05 2

Pushing Performance

HARTING Telecom Outdoor Solutions

People | Power | Partnership

HARTING Pushing Performance

Quality Connections Worldwide

HARTING was founded in 1945 by the family that still owns the company. Its headquarters are situated in Espelkamp, in Eastern Westphalia.

Today, HARTING employs approximate 3,000 people worldwide, including 400 engineers and scientists. Over 500 technical specialists are available to implement customer requirements.

With subsidiaries in 27 countries and ten production plants, the company is one of the leading manufacturers of electrical and electronic connectors.
The global HARTING network means that the company is always in close touch with the market and ideally placed to work together with its customers.

As the market leader HARTING offers the benefits of just-in-time service and maintains close business relations with all of its key customers in the global marketplace. In more than one of its product areas, HARTING leads the field.

HARTING products are manufactured using advanced, automated techniques, with CAD systems employed both in research and development and in tool-making.

In matters of quality, HARTING is convinced that zero-defect production can only be achieved through fully automated processes. Our quality assurance organization and procedures are documented in accordance with EN ISO 9001 in a quality assurance manual. In 2006 HARTING became the first company worldwide to receive the new IRIS quality certificate (the International Railway Industry Standard).

HARTING employs around 60 staff in quality assurance alone.
The majority of these engineers and technicians are trained and qualified to standards laid down by the DGQ (German Association of Quality) or SAQ (Swiss Association of Quality).

Telecom Outdoor Solutions

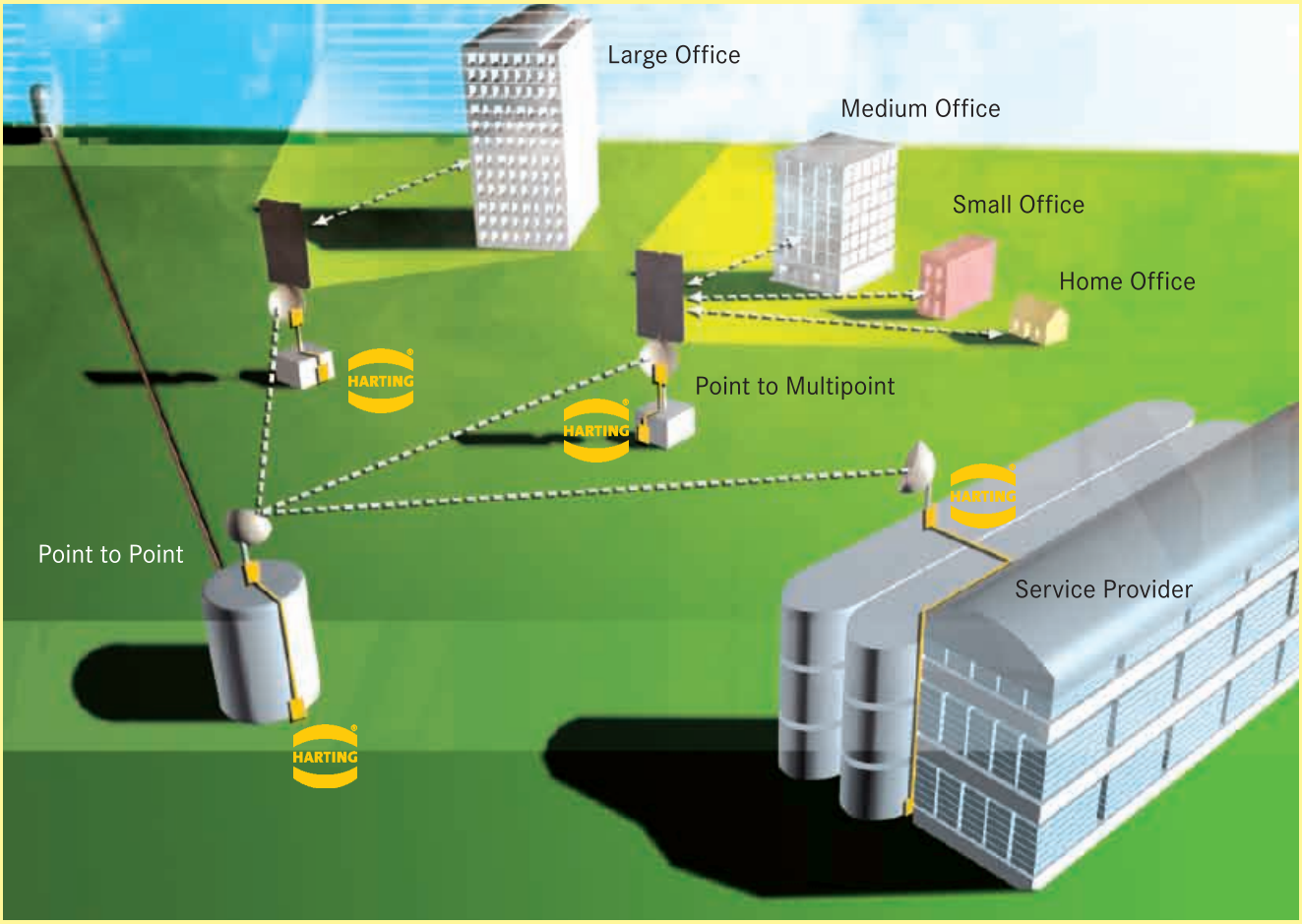
HARTING's new range of products for telecom outdoor solutions combines the advantages of the reliable HARTING PushPull and Han® 3 A housings with innovative inserts for fibre optic and copper.

The integration of the standard LC fibre optic connectors, in single mode and multi mode, 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 WiMAX, where reliable outdoor connectivity is needed.



Configurations	
Housings	Inserts
HARTING PushPull *available soon as full metal version!* Han® PushPull Han® 3 A M series Please contact us for other housings of Han® 3 A family e.g. plastic, angled, HPR (IP 68)	Power • DC 48 V / 300 V • AC 230 V / 300 V Fibre • LC duplex • 2 x LC duplex Hybrid • RJ45 & power • LC duplex & power

HARTING PushPull hood
+ insert

Han® PushPull hood
+ insert

Straight Han® 3 A
metal hood
+ insert

Straight Han® 3 A
metal hood
+ insert

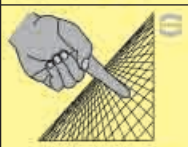
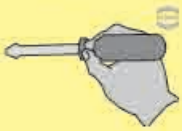
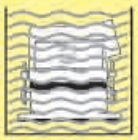
Features & benefits

- 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		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

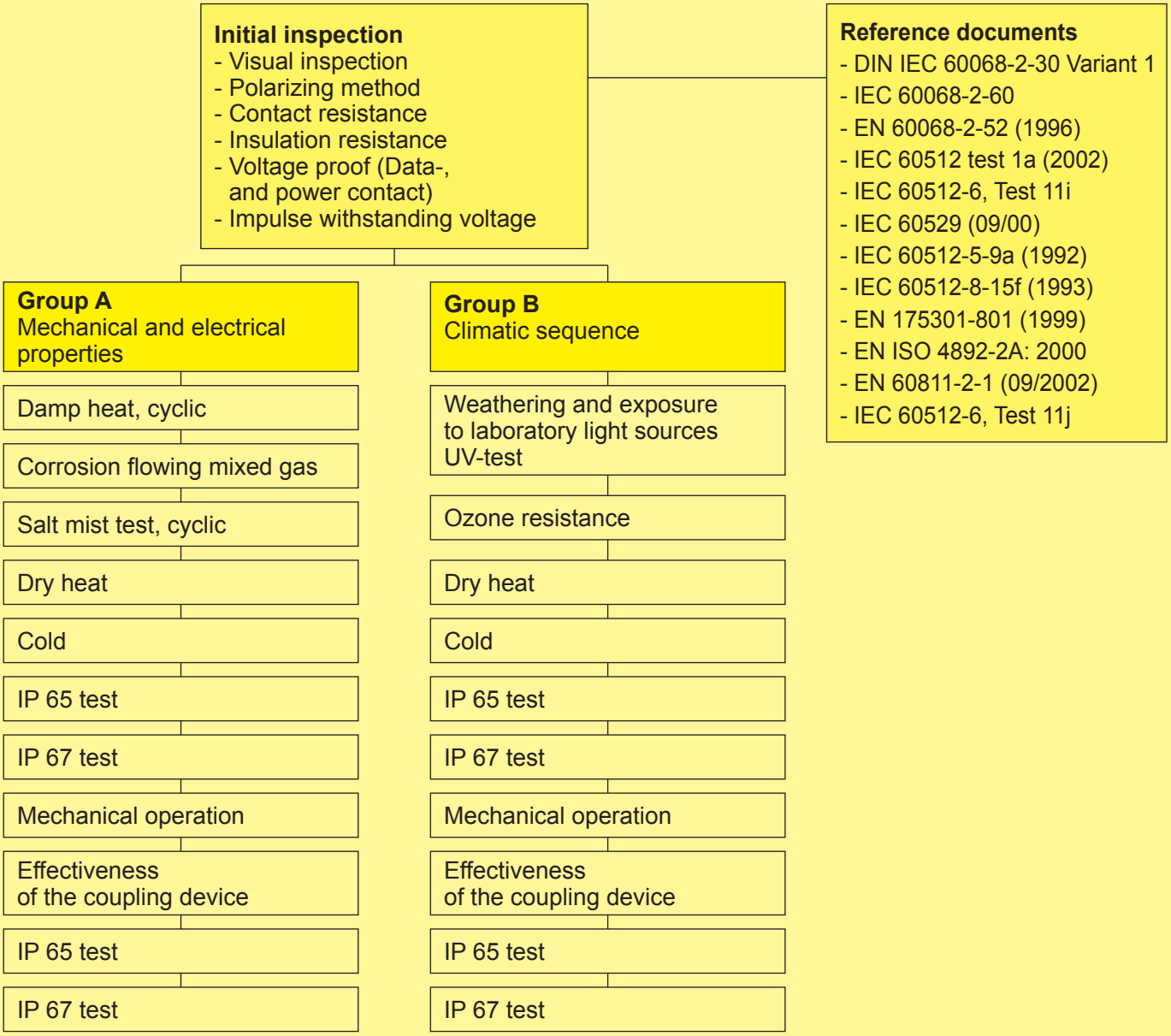
Description according to DIN EN 60 529, IEC 60 529

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.

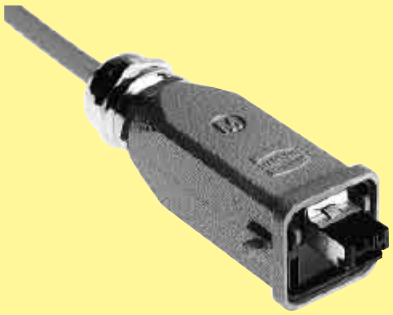
Protection level	IP 65 / IP 67
Mating interface	RJ45 acc. to IEC 60 603-7
Termination cross section	
Cat. 5	AWG 24/7 ... AWG 22/7 (stranded) AWG 23/1 ... AWG 22/1 (solid)
Cat. 6	AWG 27/7 ... AWG 24/7 (stranded)
Temperature range	-40 °C … +70 °C
Flammability acc. to UL 94	V-0
	UL approval (E102079)

HARTING PushPull connector RJ45

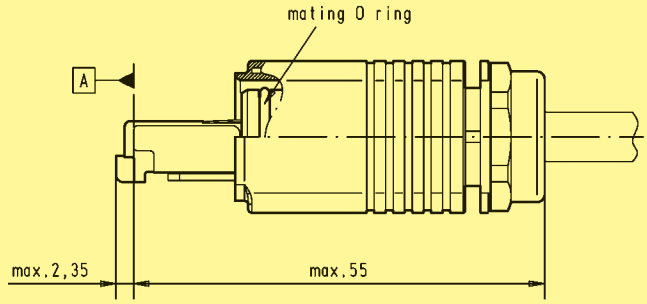
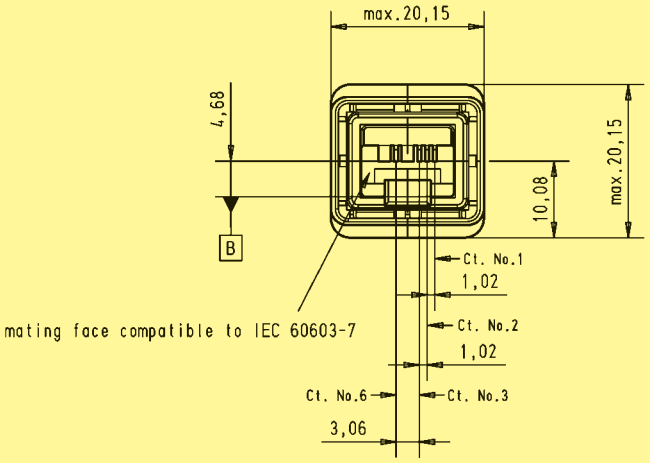
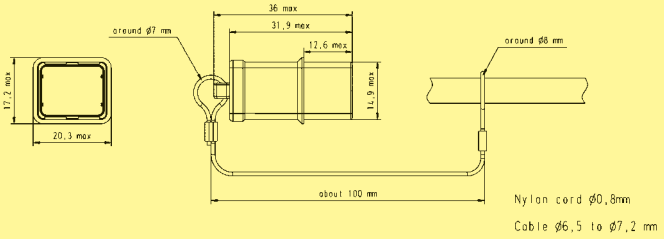
Locking mechanism	PushPull acc. to ISO/IEC 24 702 and IEC 61076-3-106, variant 4
Cable diameter	6.5 - 8.6 mm
Mating cycles	min. 750
Housing material	Plastic, black

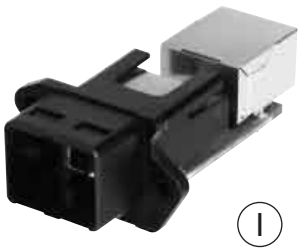
Han® 3 A connector RJ45

Cable diameter	6.0 - 8.0 mm
Mating cycles	min. 500
Housing material	Die cast aluminium alloy
Housing surface	powder-coated RAL 7037 (grey)
Locking element	V2A Steel / Steel, zinc plated / Han-Easy Lock®
Hoods/ Housings seal	NBR

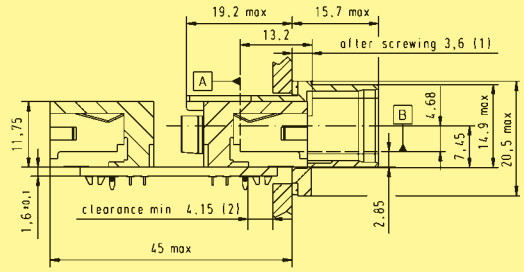
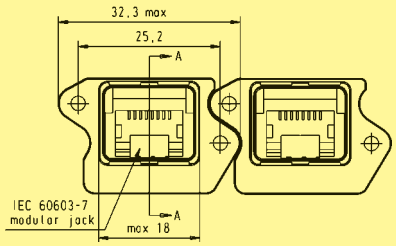
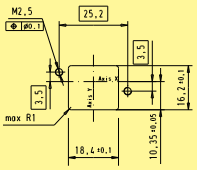
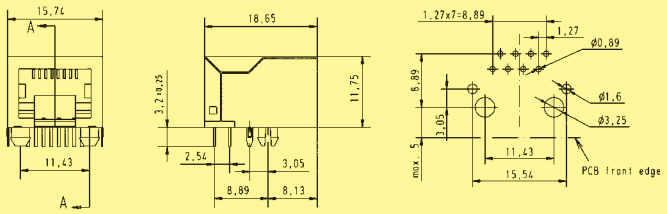
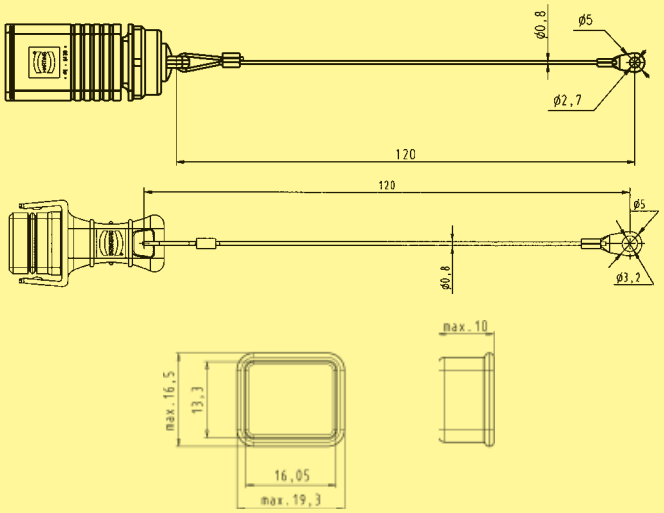


HARTING PushPull connector
RJ45, 4-pole and 8-pole

Identification	Part No.	Drawing	Dimensions in mm
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	09 45 145 1500		
Wire manager blue	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 0001		

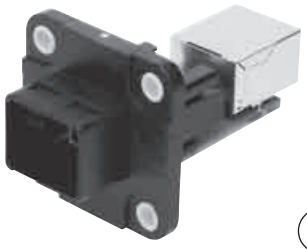


PushPull Compact panel feed through RJ45

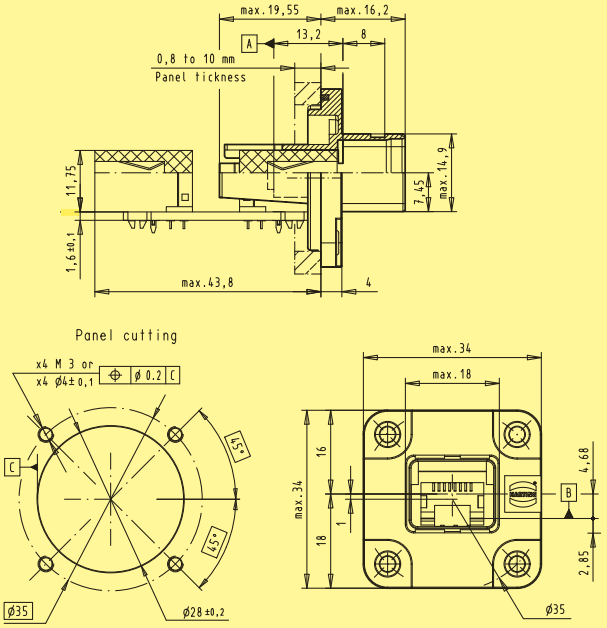
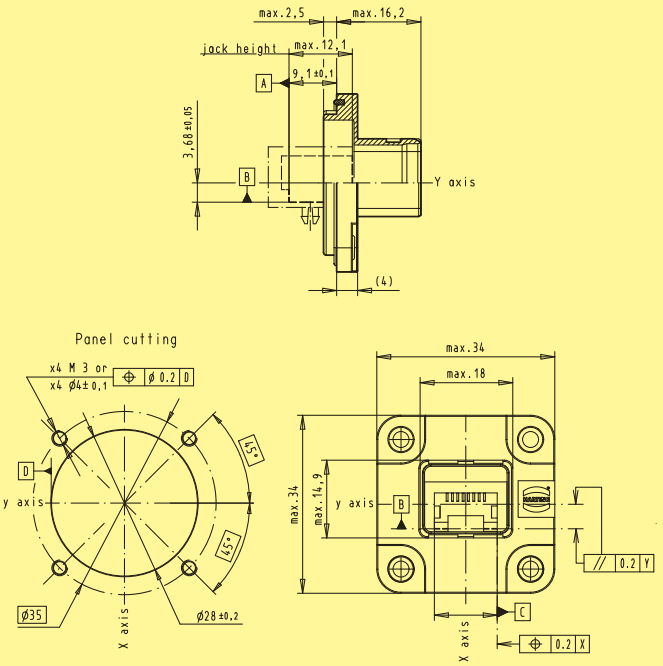
Identification	Part No.	Drawing	Dimensions in mm
Panel feed through set incl. housing and instruction manual, fixing holes M2.5 (I)	09 45 245 1102		
Separate housing incl. flat sealing for direct device integration, fixing holes M2.5 (II) with clip without clip	09 45 545 0021 09 45 545 0023		Panel cutting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

PushPull EasyInstall
panel feed through
RJ45

II



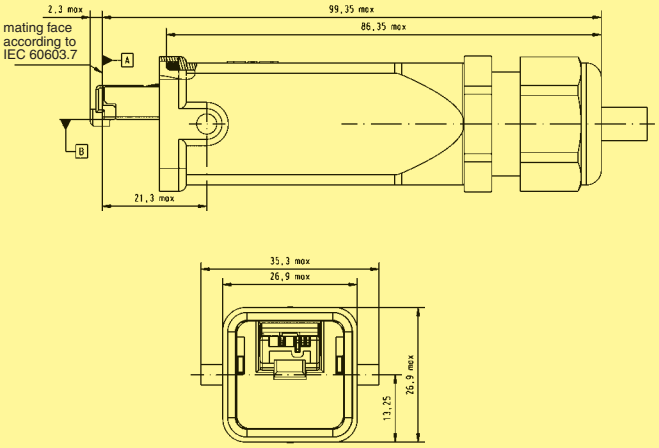
I

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	09 45 545 0030		
with fixing clip	09 45 545 0031		

Han® 3 A connector
RJ45, 4-pole

Identification		Part No.
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

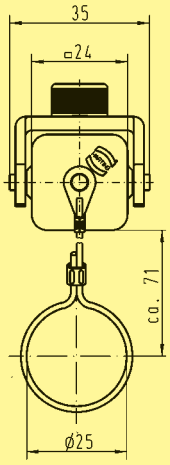
Drawing



Dimensions in mm

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



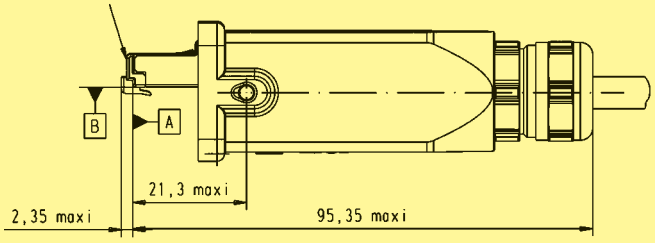
Dimensions valid for the plastic version

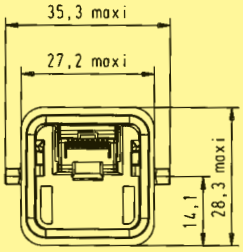
Han® 3 A connector
RJ45, 8-pole

Identification		Part No.
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

Drawing

Mating face acc. to IEC 60 603-7



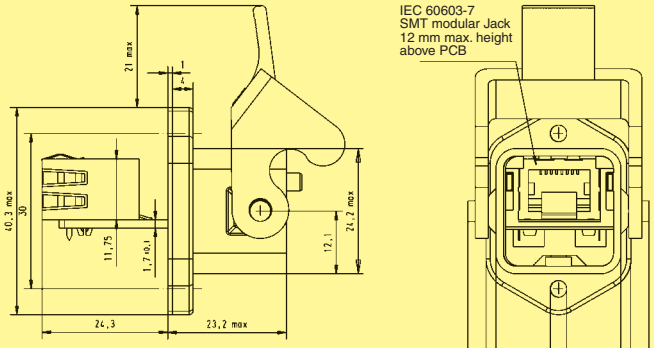


Dimensions in mm

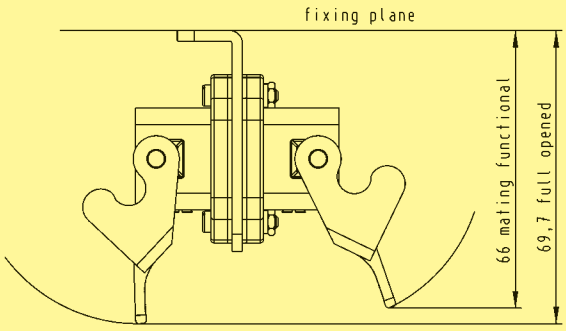
Dimensions vaild for metal version Standard

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

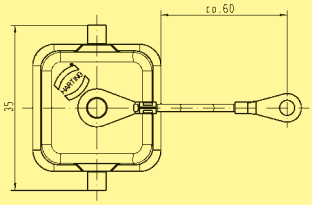
Identification		Part No.	Drawing	Dimensions in mm
Panel feed through set incl. housing and instruction manual				
Plastic version	straight	09 45 225 1100		
	angled	09 45 225 1108		
Standard metal version	straight	09 45 215 1100		
	angled	09 45 215 1108		
Standard metal version with self-closing protective 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		
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		
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 straight plastic version



Dimensions valid for the plastic version



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

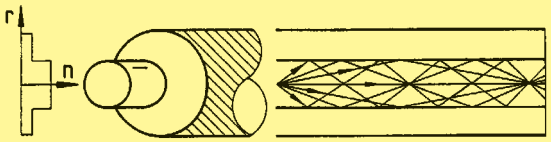
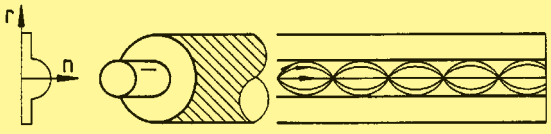
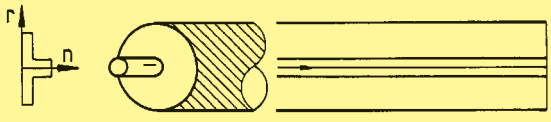
Fibre optic communication works by pulses of light. When feeding them in at one end of the fibre optic cable, the pulses are passed to the other end by total internal reflection.

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 ø	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	6.5 - 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
Han® 3 A 2 x LC duplex	Die cast aluminium alloy
Flammability acc. to UL 94	V-0

Han® 3 A 2 x LC duplex

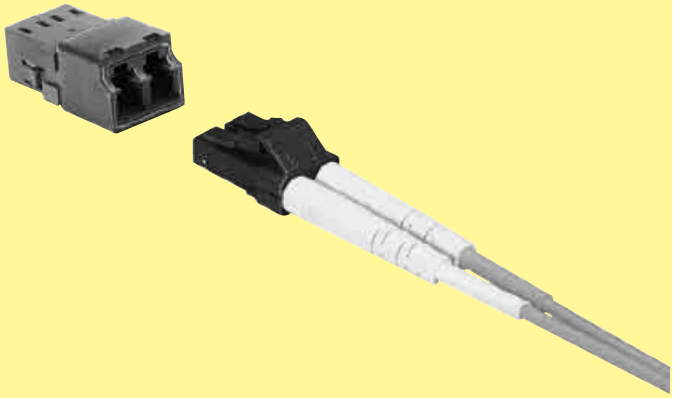
Housing surface	
- Priming	Chromated
- Top Coat	Epoxy powder paint (black)
Locking element	V2A Steel
Hoods/Housings seal	FPM

The optic module is based on standardized LC connector mating face in accordance with IEC 61 754-20. 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

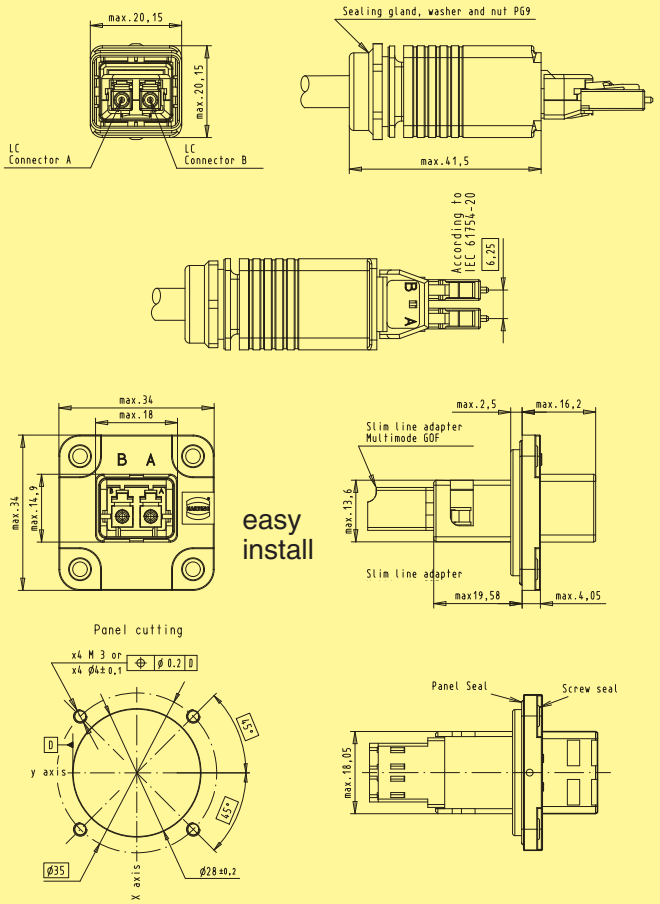
Adaptor for easy extension of optical lines (under preparation).



* cable side is delivered with sealing gland

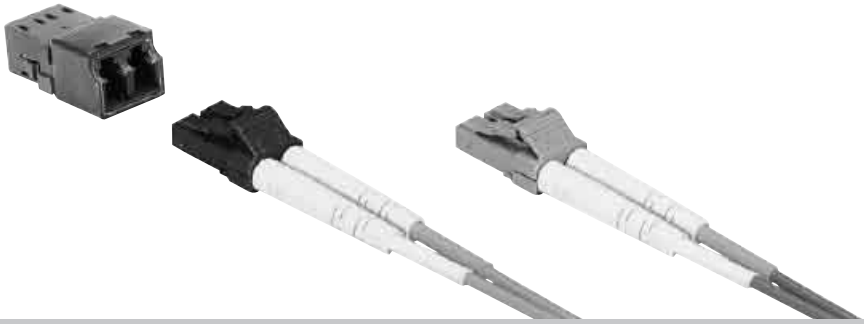
HARTING
PushPull/Han® 3 A 2 x LC duplex

Identification	Part No.	Drawing	Dimensions in mm
HARTING PushPull LC duplex			
Cable side			
Multimode GOF	09 57 402 0500 000		
Singlemode GOF	09 57 402 0501 000		
Device side EasyInstall			
Multimode GOF	09 57 441 0500 000		
Singlemode GOF	09 57 441 0501 000		
Device side M16			
Multimode GOF	09 57 442 0500 000		
Singlemode GOF	09 57 442 0501 000		
Han® 3 A 2 x LC duplex*			
Cable side			
Multimode GOF	09 57 407 0001 000		
Singlemode GOF	09 57 407 0002 000		
Device side			
Multimode GOF	09 57 467 0001 000		
Singlemode GOF	09 57 467 0002 000		



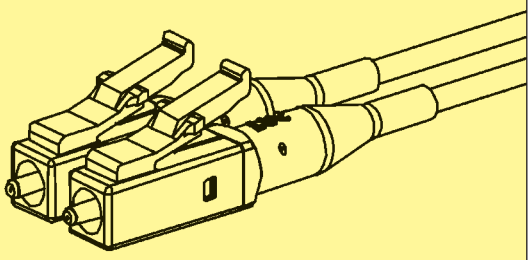
Dimensions valid for the HARTING PushPull LC duplex

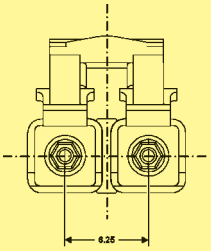
* For more details please contact us

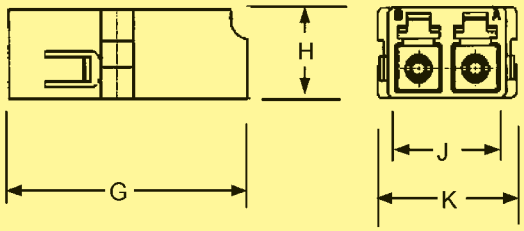


LC duplex

Identification	Part No.	Drawing	Dimensions in mm
LC duplex			
Unibody			
Multimode GOF	09 57 400 0001 000		
Singlemode GOF	09 57 400 0002 000		
Adapter			
Multimode GOF	09 57 400 0003 000		
Singlemode GOF	09 57 400 0004 000		







	min.	max.
G	26.60	26.80
H	9.35	9.45
J	12.80	12.90
K	15.24	15.34

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 lightening 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 60 664-1, 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 60 664-1, 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 excepted.

Current carrying capacity

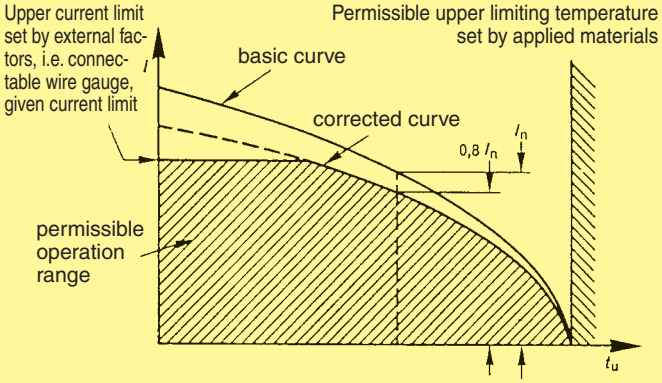
The current carrying capacity is determined in tests which are conducted on the basis of the DIN IEC 60 512 part 3. The current carrying capacity is limited by the thermal properties of materials which are used for inserts as well as by the insulating materials. These components have a limiting temperature 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 [mm²] 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 60 204 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 rsp. 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.

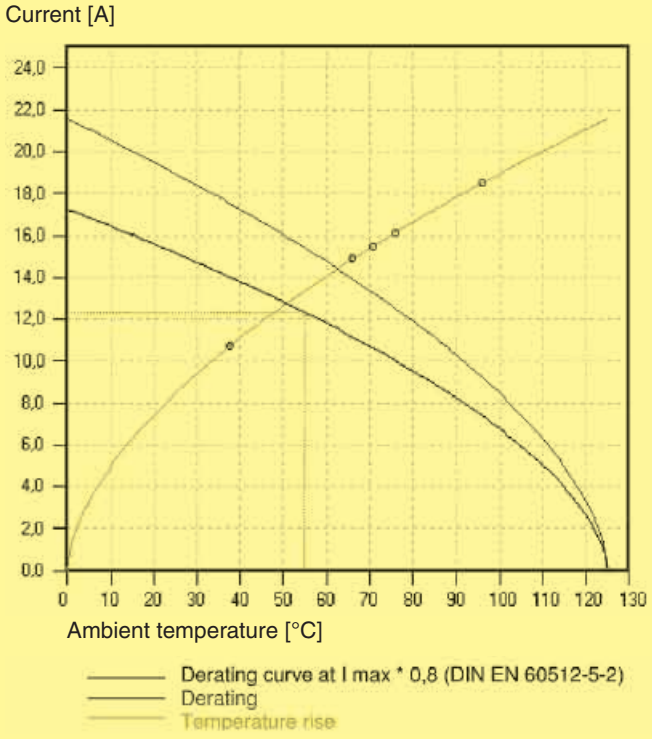
The innovative locking mechanism of the connector enables an easy plugging and pulling with just one hand. The mechanism is based on the same housing which is already established for the HARTING RJ45 product family.

Benefits

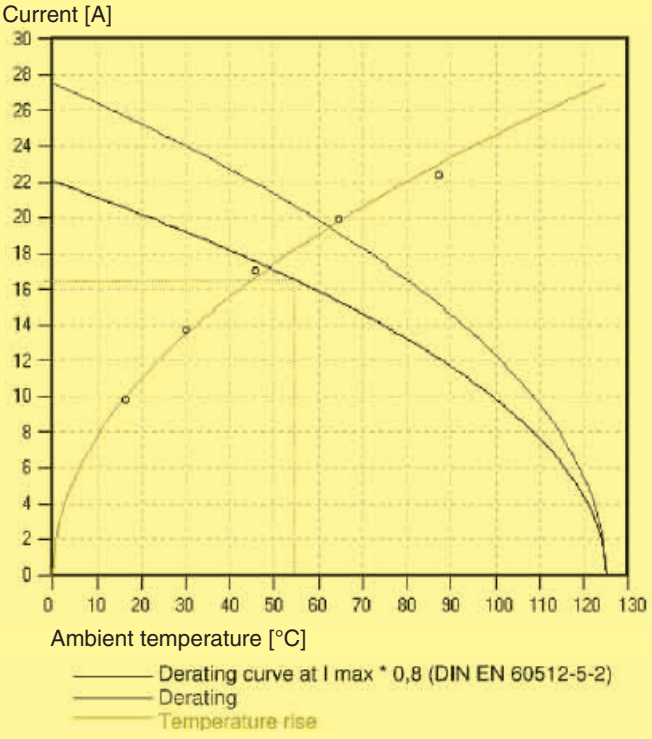
- Minimum space requirements in spite of high current carrying capacity
- Very compact housing in a high protection class
- Innovative PushPull locking mechanism
- Protection against contact on plug AND receptacle side enables an easy and safe installation
- For low voltage (48 V) and for power supply (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



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
Housing material	Plastic, black, UL 94 V-0
Locking system	PushPull

Han® PushPull Power 4/0

Rated voltage	230/400 V
Rated current	16 A
No. of current carrying contacts	4
Pre-leading PE contact	1
Wire gauge	0.5 – 2.5 mm²
Cable diameter	9 – 13 mm

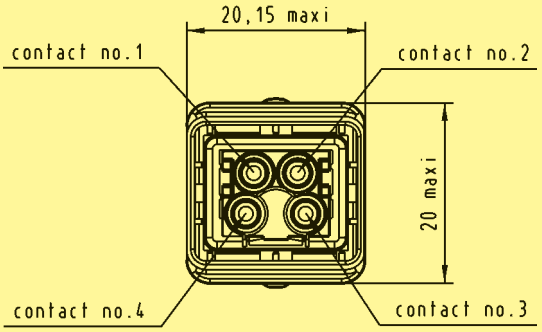
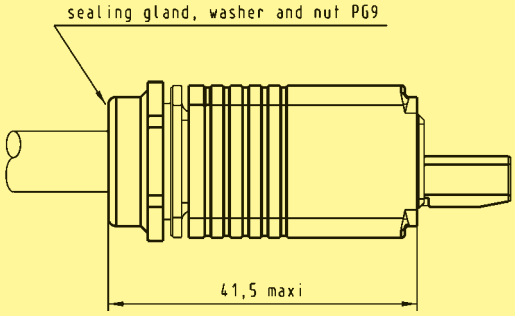
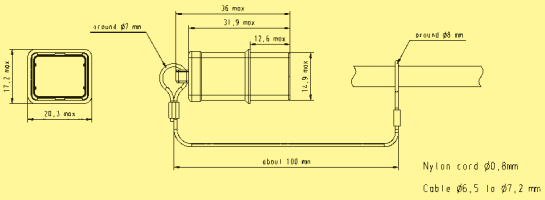
HARTING PushPull Power 4/0

Rated voltage	48 V
Rated current	12 A @ 55 °C
No. of current carrying contacts	4
Wire gauge	1.5 mm² (AWG 16)
Cable diameter	5 – 8.6 mm

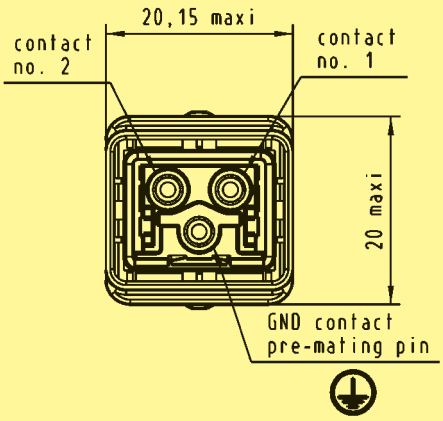
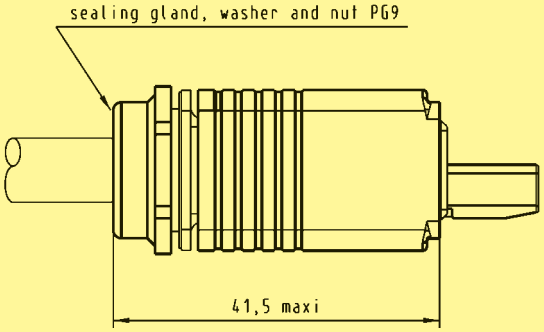
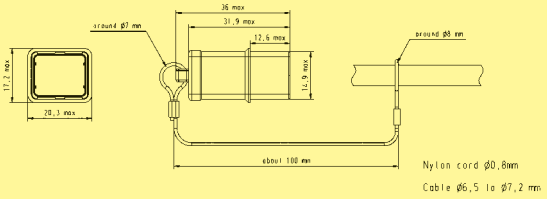
HARTING PushPull Power 2/0

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 mm² (AWG 16)
Cable diameter	5 – 8.6 mm

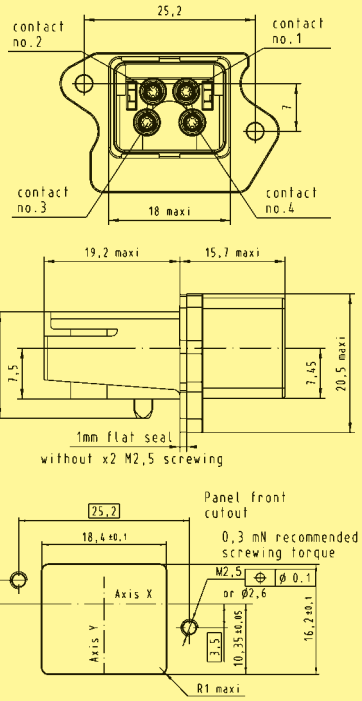
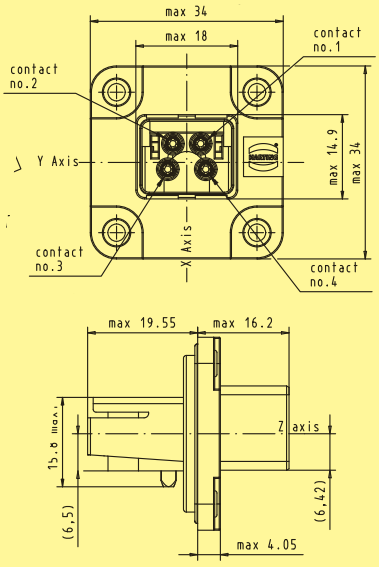
HARTING PushPull Power 4/0 connector for low voltage (48 V) applications

Identification	Part No.	Drawing	Dimensions in mm
Connector set incl. 4 turned crimp contacts (male), insulator body (**grey**), housing, cable gland	09 46 145 4400		
Set of coding pins To avoid accidental incorrect mating a coding system is required. The coding pins are inserted without loss of contacts.	09 46 840 0000		
IP 65 / IP 67 protective cap with cord	09 45 845 0001		

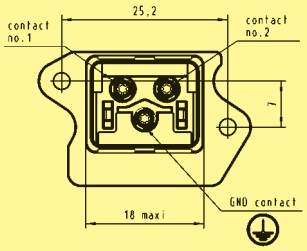
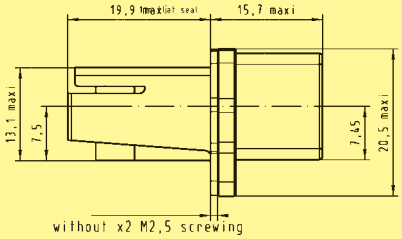
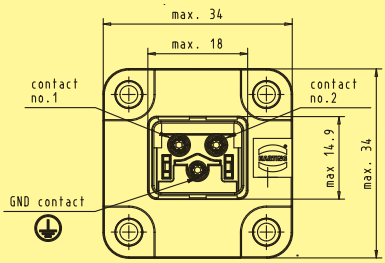
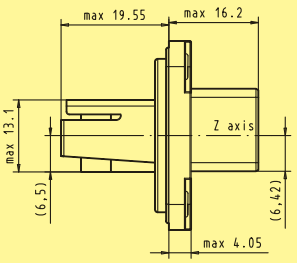
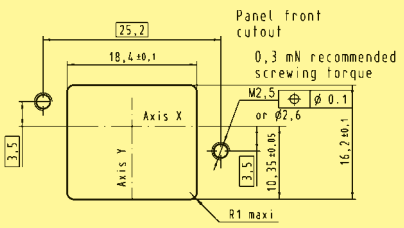
HARTING PushPull Power 2/0 connector for (250 V) power supply

Identification	Part No.	Drawing	Dimensions in mm
Connector set incl. 3 turned crimp contacts (male) insulator body (**black**), housing, cable gland	09 46 145 3410		
Set of coding pins To avoid accidental incorrect mating a coding system is required. The coding pins are inserted without loss of contacts.	09 46 840 0000		
			
IP 65 / IP 67 protective cap with cord	09 45 845 0001		

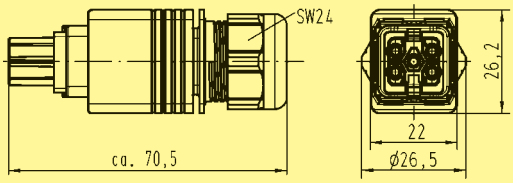
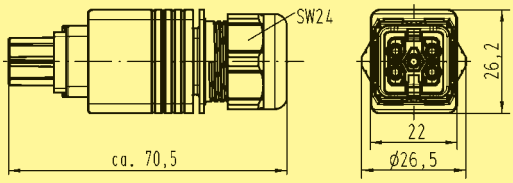
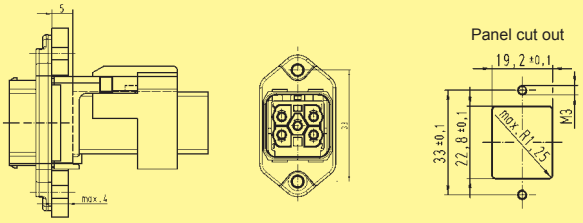
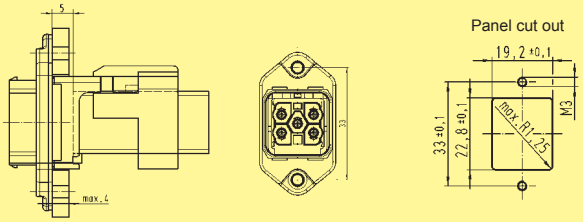
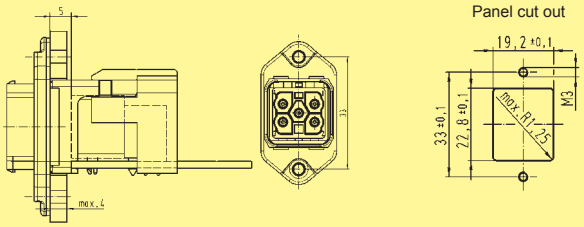
HARTING PushPull Power 4/0 panel feed through for low voltage (48 V) applications

Identification	Part No.	Drawing	Dimensions in mm
Housing bulkhead mounting **Compact**			
with 4 turned female contacts and insulation			
with crimp termination for 1.5 mm²	09 46 245 4400		
with solder termination, 90° angled	09 46 245 4000		
with cable cage clamp	09 46 245 4001		
			
Housing bulkhead mounting **EasyInstall**			
with 4 turned female contacts and insulation			
with crimp termination for 1.5 mm²	09 46 245 4430		
with solder termination, 90° angled	09 46 245 4030		
with cable cage clamp	09 46 245 4031		
			
Set of coding pins			
To avoid accidental incorrect mating a coding system is required. The coding pins are inserted without loss of contacts.	09 46 840 0000		
IP 65 / IP 67 protective cap			
with cord	09 45 845 0009		

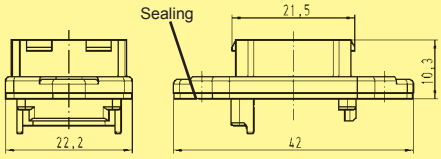
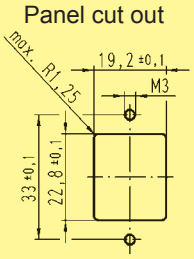
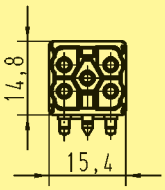
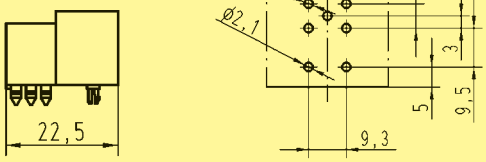
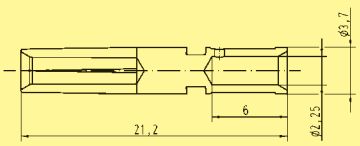
HARTING PushPull Power 2/0 panel feed through for (250 V) power supply

Identification	Part No.	Drawing	Dimensions in mm
Panel feed through set incl. 3 turned female contacts, insulator body (**black**), receptacle housing for crimp termination	09 46 245 3410		
			
Panel feed through set incl. 3 turned crimp contacts (female), insulator body (**black**), housing bulkhead mounting EasyInstall	09 46 245 3430		
			
Set of coding pins To avoid accidental incorrect mating a coding system is required. The coding pins are inserted without loss of contacts.	09 46 840 0000		
IP 65 / IP 67 protective cap with cord	09 45 845 0004		

Han® PushPull Power 4/0

Identification	Part No.	Drawing	Dimensions in mm
Cable side including hood and female insert with crimp termination order Han® P crimp contacts separately	09 35 231 0423		
Cable side including hood and female insert with Han-Quick Lock® termination Han-Quick Lock®	09 35 232 0423		
Panel feed through including housing and male insert 16 A, 690 V with crimp termination please order crimp contacts separately	09 35 231 0313		
Panel feed through including hood and male insert 16 A, 690 V with Han-Quick Lock® termination	09 35 232 0313		
Panel feed through including hood and male insert 16 A, 230/400 V on PCB with solder termination	09 35 233 0313		

Han® PushPull Power 4/0

Identification	Part No.	Drawing	Dimensions in mm
Components device side			
Han® PushPull Power 4/0 bulkhead mounted housing	09 35 002 0323		Panel cut out 
Male insert			
solder variant, 90° angled	09 35 002 3003		Layout of printed circuit boards 
Crimp contacts Han® P			
female, silver plated			
for 0.5 mm²	09 35 000 6203		
for 0.75 mm²	09 35 000 6204		
for 1.0 mm²	09 35 000 6205		
for 1.5 mm²	09 35 000 6206		
for 2.5 mm²	09 35 000 6207		

Han® 3 A hybrid RJ45

- Field-assembly with mounting tool
- Category of transmission Cat. 5
- 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 60529
- 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	Die cast aluminium alloy
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.

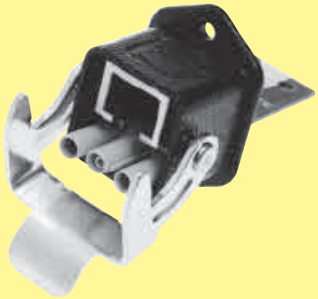
Data part RJ45

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

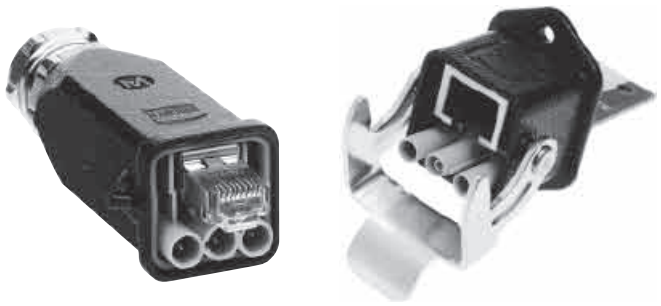
Mating interface	RJ45 in accordance with IEC 60 603-7

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 mm²



* please contact us for other cable diameter



Han® 3 A hybrid RJ45

Identification	Part No.	Drawing	Dimensions in mm

Han® 3 A hybrid RJ45

Cable side

incl. 3 x Han D® male contacts

AC version	09 57 308 0500 000
DC version	09 57 308 0501 000

Device side

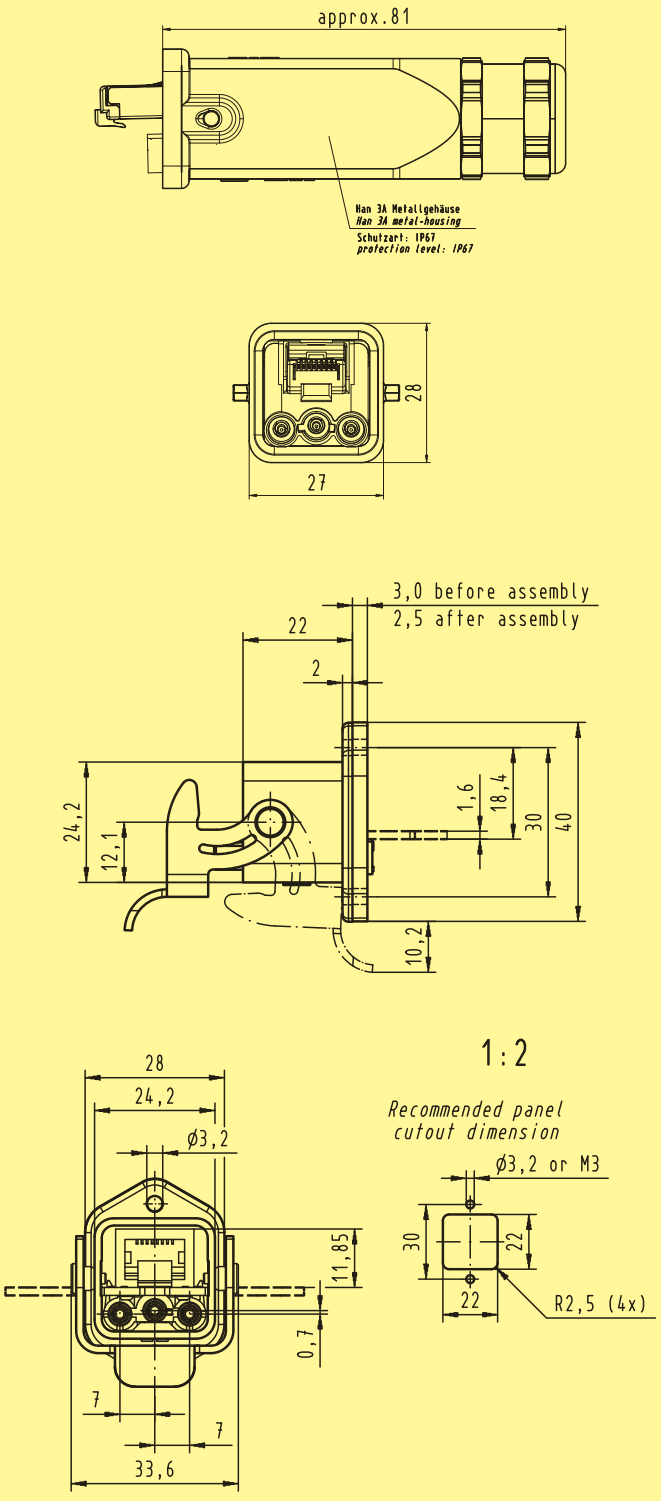
incl. 3 x Han D® female contacts

RJ45 jack without PCB

AC version	09 57 368 0500 000
DC version	09 57 368 0501 000

PCB with 2 RJ45 jacks

AC version	09 57 368 0510 000
DC version	09 57 368 0511 000

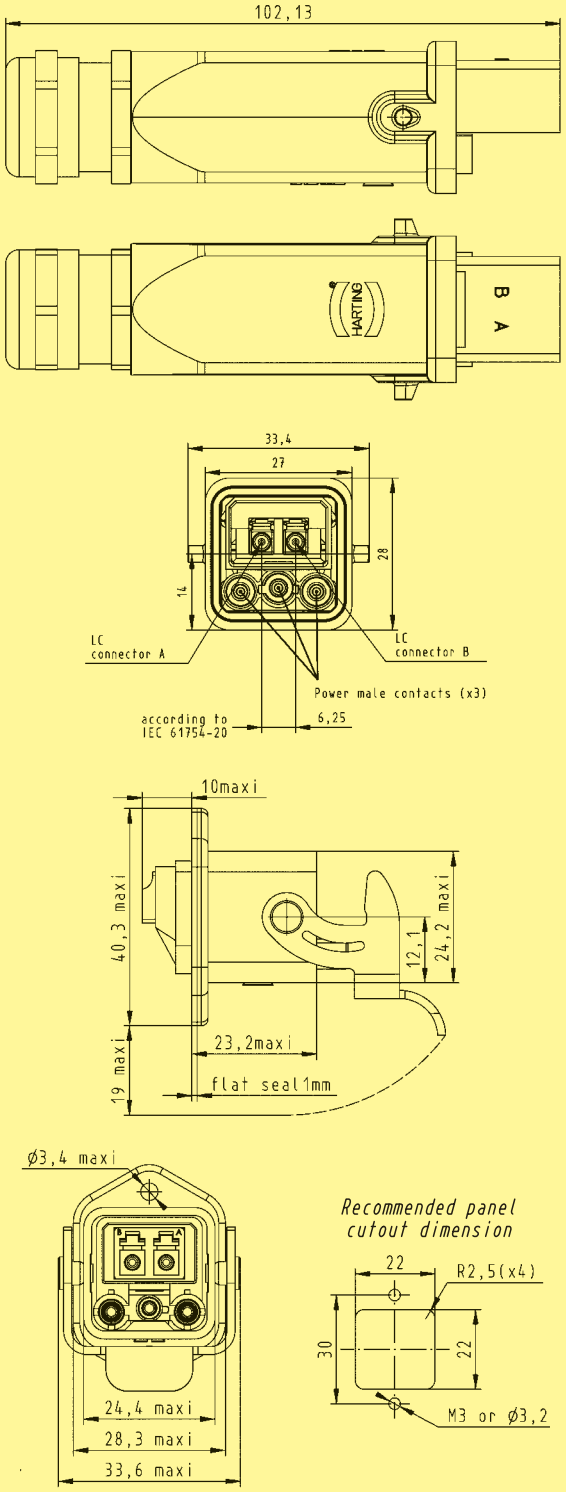


Han® 3 A hybrid LC duplex

Identification	Part No.
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

Drawing

Dimensions in mm

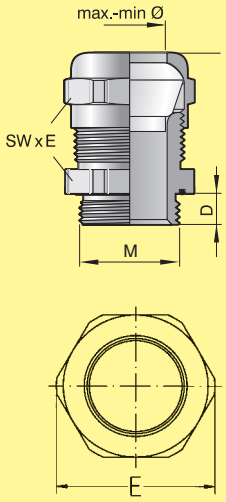


* cable side is delivered with sealing gland

Cable gland for metric cable entries

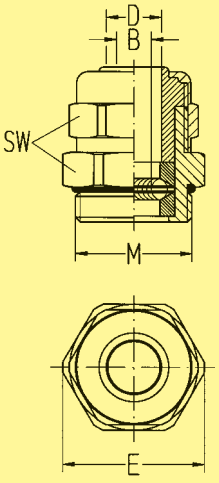
Cable gland for metric cable entries (IP 68)

Identification	Part No.	thread M	cable diameter D	SW	E	Nm
Metal	19 00 000 5050	20	5 - 14 mm	24	26.5	10



EMC clamp for metric cable entries (IP 68)

Part No.	thread M	cable-Ø D min.	cable-Ø D max.	shield-Ø B min.	shield-Ø B max.	SW	E
19 62 000 5080	20	6.5	9.5	3.5	8.5	22	24.4
19 62 000 5081	20	4.0	6.5	2.5	6.5	22	24.4
19 62 000 5082	20	7	10.5	6.5	10.5	22	24.4
19 62 000 5084	20	9	13	6.5	10.5	22	24.4



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

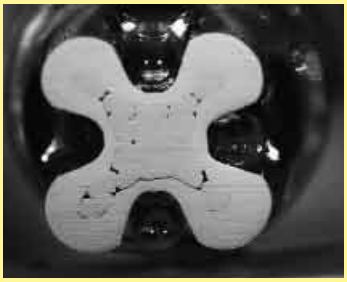
② It prevents the tool being opened before the crimping action is completed

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

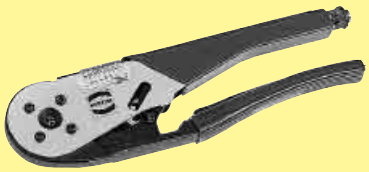
Tensile strength of crimped connections

Conductor cross-section		Tensile strength
mm²	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 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	
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	
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.

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

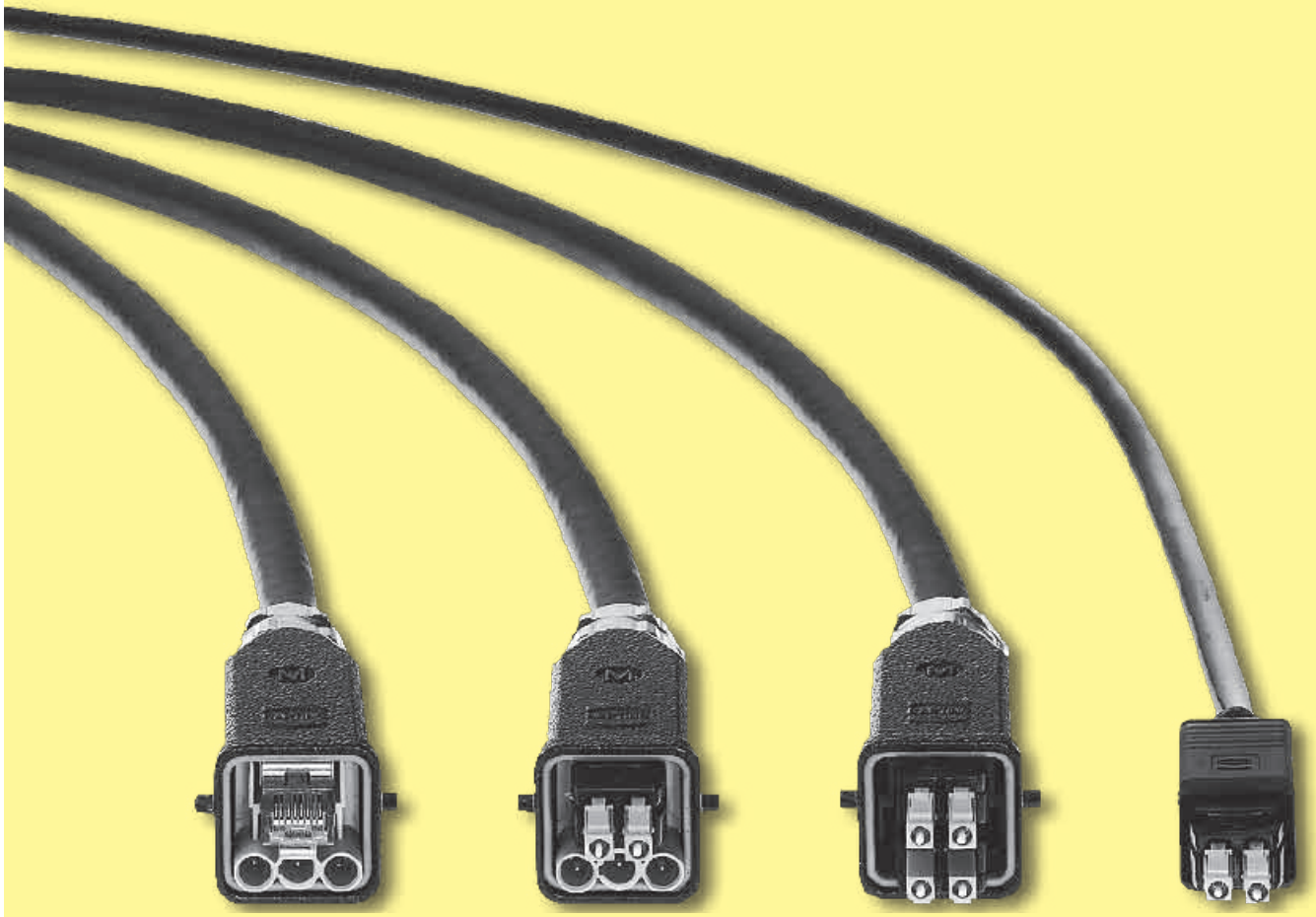
Identification	Wire gauge (mm^2)	Part No.	
Tool kit GI-fibre		20 99 000 3015	 Height : 170 mm Width : 470 mm Depth : 360 mm Tool kit for connector mounting of glass fibres, using adhesive e.g.: GI 50/125 µm.
HARTING crimping tool for F.O. connector (glass fibre) SW 4.3 and 3.8 mm		20 99 000 1031	 For crimping the strain relief to the connector ... 1031 F.O. cable for glass fibre ... 1033 POF[1)] and SERCOS[2)] cable ø 6.0; ø 3.6
HARTING crimping tool for F.O. connector (glass fibre) SW 6.5, 4.95 and 3.0 mm		20 99 000 1033	
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®			
Removal tool		09 99 000 0012	 . . 0012
Replacement-tip for removal tool		09 99 000 0004	. . 0004
Removal tool		09 99 000 0052	 . . 0052
			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.

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.

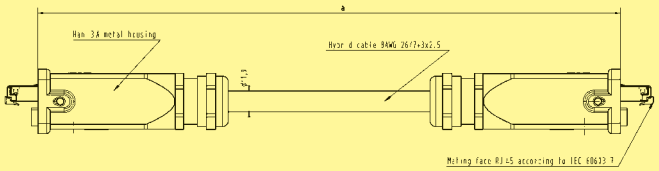
The HARTING product portfolio offers fully assembled 100% tested cable harnesses and removes the need for on-site assembly activity. Customer specific lengths are available on request.

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.

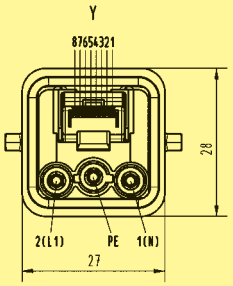


Hybrid cable assembly

Identification	Part No.	Drawing	Dimensions in mm
Hybrid cable **4 x 2 x AWG 26/7 + 3 x 2.5 mm²**			
Length: 1 m			
AC version	33 57 211 001 0001		
DC version	33 57 211 001 0002		
Length: 5 m			
AC version	33 57 211 005 0001		
DC version	33 57 211 005 0002		
Length: 10 m			
AC version	33 57 211 010 0001		
DC version	33 57 211 010 0002		
Length: 20 m			
AC version	33 57 211 020 0001		
DC version	33 57 211 020 0002		



a = length



Protection level: IP 65 / IP 67

Data part: Transmission properties in accordance with ISO/IEC 11 801:2002: Class D

Hybrid outdoor cable			
Length: 10 m	33 57 851 010 0001		PVC jacket 4 x 2 x AWG 26/7 + 3x2.5 mm² Outer diameter: 12 mm Min. bending radius: single: 5 x OD repeated: 10 x OD
Length: 20 m	33 57 851 020 0001		
Length: 500 m	33 57 851 500 0001		

List of part numbers

Catalogue order information

Please send me further information:

☐ **CD-Rom** HARKIS® basic

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Interface Connectors

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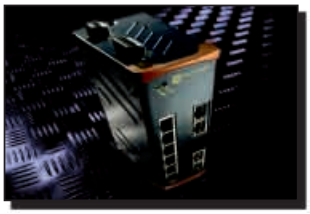
☐ 

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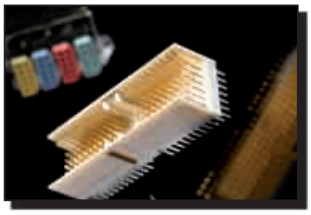
☐ 

Coaxial and Metric Connectors

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Application brochure

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TCA Connectors

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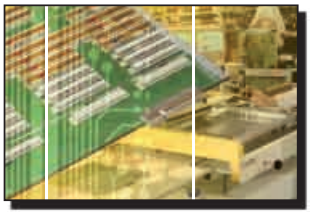
Device Connectivity DeviceCon

☐ 

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