Pushing Performance

HARTING F.O. Components and Systems

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.

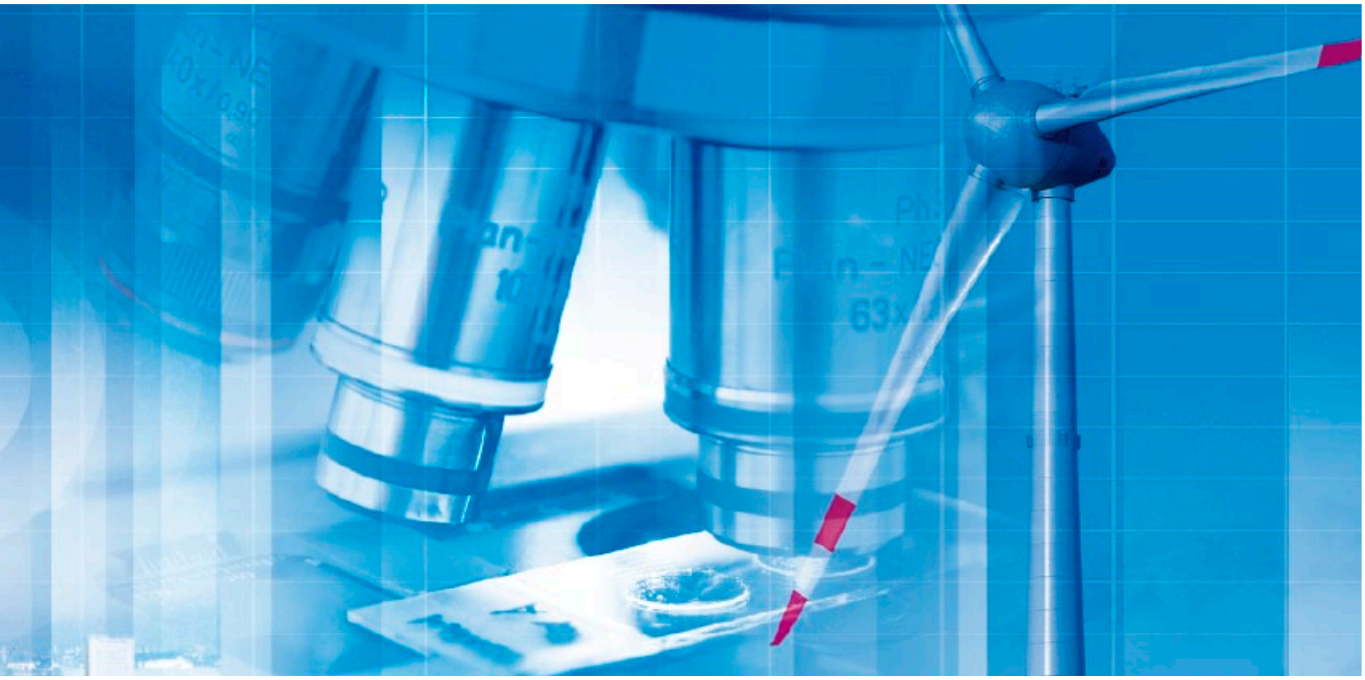
The HARTING brand stands for superior quality and reliability – worldwide. The standards we set are the result of consistent, stringent quality management that is subject to regular certifications and audits.

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.

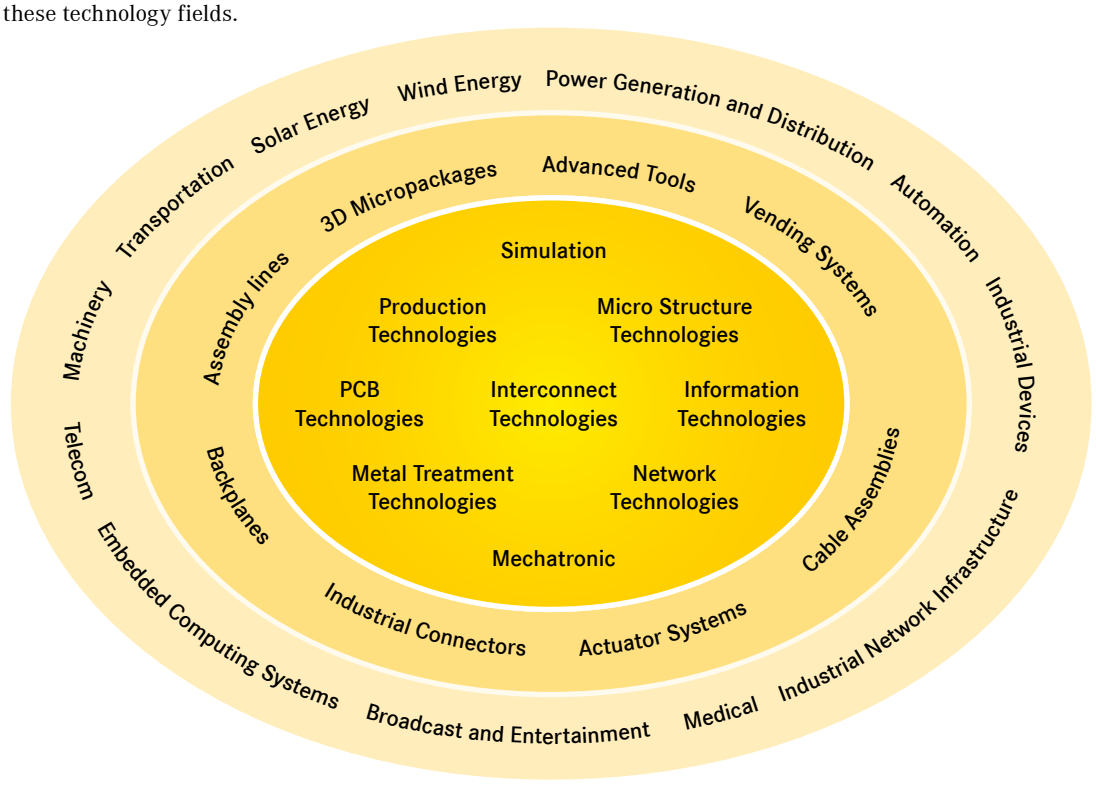
HARTING solutions extend across technology boundaries.
Drawing on the comprehensive resources of the group's technology pool, HARTING devises practical solutions for its customers. Whether this involves industrial networks for manufacturing automation, or hybrid interface solutions for wireless telecommunication 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.



Field of application

HARTING Industrial Connectors are applicable in a wide variety of electronic and electrical applications. The degree of protection of all hoods and housings is in accordance with International Standard IEC 60 529, EN 60 529.

- Power Utilities
- Robotics
- Chemical Plants
- Machine Tool Controls
- Injection Moulding
- Industrial Instrumentation
- Conveyor Equipment
- Transportation
- and many more.

Certified according to EN ISO 9001 in design/development, production, installation and servicing

Specifications:

VDE 0110
Table concerning clearance and creepage distances

VDE 0627
Connectors and plug devices

Standards:
DIN EN 175301-801, DIN EN 61 984

Approvals:
UL, CSA for inserts
Nema 4/12 and 4x for hoods and housings

Note:
Connectors should not be coupled and decoupled under electrical load. Connectors of the same or different series being mounted side by side may be protected against incorrect mating by the use of coding options.

General information:

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

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

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General

Apart from applications in the field of telecommunications, fibre optic technology is of great importance in the industrial market sector. In telecommunications there are requirements for:

- High transmission capacity
- Low cable attenuation
- No crosstalk

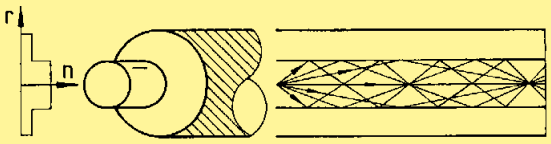
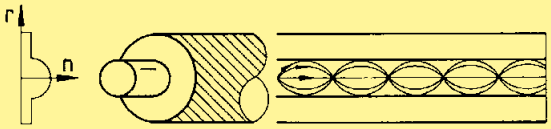
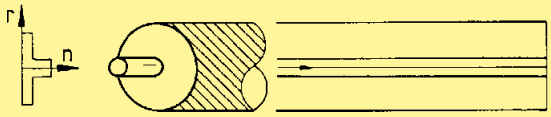
These features are also required in the industrial sector along with the following major considerations:

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

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

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

There are three different types of optical fibres:

		Typical Dimensions Core/Cladding Ø	Attenuation
Step index (SI) fibre HCS® [1] / POF[2]		200 / 230 µm	5 dB/km ... 8 dB/km 0.2 dB/km
Gradient index(GI) fibre		50 /125 µm	2.6 dB/km 3.2 dB/km
Single modem fibre		9 / 125 µm	< 0.3 dB/km

optical refractive index profile

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

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

Mounting of connectors for gradient fibres is achieved by the use of adhesive.

For POF[2] or HCS® [1] fibres, the crimping technique eases the connector attachment.

With the advanced HARTING quick assembly components, POF-cables can be mounted without the need of special tools. HARTING F.O. systems are designed for gradient index fibres with a core diameter of 50 and 62.5 µm as well as for 200 µm (HCS® [1]) and 1 mm (POF[2]) step index fibres.

The typical operating wavelengths are 660 nm (POF[2], HCS® [1]), 850 nm (GI, HCS® [1]) and 1300 nm (GI).

[1] HCS® (=Hard Clad Silica) is registered trade mark of SpecTran Corporation
[2] POF = Polymer Optical Fibre

Dimensioning of F.O. Transmission Systems

For reliable operation of a F.O. data transmission system it is essential that the transmitted optical signals arrive at the receiver with sufficient amplitude. The incident power should at least exceed twice (+ 3 dB) the value of the minimum sensitivity of the receiver. Otherwise, the inherent noise of the system may result in increasing randomly distributed transmission errors in the data transfer. Therefore, in system design the power budget of the optical path has to be checked. The following aspects have to be considered:

- Optical power output of the transmitter
  The optical power generated by the LED does mainly depend on the applied forward current.Typical power levels coupled into the core are:

  for glass-fibre (λ = 850 nm):
  50/ 125 µm GI fibre: 80 µW
  200/ 230 µm SI fibre: 250 µW
  for Polymer fibre (λ = 660 nm):
  980/1000 µm: 600 µW

- Specific attenuation-coefficient of the fibre
  The specific attenuation of optical fibres depends on the wavelength applied and is specified in dB/km.
  Typical values are:

  for glass-fibres (λ = 850 nm):
  50/ 125 µm GI fibre: ---3 dB/km
  200/ 230 µm HCS: ---5 dB/km
  for polymer fibre (λ = 660 nm):
  980/1000 µm (PMMA): ---0.2 dB/m
  The fibre loss usually contributes to the highest amount to the overall transmission index of the optical link.

- Additional interconnections in the cable system
  Interconnections in the optical link create some further attenuation for the travelling optical signals.
  Typical insertion loss is
  - for a spliced connection ≤0.3 dB
  - for a connector-set 0.8 dB ... 0.5 dB

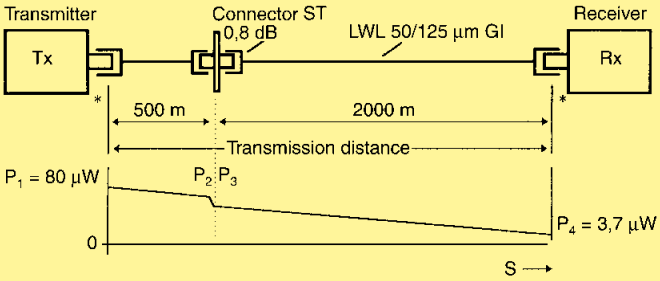
  depending on the type of fibre and the connectors applied.

- Sensitivity of the optical receiver DC-coupled optical receivers, commonly used, with SI-diodes as receiving elements show typical minimum sensitivities of
  ≤ 3 µW at 850 nm (glass fibre systems)
  ≤ 5 µW at 660 nm (polymer fibre systems)

- Temperature dependence and ageing of LED, thermal influence on cable loss
  These items should be taken into account with an amount of 2 dB. Thus, in total a system reserve of 5 dB has to be considered in the link power budget.

Examples

a) Glass fibre system (λ = 850 nm)



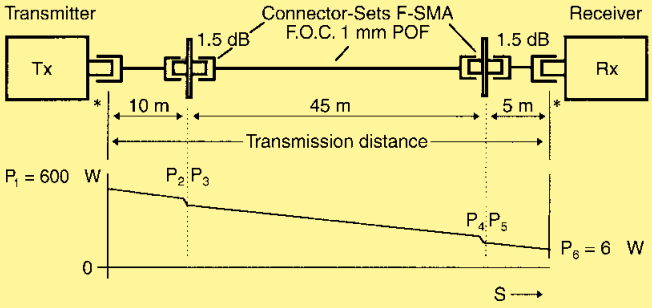
Link budget analysis:
Transmitter:
P1 = 80 µW = -11 dBm
power coupled into fibre core

Cable Loss: 2.5 km x 3 dB/km	= 7.5 dB
Loss per connector set ST	= 0.8 dB
System reserves (3 dB + 2 dB)	= 5.0 dB
Total system losses:	**13.3 dB**

Incident power at receiver: P4 = - 24.3 dBm = 3.7 µW
This satisfies the required minimum-conditions ≥ 3 µW

* The injection- and decoupling-loss at the transmitter- and receiver-ends of the fibre has not additionally to be taken into account as they are alraedy included in the given power ratings of these elements.

b) Polymer fibre system (λ = 660 nm)

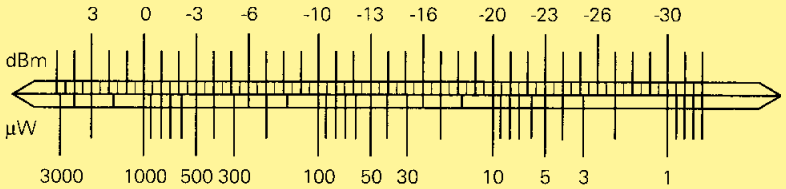


Link budget analysis:
Transmitter:
P1 = 600 µW = -2.2 dBm
power coupled into fibre core

Cable loss: 60 m x 0,2 dB/m	= 12 dB
2 connector-sets F-SMA (2 x 1.5 dB)	= 3.0 dB
System reserves (3 dB + 2 dB)	= 5.0 dB
Total system losses:	**20.0 dB**

Incident power at receiver:
P6 = - 22.2 dBm = 6.0 µW
This satisfies the required minimum-conditions ≥ 5 µW
Omitting the additional interconnections in the cable (here e.g. the 2 F-SMA connector sets) results in larger maximum transmission distances.

Conversion Diagram



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Features

- The technical specifications for the SERCOS Interface[1)] are fulfilled by the LED 660 nm and the receiver 5 MBit/s.

Technical characteristics

Standards	DIN EN 60 664-1 DIN EN 61 984
Approvals	

General and limiting values at T = 25 °C

Transmitter (LED 850 nm): OPF 370 A

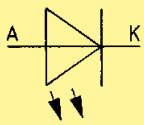
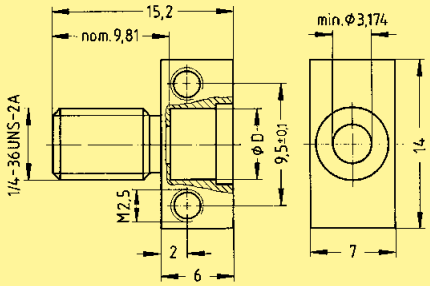
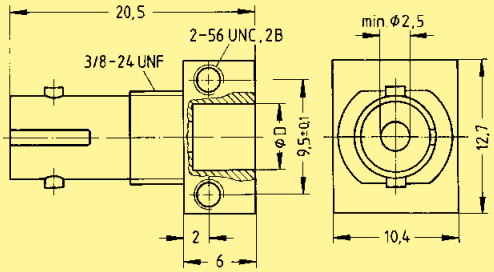
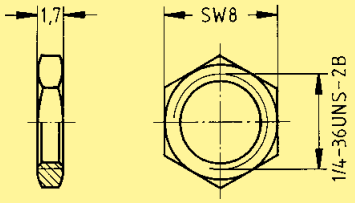
Analog band-width	BWE	80 MHz (I_F = 100 mA DC)
Optical wave-length	λ	830 mm ... 870 nm
Spektral band-width	Δλ	35 nm
Drive current	I_{Fmax}	100 mA
Forward voltage	U_V	1.8 V ... 2.0 V typ.
Derating at 25 °C	I_F	0.8 mA/°C
Reverse voltage	U_{Rmax}	4 V
Storage temperature		-55 °C ... +115 °C
Operating temperature		-40 °C ... +100 °C
Power coupled into fibre (at IF = max.)		
in 50/125 GI	P_S	15 µW ... 25 µW typ.
in 200/230 SI	P_S	650 µW max.

Transmitter (LED 650 nm): SFH 757

Analog band-width	BWE	7 MHz (I_F = 30 mA DC)
Optical wave-length	λ	650 nm
Spektral band-width	Δλ	25 nm
Drive current	I_{Fmax}	50 mA
Forward voltage	U_V	2.1 V typ.
Derating at 25 °C	I_F	0.93 mA/°C
Reverse voltage	U_{Rmax}	4 V
Storage temperature		-40 °C ... +100 °C
Operating temperature		-40 °C ... +80 °C
Power coupled into fibre (at I_F = 10 mA)		
in 980/1000 POF	P_S	150 µW typ.

1) **SERCOS** = **SE**riell **R**ealtime **CO**mmunication **S**ystem

for fibre optic transmission

Identification	Part Number	Drawing	Dimensions in mm
F.O. transmitter for PBC mounting receptacle (metall)			
LED 850 nm OPF 370 A in F-SMA housing in F-ST housing	20 50 000 1111 20 50 000 1121		F-SMA
LED 650 nm SFH 757 in F-SMA housing in F-ST housing	20 40 000 1112 20 40 000 1122		F-ST
F-SMA			
fixing nut	20 80 000 1072		

Features

- The technical specifications for the SERCOS Interface[1)] are fulfilled by the LED 660 nm and the receiver 5 MBit/s.

Technical characteristics

Standards	DIN EN 60 664-1 DIN EN 61 984
Approvals	

General and limiting values at T = 25 °C

Receiver (LED 850 nm): OPF 520

Receiver type		0 Mbit/s... 5 Mbit/s (DC coupled)
Supply voltage	V_{CC}	4.5 V ... 5.5 V DC
Supply current	I_{CC}	10 mA max.
Opt. power input		4 µW ... 100 µW (at 850 nm)
Operating temperature		-40 °C ... +85 °C

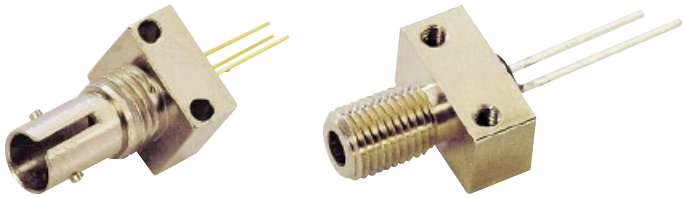
Receiver (digital): SFH 551

Wave-length	600 nm ... 780 nm
Data rate	5 Mbit/s
Sensitivity	-22 dBm typ.
Optical input power	typ. 6 µW ... 1000 µW (at λ = 650 nm)
Electrical output	TTL, open collector
Operating voltage	5 V DC ±5 %
Operating temperature	-40 °C ... +85 °C

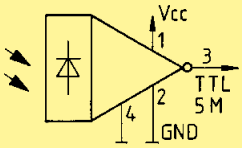
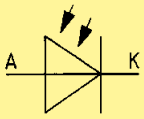
Receiver (photo diode): BPX 65

Wave-length	350 nm ... 1100 nm
Switching times	typ. 12 ns
Photo current	typ. 4 µA (t λ = 650 nm; input power 10 µW; reverse voltage 5 V)
Dark current	1 nA typ. (bei V_R = 20 V)
Capacity	11 pF typ.
Operating temperature	-40 °C ... +85 °C

[1)] **SERCOS** = **SE**riell **R**ealtime **CO**mmunication **S**ystem



for fibre optic transmission

Identification	Part Number	Drawing	Dimensions in mm
F.O. Receiver for PBC mounting receptacle (metall)			
TTL 5 Mbit/s OPF 520 in F-SMA housing in F-ST housing	 20 50 000 2112 20 50 000 2222		The mounted, integrated receivers are suitable for applications in combination with glass fibre as well as polymer fibre. Dimensions of housing see page for F.O. transmitter.
TTL 5 Mbit/s SFH 551 in F-SMA housing in F-ST housing	 20 50 000 2116 20 50 000 2226		
Si-PIN photo diode BPX 65 in F-SMA housing in F-ST housing	 20 50 000 2119 20 50 000 2229		

Features

- Electro-optical converters integrated into D-Sub connector shell housings
- Cost-effective solution for fibre optic duplex links
- Transmission distance up to 60 m
- Standard accessories for D-S ub can be applied
- Suitable for 1 mm Ø polymer optical fibres (λ = 660 nm)
- Special housing for heavy duty applications is available

Technical characteristics

Standards	DIN EN 60 664-1 DIN EN 61 984
Approvals	

General and limiting values at T = 25 °C

Transmitter (LED): SFH 757

Drive current (max.)	I_{Fmax}	max. 70 mA
Optical power		
at 20 mA		300 µW
at 50 mA		600 µW
Wave-length		660 nm
Storage temperature		-35 °C ... +100 °C
Operating temperature		-30 °C ... +85 °C

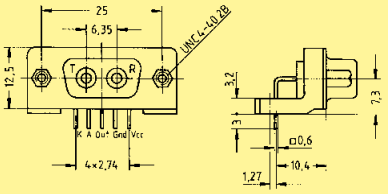
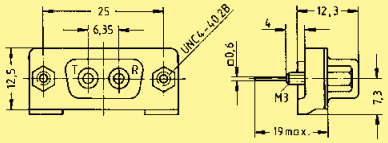
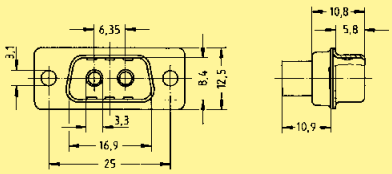
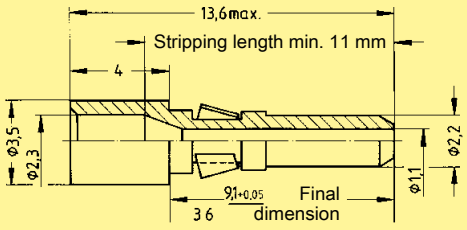
Receiver (digital): SFH 551

Wave-length	600 nm ... 780 nm
Data rate	5 Mbit/s
Sensitivity	-22 dBm typ.
Optical input power	typ. 6 µW ... 1000 µW (at λ = 650 nm)
Electrical output	TTL, open collector
Operating voltage	5 V DC ±5 %
Operating temperature	-40 °C ... +85 °C

Receiver (photo diode): SFH 250

Wave-length	400 nm ... 1100 nm
Switching times	10 ns
Photo current	3 µA (at λ = 650 nm; input power 10 µW; reverse voltage 5 V) 4 µA (at λ = 950 nm; input power 10 µW; reverse voltage 5 V)
Dark current	1 nA typ. (at V_R = 20 V)
Capacity	11 pF typ.
Operating temperature	-40 °C ... +85 °C

in duplex style for short range transmission
with optical fibres (λ = 660 nm)

Identification	Part Number	Drawing	Dimensions in mm
F.O. D-Sub T/E female connector			
angled 1x SFH 757 / 1x SFH 551	20 66 009 3811		
2x pin diode (SFH 250)	20 66 009 3813		
straight 1x SFH 757 / 1x SFH 551	20 66 009 3812		
Outer dimensions like 9-pin D-Sub female			
F.O. D-Sub male connector	20 67 009 3811		Cavities are designed for HARTING POF[1] ferrules
Outer dimensions like 9-pin D-Sub male			
Ferrule			
for 1 mm POF[1] with cladding gauge 2.2 mm	20 10 001 3232		The mounting/endface-preparation of the ferrule can be achieved by crimping, hot-plate technique or by using adhesive
			The ferrules are snap-mounted into the male connector and can be released with aid of removal tool 09 99 000 0052 (see catalogue “Industrial Connectors Han®”)

[1] POF = Polymer Optical Fibre

Features

- Electro-optic converters integrated in multi-mode connectors
- Up to 16 optical lines via one connection
- Cost-effictive alternative to conventional connectors
- Suitable for 1 mm Ø polymer fibres (λ = 660nm)
- Transmission distance up to 60 m

Technical characteristics

Standards	DIN EN 60 664-1 DIN EN 61 984
Approvals	

General and limiting values at T = 25 °C

Transmitter (LED): SFH 757

Wave-length	650 nm
Switching times	100 ns
Übertragungsrate	max. 100 Mbit/s
Output power (I = 10 mA)	
typ.	150 µW
min.	100 µW
Drive current	max. 50 mA
Forward voltage	2.1 V DC
Operating temperature	-40 °C ... +80 °C

Receiver (digital): SFH 551

Wave-length	600 nm ... 780 nm
Data rate	5 Mbit/s
Sensitivity	-22 dBm typ.
Optical input power	typ. 6 µW ... 1000 µW (at λ = 650 nm)
Electrical output	TTL, open collector
Operating voltage	5 V DC ±5 %
Operating temperature	-40 °C ... +85 °C

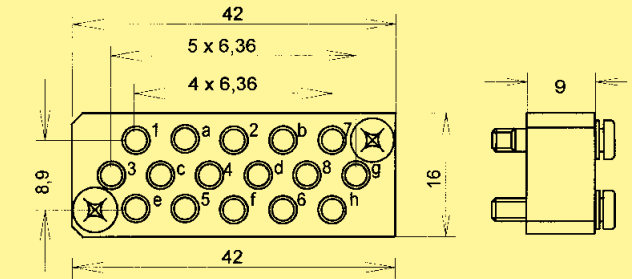
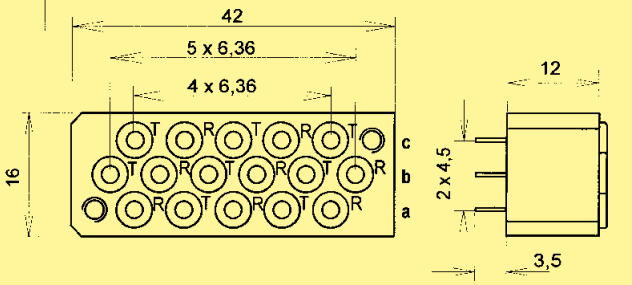
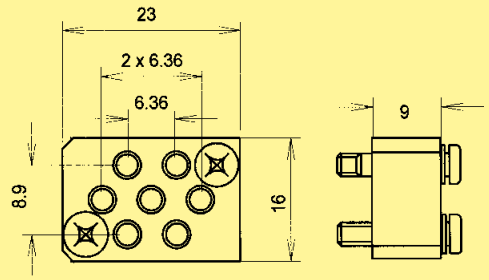
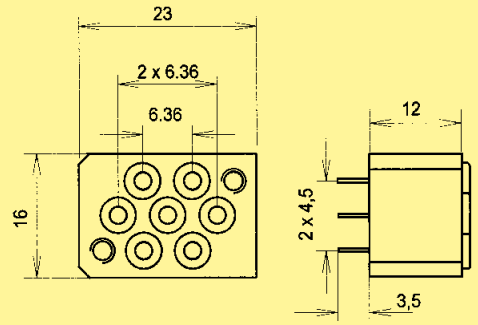
Receiver (photo diode): SFH 250

Wave-length	400 nm ... 1100 nm
Switching times	10 ns
Photo current	3 µA (at λ = 650 nm; input power 10 µW; reverse voltage 5 V)
Dark current	1 nA typ. (at V_R = 20 V)
Capacity	11 pF typ.
Operating temperature	-40 °C ... +85 °C

Receiver (photo diode): BPX 65

Wave-length	350 nm ... 1100 nm
Switching times	typ. 12 ns
Photo current	typ. 4 µA (t λ = 650 nm; input power 10 µW; reverse voltage 5 V)
Dark current	1 nA typ. (bei V_R = 20 V)
Capacity	11 pF typ.
Operating temperature	-40 °C ... +85 °C

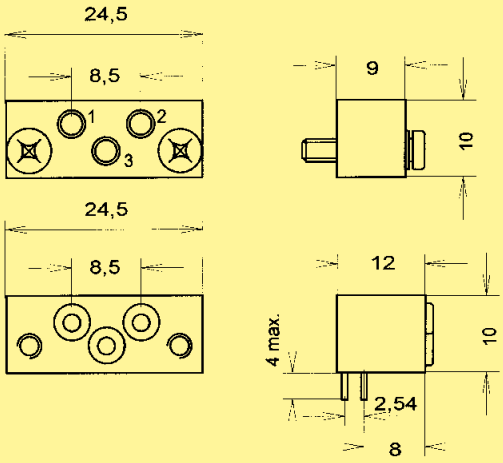
For short range data transmission with
polymer optical fibres (λ = 660 nm)
Multipole versions
for SFH 756, SFH 551 and SFH 250

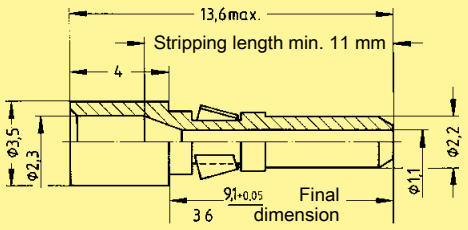
Identification	Part Number	Drawing	Dimensions in mm
Mounting device 16 cables for 1 mm POF[1] fibres with HARTING POF ferrules	20 10 016 3211		
Mounting device 16 diodes solder straight with 8x SFH 757 and 8x SFH 551	20 40 016 3823		
Mounting device 7 cables for 1 mm POF[1] fibres with HARTING POF ferrules	20 10 007 3211		
Mounting device 7 diodes abgewinkelt with 3x SFH 757 and 3x SFH 250	20 40 007 3821		
with 7x SFH 757	20 40 007 3841		

[1] POF = Polymer Optical Fibre

For short range data transmission with
polymer optical fibres (λ = 660 nm)
Multipole versions
for SFH 757, SFH 551 and SFH 250

Identification	Part Number	Drawing	Dimensions in mm
Mounting device **3 cables**			
for 1 mm POF[1)] fibres with HARTING POF ferrules	20 10 003 3211		
Mounting device **3 diodes**			
angled with 1x SFH 757 with 2x SFH 551	20 40 003 3821		
with 2x SFH 757 with 1x SFH 551	20 40 003 3822		
Ferrule			
1 mm POF[1)] with cladding gauge 2.2 mm	20 10 001 3232		





The mounting/endface-preparation of the ferrule can be achieved by crimping, hot-plate technique or by using adhesive

The ferrules are snap-mounted into the male connector and can be released with aid of removal tool 09 99 000 0052 (see catalogue “Industrial Connectors Han®”)

1) POF = Polymer Optical Fibre

Stock items in bold type

For short range data transmission with
polymer optical fibres (λ = 660 nm)
Multipole versions
for SFH 757 and SFH 551

Identification	Part Number	Drawing	Dimensions in mm
Mounting device 3 cables			
for 1 mm POF[1)]	20 10 003 4811		
Mounting device 3 diodes			
angled			
with 2x SFH 757 with 1x SFH 551	20 40 003 4813		
with 1x SFH 757 with 2x SFH 551	20 40 003 4823		

1) POF = Polymer Optical Fibre

CONTENTS PAGE

Features

The standard hoods and housings can be equipped with a mix of FO contacts as well as contacts for other electrical applications

- FO contacts for 1 mm POF
- Suitable for industrial connectors Han for the series Han D®, Han DD®, Han E®, Han® EE, Han® K and Han-Modular®
- Mixed inserts using FO contacts and electrical contacts possible
- Combination of optical signals and electrical supply in one connector is possible
- Degree of protection IP 65, IP 67 or IP 68 in the locked position depending on the hoods and housings used

Attention

Please make sure the correct contacts are used only in combination with the inserts given with the series mentioned above.

For more technical information and Part-Numbers concerning the inserts please refer to the catalogue “Industrial Connectors Han®“.

Technical characteristics

Standards	DIN EN 60 664-1 DIN EN 61 984

Inserts

see catalogue „Industrial Connectors Han®“

Han D®	chapter 02
Han DD®	chapter 02
Han DD® module	chapter 06
Han® DDD module	chapter 06
Han E®	chapter 03
Han® EE	chapter 03
Han® K 8/24	chapter 05
Han® K 6/36	chapter 05
Han® K 12/2	chapter 05
Han® 4 A SC	chapter 19
Han® SC module	chapter 06
Han® Multi module	chapter 06

[1)] POF = Polymer Optical Fibre

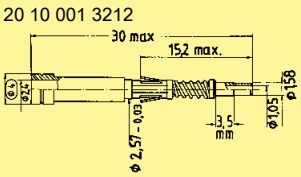
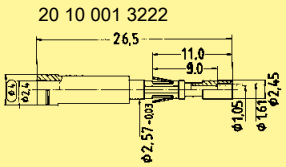
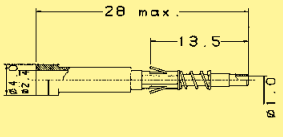
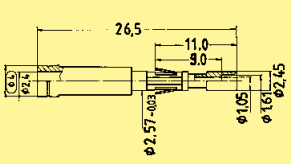
F.O. inserts for multi-pole connectors of serie Han D®

Identification	Part number Male insert (M)	Part number Female insert (F)	Drawing	Dimensions in mm
Han® Inserts				
for Han® 7 D ... Han® 128 D				
Han® 7 D	09 21 007 3031	09 21 007 3131		
Han® 8 D	09 36 008 3001	09 36 008 3101		
Han® 40 D	09 21 040 3001	09 21 040 3101		
Han® 64 D	09 21 064 3001	09 21 064 3101		
Han® 80 D	09 21 040 3001	09 21 040 3101		
	09 21 040 3001	09 21 040 3101		
Han® 128 D	09 21 064 3001	09 21 064 3101		
	09 21 064 3001	09 21 064 3101		

Identification	Size	max. number of F.O. contacts
Han® 7 D	Han® 3 A	7
Han® 8 D	Han® 3 A	8
Han® 40 D	Han® 16 B	40
Han® 64 D	Han® 24 B	64
Han® 80 D	Han® 32 B	80 (2x 40)
Han® 128 D	Han® 48 B	128 (2x 64)

for Han® 15 D ... Han® 50 D				
Han® 15 D	09 21 015 3001	09 21 015 3101		
Han® 25 D	09 21 025 3001	09 21 025 3101		
Han® 50 D	09 21 025 3001	09 21 025 3101		
	09 21 025 3001	09 21 025 3101		

Identification	Size	max. number of F.O. contacts
Han® 15 D	Han® 10 A	15
Han® 25 D	Han® 16 A	25
Han® 50 D	Han® 32 A	50 (2x 25)

Identification	Part number Male contact	Part number Female contact	Drawing	Dimensions in mm
F.O. contacts for Han D® contact cavity				
for 1 mm POF[1] fibre				
for Han® 7 D ... Han® 128 D	20 10 001 3212	20 10 001 3222	20 10 001 3212 	20 10 001 3222 
for Han® 15 D ... Han® 50 D	20 10 001 3213	20 10 001 3222	20 10 001 3213 	20 10 001 3222 

[1] POF = Polymer Optical Fibre

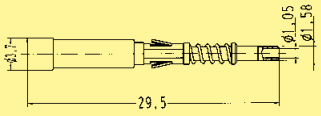
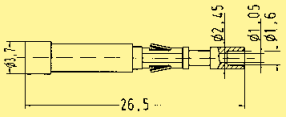
F.O. inserts for multi-pole connectors of serie Han DD®

Identification	Part number Male insert (M)	Part number Female insert (F)	Drawing	Dimensions in mm
Han® Inserts				
Han® 24 DD	09 16 024 3001	09 16 024 3101		
Han® 42 DD	09 16 042 3001	09 16 042 3101		
Han® 72 DD	09 16 072 3001	09 16 072 3101		
Han® 108 DD	09 16 108 3001	09 16 108 3101		
Han® 144 DD	09 16 072 3001	09 16 072 3101		
	09 16 072 3011	09 16 072 3111		
Han® 216 DD	09 16 108 3001	09 16 108 3101		
	09 16 108 3011	09 16 108 3111		

Identification	Size	max. number of F.O. contacts
Han® 24 DD	Han® 6 B	24
Han® 42 DD	Han® 10 B	42
Han® 72 DD	Han® 16 B	72
Han® 108 DD	Han® 24 B	108
Han® 144 DD	Han® 32 B	144 (2x 72)
Han® 216 DD	Han® 48 B	216 (2x 216)

Identification	Part number Male insert (M)	Part number Female insert (F)	Drawing	Dimensions in mm
Han DD® Modul	09 14 012 3001	09 14 012 3101		
Han® DDDModul	09 14 017 3001	09 14 017 3101		

Identification	Size	max. number of F.O. contacts
Han DD® Modul	-	12
Han® DDD Modul	-	17

Identification	Part number Male contact	Part number Female contact	Drawing	Dimensions in mm
F.O. contacts for Han DD® contact cavity				
for 1 mm POF[1] fibre	20 10 001 3211	20 10 001 3221	20 10 001 3211 	
			20 10 001 3221 	

[1] POF = Polymer Optical Fibre

Stock items in bold type

F.O. inserts for multi-pole connectors of series
Han E® and Han® EE

Identification	Part number Male insert (M)	Part number Female insert (F)	Drawing	Dimensions in mm
Han® Inserts				
Han® 6 E	09 33 006 2602	09 33 006 2702		
Han® 10 E	09 33 010 2602	09 33 010 2702		
Han® 16 E	09 33 016 2602	09 33 016 2702		
Han® 24 E	09 33 024 2602	09 33 024 2702		
Han® 32 E	09 33 016 2602	09 33 016 2702		
	09 33 016 2612	09 33 016 2712		
Han® 48 E	09 33 024 2602	09 33 024 2702		
	09 33 024 2612	09 33 024 2712		

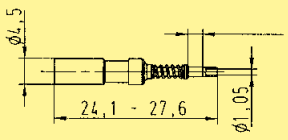
Identification	Size	max. number of F.O. contacts
Han® 6 E	Han® 6 B	6
Han® 10 E	Han® 10 B	10
Han® 16 E	Han® 16 B	16
Han® 24 E	Han® 24 B	24
Han® 32 E	Han® 32 B	32 (2x 16)
Han® 48 E	Han® 48 B	48 (2x 24)

Han® 10 EE	09 32 010 3001	09 32 010 3101		
Han® 18 EE	09 32 018 3001	09 32 018 3101		
Han® 32 EE	09 32 032 3001	09 32 032 3101		
Han® 46 EE	09 32 046 3001	09 32 046 3101		
Han® 64 EE	09 32 032 3001	09 32 032 3101		
	09 32 032 3011	09 32 032 3111		
Han® 92 EE	09 32 046 3001	09 32 046 3101		
	09 32 046 3011	09 32 046 3111		

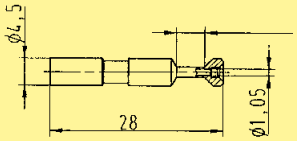
Identification	Size	max. number of F.O. contacts
Han® 10 EE	Han® 6 B	10
Han® 18 EE	Han® 10 B	18
Han® 32 EE	Han® 16 B	32
Han® 46 EE	Han® 24 B	46
Han® 64 EE	Han® 32 B	64 (2x 32)
Han® 92 EE	Han® 48 B	92 (2x 46)

Identification	Part number Male contact	Part number Female contact	Drawing	Dimensions in mm
F.O. contacts for Han E® and Han® EE contact cavity				
for 1 mm POF[1] fibre	20 10 001 3311	20 10 001 3321		

20 10 001 3311



20 10 001 3321



[1] POF = Polymer Optical Fibre

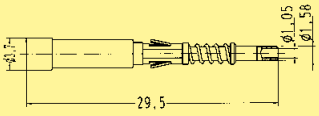
F.O. inserts for multi-pole connectors of serie Han® K

Identification	Part number Male insert (M)	Female insert (F)	Drawing	Dimensions in mm
Han® Inserts				
Han® K 8/24	09 38 032 3001	09 38 032 3101		
Han® K 6/36	09 38 042 3001	09 38 042 3101		
Han® K 12/2	09 32 012 3001	09 32 012 3101		

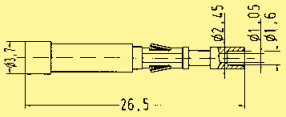
Identification	Size	max. number of F.O. contacts
Han® K 8/24	Han® 10 B	24
Han® K 6/36	Han® 16 B	36
Han® K 12/2	Han® 16 B	2

Identification	Part number Male contact	Female contact	Drawing	Dimensions in mm
F.O. contacts for Han® K contact cavity				
for 1 mm POF[1] fibre	20 10 001 3211	20 10 001 3221		

20 10 001 3211



20 10 001 3221



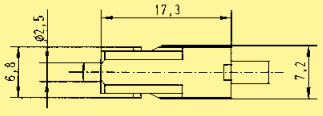
[1] POF = Polymer Optical Fibre

Stock items in bold type

F.O. inserts for multi-pole connectors of series
Han® 4 A and Han-Modular®

Identification	Part number Male insert (M)	Part number Female insert (F)	Drawing	Dimensions in mm
Han® Inserts				
Han® 4 A SC	09 20 004 4701	09 20 004 4711		
Han® SC module	09 14 004 4701	09 14 004 4711		

Identification	Size	max. number of F.O. contacts
Han® 4 A SC	Han® 3 A	4
Han® SC module	-	4

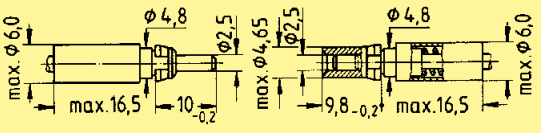
Identification	Part number Male contact	Part number Female contact	Drawing	Dimensions in mm
SC contacts				
for GI fibre 50/125 µm or 62.5/125 µm ceramic ferrule	20 10 125 5211			
for SI fibre (HCS® [1]) 200/230 µm	20 10 230 5211			
for 1 mm POF[2] fibre with IDC termination technology	20 10 001 5217			
Crimp contact for 1 mm POF[2] fibre (for Han® SC module only)	20 10 001 5211			

[1] HCS® Hard Clad Silica (is registered trade mark of the SpecTran Corporation)
[2] POF = Polymer Optical Fibre

F.O. inserts for multi-pole connectors of serie Han-Modular®

Identification	Part number Male insert (M)	Part number Female insert (F)	Drawing	Dimensions in mm
Han® Inserts				
Han® Multi module 4 contacts 12 contacts	 09 14 004 4501 09 14 012 4501	 09 14 004 4512 09 14 012 4512		
Other fields of application see also catalogue „Connectors DIN 41 612“				

Identification	Size	max. number of F.O. contacts
Han® Multi module	-	4
Han® Multi module	-	12

Identification	Part number Male contact	Part number Female contact	Drawing	Dimensions in mm
F.O. contacts according to DIN 41 626				
for GI fibre 50/125 µm or 62.5/125 µm ceramic ferrule	20 10 125 4212	20 10 125 4222		
for SI fibre (HCS® [1]) 200/230 µm	20 10 230 4211	20 10 230 4221		
for 1 mm POF fibre	20 10 001 4211	20 10 001 4221		
with LED 650 nm	20 10 001 4231			
with receiver 5 Mbit/s	20 10 001 4232			

[1] HCS® Hard Clad Silica (is registered trade mark of the SpecTran Corporation)

Stock items in bold type

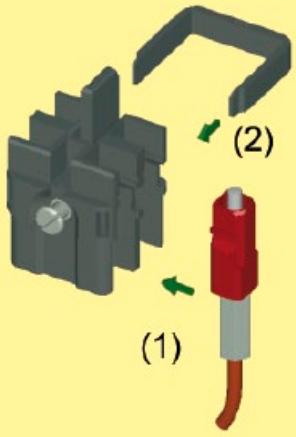
CONTENTS PAGE

Features

- Suitable with housings, size Han® 3 A including versions Han® M, Han® EMV and Han® HPR
- Degree of protection up to IP 68
- For fibre optic SC contacts; up to 4 SC contacts per connector
- For Multimode fibre 50 - 62.5 / 125 µm and Single-mode fibre 9 / 125 µm
- Full ceramic sleeves for a minimal insertion loss

Assembly instructions

Male insert (09 20 004 4701)

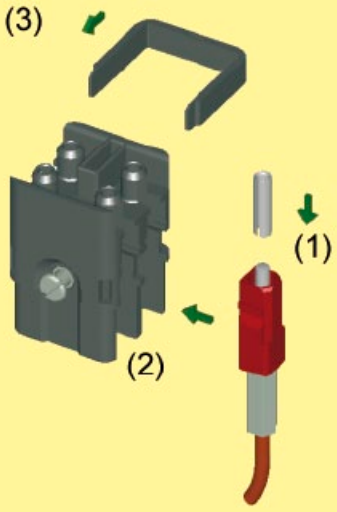


Assemble the SC contact

(1) Push the SC contact from the side into the relevant insert

(2) Push the spring clip over the contact body.

Female insert (09 20 004 4711)



Assemble the SC contact

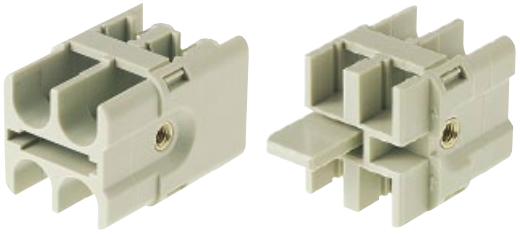
(1) Push the centering ferrule (included in delivery) on the SC contact

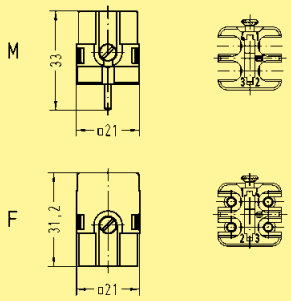
(2) Push the SC contact from the side into the relevant insert

(3) Push the spring clip over the contact body.

Number of contacts

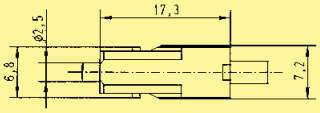
4



Identification	Part number Male insert (M)	Part number Female insert (F)	Drawing	Dimensions in mm
SC module Order SC contacts separately	**09 20 004 4701**	**09 20 004 4711**		

Contact arrangement view from termination side

The female inserts are equipped with centering ferrules.
4 ferrules are included in delivery range.

Identification	Part number Male contact	Part number Female contact	Drawing	Dimensions in mm
SC contact for GI fibre 50/125 µm or 62.5/125 µm ceramic ferrule	**20 10 125 5211**	**20 10 125 5211**		
				
for SI fibre (HCS®[1]) 200/230 µm	**20 10 230 5211**	**20 10 230 5211**		
with quick assembly technique for 1 mm POF[2]	**20 10 001 5217**	**20 10 001 5217**		
with crimp termination technique for 1 mm POF[2]	**20 10 001 5211**	**20 10 001 5211**		

1) HCS®=Hard Clad Silica is registered trade mark of SpecTran Corporation
2) POF = Polymer Optical Fibre

Features

General Description

The Han-Brid® series allows the connection of a data interface and a power supply in a single space saving connector. This means that it is now possible to provide data transmission and power to devices in a single bus structure. This hybrid connector family includes provision for connection of a max. 50 V, 10 A power supply together with a range of inserts for connection of a variety of data protocols and transmission medias:

- Han-Brid® F.O. for plastic (POF) or for HCS®* optical fibre
- Han-Brid® Cu for shielded twisted pair.
- Han-Brid® Quintax 3 A for shielded 4 wire bus systems (2 pair STP)
- Han-Brid® RJ45 C for Ethernet application
- Han-Brid® USB / Firewire for fast data transmission

Han-Brid® inserts fit into the standard plastic as well as metal hoods and housings with seal of the Han® 3 A series offering a degree of protection IP 65 according to DIN EN 60 529. For harsher environments Han® 3 HPR hoods and housings with a degree of protection of IP 68 can be used.

Power supply

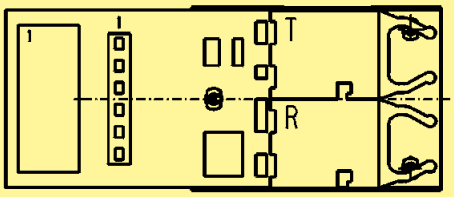
- Han D® male and female with standard crimp contacts
- Rated current 10 A
- Rated voltage 50 V
- termination side 0.14 - 2.5 mm²
- Approval

Data interfaces

Han-Brid® F.O.

- Is suitable for all HP Versatile Link (Horizontal Package) transmitters and receivers
- Data rates: Standard 12 Mbit/s, suitable for all common fieldbus systems
- Insert allows integration of HP standard contacts for POF[2)] and HCS®[1)] fibres
- Temperature range: -40 °C … +70 °C

Wiring plan



Signal assignment:

/R	Optical reception data (electrical output), TTL-compatible, negative logic, $I_{out\ max}$: ±16 mA
GND	Ground, Power supply, data
+5VDC	Power supply +5 V DC ±5 %
/T	Optical transmission data (electrical input), TTL compatible, negative logic

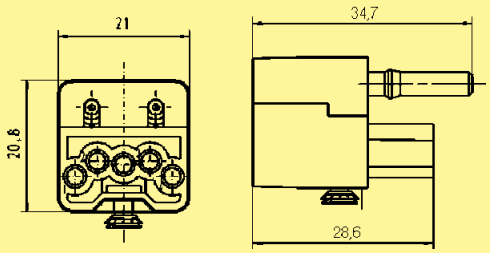
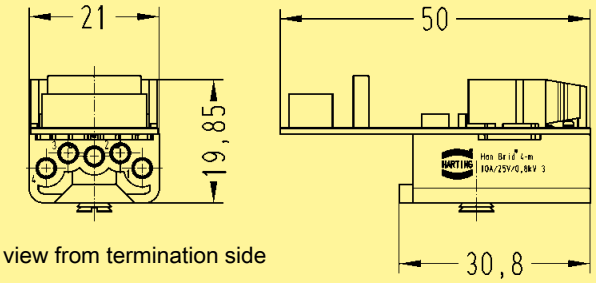
Optical elements:

Laser classification I

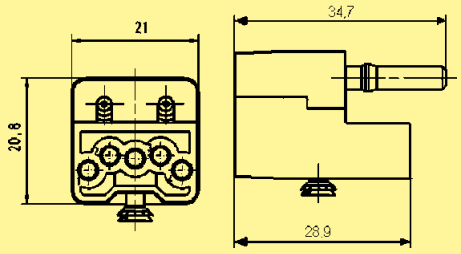
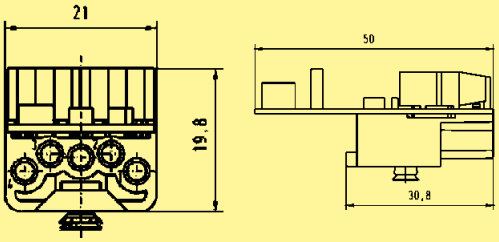
	Pin Out			
	/R	GND	-5VDC	/T
Board stacker	5	4, 6	1, 3	2
IDC	8, 9	1, 4, 7, 10	2, 3	5, 6

1) HCS® = Hard Clad Silica (is registered trade mark of the SpecTran Corporation)
2) POF = Polymer Optical Fibre

Hybrid field bus connector
with F.O. transmitter and receiver
+ 4 electrical contacts 10 A
+ option for PE

Identification	Part number Male insert (M)	Part number Female insert (F)	Drawing	Dimensions in mm
Cable side, female F.O. (m) + Han D® (f)				
with F.O. contacts 		for POF 09 12 004 2711 for POF crimpless 09 12 004 2713 for HCS®* fibre 09 12 004 2716	 view from termination side	
without F.O. contacts 		for POF 09 12 004 3111 for POF crimpless 09 12 004 3113 for HCS®* fibre 09 12 004 3116		
Device side, male F.O. (f) + Han D® (m)				
with PCB 	09 12 004 2611		 view from termination side	
without PCB 	09 12 004 3011			

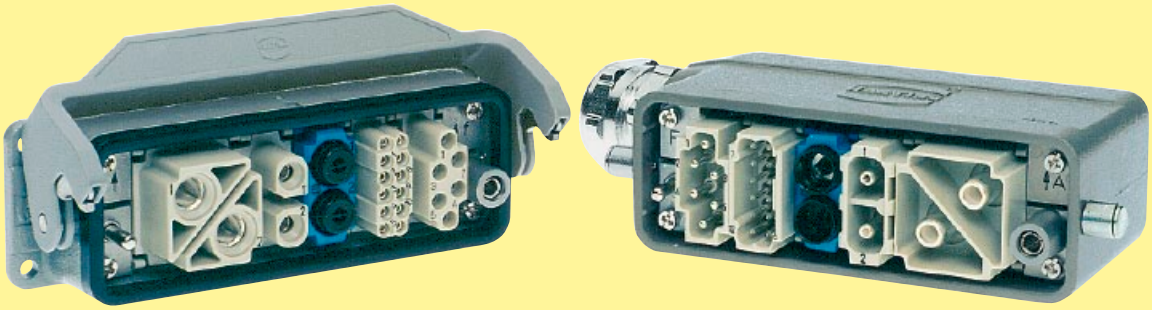
* HCS®=Hard Clad Silica (is registered trade mark of the SpecTran Corporation)

Identification	Part number Male insert (M)	Female insert (F)	Drawing	Dimensions in mm
Cable side, male F.O. (m) + Han D® (m)				
with F.O. contact 	for POF 09 12 004 2601 for POF crimpless **09 12 004 2603** for HCS®* fibre 09 12 004 2606		 view from termination side	
without F.O. contact 	for POF 09 12 004 3001 for POF crimpless 09 12 004 3003 for HCS®* fibre **09 12 004 3006**			
Device side, female F.O. (f) + Han D® (f)				
with PCB 		09 12 004 2701	 view from termination side	
without PCB 		09 12 004 3101		

* HCS®=Hard Clad Silica (is registered trade mark of the SpecTran Corporation)

Stock items in bold type

Description of the Han-Modular® system



The Han-Modular® series is a new system of inserts designed to meet the specific requirements of individual customers. In close cooperation with potential users a range of modular inserts have been developed allowing the simple assembly of custom designed complete connectors which meet the diverse requirements encountered by designers today.

Han-Modular® is a logical development of the Han-Com® series which already offers the combination of power and signal circuits in one connector.

The individual modules of this series now allow the integration of electrical, optical and gaseous signal and power connections in one connector assembly.

The pneumatic contacts are also suitable for the connection of liquid media. However it must be stated that a combination of electrical and liquid connections in one connector is not allowed according to VDE regulations.

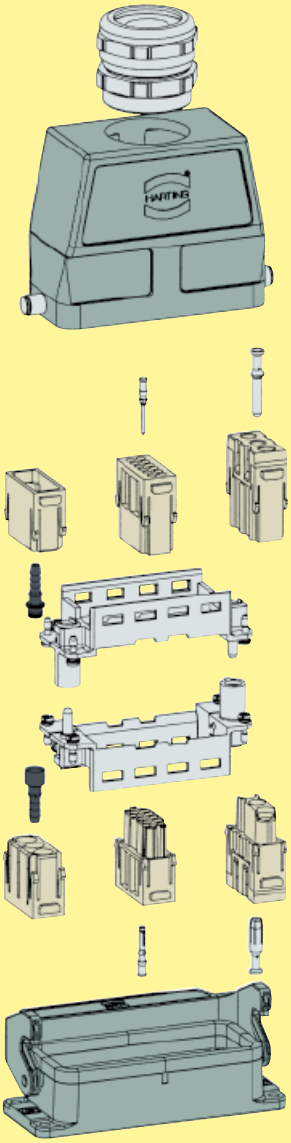
The individual contacts used in this system are all from existing well proven ranges and it is possible to use combinations of 1 to 12 modules depending on the size of the hoods and housings chosen.

The basic modules snap into a mounting frame and can be exchanged separately at any time.

Advantages:

- ❑ Custom designs can be simply assembled
- ❑ Optimum solutions can be reached
- ❑ Stock can be minimized

Assembly details



* HCS® Hard Clad Silica (is registered trade mark of the SpecTran Corporation)

Features

- Suitable for Han D® crimp contacts
- Standard module for power up to 10 A

Technical characteristics

Specifications	DIN EN 60 664-1 DIN EN 61 984
Approvals	

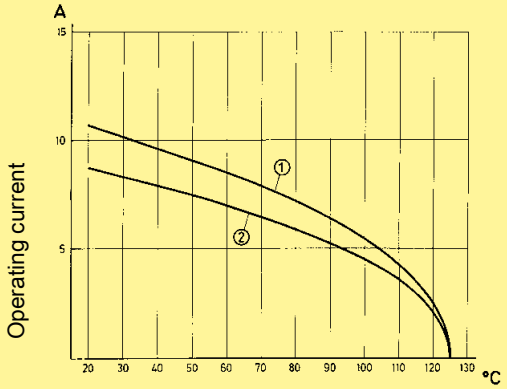
Inserts

Number of contacts	12
Electrical data	
acc. to EN 61 984	**10 A 250 V 4 kV 3**
Rated current	10 A
Rated voltage	250 V
Rated impulse voltage	4 kV
Pollution degree	3
Rated voltage	
acc. to UL/CSA	600 V
Insulation resistance	≥ 10^{10} Ω
Material	polycarbonate
Limiting temperatures	-40 °C ... +125 °C
Flammability acc. to UL 94	V 0
Mechanical working life	
- mating cycles	≥ 500

Current carrying capacity

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

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



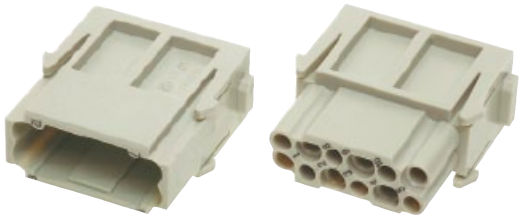
Ambient temperature

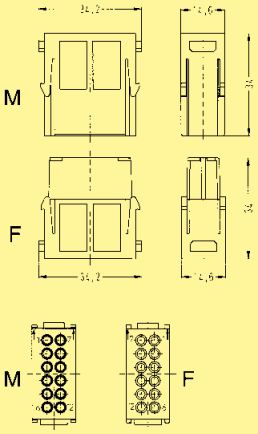
① 24 B hoods/housings with 6 modules; wire gauge: 1.5 mm²

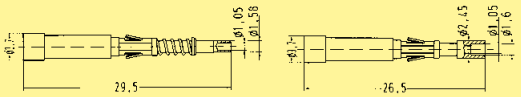
② 24 B hoods/housings with 6 modules; wire gauge: 1.0 mm²

Number of contacts

12



Identification	Part number Male insert (M)	Part number Female insert (F)	Drawing	Dimensions in mm
Crimp terminal Order crimp contacts separately	**09 14 012 3001**	**09 14 012 3101**	 Contact arrangement view from termination side	

Identification	Wire gauge (mm²)	Part number Male contact	Part number Female contact	Drawing	Dimensions in mm
F.O. contacts for 1 mm plastic fibre 		20 10 001 3211	20 10 001 3221		

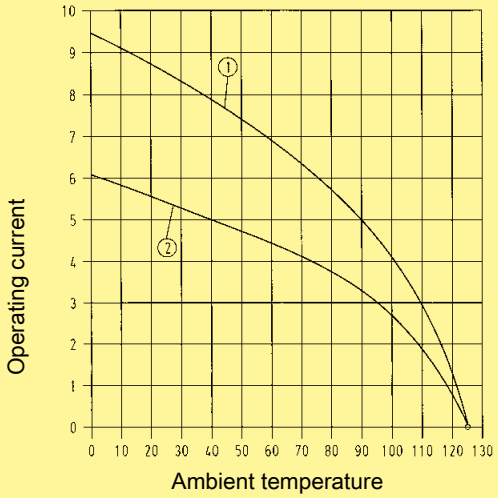
Features

- Suitable for Han D® crimp contacts
- High contact density

Current carrying capacity

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

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



① 24 B hoods/housings with 6 modules; wire gauge: 1.5 mm²

② 24 B hoods/housings with 6 modules; wire gauge: 1.0 mm²

Technical characteristics

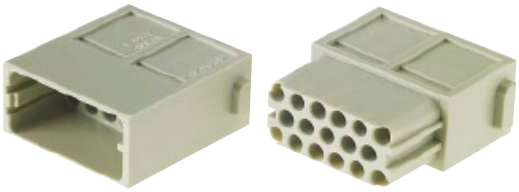
Specifications	DIN EN 60 664-1 DIN EN 61 984
Approvals	

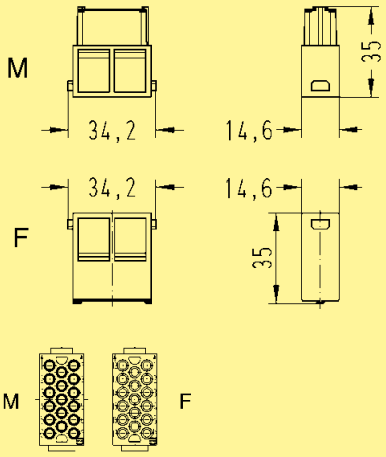
Inserts

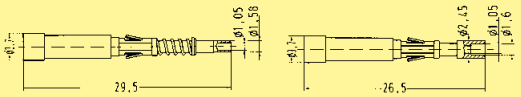
Number of contacts	17
Electrical data	
acc. to EN 61 984	**10 A 160 V 2.5 kV 3**
Rated current	10 A
Rated voltage	160 V
Rated impulse voltage	2.5 kV
Pollution degree	3
Pollution degree 2 also	10 A 250 V 4 kV 2
Rated voltage	
acc. to UL	250 V
Insulation resistance	≥ 10^{10} Ω
Material	polycarbonate
Limiting temperatures	-40 °C ... +125 °C
Flammability acc. to UL 94	V 0
Mechanical working life	
- mating cycles	≥ 500

Number of contacts

17



Identification	Part number Male insert (M)	Part number Female insert (F)	Drawing	Dimensions in mm
Crimp terminal Order crimp contacts separately	**09 14 017 3001**	**09 14 017 3101**	 Contact arrangement view from termination side	

Identification	Wire gauge (mm²)	Part number Male contact	Part number Female contact	Drawing	Dimensions in mm
F.O. contacts for 1 mm plastic fibre 		20 10 001 3211	20 10 001 3221		

Features

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

Contact arrangement

according to following matrix

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

Technical characteristics

Specifications	DIN EN 60 664-1 DIN EN 61 984
Approvals	

Inserts

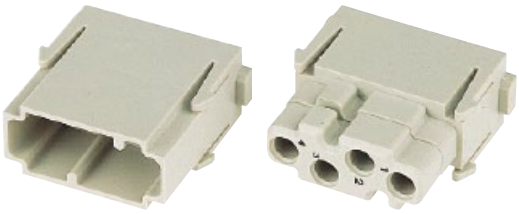
Number of contacts	4
Insulation resistance	≥ 10^{10} Ω
Material	polycarbonate
Limiting temperatures	-40 °C ... +125 °C
Flammability acc. to UL 94	V 0
Mechanical working life	
- mating cycles	≥ 500

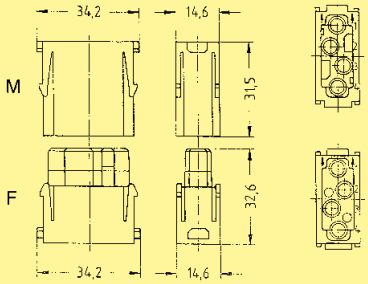
F.O. contacts

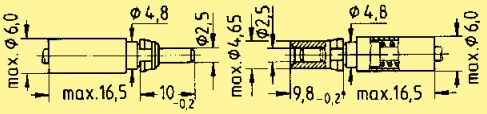
Fibre type	Glas fibre (GI)
Attenuation	< 1.5 dB
Fibre type	Polymer Optical Fibre (POF)
Attenuation	< 2.5 dB

Number of contacts

4



Identification	Part number Male insert (M)	Part number Female insert (F)	Drawing	Dimensions in mm
Multi module acc. to DIN 41 626 Order contacts separately	**09 14 004 4501**	**09 14 004 4512**	 Contact arrangement view from termination side	

Identification	Impedance	Part number		Drawing	Dimensions in mm
F.O. contacts acc. to DIN 41 626 for SI fibre (HCS® 1)) 200/230 µm		20 10 230 4211	20 10 230 4221		
 for GI fibre 50/125 µm or 62.5/125 µm ceramic ferrule		20 10 125 4212	20 10 125 4222		
for 1 mm plastic fibre		20 10 001 4211	20 10 001 4221		
with LED 650 nm		20 10 001 4231			
with receiver 5 Mbit/s		20 10 001 4232			

* HCS®=Hard Clad Silica (is registered trade mark of the SpecTran Corporation)

Features

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

Contact arrangement

according to following matrix

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

Technical characteristics

Specifications	DIN EN 60 664-1 DIN EN 61 984
Approvals	

Inserts

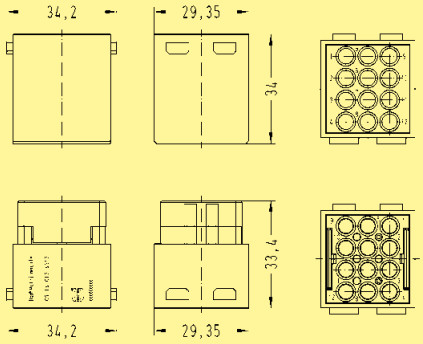
Number of contacts	12
Insulation resistance	≥ 10^{10} Ω
Material	polycarbonate
Limiting temperatures	-40 °C ... +125 °C
Flammability acc. to UL 94	V 0
Mechanical working life	
- mating cycles	≥ 500

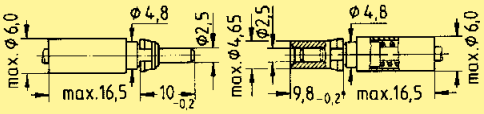
Contacts

Fibre type	Glas fibre (GI)
Attenuation	< 1.5 dB
Fibre type	Polymer Optical Fibre (POF), 1 mm
Attenuation	< 2.5 dB

Number of contacts

12

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

Identification	Impedance	Part number		Drawing	Dimensions in mm
F.O. contacts acc. to DIN 41 626 for SI fibre (HCS®) 200/230 µm		20 10 230 4211	20 10 230 4221		
 for GI fibre 50/125 µm or 62.5/125 µm ceramic ferrule		20 10 125 4212	20 10 125 4222		
for 1 mm plastic fibre		20 10 001 4211	20 10 001 4221		
with LED 650 nm		20 10 001 4231			
with receiver 5 Mbit/s		20 10 001 4232			

* HCS®=Hard Clad Silica (is registered trade mark of the SpecTran Corporation)

Features

- Suitable for SC contacts
- For GI-Fibre 50 - 62.5 / 125µm
- Using of guiding pins (male and female) is recommended (see chapter 40).

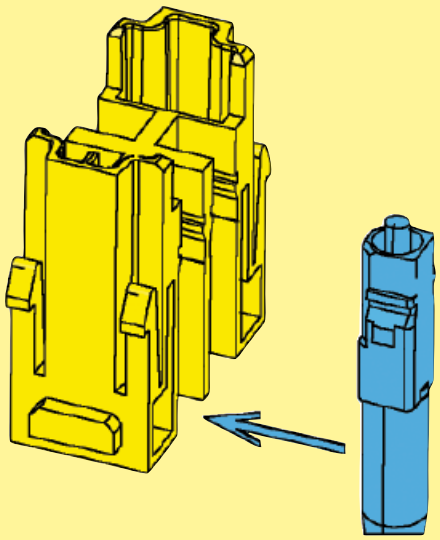
Technical characteristics

Inserts

Number of contacts	4
Insertion loss	< 0.5 dB
Material	polycarbonate
Limiting temperatures	-40 °C ... +85 °C
Flammability acc. to UL 94	V 0
Mechanical working life	
- mating cycles	≥ 500

Assembly instructions

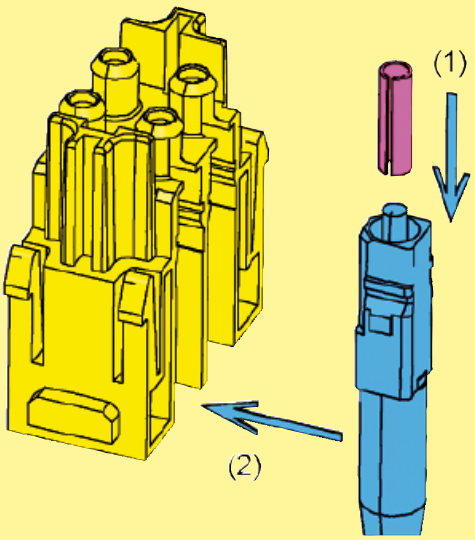
Male insert (09 14 004 4701)



Assemble the SC contact

Push the SC contact from the side into the relevant insert

Female insert (09 14 004 4711)



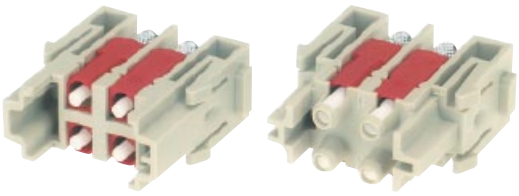
Assemble the SC contact

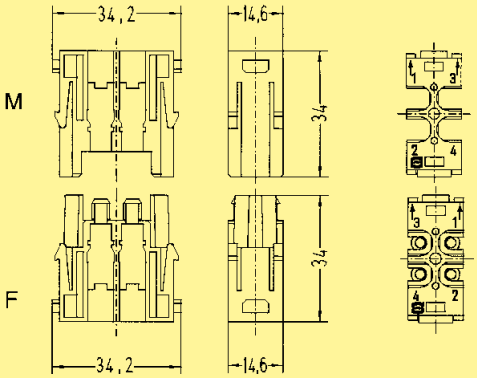
Push the centering ferrule (included in delivery) on the SC contact

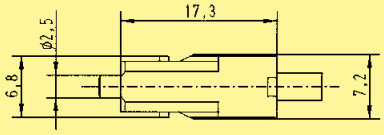
Push the SC contact from the side into the relevant insert

Number of contacts

4



Identification	Part number Male insert (M)	Part number Female insert (F)	Drawing	Dimensions in mm
SC module Order contacts separately 	**09 14 004 4701**	**09 14 004 4711***	 Contact arrangement view from termination side	

Identification	Part number Male contact	Part number Female contact	Drawing	Dimensions in mm
SC contact				
for GI fibre 50/125 µm or 62.5/125 µm ceramic ferrule 	**20 10 125 5211**			
for SI fibre (HCS®) 200/230 µm	**20 10 230 5211**			
with quick assembly technique for 1 mm POF[2)]	**20 10 001 5217**			
Crimp contacts for 1 mm POF[2)]	**20 10 001 5211**			

* The female inserts are equipped with centering ferrules. 4 ferrules are included in delivery range.
[1)] HCS®=Hard Clad Silica (is registered trade mark of the SpecTran Corporation)
[1)] POF=Polymer Optical Fibre

Stock items in bold type

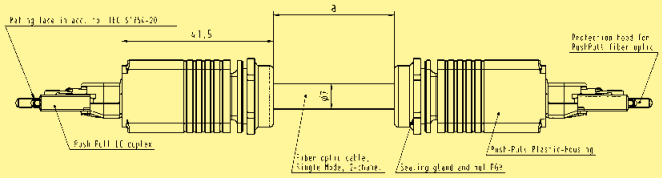
CONTENTS

Identification	Part No.	Drawing	Dimensions in mm

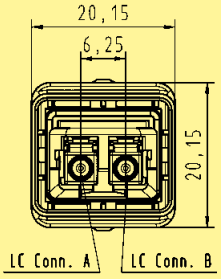
Fibre optic cable, double ended, single mode

Length: a = 1 m	33 58 211 0010 002	
a = 5 m	33 58 211 0050 002	
a = 10 m	33 58 211 0100 002	
a = 20 m	33 58 211 0200 002	
a = 40 m	33 58 211 0400 002	
a = 50 m	33 58 211 0500 002	
a = 100 m	33 58 211 1000 002	

double ended



a = length

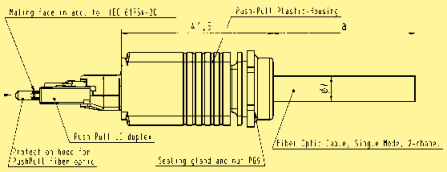


Fibre optic cable, single ended, single mode

Length: a = 1 m	33 58 111 0010 002	
a = 5 m	33 58 111 0050 002	
a = 10 m	33 58 111 0100 002	
a = 20 m	33 58 111 0200 002	
a = 40 m	33 58 111 0400 002	
a = 50 m	33 58 111 0500 002	
a = 100 m	33 58 111 1000 002	

Protection level: IP 65 / IP 67

single ended



a = length

Fibre optic breakout cable, single mode

Length: 10 m	33 58 751 0100 002	
Length: 20 m	33 58 751 0200 002	
Length: 100 m	33 58 751 1000 002	

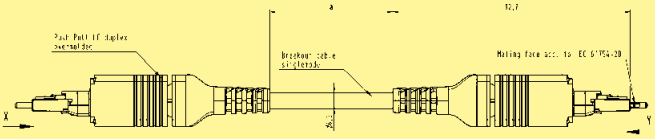
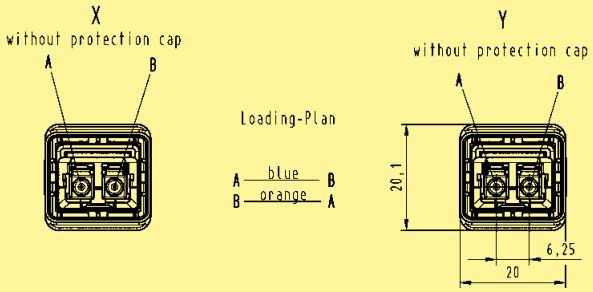
PUR jacket

2-fibre single mode

Outer diameter: 6.5 mm

Min. bending radius:
Installation: 10.4 cm
Operating: 5.2 cm

 Further cable lengths are available on request

Identification	Part No.	Drawing	Dimensions in mm
Fibre optic cable, double ended, single mode overmolded		double ended	
Length: a = 1 m	33 58 231 0010 015		
a = 5 m	33 58 231 0050 015	a = length	
a = 10 m	33 58 231 0100 015		
a = 20 m	33 58 231 0200 015		
a = 40 m	33 58 231 0400 015		
a = 50 m	33 58 231 0500 015		
a = 60 m	33 58 231 0600 015		
a = 100 m	33 58 231 1000 015		
a = 300 m	33 58 231 3000 015		
Fibre optic breakout cable, single mode			
Length: 10 m	33 58 751 0100 002	PUR jacket 2-fibre single mode Outer diameter: 6.5 mm Min. bending radius: Installation: 10.4 cm Operating: 5.2 cm	
Length: 20 m	33 58 751 0200 002		
Length: 100 m	33 58 751 1000 002		

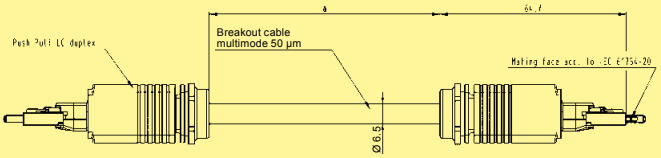
Further cable lengths are available on request

Identification	Part No.	Drawing	Dimensions in mm

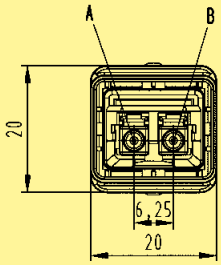
Fibre optic cable, double ended, multi mode, 50 µm

Length: a = 1 m	33 58 211 0010 004	
a = 5 m	33 58 211 0050 004	
a = 10 m	33 58 211 0100 004	
a = 20 m	33 58 211 0200 004	
a = 40 m	33 58 211 0400 004	
a = 50 m	33 58 211 0500 004	
a = 100 m	33 58 211 1000 004	

double ended



a = length

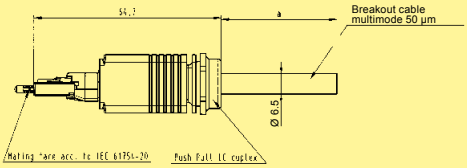


Fibre optic cable, single ended, multi mode, 50 µm

Length: a = 1 m	33 58 111 0010 004	
a = 5 m	33 58 111 0050 004	
a = 10 m	33 58 111 0100 004	
a = 20 m	33 58 111 0200 004	
a = 40 m	33 58 111 0400 004	
a = 50 m	33 58 111 0500 004	
a = 100 m	33 58 111 1000 004	

Protection level: IP 65 / IP 67

single ended



a = length

Fibre optic breakout cable , multi mode, 50 µm

Length: 10 m	33 58 751 0100 003
Length: 20 m	33 58 751 0200 003
Length: 100 m	33 58 751 1000 003

PUR jacket

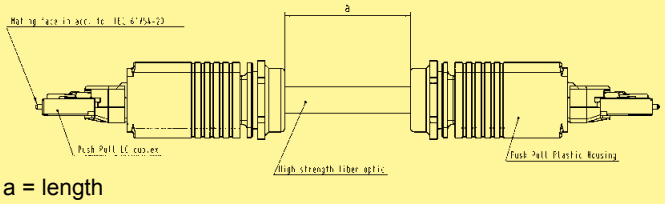
2-fibre multi mode	50 µm
Outer diameter:	6.5 mm
Min. bending radius:	
Installation:	10.4 cm
Operating:	5.2 cm

 Further cable lengths are available on request

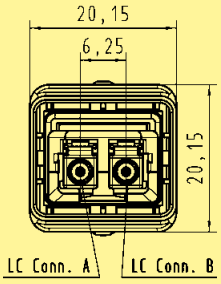
Identification	Part No.	Drawing	Dimensions in mm
Fibre optic cable, double ended, multi mode, 50 µm overmolded		double ended	
Length: a = 1 m	33 58 231 0010 017		
a = 5 m	33 58 231 0050 017		
a = 10 m	33 58 231 0100 017	a = length	
a = 20 m	33 58 231 0200 017		
a = 40 m	33 58 231 0400 017		
a = 50 m	33 58 231 0500 017		
a = 60 m	33 58 231 0600 017		
a = 100 m	33 58 231 1000 017		
a = 300 m	33 58 231 3000 017		
Fibre optic breakout cable, multi mode		PUR jacket 2-fibre multi mode 50 µm Outer diameter: 6.5 mm Min. bending radius: Installation: 10.4 cm Operating: 5.2 cm	
Length: 10 m	33 58 751 0100 003		
Length: 20 m	33 58 751 0200 003		
Length: 100 m	33 58 751 1000 003		

Further cable lengths are available on request

Identification	Part No.	Drawing	Dimensions in mm
Fibre optic cable, double ended, multi mode, 62.5 µm		double ended	
Length: a = 1 m	33 58 211 0010 001		
a = 5 m	33 58 211 0050 001		
a = 10 m	33 58 211 0100 001		
a = 20 m	33 58 211 0200 001		
a = 40 m	33 58 211 0400 001		
a = 50 m	33 58 211 0500 001		
a = 100 m	33 58 211 1000 001		
Fibre optic cable, single ended, multi mode, 62.5 µm			
Length: a = 1 m	33 58 111 0010 001		
a = 5 m	33 58 111 0050 001		
a = 10 m	33 58 111 0100 001		
a = 20 m	33 58 111 0200 001		
a = 40 m	33 58 111 0400 001		
a = 50 m	33 58 111 0500 001		
a = 100 m	33 58 111 1000 001		
Fibre optic breakout cable, multi mode, 62.5 µm			
Length: 10 m	33 58 751 0100 001		
Length: 20 m	33 58 751 0200 001		
Length: 100 m	33 58 751 1000 001		

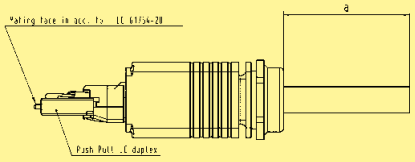


a = length



Protection level: IP 65 / IP 67

single ended



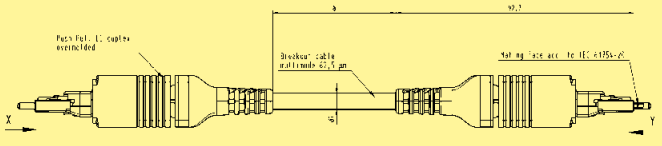
a = length

PUR jacket

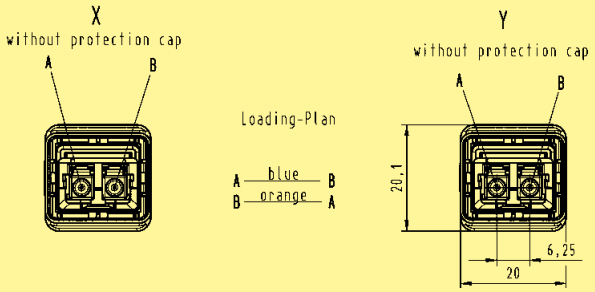
2-fibre multi mode	62.5 µm
Outer diameter:	7 mm
Min. bending radius:	
Installation:	10.5 cm
Operating:	7.0 cm

 Further cable lengths are available on request

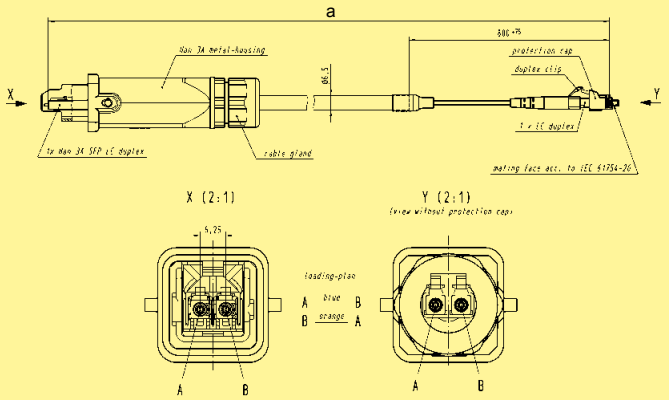
Identification	Part No.	Drawing	Dimensions in mm
Fibre optic cable, double ended, multi mode, 62.5 µm overmolded		double ended	
Length: a = 1 m	33 58 231 0010 016		
a = 5 m	33 58 231 0050 016		
a = 10 m	33 58 231 0100 016		
a = 20 m	33 58 231 0200 016		
a = 40 m	33 58 231 0400 016		
a = 50 m	33 58 231 0500 016		
a = 60 m	33 58 231 0600 016		
a = 100 m	33 58 231 1000 016		
a = 300 m	33 58 231 3000 016		
Fibre optic breakout cable, multi mode, 62.5 µm			
Length: 10 m	33 58 751 0100 001	PUR jacket 2-fibre multi mode 62.5 µm Outer diameter: 7 mm Min. bending radius: Installation: 10.5 cm Operating: 7.0 cm	
Length: 20 m	33 58 751 0200 001		
Length: 100 m	33 58 751 1000 001		



a = length



Identification	Part No.	Drawing	Dimensions in mm
Fibre optic cable, double ended, single mode Han® SFP LC duplex to LC duplex		double ended	
Length: a = 1.0 m	33 54 451 0010 010		
a = 2.0 m	33 54 451 0020 010		
a = 5.0 m	33 54 451 0050 010		
a = 10.0 m	33 54 451 0100 010		
a = 15.0 m	33 54 451 0150 010		
a = 20.0 m	33 54 451 0200 010		
Fibre optic cable, double ended, multi mode 50/125 µm Han® SFP LC duplex to LC duplex			
Length: a = 1.0 m	33 54 451 0010 012		
a = 2.0 m	33 54 451 0020 012		
a = 5.0 m	33 54 451 0050 012		
a = 10.0 m	33 54 451 0100 012		
a = 15.0 m	33 54 451 0150 012		
a = 20.0 m	33 54 451 0200 012		
Fibre optic cable, double ended, multi mode 62.5/125 µm Han® SFP LC duplex to LC duplex			
Length: a = 1.0 m	33 54 451 0010 007		
a = 2.0 m	33 54 451 0020 007		
a = 5.0 m	33 54 451 0050 007		
a = 10.0 m	33 54 451 0100 007		
a = 15.0 m	33 54 451 0150 007		
a = 20.0 m	33 54 451 0200 007		



a = length

Further cable lengths are available on request
Further fibre optic connectors are available on request

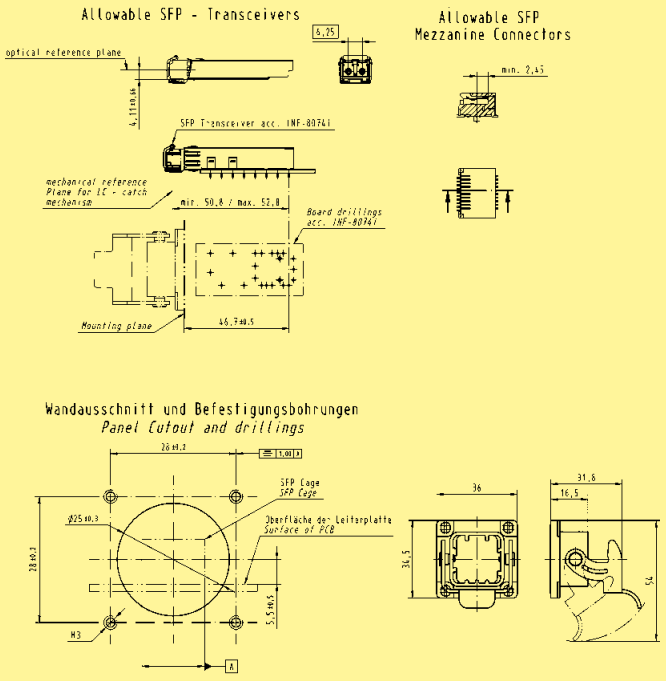
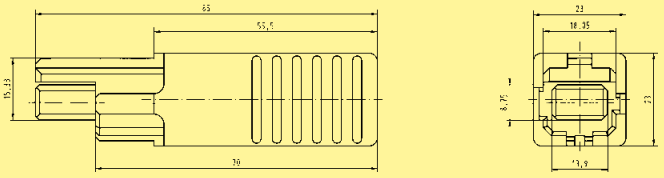
Han® SFP

Advantages

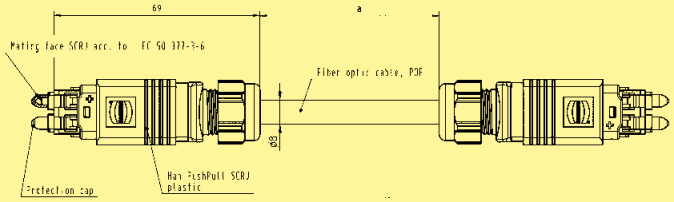
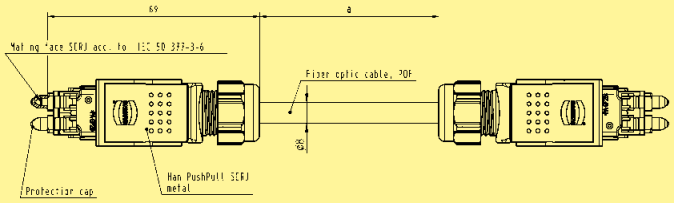
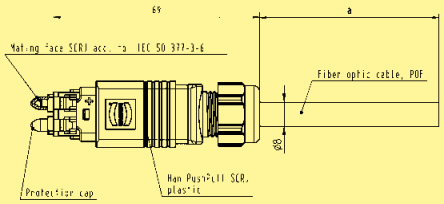
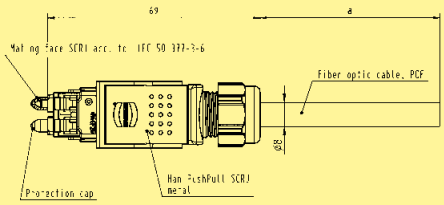
- For blind mating on various optical SFP transceivers
- Direct compensation of largest transceiver tolerances
- Direct connection to SFP transceivers
- Mechanical keying – no mismatching possible

Technical characteristics

Degree of protection	IP 65 / IP 67
Mating face	LC acc. to IEC 61 754-20
Mating cycles	50
Temperature range	-40 °C … +85 °C
Housing material	Zinc die-cast, powder coating black
Glas optical fibre	Single mode, multi mode 50/125 and multi mode 62.5/125

Identification	Part No.	Drawing	Dimensions in mm
Han® SFP Receptacle housing device side	09 57 474 0500 001		
Assembly aid	09 57 000 0000 200		

Han® PushPull SCRJ

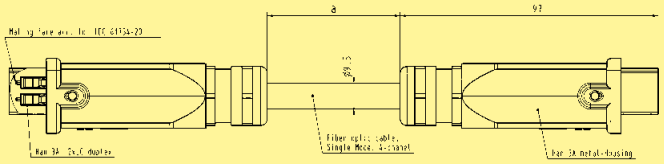
Identification	Part No.	Drawing	Dimensions in mm
Han® PushPull SCRJ double ended Hood: plastic with top entry Cable: POF, multi mode, 980/1000 µm, PROFINET type C Length: a = 1 m a = 2 m a = 5 m a = 10 m a = 20 m	 33 53 211 0010 001 33 53 211 0020 001 33 53 211 0050 001 33 53 211 0100 001 33 53 211 0200 001		
Han® PushPull SCRJ double ended Hood: metal with top entry Cable: POF, multi mode, 980/1000 µm, PROFINET type C Length: a = 1 m a = 2 m a = 5 m a = 10 m a = 20 m	 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 single ended Hood: plastic with top entry Cable: POF, multi mode, 980/1000 µm, PROFINET type C Length: a = 1 m a = 2 m a = 5 m a = 10 m a = 20 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		
Han® PushPull SCRJ single ended Hood: metal with top entry Cable: POF, multi mode, 980/1000 µm, PROFINET type C Length: a = 1 m a = 2 m a = 5 m a = 10 m a = 20 m	 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		

Identification	Part No.	Drawing	Dimensions in mm

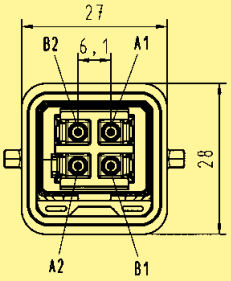
Fibre optic cable, double ended, single mode, metal
2 x Han® 3 A, 2 x LC duplex

Length: a = 1 m	33 54 211 0010 001	
a = 5 m	33 54 211 0050 001	
a = 10 m	33 54 211 0100 001	
a = 20 m	33 54 211 0200 001	
a = 40 m	33 54 211 0400 001	
a = 50 m	33 54 211 0500 001	
a = 100 m	33 54 211 1000 001	

double ended



a = length

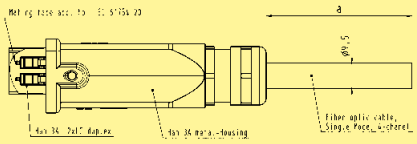


Fibre optic cable, single ended, single mode, metal
1 x Han® 3 A, 2 x LC duplex

Length: a = 1 m	33 54 111 0010 001	
a = 5 m	33 54 111 0050 001	
a = 10 m	33 54 111 0100 001	
a = 20 m	33 54 111 0200 001	
a = 40 m	33 54 111 0400 001	
a = 50 m	33 54 111 0500 001	
a = 100 m	33 54 111 1000 001	

Protection level: IP 65 / IP 67

single ended



a = length

Fibre optic breakout cable, single mode

Length: 10 m	33 54 751 0100 001
Length: 20 m	33 54 751 0200 001
Length: 100 m	33 54 751 1000 001

PVC jacket
4-fibre single mode
Outer diameter: 9.5 mm
Min. bending radius:
Installation: 15 x OD
Operating: 10 x OD

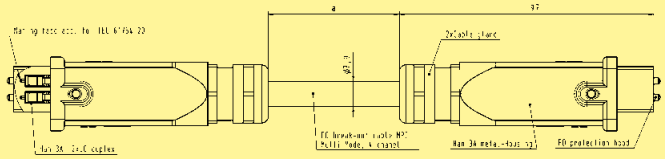
Further cable lengths are available on request

Identification	Part No.	Drawing	Dimensions in mm

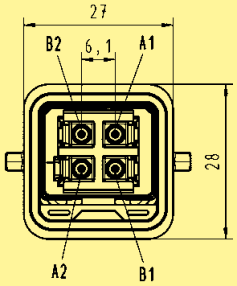
Fibre optic cable, double ended, multi mode, metal, 50 µm
2 x Han® 3 A, 2 x LC duplex

Length: a = 1 m	33 54 211 0010 002	
a = 5 m	33 54 211 0050 002	
a = 10 m	33 54 211 0100 002	
a = 20 m	33 54 211 0200 002	
a = 40 m	33 54 211 0400 002	
a = 50 m	33 54 211 0500 002	
a = 100 m	33 54 211 1000 002	

double ended



a = length

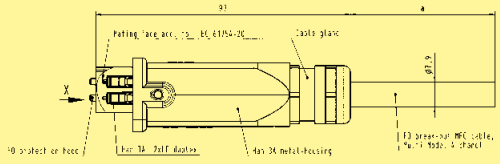


Fibre optic cable, single ended, multi mode, metal, 50 µm
1 x Han® 3 A, 2 x LC duplex

Length: a = 1 m	33 54 111 0010 002	
a = 5 m	33 54 111 0050 002	
a = 10 m	33 54 111 0100 002	
a = 20 m	33 54 111 0200 002	
a = 40 m	33 54 111 0400 002	
a = 50 m	33 54 111 0500 002	
a = 100 m	33 54 111 1000 002	

Protection level: IP 65 / IP 67

single ended



a = length

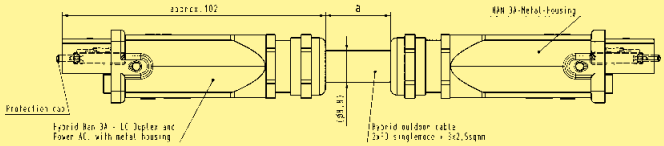
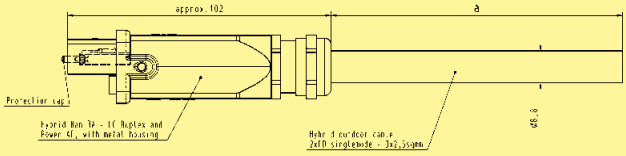
Fibre optic breakout cable , multi mode, 50 µm

Length: 10 m	33 54 751 0100 002
Length: 20 m	33 54 751 0200 002
Length: 100 m	33 54 751 1000 002

FRNC jacket

4-fibre multi mode	50 µm
Outer diameter:	7.9 mm
Min. bending radius:	
Installation:	9.8 cm
Operating:	7.9 cm

 Further cable lengths are available on request

Identification			Part No.	Drawing	Dimensions in mm
Hybrid fibre optic cable, single mode, double ended 2 x FO + 3 x 2.5 mm², 2 x Han® 3 A				double ended	
Length:	a = 1 m	AC version	33 57 211 0015 003		
		DC version	33 57 211 0015 004		
	a = 5 m	AC version	33 57 211 0055 003		
		DC version	33 57 211 0055 004	a = length	
	a = 10 m	AC version	33 57 211 0105 003		
		DC version	33 57 211 0105 004		
	a = 20 m	AC version	33 57 211 0205 003		
		DC version	33 57 211 0205 004		
	a = 40 m	AC version	33 57 211 0405 003		
		DC version	33 57 211 0405 004		
	a = 50 m	AC version	33 57 211 0505 003		
		DC version	33 57 211 0505 004	Protection level: IP 65 / IP 67	
	a = 100 m	AC version	33 57 211 1005 003		
		DC version	33 57 211 1005 004		
Hybrid fibre optic cable, single mode, single ended 2 x FO + 3 x 2.5 mm², 1 x Han® 3 A				single ended	
Length:	a = 1 m	AC version	33 57 111 0015 003		
		DC version	33 57 111 0015 004		
	a = 5 m	AC version	33 57 111 0055 003		
		DC version	33 57 111 0055 004	a = length	
	a = 10 m	AC version	33 57 111 0105 003		
		DC version	33 57 111 0105 004		
	a = 20 m	AC version	33 57 111 0205 003		
		DC version	33 57 111 0205 004		
	a = 40 m	AC version	33 57 111 0405 003		
		DC version	33 57 111 0405 004		
	a = 50 m	AC version	33 57 111 0505 003		
		DC version	33 57 111 0505 004		
	a = 100 m	AC version	33 57 111 1005 003		
		DC version	33 57 111 1005 004		
Hybrid fibre optic cable, single mode					
	Length: 10 m		33 57 851 0100 003	PVC jacket	
	Length: 20 m		33 57 851 0200 003	2 x 9/125 + 3 x 2.5 mm²	
	Length: 500 m		33 57 851 5000 003	Outer diameter: 8.8 mm	
				Min. bending radius: Installation: 9 cm Operating: 18 cm	

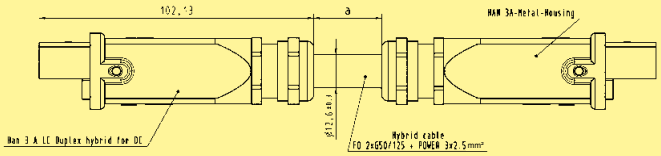
Further cable lengths are available on request

Identification	Part No.	Drawing	Dimensions in mm

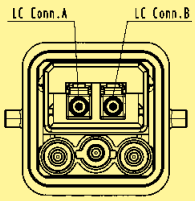
Hybrid fibre optic cable, multi mode, double ended 2 x G50/125 + 3 x 2.5 mm²

Length: a = 1 m	AC version	33 57 211 0015 001	
	DC version	33 57 211 0015 002	
a = 5 m	AC version	33 57 211 0055 001	
	DC version	33 57 211 0055 002	
a = 10 m	AC version	33 57 211 0105 001	
	DC version	33 57 211 0105 002	
a = 20 m	AC version	33 57 211 0205 001	
	DC version	33 57 211 0205 002	
a = 40 m	AC version	33 57 211 0405 001	
	DC version	33 57 211 0405 002	
a = 50 m	AC version	33 57 211 0505 001	
	DC version	33 57 211 0505 002	
a = 100 m	AC version	33 57 211 1005 001	
	DC version	33 57 211 1005 002	

double ended



a = length

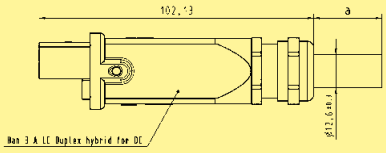


Protection level: IP 65 / IP 67

Hybrid fibre optic cable, multi mode, single ended 2 x G50/125 + 3 x 2.5 mm²

Length: a = 1 m	AC version	33 57 111 0015 001	
	DC version	33 57 111 0015 002	
a = 5 m	AC version	33 57 111 0055 001	
	DC version	33 57 111 0055 002	
a = 10 m	AC version	33 57 111 0105 001	
	DC version	33 57 111 0105 002	
a = 20 m	AC version	33 57 111 0205 001	
	DC version	33 57 111 0205 002	
a = 40 m	AC version	33 57 111 0405 001	
	DC version	33 57 111 0405 002	
a = 50 m	AC version	33 57 111 0505 001	
	DC version	33 57 111 0505 002	
a = 100 m	AC version	33 57 111 1005 001	
	DC version	33 57 111 1005 002	

single ended



a = length

Hybrid fibre optic cable, multi mode, 50 µm

Length: 10 m	33 57 851 0100 002	
Length: 20 m	33 57 851 0200 002	
Length: 500 m	33 57 851 5000 002	

PVC jacket

2 x G50/125 + 3 x 2.5 mm²

Outer diameter: 12.6 mm

Min. bending radius:
single: 5 x OD
repeated: 10 x OD

HARTING PushPull LC duplex

HARTING PushPull type acc. to IEC 61 076-3-106 variant 4
LC duplex panel feed-through and connector

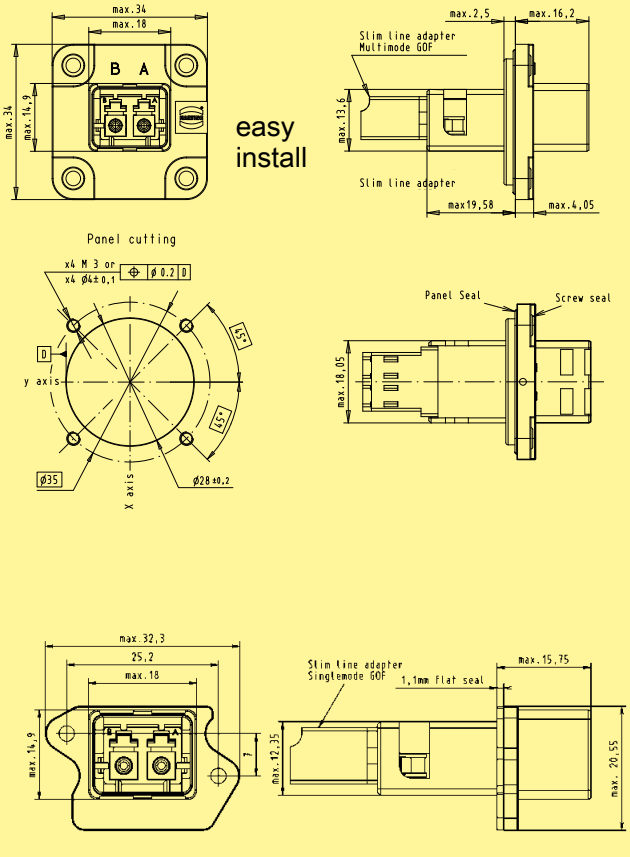
Advantages

- Optical PushPull connector based on LC with small form factor (requires 50 % compared to SC and ST)
- EasyInstall and Compact panel feed-through for simple device integration
- 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

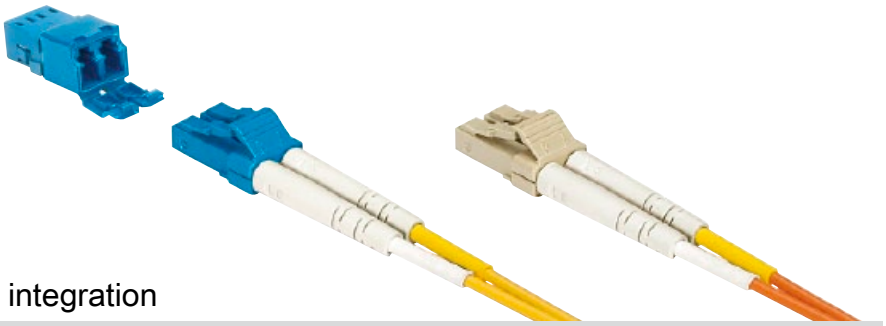
Technical characteristics

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
Mating cycles	min. 200
Temperature range	-40 °C … +70 °C
Housing material	Plastic, black
Flammability acc. to UL 94	V 0

Identification	Part No.	Drawing	Dimensions in mm
HARTING PushPull LC duplex			
Device side EasyInstall version			
Multimode GOF	09 57 441 0500 000		
	09 57 468 0500 000 (metal version)		
Singlemode GOF	09 57 441 0501 000		
	09 57 468 0501 000 (metal version)		
Device side Compact version			
Multimode GOF	09 57 442 0502 001		
Singlemode GOF	09 57 442 0503 001		



HARTING PushPull LC duplex



LC duplex IP 20 adapter for device integration

Advantages

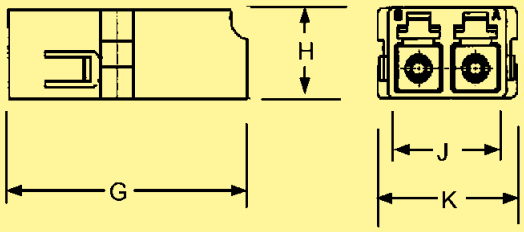
- Small form factor requires 50 % (compared to SC and ST)
- Compact, space-saving design
- High packing density
- A & B parts identification according TIA 568 standard
- Complement adapter for IP 67 connector on device side

Technical characteristics

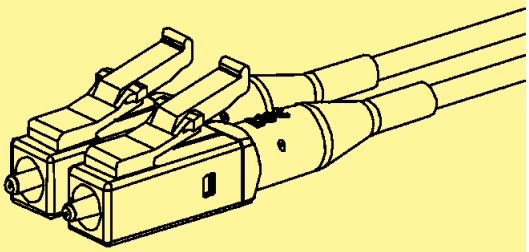
Degree of protection	IP 20
Mating interface	LC duplex with two fibres
Temperature range	-40 °C … +70 °C

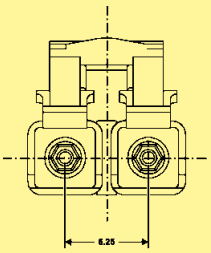
Identification	Part No.
Device side	
Adapter	
Multimode GOF	09 57 400 0003 000
Singlemode GOF	09 57 400 0004 000
Connector LC duplex	
Multimode GOF	09 57 400 0001 000
Singlemode GOF	09 57 400 0002 000

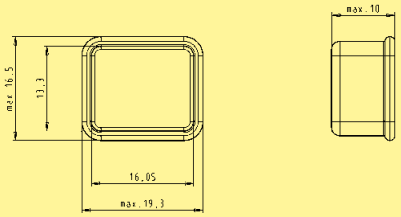
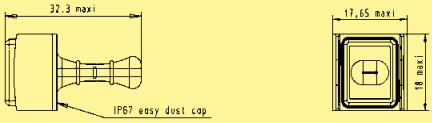
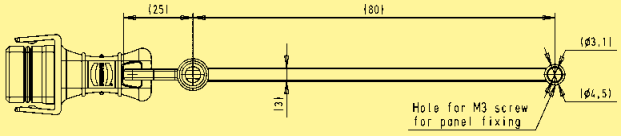
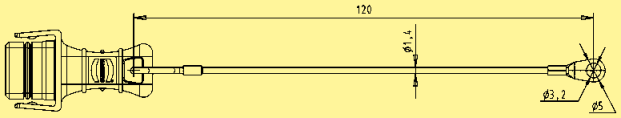
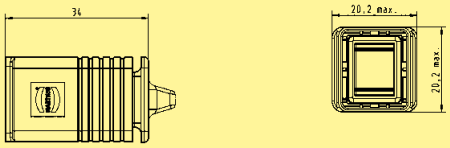
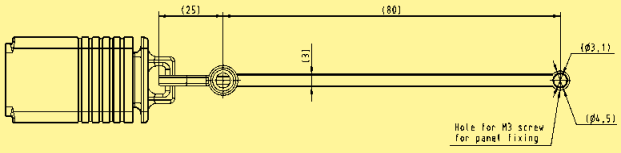
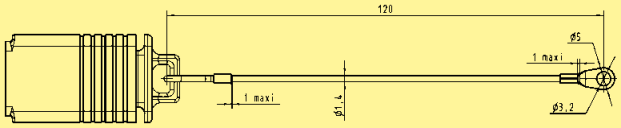
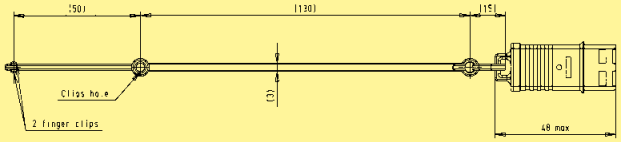
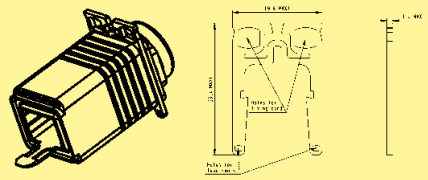
Drawing — Dimensions in mm



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





Identification	Part No.	Drawing	Dimensions in mm
Transport protecion for device side IP 40	09 45 845 0003		
Protection cover for device side IP 65 / IP 67			
Version with passive locking without cord	09 45 845 0009 024		
Version with passive locking with plastic cord for fixing screw M3	09 45 845 0009		
Version with passive locking with nylon cord for fixing screw M2.5 / M3	09 45 845 0011 024		
Version with active locking without cord	09 45 845 0015		
Version with active locking with plastic cord for fixing screw M3	09 45 845 0014		
Version with active locking with nylon cord for fixing screw M2.5 / M3	09 45 845 0013		
Protection cover for connectors IP 65 / IP 67	09 45 845 0010		
Security clip for connectors can be sealed and protects against unauthorized unplugging	09 45 845 0020		

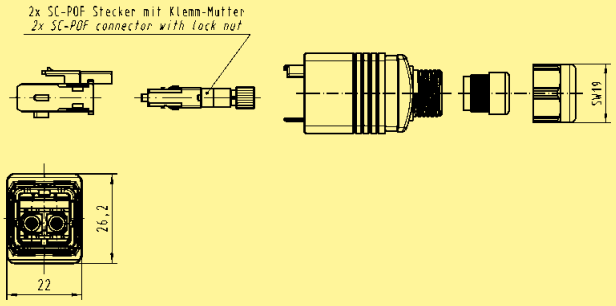
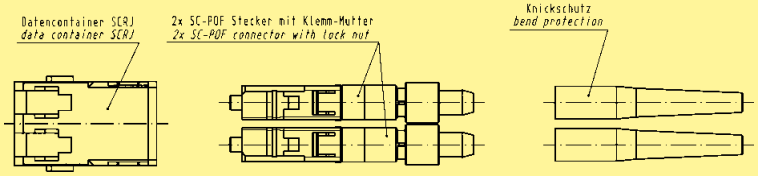
Han® PushPull, type acc. to IEC 61 076-3-117 variant 14
SCRJ connector

Features

- HARTING PushPull technology
- Compact design
- High packing density
- Han® PushPull SCRJ for POF is according the requirements of AIDA (German Domestic Automobile Manufacturers)
- Field installable

Technical characteristics

Locking	PushPull technology
Degree of protection	IP 65 / IP 67
Mating face	SCRJ acc. to IEC 61 754-24
Fiber Typen	POF[1)] 1 mm
	HCS®[2)] 200 µm / 230 µm
	MM 62.5 µm / 125 µm
	MM 50 µm / 125 µm
	SM 10 µm / 125 µm
Mating cycles	min. 750
Temperature range	-40 °C ... +70 °C
Housing material	Plastic, black
Flammability acc. to UL 94	V 0
Cable diameter	6.5 - 9.5 mm

Identification	Part No.	Drawing	Dimensions in mm
Connector set, plastic incl. housing and SCRJ insert, POF contacts	09 35 241 0421		
PROFINET-Identification: PROFINET O-Plug SCRJ incl. housing and SCRJ insert SC contacts order separately	09 35 241 0422		
SCRJ IP 20 POF connector	09 35 002 4002		
Dust protection cover IP 40	09 35 002 5412		
Protection cover IP 65 / IP 67	09 35 002 5411		
Contacts			
SC POF contact, 1 mm	20 10 001 5217		
SC 125 GI contact	20 10 125 5211		
SC 230 HCS contact	20 10 230 5211		

Tooling see page 70

Han® PushPull, type acc. to IEC 61 076-3-117 variant 14
Housing bulkhead mounting for device integration
Optical connector based on SCRJ

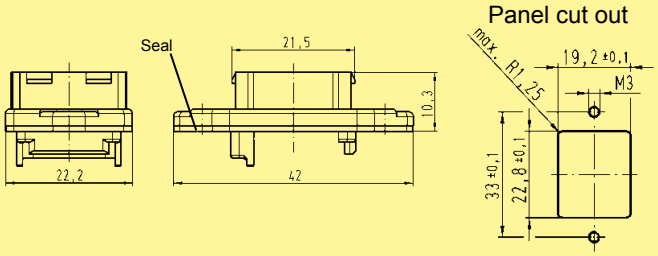
Features

- HARTING PushPull technology
- Compact design
- High packing density
- Device integration via transceiver
- Han® PushPull SCRJ for POF is according the requirements of AIDA (German Domestic Automobile Manufacturers)

Technical characteristics

Locking	PushPull technology
Degree of protection	IP 65 / IP 67
Mating face	SCRJ acc. to IEC 61 754-24
Fiber Typen	POF[1] 1 mm
	HCS®[2] 200 µm / 230 µm
	MM 62.5 µm / 125 µm
	MM 50 µm / 125 µm
	SM 10 µm / 125 µm
Mating cycles	min. 750
Temperature range	-40 °C ... +70 °C
Housing material	Zinc die-cast, nickel plated

Identification	Part No.	Drawing	Dimensions in mm
Components device side			
Housing bulkhead mounting Optical transceiver not included			
metal	09 35 002 0303		
Dust protection cover IP 40 rubber (NBR)	09 35 002 5401		
Protection cover IP 65 / IP 67	09 35 002 5402		
Reference for transceiver as well as mounting instruction on request			



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

Han® PushPull, type acc. to IEC 61 076-3-117 variant 14
RJ45 panel feed through
for optical connector based on SCRJ

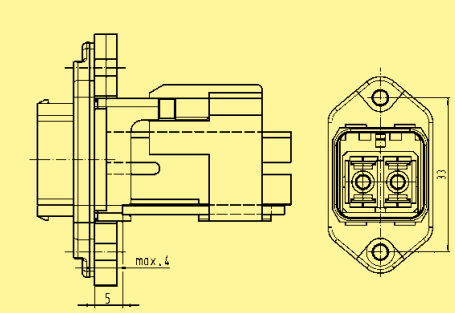
Features

- HARTING PushPull technology
- Compact design
- High packing density
- Han® PushPull SCRJ for POF is according the requirements of AIDA (German Domestic Automobile Manufacturers)

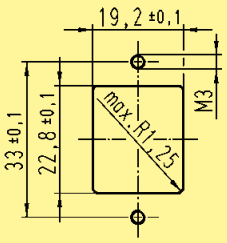
Technical characteristics

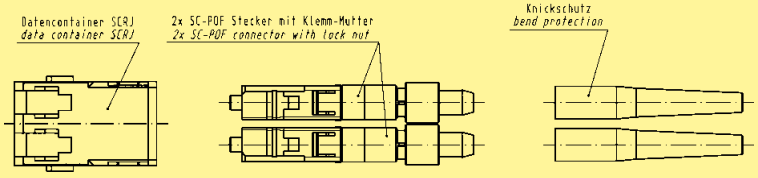
Locking	PushPull technology
Degree of protection	IP 65 / IP 67
Mating face	SCRJ acc. to IEC 61 754-24
Fiber Typen	POF[1)] 1 mm
	HCS®[2)] 200 µm / 230 µm
	MM 62.5 µm / 125 µm
	MM 50 µm / 125 µm
	SM 10 µm / 125 µm
Mating cycles	min. 750
Temperature range	-40 °C ... +70 °C
Housing material	Zinc die-cast, nickel plated

Identification	Part No.	Drawing	Dimensions in mm
Han® PushPull SCRJ			
Panel feed through	09 35 242 0313		
SC contacts order separately			
SCRJ IP 20 POF connector	09 35 002 4002		
Contacts			
SC POF contact, 1 mm	20 10 001 5217		
SC 125 GI contact	20 10 125 5211		
SC 230 HCS contact	20 10 230 5211		



Panel cut out





Han® PushPull, type acc. to IEC 61 076-3-117 variant 14
SCRJ connector

Features

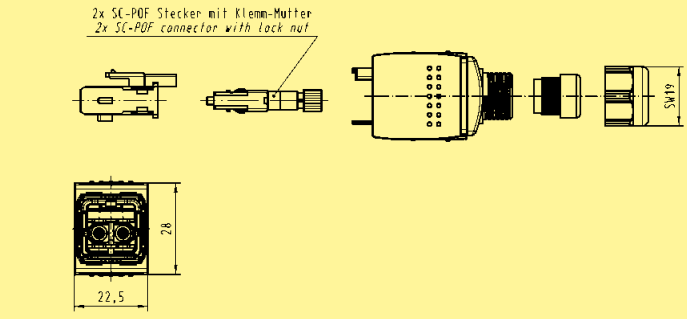
- HARTING PushPull technology
- Compact design
- High packing density
- Han® PushPull SCRJ for POF is according the requirements of AIDA (German Domestic Automobile Manufacturers)
- Field installable

Technical characteristics

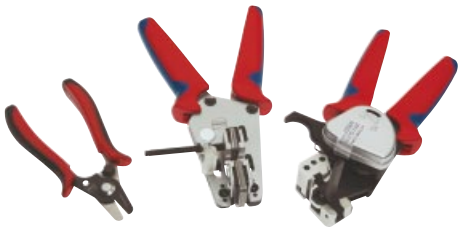
Locking	PushPull technology
Degree of protection	IP 65 / IP 67
Mating face	SCRJ acc. to IEC 61 754-24
Fiber Typen	POF[1)] 1 mm
	HCS®[2)] 200 µm / 230 µm
	MM 62.5 µm / 125 µm
	MM 50 µm / 125 µm
	SM 10 µm / 125 µm
Mating cycles	min. 750
Temperature range	-40 °C ... +70 °C
Housing material	Zinc die-cast, nickel plated
Flammability acc. to UL 94	V 0
Cable diameter	6.5 - 9.5 mm

Identification	Part No.
Connector set, metal incl. housing and SCRJ insert, POF contacts	09 35 241 0401
PROFINET-Identification: PROFINET O-Plug SCRJ incl. housing and SCRJ insert SC contacts order separately	09 35 241 0402
SCRJ IP 20 POF connector	09 35 002 4002
Dust protection cover IP 40	09 35 002 5412
Protection cover IP 65 / IP 67	09 35 002 5411
Contacts	
SC POF contact, 1 mm	20 10 001 5217
SC 125 GI contact	20 10 125 5211
SC 230 HCS contact	20 10 230 5211

Drawing — Dimensions in mm



Tooling see page 70



Han® PushPull SCRJ POF
Assembly tools for polymer-optical fibres

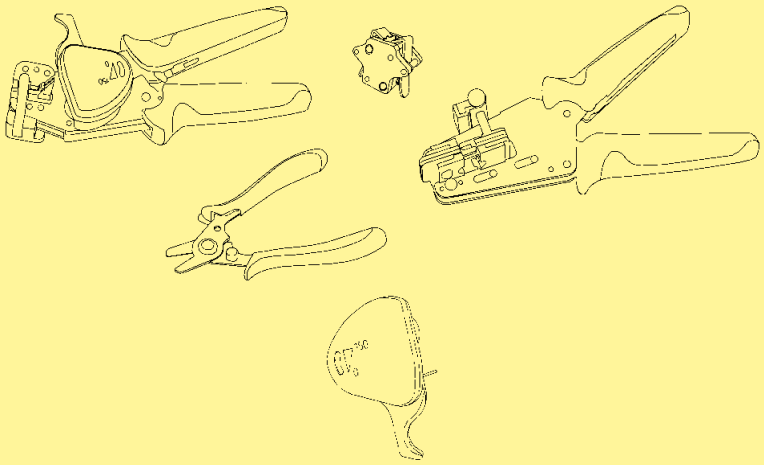
Features

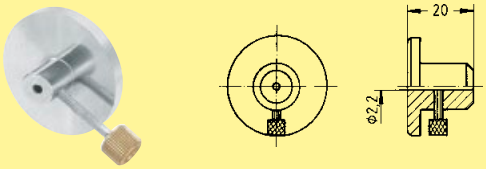
- Cable insulation (PUR / PVC) is stripped without damage
- The ‘stripping’ and ‘precision cutting’ operations are completed within the one tool
- Specialized cutting method with an automatically advancing round blade for an accurate cutting result requiring no final polishing
- Optical display indicating remaining operations
- Simultaneous handling of twin fibers (duplex mode)

Technical characteristics

Connector type	SCRJ connector acc. to IEC 61 754-24
Locking	PushPull technology acc. to IEC 61 076-3-117 variant 14 (AIDA compliant)
Insertion loss	typically 1.5 to 2.0 dB
Termination SC contacts	Fast termination technique, reusable
Fibre dimensions	POF 980 / 1000 µm
Fibre outer diameter	2.2 mm
Cable outer diameter	7 to 8.5 mm
No. of cutting operations	Maximum 1260

Identification	Part No.	Drawing	Dimensions in mm
Assembly tool set for POF cutting, without final polishing			
The set contains - one stripping and cutting tool for 1260 operations - one sheath stripping tool - one Kevlar shear - one positioner for SCRJ contacts Supplied in a robust plastic case	09 35 000 9913		
Replacement cutting tool for 1260 operations	09 35 000 9914		
Assembly tool set for POF cutting, with final polishing			
Without an optical meter	20 99 000 3016		
With an optical meter	20 99 000 3013		
Polishing wheel (grinding wheel) for POF cables 2.2	20 99 000 1099		
Sand paper for POF, grain size 1000	20 80 001 9911		





Han® 3 A 2 x LC duplex

Han® 3 A 2 x LC duplex

Advantages

- Compact, space-saving Design
- Just one LWL modul for high mechanical load
- High packing density
- A & B parts identification according to TIA 568 standard

Technical characteristics

Degree of protection	IP 65 / IP 67
Temperature range	-40 °C … +70 °C
Housing material	Zinc die-cast powder coating black

Identification	Part No.	Drawing	Dimensions in mm
Components device side			
Multimode GOF	09 57 467 0004 000		
Singlemode GOF	09 57 467 0005 000		
Connector			
Multimode GOF	09 57 407 0001 000		
Singlemode GOF	09 57 407 0002 000		

Han® 3 A LC duplex Hybrid

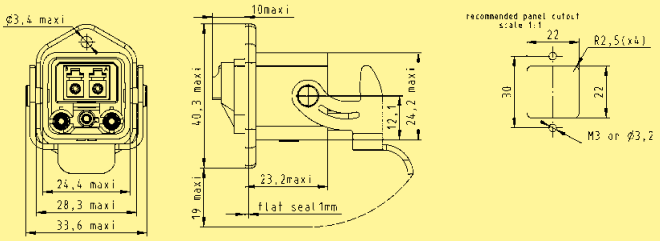
Advantages

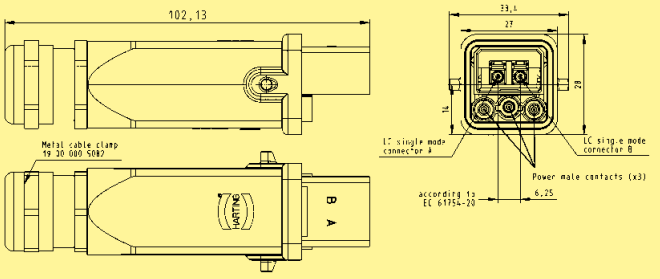
- Small form factor (compared to SC and ST®)
- Compact, space-saving Design
- Combined to only one LWL-module for high mechanical load
- High packing density
- A & B partsidentification according to TIA 568 standard

Technical characteristics

Degree of protection	IP 65 / IP 67
Temperature range	-40 °C … +70 °C
Data	
Mating module	LC duplex (2 fibres)
Cable diameter	6.0 … 9.0 mm
Power	
Number of contacts	3 (AC: L1, PE, N / DC: V+, GND, V-)
Working voltage	300 V AC/DC
Working current	12 A @ 70°C
Number of contacts	3 (AC: L1, PE, N / DC: V+, GND, V-)
Housing material	Aluminium die-cast, black

Identification		Part No.	Drawing	Dimensions in mm
Components device side				
Power: 3x Han D® male contacts				
Data: Multimode GOF	AC	09 57 568 0500 000		
	DC	09 57 568 0510 000		
Data: Singlemode GOF	AC	09 57 568 0501 000		
	DC	09 57 568 0511 000		
Connector				
Power: 3x Han D® female contacts				
Data: Multimode GOF	AC	09 57 508 0500 000		
	DC	09 57 508 0510 000		
Data: Singlemode GOF	AC	09 57 508 0501 000		
	DC	09 57 508 0511 000		





CONTENTS PAGE

Features

Advantages of the HARTING quick-assembly technique:

- No special tools necessary
- Quick, cost-effective assembly
- No crimping, no glueing
- Fixed connection due to metallic type
- Suitable for 1 mm polymer fibre
  2.2 mm jacket

Technical characteristics

Assembly of the single connectors:

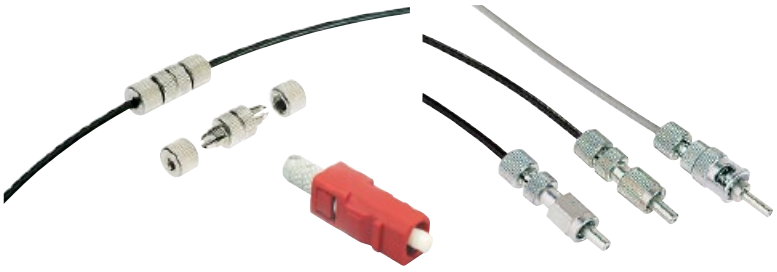
- Cut the cable
- Strip the jacket
- Insert of the fibre
- Tighten the sleeve nut
- Polish the connector's tip

Assembly of the coupling sleeve:

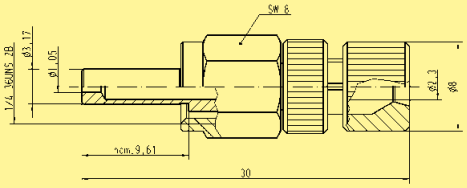
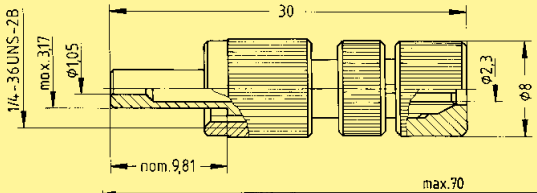
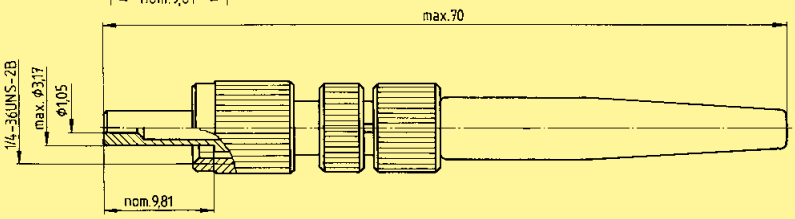
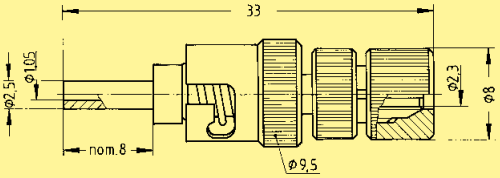
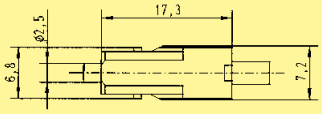
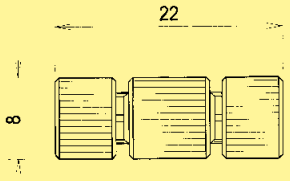
- Cut the cable's ends
- Insert in the coupling sleeve
- Tighten the sleeve nut

1) POF = Polymer Optical Fibre

Quick-assembly Connector for 1 mm POF[1)]

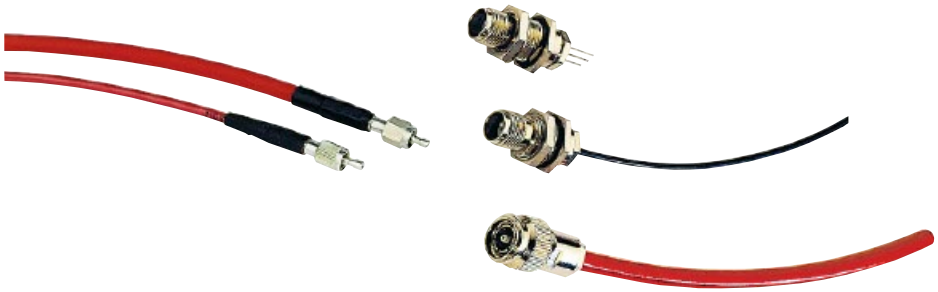


Quick-assembly connector
for polymer fibre (POF[1)])

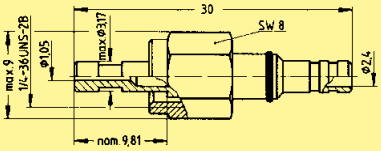
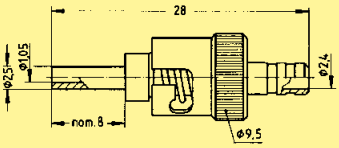
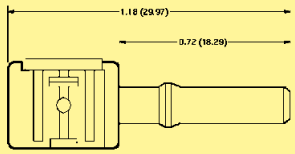
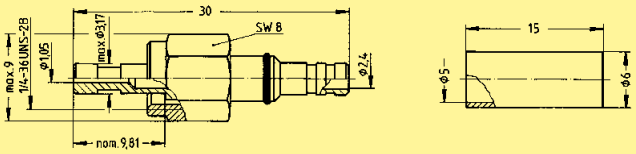
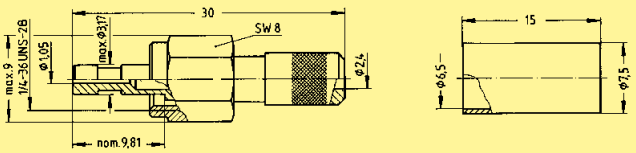
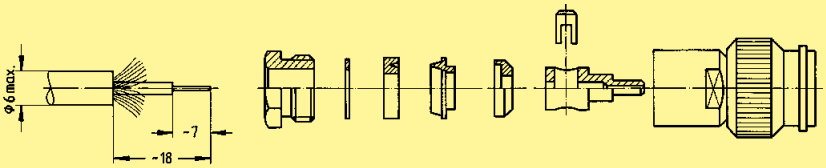
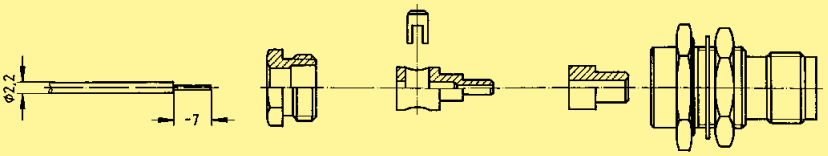
Identification	Part number	Drawing	Dimensions in mm
Quick-assembly connector for 1 mm polymer fibre cable ∅ 2.2 mm			
F-SMA type with hexagonal nut bending - without protection	20 10 001 1212		
with knurled nut bending - without protection	20 10 001 1215		
with bend protection sleeve	20 10 001 1217		
F-ST type - without protection	20 10 001 2212		
SC contact	20 10 001 5217 20 10 001 5218		
Coupling sleeve or 1 mm polymer fibre cable Ø 2.2 mm			
Standard-Set	20 80 000 1065	Delivery range: 4 x quick assembly cable coupler 1 x cutter	
Standard-Set	20 80 000 1066	10 x quick assembly cable coupler	

[1)] POF = Polymer Optical Fibre

Single Connectors for 1 mm POF[1)]



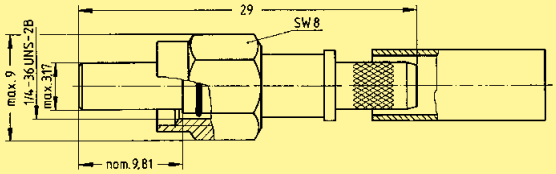
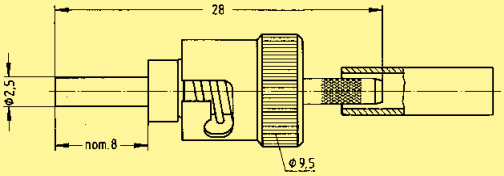
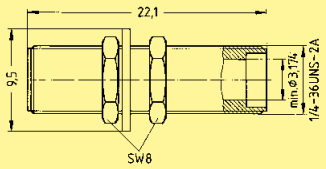
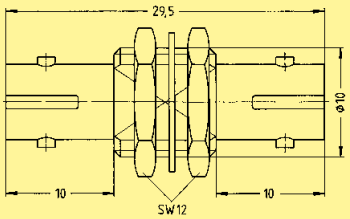
Single connectors
for fibre optical cables (POF[1)])

Identification	Part number	Drawing	Dimensions in mm
F.O. connectors for 1 mm polymer fibre cable Ø 2.2 mm			
F-SMA type with hexagonal nut	20 10 001 1211		The connector for 1 mm POF may be directly attached to the fibre by crimping, glueing or by using a “hot plate”. Insertion loss: POF < 2.5 dB
F-ST type	20 10 001 2211		
Versatile Link HFBR type Crimp	20 10 001 7111		
Crimpless	20 10 001 7112		
SC contact	20 10 001 5211		
für 1 mm Kunststoff-Faser; 3,6 mm SERCOS Kabel F-SMA type mit Sechskantmutter	20 10 001 1241		
for 1 mm polymer fibre cable 3.6 mm SERCOS F-SMA type with hexagonal nut	20 10 001 1221		
F-TNC (IP 65)			
Male cable connector for 1 mm polymer fibre cable SERCOS Ø 6 mm	20 10 001 6211		
Female cable connector for 1 mm polymer fibre cable Ø 2.2 mm	20 10 001 6233		

[1)] POF = Polymer Optical Fibre

Stock items in bold type

F.O. single connectors with glass fibres

Identification	Part number	Drawing	Dimensions in mm
F.O. connectors			
for GI-fibre 50 µm ... 62.5 / 125 µm		F-SMA type	
F-SMA type for cable ∅ 2.8 mm	20 10 125 1212		
F-ST type for cable ∅ 2.8 mm	20 10 125 2212	The ferrule of the FO connector for GI-fibre is ceramic. Insertion loss: F-SMA GI / SI < 1.0 dB	
SC contact	20 10 125 5211		
		F-ST type	
for SI-fibre (HCS® [1]) 200 / 230 µm			
F-SMA type for cable ∅ 2.8 mm	20 10 230 1212	Insertion loss: F-ST GI / SI < 0.5 dB	
F-ST type for cable ∅ 2.8 mm	20 10 230 2212		
Versatile Link type for cable ∅ 2.8 mm	20 10 230 7111		
Coupling sleeve			
F-SMA type	20 80 000 1071		F-SMA connector and coupling sleeve acc. to IEC 874-2
F-ST type	20 80 000 1021		FH-ST connector and coupling sleeve acc. to IEC 874-10 CECC 86123-801

[1] HCS® (= Hard Clad Silica) is registered trade mark of SpecTran Corporation

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Ethernet components - Overview *

Function Class	Installation Class	Switches
Ha-VIS eCon unmanaged Plug & Play Store and Forward Switching Mode Non-Blocking Auto-negotiation Auto-polarity Auto-crossing	Inside (IP 30 Protection Class)	**Ha-VIS eCon 3000** - 1/6/8 Copper ports with 1/2 F.O. ports - Robust metal housing - Top-Hat Rail mount - Narrow form factor  **Ha-VIS eCon 3061-AD** 6 RJ45, 1 SC **Ha-VIS eCon 3061-AE** 6 RJ45, 1 ST  **Ha-VIS eCon 3062-AD/-AD2/-AF** 6 RJ45, 2 SC also available with: - Extended temperature range (-AD2) - Single mode (-AF) **Ha-VIS eCon 3062-AE** 6 RJ45, 2 ST
Ha-VIS sCon configurable Plug & Play via USB-interface configurable through a graphic user interface	Inside (IP 30 Protection Class)	**Ha-VIS sCon 3000** - 6 / 8 Copper ports (RJ45) and 2 / 3 F.O. ports (SC) - Robust metal housing - Parallel-/ ring-redundancy - Top-Hat rail mounting - Potential-free alarm contact  **Ha-VIS sCon 3082-AD/-AF** 8 RJ45, 2 SC **Ha-VIS sCon 3063-AD** 6 RJ45, 3 SC
Ha-VIS mCon managed Webinterface SNMP (v1, v2c, v3) User Management LLDP Quality of Service VLAN support Rapid Spanning Tree 802.1X RADIUS Client IP authorize manager IGMP Snooping (v1, v2, v3) with querier DHCP Client DHCP Option 82 SNTP Alarms via Email SNMP Traps Port diagnostic	Inside (IP 30 Protection Class)	**Ha-VIS mCon 3000** - 6 / 8 / 10 Copper ports (RJ45) and 2 / 3 FO-ports (SC / ST) - Robust metal housing - Top-Hat rail mounting - Web management - Potential-free alarm contact SC  **Ha-VIS mCon 3061-ADV** 6 RJ45, 1 SC **Ha-VIS mCon 3082-ADV** 8 RJ45, 2 SC **Ha-VIS mCon 3063-ADV** 6 RJ45, 3 SC ST  **Ha-VIS mCon 3061-AEV** 6 RJ45, 1 ST **Ha-VIS mCon 3082-AEV** 8 RJ45, 2 ST **Ha-VIS mCon 3063-AEV** 6 RJ45, 3 ST **Ha-VIS mCon 3000 NG** - 8 Copper ports (RJ45) and 2 F.O. ports (SFP Combo ports) - Robust metal housing - Top-Hat rail mounting - Web management - Slot for SD cards SFP  **Ha-VIS mCon 3102-AASFP** 8 RJ45, 2 SFP

* ... see catalogue "Smart Network Infrastructure - Intelligent Network Solutions"

Ethernet Media converter
Ha-VIS eCon 3011

Ethernet Media converter, unmanaged,
for installation in control cabinets

General Description

The Fast Ethernet Media converter Ha-VIS eCon3011 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 Single-mode).

The Ha-VIS eCon 3011 Mediaconverter is configu-rable via Dip Switch and offers a variety of control functions.

The Mediaconverter 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

- Converter Mode with a very low latency
- Store and Forward switch mode
- Link Fault Path Through (LFP)
- Power over Ethernet (Power Source Equipment)
- 9 kByte Jumbo Frames in converter mode
- 2 kByte Frames in switch mode

Advantages

- Power over Ethernet (IEEE 802.3af)

Configuration via Dip Switch

- Small and 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

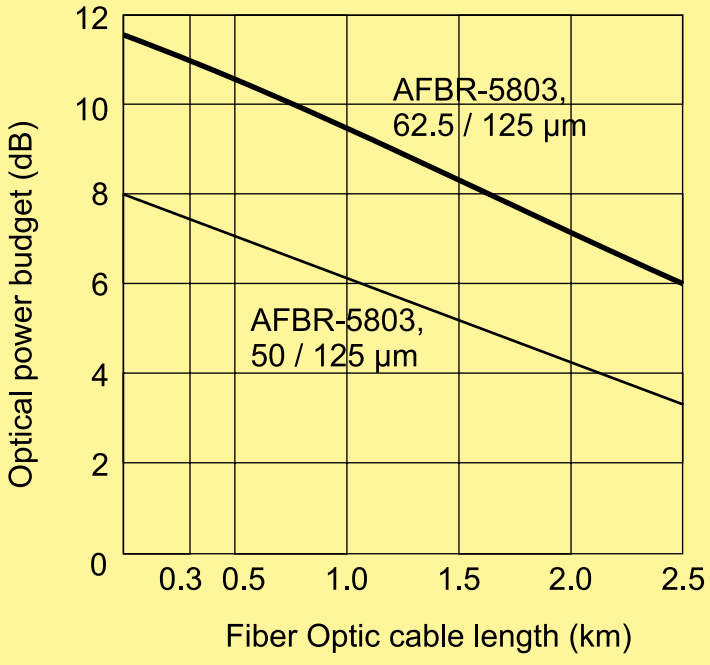
Technical characteristics Media converter

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 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) – 100 Mbit/s: Yellow / 10 Mbit/s: OFF • Duplex – Full duplex: Yellow / Half duplex: OFF • PoE (Power Source Equipment) (PSE) – Green
Topology	Line
Power supply	
Input voltage	24 V DC (12 V … 30 V DC)
Input voltage, mode PoE	48 V DC (46 V … 57 V DC)
Termination	5-pole pluggable screw contact (PRW1 + / PWR1 - / PWR2 + / PWR2 - / PE)
Diagnostics (via LED)	Power supply - Green
Configuration	via DIP switches: Mode, Auto-negotiation, Data rate, Duplex TP, Duplex FX, Link monitoring, PoE (PSE)
Design features	
Housing material	Metal (powder coated)
Dimensions (W x H x D)	23 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
Weight	approx. 0.6 kg
Environmental conditions	
Operating temperature	–40 °C … +70 °C
Storage 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	Multimode fibre, 1300 nm; 50 / 125 µm or 62.5 / 125 µm
Data rate	100 Mbit/s
Link monitoring	Link Fault Pass-Through (LFP)
Maximum cable length	2000 m (Multimode)
Termination	SC-D female
Diagnostics (via 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 / 125 µm) • -14 dBm (62.5 / 125 µm)
Transmission power T(X) min.	• -23.5 dBm (50 / 125 µm) • -20 dBm (62.5 / 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

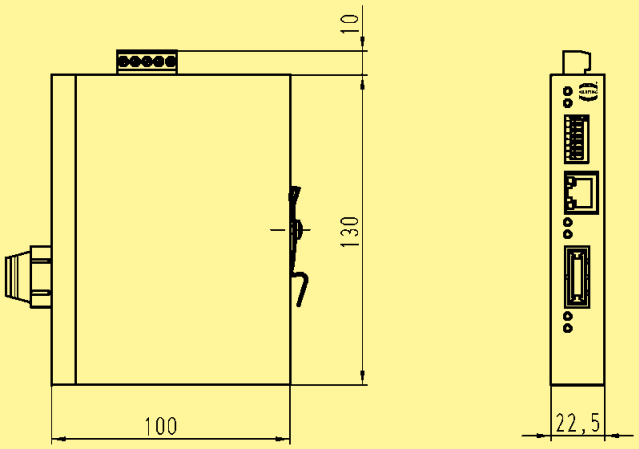


Ethernet Media converter
Ha-VIS eCon 3011-AD

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

Unmanaged	IP 30	PROFINET compatible ☒	EtherNet/IP compatible ☐

Number of ports, Copper / Termination	1x 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 / 5-pole pluggable screw contact, redundancy (PRW1 + / PWR1 - / PWR2 + / PWR2 - / PE)
Permissible range (min/max)	12 V … 48 V DC
Input voltage mode PoE	48 V DC when using as PSE
Permissible range (min/max)	46 V … 57 V DC
Input current	approx. 100 mA (at 24 V DC) approx. 100 … 400 mA (at 48 V DC with PoE)
Housing material	Metal (powder coated)
Dimensions (W x H x D)	23 x 130 x 100 mm (without connectors)
Weight	approx. 0.6 kg
Operating temperature	–40 °C … +70 °C
Approvals	cUL (in preparation)

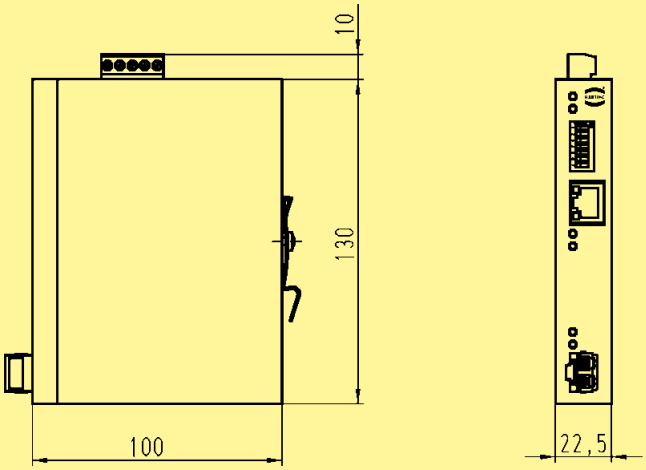
Identification	Part number	Drawing	Dimensions in mm
Ha-VIS eCon 3011-AD Ethernet Media converter with 1 RJ45 port 1 F.O. port	20 76 102 3100		

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)
Number of ports, F.O. / Termination	1x 100 Mbit/s SFP module slot
Input voltage / Termination	24 V DC / 5-pole pluggable screw contact, redundant (PRW1 + / PWR1 - / PWR2 + / PWR2 - / PE)
Permissible range (min/max)	12 V … 48 V DC
Input voltage mode PoE	48 V DC when using as PSE
Permissible range (min/max)	46 V … 57 V DC
Input current	approx. 100 mA (at 24 V DC) approx. 100 … 400 mA (at 48 V DC with PoE)
Housing material	Metal (powder coated)
Dimensions (W x H x D)	23 x 130 x 100 mm (without connectors)
Weight	approx. 0.6 kg
Operating temperature	–40 °C … +70 °C
Approvals	cUL (in preparation)

Identification	Part number	Drawing	Dimensions in mm
Ha-VIS eCon 3011-ASFP Ethernet Media converter with 1 RJ45 port 1 port SFP module slot SFP modules on request	20 76 102 3101		

Accessories
SFP modules

General Description

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

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

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

Features

SFP modules

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

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

Advantages

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

Application fields

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

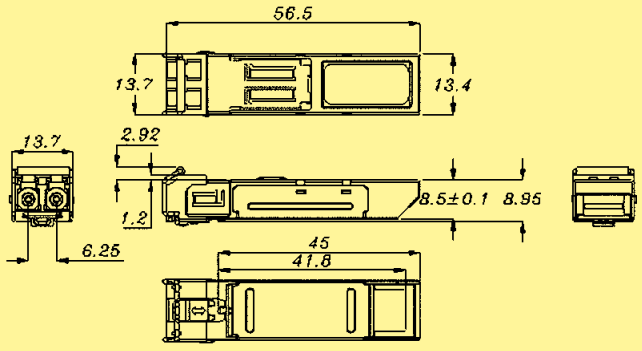
Accessories
SFP modules

SFP:

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

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

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



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Description

The components offered by HARTING in the field of fibre optical data transmission are suitable in combination with different types of FOC. With view to the optical transmission characteristics we differentiate between the following types of fibre:

Cables with Multimode-Gradient-Fibres (GI-Fibres)
- Suitable for transmission distances up to approx. 2 km (850 nm), approx. 5 km (1300 nm)
- Typical POF-connector termination: adhesive technique
- Typical wave length: 850/1300 nm

Cable with HCS-Step-Index-Fibres (HCS® [1])-Fibres)
- Suitable for transmission distances up to approx. 2 km (850 nm), approx. 400 m (660 nm)
- Typical POF-connector termination: Crimp termination
- Typical wave length: 660/850 nm

Cable with Plastic-Optical-Fibres (POF[2])
- Suitable for transmission distances up to approx.100 m
- Typical POF-connector termination: Crimp termination, or HARTING quick assembly technique, no special tool necessary
- Typical wave length: 660 nm

Fibre Types (typical characteristics)

	Plastic-Optical Fibre POF[2]	Optical Fibre HCS® [1]	Glass-Optical Fibre	
Fibre type	SI	SI	GI	GI
Core / jacket Ø	980 / 1000 µm	200 / 300 µm	62.5 / 125 µm	50 / 125 µm
Attenuation coefficient				
at 660 nm	200	10	-	
at 850 nm	2000	8	≤ 3.5	≤ 3.0
at 1350 nm	-	-	≤ 0,80	≤ 0,70
typ. wave length	660 nm	660 / 850 nm	850 / 1300 nm	850 / 1300 nm
Bandwidth MHz*km				
at 660 nm	10	-	-	-
at 850 nm	-	≥ 17	≥ 200	≥ 400

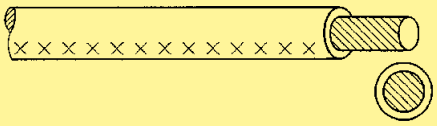
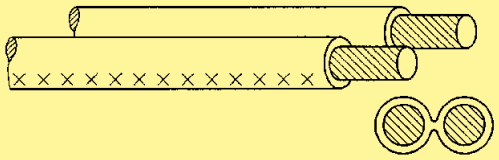
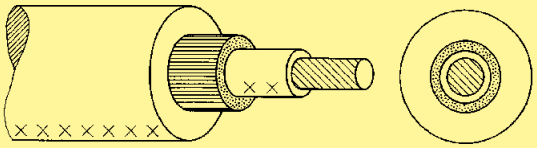
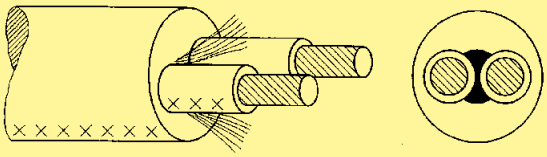
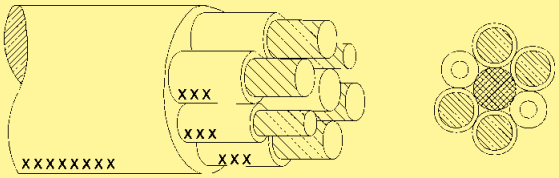
Cable Plastic Materials

Material designation		Polymers (LowSmoke ZeroHalogen)	Polyvinylcloride	Polyethylene	Polyurethane	Polyamide
Abbreviation		LSOH	PVC	PE	PUR	PA
Halogen free		yes	no	yes	yes	yes
Fire behaviour		self-extinguishing	self-extinguishing	combustible	self-extinguishing	combustible
Resistance	to UV radiation	fair - good	fair	good	fair - good	good
	to oil	poor	fair	fair	fair - good	good
	with hydrolysis	good	good	good	poor - fair	fair
Abrasion resistance		good	fair	good	excellent	good
Mechanical resistance		good	fair	good	good	good

[1] HCS®=Hard Clad Silica is registered trade mark of SpecTran Corporation
[2] POF = Polymer Optical Fibre

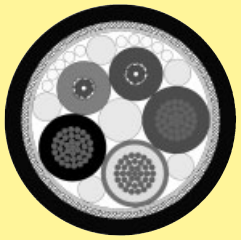
F.O. Cables with POF[1)]

F.O. cables with polymer fibres (POF[1)])
for internal and external applications
SI-fibre with 980 µm PMMA-core;
easy mechanical crimp technology

Identification	Part number	Drawing	Dimensions in mm
F.O. cable POF[1)] standard cable		Technical Details: PMMA fibre: 980 / 1000 µm Temperature range: -40 °C ... +85 °C Bending radius min.: 30 mm	
Simplex ∅ 2.2 mm PE fibre coating	20 20 001 1011		
Duplex ∅ 2.2 x 4.4 mm PE fibre coating	20 20 001 1021		
Special cable with strain relief suitable for SERCOS applications		When ordering please specify cable length in metres.	
Simplex ∅ 6.0 mm PE fibre coating PUR cable coating	20 21 001 1011		
Simplex ∅ 3.6 mm PE fibre coating PUR cable coating	20 21 001 1012		
Duplex ∅ 2.2 x 4.4 mm PE fibre coating	20 21 001 1021		
Hybrid cable geeignet für DESINA®-Applikationen			
PUR cable coating 2x POF[1)] PA fibre coating 4x 1.5 mm² 300 V / 300 V ∅ 10.6 mm	20 23 041 1023		

[1)] POF = Polymer Optical Fibre

F.O. cables with glass-fibre
for internal and external applications
GI-fibre
easy mechanical crimp technology

Identification		Part number	Drawing	Dimensions in mm
F.O. cable glass-fibre standard cable				PUR Mantel 2 fibres Multimode 62.5 µm Outer diameter: 7.0 mm Min. bending radius: Installation 10.5 cm Operating 7.0 cm
Length*:	10 m	33 58 751 0100 001		
	20 m	33 58 751 0200 001		
	100 m	33 58 751 1000 001		
F.O. cable, hybride 2x G50/125 + 3x 2.5 mm²				PVC Mantel Outer diameter (AD): 12.6 mm Min. bending radius: singular 5 x AD repeated 10 x AD
Length*:	10 m	33 57 851 0100 002		
	20 m	33 57 851 0200 002		
	500 m	33 57 851 5000 002		

* other lengths on request

Stock items in bold type

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Description

The tools of the HARTING F.O. tool kit are suitable for the installtion of F.O. connectors in site conditions.
Detailed instructions for assembling the different connector types are included.

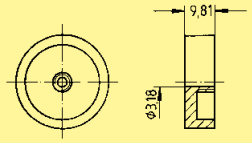
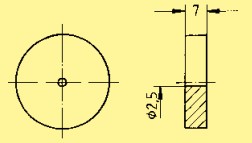
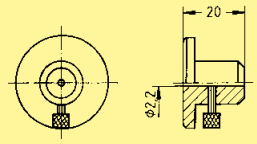
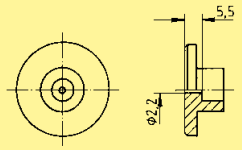
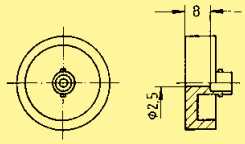
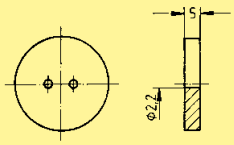
Identification	Part number	Drawing	Dimensions in mm
Tool kit POF[1)] without optical measuring device	20 99 000 3016		Depth 360 mm Width 470 mm Hight 170 mm Tool kit for F.O. connector assembly to all POF[1)] cables, without optical measuring instruments.
Tool kit POF[1)] witht optical measuring device	20 99 000 3013		Tool kit for F.O. connector assembly and control of the F.O. transmission links for 1 mm polymer-optical fibres (POF[1)]). When applying these tools, F.O. connector types F-SMA, FH-ST and R 15 can be assembled without adhesive and grinding. The measuring instruments are easy to handle and suitable for service and maintenance. The tool kit contains a complete set of tools and test equipment.
F.O. kit measuring instruments	20 99 000 3014		Suitable cables are included in the delivery range.
Tool kit GI fibre	20 99 000 3015		Depth 360 mm Width 470 mm Hight 170 mm Tool kit for connector mounting of glass fibres, using adhesive e.g.: GI 50/125 µm.

1) POF = Polymer Optical Fibre

Identification	Part number	Drawing	Dimensions in mm
HARTING Crimping tool for F.O. connector (glass fibre) SW 4.3 mm SW 3.8 mm SW 4.95 mm	20 99 000 1031	 For crimping the strain relief to the connector F.O. cable for glass fibre	
HARTING Crimping tool for F.O. connector (POF[1] fibre) SW 6.95 mm SW 4.95 mm SW 3.0 mm	20 99 000 1033	 For crimping the strain relief to the connector F.O. cable for POF[1] fibre	
Vierkerbcrimpzange for following 1 mm POF[1] contacts Han D®, Han E® DIN 41 626 Ferrule F-SMA, -ST	20 99 000 1035	 This tool is only usuable for F.O. contacts. Crimping tools for electrical contacts see catalogue “Industrial Connectors Han®”.	
Crimping tool **Han-Brid®** for electrical and optical crimp contacts	09 99 000 0362		
Cutting tool 2.2 mm POF[1]	20 99 000 1049	Delivery range 10 pieces / set	
Fibre stripper 1 mm POF[1] 0.3 mm 1 mm 0.18 / 0.3 mm	 20 99 000 1041 20 99 000 1045 20 99 000 1046		

[1] POF = Polymer Optical Fibre

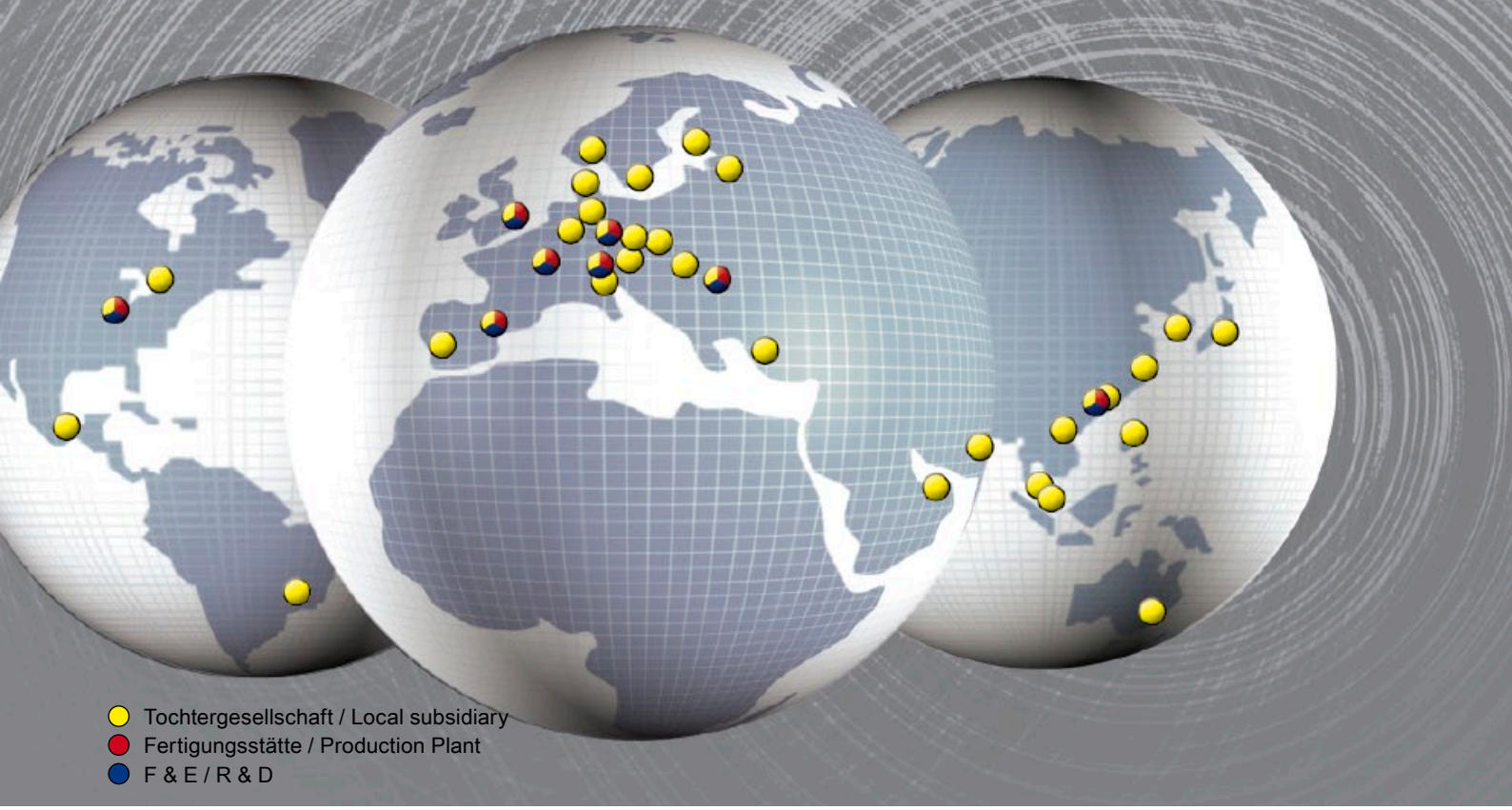
Stock items in bold type

Identification	Part number	Drawing	Dimensions in mm
Polishing tool for F.O. connectors:			
F-SMA	20 99 000 1091		
DIN 41 626	20 99 000 1092		
POF[1] cable ∅ 2.2 mm	20 99 000 1093		
F-TNC	20 99 000 1094		
F-ST	20 99 000 1095		
Ferrule SC	20 99 000 1096		
Polishing kit Versatile Link	20 80 001 9914	Delivery range: Duplex polishing tool 2x polish paper	
Epoxy adhesive glass fibre	20 80 001 9902	2 ml EPO-TEK 360 with hardener (10:1), 4 g foil pack	
Polishing paper			
for POF[1] grain size 1000 for GI 9 µ-grain size for GI 1 µ-grain size	20 80 001 9911 20 80 001 9912 20 80 001 9913	Delivery range: Each part number ordered comprises 5 pieces.	

[1] POF = Polymer Optical Fibre

List of part numbers

List of part numbers



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