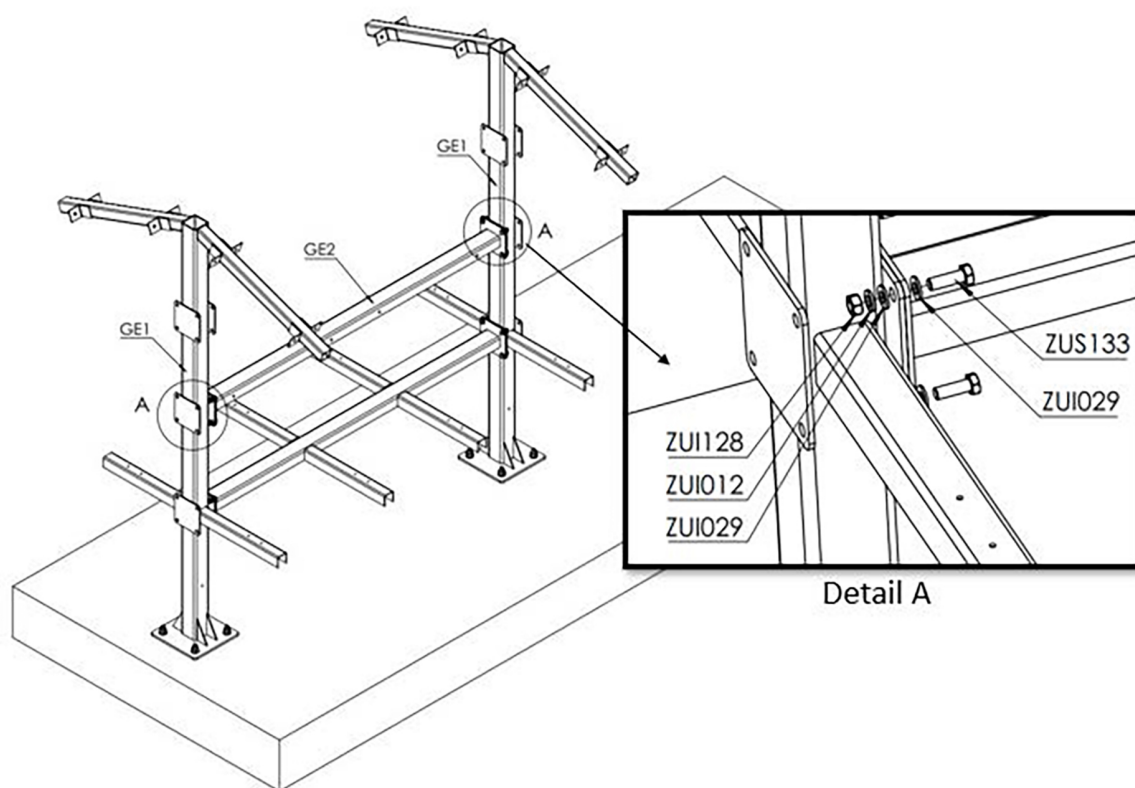


Figure 6. Assembly — Inverter rack — GE2, GE1 (detailed view)

Step 4:

You need:

Description	Amount	Item no.
Spring washer D10.2	8	ZUI012
Disc washer D10.5	16	ZUI029
Hexagon nut M10	8	ZUS128
Hexagon head bolt, fully threaded M10 x 30	8	ZUS133
Steel frame 03	1	GE2 (ZUI997)

- Bolt the frame element GE2 to the frame elements GE1.
- To do this, use the components in "Detail A" of [Figure GE2-2, GE1](#).
- **Caution:** Attach the frame element GE2 so that the U-profile is positioned with the opening facing up.
- Observe the permissible torque: 50 Nm.

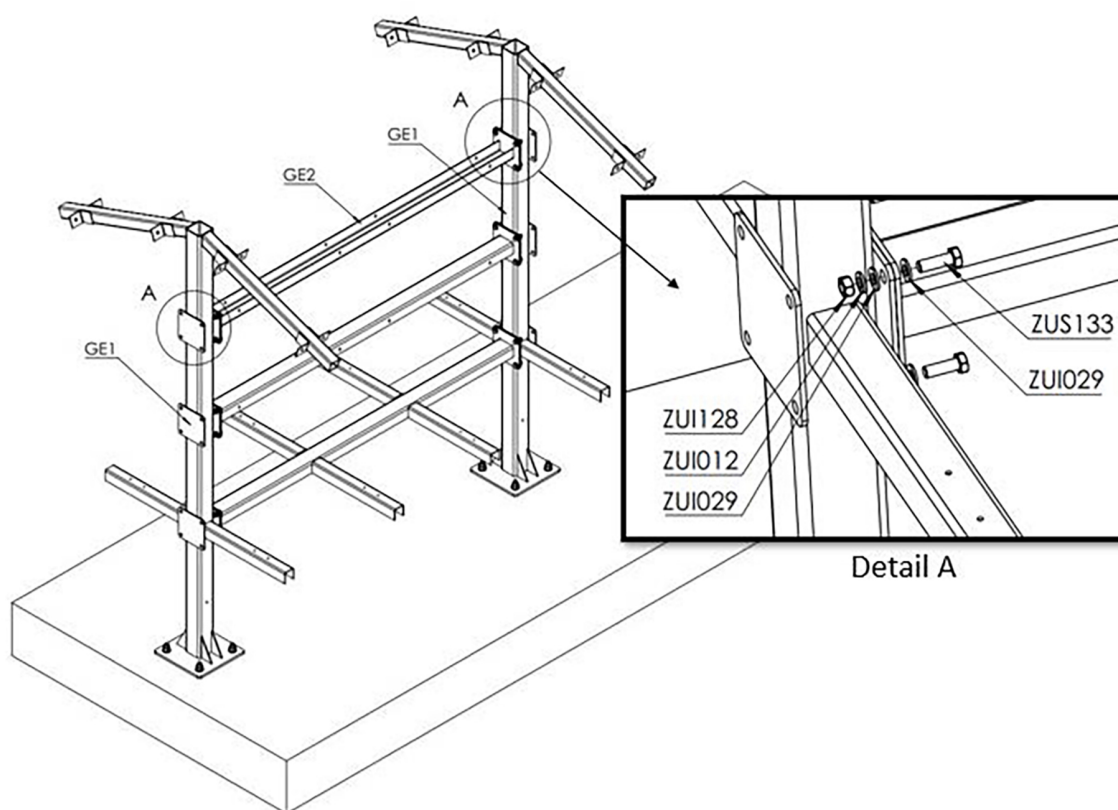


Figure 7. Assembly — Inverter rack — GE2-2, GE1 (detailed view)

3.4. Assembly of the inverter rack

Step 5:

You need:

Description	Amount	Item no.
Spring washer D10.2	4	ZUI012
Disc washer D10.5	8	ZUI029
Hexagon nut M10	4	ZUS128
Hexagon head bolt fully threaded M10 x 25	4	ZUS088
Cover 02	2	DE2 (ZUI997)
Cover 03	2	DE3 (ZUI997)

- Bolt the roof elements DE2 and DE3 to the frame element GE1.
- Use the components in "Detail A" of [Figure DE2-DE3, GE1](#).
- Please also note the components in "Detail A" and the permissible torque: 50 Nm.

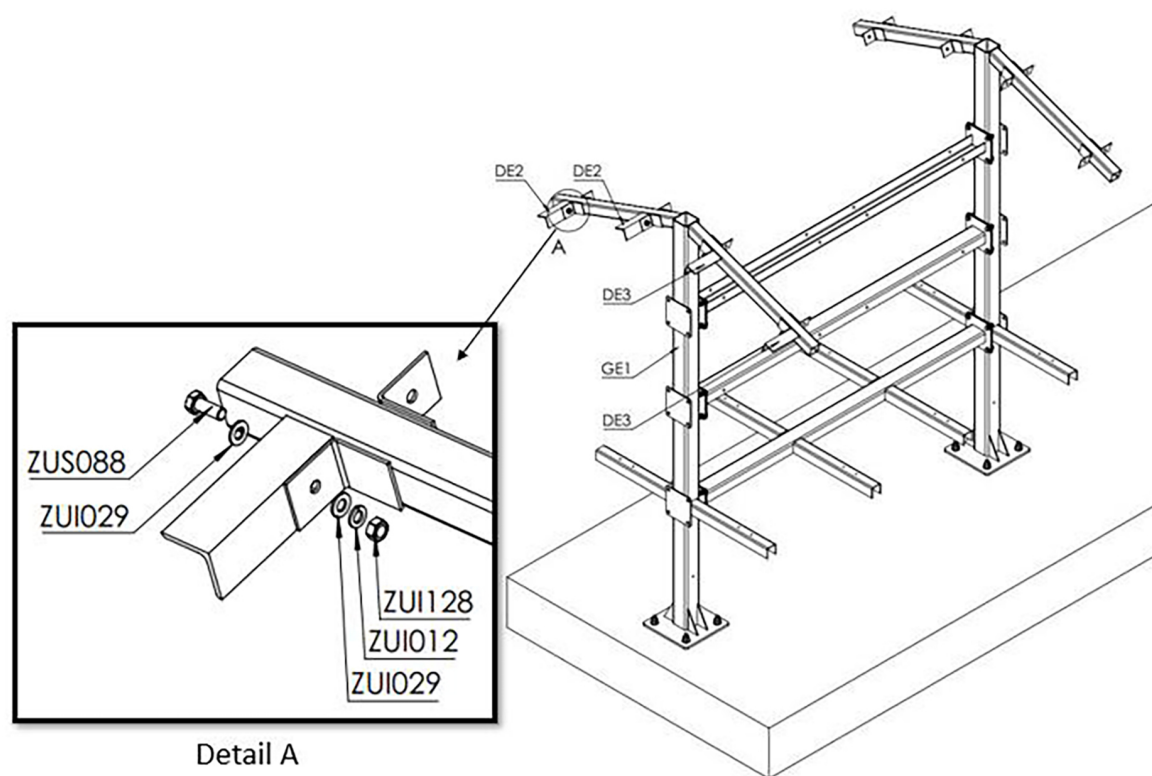


Figure 8. Assembly — Inverter rack — DE2-DE3, GE1 (detailed view)

Step 6:

You need:

Description	Amount	Item no.
Spring washer D10.2	4	ZUI012
Disc washer D10.5	8	ZUI029
Hexagon nut M10	4	ZUS128
Hexagon head bolt, fully threaded M10 x 25	4	ZUS088
Cover 01	4	DE1 (ZUI997)

- Bolt the roof elements DE1 to the frame element GE1.
- To do this, use the components in "Detail A" of [Figure DE1, GE1](#).
- Observe the permissible torque: 50 Nm.

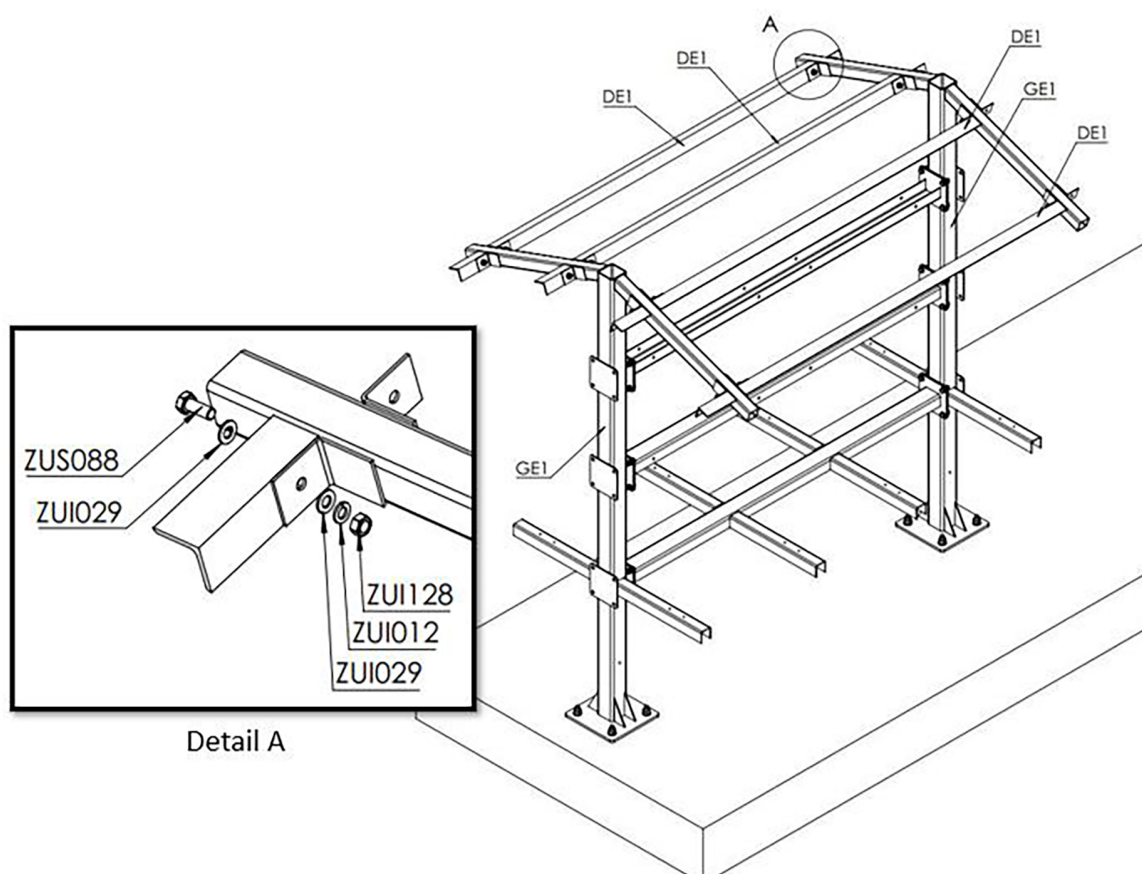


Figure 9. Assembly — Inverter rack — DE1, GE1 (detailed view)

3.4. Assembly of the inverter rack

Step 7:

You need:

Description	Amount	Item no.
Steel frame 01	1	GE1 (ZUI997)
Bolt anchor HST3-R M16 x 135 35/15	4	ZUS791

- Position the third frame element on the foundation and anchor it.
- Use the "Detail A" components of [Figure Third GE1](#) for this.
- Please refer to the section [Ground Anchor](#) of these installation instructions and the specified torque for the bolt anchor: 110 Nm.

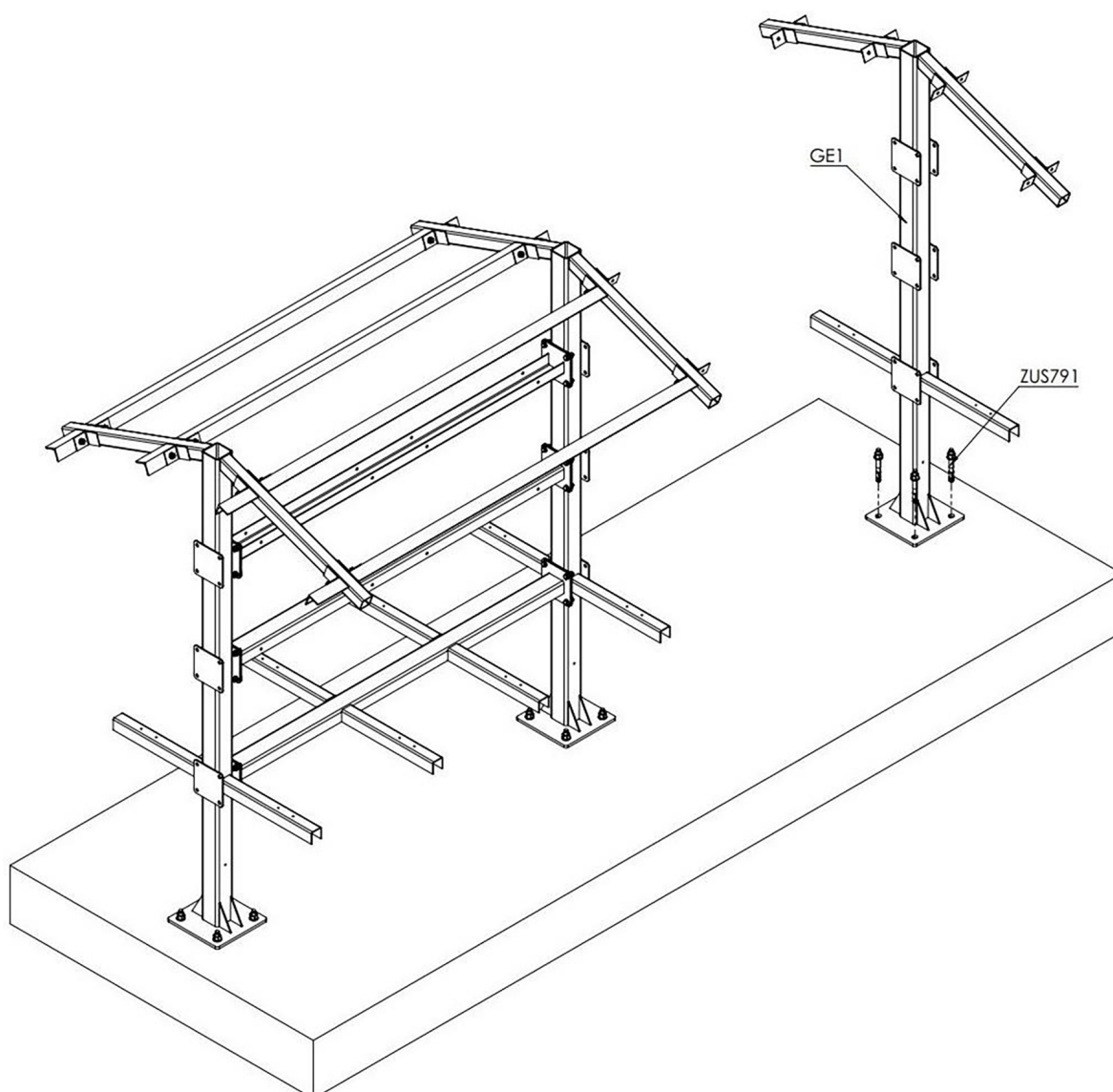


Figure 10. Assembly — Inverter rack — Third GE1 (detailed view)

Step 8:

You need:

Description	Amount	Item no.
Spring washer D10.2	8	ZUI012
Disc washer D10.5	16	ZUI029
Hexagon nut M10	8	ZUS128
Hexagon head bolt, fully threaded M10 x 30	8	ZUS133
Steel frame 03	1	GE3 (ZUI997)

- Bolt the frame element **GE3** to the frame element **GE1**.
- To do this, use the components in "Detail A" of [FigureGE3-2, GE1](#).
- Please also note the assembly of the components in "Detail A" and the permissible torque: 50 Nm.

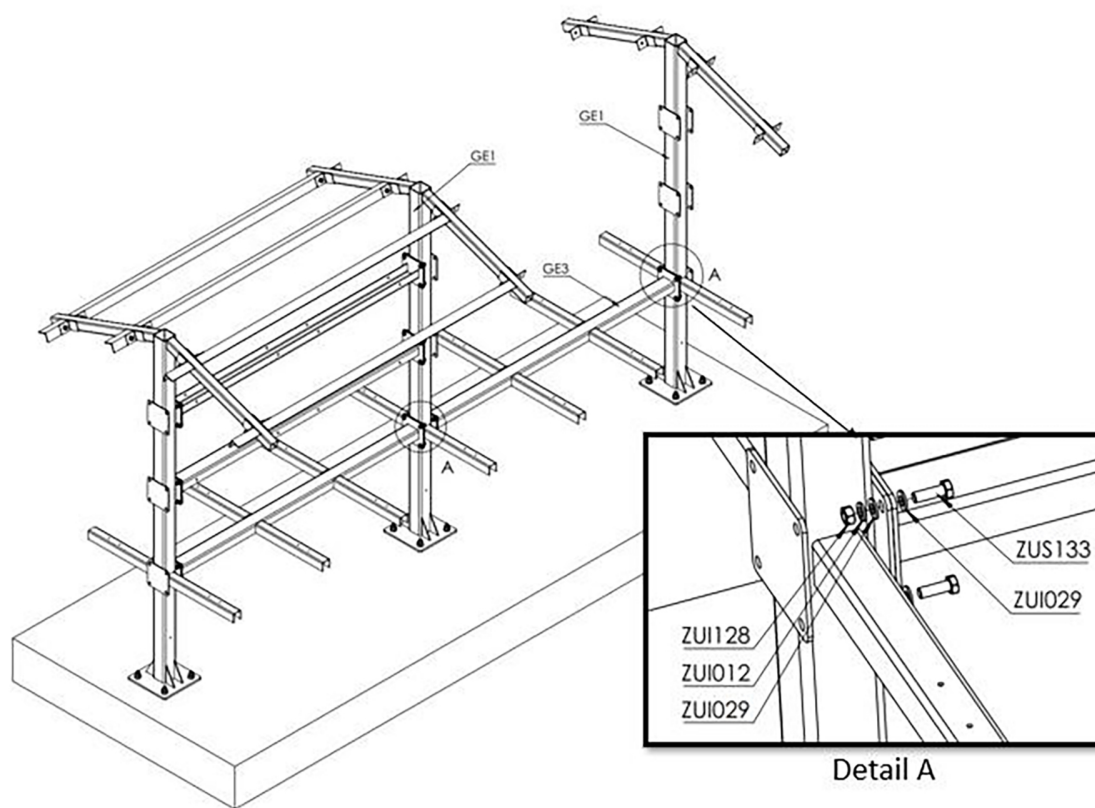


Figure 11. Assembly — Inverter rack — GE3-2, GE1 (detailed view)

3.4. Assembly of the inverter rack

Step 9:

You need:

Description	Amount	Item no.
Spring washer D10.2	8	ZUI012
Disc washer D10.5	16	ZUI029
Hexagon nut M10	8	ZUS128
Hexagon head bolt, fully threaded M10 x 30	8	ZUS133
Hexagon head bolt, fully threaded M10 x 25	8	ZUS088
Steel frame 02	1	GE2 (ZUI997)

- Bolt the frame element GE2 to the frame element GE1.
- Use the components in "Detail A" of [Figure GE2-3, GE1](#).
- **Caution:** Attach the frame element GE2 with the U-profile opening facing downwards.
- Observe the permissible torque: 50 Nm.

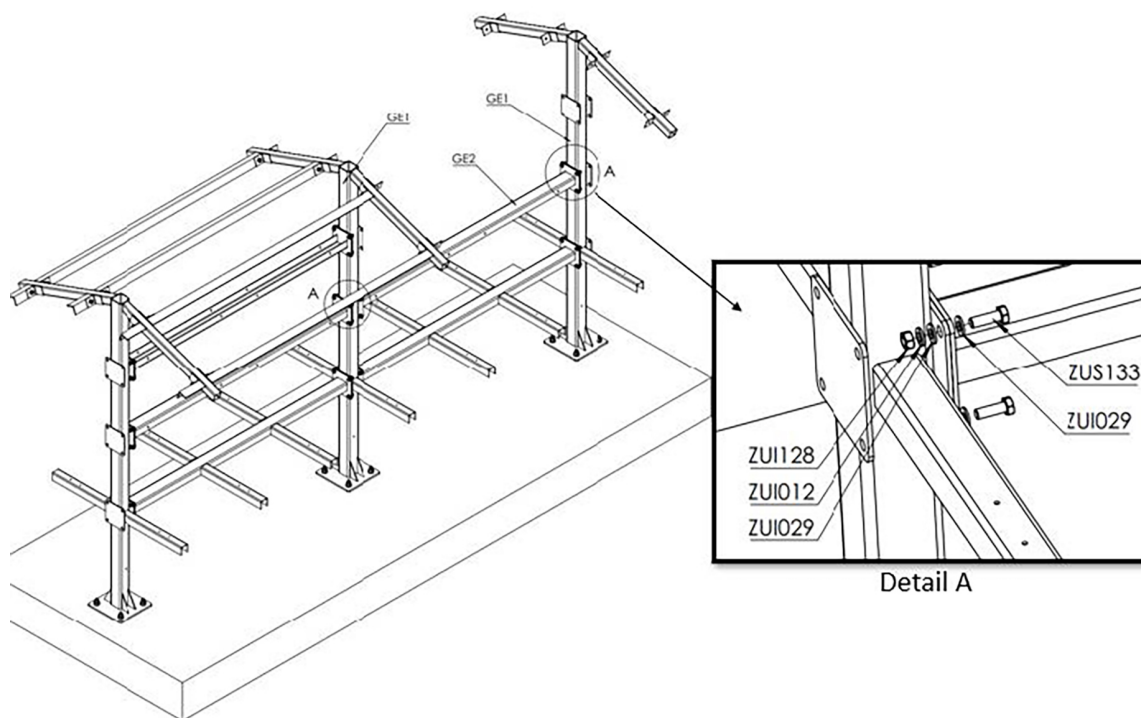


Figure 12. Assembly — Inverter rack — GE2-3, GE1 (detailed view)

Step 10:

You need:

Description	Amount	Item no.
Spring washer D10.2	8	ZUI012
Disc washer D10.5	16	ZUI029
Hexagon nut M10	8	ZUS128
Hexagon head bolt, fully threaded M10 x 30	8	ZUS133
Hexagon head bolt, fully threaded M10 x 25	8	ZUS088
Steel frame 02	1	GE2 (ZUI997)

- Bolt the frame element GE2 to the frame element GE1.
- To do this, use the components in "Detail A" of [Figure GE2-4, GE1](#).
- **Caution:** Attach the frame element GE2 so that the U-profile is positioned with the opening facing up.
- Observe the permissible torque: 50 Nm.

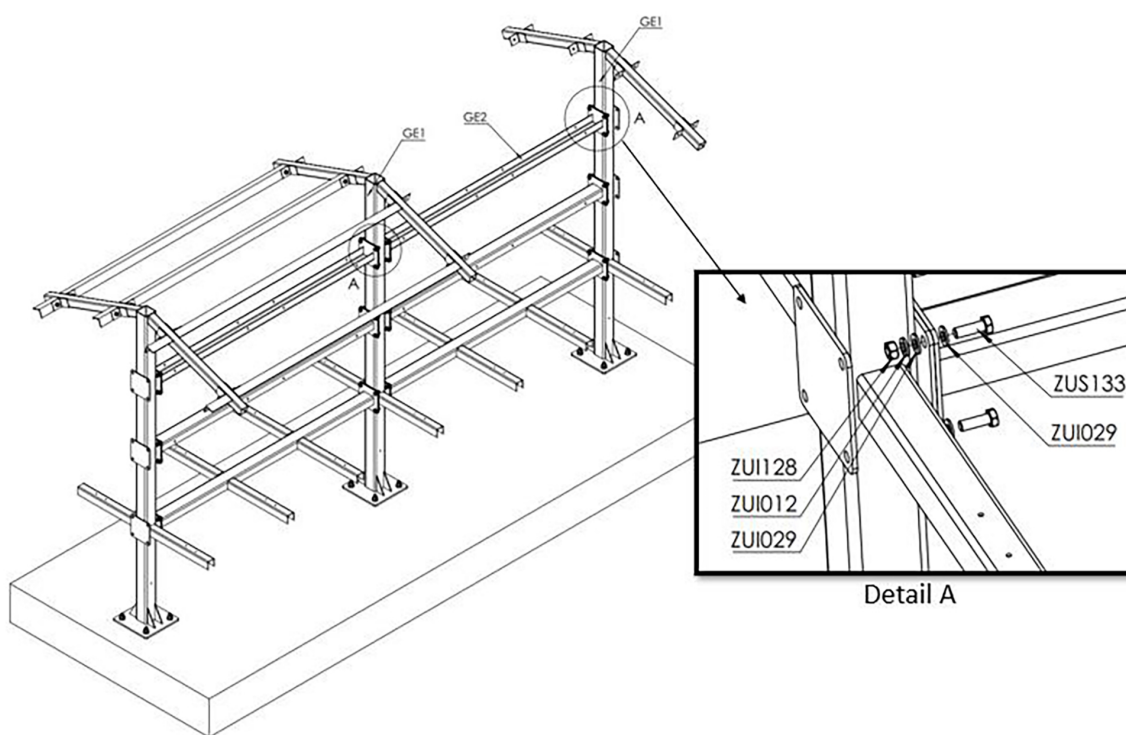


Figure 13. Assembly — Inverter rack — GE2-4, GE1 (detailed view)

3.4. Assembly of the inverter rack

Step 11:

You need:

Description	Amount	Item no.
Spring washer D10.2	4	ZUI012
Disc washer D10.5	8	ZUI029
Hexagon nut M10	4	ZUS128
Hexagon head bolt, fully threaded M10 x 25	4	ZUS088
Cover 01	4	DE1 (ZUI997)

- Bolt the roof elements DE1 to the frame element GE1.
- Use the components in "Detail A" of [Figure DE1-2, GE1](#).
- Observe the permissible torque: 50 Nm.

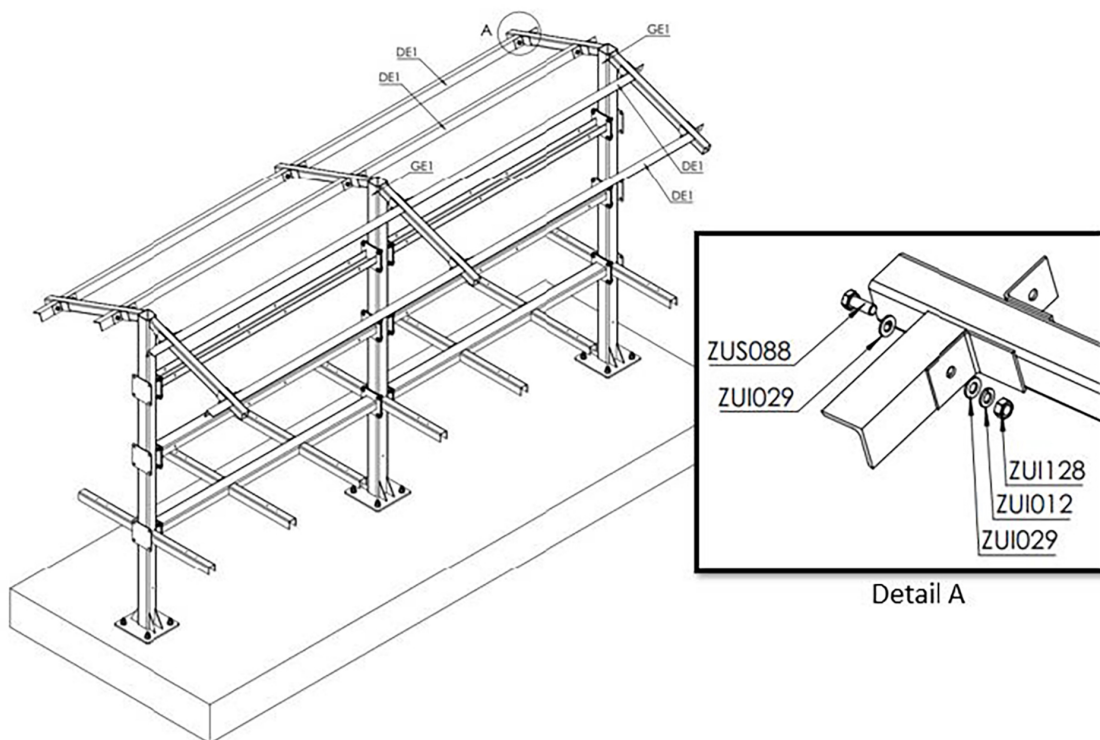


Figure 14. Assembly — Inverter rack — DE1-2, GE1 (detailed view)

Step 12:

You need:

Description	Amount	Item no.
Spring washer D10.2	4	ZUI012
Disc washer D10.5	8	ZUI029
Hexagon nut M10	4	ZUS128
Hexagon head bolt, fully threaded M10 x 25	4	ZUS088

- Bolt the roof elements DE1 to the frame element GE1.
- Use the components in "Detail A" of [Figure DE1-3, GE1](#).
- Observe the permissible torque: 50 Nm.

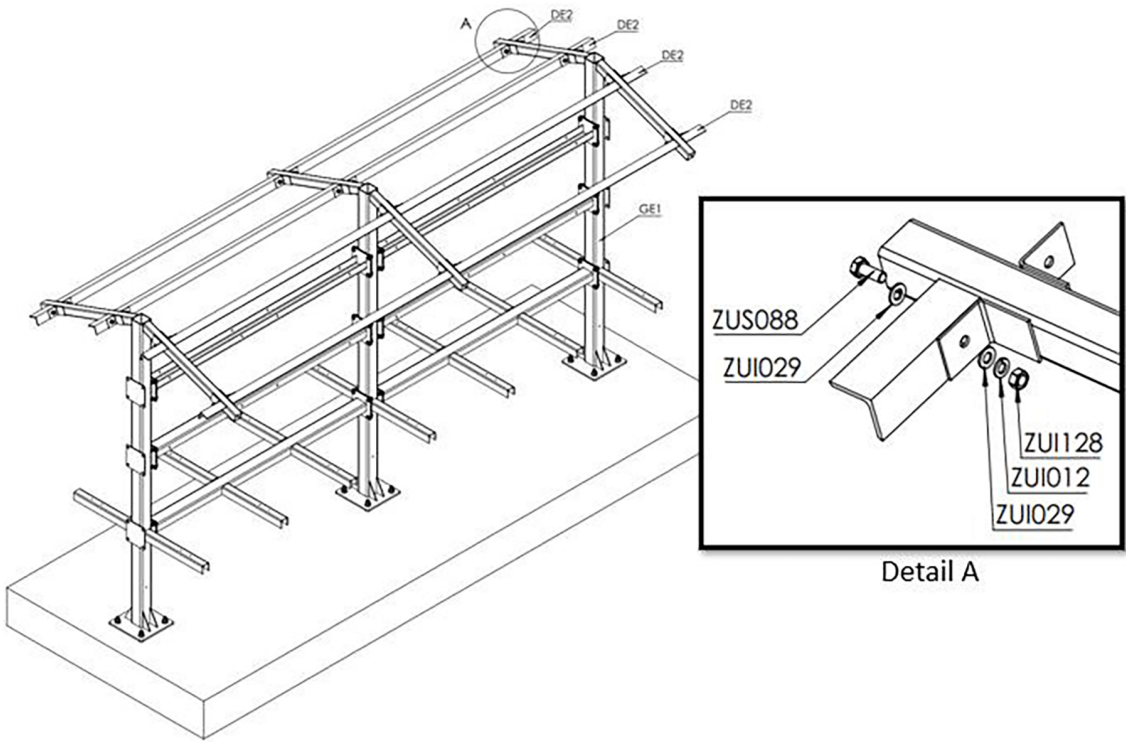


Figure 15. Assembly — Inverter rack — DE1-3, GE1 (detailed view)

3.4. Assembly of the inverter rack

Step 13:

You need:

Description	Amount	Item no.
EJOT self-drilling screw JT6-6-5.5	10	ZUS792
Sheet metal roof 01	2	DB1 (ZUI997)

- Bolt the metal roof sheets DB1 to the steel structure.
- Please only fasten the bottom row tightly.

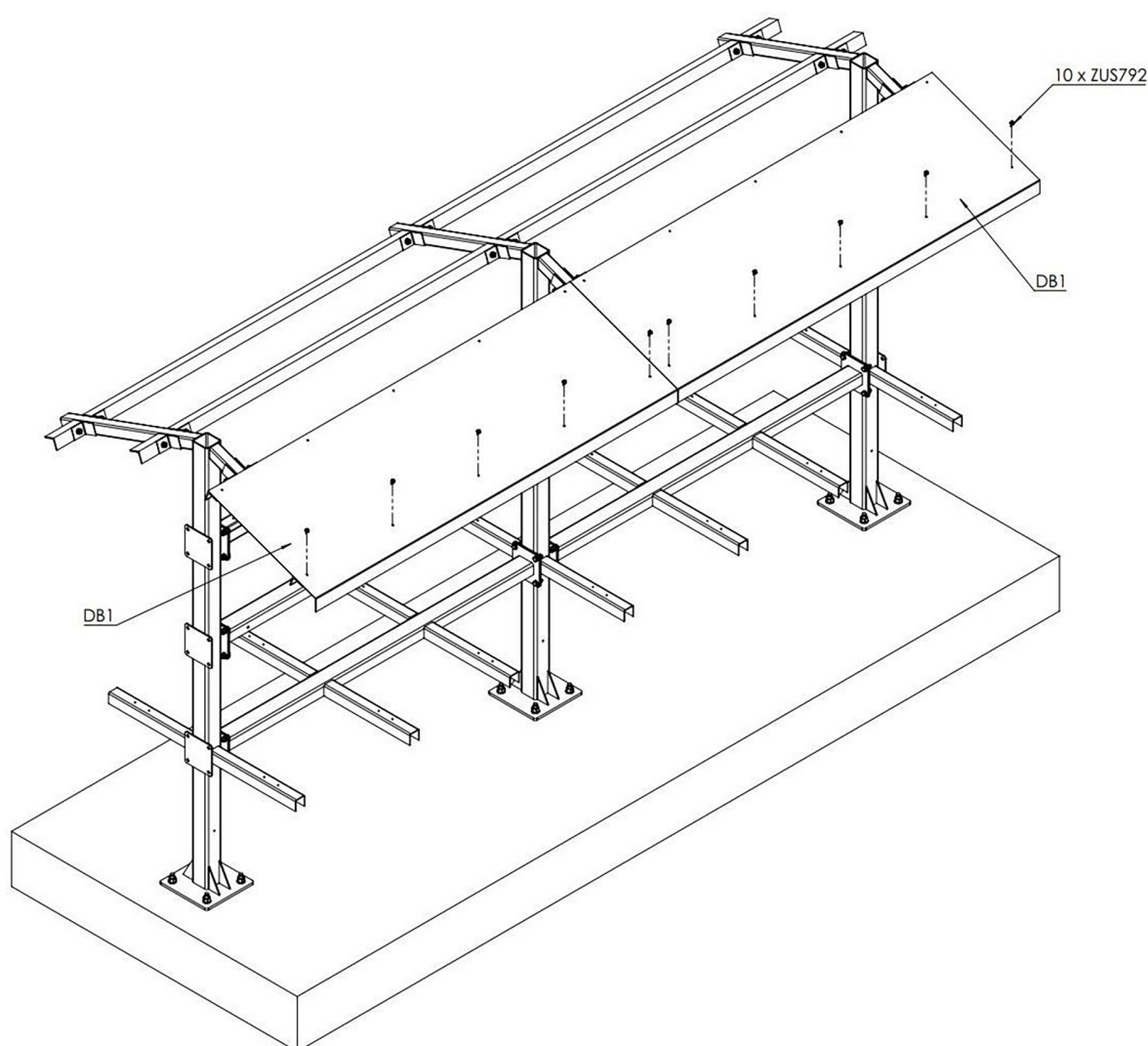


Figure 16. Assembly — Inverter rack — Sheet metal roof DB1

Step 14:

You need:

Description	Amount	Item no.
EJOT self-drilling screw JT6-6-5.5	30	ZUS792
Sheet metal roof 02	2	DB2 (ZUI997)

- Bolt the sheet metal roof pieces DB2 to the steel structure.
- We recommend sealing the overlaps and seams with transparent silicone on site.

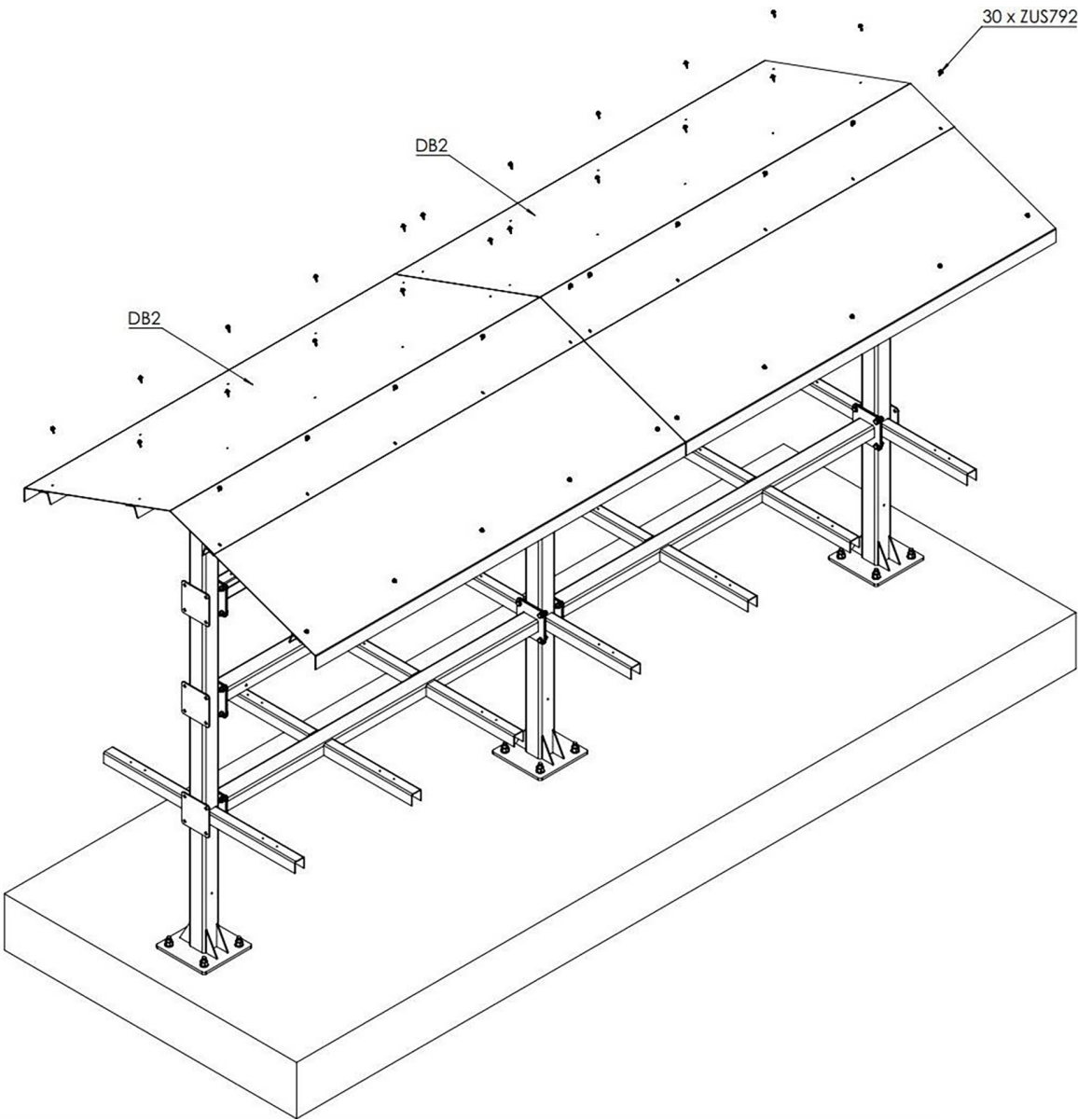


Figure 17. Assembly — Inverter rack — Sheet metal roofs DB2

3.5. Assembly of the inverters

3.5. Assembly of the inverters

You need:

Description	Amount	Item no.
Spring washer D8.1	4	ZUS056
Disc washer D8.4	8	ZUS162
Hexagon nut M8	4	ZUI006
Hexagon head bolt, fully threaded M8 x 22	4	ZUS789

Please note:

The mounting plate is included in the scope of delivery of the inverter. Please refer to the complete delivery for the supplied inverters and mounting plates.

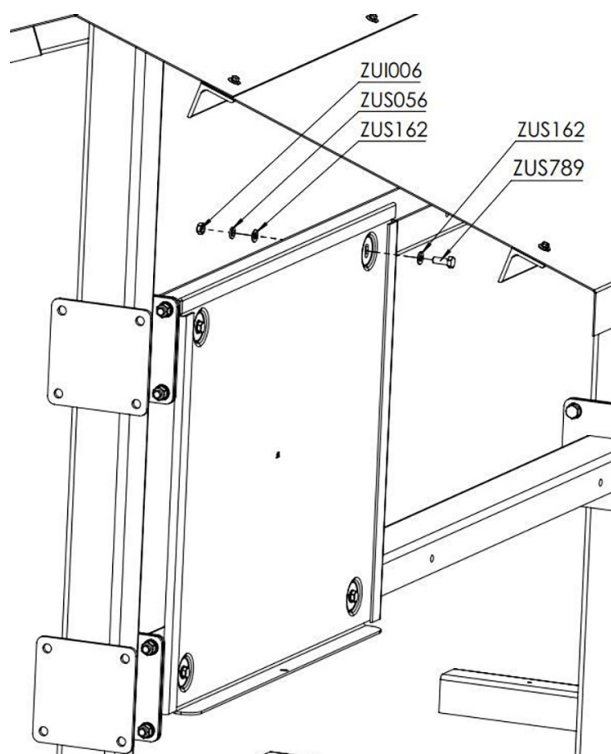


Figure 18. Mounting plate — KACO

- Install the mounting plates as shown in the illustration in this table.
- Now mount the inverters as described in the illustration [Assembly — Cable channels](#).

For the further installation steps of the inverters, please refer to the description in the manufacturer's manual under the following link (from page 16):

<https://kaco-newenergy.com/index.php?eID=dumpFile&t=f&f=17863&token=cf414aa716dbfb91399d35c505ac6dd613f6e9e3>

3.6. Assembly of the cable ducts

You need:

Description	Amount	Item no.
Bolt, flattened, hexagon socket M6 x 10	28	ZUS302
Cable duct 200 x 50	4	KAI057

- Fasten the 4 cable channels as shown in [Assembly — Cable channels](#).
- Use the bolts with the item no. ZUS302 for fastening.

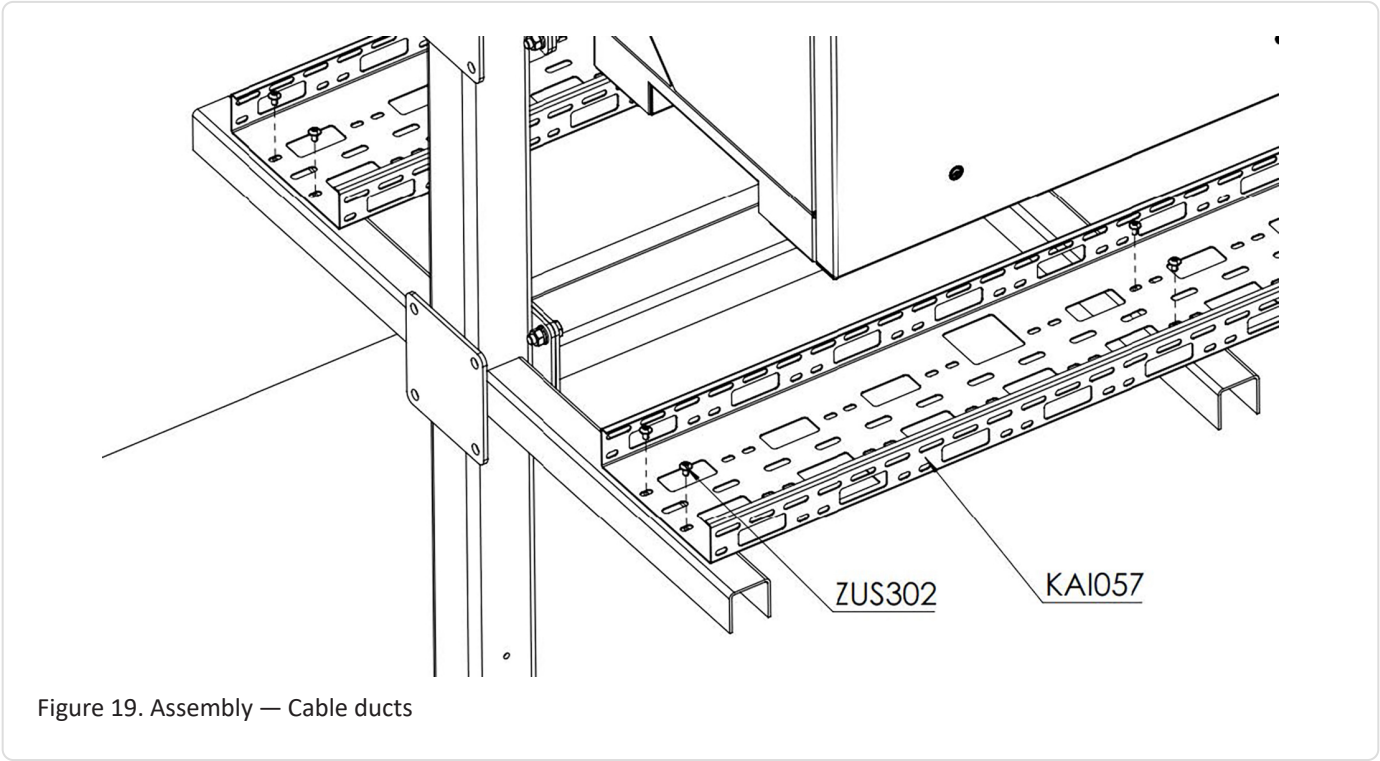


Figure 19. Assembly — Cable ducts

3.7. Assembly of the earth circuit connector

3.7. Assembly of the earth circuit connector

You need:

Description	Amount	Item no.
Earth circuit connector	1	ZUS787
T-shaped connector 01	2	PE1 (ZUI997)
T-shaped connector 02	2	PE2 (ZUI997)
Disc washer D10.5	8	ZUI029
Hexagon nut M10	4	ZUS128
Cylinder head bolt with hexagon socket M10 x 80	4	ZUS790
Hexagon head bolt, fully threaded M10 x 18	2	ZUS788

- Mount the earth circuit connector to the bracket as shown in the illustration [Earth circuit connector](#).
- ° Observe the permissible torque: 20 Nm.

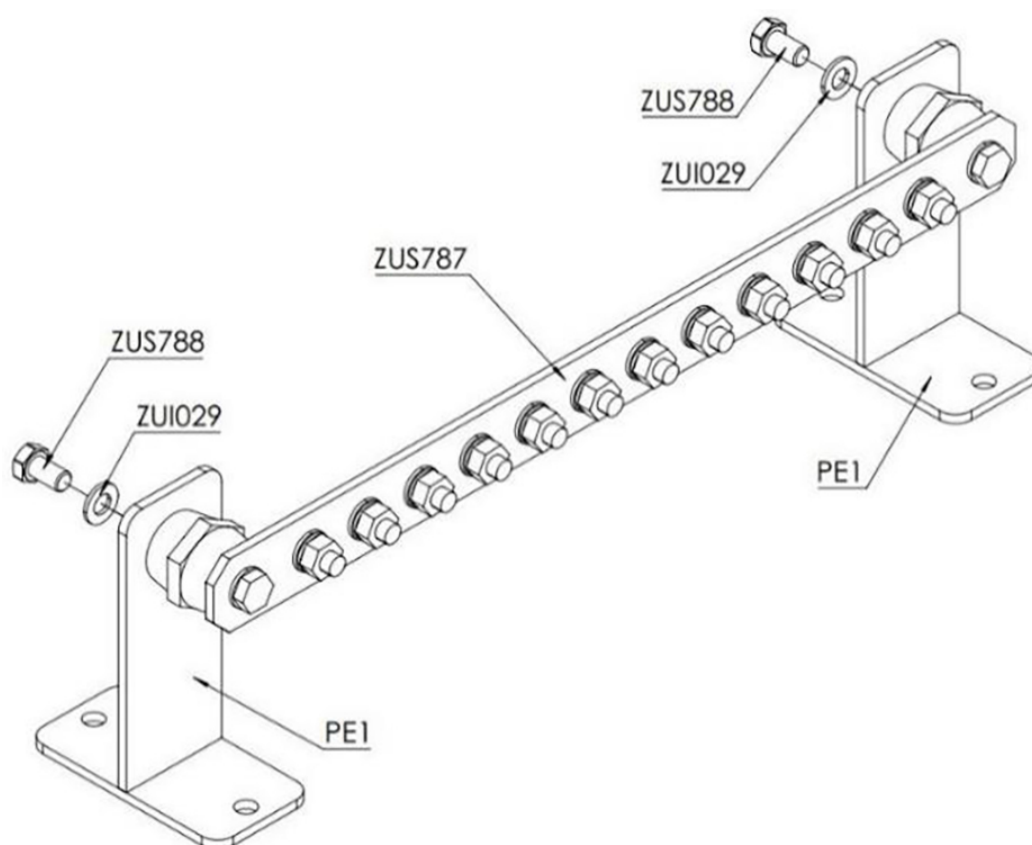


Figure 20. Earth circuit connector

- Bolt the earth circuit connector with the bracket to the inverter rack as shown in the illustration [Earth circuit connector — assembly](#).
 - Observe the permissible torque: 40 Nm.

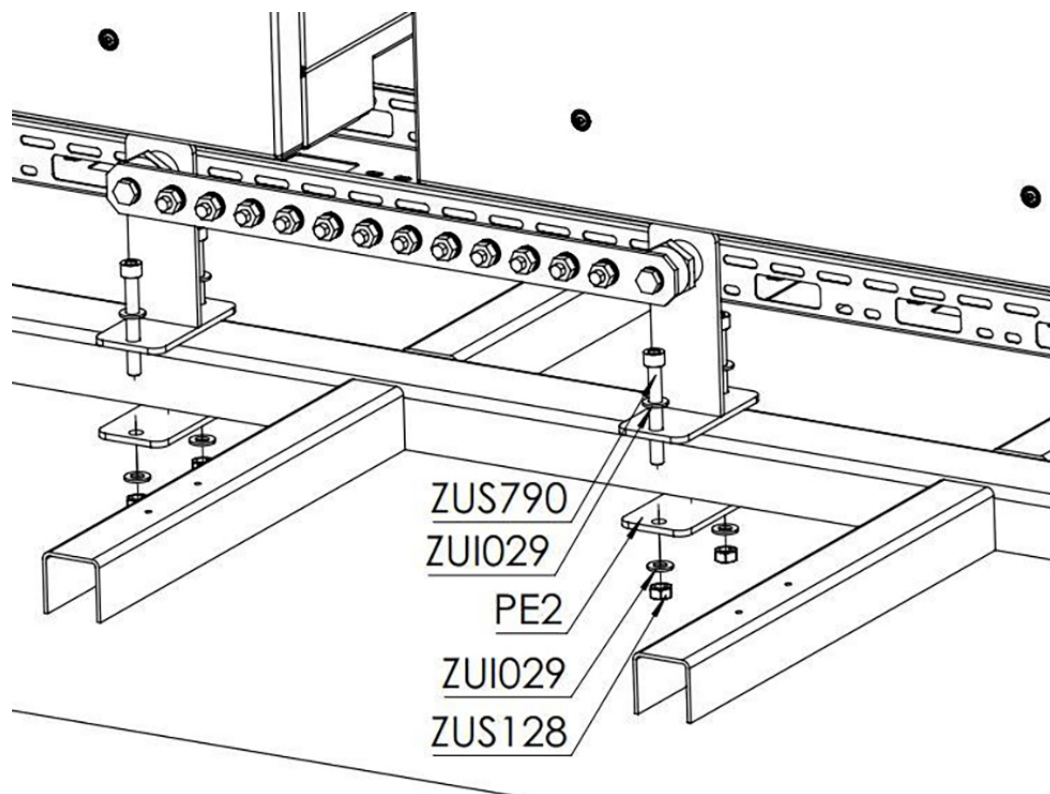


Figure 21. Assembly — Earth circuit connector

3.8. List of images

3.8. List of images

Figure 1. Inverter rack — General view

Figure 2. Drilling pattern

Figure 3. Bolt anchor — Instructions

Figure 4. Assembly — Inverter rack — GE1

Figure 5. Assembly — Inverter rack — GE3, GE1 Detailed view

Figure 6. Assembly — Inverter rack — GE2, GE1 (detailed view)

Figure 7. Assembly — Inverter rack — GE2-2, GE1 (detailed view)

Figure 8. Assembly — Inverter rack — DE2-DE3, GE1 (detailed view)

Figure 9. Assembly — Inverter rack — DE1, GE1 (detailed view)

Figure 10. Assembly — Inverter rack — Third GE1 (detailed view)

Figure 11. Assembly — Inverter rack — GE3-2, GE1 (detailed view)

Figure 12. Assembly — Inverter rack — GE2-3, GE1 (detailed view)

Figure 13. Assembly — Inverter rack — GE2-4, GE1 (detailed view)

Figure 14. Assembly — Inverter rack — DE1-2, GE1 (detailed view)

Figure 15. Assembly — Inverter rack — DE1-3, GE1 (detailed view)

Figure 16. Assembly — Inverter rack — Sheet metal roof DB1

Figure 17. Assembly — Inverter rack — Sheet metal roofs DB2

Figure 18. Mounting plate — KACO

Figure 19. Assembly — Cable ducts

Figure 20. Earth circuit connector

Figure 21. Assembly — Earth circuit connector

3.8.1. Notes

3.8. List of images

3.8.2. Notes 2

3.8.3. Notes 3