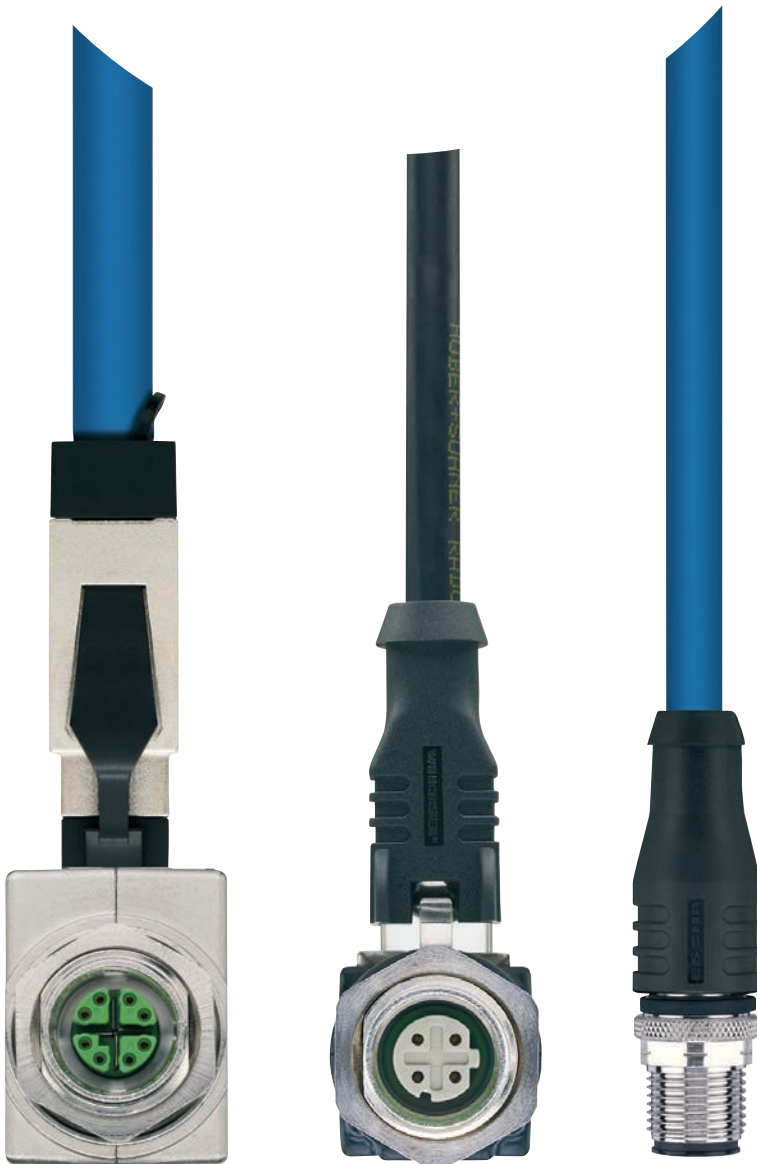


rail approved



Coming from automation engineering, we master the technology of dust- and waterproof connectivity- and housing solutions. With our broad experience we developed a connector range for fast and secure on-board data transmission for Bus and Train.

'rail approved' products from ESCHA comply with the typical requirements of advanced on-board network systems.

Product Program 2016

Components for ECN and ETBN

Connectivity technology for backbone wiring and subsystems (IEC 61375-3-4 | IEC 61375-2-5)

High transmission rates

Secure data transmission via Industrial Ethernet with transmission rates up to 10Gbit/s

Rail-specific standards

Tested according to DIN EN 50155 and Fire protection standard DIN EN 45545 (Hazardous Level 3)

360°-Shielding

Permanent 360°-Shielding even with vibration and high mechanical stresses due to patented ESCHA 2SSK-Technology

Highest protection class

Dust- and waterproof according to IP65 and IP67 (IEC 60529)

ESCHA Bauelemente GmbH
Elberfelder Str. 32 | 58553 Halver
Phone +49 2353 708 - 800
Fax +49 2353 708 -8410
Germany



ESCHA: the company

ESCHA has stood for competence and quality in connectivity- and housing technology for more than 30 years. We develop and manufacture connectivity that stands up to the industrial requirements of automation as well as numerous other application areas.

Through our innovative strength and a highly in-depth production, we realize industry-related special solutions and custom-made products on a daily basis.

Our claim is, let our customer experience the extraordinary. Getting pleasure from service, innovation and technology are our roadmap to economic success; social responsibility and sustainable budgeting are our benchmark.

www.escha.net



‘rail approved’: Connectors for Train applications

Based on our comprehensive experience, we have developed a connector range for a fast and secure on-board data transmission for Bus- and Train applications.

ESCHA products with the ‘rail approved’ seal comply with the typical requirements of advanced on-board networks: They can be swiftly and easily integrated into the vehicle and are resistant to harsh mechanical-, chemical- or thermal stresses. Through inch-perfect cable lengths, our products adapt perfectly to your application.



ESCHA: worldwide

Our base is Halver/Germany. Here, we develop and manufacture with more than 400 employees. We guarantee high availability and consistent quality of our products worldwide through production capacities in Germany, Czech Republic and China as well as licensed production in USA and Mexico. ESCHA connectivity- and housing technology is at your disposal worldwide via own sales companies and a network of sales partners.

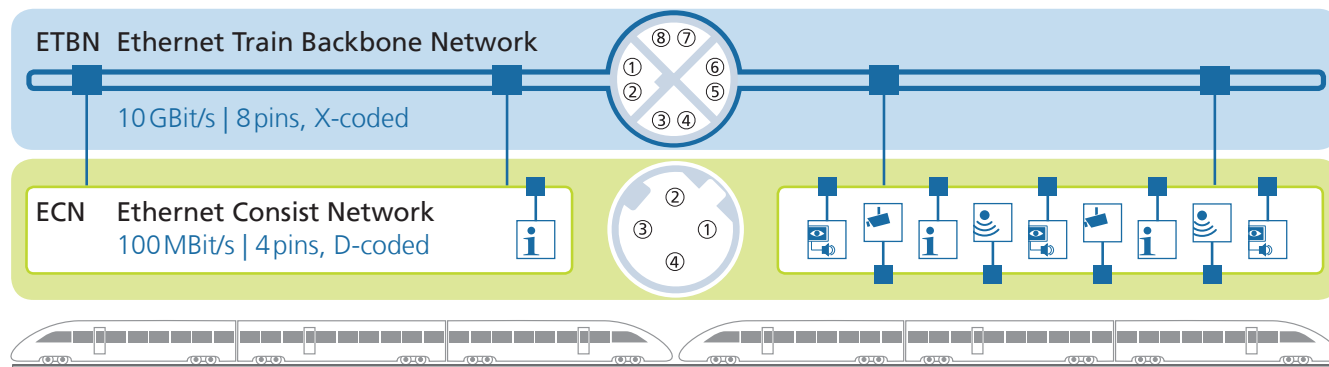
Since June 2009, ESCHA has had the status of Authorized Economic Operator. This AEO-Certification provides us with customs-law simplifications and guarantees our customers high security standards within the entire international supply chain.

We are committed to the Code of Conduct of the Bundesverband Materialwirtschaft, Einkauf und Logistik e.V. (BME) (Federal Association Materials Management, Purchasing and Logistics).





Index Type Version Page



Safe and secure data-transmission in transportation provides high requirements to the transmission networks. The 'rail approved' seal combines all railway specific features, standards and tests for connectors and cables.

ESCHA products with this seal are tested according to the following standards:

- DIN EN 45545-2 (fire behavior)
- DIN EN 50155 (mechanical stresses, vibration, shock)
- IEC 61076-2-109 resp IEC 61076-2-101 (type testing of connector)
- IEC 60529 (outside influences: water, dust, foreign bodies, contact, humidity)

The connectors are electrically tested in series and meet the Cat6A resp. Cat5e datatransmission features.

Go to escha.net for Manufacturer's Information on test- procedures and results.

The patented ESCHA two-shell shielding concept (2SSK) provides for a secure data transmission even with vibration, high mechanical stresses and shock. It guarantees a 100 percent and 360° shielding all around the connector. A two-component overmolding ensures a dust- and waterproof connection between grip and irradiated cable. See Technical Information on page 33.

10 GBit/s	M 12x1	8X: <i>m</i> ↑ ☞	06 - 07
	M 12x1	8X: Extension cable	08 - 09
	M 12x1	8X: Receptacle connectors for housing assembly <i>f</i> ↑ ☞	10 - 11
	M 12x1, RJ45	8X: Feed-through connection	12 - 13
	M 12x1	8X: Adapter Cable-connection	14 - 15
100 MBit/s	M 12x1	4D: <i>m</i> ↑ ☞ ☞	16 - 17
	RJ45	<i>m</i> ↑ ☞	18 - 19
	M 12x1, RJ45	4D: Extension cable	20 - 21
	M 12x1	4D: Receptacle connectors for housing assembly <i>f</i> ↑ ☞	22 - 23
	M 12x1, RJ45	4D: Feed-through connection	24 - 25
	M 12x1	4D: Adapter	26 - 27
Accessories	Safety-caps, safety-stoppers, Dustproof-caps		28
	Torque-wrench set		28
	Mounting-clips		29
	Safety-clips		29
	Spare nuts for Receptacles		29
	Marking labels		29
	Cable qualities: Features, resistance, structure		
Technical information	S4005 RADOX® Railcat Cat7 Standard		30
	S4002 RADOX® Railcat Cat5 thinwall		31
	S4003 RADOX® Railcat Cat5 Standard		32
	S4004 RADOX® Railcat Cat5 Eco		33
	Standards		34
	Conversion of American Wire Gauge, AWG in mm ²		35
	Colour guide		35
	Overview Pg-thread vs. metric thread		35
	Degrees of Protection IP		36
	Shielding ESCHA two-component overmould shielding		37
Adress register	Certifications		37
	Wiring instructions		38
	Representatives abroad, Headquarters		39

f = female | *m* = male | ↑ = straight | ☞ = angled | ☞ = field wireable

RA-	WAS	S	X	8.066	L /	S4005
						Cable quality
						Cable length [m]**
						Contacts.allocation code
			X-coded			
		shielded ⊙				
		Round connector M12x1 WAS: <i>male</i>				
		WASC: <i>male</i> field-wireable 🖱				
RA:	Rail Approved					
IE:	Industrial Ethernet (Rail Approved)					



Version	Cable quality	Item description	Item-No.
M12x1 8 X Cat6A	m ↑	RA-WASSX8.066-L /S4005	*
M12x1 8 X Cat6A	m ↑ 🖱	IE-WASCXS85	8050231
100m buscable RADOX® Railcat Cat7	S4005		8063117

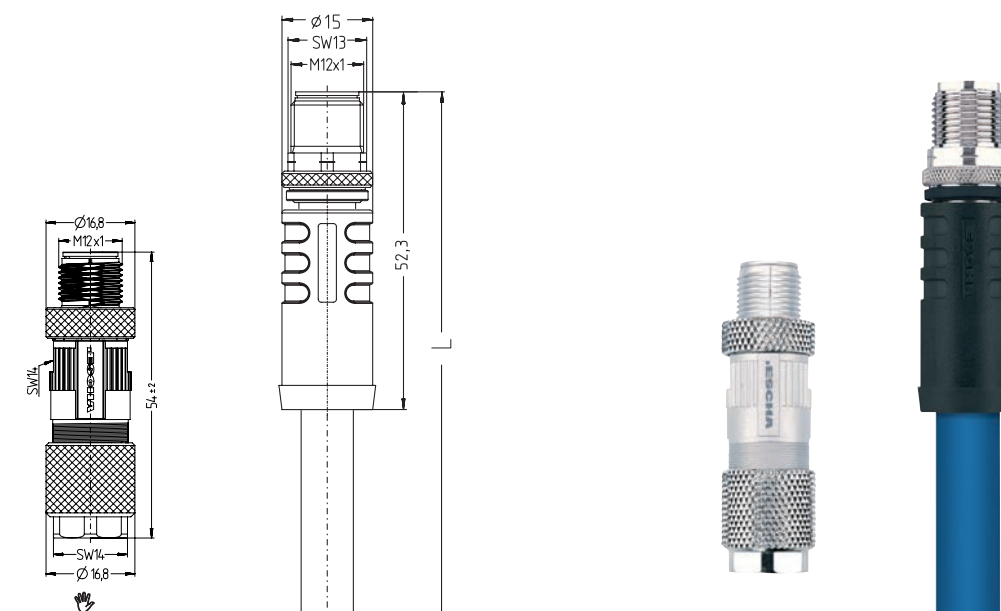
* Inch-perfect cable lengths are available upon request. Just add Item description and cable length »L« in meters to your order.

For example: cable length L = 5.2m (see dimensioned drawing) | RA-WASSX8.066-5,2/S4005

Cable quality S4005 | RADOX® Railcat Cat7 4x(2x24AWG)

Halogen-free irradiated cable with good behavior in case of fire. The four-pair cable is adapted to stationary wiring and for the application in Backbone (ETBN) of railway vehicles meeting the fire protection requirements according to h DIN EN 45545 Hazardous Level 3. Data transmission rates up to 10Gbit/s are possible.

ESCHA Nomenclatur	S4005
Cable quality for	ETBN (IEC 61375-2-5)
Transmission category	Cat7
Nominal diameter	Ø 8.1mm
Wire-structure data	4x2xAWG24
Wire colours	WH(OG) OG; WH(GN) GN; WH(BN) BN; WH(BU) BU
Colour outer-jacket	BU
Bending radius fixed	4xd
Temperature range	-40°C...+70°C



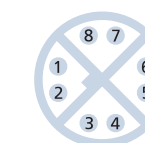
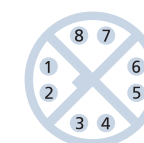
Connection cable 10 GBit/s | M12x1_8 pins

Technical data	Round connector	Field-wireable 🖱
Rated voltage [U _{max}]	50 V _{AC} 60 V _{DC}	50 V _{AC} 60 V _{DC}
Current load [I _{max}]	0.5A	0.5A
Insulation resistance	≥ 10 ⁸ Ω	≥ 10 ⁸ Ω
Standards	IEC 61076-2-109 DIN EN 50155 DIN EN 45545-2	IEC 61076-2-109 DIN EN 50155 DIN EN 45545-2
Materials Grip	TPU, BK	Zinc diecasting, nickel-plated
Contact carrier	PA, transparent	PA, GN
Contacts	CuZn, gold-plated	CuSn, gold-plated
Locking mechanism (M12x1)	CuZn, nickel-plated	CuZn, nickel-plated
Sealing		NBR
Cut-contacts		Zn, nickel-plated
Locking mechanism (M15x0,5)		Bronze, tin-plated
Stress-relief/Loader		PA
Shielding		Bronze, tin-plated
Ambient temperature	-40°C...+90°C	-40°C...+85°C
Degree of pollution	2	2
Protection class (installed)	IP67 (-30°C...+90°C) IP65 (-40°C...+85°C)	IP67 (-30°C...+85°C) IP65 (-40°C...+85°C)
Mechanical life cycle	>100 Mating cycles	>100 Mating cycles
Core cross-section/Clamping ability		AWG26/7 - AWG22/7 AWG24/1 - AWG22/1
External diameter of the cable		Ø 5...9.7mm
Connection		IDC

Coding | *male*

8 pins | X

8 pins | X



1WH(OG) | 2OG; 3WH(GN) | 4GN;
5WH(BN) | 6BN; 7WH(BU) | 8BU

RA-	WAS	S	X	8.066-	L-	RA-	WAS	S	X	8.066/	S4005
											Cable quality
											Contacts.allocation code
											X-coded
											Shielded ⊙
											WAS: Round connector M12x1 <i>male</i>
											Rail Approved
											Cable length [m]*
											Contacts.allocation code
											X-coded
											Shielded ⊙
											WAS: Round connector M12x1 <i>male</i>
											FKFDS: Receptacle overmolded Back-wall mounting M12x1 <i>female</i>
											Rail Approved



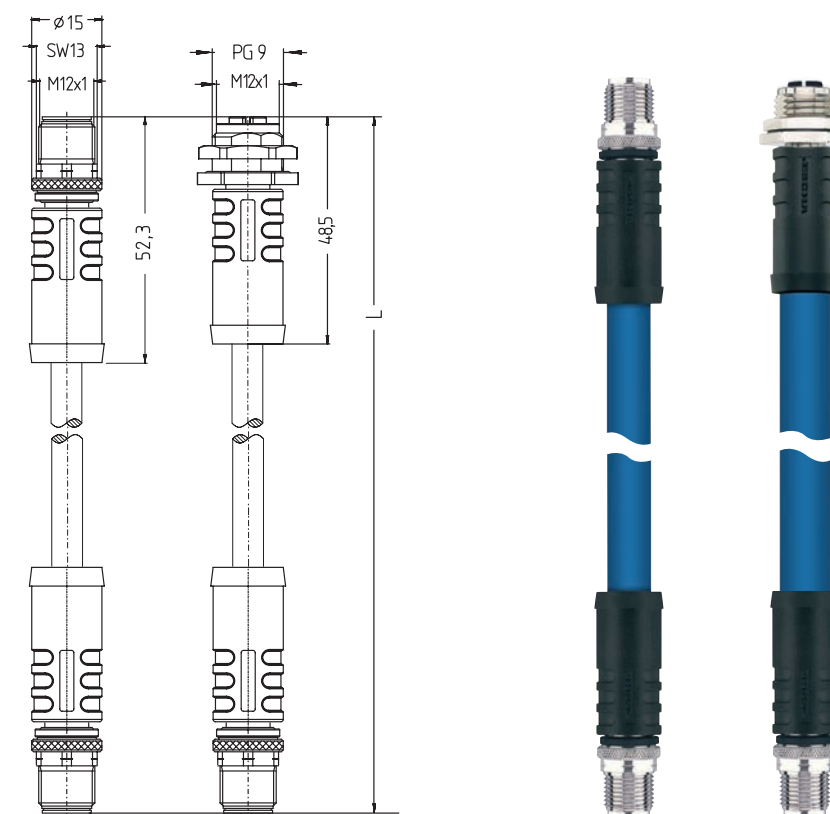
Version	Cable quality	Item description
M12x1 Cat6A	<i>m</i> ↑ __ <i>m</i> ↑	S4005 RA-WASSX8.066-L-RA-WASSX8.066/S4005
M12x1 Receptacle HW_M12x1 Cat6A	<i>f</i> ↑ __ <i>m</i> ↑	S4005 RA-FKFDX8.066-L-RA-WASSX8.066/S4005

*Inch-perfect cable lengths are available upon request. Just add item description and cable length »L« in meters to your order.
For example: cable length L = 5.2m (see dimensioned drawing) | RA-WASSX8.066-5,2-RA-WASSX8.066/S4005

Cable quality S4005 | RADOX® Railcat Cat7 4x(2x24AWG)

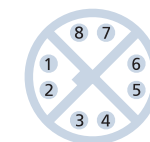
Halogen-free irradiated cable with good behavior in case of fire. The four-pair cable is adapted to stationary wiring and for the application in Backbone (ETBN) of railway vehicles meeting the fire protection requirements according to h DIN EN 45545 Hazardous Level 3. Data transmission rates up to 10Gbit/s are possible.

ESCHA Nomenclatur	S4005
Cable quality for	ETBN (IEC 61375-2-5)
Transmission category	Cat7
Nominal diameter	Ø 8.1mm
Wire-structure data	4x2xAWG24
Wire colours	WH(OG) OG; WH(GN) GN; WH(BN) BN; WH(BU) BU
Colour outer-jacket	BU
Bending radius fixed	4xd
Temperature range	-40°C...+70°C

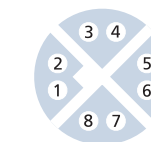


Extension cable 10 GBit/s | 8 pins

Technical data	Round connector	Receptacle
Rated voltage [U _{max}]	50 V _{AC} 60 V _{DC}	50 V _{AC} 60 V _{DC}
Current load [I _{max}]	0.5A	0.5A
Insulation resistance	≥ 10 ⁸ Ω	≥ 10 ⁸ Ω
Standards	IEC 61076-2-109 DIN EN 50155 DIN EN 45545-2	IEC 61076-2-109 DIN EN 50155 DIN EN 45545-2
Materials	Receptacle housing/spare nut	CuZn, nickel-plated
	Grip	TPU, BK
	Contact carrier	PA, transparent
	Contacts	CuZn, gold-plated
	Locking mechanism (M12x1)	CuZn, nickel-plated
	Sealing	FPL /FKM
	Sealing (screw in thread)	NBR
Ambient temperature	-40°C...+90°C	-40°C...+90°C
Degree of pollution	2	2
Protection class (installed)	IP67 (-30°C...+90°C) IP65 (-40°C...+85°C)	IP67 (-30°C...+90°C) IP65 (-40°C...+85°C)
Mechanical life cycle	>100 Mating cycles	>100 Mating cycles
Coding <i>male</i>	8 pins X <i>male</i>	8 pins X <i>female</i>



1WH(OG) | 2OG; 3WH(GN) | 4GN;
5WH(BN) | 6BN; 7WH(BU) | 8BU



1WH(OG) | 2OG; 3WH(GN) | 4GN;
5WH(BN) | 6BN; 7WH(BU) | 8BU

RA-	W	FK	F	D	S	X	8.066-	L/	16/	S3525	S4005
											Cable quality
											Wall thickness compensation Δh for WFKFS, colour GN
											Screw in thread: 16: M16x1.5 12: M12x1
											Cable length [m]* P: Print-contact
											Contacts.allocation code
											X-coded
											Shielded \odot
											Adjustable \cup
											F: threaded front
											without: threaded back
											FK: Receptacle M12x1 female
											W: angled \curvearrowright without: straight \uparrow

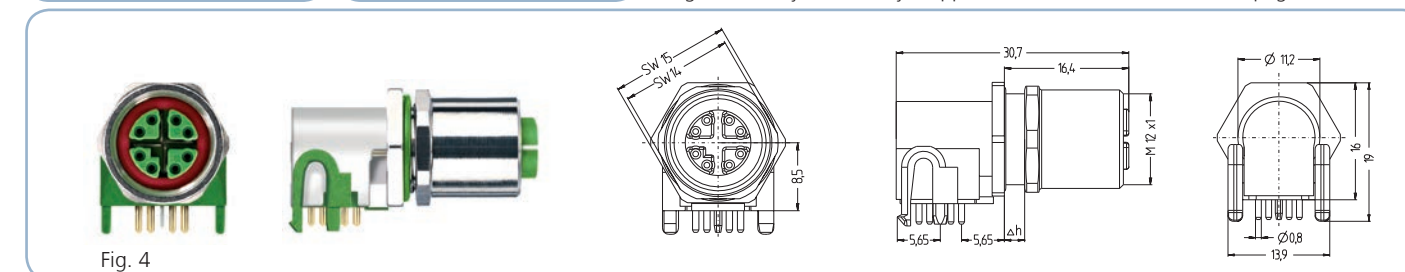
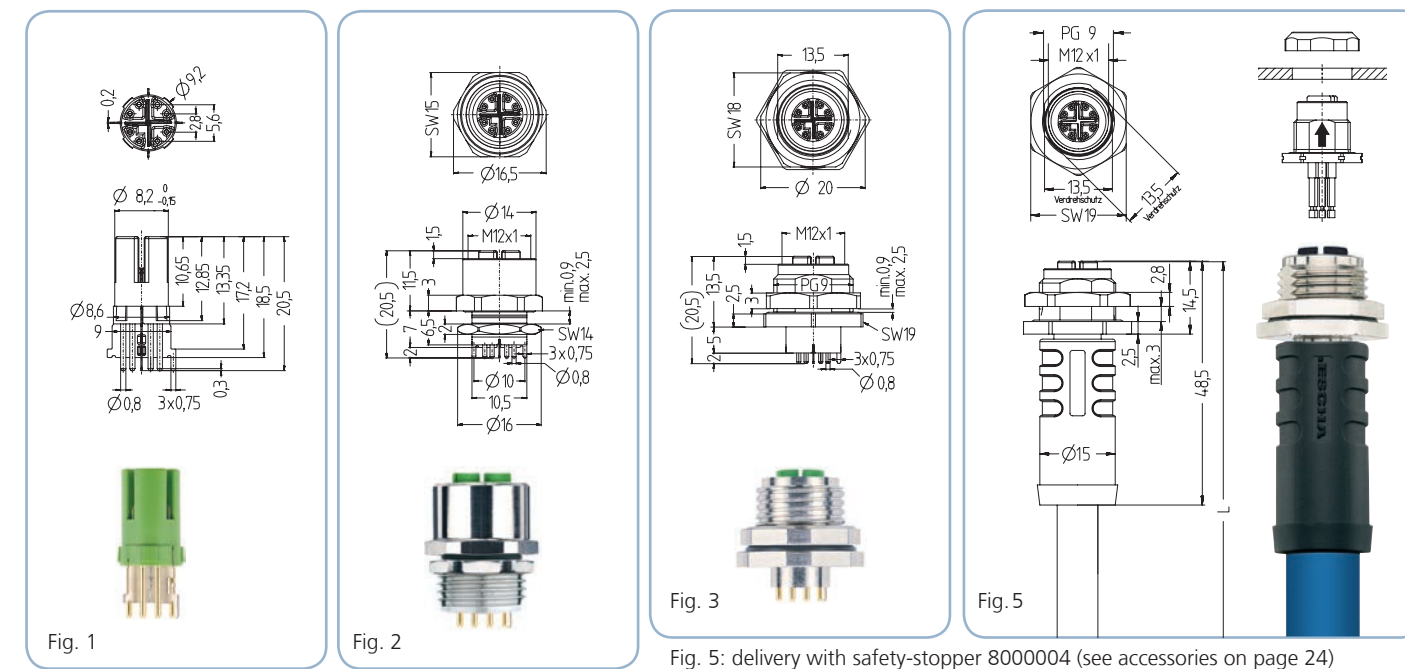
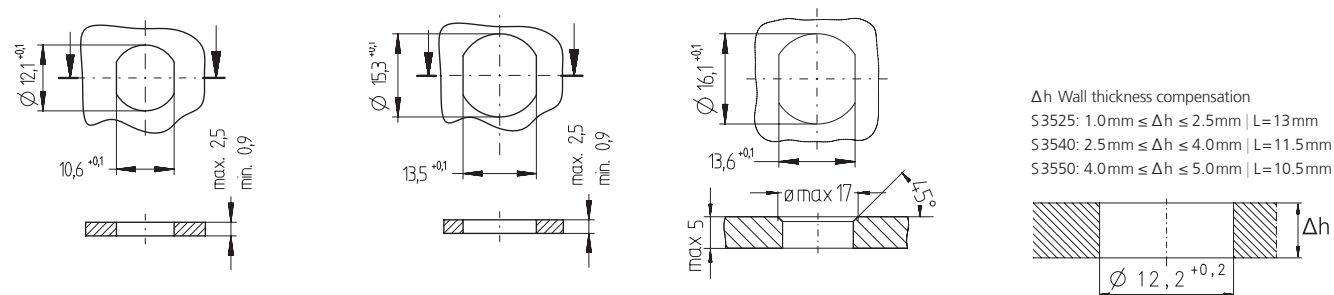
RA: Rail Approved
IE: Industrial Ethernet (Rail Approved)



M12x1-Receptacles	Connection	Version	Item description	Item-No.
Front-wall mounting	Print-contact	$f \uparrow \odot \cup$ Cat6A	Fig. 2	IE-FKDSX8-P/12 8050232
		$f \uparrow \odot \cup \Delta h$ Cat6A	Fig. 2	IE-FKDHSX8-P/12 8053483
Back-wall mounting	Cable	$f \uparrow \odot$ Cat6A	Fig. 5	RA-FKFSX8.066-L/S4005 *
		Print-contact		
	$f \uparrow \odot \cup$ Cat6A	Fig. 3	IE-FKFSX8-P 8053484	
	$f \uparrow \odot \cup \Delta h$ Cat6A	Fig. 3	IE-FKFDHSX8-P 8053485	
	$f \curvearrowright \odot \Delta h < 2.5\text{mm}$ Cat6A	Fig. 4	IE-WFKFSX8-P/12/S3525 8059345	
Panel connector	Print-contact	$f \curvearrowright \odot \Delta h < 4.0\text{mm}$ Cat6A	Fig. 4	IE-WFKFSX8-P/12/S3540 8059346
		$f \curvearrowright \odot \Delta h < 5.0\text{mm}$ Cat6A	Fig. 4	IE-WFKFSX8-P/12/S3550 8059347
		$f \uparrow \odot$ Cat6A	Fig. 1	IE-EKSX8-P 8050233

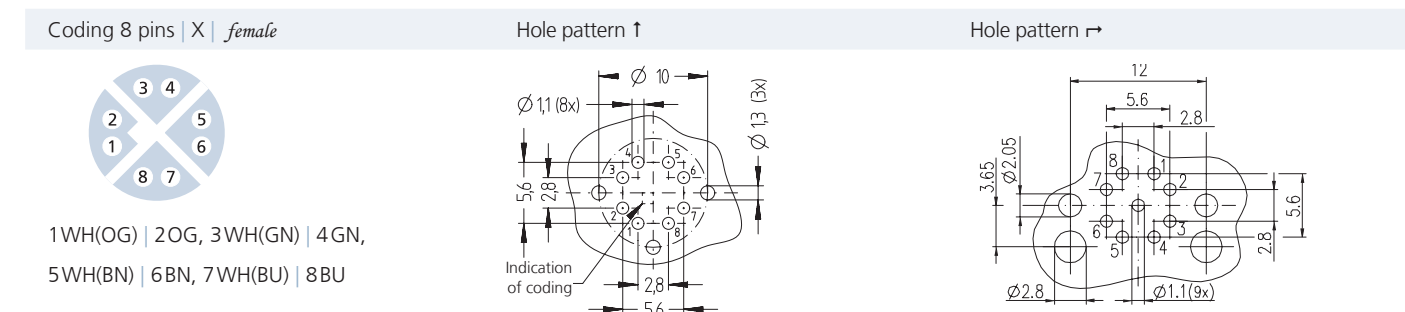
* Inch-perfect cable lengths are available upon request. Just add item description and cable length »L« in meters to your order.
For example: cable length L = 5.2m (see dimensioned drawing) | RA-FKFSX8.066-5,2/S4005

Panel cut-out (cutting for anti-twist safeguard)			
IE-FKD(H)SX8-P/12	IE-FKFD(H)SX8-P	RA-FKFSX8.066-5/S4005	IE-WFKFSX8-P

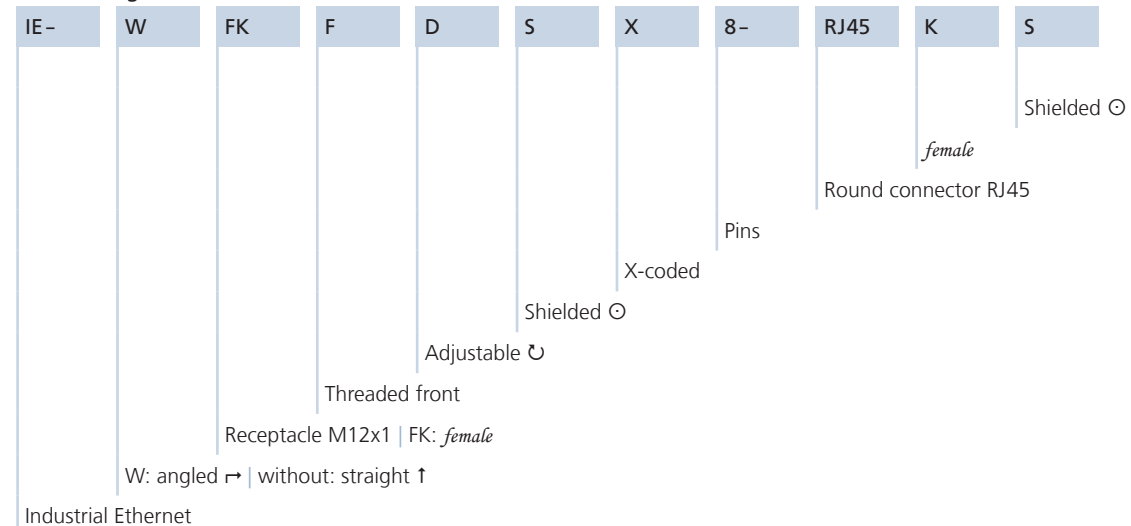


Receptacle connectors for housing assembly | 8 pins

Technical data	Value
Rated voltage [U _{max}]	50 Vac 60 Vdc
Current load [I _{max}]	0.5A
Insulation resistance	$\geq 10^8 \Omega$
Standards	IEC 61076-2-109 DIN EN 50155 DIN EN 45545-2
Materials	Receptacle housing/spare nut: CuZn, nickel-plated
	Contact carrier IE: \uparrow : PA, GN \curvearrowright : PBT, GN
	Contact carrier RA: \uparrow : PA, BK
	Grip: TPU, BK
	Contacts: CuZn, gold-plated
	Sealing: FPL /FKM
	Sealing (screw in thread): NBR
Ambient temperature	-40°C...+90°C
Degree of pollution	2
Protection class (installed)	IP67 (-30°C...+90°C) IP65 (-40°C...+85°C)
Mechanical life cycle	>100 Mating cycles



Feed-through connection



Product line	Version	Pins Coding	Item description	Item-No.
Back-wall mounting	M12x1 > RJ45	f ↑ ◡ ◯ Cat6A 8 X Fig. 1	IE-FKFDSX8-RJ45KS	8055773
(Threaded front)		f ↗ ◡ ◯ Cat6A 8 X Fig. 2	IE-WFKFDSX8-RJ45KS	8055774

Wiring

IE-(W)FKFDSX8-RJ45KS

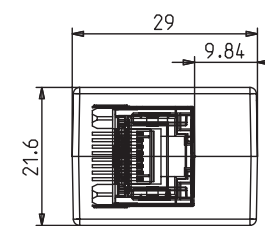
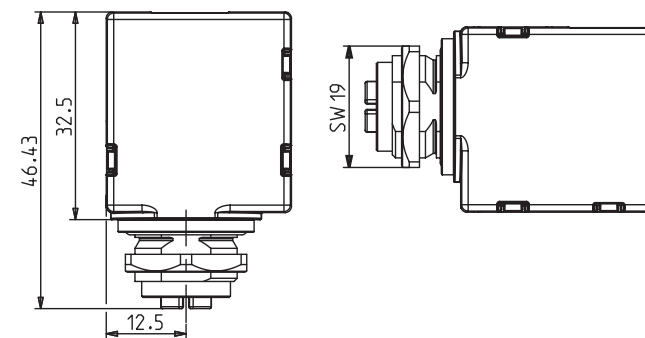
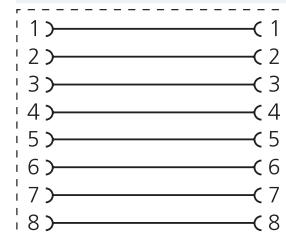


Fig. 1

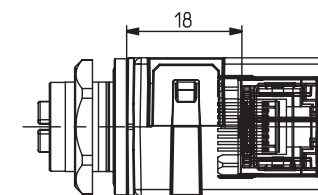
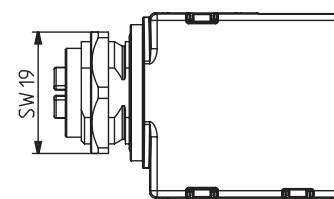
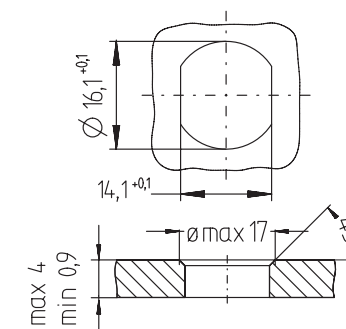
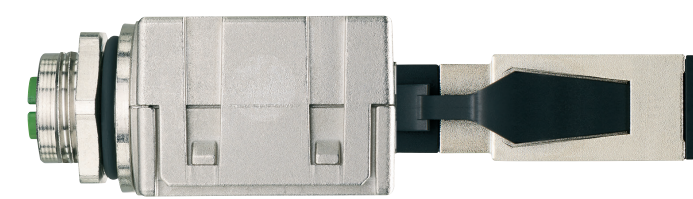


Fig. 2



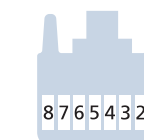
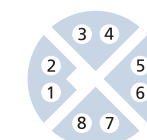
Feed-through connection/Adapter M12x1 – RJ45 | 8 pins

Technical data	Feed-through connection
Rated voltage [U _{max}]	50Vac 60Vdc
Current load [I _{max}]	0.5A
Insulation resistance	≥10 ⁸ Ω
Standards	M12x1: IEC 61076-2-109 RJ45: IEC 60603-7-51
Materials Housing	Zinc diecasting
Contact carrier Loader	PA, GN/BK
Contacts	M12x1: CuZn, gold-plated
Locking mechanism	CuZn, nickel-plated
Sealing	M12x1: FPL /FKM
Shielding	CuSn
Ambient temperature	-25°C...+85°C
Degree of pollution	2
Protection class (installed)	M12x1: IP67 RJ45: IP20
Mechanical life cycle	>100 Mating cycles

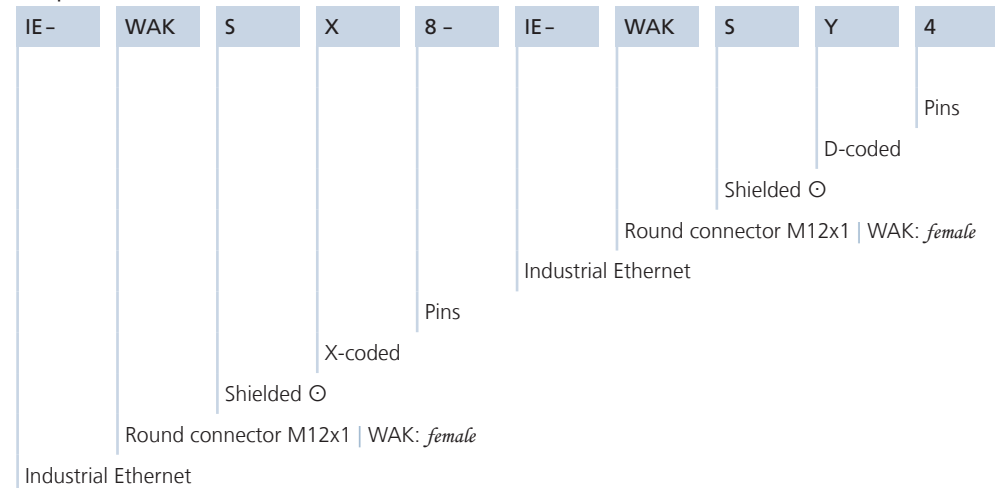
Coding | female

M12x1 8 pins | X

RJ45



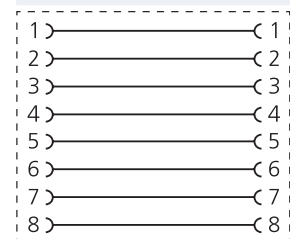
Adapter M12x1 → M12x1



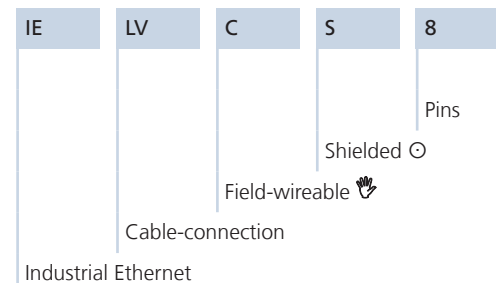
Product line	Pins Coding	Version	Item description	Item-No.
Adapter M12x1	8 X → 8 X	f ↑ Cat6A	Fig. 1	IE-WAKSX8-IE-WAKSX 8065951
Accessories	Mounting-angle see accessories on page 29			8065953

Wiring

IE-WAKSX8-IE-WAKSX



Cable-connection



Product line	Pins	Version	Item description	Item-No.
IE Cable-connection	8	⊙ Cat7 Class FA	Fig.. 2	IE-LVCS8 8055776

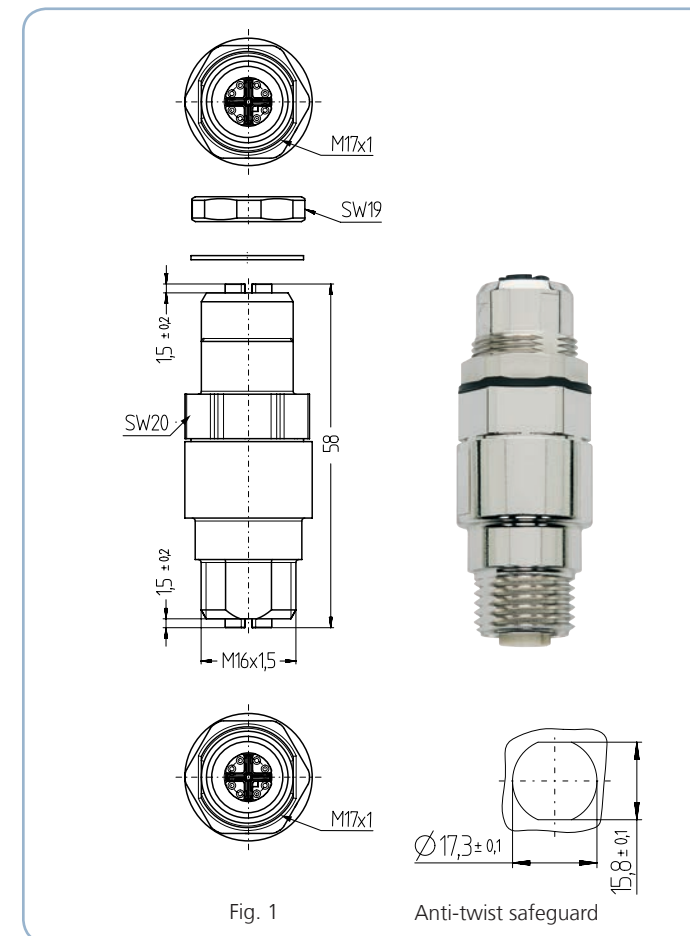


Fig. 1

Anti-twist safeguard

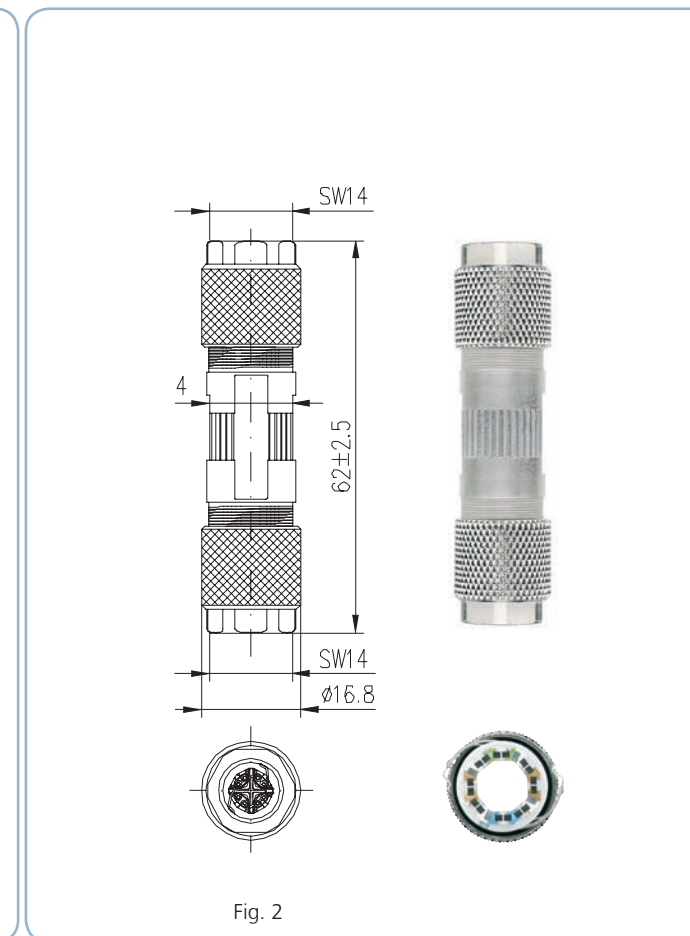
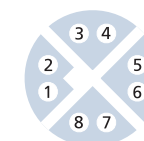


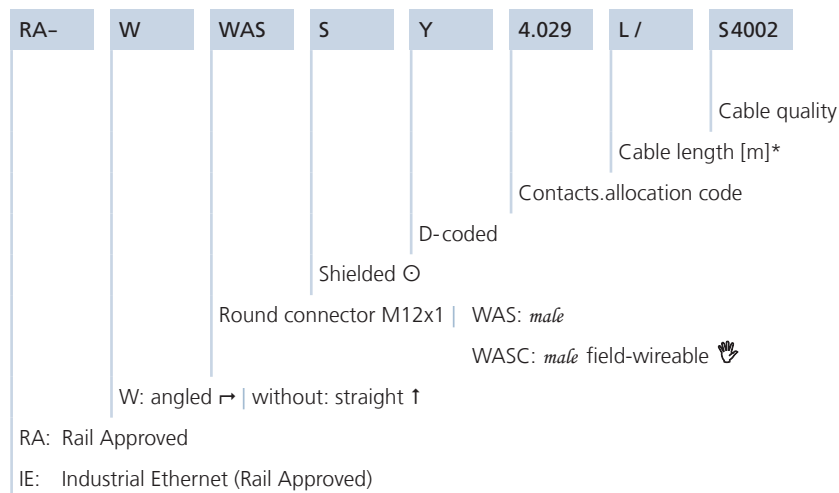
Fig. 2

Adapter M12x1 – M12x1 | Cable-connection | 8 pins

Technical data	Adapter 8X → 8X	Cable-connection
Rated voltage [U _{max}]	50 Vac 60 Vdc	50 Vac 60 Vdc
Current load [I _{max}]	0.5A	0.5A
Insulation resistance	≥ 10 ⁸ Ω	≥ 10 ⁸ Ω
Standards	IEC61076-2-109	DIN EN 50155
Materials	Housing: Zinc diecasting	Zinc diecasting
	Contact carrier: PA, BK	PA
	Contacts: M12x1: CuZn, gold-plated	CuSn
	Locking mechanism: CuZn, nickel-plated	CuZn, nickel-plated
	Sealing: FPM /FKM	
	Contacts: -	CuSn
	Shielding: CuSn	CuSn
Ambient temperature	-40°C...+85°C	-40°C...+85°C
Degree of pollution	2	2/3
Protection class (installed)	IP65 IP67	IP65 IP67
Mechanical life cycle	>100 Mating cycles	10 re-connections
Core cross-section/Clamping ability		AWG24/1 - AWG22/1 AWG26/7 - AWG22/7
External diameter of the cable		Ø 5.0...9.7mm
Connection		IDC

Coding M12x1 | *female* 8 pins | X





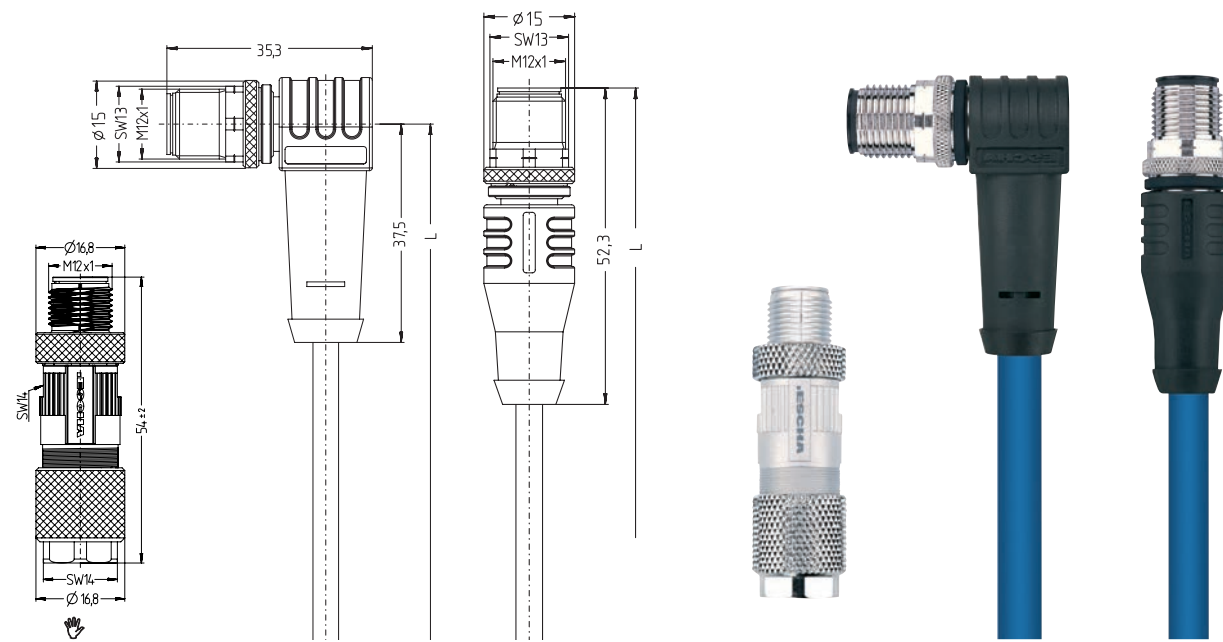
Version	Cable quality	Item description	Item-No.
M12x1 4 D m ↑ Cat5e	S4002	RA-WASSY4.029-L/S4002	*
	S4003	RA-WASSY4.029-L/S4003	*
	S4004	RA-WASSY4.029-L/S4004	*
M12x1 4 D m ↗ Cat5e	S4002	RA-WWASSY4.029-L/S4002	*
	S4003	RA-WWASSY4.029-L/S4003	*
	S4004	RA-WWASSY4.029-L/S4004	*
M12x1 4 D m ↑ ↗ Cat5e		IE-WASCSY4S	8065954
100m buscable	RADOX® Railcat Cat5 thinwall	S4002	8063114
	RADOX® Railcat Cat5 Standard	S4003	8063115
	RADOX® Railcat Cat5 Eco	S4004	8063116

* Inch-perfect cable lengths are available upon request. Just add item description and cable length »L« in meters to your order.
For example: cable length L = 5.2m (see dimensioned drawing) | RA-WASSX8.066-5,2/S4002

Cable qualities S4002, S4003, S4004, | RADOX® Railcat Cat5 4x22AWG

Halogen-free irradiated cable with good behavior on case of fire. The two-pair cable is adapted to stationary (S4002) and limited flexible (S4003, S4004) wiring and for the application in Consist Networks (ECN) of railway vehicles meeting the fire protection requirements according to DIN EN 45545 Hazardous Level 3. Data transmission rates up to 100MBit/s are possible.

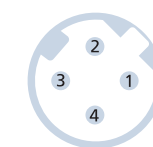
ESCHA Nomenclatur	S4002	S4003	S4004
Cable quality for	ECN (IEC 61378-3-4)	ECN (IEC 61378-3-4)	ECN (IEC 61378-3-4)
Transmission category	Cat5e	Cat5e	Cat5e
Nominal diameter	Ø 6.6mm	Ø 7.25mm	Ø 7.25mm
Wire-structure data	4xAWG22	4xAWG22	4xAWG22
Wire colours	WH-BU OG-YE	WH-BU OG-YE	WH-BU OG-YE
Colour outer-jacket	BK	BK	BU
Bending radius fixed	6xd	6xd	6xd
sporadic movement	-	10xd	10xd
Temperature range	-40°C...+90°C	-40°C...+90°C	-40°C...+90°C



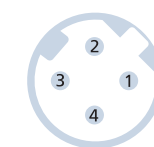
Connection cable 100 MBit/s | M12x1_4 pins

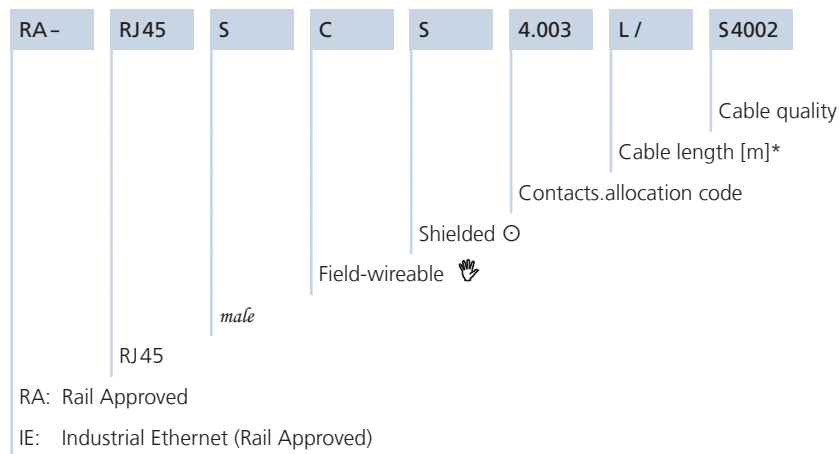
Technical data	Round connector	Field-wireable
Rated voltage [U _{max}]	250V	250V
Current load [I _{max}]	4A	4A
Insulation resistance	≥ 10 ⁸ Ω	≥ 10 ⁸ Ω
Standards	IEC 61076-2-101 DIN EN 50155 DIN EN 45545-2	IEC 61076-2-101 DIN EN 50155 DIN EN 45545-2
Materials Grip	TPU, BK	Zinc diecasting, nickel-plated
Contact carrier	PA, BK	PA, GN
Contacts	CuZn, gold-plated	CuZn, gold-plated
Locking mechanism (M12x1)	CuZn, nickel-plated	Zinc diecasting, nickel-plated
Sealing		FPM
Ambient temperature	-40°C...+90°C	-40°C...+85°C
Degree of pollution	3	3
Protection class (installed)	IP67 (-30°C...+90°C) IP65 (-40°C...+85°C)	IP67 (-30°C...+85°C) IP65 (-40°C...+85°C)
Mechanical life cycle	>100 Mating cycles	>100 Mating cycles
External diameter of the cable		Ø 5...9.7 mm
Connection		IDC

Coding | male



1YE | 2WH | 3OG | 4BU





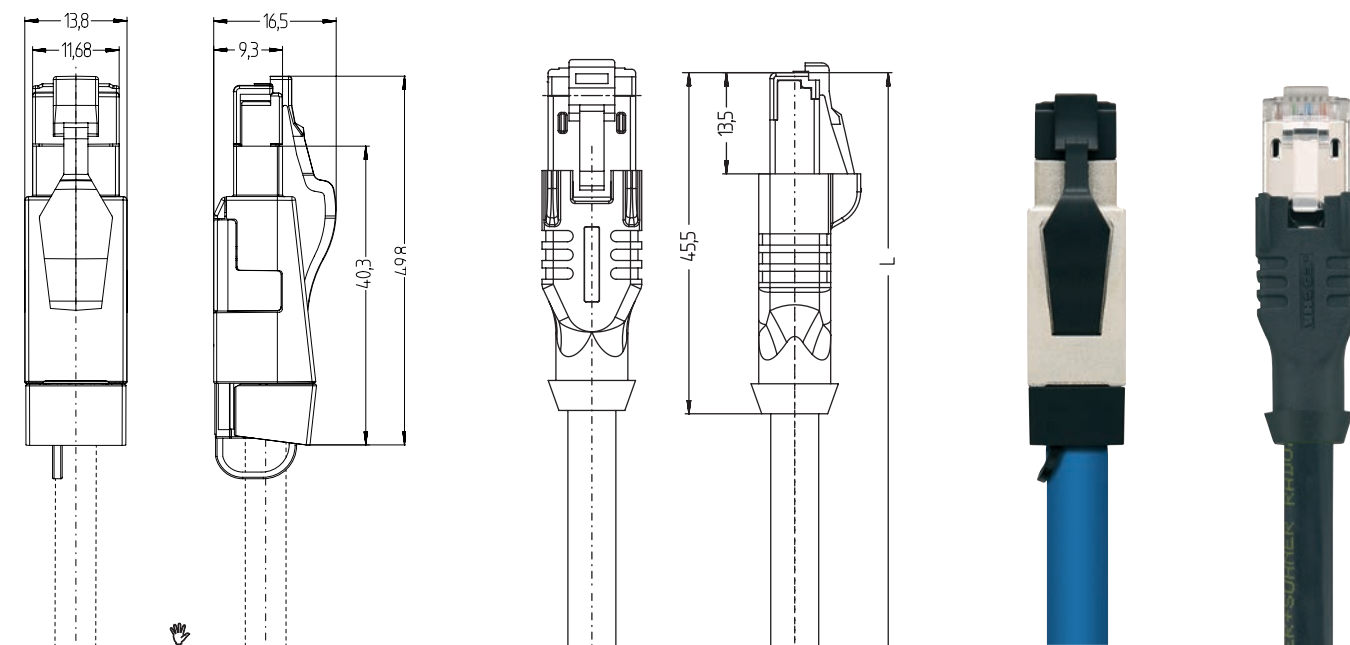
Version	Cable quality	Item description	Item-No.
RJ45 Cat5e	S4002	RA-RJ45SS4.003-L/S4002	*
RJ45 ✎ Cat5e	all	IE-RJ45SCS8	8065955
100m buscable RADOX® Railcat Cat5 thinwall	S4002 BK		8063114
100m buscable RADOX® Railcat Cat5	S4003 BK		8063115
100m buscable RADOX® Railcat Cat5	S4004 BU		8063116
100m buscable RADOX® Railcat Cat7	S4005 BU		8063117

* Inch-perfect cable lengths are available upon request. Just add item description and cable length »L« in meters to your order.
For example: cable length L = 5.2m (see dimensioned drawing) | RA-RJ45SS4.003-5,2/S4002

Cable qualities S4002, S4003, S4004, | RADOX® Railcat Cat5 4x22AWG

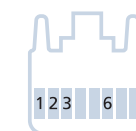
Halogen-free irradiated cable with good behavior on case of fire. The two-pair cable is adapted to stationary (S4002) and limited flexible (S4003, S4004) wiring and for the application in Consist Networks (ECN) of railway vehicles meeting the fire protection requirements according to DIN EN 45545 Hazardous Level 3. Data transmission rates up to 100MBit/s are possible.

ESCHA Nomenclatur	S4002
Cable quality for	ECN (IEC 61378-3-4)
Transmission category	Cat5e
Nominal diameter	Ø 6.6mm
Wire-structure data	4xAWG22
Wire colours	WH-BU OG-YE
Colour outer-jacket	BK
Bending radius fixed	6xd
sporadic movement	-
Temperature range	-40°C...+90°C

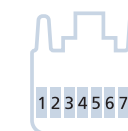


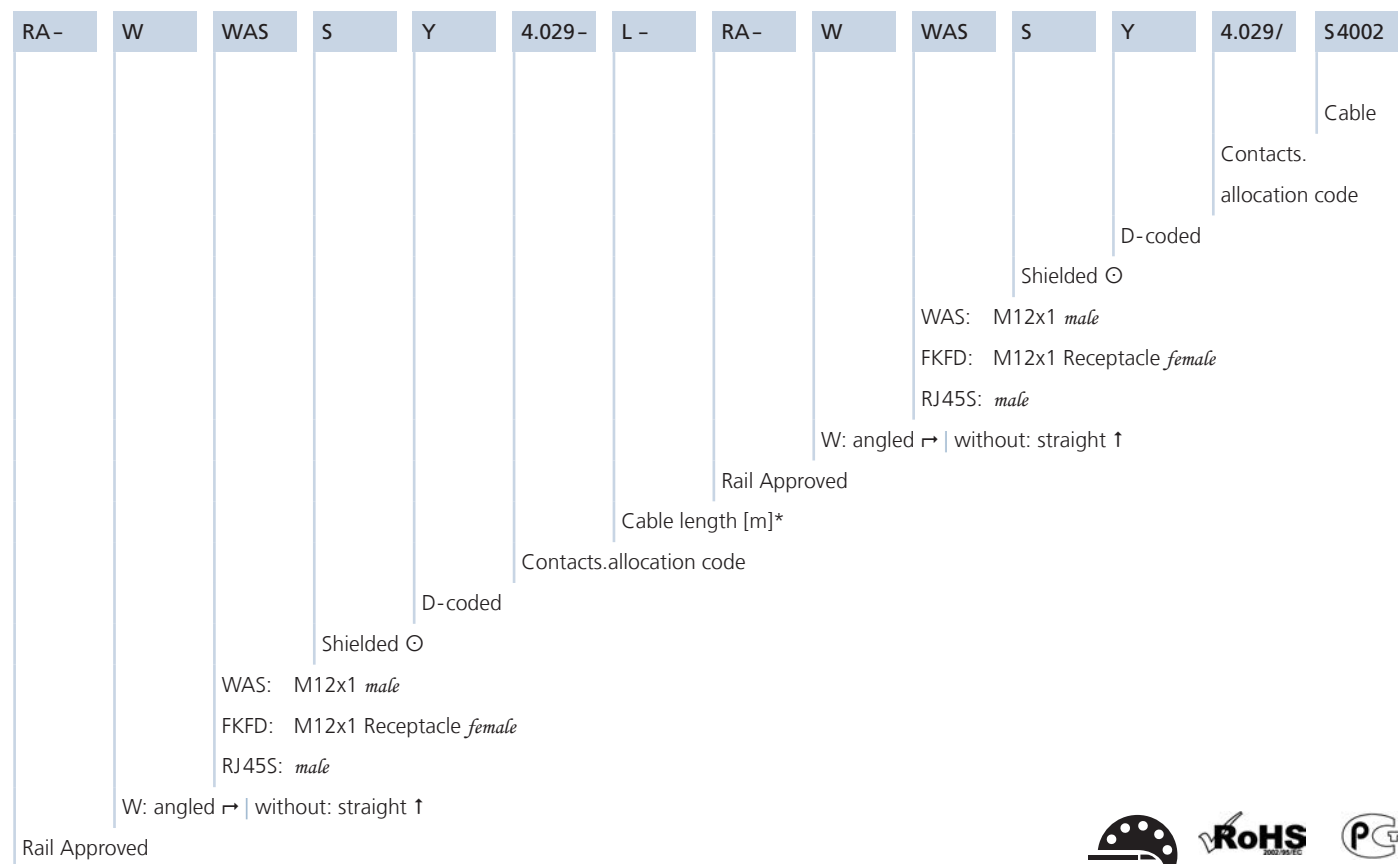
Connection cable 100 MBit/s RJ45

Technical data	Round connector	Field-wireable ✎
Rated voltage [U _{max}]	50V	50V
Current load [I _{max}]	1A	1A
Insulation resistance	≥ 10 ⁸ Ω	≥ 5 ⁸ Ω
Standards	IEC 60603-7-5	IEC 60603-7-5
Materials	Grip: TPU, BK Housing: Zinc diecasting Contact carrier/Loader: PC, transparent Contacts: CuZn, gold-plated Shielding: CuZn, nickel-plated	Zinc diecasting PA UL94-V0, transparent CuSn, gold-plated CuZn, nickel-plated
Ambient temperature	-20°C...+75°C	-40°C...+70°C
Degree of pollution	1	1
Protection class (installed)	IP20	IP20
Mechanical life cycle	>750 Mating cycles	>750 Mating cycles
Empfohlene Cablesquerschnitte		AWG27/7 - AWG22/7 AWG26/1 - AWG22/1
External diameter of the cable		Ø 5.5... 10.5mm
Connection		IDC
Pinning male	RJ45 Industrial 4 pins	RJ45



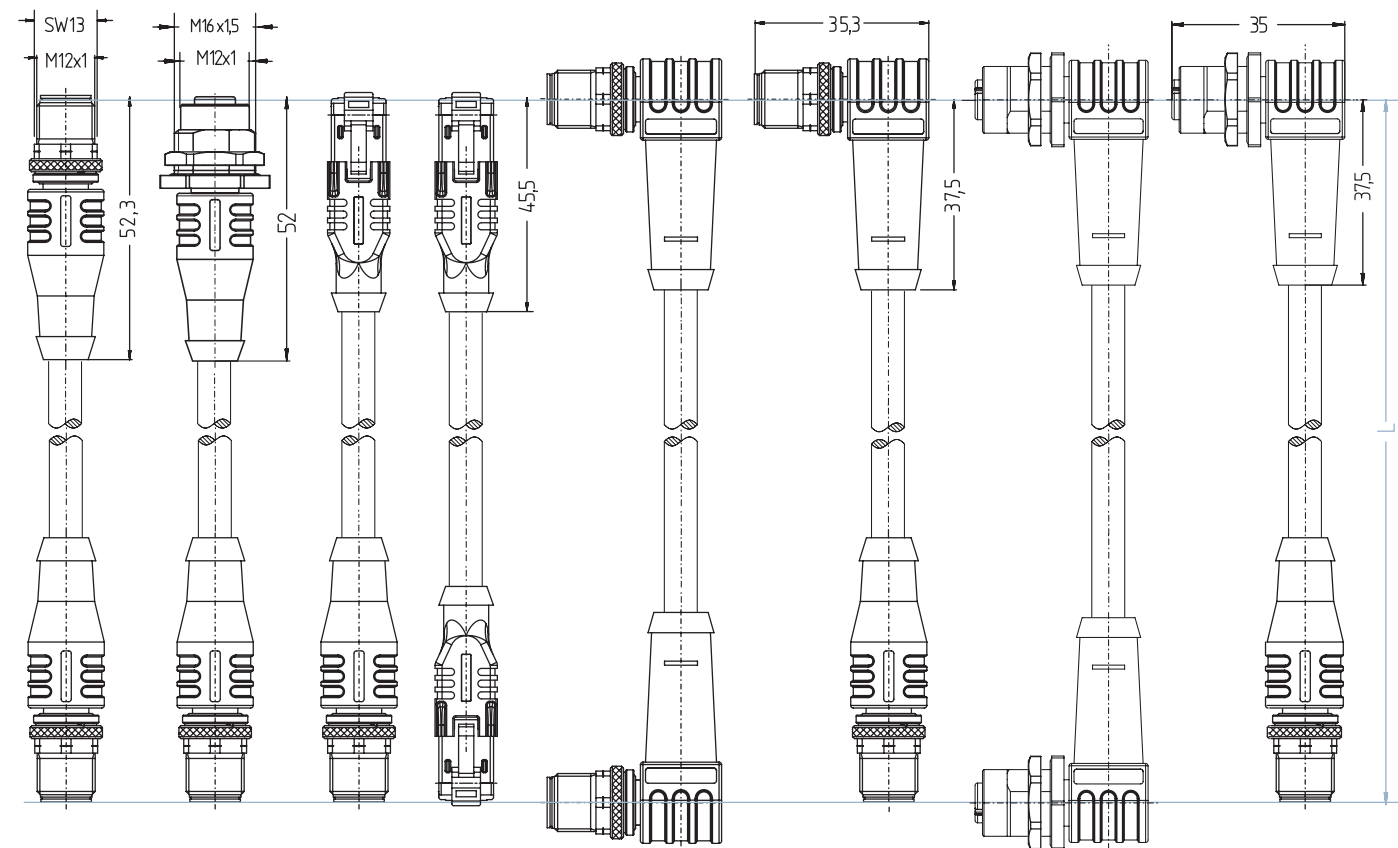
1YE | 2OG | 3WH | 6BU



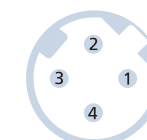


Version	Cable quality	Item description	
M12x1 Cat5e	<i>m</i> ↑__ <i>m</i> ↑	S4002 RA-WASSY4.029-L-RA-WASSY4.029/S4002	
		S4003 RA-WASSY4.029-L-RA-WASSY4.029/S4003	
		S4004 RA-WASSY4.029-L-RA-WASSY4.029/S4004	
	<i>m</i> ↗__ <i>m</i> ↑	S4002 RA-WWASSY4.029-L-RA-WASSY4.029/S4002	
		S4003 RA-WWASSY4.029-L-RA-WASSY4.029/S4003	
		S4004 RA-WWASSY4.029-L-RA-WASSY4.029/S4004	
	<i>m</i> ↗__ <i>m</i> ↗	S4002 RA-WWASSY4.029-L-RA-WWASSY4.029/S4002	
		S4003 RA-WWASSY4.029-L-RA-WWASSY4.029/S4003	
		S4004 RA-WWASSY4.029-L-RA-WWASSY4.029/S4004	
	M12x1 Receptacle__M12x1 Cat5e	<i>f</i> ↑__ <i>m</i> ↑	S4002 RA-FKFDSY4.029-L-RA-WASSY4.029/S4002
			S4003 RA-FKFDSY4.029-L-RA-WASSY4.029/S4003
			S4004 RA-FKFDSY4.029-L-RA-WASSY4.029/S4004
<i>f</i> ↑__ <i>m</i> ↗		S4002 RA-FKFDSY4.029-L-RA-WWASSY4.029/S4002	
		S4003 RA-FKFDSY4.029-L-RA-WWASSY4.029/S4003	
		S4004 RA-FKFDSY4.029-L-RA-WWASSY4.029/S4004	
<i>f</i> ↗__ <i>m</i> ↑		S4002 RA-WFKFDSY4.029-L-RA-WASSY4.029/S4002	
		S4003 RA-WFKFDSY4.029-L-RA-WASSY4.029/S4003	
		S4004 RA-WFKFDSY4.029-L-RA-WASSY4.029/S4004	
M12x1__RJ45 Cat5e		<i>m</i> ↑__RJ45 ↑	S4002 RA-WASSY4.029-L-RA-RJ45SS4.003/S4002
		<i>m</i> ↗__RJ45 ↑	S4002 RA-WWASSY4.029-L-RA-RJ45SS4.003/S4002
			S4003 RA-WFKFDSY4.029-L-RA-WWASSY4.029/S4003
		S4004 RA-WFKFDSY4.029-L-RA-WWASSY4.029/S4004	
RJ45__RJ45 Cat5e	RJ45 ↑__RJ45 ↑	S4002 RA-RJ45SS4.003-L-RA-RJ45SS4.003/S4002	

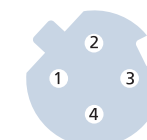
*Inch-perfect cable lengths are available upon request. Just add item description and cable length »L« in meters to your order.
For example: cable length L = 5.2m (see dimensioned drawing) | RA-WASSY4.029-5,2-RA-WASSY4.029/S4002



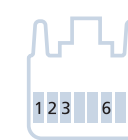
Extension cable 100 MBit/s 4 pins				
Technical data	M12x1	M12x1 Receptacle	RJ45	
	Round connector	Back-wall mounting		
Rated voltage [U _{max}]	250V	250V	50V	
Current load [I _{max}]	4A	4A	1A	
Insulation resistance	≥10 ⁸ Ω	≥10 ⁸ Ω		
Standards	IEC 61076-2-101 DIN EN 50155 DIN EN 45545-2	IEC 61076-2-101 DIN EN 50155 DIN EN 45545-2	IEC 60603-7-5	
Materials	Grip	TPU, BK	TPU, BK	
	Contact carrier/Loader	PA, BK	PA, BK	
	Contacts	CuZn, gold-plated	CuZn, gold-plated	CuZn, gold-plated
	Locking mechanism/housing	CuZn, nickel-plated	CuZn, nickel-plated	
	Shielding			CuZn, nickel-plated
	Sealing		FPL /FKM	
	Sealing (screw in thread)		NBR	
Ambient temperature	-40°C...+90°C	-40°C...+90°C	-30°C...+90°C	
Degree of pollution	3	3	1	
Protection class (installed)	IP67 (-30°C...+90°C)	IP67 (-30°C...+90°C)	IP20	
	IP65 (-40°C...+85°C)	IP65 (-40°C...+85°C)		
Mechanical life cycle	>100 Mating cycles	>100 Mating cycles	>750 Mating cycles	
Coding	4 pins <i>male</i> D	4 pins <i>female</i> D	RJ45 <i>male</i>	



1YE | 2WH | 3OG | 4BU



1YE | 2WH | 3OG | 4BU



1YE | 2OG | 3WH | 6BU

RA-	W	FK	F	D	S	Y	4.029-	L/	16/	S3525	S4002
											Cable quality
											Wall thickness compensation Δh for WFKFS, colour GN
											Screw in thread 16: M16x1.5 12: M12x1
											Cable length [m]* P: Print-contact
											Contacts.allocation code
											D-coded
											Shielded \odot
											Adjustable \cup
											F: threaded front without: threaded back
											Receptacle M12x1: FK: female
											W: angled \curvearrowright without: straight \uparrow

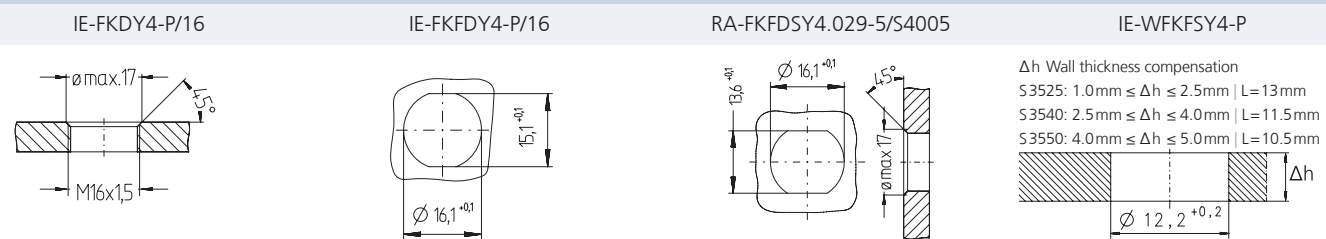
RA: Rail Approved
IE: Industrial Ethernet (Rail Approved)



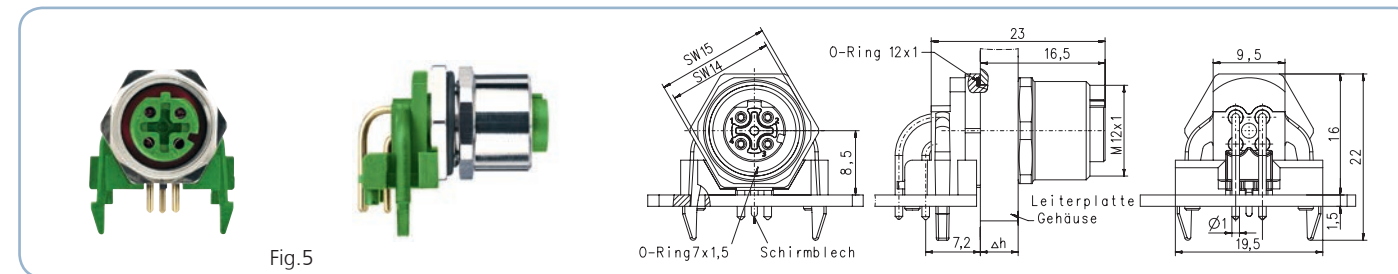
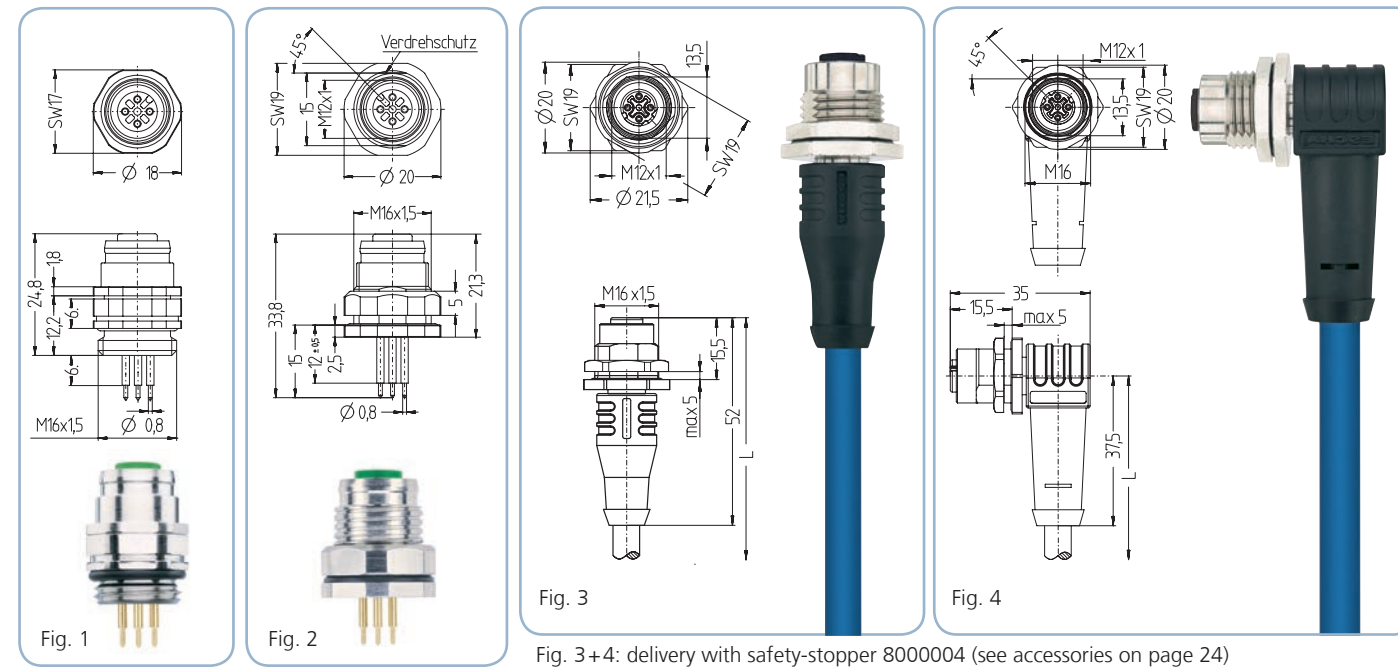
M12x1-Receptacles	Connection	Cable-quality	Version	Item description	Item-No.
Front-wall mounting	Print-contact		f \uparrow \cup Cat5e	Fig. 1 IE-FKDY4-P/16	8047944
Back-wall mounting	Cable	S4002	f \uparrow \odot Cat5e	Fig. 3 RA-FKFDY4.029-L/16/S4002	*
		S4003		Fig. 3 RA-FKFDY4.029-L/16/S4003	*
		S4004		Fig. 3 RA-FKFDY4.029-L/16/S4004	*
	Cable	S4002	f \curvearrowright \odot Cat5e	Fig. 4 RA-WFKFDY4.029-L/16/S4002	*
		S4003		Fig. 4 RA-WFKFDY4.029-L/16/S4003	*
		S4004		Fig. 4 RA-WFKFDY4.029-L/16/S4004	*
Print-contact			f \uparrow \cup Cat5	Fig. 2 IE-FKDY4-P/16	8047945
			f \curvearrowright \odot $\Delta h < 2.5\text{mm}$ Cat5e	Fig. 5 IE-WFKFSY4-P/12/S3525	8050282
			f \curvearrowright \odot $\Delta h < 4.0\text{mm}$ Cat5e	Fig. 5 IE-WFKFSY4-P/12/S3540	8050284
			f \curvearrowright \odot $\Delta h < 5.0\text{mm}$ Cat5e	Fig. 5 IE-WFKFSY4-P/12/S3550	8050285

* Inch-perfect cable lengths are available upon request. Orderexample: Cable length L = 5.2m | RA-FKFDY4.029-5,2/16/S4002

Panel cut-out (cutting for anti-twist safeguard)

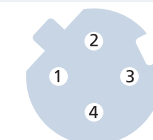


Hole pattern



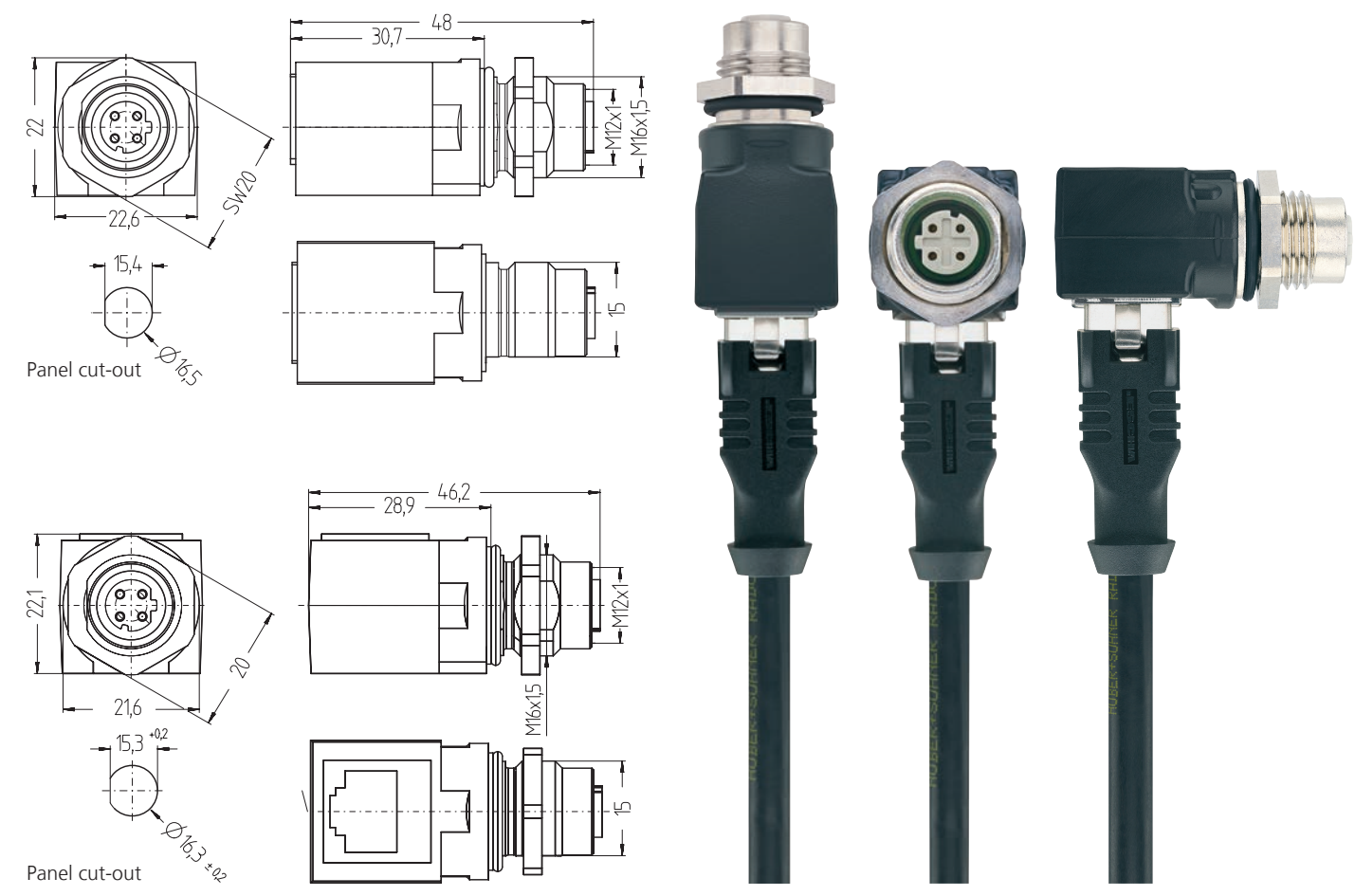
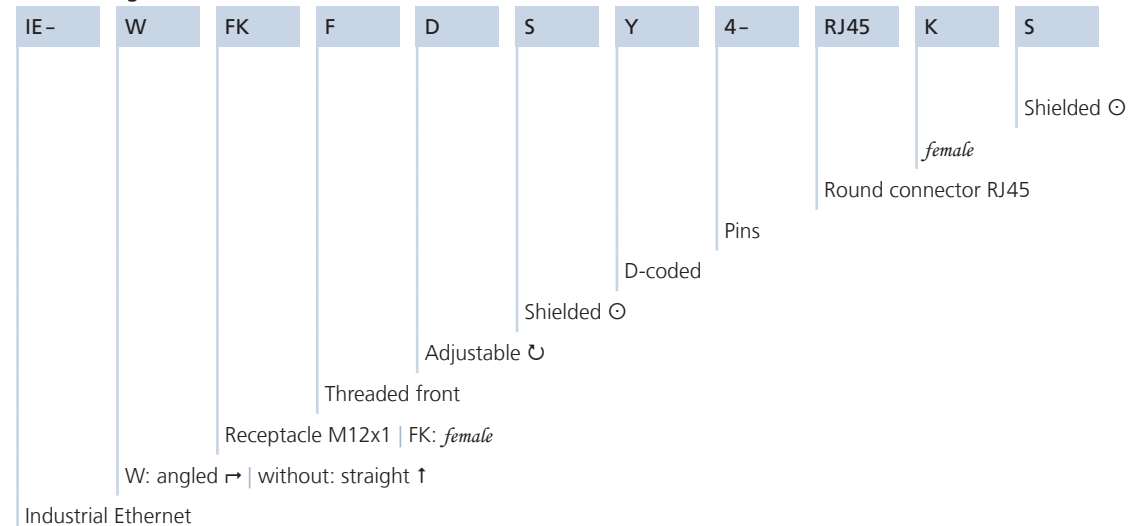
Receptacle connectors for housing assembly | 4 pins

Technical data		
Rated voltage [U _{max}]	250V	
Current load [I _{max}]	4A	
Insulation resistance	$\geq 10^8 \Omega$	
Standards	IEC 61076-2-101 DIN EN 50155 DIN EN 45545-2	
Materials	Receptacle housing/spare nut	CuZn, nickel-plated
	Contact carrier IE	\uparrow : TPU, GN \curvearrowright : PA, GN
	Contact carrier RA	PA, BK
	Grip	TPU, BK
	Contacts	CuZn, gold-plated
	Sealing	FPL /FKM
Sealing (screw in thread)		NBR
Ambient temperature	-30°C...+90°C -40°C...+85°C with overmoulded grip	
Degree of pollution	3	
Protection class (installed)	IP67 (-30°C...+90°C) IP65 (-40°C...+85°C)	
Mechanical life cycle	>100 Mating cycles	
Coding	4 pins female D	



1YE | 2WH | 3OG | 4BU

Feed-through connection M12x1 → RJ45

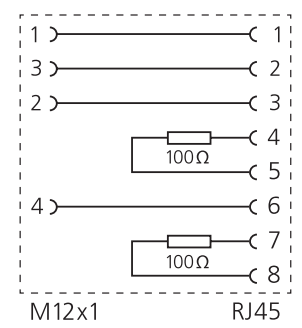


Product line	Version	Pins Coding	Item description	Item-No.		
Back-wall mounting	M12x1 → RJ45	f ↑ ⚙ Ⓞ Cat5e	4 D	Fig.2	IE-FKFDSY4-RJ45KS	8057085
(Threaded front)		f ↗ ⚙ Ⓞ Cat5e	4 D	Fig.3	IE-WFKFDSY4-RJ45KS	8057086

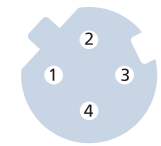
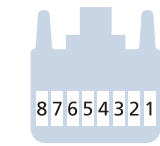
Feed-through connection M12x1 → RJ45 | 4 pins

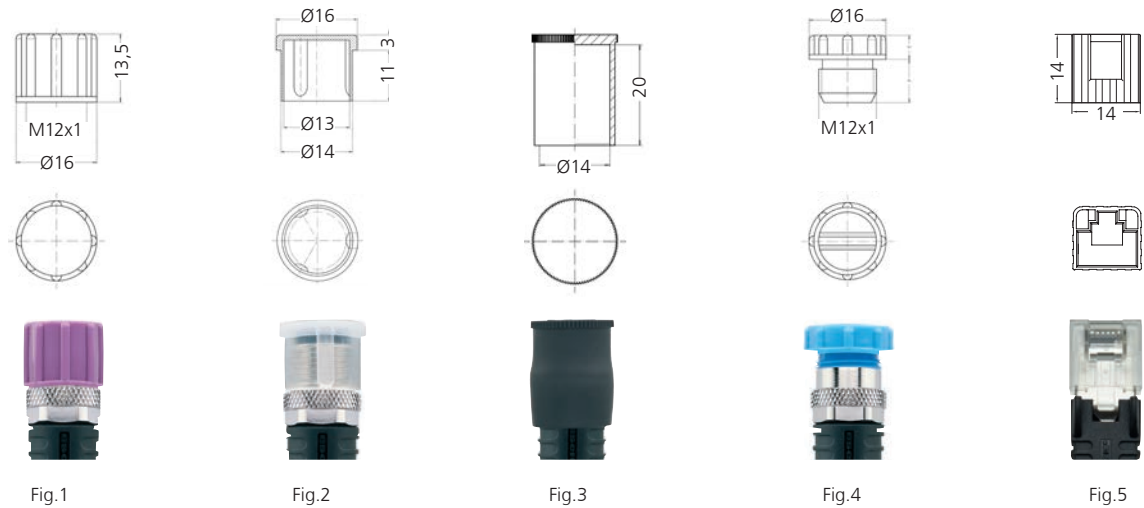
Technical data	Adapter M12x1 → RJ45
Rated voltage [U _{max}]	50 V _{AC/DC}
Current load [I _{max}]	0.2 A
Standards	M12x1: IEC 61076-2-101 RJ45: IEC 60603-7-51
Ambient temperature	-25°C...+85°C
Protection class (installed)	M12x1: IP67

Wiring
IE-(W)FKFDSY4-RJ45K

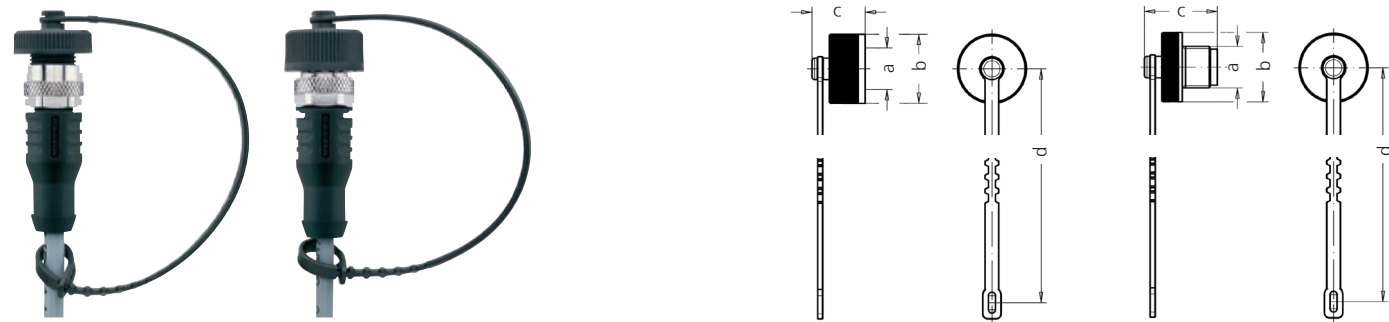


Coding	RJ45	M12x1 female 4 pins D
--------	------	-------------------------



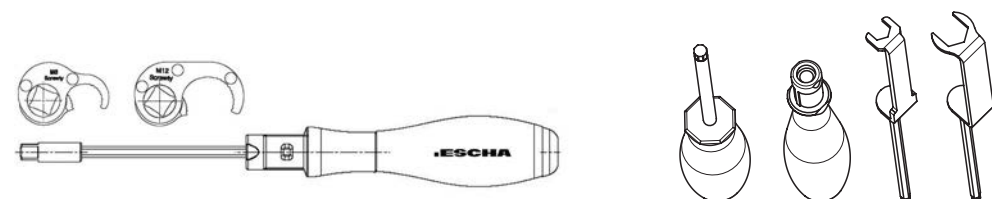


Product line	for	Protection class	colour (according to RAL)	Fig.	Item-No.
Safety-stopper	M12x1 <i>f</i>	IP67	BK RAL9005	4	8000004
		IP67	VT RAL4001	4	8041992
		IP67	BU RAL5012	4	8041993
		IP67	GN RAL6018	4	8059233
Safety-cap	M12x1 <i>m</i>	IP67	BK RAL9005	1	8036742
		IP67	VT RAL4001	1	8041995
		IP67	BU RAL5012	1	8041996
		IP67	GY RAL7053	1	8041994
Safety-cap (PU: 100pcs.)	RJ45	IP20	transparent	5	8064715
Dustproof-cap	M12x1 <i>m</i>		transparent	2	8009778
	M12x1 <i>m + f</i>		BK RAL9005	3	8043617



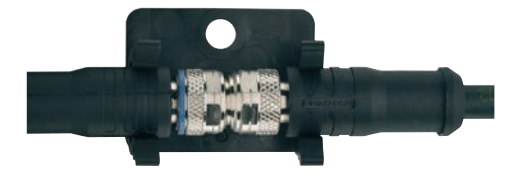
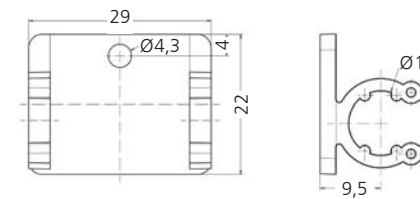
Product line	for	Protection class	a	b	c	d	Item-No.
Safety-stopper captiv	M12x1 <i>f</i>	IP67	M12x1	Ø 20mm	21.0mm	160mm	8048568
Safety-cap captiv	M12x1 <i>m</i>	IP67	M12x1	Ø 20mm	15.5mm	160mm	8048569

Torque-wrench set
M8x1 | M12x1



Item description	Item-No.
Torque-wrench-set in wallet fully fitted for M8x1 M12x1 (knurl, hexagon-nut)	8055431

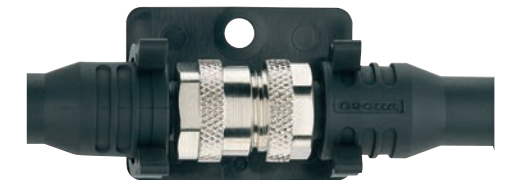
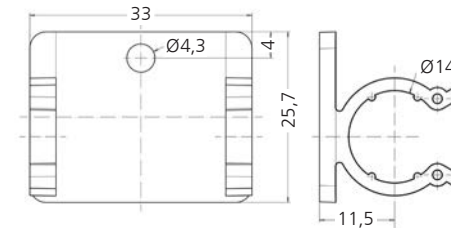
Mounting-clip
for M8x1 Round connectors
and cables



POM BK

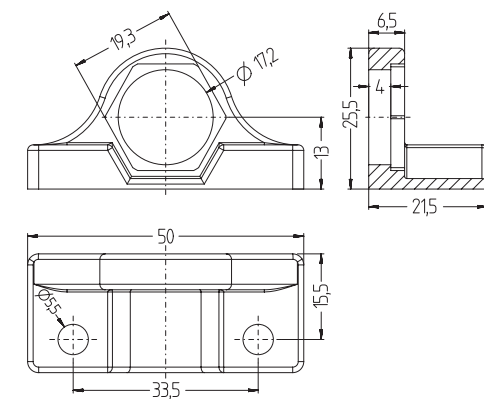
Mounting-clip M8x1	1xClip	8047658
Mounting-clip set M8x1	10xClip + 10xscrews M4x8	8047663

Mounting-clip
for M12x1 Round connectors,
fieldwireable connectors
and cable-connections
POM BK



Mounting-clip M12x1	1xClip	8047660
Mounting-clip set M12x1	10xClip + 10xscrews M4x8	8047664

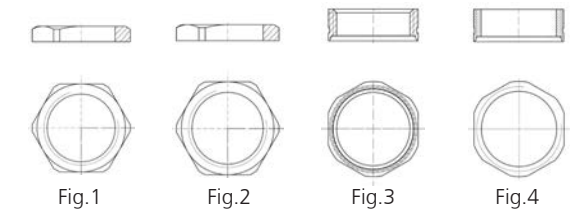
Mounting-angle
for adapters M12x1/M12x1



PA BK

Mountin-angles	1pcs.	8065953
----------------	-------	---------

Spare nuts
for Receptacles
CuZn nickel-plated

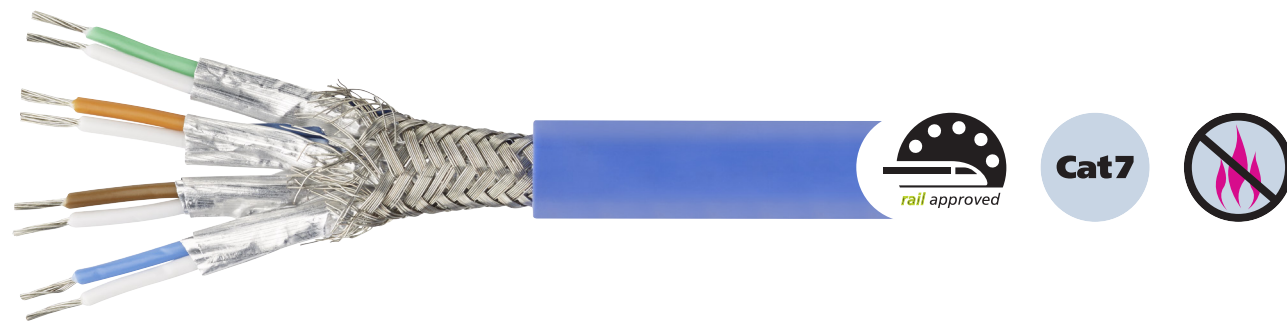


Thread	Fig.	for Receptacle	Materials	SW	h [mm]	Item-No.
PG9	1	M12x1 PG9	CuZn VA*	18	3.0	8004913
M16x1.5	4	M12x1 M16x1.5	CuZn VA*	19	2.8	8029359
PG9	3	M12x1 FKD	CuZn	17	6.0	8004874
M16x1.5	4	M12x1 FKD	CuZn VA*	17	6.0	8027491

Marking label

- 25.4mm x 38.1mm
- Factory made-up with optional customer-specific position on the cable
- Wipe-proof two-line print text each with 22 characters Arial 6pt
- Label is UL-approved and comprehensively media-resistant
- Available in numerous colors





RADOX® Railcat Cat7 4x2x24 AWG | S4005

Halogen-free irradiated cable with good behavior in case of fire. The four-pair cable is adapted to stationary wiring and for the application in Backbone (ETBN) of railway vehicles meeting the fire protection requirements according to DIN EN 45545 Hazardous Level 3. Data transmission rates up to 10 GBit/s are possible.

Features	<ul style="list-style-type: none"> ■ Flame-retardant ■ Low smoke ■ Fire protection according to DIN EN 45545 HL1-3 DIN 5510 Degree of fire protection 1-4 NF F16-101 Class A1, A2, B UNI CEI 11170, Threat level LR1-LR4 ■ Acids- and alkali resistance ■ Oil- and fuel resistant ■ Halogen-free ■ Weatherproof
Cable quality for	ETBN (IEC 61375-2-5)
Transmission category	Cat 7
Transmission rate	≤ 10 GBit/s
Rated voltage	≤ 125V
Nominal diameter	Ø 8.1 mm
Wire-structure data	4x2xAWG24
Wire colours	WH(OG) OG; WH(GN) GN; WH(BN) BN; WH(BU) BU
Colour outer-jacket	BU
Bending radius fixed	4xd
Temperature range	-50°C...+70°C
ESCHA Item-No. 100m buscable	8063117



S4002 | RADOX® Railcat Cat5 4x22AWG thinwall

Halogen-free irradiated cable with good behavior on case of fire. The two-pair cable is adapted to stationary wiring and for the application in Consist Networks (ECN) of railway vehicles meeting the fire protection requirements according to DIN EN 45545 Hazardous Level 3. Data transmission rates up to 100 MBit/s are possible.

Features	<ul style="list-style-type: none"> ■ Flame-retardant ■ Low smoke ■ Fire protection according to DIN EN 45545 HL1-3 DIN 5510 Degree of fire protection 1-4 NF F16-101 Class A1, A2, B UNI CEI 11170, Threat level LR1-LR4 ■ Acids- and alkali resistance ■ Oil- and fuel resistant ■ Halogen-free ■ Weatherproof
Cable quality for	ECN (IEC 61378-3-4)
Transmission category	Cat 5e
Transmission rate	≤ 100 MBit/s
Rated voltage	≤ 300V
Nominal diameter	Ø 6.6mm
Wire-structure data	4xAWG22
Wire colours	WH-BU OG-YE
Colour outer-jacket	BK
Bending radius fixed	6xd
Temperature range	-40°C...+90°C
ESCHA Item-No. 100m buscable	8063114

Comprehensive Information on Connectors

The respective requirements of machinery specifications are binding for the user with connector applications. The relevant standards and specifications according to which our products are made and tested are explained in the following.

■ **DIN EN 45545-2 | Fire behavior**

This standard defines the protection requirements against fires and their impacts on busses and rail vehicles. It aims at minimizing the probability of fire outbreak, containing fire development and thus reducing harmful effects on passengers as much as possible. It is to be ensured that the passengers can leave the vehicle without outside help and secure themselves independently especially against heat, smoke, and toxic gases. The resulting requirements for cables and other electronic facilities as well as the necessary testing methods are regulated in part 2 of the standard. In order to most possibly cover all design and operating types of the vehicles, our connectors' materials have been selected according to the R24 requirement type.

■ **DIN EN 50155 | Mechanical stresses**

The DIN EN 50155 requirements for electrical facilities simulate all devisable application conditions under which rail vehicles may operate. The required tests show whether the products still function faultlessly at extreme temperatures, temperature shocks, high humidity, and heat as well as under strong vibrations and mechanical shocks. IP67 protection class test is also carried out within the scope of the entire testing procedure.

■ **IEC 60529; 2009-09 | Degrees of Protection by Housing (IP-Code)**

This international standard corresponds to the European standard DIN EN 60529 and complies with the German standard DIN VDE 0470 -1, November 92 edition. It determines the designation, requirements and tests for the classification of protection degrees by housings for electrical devices (e.g. connectors). Thereby, protection against access to dangerous parts, protection against solid foreign bodies and protection against water are evaluated. The degree of protection is designated by an IP-code.

■ **IEC 60664-1; 2008-01 | Coordination of Isolation**

This international standard, which complies with the German standard DIN VDE 0110 -1, April 97 edition, is a basic safety standard for achieving the coordination of isolation. It contains the required data to determine air distances, creep distances and solid insulations for electrical devices (e.g. connectors). This is realised considering the micro-ambient conditions and other loads they are exposed to in the course of the expected service life. Processes for the voltage test related to the coordination of isolation are included.

■ **IEC 60512; May1994 | Measuring- and Testing-Process**

This international standard corresponds to the European standard DIN EN 60512 and has replaced the previous German standard DIN 41640. It determines the measuring- and testing-processes for electromechanical components (e.g. connectors). The standard is very comprehensive and consists of 9 sections in total in which all electrical, mechanical and climatic tests are described. In addition, the standard contains tests on soldering ability, density, shielding and cable pull-out support.

Changes in design are subject to further notice for reasons of quality improvements, refinement or production optimisation. The technical data stated in the catalogue refer to connectors, i.e. components which must not be plugged or unplugged under voltage. In order to secure the correct use of the products, the technical data are listed. It is possible to select the right products using these data. The products are described as well, however the properties are not assured. All ESCHA connectors have been developed and designed for applications in plant-, control and electric device version. It is up to the user to verify the possibility of using the connectors in other application areas as well. Data on properties and Sealing refer to torques of 1.0Nm for M12x1-Round Connectors or 0.6Nm for M8x1-Round Connectors. All data concerning the IP-degrees of protection are only guaranteed for the connections of ESCHA components.

Conversion of American Wire Gauge, AWG in mm²

In some industrial areas, the American Wire Gauge is also used for cables. The following table serves the conversion from AWG in mm². It should be taken into consideration that wires with the same AWG-number but different structures show slightly different cross sections.

AWG	Wire structure [mm]	Wire diameter [mm]	Wire cross-section [mm²]
30	1 x 0.25	0.25	0.05
	7 x 0.10	0.36	0.06
28	1 x 0.32	0.32	0.08
	7 x 0.13	0.38	0.09
26	1 x 0.4	0.40	0.13
	7 x 1.16	0.48	0.14
	19 x 0.10	0.51	0.15
24	1 x 0.51	0.51	0.21
	17 x 0.20	0.61	0.22
	19 x 0.13	0.64	0.25
22	1 x 0.64	0.64	0.33
	7 x 0.25	0.76	0.34
	19 x 0.16	0.81	0.38
20	1 x 0.81	0.81	0.52
	7 x 0.32	0.97	0.56
	19 x 0.20	1.02	0.60
18	1 x 1.02	1.02	0.82
	19 x 0.25	1.27	0.93
16	19 x 0.29	1.44	1.25
14	19 x 0.36	1.80	1.93
12	19 x 0.46	2.29	3.16
10	37 x 0.40	3.10	4.65

Colour guide

WH	BN	GN	YE	GY	PK	BU	RD	BK	VT	GY/PK	RD/BU	WH/GN	BN/GN	WH/YE	YE/BN	WH/GY	GY/BN	GN/YE
white	brown	green	yellow	grey	pink	blue	red	black	violet	grey/pink	red/blue	white/green	brown/green	white/yellow	yellow/brown	white/grey	grey/brown	green/yellow

Overview Pg-thread vs. metric thread

The interim period for DIN 46320 "screwing for cables and conductinglines with Pg-thread" expired on 31.12.1999. Since then, screwing for cables and conductinglines had to comply with the national standard 46319 before this was replaced by EN 50262 on 01.03.2001.

Comparison Pg-thread vs. metric thread, wrench width for cable screwing according to EN 50262

Pg	Metric thread	max. Wrench width [mm]	max. Corner length [mm]
Pg7	M10x1.5 M12x1.5	16	18
Pg9 Pg11	M16x1.5	21	23
Pg13.5	M20x1.5	25	28

■ Supplementary information to the technical data stated in the catalogue

Characteristic	Standard ¹⁾	Note
Protection class housing	IEC 60529	Data in plugged condition.
Mechanical life cycle	IEC 60512-5/9a	Test is done without electrical load
Rated voltage	IEC 60664-1	The stated value is defined in connection with degree of pollution and overvoltage category
Degree of pollution	IEC 60664-1	
Current load	IEC 60512-3/5b	
Contact resistance	IEC 60512-2/2a	Contact resistance contact-pin/contact-bush in plugged condition throughout a defined range
Insulation resistance	IEC 60512-2/3a	Insulation between two conducting parts (dependent on material)

¹⁾ The technical data represent initial values which can change depending on load. The housings have to be included in the device protective-measures when mounting electrically conductive Receptacle housings. The cables to be connected should be insulated in such a way that the distances to electrically conductive parts are not reduced. When soldering the cables, care must be taken that none of the single wires is projecting which can cause short circuits.

Degrees of Protection | IP: International Protection

For reasons of safety, connectors must be protected against environmental influences, e.g. dust, foreign bodies, touch, humidity and water. In case of industrial connectors, this protection must be provided for by the housing and its locking as well as the insulation on cable outlet. The degrees of protection are indicated by an abbreviation consisting of two constant characteristic letters IP (International Protection) and two following digits for the protection degree. The first digit indicates the protection degree against touch and foreign bodies. The second digit indicates the protection against damaging ingress of water. All data are only valid in locked condition. Awarding degrees of protection is subject to a standardised testing procedure.

	Digit 1	Digit 2
0	Unprotected	Unprotected
1	Protected against access to dangerous parts by hand pressure. Protected against solid foreign bodies Ø50mm.	Protected against dripping water
2	Protected against access to dangerous parts by fingers. Protected against solid foreign bodies Ø12.5mm.	Protected against dripping water when housing is inclined up to 15°
3	Protected against access to dangerous parts by a tool. Protected solid foreign bodies Ø2.5mm.	Protected against spraying water
4	Protected against access to dangerous parts by a wire. Protected against solid foreign bodies Ø1mm.	Protected against sprinkling water
5	Protected against access to dangerous parts by a wire. Protected against dust.	Protected against water-jet
6	Protected against access to dangerous parts by wire. Dustproof.	Protected against a strong water-jet
7		Protected against effects due to temporary immersion in water.
8		Protected against effects due to permanent immersion in water. (Conditions to be agreed upon between manufacturer and user. However, conditions must be more difficult than with IP_7.)
9 K		Protected against water by high-pressure steam-jet cleaning

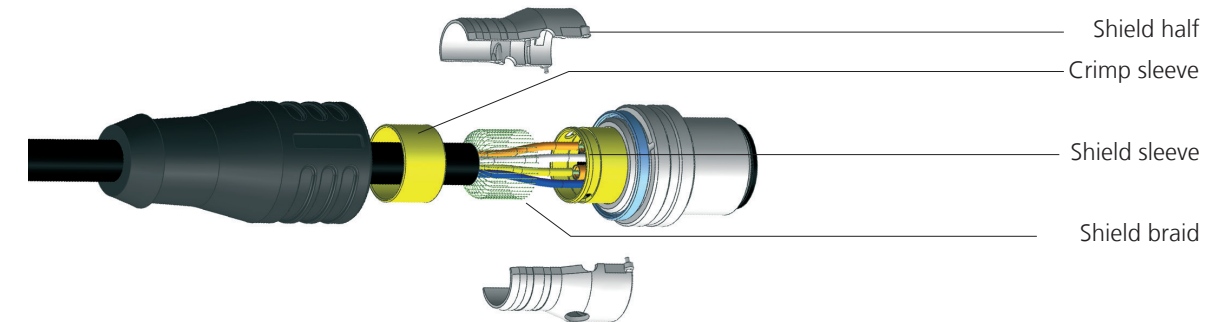
Shielding | ESCHA two-component overmould shielding

EMC of devices has gained more significance since the publication of the law on electromagnetic compatibility. The devices have to be made in such a way that:

The generation of electromagnetic interferences is limited to the extent that a proper operation of these devices is possible.

The devices have an adequate stability against electromagnetic interferences in order that a proper operation is possible.

The ESCHA two-shell-shielding concept comprises an equipotential surface through two interconnected metal shells encapsulating the round connector at 360°. The shield braid of the molded cable is crimped all around on the shield sleeve. A twofold-overmold provides for 360°-shielding even at high mechanical stresses, dust- and waterproof at high pressure- and steam jet cleaning according to IP67 and IP69.



Certifications

UL (Underwriter Laboratories Inc.)

The certification of products, components or materials by the Underwriter Laboratories Inc. is the verified proof that it meets the specific safety requirements. UL-approvals are, above all, required for the American and Canadian markets. For relevant ESCHA products, component approvals (UL Recognized Component) apply, qualifying them as UL-approved components for installation into UL-approved systems. This component approval also holds for relevantly used cable qualities.



GOST-R (ГОСТ - Государственный Стандарт)

Importing goods into the Russian Federation requires the certification by the Federal Agency for Technical Regulation and Metrology which verifies product compliance with the Russian requirements, standards and quality standards.



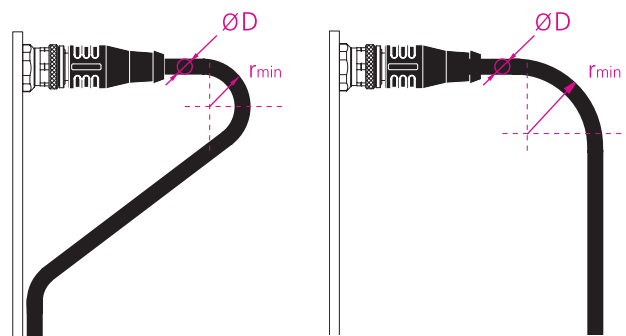
Guideline 2002/95/EG (RoHS - Restriction of [the use of certain] hazardous substances)

The EU-guideline restricting the use of certain hazardous substances in electrical- and electronic devices does not allow hazardous substances in devices and components above defined limits. Lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl (PBDE) are among the hazardous substances. For ESCHA products, this means lead-free soldering and no use of flame retardants in plastics and cables.

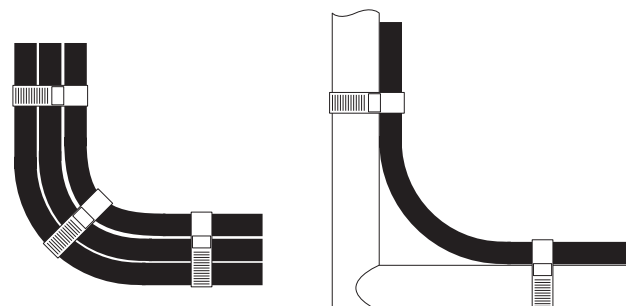
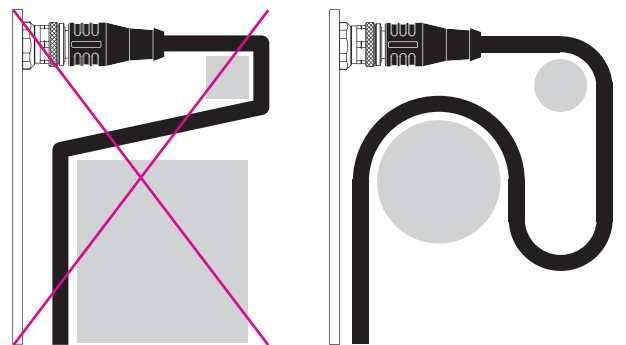


ESCHA connectors are electronic components and are not subject to CE-designation. This is confirmed by the European Commission directives for low-voltage- and EMC-guidelines.

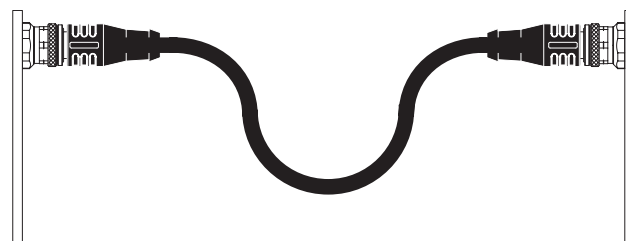




Fixed wiring



Bundling of several cables Fixing of cables



Cable loops

Wiring instructions

The correct installation of the round connector and a professional wiring are the precondition for properties of a relevantly tight and reliable electrical connection guaranteed by the manufacturer.

The use of a torque application tool is recommended for tightening and loosening of round connectors (accessories page 24).

Recommended tightening torque according to IEC 61076-2 test requirements:
1.0Nm for M12x1 round connectors

Recommended tightening torque for Receptacles according to IEC 61076-2 test requirements:
2.0Nm for M12x1 round connectors

The recommendations base on internal tests and cover a majority of applications and product combinations. Due to the design variety of products available on the market, specifications have to be checked in individual cases.

In order to avoid damage to a round connector and cable, the minimum bending radius of the cable (rmin) is to be observed during the wiring.

When using cable ties for cable bundling or permanent wiring, the ties must not cut into or deform the cable to avoid short circuits, a disturbance of the data transmission or a reduction of the dielectric strength.

In case of extension cables, sufficient cable length between the connections should be observed in order to absorb the generated energy during movement. The use of cable loops guarantees a high life cycle of the round connector system.

Data lines are high-performance products. Avoid any mechanical influences like squeezing, edgy snapping and tractive forces during mounting and operating to ensure a permanent and safe data transmission. Be careful while mounting at sub-zero temperatures, as plastics boast different features at low temperatures and the end product might be damaged.

Representatives abroad



AR
AUMECON S.A.
Acassuso 4768
1605 Munro/Buenos Aires
Phone: +54 11 47561251
Fax: +54 11 47626331
aumeco@aumecon.com.ar
www.aumecon.com.ar



AT
ESCHA Bauelemente GmbH
Büro Wien
Gumpoldskirchner Str. 14/8
2340 Mödling
Phone: +43 664 3072340
Fax: +49 2353 708-89487
info.austria@escha.net
www.escha.net



AU
Micromax Sensors
and Automation Pty Ltd
Unit 2, 106 Beaconsfield Street
Silverwater NSW 2128
Phone: +61 2 8748 2800
Fax: +61 2 9648 3245
info@micromaxsa.com.au
www.micromaxsa.com.au



CH
Dietrich+Blum AG
Hertistr. 31
8304 Wallisellen
Phone: +41 848 300700
Fax: +41 848 300701
dbnet@dietrichundblum.ch
www.dietrichundblum.ch



CN
ESCHA Automation Connectivity
(Shanghai) Co., Ltd.
2060 Duhui Road, Building F,
2nd Floor, Minhang District
201108 Shanghai
Phone: +86 21 52968180
Fax: +86 21 52968190
info.china@escha.net
www.escha.net



DK
Hans Følsgaard A/S
Theilgaards Torv 1
4600 Køge
Phone: +45 43 208600
Fax: +45 43 968855
hf@hf.net
www.hf.net



ES
ELION S.A.
Farell, 5
08014 Barcelona
Phone: +34 9 32982000
Fax: +34 9 34311800
elion@elion.es
www.elion.es



FI
SARLIN Oy Ab
Kaivokselantie 3-5
01610 Vantaa
Phone: +358 10550 4000
Fax: +358 10550 4201
info@sarlin.com
www.sarlin.com



FR
ESCHA S.A.S
60, Avenue Charles de Gaulle -
CS 60016
92573 NEUILLY SUR SEINE CÉDEX
Phone: +33 1 73 02 89 45
Fax: +33 1 73 02 89 46
info.france@escha.net
www.escha.net



HR
Tipteh d.o.o. Zagreb
Pešćanska ulica 170,
10000, Zagreb
Phone: +385 1 381 65 74
Fax: +385 1 381 65 77
info@tipteh.hr
www.tipteh.hr



IN
Automation Combine
B.R. House, 2nd Floor
Hennur Main Road
Bangalore 560043
Phone: +91 80 2543 5757
Fax: +91 80 2543 5759
info@automationcombine.com
www.automationcombine.in



IT
R.E.D. s.r.l.
Via Mappano 30
10071 Borgaro (TO)
Phone: +39 011 45 01 373
Fax: +39 011 45 100 69
info@redto.it
www.redto.it



MK
Tipteh d.o.o. Skopje
Ul. Bul.Partizanski Odredi 80 lok 5
1000 Skopje
Phone:/Fax:+389 2 31 74 197
info@tipteh.mk
www.tipteh.mk



NO
HF DANYKO AS
Bark Silas Vei 8
4876 Grimstad
Phone: +47 37 090 940
Fax: +47 37 090 941
danyko@hf.net
www.danyko.no



PL
ENMATEK spółka z o.o.
ul. Wrocławska 31
30-011 Kraków
Phone: +48 608 69 07 05
sales@enmatek.eu
www.enmatek.eu



PT
BRESIMAR Automacao, S.A.
Quinta do Simao
EN109 - Esgueira
Apartado 3080
3801-101 Aveiro
Phone: +351 234 303 320
Fax: +351 234 303 328/9
bresimar@bresimar.pt
www.bresimar.pt



RS
Tipteh d.o.o. Beograd
Toplice Milana 14A,
1050 Beograd
Phone:/Fax: 011 28 92 250
info@tipteh.rs
www.tipteh.rs



SE
Tufvasson Tesch AB
Märstavägen 20
193 40 Sigtuna
Tel: +46 8-594 809 00
Fax: +46 8-592 527 68
reception@tufvassons.se
www.tufvassons.se



SI
Tipteh d.o.o.
Ulica Ivana Roba 21
1000 Ljubljana
Phone: +386 1 200 51 50,
Fax: +386 1 200 51 51,
info@tipteh.si
www.tipteh.si



SK
MARPEX s.r.o.
Sportovcov 672
01841 Dubnica nad Váhom
Phone: +421 42 4426986-87
Fax: +421 42 44400 10-11
marpex@marpex.sk
www.marpex.sk



TR
Gökhan Elektrik
Malzemeleri Sanayi ve Ticaret
LTD STI.
Perpa Elektrokent is Merkezi A
Blok K.8
No.692-694
34385 Okmeydani /Istanbul
Phone: +90 2122213236
Fax: +90 2122213240
gokhan@gokhanelektrik.com.tr
www.gokhanelektrik.com.tr



ZA
RET Automation Controls
PO 8378
Edenglen, 1613
Phone: +27 11 4532468
Fax: +27 11 4532406
info@retauto.co.za
www.retauto.co.za

ESCHA Bauelemente GmbH
Elberfelder Str. 32
58553 Halver | Germany
Phone: +49 2353 708-800
Fax: +49 2353 708-8410
www.escha.net

