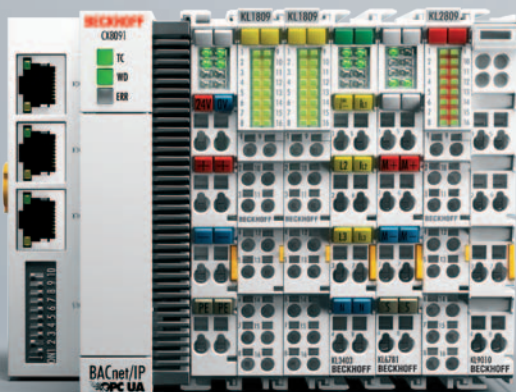**BECKHOFF** New Automation Technology

Building Automation News | **04'2014**

TwinCAT
BA PLC
Libraries

TwinCAT
BA PLC
Templates

TwinCAT
BA Project
Builder

NEWS

TwinCAT Building Automation

TwinCAT Building Automation – efficient engineering for all building systems

To meet the high demands on building automation such as convenience, energy savings, low investment and operating costs, and a rapid return on investment, you must have an integrated, thoroughly coordinated control system for all the technical systems in a building. With TwinCAT Building Automation, Beckhoff has developed a software product that reduces the engineering time and integrates all major components of a modern building automation system. Extensive software libraries and supplements extend the concept of the modular range of automation components from Beckhoff to the software level.

The new suite comprises three basic functions:
1. TwinCAT BA PLC Libraries: basic functions for all building systems
2. TwinCAT BA PLC Templates: function templates for all building systems
3. TwinCAT BA Project Builder: configuration tool for linking templates, hardware and BACnet objects

TwinCAT BA PLC Libraries

The TwinCAT BA PLC Libraries provide the system integrator with established and tested building blocks, such as basic functions in the areas of closed-loop control, signal processing, special mathematical functions, fault signal processing and general system functions.

TwinCAT BA PLC Templates

The TwinCAT BA PLC templates are complete TwinCAT program blocks for sensors and actuators, for complete modules and for system parts or complete systems in the areas of HVAC and room automation. Unlike conventional PLC libraries, the TwinCAT BA PLC Templates are imported into the PLC programs as whole software modules, which the system integrator can then modify as needed. They can also create their own TwinCAT BA PLC templates.

| EN15232, VDI3814, VDI3813, XLS …	TwinCAT BA PLC Libraries	TwinCAT BA PLC Templates	TwinCAT BA Project Builder	TwinCAT PLC, System Manager
Import Planning data	Engineering			Project implementation

TwinCAT BA Project Builder

Having a consistent TwinCAT project file structure is a prerequisite for proper plant maintenance. The central underlying idea is the component identification system, which assigns a name to each data point and software module in accordance with defined rules. For all Beckhoff controllers the TwinCAT BA Project Builder automatically generates the project files for TwinCAT PLC Control functions and the TwinCAT System Manager. It can be expanded with custom PLC templates for full engineering flexibility, while special add-ins enable integration of planning resources (for example, Excel lists) as well as visualisation systems. An open add-in interface allows you to integrate planning tools, import Excel lists from TRIC (MSR Software), or connect visualisation systems.

▶ **www.beckhoff.com/TS8040**

BECKHOFF New Automation Technology
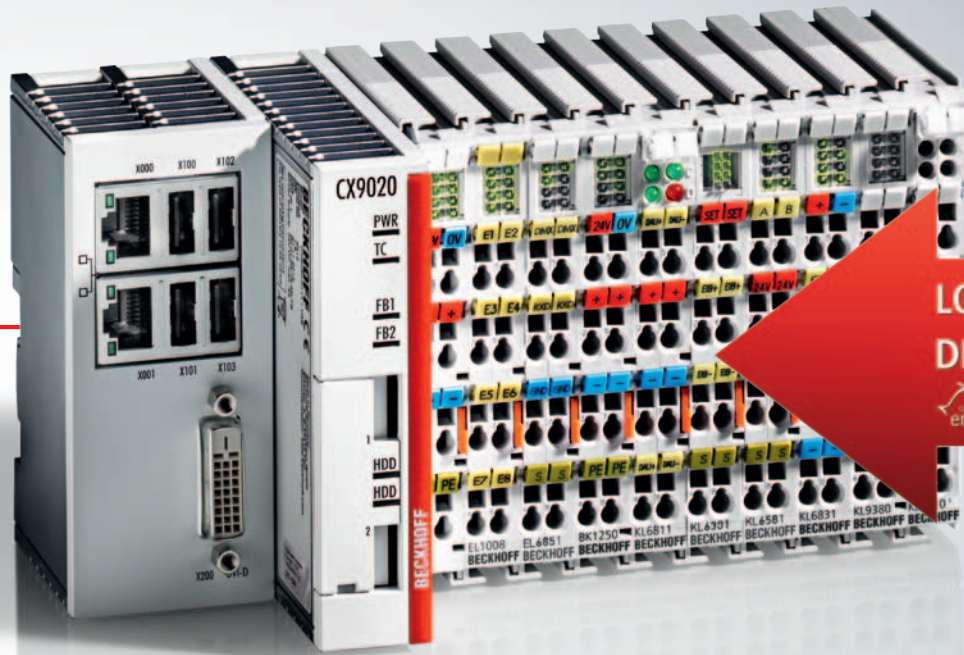
TwinCAT BACnet/IP

New features of BACnet revision 12 at a glance

– enhanced alarm and event processing and generation
– further new BACnet object types in updated Beckhoff BACnet building controllers
– efficient configuration and programming of BACnet clients and servers with TwinCAT System Manager
– integration of services for cross communication with remote BACnet controllers
– extensive device management functions
– Numerous improvements in detail round off the in-house development.

Updated BACnet Building Controller according to revision 12

The international BACnet standard ISO 16484-5 is increasingly gaining in importance for building automation and new functions are constantly being added. With an extended stack in the CX8091, CX9020, CX5010 and CX5020 controllers, Beckhoff is providing its customers with important new features and continues to focus on a scalable product range with an optimum price/performance ratio: starting with the CX8091, which supports up to 250 BACnet objects, through to the high-performance CX5020, on which several thousand BACnet objects can be processed. The DIN rail-mountable Embedded PCs integrate an interface for the direct series connection of Bus Terminals. Due to the integration of the BACnet/IP protocol in the

TwinCAT System Manager the I/O Bus Terminals and BACnet devices can be efficiently configured with a single tool. Through extensive project experience, the in-house development of the BACnet stacks ensures the profound know-how of Beckhoff as an expert partner for consultation, planning and problem solving, who provides future-proof solutions for system integrators. With over 400 different signal forms, the modular Beckhoff Bus Terminal system not only supports all common sensors and actuators, but also permits the integration of all subsystems that are relevant for building automation, such as EIB/KNX, LON, DALI, DMX, MP-Bus, M-Bus, SMI, Modbus and EnOcean.

TwinCAT

TwinCAT Sequencer Scheduler

Sequences of operations and schedules can be dynamically configured across several controllers using the new TwinCAT Sequencer Scheduler module. Intervention in the programming of the PLC is not required. PLC function blocks and a configuration tool are available for the creation, management and monitoring of event and time-controlled logics. A multitude of possible applications can be implemented in a short time without specific PLC know-how, such as the assignment and re-assignment of buttons, the configuration of sequences, scenes, ramps, timers and alarm functions, and the management of recipes.

Possible operations in sequences:
- branching (if-then-else depending on PLC variable values)
- waiting for changes of value of PLC variables
  (attainment of a value, fixed time interval)

- following of ramps (value range/time),
  writing of values into PLC variables
- toggling between values
- email dispatch
- starting of other sequences

Possible scheduler events:
- schedules similar to the schedule functionality of the Outlook recurring appointments or Windows task planning (freely definable repetition intervals)
- variable changes: comparison operations with a constant value ($>$, $<$, $==$, $! =$, $>=$, $<=$)

BECKHOFF New Automation Technology

Embedded PC series CX51xx: Multi-core processors for controllers in the medium performance class

Beckhoff presents its new CX5100 Embedded PC series. With the introduction of the latest Intel® Atom™ CPUs, multi-core technology is now also available for controllers in the medium performance class. The 22-nm technology of the new Atom™ processors leads to a higher performance while maintaining the same thermal budget. All devices from the CX5100 series are fanless and are characterised by low power consumption and a compact housing format:

- CX5120: Intel® Atom™ CPU, 1.46 GHz, single-core
- CX5130: Intel® Atom™ CPU, 1.75 GHz, dual-core
- CX5140: Intel® Atom™ CPU, 1.91 GHz, quad-core

▶ **www.beckhoff.com/CX51xx**

Embedded PC CX8091: Decentral small controller with BACnet protocol

The CX8091 Embedded PC is a flexible and compact controller with a switched Ethernet port. It supports the BACnet protocol, which is well established in building automation – in particular at the management and control level. Bus Terminals (K-bus) and EtherCAT terminals (E-bus), as modular I/O systems, can be connected directly to, and are automatically identified by the Embedded PC. Alternatively, the CX8091 Embedded PC can also be used with the OPC UA (Unified Architecture) communication standard.
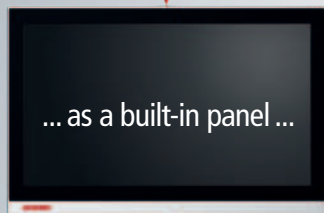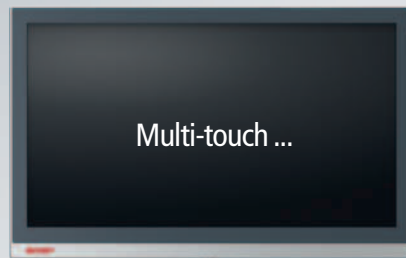
▶ **www.beckhoff.com/BACnet**
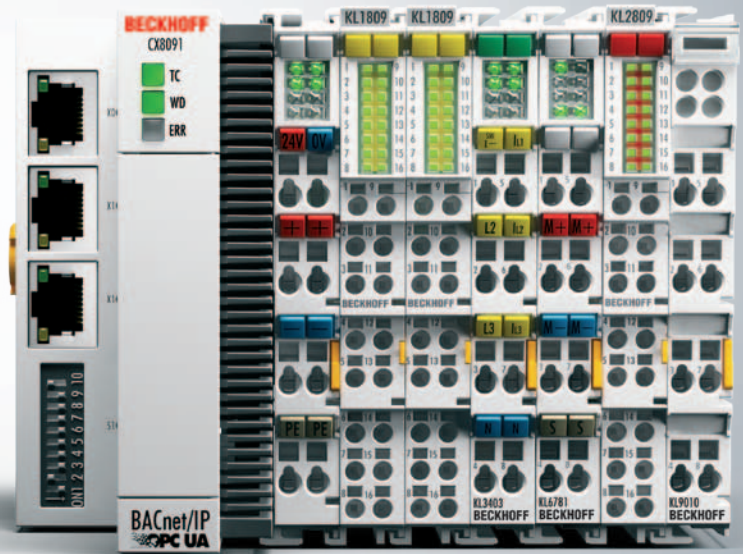
Embedded-PCs

CX9020 Embedded PC with BACnet

With the TwinCAT BACnet/IP supplement, the CX9020 Embedded PC becomes a BACnet controller with BBC profile, which can act as a client or server. Thanks to the range of over 400 different Bus Terminals, the Embedded PC can also be used as a gateway between DALI, EnOcean, EIB/KNX, LON, M-Bus, MP-BUS, SMI, Modbus and other interfaces. The CX9020 is suitable for applcation as a zone or floor controller.

▶ **www.beckhoff.com/BACnet**

BECKHOFF New Automation Technology

Multi-touch …

… as a built-in panel …   … as a built-in Panel PC …
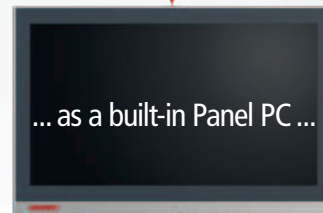
… with DVI/USB Extended …

… or CP-Link 4 interface.

… with ARM Cortex™-A8, …

… Intel® Celeron® ULV …

… or Intel® Core™ i3, i5, i7.

Operating panels and Panel PCs

Universal multi-touch for building automation

The multi-touch built-in Panel PCs blend into modern architecture in a visually outstanding way with their narrow aluminium edge and low installation depth. The scalable range of active and passive panels enables the universal use in buildings, e.g. as operating unit for room automation.

- display sizes from 7- to 24-inch (16:9, 5:4, 4:3), landscape and portrait format
- multi-finger touch screen (PCT)
- CP22xx: high-performance Panel PC series with Intel® Celeron® or Core™ i3, i5, i7 processor (3rd and 4th generation)
- CP27xx: fanless Panel PC series with Intel® Celeron® ULV 827E 1.4 GHz
- CP26xx: compact Panel PC series with ARM Cortex™-A8, 1 GHz
- CP29xx-0000: Control Panel with DVI/USB Extended interface (distance to PC up to 50 m)
- CP29xx-0010: Control Panel with CP-Link 4 (distance to PC up to 100 m)

▶ **www.beckhoff.com/multitouch**

Powerful and compact – Panel PCs for installation in the control cabinet or control console

The CP6606 "Economy" Panel PC with 7-inch touch display, power-saving 1 GHz ARM Cortex™-A8 CPU and 1 GB DDR3 RAM offers an optimum price-performance ratio. Designed as a built-in device in a fanless, compact format, the CP6606 is suitable for versatile use in PLC and operating applications in building automation.

ℹ CP-Link 4 – The One Cable Display Link

With CP-Link 4 operating panels can be located up to 100 m away from the Industrial PC. The single-cable solution can be used to transfer video signals, USB 2.0 and the power supply in a standard CAT 6a cable, thus reducing cable and installation costs.

▶ **www.beckhoff.com/CP-Link4**

BECKHOFF New Automation Technology

SMI master terminal flexibly integrates light and shading solutions into building automation

With the SMI master terminals, KL6831 for LoVo SMI drives (24 V DC) and KL6841 for 230 V AC, roller shutters and blinds can be driven up or down according to the position of the sun or driven to defined positions and exact angles. Each terminal can control up to 16 SMI-compliant roller shutter and sunblind drives. The energy consumption for heating/cooling and lighting is reduced by intelligently controlling the blinds or roller shutters according to the position of the sun.

▶ **www.beckhoff.com/KL6831**

Bus Terminals

[i] KL3208-0010 also supports NTC sensors and potentiometers

The analog input terminal enables connection of eight resistance sensors. Linearisation over the full temperature range is realised with the aid of a microprocessor. The temperature range can be selected freely. The Bus Terminal's standard settings are: resolution 0.01 °C within the temperature range of PT/Ni1000 sensors.

In addition to PT000 and Ni1000 the terminal now supports further sensor types: Poti 1 kΩ, 5 kΩ and 10 kΩ as well as NTC 1.8 kΩ, 2.2 kΩ, 3 kΩ, 5 kΩ, 10 kΩ, 20 kΩ and 100 kΩ.

▶ **www.beckhoff.com/KL3208**

The energy experts for all building systems

Energy consumption must be precisely measured in all industrial applications if increasing worldwide energy costs are to be lowered. Beckhoff offers modular Bus Terminals that cover a wide range of applications for a simple, system-integrated solution. This enables the measurement of energy anywhere in buildings, making energy consumption much more transparent.

– KL3403: 3-phase power measurement
– KL3681: digital multimeter
– KL6781: M-Bus master

▶ **www.beckhoff.com/KL3403**
▶ **www.beckhoff.com/KL3681**
▶ **www.beckhoff.com/KL6781**

Energy Measurement
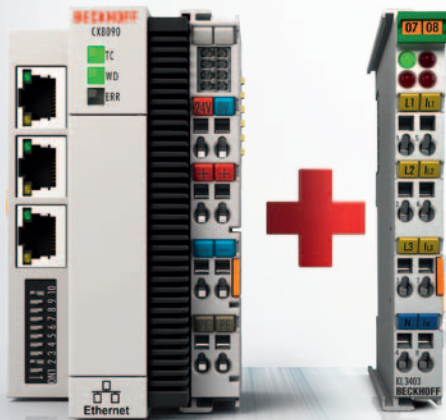
Simply integrated: the energy meter with an Ethernet connection.

Using inexpensive standard components instead of expensive stand-alone solutions: In its simplest form, the flexible Beckhoff solution for compact energy meters is based on a DIN rail-mounted Embedded PC, a power measurement terminal and TwinCAT software. The wide range of different modular power measurement terminals extends from the measurement of current, voltage and active power up to data sampling via M-Bus. The PC-based solution enables simple integration into IT and Ethernet networks and can implement functions such as remote diagnostics via Web interfaces, for example.
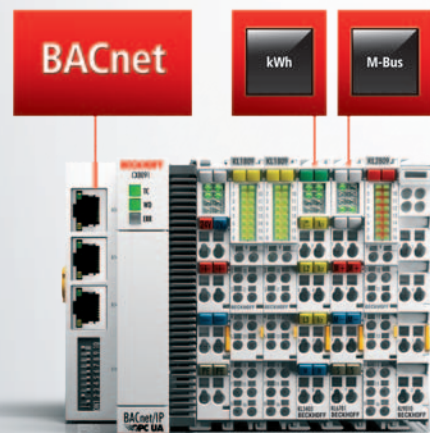
Energy management: compact data collector for BACnet

The CX8091 is a compact Embedded PC for BACnet. In combination with the power measuring terminals it is suitable for use as a local data collector, which supplies all information for comprehensive energy management via BACnet. For example, the KL6781 and KL6401 Bus Terminals can very easily be integrated in the commonly used gas, water and heat meters via the M-Bus or LON interface.

▶ **www.beckhoff.com/CX8091**

BECKHOFF New Automation Technology

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tion see the flyers "Integrated Building Automation" for investors, planners
and technicians. Or visit us on the Internet:

www.beckhoff.com/building