



# Leading Tracking Technology

**sonnen\_system**

Astronomically Controlled  
Dual-Axis Solar Tracker



A product of Kirchner Solar Group



**Kirchner  
Solar  
Group**

# Infinite Energy

The sun provides an infinite amount of energy each day. Our mission is to use this energy for a stable climate, clean environment and sustainable growth.

Towards these goals, **Kirchner Solar Group** provides solar tracking systems that convert more solar energy into much-needed distributed electricity.

Reliable, efficient and accessible.





# We Follow the Sun

Our dual-axis photovoltaic tracking systems always align with the optimum angle to the sun. Optimum solar alignment is made possible by a precise astronomical control developed specifically for this purpose. Over the years thousands of **sonnen\_system** trackers have demonstrated and verified maximum effectiveness.



ENERGY SURPLUS  
**45%**  
OF UP TO 45%





# Setting Standards

**sonnen\_system** is the world's most reliable and comprehensive solution for dual-axis tracking systems. It is a meticulously engineered product that includes a precise astronomical control, developed in cooperation with the photovoltaic specialists at SMA Solar Technology.

Our unique safety concept **safeguard** enables a comprehensive communications exchange, allowing **sonnen\_system** to reliably produce electricity at a consistently high level.

Our tracking systems follow the course of the sun precisely, allowing for the maximum of available solar energy to be captured throughout the day. Our innovative technology generates a solar energy surplus of up to 45 % compared to fixed-mount PV installations.

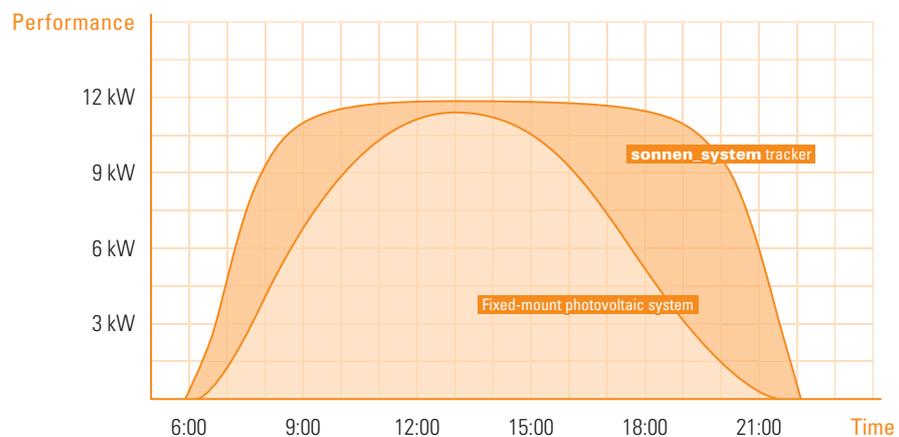


Chart: Performance of a **sonnen\_system** tracking unit for 24 hrs vs. performance history of a fixed-mount photovoltaic system of the same system size.

Computer-aided welding  
for exceptional precision  
of the construction



#### Bearing Units

- triple-bearing panel surface mounts
- solid stainless-steel parts
- exceedingly high stability and operational safety
- maintenance-free, tried-and-tested, reliable

# Next Generation of Solar Tracking Systems

The construction of our **sonnen\_system** ensures safe and reliable operation. A robust and optimized structure provides stability and support throughout the lifetime of the tracking system. **sonnen\_system** is designed to operate for 20+ years and is equipped and constructed with the highest-quality components and materials available on the market today.

Our tracking system was designed for the global market and is guaranteed to operate safely – even in extreme climate conditions.

You are getting incomparable technological quality, engineered in Germany.



## Elevation Drive

- solid stainless-steel drive
- superior operational safety
- very low maintenance over its lifetime
- fast and simple installation



## Azimuth Drive

- robust and reliable slew drive
- meets highest manufacturing standards
- designed especially for heavy loads
- low maintenance, durable construction

# Ready for Future PV Technologies

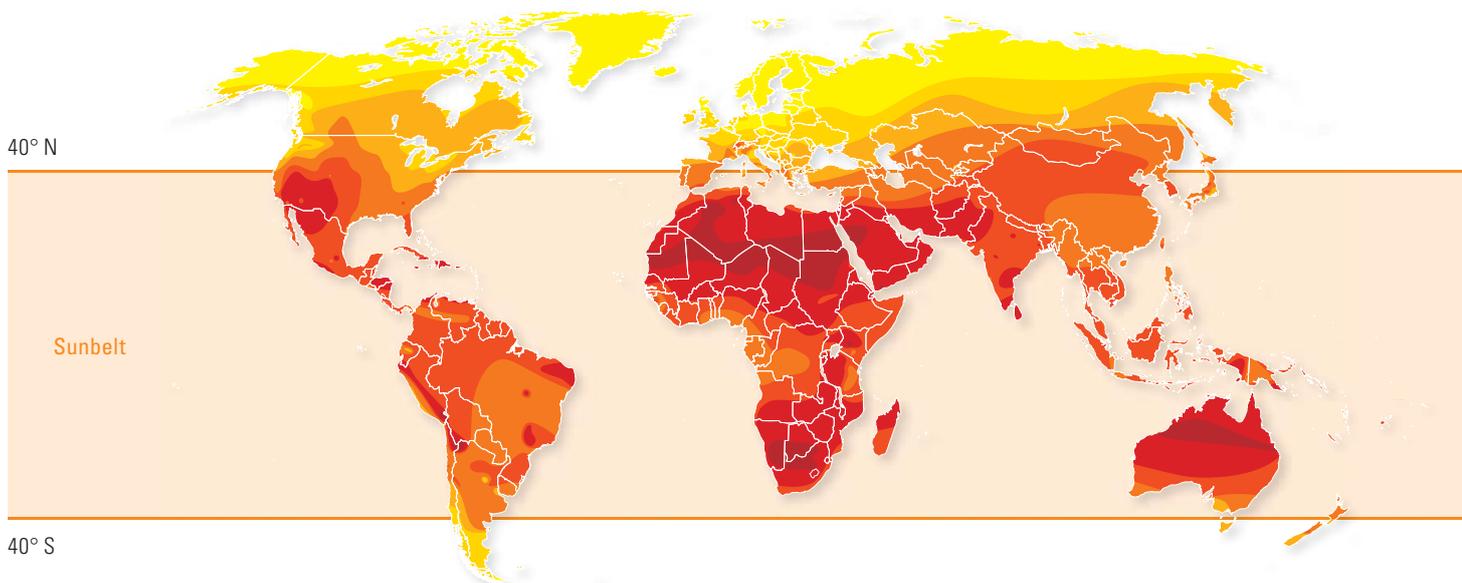




# Concentrator Photovoltaics

Within the solar industry, CPV will be the leading edge technology with outstanding high efficiency from 30 % to 40 % in the near future. In the sunbelt CPV provides for the lowest solar electricity production cost combined with the best temperature characteristics.

**sonnen\_system** always aligns with the optimum angle to the sun. Optimal solar alignment is made possible by a precise astronomical control developed specifically for this purpose. Our control can provide the high accuracy of up to 0.1 degrees which is an absolute necessity for concentrator module applications in high DNI regions.



# SolTrk

Each **sonnen\_system** is equipped with its own control unit, so each system can be individually accessed and analyzed.

Only a supply cable, a feed-in cable and a communications cable are needed for operation. Their entry points are aligned on the bottom of **SolTrk**, designed as individual PG screwings and marked according to their **sonnen\_system** configuration. This ensures a simple, fast and correct connection.

Groupings of up to 25 **sonnen\_system** trackers can be made that way, and multiple groups pooled into large-scale power plants. This makes the costly laying of control wiring redundant.



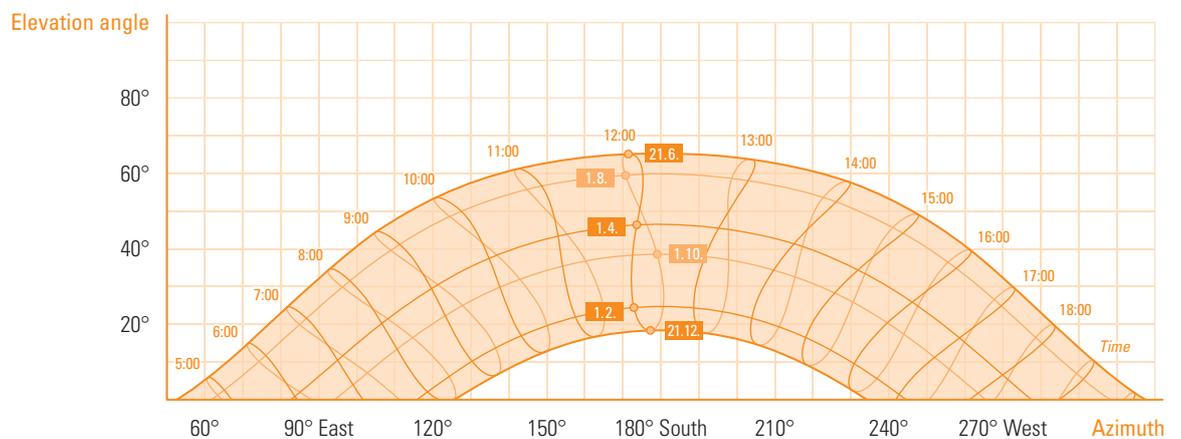
**SolTrk** is the control unit of **sonnen\_system**



# Astronomical Control

Our astronomical control unit **SolTrk** was developed in close cooperation with the photovoltaic specialists at SMA Solar Technology and offers an angular accuracy of up to 0.1 degrees. This high precision is an absolute necessity for applications such as concentrator module technology.

The control is fully integrated with the field-level SCADA and communications protocol and allows for bi-directional data exchange from anywhere in the world.



This solar altitude diagram depicts the position of the sun at any time during the year.

# Stay Informed – Any Place, Any Time

The evaluation function of our newly revised mobile application **track\_app** allows for a continuous overview of your investment earnings in real time.

Output, performance and all other crucial data such as irradiance, module temperature, ambient temperature and wind speed are displayed in real time by the power indicator.

With a simple push of a key the integrated camera control allows you to view the installation directly through the webcam, while the scalable long-term evaluation will give you detailed information on the overall performance of the system.



**track\_app Expert**



**track\_app Basic**

**Platform:**

iPad based

iPhone based

**Customer group:**

Kirchner Solar Group partners, installers, service technicians, plant operators

private owners, commercial owners

**Features:**

## Yield information

Daily power curve	●	●
Monthly yield overview	●	●
Yearly yield overview	●	●
Summary yield overview	●	●
Real time performance	●	●

## Weather station<sup>1</sup>

Real time irradiation	●	●
Real time ambient temperature	●	●
Real time module temperature	●	●
Real time wind speed	●	●

## Plant profile

Facts overview	●	–
Plant description	●	–

## sonnen\_system tracker controlling

Manual moving to East, West, 0°, 70°	●	–
Tracking mode	●	–
Clean position <sup>2</sup>	●	–

## sonnen\_system tracker monitoring

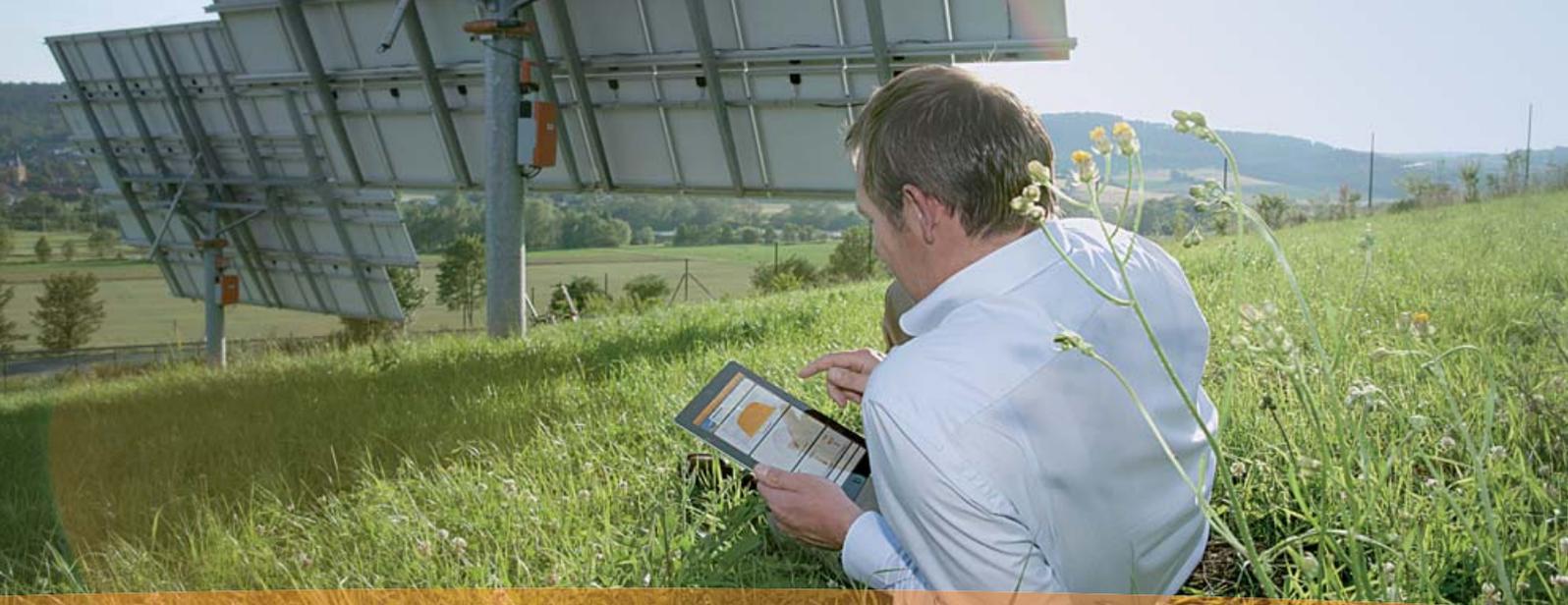
Tracking mode	●	–
Alignment azimuth, elevation	●	–
Motor current azimuth drive, elevation drive	●	–

## Inverter

Mode	●	–
Power monitoring	●	–

## Webcam<sup>3</sup>

Visual inspection	●	–
Visual analysis	●	–



# Real Time Communication

The communications hub allows for continuous monitoring of the operational data and offers a significant time advantage for maintenance and support work.

The system operator receives all system messages and relevant performance data in real time. Online applications allow you to set your system into operation, service and evaluate the performance from anywhere in the world.

This feature makes it possible to avoid unnecessary on-site visits and saves both costs and valuable time.

**track\_app Basic** for iPhone is a free application that provides real time performance data. You are always up-to-date on energy production and the power fed into the grid.



**track\_app Expert** is a simple and intuitive application on the iPad, which allows you to set **sonnen\_system** trackers into operation as well as to monitor and control those remotely.

**track\_app Expert** supports installers and service technicians who assemble and start up trackers and inverters. A physical connection to the system's control unit is no longer necessary. This boosts speed and efficiency of the installation and contributes to considerable cost savings.

Service technicians receive timely status messages on the go and can directly log on to the systems via **track\_app Expert**. Whatever the technician's location, they can process those messages and flexibly perform diagnostics.

# Protection

**sonnen\_system** is equipped with an extensive array of safety features. This allows for reliable operation in extreme conditions – protecting your investment even in the event of storms or power failures.



# Safety Concept

All security features are summarized in our unique safety concept **safeguard**. A voltage monitoring system continuously checks the charge level of the control batteries so that the secure table position can always be accessed when needed.



The wind speed indicator includes a wind sensor and a control unit. These ensure that **sonnen\_system** automatically moves into the secure table position in case of high winds.



# multi\_use References

**sonnen\_system** trackers  
provide winemakers with  
additional income





## sonnen\_system multi\_use Approach

The construction and carefully engineered features of **sonnen\_system** allow for a wide range of uses. The unique, height-adjustable mast provides vertical clearance that other PV installations lack making **sonnen\_system** a perfect fit for integration into agricultural land and parking lots.

Truly multi-functional, the area used for power generation with **sonnen\_system** can, at the same time, be used profitably for a variety of additional purposes.

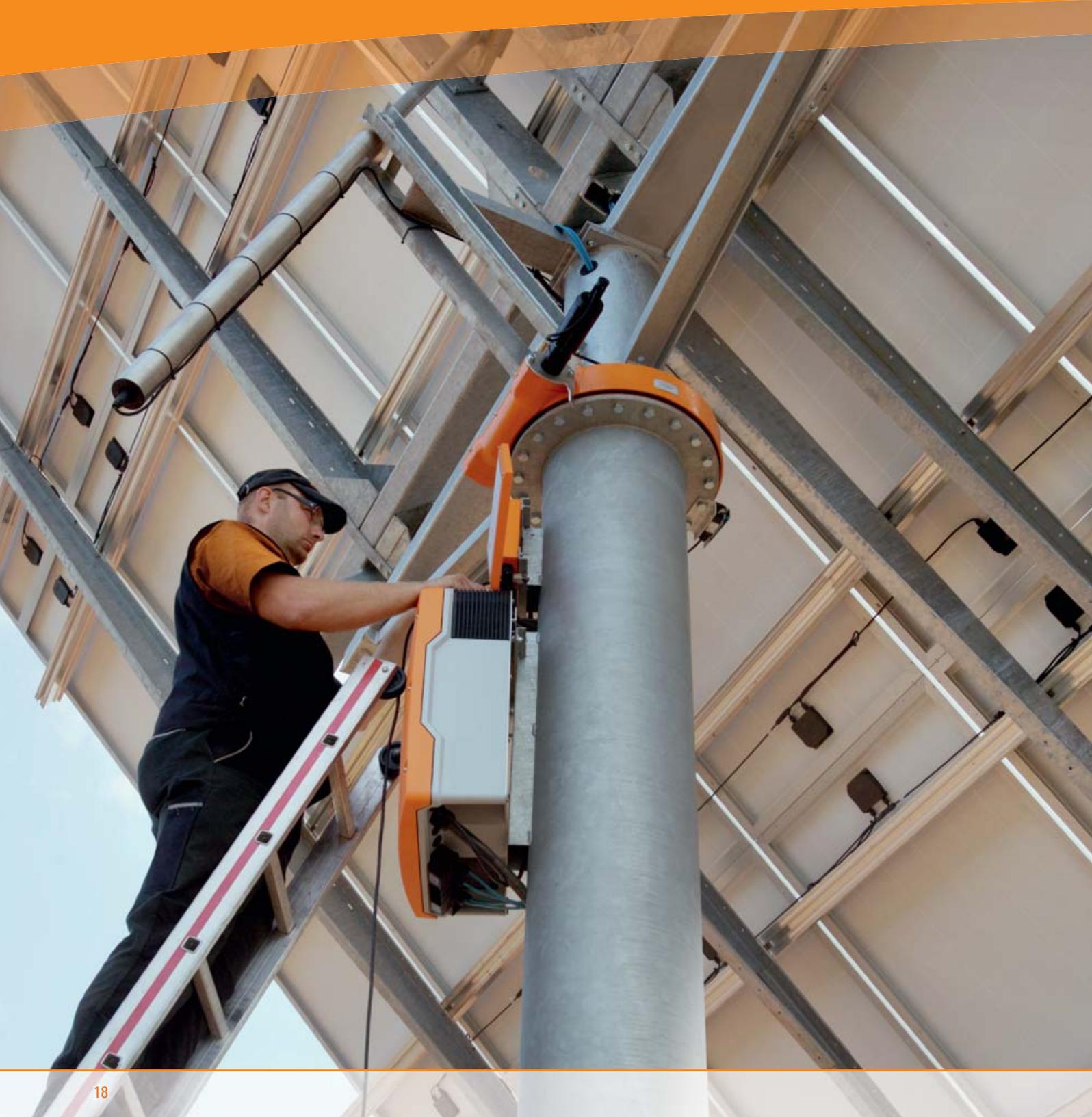


Cows grazing under **sonnen\_system**



**sonnen\_system** trackers on the roof of **Kirchner Solar Group** headquarters

EXTENDED WARRANTY  
**20**  
OF UP TO 20 YEARS



# Warranty, Service, Academy

We offer our customers products they can rely on, both in terms of safety and predictability of operating costs. In addition to a modular service concept that includes regular maintenance intervals, we also offer extended warranty options of up to 20 years.

**sonnen\_system Academy** provides the latest technological and market developments for the PV tracking industry to ensure a secure investment.

Long-term experience, outstanding service and support.



Warranties of up to 20 years, starting with the date of initial operation of each **sonnen\_system**



Technical training to become a **Kirchner Solar Group** Certified Service Partner at our headquarters

# Main Technical Features

- Biaxial tracking system for photovoltaic installations
- Astronomical control based on local coordinates
- Centralized monitoring via Internet
- Comprehensive safety concept **safeguard**
- Building integration feasible
- Additional yield up to 45% compared to fixed-mount installations
- Track-back function to prevent cross-shading
- 20-year warranty (depending on service agreement)
- Suitable for all panel brands

## sonnen\_system 3\_40

## sonnen\_system 3\_60

### Dimensions

Size of panel surface	approx. 36 – 45 m <sup>2</sup>	approx. 46 – 60 m <sup>2</sup>
Size of supporting structure (without profile rails, width x height)	7 m x 5 m	7 m x 6.4 m
Maximum installation height (upper edge of panel surface above ground level)	20 m	20 m
Weight (without mast, profile rails and panels)	approx. 620 kg	approx. 670 kg
Load	approx. 1200 kg	approx. 1200 kg

### Components

Control unit	astronomical with RS 485 interface
Steel construction	hot-dip galvanised according to DIN EN 1461
Azimuth	electromechanical slew drive 102:1
Elevation	electromechanical lifting spindle 225:1

### safeguard

Wind alert system operates at wind speed	≥ 13 m/s	≥ 13 m/s
Type of protection	IP 54 / 65	IP 54 / 65
Voltage monitor operates at	≤ 24V / DC	≤ 24V / DC
Uninterruptible power supply	18 – 100 Ah depending on the number of sonnen_system trackers	
Monitoring	monitoring system for the entire plant via SMA Sunny WebBox	

### Performance

Capacity of PV generator (depending on panel type)	5 – 8 kWp	8 – 12 kWp
Operating voltage	24 V / DC	24 V / DC
Nominal power	max. 110 W	max. 110 W
Angular range		azimuth 270°, elevation 70°
Angular accuracy		by 0.1° – 0.25°



# Panel Allocation

The rail rack of **sonnen\_system** allows for an extremely versatile and flexible arrangement of all current PV panels. The layout of **sonnen\_system** trackers can be individually adapted to the quantity and size of the applied panel type, and thus, the most different panel allocations can be realized.

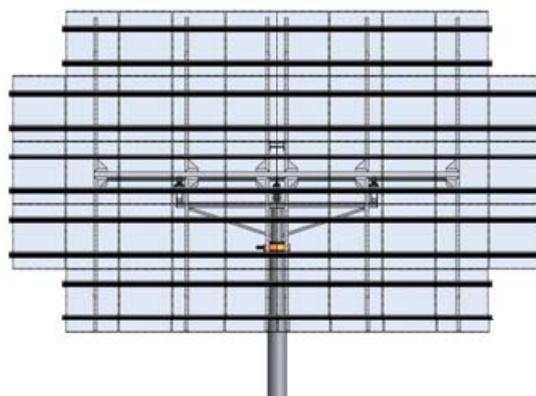
Two examples for panel allocation:

## 46 panels

8.74 kWp

Single panel size (width x height)	990 x 1310 mm
Total panel surface	60 m <sup>2</sup>
Total system size (without mast)	10.2 x 6.5 m

1

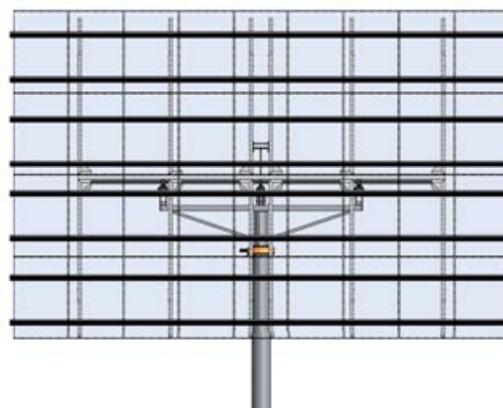


## 36 panels

11.99 kWp

Single panel size (width x height)	1046 x 1559 mm
Total panel surface	58.68 m <sup>2</sup>
Total system size (without mast)	9.6 x 6.4 m

2



# Connections and Cabling

All devices of a **sonnen\_system** tracker are connected to a Sunny WebBox via RS485 communication bus. Every **SolTrk** is equipped with a COM-IN and COM-OUT plug-in to integrate them into the bus. The inverter is connected to the appropriate **SolTrk** control unit via branch line.



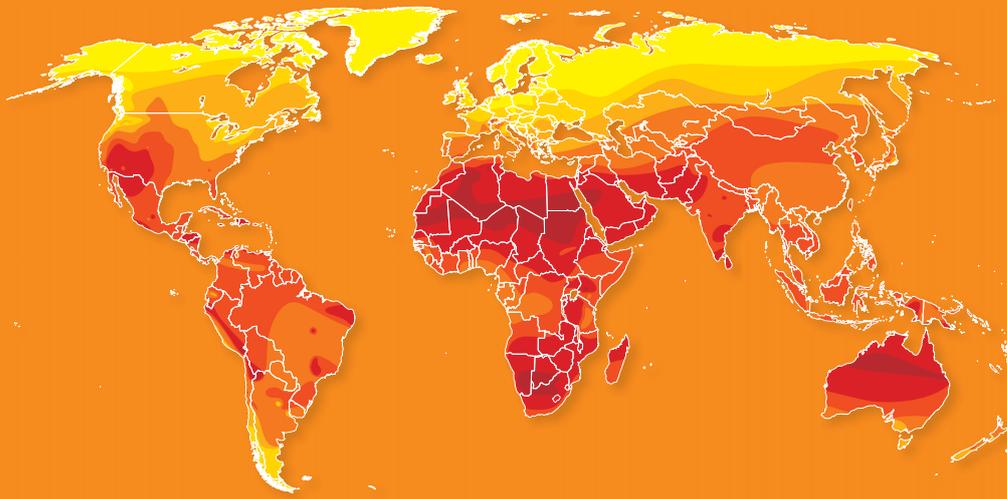


# Kirchner Solar Group

**Kirchner Solar Group** is a pioneer in the solar industry and was founded in 1991. The company's products and services include the design and the installation of photovoltaic systems for any type of roof, the production of its own solar tracker systems **sonnen\_system**, the production of independent off-grid systems, trade of high-quality PV components and public fund concepts as well as customized solar systems.

So far **Kirchner Solar Group** produced and installed more than 11,000 **sonnen\_system** trackers worldwide, implemented more than 6,500 rooftop systems and solar parks.

Besides their PV systems project and implementation activities, the company has engaged in years of commitment in the field of sustainable and environmental education. **Kirchner Solar Group** was awarded the German Solar Award 2010 for their work and commitment in the PV sector.



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