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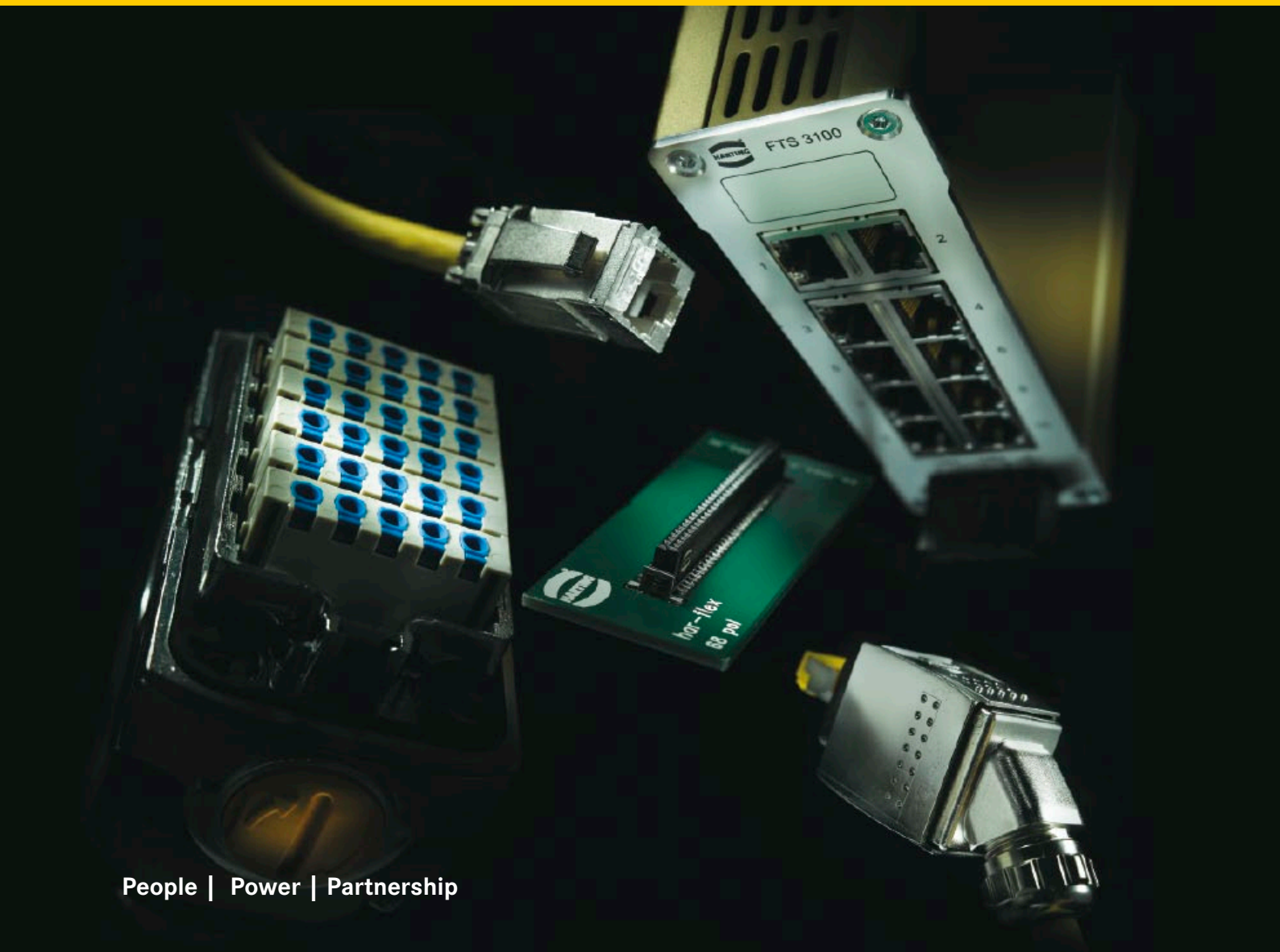
HARTING

Pushing Performance

HARTING News 2011



People | Power | Partnership

Transforming customer wishes into concrete solutions

The HARTING Technology Group is skilled in the fields of electrical, electronic and optical connection, transmission and networking, as well as in manufacturing, mechatronics and software creation. The Group uses these skills to develop customized solutions and products such as connectors for energy and data transmission applications including, for example, mechanical engineering, rail technology, wind energy plants, factory automation and the telecommunications sector. In addition, HARTING also produces electro-magnetic components for the automobile industry and offers solutions in the field of Enclosures and Shop Systems.
The HARTING Group currently comprises 32 subsidiary companies and worldwide distributors employing a total of approximately 3,200 staff.

HARTING Subsidiary company HARTING Representatives

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.

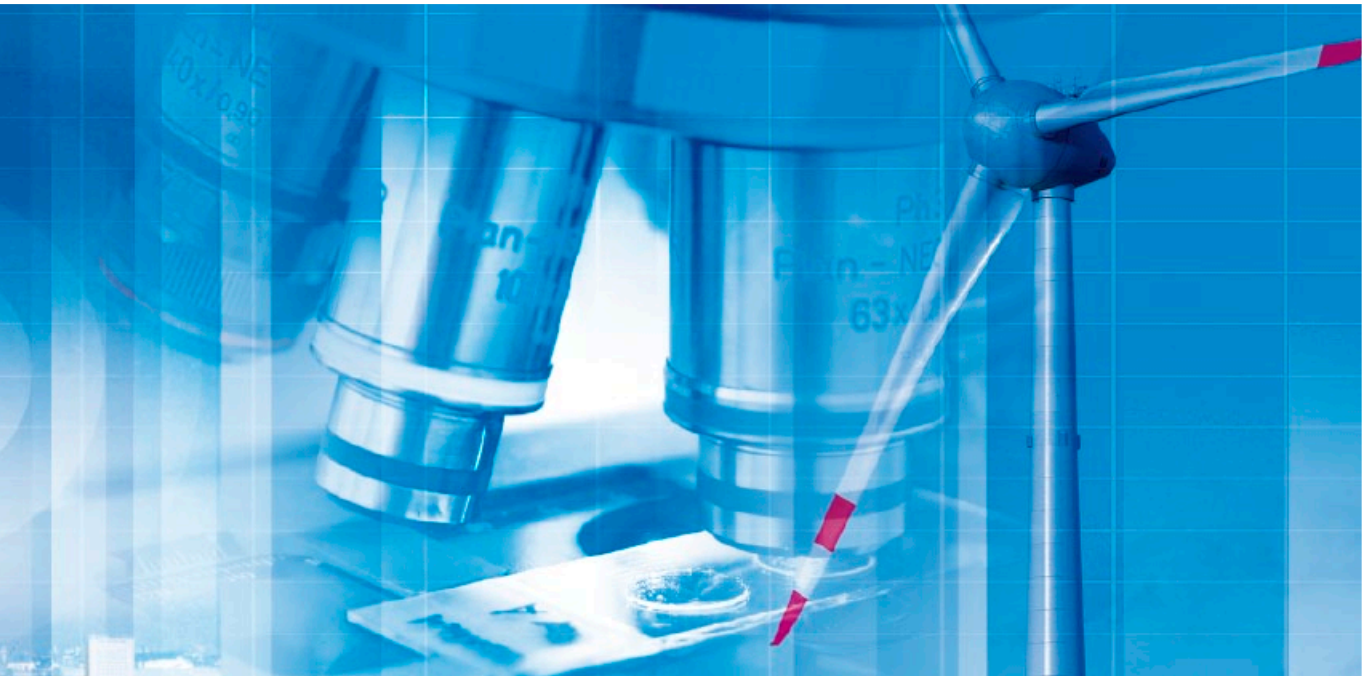
In order to develop connectivity and network solutions serving an exceptionally wide range of connector applications and task scopes in a professional and cost optimized manner, **HARTING** not only commands the full array of conventional tools and basic technologies. Over and beyond these capabilities, **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.

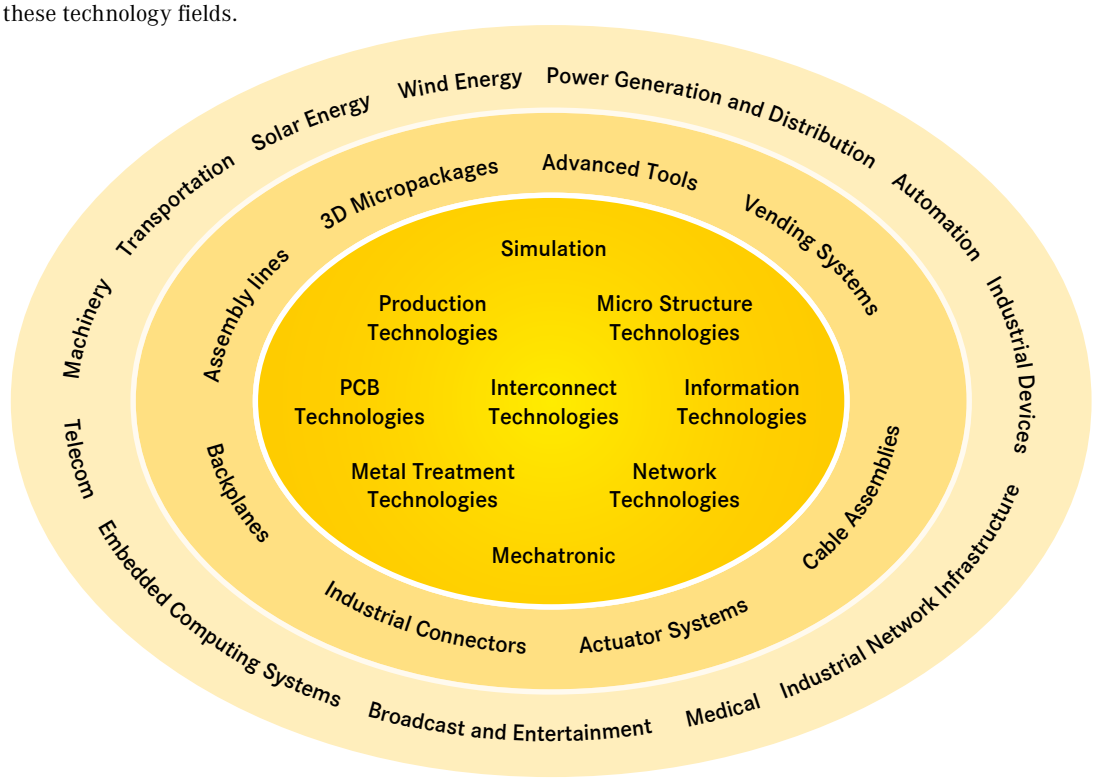
In order to ensure the future proof design of RF- and EMC-compatible interface solutions, the central **HARTING** laboratory (certified to EN 45001) provides simulation tools, as well as experimental, testing and diagnostics facilities all the way through to scanning electron microscopes. In the selection 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.



Contents

Contents

Contents

Contents

Description of the Han-*Yellock*® system

The Han-*Yellock*® - a special Han® connector

Han-*Yellock*® is a new product series which retains the core functionality but differs significantly from current size and shape formats. The approach of this series makes many new functions possible, for example:

- ❑ An internal, latched locking mechanism on the hood
- ❑ Multiplies the potentials in the connector with Han-*Yellock*® modules
- ❑ Usage of Han-Modular® modules with adapter frames
- ❑ Insert can snap into the front or back walls of the housing
- ❑ Protected Earth contact (PE) in crimp or Quick Lock termination

These new technical features encourage sustained and effective improvements:

when purchasing products

- ❑ Less article numbers and less inventory,

when planning for the electrical and mechanical layout

- ❑ Less wiring work within a machine,

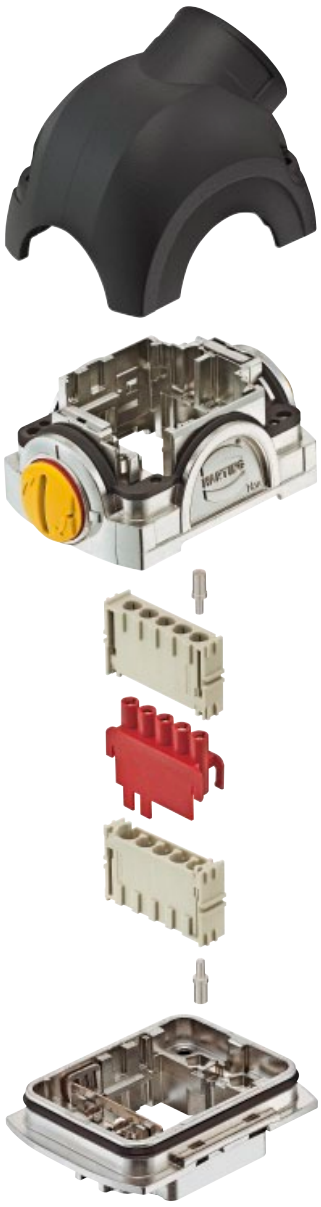
during the work flow

- ❑ Less steps in the work flow and quicker assembly,

and during the after-sales stage

- ❑ Reduced down times because of the latched locking mechanism and maintenance-friendly design

Thus, the Han-*Yellock*® offers improved functionality in the form of increased variability, multiplied potential, simplified handling, reduced incidence of errors and maximized safety.



Assembly details

Design overview

The Han-*Yellock*® interface consists of a housing, bulkhead mounting, on the housing side and a carrier hood with cover on the cable side.
Han-*Yellock*® offers the following features when assembling components:

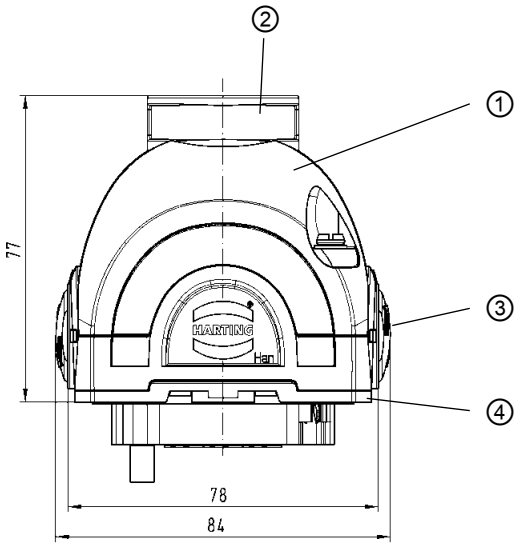
- ❑ Han-*Yellock*® modules require only male crimp contacts.
- ❑ The PE is contacted on the housing; it can be connected with crimp and/or Quick Lock contacts.
- ❑ The Han-*Yellock*® hoods/housing are not plug-compatible with all other Han® hood/housing series.

The Han-*Yellock*® system can be used with a variety of insulators and contact inserts in order to establish an interface.

Features

- Two-part hoods for easy wiring and testing
- High robustness via an internal locking mechanism
- Earthed contacts PE in crimped or Quick Lock termination technique
- Protection cover retrofit on housing side

Description



① Shell with top entry
② cable entry
③ Carrier hood with push button release
④ Housing, bulkhead mounting

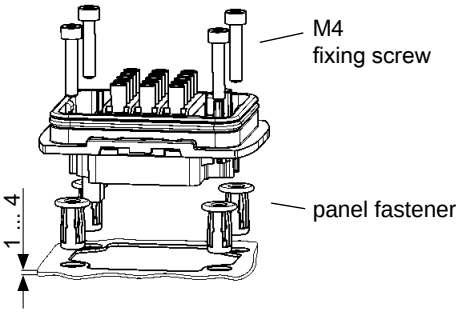
Technical characteristics

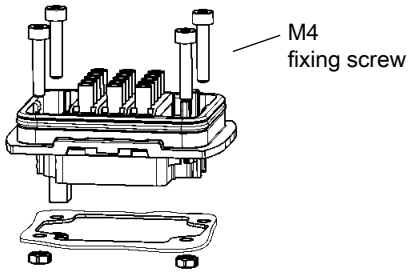
Shell

Material	aluminium
Surface	powder-coated
Locking element	
Limiting temperatures	-40 °C ... +125 °C
Degree of protection acc. to DIN EN 60 529 when locking	IP 67
Tightening tourque	
M4 fixing screw	1.2 Nm

Carrier hoods and Housings, bulkhead mounting

Number of Han-*Yellock*® modules	
Han-*Yellock*® 30	3
Han-*Yellock*® 60	6
Material	Zinc die-cast
Surface	Zinc passivation
Locking element	PA / stainless steel
Hoods/Housings sealing	NBR
Limiting temperatures	-40 °C ... +125 °C
Un-/Locking temperature	-10 °C .... +85 °C
Degree of protection acc. to DIN EN 60 529 when locking	IP 67
Mechanical working life - mating cycles	500
PE wire termination gauge	≤ 4 mm²
Tightening tourque	
- M4 fixing screw	≥ 1 Nm
- panel fastener	2.3 Nm



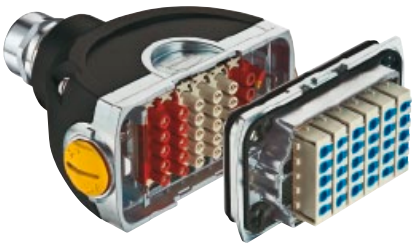


Protection covers

Material	PA
Hoods/Housings sealing	NBR
Degree of protection acc. to DIN EN 60 529 when locking	IP 67
Flammability acc. to UL 94	V0

Please find the whole product portfolio of the Han-*Yellock*® series in the catalogue „HARTING Han-*Yellock*®“

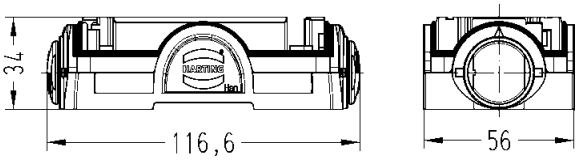
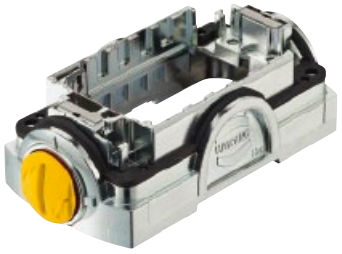
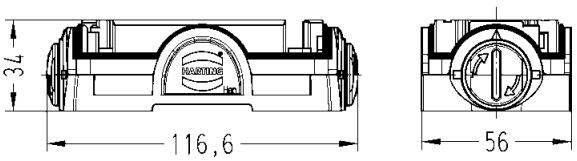
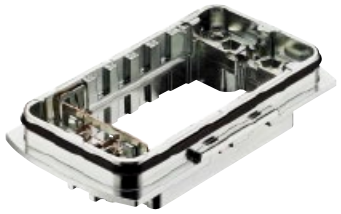
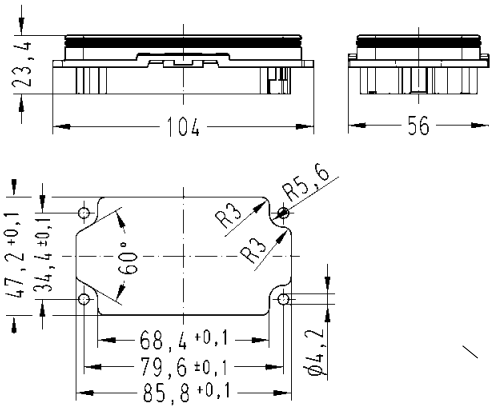
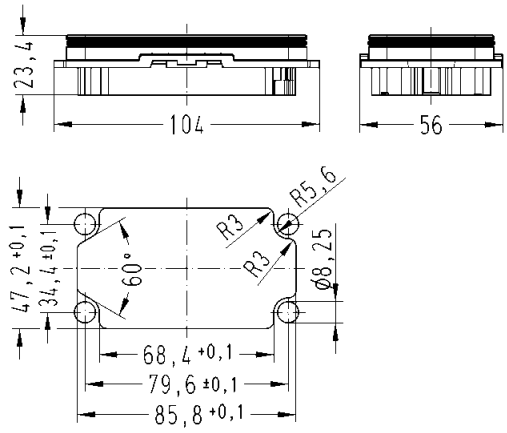
Han-*Yellock*® Hoods/Housings



Identification	Part number	Cable entry	Drawing	Dimensions in mm
Shell side entry Han-*Yellock*® 60	11 12 600 1501 11 12 600 1502 11 12 600 1503	M25 M32 M40		
Shell top entry Han-*Yellock*® 60	11 12 600 1401 11 12 600 1402 11 12 600 1403	M25 M32 M40		

Please find the whole product portfolio of the Han-*Yellock*® series in the catalogue „HARTING Han-*Yellock*®“

Han-*Yellock*® Hoods/Housings

Identification	Part number	Cable entry	Drawing	Dimensions in mm
Carrier hood side entry Han-*Yellock*® 60 	11 12 600 0100	-		
Carrier hood top entry Han-*Yellock*® 60 	11 12 600 0110	-		
Housing, bulkhead mounting Han-*Yellock*® 60 	11 12 600 0301	-		
Housing, bulkhead mounting Han-*Yellock*® 60   Set consists of Han-*Yellock*® 60 housing, bulkhead mounting and panel fastener	11 12 600 0302	-		

Please find the whole product portfolio of the Han-*Yellock*® series in the catalogue „HARTING Han-*Yellock*®“

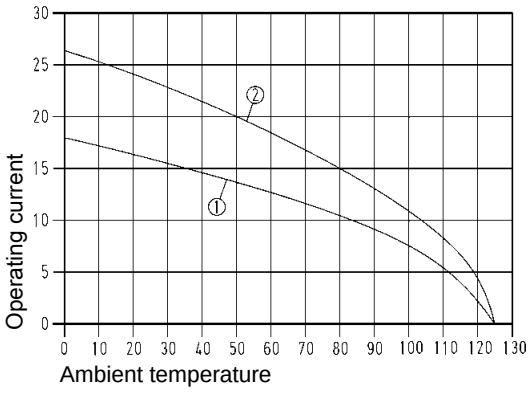
Features

- Snap-in assembly from mating side and from termination side
- Bus bar within bridge attachements
- Finger safe design
- Fast and tool-less assembly
- Compatible with Han-*Yellock*® modules with crimp termination

Current carrying capacity

The current carrying capacity of the connectors is limited by the thermal load capability of the contact element material including the connections and the insulating parts. The derating curve is therefore valid for currents which flow constantly (non-intermittent) through each contact element of the connector evenly, without exceeding the allowed maximum temperature.

Measuring and testing techniques according to DIN EN 60 512-5



① Wire gauge: 1.5 mm²
② Wire gauge: 2.5 mm²
③ Wire gauge: 4.0 mm²
for connector with 3 Han-*Yellock*® modules, fully loaded (multiplier 1:1)

Technical Characteristics

Specifications	DIN EN 60 664-1 DIN EN 61 984

Quick Lock-Modules

Electrical data	
acc. to DIN EN 61 984	**20 A 500 V 6 kV 3**
Rated current	20 A
Rated voltage	500 V
Rated impulse voltage	6 kV
Pollution degree	3
Pollution degree 2 also	20 A 690 V 8 kV 2
Insulation resistance	≥ 10^{10} Ω
Material	Polycarbonate
Limiting temperatures	-40 °C ... +125 °C
Flammability acc. to UL 94	V0
Mechanical working life	
- mating cycles	≥ 500

Contacts

Material	copper alloy
Surface	
- hard-silver plated	3 µm Ag
Contacd resistance	≤ 2 mΩ
Quick Lock terminal	
- wire gauge	0.5 ... 2,5 mm²
- AWG	20 ... 14
- Stripping length	10 mm

Contacts

Material	copper alloy
Surface	
- hard-silver plated	3 µm Ag
Contact resistance	≤ 2 mΩ
Crimp terminal	
- wire gauge	6 + 10 mm²
- AWG	10 + 8
- Stripping length	7.5 mm

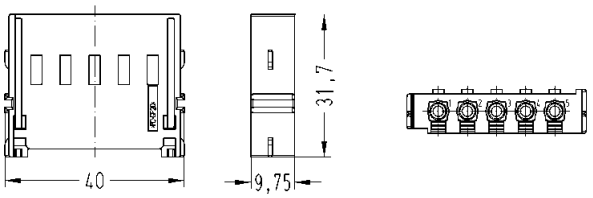
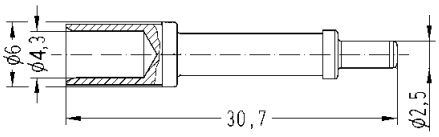
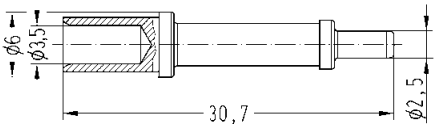
Suitable Crimp tool	09 99 000 0377

Han-*Yellock*® Quick Lock Module

Number of contacts

5

Available by June 2011

Identification	Part-Number	Drawing	Dimensions in mm
Han-*Yellock*® module with Quick Lock termination 	11 05 105 2633		
Male PE contacts  wire gauge Ø 10 mm²	11 00 000 9510		
Ø 6 mm²	11 00 000 9509		

Available by May 2011

Please find the whole product portfolio of the Han-*Yellock*® series in the catalogue „HARTING Han-*Yellock*®“

Features

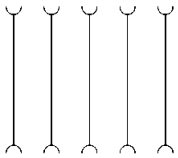
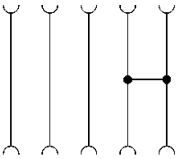
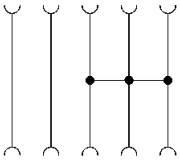
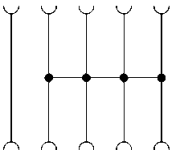
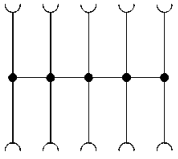
- Visible bridge position from mating side and from termination side
- Multiplier can be placed on the housing side or on the cable side
- Bus bar functionality for 1 up to 5 contacts
- Fast and easy exchange

Technical Characteristics

Specifications	DIN EN 60 664-1 DIN EN 61 984

Multiplier

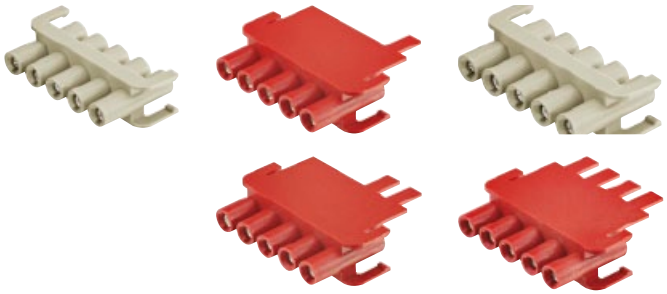
Number of contacts	5
Material	Polycarbonate
Flammability acc. to UL 94	V0
Mechanical working life - mating cycles	≥ 500

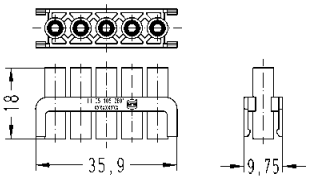
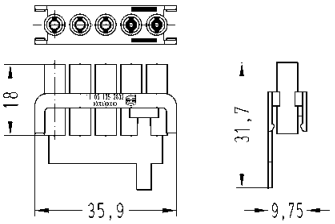
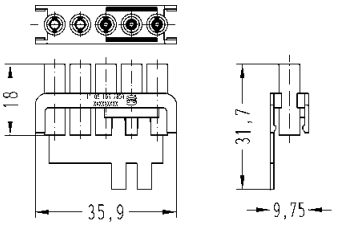
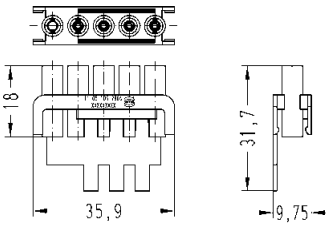
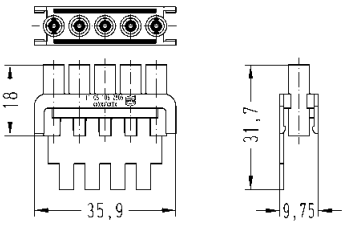
	Bus bar contacts	Single contacts	Circuit diagram
multiplier 1:1	0	5	
multiplier 2:3	2	3	
multiplier 3:2	3	2	
multiplier 4:1	4	1	
multiplier 5:0	5	0	

Han-*Yellock*® Modules

Number of contacts

5



Identification	Part number	Drawing	Dimensions in mm
Han-*Yellock*® multiplier			
multiplier 1:1 	11 05 105 2801		
multiplier 2:3 	11 05 105 2802		
multiplier 3:2 	11 05 105 2803		
multiplier 4:1 	11 05 105 2804		
multiplier 5:0 	11 05 105 2805		

Please find the whole product portfolio of the Han-*Yellock*® series in the catalogue „HARTING Han-*Yellock*®“

Han-*Yellock*® Adapter frames

Features

- Snap-in assembly from mating side and from termination side
- Flexible design of interfaces with the aid of Han-Modular®
- Fast and tool-less assembly

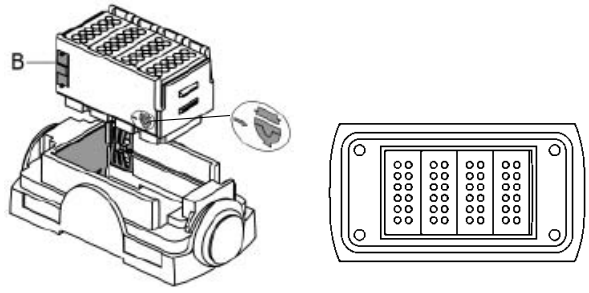
Technical Characteristics

Specifications	DIN EN 60 664-1 DIN EN 61 984
Number of modules	4
Material	Polycarbonate
Flammability acc. to UL 94	V0

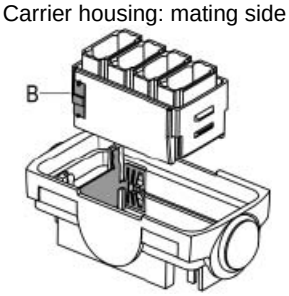
Mounting

- The adapter frame can be snapped into the housing, bulkhead mounting, on the connection side and the plug-in side (refer to the illustration).
- The lateral plastic tabs („B“) are pressed into the metal clamps on the housing.
- The adapter frame then snaps in with a distinctly audible click.

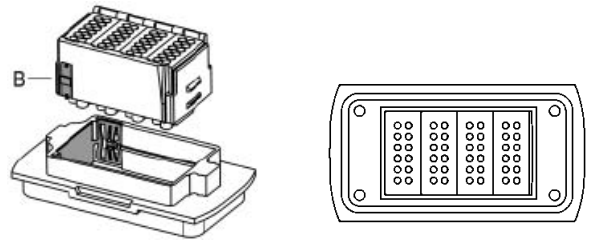
Carrier housing: termination side



Carrier housing: mating side



Bulkhead mounted housing: termination side

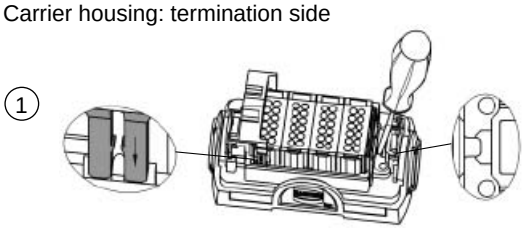


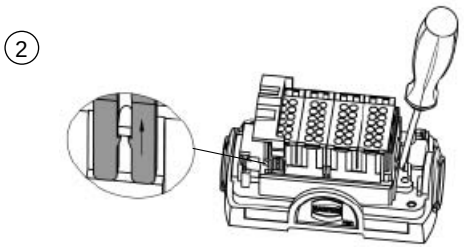
Bulkhead mounted housing: mating side

Removal

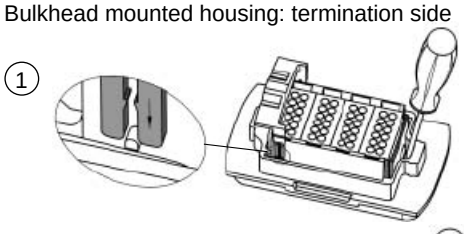
- The removal tool part no. 11 99 000 0001 is required for removal.
- The removal tool is inserted into the metal clamp and pressed down as shown in the following illustration. A screw-driver can also be placed into the notch in the housing.
- The removal tool should then be pulled outwards to remove the adapter frame from the housing.
- The removal can be made from the connection side as well as from the plug-in side.
- The process is identical for both housings, bulkhead mounting, and carrier hoods.

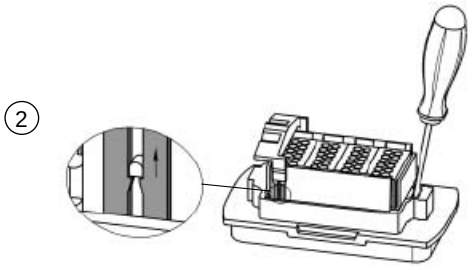
Carrier housing: termination side





Bulkhead mounted housing: termination side





Han-*Yellock*® Adapter frames

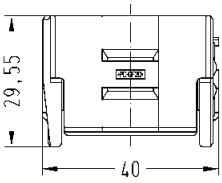
Available by May 2011

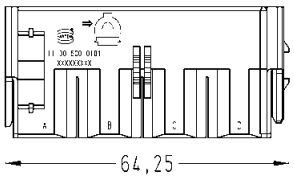
Identification	Part-Number	Drawing	Dimensions in mm

Han-*Yellock*® 60 adapter frames

for carrier hoods

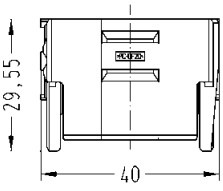
11 00 600 0101

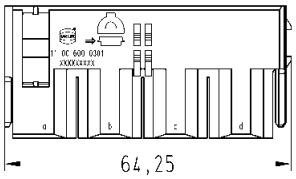




for bulkhead mounted housings

11 00 600 0301





Please find the whole product portfolio of the Han-*Yellock*® series in the catalogue „HARTING Han-*Yellock*®“

Features

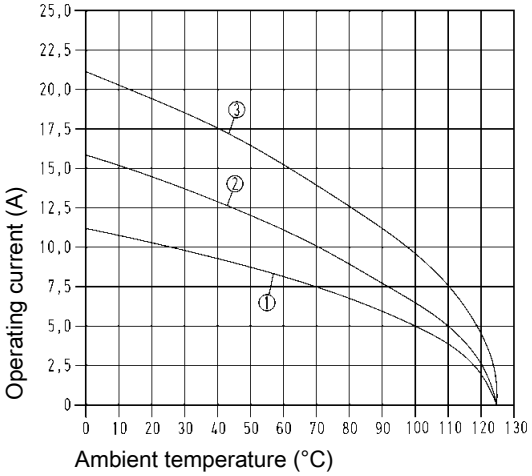
- Snap-in assembly from mating side and from termination side
- Wiring with male and female contacts
- Finger safe design
- Fast and tool-less assembly

Current carrying capacity

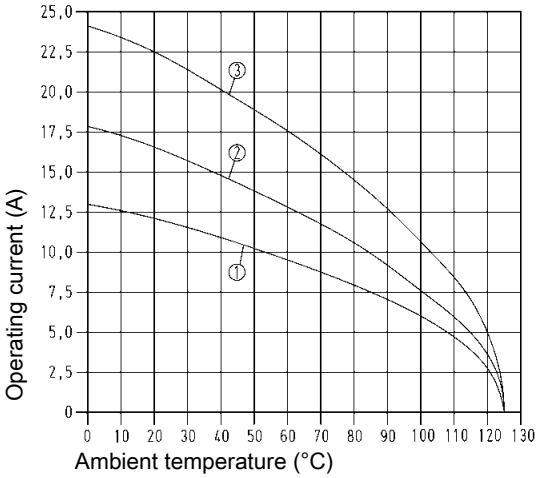
The current carrying capacity of the connectors is limited by the thermal load capability of the contact element material including the connections and the insulating parts. The derating curve is therefore valid for currents which flow constantly (non-intermittent) through each contact element of the connector evenly, without exceeding the allowed maximum temperature.

Measuring and testing techniques according to DIN EN 60 512-5

For monoblock 60



For monoblock 30



For Monoblock 30 + 60
① Wire gauge: 1.5 mm²
② Wire gauge: 2.5 mm²
③ Wire gauge: 4.0 mm²

Technical Characteristics

Specifications	DIN EN 60 664-1 DIN EN 61 984

Monoblocks

Electrical data	
acc. to DIN EN 61 984	**16 A 500 V 6 kV 3**
Rated current	16 A
Rated voltage	500 V
Rated impulse voltage	6 kV
Pollution degree	3
Pollution degree 2 also	16 A 690 V 8 kV 2
Insulation resistance	≥ 10^{10} Ω
Material	Polycarbonate
Limiting temperatures	-40 °C ... +125 °C
Flammability acc. to UL 94	V0
Mechanical working life	
- mating cycles	≥ 500

Contacts

Material	copper alloy
Surface	
- hard-silver plated	3 µm Ag
Contact resistance	≤ 2 mΩ
Crimp terminal	
- wire gauge	0.14 ... 4 mm²
- AWG	26 ... 12
- Stripping length	6.5 mm

Han-*Yellock*® Monoblocks

Identification	Part number Male insert (m)	Female insert (f)	Drawing	Dimensions in mm
Han-*Yellock*® Monoblock 30 order crimp contacts separately suitable for hoods/housings size 30	11 05 325 3001	11 05 325 3101	View termination side	
ATTENTION: It is not possible to use 2 monoblocks 30 in the Han-*Yellock*® 60 series!			**Available by May 2011**	
Han-*Yellock*® Monoblock 60 order crimp contacts separately suitable for hoods/housings size 60	11 05 648 3001	11 05 648 3101	View termination side	
			Available by June 2011	

Identification	Wire gauge mm²	Part-Number Male contact (m)	Female contact (f)	Drawing	Dimensions in mm
Han-*Yellock*® Crimp contacts TC20 silver plated	0.14-0.37	11 05 000 6101	11 05 000 6201		
	0.5	11 05 000 6102	11 05 000 6202		
	0.75	11 05 000 6103	11 05 000 6203		
	1.0	11 05 000 6104	11 05 000 6204		
	1.5	11 05 000 6105	11 05 000 6205		
	2.5	11 05 000 6106	11 05 000 6206		
	3.0	11 05 000 6107	11 05 000 6207		
	4.0	11 05 000 6108	11 05 000 6208		

Wire gauge		Stripping length
0.14-0.37 mm²	AWG 26-22	6.5 mm
0.5 mm²	AWG 20	6.5 mm
0.75 mm²	AWG 18	6.5 mm
1.0 mm²	AWG 18	6.5 mm
1.5 mm²	AWG 16	6.5 mm
2.5 mm²	AWG 14	6.5 mm
3.0 mm²	AWG 12	6.5 mm
4.0 mm²	AWG 12	6.5 mm

Please find the whole product portfolio of the Han-*Yellock*® series in the catalogue „HARTING Han-*Yellock*®“

Han® RJ45 female module cat. 6

Features

- Single module with completely shielded RJ45 metal block
- Cat 6 for all data pairs (all 8 pins)
- Conforming to the RoHS directive
- The RJ45 inserts are protected by a reliable plastic insulator
- Patch cables are assembled/removed without tools

Technical characteristics

Specifications	DIN EN 60 664-1 DIN EN 61 984

Inserts

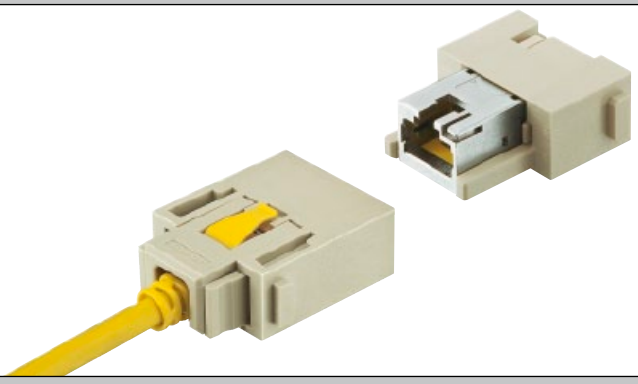
Number of contacts	8
Electrical data	
acc. to EN 61 984	**1 A 50 V 0.8 kV 3**
Rated current	1 A
Rated voltage	50 V
Rated impulse voltage	0.8 kV
Pollution degree	3
Transmission features	Category 6 / Class E up to 250 MHz; acc. to ISO/IEC 24 702 or ISO/IEC 11 801
Transmission rate	10/100/1000 Mbit/s
Insulation resistance	≥ 10^{10} Ω
Material	polycarbonate
Limiting temperatures	-40 °C ... +85 °C
Flammability acc. to UL 94	V 0
Mechanical working life	
- mating cycles	≥ 500

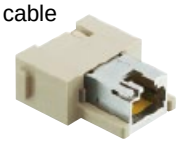
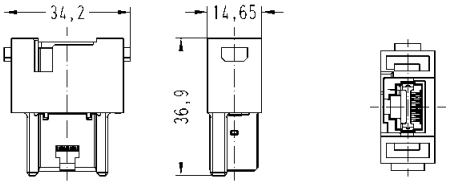
Han® RJ45 female module cat. 6

Number of contacts

8

Available by July 2011



Identification	Part number Male insert (M)	Part number Female insert (F)	Drawing	Dimensions in mm
Female module (Gender Changer) for patch cable 		09 14 001 4721		

Features

- Locking lever protection for RJ45 connector latch
- Very short plug design in combination with robust bend protection
- RoHS compliant
- Fully EMC screened (aluminium-clad foil and braid)

Technical characteristics

Specifications	ISO/IEC 24 702 ISO/IEC 11 801 ISO/IEC 61 935-2

Cat. 5 e RJ45 patch cable

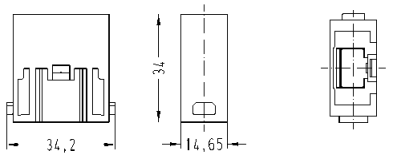
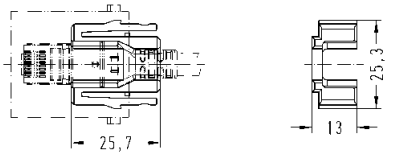
Transmission features	Category 5 / Class D up to 100 MHz; acc. to ISO/IEC 24 702 or ISO/IEC 11 801
Transmission rate	10/100/1000 Mbit/s
Cable type	1:1 EIA/TIA 568 B, 8 poles
Material cables	SF/UTP, PUR, yellow
Limiting temperatures	
- mobile	0 °C ... +60 °C
- stationary	-40 °C ... +80 °C
Flammability	flame retardant, halogen-free
Degree of protection	IP 20

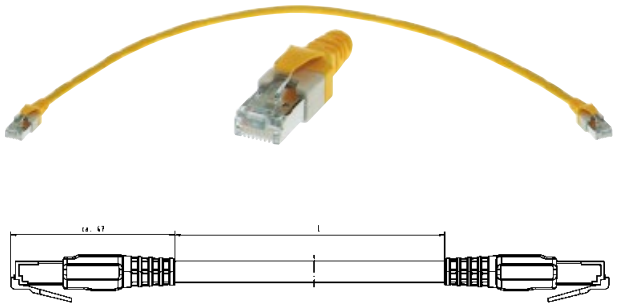
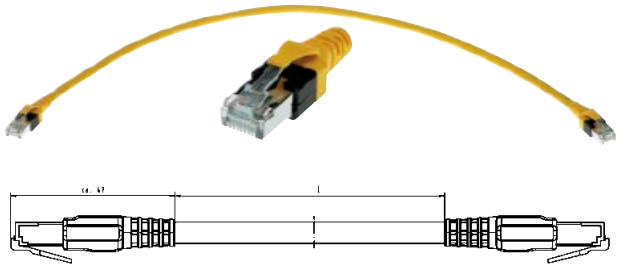
Cat. 6 RJ45 patch cable

Transmission features	Category 6 / Class E up to 250 MHz; acc. to ISO/IEC 24 702 or ISO/IEC 11 801
Transmission rate	10/100/1000 Mbit/s
Cable type	1:1 EIA/TIA 568 B, 8 poles
Material cables	SF/UTP, PUR, yellow
Limiting temperatures	
- mobile	0 °C ... +60 °C
- stationary	-20 °C ... +80 °C
Flammability	flame retardant, halogen-free
Degree of protection	IP 20

Number of contacts

8

Identification		Part number	Drawing	Dimensions in mm
Male module for patch cable		09 14 001 4623		
Adapter for HARTING patch cable		09 14 000 9966		

Identification		Part number	Drawing	Dimensions in mm
Cat. 5e RJ45 patch cable Length	0,2 m	09 47 474 7001		
	0,3 m	09 47 474 7002		
	0,4 m	09 47 474 7003		
	0,5 m	09 47 474 7004		
	0,6 m	09 47 474 7005		
	0,7 m	09 47 474 7006		
	0,8 m	09 47 474 7007		
	0,9 m	09 47 474 7008		
	1,0 m	09 47 474 7009		
	1,5 m	09 47 474 7010		
	2,0 m	09 47 474 7011		
	2,5 m	09 47 474 7012		
	3,0 m	09 47 474 7013		
	4,0 m	09 47 474 7014		
	5,0 m	09 47 474 7015		
	6,0 m	09 47 474 7016		
	7,0 m	09 47 474 7017		
	7,5 m	09 47 474 7018		
	8,0 m	09 47 474 7019		
	9,0 m	09 47 474 7020		
	10 m	09 47 474 7021		
	15 m	09 47 474 7022		
	20 m	09 47 474 7023		
Cat. 6 RJ45 patch cable Length	0,2 m	09 47 474 7101		
	0,3 m	09 47 474 7102		
	0,4 m	09 47 474 7103		
	0,5 m	09 47 474 7104		
	0,6 m	09 47 474 7105		
	0,7 m	09 47 474 7106		
	0,8 m	09 47 474 7107		
	0,9 m	09 47 474 7108		
	1,0 m	09 47 474 7109		
	1,5 m	09 47 474 7110		
	2,0 m	09 47 474 7111		
	2,5 m	09 47 474 7112		
	3,0 m	09 47 474 7113		
	4,0 m	09 47 474 7114		
	5,0 m	09 47 474 7115		
	6,0 m	09 47 474 7116		
	7,0 m	09 47 474 7117		
	7,5 m	09 47 474 7118		
	8,0 m	09 47 474 7119		
	9,0 m	09 47 474 7120		
	10 m	09 47 474 7121		
	15 m	09 47 474 7122		
	20 m	09 47 474 7123		

Features

Han-Modular® RJ Industrial RJ45 connector set

- Conforming to the RoHS directive
- 360° shielded contact
- Field assembly without tools possible by means of HARAX® rapid termination in IDC technology
- Suitable for termination of massive and flexible wires

Han-Modular® RJ Industrial Gigalink RJ45 connector set

- Conforming to the RoHS directive
- 360° shielded contact
- Field assembly by means of piercing contacts
- Suitable for termination of flexible wires

Technical characteristics

Specifications	IEC 60 603-7 DIN EN 60 664-1 DIN EN 61 984

HARTING RJ Industrial®, 4 pins

Number of contacts	4
Transmission features	Category 5 / Class D up to 100 MHz; acc. to ISO/IEC 11 801:2002 and EN 50 173-1
Transmission rate	10/100 Mbit/s
Wire termination	IDC contacts; without tools
Terminated cable	
- Conductor cross section	
flexible	AWG 24/7 ... AWG 22/7
solid	AWG 23/1 ... AWG 22/1
- Cable outside diameter	≤ 1.6 mm
Material insert	polyamide
Limiting temperatures	-40 °C ... +70 °C

HARTING RJ Industrial® Gigalink, 8 pins

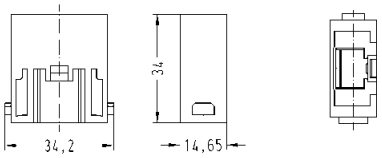
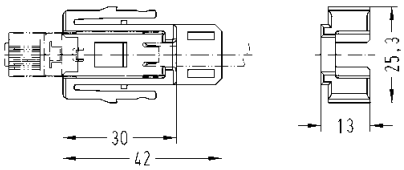
Number of contacts	8
Transmission features	Category 6 / Class E up to 250 MHz; acc. to ISO/IEC 11 801:2002 and EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Wire termination	Piercing contacts
Terminated cable	
- Conductor cross section	
flexible	AWG 28/7 ... AWG 24/7
- Cable outside diameter	≤ 1.05 mm
Material insert	polyamide
Limiting temperatures	-40 °C ... +70 °C

HARTING RJ Industrial® 10G, 8 pins

Number of contacts	8
Transmission features	Category 6 / Class E up to 250 MHz; acc. to ISO/IEC 11 801:2002 and EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Wire termination	IDC contacts; without tools
Terminated cable	
- Conductor cross section	
flexible	AWG 27/7 ... AWG 22/7
solid	AWG 27/1 ... AWG 22/1
- Cable outside diameter	≤ 1.5 mm
Material insert	polyamide
Limiting temperatures	-40 °C ... +70 °C

Number of contacts

4 / 8

Identification	Part number Male insert (M)	Drawing	Dimensions in mm
Male Module for RJ Industrial 	09 14 001 4623	View termination side 	
Han-Modular® RJ Industrial RJ45 connector set Cat. 5 4 pins for AWG 24 ... 22  4 pins for AWG 26	09 45 400 1100 09 45 400 1109		
Cat. 6 Gigalink, 8 pins, white  Gigalink, 8 pins, blue	09 45 400 1500 09 45 400 1510		
Cat. 6 10G, 8 pins, 	09 45 400 1560	Set consists of the relevant RJ45 insert and the suitable adapter for Han® RJ45 module, male.	
HARTING RJ Industrial® Gigalink Assembly tool	09 45 800 0500		

Han® HV module

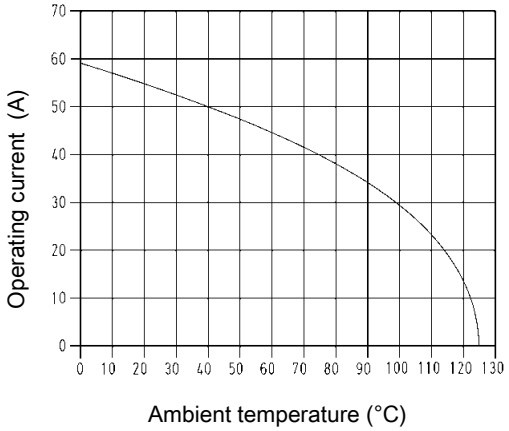
Features

- Suitable for Han® C crimp contacts
- 2 contacts up to 5000 V
- Insulator out of a voltage resistant teflon material
- Combination of all other modules (pneumatic, signal etc.)

Current carrying capacity

The current carrying capacity of the connectors is limited by the thermal load capability of the contact element material including the connections and the insulating parts. The derating curve is therefore valid for currents which flow constantly (non-intermittent) through each contact element of the connector evenly, without exceeding the allowed maximum temperature.

Measuring and testing techniques according to DIN EN 60 512-5



24 B hoods/housings with 3 modules; wire gauge: 6 mm²

Technical characteristics

Specifications	DIN EN 61 984 DIN VDE 0115 DIN EN 60 664-1

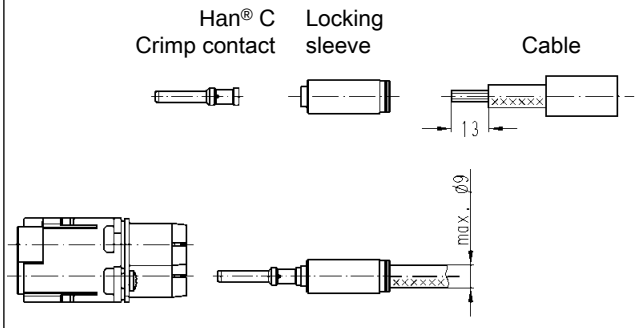
Inserts

Number of contacts	2
Electrical data	
acc. to EN 61 984	**40 A 2900/5000 V 15 kV 3**
Rated current	40 A
Rated voltage conductor - ground	2900 V
Rated voltage conductor - conductor	5000 V
Rated impulse voltage	15 kV
Pollution degree	3
Insulation resistance	≥ 10^{10} Ω
Material	polycarbonate/Teflon (PTFE)
Limiting temperatures	-40 °C ... +125 °C
Flammability acc. to UL 94	V 0
Max. cable diameter	9 mm
Mechanical working life	
- mating cycles	≥ 500

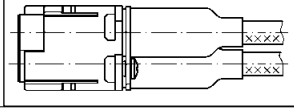
Contacts

Material	copper alloy
Surface	
- hard-silver plated	3 µm Ag
Contact resistance	≤ 0.3 mΩ
Crimp terminal	
- mm²	1.5 ... 10 mm²
- AWG	16 ... 8

Assembly instructions



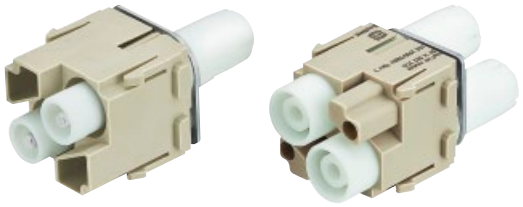
Crimp with tool 0999 000 0001, 0999 000 0110 or 0999 000 0377
Snap crimped cable in the insert



shrink the heat shrink tube over the rear of contact

Number of contacts

2



Identification	Part number Male insert (M)	Part number Female insert (F)	Drawing	Dimensions in mm
Crimp terminal Order crimp contacts separately			M	
Range of delivery: - 1 module - 2 locking sleeves - 2 heat shrink tubes	09 14 002 3023	09 14 002 3123	F	
Removal tool for locking sleeve	09 99 000 0327	09 99 000 0327		

Identification	Wire gauge (mm²)	Part number Male contact	Part number Female contact	Drawing	Dimensions in mm
Crimp contacts Power contacts					
silver plated	1.5	09 32 000 6104	09 32 000 6204		
	2.5	09 32 000 6105	09 32 000 6205		
	4	09 32 000 6107	09 32 000 6207		
	6	09 32 000 6108	09 32 000 6208		
	10	09 32 000 6109	09 32 000 6209		

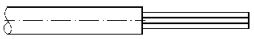
Wire gauge			∅	Stripping length
1.5	mm²	AWG 16	1.75	13 mm
2.5	mm²	AWG 14	2.25	13 mm
4	mm²	AWG 12	2.85	13 mm
6	mm²	AWG 10	3.5	13 mm
10	mm²	AWG 8	4.3	13 mm

Han® 70 A Crimp Module

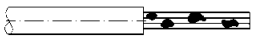
Features

- Crimp termination
- Compatible with Han® 70 A module with axial screw termination

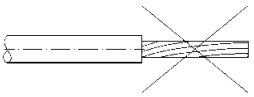
Assembly Details



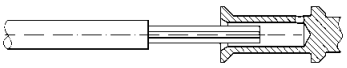
Cut the cable square and strip the insulation



The copper strands must be cleaned from dirt and oxide film



Copper strands must not be twisted



Insert the cable strand completely into the crimp ferrule.
Check insertion via inspection hole

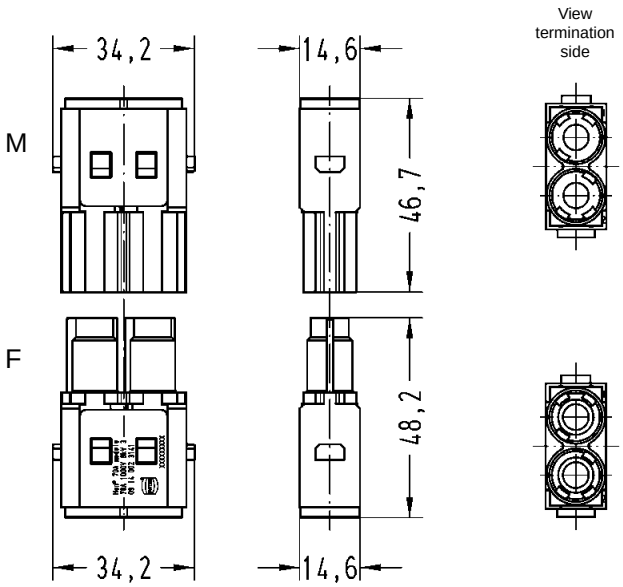
Technical characteristics

Specifications	DIN EN 60 664-1 DIN EN 61 984
Inserts	
Number of contacts	2
Electrical data acc. to DIN EN 61 984	**70 A 1000 V 8 kV 3**
Rated current	70 A
Rated voltage	1000 V
Rated impulse voltage	8 kV
Pollution degree	3
Insulation resistance	≥ 10^{10} Ω
Material	Polycarbonate
Limiting temperatures	-40 °C ... +125 °C
Flammability acc. to UL 94	V 0
Mechanical working life	≥ 500 mating cycles
Contacts	
Power contacts	
Material	Copper alloy
Surface	
- hard-silver plated	3 µm Ag
Contact resistance	≤ 0.5 mΩ
Crimp terminal	
- wire gauge	10 - 25 mm²
Max. insulation diameter	11 mm
Stripping length	15.5 mm

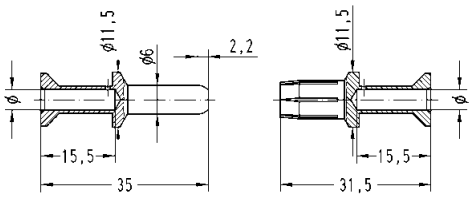
Number of contacts

2


Identification	Part-Number Male insert (M)	Part-Number Female insert (F)	Drawings	Dimensions in mm
Han® 70 A module Crimp terminal	09 14 002 3041	09 14 002 3141		

Identification	Wire gauge mm²	Part-Number Male contacts (M)	Part-Number Female contacts (F)	Drawings	Dimensions in mm
Crimp contacts* Silver plated	10	09 11 000 6131	09 11 000 6231		
	16	09 11 000 6132	09 11 000 6232		
	25	09 11 000 6133	09 11 000 6233		



Wire gauge	Ø	Stripping length
10 mm²	4.3	15.5 mm
16 mm²	5.5	15.5 mm
25 mm²	7.0	15.5 mm
for stranded wires acc. to IEC 60 228 class 5		

* Crimp zone acc. to DIN EN 46 235

For further information see chapter 99 (Tools) in the main catalogue „Industrial Connectors Han®“

Features

- Crimp or axial screw termination available
- Unlock of contacts with a screw driver from mating side
- Connect PE contact with special cable shoe (see chapter 40 in the main catalogue „Industrial Connectors Han®)
- Separate axial screw contacts can be terminated without any special tools directly to the wire.

Technical characteristics

Specifications	DIN EN 60 664-1 DIN EN 61 984

Inserts

Number of contacts	1
Electrical data	
acc. to EN 61 984	**100 A 1000 V 8 kV 3**
Rated current	100 A
Rated voltage	1000 V
Rated impulse voltage	8 kV
Pollution degree	3
Insulation resistance	≥ 10^{10} Ω
Material	polycarbonate
Limiting temperatures	-40 °C ... +125 °C
Flammability acc. to UL 94	V 0
Mechanical working life	
- mating cycles	≥ 500
Max. insulation diameter	13 mm

Crimp Contacts

Material	copper alloy
Surface	
- hard-silver plated	3 µm Ag
Contact resistance	≤ 0.3 mΩ
Crimp terminal	
- wire gauge[1)]	10 ... 35 mm²

Axial Screw Contacts

Material	copper alloy
Surface	
- hard-silver plated	3 µm Ag
Contact resistance	≤ 0.3 mΩ
Screw terminal	
- wire gauge[1)]	10 ... 35 mm²
- AWG	6 ... 2
- hexagonal driver	SW 4
- tightening torque	

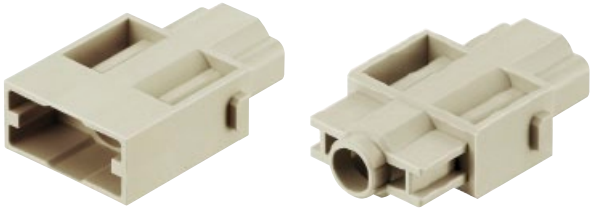
mm²	10	16	25	35
Nm	6	6	7	8

1) geometric wire gauge

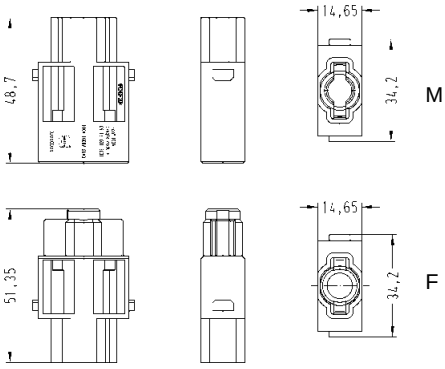
Number of contacts

1

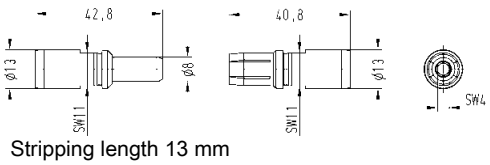
Available by June 2011

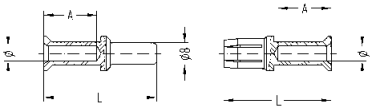


Identification	Part number Male insert (M)	Part number Female insert (F)	Drawing	Dimensions in mm
100 A single module order contacts separately	09 14 001 3031	09 14 001 3131	M F view termination side	



Identification	Wire gauge (mm²)	Part number Male contact	Part number Female contact	Drawing	Dimensions in mm
Contacts axial screw terminal	10-25	09 11 000 6112	09 11 000 6212	Stripping length 13 mm	
	16-35	09 11 000 6113	09 11 000 6213		
crimp terminal*	10	09 11 000 6114	09 11 000 6214		
	16	09 11 000 6116	09 11 000 6216		
	25	09 11 000 6125	09 11 000 6225		
	35	09 11 000 6135	09 11 000 6235		





Wire gauge	Ø	Stripping length (A)
10 mm² 16 mm² 25 mm² 35 mm²	4.3 5.5 7.0 8.2	19 mm 19 mm 19 mm 16 mm
for stranded wire acc. to IEC 60 228 Class 5		

* Crimp zone acc. to DIN EN 46 235

For further information see chapter 99 (Tools) in the main catalogue „Industrial Connectors Han®“

Features

- New: First connector for potential equalization
- Slim, space saving design
- Low cost plastic hoods and housings
- Colours: green and yellow
- Separate axial screw contacts can be terminated without any special tools directly to the wire.

Technical characteristics

Specifications	DIN EN 60 664-1 DIN EN 61 984

Hoods/Housings

Material	
- hoods/housings	polycarbonate
- seal	NBR
- cable seal	polyamide
Limiting temperatures	-40 °C ... +85 °C
Flammability acc. to UL 94	V 0
Degree of protection according to DIN EN 60 529 for coupled connectors	IP 65
Mechanical working life	≥ 500 mating cycles
Cable diameter	7.5 - 14 mm

Modules

Number of contacts	1
Material	polycarbonate
Limiting temperatures	-40 °C ... +125 °C
Flammability acc. to UL 94	V 0
Mechanical working life	≥ 500 mating cycles

Crimp Contacts

Material	copper alloy
Surface	
- hard-silver plated	3 µm Ag
Contact resistance	≤ 0.3 mΩ
Crimp terminal	
- wire gauge[1)]	10 ... 35 mm²

Axial Screw Contacts

Material	copper alloy
Surface	
- hard-silver plated	3 µm Ag
Contact resistance	≤ 0.3 mΩ
Screw terminal	
- wire gauge[1)]	10 ... 35 mm²
- AWG	6 ... 2
- hexagonal driver	SW 4
- tightening torque	

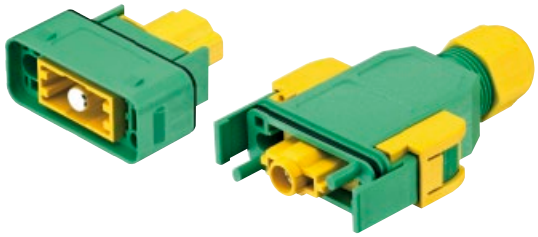
mm²	10	16	25	35
Nm	6	6	7	8

1) geometric wire gauge

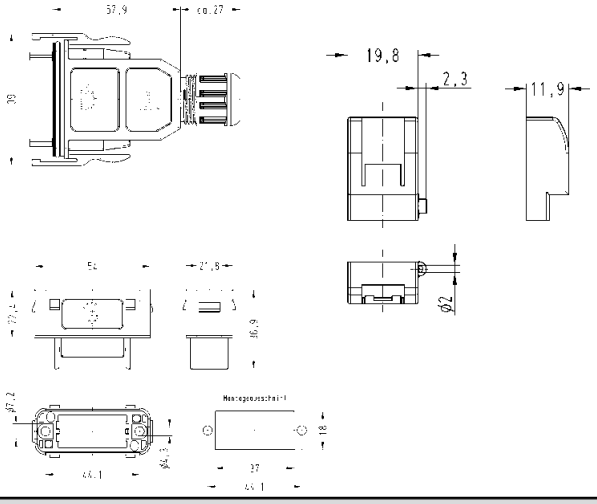
Number of contacts

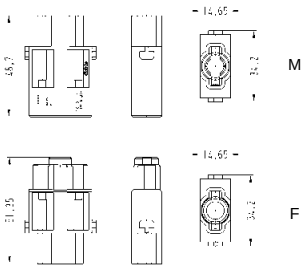
1

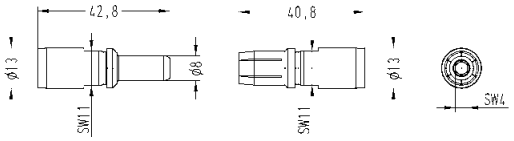
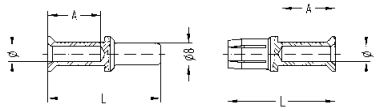
Available by June 2011



Mateable Potential Equalization

Identification		Part-Number	Drawings	Dimensions in mm
Hood top entry		09 14 001 0430		
Unlocking Protection		09 14 000 9938		
Housing		09 14 001 0330		

Identification		Part-Number Male module (M)	Part-Number Female module (F)	Drawings	Dimensions in mm
Modules order contacts separately	 	09 14 001 3032	09 14 001 3132		View termination side

Identification	Wire gauge mm²	Part-Number Male contacts (M)	Part-Number Female contacts (F)	Drawings	Dimensions in mm
Axial screw contacts	10-25	09 11 000 6112	09 11 000 6212		
	16-35	09 11 000 6113	09 11 000 6213		
Crimp contacts*				Stripping length 13 mm	
	10	09 11 000 6114	09 11 000 6214		
	16	09 11 000 6116	09 11 000 6216		
	25	09 11 000 6125	09 11 000 6225		
	35	09 11 000 6135	09 11 000 6235		

Wire gauge	Ø	Stripping length (A)
10 mm²	4.3	19 mm
16 mm²	5.5	19 mm
25 mm²	7.0	19 mm
35 mm²	8.2	16 mm
for stranded wire acc. to IEC 60 228 Class 5		

* Crimp zone acc. to DIN EN 46 235

For further information see chapter 99 (Tools) in the main catalogue „Industrial Connectors Han®“

Features

- Suitable for FOC and coaxial contacts acc. to DIN 41 626
- Using of guiding pins (male and female) is imperative (see chapter 40 in the main catalogue „Industrial Connectors Han®).

Contact arrangement

according to following matrix

Contacts	Male insert (M) 09 14 004 4501	Female insert (F) 09 14 004 4512
Coaxial contacts	09 14 000 62xx	09 14 000 61xx
F.O. contacts	20 10 xxx 421x	20 10 xxx 422x

Coaxial cables (group 2)

Wires	Shell ∅	Internal wire ∅	Attenuation db/100 m at		
	mm	mm	100 MHz	200 MHz	800 MHz
50 Ω					
RG 174 / U	2.5	0.48			84
RG 188 A / U	2.6	0.54	29	40	
RG 316 / U	2.5	0.54		40	
75 Ω					
RG 179 B / U	2.55	0.3		41	
RG 187 A / U	2.7	0.3		41	

Technical characteristics

Specifications	DIN EN 60 664-1 DIN EN 61 984

Inserts

Number of contacts	12
Insulation resistance	≥ 10^{10} Ω
Material	polycarbonate
Limiting temperatures	-40 °C ... +125 °C
Flammability acc. to UL 94	V 0
Mechanical working life	
- mating cycles	≥ 500

Contacts

Coaxial contacts

Material	copper alloy
Surface	
- hard-gold plated	demand level 2
Impedance	50 Ω / 75 Ω
Contact resistance	
- Internal wire	≤ 10 mΩ
- Outer conductor	≤ 3 mΩ
Rated current	1.5 A
Rated voltage	50 V

F.O. contacts

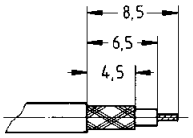
Fibre type	glas fibre (GI)
Attenuation	< 1.5 dB

F.O. contacts

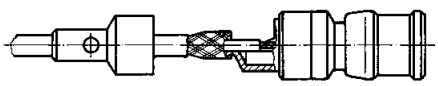
Fibre type	polymer Optical Fibre (POF)
Attenuation	< 2.5 dB

Assembly instructions

Stripping de-scription



Assembly details for coaxial contacts



Crimp barrel solder

Solder temperature	approx. 300 °C
Solder duration	approx. 2 s

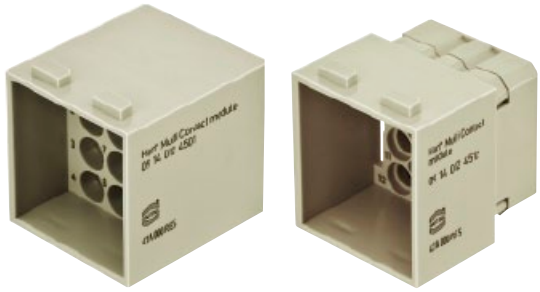
Due to the closed entry design of female insert the upper part has to be removed by screw driver before extracting the contacts.

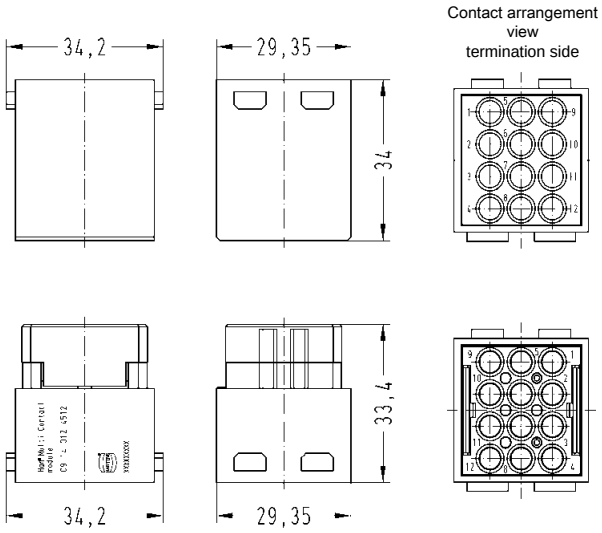
Han® Multi Contact module

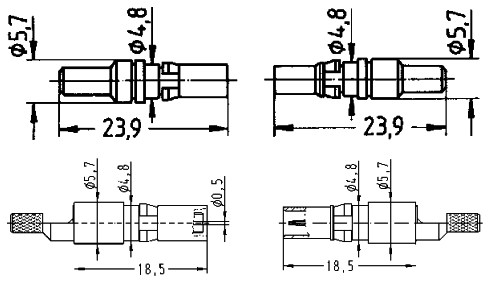
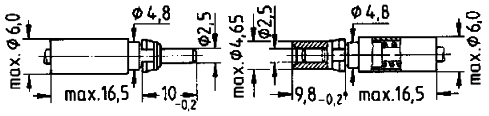
Number of contacts

4

Available by July 2011

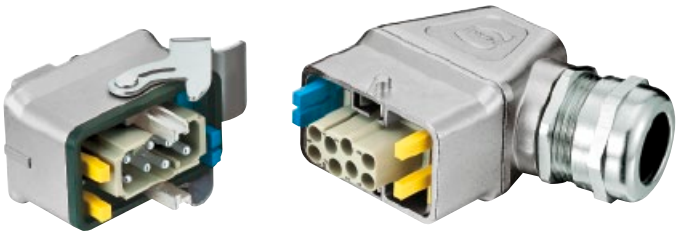


Identification	Part number Male insert (M)	Part number Female insert (F)	Drawing	Dimensions in mm
Multicontact module acc. to DIN 41 626 Order contacts separately	09 14 012 4501	09 14 012 4512		Contact arrangement view termination side

Identification	Impedance	Part number		Drawing	Dimensions in mm
Coaxial contacts acc. to DIN 41 626* Solder / crimp contact	50 Ω 75 Ω	09 14 000 6211 09 14 000 6221	09 14 000 6111 09 14 000 6121	 For cable group 2 flexible wires	
F.O. contacts acc. to DIN 41 626* for SI fibre (HCS®) 200/230 µm		20 10 230 4211	20 10 230 4221		
for GI fibre 50/125 µm or 62.5/125 µm ceramic ferrule		20 10 125 4212	20 10 125 4222		
for 1 mm plastic fibre		20 10 001 4211	20 10 001 4221		

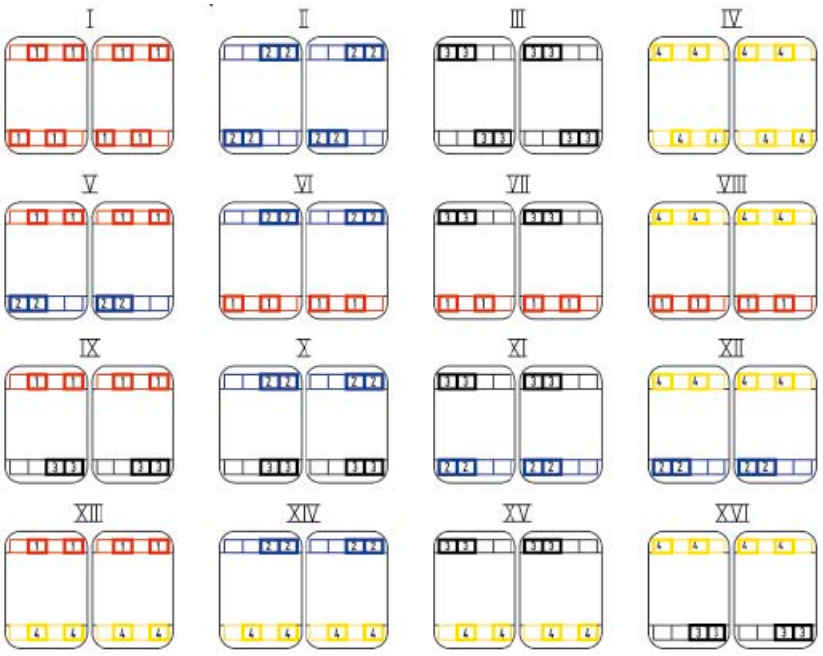
* Usage of guiding pins is imperative (see chapter 40 in the main catalogue „Industrial Connectors Han®“).

Coding pins

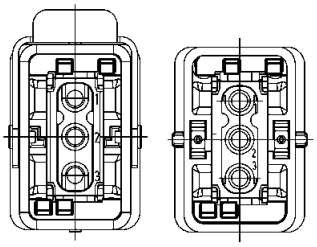


Identification	Part number	Drawing	Dimensions in mm
Coding pin 1 (red)	09 14 000 9971		
Coding pin 2 (blue)	09 14 000 9972		
Coding pin 3 (black)	0914 000 9973		
Coding pin 4 (yellow)	09 14 000 9974		

16 Coding options



Example for coding option IV



Remark

Coding pins can be retro fitted from the front.

- 09 14 000 9971 red
- 09 14 000 9972 blue
- 09 14 000 9973 black
- 09 14 000 9974 yellow

Notes

Han-Modular® Docking Frame

Features

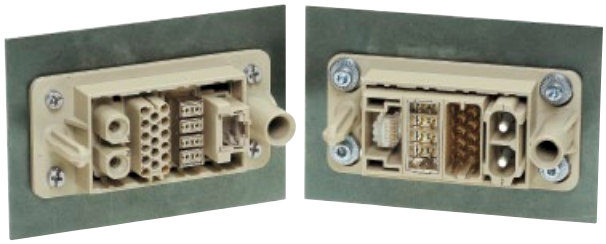
- Suitable for all Han-Modular® modules
- Very robust design
- Solid pre-leading guid pins and float bushes
- Can be fixed with standard M4 screws
- Due to the plastic material used in the docking frame without PE, the panel will need to be grounded separately.

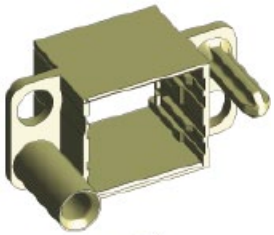
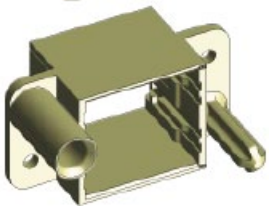
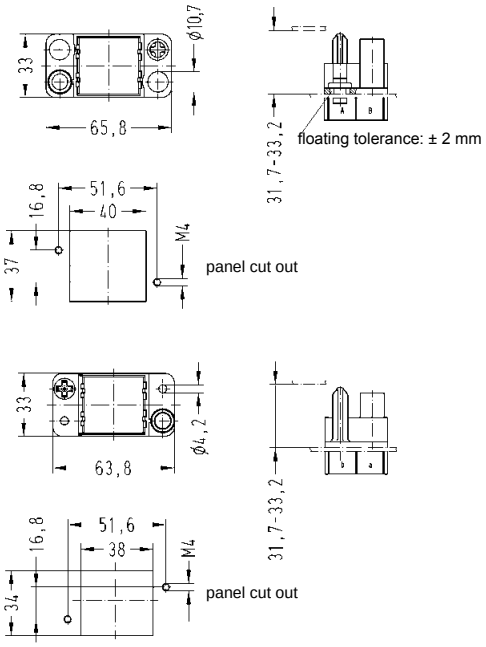
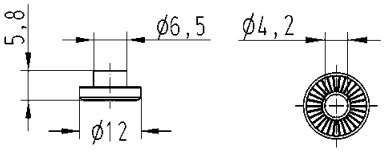
Technical characteristics

Specifications	DIN EN 60 664-1 DIN EN 61 984
Frames	
Number of modules	2, 4, 6
Material	
Docking Frame	polycarbonate
Float washer	zinc die-cast alloy
Floating tolerance	± 2 mm
Aligning tolerance	± 4 mm
Limiting temperatures	-40 °C ... +125 °C
Flammability acc. to UL 94	V 0
Mechanical working life	≥ 500 mating cycles

Han-Modular® Docking Frame

Available by October 2011



Identification	Float mount A ... F	Fixed a ... f	Drawings	Dimensions in mm
Docking frame for 2 modules  	09 14 006 1701	09 14 006 1711		
Docking frame for 4 modules	09 14 016 1701	09 14 016 1711		
Docking frame for 6 modules	09 14 024 1701	09 14 024 1711		
Float washer to enable the frame to be float mounted using standard M4 fixing screws 	09 14 000 9936			

PCB adapter for Han® Q 12/0

Features

- PCB adapter for Han® Q 12/0
- Robust design
- Suitable for standard and EMC hoods and housings size Han® 3 A
- High contact density
- 12 contacts + PE to the PCB

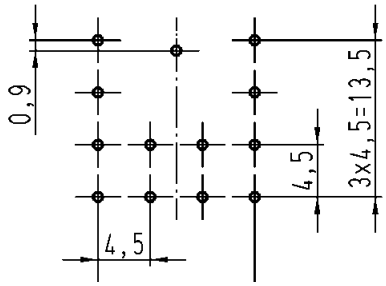
Technical characteristics

Electrical data acc. to EN 61 984	**7.5 A 250 V 4 kV 3**
Rated current	7.5 A
Rated voltage	250 V
Rated impulse voltage	4 kV
Pollution degree	3
Insulation resistance	≥ 10^{10} Ω
Material	Polycarbonate
Limiting temperatures	-40 °C ... +125 °C
Flammability acc. to UL 94	V 0

Layout of PCB

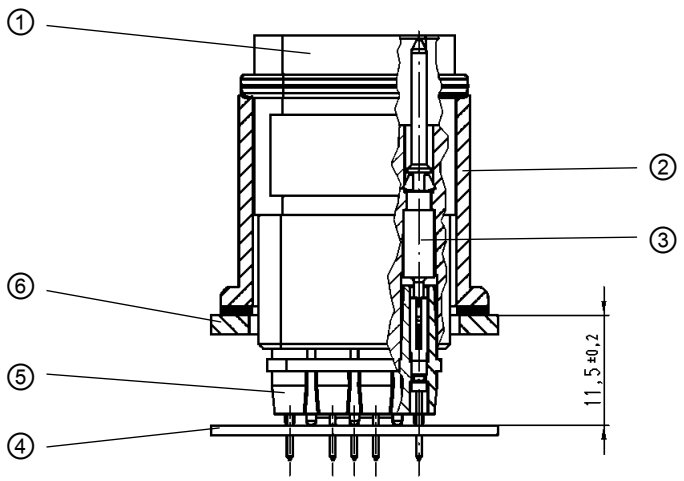
Dimensions in mm

Recommended hole diameter: 0.8 mm



PCB-Adapter

Assembly situation

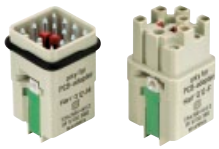
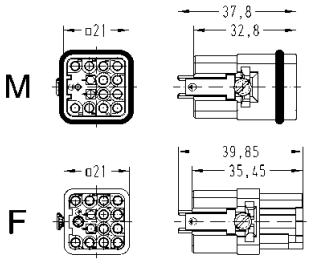


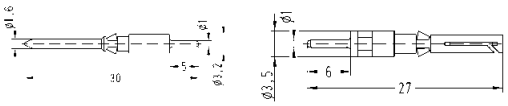
① Han® Q 12/0 insert for PCB adapter
② Han® 3 A bulkhead mounting housing
③ Han D® double contact
④ Printed circuit board (PCB)
⑤ Printed circuit board (PCB) adapter
⑥ Switch board panel

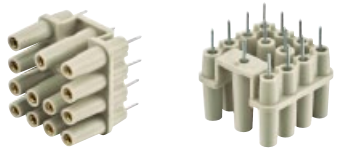
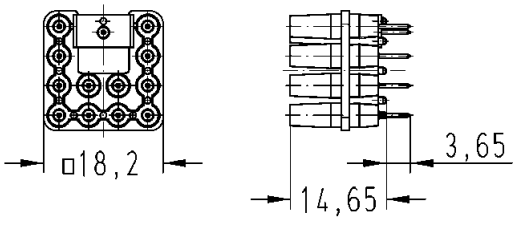
Han® Q 12/0 Inserts with PCB adapter

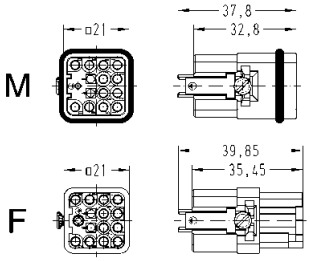
250 V 7.5 A

Available by May 2011

Insert	Part number Male insert (M)	Part number Female insert (F)	Drawing	Dimensions in mm
for PCB adapter Order contacts separately 	09 12 012 3002	09 12 012 3102		

Han D® double contacts	Part number Male contacts	Part number Female contacts	Drawing	Dimensions in mm
to connect the PCP-Adapter 	09 15 000 6191	09 15 000 6297		

PCB adapter	Part number Male insert (M)	Part number Female insert (F)	Drawing	Dimensions in mm
for PCBs up to 2.4 mm 	09 12 012 9901	09 12 012 9901		

Insert	Part number Male insert (M)	Part number Female insert (F)	Drawing	Dimensions in mm
Standard for cable side Order contacts separately 	09 12 012 3001	09 12 012 3101		

For further information see chapter 13 (Han® Q) in the main catalogue "Industrial Connectors Han®"

Han® Q 2/0 Crimp

Features

- High current rated compact designed connector for hoods/housings size Han® 3 A
- Mating compatible to the axial screw version with 16 coding options
- Using of standard Han C crimp contacts and crimp tools wich allows a cost optimised production of high quantities
- Finger protected male and female contacts

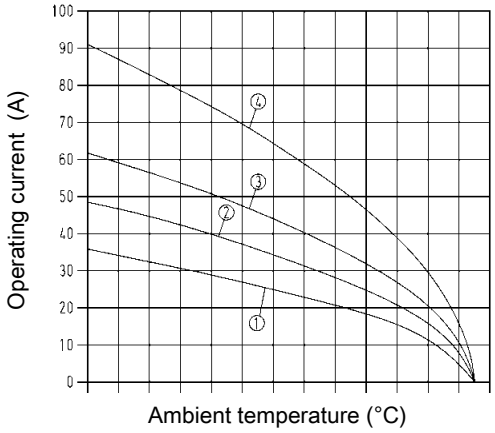
Remark

- By using in Han® 3 A HPR hoods/housings the sealing on the insert has to be removed.

Current Carrying Capacity

The current carrying capacity of the connectors is limited by the thermal load capability of the contact element material including the connections and the insulating parts. The derating curve is therefore valid for currents which flow constantly (non-intermittent) through each contact element of the connector evenly, without exceeding the allowed maximum temperature.

Measuring and testing techniques according to DIN EN 60 512-5



① wire gauge: 2.5 mm²
② wire gauge: 4 mm²
③ wire gauge: 6 mm²
④ wire gauge: 10 mm²

Technical characteristics

Inserts

Number of contacts	2 + PE
Electrical data	
acc. to EN 61 984	**40 A 400 V 6 kV 3**
Rated current	40 A
Rated voltage	400 V
Rated impulse voltage	6 kV
Pollution degree	3
Insulation resistance	≥ 10^{10} Ω
Material	polycarbonate
Limiting temperatures	-40 °C ... 125 °C
Flammability acc. to UL 94	V 0
Mechanical working life	
- mating cycles	≥ 500

Contacts

Material	copper alloy
Surface	
- hard-silver plated	3 µm Ag
Contact resistance	≤ 1 mΩ
Crimp termination	
- mm²	1.5 ... 10 mm²
- AWG	16 ... 8
Tools	see chapter 99 in the main catalogue „Industrial Connectors Han®“

Hoods/Housings

Selection of hoods/housings	see Han® main catalogue chapter 30 / chapter 31
Plastic hoods/housings	
Material	polycarbonate
Flammability acc. to UL 94	V 0
Degree of protection acc. to DIN EN 60 529 for coupled connector	IP 67
Metal hoods/housings	
Material	zinc die-cast
Degree of protection acc. to DIN EN 60 529 for coupled connector	IP 44 IP 67 is achieved with seal screw 09 20 000 9918

Han® Q 2/0 Crimp

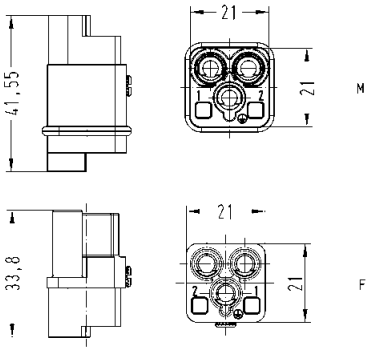
Size 3 A

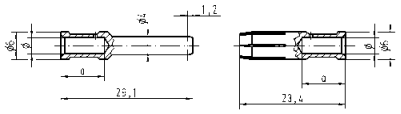
400 V 40 A

Number of contacts

2 + ⏚

Available by July 2011

Identification	Part number Male insert (M)	Part number Female insert (F)	Drawing	Dimensions in mm
Crimp terminal Order crimp contacts separately	09 12 002 3051	09 12 002 3151	 Contact arrangement view from termination side	
Coding element	09 12 000 9922	09 12 000 9922		

Identification	Wire gauge (mm²)	Part number Male contact	Part number Female contact	Drawing	Dimensions in mm
Crimp contacts Power contacts					
silver plated	1.5	09 32 000 6104	09 32 000 6204		
	2.5	09 32 000 6105	09 32 000 6205		
	4	09 32 000 6107	09 32 000 6207		
	6	09 32 000 6108	09 32 000 6208		
	10	09 32 000 6109	09 32 000 6209		

Wire gauge			∅	Stripping length
1.5	mm²	AWG 16	1.75	9 mm
2.5	mm²	AWG 14	2.25	9 mm
4	mm²	AWG 12	2.85	9.6 mm
6	mm²	AWG 10	3.5	9.6 mm
10	mm²	AWG 8	4.3	12 mm

Han® Q 2/0 Crimp High Voltage

Features

- High current rated compact designed connector for hoods/housings size Han® 3 A
- Mating compatible to the axial screw version with 16 coding options
- Using of standard Han C crimp contacts and crimp tools wich allows a cost optimised production of high quantities
- For high voltages, please use heat shrink tube
- Finger protected male and female contacts

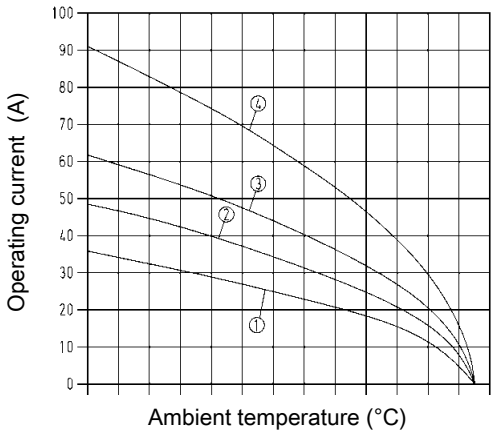
Remark

- By using in Han® 3 A HPR hoods/housings the sealing on the insert has to be removed.

Current Carrying Capacity

The current carrying capacity of the connectors is limited by the thermal load capability of the contact element material including the connections and the insulating parts. The derating curve is therefore valid for currents which flow constantly (non-intermittent) through each contact element of the connector evenly, without exceeding the allowed maximum temperature.

Measuring and testing techniques according to DIN EN 60 512-5



① wire gauge: 2.5 mm²
② wire gauge: 4 mm²
③ wire gauge: 6 mm²
④ wire gauge: 10 mm²

Technical characteristics

Inserts

Number of contacts	2 + PE
Electrical data	
acc. to EN 61 984	**40 A 830 V 6 kV 3**
Rated current	40 A
Rated voltage	830 V
Rated impulse voltage	6 kV
Pollution degree	3
Insulation resistance	≥ 10^{10} Ω
Material	polycarbonate
Limiting temperatures	-40 °C ... 125 °C
Flammability acc. to UL 94	V 0
Mechanical working life	
- mating cycles	≥ 500

Contacts

Material	copper alloy
Surface	
- hard-silver plated	3 µm Ag
Contact resistance	≤ 1 mΩ
Crimp termination	
- mm²	1.5 ... 10 mm²
- AWG	16 ... 8
Tools	see chapter 99 in the main catalogue „Industrial Connectors Han®“

Hoods/Housings

Selection of hoods/housings	see Han® main catalogue chapter 30 / chapter 31
Plastic hoods/housings	
Material	polycarbonate
Flammability acc. to UL 94	V 0
Degree of protection acc. to DIN EN 60 529 for coupled connector	IP 67
Metal hoods/housings	
Material	zinc die-cast
Degree of protection acc. to DIN EN 60 529 for coupled connector	IP 44 IP 67 is achieved with seal screw 09 20 000 9918

Han® Q 2/0 Crimp HV

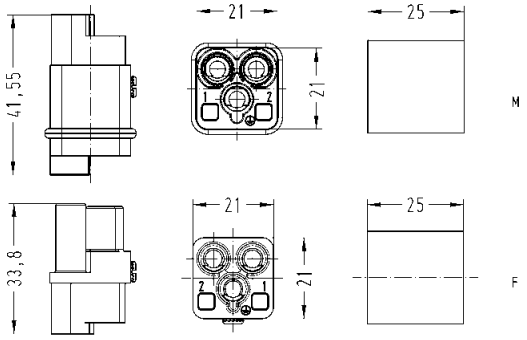
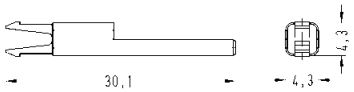
Size 3 A

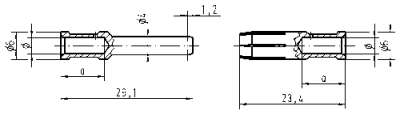
830 V 40 A

Number of contacts

2 + ⏚

Available by July 2011

Identification	Part number Male insert (M)	Part number Female insert (F)	Drawing	Dimensions in mm
Crimp terminal with heat shrink tube order crimp contacts separately	09 12 002 3052	09 12 002 3152	 Contact arrangement view from termination side	
Coding element	09 12 000 9922	09 12 000 9922		

Identification	Wire gauge (mm²)	Part number Male contact	Part number Female contact	Drawing	Dimensions in mm
Crimp contacts Power contacts silver plated	1.5	09 32 000 6104	09 32 000 6204		
	2.5	09 32 000 6105	09 32 000 6205		
	4	09 32 000 6107	09 32 000 6207		
	6	09 32 000 6108	09 32 000 6208		
	10	09 32 000 6109	09 32 000 6209		

Wire gauge			∅	Stripping length
1.5	mm²	AWG 16	1.75	9 mm
2.5	mm²	AWG 14	2.25	9 mm
4	mm²	AWG 12	2.85	9.6 mm
6	mm²	AWG 10	3.5	9.6 mm
10	mm²	AWG 8	4.3	12 mm

Han® 16 HPR enlarged

General description

- High current connector, 4 poles, size 16 B
- Robust and compact design
- Large cabling space
- Possibility to be equipped with 4 Han® HC Modular 250 contacts
- 4 x M25 cable entries

Features

- High contact density within a small space
- Suitable for harsh environments
- Highly EMC resistant
- Suitable for sensitive interconnections that have to be protected and shielded

Technical Characteristics

Hoods/ housing bulkhead mounting

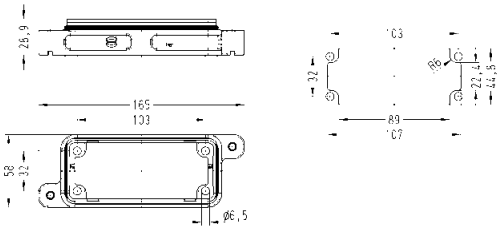
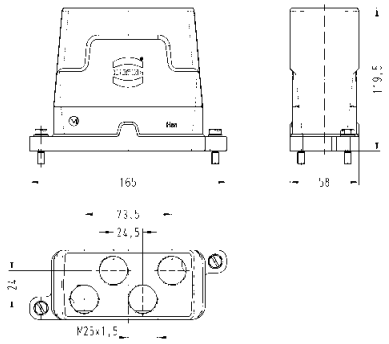
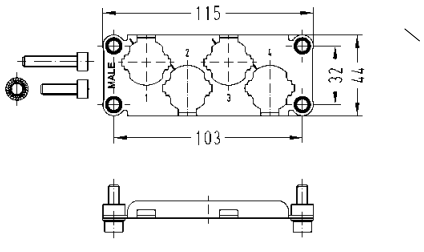
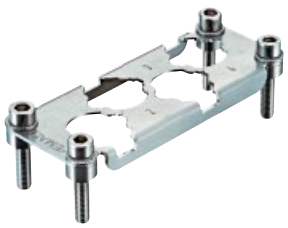
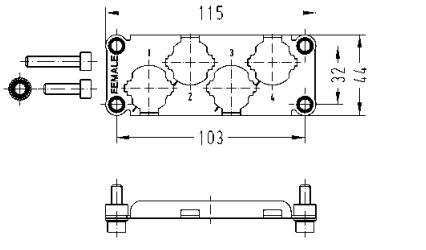
Material	aluminium die cast
Surface	powder coated, RAL 9005, black
Locking	screw locking M6 stainless steel
Limiting temperatures	-40 °C ... +125 °C
Protection degree acc. to DIN EN 60 529 in locked position	IP 68 / IP 69K

Frames

Version	4 poles for Han® HC Modular 250
Material	stainless steel

Han® 16 HPR enlarged

Available by July 2011

Identification	Part-Number	Drawing	Dimensions in mm
Bulkhead mounted housing 	09 40 016 0368	Panel cut out 	
Hood 	09 40 016 0478		
Frames			
4 poles, male 	09 11 000 9937		
4 poles, female 	09 11 000 9938		

Han® 24 HPR EasyCon

General description

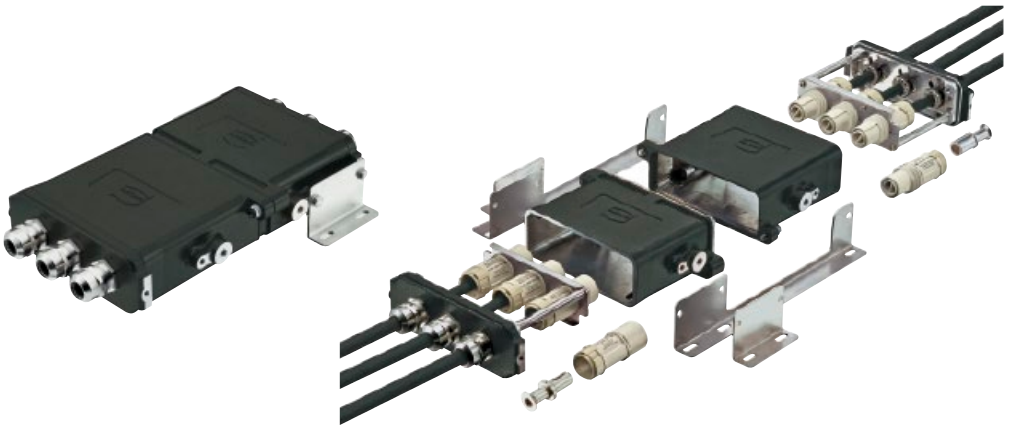
- High current connector for motor applications in the field of Railway rolling stock
- Robust and compact design
- Easy assembly due to split hood and surface mounted housing
- High EMC resistance
- Large space for cables

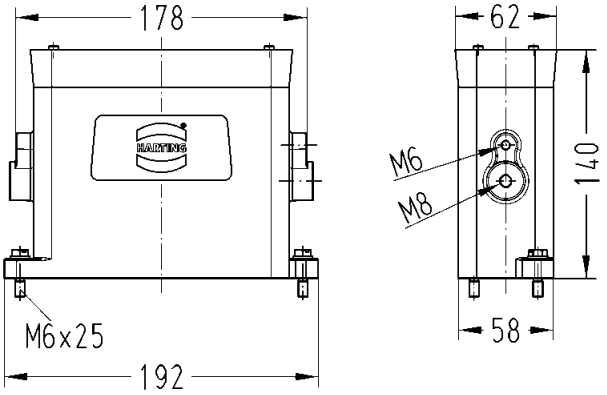
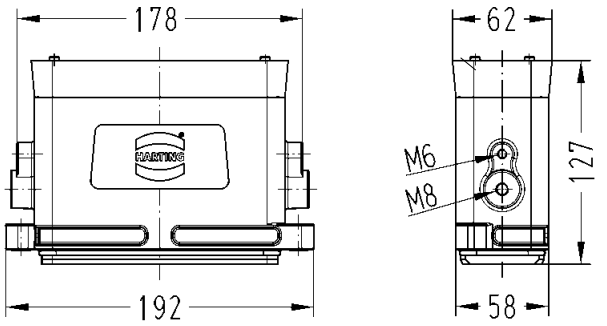
Features

- Suitable for extreme environmental conditions
- Many assembly possibilities due to separate assembly panels
- External termination of PE termination on hood and surface mounted housing
- New cable gland for secure and a visible connection of screening braid of shielded cables.

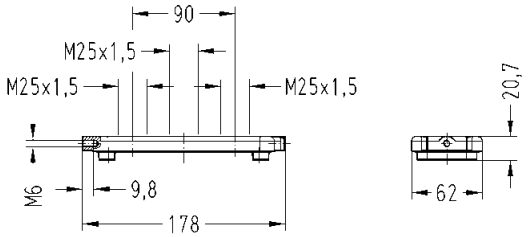
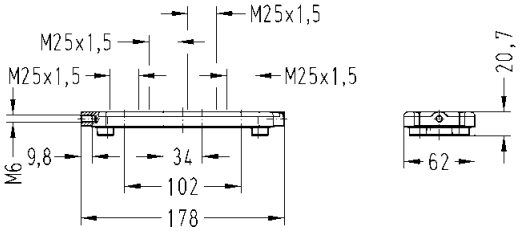
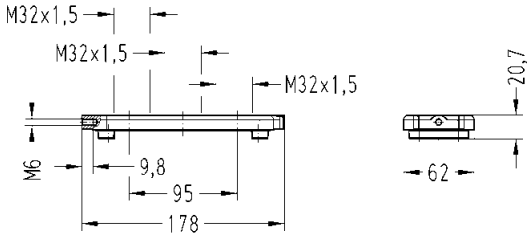
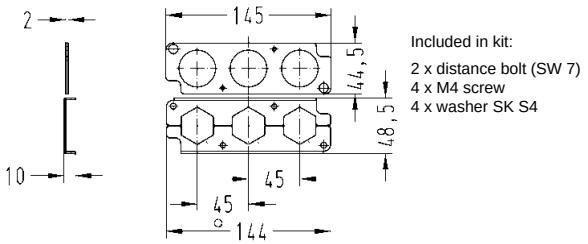
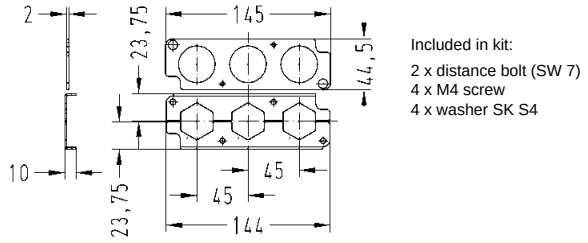
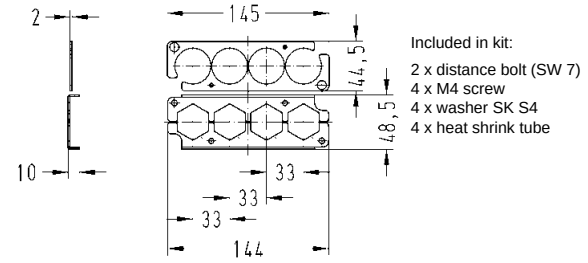
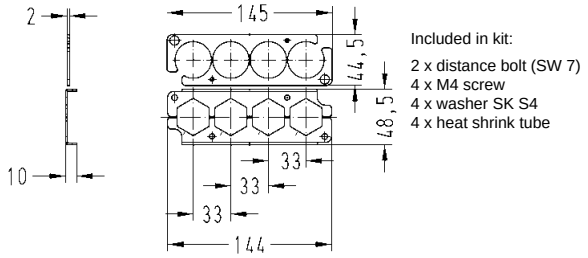
Technical characteristics

Material	Aluminium die-cast
Surface	Powder-coated, RAL 9005 (black)
Limiting temperatures	-40 °C ... 125 °C
Locking	Screw locking, M6 stainless steel
Frame	3 and 4 contacts for Han® HC Modular 350 stainless steel
Frames	Short and long version stainless steel
Cable gland	Special cable gland with self tightening clamp for shielded cables
Degree of protection acc. to EN 60 529 in locked position	IP 68

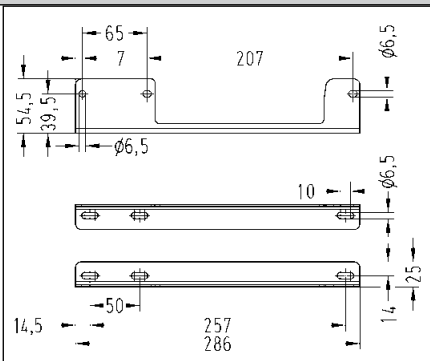
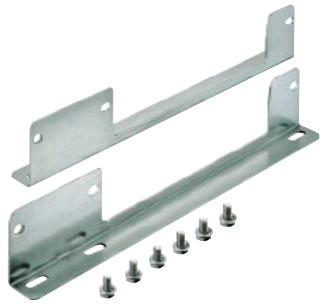
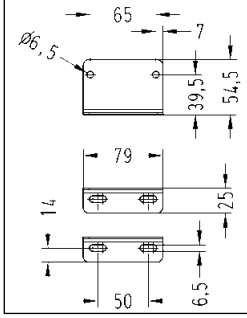
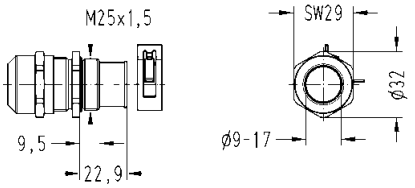
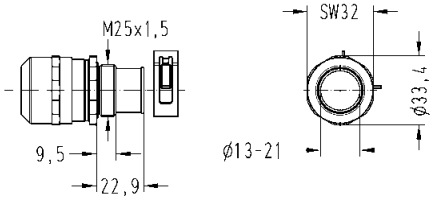
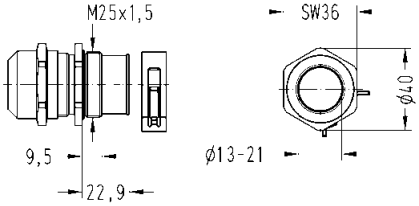
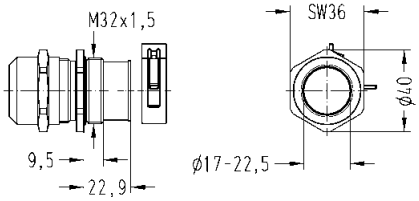
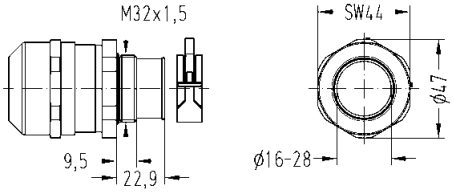


Identification	Part-Number	Drawing	Dimensions in mm
Hood 	09 40 024 0451		
Housing, surface mounting 	09 40 024 0951		

Han® 24 HPR EasyCon

Identification		Part-Number	Drawing	Dimensions in mm
Covers				
	3 x M25	19 40 024 9901		
	4 x M25	19 40 024 9902		
	3 x M32	19 40 024 9903		
Frames				
for 3 x Han® HC Modular 350				
	Male	09 40 024 9911		Included in kit: 2 x distance bolt (SW 7) 4 x M4 screw 4 x washer SK S4
	Female	09 40 024 9912		Included in kit: 2 x distance bolt (SW 7) 4 x M4 screw 4 x washer SK S4
for 4 x Han® HC Modular 350				
	Male	09 40 024 9913		Included in kit: 2 x distance bolt (SW 7) 4 x M4 screw 4 x washer SK S4 4 x heat shrink tube
	Female	09 40 024 9914		Included in kit: 2 x distance bolt (SW 7) 4 x M4 screw 4 x washer SK S4 4 x heat shrink tube

Han® 24 HPR EasyCon

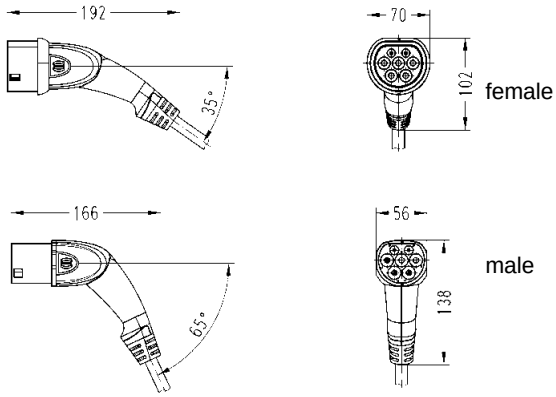
Identification	Part-Number	Drawing	Dimensions in mm
Mounting panels Long version	09 40 000 9925		Included in kit: 6 x washer M6 6 x M6 screw
			
Short version	09 40 000 9926		Included in kit: 4 x washer M6 4 x M6 screw
			
Cable glands M25			
	For cable Ø 9 - 17 mm	19 00 000 5013	
	For cable Ø 13 - 21 mm	19 00 000 5019	
M32			
	For cable Ø 13 - 21 mm	19 00 000 5014	
	For cable Ø 17 - 22.5 mm	19 00 000 5015	
	For cable Ø 16 - 28 mm	19 00 000 5022	

Han® E Mobility Power Supply Cable

Available by June 2011

Identification	Part-Number	Drawing	Dimensions in mm

Han® E Mobility Power supply cable



Variants Han® E Mobility power supply cables

male/male, 16 A, 2.5 mm², 1-phase (flat) male/female, 16 A, 2.5 mm², 1-phase (flat)	09 93 005 2601 09 93 005 2671
male/male, 16 A, 2.5 mm², 1-phase (spiral) male/female, 16 A, 2.5 mm², 1-phase (spiral)	09 93 005 2606 09 93 005 2676
male/male, 16 A, 2.5 mm², 3-phase (flat) male/female, 16 A, 2.5 mm², 3-phase (flat)	09 93 007 2601 09 93 007 2671
male/male, 16 A, 2.5 mm², 3-phase (spiral) male/female, 16 A, 2.5 mm², 3-phase (spiral)	09 93 007 2606 09 93 007 2676
male/male, 32 A, 6 mm², 3-phase (flat) male/female, 32 A, 6 mm², 3-phase (flat)	09 93 007 2603 09 93 007 2673
male/male, 32 A, 6 mm², 3-phase (spiral) male/female, 32 A, 6 mm², 3-phase (spiral)	09 93 007 2608 09 93 007 2678

General description

- Power supply cable for vehicles in male and female version
- according to VDE-AR-E 2623-2-2
- up to 63 A charge current
- 1P + N + PE and PP + CP
- 3P + N + PE and PP + CP

Features

- easy to handle and ergonomic design
- robust metal hood/housing
- minimum mating forces
- available in different cable versions and lengths (flat and spiral)
  standard length: 4 m.

Technical Characteristics

Hoods/ housing

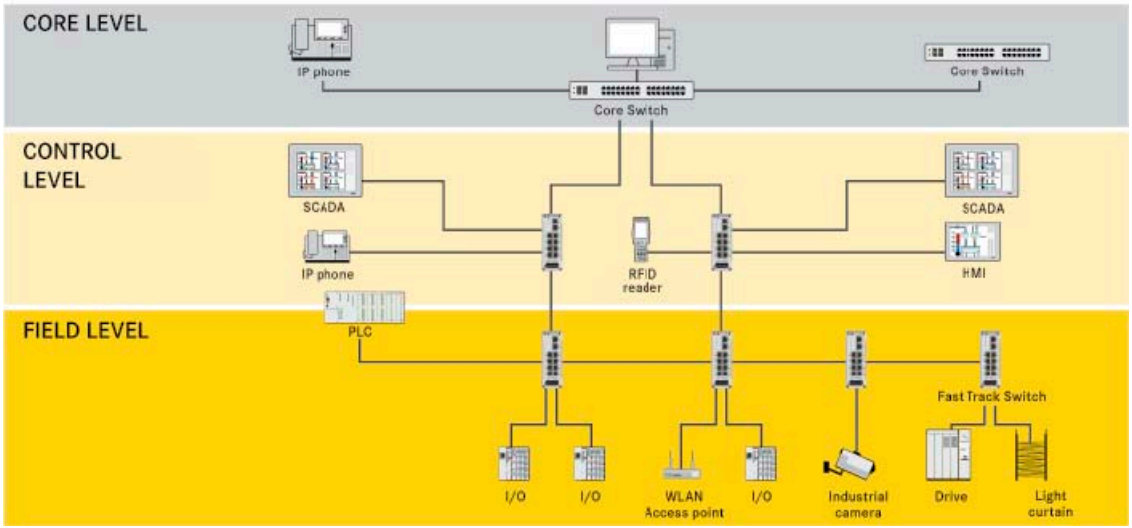
Material	aluminium die cast
Surface	powder coated, anthracite
Protection degree acc. to DIN EN 60 529 in mated position	IP 44

Introduction

Fast Track Switching

Automation IT is a communication platform that serves all applications within an industrial manufacturing firm. By connecting all applications, the uniform platform network increases the efficiency of company workflows.
Automation IT supports Standard Ethernet at all levels – including the office, management and control levels, and also in the field.

Automation IT – the platform for all applications



The currently available switching technology used in IEEE 802.3 Ethernet, however, does not offer the level of determinism required for automation applications. That is why automation solutions that only implement standard (unchanged) Ethernet require a restricted network design in order to match automation performance levels. Thus there are limited options for the network topology or segmentation – to the extent that IT communications are not allowed within the automation environment.

Automation requires for Industrial Ethernet:

- top performance
- safety
- flexible topology
- and above all determinism

Standard Ethernet switching is based on store-and-forward switching and this introduces long latency times for the frames. But even more serious is the tight dependency on the degree of network traffic: if only automation frames are present in the network, then these frames can be transmitted with no problems. But additional data traffic on the network will compete with the automation frames for forwarding and can thus delay these frames.

Standard switching uses the QoS (Quality of Service) option to influence this. If multiple frames are located in the switch queue, then the frames with the highest priority are forwarded first. But it is still possible for other data frames with priorities equal to or greater than the automation frames to be present. And even when the automation frame has the highest priority, if a data frame is in the process of being sent, the next automation frame must wait until 1522 bytes have been completely sent. Only then is the path open for the automation frame. The same delay could then happen on the next network switch once more. So these wait delays can quickly add up to times which are critical for automation applications. This behaviour can be seen as stochastically random. Most of the time the transfer times will be sufficient. But it only takes one delayed frame to trigger a problem.

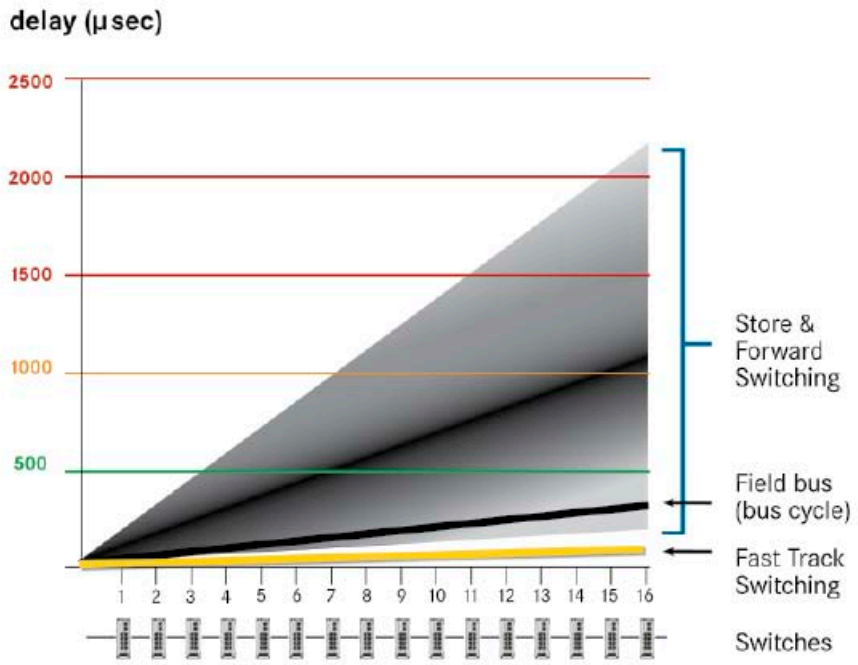
Several Ethernet-based methods have identified this problem and eliminated it. However such methods require each network node to implement specialized hardware for communication.

With the development of Fast Track Switching (FTS), HARTING has found a new path. FTS switches solve the performance and deterministic problems while all other nodes require only the standard Ethernet interfaces.

Fast Track Switching uses three key features to achieve this:

1. Preferred frames (such as automation frames) are detected first. The switch can focus on any specific part of the Ethernet header for special properties. For example, PROFINET frames are Ethertype 8892. This type is then monitored and evaluated if the application needs to accelerate their transmission.
2. These key frames get fast-track forwarding – a cut-through process instead of store-and-forwarding. As a result, the switch latency time is minimized.
3. If the switch port needed for the forwarding is busy at that moment sending a data frame, then the data frame is buffered and the forwarding is aborted so that the automation frame can be forwarded immediately. Only after the automation frame is sent is a second attempt made to send the data frame.

A simple example serves to illustrate the superior performance of this Fast Track Switching:



An automation frame must travel on a path through 16 switches. The transmission time for the Ethernet frames under standard switching rules is tightly dependent on the network load. Thus the transmission time for the frames can vary widely according to the network load: a few arrive quite quickly, the majority have an average time, and a few frames travel quite slowly.

As a reference point, a comparable cycle for one of the Field bus protocols used widely in automation applications is shown in black. This protocol has state-of-the-art levels of determinism and transfer speeds. Sometimes the data arrives just as fast at its destination when standard switching is used – but only sometimes.

Fast Track Switching, on the contrary, exhibits excellent results and is deterministic.

Now it has finally become possible to setup a universal **Automation IT** communications platform that reaches into the field level. And finally automation protocols which rely on standard unchanged Ethernet (such as PROFINET RT or EtherNet/IP) can deliver the high performance needed for automation applications.

HARTING has also integrated this groundbreaking technology into production models available for the user:
The configurable FTS 3100 model offers an easy-to-configure FTS solution for users. Many switch options can be customized to fit your application – even by those who are not trained network administrators.

And with the fully managed switches from the FTS 3000 line, HARTING combines FTS technology with all of the well-known functions of modern managed industrial Ethernet Switches.

Ethernet Switch
Ha-VIS FTS 3060-A

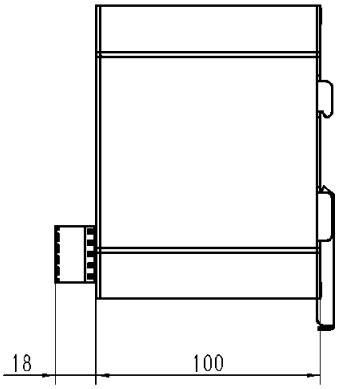
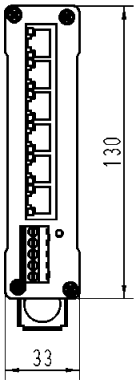
6-port Ethernet Switch with Fast Track Switching Technology
managed

Advantages

- Identification, acceleration and preference for automation frames
- Deterministic data transfer for selected profiles
- Managed Ethernet Switch acc. to IEEE 802.3
- Fast Track Switching Mode, Store and Forward Switching mode
- Robust metal housing, RoHS compliant

General Description

The Fast Ethernet Switches of the product family Ha-VIS FTS 3000 can identifiy automation profiles (e.g PROFINET, EtherNet/IP, Modbus TCP and customized profiles), accelerate their data transmission and prefer them. They are suitable for industrial applications.
The Ha-VIS FTS 3060-A enables the connection of up to 6 network devices over shielded Twisted Pair. It supports Ethernet (10 Mbit/s) and Fast Ethernet (100 Mbit/s).
The Ethernet Switch works as a managed switch and can work in Fast Track Switching Mode and in Store and Forward mode. It supports Auto-crossing, Auto-negotiation and Auto-polarity.

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS FTS 3060-A Ethernet Switch with 6 ports RJ45 for top-hat mounting rail	20 78 106 4000		

Technical characteristics

Features
- Auto-crossing
- Auto-negotiation
- Auto-polarity
- Store and Forward Switching mode
- Fast Track Switching mode

Ethernet Interface

Number of ports	• 6x 10/100Base-TX, managed
Cable types acc. to IEEE 802.3	• Shielded Twisted Pair (STP) or Unshielded Twisted Pair (UTP), min. Category 5
Data rate	• 10 Mbit/s or 100 Mbit/s (RJ45)
Maximum cable length	• 100 m (Twisted Pair; with cable Category 5 acc. to EN 50 173-1)
Terminating method	• RJ45 (Twisted Pair)
Diagnostics (via LED)	• Status Link: Green • Status Data transfer (Act): Green flashing • Data transfer rate (Speed): 100 Mbit/s: Yellow / 10 Mbit/s: OFF
Topology	Line, Ring, Star or mixed

Basic functions

Port settings	• 10/100 Mbit/s • Full/Half Duplex • Port enable/disable • Port mirroring • Flow Control • Industrial Profile (PROFINET, EtherNet/IP, Modbus TCP, customized) • NRT Bandwidth Control
Management functions	• STP, RSTP • IGMP Snooping with support for querier • Port Based VLANs • Alarm via email, SNMP traps • PROFINET diagnosis • DHCP Option 82 • Plugable Memory Card

Power Supply

Nominal input voltage range	12 V ... 48 V DC
Permissible range	9.6 V ... 60 V
Current consumption	220 mA (at 24 V DC)
Diagnostics (via LED)	• Power supply in permissible range: Green • Undervoltage: Red
Terminating Power supply	5-pole pluggable screw contact, for redundant power supply

Design features

Material of housing	Aluminium, anodized
Dimensions (W x H x D)	33 x 130 x 100 mm (without connectors)
Degree of protection acc. to DIN 60 529	IP 30
Mounting	• 35 mm top-hat rail acc. to EN 60 715 • Panel mounting, vertical assembly
Weight	approx. 0.35 kg

Environmental conditions

Operating temperature	0 °C ... +55 °C
Storage temperature	-40 °C ... +85 °C
Relative humidity	30 % ... 95 % (non-condensing)

Ha-VIS FTS 3000

Ethernet Switch
Ha-VIS FTS 3100-A

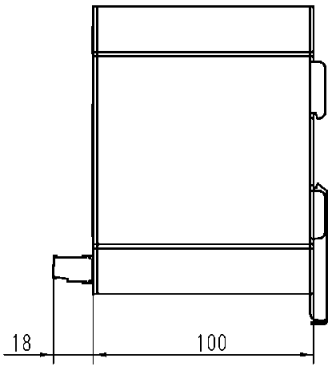
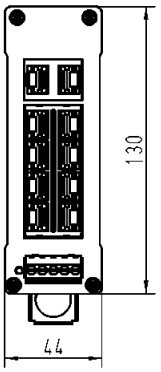
10-port Ethernet Switch with Fast Track Switching Technology
managed

Advantages

- Identification, acceleration and preference for automation frames
- Deterministic data transfer for selected profiles
- Managed Ethernet Switch acc. to IEEE 802.3
- Fast Track Switching Mode, Store and Forward Switching mode
- Robust metal housing, RoHS compliant

General Description

The Fast Ethernet Switches of the product family Ha-VIS FTS 3000 can identifiy automation profiles (e.g PROFINET, EtherNet/IP, Modbus TCP and customized profiles), accelerate their data transmission and prefer them. They are suitable for industrial applications.
The Ha-VIS FTS 3100-A enables the connection of up to 10 network devices over shielded Twisted Pair. It supports Ethernet (10 Mbit/s) and Fast Ethernet (100 Mbit/s).
The Ethernet Switch works as a managed switch and can work in Fast Track Switching Mode and in Store and Forward mode. It supports Auto-crossing, Auto-negotiation and Auto-polarity.

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS FTS 3100-A Ethernet Switch with 10 ports RJ45 for top-hat mounting rail	20 78 110 4000		

Technical characteristics

Features
- Auto-crossing
- Auto-negotiation
- Auto-polarity
- Store and Forward Switching mode
- Fast Track Switching mode

Ethernet Interface

Number of ports	• 10x 10/100Base-TX, managed
Cable types acc. to IEEE 802.3	• Shielded Twisted Pair (STP) or Unshielded Twisted Pair (UTP), Category 5
Data rate	• 10/100 Mbit/s (RJ45)
Maximum cable length	• 100 m (Twisted Pair; with cable Category 5 acc. to EN 50 173-1)
Terminating method	• RJ45 (Twisted Pair)
Diagnostics (via LED)	• Status Link: Green • Status Data transfer (Act): Green flashing • Data transfer rate (Speed): 100 Mbit/s: Yellow / 10 Mbit/s: OFF
Topology	Line, Ring, Star or mixed

Basic functions

Port settings	• 10/100 Mbit/s • Full/Half Duplex • Port enable/disable • Port mirroring • Flow Control • Industrial Profile (PROFINET, EtherNet/IP, Modbus TCP, customized) • NRT Bandwidth Control
Management functions	• STP, RSTP • IGMP Snooping with support for querier • Port Based VLANs • Alarm via email, SNMP traps • PROFINET diagnosis • DHCP Option 82 • Plugable Memory Card

Power Supply

Nominal input voltage range	12 V ... 48 V DC
Permissible range	9.6 V ... 60 V
Current consumption	270 mA (at 24 V DC)
Diagnostics (via LED)	• Power supply in permissible range: Green • Undervoltage: Red
Terminating Power supply	5-pole pluggable screw contact, for redundant power supply

Design features

Material of housing	Aluminium, anodized
Dimensions (W x H x D)	44 x 130 x 100 mm (without connectors)
Degree of protection acc. to DIN 60 529	IP 30
Mounting	• 35 mm top-hat rail acc. to EN 60 715 • Panel mounting, vertical assembly
Weight	approx. 0.5 kg

Environmental conditions

Operating temperature	0 °C ... +55 °C
Storage temperature	-40 °C ... +85 °C
Relative humidity	30 % ... 95 % (non-condensing)

Ethernet Switch
Ha-VIS FTS 3082-ASFP

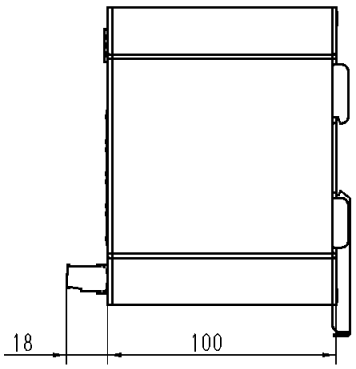
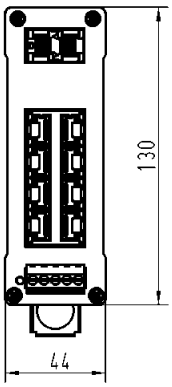
10-port Ethernet Switch with Fast Track Switching Technology, with 2 slots for SFP modules, managed

Advantages

- Identification, acceleration and preference for automation frames
- Deterministic data transfer for selected profiles
- Managed Ethernet Switch acc. to IEEE 802.3
- Fast Track Switching Mode, Store and Forward Switching mode
- Robust metal housing, RoHS compliant

General Description

The Fast Ethernet Switches of the product family Ha-VIS FTS 3000 can identifiy automation profiles (e.g PROFINET, EtherNet/IP, Modbus TCP and customized profiles), accelerate their data transmission and prefer them. They are suitable for industrial applications.
The Ha-VIS FTS 3082-ASFP enables the connection of up to 8 network devices over shielded Twisted Pair and further 2 devices via F.O. ports (depending on chosen SFP modules). It supports Ethernet (10 Mbit/s) and Fast Ethernet (100 Mbit/s). The Ethernet Switch works as a managed switch and can work in Fast Track Switching Mode and in Store and Forward mode. It supports Auto-crossing, Auto-negotiation and Auto-polarity.

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS FTS 3082-ASFP Ethernet Switch with 8 ports RJ45 2 slots for SFP modules (100 Mbit/s) for top-hat mounting rail	20 78 110 4300		

Technical characteristics

Features	• Auto-crossing • Auto-negotiation • Auto-polarity • Store and Forward Switching mode • Fast Track Switching mode
Ethernet Interface	
Number of ports	• 8x 10/100Base-TX, managed • 2x slots for SFP modules 100Base-FX, managed
Cable types acc. to IEEE 802.3	• Shielded Twisted Pair (STP) or Unshielded Twisted Pair (UTP), Category 5
Data rate	• 10/100 Mbit/s (RJ45) / 100 Mbit/s (F.O.)
Maximum cable length	• 100 m (Twisted Pair; with cable Category 5 acc. to EN 50 173-1)
Terminating method	• RJ45 (Twisted Pair) / SFP modules
Diagnostics (via LED)	• Status Link: Green • Status Data transfer (Act): Green flashing • Data transfer rate (Speed): 100 Mbit/s: Yellow / 10 Mbit/s: OFF
Topology	Line, Ring, Star or mixed
Basic functions	
Port settings	• 10/100 Mbit/s • Full/Half Duplex • Port enable/disable • Port mirroring • Flow Control • Industrial Profile (PROFINET, EtherNet/IP, Modbus TCP, customized) • NRT Bandwidth Control
Management functions	• STP, RSTP • IGMP Snooping with support for querier • Port Based VLANs • Alarm via email, SNMP traps • PROFINET diagnosis • DHCP Option 82 • Plugable Memory Card
Power Supply	
Nominal input voltage range	12 V ... 48 V DC
Permissible range	9.6 V ... 60 V
Current consumption	270 mA (at 24 V DC)
Diagnostics (via LED)	• Power supply in permissible range: Green • Undervoltage: Red
Terminating Power supply	5-pole pluggable screw contact, for redundant power supply
Design features	
Material of housing	Aluminium, anodized
Dimensions (W x H x D)	44 x 130 x 100 mm (without connectors)
Degree of protection acc. to DIN 60 529	IP 30
Mounting	• 35 mm top-hat rail acc. to EN 60 715 • Panel mounting, vertical assembly
Weight	approx. 0.5 kg
Environmental conditions	
Operating temperature	0 °C ... +55 °C
Storage temperature	-40 °C ... +85 °C
Relative humidity	30 % ... 95 % (non-condensing)

Network Management

With the Ha-VIS mCon families, HARTING has expanded its range of Ethernet switches. The series offers a broad spectrum of possibilities: in addition to the standard functions already present in the sCon and eCon Series, the Ha-VIS mCon switches offers management functions which set up a convergent and manageable network.

With the introduction of the new management software V2.0 for the HARTING Ha-VIS mCon switch families, the strong competitive capability will achieve a new level. A lot of improvements and additional features have been added to the software and the future development is assured. This new management software has been designed for industrial use and provides professional network solutions.

The configuration and management of the Ha-VIS mCon switches is made simply: either via SNMP tools, network management software or very easily via a web interface.

Overview - Intuitive web management interface

The Ha-VIS mCon switches can be accessed and configured via a normal internet browser, without the need of any additional tools or browser plugins (Java etc.)The web management is password protected and provides a range of access levels. An easy and intuitive tree menu allows the Ha-VIS mCon switches to be customized and adapted to a specific network.

A huge variety of management functionalities and features are integrated in the HARTING Ha-VIS mCon switches, to provide the best possibilities for the customer.

Support of VLANs allow the Ha-VIS mCon switches to segment a network, which results in better control of the communication flow and the avoidance of unnecessary network loads. The IGMP functionality ensures, that multicast traffic like video/audio streams and automation packets are only forwarded through ports, which are involved in this application. With RSTP it is possible to build up redundant networks, to assure the availability of the network even in the case of failure or incorrect configuration. To improve and assure the security and integrity of the network, HARTING has integrated a lot of security functionalities, like the port based access control via 802.1x and Radius and the IP Authorized manager. All Ha-VIS mCon switches support a fast and easy network diagnosis and a wide scale of alerting mechanisms.

Ha-VIS mCon switches can be used in all applications, offer professional solutions for the operation of Ethernet networks and are simple to install and use. The Ha-VIS mCon families will always be used in high level applications to provide a fully managed and adaptable Ethernet network for automation solutions. The customer has the possibility to configure and develop all applications on the basis of his requirements.

Web-Interface via HTTP

- HTML based web interface
- No additional software needed
- Rapid access to the switch
- Intuitive configuration

SNMP (v1, v2, v3)

- Accessible via standard MIBs
- Professional configuration
- Using of professional management tools

Overview

Diagnostic and alert functions

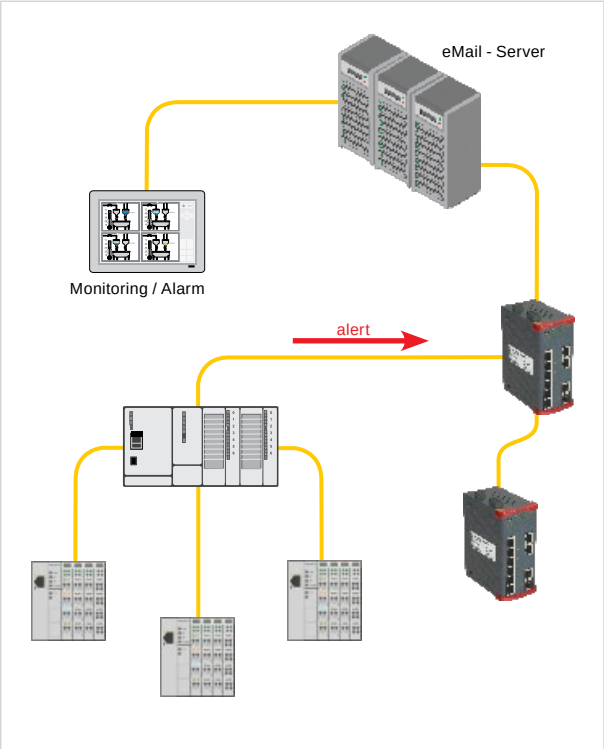
The reliability and operational availability of industrial Ethernet networks are highly associated with the possibility of management and diagnosis functionalities. For most applications it is mandatory to have an overview of what is happening in the network anytime. To assure a trouble free data flow, it is necessary that all failures in the network are propagate to a maintenance station.

The Port Mirroring feature allows the capturing of the incoming and outgoing data traffic of the switch. By connecting a network analyzer to a configured mirror-to port, the network traffic going through the entire switch can be easily monitored, without changing the network topology.

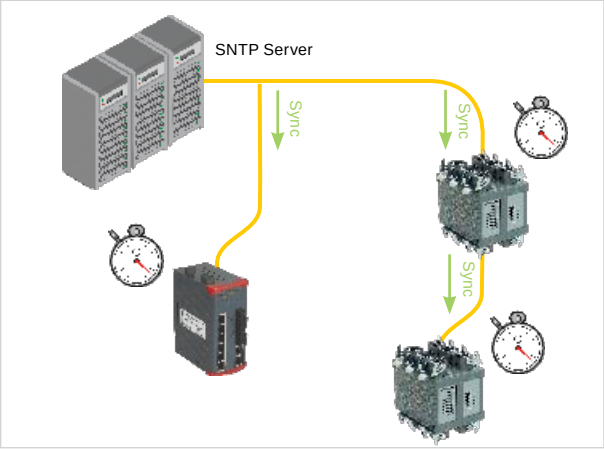
Certain network or Ethernet switch events may require the attention of service personnel. It is possible to select several events according to the requirements, which will cause a notification to a remote monitoring station if they occur. This notification can be done by sending an eMail or a SNMP trap.

In addition to notification per e-mail and SNMP trap, the alarm signal can be relayed via a connected relay to an external signaling device (depending on the type).

Examples for an event within the system are alterations to the configuration, a port event, interruption or creation of a link between a port and a connected device. Additional features like a locally saved switch history and a MAC address table are also helpful utilities to keep track of the network. All events are time synchronized with support of the SNTP protocol.



eMail and SNMP alert mechanismus



Time synchronization with SNTP

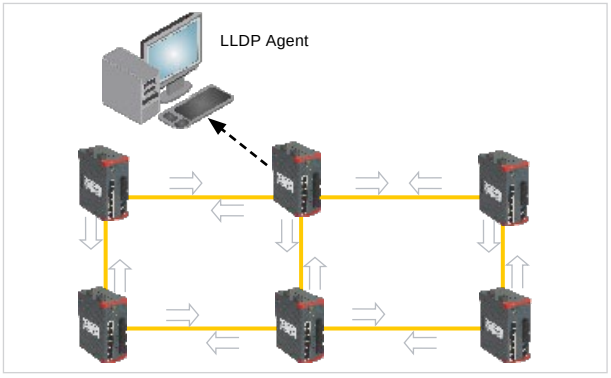
Overview

Network Discovery via Link Layer Discovery Protocol (LLDP)

The Link Layer Discovery Protocol allow systems on an Ethernet LAN to advertise their key capabilities to neighbor nodes and also to learn about the key capabilities of other systems on the same Ethernet LAN.

This, in turn, promotes a unified network management view of the LAN topology and connectivity to aid network administration and trouble-shooting.

In general a network administration station can be connected to one single switch and from there it is able to access the connectivity information in the complete network within the application.



LLDP- Neighbor information exchange

Port-Based Access Control with 802.1x

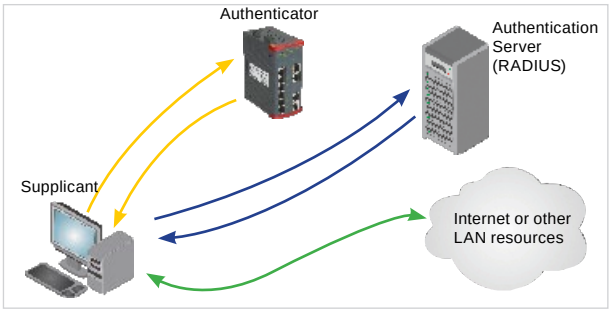
With the affiliation of the common office communication with the industrial networks, security and flexibility become more and more important for industrial Ethernet networks and applications. The demand of security and reliability is increasing rapidly. Therefore, industrial Ethernet networks need an end device authentication method that is highly secure but not tied to a ports physical location. For this reason, the HARTING Ha-VIS mCon Switches supports the 802.1x authentication functionality conform to the IEEE standard 802.1X REV 2004. This authentication method prevents access to a switch port in cases, if the authentication and authorization fails. The HARTING management software supports dynamic enabling or disabling of the Network Access Control feature in the switch through management configuration. The authorization of an attached supplicant can be proceed on two different ways: either remote or local.

With the local authorization, the data which is needed is stored directly on the switch, so no external instance is needed. The other way is the remote authorization via a RADIUS server and the EAPoL protocol. The database, containing all information of the network devices which are allowed to get access to the network are stored at the server side and can be managed from a single point. 802.1x user authentication is rapidly becoming an expected component of any Ethernet infrastructure.

- Prevention of unauthorized network access based on access data, not the physical address
- User authentication in the complete network without bindings to a special port
- Attaching an move devices

IP authorized manager

The IP authorized manager feature enables the switch to enhance security on the network by using IP addresses to authorize which stations (PCs or workstations) can access the switch. Thus, having the correct passwords (when logging through TELNET/ WEB) is not sufficient for accessing the switch through the network, unless the station attempting access is also included in the switch's Authorized IP Managers configuration.

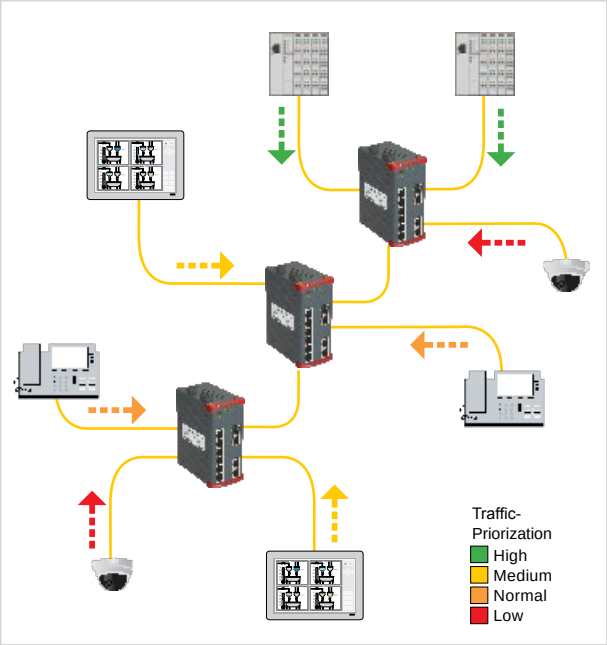


802.1X based user authentication procedure

Overview

Quality of Service (802.1p, DiffServ)

Quality of Service (QoS) is a technology for managing network traffic in a cost effective manner to enhance network performance and reliability of the application. QoS allows the priorization of the network traffic to assure quality and performance at any time. For example, QoS technologies can be applied to prioritize traffic for latency-sensitive applications (such as automation protocols and voice or video) and to control the impact of latency-insensitive traffic. The IEEE 802.1p standard provides up to eight traffic classes which can be configured via the management software. The queuing scheme and the way the traffic will be handled inside the switch can adapted to the requirements of the application.

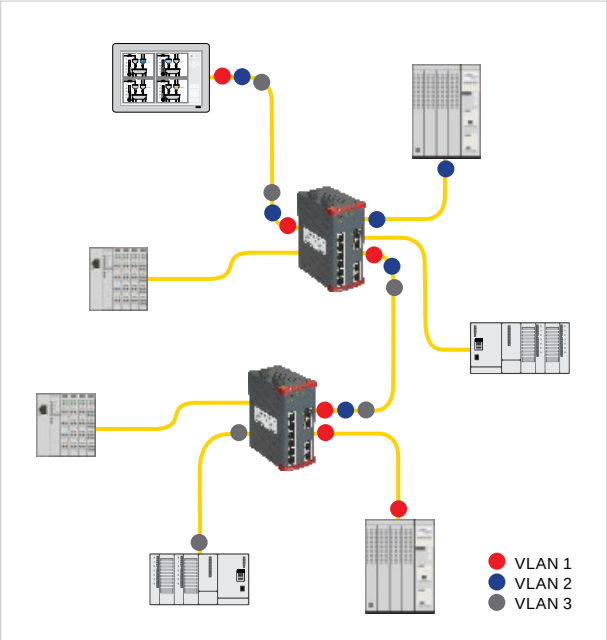


Traffic priorization for time critical applications

Virtual LAN (VLAN)

As networks have grown in size and complexity, the claim to segment these networks increased rapidly. To avoid the rise of costs and complexity of the devices, the segmentation and separation of different network groups should be established by virtual local area networks (VLANs). This functionality provides a way of structuring and organize the network. Basically, a VLAN is a collection of nodes that are grouped together in a single broadcast domain that is not based on physical location of the devices. VLANs logically segment the shared media LAN and forming virtual workgroups. The different VLANs will send and receive data only to devices which are members of this special LAN. HARTING Ha-VIS mCon switches support up to 4094 VLAN tags and conforms with IEEE standard 802.1Q. The use of VLANs will have the following benefits:

- Security - Separating systems that have sensitive data from the rest of the network
- Performance/Bandbreite - Limitation and administrativ control of the network
- Broadcasts/Traffic-flows - VLANs does not pass broadcast traffic to nodes that are not part of the VLAN, it automatically reduces broadcasts



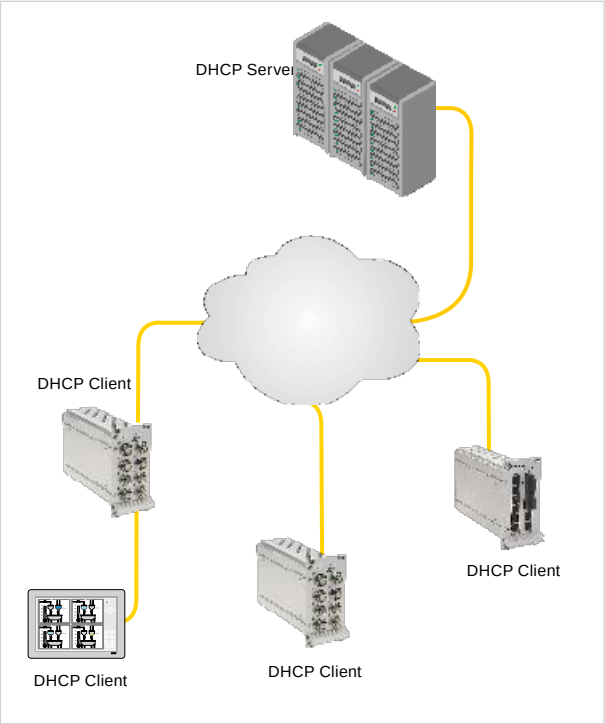
Traffic management with VLANs

Overview

DHCP Option 82

Upgrading and changing the structure of Ethernet networks causes usually a lot of administrative effort. Configuration of security and addressing procedures has to be redone every time a device will be changed. Replacing or moving of network devices causes a lot of trouble, because some network mechanisms such as dynamic IP address assignment are MAC based. The Industrial market searches for a method to simplify the addition and replacement of Ethernet devices to reduce the maintenance effort. DHCP Option 82 provides a mechanism for generating IP addresses based on the location where the client device is attached in the network. By using DHCP option 82, the Ha-VIS mCon switches are able to include additional information about itself, when forwarding DHCP packets. Information about its location can be sent along with the request to the server.

The DHCP server makes a decision on what IP should be assigned to the end device based on this location information.

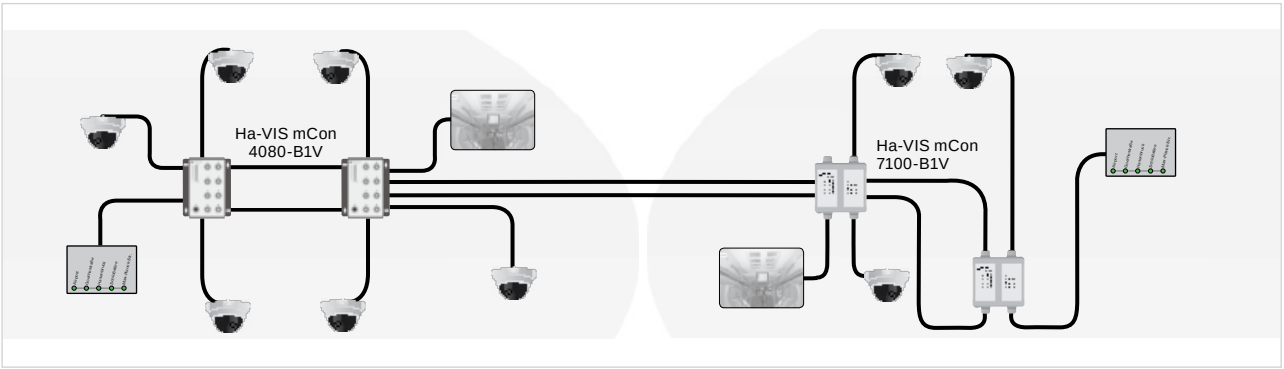


Location-dependent IP address assignment

IGMP Snooping

A Layer 2 switch by default, floods multicast traffic within the broadcast domain. This can consume a lot of bandwidth if many multicast servers are sending streams of data. IGMP Snooping are meant to dynamically discover the presence of multicast receivers and use the learnt information to control the multicast traffic flow, restricting it only to the desired ports on which receivers are present. HARTING provides support for dynamic multicast registration support through IGMP snooping (for IPv4 multicast traffic). IGMP snooping can be used for Layer 2/3 traffic and provides a much greater degree of granularity in selecting multicast traffic.

IGMP learns the multicast forwarding information through the IGMP report messages from hosts and updates the forwarding database. It is possible to edit and add information to the forwarding database manually, so there is no limitation and restriction for the network topology and the application. The IGMP forwarding database based on multicast group MAC address (MAC based). All Ha-VIS mCon switches support IGMP version 1,2 and 3 and also the Querier functionality.



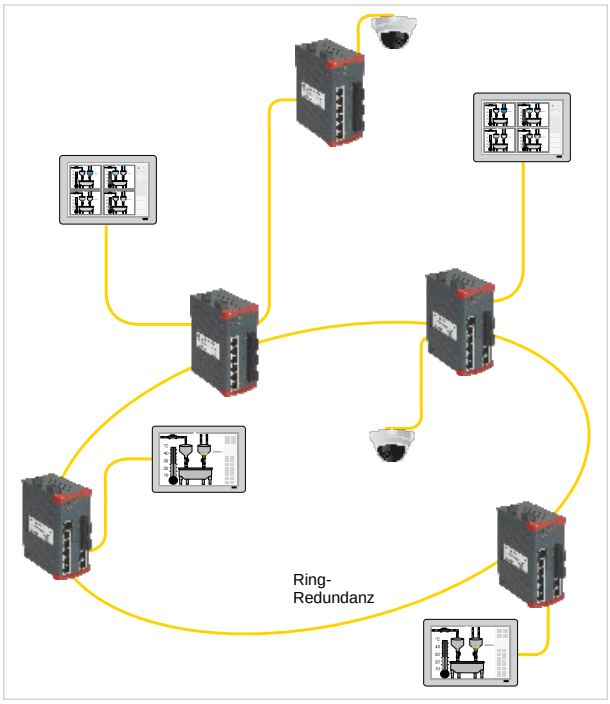
Multicast application with multiple sources and receivers

Overview

Rapid Spanning Tree

A continuous and failure tolerant network is an essen-tial claim for industrial applications and their network components. The high availability is a mandatory demand to guarantee the failure free operation of these networks. Network redundancy is the ability to handle and endure a link failure without a permanent communication break down. Network redundancy is important in applications, where a single failure can result in significant consequences which can not be tolerated. The Ha-VIS Management Software supports the Rapid Spanning Tree protocol to form loop free topology in a network. RSTP detects topology changes and reconfigures the topology and intimates the topology change to all the switches in the LAN. RSTP avoids this delay by calculating an alternate root port, and immediately switching over to this port if the root port becomes unavailable. Thus, using RSTP, the switch immediately brings the alternate port to forwarding state, without any delay.

- High availability via redundancy
- Loop free and failure tolerant network
- Fast convergent and recovery time



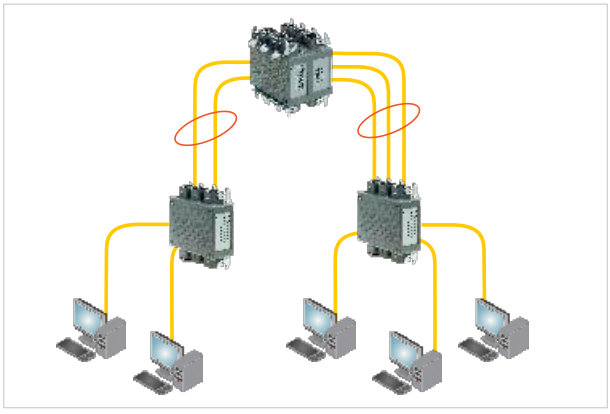
High availability with RSTP

Link Aggregation (LA)

Link Aggregation or trunking is a feature, which allows the combining of several physical network links into a single logical link. This combination brings a lot of advantages to the existing network topology. With Link Aggregation it is clearly possible to increase the bandwidth between to switches to handle heavy network loads at specific points. Furthermore LA offers the possibility to use load balancing on these links. One of the most important benefits is the increased availability between to network devices. Because of the physical redundant link with more than one cable, the connection is still available in case of a link failure. Aggregation groups are formed dynamically using LACP or statically using manual aggregation.

Link Aggregation bietet die folgenden Vorteile:

- Increased bandwidth
- Link redundancy
- High availability
- Load sharing on the individual links
- Aggregating replaces Upgrading



Link Aggregation - Load Balancing, Redundancy, increased bandwidth

Management functions

Basic Functions		
	Store and Forward Switching Mode	IEEE 802.3
	Manual and Dynamic IP Address Assignment	
Port-Settings	Auto-negotiation on / off	
	Port Speed 10 Mbit/s / 100 Mbit/s	
	Half / Full duplex	
	Port disable / enable	
	Link Up/Down Trap disable / enable	
	Flow Control disable / enable	
Network Discovery	Link Layer Discovery Protocol (LLDP)	802.1AB, 2005
PoE	Power Over Ethernet Support*	IEEE 802.1af
Rate Control	Rate Control per port* (Broadcast, Multicast, Unicast)	
File Transfer	Firmware import and export via TFTP and HTTP	
	Configuration import and export via TFTP and HTTP	
Time Settings	Manual time setting	
	Simple Network Time Protocol (SNTP)	RFC 1305, RFC 4330
User Management	Admin, Guest and Service Level	
Service	Service Mode via port 1	
QoS		
	Quality of Service (QoS)	IEEE 802.1p
	Differentiated services (DiffServ)	RFC 2474, 2475
VLAN		
	Port protocol based VLANs VLAN ID Range: 1 – 4094 Max. Anzahl aktiver VLANs: 256	IEEE 802.1Q Rev D5.0, 2005
Redundancy		
	Spanning Tree (STP)	IEEE 802.1D (2004)
	Rapid Spanning Tree (RSTP)	IEEE 802.1D (2004)
Security		
	Port-Based Network Access Control* Port Based Authentication with EAP	802.1X (2004)
	RADIUS Client*	RFC 2138
	IP authorized manager	
Link Aggregation		
	Link Aggregation (LACP)	IEEE 802.3ad (2005)
Multicast		
	IGMP Snooping (v1, v2, v3) with support for querier	RFC 1112, 2236, 3376
DHCP		
	DHCP Client	RFC 2131
	DHCP relay agent	RFC 2131
	DHCP Option 82	RFC 3046

Management functions

Alarm		
	Alarms via E-mail (SMTP) and SNMP Traps	
	Signalling contact for low voltage detection or Link break	
Diagnostic		
	Port diagnostic	
	Port Mirroring	
	Switch History	
	MAC Address Table	
	RMON (1,2,3 & 9 groups)	RFC 2819
Management		
	Password protected Web-Management interface	
	SNMP (v1, v2c, v3) agent & MIB support	RFC 1155, 1157, 1212, 1213, 1215, 2089, 2578, 3411, 3412, 3413, 3414, 3415, 3416, 3417, 3584

* Available up to software release 2.2 (2nd quarter 2011); functions are partially dependent on the type

Ha-VIS mCon 3000 Next Generation – Introduction and features

Ethernet Switch
Ha-VIS mCon 3000 Next Generation
Ethernet Switches, managed,
for mounting onto top-hat mounting rail
in control cabinets

General Description

The fully Managed Ethernet Switches of the product family Ha-VIS mCon 3000 enable the connection of up to 10 network devices (according to type) over Twisted Pair cables on lowest area.

Degree of protection, mechanical stability and the comprehensive management software provide for high operation safety and meet highest demands.

The Ha-VIS mCon 3000 Ethernet Switches are designed for an effective, industrial and individual use.

The configuraton via SD card or via the Multifunction button enables an easy and fast commisioning in the field.

Comprehensive possibilities of configuration and diagnostic are provided easy via web interface or standardized via SNMP.

Features

- Full managed Ethernet Switch acc. to IEEE 802.3
- Up to 10 ports, managed, non-blocking
- Store and Forward Switching Mode
- Gigabit Uplink ports, RJ45 and SFP modules
- Auto-crossing, Auto-negotiation, Auto-polarity
- Temperature range -40 °C ... +70 °C
- Multifunction button for fast commsioning
- SD card slot for storage of the configuration
- Management functions see page 70

Advantages

- Small, robust metal housing
- External SD card for storage of the configuration
- Individual pre-configuration via Multifunction button
- Fast removable Ethernet data links via SFP „hot-swap“
- Optimised DIN rail fitting
- EMC, temperature range and mechanical stability meet the highest demands

Application fields

- Industrial automation
- Automotive industry
- Wind power, Solar Power
- Maritime

Technical characteristics

Ethernet interface RJ45

Number of ports	
Ha-VIS mCon 3080-A	8x 10/100Base-T(X)
Ha-VIS mCon 3102-AASFP	8x 10/100Base-T(X) 2x 10/100/1000Base-T(X) (Combo ports with SFP port)
Cable types according to IEEE 802.3	Shielded Twisted Pair (STP) or Unshielded Twisted Pair (UTP), Category 5
Data rate	10 Mbit/s, 100 Mbit/s or 1000 Mbit/s (RJ45)
Maximum cable length	100 m (Twisted Pair; with Category 5 cable acc. to DIN EN 50 173-1)
Termination	RJ45 (Twisted Pair)
Diagnostics (via LED)	• Status Link – Green • Data transfer (Act) – Green flashing • Data transfer rate (Speed) –– 1000 Mbit/s: grün 100 Mbit/s: gelb 10 Mbit/s: AUS
Topology	Ring, Line, Star or mixed

Ethernet Interface SFP (mini-GBIC) Fibre Optic and copper

Number of ports	
Ha-VIS mCon 3102-AASFP	2x 100/1000Base (Combo ports with SFP port)
Data rate	100 Mbit/s, 1000 Mbit/s
Termination	SFP modules according to MSA (Multi Source Agreement) (see catalogue „HARTING Ethernet Network Solutions Automation IT“)
Diagnostics	Digital Diagnostics Monitoring (DDM) according to SFF-8472
Diagnostics (via LED)	• Status Link – Green • Data transfer (Act) – Green flashing

Power supply

Nominal input voltage	24 V DC
Termination	5-pole screw terminal, pluggable for redundant power supply
Diagnostics (via LED)	Power supply in the admissible range – Green Low voltage – Red

Technical characteristics

Design features

Housing material	Aluminium, anodized
Dimensions (W x H x D)	44 x 130 x 100 mm (without connectors)
Degree of protection acc. to DIN 60529	IP 30
Mounting	• 35 mm top-hat rail acc. to EN 60715 • Panel mounting, vertical assembly
Weight	approx. 0.5 kg

Environmental conditions

Operating temperature	–40 °C … +70 °C
Storage temperature	–40 °C … +85 °C
Relative humidity	10 % … 95 % (non-condensing)

Management software

Full managed via web interface and SNMP

Range of functions and detailed description see page 70

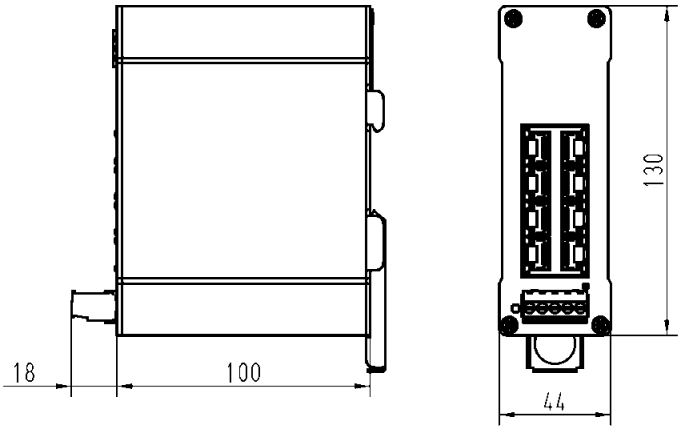
Ha-VIS mCon 3080-A

Ethernet Switch
Ha-VIS mCon 3080-A

8-port Ethernet Switch, full managed
for mounting onto top-hat mounting rail in control cabinets

Managed	IP 30	PROFINET compatible [X]	EtherNet/IP compatible [X]

Number of ports, Copper / Termination	8x 10/100Base-T(X) / RJ45 (Twisted Pair)
Nominal input voltage range	12 V ... 48 V DC
Permissible range (min/max)	9.6 V … 60 V DC
Termination	5-pole screw terminal, pluggable redundant power supply
Input current	approx. 200 mA (at 24 V DC)
Housing material	Aluminium, anodized
Dimensions (W x H x D)	44 x 130 x 100 mm (without connectors)
Weight	approx. 0.5 kg
Operating temperature	–40 °C … +70 °C
Approvals (in preparation)	UL 508; UL 60 950-1; DNV
Management	fully Managed via Web interface and SNMP Functions see page 70

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS mCon 3080-A Ethernet Switch, full managed 8 RJ45 ports including Set for assembly on standard rail	20 76 108 4000		

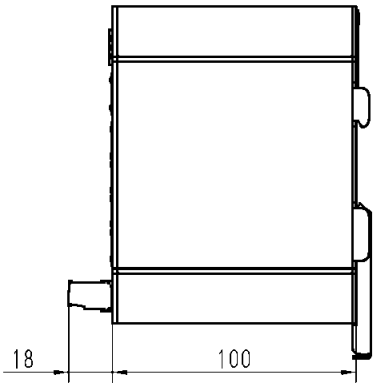
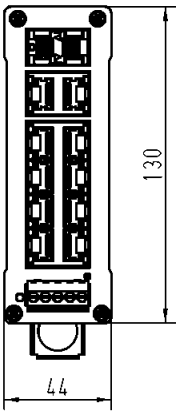
Ha-VIS mCon 3102-AASFP

Ethernet Switch
Ha-VIS mCon 3102-AASFP

10-port Ethernet Switch with 2 ports Gigabit Ethernet, full managed
for mounting onto top-hat mounting rail in control cabinets

Managed	IP 30	PROFINET compatible [X]	EtherNet/IP compatible [X]

Number of ports, Copper / Termination	8x 10/100Base-T(X) / RJ45 (Twisted Pair) 2x 10/100/1000Base-T(X) / RJ45 (Twisted Pair)
Number of ports SFP / Termination	2x 100/1000Base / Combo ports
Nominal input voltage range	12 V ... 48 V DC
Permissible range (min/max)	9.6 V … 60 V DC
Termination	5-pole screw terminal, pluggable redundant power supply
Input current	approx. 260 mA (at 24 V DC)
Housing material	Aluminium, eloxiert
Dimensions (W x H x D)	44 x 130 x 100 mm (incl. cap, without connectors)
Weight	approx. 0.5 kg
Operating temperature	–40 °C … +70 °C
Approvals (in preparation)	UL 508; UL 60 950-1; DNV
Management	fully Managed via Web interface and SNMP Functions see page 70

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS mCon 3102-AASFP Ethernet Switch, full managed 8 ports Fast Ethernet RJ45 2 ports Gigabit Ethernet (combo SFP) including Set for assembly on standard rail	20 76 112 4300		

SFP modules

Accessories
SFP modules

General Description

SFPs (**S**mall **F**orm-factor **P**luggable) are small standardized modules for network connections.

These modules are a specification for a new generation of modular optical transceivers. The devices are constructed as connecting plugs for extremely quick network connections.

The SFPs are available in a variety of models, depending on the cable type (multi-mode or single-mode), the wave length (850 nm, 1300 nm, 1550 nm or CWDM), data rate or range. Copper-based SFP are also available.

Features

SFP modules

- Highly flexible
- Easily swapped out in event of malfunction
- Hot swappable
- Variants:

	SM fibre	MM fibre
100 Mbit/s	X	X
1000 Mbit/s	X	X

Advantages

- SFP used as connecting plug for extremely quick network connections
- Standardized modules for network connections

Application fields

- Railway applications
- Industrial automation
- Automotive industry
- Wind power

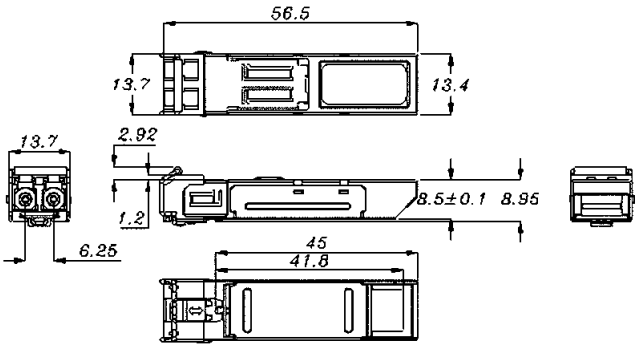
Accessories
SFP modules

SFP:

Type	SFP Fast Ethernet Transceiver 155 Mbit/s MM	SFP Fast Ethernet Transceiver 155 Mbit/s SM	SFP Gigabit Ethernet Transceiver 1.25 Gbit/s MM	SFP Gigabit Ethernet Transceiver 1.25 Gbit/s SM
Wave length	1310 nm	1310 nm	850 nm	1310 nm
Mode	Multimode	Singlemode	Multimode	Singlemode
Fiber	50 / 125 µm or 62.5 / 125 µm	9 / 125 µm	50 / 125 µm or 62.5 / 125 µm	9 / 125 µm
Max. cable length*	2 km	15 km	550 m (50 / 125) 275 m (62.5 / 125)	10 km
Connector	LC connector duplex	LC connector duplex	LC connector duplex	LC connector duplex
Optical budget	min. 8.2 dB	min. 8.2 dB	min. 9 dB	min. 9 dB
Data rate	155 Mbit/s	155 Mbit/s	1250 Mbit/s	1250 Mbit/s

* Typical cable length depending on attenuation of each specific application.

Identification	Part number	Drawing	Dimensions in mm
SFP modules			
SFP Fast Ethernet Transceiver 155 Mbit/s MM	20 76 000 0300		
SFP Fast Ethernet Transceiver 155 Mbit/s SM	20 76 020 0300		
SFP Gigabit Ethernet Transceiver 1.25 Gbit/s MM	20 76 010 0300		
SFP Gigabit Ethernet Transceiver 1.25 Gbit/s SM	20 76 030 0300		
other types on request			



Ha-VIS 19“ DIN-Rail Mounting kit – Introduction and features

Ha-VIS 19“ DIN-Rail Mounting kit

General Description

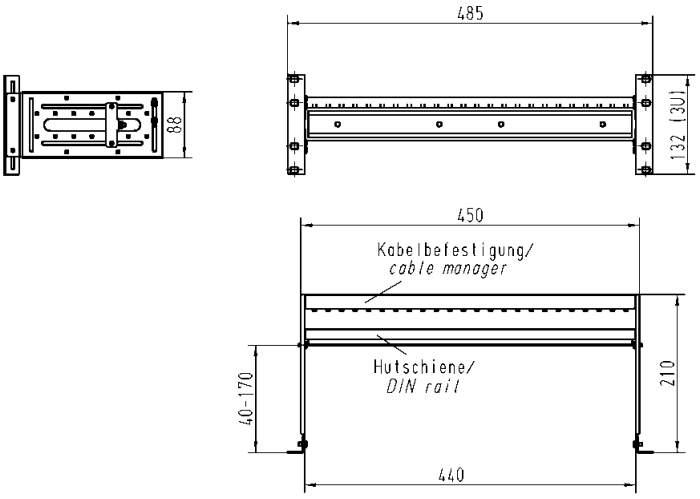
The 19’’ mounting kit has been designed to install DIN-Rail mounted systems in a standard 19’’ rack.

The mounting kit is modular and very flexible. The DIN-Rail position can be changed in a very easy way. It can be installed in a horizontal or in a vertical position.

Each mounting kit has a cable management at the backside.

Features

- 19 inch / 3 U
- Flexible installation
- Variable mounting
- Integrated mounting rail
- Robust design

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS 19“ DIN-Rail Mounting kit	20 80 000 0007		

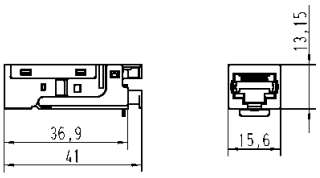
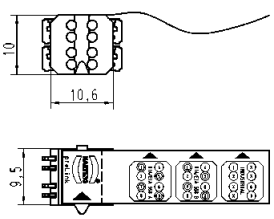
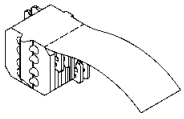
Ha-VIS preLink®
RJ45 HIFF

Advantages

- Consistent connection technology in the cabling system
- Quick and easy assembling of data cables
- Small size, suitable for hoods and housings of series Han® 3 A and HARTING PushPull RJ45 connetors acc. to ISO/IEC 24 702, variant 4
- Future proof, Cat. 6 Class E_A 500 MHz transmission performance, transmission rate up to 10 Gbit/s

Applications

- Structured cabling for industrial premises
- For applications in IP 20 and IP 65 / IP 67 environment

Identification		Part number	Drawing	Dimensions in mm
Ha-VIS preLink® set RJ45 jack AWG 22/23 consists of: • 1x RJ45 module • 1x terminal module • 1x cable tie		20 82 001 0001		
Ha-VIS preLink® module RJ45 jack		20 82 000 0002		
Termination:	RJ45			
Number of contacts:	8			
Transmission:	Cat. 6 for Class E_A			
Transmission rate:	10 Gbit/s			
Shielding:	fully shielded 360° flexible shielding termination			
Cable sheath diameter:	5 ... 9 mm			
Housing material:	zinc die-cast, nickel-plated			
Ha-VIS preLink® terminal module AWG 22/23		20 82 000 0001		
Contact block with IDC termination				
Number of contacts:	8			
Wire gauge:	AWG 22 ... 24 0.25 ... 0.34 mm² solid and stranded			
Strand sheath diameter (incl. insulation)	1.3 ... 1.6 mm			

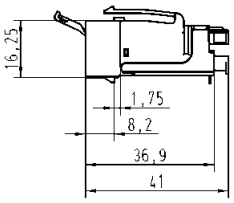
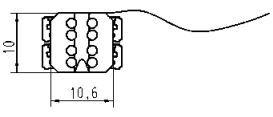
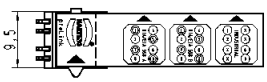
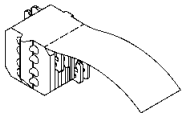
Ha-VIS preLink®
RJ45 Keystone

Advantages

- Ha-VIS preLink® termination
- Simple, fast and reliable connection of data cables
- Integrated dust protection cover, removable
- Future proof, Cat. 6 Class E_A 500 MHz transmission performance, transmission rate up to 10 Gbit/s

Applications

- Structured cabling for industrial premises
- For panel cut-outs according to EN 60 603-7 (Keystone holding fixture)

Identification		Part number	Drawing	Dimensions in mm
Ha-VIS preLink® set RJ45 jack AWG 22/23 Keystone consists of: • 1x RJ45 module, Keystone jack • 1x terminal module • 1x cable tie		20 82 501 0001		
Ha-VIS preLink® module RJ45 jack, Keystone		20 82 500 0001		
Termination:	RJ45			
Number of contacts:	8			
Transmission:	Cat. 6 for Class E_A			
Transmission rate:	10 Gbit/s			
Shielding:	fully shielded 360° flexible shielding termination			
Cable sheath diameter:	5 ... 9 mm			
Housing material:	zinc die-cast, nickel-plated			
Ha-VIS preLink® terminal module AWG 22/23		20 82 000 0001	 	
Contact block with IDC termination				
Number of contacts:	8			
Wire gauge:	AWG 22 ... 24 0.25 ... 0.34 mm² solid and stranded			
Strand sheath diameter (incl. insulation)	1.3 ... 1.6 mm			

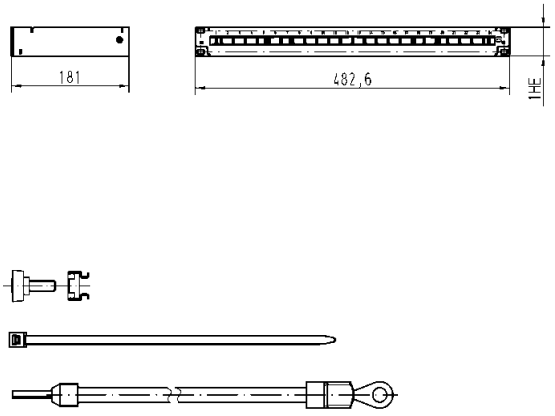
Ha-VIS preLink®
19“ Patch panel

Advantages

- Flexible, suitable for Ha-VIS preLink® modules RJ45 jack and HARTING RJ Industrial® modules in HIFF size
- Economical, time-saving installation due to the slidable module carrier, frontward and backward removal
- Safety, additional strain-relief, fully shielded modules connected by module carrier, earth bolt
- High grade, stainless steel front cover
- Future proof, Cat. 6 Class E_A 500 MHz transmission performance, transmission rate up to 10 Gbit/s

Applications

- Structured cabling for industrial premises
- IP 20 installation for distributors and switch cabinets
- Assembly in 19“ racks acc. to IEC/DIN EN 60 297-3-100 (DIN 41 494-1)

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS preLink® 19“ patch panel, unloaded Suitable modules: Ha-VIS preLink® RJ45 jack HIFF, HARTING RJ Industrial® 10G bulkhead, mixed loading possible Number of modules: 24 Dimensions: 19“, 1 U, depth 181 mm Design: Module carrier, 2-parts steel sheet front cover stainless steel Range of delivery: Screw set M5 24 cable ties 1x earth conductor 6 mm²	20 82 400 0001		

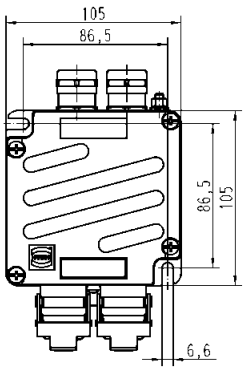
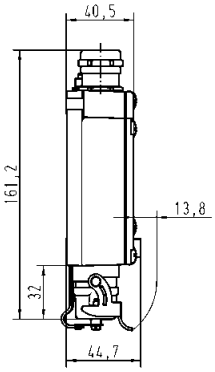
Ha-VIS preLink®
Han® 3 A Metal Outlet

Advantages

- Simple mounting, fixing and earth connection both outside
- Fast termination of data cables due to Ha-VIS preLink® technology
- Lockable Han® 3 A connector ports
- Future proof, Cat. 6 Class E_A 500 MHz transmission performance, transmission rate up to 10 Gbit/s

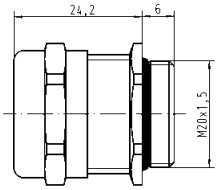
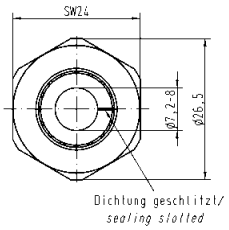
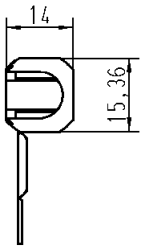
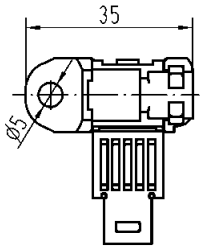
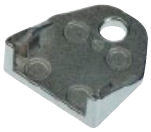
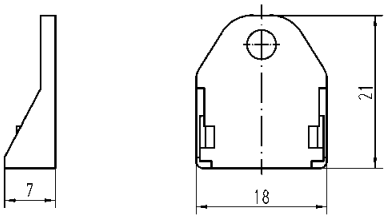
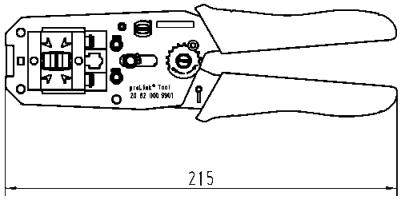
Applications

- Structured cabling for industrial premises
- Robust metal housing for IP 65 / IP 67 applications
- PROFINET compatible

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS preLink® Han® 3 A Metal Outlet RJ45 Industrial Outlet, consists of: • 1x Housing including protection covers • 2x Ha-VIS preLink® Set RJ45 jack AWG 22/23 • 2x Cable gland with slotted seal • 1x Assembly instruction	20 82 102 0101		

Technical characteristics:

Number of ports, cooper	2
Termination	Han® 3 A RJ45
Transmission performance	Cat. 6 for Class E_A
Transmission rate	10 Gbit/s
Termination	Ha-VIS preLink®
Wire gauge	AWG 22 – 24 (0,25 – 0,34 mm) solid and stranded
Strand diameter	Ø 1,3 – 1,6 mm
Cable diameter	7,2 – 8 mm
Shielding	fully shielded 360° flexible shielding termination
Mounting	Wall mounting
Dimensions (H x W x D)	105 x 105 x 40,5 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	-40°C ... + 70°C
Housing material	Aluminium, die-cast
Colour	Grey RAL 7037

Identification	Part number	Drawing	Dimensions in mm
Cable gland M20x1,5 for pre-terminated Ha-VIS preLink® cable assemblies with slotted seal Cable-sheath: 7.2 – 8.0 mm 	19 00 000 5020		
Protection cover for pre-terminated Ha-VIS preLink® cable assemblies Set of 10 pieces 	20 82 000 9915		
Unlocking tool for Ha-VIS preLink® RJ45 module Set of 5 pieces 	20 82 000 9916		
HARTING Assembly tool for Ha-VIS preLink® terminal module 	20 82 000 9901		

HARTING Industrial Cable 8-wire Cat. 6_A PUR

Industrial Cable
8-wire, Cat. 6_A, PUR

Advantages

- Suitable for generic cabling Category 6_A / Class E_A according ISO/IEC 11 801 respectively EN 50173-1 especially for flexible installation (patch cords)
- Qualified for transmission up to 10 Gigabit Ethernet 10GBase-T acc. IEEE802.3an
- Based on stranded copper wires AWG 26/7 delivers patch cord performance up to 500 MHz
- Applicable for industrial premises
- High EMC capability based on the PIMF construction
- Flame retardant, halogen free and RoHS compliant

General Description

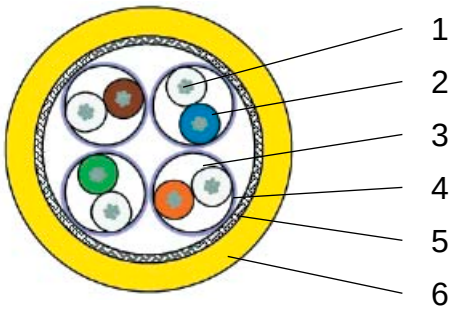
This high-speed data cable was designed for flexible installation in industrial premises and it's especially suitable for termination of HARTING RJ45 data plugs in IP 20 as well as in IP 67 / IP 65. The four pair / eight wire PIMF-construction allows the transmission of IT digital and analogue signals like Ethernet 10/100 Mbit/s, 10 Gigabit/s, video and voice services as well as IP-based data services. It delivers all characteristics to complete a generic cabling system according ISO/IEC 24 702 respectively EN 50 173-3.
The cable is fully screened (each pair in metal foil plus an overall wire braid) and guaranties a very safety signal transmission and high EMC performance.

Identification	Part number	Drawing	Dimensions in mm

Industrial cable
8-wire, Cat. 6_A, PUR

Sheath material:	Polyurethane
Colour:	Yellow, RAL 1021
Cable sheath diameter:	6.3 mm ... 6.9 mm
Transmission performance:	Category 6_A, transmission class E_A up to 500 MHz acc. to IEC 61 156-6
Transmission rate:	1 Gbit/sec, 10 Gbit/sec.
Operating temperature range:	-40 °C ... +80 °C
Cable weight:	46 kg/km

ring 20 m	09 45 600 0630
ring 50 m	09 45 600 0640
ring 100 m	09 45 600 0600
reel 500 m	09 46 600 0620



1. **Conductor**
   Tinned stranded copper wire AWG 26/7
2. **Insulation**
   PE ∅ 1.05 mm
   colour: White-Blue/Blue, White-Orange/Orange, White-Green/Green, White-Brown/Brown
3. **Pair**
   Paired
4. **Pair shielding**
   Aluminate foil, overlapped, PIMF
5. **Shielding**
   Tinned copper wire braid, braid coverage about 70 %
6. **Outer sheath**
   Polyurethane (PUR), flame retardant, halogen free, lead free
   colour: Yellow, RAL 1021

HARTING Industrial Cable 8-wire Cat. 6_A Outdoor PVC

Industrial Cable
8-wire, Cat. 6_A, Outdoor, PVC

Advantages

- Suitable for generic cabling Category 6_A / Class E_A according ISO/IEC 11 801 respectively EN 50 173-1 especially for flexible installation (patch cords)
- Designed for outdoor use, sun light resistant
- Qualified for transmission up to 10 Gigabit Ethernet 10GBase-T acc. IEEE 802.3an
- Based on stranded copper wires AWG 26/7 delivers patch cord performance up to 500 MHz
- Applicable for industrial premises and outdoor installation
- High EMC capability based on the PIMF construction
- Flame retardant, lead free and RoHS compliant
- UL certified for external use AWM Style 20276

General Description

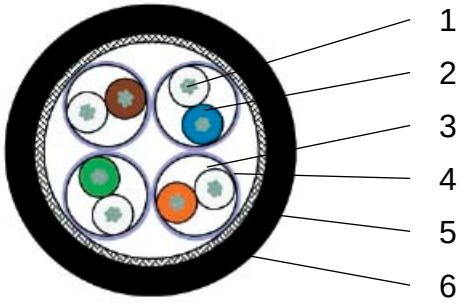
This high-speed data cable was designed for flexible installation in industrial premises and it's especially suitable for termination of HARTING RJ45 data plugs in IP 20 as well as in IP 67 / IP 65. The four pair / eight wire PIMF-construction allows the transmission of IT digital and analogue signals like Ethernet 10/100 Mbit/s, 10 GigaBit/s, video and voice services as well as IP-based data services. It delivers all characteristics to complete a generic cabling system according ISO/IEC 24 702 respectively EN 50 173-3.
The cable is fully screened (each pair in metal foil plus an overall wire braid) and guaranties a very safety signal transmission and high EMC performance.

Identification	Part number	Drawing	Dimensions in mm

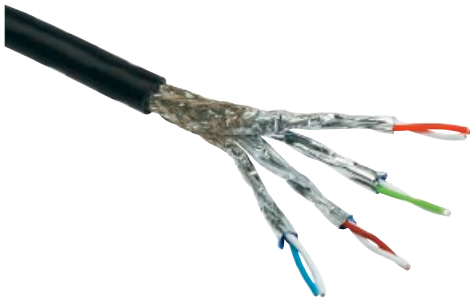
Industrial cable
8-wire, Cat. 6_A, Outdoor, PVC

Sheath material:	Polyvinylchloride
Colour:	Black, RAL 905
Cable sheath diameter:	6.3 mm ... 6.9 mm
Transmission performance:	Category 6_A, transmission class E_A up to 500 MHz acc. to IEC 61 156-6
Transmission rate:	1 Gbit/sec, 10 Gbit/sec.
Operating temperature range:	-20 °C ... +80 °C
Cable weight:	47 kg/km

ring 20 m	09 45 600 0531
ring 50 m	09 45 600 0541
ring 100 m	09 45 600 0501
reel 500 m	09 46 600 0521



1. **Conductor**
   Tinned stranded copper wire AWG 26/7
2. **Insulation**
   PE ∅ 1.05 mm
   colour: White-Blue/Blue, White-Orange/Orange, White-Green/Green, White-Brown/Brown
3. **Pair**
   Paired
4. **Pair shielding**
   Aluminate foil, overlapped, PIMF
5. **Shielding**
   Tinned copper wire braid, braid coverage about 70 %
6. **Outer sheath**
   Polyvinylchloride (PVC), flame retardant, lead free
   colour: Black, RAL 9005



Ha-VIS EtherRail®
flexible data cable, PIMF, 8-wire, Cat. 7

Advantages

- Transmission of Gigabit and 10 Gigabit Ethernet acc. IEEE 802.3 and multimedia services
- Suitable for data cabling in rail vehicles and buses
- Fire protection acc. EN 45 545-1, -2 and -5, flame retardant and heat resistant acc. DIN 5510 (1-4) and EN 50 264-1
- Temperature range -40 °C ... +90 °C
- UV resistant
- RoHS conform, halogen free LSZH

General Description

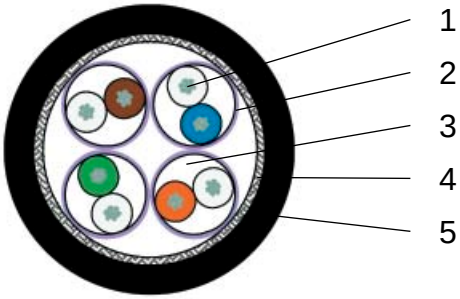
This data cable was especially designed for installation within and outside rail vehicles and buses. The cable fulfils the fire protection requirements according to the international standards for railway vehicles and buses and is suitable for operation over a wide temperature range. Cable design, material and compounds as well as processing (electron beam cross-linking) follow the basic requirements of the European standardisation for railway applications EN 45 545-1, -2 and -5. The robust PIMF cable construction guaranties a reliable data transmission up to 10 Gbit/sec. and for multimedia services.
The cable has been designed to be compatible with products from HARTING like *har*-speed M12 Crimp and Han® GigaBit module.

Identification	Part number	Drawing	Dimensions in mm

Ha-VIS EtherRail®
flexible data cable, PIMF
4x2xAWG24/7, Cat. 7

Sheath material:	Elastomer, electron beam cross-linked
Colour:	Black
Cable sheath diameter:	(8.8 +/- 0.2) mm
Transmission performance:	Category 7, transmission class D, E, E_A, F up to 600 MHz acc. to ISO/IEC 11 801 and EN 50 173-1
Transmission rate:	1/10 Gbit/sec.
Operating temperature range:	-40 °C ... +90 °C
Cable weight:	79 kg/km

ring 100 m	09 45 600 0692
reel 500 m	09 45 600 0693
reel 1000 m	09 45 600 0694



1. **Conductor**
   Tinned stranded copper wire AWG 24/7
2. **Insulation**
   Cellular PE
3. **Pair**
   4x (2x AWG 24) with aluminium-bonded polyester tape
   colour: White/Blue, White/Orange, White/Green, White/Brown
   ∅ 1.55 mm
4. **Shielding**
   Tinned fine copper braid
5. **Outer sheath**
   Elastomer electron beam cross-linked Comp 603
   colour: Black
   Printing:
   “HARTING” Ha-VIS EtherRail® CAT 7 LSZH 4x2xAWG24/7
   “Part-Number” “Chargecode” “Meter”

Notes

HARTING RJ Industrial® 10G RJ45 bulkhead

HARTING RJ Industrial® 10G RJ45 bulkhead

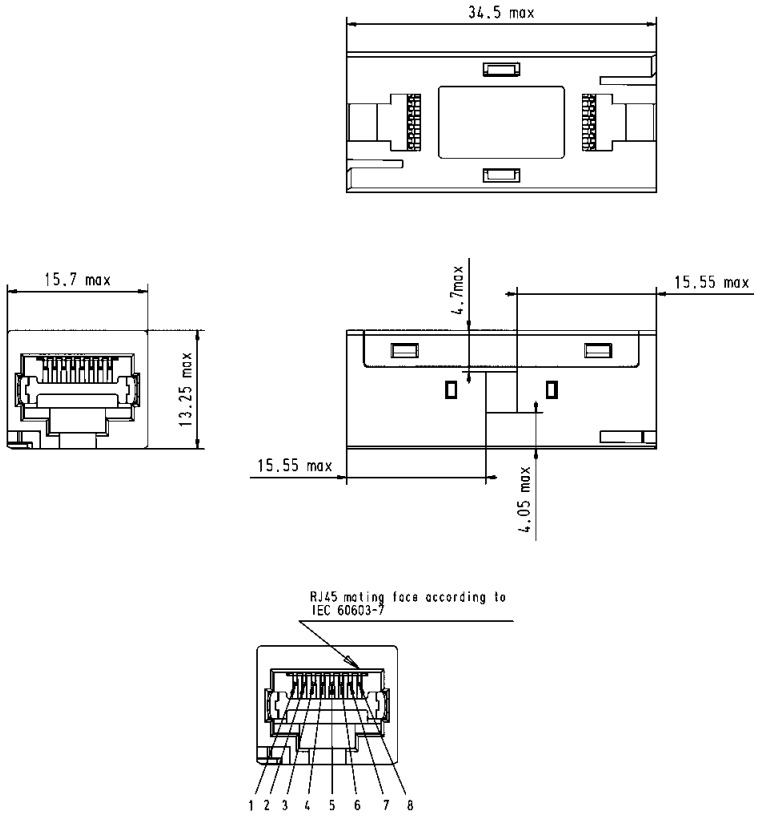
Advantages

- Compact and robust design
- 360° shielding
- Compatible with HIFF dimensions for use in Han® 3 A and PushPull panel feed throughs
- Transmission category 6, performance class E_A, suitable for 1/10 Gigabit Ethernet

Technical characteristics

Mating face	RJ45 acc. to IEC 60 603-7
Number of contacts	8
Degree of protection	IP 20
Mating cycles	min. 750
Temperature range	–40 °C ... +70 °C
Housing material	Zinc die-cast
Flammability acc. to UL 94	V-0

Identification	Part number	Drawing	Dimensions in mm
HARTING RJ Industrial® 10G RJ45 bulkhead	09 45 545 1560		



Han® 3 A RJ45 10G – panel feed through



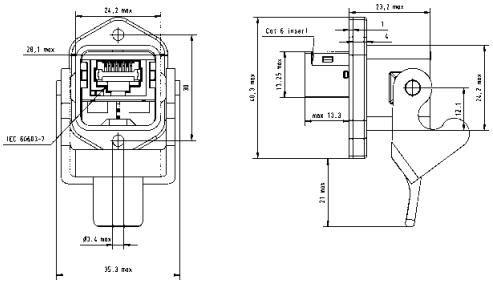
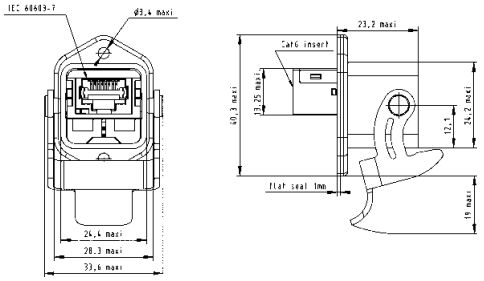
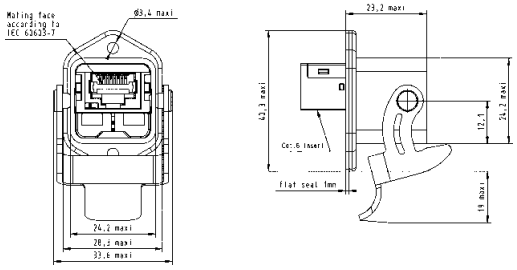
Han® 3 A RJ45 10G – panel feed through

Advantages

- Compact and robust design
- 360° shielding
- Easy mounting
- Transmission category 6, performance class E_A, suitable for 1/10 Gigabit Ethernet
- RJ45 mating compatible
- Suitable for all applications due to different variants
- Coding (4 variants) possible

Technical characteristics

Number of ports	2 / 1x Han® 3 A RJ45 (IP 65 / IP 67) 1x RJ45 (IP 20)
Transmission performance	Category 6 / class E_A acc. to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s and 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact
Mounting	Screwable to cover plates
Degree of protection	IP 65 / IP 67
Mating cycles	min. 500
Temperature range	– 40 °C ... + 70 °C
Housing material	
Plastic version	Polycarbonate, black, UL 94 V-0
Metal version	Zinc die-cast, powder-coated

Identification	Part number	Drawing	Dimensions in mm
Han® 3 A RJ45 10G panel feed through Cat. 6, plastic version, black	09 45 225 1560		
Han® 3 A RJ45 10G panel feed through Cat. 6, metal version, grey	09 45 215 1560		
Han® 3 A RJ45 10G panel feed through Cat. 6, metal M version, black	09 45 215 1561		

Han® 3 A RJ45 10G – panel feed through

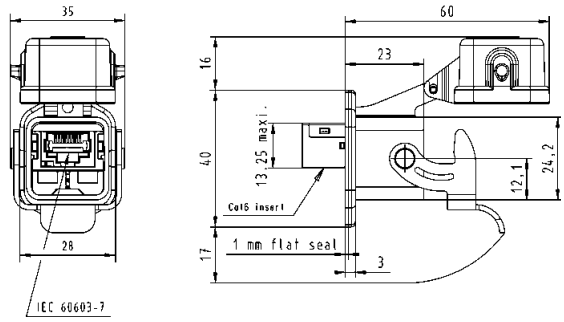
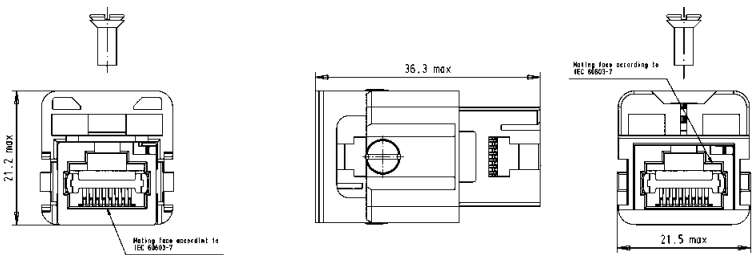
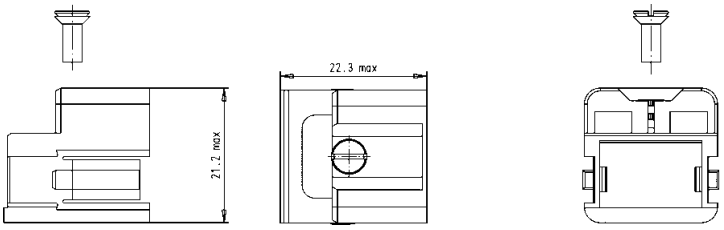
Han® 3 A RJ45 10G – panel feed through

Advantages

- Compact and robust design
- 360° shielding
- Easy mounting
- Transmission category 6, performance class E_A, suitable for 1/10 Gigabit Ethernet
- RJ45 mating compatible
- Suitable for all applications due to different variants
- Coding (4 variants) possible

Technical characteristics

Number of ports	2 / 1x Han® 3 A RJ45 (IP 65 / IP 67) 1x RJ45 (IP 20)
Transmission performance	Category 6 / class E_A acc. to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s and 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact
Mounting	Screwable to cover plates
Degree of protection	IP 65 / IP 67
Mating cycles	min. 500
Temperature range	– 40 °C ... + 70 °C
Housing material	
Plastic version	Polycarbonate, black, UL 94 V-0
Metal version	Zinc die-cast, powder-coated

Identification	Part number	Drawing	Dimensions in mm
Han® 3 A RJ45 10G panel feed through Cat. 6 metal version, grey including self-closing protection cap	09 45 215 1562		
Han® 3 A RJ45 10G insert Cat. 6 (for Han® 3 A housings)	09 45 200 1560		
Han® 3 A RJ45 HIFF adapter to mount HIFF inserts (e.g. HARTING RJ Industrial® 10G RJ45 bulkhead or Ha-VIS preLink® RJ45) in Han® 3 A housings	09 45 515 0024		

HARTING PushPull RJ45 10G – panel feed through

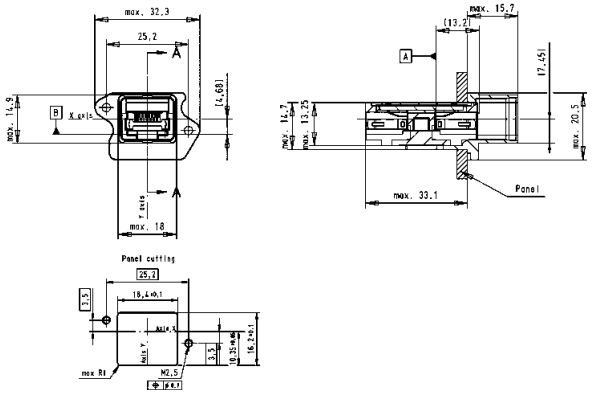
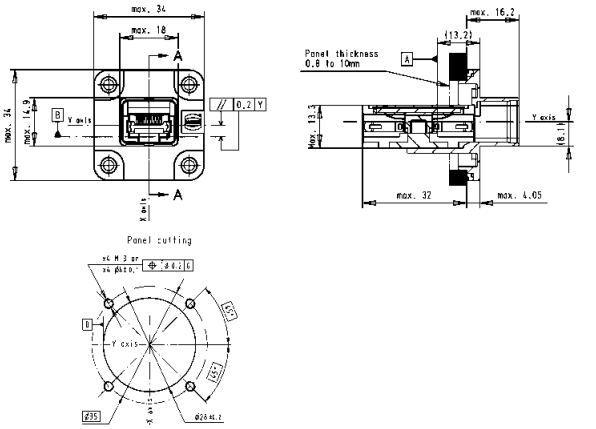
HARTING PushPull RJ45 10G – panel feed through

Advantages

- Compact and robust design
- Compact PushPull Interface in IP 65 / IP 67
- 360° shielding
- RJ45 mating compatible
- Transmission category 6, performance class E_A, suitable for 1/10 Gigabit Ethernet

Technical characteristics

Number of ports	2 / 1x PushPull RJ45 (IP 65 / IP 67) 1x RJ45 (IP 20)
Locking	PushPull technology acc. to IEC 61 076-3-106 variant 4
Transmission performance	Category 6 / class E_A acc. to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s and 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact
Mounting	Screwable to cover plates
Degree of protection	IP 65 / IP 67
Mating cycles	min. 750
Temperature range	– 40 °C ... + 70 °C
Housing material	Polycarbonate, black, UL 94 V-0

Identification	Part number	Drawing	Dimensions in mm
HARTING PushPull Compact RJ45 10G panel feed through Cat. 6, plastic version, black	09 45 245 1560		
HARTING PushPull EasyInstall RJ45 10G panel feed through Cat. 6, pastic version, black	09 45 245 1590		

HARTING PushPull RJ45

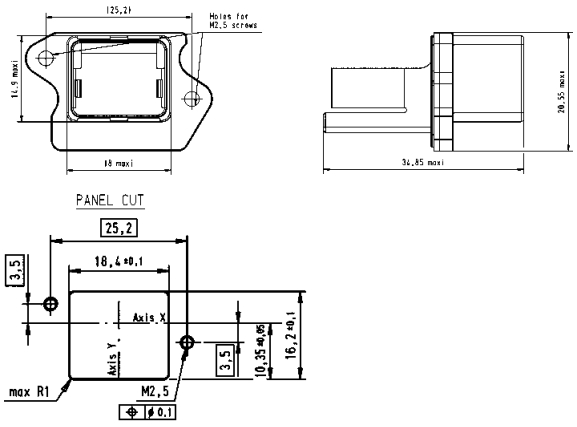
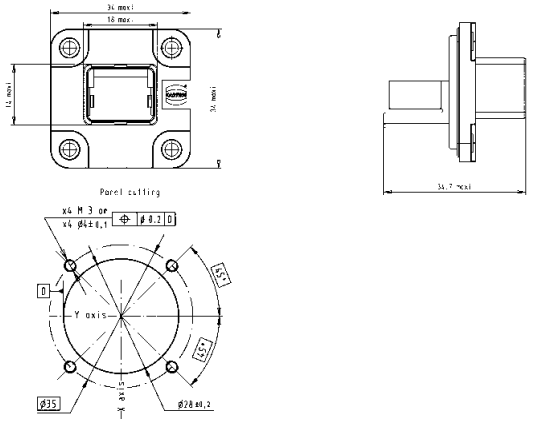
HARTING PushPull RJ45 – HIFF bulkhead housings

Advantages

- Compact and robust design
- Compact PushPull Interface in IP 65 / IP 67
- RJ45 mating compatible

Technical characteristics

Number of ports	2 / 1x PushPull RJ45 (IP 65 / IP 67) 1x RJ45 (IP 20)
Locking	PushPull technology acc. to IEC 61 076-3-106 variant 4
Mounting	Screwable to cover plates
Degree of protection	IP 65 / IP 67
Mating cycles	min. 750
Temperature range	– 40 °C ... + 70 °C
Housing material	Polycarbonate, black, UL 94 V-0

Identification	Part number	Drawing	Dimensions in mm
HARTING PushPull Compact bulkhead housing to mount HIFF inserts, e.g. HARTING RJ Industrial® 10G RJ45 bulkhead or Ha-VIS preLink® RJ45-module	09 45 545 0028		
HARTING PushPull EasyInstall bulkhead housing to mount HIFF inserts, e.g. HARTING RJ Industrial® 10G RJ45 bulkhead or Ha-VIS preLink® RJ45-module	09 45 545 0032		

Han® PushPull RJ45 10G metal – panel feed through

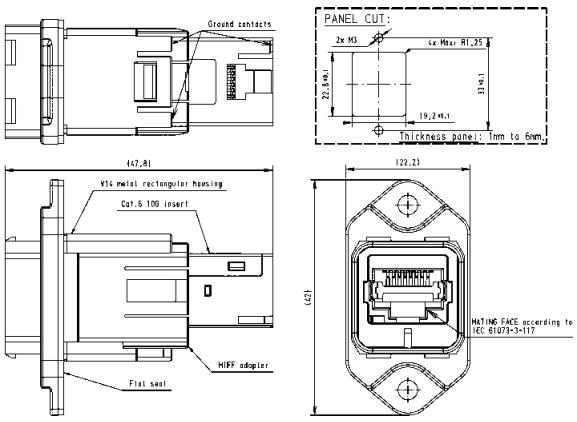
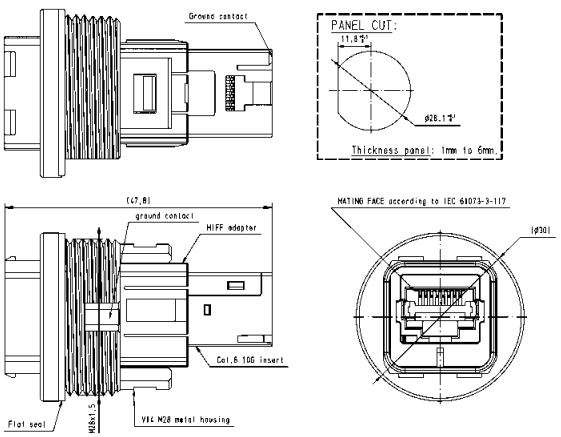
Han® PushPull, acc. to IEC 61076-3-117 variant 14
RJ45 10G panel feed through

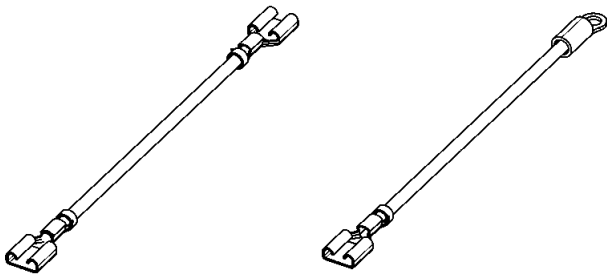
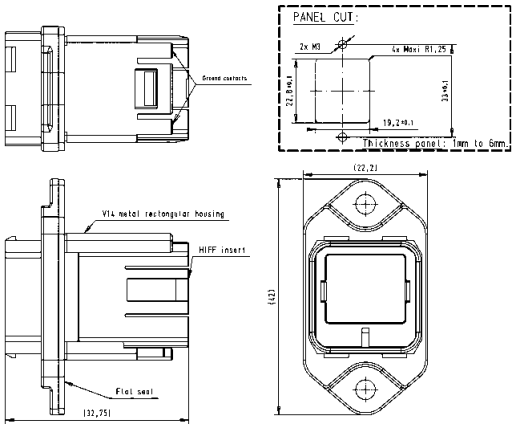
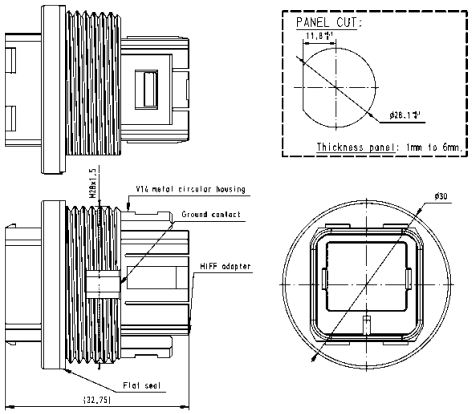
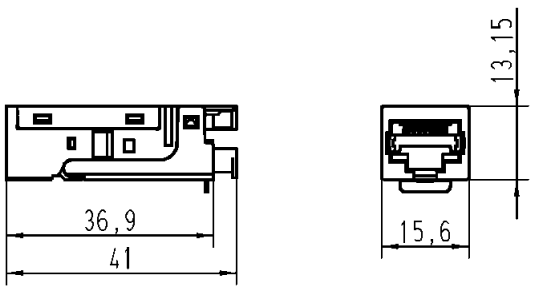
Advantages

- HARTING PushPull technology
- Compact and robust design
- 360° shielding
- RJ45 mating compatible
- Transmission category 6, performance class E_A, suitable for 1/10 Gigabit Ethernet
- PROFINET conform

Technical characteristics

Locking	PushPull technology acc. to IEC 61 076-3-117 variant 14
Mating face	RJ45 acc. to IEC 60 603-7
Transmission performance	Category 6 / class E_A acc. to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s and 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact
Mounting	Screwable to cover plates
Degree of protection	IP 65 / IP 67
Mating cycles	min. 750
Temperature range	– 40 °C ... + 70 °C
Housing material	Zinc die-cast, nickel-plated

Identification	Part number	Drawing	Dimensions in mm
Han® PushPull RJ45 10G panel feed through including bulkhead housing for rectangular panel cut out, flat seal and HARTING RJ Industrial® 10G RJ45 bulkhead, isolated bulkhead fixture	09 35 225 0311		
including bulkhead housing for circular panel cut out, flat seal and HARTING RJ Industrial® 10G RJ45 bulkhead, isolated bulkhead fixture	09 35 225 0312		

Identification	Part number	Drawing	Dimensions in mm
Patch cord 1.5 mm² for potential equalization between RJ 45 insert and bulkhead housing			
with 2 x flat receptacle	09 45 500 0001		
with flat receptacle and ring terminal M3	09 45 500 0002		
Han® PushPull RJ45 10G panel feed through			
to mount HIFF inserts, e.g. HARTING RJ Industrial® 10G RJ45 bulkhead or Ha-VIS preLink® RJ45-module Order inserts separately			
Bulkhead housing for rectangular panel cut out, incl. plastic adapter	09 35 012 0311		
Bulkhead housing for circular panel cut out, incl. plastic adapter	09 35 012 0312		
Ha-VIS preLink® set RJ45 jack AWG 22/23			
consists of: • 1x Ha-VIS preLink® module RJ45 jack • 1x Ha-VIS preLink® terminal module • 1x cable tie	20 82 001 0001		

Han® PushPull RJ45 metal – connector

Han® PushPull, acc. to IEC 61076-3-117 variant 14
RJ45 connector

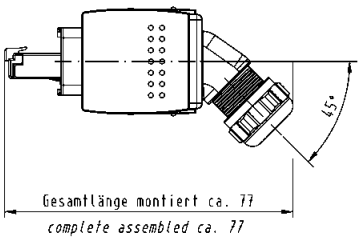
Advantages

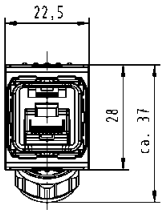
- Robust, industry-compatible design
- Angled cable exit 45° to the top / bottom
- Field-installable via IDC-Technology
- Fully shielded
- For stranded and flexible conductors AWG 22-27
- PROFINET conform
- Field-installable directly in the automation equipment
- For place-saving fitting-conditions

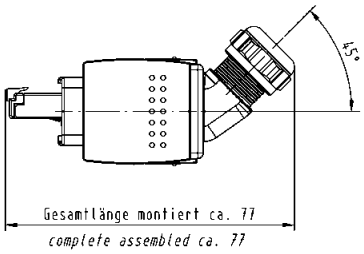
Technical characteristics

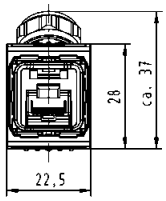
Connector type	PushPull RJ45 connector acc. to ISO/IEC 24 702, IEC 61 076-3-117 variant 14 (AIDA conform)
Transmission performance	acc. to ISO/IEC 11 801:2002, EN 50 173-1, category 5 / class D up to 100 MHz respectively category 6 / class E_A up to 500 MHz
Transmission rate	10/100 Mbit/s and 1/10 Gbit/s
Number of contacts	4 respectively 8
Shielding	Fully shielded, 360° shielding contact
Connectable cables	
- Conductor cross section	AWG 27 ... AWG 22 (solid / stranded)
- Conductor diameter	max. 1.5 mm (including insulation)
- Cable diameter	6.5 ... 9.5 mm
Degree of protection	IP 65 / IP 67
Mating cyles	min. 750
Connection of lead	via IDC-contacts, without tools
Temperature range	– 40 °C … + 70 °C
Housing material	Zinc die-cast, nickel-plated

Identification	Part number	Drawing	Dimensions in mm
Han® PushPull RJ45 connector set, metal			
cable exit bottom side, 4 poles, Cat. 5	09 35 226 0402		
cable exit bottom side, 8 poles, Cat. 6	09 35 225 0402		
cable exit top side, 4 poles, Cat. 5	09 35 226 0403		
cable exit top side, 8 poles, Cat. 6	09 35 225 0403		









har-port coupler

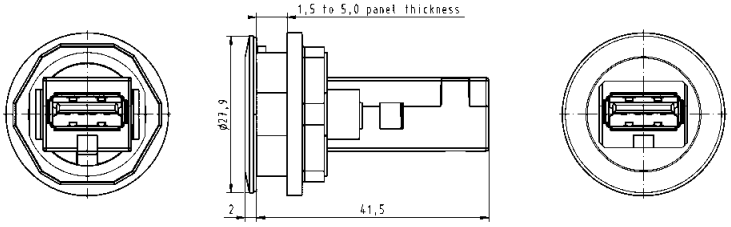
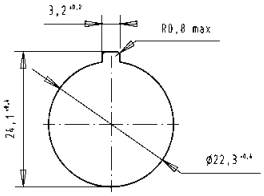
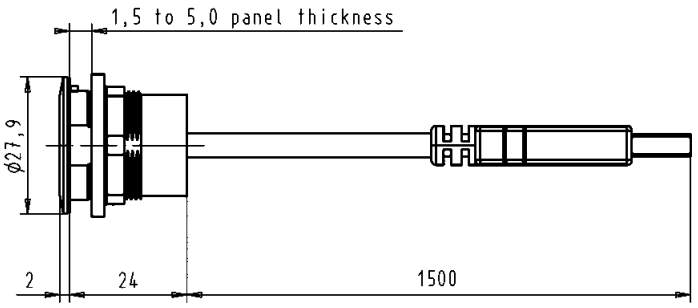
har-port USB coupler

Advantages

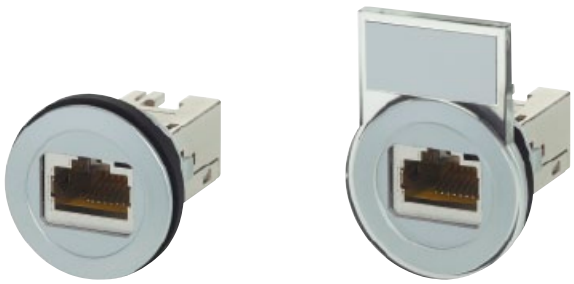
- Compact and well-shaped service interface in a timeless attractive design
- Easy mounting
- Compact and robust design
- Practical accessories

Technical characteristics

Number of ports	2x USB Typ A
Mounting	Screwable to cover plates
Degree of protection	IP 20
Mating cycles	min. 1500
Temperature range	– 25 °C ... + 70 °C
Housing material	Polyamide

Identification	Part number	Drawing	Dimensions in mm
har-port USB 2.0 A-A coupler	09 45 452 1901		
har-port USB 3.0 A-A coupler	09 45 452 1902		
har-port USB 2.0 A-A coupler with 1.5 m cable	09 45 452 1922		

har-port coupler



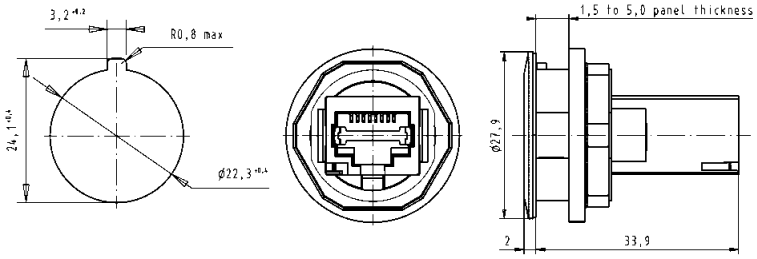
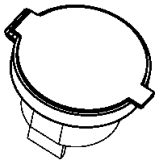
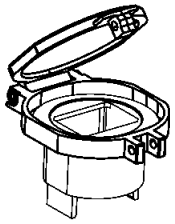
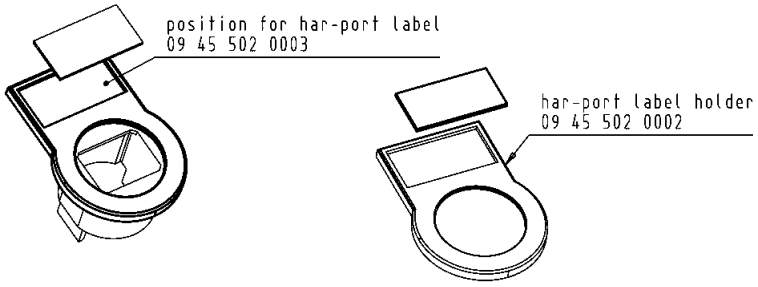
har-port RJ45 coupler and accessories

Advantages

- Compact and well-shaped service interface in a timeless attractive design
- Easy mounting
- Transmission category 6, performance class E_A, suitable for 1/10 Gigabit Ethernet
- Compact and robust design
- Practical accessories

Technical characteristics

Number of ports	2x RJ45
Transmission performance	Category 6 / class E_A acc. ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s and 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact
Mounting	Screwable to cover plates
Degree of protection	IP 20
Mating cycles	min. 750
Temperature range	– 25 °C ... + 70 °C
Housing material	Polyamide

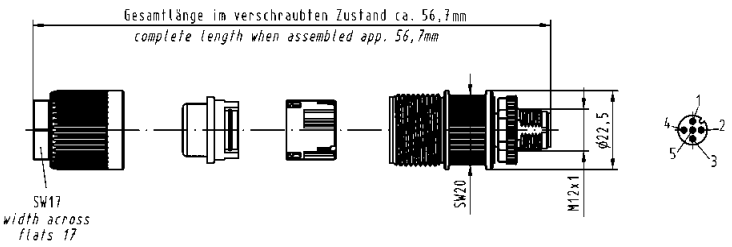
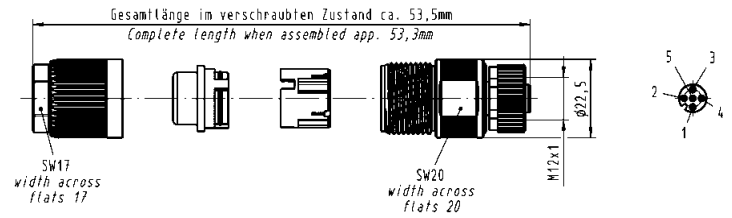
Identification	Part number	Drawing	Dimensions in mm
har-port RJ45 Cat. 6 coupler	09 45 452 1560		
Accessories			
har-port protection cover IP 44	09 45 502 0000		
har-port sealing cover	09 45 502 0001		
har-port label holder	09 45 502 0002		
har-port label for label holder 09 45 502 0002	09 45 502 0003		

HARAX® circular connector

HARAX® M12-XL

Technical characteristics

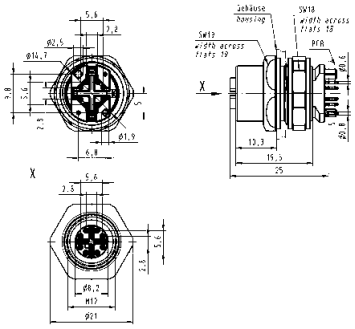
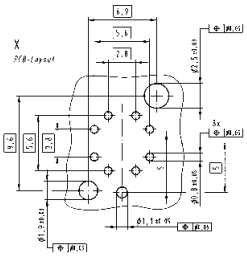
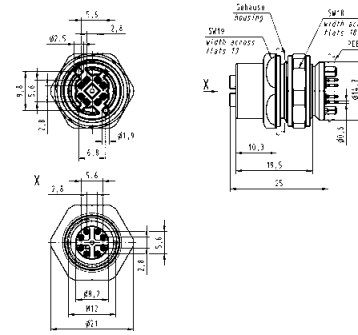
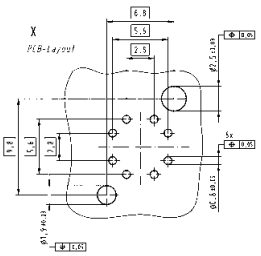
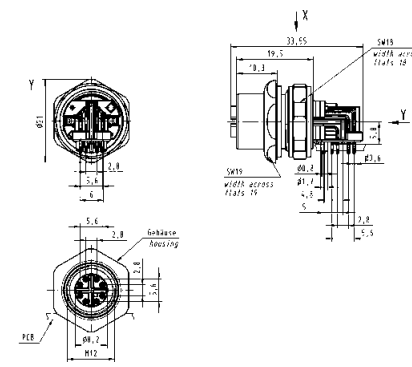
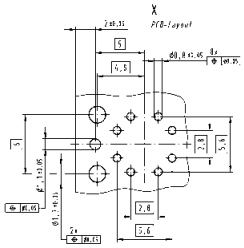
Rated voltage	50 V
Rated current	4 A
Conductor cross section	0.5 - 1 mm² AWG 20 - 18
Diameter of individual strands	≥ 0.1 mm
Conductor insulation material	PVC, ETFE
Conductor diameter	≥ 2.8 mm
Cable diameter	5.5 - 8.5 mm
Limiting temperatures	- 40 °C … + 85 °C
Temperature during connection	- 5 °C … + 50 °C
Degree of protection	IP 65 / IP 67
Termination cycles with the same cross section	10
Recommended tightening torque / Hexagonal wrench	0.6 Nm / SW 17

Identification	Part number	Drawing	Dimensions in mm
HARAX® M12-XL			
5 poles, A-coded			
Male	21 03 216 1505		
Female	21 03 216 2505		

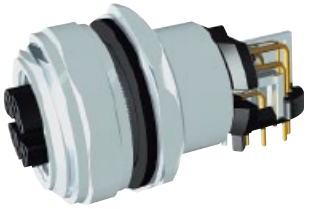
har-speed M12 receptacle

Technical characteristics

- Robust, industry-compatible design
- Fully shielded
- Performance class E_A, suitable for 1/10 Gigabit Ethernet
- Temperature range: – 40 °C … + 85 °C
- Degree of protection: IP 65 / IP 67
- Reflow compatible
- 500 mating cycles
- Mating face acc. to IEC/PAS 61 076-2-109

Identification	Part number	Drawing	Dimensions in mm
***har*-speed M12 receptacle for front mounting** 8 poles, X-coded			
straight, Cat. 6_A	21 03 381 2802		
straight, Cat. 5	21 03 381 2803		
angled, Cat. 6_A	21 03 381 4802		

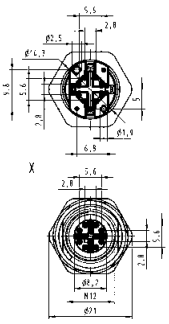
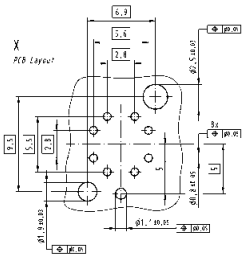
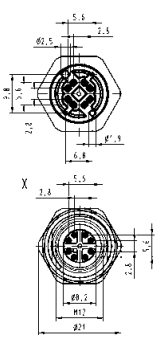
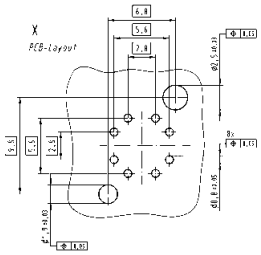
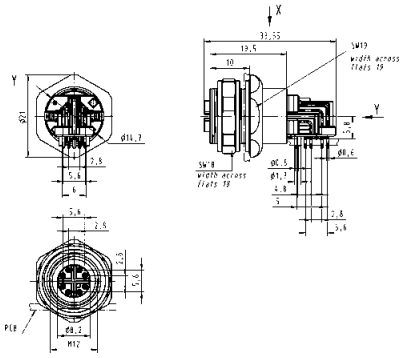
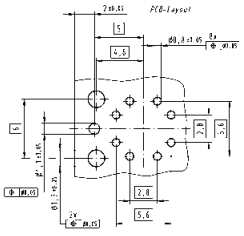




har-speed M12 receptacle

Technical characteristics

- Robust, industry-compatible design
- Fully shielded
- Performance class E_A, suitable for 1/10 Gigabit Ethernet
- Temperature range: – 40 °C … + 85 °C
- Degree of protection: IP 65 / IP 67
- Reflow compatible
- 500 mating cycles
- Mating face acc. to IEC/PAS 61 076-2-109

Identification	Part number	Drawing	Dimensions in mm
***har*-speed M12 receptacle for rear mounting** 8 poles, X-coded			
straight, Cat. 6_A	21 03 381 2804		
straight, Cat. 5	21 03 381 2805		
angled, Cat. 6_A	21 03 381 4804		

Small, flexible, robust: HARTING *har*-flex

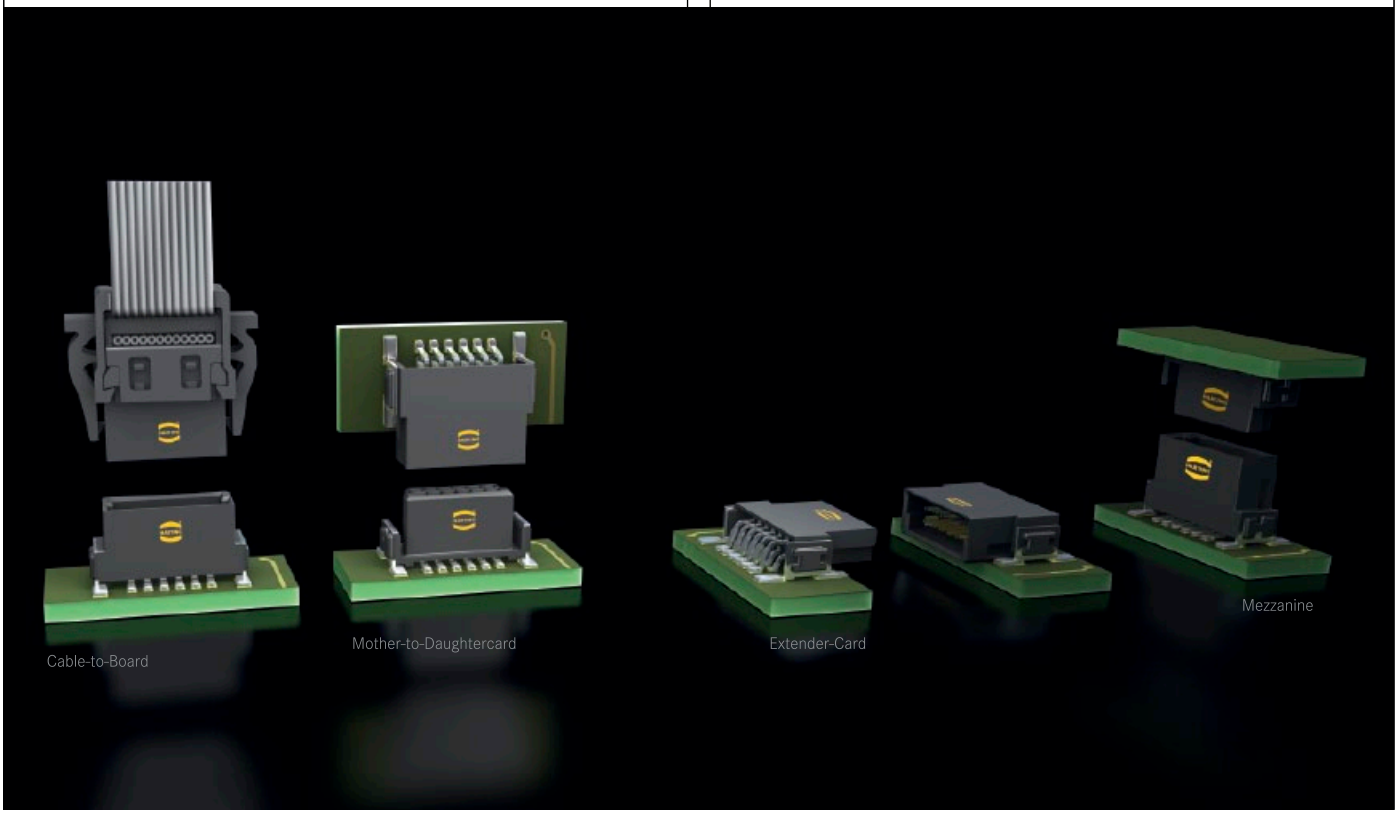
With *har*-flex, HARTING has developed a general-purpose series for internal Device Connectivity.

The continuous scalability by an even number of contacts, i.e. from 6 to 100, of the HARTING‘s *har*-flex mezzanine connector series is a special feature forming an ideal basis for customized applications. The advantage is clearly evident considering that the connector is always optimized to suit specific applications on the device PCB, while also covering the medium- and small-scale volume range that is typical for the production of industrial devices.

This flexibility is new – and represents a standard at HARTING. The triad of Device Connectivity, Installation Technology, and Automation IT creates ideal connectivity solutions for the data, power, and signal lifelines. Solutions that position customer applications as decisive factors. And the outlooks are bright – because there is a lot more to come.

Product diversity

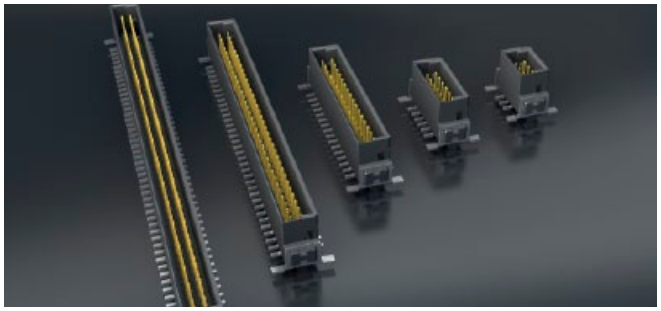
The *har*-flex product range with SMT technology is based on a 1.27 mm grid. With its angled and straight variants that support four different stacking heights and a range of cable connectors, HARTING provides connectivity solutions for many different board-to-board and cable-to-board applications.



Small, flexible, robust: HARTING *har*-flex

Many pin count options

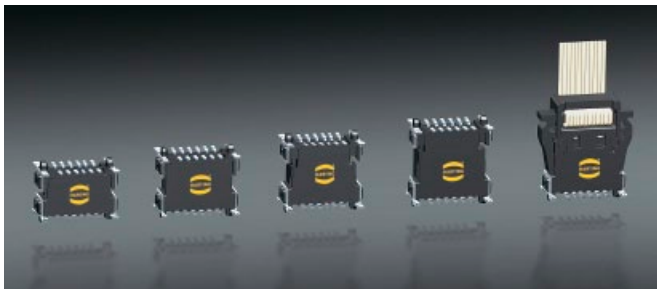
HARTING has developed a modular tooling concept which offers a broad choice of configurations between 6 and 100 poles in even numbered positions. This flexibility in the choice of number of contacts, combined with high density contact spacing, allow the designer to maximize the use of PCB real estate, thereby achieving overall space savings and cost efficiencies.



All variants providing between 6 and 100 poles are available in even numbered positions

Flexible board-to-board distances

HARTING covers mezzanine applications with a range of straight versions for four different stacking heights that can be used to interconnect PCBs arranged in parallel stacks with spacing between 8.0 mm and 13.8 mm. Additional stacking heights are in development. For applications requiring larger spacing between boards HARTING offers compatible cable-to-board connectors with insulation displacement technology.



Four different stacking heights & the IDC cable solution: PCB clearances between 8.0 mm and ∞

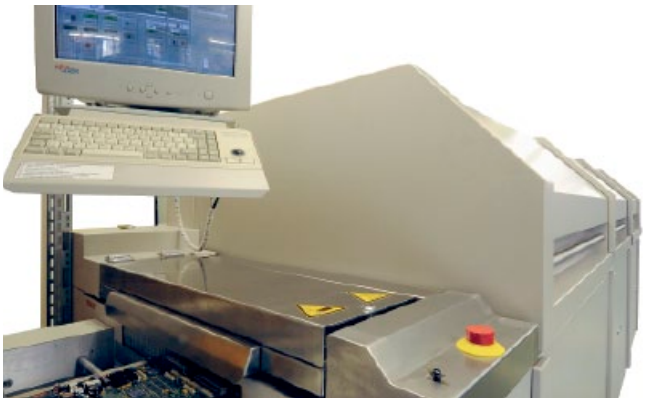
Robust design

The special SMT fixing ensures a robust and enduring connection to the PCB and helps to absorb mechanical stress on the solder contacts resulting from insertion and removal forces.

Special SMT fixing ensures a robust connection to the PCB

Automated processing features

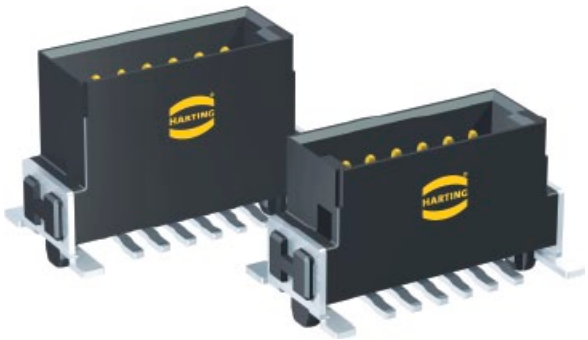
The *har*-flex SMT connectors meet the highest demands in terms of their processing capabilities. Special blister packaging provides protection during shipping and handling, while the “pick and place” pads enable automated assembly of the PCBs. The temperature resistant materials of the insulating body, in combination with consistent testing of the coplanarity of contacts, ensure reliable soldering capabilities of the connectors in the reflow process.



Reliable soldering capabilities in the reflow process

Number of contacts	6, 8, 10 … 96, 98, 100
Connector pitch	1.27 mm x 1.27 mm [0.050“ x 0.050“]
Working current acc. to IEC 60512 @ 80 % derating	
	70 °C
6way	1.1 A
12way	1.1 A
50way	0.8 A
80way	0.8 A
100way	0.8 A
Clearance and creepage	0.4 mm
Test voltage $U_{r.m.s.}$	500 V
Contact resistance	< 25 mΩ
Insulation resistance	> 10 GΩ
Temperature range	– 55 °C … + 125 °C
The higher temperature limit includes the local ambient and heating effects of the contacts under load	
During reflow soldering	max. + 260 °C for 20 - 40 s
Electrical termination	SMT
	IDC for PVC flat cables: AWG 30/1 (solid) and AWG 30/7 (stranded) for PTFE flat cables: AWG 30/1 (solid)
Insertion and withdrawal force	approx. 0.5 N / contact
Materials	
Mouldings	LCP, UL 94-V0
Contacts	Copper alloy
Contact surface	
Mating side	Au-flash over PdNi
Termination side	Sn
IDC termination	Sn
Mating cycles acc. to IEC 60603-2	
Performance level 2	≥ 250 mating cycles, 4 days gas test
Performance level 1	≥ 500 mating cycles, 10 days gas test
Performance level S4	Contact surface – min. 0.06 µm Au over $0.7^{+0.2}$ µm PdNi

Notes



Male connectors, straight

Identification	Number of contacts	Part No.	Dimensions in mm

Male connector, straight, stacking heights 1.75 / 3.25 mm

Number of contacts	Part No.
6	15 1 . 006 . 601 . . .
8	15 1 . 008 . 601 . . .
10	15 1 . 010 . 601 . . .
12	15 1 . 012 . 601 . . .
14	15 1 . 014 . 601 . . .
16	15 1 . 016 . 601 . . .
18	15 1 . 018 . 601 . . .
20	15 1 . 020 . 601 . . .
22	15 1 . 022 . 601 . . .
24	15 1 . 024 . 601 . . .
26	15 1 . 026 . 601 . . .
28	15 1 . 028 . 601 . . .
30	15 1 . 030 . 601 . . .
32	15 1 . 032 . 601 . . .
34	15 1 . 034 . 601 . . .
36	15 1 . 036 . 601 . . .
38	15 1 . 038 . 601 . . .
40	15 1 . 040 . 601 . . .
42	15 1 . 042 . 601 . . .
44	15 1 . 044 . 601 . . .
46	15 1 . 046 . 601 . . .
48	15 1 . 048 . 601 . . .
50	15 1 . 050 . 601 . . .
52	15 1 . 052 . 601 . . .
54	15 1 . 054 . 601 . . .
56	15 1 . 056 . 601 . . .
58	15 1 . 058 . 601 . . .
60	15 1 . 060 . 601 . . .
62	15 1 . 062 . 601 . . .
64	15 1 . 064 . 601 . . .
66	15 1 . 066 . 601 . . .
68	15 1 . 068 . 601 . . .
70	15 1 . 070 . 601 . . .
72	15 1 . 072 . 601 . . .
74	15 1 . 074 . 601 . . .
76	15 1 . 076 . 601 . . .
78	15 1 . 078 . 601 . . .
80	15 1 . 080 . 601 . . .
82	15 1 . 082 . 601 . . .
84	15 1 . 084 . 601 . . .
86	15 1 . 086 . 601 . . .
88	15 1 . 088 . 601 . . .
90	15 1 . 090 . 601 . . .
92	15 1 . 092 . 601 . . .
94	15 1 . 094 . 601 . . .
96	15 1 . 096 . 601 . . .
98	15 1 . 098 . 601 . . .
100	15 1 . 100 . 601 . . .

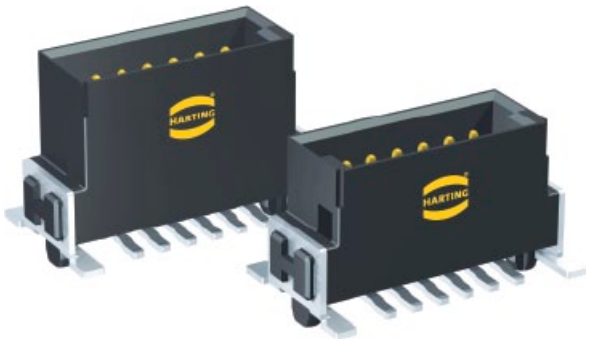
Please insert digit for stacking height

1.75 mm ▶ 1
3.25 mm ▶ 2

A	B	C	D	E	F
2.54	6.96	8.89	5.76	4.76	6.56
3.81	8.23	10.16	7.03	6.03	7.83
5.08	9.50	11.43	8.30	7.30	9.10
6.35	10.77	12.70	9.57	8.57	10.37
7.62	12.04	13.97	10.84	9.84	11.64
8.89	13.31	15.24	12.11	11.11	12.91
10.16	14.58	16.51	13.38	12.38	14.18
11.43	15.85	17.78	14.65	13.65	15.45
12.70	17.12	19.05	15.92	14.92	16.72
13.97	18.39	20.32	17.19	16.19	17.99
15.24	19.66	21.59	18.46	17.46	19.26
16.51	20.93	22.86	19.73	18.73	20.53
17.78	22.20	24.13	21.00	20.00	21.80
19.05	23.47	25.40	22.27	21.27	23.07
20.32	24.74	26.67	23.54	22.54	24.34
21.59	26.01	27.94	24.81	23.81	25.61
22.86	27.28	29.21	26.08	25.08	26.88
24.13	28.55	30.48	27.35	26.35	28.15
25.40	29.82	31.75	28.62	27.62	29.42
26.67	31.09	33.02	29.89	28.89	30.69
27.94	32.36	34.29	31.16	30.16	31.96
29.21	33.63	35.56	32.43	31.43	33.23
30.48	34.90	36.83	33.70	32.70	34.50
31.75	36.17	38.10	34.97	33.97	35.77
33.02	37.44	39.37	36.24	35.24	37.04
34.29	38.71	40.64	37.51	36.51	38.31
35.56	39.98	41.91	38.78	37.78	39.58
36.83	41.25	43.18	40.05	39.05	40.85
38.10	42.52	44.45	41.32	40.32	42.12
39.37	43.79	45.72	42.59	41.59	43.39
40.64	45.06	46.99	43.86	42.86	44.66
41.91	46.33	48.26	45.13	44.13	45.93
43.18	47.60	49.53	46.40	45.40	47.20
44.45	48.87	50.80	47.67	46.67	48.47
45.72	50.14	52.07	48.94	47.94	49.74
46.99	51.41	53.34	50.21	49.21	51.01
48.26	52.68	54.61	51.48	50.48	52.28
49.53	53.95	55.88	52.75	51.75	53.55
50.80	55.22	57.15	54.02	53.02	54.82
52.07	56.49	58.42	55.29	54.29	56.09
53.34	57.76	59.69	56.56	55.56	57.36
54.61	59.03	60.96	57.83	56.83	58.63
55.88	60.30	62.23	59.10	58.10	59.90
57.15	61.57	63.50	60.37	59.37	61.17
58.42	62.84	64.77	61.64	60.64	62.44
59.69	64.11	66.04	62.91	61.91	63.71
60.96	65.38	67.31	64.18	63.18	64.98
62.23	66.65	68.58	65.45	64.45	66.25

for performance level 1 — 2
for performance level S4 — 5
for performance level 2 — 6

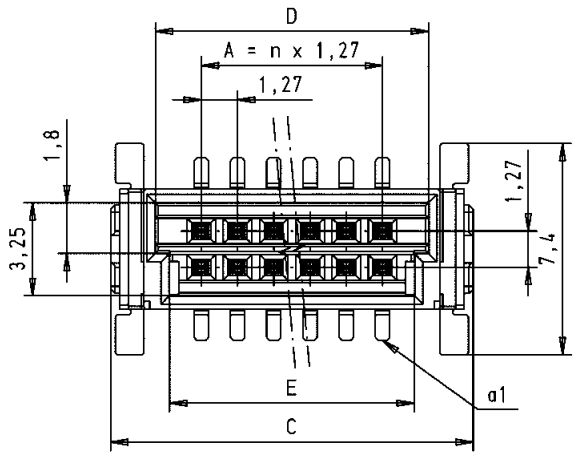
333 000 — for samples / for 280 pieces on reel



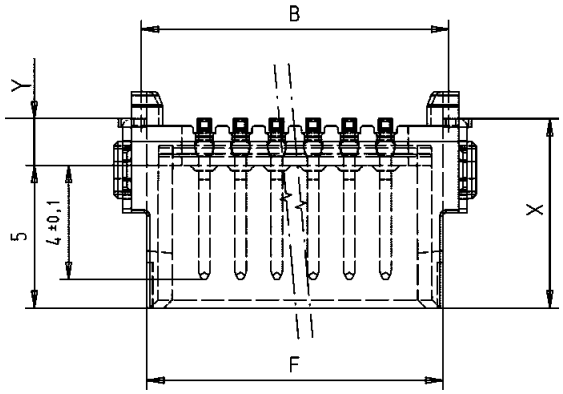
Male connectors, straight

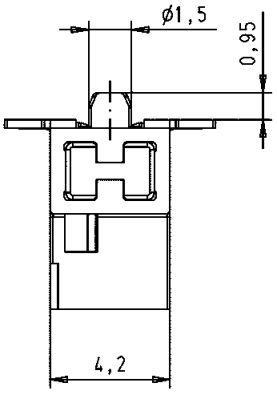
Identification	Drawing	Dimensions in mm

Dimensions

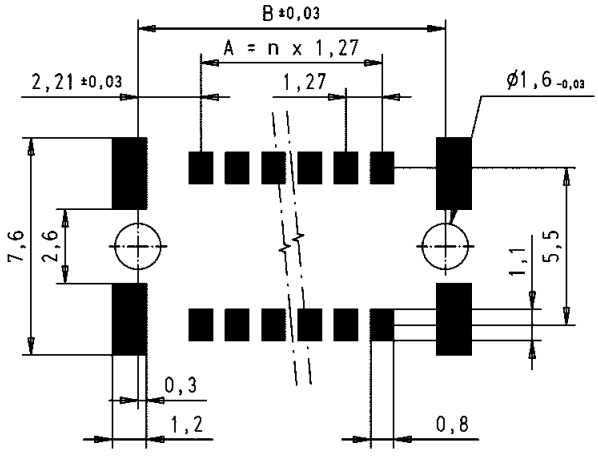


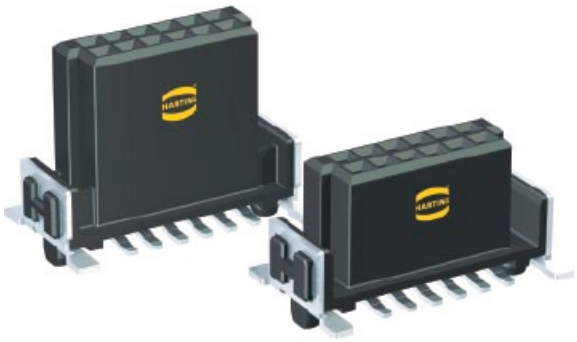
stacking height Y	X
1.75	6.6
3.25	8.1





PCB layout





Female connectors, straight

Identification	Number of contacts	Part No.	Dimensions in mm

Female connector, straight, stacking heights 6.25 / 9.05 mm

Number of contacts	Part No.
6	15 2 . 006 . 601 . . .
8	15 2 . 008 . 601 . . .
10	15 2 . 010 . 601 . . .
12	15 2 . 012 . 601 . . .
14	15 2 . 014 . 601 . . .
16	15 2 . 016 . 601 . . .
18	15 2 . 018 . 601 . . .
20	15 2 . 020 . 601 . . .
22	15 2 . 022 . 601 . . .
24	15 2 . 024 . 601 . . .
26	15 2 . 026 . 601 . . .
28	15 2 . 028 . 601 . . .
30	15 2 . 030 . 601 . . .
32	15 2 . 032 . 601 . . .
34	15 2 . 034 . 601 . . .
36	15 2 . 036 . 601 . . .
38	15 2 . 038 . 601 . . .
40	15 2 . 040 . 601 . . .
42	15 2 . 042 . 601 . . .
44	15 2 . 044 . 601 . . .
46	15 2 . 046 . 601 . . .
48	15 2 . 048 . 601 . . .
50	15 2 . 050 . 601 . . .
52	15 2 . 052 . 601 . . .
54	15 2 . 054 . 601 . . .
56	15 2 . 056 . 601 . . .
58	15 2 . 058 . 601 . . .
60	15 2 . 060 . 601 . . .
62	15 2 . 062 . 601 . . .
64	15 2 . 064 . 601 . . .
66	15 2 . 066 . 601 . . .
68	15 2 . 068 . 601 . . .
70	15 2 . 070 . 601 . . .
72	15 2 . 072 . 601 . . .
74	15 2 . 074 . 601 . . .
76	15 2 . 076 . 601 . . .
78	15 2 . 078 . 601 . . .
80	15 2 . 080 . 601 . . .
82	15 2 . 082 . 601 . . .
84	15 2 . 084 . 601 . . .
86	15 2 . 086 . 601 . . .
88	15 2 . 088 . 601 . . .
90	15 2 . 090 . 601 . . .
92	15 2 . 092 . 601 . . .
94	15 2 . 094 . 601 . . .
96	15 2 . 096 . 601 . . .
98	15 2 . 098 . 601 . . .
100	15 2 . 100 . 601 . . .

Please insert digit for stacking height

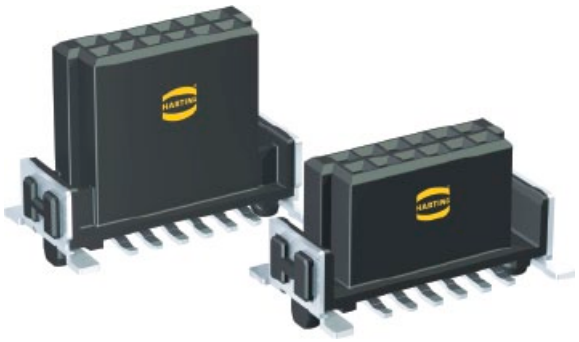
6.25 mm ▶ 1
9.05 mm ▶ 2

A	B	C	D	E
2.54	6.96	8.89	5.56	4.56
3.81	8.23	10.16	6.83	5.83
5.08	9.50	11.43	8.10	7.10
6.35	10.77	12.70	9.37	8.37
7.62	12.04	13.97	10.64	9.64
8.89	13.31	15.24	11.91	10.91
10.16	14.58	16.51	13.18	12.18
11.43	15.85	17.78	14.45	13.45
12.70	17.12	19.05	15.72	14.72
13.97	18.39	20.32	16.99	15.99
15.24	19.66	21.59	18.26	17.26
16.51	20.93	22.86	19.53	18.53
17.78	22.20	24.13	20.80	19.80
19.05	23.47	25.40	22.07	21.07
20.32	24.74	26.67	23.34	22.34
21.59	26.01	27.94	24.61	23.61
22.86	27.28	29.21	25.88	24.88
24.13	28.55	30.48	27.15	26.15
25.40	29.82	31.75	28.42	27.42
26.67	31.09	33.02	29.69	28.69
27.94	32.36	34.29	30.96	29.96
29.21	33.63	35.56	32.23	31.23
30.48	34.90	36.83	33.50	32.50
31.75	36.17	38.10	34.77	33.77
33.02	37.44	39.37	36.04	35.04
34.29	38.71	40.64	37.31	36.31
35.56	39.98	41.91	38.58	37.58
36.83	41.25	43.18	39.85	38.85
38.10	42.52	44.45	41.12	40.12
39.37	43.79	45.72	42.39	41.39
40.64	45.06	46.99	43.66	42.66
41.91	46.33	48.26	44.93	43.93
43.18	47.60	49.53	46.20	45.20
44.45	48.87	50.80	47.47	46.47
45.72	50.14	52.07	48.74	47.74
46.99	51.41	53.34	50.01	49.01
48.26	52.68	54.61	51.28	50.28
49.53	53.95	55.88	52.55	51.55
50.80	55.22	57.15	53.82	52.82
52.07	56.49	58.42	55.09	54.09
53.34	57.76	59.69	56.36	55.36
54.61	59.03	60.96	57.63	56.63
55.88	60.30	62.23	58.90	57.90
57.15	61.57	63.50	60.17	59.17
58.42	62.84	64.77	61.44	60.44
59.69	64.11	66.04	62.71	61.71
60.96	65.38	67.31	63.98	62.98
62.23	66.65	68.58	65.25	64.25

for performance level 1
for performance level S4
for performance level 2
2
5
6

333
000

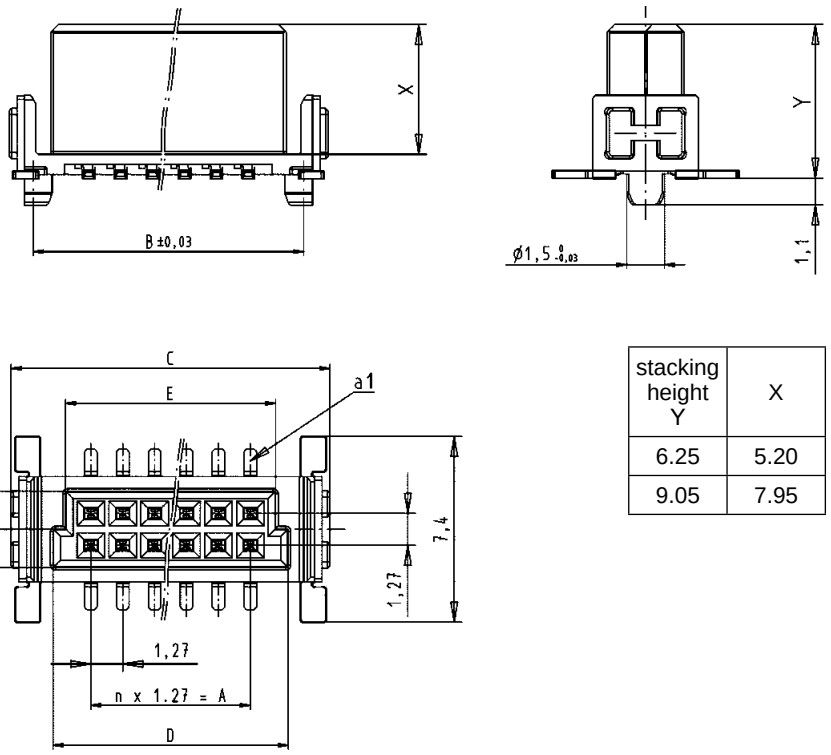
for samples
for 280 pieces on reel



Female connectors, straight

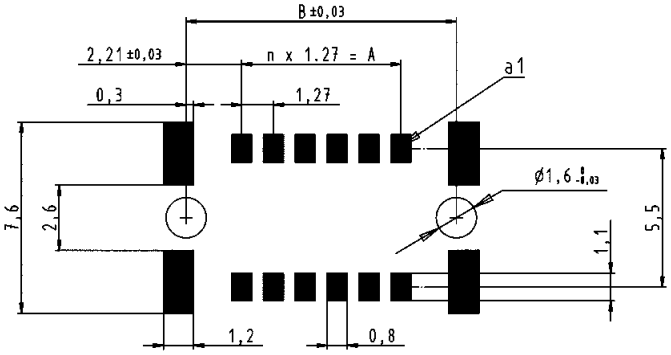
Identification	Drawing	Dimensions in mm

Dimensions



stacking height Y	X
6.25	5.20
9.05	7.95

PCB layout



available Q3/2011

Female connectors, IDC

Identification	Number of contacts	Part No.	Dimensions in mm

Female connector, IDC in a tray packaging

Number of contacts	Part No.	A	B	C	D	E
6	15 29 006 . 50 . 000	2.54	11.59	5.56	4.56	15.00
8	15 29 008 . 50 . 000	3.81	12.86	6.83	5.83	15.00
10	15 29 010 . 50 . 000	5.08	14.13	8.10	7.10	15.00
12	15 29 012 . 50 . 000	6.35	15.40	9.37	8.37	15.00
14	15 29 014 . 50 . 000	7.62	16.67	10.64	9.64	15.00
16	15 29 016 . 50 . 000	8.89	17.94	11.91	10.91	15.00
18	15 29 018 . 50 . 000	10.16	19.21	13.18	12.18	15.00
20	15 29 020 . 50 . 000	11.43	20.48	14.45	13.45	15.00
22	15 29 022 . 50 . 000	12.70	21.75	15.72	14.72	15.00
24	15 29 024 . 50 . 000	13.97	23.02	16.99	15.99	15.00
26	15 29 026 . 50 . 000	15.24	24.29	18.26	17.26	15.00
28	15 29 028 . 50 . 000	16.51	25.56	19.53	18.53	15.00
30	15 29 030 . 50 . 000	17.78	26.83	20.80	19.80	15.00
32	15 29 032 . 50 . 000	19.05	28.10	22.07	21.07	15.00
34	15 29 034 . 50 . 000	20.32	29.37	23.34	22.34	15.00
36	15 29 036 . 50 . 000	21.59	30.64	24.61	23.61	15.00
38	15 29 038 . 50 . 000	22.86	31.91	25.88	24.88	15.00
40	15 29 040 . 50 . 000	24.13	33.18	27.15	26.15	15.00
42	15 29 042 . 50 . 000	25.40	34.45	28.42	27.42	15.00
44	15 29 044 . 50 . 000	26.67	35.72	29.69	28.69	15.00
46	15 29 046 . 50 . 000	27.94	36.99	30.96	29.96	15.00
48	15 29 048 . 50 . 000	29.21	38.26	32.23	31.23	15.00
50	15 29 050 . 50 . 000	30.48	39.53	33.50	32.50	15.00
52	15 29 052 . 50 . 000	31.75	40.80	34.77	33.77	15.00
54	15 29 054 . 50 . 000	33.02	42.07	36.04	35.04	15.00
56	15 29 056 . 50 . 000	34.29	43.34	37.31	36.31	15.00
58	15 29 058 . 50 . 000	35.56	44.61	38.58	37.58	15.00
60	15 29 060 . 50 . 000	36.83	45.88	39.85	38.85	16.20
62	15 29 062 . 50 . 000	38.10	47.15	41.12	40.12	16.20
64	15 29 064 . 50 . 000	39.37	48.42	42.39	41.39	16.20
66	15 29 066 . 50 . 000	40.64	49.69	43.66	42.66	16.20
68	15 29 068 . 50 . 000	41.91	50.96	44.93	43.93	16.20
70	15 29 070 . 50 . 000	43.18	52.23	46.20	45.20	16.20
72	15 29 072 . 50 . 000	44.45	53.50	47.47	46.47	16.20
74	15 29 074 . 50 . 000	45.72	54.77	48.74	47.74	16.20
76	15 29 076 . 50 . 000	46.99	56.04	50.01	49.01	16.20
78	15 29 078 . 50 . 000	48.26	57.31	51.28	50.28	16.20
80	15 29 080 . 50 . 000	49.53	58.58	52.55	51.55	16.20
82	15 29 082 . 50 . 000	50.80	59.85	53.82	52.82	16.20
84	15 29 084 . 50 . 000	52.07	61.12	55.09	54.09	16.20
86	15 29 086 . 50 . 000	53.34	62.39	56.36	55.36	16.20
88	15 29 088 . 50 . 000	54.61	63.66	57.63	56.63	16.20
90	15 29 090 . 50 . 000	55.88	64.93	58.90	57.90	16.20
92	15 29 092 . 50 . 000	57.15	66.20	60.17	59.17	16.20
94	15 29 094 . 50 . 000	58.42	67.47	61.44	60.44	16.20
96	15 29 096 . 50 . 000	59.69	68.74	62.71	61.71	16.20
98	15 29 098 . 50 . 000	60.96	70.01	63.98	62.98	16.20
100	15 29 100 . 50 . 000	62.23	71.28	65.25	64.25	16.20

Please insert digit

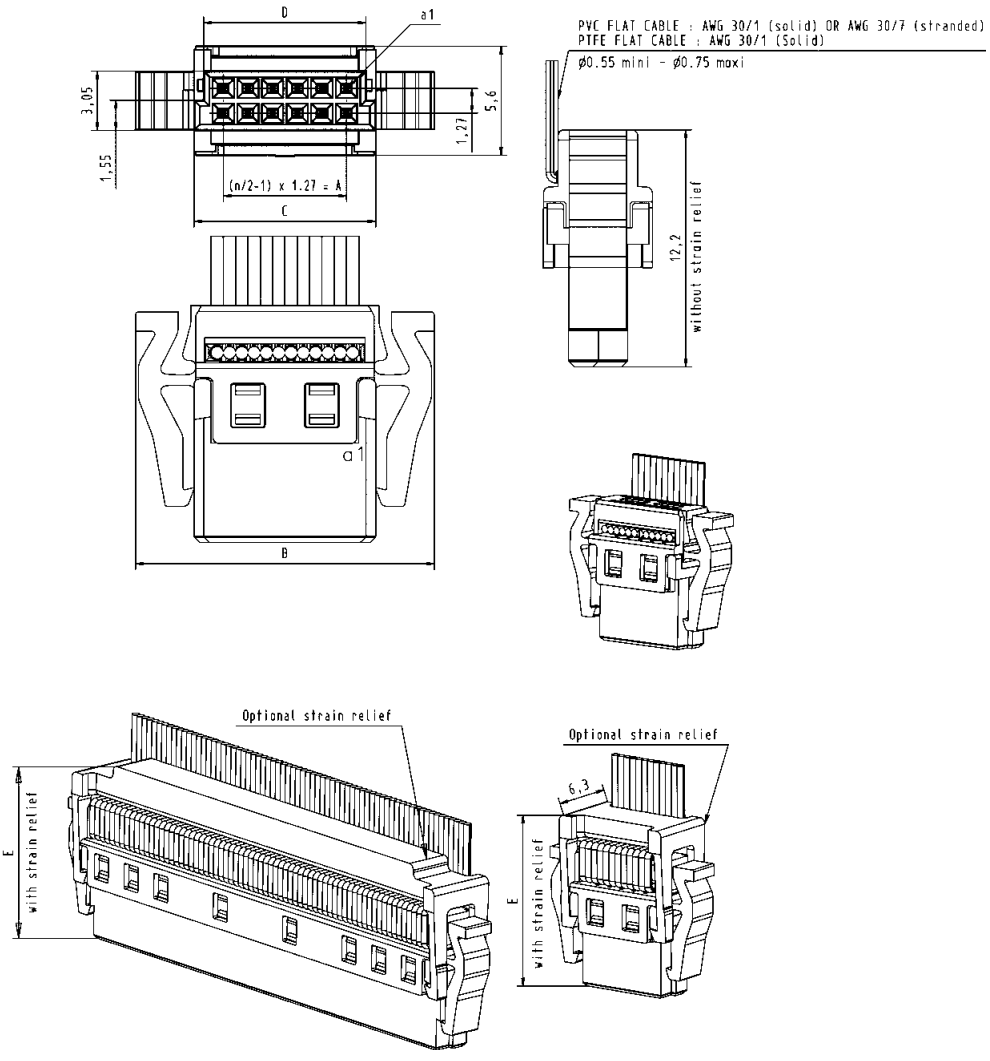
for performance level 1 ▶ 2
for performance level S4 ▶ 5
for performance level 2 ▶ 6

without strain relief 1
with strain relief 2

available Q3/2011

Female connectors, IDC

Identification	Drawing	Dimensions in mm
Dimensions		



available Q3/2011

Strain reliefs for female connectors, IDC

Identification	Number of contacts	Part No.	Dimensions in mm
			A
Strain reliefs for female connectors, IDC	6	15 29 006 0503 000	7.31
	8	15 29 008 0503 000	8.58
	10	15 29 010 0503 000	9.85
	12	15 29 012 0503 000	11.12
	14	15 29 014 0503 000	12.39
	16	15 29 016 0503 000	13.66
	18	15 29 018 0503 000	14.93
	20	15 29 020 0503 000	16.20
	22	15 29 022 0503 000	17.47
	24	15 29 024 0503 000	18.74
	26	15 29 026 0503 000	20.01
	28	15 29 028 0503 000	21.28
	30	15 29 030 0503 000	22.55
	32	15 29 032 0503 000	23.82
	34	15 29 034 0503 000	25.09
	36	15 29 036 0503 000	26.36
	38	15 29 038 0503 000	27.63
	40	15 29 040 0503 000	28.90
	42	15 29 042 0503 000	30.17
	44	15 29 044 0503 000	31.44
	46	15 29 046 0503 000	32.71
	48	15 29 048 0503 000	33.98
	50	15 29 050 0503 000	35.25
	52	15 29 052 0503 000	36.52
	54	15 29 054 0503 000	37.79
	56	15 29 056 0503 000	39.06
	58	15 29 058 0503 000	40.33
	60	15 29 060 0503 000	41.60
	62	15 29 062 0503 000	42.87
	64	15 29 064 0503 000	44.14
	66	15 29 066 0503 000	45.41
	68	15 29 068 0503 000	46.68
	70	15 29 070 0503 000	47.95
	72	15 29 072 0503 000	49.22
	74	15 29 074 0503 000	50.49
	76	15 29 076 0503 000	51.76
	78	15 29 078 0503 000	53.03
	80	15 29 080 0503 000	54.30
	82	15 29 082 0503 000	55.57
	84	15 29 084 0503 000	56.84
	86	15 29 086 0503 000	58.11
	88	15 29 088 0503 000	59.38
	90	15 29 090 0503 000	60.65
	92	15 29 092 0503 000	61.92
	94	15 29 094 0503 000	63.19
	96	15 29 096 0503 000	64.46
	98	15 29 098 0503 000	65.73
	100	15 29 100 0503 000	67.00

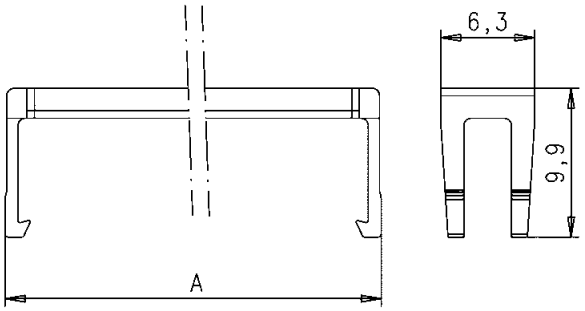
available Q3/2011

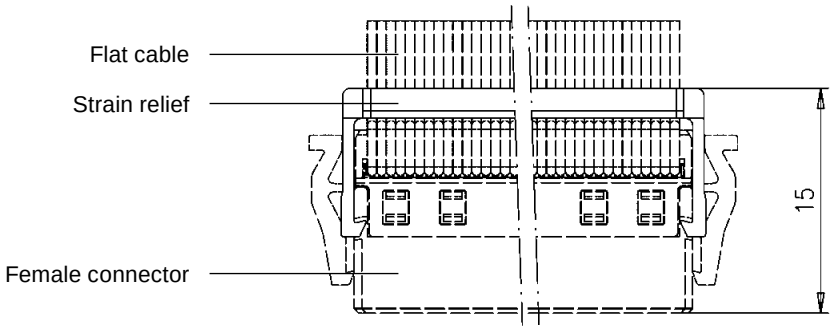
Strain reliefs for female connectors, IDC

Identification	Drawing	Dimensions in mm

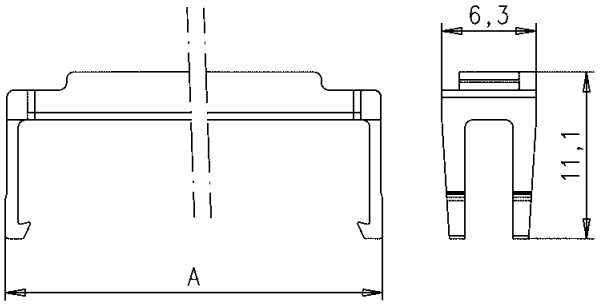
Dimensions

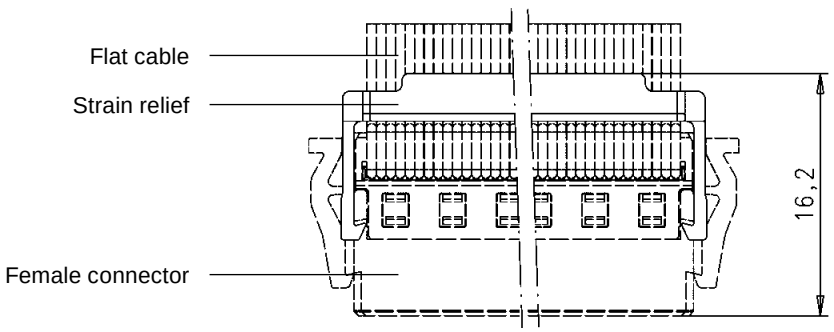
6 – 58 contacts





60 – 100 contacts



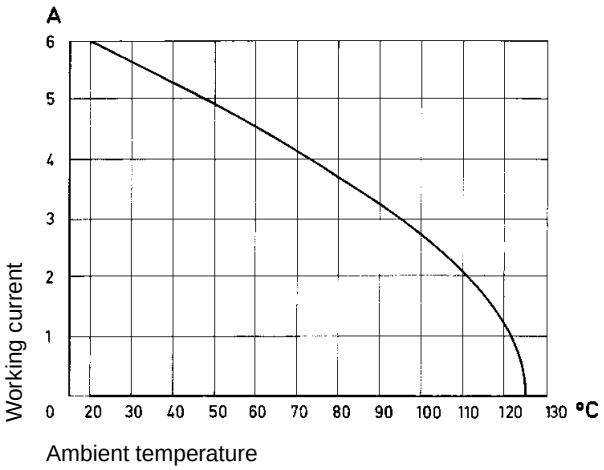


Number of contacts	32
Contact spacing (mm)	5.08
Working current see current carrying capacity chart	6 A max.
Clearance	≥ 3.0 mm
Creepage	≥ 3.0 mm
Working voltage The working voltage also depends on the clearance and creepage dimensions of the pcb itself and the associated wiring	according to the safety regulations of the equipment
Test voltage $U_{r.m.s.}$	1.55 kV
Contact resistance	≤ 15 mΩ
Insulation resistance	≥ 10^{12} Ω
Temperature range The higher temperature limit includes the local ambient and heating effects of the contacts under load	– 55 °C … + 125 °C
Degree of protection for crimp terminal according to DIN 40 050	IP 20
Electrical termination	Crimp terminal 0.09-1.5 mm²
Insertion and withdrawal force	≤ 40 N
Materials Mouldings	Thermoplastic resin, glass-fibre filled, UL 94-V0

Current carrying capacity

The current carrying capacity is limited by maximum temperature of materials for inserts and contacts including terminals. The current capacity curve is valid for continuous, non interrupted current loaded contacts of connectors when simultaneous power on all contacts is given, without exceeding the maximum temperature.

Control and test procedures according to DIN IEC 60 512

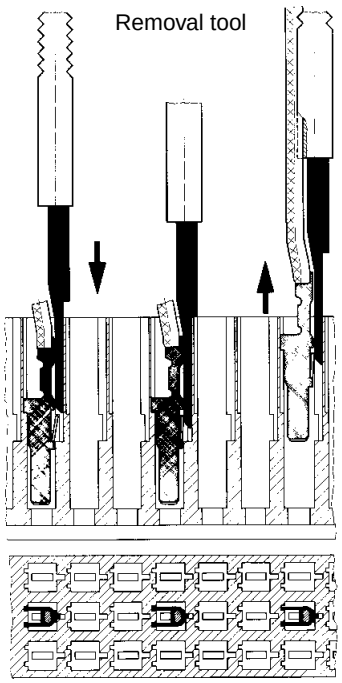


Fitting the crimp contacts

After crimping the wires onto the contacts with the help of a crimping tool or an automatic crimping machine the contacts should be correctly oriented and inserted into the cavities of the connector moulding in the required configuration. They snap into position and are firmly held in place. A light pull on the wire assures the correct tensile strength of the contact. When using stranded wires with a gauge below 0.37 mm² an insertion tool is necessary.

Removing the crimp contacts

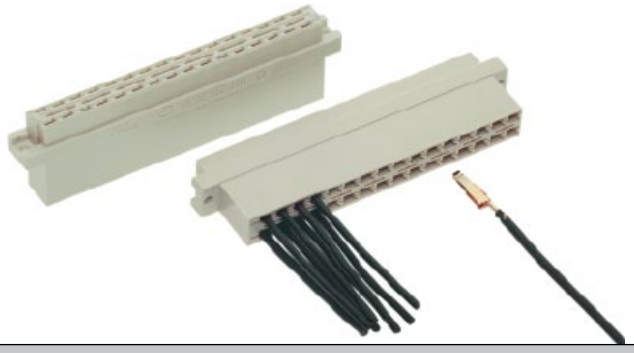
The removal tool is inserted into a slot on the side of the respective crimp cavity. This action compresses the contact retaining spring therefore the contact can then be easily withdrawn using a light pull on the wire. This action will cause no damage to the contact/wire which can be repositioned/refitted as necessary. The drawing demonstrates the crimp removal procedure (max. 5x).



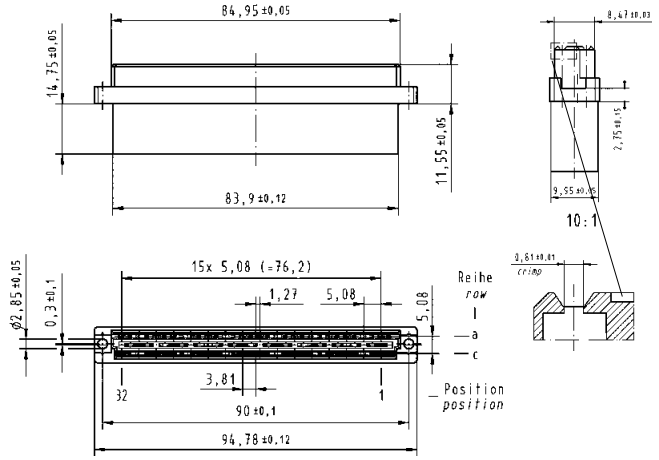
Number of contacts

max. 32

New with NFF F1/I2



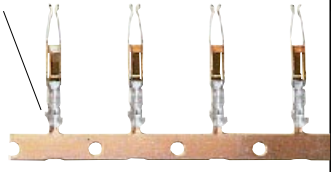
Female connectors

Identification	Number of contacts	Part No.	Drawing	Dimensions in mm
Female connector for crimp contacts				
Order contacts separately				
without coding	32	09 04 032 3213[f]		
with coding	32	09 04 532 3213[f]		

Identification	Identification Wire gauge	Part No. 2	Performance levels according to IEC 60 603-2. 1
Female crimp FC contacts			
Bandoliered contacts (approx. 2,500 pieces)	1	09 06 000 6484	09 06 000 6474
	2	09 06 000 6481	09 06 000 6471
	3	09 06 000 6482	09 06 000 6472
Bandoliered contacts (approx. 250 pieces)	1	09 06 000 7484	09 06 000 7474
	2	09 06 000 7481	09 06 000 7471
	3	09 06 000 7482	09 06 000 7472
Individual contacts[1]	1	09 06 000 8484	09 06 000 8474
	2	09 06 000 8481	09 06 000 8471
	3	09 06 000 8482	09 06 000 8472
Female contacts with solder lugs[2] (lockable)			09 06 000 6420

		Wire gauge mm²	AWG	Insulation ø mm
FC 1	1	0.09 - 0.25	28 - 24	0.7 - 1.5
FC 2	2	0.14 - 0.56	26 - 20	0.8 - 2.0
FC 3	3	0.5 - 1.5	20 - 16	1.6 - 2.8

Identification



Bandoliered contacts

Individual contacts

3.5 + 0.5 mm of insulation is stripped from the wires to be crimped

For the fabrication in line with the specification please use exclusively crimp tools approved by HARTING (see DIN EN 60 352-2)

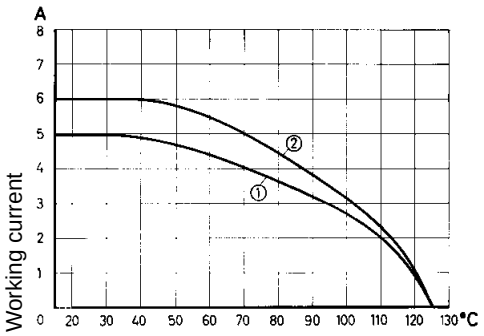
[1] Packaging unit 1,000 pieces
[2] Solder contacts must not be used together with shell housing A. Special contact surface: 2 µm gold.
[f] Railway classification NFF 16-101, Smoke index: F1, Flammability class: I2

Number of contacts	32
Working current see current carrying capacity chart	6 A max.
Clearance	≥ 1.6 mm
Creepage	≥ 3.0 mm
Working voltage The working voltage also depends on the clearance and creepage dimensions of the pcb itself and the associated wiring	according to the safety regulations of the equipment
Contact resistance	≤ 20 mΩ
Insulation resistance	≥ 10^{12} Ω
Termination	Crimp terminal 0.09-1.5 mm²
Materials Mouldings and hoods	Thermoplastic resin, glass-fibre filled
Contacts	Copper alloy

Current carrying capacity

The current carrying capacity is limited by maximum temperature of materials for inserts and contacts including terminals. The current capacity curve is valid for continuous, non interrupted current loaded contacts of connectors when simultaneous power on all contacts is given, without exceeding the maximum temperature.

Control and test procedures according to DIN IEC 60 512



① with shell housing ② without shell housing

Piggyback connectors for interfacing with female connectors with wrap posts 1 x 1 mm

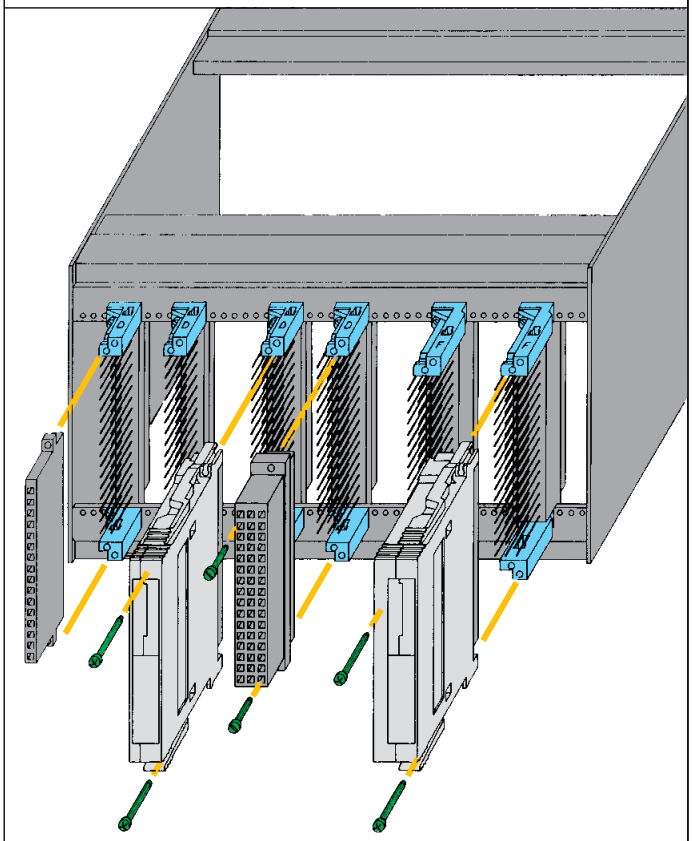
The problem of interfacing systems designed for the distribution or collection of electronic signals can be overcome by the use of piggyback connectors. Designed to be mounted on the rear of DIN 41 612 type wire wrap female connectors (1 x 1 mm posts) these piggyback elements can be used to terminate input and output cables.

Distance fixing brackets are fitted to provide either a latching or screw fixing facility over the two level wire wrap plane.

The female crimp contacts used in these versions are designed for 1 x 1 mm posts.

After crimping they can be easily inserted into the chambers of the connector body with the aid of an insertion tool. Insertion errors can be simply rectified with the use of a removal tool.

Piggyback connectors can be mounted in shell housings C and open hood G. Security is provided by either latches or screws to the distance fixing brackets.

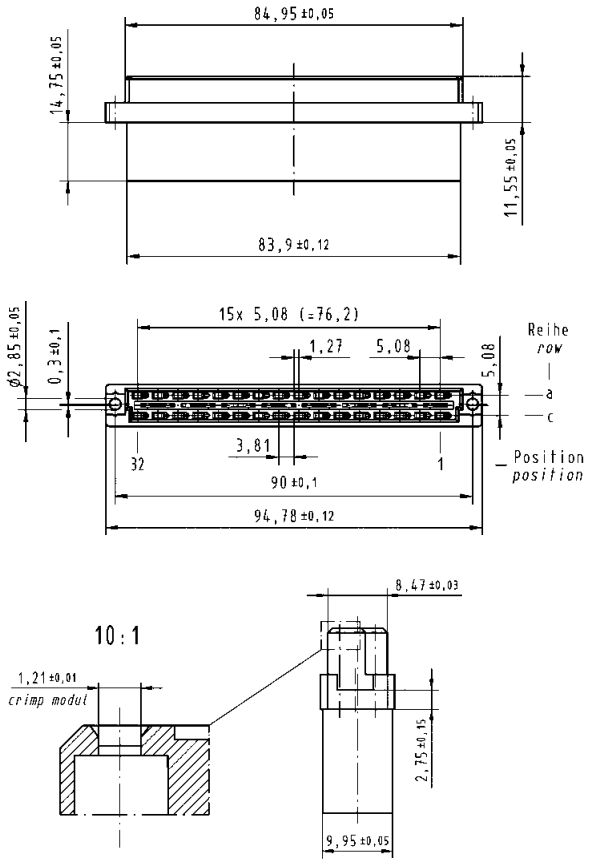


Number of contacts

max. 32

New with NFF F1/I2

Piggyback connector for 1 x 1 mm wrap posts

Identification	Number of contacts	Part No.	Drawing	Dimensions in mm
Piggyback connector for crimp contacts Order contacts separately	32	09 04 032 3215[f]		

Female FC crimp contacts

individual contacts[1)] FC1 FC2 FC3

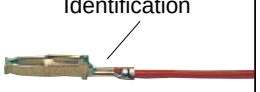
Bandoliered contacts (approx. 2,500 pcs.) FC1 FC2 FC3

Mateable with 1 x 1 mm wrap posts

Identification	Wire gauge mm²	AWG	Insulations ø mm
1	0.09-0.25	28-24	0.7-1.5
2	0.14-0.56	26-20	0.8-2.0
3	0.50-1.50	20-16	1.6-2.8
1	0.09-0.25	28-34	0.7-1.5
2	0.14-0.56	26-20	0.8-2.0
3	0.50-1.50	20-16	1.6-2.8

3.5 + 0.5 mm of insulation is stripped from the wires to be crimped.

For the fabrication in line with the specification please use exclusively crimp tools approved by HARTING (see DIN EN 60 352-2)



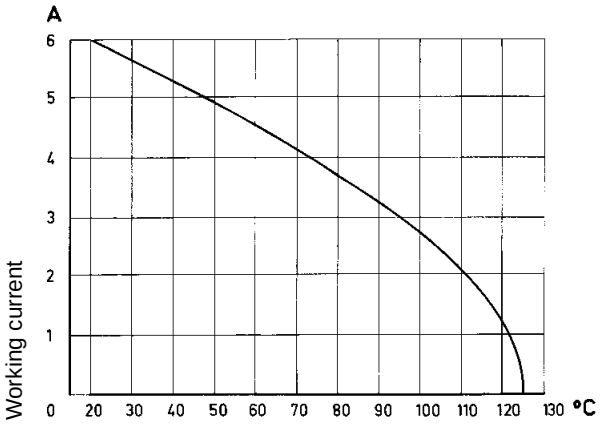
[1)] Packaging unit 1,000 pieces
[f)] Railway classification NFF 16-101, Smoke index: F1, Flammability class: I2

Number of contacts	48, 32
Contact spacing (mm)	5.08
Working current see current carrying capacity chart	6 A max.
Clearance	≥ 1.6 mm
Creepage	≥ 3.0 mm
Working voltage The working voltage also depends on the clearance and creepage dimensions on the pcb itself and the associated wiring	according to the safety regulations of the equipment
Test voltage $U_{r.m.s.}$	1.55 kV (contact-contact) 2.5 kV (contact-ground)
Contact resistance	≤ 15 mΩ
Insulation resistance	≥ 10^{12} Ω for standard articles ≥ 10^{11} Ω for special NFF articles (with part-no. ending 222)
Temperature range The higher temperature limit includes the local ambient and heating effects of the contacts under load	– 55 °C … + 125 °C – 40 °C … + 105 °C for press-in connector
Electrical termination	Solder pins for pcb connections Ø 1 ± 0.1 mm according to IEC 60326-3 Compliant press-in terminations
pcb thickness	≥ 1.6 mm
Recommended pcb holes for press-in technology	in acc. to EN 60352-5
Insertion and withdrawal force	48 way ≤ 75 N 32 way ≤ 50 N
Materials	
Mouldings	Thermoplastic resin, glass-fibre filled, UL 94-V0
Contacts	Copper alloy
Contact surface	
Contact zone	Selectively plated according to performance level

Current carrying capacity

The current carrying capacity is limited by maximum temperature of materials for inserts and contacts including terminals. The current capacity curve is valid for continuous, non interrupted current loaded contacts of connectors when simultaneous power on all contacts is given, without exceeding the maximum temperature.

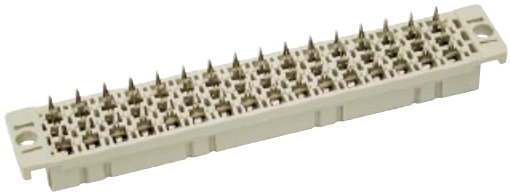
Control and test procedures according to DIN IEC 60 512



Number of contacts

48, 32

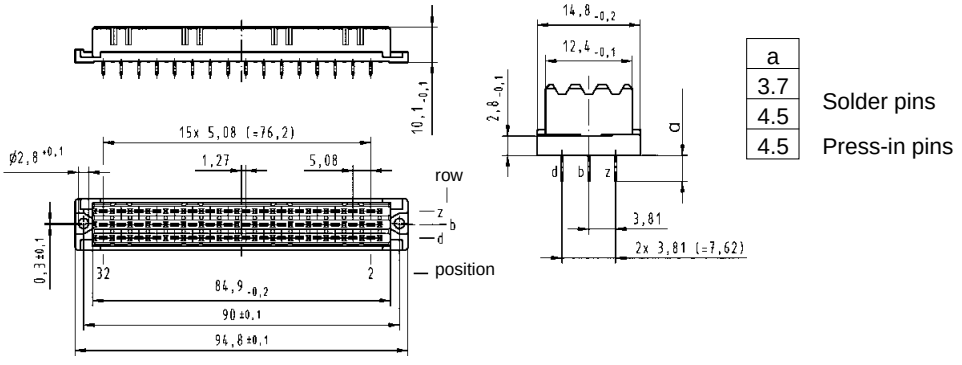
New with shroud coding



Female connectors

Identification	Number of contacts	Contact arrangement	Part No. 3	Performance levels according to IEC 60 603-2. Explanation chapter 00 2	1
Female connector "low profile" with solder pins 3.7 mm	48		09 06 248 7833	09 06 248 6833 09 06 248 6833 222 f)	09 06 248 2833
	32			09 06 232 6833	
	32			09 06 232 6893	
Female connector "low profile" with solder pins 4.5 mm	48		09 06 248 7834	09 06 248 6834 09 06 248 6834 222 f)	09 06 248 2834
	32			09 06 232 6834	
	32		09 06 232 7894	09 06 232 6894	09 06 232 2894
Female connector "low profile" with press-in pins 4.5 mm	48		09 06 248 7832	09 06 248 6832	09 06 248 2832 09 06 248 2832 222 f)
	32			09 06 232 6832	09 06 232 2832 09 06 232 2832 222 f)
	32			09 06 232 6892	

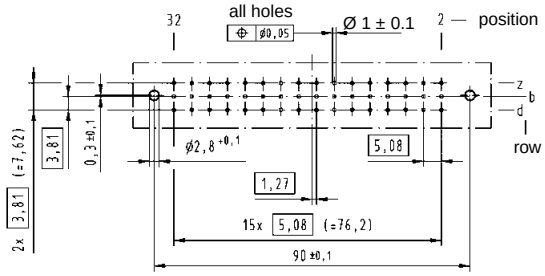
Dimensions



a	
3.7	Solder pins
4.5	Press-in pins
4.5	

Board drillings

Mounting side



Dimensions in mm

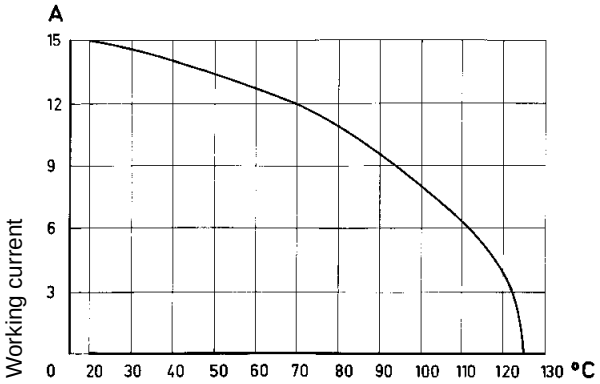
f) Railway classification NFF 16-101, Smoke index: F1, Flammability class: I2

Number of contacts	16
Working current see current carrying capacity chart	15 A max.
Clearance	≥ 4.0 mm
Creepage	≥ 8.0 mm
Working voltage The working voltage also depends on the clearance and creepage dimensions of the pcb itself and the associated wiring	according to the safety regulations of the equipment
	Connectors should not be mated under voltage
Test voltage $U_{r.m.s.}$	≥ 3.1 kV
Contact resistance	≤ 8 mΩ
Insulation resistance	≥ 10^{12} Ω
Temperature range The higher temperature limit includes the local ambient and heating effects of the contacts under load	– 55 °C … + 125 °C
Electrical termination	
	Connector with faston 6.3 x 2.5 (faston blade width x wire gauge) according to DIN 46 245 and DIN 46 247
	Solder pins for pcb connections Ø 1.6 ± 0.1 mm DIN EN 60097
Insertion and withdrawal force	≤ 100 N
Materials	
Mouldings	Thermoplastic resin, glass-fibre filled, UL 94-V0
Contacts	Copper alloy
Contact surface	
Contact zone	Hard silver plated

Current carrying capacity

The current carrying capacity is limited by maximum temperature of materials for inserts and contacts including terminals. The current capacity curve is valid for continuous, non interrupted current loaded contacts of connectors when simultaneous power on all contacts is given, without exceeding the maximum temperature.

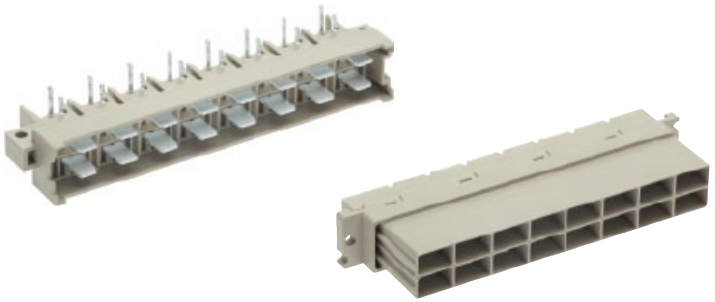
Control and test procedures according to DIN IEC 60 512



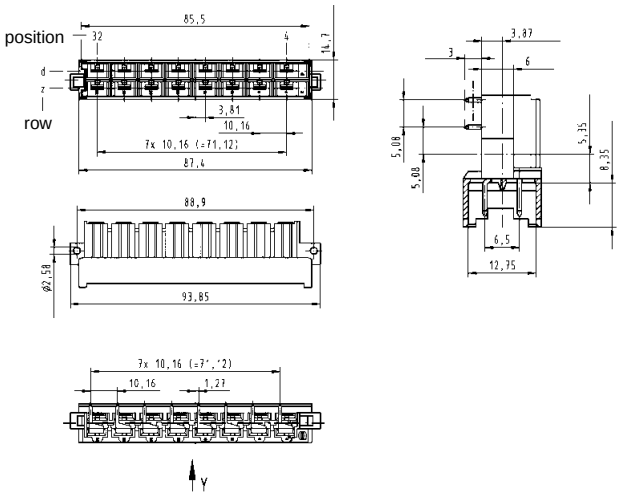
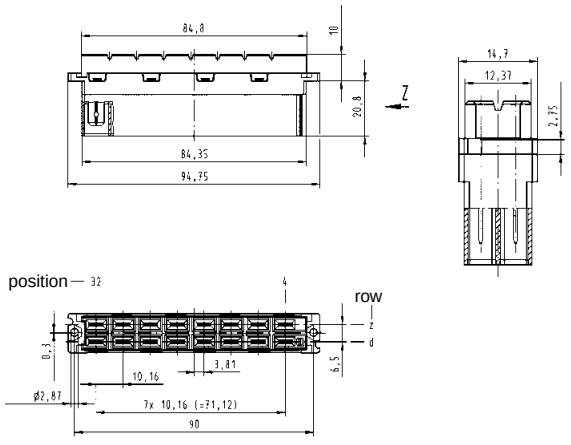
Ambient temperature

Number of contacts

16



Male connectors

Identification	Number of contacts	Part No.	Drawing	Dimensions in mm
Male connector with angled solder pins	16	09 06 116 2511		
Female connector for faston 6.3 x 2.5	16	09 06 216 2411		

Han® PushPull SCRJ – system cables

Han® PushPull SCRJ – system cables

Advantages

- Space-saving IP 65 / IP 67 interface
- AIDA compliant
- PROFINET compliant
- Easy handling

Technical characteristics

Connector types	Han® PushPull SCRJ
Cable type	Type C
Cables	for indoor applications
Fibre type	polymere fibre
Sheath material	PUR
Single strand diameter	2.2 mm
Sheath diameter	7.8 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–20 °C … +70 °C
Application PROFINET	Green
Standard lengths	1 m / 2 m / 5 m / 10 m / 20 m other lengths available on request

Identification	Part number Plastic version	Metal version
Han® PushPull SCRJ System cable double ended, SCRJ connectors IP 20		
Length 1.0 m	33 02 211 0010 001	
Length 2.0 m	33 02 211 0020 001	
Length 5.0 m	33 02 211 0050 001	
Length 10.0 m	33 02 211 0100 001	
Length 20.0 m	33 02 211 0200 001	
Han® PushPull SCRJ System cable single ended, SCRJ connector IP 20		
Length 1.0 m	33 02 111 0010 001	
Length 2.0 m	33 02 111 0020 001	
Length 5.0 m	33 02 111 0050 001	
Length 10.0 m	33 02 111 0100 001	
Length 20.0 m	33 02 111 0200 001	

Han® PushPull SCRJ – system cables

Identification	Part number Plastic version	Part number Metal version
Han® PushPull SCRJ System cable double ended, SCRJ connectors IP 65 / IP 67 to IP 20		
Length 1.0 m	33 53 411 0010 001	33 53 411 0010 002
Length 2.0 m	33 53 411 0020 001	33 53 411 0020 002
Length 5.0 m	33 53 411 0050 001	33 53 411 0050 002
Length 10.0 m	33 53 411 0100 001	33 53 411 0100 002
Length 20.0 m	33 53 411 0200 001	33 53 411 0200 002
Han® PushPull SCRJ System cable double ended, SCRJ connectors IP 65 / IP 67		
Length 1.0 m	33 53 211 0010 001	33 53 211 0010 002
Length 2.0 m	33 53 211 0020 001	33 53 211 0020 002
Length 5.0 m	33 53 211 0050 001	33 53 211 0050 002
Length 10.0 m	33 53 211 0100 001	33 53 211 0100 002
Length 20.0 m	33 53 211 0200 001	33 53 211 0200 002
Han® PushPull SCRJ System cable single ended, SCRJ connector IP 65 / IP 67		
Length 1.0 m	33 53 111 0010 001	33 53 111 0010 002
Length 2.0 m	33 53 111 0020 001	33 53 111 0020 002
Length 5.0 m	33 53 111 0050 001	33 53 111 0050 002
Length 10.0 m	33 53 111 0100 001	33 53 111 0100 002
Length 20.0 m	33 53 111 0200 001	33 53 111 0200 002

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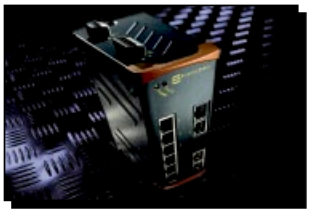

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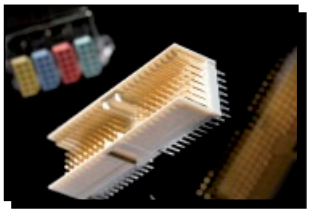

Coaxial and Metric Connectors

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Application brochure

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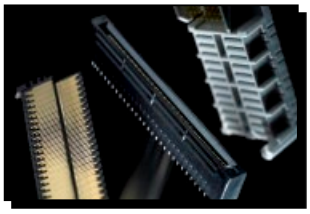
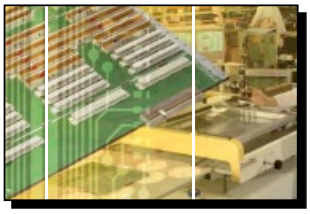


TCA Connectors

☐



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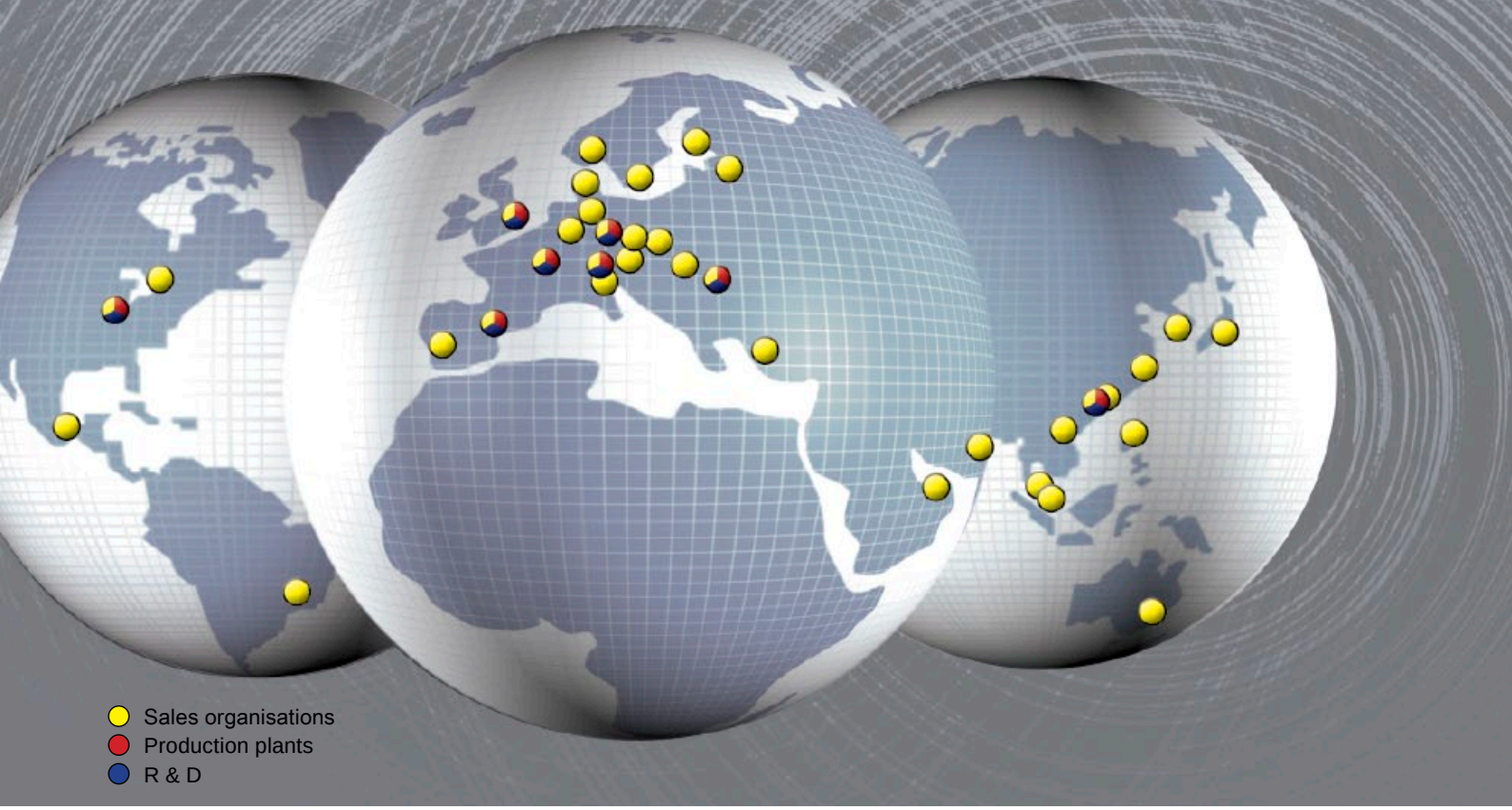

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