People | Power | Partnership

Edition II/2019

tec.news

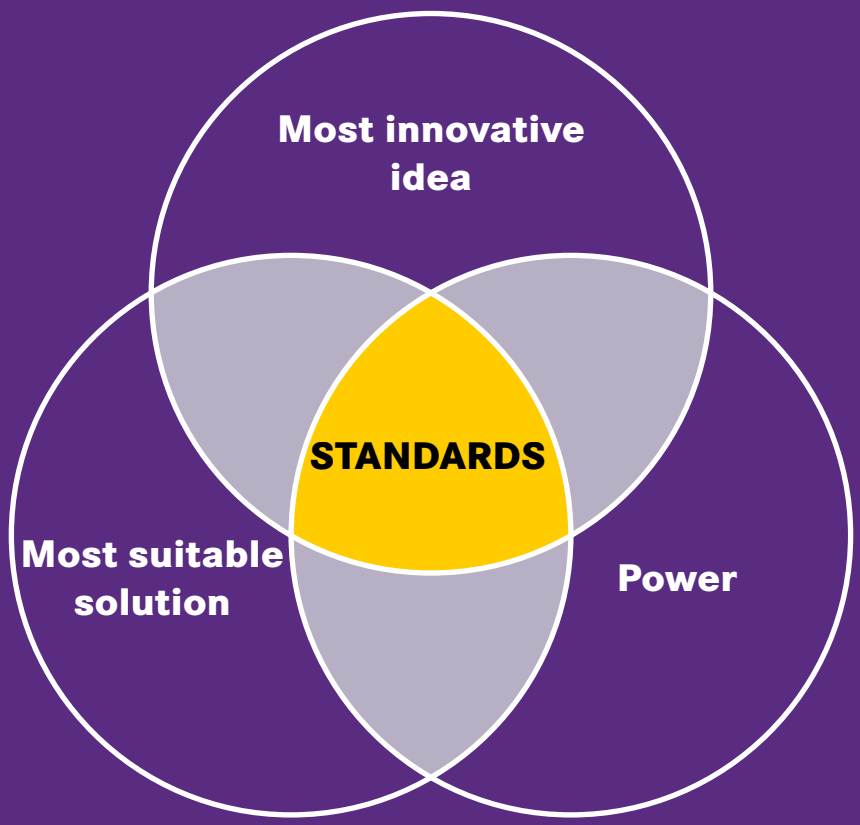
HARTING's Technology Newsletter | 37

TIME TO SET NEW STANDARDS.

About the disruptive power of innovation.

HARTING®
Pushing Performance

3 steps
to set standards in the market.



Those who develop innovative ideas from ideal solutions and have the power to establish them, will set new standards.

Shaping the future **with new standards**

Dear readers,

Standards in the industrial sector are multi-layered and affect the entire lifecycle of industrial solutions. Certainly, the pinnacle of discipline here is to set standards through innovations. In many instances, however, standards also make it possible in the first place to integrate new solutions into a system environment. Standards are also of significance when designing solutions, since, for example, certain materials or precursor products may be required to be used in order to fulfil associated standards already in place.

I am firmly convinced that, today, three steps are necessary in order to set standards and thus be successful within this elite discipline in the marketplace:

1. First and foremost, one needs the **most innovative idea.**
2. It is also necessary to implement, introduce and establish the idea with **power.**
3. Finally, there is the task of creating the **most suitable solution** and to position it on the market.

Here, HARTING's motto is: Pushing Performance!
This era of Integrated Industry is seeing the industrial sector transition towards open standards. These enable others to participate and at the same time mutually support one another in partnership.

As a consequence, setting these open standards is providing benefits to everyone.

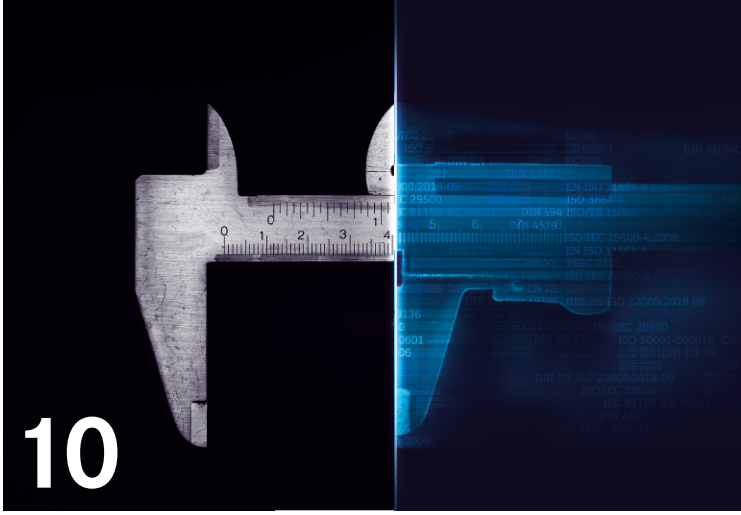
This central proposition runs like a red thread through our present edition of tec.news.

Here's wishing you enjoyable reading,

Philip Harting

Philip Harting,
Chairman of the Board

Leading HARTING figures interviewed: Dr. Andreas Starke (left), General Manager Intellectual Property, and Dr. Stephan Middelkamp, General Manager Quality Management



How are standards created?

CONTENT

STRATEGY

Dr. Andreas Hölscher,
Senior Vice President Product Development, Festo AG & Co. KG

SOLUTIONS

Setting standards together with users: Standards are becoming increasingly important. This applies in particular to new modular factory and manufacturing concepts.

Reliable delivery of goods thanks to state-of-the-art technology in the HARTING European Distribution Center

APPLICATIONS

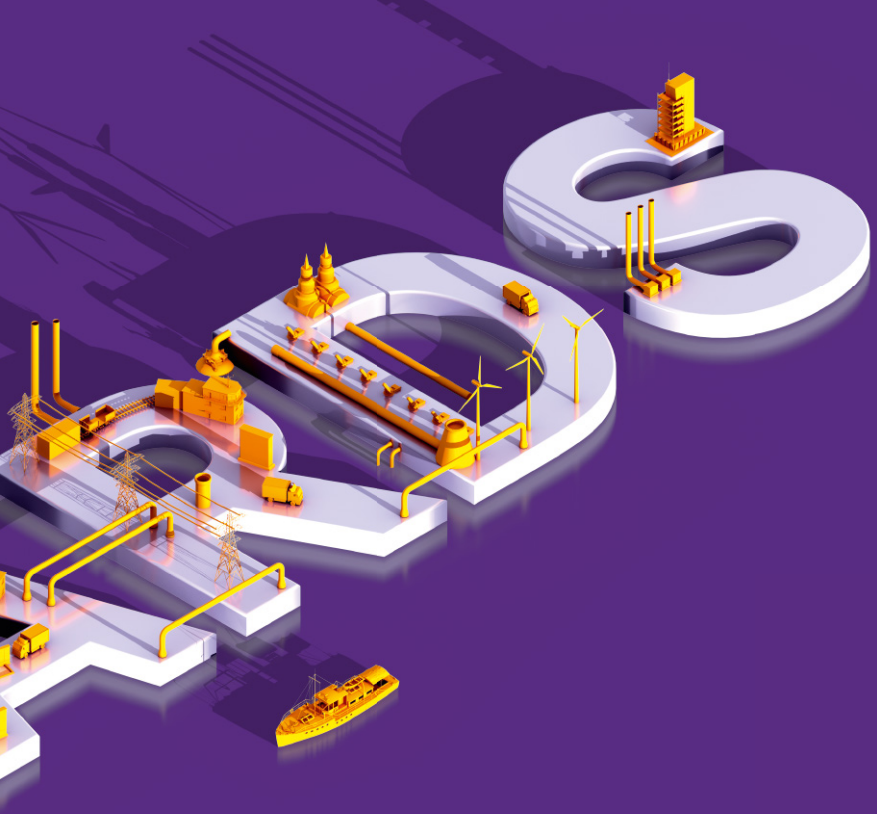
IN SHORT

INTERVIEW WITH DR. ANDREAS STARKE, DR. STEPHAN MIDDELKAMP

THE FOUNDATION FOR **GROWTH:**

Dr. Stephan Middelkamp,
General Manager Quality Management,
Stephan.Middelkamp@HARTING.com

Dr. Andreas Starke,
General Manager Intellectual Property,
Andreas.Starke@HARTING.com



Standards – in the sense of a common denominator between user and provider in order to define a common solution – are encountered everywhere and every day, both at work and at home. But why is it important for a company, and crucial for its future, to set standards? Here, a consideration on different levels and from the perspective of the user and the provider is particularly interesting during the course of the development of new technologies. What steps need to be taken to "shape the future with technologies for people" in accordance with the HARTING vision and to provide impulses for the industrial sector? tec.news spoke with Stephan Middelkamp, General Manager Quality Management at the HARTING Technology Group, as well as with Dr. Andreas Starke, General Manager Intellectual Property at HARTING.

tec.news: Why is there a need for standards?

Dr. Stephan Middelkamp: Imagine if you could produce a power outlet at home that's tailored to your needs. As tempting as this may sound, it becomes problematic once you start to put up the house's infrastructure. At the latest, I would need to recognise in the electronics store that the devices I want to buy don't fit into my outlet, that the project has failed. Standards therefore serve to ensure cross-manufacturer compatibility. The degree of dissemination of a product or a solution increases when things from multiple manufacturers fit together and can also interact within a system.

Standards serve to ensure cross-manufacturer compatibility.

Dr. Andreas Starke: This describes the perspective of the user. From a supplier's perspective, investment protection should be mentioned first and foremost. When I invest in a technology, the more that other users choose the same technology, the lower the risk. If the spare parts are standardised on top of that, I'm basically safe.

Dr. Andreas Starke, General Manager Intellectual Property

tec.news: Looking at new technologies raises the question of whether the future needs different standards than those of today?

Dr. Stephan Middelkamp: It's perfectly normal for a saturation level of standards to be reached at some later point in time. New technologies are creating new possibilities, so taking the step to the next level in the innovation cycle is necessary. This becomes clear in the following analogy: man learned to fly and produced the innovation "airplane" out of this. Its dissemination was followed by the production of variations – freight aircraft, passenger aircraft, which have become larger and faster over the years. No massive changes have taken place since then. In order to initiate another phase of innovation here, for instance, drone technology would have to be further developed in this direction. Behind every standard is an idea, and behind every idea are creative minds who have implemented this idea.

An idea alone is not enough.

Dr. Andreas Starke: It's important to emphasise here that an idea alone is not enough. Because, beyond just the idea alone you need investment and engineering to create new products. Only then can standards be established in the market.

tec.news: How has HARTING positioned itself?

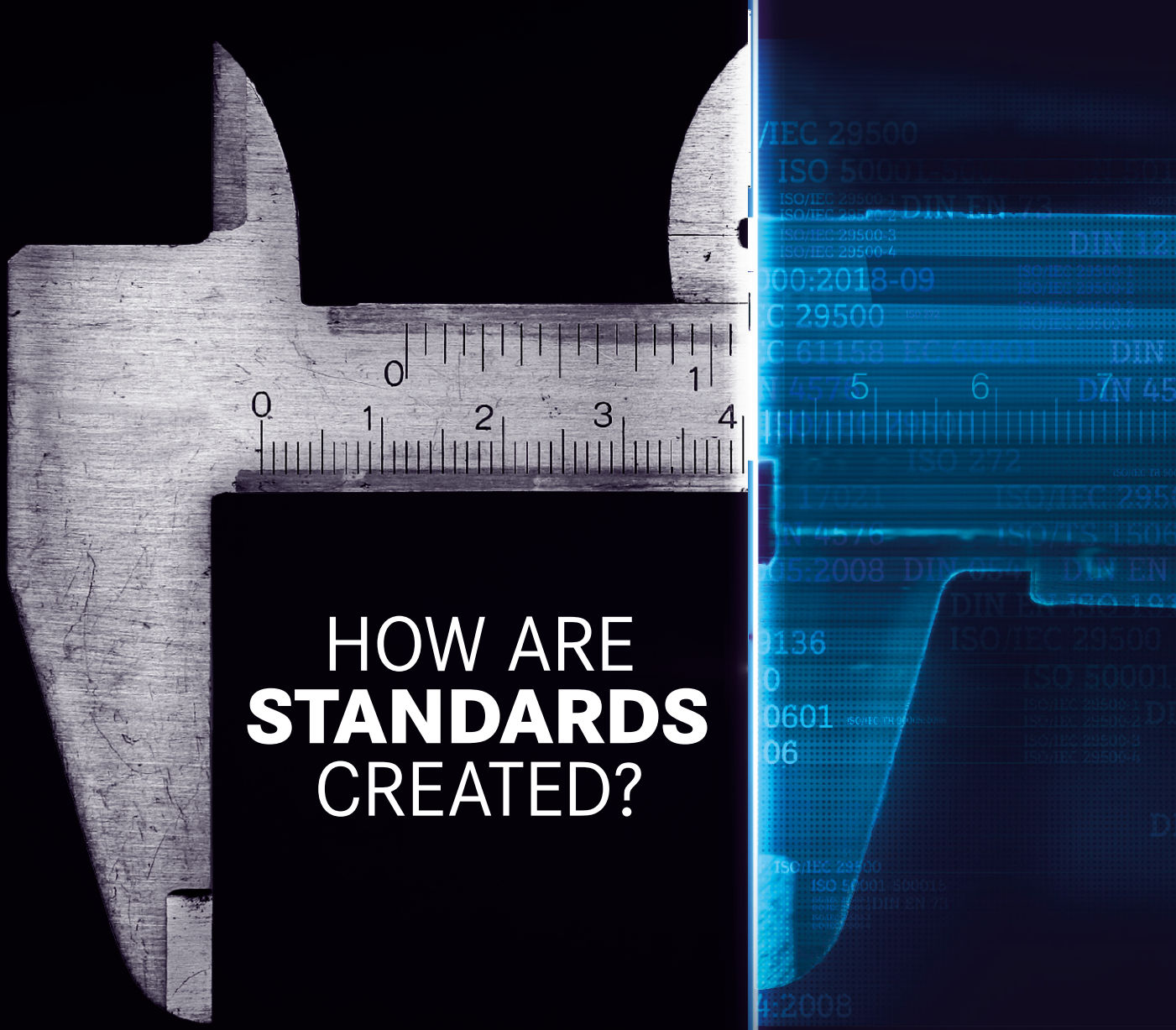
Dr. Andreas Starke: Our minds play a key role in the identity of our company. They've created standards such as our Han® connectors – which have been in use for generations – and are visible in the area of PushPull circular connector systems, and have launched the RJ Industrial as an industrial variant of the RJ45.

Dr. Stephan Middelkamp: We're also well positioned in the context of future technological changes and their respective challenges, and we will continue to set standards. Our commitment to E-mobility and data centres is just as important as the IoT (Internet of Things) area, where we're establishing new connectors. For us as a technology group, our focus is on access to the market and proximity to the customer. These factors distinguish us in order to generate benefits and promote standards together with the user in the application. ■

DISCUSS THE TOPIC STANDARDISATION WITH OUR EXPERTS ON

www.tecnews.digital

Dr. Stephan Middelkamp, General Manager Quality Management



HOW ARE **STANDARDS** CREATED?

Dr. Andreas Starke,
General Manager Intellectual Property,
HARTING Technology Group
Andreas.Starke@HARTING.com

Standardisation is an aid for driving innovation on the market, particularly when the standards in question are product standards. The annual DIN Connect Pitch is testament to this. This is a forum for young entrepreneurs – from the Berlin start-up scene in particular – to introduce products that are almost fully developed and to address a standardisation relevance that has been precisely formulated for these products. These entrepreneurs understand the leverage effect of standards and the benefits of utilising them for their products.

Most of the standards that are relevant for HARTING come about as a result of collaboration between experts within the IEC or the DKE, the German member of the IEC. Equal participation by all interested parties together with consensus are the most important basic principles here. What can basically be deduced from this is that everyone can participate in the development of standards. By implication, this means that standards are designed by those that participate. The employees working for the organisations mentioned above play no part in developing the contents of standards. "We monitor what happens in standardisation" – meaning that what actually happens is left to others, and to the market players in particular. The statement that "Anyone who doesn't standardise is standardised" is still a valid point.

Standards are designed by those that participate.

This is because it puts the onus on the relevant organisational units of a company to get actively involved. At HARTING, this particularly applies to the Connectivity product divisions and to target market segments that have been defined as strategic. Here, the size of the workforce does not play a role. As previously mentioned, this is something that even start-ups can afford.

It is often said that standardisation is tedious and that bureaucratic processes within consensus-based organisations like the IEC and DKE are a contributing factor in this. Previous standardisation projects that involved the author have shown that bottlenecks are not the formalities of standardisation organisations, but rather a lack of a willingness to compromise among participants or a lack of solid input on their part. The latter is partly caused by companies dispatching employees without a clear mandate and/or without direct internal responsibility for the topic of standardisation.

It must be understood that it takes longer to conclude a standard that is based on the principles of consensus and participation by all interested parties than it does to conclude a standard that is based on restricted participation and consensus. Taking the resulting limited level of acceptance into account, however, the IEC and DKE long ago put in place a means of deriving such "agreements". In the DKE, there is the "application rule" and in the IEC, the "Publicly Available Specification" (PAS) – both of which serve as a means of quickly creating an official document that is published by a standardisation organisation and capable of being referenced.

The same general principle applies here, i.e. that the contents of such a document will be based exclusively on what has been actively contributed by the participants. In the case of product standardisation the effectiveness of a company-internal development department is what governs the pace here. ■

STANDARDS ENABLING NEW SERVICES

Dr. Andreas Hölscher is Senior Vice President Development at Festo AG & Co. KG and therefore in charge of product development. In an interview with tec.news, he spoke about the need for standards in the area of Industry 4.0. In an age of new technologies and services, Hölscher considers standards-enabled interoperability as being necessary to function in heterogeneous systems.

Dr. Andreas Hölscher,
Senior Vice President Product Development,
Festo AG & Co. KG

tec.news: What are the goals that have to be achieved in the age of I4.0 based on standards?

Dr. A. Hölscher: Within the context of I4.0, the overall range of applications within products will only be viable for customers if components from different users work together and communicate with each other relatively easily. This is also necessary, because no supplier can cover everything or solve all the currently relevant problems within automation technology. Uniformity and consistency need to be used to prevent us from causing a situation comparable to the fieldbus war of the time.

> ***In the context of I4.0 there will be a side-by-side or co-existence of norms and manufacturer-specific standards.***

tec.news: What mission has Festo set itself?

Dr. A. Hölscher: We want to achieve functionalities that the customer can experience – the communication level in the factory has no added value for the customer. It just has to work for them. And accordingly, we have to be compatible with fieldbus protocols in different markets. If we, as an industry, establish standards for the software and service areas, we create the opportunity and the platform for other market participants to further enrich this segment.

tec.news: Will future industry standards be determined by standardisation bodies, or will de facto standards prevail?

Dr. A. Hölscher: We have to ask ourselves the question that needs to be evaluated technically: where, how, and which standards will prevail? In my opinion, in the context of I4.0 there will be a side-by-side or co-existence of norms and manufacturer-specific standards. At Festo, we actively collaborate within organisations that set and normalise standards, because an open standard is always better than a purely proprietary solution for the industrial sector. At the same time, we will actively promote solution concepts as a possible standard. One thing is clear: it won't necessarily be just one standard that will prevail. It could also be one that's different from the one considered to be ideal. Today, to avoid being overtaken by the market, you have to look at several solutions in order to reach your goal. Moreover, a standard won't simply automatically establish itself. If market participants don't adapt their products to it, the standard will just remain a piece of paper. ■

STANDARDS AS TRAILBLAZERS WITHIN THE INDUSTRIAL SECTOR

Standards play a major role in industrial environments. Technical solutions first establish themselves at one manufacturer before other companies – often active in adjacent industries – adopt them. The use of a "standard" boosts flexibility when connecting components into larger units. With its Han® connector, HARTING set the benchmark for industrial interfaces early on. When deploying it, users can always be sure that their components are compatible with their respective environment.

Han® AS STANDARD INDUSTRIAL INTERFACE

HARTING was the first manufacturer to discover the need for connectors within the emerging West German industrial sector during the post-war era. In the 1950s, company founder Wilhelm Harting invented a robust and easy-to-use rectangular connector for industrial application. Soon, the product was further developed into the HARTING "Han®" standard. First target markets were mechanical engineering and adjacent fields.

The Han® interfaces were equipped with an increasingly robust connection technology. The developers have continuously optimised the basic components in order to enable the transmission of ever higher voltages and currents. The design was also changed: cone-shaped male contacts and cylindrical, hollow female contacts increased the contact density. At the same time, the cavities for the contacts were modified in such a way that the creepage distances were enlarged, and high-voltage and high-current transmission could be achieved even in the smallest of spaces.

Soon, the industrial sector was using the new standard on a large scale, as it offered clear advantages over alternatives such as hard-wiring:

- With the help of connectors, users can pre-test their systems and reduce on-site assembly time.
- The deployment of qualified electricians for installation and service works is reduced to a minimum.
- The handling of the components becomes more comfortable, thus simplifying the installation and maintenance of machinery.

MODULAR INTERFACES INCREASE FLEXIBILITY

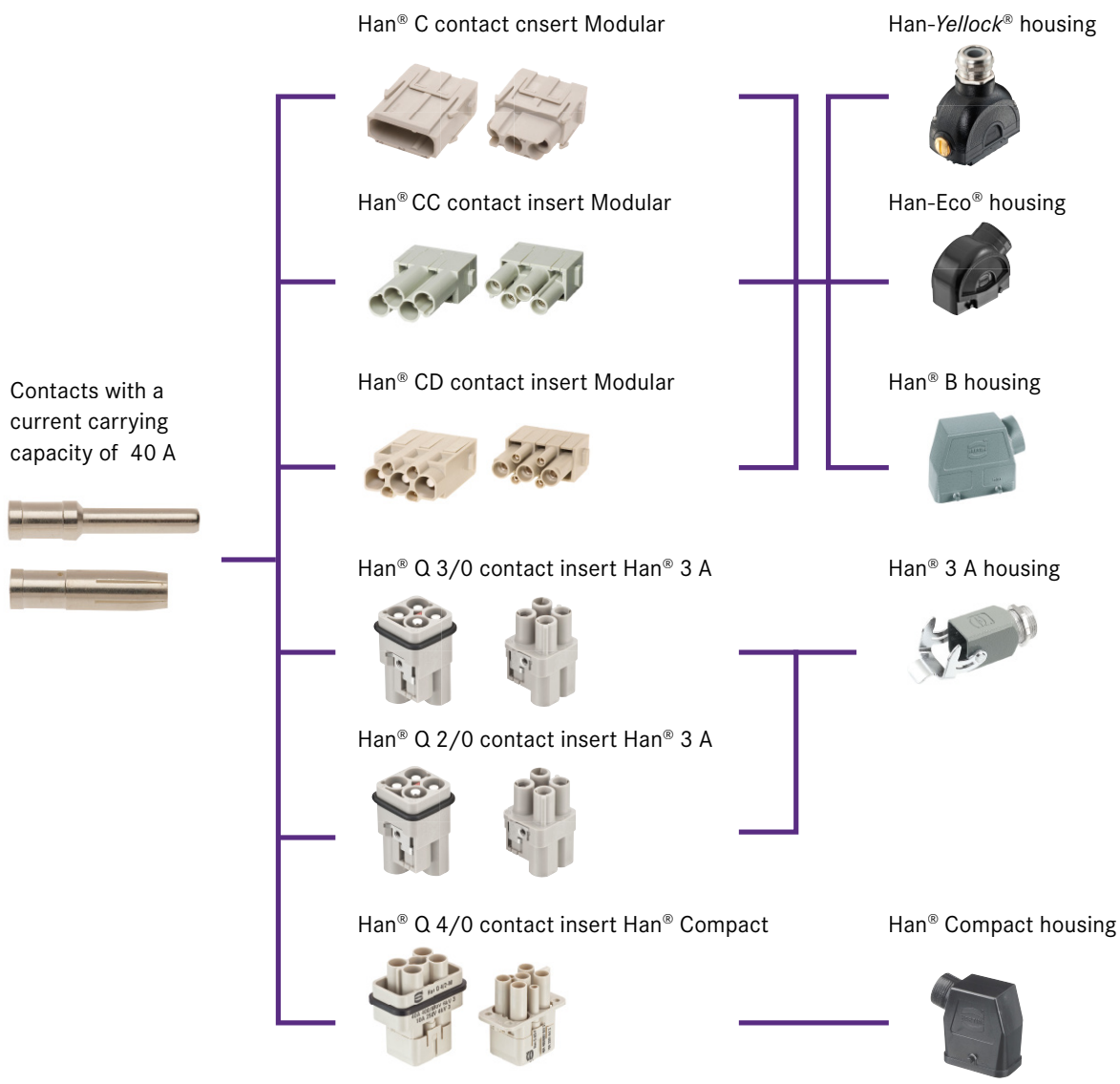
In the 1990s, machine construction became sharply more modularised. HARTING responded with the Han-Modular® range, an innovative system of standard-size contact inserts. Han-Modular® enables the transmission of power, data, signals and compressed air within a connector. Prior to installation in the hood or housing, the modules must be assembled in a hinged frame. Compared to previous solutions, modular connectors increased the flexibility of the system design and facilitated the integration of interfaces into the mechanical environment.

Further development of standards through market proximity.

The new market standard for modular connectors saw HARTING set yet another benchmark. In the more than two decades since the series debuted, Han-Modular® has established itself as a quasi-standard in mechanical engineering. Currently boasting roughly 100 modules, the series provides solutions for a wide variety of requirements.

Volker Uphoff,
Technical Editor,
HARTING Electric, Volker.Uphoff@HARTING.com

SELECTION CHART FOR POWER CURRENT INTERFACES UP TO 40A



HIGH-DENSITY SOLUTIONS FOR ROBOTICS

However, the modular solutions do not substitute the Han® standard connector, a fact that becomes evident in robotics. Robots were first used by the automotive industry. They took over the welding work on car bodies, speeded up production and ensured quality at the same time. Robots require mateable interfaces for quick installation. For this reason, HARTING has repeatedly adopted its connectors to various robot designs, which then became manufacturer-specific standards.

Connectors of the Han DD® series form the manufacturer-specific standard interface between control cabinet and robot.

Contact density was increased to such a degree that high-density solutions became available in the smallest of spaces. The Han DD® series of industrial connectors e.g. form manufacturer-specific interfaces between the electrical cabinet and the robot. The most recent example is the Han® K 32/55 insulation body that transmits power and signals in the smallest of spaces. It accommodates, for the first time, up to 87 contacts in a hood or housing of the standard Han® 10 B size.

JUMPER CABLES FOR THE RAILWAY SECTOR

For years, HARTING has been offering standard-compliant solutions with customer-specific interfaces at rail car transitions, known as jumper cables, which meet the sector's stringent requirements for insensitivity to shocks and vibrations. Han-Modular® offers classic options for the shielded transmission of data and signals: from the Han-Quintax® module for data and signals to the compact and powerful Han® Megabit and Gigabit modules for high transmission rates (up to cat. 7A). Further innovations – e.g. a redone Han-Quintax® module for Ethernet transmission – ensure that HARTING will remain the benchmark for industrial interfaces in the rail market.

CONNECTORS FACILITATE THE CONSTRUCTION OF WIND ENERGY CONVERTERS

Connectors support the modular design of wind turbines. Components can be manufactured in different locations and tested for functionality, before they are connected – for installation at the manufacturer or on-site. Due to their robustness, flexibility and ease of use, Han® connectors were often established as quasi-standard and, to some extent, even as cross-manufacturer standard. Examples include Han® Q interfaces in hoods and housings of size 3A, connecting generator brakes as well as blade pitch and yaw control systems. A unique feature in the nacelle of a wind turbine is the modular slip ring connector, which transmits power, data and signals to the rotor hub. Han-Modular® modules secure this transmission – 3-phase power, one data and one signal module – between a rotating and a stationary component.

FAST CONNECTION FOR MODULAR ENERGY STORAGE

For decentralised power generation plants as well as for the power supply of industrial facilities, HARTING has developed interfaces that contribute to a safe and uninterrupted operation. Modular storage units serve e.g. as an emergency power supply or a buffer to the grid, providing compensational power whenever required. This can result in very high currents.

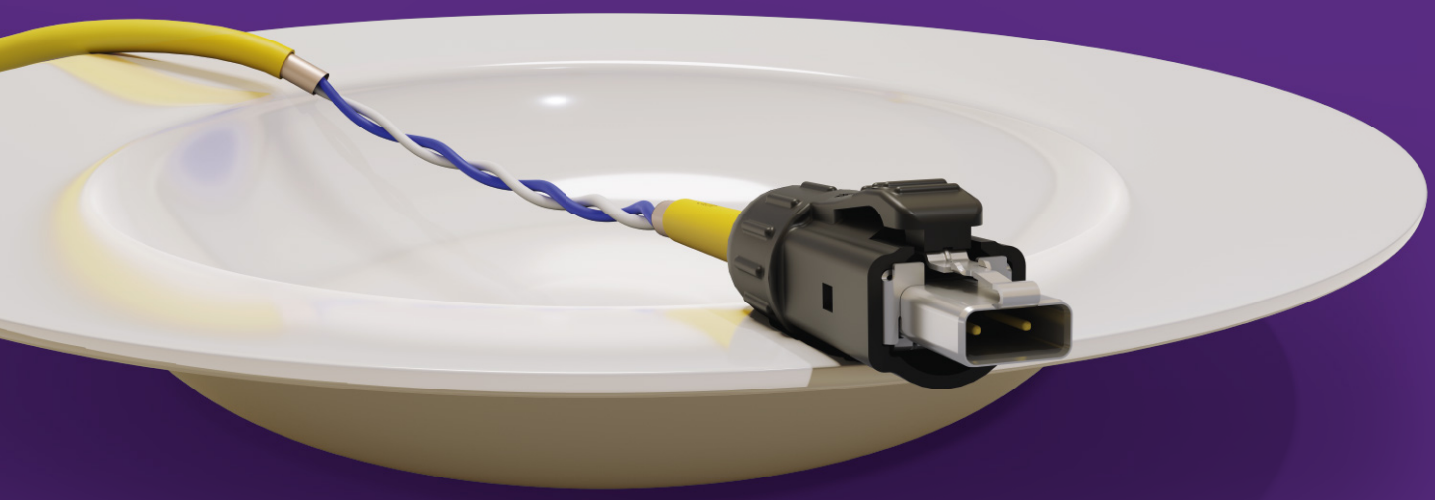
The need for standardisation is accordingly high. Multiple small storage units must be equipped and able to flexibly adapt to different generator sizes. ■

THE CUSTOMER'S VOICE

Michael Schnakenberg, CEO Commeo GmbH

Commeo GmbH from Wallenhorst, near Osnabrück, is e.g. eyeing customers in mechanical and plant engineering for its energy storage systems. "We want to become the first system provider for high-performance storage solutions in the automation world, in the process industry and at manufacturing facilities," says Managing Director Michael Schnakenberg. HARTING was the company's clear favourite when it came to the appropriate interface for the energy storage units. "The recognition factor of HARTING connectors in the industrial environment is a fact. Once they see these interfaces, our customers know that our storage systems will be compatible with their other equipment."

THINKING OUTSIDE **THE BOX**



For Single Pair Ethernet (SPE) and the HARTING T1 Industrial connector, HARTING forged a new path in various standard committees from a very early stage. Ethernet via just one twisted pair is a completely new transmission technology that requires entirely new components in an end-to-end connection. In this context, in accordance with IEC standard 63171-6 valid as of the end of 2019, HARTING is offering the first and only internationally standardized interface for industrial SPE applications. With a look to establishing a uniform ecosystem comprising all the required infrastructure components, this included close coordination with all relevant standards committees. With our users in mind, we have been thinking outside of the box.

While two wire pairs are needed for Fast Ethernet and four pairs for Gigabit Ethernet, these TCP/IP-based data streams can be transmitted through just one wire pair with the new Single Pair Ethernet (SPE). Within the framework of this development, new components are needed in the future devices such as PHYs and Magnetics, but also for the infrastructure of connectors and suitable cables.

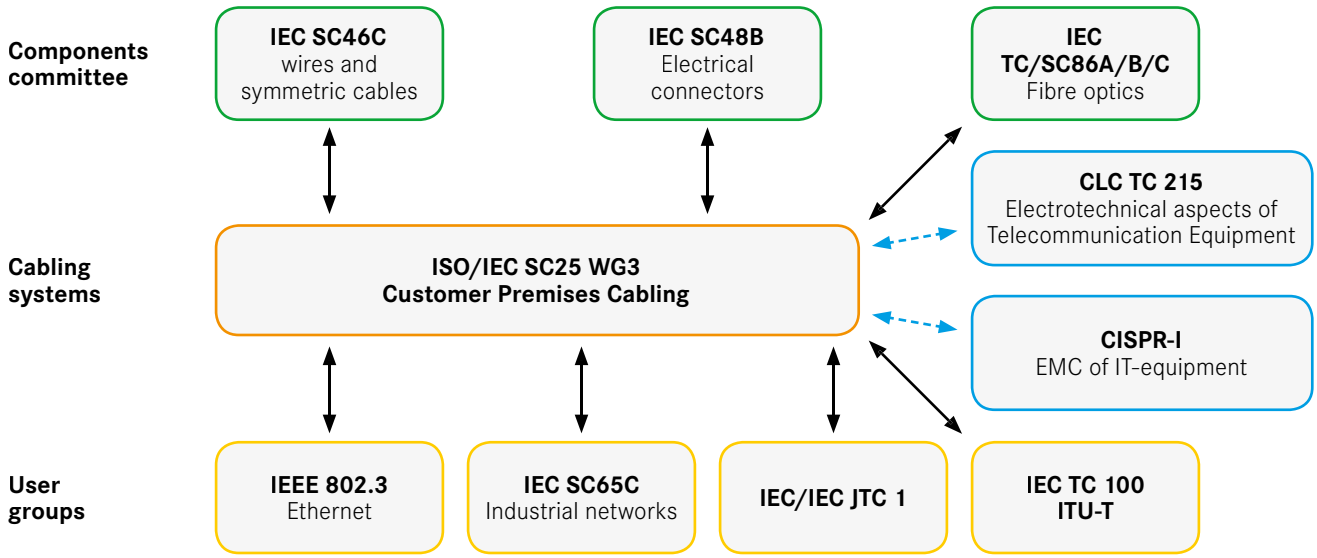
In order to make the advantages of SPE available to all users, HARTING had already submitted the first IEC SC48B draft standard in 2016. This contained a developed connector face for industrial applications fully in line with the requirements of single pair transmission. The draft was published as IEC 61076-3-125 and in a CD document and was integrated into the newly created IEC 63171-x in 2017 and renamed as IEC. This was prompted by additional proposals for SPE connector faces, also for non-industrial application areas. Apart from the name, nothing changed for the standard HARTING submitted. IEC standard 63171-6 Industrial Style is a complete standards document with all the necessary specifications and test sequences and will be published in a final version at the end of 2019. All of the standards that were being completed until that point refer to the basic IEC 63171 standard, and merely contain the different mechanical designs and explanations.

The development and definition of a standard for an internationally uniform connector face proceeded in close coordination with the relevant standards committees concerned with all the additional, SPE-related infrastructure components. As a result, the connector face according to IEC 63171-6 international and ISO/IEC JTC 1/SC 25/WG 3 and TIA42 was defined as recommended SPE device interface for $M_2I_2C_2E_2$ / $M_3I_3C_3E_3$ applications. IEEE802.3 has also incorporated this SPE Interface in IEEE802.3cg as recommended Media Depended Interface (MDI).

INTERACTION OF THE VARIOUS STANDARDS COMMITTEES

The ISO/IEC JTC 1/SC 25/WG 3 committee plays a central role in standardisation. Here, on the basis of IEEE 802.3 standards, cabling standards are created and updated in accordance with ISO/IEC 11801.

OVERVIEW OF STANDARDS COMMITTEES RELEVANT FOR ISO/IEC JTC 1/SC 25/WG 3



SPE CABLING STANDARDS

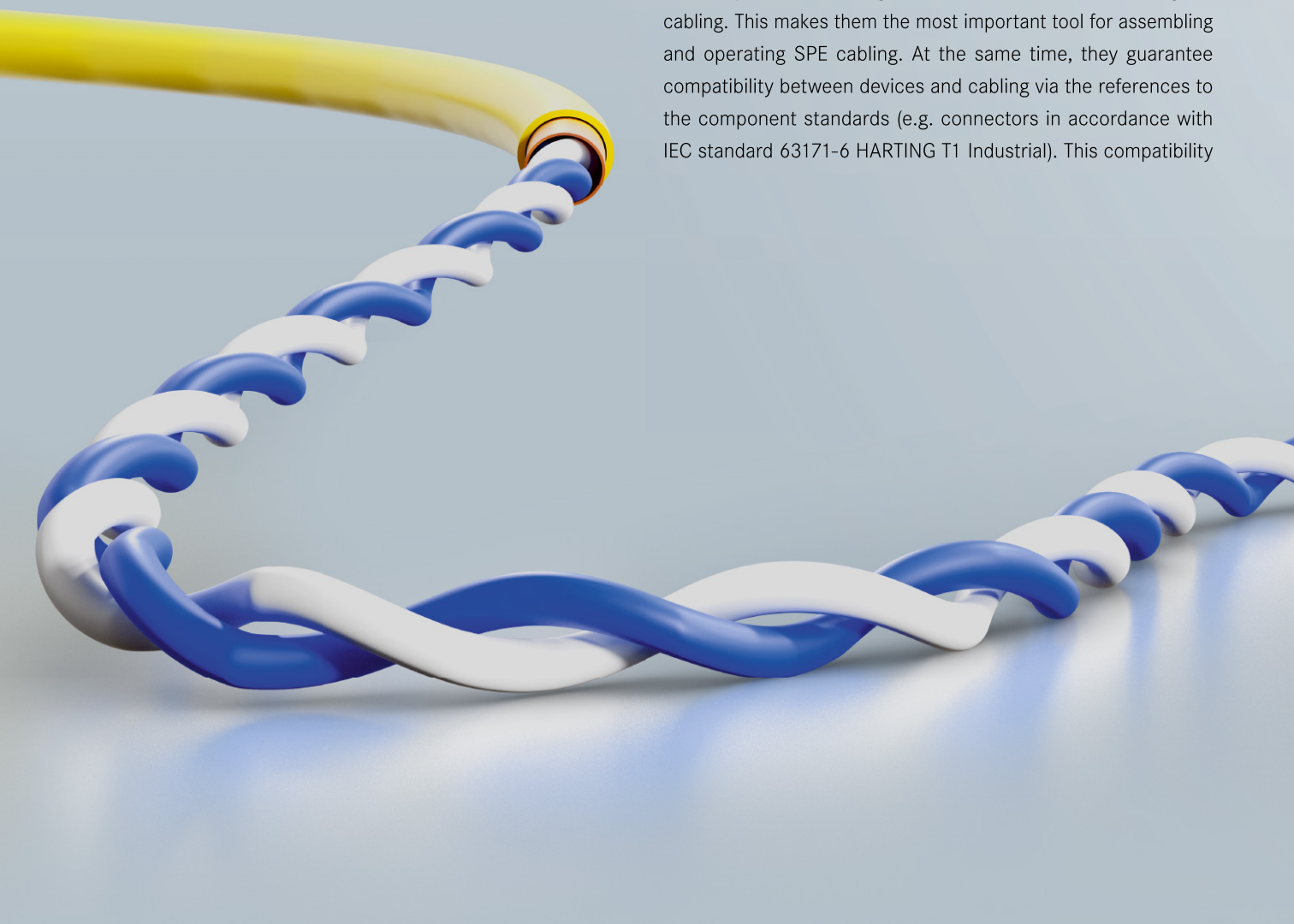
SPE and the respective standardised connectors are being incorporated into the current cabling standards. Internationally, this affects the series of standards for structured cabling in accordance with ISO/IEC 11801 as well as the European series of standards in CENELEC in accordance with EN 50173.

The implementation of SPE in the ISO/IEC 11801 documents is very important, as this is the only standard to describe the cabling channels with all the necessary parameters (length, number of connections, bandwidth and the complete set of technical transmission-related parameters including NEXT, FEXT, shielding properties, etc.) in relation to the MICE environment. This also allows them to be subsequently tested for users using technical measuring equipment after installation.

For the US, Canada and Mexico markets, standards are being prepared for ANSI/TIA-568.5 and TIA TR42.7. In the TIA42 papers, the updated information will be added via the addendum TIA-1005-A-3.

SPE needs completely new components and corresponding standards for interfaces, cables and a new transmission standard.

In conjunction with the standards for connectors and cables, these cabling standards provide users with clear guidelines on the structure of the cabling, the components to be used to achieve performance targets and the limit values for testing the cabling. This makes them the most important tool for assembling and operating SPE cabling. At the same time, they guarantee compatibility between devices and cabling via the references to the component standards (e.g. connectors in accordance with IEC standard 63171-6 HARTING T1 Industrial). This compatibility



is the main requirement for the functioning of networks and connections on the basis of SPE and thus the basis for IIoT. The use of cabling components other than those specified in ISO/IEC 11801-3 Amd.1 is not compliant with standards and runs the risk of incompatibility and functioning problems.

For this reason, ISO/IEC JTC 1/SC 25/WG 3 and TIA 42 started the international selection processes for the definition of uniform interfaces in the beginning of 2018. These were co-initiated by the IEEE 802.3.

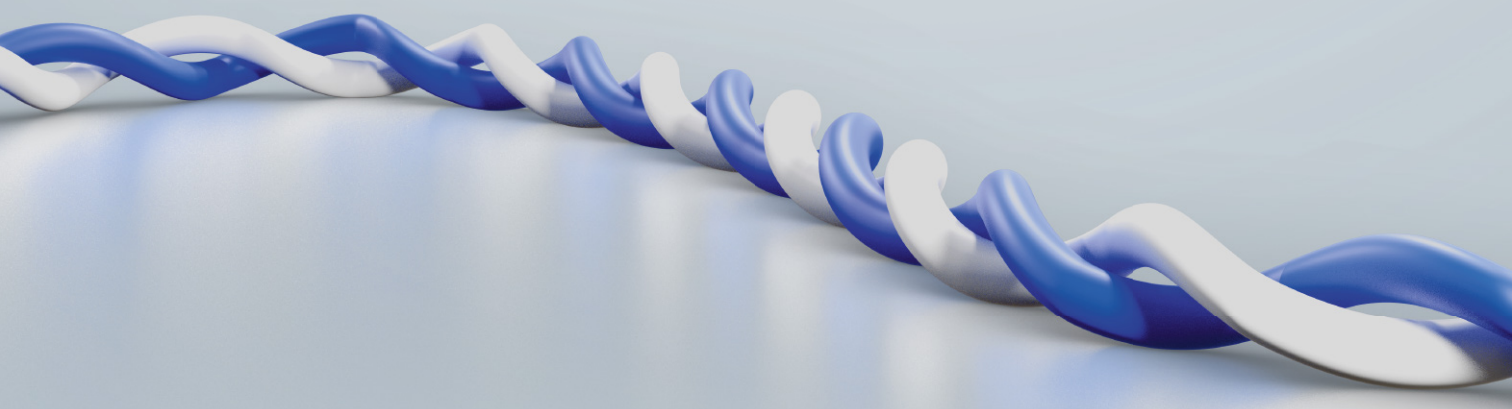
Over 20 expert committees took part in this international selection process of the IEC. Two connector faces emerged from this selection process as the preferred choice:

- for building cabling ($M_1I_1C_1E_1$) the connector face in accordance with IEC 63171-1: CommScope;
- **for industry and industrial applications** ($M_2I_2C_2E_2$ and $M_3I_3C_3E_3$) the connector face in accordance with **IEC standard 63171-6** (previously IEC 61076-3-125): **HARTING T1 Industrial.**

TIA 42 confirmed the results of ISO/IEC, resulting in global agreement on the SPE interfaces. These selected connector faces are now being integrated into the respective international standards.

This paves the way for large-scale use and, thus, the success of SPE technology thanks to the consistent compatibility of devices, cables and connectors in various fields of application. It also provides planning security for all market participants. ■

Matthias Fritsche,
Senior Specialist Ethernet, HARTING Electronics,
Matthias.Fritsche@HARTING.com



STRONG PARTNERS FOR A STANDARD

The glorious seven

Network cabling is the central nervous system of every modern industrial manufacturing facility. Continuous digitisation has seen this nervous system grow ever more extensive and branch out in an increasingly intricate manner. It now extends down to the field level and each and every sensor there, regardless of how small. This growth poses the challenge of smaller interfaces and cables that extend down to the smallest application. I4.0, the IoT, and end-to-end Ethernet from the Cloud down to individual sensors can only become a reality via this new infrastructure.

People I Power I Partnership

Jonas Diekmann,
Technical Editor, HARTING Electronics,
Jonas.Diekmann@HARTING.com

Single Pair Ethernet - SPE - is the solution for the final metres down to the sensor of this end-to-end, uninterrupted nervous system. Since 2016, greater attention has been paid to this future basis of Ethernet connectivity. Furthermore, several networking hardware companies have submitted proposals in standardisation bodies for cables and mating faces. This involvement in standards committees is important and once a standard is established, it acts as a basis for investment for all users. Today, it is increasingly apparent that partnerships, alliances and networks can meaningfully pool competences, forging their respective expertise into an optimum solution for the customer. This is the case in this instance as well.

Well-known industry leaders from cable manufacturers and industrial connectivity are joining forces.

What HARTING began at the Hannover Messe in 2019 via its partnerships with HIROSE and TE Connectivity is now being successfully continued. Under the name "SPE Industrial Partner Network", well-known industry leaders from cable manufacturers and industrial connectivity are joining forces to jointly support and establish on the market the transmission standard IEEE 802.3, SPE cable per IEC 61156-x and a standardised mating face according to IEC 63171-6. In conjunction with new microchips and transformers in end devices, test equipment and a steadily growing user community, an entire ecosystem based on SPE is slated to be developed in the future. All the participants in this ecosystem are invited to become part of the HARTING-initiated SPE Industrial Partner Network. A strong alliance of professionals - working together for the user. ■

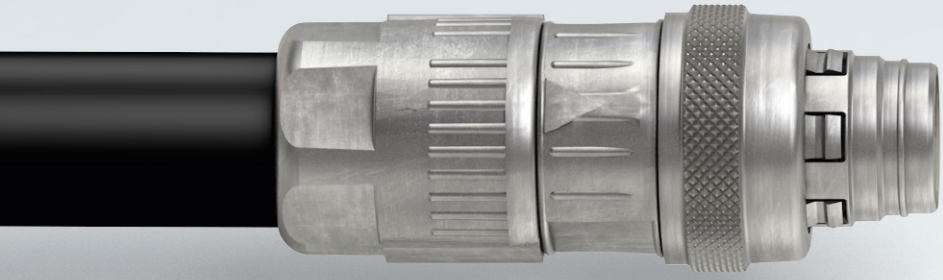
THE SPE INDUSTRIAL PARTNER NETWORK

August 28, 2019 marked the day. Under a common logo, seven founding members (logo collection) agreed on common by-laws, founded a registered association and thus created the SPE Industrial Partner Network. This partner program combines strong brands to jointly communicate and position Single Pair Ethernet (SPE) technology on the industrial market. For the user, this mean the simplest possible realisation of IIoT in conjunction with Single Pair Ethernet, one in which standardisation, components and devices as well as applications are created with clarity and transparency.

SPE Industrial Partner Network

HARTING | Hirose | LEONI | MURR Elektronik | Softing | TE Connectivity | Würth Elektronik

ROUND, FAST, AND NOW UNIFORMLY **STANDARDISED** TO BOOT



M12 circular connectors have long been an established standard in industrial applications. Whether it's automation, mechanical engineering or railway technology applications, the robust interface is equally suitable for use with data, signals and power supply. Despite being a reliable and robust interface, installing the M12 is comparatively time consuming.

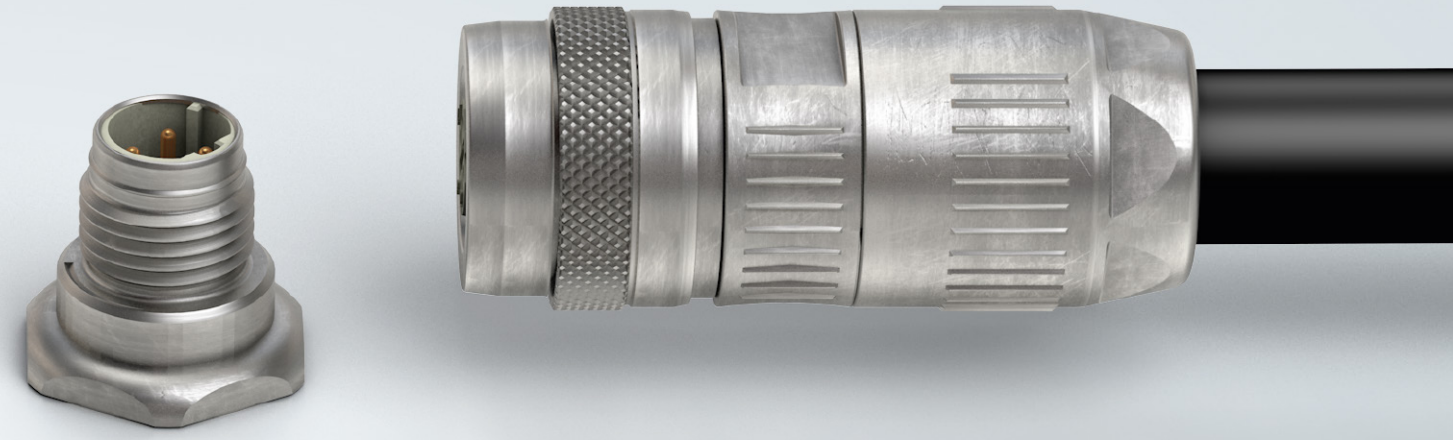
Matthias Domberg,
Product Manager, HARTING Electronics,
Matthias.Domberg@HARTING.com

The classic metric M12 thread always requires some time to be assembled. Additionally, assembly involves tightening with a tool meeting a specific torque, to ensure the required IP65/67 protection class. If several M12s need to be mounted close to each other on a switch, significant time is required. Additionally, if centre-plugged M12s are to be detached, this is only possible once other connectors have been disassembled.

For this reason, a number of years ago HARTING developed the circular M12 PushPull connectors. These first variants latch onto an outer contour on a newly created device socket and snap in with a clear audible 'click'. They can thus be mounted in seconds and - in addition to doing away with the need for additional tools - save up to 75% of assembly time and are backward compatible with existing M12 connectors with screw thread. This solution is now widely used in railway scenarios.

To date, within industrial automation, no uniform PushPull-based M12 standards have established themselves in the market. In order to provide users with a better and interchangeable basis, well-known manufacturers of connectivity have teamed up and, via IEC 61076-2-010, created a standard for M12 PushPull circular connectors that is required for connectivity.

Upright sockets in male and female, as well as recessed device sockets with inverse mating face are united for the first time un-



der this standard and are supported by numerous well-known connectivity manufacturers.

What does that mean for users?

Upright female sockets have been given a new contour and can still be used with the HARTING M12 PushPull. However, reliable PushPull connectors from other manufacturers can now be connected as well - a real win in terms of interchangeability and interoperability.

Interchangeability and interoperability.

For upright device sockets with pin contacts, which are used conventionally for power supply, sockets and mating connectors have been jointly developed under the umbrella of the standard's specifications and are now compatible with all products from manufacturers that comply with the standard.

The M12 PushPull technology places special demands in the field of automation. Device manufacturers have a need for recessed device sockets and inverse PushPull connectors. Here, industry representatives have also agreed on a uniform specification in the standard for M12 PushPull interfaces with inverse profile, a move which benefits standardisation. For automation applications in particular, countersunk sockets are generally the choice for device manufacturers. The uniform interface facilitates planning enormously, and the benefits of PushPull interlocks can also be applied here.

When it comes to circular connectors, there is no dispute as to the importance and potential of the efficient PushPull functionality. It is precisely this background that makes it clear which milestone this development of a common standard represents. ■

M12 PP inverse

THE SIGNIFICANCE OF STANDARDS FOR INDUSTRY 4.0

AND WHY WE SHOULD ALREADY BE MAKING DECENTRALISED INTELLIGENCE THE STANDARD

With Industry 4.0 having considerably surpassed the zenith of hype – prompting questions about value and use that are flushing out all the sceptics from hiding – the question that is now being asked is what are the key factors needed to achieve the undeniable benefits of digitalisation in the short term?

Standardisation is one of these critical factors that could potentially result in a large-scale introduction of Industry 4.0. The term "Integrated Industry", which was coined by HARTING, gives expression to this: integration requires standards – otherwise, it simply becomes a unique work of art with unmanageable costs. There are good examples of this, where integration into worldwide value networks is being both promoted and hindered. Technologically speaking, implementation of the long-discussed M2M communication has been possible for quite some time now. It was simply missing the standards to be able to exchange data simply and with meaningful semantics, and thereby optimise processes.

The path to reach this point can easily be traced. Around the year 2000, Ethernet was introduced to industry with the intention of it becoming a leading communication platform. The result was various Ethernet-based automation profiles. The RJ45 Ethernet connector was a good fit in most cases – "sensible" communication between devices or machines of various automation profiles was, however, not possible. Added to this was that the exchanged information was optimised for the purpose of automation alone. Important energetic or status-based information and other data that looked at the production process in its entirety could not be exchanged using these automation profiles. Cognitive information is not available in process-oriented control unit programming. Thus, the field level continued to elude integration into the new services of Industry 4.0. The administration shell in the RAMI model is supposed to provide the solution. This centennial project is to be interpreted as standardisation – however, the project has neither reached completion nor have the existing standards been established. It therefore comes as no surprise that Industry 4.0 has yet to enjoy widespread acceptance.

HARTING is actively contributing to the German standardization roadmap Industry 4.0* from DIN and DKE to show and coordinate the standardization requirements.The complexity of the roadmap illustrates the meaning and also the size of the overall task.

However, there are also some positive examples. The topic of OPC UA is a prominent one. For the first time, a wide range of players – who together more or less cover the entire value networks – seem to have agreed on a standard that is more than the classic automation profiles. This standard makes use of semantics, which are essential for new services like Predictive Maintenance, Energy Management, but also for increases in efficiency within the framework of the overall company (enterprise) or engineering.

If, however, the time scales for these standardisations are taken into account, this correlates to 10 years for a universal Ethernet communication and roughly another 10 years for OPC UA. For this reason, it is important to pave the way today for the standards that will be relevant in 10 years. With respect to Industry 4.0, consideration should be given to taking a step in the direction of autonomous production. This would mean production modules, for example, having cognitive capabilities to detect the status as well as the learning capacity to optimise this status within the framework of flexibilisation and efficiency improvement. The Smart Factory KL is a coming together of research, suppliers and users to implement Industry 4.0 on all levels. To this end, the Smart Factory KL is building demonstrators that will look to the future and to these 10 years precisely. For the Smart Factory KL, the orchestration of production services via OPC UA was a key technology when the first I4.0 Demonstrator was created – and this has now become the standard, 10 years on. The next steps will focus on initiating new standards once again for intelligent production modules that open up a new level of production characterised by autonomy. To this end, the basis is currently being laid for a new demonstrator, and HARTING will play a part here with solutions for Edge Computing.
After all – and bearing in mind the 10-year delay – perseverance is always called for when the intention is to change reality with a vision. Edge Computing will be a key factor in the new production level. And this is where HARTING comes full circle. With its MICA®, HARTING has already developed the future "brain" of the production modules. Now the goal is to use this in a standardised manner in order to make decentralised intelligence the standard. ■

It is important to pave the way today for the standards that will be relevant in 10 years.

Andreas Huhmann,
Strategy Consultant Connectivity & Networks,
Andreas.Huhmann@HARTING.com

*https://www.din.de/en/innovation-and-research/industry-4-0/german-standardization-roadmap-on-industry-4-0-77392

SETTING STANDARDS - TOGETHER WITH USERS

Andreas Naß,
Director PD Development, HARTING Electric,
Andreas.Nass@HARTING.com

In a globalised and interconnected world, standards are becoming increasingly important. This applies in particular to new modular factory and manufacturing concepts.

In plant engineering, the plant engineer plans out all the equipment and parts of a production plant and then erects and installs them. Changes in plant layout are relatively rare over the lifetime of a facility. When they are undertaken, they are first planned, and then the associated systems are modified via individual projects. With respect to connection technology, this means that the plant engineer defines the overall connector (attachment side and cable side) based on individual requirements.

Future modular production systems feature new requirements that require additional interfaces.

Future Industry 4.0 modular production systems feature new requirements that require additional interfaces, e.g. as seen in the Smart Factory^{KL} or the HARTING HAII4YOU plant. The dynamic modification of a plant during operation, as well as leasing concepts for production modules, mean that the overall connector becomes a standardised interface of the production module. Since the system is no longer completely shut down when production modules are switched out, and such change is done by operational personnel, the requirements for the systems and personnel protection also change.

In order to protect both personnel and the system, it must be ensured that the correct connector is inserted or disconnected in a safe system state. Here, in addition to adapting the electromechanics, additional functions must also be integrated into the connector and integrated into the plant environment with respect to process and data. For this to be user- and vendor-neutral, standardisation is necessary.

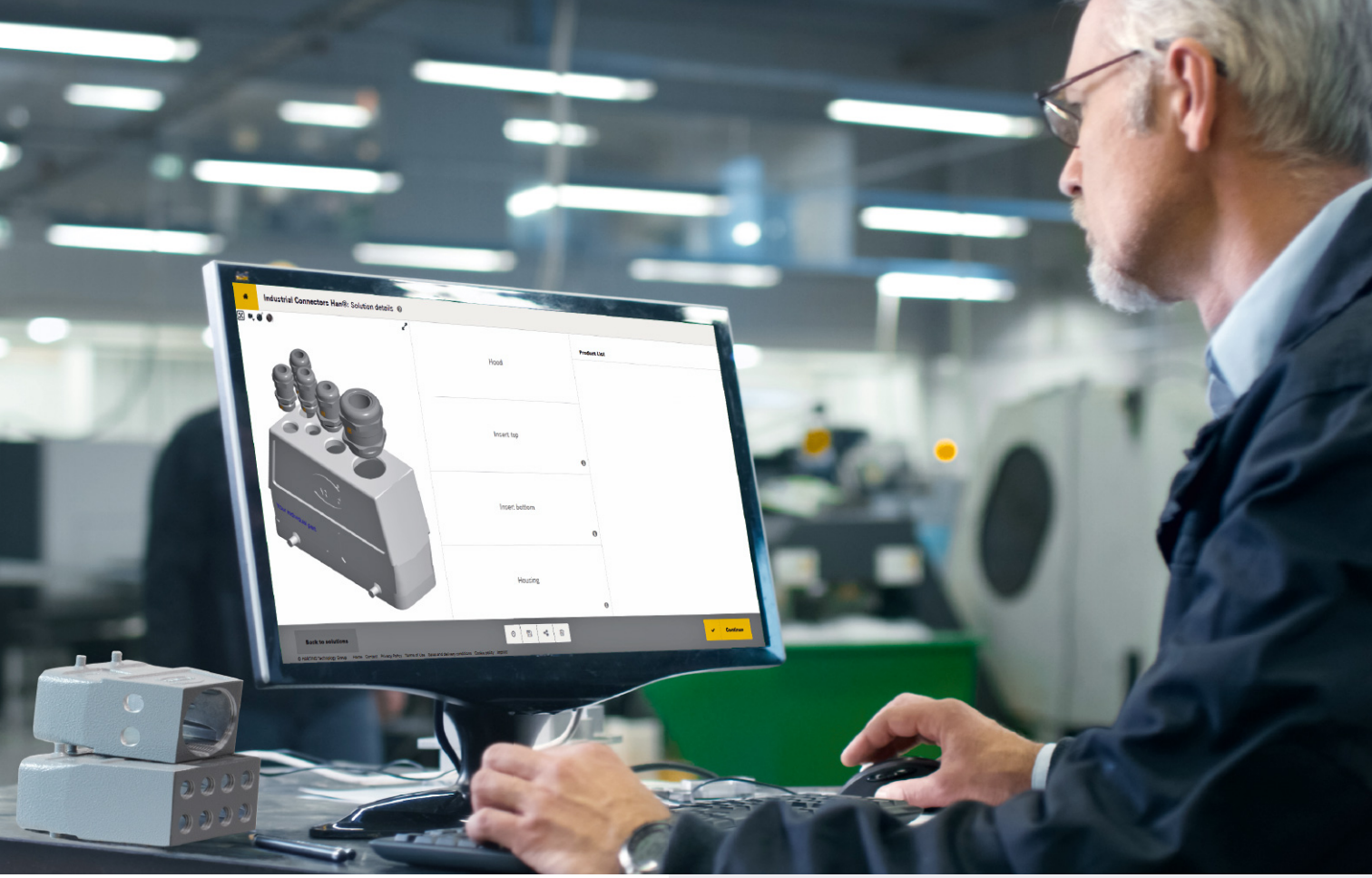
Here, the applications exert significant influence on the requirements and functionality of the interface. Consequently, users must enter more into the standardisation effort.

Currently, a working group of the DKE (German Commission for Electrical, Electronic & Information Technologies), within the German Institute for Standardization, is working on a standard for connectors with additional functions. This standardisation project is intended to define smart interfaces which, in addition to their pure connector function, feature new, additional functionality and are also integrated into plant control and IT.

The definition of the requirements for the respective application comes from user groups that bundle the requirements of all users on the market.

In the present case, this is the Smart Factory^{KL}, a research community of well-known users. The findings and solutions of the Smart Factory^{KL} provide the basis for standardisation work at the levels of system technology, electronics and electromechanics. Further applications will follow. The introduction of DC networks in the industrial sector may be another application. Currently, research projects (DC industry) are under way which are also driven by users. These projects will provide the necessary input for standardisation.

A set of standards will emerge which will represent a broad range of applications. New standards will be requested by users or user groups that will work intensively on standardisation. ■



CUSTOM CABLE ENTRIES WITH THE **Han® CONFIGURATOR**

Timo Poggemöller,
Teamleader Digital Product Service, HARTING Electric,
Timo.Poggemoeller@HARTING.com

Mechanical engineering, automation, energy and traffic engineering are all under great pressure to innovate. More than ever, tailor-made solutions are expected to meet specific requirements. Nevertheless, to date custom industrial interfaces are almost non-existent in the market due primarily to a lack of economic viability. HARTING can now offer a solution: A completely new configuration and production concept has been created that makes individual design affordable, even for small quantities, and is all based around a knowledge-based configurator for connectors.

The Han® Configurator for industrial interfaces has now been equipped with a customising function. The new functionality enables users to employ the Configurator to create tailored solutions for cable entries and to attach labels. Despite the resulting "customised" product, all design-relevant data are available for download once the configuration is completed, and the user can order the perfect solution. Small quantities down to lot size 1 are feasible.

The new functionality offers a continuous process ranging from the design through product development to transfer to the production environment and assembly – a process which enables the customer to design products easily and independently and to have them delivered within the shortest possible time. For the Configurator to work, HARTING must activate and use all the benefits of digitisation and automation (CAD automation, fully-integrated automated machinery). The objective is to offer the widest possible variety of tailor-made solutions that consist of standard components and are therefore safe, reliable and cost-effective.

The customer is a partner at eye level right from the initial design of the interface, designing e.g. a custom Han® cable gland in line with his requirements. The system does not permit inappropriate combinations and unworkable specifications. As a result, users cannot make a mistake. Once a design is complete, the customer is provided with all the engineering information (3D data, data sheets, parts lists, etc.) that describe the solution that has been developed. This immediately furnishes the user with the required knowledge about the new product, meaning the customer can transfer the solution into his own engineering environment without obstacle.

The customer is a partner at eye level right from the initial design of the interface.

The advantage for the customer is that individual interfaces become affordable even in smaller quantities. The Online Configurator shortens the time it takes to design a new product. The quality of the design is automatically checked by the system. Ordering is done with a click of the mouse. Thanks to the efficient processing offered by the Configurator, HARTING can ensure short delivery times for individual products.

Process standardisation and automation is a prerequisite for the development of customised industrial connectors. From the customer's point of view, the new customisation features of the Han® Configurator extend the range of available standards. HARTING will use this technology to advance the variant diversity of its products and will gradually equip the Han® Configurator with further customising functions for connectors. ■

Han® DDD: STRONG SIGNAL TRANSMISSION WITH **MINIMUM SPACE REQUIREMENTS**

Maik Iphöfer,
Product Manager, HARTING Electric,
Maik.Iphoefer@HARTING.com

The Han® DDD industrial connector is currently the most consistent representation of miniaturisation in the robotics sector. The monoblock expands the benefits of the Han D® Series to enable the strongest possible transmission on minimum installation space. The triple "D" stands for maximum contact density.

The need for space-saving solutions is a fundamental theme in machinery, robotics and automation. It is what prompted HARTING's development of the Han D® Series, which stands for high contact density and small dimensions. Han® DDD has twice the number of contacts than the previous standard – yet retains the same dimensions and electrical characteristics.

The "Triple D" can transmit signals or power with max. 107 contacts. The electrical power is equivalent to that of its sister product, the Han DD® (max. 250 V / 10 A). To simplify handling in automation or robotics, HARTING also offers accessories such as grip panels and guiding pins/bushes. The higher power density was achieved using the following methods:

- extending the creepage distances between the contacts using attachments;
- using an improved PE connection to free up insulation material space for additional contact chambers;
- employing an offset arrangement of chambers to reduce the distance between the rows of contacts.

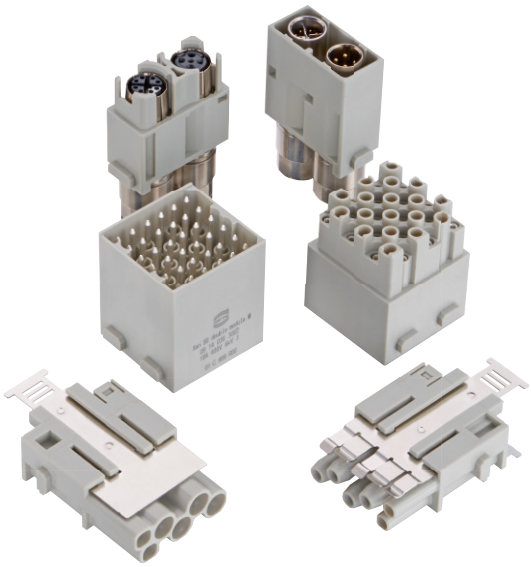
The Han® DDD can thus optimise the use of interfaces in conventional control cabinets. Existing contact surfaces for interfaces in robotics, for example, are thereby utilised more efficiently. Space-saving applications are possible in all industrial sectors where electrical connections play a role.

BENEFITS FOR THE CUSTOMER:

- Miniaturisation: in contrast to the previous standard, the surface has almost twice as many contacts (+130%) whilst retaining the same electrical characteristics.
- Han® DDD reduces costs, as the number of contacts per interface is higher.
- No additional tools are needed for processing. For example, when fitting the wire end sleeves of the PE contacts.
- The use of Han® DDD speeds up assembly. Thanks to the standard connection technology, the required cable lines to robots and machine modules can be laid quickly and easily with Han D®. ■

Han-Modular®

NEW SHIELDED MODULE FOR EMC AND AN M12 SOLUTION



With the new Shielded Module of the Han-Modular® series, users can for the first time make the connection of shielded power cables modular and mateable. Also new to the Han-Modular® portfolio is an M12 solution for mechanical engineering and transportation applications, as well as the Han DD® double module, which offers space-saving interfaces e.g. in robotics and automation.

Heiko Meier,
Product Manager, HARTING Electric,
Heiko.Meier@HARTING.com

The Han® Shielded Power Module has three power contacts and one PE contact for connecting typical three-phase loads, two signal contacts for temperature monitoring, brakes, etc., as well as a large-area shield to which the cable screen can be connected for better electromagnetic compatibility. The module represents an alternative to hard-wiring shielded power lines, while integrating such connections alongside other modules of the Han-Modular® series in one connector. HARTING has tested the module in practical applications in the EMC laboratory. The EMC characteristics of the shield in the new modules are suitable for typical drive applications such as frequency-controlled drives and other such applications. The advantages of the module are that shielded power cables can now be connectorised. It is easy to handle and as the shield can be terminated to the module. This results in shorter assembly times for machinery and equipment, in the factory and at the end customer.

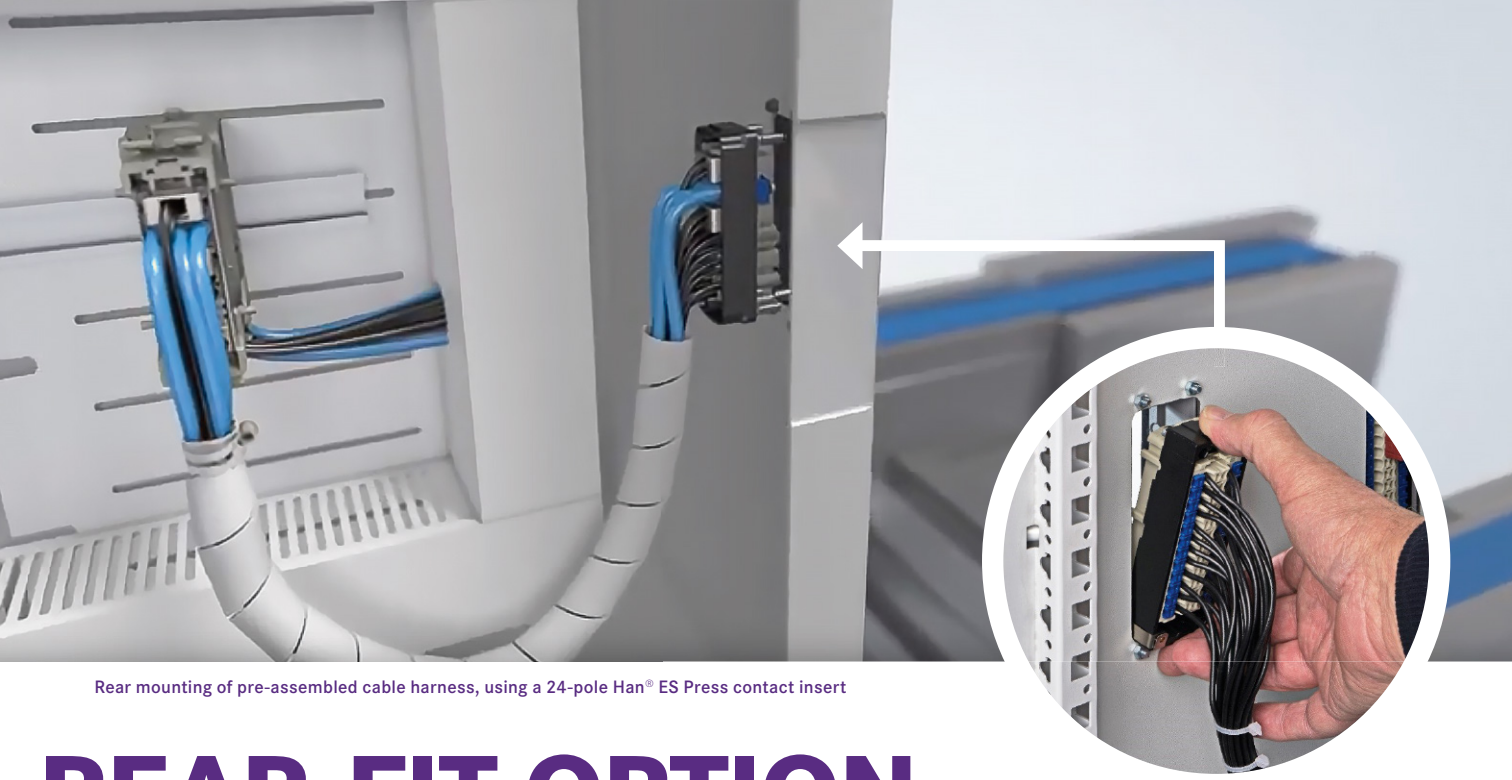
M12 in modular style

In the area of mechanical engineering, the M12 format enjoys high acceptance as a robust data interface. Now, HARTING has integrated this mating face within a single module as a Han® M12 module with two M12 interfaces for signals, industrial buses or Ethernet transmission – also available as different types, e.g. D- or X-coded version. As a result, the packing density compared to existing modules is doubled. This also saves on space for one module in the hinged frame – space that can be used for other functions.

Han® DD double module: higher voltage with Han D® contacts

With the Han DD® double module, HARTING has created a solution for 36 Han D® contacts that combine high contact density with a high rated voltage of 400 V. Existing solutions accommodate only 24 contacts for 250 V in the same space. Thus the number of contacts is increased by 50%.

Due to the electrical properties (10 A / 400 V), the double module is particularly suitable for transmitting power and signals in machines and robots. For the first time ever, it is now possible to use a single module to implement plug-in connections for three-phase AC motors, including feedback for all six axes of a robot. ■



Rear mounting of pre-assembled cable harness, using a 24-pole Han® ES Press contact insert

REAR-FIT OPTION SIMPLIFIES ELECTRICAL CABINET CONSTRUCTION

New industrial connectors enable the rear mounting of inserts for interfaces in wind turbines. The mounting option facilitates the installation of electrical cabinets, as many work steps can be carried out from the inside of the cabinet. In addition, more processes can be shifted to the pre-assembly stage, which avoids expensive technician hours for field installation.

Carsten Edler,
Industry Segment Manager,
HARTING Electric,
Carsten.Edler@HARTING.com

The search for savings opportunities is a central topic in the wind industry. All parts of the value chain are examined, in order to be able to offer WECs competitively in different markets. However successful the strategies may be, the required reductions cannot be achieved exclusively by enforcing lower purchase prices for materials and components. Instead, new ideas and processes must be implemented. Especially promising is a cooperation of suppliers and manufacturers in the field of electrical cabinet construction.

REDUCTION OF ERRORS IN FIELD INSTALLATION

An electrical cabinet is a vital WEC component including the control system of the generator as well as contactors, relays and surge protection systems. The manufacturers pre-assemble electrical cabinets at a few central locations and deliver them worldwide to the nacelle manufacturing facilities.

The rear mounting option opens a significant optimisation potential for electrical cabinet manufacturing and installation.

The rear mounting technique accelerates assemblies. As a part of the electrical installation, connectors can be snapped-in from the inside of the cabinet directly into a bulkhead mounted housing on the outer wall. This option favours the use of prefabricated subsystems. Thus, all relevant works for electrical modules can be carried out at an optimised industrial workplace, ensuring as much efficiency as possible. The harnesses e.g. are mounted to the cabinet at the manufacturing site; whilst the interfaces of the system periphery can be plugged-in at production or construction sites, depending on the WEC's installation concept.

The rear-mounting option is available for both metal Han® B and plastic Han B® hoods and housings (which are plug-compatible). The inserts are freely selectable, so monoblock inserts as well as modular connectors can be used for the transmission of different types of media – signal, data, power – and termination techniques.

The rear mounting option opens a significant optimisation potential for electrical cabinet manufacturing and installation. The technique saves time for termination and reduces errors, therefore leading to cost savings.

NACELLES NOT OPTIMISED FOR CONTROL CABINET CONSTRUCTION

Using connectors without rear-fit option, contact inserts cannot be mounted to cable harnesses until the assembly process of the electrical cabinet has started. Only then, the conductors can be passed through the cut-out in the cabinet wall in order to mount the interface from the outside. In most established processes, only specialised electricians may carry out the connection works for an electrical cabinet.

Using the rear-mounting option, by contrast, production facilities can be optimised in a way that enables the most efficient interface assembly.

With the increasing complexity and number of wind turbines, the effects of savings have become more significant. The higher the number of connectors and the more complex individual wirings, the more savings can be achieved, especially, if the manufacturer assembles at specially equipped workstations. ■

A **LIGHTWEIGHT** FOR ALL PURPOSES: **the Han® 1A**

The new Han® 1A connector series has overcome the challenges of miniaturisation. The compact rectangular connector enables powerful connections with minimum installation space requirements. The product pushes the boundary between heavy industrial connectors and smaller solutions – and thus fulfils the requirements of Industry 4.0. Its simple structure, its lightness and its wide range of accessories accelerate the assembly and networking of intelligent terminals.

Machine components in industry are becoming smaller and smaller, while modularisation is forging ahead. Drives and sensors, for example, are increasingly becoming decentralised and interfaces have to adapt to changing requirements. The Han® 1A is a conclusive response to this trend, as it is small, light and flexible. It is particularly suited to the installation of decentralised consumers, enables a modular design and supports miniaturisation. In actual fact, the new connector needs 30% less installation space than the previous smallest rectangular connector in the HARTING portfolio, the Han® 3 A.

Maximilian Tischler,
Product Manager, HARTING Electric,
Maximilian.Tischler@HARTING.com

The modular Han® 1A gives the machine design greater flexibility. Depending on requirements, it can be used in both protected areas, e.g. as an interface in control cabinets or machines, and in harsh industrial environments. Various configurations ensure a reliable transmission of data (speed 10 Gbit/s), signals (up to 12 contacts) and/or power (up to 16 A/400 V).

The versatility of the connector is based on its special design: the insulation material and housing form a unit in the Han® 1A that can be locked using a clip or a bracket. With the aid of single-wire sealing mats and housing elements, the system can be converted on a step-by-step basis from an IP20 to an IP65 solution – and thus "individually" tailored to an application. This option of developing an entire range of interfaces from just a few basic elements provides the user with considerable benefits: on the one hand, the cost of stockpiling is reduced thanks to the reduction in storage space requirements. On the other hand, the user has greater flexibility to respond to specific customer requirements.

The versatility of the connector is based on its special design.

Another special feature of the Han® 1A system is the capability of assembling the insulation material and accessories without the need for tools. This accelerates the commissioning of machines and production systems, which in turn saves time and costs. This balance between economy and the greatest possible flexibility is also a feature of the equipment with termination technology: there are screw connections for the fast and simple field installation and crimp contacts for assembly on a larger scale.

The reasons for the use of Han® 1A in machinery, robotics and automation, in power generation and distribution and in rail vehicle construction are therefore obvious. The connector enables the efficient connection of tools and modules like heating and refrigerating units, fans, control terminals, lighting and vibration conveyors. It is extremely robust and resistant to impact and vibrations, and there is a reduced risk of machine failure.

Conveyor systems are, for example, an ideal application field. The components of these systems are also becoming increasingly smaller – and interfaces also need to be adapted accordingly. In current applications, it may be the case that the connectors used are larger than the connected motor. With the Han® 1A, HARTING presents a tailor-made, yet flexible solution.

The same applies for robotics: large quantities are primarily needed in the pick & place segment, with ever smaller loads and lighter drive components becoming the trend. The changed requirements with respect to transportation also need to be factored in. The Han® 1A, with its performance range and its rectangular format, meets these requirements. What's more, the application possibilities are virtually unlimited: for the cost-efficient connection of motors and for the configuration of data and signal interfaces for controllers or sensors. ■

The Han® 1A, with its performance range and its rectangular format, meets these requirements.

RELIABLE DELIVERY OF GOODS THANKS TO STATE-OF-THE-ART TECHNOLOGY

Using RFID to set new standards in logistics

Logistics processes are becoming increasingly important, especially in these times of customisation, i.e. 'lot size one'. Not only does production need to change and adapt, logistics must also be up to the demands at hand. Here, optimising the in-house flow of goods is one aspect among many.

In the summer of 2019, HARTING opened its new "European Distribution Center" (EDC). With around 300 pallet slots and 13 shipping gates, up to ten thousand shipments per day are dispatched from here. When it comes to the subject of optimising the flow of goods, HARTING is setting new standards. Software is optimised to assign palettes to their spaces. Goods-conveying industrial lorries (ants) and forklifts are equipped with the robust and compact Ha-VIS RF-R300 UHR RFID Reader, which is also used in railway applications. Thanks to this MICA®-based reader, retrofitting standard vehicles is no problem.

All pallets are equipped with RFID transponders for the flow path through the warehouse. When pallets are loaded, the goods are "married" to the pallet and can then be uniquely assigned via the pallet ID. If a forklift driver receives a transport order on his forklift terminal and picks up a pallet, this is detected with the aid of RFID technology and an automatic check determines whether the pallet matches the order. At the same time, the storage location is also identified by RFID transponders embedded in the floor. The same procedure is used to identify the storage location. The forklift driver can thus be alerted directly when pallets are transported to the wrong storage locations. In addition, the back end at HARTING SAP always knows which storage location a pallet was actually parked at. Consequently, unloading outside of designated storage bins is technically impossible.

Naturally, communication between reader and transponder is standardised according to GS1 Class1Gen2 and/or ISO 18000-63, i.e. is not HARTING-proprietary. When coding transponders, the technology group relies on the GS1 Tag Data Standard. GS1-compliant HARTING RFID middleware handles the standard-compliant coding and/or decoding.
When loading a pallet onto a lorry, the loading ramp is also distinctly recognised by transponders embedded in the floor and

When it comes to the subject of optimising the flow of goods,* HARTING *is setting new standards.

reconciled with the transport order. This ensures that goods arrive on the right truck and that they arrive safely at the end customer. Thanks to RFID, HARTING once again reduces potential sources of error in the shipping chain. This virtually eliminates

Pallets are detected using RFID technology. There is an automatic check whether the respective pallet matches the transport order. At the same time, the storage location is also identified by RFID transponders embedded in the floor.

With its white facade, the EDC is widely visible on its 8-hectare site.

incorrect deliveries due to errors in the EDC. In addition, booking processes are carried out fully automatically, which saves additional time and increases efficiency.

The technical challenge in these RFID applications within logistics is ensuring the reliable identification of the components and storage bins that are actually loaded and used. Instead of the classic RFID Gate solution, which is also offered by HARTING, pallets and loading ramps are identified with local RFID fields. The accidental identification of wrong pallets or loading ramps is physically impossible and does not need to be filtered out by the software. With the in-ground transponders and the RFID reader mounted on the forklift, the Technology Group uses a solution that relies on local, spatially well-defined reading zones. HARTING scores points for its robust UHF RFID products, in-depth RFID knowledge and integration partners, without which such implementation would be impossible. ■

SUSTAINABLE ENERGY SUPPLY IN THE EDC

The power for the European Distribution Center is supplied by a photovoltaic system installed on the roof, while the energy requirements for cooling and heating are covered by internally produced biomethane and a geothermal plant – for which 36 holes needed to be drilled to a depth of 150m. The implemented energy concept minimises the CO_2 emissions. The cost of the entire centre came in 27 percent lower than the figure originally calculated by the Kreditanstalt für Wiederaufbau (KfW).

Olaf Wilmsmeier,
Business Development Manager Market,
HARTING IT Software Development,
Olaf.Wilmsmeier@HARTING.com

STANDARD IN THE DATA: THE DIGITAL TWIN

Traditionally, a significant amount of data (2D/3D design data, simulation data, etc.) are generated during product development. These data form the basis for a product's digital twin. During the course of the product development process, this digital twin is increasingly enriched with data that needs to be implemented into the process.

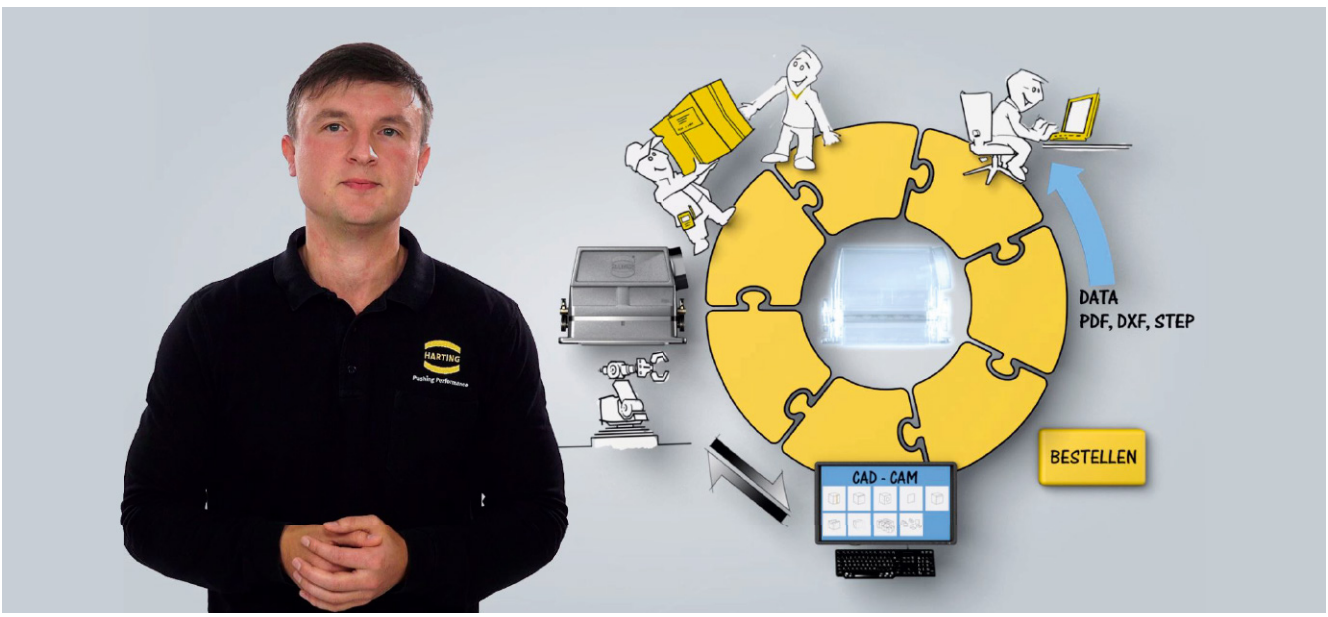
Standards for data and their structure are unavoidable if the intention is to ensure data consistency, Time to Market, quality and business performance throughout the product lifecycle. The significance of a 'standard' in data becomes particularly clear when we take the example of the HARTING customising configurator:

Jakob Moor,
Senior Specialist PLM Toolchain/
Digitalisation, HARTING Electric,
Jakob.Moor@HARTING.com

With the customising option in the configurator, we can offer our customers a wide variety of component designs while maintaining our proven product standards. Among other things, we do this by preparing our product data so that it can be used with any platform (MCAD, ECAD, various product catalogues, etc.) or by any application (configurators, simulations, etc.). This is made possible thanks to a data backbone that is described and controlled by features and functions. The features and functions are designed to be platform-neutral. This ensures that data on the defined standard exist only once and that they can be adapted to different solutions.

How can the right data be used at the right time and be directed to the right people during the product life cycle?

We can offer our customers data that meet their requirements. ■



Jakob Moor has been given an alternative career model with training in specialist know-how, strategic knowledge and innovative spirit. He develops new solutions for customers and has been empowered to try new approaches and tasks.

ENSURING TRANSPORTATION LIFELINES BETWEEN RAILCARS

Kobe City Transportation Bureau's new '6000 series' for the Seishin Yamate subway line

Inter-car connection using HARTING jumper cables

The Seishin Yamate line of the Kobe City Subway connects surrounding new towns with the city, making it an essential means of transportation for people living there. This area has many hills and valleys, meaning the railcar couplings get pushed and condensed by vertical and horizontal forces during operation above ground. In order to ensure protection against these forces, HARTING jumper cables installed on the Kobe City Transportation Bureau's new '6000 series' for the Seishin Yamate line underwent rigorous tests for durability, including stretching and condensing from the stationary state and curve and S form curve testing from the straight line. HARTING's own facility is accredited to ISO/IEC 17025, the international laboratory standard, which enables the company to conduct these tests in-house and issue test reports.

HARTING's inter-car connectivity solutions consist of cables and a rectangular, modular industrial connector which is designed for use in harsh environments. These robust solutions, which are protected against dust and water ingress, corrosion, high voltages and electromagnetic interference, were adopted for all inter-car lines of the Kobe City Transportation Bureau's new '6000 series' for the delivery of data, signals and power.

The inter-car connections of the new train use the established Han® HPR housing individually for data, signals and power. Data connection with Ethernet modules was installed for onscreen passenger information services in four languages, video and control. Modules and monoblock inserts for signals and power are used for control circuits and main circuits.

Kobe City Transportation Bureau's new trains consist of six railcars running on the Seishin Yamate line. It adopts the design determined by a citizen's ballot and was constructed by Kawasaki Heavy Industries. In February 2019, two trains started operation. All 28 trains are planned to replace the existing ones by March 2023. ■

Toshio Ohno,
Key Account Manager Transportation
HARTING K.K.,
Toshio.Ohno@HARTING.com

HARTING AND SENNHEISER SET **NEW STANDARDS**

HARTING Applied Technologies has developed two customised production machines for the Sennheiser Group, the leading manufacturer of headsets, loudspeakers, microphones and wireless transmission technology. One of the new machines produces the so-called chassis. Here, two contact strips are inserted into an injection moulding tool, where they are separated and bent, with the overmoulding process taking place in the next step. A second machine produces a magnet system consisting of two metal components, a magnet and plastic overmould. Both machines perform a 100% test on the components after the overmoulding process. Handling of the individual components and the finished parts is done by a robot. A magnet system and chassis are later assembled into a converter and this is used in the Sennheiser earphones. ■

Responsible for the cooperative development of a production plant: Dr. Volker Franke (left), Managing Director HARTING Applied Technologies and Dr. Andreas Sennheiser, CEO Sennheiser.

READ AND **WIN!**

Solve our puzzle and send the missing word to tecnews@HARTING.com

New Ethernet Standard										P	E			
Single Pair Ecosystem from HARTING										1				
Train-connection technology	J						-	C			L			
German manufacturer of audio components						S		N		H				
Monoblock connector				H		n®	-			D				
Customer-specific shop system	K					G				T				
Radio frequency technology										F		D		
German industry standard										I				
Control and automation specialist							F				O			

Dear Reader, we would like to thank you for your interest in our tec.news by entering you in a raffle. All you have to do is send us the missing word from our puzzle and you'll be automatically be entered in the draw to win a Samsung Gear Fit 2 fitness strap. The closing date for entries is 31 January 2020. Here's wishing you good luck,

Your tec.news editorial team

By participating in this promotional event, the user accepts the following Privacy Policy:
The user gives HARTING permission to send prize notifications by e-mail for the duration of the sweepstake. All data will be used exclusively for promotional purposes and will be deleted following completion of the sweepstake, provided that HARTING is not legally obligated to store the data for a longer period of time. This applies e.g. to the data of winners for tax purposes. Upon final completion of the promotion, such data will be marked with a block flag and will be deleted following expiration of the legally prescribed retention period. Consent may be revoked by the user at any time with future effect. Data will be deleted immediately once the user has revoked his or her consent, provided HARTING is not legally obligated to store the data beyond that point in time. Participation in the sweepstake shall remain unaffected. In addition, data will not be disclosed to third parties.

HARTING **TRADE SHOW CALENDAR**

2019-11-26 – 2019-11-28	Germany, Nuremberg, SPS 2019
2019-11-23 – 2019-11-28	India, Bangalore, IMTEX - Indian Metal-Cutting Machine Tool Show
2019-11-27 – 2019-11-29	Japan, Chiba, Mass-Trans Innovation Japan 19
2019-12-03 – 2019-12-06	Russia, Moscow, Electricheskie Seti 2019
2019-12-17 – 2019-12-21	Japan, Tokyo, iRex International Robot Exhibition 19
2020-02-05 – 2020-02-07	Korea, Seoul, SEMICON Korea 2019
2020-02-26 – 2020-02-28	China, Guangzhou, SIAF - SPS Industrial Automation Fair Guangzhou 2019
2020-03-17 – 2020-03-19	Poland, Warsaw, Automaticon
2020-03-17 – 2020-03-20	Czech Republic, Brno, AMPER
2020-03-18 - 2020-03-20	China, Shanghai, Electronica China 2020
2020-04-07 – 2020-04-11	China, Shanghai, CCMT - China CNC Machine Tool Fair
2020-04-20 – 2020-04-24	Germany, Hanover, Hannover Messe 2020

PUBLICATION DETAILS

Published by: HARTING Stiftung & Co. KG, M. Harting, P.O. Box 11 33, D-32325 Espelkamp (Germany), Phone +49 5772 47-0, Fax +49 5772 47-400, Internet: http://www.HARTING.com

Chief Editor: D. Sieverdingbeck

Vice Chief Editor: A. Huhmann, Dr. S. Middelkamp

Overall coordination: L. Kühme, Communication and Public Relations Department, Phone +49 5772 47-9982

Design and Layout: Dievision Agentur für Kommunikation GmbH

Production and printing: M&E Druckhaus, Belm

Circulation: 10.000 copies worldwide (German, English and 12 additional languages)

Source: If you are interested in obtaining this newsletter on a regular basis, free of charge, contact your nearest HARTING branch, your HARTING sales partner or one of the local HARTING distributors. You can also order tec.News online at www.HARTING.com.

Pictures: Adobe Stock: S.2 © 110407681 | S.10 © 5558518 | S.16 © 114525500, 196401762 | S.17 © 86408160, 199517118 | S.26 © 136135334 | S.32 © 136783756 | S.35 © 242328064 | S.37 © 109223653 | S.39 © 117407604 | S.41 © 44820744 | S.42 44820744 | Festo AG & Co. KG: S.12/13 | Getty Images: S.30 © 838527470

tec.news offers you an overview of the technological spectrum and the innovative highlights at HARTING.

WWW.TECNEWS.DIGITAL

Pushing Performance

HARTING Technologiegruppe

Marienwerderstraße 3 | 32339 Espelkamp
Postfach 11 33 | 32325 Espelkamp
Tel. +49 5772 47-0 | Fax +49 5772 47-400
E-Mail: de@HARTING.com | www.HARTING.com

You will find our international addresses here: