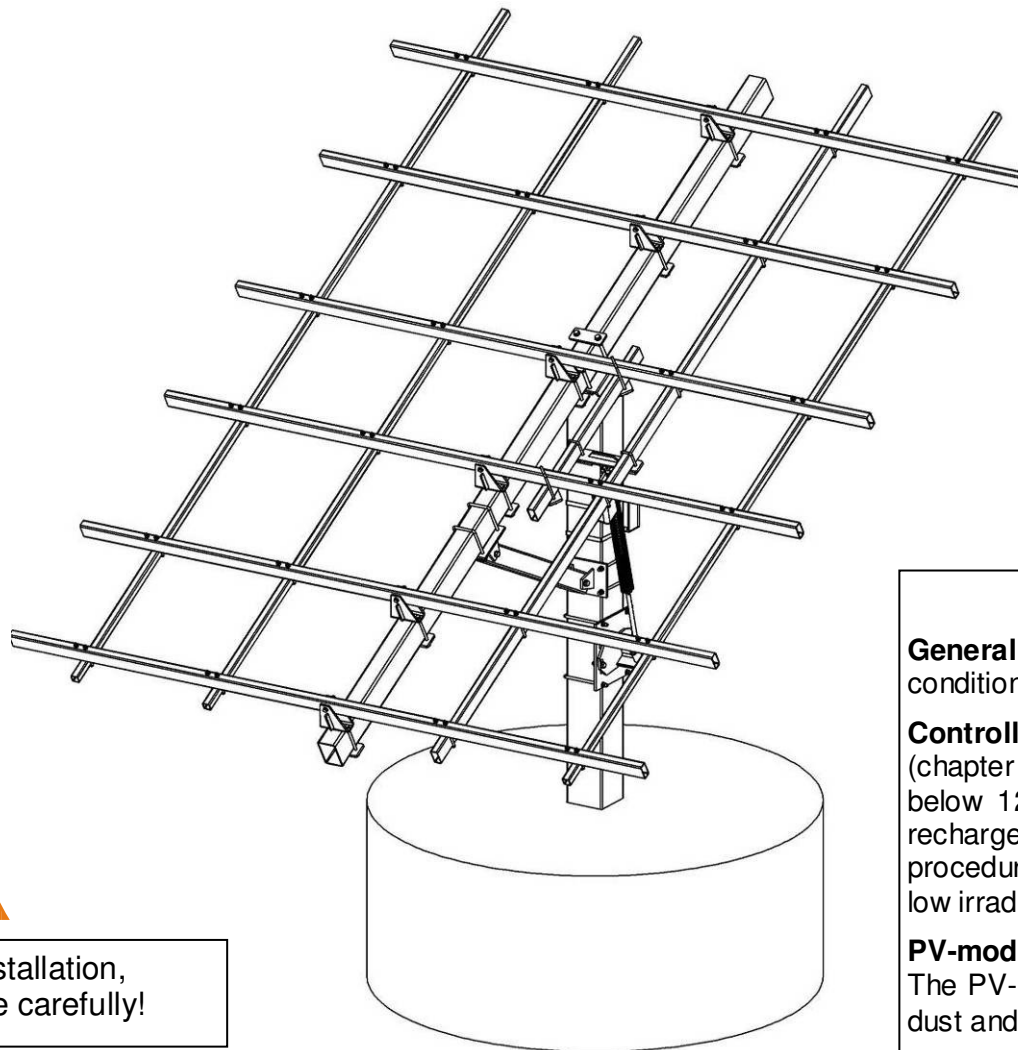


Installation guide

ETATRACK active 1500-A



Before starting the installation,
please read this guide carefully!

Critical Items

General: Pay attention to the overall operating conditions in section 2.1 and section 7.0

Controller: Check for right jumper settings (chapter 7.1)! Check the battery voltage is not below 12.6V, if it is then the battery has to be recharged! Read section 7.0 and understand the procedure for operating the tracker in a period of low irradiation (winter / clouds).

PV-module for charging the controller battery: The PV-module should be always kept free from dust and snow (chapter 7.2)!

All dimensions without units are in mm

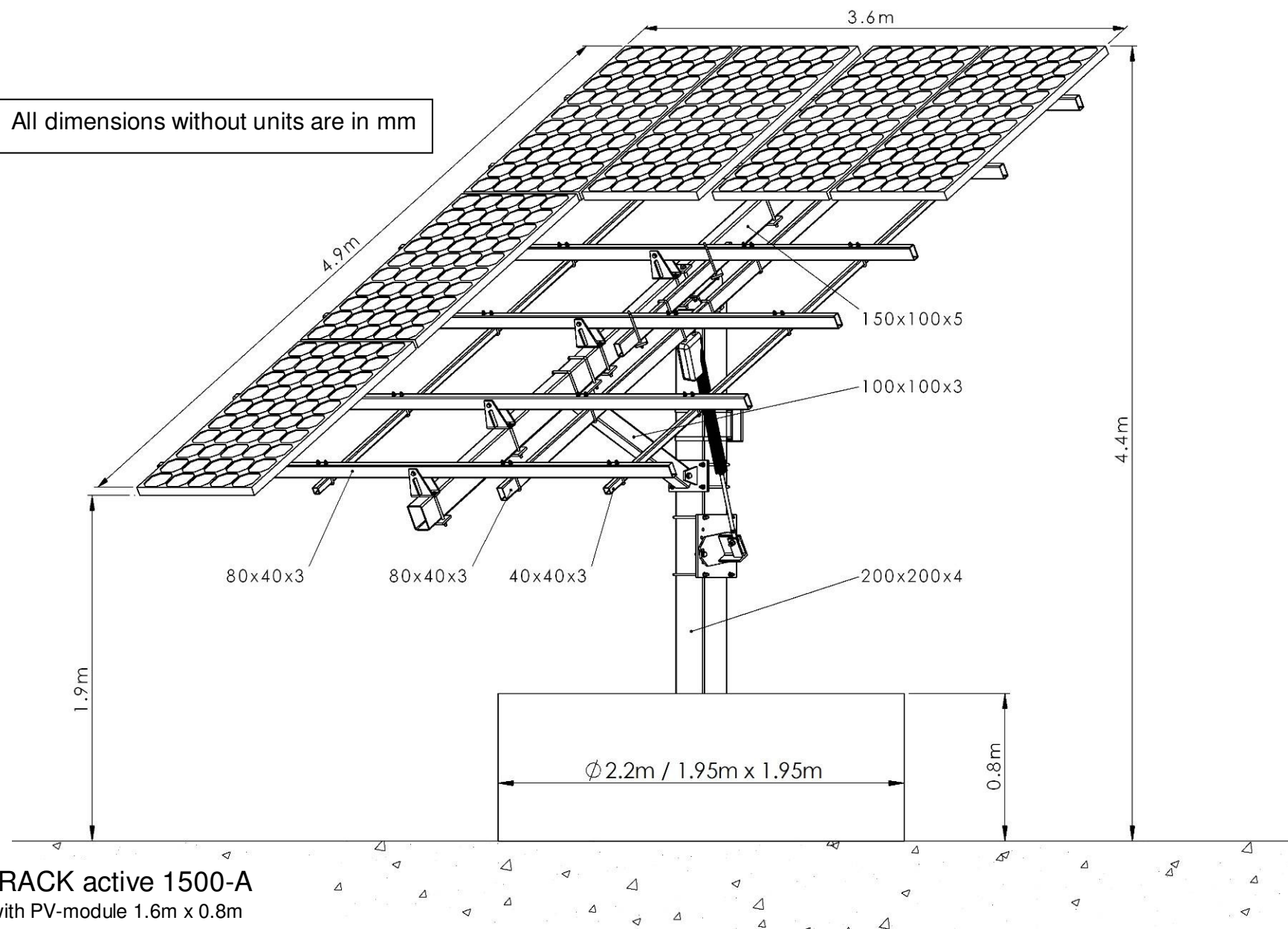


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1. Scope of delivery

The assembly kit consists of:

- 1 pc. mounting pole (200x200x4, length 2.75m)
- 1 pc. cross beam (100x100x3, length 1.0m)
- 3 pcs. rail connector (40x40x3, length 4.5m)
- 1 pc short motor connector (80x40x3, length 1.1m)
- 1 pc. controller, packed in a carton box
- 48 sets PV-module clips incl. M6 screw, packed in a carton box

All dimensions without unit in mm

- 1 pc. beam (150x100x5, length 4.5m)
- 6 pcs. rail (80x40x3, length 3.6m)
- 1 pc. motor rail connector (80x40x3, length 4.5m)
- 1 pc. motor LA36
- 1 set of fixing parts, packed in 3 carton boxes, details below

Box 1 of 3	
370 x 350 x 200	27kg
Parts	Quantity
down motor fixing, part 1	1
down motor fixing, part 2	1
down cross beam fixing	1
upper motor fixation	1

Box 2 of 3	
480 x 260 x 210	32kg
Parts	Quantity
hinge for rail	6
hinge for beam	1
upper cross beam fixing	1

Box 3 of 3	
430 x 270 x 230	29kg
Parts	Quantity
installation guide	1
screw M12x90 with 2 washers and self lock nut	6
screw M12x200 with 2 washers, spring washer and nut	12
screw M16x60 with 2 washers, spring washer and nut	2
screw M16x75 with 2 washers, self lock nut, 2 cable ties and pin	2
screw M16x160 with 2 washers, spring washer and nut	2
screw M16x210 with 2 washers, spring washer and nut	4
screw M20x260 with 2 washers and self lock nut	1
U-bolt M10x115 with 2 washers, 2 spring washers and 2 nuts	2
U-bolt M10x140 with 2 washers, 2 spring washers and 2 nuts	18
U-bolt M10x180 with 2 washers, 2 spring washers and 2 nuts	6
U-bolt M10x195 with 2 washers, 2 spring washers and 2 nuts	2
U-bolt M12x184 with 2 washers, 2 spring washers and 2 nuts	2
U-bolt M12x234 with 2 washers, 2 spring washers and 2 nuts	4
grounding cable, 2 cable ties, nut M10, nut M12 and toothed washer D10/D12	1
controller fixing with 2 screws, 2 washers, 2 spring washers and 2 nuts	2
bushing MFM 1216-20 with thin washer D16	12
clamping plate hinge for beam	2
clamping plate hinge for rail	6
clamping plate upper motor fixing	2

2. General references

This installation instruction contains important information which should be read and understood before installation and start-up. For safe and reliable operation the whole of this guide should be considered essential reading as safety and operational information is provided in all sections, not only in the "safety references" section. Both the installer and person responsible for the on-going operation should read and understand this guide. This guide should always be available at the installation site. This installation guide refers to the tracking system ETATRACK active 1500-A.

2.1 Ambient and operating conditions

- Installation Location: The tracker must be installed at ground level. The tracker must not be installed in areas where people are present due to moving parts
- Operating temperature: The tracker should only be operated in a temperature range of -25°C to +50°C. For temperatures below -25°C see chapter 7 (other operation temperatures on request)
- Humidity and air salinity: Trackers must not be stored or operated where the average day humidity is above 80%. Trackers should not be stored or operated within 1km of coastal regions or in saline air (more than 2 µg/m³) (inshore application on request)
- Altitude: Trackers must not be installed at altitudes below -400m or above + 3000m m.s.l. (other altitudes on request)
- Permanent operation: With a battery voltage of over 12.6V the tracker can operate a maximum of three reference movements (East–West or West-East) or 50 tracking steps per hour.


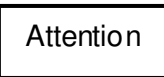

The total module area of the PV-modules, including the distances between the PV-modules must not exceed 16.8m². The maximum width of the PV-modules must not exceed 3.6m and the length must not exceed 5.5m with the combined maximum surface area of 16.8m². PV modules certified to IEC 61215 or UL 1703 must be installed vertically. If the PV-modules are not certified to IEC 61215, UL 1703 then care should be taken to assess the suitability for mounting onto the substructure of the ETATRACK active 1500-A.

The customer must consider the local weather conditions and the suitability of the tracker to operate in these conditions. The tracker structure is design to perform with a maximum wind speed of 150km/h when in the south position, 127km/h in east/west position, for a tilt of 30°. Snow loads will reduce the maximum wind speed that the tracker can endure. The structural design calculations are made in accordance with EN 1991 (Eurocode 1). The tracker must not be installed if local conditions exceed these limits. All warranty claims against LORENTZ are invalidated if the tracker is installed in inappropriate conditions.

2.2 Safety references

Please read this entire installation guide as safety references are included throughout.

Reference markings

 <p>Safety references marked with this symbol can cause damage to people or equipment.</p>	 <p>Safety references marked with this symbol can cause damage to equipment.</p>	 <p>Advice and information to assist with installation and on-going operation.</p>
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Training and qualification of the personnel

All personnel involved in installation, operation and maintenance of the tracker must be appropriately qualified and experienced to undertake the work.

Safe working

All local safety standards, health and safety assessments and good general working practices must be considered before work begin to prevent accidents.

Consequences

If safety information and advice is not followed then there is a risk of personal injury, equipment damage and loss of ability to make warranty claims.

Electrical safety

Electronic and electrical systems should only be worked on by qualified and experienced persons who have been trained and hold the necessary permits, certificates and approvals to meet local codes, requirements and laws. Untrained and unqualified persons could cause damage to the equipment and increase the risk of injury. Local rules, codes, requirements and laws must be met (for example the regulations of Verband der Elektronik = VDE, Germany).

Safety references for installation and maintenance

Before starting work on the tracking systems please make sure that the electricity supply has been switched off. Please follow the instructions on how to disconnect the battery in this guide.

Inappropriate treatment

The safety of tracking systems can only be guaranteed when they are installed and operated within the guidelines and limits listed in the technical specifications

Before installation of solar modules

Refer to the instruction manuals provided with solar modules and inverters for details about electrical and mechanical installation requirements.

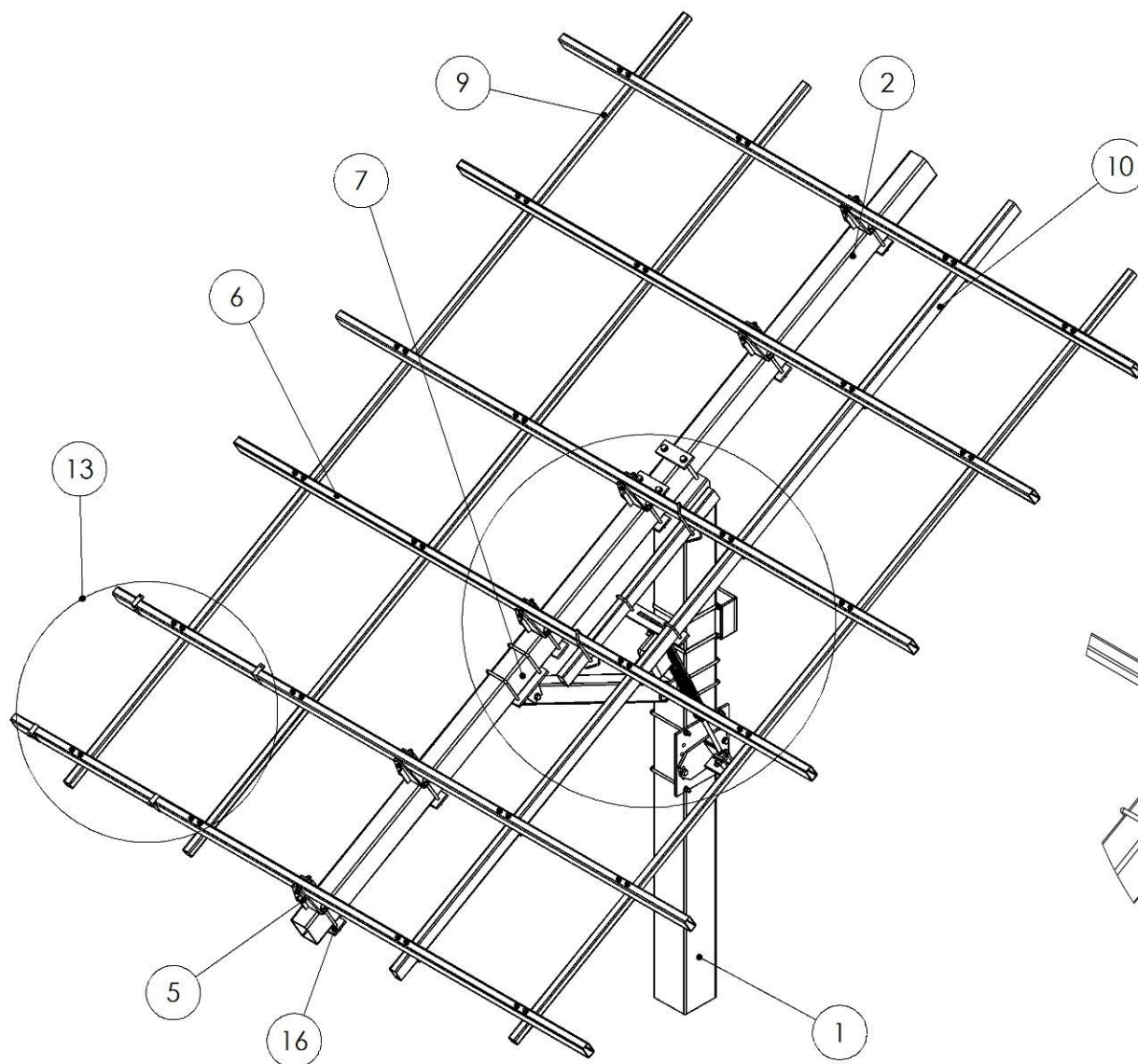
Delivery and installation

The ETATRACK active series tracking systems are supplied complete from the factory. Parts of the tracking system are very heavy so care must be taken during handling, unpacking and installation.

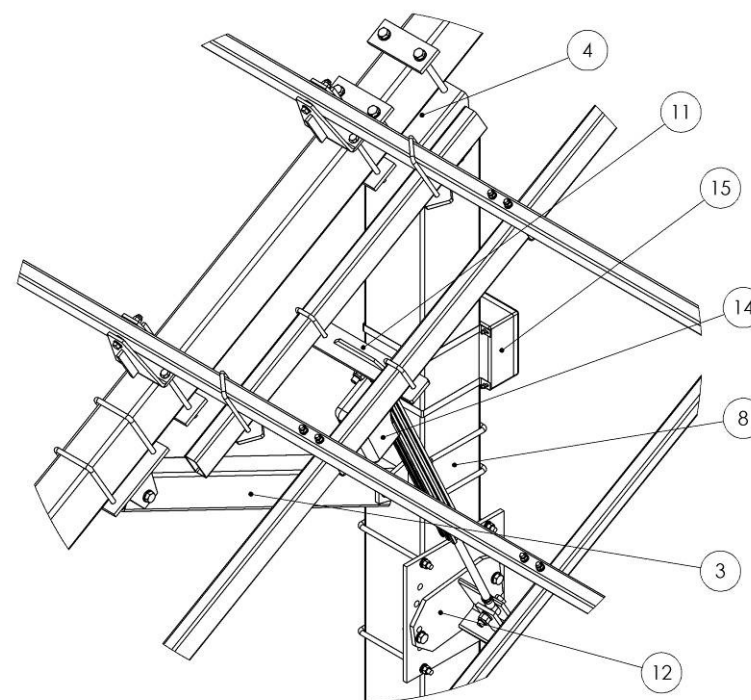


Appropriate safety equipment including safety gloves and safety shoes must be worn at all times

3. Parts list



Overview for parts list
(numbers in circles refer to assembly groups on the next pages)

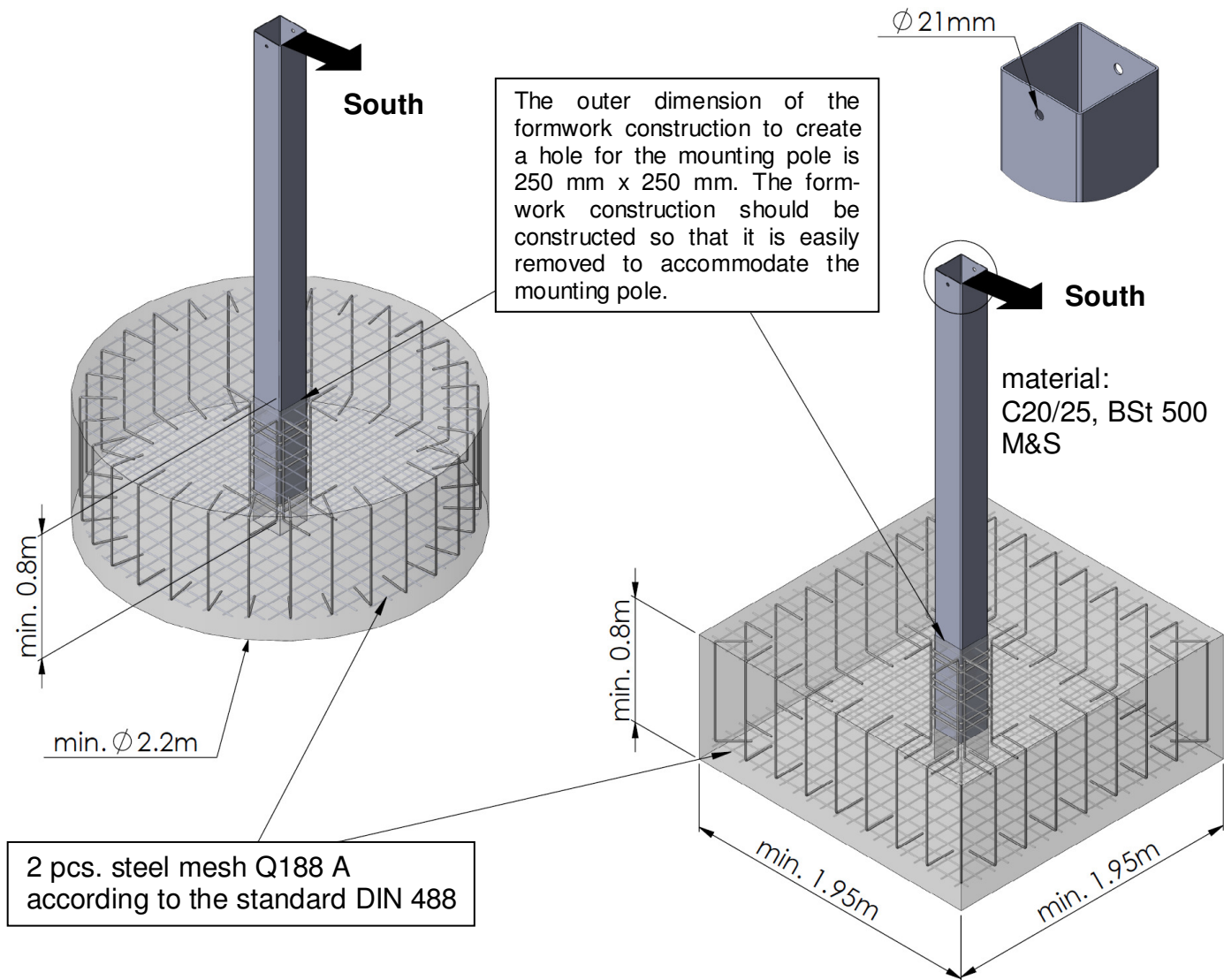


Assembly group	Pos.	Quantity	Part name	Specification	Weight [kg]	Box No.
1	mounting pole					
	1.1	1	mounting pole	tube 200x200x4, 2750 long	90	
2	beam					
	2.1	1	beam	tube 150x100x5, 4500 long	110	
3	cross beam					
	3.1	1	cross beam	tube 100x100x3, 1000 long	12	
	3.2	2	screw	M16x160, 8.8		3
	3.3	4	washer	D16		3
	3.4	4	spring washer	D16		3
	3.5	2	nut	M16, 8		3
4	hinge for beam					
	4.1	1	hinge for beam	welded part	9	1
	4.2	2	clamping plate hinge for beam	flat steel 70x12, 170 long	1,2	2
	4.3	4	screw	M16x210, 8.8		3
	4.4	8	washer	D16		3
	4.5	4	spring washer	D16		3
	4.6	4	nut	M16		3
	4.7	1	screw	M20x260, 8.8		3
	4.8	2	washer	D20		3
	4.9	1	self lock nut	M20, 8		3
5	hinge for rail					
	5.1	6	hinge for rail	bended flat steel	2	2
	5.2	6	clamping plate hinge for rail	flat steel 70x12, 170 long	1,2	2
	5.3	12	screw	M12x200, 8.8		3
	5.4	24	washer	D12		3
	5.5	12	spring washer	D12		3
	5.6	12	nut	M12, 8		3
6	rail					
	6.1	6	rail	tube 80x40x3, 3600 long		
	6.2	6	screw	M12x90, 8.8		3
	6.3	12	washer	D12		
	6.4	12	bushing	IGUS MFM1216-20		3
	6.5	12	flat washer	D16, 2,2mm thin		3
	6.6	6	self lock nut	M12, 8		3
7	upper cross beam fixing					
	7.1	1	upper cross beam fixing	welded part	4,3	1
	7.2	2	U-bolt	M12x184		3
	7.3	4	washer	D12		3
	7.4	4	spring washer	D12		3
	7.5	4	nut	M12, 8		3

Assembly group	Pos.	Quantity	Part name	Specification	Weight [kg]	Box No.
8	down cross beam fixing					
	8.1	1	down cross beam fixing	welded part	5,4	1
	8.2	2	U-bolt	M12x234		3
	8.3	4	washer	D12		3
	8.4	4	spring washer	D12		3
	8.5	4	nut	M12, 8		3
9	rail connector					
	9.1	3	rail connector	tube 40x40x3, 4500 long	20	
	9.2	18	U-bolt	M10x140		3
	9.3	36	big flat washer	D10, 3xD		3
	9.4	36	spring washer	D10		3
	9.5	36	nut	M10, 8		3
10	motor rail connector					
	10.1	1	motor rail connector	tube 80x40x3, 4500 long		
	10.2	6	U-bolt	M10x180		3
	10.3	12	big flat washer	D10, 3xD		3
	10.4	12	spring washer	D10		3
	10.5	12	nut	M10, 8		3
11	upper motor fixing					
	11.1	1	short motor connector	tube 80x40x3, 1100 long		
	11.2	2	U-bolt	M10x195		3
	11.3	2	clamping plate upper motor fixing	flat steel 70x12, 120 long		1
	11.4	4	washer	D10		3
	11.5	4	spring washer	D10		3
	11.6	4	nut	M10, 8		3
	11.7	1	upper motor fixing	welded part		2
	11.8	2	U-bolt	M10x115		3
	11.9	4	washer	D10		3
	11.10	4	spring washer	D10		3
	11.11	4	nut	M10, 8		3
12	down motor fixing					
	12.1	1	down motor fixing, part 1	welded part		1
	12.2	1	down motor fixing, part 2	flat steel, 340x330x12		1
	12.3	2	U-bolt	M12x234		3
	12.4	4	washer	D12		3
	12.5	4	spring washer	D12		3
	12.6	4	nut	M12, 8		3
	12.7	2	screw	M16x60, 8.8		3
	12.8	4	washer	D12		3
	12.9	2	spring washer	D12		3

Assembly group	Pos.	Quantity	Part name	Specification	Weight [kg]	Box No.
	12.10	2	nut	M12, 8		3
13	PV-module fixing					
	13.1	48	PV-module clip	stainless steel		3
	13.2	48	screw	M6x20		3
	13.3	96	washer	D6		3
	13.4	48	spring washer	D6		3
	13.5	48	nut	M6, 8		3
14	motor					
	14.1	1	motor	LA36	9	
	14.2	2	screw	M16x75, 8.8		3
	14.3	4	washer	D16		3
	14.4	2	self lock nut	M16, 8		3
	14.5	2	pin	stainless steel		3
15	controller box					
	15.1	1	controller box			
	15.2	2	controller fixing clip	stainless steel		3
	15.3	4	screw	M4x12		3
	15.4	4	washer	D4		3
	15.5	4	spring washer	D4		3
	15.6	4	nut	M4, 8		3
16	grounding cable					
	16.1	1	grounding cable	950mm		3
	16.2	1	toothed washer	D12		3
	16.3	1	nut	M12, 8		3
	16.4	1	toothed washer	D10		3
	16.5	1	nut	M10, 8		3
	16.6	2	cable tie			3

4. Foundation



Before mounting the tracking system a suitable foundation is required.



Close attention should be paid to the correct north-south orientation of the mounting pole and that the mounting pole is a minimum 0.6 m into the foundation (more details on next page)

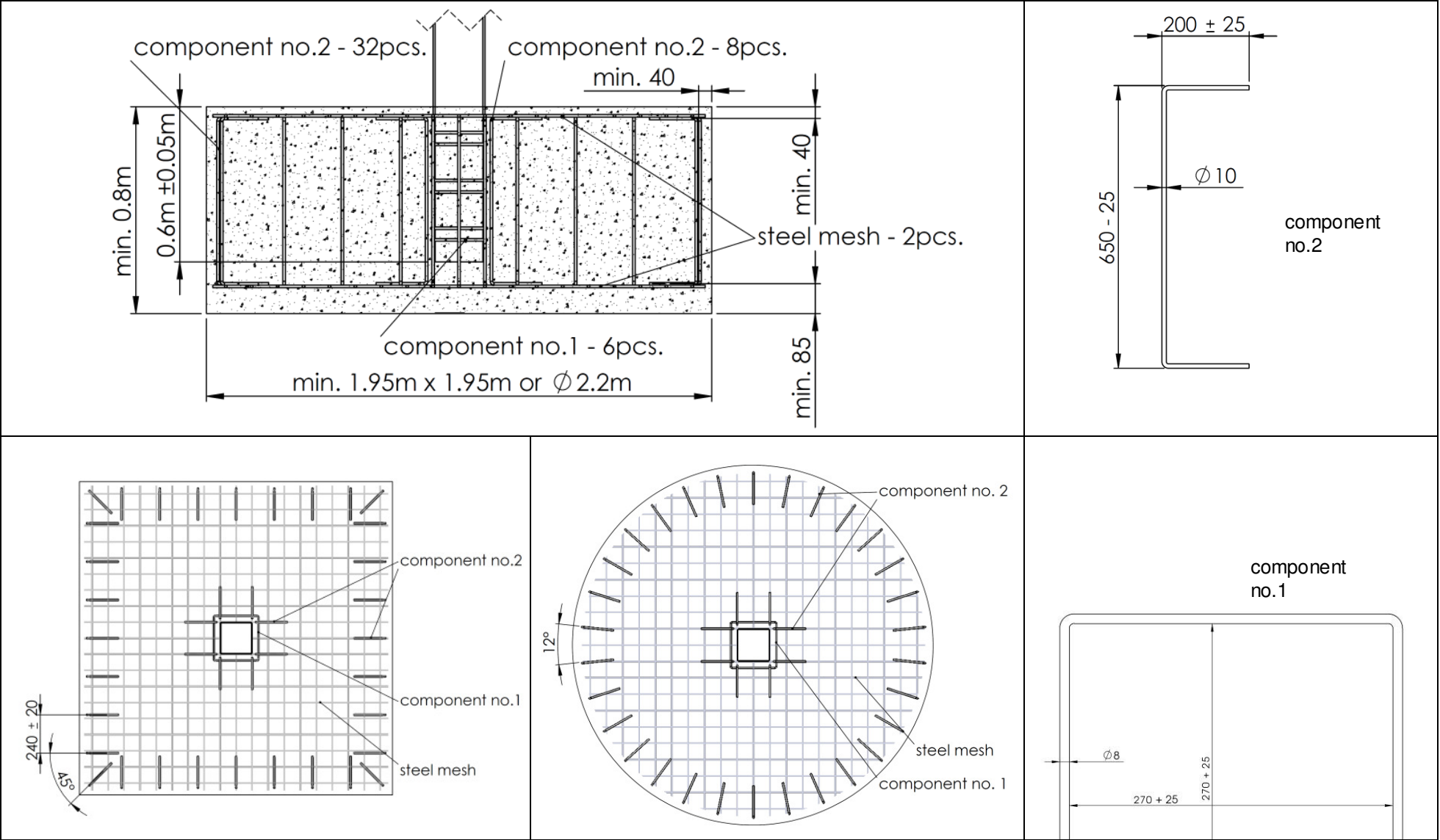
The foundation specified has been designed to meet wind load requirements for the maximum PV-module surface area. You should seek professional advice if you plan to use alternative foundation types or sizes

These drawings are examples of a suitable foundation with concrete reinforcement. Foundations must be designed to meet local standards and requirements.



Foundation parts and materials are not delivered by LORENTZ

All dimensions without units are in mm



5. Mounting

The ETATRACK active 1500-A is designed to require minimum servicing or maintenance work. For safe and reliable operation the system should be checked regularly.



We recommend that nuts, bolts and screws are checked for appropriate tightness 6 months after installation, and than every year.

All nuts, bolts and connection partners are zinc coated steel to strength class 8.8. If any parts are replaced then they should be done so with parts of the same specification.

All data provided is based on the manufacturers' specifications.

This manual is an installation guide and does not replace good engineering practice. The local installer should check and verify the installation carefully.

5.1 Required tools and equipment for assembling

- Ring or open end flat spanner, wrench size 16, 18, 24 und 30mm
- Socket nut (1/2"-drive) for wrench size 16, 18, 24 und 30mm
- Socket nut for module clamp bolts to suppliers specifications
- Ratchet spanner 1/2"
- Torque wrench 1/2" (needed torque 10-230Nm)
- Plastic hammer
- Four strong assembly tressles
- Big 90° stop bracket
- Measuring tape 5m
- Marker for steel
- Safety shoes, helmet and safety equipment for lifting and handling steel parts over head

5.2 Table of required torques

Nominal torques for bolts ETATRACK active 1500-A

<u>Screw / U-bolt / nut dimension</u>	<u>Strength class</u>	<u>Torque [Nm]</u>
M20 self lock nut	8 (Steel)	150
M16	8.8 (Steel)	230
M16 self lock nut	8 (Steel)	150
M12	8.8 (Steel)	93
M12 self lock nut	8 (Steel)	20
M10	8.8 (Steel)	54

Advice

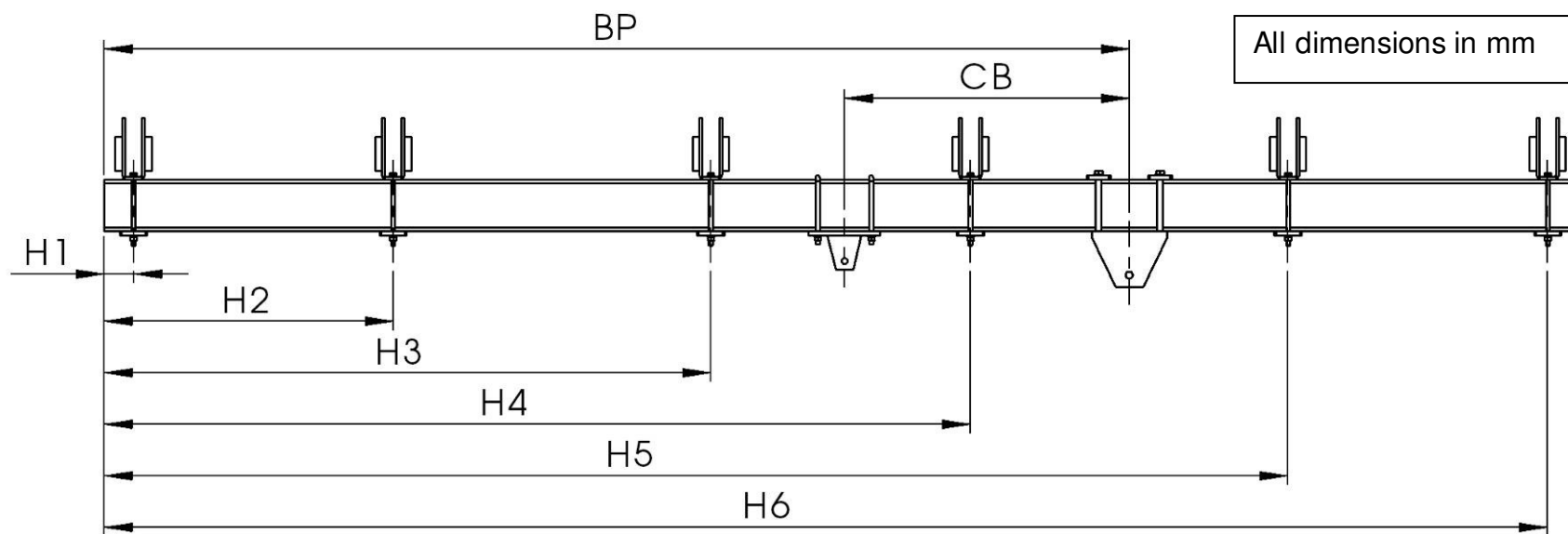
Please use a torque wrench to ensure nuts and bolts are tightened correctly

Attention

For self locking nuts nominal lower torques are given in the installation guide.

Self locking nuts must be replaced if they are ever removed. Do not reuse them.

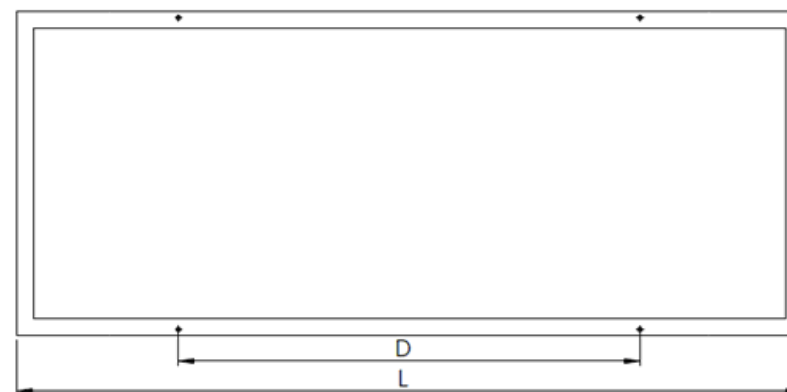
5.3 Calculation of installation dimensions



This tracker is adjustable for different sizes of PV-modules. To assemble the tracker to fit septic PV-modules some dimensions will be needed from the data table (see next pages), others have to be calculated.

Ascertain the right installation dimensions as follows:

1. find the right distance of PV-module frame holes **D** in the table
2. find the right PV-module length **L** in the table
3. take the data of BP, CB, CP, MP and MB from the table
4. calculate H1-H6 (see next page)



Advice

The distances for the rail hinges are only for pre-assembly, do not comp PV-module

L = length of PV-module

D = distance of PV-module frame holes

Before starting the installation of the tracker, please complete the entire list below.

L =

D =

BP =

CP =

CB =

MP =

MB =

Tilt =

H1 = $(4522\text{mm} - 2 \cdot L - D) / 2$ =

H2 = $H1 + D - 62\text{mm}$ =

H3 = $H2 + L - D + 82\text{mm}$ =

H4 = $H3 + D - 62\text{mm}$ =

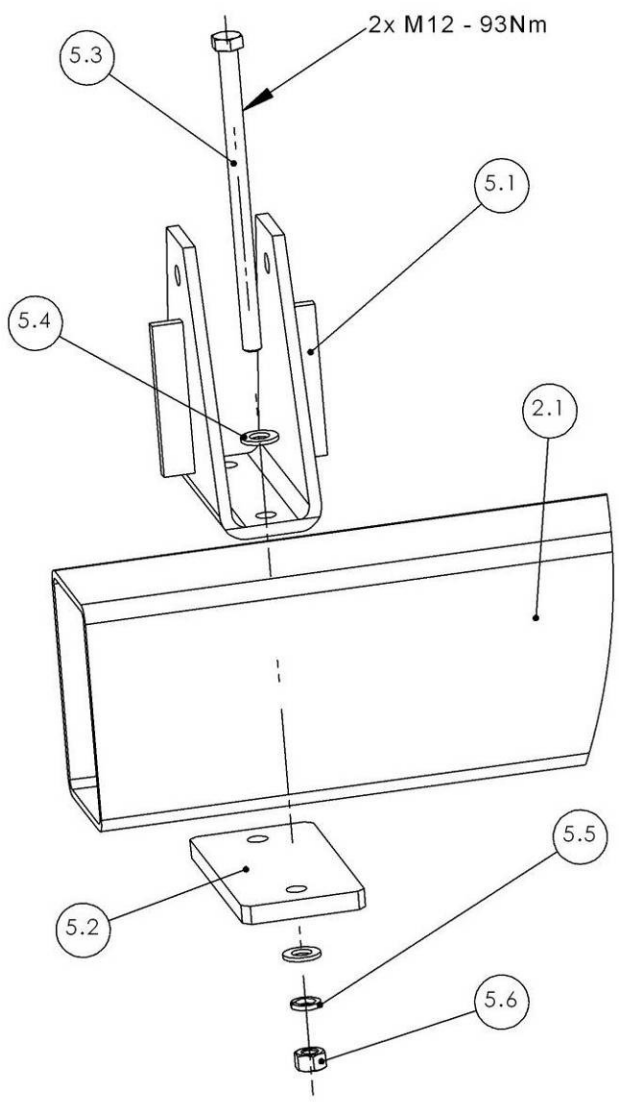
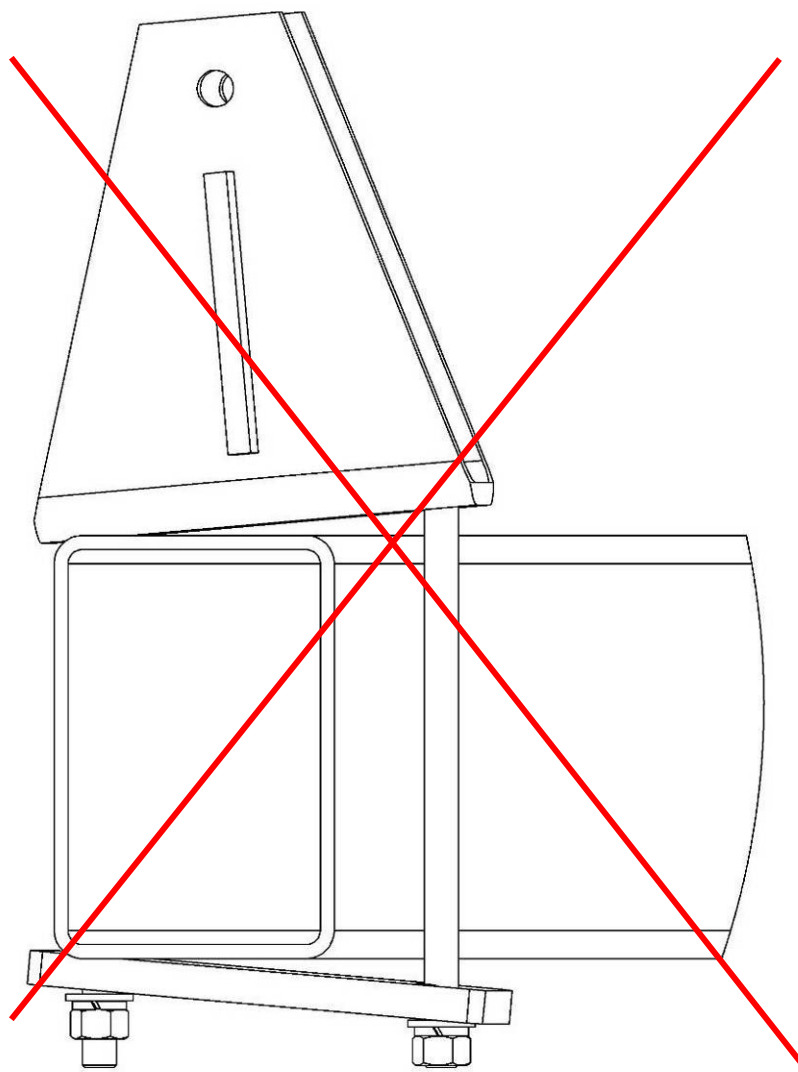
H5 = $H4 + L - D + 82\text{mm}$ =

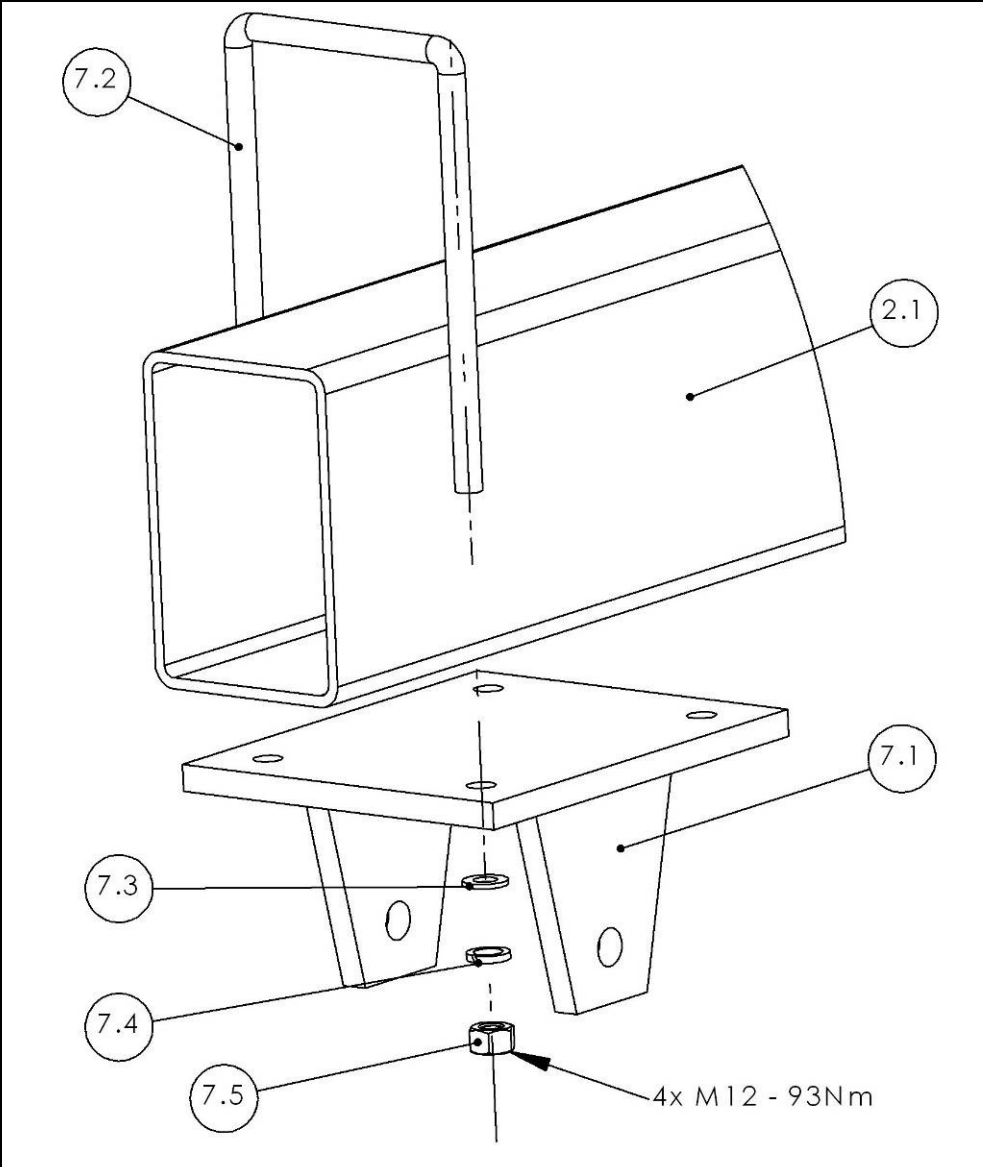
H6 = $H5 + D - 62\text{mm}$ =

Attention

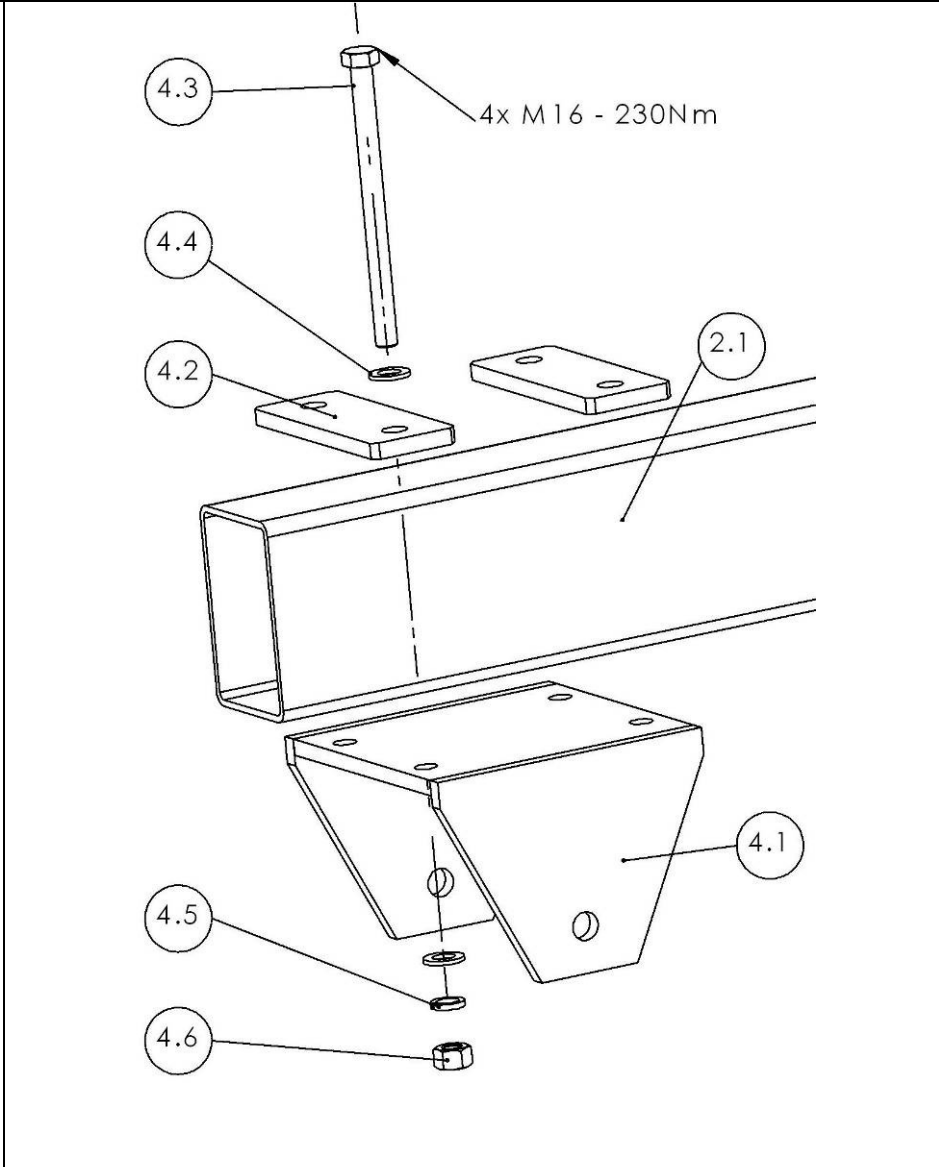
If data for your PV-modules is not listed in the table, please contact LORENTZ for further information.

Tilt	D [mm]	L [mm]	BP [mm]	CP [mm]	CB [mm]	MP [mm]	MB [mm]
0°	750 ≤ D ≤ 1000	1450 ≤ L ≤ 1700	2400	550	834	1068	-30
5°	750 ≤ D ≤ 1000	1450 ≤ L ≤ 1700	2400	550	901	1061	73
10°	750 ≤ D ≤ 1000	1450 ≤ L ≤ 1700	2400	650	889	1064	177
15°	750 ≤ D ≤ 1000	1450 ≤ L ≤ 1700	2400	700	835	1076	284
20°	750 ≤ D ≤ 1000	1450 ≤ L ≤ 1700	2420	750	991	1098	394
25°	750 ≤ D ≤ 800	1450 ≤ L ≤ 1750	2785	800	1064	1132	511
	800 < D < 850	1450 ≤ L ≤ 1750	2825	700	1125	1132	511
	850 ≤ D ≤ 1000	1450 ≤ L ≤ 1700	2475	800	1064	1132	511
30°	750 ≤ D ≤ 900	1450 ≤ L < 1550	2350	1000	992	1179	636
	750 ≤ D ≤ 1000	1550 ≤ L ≤ 1700	2300	1000	992	1179	636
35°	750 ≤ D ≤ 870	1450 ≤ L ≤ 1750	2825	1050	1141	1242	774
	870 < D ≤ 1000	1575 ≤ L ≤ 1700	2425	1050	1141	1242	774
40°	750 ≤ D ≤ 950	1450 ≤ L ≤ 1550	2250	900	1380	1325	928
	850 ≤ D ≤ 950	1550 < L ≤ 1600	2250	900	1380	1325	928
	750 ≤ D ≤ 815	1600 ≤ L ≤ 1650	2425	1140	1267	1325	928
	815 < D ≤ 950	1650 < L ≤ 1700	2425	1140	1267	1325	928
45°	750 ≤ D ≤ 870	1450 ≤ L ≤ 1635	2825	1200	1451	1435	1106

	
<p>Assembly of rail hinge to the beam (just fix, tighten bolts later)</p>	<p>WRONG installation: Parts must be fixed parallel to the beam</p>

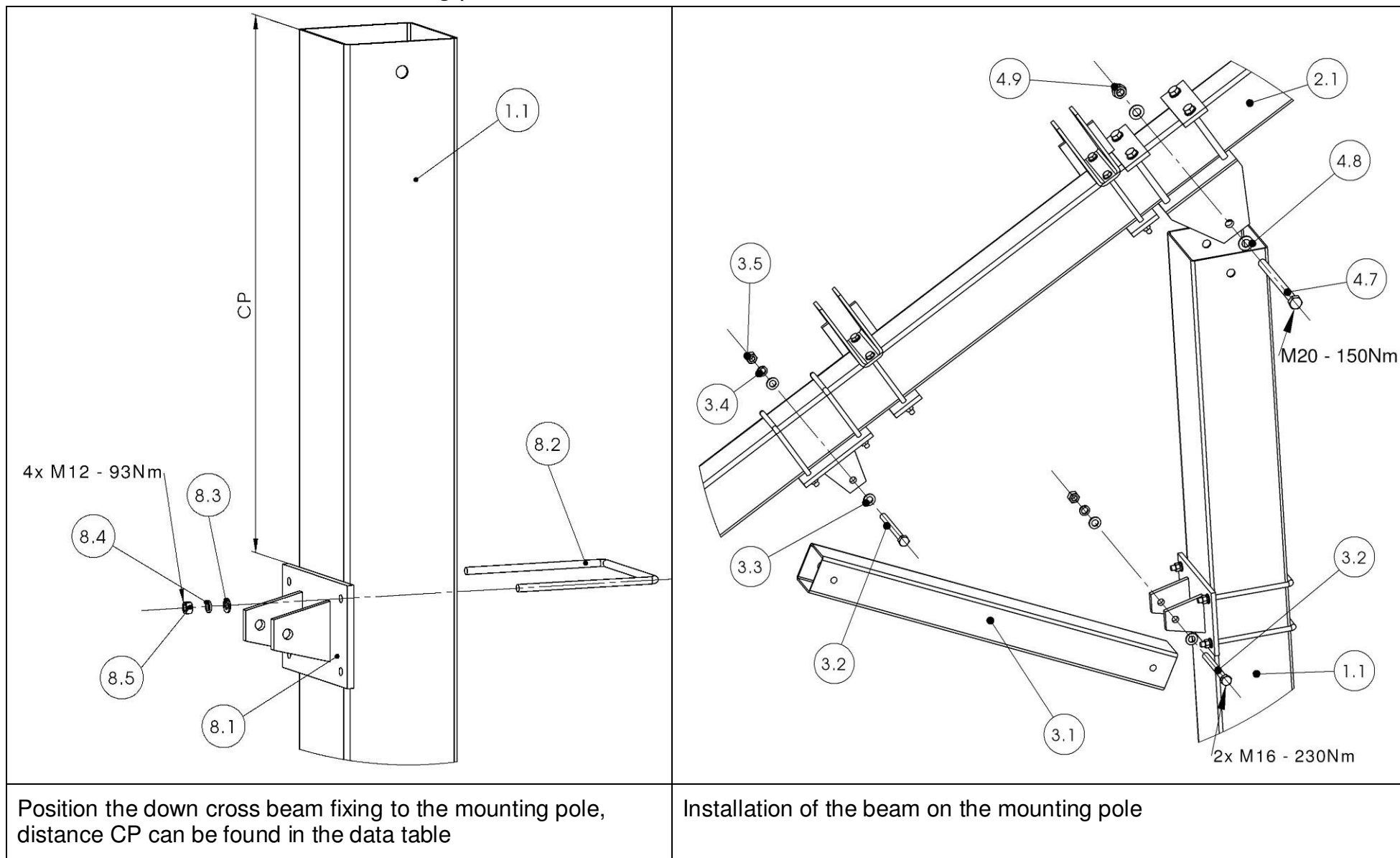


Assembly of the upper cross beam fixing to the beam

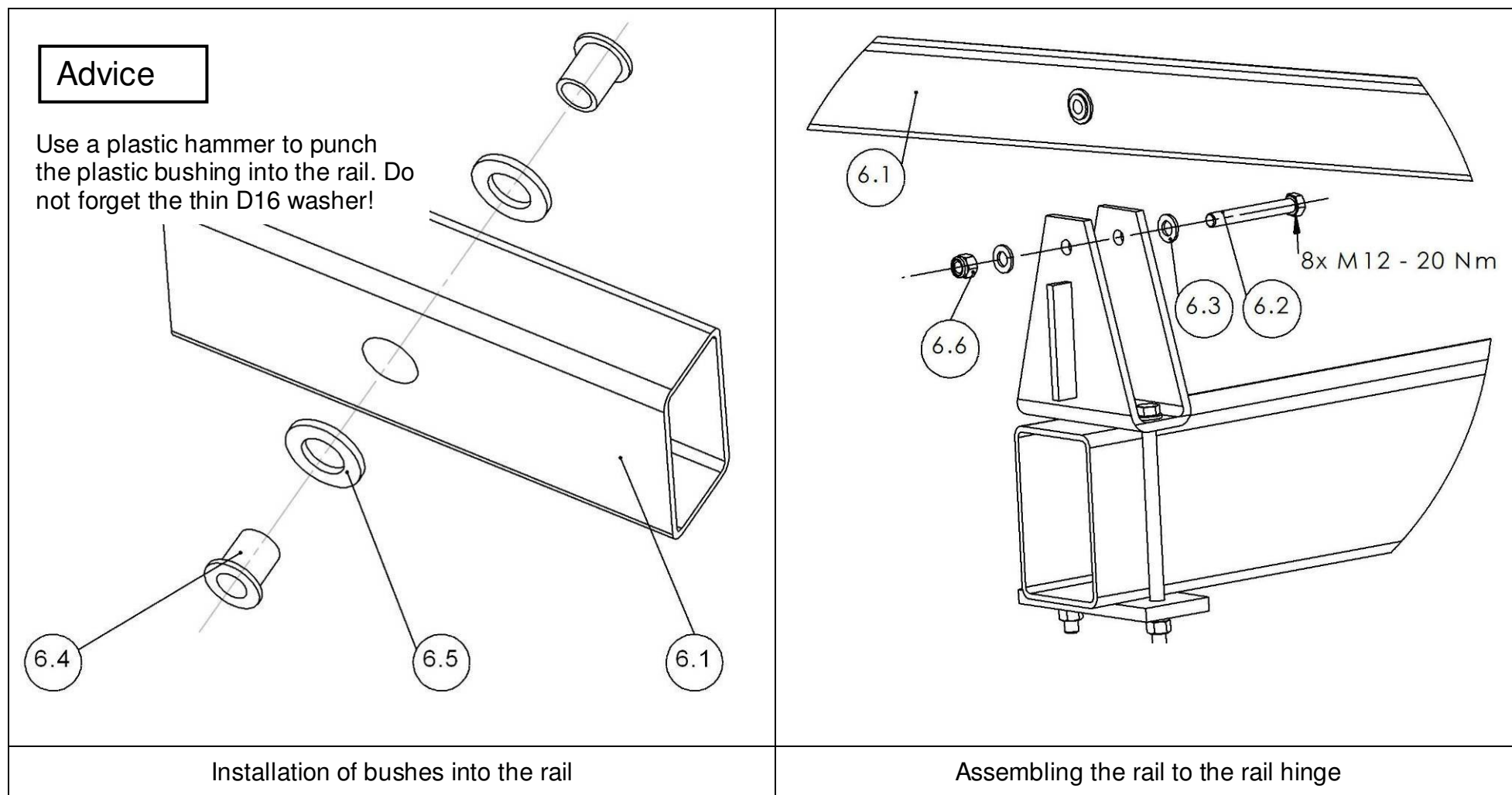


Assembly of the beam hinge to the beam

5.4 Installation of beam to mounting pole



5.5 Assembling rails and installation of the rail hinge



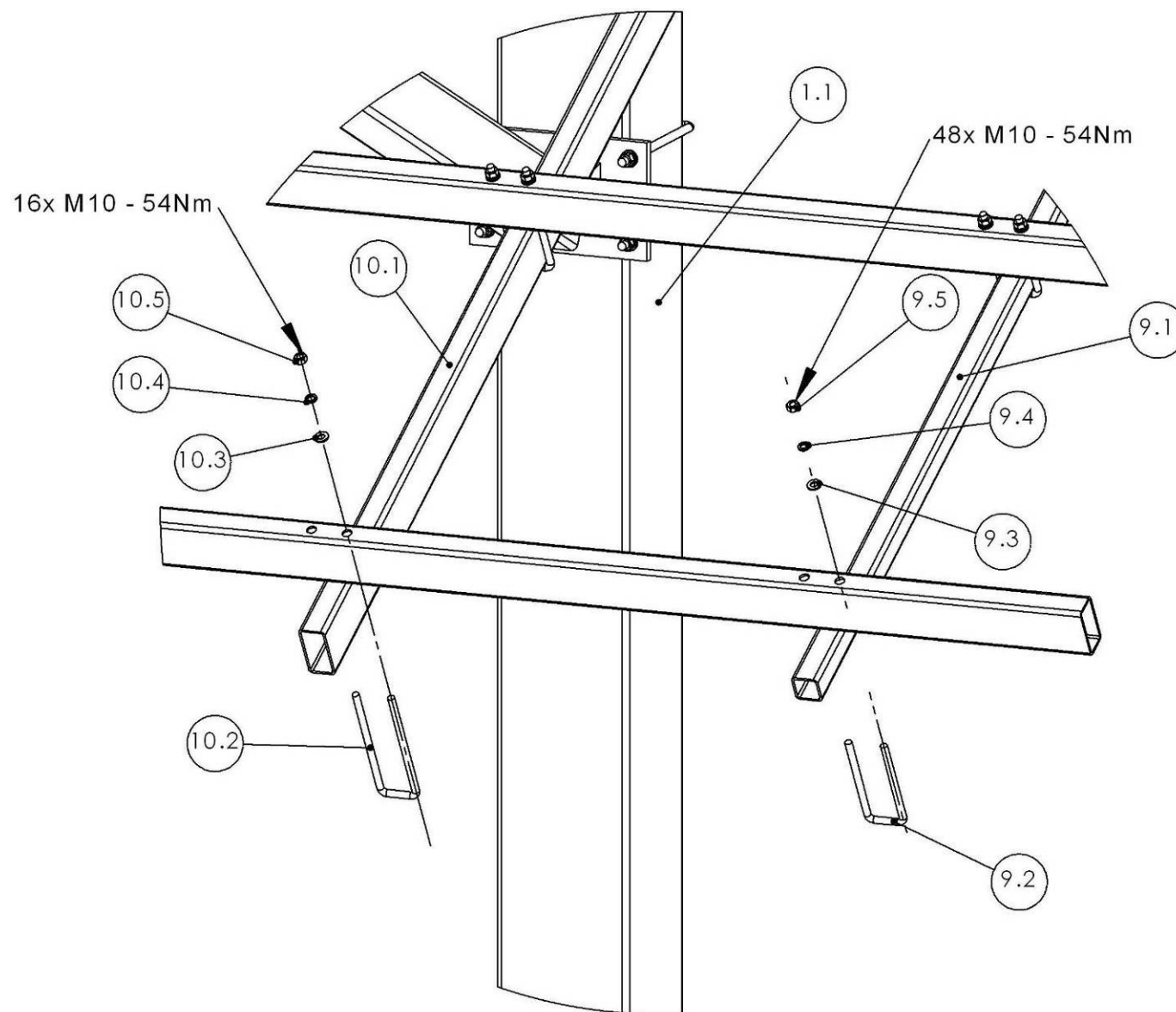
5.6 Installation of the connectors

Attention

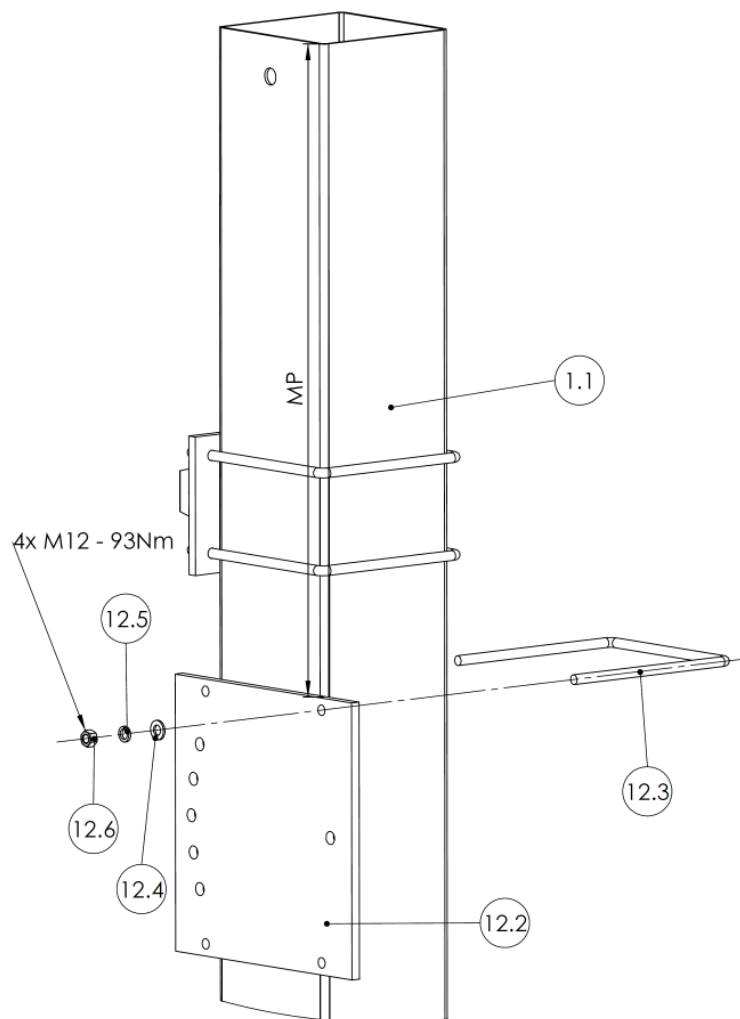
Pay attention to chapter 6.1 and set the PV-module fixing clips on the rails before assembling the rail and motor rail connector.

Ensure the rails and rail connectors are square to one another (90° degrees)

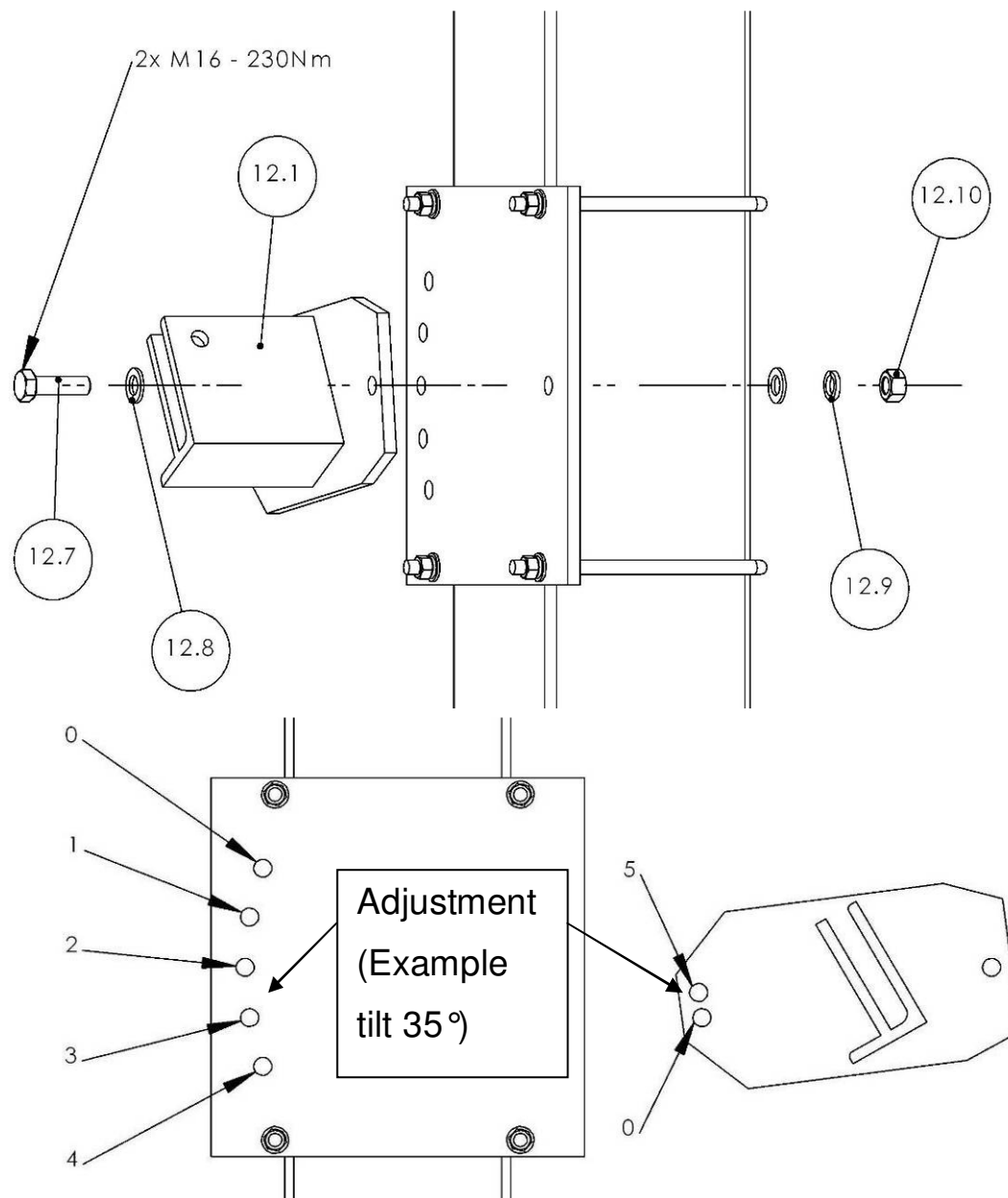
Tighten screws M12 of hinge rail (5.3) with 93Nm after installation of rail connectors.

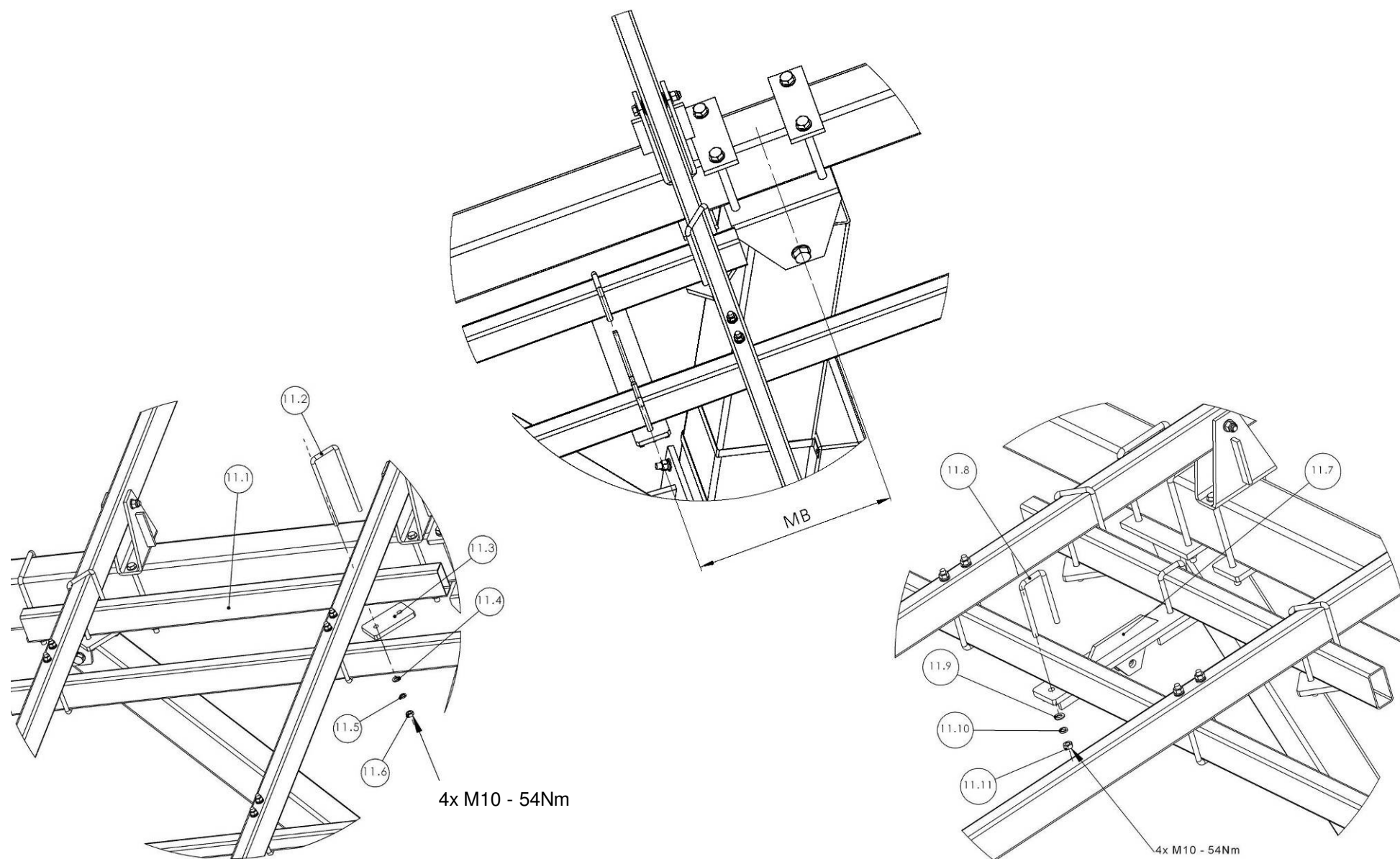


5.7 Assembling down and upper motor fixings



Fix down motor fixing to mounting pole (MP distance is from data table). Tighten the M12 bolts (12.3) up to 93Nm after motor installation and adjustment





Tighten screws after all parts are installed and adjusted.

5.8 Motor installation

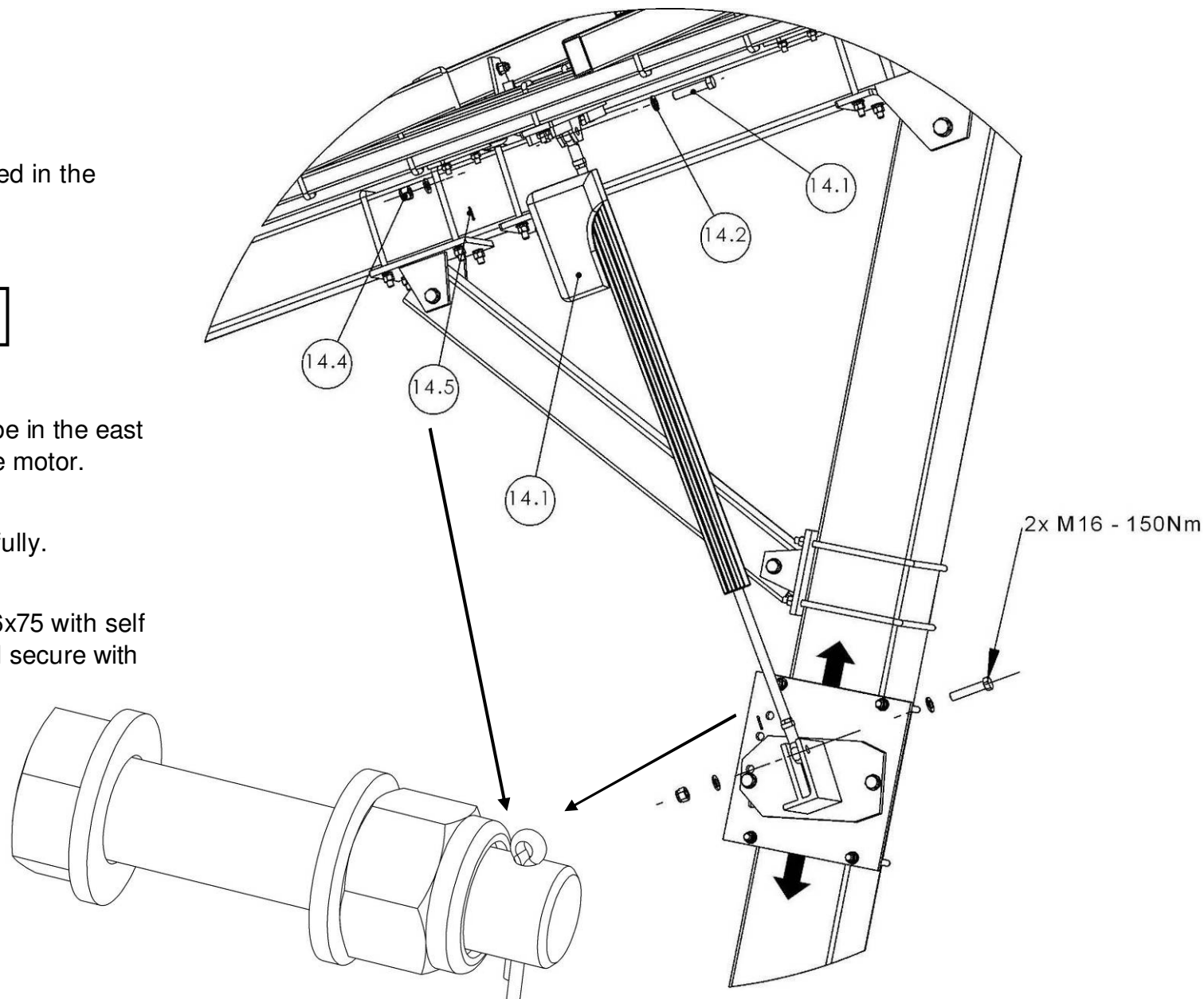
The motor (14.1) is delivered in the retracted position.

Attention

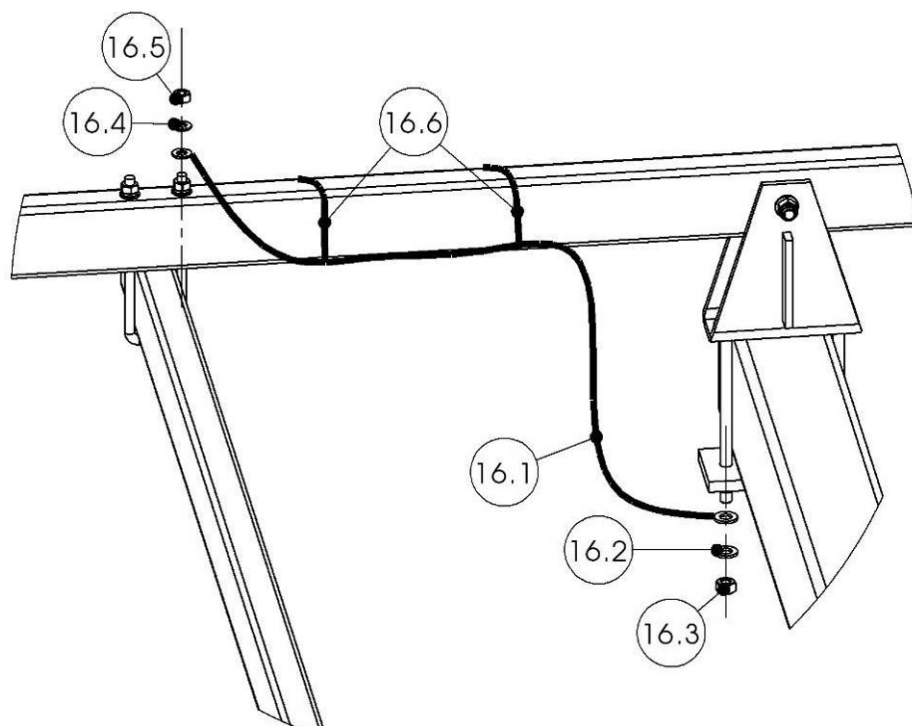
The tracker frame should be in the east position when installing the motor.

Install the motor 14.1 carefully.

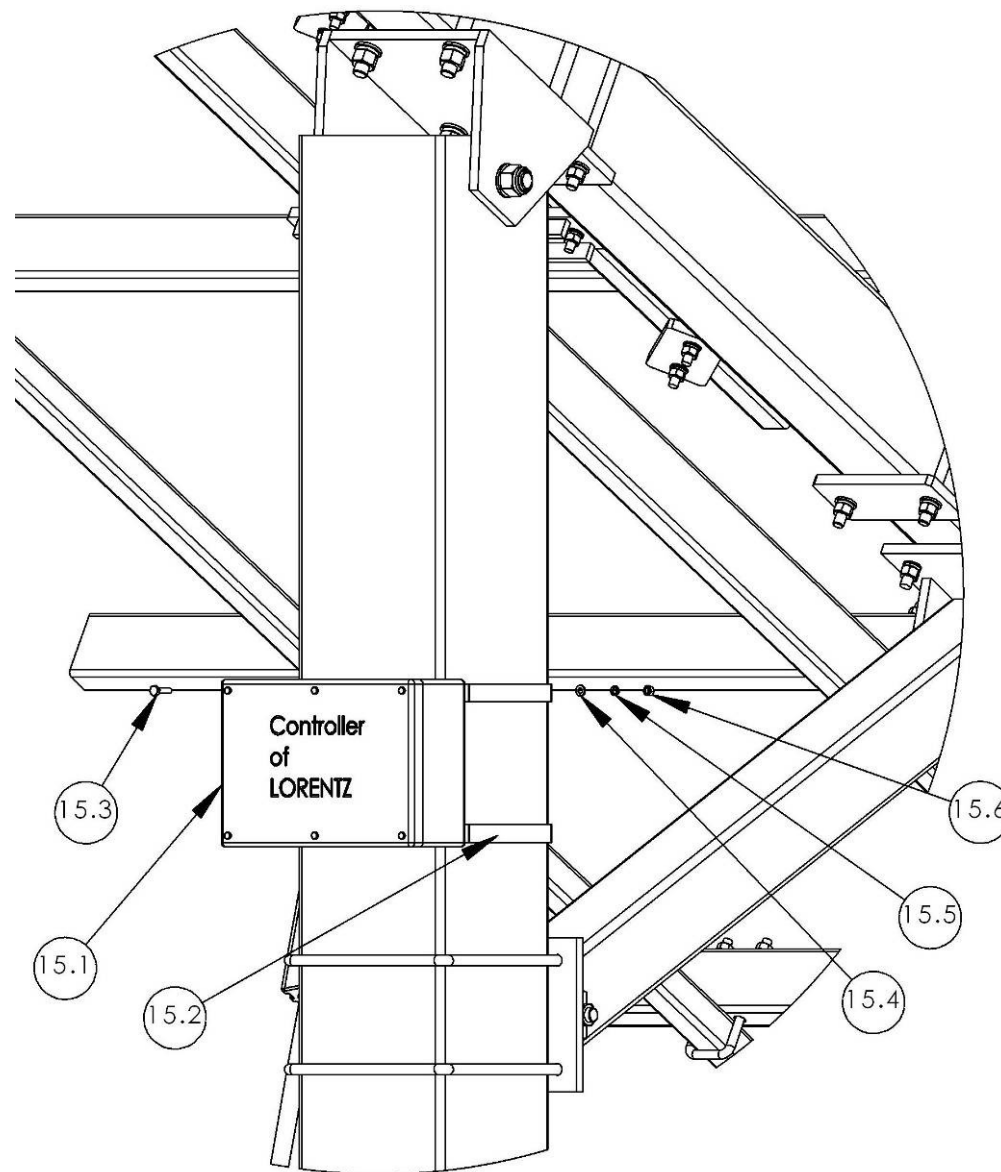
Tighten the screws 2x M16x75 with self locking nuts to 150Nm and secure with pin (14.5)



5.9 Installation of grounding cable and controller box

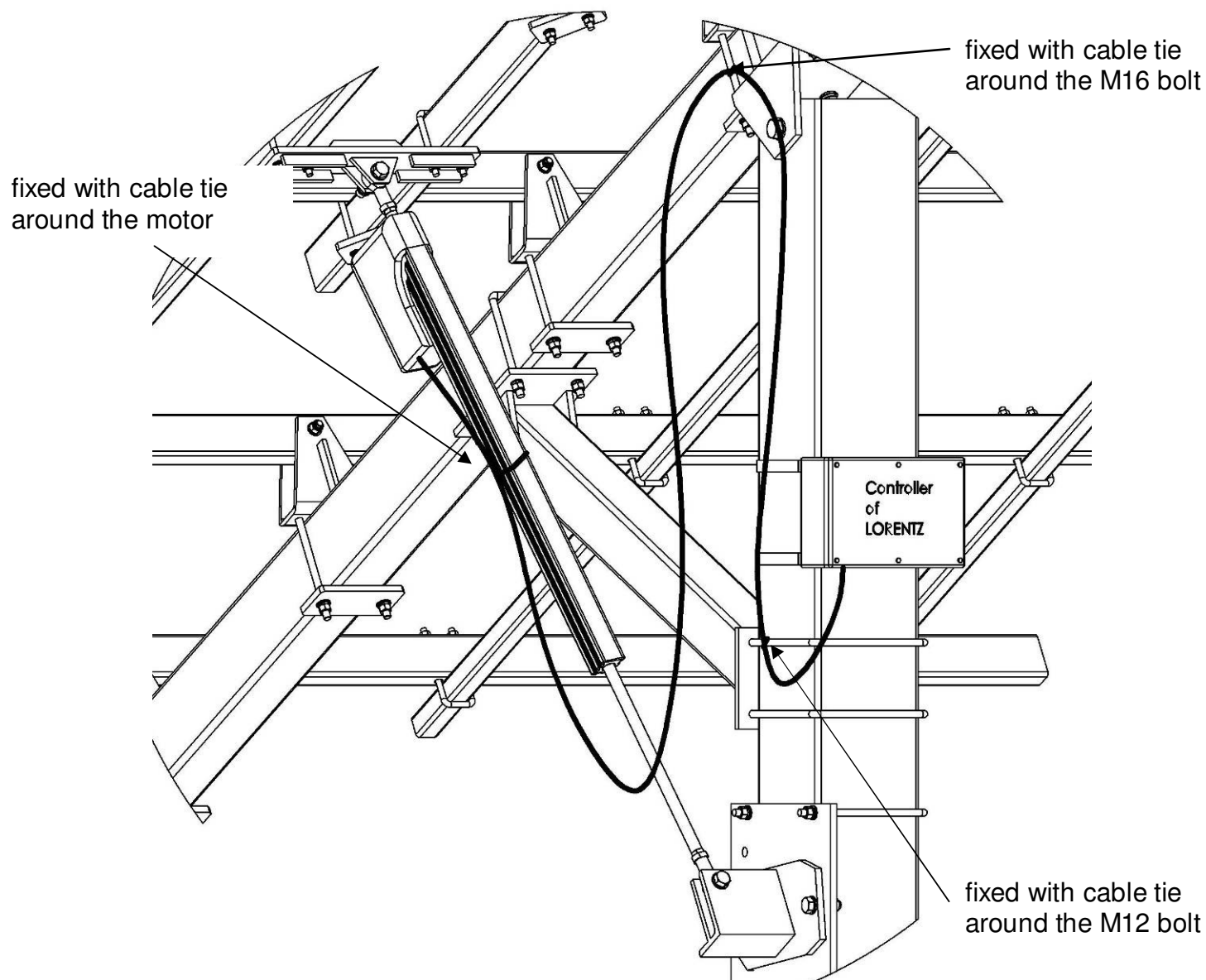


Install and route the grounding cable and fix with cable ties



Install the controller box above the down cross beam fixing (8.1)

5.10 Laying of motor cable



Fix the motor cable with the tracker in “east” position.

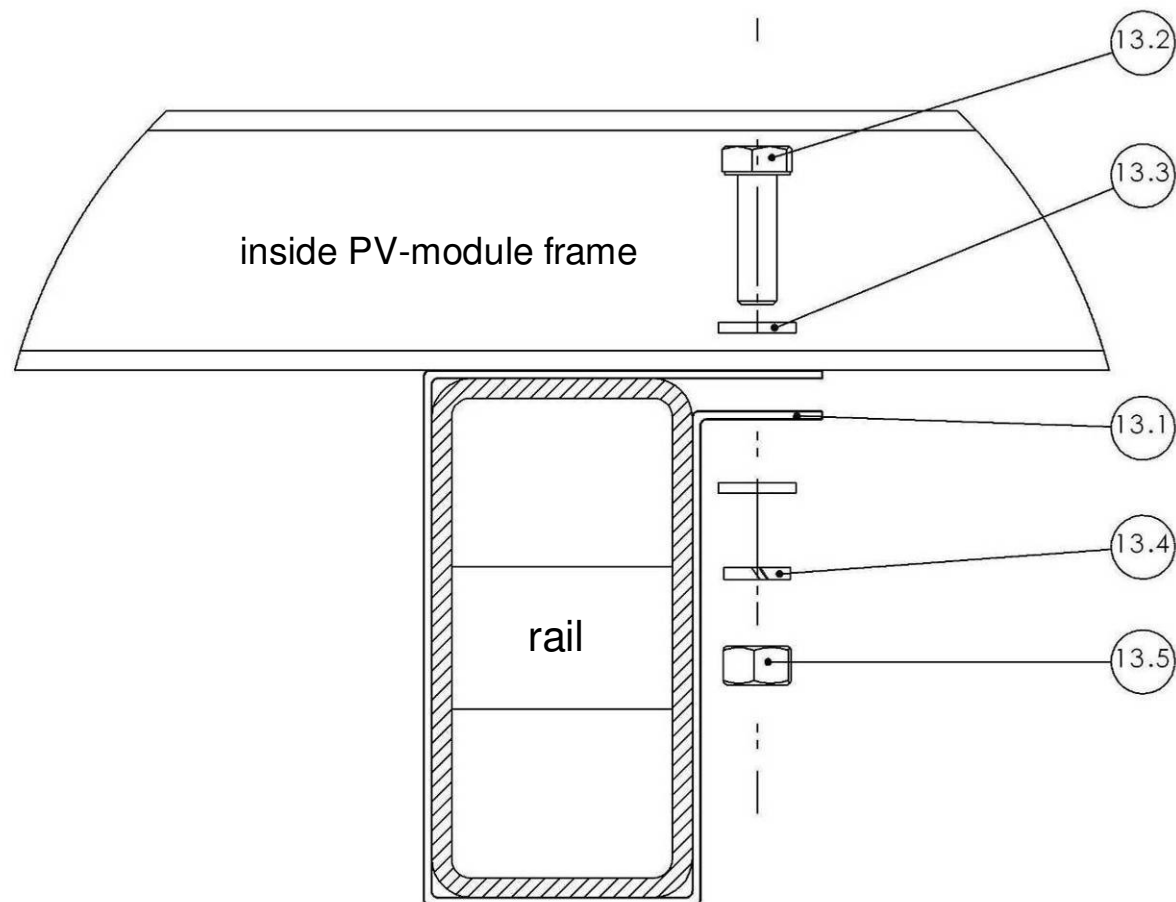
Attention

Ensure that the motor cable cannot touch the lower motor fixing.

Ensure the motor cable is long enough to reach in the “west” position.

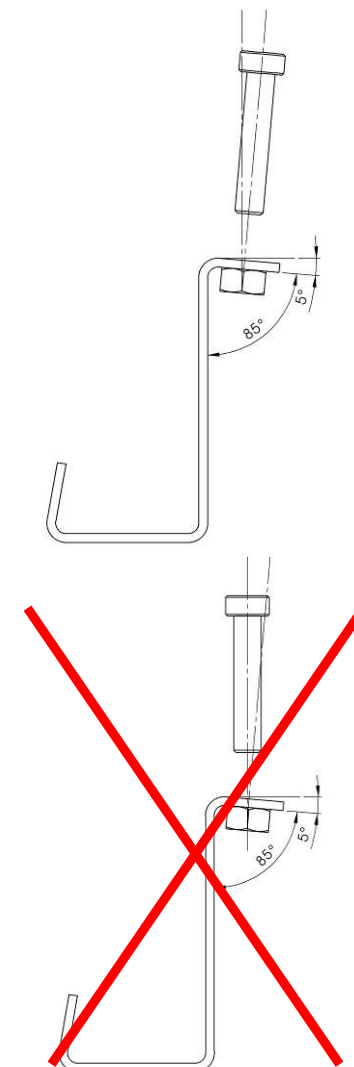
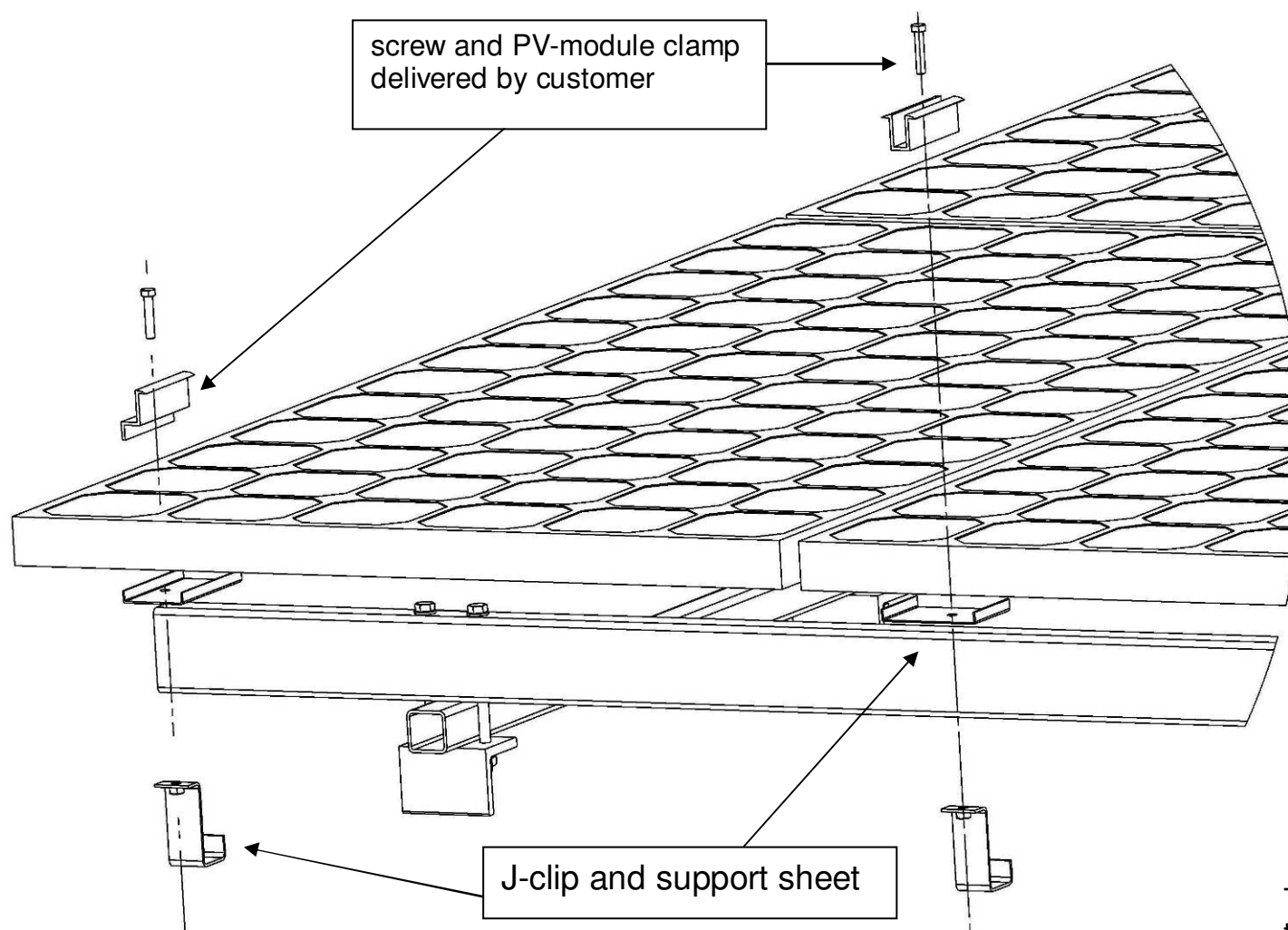
6. PV-module installation

6.1 PV-module installation with screw in module frame



PV-modules are installed with clips that wrap around the rail as shown above. The clips must be installed with the bolt hole facing the short side of the PV-module frame. The upper clip for each module should point towards the top of the tracker and the bottom clip should point towards the bottom of the tracker.

6.2 Optional PV-module fixing with J-clip and top clamp



To fix the PV-module clamp at the J-clip, the screw must be inserted at a 5° angle otherwise the nut may be damaged.

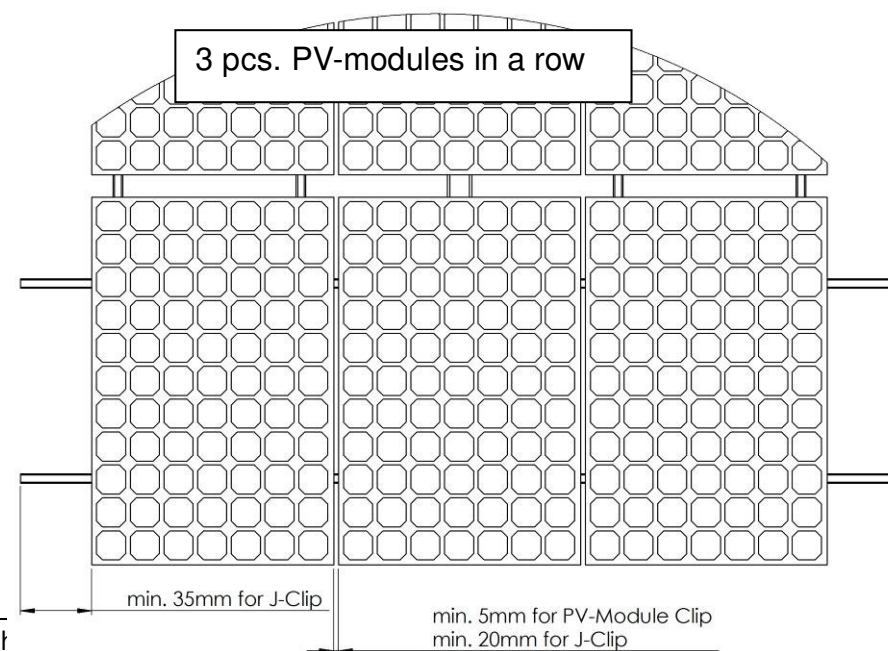
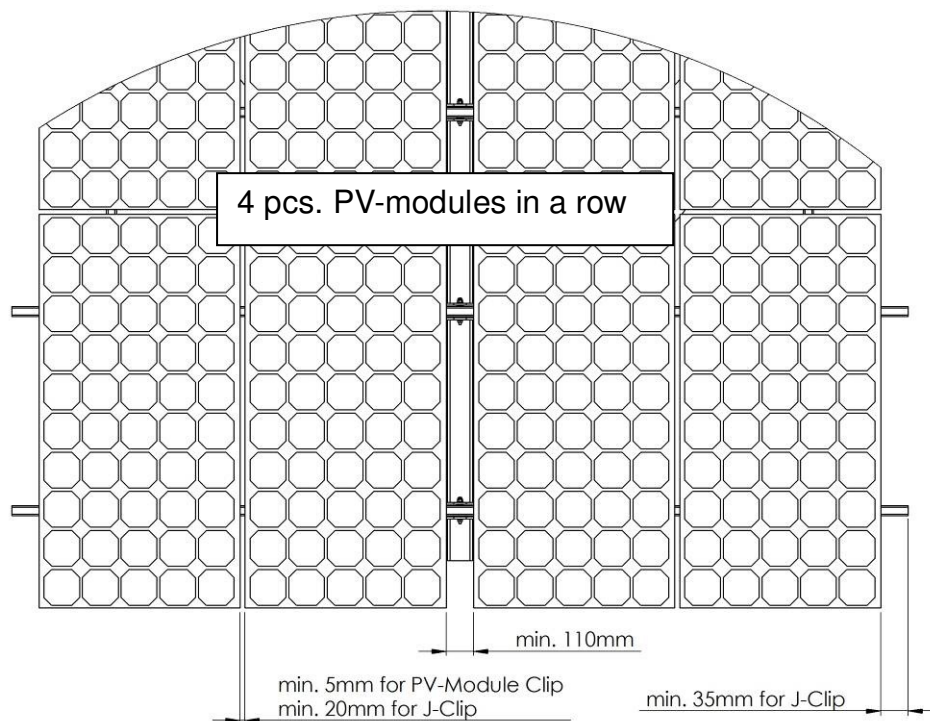
The nut of J-clip must always point to the PV-module short edge (up and down direction).

6.3 PV-module arrangement

Fixing with PV-module clip (6.1)	
$B \leq 865\text{mm}$	4 pcs.
$865\text{mm} < B \leq 1190\text{mm}$	3 pcs.

Fixing with J-clip (6.2)	
$B \leq 845\text{mm}$	4 pcs.
$845\text{mm} < B \leq 1160\text{mm}$	3 pcs.

Depending on the PV-module width B and the PV-module fixing method, **three or four** PV-modules can be assembled on each rail pair. A symmetric PV-module arrangement is recommend. The minimum distances between the PV-modules can be taken from the figures below.



7. ETATRACK active controller



Warning

Wrong wiring (e.g. wrong polarity) can cause damage of electric or electronic components. Components may not necessarily fail immediately but the life may be reduced.

Installation must be carried out by qualified personnel only.

In case of any doubt during installation the installer should contact the supplier for advice.

Damage caused by wrong wiring is not covered by warranty.



Attention

The voltage of the battery must be checked is checked after three month in stock. If the batter voltage is below 12.6V it must be recharged.

The controller and motor (actuator) are powered by a battery which is charged by a PV-module.

With an irradiation below 0,5kWh/m²/d caused by very cloudy weather, a dusty or snow-covered PV-module, the battery will be discharged continuously. The PV-module should be always kept free from dust and snow.

If the battery voltage drops below 11.8V, the tracker moves to the south position and stops tracking to minimize the power consumption (standby mode).

In standby mode, the controller still consumes energy, which equals an irradiation of 0.2kWh/m²/d.

At continuing low irradiation (approx. 8 days, depending on temperature and battery condition), the battery should be removed from the controller and - if possible - charged separately. This should be done before the voltage drops below 11V. When removing the battery, the plug "Batt. / Solar" at the controller should be always unplugged, too.

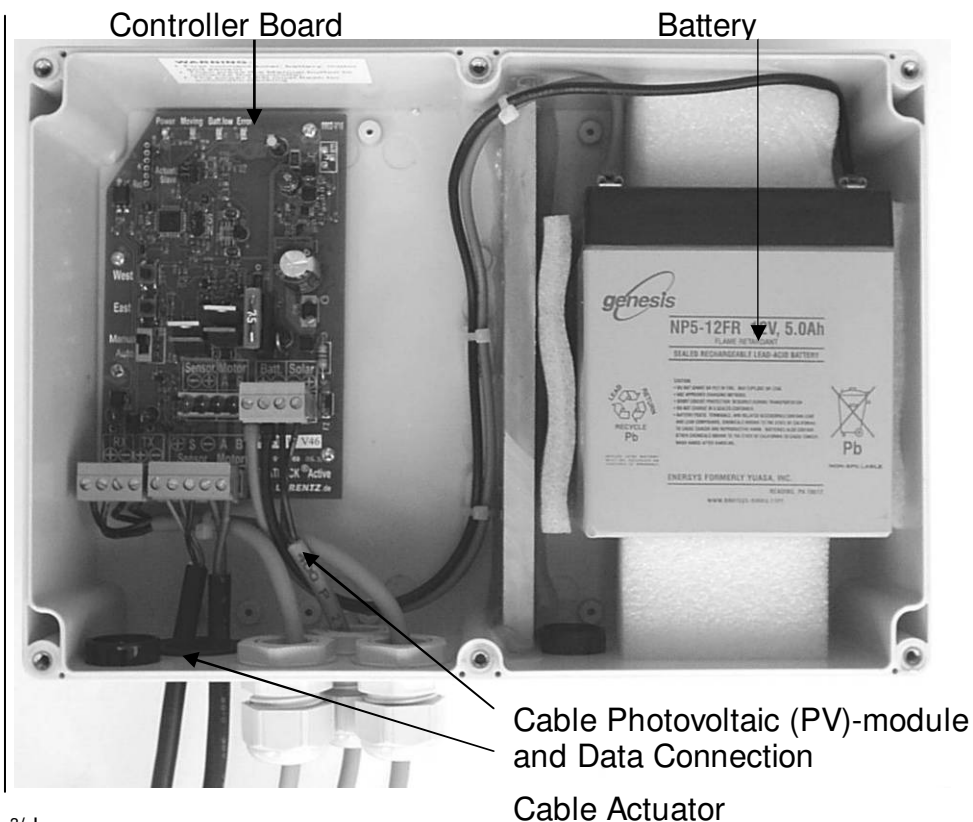
The battery can be charged using a 12V motorcycle type battery charger with a charging current not exceeding 1A and a charging voltage not exceeding 13,8V.

After the battery has been recharged, it can be reinstalled in the controller and the tracker can be put into operation again.

If there was no possibility to charge the battery separately, it can be reinstalled when the irradiation is at least 0.5Wh/m²/d. In this case, it can take ca. 6 days, until the tracker exits the standby mode and starts to move again.

Attention: Temperatures below -25°C can damage motor and the battery permanently. In this case, the battery has to be removed from the controller and stored in a frost free place. Move the tracker to the south position manually before removing the battery. **The motor will not operate below -25°!**

View inside Controller



7.1 Overview controller board

Indication Lights:

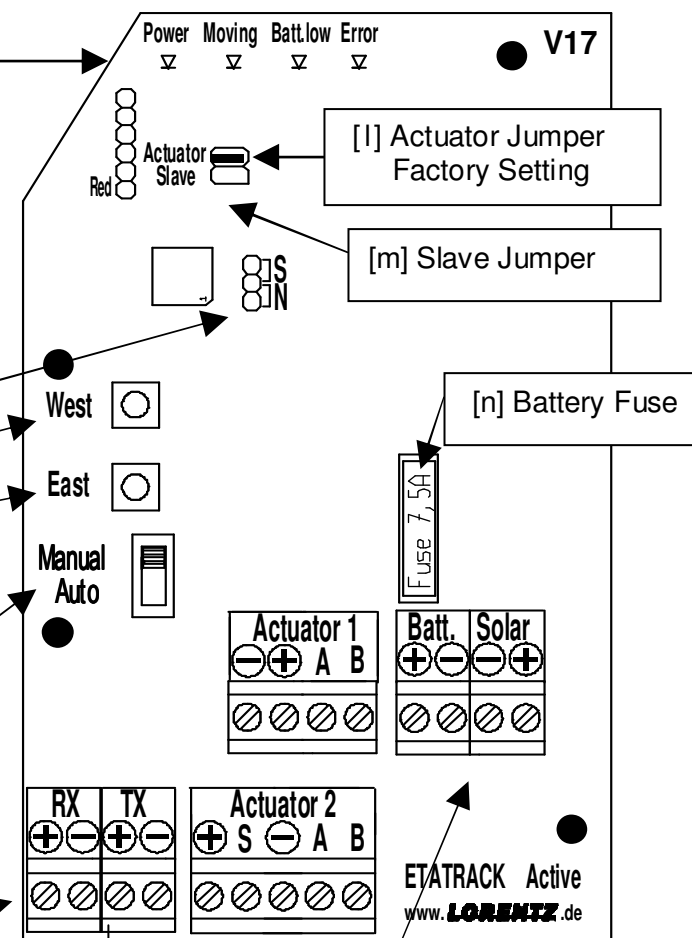
- [a] LED "Power": LED flashes in automatic mode and is permanently on in manual mode. LED is off during Reference Movement (see 7.3).
- [b] LED "Moving": LED flashes during movement.
- [c] LED "Batt. Low": LED flashes if battery voltage is low (see 7.4)
- [d] LED "Error":
 1) LED flashes at an interval of 5 sec., if data communication is missing in Slave operation (see 7.6). When data is received again, LED "Error" goes off.
 2) LED flashes at an interval of 1 sec., if the actuator was max. loaded due to wind load or blockage (see 7.4).

Control Elements:

- [e] Jumper "N, S": Choosing the hemisphere. N=North, S=South (Factory setting: Northern hemisphere)
- [f] Button "West": In manual mode move one step west.
- [g] Button "East": In manual mode move one step east.
- [h] Switch "Manual, Auto": Change between manual and automatic mode. When changing from manual to automatic mode, the tracker moves to the current position. During low battery condition, manual mode can not be chosen (see 7.4). (Factory setting: Manual mode).

Connections:

- [i] Terminal "RX-TX": Connection of data wiring for Master-Slave operation
- [j] Terminal "Actuator 2": Connection of actuator 2
- [k] Terminal "Batt. Solar": Connection of the PV-module (Solar, see 7.4 and 7.5). The battery is connected by factory. Remove this plug for temperatures below - 25 °C.



7.2 Installation of the controller



Take note of the wiring diagram (see 7.5) and the inside view of the controller (see 7).

Necessary tools: Screwdrivers 0.5x3mm and PH2

The controller uses a PV-module for controlling the daily movement and to charge the controller battery.

In systems with a LORENTZ PS-Pump Controller in solar-direct operation (not PSK-Controller), the controller can be connected in parallel to one of the PV-modules of the solar generators.

For all other applications, a separate PV-module must be used to ensure correct operation.

Data of the PV-module to be used:

- Voc max: 50V
- Vmp min: 16V

North of 45°N or. south of 45°S:

- Pmp min: 10Wp

South of 45°N or. north of 45°S:

- Pmp min: 5Wp

Connection:

- open the controller box
- remove the cover of the left cable inlet, insert the actuator cable
- close the inlet with the rubber cap provided with the actuator cable
- connect the 5-pole plug of the actuator to the 5-pole socket "Actuator2" [j] on the controller board
- check, that the jumper "Actuator" [l] is set
- insert the cable of the PV-module through cable inlet
- connect the PV-module cable to the terminal "Solar" [k] of the controller board (take care about polarity)
- insert one of the included battery fuses (7.5A) into the socket [n] of the controller board
- LED "Power" [a] illuminates, the Tracker stays in position
- execute reference movement according to 7.3
- check correct operation (see 7.)
- close the controller

7.3 Reference Movement (Northern Hemisphere)

- Switch the controller to automatic mode [h], Reference Movement starts (initialisation of the motor - linear actuator)
- Tracker moves a few degrees to west (actuator moves out)
- Tracker moves to east position (actuator moves in)
- Tracker moves to west position (actuator moves out)
- Tracker moves to south position (middle position)
- Tracker moves in steps to the west position (during several hours)
- Correct tracking will begin on the day following the Reference Movement
- Reference Movement takes place each time the voltage supply [k] is disconnected and reconnected.
- LED "Error flashes: The Actuator was max. loaded due to a blockage (or high wind loads). After removing the blockage (see 8) the Reference Movement has to be restarted.

7.4 Function and operation

Tracking Movement: (automatic mode)

- Sunrise: Tracker moves from the south position to the east position
- During the day: Tracker moves in 12 steps to the west position
- Sunset: Tracker moves to the south position (middle position)
- Battery voltage below 12V: LED "Battlow" [c] flashes, Tracker moves to the south position (middle position) and stops the tracking movement until the battery voltage reaches 12.8V again.
- LED "Error flashes": The Actuator was max. loaded due to wind loads (or a blockage). After removing the blockage (see 8) the Reference Movement has to be restarted.



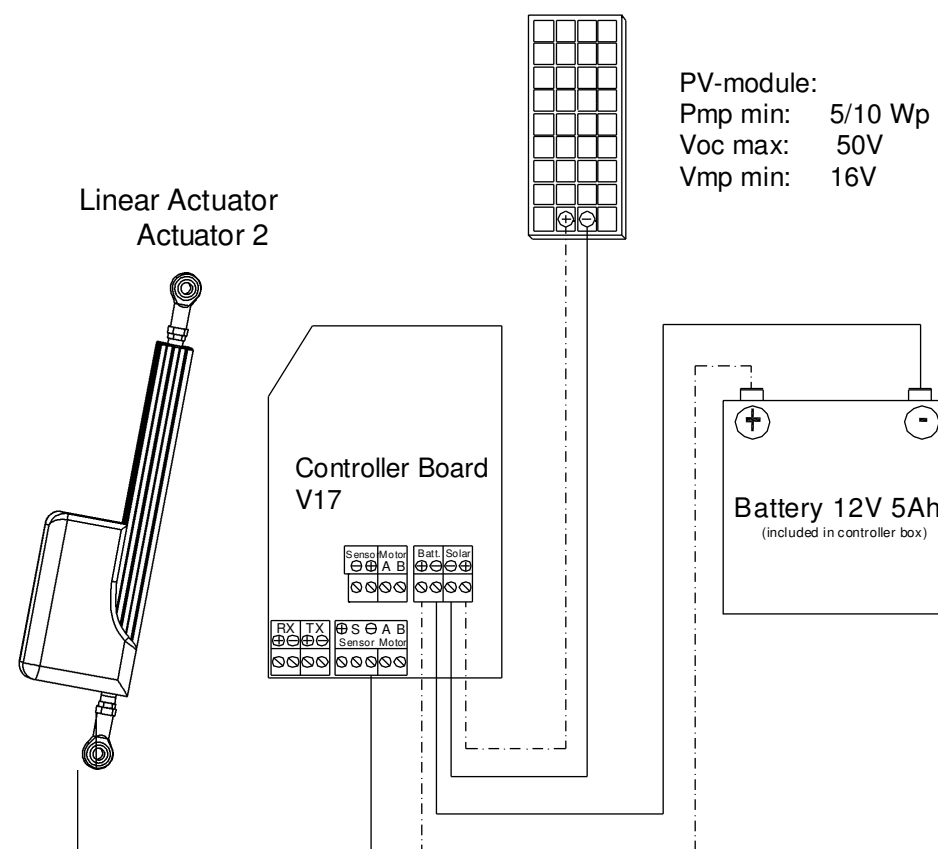
Attention

Before removing a blockage the controller board has to be switched to manual mode.

Tracking Movement: (manual mode)

- Switch [h] is set to „Manual“
- LED „Power“ [a]: permanently on
- Pushbutton "West" [f]: Movement of the Tracker in steps towards west
- Pushbutton "East" [g]: Movement of the Tracker in steps towards east
- Switching [h] to automatic mode: Tracker moves to the current position

7.5 Wiring diagram



7.6 Master-Slave operation (Only valid from V17)

Where several trackers are being installed together they can be configured for master-slave operation. In this configuration one controller (master) forces the other controllers (slaves) to follow the master controllers movements. This means that all trackers move together.

Installation:

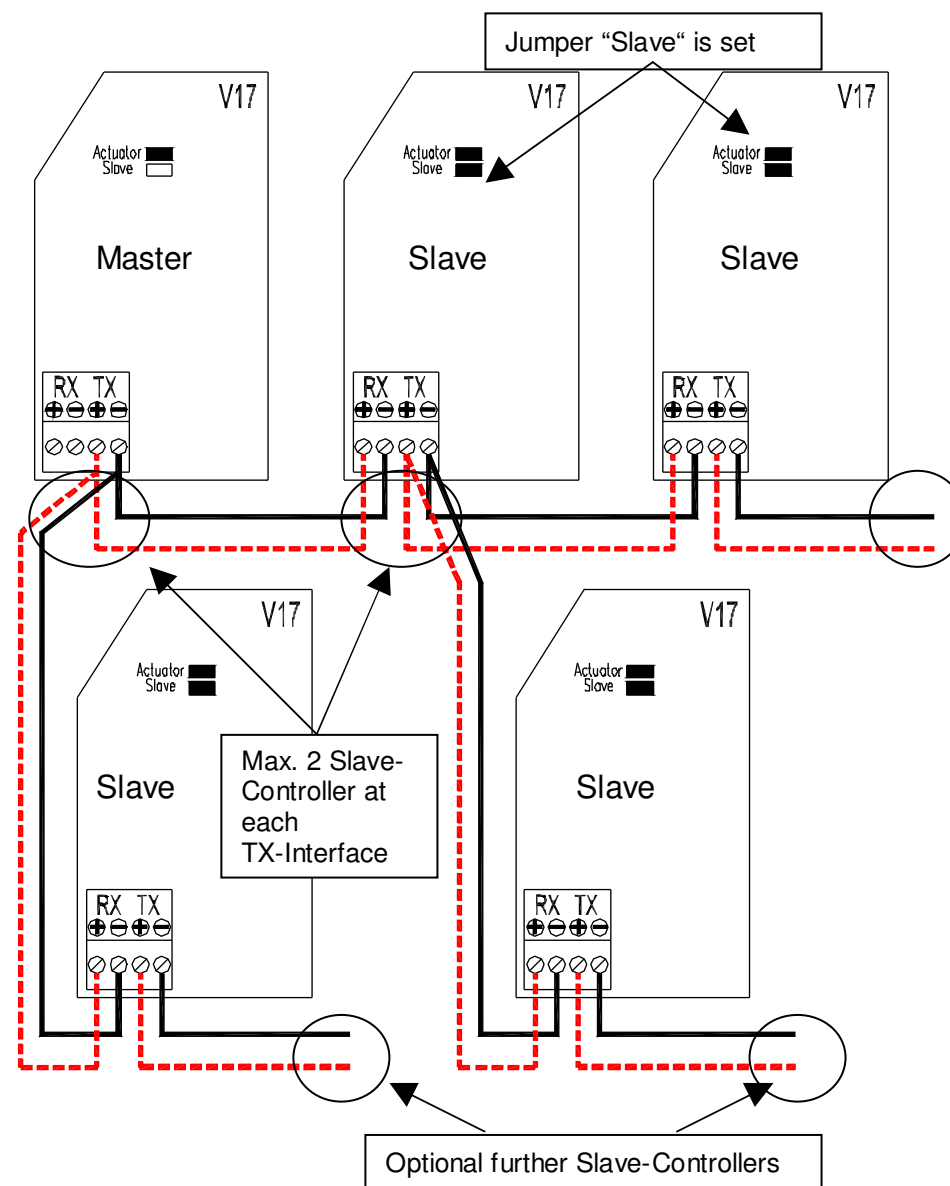
- Install the controllers as per section 7.2, 7.5
- Connect the controllers together via data interface RX-TX [i]
- The first controller is set as the master ("Slave" jumper is not set [m])
- Other controllers as set as slaves ("Slave" jumper is set [m])
- Connect the TX of the master to the RX of the slave unit. Please observe the correct polarity (take care of the polarity!)
- Connect the TX of each slave controller to the RX of the next slave unit (see 7.7).

Operation:

- The master controller sends the current position information every 5 minutes
- In manual mode no data is sent
- If after 45 minutes no signal is received by the slave controller the tracker moves to the south position (middle position) the error LED [d] flashes

Technical Parameter Master-Slave	
Number of trackers	max. 25pcs.
Number of receivers (RX) at one transmitter (TX)	max. 2pcs.
Wiring distance between receiver and transmitter	max. 20m
Wiring	min. 2x 0,75mm ²
Cable type	shielded or unshielded

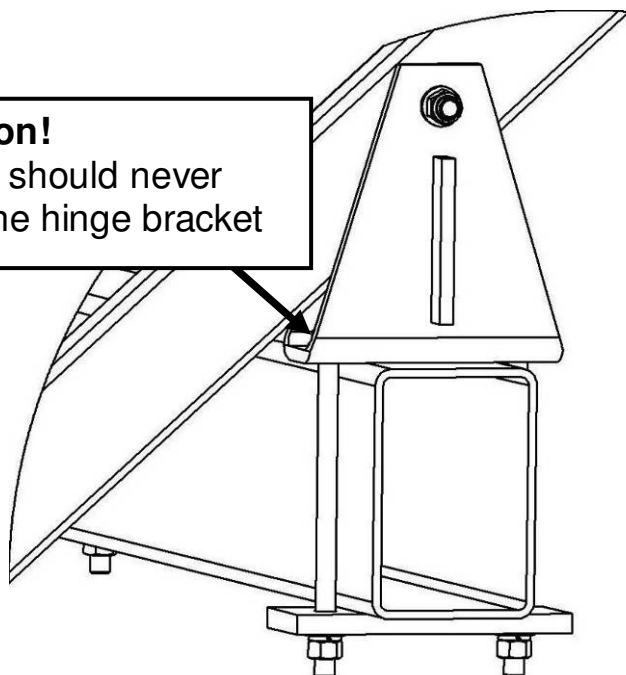
7.7 Wiring diagram Master-Slave operation



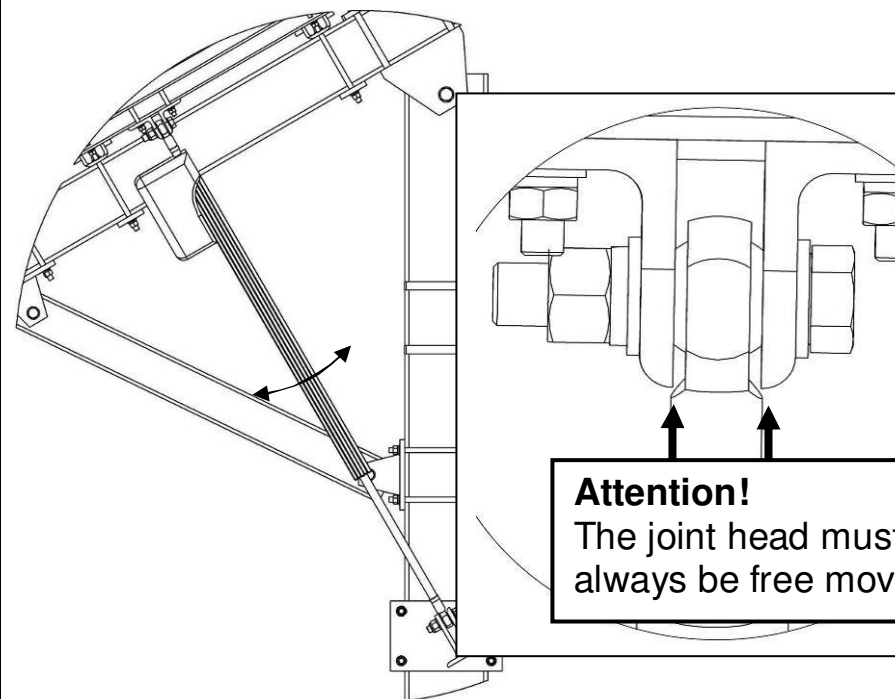
8. Check correct adjustment of motor

Attention!

The rail should never touch the hinge bracket



During the reference movement, check that the rails do not touch the hinge bracket when at the extremes of movement (east and west positions). The motor will stop if it is blocked. If the motor is stopped in this way then the tracker must be restarted. To restart the tracker, disconnect the power plug, switch to manual mode, reconnect the power plug and move the tracker in manual mode away from the point it became blocked. After solving the problem restart the reference movement (see 7.3).



Attention!

The joint head must always be free moving

Check that the joint head is free moving. Check that the joint head does not touch any of the motor fixing points in an east or west position. If the joint head does touch the motor fixings then adjust the upper motor fixing (11.1), see chapter 5.7.

Attention: Motor starts to move once the power plug is installed, tracker starts reference movement after 10 seconds

EC-Declaration of Conformity

Herewith declares

BERNT LORENTZ GMBH & Co. KG
Krögerskoppel 7
24558 Henstedt-Ulzburg
Germany

has sole responsibility, that the following product

Tracking system for Photovoltaic (PV) Modules ETATRACK active 1500-A

are in conformance with the EU Directives

2006/42/EC Machinery Directive
2004/108/EC Electromagnetic Compatibility Directive

The following standards have been used

EN60204-1:2006+A1:2009
EN61000-6-2:2005 EMC
EN61000-6-4:2007
EUROCODE 3
DIN EN 1991-1-4:2005-07

The CE label was first applied to this product in 2011.

Henstedt-Ulzburg, 15 February 2011



Bernt Lorentz
General Manager