07 1

HARTING

Pushing Performance

HARTING Device Connectivity DeviceCon

People | Power | Partnership

Transforming customer wishes into concrete solutions

Headquartered in Espelkamp in East Westphalia, Germany, the HARTING Technology Group develops tailored solutions and products revolving around electrical and electronic connector technologies. These offerings focus on power and data transmission applications, as well as on network solutions. Founded in 1945 in Minden, HARTING is currently employing a workforce of more than 2700 members of staff worldwide.
In today's increasingly knowledge and information shaped societies, the capability to network and integrate with customers and suppliers, as well as technology and business partners is playing the decisive role.
And this applies to national as well as international levels. With 40 Subsidiary companies and Representatives in 27 countries, HARTING is committed to maintaining close proximity to markets and customers. Always at hand on location, HARTING is able to rapidly record market impulses and respond flexibly.

ALWAYS AT HAND, WHEREVER OUR CUSTOMERS MAY BE.

Increasing industrialization is creating growing markets characterized by widely diverging demands and requirements. The search for perfection, increasingly efficient processes and reliable technologies is a common factor in all sectors across the globe. HARTING is providing these technologies – in Europe, America and Asia. The HARTING professionals at our international subsidiaries engage in close, partnership based interaction with our customers, right from the very early product development phases, in order to realize customer demands and requirements in the best possible manner.

Our people on location form the interface to the centrally coordinated development and production departments. In this way, our customers can rely on consistently high, superior product quality – worldwide.

OUR CLAIM: PUSHING PERFORMANCE.

HARTING provides more than optimally attuned components. In order to serve our customers with the best possible solutions, HARTING is able to contribute a great deal more and play a closely integrative role in the value creation process.

From ready assembled cables through to control racks or ready-to-go control desks: Our aim is to generate the maximum benefits for our customers – without compromise!

WE ASPIRE TO TOP PERFORMANCE.

Connectors ensure functionality. As core elements of electrical and optical wiring, connection and infrastructure technologies, they are essential in enabling the modular construction of devices, machines and systems across a very wide range of industrial applications. Their reliability is a crucial factor guaranteeing smooth functioning in the manufacturing area, in telecommunications, applications in medical technology – in fact, connectors are at work in virtually every conceivable application area. Thanks to the consistent further development of our technologies, customers enjoy investment security and benefit from durable, long term functionality.

QUALITY CREATES RELIABILITY – AND WARRANTS TRUST.

The HARTING brand stands for superior quality and reliability – worldwide. The standards we set are the result of consistent, stringent quality management that is subject to regular certifications and audits.

EN ISO 9001, the EU Eco-Audit and ISO 14001:2004 are key elements here. We take a proactive stance to new requirements, which is why HARTING ranks among the first companies worldwide to have obtained the new IRIS quality certificate for rail vehicles.

HARTING TECHNOLOGY CREATES ADDED VALUE FOR CUSTOMERS.

Technologies by HARTING are at work worldwide. HARTING's presence stands for smoothly functioning systems, powered by intelligent connectors, smart infrastructure solutions and mature network systems. In the course of many years of close, trust-based cooperation with its customers, the HARTING Technology Group has advanced to one of the worldwide leading specialists for connector technology. Extending beyond the basic functionalities demanded, we offer individual customers specific and innovative solutions. These tailored solutions deliver sustained effects, provide investment security and enable customers to achieve strong added value.

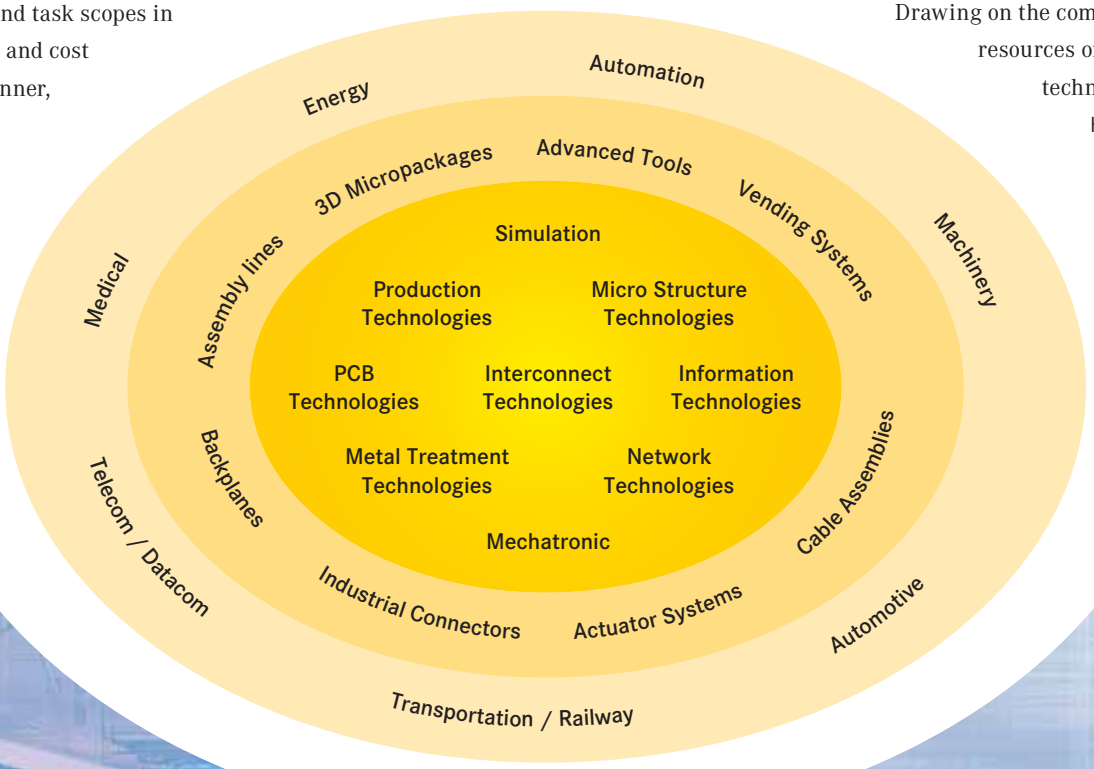
OPTING FOR HARTING OPENS UP AN INNOVATIVE, COMPLEX WORLD OF CONCEPTS AND IDEAS.

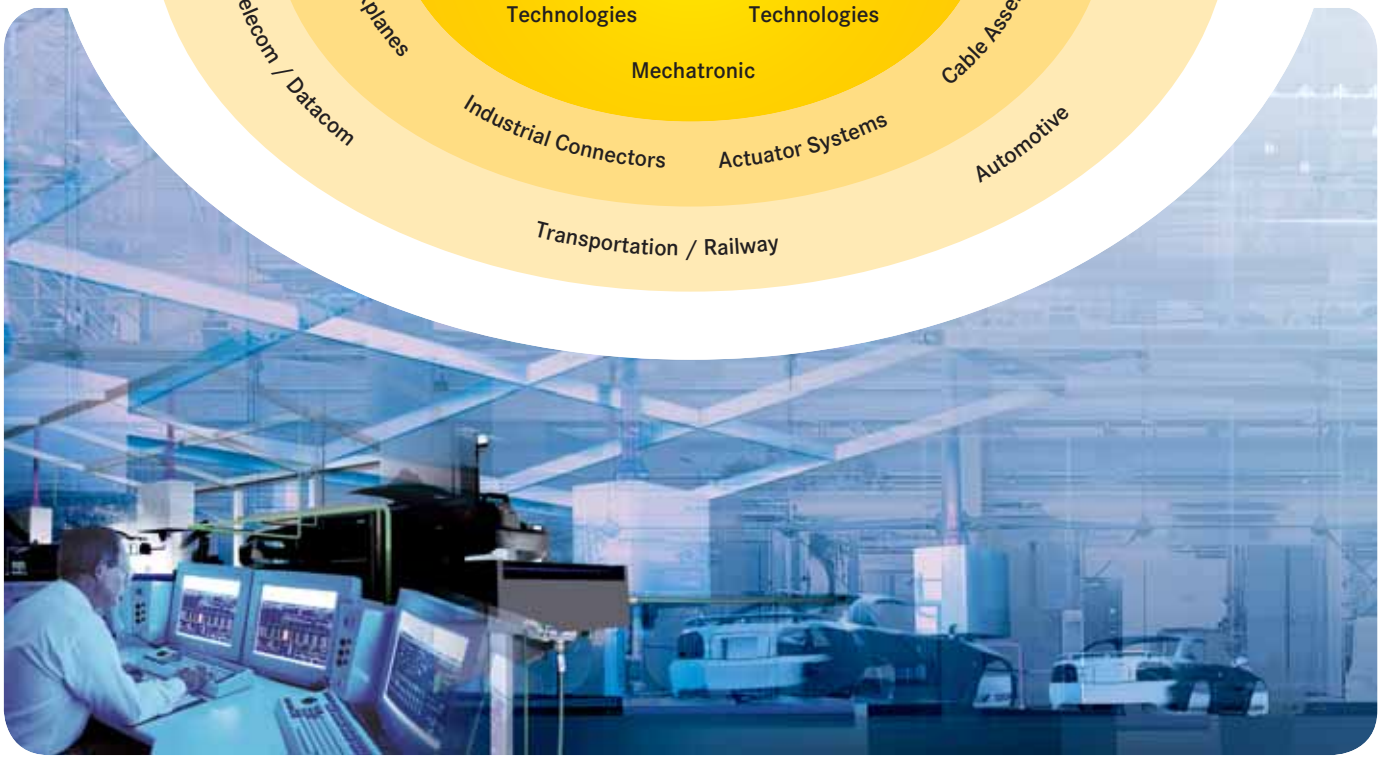
In order to develop connectivity and network solutions serving an exceptionally wide range of connector applications and task scopes in a professional and cost optimized manner, HARTING not only commands the full array of conventional tools and basic technologies. Over and beyond these capabilities, HARTING is constantly harnessing and refining its broad base of knowledge and experience to create new solutions that ensure continuity at the same time. In securing this know-how lead, HARTING draws on a wealth of sources from both in-house research and the world of applications alike.

Salient examples of these sources of innovative knowledge include microstructure technologies, 3D design and construction technology, as well as high temperature or ultrahigh frequency applications that are finding use in telecommunications or automation networks, in the automotive industry, or in industrial sensor and actuator applications, RFID and wireless technologies, in addition to packaging and housing made of plastics, aluminum or stainless steel.

HARTING SOLUTIONS EXTEND ACROSS TECHNOLOGY BOUNDARIES.

Drawing on the comprehensive resources of the group's technology pool, HARTING devises





practical solutions for its customers. Whether this involves industrial networks for manufacturing automation, or hybrid interface solutions for wireless telecommunication infrastructures, 3D circuit carriers with microstructures, or cable assemblies for high-temperature applications in the automotive industry - HARTING technologies offer far more than components, and represent mature, comprehensive solutions attuned to individual customer requirements and wishes. The range covers ready-to-use cable configurations, completely assembled backplanes and board system carriers, as well as fully wired and tested control panels.

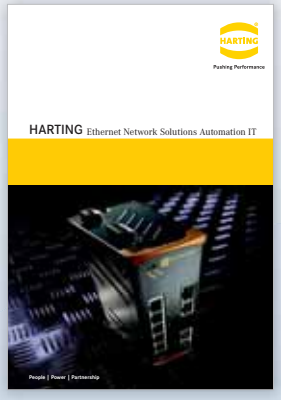
In order to ensure the future proof design of RF- and EMC-compatible interface solutions, the central HARTING laboratory (certified to EN 45001) provides simulation tools, as well as experimental, testing and diagnostics facilities all the way through to scanning electron microscopes. In the selection of materials and processes, lifecycle and environmental aspects play a key role, in addition to product and process capability considerations.

HARTING KNOWLEDGE IS PRACTICAL KNOW-HOW GENERATING SYNERGY EFFECTS.

HARTING commands decades of experience with regard to the applications conditions of connectors in telecommunications, computer and network technologies and medical technologies, as well as industrial automation technologies, such as the mechanical engineering and plant engineering areas, in addition to the power generation industry or the transportation sector. HARTING is highly conversant with the specific application areas in all of these technology fields.

The key focus is on applications in every solution approach. In this context, uncompromising, superior quality is our hallmark. Every new solution found will invariably flow back into the HARTING technology pool, thereby enriching our resources. And every new solution we go on to create will draw on this wealth of resources in order to optimize each and every individual solution. In this way, HARTING is synergy in action.

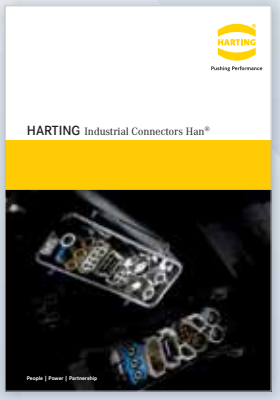
Automation IT



ETHERNET NETWORK SOLUTIONS

The Automation IT catalogue offers a consistent range of Ethernet network components and cabling products, which form the communication platform of convergent Automation IT networks. The performance of network components opens up access to a wide range of applications for industrial buildings, manufacturing plants and machines in industrial environments.

Installation Connectivity



INDUSTRIAL CONNECTORS Han®

This catalogue documents the worldwide standard for industrial connectors. Han® connectors represent the preferential solution in the cable-to-cable interconnection of data, signal and power applications operating under the most demanding conditions and meeting stringent requirements with regard to safe and detachable electrical connections with high degree of protection IP 65 / IP 67. Installations making use of Han® connectors impress with their rugged design, convenient handling and modularity of data, signal and power connections. Han® connectors represent the worldwide standard in industry, railway technology, as well as in power generation and distribution.

Device Connectivity

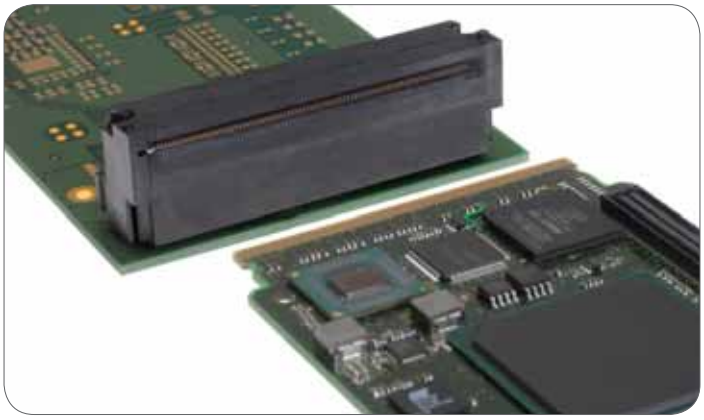
DEVICE CONNECTIVITY DeviceCon

The DeviceCon catalogue provides a universal, innovative product portfolio of PCB connections and of termination technology. The product range comprises board-to-board and cable-to-board connectors for industrial electronic devices with degree of protection IP 20 to IP 65 / IP 67. These HARTING solutions offer appropriate device connectivity for a wide range of devices, ranging from sensors to industrial computers and their respective data, signal and power interfaces.

CONTENTS CHAPTER

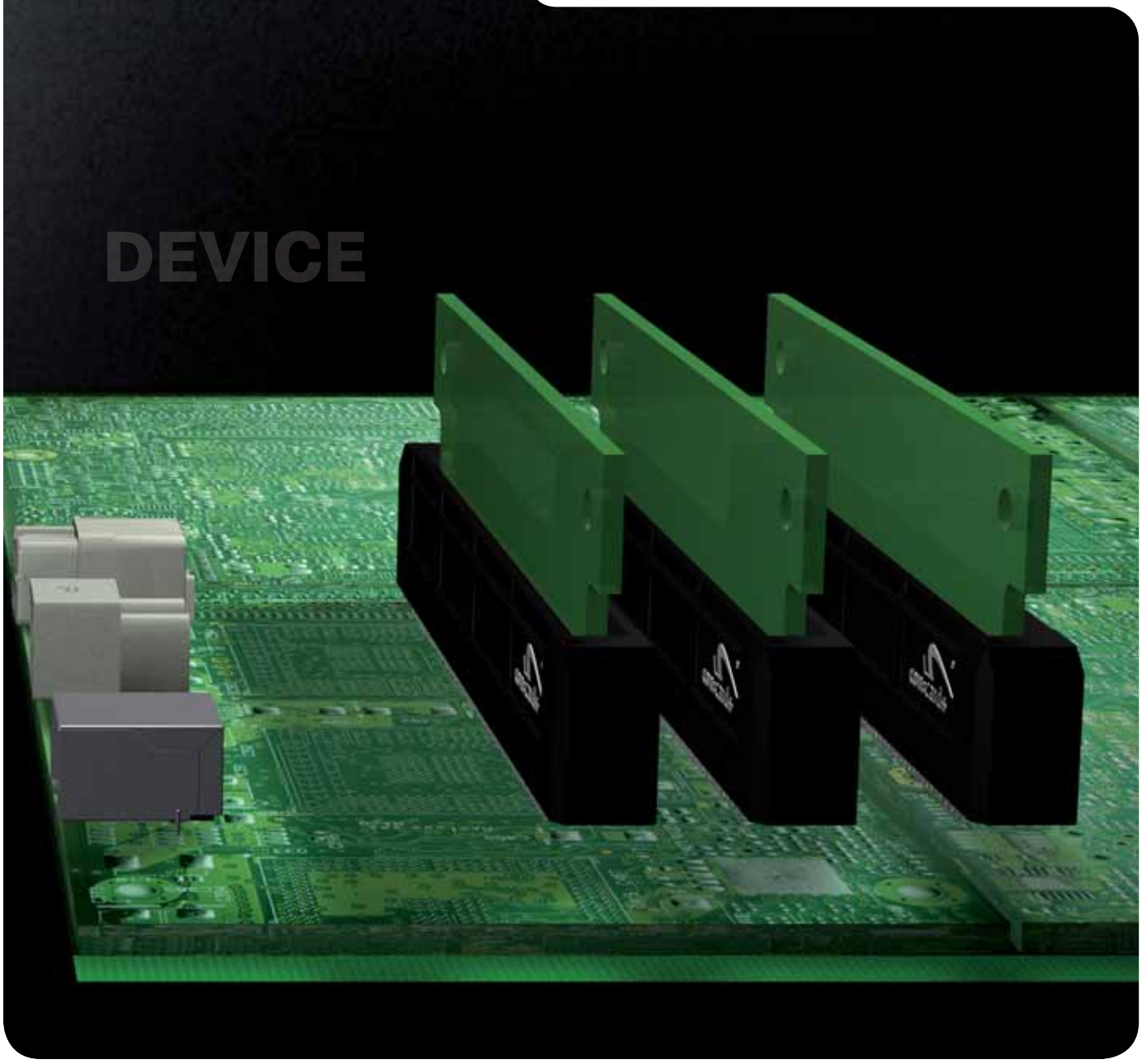
CABLE- / WIRE-TO-BOARD

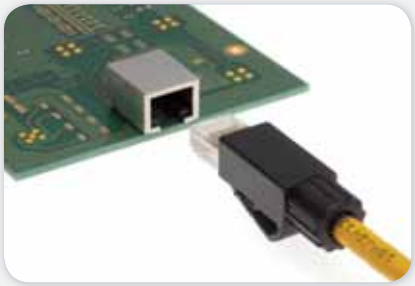
Whatever your applications may be, HARTING has the ideal solutions for your data, signal and power connectivity requirements with its matching cable-to-board and wire-to-board technologies with degree of protection IP 20 to IP 65 / IP 67.



BOARD-TO-BOARD

Regardless of your device configuration, HARTING always has an ideal board-to-board connector with maximum packing density and optimal performance with regard to signal transmission and integrity.





01. HARTING RJ INDUSTRIAL® – RJ45

HARTING offers a wide range of RJ45 contact inserts and matching RJ45 connectors for quick and reliable termination of your 2- or 4-pair Ethernet cables. The RJ Industrial connector family also supports Ethernet automation profiles such as PROFINET, Ethernet/IP, EtherCAT and Powerlink. The HARTING RJ Industrial® connectors provide standard RJ45 connection technology for the industrial field level.

02. PushPull CONNECTORS

HARTING has set the standard for connection technology for innovative IP 65 / IP 67 installation concepts with its new generation of the PushPull series. The multifunctional PushPull connector is available for data, signal and power applications and provides a concept with many connector mating faces. The universal PushPull product line is complemented by additional interfaces such as USB, LC or SCRJ.

03. CIRCULAR CONNECTORS

HARTING offers a comprehensive portfolio of M8, M12, M23, 7/8“ and Han-Max® circular connectors for industrial applications. In addition to assembled system cables, HARTING also offers connectors with *HARAX*® fast termination technology for onsite installation directly in the field.

Power

Signal

Data

04. INDUSTRIAL CONNECTORS Han®

Han® industrial connectors with degree of protection IP 65 / IP 67 represent the worldwide connector standard with regard to safe installation, efficient commissioning and servicing of machines and plants

05. D-SUB CONNECTORS

D-Sub connectors are a classic solution for cable-to-board applications. Thanks to their versatility, they represent a universal solution for applications in the field of device connectivity, and offer a wide range of data, signal and power connection technology for applications in automation systems.

06. *har-mik*® INTERFACE CONNECTORS

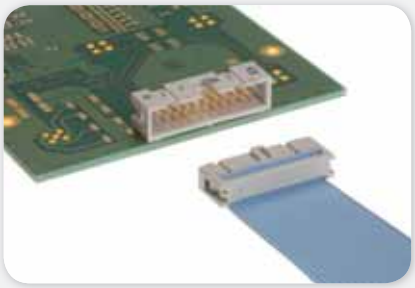
Miniature D connectors are used for applications where the focus is set on space saving solutions and high data rates. HARTING offers 14-pole to 100-pole *har-mik*® connector variants with pin & socket and bellows contact design and 1.27 mm contact grid, covering data rates up to 600 MHz.

07. *har-link*® INTERFACE CONNECTORS

The *har-link*® connector is characterized by its ability to handle the highest data rates in combination with perfect shielding functions. HARTING complements the *har-link*® connector family by assembled system cables with shielded and unshielded twisted-pair design.

08. SEK INSULATION DISPLACEMENT CONNECTORS

IDC connectors for flat ribbon cables facilitate the simple and cost-effective configuration of devices and are preferably implemented as internal connections. HARTING offers a wide range of these cable-to-board connectors.



09. DIN 41 612 CONNECTORS

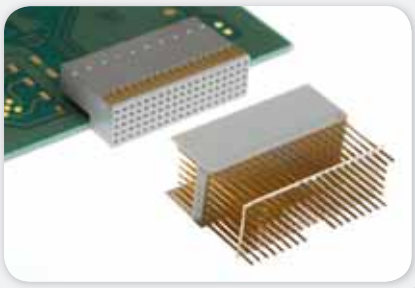
For many years, connectors to DIN 41 612 have established themselves as a standard both for board-to-board and cable-to-board applications. HARTING offers a wide product range of DIN 41 612 connectors for data, signal and power lines, including corresponding accessories.

10. Mini Coax CONNECTORS

Mini Coax connectors facilitate multi-channel, coaxial and highfrequency data transmission for board-to-board and cable-to-board applications. Device integration is supported with straight and angled contact inserts with press-in technology and SMT/SMC. The housings support applications up to IP 65.

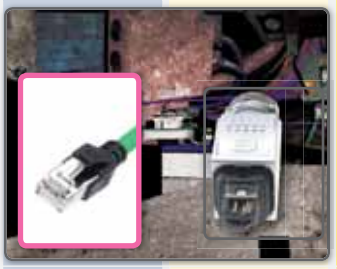
11. *har-bus*® *HM* CONNECTORS

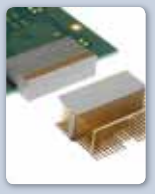
har-bus® *HM* connectors form the basis for the assembly of high-performance backplanes for control systems and for industrial computer systems with 19“ technology. The board-to-board connectors are available with press-in technology for backplanes and solder versions for sub-boards.



12. TCA CONNECTORS

TCA connectors represent the next generation of backplane connectors. Their new concept supports direct or indirect connection. A special connector covers particularly rugged connections on the basis of indirect connection. TCA connector versions are available for connecting data channels and the power supply to the modules.

PRODUCT GROUP	CONNECTION TYPE		ENVIRONMENT		
	Board to Board	Cable / Wire to Board	IP 20	IP 65 / IP 67	Data
					
01 HARTING RJ Industrial® – RJ45		●	●		●
02 PushPull Connectors		●		●	●
03 Circular Connectors		●		●	●
04 Industrial Connectors Han®		●		●	●
05 Subminiature D Connectors		●	●	●	●
06 *har-mik*® Interface Connectors		●	●		●
07 *har-link*® Interface Connectors		●	●		●
08 SEK IDC Connectors		●	●		●
09 DIN 41612 Connectors	●	●	●		●
10 Mini Coax Connectors	●	●	●		●
11 *harbus*® *HM* Connectors	●		●		●
12 TCA Connectors	●		●		●

APPLICATION						APPLICATION STANDARD
Signal	Power	high performance				
		Data rate	Shielding	Number of poles/ contact density	Voltage/ current	
						
		● *10 Gbit category 6	●			EtherCAT, EtherNet/IP, ISO IEC, IEEE, POWERLINK
●	●	● *10 Gbit Cu & LWL	●		●	EtherCAT, ISO IEC, POWERLINK
●			●			EtherCAT, DeviceNet, EtherNet/IP, CANopen, POWERLINK
●	●	● *10 Gbit Cu & LWL	●	●	● *40 A @ 400 Volt	ECOFAST
●	●		●	● *max. 78 Kontakte	● *40 A 4 kV	DeviceNet, CANopen
			● *50dB @ 2 GHz	●		SCSI
		● *> 1,5 Gbit	● *50dB @ 1 GHz	●		
●				● *max. 64 Kontakte		
●	●	●	● *35dB @ 2 GHz	● *max. 160 Kontakte	● *40 A 2,8 kV	VMEbus
		● *4 GHz	● *> 45dB @ 4 GHz			VMEbus
	●	●	●	● *max. 535 Kontakte	●	VMEbus, CompactPCI and AdvancedTCA
●	●	● *> 6 Gbit		● *max. 170 Kontakte	● *16 A	CompactPCI and AdvancedTCA

We ensure convincing connectivity for each and every device you bring to the markets.

HARTING will develop the ideal connectivity for your devices in cooperation with your product management and device developers. For us, this means: Design-in support.

HARTING, THE SPECIALIST FOR INDUSTRIAL DEVICE CONNECTIVITY

The versatility of industrial electronic devices and the potential solutions for device connectivity go hand in hand.
HARTING supports industrial electronic systems with a wide standard portfolio of device connectivity for data, signal and power applications.
This portfolio facilitates the comfortable and quick implementation of the majority of connectivity solutions.
Future device generations are frequently subject to specific requirements in terms of their interfaces. In order to implement Device Connectivity solutions that are tailored to these requirements, we utilize all expert resources of the HARTING Technology Group, drawing on our in-house development, tool production, extensive vertical range of manufacture and our accredited test laboratories. The connectivity of future industrial device generations is driven by market trends towards minimization of sizes, increase of performance and utilization of Ethernet communication with rapidly rising transmission rates. Consequently, as one of the leaders on the telecommunication connectivity market, HARTING integrates the knowledge acquired in this market segment to develop new Device Connectivity for industrial devices.
The MicroTCA telecommunications connector, for example, is implemented as a board-to-board connector for the latest devices in the field of drive control and computer technology. The new generation of PushPull connectors is also used as a robust IP 67 cable-to-board solution in both market application segments. These applications have formed a general trend of convergence in the field of device connection technology. HARTING offers more than innovative device connectors, as the connectivity provided by HARTING extends far beyond conventional connector offerings, and covers the entire range of connectors, assembled units and complete backplane solutions.

HARTING IS YOUR PARTNER IN THE DESIGN-IN PROCESS

Our field service department is your first contact partner in terms of the selection and design of the ideal connectivity solution for your device. This service is supported by HARTING's technical application support with device-specific knowledge.

HARTING also places a team of experts in the fields of RF, EMC, housing technology, mechanical strength, high-current applications and installation concepts (cabling classes) at your disposal. These capabilities allow us to simulate your applications in advance and test it in the course of development in an accredited laboratory.

The HARTING Technology Group holds all the key technologies for integrated device connectivity, such as connection technology for PCBs based on SMD, THT, THR or press-fit technology and develops connectivity solutions for international standardization in cooperation with user groups.
The latest generation of PushPull connectors was developed in cooperation with the German automotive industry and subsequently standardized on an international level.
You determine which part of the design-In process should be handled by HARTING.
There are three ways of finding the ideal device connectivity with HARTING:

1. You select the suitable device connection technology from the DeviceCon catalog and handle the design-in by yourself with the help of our technical applications support.
2. You define the scope of requirements for the device interfaces. HARTING supports you in selecting the device connection technology, with the focus always set on choosing the ideal connection technology for device integration. HARTING also holds the respective know-how for handling the entire design and the production of custom assembled units or backplanes.
3. You plan a new device generation with individualized device connectivity, which is defined in the course of a joint project. The result is a tailored, cost-effective solution for your series product and the differentiation of such products thanks to innovative device connectivity.

Whichever procedure you may prefer, you can always count on unrestricted HARTING support, as we are dedicated to ensuring convincing connectivity for each and every device you bring to the markets.

Optimal customer service thanks to innovative E-Business systems

In future, the intelligent utilization of IT systems will rank as a decisive factor in the efficient design of companies' internal and external business processes. In this context, there is potential for automating processes that were previously handled manually, thereby avoiding processing errors. Moreover, E-Business Systems are available 24 hours per day, seven days a week (24/7).

Fielding innovative E-Business systems, HARTING is offering customers various solutions for the optimization of business processes and information requirements.
The portfolio covers a comprehensive Web presence including the online catalog, the *HARKIS*® configuration system and the E-Business Center, which informs you on availability and pricing and allows you to order our products by mouse click.

Electronic Data Interchange (EDI) is available in different formats, of course.

These offers are based on reliable high-performance systems that ensure the availability, security and integrity of data and information. HARTING has years of experience in the field of the development and operation of E-Business Systems.

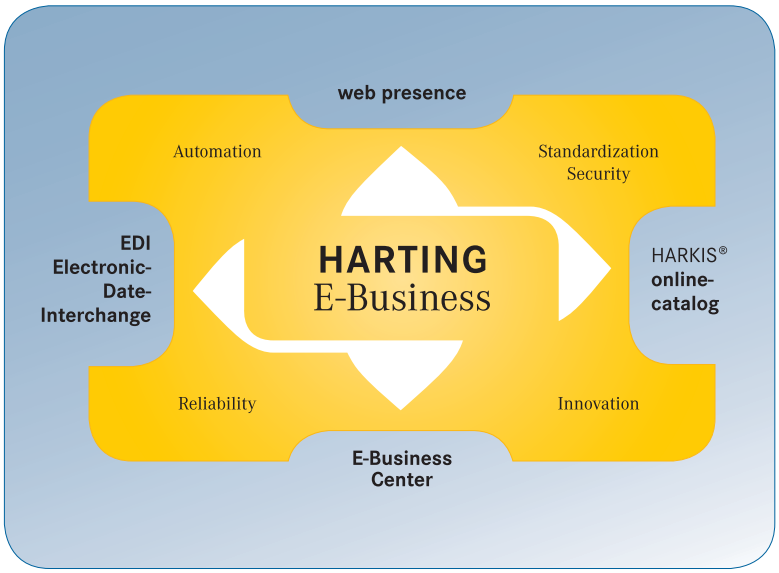
HARKIS® PRODUCT INFORMATION ONLINE

HARTING's *HARKIS*® (www.*HARKIS*.HARTING.com) Catalog Information System offers comprehensive information pertaining to all Connectivity & Networks products, including type data sheets, 3D data, as well as technical specifications and a substantial knowledge base for connection technology.

- *HARKIS*® guides you step-by-step to the right connector for your application.
- The kit consultancy functions support you in selecting several components for a complete connector kit.
- The individual configuration of connector kits can be automatically generated as a 3D module for download by customers.

ELECTRONIC DATA INTERCHANGE

Electronic Data Interchange (EDI) enables customers and suppliers to improve handling and processing efficiency and reduce error rates. HARTING has successfully deployed EDI with customers for several years, based on proven and reliable industrial standards. As a matter of principle, in the case of existing links, we always endeavor to provide an image of all process steps involved.



HARTING is currently utilizing the following standards and messages:

EDIFact:

ORDERS	Client order
ORDRSP	Order confirmation
INVOIC	Invoice
SLSRPT	Sales data report
DESADV	Message of delivery

ANSI:

ORDERS (850)	Client order
ORDRSP (855)	Order confirmation
INVOIC (810)	Invoice
PRODUCT TRANSFER & RESALE (867)	
FUNCTIONAL ACKNOWLEDGEMENT (997)	
INVENTORY INQUIRY / ADVISE (846)	

ODETTE, VDA and RosettaNet are in the planning phase.

Other aspects:

Data communication can be handled by means of SMTP, X400 or OFTP protocol. Sterling Commerce is our provider. Documents can be transferred with digital signature as required.

HARTING E-BUSINESS CENTER

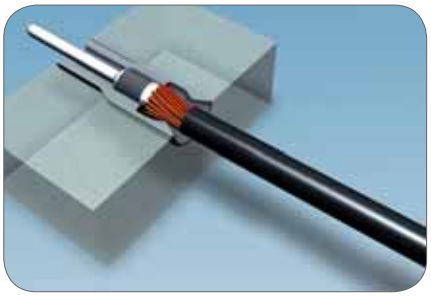
For more than two years HARTING has been expanding the scope of Web products offered to customers in the E-Business Center. The Center is available 24 hours, seven days a week (24/7).

Features:

- Web Shop for registered users
- Users can select the functionalities they intend to use
- Order tracking system (of orders registered at the E-Business Center and at Customer Service)
- Check of product availability
- Display of individual customer prices
- A product basket for placing orders at HARTING
- Product basket saving function for later use (availability check, order)
- Integration with our *HARKIS*® catalogue system, with corresponding search and configuration options
- "Tracking&Tracing" functionality for tracking the current location of dispatched packages (link to the shipping agent)
- Search for active invoices with options for branching to orders, bills of lading and to the "Tracking&Tracing" pages
- *HARKIS*® is based on the open SAP Standard OCI (Open Catalogue Interface) for transferring order numbers and batch numbers to any product basket.

1. HAN QUICK LOCK® SPRING CLAMP TECHNOLOGY

The Quick Lock® radial spring clamp technology combines the benefits of a spring-loaded contact with crimp technology. The result is a simple and vibration-proof wiring technology with the crimp technology contact grid. Quick Lock® technology is suited for wiring flexible conductors. The stranded wires are split up by means of a center mandrel and are then pressed onto this mandrel by means of radial spring force. The spring is opened and activated using a standard screwdriver, which ensures convenient on-site termination, repair or service work.



2. AXIAL SCREW TERMINALS

Flexible stranded wires inserted into axial screw terminals are split up by a center mandrel and are then pressed onto the outer wall of the contact by screwing down the mandrel. This vibration-proof connection technology is also a convenient solution for repair work and is capable of handling conductor cross-sections to 100 mm^2. The axial screw terminal is an ideal alternative to applications that required special crimp tools for wiring large conductor cross-sections.

3. CAGE CLAMP TERMINALS

The cage clamp terminal technology is used to terminate flexible and solid conductors by means of spring force. After the spring has been opened by an actuator element, the stripped conductor is simply inserted into the contact chamber. This connection technology requires minimum operating expense and is characterized by its high functional safety. The spring-loaded connection also allows thetermination of more than one wire per contact and excels with high vibration and shock resistance.

4. SCREW TERMINALS

The screw terminal represents classic connection technology, with screws retaining the stripped conductors in the contact chambers. Screw technology is suited for wiring solid and flexible conductors. Screw terminals with wire protection allows the insertion of stranded wire into the contact chamber without a ferrule. Handling screw terminal technology requires nothing more than a screwdriver. The pull out forces of screw terminal technology are standardized in IEC 60 999-1.

5. IDC INSULATION DISPLACEMENT TERMINALS

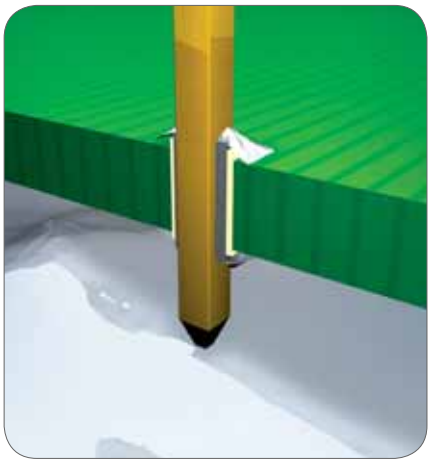
IDC (insulation displacement contact) technology facilitates the simple and safe termination of solid and flexible conductors. With IDC technology, a blade cuts through the wire insulation and produces an elastic termination in a single pass. This gas-proof connection provides maximum safety even for the lowest currents and voltages. *HARAX*® Fast termination technology is a special feature offered by HARTING which combines the insulation displacement connector with a wire guide element for conveniently producing on-site field installation without special tools. Technical requirements for IDC technology are standardized in IEC 60 352-3.

6. CRIMP TERMINALS

Gas-proof and the miniaturized contact technology are synonymous with crimp technology. The flexible conductor is inserted into the crimp contact and is retained by controlled deformation. This technology is similar to a cold welding process and provides maximum aging resistance and mechanical resistance to shock and vibration. Crimp machines facilitate the efficient, streamlined production of system cable assemblies, and crimp technology can also be deployed for field assemblies using the corresponding hand crimp tools. The technical requirements for crimp technology are standardized in IEC 60 352-2.

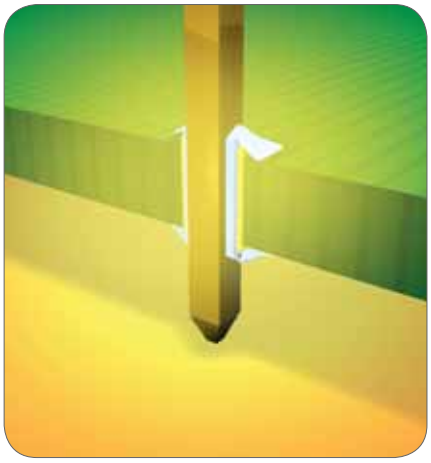
7. THT SOLDERING TECHNOLOGY

Proven over decades, standard soldering technologies deliver maximum stability and process reliability.
The soldering pins of the connectors are inserted into the through-plated PCB holes and can then be soldered simultaneously with other components in a wave soldering process.



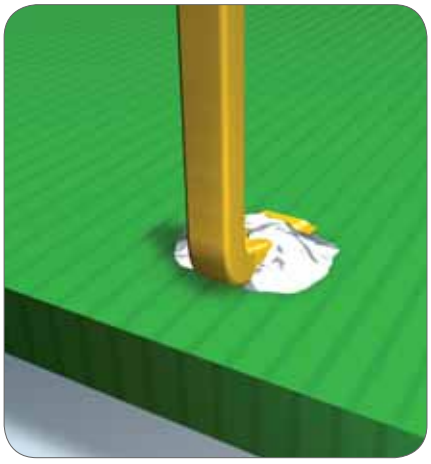
8. SMC SOLDERING TECHNOLOGY

The connector is inserted into through-plated PCB holes similar to standard component assembly for processing with SMC (Surface Mount Compatible) soldering technology. Insertion of these SMT components can be automated by means of Pick & Place assembly in preparation for a reflow soldering process together with the surface-mounted component. This connection technology is characterized by high mechanical strength and is facilitated by a design that is specially adapted to the reflow soldering process (high-temperature materials).



9. SMT SOLDERING TECHNOLOGY

By contrast to through-plated assembly, the SMT (Surface Mounted Technology) connectors are soldered directly onto the PCB surface by means of soldering pads.
This process represents a uniform connection technology for PCB assembly and offers the advantage of SMT connectors that do not require separate wave soldering.



10. PRESS-IN TECHNOLOGY

This solder-free connection technology is based on press-in mounting of a pin in a through-plated PCB hole. The implementation of a state-of-the-art, flexible press-fit zone allows for the compensation of tolerances of PCB holes and meets high electrical and mechanical requirements for properties such as low press-in forces and high holding forces.
Press-in technology supports unlimited cost efficient processing, especially of pins with selective gold plating for backplane bus systems.