

# Installation guide ETATRACK active 600



Before starting installation, please read installation guide carefully

## Attention

Operating condition consider chapter 2.1 and 7.

Controller:

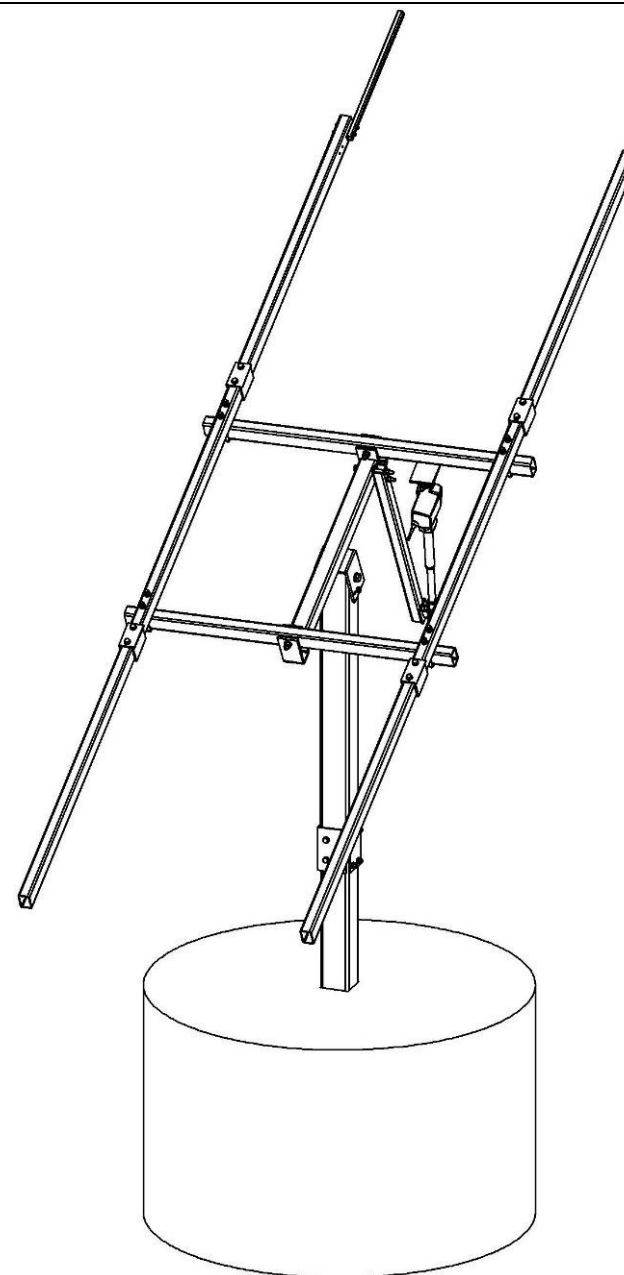
Check for right jumper setting (cf. chapter 7.1)!

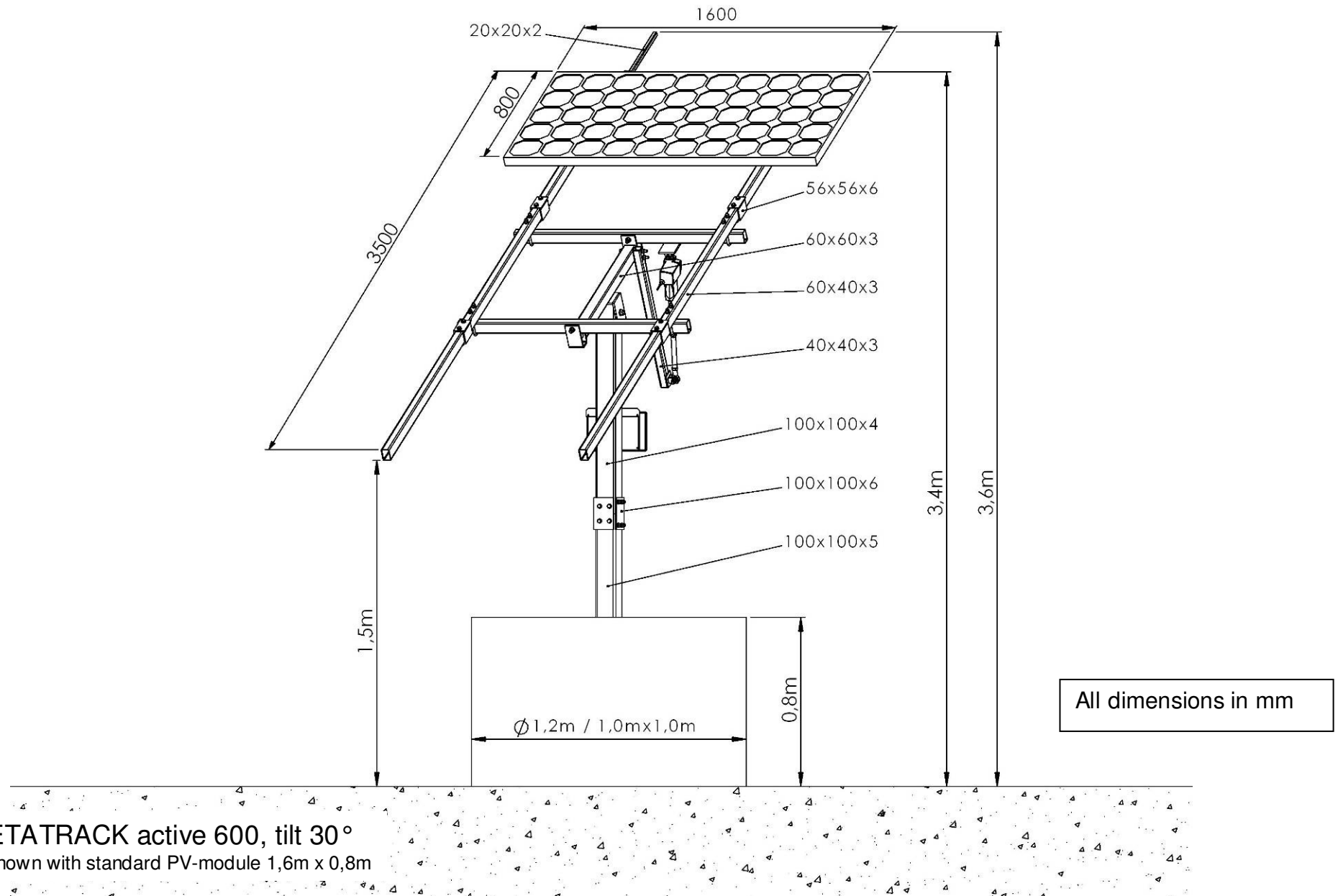
The voltage of the battery should not below 12.6V, otherwise the battery has to be recharged!

Pay attention if Tracker is in operation in a period of low irradiation, see chapter 7 for right handling by operator.

PV-module for charging controller battery:

The PV-module should be always kept free from dust and snow (cf. chapter 7.2)!





**ETATRACK active 600, tilt 30°**  
 shown with standard PV-module 1,6m x 0,8m

## 1. Scope of Delivery

The assembly kit consists of two carton boxes.

<b>Box 1 of 2</b>	
Dimension: 1200 x 350 x 120, weight 55 kg	
Parts	Quantity
upper pole	1
lower pole	1
rail end A	3
rail end B	1
upper rail connector	1
sheet metal screw M6.3 with washer	2
screw M6x20 with 2 washers, spring washer and nut	30
screw M6x75 with 2 washers, spring washer and nut	2
u-bolt M10x140 with 2 big washers, 2 spring washers and 2 nuts	4
screw M10x70 with 1 washer and self lock nut	1
earthing cable, 2 cable straps, 2 teeth washers D10, 1 nut M10	1
screw M10x90 with 2 washers, spring washer and nut	8
screw M10x130 with 2 big washers, spring washer and nut	2
screw M10x130 with 2 washers, spring washer and nut	8
screw M10x140 with 2 washers, spring washer and nut	1
screw M12x55 with 2 washers, self lock nut and 3 cable straps	1
screw M12x90 with 2 washers and self lock nut	2
bushing MFM 1216-20 with washer D16	4
screw M16x150 with 2 washers and self lock nut	1

<b>Box 2 of 2</b>	
Dimension: 1200 x 400 x 140, weight 45 kg	
Parts	Quantity
beam	1
rail middle	2
lower rail connector	1
down motor fixation	1
pole clamp	2
rail clamp	8
extra module fixation	1
motor LA31	1
controller	1
set of module clips (2 pcs. PV-module fixation clips 20x20 and 28 pcs. PV-module fixation clips 60x40)	1

## 2. General references

### General

This installation instruction contains fundamental references, which are to be considered for mounting and start-up. It is to be read therefore absolutely before assembly and start-up from the mechanic as well as the responsible user, too. It should be available at the installation site. This installation guide refers to the tracking system ETATRACK active 600, special safety reference.


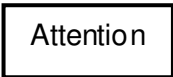

### 2.1 Ambient and operating conditions

- Ground level installation only and operation outside presence of people
- Temperature: allowed operation temperature range for tracking system is -20°C to + 50°C. Below -20°C see chapter 7 (other operation temperatures on request).
- Humidity and air salinity: No storage and operation in day average humidity above 80%. No inshore storage and installation (minimum 1 km away from coast) or in saline air ( more than 2 µg / m<sup>3</sup>) (inshore application on request)
- Altitude: range of altitude -400m to + 3000m MSL (other altitudes on request).
- Permanent operation. Maximum three reference movements or 50 tracking steps per hour, battery over 12,6V, see Chapter 7.

### 2.2 Safety references

There is not only under this section of "safety references" the specified to consider general safety reference but also into other sections inserted, special safety reference.

#### Reference markings:

 <p>Safety references marked with this symbol can cause endangerments on persons and machines.</p>	 <p>Safety references marked with this symbol can cause damages on machines of it's function.</p>	 <p>Advices and informations to facilitate working and secure perfect operational sequences.</p>
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### Training and qualification of the personnel

The personnel for installation, use and maintenance must exhibit the appropriate qualification for the work. Area of responsibility, competence and monitoring of the personnel must be exactly regulated by the user.

## Safe working

All security references, present national instructions for accident prevention as well as internal instructions for working, use and safety are to be followed.

## Consequences

In case of ignoring the security references, endangerments of persons, environment and the tracking system as well as total loss of requirement on compensation can be the consequence.

For example:

- Failure of important functions of the plant.
- Endangerments of persons caused by mechanical effects.

## Safety references for the user

Endangerments of electronic electricity are to be excluded (see details for example in the regulation of Verband der Elektronik = VDE, Germany).

## Safety references for installation and maintenance

Before starting work at the tracking system make sure that the electricity supply has been switched off. Please follow the instructions to stop the drive in this guide.

## Inappropriate treatment

Working security of tracking systems is only guaranteed in case of normal application. The limit values specified in the technical data are not to be exceeded!

## Before installation of Solar Modules

Refer to instruction manual of solar modules and inverters for details about electrical and mechanical installation requirements.

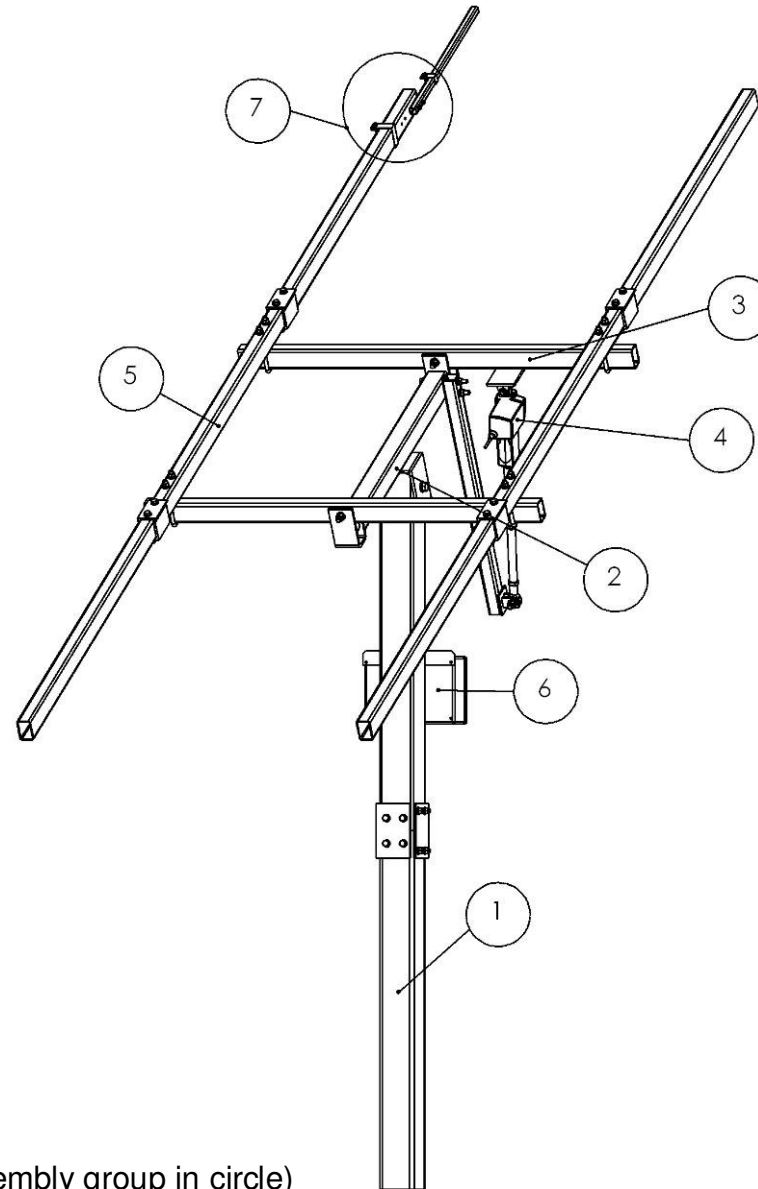
## Delivery and Installation

Tracking systems ETATRACK active series are supplied completely from the factory. Due to high weight of each part of the construction care must be taken during unpacking and handling.



It is absolutely necessary to wear security gloves and shoes!

### 3. Parts List



Overview for parts list (number of assembly group in circle)

Assembly group	Pos.	Quantity	Part name	Specification	Box No.
<b>1</b>	<b>mounting pole</b>				
	<b>1.1</b>	1	upper pole	tube 100x100x5, 990 long	1
	<b>1.2</b>	1	lower pole	tube 100x100x4, 990 long	1
	<b>1.3</b>	2	pole clamp	L-profile 100x100x6, 150 long	2
	<b>1.4</b>	8	screw	M10x130, 8.8	1
	<b>1.5</b>	16	washer	D 10	1
	<b>1.6</b>	8	spring washer	D 10	1
	<b>1.7</b>	8	nut	M10, 8	1
<b>2</b>	<b>beam</b>				
	<b>2.1</b>	1	beam	welded part	2
	<b>2.2</b>	1	screw	M16x150, 8.8	1
	<b>2.3</b>	2	washer	D 16	1
	<b>2.4</b>	1	spring washer	D 16	1
	<b>2.5</b>	1	self lock nut	M16, 8	1
	<b>2.6</b>	1	screw	M10x140, 8.8	1
	<b>2.7</b>	2	washer	D 10	1
	<b>2.8</b>	1	spring washer	D 10	1
	<b>2.9</b>	1	nut	M10, 8	1
<b>3</b>	<b>rail connector</b>				
	<b>3.1</b>	1	upper rail connector	welded part	2
	<b>3.2</b>	1	lower rail connector	60x40x3, 1160 long	1
	<b>3.3</b>	4	bushing	IGUS MFM1216-20	1
	<b>3.4</b>	2	screw	M12x90, 8.8	1
	<b>3.5</b>	4	washer	D 12	1
	<b>3.6</b>	2	self lock nut	M12, 8	1

Assembly group	Pos.	Quantity	Part name	Specification	Box No.
<b>4</b>	<b>motor and down motor fixation</b>				
	<b>4.1</b>	1	motor	LA31	2
	<b>4.2</b>	1	down motor fixation	tube 40x40x3, welded part	2
	<b>4.3</b>	2	screw	M10x130, 8.8	1
	<b>4.4</b>	4	big flat washer	D 10, 3xD	1
	<b>4.5</b>	2	spring washer	D 10	1
	<b>4.6</b>	2	nut	M10, 8	1
	<b>4.7</b>	1	screw	M10x70, 8.8	1
	<b>4.8</b>	1	washer	D 10	1
	<b>4.9</b>	4	self lock nut	M10, 8	1
	<b>4.10</b>	1	screw	M12x55, 8.8	1
	<b>4.11</b>	2	washer	D 12	1
	<b>4.12</b>	1	self lock nut	M12, 8	1
	<b>4.13</b>	1	earthing cable		1
	<b>4.14</b>	2	teeth washer	D 10	1
	<b>4.15</b>	1	flat nut	M10, 8	1
	<b>4.16</b>	2	cable strab		1
<b>5</b>	<b>frame</b>				
	<b>5.1</b>	2	rail middle	tube 60x40x3, 1160 long	2
	<b>5.2</b>	3	rail end A	tube 60x40x3, 1160 long	1
	<b>5.3</b>	1	rail end B	tube 60x40x3, 1160 long	1
	<b>5.4</b>	4	u-bolt	M10x140, 8.8	1
	<b>5.5</b>	8	big flat washer	D 10, 3xD	1
	<b>5.6</b>	8	spring washer	D10	1
	<b>5.7</b>	8	nut	M10, 8	1



Assembly group	Pos.	Quantity	Part name	Specification	Box No.
	<b>5.8</b>	8	rail clamp	L-profile 56x56x5	2
	<b>5.9</b>	8	screw	M10x90, 8.8	1
	<b>5.10</b>	16	washer	D 10	1
	<b>5.11</b>	8	spring washer	D 10	1
	<b>5.12</b>	8	nut	M10, 8	1
	<b>5.13</b>	1	extra PV-module fixation	tube 20x20x2, 560 long	2
	<b>5.14</b>	2	screw	M6x75, 8.8	1
	<b>5.15</b>	4	washer	D 6	1
	<b>5.16</b>	2	spring washer	D 6	1
	<b>5.17</b>	2	nut	M6, 8	1
<b>6</b>	<b>controller box</b>				
	<b>6.1</b>	1	controller box	plastic box	1
	<b>6.2</b>	2	sheet metal screw	M6x16, stainless steel	2
	<b>6.3</b>	2	washer	D 6, stainless steel	2
	<b>6.4</b>	3	cable strap		1
<b>7</b>	<b>module fixation</b>				
	<b>7.1</b>	28	PV-module fixation clip 60x40	stainless steel	2
	<b>7.2</b>	2	PV-module fixation clip 20x20	stainless steel	2
	<b>7.3</b>	30	screw	M6x20, stainless steel	1
	<b>7.4</b>	60	washer	D 6, stainless steel	1
	<b>7.5</b>	30	spring washer	D6, stainless steel	1
	<b>7.6</b>	30	nut	M6, stainless steel	1

## 4. Foundation

South direction

Formwork outer dimension 150x150. Formwork can be made by 4 pcs. or more boards for easier disassembly later install the tracker mounting pole 100x100.

min. 0,8m

min.  $\varnothing$  1,2m

2 pcs. Steel mesh Q 188A according to the standard DIN 488

South direction

See chapter 6.1, for correct pole assembly.

min. 0,8m

min. 1,0m

min. 1,0m

Attention

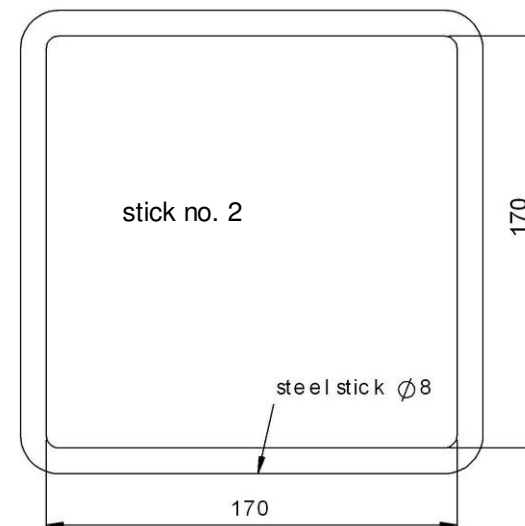
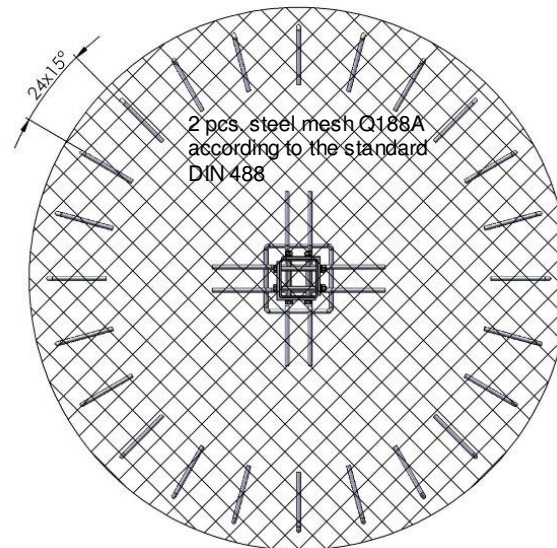
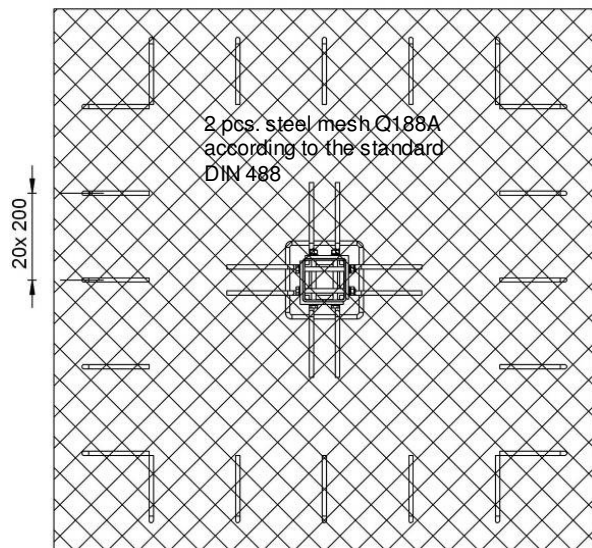
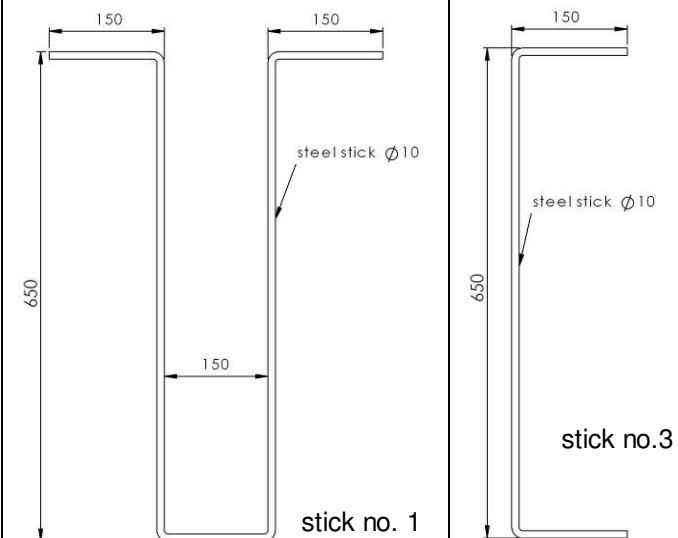
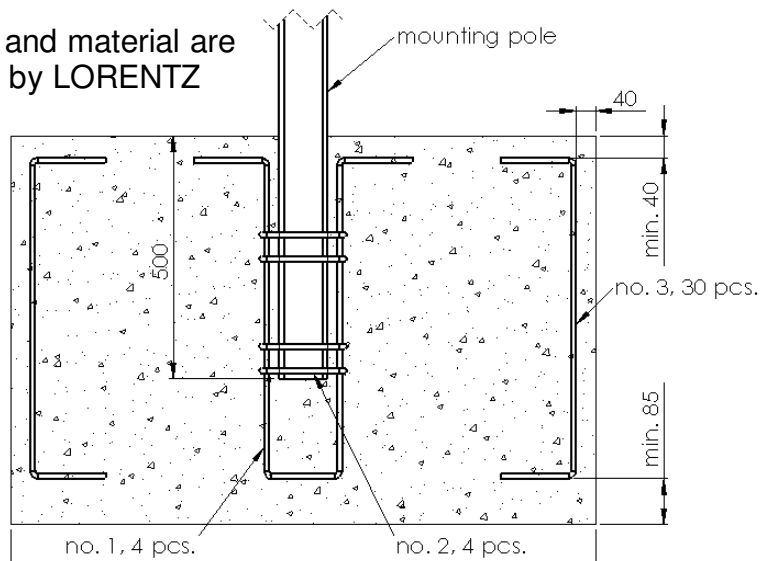
Before mounting the tracking system a suitable foundation is necessary.

**Pay attention for correct North-south direction of pole and that the pole is minimum 500 mm in the foundation, see next page!**

A surface foundation for the tracking system has to be constructed to assure the correct operation for the indicated maximum of module surfaces.

***These drawings are just examples of a suitable foundation with concrete reinforcement. Finally the foundation has to be accordingly to national standards and requirements.***

Shown parts and material are not delivered by LORENTZ



## 5. Mounting Instructions

The ETATRACK active 600 for is designed for minimum service and maintenance work. For safe and durable operation you should check the system continuously.



**We recommend a unique control of the screw connections approximately 6 months after installation, and than every year.**

All connection elements for parts of the tracker: Steel, zinc coated, strengthening class 8.8

All data are standard values in accordance with the producer's data which are not obligatory

**As this manual is only a suggestion from our side, the local technical firm has to verify the installation very carefully!**

### 5.1 Required tools and equipment for assembling

- Ring or open end flat spanner, wrench size 10, 16, 18, and 24 mm
- Socket nut (1/2"-drive) for wrench size 16, 18, and 24 mm
- Socket nut for screw of module clamps suppliers specifications
- Ratchet spanner 1/2"
- Torque wrench 1/2" ( needed torque 10-150Nm )
- Plastic hammer
- Four strong assembling tressles
- Big 90° stop bracket
- Measuring tape 4 m
- Marker for steel
- Safety shoes, helmet and safety equipment for floating load

## 5.2 Table of required torques

### Nominal torques for bolts ETATRACK active 600

<u>Screw / nut dimension</u>	<u>Strength</u>	<u>Torque [Nm]</u>
M16 self lock nut	8.8 (steel)	90
M12 self lock nut	8.8 (steel)	20 or 40
M10	8.8 (steel)	54
M10 self lock nut	8 (steel)	30
M6	8.8 / stainless steel	10 (fixed by hand force)

Please use torque wrench for exact nominal required torque!

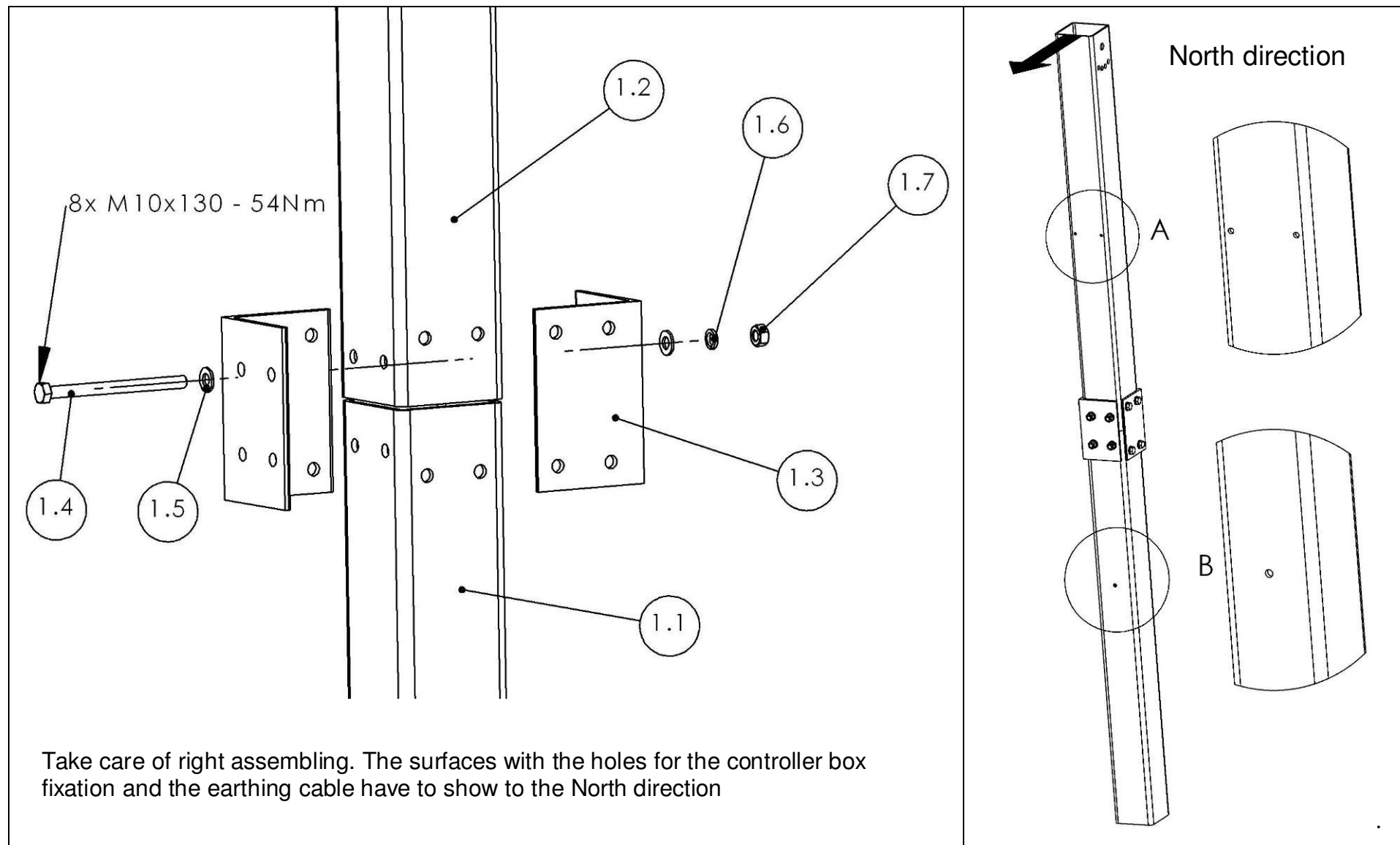
#### Attention

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

Self lock nuts must be replaced after loosen once! Use the torque wrench at the head side of the screws (not at the nuts).

## 6. Installation of assembly groups

### 6.1 Assembling mounting pole



## 6.2 Assembling beam

M16x150 - fixed by hand first

M16x150 - 90Nm

M10x140 - 54Nm

**Attention**

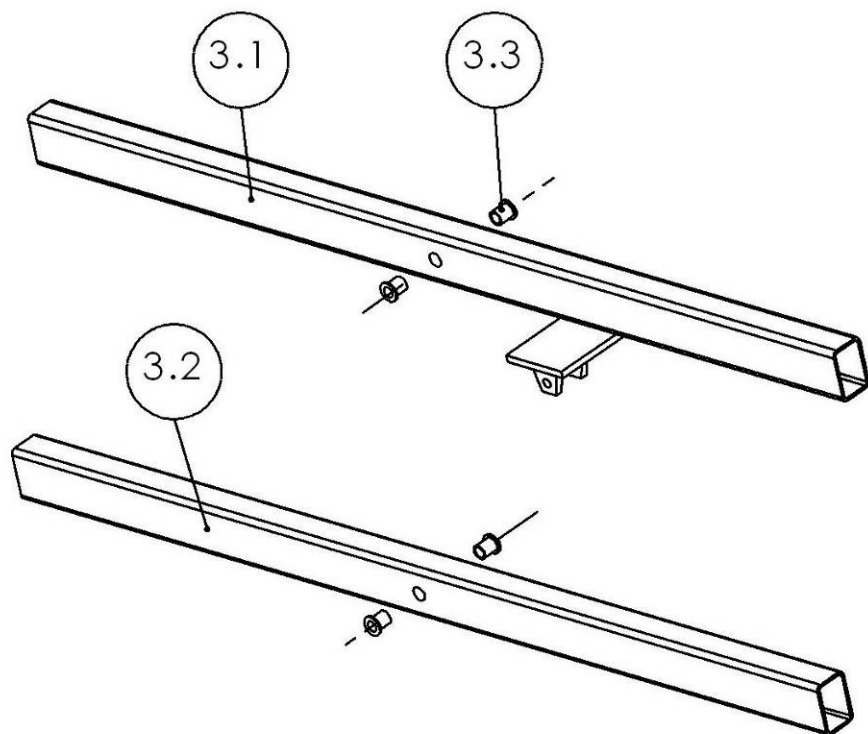
Adjust the requested tilt with the table beside. Choose the tilt and use the right hole combination.

tilt	hole combination
0°	B2
10°	A1
20°	B3
30°	A2
40°	B4
50°	A3

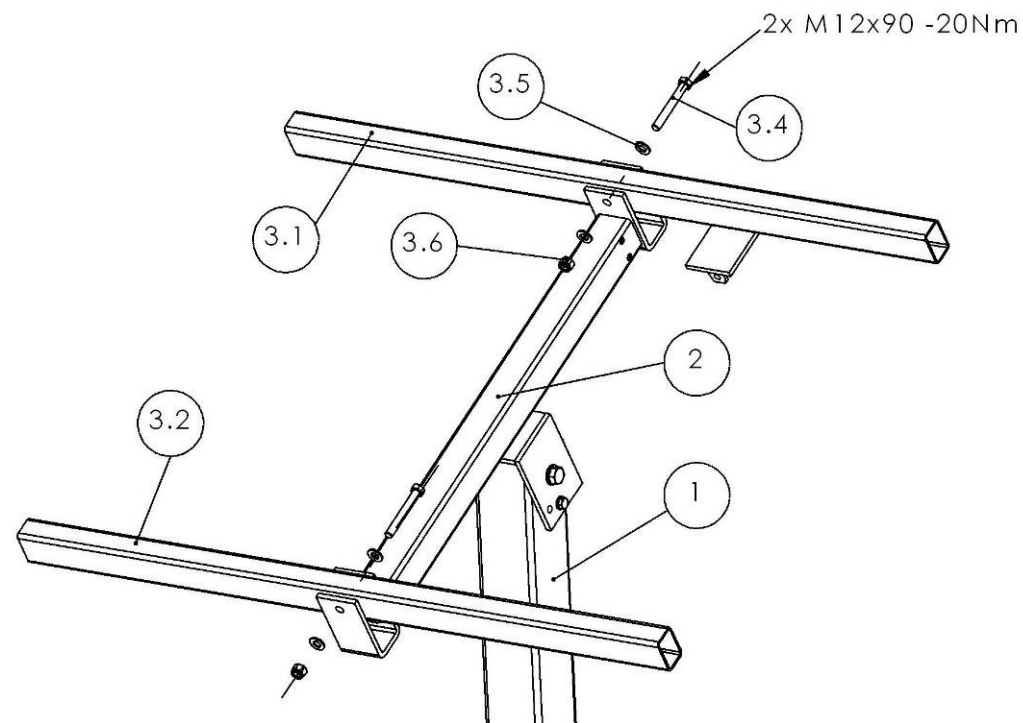
### 6.3 Assembling rail connectors and installation to hinge

**Advice**

Use a plastic hammer to punch the plastic bushing into the rail connectors.



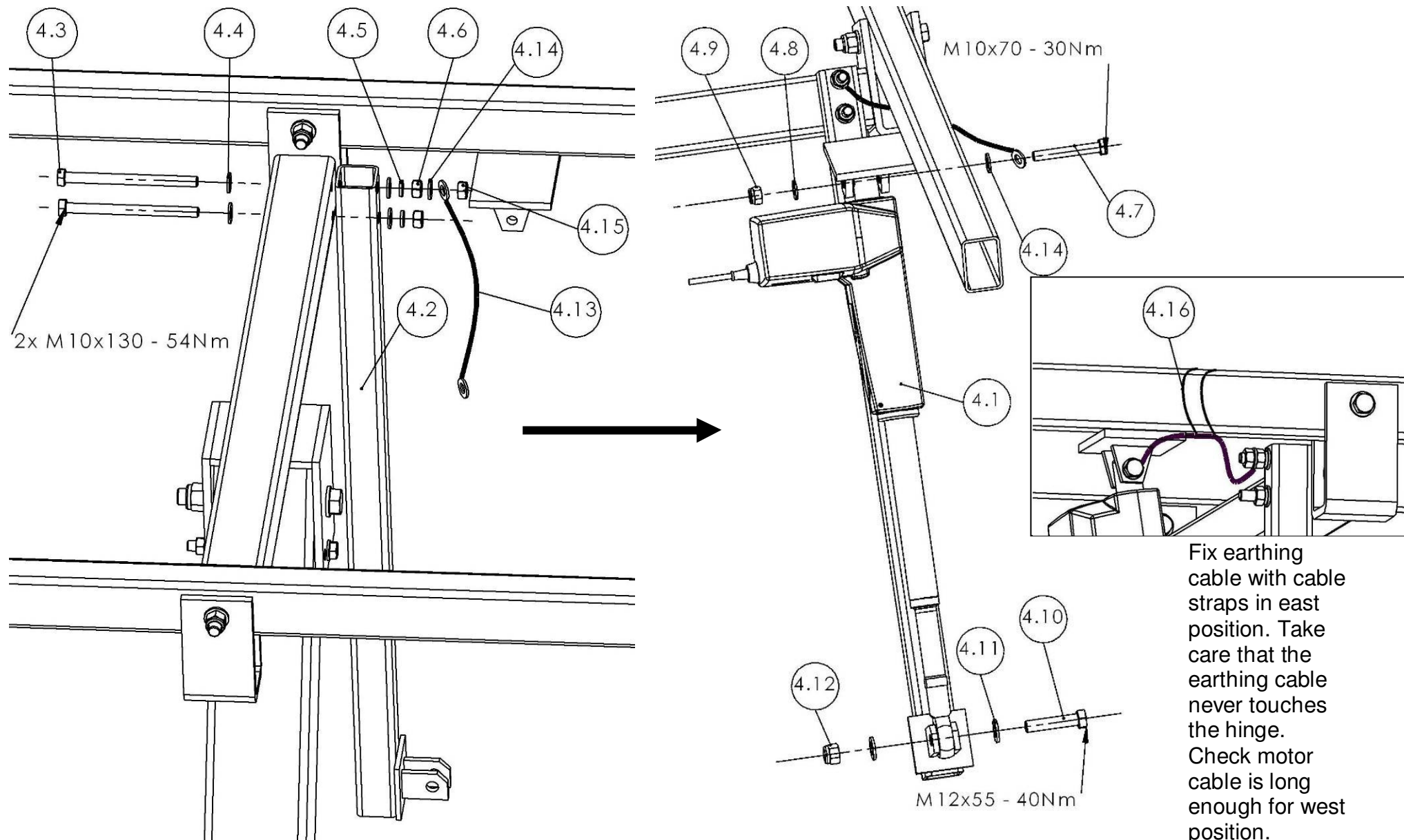
Installation of bushing into rail connectors.



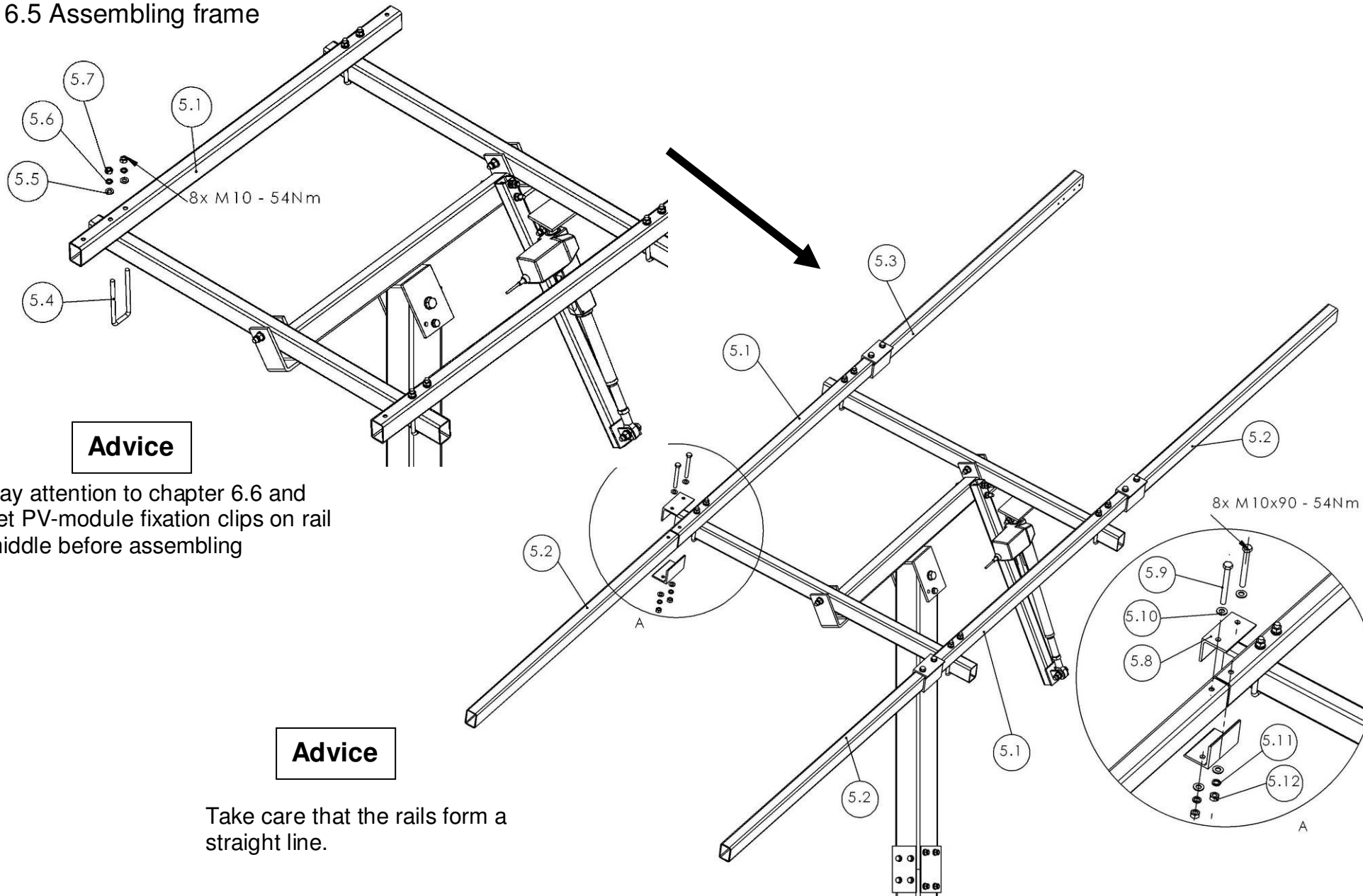
Assembling rail connectors to hinge.



### 6.4 Assembling motor and down motor fixation



### 6.5 Assembling frame



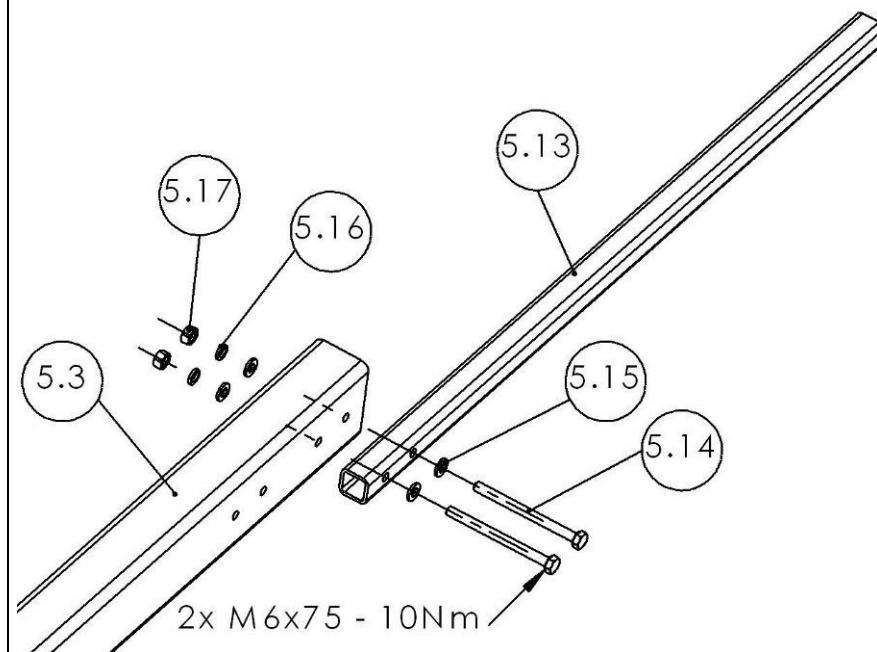
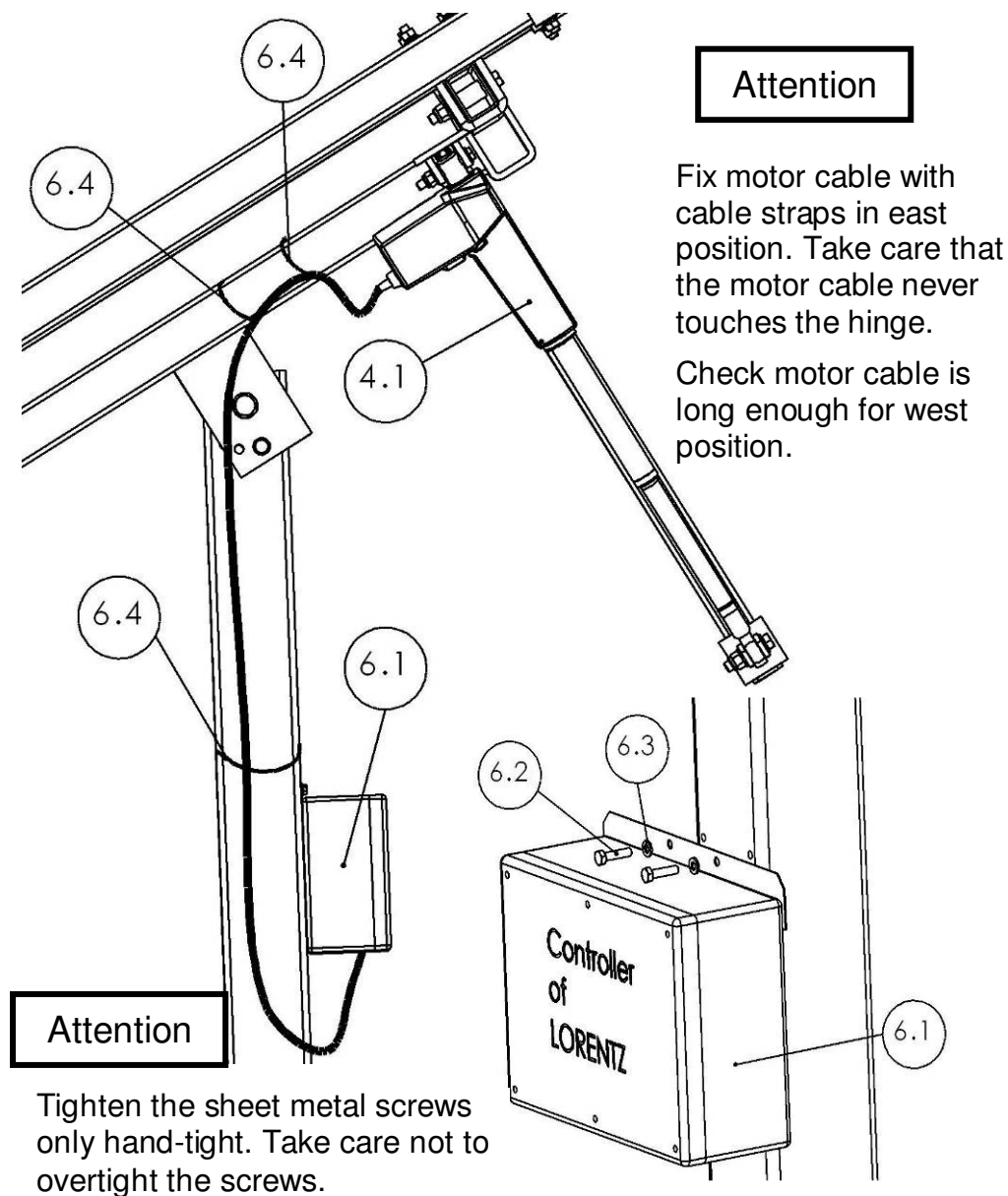
**Advice**

Pay attention to chapter 6.6 and set PV-module fixation clips on rail middle before assembling

**Advice**

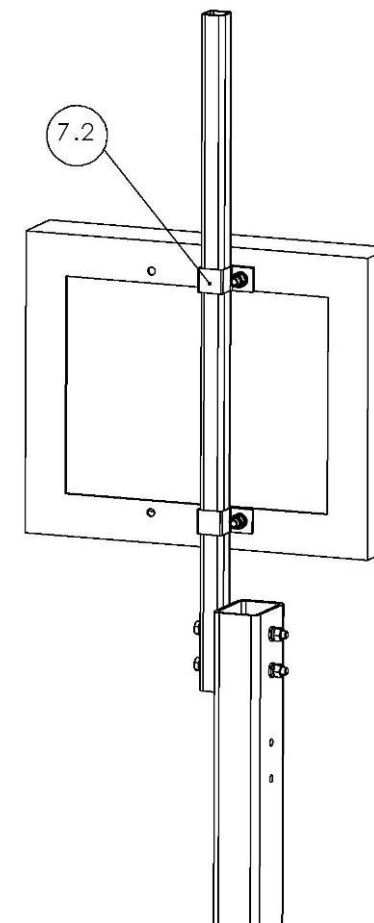
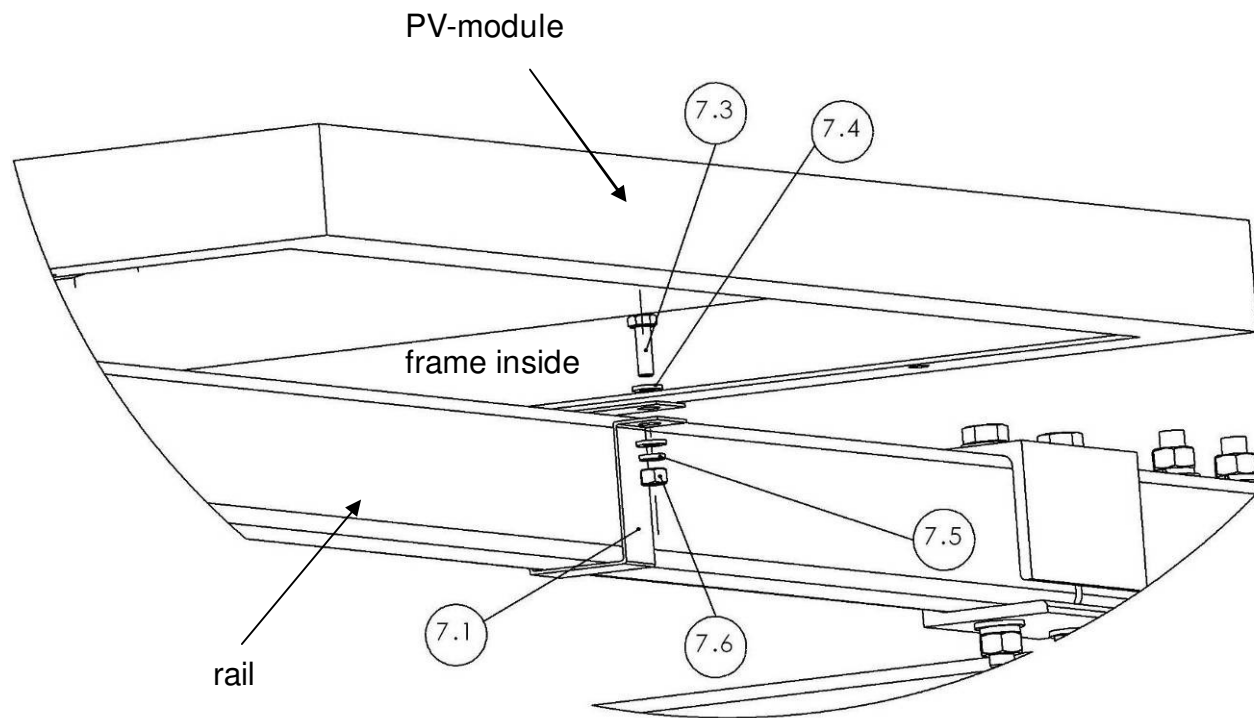
Take care that the rails form a straight line.

## 6.6 Installation of controller box and extra PV-module fixation



Depending on the module arrangement, use the holes in the front or in the back to fix the extra PV-module fixation.

## 6.7 PV-module installation



PV-module fixation with clips on the rails. The lip of the clip shows in the direction of the PV-module frame edge.

Installation of PV-module for controller power supply like the figure on the left side, but with smaller clips 7.2.

## 7. ETATRACK active Controller



### Warning

Wrong wiring (e.g. wrong polarity!) can cause damage of electric or electronic components! Components might not fail directly after installation – pre-damages can result in malfunction after some time of operation.

It has to be made sure, that installation is made by qualified personnel only. In case of any doubt during installation the supplier has to be contacted. Damages caused by wrong wiring are not covered by warranty!



### Attention

It has to be made sure, that the voltage of the battery is checked after three months in stock (including shipping from LORENTZ). The voltage should not drop down below 12.6V, otherwise the battery has to be recharged. Where appropriate, necessary data wiring has to be taken into account (7.6-7.7).

The following data of irradiation is valid for a 10Wp PV-module. Controller and actuator are powered by a PV-module, while the energy for this is stored in a battery.

**With an irradiation below 0,5kWh/m<sup>2</sup>/d (very cloudy), 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/m<sup>2</sup>/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, before the voltage drops below 11V. When removing the battery, the plug "Batt. / Solar" at the controller should be always unplugged, too.

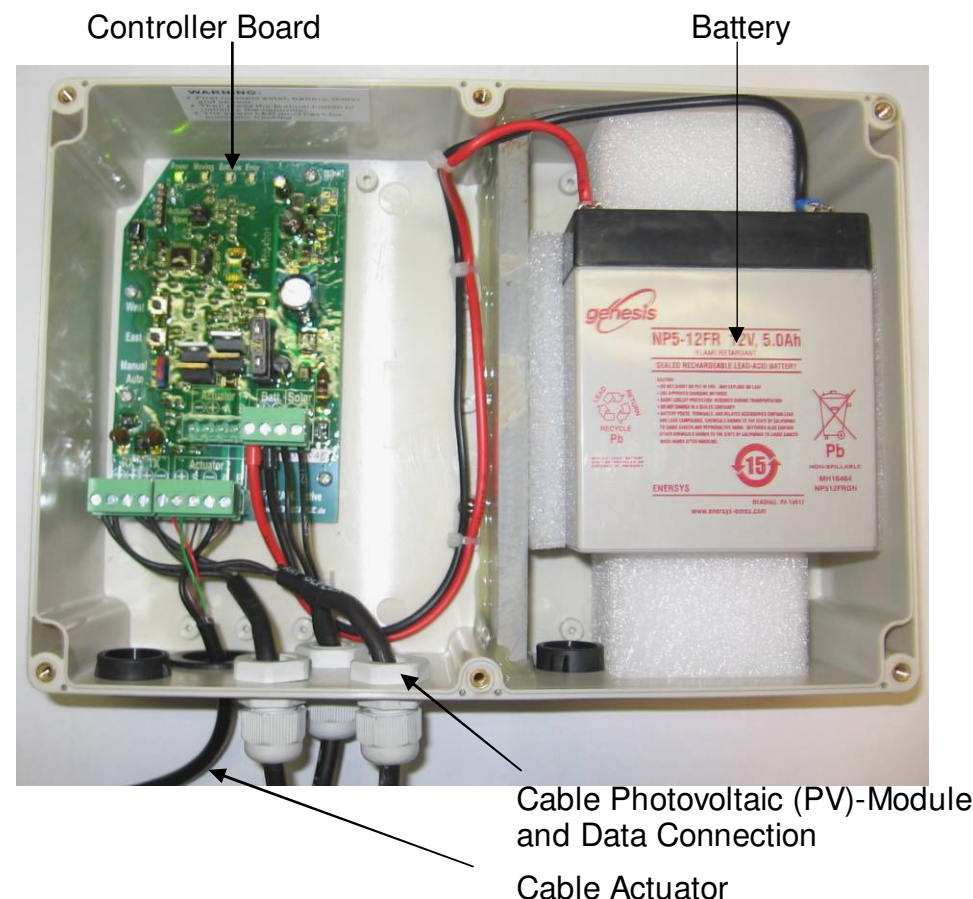
**Charging with a charger like it is used for 12V motorcycle batteries. The charging current should not exceed 1A, the charging voltage should not exceed 13,8V.**

After the battery has been recharged, it can be reinstalled in the controller and the tracker can be 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/m<sup>2</sup>/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 -20°C can damage motor and the battery permanently.** In this case, the battery has to be removed from the controller and stored in a preferably frost free place. Move the tracker to the south position manually before removing the battery. **No motor operation below -20°C!**

## View inside Controller



## 7.1 Overview Controller Board 17

### Indication Lights:

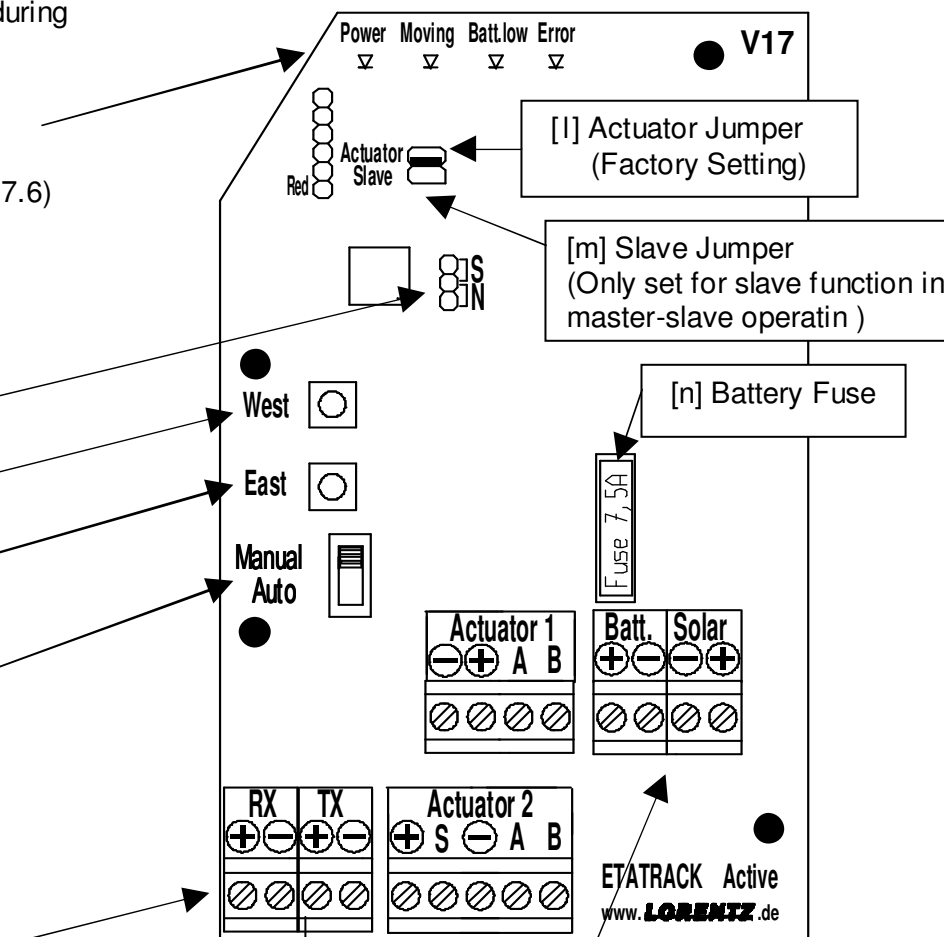
- [a] LED "Power": Flashes in automatic mode and is permanently on in manual. Off during reference travel. (See 6.3)
- [b] LED "Moving": Flashes during movement.
- [c] LED "Batt. Low": Flashes if battery voltage is low. (See 7.4)
- [d] LED "Error": Flashes if data communication is missing in Slave operation. (See 7.6)  
When data is received again, LED "Error" goes off.

### 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 6.4)  
(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 7.5 the inside view of the controller 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 LORENTZ PS-Pump Controller in solar-direct operation (not PSK-Controller), the controller can be connected to one of the PV-modules of the solar generators in parallel.**

**For all other applications, a separate PV-module has to be used, to ensure functionality.**

Data of the PV-module to be used:

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

North of 45°N resp. south of 45°S:

- Pmp min: 10Wp

South of 45°N resp. north of 45°S:

- Pmp min: 5Wp

Connection:

- Open the controller box
- Remove the cover of the left cable inlet, insert cable of the actuator
- 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.
- Close the controller

### 7.3 Reference Movement (Northern Hemisphere)

- Switch the controller to automatic mode [h], reference movement starts (Initialisation of the 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 only from the following day of reference movement
  - Reference movement takes place each time the voltage supply [k] is disconnected and reconnected.

### 7.4 Function and Operation

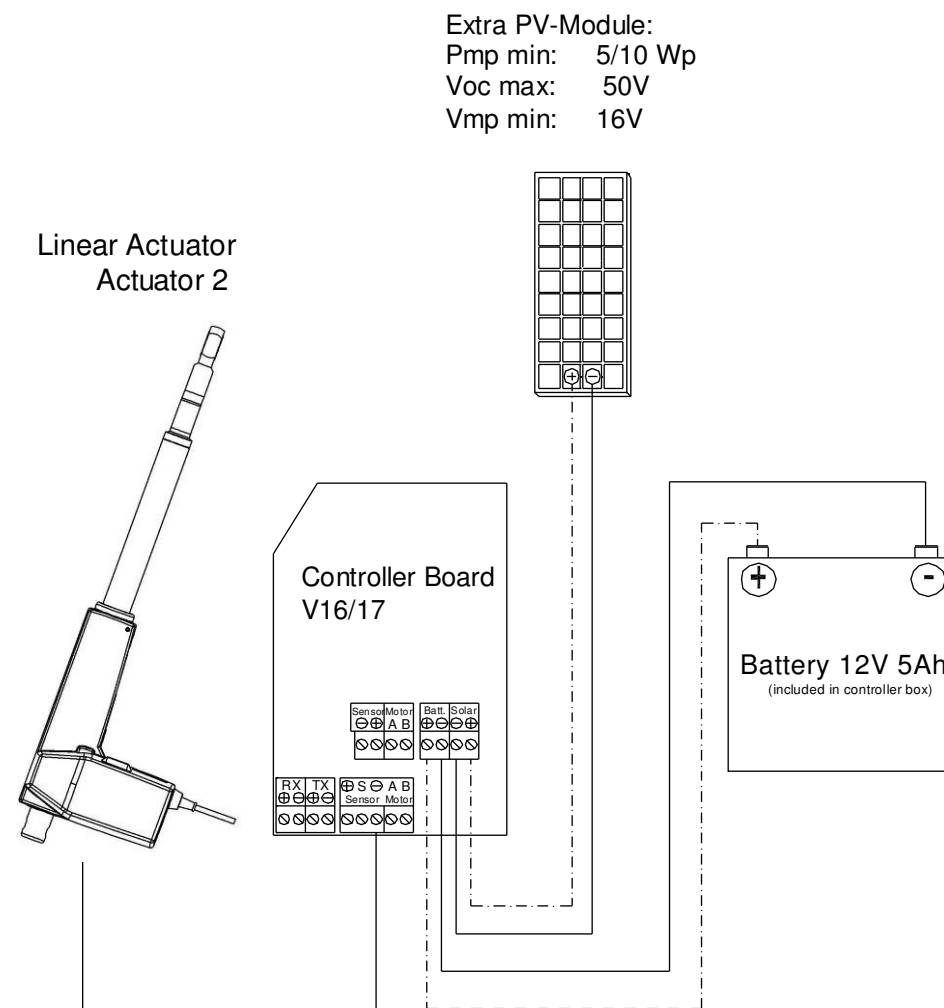
#### Tracking Movement: (Automatic mode)

- Sunrise: Tracker moves from the south position (middle 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.

#### 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



Attention: max. three reference movements or 50 tracking steps per hour, battery above 12,6V!



## 7.6 Master-Slave Operation (Only valid for V17!)

For the synchronisation of several Trackers in an application, there is the option of a Master-Slave operation. With this, one controller (Master) forces the other controllers (Slaves) to the current position.

### Installation:

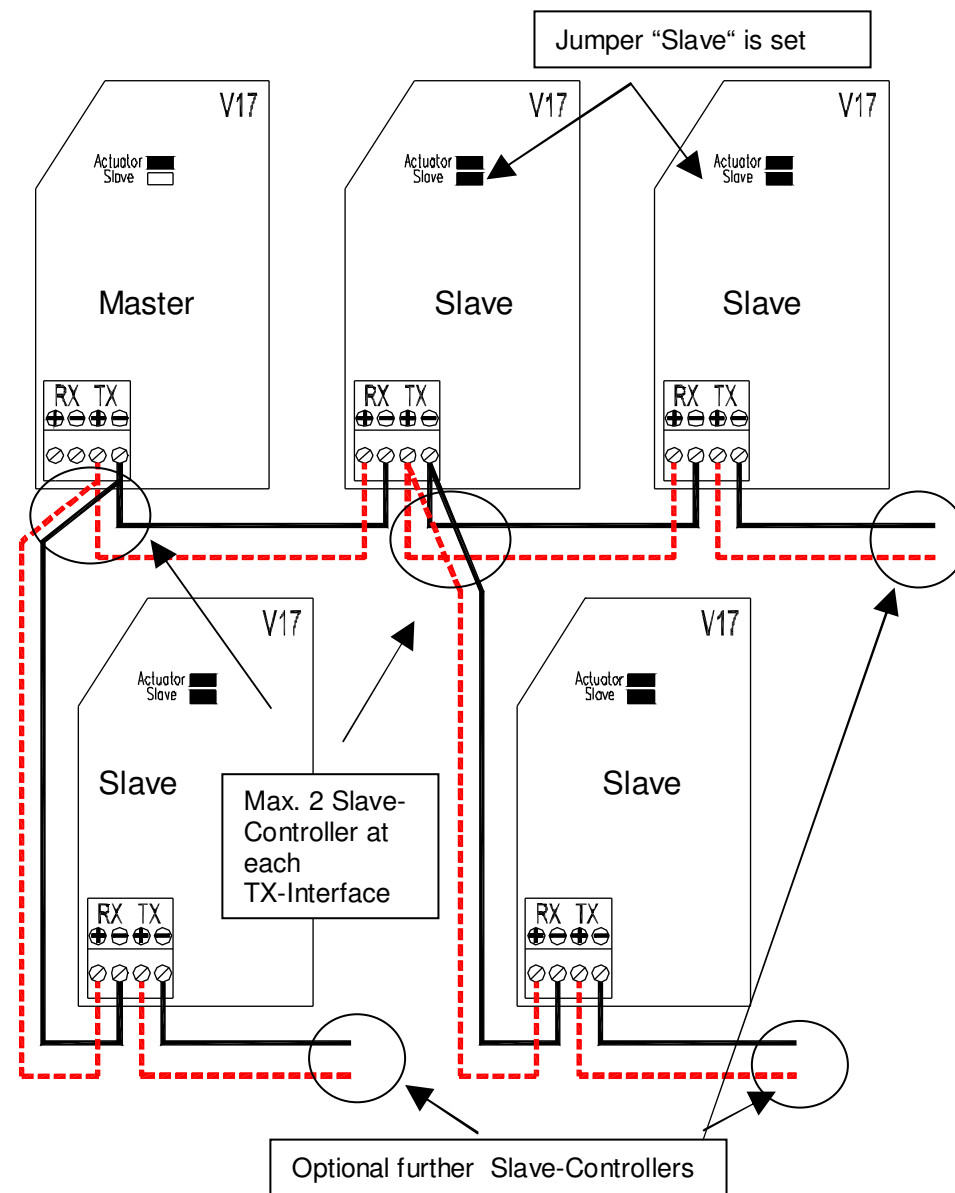
- Installation of the controllers according to 7.2, 7.5
- Connection of the controllers via data interface RX-TX [ i ]
- First controller in data string in declared as Master (Jumper "Slave" is not set [m])
- Further controllers are declared as Slave (Jumper "Slave" is set [m])
- 2-pole transmitting interface "TX" of the Master-Controllers 2-pole receiving interface "RX" of the first Slave-Controller ( take care of the polarity!)
- Reviewing interfaces "TX" of further Slave-Controllers can be connected to the transmitting interface of Slave-Controllers. (see 7.7)

### Operation:

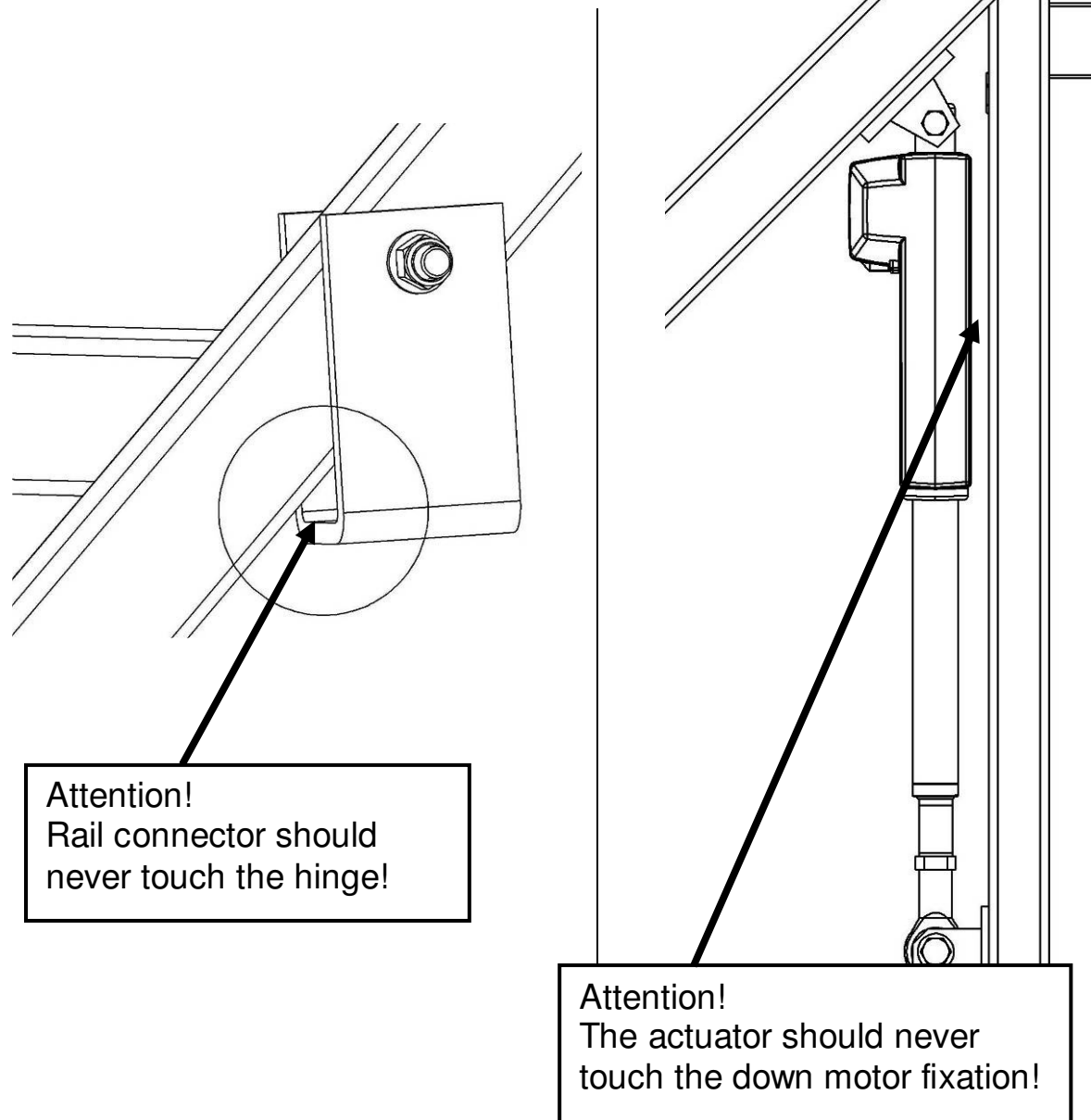
- Master-Controller sends the current position information every 5 minutes
- In manual mode no data is sent
- 45 minutes no signal at Slave-Controller: Tracker moves to the south position (middle position), LED "Error" [d] flashes

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 <sup>2</sup>
Cable type	shielded or unshielded

## 7.7 Wiring Diagram Master-Slave Operation



## 8. Check correct adjustment of motor



**Attention!**  
Rail connector should never touch the hinge!

**Attention!**  
The actuator should never touch the down motor fixation!

**Attention**

Check that the rail connectors do not touch the hinge in east and west position during reference movement. If the rail connectors touch the hinge or the actuator touches the down motor fixation contact the LORENTZ Company.

[www.lorentz.de](http://www.lorentz.de)

**Motor starts to move once the power plug is connected to controller board, Tracker starts reference movement after 10 seconds.**

Motor will stop if something blocks the movement. After a stop due to blocking, the Tracker has to be restarted by disconnecting and reconnecting the power plug after the obstacle has been removed.