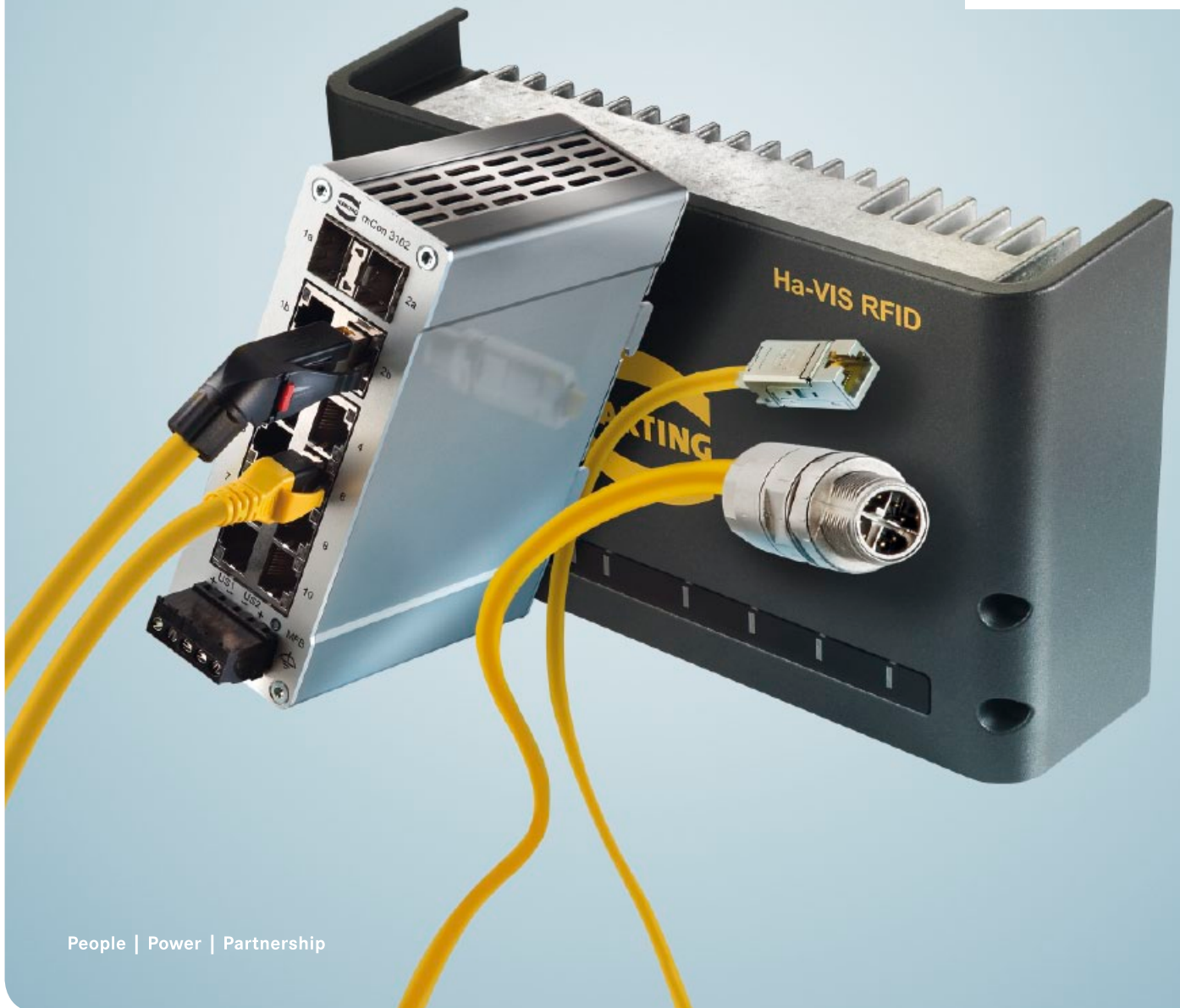




Pushing Performance



People | Power | Partnership

HARTING Smart Network Infrastructure Intelligent Network Solutions

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 36 subsidiary companies and worldwide distributors employing a total of approximately 3,500 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.

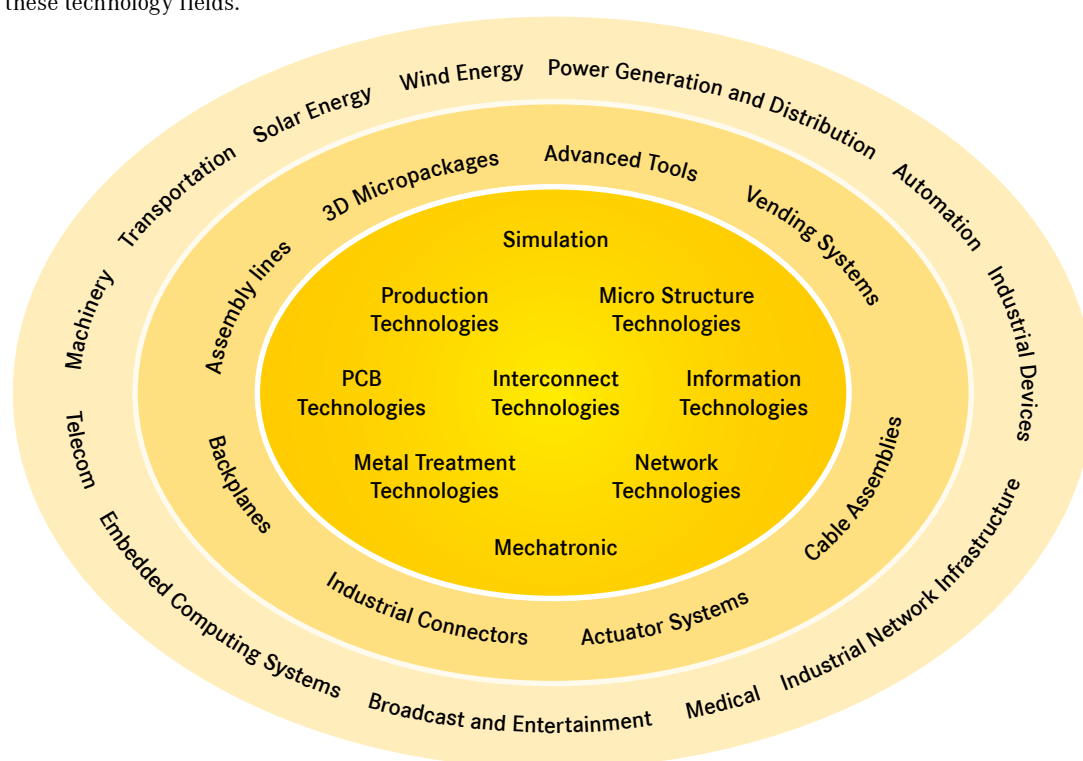
In order to ensure the future proof design of RF- and EMC-compatible interface solutions, the central **HARTING** laboratory (certified to EN 45001) provides simulation tools, as well as experimental, testing and diagnostics facilities all the way through to scanning electron microscopes. In the selection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



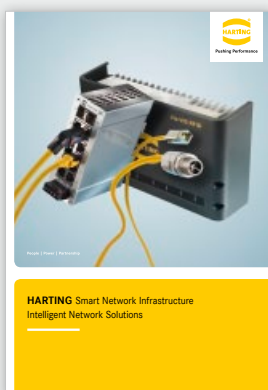
HARTING knowledge is practical know-how generating synergy effects.

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.



Smart Network Infrastructure

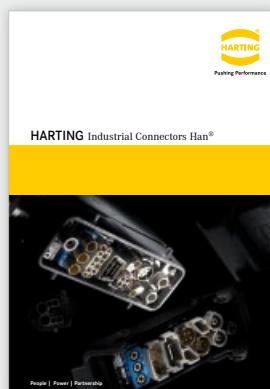


INTELLIGENT NETWORK SOLUTIONS

With its product series Ha-VIS, HARTING offers a consistent range of Ethernet network components and cabling products, which from the communication platform of convergent

automation IT networks. Under Ha-VIS HARTING offers fully integrated RFID solutions.

Installation Technology

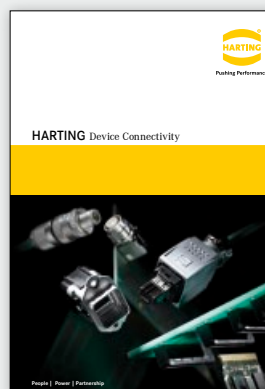


INDUSTRIAL CONNECTORS Han®

This catalogue documents the worldwide standard for industrial connectors. Han® connectors represent the preferential solution in the cable-to-cable interconnection of data, signal and power applications operating under the most

demanding conditions and meeting stringent requirements with regard to safe and detachable electrical connections with high degree of protection IP 65 / IP 67. Installations making use of Han® connectors impress with their rugged design, convenient handling and modularity of data, signal and power connections. Han® connectors represent the worldwide standard in industry, railway technology, as well as in power generation and distribution.

Device Connectivity



DEVICE CONNECTIVITY

The Device Connectivity catalogue provides a universal, innovative product portfolio of PCB connections and of termination technology. The product range comprises board-to-board and cable-to-board connectors for industrial electronic devices with

degree of protection IP 20 to IP 65 / IP 67. These HARTING solutions offer appropriate device connectivity for a wide range of devices, ranging from sensors to industrial computers and their respective data, signal and power interfaces.

CONTENTS

PAGE

A – Active Ethernet components**A 1**

A 1

Ha-VIS eCon – Ethernet Switches, unmanaged

A-1 1

Ha-VIS eCon 2000

A-1 3

Ha-VIS eCon 3000

A-1 11

Ha-VIS eCon 4000

A-1 29

Ha-VIS eCon 9000

A-1 35

Ha-VIS eCon 7000

A-1 39

A 2

Ha-VIS sCon – Ethernet Switches, configurable

A-2 1

Ha-VIS sCon 3000

A-2 4

A 3

Ha-VIS FTS – Ethernet Switches, managed

A-3 1

Ha-VIS FTS 3000s

A-3 5

Ha-VIS FTS 3000

A-3 8

A 4

Ha-VIS mCon – Ethernet Switches, managed

A-4 1

Ha-VIS mCon 3000 Next Generation

A-4 11

Ha-VIS mCon 3000

A-4 16

Ha-VIS mCon 4000

A-4 26

Ha-VIS mCon 9000

A-4 31

Ha-VIS mCon 7000

A-4 35

Ha-VIS Dashboard

A-4 43

CONTENTS

PAGE

C – Ha-VIS RFID Components

C 1

C 1 Ha-VIS RFID Transponder

C-1 1

C 2 Ha-VIS RFID Reader

C-2 1

C 3 Ha-VIS RFID Antennas

C-3 1

C 4 Cables and Accessories

C-4 1

Antenna cables

C-4 2

Accessories

C-4 6

Z – Appendix

Standards / Approvals

Z 1

List of part numbers

Z 2

Catalogue order sheet

Z 8

Addresses

Z 9

You can find the **HARTING eCatalogue** at www.HARTING.com.

The **HARTING eCatalogue** is an electronic catalogue with a product configurator. Here you can choose a connector according to your requirements. Afterwards you are able to send your inquiry directly to a HARTING sales partner. The drawings to every single part are available in PDF format. The parts are downloadable in 2D format (DXF) and 3D format (IGES, STEP). The 3D models can be viewed with a VRML-viewer.

Product configurator

General information

It is the customer's responsibility to check whether the components illustrated in this catalogue also comply with different regulations from those stated in special fields of applications.

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

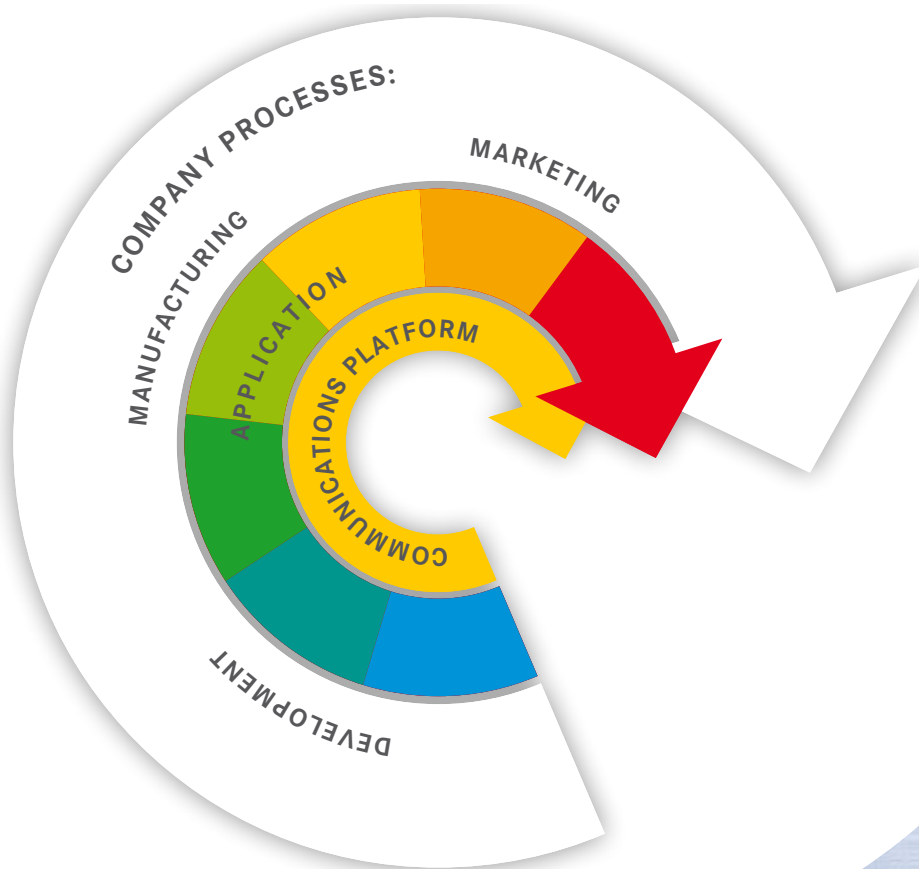
No part of this catalogue may be reproduced in any form (print, photocopy, microfilm or any other process) or processed, duplicated or distributed by means of electronic systems without the prior written consent of HARTING Electric GmbH & Co. KG, Espelkamp. We are bound by the German version only.

A Smart Network Infrastructure is the Key to Efficient Processes

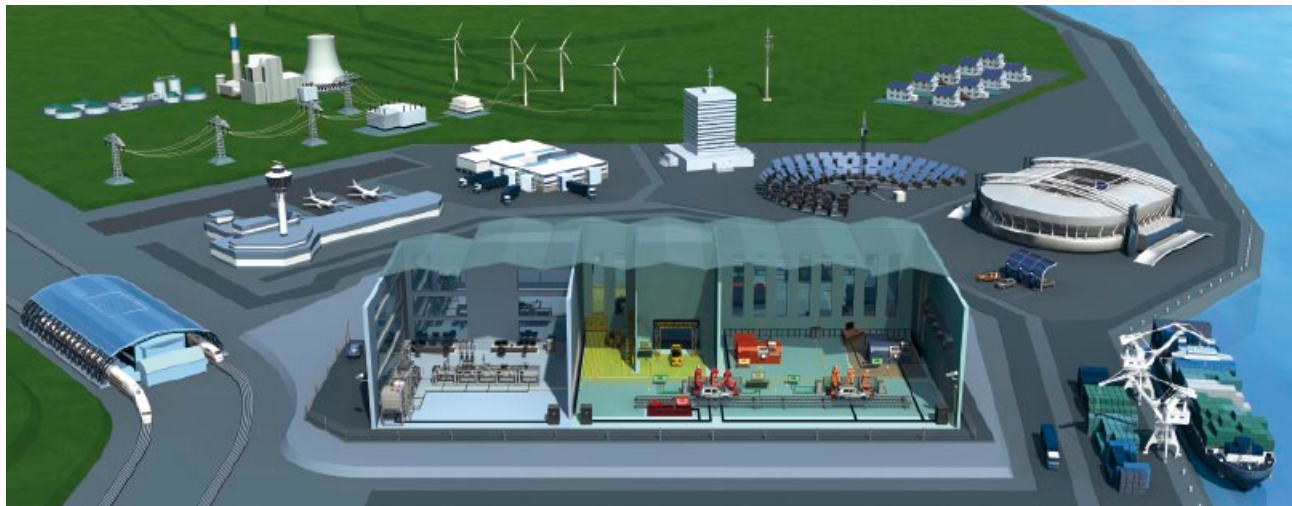
Efficient industrial production processes require a convergent network infrastructure that serves as the platform for all enterprise applications. Only this makes it possible to seamlessly integrate all applications into a total value-creation process. HARTING has formulated this insight into our Automation IT vision.

The HARTING Technology Group has created a smart network infrastructure strategy in order to implement this vision. It transforms the data/signal network: from a pure configuration and combination of passive components into a key functional component of the modern process chain. Thus it is possible for multiple applications with varying service quality demands to simultaneously use the infrastructure.

Introduction



HARTING's infrastructure solutions are targeted for industrial applications in the transportation, power generation and power distribution sectors. In all these sectors, the functional units are connected together in a similar way in order to maintain the three main application arteries – data, power and signal exchange. HARTING contributes the systems and components that are critical in keeping these arteries interconnected.



THE FUTURE OF INFRASTRUCTURE

Applications are being integrated into value-creation chains which are becoming more and more complex. In the past, each industrial sector had a proprietary specification for these main arteries. Now, however, the goal is to implement solutions which are portable and integrated. Ethernet is responsible for exchanging data between applications, since applications can be integrated into a complete system with this protocol.

During the development of a universal infrastructure platform, the HARTING Technology Group has played, and will continue to play, a central role.

Nowadays, Ethernet is being used for automation applica-

tions as well as classic IT – and it is establishing itself as a universal standard. However there are obstacles during the conversion from a Fieldbus infrastructure to an open Ethernet network, because the installation strategy and planning for an automation infrastructure is radically different than an IT application's infrastructure.

HARTING's Automation IT helps you to overcome these obstacles. Automation IT is responsible for the specifics of the Fieldbus-based infrastructure. It can therefore maintain the key automation requirements and still take advantage of innovative Ethernet technology.

Ethernet



CONVERT AND PRESERVE: A RECIPE FOR INFRASTRUCTURE SUCCESS

An infrastructure should have a long lifespan and ensure compatibility – but it should also keep your perspective open with its versatility and extensibility. Thus, an infrastructure has a seemingly contradictory character. It is structurally conservative – in a positive sense – because longevity and compatibility ensure the value of your investment. And infrastructure is also versatile, since there are challenging new tasks emerging for the future of automation.

So a converted infrastructure is used which allows the user to integrated existing technologies. The bridging technologies required for this topology are the actual key to these new infrastructure solutions. The HARTING Technology Group designs its own bridging technologies for Ethernet networking components, Ethernet cabling and RFID.

ETHERNET NETWORK COMPONENTS:

Fast track switching (FTS) is a bridging technology used for Automation IT. The old Fieldbus infrastructure ensured real-time speeds and determinism throughout the network. Consequently, it should also be simple to ensure this same level of performance for industrial applications using a convergent Ethernet network. The HARTING FTS switches provide this assurance.



ETHERNET CABLING:

HARTING's bridging solutions for adapter plugs are positioned at an entirely different level. At the transition from 2-pair to 4-pair cabling, HARTING's M12 connector – featuring Ha-VIS preLink® – serves as the bridging mechanism. This is also the foundation of our new *har*-speed M12 connector for PROFINET.



RFID:

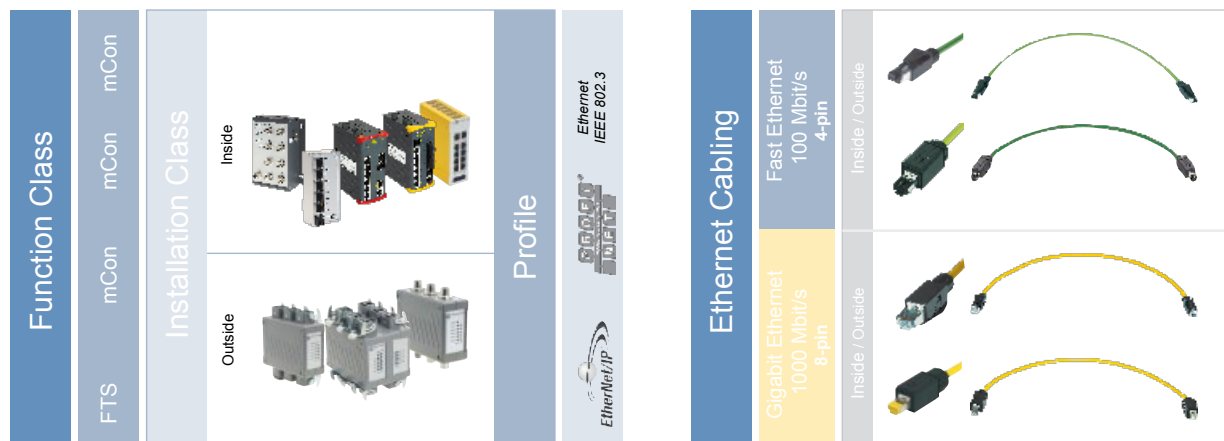
With RFID, HARTING has extended the classic data/power network to real world objects. In so doing, we have synchronized virtual and actual processes. Wireless or cable-bound sensors (such as those used for automotive identification, RFID or image recording) provide real-time data and signals emanating from many objects and process states.



HARTING provides a software platform that represents the link between the infrastructure zones (Dashboard). Our strategy in a convergent network is to give the user an universal software tool that allows him to see each application zone on the network separately.



ARRIVE AT A COMPLETE NETWORK IN JUST A FEW STEPS WITH THE SELECTION GUIDE



Our Selection Guide is a simple tool that provides you with a quick, reliable way to design an automation IT network that fits your requirements.

HARTING's Automation IT combines our services and products for passive network technology used in industrial applications.

The Selection Guide is divided into the Ethernet Switches and Ethernet Cabling chapters. The chapter on switches is sub-divided into sections describing functional classes and installation classes like protective degrees and interface-specific (profile) characteristics for each area of usage.

Various Ethernet cabling solutions exist for specific interfaces. Fast Ethernet uses four wires and up to 100 MBit/s while Gigabit Ethernet applications and other services use 8 wires.

These solutions follow structured cabling standards. HARTING offers different components that are optimized for various applications. When used together, they represent a perfect system solution for your industrial network.

Switching is typically used in a wide range of applications: for machinery, automation applications, renewable energy grids (for wind and solar), and for transportation equipment such as rail, bus, shipping and signalling.

The Selection Guide is divided into logical planning steps, so that you can quickly find the best components to build a reliable industrial network. The combination of the proper individual components results in a reliable network system that fits your requirements.

Our trio of installation technology, device connectivity and smart network infrastructure helps us to deliver state-of-the-art, custom-fit solutions to industrial customers around the globe.

CONTENTS	PAGE
A – Active Ethernet components	
Ethernet components overview	A 2
Ha-VIS eCon – Ethernet Switches, unmanaged	A-1 1
Ha-VIS eCon 2000	A-1 3
Ha-VIS eCon 3000	A-1 11
Ha-VIS eCon 4000	A-1 29
Ha-VIS eCon 9000	A-1 35
Ha-VIS eCon 7000	A-1 39
Ha-VIS sCon – Ethernet Switches, configurable	A-2 1
Ha-VIS sCon 3000	A-2 4
Ha-VIS FTS – Fast Track Switching	A-3 1
Ha-VIS FTS 3000s	A-3 5
Ha-VIS FTS 3000	A-3 8
Ha-VIS mCon – Ethernet Switches, managed	A-4 1
Ha-VIS mCon 3000	A-4 11
Ha-VIS mCon 3000	A-4 16
Ha-VIS mCon 4000	A-4 26
Ha-VIS mCon 9000	A-4 32
Ha-VIS mCon 7000	A-4 36
Ha-VIS Dashboard	A-4 44
Accessories	
Ha-VIS pCon 7000 – Industrial DC/DC converter	A-5 2
Ha-VIS SFP Modules	A-6 2
Ha-VIS SD Memory Cards	A-6 5
Ha-VIS 19“ DIN-Rail Mounting kit	A-6 6

Function Class		Installation Class	
Ha-VIS eCon unmanaged	Plug & Play Store and Forward Switching Mode Non-Blocking Auto-negotiation Auto-polarity Auto-crossing	Inside IP 30 Degree of protection	Ha-VIS eCon 2000 - 3 / 4 / 5 / 16 copper ports (RJ45) - Robust metal housing - Top-Hat rail mount - Optimum installation depth  eCon 2030-A 3 RJ45  eCon 2040-A 4 RJ45
		Inside IP 30 Degree of protection	Ha-VIS eCon 3000 - 1 / 6 / 8 copper ports with optional 1 / 2 F.O. ports - Robust metal housing - Top-Hat Rail mount - Narrow form factor  eCon 3080-A/-A2/-A4 8 RJ45 also available with: - with narrowest housing (-A2) - extended temperature range (-A4)  eCon 3080 -A1 8 RJ45
		Inside IP 30 / IP 40 Degree of protection	Ha-VIS eCon 4000 - 8 copper ports (M12 D-coding) - Robust metal housing - EMC, temperature range and mechanical stability meet the highest requirements  eCon 4080-B1 8 M12 D-coding 
		Outside IP 65 / IP 67 Degree of protection	Ha-VIS eCon 7000 - 5 / 10 copper ports (Han® 3 A RJ45 or M12 D-coding) - Robust die-cast zinc housing - EMC, temperature range and mechanical stability meet the highest requirements  eCon 7050-A1 5 Han® 3 A RJ45 wide power input range 
Ha-VIS sCon configurable	via USB interface configurable through a graphic user interface	Inside IP 30 Degree of protection	Ha-VIS sCon 3000 - 6 / 8 / 10 copper ports (RJ45) and optionally 2 / 3 F.O. ports (SC) - Robust metal housing - Parallel-/ ring-redundancy - Top-Hat rail mounting - Potential-free alarm contact  sCon 3100-A 10 RJ45 
Fast Track Switching	Webinterface SNMP (v1, v2c, v3) User Management LLDP	Inside IP 30 Degree of protection	Ha-VIS FTS 3000 - 6 / 8 / 10 copper ports (RJ45) and optionally 2 SFP modules - Robust metal housing - Top-Hat rail mounting - Web-management - Fast Track Switching Technology  FTS 3100s-A 10 RJ45
Ha-VIS mCon managed	Quality of Service VLAN support Rapid Spanning Tree 802.1X RADIUS Client IP authorize manager Link Aggregation IGMP Snooping (v1, v2, v3) with querier DHCP Client DHCP Option 82 SNMP Alarms via Email SNMP Traps Port diagnostic	Inside IP 30 Degree of protection	Ha-VIS mCon 3000 - Copper ports (RJ45); F.O. ports (SC/ST/SFP); Gigabit Uplink - Small, robust metal housing, extended temperature range - Top-Hat rail mounting - Full managed via Web Interface and SNMP - Fanless Low-Power-Design  mCon 3080-A 8 RJ45  mCon 3102-AASFP 8 RJ45 2 RJ45 Gigabit 2 SFP Gigabit Combo
		Inside IP 30 / IP 40 Degree of protection	Ha-VIS mCon 4000 - 8 copper ports (M12 D-coding) - Robust metal housing - EMC, temperature range and mechanical stability meet the highest requirements - Web management  mCon 4080-B1V 8 M12 D-Coding 
		Outside IP 65 / IP 67 Degree of protection	Ha-VIS mCon 7000 - 5 / 10 copper ports (Han® 3 A RJ45 or M12 D-coding) - Robust die-cast zinc housing - EMC, temperature range and mechanical stability meet the highest requirements - Web management  mCon 7050-B1V 5 M12 D-Coding wide power input range
Ha-VIS pCon	Industrial Power Supply 24 V / 48 V	Inside IP 20 / IP 65 Degree of protection	Ha-VIS pCon 7000 - DC/DC Converter - Operating temperature: - 40 °C ... +70 °C  pCon 7060-110/24 110 V DC / 24 V DC IP 20 Degree of protection

ork Components

Switches

Application

n 2040-A
5



eCon 2050-A
5 RJ45



eCon 2050-AA
5 RJ45 Full Gigabit



eCon 2160-A
16 RJ45



2



eCon 3061-AD
6 RJ45, 1 SC



eCon 3061-AE
6 RJ45, 1 ST



eCon 3062-AD/-AD2/-AF
6 RJ45, 2 SC also available with:
- extended temperature range (-AD2)
- Singlemode (-AF)



eCon 3062-AE
6 RJ45, 2 ST

Converter



eCon 3011-AD
1 RJ45, 1 SC
10/100 Mbit/s
PoE



eCon 3011-ASFP
1 RJ45
1 SFP module slot
10/100 Mbit/s
PoE



eCon 4080-B3

8 M12 D-coding
110 V DC power input



eCon 4080-BPoE1
8 M12 D-coding
PoE on 8 ports

Ha-VIS eCon 9000

- 7 / 8 copper ports M12 D-coding
- Robust metal housing
- 19" rack mount
- Small form-factor



eCon 9080-B1
8 M12
D-coding



eCon 9070-B
7 M12 D-coding
Power input on the front



eCon 7050-B1

5 M12 D-coding
wide power input range

10 Port



eCon 7100-B1
10 M12 D-coding



eCon 7100-AA
8 Han® 3 A RJ45
2 Han® 3 A RJ45 Gigabit



sCon 3100-AA

8 RJ45
2 RJ45 Gigabit

F.O.

SC



sCon 3082-AD
8 RJ45, 2 SC



sCon 3063-AD
6 RJ45, 3 SC



managed



FTS 3060-A
6 RJ45



FTS 3100-A
10 RJ45



FTS 3082-ASFP
8 RJ45 ,
2 SFP module slots



mCon 3100-AAV
8 RJ45
2 RJ45 Gigabit



mCon 3100-AV
10 RJ45

F.O.

SC



mCon 3082-ADV/AFV
8 RJ45, 2 SC
Multi Mode (ADV)
Single Mode (AFV)

ST



mCon 3082-AEV
8 RJ45, 2 ST

mCon 3063-AEV
6 RJ45, 3 ST



mCon 4080-B3V

8 M12 D-coding
110 V DC power input



mCon 4080-BPoE1V
8 M12 D-coding
PoE on 8 ports

Ha-VIS mCon 9000

- 7 / 8 copper ports D-coding
- Robust metal housing
- 19" rack mount
- Small form-factor



mCon 9080-BV
8 M12
D-coding



mCon 9070-BV
7 M12
D-coding
Power input on the front



10 Port



mCon 7100-B1V
10 M12 D-coding



mCon 7100-AAV
8 Han® 3 A RJ45
2 Han® 3 A RJ45 Gigabit



pCon 7150-110/48
110 V DC / 48 V DC
IP 65 Degree of protection



pCon 7150 DC-24/48
24 V DC / 48 V DC
IP 65 Degree of protection

CONTENTS	PAGE
eCon 2000	
Introduction and features	A-1 3
Technical characteristics eCon 2030-A, 2040-A, 2050-A, 2160-A	A-1 4
Technical characteristics eCon 2050-AA	A-1 5
Ha-VIS eCon 2030-A	A-1 6
Ha-VIS eCon 2040-A	A-1 7
Ha-VIS eCon 2050-A	A-1 8
Ha-VIS eCon 2160-A	A-1 9
Ha-VIS eCon 2050-AA	A-1 10
eCon 3000	
Introduction and features	A-1 11
Technical characteristics	A-1 12
Technical characteristics F.O. terminations	A-1 13
Introduction and features Media converter	A-1 14
Technical characteristics Media converter	A-1 15
Technical characteristics Media converter F.O. terminations	A-1 16
Ha-VIS eCon 3080-A	A-1 17
Ha-VIS eCon 3080-A1	A-1 18
Ha-VIS eCon 3080-A2	A-1 19
Ha-VIS eCon 3080-A4	A-1 20
Ha-VIS eCon 3061-AD	A-1 21
Ha-VIS eCon 3062-AD	A-1 22
Ha-VIS eCon 3062-AD2	A-1 23
Ha-VIS eCon 3062-AF	A-1 24
Ha-VIS eCon 3061-AE	A-1 25
Ha-VIS eCon 3062-AE	A-1 26
Ha-VIS eCon 3011-AD	A-1 27
Ha-VIS eCon 3011-ASFP	A-1 28

[illegible]



Ethernet Switch Ha-VIS eCon 2000

Ethernet Switches, unmanaged, for flat mounting onto top-hat mounting rail in control cabinets

General description

The Ethernet Switches of the product family Ha-VIS eCon 2000 are suitable for industrial applications and support Ethernet (10 Mbit/s), Fast Ethernet (100 Mbit/s) and Gigabit Ethernet (1000 Mbit/s). The product family enables the connection of up to 16 network devices (according to type) via Twisted Pair cables.

Through its flat mounting and the clearly laid out integrated LEDs on each port, the Ha-VIS eCon 2000 Ethernet Switch family supports fast and easy network diagnosis. The Ha-VIS eCon Ethernet Switch operates as an unmanaged switch in Store and Forward Switching Mode and supports Auto-crossing, Auto-negotiation and Auto-polarity.

Due to their mechanical attachment, the Ha-VIS eCon 2000 Ethernet Switches can be mounted on or dismounted from standard 35 mm top-hat rails without tools.

Features

- Auto-crossing
- Auto-negotiation
- Auto-polarity
- Store and Forward Switching Mode

For Ethernet Switch Ha-VIS eCon 2050-AA only:

- complete designed for Gigabit Ethernet
- Jumbo Frames up to 9728 Bytes
- 4 K MAC addresses

Advantages

- Flat housing design
- Robust metal housing
- Adapted for mounting onto top-hat mounting rail 35 mm according to EN 60 715
- RoHS compliant

Application fields

- Industrial automation
- Automotive industry
- Wind power
- Power distribution systems

Technical characteristics Ha-VIS eCon 2030-A, 2040-A, 2050-A / Ha-VIS eCon 2160-A

Ethernet interface – RJ45

Number of ports	3x / 4x / 5x / 16x 10/100Base-T(X)
Cable types according to IEEE 802.3	Shielded Twisted Pair (STP) or Unshielded Twisted Pair (UTP), 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 DIN EN 50 173-1)
Termination	RJ45 (Twisted Pair)
Diagnostics (LED)	• Status Link - Green • Data transfer (Act) - Green flashing • Data transfer rate (Speed) - 100 Mbit/s: Yellow 10 Mbit/s: OFF
Topology	• Line • Star • mixed

	Ha-VIS eCon 2030-A, eCon 2040-A, eCon 2050-A	Ha-VIS eCon 2160-A
Power supply		
Input voltage	24 V DC (9.6 V ... 36 V DC)	24 V DC (9.6 V ... 60 V DC) - redundant
Termination	3-pole, pluggable screw contact (24 V, 0, FE)	5-pole, pluggable screw contact, redundant (PWR1 + / PWR1 - / PWR2 + / PWR2 - / FE)
Diagnostics (LED)	Power supply - LED Green	
Design features		
Housing material	aluminium	
Dimensions (W x H x D)	46.5 x 105 x 25.5 mm (without connectors)	120 x 105 x 25.5 mm (without connectors)
Degree of protection acc. to DIN EN 60 529	IP 30	
Assembly	35 mm top-hat rail acc. to EN 60 715	
Weight	approx. 0.2 kg	approx. 0.4 kg

Environmental conditions

Working temperature	-10 °C ... +70 °C
Stock temperature	-40 °C ... +85 °C
Relative humidity	10 % ... +95 % (non-condensing)

Technical characteristics Ha-VIS eCon 2050-AA

Ethernet interface – RJ45

Number of ports	5x 10/100/1000-Base-T(X)
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 cable Category 5 acc. to DIN EN 50 173-1)
Termination	RJ45 (Twisted Pair)
Diagnostics (LED)	• Status Link - Green • Data transfer (Act) - Green flashing • Data transfer rate (Speed) - 1000 Mbit/s: Green 100 Mbit/s: Yellow 10 Mbit/s: OFF
Topology	• Line • Star • mixed

Power supply

Input voltage	24 V DC (9.6 V ... 60 V DC) - redundant
Termination	5-pole, pluggable screw contact, redundant (PWR1 + / PWR1 - / PWR2 + / PWR2 - / FE)
Diagnostics (LED)	Power supply (PWR1; PWR2) - LED Green

Design features

Housing material	aluminium
Dimensions (W x H x D)	70 x 105 x 25.5 mm (without connectors)
Degree of protection acc. to DIN EN 60 529	IP 30
Assembly	35 mm top-hat rail acc. to EN 60 715
Weight	0.4 kg

Environmental conditions

Stock temperature	-40 °C ... +85 °C
Relative humidity	10 % ... +95 % (non-condensing)

Ha-VIS eCon 2000



Ethernet Switch
Ha-VIS eCon 2030-A
3-port Ethernet Switch for flat mounting onto top-hat mounting rail in control cabinets

Unmanaged	IP 30	PROFINET compatible	EtherNet/IP compatible
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Number of ports, Copper / Termination	3x 10/100Base-T(X) / RJ45 (Twisted Pair)
Input voltage / Termination	24 V DC / 3-pole, pluggable screw contact (24 V, 0, FE)
Permissible range (min./max.)	9.6 V ... 36 V DC
Input current	approx. 100 mA (at 24 V DC)
Housing material	aluminium, anodised
Dimensions (W x H x D)	46.5 x 105 x 25.5 mm (without connectors)
Weight	approx. 0.2 kg
Working temperature	-10 °C ... +70 °C
Approvals	UL 508; UL 60 950-1; DNV
MTBF	1.020.000 h

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS eCon 2030-A Ethernet Switch with 3 RJ45 ports	20 76 103 3000		

**Ethernet Switch****Ha-VIS eCon 2040-A**

4-port Ethernet Switch for flat mounting onto top-hat mounting rail in control cabinets

Unmanaged	IP 30	PROFINET compatible	EtherNet/IP compatible
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Number of ports, Copper / Termination	4x 10/100Base-T(X) / RJ45 (Twisted Pair)
Input voltage / Termination	24 V DC / 3-pole, pluggable screw contact (24 V, 0, FE)
Permissible range (min./max.)	9.6 V ... 36 V DC
Input current	approx. 100 mA (at 24 V DC)
Housing material	aluminium, anodised
Dimensions (W x H x D)	46.5 x 105 x 25.5 mm (without connectors)
Weight	approx. 0.2 kg
Working temperature	-10 °C ... +70 °C
Approvals	UL 508; UL 60 950-1; DNV
MTBF	1.020.000 h

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS eCon 2040-A Ethernet Switch with 4 RJ45 ports	20 76 104 3000		

Ha-VIS eCon 2000



Ethernet Switch
Ha-VIS eCon 2050-A
5-port Ethernet Switch for flat mounting onto top-hat mounting rail in control cabinets

Unmanaged	IP 30	PROFINET compatible	EtherNet/IP compatible
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Number of ports, Copper / Termination	5x 10/100Base-T(X) / RJ45 (Twisted Pair)
Input voltage / Termination	24 V DC / 3-pole, pluggable screw contact (24 V, 0, FE)
Permissible range (min./max.)	9.6 V ... 36 V DC
Input current	approx. 100 mA (at 24 V DC)
Housing material	aluminium, anodised
Dimensions (W x H x D)	46.5 x 105 x 25.5 mm (without connectors)
Weight	approx. 0.2 kg
Working temperature	-10 °C ... +70 °C
Approvals	UL 508; UL 60 950-1; DNV
MTBF	1.020.000 h

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS eCon 2050-A Ethernet Switch with 5 RJ45 ports	20 76 105 3000		



Ethernet Switch

Ha-VIS eCon 2160-A

16-port Ethernet Switch for flat mounting onto top-hat mounting rail in control cabinets

Unmanaged	IP 30	PROFINET compatible ☒	EtherNet/IP compatible ☒
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Number of ports, Copper / Termination	16x 10/100Base-T(X) / RJ45 (Twisted Pair)
Input voltage / Termination	24 V DC / 5-pole, pluggable screw contact, redundant (PWR1 + / PWR1 - / PWR2 + / PWR2 - / FE)
Permissible range (min./max.)	9.6 V ... 60 V DC
Input current	approx. 220 mA (at 24 V DC)
Housing material	aluminium, anodised
Dimensions (W x H x D)	120 x 105 x 25.5 mm (without connectors)
Weight	approx. 0.4 kg
Working temperature	-10 °C ... +70 °C
MTBF	1.150.000 h

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS eCon 2160-A Ethernet Switch with 16 RJ45 ports	20 76 116 3000		

Ha-VIS eCon 2000



Ethernet Switch
Ha-VIS eCon 2050-AA

5-port Gigabit Ethernet Switch for flat mounting onto top-hat mounting rail in control cabinets

Unmanaged	IP 30	PROFINET compatible	EtherNet/IP compatible
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Number of ports, Copper / Termination	5x 10/100/1000-Base-T(X) / RJ45 (Twisted Pair)
Input voltage / Termination	24 V DC / 5-pole, pluggable screw contact, redundant (PWR1 + / PWR1 - / PWR2 + / PWR2 - / FE)
Permissible range (min./max.)	9.6 V ... 60 V DC
Input current	approx. 250 mA (at 24 V DC)
Housing material	aluminium, anodised
Dimensions (W x H x D)	70 x 105 x 25.5 mm (without connectors)
Weight	approx. 0.4 kg
Working temperature	-40 °C ... +70 °C
MTBF	1.220.000 h

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS eCon 2050-AA Ethernet Switch with 5 RJ45 ports	20 76 105 3001		



Ethernet Switch Ha-VIS eCon 3000

Ethernet Switches, unmanaged, for installation in control cabinets

eCon 3000

General description

The Fast Ethernet Switches of the product family Ha-VIS eCon 3000 are suitable for industrial applications and support Ethernet (10 Mbit/s) and Fast Ethernet (100 Mbit/s). The product family enables the connection of up to 10 network devices (according to type) over Twisted Pair cables and fibre-optic cables (Multi- and Singlemode).

The Ha-VIS eCon 3000 Ethernet Switch product family, with its integrated LEDs on each port, supports fast and easy network diagnosis.

The Ha-VIS eCon 3000 Ethernet Switch operates as an unmanaged Switch in Store and Forward Switching Mode and supports Auto-crossing, Auto-negotiation and Auto-polarity.

Features

- Auto-crossing
- Auto-negotiation
- Auto-polarity
- Store and Forward Switching Mode

Advantages

- Small housing
- Robust metal housing
- Adapted for mounting onto top-hat mounting rail 35 mm according to EN 60 715
- RoHS compliant

Application fields

- Industrial automation
- Automotive industry
- Wind power
- Power distribution systems

Technical characteristics

Ethernet interface – RJ45

Number of ports	6x / 8x 10/100Base-T(X)
Cable types according to IEEE 802.3	Shielded Twisted Pair (STP) or Unshielded Twisted Pair (UTP), 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 DIN EN 50 173-1)
Termination	RJ45 (Twisted Pair)
Diagnostics (LED)	• Status Link - Green • Data transfer (Act) - Green flashing
Topology	• Line • Star • mixed

Power supply

Input voltage	24 V DC (9.6 V ... 60 V DC) - redundant
Termination	3-pole, pluggable screw contact (24 V, 0, FE)
Diagnostics (LED)	Power supply (PWR1; PWR2) - LED Green

Design features

Housing material	metal
Dimensions (W x H x D)	23 x 130 x 100 mm (without connectors)
Degree of protection acc. to DIN EN 60 529	IP 30
Assembly	35 mm top-hat rail acc. to EN 60 715
Weight	approx. 0.6 kg

Environmental conditions

Stock temperature	-40 °C ... +85 °C
Relative humidity	10 % ... +95 % (non-condensing)

Technical characteristics F.O. termination

Ethernet interface – F.O.

Number of ports	1x / 2x 100Base-FX
Cable types according to IEEE 802.3	• Multimodefibre, 1300 nm; 50 µm / 125 µm or 62.5 µm / 125 µm • Singlemodefibre, 1300 nm; 9 µm (for AF versions only)
Data rate	100 Mbit/s
Maximum cable length	• 2000 m (Multimode) • 15 km (Singlemode)
Termination	ST female / ST female
Diagnostics (LED)	• Status Link - Green • Data transfer (Act) - Green flashing
Wavelength	1300 nm
Transceive power T(X) max. (dynamic)	• -14 dBm (50 µm / 125 µm) • -14 dBm (62.5 µm / 125 µm)
Transceive power T(X) min.	• -23.5 dBm (50 µm / 125 µm) • -20 dBm (62.5 µm / 125 µm)
Receive power RX typical (dynamic)	• -33.9 dBm (window) • -35.2 dBm (centre)
Receive power RX max. (dynamic)	-14 dBm
Signal detection (dynamic)	-33 dBm
Topology	• Line • Star • mixed



Ethernet Media converter Ha-VIS eCon 3000

Ethernet Media converter for vertical installation in control cabinets,
including 1 F.O. port

General description

The Fast Ethernet Media converter Ha-VIS eCon 3011 of the product family Ha-VIS eCon 3000 is suitable for industrial applications and support both Ethernet (10 Mbit/s) and Fast Ethernet (100 Mbit/s). The Media-converter enables the conversion from Twisted Pair cables to fiber-optic cables (Multimode and Singlemode).

The Ha-VIS eCon 3011 Media converter is configurable via Dip switch and offers a variety of control functions.

The Media converter has two operating modes:

In the switch mode, it operates as an unmanaged Ethernet Switch with Store and Forward Switching which supports asynchronous data communication, Auto-crossing and Auto-negotiation.

In the converter mode, it works with a data rate of 100 Mbit/s (Full duplex). The latency is very low in this operation mode.

Features

- Auto-crossing
- Auto-negotiation
- Auto-polarity
- Store and Forward Switching Mode

Advantages

- Power over Ethernet (IEEE 802.3af)
- Configuration via Dip switch
- Small housing
- Robust metal housing
- Adapted for mounting onto top-hat mounting rail 35 mm according to EN 60 715

Application fields

- Industrial automation
- Automotive industry
- Wind power
- Power distribution systems

Technical characteristics Media converter

Ethernet interface – RJ45

Number of ports	1x 10/100Base-T(X)
Cable types according to IEEE 802.3	Shielded Twisted Pair (STP) or Unshielded Twisted Pair (UTP), Category 5
Data rate	10 Mbit/s or 100 Mbit/s (RJ45)
Repeater class	Class II (latency: 860 ns in converter mode)
Maximum cable length	100 m (Twisted Pair, with cable Category 5 acc. to DIN EN 50 173-1)
Termination	RJ45 (Twisted Pair)
Diagnostics (LED)	• Status Link - Green • Data transfer (Act) - Green flashing • Data transfer rate (Speed) - 100 Mbit/s: Yellow 10 Mbit/s: OFF • Duplex - Full duplex: Yellow Half duplex: OFF • PoE (Power Source Equipment) (PSE) - Green
Topology	• Line • Star • mixed

Power supply

Input voltage	24 V DC (12 V ... 30 V DC) - redundant
Input voltage, mode PoE	48 V DC (46 V ... 57 V DC) - redundant
Termination	5-pole, pluggable screw contact, redundant (PWR1 + / PWR1 - / PWR2 + / PWR2 - / FE)
Diagnostics (LED)	Power supply - LED Green

Configuration

Configuration via Dip switch:
Mode, Auto-negotiation, Data rate, Duplex TP, Duplex FX,
Link monitoring, PoE (PSE)

Design features

Housing material	metal
Dimensions (W x H x D)	23 x 130 x 100 mm (without connectors)
Degree of protection acc. to DIN EN 60 529	IP 30
Assembly	35 mm top-hat rail acc. to EN 60 715
Weight	approx. 0.6 kg

Environmental conditions

Stock temperature	-40 °C ... +85 °C
Relative humidity	10 % ... +95 % (non-condensing)

Technical characteristics Media converter F.O. termination

Ethernet interface – F.O.

Number of ports	1x 100Base-FX
Cable types according to IEEE 802.3	Multimodefibre, 1300 nm; 50 µm / 125 µm or 62.5 µm / 125 µm
Data rate	100 Mbit/s
Maximum cable length	2000 m (Multimode)
Termination	SC-D female
Diagnostics (LED)	• Status Link - Green • Data transfer (Act) - Green flashing • Duplex - Full duplex: Yellow Half duplex: OFF
Wavelength	1300 nm
Transceive power T(X) max. (dynamic)	• -14 dBm (50 µm / 125 µm) • -14 dBm (62.5 µm / 125 µm)
Transceive power T(X) min.	• -23.5 dBm (50 µm / 125 µm) • -20 dBm (62.5 µm / 125 µm)
Receive power RX typical (dynamic)	• -33.9 dBm (window) • -35.2 dBm (centre)
Receive power RX max. (dynamic)	-14 dBm
Signal detection (dynamic)	-33 dBm
Topology	• Line • Star • mixed



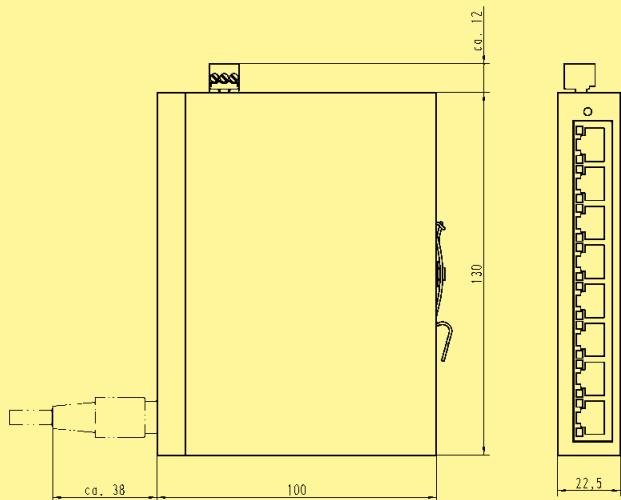
Ethernet Switch Ha-VIS eCon 3080-A

8-port Ethernet Switch for vertical installation in control cabinets

eCon 3000

Unmanaged	IP 30	PROFINET compatible 	EtherNet/IP compatible 
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Number of ports, Copper / Termination	8x 10/100Base-T(X) / RJ45 (Twisted Pair)
Input voltage / Termination	24 V DC / 3-pole, pluggable screw contact (24 V, 0, FE)
Permissible range (min./max.)	9.6 V ... 36 V DC
Input current	approx. 150 mA (at 24 V DC)
Housing material	metal, powder-coated
Dimensions (W x H x D)	23 x 130 x 100 mm (without connectors)
Weight	approx. 0.6 kg
Working temperature	-10 °C ... +70 °C
Approvals	UL 508; UL 60 950-1; DNV; e1
MTBF	548.000 h

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS eCon 3080-A Ethernet Switch with 8 RJ45 ports	20 76 108 3000		

Ha-VIS eCon 3000



Ethernet Switch
Ha-VIS eCon 3080-A1
8-port Ethernet Switch for flat installation in control cabinets

Unmanaged	IP 30	PROFINET compatible ☒	EtherNet/IP compatible ☒
Number of ports, Copper / Termination	8x 10/100Base-T(X) / RJ45 (Twisted Pair)		
Input voltage / Termination	24 V DC / 3-pole, pluggable screw contact (24 V, 0, FE)		
Permissible range (min./max.)	9.6 V ... 36 V DC		
Input current	approx. 150 mA (at 24 V DC)		
Housing material	metal, powder-coated		
Dimensions (W x H x D)	130 x 23 x 100 mm (without connectors)		
Weight	approx. 0.6 kg		
Working temperature	-10 °C ... +70 °C		
Approvals	UL 508; UL 60 950-1; DNV; e1		
MTBF	548.000 h		

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS eCon 3080-A1 Ethernet Switch with 8 RJ45 ports	20 76 108 3001		



Ethernet Switch

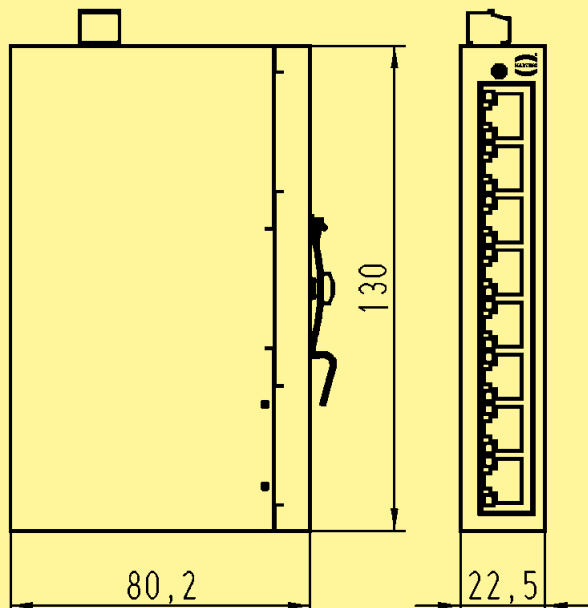
Ha-VIS eCon 3080-A2

8-port Ethernet Switch for vertical installation in control cabinets,
low installation depth

eCon 3000

Unmanaged	IP 30	PROFINET compatible ☒	EtherNet/IP compatible ☒
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Number of ports, Copper / Termination	8x 10/100Base-T(X) / RJ45 (Twisted Pair)
Input voltage / Termination	24 V DC / 3-pole, pluggable screw contact (24 V, 0, FE)
Permissible range (min./max.)	9.6 V ... 36 V DC
Input current	approx. 150 mA (at 24 V DC)
Housing material	metal, powder-coated
Dimensions (W x H x D)	23 x 130 x 80 mm (without connectors)
Weight	approx. 0.6 kg
Working temperature	-10 °C ... +70 °C
Approvals	UL 508
MTBF	548.000 h

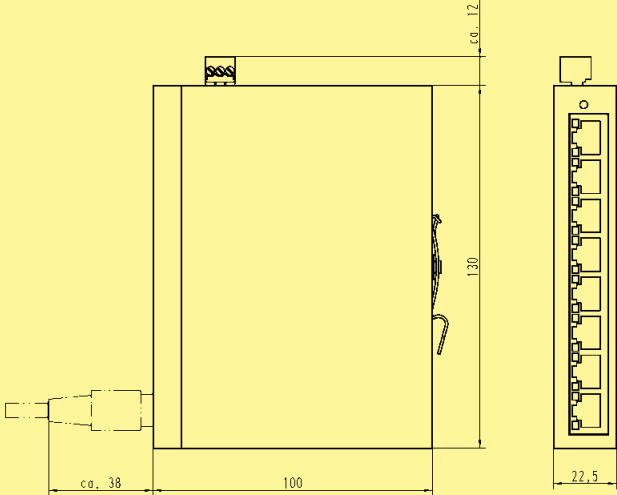
Identification	Part number	Drawing	Dimensions in mm
Ha-VIS eCon 3080-A2 Ethernet Switch with 8 RJ45 ports	20 76 108 3002		



Ethernet Switch
Ha-VIS eCon 3080-A4
8-port Ethernet Switch for vertical installation in control cabinets,
with extended temperature range

Unmanaged	IP 30	PROFINET compatible 	EtherNet/IP compatible 
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Number of ports, Copper / Termination	8x 10/100Base-T(X) / RJ45 (Twisted Pair)
Input voltage / Termination	24 V DC / 3-pole, pluggable screw contact (24 V, 0, FE)
Permissible range (min./max.)	12 V ... 36 V DC
Input current	approx. 150 mA (at 24 V DC)
Housing material	metal, powder-coated
Dimensions (W x H x D)	23 x 130 x 100 mm (without connectors)
Weight	approx. 0.6 kg
Working temperature	-40 °C ... +70 °C
Approvals	UL 508; DNV
MTBF	540.000 h

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS eCon 3080-A4 Ethernet Switch with 8 RJ45 ports	20 76 108 3004		



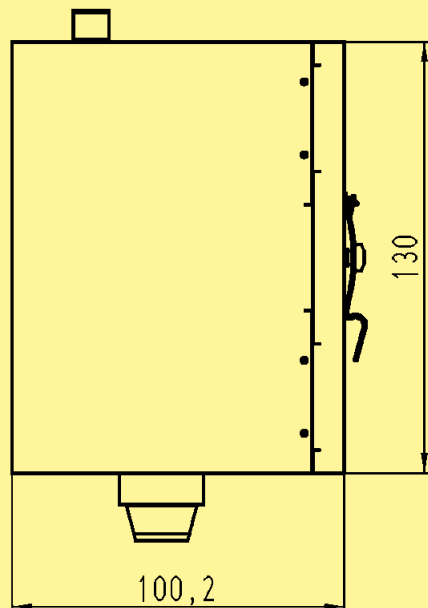
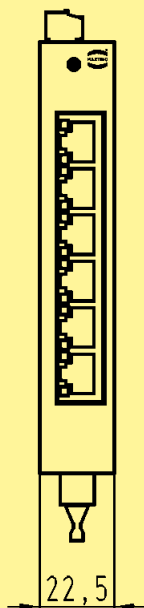
Ethernet Switch

Ha-VIS eCon 3061-AD

7-port Ethernet Switch for vertical installation in control cabinets,
including 1 F.O. port (SC, MM)

eCon 3000

Unmanaged	IP 30	PROFINET compatible ☒	EtherNet/IP compatible ☒
Number of ports, Copper / Termination	6x 10/100Base-T(X) / RJ45 (Twisted Pair)		
Number of ports, F.O. / Termination	1x 100Base-FX / SC-D female		
Input voltage / Termination	24 V DC / 3-pole, pluggable screw contact (24 V, 0, FE)		
Permissible range (min./max.)	9.6 V ... 60 V DC		
Input current	approx. 200 mA (at 24 V DC)		
Housing material	metal, powder-coated		
Dimensions (W x H x D)	23 x 130 x 100 mm (without connectors)		
Weight	approx. 0.6 kg		
Working temperature	-10 °C ... +70 °C		
Approvals	UL 508		
MTBF	825.000 h		

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS eCon 3061-AD Ethernet Switch with 6 RJ45 ports 1 F.O. port	20 76 107 3100		

Ha-VIS eCon 3000



Ethernet Switch
Ha-VIS eCon 3062-AD

8-port Ethernet Switch for vertical installation in control cabinets,
including 2 F.O. ports (SC, MM)

Unmanaged	IP 30	PROFINET compatible	EtherNet/IP compatible
Number of ports, Copper / Termination	6x 10/100Base-T(X) / RJ45 (Twisted Pair)		
Number of ports, F.O. / Termination	2x 100Base-FX / SC-D female		
Input voltage / Termination	24 V DC / 3-pole, pluggable screw contact (24 V, 0, FE)		
Permissible range (min./max.)	9.6 V ... 60 V DC		
Input current	approx. 240 mA (at 24 V DC)		
Housing material	metal, powder-coated		
Dimensions (W x H x D)	23 x 130 x 100 mm (without connectors)		
Weight	approx. 0.6 kg		
Working temperature	-10 °C ... +70 °C		
Approvals	UL 508; UL 60 950-1		
MTBF	825.000 h		

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS eCon 3062-AD Ethernet Switch with 6 RJ45 ports 2 F.O. ports	20 76 108 3100		



Ethernet Switch

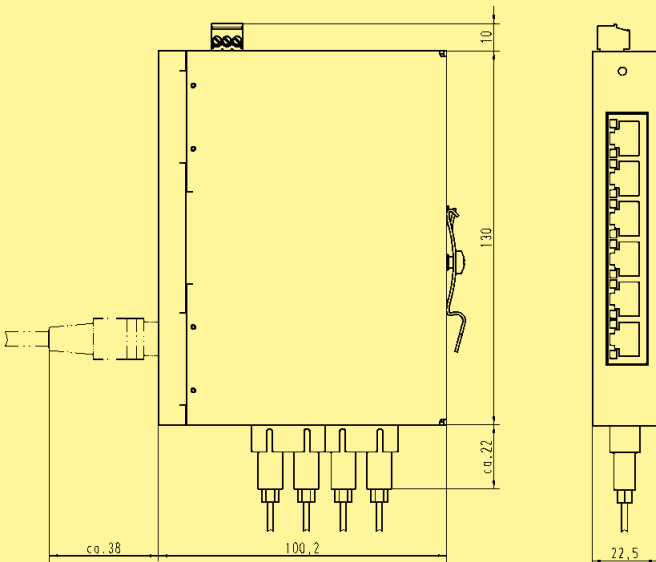
Ha-VIS eCon 3062-AD2

8-port Ethernet Switch for vertical installation in control cabinets,
including 2 F.O. ports (SC, MM), extended temperature range

eCon 3000

Unmanaged	IP 30	PROFINET compatible 	EtherNet/IP compatible 
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Number of ports, Copper / Termination	6x 10/100Base-T(X) / RJ45 (Twisted Pair)
Number of ports, F.O. / Termination	2x 100Base-FX / SC-D female
Input voltage / Termination	24 V DC / 3-pole, pluggable screw contact (24 V, 0, FE)
Permissible range (min./max.)	9.6 V ... 60 V DC
Input current	approx. 240 mA (at 24 V DC)
Housing material	metal, powder-coated
Dimensions (W x H x D)	23 x 130 x 100 mm (without connectors)
Weight	approx. 0.6 kg
Working temperature	-40 °C ... +70 °C
Approvals	UL 508
MTBF	825.000 h

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS eCon 3062-AD2 Ethernet Switch with 6 RJ45 ports 2 F.O. ports	20 76 108 3102		

Ha-VIS eCon 3000



Ethernet Switch
Ha-VIS eCon 3062-AF

8-port Ethernet Switch for vertical installation in control cabinets,
including 2 F.O. ports (SC, SM)

Unmanaged	IP 30	PROFINET compatible	EtherNet/IP compatible
Number of ports, Copper / Termination	6x 10/100Base-T(X) / RJ45 (Twisted Pair)		
Number of ports, F.O. / Termination	2x 100Base-FX / SC-D female		
Input voltage / Termination	24 V DC / 3-pole, pluggable screw contact (24 V, 0, FE)		
Permissible range (min./max.)	9.6 V ... 60 V DC		
Input current	approx. 240 mA (at 24 V DC)		
Housing material	metal, powder-coated		
Dimensions (W x H x D)	23 x 130 x 100 mm (without connectors)		
Weight	approx. 0.6 kg		
Working temperature	-10 °C ... +70 °C		
Approvals	UL 508		

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS eCon 3062-AF Ethernet Switch with 6 RJ45 ports 2 F.O. ports	20 76 108 3103		

Ethernet Switch

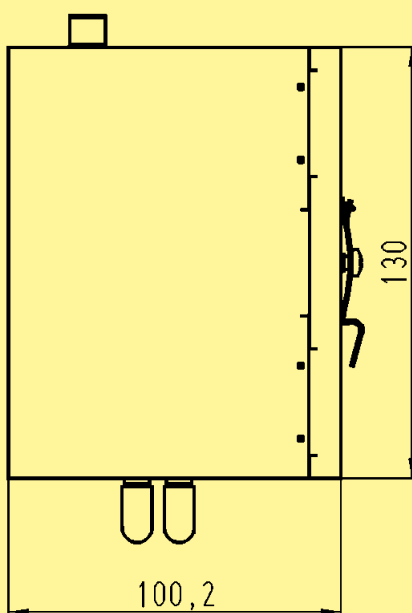
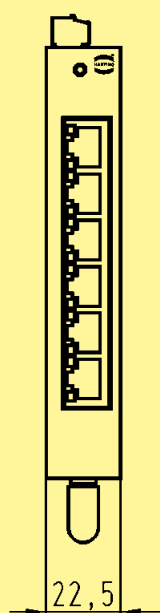
Ha-VIS eCon 3061-AE

7-port Ethernet Switch for vertical installation in control cabinets,
including 1 F.O. port (ST, MM)



eCon 3000

Unmanaged	IP 30	PROFINET compatible ☒	EtherNet/IP compatible ☒
Number of ports, Copper / Termination	6x 10/100Base-T(X) / RJ45 (Twisted Pair)		
Number of ports, F.O. / Termination	1x 100Base-FX / ST female		
Input voltage / Termination	24 V DC / 3-pole, pluggable screw contact (24 V, 0, FE)		
Permissible range (min./max.)	9.6 V ... 60 V DC		
Input current	approx. 200 mA (at 24 V DC)		
Housing material	metal, powder-coated		
Dimensions (W x H x D)	23 x 130 x 100 mm (without connectors)		
Weight	approx. 0.6 kg		
Working temperature	-10 °C ... +70 °C		
Approvals	UL 508		
MTBF	825.000 h		

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS eCon 3061-AE Ethernet Switch with 6 RJ45 ports 1 F.O. port	20 76 107 3200		

Ha-VIS eCon 3000



Ethernet Switch
Ha-VIS eCon 3062-AE
8-port Ethernet Switch for vertical installation in control cabinets,
including 2 F.O. ports (ST, MM)

Unmanaged	IP 30	PROFINET compatible	EtherNet/IP compatible
Number of ports, Copper / Termination	6x 10/100Base-T(X) / RJ45 (Twisted Pair)		
Number of ports, F.O. / Termination	2x 100Base-FX / ST female		
Input voltage / Termination	24 V DC / 3-pole, pluggable screw contact (24 V, 0, FE)		
Permissible range (min./max.)	9.6 V ... 60 V DC		
Input current	approx. 240 mA (at 24 V DC)		
Housing material	metal, powder-coated		
Dimensions (W x H x D)	23 x 130 x 100 mm (without connectors)		
Weight	approx. 0.6 kg		
Working temperature	-10 °C ... +70 °C		
Approvals	UL 508		
MTBF	825.000 h		

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS eCon 3062-AE Ethernet Switch with 6 RJ45 ports 2 F.O. ports	20 76 108 3200		

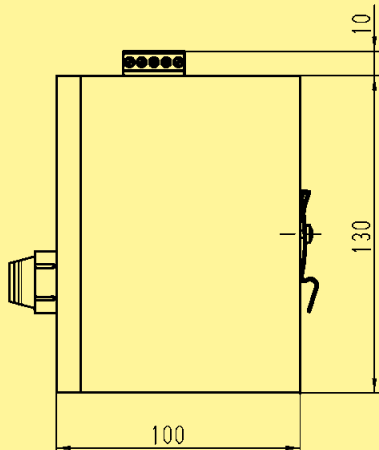
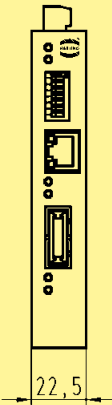


Ethernet Media converter Ha-VIS eCon 3011-AD

2-port Ethernet Media converter for vertical installation in control cabinets,
including 1 F.O. port (SC, MM)

eCon 3000

Unmanaged	IP 30	PROFINET compatible 	EtherNet/IP compatible 
Number of ports, Copper / Termination	1x 10/100Base-T(X) / RJ45 (Twisted Pair) PoE support		
Number of ports, F.O. / Termination	1x 100Base-FX / SC-D female		
mode PoE			
Input voltage / Termination	48 V DC		
Permissible range (min./max.)	46 V ... 57 V DC		
Input current	approx. 100 mA ... 400 mA at 48 V DC with PoE		
mode Non-PoE			
Input voltage / Termination	24 V DC / 5-pole, pluggable screw contact, redundant (PWR1 + / PWR1 - / PWR2 + / PWR2 - / FE)		
Permissible range (min./max.)	12 V ... 30 V DC		
Input current	approx. 100 mA (at 24 V DC)		
Housing material	metal, powder-coated		
Dimensions (W x H x D)	23 x 130 x 100 mm (without connectors)		
Weight	approx. 0.6 kg		
Working temperature	-40 °C ... +70 °C		
Approvals	cUL (in preparation)		
MTBF	2.055.000 h		

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS eCon 3011-AD Ethernet Switch with 1 RJ45 port 1 F.O. port	20 76 102 3100		

Ha-VIS eCon 3000



Ethernet Media converter
Ha-VIS eCon 3011-ASFP
2-port Ethernet Media converter for vertical installation in control cabinets,
including 1 F.O. port (SFP)

Unmanaged	IP 30	PROFINET compatible		EtherNet/IP compatible	
Number of ports, Copper / Termination		1x 10/100Base-T(X) / RJ45 (Twisted Pair) PoE support			
Number of ports, F.O. / Termination		1x 100Base-FX / SFP module slot			
mode PoE					
Input voltage / Termination		48 V DC			
Permissible range (min./max.)		46 V ... 57 V DC			
Input current		approx. 100 mA ... 400 mA at 48 V DC with PoE			
mode Non-PoE					
Input voltage / Termination		24 V DC / 5-pole, pluggable screw contact, redundant (PWR1 + / PWR1 - / PWR2 + / PWR2 - / FE)			
Permissible range (min./max.)		12 V ... 30 V DC			
Input current		approx. 100 mA (at 24 V DC)			
Housing material		metal, powder-coated			
Dimensions (W x H x D)		23 x 130 x 100 mm (without connectors)			
Weight		approx. 0.6 kg			
Working temperature		-40 °C ... +70 °C			
Approvals		cUL (in preparation)			
MTBF		2.090.000 h			

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS eCon 3011-ASFP Ethernet Switch with 1 RJ45 port 1 F.O. port	20 76 102 3101		



Ethernet Switch Ha-VIS eCon 4000

Ethernet Switches, unmanaged, for flat wall mounting

General description

The Fast Ethernet Switches of the product family Ha-VIS eCon 4000 are recommended for use in the widest range of industrial applications and support both Ethernet (10 Mbit/s) and Fast Ethernet (100 Mbit/s). The product family enables the connection of up to 8 network devices over Twisted Pair cables.

The robust M12 interface shows its advantages especially in applications at risk of vibrations.

The Ha-VIS eCon 4000 Ethernet Switch product family, with its integrated LEDs, supports fast and easy network diagnosis. The Ha-VIS eCon Ethernet Switch operates as an unmanaged Switch in Store and Forward Switching Mode and supports Auto-crossing, Auto-negotiation and Auto-polarity.

Features

- Ethernet Switch according to IEEE 802.3
- Ethernet (10 Mbit/s) and Fast Ethernet (100 Mbit/s)
- Auto-crossing, Auto-negotiation, Auto-polarity
- Diagnostic LEDs (Link Status, Data, Power)
- Store and Forward Switching Mode
- Mounting onto wall, optionally onto top-hat mounting rail

For Ethernet Switch Ha-VIS eCon 4080-BPoE1 only:

- PoE support

Advantages

- Robust metal housing and flat housing style
- EMC, temperature range and mechanical stability meet the toughest demands
- Wide range for power supply input
- Additional type test according to EN 50 155 and EN 50 121-3-2

Application fields

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

Technical characteristics

Ethernet interface – M12

Number of ports	8x 10/100Base-T(X)
Cable types according to IEEE 802.3	Shielded Twisted Pair (STP) or Unshielded Twisted Pair (UTP), Category 5
Data rate	10 Mbit/s or 100 Mbit/s (M12 D-coding)
Maximum cable length	100 m (Twisted Pair, with cable Category 5 acc. to DIN EN 50 173-1)
Termination	M12 D-coding
Diagnostics (LED)	• Status Link - Green • Data transfer (Act) - Green flashing • Data transfer rate (Speed) - 100 Mbit/s: Yellow 10 Mbit/s: Green
Topology	• Line • Star • mixed

Power supply

Input voltage	24 / 48 V DC (12 V ... 60 V DC) - redundant
Termination	M12 A-coding, male, for redundant power supply
Diagnostics (LED)	Power supply - LED Green

Design features

Housing material	metal
Dimensions (W x H x D)	130 x 166 x 50 mm (without connectors)
Degree of protection acc. to DIN EN 60 529	IP 40
Assembly	Wall mounting, flat assembly
Weight	approx. 0.85 kg

Environmental conditions

Stock temperature	-40 °C ... +85 °C
Relative humidity	10 % ... +95 % (non-condensing)

Technical characteristics Ha-VIS eCon 4080-BPoE1

Ethernet interface – M12

Number of ports	8x 10/100Base-T(X)
Cable types according to IEEE 802.3	Shielded Twisted Pair (STP) or Unshielded Twisted Pair (UTP), Category 5
Data rate	10 Mbit/s or 100 Mbit/s (M12 D-coding)
Maximum cable length	100 m (Twisted Pair, with cable Category 5 acc. to DIN EN 50 173-1)
Termination	M12 D-coding
Diagnostics (LED) Link	• Status Link - Green • Data transfer (Act) - Green flashing • Data transfer rate (Speed) - 100 Mbit/s: Yellow 10 Mbit/s: Green
PoE	• no PoE device - OFF • PoE device with failure - Red • PoE device connected - Green
Topology	• Line • Star • mixed

Power supply

Input voltage mode PoE	48 V DC (46 V ... 55 V DC)						
mode Non-PoE	24 / 48 V DC (12 V ... 55 V DC)						
Termination	M12 A-coding, male, for redundant power supply						
Diagnostics (LED)	<table> <tr> <td>Pwr X9 (switch)</td><td>voltage – LED Green</td></tr> <tr> <td>Pwr PoE (mode PoE)</td><td>> 46 V DC – LED Green</td></tr> <tr> <td>State</td><td>< 46 V DC – LED Red</td></tr> </table>	Pwr X9 (switch)	voltage – LED Green	Pwr PoE (mode PoE)	> 46 V DC – LED Green	State	< 46 V DC – LED Red
Pwr X9 (switch)	voltage – LED Green						
Pwr PoE (mode PoE)	> 46 V DC – LED Green						
State	< 46 V DC – LED Red						

Design features

Housing material	metal
Dimensions (W x H x D)	130 x 166 x 50 mm (without connectors)
Degree of protection acc. to DIN EN 60 529	IP 40
Assembly	Wall mounting, flat assembly
Weight	approx. 0.85 kg

Environmental conditions

Stock temperature	-40 °C ... +85 °C
Relative humidity	10 % ... +95 % (non-condensing)



Ethernet Switch
Ha-VIS eCon 4080-B1
8-port Ethernet Switch for flat wall mounting

Unmanaged	IP 40	PROFINET compatible	EtherNet/IP compatible
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Number of ports, Copper / Termination	8x 10/100Base-T(X) / M12 D-coding
Input voltage / Termination	24 / 48 V DC / M12 A-coding, male, for redundant power supply
Permissible range (min./max.)	12 V ... 60 V DC
Input current	approx. 150 mA (at 24 V DC)
Housing material	metal, powder-coated
Dimensions (W x H x D)	130 x 166 x 50 mm (without connectors)
Weight	approx. 0.85 kg
Working temperature	-40 °C ... +70 °C
Approvals	e1
MTBF	1.544.000 h

Identification	Part number	Drawing	Dimensions in mm
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Ha-VIS eCon 4080-B1 Ethernet Switch with 8 ports M12 D-coding for wall mounting	20 77 208 3001		
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Ethernet Switch

Ha-VIS eCon 4080-B3

8-port Ethernet Switch (110 V DC) for flat wall mounting

Unmanaged

IP 40

PROFINET compatible

EtherNet/IP compatible

Number of ports, Copper / Termination 8x 10/100Base-T(X) / M12 D-coding

Input voltage / Termination 72 / 110 V DC / M12 A-coding, male, for redundant power supply

Permissible range (min./max.) 50.4 V ... 137.5 V DC

Input current approx. 40 mA (at 110 V DC)

Housing material metal, powder-coated

Dimensions (W x H x D) 130 x 166 x 50 mm (without connectors)

Weight approx. 0.85 kg

Working temperature -40 °C ... +70 °C

MTBF 1.183.000 h

eCon 4000

Identification

Part number

Drawing

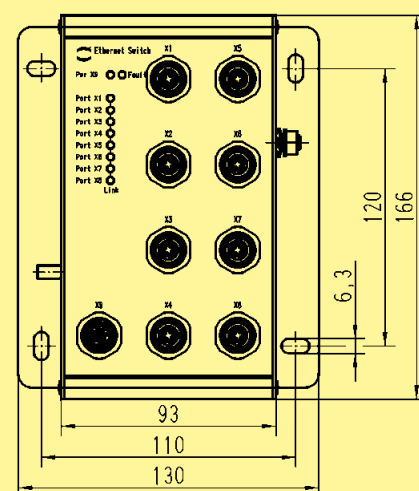
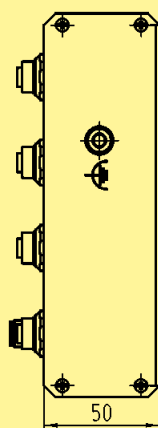
Dimensions in mm

Ha-VIS eCon 4080-B3

Ethernet Switch with
8 ports M12 D-coding

20 77 208 3003

for wall mounting





Ethernet Switch
Ha-VIS eCon 4080-BPoE1
8-port Ethernet Switch for flat wall mounting, with Power over Ethernet

Unmanaged	IP 30	PROFINET compatible	EtherNet/IP compatible
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Number of ports, Copper / Termination	8x 10/100Base-T(X) / M12 D-coding PoE supports 8 ports
mode PoE	
Input voltage / Termination	48 V DC / M12 A-coding, male
Permissible range (min./max.)	46 V ... 55 V DC
Input current	max. 3 A at 46 V DC, load 350 mA per port
mode Non-PoE	
Input voltage / Termination	24 / 48 V DC / M12 A-coding, male, for redundant power supply
Permissible range (min./max.)	12 V ... 55 V DC
Input current	approx. 150 mA (at 24 V DC)
Housing material	metal, powder-coated
Dimensions (W x H x D)	130 x 166 x 50 mm (without connectors)
Weight	approx. 0.85 kg
Working temperature	-40 °C ... +70 °C
MTBF	505.000 h

Identification	Part number	Drawing	Dimensions in mm
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Ha-VIS eCon 4080-BPoE1 Ethernet Switch with 8 ports M12 D-coding for wall mounting	20 77 208 3009	
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Ethernet Switch Ha-VIS eCon 9000

19" Ethernet Switches, unmanaged, for installation in a 19" rack

General description

The Ethernet Switches of the product family Ha-VIS eCon 9000 are recommended for use in the widest range of industrial applications and support Ethernet (10 Mbit/s) and Fast Ethernet (100 Mbit/s). The product family enables the connection of up to 8 network devices over Twisted Pair cables.

The Ha-VIS eCon 9000 Ethernet Switch family, with its integrated LEDs on each port, supports fast and easy network diagnosis. The Ha-VIS eCon Ethernet Switch operates as an unmanaged Switch in Store and Forward Switching mode and supports Auto-crossing, Auto-negotiation and Auto-polarity.

Features

- Ethernet Switch acc. to IEEE 802.3
- Ethernet (10 Mbit/s) and Fast Ethernet (100 Mbit/s)
- Auto-crossing, Auto-negotiation, Auto-polarity
- Diagnostic LEDs (Link status, Data, Power)
- Store and Forward Switching Mode, non blocking
- Pluggable in 19" racks

For Ethernet Switch Ha-VIS eCon eCon 9070-B only:

- Power input on the front - no backplane necessary

Advantages

- Robust metal housing
- EMC, temperature range and mechanical stability meet the toughest demands

Application fields

- Railway applications
- Industrial automation
- Automotive industry
- Wind power
- Power distribution systems

Technical characteristics

Ethernet interface – M12

Number of ports	7x / 8x 10/100Base-T(X)
Cable types according to IEEE 802.3	Shielded Twisted Pair (STP) or Unshielded Twisted Pair (UTP), Category 5
Data rate	10 Mbit/s or 100 Mbit/s (M12 D-coding)
Maximum cable length	100 m (Twisted Pair, with cable Category 5 acc. to DIN EN 50 173-1)
Termination	M12 D-coding
Diagnostics (LED)	• Status Link - Green • Data transfer (Act) - Green flashing • Data transfer rate (Speed) - 100 Mbit/s: Yellow 10 Mbit/s: OFF
Topology	• Line • Star • mixed

Power supply

Input voltage	24 / 48 V DC (8 V ... 60 V DC) - redundant
Termination	• M12 A-coding, male or • DIN frame connector, type F
Diagnostics (LED)	Power supply - LED Green

Design features

Housing material	aluminium
Degree of protection acc. to DIN EN 60 529	IP 20
Assembly	19" rack, 3 U
Weight	approx. 0.6 kg

Environmental conditions

Stock temperature	-40 °C ... +85 °C
Relative humidity	10 % ... +95 % (non-condensing)



Ethernet Switch

Ha-VIS eCon 9070-B

7-port Ethernet Switch for installation in a 19" rack

Unmanaged

IP 20

PROFINET compatible EtherNet/IP compatible 

Number of ports, Copper / Termination 7x 10/100Base-T(X) / M12 D-coding

Input voltage / Termination 24 / 48 V DC / M12 A-coding, male

Permissible range (min./max.) 8 V ... 60 V DC

Input current approx. 150 mA (at 24 V DC)

Housing material aluminium, anodised

Dimensions (W x H x D) 60.6 mm (3 U) x 128.4 mm (12 HP) x 167.5 mm

Weight approx. 0.6 kg

Working temperature -40 °C ... +70 °C

Approvals cUL (in preparation)

MTBF 1.411.000 h

eCon 9000

Identification

Part number

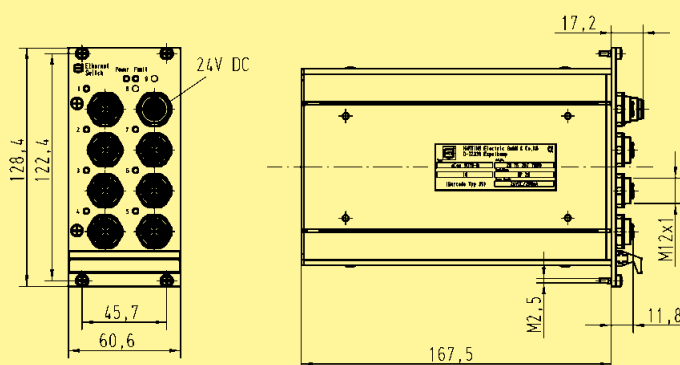
Drawing

Dimensions in mm

Ha-VIS eCon 9070-B

Ethernet Switch with
7 ports M12 D-coding

20 76 207 7000





Ethernet Switch
Ha-VIS eCon 9080-B1
8-port Ethernet Switch for installation in a 19" rack

Unmanaged	IP 20	PROFINET compatible	EtherNet/IP compatible
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Number of ports, Copper / Termination	8x 10/100Base-T(X) / M12 D-coding
Input voltage / Termination	24 / 48 V DC / DIN frame connector, Type F
Permissible range (min./max.)	8 V ... 60 V DC
Input current	approx. 110 mA (at 24 V DC)
Housing material	aluminium, anodised
Dimensions (W x H x D)	60.6 mm (3 U) x 128.4 mm (12 HP) x 173.5 mm
Weight	approx. 0.6 kg
Working temperature	-40 °C ... +70 °C
Approvals	E1
MTBF	1.260.000 h

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS eCon 9080-B1 Ethernet Switch with 8 ports M12 D-coding	20 76 208 7003		



Ethernet Switch Ha-VIS eCon 7000

Ethernet Switches, unmanaged, for use in harsh industrial environments

General description

The Ethernet Switches of the product family Ha-VIS eCon 7000 allow, according to type, the connection of up to 10 end units in industrial networks.

Protection class, temperature range and mechanical stability meet the highest demands. These Ethernet Switches can therefore be used directly in industrial environments.

Through their use, a reduction of cabling costs in the construction of industrial networks will be achieved. The Ethernet Switches facilitate any kind of network configuration. All connections are plugged, which ensures that assembly and disassembly is fast and reliable.

Features

- Ethernet Switch acc. to IEEE 802.3
- Ethernet (10 Mbit/s), Fast Ethernet (100 Mbit/s) and Gigabit Ethernet (1000 Mbit/s)
- 5 / 10 ports unmanaged
- Auto-crossing, Auto-negotiation, Auto-polarity
- Diagnostic LEDs (Link status, Data, Power, Error)
- Store and Forward Switching Mode, non-blocking

Advantages

- High degree of protection IP 65 / IP 67
- Robust metal housing
- Can be used directly in industrial environments
- EMC, temperature range and mechanical stability meet the toughest demands
- PROFINET compatible

Application fields

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

Technical characteristics Ha-VIS eCon 7050-A1, eCon 7100-AA

Ethernet interface – RJ45

Number of ports	5x / 8x 10/100Base-T(X) 2x 10/100/1000-Base-T(X)
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 (for Ha-VIS eCon 7100-AA only) (Han® 3 A RJ45)
Maximum cable length	100 m (Twisted Pair, with cable Category 5 acc. to DIN EN 50 173-1)
Termination, device-side	Han® 3 A RJ45 (female)
Diagnostics (LED)	• Status Link (Link/Act) - terminal device is connected: Green data transmission in process: Green flashing • Data transfer rate (Speed) - 1000 Mbit/s: Green 100 Mbit/s: Yellow 10 Mbit/s: OFF
Topology	• Line • Star • mixed

Power supply

Input voltage	24 / 48 V DC (12 V ... 60 V DC) - redundant
Termination, device-side	Han® 4 A, male, for redundant power supply including fixing screw 09 20 000 9918 to maintain IP 67
Diagnostics (LED)	Power supply - LED Green

Alarm signalling contact (for Ha-VIS eCon 7100-AA only)

Alarm signalling contact	Change-over contact, potential-free, 24 V DC / 0.5 A
Termination, device-side	Han® 3 A, male
Diagnostics (LED)	Error - Red

Design features

	Ha-VIS eCon 7050	Ha-VIS eCon 7100
Housing material	zinc die-cast	zinc die-cast
Dimensions (W x H x D)	45 x 120 x 87 mm (without connectors)	90 x 120 x 87 mm (without connectors)
Degree of protection acc. to DIN EN 60 529	IP 65 / IP 67	IP 65 / IP 67
Assembly	• Wall mounting, vertical assembly • Wall mounting, flat assembly • 35 mm top-hat rail acc. to EN 60 715	• Wall mounting, vertical assembly
Weight	approx. 0.8 kg	approx. 1.4 kg

Environmental conditions

Stock temperature	-40 °C ... +85 °C
Relative humidity	10 % ... +95 % (non-condensing)

Technical characteristics Ha-VIS eCon 7050-B1, eCon 7100-B1

Ethernet interface – M12

Number of ports	5x / 10x 10/100Base-T(X)
Cable types according to IEEE 802.3	Shielded Twisted Pair (STP) or Unshielded Twisted Pair (UTP), Category 5
Data rate	10 Mbit/s or 100 Mbit/s (M12 D-coding)
Maximum cable length	100 m (Twisted Pair, with cable Category 5 acc. to DIN EN 50 173-1)
Termination, device-side	M12 D-coding (female)
Diagnostics (LED)	• Status Link (Link/Act) - terminal device is connected: Green data transmission in process: Green flashing • Data transfer rate (Speed) - 100 Mbit/s: Yellow 10 Mbit/s: OFF
Topology	• Line • Star • mixed

Power supply

Input voltage	24 / 48 V DC (12 V ... 60 V DC) - redundant
Termination, device-side	M12 A-coding, male, for redundant power supply
Diagnostics (LED)	Power supply - LED Green

Alarm signalling contact (for Ha-VIS eCon 7100 only)

Alarm signalling contact	Change-over contact, potential-free, 24 V DC / 0.5 A
Termination, device-side	M12 D-coding, male
Diagnostics (LED)	Error - Red

Design features

	Ha-VIS eCon 7050	Ha-VIS eCon 7100
Housing material	zinc die-cast	zinc die-cast
Dimensions (W x H x D)	45 x 120 x 87 mm (without connectors)	90 x 120 x 87 mm (without connectors)
Degree of protection acc. to DIN EN 60 529	IP 65 / IP 67	IP 65 / IP 67
Assembly	• Wall mounting, vertical assembly • Wall mounting, flat assembly • 35 mm top-hat rail acc. to EN 60 715	• Wall mounting, vertical assembly
Weight	approx. 0.8 kg	approx. 1.4 kg

Environmental conditions

Stock temperature	-40 °C ... +85 °C
Relative humidity	10 % ... +95 % (non-condensing)

Ethernet Switch

Ha-VIS eCon 7050-A1

5-port Ethernet Switch with extended input voltage range for use in harsh industrial environments

Unmanaged	IP 65 / IP 67	PROFINET compatible	EtherNet/IP compatible
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Number of ports, Copper / Termination	5x 10/100Base-T(X) / Han® 3 A RJ45 (female)
Input voltage / Termination	24 / 48 V DC / Han® 4 A, male, for redundant power supply
Permissible range (min./max.)	12 V ... 60 V DC
Input current	approx. 110 mA (at 24 V DC)
Housing material	zinc die-cast
Dimensions (W x H x D)	45 x 120 x 87 mm
Weight	approx. 0.8 kg
Working temperature	-40 °C ... +70 °C
MTBF	1.150.000 h

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS eCon 7050-A1 Ethernet Switch with 5 RJ45 ports	20 70 305 3923		

**Ethernet Switch****Ha-VIS eCon 7050-B1**

5-port Ethernet Switch for industrial Ethernet networks
with extended input voltage range, with M12 system cabling

Unmanaged

IP 65 / IP 67

PROFINET compatible EtherNet/IP compatible 

Number of ports, Copper / Termination 5x 10/100Base-T(X) / M12 D-coding (female)

Input voltage / Termination 24 / 48 V DC / M12 A-coding, male,
for redundant power supply

Permissible range (min./max.) 12 V ... 60 V DC

Input current approx. 110 mA (at 24 V DC)

Housing material zinc die-cast

Dimensions (W x H x D) 45 x 120 x 87 mm

Weight approx. 0.8 kg

Working temperature -40 °C ... +70 °C

Approvals



MTBF 1.140.000 h

eCon 7000

Identification

Part number

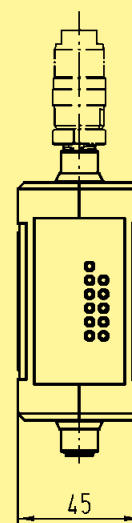
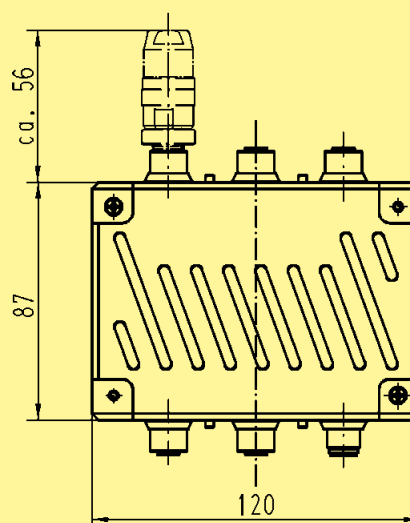
Drawing

Dimensions in mm

Ha-VIS eCon 7050-B1

Ethernet Switch with
5 ports M12 D-coding

20 70 305 3943





Ethernet Switch
Ha-VIS eCon 7100-B1

10-port Ethernet Switch for industrial Ethernet networks,
with M12 system cabling

Unmanaged	IP 65 / IP 67	PROFINET compatible	EtherNet/IP compatible
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Number of ports, Copper / Termination	10x 10/100Base-T(X) / M12 D-coding (female)
Input voltage / Termination	24 / 48 V DC / M12 A-coding, male, for redundant power supply
Permissible range (min./max.)	12 V ... 60 V DC
Input current	approx. 150 mA (at 24 V DC)
Alarm signalling contact	Change-over contact, potential-free, 24 V DC / 0.5 A M12 D-coding, male
Housing material	zinc die-cast
Dimensions (W x H x D)	90 x 120 x 87 mm
Weight	approx. 1.4 kg
Working temperature	-40 °C ... +70 °C
MTBF	740.000 h

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS eCon 7100-B1 Ethernet Switch with 10 ports M12 D-coding	20 70 310 3942		

Ethernet Switch

Ha-VIS eCon 7100-AA

10-port Ethernet Switch for use in harsh industrial environments,
with 2 Gigabit ports



Unmanaged

IP 65 / IP 67

PROFINET compatible EtherNet/IP compatible 

Number of ports, Copper / Termination

8x 10/100Base-T(X) / Han® 3 A RJ45 (female)
2x 10/100/1000-Base-T(X) / Han® 3 A RJ45 (female)

Input voltage / Termination

24 / 48 V DC / Han® 4 A, male, for redundant power supply

Permissible range (min./max.)

12 V ... 60 V DC

Input current

approx. 230 mA (at 24 V DC)

Alarm signalling contact

Change-over contact, potential-free, 24 V DC / 0.5 A
Han® 3 A, male

Housing material

zinc die-cast

Dimensions (W x H x D)

90 x 120 x 87 mm

Weight

approx. 1.4 kg

Working temperature

-40 °C ... +70 °C

eCon 7000

Identification

Part number

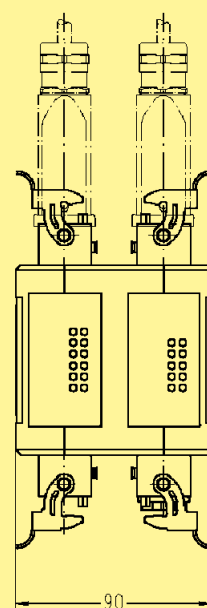
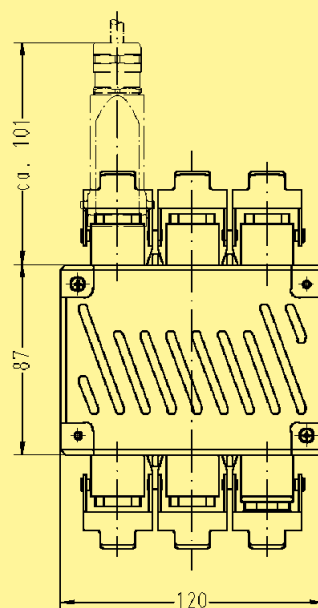
Drawing

Dimensions in mm

Ha-VIS eCon 7100-AA

Ethernet Switch with
10 ports RJ45

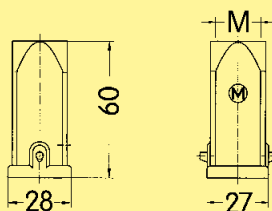
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Identification	Part number	Drawing	Dimensions in mm
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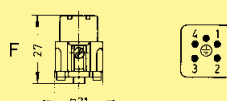
Han A® Connectors and Protection covers

Hood
Metal, straight, metric

19 20 003 1440¹⁾

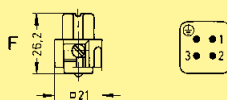
Female insert
Han® 4 A
for power supply

09 20 004 2711



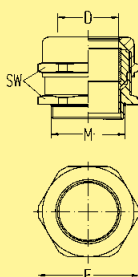
Female insert
Han® 3 A
for Alarm signalling contact
(Ha-VIS eCon 7100-AA only)

09 20 003 2711



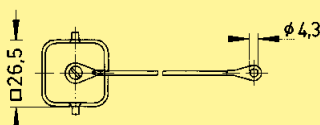
Cable gland
Metal, IP 65, metric, M20,
cable □: 5 mm ... 9 mm

19 00 000 5080



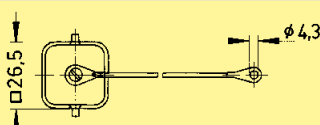
Protection cover
Han® 3 A, female insert

09 20 003 5426



Protection cover
Han® 3 A, male insert
for RJ45 interface

09 20 003 5425



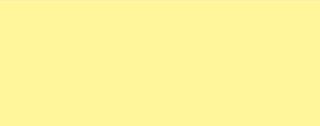
HARAX® Connectors and Protection covers

HARAX® M12-L
Circular Connectors
A-coding

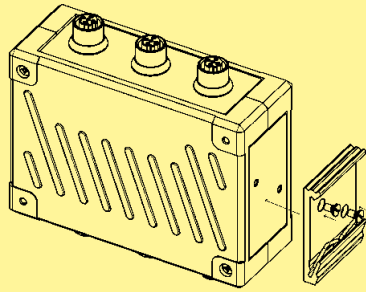
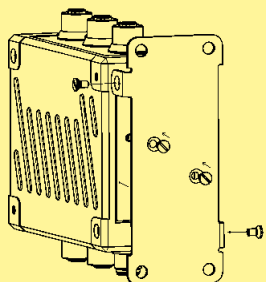
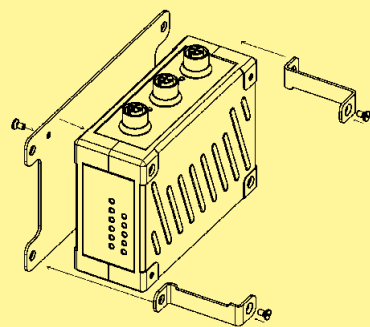
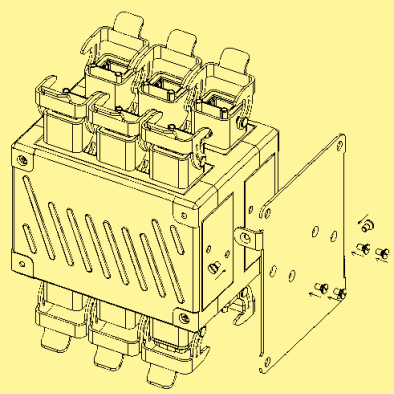
21 03 212 2305

Protection cover M12
for Ethernet

21 01 000 0003



1) ... Order insert fixing screw 09 20 000 9918 separately

Identification	Part number	Drawing	Dimensions in mm
Assembly			
Set for assembly on standard rail according to DIN EN 60 715	20 80 000 0003		
Set for panel mounting vertical assembly	20 80 010 0001		
Set for panel mounting flat assembly	20 80 024 0002		
Set for panel mounting Ha-VIS eCon 7100 vertical assembly	20 80 010 0002		

CONTENTS		PAGE
----------	--	------

Introduction		A-2 2
---------------------	--	-------

Ha-VIS sCon 3000	Introduction and features	A-2 4
-------------------------	---------------------------	-------

	Technical characteristics	A-2 5
--	---------------------------	-------

	Technical characteristics F.O. terminations	A-2 6
--	---	-------

	Ha-VIS sCon 3100-A	A-2 7
--	--------------------	-------

	Ha-VIS sCon 3100-AA	A-2 8
--	---------------------	-------

	Ha-VIS sCon 3063-AD	A-2 9
--	---------------------	-------

	Ha-VIS sCon 3082-AD	A-2 10
--	---------------------	--------

Introduction

For the user, HARTING's novel and innovative solutions open up new, more convenient and extensive options for configuring Unmanaged Ethernet Switches. The solutions available to date offered only very limited or basic options for making alterations to different settings on an Ethernet Switch.

The user made changes to the settings or the configuration via the DIP switches on the Ethernet Switch. The extensive possibilities for applications were physically restricted by the enormous space requirements of the mechanical solution.

Now for the first time, HARTING's Ha-VIS sCon solution makes it possible for the user to realise more configurations than have been possible to date.

Ease of handling and simple operation have been designed in to meet real-life application requirements. Simple and fast configuration is what this solution aims to achieve.

All Ha-VIS sCon Ethernet Switches can be configured via a USB connection cable.

At first sight, Ha-VIS sCon Ethernet Switches do not differ from the Ethernet Switches available to date. However, the possibilities that Ha-VIS sCon has to offer become more than apparent to the user when he connects the Ethernet Switch via the front-side USB socket to a PC, laptop or hand-held PC.

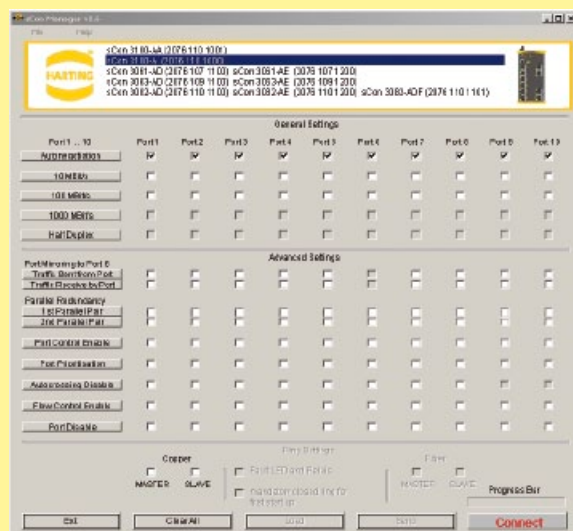


Figure 1 The Start-up menu

Once the Ha-VIS sCon Ethernet Switch has been connected to a PC, it can be accessed on-screen in much the same manner as a commercially available USB stick (Figure 1: The Start-up menu).

The user only has to copy the Ha-VIS sCon software in advance to the PC. No administrator rights are required. The Ethernet Switch does not have to be connected to a power supply for configuration purposes. That means that the configuration procedure can take place at the user's location of choice: in the office, workshop or production facility. The Ha-VIS sCon Ethernet Switch automatically detects which power supply is connected: mains supply or power supply via the USB port. Please note that it is not possible to operate the Ethernet Switch purely via the USB port. For normal industrial operations, the power must be supplied via one of the redundant inputs.

Introduction

Making configuration settings by means of DIP switches may appear to be uncomplicated. However, accidentally making an alteration to the configuration can happen more quickly than one would think possible, and in so doing make considerable changes to the previously set procedures. The Ha-VIS sCon family prevents these inadvertent alterations to the configuration. No alteration can be made to the configuration without an USB connection and the software.

Each configuration can be archived and the back-ups retrieved for future projects. By making back-ups of the configuration, all settings can be conveniently stored in case servicing is necessary.

Archived configurations can be imported and printed out when convenient. These extensive options in Ha-VIS sCon ensure that data security enjoys the significance it deserves.

The switch configuration is transmitted only when a new configuration is uploaded via the corresponding 'Send' button. This means that until the data has actually been uploaded, it is still possible to read-in the 'old' data from the Ha-VIS sCon Ethernet Switch via the Refresh option. This means it is easily possible to reverse any inadvertent activation in the corresponding menu.

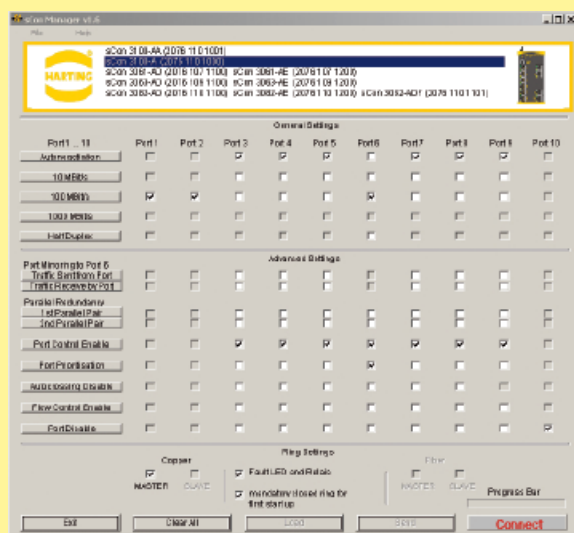


Figure 2 Example of a configuration

Once configured, the Ethernet Switch can be utilised immediately. The configuration remains stored in the Ethernet Switch after the USB cable is removed.

Meeting international standards, the USB port described is recognised as state-of-the-art technology. The standardised possibility for world-wide utilisation with all notebooks, PCs and Palmtops (revisions 1.0, 1.1 and 2.0) mean that this technology is suitable for universal usage.

The intuitive, but extensive options setting via the relevant buttons and the various options offered by Ha-VIS sCon extend the range of applications for unmanaged Ethernet Switches. With Ha-VIS sCon, the gap between unmanaged and manageable switches is getting smaller.

It is true that sCon is a solution for Unmanaged Ethernet Switches; however, it comes very close to Managed Ethernet Switch functionality.



Ethernet Switch

Ha-VIS sCon 3000

Ethernet Switches, unmanaged, for mounting onto top-hat mounting rail in control cabinets, including sCon functions

General description

The Fast Ethernet Switches of the product family Ha-VIS sCon 3000 can be configured via a USB port for special or more performance-oriented industrial usages. There are almost no limits to the different possibilities.

Activation of parallel and / or ring redundancy or port prioritisation will clearly increase the availability and reliability of data communications through the Ha-VIS sCon 3000.

Features

- Ethernet Switch acc. to IEEE 802.3
- Store and Forward Switching Mode, non blocking, unmanaged
- Auto-crossing, Auto-negotiation, Auto-polarity
- Diagnostic LEDs (Link status, Act, Power, Data transmission rate, Error)
- Following settings are available via USB port:
 - Parameterisation via USB port:
 - Alarm signalling contact
 - Auto-negotiation
 - 10/100/1000 Mbit/s
 - Full/Half Duplex
 - Ring and/or parallel redundancy
 - ports enable / disable
 - Port priority
 - Port Mirroring
 - Pause Frame

Advantages

- Individually configurable via USB port
- Robust metal housing
- EMC, temperature range and mechanical stability meet the toughest demands
- Ring redundancy and/or parallel redundancy

Application fields

- Industrial automation
- Railway applications
- Power distribution systems
- Automotive industry
- Mechanical engineering

Technical characteristics

Ethernet interface – RJ45

Number of ports	6x / 8x / 10x 10/100Base-T(X) 2x 10/100/1000-Base-T(X)
Cable types according to IEEE 802.3	Shielded Twisted Pair (STP) or Unshielded Twisted Pair (UTP), 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 DIN EN 50 173-1)
Termination	RJ45 (Twisted Pair)
Diagnostics (LED)	• Status Link - Green • Data transfer (Act) - Green flashing • Data transfer rate (Speed) - 100 Mbit/s: Yellow 10 Mbit/s: Green
Topology	• Line • Star • Star • mixed

Power supply

Input voltage	24 / V DC (9.6 V ... 60 V DC)
Termination	5-pole, pluggable screw contact, for redundant power supply
Diagnostics (LED)	Power supply - LED Green

Alarm signalling contact

Alarm signalling contact	Change-over contact, potential-free, 24 V DC / 0.5 A
Termination	3-pole pluggable screw contact
Diagnostics (LED)	Error - Red

Design features

Housing material	metal
Dimensions (W x H x D)	60 x 132 x 104 mm (without connectors)
Degree of protection acc. to DIN EN 60 529	IP 30
Assembly	• 35 mm top-hat rail acc. to EN 60 715 • Wall mounting, vertical assembly
weight	approx. 0.6 kg

Environmental conditions

Stock temperature	-40 °C ... +85 °C
Relative humidity	10 % ... +95 % (non-condensing)

Technical characteristics F.O. termination

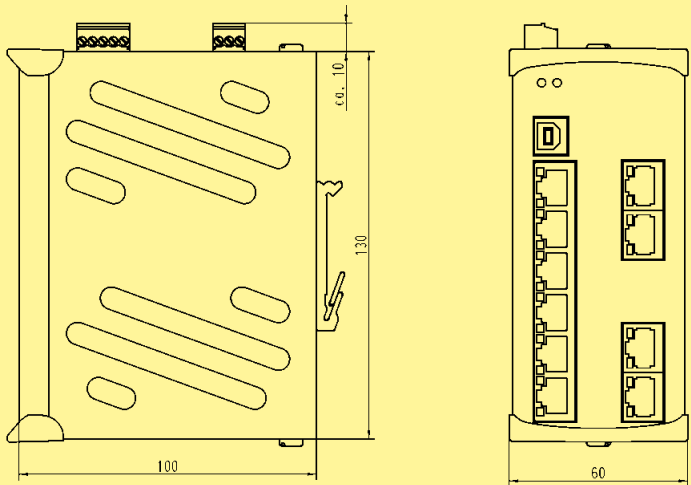
Ethernet interface – F.O.

Number of ports	3x / 2x 100Base-FX
Cable types according to IEEE 802.3	• Multimodefibre, 1300 nm; 50 µm / 125 µm or 62.5 µm / 125 µm • Singlemodefibre, 1300 nm; 9 µm (for AF versions only)
Data rate	100 Mbit/s
Maximum cable length	• 2000 m (Multimode) • 15 km (Singlemode)
Termination	SC-D female
Diagnostics (LED)	• Status Link - Green • Data transfer (Act) - Green flashing
Wavelength	1300 nm
Transceive power T(X) max. (dynamic)	• -14 dBm (50 µm / 125 µm) • -14 dBm (62.5 µm / 125 µm)
Transceive power T(X) min.	• -23.5 dBm (50 µm / 125 µm) • -20 dBm (62.5 µm / 125 µm)
Receive power RX typical (dynamic)	• -33.9 dBm (window) • -35.2 dBm (centre)
Receive power RX max. (dynamic)	-14 dBm
Signal detection (dynamic)	-33 dBm
Topology	• Line • Star • Star • mixed

**Ethernet Switch****Ha-VIS sCon 3100-A**

10-port Ethernet Switch for mounting onto top-hat mounting rail in control cabinets,
including sCon functions

Unmanaged	IP 30	PROFINET compatible ☒	EtherNet/IP compatible ☒
Number of ports, Copper / Termination	10x 10/100Base-T(X) / RJ45 (Twisted Pair)		
Input voltage / Termination	24 V DC / 5-pole, pluggable screw contact, for redundant power supply		
Permissible range (min./max.)	9.6 V ... 60 V DC		
Input current	approx. 170 mA (at 24 V DC)		
Alarm signalling contact	Change-over contact, potential-free, 24 V DC / 0.5 A 3-pole pluggable screw contact		
Housing material	metal, powder-coated		
Dimensions (W x H x D)	60 x 132 x 104 mm (including cap, without connectors)		
weight	approx. 0.6 kg		
Working temperature	-40 °C ... +70 °C		
Approvals	UL 508; UL 60 950-1		
MTBF	745.000 h		

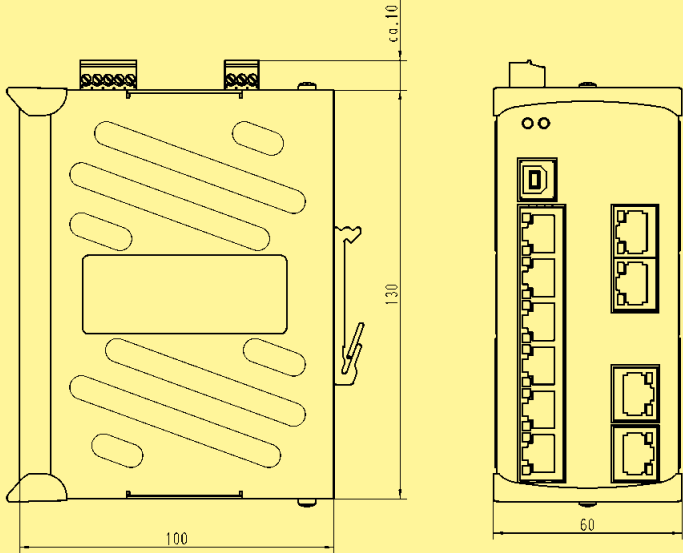
Identification	Part number	Drawing	Dimensions in mm
Ha-VIS sCon 3100-A Ethernet Switch with 10 RJ45 ports	20 76 110 1000		



Ethernet Switch
Ha-VIS sCon 3100-AA

10-port Ethernet Switch for mounting onto top-hat mounting rail in control cabinets,
including 2 Gigabit ports and sCon functions, extended temperature range

Unmanaged	IP 30	PROFINET compatible 	EtherNet/IP compatible 
Number of ports, Copper / Termination	8x 10/100Base-T(X) / RJ45 (Twisted Pair) 2x 10/100/1000-Base-T(X) / RJ45 (Twisted Pair)		
Input voltage / Termination	24 / 48 V DC / 5-pole, pluggable screw contact, for redundant power supply		
Permissible range (min./max.)	9.6 V ... 60 V DC		
Input current	approx. 240 mA (at 24 V DC)		
Alarm signalling contact	Change-over contact, potential-free, 24 V DC / 0.5 A 3-pole pluggable screw contact		
Housing material	metal, powder-coated		
Dimensions (W x H x D)	60 x 132 x 104 mm (including cap, without connectors)		
weight	approx. 0.6 kg		
Working temperature	-40 °C ... +70 °C		
Approvals	UL 508; UL 60 950-1; DNV		
MTBF	670.000 h		

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS sCon 3100-AA Ethernet Switch with 10 RJ45 ports	20 76 110 1001		

sCon 3000

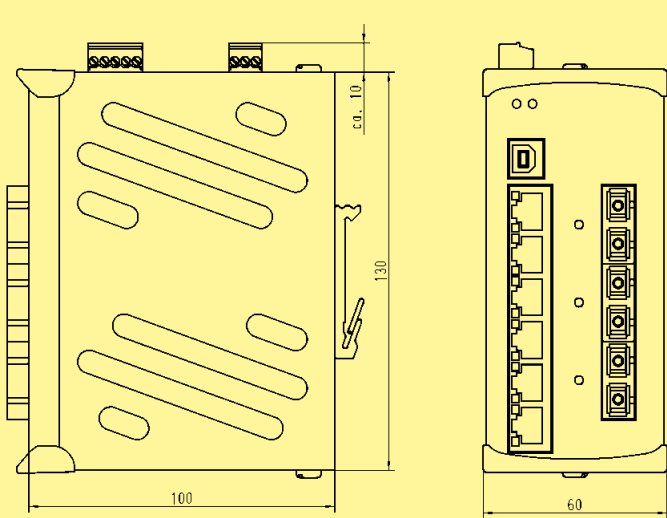


Ethernet Switch

Ha-VIS sCon 3063-AD

9-port Ethernet Switch for mounting onto top-hat mounting rail in control cabinets, including 3 F.O. ports (SC, MM) and sCon functions

Unmanaged	IP 30	PROFINET compatible ☒	EtherNet/IP compatible ☒
Number of ports, Copper / Termination	6x 10/100Base-T(X) / RJ45 (Twisted Pair)		
Number of ports, F.O. / Termination	3x 100Base-FX / SC-D female		
Input voltage / Termination	24 V DC / 5-pole, pluggable screw contact, for redundant power supply		
Permissible range (min./max.)	9.6 V ... 60 V DC		
Input current	approx. 290 mA (at 24 V DC)		
Alarm signalling contact	Change-over contact, potential-free, 24 V DC / 0.5 A 3-pole pluggable screw contact		
Housing material	metal, powder-coated		
Dimensions (W x H x D)	60 x 132 x 104 mm (including cap, without connectors)		
weight	approx. 0.6 kg		
Working temperature	-40 °C ... +70 °C		
Approvals	UL 508; UL 60 950-1		
MTBF	660.000 h		

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS sCon 3063-AD Ethernet Switch with 6 RJ45 ports 3 F.O. ports	20 76 109 1100		



Ethernet Switch
Ha-VIS sCon 3082-AD

10-port Ethernet Switch for mounting onto top-hat mounting rail in control cabinets,
including 2 F.O. ports (SC, MM) and sCon functions

Unmanaged	IP 30	PROFINET compatible ☒	EtherNet/IP compatible ☒
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Number of ports, Copper / Termination	8x 10/100Base-T(X) / RJ45 (Twisted Pair)
Number of ports, F.O. / Termination	2x 100Base-FX / SC-D female
Input voltage / Termination	24 V DC / 5-pole, pluggable screw contact, for redundant power supply
Permissible range (min./max.)	9.6 V ... 60 V DC
Input current	approx. 260 mA (at 24 V DC)
Alarm signalling contact	Change-over contact, potential-free, 24 V DC / 0.5 A 3-pole pluggable screw contact
Housing material	metal, powder-coated
Dimensions (W x H x D)	60 x 132 x 104 mm (including cap, without connectors)
weight	approx. 0.6 kg
Working temperature	-40 °C ... +70 °C
Approvals	UL 508; UL 60 950-1
MTBF	585.000 h

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS sCon 3082-AD Ethernet Switch with 8 RJ45 ports 2 F.O. ports	20 76 110 1100		

CONTENTS		PAGE
----------	--	------

Fast Track Switching - Introduction		A-3 2
--	--	-------

Ha-VIS FTS 3000s	Introduction and features	A-3 5
-------------------------	---------------------------	-------

	Technical characteristics	A-3 6
--	---------------------------	-------

	Ha-VIS FTS 3100s-A	A-3 7
--	--------------------	-------

Ha-VIS FTS 3000	Introduction and features	A-3 8
------------------------	---------------------------	-------

	Technical characteristics	A-3 9
--	---------------------------	-------

	Technical characteristics F.O. termination	A-3 10
--	--	--------

	Management functions	A-3 11
--	----------------------	--------

	Ha-VIS FTS 3060-A	A-3 13
--	-------------------	--------

	Ha-VIS FTS 3100-A	A-3 14
--	-------------------	--------

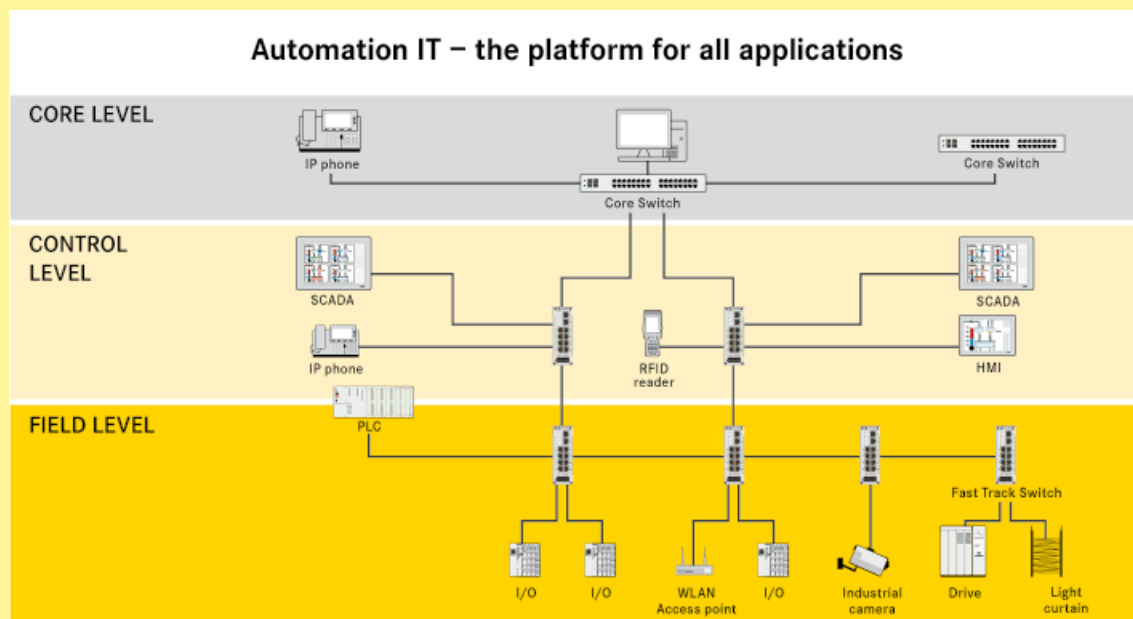
	Ha-VIS FTS 3082-ASFP	A-3 15
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Fast Track Switching Introduction

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.



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.

Fast Track Switching Introduction

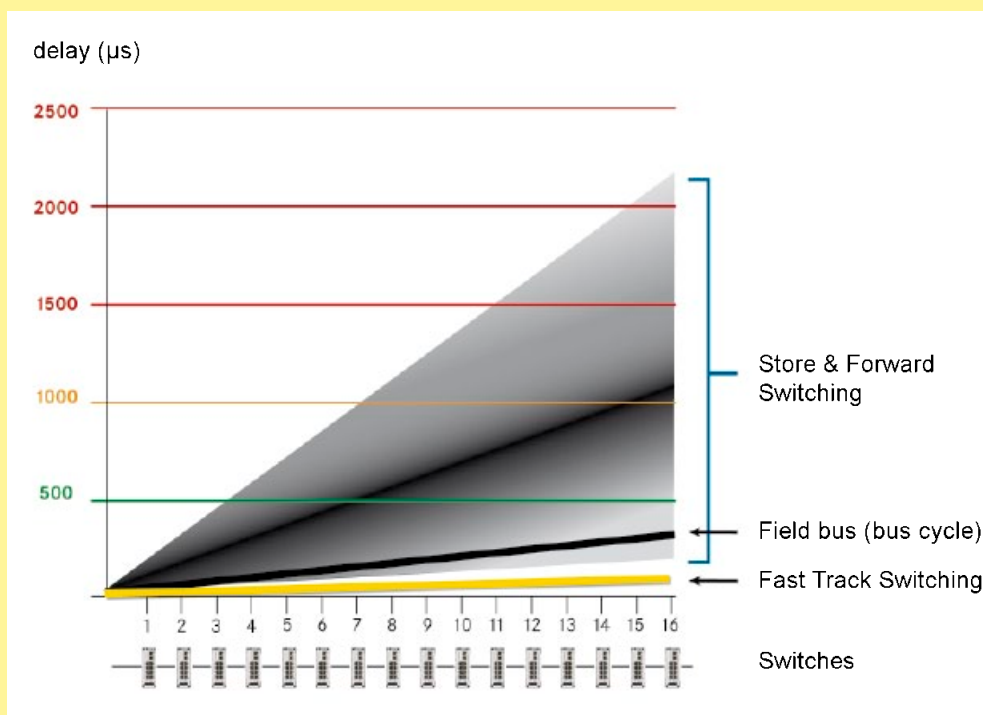
Several Ethernet-based methods have identified this problem and eliminated it. However such methods require each network node to implement specialized hardware for communication.

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.

Fast Track Switching Introduction

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 Ha-VIS 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 Ha-VIS 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 3000s

Ethernet Switches, unmanaged, with Fast Track Switching Technology, configurable via USB

General description

The Fast Ethernet Switches of the product family Ha-VIS FTS 3000 can identify 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 product family 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 an unmanaged switch and can work in Fast Track Switching mode and in Store and Forward mode. It supports Auto-crossing, Auto-negotiation and Auto-polarity.

Features

- Ethernet Switch according to IEEE 802.3
- Auto-crossing, Auto-negotiation, Auto-polarity
- Diagnostic LEDs (Link Status, Act, Data transmission rate, Power, Error)
- Store and Forward Switching Mode, non blocking, unmanaged
- Identification, acceleration and preference for automation frames
- Deterministic data transfer for selected profiles

Advantages

- Individually configurable via USB port
- Robust metal housing
- EMC, temperature range and mechanical stability meet the toughest demands

Application fields

- Industrial automation
- Mechanical engineering
- Automotive industry

Technical characteristics

Ethernet interface – RJ45

Number of ports	10x 10/100Base-T(X)
Cable types according to IEEE 802.3	Shielded Twisted Pair (STP) or Unshielded Twisted Pair (UTP), 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 DIN EN 50 173-1)
Termination	RJ45 (Twisted Pair)
Diagnostics (LED)	• Status Link - Green • Data transfer (Act) - Green flashing • Data transfer rate (Speed) - 100 Mbit/s: Yellow 10 Mbit/s: Green
Topology	• Line • Star • mixed
Parameterisation via USB	• Parameterisation via USB • Auto-negotiation • 10/100 Mbit/s • Full/Half Duplex • Port enable/disable • Port mirroring • Flow Control • FTS Port enable/disable • Industrial Profile (PROFINET, EtherNet/IP, Modbus TCP, customized) • NRT Bandwidth Control

Power supply

Input voltage	24 V $\overline{=}$ (9.6 V ... 60 V $\overline{=}$)
Termination	5-pole, pluggable screw contact, for redundant power supply
Diagnostics (LED)	Power supply - LED Green

Design features

Housing material	aluminium
Dimensions (W x H x D)	44 x 130 x 100 mm (without connectors)
Degree of protection acc. to DIN EN 60 529	IP 30
Assembly	• 35 mm top-hat rail acc. to EN 60 715 • Wall mounting, vertical assembly
weight	approx. 0.5 kg

Environmental conditions

Stock temperature	-40 °C ... +85 °C
Relative humidity	30 % ... +95 % (non-condensing)



Ethernet Switch

Ha-VIS FTS 3100s-A

10-port Ethernet Switch with Fast Track Switching Technology,
configurable via USB

Unmanaged

IP 30

PROFINET compatible

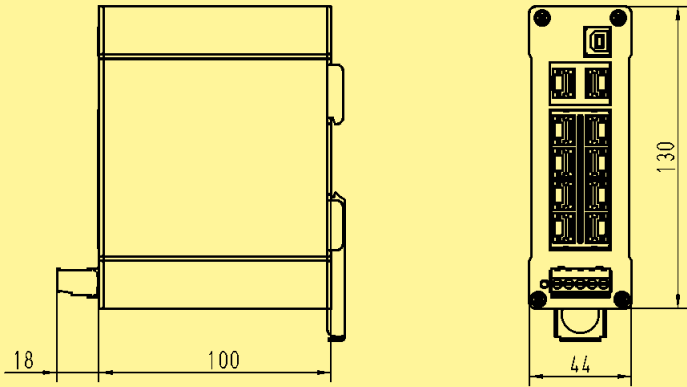


EtherNet/IP compatible



Number of ports, Copper / Termination	10x 10/100Base-T(X) / RJ45 (Twisted Pair)
Input voltage / Termination	24 V $\overline{=}$ / 5-pole, pluggable screw contact, for redundant power supply
Permissible range (min./max.)	9.6 V ... 60 V $\overline{=}$
Input current	approx. 270 mA (at 24 V DC)
Housing material	aluminium, anodised
Dimensions (W x H x D)	44 x 130 x 100 mm (without connectors)
weight	approx. 0.5 kg
Working temperature	0 °C ... +70 °C
Approvals	UL 508; UL 60 950-1; DNV

FTS 3000s

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS FTS 3100s-A Ethernet Switch with 10 RJ45 ports	20 78 110 1000		



Ethernet Switch Ha-VIS FTS 3000

Ethernet Switches, with Fast Track Switching Technology, managed

General description

The Fast Ethernet Switches of the product family Ha-VIS FTS 3000 can identify 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 product family enables the connection of up to 10 network devices over shielded Twisted Pair or F.O. interfaces, according to type. 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.

Features

- Managed Ethernet Switch according to IEEE 802.3
- Fast Track Switching Mode, Store and Forward Switching Mode
- Auto-crossing, Auto-negotiation, Auto-polarity
- Diagnostic LEDs (Link Status, Data, Power)
- Identification, acceleration and preference for automation frames
- Deterministic data transfer for selected profiles
- Robust metal housing, RoHS compliant

Advantages

- Individually configurable via USB port
- Robust metal housing
- EMC, temperature range and mechanical stability meet the toughest demands

Application fields

- Industrial automation
- Automotive industry
- Mechanical engineering

Technical characteristics

Ethernet interface – RJ45

Number of ports	6x / 8x / 10x 10/100Base-TX
Cable types according to IEEE 802.3	Shielded Twisted Pair (STP) or Unshielded Twisted Pair (UTP), 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 DIN EN 50 173-1)
Termination	RJ45 (Twisted Pair)
Diagnostics (LED)	• Status Link - Green • Data transfer (Act) - Green flashing • Data transfer rate (Speed) - 100 Mbit/s: Yellow 10 Mbit/s: Green
Topology	• Line • Star • Ring • mixed

Power supply

Input voltage	24 V $\overline{=}$ (9.6 V ... 60 V $\overline{=}$)
Termination	5-pole, pluggable screw contact, for redundant power supply
Diagnostics (LED)	Power supply - LED Green

Diagnosis device

Diagnostics (LED)	• Device acts error free - Green • Diagnosis error - Red
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Design features

Housing material	aluminium
Degree of protection acc. to DIN EN 60 529	IP 30
Assembly	• 35 mm top-hat rail acc. to EN 60 715 • Wall mounting, vertical assembly
weight	approx. 0.35 kg

Environmental conditions

Stock temperature	-40 °C ... +85 °C
Relative humidity	30 % ... +95 % (non-condensing)

Technical characteristics F.O. termination

Ethernet interface – F.O.

Number of ports	2x 100Base-FX
Cable types according to IEEE 802.3	Multimodefibre, 1300 nm; 50 µm / 125 µm or 62.5 µm / 125 µm
Data rate	100 Mbit/s
Maximum cable length	2000 m (Multimode)
Termination	SFP module slot
Diagnostics (LED)	• Status Link - Green • Data transfer (Act) - Green flashing • Duplex - Full duplex: Yellow Half duplex: OFF
Wavelength	1300 nm
Transceive power T(X) max. (dynamic)	• -14 dBm (50 µm / 125 µm) • -14 dBm (62.5 µm / 125 µm)
Transceive power T(X) min.	• -23.5 dBm (50 µm / 125 µm) • -20 dBm (62.5 µm / 125 µm)
Receive power RX typical (dynamic)	• -33.9 dBm (window) • -35.2 dBm (centre)
Receive power RX max. (dynamic)	-14 dBm
Signal detection (dynamic)	-33 dBm
Topology	• Line • Ring • Star • mixed

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	
	Port mirroring disable / enable	
	Flow Control disable / enable	
	Industrial profiles (PROFINET, EtherNet/IP, Modbus TCP, customer specific)	
	NRT Bandwidth Control	
Network Discovery	Link Layer Discovery Protocol (LLDP)	802.1AB, 2005
Protocols	IPv4	RFC 791, 903, 951, 1293, 1519
	TCP	RFC 793, 896
	UDP	RFC 768
	Ethernet ARP	RFC 826
	ICMP	RFC 2521, 1191, 1788, 792
File Transfer	Firmware import and export via TFTP	
	Configuration import and export via TFTP	
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 10 or 6	

QoS

	Quality of Service (QoS)	IEEE 802.1p
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VLAN

	Port protocol based VLANs	IEEE 802.1Q Rev D5.0, 2005
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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	

Multicast

	IGMP Snooping (v1, v2, v3) with support for querier	RFC 1112, 2236, 3376
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DHCP

	DHCP Client	RFC 2131
	DHCP relay agent	RFC 2131
	DHCP Option 82	RFC 3046

Alarm

	Alarms via E-mail (SMTP) and SNMP Traps	
	Signalling contact for low voltage detection or Link break	

Management functions

Diagnostic

	PROFINET diagnostic	
	Port Mirroring	
	Switch History	
	MAC Address Table	

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
	Pluggable memory card	

MIB Support

	Enterprise (HARTING MIB)	
	MIB II	
	MIB II for SNMPv1, SNMPv2, SNMPv3	
	Interface group MIB	
	Bridge MIB	
	MIB for Ethernet-like interfaces (requires support in hardware)	
	VLAN MIB	
	Spanning Tree Protocol MIB	
	Rapid STP MIB	
	Port-based Network Authentication Control MIB	
	Definitions of managed objects for LLDP	
	802.1/LLDP extension MIB	
	802.3/LLDP extension MIB	
	Radius Client MIB	
	IPv4 MIB	
	IGMP MIB	
	DHCP	



Ethernet Switch

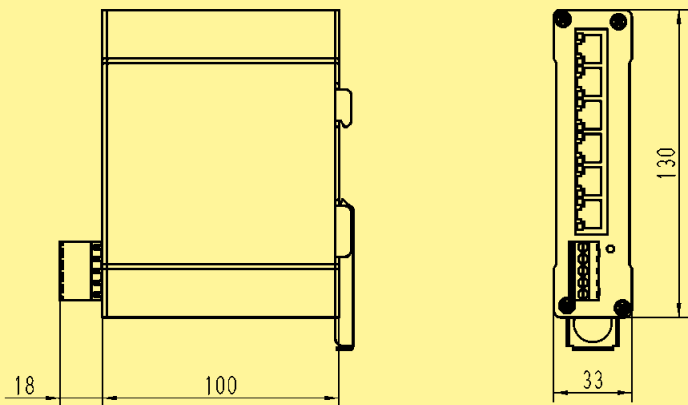
Ha-VIS FTS 3060-A

6-port Ethernet Switch with Fast Track Switching Technology, managed

Managed	IP 30	PROFINET compatible 	EtherNet/IP compatible 
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Number of ports, Copper / Termination	6x 10/100Base-TX / RJ45 (Twisted Pair)
Input voltage / Termination	24 V $\overline{=}$ / 5-pole, pluggable screw contact, for redundant power supply
Permissible range (min./max.)	9.6 V ... 60 V $\overline{=}$
Input current	approx. 220 mA (at 24 V DC)
Housing material	aluminium, anodised
Dimensions (W x H x D)	33 x 130 x 100 mm (without connectors)
weight	approx. 0.35 kg
Working temperature	-40 °C ... +70 °C
Approvals	UL 508; UL 60 950-1; DNV

FTS 3000

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



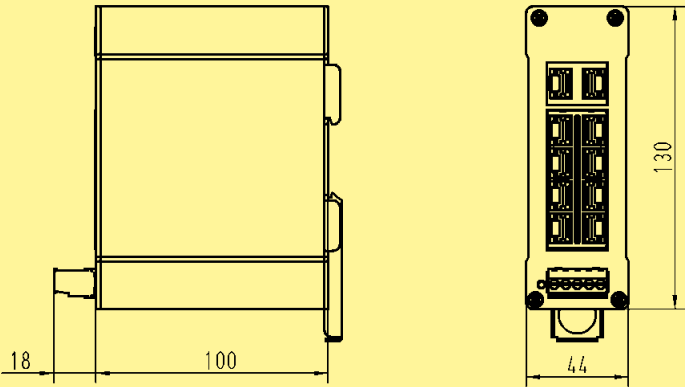
Ethernet Switch
Ha-VIS FTS 3100-A

10-port Ethernet Switch with Fast Track Switching Technology, managed

Managed	IP 30	PROFINET compatible 	EtherNet/IP compatible 
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Number of ports, Copper / Termination	10x 10/100Base-TX / RJ45 (Twisted Pair)
Input voltage / Termination	24 V $\overline{=}$ / 5-pole, pluggable screw contact, for redundant power supply
Permissible range (min./max.)	9.6 V ... 60 V $\overline{=}$
Input current	approx. 300 mA (at 24 V DC)
Housing material	aluminium, anodised
Dimensions (W x H x D)	44 x 130 x 100 mm (without connectors)
weight	approx. 0.5 kg
Working temperature	0 °C ... +70 °C
Approvals	UL 508; UL 60 950-1; DNV

FTS 3000

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



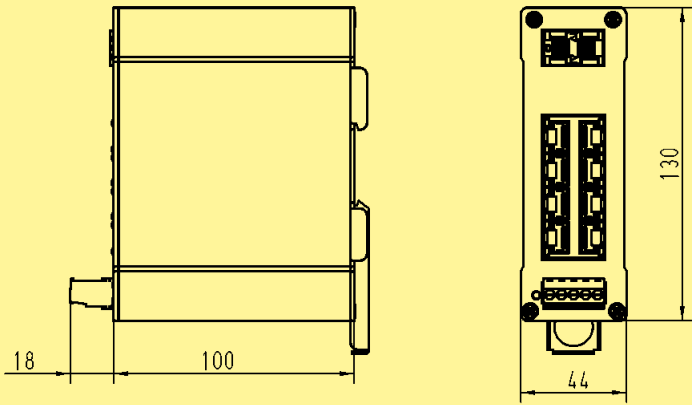
Ethernet Switch

Ha-VIS FTS 3082-ASFP

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

Managed	IP 30	PROFINET compatible 	EtherNet/IP compatible 
Number of ports, Copper / Termination	8x 10/100Base-TX / RJ45 (Twisted Pair)		
Number of ports, F.O. / Termination	2x 100Base-FX / SFP module slot		
Input voltage / Termination	24 V $\overline{=}$ / 5-pole, pluggable screw contact, for redundant power supply		
Permissible range (min./max.)	9.6 V ... 60 V $\overline{=}$		
Input current	approx. 340 mA (at 24 V DC)		
Housing material	aluminium, anodised		
Dimensions (W x H x D)	44 x 130 x 100 mm (without connectors)		
weight	approx. 0.5 kg		
Working temperature	0 °C ... +60 °C		
Approvals	UL 508; UL 60 950-1		

FTS 3000

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS FTS 3082-ASFP Ethernet Switch with 8 RJ45 ports 2 F.O. ports	20 78 110 4300		

CONTENTS	PAGE
Management Software Overview	A-4 3
Management functions	A-4 9
mCon 3000 Next Generation	
Introduction and features	A-4 11
Technical characteristics	A-4 12
Ha-VIS mCon 3080-A	A-4 14
Ha-VIS mCon 3102-AASFP	A-4 15
mCon 3000	
Introduction and features	A-4 16
Technical characteristics	A-4 17
Technical characteristics F.O. termination	A-4 18
Ha-VIS mCon 3100-AV	A-4 19
Ha-VIS mCon 3100-AAV	A-4 20
Ha-VIS mCon 3063-ADV	A-4 21
Ha-VIS mCon 3082-ADV	A-4 22
Ha-VIS mCon 3082-AFV	A-4 23
Ha-VIS mCon 3063-AEV	A-4 24
Ha-VIS mCon 3082-AEV	A-4 25
mCon 4000	
Introduction and features	A-4 26
Technical characteristics	A-4 27
Ha-VIS mCon 4080-B1V	A-4 29
Ha-VIS mCon 4080-B3V	A-4 30
Ha-VIS mCon 4080-BPoE1V	A-4 31

CONTENTS		PAGE
----------	--	------

mCon 9000	Introduction and features	A-4 32
------------------	---------------------------	--------

	Technical characteristics	A-4 33
--	---------------------------	--------

	Ha-VIS mCon 9070-BV	A-4 34
--	---------------------	--------

	Ha-VIS mCon 9080-B1V	A-4 35
--	----------------------	--------

mCon 7000	Introduction and features	A-4 36
------------------	---------------------------	--------

	Technical characteristics RJ45	A-4 37
--	--------------------------------	--------

	Technical characteristics M12	A-4 38
--	-------------------------------	--------

	Ha-VIS mCon 7050-B1V	A-4 39
--	----------------------	--------

	Ha-VIS mCon 7100-B1V	A-4 40
--	----------------------	--------

	Ha-VIS mCon 7100-AAV	A-4 41
--	----------------------	--------

	Accessories	A-4 42
--	-------------	--------

Ha-VIS Dashboard	General description	A-4 44
-------------------------	---------------------	--------

	Technical characteristics	A-4 46
--	---------------------------	--------

	Licences	A-4 47
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mCon 3000

mCon 4000
mCon 9000

mCon 7000

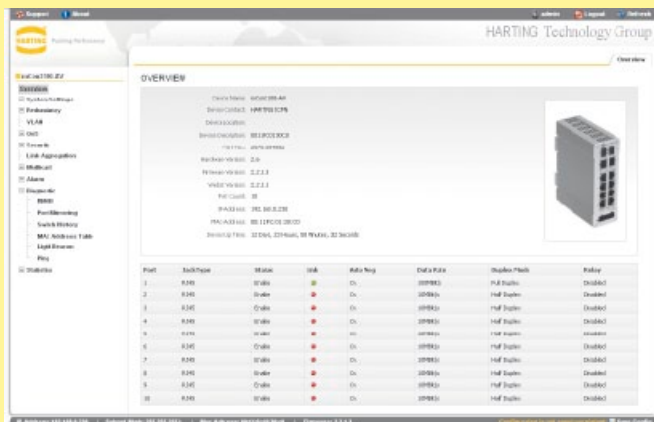
Management Software Overview

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

Management Software Overview

Diagnostic and alert functions

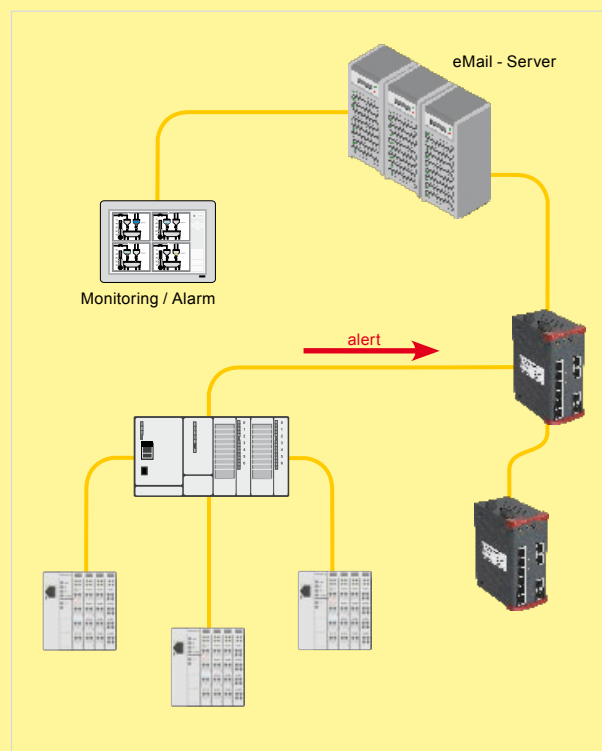
The reliability and operational availability of industrial Ethernet networks are highly associated with the possibility of management and diagnosis functionalities. For most applications it is mandatory to have an overview of what is happening in the network any-time. To assure a trouble free data flow, 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.

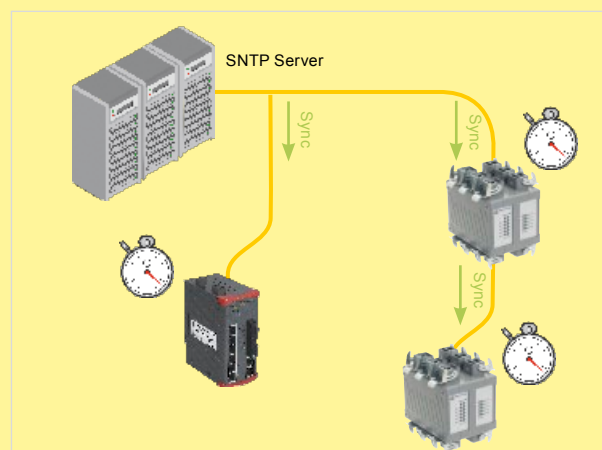
Certain network or Ethernet switch events may require the attention of service personnel. It is possible to select several events according to the requirements, which will cause a notification to a remote monitoring station if they occur. This notification can be done by sending an eMail or a SNMP trap.

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 mechanism



Time synchronization with SNTP

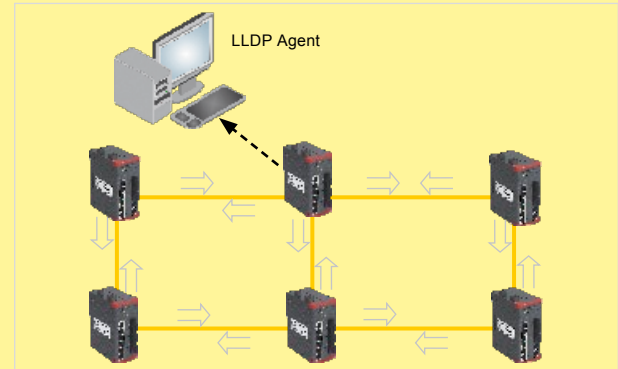
Management Software Overview

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

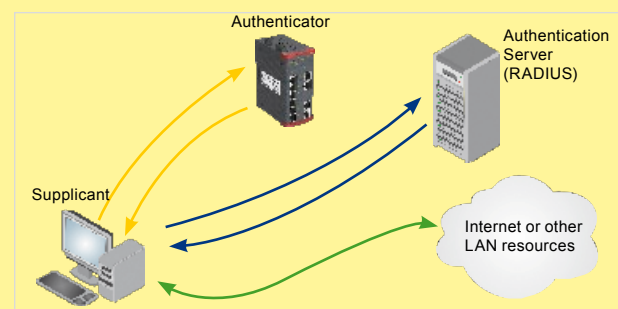
With the affiliation of the common office communication with the industrial networks, security and flexibility become more and more important for industrial Ethernet networks and applications. The demand of security and reliability is increasing rapidly. Therefore, industrial Ethernet networks need an 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.

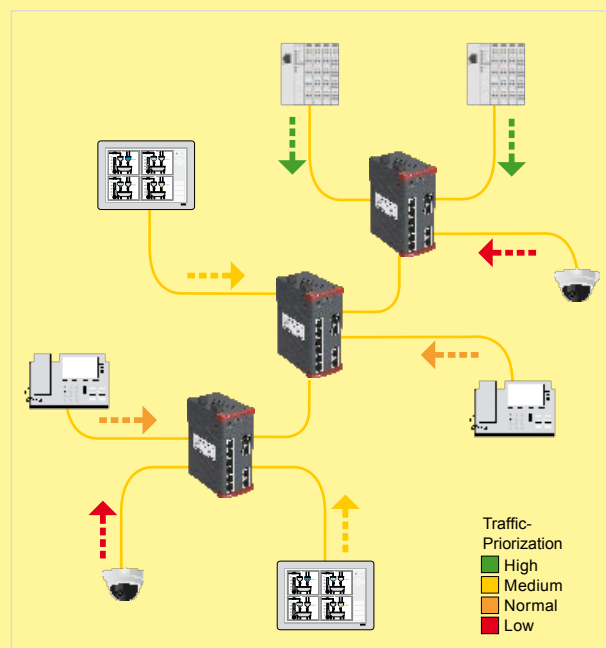


802.1X based user authentication procedure

Management Software 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 prioritization 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 be adapted to the requirements of the application.

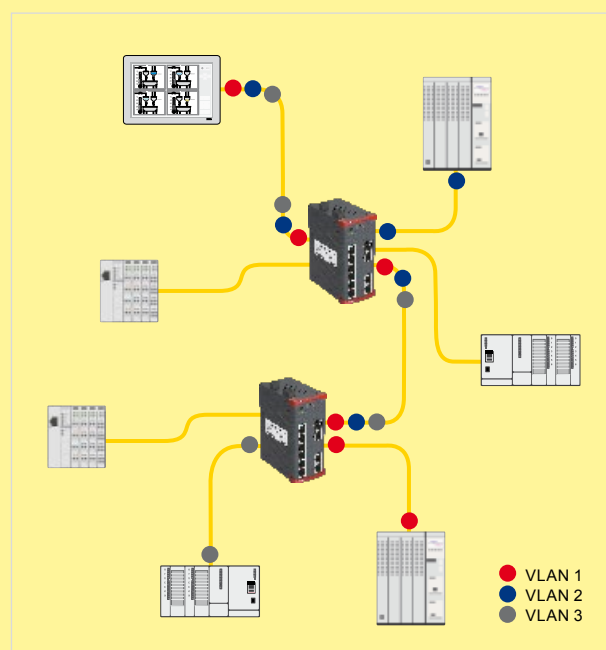


Traffic prioritization for time critical applications

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



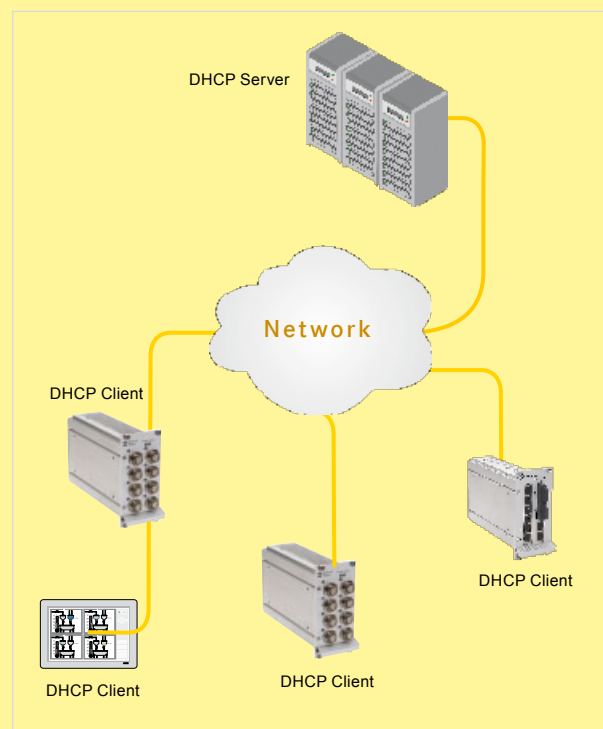
Traffic management with VLANs

Management Software 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.

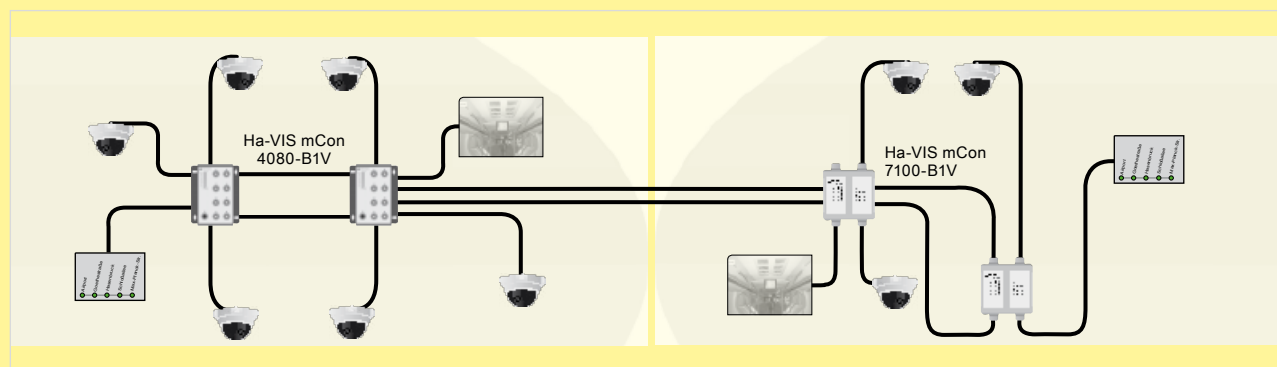


Location-dependent IP address assignment

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.



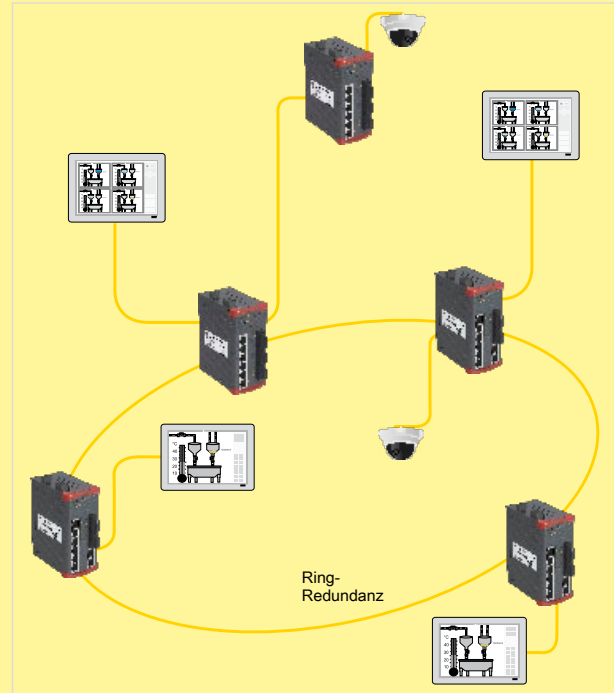
Multicast application with multiple sources and receivers

Management Software Overview

Rapid Spanning Tree

A continuous and failure tolerant network is an essential 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.

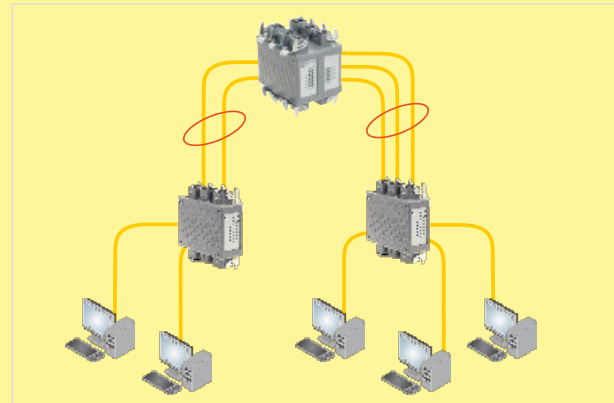
- High availability via redundancy
- Loop free and failure tolerant network
- Fast convergent and recovery time



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 - Load Balancing, Redundancy, increased bandwidth

Link Aggregation bietet die folgenden Vorteile:

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

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
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	

PROFINET

	PROFINET IO Device Stack	
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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
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Redundancy

	Spanning Tree (STP)	IEEE 802.1D (2004)
	Rapid Spanning Tree (RSTP)	IEEE 802.1D (2004)
	Media redundancy protocol (MRP) *	DIN EN 62 439-2

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)
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Multicast

	IGMP Snooping (v1, v2, v3) with support for querier	RFC 1112, 2236, 3376
	GMRP	

DHCP

	DHCP Client	RFC 2131
	DHCP relay agent	RFC 2131
	DHCP Option 82	RFC 3046

mCon 3000

mCon 4000
mCon 9000

mCon 7000

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
	Pluggable SD card for saving of configuration	
	Multifunction button	

* ... Licensing via separately available SD card



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 RJ45 ports or SFP modules 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.

The Ethernet Switches of the Ha-VIS mCon 3000 Next Generation family can be used as PROFINET IO devices.

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
- PROFINET IO device
- Multifunction button for fast commisioning
- SD card slot for storage of the configuration
- Management functions see page 9

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 slot)

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: Green
100 Mbit/s: Yellow
10 Mbit/s: OFF

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 slot)
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Data rate

100 Mbit/s, 1000 Mbit/s

Termination

SFP modules according to MSA (Multi Source Agreement) (see catalogue „HARTING Smart Network Infrastructure - Intelligent Network Solutions“)

Diagnostics

Digital Diagnostics Monitoring (DDM) according to SFF-8472 (available with software release 2.4 or higher)

Diagnostics (via LED)

- Status Link – Green
- Data transfer (Act) – Green flashing

Power supply

Nominal input voltage

24 V $\overline{\text{---}}$

Termination

5-pole screw terminal, pluggable for redundant power supply

Switch

Diagnostics (via LED)

- Device operates without failures – Green
- Power supply in the admissible range – Green
- Low voltage – Red
- Diagnostics failure – Red
- PROFINET failure / diagnosis – Red/Green flashing

Configuration

Slot for SD cards (back side)

- Saving and loading of configuration files
- Licence management for MRP

Multifunction button

Individual pre-configuration of software functions

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 60 529	IP 30
Mounting	• 35 mm top-hat rail acc. to EN 60 715 • Panel mounting, vertical assembly

Environmental conditions

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 6

Mechanical solidness

Shock	IEC 60 068-2-27 • 15 g • 11 ms duration • Shock form: Half sine-wave
Vibration	EN 60 068-2-6
Rail-standard	EN 50 155, Class 1

EMC Interference immunity (EN 61 000-6-2, EN 50 121-3-2)

		<i>Industrial</i>	<i>Railway</i>	<i>Maritime</i>
Electrostatic discharge (ESD)	EN 61 000-4-2	Criterion B	Criterion B	Criterion B
Electromagnetic field	EN 61 000-4-3	Criterion A	Criterion A	Criterion A
Fast transients (Burst)	EN 61 000-4-4	Criterion B	Criterion A	Criterion B
Impulse voltages (Surge)	EN 61 000-4-5	Criterion B	Criterion B	Criterion B
Conducted emissions	EN 61 000-4-6	Criterion A	Criterion A	Criterion A
Rail applications	EN 50 121-3-2			

EMC interference (EN 61 000-6-4, EN 55 022, EN 50 121-3-2)**Scope of delivery**

- Ethernet Switch
- User manual
- Assembly manual
- CD
- Terminal block



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	EtherNet/IP compatible
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Number of ports, Copper / Termination	8x 10/100Base-T(X) / RJ45 (Twisted Pair)
Nominal input voltage range	24 V ---
Permissible range (min/max)	9.6 V ... 60 V ---
Termination	5-pole screw terminal, pluggable redundant power supply
Input current	approx. 130 mA (at 24 V ---)
Housing material	Aluminium, anodized
Dimensions (W x H x D)	44 x 130 x 100 mm (without connectors)
Weight	approx. 0.450 kg
Operating temperature	-40 °C ... +70 °C
MTBF	678.372 h
Approvals (in preparation)	UL 508 (Safety); UL 60 950-1 (Safety); DNV
Management	fully Managed via Web interface and SNMP Functions see page 9

mCon 3000

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		

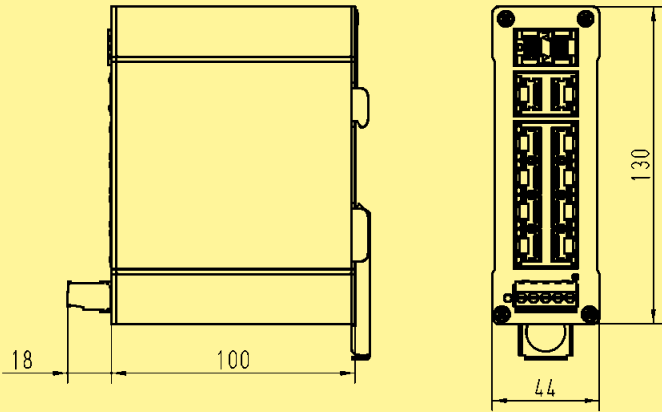


Ethernet Switch

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 	EtherNet/IP compatible 
Number of ports, Copper / Termination	8x 10/100Base-T(X) / RJ45 (Twisted Pair) 2x 10/100/1000Base-T(X) / RJ45 (Twisted Pair)		
Number of slots SFP / Termination	2x 100/1000Base / Combo ports		
Nominal input voltage range	24 V ---		
Permissible range (min/max)	9.6 V ... 60 V ---		
Termination	5-pole screw terminal, pluggable redundant power supply		
Input current	approx. 250 mA (at 24 V ---)		
Housing material	Aluminium, eloxiert		
Dimensions (W x H x D)	44 x 130 x 100 mm (incl. cap, without connectors)		
Weight	approx. 0.485 kg		
Operating temperature	-40 °C ... +70 °C		
MTBF	597.974 h		
Approvals (in preparation)	UL 508 (Safety); UL 60 950-1 (Safety); DNV		
Management	fully Managed via Web interface and SNMP Functions see page 9		

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		



Ethernet Switch

Ha-VIS mCon 3000

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 and fibre-optic cables (Multi- and Single-mode). The Ha-VIS mCon 3000 Ethernet Switch family, with its integrated LEDs on each port, supports fast and easy network diagnosis.

The Ha-VIS mCon 3000 Ethernet Switches are designed for an effective, industrial and individual use. They support both SNMP and an easy Web interface for management functions.

Features

- Ethernet Switch acc. to IEEE 802.3
- Store and Forward Switching Mode
- Up to 10 ports, managed, non-blocking
- Auto-crossing, Auto-negotiation, Auto-polarity
- Temperature range -40 °C ... +70 °C

Advantages

- Robust metal housing
- EMC, temperature range and mechanical stability meet the toughest demands
- Integrated management functions

Application fields

- Industrial automation
- Automotive industry
- Wind power
- Power distribution systems

Technical characteristics

Ethernet interface – RJ45

Number of ports	6x / 8x / 10x 10/100Base-T(X) 2x 10/100/1000-Base-T(X)
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 cable Category 5 acc. to DIN EN 50 173-1)
Termination	RJ45 (Twisted Pair)
Diagnostics (LED)	• Status Link - Green • Data transfer (Act) - Green flashing • Data transfer rate (Speed) - 1000 Mbit/s: Green 100 Mbit/s: Yellow 10 Mbit/s: OFF
Topology	• Line • Ring • Star • mixed

Power supply

Input voltage	24 V DC (9.6 V ... 60 V DC)
Termination	5-pole, pluggable screw contact, for redundant power supply
Diagnostics (LED)	Power supply - LED Green

Alarm signalling contact

Alarm signalling contact	Change-over contact, potential-free, 24 V DC / 0.5 A
Termination	3-pole pluggable screw contact
Diagnostics (LED)	Error - Red

Design features

Housing material	metal
Dimensions (W x H x D)	60 x 132 x 104 mm (without connectors)
Degree of protection acc. to DIN EN 60 529	IP 30
for Ha-VIS mCon xxxx-AEx only	IP 20
Assembly	• 35 mm top-hat rail acc. to EN 60 715 • Wall mounting, vertical assembly
Weight	approx. 0.6 kg

Environmental conditions

Stock temperature	-40 °C ... +85 °C
Relative humidity	10 % ... +95 % (non-condensing)

Technical characteristics F.O. termination

Ethernet interface – F.O.

Number of ports	2x / 3x 100Base-FX
Cable types according to IEEE 802.3	• Multimode fibre, 1300 nm; 50 µm / 125 µm or 62.5 µm / 125 µm • Singlemode fibre, 1300 nm; 9 µm (for AF versions only)
Data rate	100 Mbit/s
Maximum cable length	• 2000 m (Multimode) • 15 km (Singlemode)
Termination	SC-D female / ST female
Diagnostics (LED)	• Status Link - Green • Data transfer (Act) - Green flashing
Wavelength	1300 nm
Transceive power T(X) max. (dynamic)	• -14 dBm (50 µm / 125 µm) • -14 dBm (62.5 µm / 125 µm)
Transceive power T(X) min.	• -23.5 dBm (50 µm / 125 µm) • -20 dBm (62.5 µm / 125 µm)
Receive power RX typical (dynamic)	• -33.9 dBm (window) • -35.2 dBm (centre)
Receive power RX max. (dynamic)	-14 dBm
Signal detection (dynamic)	-33 dBm
Topology	• Line • Ring • Star • mixed



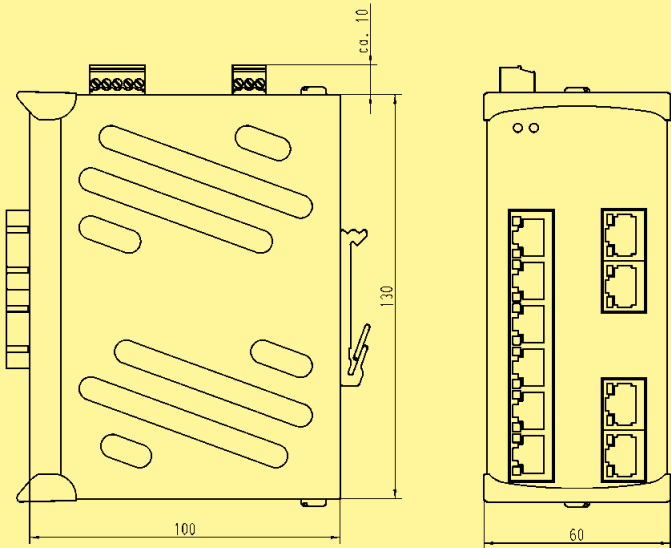
Ethernet Switch

Ha-VIS mCon 3100-AV

10-port Ethernet Switch for mounting onto top-hat mounting rail in control cabinets

Managed	IP 30	PROFINET compatible ☒	EtherNet/IP compatible ☒
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Number of ports, Copper / Termination	10x 10/100Base-T(X) / RJ45 (Twisted Pair)
Input voltage / Termination	24 V DC / 5-pole, pluggable screw contact, for redundant power supply
Permissible range (min./max.)	9.6 V ... 60 V DC
Input current	approx. 190 mA (at 24 V DC)
Alarm signalling contact	Change-over contact, potential-free, 24 V DC / 0.5 A 3-pole pluggable screw contact
Housing material	metal, powder-coated
Dimensions (W x H x D)	60 x 132 x 104 mm (including cap, without connectors)
Weight	approx. 0.6 kg
Working temperature	-40 °C ... +70 °C
Approvals	UL 508; UL 60 950-1; DNV
MTBF	625.000 h
Management	fully managed via Web interface and SNMP Functions see page A-9

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS mCon 3100-AV Ethernet Switch with 10 RJ45 ports including set for assembly on standard rail	20 76 110 4002		



Ethernet Switch

Ha-VIS mCon 3100-AAV

10-port Ethernet Switch for mounting onto top-hat mounting rail in control cabinets, including 2 Gigabit ports, with extended temperature range

Managed	IP 30	PROFINET compatible ☒	EtherNet/IP compatible ☒
Number of ports, Copper / Termination	8x 10/100Base-T(X) / RJ45 (Twisted Pair) 2x 10/100/1000-Base-T(X) / RJ45 (Twisted Pair)		
Input voltage / Termination	24 V DC / 5-pole, pluggable screw contact, for redundant power supply		
Permissible range (min./max.)	9.6 V ... 60 V DC		
Input current	approx. 260 mA (at 24 V DC)		
Alarm signalling contact	Change-over contact, potential-free, 24 V DC / 0.5 A 3-pole pluggable screw contact		
Housing material	metal, powder-coated		
Dimensions (W x H x D)	60 x 132 x 104 mm (including cap, without connectors)		
Weight	approx. 0.6 kg		
Working temperature	-40 °C ... +70 °C		
Approvals	UL 60 950-1; DNV		
MTBF	720.000 h		
Management	fully managed via Web interface and SNMP Functions see page A-9		

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS mCon 3100-AAV Ethernet Switch with 10 RJ45 ports including set for assembly on standard rail	20 76 110 4003		

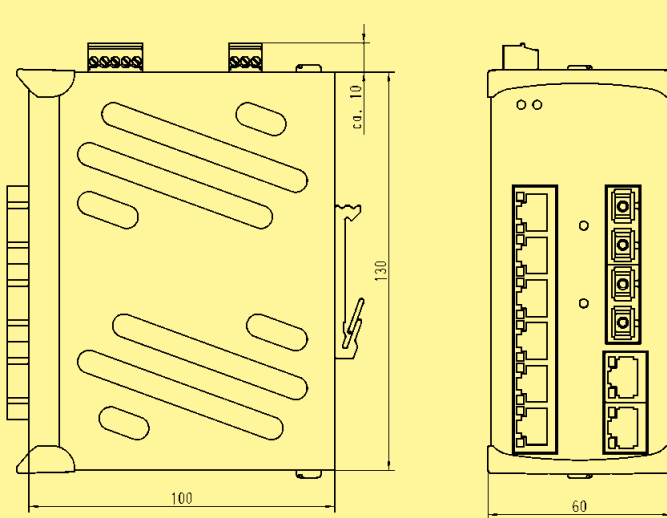


Ethernet Switch

Ha-VIS mCon 3063-ADV

9-port Ethernet Switch for mounting onto top-hat mounting rail in control cabinets,
including 3 F.O. ports (SC, MM)

Managed	IP 30	PROFINET compatible ☒	EtherNet/IP compatible ☒
Number of ports, Copper / Termination	6x 10/100Base-T(X) / RJ45 (Twisted Pair)		
Number of ports, F.O. / Termination	3x 100Base-FX / SC-D female		
Input voltage / Termination	24 V DC / 5-pole, pluggable screw contact, for redundant power supply		
Permissible range (min./max.)	9.6 V ... 60 V DC		
Input current	approx. 320 mA (at 24 V DC)		
Alarm signalling contact	Change-over contact, potential-free, 24 V DC / 0.5 A 3-pole pluggable screw contact		
Housing material	metal, powder-coated		
Dimensions (W x H x D)	60 x 132 x 104 mm (including cap, without connectors)		
Weight	approx. 0.6 kg		
Working temperature	-40 °C ... +70 °C		
Approvals	UL 508; UL 60 950-1		
MTBF	710.000 h		
Management	fully managed via Web interface and SNMP Functions see page A-9		

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS mCon 3063-ADV Ethernet Switch with 6 RJ45 ports 3 F.O. ports including set for assembly on standard rail	20 76 109 4101		



Ethernet Switch

Ha-VIS mCon 3082-ADV

10-port Ethernet Switch for mounting onto top-hat mounting rail in control cabinets,
including 2 F.O. ports (SC, MM)

Managed	IP 30	PROFINET compatible	EtherNet/IP compatible
Number of ports, Copper / Termination	8x 10/100Base-T(X) / RJ45 (Twisted Pair)		
Number of ports, F.O. / Termination	2x 100Base-FX / SC-D female		
Input voltage / Termination	24 V DC / 5-pole, pluggable screw contact, for redundant power supply		
Permissible range (min./max.)	9.6 V ... 60 V DC		
Input current	approx. 290 mA (at 24 V DC)		
Alarm signalling contact	Change-over contact, potential-free, 24 V DC / 0.5 A 3-pole pluggable screw contact		
Housing material	metal, powder-coated		
Dimensions (W x H x D)	60 x 132 x 104 mm (including cap, without connectors)		
Weight	approx. 0.6 kg		
Working temperature	-40 °C ... +70 °C		
Approvals	UL 508; UL 60 950-1; DNV		
MTBF	560.000 h		
Management	fully managed via Web interface and SNMP Functions see page A-9		

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS mCon 3082-ADV Ethernet Switch with 8 RJ45 ports 2 F.O. ports including set for assembly on standard rail	20 76 110 4101		

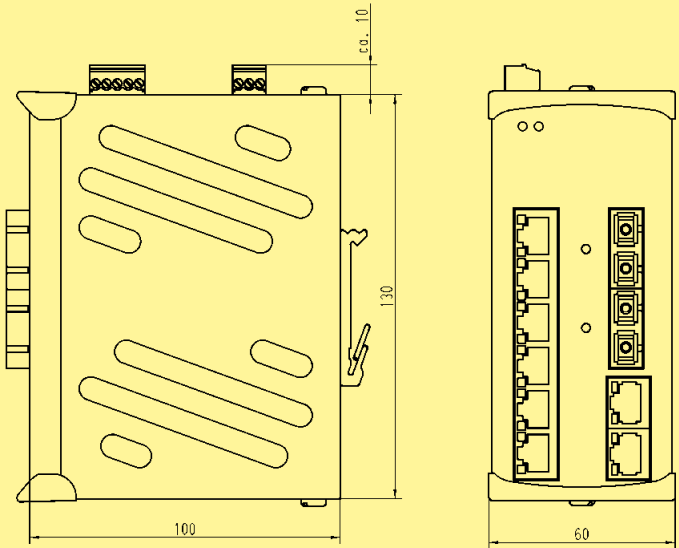


Ethernet Switch

Ha-VIS mCon 3082-AFV

10-port Ethernet Switch for mounting onto top-hat mounting rail in control cabinets,
including 2 F.O. ports (SC, SM)

Managed	IP 30	PROFINET compatible ☒	EtherNet/IP compatible ☒
Number of ports, Copper / Termination	8x 10/100Base-T(X) / RJ45 (Twisted Pair)		
Number of ports, F.O. / Termination	2x 100Base-FX / SC-D female		
Input voltage / Termination	24 V DC / 5-pole, pluggable screw contact, for redundant power supply		
Permissible range (min./max.)	9.6 V ... 60 V DC		
Input current	approx. 270 mA (at 24 V DC)		
Alarm signalling contact	Change-over contact, potential-free, 24 V DC / 0.5 A 3-pole pluggable screw contact		
Housing material	metal, powder-coated		
Dimensions (W x H x D)	60 x 132 x 104 mm (including cap, without connectors)		
Weight	approx. 0.6 kg		
Working temperature	-40 °C ... +70 °C		
Approvals	cUL (in preparation)		
MTBF	560.000 h		
Management	fully managed via Web interface and SNMP Functions see page A-9		

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS mCon 3082-AFV Ethernet Switch with 8 RJ45 ports 2 F.O. ports including set for assembly on standard rail	20 76 110 4102		



Ethernet Switch
Ha-VIS mCon 3063-AEV

9-port Ethernet Switch for mounting onto top-hat mounting rail in control cabinets,
including 3 F.O. ports (ST, MM)

Managed	IP 20	PROFINET compatible	EtherNet/IP compatible
Number of ports, Copper / Termination	6x 10/100Base-T(X) / RJ45 (Twisted Pair)		
Number of ports, F.O. / Termination	3x 100Base-FX / ST female		
Input voltage / Termination	24 V DC / 5-pole, pluggable screw contact, for redundant power supply		
Permissible range (min./max.)	9.6 V ... 60 V DC		
Input current	approx. 320 mA (at 24 V DC)		
Alarm signalling contact	Change-over contact, potential-free, 24 V DC / 0.5 A 3-pole pluggable screw contact		
Housing material	metal, powder-coated		
Dimensions (W x H x D)	60 x 132 x 104 mm (including cap, without connectors)		
Weight	approx. 0.6 kg		
Working temperature	-40 °C ... +70 °C		
Approvals	UL 508; UL 60 950-1		
MTBF	710.000 h		
Management	fully managed via Web interface and SNMP Functions see page A-9		

mCon 3000

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS mCon 3063-AEV Ethernet Switch with 6 RJ45 ports 3 F.O. ports including set for assembly on standard rail	20 76 109 4201		

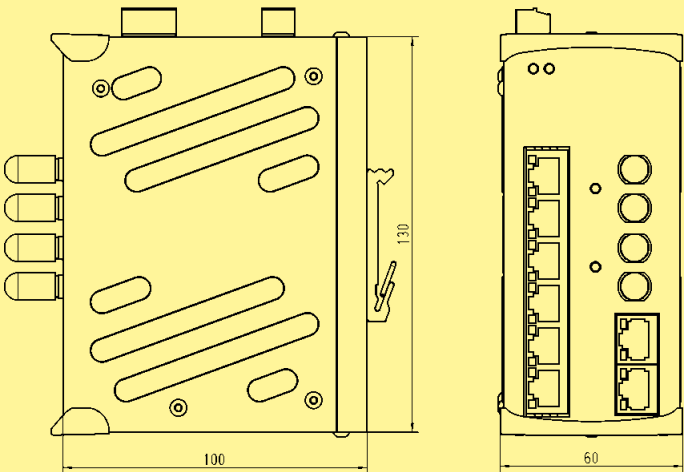
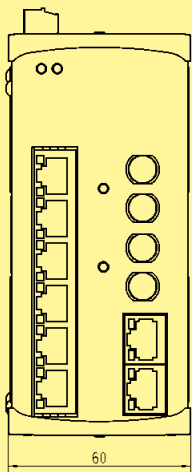


Ethernet Switch

Ha-VIS mCon 3082-AEV

10-port Ethernet Switch for mounting onto top-hat mounting rail in control cabinets,
including 2 F.O. ports (ST, MM)

Managed	IP 20	PROFINET compatible ☒	EtherNet/IP compatible ☒
Number of ports, Copper / Termination	8x 10/100Base-T(X) / RJ45 (Twisted Pair)		
Number of ports, F.O. / Termination	2x 100Base-FX / ST female		
Input voltage / Termination	24 V DC / 5-pole, pluggable screw contact, for redundant power supply		
Permissible range (min./max.)	9.6 V ... 60 V DC		
Input current	approx. 290 mA (at 24 V DC)		
Alarm signalling contact	Change-over contact, potential-free, 24 V DC / 0.5 A 3-pole pluggable screw contact		
Housing material	metal, powder-coated		
Dimensions (W x H x D)	60 x 132 x 104 mm (including cap, without connectors)		
Weight	approx. 0.6 kg		
Working temperature	-40 °C ... +70 °C		
Approvals	UL 508; UL 60 950-1; DNV		
MTBF	560.000 h		
Management	fully managed via Web interface and SNMP Functions see page A-9		

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS mCon 3082-AEV Ethernet Switch with 8 RJ45 ports 2 F.O. ports including set for assembly on standard rail	20 76 110 4201		



Ethernet Switch

Ha-VIS mCon 4000

Ethernet Switches, managed, for flat wall mounting

General description

The Fast Ethernet Switches of the product family Ha-VIS mCon 4000 are recommended for use in the widest range of industrial applications and support Ethernet (10 Mbit/s) and Fast Ethernet (100 Mbit/s). The product family enables the connection of up to 8 network devices over Twisted Pair cables.

Mechanical stability and temperature range meet the highest demands. The robust M12 interface shows its advantages especially in applications at risk of vibrations.

The Ethernet Switches support both SNMP and an easy Web interface for management functions.

Features

- Ethernet Switch according to IEEE 802.3
- Ethernet (10 Mbit/s) and Fast Ethernet (100 Mbit/s)
- Auto-crossing, Auto-negotiation, Auto-polarity
- Diagnostic LEDs (Link status, Data, Power)
- Store and Forward Switching Mode, non blocking
- Mounting onto wall, optionally onto top-hat mounting rail

For Ethernet Switch Ha-VIS eCon 4080-BPoE1 only:

- PoE support

Advantages

- Robust metal housing and flat housing style
- EMC, temperature range and mechanical stability meet the toughest demands
- Wide range for power supply input
- Additional type test according to EN 50 155 and EN 50 121-3-2

Application fields

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

Technical characteristics

Ethernet interface – M12

Number of ports	8x 10/100Base-T(X)
Cable types according to IEEE 802.3	Shielded Twisted Pair (STP) or Unshielded Twisted Pair (UTP), Category 5
Data rate	10 Mbit/s or 100 Mbit/s (M12 D-coding)
Maximum cable length	100 m (Twisted Pair, with cable Category 5 acc. to DIN EN 50 173-1)
Termination	M12 D-coding (female)
Diagnostics (LED)	• Status Link - Green • Data transfer (Act) - Green flashing • Data transfer rate (Speed) - 100 Mbit/s: Yellow 10 Mbit/s: Green • Error - Red
Topology	• Line • Ring • Star • mixed

Power supply

Input voltage	24 / 48 V DC (12 V ... 60 V DC) - redundant
for Ha-VIS mCon 4080-B3V only	72 / 110 V DC (50.4 V ... 137.5 V DC) - redundant
Termination	M12 A-coding, male, for redundant power supply
Diagnostics (LED)	Power supply - LED Green

Design features

Housing material	metal
Dimensions (W x H x D)	130 x 166 x 50 mm (without connectors)
Degree of protection acc. to DIN EN 60 529	IP 40
Assembly	Wall mounting, flat assembly
Weight	approx. 0.85 kg

Environmental conditions

Stock temperature	-40 °C ... +85 °C
Relative humidity	10 % ... +95 % (non-condensing)

Technical characteristics Ha-VIS mCon 4080-BPoE1V

Ethernet interface – M12

Number of ports	8x 10/100Base-T(X)
Cable types according to IEEE 802.3	Shielded Twisted Pair (STP) or Unshielded Twisted Pair (UTP), Category 5
Data rate	10 Mbit/s or 100 Mbit/s (M12 D-coding)
Maximum cable length	100 m (Twisted Pair, with cable Category 5 acc. to DIN EN 50 173-1)
Termination	M12 D-coding
Diagnostics (LED) Link	• Status Link - Green • Data transfer (Act) - Green flashing • Data transfer rate (Speed) - 100 Mbit/s: Yellow 10 Mbit/s: Green
PoE	• no PoE device - OFF • PoE device with failure - Red • PoE device connected - Green
Topology	• Line • Star • mixed

Power supply

Input voltage mode PoE	48 V DC (46 V ... 55 V DC)						
mode Non-PoE	24 / 48 V DC (12 V ... 55 V DC)						
Termination	M12 A-coding, male, for redundant power supply						
Diagnostics (LED)	<table> <tr> <td>Pwr X9 (switch)</td><td>voltage – LED Green</td></tr> <tr> <td>Pwr PoE (mode PoE)</td><td>> 46 V DC – LED Green</td></tr> <tr> <td>State</td><td>< 46 V DC – LED Red</td></tr> </table>	Pwr X9 (switch)	voltage – LED Green	Pwr PoE (mode PoE)	> 46 V DC – LED Green	State	< 46 V DC – LED Red
Pwr X9 (switch)	voltage – LED Green						
Pwr PoE (mode PoE)	> 46 V DC – LED Green						
State	< 46 V DC – LED Red						

Design features

Housing material	metal
Dimensions (W x H x D)	130 x 166 x 50 mm (without connectors)
Degree of protection acc. to DIN EN 60 529	IP 40
Assembly	Wall mounting, flat assembly
Weight	approx. 0.85 kg

Environmental conditions

Stock temperature	-40 °C ... +85 °C
Relative humidity	10 % ... +95 % (non-condensing)

**Ethernet Switch****Ha-VIS mCon 4080-B1V**

8-port Ethernet Switch for flat installation

Managed	IP 40	PROFINET compatible	EtherNet/IP compatible
Number of ports, Copper / Termination	8x 10/100Base-T(X) / M12 D-coding (female)		
Input voltage / Termination	24 / 48 V DC / M12 A-coding, male, for redundant power supply		
Permissible range (min./max.)	12 V ... 60 V DC		
Input current	approx. 165 mA (at 24 V DC)		
Housing material	metal, powder-coated		
Dimensions (W x H x D)	130 x 166 x 50 mm (without connectors)		
Weight	approx. 0.85 kg		
Working temperature	-40 °C ... +70 °C		
Approvals			
MTBF	489.000 h		
Management	fully managed via Web interface and SNMP Functions see page A·9		

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS mCon 4080-B1V Ethernet Switch with 8 ports M12 D-coding for wall mounting	20 77 208 4001		



Ethernet Switch
Ha-VIS mCon 4080-B3V
8-port Ethernet Switch (110 V DC) for flat installation

Managed	IP 40	PROFINET compatible	EtherNet/IP compatible
Number of ports, Copper / Termination	8x 10/100Base-T(X) / M12 D-coding (female)		
Input voltage / Termination	72 / 110 V DC / M12 A-coding, male, for redundant power supply		
Permissible range (min./max.)	50.4 V ... 137.5 V DC		
Input current	approx. 48 mA (at 110 V DC)		
Housing material	metal, powder-coated		
Dimensions (W x H x D)	130 x 166 x 50 mm (without connectors)		
Weight	approx. 0.85 kg		
Working temperature	-40 °C ... +70 °C		
MTBF	446.000 h		
Management	fully managed via Web interface and SNMP Functions see page A-9		

Identification	Part number	Drawing		Dimensions in mm
Ha-VIS mCon 4080-B3V Ethernet Switch with 8 ports M12 D-coding for wall mounting	20 77 208 4003			



Ethernet Switch

Ha-VIS mCon 4080-BPoE1V

8-port Ethernet Switch for flat installation

Managed

IP 40

PROFINET compatible ☒EtherNet/IP compatible ☒

Number of ports, Copper / Termination 8x 10/100Base-T(X) / M12 D-coding (female)

mode PoE

Input voltage / Termination

48 V DC

Permissible range (min./max.)

46 V ... 55 V DC

Input current

max. 3.0 A at 48 V DC with PoE; load 350 mA each port

mode Non-PoE

Input voltage / Termination

24 / 48 V DC / M12 A-coding, male,
for redundant power supply

Permissible range (min./max.)

12 V ... 55 V DC

Input current

approx. 350 mA (at 24 V DC)

Housing material

metal, powder-coated

Dimensions (W x H x D)

130 x 166 x 50 mm (without connectors)

Weight

approx. 0.85 kg

Working temperature

-40 °C ... +70 °C

MTBF

296.000 h

Management

fully managed via Web interface and SNMP
Functions see page A-9

Identification

Part number

Drawing

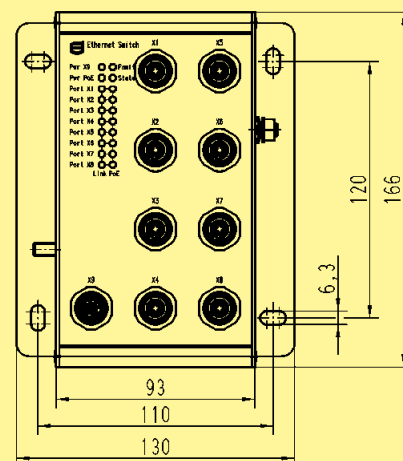
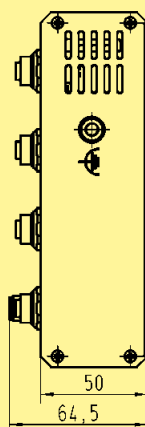
Dimensions in mm

Ha-VIS mCon 4080-BPoE1V

Ethernet Switch with
8 ports M12 D-coding

20 77 208 4009

for wall mounting





Ethernet Switch

Ha-VIS mCon 9000

Ethernet Switches, managed, for installation in a 19" rack

General description

The Ethernet Switches of the product family Ha-VIS mCon 9000 are recommended for use in the widest range of industrial applications and support Ethernet (10 Mbit/s) and Fast Ethernet (100 Mbit/s). The product family enables the connection of up to 8 network devices over Twisted Pair cables.

The Ha-VIS mCon 9000 Ethernet Switch family, with its integrated LEDs on each port, supports fast and easy network diagnosis. The Ha-VIS mCon Ethernet Switch operates in Store and Forward Switching mode and supports Auto-crossing, Auto-negotiation and Auto-polarity.

Features

- Ethernet Switch acc. to IEEE 802.3
- Ethernet (10 Mbit/s) and Fast Ethernet (100 Mbit/s)
- Auto-crossing, Auto-negotiation, Auto-polarity
- Diagnostic LEDs (Link status, Data, Power)
- Store and Forward Switching Mode, non-blocking
- Pluggable in 19" racks
- Power input on the front, no backplane necessary

Advantages

- Robust metal housing
- Integrated management functions
- EMC, temperature range and mechanical stability meet the toughest demands

Application fields

- Railway applications
- Industrial automation
- Automotive industry
- Wind power
- Power distribution systems

Technical characteristics

Ethernet interface – M12

Number of ports	7x / 8x 10/100Base-T(X)
Cable types according to IEEE 802.3	Shielded Twisted Pair (STP) or Unshielded Twisted Pair (UTP), Category 5
Data rate	10 Mbit/s or 100 Mbit/s (M12 D-coding)
Maximum cable length	100 m (Twisted Pair, with cable Category 5 acc. to DIN EN 50 173-1)
Termination	M12 D-coding (female)
Diagnostics (LED)	• Status Link - Green • Data transfer (Act) - Green flashing • Data transfer rate (Speed) - 100 Mbit/s: Yellow 10 Mbit/s: OFF
Topology	• Line • Ring • Star • mixed

Power supply

Input voltage	24 / 48 V DC (8 V ... 60 V DC) - redundant
Termination	• M12 A-coding, male or • DIN frame connector, type F
Diagnostics (LED)	Power supply - LED Green

Alarm signalling contact (for Ha-VIS mCon 9080-B1V only)

Alarm signalling contact	Change-over contact, potential-free, 24 V DC / 0.5 A
Termination, device-side	DIN frame connector, Type F
Diagnostics (LED)	Error - Red

Design features

Housing material	aluminium
Degree of protection acc. to DIN EN 60 529	IP 20 (front side IP 40, when mounted)
Assembly	19" rack, 3 U
Weight	approx. 0.6 kg

Environmental conditions

Stock temperature	-40 °C ... +85 °C
Relative humidity	10 % ... +95 % (non-condensing)



Ethernet Switch

Ha-VIS mCon 9080-B1V

8-port Ethernet Switch for installation in a 19" rack

Managed	IP 20	PROFINET compatible	EtherNet/IP compatible
---------	-------	---------------------	------------------------

Number of ports, Copper / Termination	8x 10/100Base-T(X) / M12 D-coding (female)
Input voltage / Termination	24 / 48 V DC / DIN frame connector, Type F
Permissible range (min./max.)	8 V ... 60 V DC
Input current	approx. 130 mA (at 24 V DC)
Alarm signalling contact	Change-over contact, potential-free, 24 V DC / 0.5 A DIN frame connector, Type F
Housing material	aluminium, anodised
Dimensions (W x H x D)	60.6 mm (3 U) x 128.4 mm (12 HP) x 173.5 mm
Weight	approx. 0.6 kg
Working temperature	-40 °C ... +70 °C
Approvals	cUL (in preparation)
MTBF	631.000 h
Management	fully managed via Web interface and SNMP Functions see page A-9

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS mCon 9080-B1V Ethernet Switch with 8 ports M12 D-coding	20 76 208 7002	Technical drawing showing three views of the switch: Front view: Shows 8 ports arranged in two columns of four. Dimensions: 128,4 mm (total height), 122,4 mm (port area height), 45,7 mm (port spacing), 60,6 mm (total width). Side view: Shows the rack-mountable profile. Dimensions: 11,8 mm (mounting flange thickness), 173,5 mm (total depth). Rear view: Shows the DIN connector and other rear panel features.	Technical drawing showing three views of the switch: Front view: Shows 8 ports arranged in two columns of four. Dimensions: 128,4 mm (total height), 122,4 mm (port area height), 45,7 mm (port spacing), 60,6 mm (total width). Side view: Shows the rack-mountable profile. Dimensions: 11,8 mm (mounting flange thickness), 173,5 mm (total depth). Rear view: Shows the DIN connector and other rear panel features.



Ethernet Switch

Ha-VIS mCon 7000

Ethernet Switches, managed, for harsh industrial environments

General description

If additional services for networks in harsh industrial environments (filtering, prioritisation, topology), or individual network configurations are required, then the Ethernet Switches of the product family Ha-VIS mCon 7000 come into play.

These managed switches allow the connection of up to 10 end-units, according to switch type, over IEC 802.3 Twisted-Pair cabling. Protection class, temperature range and mechanical stability satisfy the highest requirements. These Ethernet Switches can therefore be directly used in industrial environments.

They support both SNMP and an easy Web interface for management functions.

Features

- Ethernet Switch acc. to IEEE 802.3
- Store and Forward Switching Mode
- 5 or 10 ports, managed, non-blocking
- Auto-crossing, Auto-negotiation, Auto-polarity
- Ethernet (10 Mbit/s), Fast Ethernet (100 Mbit/s) and Gigabit Ethernet (1000 Mbit/s)
- Diagnostic LEDs (Link status, Data, Power, Error)

Advantages

- High degree of protection IP 65 / IP 67
- Robust metal housing, zinc die-cast
- Can be used directly in industrial environments
- EMC, temperature range and mechanical stability meet the toughest demands
- Integrated management functions

Application fields

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

Technical characteristics

Ethernet interface – RJ45

Number of ports	8x 10/100Base-T(X) 2x 10/100/1000-Base-T(X)
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 (for Ha-VIS mCon 7100-AAV only) (Han® 3 A RJ45)
Maximum cable length	100 m (Twisted Pair, with cable Category 5 acc. to DIN EN 50 173-1)
Termination	Han® 3 A RJ45 (female)
Diagnostics (LED)	• Status Link (Link/Act) - terminal device is connected: Green data transmission in process: Green flashing • Data transfer rate (Speed) - 1000 Mbit/s: Green 100 Mbit/s: Yellow 10 Mbit/s: OFF
Topology	• Line • Ring • Star • mixed

Power supply

Input voltage	24 / 48 V DC (12 V ... 60 V DC) - redundant
Termination	Han® 4 A, male, for redundant power supply (including fixing screw 09 20 000 9918 to maintain IP 67)
Diagnostics (LED)	Power supply - LED Green

Alarm signalling contact

Alarm signalling contact	Change-over contact, potential-free, 24 V DC / 0.5 A
Termination, device-side	Han® 3 A, male
Diagnostics (LED)	Error - Red

Design features

Housing material	zinc die-cast
Dimensions (W x H x D)	90 x 120 x 87 mm (without connectors)
Degree of protection acc. to DIN EN 60 529	IP 65 / IP 67
Assembly	• 35 mm top-hat rail acc. to EN 60 715 • Wall mounting, flat assembly • Wall mounting, vertical assembly
Weight	approx. 1.4 kg

Environmental conditions

Working temperature	-40 °C ... +70 °C
Stock temperature	-40 °C ... +85 °C
Relative humidity	10 % ... +95 % (non-condensing)

Technical characteristics Ha-VIS mCon 7050-B1V, mCon 7100-B1V

Ethernet interface – M12

Number of ports	5x / 10x 10/100Base-T(X)
Cable types according to IEEE 802.3	Shielded Twisted Pair (STP) or Unshielded Twisted Pair (UTP), Category 5
Data rate	10 Mbit/s or 100 Mbit/s (M12 D-coding)
Maximum cable length	100 m (Twisted Pair, with cable Category 5 acc. to DIN EN 50 173-1)
Termination, device-side	M12 D-coding (female)
Diagnostics (LED)	• Status Link (Link/Act) - terminal device is connected: Green data transmission in process: Green flashing • Data transfer rate (Speed) - 100 Mbit/s: Yellow 10 Mbit/s: OFF
Topology	• Line • Ring • Star • mixed

Power supply

Input voltage	24 / 48 V DC (12 V ... 60 V DC) - redundant
Termination, device-side	M12 A-coding, male, for redundant power supply
Diagnostics (LED)	Power supply - LED Green

Alarm signalling contact

Alarm signalling contact	Change-over contact, potential-free, 24 V DC / 0.5 A
Termination, device-side	M12 D-coding, male
Diagnostics (LED)	Error - Red

Design features

	Ha-VIS mCon 7050	Ha-VIS mCon 7100
Housing material	zinc die-cast	zinc die-cast
Dimensions (W x H x D)	45 x 120 x 87 mm (without connectors)	90 x 120 x 87 mm (without connectors)
Degree of protection acc. to DIN EN 60 529	IP 65 / IP 67	IP 65 / IP 67
Assembly	• 35 mm top-hat rail acc. to EN 60 715 • Wall mounting, flat assembly • Wall mounting, vertical assembly	• 35 mm top-hat rail acc. to EN 60 715 • Wall mounting, flat assembly • Wall mounting, vertical assembly
Weight	approx. 0.8 kg	approx. 1.4 kg

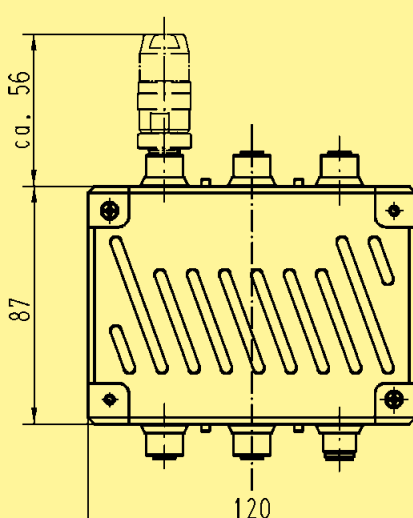
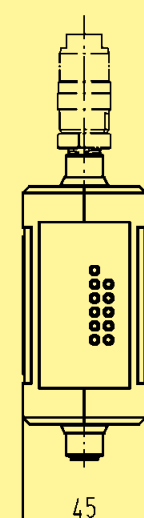
Environmental conditions

Working temperature	-40 °C ... +70 °C
Stock temperature	-40 °C ... +85 °C
Relative humidity	10 % ... +95 % (non-condensing)

**Ethernet Switch****Ha-VIS mCon 7050-B1V**

5-port Ethernet Switch with extended input voltage range for industrial Ethernet networks, with M12 system cabling

Managed	IP 65 / IP 67	PROFINET compatible 	EtherNet/IP compatible 
Number of ports, Copper / Termination	5x 10/100Base-T(X) / M12 D-coding (female)		
Input voltage / Termination	24 / 48 V DC / M12 A-coding, male, for redundant power supply		
Permissible range (min./max.)	12 V ... 60 V DC		
Input current	approx. 160 mA (at 24 V DC)		
Housing material	zinc die-cast		
Dimensions (W x H x D)	45 x 120 x 87 mm		
Weight	approx. 0.8 kg		
Working temperature	-40 °C ... +70 °C		
Approvals			
MTBF	462.000 h		
Management	fully managed via Web interface and SNMP Functions see page A-9		

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS mCon 7050-B1V Ethernet Switch with 5 ports M12 D-coding	20 70 305 4943		



Ethernet Switch Ha-VIS mCon 7100-B1V

10-port Ethernet Switch for industrial Ethernet networks,
with M12 system cabling

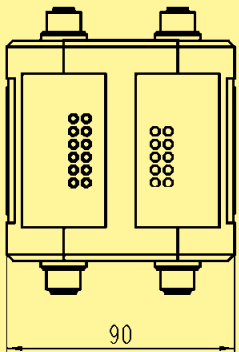
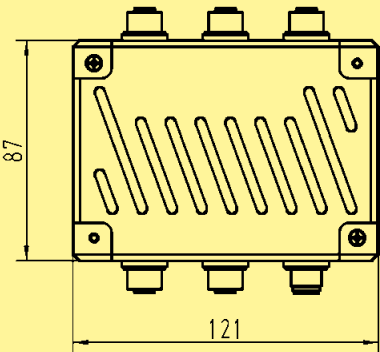
Managed	IP 65 / IP 67	PROFINET compatible	EtherNet/IP compatible
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Number of ports, Copper / Termination	10x 10/100Base-T(X) / M12 D-coding (female)
Input voltage / Termination	24 / 48 V DC / M12 A-coding, male, for redundant power supply
Permissible range (min./max.)	12 V ... 60 V DC
Input current	approx. 180 mA (at 24 V DC)
Alarm signalling contact	Change-over contact, potential-free, 24 V DC / 0.5 A M12 D-coding, male
Housing material	zinc die-cast
Dimensions (W x H x D)	90 x 120 x 87 mm
Weight	approx. 1.4 kg
Working temperature	-40 °C ... +70 °C
MTBF	378.000 h
Management	fully managed via Web interface and SNMP Functions see page A-9

Identification	Part number	Drawing	Dimensions in mm
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Ha-VIS mCon 7100-B1V
Ethernet Switch with
10 ports M12 D-coding

20 70 310 4945



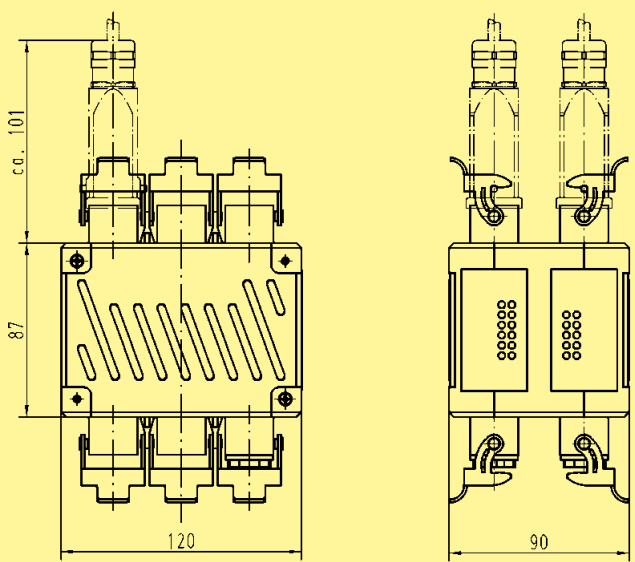
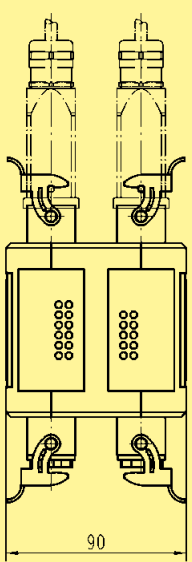
Ethernet Switch

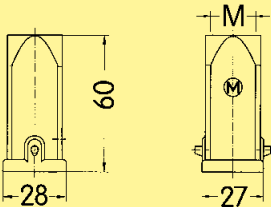
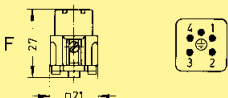
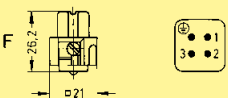
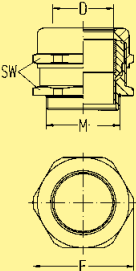
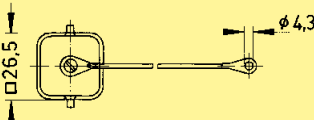
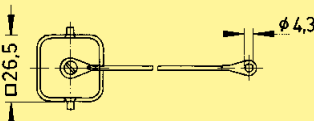
Ha-VIS mCon 7100-AAV

10-port Ethernet Switch for use in harsh industrial environments,
with 2 Gigabit ports

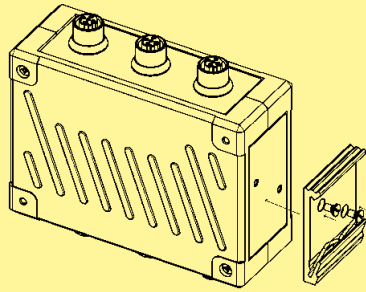
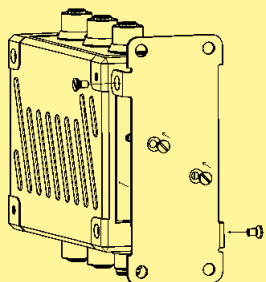
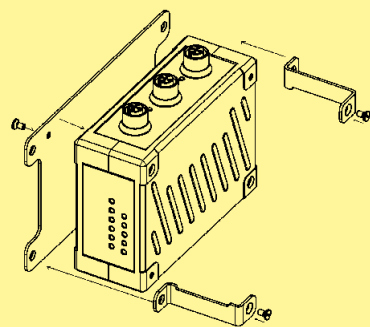
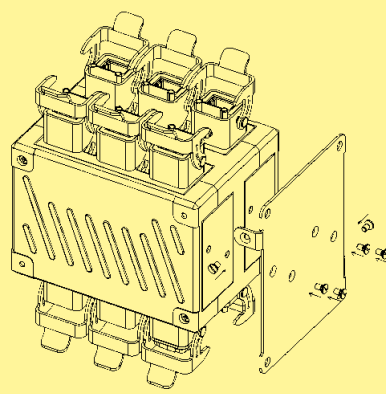


Managed	IP 65 / IP 67	PROFINET compatible 	EtherNet/IP compatible 
Number of ports, Copper / Termination	8x 10/100Base-T(X) / Han® 3 A RJ45 (female) 2x 10/100/1000-Base-T(X) / Han® 3 A RJ45 (female)		
Input voltage / Termination	24 / 48 V DC / Han® 4 A, male, for redundant power supply		
Permissible range (min./max.)	12 V ... 60 V DC		
Input current	approx. 260 mA (at 24 V DC)		
Alarm signalling contact	Change-over contact, potential-free, 24 V DC / 0.5 A Han® 3 A, male		
Housing material	zinc die-cast		
Dimensions (W x H x D)	90 x 120 x 87 mm		
Weight	approx. 1.4 kg		
Working temperature	-40 °C ... +70 °C		
Management	fully managed via Web interface and SNMP Functions see page A-9		

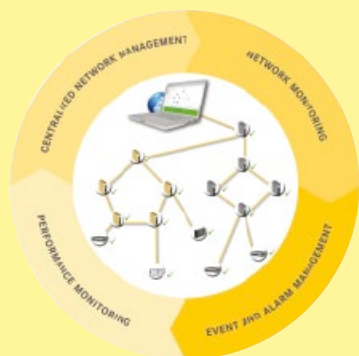
Identification	Part number	Drawing	Dimensions in mm
Ha-VIS mCon 7100-AAV Ethernet Switch with 10 RJ45 ports	20 70 310 4924		

Identification	Part number	Drawing	Dimensions in mm
Han A® Connectors and Protection covers			
Hood Metal, straight, metric	19 20 003 1440 ¹⁾		
Female insert Han® 4 A for power supply	09 20 004 2711		
Female insert Han® 3 A for Alarm signalling contact (Ha-VIS eCon 7100-AA only)	09 20 003 2711		
Cable gland Metal, IP 65, metric, M20, cable Ø: 5 mm ... 9 mm	19 00 000 5080		
Protection cover Han® 3 A, female insert	09 20 003 5426		
Protection cover Han® 3 A, male insert for RJ45 interface	09 20 003 5425		
HARAX® Connectors and Protection covers			
HARAX® M12-L Circular Connectors A-coding	21 03 212 2305		
HARAX® M12-L Circular Connectors D-coding, female (Ha-VIS mCon 7100-B1V only)	21 03 281 2405		
Protection cover M12 for Ethernet	21 01 000 0003		

1) ... Order insert fixing screw 09 20 000 9918 separately

Identification	Part number	Drawing	Dimensions in mm
Assembly			
Set for assembly on standard rail according to DIN EN 60 715	20 80 000 0003		
Set for panel mounting vertical assembly	20 80 010 0001		
Set for panel mounting flat assembly	20 80 024 0002		
Set for panel mounting Ha-VIS mCon 7100 vertical assembly	20 80 010 0002		

General Description



The Ha-VIS Dashboard acts as central operating and management software for Ethernet networks. The software is developed especially for monitoring, setting up, and maintaining complex and powerful IP-based communication networks.

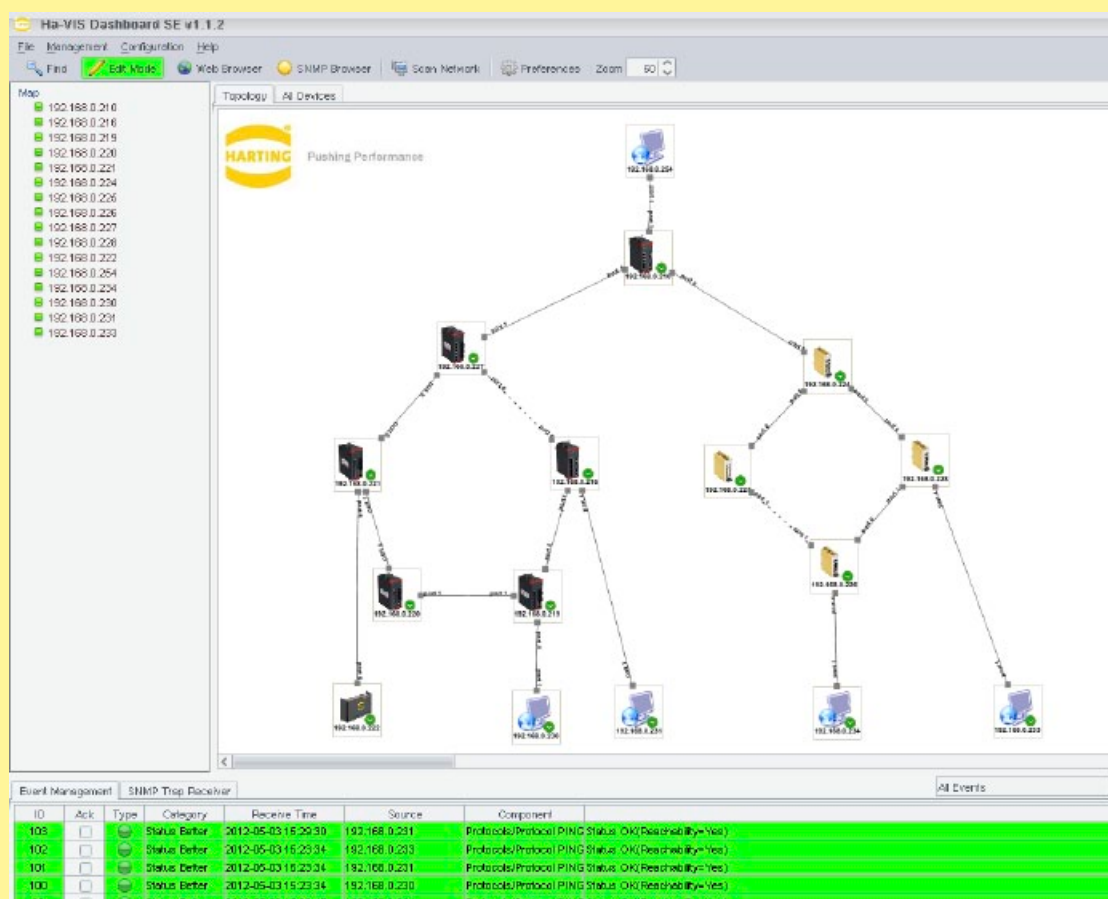
The Ha-VIS Dashboard detects managed network devices and is capable of representing the network topology automatically. All intelligent HARTING network devices can be centrally monitored and administrated.

A list of individual devices and a topology overview are displayed. A search function is also available for these devices.

The software displays ring topologies recognized by HARTING switches using the Rapid Spanning Tree Protocol.

HARTING's Ha-VIS Dashboard displays connectivity interruptions within the topology and lists them in an event log. Events (including SNMP traps) can be configured to trigger further actions such as sending e-mails or executing programs.

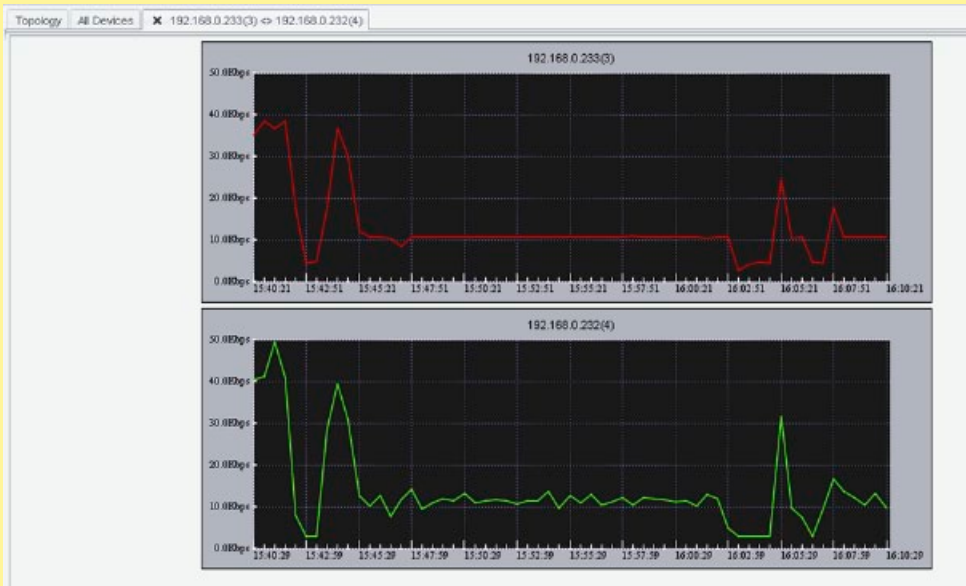
To improve clarity, events which have already been processed can be manually confirmed by the user. Custom filters can be created to filter out certain types of event messages



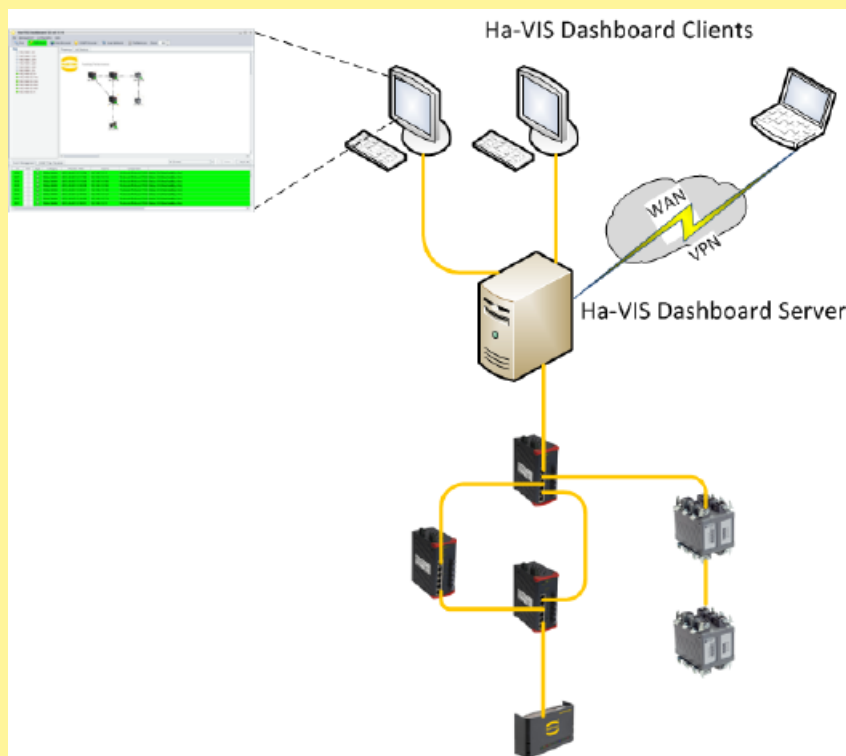
The Ha-VIS Dashboard features web-based configuration, SNMP, Telnet and SSH for configuring network devices.

The software provides centralized monitoring and configuring for an Ethernet network with up to 256 network devices. The Ha-VIS Dashboard also enables you to analyse the network load by illustrating the link and port based loads in a graph over a period of 30 minutes.

General description



You can also configure the Ha-VIS Dashboard so that external programs are integrated into its context menu. This feature allows the Ha-VIS Dashboard to be used together with other applications in a centralized display and management software system.



The Ha-VIS Dashboard can be installed as a local installation or as a server-client application, depending on your requirements. The server-client installation minimizes the network traffic generated by the monitoring process and centralizes data storage, since the key processes all run on a central server.

A VPN connection from the client can be used to establish a wide-area network (WAN) link so that the full functionality of Ha-VIS Dashboard is available on the client.

Technical Characteristics

Functionality

- Centralized management application for HARTING network devices
- Network topology visualization with all managed network devices
- Automatic topology detection based on LLDP
- Manages up to 256 network devices (basic version: 16)
- Third party devices can be included
- Link down detection and visualization
- Event logging
- Event triggered email messages or call of executable files are possible
- Possible to configure devices via SNMP, Telnet, SSH or web interface
- SNMP Trap handling
- Traffic monitoring per connection
- Possible to start up external applications
- Device images and background image are changeable
- Server-Client application with up to 5 parallel clients

Hardware

- CPU: Minimum 2 core processor with 2.5 GHz, x86 or x64 compatible
- RAM: Minimum 1 GB
- Hard Drive: Minimum 1 GB

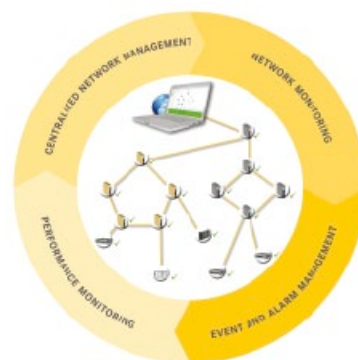
Software

Operating Systems

- Windows XP
- Windows 7
- Windows Server 2003
- Windows Server 2008

Java

- Java Runtime Version 1.6.0_29 or newer



Ha-VIS Dashboard

Advantages

- Centralized management for managed Ethernet devices
- Network monitoring
- Event and alarm management
- Performance monitoring

Identification	Part number	Drawing	Dimensions in mm
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Ha-VIS Dashboard *

Ha-VIS Dashboard License 64
 Ha-VIS Dashboard License 128
 Ha-VIS Dashboard License 256

20 16 111 2110
 20 16 111 3110
 20 16 111 4110

* ... The basic version is included in the scope of delivery of Ethernet Switches of the Ha-VIS mCon series.

pCon
2000
7000



Industrial DC/DC converter
Serial Ha-VIS pCon 7000
for centralised power supply
with degree of protection IP 20 / IP 65

General Description

These primary switched DC/DC converters of the product family Ha-VIS pCon 7000 are designed for the decentralised supply of control units, Ethernet components or automation devices in industrial areas and harsh environments.

With their wide range of input voltage, the units are suitable for world-wide use.

The converters need no ground load and are short-circuit protected by primary and secondary power limitation.

The converters are maintenance free, vacuum potted and prepared for the use in devices with Protection Class I or II, depending on the type of the converter.

Features

- Wide input range for world-wide use
- Easy installation
- Galvanically separated
- Short circuit protected
- Ambient Temperature up to 70 °C
- High degree of protection IP 65 / IP 67

Advantages

- Robust housing
- Wide operating temperature range
- Mechanical stability for highest demands
- Can be used directly in industrial and railway environments
- Compact design and high power density
- Proofed against short-circuits, overloads and no-load operation
- International approvals

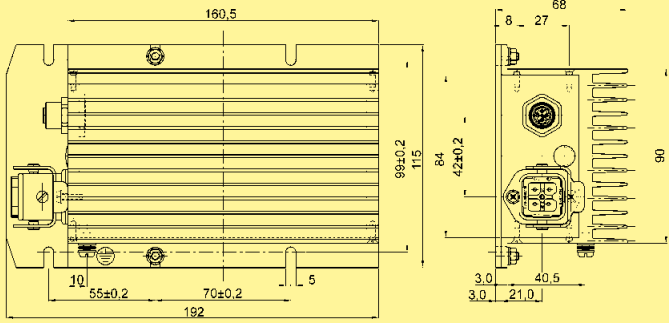
Application fields

- Industrial automation
- Automotive industry
- Railway applications
- Power generation and distribution

DC/DC converter
Ha-VIS pCon 7150-110/48
for centralised power supply
with degree of protection IP 65



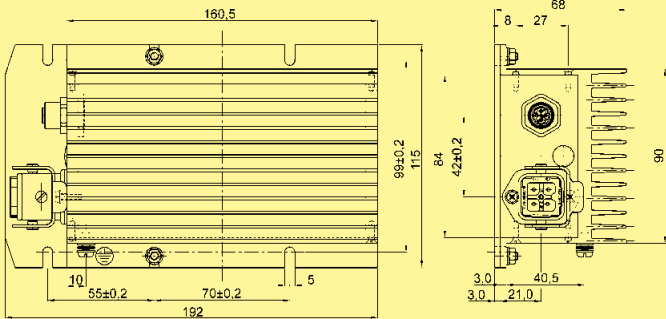
Han® 3 A / M12 A-coding		IP 65	110 V DC	48 V DC
Input		Output		
Input voltage	50.4 ... 154 V DC (wide range input)	Output voltage	48 V DC -1 % / +2 %	
Inrush current	< 7 x I _{in nom}	Output current	3.1 A	
Switching frequency	approx. 70 kHz	Ripple	≤ 1 % p-p	
Efficiency	≥ 88 %	Noise	≤ 2 % p-p	
Input filter	two-step filter	Starting time	≤ 200 ms	
Reverse polarity protection	by means of connector with coding	No load characteristics	no ground load	
Termination	Han® 3 A	Current limiting	105 ... 130 % stabilised current	
Protection class	I	Termination	M12 A-coding	
General data				
Operating temperature	-40 °C ... +70 °C / -40 °C ... +85 °C for t ≤ 10 min. according to EN 50 155			
Cooling	free convection			
Weight	approx. 1800 g			
Relative humidity	30 % ... 95 % (non-condensing)			
Dimensions	192 x 115 x 68 mm			
MTBF	> 950 000 hours (according to SN 29 500, T _A = +50 °C)			

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS pCon 7150-110/48 DC/DC converter	20 80 300 3026		



DC/DC converter
Ha-VIS pCon 7150-24/48
for centralised power supply
with degree of protection IP 65

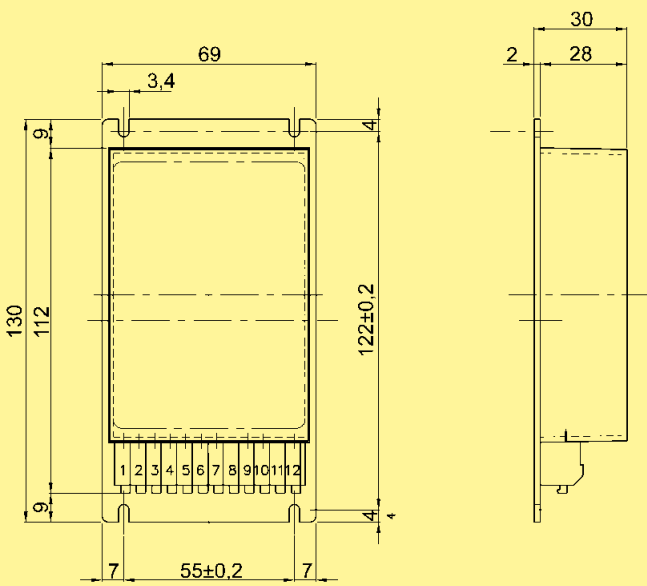
Han® 3 A / M12 A-coding		IP 65	24 V DC	48 V DC
Input		Output		
Input voltage	16.8 ... 33.6 V DC (wide range input)	Output voltage	48 V DC -1 % / +2 %	
Inrush current	< 7 x I _{in nom}	Output current	3.1 A	
Switching frequency	approx. 70 kHz	Ripple	≤ 1 % p-p	
Efficiency	> 90 %	Noise	≤ 2 % p-p	
Input filter	two-step filter	Starting time	≤ 200 ms	
Reverse polarity protection	by means of connector with coding	No load characteristics	no ground load	
Termination	Han® 3 A	Current limiting	105 ... 130 % stabilised current	
Protection class	I	Termination	M12 A-coding	
General data				
Operating temperature	-40 °C ... +70 °C / -40 °C ... +85 °C for t ≤ 10 min. according to EN 50 155			
Cooling	free convection			
Weight	approx. 1800 g			
Relative humidity	30 % ... 95 % (non-condensing)			
Dimensions	192 x 115 x 68 mm			
MTBF	> 950 000 hours (according to SN 29 500, T _A = +50 °C)			

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS pCon 7150-24/48 DC/DC converter	20 80 300 3027		

DC/DC converter
Ha-VIS pCon 7060-110/24
for centralised power supply
with degree of protection IP 20



2x spring-type terminals	IP 20	110 V DC	24 V DC
Input		Output	
Input voltage	43.2 ... 154 V DC (wide range input)	Output voltage	24 V DC ±2 %
Switching frequency	approx. 70 kHz	Output current	2.5 A
Efficiency	≥ 85 %	Ripple	≤ 1.5 % p-p
Input filter	LC filter	Noise	≤ 2 % p-p
Transient protection	1.8 kV / 5/50 µs	Starting time	≤ 200 ms
Reverse polarity protection	cross diode (together with external fuse)	No load characteristics	no ground load
Termination	Spring clamps	Current limiting	105 ... 130 % stabilised current
Protection class	II (no earth connection necessary)	Termination	Spring clamps
General data			
Operating temperature	-40 °C ... +70 °C / -40 °C ... +85 °C for t ≤ 10 min. according to EN 50 155		
Cooling	mounting on heat sink with R _{th} < 2.5 K/W, thermal coupling with Al base plate		
Weight	approx. 400 g		
Relative humidity	30 % ... 95 % (non-condensing)		
Dimensions	69 x 130 x 30 mm		
MTBF	> 1 400 000 hours (according to SN 29 500, T _A = +50 °C)		

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS pCon 7060-110/24 DC/DC converter	20 80 300 3025		



CONTENTS	PAGE
Ha-VIS SFP Modules	
Introduction + Features	A-6 2
Ha-VIS SFP modules 100 Mbit/s	A-6 3
Ha-VIS SFP modules 1000 Mbit/s	A-6 4
Ha-VIS Memory cards	A-6 5
Ha-VIS 19“ DIN-Rail Mounting kit	A-6 6



Accessories

Ha-VIS SFP modules

General description

SFPs (Small Form-factor Pluggable) 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

- 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 Ha-VIS SFP modules

SFP:

Type	SFP Fast Ethernet Transceiver 155 Mbit/s MM	SFP Fast Ethernet Transceiver 155 Mbit/s SM	SFP Fast Ethernet Transceiver 155 Mbit/s SM	SFP Fast Ethernet Transceiver 155 Mbit/s SM
Wave length	1310 nm	1310 nm	1310 nm	1550 nm
Mode	Multimode	Singlemode	Singlemode	Singlemode
Fiber	50 / 125 µm or 62.5 / 125 µm	9 / 125 µm	9 / 125 µm	9 / 125 µm
Max. cable length*	2 km	15 km	40 km	80 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. 10 dB	min. 10 dB
Data rate	155 Mbit/s	155 Mbit/s	155 Mbit/s	155 Mbit/s

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

Identification	Part number	Drawing	Dimensions in mm
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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

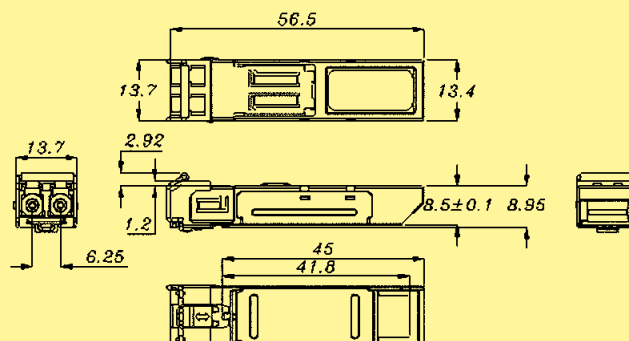
SFP Fast Ethernet Transceiver L40 155 Mbit/s SM

20 76 024 0300

SFP Fast Ethernet Transceiver L80 155 Mbit/s SM

20 76 028 0300

other types on request





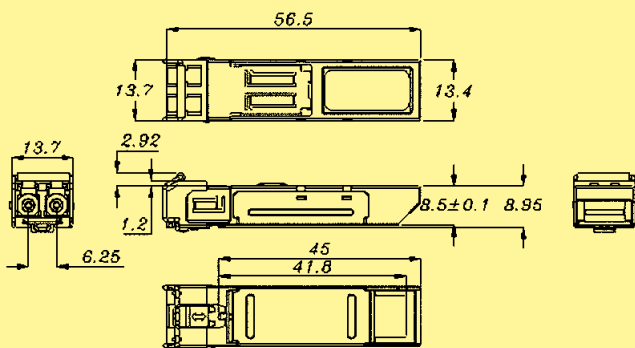
Accessories

Ha-VIS SFP modules 1000 Mbit/s

SFP:

Type	SFP Gigabit Ethernet Transceiver 1.25 Gbit/s MM	SFP Gigabit Ethernet Transceiver 1.25 Gbit/s SM	SFP Gigabit Ethernet Transceiver 1.25 Gbit/s SM	SFP Gigabit Ethernet Transceiver 1.25 Gbit/s SM
Wave length	850 nm	1310 nm	1310 nm	1310 nm
Mode	Multimode	Singlemode	Singlemode	Singlemode
Fiber	50 / 125 µm or 62.5 / 125 µm	9 / 125 µm	9 / 125 µm	9 / 125 µm
Max. cable length*	550 m (50 / 125) 275 m (62.5 / 125)	10 km	40 km	80 km
Connector	LC connector duplex	LC connector duplex	LC connector duplex	LC connector duplex
Optical budget	min. 9 dB	min. 9 dB	min. 9 dB	min. 9 dB
Data rate	1250 Mbit/s	1250 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 Gigabit Ethernet Transceiver 1,25 Gbit/s MM SFP Gigabit Ethernet Transceiver 1,25 Gbit/s SM SFP Gigabit Ethernet Transceiver L40 1,25 Gbit/s SM SFP Gigabit Ethernet Transceiver L80 1,25 Gbit/s SM other types on request	20 76 010 0300 20 76 030 0300 20 76 034 0300 20 76 038 0300		



Accessories

Ha-VIS Memory cards

The HARTING SD cards are used for saving the switch configuration. The web interface can be used to save the current configuration to the SD card.

If an SD card is inserted in the back of the switch, the switch will use the configuration saved on the card when it boots.

So it's quite easy when replacing a switch to transfer the entire configuration to the new switch. The old SD card with your current configuration is simply pushed into the new switch which then boots with these settings. No special network expertise is required.

Note: The HARTING Ethernet Switches are not compatible with conventional memory cards.

MRP memory cards allow you to activate the MRP functionality (media redundancy protocol) when using switches from the FTS 3000 and mCon 3000 series (with firmware ver. 3.0.0.1 and later). For example, in order to operate the device as an MRP slave, you need only have the corresponding MRP slave card inserted during operations.

Operating temperature -40 °C ... +70 °C

Memory space 128 MB

SD Memory cards

Configuration memory	20 89 900 1000
MRP Slave	20 89 900 1001
MRP Master	20 89 900 1002



Ha-VIS 19" DIN-Rail Mounting kit

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.

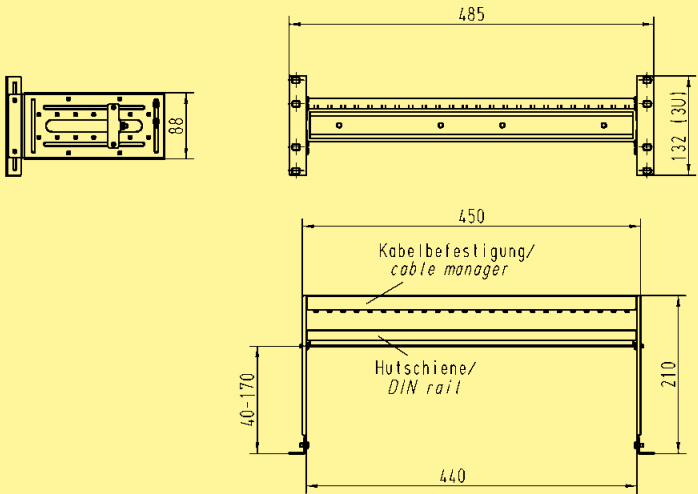
Features:

- 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



CONTENTS

PAGE

B – Ethernet cabling**Ethernet cabling overview**

B 2

Profil-specific Cabling 4-wires

IP 20

B·1 8

IP 65 / IP 67

B·1 24

Cables

B·1 98

Tools

B·1 106

Structured Cabling 8-wires

IP 20

B·2 8

IP 65 / IP 67

B·2 24

Cables

B·2 90

Tools

B·2 100

Ha-VIS preLink®

IP 20

B·3 6

IP 65 / IP 67

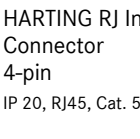
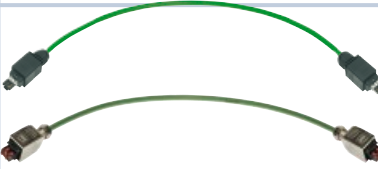
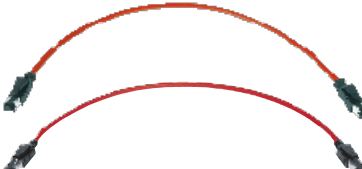
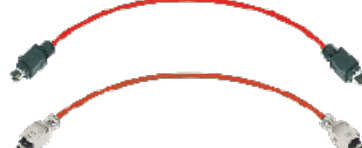
B·3 22

Tools and Accessories

B·3 26

Fast Ethernet 100 Mbit/s 4-pin & POF Ethernet IEEE 802.3

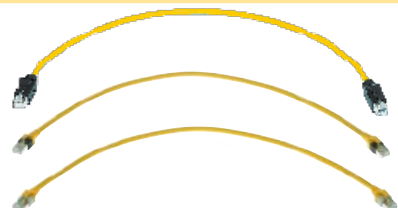
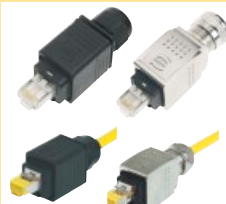
Profile spec

Connectors		System Cable	
Inside IP 20 Protection Class			HARTING RJ Industrial® RJ45 Connector 4-pin IP 20, RJ45, Cat. 5
			HARTING PushPull RJ45 Connector 4-pin IP 65 / IP 67, Cat. 5
Outside IP 65 / IP 67 Protection Class			Han® PushPull RJ45 Connector 4-pin plastic / metal IP 65 / IP 67, Cat. 5
			Han® 3 A RJ45 Connector 4-pin plastic / metal IP 65 / IP 67, Cat. 5
			HARAX® M12 D-coding Connector 4-pin IP 65 / IP 67, Cat. 5 (with IDC contacts)
			Han® PushPull SCRJ Connector POF Variant 14 plastic / metal IP 65 / IP 67
			Han® 3 A RJ45 Hybrid Connector, 4-pin plastic / metal IP 65 / IP 67, Cat. 5 with 4x power supply
			Han® M12 D-coding System cable 4-wire for rail applications IP 65 / IP 67, Cat. 5, AWG 22
Inside IP 20 Protection Class			HARTING RJ Industrial® RJ45 Connector 4-pin IP 20, RJ45, Cat. 5
			Han® PushPull RJ45 Connector 4-pin plastic / metal IP 65 / IP 67, Cat. 5
Inside IP 65 / IP 67 Protection Class			HARAX® M12 D-coding Connector 4-pin IP 65 / IP 67, Cat. 5
			Han® M12 D-coding System Cable 4-wire IP 65 / IP 67, Cat. 5, AWG 22

Outlets and Panel feed-through			Cable	Application
® RJ45 Idled	 HARTING Cabinet Outlet RJ45 IP 20, Cat. 6	 HARTING RJ Industrial® 10G RJ45 Coupling IP 20, Cat. 6	Typ A (for fixed layouts) Industrial Cat. 5  Standard Cable AWG 22/1, solid, PVC	
5 Idled 2	 HARTING PushPull RJ45 Panel feed-through IP 65 / IP 67, Cat. 5	 HARTING PushPull RJ45 Panel feed-through IP 65 / IP 67, Cat. 5	 HARTING PushPull RJ45 Outlet IP 65 / IP 67, Cat. 6	
2	 Han® PushPull RJ45 Panel feed-through plastic / metal IP 65 / IP 67, Cat. 6 Socket horizontal, vertical	 Han® PushPull RJ45 Gender Changer IP 65 / IP 67, Cat. 6	 Outdoor Cable AWG 22/7, stranded, PVC	 AIDA*
2	 Han® 3 A RJ45 Panel feed-through IP 65 / IP 67, Cat. 5	 Han® 3 A RJ45 Metal Outlet IP 65 / IP 67, Cat. 5	 Han® 3 A RJ45 Metal Outlet IP 65 / IP 67, Cat. 6	
2	 Han® M12 D-coding Panel feed-through IP 65 / IP 67, Cat. 5 straight or angled		 PROFINET Torsional Stress cable, AWG 22/19, flexible, PUR	
2			Ha-VIS EtherRail® Cable Industrial Cat. 5  Ha-VIS EtherRail® Flexible or ultra flexible cable AWG 22/7 or AWG 22/19, Elastomer	
	 Han® PushPull SCRJ Panel feed-through plastic / metal IP 65 / IP 67		POF Cable  POF Cable Type B flexible, incidental movement or vibrations	 AIDA*
2/7 poly	 Han® 3 A RJ45 Hybrid plastic / metal IP 65 / IP 67, Cat. 5		 Industrial Cat. 5 Hybrid Cable AWG 22/7, stranded with 4x power supply, FRNC	
® RJ45 Idled	 HARTING Cabinet Outlet RJ45 IP 20, Cat. 6		Typ B (for flexible layouts) Industrial Cat. 5  Stranded Cable AWG 22/7, stranded, PVC	
2	 Han® PushPull RJ45 Panel feed-through plastic / metal IP 65 / IP 67, Cat. 6 Socket horizontal, vertical	 Han® PushPull RJ45 Gender Changer IP 65 / IP 67, Cat. 6	 Outdoor Cable AWG 22/7, stranded, PVC	
2	 Han® M12 D-coding Panel feed-through IP 65 / IP 67, Cat. 5 straight or angled			

Gigabit Ethernet 1000 Mbit/s 8-pin

Structure

Connectors		System Cable		
Inside IP 20 Protection Class			HARTING RJ Industrial® / HARTING RJ Industrial® 10G RJ45 Connector 8-pin IP 20, RJ45, Cat. 6	HARTING RJ Industrial® / HARTING RJ Industrial® 10G System Cable 8-wire IP 20, Cat. 5, flexible Industrial Ethernet Patchcable RJ45, 8- IP 20, Cat. 6 or Cat. 5, AW
			HARTING PushPull RJ45 / HARTING PushPull RJ45 10G Connector 8-pin IP 65 / IP 67, Cat. 6	HARTING PushPull RJ45 / HARTING PushPull RJ45 10G System Cable, flexibl 8-wire IP 65 / IP 67, Cat. 6, flexi
			Han® PushPull RJ45 / Han® PushPull RJ45 10G Connector 8-pin plastic / metal IP 65 / IP 67, Cat. 6	Han® PushPull RJ45 / Han® PushPull RJ45 10G System Cable 8-wire plastic / metal IP 65 / IP 67, Cat. 6
			Han® 3 A RJ45 / Han® 3 A RJ45 10G Connector 8-pin plastic / metal IP 65 / IP 67, Cat. 6	Han® 3 A RJ45 / Han® 3 A RJ45 10G System Cable 8-wire IP 65 / IP 67, Cat. 6, flexi
			Han-Max® RJ45 / Han-Max® RJ45 10G Connector 8-pin IP 67, Cat. 6	
Outside IP 65 / IP 67 Protection Class			han-speed M12 Connector 8-pin IP 67, Cat. 6A	han-speed M12 System Cable 8-wire IP 67, Cat. 6
			Han® 3 A RJ45 Hybrid 10G Connector 8-pin plastic / metal IP 65 / IP 67, Cat. 6 with 4x power supply	Han® 3 A RJ45 Hybrid 10G System Cable 8-wire IP 65 / IP 67, Cat. 6, flexi
			Ha-VIS preLink® HIFF Jack RJ45	Ha-VIS preLink® System Cable 8-wire AWG 27/7
			Ha-VIS preLink® RJ45 Keystone	

Ha-VIS preLink® HIFF and accessories

d Cabling

Outlets and Panel feed-through		Cables
ial® RJ45 wire WG 26/7	 HARTING Cabinet Outlet RJ45 IP 20, Cat. 6  HARTING RJ Industrial® 10G RJ45 Coupling IP 20, Cat. 6	 Industrial Cat. 6_A Stranded cable 8-wire AWG 26/7, stranded, PVC or PUR
RJ45 ble ble	 HARTING PushPull RJ45 10G Panel feed-through IP 65 / IP 67, Cat. 6  HARTING PushPull Outlet RJ45 IP 65 / IP 67, Cat. 6	 Industrial Cat. 6_A Outdoor Cable 8-wire AWG 26/7, stranded, PVC
10G e	 Han® PushPull RJ45 Panel feed-through plastic / metal IP 65 / IP 67, Cat. 6 Socket horizontal, vertical  Han® PushPull RJ45 Outlet RJ45 IP 65 / IP 67, Cat. 6	 Industrial Cat. 5 Stranded cable 8-wire AWG 26/7, stranded, PUR
ble	 Han® 3 A RJ45 Panel feed-through IP 65 / IP 67, Cat. 6  Han® 3 A RJ45 Metal Outlet IP 65 / IP 67, Cat. 5  Han® 3 A RJ45 Metal Outlet IP 65 / IP 67, Cat. 6	 Industrial Cat. 5 Trailing Cable 8-wire AWG 26/19, PUR
	 Han-Max® Panel feed-through RJ45 IP 65 / IP 67, Cat. 5	 Industrial Cat. 5 Outdoor cable, 8-wire AWG 26/7, stranded, PVC
rid ble	 Han® 3 A RJ45 Hybrid Panel feed-through plastic / metal IP 65 / IP 67, Cat. 5	 Industrial Cat. 6 Hybrid Cable, 8-wire 4x power supply for fixed and flexible Installation AWG 26/7, PUR
	 Ha-VIS preLink® HIFF RJ45 AP Box IP 20, Cat. 6  Han® 3 A RJ45 Metal Outlet IP 65 / IP 67, Cat. 6  Han® PushPull RJ45 Metal Outlet RJ45 IP 65 / IP 67, Cat. 6	 Industrial Cat. 7 Installation Cable 8-wire for fixed Installation AWG 23/1, solid, PUR

IP 20

RJ45

- Connectors [on page B·1 8]
- System cables [on page B·1 12]
- Distribution modules and Outlets [on page B·1 22]

RJ45

IP 65 / IP 67

HARTING PushPull

- Connectors [on page B·1 24]
- System cables [on page B·1 26]
- Panel feed-throughs [on page B·1 32]
- Distribution modules and Outlets [on page B·1 34]

HARTING
PushPull**Han® PushPull**

- Connectors [on page B·1 36]
- System cables [on page B·1 44]
- Panel feed-throughs / Gender changer [on page B·1 48]

Han®
PushPull**Han® 3 A**

- Connectors [on page B·1 62]
- System cables [on page B·1 64]
- Panel feed-throughs [on page B·1 68]
- Distribution modules and Outlets [on page B·1 74]

Han® 3 A

Han® 3 A RJ45 Hybrid

- Connectors [on page B·1 78]
- System cables [on page B·1 80]
- Panel feed-throughs [on page B·1 82]
- Cables [on page B·1 84]

Han® 3 A
Hybrid**M12 D-coding**

- Connectors [on page B·1 86]
- System cables [on page B·1 88]
- Panel feed-throughs [on page B·1 94]

M12
D-coding**Cables**

- Type A, B, C [on page B·1 98]
- Type B, Outdoor [on page B·1 101]
- Ha-VIS EtherRail® [on page B·1 102]

Cables

Tools

[on page B·1 106]

Tools

<i>CONTENTS</i>	<i>PAGE</i>
Introduction	B-1 6
Cabling IP 20	
Connector sets	
HARTING RJ Industrial® Connector set, 4-pole	B-1 8
HARTING RJ Industrial® PN Cable jack, 4-pole	B-1 10
System cables	
HARTING RJ Industrial® System cable, 4-wire, straight	B-1 12
HARTING RJ Industrial® System cable, 4-wire, straight, second side open	B-1 14
HARTING RJ Industrial® System cable, 4-wire, angled, left/right	B-1 16
HARTING RJ Industrial® System cable, 4-wire, angled, top/bottom	B-1 18
HARTING RJ Industrial® System cable, 4-wire, angled, second side open	B-1 20
Distribution modules and Outlets	
HARTING Cabinet Outlet RJ45	B-1 22
Cabling IP 65 / IP 67	
HARTING PushPull	
Connector sets	
HARTING PushPull RJ45 Connector set, 4-pole	B-1 24
System cables	
HARTING PushPull RJ45 System cable, 4-wire, overmoulded	B-1 26
HARTING PushPull RJ45 System cable, 4-wire, angled, second side open	B-1 28
HARTING PushPull RJ45 System cable, 4-wire, to IP 20 (RJ45)	B-1 30
Panel feed-throughs	
HARTING PushPull RJ45 Panel feed-through	B-1 32

CONTENTS

PAGE

Distribution modules and Outlets

HARTING PushPull RJ45 Outlet	B·1 34
------------------------------	--------

Han® PushPull**Connector sets**

Han® PushPull RJ45 Connector set, 4-pole, plastic	B·1 36
Han® PushPull RJ45 Connector set, 4-pole, metal	B·1 38
Han® PushPull SCRJ Connector set, plastic	B·1 40
Han® PushPull SCRJ Connector set, metal	B·1 42

System cables

Han® PushPull RJ45 System cables, 4-wire	B·1 44
Han® PushPull SCRJ System cables, 4-wire	B·1 46

Panel feed-throughs / Gender Changer

Han® PushPull RJ45 Panel feed-throughs, , plastic	B·1 48
Han® PushPull RJ45 Panel feed-throughs, , metal	B·1 50
Han® PushPull SCRJ Panel feed-throughs, , plastic	B·1 54
Han® PushPull SCRJ Panel feed-throughs, , metal	B·1 56
Han® PushPull RJ45 Gender Changer, metal	B·1 58

Han® 3 A**Connector sets**

Han® 3 A RJ45 Connector set, 4-pole	B·1 62
-------------------------------------	--------

System cables

Han® 3 A RJ45 System cable, 4-wire	B·1 64
Han® 3 A RJ45 System cable, 4-wire , IP 65 / IP 67 to IP 20	B·1 66

Panel feed-throughs

Han® 3 A RJ45 Panel feed-through, Cat. 5	B·1 68
Han® 3 A RJ45 10G Panel feed-through, Cat. 6	B·1 70

<i>CONTENTS</i>	<i>PAGE</i>
Han® 3 A RJ45 Double-coupling	B·1 72
Distribution modules and Outlets	
Han® 3 A RJ45 Metal Outlet, Cat. 6	B·1 74
Han® 3 A RJ45 Metal Outlet, Cat. 5	B·1 75
Han® 3 A RJ45 Hybrid	
Connector sets	
Han® 3 A RJ45 Hybrid Connector set, 4-pole	B·1 78
System cables	
Han® 3 A RJ45 Hybrid System cable, 4-wire	B·1 80
Panel feed-throughs	
Han® 3 A RJ45 Hybrid Panel feed-through	B·1 82
Cables	
PROFINET Type B cable, Industrial Cat. 5 Hybrid cable, 4-wire + 4x Power	B·1 84
M12 D-coding	
Connector sets	
HARAX® M12 Connector D-coding, 4-pole	B·1 86
System cables	
Han® M12 System cable, 4-wire	B·1 88
Han® M12 System cable, 4-wire, second side open	B·1 89
Han® M12 System cable, 4-wire, angled	B·1 90
Han® M12 System cable, 4-wire, angled, second side open	B·1 91
Han® M12 System cable, 4-wire, to IP 20 (RJ45)	B·1 92
Additional technical information about overmoulded Han® M12 System cables	B·1 93
Panel feed-throughs	
Han® M12 Panel feed-through D-coding	B·1 94

*CONTENTS**PAGE***Cables**

PROFINET Type A cable Industrial Cat. 5 Standard cable, 4-wire	B-1 98
PROFINET Type B cable Industrial Cat. 5 stranded cable, 4-wire	B-1 99
SERCOS III Type B cable Industrial Cat. 5 stranded cable, 4-wire	B-1 99
PROFINET Type C cable Industrial Cat. 5 stranded cable, 4-wire useable as trailing cables	B-1 100
SERCOS III Type C cable Industrial Cat. 5 stranded cable, 4-wire useable as trailing cables	B-1 100
PROFINET Type B cable, outdoor Industrial Cat. 5 stranded cable, 4-wire, Outdoor	B-1 101
Ha-VIS EtherRail® cable, 4-wire, stranded	B-1 102
Ha-VIS EtherRail® cable, 4-wire, ultra flexible	B-1 103
Additional technical information about overmoulded System cables	B-1 104

Tools

HARTING RJ Industrial® Mounting tool	B-1 106
--------------------------------------	---------

Introduction

The chapter on „HARTING Ethernet Cabling – 4-wire” describes the complete HARTING product line for installing Ethernet cabling at machines, plants and production facilities in an industrial environment.

The product line includes:

- Four-wire cables for setting up flexible connections and for fixed installations.
- Connector components in IP 20 and IP 65 / IP 67 versions, designed for on-site assembly
- Assembled system cables in IP 20 and IP 65 / IP 67 versions
- Industrial outlets, Panel feed-throughs and adapters in IP 20 and IP 65 / IP 67 versions
- Accessories and tools

The four-wire cabling is specially designed for Ethernet transmission of data with a max. transmission rate of 100 Mbit/sec.

Data can be reliably transmitted at either 10 Mbit/sec. or 100 Mbit/sec., with the clear assignment of the four wires to the first, second, third and sixth contacts of the RJ45 connector.

This complies with the following specifications:

- 10 Mbit/sec. Ethernet, corresponding to 10Base-T
- 100 Mbit/sec. Ethernet, corresponding to 100Base-T (Fast Ethernet)

Cabling components based on the M12 D-coding system are also a part of the four-wire cable product line, since both RJ45 and M12 connectors are common in automation engineering.

In addition to IEEE 802.3 Ethernet, the following Ethernet-based Fieldbus applications, with or without real-time functionality, can be transmitted (not a complete listing):

- PROFINET (including PROFINET RT / real-time), according to IEC 61784-5-3
- EtherNet/IP
- Modbus/TCP
- Ethernet Powerlink
- SERCOS III

This type of cabling is driven by the progressive implementation of various Fieldbus systems on Ethernet platforms.

The special requirements placed on the cabling are often developed by manufacturing companies and user organizations. These requirements sometimes

contain specific characteristics for connecting applications and networks.

Withal these somewhat proprietary trends in development, there is also a movement towards international standardization, for example within the IEC SC65C committee. The key points, particularly for the field of cabling, are established in IEC 61918.

However the adoption of the ISO/IEC 24702 norm - for generic cabling in industrial buildings - ensures seamless communication between eight-wire building cabling and four-wire machinery-island cabling.

Essentially, all Ethernet-based Fieldbus systems are running on standard-compliant eight-wire cables, according to ISO/IEC 24702 Category 5 /Class D, or higher.

HARTING's four-wire cabling components are specified, developed and manufactured in technical compliance with the established requirements mentioned above.

Thus Harting provides the operator with a complete line of cabling products - products which are specially tailored to the requirements of Ethernet-based Fieldbus systems.

An overview of the advantages of four-wire cabling:

- PROFINET compliant cabling infrastructure - can be used for all PROFINET functions and conformance classes.
- Supports all safety features and real-time requirements of PROFINET.
- Can be extended and integrated to existing PROFINET infrastructures without difficulty.
- Compliance with the AIDA Directive (Automation Initiative of German Domestic Automobile Manufacturers) facilitates roll-outs within the automotive industry.
- The use of PROFINET compliant connectors reduces product variety and simplifies the purchasing and storage of components.
- Special solutions for simultaneous (hybrid) and separate transmission of power supplies extend the functionality of the network.
- Superior quality of the cabling system guarantees long life span and high operational reliability.
- Simple and convenient planning, installation and reliable operation of the network save costs and deliver a high ROI.
- The PROFINET cabling system is a part of HARTING's AUTOMATION IT network solution – all solutions coming from one source.

IP 20**RJ45**

- Connectors [on page B·1 8]
- System cables [on page B·1 12]
- Distribution modules and Outlets [on page B·1 22]

IP 65 / IP 67**HARTING PushPull**

- Connectors [on page B·1 24]
- System cables [on page B·1 26]
- Panel feed-throughs [on page B·1 32]
- Distribution modules and Outlets [on page B·1 34]

Han® PushPull

- Connectors [on page B·1 36]
- System cables [on page B·1 44]
- Panel feed-throughs / Gender Changer [on page B·1 48]

Han® 3 A

- Connectors [on page B·1 62]
- System cables [on page B·1 64]
- Panel feed-throughs [on page B·1 68]
- Distribution modules and Outlets [on page B·1 74]

Han® 3 A RJ45 Hybrid

- Connectors [on page B·1 78]
- System cables [on page B·1 80]
- Panel feed-throughs [on page B·1 82]
- Cables [on page B·1 84]

M12 D-coding

- Connectors [on page B·1 86]
- System cables [on page B·1 88]
- Panel feed-throughs [on page B·1 94]

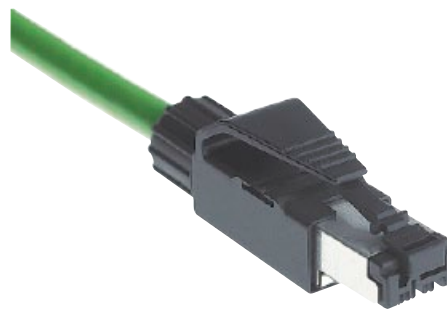
Cables

- Type A, B, C [on page B·1 98]
- Type B, Outdoor [on page B·1 101]
- Ha-VIS EtherRail [on page B·1 102]

Tools

[on page B·1 106]

Connector sets



HARTING RJ Industrial®
Connector set, 4-pole
to make up RJ45 system cables

IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector type	RJ45 connector acc. to IEC 60 603-7
Number of contacts	4
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Fully shielded, 360° shielding contact

Mounting	Field-assembly
Wire termination	Via IDC contacts, tool-less
Cable options	Suitable for solid and stranded cores
– Strand gauge	AWG 24/7 ... AWG 22/7 (stranded) AWG 23/1 ... AWG 22/1 (solid) AWG 26/7 (09 45 151 1109)
– Strand diameter	max. 1.6 mm (09 45 151 1100 / 09 45 151 1108) max. 1.2 mm (09 45 151 1109)
– Cable sheath diameter	6.1 mm ... 6.9 mm
Degree of protection	IP 20
Operating temperature range	–40 °C ... +70 °C
Housing material	Polyamide, UL94 V-0
Colour	Black

Advantages

RJ45 Ethernet-Data connector suitable for industry
Tool-less field-assembly with *HARAX*® rapid termination in IDC technology
Compact design
Ergonomical unlocking clip
Less weight assures shock- and vibration-resisting connection
Category of transmission Cat. 5
Suitable for termination of solid and stranded cables
Up to 10x reconductable
PROFINET compliant

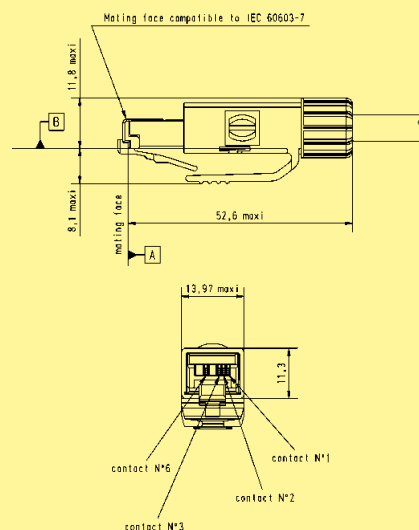
Identification	Part number	Drawing	Dimensions in mm
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HARTING RJ Industrial®
Connector set, 4-pole
 for AWG 24 ... AWG 22
 great package with 100 pieces

for AWG 26

09 45 151 1100
 09 45 151 1108
 09 45 151 1109

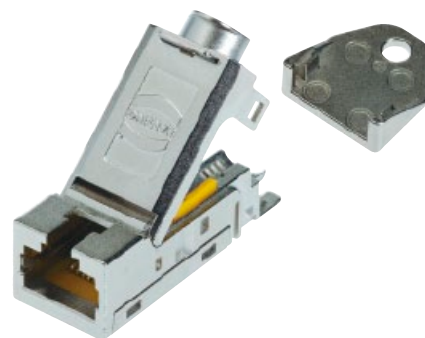
Set consists of:
 Housing including shielding
 splice element
 Cable gland
 Assembly instructions



RJ45

Connector sets

HARTING RJ Industrial® PN
Cable jack, 4-pole
to make up RJ45 system cables



IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector type	RJ45 connector acc. to IEC 60 603-7
Number of contacts	4
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Fully shielded, 360° shielding contact

Mounting	Field-assembly
Wire termination	Via IDC contacts, tool-less
Cable options	Suitable for solid and stranded cores
– Strand gauge	AWG 24 ... AWG 22 (solid / stranded)
– Strand diameter	max. 1.6 mm (incl. insulation)
– Cable sheath diameter	5 mm ... 9 mm
Degree of protection	IP 20
Operating temperature range	–40 °C ... +70 °C
Housing material	Zinc die-cast, nickel-plated

Advantages

Compact and robust design	
360° shielding	
Suitable for solid and stranded wires	
Field-assembly	
quick termination in IDC technology	
Compatible with HIFF dimensions for use in:	
• Han® 3 A series with HIFF adapter	09 45 515 0024
• HARTING PushPull (V4)	
Compact bulkhead mounting housing	09 45 545 0028
EasyInstall bulkhead mounting housing	09 45 545 0032
• Han® PushPull (V14)	
Panel feed-through plastic	09 35 012 0331
Panel feed-through metal rectangular	09 35 012 0311
Panel feed-through metal circular	09 35 012 0312
• har-port	09 45 452 0000

Identification

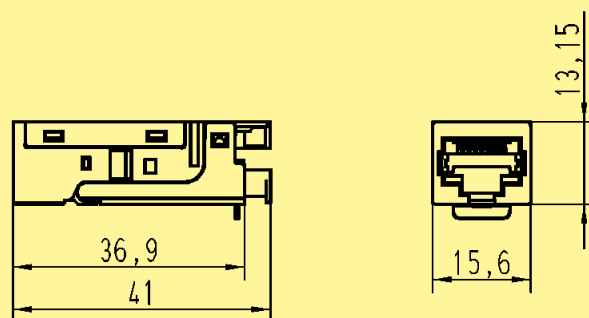
Part number

Drawing

Dimensions in mm

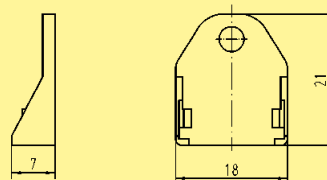
HARTING RJ Industrial® PN
Cable jack, 4-pole
for AWG 24 ... AWG 22

09 45 545 1120



Unlocking tool
for opening of the
HARTING RJ Industrial® cable jack

20 82 000 9916



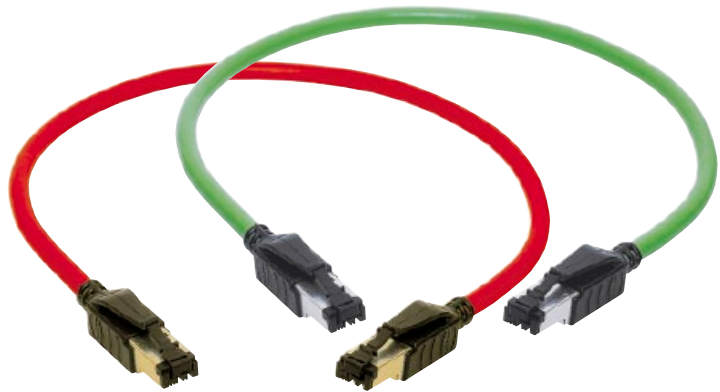
RJ45

HARTING Ethernet Cabling – 4-wire



System cables

HARTING RJ Industrial®
System cable, 4-wire, straight
RJ45 connection cable for control or
distributor cabinets or within controllers



IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector types RJ45, overmoulded

Cable types

Cable type	Type A	Type B	Type C
Cables	Copper, solid, shielded	Copper, stranded, shielded	Copper, stranded, shielded, useable as trailing cable
Wire gauge	4 x AWG 22/1	4 x AWG 22/7	4 x AWG 22/7
Sheath material	PVC	PVC	PUR
Operating temperature range	–40 °C ... +70 °C	–40 °C ... +70 °C	–40 °C ... +70 °C
Application PROFINET	Green	Green	Green
Application SERCOS III		Red	Red

Wiring	4-pole, 1:1 (RJ45 contacts 1/2 and 3/6)
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Standard lengths	1.5 m / 3 m / 5 m / 10 m / 20 m other lengths available on request

Advantages

Robust industrial design
Available also as Multiport version for especially space-critical
port configurations on switches or devices
PROFINET compliant
SERCOS III compliant

Identification	Part number		SERCOS III	
	Standard	Multiport		
HARTING RJ Industrial® System cable, 4-wire Type A	Length 1.5 m	09 45 771 0023	09 47 343 4006	
	Length 3.0 m	09 45 771 0025	09 47 343 4009	
	Length 5.0 m	09 45 771 0027	09 47 343 4012	
	Length 10.0 m	09 45 771 0051	09 47 343 4018	
	Length 20.0 m	09 45 771 0053	09 47 343 4020	
HARTING RJ Industrial® System cable, 4-wire Type B	Length 1.5 m	09 45 771 1123	09 47 343 4034	09 47 020 2003 018
	Length 3.0 m	09 45 771 1125	09 47 343 4037	09 47 020 2005 018
	Length 5.0 m	09 45 771 1127	09 47 343 4040	09 47 020 2007 018
	Length 10.0 m	09 45 771 1151	09 47 343 4046	09 47 020 2012 018
	Length 20.0 m	09 45 771 1153	09 47 343 4048	09 47 020 2014 018
HARTING RJ Industrial® System cable, 4-wire Type C	Length 1.5 m	09 45 771 1164	09 47 343 4090	09 47 020 2023 018
	Length 3.0 m	09 45 771 1166	09 47 343 4093	09 47 020 2025 018
	Length 5.0 m	09 45 771 1168	09 47 343 4096	09 47 020 2027 018
	Length 10.0 m	09 45 771 1173	09 47 343 4102	09 47 020 2032 018
	Length 20.0 m	09 45 771 1175	09 47 343 4104	09 47 020 2034 018



System cables



HARTING RJ Industrial®
System cable, 4-wire, straight
RJ45 connection cable, first end straight, second side open,
for control or distributor cabinets or within controllers

IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector types RJ45, overmoulded

Cable types

Cable type	Type A	Type B	Type C	Outdoor
Cables	Copper, solid, shielded	Copper, stranded, shielded	Copper, stranded, shielded, useable as trailing cable	Copper, stranded, shielded
Wire gauge	4 x AWG 22/1	4 x AWG 22/7	4 x AWG 22/7	4 x AWG 22/7
Sheath material	PVC	PVC	PUR	PVC
Operating temperature range	–40 °C ... +70 °C	–40 °C ... +70 °C	–40 °C ... +70 °C	–45 °C ... +60 °C
Application PROFINET	Green	Green	Green	Black

Wiring	4-pole, 1:1 (RJ45 contacts 1/2 and 3/6)
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Standard lengths	1.5 m / 2 m / 3 m / 5 m other lengths available on request
Advantages	Robust industrial design For especially space-saving cabling PROFINET compliant

Identification

Part number

HARTING RJ Industrial® System cable, angled, 4-wire

one side pre-assembled,
second side open

Type A

Length 1.5 m

09 45 771 0064

Length 3.0 m

09 45 771 0066

Length 5.0 m

09 45 771 0068

Length 10.0 m

09 45 771 0073

Length 20.0 m

09 45 771 0075

HARTING RJ Industrial® System cable, angled, 4-wire

one side pre-assembled,
second side open

Type B

Length 1.5 m

09 45 771 0123

Length 3.0 m

09 45 771 0125

Length 5.0 m

09 45 771 0127

Length 10.0 m

09 45 771 0151

Length 20.0 m

09 45 771 0153

HARTING RJ Industrial® System cable, angled, 4-wire

one side pre-assembled,
second side open

Type C

Length 1.5 m

09 45 771 0164

Length 3.0 m

09 45 771 0166

Length 5.0 m

09 45 771 0168

Length 10.0 m

09 45 771 0173

Length 20.0 m

09 45 771 0175

HARTING RJ Industrial® System cable, angled, 4-wire

one side pre-assembled,
second side open

Outdoor

Length 1.5 m

09 45 771 0102

Length 3.0 m

09 45 771 0104

Length 5.0 m

09 45 771 0106

Length 10.0 m

09 45 771 0111

Length 20.0 m

09 45 771 0113



System cables



HARTING RJ Industrial®
System cable, 4-wire, angled
RJ45 connection cable, angled left to angled right,
for control or distributor cabinets or within controllers

IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector types RJ45, overmoulded

Cable types

Cable type	Type A	Type B	Type C	Outdoor
Cables	Copper, solid, shielded	Copper, stranded, shielded	Copper, stranded, shielded, useable as trailing cable	Copper, stranded, shielded
Wire gauge	4 x AWG 22/1	4 x AWG 22/7	4 x AWG 22/7	4 x AWG 22/7
Sheath material	PVC	PVC	PUR	PVC
Operating temperature range	–40 °C ... +70 °C	–40 °C ... +70 °C	–40 °C ... +70 °C	–45 °C ... +60 °C
Application PROFINET	Green	Green	Green	Black

Wiring	4-pole, 1:1 (RJ45 contacts 1/2 and 3/6)
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Standard lengths	1.5 m / 3 m / 5 m / 10 m / 20 m other lengths available on request
Advantages	Robust industrial design For especially space-saving cabling PROFINET compliant

Identification

Part number

HARTING RJ Industrial®
 System cable, angled,
 4-wire

 Type A,
 angled left to angled right

Length 0.5 m	09 47 050 6001
Length 1.0 m	09 47 050 6002
Length 1.5 m	09 47 050 6003
Length 2.0 m	09 47 050 6004
Length 3.0 m	09 47 050 6005
Length 5.0 m	09 47 050 6007

HARTING RJ Industrial®
 System cable, angled,
 4-wire

 Type B,
 angled left to angled right

Length 0.5 m	09 47 050 6023
Length 1.0 m	09 47 050 6024
Length 1.5 m	09 47 050 6025
Length 2.0 m	09 47 050 6026
Length 3.0 m	09 47 050 6027
Length 5.0 m	09 47 050 6029

HARTING RJ Industrial®
 System cable, angled,
 4-wire

 Type C,
 angled left to angled right

Length 0.5 m	09 47 050 6045
Length 1.0 m	09 47 050 6046
Length 1.5 m	09 47 050 6047
Length 2.0 m	09 47 050 6048
Length 3.0 m	09 47 050 6049
Length 5.0 m	09 47 050 6051

HARTING RJ Industrial®
 System cable, angled,
 4-wire

 Outdoor,
 angled left to angled right

Length 0.5 m	09 47 050 6067
Length 1.0 m	09 47 050 6068
Length 1.5 m	09 47 050 6069
Length 2.0 m	09 47 050 6070
Length 3.0 m	09 47 050 6071
Length 5.0 m	09 47 050 6073

System cables

HARTING RJ Industrial® System cable, 4-wire, angled

RJ45 connection cable, angled top to angled bottom,
for control or distributor cabinets or within controllers



IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector types RJ45, overmoulded

Cable types

Cable type	Type A	Type B	Type C	Outdoor
Cables	Copper, solid, shielded	Copper, stranded, shielded	Copper, stranded, shielded, useable as trailing cable	Copper, stranded, shielded
Wire gauge	4 x AWG 22/1	4 x AWG 22/7	4 x AWG 22/7	4 x AWG 22/7
Sheath material	PVC	PVC	PUR	PVC
Operating temperature range	–40 °C ... +70 °C	–40 °C ... +70 °C	–40 °C ... +70 °C	–45 °C ... +60 °C
Application PROFINET	Green	Green	Green	Black

Wiring	4-pole, 1:1 (RJ45 contacts 1/2 and 3/6)
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Standard lengths	0.5 m / 1 m / 1.5 m / 2 m / 3 m / 5 m other lengths available on request

Advantages

Robust industrial design
For especially space-saving cabling
PROFINET compliant

Identification	Part number	
HARTING RJ Industrial® System cable, angled, 4-wire Type A, angeld top to angled bottom		
Length 0.5 m	09 47 030 4001	
Length 1.0 m	09 47 030 4002	
Length 1.5 m	09 47 030 4003	
Length 2.0 m	09 47 030 4004	
Length 3.0 m	09 47 030 4005	
Length 5.0 m	09 47 030 4007	
HARTING RJ Industrial® System cable, angled, 4-wire Type B, angeld top to angled bottom		
Length 0.5 m	09 47 030 4023	
Length 1.0 m	09 47 030 4024	
Length 1.5 m	09 47 030 4025	
Length 2.0 m	09 47 030 4026	
Length 3.0 m	09 47 030 4027	
Length 5.0 m	09 47 030 4029	
HARTING RJ Industrial® System cable, angled, 4-wire Type C, angeld top to angled bottom		
Length 0.5 m	09 47 030 4045	
Length 1.0 m	09 47 030 4046	
Length 1.5 m	09 47 030 4047	
Length 2.0 m	09 47 030 4048	
Length 3.0 m	09 47 030 4049	
Length 5.0 m	09 47 030 4051	
HARTING RJ Industrial® System cable, angled, 4-wire Outdoor, angeld top to angled bottom		
Length 0.5 m	09 47 030 4067	
Length 1.0 m	09 47 030 4068	
Length 1.5 m	09 47 030 4069	
Length 2.0 m	09 47 030 4070	
Length 3.0 m	09 47 030 4071	
Length 5.0 m	09 47 030 4073	

HARTING Ethernet Cabling – 4-wire



System cables



HARTING RJ Industrial® System cable, 4-wire, angled

RJ45 connection cable, first end angled, second side open,
for control or distributor cabinets or within controllers

IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector types RJ45, overmoulded, one side pre-assembled

Cable types

Cable type	Type A	Type B	Type C	Outdoor
Cables	Copper, solid, shielded	Copper, stranded, shielded	Copper, stranded, shielded, useable as trailing cable	Copper, stranded, shielded
Wire gauge	4 x AWG 22/1	4 x AWG 22/7	4 x AWG 22/7	4 x AWG 22/7
Sheath material	PVC	PVC	PUR	PVC
Operating temperature range	–40 °C ... +70 °C	–40 °C ... +70 °C	–40 °C ... +70 °C	–45 °C ... +60 °C
Application PROFINET	Green	Green	Green	Black

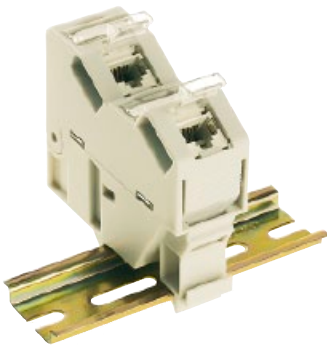
Wiring	First end 4-pole, (RJ45 contacts 1/2 and 3/6), other side open
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Standard lengths	0.5 m / 1 m / 1.5 m / 2 m / 3 m / 5 m other lengths available on request

Advantages

Robust industrial design
For especially space-saving cabling
Exact length can be customised
HARTING RJ Industrial® connector (09 45 151 1100) as ideal completion
PROFINET compliant

Identification		Part number			
		180°	0°	270°	90°
HARTING RJ Industrial® System cable angled, 4-wire one side pre-assembled, second side open Type A					
Length 0.5 m		09 47 050 0001	09 47 060 0001	09 47 030 0001	09 47 040 0001
Length 1.0 m		09 47 050 0002	09 47 060 0002	09 47 030 0002	09 47 040 0002
Length 1.5 m		09 47 050 0003	09 47 060 0003	09 47 030 0003	09 47 040 0003
Length 2.0 m		09 47 050 0004	09 47 060 0004	09 47 030 0004	09 47 040 0004
Length 3.0 m		09 47 050 0005	09 47 060 0005	09 47 030 0005	09 47 040 0005
Length 5.0 m		09 47 050 0007	09 47 060 0007	09 47 030 0007	09 47 040 0007
HARTING RJ Industrial® System cable angled, 4-wire one side pre-assembled, second side open Type B					
Length 0.5 m		09 47 050 0023	09 47 060 0023	09 47 030 0023	09 47 040 0023
Length 1.0 m		09 47 050 0024	09 47 060 0024	09 47 030 0024	09 47 040 0024
Length 1.5 m		09 47 050 0025	09 47 060 0025	09 47 030 0025	09 47 040 0025
Length 2.0 m		09 47 050 0026	09 47 060 0026	09 47 030 0026	09 47 040 0026
Length 3.0 m		09 47 050 0027	09 47 060 0027	09 47 030 0027	09 47 040 0027
Length 5.0 m		09 47 050 0029	09 47 060 0029	09 47 030 0029	09 47 040 0029
HARTING RJ Industrial® System cable angled, 4-wire one side pre-assembled, second side open Type C					
Length 0.5 m		09 47 050 0045	09 47 060 0045	09 47 030 0045	09 47 040 0045
Length 1.0 m		09 47 050 0046	09 47 060 0046	09 47 030 0046	09 47 040 0046
Length 1.5 m		09 47 050 0047	09 47 060 0047	09 47 030 0047	09 47 040 0047
Length 2.0 m		09 47 050 0048	09 47 060 0048	09 47 030 0048	09 47 040 0048
Length 3.0 m		09 47 050 0049	09 47 060 0049	09 47 030 0049	09 47 040 0049
Length 5.0 m		09 47 050 0051	09 47 060 0051	09 47 030 0051	09 47 040 0051
HARTING RJ Industrial® System cable angled, 4-wire one side pre-assembled, second side open Outdoor					
Length 0.5 m		09 47 050 0067	09 47 060 0067	09 47 030 0067	09 47 040 0067
Length 1.0 m		09 47 050 0068	09 47 060 0068	09 47 030 0068	09 47 040 0068
Length 1.5 m		09 47 050 0069	09 47 060 0069	09 47 030 0069	09 47 040 0069
Length 2.0 m		09 47 050 0070	09 47 060 0070	09 47 030 0070	09 47 040 0070
Length 3.0 m		09 47 050 0071	09 47 060 0071	09 47 030 0071	09 47 040 0071
Length 5.0 m		09 47 050 0073	09 47 060 0073	09 47 030 0073	09 47 040 0073

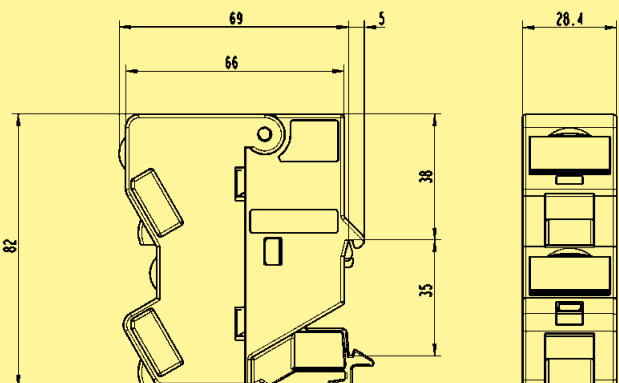
Distribution modules and Outlets



HARTING Cabinet Outlet RJ45, 8-poles
RJ45 distribution module for IP 20 environments (top-hat rail mounting)

IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Number of ports, Copper / Termination	2 / RJ45 (Twisted Pair)
Transmission performance	Category 6 / Class E up to 250 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Termination	Via IDC contacts, tool-less
Strand diameter	AWG 24 ... 22 (0.5 mm ... 0.65 mm) solid and stranded
Strand insulation	0.7 mm ... 1.6 mm
Cable diameter	6 mm ... 9 mm
Shielding	Fully shielded, 360° shielding contact
Mounting	To 35 mm top-hat mounting rail acc. to DIN EN 60 715, alignable
Dimensions (H x W x D)	82 x 28.4 x 74 mm
Degree of protection	IP 20
Operating temperature range	–20 °C ... +70 °C
Housing material	Polycarbonate, UL94 V-0
Colour	Grey
Advantages	Simple mounting Cable entering optionally from bottom or from top side Dust protection caps Port identification Angled outputs

Identification	Part number	Drawing	Dimensions in mm
HARTING Cabinet Outlet RJ45 consisting of: 2-port housing with dust protection caps and labels 2x RJ45 female module, Cat. 6 Assembly instructions	20 76 102 8000		

IP 20**RJ45**

- Connectors [on page B·1 8]
- System cables [on page B·1 12]
- Distribution modules and Outlets [on page B·1 22]

IP 65 / IP 67**HARTING PushPull**

- Connectors [on page B·1 24]
- System cables [on page B·1 26]
- Panel feed-throughs [on page B·1 32]
- Distribution modules and Outlets [on page B·1 34]

Han® PushPull

- Connectors [on page B·1 36]
- System cables [on page B·1 44]
- Panel feed-throughs / Gender Changer [on page B·1 48]

Han® 3 A

- Connectors [on page B·1 62]
- System cables [on page B·1 64]
- Panel feed-throughs [on page B·1 68]
- Distribution modules and Outlets [on page B·1 74]

Han® 3 A RJ45 Hybrid

- Connectors [on page B·1 78]
- System cables [on page B·1 80]
- Panel feed-throughs [on page B·1 82]
- Cables [on page B·1 84]

M12 D-coding

- Connectors [on page B·1 86]
- System cables [on page B·1 88]
- Panel feed-throughs [on page B·1 94]

Cables

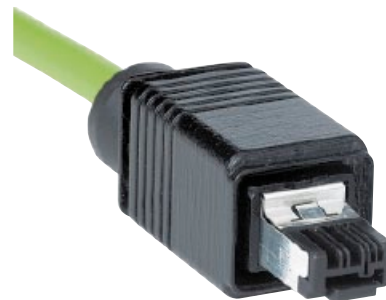
- Type A, B, C [on page B·1 98]
- Type B, Outdoor [on page B·1 101]
- Ha-VIS EtherRail [on page B·1 102]

Tools

[on page B·1 106]

Connector sets

HARTING PushPull RJ45
Connector set, 4-pole
to make up HARTING PushPull system cables RJ45



IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector type	HARTING PushPull RJ45 connector acc. to ISO/IEC 24 702, variant 4							
Number of contacts	4							
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1							
Transmission rate	10/100 Mbit/s							
Shielding	fully shielded, 360° shielding contact							
Mounting	Field-assembly							
Wire termination	via IDC contacts, tool-less							
Cable options								
– Strand gauge	AWG 24/7 ... AWG 22/7 (stranded) AWG 23/1 ... AWG 22/1 (solid)							
– Strand diameter	max. 1.6 mm							
– Cable sheath diameter	4.9 mm ... 8.6 mm							
Degree of protection	IP 65 / IP 67							
Operating temperature range	–40 °C ... +70 °C							
Housing material	Polyamide and polycarbonate, UL94 V-0							
Colour	Black							
Advantages	Tool-less field-assembly with <i>HARAX</i>® rapid termination in IDC technology Suitable for termination of solid and stranded cables Up to 10x reductable Space-saving IP 65 / IP 67 interface Easy handling IP 65 / IP 67 standard interface for structured cabling in buildings according to ISO/IEC 24 702 respectively EN 50 173-3							

Identification	Part number	Drawing	Dimensions in mm
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HARTING PushPull RJ45 Connector set, 4-pole

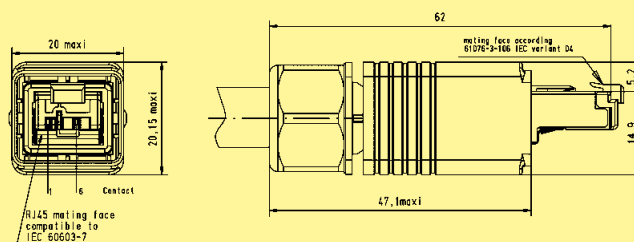
plastic

09 45 145 1100

metal

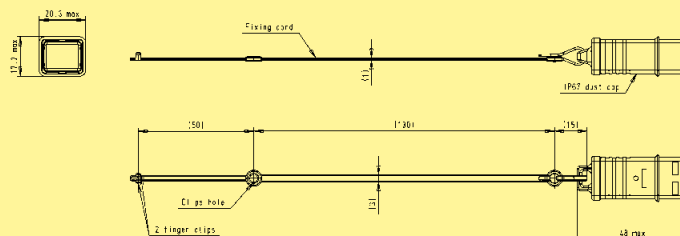
09 45 195 1100

Set consists of:
PushPull housing with RJ45 connector and shielding
Cable gland
Assembly instructions



Protection cover for PushPull connectors

09 45 845 0010



System cables



HARTING PushPull RJ45

System cable, 4-wire

RJ45 connection cable, PushPull, overmoulded, for IP 65 / IP 67 applications

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector types HARTING PushPull RJ45, overmoulded

Cable types

Cable type	Type A	Type B	Type C	Outdoor
Cables	Copper, solid, shielded	Copper, stranded, shielded	Copper, stranded, shielded, useable as trailing cable	Copper, stranded, shielded
Wire gauge	4 x AWG 22/1	4 x AWG 22/7	4 x AWG 22/7	4 x AWG 22/7
Sheath material	PVC	PVC	PUR	PVC
Operating temperature range	–40 °C ... +70 °C	–40 °C ... +70 °C	–40 °C ... +70 °C	–45 °C ... +60 °C
Application PROFINET	Green	Green	Green	Black

Wiring 4-poles (RJ45 contacts 1/2 and 3/6)

Transmission performance Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1

Transmission rate 10/100 Mbit/s

Shielding Fully shielded, 360° shielding contact

Standard lengths 1.5 m / 3 m / 5 m / 10 m / 20 m
other lengths available on request

Advantages

Space-saving IP 65 / IP 67 interface

Protected cable duct via overmoulding

Easy handling

IP 65 / IP 67 standard interface for structured cabling in buildings according to ISO/IEC 24 702 respectively EN 50 173-3

Identification

Part number

HARTING PushPull RJ45
 System cable, 4-wire
 Type A

Length 1.5 m	09 47 363 6003
Length 3.0 m	09 47 363 6005
Length 5.0 m	09 47 363 6007
Length 10.0 m	09 47 363 6012
Length 20.0 m	09 47 363 6014

HARTING PushPull RJ45
 System cable, 4-wire
 Type B

Length 1.5 m	09 47 363 6025
Length 3.0 m	09 47 363 6027
Length 5.0 m	09 47 363 6029
Length 10.0 m	09 47 363 6034
Length 20.0 m	09 47 363 6036

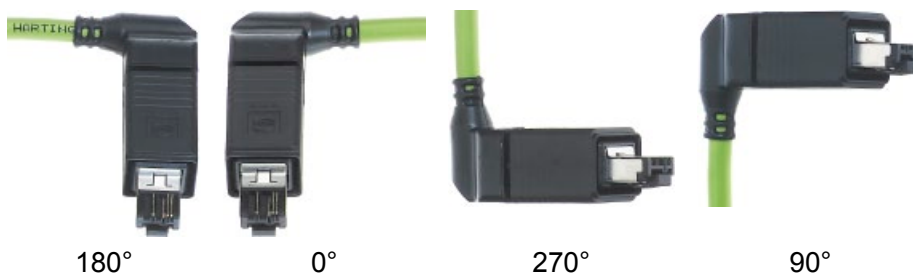
HARTING PushPull RJ45
 System cable, 4-wire
 Type C

Length 1.5 m	09 47 363 6047
Length 3.0 m	09 47 363 6049
Length 5.0 m	09 47 363 6051
Length 10.0 m	09 47 363 6056
Length 20.0 m	09 47 363 6058

HARTING PushPull RJ45
 System cable, 4-wire
 Outdoor

Length 1.5 m	09 47 363 6069
Length 3.0 m	09 47 363 6071
Length 5.0 m	09 47 363 6073
Length 10.0 m	09 47 363 6078
Length 20.0 m	09 47 363 6080

System cables



HARTING PushPull RJ45
System cable, angled,
4-wire

RJ45 connection cable, PushPull, for IP 65 / IP 67 applications,
first end angled, second side open,

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector types HARTING PushPull RJ45, overmoulded, angled,
one side pre-assembled

Cable types

Cable type	Type A	Type B	Type C	Outdoor
Cables	Copper, solid, shielded	Copper, stranded, shielded	Copper, stranded, shielded, useable as trailing cable	Copper, stranded, shielded
Wire gauge	4 x AWG 22/1	4 x AWG 22/7	4 x AWG 22/7	4 x AWG 22/7
Sheath material	PVC	PVC	PUR	PVC
Operating temperature range	–40 °C ... +70 °C	–40 °C ... +70 °C	–40 °C ... +70 °C	–45 °C ... +60 °C
Application PROFINET	Green	Green	Green	Black

Wiring 4-poles (RJ45 contacts 1/2 and 3/6)
Transmission performance Category 5 / Class D up to 100 MHz
according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate 10/100 Mbit/s
Shielding Fully shielded, 360° shielding contact

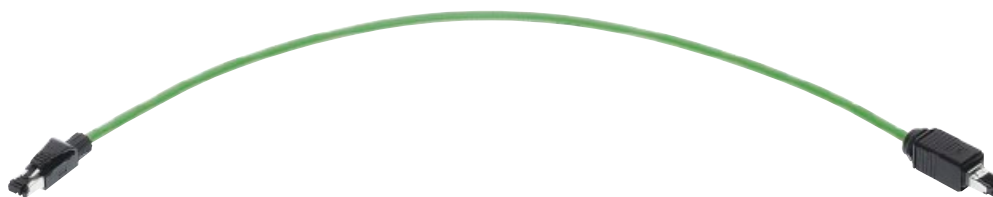
Standard lengths 1.5 m / 3 m / 5 m / 10 m / 20 m
other lengths available on request

Advantages

Robust cable duct via overmoulding
For especially space-saving cabling
Exact length can be customised
HARTING RJ Industrial® connector (09 45 151 1100) as ideal
completion
IP 65 / IP 67 standard interface for structured cabling in
buildings according to ISO/IEC 24 702 respectively EN 50 173-3

Identification	Part number 180°	0°	270°	90°
HARTING PushPull RJ45 System cable, angled, 4-wire one side pre-assembled, second side open Type A				
Length 1.5 m	09 47 390 0003	09 47 400 0003	09 47 370 0003	09 47 380 0003
Length 3.0 m	09 47 390 0005	09 47 400 0005	09 47 370 0005	09 47 380 0005
Length 5.0 m	09 47 390 0007	09 47 400 0007	09 47 370 0007	09 47 380 0007
Length 10.0 m	09 47 390 0012	09 47 400 0012	09 47 370 0012	09 47 380 0012
Length 20.0 m	09 47 390 0014	09 47 400 0014	09 47 370 0014	09 47 380 0014
HARTING PushPull RJ45 System cable, angled, 4-wire one side pre-assembled, second side open Type B				
Length 1.5 m	09 47 390 0025	09 47 400 0025	09 47 370 0025	09 47 380 0025
Length 3.0 m	09 47 390 0027	09 47 400 0027	09 47 370 0027	09 47 380 0027
Length 5.0 m	09 47 390 0029	09 47 400 0029	09 47 370 0029	09 47 380 0029
Length 10.0 m	09 47 390 0034	09 47 400 0034	09 47 370 0034	09 47 380 0034
Length 20.0 m	09 47 390 0036	09 47 400 0036	09 47 370 0036	09 47 380 0036
HARTING PushPull RJ45 System cable, angled, 4-wire one side pre-assembled, second side open Type C				
Length 1.5 m	09 47 390 0047	09 47 400 0047	09 47 370 0047	09 47 380 0047
Length 3.0 m	09 47 390 0049	09 47 400 0049	09 47 370 0049	09 47 380 0049
Length 5.0 m	09 47 390 0051	09 47 400 0051	09 47 370 0051	09 47 380 0051
Length 10.0 m	09 47 390 0056	09 47 400 0056	09 47 370 0056	09 47 380 0056
Length 20.0 m	09 47 390 0058	09 47 400 0058	09 47 370 0058	09 47 380 0058
HARTING PushPull RJ45 System cable, angled, 4-wire one side pre-assembled, second side open Outdoor				
Length 1.5 m	09 47 390 0069	09 47 400 0069	09 47 370 0069	09 47 380 0069
Length 3.0 m	09 47 390 0071	09 47 400 0071	09 47 370 0071	09 47 380 0071
Length 5.0 m	09 47 390 0073	09 47 400 0073	09 47 370 0073	09 47 380 0073
Length 10.0 m	09 47 390 0078	09 47 400 0078	09 47 370 0078	09 47 380 0078
Length 20.0 m	09 47 390 0080	09 47 400 0080	09 47 370 0080	09 47 380 0080

System cables



HARTING PushPull RJ45

System cable, 4-wire

RJ45 connection cable, PushPull, to RJ45 IP 20

IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☒	Cat. 5	☒	Cat. 6	☐
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Connector types HARTING PushPull RJ45 and RJ45 IP 20

Cable types

Cable type	Type A	Type B	Type C
Cables	Copper, solid, shielded	Copper, stranded, shielded	Copper, stranded, shielded, useable as trailing cable
Wire gauge	4 x AWG 22/1	4 x AWG 22/7	4 x AWG 22/7
Sheath material	PVC	PVC	PUR
Operating temperature range	–40 °C ... +70 °C	–40 °C ... +70 °C	–40 °C ... +70 °C
Application PROFINET	Green	Green	Green

Wiring 4-poles (RJ45 contacts 1/2 and 3/6)

Transmission performance Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1

Transmission rate 10/100 Mbit/s

Shielding Fully shielded, 360° shielding contact

Standard lengths 1.5 m / 3 m / 5 m / 10 m / 20 m
other lengths available on request

Advantages

Space-saving IP 65 / IP 67 interface

Easy change-over from harsh industrial environment to protected IP 20 environment

Easy handling for all applications

Identification

Part number

HARTING PushPull RJ45
System cable, 4-wire
Type A

Length 1.5 m	09 45 701 1123
Length 3.0 m	09 45 701 1125
Length 5.0 m	09 45 701 1127
Length 10.0 m	09 45 701 1151
Length 20.0 m	09 45 701 1153

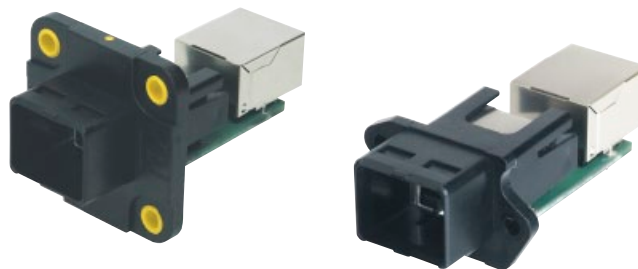
HARTING PushPull RJ45
System cable, 4-wire
Type B

Length 1.5 m	09 45 701 1164
Length 3.0 m	09 45 701 1166
Length 5.0 m	09 45 701 1168
Length 10.0 m	09 45 701 1173
Length 20.0 m	09 45 701 1175

HARTING PushPull RJ45
System cable, 4-wire
Type C

Length 1.5 m	09 45 701 0023
Length 3.0 m	09 45 701 0025
Length 5.0 m	09 45 701 0027
Length 10.0 m	09 45 701 0051
Length 20.0 m	09 45 701 0053

Panel feed-throughs



HARTING PushPull RJ45 Panel feed-through, 8-poles

RJ45 Panel feed-through for control or distributor cabinets

IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☒	Cat. 5	☒	Cat. 6	☐
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Number of ports, Copper / Termination	2 / 1x RJ45 (IP 20) 1x HARTING PushPull RJ45 (IP 65 / IP 67)
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Mounting	Screwable to steel plate covers
Dimensions	See drawing
Panel cut-out	21 mm x 27 mm (Compact) ø 28 mm ... 30 mm (EasyInstall)
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +70 °C
Plastic version	
Housing material	Polycarbonate, UL94 V-0
Colour	Black
Metal version Standard	
Housing material	Zinc, die-cast
Colour	Metallic
Advantages	Small, space-saving PushPull interface with IP 65 / IP 67 Easy handling of RJ45 system cables in the control cabinet Mounting to casings Category of transmission Cat. 5 IP 65 / IP 67 standard interface for structured cabling in buildings according to ISO/IEC 24 702 respectively EN 50 173-3

HARTING PushPull

Distribution modules and Outlets

HARTING PushPull RJ45

Outlet, 8-poles

RJ45 Industrial Outlet for IP 65 / IP 67 environments



IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Number of ports, Copper / Termination	2 / HARTING PushPull RJ45 (IP 65 / IP 67)
Transmission performance	Category 6 / Class E up to 250 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Termination	Via IDC contacts, tool-less
Wire gauge	AWG 24 ... 22 (0.25 mm ² ... 0.34 mm ²) solid and stranded
Strand diameter	0.7 mm ... 1.6 mm
Cable diameter	6 mm ... 9 mm
Shielding	Fully shielded, 360° shielding contact

Mounting	Wall mounting
Dimensions (H x W x D)	152 x 90 x 69 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	-20 °C ... +70 °C
Housing material	Polycarbonate, UL94 V-0
Colour	Black (similar RAL 9011) or White (similar RAL 9010)

Advantages

Simple mounting
 Cable entering optionally from bottom or from top side
 Self-closing protection caps in IP 65 / IP 67
 IP 65 / IP 67 label

Identification	Part number	Drawing	Dimensions in mm
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HARTING PushPull RJ45 Outlet

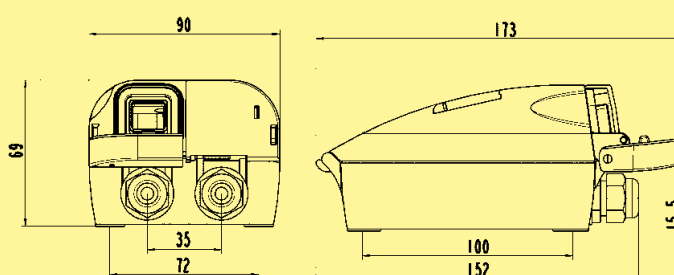
Black

white

09 45 845 1500

09 45 845 1501

consisting of:
 2-port outlet housing with protection caps, cable management, cable glands and label
 2x RJ45 female modules, Category 6
 1x blind plug (if only 1 cable is used)
 Assembly instructions



IP 20**RJ45**

- Connectors [on page B·1 8]
- System cables [on page B·1 12]
- Distribution modules and Outlets [on page B·1 22]

IP 65 / IP 67**HARTING PushPull**

- Connectors [on page B·1 24]
- System cables [on page B·1 26]
- Panel feed-throughs [on page B·1 32]
- Distribution modules and Outlets [on page B·1 34]

Han® PushPull

- Connectors [on page B·1 36]
- System cables [on page B·1 44]
- Panel feed-throughs / Gender Changer [on page B·1 48]

Han® 3 A

- Connectors [on page B·1 62]
- System cables [on page B·1 64]
- Panel feed-throughs [on page B·1 68]
- Distribution modules and Outlets [on page B·1 74]

Han® 3 A RJ45 Hybrid

- Connectors [on page B·1 78]
- System cables [on page B·1 80]
- Panel feed-throughs [on page B·1 82]
- Cables [on page B·1 84]

M12 D-coding

- Connectors [on page B·1 86]
- System cables [on page B·1 88]
- Panel feed-throughs [on page B·1 94]

Cables

- Type A, B, C [on page B·1 98]
- Type B, Outdoor [on page B·1 101]
- Ha-VIS EtherRail [on page B·1 102]

Tools

[on page B·1 106]

Connector sets

Han® PushPull RJ45
Connector set, 4-pole, plastic
to make up Han® PushPull system cables RJ45



IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector type	Han® PushPull RJ45 connector acc. to ISO/IEC 24 702
Locking	PushPull technology according to IEC 61 076-3-117, variant 14
Number of contacts	4
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Mounting	Field-assembly
Wire termination	Via IDC contacts, tool-less
Cable options	Suitable for solid and stranded cores
– Strand gauge	AWG 24/7 ... AWG 22/7 (stranded) AWG 23/1 ... AWG 22/1 (solid)
– Strand diameter	max. 1.6 mm
– Cable sheath diameter	5 mm ... 9.5 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +70 °C
Housing material	Polyamide, UL94 V-0
Colour	Black

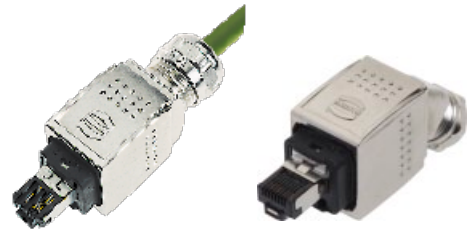
Advantages Field-assembly connector, IP 65 / IP 67
Category of transmission Cat. 5

Mounting information Tool-less field-assembly with *HARAX*® rapid termination in
IDC technology
Up to 10x reconductable
PROFINET compliant
AIDA compliant

Identification	Part number	Drawing	Dimensions in mm
Han® PushPull RJ45 connector set Plastic Set consists of: PushPull housing with male insert HARTING RJ Industrial® Category 5, 4-pole, IDC contact and shielding Cable gland Assembly instructions clamp range 6.5 mm ... 9.5 mm clamp range 5 mm ... 8 mm	 09 35 221 0421 09 35 222 0421		
Han® PushPull RJ45 PN connector set Plastic Set consists of: PushPull housing with male insert HARTING RJ Industrial® Category 5, 4-pole, IDC contact and shielding Cable gland Assembly instructions clamp range 6.5 mm ... 9.5 mm PROFINET identification: PROFINET O-Plug RJ45	 09 35 226 0421		
Protection Cover IP 65 / IP 67 IP 40	 09 35 002 5411 09 35 002 5412		

Connector sets

Han® PushPull RJ45
Connector set, 4-pole, metal
to make up Han® PushPull RJ45 system cables



IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector type	Han® PushPull RJ45 connector acc. to ISO/IEC 24 702
Locking	PushPull technology according to IEC 61 076-3-117, variant 14
Number of contacts	4
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Mounting	Field-assembly
Wire termination	Via IDC contacts, tool-less
Cable options	Suitable for solid and stranded cores
– Strand gauge	AWG 24/7 ... AWG 22/7 (stranded) AWG 23/1 ... AWG 22/1 (solid)
– Strand diameter	max. 1.6 mm
– Cable sheath diameter	4 mm ... 11 mm (straight) 6.5 mm ... 9.5 mm (angled)
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +70 °C
Housing material	Zinc die-cast
Colour	Nickel-plated

Advantages Field-assembly connector, IP 65 / IP 67
Category of transmission Cat. 5

Mounting information Tool-less field-assembly with *HARAX*® rapid termination in IDC technology
Up to 10x reconductable
PROFINET compliant
AIDA compliant

**Han®
PushPull**

Connector sets

Han® PushPull Connector set
SCRJ, plastic
to make up Han® PushPull system cables SCRJ



IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☐
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Connector type	Han® PushPull SCRJ connector according to IEC 61 754-24
Locking	PushPull technology according to IEC 61 076-3-117, variant 14
Number of fibres	2
Transmission performance	Depends on the fibre type used
Fibre types	Glass fibre MM 50 / 125 µm and 62.5 / 125 µm Glass fibre SM 10 / 125 µm POF ¹⁾ 1 mm HCS ²⁾ 200 µm / 230 µm
Mounting	Field-assembly via SC contacts
Cable options	
– Cable sheath diameter	6.5 mm ... 9.5 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +70 °C
Housing material	Polyamide, UL94 V-0
Colour	Black

Advantages	Field-assembly F.O. connector, IP 65 / IP 67 PROFINET compliant AIDA compliant
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¹⁾ POF = Polymer-Optical Fibre
²⁾ HCS® = Hard Clad Silica (registered trademark of SpecTran Corporation)

Identification	Part number	Drawing	Dimensions in mm
Han® PushPull SCRJ Connector set Plastic Set consists of: PushPull housing with SCRJ feeding Cable gland Assembly instructions SC POF ¹⁾ contact 1 mm PROFINET identification: PROFINET O-Plug SCRJ	09 35 241 0421		
Set consists of: PushPull housing with SCRJ feeding Cable gland Assembly instructions	09 35 241 0422		
SC contacts order separately			
Set consists of: housing IP 20 with SCRJ feeding SC POF ¹⁾ contact 1 mm	09 35 002 4002		
Contacts SC POF ¹⁾ contact, 1 mm SC 125 GI contact SC 230 HCS ²⁾ contact	20 10 001 5217 20 10 125 5211 20 10 230 5211		

¹⁾ POF = Polymer-Optical Fibre
²⁾ HCS® = Hard Clad Silica (registered trademark of SpecTran Corporation)

Connector sets

Han® PushPull SCRJ
Connector set, metal
to make up Han® PushPull SCRJ system cables



IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☐
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Connector type	Han® PushPull SCRJ connector according to IEC 61 754-24
Locking	PushPull technology according to IEC 61 076-3-117, variant 14
Number of fibres	2
Transmission performance	Depends on the fibre type used
Fibre types	Glass fibre MM 50 / 125 µm and 62.5 / 125 µm Glass fibre SM 10 / 125 µm POF ¹⁾ 1 mm HCS ²⁾ 200 µm / 230 µm
Mounting	Field-assembly via SC contacts
Cable options	
– Cable sheath diameter	6.5 mm ... 9.5 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +70 °C
Housing material	Zinc die-cast
Colour	Nickel-plated

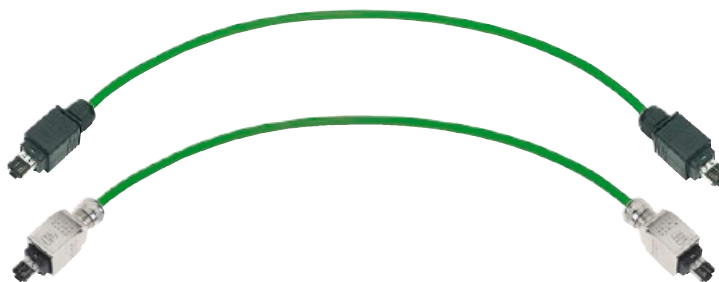
Advantages	Field-assembly F.O. connector, IP 65 / IP 67 PROFINET compliant AIDA compliant
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¹⁾ POF = Polymer-Optical Fibre
²⁾ HCS® = Hard Clad Silica (registered trademark of SpecTran Corporation)

Identification	Part number	Drawing	Dimensions in mm
Han® PushPull SCRJ Connector set Metal Set consists of: PushPull housing with SCRJ feeding Cable gland Assembly instructions SC POF ¹⁾ contact 1 mm PROFINET identification: PROFINET O-Plug SCRJ	09 35 241 0401		
Set consists of: PushPull housing with SCRJ feeding Cable gland Assembly instructions	09 35 241 0402		
Order SC contacts separately			
Contacts SC POF ¹⁾ contact, 1 mm SC 125 GI contact SC 230 HCS ²⁾ contact	20 10 001 5217 20 10 125 5211 20 10 230 5211		

¹⁾ POF = Polymer-Optical Fibre
²⁾ HCS® = Hard Clad Silica (registered trademark of SpecTran Corporation)

System cables



Han® PushPull RJ45

System cable, 4-wire

RJ45 connection cable, Han® PushPull, for IP 65 / IP 67 applications

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector types Han® PushPull RJ45

Cable types

Cable type	Type A	Type B	Type C	Outdoor
Cables	Copper, solid, shielded	Copper, stranded, shielded	Copper, stranded, shielded, useable as trailing cable	Copper, stranded, shielded
Wire gauge	4 x AWG 22/1	4 x AWG 22/7	4 x AWG 22/7	4 x AWG 22/7
Sheath material	PVC	PVC	PUR	PVC
Operating temperature range	–40 °C ... +70 °C	–40 °C ... +70 °C	–40 °C ... +70 °C	–45 °C ... +60 °C
Application PROFINET	Green	Green	Green	Black

Wiring	4-poles (RJ45 contacts 1/2 and 3/6)
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Standard lengths	1.5 m / 3 m / 5 m / 10 m / 20 m other lengths available on request

Advantages	Space-saving IP 65 / IP 67 interface AIDA compliant PROFINET compliant Easy handling
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Identification	Part number		Metal, overmoulded	
	Plastic version	Metal version		
Han® PushPull RJ45 System cable, 4-wire Type A				
Length 1.5 m	09 47 555 5003	09 47 565 6003	09 47 565 7003	
Length 3.0 m	09 47 555 5005	09 47 565 6005	09 47 565 7005	
Length 5.0 m	09 47 555 5007	09 47 565 6007	09 47 565 7007	
Length 10.0 m	09 47 555 5012	09 47 565 6012	09 47 565 7012	
Length 20.0 m	09 47 555 5014	09 47 565 6014	09 47 565 7014	
Han® PushPull RJ45 System cable, 4-wire Type B				
Length 1.5 m	09 47 555 5033	09 47 565 6033	09 47 565 7033	
Length 3.0 m	09 47 555 5035	09 47 565 6035	09 47 565 7035	
Length 5.0 m	09 47 555 5037	09 47 565 6037	09 47 565 7037	
Length 10.0 m	09 47 555 5042	09 47 565 6042	09 47 565 7042	
Length 20.0 m	09 47 555 5044	09 47 565 6044	09 47 565 7044	
Han® PushPull RJ45 System cable, 4-wire Type C				
Length 1.5 m	09 47 555 5063	09 47 565 6063	09 47 565 7063	
Length 3.0 m	09 47 555 5065	09 47 565 6065	09 47 565 7065	
Length 5.0 m	09 47 555 5067	09 47 565 6067	09 47 565 7067	
Length 10.0 m	09 47 555 5072	09 47 565 6072	09 47 565 7072	
Length 20.0 m	09 47 555 5074	09 47 565 6074	09 47 565 7074	
Han® PushPull RJ45 System cable, 4-wire Outdoor				
Length 1.5 m	09 47 555 5093	09 47 565 6093	09 47 565 7093	
Length 3.0 m	09 47 555 5095	09 47 565 6095	09 47 565 7055	
Length 5.0 m	09 47 555 5097	09 47 565 6097	09 47 565 7097	
Length 10.0 m	09 47 555 5102	09 47 565 6102	09 47 565 7102	
Length 20.0 m	09 47 555 5104	09 47 565 6104	09 47 565 7104	

System cables



Han® PushPull SCRJ

System cable

SCRJ connection cable, Han® PushPull, for IP 65 / IP 67 applications

IP 20



IP 65 / IP 67



IP 65 / IP 67
to IP 20



Cat. 5



Cat. 6



Connector types

Han® PushPull SCRJ

Cable types

Cable type	Type B
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	–40 °C ... +70 °C
Application PROFINET	Green

Standard lengths

1 m / 2 m / 5 m / 10 m / 20 m
other lengths available on request

Advantages

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

Identification	Part number		
	Plastic version	Metal version	
Han® PushPull SCRJ System cable both sides pre-assembled, SCRJ connectors IP 20 to IP 20 Length 1.0 m Length 2.0 m Length 5.0 m Length 10.0 m Length 20.0 m	 33 02 211 0010 001 33 02 211 0020 001 33 02 211 0050 001 33 02 211 0100 001 33 02 211 0200 001		
Han® PushPull SCRJ System cable one side pre-assembled, SCRJ connector IP 20 to open Length 1.0 m Length 2.0 m Length 5.0 m Length 10.0 m Length 20.0 m	 33 02 111 0010 001 33 02 111 0020 001 33 02 111 0050 001 33 02 111 0100 001 33 02 111 0200 001		
Han® PushPull SCRJ System cable both sides pre-assembled, SCRJ connectors IP 65 / IP 67 to IP 20 Length 1.0 m Length 2.0 m Length 5.0 m Length 10.0 m Length 20.0 m	 33 53 411 0010 001 33 53 411 0020 001 33 53 411 0050 001 33 53 411 0100 001 33 53 411 0200 001	 33 53 411 0010 002 33 53 411 0020 002 33 53 411 0050 002 33 53 411 0100 002 33 53 411 0200 002	
Han® PushPull SCRJ System cable both sides pre-assembled, SCRJ connectors IP 65 / IP 67 to IP 65 / IP 67 Length 1.0 m Length 2.0 m Length 5.0 m Length 10.0 m Length 20.0 m	 33 53 211 0010 001 33 53 211 0020 001 33 53 211 0050 001 33 53 211 0100 001 33 53 211 0200 001	 33 53 211 0010 002 33 53 211 0020 002 33 53 211 0050 002 33 53 211 0100 002 33 53 211 0200 002	
Han® PushPull SCRJ System cable one side pre-assembled, SCRJ connector IP 65 / IP 67 to open Length 1.0 m Length 2.0 m Length 5.0 m Length 10.0 m Length 20.0 m	 33 53 111 0010 001 33 53 111 0020 001 33 53 111 0050 001 33 53 111 0100 001 33 53 111 0200 001	 33 53 111 0010 002 33 53 111 0020 002 33 53 111 0050 002 33 53 111 0100 002 33 53 111 0200 002	

Panel feed through

Han® PushPull RJ45
Panel feed through, plastic

IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☒	Cat. 5	☐	Cat. 6	☒
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Connector type	Han® PushPull RJ45 connector acc. to ISO/IEC 24 702								
Locking	PushPull technology according to IEC 61 076-3-117, variant 14								
Number of contacts	8								
Transmission performance	Category 6 / Class E _A suitable for 1/10 Gbit Ethernet according to ISO/IEC 11 801:2002, EN 50 173-1								
Transmission rate	10/100 Mbit/s / 1/10 Gbit/s								
Shielding	Fully shielded, 360° shielding contact (Cat. 6)								
Degree of protection	IP 65 / IP 67								
Mating cycles	min. 750								
Operating temperature range	–40 °C ... +70 °C								
Housing material	Polyamide, UL94 V-0								
Colour	Black								
Advantages	Device integration via RJ45 PCB connectors PROFINET compliant AIDA compliant								

Identification	Part number	Drawing	Dimensions in mm
Han® PushPull RJ45 Panel feed through including housing and bulkhead Cat. 6 with 2 RJ45 jacks horizontally mounted in the IP 20 range	09 35 225 0331		Panel cut out
to mount HIFF inserts (e.g. HARTING RJ Industrial® 10G RJ45 coupler or Ha-VIS preLink® RJ45 module) including bulkhead housing for rectangular panel cut out Order inserts separately	09 35 012 0331		Panel cut out
Ha-VIS preLink® Set RJ45 female AWG 22/23 consists of: • 1x Ha-VIS preLink® module RJ45 female • 1x Ha-VIS preLink® termination block • 1x cable clip	20 82 001 0001		

Panel feed through



Han® PushPull RJ45
Panel feed through, metal

IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☒	Cat. 5	☒	Cat. 6	☒
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Connector type	Han® PushPull RJ45 connector acc. to ISO/IEC 24 702							
Locking	PushPull technology according to IEC 61 076-3-117, variant 14							
Number of contacts	8							
Transmission performance	Category 6 / Class E _A suitable for 1/10 Gigabit Ethernet							
Transmission rate	10/100 Mbit/s / 1/10 Gbit/s							
Shielding	Fully shielded, 360° shielding contact (Cat. 6)							
Degree of protection	IP 65 / IP 67							
Mating cycles	min. 750							
Operating temperature range	–40 °C ... +70 °C							
Housing material	Zinc die-cast							
Colour	Nickel-plated							
Advantages	Device integration via RJ45 PCB connectors PROFINET compliant AIDA compliant							

Identification	Part number	Drawing	Dimensions in mm
Han® PushPull RJ45 Panel feed through including housing and bulkhead Cat. 6 with 2 x RJ45 jacks horizontally mounted in the IP 20 range	09 35 225 0311		
including bulkhead housing for circular panel cut out, flat seal and HARTING RJ Industrial® 10G RJ45 bulkhead, isolated bulkhead fixture to mount HIFF inserts (e.g. HARTING RJ Industrial® 10G RJ45 coupler or Ha-VIS preLink® RJ45 module) including bulkhead housing for rectangular panel cut out, incl. plastic adapter Order inserts separately	09 35 225 0312		
to mount HIFF inserts (e.g. HARTING RJ Industrial® 10G RJ45 coupler or Ha-VIS preLink® RJ45 module) including bulkhead housing for rectangular panel cut out, incl. plastic adapter Order inserts separately	09 35 012 0311		
to mount HIFF inserts (e.g. HARTING RJ Industrial® 10G RJ45 coupler or Ha-VIS preLink® RJ45 module) including bulkhead housing for circular panel cut out, incl. plastic adapter and fixing nut Order inserts separately	09 35 012 0312		

Identification	Part number	Drawing	Dimensions in mm
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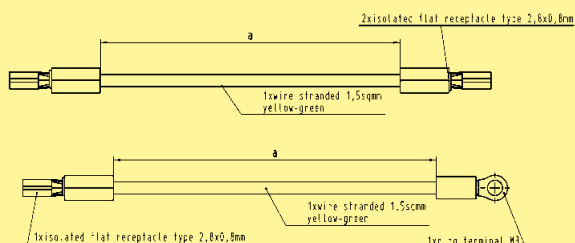
Patch cord 1.5 mm² for potential equalization between RJ45 insert and bulkhead housing

with 2 x flat receptacle

09 45 500 0001

with flat receptacle and ring terminal M3

09 45 500 0002

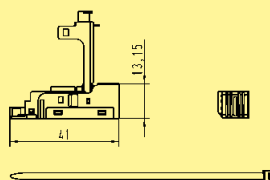


Ha-VIS preLink® Set
RJ45 female AWG 22/23

consists of:

- 1x Ha-VIS preLink® module RJ45 female
- 1x Ha-VIS preLink® termination block
- 1x cable clip

20 82 001 0001



Panel feed through



Han® PushPull SCRJ
Panel feed through, plastic

IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☒	Cat. 5	☐	Cat. 6	☐
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Connector type	Han® PushPull SCRJ connector according to IEC 61 754-24
Locking	PushPull technology according to IEC 61 076-3-117, variant 14
Number of fibres	2
Transmission performance	Depends on the fibre type used
Fibre types	Glass fibre MM 50 / 125 µm and 62.5 / 125 µm Glass fibre SM 10 / 125 µm POF ¹⁾ 1 mm HCS ²⁾ 200 µm / 230 µm
Degree of protection	IP 65 / IP 67
Mating cycles	min. 750
Operating temperature range	–40 °C ... +70 °C
Housing material	Polyamide, UL94 V-0
Colour	Black

Advantages

Han® PushPull SCRJ for POF¹⁾ is according the requirements of AIDA (German Domestic Automobile Manufacturers)
PROFINET compliant
AIDA compliant

¹⁾ POF = Polymer-Optical Fibre

²⁾ HCS® = Hard Clad Silica (registered trademark of SpecTran Corporation)

Identification	Part number	Drawing	Dimensions in mm
Han® PushPull SCRJ Panel feed through Panel feed through	09 35 242 0333		
SCRJ IP 20 POF connector	09 35 002 4002		
Contacts SC POF ¹⁾ contact, 1 mm SC 125 GI contact SC 230 HCS ²⁾ contact	20 10 001 5217 20 10 125 5211 20 10 230 5211		
Protection Cover with cord IP 65 / IP 67	09 35 002 5402		

¹⁾ POF = Polymer-Optical Fibre
²⁾ HCS® = Hard Clad Silica (registered trademark of SpecTran Corporation)

Panel feed through



Han® PushPull SCRJ
Panel feed through, metal

IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☒	Cat. 5	☐	Cat. 6	☐
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Connector type	Han® PushPull SCRJ connector according to IEC 61 754-24							
Locking	PushPull technology according to IEC 61 076-3-117, variant 14							
Number of fibres	2							
Transmission performance	Depends on the fibre type used							
Fibre types	Glass fibre MM 50 / 125 µm and 62.5 / 125 µm Glass fibre SM 10 / 125 µm POF ¹⁾ 1 mm HCS ²⁾ 200 µm / 230 µm							
Degree of protection	IP 65 / IP 67							
Mating cycles	min. 750							
Operating temperature range	–40 °C ... +70 °C							
Housing material	Zinc die-cast							
Colour	Nickel-plated							
Advantages	Han® PushPull SCRJ for POF ¹⁾ is according the requirements of AIDA (German Domestic Automobile Manufacturers) PROFINET compliant AIDA compliant							

¹⁾ POF = Polymer-Optical Fibre

²⁾ HCS® = Hard Clad Silica (registered trademark of SpecTran Corporation)

Identification	Part number	Drawing	Dimensions in mm
Han® PushPull SCRJ Panel feed through Panel feed through	09 35 242 0313		
SCRJ IP 20 POF connector	09 35 002 4002		
Contacts SC POF ¹⁾ contact, 1 mm SC 125 GI contact SC 230 HCS ²⁾ contact	20 10 001 5217 20 10 125 5211 20 10 230 5211		
Protection Cover with cord IP 65 / IP 67	09 35 002 5402		

¹⁾ POF = Polymer-Optical Fibre
²⁾ HCS® = Hard Clad Silica (registered trademark of SpecTran Corporation)

Gender Changer

Han® PushPull RJ45
Gender Changer, metal

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector type	Han® PushPull RJ45 connector acc. to ISO/IEC 24 702
Locking	PushPull technology according to IEC 61 076-3-117, variant 14
Number of contacts	8
Transmission performance	Category 6 / Class E up to 250 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Degree of protection	IP 65 / IP 67
Mating cycles	min. 750
Mounting	Surface mounting with 4 screws type M5
Operating temperature range	–20 °C ... +70 °C
Housing material	Aluminium, anodised

Advantages

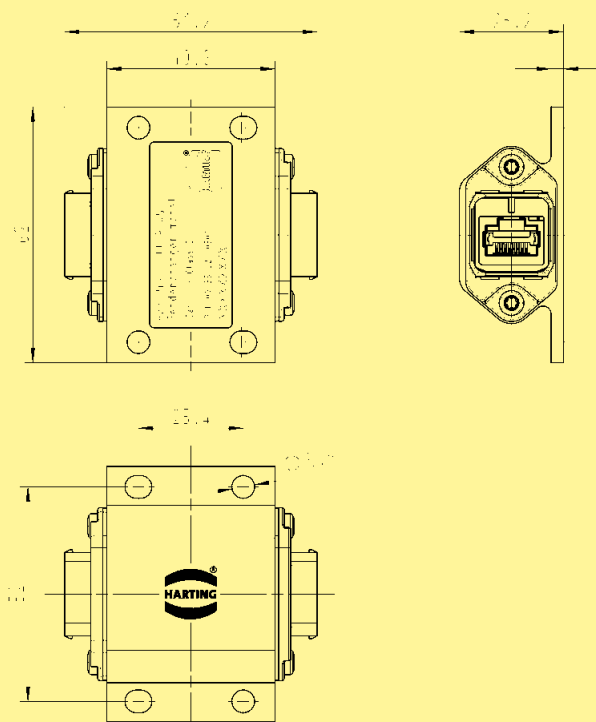
Extension of Han® PushPull system cable RJ45
Robust design
AIDA compliant
Only one connection according to PROFINET guideline

Identification	Part number	Drawing	Dimensions in mm
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Han® PushPull RJ45
Gender Changer, metal

including housing and
printed board
with 2x RJ45 jack

09 35 221 0501



IP 20

RJ45

- Connectors [on page B·1 8]
- System cables [on page B·1 12]
- Distribution modules and Outlets [on page B·1 22]

IP 65 / IP 67

HARTING PushPull

- Connectors [on page B·1 24]
- System cables [on page B·1 26]
- Panel feed-throughs [on page B·1 32]
- Distribution modules and Outlets [on page B·1 34]

Han® PushPull

- Connectors [on page B·1 36]
- System cables [on page B·1 44]
- Panel feed-throughs / Gender Changer [on page B·1 48]

Han® 3 A

- Connectors [on page B·1 62]
- System cables [on page B·1 64]
- Panel feed-throughs [on page B·1 68]
- Distribution modules and Outlets [on page B·1 74]

Han® 3 A RJ45 Hybrid

- Connectors [on page B·1 78]
- System cables [on page B·1 80]
- Panel feed-throughs [on page B·1 82]
- Cables [on page B·1 84]

M12 D-coding

- Connectors [on page B·1 86]
- System cables [on page B·1 88]
- Panel feed-throughs [on page B·1 94]

Cables

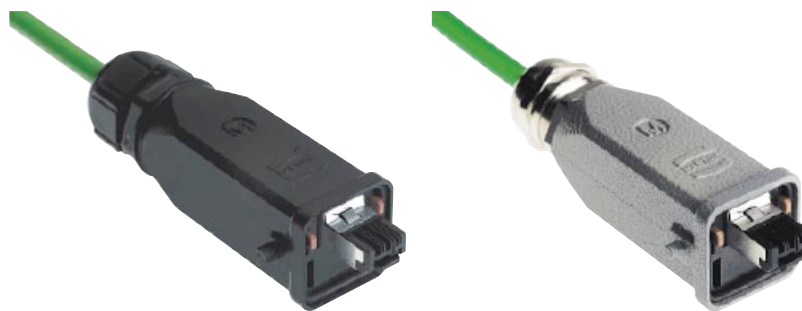
- Type A, B, C [on page B·1 98]
- Type B, Outdoor [on page B·1 101]
- Ha-VIS EtherRail [on page B·1 102]

Tools

[on page B·1 106]

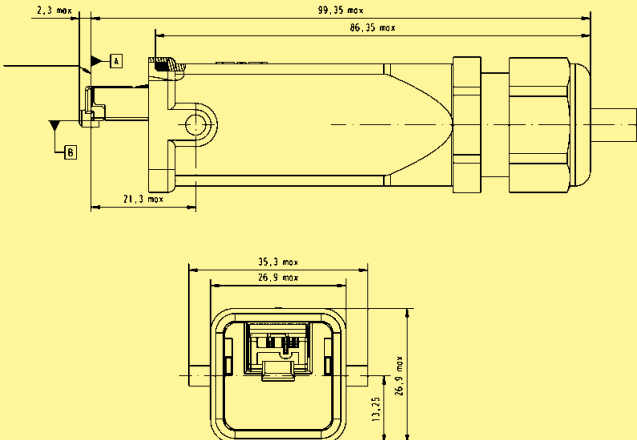
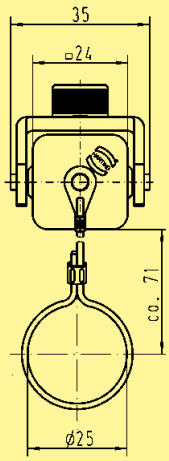
Connector sets

Han® 3 A RJ45
Connector set, 4-pole
to make up Han® 3 A system cables RJ45



IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector type	Han® 3 A RJ45 connector acc. to IEC 61 918
Number of contacts	4
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Mounting	Field-assembly
Wire termination	Via IDC contacts, tool-less
Cable options	
– Strand gauge	AWG 24/7 ... AWG 22/7 (stranded) AWG 23/1 ... AWG 22/1 (solid)
– Strand diameter	max. 1.6 mm
– Cable sheath diameter	5 mm ... 9 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +70 °C
Plastic version	
Housing material	Polyamide, UL94 V-0
Colour	Black
Metal version Standard	
Housing material	Zinc, die-cast
Colour	Grey
Metal version M	
Housing material	Zinc, die-cast
Colour	Black
Advantages	Tool-less field-assembly with <i>HARAX</i>® rapid termination in IDC technology Category of transmission Cat. 5 Coding possible Up to 10x reconductable PROFINET compliant

Identification	Part number	Drawing	Dimensions in mm
Han® 3 A RJ45 Connector set, 4-pole Plastic version straight style angled style Metal version Standard straight style angled style Metal version M straight style angled style Set consists of: Han® 3 A housing including RJ45 connector and shielding Cable gland Assembly instructions	09 45 125 1100 09 45 125 1104 09 45 115 1100 09 45 115 1104 09 45 115 1102 09 45 115 1106	 Dimensions valid for straight Plastic version	
Protection cover for Han® 3 A connector Plastic version Metal version Standard Metal version M	09 20 003 5442 09 20 003 5422 09 37 003 5402	 Dimensions valid for Plastic version	
Set of coding pins	09 46 820 0000		

System cables



Han® 3 A RJ45
System cable, 4-wire

Han® 3 A RJ45 connection cable for harsh industrial environments

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector types Han® 3 A RJ45 metal

Cable types

Cable type	Type A	Type B	Type C	Outdoor
Cables	Copper, solid, shielded	Copper, stranded, shielded	Copper, stranded, shielded, useable as trailing cable	Copper, stranded, shielded
Wire gauge	4 x AWG 22/1	4 x AWG 22/7	4 x AWG 22/7	4 x AWG 22/7
Sheath material	PVC	PVC	PUR	PVC
Operating temperature range	–40 °C ... +70 °C	–40 °C ... +70 °C	–40 °C ... +70 °C	–45 °C ... +60 °C
Application PROFINET	Green	Green	Green	Black

Wiring	4-poles, 1:1 (RJ45 contacts 1/2 and 3/6)
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Standard lengths	1.5 m / 3 m / 5 m / 10 m / 20 m other lengths available on request

Advantages

Robust design
Use on-site made possible by IP 65 / IP 67 protection
Easy handling for all applications
PROFINET compliant

Identification		Part number
Han® 3 A RJ45 System cable, 4-wire Type A	Length 1.5 m	09 45 715 1123
	Length 3.0 m	09 45 715 1125
	Length 5.0 m	09 45 715 1127
	Length 10.0 m	09 45 715 1151
	Length 20.0 m	09 45 715 1153
Han® 3 A RJ45 System cable, 4-wire Type B	Length 1.5 m	09 45 715 1164
	Length 3.0 m	09 45 715 1166
	Length 5.0 m	09 45 715 1168
	Length 10.0 m	09 45 715 1173
	Length 20.0 m	09 45 715 1175
Han® 3 A RJ45 System cable, 4-wire Type C	Length 1.5 m	09 45 715 0023
	Length 3.0 m	09 45 715 0025
	Length 5.0 m	09 45 715 0027
	Length 10.0 m	09 45 715 0051
	Length 20.0 m	09 45 715 0053
Han® 3 A RJ45 System cable, 4-wire Outdoor	Length 1.5 m	09 45 715 0064
	Length 3.0 m	09 45 715 0066
	Length 5.0 m	09 45 715 0068
	Length 10.0 m	09 45 715 0073
	Length 20.0 m	09 45 715 0075

System cables

Han® 3 A RJ45 System cable, 4-wire

Han® 3 A RJ45 connection cable for harsh industrial environments, change-over to IP 20



IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☒	Cat. 5	☒	Cat. 6	☐
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Connector types Han® 3 A RJ45 metal (IP 65 / IP 67) / RJ45 (IP 20)

Cable types

Cable type	Type A	Type B	Type C
Cables	Copper, solid, shielded	Copper, stranded, shielded	Copper, stranded, shielded, useable as trailing cable
Wire gauge	4 x AWG 22/1	4 x AWG 22/7	4 x AWG 22/7
Sheath material	PVC	PVC	PUR
Operating temperature range	–40 °C ... +70 °C	–40 °C ... +70 °C	–40 °C ... +70 °C
Application PROFINET	Green	Green	Green

Wiring	4-pole, 1:1 (RJ45 contacts 1/2 and 3/6)
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Standard lengths	1.5 m / 3 m / 5 m / 10 m / 20 m other lengths available on request

Advantages

Robust design
Easy change-over from harsh industrial environment to protected IP 20 environment
Easy handling for all applications
PROFINET compliant

Identification		Part number
Han® 3 A RJ45 System cable, 4-wire Type A		
Length 1.5 m	09 45 700 1123	
Length 3.0 m	09 45 700 1125	
Length 5.0 m	09 45 700 1127	
Length 10.0 m	09 45 700 1151	
Length 20.0 m	09 45 700 1153	
Han® 3 A RJ45 System cable, 4-wire Type B		
Length 1.5 m	09 45 700 1164	
Length 3.0 m	09 45 700 1166	
Length 5.0 m	09 45 700 1168	
Length 10.0 m	09 45 700 1173	
Length 20.0 m	09 45 700 1175	
Han® 3 A RJ45 System cable, 4-wire Type C		
Length 1.5 m	09 45 700 0023	
Length 3.0 m	09 45 700 0025	
Length 5.0 m	09 45 700 0027	
Length 10.0 m	09 45 700 0051	
Length 20.0 m	09 45 700 0053	

Panel feed-throughs



Han® 3 A RJ45

Panel feed-through, 8-poles, Cat. 5

RJ45 Panel feed-through for control or distributor cabinets

IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☒	Cat. 5	☒	Cat. 6	☐
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Number of ports, Copper / Termination	2 / 1x Han® 3 A RJ45 (IP 65 / IP 67) 1x RJ45 (IP 20)
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s

Mounting Screwable to steel plate covers

Dimensions See drawing

Panel cut-out 20 mm x 22 mm

Mounting hole Diameter 3.4 mm

Degree of protection IP 65 / IP 67

Operating temperature range –40 °C ... +70 °C

Plastic version

Housing material Polyamide, UL94 V-0
Colour Black

Metal version Standard

Housing material Zinc, die-cast
Colour Grey

Metal version M

Housing material Zinc, die-cast
Colour Black

Advantages

Simple mounting
RJ45 plug-compatible
Different versions cover all applications
Coding possible
PROFINET compliant

Identification	Part number	Drawing	Dimensions in mm
Han® 3 A RJ45 Panel feed-through Plastic version straight style angled style Accessories IP 65 / IP 67 protection cap for Panel feed-through	09 45 225 1100 09 45 225 1108 09 20 003 5445	IEC 60503-7 SMC modular jack 12mm height above PC-Board 24,3 max 23,2 max 40,3 max 24,2 max 28,1 max 35,3 max flat seal 1mm 22 30 22 4x R2,5 M3 or 3.2 panel cut out	
Han® 3 A RJ45 Panel feed-through Metal version Standard straight style straight style including self-closing protection cap angled style Accessories IP 65 / IP 67 protection cap for Panel feed-through	09 45 215 1100 09 45 215 1103 09 45 215 1108 09 20 003 5425	Dimensions valid for straight Plastic version	
Han® 3 A RJ45 Panel feed-through Metal version M straight style angled style Accessories IP 65 / IP 67 protection cap for Panel feed-through	09 45 215 1102 09 45 215 1109 09 37 003 5405	35 3 6,0	Dimensions valid for Plastic version
Accessories Set of coding pins	09 45 820 0000		

Panel feed-throughs

Han® 3 A RJ45 10G
Panel feed-through, 8-poles
RJ45 Panel feed-through for control or distributor cabinets



IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☒	Cat. 5	☐	Cat. 6	☒
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Number of ports, Copper / Termination	2 / 1x Han® 3 A RJ45 (IP 65 / IP 67) 1x RJ45 (Twisted Pair) (IP 20)
Transmission performance	Category 6 / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s / 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact
Mounting	Screwable to steel plate covers
Dimensions	See drawing
Panel cut-out	20 mm x 22 mm
Mounting hole	Diameter 3.4 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +70 °C

Plastic version	
Housing material	Polyamide, UL94 V-0
Colour	Black
Metal version Standard	
Housing material	Zinc, die-cast
Colour	Grey
Metal version M	
Housing material	Zinc, die-cast
Colour	Black

Advantages	Simple mounting RJ45 plug-compatible Various versions cover all applications Coding possible PROFINET compliant
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Han® 3 A

Panel feed-throughs

Han® 3 A RJ45
 Double-coupling, 8-poles
 RJ45 double-coupling for control or distributor cabinets



IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Number of ports, Copper / Termination	2 / Han® 3 A RJ45 (IP 65 / IP 67)
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s

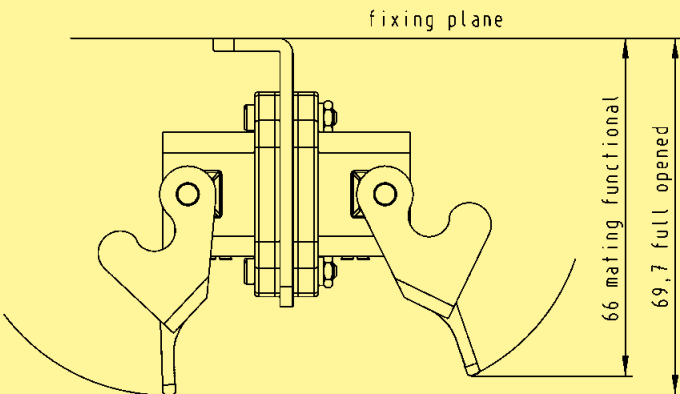
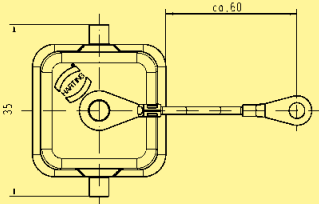
Mounting	Screwable to steel plate covers
Dimensions	See drawing
Panel cut-out	20 mm x 22 mm
Mounting hole	Diameter 3.4 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +70 °C

Plastic version	
Housing material	Polyamide, UL94 V-0
Colour	Black

Metal version Standard	
Housing material	Zinc, die-cast
Colour	Grey

Metal version M	
Housing material	Zinc, die-cast
Colour	Black

Advantages	Simple mounting
	RJ45 plug-compatible
	Different versions cover all applications
	Coding possible
	PROFINET compliant

Identification	Part number	Drawing	Dimensions in mm
Han® 3 A RJ45 double-coupling Plastic version Accessories IP 65 / IP 67 protection cap for Panel feed-through	09 45 225 1107 09 20 003 5445	 Dimensions valid for Plastic version	
Han® 3 A RJ45 double-coupling Metal version Standard Accessories IP 65 / IP 67 protection cap for Panel feed-through	09 45 215 1107 09 20 003 5425	Dimensions valid for Plastic version	
Han® 3 A RJ45 double-coupling Metal version M Accessories IP 65 / IP 67 protection cap for Panel feed-through	09 45 215 1110 09 37 003 5405	 Dimensions valid for Plastic version	
Accessories Set of coding pins	09 45 820 0000		

Distribution modules and Outlets

Han® 3 A RJ45
Metal Outlet, Cat. 6, 8-poles
 RJ45 Industrial Outlet for IP 65 / IP 67 environments



IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Number of ports, Copper / Termination	2 / Han® 3 A RJ45 (IP 65 / IP 67)
Transmission performance	Category 6 / Class E up to 250 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Termination	Via IDC contacts, tool-less
Strand diameter	AWG 24 ... 22 (0.5 mm ... 0.65 mm) solid and stranded
Strand insulation	0.7 mm ... 1.6 mm
Cable diameter	5 mm ... 9 mm
Shielding	Fully shielded, 360° shielding contact

Mounting	Wall mounting
Dimensions (H x W x D)	125 x 80 x 57.5 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–20 °C ... +70 °C
Housing material	Aluminium, die-cast
Colour	Grey RAL 7037

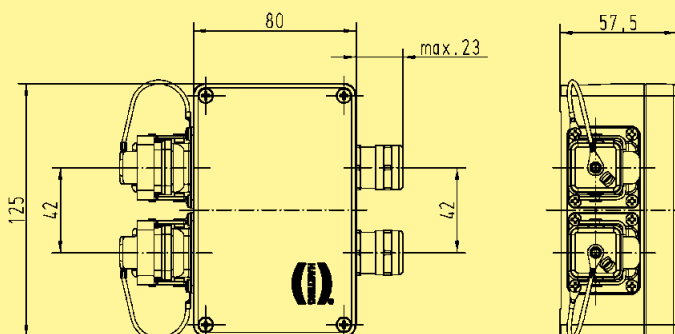
Advantages	Robust metal housing for use in harsh industrial environments Simple mounting Lockable Han® 3 A connector ports PROFINET compliant
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Identification	Part number	Drawing	Dimensions in mm
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Han® 3 A RJ45
Metal Outlet, Cat. 6

consisting of:
 2-port metal housing with protection caps and cable glands
 2x RJ45 female module, Cat. 6
 Assembly instructions

20 79 302 0922



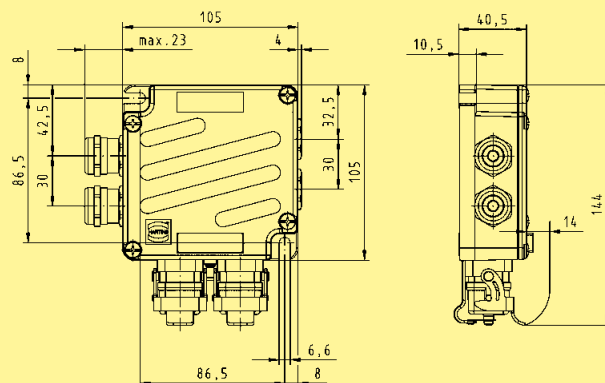
Distribution modules and Outlets



Han® 3 A RJ45
Metal Outlet, Cat. 5, 8-poles
 RJ45 Industrial Outlet for IP 65 / IP 67 environments

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Number of ports, Copper / Termination	2 / Han® 3 A RJ45 (IP 65 / IP 67)
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Termination	LSA-PLUS module, terminating via LSA-PLUS tool
Strand diameter	AWG 26 ... 22 (0.35 mm ... 0.65 mm) solid and stranded
Strand insulation	0.7 mm ... 1.6 mm
Cable diameter	5 mm ... 9 mm
Shielding	Fully shielded, 360° shielding contact
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
Advantages	Robust metal housing for use in harsh industrial environments Simple mounting Cable feeding optionally from the left or from the right side Lockable Han® 3 A connector ports PROFINET compliant

Identification	Part number	Drawing	Dimensions in mm
Han® 3 A RJ45 Metal Outlet, Cat. 5 consisting of: 2-port metal housing with protection caps, cable glands and blanking piece PCB module with LSA-PLUS strips Label Assembly instructions	09 45 815 1100		

IP 20**RJ45**

- Connectors [on page B·1 8]
- System cables [on page B·1 12]
- Distribution modules and Outlets [on page B·1 22]

IP 65 / IP 67**HARTING PushPull**

- Connectors [on page B·1 24]
- System cables [on page B·1 26]
- Panel feed-throughs [on page B·1 32]
- Distribution modules and Outlets [on page B·1 34]

Han® PushPull

- Connectors [on page B·1 36]
- System cables [on page B·1 44]
- Panel feed-throughs / Gender Changer [on page B·1 48]

Han® 3 A

- Connectors [on page B·1 62]
- System cables [on page B·1 64]
- Panel feed-throughs [on page B·1 68]
- Distribution modules and Outlets [on page B·1 74]

Han® 3 A RJ45 Hybrid

- Connectors [on page B·1 78]
- System cables [on page B·1 80]
- Panel feed-throughs [on page B·1 82]
- Cables [on page B·1 84]

M12 D-coding

- Connectors [on page B·1 86]
- System cables [on page B·1 88]
- Panel feed-throughs [on page B·1 94]

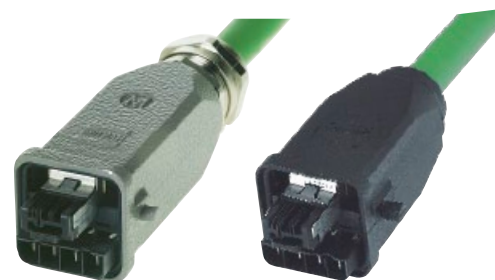
Cables

- Type A, B, C [on page B·1 98]
- Type B, Outdoor [on page B·1 101]
- Ha-VIS EtherRail [on page B·1 102]

Tools

[on page B·1 106]

Connector sets



Han® 3 A RJ45 Hybrid
Connector set, 4-pole

to make up Han® 3 A RJ45 Hybrid system cables

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector type Han® 3 A RJ45 Hybrid connector according to IEC 61 918

Number of contacts 4 + 4x power contacts (48 V / 16 A)

Transmission performance Category 5 / Class D up to 100 MHz
according to ISO/IEC 11 801:2002, EN 50 173-1

Transmission rate 10/100 Mbit/s

Shielding Fully shielded, 360° shielding contact

Mounting Field-assembly

Wire termination Via IDC contacts, tool-less

Cable options Hybrid cable (2 x 2 data + 4x power)

– Wire gauge (data) AWG 24/7 ... AWG 22/7 (stranded)

AWG 23/1 ... AWG 22/1 (solid)

– Wire gauge (power) 1.5 mm², stranded

– Strand diameter (data) max. 1.6 mm

– Strand diameter (power) max. 2.6 mm

– Cable sheath diameter 10 mm ... 11 mm

Degree of protection IP 65 / IP 67

Operating temperature range –40 °C ... +70 °C

Plastic version

Housing material

Polyamide, UL94 V-0

Colour

Black

Metal version Standard

Housing material

Zinc, die-cast

Colour

Grey

Advantages

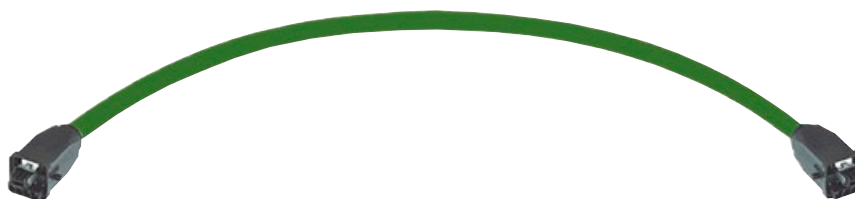
Tool-less field-assembly with *HARAX*® rapid termination in
IDC technology

Category of transmission Cat. 5

PROFINET compliant

Identification	Part number	Drawing	Dimensions in mm
Han® 3 A RJ45 Hybrid Connector set, 4-pole Plastic version straight style Metal version Standard straight style Set consists of: Han® 3 A Hybrid housing including RJ45 connector and shielding Cable gland Assembly instructions	09 45 125 1300 10 12 005 2001		
Protection cover for Han® 3 A connector Plastic version Metal version Standard	09 20 003 5442 09 20 003 5422	Dimensions valid for Plastic version	

System cables



Han® 3 A Hybrid System cable RJ45, 4-wire

Han® 3 A Hybrid connection cable for harsh industrial environments

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector types	Han® 3 A RJ45 Hybrid, plastic / metal
Cable types	4 x AWG 22/7, star quad, shielded + 4 power cores
Sheath material	FRNC
Wiring	4-poles (RJ45 contacts 1/2 and 3/6)
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s + Power supply
Shielding	Fully shielded, 360° shielding contact
Operating temperature range	–20 °C ... +70 °C
Standard lengths	1.5 m / 3 m / 5 m / 10 m / 20 m other lengths available on request
Colour	Green
Advantages	Robust design Use on-site made possible via IP 65 / IP 67 protection Easy handling for applications with additional power supply PROFINET compliant

Identification

Part number

Han® 3 A RJ45 Hybrid
System cable, 4-wire,
plastic

Length 1.5 m	09 45 725 1323
Length 3.0 m	09 45 725 1325
Length 5.0 m	09 45 725 1327
Length 10.0 m	09 45 725 1351
Length 20.0 m	09 45 725 1353

Han® 3 A RJ45 Hybrid
System cable, 4-wire,
metal

Length 1.5 m	09 45 715 1364
Length 3.0 m	09 45 715 1366
Length 5.0 m	09 45 715 1368
Length 10.0 m	09 45 715 1373
Length 20.0 m	09 45 715 1375

Panel feed-throughs



Han® 3 A RJ45 Hybrid
Panel feed-through, 8-poles

Hybrid Panel feed-through for control or distributor cabinets

IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☒	Cat. 5	☒	Cat. 6	☐
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Number of ports, Copper / Termination	2 / 1x Han® 3 A RJ45 (IP 65 / IP 67) 1x RJ45 (IP 20)
Termination power supply	4x contacts in the Han® 3 A connector (IP 65 / IP 67) 4x contacts for power supply via cage-clamp terminal (48 V / 16 A) (IP 20)
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Mounting	Screwable to steel plate covers
Dimensions	See drawing
Panel cut-out	20 mm x 22 mm
Mounting hole	Diameter 3.4 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +70 °C
Plastic version	
Housing material	Polyamide, UL94 V-0
Colour	Black
Metal version Standard	
Housing material	Zinc, die-cast
Colour	Grey
Metal version M	
Housing material	Zinc, die-cast
Colour	Black
Advantages	Simple mounting RJ45 plug-compatible Additional power supply via hybrid cable Coding possible PROFINET compliant

Identification	Part number	Drawing	Dimensions in mm
Han® 3 A RJ45 Hybrid Panel feed-through Plastic version, black straight style Accessories IP 65 / IP 67 protection cover for Panel feed-through	09 45 225 1300 09 20 003 5445		panel cut out
Han® 3 A RJ45 Hybrid Panel feed-through Metal version Standard, grey straight style Accessories IP 65 / IP 67 protection cover for Panel feed-through	10 12 005 1002 09 20 003 5425		panel cut out
Han® 3 A RJ45 Hybrid Panel feed-through Metal version M, black straight style Accessories IP 65 / IP 67 protection cover for Panel feed-through	09 45 215 1301 09 37 003 5405		panel cut out
Accessories Set of coding pins	09 45 820 0000		

Cables

Industrial Cat. 5 Hybrid Cable
PROFINET Hybrid Type B,
4-wire + 4 power wires
to make up hybrid system cables



IP 20	☐	IP 65 / IP 67	☒	FRNC	Cat. 5	☒	Cat. 6	☐
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Cable structure	Star quad + 4 power cores, double shielding
Core structure	4x AWG 22/7, star quad, shielded + 4 power cores, 84 x 0.15, , stranded
Sheath material	FRNC
Cable sheath diameter	9.7 mm ... 10.3 mm
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Shielding foil and shielding braid

Operating temperature range -20 °C ... +80 °C

Standard lengths 10 m / 20 m / 50 m / 100 m

Colour Green

Printing HARTING specific printing

Advantages

Robust design suitable for industry
PROFINET compliant
Additional power supply
Halogen free, LSZH
UL AWM 21 282

Identification	Part number	Drawing	Dimensions in mm
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Industrial Cat. 5 Hybrid cable
PROFINET Hybrid Type B,
4x data + 4x power wires
FRNC

10 m ring
20 m ring
50 m ring
100 m reel
500 m reel

09 45 600 0310
09 45 600 0330
09 45 600 0340
09 45 600 0300
09 45 600 0320



IP 20**RJ45**

- Connectors [on page B·1 8]
- System cables [on page B·1 12]
- Distribution modules and Outlets [on page B·1 22]

IP 65 / IP 67**HARTING PushPull**

- Connectors [on page B·1 24]
- System cables [on page B·1 26]
- Panel feed-throughs [on page B·1 32]
- Distribution modules and Outlets [on page B·1 34]

Han® PushPull

- Connectors [on page B·1 36]
- System cables [on page B·1 44]
- Panel feed-throughs / Gender Changer [on page B·1 48]

Han® 3 A

- Connectors [on page B·1 62]
- System cables [on page B·1 64]
- Panel feed-throughs [on page B·1 68]
- Distribution modules and Outlets [on page B·1 74]

Han® 3 A RJ45 Hybrid

- Connectors [on page B·1 78]
- System cables [on page B·1 80]
- Panel feed-throughs [on page B·1 82]
- Cables [on page B·1 84]

M12 D-coding

- Connectors [on page B·1 86]
- System cables [on page B·1 88]
- Panel feed-throughs [on page B·1 94]

Cables

- Type A, B, C [on page B·1 98]
- Type B, Outdoor [on page B·1 101]
- Ha-VIS EtherRail [on page B·1 102]

Tools

[on page B·1 106]

Connector sets



HARAX® M12
Connector D-coding, 4-pole
to make up HARTING system cables M12

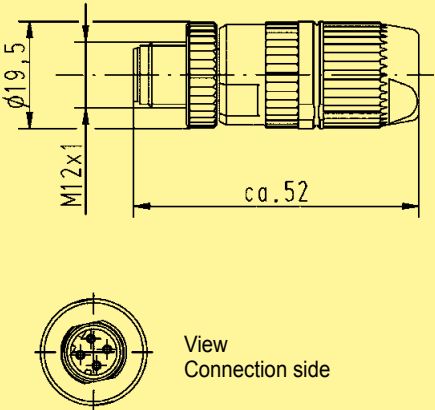
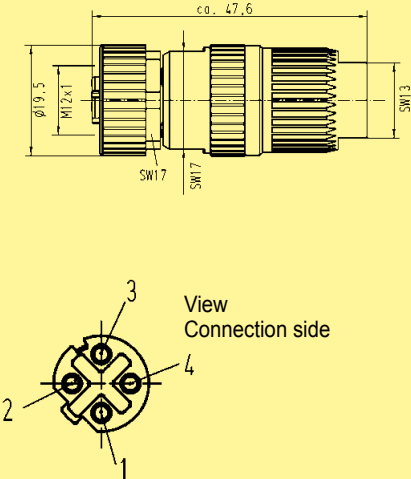
IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector type	HARAX® connector M12-L, D-coding
Number of contacts	4
Transmission performance	Class D according to ISO/IEC 11 801:2002
Transmission rate	10/100 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Mounting	Field-assembly
Wire termination	Via IDC contacts
Cable options	
– Strand diameter	AWG 24 ... AWG 22 (Cord)
– Cable sheath diameter	4.5 mm ... 8.8 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–25 °C ... +85 °C
Housing material	Metal

Advantages	Field-assembly M12 connector Compact design Tool-less assembly
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Specifications	IEC 60 352-4 IEC 60 947-5-2
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Approvals	
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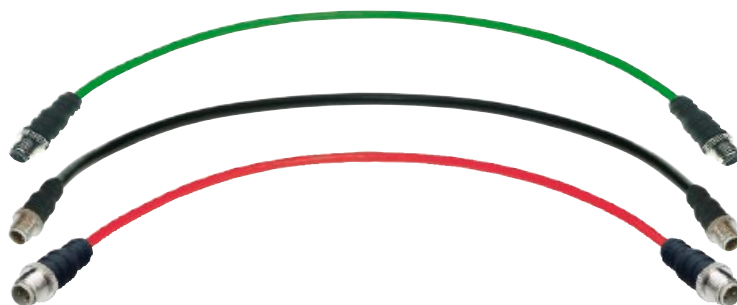
Identification	Part number	Drawing	Dimensions in mm
HARAX® M12 Connector D-coding, 4-pole, male straight style 	21 03 281 1405		
HARAX® M12 Connector D-coding, 4-pole, female straight style	21 03 281 2405		

System cables

Han® M12

System cable, 4-wire, straight

Han® M12 connection cable, D-coding, for harsh industrial environments, pre-assembled on both sides



IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector types	2x Han® M12 D-coding, overmoulded
Cable types	4 x AWG 22/7, Star quad, double shielding
Sheath material	PUR / PVC
Wiring	4-pole, 1:1
Transmission performance	Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Fully shielded, 360° shielding contact

Operating temperature range –25 °C ... +70 °C

Standard lengths 1 m / 1.5 m / 3 m / 5 m / 7.5 m / 10 m / 20 m
other lengths available on request

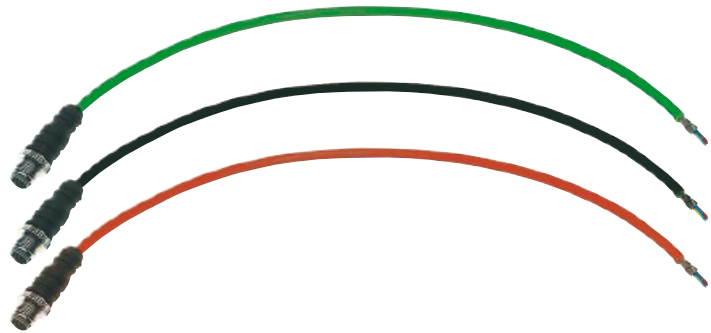
Colour Green / Black
Red (SERCOS III)

Advantages

Robust design
Use on-site made possible by IP 65 / IP 67 protection
PUR variants are useable as trailing cables

Identification	PUR	Part number PVC	SERCOS III PUR	Drawing	Dimensions in mm
Han® M12 System cable, 4-wire	Green	Black	Red		
Length 1.0 m	21 03 485 1401	09 47 222 2002	09 47 222 2002 018		
Length 1.5 m	21 03 485 1451	09 47 222 2003	09 47 222 2003 018		
Length 3.0 m	21 03 485 1403	09 47 222 2005	09 47 222 2005 018		
Length 5.0 m	21 03 485 1405	09 47 222 2006	09 47 222 2007 018		
Length 7.5 m	21 03 485 1457	09 47 222 2022	09 47 222 2018 018		
Length 10.0 m	21 03 485 1410	09 47 222 2011	09 47 222 2012 018		
Length 20.0 m	21 03 485 1420	09 47 222 2013	09 47 222 2014 018		

System cables



Han® M12

System cable, 4-wire

Han® M12 connection cable, D-coding,
for harsh industrial environments, second side open

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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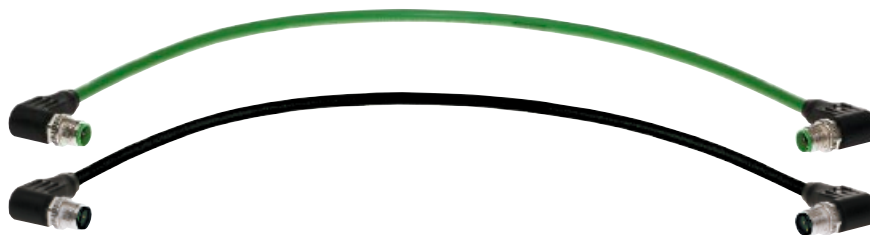
Connector types	1x Han® M12 D-coding, overmoulded second side open
Cable types	4 x AWG 22/7, Star quad, double shielding
Sheath material	PUR / PVC
Wiring	4-pole
Transmission performance	Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Operating temperature range	–25 °C ... +70 °C
Standard lengths	1 m / 1.5 m / 3 m / 5 m / 7.5 m / 10 m / 20 m other lengths available on request
Colour	Green / Black Red (SERCOS III)
Advantages	Robust design Use on-site made possible by IP 65 / IP 67 protection PUR variants are useable as trailing cables

M12
D-coding

Identification	PUR	Part number PVC	SERCOS III PUR	Drawing	Dimensions in mm
Han® M12 System cable, 4-wire	Green	Black	Red		
Length 1.0 m	21 03 585 1401	09 47 220 0002	09 47 220 0002 018		
Length 1.5 m	21 03 585 1451	09 47 220 0003	09 47 220 0003 018		
Length 3.0 m	21 03 585 1403	09 47 220 0005	09 47 220 0005 018		
Length 5.0 m	21 03 585 1405	09 47 220 0006	09 47 220 0007 018		
Length 7.5 m	21 03 585 1457	09 47 220 0022	09 47 220 0018 018		
Length 10.0 m	21 03 585 1410	09 47 220 0011	09 47 220 0012 018		
Length 20.0 m	21 03 585 1420	09 47 220 0013	09 47 220 0014 018		

B-1
89

System cables



Han® M12

System cable, 4-wire, angled

Han® M12 connection cable, D-coding, for harsh industrial environments
pre-assembled on both sides

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector types	2x Han® M12 D-coding, angled, overmoulded
Cable types	4 x AWG 22/7, Star quad, double shielding
Sheath material	PUR / PVC
Wiring	4-pole, 1:1
Transmission performance	Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Fully shielded, 360° shielding contact

Operating temperature range –25 °C ... +70 °C

Standard lengths 1 m / 1.5 m / 3 m / 5 m / 7.5 m / 10 m / 20 m
other lengths available on request

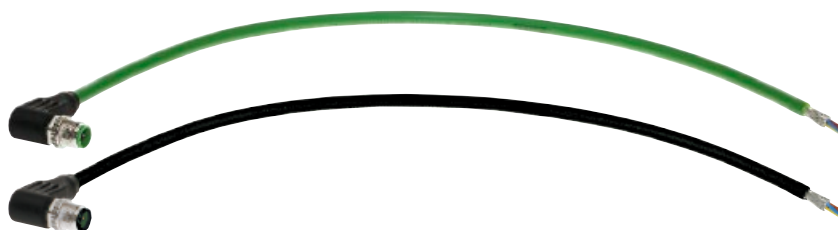
Colour Green / Black

Advantages

Robust design
Use on-site made possible by IP 65 / IP 67 protection
PUR variants are useable as trailing cables

Identification	PUR	Part number PVC	Drawing	Dimensions in mm
Han® M12 System cable, angled, 4-wire	Green	Black		
Length 1.0 m	21 03 485 3401	09 47 808 0002		
Length 1.5 m	21 03 485 3451	09 47 808 0003		
Length 3.0 m	21 03 485 3403	09 47 808 0005		
Length 5.0 m	21 03 485 3405	09 47 808 0006		
Length 7.5 m	21 03 485 3457	09 47 808 0022		
Length 10.0 m	21 03 485 3410	09 47 808 0011		
Length 20.0 m	21 03 485 3420	09 47 808 0013		

System cables



Han® M12

System cable, 4-wire, angled

Han® M12 connection cable, D-coding, for harsh industrial environments
second side open

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector types	1x Han® M12 D-coding, angled, overmoulded second side open
Cable types	4 x AWG 22/7, Star quad, double shielding
Sheath material	PUR / PVC
Wiring	4-pole
Transmission performance	Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Fully shielded, 360° shielding contact

Operating temperature range –25 °C ... +70 °C

Standard lengths 1 m / 1.5 m / 3 m / 5 m / 7.5 m / 10 m / 20 m
other lengths available on request

Colour Green / Black

Advantages

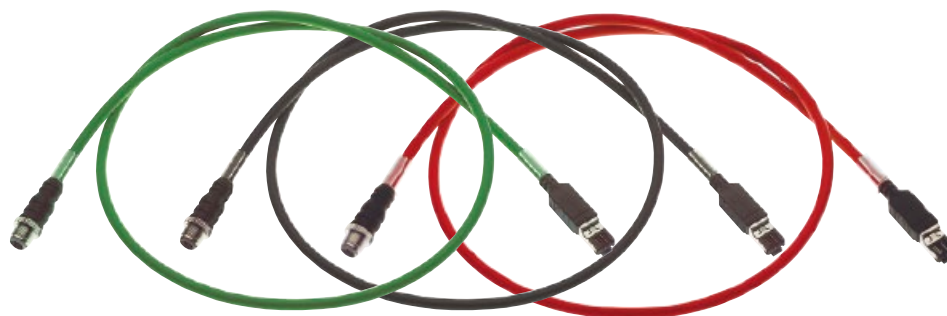
Robust design
Use on-site made possible by IP 65 / IP 67 protection
PUR variants are useable as trailing cables

M12
D-coding

Identification	Part number		Drawing	Dimensions in mm
	PUR	PVC		
Han® M12 System cable, angled, 4-wire	Green	Black		
Length 1.0 m	21 03 585 3401	09 47 800 0002		
Length 1.5 m	21 03 585 3451	09 47 800 0003		
Length 3.0 m	21 03 585 3403	09 47 800 0005		
Length 5.0 m	21 03 585 3405	09 47 800 0006		
Length 7.5 m	21 03 585 3457	09 47 800 0022		
Length 10.0 m	21 03 585 3410	09 47 800 0011		
Length 20.0 m	21 03 585 3420	09 47 800 0013		

B-1
91

System cables



Han® M12 / RJ45
System cable, 4-wire

Han® M12 connection cable, D-coding, to RJ45 (IP 20), overmoulded

IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☒	Cat. 5	☒	Cat. 6	☐
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Connector types	Han® M12 D-coding, overmoulded (IP 65 / IP 67) RJ45 4-pole, contacts 1/2 and 3/6, overmoulded (IP 20)
Cable types	4 x AWG 22/7, Star quad, double shielding
Sheath material	PUR / PVC
Wiring	4-pole
Transmission performance	Cat. 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Fully shielded, 360° shielding contact

Operating temperature range –25 °C ... +70 °C

Standard lengths 1 m / 3 m / 5 m / 10 m
other lengths available on request

Colour Green / Black
Red (SERCOS III)

Advantages Robust design
PUR variants are useable as trailing cables
PROFINET compliant

Contact assignment	Signal	M12 D-coding	RJ45
	TD+	1	1
	TD-	3	2
	RD+	2	3
	RD-	4	6

Identification	PUR	Part number PVC	SERCOS III PUR	Drawing	Dimensions in mm
Han® M12 / RJ45 System cable, 4-adrig	Green	Black	Red		
Length 1.0 m	09 45 700 5022	09 45 700 5063	09 47 220 2003 018		
Length 3.0 m	09 45 700 5025	09 45 700 5066	09 47 220 2005 018		
Length 5.0 m	09 45 700 5027	09 45 700 5068	09 47 220 2007 018		
Length 10.0 m	09 45 700 5051	09 45 700 5073	09 47 220 2012 018		
Length 20.0 m	09 45 700 5053	09 45 700 5075	09 47 220 2014 018		

System cables

Additional technical information about overmoulded System cables M12

IP 20	☒	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☒	Cat. 5	☒	Cat. 6	☐
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Electrical characteristics at 20 °C

Contact resistance:	$\leq 20 \text{ m}\Omega$
Insulation resistance:	$\geq 500 \text{ M}\Omega$
Dielectric withstand voltage:	
contact - contact	1 kV
contact - ground	1.5 kV

Electrical characteristics after damp heat cycles

Contact resistance:	$\leq 20 \text{ m}\Omega$
Insulation resistance:	$\geq 100 \text{ M}\Omega$
Dielectric withstand voltage:	
contact - contact	1 kV
contact - ground	1.5 kV

For reliable and proof connection it is recommended to use the dynamometric screwdriver Han® M12 (part number 09 99 000 0382; see page B·1 104).

Panel feed-throughs



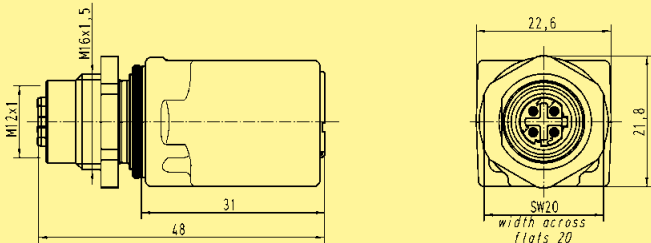
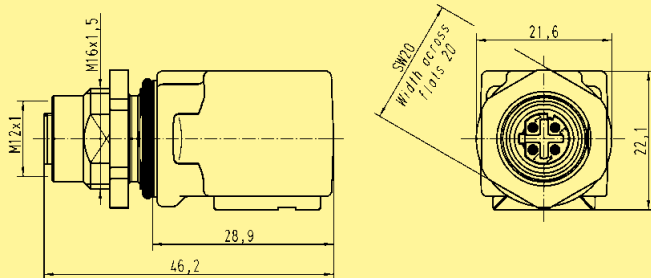
Han® M12

Panel feed-through D-coding

M12 Panel feed-through for control or distributor cabinets

IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☒	Cat. 5	☒	Cat. 6	☐
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Number of ports, Copper / Termination	2 / 1x M12 D-coding (IP 65 / IP 67) 1x RJ45 (IP 20)
Transmission performance	Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Mounting	Screwable to steel plate covers
Dimensions	See drawing
Panel cut-out	Diameter 16.5 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +85 °C
Housing material	Metal / plastic
Colour	Black
Advantages	Simple mounting RJ45 plug-compatible on back side PROFINET compliant

Identification	Part number	Drawing	Dimensions in mm
Han® M12 Panel feed-through D-coding straight	21 03 381 2400		
Han® M12 Panel feed-through D-coding angled	21 03 381 4400		

IP 20**RJ45**

- Connectors [on page B·1 8]
- System cables [on page B·1 12]
- Distribution modules and Outlets [on page B·1 22]

IP 65 / IP 67**HARTING PushPull**

- Connectors [on page B·1 24]
- System cables [on page B·1 26]
- Panel feed-throughs [on page B·1 32]
- Distribution modules and Outlets [on page B·1 34]

Han® PushPull

- Connectors [on page B·1 36]
- System cables [on page B·1 44]
- Panel feed-throughs / Gender Changer [on page B·1 48]

Han® 3 A

- Connectors [on page B·1 62]
- System cables [on page B·1 64]
- Panel feed-throughs [on page B·1 68]
- Distribution modules and Outlets [on page B·1 74]

Han® 3 A RJ45 Hybrid

- Connectors [on page B·1 78]
- System cables [on page B·1 80]
- Panel feed-throughs [on page B·1 82]
- Cables [on page B·1 84]

M12 D-coding

- Connectors [on page B·1 86]
- System cables [on page B·1 88]
- Panel feed-throughs [on page B·1 94]

Cables

- Type A, B, C [on page B·1 98]
- Type B, Outdoor [on page B·1 101]
- Ha-VIS EtherRail® [on page B·1 102]

Tools

[on page B·1 106]

Cables



Industrial Cat. 5 Standard cable, 4-wire

Type A

for permanent installation or to make up PROFINET system cables

IP 20	☐	IP 65 / IP 67	☐	PVC	Cat. 5	☒	Cat. 6	☐
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Cable structure	Star quad, double shielding
Core structure	4 x AWG 22/1, solid
Wire insulation	PE, Ø 1.5 mm
Sheath material	PVC
Cable sheath diameter	6.5 mm
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Shielding foil and shielding braid

Operating temperature range –40 °C ... +75 °C

Standard lengths 20 m / 50 m / 100 m / 500 m

Colour Green

Printing HARTING specific printing

Advantages

Robust design suitable for industry

PROFINET compliant

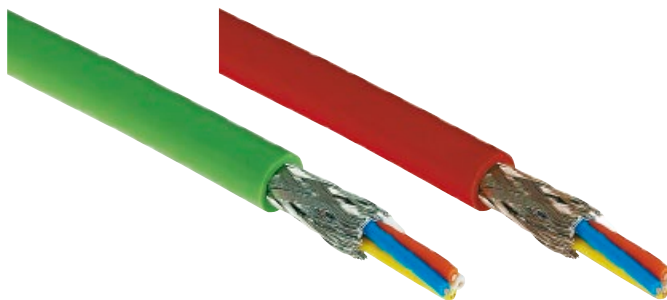
Easy stripping of cable sheath and screening braid with stripping tool **09 45 800 0000**

RoHS compliant

Identification	Part number PVC	Drawing	Dimensions in mm
Industrial Cat. 5 Standard cable Type A, 4-wire	Green		
20 m ring	09 45 600 0130		
50 m ring	09 45 600 0140		
100 m ring	09 45 600 0100		
500 m drum	09 45 600 0110		



Cables



Industrial Cat. 5 stranded cable, 4-wire
Type B
to make up PROFINET / SERCOS III system cables

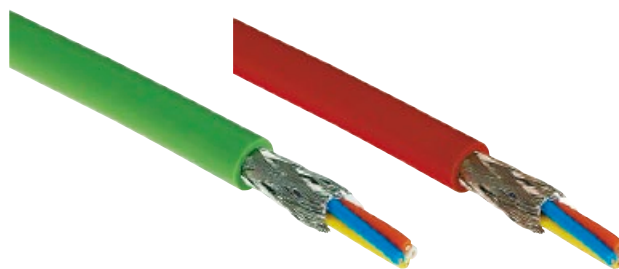
IP 20	☐	IP 65 / IP 67	☐	PVC		Cat. 5	☒	Cat. 6	☐
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Cable structure	Star quad, double shielding
Core structure	4 x AWG 22/7, tinned copper wire, stranded
Wire insulation	PE, Ø 1.56 mm
Sheath material	PVC
Cable sheath diameter	6.5 mm
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Shielding foil and shielding braid
Operating temperature range	–40 °C ... +70 °C
Standard lengths	20 m / 50 m / 100 m / 500 m
Colour	Green (PROFINET) Red (SERCOS III)
Printing	HARTING specific printing
Advantages	Robust design suitable for industry PROFINET compliant (Green) SERCOS III compliant (Red) Easy stripping of cable sheath and screening braid with stripping tool 09 45 800 0000 RoHS compliant

Identification	PUR	Part number PVC	SERCOS III PVC	Drawing	Dimensions in mm
Industrial Cat. 5 stranded cable Type B, 4-wire	Green	Green	Red		
20 m ring	09 45 600 0139	09 45 600 0132	09 45 600 0134		
50 m ring	09 45 600 0149	09 45 600 0142	09 45 600 0144		
100 m ring	09 45 600 0109	09 45 600 0102	09 45 600 0104		
500 m drum	09 45 600 0119	09 45 600 0112	09 45 600 0114		

Cables

Industrial Cat. 5 stranded cable, 4-wire,
useable as trailing cables,
Type C
to connect to mobile equipment
to make up PROFINET / SERCOS III system cables



IP 20	☐	IP 65 / IP 67	☐	PUR	Cat. 5	☒	Cat. 6	☐
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Cable structure	Star quad, double shielding
Core structure	4 x AWG 22/7, stranded
Wire insulation	PE, Ø 1.5 mm
Sheath material	PUR
Cable sheath diameter	6.5 mm
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Shielding foil and shielding braid
Operating temperature range	–40 °C ... +70 °C

Standard lengths	20 m / 50 m / 100 m / 500 m
Colour	Green (PROFINET) Red (SERCOS III)
Printing	HARTING specific printing

Advantages	Robust design suitable for industry PROFINET compliant (Green) SERCOS III compliant (Red) Useable as trailing cables Easy stripping of cable sheath and screening braid with stripping tool 09 45 800 0000 RoHS compliant
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Identification	Part number		Drawing	Dimensions in mm
	PUR	SERCOS III PUR		
Industrial Cat. 5 stranded cable, 4-wire, useable as trailing cables, Type C				
	Green	Red		
20 m ring	09 45 600 0131	09 45 600 0137		
50 m ring	09 45 600 0141	09 45 600 0147		
100 m ring	09 45 600 0101	09 45 600 0107		
500 m drum	09 45 600 0111	09 45 600 0117		

Cables



Industrial Cat. 5 stranded cable, 4-wire,
Type B, outdoor
to make up PROFINET system cables

IP 20	☐	IP 65 / IP 67	☐	PVC	Cat. 5	☒	Cat. 6	☐
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Cable structure	Star quad, double shielding
Core structure	4 x AWG 22/7, stranded
Wire insulation	PE, Ø 1.56 mm
Sheath material	PVC
Cable sheath diameter	6.5 mm
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Shielding foil and shielding braid
Operating temperature range	–45 °C ... +60 °C
Standard lengths	20 m / 50 m / 100 m / 500 m
Colour	Black
Printing	HARTING specific printing

Advantages

Robust design suitable for industry
PROFINET compliant
UV protected
Easy stripping of cable sheath and screening braid with
stripping tool **09 45 800 0000**
RoHS compliant

Identification	Part number PVC	Drawing	Dimensions in mm
Industrial Cat. 5 stranded cable, 4-wire, Type B, outdoor	Black		
20 m ring 50 m ring 100 m ring 500 m drum	09 45 600 0135 09 45 600 0145 09 45 600 0105 09 45 600 0115		



Cables



Ha-VIS EtherRail®
stranded cable, Cat. 5, 4-wire
for installation within and outside rail vehicles

IP 20	☐	IP 65 / IP 67	☐	Elastomer	Cat. 5	☒	Cat. 6	☐
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Cable structure	Star quad, double shielding
Core structure	4 x AWG 22/7, tinned copper wire, stranded
Wire insulation	PE-Foam Skin, Ø 1.5 mm
Sheath material	Elastomer, electron beam cross-linked
Cable sheath diameter	6.6 +/-0.2 mm
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Shielding foil and shielding braid
Operating temperature range	-40 °C ... +90 °C
Standard lengths	100 m / 500 m / 1000 m
Colour	Black
Tests / Certificats	Tests and certificats according to DIN, N FF, BS and ASTM, detail information see Technical Data sheet

Advantages	Robust design Fire protection according to EN 45 545-1, -2 and -5 Flame-retardant and heat resistant according to DIN 5510 (1-4) and EN 50 264-1 UV protected RoHS compliant Halogen free small Ø permits RJ45 assembly
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Identification	Part number Elastomer	Drawing	Dimensions in mm
Ha-VIS EtherRail® stranded cable, Cat. 5 4-wire 100 m ring 500 m drum 1000 m drum	Black 09 45 600 0108 09 45 600 0118 09 45 600 0128		

Cables



Ha-VIS EtherRail®

ultra flexible cable, Cat. 5, 4-wire

for installation within and outside rail vehicles and especially between coaches

IP 20	☐	IP 65 / IP 67	☐	Elastomer	Cat. 5	☒	Cat. 6	☐
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Cable structure	Star quad, double shielding
Core structure	4 x AWG 22/19, tinned copper wire, ultra flexible
Wire insulation	PE, Ø 1.98 mm
Sheath material	Elastomer, electron beam cross-linked
Cable sheath diameter	7.4 +/- 1 mm
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Shielding	Shielding foil and shielding braid
Operating temperature range	-40 °C ... +90 °C
Standard lengths	100 m / 500 m / 1000 m
Colour	Black
Tests / Certificats	Tests and certificats according to DIN, N FF, BS and ASTM, detail information see Technical Data sheet

Advantages

Robust design, especially suitable between coaches
 Fire protection according to EN 45 545-1, -2 and -5
 Flame-retardant and heat resistant according to DIN 5510 (1-4)
 and EN 50 264-1
 UV protected
 RoHS compliant
 Halogen free

Identification	Part number Elastomer	Drawing	Dimensions in mm
Ha-VIS EtherRail® ultra flexible cable, Cat. 5 4-wire 100 m ring 500 m drum 1000 m drum	Black 09 45 600 0138 09 45 600 0148 09 45 600 0158		

System cables

Additional technical information about overmoulded System cables

IP 20	☒	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Electrical characteristics at 20 °C

Contact resistance:	$\leq 20 \text{ m}\Omega$
Insulation resistance:	$\geq 500 \text{ M}\Omega$
Dielectric withstand voltage:	
contact - contact	1 kV
contact - ground	1.5 kV

Electrical characteristics after damp heat cycles

Contact resistance:	$\leq 20 \text{ m}\Omega$
Insulation resistance:	$\geq 100 \text{ M}\Omega$
Dielectric withstand voltage:	
contact - contact	1 kV
contact - ground	1.5 kV

IP 20**RJ45**

- Connectors [on page B·1 8]
- System cables [on page B·1 12]
- Distribution modules and Outlets [on page B·1 22]

IP 65 / IP 67**HARTING PushPull**

- Connectors [on page B·1 24]
- System cables [on page B·1 26]
- Panel feed-throughs [on page B·1 32]
- Distribution modules and Outlets [on page B·1 34]

Han® PushPull

- Connectors [on page B·1 36]
- System cables [on page B·1 44]
- Panel feed-throughs / Gender Changer [on page B·1 48]

Han® 3 A

- Connectors [on page B·1 62]
- System cables [on page B·1 64]
- Panel feed-throughs [on page B·1 68]
- Distribution modules and Outlets [on page B·1 74]

Han® 3 A RJ45 Hybrid

- Connectors [on page B·1 78]
- System cables [on page B·1 80]
- Panel feed-throughs [on page B·1 82]
- Cables [on page B·1 84]

M12 D-coding

- Connectors [on page B·1 86]
- System cables [on page B·1 88]
- Panel feed-throughs [on page B·1 94]

Cables

- Type A, B, C [on page B·1 98]
- Type B, Outdoor [on page B·1 101]
- Ha-VIS EtherRail [on page B·1 102]

Tools

[on page B·1 106]

Identification	Part number	
HARTING RJ Industrial® Stripping Tool Stripping tool for Ethernet cables including blade cassette Spare blade cassette	09 45 800 0000 09 45 800 0001	 The RJ Industrial Stripping Tool is ready to remove insulation from Ethernet cables for fast mounting with diameters from 2.5 to 8 mm quick and easy. It allows to remove cable sheath and shielding braid in one.
Stripping tool	09 45 800 0002	
HARTING RJ Industrial® LSA-Punch Down Tool	09 45 800 0020	 The LSA-Punch Down Tool is used to wire RJ45 Industrial Metal Outlets (part no. 09 45 815 1100). The various conductors are cut to length and inserted into the insulation displacement contacts in a single pass.
Han® M12 dynamometric screwdriver SW 18 or 13	09 99 000 0382	
Cable shear	09 45 800 0004	
Wire cutter	09 45 800 0005	

IP 20

RJ45

- Connectors [on page B-2 8]
- System cables [on page B-2 14]
- Distribution modules and Outlets [on page B-2 21]

RJ45

IP 65 / IP 67

HARTING PushPull

- Connectors [on page B-2 24]
- System cables [on page B-2 30]
- Panel feed-throughs [on page B-2 32]
- Distribution modules and Outlets [on page B-2 34]

HARTING
PushPull**Han® PushPull**

- Connectors [on page B-2 36]
- System cables [on page B-2 44]
- Panel feed-throughs / Gender Changer [on page B-2 46]

Han®
PushPull**Han® 3 A**

- Connectors [on page B-2 54]
- System cables [on page B-2 58]
- Panel feed-throughs [on page B-2 60]
- Distribution modules and Outlets [on page B-2 66]

Han® 3 A

Han® 3 A RJ45 Hybrid

- Connectors [on page B-2 70]
- System cables [on page B-2 72]
- Panel feed-throughs [on page B-2 74]
- Cables [on page B-2 76]

Han® 3 A
RJ45 Hybrid**har-speed M12**

- Connectors [on page B-2 78]
- System cables [on page B-2 80]

har-speed
M12**Han-Max®**

- Connectors [on page B-2 82]
- Panel feed-throughs [on page B-2 86]

Han-
Max®**Cables**

- Industrial Cat. 6_A [on page B-2 90]
- Industrial Cat. 5 [on page B-2 93]
- Industrial Cat. 7 [on page B-2 96]

Cables

Tools

[on page B-2 100]

Tools

B-2
1

CONTENTS	PAGE
Introduction	B-2 6
Cabling IP 20	
Connector sets	
HARTING RJ Industrial® Connector set, 8-pole	B-2 8
HARTING RJ Industrial® 10G Connector set, 8-pole	B-2 10
HARTING RJ Industrial® PN Cable jack, 8-pole	B-2 12
System cables	
HARTING Industrial Ethernet Patch cable RJ45, overmoulded, 8-wire, Cat. 5 / 5e	B-2 14
HARTING Industrial Ethernet Patch cable RJ45, overmoulded, 8-wire, Cat. 6	B-2 16
Ha-VIS Smart patch cable, IP 20, 8-wire, Cat. 6	B-2 18
HARTING RJ Industrial® System cable, 8-wire, Cat. 6	B-2 20
Distribution modules and Outlets	
HARTING Cabinet Outlet RJ45	B-2 21
Cabling IP 65 / IP 67	
HARTING PushPull	
Connector sets	
HARTING PushPull RJ45 Connector set, 8-pole	B-2 24
HARTING PushPull RJ45 10G Connector set, 8-pole	B-2 26
HARTING PushPull LC duplex Connector set	B-2 28
System cables	
HARTING PushPull RJ45 System cable, 8-wire	B-2 30
HARTING PushPull RJ45 System cable, 8-wire, to RJ45 (IP 20)	B-2 31
Panel feed-throughs	
HARTING PushPull RJ45 Panel feed-through	B-2 32

CONTENTS	PAGE
Distribution modules and Outlets	
HARTING PushPull RJ45 Outlet	B-2 34
Han® PushPull	
Connector sets	
Han® PushPull RJ45 Connector set, 8-pole, plastic	B-2 36
Han® PushPull RJ45 10G Connector set, 8-pole, plastic	B-2 38
Han® PushPull RJ45 Connector set, 8-pole, metal	B-2 40
Han® PushPull RJ45 10G Connector set, 8-pole, metal	B-2 42
System cables	
Han® PushPull RJ45 System cable, 8-wire	B-2 44
Panel feed-throughs / Gender Changer	
Han® PushPull RJ45 Panel feed-through, 8-pole, plastic	B-2 46
Han® PushPull RJ45 Panel feed-through, 8-pole, metal	B-2 48
Han® PushPull RJ45 Gender Changer, 8-pole	B-2 50
Han® 3 A	
Connector sets	
Han® 3 A RJ45 Connector set, 8-pole	B-2 54
Han® 3 A RJ45 10G Connector set, 8-pole	B-2 56
System cables	
Han® 3 A RJ45 System cable, 8-wire	B-2 58
Han® 3 A RJ45 System cable, 8-wire; IP 65 / IP 67 to IP 20	B-2 59
Panel feed-throughs	
Han® 3 A RJ45 Panel feed-through, Cat. 5	B-2 60
Han® 3 A RJ45 10G Panel feed-through, Cat. 6	B-2 62
Han® 3 A RJ45 Double coupling	B-2 64

CONTENTS	PAGE
Distribution modules and Outlets	
Han® 3 A RJ45 Metal Outlet, Cat. 6	B-2 66
Han® 3 A RJ45 Metal Outlet, Cat. 5	B-2 67
Han® 3 A RJ45 Hybrid	
Connector sets	
Han® 3 A RJ45 Hybrid 10G Connector set, 8-pole	B-2 70
System cables	
Han® 3 A RJ45 Hybrid System cable, 8-wire	B-2 72
Han® 3 A RJ45 Hybrid System cable, 8-wire, Outdoor	B-2 73
Panel feed-throughs	
Han® 3 A RJ45 Hybrid Panel feed-through	B-2 74
Cables	
Industrial Ethernet Hybrid cable, 8-wire, PUR	B-2 76
har-speed M12	
Connector sets	
har-speed M12 Connector set, 8-pole	B-2 78
Systemkabel	
har-speed M12 System cable, 8-wire	B-2 80
Han-Max®	
Connector sets	
Han-Max® RJ45 Connector set, 8-pole	B-2 82
Han-Max® RJ45 10G Connector set, 8-pole	B-2 84
Panel feed-throughs	
Han-Max® RJ45 Panel feed-through	B-2 86

CONTENTS	PAGE
----------	------

Cables	
---------------	--

Industrial Cat. 6 _A cable, stranded, 8-wire, PVC	B-2 90
---	--------

Industrial Cat. 6 _A cable, stranded, 8-wire, PUR	B-2 91
---	--------

Industrial Cat. 6 _A cable, stranded, 8-wire, PVC, Outdoor	B-2 92
--	--------

Industrial Cat. 5 cable, stranded, 8-wire, PUR	B-2 93
--	--------

Industrial Cat. 5 / 5e cable, stranded, 8-wire, PUR, trailing	B-2 94
---	--------

Industrial Cat. 5 cable, stranded, 8-wire, PVC, Outdoor	B-2 95
---	--------

Ha-VIS EtherRail® data cable, Cat. 7, stranded, 8-wire, PIMF	B-2 96
--	--------

Industrial Cat. 7 cable, stranded, 8-wire, PUR elastomer	B-2 97
--	--------

Tools	
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HARTING mounting tools	B-2 100
------------------------	---------

Introduction

The chapter on „HARTING Ethernet Cabling – 8-wire“ describes the complete HARTING product line for installing application-neutral cabling at machines, plants and buildings in an industrial environment.

The product line includes:

- Eight-wire cables for setting up flexible connections and for fixed installations.
- Connector components in IP 20 and IP 65 / IP 67, designed for on-site assembly
- Assembled system cables in IP 20 and IP 65 / IP 67 versions
- Industrial outlets, Panel feed-throughs and adapters in IP 20 and IP 65 / IP 67 versions
- Accessories and tools

The advantage of application-neutral eight-wire cabling is that all necessary services from all applications can be transmitted without needing to change cable.

This is especially important for all IP-based data, for control protocols and also for voice services such as those carried by Ethernet according to IEEE 802.3x.

- 10 and 100 Mbit/sec. Ethernet, corresponding to 10Base-T and 100Base-T (Fast Ethernet)
- Gigabit Ethernet according to IEEE 802.3ab, corresponding to 1000Base-T
- Voice over IP (VoIP)
- Analog voice, data and video signals
- Power over Ethernet (PoE) according to IEEE 802.3af and future applications such as:
- 10 Gigabit Ethernet according to IEEE 802.3an
- Power over Ethernet Plus (PoE+) according to IEEE 802.3af

and also Ethernet-based Fieldbus applications, with and without real-time functionality, such as:

- PROFINET (including PROFINET RT / real-time), according to IEC 61784-5-3
- EtherNet/IP, Modbus/TCP and Ethernet Powerlink

This type of cabling is globally standardized because of the advantages it offers and its distribution through ISO/IEC 11801. In Europe it has been established in EN 50173-3.

The special requirements for industrial cable use are described in the ISO/IEC 24702 and in its European equivalent EN 50173-3.

HARTING's eight-wire cabling components are specified, developed and manufactured in strict

technical compliance with the established requirements mentioned above.

The trends are towards higher transmission rates and larger bandwidths, but operators are also seeking environmentally-safe products and products which are safe in cases of malfunction or fire.

For these latter two areas of safety, HARTING is constantly developing and testing its products. Individual components are also certified accordingly.

Thus in this chapter, products are specified for:

- Cat. 5 (up to 100 MHz), Cat. 6 (up to 250 MHz), and Cat. 6A (up to 500 MHz)
- Non-Halogen cabling materials such as LSZH, FRNC and PUR
- Suitable for use in electrical or distribution cabinets under IP 20. Also for use in harsh industrial environments and for outdoor installations corresponding to IP 65 / IP 67

To the user, HARTING provides a high-performance, future-oriented line of cabling products which are sure to fulfill all present and future requirements.

An overview of the advantages of eight-wire cabling:

- Profile-independent cabling infrastructure which can be used for all Ethernet applications
- Supports all safety features and real-time requirements of various applications
- Can be extended and integrated into existing IT infrastructures without difficulty
- Conforms to ISO/IEC 24702 standard and facilitates roll-outs at companies operating internationally.
- The use of standardized connectors reduces product variety and simplifies the purchasing and storage of components
- Future-oriented design ensures the convenient application of new technologies such as Gigabit Ethernet or PoE
- Superior quality of the cabling system guarantees long life span and high operational reliability
- Simple and convenient planning, installation and reliable operation of the network - thus saving costs and delivering a high ROI
- The eight-wire generic cabling system is a part of HARTING's AUTOMATION IT network solution - all solutions coming from one source

IP 20**RJ45**

- Connectors [on page B·2 8]
- System cables [on page B·2 14]
- Distribution modules and Outlets [on page B·2 21]

IP 65 / IP 67**HARTING PushPull**

- Connectors [on page B·2 24]
- System cables [on page B·2 30]
- Panel feed-throughs [on page B·2 32]
- Distribution modules and Outlets [on page B·2 34]

Han® PushPull

- Connectors [on page B·2 36]
- System cables [on page B·2 44]
- Panel feed-throughs / Gender Changer [on page B·2 46]

Han® 3 A

- Connectors [on page B·2 54]
- System cables [on page B·2 58]
- Panel feed-throughs [on page B·2 60]
- Distribution modules and Outlets [on page B·2 66]

Han® 3 A RJ45 Hybrid

- Connectors [on page B·2 70]
- System cables [on page B·2 72]
- Panel feed-throughs [on page B·2 74]
- Cables [on page B·2 76]

har-speed M12

- Connectors [on page B·2 78]
- System cables [on page B·2 80]

Han-Max®

- Connectors [on page B·2 82]
- Panel feed-throughs [on page B·2 86]

Cables

- Industrial Cat. 6_A [on page B·2 90]
- Industrial Cat. 5 [on page B·2 93]
- Industrial Cat. 7 [on page B·2 96]

Tools

[on page B·2 100]

Connector sets

HARTING RJ Industrial®
Connector set, 8-pole
to make up RJ45 system cables



IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector type	RJ45 connector acc. to IEC 60 603-7
Number of contacts	8
Transmission performance	Category 6 _A / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s / 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact

Mounting	Field-assembly possible
Wire termination	Via piercing contacts

Cable options	
– Strand gauge	AWG 28/7 ... AWG 24/7 (stranded)
– Strand diameter	max. 1.05 mm (including insulation)
– Cable sheath diameter	6.1 mm ... 6.9 mm

Degree of protection	IP 20
Operating temperature range	–40 °C ... +70 °C
Housing material	Polyamide, UL94 V-0
Colour	Black

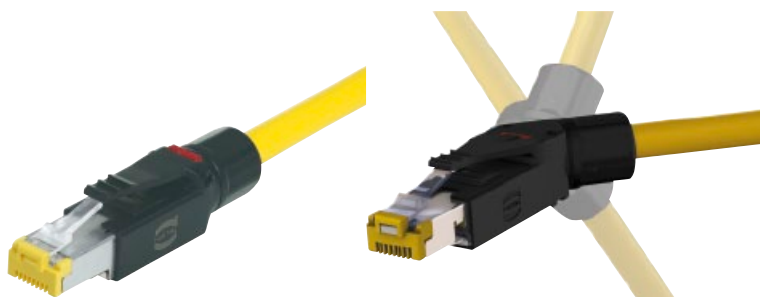
Advantages	Field-assembly connector, Cat. 6
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Mounting information	If the cable is assembled on both sides, please use one connector set with white and one connector set with blue cable manager (assures optimal transmission behavior)
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Identification	Part number	Drawing	Dimensions in mm
HARTING RJ Industrial® Connector set, 8-pole great package with 100 pieces Set consists of: Housing including shielding Splice element Cable gland Assembly instructions	09 45 151 1520 09 45 151 1520 XL		
HARTING RJ Industrial® Gigalink Mounting tools for HARTING RJ Industrial® Gigalink connectors	09 45 800 0520		

Connector sets

HARTING RJ Industrial® 10G
Connector set, 8-pole
to make up RJ45 system cables



IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector type	RJ45 connector acc. to IEC 60 603-7
Number of contacts	8
Transmission performance	Category 6 / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s / 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact

Mounting	Field-assembly possible
Wire termination	Via IDC contacts, tool-less
Cable options	
– Strand gauge	AWG 27 ... AWG 22 (solid / stranded)
– Strand diameter	max. 1.6 mm (including insulation)
– Cable sheath diameter	4.5 mm ... 9 mm
Degree of protection	IP 20
Operating temperature range	–40 °C ... +70 °C
Housing material	Polyamide, UL94 V-0
Colour	Black

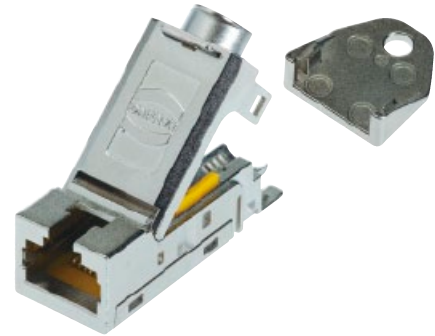
Advantages

RJ45 Ethernet-Data connector suitable for industry
Tool-less field-assembly with *HARAX*® rapid termination in IDC technology
Compact design
Ergonomical unlocking clip
Less weight assures shock- and vibration-resisting connection
Category of transmission Cat. 6
Suitable for termination of solid and stranded cables

Identification	Part number	Drawing	Dimensions in mm
HARTING RJ Industrial® 10G Connector set, 8-pole Set consists of: Housing including shielding Splice element Cable gland Assembly instructions straight	09 45 151 1560		
angled 45° angled version (four different cable outlets possible)	09 45 151 1561		
HARTING RJ Industrial® 10G colour clips for HARTING RJ Industrial® 10G connectors package with 50 pieces Colour:	White 09 45 850 0001 Grey 09 45 850 0002 Yellow 09 45 850 0003 Magenta 09 45 850 0005 Red 09 45 850 0007 Blue 09 45 850 0008 Green 09 45 850 0009 Brown 09 45 850 0010		

Connector sets

HARTING RJ Industrial® PN
Cable jack, 8-pole
to make up RJ45 system cables



IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector type	RJ45 connector acc. to IEC 60 603-7
Number of contacts	8
Transmission performance	Category 6 / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1 suitable for 1/10 Gbit Ethernet
Transmission rate	10/100 Mbit/s / 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact

Mounting	Field-assembly
Wire termination	With IDC contacts, tool-less
Cable options	Suitable for solid and stranded cores
– Strand gauge	AWG 27 ... AWG 24 (solid / stranded)
– Strand diameter	AWG 24 ... AWG 22 (solid / stranded)
– Cable sheath diameter	max. 1.6 mm (incl. insulation)
Degree of protection	5 mm ... 9 mm
Operating temperature range	IP 20
Housing material	–40 °C ... +70 °C
	Zinc die-cast, nickel-plated

Advantages

Compact and robust design	
360° shielding	
Suitable for solid and stranded wires	
Field-assembly	
quick termination in IDC technology	
Compatible with HIFF dimensions for use in:	
• Han® 3 A series with HIFF adapter	09 45 515 0024
• HARTING PushPull (V4)	
Compact bulkhead mounting housing	09 45 545 0028
EasyInstall bulkhead mounting housing	09 45 545 0032
• Han® PushPull (V14)	
Panel feed-through plastic	09 35 012 0331
Panel feed-through metal rectangular	09 35 012 0311
Panel feed-through metal circular	09 35 012 0312
• har-port	09 45 452 0000

Identification	Part number	Drawing	Dimensions in mm
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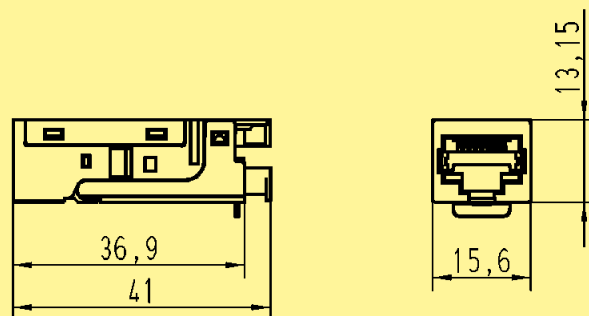
HARTING RJ Industrial® PN
Cable jack, 8-pole

for AWG 27 ... AWG 24

09 45 545 1561

for AWG 24 ... AWG 22

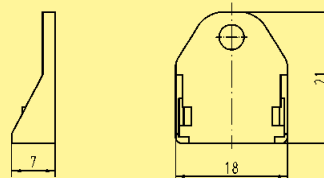
09 45 545 1562



Unlocking tool

for opening of the
HARTING RJ Industrial® cable jack

20 82 000 9916



RJ45

System cables



HARTING RJ Industrial®

Patch cable, overmoulded, 8-wire, Cat. 5 / Cat. 5e

RJ45 connection cable for control or distributor cabinets or within controllers

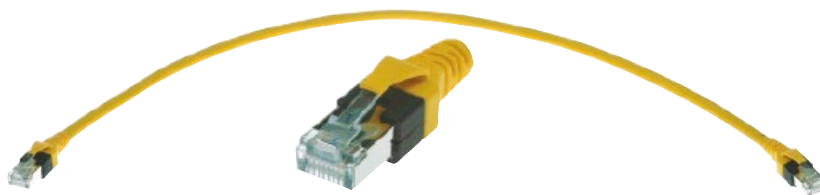
IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector types	RJ45, overmoulded, with locking lever protection
Cable types	4 x 2, Twisted Pair, shielded, SF/UTP
Sheath material	PUR, halogen free LSZH
Wiring	8-pole, 1:1
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Operating temperature range	0 °C ... +60 °C
Standard lengths	0.5 m / 1 m / 2 m / 3 m / 5 m / 10 m other lengths available on request
Colour	Yellow
Advantages	Robust industrial design High operational reliability in vibration-prone locations Halogen free RoHS compliant

Identification		Part number	Drawing	Dimensions in mm
HARTING RJ Industrial® Patch cable, 8-wire, Cat. 5 / 5e, overmoulded		Yellow		
Length	0.20	09 47 474 7001		
Length	0.30	09 47 474 7002		
Length	0.40	09 47 474 7003		
Length	0.50	09 47 474 7004		
Length	0.60	09 47 474 7005		
Length	0.70	09 47 474 7006		
Length	0.80	09 47 474 7007		
Length	0.90	09 47 474 7008		
Length	1.00	09 47 474 7009		
Length	1.50	09 47 474 7010		
Length	2.00	09 47 474 7011		
Length	2.50	09 47 474 7012		
Length	3.00	09 47 474 7013		
Length	3.50	09 47 474 7024		
Length	4.00	09 47 474 7014		
Length	5.00	09 47 474 7015		
Length	6.00	09 47 474 7016		
Length	7.00	09 47 474 7017		
Length	7.50	09 47 474 7018		
Length	8.00	09 47 474 7019		
Length	9.00	09 47 474 7020		
Length	10.00	09 47 474 7021		
Length	15.00	09 47 474 7022		
Length	20.00	09 47 474 7023		
HARTING RJ Industrial® colour clips for HARTING RJ Industrial® connectors package with 10 pieces Colour:				
	Grey	09 45 870 0002		
	Yellow	09 45 870 0003		
	Orange	09 45 870 0006		
	Red	09 45 870 0007		
	Blue	09 45 870 0008		
	Green	09 45 870 0009		
	Black	09 45 870 0011		



System cables



HARTING RJ Industrial®

Patch cable, overmoulded, 8-wire, Cat. 6

RJ45 connection cable for control or distributor cabinets or within controllers

IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector types	RJ45, overmoulded, with locking lever protection
Cable types	4 x 2, Twisted Pair, shielded, S/FTP Category 7 according to IEC 61 156-6, EN 50 288-4-2
Sheath material	PUR, halogen free LSZH
Wiring	8-pole, 1:1 or crossed
Transmission performance	Category 6 / Class E up to 250 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Operating temperature range	0 °C ... +60 °C

Standard lengths	0.5 m / 1 m / 2 m / 3 m / 5 m / 10 m other lengths available on request
Colour	Yellow

Advantages

Robust industrial design
Easy handling for all applications
Halogen free
RoHS compliant

Identification		Part number		Drawing	Dimensions in mm
HARTING RJ Industrial® Patch cable, 8-wire, Cat. 6, overmoulded		Yellow 1:1	Yellow crossed		
Length	0,20	09 47 474 7101	09 47 474 7141		
Length	0,30	09 47 474 7102	09 47 474 7142		
Length	0,40	09 47 474 7103	09 47 474 7143		
Length	0,50	09 47 474 7104	09 47 474 7144		
Length	0,60	09 47 474 7105	09 47 474 7145		
Length	0,70	09 47 474 7106	09 47 474 7146		
Length	0,80	09 47 474 7107	09 47 474 7147		
Length	0,90	09 47 474 7108	09 47 474 7148		
Length	1,00	09 47 474 7109	09 47 474 7149		
Length	1,50	09 47 474 7110	09 47 474 7150		
Length	2,00	09 47 474 7111	09 47 474 7151		
Length	2,50	09 47 474 7112	09 47 474 7152		
Length	3,00	09 47 474 7113	09 47 474 7153		
Length	4,00	09 47 474 7114	09 47 474 7154		
Length	5,00	09 47 474 7115	09 47 474 7155		
Length	6,00	09 47 474 7116	09 47 474 7156		
Length	7,00	09 47 474 7117	09 47 474 7157		
Length	7,50	09 47 474 7118	09 47 474 7158		
Length	8,00	09 47 474 7119	09 47 474 7159		
Length	9,00	09 47 474 7120	09 47 474 7160		
Length	10,00	09 47 474 7121	09 47 474 7161		
Length	15,00	09 47 474 7122	09 47 474 7162		
Length	20,00	09 47 474 7123	09 47 474 7163		
HARTING RJ Industrial® colour clips for HARTING RJ Industrial® connectors package with 10 pieces Colour:					
	Grey	09 45 870 0002			
	Yellow	09 45 870 0003			
	Orange	09 45 870 0006			
	Red	09 45 870 0007			
	Blue	09 45 870 0008			
	Green	09 45 870 0009			
	Black	09 45 870 0011			



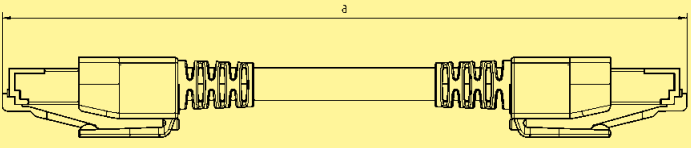
System cables



Ha-VIS Smart Patch Cable IP 20 Cat. 6

IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector types	HARTING RJ45 Industrial®
Cable types	4 x 2, Twisted Pair, shielded, AWG 27
Sheath material	FRNC
Wiring	8-pole, 1:1
Transmission performance	Category 6 / Class E up to 250 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Operating temperature range	–10 °C to +70 °C
Standard lengths	1 m / 2 m / 5 m / 7 m / 10 m other lengths available on request
Colour	Yellow
Advantages	Easy and fast illuminated detection of patch cables via integrated LEDs Compact and space saving plug by dual boot design Capable for Multiport applications Flame retardant Halogen free Colour coding option

Identification	Part number FRNC	Drawing	Dimensions in mm
Ha-VIS Smart Patch Cable IP 20 Cat. 6	Yellow		
Length 1.0 m	09 47 474 7201		
Length 2.0 m	09 47 474 7203		
Length 5.0 m	09 47 474 7206		
Length 7.0 m	09 47 474 7208		
Length 10.0 m	09 47 474 7211		
further lengths on request			

Identification	Part number	Drawing	Dimensions in mm
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Ha-VIS Smart Patchkabel
Detektor

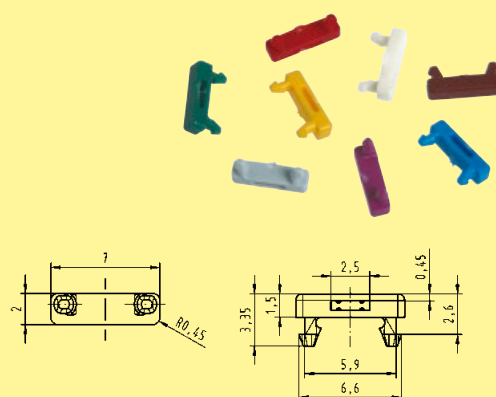
09 47 900 0001



HARTING RJ Industrial® 10G
colour clips

for HARTING RJ Industrial® 10G
connectors
package with 50 pieces

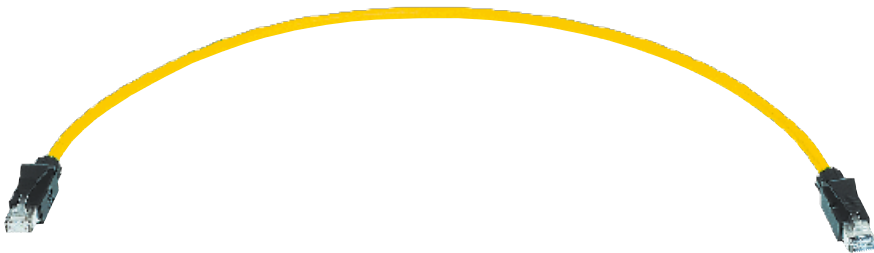
Colour:	White	09 45 850 0001
	Grey	09 45 850 0002
	Yellow	09 45 850 0003
	Magenta	09 45 850 0005
	Red	09 45 850 0007
	Blue	09 45 850 0008
	Green	09 45 850 0009
	Brown	09 45 850 0010



HARTING Ethernet Cabling – 8-wire



System cables



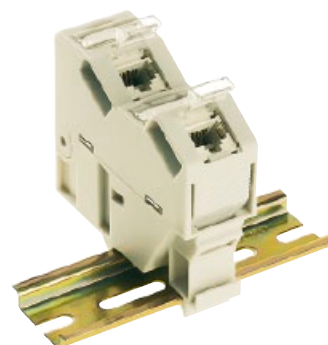
HARTING RJ Industrial®
System cable, 8-wire, Cat. 6
RJ45 connection cable for control or distributor cabinets or within controllers

IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector types	RJ45
Cable types	4 x 2, Twisted Pair, shielded, PIMF
Sheath material	PVC / PUR
Wiring	8-pole, 1:1
Transmission performance	Category 6 / Class E up to 250 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Operating temperature range	–10 °C ... +70 °C
Standard lengths	1.5 m / 3 m / 5 m / 10 m / 20 m other lengths available on request
Colour	Yellow
Advantages	Robust industrial design High operational reliability in vibration-prone locations

Identification	Part number		Drawing	Dimensions in mm
	PVC	PUR		
HARTING RJ Industrial® System cable, 8-wire, Cat. 6	Yellow	Yellow		
Length 1.5 m	09 45 751 1523	09 45 751 1563		
Length 3.0 m	09 45 751 1525	09 45 751 1565		
Length 5.0 m	09 45 751 1527	09 45 751 1567		
Length 10.0 m	09 45 751 1551	09 45 751 1572		
Length 20.0 m	09 45 751 1553	09 45 751 1574		

Distribution modules and Outlets



HARTING Cabinet Outlet RJ45, 8-pole

RJ45 distribution module for IP 20 environments (top-hat rail mounting)

IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Number of ports, Copper / Termination	2 / RJ45 (Twisted Pair)
Transmission performance	Category 6 / Class E up to 250 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Termination	Via IDC contacts, tool-less
Strand diameter	AWG 24 ... 22 (0.5 mm ... 0.65 mm) solid and stranded
Strand insulation	0.7 mm ... 1.6 mm
Cable diameter	6 mm ... 9 mm
Shielding	Fully shielded, 360° shielding contact
Mounting	To 35 mm top-hat mounting rail acc. to DIN EN 60 715, alignable
Dimensions (H x W x D)	82 x 28.4 x 74 mm
Degree of protection	IP 20
Operating temperature range	–20 °C ... +70 °C
Housing material	Polycarbonate, UL94 V-0
Colour	Light grey RAL 7035

Advantages

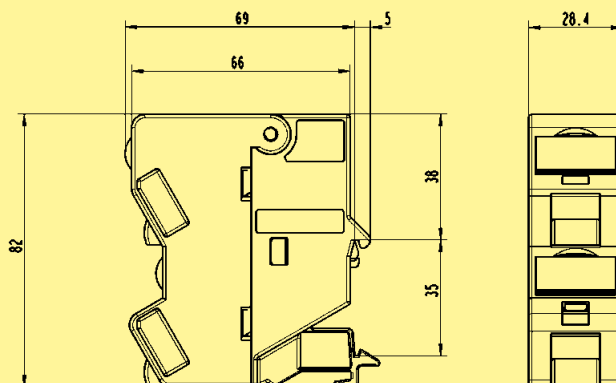
Simple mounting
Cable entering optionally from bottom or from top side
Dust protection caps
Port identification
Angled outputs

Identification	Part number	Drawing	Dimensions in mm
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HARTING Cabinet Outlet RJ45

consisting of:
2-port housing
including dust protection caps
and labels
2x RJ45 female modules, Cat. 6
Assembly instructions

20 76 102 8000



IP 20

RJ45

- Connectors [on page B·2 8]
- System cables [on page B·2 14]
- Distribution modules and Outlets [on page B·2 21]

IP 65 / IP 67

HARTING PushPull

- Connectors [on page B·2 24]
- System cables [on page B·2 30]
- Panel feed-throughs [on page B·2 32]
- Distribution modules and Outlets [on page B·2 34]

Han® PushPull

- Connectors [on page B·2 36]
- System cables [on page B·2 44]
- Panel feed-throughs / Gender Changer [on page B·2 46]

Han® 3 A

- Connectors [on page B·2 54]
- System cables [on page B·2 58]
- Panel feed-throughs [on page B·2 60]
- Distribution modules and Outlets [on page B·2 66]

Han® 3 A RJ45 Hybrid

- Connectors [on page B·2 70]
- System cables [on page B·2 72]
- Panel feed-throughs [on page B·2 74]
- Cables [on page B·2 76]

har-speed M12

- Connectors [on page B·2 78]
- System cables [on page B·2 80]

Han-Max®

- Connectors [on page B·2 82]
- Panel feed-throughs [on page B·2 86]

Cables

- Industrial Cat. 6_A [on page B·2 90]
- Industrial Cat. 5 [on page B·2 93]
- Industrial Cat. 7 [on page B·2 96]

Tools

[on page B·2 100]

Connector sets



HARTING PushPull RJ45
Connector set, 8-pole
to make up PushPull RJ45 system cables

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector type	HARTING PushPull RJ45 connector acc. to ISO/IEC 24 702, variant 4								
Number of contacts	8								
Transmission performance	Category 6 _A / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1								
Transmission rate	10/100 Mbit/s / 1/10 Gbit/s								
Shielding	Fully shielded, 360° shielding contact								
Mounting	Field-assembly possible								
Wire termination	Via piercing contacts								
Cable options									
– Strand gauge	AWG 28/7 ... AWG 24/7 (stranded)								
– Strand diameter	max. 1.05 mm (including insulation)								
– Cable sheath diameter	4.9 mm ... 8.6 mm								
Degree of protection	IP 65 / IP 67								
Operating temperature range	–40 °C ... +70 °C								
Housing material	Polyamide and polycarbonate, UL94 V-0								
Colour	Black								
Advantages	Space-saving connector assembly via PushPull interface Standard conform to ISO/IEC 24 702								
Mounting information	If the cable is assembled on both sides, please use one connector set with white and one connector set with blue cable manager (assures optimal transmission behavior)								

Identification	Part number	Drawing	Dimensions in mm
HARTING PushPull RJ45 Connector set, 8-pole plastic version great package with 100 pieces metal version Set consists of: PushPull housing including RJ45 connector and shielding Splice element Cable gland Assembly instructions	09 45 145 1520 09 45 145 1520 XL 09 45 195 1520		
Protection cover for PushPull connectors	09 45 845 0010		
HARTING RJ Industrial® Gigalink Mounting tools for HARTING RJ Industrial® Gigalink connectors	09 45 800 0520		

Connector sets

HARTING PushPull RJ45 10G
Connector set, 8-pole
to make up PushPull RJ45 system cables



IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector type	HARTING PushPull RJ45 connector acc. to ISO/IEC 24 702, variant 4
Number of contacts	8
Transmission performance	Category 6 / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s / 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact
Mounting	Field-assembly
Wire termination	Via IDC contacts, tool-less
Cable options	
– Strand gauge	AWG 27 ... AWG 22 (solid / stranded)
– Strand diameter	max. 1.6 mm (including insulation)
– Cable sheath diameter	4.9 mm ... 8.6 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +70 °C
Plastic version	
Housing material	Polyamide and polycarbonate, UL94 V-0
Colour	Black
Advantages	Space-saving connector assembly via PushPull interface Field-assembly connector, in IP 65 / IP 67 Standard conform to ISO/IEC 24 702

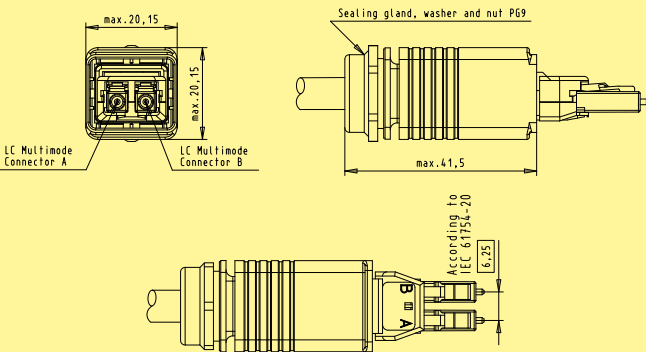
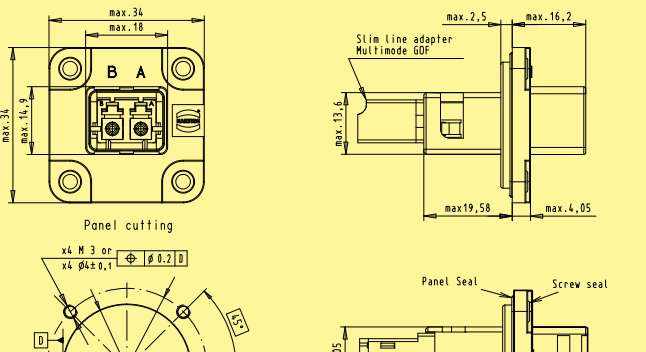
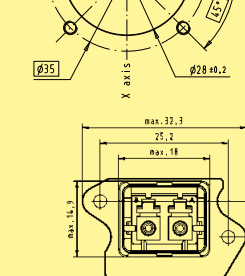
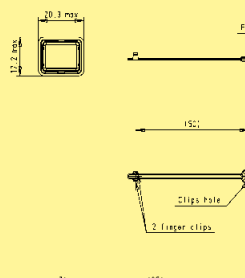
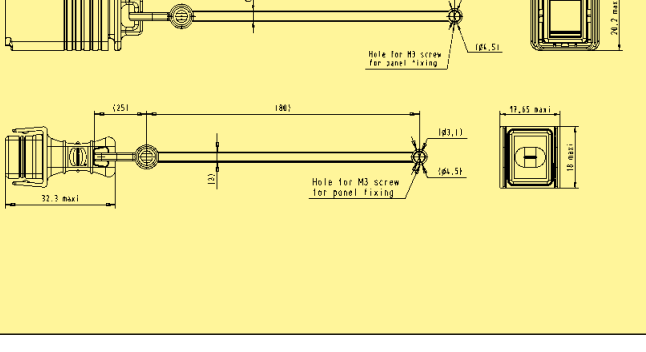
Identification	Part number	Drawing	Dimensions in mm
HARTING PushPull RJ45 10G Connector set, 8-pole plastic version metal version Set consists of: PushPull housing including RJ45 connector and shielding Splice element Cable gland Assembly instructions	09 45 145 1560 09 45 195 1560	contact no. 8 contact no. 1 mating face according to IEC 60 603-7 Dimensions valid for plastic version	
Protection cover for PushPull connectors plastic version	09 45 845 0010	20.3 max 12.2 max Fixing cord PG9 dust cap 150 1130 175 13 48 max Clips hole 2 finger clips	
HARTING PushPull RJ45 10G colour clips for HARTING PushPull RJ45 10G connectors package with 10 pieces Colour:	White 09 45 840 0011 Yellow 09 45 840 0013 Red 09 45 840 0017 Blue 09 45 840 0018 Green 09 45 840 0019	On request : color ring for Pg9 nut TB 09 45 840 001X	

Connector sets

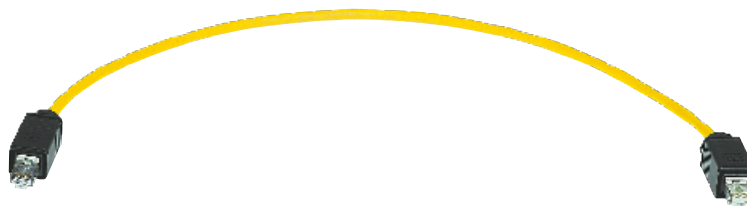
HARTING PushPull LC duplex
Connector set
Panel feed-through and connector

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☐
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Connector type	HARTING PushPull LC duplex connector acc. to IEC 61 754-20-100							
Number of contacts	2							
Transmission rate	10/100/1000 Mbit/s							
Locking	PushPull Technology acc. to IEC 61 076-3-106 variant 4							
Degree of protection	IP 65 / IP 67							
Mating face	LC acc. to IEC 61 754-20							
Cable diameter	4.9 mm ... 8.6 mm							
Mating cycles	min. 100							
Temperature range	-40 °C ... +85 °C							
Housing material	Plastic, Polyamide, UL94 V-0							
Colour	Black							
Advantages	Optical PushPull connector based on LC with small form factor (requires 50 % compared to SC and ST) Optical module with inserts acc. to IEC 61 754-20 One-piece LC body assures high mechanical stability A & B parts identification for duplex according TIA 568 standard							

Identification	Part number	Drawing	Dimensions in mm
HARTING PushPull LC duplex Connector set			
Cable side			
Multimode GOF	09 57 402 0500 000		
Singlemode GOF	09 57 402 0501 000		
Device side EasyInstall			
Multimode GOF	09 57 441 0500 000		
Singlemode GOF	09 57 441 0501 000		
Device side Compact housing			
Multimode GOF	09 57 442 0502 001		
Singlemode GOF	09 57 442 0503 001		
Protection cover for PushPull connectors	09 45 845 0010		
for PushPull device side with active locking M3	09 45 845 0014		
with passive locking M3	09 45 845 0009		

System cables



HARTING PushPull RJ45

System cable, 8-wire

RJ45 connection cable HARTING PushPull for IP 65 / IP 67 applications

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector types	HARTING PushPull
Cable types	4 x 2, Twisted Pair, shielded, PIMF
Sheath material	PVC / PUR
Wiring	8-pole, 1:1
Transmission performance	Category 6 / Class E up to 250 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Operating temperature range	–10 °C ... +70 °C
Standard lengths	1.5 m / 3 m / 5 m / 10 m / 20 m other lengths available on request
Colour	Yellow
Advantages	Standardised PushPull interface for IP 65 / IP 67 according to ISO/IEC 24 702 Easy and safe operation Especially space-saving

Identification	Part number		Drawing	Dimensions in mm
	PVC	PUR		

HARTING PushPull RJ45
System cable, 8-wire

Yellow

Yellow

Length 1.5 m

09 45 745 1523

09 45 744 1523

Length 3.0 m

09 45 745 1525

09 45 744 1525

Length 5.0 m

09 45 745 1527

09 45 744 1527

Length 10.0 m

09 45 745 1551

09 45 744 1532

Length 20.0 m

09 45 745 1553

09 45 744 1534

System cables



HARTING PushPull RJ45

System cable, 8-wire

connection cable HARTING PushPull to RJ45 (IP 20)

IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☒	Cat. 5	☐	Cat. 6	☒
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Connector types	HARTING PushPull and RJ45 (IP 20)
Cable types	4 x 2, Twisted Pair, shielded, PIMF
Sheath material	PVC
Wiring	8-pole, 1:1
Transmission performance	Category 6 / Class E up to 250 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Operating temperature range	–10 °C ... +70 °C
Standard lengths	1.5 m / 3 m / 5 m / 10 m / 20 m other lengths available on request
Colour	Yellow
Advantages	Standardised PushPull interface for IP 65 / IP 67 according to ISO/IEC 24 702 Easy transition from harsh industrial environment into saved IP 20 environment

Identification	Part number PVC	Drawing	Dimensions in mm
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HARTING PushPull RJ45
System cable, 8-wire

Yellow

Length 1.5 m	09 45 701 1509
Length 3.0 m	09 45 701 1510
Length 5.0 m	09 45 701 1511
Length 10.0 m	09 45 701 1512
Length 20.0 m	09 45 701 1514

Panel feed-throughs



HARTING PushPull RJ45 10G

Panel feed-through, 8-pole

RJ45 Panel feed-through for control or distributor cabinets

IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☒	Cat. 5	☐	Cat. 6	☒
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Number of ports, Copper / Termination

2 / 1x RJ45 (IP 20)
1x PushPull RJ45 (IP 65 / IP 67)

Transmission performance

Category 6 / Class E_A up to 500 MHz
according to ISO/IEC 11 801:2002, EN 50 173-1

Transmission rate

10/100 Mbit/s / 1/10 Gbit/s

Mounting

Screwable to steel plate covers

Dimensions

See drawing

Panel cut-out

21 mm x 27 mm (Compact)
ø 28 mm ... 30 mm (EasyInstall)

Degree of protection

IP 65 / IP 67

Operating temperature range

–40 °C ... +70 °C

Housing material

Polycarbonate, UL94 V-0

Colour

Black

Advantages

Small, space-saving PushPull interface with IP 65 / IP 67

Easy handling of RJ45 system cables in the control cabinet

Mounting to casings

Category of transmission Cat. 6

IP 65 / IP 67 standard interface for structured cabling for
buildings according to ISO/IEC 24 702 respectively EN 50 173-3

Identification	Part number	Drawing	Dimensions in mm
HARTING PushPull RJ45 Compact Panel feed-through plastic consisting of: Housing bulkhead mounting Compact including flat gasket Assembly instructions board drillings for M2.5	09 45 245 1560		
HARTING PushPull RJ45 EasyInstall Panel feed-through plastic consisting of: Housing bulkhead mounting Easy Install including integrated seal Assembly instructions board drillings for M3	09 45 245 1590		
Protection cover IP 65 / IP 67, with fixing ring Version with active locking and plastic strap for fixing screw M3 Version with active locking without fixing screw Version with passive locking and plastic strap for fixing screw M3 Version with passive locking and Nylon strap for fixing screw M2,5 / M3	09 45 845 0014 09 45 845 0015 09 45 845 0009 09 45 845 0011 024		
Transport protection for housing bulkhead mounting, IP 40	09 45 845 0003		

Distribution modules and Outlets

HARTING PushPull RJ45

Outlet, 8-pole

RJ45 Industrial Outlet for IP 65 / IP 67 environments



IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Number of ports, Copper / Termination	2 / PushPull RJ45 (IP 65 / IP 67)
Transmission performance	Category 6 / Class E up to 250 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Termination	Via IDC contacts, tool-less
Strand diameter	AWG 24 ... 22 (0.5 mm ... 0.65 mm) solid and stranded
Strand insulation	0.7 mm ... 1.6 mm
Cable diameter	6 mm ... 9 mm
Shielding	Fully shielded, 360° shielding contact
Mounting	Wall mounting
Dimensions (H x W x D)	152 x 90 x 69 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–20 °C ... +70 °C
Housing material	Polycarbonate, UL94 V-0
Colour	Black (similar RAL 9011) or White (similar RAL 9010)

Advantages

Simple mounting
 Cable entering optionally from bottom or from top side
 Self-closing protection caps in IP 65 / IP 67
 IP 65 / IP 67 label
 IP 65 / IP 67 standard interface for structured cabling for buildings according to ISO/IEC 24 702 respectively EN 50 173-3

Identification	Part number	Drawing	Dimensions in mm
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HARTING PushPull RJ45 Outlet Black white consisting of: 2-port outlet housing with protection caps, cable management, cable glands and label 2x RJ45 female modules, Category 6 1x blind plug (if only 1 cable is used) Assembly instructions	09 45 845 1500 09 45 845 1501		
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IP 20

RJ45

- Connectors [on page B·2 8]
- System cables [on page B·2 14]
- Distribution modules and Outlets [on page B·2 21]

IP 65 / IP 67

HARTING PushPull

- Connectors [on page B·2 24]
- System cables [on page B·2 30]
- Panel feed-throughs [on page B·2 32]
- Distribution modules and Outlets [on page B·2 34]

Han® PushPull

- Connectors [on page B·2 36]
- System cables [on page B·2 44]
- Panel feed-throughs / Gender Changer [on page B·2 46]

Han® 3 A

- Connectors [on page B·2 54]
- System cables [on page B·2 58]
- Panel feed-throughs [on page B·2 60]
- Distribution modules and Outlets [on page B·2 66]

Han® 3 A RJ45 Hybrid

- Connectors [on page B·2 70]
- System cables [on page B·2 72]
- Panel feed-throughs [on page B·2 74]
- Cables [on page B·2 76]

har-speed M12

- Connectors [on page B·2 78]
- System cables [on page B·2 80]

Han-Max®

- Connectors [on page B·2 82]
- Panel feed-throughs [on page B·2 86]

Cables

- Industrial Cat. 6_A [on page B·2 90]
- Industrial Cat. 5 [on page B·2 93]
- Industrial Cat. 7 [on page B·2 96]

Tools

[on page B·2 100]

Connector sets



Han® PushPull RJ45
Connector set, 8-pole

to make up Han® PushPull RJ45 system cables

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector type	Han® PushPull RJ45 connector
Locking	PushPull technology according to IEC 61 076-3-117, variant 14
Number of contacts	8
Transmission performance	Category 6 _A / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s / 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact
Mounting	Field-assembly possible
Wire termination	Via piercing contacts
Cable options	
– Strand gauge	AWG 27/7 ... AWG 24/7 (stranded)
– Strand diameter	max. 1.05 mm (including insulation)
– Cable sheath diameter	5 mm ... 8 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +70 °C
Housing material	Polyamide, UL94 V-0
Colour	Black

Advantages

Space-saving connector assembly via PushPull interface
Field-assembly connector, Cat. 6, in IP 65 / IP 67
AIDA compliant

Mounting information

If the cable is assembled on both sides, please use one connector set with white and one connector set with blue cable manager (assures optimal transmission behavior)

Identification	Part number	Drawing	Dimensions in mm
Han® PushPull RJ45 Connector set, 8-pole Plastic Cable diameter 5 mm ... 8 mm	09 35 227 0421		
HARTING RJ Industrial® Gigalink Mounting tools for HARTING RJ Industrial® Gigalink connectors	09 45 800 0520		

Connector sets



Han® PushPull RJ45 10G

Connector set, 8-pole

to make up Han® PushPull RJ45 system cables

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector type	Han® PushPull RJ45 connector
Locking	PushPull technology according to IEC 61 076-3-117, variant 14
Number of contacts	8
Transmission performance	Category 6 / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s / 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact
Mounting	Field-assembly
Wire termination	Via IDC contacts , tool-less
Cable options	Suitable for solid and stranded cores
– Strand gauge	AWG 27 ... AWG 22 (solid / stranded)
– Strand diameter	max. 1.6 mm (including insulation)
– Cable sheath diameter	6.5 mm ... 9.5 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +70 °C
Housing material	Polyamide, UL94 V-0
Colour	Black

Advantages

Space-saving connector assembly via PushPull interface
Field-assembly connector, in IP 65 / IP 67
AIDA compliant

Identification	Part number	Drawing	Dimensions in mm
Han® PushPull RJ45 10G Connector set, 8-pole Plastic Cable diameter 6.5 mm ... 9.5 mm	09 35 225 0421		
Protection Cover IP 65 / IP 67	09 35 002 5411		
IP 40	09 35 002 5412		

Connector sets

Han® PushPull RJ45
Connector set, 8-pole
to make up Han® PushPull RJ45 system cables

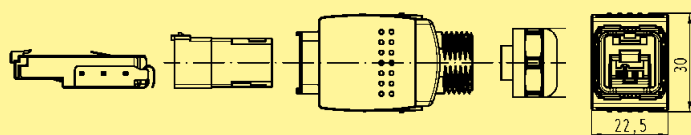


IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector type	Han® PushPull RJ45 connector
Locking	PushPull technology according to IEC 61 076-3-117, variant 14
Number of contacts	8
Transmission performance	Category 6 _A / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s / 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact
Mounting	Field-assembly possible
Wire termination	Via piercing contacts
Cable options	
– Strand gauge	AWG 27/7 ... AWG 24/7 (stranded)
– Strand diameter	max. 1.05 mm (including insulation)
– Cable sheath diameter	4 mm ... 11 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +70 °C
Housing material	Zinc die-cast
Colour	Nickel-plated

Advantages	Space-saving connector assembly via PushPull interface Field-assembly connector, Cat. 6, in IP 65 / IP 67 AIDA compliant
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Mounting information	If the cable is assembled on both sides, please use one connector set with white and one connector set with blue cable manager (assures optimal transmission behavior)
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Identification	Part number	Drawing	Dimensions in mm
Han® PushPull RJ45 Connector set, 8-pole Metal Cable diameter 4 mm ... 11 mm	09 35 227 0401		
HARTING RJ Industrial® Gigalink Mounting tools for HARTING RJ Industrial® Gigalink connectors	09 45 800 0520		

Connector sets



Han® PushPull RJ45 10G
Connector set, 8-pole
to make up Han® PushPull RJ45 system cables

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector type	Han® PushPull RJ45 connector
Locking	PushPull technology according to IEC 61 076-3-117, variant 14
Number of contacts	8
Transmission performance	Category 6 / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s / 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact
Mounting	Field-assembly
Wire termination	Via IDC contacts , tool-less
Cable options	Suitable for solid and stranded cores
– Strand gauge	AWG 27 ... AWG 22 (solid / stranded)
– Strand diameter	max. 1.6 mm (including insulation)
– Cable sheath diameter	4 mm ... 11 mm (straight) 6.5 mm ... 9.5 mm (angled)
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +70 °C
Housing material	Zinc die-cast
Colour	Nickel-plated

Advantages	Space-saving connector assembly via PushPull interface Field-assembly connector, in IP 65 / IP 67 AIDA compliant
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Identification	Part number	Drawing	Dimensions in mm
Han® PushPull RJ45 10G Connector set, 8-pole Metal Cable diameter 4 mm ... 11 mm straight entry Cable diameter 6.5 mm ... 9.5 mm angled entry, bottom Cable diameter 6.5 mm ... 9.5 mm angled entry, top	09 35 225 0401 09 35 225 0402 09 35 225 0403	 	
Protection Cover IP 65 / IP 67 IP 40	09 35 002 5411 09 35 002 5412	 	

System cables



Han® PushPull RJ45

System cable, 8-wire

RJ45 connector cable Han® PushPull for IP 65 / IP 67 applications

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector types	Han® PushPull RJ45
Cable types	4 x 2, Twisted Pair, shielded
Sheath material	PUR
Wiring	8-pole, 1:1
Transmission performance	Category 6 / Class E up to 250 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Operating temperature range	–10 °C ... +70 °C
Standard lengths	1.5 m / 3 m / 5 m / 10 m / 20 m other lengths available on request
Colour	Yellow
Advantages	Standardised PushPull interface for IP 65 / IP 67 Easy and safe operation Especially space-saving AIDA compliant

Identification	Part number		Drawing	Dimensions in mm
	Plastic	Metal		
Han® PushPull RJ45 System cable, 8-wire	Yellow	Yellow		
	Length 1.5 m	09 47 575 7001	09 47 585 8001	
	Length 3.0 m	09 47 575 7002	09 47 585 8002	
	Length 5.0 m	09 47 575 7003	09 47 585 8003	
	Length 10.0 m	09 47 575 7004	09 47 585 8004	
	Length 20.0 m	09 47 575 7005	09 47 585 8005	

Panel feed through



Han® PushPull RJ45
Panel feed through, plastic

IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☒	Cat. 5	☐	Cat. 6	☒
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Connector type	Han® PushPull RJ45 connector
Locking	PushPull technology according to IEC 61 076-3-117, variant 14
Number of contacts	8
Transmission performance	Category 6 / Class E _A suitable for 1 / 10 Gigabit Ethernet
Transmission rate	10/100 Mbit/s / 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact (Cat. 6)
Degree of protection	IP 65 / IP 67
Mating cycles	min. 750
Operating temperature range	–40 °C ... +70 °C
Housing material	Polyamide, UL94 V-0
Colour	Black

Advantages

Device integration via RJ45 PCB connectors
Compact design
High packing density
AIDA compliant

Identification	Part number	Drawing	Dimensions in mm
Han® PushPull RJ45 Panel feed through, Cat. 6 including housing and HARTING RJ Industrial® 10G RJ45 coupler	09 35 225 0331		Panel cut out
Han® PushPull RJ45 Panel feed through for assembly with all HIFF compatible inserts (e.g. Ha-VIS preLink®) Please order inserts separately.	09 35 012 0331		Panel cut out
Ha-VIS preLink® Set Cat. 6 RJ45 female AWG 22/23 consists of: • 1x Ha-VIS preLink® module RJ45 female • 1x Ha-VIS preLink® termination block • 1x cable clip	20 82 001 0001		

Panel feed through



Han® PushPull RJ45
Panel feed through, metal

IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☒	Cat. 5	☐	Cat. 6	☒
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Connector type	Han® PushPull RJ45 connector
Locking	PushPull technology according to IEC 61 076-3-117, variant 14
Number of contacts	8
Transmission performance	Category 6 / Class E _A suitable for 1 / 10 Gigabit Ethernet
Transmission rate	10/100 Mbit/s / 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact (Cat. 6)
Degree of protection	IP 65 / IP 67
Mating cycles	min. 750
Operating temperature range	–40 °C ... +70 °C
Housing material	Zinc die-cast
Colour	Nickel-plated
Advantages	Device integration via RJ45 PCB connectors Compact design High packing density AIDA compliant

**Han®
PushPull**

Gender Changer



Han® PushPull RJ45
Gender Changer, metal

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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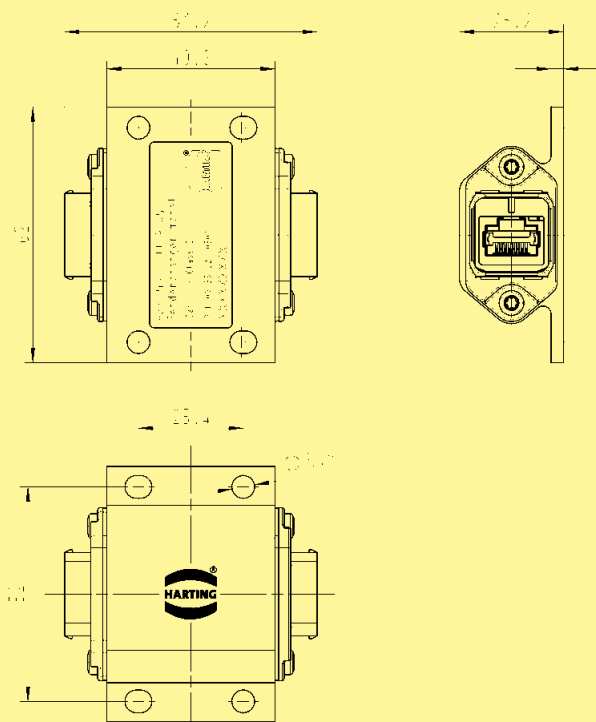
Connector type	Han® PushPull RJ45 connector
Locking	PushPull technology acc. to IEC/PAS 61 076-3-117, variant 14
Number of contacts	8
Transmission performance	Category 6 / Class E up to 250 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Degree of protection	IP 65 / IP 67
Mating cycles	min. 750
Mounting	Surface mounting with 4 screws type M5
Operating temperature range	–20 °C ... +70 °C
Housing material	Aluminium, anodised
Advantages	Extension of Han® PushPull system cable RJ45 Robust design Only one connection according to PROFINET guideline according to IEC 11 801 chapter 10.2.4 AIDA compliant

Identification	Part number	Drawing	Dimensions in mm
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Han® PushPull RJ45
Gender Changer

including housing and
printed board Cat. 6
with 2x RJ45 jack

09 35 221 0501



Han®
PushPull

IP 20

RJ45

- Connectors [on page B·2 8]
- System cables [on page B·2 14]
- Distribution modules and Outlets [on page B·2 21]

IP 65 / IP 67

HARTING PushPull

- Connectors [on page B·2 24]
- System cables [on page B·2 30]
- Panel feed-throughs [on page B·2 32]
- Distribution modules and Outlets [on page B·2 34]

Han® PushPull

- Connectors [on page B·2 36]
- System cables [on page B·2 44]
- Panel feed-throughs / Gender Changer [on page B·2 46]

Han® 3 A

- Connectors [on page B·2 54]
- System cables [on page B·2 58]
- Panel feed-throughs [on page B·2 60]
- Distribution modules and Outlets [on page B·2 66]

Han® 3 A RJ45 Hybrid

- Connectors [on page B·2 70]
- System cables [on page B·2 72]
- Panel feed-throughs [on page B·2 74]
- Cables [on page B·2 76]

har-speed M12

- Connectors [on page B·2 78]
- System cables [on page B·2 80]

Han-Max®

- Connectors [on page B·2 82]
- Panel feed-throughs [on page B·2 86]

Cables

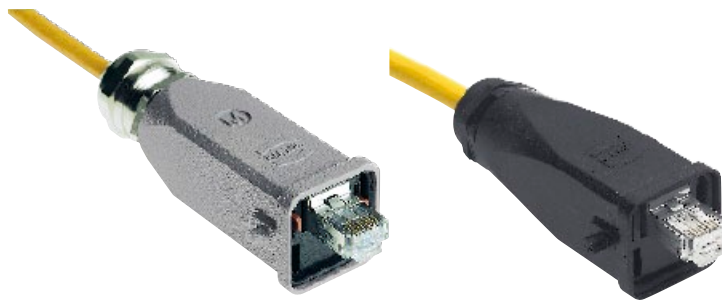
- Industrial Cat. 6_A [on page B·2 90]
- Industrial Cat. 5 [on page B·2 93]
- Industrial Cat. 7 [on page B·2 96]

Tools

[on page B·2 100]

Connector sets

Han® 3 A RJ45
Connector set, 8-pole
to make up Han® 3 A RJ45 system cables



IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector type	Han® 3 A RJ45 connector
Number of contacts	8
Transmission performance	Category 6 _A / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s / 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact
Mounting	Field-assembly possible
Wire termination	Via piercing contacts
Cable options	
– Strand gauge	AWG 28/7 ... AWG 24/7 (stranded)
– Strand diameter	max. 1.05 mm (including insulation)
– Cable sheath diameter	5 mm ... 9 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +70 °C
Plastic version	
Housing material	Polyamide, UL94 V-0
Colour	Black
Metal version Standard	
Housing material	Zinc, die-cast
Colour	Grey
Metal version M	
Housing material	Zinc, die-cast
Colour	Black
Advantages	Very robust metal housing Field-assembly connector, Cat. 6, IP 65 / IP 67
Mounting information	If the cable is assembled on both sides, please use one connector set with white and one connector set with blue cable manager (assures optimal transmission behavior)

Identification	Part number	Drawing	Dimensions in mm
Han® 3 A RJ45 Connector set, 8-pole plastic version metal version Standard metal version M Set consists of: Han® 3 A housing including RJ45 connector and shielding Cable gland Assembly instructions	09 45 125 1520 09 45 115 1520 09 45 115 1522	mating face according to IEC 60 603-7 Dimensions valid for Metal version Standard	
Han® 3 A RJ45 insert, 8-pole for Han® 3 A hoods	09 45 100 1520	contact 1 contact 8 	
Protection cover for Han® 3 A connector Plastic version Metal version Standard Metal version M	09 20 003 5442 09 20 003 5422 09 37 003 5402	 Dimensions valid for Plastic version	
HARTING RJ Industrial® Gigalink Mounting tools for HARTING RJ Industrial® Gigalink connectors	09 45 800 0520		

Connector sets



Han® 3 A RJ45 10G
Connector set, 8-pole
to make up Han® 3 A RJ45 system cables

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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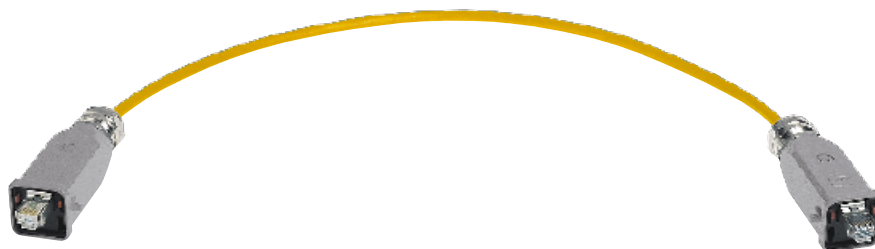
Connector type	Han® 3 A RJ45 connector
Number of contacts	8
Transmission performance	Category 6 / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s / 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact
Mounting	Field-assembly
Wire termination	Via IDC contacts , tool-less
Cable options	
– Strand gauge	AWG 27 ... AWG 22 (solid, stranded)
– Strand diameter	max. 1.6 mm (including insulation)
– Cable sheath diameter	5 mm ... 9 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +70 °C
Plastic version	
Housing material	Polyamide, UL94 V-0
Colour	Black
Metal version Standard	
Housing material	Zinc, die-cast
Colour	Grey

Advantages

Robust metal housing
Field-assembly connector, IP 65 / IP 67

Identification	Part number	Drawing	Dimensions in mm
Han® 3 A RJ45 10G Connector set, 8-pole Plastic version Metal version Standard Set consists of: Han® 3 A housing including RJ45 connector and shielding Cable gland Assembly instructions	09 45 125 1560 09 45 115 1560	mating face according to IEC 60 603-7	
Han® 3 A RJ45 10G insert, 8-pole for Han® 3 A connector hoods	09 45 100 1560	contact 1 contact 8	
Protection cover for Han® 3 A connector Plastic version Metal version Standard Metal version M	09 20 003 5442 09 20 003 5422 09 37 003 5402	Dimensions valid for Plastic version	
Accessories Set of coding pins	09 45 820 0000		

System cables



Han® 3 A RJ45

System cable, 8-wire

RJ45 connector cable Han® 3 A for IP 65 / IP 67 applications

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector types	Han® 3 A RJ45
Cable types	4 x 2, Twisted Pair, shielded
Sheath material	PVC / PUR
Wiring	8-pole, 1:1
Transmission performance	Category 6 / Class E up to 250 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Operating temperature range	–10 °C ... +70 °C
Standard lengths	1.5 m / 3 m / 5 m / 10 m / 20 m other lengths available on request
Colour	Yellow
Advantages	Very robust metal housing Han® 3 A for IP 65 / IP 67 Additional locking

Identification	Part number		Drawing	Dimensions in mm
	PVC	PUR		

Han® 3 A RJ45
System cable, 8-wire

Yellow

Yellow

Length 1.5 m	09 45 715 1523	09 45 715 1563
Length 3.0 m	09 45 715 1525	09 45 715 1565
Length 5.0 m	09 45 715 1527	09 45 715 1567
Length 10.0 m	09 45 715 1551	09 45 715 1572
Length 20.0 m	09 45 715 1553	09 45 715 1574

System cables



Han® 3 A RJ45
System cable, 8-wire

RJ45 connector cable Han® 3 A for IP 65 / IP 67 applications to RJ45 (IP 20)

IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☒	Cat. 5	☐	Cat. 6	☒
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Connector types	Han® 3 A RJ45 (IP 65 / IP 67) RJ45 (IP 20)
Cable types	4 x 2, Twisted Pair, shielded
Sheath material	PVC / PUR
Wiring	8-pole, 1:1
Transmission performance	Category 6 / Class E up to 250 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Operating temperature range	–10 °C to +70 °C

Standard lengths	1.5 m / 3 m / 5 m / 10 m / 20 m other lengths available on request
Colour	Yellow

Advantages	Very robust metal housing Han® 3 A for IP 65 / IP 67 Additional locking Easy change-over from harsh industrial environment to protected IP 20 environment Easy handling for all applications
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Identification	Part number		Drawing	Dimensions in mm
	PVC	PUR		
Han® 3 A RJ45 System cable, 8-wire IP 65 / IP 67 to IP 20	Yellow	Yellow		
Length 1.5 m	09 45 701 1564	09 45 701 1534		
Length 3.0 m	09 45 701 1566	09 45 701 1536		
Length 5.0 m	09 45 701 1568	09 45 701 1538		
Length 10.0 m	09 45 701 1573	09 45 701 1543		
Length 20.0 m	09 45 701 1575	09 45 701 1545		

Panel feed-throughs



Han® 3 A RJ45

Panel feed-through, 8-pole

RJ45 Panel feed-through for control or distributor cabinets

IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☒	Cat. 5	☒	Cat. 6	☐
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Number of ports, Copper / Termination	2 / 1x Han® 3 A RJ45 (IP 65 / IP 67) 1x RJ45 (Twisted Pair) (IP 20)
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Mounting	Screwable to steel plate covers
Dimensions	See drawing
Panel cut-out	20 mm x 22 mm
Mounting hole	Diameter 3.4 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +70 °C
Plastic version	
Housing material	Polyamide, UL94 V-0
Colour	Black
Metal version Standard	
Housing material	Zinc, die-cast
Colour	Grey
Metal version M	
Housing material	Zinc, die-cast
Colour	Black
Advantages	Simple mounting RJ45 plug-compatible Various versions cover all applications Coding possible

Identification	Part number	Drawing	Dimensions in mm
Han® 3 A RJ45 Panel feed-through Plastic version straight style angled style Accessories IP 65 / IP 67 protection cover for Panel feed-through	09 45 225 1100 09 45 225 1108 09 20 003 5445	Dimensions valid for straight Plastic version	
Han® 3 A RJ45 Panel feed-through Metal version Standard straight style straight style including self-closing protection cap angled style Accessories IP 65 / IP 67 protection cover for Panel feed-through	09 45 215 1100 09 45 215 1103 09 45 215 1108 09 20 003 5425	panel cut out	
Han® 3 A RJ45 Panel feed-through Metal version M straight style angled style Accessories IP 65 / IP 67 protection cover for Panel feed-through	09 45 215 1102 09 45 215 1109 09 37 003 5405	Dimensions valid for Plastic version	
Accessories Set of coding pins	09 45 820 0000		

Panel feed-throughs

Han® 3 A RJ45 10G
Panel feed-through, 8-pole
RJ45 Panel feed-through for control or distributor cabinets



IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☒	Cat. 5	☐	Cat. 6	☒
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Number of ports, Copper / Termination	2 / 1x Han® 3 A RJ45 (IP 65 / IP 67) 1x RJ45 (Twisted Pair) (IP 20)
Transmission performance	Category 6 / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s / 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact
Mounting	Screwable to steel plate covers
Dimensions	See drawing
Panel cut-out	20 mm x 22 mm
Mounting hole	Diameter 3.4 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +70 °C

Plastic version	
Housing material	Polyamide, UL94 V-0
Colour	Black
Metal version Standard	
Housing material	Zinc, die-cast
Colour	Grey
Metal version M	
Housing material	Zinc, die-cast
Colour	Black

Advantages	Simple mounting RJ45 plug-compatible Various versions cover all applications Coding possible
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Han® 3 A

Panel feed-throughs

Han® 3 A RJ45
double-coupling, 8-pole
RJ45 double-coupling for control or distributor cabinets



IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Number of ports, Copper / Termination	2 / Han® 3 A RJ45 (IP 65 / IP 67)
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Mounting	Screwable to steel plate covers
Dimensions	See drawing
Panel cut-out	20 mm x 22 mm
Mounting hole	Diameter 3.4 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +70 °C

Plastic version	
Housing material	Polyamide, UL94 V-0
Colour	Black

Metal version Standard	
Housing material	Zinc, die-cast
Colour	Grey

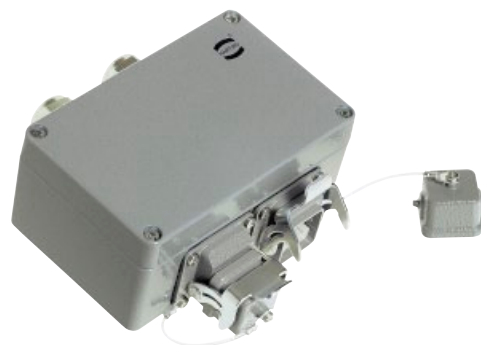
Metal version M	
Housing material	Zinc, die-cast
Colour	Black

Advantages	Simple mounting
	RJ45 plug-compatible
	Various versions cover all applications
	Coding possible

Identification	Part number	Drawing	Dimensions in mm
Han® 3 A RJ45 double-coupling Plastic version Accessories IP 65 / IP 67 protection cover for Panel feed-through	09 45 225 1107 09 20 003 5445	fixing plane 66 mating functional 69,7 full opened Dimensions valid for Plastic version	
Han® 3 A RJ45 double-coupling Metal version Standard Accessories IP 65 / IP 67 protection cover for Panel feed-through	09 45 215 1107 09 20 003 5425	Dimensions valid for Plastic version	
Han® 3 A RJ45 double-coupling Metal version M Accessories IP 65 / IP 67 protection cover for Panel feed-through	09 45 215 1110 09 37 003 5405	35 ca. 60 Dimensions valid for Plastic version	
Accessories Set of coding pins	09 45 820 0000		

Distribution modules and Outlets

Han® 3 A RJ45
Metal Outlet, Cat. 6, 8-pole
RJ45 Industrial Outlet for IP 65 / IP 67 environments



IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Number of ports, Copper / Termination	2 / Han® 3 A RJ45 (IP 65 / IP 67)
Transmission performance	Category 6 / Class E up to 250 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Termination	Via IDC contacts, tool-less
Strand diameter	AWG 24 ... 22 (0.5 mm ... 0.65 mm) solid and stranded
Strand insulation	0.7 mm ... 1.6 mm
Cable diameter	5 mm ... 9 mm
Shielding	Fully shielded, 360° shielding contact

Mounting	Wall mounting
Dimensions (H x W x D)	125 x 80 x 57.5 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–20 °C ... +70 °C
Housing material	Aluminium, die-cast
Colour	Grey RAL 7037

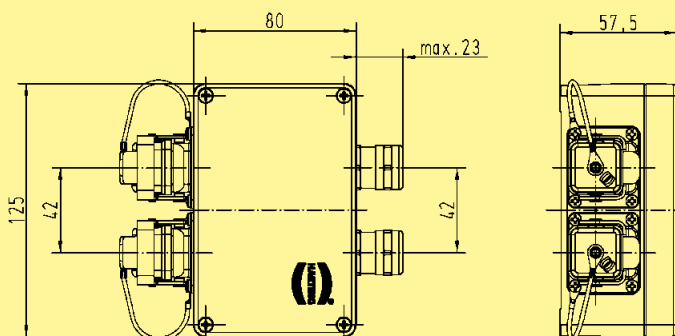
Advantages	Robust metal housing for use in harsh industrial environments Simple mounting Lockable Han® 3 A connector ports
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Identification	Part number	Drawing	Dimensions in mm
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Han® 3 A RJ45
Metal Outlet, Cat. 6

20 79 302 0922

consisting of:
2-port metal housing with
protection caps and
cable glands
2x RJ45 female module, Cat. 6
Assembly instructions



Distribution modules and Outlets



Han® 3 A RJ45
Metal Outlet, Cat. 5, 8-pole
 RJ45 Industrial Outlet for IP 65 / IP 67 environments

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Number of ports, Copper / Termination	2 / Han® 3 A RJ45 (IP 65 / IP 67)
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s
Termination	LSA-PLUS module, terminating via LSA-PLUS tool
Strand diameter	AWG 26 ... 22 (0.35 mm ... 0.65 mm) solid and stranded
Strand insulation	0.7 mm ... 1.6 mm
Cable diameter	5 mm ... 9 mm
Shielding	Fully shielded, 360° shielding contact

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

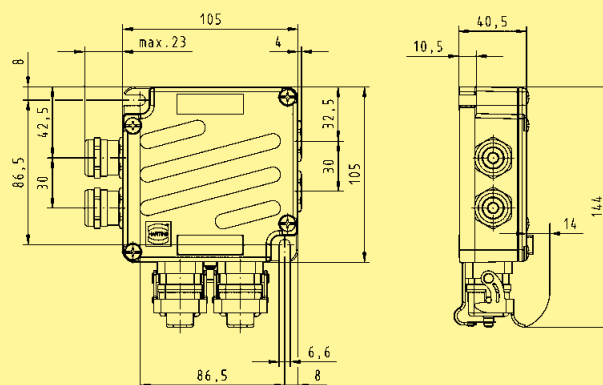
Advantages	Robust metal housing for use in harsh industrial environments Simple mounting Cable feeding optionally from the left or from the right side Lockable Han® 3 A connector ports
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Identification	Part number	Drawing	Dimensions in mm
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Han® 3 A RJ45
Metal Outlet, Cat. 5

consisting of:
 2-port metal housing with protection caps, cable glands and blanking plug
 PCB module with LSA-PLUS strips
 Label
 Assembly instructions

09 45 815 1100



IP 20

RJ45

- Connectors [on page B·2 8]
- System cables [on page B·2 14]
- Distribution modules and Outlets [on page B·2 21]

IP 65 / IP 67

HARTING PushPull

- Connectors [on page B·2 24]
- System cables [on page B·2 30]
- Panel feed-throughs [on page B·2 32]
- Distribution modules and Outlets [on page B·2 34]

Han® PushPull

- Connectors [on page B·2 36]
- System cables [on page B·2 44]
- Panel feed-throughs / Gender Changer [on page B·2 46]

Han® 3 A

- Connectors [on page B·2 54]
- System cables [on page B·2 58]
- Panel feed-throughs [on page B·2 60]
- Distribution modules and Outlets [on page B·2 66]

Han® 3 A RJ45 Hybrid

- Connectors [on page B·2 70]
- System cables [on page B·2 72]
- Panel feed-throughs [on page B·2 74]
- Cables [on page B·2 76]

har-speed M12

- Connectors [on page B·2 78]
- System cables [on page B·2 80]

Han-Max®

- Connectors [on page B·2 82]
- Panel feed-throughs [on page B·2 86]

Cables

- Industrial Cat. 6_A [on page B·2 90]
- Industrial Cat. 5 [on page B·2 93]
- Industrial Cat. 7 [on page B·2 96]

Tools

[on page B·2 100]

Connector sets

Han® 3 A RJ45 Hybrid 10G
Connector set, 8-pole

to make up Han® 3 A RJ45 Hybrid system cables



IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector type	Han® 3 A RJ45 Hybrid connector
Number of contacts	8x RJ45 + 4x power contacts (up to max. 48 V / 16 A)
Transmission performance	Category 6 / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s / 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact
Mounting	Field-assembly
Wire termination	Via IDC contacts , tool-less
Cable options	Hybrid cable, (4 x 2 data + 4x power)
– Strand gauge (data)	AWG 27 ... AWG 22 (solid / stranded)
– Strand gauge (power)	1.5 mm ² (stranded)
– Strand diameter (data)	max. 1.6 mm
– Strand diameter (power)	max. 2.6 mm
– Cable sheath diameter	10 mm ... 11 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +70 °C
Plastic version	
Housing material	Polyamide and polycarbonate, UL94 V-0
Colour	Black
Metal version Standard	
Housing material	Zinc, die-cast
Colour	Grey
Metal version M	
Housing material	Zinc, die-cast
Colour	Black
Advantages	Tool-less fast termination technique via IDC contacts Field-assembly connector PROFINET compliant

Identification	Part number	Drawing	Dimensions in mm
Han® 3 A RJ45 Hybrid Connector set, 8-pole Plastic version Metal version Standard Set consists of: Han® 3 A housing including RJ45 Hybrid connector and shielding Cable gland Assembly instructions	09 45 125 1760 09 45 115 1760	① ... mating face according to IEC 60 603-7	
Han® 3 A RJ45 Hybrid Connector set, 8-pole for Han® 3 A hoods and housings	09 45 100 1760		
Protection cover for Han® 3 A connector Plastic version Metal version Standard	09 20 003 5442 09 20 003 5422	Dimensions valid for Plastic version	

System cables



Han® 3 A RJ45 Hybrid

System cable, 8-wire, Outdoor, plastic

RJ45 Hybrid connector cable Han® 3 A plastic for IP 65 / IP 67 applications

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector types	Han® 3 A RJ45 Hybrid, plastic
Cable types	4 x 2, Twisted Pair, shielded + 4 power cores
Sheath material	PUR
Wiring	8-pole, 1:1
Transmission performance	Category 6 / Class E up to 250 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Operating temperature range	–10 °C ... +70 °C
Standard lengths	1.5 m / 3 m / 5 m / 10 m / 20 m other lengths available on request
Colour	Black
Advantages	Robust plastic housing Han® 3 A for IP 65 / IP 67 Easy handling for applications with additional power supply

Identification	Part number PUR	Drawing	Dimensions in mm
Han® 3 A RJ45 Hybrid System cable, 8-wire Outdoor	Black		
Length 1.5 m	09 45 725 1503		
Length 3.0 m	09 45 725 1505		
Length 5.0 m	09 45 725 1507		
Length 10.0 m	09 45 725 1512		
Length 20.0 m	09 45 725 1514		

System cables



Han® 3 A RJ45 Hybrid
 System cable, 8-wire, Outdoor, metal
 RJ45 Hybrid connector cable Han® 3 A metal for IP 65 / IP 67 applications

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector types	Han® 3 A RJ45 Hybrid, metal
Cable types	4 x 2, Twisted Pair, shielded + 4 power cores
Sheath material	PUR
Wiring	8-pole, 1:1
Transmission performance	Category 6 / Class E up to 250 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Shielding	Fully shielded, 360° shielding contact
Operating temperature range	–10 °C to +70 °C
Standard lengths	1.5 m / 3 m / 5 m / 10 m / 20 m other lengths available on request
Colour	Black
Advantages	Robust metal housing Han® 3 A for IP 65 / IP 67 Easy handling for applications with additional power supply

Identification	Part number PUR	Drawing	Dimensions in mm
Han® 3 A RJ45 Hybrid System cable, 8-wire Outdoor	Black		
Length 1.5 m	09 45 725 1533		
Length 3.0 m	09 45 725 1535		
Length 5.0 m	09 45 725 1537		
Length 10.0 m	09 45 725 1542		
Length 20.0 m	09 45 725 1544		

Panel feed-throughs



Han® 3 A RJ45 Hybrid
Panel feed-through, 8-pole

RJ45 Hybrid Panel feed-through for control or distributor cabinets

IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☒	Cat. 5	☐	Cat. 6	☒
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Number of ports, Copper / Termination	2 / 1x Han® 3 A RJ45 (IP 65 / IP 67) 1x RJ45 (Twisted Pair) (IP 20)
Termination power supply	4 contacts in the Han® 3 A RJ45 Hybrid connector 4 contacts for power supply via cage-clamp terminal up to 48 V, 16 A
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Mounting	Screwable to steel plate covers
Dimensions	See drawing
Panel cut-out	20 mm x 22 mm
Mounting hole	Diameter 3.4 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +70 °C
Plastic version	
Housing material	Polyamide, UL94 V-0
Colour	Black
Metal version Standard	
Housing material	Zinc, die-cast
Colour	Grey
Metal version M	
Housing material	Zinc, die-cast
Colour	Black
Advantages	Simple mounting RJ45 plug-compatible Additional power supply via hybrid cable Coding possible

Han® 3 A RJ45 Hybrid

Cables



Industrial Cat. 6 Hybrid
Installation cable, 8-wire

IP 20	☒	IP 65 / IP 67	☒	FRNC	Cat. 5	☐	Cat. 6	☒
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Cable structure	4 x 2, Twisted Pair, shielded, PIMF 4 power cores
Core structure	4 x 2 x AWG 26/7, stranded 4x 84 * 0.15 mm (cord 1.5 mm²), stranded
Sheath material	PUR
Cable sheath diameter	10 mm ... 10.6 mm
Transmission performance	Category 6 / Class E up to 250 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Shielding	Paired shielded with additional cable shield
Operating temperature range	-20 °C ... +80 °C

Supply lengths	20 m / 50 m / 100 m other lengths on request
Colour	Black

Advantages	Robust design suitable for industry Additional power supply Halogen free RoHS compliant UV proof Outdoor capable
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Identification	Part number	Drawing	Dimensions in mm
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Industrial Cat. 6 Hybrid
installation cable, 8-wire
PUR

20 m ring
50 m ring
100 m drum

09 45 600 0332
09 45 600 0342
09 45 600 0302



IP 20

RJ45

- Connectors [on page B·2 8]
- System cables [on page B·2 14]
- Distribution modules and Outlets [on page B·2 21]

IP 65 / IP 67

HARTING PushPull

- Connectors [on page B·2 24]
- System cables [on page B·2 30]
- Panel feed-throughs [on page B·2 32]
- Distribution modules and Outlets [on page B·2 34]

Han® PushPull

- Connectors [on page B·2 36]
- System cables [on page B·2 44]
- Panel feed-throughs / Gender Changer [on page B·2 46]

Han® 3 A

- Connectors [on page B·2 54]
- System cables [on page B·2 58]
- Panel feed-throughs [on page B·2 60]
- Distribution modules and Outlets [on page B·2 66]

Han® 3 A RJ45 Hybrid

- Connectors [on page B·2 70]
- System cables [on page B·2 72]
- Panel feed-throughs [on page B·2 74]
- Cables [on page B·2 76]

har-speed M12

- Connectors [on page B·2 78]
- System cables [on page B·2 80]

Han-Max®

- Connectors [on page B·2 82]
- Panel feed-throughs [on page B·2 86]

Cables

- Industrial Cat. 6_A [on page B·2 90]
- Industrial Cat. 5 [on page B·2 93]
- Industrial Cat. 7 [on page B·2 96]

Tools

[on page B·2 100]

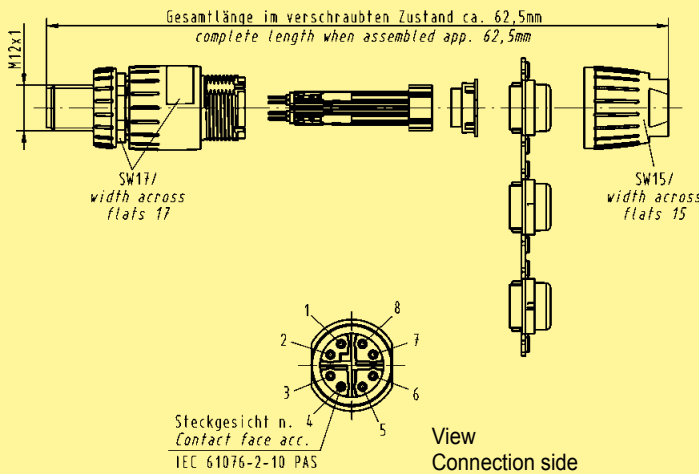
Connector sets

har-speed M12
Connector, 8-pole
to make up *har-speed* M12 system cables



IP 20	☐	IP 65	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector type	<i>har-speed</i> M12 connector X coding acc. to IEC 61076-2-109
Number of contacts	8
Transmission performance	Category 6 _A / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s / 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact
Wire termination	Via crimp contacts
Cable options	
– Strand gauge	AWG 28 ... AWG 24 (stranded)
– Strand diameter	max. 1.05 mm (including insulation)
– Cable sheath diameter	4.5 mm ... 8.8 mm
Degree of protection	IP 65
Operating temperature range	–40 °C ... +85 °C
Housing material	Metal
Advantages	Very robust metal housing M12 with degree of protection IP 65 / IP 67 Vibration proof crimp connection Maximum data rates through the configuration of the contacts in conformance with Ethernet technology Minimal interaction and perfect shielding through paired shielding of the contacts Fault proof connection through coding of the connector face. A connection error with other 8-pole M12's is impossible PROFINET compliant Type X mating face

Identification	Part number	Drawing	Dimensions in mm
har-speed M12 connector, 8-pole, male straight style	21 03 881 5805		
Crimp contacts, male	21 01 100 9014		
Crimping tool	09 99 000 0501		
Locator	09 99 000 0525		

System cables

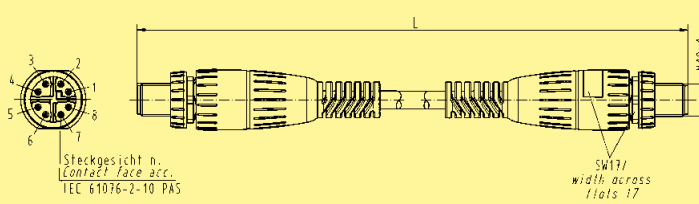
*har-speed* M12

System cable, 8-wire

har-speed M12 connector cable for IP 65 / IP 67 applications

IP 20	☐	IP 65	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector types	<i>har-speed</i> M12 connector X coding acc. to IEC 61076-2-109
Cable types	4 x 2, Twisted Pair, shielded
Sheath material	PUR
Wiring	8-pole, 1:1
Transmission performance	Category 6 _A / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s / 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact
Operating temperature range	–40 °C ... +70 °C
Standard lengths	0.5 m / 1 m / 1.5 m / 2 m / 2.5 m other lengths available on request
Colour	Yellow
Advantages	Very robust metal housing M12 with degree of protection IP 65 Vibration proof crimp connection Maximum data rates through the configuration of the contacts in conformance with Ethernet technology Minimal interaction and perfect shielding through paired shielding of the contacts Fault proof connection through coding of the connector face. A connection error with other 8-pole M12's is impossible PROFINET compliant Type X mating face

Identification	Part number PUR	Drawing	Dimensions in mm
<i>har-speed</i> M12 system cable, 8-wire	Yellow Length 0.5 m 21 03 483 5850 Length 1.0 m 21 03 483 5801 Length 1.5 m 21 03 483 5851 Length 2.0 m 21 03 483 5802 Length 2.5 m 21 03 483 5852	 Steckgesicht n. Contact face acc. IEC 61076-2-10 PAs SW171 width across flats 17	

IP 20

RJ45

- Connectors [on page B·2 8]
- System cables [on page B·2 14]
- Distribution modules and Outlets [on page B·2 21]

IP 65 / IP 67

HARTING PushPull

- Connectors [on page B·2 24]
- System cables [on page B·2 30]
- Panel feed-throughs [on page B·2 32]
- Distribution modules and Outlets [on page B·2 34]

Han® PushPull

- Connectors [on page B·2 36]
- System cables [on page B·2 44]
- Panel feed-throughs / Gender Changer [on page B·2 46]

Han® 3 A

- Connectors [on page B·2 54]
- System cables [on page B·2 58]
- Panel feed-throughs [on page B·2 60]
- Distribution modules and Outlets [on page B·2 66]

Han® 3 A RJ45 Hybrid

- Connectors [on page B·2 70]
- System cables [on page B·2 72]
- Panel feed-throughs [on page B·2 74]
- Cables [on page B·2 76]

har-speed M12

- Connectors [on page B·2 78]
- System cables [on page B·2 80]

Han-Max®

- Connectors [on page B·2 82]
- Panel feed-throughs [on page B·2 86]

Cables

- Industrial Cat. 6_A [on page B·2 90]
- Industrial Cat. 5 [on page B·2 93]
- Industrial Cat. 7 [on page B·2 96]

Tools

[on page B·2 100]

Connector sets

Han-Max® RJ45
Connector set, 8-pole
to make up Han-Max® RJ45 system cables



IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector type	Bayonet connector RJ45 acc. to IEC 24 702
Number of contacts	8
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Shielding	Fully shielded, 360° shielding contact or unshielded
Mounting	Field-assembly
Wire termination	Via piercing contacts
Cable options	
– Strand gauge	AWG 26 ... AWG 24 (stranded)
– Strand diameter	max. 1.0 mm (including isolation)
– Cable sheath diameter	4 mm ... 8 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–25 °C ... +80 °C
Housing material	Zinc, die-cast, nickel-plated
Colour	Metal

Advantages	Very robust IP 65 / IP 67 connector with bayonet nut Field-assembly connector, Cat. 5, IP 65 / IP 67 Shielded or unshielded
-------------------	---

Identification	Part number	Drawing	Dimensions in mm
Han-Max® RJ45 connector set , 8-pole STP UTP Set consists of: Bayonet housing including RJ45 connector Cable gland Assembly instructions	09 15 300 0402 09 15 300 0401		
Protection cover for Han-Max® connector	09 15 300 5401		

Connector sets

Han-Max® RJ45 10G
Connector set, 8-pole
to make up Han-Max® RJ45 system cables



IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☒	Cat. 6	☐
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Connector type	Bayonet connector RJ45 acc. to IEC 24 702
Number of contacts	8
Transmission performance	Category 6 / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100 Mbit/s / 1/10 Gbit/s
Shielding	Fully shielded, 360° shielding contact
Mounting	Field-assembly
Wire termination	Via IDC contacts, tool-less
Cable options	
– Strand gauge	AWG 27 ... AWG 22 (solid / stranded)
– Strand diameter	max. 1.6 mm (including isolation)
– Cable sheath diameter	4 mm ... 8 mm
Degree of protection	IP 65 / IP 67
Operating temperature range	–40 °C ... +70 °C
Housing material	Zinc, die-cast, nickel-plated
Colour	Metal
Advantages	Very robust IP 65 / IP 67 connector with bayonet nut Field-assembly connector, IP 65 / IP 67

Identification	Part number	Drawing	Dimensions in mm
Han-Max® RJ45 10G connector set, 8-pole Set consists of: Bayonet housing including RJ45 connector Cable gland Assembly instructions	09 15 300 0431	Im verschraubten Zustand montiert mit RJ-CAT 6 8polig ca. 68mm <i>complete length when assembled with RJ-CAT 6 8pole app. 68mm</i>	
Protection cover for Han-Max® connector	09 15 300 5401		

Panel feed-throughs

Han-Max® RJ45 Panel feed-through

RJ45 Panel feed-through for control or distributor cabinets



IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☒	Cat. 5	☒	Cat. 6	☐
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Number of ports, Copper / Termination 1x RJ45 (IP 65 / IP 67) on LSA-PLUS IDC terminal (IP 20)
1x RJ45 Bayonet (IP 65 / IP 67)

Transmission performance Category 5 / Class D up to 100 MHz
according to ISO/IEC 11 801:2002, EN 50 173-1

Transmission rate 10/100/1000 Mbit/s

Shielding Fully shielded, 360° shielding contact
or unshielded

Mounting Screwable to steel plate covers

Wire termination Via IDC contacts, tool-less

Cable options
– Strand gauge AWG 24 ... AWG 22 (solid / stranded)

Dimensions See drawing

Panel cut-out See drawing

Mounting hole Diameter 27 mm

Degree of protection IP 65 / IP 67

Operating temperature range –25 °C ... +85 °C

Housing material Zinc, die-cast, nickel-plated

Colour Metal

Advantages Solid metal interface IP 65 / IP 67
with bayonet nut
Shielded or unshielded

Han- Max[®]

IP 20

RJ45

- Connectors [on page B·2 8]
- System cables [on page B·2 14]
- Distribution modules and Outlets [on page B·2 21]

IP 65 / IP 67

HARTING PushPull

- Connectors [on page B·2 24]
- System cables [on page B·2 30]
- Panel feed-throughs [on page B·2 32]
- Distribution modules and Outlets [on page B·2 34]

Han® PushPull

- Connectors [on page B·2 36]
- System cables [on page B·2 44]
- Panel feed-throughs / Gender Changer [on page B·2 46]

Han® 3 A

- Connectors [on page B·2 54]
- System cables [on page B·2 58]
- Panel feed-throughs [on page B·2 60]
- Distribution modules and Outlets [on page B·2 66]

Han® 3 A RJ45 Hybrid

- Connectors [on page B·2 70]
- System cables [on page B·2 72]
- Panel feed-throughs [on page B·2 74]
- Cables [on page B·2 76]

har-speed M12

- Connectors [on page B·2 78]
- System cables [on page B·2 80]

Han-Max®

- Connectors [on page B·2 82]
- Panel feed-throughs [on page B·2 86]

Cables

- Industrial Cat. 6_A [on page B·2 90]
- Industrial Cat. 5 [on page B·2 93]
- Industrial Cat. 7 [on page B·2 96]

Tools

[on page B·2 100]

Cables



Industrial Cat. 6_A cable, stranded, 8-wire, PVC
to make up flexible connections
(one- or two-sided assembled system cables)

IP 20	☒	IP 65 / IP 67	☒	PVC	Cat. 5	☐	Cat. 6 _A	☒
-------	-------------------------------------	---------------	-------------------------------------	-----	--------	--------------------------	---------------------	-------------------------------------

Cable structure	4 x 2, Twisted Pair, shielded, PIMF
Core structure	4 x 2 x AWG 26/7
Wire insulation	PE, Ø 1.05 mm
Sheath material	PVC
Cable sheath diameter	6.3 mm ... 6.9 mm
Transmission performance	Category 6 _A / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s, 10 Gbit/s
Shielding	Paired shielded with additional cable shield
Operating temperature range	–20 °C ... +80 °C
Standard lengths	20 m / 50 m / 100 m / 500 m
Colour	Yellow

Advantages

Robust design suitable for industry
Optimal performance reserves
 UL, AWM style 20 276
Flame retardant
RoHS compliant
Best usable for all 8-wire HARTING RJ45 connectors

Identification	Part number	Drawing	Dimensions in mm
----------------	-------------	---------	------------------

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

20 m ring
50 m ring
100 m ring
500 m drum

09 45 600 0532
09 45 600 0542
09 45 600 0502
09 45 600 0522



Cables



Industrial Cat. 6_A cable, stranded, 8-wire, PUR
to make up flexible connections
(one- or two-sided assembled system cables)

IP 20	☒	IP 65 / IP 67	☒	PUR	Cat. 5	☐	Cat. 6 _A	☒
-------	-------------------------------------	---------------	-------------------------------------	-----	--------	--------------------------	---------------------	-------------------------------------

Cable structure	4 x 2, Twisted Pair, shielded, PIMF
Core structure	4 x 2 x AWG 26/7
Wire insulation	PE, Ø 1.05 mm
Sheath material	PUR
Cable sheath diameter	6.3 mm ... 6.9 mm
Transmission performance	Category 6 _A / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s, 10 Gbit/s
Shielding	Paired shielded with additional cable shield
Operating temperature range	–40 °C ... +80 °C
Standard lengths	20 m / 50 m / 100 m / 500 m
Colour	Yellow

Advantages

Robust design suitable for industry
Optimal performance reserves
Halogen free
RoHS compliant
Flame retardant sheath material

Identification	Part number	Drawing	Dimensions in mm
----------------	-------------	---------	------------------

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

20 m ring
50 m ring
100 m ring
500 m drum

09 45 600 0630
09 45 600 0640
09 45 600 0600
09 45 600 0620



Cables



Industrial Cat. 6_A cable, stranded, 8-wire, PVC, Outdoor
to make up flexible connections
(one- or two-sided assembled system cables)

IP 20	☒	IP 65 / IP 67	☒	PVC	Cat. 5	☐	Cat. 6 _A	☒
-------	-------------------------------------	---------------	-------------------------------------	-----	--------	--------------------------	---------------------	-------------------------------------

Cable structure	4 x 2, Twisted Pair, shielded, PIMF
Core structure	4 x 2 x AWG 26/7
Wire insulation	PE, Ø 1.05 mm
Sheath material	PVC
Cable sheath diameter	6.3 mm ... 6.9 mm
Transmission performance	Category 6 _A / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s, 10 Gbit/s
Shielding	Paired shielded with additional cable shield
Operating temperature range	–20 °C ... +80 °C

Standard lengths	20 m / 50 m / 100 m / 500 m
Colour	Black

Advantages

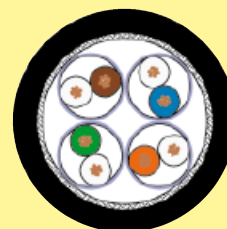
Robust design suitable for industry
Optimal performance reserves
Usable for outdoor applications
UV proof
RoHS compliant
UL, AWM style 20 276

Identification	Part number	Drawing	Dimensions in mm
----------------	-------------	---------	------------------

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

20 m ring
50 m ring
100 m ring
500 m drum

09 45 600 0531
09 45 600 0541
09 45 600 0501
09 45 600 0521



Cables



Industrial Cat. 5 cable, stranded, 8-wire, PUR
to make up flexible connections
(one- or two-sided assembled system cables)

IP 20	☒	IP 65 / IP 67	☒	PUR	Cat. 5	☒	Cat. 6	☐
-------	-------------------------------------	---------------	-------------------------------------	-----	--------	-------------------------------------	--------	--------------------------

Cable structure	4 x 2, Twisted Pair, shielded
Core structure	4 x 2 x AWG 26/7
Wire insulation	PE, Ø 1.0 mm
Sheath material	PUR
Cable sheath diameter	6.5 mm ... 6.9 mm
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Shielding	Foil screen and additional plaited cable
Operating temperature range	–10 °C ... +60 °C
Standard lengths	20 m / 50 m / 100 m / 500 m
Colour	Yellow
Advantages	Robust design suitable for industry Halogen free UL, AWM style 21 586 Flame retardant Oil proof RoHS compliant With Fast Connect inside sheath

Identification	Part number	Drawing	Dimensions in mm
Industrial Cat. 5 stranded cable, 8-wire PUR 20 m ring 50 m ring 100 m ring 500 m drum	09 45 600 0430 09 45 600 0440 09 45 600 0400 09 45 600 0420		

Cables



Industrial Cat. 5 high flexible cable, 8-wire, PUR trailing

IP 20	☒	IP 65 / IP 67	☒	FRNC	Cat. 5	☒	Cat. 6	☐
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Cable structure	4 x 2, Twisted Pair, shielded
Core structure	4 x 2 x AWG 26/19
Wire insulation	PE, Ø 1.0 mm
Sheath material	PUR
Cable sheath diameter	6.8 mm
Transmission performance	Category 5 / 5e / Class D up to 100 MHz according to EN 50288-2-2:2004, IEC 61 156-6:2002
Transmission rate	10/100/1000 Mbit/s
Shielding	Overall screen of tinned copper braid
Operating temperature range	
- fix operation	-40 °C ... +85 °C
- flexible operation	0 °C ... +50 °C
Bending cycles	5 million
Supply lengths	20 m / 50 m / 100 m / 500 m
Colour	Yellow

Advantages

Robust design suitable for industry
 Usable as trailing cables in drag chains and fit for torsion strength
 Usable for transfer rate up to 1 Gigabit Ethernet
 Halogen free
 Flame retardant
 Free silicone oil
 RoHS compliant

Identification	Part number	Drawing	Dimensions in mm
----------------	-------------	---------	------------------

Industrial Cat. 5 / 5e
 installation cable, 8-wire
 PUR

20 m ring
 50 m ring
 100 m ring
 500 m drum

09 45 600 0136
 09 45 600 0146
 09 45 600 0106
 09 45 600 0156



Cables



Industrial Cat. 5 stranded cable, 8-wire, PVC, Outdoor
to make up flexible connections
(one- or two-sided assembled system cables)

IP 20	☒	IP 65 / IP 67	☒	PVC	Cat. 5	☒	Cat. 6	☐
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Cable structure	4 x 2, Twisted Pair, shielded
Core structure	4 x 2 x AWG 26/7
Wire insulation	PE, Ø 1.0 mm
Sheath material	PVC
Cable sheath diameter	6.5 mm ... 6.9 mm
Transmission performance	Category 5 / Class D up to 100 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	10/100/1000 Mbit/s
Shielding	Foil screen and additional plaited cable
Operating temperature range	-10 °C ... +60 °C
Standard lengths	20 m / 50 m / 100 m / 500 m
Colour	Black

Advantages

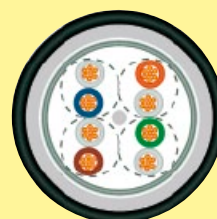
Robust design suitable for industry
Applicable also for outside applications
UL, AWM style 2969
Flame retardant
Weather proof
UV resistant
RoHS compliant
With Fast Connect inside sheath

Identification	Part number	Drawing	Dimensions in mm
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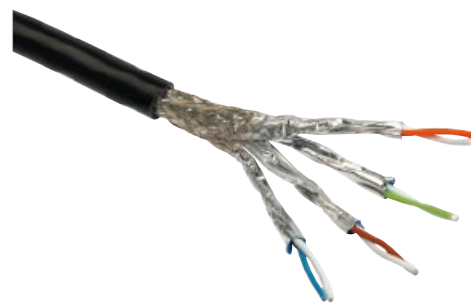
Industrial Cat. 5 stranded cable,
8-wire, outdoor
PVC

20 m ring
50 m ring
100 m ring
500 m drum

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



Cables



Ha-VIS EtherRail®

flexible data cable, Cat. 7, 8-wire

for installation within and outside rail vehicles and buses

IP 20	☒	IP 65 / IP 67	☒	Elastomer	Cat. 5	☐	Cat. 7	☒
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Cable structure	4 x 2, Twisted Pair, shielded, PIMF
Core structure	4 x 2 x AWG 24/7, tinned copper wire
Wire insulation	PE, Ø 1.55 mm
Sheath material	Elastomer, electron beam, cross-linked
Cable sheath diameter	(8.8 +/- 0.2) mm
Transmission performance	Category 7 / Class D, E, E _A , F up to 600 MHz according to ISO/IEC 11 801 and EN 50 173-1
Transmission rate	1/10 Gbit/s
Shielding	Paired shielded with additional cable shield
Operating temperature range	-40 °C ... +90 °C

Supply lengths	100 m / 500 m / 1000 m
Colour	Black

Advantages

Transmission of Gigabit and 10 Gigabit Ethernet acc. IEEE 802.3 and multimedia services

For installation within and outside 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

UV resistant, RoHS conform, halogen free LSZH

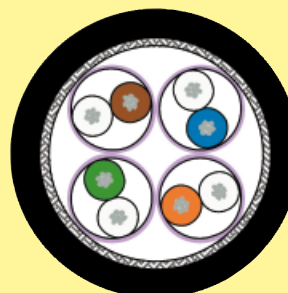
Designed to be compatible with products from HARTING like *har-speed* M12 Crimp and Han® GigaBit module.

Identification	Part number	Drawing	Dimensions in mm
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Ha-VIS EtherRail®
flexible data cable, PIMF
4x2xAWG24/7, Cat. 7

10 m ring
100 m ring
500 m reel
1000 m reel

09 45 600 0694
09 45 600 0692
09 45 600 0691
09 45 600 0690



Cables



Industrial Cat. 7 cable, 8-wire, PUR

IP 20	☒	IP 65 / IP 67	☒	PUR	Cat. 5	☐	Cat. 7	☒
Cable structure	4 x 2, Twisted Pair, shielded, PIMF							
Core structure	4 x 2 x AWG 23/1, solid copper wire							
Wire insulation	PE, Ø 1.4 mm							
Sheath material	PUR Elastomer							
Cable sheath diameter	8.3 mm							
Transmission performance	Category 7 / Class F up to 600 MHz according to ISO/IEC 11 801 and EN 50 173-1							
Transmission rate	1/10 Gbit/s							
Shielding	Paired shielded with additional cable shield							
Operating temperature range								
- fix operation	-40 °C ... +70 °C							
- flexible operation	-10 °C ... +50 °C							
Supply lengths	100 m / 500 m / 1000 m							
Colour	Yellow							
Advantages	Robust design suitable for industry Transmission of Gigabit and 10 Gigabit Ethernet acc. IEEE 802.3 and multimedia services Flame retardant Oil retardant RoHS conform Halogen free							

Identification	Part number	Drawing	Dimensions in mm
Industrial Cat. 7 installation cable, 8-wire PUR 100 m ring 500 m reel 1000 m reel	 09 45 600 0651 09 45 600 0650 09 45 600 0660		

IP 20

RJ45

- Connectors [on page B·2 8]
- System cables [on page B·2 14]
- Distribution modules and Outlets [on page B·2 21]

IP 65 / IP 67

HARTING PushPull

- Connectors [on page B·2 24]
- System cables [on page B·2 30]
- Panel feed-throughs [on page B·2 32]
- Distribution modules and Outlets [on page B·2 34]

Han® PushPull

- Connectors [on page B·2 36]
- System cables [on page B·2 44]
- Panel feed-throughs / Gender Changer [on page B·2 46]

Han® 3 A

- Connectors [on page B·2 54]
- System cables [on page B·2 58]
- Panel feed-throughs [on page B·2 60]
- Distribution modules and Outlets [on page B·2 66]

Han® 3 A RJ45 Hybrid

- Connectors [on page B·2 70]
- System cables [on page B·2 72]
- Panel feed-throughs [on page B·2 74]
- Cables [on page B·2 76]

har-speed M12

- Connectors [on page B·2 78]
- System cables [on page B·2 80]

Han-Max®

- Connectors [on page B·2 82]
- Panel feed-throughs [on page B·2 86]

Cables

- Industrial Cat. 6_A [on page B·2 90]
- Industrial Cat. 5 [on page B·2 93]
- Industrial Cat. 7 [on page B·2 96]

Tools

[on page B·2 100]

Identification	Part number	
HARTING RJ Industrial® Stripping Tool Stripping tool for Ethernet cables including blade cassette Spare blade cassette	09 45 800 0000 09 45 800 0001	 The RJ Industrial Stripping Tool is ready to remove insulation from cables for fast mounting with diameters from 2.5 mm ... 8 mm quick and easy. It allows to remove cable sheath and shielding braid in one.
Stripping tool	09 45 800 0002	
HARTING RJ Industrial® LSA-Punch Down Tool	09 45 800 0020	 The LSA-Punch Down Tool is used to wire RJ45 Industrial Metal Outlets (part no. 09 45 815 1100). The various conductors are cut to length and inserted into the insulation displacement contacts in a single pass.
HARTING RJ Industrial® Gigalink Mounting tools for HARTING RJ Industrial® Gigalink connectors	09 45 800 0520	 With the RJ Industrial Gigalink Assembly Tool Ethernet connectors can be quickly, easily and reliably connected to flexible cables.
Wire cutter	09 45 800 0005	
Cable shear	09 45 800 0004	

IP 20**Ha-VIS preLink®**

- Connectors [on page B·3 6]
- System cables [on page B·3 10]
- Distribution modules and Outlets [on page B·3 14]

Ha-VIS preLink®
IP 20**IP 65 / IP 67****Ha-VIS preLink®**

- Outlets [on page B·3 22]
- Hoods/Housings components [on page B·3 24]

Tools and Accessories

[on page B·3 26]

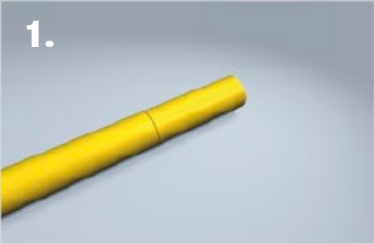
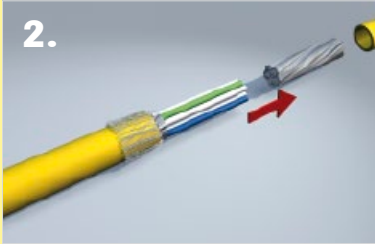
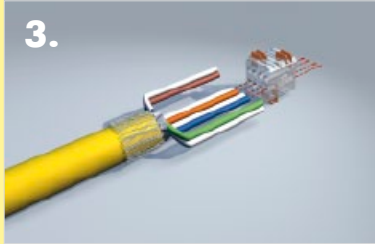
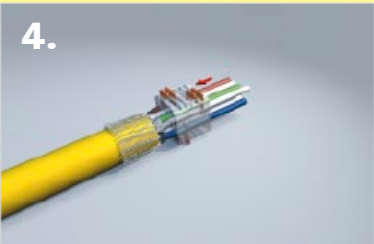
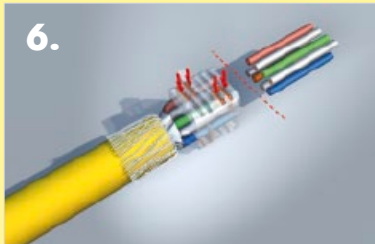
Ha-VIS preLink®
IP 65 / IP 67
Tools
Accessories

CONTENTS	PAGE
Introduction	B-3 3
Cabling IP 20	
Connector sets	
Ha-VIS preLink® RJ45 HIFF	B-3 6
Ha-VIS preLink® RJ45 Keystone	B-3 8
System cables	
Ha-VIS preLink® Patch cable, 8-wire, termination block, second side open	B-3 10
Ha-VIS preLink® Patch cable, 8-wire, termination block	B-3 11
Ha-VIS preLink® Patch cable, 8-wire, termination block, to RJ45 (IP 20)	B-3 12
Distribution modules and Outlets	
Ha-VIS preLink® 19" Patch panel, HIFF	B-3 14
Ha-VIS preLink® 19" Patch panel, Keystone	B-3 16
Ha-VIS preLink® HIFF RJ45 AP Box	B-3 18
Cabling IP 65 / IP 67	
Outlets	
Ha-VIS preLink® Han® 3 A Metal Outlet	B-3 22
Ha-VIS preLink® Han® PushPull Metal Outlet	B-3 23
Hoods/Housings components	
Han® 3 A RJ45 HIFF Adapter	B-3 24
Han® PushPull variant 14	B-3 24
HARTING PushPull variant 4	B-3 24
Tools and Accessories	
Ha-VIS preLink® tools	B-3 26

Introduction and Features

HARTING's preLink® cabling system presents you with a completely new concept for data network cabling. The central point is the structural separation of the cable connection from the plug-in connector. The data cable is initially only provided with a cable termination as a part of this innovative assembly technology. The cable termination is similar in principle to a wire-end ferrule, and passes the HF performance of the cable to the connector module.

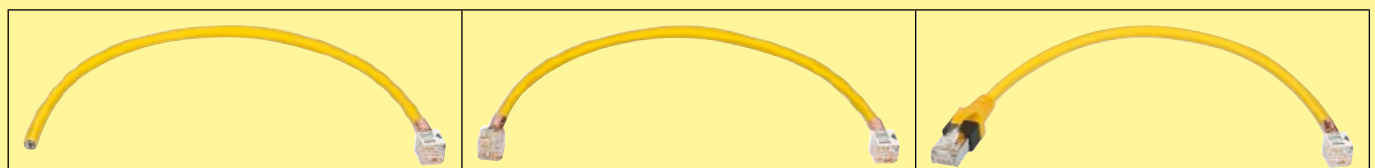
The connection between the termination block and the individual wires of the cable is done using insulation displacement connection and is therefore stable in the long-term and vibration-proof. The block's compact design only minimally increases the diameter of the cable, so that the assembled cable can be pulled through the narrowest cable duct. This means that a defined and checkable data transmission route is created, the link before the link – the Ha-VIS preLink®.

1.  Strip cable back about 5 cm.	2.  Shorten braided shielding and fold back over the cable. Remove foil shielding.	3.  Untwist the pairs and arrange the wires by colour code.
4.  Observing the colour coding, insert the wires into the Ha-VIS preLink® cable terminal and push the terminal back to the cable sheath.	5.  Position the Ha-VIS preLink® installation tool and press until fully closed.	6.  The installation tool securely presses all eight IDC contacts into the final position and also cuts the wire ends to the correct length. Assembly of the Ha-VIS preLink® cable termination is complete.

Assembling the termination block

The pre-assembled cable link can be combined with a suitable module in this application in a plug or socket design to form a single unit. This creates either a Permanent Link (in accordance with ISO/IEC 11 801 (EN 50 173)) or an end-to-end link (PROFINET).

As it is possible to exchange the data modules, there is the greatest possible flexibility for the user and the link is future-proof. Other advantages such as safety and economy result from the use of pre-assembled system cabling and cable links as well as the use of coordinated installation materials like patch panels, junction boxes and housing components.



Assembled system cables

Introduction and Features

Features:

Mating profile	RJ45 according to IEC 60 603-7
No. of contacts	8
Transmission characteristics	Category 6, suitable for Class E _A
Cable diameter	5 mm ... 9 mm
Wire cross-section	AWG 22 ... AWG 27, depending on termination block, solid or stranded
Single wire diameter	0.8 mm ... 1.6 mm, depending on termination block
Degree of protection	IP 20 IP 65 / IP 67 with suitable housing (Han® 3 A, Han® PushPull, HARTING PushPull)
Mating cycles	min. 750
Temperature range	-40 °C ... +70 °C
Material	Zinc die-cast, nickel-plated

IP 20

Ha-VIS preLink®

- Connectors [on page B·3 6]
- System cables [on page B·3 10]
- Distribution modules and Outlets [on page B·3 14]

IP 65 / IP 67

Ha-VIS preLink®

- Outlets [on page B·3 22]
- Hoods/Housings components [on page B·3 24]

Tools and Accessories

[on page B·3 26]

Connector sets



Ha-VIS preLink®
RJ45 HIFF

IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Connector type	RJ45 connector acc. to IEC 60 603-7
Number of contacts	8
Transmission performance	Category 6 / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	up to 10 Gbit/s
Shielding	Fully shielded, 360° shielding contact

Mounting	Field-assembly possible
Wire termination	Via Ha-VIS preLink® terminal module
Cable options	
– Strand gauge	0.08 mm ² ... 0.25 mm ²
– Strand diameter	AWG 27 ... AWG 22 (stranded and solid)
– Cable sheath diameter	0.8 mm ... 1.6 mm (including isolation)
Degree of protection	IP 20
Operating temperature range	–40 °C ... +70 °C
Housing material	Zinc die-cast, nickel-plated

Advantages	Small size, suitable for hoods and housings of series Han® 3 A, Han® PushPull variant 14 and HARTING PushPull RJ45 connectors variant 4 Consistent connection technology in the cabling system Quick and easy assembling of data cables
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Identification	Part number	Drawing	Dimensions in mm
Ha-VIS preLink® set RJ45 jack AWG 22/23 (24) AWG 26/27 Set, consists of: • 1x RJ45 module • 1x terminal module • 1x cable tie	20 82 001 0001 20 82 001 0002		
Ha-VIS preLink® module RJ45 jack	20 82 000 0002		
Ha-VIS preLink® terminal module Contact block with IDC termination AWG 22/23 (24), Yellow AWG 26/27, White package with 10 pieces	20 82 000 0001 20 82 000 0003		

Connector sets



Ha-VIS preLink®
RJ45 Keystone

IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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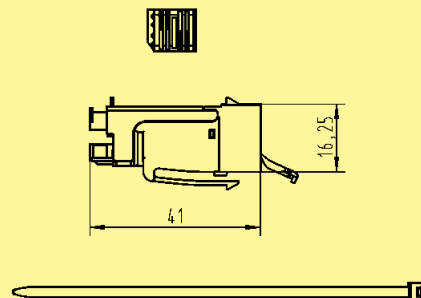
Connector type	RJ45 connector acc. to IEC 60 603-7								
Number of contacts	8								
Transmission performance	Category 6 / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1								
Transmission rate	up to 10 Gbit/s								
Shielding	Fully shielded, 360° shielding contact								
Mounting	Field-assembly possible								
Wire termination	Via Ha-VIS preLink® terminal module								
Cable options									
– Strand gauge	0.25 mm ² ... 0.34 mm ²								
– Strand diameter	AWG 22 ... AWG 24 (stranded and solid)								
– Cable sheath diameter	1.3 mm ... 1.6 mm (including isolation)								
Degree of protection	IP 20								
Operating temperature range	–40 °C ... +70 °C								
Housing material	Zinc die-cast, nickel-plated								
Advantages	Simple, fast and reliable connection of data cables Integrated dust protection cover, removable 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
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Ha-VIS preLink® set
RJ45 jack
AWG 22/23 Keystone

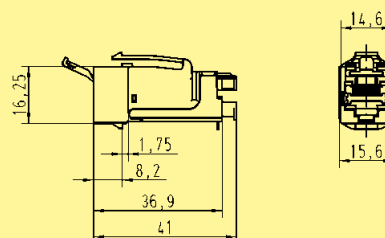
- Set consists of:
- 1x RJ45 module, Keystone jack
 - 1x terminal module
 - 1x cable tie

20 82 501 0001



Ha-VIS preLink® module
RJ45 jack, Keystone

20 82 500 0001

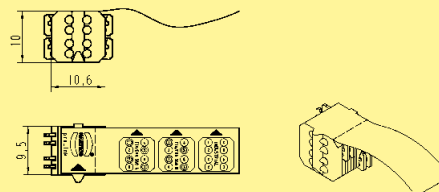


Ha-VIS preLink® terminal module
AWG 22/23

Contact block with IDC termination

20 82 000 0001

package with 10 pieces



Ha-VIS preLink®
IP 20

System cables



Ha-VIS preLink® Patch cables

terminal module to one side, secured by protection cap

IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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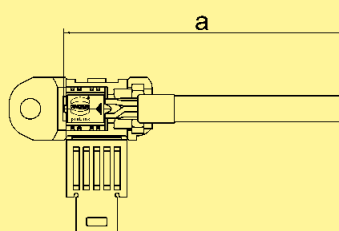
Connector types	1x terminal module, secured by protection cap second side open	
Cable types	4 x 2 AWG 27/7, shielded, S/FTP Cat. 7	
Sheath material	PUR	
Wiring	TIA/EIA 568B, 1:1	
Transmission performance	Category 6 / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1	
Transmission rate	up to 10 Gbit/s	
Shielding	Copper braid, tinned	
Operating temperature range		
fixed operation	-35 °C ... +70 °C	
flexible operation	-5 °C ... +50 °C	
Standard lengths	0.6 m / 1 m / 2 m / 3 m / 5 m / 10 m other lengths available on request	
Colour	Yellow	
Advantages	Pre-assembled system cable, fast, flexible and reliable in the application Simple in handling Robust in design Installation of Ha-VIS preLink® cables for industrial environment Connection cable for control or distributor cabinets or within controllers	

Identification	Part number	Drawing	Dimensions in mm
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Ha-VIS preLink® Patch cable

Yellow

Length	0.2 m	20 82 600 1002
Length	0.4 m	20 82 600 1004
Length	0.6 m	20 82 600 1006
Length	0.8 m	20 82 600 1008
Length	1.0 m	20 82 600 1010
Length	2.0 m	20 82 600 1020
Length	3.0 m	20 82 600 1030
Length	4.0 m	20 82 600 1040
Length	5.0 m	20 82 600 1050
Length	10.0 m	20 82 600 1100



System cables



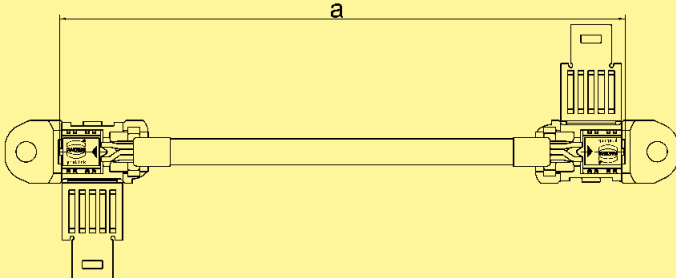
Ha-VIS preLink® Patch cables

terminal module to both sides, secured by protection cap

Ha-VIS preLink®
IP 20

IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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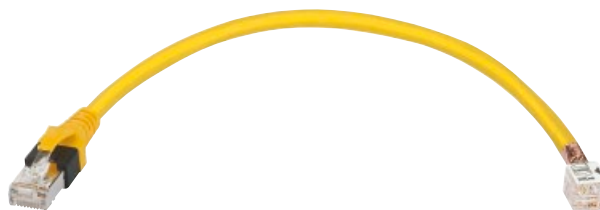
Connector types	terminal module, secured by protection cap	
Cable types	4 x 2 AWG 27/7, shielded, S/FTP Cat. 7	
Sheath material	PUR	
Wiring	TIA/EIA 568B, 1:1	
Transmission performance	Category 6 / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1	
Transmission rate	up to 10 Gbit/s	
Shielding	Copper braid, tinned	
Operating temperature range		
fixed operation	-35 °C ... +70 °C	
flexible operation	-5 °C ... +50 °C	
Standard lengths	0.6 m / 1 m / 2 m / 3 m / 5 m / 10 m other lengths available on request	
Colour	Yellow	
Advantages	Pre-assembled system cable, fast, flexible and reliable in the application Simple in handling Robust in design Installation of Ha-VIS preLink® cables for industrial environment Connection cable for control or distributor cabinets or within controllers	

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS preLink® Patch cable			
	Yellow		
Length 0.2 m	20 82 600 2002		
Length 0.4 m	20 82 600 2004		
Length 0.6 m	20 82 600 2006		
Length 0.8 m	20 82 600 2008		
Length 1.0 m	20 82 600 2010		
Length 2.0 m	20 82 600 2020		
Length 3.0 m	20 82 600 2030		
Length 4.0 m	20 82 600 2040		
Length 5.0 m	20 82 600 2050		
Length 10.0 m	20 82 600 2100		

System cables

Ha-VIS preLink® Patch cables

Side 1 with terminal module, secured by protection cap
Side 2 RJ45 overmoulded, with locking lever protection



IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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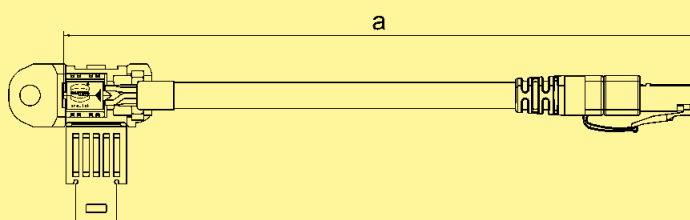
Connector types	1x terminal module, secured by protection cap 1x RJ45, overmoulded, with locking lever protection
Cable types	4 x 2 AWG 27/7, shielded, S/FTP Cat. 7
Sheath material	PUR
Wiring	TIA/EIA 568B, 1:1
Transmission performance	Category 6 / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	up to 10 Gbit/s
Shielding	Copper braid, tinned
Operating temperature range	
fixed operation	-35 °C ... +70 °C
flexible operation	-5 °C ... +50 °C
Standard lengths	0.6 m / 1 m / 2 m / 3 m / 5 m / 10 m other lengths available on request
Colour	Yellow
Advantages	Pre-assembled system cable, fast, flexible and reliable in the application Simple in handling Robust in design Installation of Ha-VIS preLink® cables for industrial environment Connection cable for control or distributor cabinets or within controllers

Identification	Part number	Drawing	Dimensions in mm
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Ha-VIS preLink® Patch cable

Yellow

Length	0.2 m	20 82 601 1002
Length	0.4 m	20 82 601 1004
Length	0.6 m	20 82 601 1006
Length	0.8 m	20 82 601 1008
Length	1.0 m	20 82 601 1010
Length	2.0 m	20 82 601 1020
Length	3.0 m	20 82 601 1030
Length	4.0 m	20 82 601 1040
Length	5.0 m	20 82 601 1050
Length	10.0 m	20 82 601 1100

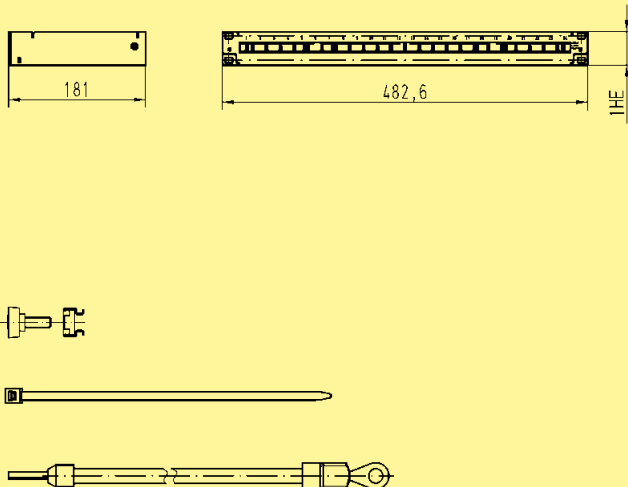


Patch panel

Ha-VIS preLink®
19" Patch panel, HIFF

IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Number of modules	24
Transmission performance	Category 6 / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	up to 10 Gbit/s
Assembly	in 19" racks acc. to IEC/DIN EN 60 297-3-100 (DIN 41 494-1)
Dimensions (W x H x D)	482.6 mm (19") x 44.5 mm (1 U) x 181 mm
Degree of protection	IP 20
Operating temperature range	-40 °C ... +70 °C
Material	
module carrier, 2-parts	steel sheet
front cover	stainless steel
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 Structured cabling for industrial premises IP 20 installation for distributors and switch cabinets

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 Range of delivery:: • Screw set M5 • 24 cable ties • 1x earth conductor 6 mm²	20 82 400 0001		

Patch panel

Ha-VIS preLink®
19" Patch panel, Keystone

IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Number of modules	24
Transmission performance	Category 6 / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	up to 10 Gbit/s
Module design	Keystone size acc. to EN 60 603-7:2009
Assembly	in 19" racks acc. to IEC/DIN EN 60 297-3-100 (DIN 41 494-1)
Dimensions (W x H x D)	482.6 mm (19") x 44.5 mm (1 U) x 107 mm
Degree of protection	IP 20
Operating temperature range	-40 °C ... +70 °C
Material	steel sheet
Advantages	Suitable for Ha-VIS preLink® RJ45 module in Keystone size Economic due to easy design Safety, additional strain-relief Fully shielded modules connected through metal holding fixture Earth bolt

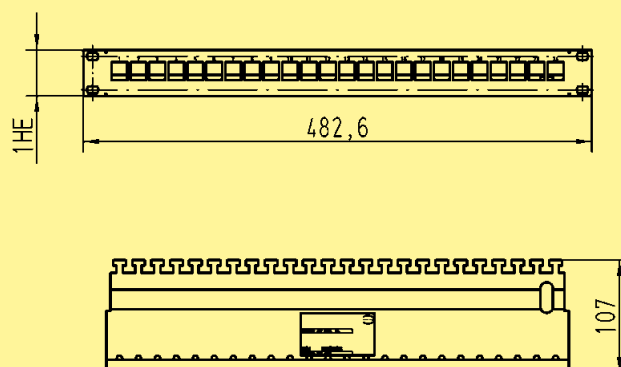
Identification

Ha-VIS preLink®
19" patch panel, Keystone

Part number

20 82 405 0001

Drawing



Range of delivery::

24 pieces of:

- Ha-VIS preLink® RJ45 Keystone jack
- terminal modules for AWG 22 / 23
- strain relief

Wall-mounted box

Ha-VIS preLink®
HIFF RJ45 AP Box

IP 20	☒	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Number of ports, Copper / Termination	2 / RJ45 jack HIFF
Transmission performance	Category 6 / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	up to 10 Gbit/s
Shielding	Fully shielded, 360° shielding contact
Cable diameter	5 mm ... 9 mm
Mounting	on-wall or DIN Rail
Dimensions (WxHxD)	60 x 81 x 70 mm
Degree of protection	IP 20
Operating temperature	-40 °C ... +70 °C
Housing material	steel plate
Colour	Anthracite grey (RAL 7016)
Advantages	Flexible, suitable for on-wall mounting or for top-hat mounting rail (35mm) Economical, time-saving installation due to the use of pre-assembled data cables with Ha-VIS preLink® termination Robust design, powder-coated steel plate housing Structured cabling for industrial premises

Identification

Part number

Drawing

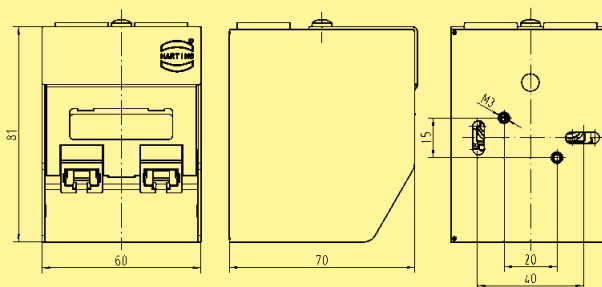
Dimensions in mm

Ha-VIS preLink® HIFF RJ45 AP Box

RJ45 wall-mounted box
consisting of:

- 1x steel-plate housing, 2-parts
- 2x Ha-VIS preLink® Set,
RJ45 jack HIFF, AWG 22/23
- 2x grommet with membrane
- 1x assembly instruction

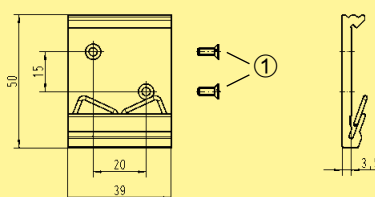
20 82 101 0220



Accessory

DIN Rail mounting bracket

20 80 000 0003



IP 20

Ha-VIS preLink®

- Connectors [on page B·3 6]
- System cables [on page B·3 10]
- Distribution modules and Outlets [on page B·3 14]

IP 65 / IP 67

Ha-VIS preLink®

- Outlets [on page B·3 22]
- Hoods/Housings components [on page B·3 24]

Tools and Accessories

[on page B·3 26]

Outlets



Ha-VIS preLink®
Han® 3 A Metal Outlet

IP 20 ☐	IP 65 / IP 67 ☒	IP 65 / IP 67 to IP 20 ☐	Cat. 5 ☐	Cat. 6 ☒
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Number of ports, Copper / Termination	2 / Han® 3 A RJ45 (IP 65 / IP 67)
Transmission performance	Category 6 / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	up to 10 Gbit/s
Termination	Ha-VIS preLink®
Wire gauge	AWG 24 ... 22 (0.25 mm ² ... 0.34 mm ²) solid and stranded
Strand diameter	Ø 1.3 mm ... 1.6 mm
Cable diameter	7.2 mm ... 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

Advantages

Simple mounting, fixing and earth connection both outside
Fast termination of data cables due to Ha-VIS preLink® technology
Structured cabling for industrial premises
PROFINET compatible

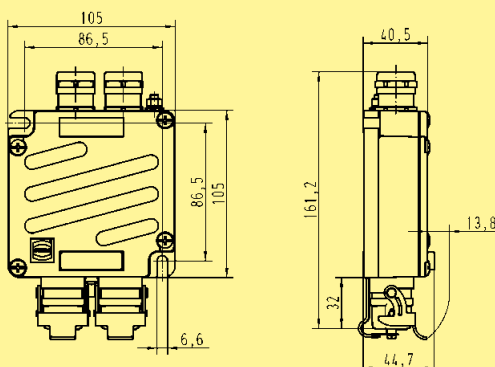
Identification	Part number	Drawing	Dimensions in mm
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Ha-VIS preLink®
Han® 3 A Metal Outlet

20 82 102 0101

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



Outlets



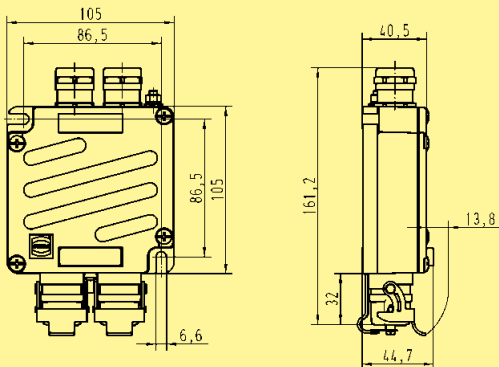
Ha-VIS preLink®
Han® PushPull Metal Outlet

IP 20	☐	IP 65 / IP 67	☒	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☒
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Number of ports, Copper / Termination	2 / Han® PushPull RJ45 (IP 65 / IP 67)
Transmission performance	Category 6 / Class E _A up to 500 MHz according to ISO/IEC 11 801:2002, EN 50 173-1
Transmission rate	up to 10 Gbit/s
Termination	Ha-VIS preLink®
Wire gauge	AWG 24 ... 22 (0.25 mm ² ... 0.34 mm ²) solid and stranded
Strand diameter	Ø 1.3 mm ... 1.6 mm
Cable diameter	7.2 mm ... 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	Black

Advantages

Simple mounting, fixing and earth connection both outside
Fast termination of data cables due to Ha-VIS preLink®
technology
Structured cabling for industrial premises
Mating face AIDA compliant, protection cover incl.
PROFINET compatible

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS preLink® Han® PushPull Metal 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 82 104 0101		

**Ha-VIS preLink®
IP 65 / IP 67**

B-3

24

IP 20

Ha-VIS preLink®

- Connectors [on page B·3 6]
- System cables [on page B·3 10]
- Distribution modules and Outlets [on page B·3 14]

IP 65 / IP 67

Ha-VIS preLink®

- Outlets [on page B·3 22]
- Hoods/Housings components [on page B·3 24]

Tools and Accessories

[on page B·3 26]

Identification

Part number

Cable gland M20x1.5
for pre-terminated Ha-VIS preLink®
cable assemblies

with slotted seal

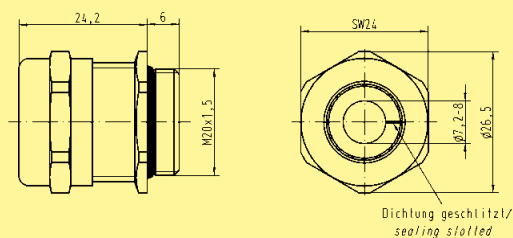
Cable-sheath 7.2 mm ... 8.0 mm

Cable-sheath 4.0 mm ... 6.5 mm



19 00 000 5020

19 00 000 5079

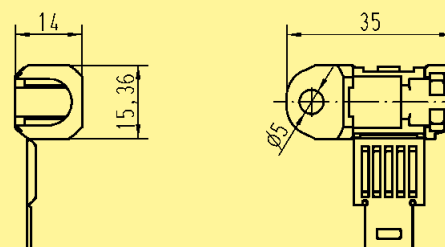


Protection cover
for pre-terminated
Ha-VIS preLink® cable
assemblies

Set of 10 pieces

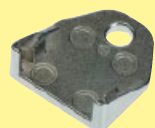


20 82 000 9915

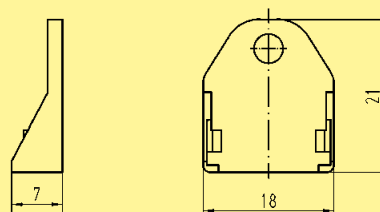


Unlocking tool
for Ha-VIS preLink® RJ45 module

Set of 5 pieces



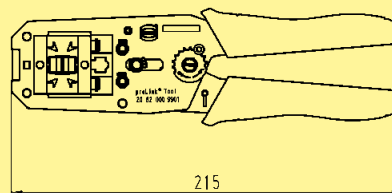
20 82 000 9916



HARTING Assembly tool
for Ha-VIS preLink® terminal
module



20 82 000 9901



Cables + Accessories	RFID Antennas	RFID Reader	RFID Transponder
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General

HARTING Ha-VIS RFID System components

Real-time information and the close synchronization of computer data and real processes play a critical role in process management and process optimization. Ensuring that information precisely maps and concurs with reality is the only way to control processes optimally and reap savings potentials accordingly.

One important prerequisite for guaranteeing that data and processes are synchronized is an intelligent infrastructure that makes data transparent and available throughout a company in order to achieve the maximum savings potentials.

RFID offers you the full potential to create intelligent infrastructures: benefit from the simultaneous identification of up to several hundred objects - without the need for the direct line of sight as required by barcode solutions. The collected data are immediately ready for further processing throughout the company.

Moreover, a transponder can be used to store information directly on the product at the same time it is identified. This means that these data are also always available wherever the product may happen to be located.

HARTING offers smart infrastructure solutions based on optimally coordinated components from a single source. These solutions enable the reliable control and steering of production and business processes, thereby resulting in lower costs.

The HARTING RFID Reader and components have been designed for harsh industrial applications. Deployed in the transportation, machinery and energy markets, HARTING RFID components guarantee secure and reliable information processing - also under the most challenging environmental conditions



[illegible]



Passive UHF Transponder
Ha-VIS RFID FT 89 (NT)

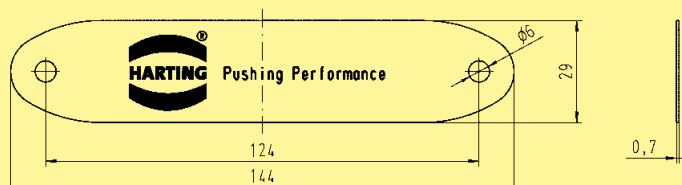
Technical characteristics

Frequency range	860 MHz ... 960 MHz
Protocol	EPC C1 Gen2
Chip	Impinj Monza 4
Read range	> 8 m (on metal plate in free space, 2 W ERP)
Dimensions (W x D x H)	144 x 29 x 0.7 mm
Degrees of protection	IP 64 / IP 67 / IP 69K
Temperature range	-32 °C ... +90 °C
Mounting	M4 screws or rivets with washers
Colour	White/ flexible / also barcode possible
Features	• For non-conductive surface • Extremely imperishable by the use of reverse printing • Scratch- and smear-resistant by the use of Polycarbonate • Flexible printing possible • Flexible mounting on different shapes of surfaces • Mounting with glue/ screw/ rivets • Washable, resistance against chemicals

Identification	Part number	Drawing	Dimensions in mm
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Passive UHF Transponder
Ha-VIS RFID FT 89 (NT)

20 92 641 0700



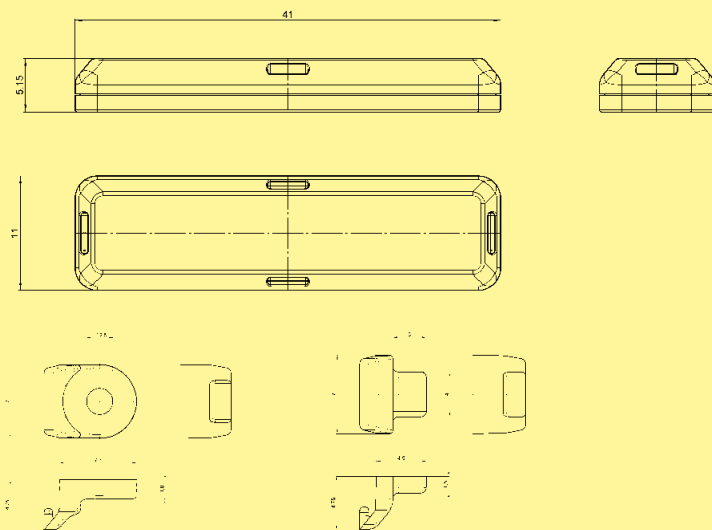
Minimum order quantity:
500 pieces



Passive UHF Transponder
Ha-VIS RFID VT 86 (HT)

Technical characteristics

Frequency range	860 MHz ... 960 MHz
Protocol	EPC C1 Gen2
Chip	Alien Higgs 3
Memory	512 bit
Read range	≥ 2.5 m (on metal plate in free space, 2 W ERP, 868 MHz)
Dimensions (W x D x H)	41 x 11 x 5 mm
Degrees of protection	IP 64 / IP 67 / IP 69K
Temperature range	
Operational range (read)	-50 °C ... +85 °C
Operational range (write)	-50 °C ... +85 °C
max. range	-65 °C ... +210 °C
Mounting	Screw, rivet, adhere
Colour	Black
Features	• Extremely robust and durable transponder for maintenance and life cycle applications in rough environments • Functions on metal • Robust housing, resistant against chemicals • EPC C1 Gen2 compatible • Extended memory

Identification	Part number	Drawing	Dimensions in mm
Passive UHF Transponder Ha-VIS RFID VT 86 (HT) set with clip houlder Package with 10 units Package with 50 units	20 92 641 0201 20 92 641 0202		



Passive UHF Transponder Ha-VIS RFID SL 89 (MT)-G2AH3

Technical characteristics

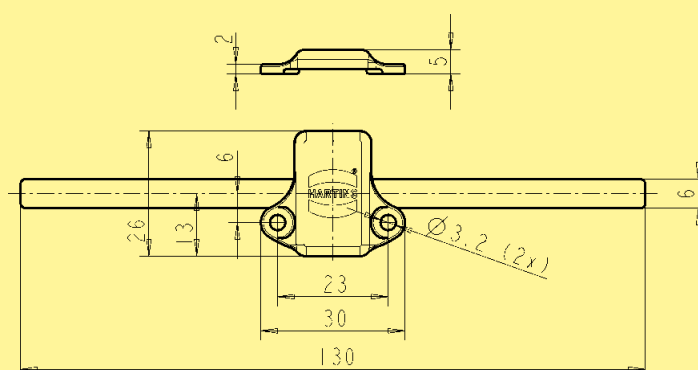
Frequency range	860 MHz ... 960 MHz
Protocol	EPC C1 Gen2
Chip	Alien Higgs 3
Memory	512 bit
Read range	≥ 4.0 m (on metal plate in free space, 2 W ERP)
Dimensions (W x D x H)	30 x 26 x 5 mm
Degrees of protection	IP 64 / IP 67 / IP 69K
Temperature range	
Operational range (read)	-50 °C ... +85 °C
Operational range (write)	-50 °C ... +85 °C
Storage	-65 °C ... +130 °C
Mounting	M3 screws or rivets with washers
Slot dimensions	140 x 6 mm
Colour	Black
Features	• Slot tag for integration in metallic objects like barrels, pallets or extruded profiles (slot dimensions 140 x 6 mm) • Extremely high mechanical protection • EPC C1 Gen2 compatible • Extended memory

Identification	Part number	Drawing	Dimensions in mm
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Passive UHF Transponder
Ha-VIS RFID SL 89 (MT)-G2AH3

Package with 10 units
Package with 50 units

20 92 641 0601
20 92 641 0602





Passive UHF Transponder
Ha-VIS RFID CT 89 (NT)-G2UCXM

Technical characteristics

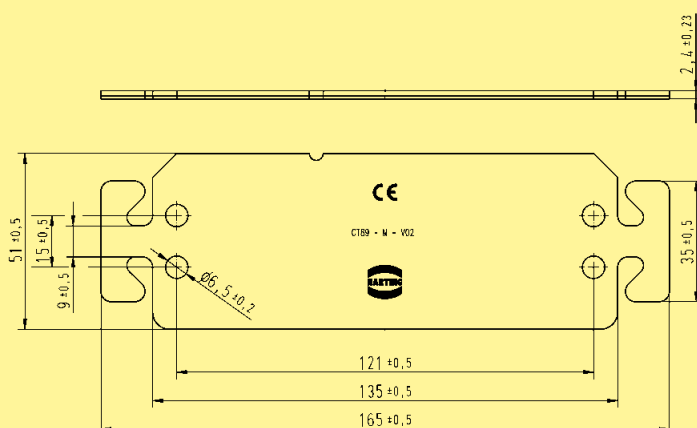
Frequency range	860 MHz ... 960 MHz
Protocol	EPC C1 Gen2
Chip	NXP UCODE G2XM
Memory	512 bit
Read range	≥ 5.0 m (on metal plate in free space, 2 W ERP)
Dimensions (W x D x H)	165 x 51 x 2 mm
Degrees of protection	IP 64 / IP 67 / IP 69K
Temperature range	
Operational range (read)	-40 °C ... +85 °C
Operational range (write)	-40 °C ... +85 °C
Storage	-50 °C ... +85 °C
Mounting	M4 screws or rivets with washers
Colour	Black
Features	• Identification of reinforced concrete parts for the building industry • Integration in concrete floors for location of storage areas • High read range also in wet materials • Robust housing • EPC C1 Gen2 compatible • Extended memory

Identification	Part number	Drawing	Dimensions in mm
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Passive UHF Transponder
Ha-VIS RFID CT 89 (NT)-G2UCXM

Package with 10 units
Package with 50 units

20 92 641 0301
20 92 641 0302

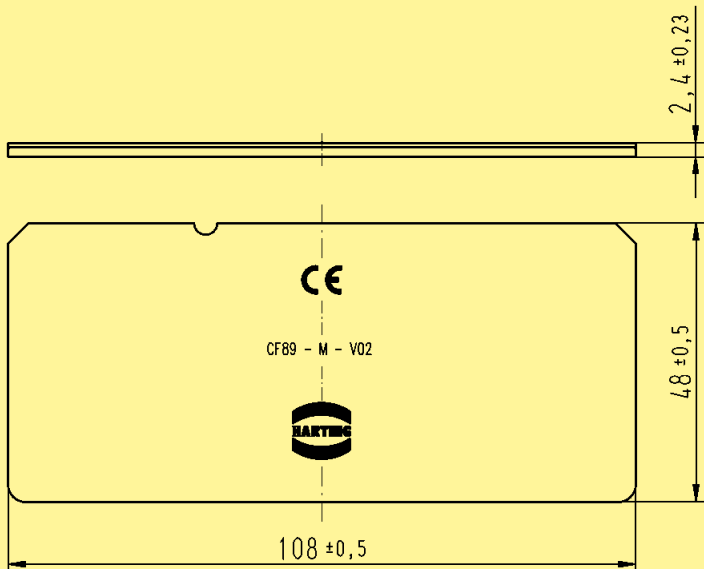




Passive UHF Transponder
Ha-VIS RFID CF 89 (NT)-G2UCXM

Technical characteristics

Frequency range	860 MHz ... 960 MHz
Protocol	EPC C1 Gen2
Chip	NXP UCODE G2XM
Memory	512 bit
Read range	≥ 5.0 m (on metal plate in free space, 2 W ERP)
Dimensions (W x D x H)	108 x 48 x 2 mm
Degrees of protection	IP 64 / IP 67 / IP 69K
Temperature range	
Operational range (read)	-40 °C ... +85 °C
Operational range (write)	-40 °C ... +85 °C
Storage	-50 °C ... +85 °C
Mounting	M4 screws or rivets with washers
Colour	Black
Features	• Identification of reinforced concrete parts for the building industry • Integration in concrete floors for location of storage areas • High read range also in wet materials • Robust housing • EPC C1 Gen2 compatible • Extended memory

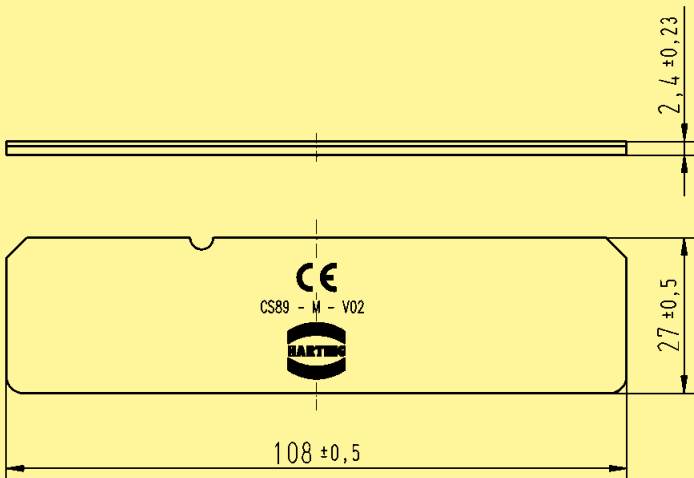
Identification	Part number	Drawing	Dimensions in mm
Passive UHF Transponder Ha-VIS RFID CF 89 (NT)-G2UCXM Package with 10 units Package with 50 units	20 92 641 0401 20 92 641 0402		



Passive UHF Transponder Ha-VIS RFID CS 89 (NT)-G2UCXM

Technical characteristics

Frequency range	860 MHz ... 960 MHz
Protocol	EPC C1 Gen2
Chip	NXP UCODE G2XM
Memory	512 bit
Read range	≥ 5.0 m (on metal plate in free space, 2 W ERP)
Dimensions (W x D x H)	108 x 27 x 2 mm
Degrees of protection	IP 64 / IP 67 / IP 69K
Temperature range	
Operational range (read)	-40 °C ... +85 °C
Operational range (write)	-40 °C ... +85 °C
Storage	-50 °C ... +85 °C
Mounting	M4 screws or rivets with washers
Colour	Black
Features	• Identification of reinforced concrete parts for the building industry • Integration in concrete floors for location of storage areas • High read range also in wet materials • Robust housing • EPC C1 Gen2 compatible • Extended memory

Identification	Part number	Drawing	Dimensions in mm
Passive UHF Transponder Ha-VIS RFID CS 89 (NT)-G2UCXM Package with 10 units Package with 50 units	20 92 641 0501 20 92 641 0502		

Notes

C-2
1



RFID Reader

Ha-VIS RFID RF-R500

General description

The Ha-VIS® RFID RF-R500 is a high performance UHF RFID long range reader. It supports up to 4 antennas simultaneously reducing costs and easing integration of RFID technology. Due to its robust aluminium housing and up to IP 64, it is ideally suited for industrial applications.

The reader was designed for very high reading sensitivity combined with impressive reading and data processing speed. The reader brings wireless RFID communication into industrial environments.

The reader can directly control lamps, sirens or gates via the integrated GPIOs.

Features

- Up to 4 antenna
- Up to 4 W transmitting power
- Impressive bulk reading
- Power over Ethernet (PoE)
- Up to IP 64 with an optional protection cap (otherwise IP 53)
- 5 hardware interfaces: Ethernet, RS 232, RS 485, USB

Advantages

- High receiver sensitivity for enlarged and homogeneous tag detection range
- Metal housing
- Integrated antenna multiplexer
- Simple installation
- Versatile hardware and software configuration

Application fields

- Smart infrastructure
- Logistics
- Asset management
- Machinery

Technical characteristics

Transponder protocol	EPC Gen2 (ISO 18000-6-c)
UHF RFID antenna interface	
Antenna connection	4x SMA connector (50 Ohm); Reader internally multiplexed
Frequency area	860 MHz ... 960 MHz (depending on specific reader)
Radio license	Europe EN 302 208
Supply voltage on antenna outputs	24 V DC / 200 mA (Ha-VIS RFID RF-R500-p only)
Interfaces	• Ethernet (TCP/IP) 10/100 Mbit/s; Full Spec. 802.3 • RS 232 / RS 485 • USB / USB-Port for WLAN dongle or external memory
Inputs	5 Optocoupler (max. 24 V DC / 20 mA)
Outputs	• 2 Optocoupler (24 V DC / 30 mA) • 3 Relays (24 V DC / 1 A)
LED Diagnosis	
8 LEDs (from left to right)	• Run • Host communication • Warning • Input / output • Antenna 1 • Antenna 2 • Antenna 3 • Antenna 4
Performance	
Max. Operating Distance	Up to 16 m, depending on kind of transponder & environmental conditions
Protocol Modi	• HARTING Host Mode • Scan Mode • Notification Mode • Buffered Read Mode
Power Supply	
Current consumption	max. 2 A
Design features	
Material of housing	Aluminium, powder coated
Dimensions (W x H x D)	260 x 157 x 68 mm
Weight	2000 g
Degree of protection acc. to DIN 60 529	IP 64 (with protection cap) / IP 53 (without protection cap)
Installation on DIN rail	DIN rail mounting kit (optional accessories)

Technical characteristics

Environmental conditions

Operating temperature	-25 °C ... +50 °C
Storage temperature	-25 °C ... +85 °C
Relative humidity	5 % ... 95 % (non-condensing)
Vibration	EN 60 068-2-6 10 Hz ... 150 Hz: 0.075 mm / 1 g
Shock	EN 60 068-2-27 Acceleration: 30 g

Norms & Safety

Radio license	• EN 302 208 • FCC 47 FCR Part 15 • IC RSS-GEN, RSS-210
EMC	EN 301 489
Low voltage	EN 60 950
Human Exposure	EN 50 364
RoHS compliant	

RF diagnosis

- RF Channel monitoring
- Antenna SWR control
- Internal overheating control

Operating system

Linux (Kernel 3.x.x)
64 MB RAM, 256 MB Flash

Others

- Anticollision function
- Real time clock
- RSSI

Software

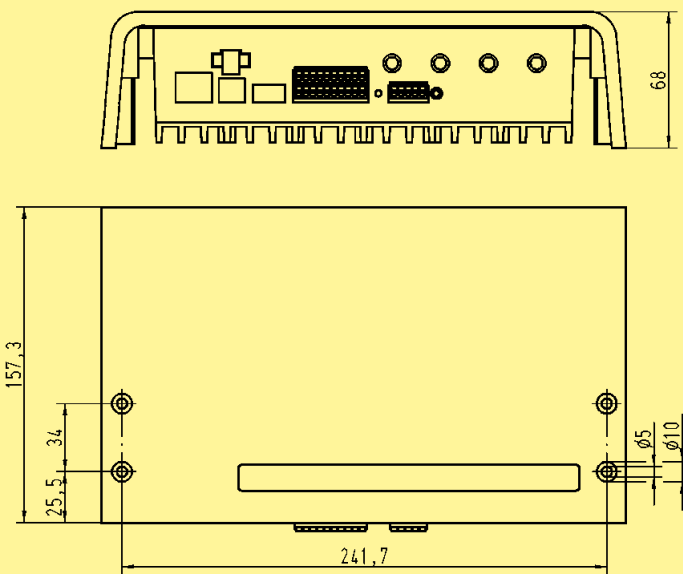
Demo- and configuration software	Ha-VIS RFID config
Minimal hardware requirements	• Personal computer IBM PC Pentium III 1000 MHz or faster recommended • Windows XP® (32 Bit) with 256 MB RAM or Windows® 7 (32 / 64 Bit) • Hard disk with minimum free 30 MB memory space • Windows® compatible mouse • Windows® compatible super VGA graphic card (800 x 600) (1024x768 recommended)



UHF RFID Long Range Reader Ha-VIS RFID RF-R500-c-EU

Technical characteristics

Antenna connection	4x SMA connector (50 Ohm); reader internally multiplexed
Transmitting Power	max. 2 W
Frequency area	865 MHz ... 870 MHz
Radio license	EN 302 208
Inputs	5 optocoupler (max. 24 V DC / 20 mA)
Outputs	• 2 optocoupler (24 V DC / 30 mA) • 3 relays (24 V DC / 1 A)
Bulk-Read capability	< 150 transponders/sec
Max. Operating Distance	< 10 m, depending on kind of transponder & environmental conditions
Power supply	+24 V DC ($\pm 5\%$)
Current consumption	max. 2 A
Dimensions (W x H x D)	260 x 157 x 68 mm
Weight	2000 g
Degree of protection acc. to DIN 60 529	IP 64 (with protection cap) / IP 53 (without protection cap)
Operating temperature	-25 °C ... +50 °C

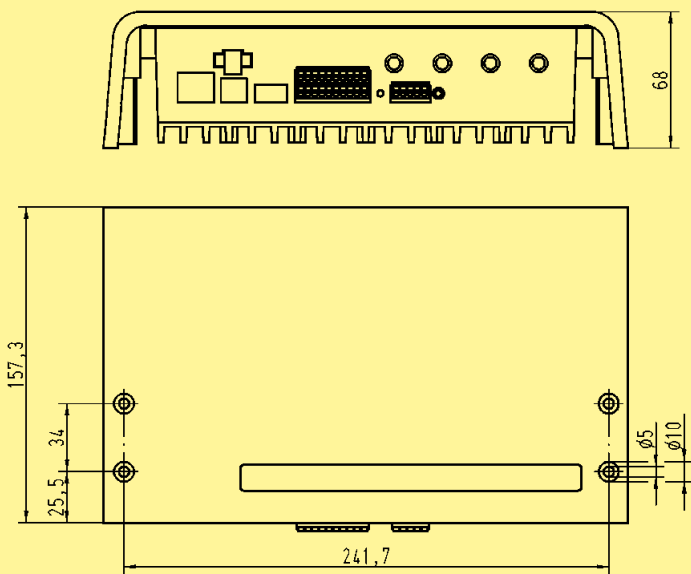
Identification	Part number	Drawing	Dimensions in mm
UHF RFID long range Reader Ha-VIS RFID RF-R500-c-EU 2 W transmission power EU version	20 91 104 1103	 The drawing shows the top and side views of the reader. The top view indicates a width of 260 mm and a depth of 157.3 mm. The side view shows a height of 68 mm. Mounting holes are specified with diameters of 5 mm and 10 mm, and a center-to-center distance of 241.7 mm. Other dimensions include 25.5 mm, 34 mm, and 25.5 mm for the mounting bracket.	

UHF RFID Long Range Reader Ha-VIS RFID RF-R500-p-EU



Technical characteristics

Antenna connection	4x SMA connector (50 Ohm); reader internally multiplexed
Transmitting Power	max. 4 W / max. 1 W in PoE mode
Frequency area	865 MHz ... 870 MHz
Radio license	EN 302 208
Supply voltage on antenna outputs	24 V DC / 200 mA
Inputs	5 optocoupler (max. 24 V DC / 20 mA)
Outputs	• 2 optocoupler (24 V DC / 30 mA) • 3 relays (24 V DC / 1 A)
Bulk-Read capability	> 150 transponders/sec
Max. Operating Distance	Up to 16 m, depending on kind of transponder & environmental conditions
Power supply	+24 V DC ($\pm 5\%$) / Power over Ethernet (PoE)
Current consumption	max. 2 A
Dimensions (W x H x D)	260 x 157 x 70 mm
Weight	2000 g
Degree of protection acc. to DIN 60 529	IP 64 (with protection cap) / IP 53 (without protection cap)
Operating temperature	-25 °C ... +50 °C

Identification	Part number	Drawing	Dimensions in mm
UHF RFID long range Reader Ha-VIS RFID RF-R500-p-EU 4 W transmission power with PoE EU version	20 91 104 1101		



UHF RFID Long Range Reader
Ha-VIS RFID RF-R500-c-US

RFID
Reader

Technical characteristics

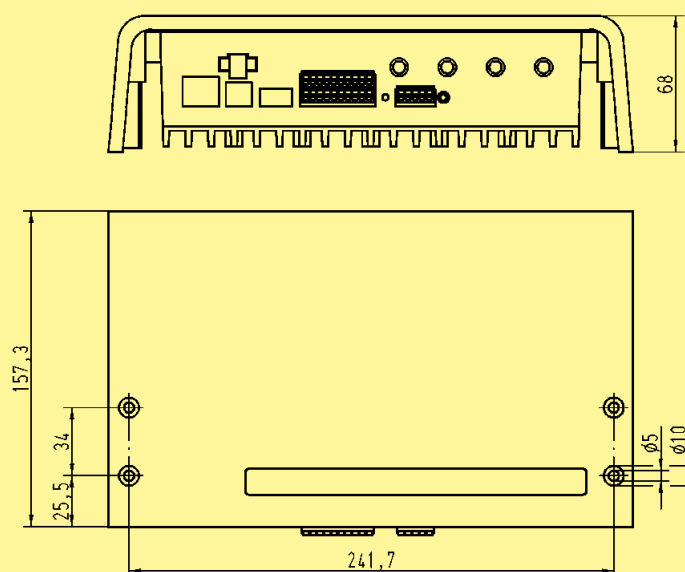
Antenna connection	4x SMA connector (50 Ohm); reader internally multiplexed
Transmitting Power	max. 2 W
Frequency area	902 MHz ... 928 MHz
Radio license	FCC 47 CFR Part 15; IC RSS-GEN; IC RSS -210
Inputs	5 optocoupler (max. 24 V DC / 20 mA)
Outputs	• 2 optocoupler (24 V DC / 30 mA) • 3 relays (24 V DC / 1 A)
Bulk-Read capability	< 150 transponders/sec
Max. Operating Distance	Up to 10 m, depending on kind of transponder & environmental conditions
Power supply	+24 V DC ($\pm 5\%$)
Current consumption	max. 2 A
Dimensions (W x H x D)	260 x 157 x 68 mm
Weight	2000 g
Degree of protection acc. to DIN 60 529	IP 64 (with protection cap) / IP 53 (without protection cap)
Operating temperature	-25 °C ... +50 °C

Identification	Part number	Drawing	Dimensions in mm
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UHF RFID long range Reader
Ha-VIS RFID RF-R500-c-US
2 W transmission power

US version

20 91 104 1104



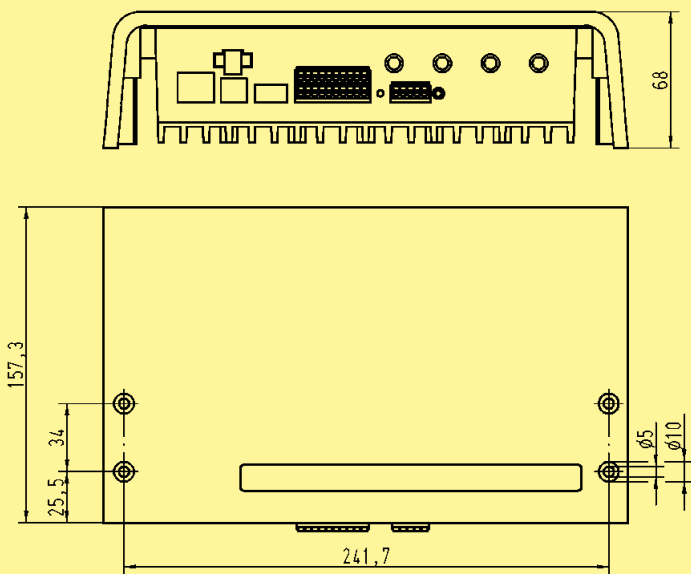
RFID Reader

Ha-VIS RFID RF-R500-p-US



Technical characteristics

Antenna connection	4x SMA connector (50 Ohm); reader internally multiplexed
Transmitting Power	max. 4 W / max. 1 W in PoE mode
Frequency area	902 MHz ... 928 MHz
Radio license	FCC 47 CFR Part 15; IC RSS-GEN; IC RSS -210
Supply voltage on antenna outputs	24 V DC / 200 mA
Inputs	5 optocoupler (max. 24 V DC / 20 mA)
Outputs	• 2 optocoupler (24 V DC / 30 mA) • 3 relays (24 V DC / 1 A)
Bulk-Read capability	> 150 transponders/sec
Max. Operating Distance	Up to 16 m, depending on kind of transponder & environmental conditions
Power supply	+24 V DC ($\pm 5\%$) / Power over Ethernet (PoE)
Current consumption	max. 2 A
Dimensions (W x H x D)	260 x 157 x 70 mm
Weight	2000 g
Degree of protection acc. to DIN 60 529	IP 64 (with protection cap) / IP 53 (without protection cap)
Operating temperature	-25 °C ... +50 °C

Identification	Part number	Drawing	Dimensions in mm
UHF RFID long range Reader Ha-VIS RFID RF-R500-p-US 4 W transmission power with PoE US version	20 91 104 1102		



Ha-VIS RFID Handheld RF-M3000

mobile UHF RFID Reader

Technical characteristics

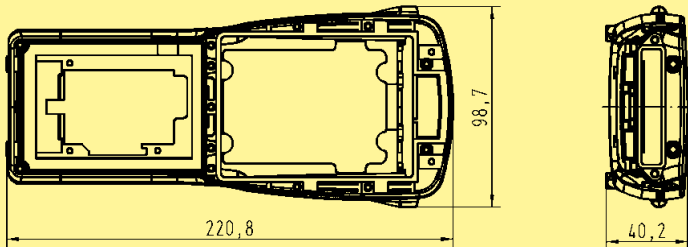
The Ha-VIS RF-M3000 is a powerful mobile RFID Reader, approved acc. to ETSI, FCC und IC.

Properties

- Highly sensitive receiver for extended reading range
- Robuste housing
- High protection class IP 65
- WLAN, Bluetooth and RFID in one handheld
- Large, very bright display
- Very long battery life (> 8 h)
- Highly modular

Standard configuration

- WIFI
- Bluetooth
- large keyboard

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS RFID Handheld RF-M3000 standard configuration (no barcode)	20 91 211 1011		
Ha-VIS RFID Handheld RF-M3001 additional to Ha-VIS RF-M3000 with:	20 91 211 1111		
• 1D Laser Scanner			
Ha-VIS RFID Handheld RF-M3002 additional to Ha-VIS RF-M3000 with:	20 91 211 1311		
• 2D Imager			
Optional:	on request		
• GPS			
• small keyboard			
• GPRS			
• 3G HSDPA			
Recommended accessories:			
High capacity battery	20 93 405 0101		
Docking Station Desktop	20 93 305 0101		
Docking Station Quad	20 93 305 0102		

Technical characteristics

Processor and memory	PXA270 624 MHz Processor 1 GB FLASH ROM 256 MB RAM
Operating system	Windows(R) CE 5
Wireless communication	WLAN 802.11 b/g Compact Flash Bluetooth® Class II, V 2.0 + EDR
Barcode scanner	1D Laser Scanner Long Range or 2D Area Imager Optional pistol grip
RFID module	UHF module Frequency 868 MHz or 915 MHz Tag supported: EPC Class 1 Gen 2; other protocols on request Reading-Writing distance up to 250 cm
External connections	Tether-Port for RS 232 and USB On-The-Go (USB 1.1) Docking-connector DC power jack
User interface	VGA colour touchscreen 3,6", resolution 480x640, TFT Sunlight readable (for outdoor use), LED backlight Touch screen pencil (stylus) or finger operation Keyboard (alphanumeric ABCDEF); alternatives on request Audio: 90 dB speaker, microphone, beeper
Programming environment	HTML, XML Mobile Devices SDK .NET and C++ via Microsoft Visual Studio® 2005 Java programming support JDK 1.2. or higher Standard Protocol APIs Windows sockets (CE.net)
Expansion slots	SD/MMC memory card slot 100-pin Expansion interface supports PCMCIA (Type II), GPRS/EDGE One Type II CF card slot
Power management	4400 mAh High capacity Accu (3,7 V) Advanced Smart Battery System Built-in Charger
Environmental	Withstands several drops from 1,8 m to polished concrete while powered on and configured with accessories Rain/Dust: IP 65, IEC 60 629 Operating temperature: -20 °C ... +50 °C Storage temperature: -40 °C ... +60 °C Relative humidity: 5 % ... 95 % (non-condensing) ESD +/- 8 kV DC air discharge; +/- 4 kV DC contact
Dimensions (W x H x D)	223 mm x 75/100 mm x 31/42 mm
Approvals	Safety CSA/UL60950-1, IEC 60950-1, EN 60950-1 EMC FCC Part15 Class B EN 55022; EN 55024; EN 301 489 Laser IEC 60825-1, Class 2 FDA 21 CFR 1040.10, 1040.11 Class II Bluetooth 1.2 In-vehicle cradle: e Mark

Ha-VIS RFID Box



Ha-VIS RFID Box

Technical characteristics

The Ha-VIS RFID Box offers system integrators and customers a complete RFID System „out of the Box.“

The box is made from steel. All components are preinstalled and tested. The box is ready for installation. You only have to connect power, Ethernet and antenna.

Properties

- 2 mm VA steel box
- Locked with key

Advantages

- Completely installed RFID system in a box
- Tested and ready to connect
- Highly modular
- Customer specific configurations
- Robust Metal housing

Standard configuration

- Ethernet Switch: Ha-VIS eCon 2050-A
- Bottom plate: Bushing; 1x M20 / 1x M25 / 4x M32

Identification	Part number	Drawing	Dimensions in mm
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Ha-VIS RFID Box
standard configuration

with RFID Reader
Ha-VIS RF-R500-p-EU

20 91 421 1001

with RFID Reader
Ha-VIS RF-R500-c-EU

20 91 411 1001

other configuration

on request

Accessories

Blanking pieces metal

M20

19 00 000 5070

M25

19 00 000 5071

M32

19 00 000 5072

Cable glands metal

M20 (cable Ø 6 mm ... 12 mm)

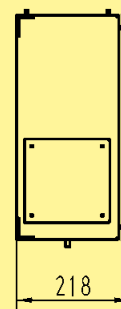
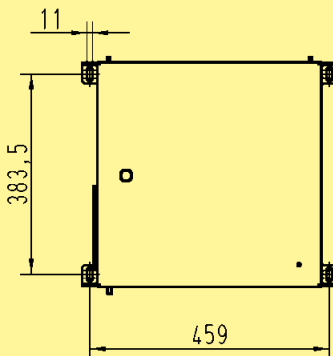
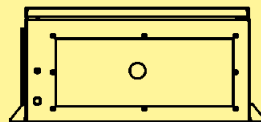
19 00 000 5082

M25 (cable Ø 9 mm ... 16 mm)

19 00 000 5090

M32 (cable Ø 13 mm ... 20 mm)

19 00 000 5094



Technical characteristics

General

Housing	VA steel, powder coated
Physical dimensions (W x H x D)	430 mm x 430 mm x 220 mm
Degree of protection	IP 65
Colour	light grey (RAL 7073)
Power supply	230 V or 110 V
Over voltage protection	Class II
Cable bushings	
standard:	up to 10 bushings for Power, Ethernet, GPIOs, antenna cables
optional:	• Han-Yellock® 1 Han-Yellock® 60 bulkhead mounted housing for Power, Ethernet and GPIOs 1 Han-Yellock® 60 bulkhead mounted housing for up to 4 antenna cables • Han® B 1 Han® 16 B bulkhead mounted housing for Power, Ethernet and GPIOs 1 Han® 24 B bulkhead mounted housing for up to 4 antenna cables • HARTING Push Pull 1 HARTING Push Pull for Power 1 HARTING Push Pull for Ethernet up to 4 bushings for antenna cables

Installed components

standard	• RFID Reader Ha-VIS RF-R500-p-EU or Ha-VIS RF-R500-c-EU • Ethernet Switch Ha-VIS eCon 2050-A • Power supply All components are completely connected, tested and ready for field installation.
other configuration:	on request

Further components, for example Industrial PC, heater, fan on request

Ha-VIS RFID Reader

standard:	• for harsh industrial environments • up to 16 m read range • Degree of protection up to IP 64 • excellent UHF performance in metal containing • 865 MHz ... 870 MHz • 5 / 5 GPIOs • connections for Ethernet, USB, RS 232, RS 485 • up to 4 W transmission power
other configuration:	on request

Environmental conditions

Temperature range	depending on configuration
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CONTENTS

PAGE

UHF Wide range antennas

	Introduction and features	C-3 2
	Technical characteristics	C-3 3
	Ha-VIS RF-ANT-WR30-EU	C-3 4
	Ha-VIS RF-ANT-WR30-US	C-3 5

Ruggedized UHF Wide range antennas

	Introduction and features	C-3 6
	Technical characteristics	C-3 7
	Ha-VIS RF-ANT-WR80-30-EU	C-3 8
	Ha-VIS RF-ANT-WR80-30-US	C-3 9

UHF Middle range antennas

	Introduction and features	C-3 10
	Technical characteristics	C-3 11
	Ha-VIS RF-ANT-MR20-EU	C-3 12
	Ha-VIS RF-ANT-MR20-US	C-3 13

UHF Ultra low range antennas

	Introduction and features	C-3 14
	Technical characteristics	C-3 15
	Ha-VIS RF-ANT-LR10	C-3 16



UHF Wide range antenna
Ha-VIS RF-ANT-WR30

General description

Features

- UHF RFID wide range antenna
- Reading range up to 16 m (depending upon tag properties, environment and requirements)
- Compact construction
- Optimized for portal applications
- Suitable for industrial environments
- High IP 65 protection class
- Suitable for outdoor usage

Advantages

Application fields

- Smart infrastructure
- Gate applications
- Asset management
- Machinery

Technical characteristics

Technical properties

Polarization	circular
Axial ratio	typ. 1 dB
VSWR	< 1.2:1
Impedance	50 Ohm
Front-to-back ratio	> 18 dB
Far field half-power beam width	69°
Connection	TNC socket
Protection class	IP 65
Weight	approx. 1.7 kg
Dimensions (WxDxH)	270 x 270 x 45 mm
Material	
Antenna cover	tough, weather-resistant polymer blend colour RAL 7045
Chassis	Aluminium
Seals	thermoplastic elastomer
Installation	four M5 drill holes 100 x 100 mm
Temperature range	
storage	-40 °C ... +85 °C
ambient	-20 °C ... +55 °C



UHF Wide range antenna
Ha-VIS RF-ANT-WR30-EU

Technical characteristics

Frequency range	865 MHz ... 870 MHz
Antenna gain	8.5 dBic @ 866 MHz
Max. radiated power	(ETSI EN 302 208) 2 W ERP

Identification	Part number	Drawing	Dimensions in mm
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UHF Wide range antenna
Ha-VIS RF-ANT-WR30-EU

EU version

20 93 201 0102

Recommended accessories

Antenna cables

Ha-VIS Coax ...

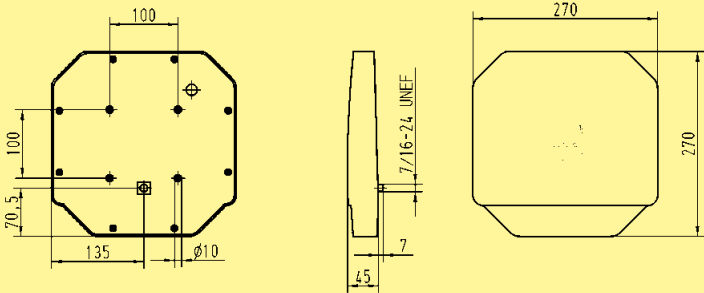
... SMA-TNC, RG58	3 m
... SMA-TNC, LL240flex	3 m
... SMA-TNC, LL240flex	10 m

20 93 204 0101
20 93 204 0102
20 93 204 0103

Antenna mounting kit

Ha-VIS RF-MOUNT-ANT-C

20 93 102 0105





UHF Wide range antenna
Ha-VIS RF-ANT-WR30-US

Technical characteristics

Frequency range	902 MHz ... 928 MHz
Antenna gain	8.3 dBic @ 915 MHz
Max. radiated power	(FCC 15.247) 4 W EIRP

Identification	Part number	Drawing	Dimensions in mm
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UHF Wide range Antenne
Ha-VIS RF-ANT-WR30-US

US version

20 93 201 0103

Recommended accessories

Antenna cables

Ha-VIS Coax ...

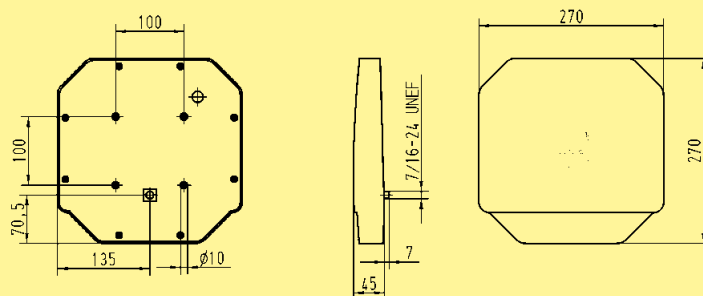
... SMA-TNC, RG58	3 m
... SMA-TNC, LL240flex	3 m
... SMA-TNC, LL240flex	10 m

20 93 204 0101
20 93 204 0102
20 93 204 0103

Antenna mounting kit

Ha-VIS RF-MOUNT-ANT-C

20 93 102 0105





Ruggedized UHF Wide range antenna
Ha-VIS RF-ANT-WR80-30

General description

Features

- UHF RFID wide range antenna
- Reading range up to 16 m (depending upon tag properties, environment and requirements)
- Compact design for ruggedized environmental applications
- Optimized for portal applications
- Different half power beam widths in azimuth and elevation plane
- Suitable for industrial environments
- High IP 65 protection class
- Suitable for outdoor usage

Advantages

Application fields

- Smart infrastructure
- Gate applications
- Asset management

Technical characteristics

Technical properties

Polarization	circular
Axial ratio	< 2 dB
VSWR	< 1.2:1
Impedance	50 Ohm
Front-to-back ratio	> 20 dB
Far field half-power beam width	30° vertical 70° horizontal
Connection	N (female)
Protection class	IP 65
Weight	approx. 3.7 kg
Dimensions (WxDxH)	557 x 262 x 59 mm

Material

Antenna cover	fiberglass radome (UV resistance), gray
Chassis	stainless steel
Plate patch	brass tin-plated
Gasket	thermoplastic elastomer

Installation	four M5 drill holes 100 x 100 mm
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Temperature range

storage	-40 °C ... +85 °C
ambient	-20 °C ... +65 °C



Ruggedized UHF Wide range antenna
Ha-VIS RF-ANT-WR30-EU

Technical characteristics

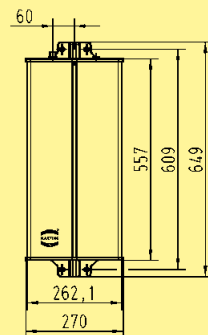
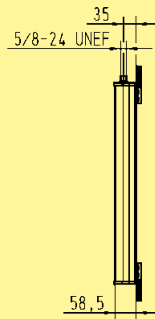
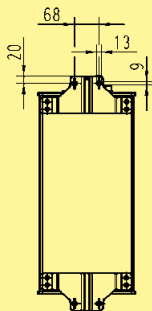
Frequency range	865 MHz ... 870 MHz
Antenna gain	11.0 dBic
Max. radiated power	(ETSI EN 302 208) 2 W ERP

Identification	Part number	Drawing	Dimensions in mm
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Ruggedized UHF Wide range
antenna
Ha-VIS RF-ANT-WR80-30-EU

EU version

20 93 201 0203





Ruggedized UHF Wide range antenna
Ha-VIS RF-ANT-WR30-US

Technical characteristics

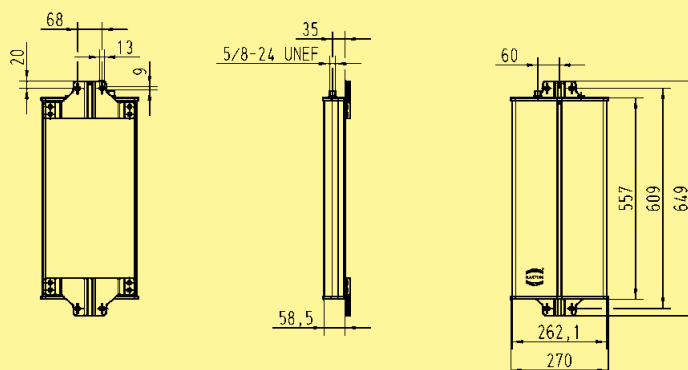
Frequency range	902 MHz ... 928 MHz
Antenna gain	10.5 dBic
Max. input power (FCC 15.247)	700 mW (28.5 dBm) conducted for a max. radiated power of 4 W EIRP

Identification	Part number	Drawing	Dimensions in mm
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Ruggedized UHF Wide range
antenna
Ha-VIS RF-ANT-WR80-30-US

US version

20 93 201 0204





UHF Middle range antenna
Ha-VIS RF-ANT-MR20

General description

Features

- UHF RFID middle range antenna
- Reading range up to 2 m (depending upon tag properties, environment and requirements)
- Compact design for ruggedized environmental applications
- Suitable for industrial environments
- High IP 67 protection class
- Suitable for outdoor usage

Advantages

Application fields

- Smart infrastructure
- Asset management

Technical characteristics

Technical properties

Polarization	circular
Axial ratio	typ. 2 dB
Impedance	50 Ohm
Front-to-back ratio	> 10 dB
Far field half-power beam width	100°
Connection	TNC socket
Protection class	IP 67
Weight	approx. 0.3 kg
Dimensions (WxDxH)	156 x 126 x 25 mm

Material

Antenna cover	Tough, weather-resistant polymer blend
Colour	RAL 7045 (light grey)

Installation	four through-holes diameter 4.2 mm for M4 screws
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Temperature range

storage	-40 °C ... +85 °C
ambient	-20 °C ... +55 °C



UHF Middle range antenna
Ha-VIS RF-ANT-MR20-EU

Technical characteristics

Frequency range	865 MHz ... 870 MHz
Antenna gain	4 dBic @ 866 MHz
Max. radiated power	(ETSI EN 302 208) 0.5 W ERP
VSWR	< 1.3:1

Identification	Part number	Drawing	Dimensions in mm
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UHF Wide range antenna
Ha-VIS RF-ANT-MR20-EU

EU version

20 93 201 0301

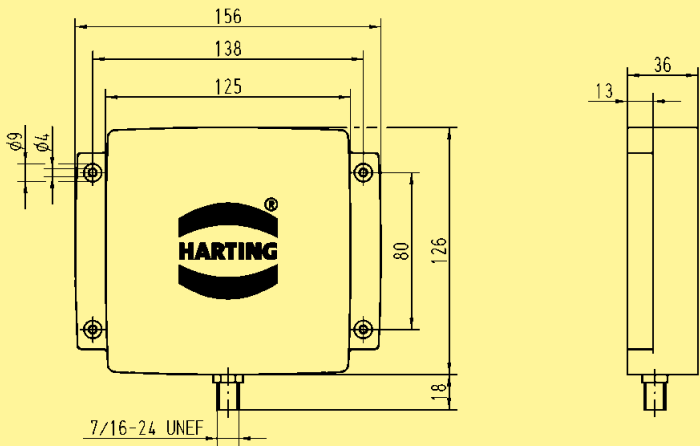
Recommended accessories

Antenna cables

Ha-VIS Coax ...

... SMA-TNC, RG58	3 m
... SMA-TNC, LL240flex	3 m
... SMA-TNC, LL240flex	10 m

20 93 204 0101
20 93 204 0102
20 93 204 0103





UHF Middle range antenna
Ha-VIS RF-ANT-MR20-US

Technical characteristics

Frequency range	902 MHz ... 928 MHz (FCC)
Antenna gain	2.5 dBic
Max. input power	(FCC 15.247) 1 W
VSWR	< 1.5:1

Identification	Part number	Drawing	Dimensions in mm
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UHF Wide range Antenne
Ha-VIS RF-ANT-MR20-US

US version

20 93 201 0302

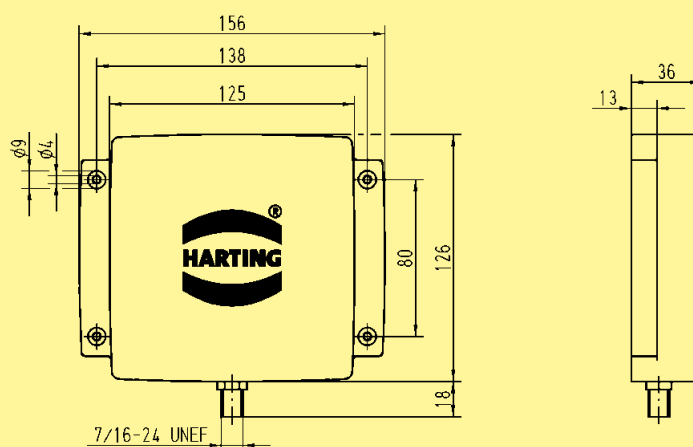
Recommended accessories

Antenna cables

Ha-VIS Coax ...

... SMA-TNC, RG58	3 m
... SMA-TNC, LL240flex	3 m
... SMA-TNC, LL240flex	10 m

20 93 204 0101
20 93 204 0102
20 93 204 0103





Ruggedized UHF Ultra low range antenna
Ha-VIS RF-ANT-LR10

General description

Features

- UHF RFID wide range antenna
- Compact design for ruggedized environmental applications
- Different half power beam widths in azimuth and elevation plane
- Suitable for industrial environments
- High IP 67 protection class
- Suitable for outdoor usage

Advantages

Application fields

- Smart infrastructure
- Asset management

Technical characteristics

Electric properties

EIFF *	15 dB
VSWR	< 1.2:1
Impedance	50 Ohm
Range of near field tags **	3 cm
Selectivity of near field tags **	3 cm
Connection	TNC socket

Mechanical properties

Dimensions (B x H x T)	90 x 63 x 31 mm
Weight	0.1 kg
Degree of protection	IP 67
Antenna cover	Tough, weather-resistant polymer blend
Colour	RAL 7045 (light grey)
Installation	Four through-holes diameter 4.2 mm for M4 screws
Operating temperature range	−20 °C ... +55 °C
Storage temperature range	−40 °C ... +85 °C

* ... The Effective Isotropic Field Factor (EIFF) shows the field isolation from far field to near field standardized to an isotropic radiator. The values were determined with 3 cm spacing.

** ... dependent upon transmission power and tag typ



Ruggedized UHF Ultra low range antenna
Ha-VIS RF-ANT-LR10

Technical characteristics

Frequency range	865 MHz ... 928 MHz
Antenna gain	-30 dBic
Max. radiated power	(compliant to FCC) 1 W

Identification	Part number	Drawing	Dimensions in mm
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UHF Ultra low range antenna
Ha-VIS RF-ANT-LR10

20 93 201 0303

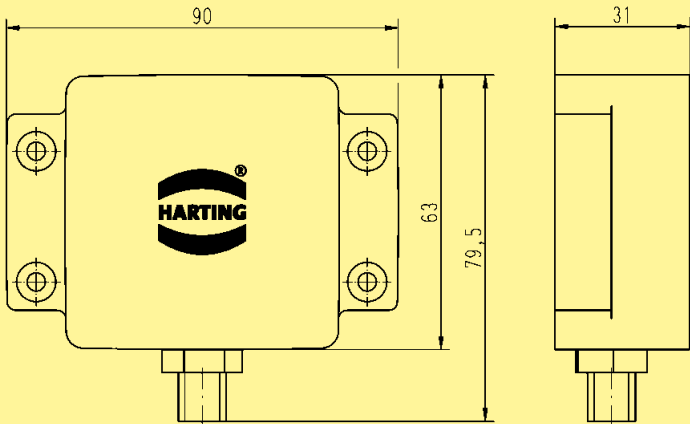
Recommended accessories

Antenna cables

Ha-VIS Coax ...

... SMA-TNC, RG58	3 m
... SMA-TNC, LL240flex	3 m
... SMA-TNC, LL240flex	10 m

20 93 204 0101
20 93 204 0102
20 93 204 0103



Cables + Accessories

Antenna cables



Ha-VIS Coax, SMA-TNC, RG58

Low cost coax cable, left side TNC connector, right side SMA connector

IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☐
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Connector types	left side TNC connector, right side SMA connector	
Sheath material	PE, Black	
Outer diameter	4.95 mm	
Cable weight	35 kg/km	
Minimum bend radius (single bend)	25 mm	
Operating temperature range	-20 °C ... +70 °C	
Impedance	50 Ohm	
Attenuation	63 dB/100 m @ 800 MHz (depending on application and environmental conditions)	
Standard lengths	3 m	
Colour	Black	

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS Coax, SMA-TNC, RG58 Length 3.0 m	Black 20 93 204 0101		

Antenna cables

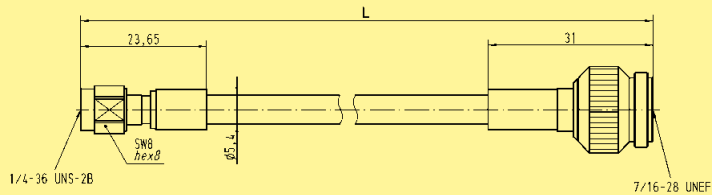


Ha-VIS Coax, SMA-TNC, LL240 flex

Low loss coax cable, left side TNC connector, right side SMA connector

IP 20 ☐	IP 65 / IP 67 ☐	IP 65 / IP 67 to IP 20 ☐	Cat. 5 ☐	Cat. 6 ☐
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Connector types	left side TNC connector, right side SMA connector
Sheath material	PE, Black
Outer diameter	5.4 ± 0.2 mm
Cable weight	39 kg/km
Minimum bend radius (single bend)	35 mm
Operating temperature range	-40 °C ... +80 °C
Impedance	50 Ohm
Screening effectiveness	> 75 dB (30 MHz ... 1000 MHz)
Attenuation	28 dB/100 m @ 800 MHz (depending on application and environmental conditions)
Standard lengths	3 m / 10 m
Colour	Black

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS Coax, SMA-TNC, LL240flex Length 3.0 m Length 10.0 m	Black 20 93 204 0102 20 93 204 0103		

Antenna cables



Ha-VIS Coax, SMA-N, LL240 flex

Low loss coax cable, left side N connector, right side SMA connector

IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☐
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Connector types	left side N connector, right side SMA connector
Sheath material	PE, Black
Outer diameter	5.4 ± 0.2 mm
Cable weight	39 kg/km
Minimum bend radius (single bend)	35 mm
Operating temperature range	-40 °C ... +80 °C
Impedance	50 Ohm
Screening effectiveness	> 75 dB (30 MHz ... 1000 MHz)
Attenuation	28 dB/100 m @ 800 MHz (depending on application and environmental conditions)
Standard lengths	3 m / 10 m
Colour	Black

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS Coax, SMA-N, LL240flex Length 3.0 m Length 10.0 m	Black 20 93 204 0104 20 93 204 0105		

Antenna cables

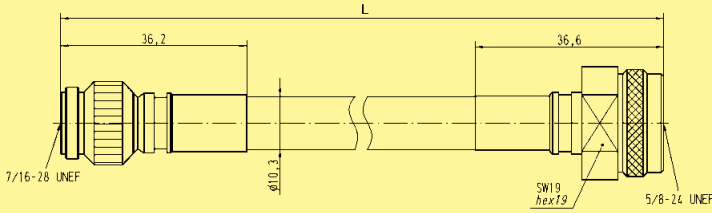


Ha-VIS Coax, TNC-N, RG213

Low loss ruggedized coax cable, left side N connector, right side TNC connector

IP 20	☐	IP 65 / IP 67	☐	IP 65 / IP 67 to IP 20	☐	Cat. 5	☐	Cat. 6	☐
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Connector types	left side N connector, right side TNC connector
Sheath material	PVC, Black
Outer diameter	10.3 ± 0.2 mm
Cable weight	161.7 kg/km
Minimum bend radius (single bend)	35 mm
Operating temperature range	-55 °C ... +85 °C
Impedance	50 Ohm
Screening effectiveness	> 55 dB (100 MHz ... 900 MHz)
Attenuation	22 dB/100 m @ 800 MHz (depending on application and environmental conditions)
Standard lengths	3 m / 10 m
Colour	Black
Optional accessory	SMA-TNC adapter, necessary to connect to Ha-VIS RF-R500

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS Coax, TNC-N, RG213 Length 3.0 m Length 10.0 m	Black 20 93 204 0106 20 93 204 0107		

Identification	Part number	Drawing	Dimensions in mm
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DIN rail Mounting kit

Mounting kit for Ha-VIS RF-R500
for easy mounting on a DIN rail

Inclusive necessary screws

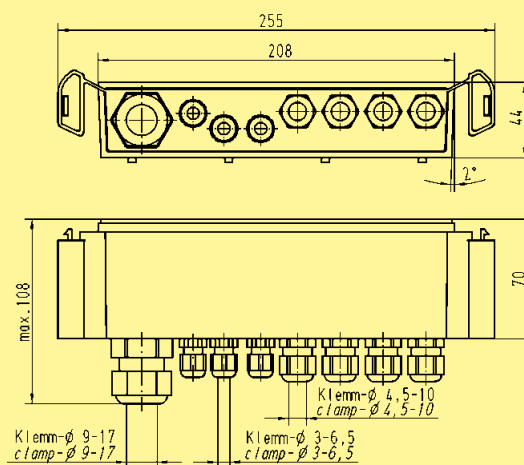


20 93 102 0201

**Protection cap
for Ha-VIS RF-R500**

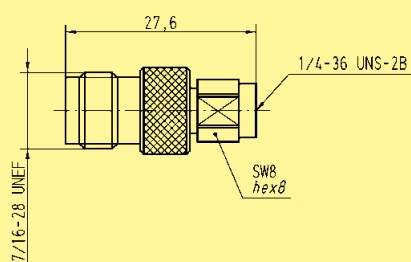
Protection cap for increased degree
of protection from IP 53 to IP 64
Easy assembly
PG openings for different cable
diameters

20 93 901 0101

**Adapter SMA-TNC**

necessary adapter to connect
Ha-VIS coax RG213 cords to the
Ha-VIS RF-R500

20 93 204 0301

**Antenna mounting kit**

Ha-VIS RF-MOUNT-ANT-A

20 93 102 0103

Ha-VIS RF-MOUNT-ANT-B

20 93 102 0104

Standard / Approvals

		eCon 2000	eCon 3000	eCon 4000	eCon 9000	eCon 7000	sCon 3000		FTS 3000s
				mCon 4000	mCon 9000	mCon 7000	mCon 3000	mCon 3000 NG	FTS 3000
Mechanical stability									
Shock assay	IEC 60 068-2-27	X	X	X	X	X	X	X	X
Vibration	IEC 60 068-2-6	X	X	X	X	X	X	X	X
Rail standard	EN 50 155, Class 1		X	X	X	X	X	X	
EMC standards									
Interference immunity ESD	IEC 61 000-4-2	X	X	X	X	X	X	X	X
Interference immunity HF, radiated	IEC 61 000-4-3	X	X	X	X	X	X	X	X
Interference immunity Burst	IEC 61 000-4-4	X	X	X	X	X	X	X	X
Interference immunity Surge	IEC 61 000-4-5	X	X	X	X	X	X	X	X
Interference immunity	IEC 61 000-4-6	X	X	X	X	X	X	X	X
Emitted radiation	EN 55 011, Class	A	A	A	A	A	A	A	A
Emitted radiation	EN 55 022, Class	A	A	A	A	A	A	A	A
System perturbation	IEC 61 000-3-3								
Rail standard	EN 50 121-3-2		X	X	X	X	X	X	

List of part numbers



Part number	Page	Part number	Page	Part number	Page	Part number	Page
09 15 300 0301	B2.87	09 35 012 0311	B1.51	09 45 115 1100	B1.63	09 45 225 1100	B1.69
09 15 300 0302	B2.87	09 35 012 0311	B2.49	09 45 115 1102	B1.63	09 45 225 1100	B2.61
09 15 300 0311	B2.87	09 35 012 0311	B3.24	09 45 115 1104	B1.63	09 45 225 1107	B1.73
09 15 300 0312	B2.87	09 35 012 0312	B1.51	09 45 115 1106	B1.63	09 45 225 1107	B2.65
09 15 300 0401	B2.83	09 35 012 0312	B2.49	09 45 115 1520	B2.55	09 45 225 1108	B1.69
09 15 300 0402	B2.83	09 35 012 0312	B3.24	09 45 115 1522	B2.55	09 45 225 1108	B2.61
09 15 300 0431	B2.85	09 35 012 0331	B1.49	09 45 115 1560	B2.57	09 45 225 1300	B1.83
09 15 300 5401	B2.83	09 35 012 0331	B2.47	09 45 115 1760	B2.71	09 45 225 1300	B2.75
09 15 300 5401	B2.85					09 45 225 1560	B1.71
09 15 300 5411	B2.87	09 35 221 0401	B1.39			09 45 225 1560	B2.63
		09 35 221 0421	B1.37	09 45 125 1100	B1.63		
		09 35 221 0501	B1.59	09 45 125 1104	B1.63	09 45 245 1102	B1.33
		09 35 221 0501	B2.51	09 45 125 1300	B1.79	09 45 245 1130	B1.33
09 20 003 2711	A1.46			09 45 125 1520	B2.55	09 45 245 1560	B2.33
09 20 003 2711	A4.42	09 35 222 0421	B1.37	09 45 125 1560	B2.57	09 45 245 1590	B2.33
09 20 003 5422	B1.63			09 45 125 1760	B2.71		
09 20 003 5422	B1.79	09 35 225 0311	B1.51			09 45 295 1130	B1.33
09 20 003 5422	B2.55	09 35 225 0311	B2.49	09 45 145 1100	B1.25		
09 20 003 5422	B2.57	09 35 225 0312	B1.51	09 45 145 1520	B2.25	09 45 500 0001	B1.52
09 20 003 5422	B2.71	09 35 225 0312	B2.49	09 45 145 1520 XL	B2.25	09 45 500 0001	B2.49
09 20 003 5425	A1.46	09 35 225 0331	B1.49	09 45 145 1560	B2.27	09 45 500 0002	B1.52
09 20 003 5425	A4.42	09 35 225 0331	B2.47			09 45 500 0002	B2.49
09 20 003 5425	B1.69	09 35 225 0401	B2.43	09 45 151 1100	B1.09		
09 20 003 5425	B1.71	09 35 225 0402	B2.43	09 45 151 1108	B1.09	09 45 515 0024	B3.24
09 20 003 5425	B1.73	09 35 225 0403	B2.43	09 45 151 1109	B1.09		
09 20 003 5425	B1.83	09 35 225 0421	B2.39	09 45 151 1520	B2.09	09 45 545 0028	B3.24
09 20 003 5425	B2.61			09 45 151 1520 XL	B2.09	09 45 545 0032	B3.24
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09 20 003 5425	B2.65	09 35 226 0402	B1.39	09 45 151 1561	B2.11	09 45 545 1561	B2.13
09 20 003 5425	B2.75	09 35 226 0403	B1.39			09 45 545 1562	B2.13
09 20 003 5426	A1.46	09 35 226 0421	B1.37	09 45 195 1100	B1.25		
09 20 003 5426	A4.42			09 45 195 1520	B2.25	09 45 600 0100	B1.98
09 20 003 5442	B1.63	09 35 227 0401	B2.41	09 45 195 1560	B2.27	09 45 600 0101	B1.100
09 20 003 5442	B1.79	09 35 227 0421	B2.37			09 45 600 0102	B1.99
09 20 003 5442	B2.55			09 45 200 1560	B1.71	09 45 600 0104	B1.99
09 20 003 5442	B2.57	09 35 241 0401	B1.43	09 45 200 1560	B2.63	09 45 600 0105	B1.101
09 20 003 5442	B2.71	09 35 241 0402	B1.43			09 45 600 0106	B2.94
09 20 003 5445	B1.69	09 35 241 0421	B1.41	09 45 215 1100	B1.69	09 45 600 0107	B1.100
09 20 003 5445	B1.71	09 35 241 0422	B1.41	09 45 215 1100	B2.61	09 45 600 0108	B1.102
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09 20 003 5445	B2.61	09 35 242 0333	B1.55	09 45 215 1103	B1.69	09 45 600 0111	B1.100
09 20 003 5445	B2.63			09 45 215 1103	B2.61	09 45 600 0112	B1.99
09 20 003 5445	B2.65			09 45 215 1107	B1.73	09 45 600 0114	B1.99
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09 35 002 5402	B1.57	09 37 003 5405	B2.65	09 45 215 1301	B2.75	09 45 600 0133	B1.99
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						09 45 600 0142	B1.99
						09 45 600 0144	B1.99

List of part numbers



Part number	Page	Part number	Page	Part number	Page	Part number	Page
09 45 600 0145	B1.101	09 45 700 5066	B1.92	09 45 715 1551	B2.58	09 45 771 0125	B1.15
09 45 600 0146	B2.94	09 45 700 5068	B1.92	09 45 715 1553	B2.58	09 45 771 0127	B1.15
09 45 600 0147	B1.100	09 45 700 5073	B1.92	09 45 715 1563	B2.58	09 45 771 0151	B1.15
09 45 600 0148	B1.103	09 45 700 5075	B1.92	09 45 715 1565	B2.58	09 45 771 0153	B1.15
09 45 600 0149	B1.99			09 45 715 1567	B2.58	09 45 771 0164	B1.15
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09 45 600 0158	B1.103	09 45 701 0023	B1.31	09 45 715 1574	B2.58	09 45 771 0168	B1.15
09 45 600 0200	B2.95	09 45 701 0025	B1.31			09 45 771 0173	B1.15
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09 45 600 0302	B2.76	09 45 701 1127	B1.31	09 45 725 1353	B1.81	09 45 771 1153	B1.13
09 45 600 0310	B1.84	09 45 701 1151	B1.31			09 45 771 1164	B1.13
09 45 600 0320	B1.84	09 45 701 1153	B1.31	09 45 725 1503	B2.72	09 45 771 1166	B1.13
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09 45 600 0340	B1.84	09 45 701 1168	B1.31	09 45 725 1512	B2.72	09 45 771 1175	B1.13
09 45 600 0342	B2.76	09 45 701 1173	B1.31	09 45 725 1514	B2.72		
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09 45 600 0400	B2.93	09 45 701 1175	B1.31	09 45 725 1535	B2.73	09 45 800 0000	B1.106
09 45 600 0420	B2.93	09 45 701 1509	B2.31	09 45 725 1537	B2.73	09 45 800 0000	B2.100
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09 45 600 0502	B2.90	09 45 701 1514	B2.31	09 45 744 1525	B2.30	09 45 800 0004	B1.106
09 45 600 0521	B2.92	09 45 701 1534	B2.59	09 45 744 1527	B2.30	09 45 800 0004	B2.100
09 45 600 0522	B2.90	09 45 701 1536	B2.59	09 45 744 1532	B2.30	09 45 800 0005	B1.106
09 45 600 0531	B2.92	09 45 701 1538	B2.59	09 45 744 1532	B2.30	09 45 800 0005	B2.100
09 45 600 0532	B2.90	09 45 701 1543	B2.59	09 45 744 1534	B2.30	09 45 800 0020	B1.106
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		09 45 701 1566	B2.59	09 45 745 1523	B2.30	09 45 800 0520	B2.09
09 45 600 0600	B2.91	09 45 701 1568	B2.59	09 45 745 1525	B2.30	09 45 800 0520	B2.100
09 45 600 0620	B2.91	09 45 701 1573	B2.59	09 45 745 1527	B2.30	09 45 800 0520	B2.25
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09 45 600 0640	B2.91			09 45 745 1553	B2.30	09 45 800 0520	B2.41
09 45 600 0650	B2.97					09 45 800 0520	B2.55
09 45 600 0651	B2.97	09 45 715 0023	B1.65				
09 45 600 0660	B2.97	09 45 715 0025	B1.65	09 45 751 1523	B2.20		
09 45 600 0690	B2.96	09 45 715 0027	B1.65	09 45 751 1525	B2.20		
09 45 600 0691	B2.96	09 45 715 0051	B1.65	09 45 751 1527	B2.20	09 45 815 1100	B1.75
09 45 600 0692	B2.96	09 45 715 0053	B1.65	09 45 751 1551	B2.20	09 45 815 1100	B2.67
09 45 600 0694	B2.96	09 45 715 0064	B1.65	09 45 751 1553	B2.20		
		09 45 715 0066	B1.65	09 45 751 1563	B2.20		
		09 45 715 0068	B1.65	09 45 751 1565	B2.20	09 45 820 0000	B1.69
09 45 700 0023	B1.67	09 45 715 0073	B1.65	09 45 751 1567	B2.20	09 45 820 0000	B1.71
09 45 700 0025	B1.67	09 45 715 0075	B1.65	09 45 751 1572	B2.20	09 45 820 0000	B1.73
09 45 700 0027	B1.67			09 45 751 1574	B2.20	09 45 820 0000	B1.83
09 45 700 0051	B1.67	09 45 715 1123	B1.65			09 45 820 0000	B2.57
09 45 700 0053	B1.67	09 45 715 1125	B1.65	09 45 771 0023	B1.13	09 45 820 0000	B2.61
09 45 700 1123	B1.67	09 45 715 1127	B1.65	09 45 771 0025	B1.13	09 45 820 0000	B2.63
09 45 700 1125	B1.67	09 45 715 1151	B1.65	09 45 771 0027	B1.13	09 45 820 0000	B2.65
09 45 700 1127	B1.67	09 45 715 1153	B1.65	09 45 771 0051	B1.13		
09 45 700 1151	B1.67	09 45 715 1164	B1.65	09 45 771 0053	B1.13	09 45 840 0011	B2.27
09 45 700 1153	B1.67	09 45 715 1166	B1.65	09 45 771 0064	B1.15	09 45 840 0013	B2.27
09 45 700 1164	B1.67	09 45 715 1168	B1.65	09 45 771 0066	B1.15	09 45 840 0017	B2.27
09 45 700 1166	B1.67	09 45 715 1173	B1.65	09 45 771 0068	B1.15	09 45 840 0018	B2.27
09 45 700 1168	B1.67	09 45 715 1175	B1.65	09 45 771 0073	B1.15	09 45 840 0019	B2.27
09 45 700 1173	B1.67	09 45 715 1364	B1.81	09 45 771 0075	B1.15		
09 45 700 1175	B1.67	09 45 715 1366	B1.81				
		09 45 715 1368	B1.81	09 45 771 0102	B1.15	09 45 845 0003	B1.33
09 45 700 5022	B1.92	09 45 715 1373	B1.81	09 45 771 0104	B1.15	09 45 845 0003	B2.33
09 45 700 5025	B1.92	09 45 715 1375	B1.81	09 45 771 0106	B1.15	09 45 845 0009	B1.33
09 45 700 5027	B1.92			09 45 771 0111	B1.15	09 45 845 0009	B2.29
09 45 700 5051	B1.92	09 45 715 1523	B2.58	09 45 771 0113	B1.15	09 45 845 0009	B2.33
09 45 700 5053	B1.92	09 45 715 1525	B2.58	09 45 771 0123	B1.15	09 45 845 0010	B1.25
09 45 700 5063	B1.92	09 45 715 1527	B2.58				

List of part numbers



Part number	Page	Part number	Page	Part number	Page	Part number	Page
09 45 845 0010	B2.25	09 47 030 0001	B1.21	09 47 040 0051	B1.21	09 47 060 0025	B1.21
09 45 845 0010	B2.27	09 47 030 0002	B1.21	09 47 040 0067	B1.21	09 47 060 0026	B1.21
09 45 845 0010	B2.29	09 47 030 0003	B1.21	09 47 040 0068	B1.21	09 47 060 0027	B1.21
09 45 845 0011 024	B1.33	09 47 030 0004	B1.21	09 47 040 0069	B1.21	09 47 060 0029	B1.21
09 45 845 0011 024	B2.33	09 47 030 0005	B1.21	09 47 040 0070	B1.21	09 47 060 0045	B1.21
09 45 845 0014	B1.33	09 47 030 0007	B1.21	09 47 040 0071	B1.21	09 47 060 0046	B1.21
09 45 845 0014	B2.29	09 47 030 0023	B1.21	09 47 040 0073	B1.21	09 47 060 0047	B1.21
09 45 845 0014	B2.33	09 47 030 0024	B1.21			09 47 060 0048	B1.21
09 45 845 0015	B1.33	09 47 030 0025	B1.21			09 47 060 0049	B1.21
09 45 845 0015	B2.33	09 47 030 0026	B1.21	09 47 050 0001	B1.21	09 47 060 0051	B1.21
		09 47 030 0027	B1.21	09 47 050 0002	B1.21	09 47 060 0067	B1.21
09 45 845 1500	B1.34	09 47 030 0029	B1.21	09 47 050 0003	B1.21	09 47 060 0068	B1.21
09 45 845 1500	B2.34	09 47 030 0045	B1.21	09 47 050 0004	B1.21	09 47 060 0069	B1.21
09 45 845 1501	B1.34	09 47 030 0046	B1.21	09 47 050 0005	B1.21	09 47 060 0070	B1.21
09 45 845 1501	B2.34	09 47 030 0047	B1.21	09 47 050 0007	B1.21	09 47 060 0071	B1.21
		09 47 030 0048	B1.21	09 47 050 0023	B1.21	09 47 060 0073	B1.21
		09 47 030 0049	B1.21	09 47 050 0024	B1.21		
09 45 850 0001	B2.11	09 47 030 0051	B1.21	09 47 050 0025	B1.21		
09 45 850 0001	B2.19	09 47 030 0067	B1.21	09 47 050 0026	B1.21	09 47 220 0002	B1.89
09 45 850 0002	B2.11	09 47 030 0068	B1.21	09 47 050 0027	B1.21	09 47 220 0002 018	B1.89
09 45 850 0002	B2.19	09 47 030 0069	B1.21	09 47 050 0029	B1.21	09 47 220 0003	B1.89
09 45 850 0003	B2.11	09 47 030 0070	B1.21	09 47 050 0045	B1.21	09 47 220 0003 018	B1.89
09 45 850 0003	B2.19	09 47 030 0071	B1.21	09 47 050 0046	B1.21	09 47 220 0005	B1.89
09 45 850 0005	B2.11	09 47 030 0073	B1.21	09 47 050 0047	B1.21	09 47 220 0005 018	B1.89
09 45 850 0005	B2.19			09 47 050 0048	B1.21	09 47 220 0006	B1.89
09 45 850 0007	B2.11	09 47 030 4001	B1.19	09 47 050 0049	B1.21	09 47 220 0007 018	B1.89
09 45 850 0007	B2.19	09 47 030 4002	B1.19	09 47 050 0051	B1.21	09 47 220 0011	B1.89
09 45 850 0008	B2.11	09 47 030 4003	B1.19	09 47 050 0067	B1.21	09 47 220 0012 018	B1.89
09 45 850 0008	B2.19	09 47 030 4004	B1.19	09 47 050 0068	B1.21	09 47 220 0013	B1.89
09 45 850 0009	B2.11	09 47 030 4005	B1.19	09 47 050 0069	B1.21	09 47 220 0014 018	B1.89
09 45 850 0009	B2.19	09 47 030 4007	B1.19	09 47 050 0070	B1.21	09 47 220 0018 018	B1.89
09 45 850 0010	B2.11	09 47 030 4023	B1.19	09 47 050 0071	B1.21	09 47 220 0022	B1.89
09 45 850 0010	B2.19	09 47 030 4024	B1.19	09 47 050 0073	B1.21		
		09 47 030 4025	B1.19			09 47 220 2003 018	B1.92
		09 47 030 4026	B1.19	09 47 050 6001	B1.17	09 47 220 2005 018	B1.92
		09 47 030 4027	B1.19	09 47 050 6002	B1.17	09 47 220 2007 018	B1.92
09 45 870 0002	B2.15	09 47 030 4029	B1.19	09 47 050 6003	B1.17	09 47 220 2012 018	B1.92
09 45 870 0002	B2.17	09 47 030 4045	B1.19	09 47 050 6004	B1.17	09 47 220 2014 018	B1.92
09 45 870 0003	B2.15	09 47 030 4046	B1.19	09 47 050 6005	B1.17		
09 45 870 0003	B2.17	09 47 030 4047	B1.19	09 47 050 6007	B1.17	09 47 222 2002	B1.88
09 45 870 0006	B2.15	09 47 030 4048	B1.19	09 47 050 6023	B1.17	09 47 222 2002 018	B1.88
09 45 870 0006	B2.17	09 47 030 4049	B1.19	09 47 050 6024	B1.17	09 47 222 2003	B1.88
09 45 870 0007	B2.15	09 47 030 4051	B1.19	09 47 050 6025	B1.17	09 47 222 2003 018	B1.88
09 45 870 0007	B2.17	09 47 030 4067	B1.19	09 47 050 6026	B1.17	09 47 222 2005	B1.88
09 45 870 0008	B2.15	09 47 030 4068	B1.19	09 47 050 6027	B1.17	09 47 222 2005 018	B1.88
09 45 870 0008	B2.17	09 47 030 4069	B1.19	09 47 050 6029	B1.17	09 47 222 2006	B1.88
09 45 870 0009	B2.15	09 47 030 4070	B1.19	09 47 050 6045	B1.17	09 47 222 2007 018	B1.88
09 45 870 0009	B2.17	09 47 030 4071	B1.19	09 47 050 6046	B1.17	09 47 222 2011	B1.88
09 45 870 0011	B2.15	09 47 030 4073	B1.19	09 47 050 6047	B1.17	09 47 222 2012 018	B1.88
09 45 870 0011	B2.17			09 47 050 6048	B1.17	09 47 222 2013	B1.88
				09 47 050 6049	B1.17	09 47 222 2014 018	B1.88
		09 47 040 0001	B1.21	09 47 050 6051	B1.17	09 47 222 2018 018	B1.88
		09 47 040 0002	B1.21	09 47 050 6067	B1.17	09 47 222 2022	B1.88
		09 47 040 0003	B1.21				
09 46 820 0000	B1.63	09 47 040 0004	B1.21	09 47 050 6068	B1.17		
		09 47 040 0005	B1.21	09 47 050 6069	B1.17		
		09 47 040 0007	B1.21	09 47 050 6070	B1.17	09 47 343 4006	B1.13
		09 47 040 0023	B1.21	09 47 050 6071	B1.17	09 47 343 4009	B1.13
		09 47 040 0024	B1.21	09 47 050 6073	B1.17	09 47 343 4012	B1.13
09 47 020 2003 018	B1.13	09 47 040 0025	B1.21			09 47 343 4018	B1.13
09 47 020 2005 018	B1.13	09 47 040 0026	B1.21	09 47 060 0001	B1.21	09 47 343 4020	B1.13
09 47 020 2007 018	B1.13	09 47 040 0027	B1.21	09 47 060 0002	B1.21	09 47 343 4034	B1.13
09 47 020 2012 018	B1.13	09 47 040 0029	B1.21	09 47 060 0003	B1.21	09 47 343 4037	B1.13
09 47 020 2023 018	B1.13	09 47 040 0045	B1.21	09 47 060 0004	B1.21	09 47 343 4040	B1.13
09 47 020 2025 018	B1.13	09 47 040 0046	B1.21	09 47 060 0005	B1.21	09 47 343 4046	B1.13
09 47 020 2027 018	B1.13	09 47 040 0047	B1.21	09 47 060 0007	B1.21	09 47 343 4048	B1.13
09 47 020 2032 018	B1.13	09 47 040 0048	B1.21	09 47 060 0023	B1.21	09 47 343 4090	B1.13
09 47 020 2034 018	B1.13	09 47 040 0049	B1.21	09 47 060 0024	B1.21	09 47 343 4093	B1.13
						09 47 343 4096	B1.13

List of part numbers



Part number	Page	Part number	Page	Part number	Page	Part number	Page
09 47 343 4102	B1.13	09 47 390 0003	B1.29	09 47 474 7023	B2.15	09 47 555 5065	B1.45
09 47 343 4104	B1.13	09 47 390 0005	B1.29	09 47 474 7024	B2.15	09 47 555 5067	B1.45
		09 47 390 0007	B1.29			09 47 555 5072	B1.45
09 47 363 6003	B1.27	09 47 390 0012	B1.29	09 47 474 7101	B2.17	09 47 555 5074	B1.45
09 47 363 6005	B1.27	09 47 390 0014	B1.29	09 47 474 7102	B2.17	09 47 555 5093	B1.45
09 47 363 6007	B1.27	09 47 390 0025	B1.29	09 47 474 7103	B2.17	09 47 555 5095	B1.45
09 47 363 6012	B1.27	09 47 390 0027	B1.29	09 47 474 7104	B2.17	09 47 555 5097	B1.45
09 47 363 6014	B1.27	09 47 390 0029	B1.29	09 47 474 7105	B2.17		
09 47 363 6025	B1.27	09 47 390 0029	B1.29	09 47 474 7106	B2.17	09 47 555 5102	B1.45
09 47 363 6027	B1.27	09 47 390 0034	B1.29	09 47 474 7107	B2.17	09 47 555 5104	B1.45
09 47 363 6029	B1.27	09 47 390 0036	B1.29	09 47 474 7108	B2.17		
09 47 363 6034	B1.27	09 47 390 0047	B1.29	09 47 474 7109	B2.17		
09 47 363 6036	B1.27	09 47 390 0049	B1.29	09 47 474 7110	B2.17	09 47 565 6003	B1.45
09 47 363 6047	B1.27	09 47 390 0051	B1.29	09 47 474 7111	B2.17	09 47 565 6005	B1.45
09 47 363 6049	B1.27	09 47 390 0056	B1.29	09 47 474 7112	B2.17	09 47 565 6007	B1.45
09 47 363 6051	B1.27	09 47 390 0058	B1.29	09 47 474 7113	B2.17	09 47 565 6012	B1.45
09 47 363 6056	B1.27	09 47 390 0069	B1.29	09 47 474 7114	B2.17	09 47 565 6014	B1.45
09 47 363 6058	B1.27	09 47 390 0071	B1.29	09 47 474 7115	B2.17	09 47 565 6033	B1.45
09 47 363 6069	B1.27	09 47 390 0073	B1.29	09 47 474 7116	B2.17	09 47 565 6035	B1.45
09 47 363 6071	B1.27	09 47 390 0078	B1.29	09 47 474 7117	B2.17	09 47 565 6037	B1.45
09 47 363 6073	B1.27	09 47 390 0080	B1.29	09 47 474 7118	B2.17	09 47 565 6042	B1.45
09 47 363 6078	B1.27			09 47 474 7119	B2.17	09 47 565 6044	B1.45
09 47 363 6080	B1.27			09 47 474 7120	B2.17	09 47 565 6063	B1.45
		09 47 400 0003	B1.29	09 47 474 7121	B2.17	09 47 565 6065	B1.45
		09 47 400 0005	B1.29	09 47 474 7122	B2.17	09 47 565 6067	B1.45
		09 47 400 0007	B1.29	09 47 474 7123	B2.17	09 47 565 6072	B1.45
09 47 370 0003	B1.29	09 47 400 0012	B1.29	09 47 474 7141	B2.17	09 47 565 6074	B1.45
09 47 370 0005	B1.29	09 47 400 0014	B1.29	09 47 474 7142	B2.17	09 47 565 6093	B1.45
09 47 370 0007	B1.29	09 47 400 0025	B1.29	09 47 474 7143	B2.17	09 47 565 6095	B1.45
09 47 370 0012	B1.29	09 47 400 0027	B1.29	09 47 474 7144	B2.17	09 47 565 6097	B1.45
09 47 370 0014	B1.29	09 47 400 0029	B1.29	09 47 474 7145	B2.17		
09 47 370 0025	B1.29	09 47 400 0034	B1.29	09 47 474 7146	B2.17	09 47 565 6102	B1.45
09 47 370 0027	B1.29	09 47 400 0036	B1.29	09 47 474 7147	B2.17	09 47 565 6104	B1.45
09 47 370 0029	B1.29	09 47 400 0047	B1.29	09 47 474 7148	B2.17	09 47 565 7003	B1.45
09 47 370 0034	B1.29	09 47 400 0049	B1.29	09 47 474 7149	B2.17	09 47 565 7005	B1.45
09 47 370 0036	B1.29	09 47 400 0051	B1.29	09 47 474 7150	B2.17	09 47 565 7007	B1.45
09 47 370 0047	B1.29	09 47 400 0056	B1.29	09 47 474 7151	B2.17	09 47 565 7012	B1.45
09 47 370 0049	B1.29	09 47 400 0058	B1.29	09 47 474 7152	B2.17	09 47 565 7014	B1.45
09 47 370 0051	B1.29	09 47 400 0069	B1.29	09 47 474 7153	B2.17	09 47 565 7033	B1.45
09 47 370 0056	B1.29	09 47 400 0071	B1.29	09 47 474 7154	B2.17	09 47 565 7035	B1.45
09 47 370 0058	B1.29	09 47 400 0073	B1.29	09 47 474 7155	B2.17	09 47 565 7037	B1.45
09 47 370 0069	B1.29	09 47 400 0078	B1.29	09 47 474 7156	B2.17	09 47 565 7042	B1.45
09 47 370 0071	B1.29	09 47 400 0080	B1.29	09 47 474 7157	B2.17	09 47 565 7044	B1.45
09 47 370 0073	B1.29			09 47 474 7158	B2.17	09 47 565 7055	B1.45
09 47 370 0078	B1.29			09 47 474 7159	B2.17	09 47 565 7063	B1.45
09 47 370 0080	B1.29			09 47 474 7160	B2.17	09 47 565 7065	B1.45
		09 47 474 7001	B2.15	09 47 474 7161	B2.17	09 47 565 7067	B1.45
		09 47 474 7002	B2.15	09 47 474 7162	B2.17	09 47 565 7072	B1.45
09 47 380 0003	B1.29	09 47 474 7003	B2.15	09 47 474 7163	B2.17	09 47 565 7074	B1.45
09 47 380 0005	B1.29	09 47 474 7004	B2.15			09 47 565 7093	B1.45
09 47 380 0007	B1.29	09 47 474 7005	B2.15	09 47 474 7201	B2.18	09 47 565 7097	B1.45
09 47 380 0012	B1.29	09 47 474 7006	B2.15	09 47 474 7203	B2.18	09 47 565 7102	B1.45
09 47 380 0014	B1.29	09 47 474 7007	B2.15	09 47 474 7206	B2.18	09 47 565 7104	B1.45
09 47 380 0025	B1.29	09 47 474 7008	B2.15	09 47 474 7208	B2.18		
09 47 380 0027	B1.29	09 47 474 7009	B2.15	09 47 474 7211	B2.18		
09 47 380 0029	B1.29	09 47 474 7010	B2.15			09 47 575 7001	B2.45
09 47 380 0034	B1.29	09 47 474 7011	B2.15			09 47 575 7002	B2.45
09 47 380 0036	B1.29	09 47 474 7012	B2.15	09 47 555 5003	B1.45	09 47 575 7003	B2.45
09 47 380 0047	B1.29	09 47 474 7013	B2.15	09 47 555 5005	B1.45	09 47 575 7004	B2.45
09 47 380 0049	B1.29	09 47 474 7014	B2.15	09 47 555 5007	B1.45	09 47 575 7005	B2.45
09 47 380 0051	B1.29	09 47 474 7015	B2.15	09 47 555 5012	B1.45		
09 47 380 0056	B1.29	09 47 474 7016	B2.15	09 47 555 5014	B1.45		
09 47 380 0058	B1.29	09 47 474 7017	B2.15	09 47 555 5033	B1.45		
09 47 380 0069	B1.29	09 47 474 7018	B2.15	09 47 555 5035	B1.45	09 47 585 8001	B2.45
09 47 380 0071	B1.29	09 47 474 7019	B2.15	09 47 555 5037	B1.45	09 47 585 8002	B2.45
09 47 380 0073	B1.29	09 47 474 7020	B2.15	09 47 555 5042	B1.45	09 47 585 8003	B2.45
09 47 380 0078	B1.29	09 47 474 7021	B2.15	09 47 555 5044	B1.45	09 47 585 8004	B2.45
09 47 380 0080	B1.29	09 47 474 7022	B2.15	09 47 555 5063	B1.45	09 47 585 8005	B2.45

List of part numbers



Part number	Page	Part number	Page	Part number	Page	Part number	Page
09 47 800 0002	B1.91	20 10 001 5217	B1.41	20 76 105 3000	A1.08	20 79 302 0922	B1.74
09 47 800 0003	B1.91	20 10 001 5217	B1.43	20 76 105 3001	A1.10	20 79 302 0922	B2.66
09 47 800 0005	B1.91	20 10 001 5217	B1.55				
09 47 800 0006	B1.91	20 10 001 5217	B1.57				
09 47 800 0011	B1.91			20 76 107 3100	A1.21		
09 47 800 0013	B1.91			20 76 107 3200	A1.25		
09 47 800 0022	B1.91	20 10 125 5211	B1.41			20 80 000 0003	A1.47
		20 10 125 5211	B1.43			20 80 000 0003	A4.43
		20 10 125 5211	B1.55	20 76 108 3000	A1.17	20 80 000 0003	B3.19
		20 10 125 5211	B1.57	20 76 108 3001	A1.18	20 80 000 0007	A6.06
09 47 808 0002	B1.90			20 76 108 3002	A1.19		
09 47 808 0003	B1.90			20 76 108 3004	A1.20	20 80 010 0001	A1.47
09 47 808 0005	B1.90	20 10 230 5211	B1.41	20 76 108 3100	A1.22	20 80 010 0001	A4.43
09 47 808 0006	B1.90	20 10 230 5211	B1.43	20 76 108 3102	A1.23	20 80 010 0002	A1.47
09 47 808 0011	B1.90	20 10 230 5211	B1.55	20 76 108 3103	A1.24	20 80 010 0002	A4.43
09 47 808 0013	B1.90	20 10 230 5211	B1.57				
09 47 808 0022	B1.90			20 76 108 3200	A1.26		
				20 76 108 4000	A4.14	20 80 024 0002	A1.47
09 47 900 0001	B2.19	20 16 111 2110	A4.47			20 80 024 0002	A4.43
		20 16 111 3110	A4.47	20 76 109 1100	A2.09		
		20 16 111 4110	A4.47	20 76 109 4101	A4.21	20 80 300 3025	A5.05
09 57 402 0500 000	B2.29			20 76 109 4101	A4.21	20 80 300 3026	A5.03
09 57 402 0501 000	B2.29			20 76 109 4201	A4.24	20 80 300 3027	A5.04
09 57 441 0500 000	B2.29	20 70 305 3923	A1.42	20 76 110 1000	A2.07	20 82 000 0001	B3.07
09 57 441 0501 000	B2.29	20 70 305 3943	A1.43	20 76 110 1001	A2.08	20 82 000 0001	B3.09
		20 70 305 4943	A4.39	20 76 110 1100	A2.10	20 82 000 0002	B3.07
				20 76 110 4002	A4.19	20 82 000 0003	B3.07
09 57 442 0502 001	B2.29	20 70 310 3924	A1.45	20 76 110 4003	A4.20	20 82 000 9901	B3.26
09 57 442 0503 001	B2.29	20 70 310 3942	A1.44	20 76 110 4101	A4.22	20 82 000 9915	B3.26
		20 70 310 4924	A4.41	20 76 110 4102	A4.23	20 82 000 9916	B1.11
		20 70 310 4945	A4.40	20 76 110 4201	A4.25	20 82 000 9916	B2.13
						20 82 000 9916	B3.26
09 99 000 0382	B1.106						
09 99 000 0501	B2.79	20 76 000 0300	A6.03	20 76 112 4300	A4.15	20 82 001 0001	B1.49
09 99 000 0525	B2.79					20 82 001 0001	B1.52
		20 76 010 0300	A6.04	20 76 116 3000	A1.09	20 82 001 0001	B2.47
						20 82 001 0001	B2.49
		20 76 020 0300	A6.03	20 76 207 7000	A1.37	20 82 001 0001	B3.07
10 12 005 1002	B1.83			20 76 207 7002	A4.34	20 82 001 0002	B3.07
10 12 005 1002	B2.75	20 76 024 0300	A6.03				
10 12 005 2001	B1.79			20 76 208 7002	A4.35	20 82 101 0220	B3.19
		20 76 028 0300	A6.03	20 76 208 7003	A1.38		
						20 82 102 0101	B3.22
		20 76 030 0300	A6.04				
				20 77 208 3001	A1.32	20 82 104 0101	B3.23
19 00 000 5020	B3.26	20 76 034 0300	A6.04	20 77 208 3003	A1.33		
19 00 000 5070	C2.12			20 77 208 3009	A1.34	20 82 400 0001	B3.15
19 00 000 5071	C2.12						
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19 00 000 5079	B3.26			20 77 208 4003	A4.30		
19 00 000 5080	A1.46			20 77 208 4009	A4.31	20 82 500 0001	B3.09
19 00 000 5080	A4.42	20 76 102 3100	A1.27				
19 00 000 5082	C2.12	20 76 102 3101	A1.28				
19 00 000 5090	C2.12	20 76 102 8000	B1.22			20 82 501 0001	B3.09
19 00 000 5094	C2.12	20 76 102 8000	B2.21	20 78 106 4000	A3.13		
		20 76 103 3000	A1.06	20 78 110 1000	A3.07	20 82 600 1002	B3.10
				20 78 110 4000	A3.14	20 82 600 1004	B3.10
19 20 003 1440	A1.46			20 78 110 4300	A3.15	20 82 600 1006	B3.10
19 20 003 1440	A4.42	20 76 104 3000	A1.07			20 82 600 1008	B3.10
						20 82 600 1010	B3.10

List of part numbers



Part number	Page	Part number	Page	Part number	Page	Part number	Page
20 82 600 1020	B3.10	20 93 102 0103	C4.06	21 03 381 2400	B1.95	33 53 111 0020 001	B1.47
20 82 600 1030	B3.10	20 93 102 0104	C4.06	21 03 381 4400	B1.95	33 53 111 0020 002	B1.47
20 82 600 1040	B3.10	20 93 102 0105	C3.04			33 53 111 0050 001	B1.47
20 82 600 1050	B3.10	20 93 102 0105	C3.05			33 53 111 0050 002	B1.47
20 82 600 1100	B3.10	20 93 102 0201	C4.06	21 03 483 5801	B2.80	33 53 111 0100 001	B1.47
20 82 600 2002	B3.11			21 03 483 5802	B2.80	33 53 111 0100 002	B1.47
20 82 600 2004	B3.11	20 93 201 0102	C3.04	21 03 483 5850	B2.80		
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20 82 600 2008	B3.11			21 03 483 5852	B2.80	33 53 111 0200 002	B1.47
20 82 600 2010	B3.11	20 93 201 0203	C3.08				
20 82 600 2020	B3.11	20 93 201 0204	C3.09	21 03 485 1401	B1.88	33 53 211 0010 001	B1.47
20 82 600 2030	B3.11	20 93 201 0301	C3.12	21 03 485 1403	B1.88	33 53 211 0010 002	B1.47
20 82 600 2040	B3.11	20 93 201 0302	C3.13	21 03 485 1405	B1.88	33 53 211 0020 001	B1.47
20 82 600 2050	B3.11	20 93 201 0303	C3.16	21 03 485 1410	B1.88	33 53 211 0020 002	B1.47
20 82 600 2100	B3.11			21 03 485 1420	B1.88	33 53 211 0050 001	B1.47
		20 93 204 0101	C3.04	21 03 485 1451	B1.88	33 53 211 0050 002	B1.47
		20 93 204 0101	C3.05	21 03 485 1457	B1.88		
20 82 601 1002	B3.12	20 93 204 0101	C3.12	21 03 485 3401	B1.90	33 53 211 0100 001	B1.47
20 82 601 1004	B3.12	20 93 204 0101	C3.13	21 03 485 3403	B1.90	33 53 211 0100 002	B1.47
20 82 601 1006	B3.12	20 93 204 0101	C3.16	21 03 485 3405	B1.90		
20 82 601 1008	B3.12	20 93 204 0101	C4.02	21 03 485 3410	B1.90		
20 82 601 1010	B3.12	20 93 204 0102	C3.04	21 03 485 3420	B1.90	33 53 211 0200 001	B1.47
20 82 601 1020	B3.12	20 93 204 0102	C3.05	21 03 485 3451	B1.90	33 53 211 0200 002	B1.47
20 82 601 1030	B3.12	20 93 204 0102	C3.12	21 03 485 3457	B1.90		
20 82 601 1040	B3.12	20 93 204 0102	C3.13				
20 82 601 1050	B3.12	20 93 204 0102	C3.16	21 03 585 1401	B1.89	33 53 411 0010 001	B1.47
20 82 601 1100	B3.12	20 93 204 0102	C4.03	21 03 585 1403	B1.89	33 53 411 0010 002	B1.47
		20 93 204 0103	C3.04	21 03 585 1405	B1.89	33 53 411 0020 001	B1.47
		20 93 204 0103	C3.05	21 03 585 1410	B1.89	33 53 411 0020 002	B1.47
20 89 900 1000	A6.05	20 93 204 0103	C3.12	21 03 585 1420	B1.89	33 53 411 0050 001	B1.47
20 89 900 1001	A6.05	20 93 204 0103	C3.13	21 03 585 1451	B1.89	33 53 411 0050 002	B1.47
20 89 900 1002	A6.05	20 93 204 0103	C3.16	21 03 585 1457	B1.89		
		20 93 204 0103	C4.03	21 03 585 3401	B1.91	33 53 411 0100 001	B1.47
		20 93 204 0104	C4.04	21 03 585 3403	B1.91	33 53 411 0100 002	B1.47
		20 93 204 0105	C4.04	21 03 585 3405	B1.91	33 53 411 0200 001	B1.47
		20 93 204 0106	C4.05	21 03 585 3410	B1.91	33 53 411 0200 002	B1.47
20 91 104 1101	C2.06	20 93 204 0107	C4.05	21 03 585 3420	B1.91		
20 91 104 1102	C2.08	20 93 204 0107	C4.05	21 03 585 3451	B1.91		
20 91 104 1103	C2.05	20 93 204 0301	C4.06	21 03 585 3457	B1.91		
20 91 104 1104	C2.07						
		20 93 305 0101	C2.10				
		20 93 305 0102	C2.10				
20 91 211 1011	C2.10			21 03 881 5805	B2.79		
20 91 211 1111	C2.10						
20 91 211 1311	C2.10	20 93 405 0101	C2.10				
20 91 411 1001	C2.12	20 93 901 0101	C4.06				
20 91 421 1001	C2.12						
		21 01 000 0003	A1.46	33 02 111 0010 001	B1.47		
		21 01 000 0003	A4.42	33 02 111 0020 001	B1.47		
				33 02 111 0050 001	B1.47		
20 92 641 0201	C1.03			33 02 111 0100 001	B1.47		
20 92 641 0202	C1.03	21 01 100 9014	B2.79	33 02 111 0200 001	B1.47		
20 92 641 0301	C1.05						
20 92 641 0302	C1.05			33 02 211 0010 001	B1.47		
20 92 641 0401	C1.06			33 02 211 0020 001	B1.47		
20 92 641 0402	C1.06	21 03 212 2305	A1.46	33 02 211 0050 001	B1.47		
20 92 641 0501	C1.07	21 03 212 2305	A4.42	33 02 211 0100 001	B1.47		
20 92 641 0502	C1.07			33 02 211 0200 001	B1.47		
20 92 641 0601	C1.04	21 03 281 1405	B1.87				
20 92 641 0602	C1.04	21 03 281 2405	A4.42	33 53 111 0010 001	B1.47		
20 92 641 0700	C1.02	21 03 281 2405	B1.87	33 53 111 0010 002	B1.47		

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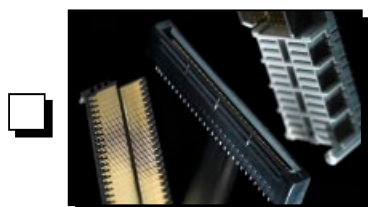
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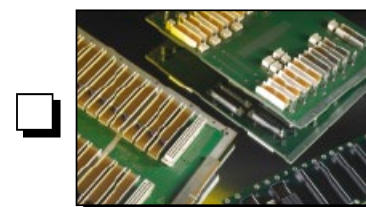
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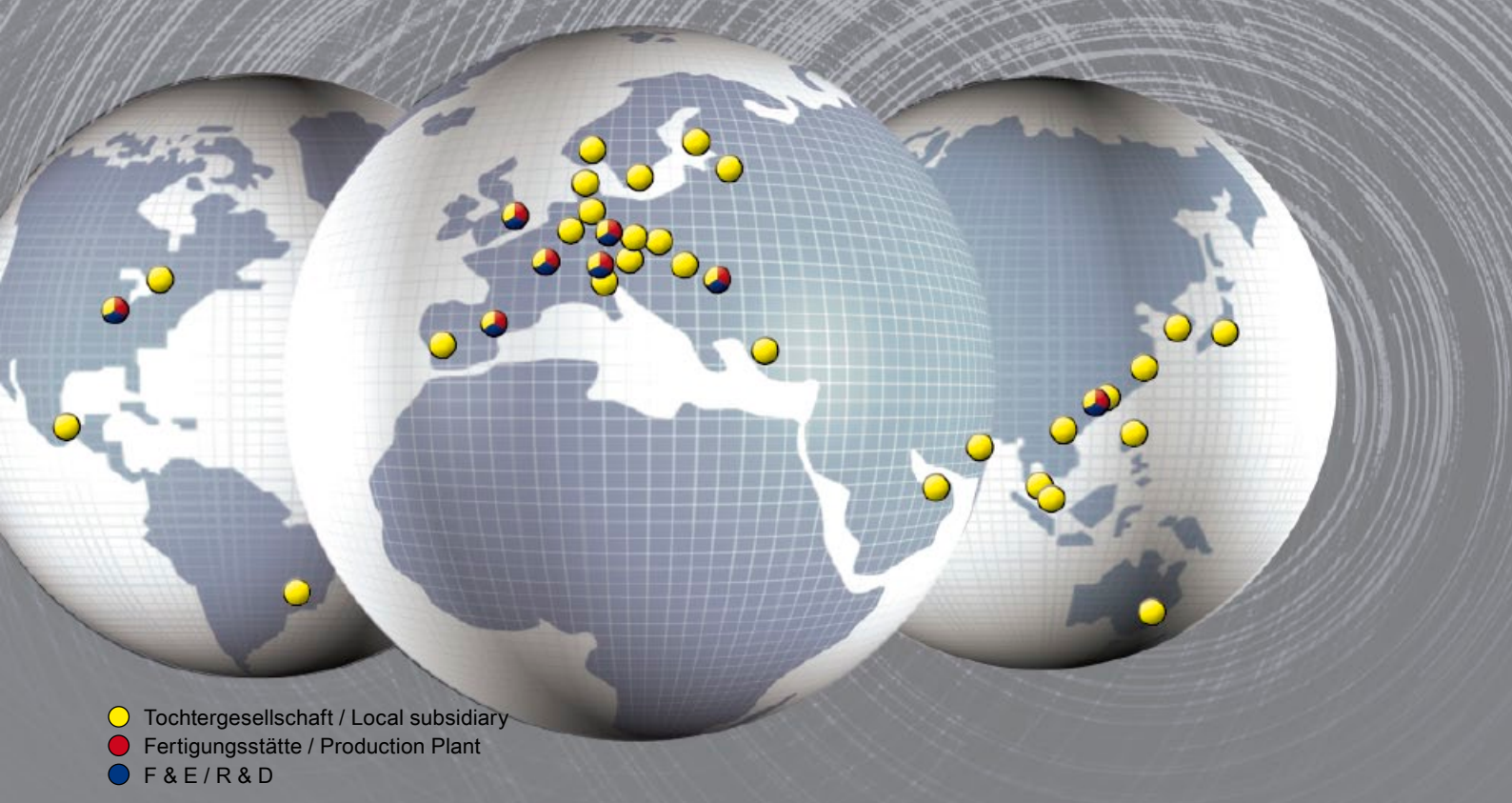
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