Focus on efficiency

Solutions for energy-efficient and safe building technology
The energy-efficiency trend in Building Automation

“Building Automation” is a broad term for one of Phoenix Contact’s focus industries. It covers everything around a building’s operation including security, access controls, fire alarms, lighting, AV controls, and HVAC. Each of the categories within Building Automation can expand into its own industry, like lighting, and all have their own challenges and trends. Today, opportunities exist to integrate all of these categories and ultimately create a smarter building. Integrated building systems that collect data from smarter devices, like thermostats, will allow the facility manager to identify potential problems before they happen and ultimately become more energy efficient.

The main driver behind smarter buildings is energy efficiency, and this is seen within all Building Automation categories in both the government and commercial sectors. As energy and maintenance costs continue to rise, efficiency becomes more important. But rising energy costs are not the only reason to improve efficiency. Buildings in the U.S. and the European Union account for close to 40 percent of all fossil fuel consumption, so the impact of climate change also plays a role in the need for efficiency.

“Net Zero” – where a building produces as much energy for the grid as it consumes – is the ultimate goal for energy efficiencies. Although we are stepping closer to that with new building construction, we still have a long way to go. Solar energy and storage are helping to move toward Net Zero buildings, but retrofitting costs remain high.

Energy efficiencies have a direct effect on the bottom line of the cost to manage a facility. This is an important topic, and one that will not be going away in the near future.

Chris Beevers
Manager of Strategic Accounts and Business Development

www.phoenixcontact.com
A **BRIGHT** idea: Energy-efficient LEDs

Traditional incandescent bulbs use a lot of energy to produce light. **90%** of this energy is given off as heat, so it is essentially throwing money away.

Electricity cost to operate a traditional incandescent bulb for a year: **$4.80**

Light-emitting diodes (LEDs) use at least **75%** less energy and last 25 times longer than traditional incandescent lighting.

Electricity cost to operate an LED bulb that produces the same amount of light: **$1.00**

References:
Measuring lightning on the Burj Khalifa

The LM-S lightning monitoring system provides information about lightning strikes on the tallest building in the world

The taller a building, the stronger the loads it is exposed to from lightning strikes. Phoenix Contact has developed the LM-S lightning monitoring system to detect and evaluate lightning strikes. Today it provides data from the tallest building in the world, the Burj Khalifa in Dubai, United Arab Emirates.

Burj Khalifa is the world’s tallest skyscraper. Emaar Properties, a global property developer located in Dubai, completed construction on Burj Khalifa in 2010. The company erects and supervises the building of numerous megaprojects.

If it is windy, the top floors of the skyscraper move by around 5 feet. The 5,661-square-foot gross floor area includes hotels, restaurants, offices, and private residences. Two underground levels provide parking space for cars. The building’s 57 elevators connect the 160 commercial stories. The world’s highest elevator stop is also located here, at a height of more than 2,000 feet.

The LM-S lightning monitoring system consists of an analyzer, a connection cable, and up to three sensors. If lightning strikes one of the lightning rods installed on the Burj Khalifa, then a magnetic field is created in the arrester that guides the lightning surge current. The LM-S uses the Faraday effect to measure these surge currents in the lightning arresters.

If the measuring section of the sensor detects a magnetic field that was caused by a lightning strike, the plane of polarization of the previously polarized light rotates in a way that can be measured. The L-MS detects the characteristics of the lightning events – amplitude, maximum slope, specific energy, charge – and can store that data, along with the date and time of the lightning strike. A fiber-optic cable transmits the light signal from the sensor to the analyzer.

Learning from wind power

Installing the lightning monitoring system in Dubai took place under extreme conditions, and the operation set some new records. In wind power plants, a 10-meter cable length is generally sufficient for connecting the sensor in the base of the blade with the analyzer in the hub; however, in the Burj Khalifa, the cable length was some 650 feet. The LM-S was essentially developed to
provide a better analysis of damage caused by lightning strikes in wind power plants. In such cases, unplanned service and repairs always result in increased costs.

**Maximum values of more than 50 kA**

In the meantime, the world’s highest lightning measuring system integrated into a building has already detected lightning strikes that have struck the tip – all with maximum values of over 50 kA. The operator of the building uses this information for statistical evaluation, as the building is equipped with a comprehensive exterior and interior lightning protection system.

Any irregularities in the electronics and operating technology of the Burj Khalifa are reconciled using up-to-date measured values from the lightning monitoring system. If lightning strikes are measured in buildings and also in wind power plants, then conclusions can be drawn relating to the damage based on the relationship between the lightning parameters and the operating parameters of the system.

In addition, the evaluation of certain events enables conclusions to be drawn about the efficiency of the lightning protection system.

Lightning information systems can also collect information on lightning strikes for claims settlement. However, they can only locate a lightning strike within 200 m.

The only way to determine whether lightning strikes a building and at what point is by using a lightning monitoring system, such as the LM-S from Phoenix Contact.

Alexa Broer, Arno Kiefer
www.phoenixcontact.com/LM-S

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**How measured values are integrated**

The LM-S analyzer has an Ethernet interface which is used to integrate the device into a standard network. This makes it possible for the operators of the LM-S to access data for ongoing monitoring.

If a mobile phone network is available, communication is possible regardless of the existing network structure. The operator can configure the system via an internal web server and call up the data. This means the system can be accessed remotely at any time, even using a smartphone. Furthermore, a switching relay with an accessible remote contact is integrated into the analyzer. This N/C contact issues a short pulse at each event, which a counter evaluates. This means the number of lightning strikes can also be recorded.

The relay contact only assumes its normal position once the system is started up. In the event of a system malfunction, the relay drops out. As such, system availability is queried via the remote contact. When the signal is connected to a controller, the planners can determine a follow-up reaction in the event of a lightning strike.
Combining art and engineering
Electroland lights up public art with interactive displays

A 30-foot-tall bouquet of stainless steel flowers in a vase is the centerpiece of MacArthur Square, a public park in Norfolk, Virginia. This publicly commissioned work is more than just static artwork for passersby to admire. As visitors approach, each flower comes with a personality manifested through light and sound. At set intervals, all of the flowers erupt in a chorus of light and sound. The interactive display was designed, fabricated and installed by Electroland (www.electroland.net), a California-based company that creates interactive experiences and large-scale public art projects.

Each Electroland project is site-specific and designed with the space in mind. Each combines light, sound, images, motion, architecture and interactivity. Owners Damon Seeley and Cameron McNall co-founded Electroland in 2002. For many years the team used different technologies from the Broadway and Las Vegas show control world, as well as a few “do it yourself” lighting techniques. Because these technologies often weren’t designed for permanent outdoor settings, however, Electroland encountered issues with performance and reliability.

A few years ago, Electroland sought ways to improve the robustness and reliability of its control technology. The company turned to the world of industrial automation and found Phoenix Contact. Although the world of interactive art is not a typical one for Phoenix Contact, the concept of reliable, robust solutions is a familiar one.

Denver Airport helps passengers ‘Relax’
Flying can be a draining experience, so when the Denver Airport commissioned an Electroland project, it envisioned something to help travelers reduce stress. In 2013, Electroland debuted an installation called Relax in the Denver Airport.

Relax is a 1,300-square-foot display comprising five illuminated panels, each displaying a themed episode. Each of the five themes speaks to the experience of being in an airport. One of the panels pulses the word “RELAX” as passengers walk by. Other panels display a tropical beach scene with undulating water and a bay, while another cycles the words “Arrival” and “Departure” set against images of clouds.

To achieve Relax in the Denver Airport, Electroland turned once again to Phoenix Contact products. Inline controllers and relays control the lights of the display, and terminal blocks provide reliable connections. A bus coupler chooses which of 48 relays is lit to achieve the desired lighting effect.
Electroland also used PC Worx Express to generate the lighting program. Although Electroland employees had no prior PLC programming experience, they took on the challenge of learning PC Worx, an IEC 61131 programming software. Phoenix Contact sales and technical service personnel helped Electroland employees learn the software to incorporate into these installations.

**Blooming in Norfolk**

Electroland was commissioned to design and build an interactive sculpture to serve as the centerpiece sculpture in MacArthur Square – a lively location in downtown Norfolk, Virginia. This installation, called MetalMatisse, was unveiled in May 2013. The improbably large steel vase and flowers sculpture, which stands at 30 feet tall, is an interactive adaptation based on paintings by French artist Henri Matisse. The individual flowers within the vase light up and emit sound when visitors approach. Intermittently, the entire sculpture comes to life in a carefully orchestrated composition of light and sound.

To achieve the interactive sculpture that sits in downtown Norfolk, Electroland again enlisted the support of Phoenix Contact. MetalMatisse uses a Phoenix Contact bus coupler to process the data that is received via custom sensors present in each of the flower elements. These sensors allow the sculpture to interact with visitors. The installation also uses an IP20 bus coupler inside an IP67 enclosure, a custom translator for sensing and lighting data, managed Ethernet switches to route data to a Power over Ethernet midspan device, gigabit switches, terminal blocks for power bussing, a WiFi access point radio and a 3G router modem for troubleshooting. The entire system is run on Phoenix Contact’s Valueline industrial PC, using Electroland’s custom stack of Java software.

Using the 3G router modem, Electroland employees are able to remotely access and observe the performance of the sculpture from their offices in California. Although they have not encountered any issues with the installation, an employee in California is able to log in and perform resets on parts of the sculpture or the sculpture in its entirety, if necessary. The connection is fast enough to screen-share in real time on the Valueline, so that imagery rendered on screen in California is identical to what is going on in Virginia.

Seeley likened the process of creating a new piece of interactive art to creating a new musical instrument: “It has never been played before, so we don’t know exactly how it will sound. While there are expectations and criteria so we have some idea, until it’s built, we don’t actually know.”

With the help of Phoenix Contact products, Electroland is able to make unforeseen changes to its installations while achieving the reliability that the company is known for. According to Seeley, Phoenix Contact products are vital to the operations and longevity of the installations: “In the world we operate in, there often isn’t a good reputation for permanent technology-driven artwork.”

Electroland has worked to establish a reputation of reliability, and Phoenix Contact is helping it keep the lights on.

Using a Phoenix Contact 3G router modem, Electroland employees are able to remotely access and observe the performance of the sculpture from their offices in California. (Photos courtesy of Electroland)
The LED lighting controller in the dragon caves in Syrau, Germany, provides new ways of putting the rock formations in center stage, saves a great deal of energy, and helps to guide visitors safely back out in the event of a malfunction. Technology from Phoenix Contact guarantees reliable and efficient operation.

Presenting the dragon in the best light
New lighting system for show caves is controlled by technology from Phoenix Contact

It all began with a mishap... On March 14, 1928, Ludwig Undeutsch, a master quarry worker, lost his boring tool in a crevice as he prepared a blast hole in the limestone quarry in Syrau, Saxony. Aiming to recover the expensive tool, his son descended the crevice and, 15 meters down, discovered a cave with striking sinter formations.

The municipality immediately recognized an opportunity to make use of these caves for the newly emerging tourist trade in the Vogtland region of Saxony. Just a few months later, the cave was opened up to an amazed public and since then has drawn in visitors as the only show cave in Saxony.

Today around 40,000 people a year clamber down the 81 steps to see the bizarre calcareous formations and to gaze with wonder at the underground lake with its crystal-clear water. In the 40-minute tours, the visitors are amazed by the 1,100-foot-long obstacle course of sinter formations, the most spectacular of which have been given nicknames, such as “elephant’s ear” or “curtains.” Children listen eagerly to the legend of the man-eating dragon Justus, after whom the cave is named.
The switch to LED illumination has brought benefits

The right lighting is crucial when it comes to showcasing the dramatic effect of the caves and ensuring that visitors can move around safely at all times. To make sure current requirements were met, both in terms of saving energy and the safety of visitors, and to benefit from new lighting technology, the lighting system was converted to the new LED technology over a ten-week transitional phase between December 2013 and February 2014.

“We use lighting for floor paths as well as spotlights for special details,” explains Heidrun Bauer, who is in charge of Drachenhöhle und Windmühle (dragon caves and windmills), an independent municipal company of the Syrau municipality. “This creates a new ambience.”

Cave lighting requires specialists

The installation of 200 LED lamps under the instruction of the site manager, Michael Brust, provided effective staging for many details and, at the same time, reduced energy consumption by up to approximately 90 percent. The ambient conditions made such an installation challenging, as the cave’s temperature is between 48 and 51 degrees Fahrenheit year-round, with 100 percent humidity.

The employees from the company GermTec, based in the German town of Herborn, are experts in lighting installations of this type. As speleologists, they were never satisfied with the lighting in such underground show worlds, and in 2005 they set up their own company and went on to install the first lighting system for a cave in 2008. “That system has been running flawlessly for the last six years,” proudly explains Alexander Chrapko, the executive vice president of the German company and head of cave lighting.

In the meantime, GermTec has become the market leader when it comes to lighting solutions for caves. “To date, we have installed lighting for 48 show caves. Back in 2010, we completed a project in Georgia using solutions from Phoenix Contact,” says Chrapko. There, Quint Power power supplies including UPS modules were mainly used. In a cave in Switzerland in 2011/2012, a full FO network was established with components from Phoenix Contact. Inline controllers and network switches were also used. The lighting system in the Syrau dragon cave was planned in collaboration with the HESA engineering firm from Sondershausen, Germany.

This company also has a great deal of experience with controllers, power supplies, relays, and surge protection from Phoenix Contact. “Above all, we needed a solution that enabled the operator to switch the path lighting...
on and off easily, section by section,” says Matthias Kircheis, the head planner at HESA. They opted for solenoid switches that are easy to operate and resistant to climatic conditions. The switching signals are processed by ILC 151 ETH controllers.

In total, 80 digital signals were linked into the control program. The controllers communicate with one another via Modbus/TCP. The LED lights are dimmed using pulse width modulation.

Safety at every turn

Visitor safety is also important. For example, emergency lighting must be provided to ensure that visitors can safely leave the cave in the event of a malfunction, including a power failure. The ILC controller programmed with PC Worx also controls this function.

The controller features Ethernet interfaces and can be networked. In addition, the system uses FL Switch LM 4TX/2FX Lean Managed Switches, which are each equipped with four RJ45 and two FX ports. The ring structure of the FO network minimizes the risk of failure. Matthias Kircheis highlights yet another advantage: “The network-based solution provides us with the option of extending it at some point in the future.”

At the ticket office, a WP06T touch panel informs staff about the operating status of the safety lighting and issues a warning in the event of a failure of the lighting circuit. Once the tours have been completed, the cave lighting can be switched off at a central point. The safety lighting is blocked using a key switch, which prevents the batteries from discharging if there is a voltage failure overnight.

In the meantime, HESA and GermTec have continued to collaborate in the technical setup of other caves. Their expertise was in demand when it came to renewing the lighting in the “Erdmannshöhle,” another stalactite cave in Hasel, Germany, as well as the “Lurgrotte” cave in Semriach, Austria, where they once again turned to solutions from Phoenix Contact. ■

Ulf Krüger/Christoph Manegold

www.phoenixcontact.com/control
Redundant power supply concepts

Important contribution to uptime

Today's machines and systems require a high degree of reliability. Less downtime results in higher profits, and control cabinets that operate continuously are a key to keeping factories efficient. For this reason, many engineers are implementing redundant power supply concepts combined with redundancy modules.

Power supplies are configured redundantly anywhere that downtimes would have a negative impact. For example, for a device with a rated current of 5 A, the power supply system would consist of two power supplies, each with 5 A on the output side, connected in parallel.

If one of the power supply units develops an internal fault or if the primary power supply fails, the second unit automatically takes over and supplies the load current. This means that the power supplies must be dimensioned so that one power supply unit can cover the complete power demand of the connected devices in all operating states.

Faults can come from many sources, so be sure to consider all potential sources. Please see the link at the end of this article for a list of common failure causes and suitable solutions.

Monitoring the load current

Combining load current monitoring with an alert provides advantages. If a user connects additional loads to a redundant power supply when expanding the system, the system redundancy will be defeated.

By monitoring the load current, the system operator is immediately aware of the loss of redundancy. To facilitate this, Phoenix Contact's redundancy modules have an “ORing” function, which can inform users of a loss of redundancy due to load current draw.

Service life doubled

Configuring output voltages unevenly results in asymmetries. Often, only one power supply unit feeds the load while the other device remains idle. This places thermal stress on the power supply, which will reduce its electrical lifetime. Operating both power supply units at half the rated power will decrease their temperature by around 10 degrees Celsius, which will significantly increase service life.

Based on this principle, a technology that automatically balances the power supplies can ensure that both power supplies share the load current evenly – doubling the service life of the redundant power supplies. ORing redundancy modules monitor the complete redundant solution – extending from the output voltages of the power supplies through the wiring and the decoupling section up to the load current. In addition, the “Redundancy OK” and “ACB OK” indicators and the LED lights give the operator quick insight into whether the redundancy modules are working.

Anja Moldehn/Mike Garrick

For full technical details, read the full version of this white paper at http://rd.phoenixcon.com/aspapps/GWIS/splashproc/mediaDLs/238/Redundant_power_supply_concepts_final.pdf
LEDs continue to show their dominance in the marketplace. At every turn, LEDs can be found in almost any lighting form factor. LEDs allow designers flexibility when it comes to designing light and fixtures while also having the ability to create numerous colors and designs.

The real value of LEDs is the lower power consumption and the long-lasting life of the light. Therefore, the connector we place on the fixture must be able to outlast the life of the luminaire itself. This is a challenge, because the connections must be flexible and withstand vibration, ambient temperature, humidity, and mechanical security to the board.

Rigid or solid-core boards

The most common type of lighting in a building is the light above your head, known as downlighting, which casts illumination to objects below. It is typically integrated into a flat ceiling, so a rigid or solid-core board works perfectly here because it can only allow for processing on the top of the PCB. Another advantage of rigid boards is their ability to drive heat away from the LEDs, which is the biggest killer of LED life.

Solid boards make great sense for LEDs, but when it comes to connecting power, there are challenges. The first option is to directly solder wire to the PCB. The challenge can be that due to the small size of the fixtures, the soldering pads on the PCB may be too close together, resulting in the wires being too short from one position to the next. There is also a concern about vibration and its effects on the solder joint. A crack in the solder joint could lead to excess resistance and cause the device to fail, or in a worst case scenario, cause a fire. Soldering wires to the board also means eliminating the chance to repair it later.

Traditionally, connectors have been through-hole components, with a wave solder process used to secure the connectors to the board. But, with the proliferation of solid boards in lighting, these through-hole connectors can no longer be used. The connector is now required to be mounted and soldered to the top side of the board through surface-mount technology (SMT).

One good way to prevent the product from delaminating from the board is to utilize anchors on the side of the connector. Anchors supply no electrical contact, and ensure the connectors are secure while taking stress off the electrically necessary solder joints.

Connecting LEDs

The connection counts

LEDs have many benefits for designers, including flexibility and the ability to create many colors and designs.
**Connector options for rigid boards**

The next step is to decide what style of connection is needed. There are two main styles of connectors: fixed and pluggable. A fixed connector is a single-piece connector that solders to the board and accepts the wire all in one block. The wiring on the PCB is easy to access because most fixed connectors are available for wire entry that is horizontal, angled, or vertical to the PCB.

Pluggable connectors are great when troubleshooting boards, swapping modules, or dealing with a difficult-to-access wiring interface. With pluggable connections, there are two pieces: a plug connected to the wire, and a header soldered to the PCB. The header (board-mount side) can be mounted to the PCB horizontally or vertically. A few manufacturers have a through-board design that allows the plug to connect on the bottom side of the board, moving the connector mass below the PCB and away from the LEDs.

Some manufacturers also allow the same connector family to do board-to-board connections. When LED modules are to be stacked end to end, you can do it securely with a connector on each board, and slide the modules together by using an “inverted” header (header with plug mating interface) with a standard header, which allows you to slide the connectors into each other without the need to wire the boards together.

**Flex boards**

Flex boards allow lighting to wrap around almost anything. Many consumers use these in their homes because of the simplicity: Buy a kit, unwind the reel of LEDs, peel the adhesive off the back of the strip, stick the strip wherever you want, and plug the strip into an outlet.

The challenge with these strips is also their beauty: flexibility. The flexible nature makes it difficult to find a connector that will do the job consistently. Directly soldering a wire is an option, but if any flex happens at this solder joint, it can crack and create significant resistance on the electrical connection. There are a number of connectors available on the market that make this process a little better by making connection with the solder pads and not using the solder. While connectors can be a great option, the flexibility can create some challenges. Many of the connectors secure to the board with a pressure fit to the flex strip, which may not be enough to secure the connector to the board if the flex strip has any movement. So, for added insurance of a secure connection, there are connectors that have a locking pin that pierces through the flexible PCB.

**What’s next for LEDs and connectors?**

The LED lighting industry is moving at a fast and furious pace. Connector manufacturers have to evolve with the market as well to keep up with the incredibly high pace of technological advancements.

As buildings and facilities continue their trend of getting smarter and more connected, will we see a need for more data connections to every light? As renewable energies continue their proliferation at business sites, will we begin to see a DC electrical system in the ceiling put in place for lighting? As LED lighting continues to evolve, will we ever get away from the Edison light bulb concept?

Some of these trends may be coming soon, and some might be further off in the distance. One thing we do know is that LED lighting technology is constantly evolving. 

Andrew Bogaczyk, Phoenix Contact USA
www.phoenixcontact.com/lighting
Reliable, safe access

Access control and remote maintenance of door systems

Automatic door systems from Dorma are leading the way worldwide, thanks to their design and innovative technology. Controllers and components for remote communication from Phoenix Contact ensure reliable access control and make fast troubleshooting possible.

Dorma Holding GmbH & Co. KGaA provides modern door systems for hotels, office buildings, airports, and shopping malls around the world. In addition, the family company provides a wide range of automated doors in which Phoenix Contact components are used.

Dorma’s entry areas are elegantly designed, acting as the “business card” of the building. The good first impression is an important feature, but a safe and secure entrance must also be ensured. For this reason, Dorma equips the KTV Secure automatic systems for access control with a system that reads a card, keypad or fingerprint to authorize access. If the employee or visitor is permitted to enter, then a pulse allows access. Once the person has gone through the door, the system blocks access once again, until there is another pulse.

Inline ILC 1 xx small-scale controllers from Phoenix Contact are at the heart of the KTV Secure revolving doors with access control systems. The devices have all relevant functions and interfaces required for smooth motion sequences as well as a high level of reliability.

Secure data transmission via mobile phone network and Internet

Constant monitoring of each individual automatic door is not necessary. For this reason, Dorma equips its service technicians with a mobile remote maintenance box, which can be quickly installed if necessary. The box, which contains a mobile router, can be easily
coupled to the Inline ILC 1xx small-scale controllers on site via Ethernet connections. If the technician cannot correct the error, a service expert accesses the small-scale controller via an encrypted VPN connection from the headquarters in Ennepetal, North Rhine-Westphalia, Germany. The Inline controller has an internal web server that enables cost-effective visualization. The easy-to-use WebVisit software, stored on the Inline ILC 1xx, creates this easy-to-use visualization.

**Seamless communication right through to the headquarters**

In the door systems, the Inline ILC 1xx small-scale controllers act as a central link between the sensors and the drive components. The PLC has the flexibility to extend the standard and function modules of the Inline automation blocks, so that Dorma can precisely adapt to every single demand of the application at hand. The controllers, which are programmed with the intuitive, easy-to-use PC Worx Express software, also support all relevant automation and IT protocols. This guarantees consistent data transmission from the sensor to the Dorma headquarters in North Rhine-Westphalia. The integrated web server makes it possible to create individual web pages using the WebVisit software, which are then loaded onto the controller.

In this way, Dorma can then operate and monitor door systems remotely using standard web browsers. Using the built-in FTP server (File Transfer Protocol), for example, data can be transferred via the network to the controller or logged application data can be read in.

**Uniform programming environment for all types of controllers**

All Phoenix Contact controllers are programmed according to IEC 61131-3 using the PC Worx engineering tool. The software works with the following programming languages: structured text, function block diagram, ladder diagram, instruction list and sequential function chart. PC Worx features an easy-to-learn workflow, which helps the user to get started with the programming environment. This means that users are working productively in no time at all.

The free PC Worx Express version is available for small to medium applications; it was specially developed for the ILC 1xx small-scale controllers. Its reduced level of complexity makes program creation even more intuitive. Another special feature of Phoenix Contact’s control technology is the consistent migration of all controller classes in one engineering system. This means that all devices, from the small-scale controller to high-end PLCs, can be programmed in the same way using PC Worx. At busy times, this is particularly important. If changes to application conditions require a more powerful controller, the user now only needs to change the PLC; the workflow and the programming remain the same. This increases efficiency, right from the creation of the program.

Andreas H. Schmidt

[www.phoenixcontact.com/control](http://www.phoenixcontact.com/control)
In building automation, installation devices are standardized according to DIN 43880. This standard specifies the installation dimensions of the housing and the dimensions of the components which are built into the distribution cabinets for the installation. Device manufacturers depend on electronics housings with these standard dimensions.

Building automation consists of monitoring, control, and regulation in buildings. This includes sub-areas such as roller blind and awning controls, building services management, access control systems or lighting controllers. Instead of using single-device solutions, the individual sub-tasks are separated into individual devices. To this end, a flexible overall solution plays an important role – and part of this is the design of the housing system.

Using DIN rail connectors can simplify communication between the modules. The cross connection of the individual modules saves space on the DIN rail. Without additional wiring, the individual modules are inserted into the cross connector. All modules can be independently removed from the system and then later reconnected. This saves time when it comes to installation and maintenance and prevents errors during wiring. If extension modules are needed later on, it is quick and convenient to add them.

The 16-position connectors are ideal for transmitting bus and control signals as well as for energy supply. Parallel and series contacts enable the setup of parallel and series connections to be used for the most varied of protocols.

Even more flexible, thanks to BC modular

The new BC 161.6 modular upper housing part enables the printed-circuit board surface to be tailored even more to individual needs and simplifies installation of PCB connection technology. An innovative tool concept makes it possible to position the side panels of the housing in different ways. This means that three side panel layouts can be selected in segments. If the panel is positioned flush with the outer edge of the lower housing part, the maximum surface of the printed-circuit board can be used in the interior space, for mounting with components. However, if the side panel is at its innermost position, it offers lots of installation space for connection technology such as double-level PCB terminal blocks or RJ45 sockets. The middle position of the side panel integrates both functionalities: connection technology externally and surfaces for mounting the printed-circuit boards internally.

Marta Ciesielski
www.phoenixcontact.com/bchousing
Compact connectors for flexible LED strips

The PTF flex-strip connector now has a compact and high-performance new design, making it even easier to connect 8-mm and 10-mm wide flexible LED strips. Slide the card edge of the LED strip into the PTF connector and simply squeeze the connector onto the cut LED strip. Once the connector has been pressed down, a gripping mechanism secures the connector and the flexible LED board.

www.phoenixcontact.com/lighting

Cut, strip, twist, and crimp wires with a single tool

Phoenix Contact’s newest addition to the TOOL fox product line offers an all-in-one solution for cutting, stripping, twisting, and crimping. The Crimpfox 4-in-1 crimping pliers are a multifunctional tool for processing conductors and ferrules from 20-14 AWG, with minimal adjustment required. This tool will save you time and money.

www.phoenixcontact.com/handtools

Easy retrofitting of current measuring technology

Phoenix Contact now offers a Rogowski coil solution to easily retrofit current-measuring applications up to 4000 A. The PACT RCP current transformer (CT) is an alternative to split-core current transformers and other CT technologies.

The Rogowski coil is a flexible, rope-styled CT. Because it is designed as a loop, the Rogowski coil can be separated easily for quick installation on an existing busbar or wire.

www.phoenixcontact.com/rogowski

Touch-panel HMI for a wide range of applications

With the introduction of the TP 3000 series, Phoenix Contact now offers more flexibility in its human machine interface (HMI) operator panel product offering. Screen sizes range from 5.7 to 15 inches, with certain panels available in a 16:9 aspect-ratio wide screen.

The TP 3000 series employs a rugged, all-metal housing with a fanless design that consumes less energy and produces less heat. The free VISU+ EXPRESS programming software provides easy programming and features trending, alarming, logging, and recipe handling.

www.phoenixcontact.com/HMI
Go ahead, DIY
Build your own expandable I/O platform with ME-IO housings

Modular ME-IO housings from Phoenix Contact empower you to maximize your I/O density. Prove it to yourself with our free ME-IO Development Kit. Our simple-to-use, off-the-shelf housing product, with convenient front-wiring connections and a scalable design, enables you to create your own control platform.

ME-IO housings:
- Up to 36 I/O connection points
- A slim 19-mm profile
- Scalable
- Built-in backplane communication

DIY I/O!
Request a free ME-IO Development Kit. Call 1-800-322-3225 or visit: www.phoenixcontact.com/systemhousings