Solutions for building automation
PHOENIX CONTACT – Communicating with customers and partners worldwide

Phoenix Contact is a leading manufacturer of electrical connection and industrial automation technology. Founded more than 80 years ago, the company now has 8400 employees, of which more than 4000 are located in Germany. A sales network of 40 subsidiaries and more than 30 sales representatives guarantees proximity to the customer.

The product range includes high-grade components, systems and services across a wide variety of applications. The selection ranges from modular terminal blocks to interface technology, PCB connection technology and solutions for surge protection to hardware and software solutions for the automation of industrial systems.

Phoenix Contact values in-house expertise. The design and development departments continuously implement innovative product ideas and deliver special solutions to meet customer requirements. Numerous patents have resulted from products developed at Phoenix Contact.
Building automation in functional buildings

- Long-standing experience in automation technology and in the application of industrial programming software (IEC 61131-3)
- Know-how on the subject of installation and maintenance of industrial and office Ethernet networks
- Responsible for system availability
- Concepts for training, support, service and maintenance

Open solutions for your building
Phoenix Contact provides open and future-oriented solutions for your functional building and the automation of all levels in your building. With our intelligent solutions, we do complete justice to your requirements as regards energy efficiency, availability and maximum convenience as expected of modern working methods and production.

Table of contents

AUTOMATIONWORX
for building automation .......................... Page 4

On-site operation – web-based with BAVL .......................... Page 6

DDC control technology with Inline Control .......................... Page 8

Application-specific I/O combination with Inline Modular .......................... Page 10

Application examples .......................... Page 12

Product portfolio for building automation .......................... Page 15
Phoenix Contact has more than 20 years of experience in automation and is thus perfectly capable of fulfilling your requirements as regards optimum building automation competently and innovatively with the AUTOMATIONWORX system.

Our components and solutions are scalable, are based on industrial standards and can always be adapted to your applications. Information is exchanged seamlessly between field, automation and management levels using Ethernet-based protocols, as well as web technologies and programming tools such as the PC WORX automation software.
Solution for future-proof investment security:
- Standardized PCP interfaces
- Manufacturer-independent solution
- Efficient engineering
- Uniform planning and integrated execution of systems

AUTOMATIONWORX for building automation offers a uniform, Ethernet-based solution from the field level to the building control system. The service offer comprises visualization, programming, industrial Ethernet infrastructure, DDC controllers, devices for on-site operation and modular I/O components.
With the high-performance Micro Browser installed on the touch panels from Phoenix Contact, you visualize the statuses of your systems easily, flexibly and clearly. The visualization object library Building Automation Visualization Library provides objects via a graphical user interface which can be easily connected to the data points.

Thanks to the easy operation of the touch panels, you can always track the course of the process data, follow up errors and alarms and operate the system manually.

A uniform and economical solution for your building!

Visualization with WebVisit™

With WebVisit™, you can create web-based visualizations easily and conveniently that can be run on the integrated web server of the Inline controllers. Access to the web server of the DDC is possible with every standard browser and without any detailed Java knowledge, providing the visualization independent of the operating system.

- No programming knowledge required
- Easy creation of graphical objects with standard symbols
- Based on the open Java Applet Standard
- Can be run on Phoenix Contact touch panels
- Access via Intranet with every standard browser
- Remote access with modem, WLAN or via Internet
- Activation through easy link to the process points (PPO) of the DDC

System requirements

- Windows NT/2000/XP
- Pentium processor min. 600 MHz clock frequency
- 64 MB of RAM; 30 MB free memory space
- Web browser with Java VM JDK 1.17 or higher

WebVisit™ is a part of the AUTOMATIONWORX Software Suite that provides a variety of software tools.
The graphical workspace guarantees easy implementation of your building-specific requirements.

**BAVL – Building Automation Visualization Library**

- Comprehensive symbol library with standardized symbols for sensors (probes) and actuators (fans, pumps, valves, flaps, etc.)
- Symbols for actuators with dialogs for operation
- Symbols for building control system and on-site operation with touch panels
- Optimized for interaction with the PC WORX functions (BACL)
- Easy placing using Drag & Drop
- Time plan elements for day and week timers as pre-defined macro
DDC control technology with Inline Control

Designed for the user, our innovative Ethernet-based control technology enables the distributed automation of all systems in your building. From the focus on information to the management level, building automation can be networked via a homogenous data communication protocol.

The control system from Phoenix Contact is scalable and modular and thus offers the right solution for every task.

BACL – Building Automation Control Function Library
Function library for time-saving implementation of complex building automation applications
- Modules
  - For controlling and regulating fans, flaps and pumps
  - For connecting romutec manual operation levels via Modbus RTU
  - For wireless integration of operating devices and sensors with EnOcean wireless technology
  - For controlling lamp ballasts in acc. with the DALI standard
- Interface for communication with WebVisit™
**Programming with PC WORX**

The uniform programming of the building automation system is done using the PC WORX automation software that contains the following programming languages defined in the IEC 61131-3:

- Instruction list (IL)
- Function block diagram (FBD)
- Structured text (ST)
- Ladder diagram (LD)
- Sequential function chart (SFC)

Freely available programming modules for HVAC systems:

- Startup and frost protection control system
- PID heating and ventilation controller
- PID controller universal
- Min. and max. restrictions
- Mean value generation of various measured values
- Motor control modules
- Easy remote control libraries as per IEC 60870-5-101 and IEC 60870-5-104

**DDC control technology**

The Inline Control compact controllers can be directly integrated into the input/output system wherever high system availability is desired or required. They control and regulate all downstream I/Os and communicate with all other compact controllers, the PC-based control technology, the all-in-one S-MAX control systems, the CP control panels and PPC industrial PCs of the building automation via Ethernet.

**Operation & Monitoring**

Due to the compact design, the touch panels enable convenient and powerful on-site operation that can be easily integrated into your building automation via OPC. One Ethernet and two USB interfaces as well as an optional INTERBUS interface ensure fast and seamless communication.

**Ethernet infrastructure**

Modular managed Factory Line Switches (MMS) solve every Ethernet installation task in your building – adapted to the particular connection requirement – i.e. the number of ports, connectors or transmission medium. As a compact block variant, we offer Managed Compact Switches (MCS).

MMS and MCS are suitable for realtime and Ethernet applications as well as redundant network structures with fast switching times, and they support the setup of Virtual Local Area Networks (VLAN). The reliable data transmission can be additionally increased using Spanning Tree, a variable redundancy function. Simpler and more economical applications can be realized with 4, 5 or 8-port switches.
Application-specific I/O combination with Inline Modular

All data points of an information focus in a system: The Inline bus terminal modules from Phoenix Contact allow the connection of data points for all commonly used sensors and actuators; corresponding Inline bus coupler types ensure connection to all commonly used bus systems. Expansions are thus possible quickly and easily; via PCP bus terminal modules, lower-level systems such as DALI and Modbus RTU are integrated in the same manner as devices with the serial interfaces RS-232/RS-485.

Overview

Phoenix Contact bus terminal modules – The complete I/O system for building automation

<table>
<thead>
<tr>
<th>Buskoppler/Controller</th>
<th>IL BK</th>
<th>ILC</th>
<th>CP</th>
<th>S-MAX</th>
<th>PPC</th>
<th>IPC</th>
<th>Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROFINET</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>RS 232</td>
</tr>
<tr>
<td>Ethernet</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>RS 422/RS 485</td>
</tr>
<tr>
<td>Modbus/TCP (UDP)</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>DALI</td>
</tr>
<tr>
<td>INTERBUS</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Modbus/RTU (ASCII)</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td><strong>Digital inputs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Channels</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>16</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>24 V DC</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>24 V DC</td>
</tr>
<tr>
<td>120 V AC</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>12 ... 253 V DC</td>
</tr>
<tr>
<td>230 V AC</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>SØ</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>W = Wechsler</td>
</tr>
</tbody>
</table>

| **Digital outputs**    |       |     |    |       |     |     |             |
| Channels               | 1     | 2   | 4  | 8     | 16  | 32  |             |
| 24 V DC                | •     | •   | •  | •     | •   | •   |             |
| 12 ... 253 V DC        | •     | •   | •  | •     | •   | •   |             |
| Relay                  | •     | •   | •  | •     | •   | •   | W           |

| **Analog inputs**      |       |     |    |       |     |     |             |
| Channels               | 2     | 4   | 8  |       |     |     |             |
| 0 ... 10 V             | •     | •   | •  | •     | •   | •   |             |
| ± 10 V                 | •     | •   | •  | •     | •   | •   |             |
| 0 ... 5 V              | •     | •   | •  | •     | •   | •   |             |
| ± 5 V                  | •     | •   | •  | •     | •   | •   |             |
| 0 ... 25 V             | •     | •   | •  | •     | •   | •   |             |
| ± 25 V                 | •     | •   | •  | •     | •   | •   |             |
| 0 ... 50 V             | •     | •   | •  | •     | •   | •   |             |
| 0 ... 20 mA            | •     | •   | •  | •     | •   | •   |             |
| 4 ... 20 mA            | •     | •   | •  | •     | •   | •   |             |
| ± 20 mA                | •     | •   | •  | •     | •   | •   |             |
| Resistance thermometer (RTD) | • | | | | | | |
| Thermocouple (UTH)     | •     | •   | •  | •     | •   | •   |             |
Only a few steps away from a functional application

With our uniform tools, implementation of your requirements for an economical and convenient building automation is now even easier. One tool connects to another seamlessly: From the building plan to the BACS function list to the configuration tool AX sales. The configuration and offer inquiry are completely automated and all Inline rules taken into account by simply entering the planned data points!
Application examples – Implementing non-proprietary building solutions

Connection of the frequency converter

For example, Danfoss

Frequency converters are often used in large HVAC systems for the regulated operation of fans or pumps. The extremely common device range, VLT 6000 from Danfoss, is controlled using an RS-485 PCP module and Modbus RTU; the programming and parameterization of the application program via the PC WORX programming software is supported by the Building Automation Control Library function module library (BACL).

Connection of emergency or manual operation levels

For example, romutec

Emergency or manual operation levels are often used for the manual operation of local systems. The romutec emergency operation level is bus-capable and can be used for operating the local system in the case of a failure of the control technology. Phoenix Contact implements this requirement by integrating the romutec emergency or manual operation levels with an RS-485 PCP module and Modbus RTU. The Building Automation Control Library function block library (BACL) is available for easy integration into PC WORX.
Connection of damper actuators

For example, Belimo

Intelligent motor-driven damper actuators are mandatory for a safe and future-oriented building automation, especially in conjunction with anti-fire measures. Phoenix Contact realizes the connection of Belimo damper actuators with a PCP terminal from the Inline automation kit. This serves as master for the MP-Bus, thus enabling integration into a higher-level Ethernet bus system. The Building Automation Control Library (BACL) function block library contains special modules for programming and parameterization of the application program.

Delivery date: On request

Connecting consumer meters

For example, SO interface

The remote activation of consumer meters in communication networks is state-of-the-art today. Media meters for electricity, water or gas are usually equipped with a pulse interface that can be connected to the SO current interface of the control systems as per DIN 43846. PCP-capable media meters can be integrated via the widely used Modbus RTU protocol with the RS-485 Inline PCP terminal. The programming and parameterization of the application program are supported by the Building Automation Control Library (BACL) function block library via the PC WORX programming software.
Lighting control system with DALI

Lighting control systems that are controlled with DALI are increasingly being used in building projects – a flexible and economical solution for the operator. For the connection to DALI, Phoenix Contact provides two different PCP terminals from the Inline kit. The PC WORX control program comprises specific modules for DALI within the scope of the Building Automation Control Library (BACL) function block library, which facilitate programming and parameterization of the application range.

Enocean

Tried and tested maintenance-free radio switches and sensors with Enocean technology increase the flexibility and reduce costs in your building. The connection to the Enocean technology is realized with an RS-485 PCP module. A special receiver transmits the wireless signals to the control system. For connection to the Enocean wireless technology, the Building Automation Control Library (BACL) functional module library contains special modules that facilitate programming and parameterization of the application range.
**Product portfolio for building automation**

**Modular terminal blocks for building installation**

Modular terminal blocks from Phoenix Contact have become synonymous with quality in electrical connection technology worldwide. The terminal blocks were originally developed for the power industry, but have now become the basic module in all fields of electrical installation, a fact due to their ease of connection and modularity. With CLIPLINE complete, the unique modular terminal block system, you can choose the connection methods freely. Whether you choose screw, spring-cage, push-in or fast connections. All connection technologies can be freely combined using just one range of accessories.

**Securing installations and devices**

TRABTECH surge protection – This comprehensive range of arresters provides efficient solutions for protection against surge voltage damage and can be easily integrated in all fields of electrical building installation. The principle of the protective circuit with its four defined protection areas makes the planning of individual protective concepts easier.

**New power supply range for installation distributors**

In a housing specially developed for building automation, the STEP POWER power supply units in the design widths 36, 54, 72 and 90 mm save valuable space in the installation distributor. Low stand-by losses and a high degree of efficiency ensure maximum energy efficiency. Four performance classes with the nominal output voltages of 12 and 24 V DC can be adjusted progressively via the user-friendly front potentiometer.

**PLUSCON industrial connectors**

For the sector of power supply and data communication within buildings, Phoenix Contact provides a comprehensive range of cabling solutions. With PLUSCON data, a complete installation system consisting of patch panels, terminal outlets, assembled conductors and connectors with fast connection are available with IP20 and IP67 protection. PLUSCON heavy provides rugged connection solutions for a uniform power supply from the DIN rail in the control cabinet to the PCB in the field device.
Further information on the products presented here and on the world of solutions from Phoenix Contact can be found at www.catalog.phoenixcontact.com

Or contact us directly.

PHOENIX CONTACT GmbH & Co. KG
D-32823 Blomberg, Germany
Phone: +49/5235/3-00
Fax: +49/5235/3-1 07 99
www.phoenixcontact.com