

Beckhoff Automation Introduces High-precision PC-based Solar Tracking Software

TwinCAT Solar Position Algorithm software library optimizes solar energy harvesting

MINNEAPOLIS, August 26, 2010 – In order to bring cost-effective and high-performance embedded PC-based control to solar power plants, Beckhoff Automation has released the TwinCAT Solar Position Algorithm library. This feature-laden function block permits the exact calculation of sun angles anywhere in the world at any time, without the use of sensors.

This flexible TwinCAT solution is ideal for parabolic mirror and photovoltaic systems as well as for other solar power plant designs that automatically track the sun's position for optimum utilization of the sun's rays. The control algorithm, which calculates the zenith and azimuth angles of the sun with an impressive precision of $\pm 0.001^\circ$, can also be used for other applications such as in building automation or with wind turbines for shadow flicker calculations.

The TwinCAT Solar Position Algorithm software library enables high-precision determination of sun angles and the times for sunrise, solar noon and sunset year-round. The calculation of sun angles with the TwinCAT library simply requires the specification of the date, time and exact longitude and latitude of the location (e.g. through a GPS system). Depending on the required precision, the algorithm can take into account additional parameters such as the time zone, the height above mean sea level, the slope of the ground or the orientation of the object, as well as the air temperature and pressure, which influence atmospheric refraction.

TwinCAT is the ideal complement to EtherCAT, the Industrial Ethernet-based technology from Beckhoff. With industry-leading performance, EtherCAT provides low microsecond level communication speeds, full connectivity to higher level systems and to IEEE 802.3 Ethernet-based infrastructure. EtherCAT also facilitates cost-effective Web-based remote maintenance capabilities. EtherCAT is compatible with copper and/or fiber optic cabling at distances up to 20 km (12.4 mi) for singlemode fiber optics or 2 km (1.2 mi) for multimode fiber optics. It also permits extremely flexible wiring and via line, tree, star and/or mixed topologies.

Additionally, EtherCAT does not require hubs, switches or IP addresses, greatly reducing costs and the burden on the IT departments of solar energy businesses.

Areas of application for the TwinCAT Solar Position Algorithm include parabolic mirror systems that focus mirrors of several meters in diameter and track the sun with great accuracy in order to focus the sun's rays in an ideal focal point. This requires high-precision measurement of the sun angles. Photovoltaic, CSV and CSP installations that track the sun position also operate on this basis. Another area of application for this solution is in building automation, where sensors alone are no longer sufficient to adequately deal with shading of large building facades. The Beckhoff software can also be used for exact calculation of shadow flicker from wind turbines, which is to be avoided in populated areas. The results allow individual turbines to be switched off if necessary.

For more information:

[TwinCAT Solar Position Algorithm](#)

Link to high res images of product:

ftp://ftp.beckhoff.com/press/2010/pictures/pr242010_Beckhoff.zip

TwinCAT® is a trademark of Beckhoff Automation GmbH.

Beckhoff Automation provides advanced, open automation products based upon proven technologies so that customers can implement high performance control systems faster and at a lower overall cost than traditional PLC and motion control systems. Beckhoff's "New Automation Technology" product range includes PC based control, industrial PCs, automation controllers, operator interface, I/O, servo drives and motors. With representation in more than 60 countries, Beckhoff is well positioned to provide global sales and service to its customers. Sales and service are handled directly, with no intermediaries involved to provide faster response and improved communications.

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