Pushing Performance

HARTING Device Connectivity – PushPull

People | Power | Partnership

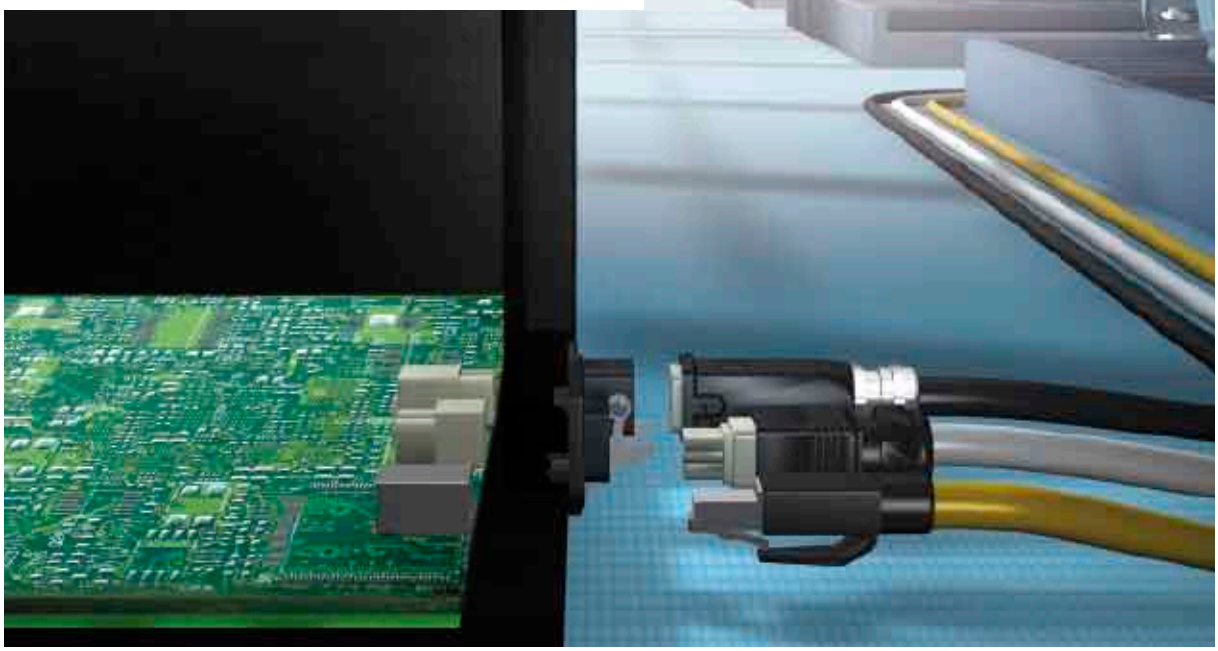
Device Connectivity: Solutions from HARTING

For device manufacturers, **HARTING** offers a comprehensive product line of device connection systems for data, signal and power. These connectors are ideal for all industrial electronic devices in protection classes ranging from IP 20 to IP 65 / IP 67. This includes anything from sensors, controllers and industrial computers. **HARTING** defines the right solution for all devices. We also deliver optimized benefit for the customer within the context of economic device design, easy device installation, and total system innovation.

It is the user's application that stipulates the installation requirements. The technical specifications for the device interface are generated from the network system. The electronic and mechanical layout of the device then determines the method of integration.

Our individual design-in support process provides a mutual path which takes you from the connector to the customized device with the ideal connection technology.

At **HARTING**, our goal is that device connectivity systems should also be able to satisfy and persuade customers.



PushPull from HARTING

PushPull – The robust device connection for harsh industrial applications

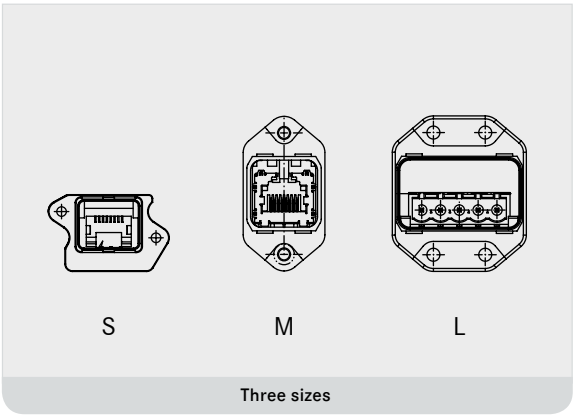
The PushPull connector family is designed for transmitting optical and electrical communications, as well as signals and power. As a true device connector, the PushPull is perfect for device communications because of its high assembly density, high bandwidth and outstanding signal integrity. This product line is supplemented by the power connectors which are capable of up to 690 V and 16 A. PushPull connectors are integrated into installation systems, such as the PROFINET system from the PNO (PROFIBUS User Organization). These installation systems are already in wide use throughout all sectors of plant automation, the automotive industry, and in the cabling of industrial buildings.

For convenient installations, on-site user-assembled connection systems provide solutions ranging from sensitive Ethernet communication to connections for power contacts.

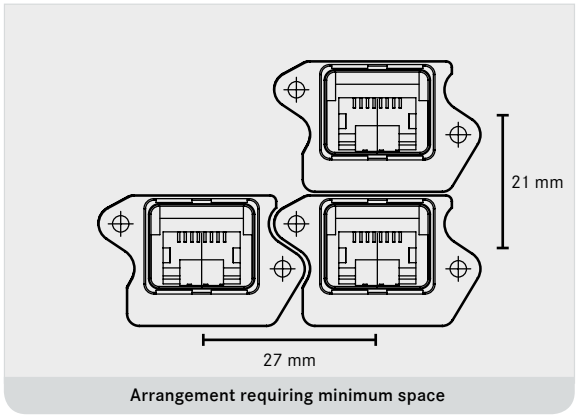
PushPull – The new dimension in locking technology

HARTING's PushPull locking technology features easy-to-use handling even in very constricted spaces. The inner, circular locking profile guarantees a self-locking plugging process. This leads to a permanent device connection which is mechanically stable. The locking mechanism is intuitively plugged and activated in one step, since no additional locking levers are involved. Only a minimum of force is needed for plugging the connection. And then an audible "click" signals that the connection has been established. If servicing is required, the connection can be unplugged just as easy as it is plugged. After releasing the interlock ring, the connector is simply pulled out of the device. The circular, inner seal provides the PushPull with IP 65 / IP 67 protection in its plugged-in state.

The interlocking principle of the PushPull



Three sizes



Arrangement requiring minimum space

PushPull – The complete connector family

The PushPull connector family includes three sizes: **small**, **medium** and **large**. Each size is available in either a plastic or metal housing.

The S version (**HARTING** PushPull / Var. 4) complies with the requirements for generic cabling according to ISO/IEC 24702 / EN 50173-3.

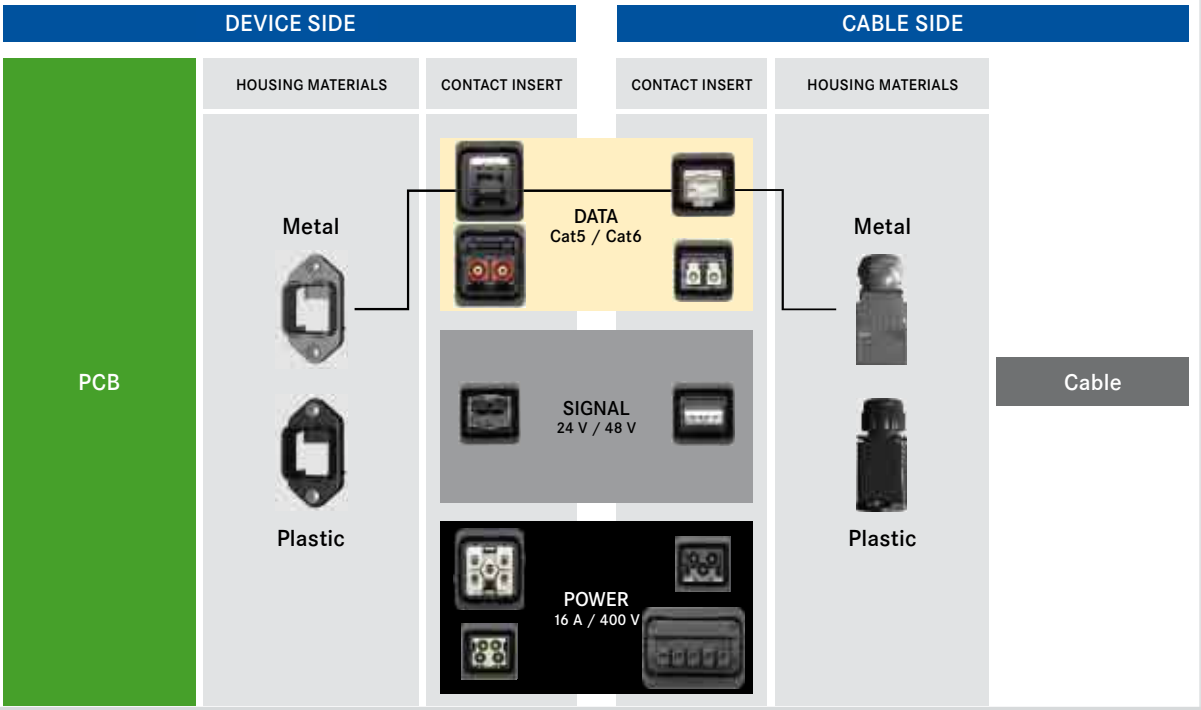
The M+L versions (Han® PushPull / Var. 14) follow the PROFINET guideline and comply with automation requirements as specified by German automobile manufacturers.

PushPull – The backbone of an innovative installation system

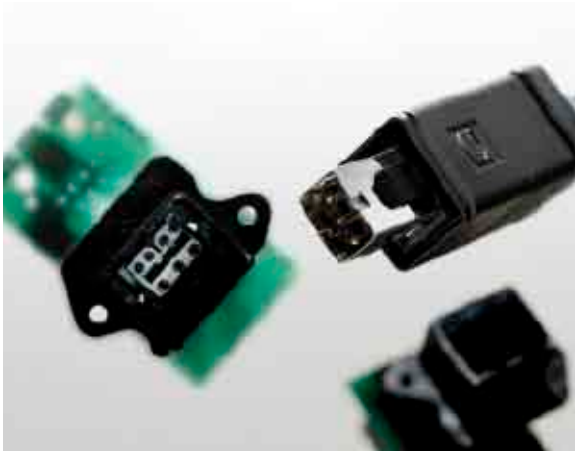
PushPull – Versatility and modularity, designed with the future in mind

The modularity of the PushPull connector enables you to use different contact inserts even when the external dimensions are identical. PushPull is a connector concept which encompasses many mating faces. The PushPull connector is available to fit a wide variety of communication profiles and to suit a variety of signal or power supply demands. The modularity of the PushPull connector enables you to use different contact inserts even when the external dimensions are identical. PushPull is continually expanding; its modularity enables the PushPull series to flexibly include new customer-specific or application-specific contact inserts.

PushPull – its unique modularity makes it so versatile



Universal concept of the modular system



PushPull Hybrid –
The combined connector for data and power

As communications evolve towards Ethernet, we have the opportunity to streamline machine installations and to introduce an innovative, hybrid installation concept. The PushPull hybrid connector and hybrid cable combine data transmission and 24 V (5 A) power supply. This allows installations to be simplified.

Everything is cut in half:

- The number of plug-in slots and cables
- The space needed on the device
- The cabling overhead

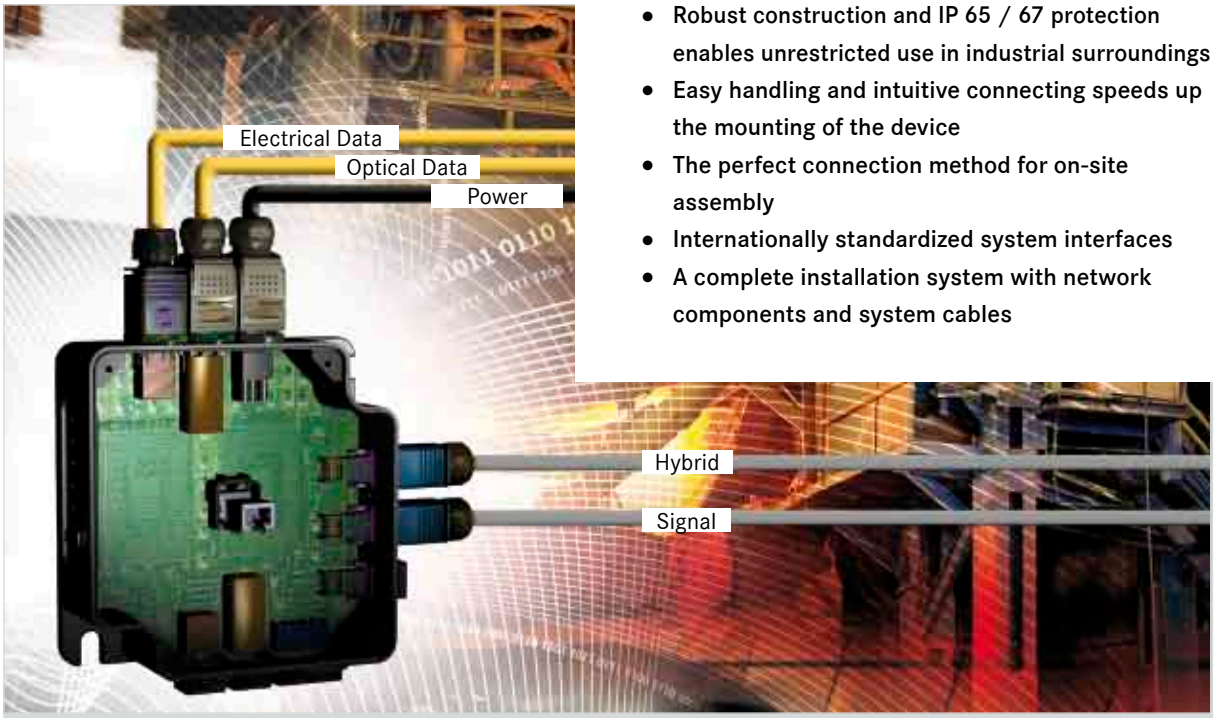
PushPull Hybrid –
Device connectivity with streamlining potential

PushPull – Streamlining opportunities for the device manufacturer

- **Robust construction and IP 65 / 67 protection enables unrestricted use in industrial surroundings**
- **Modularity leads to versatility: can be used for data, signals, and power**
- **Available with plastic or metal housing according to your device design**
- **Can be integrated within the device: saves space with miniaturized design and optimized alignment possibilities**
- **Scalable PCB connection methods can be used from the panel feed-through to the pick-and-place solution**
- **Direct device integration of the housing shape or integration via bulkhead housings**

PushPull – Benefits for the device user

- **Robust construction and IP 65 / 67 protection enables unrestricted use in industrial surroundings**
- **Easy handling and intuitive connecting speeds up the mounting of the device**
- **The perfect connection method for on-site assembly**
- **Internationally standardized system interfaces**
- **A complete installation system with network components and system cables**



PushPull – Universal: for data, signal and power

PushPull – Simple Design-In

PushPull represents simple design-in:

- All device interfaces for communication, data and power have been implemented uniformly with PushPull
- Device-specific concepts are ready for customized PCB integration and optimal housing integration
- The device manufacturer receives active design-in support from HARTING

The results are both efficient PushPull integration and devices which get noticed for their innovative connection technology.

Integration of the interface directly on the device PCB

Device integration with a sub-board

Device integration with a panel feed-through

1. Integration alternatives for the PushPull interface:

a. The interface is integrated directly on the device's printed circuit board (PCB)

The electrical contact insert or optical transceiver is positioned directly on the device's main PCB. This allows the signal transmission to take place directly on the board. It is also possible for contact resistances and line attenuations to be reduced. This variant requires a minimum number of components and is thus the most cost-effective method for integrating devices in large quantities.

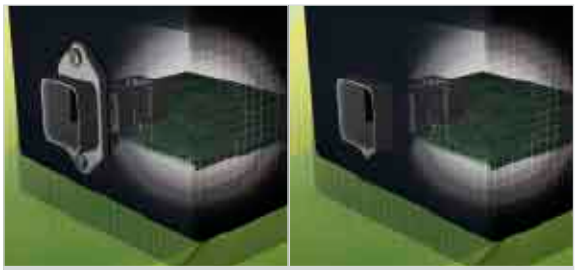
b. Device integration with a sub-board

Integrating sub-board interfaces makes it possible to decouple the PushPull connector and the PCB. This simplifies the design of small-batch devices. It also allows you to efficiently retrofit an existing device model with an interface. The central device PCB can remain application-neutral and be fitted with standardized PCB connectors. The application-specific interface is then localized on the sub-board.

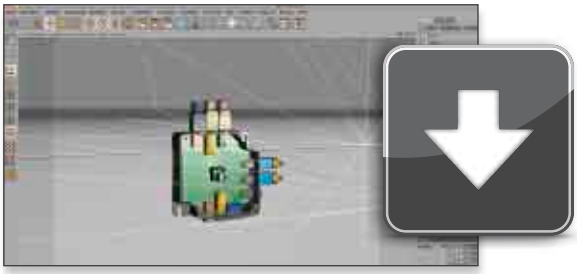
c. Device integration with a panel feed-through

For larger devices which lack a main PCB, control/electrical cabinet or operator panel, the PushPull connector is connected to the device electronics with a panel feed-through interface. Here, the panel feed-through is an independent component which is mounted to the housing wall or panel. Inside the housing, a system cable is using to feed to the device.

Alignment of the PCB



Mechanical layout of the interface



Assembly

2. Alignment of the PCB

Inside the device, straight or angled contact inserts can be used to adapt to a variety of different board alignments. The alignment of the board is dependent on the device design. The exact positioning of the PushPull contact insert in relation to the housing panel is ensured because the contact insert is retained with the PushPull bulkhead housing profile (screwed or snapped in).

3. Integration of the connector housing

The mechanical mating component for the connector housing on the cable side is the bulkhead housing on the device side. The bulkhead housing along with a seal are then screwed into the device. The profile shape of the bulkhead housing can be formed into the device housing. This results in a minimized seal surface area and a more efficient device production process.

4. Service and support

All data and specifications required for device integration are available for download from the HARKIS online catalogue. From anywhere in the world, you can access technical specifications, technical data sheets, and many 2-D and 3-D files for use with standard CAD programs. 2D:PDF/DXF / 3D:IGES/DXF/VRML

5. Assembly

As the number of device interfaces grows, devices are becoming increasingly complex. Thus the demands on the mechanical design and the manufacturing process are also growing. In the overall device planning process, the sequence of device assembly is a critical factor. Our PushPull solutions allow for this fact by providing optimized procedures for a wide variety of housing designs.

PushPull – Expertise in Printed Circuit Boards Integration

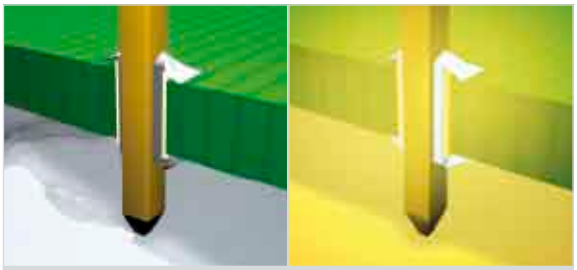
On the device side it is the variety of connection methods which is important, since the deployed technology is somewhat predetermined by the device layout. Thus it can vary from one device to another. Scalability is an additional factor. A connector should be versatile enough so that it can be used both in small hand-assembled batches and also in large batches with pick-and-place methods. The PushPull family has been designed for these requirements and can be used in combination with many different solder and assembly processes.

Expertise in PCB connections

- **Soldering method:** The connector's solder pins are inserted into plated-through holes in the board and then soldered in a solder wave bath.
- **SMC soldering method:** In the SMC (surface mount compatible) soldering process, the connector pins are inserted into the plated-through holes on the board. The holes have been pre-filled with solder paste. Then the SMC components are soldered using a reflow soldering process.
- **SMT soldering method:** SMT (surface mounted technology) is processed using solderable connection areas positioned directly on the surface of the board.

Expertise in assembly

- **Pick & place for reflow:** Modern printed circuit boards with high component densities and surface-mounted components (SMD) are typically assembled using "pick-and-place" machines.
- **Hand assembly:** Manual assembly and soldering are particularly needed at the start of the design-in process. Manual methods are required to optimize the process leading up to series production.
- **Press-In:** This connection method uses no solder. Instead, a press-in machine presses the pin into a plated-through hole in the board.



Soldering / SMC soldering

SMT soldering

Pick-and-Place / Hand assembly

Press-In

PushPull – Expertise in Cable Termination

On the cable side, the user requires either an on-site assembled termination or an automatically assembled system cable which provides economic pre-cabling. For series machinery, many pre-assembled system cables are used. However the systems or plant engineer often requires simple on-site termination methods. Devices which feature PushPull are compatible with both of these installation methods.

Han-Quick Lock® spring-clamp terminals / caged tension-spring terminals

IDC insulation displacement terminals / crimp terminals

Expertise in wire termination

• Han Quick Lock® spring-clamp technology:

The radial Han Quick Lock® spring-clamp termination combines the advantages of a clamp with the benefits of crimp technology. The Han Quick Lock® system is suitable for flexible (stranded) wires. It is opened and closed with a normal screwdriver.

• Caged clamp terminals connection:

The caged tension-spring termination uses a spring to establish contact with flexible and solid-core wires. After moving the opening mechanism to open the spring, the stripped wire can simply be inserted into the contact chamber (wire bay).

• IDC insulation displacement terminals:

With the insulation displacement contact (IDC) method, only one step is required for a cutting clamp to cut through the insulation and make an elastic contact with the wire strands. The HARAX® quick-connect system is special because its cutting clamp is combined with a wire lead-in mechanism. This enables convenient on-site assembly without the need for special tools.

• Crimp Terminals:

In the crimp method, a controlled deformation technique is used to create a gas-tight clamping of a flexible wire in a crimp contact. Crimping machines make it possible to efficiently produce pre-assembled system cables.

• Fibre-optic Terminals

For direct plug connections, all fibre-optic types are available including multi-mode, single-mode, HCS, and polymer-optic fibre connections elements. Polymer-optic fibre is also suitable for quick on-site assembly methods, thanks to the quick-connect technology.

				DIRECT DEVICE INTEGRATION ON PCB		DEVICE INTEGRATION WITH PANEL FEED THROUGH	
DATA/SIGNAL	RJ45 Cat. 5	V4	Housing bulkhead mounting metal	09455950030	EasyInstall	09452951130	RJ45 EasyInstall
			Housing bulkhead mounting plastic	09455450030 09455450031 09455450023 09455450021	EasyInstall EasyInstall Compact Compact	09452451130 09452451102	RJ45 EasyInstall RJ45 Compact
			Female, solder variant	09455511100 09455511101 09455511102 09455511103	angled SMD 90° angled EMC 90° angled 90° straight 180°		
		V14	Housing bulkhead mounting metal	09350020301	straight	09352210311 09352230311 09352240311 09352220311 09352260311	RJ45 straight RJ45 angled RJ45 47° Flachbandkabel Solder termination
			Housing bulkhead mounting plastic	09350020321	straight	09352210331 09352230331 09352240331 09352220331 09352260331	RJ45 straight RJ45 angled RJ45 47° Flachbandkabel Solder termination
			Female, solder variant	09350022102 09350022101	straight 180° angled 90°		
	Hybrid 24V 5A Cat. 5	V4	Housing bulkhead mounting metal	09455951320 09455951325	straight EasyInstall angled Compact	09452951320	EasyInstall
			Housing bulkhead mounting plastic	09455451320 09455451325	Compact angled Compact	09452451320	Compact
			Female, solder variant	09455451300 09455451305	straight 180° angled 90°		
	LWL SCRJ	V14	Housing bulkhead mounting metal	09350020303	straight	09352420313	optical PFT **
			Housing bulkhead mounting plastic	09350020323	straight	09352420333	optical PFT **
	LWL LC duplex	V4	Housing bulkhead mounting metal	—	—	09574680500000 09574680501000	Multimode GOF EasyInstall Singlemode GOF EasyInstall
			Housing bulkhead mounting plastic	—	—	09574020500 09574020501 09574420502000 09574420503000	MultimodeGOF EasyInstall Singlemode GOF EasyInstall Multimode GOF Compact Singlemode GOF Compact
POWER	24V 16A	V14	Housing bulkhead mounting metal	09350040301	straight	09354310311	Spring-cage connection
			Housing bulkhead mounting plastic	09350040321	straight	09354310331	Spring-cage connection
			Stifteinsatz, Solder termination	09350043004 09350043003	straight angled		
	48V 12A	V4	Housing bulkhead mounting metal	09455950030	EasyInstall	09462954030 09462954430 09462954031	Solder termination EasyInstall Crimp termination EasyInstall Spring-cage connection EasyInstall
			Housing bulkhead mounting plastic	09455450030 09455450031 09455450023 09455450021	EasyInstall EasyInstall Compact Compact	09462454030 09462454000 09462454430 09462454400 09462454031 09462454001	Solder termination EasyInstall Solder termination Compact Crimp termination EasyInstall Crimp termination Compact Spring-cage connection EasyInstall Spring-cage connection Compact
			Female, solder variant	09465004400	angled		
	250V 16A	V4	Housing bulkhead mounting plastic	09455450030 09455450031 09455450023 09455450021	EasyInstall EasyInstall Compact Compact	09462453430 09462453410	Crimp termination EasyInstall Crimp termination Compact
	400V 16A	V14	Housing bulkhead mounting metal	09350020303	straight	09352310313	Solder termination
			Housing bulkhead mounting plastic	09350020323	straight	09352310333	Solder termination
			Male insert, solder termination	09350023003 09350023004	straight 180° angled 90°		
	690V 16A	V14	Housing bulkhead mounting metal	—	—	09352320313 09352330313	Quick Lock® Crimp termination*
			Housing bulkhead mounting plastic	—	—	09352320333 09352330333	Quick Lock® Crimp termination*

* Crimp contacts Han® P: 0,5 mm² | Male contact: 09350006103 | female contact: 09350006203 / Crimp contacts Han® P: 0,75 mm² | Male contact: 09350006104 | female contact: 09350006204 / Crimp contacts Han® P: 1,0 mm² | Male contact: 09350006105 | female contact: 09350006205 / Crimp contacts Han® P: 1,5 mm² | Male contact: 09350006106 | female contact: 09350006206 / Crimp contacts Han® P: 2,5 mm² | Male contact: 09350006107 | female contact: 09350006207

ACCESSORIES DEVICE SIDE		CONNECTOR CABLE SIDE		ACCESSORIES CABLE SIDE	
09458450003 09458450009	Protection cover IP 40 Protection cover IP 65 / IP 67	09451951100 09451951500 09451951510	RJ45 4 poles RJ45 8 poles, Cat. 6 RJ45 8 poles, Cat. 6	09458450001	Protection cover IP 65 / IP 67
		09451451100 09451451500 09451451510	RJ45 4 poles RJ45 8 poles, Cat. 6 RJ45 8 poles, Cat. 6		
09350025401 09350025402	Protection cover IP 40 Protection cover IP 65 / IP 67	09352210401 09352230401 09352240401	RJ45 4 poles RJ45 8 poles, Cat. 6 RJ45 8 poles, Cat. 6	09350025412 09350025411	Protection cover IP 40 Protection cover IP 65 / IP 67
		09352210421 09352220421 09352230421 09352240401	RJ45 4 poles, 6.5-9.5mm RJ45 4 poles, 5-8mm RJ45 8 poles, Cat. 6 RJ45 8 poles, Cat. 6		
09458450003 09458450009	Protection cover IP 40 Protection cover IP 65 / IP 67	09451951300	Crimp termination	09458450001	Protection cover IP 65 / IP 67
		09451451300	Crimp termination		
09350025401 09350025402	Protection cover IP 40 Protection cover IP 65 / IP 67	09352410402	SCRJ**	09350025412 09350025411	Protection cover IP 40 Protection cover IP 65 / IP 67
		09352410422	SCRJ**		
09458450003 09458450009	Protection cover IP 40 Protection cover IP 65 / IP 67	09574090500000 09574090501000	Multimode GOF Singlemode GOF	0945845010	Protection cover IP 65 / IP 67
		09574020500 000 09574020501 000	Multimode GOF Singlemode GOF		
		09354310401	Spring-cage connection		
		09354310421	Spring-cage connection		
09458450003 09458450009	Protection cover IP 40 Protection cover IP 65 / IP 67	09461954400	Crimp termination	09458450001	Protection cover IP 65 / IP 67
		09461454400	Crimp termination		
		09461453410	Crimp termination		
09350025401 09350025402	Protection cover IP 40 Protection cover IP 65 / IP 67	09352310401 09352320401	Crimp termination* Quick Lock®	09350025412 09350025411	Protection cover IP 40 Protection cover IP 65/ 67
		09352310423 09352310423 09352320421	Crimp termination* Quick Lock®		
		09352310401 09352320401	Crimp termination* Quick Lock®		
		09352310423 09352310423 09352320421	Crimp termination* Quick Lock®		

** SC contacts order separately
SC POF contact, 1 mm: 20100015217 | SC 125 GI contact: 20101255211 | SC 230 HCS contact: 20102305211

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