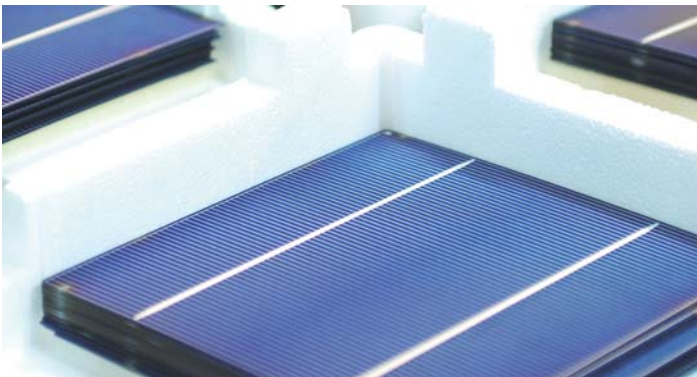


PC-based control technology conquers cleantech market

# EtherCAT and XFC in photovoltaic production

PC-based control technology from Beckhoff is used in a wide range of conventional machine building sectors such as wood-working machines, packaging machines and countless more. More recently, Beckhoff has also been gaining ground in renewable energy sectors such as wind energy and photovoltaic production. For the Photovoltaic Technology Show in Munich, Germany, PC Control magazine interviewed Andreas Schulze, Photovoltaic Business Manager at Beckhoff.



Andreas Schulze, Photovoltaic Business Manager, Beckhoff office Berlin, Germany



**With its involvement in the photovoltaic industry, Beckhoff intends to become well-established in a new market.**

**What are the reasons for this?**

Beckhoff's involvement in the photovoltaic industry is based on long-standing cooperation with key machine and system manufacturers in this sector. Strong demand for solar modules and increasing cost pressures led to a wind of change in the photovoltaic market and to even stronger commitment from us. In order for photovoltaic technology to make a significant contribution to

our energy supply in the long term, production facilities, which in the past have been largely semi-automated, must be upgraded. In other words, the whole supply chain for the solar industry should be automated. As a result, suppliers of automation solutions can expect a market with double-digit growth rates through 2020. Our company has experienced double-digit growth over recent years, and we see scope for continued growth on this scale in the photovoltaic markets. Our PC-based control technology has been used since 2001 in a wide range of

applications such as wafer inspection, diffusion, antireflective coating and classification by the world's largest solar cell manufacturer and other companies from this sector.

**What market opportunities do you envision?**

To enable further growth in the market, production costs have to be reduced while maintaining consistently high quality. This is possible by introducing open and flexible control technology in the production equipment as offered by

Beckhoff: PC Control is a versatile automation solution that can be used in all areas of the photovoltaic industry. With an extensive portfolio of Industrial PCs and fieldbus components, Drive Technology, TwinCAT automation software, the high-speed EtherCAT communication system and XFC (the high-speed machine control system), Beckhoff offers machine and system manufacturers a comprehensive range of solutions for this task. Only through advanced automation technology will the solar industry be able to reduce its production costs and expand its position in the global energy market.

#### **What are the advantages of Beckhoff control technology for photovoltaic production?**

The wide range of tasks involved in photovoltaic production such as wafer processing, cell production and module production not only require complex control solutions in the areas of handling, loading and unloading, transport, palletizing and gluing, but also require networking of the individual manufacturing steps. PC-based control technology is inherently open with re-

gard to hardware and software interfaces. This facilitates integration and networking of production modules without major cabling efforts. For any application, the modularity and scalability of Beckhoff control technology offers a tailor-made control solution with regard to computing power, complexity and costs.

#### **Beckhoff offers a wide range of hardware and software solutions for Motion Control applications. What are the requirements in photovoltaic production?**

Beckhoff offers state-of-the-art Drive Technology and integrated automation software. This makes it optimally equipped for Motion Control tasks with stringent requirements in terms of dynamics and precision, which are common in the photovoltaic industry. Look at module production, for example. During stringing, solar cells are strung together and electrically connected. This process requires high-precision drive systems and measurement technology. The strings must be positioned with a tolerance of 0.5 mm to ensure that the module matrix can be transported to the next station for fully automated welding.

#### **In March 2009, Beckhoff made its first appearance at the Photovoltaic Technology Show in Munich, Germany. What was the reason?**

This trade show offers an excellent overview of machine construction and plant engineering for the solar industry. Beckhoff is the control equipment supplier for many of the machine and plant manufacturers that exhibited at the Photovoltaic Technology Show. With our presence, we supported our customers and presented Beckhoff as a partner for producers of wafers, solar cells and modules.

#### **The EtherCAT communication system offers outstanding real-time characteristics at low costs.**

#### **What new control concepts does EtherCAT enable?**

The high-speed fieldbus system is characterized by real-time capability in conjunction with TwinCAT and low engineering and acquisition costs. In addition to cost benefits, EtherCAT offers impressive technical opportunities, such as configuration of networks with different topologies. During classification of solar cells, for example, an EtherCAT line topology is installed in the corresponding plant section. Up to 48 classi-

fication stations branch off from these lines in a star configuration. In this way, it is possible to switch off a station without interrupting operation of the other classification stations or the complete plant section.

#### **eXtreme Fast Control technology (XFC) from Beckhoff enables process optimization at the machine and a high degree of precision.**

#### **What benefits does XFC offer for photovoltaic production?**

Let's use the classification station example again. Solar cells not only have to be transported quickly, but at the same time they must be classified locally and in synchronicity with the whole system. XFC technology from Beckhoff offers a control solution that optimally meets these requirements. XFC utilizes EtherCAT for data communication and offers control and I/O level components that achieve cycle times of 100  $\mu$ s, while at the same time allowing central intelligence to be utilized.

[www.beckhoff.com/photovoltaic](http://www.beckhoff.com/photovoltaic)



#### **Photovoltaic Technology Show 2009**

At the Photovoltaic Technology Show in March 2009 Beckhoff presented its PC- and EtherCAT-based control technology. The comprehensive requirements in photovoltaic production, including wafer handling, cell production and module assembly, result in a high degree of automation for handling, loading and unloading, transport, palletizing, gluing and networking of the individual manufacturing steps.