

HARTING Technologies meet Markets



Connectors and System Components for

- Machine Manufacturing
- Transportation
- Factory Automation
- Energy
- Telecommunications



People | Power | Partnership



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The Technology Group HARTING

Using the strength of our expertise and the experience of our employees, we recognize customer needs and develop solutions. For decades, we have been ranked as a leading specialist in the field of electrical and electronic connection technology. We develop, produce and sell connectors, system components and complete systems for connecting and supplying machines, plants, appliances, railways, base stations, and many other customer applications with power and data.

We do this by drawing on the extensive performance range of the Technology Group HARTING that currently has subsidiaries in 22 countries. Our connectivity technologies and the competence of over 2,000 employees promote the creation of products that have one common aim: meeting customer requirements to an optimum degree.

We focus on a total of five core markets in the field of connection technology and our experience spans all continents. A selection of projects serves to illustrate the wide diversity of potential and applications in these areas:

- Machine Manufacturing
- Transportation
- Factory Automation
- Energy
- Telecommunications

Combining our experience and available expertise we work to create market-oriented solutions.

TECHNOLOGIES MEET MARKETS.



MACHINE MANUFACTURING

Operating under tough ambient conditions, modern industrial connectors for machines and plants have to be capable of interference-free transfer of power in the high-current range for example for drive systems while also transmitting bus signals to and from automation systems. Decentralized structures of power and control systems in connection with bus systems is gaining increasing significance.

Drawing on standard products from the comprehensive HARTING range, it is possible to configure virtually any connection to meet the needs of the respective application in terms of space requirements, assembly requirements and transfer medium (electrical, optical, pneumatic). Solutions for industrial Ethernet in IP 67 protection expand the range of solutions to meet emerging customer requirements.



Machine frame/housing with distribution unit. ULVAC, Inc., Susono City, Japan

Compact Connections for Distribution Units

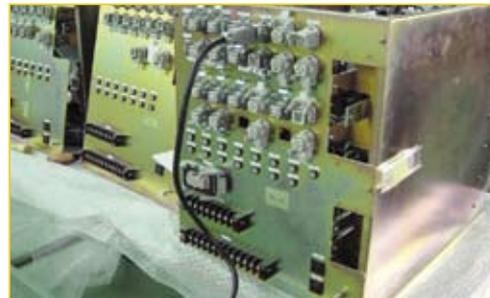
ULVAC was founded in 1952 and is one of the largest manufacturers of semiconductor equipment in Japan. Their customers are global manufacturers of semiconductors and electronic equipment.

Currently ULVAC has developed a new generation of machinery called Entron, which is the successor of the Daytona machine type. Han® connectors are applied for the connection of the control panels to the different racks that are part of the machine.

Customer benefits:

- The coding system prevents incorrect mating when connectors are mounted side by side
- The locking system is superior in terms of safety to that of circular connectors
- The compact and space saving size of Han® 3A

When ULVAC reduced the size of their machinery, less space was left for connectivity with the circular connectors they were using. The Han® 3A's size and its locking system, not requiring any room for twisting it to lock, led ULVAC to decide to use Han® connectors. Since ULVAC particularly likes the Han® 3A size, there are new opportunities for applications of other products of that size.



Distribution unit with Han® 3A panel feed-through housings

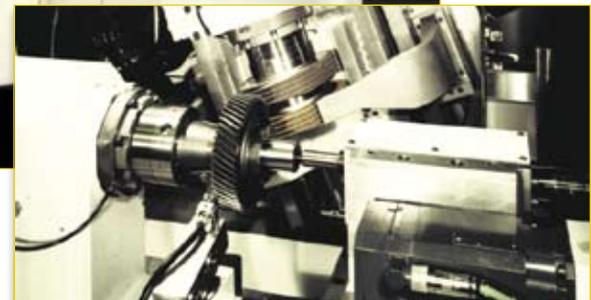


Han® Q 5/0 inserts

The DESINA® Concept delivers Cost Savings thanks to Decentralization



Machine for grinding outer gears. KAPP GmbH, Coburg, Germany



Detail of KAPP machine: grinding of a gear wheel

The KAPP Group, headquartered in Coburg Germany, is one of the world's leading manufacturers of machine tools specialized in gear and profile grinding machines. Its core activity is the finish processing of gears.

KAPP machines are installed in accordance with the DESINA® concept – a project of the German Machine and Tool Builders' Association for decentralized installation of machine control networks. HARTING supplies the hybrid field-bus connector, Han-Brid®, which is tailored to the requirements of the field-bus world. This connector enables the transmission of bus signals and voltage supply in one single connector in areas requiring at least an IP 65 degree of protection. The sensor and actuator cables can be easily connected in the field to the field-bus

components via the rapid termination technology provided by the HARAX® M12 circular connector. A power bus structure can also be realized via the Han® Q 8/0 connector for the supply of power and signals for the motor connection.

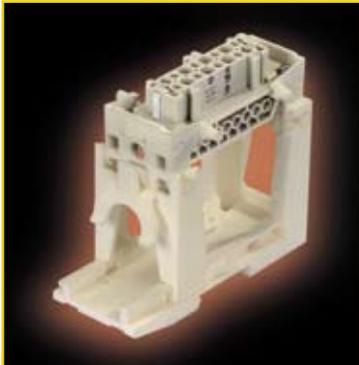
Thanks to the decentralized installation technology in connection with modern field bus systems, complex substations and control cabinets can be dispensed with. Moreover, both installation costs and the risk of connection errors are reduced and component exchange is simplified.



Han-Brid® F.O. connector



Han® Q 8/0 contact inserts



Han-Snap® Insert mounting parts, swinging

Assembly System for Control Cabinets

In order to be able to respond with flexibility to individual customer requirements, manufacturers are increasingly building equipment with a modular design concept. Machine complexity is increasing, as are the demands to meet cost budgets and tight installation deadlines.

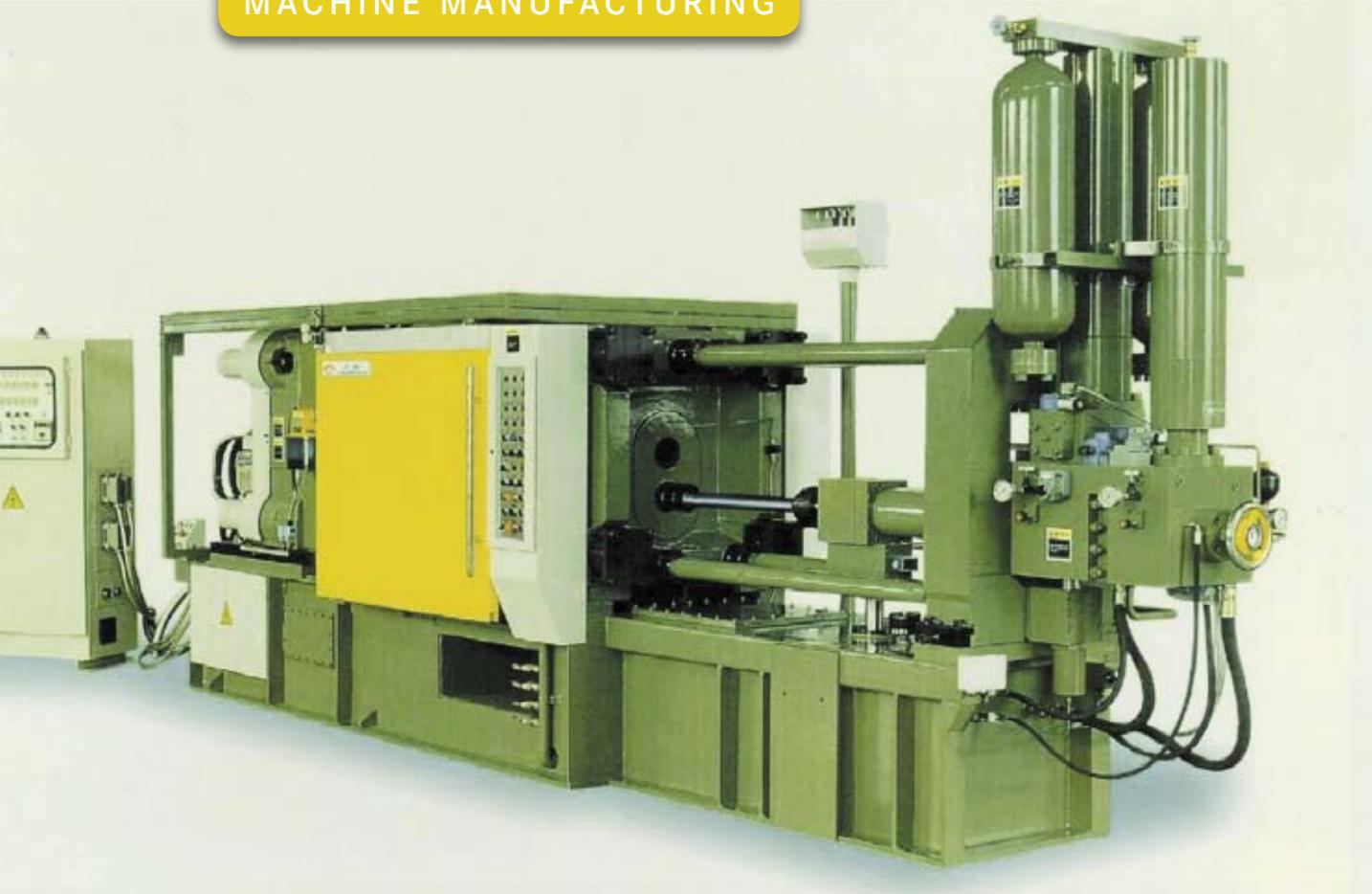
The HARTING Han-Snap® System provides a solution for assembly of standard Han® connector inserts in the control cabinet. Multi-pole connectors from the diverse Han® series can be easily "snapped" to standard rails without the use of special tools by using the polycarbonate Han-Snap® attaching pieces.

Installation of Han® inserts within the protected environment of the control cabinet, eliminates the need for metal hoods/housings and conventional terminal blocks are no longer required, thus material and assembly costs are reduced. Modular and complex power and control components, such as devices for the dimensionally accurate, parallel and angular assembly of work pieces, can be pre-assembled and tested separately.

After completion of all modules, the Han® connectors are mounted quickly and securely. The tilt function enables the simple inspection of the cable, as well as testing with the connector plugged in. This results in efficient manufacturing operations – saving time and money.



Control cabinet. IMA Maschinenfabriken Klessmann GmbH, Lübbecke, Germany



Die-casting machine. L. K. Machinery Co. Ltd., Hong Kong

Greater Flexibility thanks to Modular Machine Structures

The L.K. Group is one of the largest machine manufacturers in Hong Kong, South China.

The company's annual capacity totals an impressive 2,000 – 4,000 machines. The L.K. Group has branches in the USA, Canada, Japan, Taiwan and Indonesia, as well as dealerships throughout the world.

Han® connectors are utilized in the "IMPRESS" cold-chamber die-casting machines. The decisive advantage for the customer is shorter manufacturing times because operating terminals and

machine parts can be manufactured simultaneously at different locations. Using Han® connectors, the very flexible and modular structure of the "IMPRESS" machine is realized.

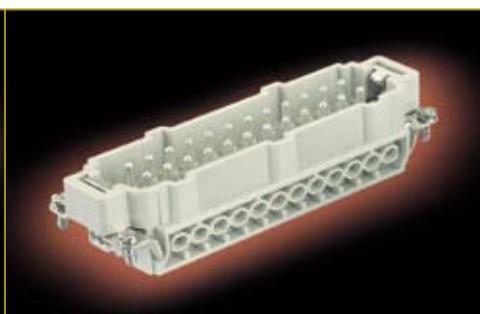
HARTING is the preferred supplier to the L.K. Group, particularly for high-end plants and facilities. Han-Modular® (D-Sub) connectors are currently being tested in prototypes in two new projects, where the connectors are interfacing with the respective computers.



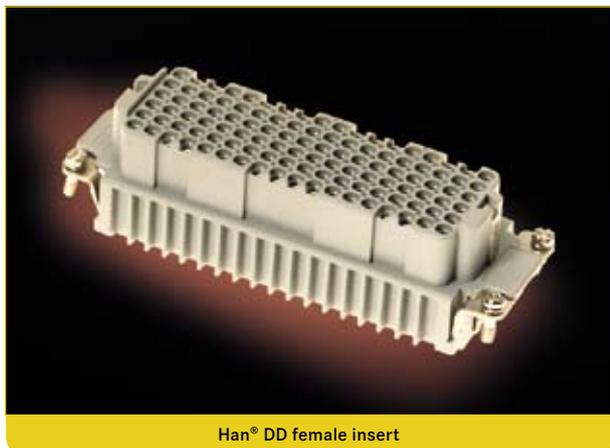
Han® D-Sub modules



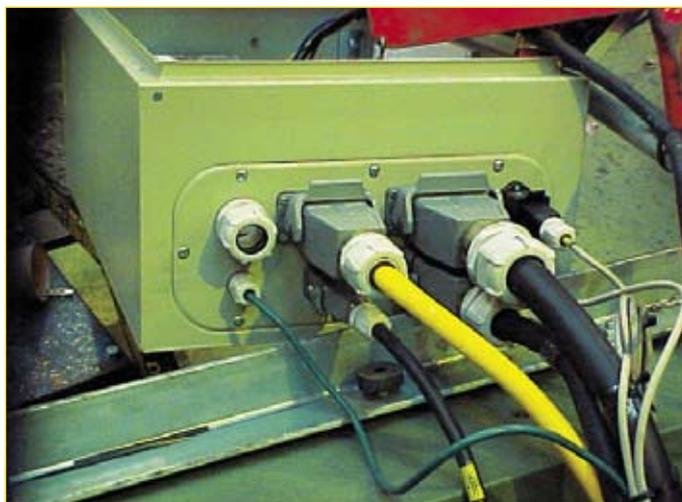
Han® 24 B bulkhead mounted housing



Han® 24 E male insert



Han® DD female insert



Distribution Box.
THYSSENKRUPP NORTE S.A., Mieres, Spain

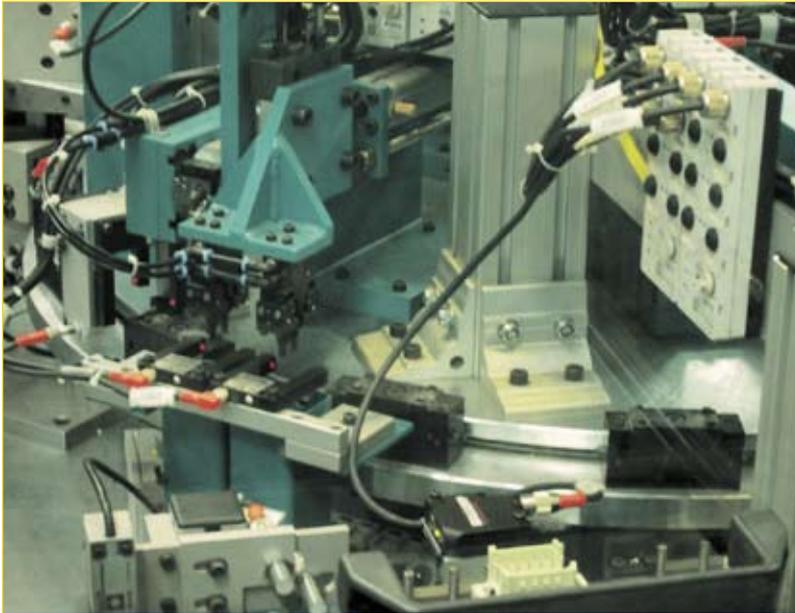
Enhancing Manufacturing Processes

In order to interconnect the various different modules quickly and flexible, THYSSENKRUPP NORTE S.A., Spain is working with distribution boxes that are connected via multi-conductor cables.

The cables are connected using Han DD® and Han-Modular® connectors. The connector pin assignment is always the same and redundant wires are available for flexible installation. This greatly facilitates the wiring process. The same cables are used always, which eases testing. The finished products from each production cell are 100 % tested and pass through an automatic control system before they will be used in the final product.



Han-Modular® connector



Automatic assembly machine with *HARAX*[®] compact module for AS interface. SIM Automation GmbH & Co. KG, Heiligenstadt, Germany

Rapid Termination Technology for Sensor-/Actuator Boxes

The proven axial *HARAX*[®] insulation displacement connector technology simplifies the connection of sensors and actuators.

HARAX[®] connection technology allows the connection of sensors in the field and no special tools for stripping the wires or for assembling the components are required.

As a result, popular sensor types with fixed cable lengths can be customized in the field. Money spent on excess cable lengths and resultant unwanted cable loops is saved.

The *HARAX*[®] components can be reused several times. The high requirements of IP 67 environmental protection are fulfilled. In addition to passive sensor/actuator boxes, compact modules for the AS interface with a maximum of 8 *HARAX*[®] terminals are also available.



HARAX[®] M12 circular connectors



HARAX[®]-passive sensor-/actuator box



Mobile X-ray system. Ziehm GmbH, Nuremberg, Germany

Image Transmission with Modular Connectors

The Ziehm 8000 of Ziehm GmbH, Germany is a state-of-the-art mobile C-arm – highly rated for its mobility and simple operation. The system is equipped with a sophisticated radiograph delivering the highest image quality and excellent reliability.

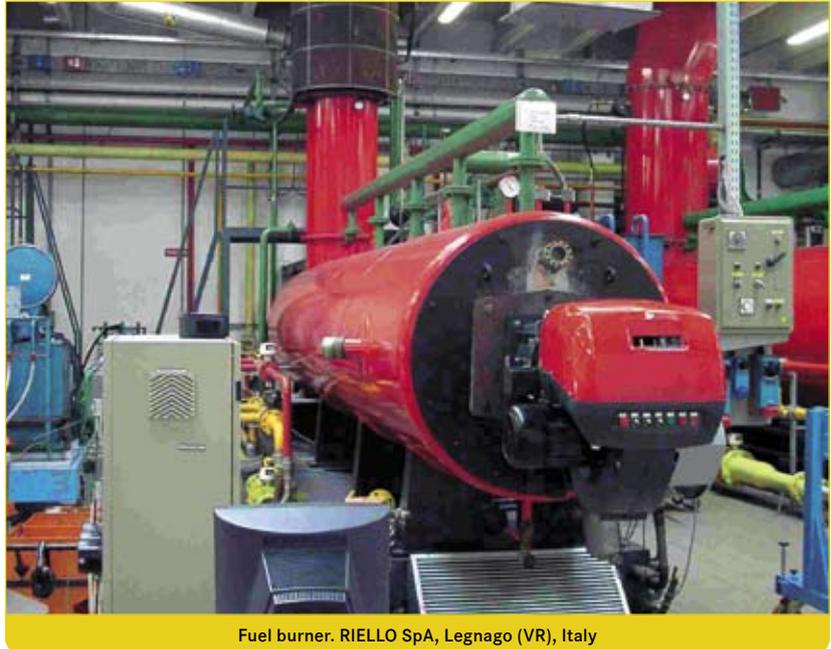
The Ziehm 8000 impresses with one of the smallest footprints of any mobile C-arm available, while also featuring one of the largest C-arms. The small footprint, the reduced weight and the large C-arm make the Ziehm 8000 the perfect choice for intra-operative fluoroscopy and digital radiography.

The system is available in a pluggable design exclusively. The connection of the moving part to the monitor cart is achieved by way of a HARTING Han-Modular® connector in a Han® 10 B housing with one Han E® module and two Han DD® modules.

For the next generation of C-arms, the modular connector is to be extended by one multi-contact module with 75 Ohm coaxial cable thereby enabling higher data rates for image transmission.



Example for a Han-Modular® connector



Fuel burner. RIELLO SpA, Legnago (VR), Italy

Reduction of Downtime

Riello is one of the world's biggest manufacturers of multi-purpose fuel burners, covering a power range from 0,5 kW to 20 MW. These products are especially used in the fields of industrial and residential heating systems, energy production and transportation (heating installation on ships).

For the signal and power connection of the control compartment with other parts of the burner like fan motor, safety valves, temperature and pressure probes etc. Riello decided to use connectors of the Han® Q-series with Q 4/2, Q 8/0 and Q 17 inserts.

Herewith considerable benefits are achieved, e.g. in case of maintenance – when the control compartment is opened and separated from the burner – downtime and (therefore costs) are noticeably reduced, since there is no labour termination of the single wires.



Han® Q 4/2-connector



Han® Q 17-connector



Injection Moulding Machine.
Sonceboz S.A., Sonceboz, Switzerland

Effective Manufacturing Process with Ethernet



HARTING Ethernet Switch ESC 67-10 RJ Industrial

All over the world in every key sector of industry and daily life, systems made by SONCEBOZ control movements in vehicles, machinery and equipment. The motors, drives and mechatronics systems are designed to meet the demanding requirements and the highest standards of precision.

An effective monitoring and documentation of the whole production process. The host computer system is connected to the machines via the world standard of Ethernet cabling network.

The benefits for the customer are: less planning, easy and fast installation, flexible and robust equipment and minimal costs. Solutions which meet the requirements of an industrial environment perfectly.



Biaxially oriented film die. Cloeren Inc., Orange (TX), USA

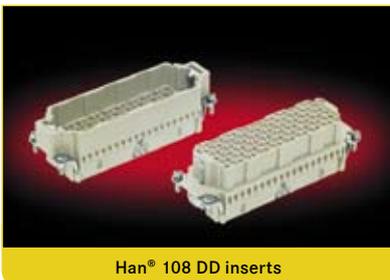
Faultless Connections in Foil Production

Cloeren Incorporated is the world leader in extrusion die technology. The company's commitment to innovation began with the introduction of its first patented feed block in 1975. Since then, the number of patents issued to Cloeren stands unsurpassed by any competitor. And, today, more processors buy Cloeren dies than any other brand.

Cloeren sets the standard in die design technology and know-how. Dies must meet exacting requirements, without strictly limiting the processor's operating window. Accomplishing this requires a comprehensive understanding of polymer and fluid behavior, rheological science, fluid mechanics, structural mechanics and thermal dynamics, as well as in-depth process knowledge. Cloeren brings all these disciplines in one package.

HARTING connectors are utilized by Cloeren to connect sensors and heaters within "zones" of the manifold dies. Han E® connectors within 32 B and 48 B hoods provide connectivity to sensors while connectors of the Han DD® range provide connectivity to the heaters. Depending on the flatness and/or thickness of the product sheet flowing through the die, the connectors provide a feedback loop to adjust the die opening for optimal control.

In addition to providing a sound connection to the components of the manifold die, HARTING connectors also provide quick installation and change out for Cloeren's key customers.



Han® 108 DD inserts



Han® 48 B hood



Reduction of Installation Time

Lantech, Inc. introduced the first stretch wrapper machine to the packaging world in 1973. Today, Lantech remains the industry leader in choices and quality of stretch wrappers. The Lantech stretch wrapper product line includes the Q-Series™ turntable models, S-Series™ overhead straddle models and Lan-ringer® horizontal wrapping model. Each model is designed to maximize operating safety, uptime, ease of use and wrapping performance. Lantech has over 40,000 wrapper placements worldwide.

The S-Series™ Automatic Stretch Wrapper is the highest throughput capacity machine of Lantech, capable of up to 90 loads per hour. The machine is ideal for loads that are too light, tall or heavy to rotate.

A key benefit of the S-Series™ model is the modularity of the system. This model requires 50% less time to install than competitive systems. The shortened install time is made possible through the use of HARTING connectors that provide for quick connect wiring. Han E®, Han E®AV and Han A® connectors provide for connectivity to the main control panel, operator interface, and interconnects beneath sections of the machine.

In addition to a reduced installation time, HARTING connectors also allow for manufacturing the machinery in a modular format as well as quick change out of components by the end user.



Han® E AV-male insert



Han® 3A-inserts



Automatic stretch wrapper. Lantech, Inc., Louisville (KY), USA

Modularity is a trend that is increasingly gaining ground in the rail technology field. The development and production of modules that are assembled to make a complete unit require simple, safe and reliable electrical and electronic connections. This applies to both the control signal and power transmission areas.

HARTING offers a complete connector range to fulfill these needs. The spectrum ranges from shielded connectors for the transmission of sensitive signals to the interface for power connections on main propulsion units.





“Hercules” diesel locomotive. Siemens Krauss-Maffei, Munich, Germany

Flexibility in Rail Applications

The “Hercules” BR 2016 diesel locomotive of the Austrian State Railways, features Han® standard connectors with Han-Easy Lock® or central-locking lever which are used inside the vehicle.

In both diesel and electric locomotives, a wide range of signals or power has to be transmitted for control purposes. Here – as in diverse other applications – customers require safe commissioning, the possibility to easily search for faults or, if necessary, the quick exchange of components or modules.

The suitability of a connector always depends on the respective usage requirements and ambient conditions. The ambient conditions inside locomotives and train cars differ from those outside. The restricted access for installation is a typical aspect of interior applications. However, simple operation and accessibility of the connectors must be guaranteed at the same time. HARTING meets

these requirements by providing a wide variety of different hoods and housings as well as the associated locking systems.

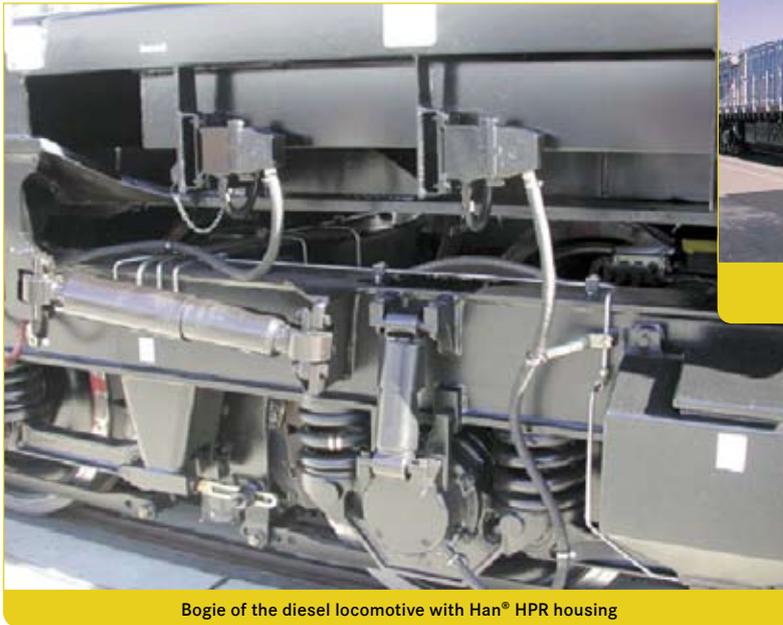
The 2016 series diesel locomotive features connectors with a central locking lever which provides easy operation in areas that are difficult to access – both from below and from the side. Connectors with the Han-Easy Lock® lever were chosen for the generator area, since installation conditions would only allow locking from the side.



Han-Easy Lock® lever



Han® B housing with central locking



Bogie of the diesel locomotive with Han® HPR housing

"Blue Tiger" diesel locomotive.
Bombardier Transportation, Kassel, Germany

Safe Use under extreme Environmental Conditions

In this rail bogie application, connectors are used to transmit rpm and bearing temperature signals at the bogie of the "Blue Tiger" diesel locomotive.

Sensors are fitted to the axles in order to obtain information about the correct functioning of the bearings and current speed. Connectors along with cables are used with these sensors to transmit the relevant signals to the evaluation electronics. In the event of a fault, quick and safe disassembly is a low cost experience.

Since the Han® connectors are located externally, they are consequently subjected to thermal, mechanical and corrosive ambient conditions: namely heat, cold, vibration, and the impact of stones, salt, etc. In order to guarantee problem-free operation even under these extreme conditions, a connector is required that is specially designed for this type of demand: the solution is the use of a HARTING Han® HPR housing (HPR: High Pressure Resistant).

Han® HPR hoods and housings are suitable for maximum protection underneath and external to the vehicle and in extreme conditions. The connector function is guaranteed by the following features, e.g.:

- IP 68 protection
- Use of a non-corrosive alloy
- Internal, protected seal
- Fastening screws within the sealed area
- Locking elements made of stainless steel



Han® HPR housing



Etris H2000 power converter.
ELIN EBG Traction, Vienna, Austria

Compact and Modular Connection of Power Converters

Locomotives and trains operate on high power. Overhead lines are used to transmit electrical power to the train and carry very high voltages and currents.

The power converter is an essential element of drive technology within the “overhead line” to the “engine” power chain.

To ensure that these power converters fit into the modular system concept and that assembly and maintenance can take place quickly and flexibly, connections for the safe transmission of high currents must be used.

In these applications, HARTING is offering the Han® HC Modular connectors. These are capable of safely transmitting up to 650 A. The use of the axial screw termination results in a compact and space-saving electrical connection.

The connectors are installed in the Han® HPR housing that is specially designed for outdoor use.



Han® HC Modular 650 with Han® HPR housing



Han® HC Modular 350 with Han® HPR housing

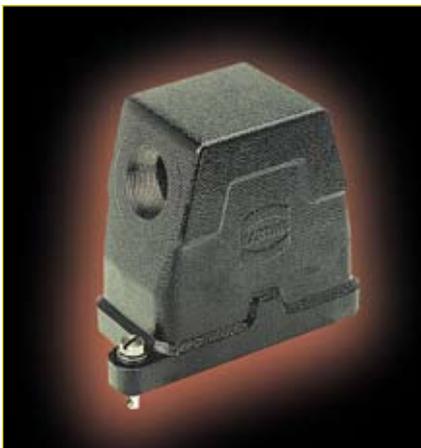
Quick Connection of Drive Motors



Motor connection of the traction bogie. Siemens AG TS, Erlangen, Germany



Han® K 3/0 high current connectors



Han® HPR housing

Power-transmission connectors are at work here; the traction-bogie motor is connected via the Han® K 3/0 (rated 200 amps) in the Han® HPR housing.

The advantages of optimized manufacturing and faster servicing are strong arguments in favor of the modular principle. The trend towards making higher voltages or currents connectable is continuing undiminished, whether as an interface for grounding circuits on the vehicle chassis or as a motor connection for the motor bogies. HARTING has mastered these demands by offering a cost-effective termination system: the axial screw termination. The system significantly reduces connection time and enables, for example, the design of drive bogies – increasingly with modular structures – to be quickly connected/disconnected. Use of the Han® K 3/0 and Han® HC Modular in the pressure-tight Han® HPR series (IP 68) hoods and housings for outdoor applications, efficiently connectorizes the supply lines to the bogie drive motors.



Ethernet-Interface for Passenger Information System

Ethernet is used extensively in the office environment and is gaining more and more importance as a bus system in industrial applications. But commercially available office equipment connectors can not be utilized offhand in industrial applications. This is due to the harsh environmental conditions which are typically found in factories and manufacturing environments.

Ethernet has already established a presence in the railway market and is applied in rolling stock and stationary systems. At present, Ethernet is mostly used as a bus system for passenger information systems. For example, it is used to connect the central units of audio- and video-systems within the train or for ticketing. The HARTING RJ Industrial® Ethernet connectors and Ethernet cable from HARTING are currently being tested for networking in these applications by the Stadler Rail Group, Switzerland.

The HARTING RJ Industrial® connector family includes several variants which have been developed for use in harsh indus-

trial environments. The connectors feature a time saving and easy mounting capability as no additional tools are needed for their assembly. One can assemble RJ Industrial connectors to cable for industrial Ethernet with stranded or solid wires with a conductor cross section up to AWG 22/0.34 mm². Through the use of HARAX® insulation displacement contacts, the HARTING RJ Industrial® connector has proven to be reliable and time saving. Special stamped metal sheets have been designed and implemented for EMC protection around the connector body.

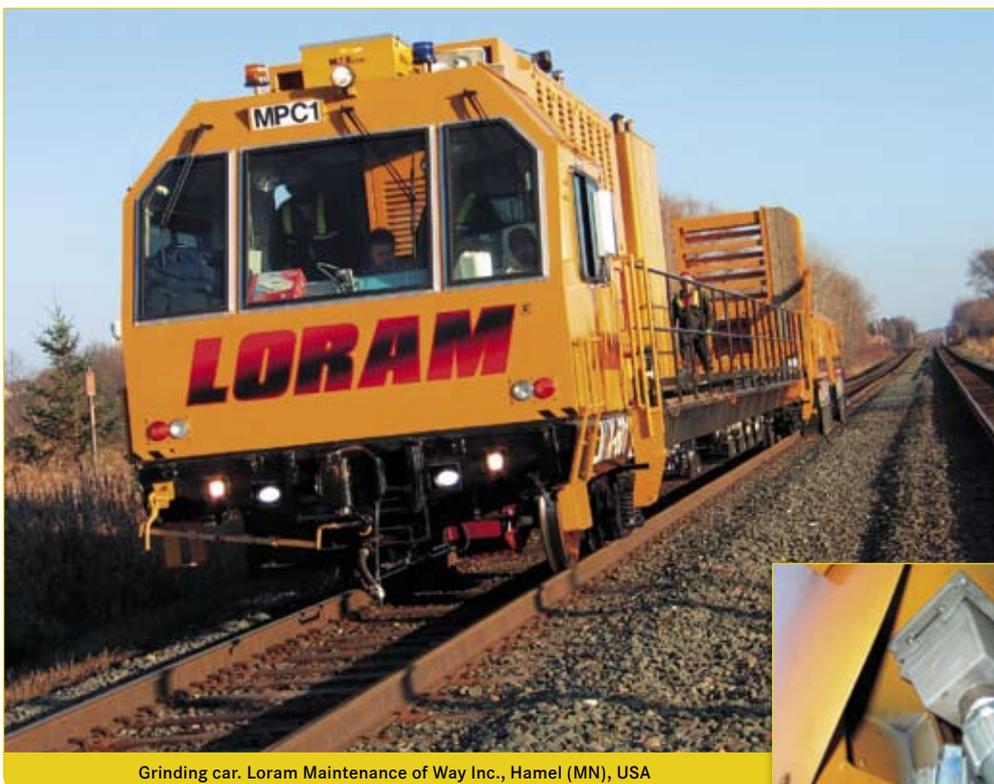
In addition to Ethernet connectors, HARTING offers harnessed system cables in various lengths, Ethernet switches for building Ethernet networks, and a complete line of Ethernet connectivity solutions for your needs.



RJ Industrial IP 20 Plug



HARTING RJ Industrial®. Stadler Rail Group, Altenrhein, Switzerland



Grinding car. Loram Maintenance of Way Inc., Hamel (MN), USA



Han-Quintax® connector

Flexible Connection in Railway Maintenance

With over 170,000 miles of track in the United States, rail is the single most valuable asset of most railways. Extending the life of the rail by rail grinding is considered the single most effective maintenance practice to control the effect of rolling contact fatigue, restore profile and maximize value from the rail asset.

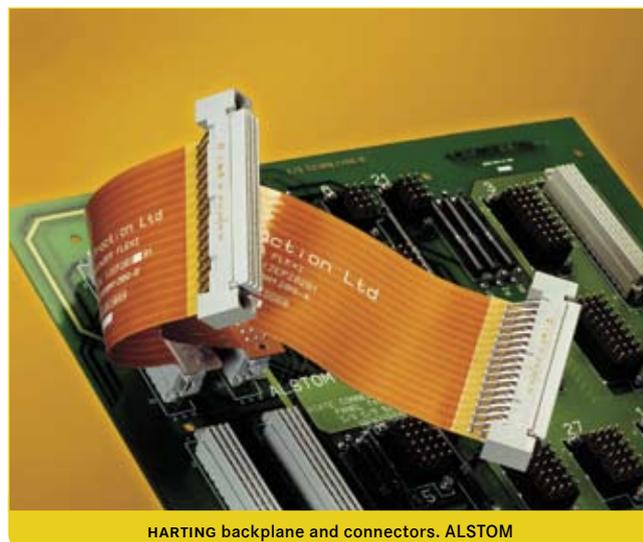
Loram manufactures rail grinding equipment that incorporates high power, flexible grinding modules in configurations ranging from 16 to 96 grinding stones. Communication between the grinding cars is accomplished by a coax based ControlNet® system. In the past, the communication system was hardwired between cars. When cars had to be separated, each conductor had to be disconnected by hand and then reconnected when the cars went back together. Loram desired connectorization for the shielded coax ControlNet® cable and found the Han-Quintax® connector to be an excellent solution.

Han-Quintax® is a highly shielded, low impedance, 4-pin connector that is assembled into the Han-Modular® frame connector and then assembled into IP 65 hoods and housings. Large, 32 B hoods were selected so that up to 8 coax cables could be disconnected at the same time. The timesavings are dramatic

over hard wiring. Han-Quintax® is specially designed to handle very sensitive signals with no loss of signal. The completely assembled connector has been tested and easily meets the latest vibration test criteria.



Han® 32 B hood and housing



HARTING backplane and connectors. ALSTOM

HARTING Backplane and Connectors

Serving ALSTOM, an internationally leading French manufacturer of rail technology, HARTING is manufacturing a fully assembled backplane including a flexible PCB for the connection of further modules. In addition to manufacturing and designing the backplane, HARTING has collaborated with the customer in developing the special DIN 41612 connectors. The backplane illustrated is used for control purposes. The connectors are deployed in various control-unit applications.

Thanks to its own backplane manufacturing capability, HARTING provides customers with the option of sourcing complete modules. In this way clients not only receive individual components, but also comprehensive system modules. The connector shown from the DIN 41612 range was equipped with two special flanges. The flanges ensure a safe connection that compensates for the slight tolerances that occur, for example, with mechanical inserts. Drawing on these strengths, HARTING products are supporting safe and reliable operations in the rail technology sector.

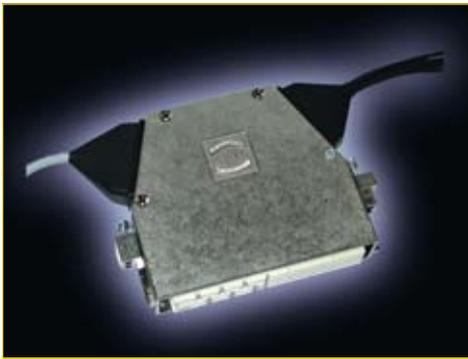


DIN 41612 connector

HARTING Interface Solution for Train Control

In collaboration with Bombardier Transportation, the world-leading manufacturer of railway technology, HARTING has developed a customized full metal housing for connectors in the DIN 41612 range. The housing features a unique design that both reduces costs and saves time in production operations.

The housing is used as a front interface for train control modules. It offers various possibilities for connecting cables: either via cable sleeves for the variable connection of different lines or via crimp inserts for use in areas with high interference levels that require especially sound EMC properties. The amount of space available within the housing for wiring, the strain relief for the cable to be connected, as well as the placement of the screws to fasten the housing cover result in time-saving assembly in production.



DIN 41612 full metal housing



HARTING full metal housing for train control modules.
Bombardier Transportation, Germany



HARTING Connection Technology for Drive and Vehicle Controls

HARTING is supplying DIN 41612 connectors as well as the required shell housing for the drive and vehicle controls of leading manufacturer ELIN EBG Traction. These elements are used, for example, as a front interface in the microprocessor-controlled drive and vehicle controls in the company's ELTAS product range. The ELTAS controls are deployed in both the heavy-rail and light-rail vehicle areas.

Thanks to their robust construction and the corresponding air clearances and creepage distances, the DIN 41612 interfaces are particularly suitable for rail technology applications. A wide variety of different accessories, such as housings or different connector types, are also available. In addition to the plastic housing shown in the figure, full metal housings are utilized in rail technology, as well as metallized plastic casings. As leading manufacturer for connectors in the field of railway technology, HARTING is offering an extensive portfolio of DIN 41612 products.



HARTING connection technology for vehicle controls.
ELIN EBG Traction, Austria



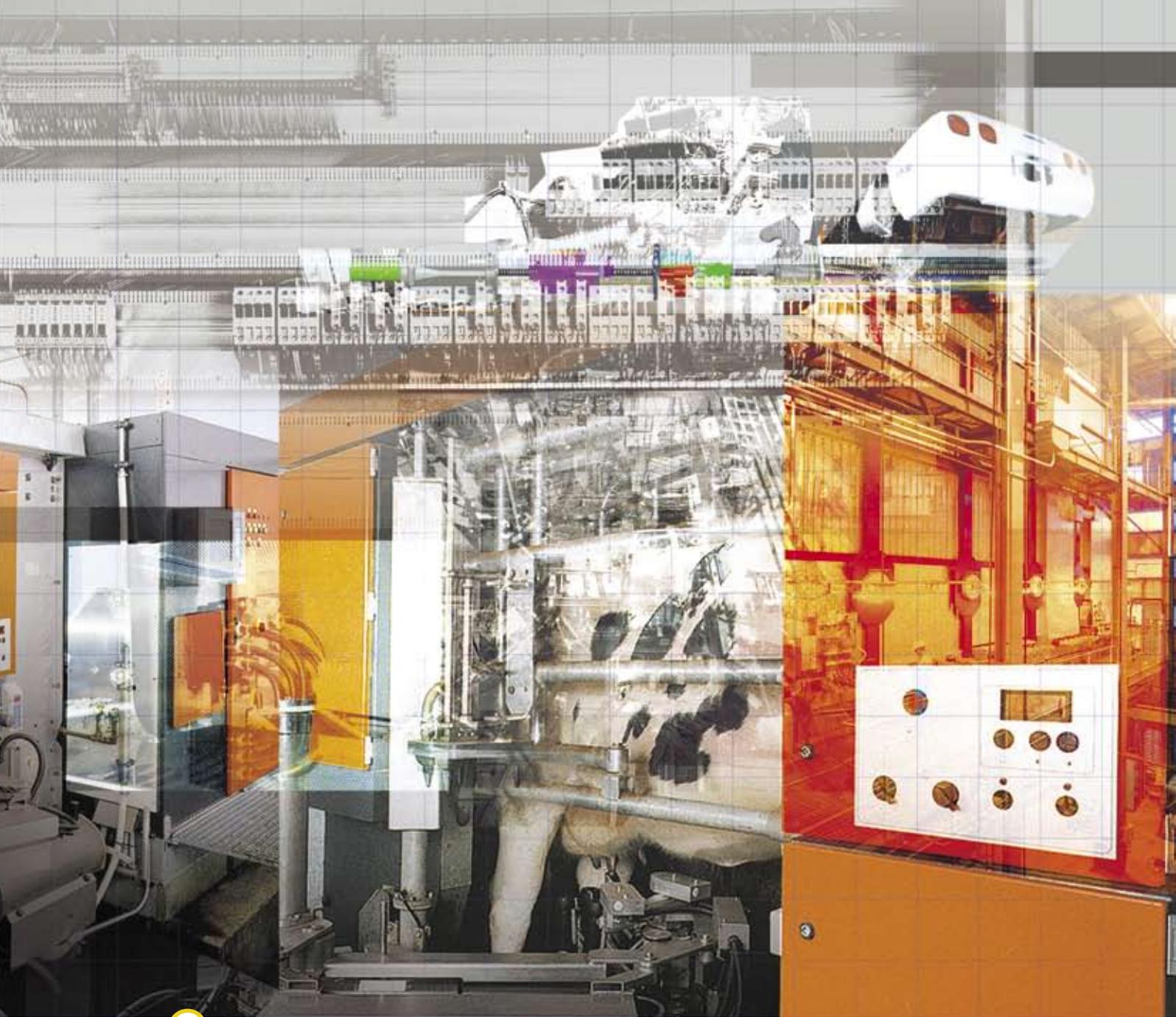
Housing from the DIN 41612 range with coding

AUTOMATION TECHNOLOGY

Flexibility and modularity are key terms in the world of modern automation technology. During development, assembly, transport and operation, both flexibility and modularity can only be achieved with the help of the appropriate connection technology.

HARTING offers the appropriate solutions for virtually all automation applications. The available range includes connectors for electrical signal and power transmission, fiber-optic technology, and interfaces for pneumatic lines.

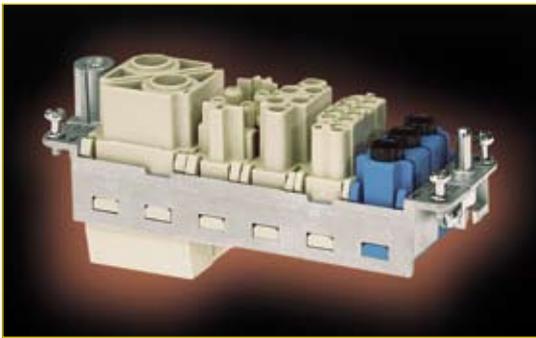
Complete solutions for industrial Ethernet are also available, ranging from connectors based on the RJ 45 and M12 systems, system cabling, to devices such as industrial switches or outlets. The main focus is on products offering IP 65 / 67 protection.





Han-Quintax® connector

Modular Connector Systems for Packaging Machines



Han-Modular® modules

Today's modular packaging systems require flexible interfaces. HARTING's Han-Modular® connector series is a driving force behind this trend.

In place of a moulded, pre-configured insert, the Han-Modular® system is based on a retaining frame and individual modules. Using this system, the modules can be assembled and disassembled in the die-cast retaining frames without the use of tools. Finished module/frame assemblies are mounted into robust Han® hoods and housings that offer the right protection for virtually all applications.

With the help of different modules, electrical signals and power can be made pluggable. Moreover, standard modules are available and provide plug-in facilities for pneumatic tubes, fiber optic and coaxial cables. In addition, a module is available with the Han-Quintax®, a shielded communication connector that enables a highly shielded transmission of signals.



Cigarette packing machine. G.D.S.p.A., Bologna, Italy



DESINA® encoder with PROFIBUS interface for optical data transmission. TWK-Elektronik GmbH, Dusseldorf, Germany

DESINA® Encoder with PROFIBUS Interface for optical Data Transmission with Han-Brid®

For high-resolution angle encoders with PROFIBUS or CAN interface: Han-Brid® connectors ensure an easy, standardized connection to the transmission medium.

The DESINA® concept (DEcentralised and Standardized INstallation technology) developed under the direction of the German Machine Tool Builders' Association defines various aspects, including profiles for electro-mechanical interfaces, for cable and interconnection engineering, as well as for frequently used field components, such as sensors, valves and I/O distributor modules.

Copper-based signal lines are of interest for standard applications in angle measurement engineering; fiber-optic cables are used to meet higher-speed requirements for transmission security and distance. Both types of signal lines are combined with copper wires for power supply (in Europe) in one connector.

TWK-Elektronik offers high-resolution angle encoders with PROFIBUS interface for both variants. Han-Brid® connectors ensure easy, standardized connection to the transmission medium.

The main application for angle encoders with PROFIBUS is, wherever angles and distances must be identified as accurately as possible, for example, in transport and feed units, peripheral units, extended cranes and loading systems or in the paper machine industry, to name just a few.

The DESINA® concept that was originally developed for the machine tool industry is now proving benefits in many other segments and application areas.



Han-Brid® F.O. connector



Han-Brid® Cu connector



Power and Signal Transmission in Robots

Han® industrial connectors are important components in realizing maximum flexibility when it comes to assembly, testing, transportation and commissioning of modern robotic systems.

An industrial robot essentially consists of two components: the control cabinet, which controls the functions of the robot and communicates with other robots or plant components, and the industrial robot itself.

Various Han® industrial connectors are used to transmit both signals and power between the control cabinet and robot.

Connectors from the Han-Modular® series in particular, play an important role and enable the combination of both signal and power transmission in a single connector. In addition, connectors from the Han DD® series are often used and enable signal transmission (10 A / 250 V) in a minimum amount of space. Other products from the Han® EE series provide connectorization for power transmission and are rated at 16 A / 500 V.

The supply of power to the entire robotic system can also be designed to be pluggable for example, by using a Han® 6 HsB insert (rated at 35 A / 500 V).

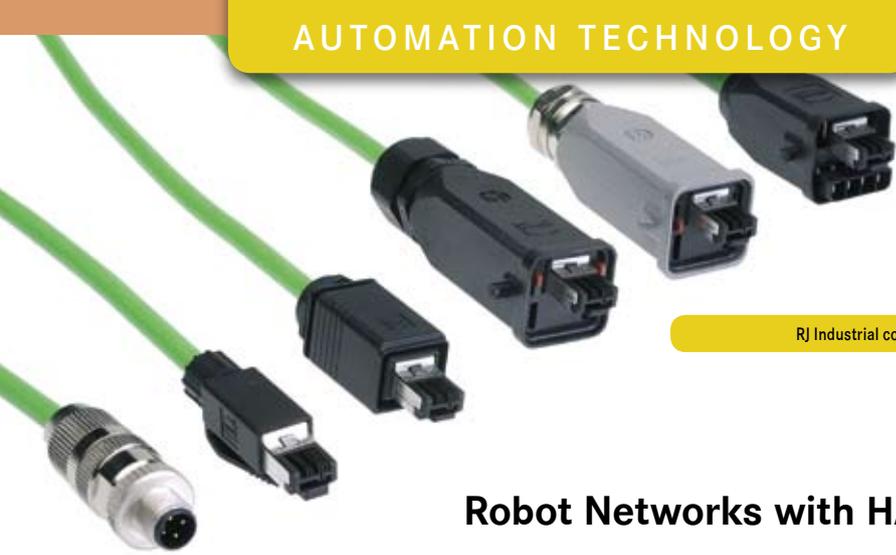
Various other Han® industrial connectors are also available for communication with additional machine or plant components, and allow the robotic head tools to be pluggable. Using the strength of their robust mechanical design and IP 65 protection, the Han® connectors are suitable for all industrial applications. Connectors are essential to low cost robotic applications, as fixed wiring for assembling, testing, transport and commissioning of the system in the field would be far too expensive.



Robot. KUKA Roboter GmbH, Augsburg, Germany



Han® 6 HsB contact inserts



RJ Industrial connectors and system cables

Robot Networks with HARTING Industrial Ethernet

The new DaimlerChrysler A-Class is produced in Rastatt, Germany. HARTING now supplies the industrially proven connector technology for linking the robot and welding controls to the internal DaimlerChrysler Ethernet company network at the A-Class production facility.

More than 1,000 industrial connection points – so called “Industrial Outlets” – panel feed throughs, and industrial Ethernet system cables with IP 67 RJ Industrial DATA 3 A connectors connect the robot and welding controls.

According to Mr. Fabien Beill, network manager at DaimlerChrysler, the robustness of the components and the backward compatibility of the RJ 45 interface that allows diagnostics and service with standard patch cables, were the main reason to choose the HARTING technology. Especially in welding applications, the weld splatter resistance of the network components is evident. Metal outlets and connectors from HARTING were used in this application.

With its robust design and its IP 65 / 67 protection degree the HARTING Industrial Outlet INO 67-30 TP02 can be easily mounted on walls and lattices inside and on the outside of production facilities. The approved LSA-Plus® termination technology allows a quick and easy harnessing of horizontal cables. The internal DaimlerChrysler Ethernet network is linked to the production plant via a user friendly termination and easy to lock RJ 45 system cable. The Industrial Outlet INO 67-30 TP02 is designed and built according to the PROFINET installation guideline.



Switch Cabinet



RJ Industrial device connectors in switch cabinets for robot controls in an industrial environment.



Industrial Outlet mounted on a production line. DaimlerChrysler AG, Rastatt, Germany



SIEMENS ET 200 X decentral peripheral devices. Siemens AG, A&D, Germany

Decentralized Installation Technology interacting with SIEMENS Automation Components

In modern machine and plant configurations, conventional industrial installation technology with central switch cabinets is being replaced by decentralized installation structures.

The modules necessary for the automation functions, such as I/O modules or motor control units, are no longer being installed in the switch cabinets, but rather in the field on/or close to a machine.

Essential cost savings can be achieved during planning, installation and commissioning by combining serial wiring for communication via field bus systems and power.

Installation components with a high degree of protection are basic necessities for the development of decentralized installation structures. The ET 200 X, ET 200 ECO and ECOFAST® series from Siemens AG, A&D offers a broad range of products that support these structures. Han-Brid® connectors are integrated into these components as interfaces for the combined data and auxiliary energy transmission and Han® Q and Han-Drive® connectors for the energy supply. Combined with system cables, these interfaces enable simple, fault-free installation, thereby forming the foundation for the above-mentioned cost savings.



Han® Q 8/0 connector



Automated baggage. Siemens Dematic S.A., Madrid, Spain

Automated Baggage-Handling with intelligent Connections

In 2000, Siemens Dematic undertook the extension of the Madrid-Barajas airport. In this extension, Siemens Dematic is installing the automatic baggage handling system (BHS).

The baggage handling system with a total circuit length of 91.3 kms, will process more than 16,500 pieces of luggage per hour.

The development of this important project required careful consideration of points crucial to the efficiency of the system: rapid and secure connections, practical installation and assembly and uncomplicated maintenance. These same considerations have been applied to all the electrical and electronic components supplied by the HARTING Technology Group.

The PROFIBUS-DP connector *HARAX*® M12-L link the INDRIVE motors and the read/write stations of inductive identification. The connection is made by means of axial insulation displacement. A Han® 10 E connector with crimp termination is installed in the connection box of the motors. Quintax connectors are using crimp contacts in peripheral cabinets to connect touch panels and carry out the motor control in manual mode. Han® 3A connectors with screw terminals are used to connect the photocells of the vertical classifiers by means of extra flexible cables.



HARAX® M12-L circular connector



Han® 3A inserts



Han® 10 E inserts



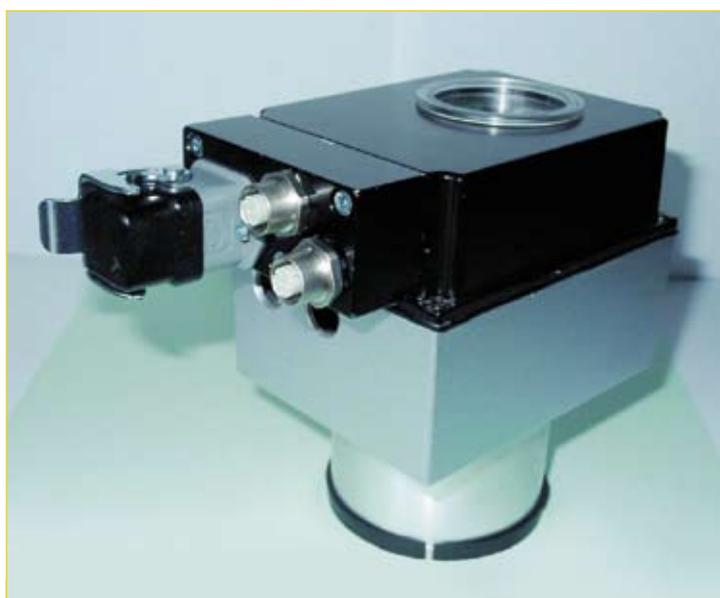
Rotary Drives with Ethernet

Company Haselhofer Feinmechanik, located in Villingen-Schwenningen in southern Germany, is a specialist in developing and manufacturing electric actuating drives. These products are commonly used in combination with valves, flaps, control fittings etc. and are part of many applications in the field of measuring and controlling.

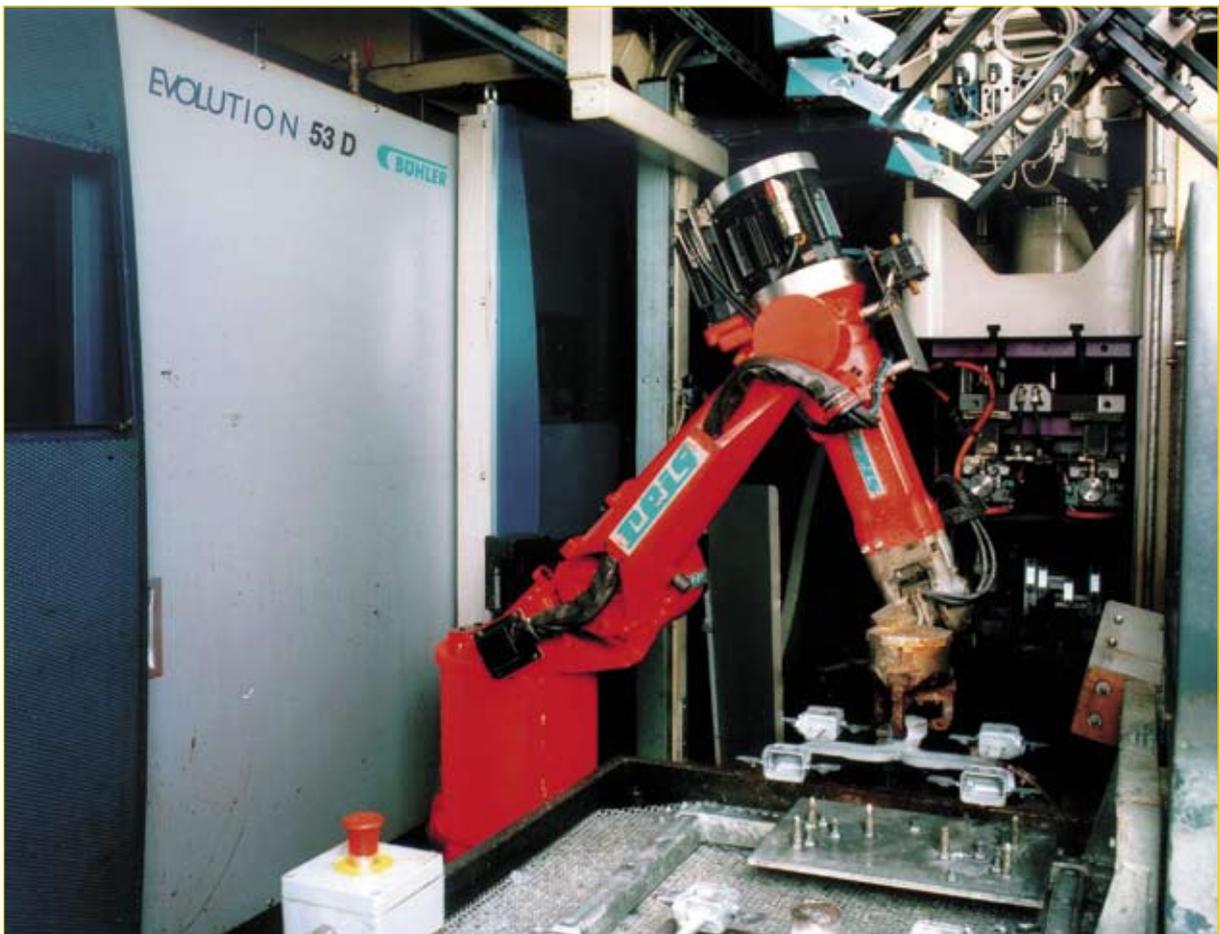
Ethernet is used to connect several rotary drives which are used to adjust the position of air flaps in a compound burner system. Robustness and reliability are crucial criteria which company Haselhofer used to make the decision to select the M12 connectors from HARTING for their high-tech device.



M12 Panel feed through



Actuating drive. Haselhofer Feinmechanik GmbH,
Villingen-Schwenningen, Germany



Reis-robot, type RV 16. Reis GmbH & Co, Obernburg, Germany

Automation in the smallest Space

Many casting houses are now refitting existing and installing new stations with robots to assure process automation and quality of the cast parts. The installation of the robots often poses space problems as the machine was already designed around the

part and material flow process without the robots. The challenge is to find the optimum regarding machine functional efficiency, accessibility and expansion possibilities in the future.

Han® industrial connectors play an important role in the robotic technology sector as they help solve the above challenges. The use of Han® connectors not only helps obtain the necessary flexibility that such critical space environments demand, but also allows quick set-up times and reduces the effort needed when changing the cast parts, thus reducing costs. The connectors provide both the power transfer and data communication from the control cabinet to the robot. Here the Han DD® and Han-Modular® series are used to connect the system components.

The flexible possibilities shown by the successful use of connectors in the robotic industry can also be transferred in other industrial areas as well and thus lead the way for use in technologies of the future.



Han® 72 DD inserts



Drive technology.
SEW-EURODRIVE GmbH & Co KG, Bruchsal, Germany



Gear motor
with HARTING Industrial Connector

Step by Step to the Future

For the realisation of a “quick equipment replacement” HARTING industrial connectors play a major role for SEW-EURODRIVE on gear motors and drive units. The electrical installation of machines and plants must be achieved in a timely and cost effective manner. A solution based on standard termination technology is well accepted in the manufacturing and factory automation markets.

Industrial connectors Han[®] – according to the application with standard or EMC housings and Han E[®] or Han-Modular[®] inserts – are an integral part of many SEW-EURODRIVE devices. This concept is – regarding connection safety and documentation as well as in terms of minimi-

sation of down-time and installation costs – clearly superior to classic motor connections via a junction plate.

The replacement of a drive unit can be carried out by personnel in the shortest possible time. Therefore risks due to downtime or breakdown costs can be reduced to a minimum. The use of pre-assembled and standardised connections virtually eliminates the risk of incorrect terminations. In applications with decentralised drive networks, hybrid connections with data and power lines avoid the grave implications at faulty junctions. So the time and cost intensive error search can be reduced to a minimum.



Han E[®] modules



Han[®] 10 E-inserts



System cabling network. SIDMAR N.V., Gent, Belgium

Connections reliable as Steel

Ethernet Switch and HARTING RJ Industrial System Cabling network in a steel production plant of SIDMAR. SIDMAR N.V., part of the French ARCELOR-Group, focuses on the production of flat steel products. High quality is a must for SIDMAR's customers as the steels finding use in the automotive industry, for example, must be of a premium type.

In order to guarantee high quality standards, SIDMAR has installed a camera system along production lines. At different steps of the production process photos are taken of each individual product. The cameras make four photos per product, and these photos are stored in addition to the normal production data. In this way SIDMAR realizes a complete follow-up of the production process of each end product. An Ethernet system based on HARTING technology solutions links the cameras.

Industrial Ethernet switches are the core elements of the Ethernet system. The HARTING Ethernet Switch ESC 67-10 RJ Industrial offers switch functionality in connection with a very robust, shock- and vibration resistant metal housing offering IP 65 / 67 protection. Thanks to the specific metal material of the housing, the switch provides a very high mechanical stability. It is highly shock and vibration resistant, and additionally incorporates very good resistance against electromagnetic interferences.

The HARTING RJ Industrial connectors offer Cat. 5 transmission based on RJ 45 connector technology in addition to proven mechanical stability and robustness.

The combination of the HARTING Ethernet Switch, the metal connectors and the industrially proven cables represents a perfect solution for the harsh environmental conditions prevailing at SIDMAR manufacturing facilities.



HARTING Ethernet Switch ESC 67-10 RJ Industrial



In power plants, the rapid exchange of systems or sub-systems is a particularly vital aspect. **HARTING** offers a wide range of connectors serving a wide variety of application areas, thereby making a key contribution as a supplier to the energy industry.

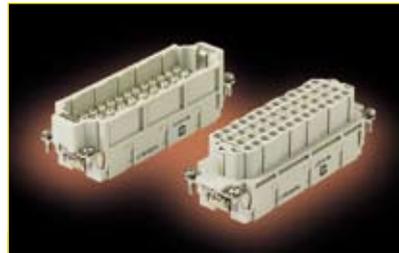
The required product spectrum ranges from high-current components for applications up to 650 A to solutions for data transfer, such as the RJ 45 in robust industrial housings.

Cost efficient Connection of high-voltage Switches for outdoor Use

The 3AP1 FI power circuit breaker is designed for high voltages up to 145 kV for outside operations. The power circuit breaker consists of three insulator columns with one operating unit each and a shared control unit. The insulator columns each contain an interrupter unit and the necessary drives. To ensure secure and controlled switching of the high power, the three interrupters are controlled electronically. A secure connection between the drives and the control unit is therefore essential.

This connection is realized by using 46 conductor special cables to transmit the sensor and actuator signals. The connections are pluggable in order to reduce assembly work. The pre-manufactured cables are tested before shipping and thus minimize the possibility of wiring errors. Service and maintenance are simple procedures.

The relevant environmental conditions have to be taken into account as the circuit breaker can be used outdoors. Temperature fluctuations and humidity in particular play a key role. Even snow and ice can not be excluded. Consequently, Han® HPR housings and seals have been chosen and have been specially developed to withstand these types of stress.



Han® 46 EE contact inserts



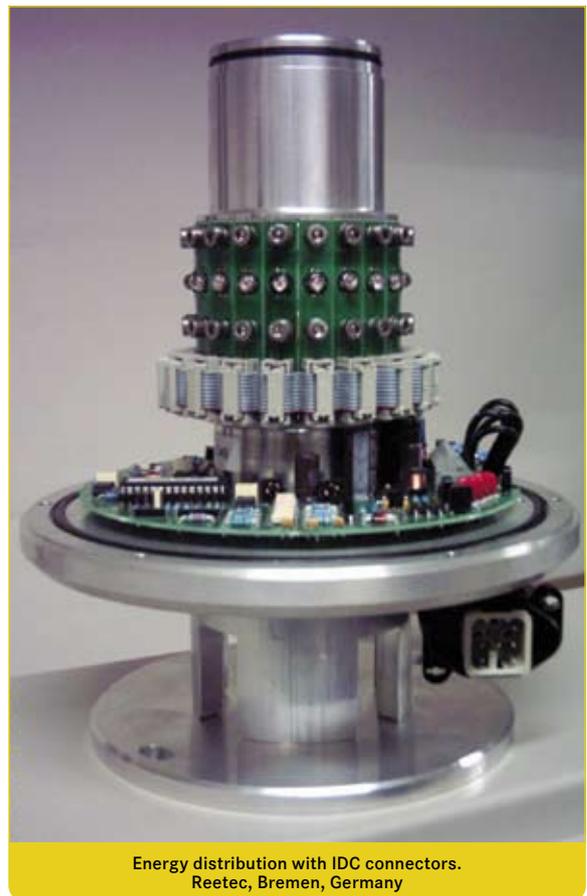
Han® HPR housing



High-voltage power switch.
Siemens AG, PTD, Berlin, Germany



Lighting system
for wind power stations



Energy distribution with IDC connectors.
Reetec, Bremen, Germany

Energy Distribution with HARTING IDC Connectors for Flat Cables in Signal Lighting Systems

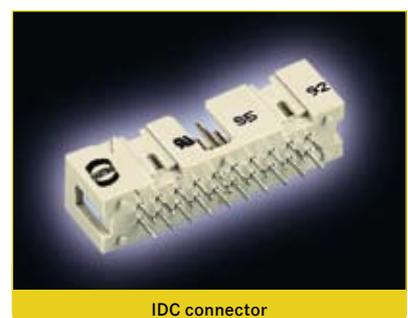
The HARTING connection systems for IDC flat cables in accordance with DIN EN 60 603-13 include connectors for cable and PCB assembly for various connection technologies, including pick-and-place-compatible high-temperature versions for SMC assembly.

The IDC termination method guarantees cost efficient and secure connections. Flat cables and connectors can be prefabricated and used as an assembly with defined functional properties. The HARTING IDC connections cut through the flat cable insulation and create a permanent gastight contact with the conductor.

Reetec GmbH, Bremen, has opted for the IDC termination technique in its day/night signal lighting systems, especially for wind power stations.



IDC connector



IDC connector



Rapid Replacement of Systems in Wind Turbines



Wind turbine. ENERCON Electric GmbH, Aurich, Germany

systems (transmission rate: 100 Mbit/s) and is based on a coaxial plug connection.

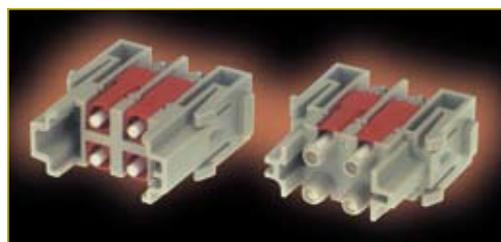
The fiber-optic connections widely employed in networking must be designed to be pluggable for different optical fiber types and must also meet the requirements described above. The Han-Modular® SC module allows the integration of standard SC connectors from different vendors into one module from the Han-Modular® line. Using the “snap-in” technique, up to 4 fiber-optic connections (50/125 µm; 62.5/125 µm) can be installed in the Han-Modular® SC module without any additional tools and can be removed just as easily. Thanks to a host of installation options, such as a Han-Modular® Compact housing, this connection also achieves a protection degree of at least IP 65.

The interface of a hybrid connector, as defined in the DESINA® standard, offers transmission of fiber optic signals and a copper connection with up to five 10 A contacts, which can be used for the bus power supply.

The fiber-optic connection – which can be designed for POF and HCS® – allows transmission rates via a HCS® fiber of up to 12 Mbit/s at a maximum distance of 300 m. The maximum cable length of the POF cable is 50 m.

The functions involved in energy generation necessitate the multiple connection of high currents and voltages. If the connection is to be made pluggable, the high current connection possibility using the Han® HC Modular line is suitable for a number of configurations. With a current-carrying capacity of up to 650 A at voltages of up to 4 kV, such multiple-pin plug connections in conjunction with Han® HPR housings can be combined to form an extremely robust system.

High-performance, reliable connections for data exchange and local power supply are the basic requirements when implementing a modern control system. Operating, monitoring, and programming units are usually networked via the widely used RJ 45 interface. For this application, HARTING offers a variety of industrial connections such as the RJ Industrial family of Ethernet connectors. The Han-Quintax® is recommended for high shielding within the connection. The Han-Quintax® connection allows secure data exchange of sensitive signals, e.g. for bus



Han-Modular® SC module



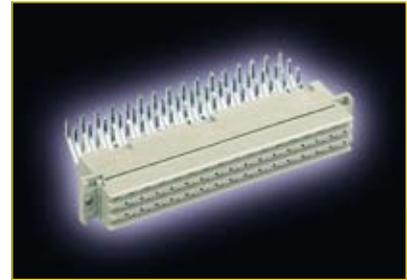
Han-Modular® Compact connector

DIN 41612 Connectors in Energy Management Applications

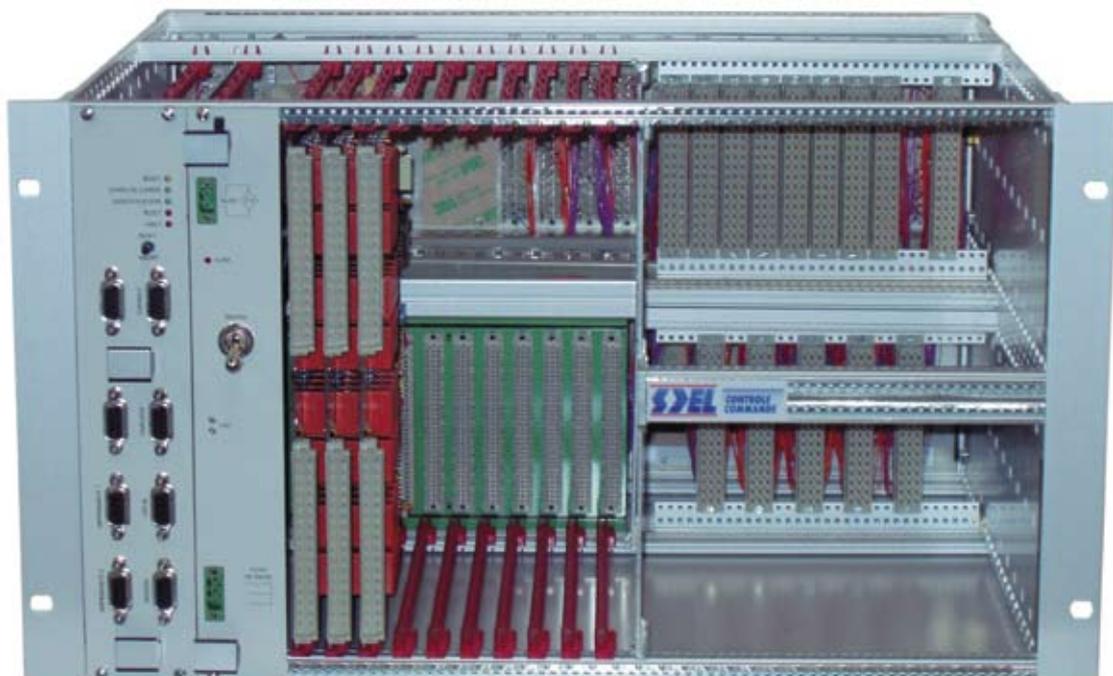
HARTING's DIN connectors are the preferential choice in energy management applications. They are installed in rack systems that serve as control and monitoring units in transformer substations or power stations. Each transformer substation is more or less unique and requires special wiring within the control units. As they enable the easy realization of the required special backplane wiring, connectors with wire-wrap connections are frequently opted for.

DIN connectors are also eminently suitable for front-side board-to-cable connections. Shell housings available in both plastic and metal add the finishing touch to the diversified offerings from HARTING. Locking levers, fixing screws and coding are available as accessories compatible with the entire DIN range.

SDEL has specialized in the development and production of high-quality energy management components, particularly control and monitoring units for transformer substations.



DIN 41612 connector



Control unit with DIN connectors. SDEL, France

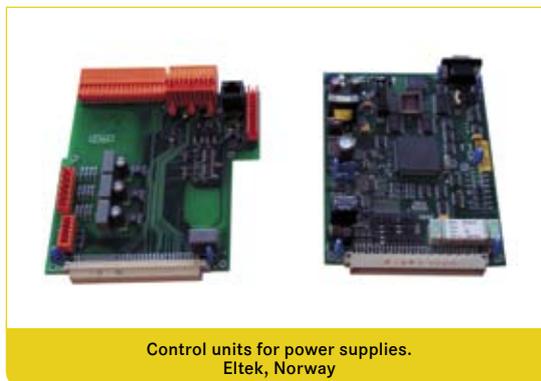


DIN 41612 Connectors in professional Power Supply Solutions

HARTING's DIN 41612 product portfolio ranks as one of the most extensive on the market. It essentially contains the C, D, E, F and H ranges (also as multipurpose connectors), which can be assembled with high-current, high-voltage, fiber-optic and coaxial contacts. The connectors thereby assembled are utilized in power supplies for signal and power connections. The outstanding reliability and extensive application areas of all DIN 41612 connectors are especially noteworthy strengths.

SMC (Surface Mount Compatible) versions, based on high-temperature-resistant plastics, are fitted with retaining clips in order to guarantee secure positioning during the reflow soldering process.

Eltek is a Norwegian specialist for power supplies in telecommunications applications. The company develops and markets both rectifiers and monitoring units, as well as customer-specific power supply solutions.



Control units for power supplies.
Eltek, Norway



DIN 41612 connector

Connector technologies have to cope with extreme demands in terms of the transmission of maximum data volumes especially in the telecommunications area. Base stations must be able to reliably guarantee the operation of cellular radio-communications, even during heavy traffic periods.

HARTING solutions are easy to work with and install, and they uphold the required performance characteristics. When considering multimedia applications and their constantly increasing data rates and the steadily advancing degree of integration of electronic modules and components, the choice of connectors having high-frequency transmission characteristics, such as crosstalk, insertion loss, reflection property, etc., plays an ever increasing important role.

In all areas of connector technology, HARTING is supporting leading manufacturers of telecommunications infrastructure equipment early in the design-in stage.





Wireless access point, front view. Repeatit AB, Sweden



Wireless access point, top view

RJ Industrial Push Pull Connectors in wireless Telecommunications Applications

The Swedish manufacturer Repeatit AB is a provider of high-speed wireless access point solutions for network suppliers (ISP) wishing to acquire new customers in regions with rudimentary or inadequate telecommunications infrastructures.

Repeatit supplies base stations and wireless modems as well as the required software. The base stations are connected to existing copper or optical backbones in close vicinity to customers. As soon as a customer installs a wireless modem on premises, it is possible to login wirelessly into a network via the respective local base station.

In view of the fact that secure high-speed communications also have to function under poor weather conditions such as snow, ice and rain, Repeatit opted for the RJ Industrial Push Pull as connector.

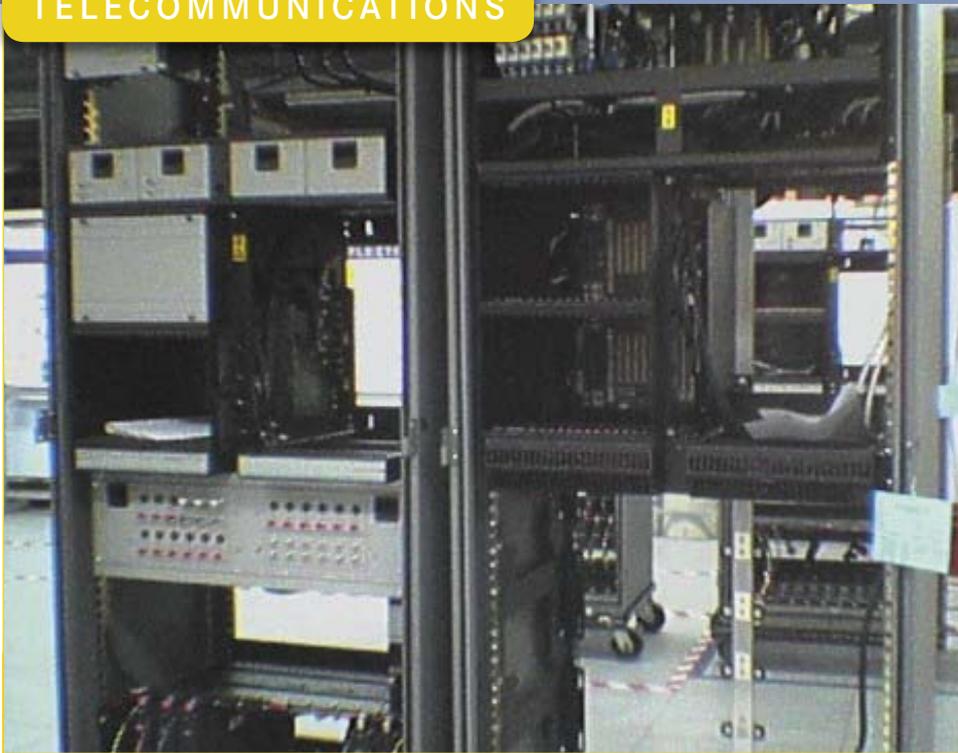
The decisive factor in the choice of this connector was the tightness of the 8-pin RJ 45 connector in accordance with IP 67 for use in outdoor applications, as well as its compact dimensions. This aspect was particularly important given the very limited installation area for the access point that excluded the utilization of other connector solutions.



Wireless LAN in outdoor applications



RJ Industrial Push Pull connector



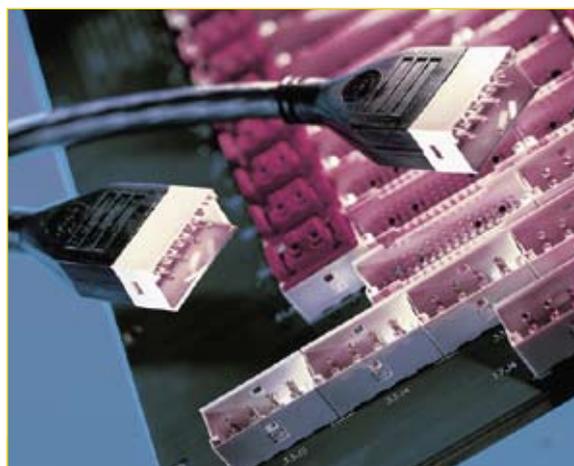
CDMA base station

Connectivity Solutions for specific Base Station Requirements

A global supplier of CDMA infrastructure equipment selected HARTING connectors to solve specific problems it had with its CDMA cellular Base Stations.

The HARTING Mini-Coax RF connectors and cables and the HARTING 2.5 mm *har-pak*® digital connectors were selected to ensure that the cellular Base Transceiver System (BTS) would have 6 sigma board mating, to allow RF and digital signal interconnections to be integrated in one back plane and to minimize RF cable routing that ensures ease of assembly and field service, as well as maintain a clean appearance.

To bring low power RF signals from the Site Interface Frame (SIF) to the Modem Frame (MOPA) a dust proof solution was required. HARTING utilized the HARTING Mini-Coax cable assemblies and the Han® 6 B housing and hood to more than fulfill these requirements.



Mini-Coax connectors and cables



Mini-Coax in Han® 6 B housing

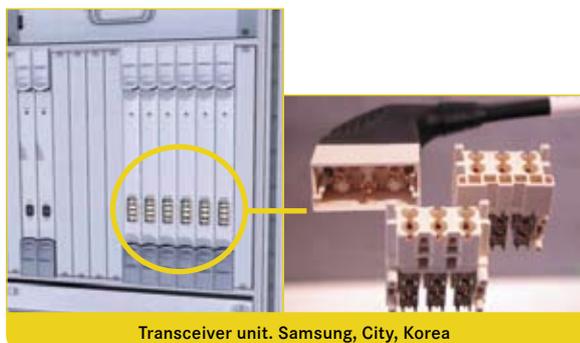
*har-pak*® and Mini-Coax in CDMA base station



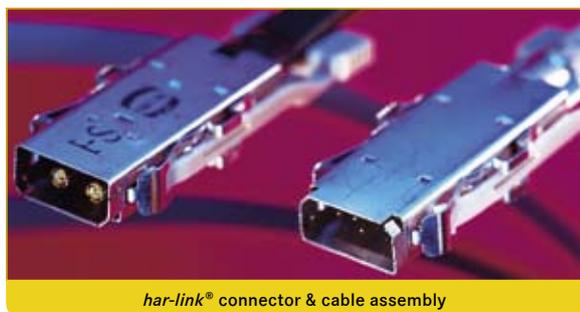
Front Access Solution for 20 mm Slot Pitch

The new Samsung „SlimBTS SCBS-508M“ base station (CDMA2000 1xEV-DO) opens the possibilities for data connections, which are controlled by the Base Station Controller (ANC, Access Network Controller), to mobile phones.

HARTING redesigned the existing Mini-Coax system to a low profile Mini-Coax connector & cable version to meet Samsungs requirements for a 20 mm slot pitch.

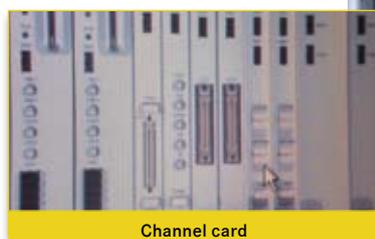


Transceiver unit. Samsung, City, Korea

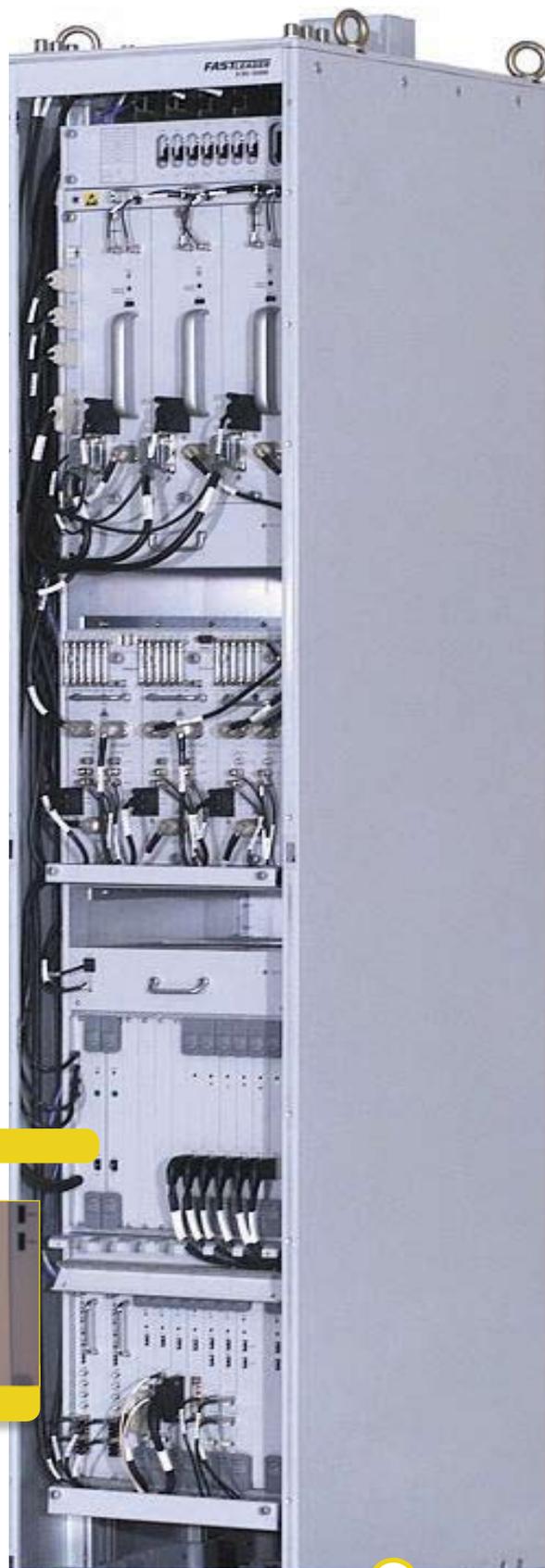


har-link® connector & cable assembly

Application – Telecom



Channel card





CPM 2001/s

CPM Press-In Technology

Connectors are playing an increasingly vital role in press-in technology for telecommunications applications. Tools and handling are crucial for optimum processing as well as ensuring uniformly high quality. ALCATEL, based in Eu, France, has opted for CPM2001/s-type press-in machines as part of its flexible and efficient processing solution. Thanks to their networking capabilities and high flexibility – in connection with outstanding operator convenience – the insertion machines were capable of meeting the highly specific requirements of existing production processes.

With their powerful insertion force of 100 kN and the highly flexible and intelligent insertion force monitoring function, the CPM2001/s were predestined to meet the requirements at the ALCATEL plant. Proprietary tools or tool systems were quickly implemented. The optimum utilization of the four machines that were already installed was accomplished via the data available in the internal computer network. In this way it is possible to retrieve all key data at each individual machine within seconds, thereby ensuring flexible and efficient processing at all times.



Processing strategies adapted to changing production layout. ALCATEL, Eu, France



Two machines form an insertion center for several SMD lines



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People | Power | Partnership

www.HARTING.com