



Pushing Performance

HARTING Outdoor Solutions



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 3,200 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.



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.

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!

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.

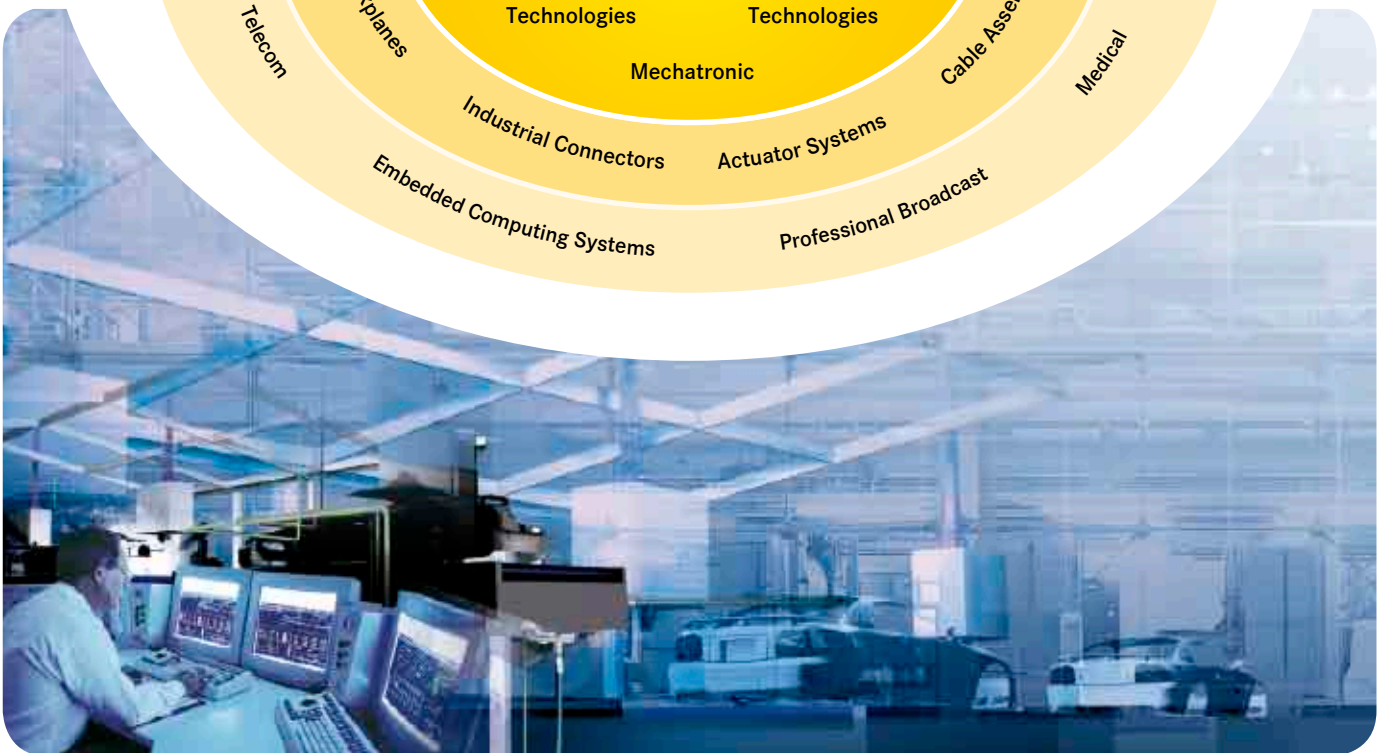
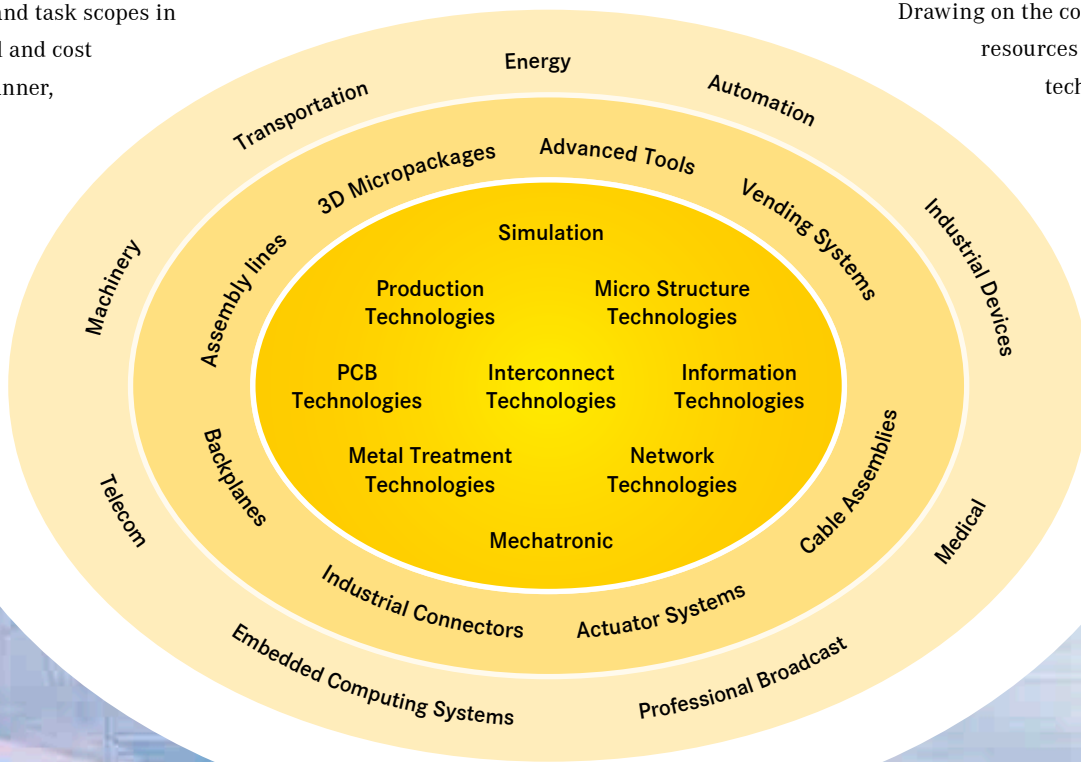
In order to develop connectivity and network solutions serving an exceptionally wide range of connector applications and task scopes in a professional and cost optimized manner, HARTING not only

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



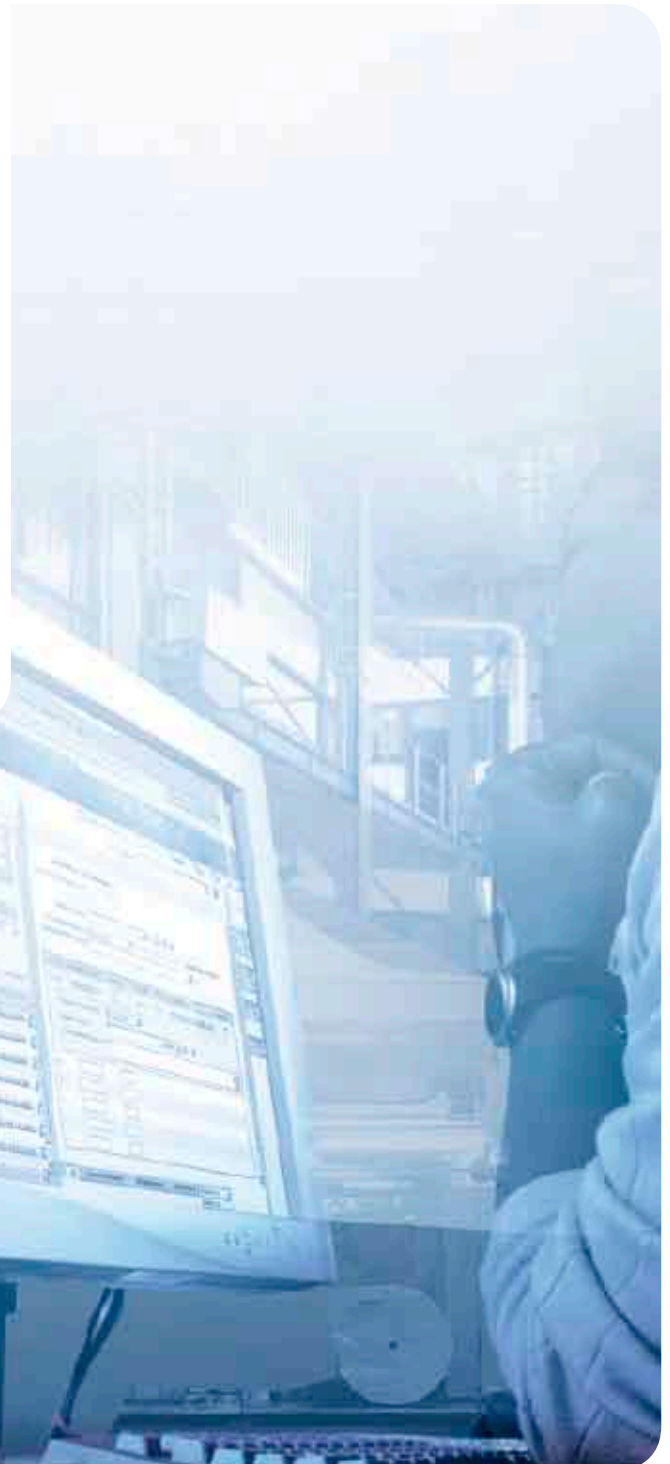
practical solutions for its customers. Whether this involves industrial networks for manufacturing automation, or hybrid interface solutions for wireless telecommunication infrastructures, 3D circuit carriers with microstructures, or cable assemblies for high-temperature applications in the automotive 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.





HARKIS® is the abbreviation for **HARTING-Katalog-Informationen-System** (HARTING catalogue information system).

HARKIS® is an electronic catalogue with part configuration and 3D components library. Here you can choose a connector according to your demands. Afterwards you are able to send your inquiry created with the listed parts. The drawings to every single part are available in PDF-format. The parts are downloadable in 2D-format (DXF) and 3D-format (IGES, STEP). The 3D-models can be viewed with a VRML-viewer.

You can find **HARKIS®** at www.HARKIS.HARTING.com. It is also available on CD-ROM and DVD.



Piece part consulting



CAD library



Product samples: Fast-track delivery to your desk, free of charge

With immediate effect, the new express sample dispatching service in the HARTING catalogue information system (**HARKIS®**) allows customers to order samples immediately, easily and free of charge on express delivery. A broad selection from the device connectivity product portfolio is now available. In the case of unavailable items the system offers alternative products with similar features that can be requested at a mouse click.

The samples are shipped within 48 hours after your order, free of charge. This service enables tremendous flexibility, especially in the design phase of projects.

Identification

Part number

HARKIS® CD-ROM
Basic product catalogue

98 40 000 0401

HARKIS® DVD
Basic product catalogue
2D and 3D CAD files inclusive

98 40 000 0405



General information









It is the customer's responsibility to check whether the components illustrated in this catalogue comply with different regulations from those stated in special fields of application which we are unable to foresee.

We reserve the right to modify designs in order to improve quality, keep pace with technological advancement or meet particular requirements in production.

No part of this catalogue may be reproduced in any form (print, photocopy, microfilm or any other process) or processed, duplicated or distributed by means of electronic systems without the written permission of HARTING Electronics GmbH & Co. KG, Espelkamp. We are bound by the English version only.

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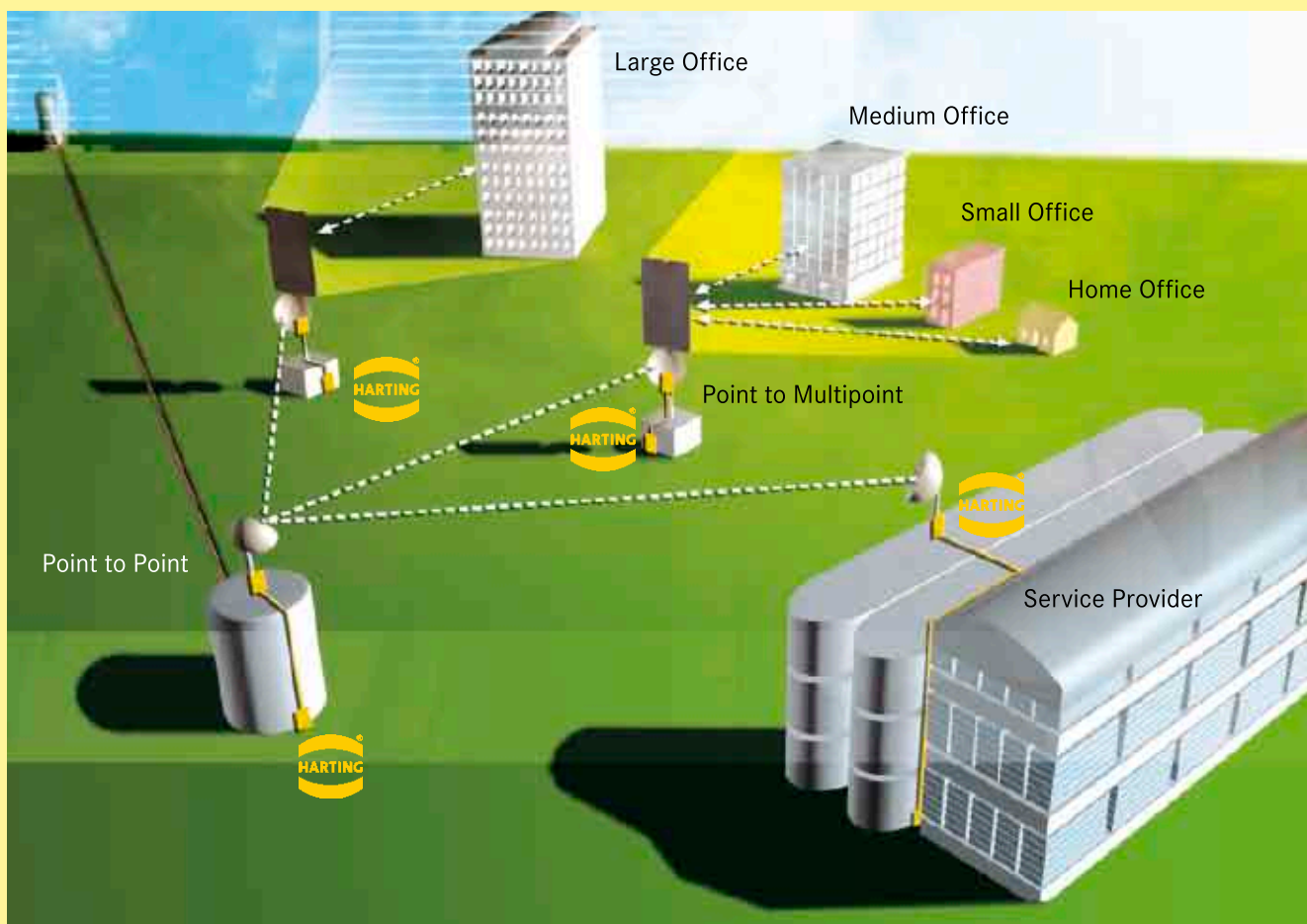
HARTING's new range of products for outdoor solutions combines the advantages of the reliable HARTING PushPull and Han® 3 A housings with innovative inserts for fibre optic and copper.

The integration of the standard LC fibre optic connectors, in singlemode and multimode, meets the demands set by harsh outdoor environments.

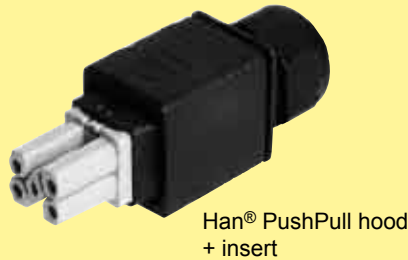
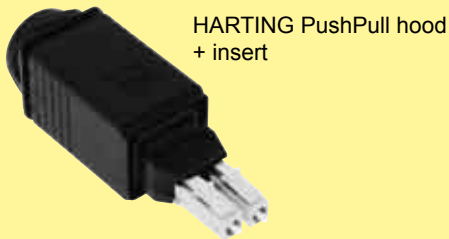
The hybrid variants combine data (LC fibre or RJ45) and power in one connector for EasyInstallation and maintenance.

These high-quality, robust HARTING interfaces offer vibration protection and IP 65 / IP 67 as standard. Power solutions and data connectors for the IP 20 environment complete the product range.

All these features make this HARTING connector range ideal for applications such as FTTA (Fibre To The Antenna), FTTH (Fibre To The Home) or LTE and WiMAX, where reliable outdoor connectivity is needed.



Configurations	
Housings	Inserts
HARTING PushPull	Power <ul style="list-style-type: none"> • DC 48 V / 300 V • AC 230 V / 300 V • 690 V / 16 A
Han® PushPull	Fibre <ul style="list-style-type: none"> • LC duplex • 2 x LC duplex
Han® 3 A M series Please contact us for other housings of Han® 3 A family e.g. plastic, angled, HPR (IP 68)	Hybrid <ul style="list-style-type: none"> • RJ45 & power • LC duplex & power



Features & benefits

- Standardized housings
- Smallest size in IP 65 / IP 67
- Up to four standardized LC fibre optic contacts
- Hybrid connectors for data & power
- EasyInstallation
- Advantages during maintenance
- Dedicated for singlemode or multimode fibres

The connector's housing, sealing and locking mechanism protect the connection from external influences such as mechanical shocks, foreign bodies, humidity, dust, water or other fluids such as cleansing and cooling agents, oils, etc. The degree of protection the housing offers is explained in the IEC 60 529, DIN EN 60 529, standards that categorize enclosures according to foreign body and water protection. The following table shows the different degrees of protection.

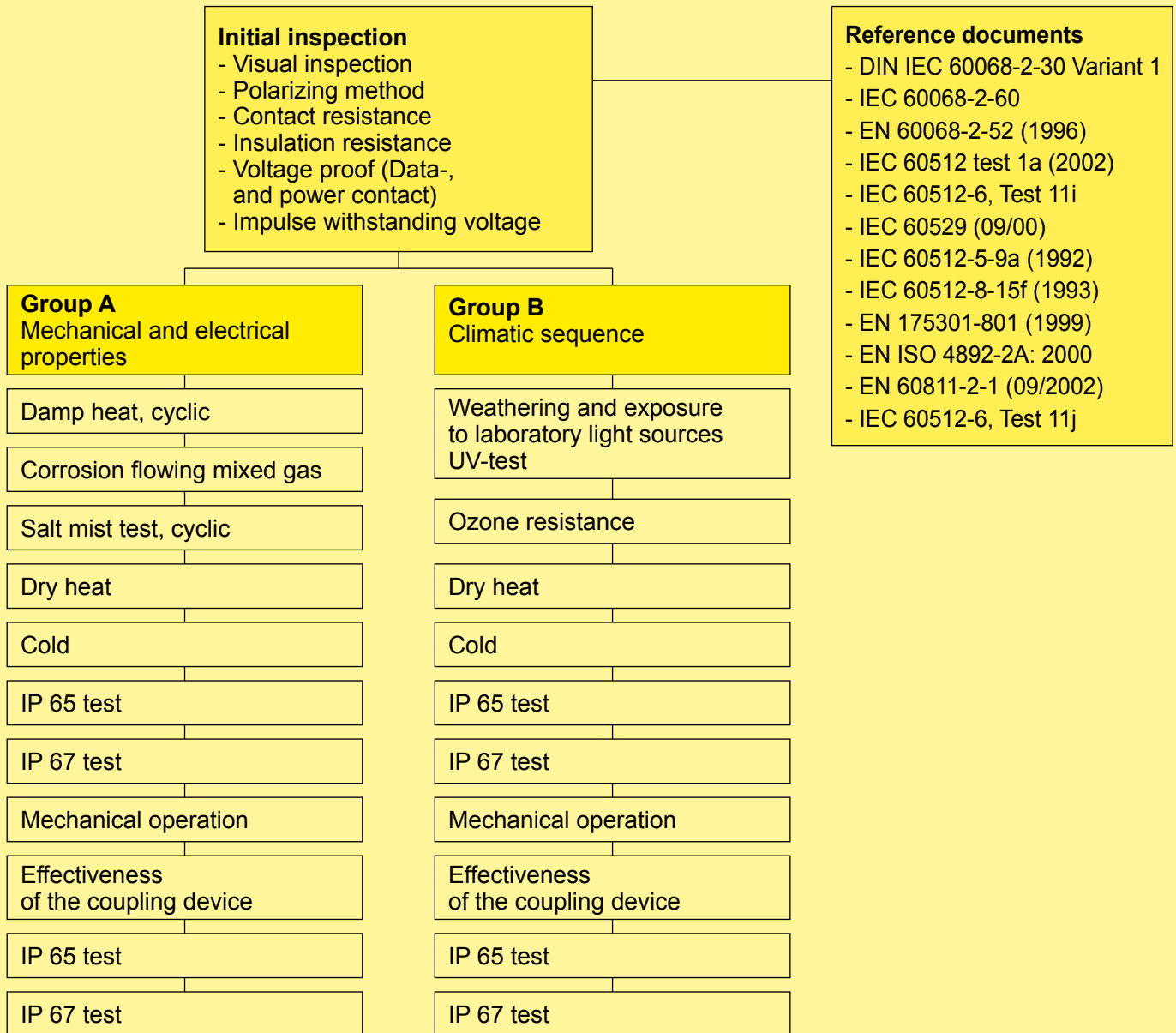
Code letters (International Protection)		First Index Figure (Foreign bodies protection)		Second Index Figure (Water protection)		
IP		6		5		
Index figure	Degree of protection		Index figure	Degree of protection		
0	No protection		No protection against accidental contact, no protection against solid foreign bodies	0	No protection against water	
1	Protection against large foreign bodies		Protection against contact with any large area by hand and against large solid foreign bodies with Ø > 50 mm	1	Drip-proof 	Protection against vertical water drips
2	Protection against medium sized foreign bodies		Protection against contact with the fingers, protection against solid foreign bodies with Ø > 12 mm	2	Drip-proof 	Protection against water drips (up to a 15° angle)
3	Protection against small solid foreign bodies		Protection against tools, wires or similar objects with Ø > 2.5 mm, protection against small foreign solid bodies with Ø > 2.5 mm	3	Spray-proof 	Protection against diagonal water drips (up to a 60° angle)
4	Protection against grain-shaped foreign bodies		As 3 however Ø > 1 mm	4	Splash-proof 	Protection against splashed water from all directions
5	Protection against injurious deposits of dust		Full protection against contact. Protection against interior injurious dust deposits	5	Hose-proof 	Protection against water (out of a nozzle) from all directions
6	Protection against ingress of dust		Total protection against contact. Protection against penetration of dust	6	Strong hose-proof 	Protection against strong water (out of a nozzle) from all directions
				7	Protected against immersion 	Protected against temporary immersion
				8	Water-tight 	Protected against water pressure

Connectors used outdoors have to meet the demands set by harsh environments and rapidly changing conditions.

This is the reason why special materials such as stainless steel, special coatings and seals are used for the HARTING PushPull and Han® 3 A M series. The chosen materials guarantee an optimal functionality of the connectors for up to 15 years of operation in outdoor applications.

The HARTING Outdoor Solutions connectors pass an extensive row of laboratory tests. The results show that both the plastic and the metal housings are ideally suited for the use in outdoor applications. The test schedule includes IP testing, exposure to ozone and UV light, mixed gas and salt spray tests.

The details of the tests are shown in the flow chart below:



The modular HARTING RJ45 connector family is based on the standard RJ45 pin profile and was developed especially for use in rugged environments.

This technology charts a new course in the wiring of appliances with Ethernet interfaces, enabling the on-site configuration of connectors for many applications, no matter if the product is a power connector or a communications connector. In the context of the wiring of 4-pole Fast Ethernet networks, HARTING relies consistently on the HARAX® quick connection technology.


Solid or flexible conductors up to a cross-section of AWG 22 are terminated by IDC technology, without stripping or using any special tool.

HARTING offers the 8-pole data module with piercing connection technology, which meets the high requirements of category 6 for all Gigabit Ethernet networks. The 8-pole adapter of the category 6 data module also matches the screening plates of the 4-wire data module with quick connection technology. This functionality enables the conversion of any 100 MBit Fast Ethernet network into a Gigabit Ethernet network using HARTING RJ45 connectors. This innovative platform strategy also permits the use of the RJ45 data module in combination with the PushPull and Han® 3 A connector families.

Based on this innovative data module, HARTING has developed a comprehensive connector family which covers all applications for Fast Ethernet, Gigabit Ethernet, Ethernet/IP and other Ethernet profiles.

APPLIANCE INTEGRATION:

HARTING offers various RJ45 jacks for direct mounting on the PCBs of appliances.

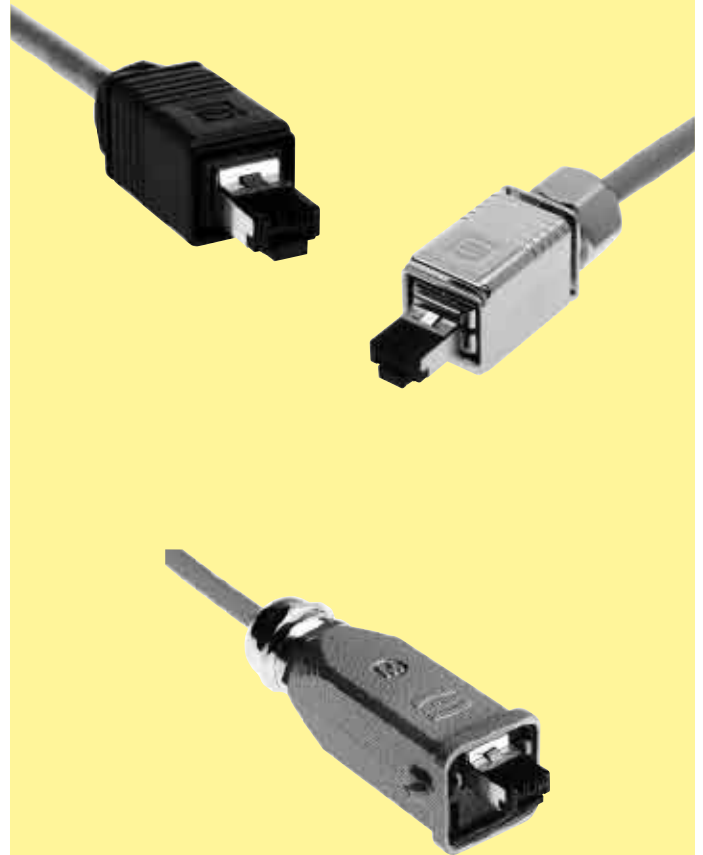
Protection level	IP 65 / IP 67
Mating interface	RJ45 acc. to IEC 60 603-7
Termination cross section	
Cat. 5	AWG 24/7 ... AWG 22/7 (stranded) AWG 23/1 ... AWG 22/1 (solid)
Cat. 6	AWG 27/7 ... AWG 24/7 (stranded)
Temperature range	-40 °C ... +70 °C
Flammability acc. to UL 94	V-0
	UL approval (E102079)

HARTING PushPull connector RJ45

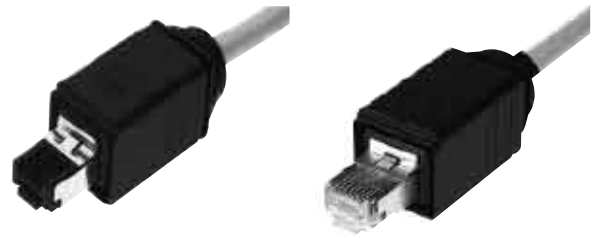
Locking mechanism	PushPull acc. to ISO/IEC 24 702 and IEC 61076-3-106, variant 4
Cable diameter	4.9 - 8.6 mm
Mating cycles	min. 750
Housing material	Plastic, black Coated zinc die cast

Han® 3 A connector RJ45

Cable diameter	6.0 - 9.0 mm
Mating cycles	min. 500
Housing material	Plastic, black Coated zinc die cast
Housing surface	Powder-coated RAL 7037 (grey)
Locking element	Steel, zinc plated
Hoods/ Housings seal	NBR



Copper connectors RJ45

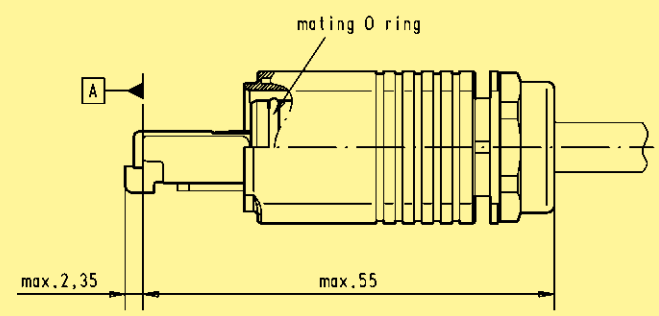


HARTING PushPull connector
RJ45, 4-pole and 8-pole, plastic

Identification	Part No.	Drawing	Dimensions in mm
<p>Connector set, Cat. 5, 4-pole incl. housing, cable gland and instruction manual</p>	<p>09 45 145 1100</p>		
<p>Connector set, Cat. 6, 8-pole incl. housing, cable gland and instruction manual</p> <p>Wire manager white</p> <p>Wire manager blue</p>	<p>09 45 145 1500</p> <p>09 45 145 1510</p>		
<p>Reference note: For Cat. 6 patch cords it is recommended to use 1 connector with a white wire manager and one with a blue cable manager, in order to optimise the crosstalk between different signal pairs.</p>			
<p>Protection cover for connectors with cord, IP 65 / IP 67</p>	<p>09 45 845 0010</p>		

Connector set, Cat. 5, 4-pole
incl. housing, cable gland
and instruction manual

09 45 145 1100



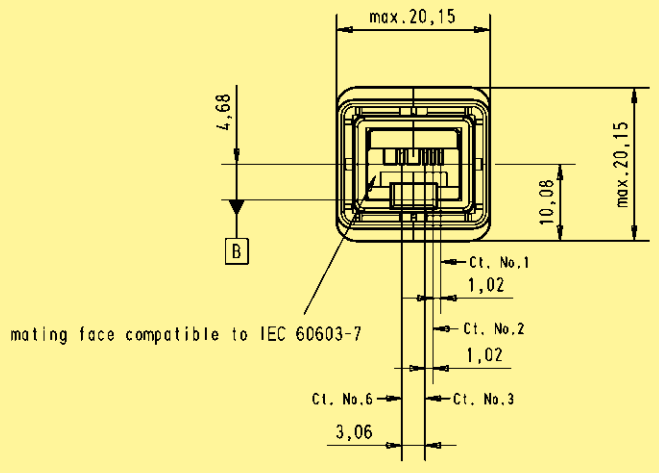
Connector set, Cat. 6, 8-pole
incl. housing, cable gland
and instruction manual

Wire manager white

Wire manager blue

09 45 145 1500

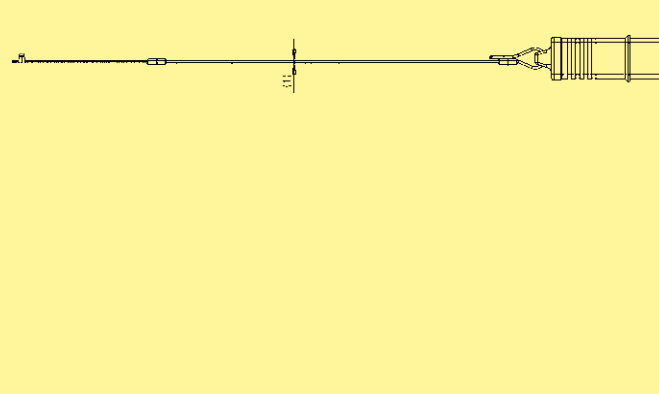
09 45 145 1510



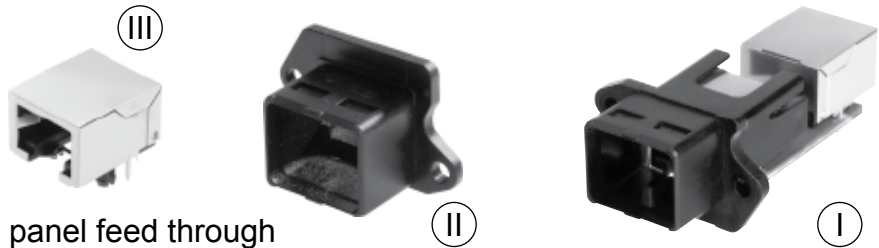
Reference note:
For Cat. 6 patch cords it is recommended to
use 1 connector with a white wire manager
and one with a blue cable manager, in order
to optimise the crosstalk between different
signal pairs.

Protection cover for connectors
with cord, IP 65 / IP 67

09 45 845 0010



Copper connectors RJ45



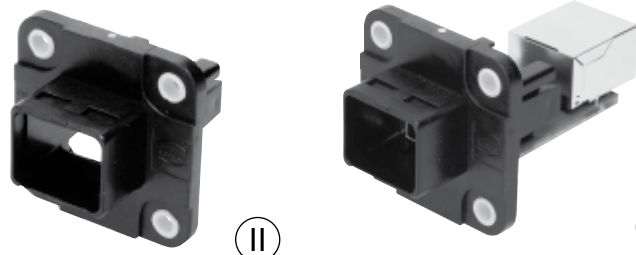
HARTING PushPull Compact panel feed through RJ45, plastic

Identification	Part No.	Drawing	Dimensions in mm
Panel feed through set incl. housing and instruction manual, fixing holes M2.5 (I)	09 45 245 1102		
Separate housing incl. flat sealing for direct device integration, fixing holes M2.5 (II)	with clip 09 45 545 0021 without clip 09 45 545 0023		
RJ45 jacks, Cat. 5 for direct device integration, Category 5, shielded (III)	SMD 09 45 551 1100 ¹⁾ SMD 09 45 551 1110 ²⁾ through hole 09 45 551 1102 ¹⁾		
Protection cover for housing bulkhead mounting with cord IP 65 / IP 67 fixing ring for M3 Version with active locking	09 45 845 0006		
Version with passive locking	09 45 845 0009		
IP 40 protection cover for housing bulkhead mounting, rubber	09 45 845 0003		

1) Packaging: Blister à 120 pieces

2) Packaging: Tape & Reel à 130 pieces

HARTING PushPull EasyInstall
panel feed through
RJ45, plastic

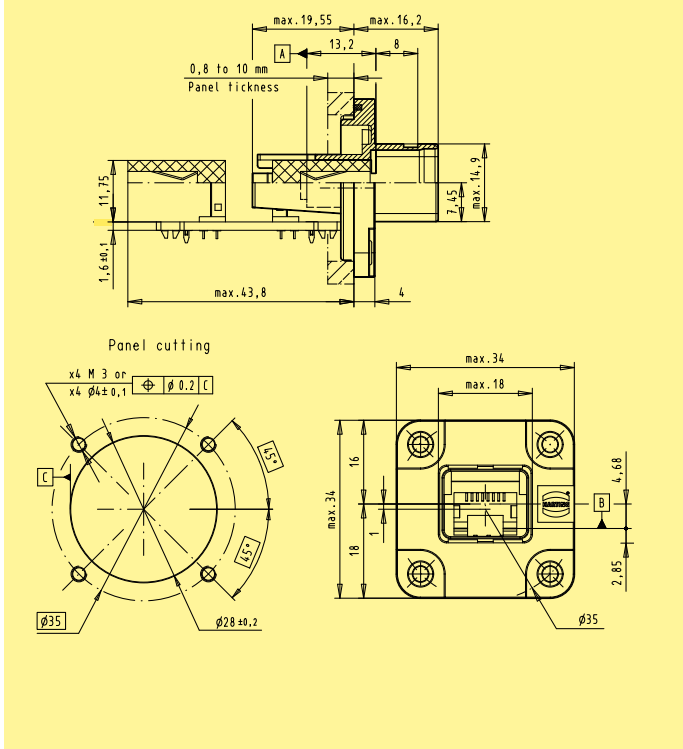


Identification Part No. Drawing Dimensions in mm

EasyInstall panel feed through set
incl. PCB and 2 RJ45 jacks

I

09 45 245 1130



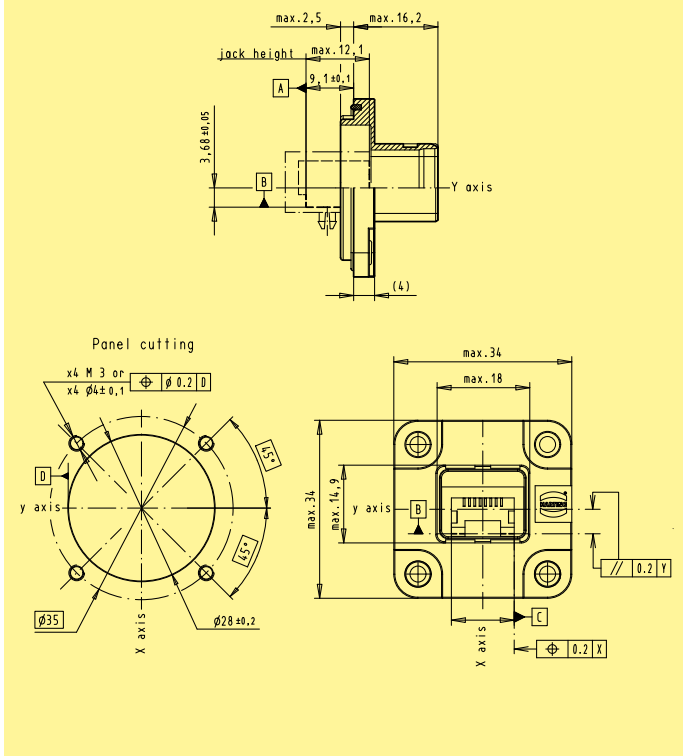
Separate housing EasyInstall

II without fixing clip

with fixing clip

09 45 545 0030

09 45 545 0031





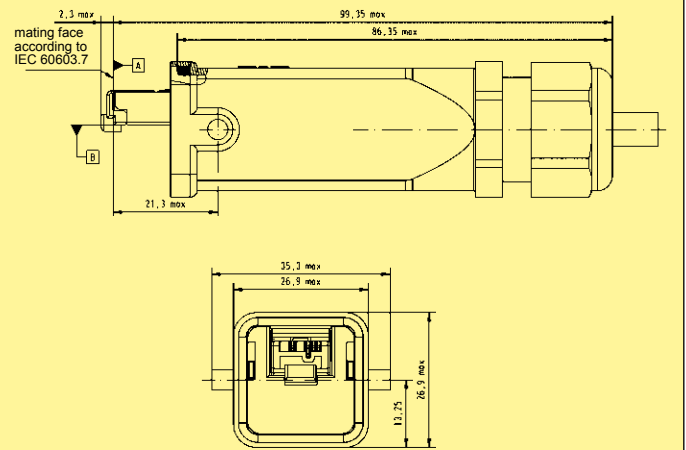
Han® 3 A connector
RJ45, 4-pole

Identification	Part No.	Drawing	Dimensions in mm
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Connector set

incl. housing, cable gland and instruction manual

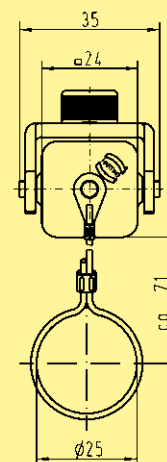
Plastic version	straight	09 45 125 1100
	angled	09 45 125 1104
Standard metal version	straight	09 45 115 1100
	angled	09 45 115 1104
Metal version M	straight	09 45 115 1102
	angled	09 45 115 1106
Coding pin set		09 45 820 0000



Dimensions valid for the straight plastic version

Protection cover for connectors with cord, IP 65 / IP 67

Plastic version, grey	09 20 003 5442
Standard metal version, grey	09 20 003 5422
Metal version M, black	09 37 003 5402



Dimensions valid for the plastic version

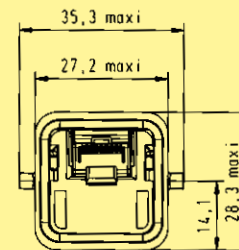
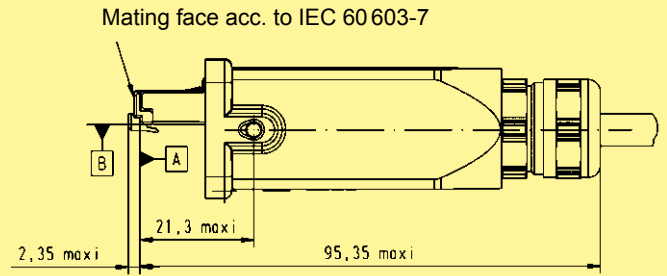
Copper connectors RJ45



Han® 3 A connector
RJ45, 8-pole

Identification	Part No.	Drawing	Dimensions in mm
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Connector set incl. housing, cable gland and instruction manual			
Plastic version	Wire manager white	09 45 125 1500	
	Wire manager blue	09 45 125 1510	
Metal version Standard	Wire manager white	09 45 115 1500	
	Wire manager blue	09 45 115 1510	
Metal version M	Wire manager white	09 45 115 1502	
	Wire manager blue	09 45 115 1512	
Coding pin set		09 45 820 0000	



Dimensions valid for metal version Standard

Copper connectors RJ45



Han® 3 A panel feed through RJ45, 8-pole

Identification	Part No.	Drawing	Dimensions in mm	
Panel feed through set incl. housing and instruction manual				
Plastic version	straight	09 45 225 1100		
	angled	09 45 225 1108		
Standard metal version	straight	09 45 215 1100		
	angled	09 45 215 1108		
Standard metal version with self-closing protective cap	straight	09 45 215 1103		
Metal version M	straight	09 45 215 1102		
	angled	09 45 215 1109		
Coding pin set		09 45 820 0000		
Dimensions valid for the straight plastic version				
Gender changer incl. installation frame				
Plastic version		09 45 225 1107		
Standard metal version		09 45 215 1107		
Metal version M		09 45 215 1110		
Coding pin set		09 45 820 0000		
Dimensions valid for the plastic version				
Protection cover for panel feed through IP 65 / IP 67				
Plastic version, black		09 20 003 5449		
Standard metal version, grey		09 20 003 5425		
Metal version M, black		09 37 003 5406		
Dimensions valid for the plastic version				

Apart from applications in the field of telecommunications, fibre optic technology is of great importance in the industrial market sector.

In telecommunications there are requirements for:

- High transmission capacity
- Low cable attenuation
- No crosstalk

The features are also required in the industrial sector along with the following major considerations:

- Zero susceptibility to electromagnetic interference
- Electrical insulation between transmitter and receiver
- Small cable diameter

Fibre optic communication works by pulses of light. When feeding them in at one end of the fibre optic cable, the pulses are passed to the other end by total internal reflection.

Total internal reflection occurs at the boundary layer between core and cladding by virtue of the different values of optical refractive index (n) between the two materials (n cladding less than n core).

The singlemode fibre is mainly used in telecommunications because of its low attenuation and wide bandwidth.

The gradient index fibre and the step fibre with their large core diameters are chiefly used as communication cables in industrial applications due to their easy handling and relatively low costs. The link length ranges from several meters to several kilometers.

There are three different types of optical fibres:

		Typical Dimensions Core/Cladding \varnothing	Attenuation
Step index (SI) fibre HCS ²⁾ / POF ¹⁾		200 / 230 μm 980 / 1000 μm	5 ... 8 dB/km 0.2 dB/m
Gradient index (GI) fibre		50 / 125 μm 62.5 / 125 μm	2.6 dB/km 3.2 dB/km
Singlemode fibre		9 / 125 μm	< 0.3 dB/km

optical refractive index profile

¹⁾ POF = Polymer-Optical Fibre

²⁾ HCS[®] = Hard Clad Silica is registered trademark of SpecTran Corporation

Protection level

HARTING PushPull /	
Han® 3 A 2 x LC duplex	IP 65 / IP 67
Unibody / Adapter	IP 20

Cable diameter

HARTING PushPull	4.9 - 8.6 mm
Han® 3 A 2 x LC duplex*	5 - 14 mm

Mating cycles

min. 200

Temperature range

-40 °C ... +70 °C

Housing material

HARTING PushPull	Plastic, black Coated zinc die cast
Han® 3 A 2 x LC duplex	Coated zinc die cast

Flammability

acc. to UL 94

V-0

Han® 3 A 2 x LC duplex

Housing surface

- Priming	Chromated
- Top Coat	Epoxy powder paint (black)

Locking element

V2A Steel

Hoods/Housings seal

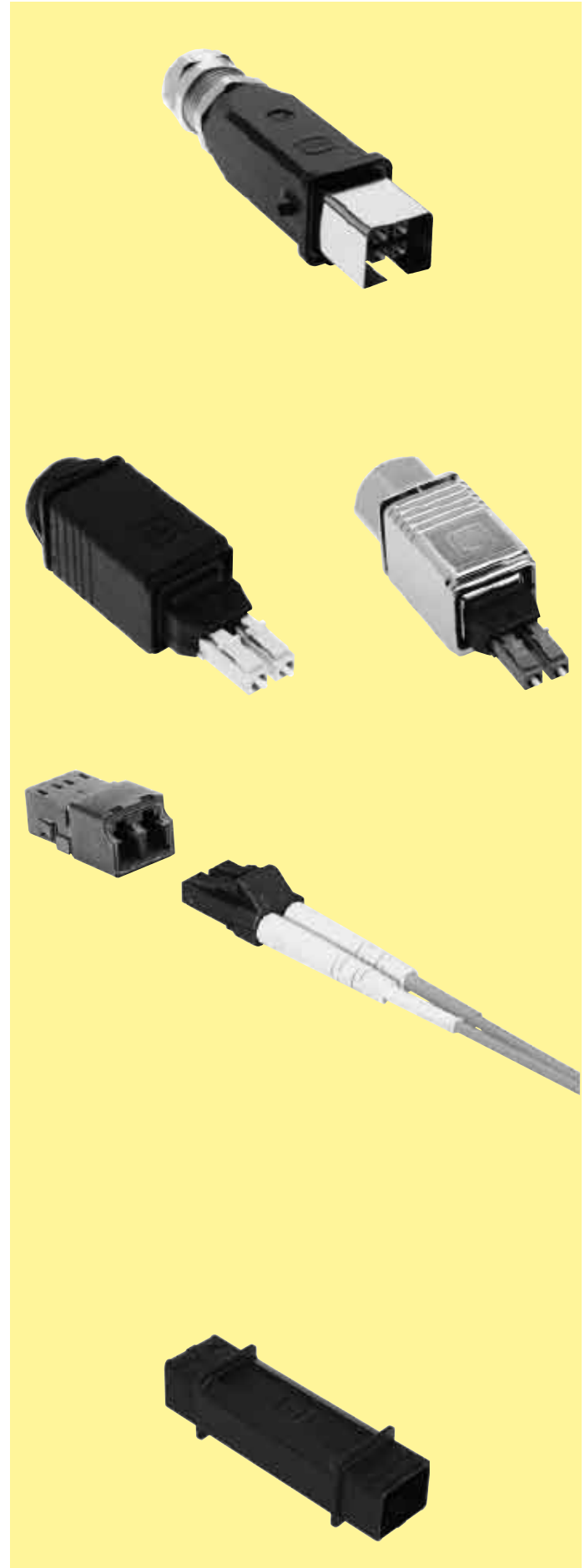
FPM

The optic module is based on standardized LC connector mating face in accordance with IEC 61754-20. The coupling sleeve is mateable to standard LC patch cables on rear side.

- Small form factor (50 % compared to SC and ST®)
- A one-piece moulded LC body form for enhanced mechanical reliability
- A & B part identification on duplex in accordance with TIA 568 standard

Extension cord adaptor

Adaptor for easy extension of optical lines (under preparation).



* cable side is delivered with sealing gland

Overvoltage category

The overvoltage category is dependent on the mains voltage and the location at which the equipment is installed. It describes the maximum overvoltage resistance of a device in the event of a power supply system fault, e. g. in the event of a lightning strike.

The overvoltage category affects the dimensioning of components in that it determines the clearance air gap. Pursuant to the relevant standards, there are 4 overvoltage categories.

Equipment for industrial use, all HARTING industrial connectors fall into Overvoltage Category III.

Extract from DIN VDE 0110-1 and IEC 60664-1, Para. 2.2.2.1.1

Equipment of overvoltage category III is equipment in fixed installations and for cases where the reliability and the availability of the equipment is subject to special requirements.

Note: Examples of such equipment are switches in the fixed installation and equipment for industrial use with permanent connection to the fixed installation.

Pollution degree

The dimensioning of operating equipment is dependent on environmental conditions. Any pollution or contamination may give rise to conductivity that, in combination with moisture, may affect the insulating properties of the surface on which it is deposited. The pollution degree influences the design of components in terms of the creepage distance.

The pollution degree is defined for exposed, unprotected insulation on the basis of environmental conditions.

HARTING industrial connectors are designed as standard for Pollution Degree 3.

Pollution degree 3 in industrial, commercial and agricultural premises, unheated storage premises, workshops or boiler rooms, also for the electrical components of assembly or mounting equipment and machine tools.

Extract from DIN VDE 0110-1 and IEC 60664-1, Para. 2.5.1

Pollution degree 3: Conductive pollution occurs or dry non-conductive pollution occurs which becomes conductive due to condensation which is to be expected.

Current carrying capacity

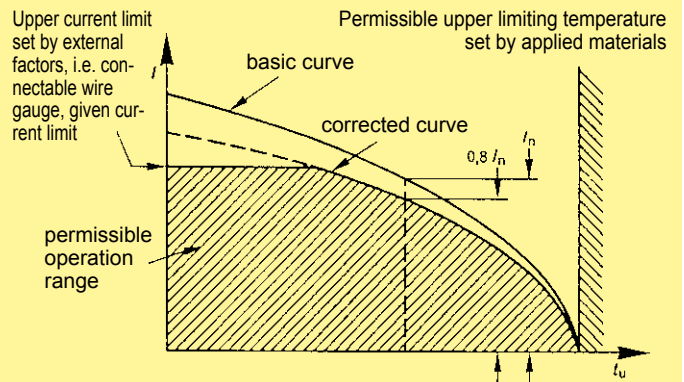
The current carrying capacity is determined in tests which are conducted on the basis of the DIN IEC 60512 part 3. The current carrying capacity is limited by the thermal properties of materials which are used for inserts as well as by the insulating materials. These components have a limiting temperature which should not be exceeded.

The relationship between the current, the temperature rise (loss at the contact resistance) and the ambient temperature of the connector is represented by a curve. On a linear co-ordinate system the current lies on the vertical line (ordinate) and the ambient temperature on the horizontal line (abscissa) which ends at the upper limiting temperature.

In another measurement the self-heating (Δt) at different currents is determined.

At least 3 points are determined which are connected to a parabolic curve, the basic curve.

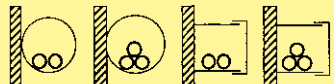
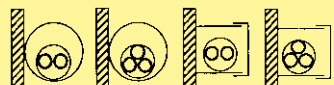

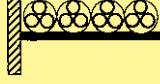
The corrected current carrying capacity curve is derived from this basic curve. The reasons for the correction are external factors that bring an additional limitation to the current carrying capacity, i.e. connectable wire gauge or an unequal dispersion of current.



Example of a current capacity curve

Definition: The rated current is the continuous, not interrupted current a connector can take when simultaneous power on all contacts is given, without exceeding the maximum temperature.

Current carrying capacity of copper wires

Diameter [mm ²] of single wires in a three-phase system	0.75	1	1.5	2.5
Type of installation				
 B1 Wires in protective tubes and installation conduits	7.6	10.4	13.5	18.3
 B2 Cables and wires in protective tubes and installation conduits	–	9.6	12	16.5
 C Cables and wires at walls	–	11.7	15.2	21
 D Cables and wires on a bed	–	11.5	16.1	22
Depiction in accordance with DIN EN 60204 for PVC-insulated copper wires in an ambient temperature of + 40 °C under permanent operating conditions.				
For different conditions and temperatures, installations, insulation materials or conductors the relevant corrections have to be carried out.				

HARTING offers with the HARTING PushPull Power connector an universal solution for the power supply in compact and robust applications. It is in its element wherever small dimensions are combined with a high protection class.

The connector is available in a 4 pole 48 V and a 2 pole 250 V version. The newly designed power contacts can carry up to 12 resp. 16 A each (see deratings). In spite of this high current carrying capacity the connector gets by with minimal dimensions and fulfils the industrial requirements for clearances and creepage distances at the same time.

Additionally the HARTING PushPull Power connector offers the protection class of IP 65 and IP 67. Beside numerous industrial use cases it is thereby suited for diverse applications in the fields of transportation and telecommunication.

The cable side of the HARTING PushPull Power is terminated with crimping technology. For the receptacle several solutions with different termination technologies are offered.

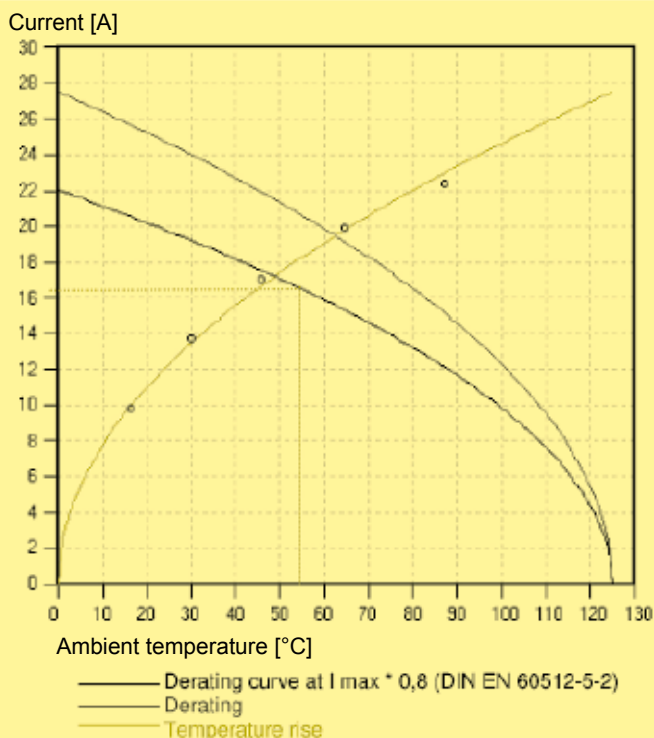
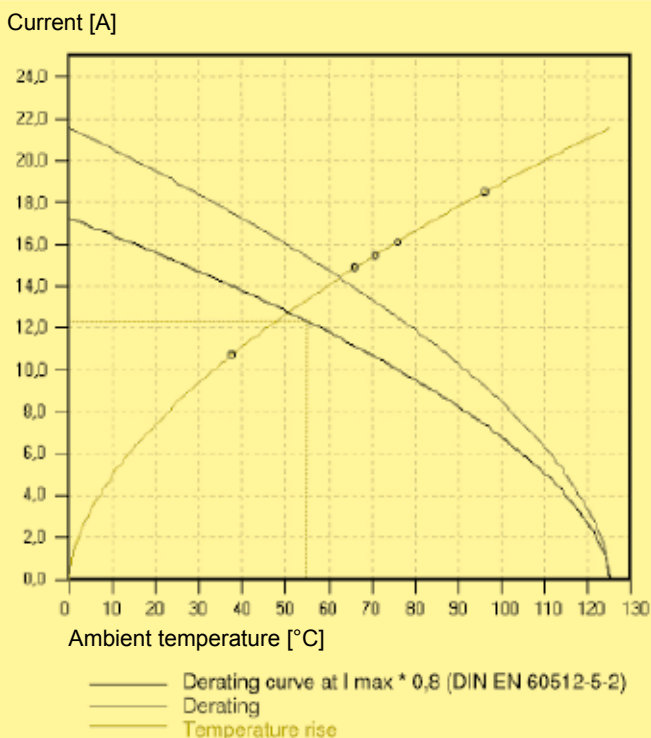
The innovative locking mechanism of the connector enables an easy plugging and pulling with just one hand. The mechanism is based on the same housing which is already established for the HARTING RJ45 product family.

Benefits

- Minimum space requirements in spite of high current carrying capacity
- Very compact housing in a high protection class
- Innovative PushPull locking mechanism
- Protection against contact on plug AND receptacle side enables an easy and safe installation
- For low voltage (48 V) and for power supply (250 V) available
- Codeable without losing contacts
- Different termination technologies for individual device integration

Typical application areas

- Factory and building automation
- Industrial electronics
- Telecommunication und wireless networks
- Transportation
- Industrial monitoring and camera systems
- Lighting and display technology
- Access control systems



28 Derating diagram "low voltage, 48 V"; 4 contacts loaded

Derating diagram "power supply, 250 V"; 2 contacts loaded

Specification	DIN VDE 0110
Protection level	IP 65 / IP 67
Finger protection on cable and device side	
Mating cycles	min. 750
Temperature range	-40 °C ... +70 °C
Locking system	PushPull

Han® PushPull Power 4/0

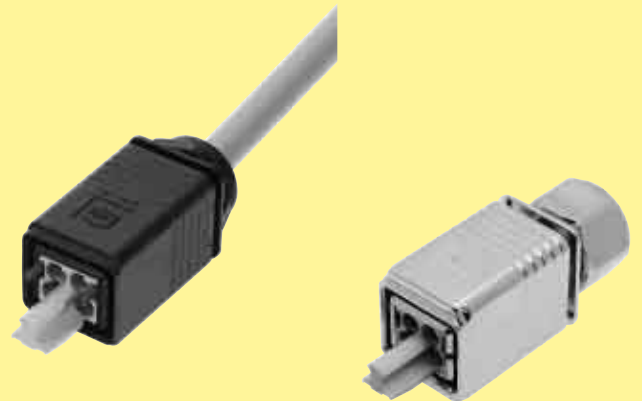
Rated voltage	690 V
with solder termination	230 / 400 V
Rated current	16 A
No. of current carrying contacts	4
Pre-leading PE contact	1
Wire gauge	0.5 – 2.5 mm ²
Cable diameter	6.5 – 13 mm
Housing material	Plastic, black, UL 94 V-0

HARTING PushPull Power 4/0

Rated voltage	48 V
Rated current	12 A @ 55 °C
No. of current carrying contacts	4
Wire gauge	1.5 mm ² (AWG 16)
Cable diameter	4.9 – 8.6 mm
Housing material	Plastic, black, UL 94 V-0 Coated zinc die cast

HARTING PushPull Power 2/0

Rated voltage	250 V
Rated current	16 A @ 55 °C
No. of current carrying contacts	2
Pre-leading PE contact	1
Wire gauge	1.5 mm ² (AWG 16)
Cable diameter	4.9 – 8.6 mm
Housing material	Plastic, black, UL 94 V-0





HARTING PushPull Power 4/0 connector for low voltage (48 V) applications, plastic

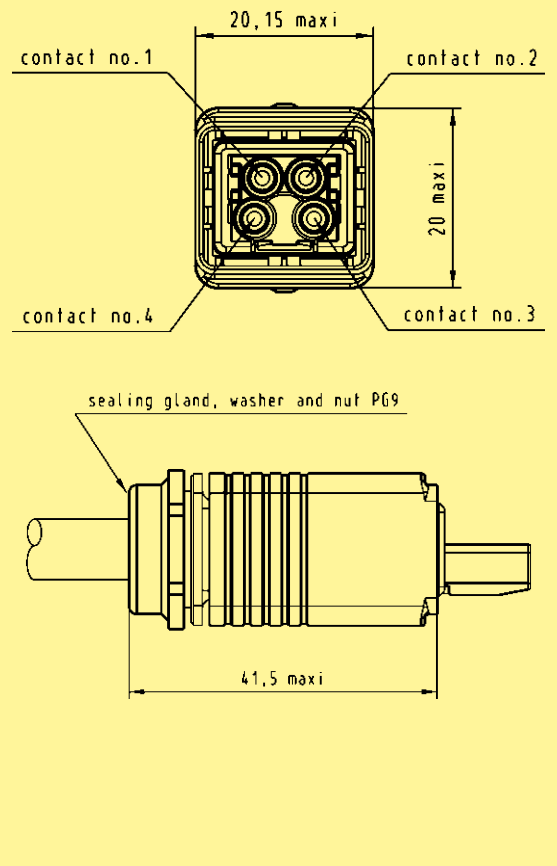
Identification	Part No.	Drawing	Dimensions in mm
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Connector set
incl. 4 turned crimp contacts (male), insulator body (**grey**), housing, cable gland

Set of coding pins
To avoid accidental incorrect mating a coding system is required. The coding pins are inserted without loss of contacts.

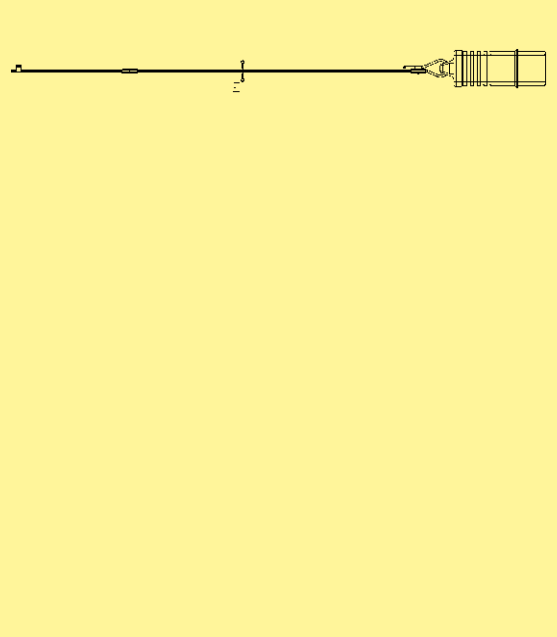
09 46 145 4400

09 46 840 0000



Protection cover for connectors
with cord, IP 65 / IP 67

09 45 845 0010





HARTING PushPull Power 4/0 panel feed through for low voltage (48 V) applications, plastic

Identification	Part No.	Drawing	Dimensions in mm
<p>Housing bulkhead mounting Compact</p> <p>with 4 turned female contacts and insulation</p> <p>with crimp termination for 1.5 mm²</p> <p>with solder termination, 90° angled</p> <p>with cable cage clamp</p>	<p>09 46 245 4400</p> <p>09 46 245 4000</p> <p>09 46 245 4001</p>		<p>25.2</p> <p>18 maxi</p> <p>19.2 maxi</p> <p>15.7 maxi</p> <p>15.8 maxi</p> <p>3.5</p> <p>7.45</p> <p>20.5 maxi</p> <p>1mm flat seal</p> <p>without x2 M2,5 screwing</p> <p>Panel front cutout</p> <p>0.3 mN recommended screwing torque</p> <p>M2,5 or Ø2,6</p> <p>Ø 0.1</p> <p>16.2 max.</p> <p>10.35 radius</p> <p>R1 maxi</p> <p>3.5</p> <p>18.4 ±0.1</p> <p>Axis X</p> <p>Axis Y</p>
<p>Housing bulkhead mounting EasyInstall</p> <p>with 4 turned female contacts and insulation</p> <p>with crimp termination for 1.5 mm²</p> <p>with solder termination, 90° angled</p> <p>with cable cage clamp</p>	<p>09 46 245 4430</p> <p>09 46 245 4030</p> <p>09 46 245 4031</p>		<p>max 34</p> <p>max 18</p> <p>max 16.9</p> <p>max 34</p> <p>max 19.55</p> <p>max 16.2</p> <p>15.8 maxi</p> <p>(6,5)</p> <p>max 4.05</p> <p>(6,42)</p> <p>Z axis</p> <p>Y Axis</p> <p>X Axis</p> <p>contact no. 1</p> <p>contact no. 2</p> <p>contact no. 3</p> <p>contact no. 4</p>
<p>Set of coding pins</p> <p>To avoid accidental incorrect mating a coding system is required. The coding pins are inserted without loss of contacts.</p>	<p>09 46 840 0000</p>		
<p>IP 65 / IP 67 protective cap</p> <p>with cord</p>	<p>09 45 845 0009</p>		



HARTING PushPull Power 4/0 connectors for low voltage (48 V) applications, metal

Identification	Part No.	Drawing	Dimensions in mm
Connector set incl. 4 turned crimp contacts (male), insulation, housing, cable gland	09 46 195 4400		
Crimp contacts male 0.75 mm ² (AWG 20 - 18) 1.5 mm ² (AWG 16 - 14) 2.5 mm ² (AWG 12)	09 46 500 0403 09 46 500 0401 09 46 500 0405		
Set of coding pins To avoid accidental incorrect mating a coding system is required. This coding pins are inserted without loss of contact.	09 46 840 0000		
IP 65 / IP 67 protective cap for connector with cord for device side with cord	09 45 845 0010 09 45 845 0009		
IP 40 protection cover for housing bulkhead mounting, rubber	09 45 845 0003		



HARTING PushPull Power 2/0 connector
for (250 V) power supply, plastic

Identification	Part No.	Drawing	Dimensions in mm
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<p>Connector set incl. 3 turned crimp contacts (male) insulator body (black), housing, cable gland</p>	09 46 145 3410		<p>20,15 maxi</p> <p>contact no. 2</p> <p>contact no. 1</p> <p>20 maxi</p> <p>GND contact pre-mating pin</p> <p>sealing gland, washer and nut PG9</p> <p>41,5 maxi</p>
<p>Set of coding pins To avoid accidental incorrect mating a coding system is required. The coding pins are inserted without loss of contacts.</p>	09 46 840 0000		

<p>Protection cover for connectors with cord, IP 65 / IP 67</p>	09 45 845 0010		
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Han® 3 A hybrid RJ45

- Field-assembly with mounting tool
- Compact design and very robust housing
- Suitable for termination with solid and stranded cables
- Protection against direct contact on cable and device side according to EN 60 529
- RJ45 Ethernet data connector with Power Pins for hybrid applications

Han® 3 A hybrid LC duplex

- Small form factor (compared to SC and ST®)
- Compact, space-saving design
- Combined to only one FO-module for high mechanical load
- High packing density
- A & B part identification according to TIA 568 standard

Protection level	IP 65 / IP 67
Cable diameter*	
Han® 3 A RJ45	9 - 13 mm
LC duplex	5 - 14 mm
Sealing gland	
RJ45	EMC
Fibre optic	standard
Mating cycles	
RJ45	100
Fibre optic	200
Temperature range	-40 °C ... +70 °C
Housing material	Coated zinc die cast
Housing surface	
- Priming	Chromated
- Top coat	Epoxy powder paint (black)
Locking element	V2A Steel
Hoods/Housings seal	FPM
Flammability acc. to UL 94	V-0

Data part LC duplex

The optic module is based on standardized LC connector mating face in accordance with IEC 61 754-20. The coupling sleeve is mateable to standard LC patch cables on rear side.

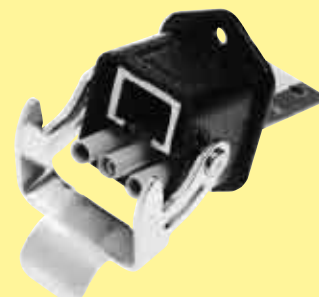
Data part RJ45

Transmission properties in accordance with Category 5 ISO/IEC 11 801:2002, corresponding to TIA/EIA 568:2002

Mating interface	RJ45 in accordance with IEC 60 603-7
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Power part (available in two coded versions)

Rated voltage	300 V AC/DC
Rated current	12 A @ 70 °C
No. of current carrying contacts	3 (AC: L1, PE, N or DC: V+, GND, V-)
	Premating PE/GND
Finger protection	On cable and device side (acc. to EN 60 529)
Cable diameter	2.5 mm ²



* please contact us for other cable diameter



Han® 3 A hybrid LC duplex

Identification	Part No.	Drawing	Dimensions in mm
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Han® 3 A hybrid LC duplex

Cable side*

Power: 3 x Han D® male contacts

Data: Multimode GOF

AC version

09 57 508 0500 000

DC version

09 57 508 0510 000

Data: Singlemode GOF

AC version

09 57 508 0501 000

DC version

09 57 508 0511 000

Device side

Power: 3 x Han D® female contacts

Data: Multimode GOF

AC version

09 57 568 0500 000

DC version

09 57 568 0510 000

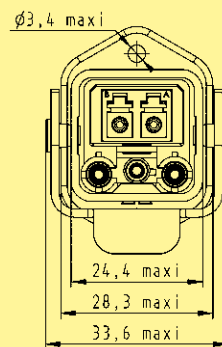
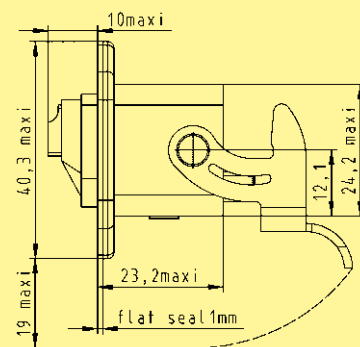
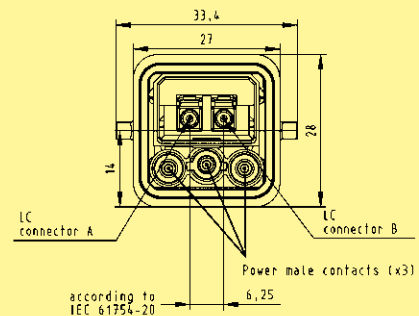
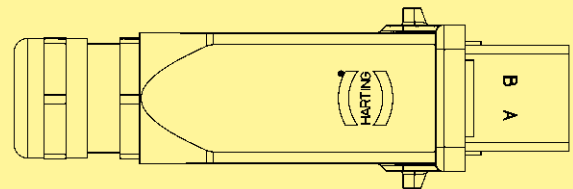
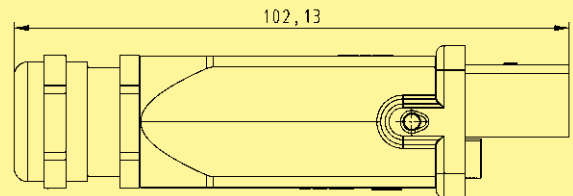
Data: Singlemode GOF

AC version

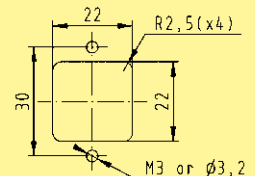
09 57 568 0501 000

DC version

09 57 568 0511 000



Recommended panel cutout dimension



* cable side is delivered with sealing gland

Crimp connection

A perfect crimp connection is gastight, therefore corrosion free and amounts to a cold weld of the parts being connected. For this reason, major features in achieving high quality crimp connections are the design of the contact crimping parts and of course the crimping tool itself. Wires to be connected must be carefully matched with the correct size of crimp contacts. If these basic requirements are met, users will be assured of highly reliable connections with low contact resistance and high resistance to corrosive attack.

The economic and technical advantages are:

- Constant contact resistance as a result of precisely repeated crimp connection quality
- Corrosion free connections as a result of cold weld action
- Pre-preparation of cable forms with crimp contacts fitted
- Optimum cost cable connection

Requirements for crimp connectors are laid down in DIN IEC 60 352-2, Amend. 2, as illustrated in the table.

Pull out force of stranded wire

The main criterion by which to judge the quality of a crimp connection is the retention force achieved by the wire conductor in the terminal section of the contact. DIN IEC 60 352, part 2, defines the extraction force in relation to the cross-section of the conductor. When fitted using HARTING crimping tools and subject to their utilization in an approved manner, our crimp connectors comply with the required extraction forces.

Crimping tools

Crimping tools (hand operated or automatic) are carefully designed to produce with high pressure forming parts a symmetrical connection of the crimping part of the contact and the wire being connected with the minimum increase in size at the connection point. The positioner automatically locates the crimp and wire at the correct point in the tool.

A ratchet in the tool performs 2 functions:

- ① It prevents insertion of the crimp into the tool for crimping before the jaws are fully open
- ② It prevents the tool being opened before the crimping action is completed

Identical, perfectly formed, connections can be produced using this crimping system.






Tensile strength of crimped connections







Conductor cross-section		Tensile strength
mm ²	AWG	N
0.08	28	11
0.12	26	15
0.14		18
0.22	24	28
0.25		32
0.32	22	40
0.5	20	60
0.75		85
0.82	18	90
1.0		108
1.3	16	135
1.5		150
2.1	14	200
2.5		230
3.3	12	275
4.0		310

Extract from DIN IEC 60 352-2, Amend. 2, Table IV



Crimp-cross section
HARTING crimp profile

Identification	Wire gauge (mm ²)	Part No.								
Han® PushPull Power 8-indent crimping tool		09 46 800 0000		For wire gauges 0.08 ... 4.0 mm ² (AWG 28 ... 12).						
Locator HARTING PushPull Power contacts for crimping tool (09 99 000 0001)		09 46 800 0010								
Crimping tool depth adjustment gauge				For the fine adjustment of the crimping depth of the Han® PushPull Power 8-indent crimping tool.						
Ø 1.02 mm		09 46 800 0002								
Ø 1.15 mm		09 46 800 0003								
			<table border="1"> <thead> <tr> <th>Wire</th> <th>Gauge</th> </tr> </thead> <tbody> <tr> <td>0.25 mm² ... 1.50 mm²</td> <td>Ø 1.02 mm</td> </tr> <tr> <td>1.50 mm² ... 2.50 mm²</td> <td>Ø 1.15 mm</td> </tr> </tbody> </table>	Wire	Gauge	0.25 mm ² ... 1.50 mm ²	Ø 1.02 mm	1.50 mm ² ... 2.50 mm ²	Ø 1.15 mm	
Wire	Gauge									
0.25 mm ² ... 1.50 mm ²	Ø 1.02 mm									
1.50 mm ² ... 2.50 mm ²	Ø 1.15 mm									
Insertion tool		09 46 800 0099		For an easy insertion and extraction of the male and female crimp contacts into / out of the insulator body.						
Extraction tool		09 46 800 0098								
Han D® and Han® P contacts										
BUCHANAN crimping tool for all contacts		09 99 000 0001								
Locator for Han D® contacts		09 99 000 0311								
Locator for Han® P contacts		09 99 000 0329								
Crimping tool depth adjustment gauge for Han D® contacts	0.14-0.25	09 99 000 0203								
	0.37	09 99 000 0125								
	0.5-1.0	09 99 000 0007								
	1.5	09 99 000 0008								
	2.5	09 99 000 0007								
HARTING RJ45 Assembly Tool for 8-pole HARTING RJ45 connectors		09 45 800 0500		With the RJ45 Assembly Tool 8-pole connectors can be fast, easily and reliably connected to flexible cables.						
Stripping Tool Stripping Tool for 2 pairs PROFINET cables incl. blade cassette		09 45 800 0000								
Blade cassette		09 45 800 0001		The RJ45 Stripping Tool allows the insulation to be removed from suitable 2 pair and 4 pair cables for fast mounting with diameters between 2.5 - 8 mm quickly and easily. The tool is pre-set for a cable diameter of 6.5 mm. It allows the cable sheath and screening braid to be stripped consistently and simultaneously.						

Identification	Wire gauge (mm ²)	Part No.	
Tool kit GI-fibre		20 99 000 3015	 <p>Height : 170 mm Width : 470 mm Depth : 360 mm</p> <p>Tool kit for connector mounting of glass fibres, using adhesive e.g.: GI 50/125 µm.</p>
HARTING crimping tool for F.O. connector (glass fibre) SW 4.3 and 3.8 mm		20 99 000 1031	
HARTING crimping tool for F.O. connector (glass fibre) SW 6.5, 4.95 and 3.0 mm		20 99 000 1033	<p>For crimping the strain relief to the connector</p> <p>... 1031 F.O. cable for glass fibre</p> <p>... 1033 POF¹⁾ and SERCOS²⁾ cable ø 6.0; ø 3.6</p>
HARTING crimping tool with locator for Han D [®] , Han E [®] , Han C [®]	0.14-1.5	09 99 000 0110	
HARTING crimping tool with locator for Han D [®] , Han E [®]	0.14-1.5	09 99 000 0021	
HARTING crimping tool for LC contacts	4 - 6	09 99 000 0303	
Removal tool for crimp contacts Han D [®]			 <p> . . 0012 . . 0004 . . 0052 </p> <p>A removal tool is necessary if contacts are to be replaced in the insert. It is inserted from the mating face and pushed over the contact until a stop is noticeable. Additional pressure unlocks the contact and pushes it out of the wiring side. In case of the removal tool (. . 0052) the unlocking process is achieved by pressure on the central rod.</p>

HARTING offers a wide choice of cable assemblies in either copper, hybrid (power and data) or fibre optic based around its comprehensive range of I/O connectors.

These cable assemblies are manufactured using components selected from a wide range of inserts with housings available in either a metal or plastic construction. The significant range of connectors and housings available allow for customer specific applications to be fulfilled.

The HARTING product portfolio offers fully assembled 100% tested cable harnesses and removes the need for on-site assembly activity. Customer specific lengths are available on request.

The “new” fibre optic and hybrid interfaces used in HARTING customised cable assemblies are ideally suited for FTTA (Fibre To The Antenna) applications offering easier handling and transportation and reduced installation time.





Fibre optic cable assembly
HARTING PushPull LC duplex multimode

Identification	Part No.	Drawing	Dimensions in mm
<p>Fibre optic cable, double ended, multimode, 62.5 μm</p> <p>Length: a = 1 m a = 5 m a = 10 m a = 20 m a = 40 m a = 50 m a = 100 m</p>	<p>33 58 211 0010 001 33 58 211 0050 001 33 58 211 0100 001 33 58 211 0200 001 33 58 211 0400 001 33 58 211 0500 001 33 58 211 1000 001</p>	<p>double ended</p> <p>a = length</p>	
<p>Fibre optic cable, single ended, multimode, 62.5 μm</p> <p>Length: a = 1 m a = 5 m a = 10 m a = 20 m a = 40 m a = 50 m a = 100 m</p>	<p>33 58 111 0010 001 33 58 111 0050 001 33 58 111 0100 001 33 58 111 0200 001 33 58 111 0400 001 33 58 111 0500 001 33 58 111 1000 001</p>	<p>Protection level: IP 65 / IP 67</p> <p>single ended</p> <p>a = length</p>	
<p>Fibre optic breakout cable</p> <p>Length: 10 m Length: 20 m Length: 100 m</p>	<p>33 58 751 0100 001 33 58 751 0200 001 33 58 751 1000 001</p>	<p>PUR jacket 2-fibre multimode Outer diameter: Min. bending radius: Installation: Operating:</p>	<p>62.5 μm 7 mm 10.5 cm 7.0 cm</p>

Further cable lengths are available on request



Hybrid cable assembly Han® 3 A hybrid RJ45

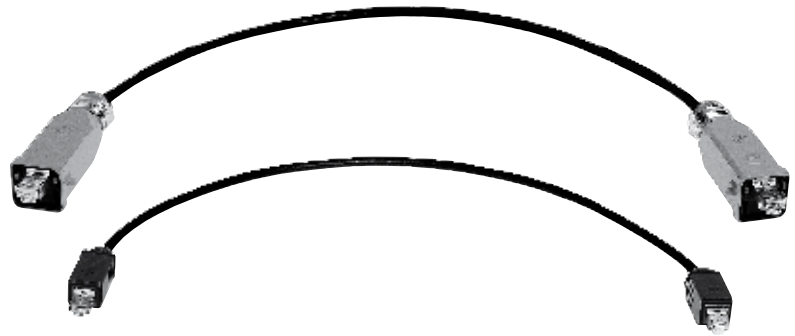
Identification	Part No.	Drawing	Dimensions in mm
<p>Hybrid cable, double ended, 4 x 2 x AWG 26/7 + 3 x 2.5 mm²</p> <p>Length: a = 1 m AC version DC version</p> <p> a = 5 m AC version DC version</p> <p> a = 10 m AC version DC version</p> <p> a = 20 m AC version DC version</p>	<p>33 57 211 0010 001 33 57 211 0010 002</p> <p>33 57 211 0050 001 33 57 211 0050 002</p> <p>33 57 211 0100 001 33 57 211 0100 002</p> <p>33 57 211 0200 001 33 57 211 0200 002</p>	<p>double ended</p> <p>a = length</p>	
<p>Hybrid cable, single ended, 4 x 2 x AWG 26/7 + 3 x 2.5 mm²</p> <p>Length: a = 1 m AC version DC version</p> <p> a = 5 m AC version DC version</p> <p> a = 10 m AC version DC version</p> <p> a = 20 m AC version DC version</p>	<p>33 57 111 0010 002 33 57 111 0010 001</p> <p>33 57 111 0050 002 33 57 111 0050 001</p> <p>33 57 111 0100 002 33 57 111 0100 001</p> <p>33 57 111 0200 002 33 57 111 0200 001</p>	<p>Protection level: IP 65 / IP 67</p> <p>Data part: Transmission properties in accordance with ISO/IEC 11801:2002: Class D</p> <p>single ended</p> <p>a = length</p>	
<p>Hybrid outdoor cable</p> <p>Length: 10 m</p> <p>Length: 20 m</p> <p>Length: 500 m</p>	<p>33 57 851 0100 001</p> <p>33 57 851 0200 001</p> <p>33 57 851 5000 001</p>		<p>PVC jacket</p> <p>4 x 2 x AWG 26/7 + 3 x 2.5 mm²</p> <p>Outer diameter: 12 mm</p> <p>Min. bending radius: single: 5 x OD repeated: 10 x OD</p>

Further cable lengths are available on request



Outdoor cable assembly RJ 45, 4-wire

Identification	Part No.	Drawing	Dimensions in mm
HARTING PushPull Outdoor cable, RJ45, 4-wire Length: a = 1.5 m a = 3.0 m a = 5.0 m a = 10.0 m a = 20.0 m	09 47 363 6069 09 47 363 6071 09 47 363 6073 09 47 363 6078 09 47 363 6080	double ended a = length 	
Han® 3 A Outdoor cable, RJ45, 4-wire Length: a = 1.5 m a = 3.0 m a = 5.0 m a = 10.0 m a = 20.0 m	09 45 715 0064 09 45 715 0066 09 45 715 0068 09 45 715 0073 09 45 715 0075	double ended a = length 	
Outdoor cable 4-wire, RJ45, Cat. 5, PVC Length: 20 m ring Length: 50 m ring Length: 100 m ring Length: 500 m reel	09 45 600 0135 09 45 600 0145 09 45 600 0105 09 45 600 0115		Wire: stranded tinned copper, AWG 22/7 Overall screen: aluminate foil overlapped, tinned copper wire braid, braid coverage about 85 % Overall diameter: 6.3 – 6.7 mm



Outdoor cable assembly RJ 45,
8-wire Cat. 5 / Cat. 5e

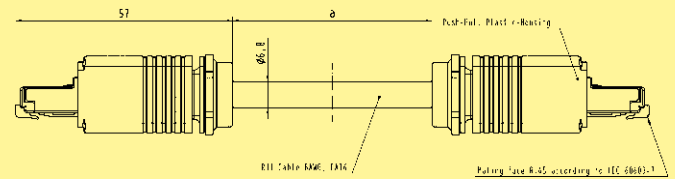
Identification	Part No.	Drawing	Dimensions in mm
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**HARTING PushPull
Outdoor cable, RJ45, 8-wire**

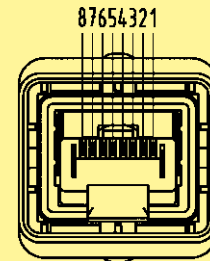
Length: a = 1.5 m
 a = 3.0 m
 a = 5.0 m
 a = 10.0 m
 a = 20.0 m

09 45 745 1105
 09 45 745 1107
 09 45 745 1109
 09 45 745 1114
 09 45 745 1116

double ended



a = length

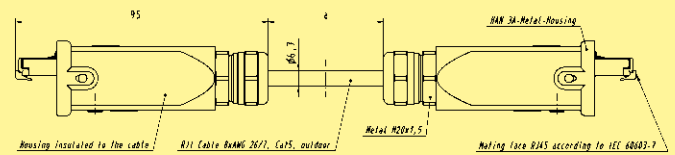


**Han® 3 A
Outdoor cable, RJ45, 8-wire**

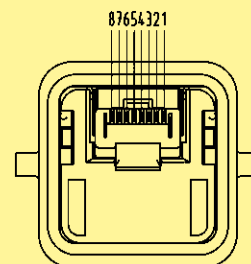
Length: a = 1.5 m
 a = 3.0 m
 a = 5.0 m
 a = 10.0 m
 a = 20.0 m

09 45 715 1105
 09 45 715 1107
 09 45 715 1109
 09 45 715 1114
 09 45 715 1116

double ended



a = length



**Outdoor cable 8-wire, RJ45,
Cat. 5 / Cat. 5e, PVC**

Length: 20 m ring
 Length: 50 m ring
 Length: 100 m ring
 Length: 500 m reel

09 45 600 0230
 09 45 600 0240
 09 45 600 0200
 09 45 600 0220



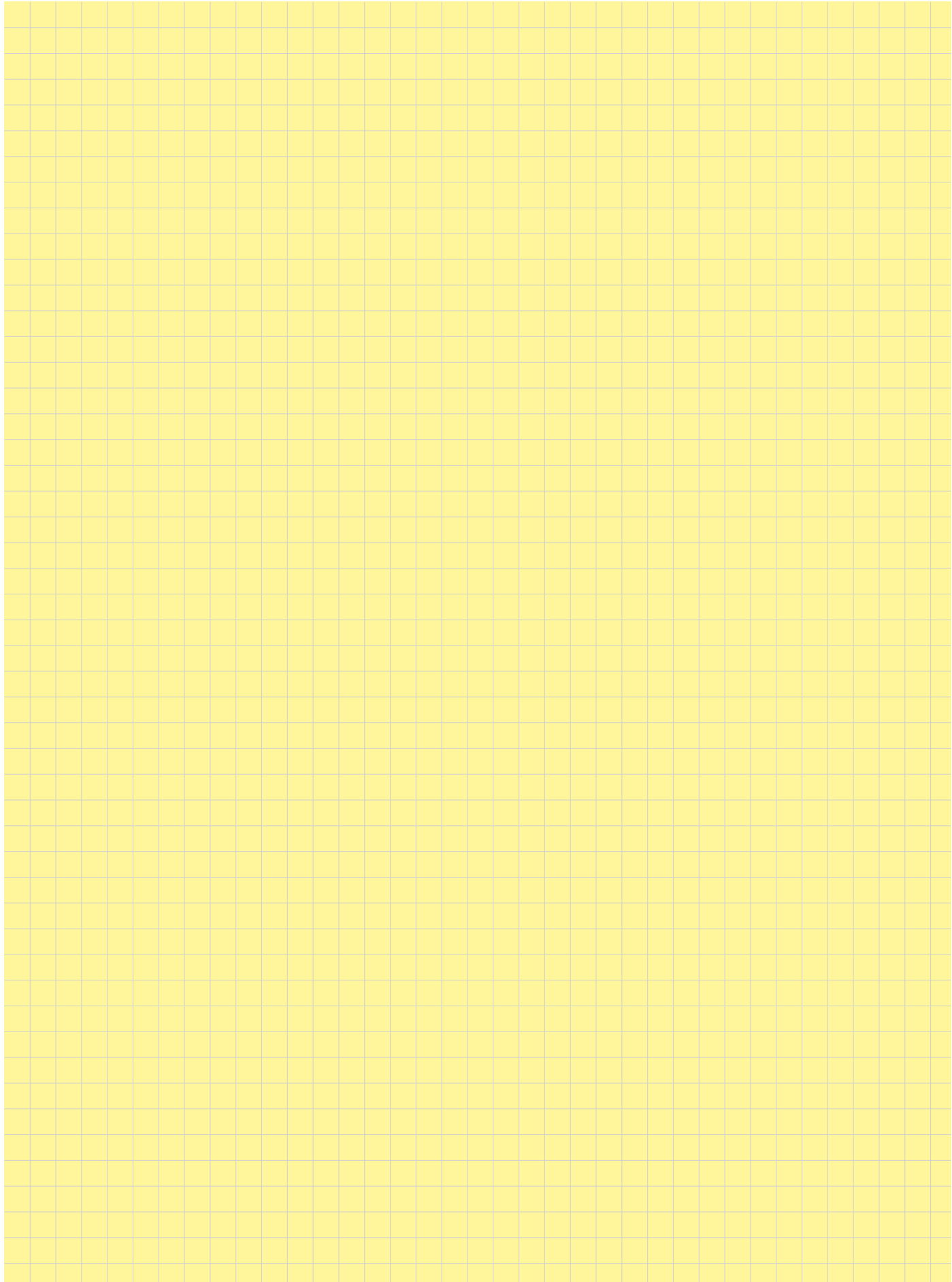
Wire: bare stranded copper, AWG 26/7
 Overall screen: aluminium bonded polyester tape and tinned copper wire braid, braid coverage about 85 %
 Overall diameter: 6.5 – 6.9 mm

Further cable lengths are available on request



Outdoor cable assembly RJ 45,
8-wire Cat. 6

Identification	Part No.	Drawing	Dimensions in mm
<p>HARTING PushPull Outdoor cable, RJ45, 8-wire</p> <p>Length: a = 1.5 m a = 3.0 m a = 5.0 m a = 10.0 m a = 20.0 m</p>	<p>09 45 745 1578 09 45 745 1580 09 45 745 1582 09 45 745 1587 09 45 745 1589</p>	<p>double ended</p> <p>a = length</p>	
<p>Han® 3 A Outdoor cable, RJ45, 8-wire</p> <p>Length: a = 1.5 m a = 3.0 m a = 5.0 m a = 10.0 m a = 20.0 m</p>	<p>09 45 715 1583 09 45 715 1585 09 45 715 1587 09 45 715 1592 09 45 715 1594</p>	<p>double ended</p> <p>a = length</p>	
<p>Outdoor cable 8-wire, RJ45, Cat. 6, PVC</p> <p>Length: 20 m ring Length: 50 m ring Length: 100 m ring Length: 500 m reel</p>	<p>09 45 600 0531 09 45 600 0541 09 45 600 0501 09 45 600 0521</p>	<p>Wire: bare stranded copper, AWG 27/7 Pairs: aluminate foil overlapped PIMF Overall screen: tinned copper wire braid, braid coverage about 60 % Overall diameter: 6.3 – 6.9 mm</p>	



List of part numbers





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