DEGER ENERGIE
SOLAR TRACKING SYSTEMS

# Assembly Instruction

DEGER**traker** 3000NT
DEGER**traker** 3000HD
DEGER**traker** 5000NT
DEGER**traker** 5000HD
DEGER**traker** 6000NT
DEGER**traker** 7000NT
DEGER**traker** 9000NT

Effective 2012-07-01

# Assembly Instruction DEGERtraker

## List of content



**Please pay attention to the instructions on Page I-1 and I-2!**

# Assembly Instruction DEGERtraker

## Part I - Basics
## Inroduction

Congratulation for aquiring a DEGERtraker.
You decided on a high quality dual-axis solar tracking system which is suitable for all current photovoltaic solar modules.

**Maximum solar yield:**

The maximum solar yield can be achieved with the DEGERtraker tracking system.
By using the DEGERtraker tracking system, you are truly acknowledging the power of nature: you are not only protecting our environment and nature but you are increasing your yield and thus achieving ROI sooner. During the day, the DEGERtraker aligns itself like a sunflower following the sun or the brightest source of light.

**Maintenance-free. Long-life. Recyclable.**

The systems designed to these exacting parameters are mass-produced in an ISO 9001-certified factory under environmentally sound conditions. DEGERtraker systems are truly 99.9% recyclable.
Compared with rigid systems, the amount of electronic scrap after useful life is 40% lower!

**Quick installation.**

Pre-assembled components with detailed instructions allow an installation within less than four hours (after the mast has been erected).

**A technology to rely on.**

The fact that the patent-protected control system and the utility model-protected mechanical system were awarded the inventor's prize of the federal state of Baden-Württemberg in South-Germany in 2000 shows that the DEGERtraker meets the demands of both experts and investors.
Since this award the control unit and the mechanical system have been improved continuously. The design of the DEGERtrakers is done according to DIN 1055-4 (3/2005) with independent certification.

**Scope of delivery.**

Complete dual-axis tracking system: mast, rotating head, supporting frame, aluminium solar module carrier system - to fit the respective module type.
Control electronics: DEGERconecter with energy converter for extremely economical operation, wind monitor and optional sunlight sensor and security sensor.
Foundation plan and this assembly instructions.

DANGER **ATTENTION!**

## Read all of the instructions prior to working with the equipment and save these Assembly Instructions!

**The installation of the DEGERtraker may only be conducted by suitable specialists!**
**We recommend that the system be inspected by a master electrician, or at least a person with equivalent qualification, after completion.**

**A fault report (page VII-3) must be submitted in order to process complaints. Complaints cannot be processed if fault reports have not been filled out correctly!! (the serial number of the defect system must be included in the report)**

# Assembly Instruction DEGERtraker

## Part I - Basics
## Security advices

⚠ CAUTION The installed DEGERtraker tracking system has to be protected against trespassing in its whole sphere of action by adapted measures, for example by erecting a fence.

⚠ CAUTION While assemblage of the DEGERtraker or parts of the system and while the system is put into operation some risks of injury exist caused by moveable parts of the tracking system. To protect injuries caused by possibly existing burrs or sharp angles we imperatively recommend to wear gloves when mounting the steel parts of the system.

⚠ DANGER In case of checks or changes at the DEGERtraker all parts of the system have to be free of potential through a Customer-supplied electrical power switch. Zero-potential and mechanical protection have to be proven and guaranteed due to the “General rules for accident prevention”. When voltage supply is indispensable for checking the system injuries of persons have to be ruled out by adapted actions.

NOTICE Lightning protection and grounding should be installed/designed in accordance with state specific requirements and national standards for photovoltaic systems.

NOTICE The whole sphere of action has to be free of any objects.

Elevation-axle and azimuth-axle of the DEGERtraker can be moved manually by the enclosed Central Control Box (CCB). Therefore please pay attention to part V of this assembly instruction.
NOTICE To move the traker safely in the horizontal position in case of power failure we recommend to use a uninterruptible power supply. When all electrical components fail the systems can be moved into the horizontal position by using standard tools. (see III-6)

The development of the DEGERtrakers is based on the DIN 1055-4. Reducing the module surface the system will be able to resist higher demands than the values given in the norm. The maximum mountable module surface depends on regional conditions and regulations. To calculate the maximum mountable module surface a dimensioning-tool is available on our website. The download of the dimensioning-tool is free.

DEGERtrakers can also be set up in earthquake endangered zones without reservation in respect of module area or foundations geometry.

NOTICE In case of accumulation of snow on the module surface with more than 35kg/m²(equivalent to about 8 cm wet snow and about 15 cm powder snow) it is necessary to broach the module surface. It is possible to do this by activating manually the CCB as described above.
For 6000NT and 9000NT the snow sensor is mandatory. Upon failure of the snow sensor, it is necessary to tilt the module surface at a load of more than 10kg/m².

**Intended Use**
NOTICE A DEGERtraker is designed and dimensioned to be applied with standard-photovoltaic modules and is therefore not adapted to be applied with concentrator modules, mirrors, solar thermal collectors etc. The maximum mountable module surface calculated by the dimensioning-tool must not be exceeded in any case. As soon as the modules are mounted an operating wind guard has to be assembled or the module surface has to stay in the horizontal position.

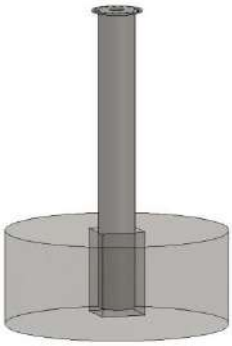
| | | |
|---|---|---|
| Permissible ambient temperature: | | -20°C to +55°C |
| Sound level | Distance 20m: | no difference to the sound level of the surrounding measurable |
| | Distance 10m: | 40 dB(A) Reference value: 40 dB(A) corresponds to:<br>- tweet of a bird<br>- usual background sound level in a house |

# Assembly Instruction
# DEGERtraker

## Part I - Basics
## Short assembly instruction

**1st step**

Assembly of foundation and mast



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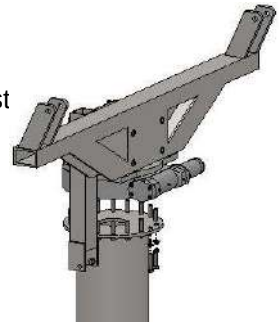
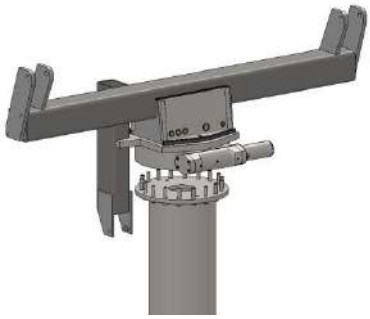
**2nd step**

Assembly of integrated motor east west





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**3rd step**

Assembly of base frame

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**4th step**

Assembly of Elevation motor

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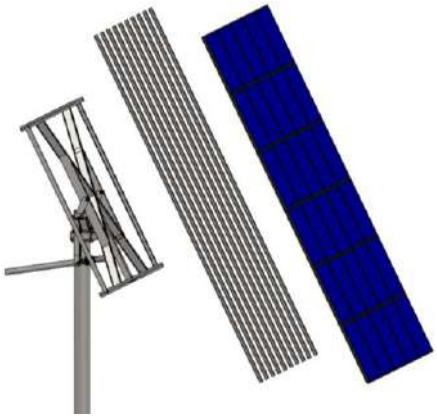
**5th step**

Assembly of modules and control unit



# Scope of delivery
# DEGERtraker

DEGER ENERGIE
SOLAR TRACKING SYSTEMS

**1300001 DEGERtraker 3000NT**

| A-Nr. | Name of item | | p | Pos. |
|---|---|---|---|---|
| * | Mast | | 1 | 1 |
| 8100041 | Rotating head 3000NT | | 1 | 2 |
| 8100017 | Base frame 3000NT | | 1 | 3 |
| 4100038 | Elevation-motor EMO V | | 1 | 4 |
| 8100036 | Boltpack rotating head | | 1 | 5 |
| 6800003 | Tread locking fluid 5g | | 1 | 6 |
| 8100034 | Boomerang II 3000NT | | 1 | 7 |
| 8910 | Assembly instruction | | 1 | 8 |
| 8100115 | Energy converter 6 | | 1 | 9 |
| * | Aluminium profiles F-Set-HD | | * | 10 |
| 6900003 | Sliding nut M10, 30x20x6 | Alu/Base frame | * | 12 |
| 6100005 | Bolt M10x140 | Alu/Base | * | 14 |
| * | End clamp | Solar module | * | 15 |
| 6900007 | Sliding nut M8 20x20x5 | Solar module | * | 16 |
| * | Bolt M8 | Solar module | * | 17 |
| 6900015 | Clamp plate 25x6, 4x2 | Solar module | * | 18 |
| * | Bolt M6 | Solar module | * | 19 |
| 6900006 | Sliding nut M6 20x20x5 | Solar module | * | 20 |

**1310001 DEGERtraker 3000HD**

| A-Nr. | Name of item | | p |
|---|---|---|---|
| * | Mast | | 1 |
| 8100048 | Rotating head 3000HD | | 1 |
| 8100018 | Base frame 3000HD | | 1 |
| 4100038 | Elevation-motor EMO V | | 1 |
| 8100019 | Boltpack rotating head | | 1 |
| 6800003 | Tread locking fluid 5g | | 1 |
| 8100031 | Boomerang II 3000HD | | 1 |
| 8910 | Assembly instruction | | 1 |
| 8100115 | Energy converter 6 | | 1 |
| * | Aluminium profiles F-Set-HD | | * |
| 6900003 | Sliding nut M10, 30x20x6 | Alu/Base frame | * |
| 6100005 | Bolt M10x140 | Alu/Base | * |
| * | End clamp | Solar module | * |
| 6900007 | Sliding nut M8 20x20x5 | Solar module | * |
| * | Bolt M8 | Solar module | * |
| 6900015 | Clamp plate 25x6, 4x2 | Solar module | * |
| * | Bolt M6 | Solar module | * |
| 6900006 | Sliding nut M6 20x20x5 | Solar module | * |

**1500001 DEGERtraker 5000NT**

| A-Nr. | Name of item | | p | Pos. |
|---|---|---|---|---|
| * | Mast | | 1 | 1 |
| 8100005 | Rotating head 5000NT | | 1 | 2 |
| 8100003 | Base frame 5000NT | | 1 | 3 |
| 4100038 | Elevation-motor EMO V | | 1 | 4 |
| 8100036 | Boltpack rotating head | | 1 | 5 |
| 6800003 | Tread locking fluid 5g | | 1 | 6 |
| 8100034 | Boomerang II 5000NT | | 1 | 7 |
| 8910 | Assembly instruction | | 1 | 8 |
| 8100115 | Energy converter 6 | | 1 | 9 |
| * | Aluminium profiles F-Set-X | | * | 10 |
| 6900011 | Clamp MTH M10-vz, Nova-Gr | Alu/Base frame | * | 11 |
| 6900003 | Sliding nut M10, 30x20x6 | Alu/Base frame | * | 12 |
| 6100020 | Bolt M10x35 | Alu/Base frame | * | 13 |
| * | End clamp | Solar module | * | 15 |
| 6900007 | Sliding nut M8 20x20x5 | Solar module | * | 16 |
| * | Bolt M8 | Solar module | * | 17 |
| 6900015 | Clamp plate 25x6, 4x2 | Solar module | * | 18 |
| * | Bolt M6 | Solar module | * | 19 |
| 6900006 | Sliding nut M6 20x20x5 | Solar module | * | 20 |

**1510001 DEGERtraker 5000HD**

| A-Nr. | Name of item | | pc |
|---|---|---|---|
| * | Mast | | 1 |
| 8100046 | Rotating head 5000HD | | 1 |
| 8100027 | Base frame 5000HD | | 1 |
| 4100055 | Elevation-motor EMO | | 1 |
| 8100019 | Boltpack rotating head | | 1 |
| 6800003 | Tread locking fluid 5g | | 1 |
| 8100032 | Boomerang II 5000HD | | 1 |
| 8910 | Assembly instruction | | 1 |
| 8100115 | Energy converter 6 | | 1 |
| * | Aluminium profiles F-Set-HD | | * |
| 6900011 | Clamp MTH M10-vz, Nova-Gr | Alu/Base frame | * |
| 6900003 | Sliding nut M10, 30x20x6 | Alu/Base frame | * |
| 6100020 | Bolt M10x35 | Alu/Base frame | * |
| * | End clamp | Solar module | * |
| 6900007 | Sliding nut M8 20x20x5 | Solar module | * |
| * | Bolt M8 | Solar module | * |
| 6900015 | Clamp plate 25x6, 4x2 | Solar module | * |
| * | Bolt M6 | Solar module | * |
| 6900006 | Sliding nut M6 20x20x5 | Solar module | * |

**1600001 DEGERtraker 6000NT**

| A-Nr. | Name of item | | p | Pos. |
|---|---|---|---|---|
| * | Mast | | 1 | 1 |
| 8100083 | Rotating head 6000NT | | 1 | 2 |
| 8100081 | Base frame 6000NT | | 1 | 3 |
| 4100055 | Elevation-motor EMO V HD | | 1 | 4 |
| 8100019 | Boltpack rotating head | | 1 | 5 |
| 6800003 | Tread locking fluid 5g | | 1 | 6 |
| 8100032 | Boomerang II 6000NT | | 1 | 7 |
| 8910 | Assembly instruction | | 1 | 8 |
| 8100115 | Energy converter 6 | | 1 | 9 |
| * | Aluminium profiles F-Set-HD | | * | 10 |
| 6900011 | Clamp MTH M10-vz, Nova-Gr | Alu/Base frame | * | 11 |
| 6900003 | Sliding nut M10, 30x20x6 | Alu/Base frame | * | 12 |
| 6100020 | Bolt M10x35 | Alu/Base frame | * | 13 |
| * | End clamp | Solar module | * | 15 |
| 6900007 | Sliding nut M8 20x20x5 | Solar module | * | 16 |
| * | Bolt M8 | Solar module | * | 17 |
| 6900015 | Clamp plate 25x6, 4x2 | Solar module | * | 18 |
| * | Bolt M6 | Solar module | * | 19 |
| 6900006 | Sliding nut M6 20x20x5 | Solar module | * | 20 |

**1700001 DEGERtraker 7000NT**

| A-Nr. | Name of item | | p |
|---|---|---|---|
| * | Mast | | 1 |
| 8100006 | Rotating head 7000NT | | 1 |
| 8100004 | Base frame 7000NT | | 1 |
| 4100038 | Elevation-motor EMO V | | 1 |
| 8100019 | Boltpack rotating head | | 1 |
| 6800003 | Tread locking fluid 5g | | 1 |
| 8100031 | Boomerang II 7000NT | | 1 |
| 8910 | Assembly instruction | | 1 |
| 8100115 | Energy converter 6 | | 1 |
| * | Aluminium profiles F-Set-X | | * |
| 6900011 | Clamp MTH M10-vz, Nova-Gr | Alu/Base frame | * |
| 6900003 | Sliding nut M10, 30x20x6 | Alu/Base frame | * |
| 6100020 | Bolt M10x35 | Alu/Base frame | * |
| * | End clamp | Solar module | * |
| 6900007 | Sliding nut M8 20x20x5 | Solar module | * |
| * | Bolt M8 | Solar module | * |
| 6900015 | Clamp plate 25x6, 4x2 | Solar module | * |
| * | Bolt M6 | Solar module | * |
| 6900006 | Sliding nut M6 20x20x5 | Solar module | * |

**1900001 DEGERtraker 9000NT**

| A-Nr. | Name of item | | p |
|---|---|---|---|
| * | Mast | | 1 |
| 8100077 | Rotating head 9000NT | | 1 |
| 8100074 | Base frame 9000NT | | 1 |
| 4100055 | Elevation-motor EMO HD | | 1 |
| 8100019 | Boltpack rotating head | | 1 |
| 6800003 | Tread locking fluid 5g | | 1 |
| 8100032 | Boomerang II 9000NT | | 1 |
| 8910 | Assembly instruction | | 1 |
| 8100115 | Energy converter 6 | | 1 |
| * | Aluminium profiles F-Set-HD | | * |
| 6900011 | Clamp MTH M10-vz, Nova-Gr | Alu/Base frame | * |
| 6900003 | Sliding nut M10, 30x20x6 | Alu/Base frame | * |
| 6100020 | Bolt M10x35 | Alu/Base frame | * |
| * | End clamp | Solar module | * |
| 6900007 | Sliding nut M8 20x20x5 | Solar module | * |
| * | Bolt M8 | Solar module | * |
| 6900015 | Clamp plate 25x6, 4x2 | Solar module | * |
| * | Bolt M6 | Solar module | * |
| 6900006 | Sliding nut M6 20x20x5 | Solar module | * |

**Pos. 4a:**

| | | | |
|---|---|---|---|
| 4100064 | Boltpack EMO | | 1 |

**Optional :**

| | |
|---|---|
| 1900003 | Inverter holding plate 1200 mm |
| 1900004 | Inverter holding plate 900 mm |
| 1900005 | Inverter holding plate 600 mm |
| 1900010 | Inverter holding plate1200mm with support bracket |
| 1900011 | Inverter holding plate 900mm with support bracket |
| 1900012 | Inverter holding plate 600mm with support bracket |
| 1900007 | Snow sensor |
| 5100032 | Sunlight sensor |
| 1990001 | CentralControlBox BASIC |
| 1990004 | CentralControlBox STANDARD |
| 1990003 | CentralControlBox ADVANCED |
| 1990008 | Pendulum kit for wind guard |

* depending on amount and size of modules
The excat number and dimensions refer to the enclosed packing list.
In the packing list you also can find the corresponding item number.

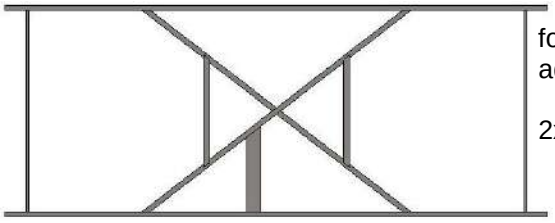
# Assembly Instruction
# DEGERtraker

## Part I - Basics
## Scope of delivery

Pos.1 : Mast

Pos.2 : Rotating head

Pos.3 : Base frame



for 9000NT
additional:

2x Thread rod

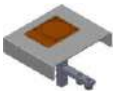
Pos.4 :Elevation motor EMO

Pos.4a: Bolt pack EMO

*optional:*

*Inverter holding plate*

*Snow Sensor*



*Sunlight Sensor*

*CentralControlBox*

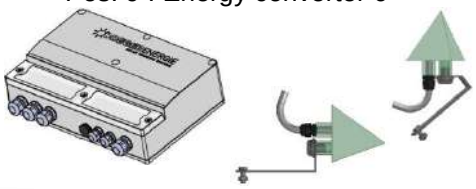
*Wind guard*
*BASIC*
*STANDARD*
*ADVANCED*

*Pendulum for Wind guard*

Pos. 5 : Bolt pack rotating head


Pos. 7 Boomerang II

Pos. 9 : Energy converter 6



Pos. 10 : Aluminum profiles

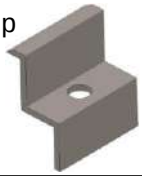
Pos. 11: Clamp MTH M10

Pos 12: Sliding nut M10

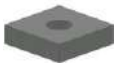
Pos. 13: Bolt
M10x35

Pos. 14: Bolt
M10x140

Pos. 15: End Clamp



Pos. 16: Sliding nut M8



Pos. 17: Bolt M8

Pos. 18: Clamp plate

Pos. 19: Bolt M6

Pos. 20: Sliding nut M6

# Assembly Instruction DEGERtraker

## Part II – Foundation and mast Assembley foundation

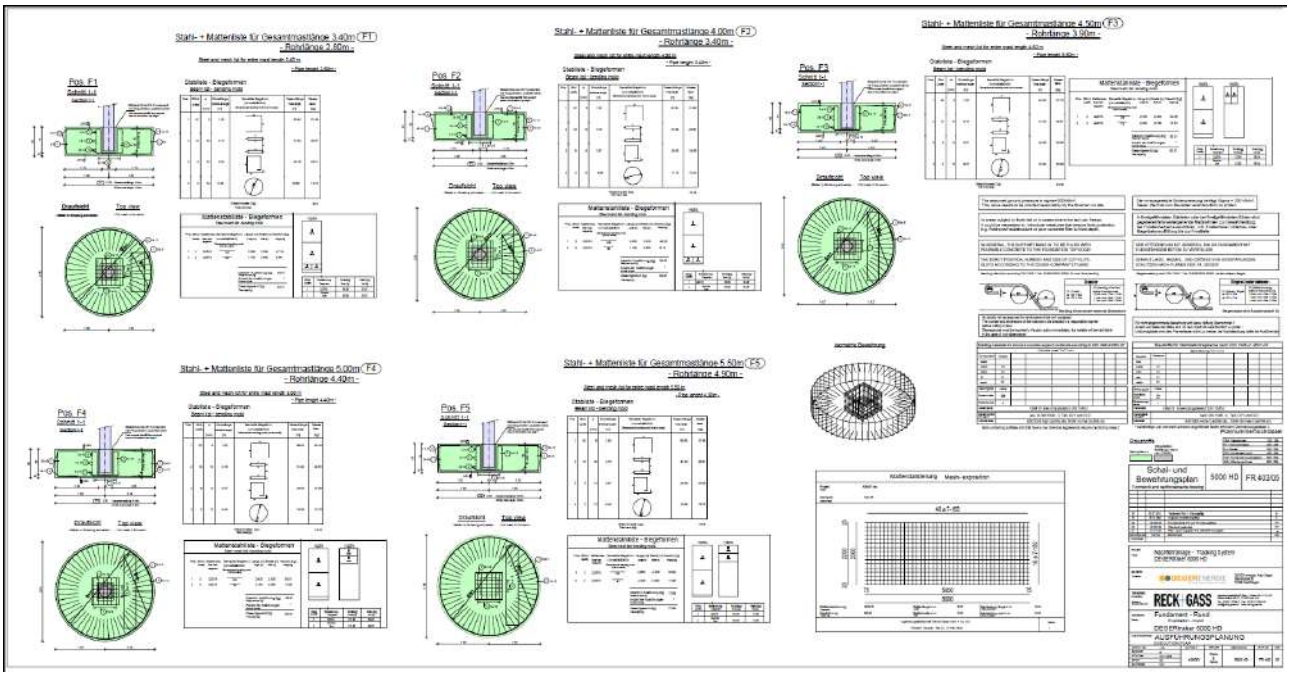
**A qualified professional must be commissioned with creating the foundation.**

**We recommend having the foundation reinforcement approved by a qualified engineer or technician before concreting.**

**The necessary bearing capacity of the subsoil is 200 kN/m². This value must be checked for correctness and documented by the site manager in charge. A substratum expert is to be called in if there is any uncertainty.**

**In regions and with soils at risk of frost, further measures must be taken to ensure frost protection, e.g. frost-proof sub-base or lean-mixed concrete fill down to the frost line.**

A formwork and reinforcement diagram for the particular foundation, as shown below, can be obtained for each DEGERtraker on request – you must observe the instructions given in the diagrams! This diagram will be sent with the order confirmation. The diagram shown is only intended as a sample drawing.



**Creating foundation**

**1st Step:**

- Excavate top soil
- Insert conduit for cable (not in picture)
- Install formwork (Foundation dimensions, see page II-4)
- Lay bottom layer of wire-mesh steel Q257A Item1 into the formwork (cut into the formwork)
- Insert a spacer to ensure minimum concrete coverage (5 cm).

# Assembly Instruction DEGERtraker

## Part II – Foundation and mast Assembley foundation

**2nd Step:**

- Insert mast mount centrally (height approx.10 cm).
- Install bent bar-steel into the center of the foundation.

**ATTENTION: Conduit must be inside the mast**

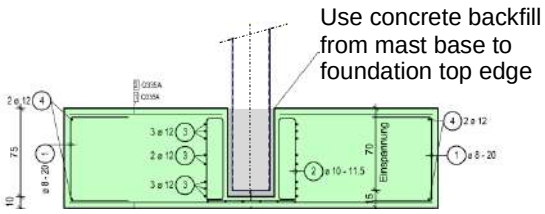
- Install bent bar-steel.
- Install top layer of wire-mesh steel Q257A (cut into the formwork).

**3th Step:**

- Create formwork for the receiving part.
- Attach foundation formwork.
- Affix foundation formwork in such a way that the formwork pressure generated by filling can be absorbed.
- Pour out and compact the foundation (without receiving part) using C20/30 concrete.

**4th Step:**

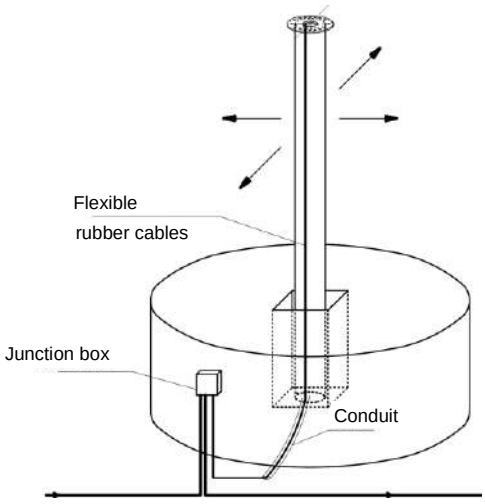
- Affix mast with 2 reinforcement against rotation.
- Insert mast into the foundation receiving part.
  You do not have to take account of the location of the bores in the flange.
  ATTENTION: Conduit must be inside the mast until min. 10 cm above foundation top edge
- Align mast vertically.
- Fill up receiving part and mast base up to the top edge of the foundation using grout concrete C25/30 (flowable) and compact the concrete.




**The concrete should be allowed to harden for at least 2 days before any further installation work is done!**

**ATTENTION! Cable guide**

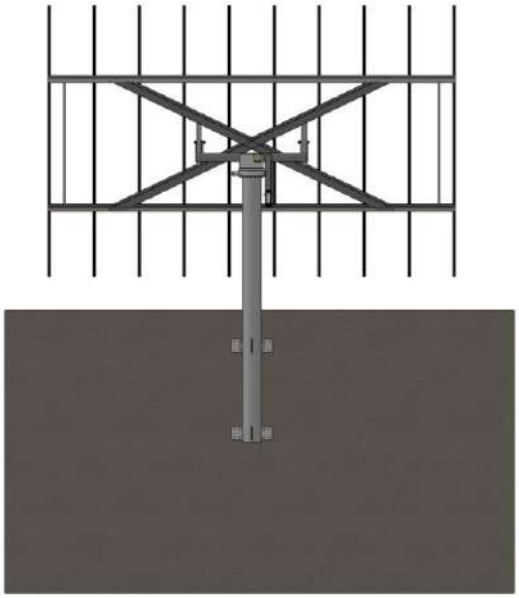
We recommend you attach a junction box to the side of the foundations, as shown in the adjacent drawing. The cables from the junction box to the rotating head must be designed as flexible rubber cables.



# Assembly Instruction DEGERtraker

## Part II – Foundation and mast
## Assembly of the mast

**Example for mounting on concrete wall C20/25:**

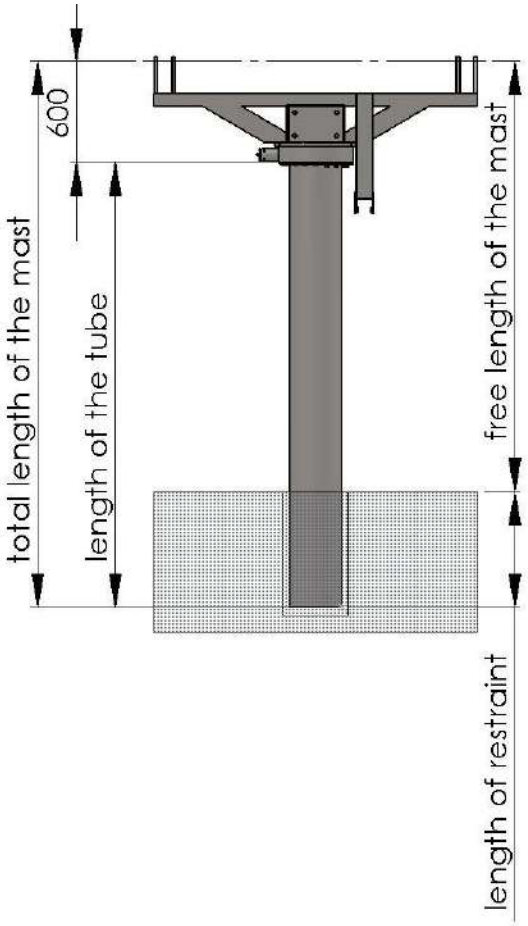


DANGER **ATTENTION!**

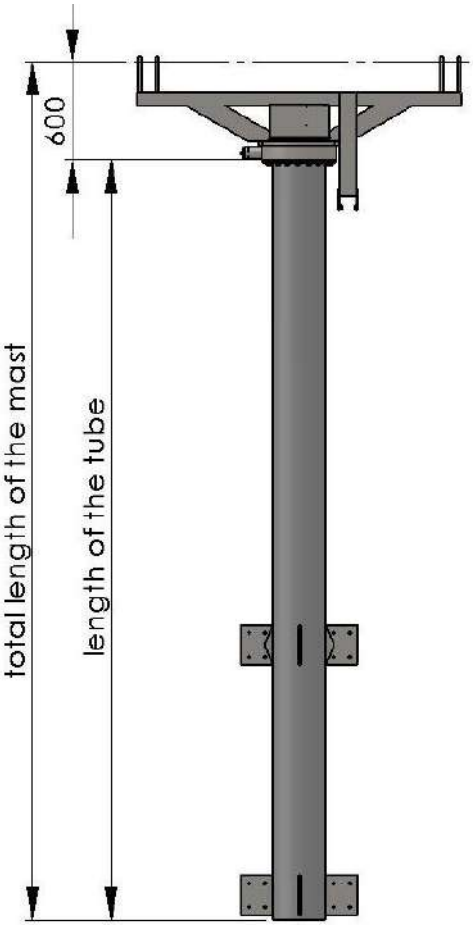
**It is necessary to dimension the mounting for every system separately according to the conditions on site.**
**The calculations are to be assigned to a local structural engineer who is responsible for the present building!**

Dimensions:

Free standing tracker:




Tracker building integrated:



# Assembly Instruction DEGERtraker

## Part II – Foundation and mast Dimensions

**DEGERtraker 3000**

| modul area m² | total length of the mast m | free length of the mast m | length of restraint m |
|---|---|---|---|
| 25 | 3,3 | 2,6 | 0,7 |
| 25 | 4,0 | 3,3 | 0,7 |
| 25 | 4,5 | 3,8 | 0,7 |
| 25 | 5,0 | 4,3 | 0,7 |
| 25 | 5,5 | 4,8 | 0,7 |

**NT**

| mast cross section Ø / wall thickness mm | mast weight kg | foundation dimensions cm | foundation dimensions cm |
|---|---|---|---|
| tube 219.1 x 7.1 | 113 | Ø205x85 | 180x180x85 |
| tube 219.1 x 8.0 | 160 | Ø210x85 | 185x185x85 |
| tube 219.1 x 8.8 | 198 | Ø215x85 | 190x190x85 |
| tube 219.1 x 10.0 | 251 | Ø225x85 | 200x200x85 |
| tube 219.1 x 11.0 | 303 | Ø235x85 | 205x205x85 |

**HD**

| mast cross section Ø / wall thickness mm | mast weight kg | foundation dimensions cm | foundation dimensions cm |
|---|---|---|---|
| tube 323.9 x 8.8 | 212 | Ø205x85 | 180x180x85 |
| tube 323.9 x 8.8 | 263 | Ø215x85 | 190x190x85 |
| tube 323.9 x 8.8 | 299 | Ø225x85 | 200x200x85 |
| tube 323.9 x 8.8 | 316 | Ø225x85 | 200x200x85 |
| tube 323.9 x 8.8 | 350 | Ø235x85 | 200x200x85 |

**DEGERtraker 5000**

| modul area m² | total length of the mast m | free length of the mast m | length of restraint m |
|---|---|---|---|
| 40 | 3,3 | 2,6 | 0,7 |
| 40 | 4,0 | 3,3 | 0,7 |
| 40 | 4,5 | 3,8 | 0,7 |
| 40 | 5,0 | 4,3 | 0,7 |
| 40 | 5,5 | 4,8 | 0,7 |
| 40 | 6,0 | 5,3 | 0,7 |
| 40 | 8,0 | 7,3 | 0,7 |

**NT**

| mast cross section Ø / wall thickness mm | mast weight kg | foundation dimensions cm | foundation dimensions cm |
|---|---|---|---|
| tube 219.1 x 7.1 | 113 | Ø230x85 | 200x200x85 |
| tube 219.1 x 8.0 | 160 | Ø250x85 | 220x220x85 |
| tube 219.1 x 8.8 | 198 | Ø280x85 | 240x240x85 |
| tube 219.1 x 10.0 | 251 | Ø300x85 | 260x260x85 |
| tube 219.1 x 11.0 | 303 | Ø310x85 | 270x270x85 |

**HD**

| mast cross section Ø / wall thickness mm | mast weight kg | foundation dimensions cm | foundation dimensions cm |
|---|---|---|---|
| tube 323.9 x 8.8 | 212 | Ø260x85 | 230x230x85 |
| tube 323.9 x 8.8 | 263 | Ø270x85 | 240x240x85 |
| tube 323.9 x 8.8 | 299 | Ø285x85 | 250x250x85 |
| tube 323.9 x 8.8 | 316 | Ø290x85 | 255x255x85 |
| tube 323.9 x 8.8 | 350 | Ø300x85 | 265x265x85 |
| tube 323.9 x 10,0 | 434 | Ø310x85 | 275x275x85 |
| tube 323.9 x 17,5 | 989 | Ø340x85 | 300x300x85 |

**DEGERtraker 6000**

| modul area m² | total length of the mast m | free length of the mast m | length of restraint m |
|---|---|---|---|
| 53 | 4,0 | 3,3 | 0,7 |
| 53 | 4,5 | 3,8 | 0,7 |
| 53 | 5,0 | 4,3 | 0,7 |
| 53 | 5,5 | 4,8 | 0,7 |
| 53 | 6,0 | 5,3 | 0,7 |
| 53 | 8,0 | 7,3 | 0,7 |

**NT**

| mast cross section Ø / wall thickness mm | mast weight kg | foundation dimensions cm | foundation dimensions cm |
|---|---|---|---|
| tube 323.9 x 7,1 | 205 | Ø255x85 | 225x225x85 |
| tube 323.9 x 7,1 | 233 | Ø260x85 | 230x230x85 |
| tube 323.9 x 8.0 | 292 | Ø265x85 | 235x235x85 |
| tube 323.9 x 8.8 | 356 | Ø270x85 | 240x240x85 |
| tube 323.9 x 8.8 | 387 | Ø285x85 | 250x250x85 |
| tube 323.9 x 14,2 | 817 | Ø310x85 | 270x270x85 |

**DEGERtraker 7000**

| modul area m² | total length of the mast m | free length of the mast m | length of restraint m |
|---|---|---|---|
| 60 | 3,3 | 2,6 | 0,7 |
| 60 | 4,0 | 3,3 | 0,7 |
| 60 | 4,5 | 3,8 | 0,7 |
| 60 | 5,0 | 4,3 | 0,7 |
| 60 | 5,5 | 4,8 | 0,7 |

**NT**

| mast cross section Ø / wall thickness mm | mast weight kg | foundation dimensions cm | foundation dimensions cm |
|---|---|---|---|
| tube 323.9 x 7.1 | 166 | Ø280x85 | 280x280x85 |
| tube 323.9 x 7.1 | 205 | Ø290x85 | 290x290x85 |
| tube 323.9 x 8.0 | 259 | Ø300x85 | 300x300x85 |
| tube 323.9 x 10.0 | 356 | Ø320x85 | 320x320x85 |
| tube 323.9 x 11.0 | 430 | Ø330x85 | 330x330x85 |

**DEGERtraker 9000**

| modul area m² | total length of the mast m | free length of the mast m | length of restraint m |
|---|---|---|---|
| 70 | 4,0 | 3,3 | 0,7 |
| 70 | 4,5 | 3,8 | 0,7 |
| 70 | 5,0 | 4,3 | 0,7 |
| 70 | 6,0 | 5,3 | 0,7 |
| 70 | 8,0 | 7,3 | 0,7 |

**NT**

| mast cross section Ø / wall thickness mm | mast weight kg | foundation dimensions cm | foundation dimensions cm |
|---|---|---|---|
| tube 323.9 x 7.1 | 205 | Ø320x85 | 290x290x85 |
| tube 323.9 x 8.0 | 259 | Ø330x85 | 300x300x85 |
| tube 323.9 x 10.0 | 356 | Ø340x85 | 320x320x85 |
| tube 323.9 x 16,0 | 672 | Ø380x85 | 330x330x85 |
| tube 323.9 x 20.0 | 1121 | Ø420x85 | 365x365x85 |

NOTICE **ATTENTION!**

The measurements and dimensions listed have been calculated according to DIN norms and should be understood as a guide values. National norms, directives and materials must also be taken into consideration. Special foundation plans (also for Canada and USA) can be made available on request!!
**The total length of the mast 6,0m and 8,0m are only available in Europe!**

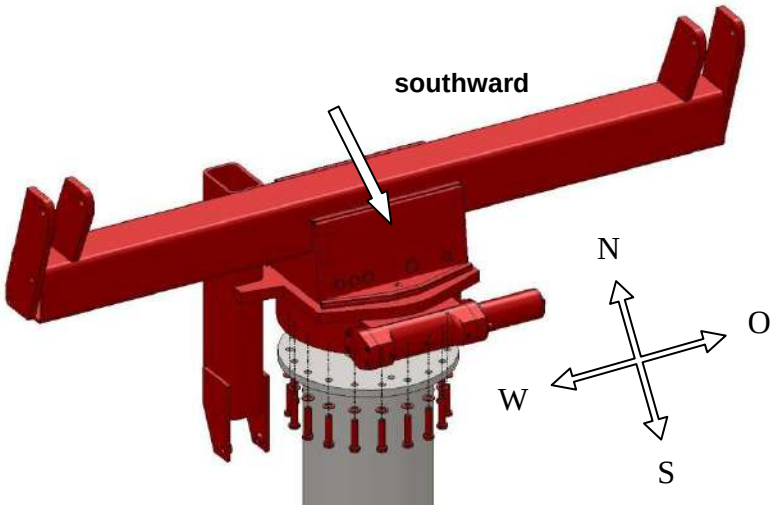
# Assembly Instruction
# DEGERtraker

## Part III - Structure
## Assembly integrated motor east-west and boomerang

**1st step:**

Set rotating head carefully onto the flange on the top of the mast. The gearbox should not get hard knocks.

The drive unit should roughly point south (+/- 30°) while being screwed tight.




**2nd step:**

Screw rotating head with the flange by using bolts M16x75 and washers M16.

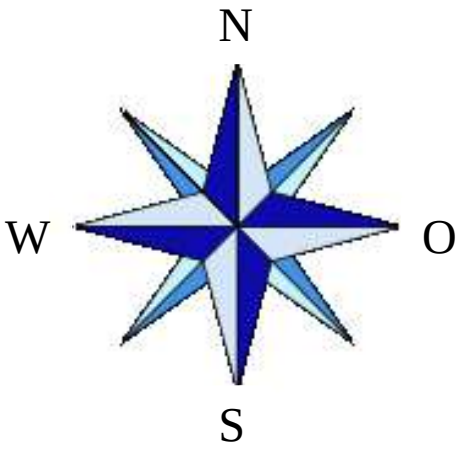
**torque 200Nm**

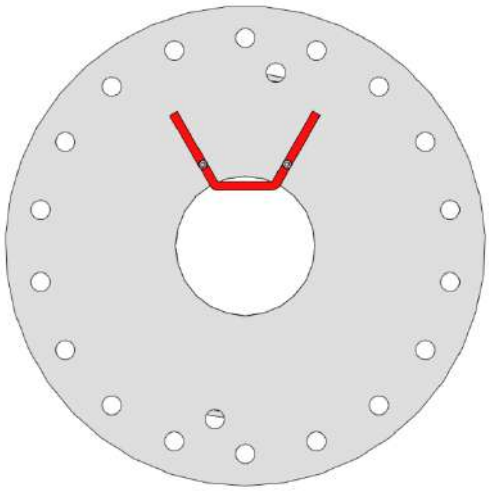
| Weight of rotation head | |
|---|---|
| DEGERtraker 3000NT, 5000NT | 160kg |
| DEGERtraker 3000HD, 7000NT | 240kg |
| DEGERtraker 5000HD, 6000NT, 9000NT | 260kg |

**3rd step:**

Mounting boomerang at the mast flange.

The tip of the “boomerang” must point in a southward direction (+/-3°). Use a GPS device or refer to the surveyor’s plan of the property to determine the south position. A compass is not precise enough.
As the boomerang is operating the end-limit-switch and with this the final position of the east-west-axis is set, an exact arrangement is necessary.

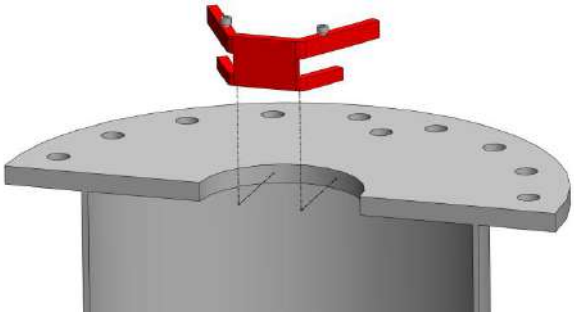


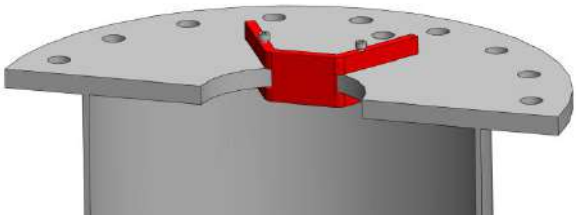



The position of the bore holes is irrelevant.

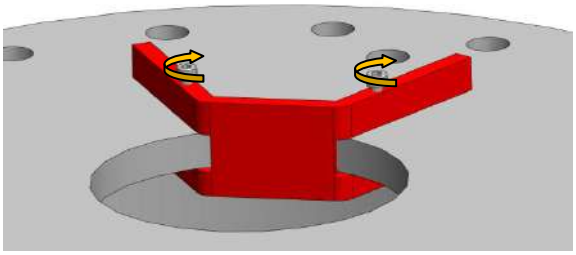
# Part III – Structure
# Assembly boomerang and limit switch

Push the boomerang as shown at the mast flange and fix it with the screws M5x18.





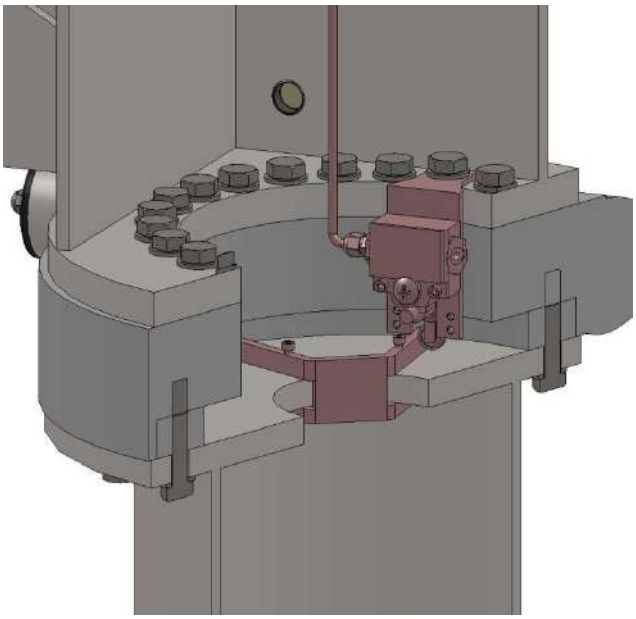
**torque 6.5Nm**

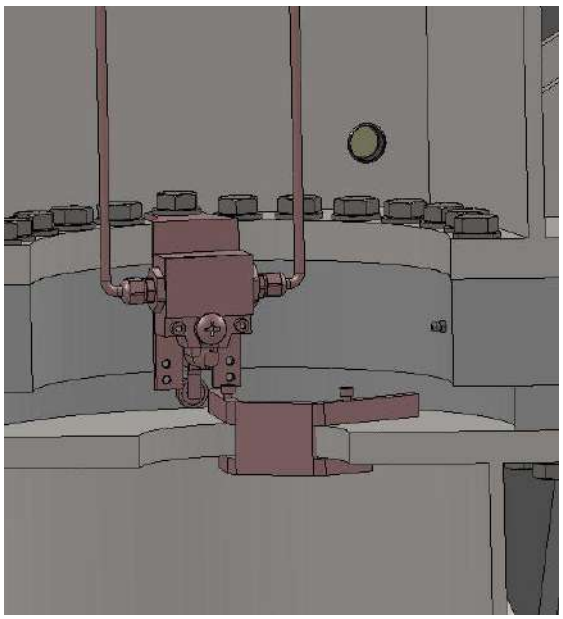


**4th Step:**

Attach the limit switch setting azimuth in the free bore on the rotating head.

Make sure that the switch flag terminals make contact upon operation of the boomerang and that the rotation movement is stopped.





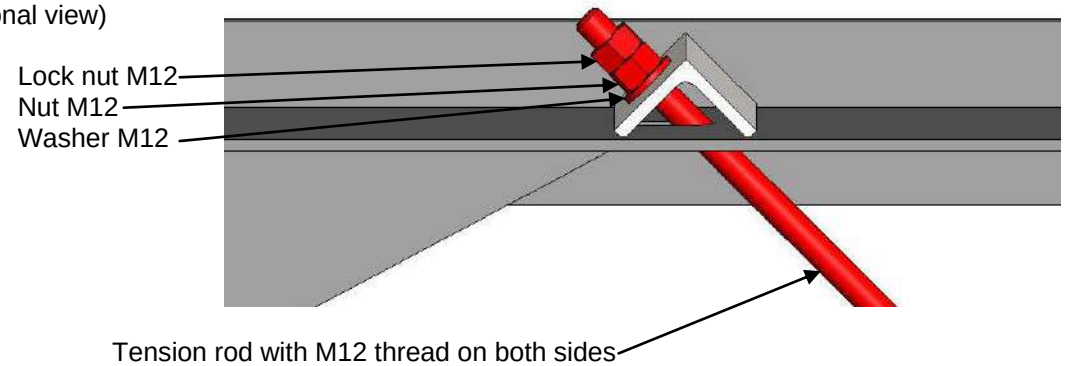
# Assembly instruction DEGERtraker

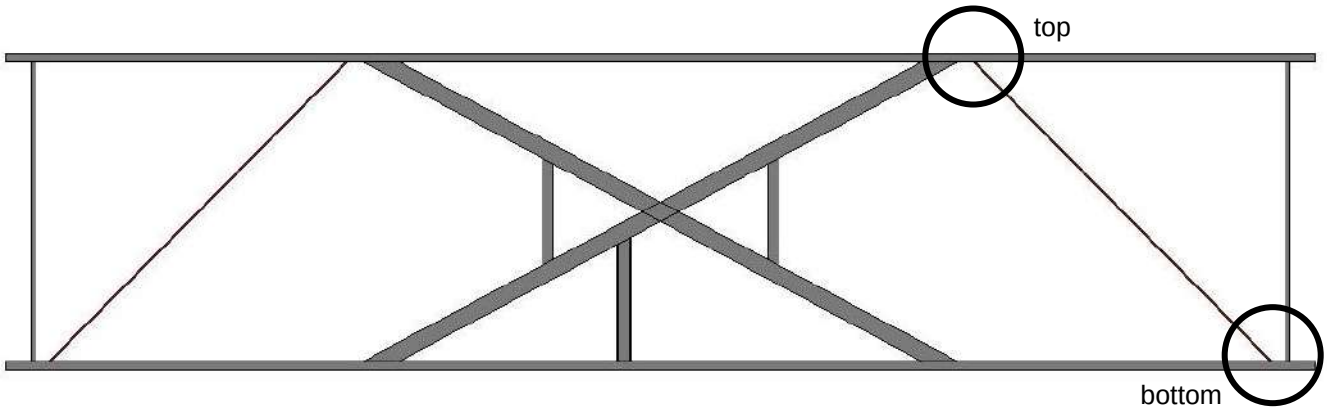
## Part III – Structure
## Assembly base frame

**Only required for the DEGERtrakers 9000NT supporting frames:**

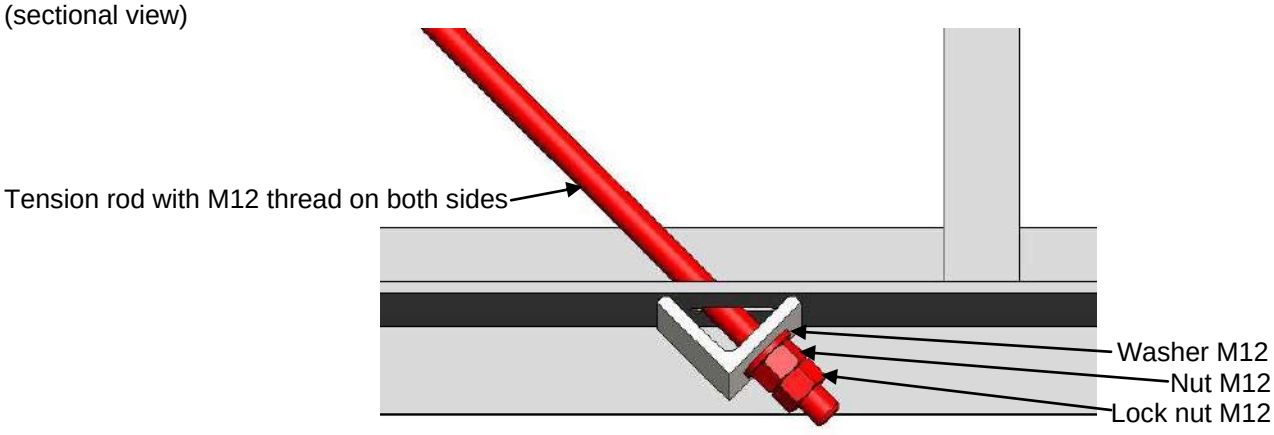
The tension rods supplied must be installed before assembling the DEGER**traker**s 9000NT base frame onto the rotating head. To do this, push the tension rods through the longitudinal holes of the upper and lower cross member and secure each with an Washer M12, an M12 nut and an M12 self-locking nut.
**torque 15Nm**

Detailed view from above:
(sectional view)




Detailed view from below:
(sectional view)



# Assembly Instruction
# DEGERtraker

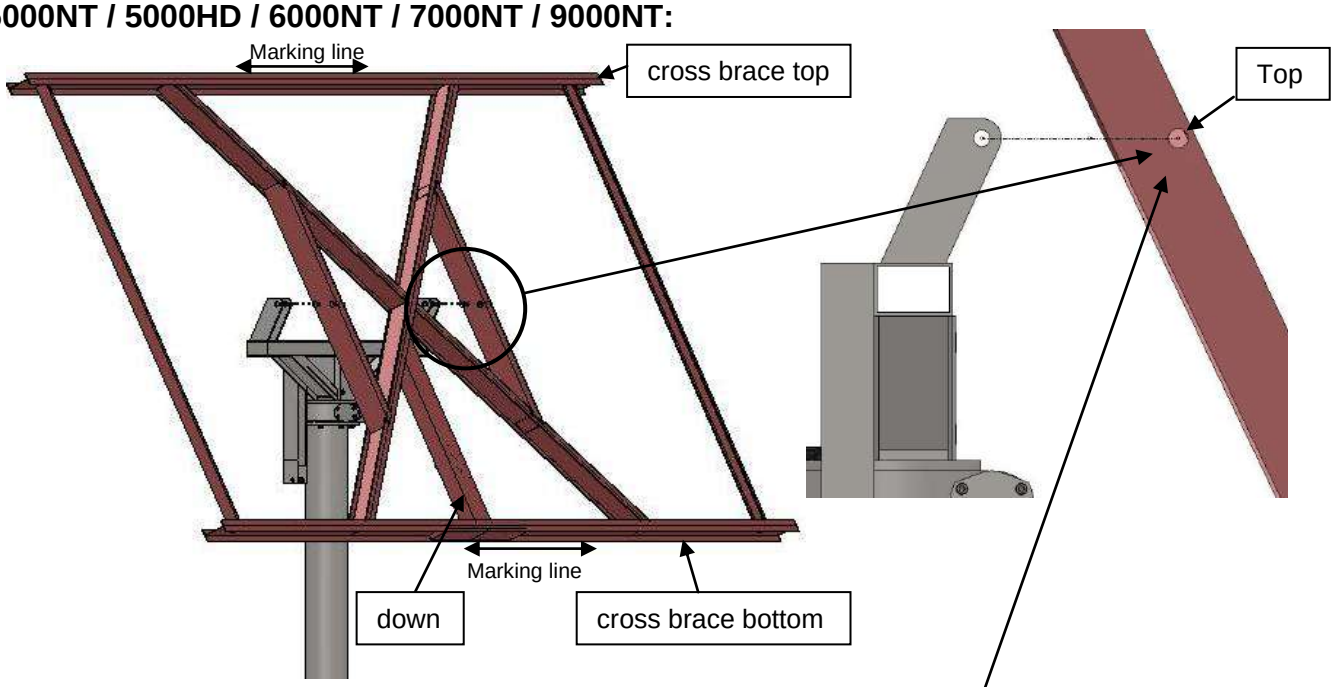
## Part III – Structure
## Assembly base frame

Before installing the base frame, it is advisable to mark the positions of the aluminium profiles on the side of the top cross brace and the bottom cross brace – according to the description Part IV.
Labelling must always be from the centre of the cross brace to the outside.

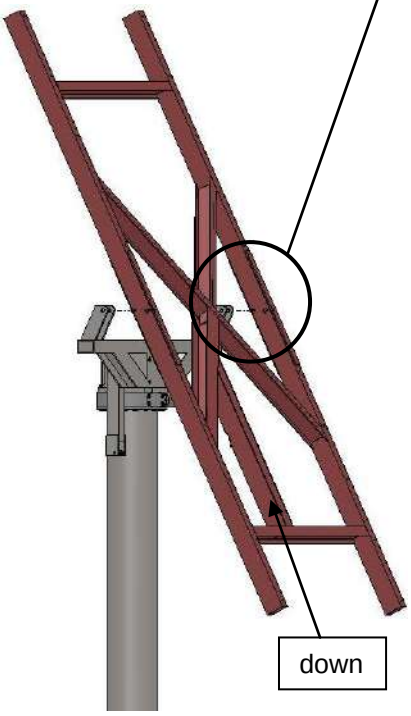
**1st step:**

Suspend the base frame by using a crane in such a way that the bore holes at the tip of rotation of the base frame are at the top and the connection for the Elevation motor (EMO) is on the left.

**5000NT / 5000HD / 6000NT / 7000NT / 9000NT:**




**3000NT / 3000HD:**



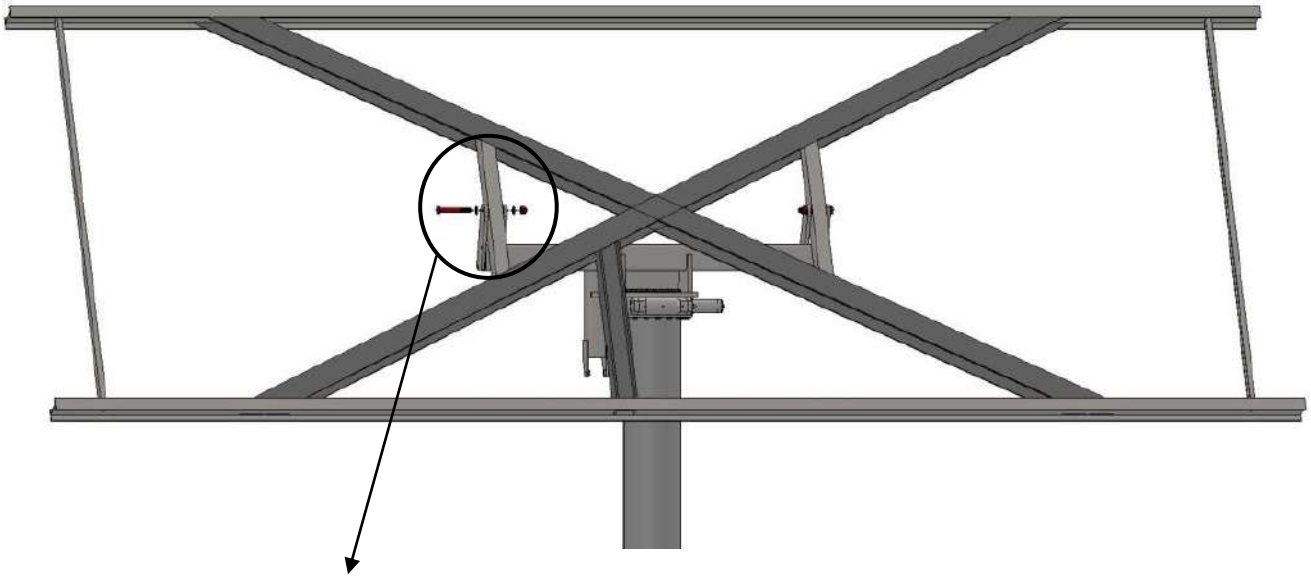

**Weight of base frame**

| | |
|---|---|
| **DEGERtraker 3000NT** | **217 kg** |
| **DEGERtraker 3000HD** | **328 kg** |
| **DEGERtraker 5000NT** | **383 kg** |
| **DEGERtraker 5000HD** | **600 kg** |
| **DEGERtraker 6000NT** | **650 kg** |
| **DEGERtraker 7000NT** | **665 kg** |
| **DEGERtraker 9000NT** | **675 kg** |

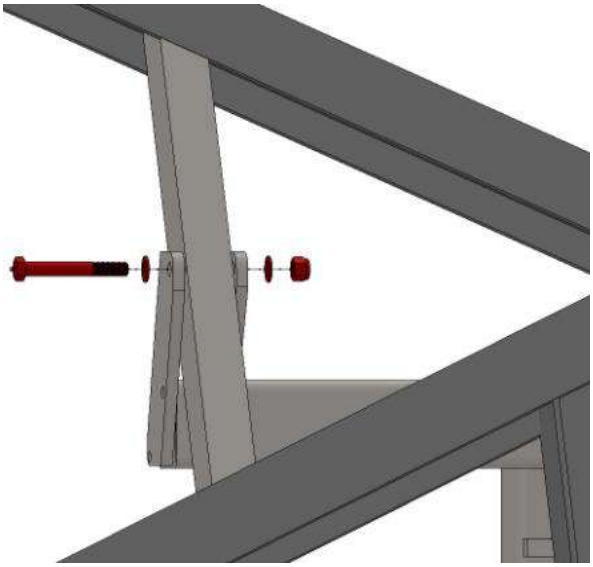
# Part III – Structure
# Assembly base frame

**2nd step:**

Built in bolt M24x180 with washer M24 and self-looking nut M24. **Do not screw the bolts with the nut too tightly, to ensure that the shackles at the rotating head are not pressed together.**



Detail:



NOTICE **ATTENTION!**

Slide bearing bushings are installed at the rotation point of the base frame – these must be slightly lubricated in the initial installation. Later on lubrication is possible at any time through a lubricating nipple in the bolt M24x180. A list of suitable lubricants you find on page VII-3.

**Mounting the modules on the base frame beforehand is not permitted!!**

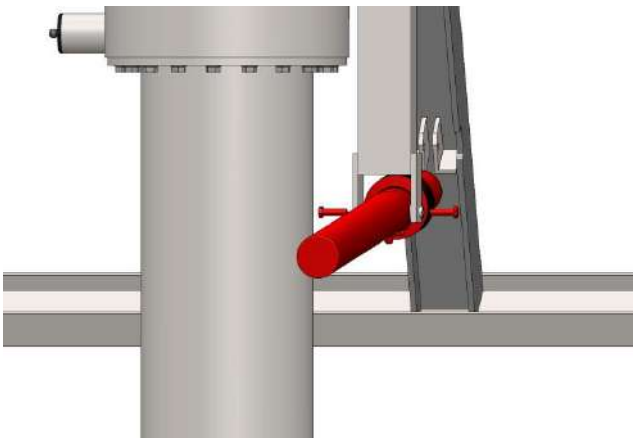
# Assembly Instruction
# DEGERtraker

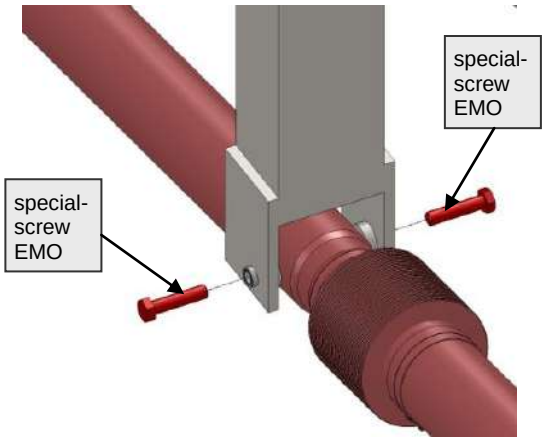
## Part III – Structure
## Assembly Elevation-Motor (EMO)

**1st step:**

The EMO is delivered with preset limit switches so no set up work has to be done at all.

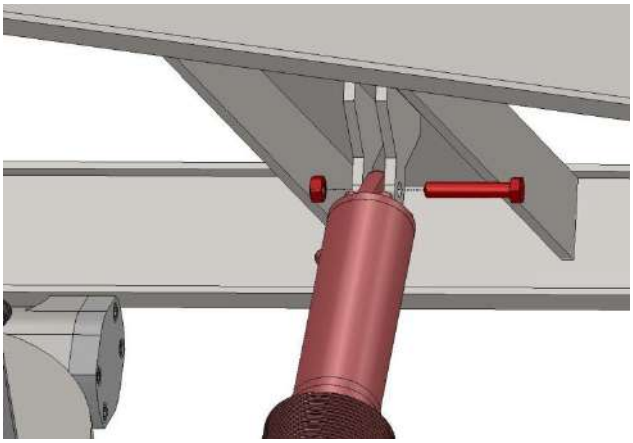
Fix Elevation motor at the rotation head by using the special screws EMO. Therefore the enclosed thread locking fluid has to be used. Tighten the special screws. **Torque: 35 Nm,**
**EMO HD: 50Nm**



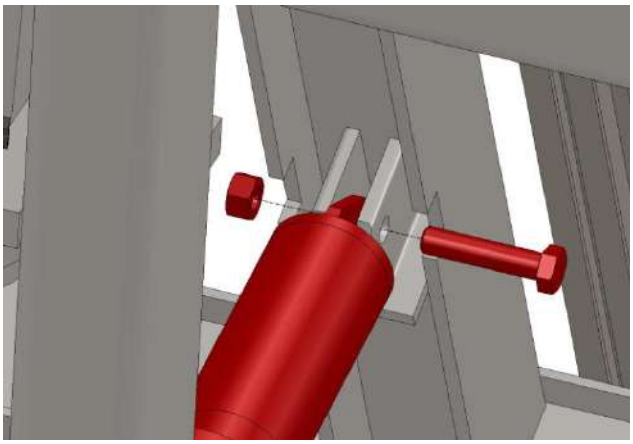



**2nd step:**

Fix Elevation motor (EMO) at the base frame by using bolt M14x80 and self-locking nut M14. The bolt should not turn during operation.



Fix Elevation motor (EMO-HD) at the base frame by using bolt M20x80 and self-locking nut M20. The bolt should not turn during operation.



NOTICE **ATTENTION!**

- Do not use any other screws except those included in the delivery!
- Apply max. one drop of the thread locking fluid to the internal thread of the EMO. Ensure that **no** locking
- fluid enters into the sliding bearing connector!
- The cable connections for the elevation motor must be at the bottom!
- In both holding fixture points the Elevation motor must be movable.

# Part III – Structure
# Assembly Elevation-Motor (EMO)

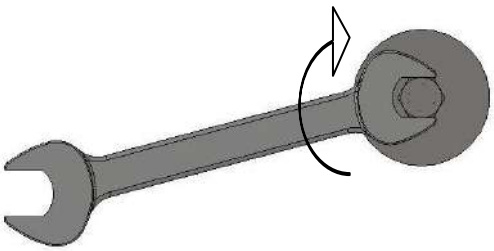
DANGER **ATTENTION!**

**Disconnect the Elevation-Motor from the Energy-Converter by loosen clamp 1 and 2 before beginning with this work.**

**Manual operation:**

When electrical components fail the systems can be moved into the horizontal position by using a 12V or 24V batterie.

When all electrical components fail the systems can be moved into the horizontal position by using standard tools. For this the Aluminium-Cover at the lower side of the elevation motor has to be removed. After this apply a spanner wrench (size 17mm) at the hexagonal nut at the end of the elevation motor and **turn slowly (max. 30°/sec ==> 5 Upm) clockwise.**



NOTICE **ATTENTION! IMPORTANT OPERATING INSTRUCTIONS!**

**The expansion bellows may not be pinched, blocked or compressed, since this can lead to damage to the internal parts.**

**A mechanical blockage of the movement of the piston rods is to be avoided since this can lead to damage to the drive system.**

**The linear actuator must come to a complete stop before changing the movement direction.**

**A fast reversal of the travel direction of the actuator (for example with the aid of the CCB) is not permitted.**

NOTICE **CHECKING OF THE MECHANICS**

**Extend and retract the complete way of the drive, to guarantee that the mechanics moves freely, does not knock against anything and that the cables are long enoungh. Use a 12V or 24V batterie (for ex. suitable for a batterie-driven drill) for the head of the drive.**

# Assembly Instruction
# DEGERtraker

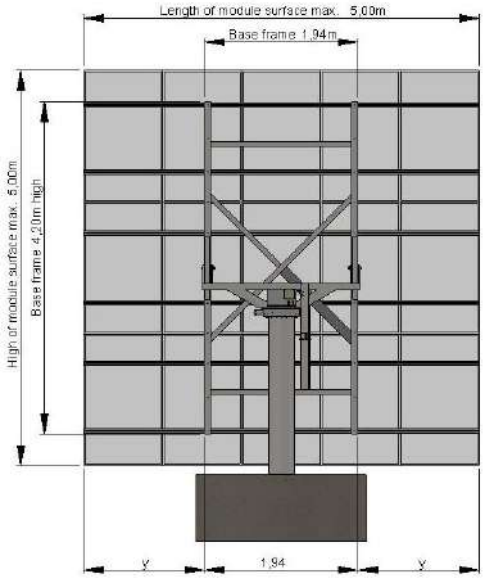
## Part IV – Module carry system
## DEGERtraker 3000NT / 3000HD

**Module arrangement:**

The following dimensions have to be abode and have to be reduced according to regional conditions if necessary:

- Module surface: **max. 25m²**
- length of Module surface: **max. 5.00m**
- height of Module surface: **max. 5.00m**

**The total module area is to be determined relative to the site with the aid of the DEGERenergie dimensioning tool and may in no case be greater than 25m².**




**1st step: Arrangement of aluminium profiles:**

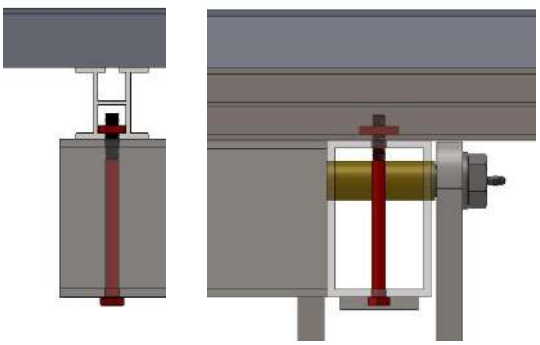
Following points have to be attended:

- in both axis modules have to be arranged symmetrically to the center of gravity
- 2 aluminium profiles for each row of modules
- attend the connecting socket on the backside of the modules

Overhang of the aluminium profile: **y** = (length of aluminium profile – 1.942m) / 2

**2nd Step: Installation of aluminium profile F-SET-HD: (only for DEGERtraker 3000NT and 3000HD)**

Insert screw M10x140 through existing bores; slide, align and fix Alu profile F-SET-X via the sliding nuts. The two screws are to be tightened with a **torque of 40NM.**



# Assembly Instruction DEGERtraker

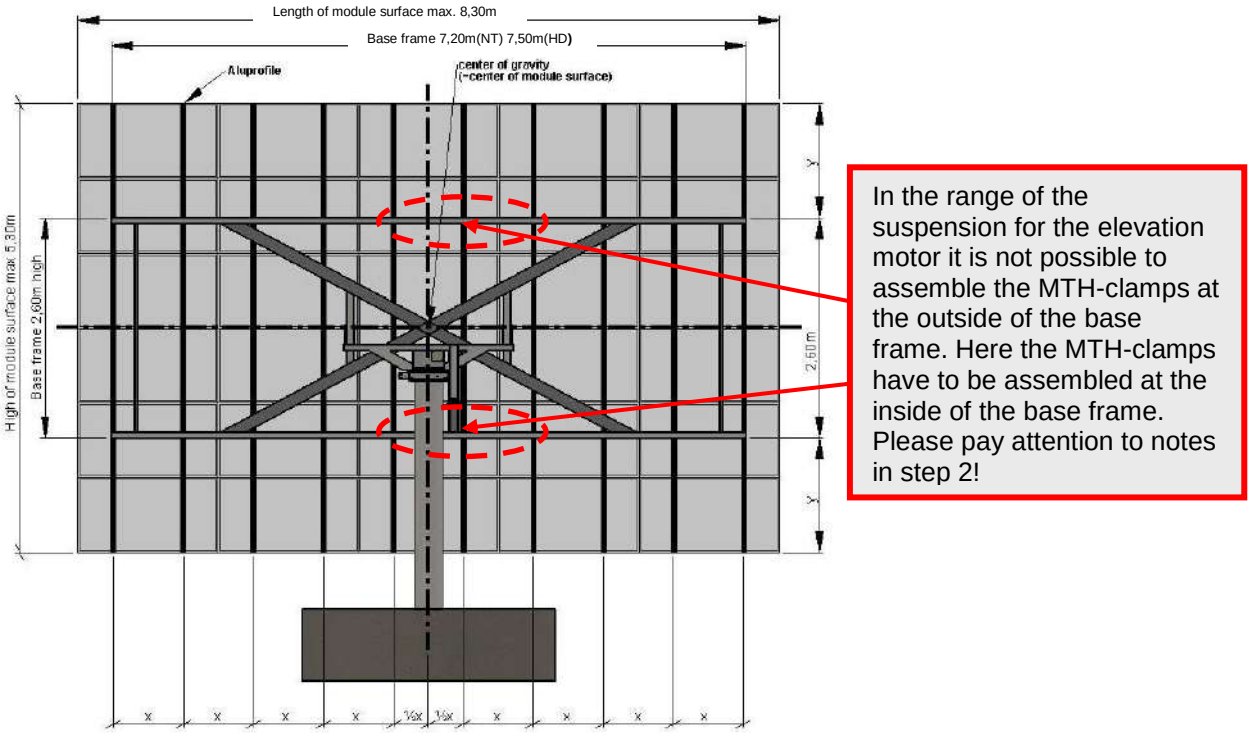
# Part IV – Module carry system DEGERtraker 5000NT / 5000HD

**Module arrangement:**

The following dimensions have to be abode and have to be reduced according to regional conditions if necessary:

- Module surface: **max. 40m²**
- length of Module surface: **max. 8.30m**
- height of Module surface: **max. 5.30m**

**The total module area is to be determined relative to the site with the aid of the DEGERenergie dimensioning tool and may in no case be greater than 40m².**




In the range of the suspension for the elevation motor it is not possible to assemble the MTH-clamps at the outside of the base frame. Here the MTH-clamps have to be assembled at the inside of the base frame. Please pay attention to notes in step 2!

**1st step: Arrangement of aluminium profiles:**

Distance between 2 aluminium profiles: **x** = width of module / 2
(**attend the point of fastening from the modul manufacturer**)

Overhang of the aluminium profile: **y** = (length of aluminium profile - 2.60m) / 2

Following points have to be attended:
- assemble aluminium profile from the middle to the outsite
- in both axis modules have to be arranged symmetrically to the center of gravity
- 2 aluminium profiles for each row of modules
- attend the connecting socket on the backside of the modules

**2nd step: Assembly of aluminium profiles** see Page IV-6!

# Assembly Instruction DEGERtraker

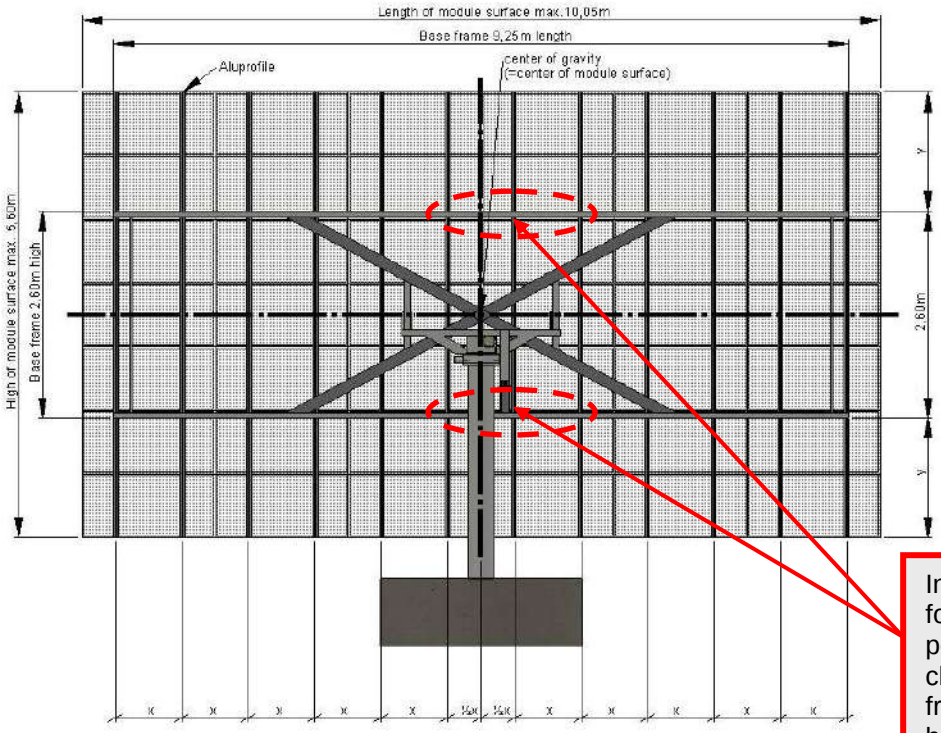
## Part IV – Module carry system DEGERtraker 6000NT

**Module arrangement:**

The following dimensions have to be abode and have to be reduced according to regional conditions if necessary:

- Module surface: **max. 53m²**
- length of Module surface: **max. 10.05m**
- height of Module surface: **max. 5.60m**

**The total module area is to be determined relative to the site with the aid of the DEGERenergie dimensioning tool and may in no case be greater than 53m².**




In the range of the suspension for the elevation motor it is not possible to assemble the MTH-clamps at the outside of the base frame. Here the MTH-clamps have to be assembled at the inside of the base frame. Please pay attention to notes in step 2!

**1st step: Arrangement of aluminium profiles:**

Distance between 2 aluminium profiles: **x** = width of module / 2
(**attend the point of fastening from the modul manufacturer**)

Overhang of the aluminium profile: **y** = (length of aluminium profile - 2.60m) / 2

Following points have to be attended:
- assemble aluminium profile from the middle to the outsite
- in both axis modules have to be arranged symmetrically to the center of gravity
- 2 aluminium profiles for each row of modules
- attend the connecting socket on the backside of the modules

**2nd step: Assembly of aluminium profiles** see Page IV-6!

# Assembly Instruction DEGERtraker

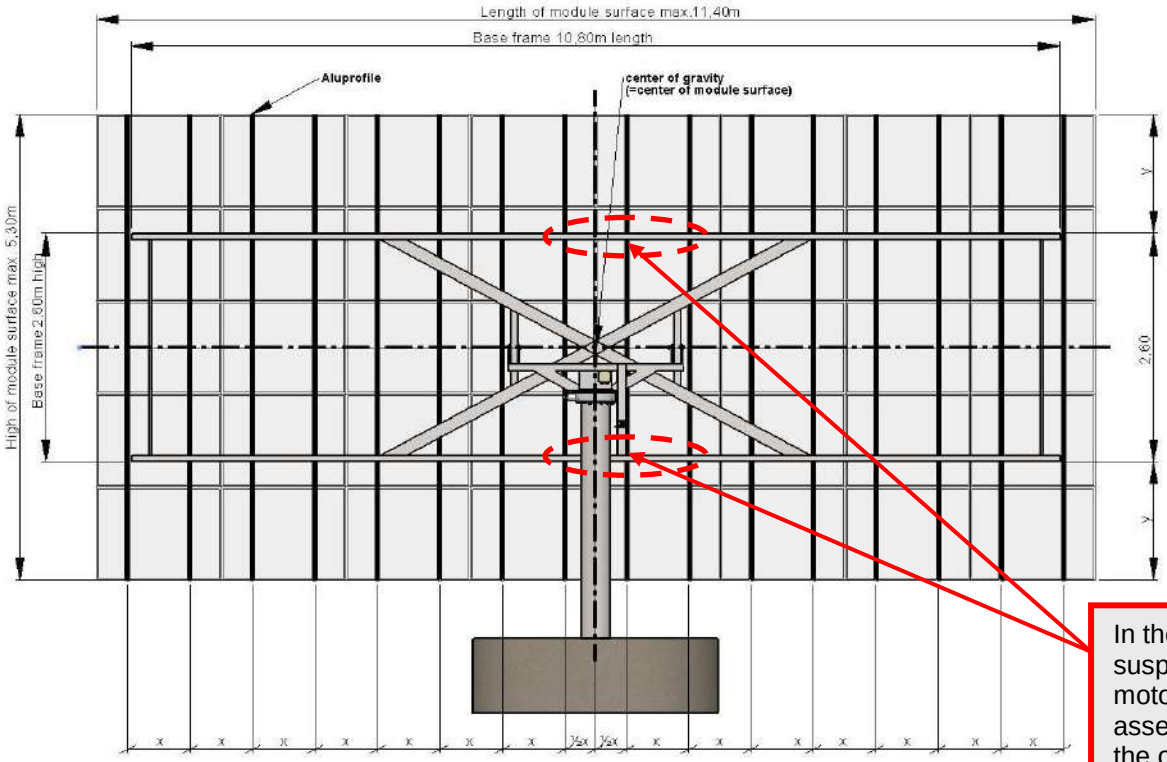
# Part IV – Module carry system DEGERtraker 7000NT

**Module arrangement:**

The following dimensions have to be abode and have to be reduced according to regional conditions if necessary:

- Module surface: **max. 60m²**
- length of Module surface: **max. 11.40m**
- height of Module surface: **max. 5.30m**

**The total module area is to be determined relative to the site with the aid of the DEGERenergie dimensioning tool and may in no case be greater than 60m².**




In the range of the suspension for the elevation motor it is not possible to assemble the MTH-clamps at the outside of the base frame. Here the MTH-clamps have to be assembled at the inside of the base frame. Please pay attention to notes in step 2!

**1st step: Arrangement of aluminium profiles:**

Distance between 2 aluminium profiles: **x** = width of module / 2
(**attend the point of fastening from the modul manufacturer**)

Overhang of the aluminium profile: **y** = (length of aluminium profile - 2.60m) / 2

Following points have to be attended:
- assemble aluminium profile from the middle to the outsite
- in both axis modules have to be arranged symmetrically to the center of gravity
- 2 aluminium profiles for each row of modules
- attend the connecting socket on the backside of the modules

**2nd step: Assembly of aluminium profiles** see Page IV-6!

# Assembly Instruction DEGERtraker

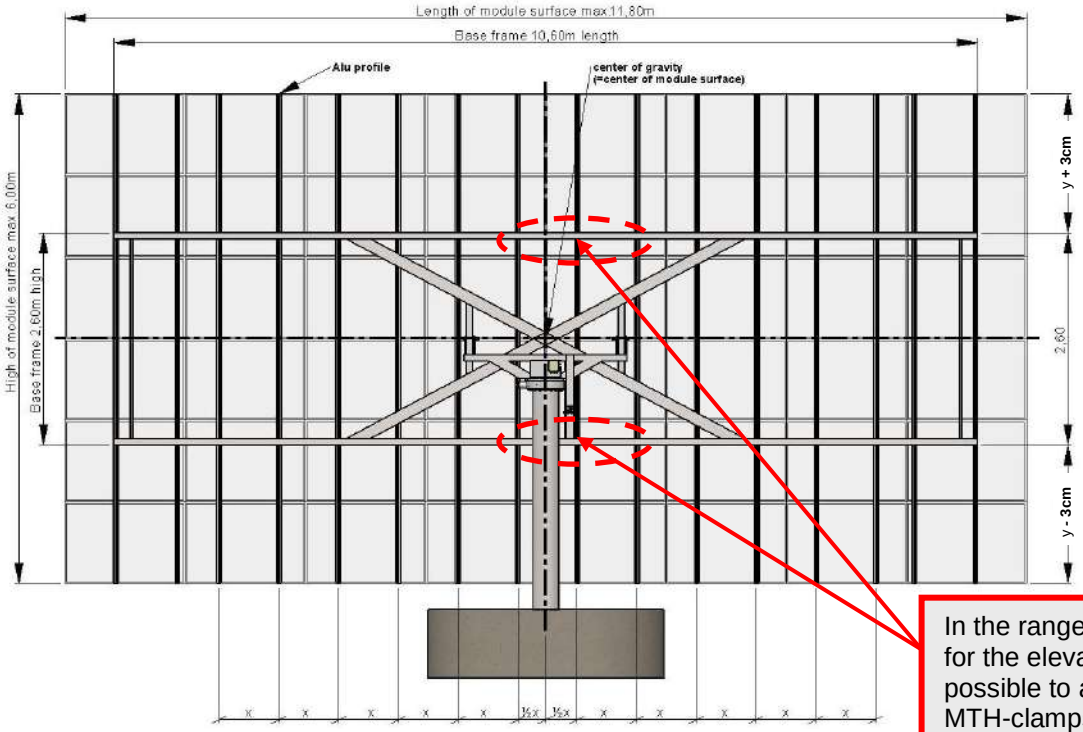
# Part IV – Module carry system DEGERtraker 9000NT

**Module arrangement:**

The following dimensions have to be abode and have to be reduced according to regional conditions if necessary:

- Module surface: **max. 70m²**
- length of Module surface: **max. 11.80m**
- height of Module surface: **max. 6.00m**

**The total module area is to be determined relative to the site with the aid of the DEGERenergie dimensioning tool and may in no case be greater than 70m².**




In the range of the suspension for the elevation motor it is not possible to assemble the MTH-clamps at the outside of the base frame. Here the MTH-clamps have to be assembled at the inside of the base frame.
Please pay attention to notes in step 2!

**1st step: Arrangement of aluminium profiles:**

Distance between 2 aluminium profiles: **x** = width of module / 2
(**attend the point of fastening from the modul manufacturer**)

Overhang of the aluminium profile: **y** = (length of aluminium profile - 2.60m) / 2

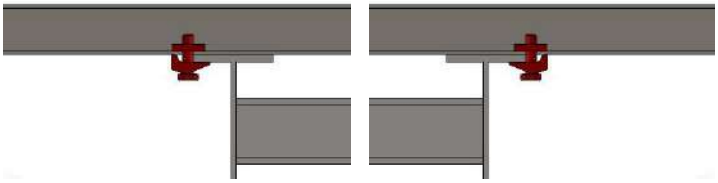
Following points have to be attended:
- assemble aluminium profile from the middle to the outsite
- in both axis modules have to be arranged symmetrically to the center of gravity. **Recommendation: Move the modulesurface 3 cm towards the top to reduce the self consumption of the system and to exeed the lifetime durability of the system.**
- 2 aluminium profiles for each row of modules
- attend the connecting socket on the backside of the modules

**2nd step: Assembly of aluminium profiles** see Page IV-6!

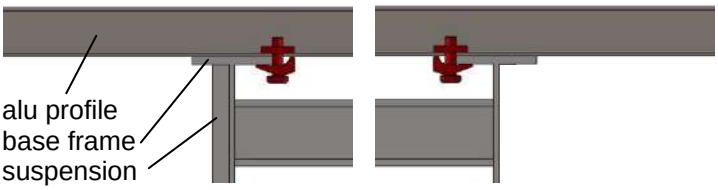
# Part IV – Module carry system
# Assembly of aluminium profiles and the modules

**2nd step: Assembly of aluminium profiles**
**(DEGERtraker 5000NT, 5000HD, 6000NT, 7000NT and 9000NT)**

Assemble aluminum profile **on both sides at the outside** of the base frame by using clamp MTH, bolt M 10 x 35 and sliding nut M10. The clamp MTH has to slide along inside the aluminum profile towards the base frame until the bolt contacts the base frame.



In the range of the suspension for the elevation motor it is not possible to assemble the MTH-clamps at the outside of the base frame. Here the MTH-clamps have to be assembled at the inside of the base frame.




**torque: 35NM**

**Tip: Bring the DEGERtraker in a horizontal position – then it will be easier to mount the moduls**

**3rd step: Assembly of the modules**

NOTICE **ATTENTION!**

**The total module area is to be determined relative to the site with the aid of the DEGERenergie dimensioning tool and may in no case exceed the maximum allowable total module surface.**
**Maximum total module surface**

| | |
|---|---|
| **DEGERtraker 3000NT / 3000HD:** | **25m²** |
| **DEGERtraker 5000NT / 5000HD:** | **40m²** |
| **DEGERtraker 6000NT:** | **53m²** |
| **DEGERtraker 7000NT:** | **60m²** |
| **DEGERtraker 9000NT:** | **70m²** |

Defects resulting from a too large module surface are not covered by the warranty. As soon as the solar modules are installed you have to install a functioning windguardt or the module surface has to stay in a horizontal position. Because the elevation motor is not completely self-locking, it is possible that the module surface can move to a steeper position in strong winds. In order to avoid this situation, the motor connections should be kept short. It is recommended that the module surface position be inspected on a daily basis until commissioning is finalized!

**Note the module mounting:**

**DEGERenergie supplies the tracking system, incl. aluminum rails and standard mounting hardware to fasten the modules. The scope of delivery from DEGERenergie does not include module specific mounting hardware.**

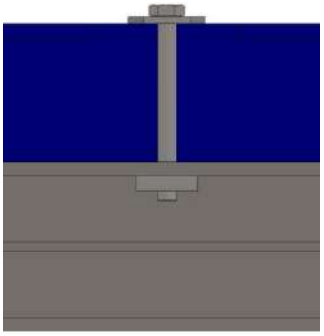
**Assembly of the modules is permitted only on the already-assembled base frame.**
**Module assembly beforehand is not permitted.**

# Assembly Instruction DEGERtraker

## Part IV – Module carry system
## Assembly of the module

**Between the modules**

In order to achieve the most precise symmetry, it is advisable to install the modules from the centre outwards.
Assemble modules on the aluminum profiles by using bolt M6, clamp plate and sliding nut M6. The distance between the modules must not be more than the thickness of the bolt
**torque: 8NM**



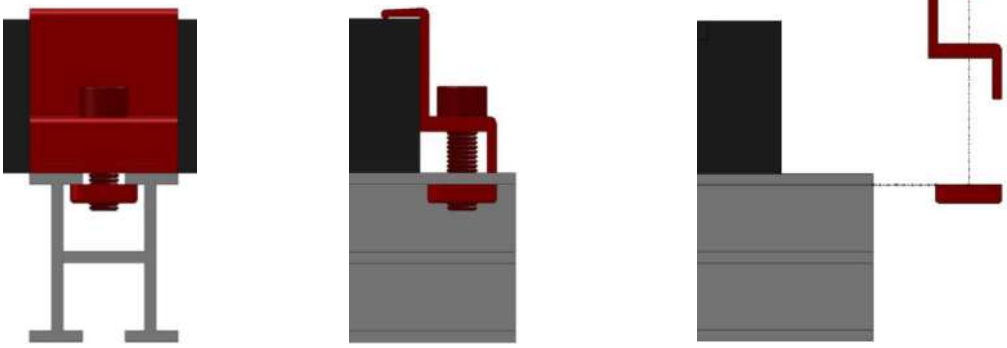
sectional view

NOTICE **ATTENTION!**

We strongly recommend that a gap of approximately 2 mm be left between the individual module column.

**At the end of the module-surface**

Mount the modules onto the aluminum profiles using end clamp, bolt M8 and sliding nut M8.
**torque:20NM**

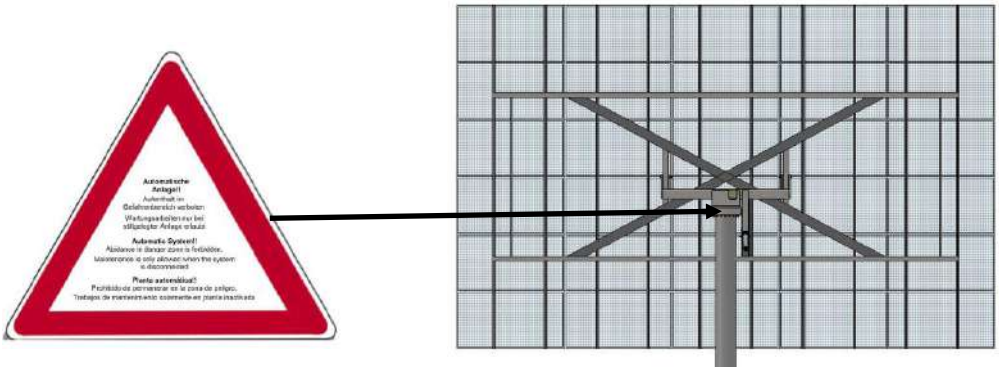


NOTICE **ATTENTION!**

Extend and retract the complete way of the drive, to guarantee that the mechanics move freely, don't knock against anything and that the cables are long enough.

**AFFIX WARNING NOTICE**

The delivered warning notice has to be affixed to the mast of every system well observable.

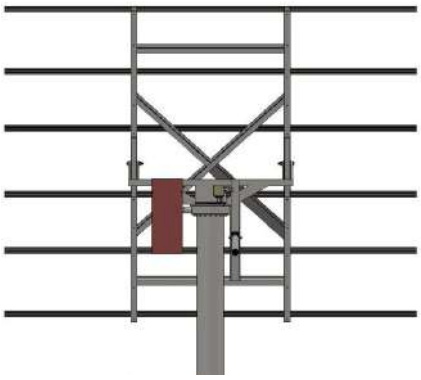


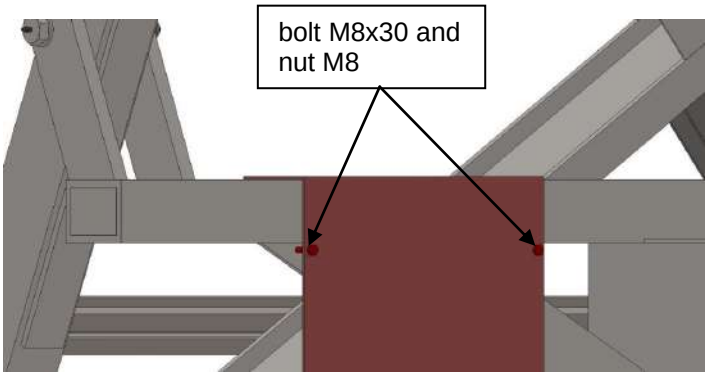
# Part IV – Module carry system
# Assembly inverter holding plate (optional)

**Assembly inverter holding plate**

3000NT / 3000HD / 5000NT / 7000NT:

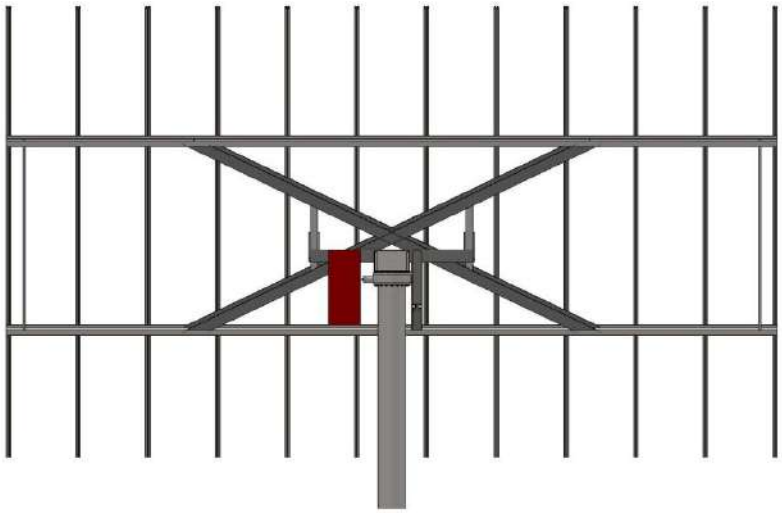
Hang up the inverter holding plate directly at the traverse of the rotating head. Save the plate against lift-off by using bolts M8x30 and nut M8.

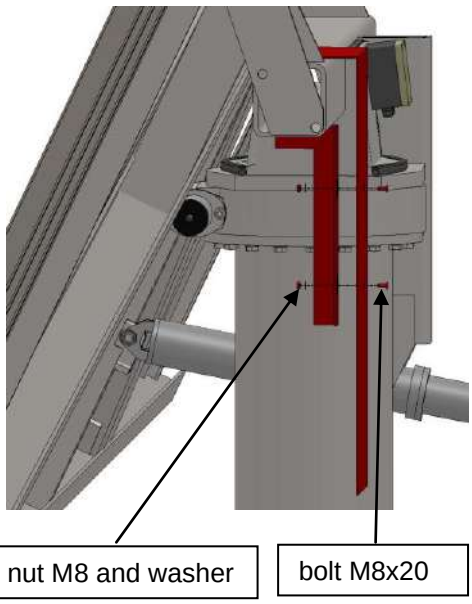





5000HD / 6000NT / 9000NT:

Hang up the inverter holding plate directly at the traverse of the rotating head. Save the plate against lift-off by using the framing square, bolts M8x20 and nut M8 and washer.



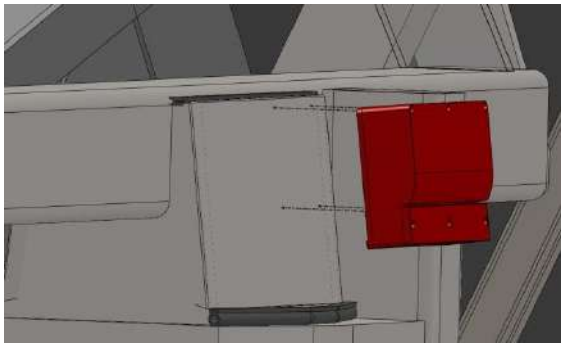


# Assembly Instruction DEGERtraker

## Part V – Control unit
## Assembly control unit

**1st step: Fixing energy converter**

Fix the energy converter at the cover of gear casing of the rotating head by using the provided screws M3.9 x 13. Therefore prefabricated holes are in the cover.

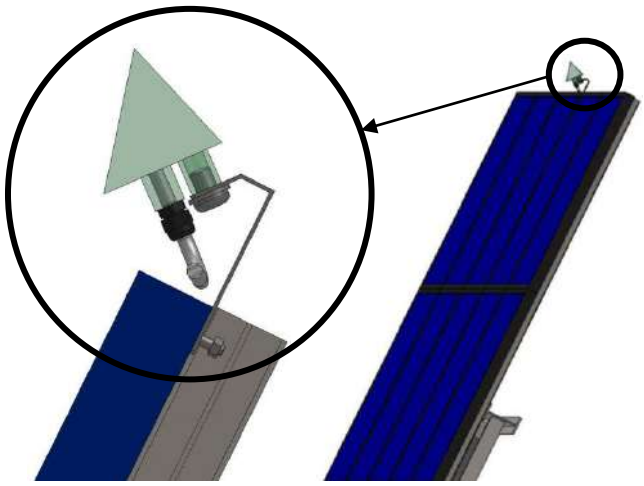


DANGER **ATTENTION!**

It must be no cable between the rotating head and the base frame.

**2nd step: Controling the east-west axis**

Mount the DEGER**conecter** with the inscription 'Ost-West' pointing **UPWARDS** above the solar module surface. If the DEGERconecter is mounted out of centre, it should be placed on the eastern side of the module surface.

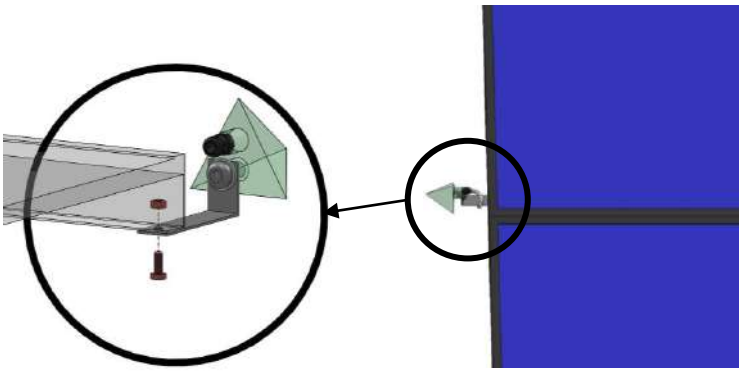



**Connect the cable of the azimut-actuator (drive motor east-west)**
blue cable connection 3
brown cable connection 4

**Function test:**
Check if the drive rotates the module surface towards the brightest spot in the sky. If you are not sure, you can cover a sensor cell at the DEGER**conecter** with your hand – now the module surface should rotate in the direction of the non-covered sensor cell. Otherwise change connection 3 / 4

**3rd step:**
**Controlling the elevation axis**

Mount the DEGER**conecter** with the inscription 'elevation' **LATERALLY** at the solar module surface. (left side; seen from the front side)

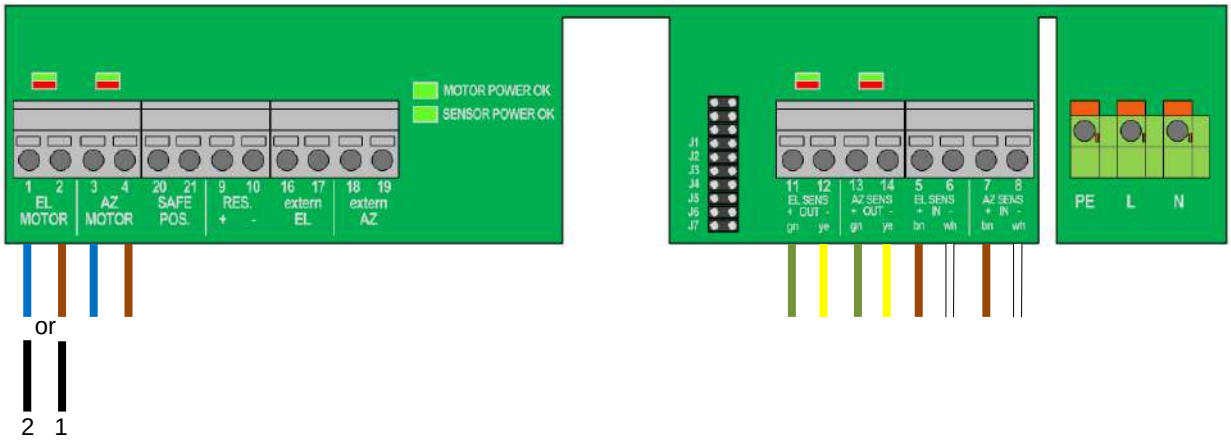


**Connect the cable of the elevation-actuator (drive motor for elevation)**
blue cable connection 1
brown cable connection 2

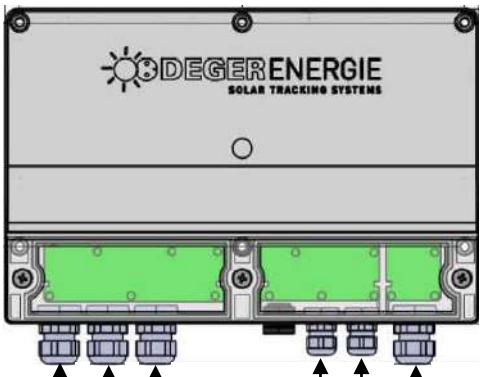
**Function test:**
Check if the drive rotates the module surface towards the brightest spot in the sky. When the sky is cloudy the control will move the module surface into the horizontal. In this case, too, if you are not sure, you can cover a sensor cell at the DEGER**conecter** – then the module surface should rotate in the direction of the non-covered sensor cell. Otherwise change connection 3 / 4

# Assembly Instruction
# DEGERtraker

## Part V – Control unit
## Data sheet energy converter 6




| Terminal | Function | | Terminal | Function |
|---|---|---|---|---|
| 1-2 | Output for EL motor<br>- +/- 24 V DC<br>- 2.5 A<br>Terminal 1 => Wire blue or 2, depending on motor<br>Terminal 2 => Wire brown or 1, depending on motor | | 11-12 | Output for DEGER**conecter** EL<br>- +/- 23 V DC<br>- 0.25 A<br>Terminal 11 => Wire green<br>Terminal 12 => Wire yellow |
| 3-4 | Output for AZ motor<br>- +/- 24 V DC<br>- 2.5 A<br>Terminal 3 => Wire blue<br>Terminal 4 => Wire brown | | 13-14 | Output for DEGER**conecter** AZ<br>- +/- 23 V DC<br>- 0.25 A<br>Terminal 13 => Wire green<br>Terminal 14 => Wire yellow |
| 20-21 | Input for safety position<br>- +/- 21 V DC<br>- +/- 21 V DC | | 5-6 | Input for DEGER**conecter** EL<br>Terminal 7 => Wire brown +24 V DC<br>Terminal 8 => Wire white 0 V DC |
| 9-10 | Output for reserve<br>- 24 V DC<br>- 1.1 A | | 7-8 | Input for DEGER**conecter** AZ<br>Terminal 7 => Wire brown +24 V DC<br>Terminal 8 => Wire white 0 V DC |
| 16-17 | Input for external control EL from CCB<br>- +/- 24 V DC +/-10%<br>- 5 mA | | PE - L - N | Input for power supply<br>- 100 - 240 V AC<br>- 2 A |
| 18-19 | Input for external control AZ from CCB<br>- +/- 24 V DC +/-10%<br>- 5 mA | | | |



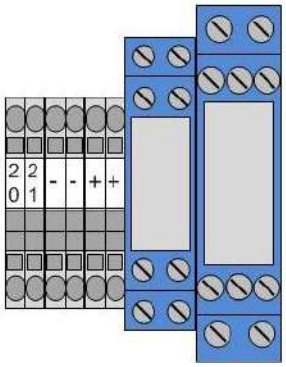

Motor EL connection
Motor AZ connection
External connection (CCB III)

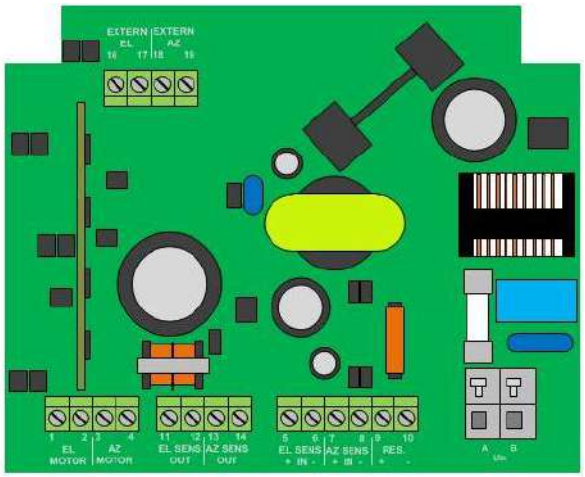
Grid connection
DEGER**conecter** AZ connection
DEGER**conecter** EL connection

The clamping area on the M12 cable fitting is designed for a cable cross-section of 3 to 6 mm, while the clamping area on the M16 cable fitting is designed for a cable cross-section of 5 to 10 mm.

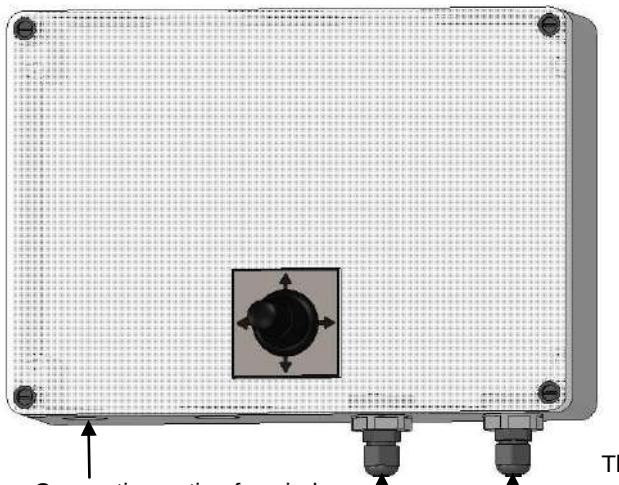
# Assembly Instruction
# DEGERtraker

## Part V – Control unit
## Data sheet Central Control Box II




| Terminal | Function | | Terminal | Function |
|---|---|---|---|---|
| 20 | Input for control input (flat) for special sensors<br>- 21 V DC | | A - B $U_{in}$ | Input for power supply<br>- 80 - 380 V DC<br>- 100 - 265 V AC<br>- 1 A |
| 21 | Input for control input (upright) for special sensors<br>- 21 V DC | | 1-2 | Remote control for EL axis<br>- +/- 21 V DC<br>- 1.4 A |
| + | Auxiliary supply output for special sensors<br>- 21 V DC<br>- 1.4 A | | 3-4 | Remote control for AZ axis<br>- +/- 21 V DC<br>- 1.4 A |
| - | Auxiliary supply output for special sensors<br>- 21 V DC<br>- 1.4 A | | | |



Connection option for wind monitor

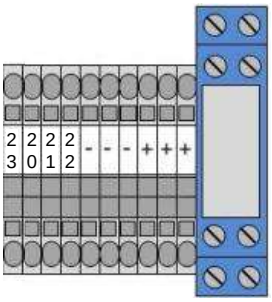
The clamping area on the cable fitting is designed for a cable cross section of 3.5 mm to 7 mm.

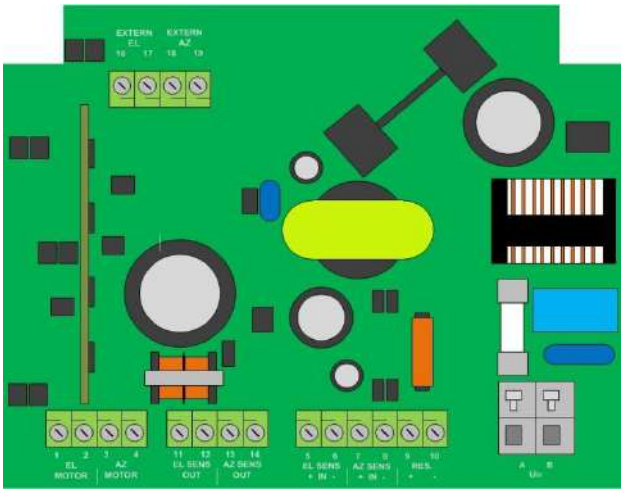
Grid connection

Energy converter connection (not included in delivery)

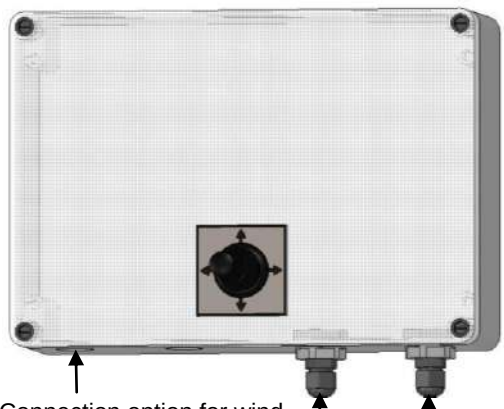
# Assembly Instruction
# DEGERtraker

## Part V – Control unit
## Data sheet Central Control Box III



| Terminal | Function | | Terminal | Function |
|---|---|---|---|---|
| 20 | Input for control input (flat) for special sensors<br>- 21 V DC | | A - B $U_{in}$ | Input for power supply<br>- 80 - 380 V DC<br>- 100 - 265 V AC<br>- 1 A |
| 21 | Input for control input (upright) for special sensors<br>- 21 V DC | | 1-2 | Remote control for EL axis<br>- +/- 21 V DC<br>- 1.4 A |
| 22 | Control input for<br>wind monitor ADVANCED<br>wind monitor STANDARD | | 3-4 | Remote control for AZ axis<br>- +/- 21 V DC<br>- 1.4 A |
| 23 | Terminal for<br>wind monitor ADVANCED<br>wind monitor STANDARD | | | |
| + | Auxiliary supply output for special sensors<br>- 21 V DC<br>- 1.4 A | | | |
| - | Auxiliary supply output for special sensors<br>- 21 V DC<br>- 1.4 A | | | |



Connection option for wind monitor

The clamping area on the cable fitting is designed for a cable cross section of 3.5 mm to 7 mm.

Grid connection

Energy converter connection (not included in delivery)

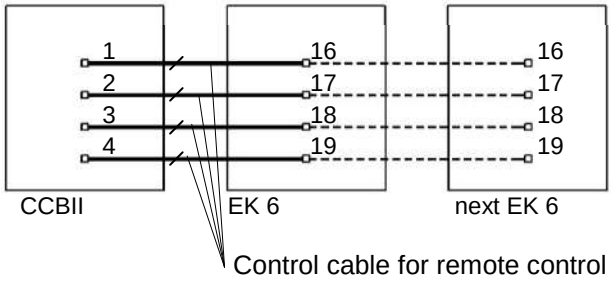
# Assembly Instruction
# DEGERtraker

## Part V – Control unit
## Connecting energy converter to Central Control Box

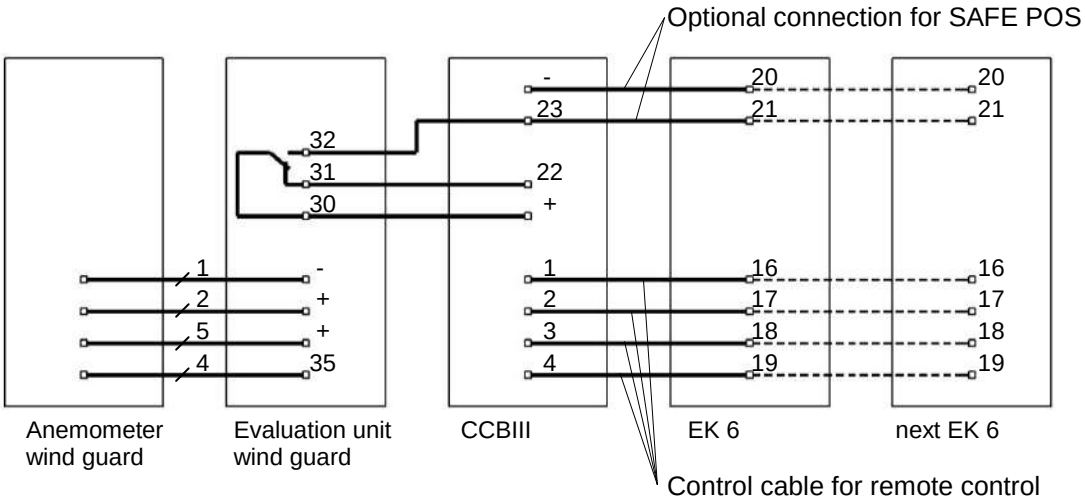
**DANGER ATTENTION!**
**Connection of the energy converter to the Central Control Box may only be carried out by specialist personnel and only when disconnected from the power supply.**

Open the housing cover on the Central Control Box and energy converter, then connect the two devices to each other as follows:

**Connecting the energy converter 6 to the Central Control Box II:**
with wind guard BASIC




**Connecting the energy converter 6 to the Central Control Box III**
with wind guard ADVANCED/STANDARD

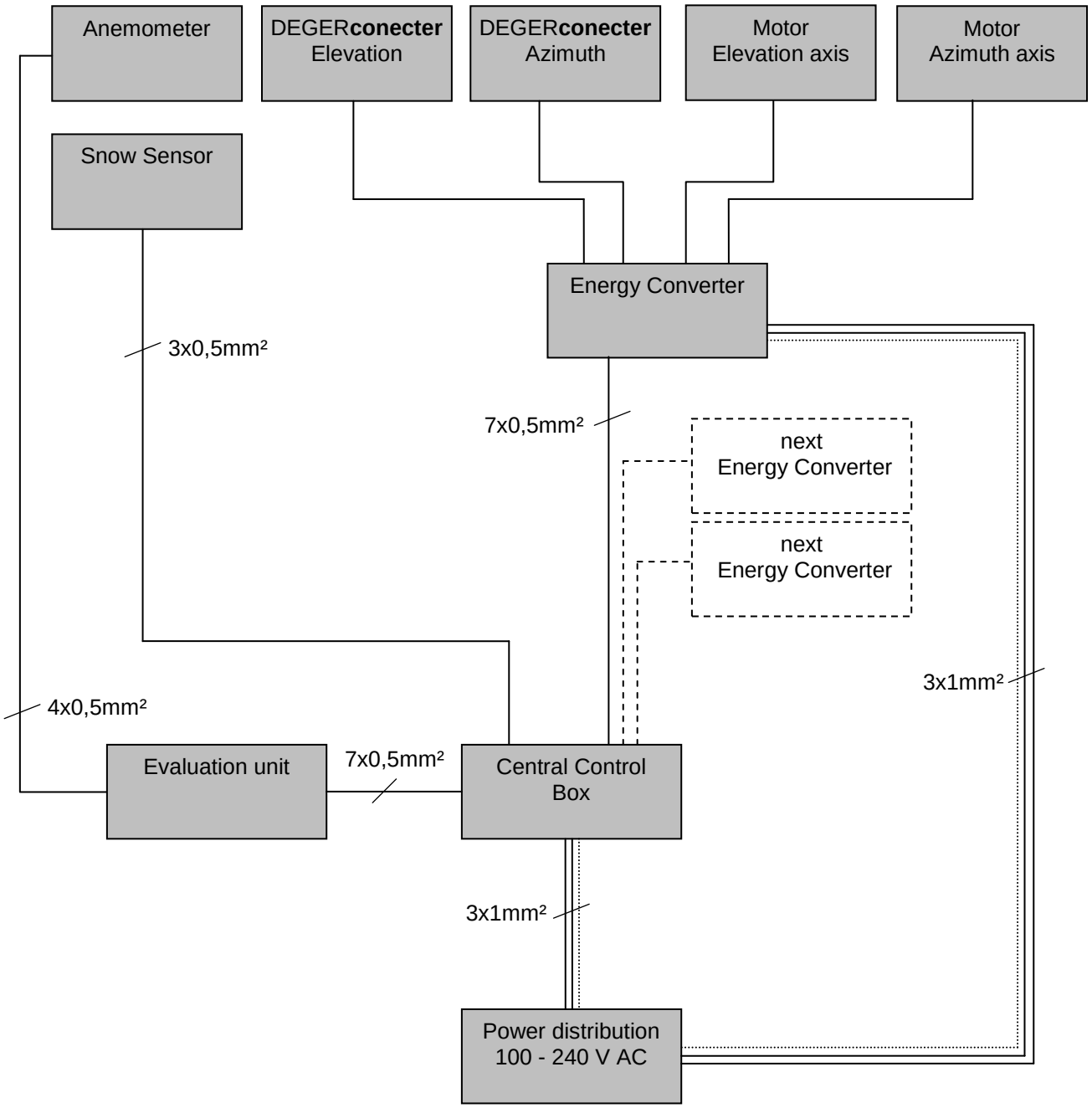



**The conductor cross-section of the control cable has to be appropriate for the number of energy converters connected to the Central Control Box and the cable length. The cable for connecting to EK 6 to CCB is not included. To connect the remote control a 4-wire cable is enough, to connect the optional SAFE POS, a 6-wire cable is required.**
The power supply (100 - 240 V) for the energy converter (PE - L - N) and Central Control Box (A-B Uin) must be provided by a qualified technician externally on-site.

**DANGER ATTENTION!**
**The external power supply must be set up according to the local regulations.**
**It must be possible for the energy converter to be cut off from the supply voltage by means of a safety cut-out switch 10A B or 6A C. It must also be possible for the Control Box to be cut off from the supply voltage by means of a safety cut-out switch 3A B.**
**The safety cut-out switch must be readily accessible.**

# Part V – Control unit DEGERcontrolsystem to DEGERtraker

**The complete control system in overview:**



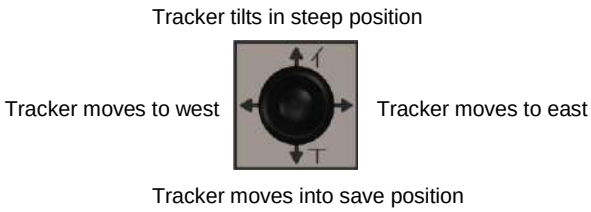
# Assembly Instruction
# DEGERtraker

## Part V – Control unit
## CCB and Wind guard, Sunlight Sensor, Security Sensor

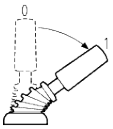
### CCB and Wind guard

It's possible to control up to 200 DEGER**trakers** manually using the optional CCB.

Activating the joystick can override the automated operation. Every installation connected to the CCB will move in the direction the joystick determines.




If the joystick is brought back into the neutral position (0), all the DEGER**trakers** return to the automatic operation mode.




**The wind sensor function takes priority over manual control.**
If the wind alarm has been triggered, the DEGER**traker** moves into a horizontal position. Automatic or manual operation will only be possible again once the wind velocity has dropped below the value set for it. (After 10 minutes at the earliest)
The wind guard is set to a triggervalue at the factory. Under no circumstances may this value be increased. **Changing this value automatically entails a complete loss of warranty for the entire system.**

**Assembly Site for Wind guard and CCB:**
The Assembly location for the CCB can be freely selected – though **not directly next to the inverter**. It is recommended to install the CCB within a building at an inaccessible place for unauthorized people. A detailed assembly instruction is appended to the CCB.
The wind guard should be assembled at a point exposed to the wind, near the DEGERtraker above the upper edge of the module. An installation on the DEGERtraker is possible with the optional "Pendulum for wind guard". A detailed assembly instruction is appended to the Pendulum.

**Feed Line to the Wind guard:**
Measurement lines are not to be laid in parallel to other electrical lines and are to be shielded as of a length of 10 meters (max. 30m), for example JY-ST-Y. It is not permitted to connect the shield of the cable to GND. Use terminal screws and moisture proof boxes for extension.

### Sunlight Sensor

The Sunlight Sensor continuously measures the insolation. At less than 100W/m², for example on cloudy weather or twilight, the tracker will move into flat position.

**Installation of Sunlight Sensor:**
Install the sunlight sensor with the spire on top at a light exposed position. Please note that the sensor must not be shaded at any point during the day. A detailed assembly instruction is appended to the Sunlight Sensor.

### Security Sensor

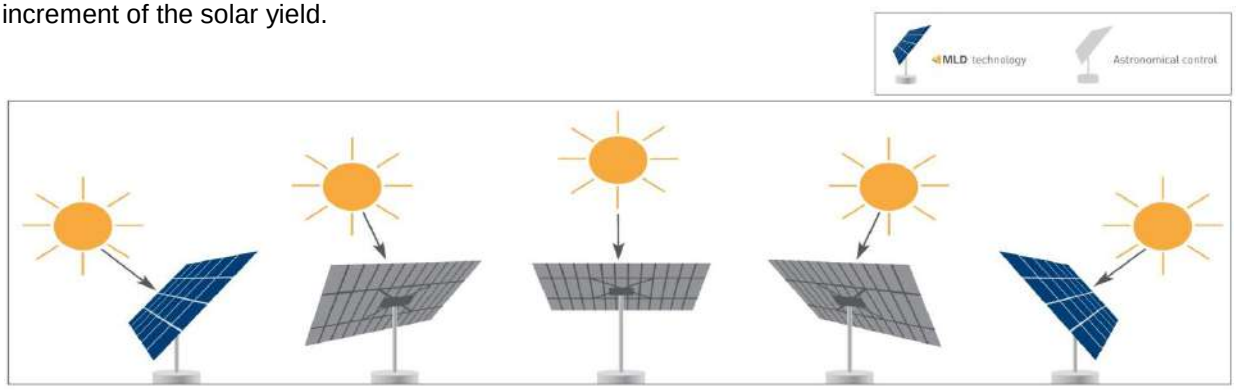
The Security Sensor detects snow and ice cover on the modules and is delivered preinstalled and calibrated. Upon reaching a preset snow mass, DEGER**traker** moves to its max. vertical position to let snow and ice slide off.

**Installation of Security Sensor:**
The Security Sensor is installed on the underside of the module. A detailed assembly instruction is appended to the Security Sensor.

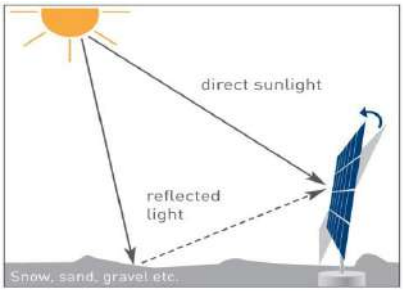
# Part V – Control unit
# Functional characteristics - arrangement check

**A technology to rely on.**
The fact that the patent-protected control system and the utility model-protected mechanical system were awarded the inventor's prize of the federal state of Baden-Württemberg in South-Germany in 2000 shows that the DEGER**traker** meets the demands of both experts and investors.

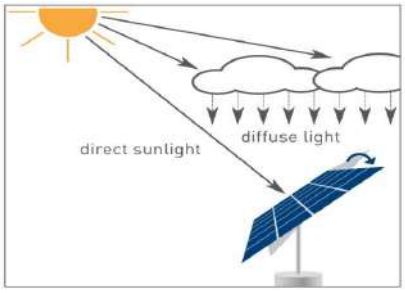
**Functioning**
The DEGER**conecter** control unit detects the brightest spot in the sky and adjusts the module surface's position to face it. The DEGER**traker's** mechanical system allows the accurate adjustment of the module surface to the sun all year round. **This technology also works in cloudy, rainy or foggy conditions.** If, for example, a day starts off sunny with clouds moving in from the west in the afternoon, the module surface will then move back slightly towards the east. On a completely overcast day, the module surface is adjusted to a horizontal position, or to face the point of the strongest irradiation. This allows to make the most out of adverse weather conditions.
The control unit is designed to work preferably efficiently and only to do activities that cause a direct increment of the solar yield.



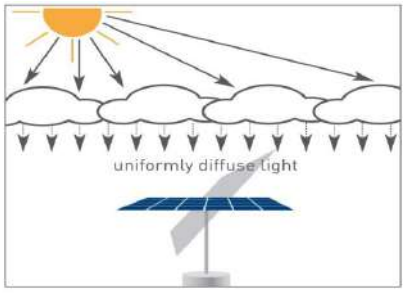

**Sunshine:** The DEGERtraker directly faces the sun all day.



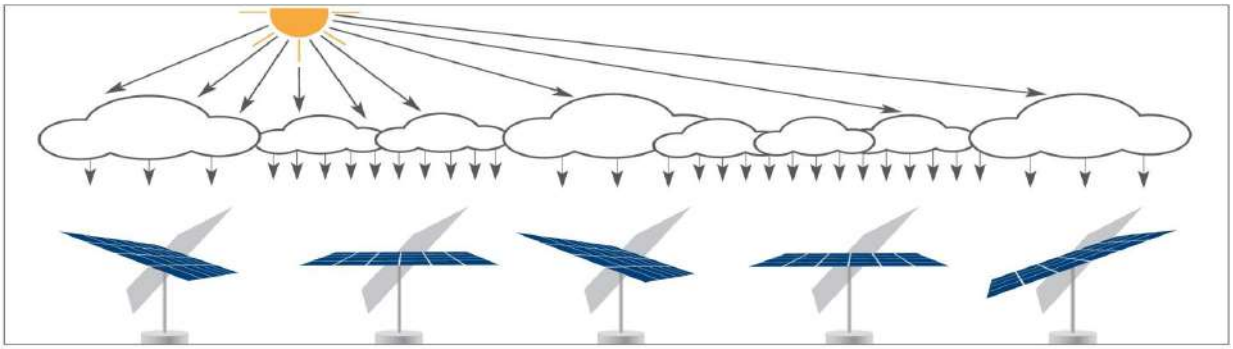

**Reflecting surface:** The DEGERtraker uses direct solar irradiation as well as energy from reflected light.




**Partly clouded:** In addition to the direct solar irradiation, diffused light is also used to maximize the effect.




**Overcast sky:** The DEGERtraker catches all the diffused light by moving to horizontal position.



**Varying light conditions:** Because of different levels of cloudiness, the light conditions in solar parks vary for each DEGERtraker. The individual control makes sure every DEGERtraker is optimally oriented to the brightest source of irradiation. This guarantees the highest energy yield possible.

# Declaration of Conformity

## in accordance with EC machine directive 2006/42/EG, addendum II A

for solar tracking systems

We,

**DEGERenergie GmbH, 72160 Horb, Germany**

herewith declare that the listed products in the way we put them in circulation destined for EC member countries are fitted with CE plates in accordance with EC machine directive.

Note:
This declaration will become invalid if the product is
- modified, supplemented or changed in any kind
- and/or accessories not from DEGERenergy are used
- and in case of inappropriate assembling or installation or not intended use/improper use without our express permission

| | |
|---|---|
| marking of the systems: | DEGER**traker 3000NT, 3000HD, 5000NT, 5000HD, 6000NT, 7000NT, 9000NT** |
| EC-directives: | EC machine directive (2006/42/EC)<br>EC Low Voltage Directive 73/23/EEC)<br>EC EMV directive (89/336/EWG) i.d.F. 93/31/EWG |
| Applied harmonised standards: | EN 60730-1:2000<br>EN 60730-1/A14:2005<br>EN 55011:1998<br>EN 61000-3-2:2000<br>EN 61000-3-3:1995 + A1:2001<br>EN 61000-6-2:2005<br>EN 50102 |
| Applied national standards and technical specification: | VDE 0470-100,VDE 0875,E VDE 0530,DIN VDE 0470-1<br>DIN 42025<br>DIN 40050-2<br>DIN 1055-1<br>DIN 1055-4<br>DIN 18800<br>DIN 4149 (04/2005) |
| Manufacturer | DEGERenergie GmbH<br>Industriestraße 70<br>D-72160 Horb |

Horb, 01.07.2012

# Declaration of commitment DEGERtraker

**DEGERtraker 3000NT, 5000NT, 6000NT, 7000NT, 9000NT, 3000HD, 5000HD**

You have purchased a product that was subject to meticulous examination before it was delivered.
Nevertheless, in the event that the DEGERtraker supplied by us does display any defects then the scope of our liability for defects shall be as follows (valid from 1st June 2012):

## Liability for defects

DEGERenergie GmbH grants a 3-year period for any claims for defects to be asserted. This period starts with the delivery from the factory. DEGERenergie GmbH offers to replace the defective parts free of charge where any justified claims are received in this period.

In addition, DEGERenergie GmbH offers a lump sum as compensation for outlays for transportation and labor where defective parts are replaced. An up-to-date list of these one-off lump sums is available upon request. Actual costs may vary through the location and design of the systems and cannot therefore be taken into account. In all other respects the General Terms and Conditions for deliveries and services shall additionally apply in this regard: version: July 2012.

For the entire steel construction DEGERenergie GmbH offers extended liability for defects of 20 years against rust-through starting with the delivery from the factory. Where a defect arises the contract partner of DEGERenergie GmbH is obligated to inform DEGERenergie GmbH immediately by sending a fault report (part of the assembly instructions) by fax to: +49 (0)7451 539 1410 or by e-mail to: service@DEGERenergie.com, stating the system serial number.

## Proof

A fault report completed in full and stating the system serial number is considered as proof with any claim for defects (see Liability for defects). The defective assembly part must be sent to DEGERenergie GmbH for examination with a copy of the fault report. The type plate on the equipment must be completely legible. There must be no changes present or made to the original delivery condition and no mechanical damage (cut cables, damaged terminals, etc.). An invoice must be submitted with a copy of the fault report in order to claim the lump-sum payment. DEGERenergie GmbH will decide on its liability for defects as well as the lump-sum payment following an examination of the assembly part sent.

## Terms and conditions

Once the spare part is received, the damaged part must be returned to DEGERenergie GmbH in its original packaging or at least in equivalent transport packaging. A return slip will be enclosed with the spare part.
Where there is a defect in the contractual item and DEGERenergie GmbH is responsible for this, then DEGERenergie GmbH shall be under an obligation to repair the damaged part or replace it with a spare part, unless DEGERenergie GmbH is entitled to refuse the supplementary performance on account of statutory regulations.
Any replacement of individual parts within the defect period does not give rise to an extension to the validity period neither for the liability for defects in the system nor for the replaced spare part.
The contract partner of DEGERenergie GmbH must grant the latter a reasonable period for the supplementary performance.
DEGERtraker that are standardized with a wind guard are only allowed to be operated in association with a suitable wind guard which brings the solar module area into the horizontal position in the event of a storm. This must be assembled in accordance with the specifications in the assembly instructions. It must be ensured that this wind guard is available and fully functional at all times.

## Liability Disclaimer

DEGERenergie GmbH is not liable for any damage that arises as a consequence of improper operation by the contract partner, in particular if the module area is dimensioned too generously. The maximum module area that can be installed can be seen in the module layout plan sent with the order confirmation from DEGERenergie GmbH.
Where permissible under the law then DEGERenergie GmbH shall not be liable for material damage and financial loss (e.g. lost buyback price) which result from a defect in the tracking system.
**Open area systems:** Under the provision under "Liability for defects", DEGERenergie GmbH is not liable for any extra costs (e.g. use of crane, skylift , etc.) that arise from using higher masts than the standard version.
**Building integration:** Under the provision under "Liability for defects", DEGERenergie GmbH is not liable in particular for any extra costs (e.g. use of crane, skylift , etc.) that arise from erecting masts on buildings.
In addition DEGERenergie GmbH is not liable for:
- defects that arise from unintended use
- defects that arise from the use of third-party components, e.g. the mounting profile
- defects that arise through changes to the mechanics and/or electronics
- defects that arise on account of a force majeure event (lightning strikes, surges, severe storm, fire, etc.)
- defects that arise through the module area being too large in derogation from the module layout plan (depending on the installation location,
  installation height, etc.)
- defects that arise through interventions, changes or repair attempts that have been made
- defects that arise through a failure to follow the information in the assembly and operating manual.

In all other respects our General Terms and Conditions for deliveries and services shall additionally apply, version: July 2012.

*The German version of this declaration is legally binding. Translations into other languages serve only for a better comprehension.*

DEGERenergie GmbH
Industriestrasse 70
72160 Horb
www.degerenergie.com

(Artur Deger, CEO)

# Report of implementing DEGERtraker

**Type:** ☐ DEGER**traker**3000NT ☐ DEGER**traker**7000NT ☐ DEGER**traker**3000HD
☐ DEGER**traker**5000NT ☐ DEGER**traker**9000NT ☐ DEGER**traker**5000HD
☐ DEGER**traker**6000NT

**(Please fill in using capital letters so it is easily legible!!)**

**Operator:**
Name: _____
Address: _____
Telephone: _____

**Installer/Planer:**
Name: _____
Address: _____
Telephone: _____

**Delivery date:** _____

**Delivery note number:** _____
**Please also attach a copy of the delivery note!!!**

**Date of implementing:** _____

**Name of the solar park:** _____

**Number of systems:** _____

**Serial number:** (Tracker) _____
(please mention complete serial number)


**Assembly:**
☐ free standing traker ☐ traker integrated in building ☐ total height _____m
(top edge module surface)

☐ standard-mast ☐ Mast extension_____m

| **Control of the assembly** | **Inplementing** |
|---|---|
| reinforcement of the foundation was build in due to the plan | |
| hole sphere of action is free of objects | |
| mechanic moves freely, cables are long enough | |
| cable connection of the EL-motor on the lower side | |
| locking fluid EL-motor is applied | |
| dimensions of module arrangement are abode | |
| symetrical arrangement of the modules according to the modul layout and assembly instructions | |
| lightning protection and grounding is connected | |
| conecter East-West axle is mounted pointed upwards above the solar module surface | |
| conecter elevation axle is mounted laterally at the solar module surface | |
| **Control of the function** | |
| East-West drive rotates towards the brightest spot | |
| Elevation drive rotates towards the brightest spot | |
| Test wind monitor setting (> 12m/s) | |
| **Measured data** | |
| current consumption motor elevation | A |
| current consumption motor east-west | A |

Date: _____

Signature: _____ (Operator)

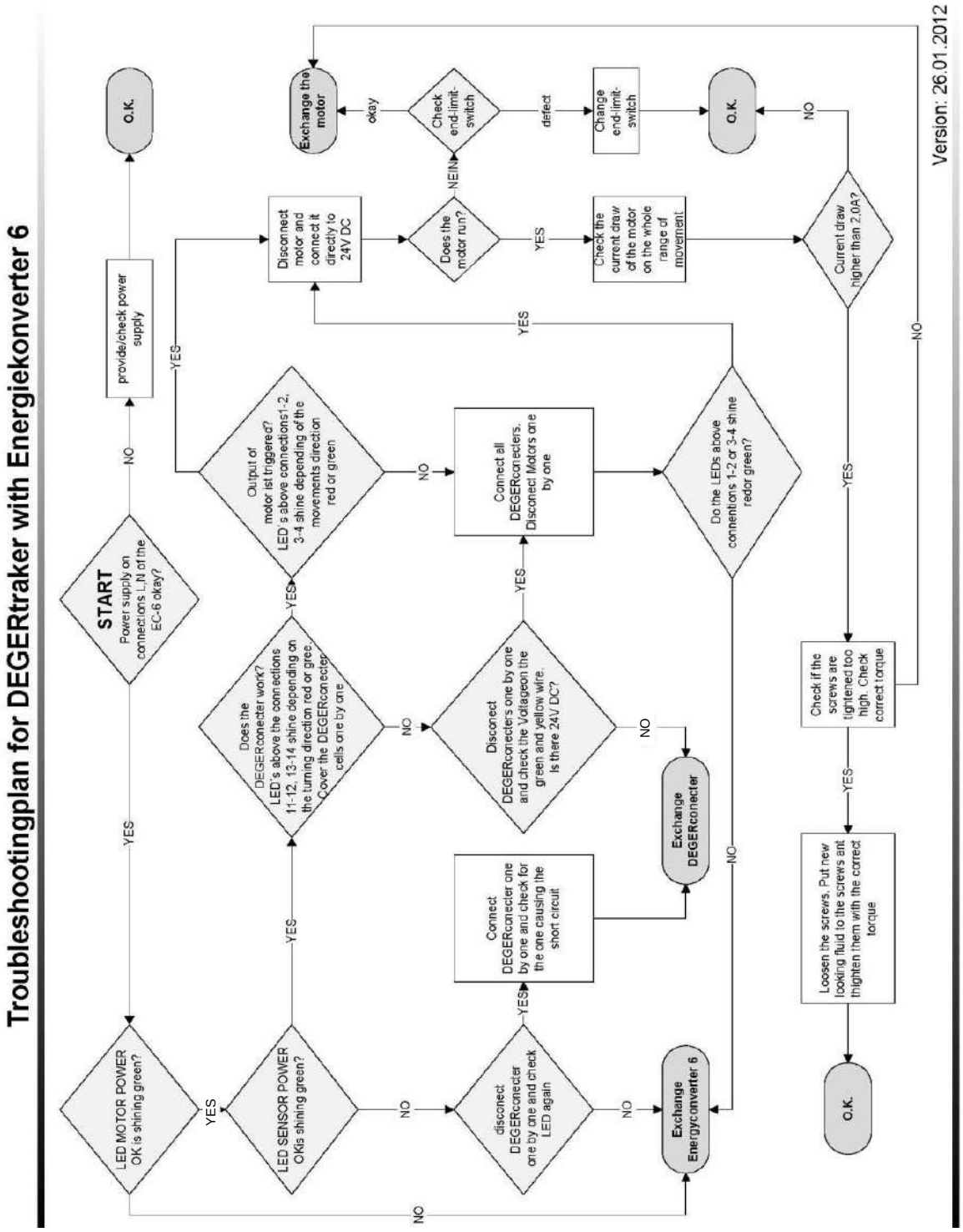
Signature: _____ (Installer/Planer)

**IMPORTANT INSTRUCTIONS!!**
**The commissioning protocol must be filled in when the system is first commissioned, and faxed within 4 weeks of commissioning (at the latest 3 months after delivery) to DEGERenergie GmbH +49 7451 5391410 or sent by e-mail to service@degerenergie.com.**
**The protocol is ready for download at www.degerenergie.com!**

# Part VII – Trouble shooting / Maintenance
# Trouble Shooting

**DANGER** **ATTENTION!**

In the case of inspections or modifications to the DEGERtraker all electrical parts need to be disconnected from line-power by an electrical separator or breaker. It is important to ensure the technical security and the absence of voltage has been verified. When voltage supply is imperative for checking the system, injuries of persons have to be prevented by appropriate actions.




The application of the troubleshooting plan presented above enables a target-oriented troubleshooting.

To exchange defective parts, please contact us with the fault report located in these instructions. We will promptly ship you the necessary replacement parts including detailed exchange instructions.

# Part VII – Trouble shooting / Maintenance
# Maintenance

The DEGERtraker is designed for as less as possible service- and maintenance work to do. For a safe and long-life running of the system it is necessary to do the following jobs periodically once a year:

- control all screws and tighten them up to the torque given in the assembly instruction.

| Mounting screw Dimensions | Tightening torque $M_A$[1)] in Nm screw strength class |
|---|---|
| M6 | 7.8 |
| M8 | 19.1 |
| M10 | 38.0 |
| M12 | 66.5 |
| M14 | 107.0 |
| M16 | 168.0 |

1) $M_A$ according to VDI-guideline 2230 (Feb. 2003) for $\mu_A$=0.08 and $\mu_B$=0.12

- Control all moving parts and lubricate them again if necessary. Pay special attention to the IMO.
- For this you can find some lubricate nipples at the IMO and at the bolt M24 (Fixation base frame).
- You find recommended lubricants in the list below.

NOTICE **ATTENTION!**

**The elevation motor is free of maintenance and does not need to be lubricated.**

**Addapted Lubricants for DEGERtraker:**

| Supplier | Product name | Art.-Nr. | Applicable temperature range |
|---|---|---|---|
| DEGERenergie | Grease in cartridge KG-2-3-B | 6800022 | -40 °C until +140 °C |

NOTICE **ATTENTION!**

**The systems are filled up ex works with a specially grease, which is not mixable with other greases.**

That **Grease in cartridge KG-2-3-B** can be obtained by DEGERenergie.

# Protocols – Fault report DEGERtraker

**To assist in case of problems with our systems it is necessary to have this fault report on hand.**
**Without a completely filled out fault report there can not be any support provided!!**
**Please send this report to the following fax number: +49 7451 5391410**
**or scan and email to: service@degerenergie.com**
**Please provide a phone number to contact you.**
**RECALL-NUMBER: _____ (required)**

## Fault report from ___.___._____

### 1 Information about the system

| | | | |
|---|---|---|---|
| ☐ TOPtraker 6.1 (since 2002) | ☐ 300EL (1999 to 2010) | ☐ 3000NT (since 3/2008) | ☐ 3000HD (since 5/2008) |
| ☐ TOPtraker 8.5 (since 4/2008) | ☐ 1000/1200EL (1999 to 2002) | ☐ 5000NT (since 10/2005) | ☐ 5000HD (since 5/2008) |
| ☐ TOPtraker 25HD (since 2008) | ☐ 1600EL (2002 to 3/2008) | ☐ 6000NT (since 9/2010) | ☐ 3000CT (since 1/2010) |
| ☐ TOPtraker 40NT (since 2008) | ☐ 2500EL (2003 to 2005) | ☐ 7000NT (since 8/2006) | ☐ 5000CT (since 1/2010) |
| | ☐ 4000EL (until 2006) | ☐ 9000NT (since 8/2010) | |

| | | | |
|---|---|---|---|
| _____ date of delivery | 204-_____ serial number EC 6 | ☐ individual DEGERtraker ☐ plant with trackers | _____ serial number(s) DEGERtraker |

| | | |
|---|---|---|
| energy-converter-type: ☐ I ☐ II ☐ III ☐ V ☐ 6 | Windguard/control-type ☐ ELERO ☐ ELTAKO ☐ CCB I ☐ CCB II BASIC ☐ CCB III STANDARD ☐ CCB III ADVANCED | power-supply-energy-converter Voltage: V, ☐ AC, ☐ DC |
| assembly: ☐ free standing ☐ integrated in building | | total height (top edge of module-surface over ground) m |

If your system is equipped with an Energy Converter 6 (EC 6 ), the power supply (24V/DC) to the motors and DEGERconecters can be checked on the LEDs above the connection clamps. Please follow the trouble shooting chart for the EC 6. This chart can be found in the assembly instructions or the operating manual of your system.

### 2 Measurement

| function-control: | | | o.k.? |
|---|---|---|---|
| East-West drive rotates to the brightest spot (cover one sensor cell) | | | ☐ |
| Elevation drive moves to the brightest spot (cover one sensor cell) | | | ☐ |
| by activating wind-guard the DEGERtraker moves into horizontal position | | | ☐ |
| **Measured data at the energy-converter** | | | **measured** |
| power supply | clamp A-B/L-N | | V |
| DEGERconecters: | | | |
| power supply to DEGERconecter elevation | clamp 5-6 | | V |
| output from DEGERconecter elevation | clamp 11-12 | | V |
| power supply to DEGERconecter east-west | clamp 7-8 | | V |
| output from DEGERconecter east-west | clamp 13-14 | | V |
| Motors: | | | |
| power supply to motor elevation | clamp 1-2 | | V |
| power supply to motor east-west | clamp 3-4 | | V |
| current consumption motor elevation | | | A |
| current consumption motor east-west | | | A |

**To give you a quick help this completely filled in form is required.**

**Without a completely filled in form the processing of complaints is not possible!**

**For guarantee claims a copy of the delivery note is required additional.**

**Send the completely filled in form to: service@degerenergie.com or by Fax: +49 7451 53914-10 to DEGERenergie.**

**We´ll get in contact to you.**
**Thank you for your cooperation.**

### 3 Data

Contact
☐ distributor ☐ installer ☐ operator

_____ Company / location

_____ Adress

_____ ZIP Code / location

_____ Contact person

**adress to send defective parts back:**

DEGERenergie GmbH
- Service -
Industriestrasse 70
72160 Horb a.N.

### 4 Formulation of problem

_____

### 5 Spare-part(s) with number

_____