Impulse Issue 31

impulse

Murrelektronik Customer Magazine

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EDITORIAL

Dear Customer,

We supply a complete system of high-quality, modular components for your automation needs and work with you to develop clever and effective installation solutions. Our diverse and global customers are a constant source of inspiration for us. Their needs give rise to new system solutions, products, and automation components.

Our goal is to bring added value to your application, machine or product because we are only satisfied when you are. We have always worked with customers and managed our product development program according to the principle of maximum customer benefit.

The trend is heading in the direction of system solutions, complete packages, and full-service system support. We live up to these market developments by not only rounding out our portfolio but also by integrating our products together. This is possible thanks to our highly qualified and motivated employees, who always bring out the best of our products. The end result for you is a complete, scalable package from Murrelektronik that has been fully adapted to your situation for maximum customer benefit.

Come to our trade show booth at SPS IPC Drives and see our decentralized and affordable IP67 solutions for yourself: from power supplies with integrated load circuit protection to ultracompact managed switches and modular field bus modules with IO-Link and safety interfaces. With everything ready for quick connection and setup, of course!

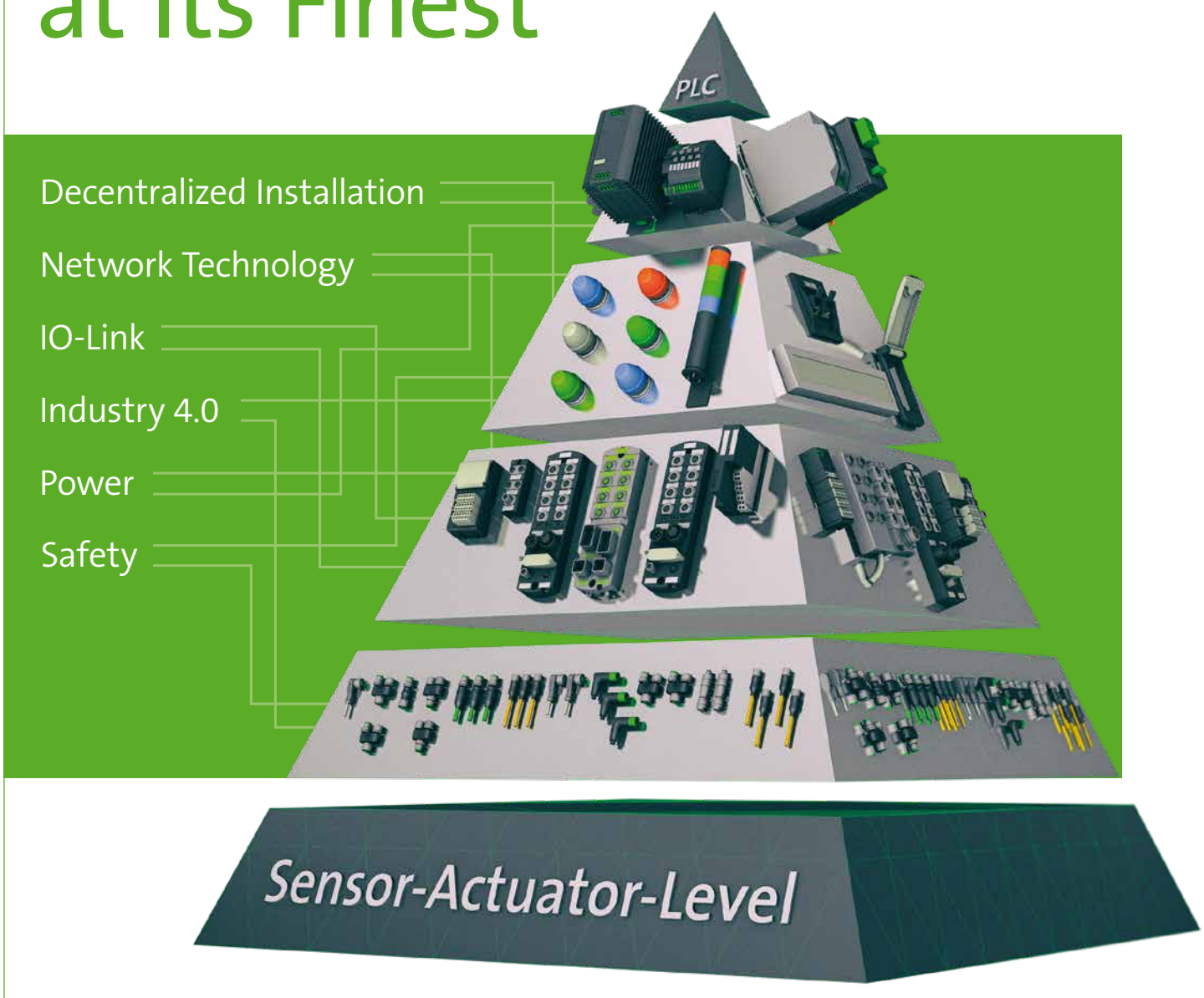
Murrelektronik – we are the specialists in decentralized automation technology.

Stay connected!

Frank Eckert
CSO/CFO

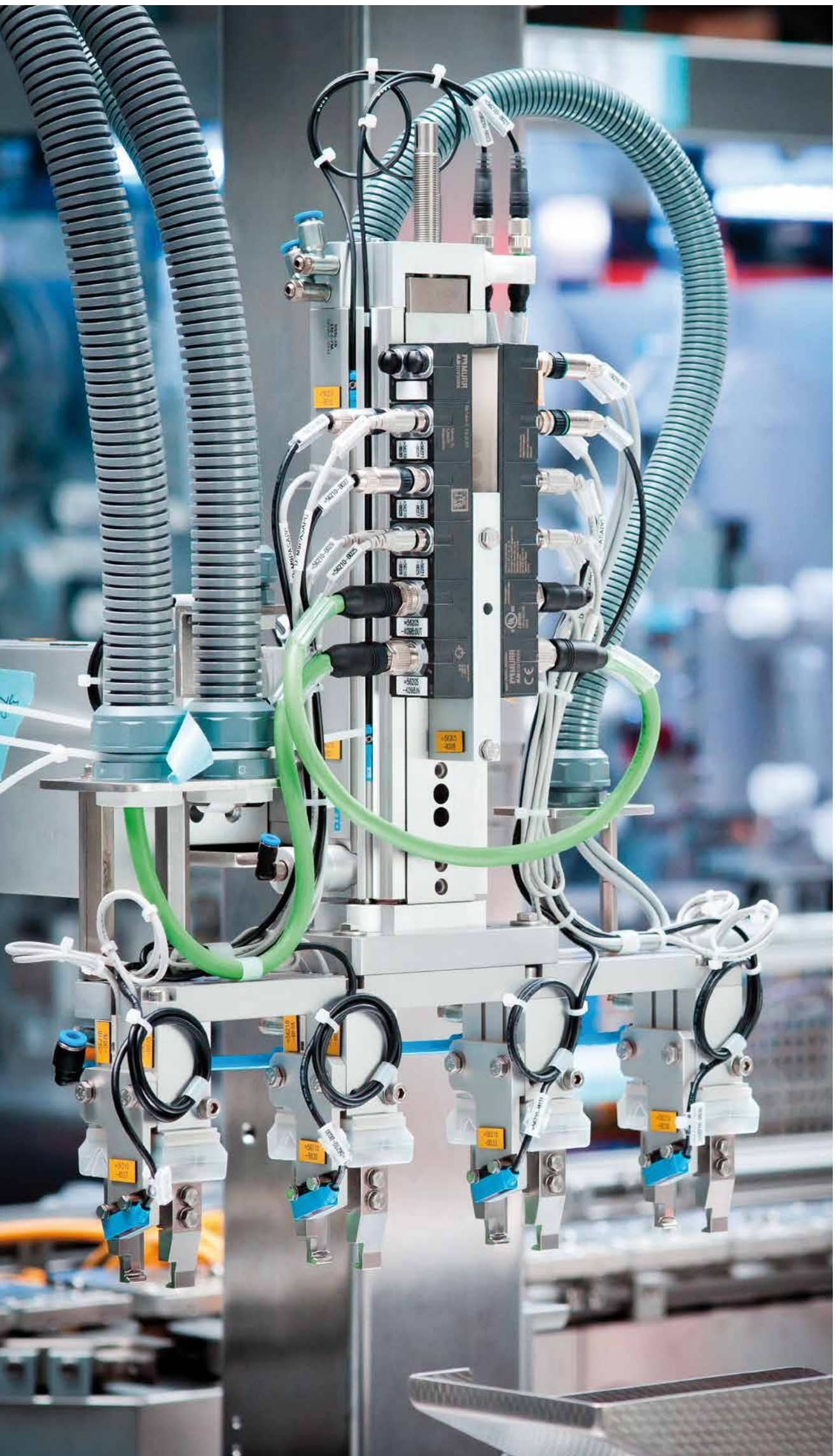
COVER STORY

Decentralization at Its Finest



DECENTRALIZATION AT ITS FINEST

The Murrelektronik Cube67 system advances the trend toward greater flexibility and modularity



Greater flexibility and modularity are major trends in machine and plant engineering. It is increasingly common for standard machines and optional additional units to be manufactured as separate mechanical and electronic units that are joined together only shortly before commissioning the full system. The installation hardware must live up to the modularity of the machine. The Murrelektronik Cube67 field bus system is exactly the right solution. With the combination of a Cube67 Diagnostics Gateway and the straightforward integration of IO-Link, Cube67 paves the way toward decentralization and digitalization in the cloud using OPC UA.

The Murrelektronik Cube67 system advances the trend toward flexibility and is designed for modularity – including even the finest details. Already used in well over 100,000 machines and plants in diverse industries and applications worldwide, the system can boast an impressively large number of different products.

Many of these are equipped with multifunctional ports that can be configured as inputs or outputs, enabling flexible installation concepts that are customized for number of IOs at the sensor/actuator level in order to meet the customer's precise needs. This cost-efficient solution leaves practically no port unused to achieve decentralization at its finest.

One major advantages of the Cube system is the "one cable strategy:" both communication and power are carried over just one system cable. This leaves cable channels and energy chains available meaning that they can be designed smaller from the start, or even eliminated entirely. The six-pole M12 connector also eliminates the possibility of wiring errors.

Up to 32 modules can be connected to each bus node, using four lines within an installation radius of 60 m, making the Cube system perfectly suited for even extensive installations. The lines are protected by integrated electronic fuses (MICO), the proven Murrelektronik current monitoring system. This saves space in the control cabinet by removing the need for circuit breakers.

A complete portfolio of modules ranging from protection level IP20 to IP67 and even IP69K is available for installations. Meanwhile, the communication only ever runs through a single bus node, which can also be swapped out depending on the protocol in use. As a result, it is also possible to "change the protocol without changing the system." In other words, an identical installation concept (Profibus, ProfiNet, Ethernet/IP, EtherCAT) can be designed for different protocols by simply choosing the appropriate bus node. The streamlining potential of this concept is unbelievable.

The one cable system (green cordset) carries communication data and supply voltages

With the Cube67 field bus system, no port goes unused

The network topology and any errors are clearly visualized in a user-friendly, multilingual web interface

Machine option management – one concept for all versions

To prevent difficulties when getting different machine modules to work together, the Cube system offers machine option management (MOM). The related hardware and software planning is carried out virtually based on a standardized full configuration. The components actually present in the real machine are activated automatically, making configuration for all the different parts of the machine a breeze. This simplification streamlines everything for the user. Optional add-ons can be configured easily with the press of a button. No need for time-consuming software modifications.

Direct integration of safety signals

The idea of streamlined machine installations poses a particular challenge when it comes to integrating safety aspects. The Cube system offers an extremely appealing solution to this problem: combining Cube67 K3 modules with the MVK Metal Safety block module is an affordable way to duplicate safety outputs.

The safety outputs of the MVK Metal Safety module will securely switch off up to 12 standard outputs, controlled by a ProfiNet/PROFIsafe control system (K3 functionality). They are divided between two safety circuits, each with three ports suitable for double connections. This multiplication of the safety outputs is a simple but effective way to reduce both costs and labor. Safety sensors are integrated directly into the installation concept with this approach, and eliminating the need for a safety relay significantly reduces the wiring workload while saving considerable space in the rack cabinet.

Highly detailed diagnosis of the entire installation

One of the core advantages of the Cube system is its impressive range of informative diagnostic capabilities, which extend from the bus node across the entire installation down to the individual modules and channels. The extensive information saves time during commissioning and is of particular advantage during troubleshooting taking into consideration the immense costs that can result from even short downtimes.

Cube offers easily identifiable diagnostics with red LEDs that show maintenance at a glance which port is affected by an error. This diagnostic functionality can be used in detail via programming on the relevant control system.

The Cube67 Diagnostics Gateway certainly offers a more efficient, time-saving, and highly integrated method of diagnosis as it allows troubleshooting without any programming at all. The module is unique in the market and is suitable for both new and existing installations.

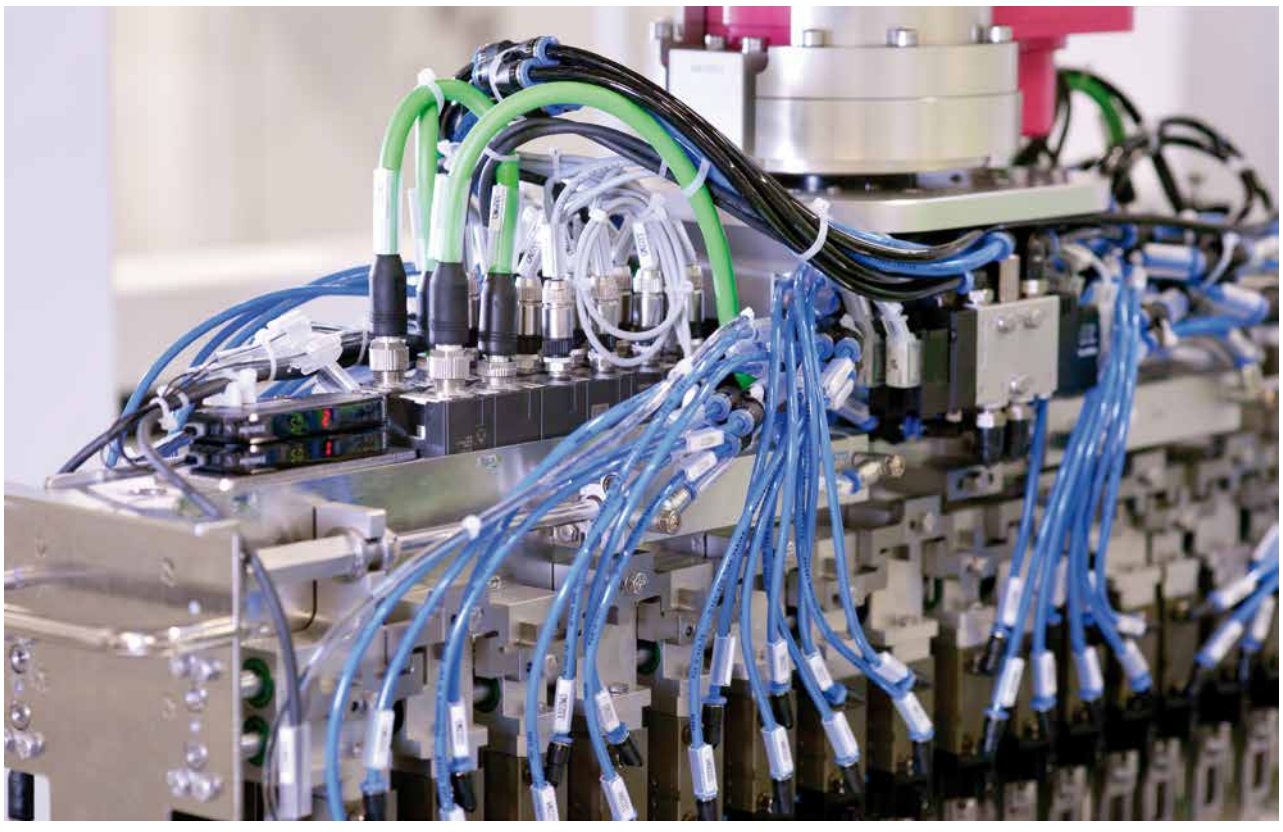
The Cube67 Diagnostics Gateway precisely evaluates all signals and diagnostic messages from the entire installation, independently of the control system. The network topology and any errors that arise are clearly visualized in a user-friendly, multilingual web interface.

The data is also available over a standard OPC UA interface for further analysis in any cloud system. This all takes place entirely independently of the control system, making it an integral aspect of the installation that need not be changed even if the control system is changed.

52 smart IO-Link devices in a single node

Thanks to specially designed modules, Cube67 is also excellently suited for the integration of smart IO-Link sensors. Up to 52 IO-Link devices can be connected to a single node – an impressive number compared to the competition! Murrelektronik makes installation even easier with a wide selection of accessories for IO-Link integration, including analog/IO-Link converters, inductive couplers, and hubs.

Sensors and actuators can be connected with the shortest possible cables



Anyone looking to realize flexible and modular installation concepts and increase the modularity of existing machines and systems will find the Cube67 to be a versatile and powerful solution. The system opens the door to Industry 4.0, but not only for new installations. The Cube67 Diagnostics Gateway also makes it possible to optimally upgrade existing solutions with new standards.

SUCCESSFUL RETROFIT WITH MVK METAL

Electrical designers at Alfred Ritter GmbH use the relocation of a plant to thoroughly refurbish the electrical system

Chocolates from Ritter Sport are enjoyed all over the world. Their square shape is an unmistakable trademark. Every child knows: Quality. Chocolate. Squared. is Ritter Sport's slogan. One popular best-seller is the rum bar made with real Jamaican rum. Recently, the system that produces crispy bars was retrofitted and field bus modules from Murrelektronik are now used for the communication.

Alfred Ritter GmbH & Co. KG has its headquarters in Waldenbuch, a town located south of Stuttgart. The company uses sustainable energy production and has constructed a new building with a modern co-generation plant. This required the relocation of the existing plant that produces the popular Ritter Sport Rum chocolate bars.

The electrical construction team led by Peter Schetter saw this as an opportunity. "We decided to use this opportunity to thoroughly refurbish the mechanics and control systems of the plant," says the construction manager. The focus was on safety. For the Ritter Sport electrical designers, it was clear "that the solution should not only comply with the standards in every respect, but also should achieve a maximum cost-benefit effect."

The chocolate bar production plant extends over three floors. The processes are precisely coordinated and everything is intermeshed. First, the components are mixed to form a basic mass. After this, pieces of wafers and California raisins, which have been previously soaked in genuine Jamaican rum for more than 20 hours, are added. In the next step, the bars are shaped, covered with delicious whole milk chocolate and – right at the end of the process – they are packed in the distinctive blue wrappers.

Peter Schetter from Alfred Ritter GmbH & Co. KG talking to Nancy Locher from Murrelektronik

While the many sensors and actuators of the individual plant components were connected with point-to-point wiring at their previous location, the extensive installation has now been retrofitted with MVK series field bus modules from Murrelektronik. These consist of a robust die-cast zinc housing with a coated surface, and the fully molded housing makes them ideal for use in harsh industrial environments.

"With a plant which extends over three floors, the field bus solution saves a considerable amount of wiring," says Peter Schetter. The field bus modules are installed in the immediate vicinity of the processes and from there, the sensors and actuators are connected with very short cables. If a cable wears out, it can be replaced quickly. In the MVK Metal field bus module, all channels are individually monitored for errors such as overload, short circuits or cable breaks. If an error occurs, this is indicated by an LED at the relevant port. In addition, a message is sent to the control unit. "We utilize these diagnostic facilities to the fullest extent," says Peter Schetter. Errors are quickly detected and can be quickly remedied, which prevents downtimes. The head of the electrical design department explains why a high availability of the plant is economically important: "We produce just-in-time without large inventories, so as to be as fresh as possible in the shops." Moreover, in the sensitive food industry, even a small problem can add up to a time-consuming failure if the plant has to be thoroughly cleaned before restarting operation.

M12 cables from Murrelektronik that were preassembled on one side are used in many places throughout the installation. At many of the ports, the Ritter Sport electrical designers use T-couplers in order to be able to use both channels for transferring signals, so that more sensors and actuators can be connected to each module. The cables are tightened with a torque wrench from Murrelektronik: "With this, we can easily access the hexagonal nuts, even when there's not a lot of space to work on the module," says Peter Schetter. The correct torque is important because machines undergo heavy vibrations, and connections may come loose if not tightened accurately.

Highest safety standards with MVK Metal Safety

Industrial safety is also highly relevant in the Ritter Sport Rum bars production plant. Because of this, there are protective devices in all areas of the plant to ensure the safety of humans and machines. For example, the agitator cannot start unless the covers are closed. For the first time, the Ritter electrical designers have installed safety-relevant sensors and actuators. To accomplish this, they have integrated the MVK Metal Safety field bus module from Murrelektronik into the plant, which enables safety-relevant data to be transferred directly via PROFIsafe, a safety-specific extension of PROFINET. This eliminated the need for passive wiring in the control cabinet and still met the very highest safety standards (SIL3 and PLe).

Solid67

CHANGE THE PROTOCOL IN THE BLINK OF AN EYE

SOLID67 is the new Murrelektronik line of compact I/O modules. They simplify installations in the field and are especially attractive for applications with IO-Link sensors and actuators. The modules provide eight IO-Link ports close to the process itself and can easily incorporate classic IOs into the system as well.

Thanks to the fully encapsulated metal housing, and impressive vibration and shock resistance (15 and 5 G), the modules are ready to be used in rough industrial environments, even in temperature ranges from -20 to +70 degrees Celsius. This paves the way for numerous applications. The extensive diagnostic functions, available via the control system or an integrated web server, make trouble-shooting a simple matter.

IO-Link EtherNet/IP PROFINET

Simplified inventory management

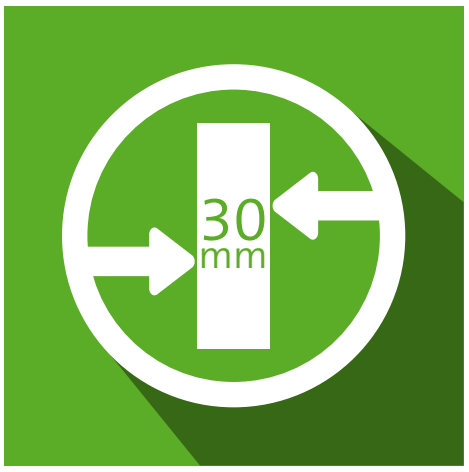
The SOLID67 modules are compatible with multiple protocols: they support ProfiNet and Ethernet/IP. You only have to flip a switch directly on the module to select the protocol. **This reduces the number of versions needed, meaning that fewer modules need to be kept in stock.**

Using all ports

The ports (pin 4) of the IO-Link master modules are multifunctional and can be used for IO-Link sensors and actuators or to be parameterized as classic inputs or outputs. **Signals of all kinds can be read with just a single module.**

Shorter installation times

The compact M12 cordsets (L-coded) can withstand especially high current loads of up to 16 A. Daisy chains of multiple modules can be assembled to supply power where needed. **This simplifies the installation work and shortens the cord-set lengths.** PI, the user organization for Profibus and ProfiNet, has set the L-coded M12 as the future standard for power connectors.



Minimizing space requirements

With a unit width of only 30 millimeters, the thin IO-Link versions of SOLID67 are ideal for installations with limited available space. Modules can be installed extremely close to the process, and sensors and actuators can be **connected with the shortest cordsets possible.**

Modlight Illumix

DAYLIGHT QUALITY LIGHTING

In the field: All Modlight Illumix lamps can be used with Murrelektronik fieldbus modules.

The Modlight Illumix series of machine lights by Murrelektronik optimally illuminate machines and plants with maintenance-free and long-lasting LED technology, shining in daylight quality.

Slim Line lamps with their compact construction are a reliable solution in machines and plants that don't have a lot of space. In harsh industrial environments, the Classic Line are the ideal light source with their aluminum housing and 4-millimeter thick single-pane safety glass. They are also specified for use in classic plant and machine construction environments.

The Modlight Illumix Xtreme Line features a high protection class of IP69K and is ideal in work areas that come in constant contact with coolants and lubricants. It continues operating reliably and is 100 percent sealed even in sub-tropical conditions with temperatures up to 55 degrees Celsius. The LED technology of the lamps is more efficient than halogen tubes since its light yield of 105 lm/W provides the same number of lumens with significantly less power consumption. LEDs are lead-free and mercury-free and reduce harm to the environment.

Emparro ACCUcontrol

KEEPING MACHINES RUNNING

Uninterruptible power supply to bridge power failures with the UPS-module Emparro ACCUcontrol

Few things are as irritating (or expensive) as unplanned downtimes of plants and machines. The Murrelektronik UPS-module Emparro ACCUcontrol extends the powerful Emparro power supply system and keeps machines running by switching smoothly to battery operation in the event of a mains power failure. The investment in a UPS system frequently pays for itself the first time downtime is avoided.

External lead batteries with a capacity of up to 40 Ah are connected to the UPS module to ensure prolonged outages. Upon the application, a 20 A or a 40 A variant can be chosen. The module can be installed without tools, and the 20 A variant takes up an extremely small amount of space in the cabinet with a width of only 65 millimeters.

Predictive maintenance – Be alerted before the failure

Emparro ACCUcontrol continuously monitors the internal resistance of the connected batteries. When a limit is exceeded, the device sends a warning signal over a signaling contact. The battery replacement can then be planned for the next scheduled service.
This predictive information prevents unplanned down-times and avoids the need to arrange for service visits at short notice.

Maximum life time

Batteries like low temperatures. They supply more power and last longer under such conditions. Emparro ACCU-control, therefore offers temperature-guided battery charging. This feature adapts the end-of-charge voltage to the ambient temperature, helping ensure that the battery achieves its maximum service life, even at higher ambient temperatures.

Simple connection to IPCs

Emparro ACCUcontrol can be easily connected to an industrial PC via Mini-USB.

- The industrial PC can then be shut down in a controlled manner in the event of a power outage
- The mains voltage and the charge state of the battery can be monitored in real time
- Operating statuses can be documented in a log
- The operating parameters are easy to configure

UPS module or capacity-based buffer module?

“The UPS Emparro ACCUcontrol module is the right solution when it comes to bridging a pro-longed power failure and avoiding failures and downtime in production. Externally connected lead batteries can supply backup power for an hour or more. Emparro Cap operates using ultracapacitors, it requires no maintenance at any time and it is the right solution in some cases when sufficient power has to be available for shutting down machines and PLC in an organized manner.“

Manuel Senk
Business Development Manager

Impact67

PARAMETERIZE PORTS EXACTLY AS NEEDED

The Murrelektronik compact field bus module Impact67 is now also avail-able with Ethernet/IP and has just gained the CT14 ODVA (Open DeviceNet Vendors Associations) certification. Thanks to its full molded housing, this high-quality module guarantees high machine and plant availability. The ports of the Impact67 can be parameterized as inputs, outputs, and IO-Link ports, depending on the specific application. This extreme flexibility comes along with tremendous cost savings since the number of modules per installation can be reduced to a minimum. Extensive diagnostic functions and the ability to build a ring structure further improve the sys-tem availability. A simple and intuitive web interface makes for a quick setup. “Quick Connect” ensures a short start-up time for the module, which can be of particular value in the area of robotics. A broad portfolio of accessories, such as IO-Link/analog converters, IO-Link hubs, and practical induc-tive couplers, open up additional possibili-ties for the installation.

MASI20

AN ESPECIALLY AFFORDABLE WAY TO CONNECT SIGNALS TO A CONTROL SYSTEM

The MASI installation solution, the Murrelektronik AS-Interface system, allows the simple and inexpensive integration of IO sig-nals into higher order control systems. MASI supports extremely flexible installation concepts in control cabinets and in the field, without the need to adhere to rigid topologies.

Murrelektronik now presents a new and especially compact generation of MASI20 control cabinet modules with an innova-tive new design and an outstanding value for the money: They offer an especially affordable way to integrate signals into a control system.

The MASI20 control cabinet modules are only 19 mm wide, which saves space in the cabinet. They have been optimized for use in terminal boxes with a depth of 120 mm. The 28 push-in terminals are situated on the front and are easily accessible for their connection. AS-Interface and AUX power are bridged internally. No interruption results from the removal of a module. The models with semiconductor outputs are suitable as passively safe solutions reaching performance level d (K3 functionality). Illuminated numeric displays convey clear IO diagnostics.

Tree M

PERFECT ON-MACHINE NETWORKING

The Murrelektronik IP67 managed switches ensure fast data communication and seamless networking. They offer extensive diagnostic functions and assistance with rapid troubleshooting to considerably reduce expensive downtimes.

The switches are compact and fully encapsulated, making them both robust and durable. They can be used in industrial settings, including dirty and rough environments. The M12 connections are water resistant and offer IP67 protection. Shifting the network technology onto the machine saves valuable space inside the control cabinet.

Thanks to the practical and intuitive web interface, commissioning takes no time at all.

The switches can diagnose a wide range of situations and record network statistics. The topology is mapped out automatically in order to detect when channels fail. Downtimes are reduced by detecting channel errors and losses. Even gradually developing errors can be identified by the system's web server.

Network security is a high priority in designing switches. The management interface is protected by a password, and the switches automatically detect unknown or unauthorized devices on the network.

The Murrelektronik managed switches offer an inexpensive way to bundle Ethernet-based sensors, such as vision sensors for the automation of handling and packaging.

Special ProfiNet version

The new Murrelektronik Tree Managed ProfiNet Switch supports ProfiNet according to Conformance Class B and can also be easily put into operation with a GSDML file via the Siemens TIA portal.

With its automatic top-down name assignment, start-up is a quick process. Network availability is improved considerably with the help of the integrated ProfiNet topology recognition and the prioritizing of ProfiNet telegrams.

Thanks to the automatic ProfiNet name assignment, maintenance is greatly simplified by the ability to immediately restart machines and plants after a replacing a module. Ring topologies (media redundancy, MRP) can also be carried out with the ProfiNet switch to improve plant availability by providing redundancy within the installation.

Modlink Heavy

HEAVY DUTY, ALL PURPOSE CONNECTORS

The heavy duty connectors from **Murrelektronik's Modlink Heavy series** transmit signals, power, data, and pneumatics, even in the toughest industrial environments. They consistently protect the interfaces from water, coolants, lubricants, dirt, and high mechanical loads. Murrelektronik's Modlink Heavy connectors have a superior seal – with a protection rating of up to IP68.

The greatest strength of the product line is its configuration flexibility:

- **Four** housing types
- **Seven** sizes
- **Three** locking types
- **Countless** contact inserts – fixed-pin and modular

This allows the optimum configuration of Modlink Heavy to be used in every application. An extensive portfolio of accessories makes handling easy.

Emparro67 Hybrid

A NEW DIMENSION OF ON-MACHINE POWER SUPPLIES

The innovative Emparro67 Hybrid switch mode power supply unit is an all-rounder with many powerful features: it not only relocates power supply from the control cabinet to the industrial field, but it also monitors currents using two integrated channels for 24 VDC load circuit monitoring to ensure high operational reliability. An IO-Link interface permits extensive and transparent communication.

The fully molded IP67 power supplies of the Emparro67 family with robust metal housing impress with their high energy efficiency: up to 93.8 percent of the energy applied can be used. The great advantage of this decentralized solution is that the voltage conversion from 230 VAC to 24 VDC no longer takes place in the cabinet, but directly on the machine. Thus, power loss is reduced to a minimum. Smaller cabinets can be used, and in some applications it may even be possible to completely get rid of them.

The new Emparro67 Hybrid switching power supply unit has two integrated MICO channels to monitor electronic currents of, separate system components, sensors, actuators or, in particular, of fieldbus modules. In this way, both sensor and module voltage, and actuator voltage of the connected fieldbus systems can be monitored separately. This guarantees maximum operational reliability. The MICO channels for monitoring the two 24 VDC load circuits can be adjusted to different current values. The tripping process applies the principle of "as late as it's safe, but as safe as possible."

The Emparro67 Hybrid is equipped with an IO-Link interface (M12 connection) and is able to communicate as a device with a superior IO-Link master. It is thus possible to use the Emparro67 Hybrid in fully-networked intelligent applications. A concrete application is the monitoring of the device's life span. Companies in the plant construction and mechanical engineering sector can use such predictive maintenance functions for the development of new business models.

INDUSTY 4.0 IN AUSTRIA AND CEE

Media representatives in dialogue with Murrelektronik Austria

Industry 4.0 and Internet of things are not just catchphrases in a world of increasing digitization, but in many cases already state of the art and impossible to be dismissed from any future-orientated company.

To underline the extraordinary importance, Murrelektronik Austria invited to an exclusive press conference regarding "Industry 4.0 in Austria and CEE". A large group of journalists paid rapt attention to the explanations of Managing Director Andreas Chromy (AT & CEE), Jörg Krautter (Vice President Automation, Murrelektronik Germany) and Dr. Arnold Schuh (Director Competence Center for Emerging Markets & CEE,

From left to right: Ass. Prof. Dr. Arnold Schuh (Director Competence Center for Emerging Markets & CEE, Vienna University of Economics and Business), Andreas Chromy (Managing Director Austria & CEE, Murrelektronik), Jörg Krautter (Vice President Automation, Murrelektronik Germany)

WU Vienna). Due to their in-depth know-how and vast expertise, they were able to deliver insights into the economic importance of the CEE region for Austria, Murrelektronik's performance in Austria and the CEE, and the significance of industry 4.0.

It becomes apparent that the Central and Eastern European countries, which are operated by Murrelektronik's CEE headquarters in Schwechat near Vienna, are considered as one of the most dynamic growth regions. In particular, the growing automotive industry in Slovakia and Hungary, as well as the development of mechanical engineering and automotive supply industry in Romania led to sales growth.

According to Ass. Prof. Dr. Arnold Schuh of "Wirtschaftsuniversität Wien" the reindustrialization in CEE countries such as for example the establishment of large production companies in the automotive sector accelerates growth. As a result, the importance of Vienna as a CEE hub is again gaining momentum.

Andreas Chromy, Managing Director Murrelektronik Austria & CEE, certainly considers the variable Murrelektronik product portfolio with its intelligent installation solutions the most important success factor. With a potential savings of up to 30 percent for installation costs and power consumption, as well as the possibility of upgrading the production processes for the Internet of things/industry 4.0 Murrelektronik is at the pulse of time.

Jörg Krautter (Vice President Automation) plays a leading role as an active member of „Führungskreis Industrie 4.0". Thus, Murrelektronik can significantly assist in establishing new automation trends. The modular fieldbus system Cube67 with intelligent on-demand cloud solution is, for example, optimally orientated at the new standards and a figurehead for smart automation.

The trend towards intelligent decentralized energy supply with custom-fit, ready-made and pretested connectivity to smart field bus solutions is increasing. Therefore, there will be a high demand for the realization of flexible plant networks, which also ensure a precise diagnosis of their status. For that reason, the preventive maintenance, which is essential to energy efficiency and to optimize the value chain, will increasingly take hold in the industry 4.0 day-to-day production. For Murrelektronik, this offers many new possibilities.

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