DEGERconecter
the patented system control

PROFESSIONAL
POWER GENERATION
TOPtraker® 8.5
TOPtraker® NT
Single-axis

DEGERtraker 3000NT
DEGERtraker 5000NT
DEGERtraker 7000NT
Dual-axis

BUILDING-INTEGRATED
TOPtraker® 8.5
TOPtraker® HD
Single-axis

DEGERtraker 3000HD
DEGERtraker 5000HD
Dual-axis

HOBBY & LEISURE TIME
DEGERtraker 300EL
Dual-axis

Available at any time:
From your solar equipment retailer.

PRODUCT - Guide
Your Advantages

that pay for themselves!

DEGERconecter
... the unique, patented control system
- Advantage through experience - since 1999
- Highest returns
- Lowest consumption - no energy-intensive computer in the background
- Highest availability (99.9%) - decentralised control with fail-safe program
- Most clever control unit - takes full advantage of snow- and eye-of-cloud effect
- Simple, easily mastered control electronics (no turning angle transmitter, relays, multiphase motors...) thus simple maintenance
- Lower cabling expenditures at large solar parks - no networking with data lines is necessary
- Poor weather situations are also used efficiently
- Only movements that immediately result in an increased yield are made
- The most effective control on large surfaces through individual controls
- Clouds only influence the respective part of the solar park
- Highest precision through large measuring surfaces of the sensors - no loss in performance when dirty
- With a soft subsurface and use of the foundation, the DEGERconecter automatically readjusts - safety during long-term operation without inspection effort

DEGERtracker / TOPtracker
... the complete tracking systems
- Advantage through experience - since 1999
- Highest additional yields - DEGERtracker up to 45%, TOPtracker up to 30%
- Also suitable for desert and equatorial regions
- Lowest consumption - calculated mechanics allow the use of cost-efficient mini-DC motors
- Shortest assembly times
- TÜV tested and certified
- Passed hardest load tests of the Stuttgart Institute for Material Testing (MPA)
- Most flexible assembly system - suitable for all current modules and inverter types
- Lowest maintenance expenses
- Longest life
- 99.9% recyclable through aluminium and steel construction
- Lowest transport costs
- Best price-performance ratio
- Therefore a fast payoff

DEGERenergie
... Market leader for tracking systems
- Advantage through experience - since 1999
- 70,000 DEGERtrackers on the grid (status 05/2008)
- Growth rates of over 300% - since 1999
- 100 MW production capacity
- Up to 25 year warranty
- That results in safety - even in the spare parts supply

Up to 45% more yield - possible only with the DEGERconecter.

Can you afford to do without half of the possible yield?
DEGERconecter Control System for the DEGERtracker

Accurate adjustment ... The DEGERconecter always adjusts the solar installation to face the brightest point in the sky. It includes the entire system control.

Maximum power yield During times of sunshine the module surface is accurately adjusted to face the sun. During times of overcast weather, the DEGERconecter automatically adjusts to face the point with the strongest global radiation.

A control system to rely on. The patented DEGERconecter control was distinguished with the Baden-Württemberg Prize for Innovation in 2000, has been continuously improved and has more than 40,000 units in operation.

Description of DEGERconecter functions Two sensor cells in the DEGERconecter supply reference values which are evaluated by the logic device, and which provide the basis for the adjustments of the module surface in the course of the day. A third sensor cell is attached to the back of the DEGERconecter to reset the installation in the morning. Depending on the irradiation intensity, a differential amplifier controls the transition from the logarithmic characteristic curve during strong irradiation to a linear characteristic curve during low currents in diffuse light. That means that the logic device accepts a much higher value for the linear characteristic curve rather than for the logarithmic characteristic curve. This leads to improved adjustment accuracy in dim light. A load is added to the differential voltage, moving the switch-off threshold further into dark, to ca. 30 W/m².

Drive control The drive is controlled directly — and without requiring additional parts — by the MOSFET bridge circuit, which is integrated in the DEGERconecter. The bridge is characterised by a very low closing resistance. To avoid overload of the motor and the DEGERtracker’s structure, a current limiter was integrated into the system. This current limiter functions dynamically, i.e. the motor is switched off as a response to overload (e.g. frozen or blocked drives). As soon as the drive works again, the system is reset automatically.

Tasks of an energy converter The energy converter exploits wide voltage ranges of solar modules, battery systems and the grid for the DEGERconecter. The power for the control and drive systems may also be supplied without a battery, by direct connection to solar modules with less than one Watt power.

Circuit Diagram

During dawn, the DEGERconecter recognises the brightest spot in the sky and tries to reset the installation. The power supply module for the control system starts by producing 0.01 Watts or less, and as soon as the DEGERconecter attempts to control the electric motor, the voltage on the solar module breaks down. To avoid the DEGERconecter switching the drive on and off all the time and to achieve quick resetting, DEGERenergie has developed the energy converter. The energy converter collects even small power inputs from the solar module (which are too small to be fed into the grid) in a high performance condenser and makes this energy available to the DEGERconecter. The DEGERconecter is thus able to reset the installation to face the brightest spot even before the modules produce enough energy to be fed into the grid. To avoid both drivers from working simultaneously, the energy converter gives the east-west drive priority over elevation. The energy converter also ensures that not more than ca. 1-3 Watts is drawn from the solar module while the drive is running. The control does not use any energy during the night.

Power supply
- directly from the solar module or string,
- from a battery for stand-alone-systems,
- from the AC grid,
- or from an additional 1-5 Wp solar module for self-powered systems.

System Control

DEGERconecter Control System for the DEGERtracker

For a surplus of up to 45%
### DEGER TOPtrak® 8.5 / NT

**Single-axis, active tracking systems**

**Areas of application:**
- For increased performance for all photovoltaic applications.
- For open spaces and landfills.
- For all current modules.

<table>
<thead>
<tr>
<th>Art.no.</th>
<th>Description</th>
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<tbody>
<tr>
<td>130001</td>
<td>DEGER TOPtrak® 8.5 with concrete foundation for open land installation</td>
</tr>
</tbody>
</table>

**Scope of delivery:**
Complete tracking system in the optimized azimuth axis, DEGERconecter control electronics, module bearing system in aluminium, compatible with the module type used, installation instructions.

### DEGERtracker 3000NT / 5000NT / 7000NT

**Dual-axis, active tracking systems**

**Areas of application:**
- For professional power generation
- For open spaces and for installation with different mast lengths.
- For all current modules.

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<tr>
<td>1110001</td>
<td>DEGERtracker 3000NT / 5000NT / 7000NT Dual-axis, active tracking systems Professional Power Generation</td>
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**Scope of delivery:**
Complete dual-axis tracking system, mast, aluminium solar module carrier system to fit the respective module type, DEGERconecter control electronics with energy converter for extremely economical operation, foundation plan, construction plan.

<table>
<thead>
<tr>
<th>TOPtrak® 8.5</th>
<th>TOPtrak® NT</th>
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<tr>
<td>For solar energy capacity</td>
<td>500 ... 1,290 Wp</td>
</tr>
<tr>
<td>Module area up to</td>
<td>8.5 m²</td>
</tr>
<tr>
<td>Angle of inclination - south</td>
<td>30°</td>
</tr>
<tr>
<td>Elevation inclination angle</td>
<td>10° ... 50°</td>
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<tr>
<td>Control unit</td>
<td>DEGERconecter</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>20 ... 40 VDC</td>
</tr>
<tr>
<td>East - west drive</td>
<td>420 mm stroke path</td>
</tr>
<tr>
<td>Internal power consumption</td>
<td>control mode</td>
</tr>
<tr>
<td>with operating drives</td>
<td>5 Watts</td>
</tr>
<tr>
<td>Power consumption per year</td>
<td>0.3 kWh</td>
</tr>
<tr>
<td>Mast height</td>
<td>—</td>
</tr>
<tr>
<td>Weight (excluding mast)</td>
<td>115 kg</td>
</tr>
<tr>
<td>Maintenance</td>
<td>maintenance-free</td>
</tr>
<tr>
<td>Geographic region</td>
<td>Equator ... 60° latitude</td>
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<th>TOPtrak® NT</th>
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<tbody>
<tr>
<td>For solar energy capacity</td>
<td>3,000 ... 3,800 Wp</td>
</tr>
<tr>
<td>Module area up to</td>
<td>25 m²</td>
</tr>
<tr>
<td>Rotation angle east - west</td>
<td>360° with adjustable limit switches</td>
</tr>
<tr>
<td>Elevation inclination angle</td>
<td>30° ... 90°</td>
</tr>
<tr>
<td>Control unit</td>
<td>DEGERconecter</td>
</tr>
<tr>
<td>Energy converter</td>
<td>8 or 9</td>
</tr>
<tr>
<td>East - west drive</td>
<td>Drive integrated in the power head</td>
</tr>
<tr>
<td>Elevation drive</td>
<td>1,000 mm stroke path</td>
</tr>
<tr>
<td>Internal power consumption</td>
<td>control mode</td>
</tr>
<tr>
<td>with operating drives</td>
<td>7 Watts</td>
</tr>
<tr>
<td>Power consumption per year</td>
<td>3.3 kWh</td>
</tr>
<tr>
<td>Mast height</td>
<td>3.3 ... 5.5 m</td>
</tr>
<tr>
<td>Weight (excluding mast)</td>
<td>440 kg</td>
</tr>
<tr>
<td>Maintenance</td>
<td>maintenance-free</td>
</tr>
<tr>
<td>Geographic region</td>
<td>25° ... 60° / optional equator to 90th degree of latitude</td>
</tr>
<tr>
<td>Art.no.</td>
<td>1300001</td>
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</table>

**Note:**
The systems are designed in accordance with DIN 1055-4 (03/2005). Project-specific assimilation to regional provisions.
Subject to technical changes for future improvements.

NEW! in October 2008 TOPtrak® NT
DEGER TOPtrak® 8.5 / HD
Single-axis, active tracking systems

For solar energy capacity
- TOPtrak® 8.5: 500 ... 1,290 Wp
- TOPtrak® HD: 2,000 ... 3,800 Wp

Module area up to
- TOPtrak® 8.5: 8.5 m²
- TOPtrak® HD: 25 m²

Angle of inclination - south
- Standard 30°, optional 0°

Elevation inclination angle
- 30° ... 45°

Control unit
- DEGERconecter

Operating voltage
- TOPtrak® 8.5: 20 ... 40 VDC
- TOPtrak® HD: 24 (20 ... 30 V)

Internal power consumption:
- Control mode: 0.01 Watt
- with operating drives: 5 Watts
- Power consumption per year:
  - TOPtrak® 8.5: 0.3 kWh
  - TOPtrak® HD: 2 kWh
- Mast height
  - TOPtrak® 8.5: 3.3 ... 5.5 m
  - TOPtrak® HD: 5.5 ... 9 m
- Weight (excluding mast):
  - TOPtrak® 8.5: 115 kg
  - TOPtrak® HD: 430 kg
- Maintenance: maintenance-free

Geographic region: Equator ... 60° latitude

Art.no.: 1110001 1120001

The systems are designed in accordance with DIN 1055-4 (03/2005). Project-specific assimilation to regional provisions.
Subject to technical changes for future improvements.

Scope of delivery:
- Complete tracking system in the optimised azimuth axis, DEGERconecter control electronics, mast, aluminium solar module carrier system, installation instructions.

DEGER TOPtrak® 8.5
without concrete foundations for flat roof installation

DEGER TOPtrak® HD
For solar energy capacity
- 2,000 ... 3,800 Wp

Module area up to
- 25 m²

Rotation angle east - west
- 360° with adjustable limit switches

Elevation inclination angle
- 20° ... 90°

Control unit
- DEGERconecter

Energy converter
- II or V

East - west drive
- Drive integrated in the power head

Elevation drive
- 1,000 mm stroke path

Internal power consumption:
- Control mode: 0.2 Watt
- with operating drives: 7 Watts

Power consumption per year
- 3 kWh

Mast height: 3.3 ... 5.5 m

Weight (excluding mast)
- 500 kg

Maintenance: maintenance-free

Geographic region: Equator ... 60° latitude

Art.no.: 1310001 1510001

The systems are designed in accordance with DIN 1055-4 (03/2005). Project-specific assimilation to regional provisions. Subject to technical changes for future improvements.

Scope of delivery:
- Complete dual-axis tracking system, mast, aluminium solar module carrier system to fit the respective module type, DEGERconecter control electronics with energy converter for extremely economical operation, construction plan.
DEGERtrakker 300EL
Dual-axis, active tracking system

For solar yield 100 - 400 Wp
Module area up to 3 m²
Rotation angle east-west 200°
Elevation inclination angle 15°...90°
Control unit DEGERconecter
Energy converter I or III
East - west drive drive integrated in the power head
Elevation drive linear drive, 200 mm stroke path
Internal power consumption:
control mode 0.2 Watt
during drive operation 2 Watts
Power consumption per year 1 kWh
Mast length mast not included, Ø 90mm
Weight [without mast] 30 kg
Maintenance maintenance-free
Geographic regions 25th ... 60th degree of latitude
Art.no.: 1000001

Operating efficiency ...

in the example of a 100 kWp system with DEGERtrakkers rigid systems in one area, providing approx.
1,300 kWh / kWp per year.

Rigid system yield in 20 yrs: 2,600,000 kWh at 35 ct/kWh  = C 910,000,-
DEGERtrakker yield in 20 yrs: 3,640,000 kWh at 35 ct/kWh  = C 1,274,000,-

Profit = C 364,000,-
Higher purchase price of DEGERtrakker vs. rigid approx. = C 60,000,-
End profit = C 304,000,-

Scope of delivery:
Complete dual-axis tracking system, aluminium solar module carrier system to fit the respective module type, DEGERconecter control electronics with energy converter for extremely economical operation, construction plan.

DEGERtrakker and look forward to your electricity bill

DEGERenergie Tracking Systems