

sercos

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news

the automation bus magazine



Automation with **Sercos**

Sercos in China

Chinese robots specialist Siasun opts for a motion control solution from Schneider Electric

Drive technology of the future

Cabinet-free, modular and flexible

Gerhard Schubert

Automated adjustment to different packaging formats

Dear readers,

The requirements for networking in machine and plant engineering have grown steadily over the decades.

Bus systems today must not only guarantee that data is exchanged quickly, precisely, efficiently, and safely between the peripheral components of a machine or system. But in the course of the implementation of Industry 4.0 and IIoT concepts, additional requirements have been added.

Today, consistent and secure communication with superimposed automation and IT systems is required, as is horizontal networking with other machines and systems within a plant. In addition, bus systems must contribute to the convergence of conventional real-time Ethernet solutions into a uniform, standardized, and integrated network infrastructure.

Sercos® is an international standard that fulfills all the above requirements, proving that the technology always adapts itself to the changing needs of the users, insuring high investment security. It is therefore attractive to equip machine control systems with a Sercos III interface, thereby integrating the various peripheral components, such as servo drives, frequency converters, stepping motors, decentralized I/Os, safety components, encoders, camera systems, sensor systems, communication gateways, and hydraulic and pneumatic components.

The current Sercos magazine provides information about innovative applications, new products and news about the Sercos automation bus.

Enjoy reading!



Peter Lutz

Peter Lutz
Managing Director
Sercos International e.V.

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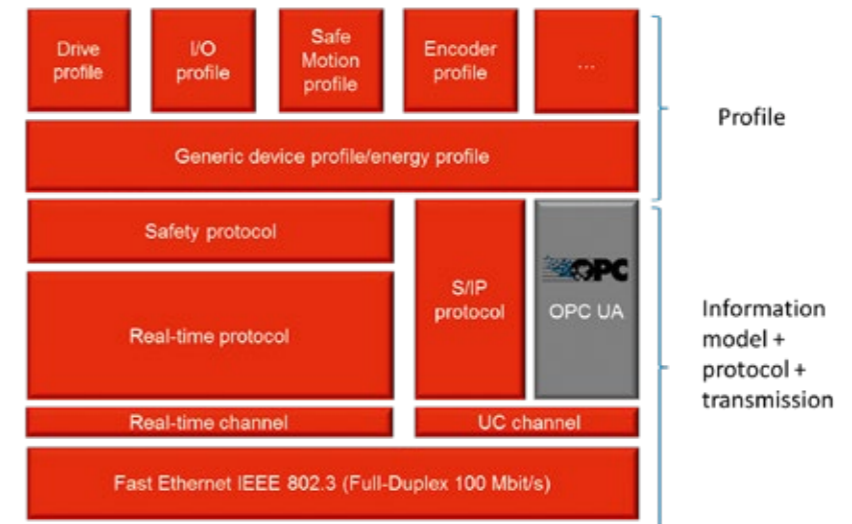
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OPC UA Companion Standard for Sercos released

The OPC Foundation and Sercos International announced that the Sercos OPC UA Companion Specification release is now available. This specification describes the mapping of the Sercos device model and the Sercos device profiles to OPC UA, so that functions and parameters of Sercos devices are made accessible via OPC UA in a vendor-independent manner.

This initiative aims to simplify the communication between machine periphery and supervisory IT systems and to support the requirements of Industry 4.0 regarding semantic interoperability. "Sercos® provides a very rich, robust device model and device profiles that made logical sense to plug into an OPC UA namespace. The Sercos OPC UA Companion Specification enables machine-to-machine interoperability and machine integration with the cloud-based applications at a minimum. Sercos suppliers will now be able to take advantage of the rich service-oriented architecture of OPC UA, truly facilitating the vision of the embedded world having information integration into the cloud. The OPC community will now be able to easily extend their products to support the great networking technology of Sercos. Both organizations are

working together to facilitate and help the suppliers bring certified products to the marketplace supporting this new companion specification", says Thomas J. Burke, President and Executive Director of the OPC Foundation.

"In today's manufacturing systems, automation devices and systems from many different manufacturers have to be integrated and maintained, resulting in significant total cost of ownership (TCO) during the entire product life cycle. At the same time, product planning and control require process- and machine-related information to facilitate the efficient use of the manufacturing resources. This challenge can be best faced with a standardized mapping which brings together the well-defined semantics of Sercos with the OPC UA Sercos information model. Use cases cover



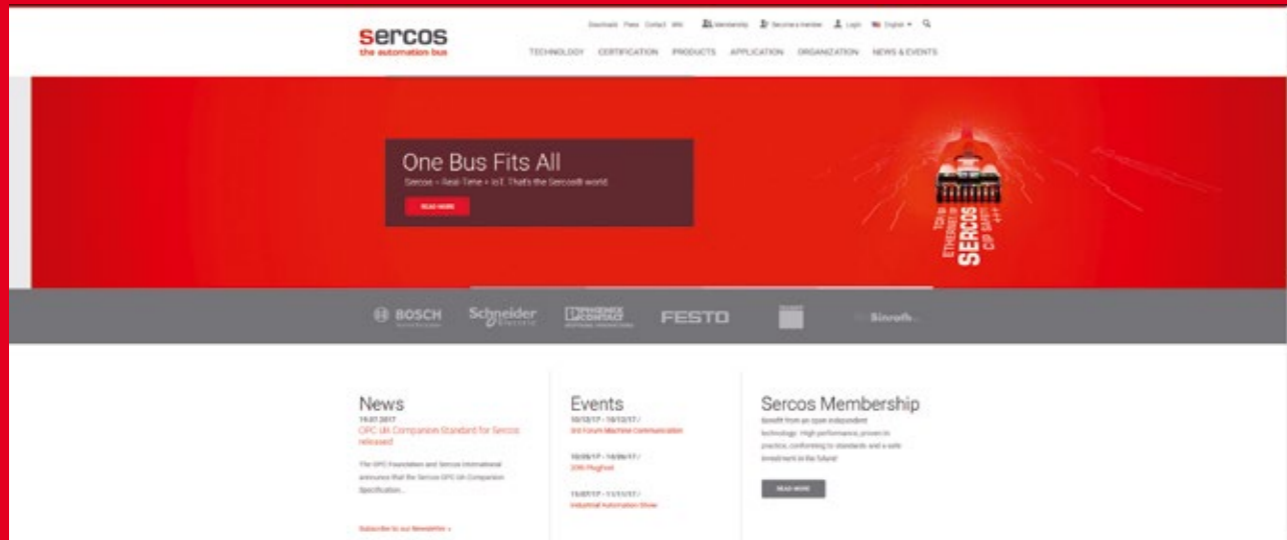
a broad range from device parametrization and network configuration up to energy management and preventive maintenance. Furthermore, new business models can be easily implemented because users and suppliers can rely on a consistent and vendor-independent semantic”, states Peter Lutz, Managing Director of Sercos International.

The mapping rules specified by Sercos can be used for different implementation approaches. On the one hand,

the OPC UA server functionality can be implemented in a Sercos master device (e.g., CNC or PLC). On the other hand, it is possible to transfer this functionality to a Sercos slave device. In the latter case, the OPC UA accesses are executed in parallel to or even without any Sercos real-time communication. Thus, a consistent communication with OPC UA down to the field level is possible without abandoning the hard-real-time communication of the Sercos automation bus.

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i www.sercos.com becomes www.sercos.org



Good things are worth waiting for! On November 14, North American website www.sercos.com migrated to the international website www.sercos.org. Information specific to particular regions, such as North American and Asian

members, membership fees, etc. can be accessed with a mouse click on the appropriate pages of the world map. The different pages for each country can be accessed with the language tab at www.sercos.org.

EVENTS 2018

April

Automation Summit

04/10-12/2018,

Boeblingen - Germany

Hanover Fair 2018

04/23-27/2018, Hanover - Germany

May

Industrial Automation

05/09-11/2018, Beijing - China

21st PlugFest

05/16-17/2018, location tbd

SPS IPC Drives Italia

05/22-24/2018, Parma - Italy

July

Industrial Open Network Roadshow

Date and location tbd - Japan

August

Automation

08/29-09/01/2017,

Mumbai - India

September

Industrial Automation North America

09/10-15/2018,

Chicago - USA

October

Machine Communication Forum

Date tbd, Würzburg - Germany

22nd PlugFest

10/24-25/2018, location tbd

November

Industrial Automation Show

Date tbd,

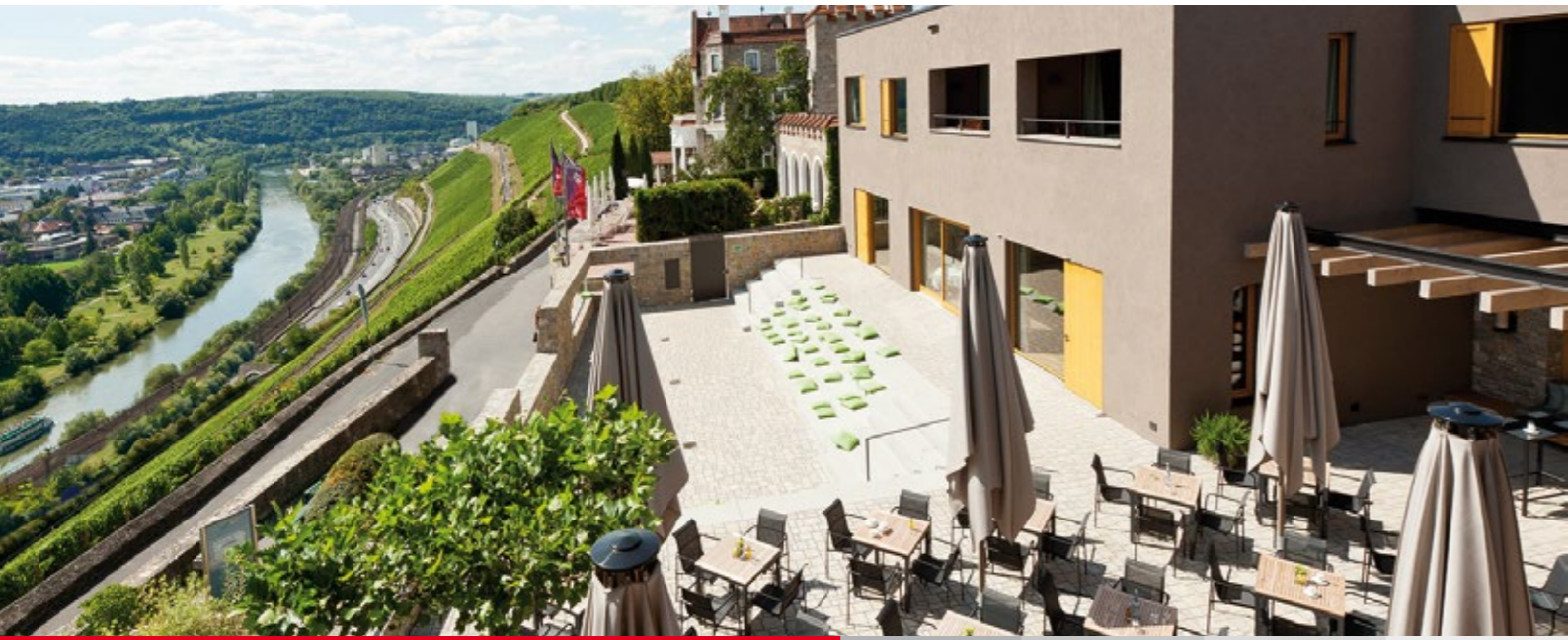
Shanghai - China

SPS IPC Drives

11/27-11/29/2018,

Nuremberg - Germany

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Machine Communication Forum: It's all in the mix!

The third Machine Communication Forum took place at the Schlosshotel Steinburg (Würzburg) on October 12. Together with SPS-MAGAZIN, Sercos International invited users and providers from the machine and plant engineering sector, as well as equipment and automation manufacturers to the event.

The key focal points of this year's event were presentations on Industry 4.0 as well as trends, technologies, and user reports.

The keynote presentation by Dr. Georg Wunsch, Managing Director and founder of machineering GmbH, addressed the topic of "Augmented and virtual reality in automation and manufacturing technology". Dr. Wunsch explained how virtual commissioning with simulation software doesn't just reduce development times and costs, but can also increase the quality of machinery and installations. The combination of virtual reality and simulation based on real data is the next step towards Industry 4.0.

The lead presentation by Prof. Faller of Bochum University addressed machine communications at a time of ubiquitous computing. Current topics in the automation sector – Industry 4.0 and cyber-physical systems (CPS) – are leading to changes in the current processes and struc-

tures in industrial installations and organizations. The networking of technology in terms of both the width and depth of an organization is increasing all the time. Data are being used to make systems and processes more efficient. This is leading to an omnipresence of different IT systems and control systems, whether dedicated, embedded or portable. This omnipresence is known as ubiquitous computing. The different and distributed systems only offer the benefits of Industry 4.0 if they are combined effectively. The presentation highlighted different factors in terms of how this combination can be achieved.

The morning concluded with three presentations addressing the topic of trends.

Alex West, Principal Analyst at IHS Global, spoke about machine interfaces within the factory of the future. For mechanical engineers, this is one of the key challenges of both IoT and the Industry 4.0. West also looked

ahead to the development of machine communications, and discussed how they will affect automation and the achievable benefits.

Stefan Bina, Technology Market Manager at Bernecker + Rainer, discussed the also much-noticed topic of "OPC UA time-sensitive networking – the way out of the industrial communications problem?". He highlighted how the use of the powerful OPC UA data description model with the IEEE Ethernet TSN upgrade at the machine level, in combination with high-performance industrial Ethernet protocols such as Sercos® or Powerlink, enables the monetization of big data at the sensor level.

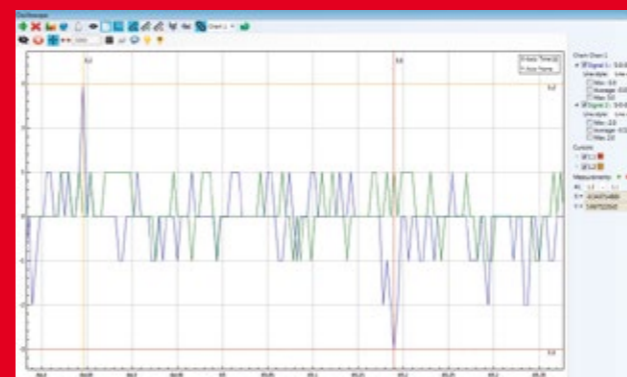
In his presentation, Maik Seewald, Senior Technical Leader at Cisco, discussed the topic of time-sensitive networking (TSN) and demonstrated the value of this technology for the industrial Internet of things (IIoT). Seewald presented the technology and the basic standards and provided an overview of possible applications in various industries. Taking specific use cases as examples, he highlighted the possibilities offered by TSN that make this technology

so interesting and promising for the industrial Internet of things.

A variety of user reports were presented in the afternoon, including a report by Bosch Rexroth and Dassault Systèmes on "Networked packaging lines – from engineering to delivery: constant data flows from design to production". To achieve a significant reduction in the development times of its machines, WestRock uses model-based engineering with Rexroth and Dassault Systèmes.

Ralf Schubert, Managing Director of Gerhard Schubert GmbH, was going into the question, how machining concepts have been changing over the last three decades and which innovations have shaped especially the machine construction in the packaging and food industry. In the following, he particularly focused on the benefits that the cabinet-free packaging machine offers to both end-customers and mechanical engineers. The day concluded with presentations by K.R. Pfflner and Schneider Electric about the networking of machine tools, as well as the use of Sercos in robot applications.

Sercos Monitor version 3.3.3 available



A new version of the Sercos® Monitor software is available to download free-of-charge from the Sercos website.

The software update of the diagnosis tool for Sercos III networks includes a variety of functional upgrades and user-friendly improvements such as the introduction of drag & drop. The new features include analysis options for Hot Plug, the further development of the oscilloscope function,

signal export during recording and advanced S/IP support. Furthermore, in the new version, the Sercos Monitor can be operated as a straightforward console application without a graphical interface. A program-supported operation of the Sercos Monitor via a programming interface (API) is also possible for the automated test.



Drive technology of the future: Cabinet-free, modular and flexible

Cabinet-free drive technology increases productivity along the complete value stream

Intelligent servo drives are indispensable for modern machines. They handle format conversions or changes in the motion profile at the push of a button. This decreases changeover times of machines significantly.

Until now, however, the increasing number of servo drives also increased the size of cabinets. The more space required by "unproductive" cabinets, the less space is available for the actual machines and facilities. Industrial companies are also faced with the challenge that product life cycles decrease continuously, in all industries. Existing production lines are continuously adjusted to new tasks and supplemented with new processing stations. With a consistent modularization, these expansions can be done significantly faster and more cost-efficient.

1. Zero control cabinet – full flexibility

In conventional drive technology, motor and control device are separate from each other. One power and one encoder

cable leads to the cabinet for every motor. Until recently, machinery manufacturers and end users had to accept this in order to benefit from the advantages of servo technology. Cabinet-free drive technology by Rexroth maintains the advantages of servo drives and combines them with a wiring reduction of up to 90 percent, and a significant area gain due to the elimination of cabinets.

With IndraDrive Mi, Rexroth in 2005 already presented the world's first motor-integrated servo drive. In 2014, the manufacturer marked a new milestone in cabinet-free drive technology: All mains connection and power supply components that had until then been placed in the cabinet are now being designed in IP65 and can be installed directly in the machine. The mains module includes a mains filter, mains choke, and even the mains contactor in one device and is connected directly to the mains. The regenerative supply module with control and power electronics, brake resistor, and brake transistor fully replaces the regenera-

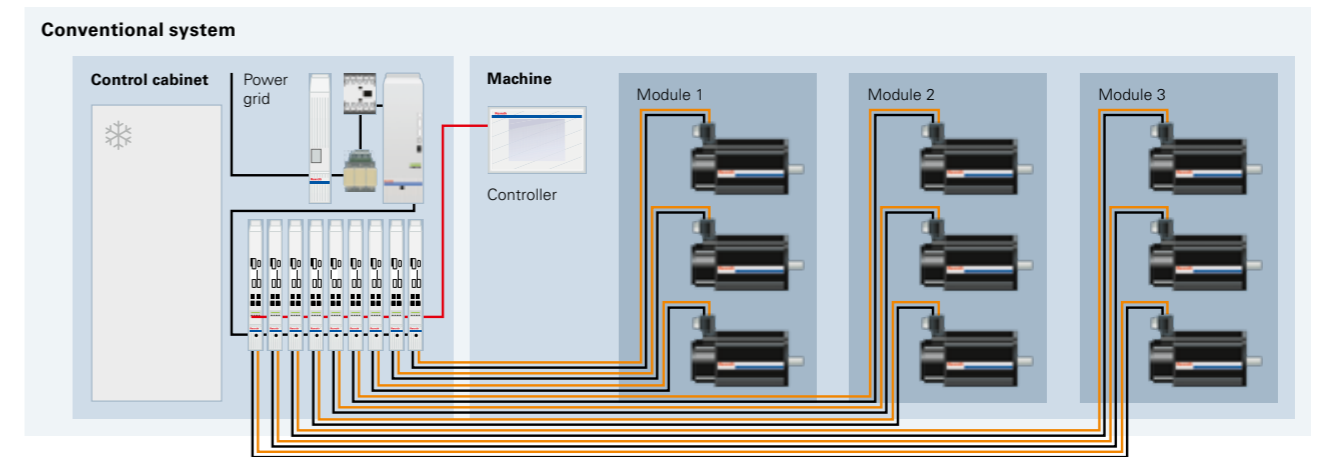
Five requirements for a drive technology that is ready for the future

1. The footprint of machines is an economic factor throughout the complete lifespan of the machine. Control cabinets take away space for other machines and reduce the available production area.
2. Production lines must be adjusted to new products and processes faster than ever before. A retroactive expansion must be possible, easier, and quicker than before.
3. Standard-compliant machine safety is a basic prerequisite. A fast restart after manual interventions increases the availability of machines and production lines.
4. Higher energy efficiency has a direct effect on operating costs. Modern drive solutions reduce power consumption as well as peak loads.
5. All concepts for Industry 4.0 require a decentralized intelligence and a high level of connectivity of the automation components. Solutions that are ready for the future support all common Ethernet-based real-time protocols and are open for a communication with superordinate IT levels.

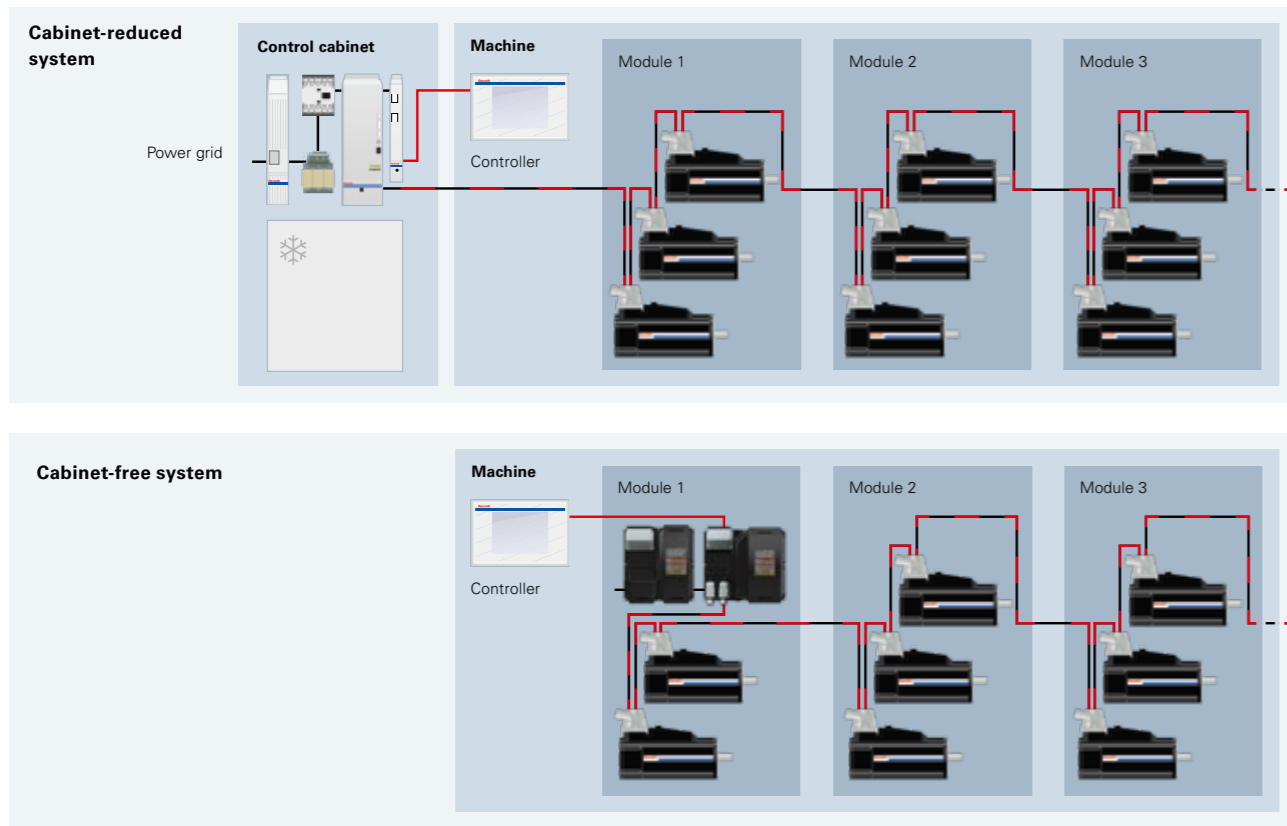
tive supply and the control electronics in the cabinet. Thus, the cabinet can be completely eliminated. End users gain valuable space for additional machines on their existing surface.

Up to 30 servo drives on one hybrid cable with a length of up to 200 m form one drive system. Only the first drive is connected to the power supply and the control via a cable; all other drives after that are switched only in series via a hybrid cable for power and communication.

In comparison to a classical automation, this approach reduces wiring by up to 90 percent. A common solution using a control cabinet with ten drives usually requires the installation of 110 m of power and encoder cable. Cabinet-free drive technology reduces this effort to only 10 m of hybrid cable, while keeping motor distance the same. This not only reduces material costs and installation times, it also reduces the probability of wiring errors. The savings effect is even higher, because sensors, I/Os, and fieldbus components can be connected directly to the decentralized drives.



In comparison to the common variant, cabinet-free drive technology allows not only a reduction of the control cabinet volume but the realization of a completely cabinet-free drive solution. This saves up to 90 percent of wiring, and control cabinet cooling can be eliminated completely.



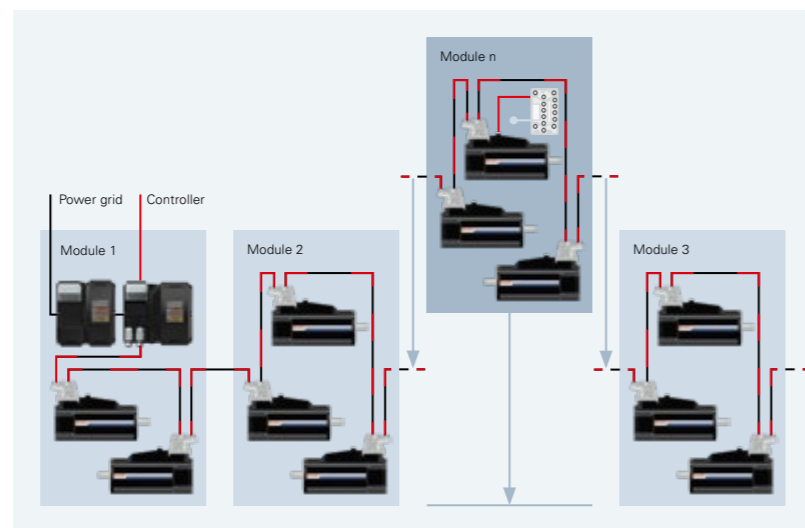
Packaging machine manufacturer Gerhard Schubert GmbH from Crailsheim, Germany, presented the world's first cabinet-free packaging machine during the interpack 2014 based on the drive system IndraDrive Mi.

2. Modularity in electronics: Simply combine and expand

The cabinet-free drive technology develops new opportunities of modularization and also simplifies the subsequent installation of stations into existing production lines. Until now, the expansion of a production line often causes longer downtimes. The installers must install each drive individually into the control cabinet, and wire it to the motors. The line cannot produce during this time due to safety reasons. After that, the drives are started up on site, which also requires time.

With cabinet-free drive technology, however, machinery manufacturers completely preinstall the corresponding modules in their plant and start-up the drives already in the plant. These modules are combined depending on the end user's requirements. For integration into existing lines it is then enough to create the power supply and the connection to the superordinate control. The commissioning effort is reduced significantly because the drives are already parameterized. This reduces machine downtimes for the conversion of the line to a minimum.

Simple integration of additional machine modules and components ensure full flexibility.



3. Safety everytime assured

The first machinery manufacturers have already implemented this approach of cabinet-free machines. Packaging machine manufacturer Gerhard Schubert GmbH from Crailsheim, Germany, presented the world's first cabinet-free packaging machine during the interpack 2014 based on the IndraDrive Mi system. It consists of several robot modules, one user interface, one integrated image processing, and the Transmodul flexible transport system. The company can now structure flexible and modular machines that perform all packaging tasks, e.g. feeding, filling, closing, labeling, and palletizing.

Machine safety is a material framework condition for cabinet-free drive technology. End users expect the same integrated safety functions as in drives where control devices are located in the cabinet. On the one hand, this is about the standard-compliant implementation of functional safety requirements. On the other hand, they also expect the highest level of machine availability, meaning that the machine produces again as quickly as possible after a manual intervention.

"With the Rexroth drives we can do completely without conventional control cabinets," emphasizes the Managing Director Ralf Schubert. "The customers were so impressed by the machine that all of our machines are cabinet-free since 2016."

The decentralized concepts simplify the implementation of the Machinery Directive through modularization. Rexroth offers certified safety functions even for cabinet-free IndraDrive Mi. The hybrid cable transmits all safety signals. This means that separate wiring is no longer necessary. This reduces the need for wires and reduces wiring errors.

A special advantage of IndraDrive Mi: The Multi-Ethernet interface supports all common Ethernet protocols, e.g. Sercos®. In this way, the modules integrate into the automation landscape of the end user without additional efforts. Another advantage: The Multi-Ethernet interface minimizes variant diversity and thus reduces the inventory required in maintenance.

What is particularly interesting about it is the easy adaptation of safety zones with several drives in one drive train. For Safe Torque Off, the first drive of a safety zone is wired in such a way that it processes the safety signals. To add additional drives to a safety zone, all that needs to be done is to use a safety plug there. That is extremely easy to do as part of the start-up and transparent during operations.



Protecting people against uncontrollable machine movement has absolute priority for every type of application. Cabinet-free drive technology therefore offers flexible solutions for the integration of safety technology into the total system.

Several safety zones are possible in one drive train. This solution shortens the time required for restart after a manual adjustment and thus increases the machine's availability.

Furthermore, extensive safety functions are available with Safe Motion – from safe stop to safe movements. Functions that do not require an encoder, e.g. SS1, SS1-ES and STO, are certified with category 4 PLe according to EN ISO 13849-1 and SIL3 in compliance with EN 62061. Functions requiring encoder feedback, e.g. SS2, SOS, SLS, SMS, SMD, SLI and SDI, are certified with category 3 PLd in compliance with EN ISO 13849-1, and SIL2 in compliance with EN 62061.

IndraDrive Mi uses for example the safety standards CIP Safety on Sercos (CSoS). The signals are simply transmitted with the standard data. The integration of drive, peripheral and safety bus as well as Standard-Ethernet communication in a single network simplifies handling and reduces hardware and installation costs.

4. Efficient use of energy

Higher energy efficiency of machines and facilities is listed right at the start of the performance requirements of numerous end users. On the one hand, this contributes to climate protection, while energy consumption on the other hand is a major part of the life-cycle cost of machines.

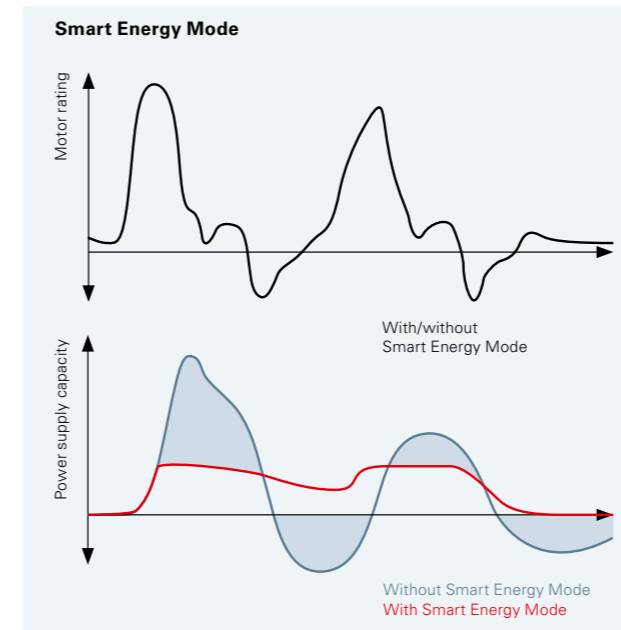
Cabinet-free drives are an effective lever here. Energy can be exchanged between the drives due to the system's energetic coupling via the hybrid cable. If for ex-

ample one drive brakes, the created braking energy can simultaneously be provided to an accelerating drive in the machine. The energy is thus kept in the system or, if too much energy is created, is being fed back into the network. This achieves energy savings of up to 50 percent.

This also eliminates power loss in the cabinet. In part it creates high temperatures in the cabinet in conventional drive solutions, which require cooling. With cabinet-free drive technology, the hardware expense for cabinet cooling can be eliminated in most cases. This also means that the energy requirement for cooling is eliminated, which in turn increases energy efficiency.

The power supply module is furthermore designed for a wide voltage range and can therefore be used in power supplies of 380 V to 500 V and are thus usable worldwide. It creates a regulated DC-bus voltage for the individual drives. This ensures that a machine always has the same performance on all mains voltages. Thanks to its control, the device is also robust against mains voltage fluctuations.

The active control of the supply module brings even more advantages: Circuit feedback is reduced to a minimum and additional measures are therefore unnecessary. An integrated reactive current regulation compensates not only its own reactive current consumption, other inductive or capacitive users can also be offset. The losses incurred due to reactive current are thus completely eliminated. The Smart Energy Mode with its intelligent control assures that the energy stores existing on principle can be optimally utilized in the DC-bus. It limits not only performance peaks



The Smart Energy Mode with its intelligent control assures that the energy stores existing on principle can be optimally utilized in the DC-bus. It limits not only performance peaks but also reduces the average energy consumption. In practice this results in performance peak reductions by up to 60 percent and a reduction of the average performance by up to 30 percent.

but also reduces the average energy consumption. In practice this results in performance peak reductions by up to 60 percent and a reduction of the average performance by up to 30 percent. Since all mains supply components are designed for average performance, these components could be designed smaller.

5. Integration has begun

The ability for vertical integration with company IT will become more important in the future in order to realize Industry 4.0 approaches. The objective is direct access of IT functions to the drives. Servo drives are decentralized intelligent and perform their tasks autonomously accord-

ing to the specifications of the next higher level. Just as important: Due to their Multi-Ethernet interface, they can today already be integrated vertically and horizontally and are ready for a comprehensive data exchange.

Beyond all opportunities of PLC-based automation according to IEC 61131-3 and PLCopen as well as OPC UA technologies, Rexroth is the first drive and control manufacturer that has bridged drive technology to IT. The interface technology Open Core Interface for Drives, which is integrated in Open Core Engineering, allows direct access to all drive parameters via high-level-language-based applications on external devices, e.g. PCs. Instead of PLC programming, which must be created individually, macros of commonly used spreadsheet programs for example suffice to access and evaluate drive data, e.g. energy consumption, directly. Machinery manufacturers today already use self-programmed apps for commercially available smartphones and tablets to simplify start-up, parameterization, and diagnosis of the intelligent, decentralized drives by Rexroth.

Conclusion: Cabinet-free drive technology is ready for the future

Cabinet-free drive technology fulfills numerous requirements of machinery manufacturers and end users, for which they previously had to accept compromises. Now they can use more servo drives without ever-larger control cabinets reducing their machine footprint. The option for a complete modularization reduces efforts and costs for retroactive expansions of existing production lines. Standard-compliant safety at drive level with a clever solution for the simple switching of safety zones increases machine availability. The simple energy exchange within the drive assemblage reduces average power consumption and limits peak loads. With the Multi-Ethernet interface and own intelligence, cabinet-free drive technology by Rexroth is ready for the future and integrates into future Industry 4.0 environments.



Increasingly important for the future: Horizontal and vertical integration to implement Industry 4.0.

Chinese robots specialist Siasun opts for a motion control solution from Schneider Electric

Shanghai-based Siasun Robot & Automation Co. Ltd is one of the leading providers of industrial robot systems in China. To ensure that Siasun maintains its leading position in light of increasing international competition, the company is using innovative motion control technology from Schneider Electric in its new SRBD range of Delta robots.



"The PacDrive 3 platform helped improve the performance of Siasun's parallel robots," Jihong Qiu, General Manager, Siasun Robot & Automation Co. Ltd.



High continuous path accuracy also during deceleration and acceleration process

The key focus of Siasun is on the global sale of mobile robotic systems and intelligent industry and service robots. To successfully respond to increasing industrial requirements and customer needs, Siasun attributes considerable importance to ensuring consistent development of its business. The goal of the company is to ensure the sustainable and continuous improvement of its production processes at both the manufacturing and digital levels throughout the entire product life cycle. In this context, the beating heart of the company is its independent research and development department, in which sector-specific customer solutions ranging from food technology to the automotive industry can be planned and realized according to demand.

From traditional to intelligent manufacturing – thanks to strong partnerships

Due to the consistent implementation of this concept since its foundation 17 years ago, Siasun hasn't just succeeded in making a name for itself as a pioneer in the digital and industrial transformation in Asia. To live up to its pioneering role and to build on its market-leading position despite growing international competition in the area of parallel ro-

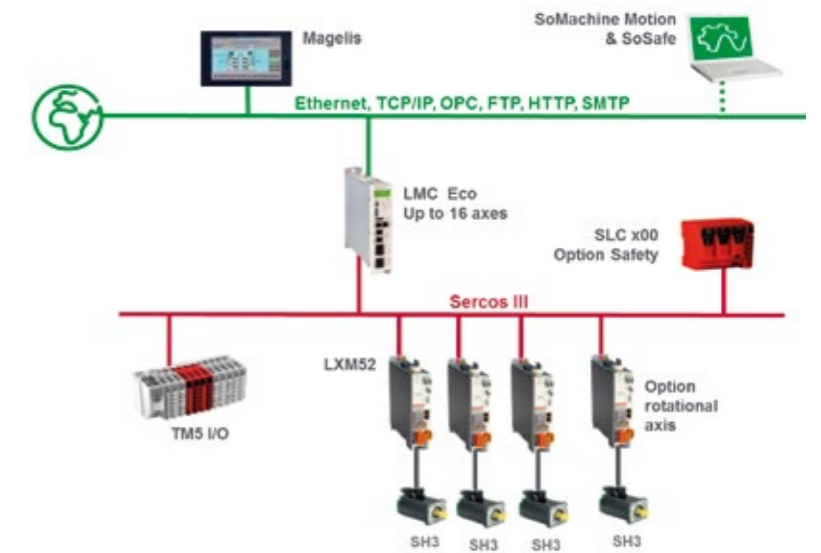
bots, Siasun prioritizes strong partnerships and the latest technologies.

During the development of its latest Delta robots in its SRBD range, the company therefore based its efforts on open, scalable software and hardware technologies that comply with strict international standards. The PacDrive 3 high-end motion control solution from Schneider Electric fulfilled these requirements. For each Delta robot, Schneider Electric supplied a PacDrive logic motion control unit and three or four Lexium 52 servo amplifiers and motors with gears. These enabled a high performance and flexible communications concept via Sercos® and OPC UA which was possible to adapt individually to the individual strengths.

With Schneider Electric's SoMachine Motion, Siasun was able to make use of a flexible and easily configurable software solution, completing the full programming of the robot units within just one week. Thanks to the PacDrive technology, Siasun is now able to make full use of its research and development expertise to maximize the productivity of its Delta robots at all times.

Siasun parallel robots are now finding successful use in medical technology, electronics and food packaging.

Jihong Qiu, General Manager in the area of Rail Transportation at Siasun, is enthused by the collaboration: "Due to our cooperation with Schneider Electric, we were able to complete the development of our latest Delta robots within just one year. We are now in the position of being able to serve an even wider range of customers with a forward-looking robotic solution and to further advance our market position."



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Automated adjustment to different packaging formats

Fast and flexible format changeovers are vital for maximizing the efficiency of automated packaging lines. Gerhard Schubert GmbH is a market leader in top-loading packaging machines (TLM) and therefore decided to invest in positioning systems (PSE) from halstrup-walcher GmbH to switch between package formats. This automation ensures high quality standards.

The machines of Gerhard Schubert GmbH are principally used for packaging individual products in trays or folding boxes before dispatch. The company with approx. 1,100 employees manufactures packaging machines and other technology products for the pharmaceutical, cosmetic and food processing sectors. Well-known customers include Nestlé, Danone and Unilever.

Schubert assembles every packaging line from its portfolio of sub-machines. "Our range includes a box erector, grouping, loading and closing machines and a palletizer," explains Rolf Bögelein, control technician at Gerhard Schubert GmbH. "The smallest TLM packaging machine could be just a single sub-machine but our lines contain five or six on average," he continues. The largest packaging line Schubert has built so far had a grand total of 26.



Automatic adjustment of the glue application module for gluing boxes with positioning systems (PSE) of halstrup-walcher: It is vital to apply exactly the right amount of adhesive in exactly the right place.

Automated positioning replaces manual adjustment

"In the past, operators had to use handwheels to adjust machines when the packaging format changed. The adjustment process can be very time-consuming. Especially when there are a number of axles to be adjusted this can lead to long standstills; a loss of production time. Human errors can lead to ejects, tool or machine damages," explains Christian Sura, Managing Director for Sales at halstrup-walcher GmbH.

Positioning systems can adjust to their specified target positions for format changeovers precisely, quickly and at several axles at the same time. "Automated format changeover makes production even of one piece profitable. The machine user can package the product in exactly the right way – that's an advantage," continues Sura. The drives can also be installed in locations which are poorly accessible. Handwheels must be integrated with easy access into the machines.

The positioning systems are integrated drives that comprise a brushless EC motor, gearbox, absolute distance measurement system, and motor control. The PSE receives the run command from the control via the bus communication and reports whether it has reached the target position in the specified time. The absolute distance measuring system helps to maintain the specified position with outstanding accuracy. It operates reliable without battery or the need for maintenance. It records the revolutions directly on the output shaft, not the motor like similar systems. Consequently, gear backlash has no impact on the accuracy of the measurements. It will send a message to the control unit reporting that the axle has been turned manually, even when no power supply is connected.

Besides the position itself the PSE is able to monitor and report a number of other parameters back to the control unit. The operator can recognize e.g. if a spindle is no longer running smoothly, a bearing is becoming worn with the torque or temperature parameters of the device. This feature simplifies the task of preventive maintenance for the packaging machine before the problem becomes serious.

An enduring partnership – with further cooperation

After several years of cooperation Schubert is now using PSE at every point where positioning is required during format changeovers. "We expected halstrup-walcher to supply advanced, high-quality technological products with punctual, quick and flexible delivery – they have met all our expectations. In the rare instances that we discover a problem, it is quickly solved by open and honest communication," explains Rolf Bögelein. One example is the

introduction of a standardized communication interface a few years ago. Schubert converted all its components of the packaging machines from CANopen to Sercos®. Because Sercos offers better diagnostics and is already being used in the drive control units which – like the 3- and 4-axle robots – Schubert builds itself, halstrup-walcher was able to adapt the positioning systems quickly to Sercos. This standardization simplifies now every area of programming and controlling the machine.

Gerhard Schubert GmbH will therefore continue to use positioning systems from halstrup-walcher for automating its packaging machines. In the future, it plans to take even greater advantage of the positioning systems' diagnostic capabilities in order to optimize preventive maintenance of its machines.

Rolf Bögelein, control technician at Gerhard Schubert GmbH, trusts positioning systems from halstrup-walcher.



Schubert uses positioning systems of halstrup-walcher to perform automatic format changeovers.

AMK Arnold Müller GmbH & Co. KG



Gausstrasse 37-39 | 73230 Kirchheim/Teck | Germany
 ☎: +49 (0)7021 5005-0 | 📠: +49(0)7021 5005-199 | www.amk-antriebe.de



AMKSMART iC

Product features:

- Control of synchronous and asynchronous motors, both linear and rotary
- Power supply 3 x 400 V AC
- Line filter, braking chopper and brake resistor integrated
- 5 multifunctional I/Os incl. 24 V DC supply voltage
- Ideal for modular machines
- Reduced control cabinet
- Simplified wiring and installation

The AMKSMART iC servo inverter is a compact device for control of servomotors up to 10 kW peak power that can be installed practically anywhere in the machine. The device contains the 3 x 400 V AC supply, a mains filter, brake chopper, and the 24 V DC power supply unit. This offers the user a generous all-inclusive package in a very compact space. Different cooling concepts are used depending on the power requirements. Convection cooling, an integrated fan, or cold plate installation are available. If several axes are operated, the power supply, available as AC or DC, can be wired further through a terminal block. This reduces cabling to the absolute minimum.

The communication via Sercos® III offers a very good basis for industrial use. Five multifunctional I/Os are available for the direct connection of sensors and actuators to the machine. The iC servo drives also have something to offer in the area of safety: they allow STO (Safe Torque Off) to be implemented standardly with any device.



AMKSMART iDT 5

Product features:

- Control of synchronous and asynchronous motors, both linear and rotary
- IP65, shock- and vibration-resistant
- Simplified wiring and installation
- 5 multifunctional I/Os incl. 24 V DC supply voltage
- Ideal for modular machines
- Reduced control cabinet
- Simplified wiring and installation

The AMKSMART iDT5 series features a DT synchronous motor with an integrated servo controller. They are a plug-and-play solution for modular machine concepts. The system combines the mechanism, electronics, and software for distributed uses. The AMKSMART iDT series is available up to a peak power of 10 kW. Sercos® III is used for real-time Ethernet communication.

Multifunctional I/Os in each servo controller are available for sensors and actuators on the machine. Instead of using a hybrid cable manufactured separately, the decision was made to separate the power supply and fast communication via real-time Ethernet for AMK.

Conductix-Wampfler Srl



Via dei Capitani 14/16 | 20864 Agrate Brianza (MB) | Italy
 ☎: +39 039 607431 | 📠: +39 039 60743292 | www.conductix.com



Conductix-Wampfler INDETH100

Product features:

- High performance
- Long life
- Plug-and-play solution

INDETH100 is a new family of slip rings addressed to the use of industrial communication systems of real-time Industrial Ethernet at 100 Mbit/s. The technology, based on a special gold-on-gold sliding contact solution, assure high performances and long life. The slip rings are delivered as plug-and-play with RJ45 certified connectors, ready to be used on the rotating machines.

General characteristics:

- 1 or 2 Ethernet lines at 100 Mbit/s
- Protection: IP65
- Max. rotational speed: 100 rpm
- Mounting: Vertical/horizontal
- Working temperature: +5°C to +45°C
- Relative humidity: 90 percent without condensation
- Rotation sense: Clockwise/counterclockwise

Standard construction:

- Material: Steel/aluminum
- Ring material: Gold-plated brass
- Brush material: Quality alloy wire

INDETH100 can be integrated inside different types of slip rings, including hollow shaft versions, to fully meet the customer's needs. Even complete solutions including power, auxiliary and signals poles are available.

Performance pure.

IBH-CNCore 9005

The Soft CNC for hard real-time is powered by an Intel® Core i3 processor of the latest generation.

- PC-based CNC with integrated SPS
- Sercos III Master (based on the Open Source Common SERCOS Master API)
- eTool (IBH commissioning tool)
- Modular expansion options with extension and I/O modules
- CNC software for nearly all the technologies of modern machine tools and automation systems

sps ipc drives
 Nürnberg, 28.-30.11.2017
 Look at the IBH-CNCore 9005 live at SERCOS exhibition stand hall 2, booth 440



IBH Automation Gesellschaft für Steuerungstechnik mbH
 Enzstraße 21 · D-70806 Kornwestheim · Germany
 Fon: +49 (0) 7154/8216-0 · Fax: 8216-26
 e-mail: info@ibh-cnc.com · www.ibh-cnc.com



IBH-CNC-Innovations reliable from experience.



Harmonic Drive AG



Hoenbergstrasse 14 | 65555 Limburg | Germany
 ☎: +49 (0)6431 5008-214 | 📠: +49 (0)6431 5008-119 | www.harmonicdrive.de

YukonDrive® – universal servo controller

The YukonDrive® is designed to operate with superimposed CNC controls featuring cyclic set point selection via bus systems. At all times, the modularity of the YukonDrive family ensures optimum integration of the servo axis into the machine process. Whether in high-speed fieldbus communication with a central machine controller or with distributed motion control intelligence in the servo controller – the YukonDrive is a master of both. Optimized for the lower power range, the YukonDrive offers maximum capacity in four compact designs.

The integration of high-speed fieldbus systems and the latest encoder interfaces such as the digital EnDat 2.2 or HIPERFACE DSL interface ensure that future security and flexibility continue to be at the forefront of development. Comprehensive motion control functions provide a variety of possible solutions. Complete plug connections ensure fast installation and commissioning.

Its SIL3-certified STO function means that the YukonDrive® can be integrated into safety concepts.



Ing.-Büro Heintl GmbH

Bachstrasse 5 | 85406 Zolling | Germany
 ☎: +49 (0)8167 69525 | 📠: +49 (0)8167 69524 | www.FEM-Heintl.de

Fiberoptic components for Sercos I and II

Product features:

- For data transmission over POF-fibers
- F-SMA-connector
- High reliability and ruggedness
- Metal and plastic housings available
- Up to 16 Mbit/s

The model range of fiber emitters and receivers for data transmission via POF fibers with SMA connectors is applicable for Sercos® I and II systems with data rates up to 16 Mbit/s. Metal and plastic housings are available alternatively. The metal versions show extremely high ruggedness both against mechanical stress and as far as EMI is concerned. The housings are either soldered or bolted to the PCB. Alternative fiber connectors such as ST or „Red-Link“ are available, too.



Lenord, Bauer & Co. GmbH



Dohlenstrasse 32 | 46145 Oberhausen | Germany
 ☎: +49 (0)208 9963-123 | 📠: +49 (0)208 676292 | http://www.lenord.de

Positioning drive with through hollow shaft

Product features:

- Aluminium housing
- Nominal torques 5 Nm, 7 Nm, 10 Nm
- Absolute multiturn encoder
- 24 V DC supply voltage
- Operating temperature range to +60°C

of the manual drives to automatic positioning systems is significantly simplified.

The PowerDRIVE GEL 6113 has a hollow shaft with an inside diameter of 20 mm. With the aid of slotted double clamping rings, the dimension is reduced by up to 10 mm. Plants using the PowerDRIVES with integrated Sercos® III interface or the PowerDRIVE system with a Sercos module can be optimized significantly.

Positioning drives with continuous hollow shaft permit the direct replacement of handwheels without mechanical modification of the spindle shaft. In this way the conversion



Renesas Electronics Europe GmbH



Arcadiastrasse 10 | 40472 Düsseldorf | Germany
 ☎: +49 (0)211 65030 | www.renesas.com

RZ/N1 series – multiprotocol communication SoCs for industrial networks

Product features:

- Multicore ARM® architecture integrated R-IN engine
- Integrated five-port Gigabit Ethernet switch for single-chip support of leading industrial network protocols and network redundancy protocols
- Ecosystem supporting easy exchange between various industrial Ethernet protocols
- Line-up comprising three product groups for scalability from the high end to the low end

Renesas is positioning the new RZ/N1 series as a single-chip solution offering support for the leading industrial network protocols and the latest network redundancy protocols used in factory networks. The new RZ/N1 series of industrial networking communication SoCs (System on Chip) simplifies network-based application development. It is ideal for use in industrial network devices such as network switches, gateways, programmable logic controllers (PLCs), operator terminals, and remote I/O units. The RZ/N1 brings together multiple industrial networking technologies within a single chip, enabling system manufacturers to develop systems supporting a variety of industrial network protocols and network redundancy protocols in less time. Among others, the Sercos® protocol is supported.



Texas Instruments Germany



Haggertystrasse 1 | 85356 Freising | Germany
 ☎: +49 (0)8161 800 | www.ti.com

AMIC110 industrial communication engine (TMDXICE110)

Cost and form-factor optimized reference design for I/O devices and sensors supporting multiple protocols in one single chip. The Sitara AMIC110 ARM® Cortex™-A8 micro-processors include one programmable real-time unit and

industrial communication subsystems (PRU-ICSS) created specifically to enable real-time industrial communications capability (between master and slaves) supporting popular protocols, such as Sercos® III.



WITTENSTEIN cyber motor GmbH



Walter-Wittenstein-Strasse 1 | 97999 Igersheim | Germany
 ☎: +49 (0)7931 493-0 | www.wittenstein-cyber-motor.de

Intelligent and safe servo amplifier

Product features:

- Power supply voltage: 16–56 V DC
- Compact and space-saving design with protection ratings IP20 and IP65
- Supports communication interface Sercos® III, other leading fieldbus systems are supported
- Intuitive commissioning and diagnostics with PC-based user interface/MotionGUI software
- Wireless and device independent condition monitoring with the integrated web server
- Realization of stand-alone applications by programming individual motion tasks
- STO safety function in accordance with SIL
- Encoder interfaces: BISS C, EnDat 2.2, Hall effect sensor, resolver
- Inputs/outputs: 4 digital inputs, 2 digital outputs
- Fast current measurements with high-resolution current control: 8 µs/14 bit

simco® drive is an intelligent low voltage servo amplifier for sine-commutated servomotors with up to 2,500 W continuous power. The drive is available in IP20 or IP65, which allows the integration into the machine architecture in a flexible, modular way with only minimal cabinet space and wiring required. The integrated safety function STO (Safe Torque Off) to SIL3/ PLe ensures the safe disconnection of the drive system in case of an emergency. Thanks to intelligent software features like condition monitoring via an integrated web server or decentral implementation of motion tasks (decentral intelligence) simco drive increases the transparency and productivity of the drive system. With a high-resolution current control, the simco drive is suitable for high precision applications, e.g. in the machine tool, electronic or packaging industries. In combination with several servomotors simco drive offers a perfect solution for safe, efficient and smart applications.

Freedom and efficiency in engineering

Your move?

We're in.

i 4.0
CONNECTED INDUSTRY

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Would you like to discover a new level of flexible and efficient engineering? We're in! With Open Core Engineering we provide you with powerful solutions: software tools to support workflows, function toolkits to simplify processes and open standards for future proof Industry 4.0 automation solutions.



Bosch Rexroth AG
 boschrexroth.com/oce

The Drive & Control Company



Industrial Raspberry Pi open-source revolution with Sercos III interface

In the scope of Industry 4.0 and industrial Internet of things (IIoT), the demands on the control level are changing dramatically. On the one hand, the demand for decentralized control systems (and communication in general) will increase sharply, on the other hand, completely different applications will be integrated into higher-level networks.



Building automation and control, event technology, IIoT requirements, private control tasks, monitoring technology, process automation and automation technology move together.

Decentralized solutions are becoming more important and this is accompanied by the demand for low-cost, scalable and industrial-grade small controllers. In addition, there is a great demand to connect these small controllers to industrial networks such as Sercos®.

The demand for open-source solutions is also growing and cloud solutions will soon become standard in the industry.

But how can such a solution look like?

Revolution Pi

Revolution Pi is based on a Raspberry Pi Compute Module and like the rest of the RevPi family is designed according to the EN 61131-2 standard. It is supplemented by digital and analog I/O modules as well as suitable Ethernet and fieldbus gateways (e.g. Sercos III). The hardware and soft-

ware is open-source: all schematics and source codes are available to everyone.

The core of the family is RevPi Core. The RevPi Core is a small computer based on the Raspberry Pi Compute Module, which has USB, Ethernet and HDMI ports. Its DIN rail housing contains a rugged 24 V industrial hardware, which complies with the EN 61131-2 standard. This hardware therefore meets all the requirements for a fully-fledged, industrial-compatible small control system.

RevPi Core is an open platform on which everything running on a Raspberry Pi can be installed, from the operating system to applications. By default, Raspbian (with real-time patch and suitable driver for the expansion modules) is preinstalled as an operating system. On this basis, users can purchase a Soft PLC from logi.cals and SCADA software PROCON-WEB IoT among other things directly from an online shop. These components enable users to have a complete and operational PLC.

Because of its modular structure, PiCore can connect digital and analog input and output modules as well as

certified gateways to all important fieldbuses such as Sercos III.

Process image

All cyclically exchanged process data originate from a central process image in the RevPi Core or is stored there. This is a memory area in which the process data is stored at predetermined addresses. The process data can be exchanged not only via the PiBridge, but also via USB, Ethernet or the GPIO ports of the compute module. Developers can write to or read from the process image by simply calling the operating system. Connected gateways such as Sercos III also exchange their data with the RevPi Core.

Own software?

The open-source idea also allows you to use your own software and program under Linux with Python. For this purpose, our drivers and the operating software can be used, as well as all process data can be accessed.

Developers can write their own application programs using Python, C or other programming languages and the tools known for Raspberry Pi, using Linux functions to access the process image.

I/O modules

The I/O modules are available in four versions, all of which have the same 28-pin I/O connector on the front side:

- The standard version RevPi DIO has 14 digital inputs and 14 digital outputs.
- The special version RevPi DI has 16 digital inputs and no outputs.
- The special version RevPi DO has 16 digital outputs and no inputs.
- The analog version RevPi AIO has four analog inputs, two analog outputs (optionally as current or voltage interface) and two RTD/PT100-1000.

In all four versions, the inputs and outputs are galvanically isolated from the logic part. All four versions are protected against interference, polarity reversal or overvoltage in accordance with EN 61131-2 and can be operated (like the RevPi Core) between -40 and +50°C ambient temperature and up to 80 percent relative humidity.

The power supply operates with an input voltage of 10.2 V to 28.8 V and requires a maximum of 50 mA.

Modular gateways, Sercos III

The Kunbus modular gateways were previously used to

connect industrial networks with different network protocols (e.g. a Sercos III network with a Profinet network). The approach of placing the individual protocols in separate DIN rail modules provides great flexibility, as all available protocol modules are compatible with each other. The advantage of the modular structure is the cost factor when the technical conditions in the field change. Whereas conventional gateways, for example, have to be completely replaced when changing networks, our system only replaces the module of the affected network.

These gateways can also be used to connect Revolution Pi to a Sercos III network.

The Sercos III Gateway (slave) is simply plugged onto a DIN rail next to the RevPi Core and connected by means of a jumper.

The (slave) Gateway is housed in a plastic housing with dimensions of 22.5 x 101.4 x 115 mm W x H x D. The module is supplied with an operating voltage of 24 V, whereby the power consumption is less than 3 W (100 mA). The module has two RJ45 plugs for connection to the Sercos III network. Up to 512 bytes of I/O data can be exchanged with the RevPi Core. The data is stored in the process image of the RevPi Core and is available to other applications. The complete ecosystem has IP20 protection class. The Sercos III modules have been tested and certified by Sercos International e. V.

The future: The roadmap of Kunbus GmbH also includes the integration of the Sercos III master stack into the Revolution Pi.

Revolution Pi is a concept

Revolution Pi is on the one hand the idea to provide a low-cost industrial version of Raspberry Pi under open-source-conditions and to make it a community-based project. On the other hand, the Pi revolution is intended to advance the fourth Industrial Revolution.

So the PI revolution is many things. It is:

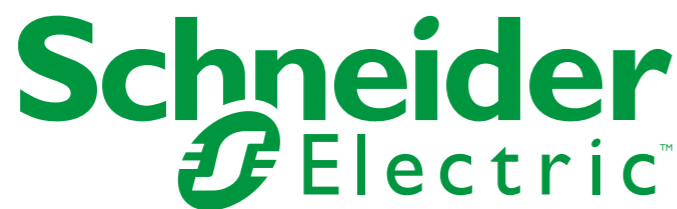
- A Raspberry Pi
- An industrial PC (IPC)
- A PLC
- An IoT gateway
- A web server
- One software platform
- A small control unit for a HMI
- A Cloud solution

And all this with a certified Sercos III connection.

Schneider Electric's PacDrive 3 technology

Schneider Electric's PacDrive 3 technology incorporates the advantages of the latest technologies into a proven concept for controlling modern production, assembly, and packaging machines with a motion/robotic component. PacDrive 3 unifies PLC, IT, and motion functionalities on a single hardware platform and is one of four hardware platforms of MachineStruxure, Schneider Electric's solution package for general machinery applications. PacDrive 3's scalable controller performance allows economical automation of applications ranging from small systems with only a few servo axes to high-performance solutions with up to 130 servo axes including multirobot applications.

With Sercos®, Schneider Electric has created a fully Ethernet-based communication solution for PacDrive applications. Enabling communication with both drives and field devices, Sercos also smoothes the way for the integration of safety automation: In PacDrive 3, standard communication and safe communication merge into one – Sercos is the basis. The Safe Logic Controller Modicon SLC permits programming of the safety functions, the Modicon TM5/TM7 safe I/O system is connecting safety signals to the SLC.



Schneider Electric SAS Head Office
35, Rue Joseph Monier • F-92500 Rueil-Malmaison • France
Phone: +33 (0) 1 41 29 70 00 • Fax: +33 (0) 1 41 29 71 00

www.schneider-electric.com

A hot August in Asia

In August, Sercos International attended two roadshows in Japan as well as the Automation Expo in Mumbai, India. This year, the biggest and most important trade show for automation in India recorded some 50,000 visitors, with more than 20,000 products and more than 800 exhibitors.



Sercos International attended the event with a joint stand for the sixth time, and in addition to its range of products, presented a variety of demonstrations based on Sercos® III. From August 9 to 12, the user organization recorded numerous contacts with manufacturers and users in relation to new product developments, possible uses, as well as technological and market trends.

With a presentation on the impact of Industry 4.0 and IoT on the further evolution of industrial communication, the second IIoT conference was also well attended and a great success for Sercos.

The Industrial Open Network (ION) roadshows took place in Tokyo on August 24 and Osaka on August 29.

With approximately 1,000 visitors in Tokyo and approx. 500 participants in Osaka, these events have become a compulsory fixture. The visitor numbers were approximately 30 percent higher in comparison to last year. Industry 4.0/IoT, OPC UA and TSN are important topics in Japan and attracted many visitors to the Sercos stand, where demonstrations on these topics were provided.

In both cities, Sercos contributed to a well-attended seminar on IO-link, which was the subject of strong interest.

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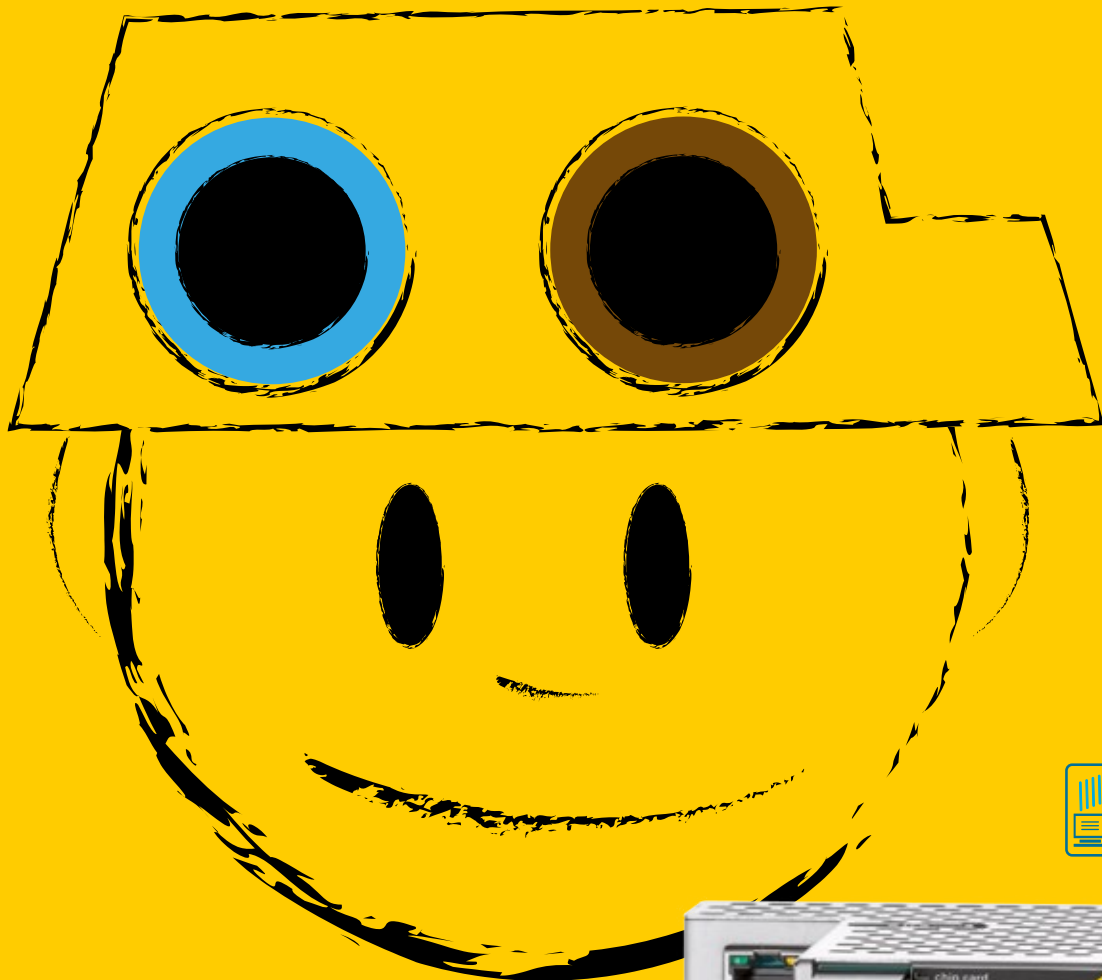
☎ : +49 (0)7162 9468-65
✉ : +49 (0)7162 9468-66
info@sercos.de
www.sercos.org

Editing and Design

MILANO medien GmbH
Hanauer Landstrasse 196A
60314 Frankfurt am Main
Germany

☎ : +49 (0)69 4800054-0
✉ : +49 (0)69 4800054-9
info@milanomedien.com
www.milanomedien.com

Safety@work!



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Simple safety technology for greater efficiency

- > Safety technology with AS-i Safety at Work: only one cable for data and power - easy to use, independent of system and manufacturer, approved
- > PLC connection via all common fieldbuses, all diagnostic data in the controller, safety and standard signals mixed
- > Safety Gateways for use as Safety Slave (in combination with a safety controller) and as Safety Master (for safely controlling drives without an additional safety PLC)
- > Safe Link over Ethernet: The simplest way of coupling many safe signals
- > Universally expandable with Safety I/O Modules + Standard I/O Modules in IP20 or IP67 and with a multitude of other modules for a wide range of applications



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