BECKHOFF New Automation Technology

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TwinCAT supports IEC 61850

Beckhoff opens up new opportunities by implementing this communication protocol in a software PLC: The user can use a cost-effective standard PLC for controlling his electrical installation, which not only offers the benefits of PC-based control technology but can also communicate externally via a standardised IEC 61850 protocol. The basic standard defines a general transmission protocol for protective and control equipment in medium and high voltage electrical substations. This means that time-consuming and costly special developments for the implementation of manufacturer-specific protocols are no longer required, and the associated engineering is simplified significantly.

Customers can utilise the complete communication stack developed by Beckhoff in the form of a PLC library. The server can be integrated into the TwinCAT automation suite in the form of the TcIEC61850Server.lib library and provides the connection to the MMS-based (Manufacturing Message Specification) communication stack. TcIEC61850.lib, which contains some of the logical nodes and common data classes defined in IEC 61850, can be integrated in addition to TcIEC61850Server.lib.

As extension to the basic IEC 61850 standard, IEC 61400-25 defines the communication requirements for monitoring and controlling wind turbines. The integration of this standard into the TwinCAT library will simplify the control of heterogeneous wind farms significantly. The wind farm standard is characterised by a single wind power-specific dataset, so that TwinCAT users can use TcIEC61850Server.lib for communication purposes and TcIEC61400_25.lib for specific logical nodes and common data classes.

System requirements

The PLC libraries presented here run on various PC platforms, including high-end Industrial PCs with Windows XP Professional and compact embedded solutions with XP Embedded or Windows CE.

- Programming environment
    - TwinCAT PLC (or higher)
    - TwinCAT version 2.10.0 Build >= 1340 (or higher)

- Target platform
    - PC or CyX (x86): XP, XPe, CE 6 (image v3.06e or higher)
    - CX (ARM): CE 5 (image v2.20e or higher)

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Product components

The complete communication stack for IEC 61850 was implemented in TwinCAT. The modular design in the form of libraries and the structured programmed interfaces between the individual communication layers meet the requirement of future-proofness. Abstract interfaces enable individual stack protocols to be exchanged.

- TcIEC61850
  (Server.Lib PLC library with server block. This library must be included in the PLC project. All other libraries are then integrated automatically)
- TcIEC61400_25.Lib
  (common data types (CDC), logical nodes (LN) according to IEC 61400-25. This library must be included in addition to TcIEC61850Server.Lib if a server is to be implemented based on the IEC 61400-25 standard.)
- TcIEC61850.Lib
  (common data types (CDC according to IEC 61850-7-3), logical nodes (LN according to IEC 61850-7-4))
- TcACSI.Lib
  (basic ACSI data types for device modelling according to IEC 61850-7-2)
- TcIEC61850_8_1.Lib
  (SCSM: mapping of MMS services according to IEC 61850-8-1)
- TcMMS.Lib
  (basic MMS functions, blocks, data types)
- TcULOSI.Lib
  (implementation of the session, presentation and ACSE layer);
- TcBER.Lib
  (BER decoding/encoding)
- TcRFC1006.Lib
  (implementation of the transport layer)
- TcTPKT.Lib
  (transport packetizer)
- TcCollections.Lib
  (collection classes)
- TcSocketHelper.Lib
  (TCP/IP help functions)
- TcpIp.Lib
  (TCP/IP basic functions)
- TwinCAT TCP/IP Connection Server

Product announcement

The new TwinCAT supplement product, "TwinCAT PLC IEC 61850 Server", is expected to be available from the first quarter of 2010. For queries regarding this product please contact Mr. Dresselhaus at p.dresselhaus@beckhoff.com.