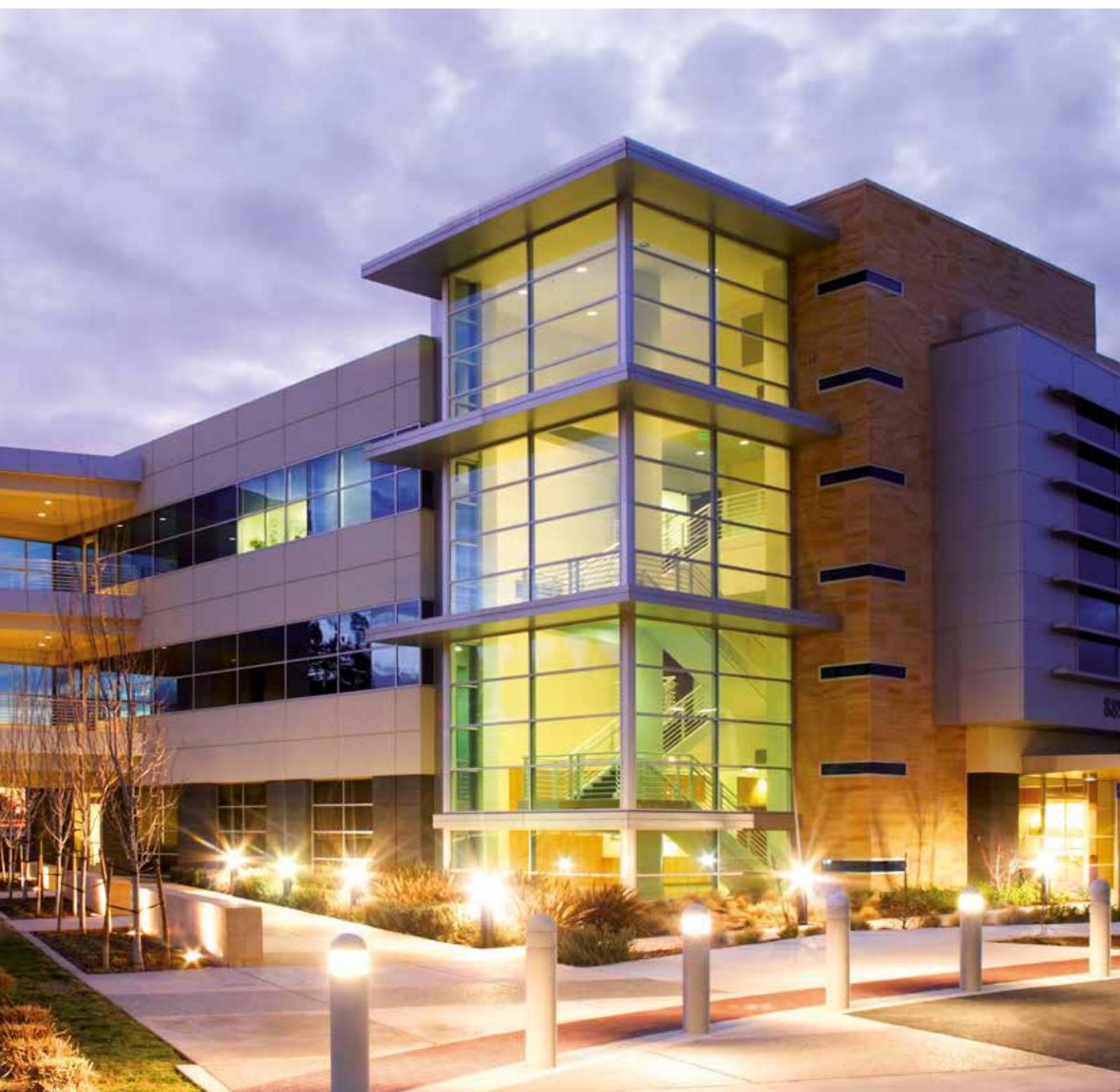


Building Automation Overview



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WAGO AUTOMATION

WAGO's *ELECTRICAL INTERCONNECTIONS* division has undergone rapid development over the years, paving the way for more industry-leading innovations. In 1995, WAGO reached another milestone by launching the WAGO-I/O-SYSTEM, the world's first fieldbus-independent and finely modular I/O system.

The introduction of industrial fieldbus systems has significantly impacted automation. Modern, decentralized topologies with distributed "intelligence" have replaced traditional, centralized automation structures. Now, WAGO is meeting virtually all of the industry's needs as both the leader in Spring Pressure Connection Technology and a pioneer in automation technology.

For more than 15 years, WAGO has successfully offered a wide range of advanced building automation components based on the WAGO-I/O-SYSTEM 750. The WAGO-I/O-SYSTEM 750's modular design enables solutions for pressing projects to be easily, and efficiently, implemented. A wide range of controllers with open fieldbus protocols (e.g., M-Bus, BACnet, KNX or MODBUS) in combination with standard inputs/outputs or subsystems (e.g., DALI, SML, EnOcean or LonWorks®) covers the entire building automation market.



Engineering Software

e!COCKPIT is an integrated development environment that supports every automation task from hardware configuration, programming, simulation and visualization up to commissioning – all-in-one software package. Completely reimagined, this development environment enables users to easily master complex automation networks, saving both time and money.

Operation and Monitoring

Operate, observe, visualize, diagnose in production and process industry: WAGO's web and control panels for small to medium-sized control and visualization tasks feature perfect usability and with the quickly created visualizations, set the focus on time savings.



Controllers

WAGO offers programmable controllers in a wide variety of performance classes for performing any automation task. And, they can be used for both centralized and decentralized applications. For decentralized control tasks, the WAGO controllers can be incorporated into the most prevalent fieldbus networks and they record all field signals via I/O modules.

WAGO's IEC 61131-3 programmable controllers perform a variety of automation tasks, while providing all the benefits of standard PLC technology (e.g., strength, stability, reliability and high availability).

I/O SYSTEMS

At WAGO, you will find the exact I/O components you need: whether industrial, process or building automation, sensitive safety applications, telecontrol or in hazardous areas. WAGO's 750 Series and 750 XTR I/O Systems reliably collect and transfer all signals in your installation. International certifications mean that these systems can be used worldwide in virtually any industry.



Infrastructure

In the field of industrial automation, more and more wireless technologies, such as mobile radio, *Bluetooth*® and WLAN, supplement data transmission via fieldbus or industrial ETHERNET systems. This is complemented by the economic industrial switches, which reliably transmit data traffic and protect against network failures. WAGO's sensor/actuator boxes are the perfect choice for signal acquisition at the machine level.

WAGO BUILDING SOLUTIONS

for Specific Markets



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Office and Administrative Buildings

Investors are increasingly placing a great amount of importance on flexible use of space supported by an appropriate infrastructure. WAGO's room automation systems can be commissioned quickly and flexibly adapted to address this need. Meeting the European Union's most stringent energy guidelines, class A (per DIN EN 15232), can be easily and reliably achieved using WAGO products.

Production Facilities and Warehouses

Safe and efficient energy management in production facilities and warehouses is essential to reduce operating costs. Lighting significantly contributes to overall operating costs. Using WAGO's solutions, energy costs can be reduced by up to 30%.



© photocreo/Fotolia.com



© Carsten Kyllau/Fotolia.com

Retail Centers

Building operation is becoming more and more expensive – a key reason why operators are searching for new building automation solutions. Intelligent buildings provide a secure and comfortable environment, while keeping costs under tight control. WAGO's building automation systems can readily help operators meet specific energy costs to improve the bottom line.

Public Infrastructure Buildings

Visitor safety, comfort and convenience are of primary importance in operating airports, convention centers and railway stations.

WAGO's integrated building automation solutions meet the high efficiency and safety standards for public infrastructure buildings that serve thousands daily.

INTEGRATED BUILDING AUTOMATION –



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Lighting

The ideal lighting control system not only creates an atmosphere that promotes a sense of well-being, but also economizes room and building lighting. WAGO's lighting control solutions skillfully set up lighting scenes – from simple switching and dimming up to tailored and daylight-dependent lighting controls. Both demanding color temperature control for enhanced well-being and productivity, as well as the impressive and artistic lighting of buildings, can be easily implemented using WAGO products.



HVAC

Heating, ventilation and air conditioning (HVAC) systems represent one of a building's major costs. Automatically regulating HVAC systems minimizes energy costs and improves the climate in a building. Planning and executing HVAC systems requires extensive knowledge from every building automation professional, starting with the creation of demanding control programs on through to visualizing energy flows. Extensive libraries with ready-made system macros generally make programming unnecessary. The use of these system macros contributes to standardization, significantly reducing costs.

BETTER ENERGY EFFICIENCY



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Room Automation

Planning, implementation and building operation must demonstrate maximum efficiency and a high degree of adaptability. Modern building technology maximizes flexibility by enabling rooms to be individually planned, managed and even repurposed at any time – without any programming. WAGO's modern room automation solutions perform many tasks in a building. They optimize room temperature, automatically adjust shades based on the sun's position throughout the day, regulate light intensity and switch lights off when not needed.



Energy Management

Energy efficiency hinges on sensibly planning a building's technical systems. Constructing or retrofitting buildings is an operational challenge in terms of energy savings. Investors must see a high level of energy efficiency being incorporated into their buildings. Compliant with the European Union's energy efficiency class A, WAGO's energy management solutions can help reassure investors that the building's operational life-cycle costs will be minimal.

WAGO BUILDING AUTOMATION

Universal, Compact, Economical – WAGO-I/O-SYSTEM

Management Level

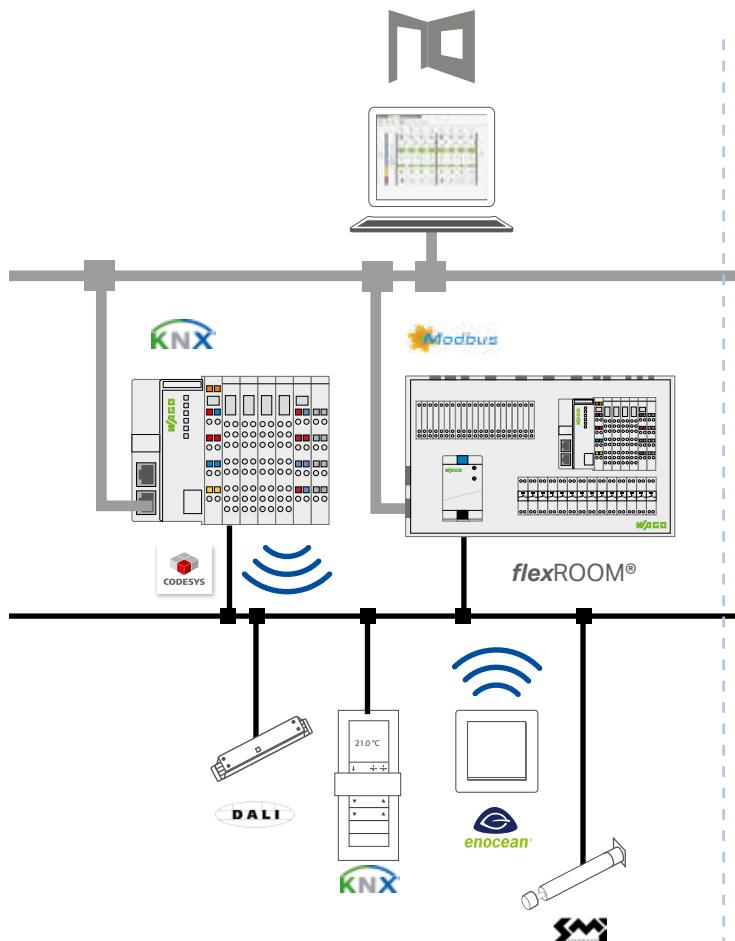
At the management level, building automation is an integral part of both cost and facility management; it's also a key component in overall building control. Open protocols link higher-level functions to building automation. To make the most of these protocols, WAGO offers software tools for commissioning and diagnostics that optimally support both system engineering and monitoring. Access to the Web visualization of each individual control unit is also performed at this management level.

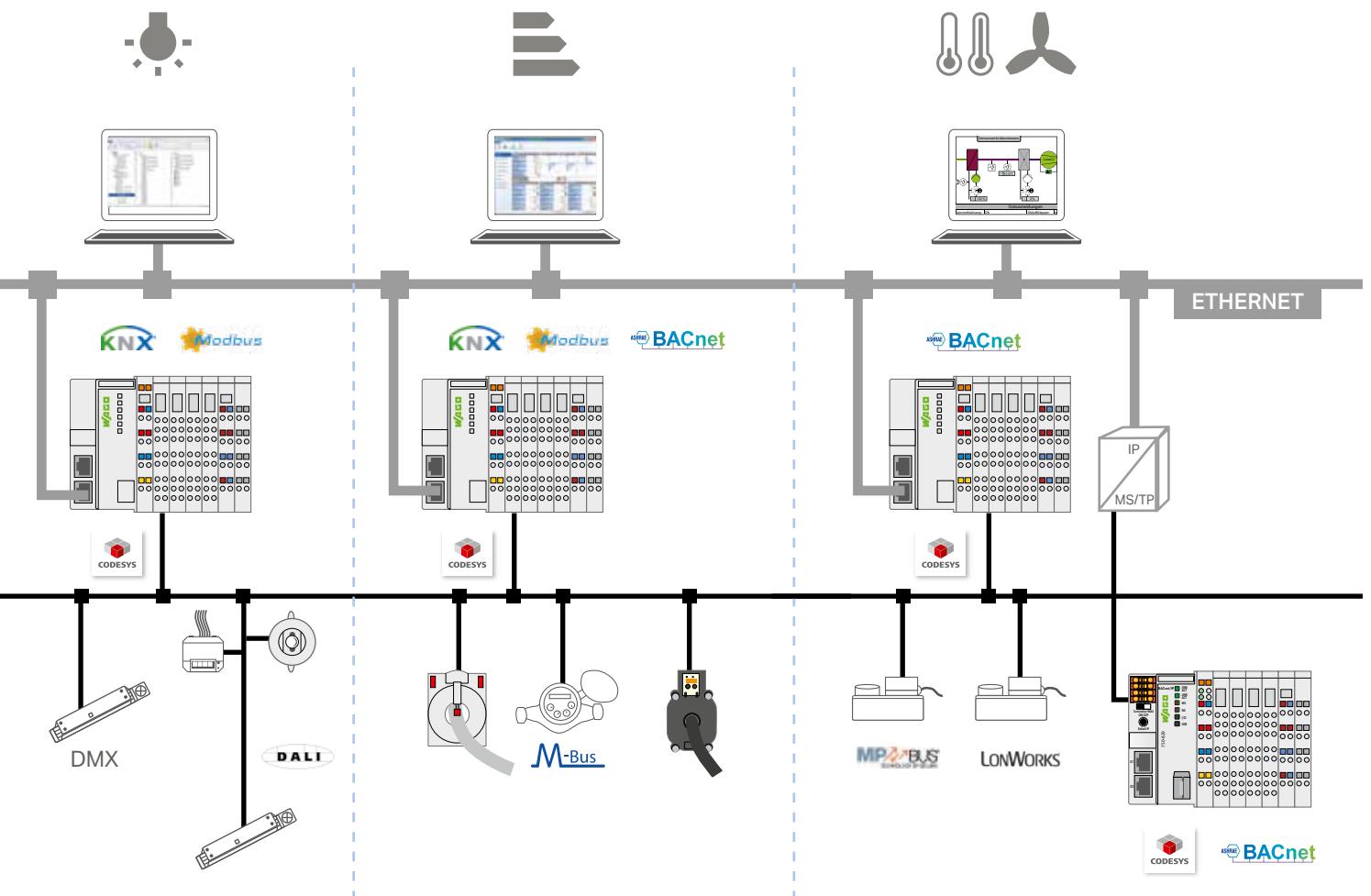
Automation Level

ETHERNET has long established itself as the dominant medium at the automation level. As such, WAGO's control units can be easily and efficiently interlinked using open, standardized bus protocols for building automation (e.g., BACnet IP, KNX IP or Modbus/TCP). Standardized protocols provide interoperable and future-ready interfaces between individual building technologies and levels.

Field Level

Depending on the application, building automation systems can vary greatly from one building level to the next, requiring different transmission media (wired or wireless) and interfaces. Thus, flexible and easy-to-install media are required on the field level (room level). This is why WAGO offers a wide variety of solutions ranging from the direct control of standard sensors and actuators via interfaces to two-wire subsystems (e.g., DALI, BACnet MS/TP, KNX TP1 or LonWorks®), on through to radio-based solutions such as, such as EnOcean or Bluetooth®.







BACnet

KNX

Modbus

WAGO-I/O-SYSTEM

Fieldbus Controllers and I/O Modules

WAGO's comprehensive range of fieldbus controllers supports established protocol standards. Configuration, programming and visualization are easily performed using the IEC 61131-3-compliant WAGO-I/O-PRO software package.

BACnet Controllers

For BACnet communication, WAGO offers two different controllers equipped with BACnet/IP (ETHERNET) or BACnet MS/TP (RS-485) interfaces. Both high-performance controllers support the BACnet Building Controller (B-BC) profile and are freely programmable. The controllers can be easily commissioned with WAGO's user-friendly BACnet Configurator.

KNX IP Controller

The KNX IP fieldbus controller is freely programmable and communicates via standard 10/100 Mbit ETHERNET network. Commissioning the KNX interface is performed using the ETS Network Management Tool. A product database from WAGO is available for commissioning the controller.

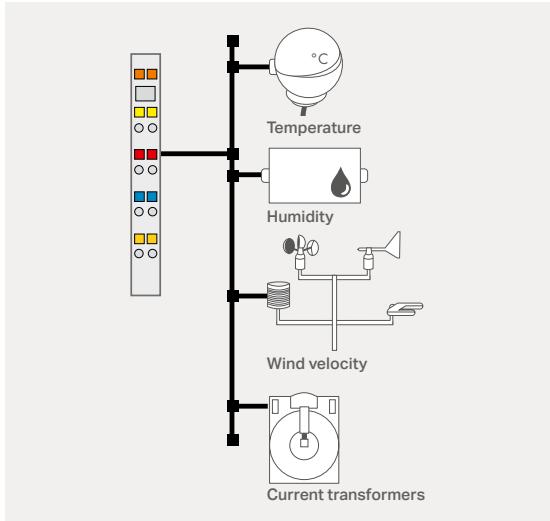
ETHERNET Controllers

WAGO provides a wide range of ETHERNET controllers in different performance classes and with various interface combinations. The ETHERNET fieldbus controllers support Modbus TCP. A wide variety of standard ETHERNET protocols is also supported for easy integration into IT environments (e.g., HTTP, BootP, DHCP, DNS, SNTP, SNMP, FTP).

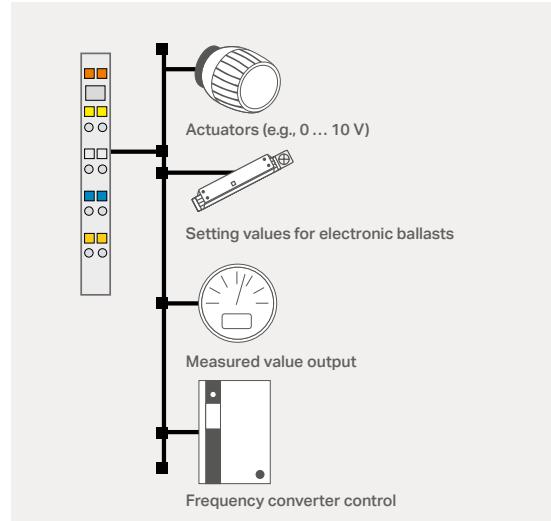
PFC Controllers

WAGO's PFC Controllers are ideal for complex control applications and higher-level control of series machines. The PFC200 Controller offers numerous interfaces and is available as a PFC200 XTR variant for extreme environments.

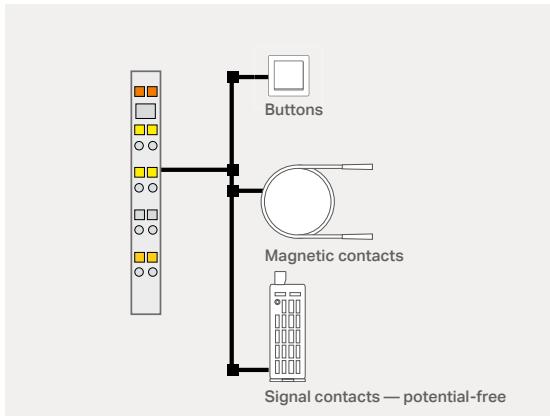
Analog input module



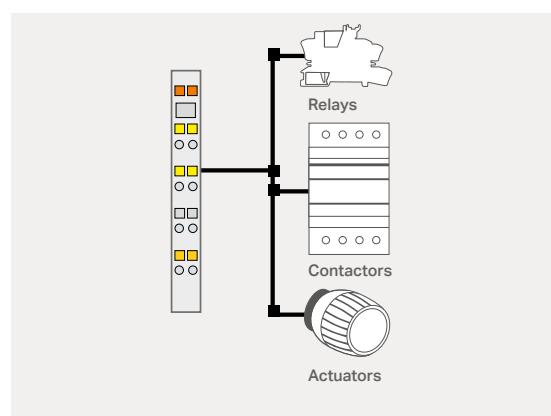
Analog output module



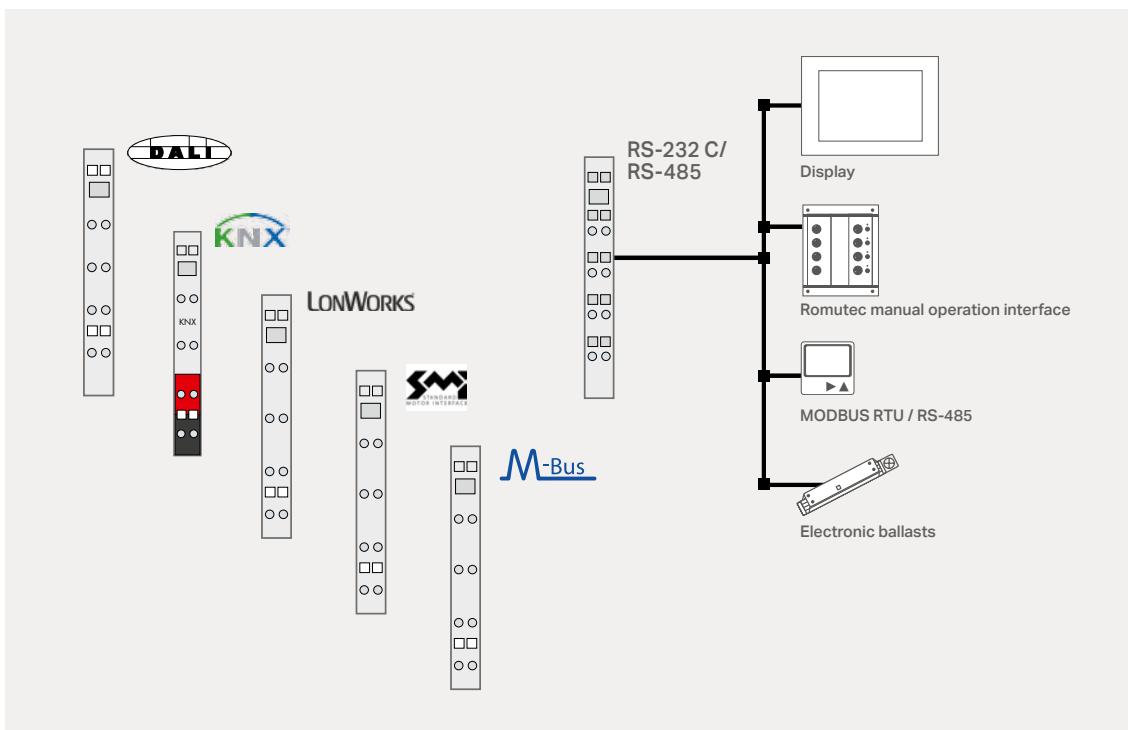
Digital input module



Digital output module



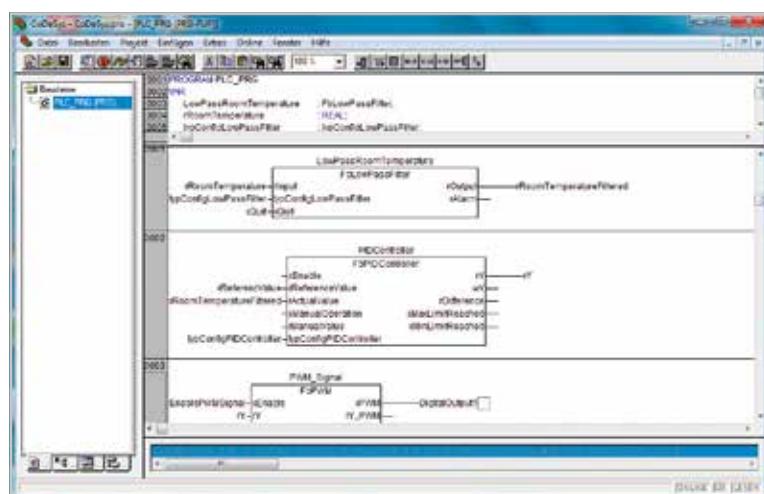
Communication module



BASIC WAGO SOFTWARE

WAGO-I/O-CHECK

WAGO-I/O-CHECK is an easy-to-use Windows® application for checking inputs and outputs, as well as displaying a WAGO-I/O-SYSTEM 750 node. The node does not have to be connected to a fieldbus system. In addition to checking the actuators/sensors connected on the field-side and module-specific configurations, the application can also document node configuration.



WAGO-I/O-PRO

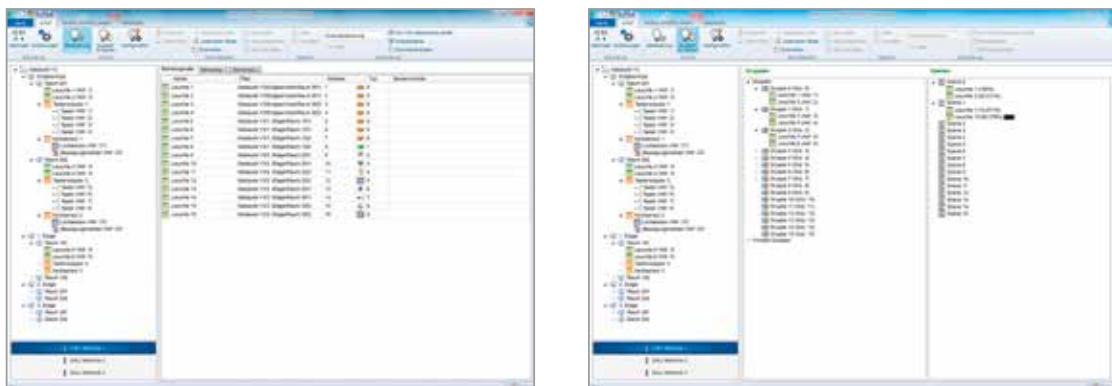
WAGO-I/O-PRO is a basic tool for creating control programs. The software contains freely selectable and graphic/text-based programming languages (FBD, LD, IL, ST, CFC and SFC) according to the international standard IEC 61131-3.

In addition to individual programming using WAGO-I/O-PRO, function blocks can also be accessed from pre-designed libraries. Graphically structured programs, such as those created with the Function Block Diagram (FBD) programming language, are very easy to create.



Web Visualization

Project-specific visualizations are generated in the WAGO-I/O-PRO software's graphic editor. Ready-made macros with a graphical configuration interface are available for certain functions or function blocks, which can be easily integrated into a project. Visualization is performed on a Webserver, which is locally contained in the ETHERNET controller. This allows the visualization to be displayed in a Web browser on any Internet-connected computer connected (e.g., for remote maintenance). The Web visualization can also be accessed on a tablet or smartphone using an app.



Specific Software Tools

In addition to these general software tools, WAGO also offers tools specifically engineered for select technologies, applications and products.

Among these are WAGO's DALI and BACnet Configurators, which allow devices connected to a specific network to be easily and efficiently addressed and parameterized. The individual tools and functions are described on their respective product or technology pages.



LIBRARIES

Building Automation

To simplify programming, WAGO has a multitude of pre-configured functions available for free: from simple room applications (such as lighting, dimming and anti-glare control) to HVAC modules, system macros and communication applications. The latter offers interfaces to LON®, DALI, EnOcean radio technology and MP-Bus, while enabling emails and SMS messages to be sent. The libraries can be directly used for efficient and error-free customer applications.

Libraries exist in the following areas:

- Room/air intake temperature cascade control
- Single-room control
- Lighting
- Dimmers
- Lighting scenes
- Constant light control
- Sun protection

HVAC

- Error message monitoring
- Frost protection monitoring
- Heat recovery
- Room/air intake temperature cascade control
- Heating circuit control
- Boiler sequence control

Communication

- EnOcean radio technology
- DALI
- DMX
- M-Bus
- SMI
- MP-Bus
- KNX/EIB
- SMS/Email
- ...

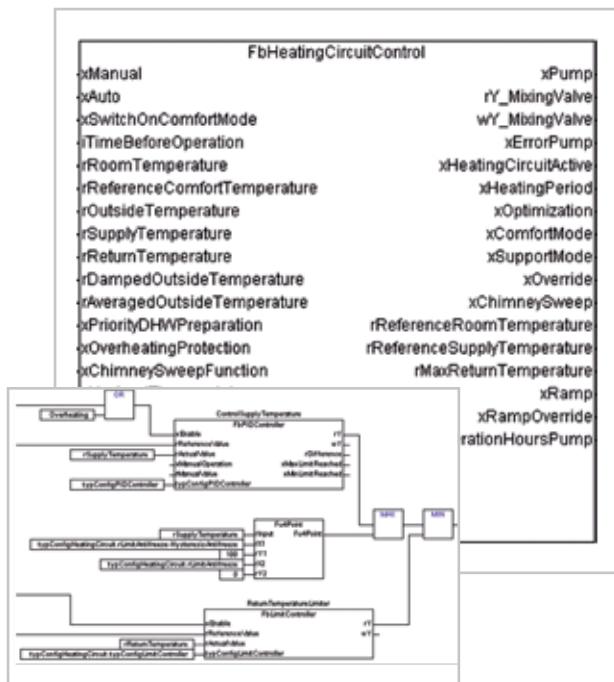
All current libraries and application notes can be downloaded at www.wago.com.

Application Notes

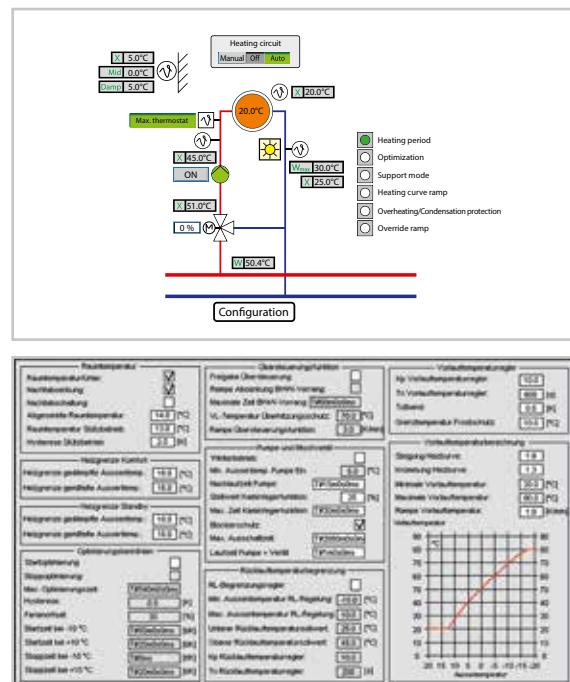
WAGO has an extensive library of detailed application notes for complex tasks, including: measurement, control, regulation technology (system macros, e.g., cascaded control systems with re-circulated air) and other building automation applications. In addition, the application programs are ready to use. And to simplify project development, the application notes can be consulted, or used directly as templates for custom programming. The programs are executable and have the WAGO-I/O-PRO software environment. This inter-

face can also be used via Web browser for controllers equipped with a Webserver. Other application examples: M-Bus meter reading, connection to bidirectional EnOcean gateways, energy data acquisition via 3-phase power measurement module, iPhone connection and much more.

Macros for ventilation, boiler, heating circuit and duty cycle monitoring (hot water), including ready-to-use configuration screens in Web Visualization



"Heating circuit" function block



Configuration screens in a Web Visualization



MODULES FOR DISTRIBUTION BOXES

The products and solutions outlined in this brochure form a solid foundation for building automation. However, additional peripheral systems, control modules and components are required for complete automation solutions.

WAGO not only provides a wide range of products, but can also furnish tailor-made solutions consisting of fully equipped system distribution boxes. Users not only benefit from shortened assembly times and error-free installation, but also from easier commissioning.

Key Components at a Glance:

- **Power Supplies**

The EPSITRON® Series provides 24 V to power WAGO controllers and IPCs.

- **Network Infrastructure Components**

From a simple switch to configurable communication capabilities with a fiber optic connection

- **Customizable ETHERNET**

User-configurable ETHERNET RJ-45 connectors

- **Transfer Modules**

For RJ-45 patch cables and universal connections, such as a 9-pole Sub-D RS-232 connection

- **Relays**

To control loads, such as lights, shutter drives and much more.



Controllers



TOPJOB® S Rail-Mount Terminal Blocks



WINSTA®
Pluggable Connection System



Distribution Boxes

- **WINSTA® Pluggable Connectors**

Innovative connectors from the WAGO WINSTA® system for preassembled components that provide fast and safe on-site installation; accommodate conductor cross-sections up to 4 mm² (12 AWG) and nominal currents up to 25 A.

- **Screwless Rail-Mount Terminal Blocks**

WAGO TOPJOB® S is a range of screwless rail-mount terminal blocks for building installations with conductors rated 1.5–16 mm² (16–6 AWG).

- **Current Measurement**

Coupled with Electronic Interface devices and the WAGO-I/O-SYSTEM 750, WAGO offers a comprehensive range of perfectly tuned energy efficiency solutions.

- **WAGO-I/O-SYSTEM**

Benefits of WAGO's successful fieldbus system: Solution with scalable performance, high integration density and an unbeatable price/performance ratio.

- **Pre-Assembled Custom Solutions**

WAGO product specialists have the experience and efficient solutions to assist you from initial specs to final installation.



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flexROOM®

A Flexible Room Concept

Our Concept

Planning, commissioning and building operation must demonstrate maximum efficiency and a high degree of adaptability. Pre-configured programs and pre-defined hardware significantly streamline planning and commissioning. The more applications created within a project, the greater the benefit. Flexible building operation (e.g., conversions and room remodeling) via special maintenance levels eliminates external service costs.

Install, commission and configure according to project specifications – WAGO **flexROOM®** combines these strengths into a standard module. The integrated control unit and application software are precisely tailored to room requirements.

Parameter Setting

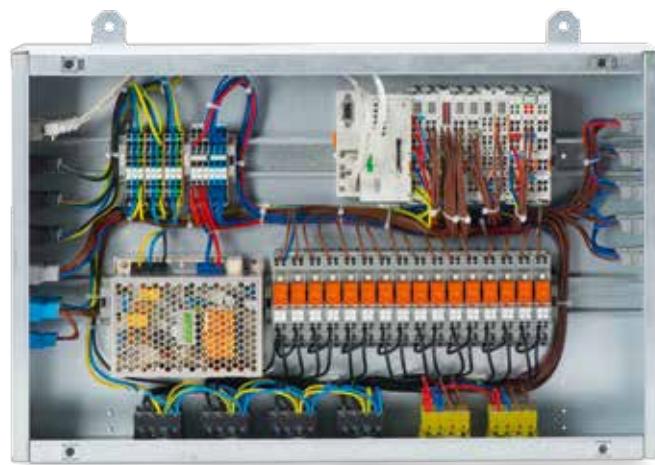
For each room, parameters can be individually stored for lighting, shading and room control. All parameters are cyclically saved either directly in the distribution box or on a separate computer via network connection. A higher-level management station accesses the distribution box parameters via the open Modbus TCP/IP protocol. This ensures that all modifications can be implemented on site or via the management station. BACnet or KNX IP systems can also be connected via Modbus TCP/IP.

Configuring – Not Programming

Each WAGO **flexROOM®** Distribution Box has a Web interface. Both the commissioning technician and end-user can configure the controls for each room via Web browser, regardless of the user's location and the distribution box in use. Complete wall relocations, room assignments, lighting and shading groups can be changed from the parameter interface. No additional software is required.

flexROOM® Advantages

The distribution boxes are delivered ready to operate and can be installed directly in a suspended ceiling or a sub-floor. Room segment configuration is performed directly in the distribution box via standard Web browser. No expert knowledge is required to configure rooms or convert them later. Several **flexROOM®** Distribution Boxes can be wired into a building automation network via ETHERNET to automate a building area, floor or an entire section of offices. A standard Web browser also establishes communication between the distribution boxes. If electrical distribution boxes are present, **flexROOM®** components can also be installed or retrofitted during facility renovation. Space conversion costs are reduced with **flexROOM®**, because expenses are transparent and thus predictable.



WINSTA®

A Complete Series Perfects the System

WINSTA® MINI

WINSTA® MINI special



WINSTA® MIDI

WINSTA® MIDI special



WINSTA® MIDI & Linect®



WINSTA® MAXI





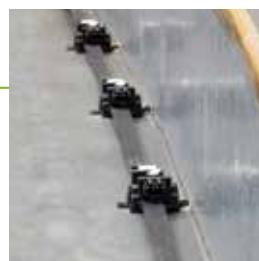
WINSTA® RD



WINSTA® KNX



WINSTA® IDC





WAGO LIGHTING MANAGEMENT

Stay in Control of Your System

Modern lighting management offers more than merely reducing energy consumption and costs, it simplifies economizing and resource conservation while maintaining user comfort and flexibility.

Our Concept

WAGO Lighting Management is a proven concept based on predefined hardware and preconfigured software, which greatly simplifies planning, commissioning and operation. The basic idea: WAGO Lighting Management is based on different lighting requirements in warehouses and production facilities.

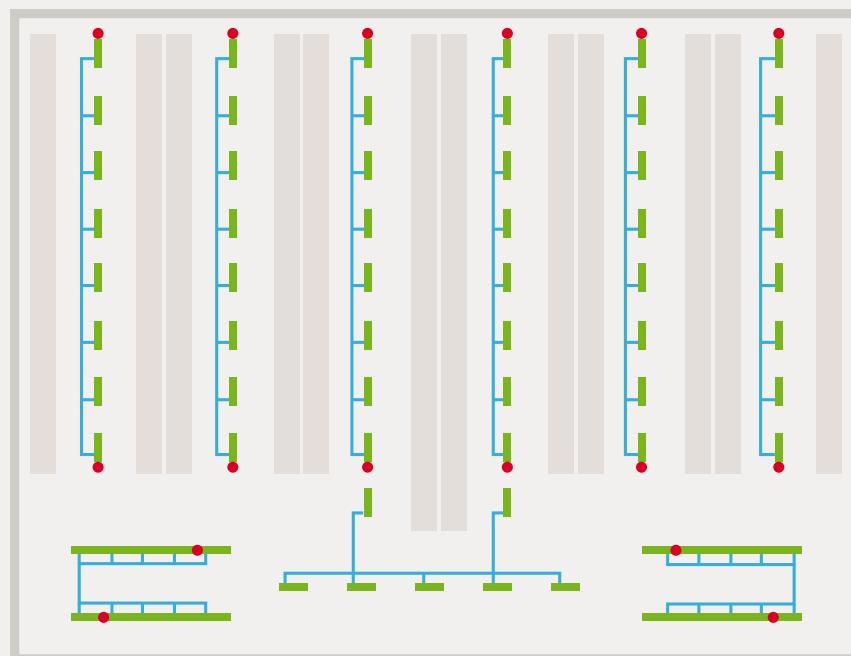
For example, a production facility is divided into virtual rooms in which the light can be flexibly adapted. Each virtual room receives signals from sensors and actuators in order to automatically set the appropriate light intensity. By using the

virtual rooms, conversions and room remodeling can be implemented quickly and simply via Web configuration.

Operation

WAGO Light Management features a Web interface that allows you to easily create and edit virtual rooms. Do you need to illuminate a production line, hallway or a storage area? No problem – simply create three different rooms with the required functions. Parameter values are stored on an SD card or a backup server via FTP. The values can be forwarded to a higher-level building control system or to a production control center via Modbus TCP/IP.

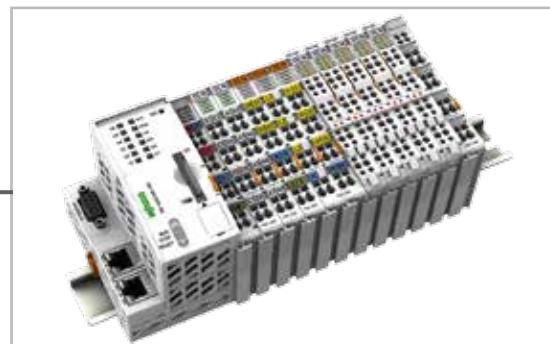
The foundation is an intelligent lighting control system, which ensures the correct light is available in the right amount at the right time by using daylight sensors, presence sensors and thoughtfully programmed lighting scenarios.



Example of typical production facility lighting

WAGO Lighting Management significantly reduces the overall costs of new installations and conversions. WAGO Lighting Management provides the perfect combination of high-quality hardware and

intuitive custom software! Reduce lifecycle costs with quick and simple commissioning, good diagnostic and service capabilities and simple adaptation of lighting situation to varying requirements.



Advantages of WAGO Lighting Management:

- Reduce lifecycle costs through efficient lighting management
- Scalable to any system requirement
- Commissioning via easy, wizard-based configuration
- Simple, programming-free conversion
- Connect to higher-level management and control systems within industrial or technical building environments

Works photo, WAGO

Do you need to illuminate a large area?

No problem! Our Lighting Management application allows you to illuminate nearly 3000 m² depending on the type of lamp. For larger areas, it is easy to link a number of controllers with one another.

WAGO SERVICES

Technical Support

WAGO's technical support staff is ready to assist all customers with advice and guidance – from selecting the right product, through telephone support during commissioning, all the way up to on-site troubleshooting. Customers directly benefit from knowledgeable WAGO experts who dramatically expedite project implementation.

WAGO Provides Advice and Support with:

- Product selection
- Product commissioning
- Troubleshooting
- All technical questions about WAGO products and solutions

Contact Our Technical Support:

- by phone at +49 571 887 555
- by email at support@wago.com
- via the contact form at www.wago.com
 > Service > Support Hotlines
 > Technical Support AUTOMATION

Project Support

WAGO offers consultation and project planning services to help devise the best possible solutions for your custom building automation and installation projects. Our experienced team of professionals will gladly help you implement your projects with WAGO products.

Large-Scale Applications Include:

- Production facilities and warehouses
- Office buildings
- Shops and display areas
- Schools
- Hospitals
- Airports

Planning and Project Design:

- Conceptual design
- Network planning
- Application design
- Component selection
- Quote generation

WAGO Helps Customers with:

- Advice from experts with years of experience in planning construction projects
- Customizing solutions to ensure the technical and financial success of large projects.
- Technical support while implementing building projects



WAGO Seminars

Innovative ideas and advanced technology are the driving forces behind the development and creation of WAGO's market-leading products. Attending WAGO training seminars provides you with product insights that will enable you to maximize the benefits of WAGO products. The skills and expertise gained in our effective, user-focused sessions will ultimately save you time while getting the most from our products.

Professional Environment – Effective Learning

- Small groups in which all questions will be addressed.
- Collaborative learning is effective because group settings encourage the exchange of experiences.
- Highly practical – we believe your experiences are the ideal base to build upon with product information that's uniquely tailored to you.

WAGO Building Automation Seminars

- Building automation with WAGO KNX components
- Building automation with WAGO BACnet components
- Building automation with WAGO LON® components
- HVAC applications
- DALI applications
- EnOcean applications
- **flexROOM®**

Custom, On-Site Training

In addition to these open-forum seminars, WAGO also offers sessions that are specifically tailored to your organization and its particular needs. Upon request, we can conduct these seminars at your location.

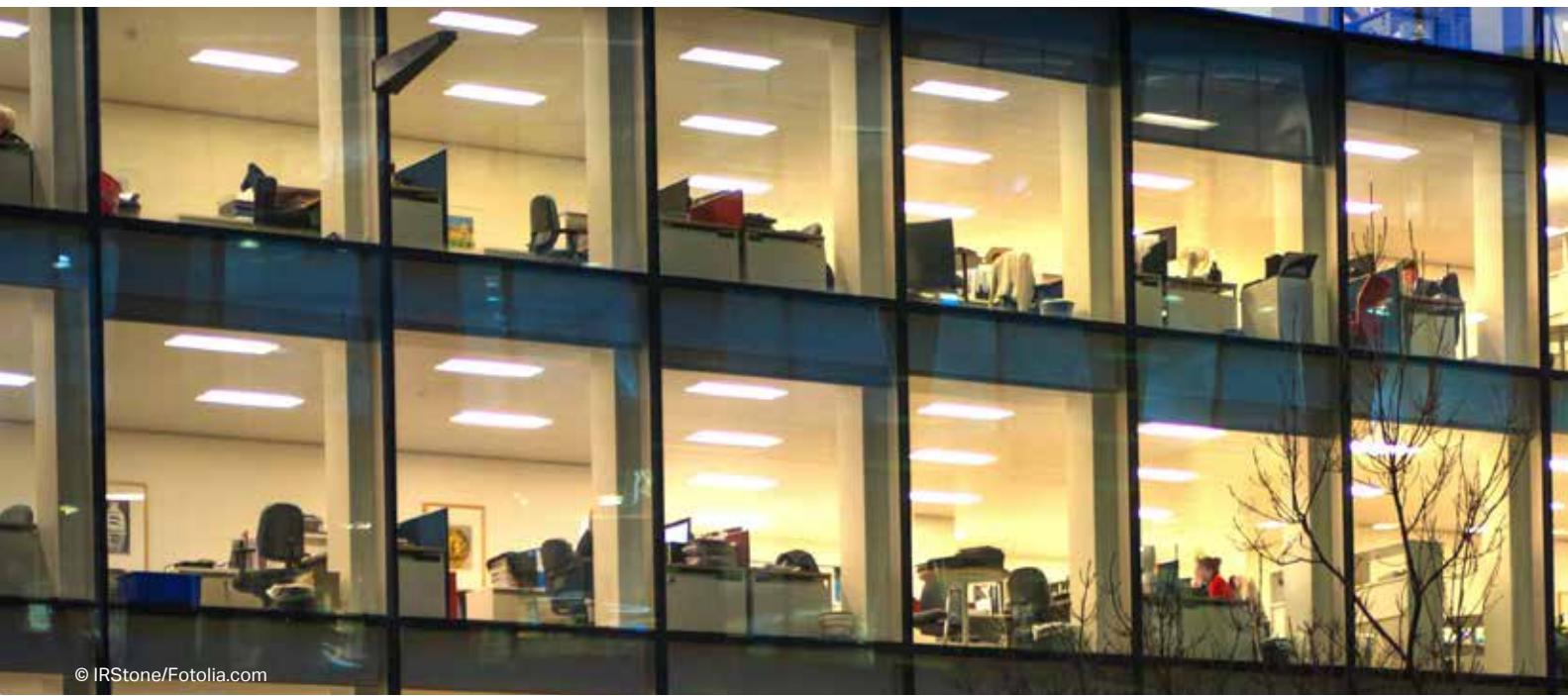
Note

Technical Support

global.wago.com/en/services/support-hotlines

WAGO Seminars

global.wago.com/en/services/seminars-training



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KNX

Maximum Flexibility and High Performance

KNX is a uniform, manufacturer-independent communication protocol for intelligently networking various building automation functions. KNX is used to plan and implement energy-efficient solutions, while incorporating greater functionality and convenience into buildings.

Global communication standards paired with maximum data speeds make ETHERNET an indispensable building automation technology. With its freely programmable **KNX IP Controller**, WAGO offers a product that links the KNX world with ETHERNET. Using this controller, you can link, control, regulate and monitor all types of KNX devices from a variety of sectors. When paired with the WAGO-I/O-SYSTEM 750 I/O modules, other sensors, actuators and sub-buses (e.g., DALI and EnOcean) can be easily integrated into the controller.

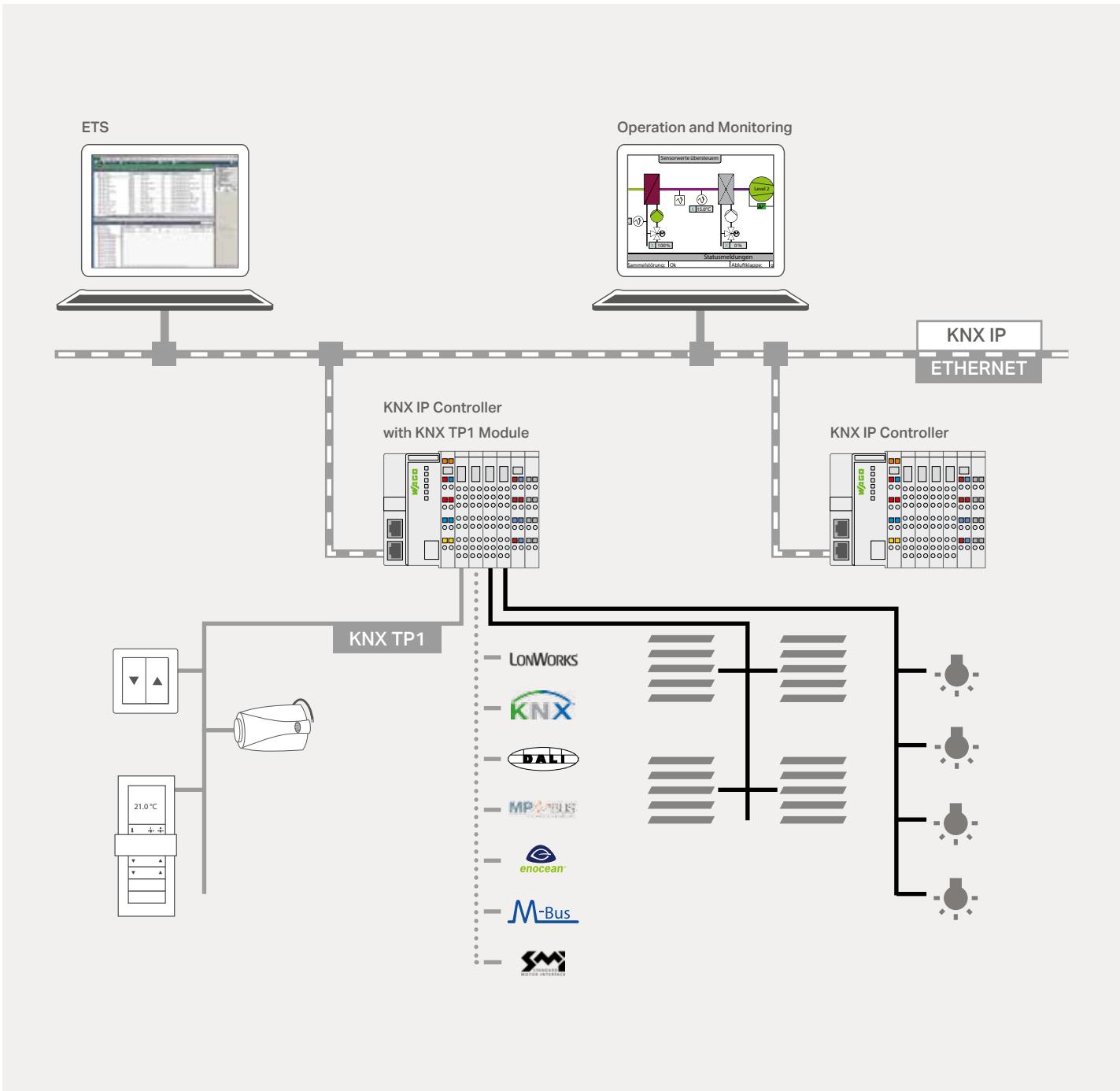
The **KNX TP1 Module** connects KNX TP1 networks to the WAGO I/O-SYSTEM and is compatible with all building-related WAGO Controllers (e.g., BACnet).

Combining a **KNX IP Controller** with a **KNX TP1 Module** creates a router that automatically connects the KNX two-wire bus system to ETHERNET. This provides a tremendous amount of freedom to conveniently operate buildings or systems via the Internet – wherever you are.

WAGO ETS Plug-In

The ETS standard programming tool assigns group addresses and commissions WAGO KNX products. WAGO's custom-developed plug-in supports users in configuring the KNX interface.





Additional Benefits

WAGO's innovative KNX components are seamlessly integrated into the WAGO-I/O-SYSTEM. This provides a wide range of input, output and specialty modules for sub-bus systems (e.g., DALI), as well as controllers for higher-level networks (e.g., BACnet). Cost-effective control units replace several individual KNX components as room and zone controllers. The KNX standard provides communication with thousands of devices from other manufacturers.





DALI

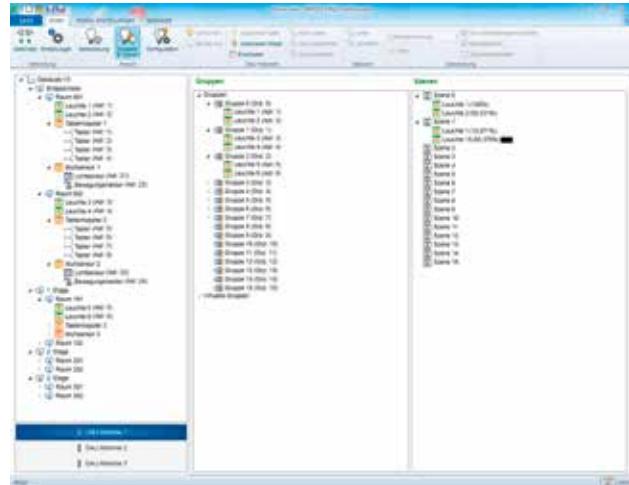
Flexible Solutions and Simple Commissioning

DALI stands for "Digital Addressable Lighting Interface" and is a protocol that adheres to the IEC Standard 62386. The DALI standard, a protocol common to all manufacturers, substitutes for the 1–10V dimmer interface and ensures the interoperability of DALI devices (e.g., electronic ballasts in lighting applications). A DALI master can control a line with up to 64 devices. In addition, sensors (e.g., brightness measurement and presence detection) can be integrated into a DALI network.

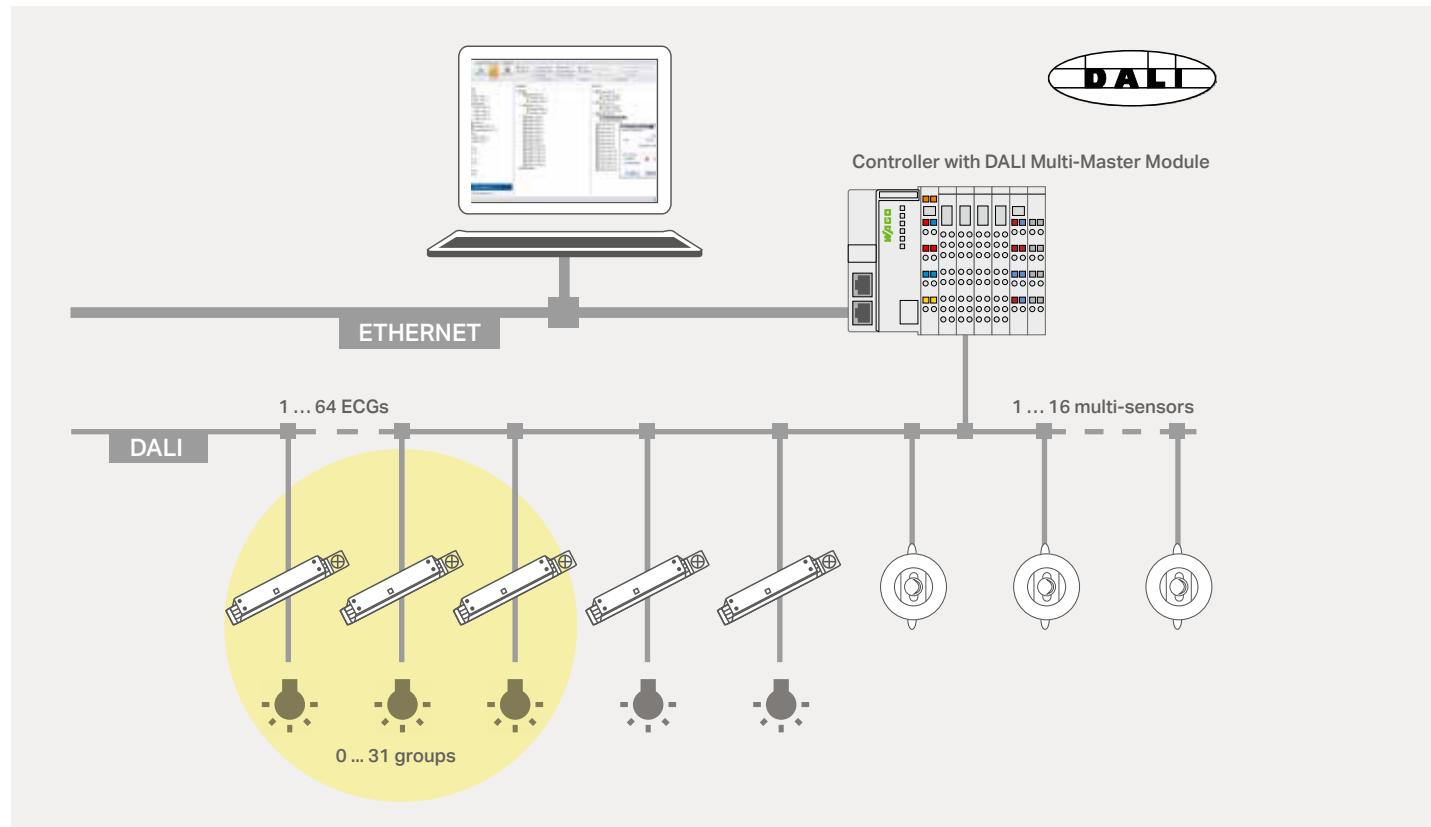


A DALI system allows individual lights or lighting groups to be controlled. No parallel wiring of the control groups is necessary. Assigning individual lights to operating elements and the grouping of lights can also be done after installation and is possible at any time without re-wiring.

The **DALI Multi-Master Module** is a comprehensive and highly flexible IEC 62386-compliant interface for the modular WAGO-I/O-SYSTEM 750. Combined with controllers and I/O modules from the WAGO-I/O-SYSTEM, even complex DALI lighting applications can be realized. In addition, the module can function as an interface to numerous fieldbus and sub-bus systems. There is no need to install an additional sensor bus, since sensors can be easily integrated into a DALI network.



DALI network devices are configured and commissioned using WAGO's DALI Configurator. This tool includes comprehensive functions that simplify and streamline both the installation and maintenance of a DALI network. These functions include: addressing and configuring all DALI network devices, group and scene formation, as well as comprehensive diagnostics.



BACnet

Fast Control Solution for Complex Applications

BACnet is a building automation communication protocol standardized according to DIN EN 16484-5. BACnet standardizes communication between products from different manufacturers. Device profiles, services, communication objects, object properties and transmission media have been defined in this standard to meet this goal. WAGO's BACnet Controllers comply with the BACnet Building Controller (B-BC) profile and communicate via **BACnet/IP** or **BACnet MS/TP**.

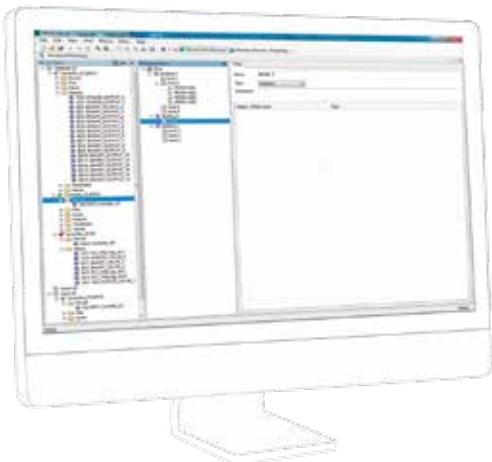
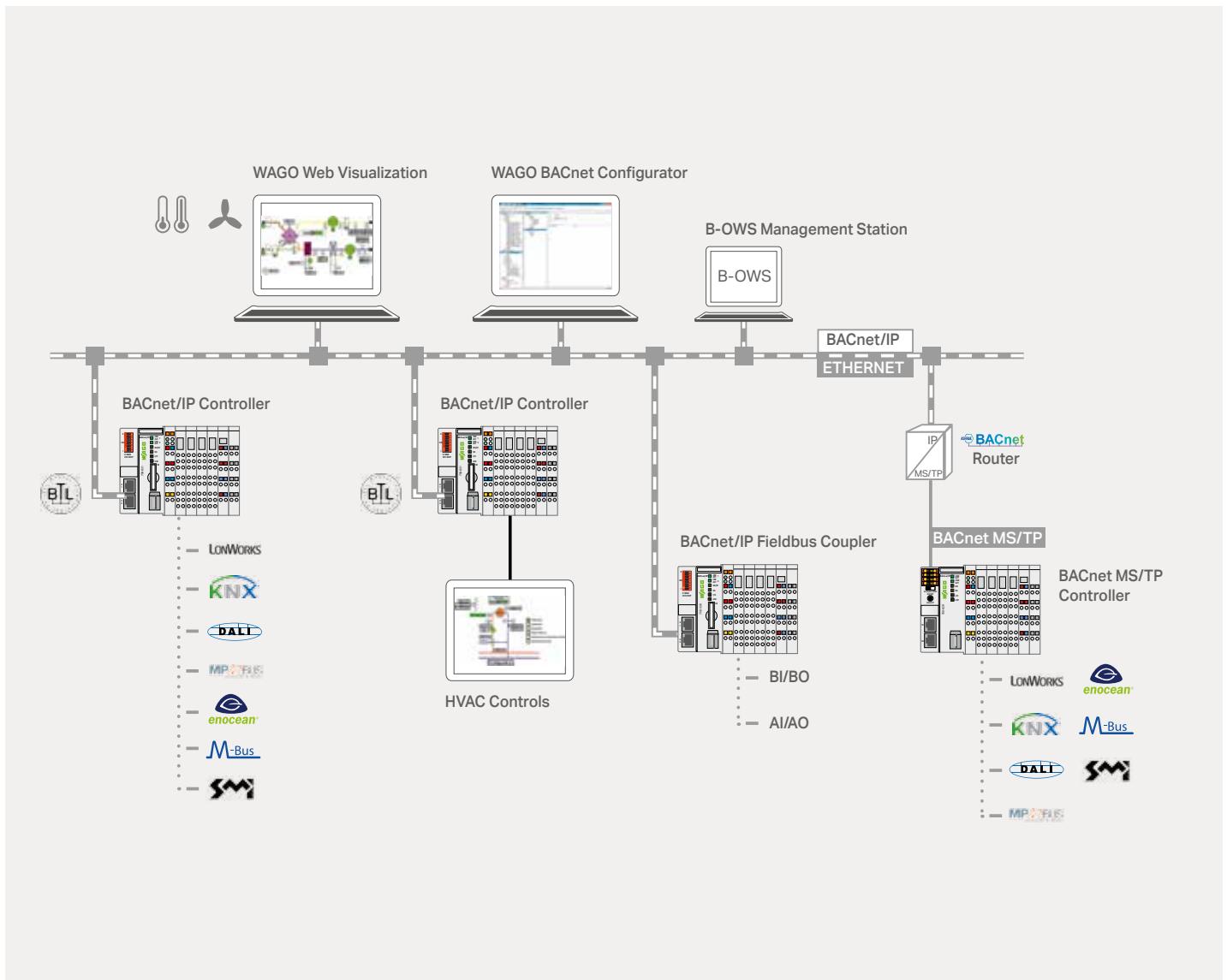
WAGO BACnet Configurator

The BACnet Configurator is a useful tool for configuring and operating BACnet controllers in a heterogeneous BACnet network. Logically structuring the network and addressing the controller, as well as configuring both client and server can be performed on the configuration interface. In addition, the properties of BACnet objects can be accessed using a value browser.

Additional Benefits

Beyond B-BC profile compliance defined in the BACnet Standard, WAGO's freely programmable BACnet Controllers are compatible with the associated, defined BACnet Interoperability Building Blocks (BIBBs). The sheer diversity of available input, output and specialty modules for sub-buses – such as KNX/EIB, MP-Bus and DALI – complete the system, making the WAGO BACnet Controllers very versatile.







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MODBUS TCP/IP

Fast and Lean Communication

Extending 1979's Modbus protocol for PLCs, the well-established MODBUS/TCP protocol has become the de facto standard for building automation. The advantage: MODBUS is a streamlined protocol that ensures ultra-fast ETHERNET data transmission. A manufacturer-independent data structure also permits communication between devices from different manufacturers.

Thus, Modbus TCP is recommended for applications that collect data and/or network intelligent controllers with self-sufficient control logic. Therefore, in addition to the respective fieldbus protocol, WAGO's ETHERNET-based controllers for building automation also support Modbus TCP.



ENERGY DATA COLLECTION

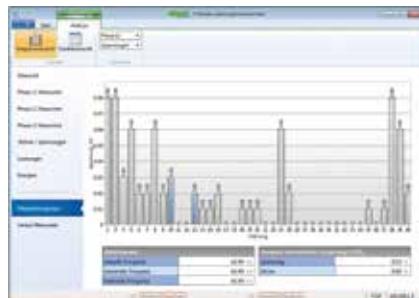
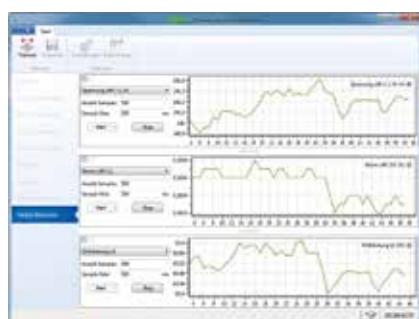
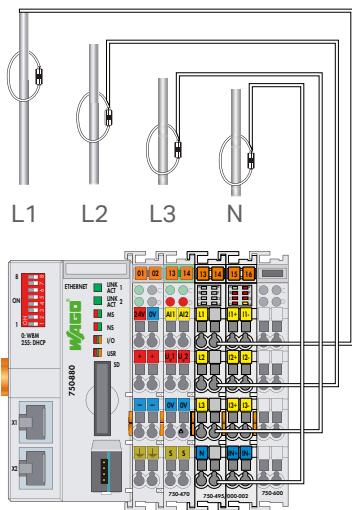
Today, systematic energy management is essential for the energy-efficient operation of buildings and systems. Ongoing acquisition and analysis of the actual energy consumption is the foundation for outlining and executing appropriate energy-saving measures. In order to fully maximize efficiency and economy, we must know the exact levels of energy consumption.

WAGO's 3-Phase Power Measurement Module is used for measuring the electrical data in a

three-phase supply network. This data makes the energy consumption of a building, its individual areas or systems more transparent to the building operator.

The 3-phase power measurement module can be combined with all building-related WAGO controllers and modules from the WAGO-I/O-SYSTEM 750. The voltage is measured via network connection. The current of the three phases is directly connected to the I/O module at low currents and is fed to the terminals via current transformers at high currents.

In addition to energy consumption measurement, the 3-phase power measurement module also features additional functions for comprehensive grid analysis (e.g., detection of insulation faults, over/under voltage, interference spikes or grid "disturbances"). Based on the values for voltage, current, effective and apparent power consumption, the user is able to reliably measure, evaluate and economize energy consumption.



SMI MASTER

For Direct Connection of Electrical Drives

A compact design paired with advanced technology. The new 750-1630 SMI Master Module for the WAGO-I/O-SYSTEM 750 enables direct connection of electric drives for sun blinds or roller shades, without requiring a level inverter.

In addition to reduced wiring expenses, using the new SMI Master also minimizes other costs: for example, because the module has an integrated power supply, thus an external one is no longer necessary. In addition, a digital output temporarily deactivates the drives when they are not needed.

The 750-1630 SMI Master Module controls 230 VAC SMI motors, and the 753-1631 model can be

used with low voltage shade drives (24 V). Up to 16 drives can be connected per module. The SMI Master Module also offers users numerous helpful functions: the “auto-replace” function, for example, allows building operators to replace a defective motor – without modifying the configuration.

WAGO also offers a new SMI configurator to design and commission SMI networks. The software is used to quickly address the SMI drives and to expedite both the import and export of all configured drives.





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M-BUS MASTER

For Direct Connection of Energy and Consumption Meters

Reduce costs, simplify installation, and save space: The new 753-649 M-Bus Master Module directly connects up to 40 M-Bus devices to the I/O system to capture consumption data – without external gateways and level inverters.

Using the new Master module, M-Bus devices can be directly connected to the I/O system. Additional cabling is unnecessary. The M-Bus system, based on a master/slave communication model, can be operated as a line, star or tree topology. A WAGO Controller with the M-Bus module, which communicates with bus components via 2-wire bus, assumes the role of the master. Up to 40

slaves can be connected per module. The M-Bus transmits data at speeds of 300 to 9600 bps. Regular type J-Y(St)Y N x 2 x 0.8 mm telephone cable, for example, can be used as the M-Bus cabling.





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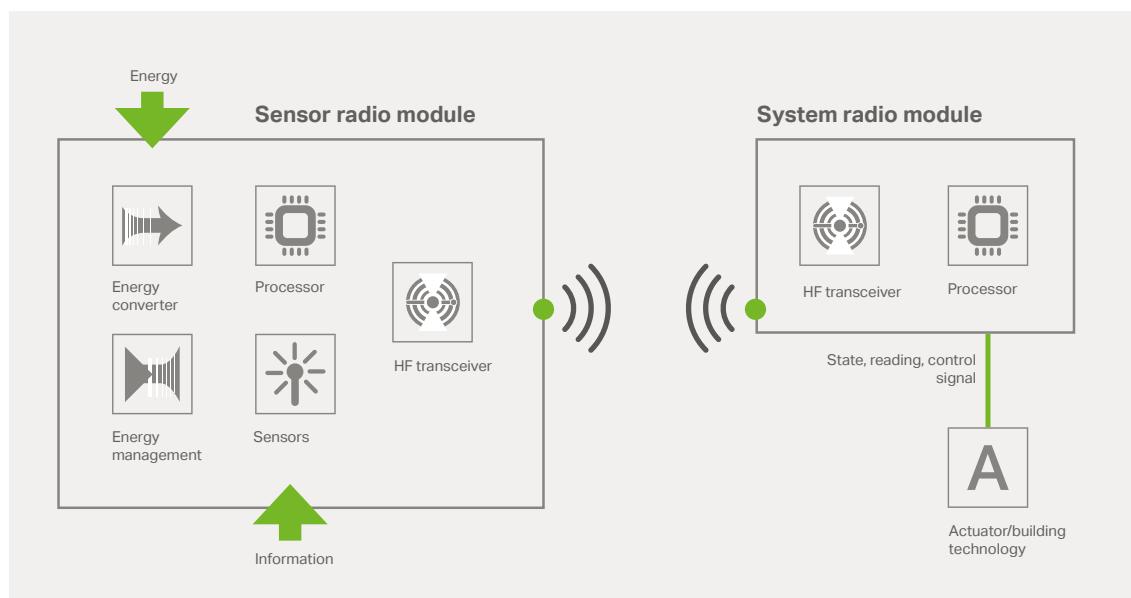
ENOCEAN RADIO TECHNOLOGY

Innovative Concepts for Building Automation

WAGO EnOcean radio technology opens up a new level of innovative building automation solutions, both technically and aesthetically. Wireless switches and sensors based on EnOcean technology harvest existing energy to power themselves, e.g., kinetic energy from actuating a switch or sensors powered by temperature variations or ambient light.

Each transmitter has a unique address and communicates with a receiving unit. Despite the limited energy available, these highly efficient electronics can transmit the signal several times, guaranteeing high transmission reliability.

The EnOcean Dolphin system architecture expands the previous system architecture to include sensors and actuators that communicate bidirectionally. The interoperability of EnOcean Dolphin makes it possible to combine products from different manufacturers into one advanced system.



ADDITIONAL TECHNOLOGIES

The WAGO-I/O-SYSTEM provides users with a wide range of interface solutions for bus systems and subsystems for building automation. Beyond the previously mentioned protocols, WAGO also supports:

LonWorks® technology is standardized per ISO/IEC 14908. In addition to BACnet and KNX, LonWorks® is one of the most important protocols in building automation worldwide. A large number of manufacturers use LonWorks® as a communication protocol, allowing interoperable communication between intelligent devices.

DMX is a digital protocol used to control lighting or special stage effects. With the rapid deployment of LED lighting technology, DMX is also used to control LED lights in commercial and utility buildings. DMX displays its strengths in RGB color-control applications (e.g., facade illumination).

The MP-Bus controls HVAC actuators for dampers, regulator valves or VAV air volume controls. The actuators have connections for sensors (temperature, humidity, ON/OFF switches), which are also accessible via MP-Bus.



DMX



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