Tracking systems for photovoltaics | Specifications

Conergy SolarOptimus

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PHOTOVOLTAICS

The Conergy SolarOptimus is a photovoltaic (PV) tracking system specifically developed for the high-irradiation regions of southern Europe, making full use of the available solar energy.

It is the most robust dual-axis tracking system and has been designed for maximum reliability and lowest total cost of ownership. It features an industry-leading monitoring system and maintenance and service concept.

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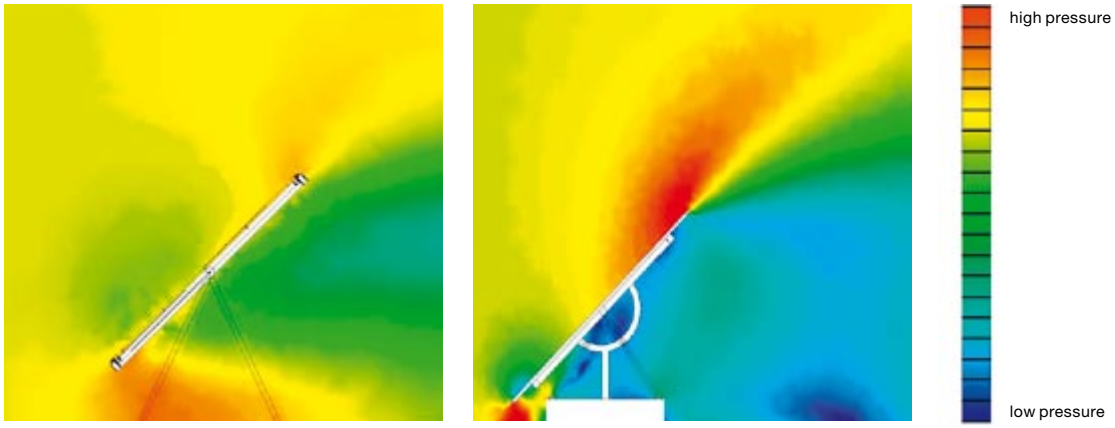
The design

The SolarOptimus has a unique and patented flow-optimised design in which the modules are aligned in rows and surrounded by an outer frame. Wind simulations have shown that the stress through wind loads is significantly reduced compared to conventional trackers with a closed module area. This gives this strong but flexible system some unique advantages, including the ability to operate in tracking mode even in strong winds. The design also utilises a number of foundations and bearings to distribute the loads and reduces the stress on a single component, thus maximising the life expectancy of the system.

Maximum product life

Essential characteristics for photovoltaic systems are durability and low maintenance requirements. To meet this, only high-quality, low maintenance components are used throughout the SolarOptimus. As there is high stress on moving parts, both the drive systems and the bearings have been carefully selected to satisfy the most demanding requirements. The system is completely made from hot-dipped galvanised steel guaranteeing corrosion resistance and maximum product life.



Comparison of wind flow simulations: SolarOptimus (left) and conventional tracking system (right). In case of conventional tracking systems large differences in pressure can be measured (heavy loads on system).

Safety

Due to the frequent wind activity in southern Europe, it is important that normal tracking operation is possible even in strong winds in order to maximize the yield of the PV modules. SolarOptimus is leading the industry with tracking operation possible up to wind speeds of 80 km/h. In the event of a storm, tracking systems have to be stowed into a horizontal position. Therefore the wind speed is monitored constantly. The SolarOptimus features an elaborate three-level safety concept for this safety-critical tracking element.

First level: the CAN bus, which has been developed for and is used in safety-critical automotive applications, was chosen for communication.

Second level: SolarOptimus supports the use of back-up wind sensors to compensate a possible loss of a sensor.

Third level: If all wind sensors, communication bus and/or the centralised monitoring unit fail, the decentralised motor controls will automatically drive the tracking system into a horizontal safe position.

Additionally an electronic gravitational sensor constantly monitors the position of the tracking axes and issues an alert if drive commands are not executed properly. Complete or limited failures of the motor drive can also be detected. In case of failures the operator will be alerted by the central monitoring system

The control system

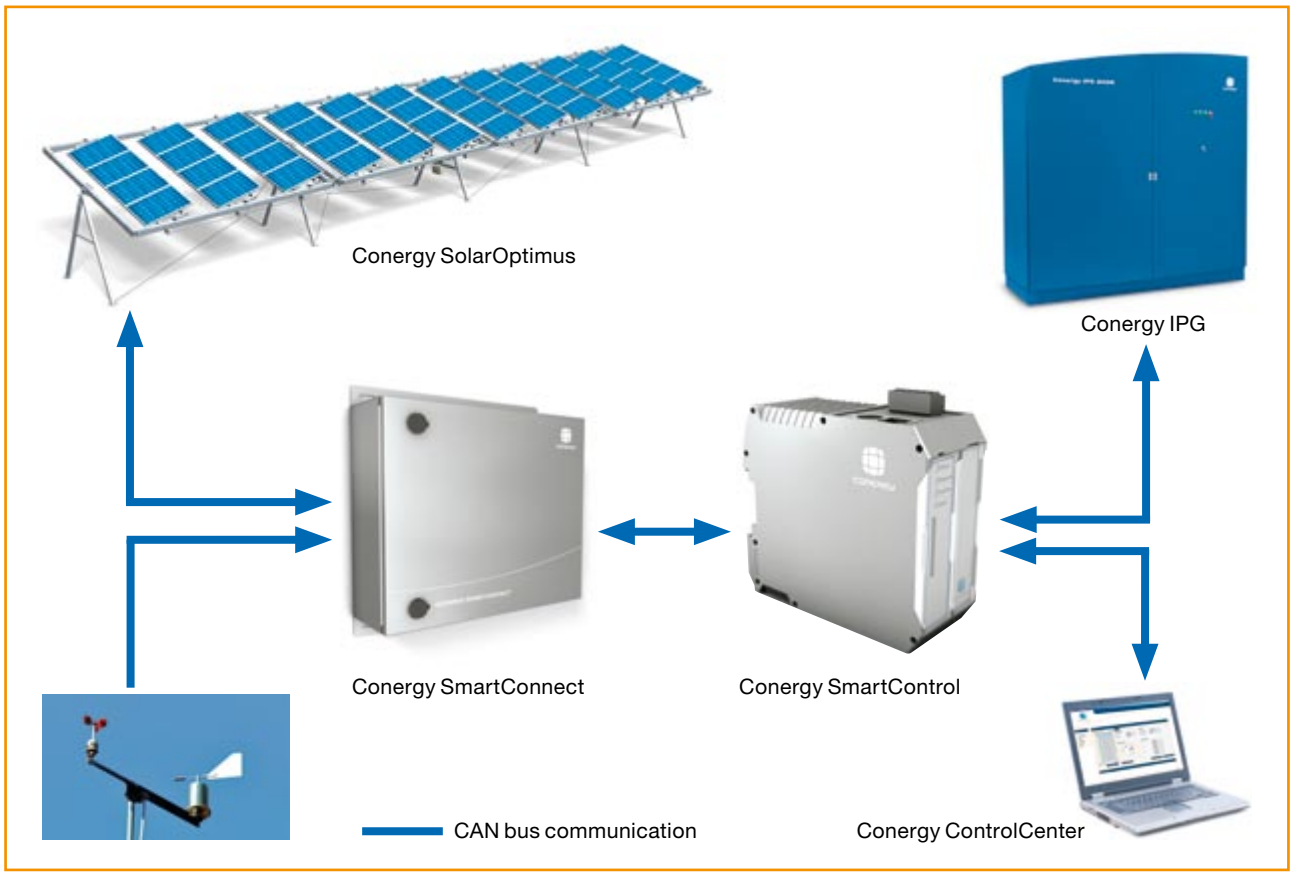
At the centre of the SolarOptimus is its control system. It not only controls the tracking itself, but also monitors the entire system. An astronomical algorithm implemented in the decentralised motor controls calculates the exact position of the sun at each point in time and aligns the modules with it by moving them in two horizontal axes. In addition, all functions, from the actual orientation of the tables to the component status of the motor controls, are checked by a centralised monitoring unit, the Conergy SmartControl. The control system also allows completely automated commissioning, as well as movement to various positions (stowage for storm, snow throw-off, service position). The central monitoring unit and the motor controls communicate via CAN bus. Originally developed for and used in safety-critical automotive applications, this communication bus is the first choice for demanding automation applications.

In combination with Conergy IPG central inverters and the Conergy SmartConnect junction boxes, all components can be monitored via a single system. Detailed string, inverter and tracking data can be viewed for simple and easy system management.

Service and maintenance concept

The service and maintenance concept of the SolarOptimus has been specially tailored to the requirements of large-scale photovoltaic projects. The monitoring system constantly checks the status of all components. In case of any problem the operator will be alerted and can connect to the monitoring system locally or remotely via an internet connection. Detailed status and error information for each component facilitates the troubleshooting in order to keep downtime to a minimum.

The flow-optimized design of the SolarOptimus supports a large module area per drive. This minimises the frequency of service calls and reduces the overall maintenance requirements. In case of need for replacement, all major components of the system are easily accessible.



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	Conergy SolarOptimus 12	Conergy SolarOptimus 8	Conergy SolarOptimus 8 B	Conergy SolarOptimus 8 L
Dimensions				
Length × Width × Height	26.0 m × 4.7 m × 4.7 m	22.0 m × 4.7 m × 4.7 m	22.0 m x 5.5 m x 5,0 m	26.0 m × 4.7 m × 4.7 m
Weight	2,855 kg	2,500 kg	2,970 kg	2,611 kg
Mechanical data				
Angular range of axis 1 (main frame)	+/–55°	+/–55°	+/–55°	+/–55°
Angular range of axis 2 (module support frame)	+60°/–10°	+60°/–10°	+60°/–10°	+60°/–10°
Control				
Basis	Astronomical algorithm			
Technical implementation	Centralised monitoring unit with decentralised motor controls			
Special positions	Stowage for storm, snow throw-off, service position			
Communication	CAN bus	CAN bus	CAN bus	CAN bus
Electrical Data				
Operating voltage	230 V	230 V	230 V	230 V
Power	130 W main drive, 180 W module drive			
Environmental conditions				
Installation location	Ground	Ground	Ground	Ground
Temperature range	from –20 °C to +60 °C	from –20 °C to +60 °C	from –20 °C to +60 °C	from –20 °C to +60 °C
Permissible wind load in operation	80 km/h	80 km/h	80 km/h	80 km/h
PV Module framed				
Max. length	1,350 mm	1,700 mm	1,700 mm	2,000 mm
Max. height	51 mm	51 mm	51 mm	51 mm
Max. number of modules per system	48 (1,350 × 1,000 mm)	40 (1,700 × 815 mm)	40 (1,700 x 1,000 mm)	32 (2,000 × 1,000 mm)
Materials				
Frame sections	Cold formed welded structural hollow sections i.a.w. DIN EN 10219 S235JRH			
Bearings	Iglidur®	Iglidur®	Iglidur®	Iglidur®

Available from:

PHOTOVOLTAICS

SOLAROPTIMUS-TD-ENG-0801

For further information: www.conergy.com