

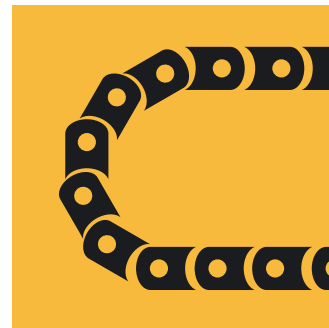
**100**  
MBit/s

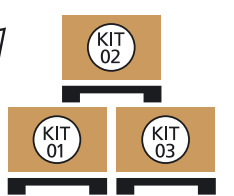
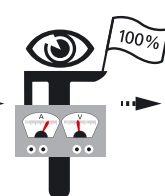
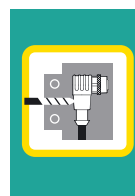
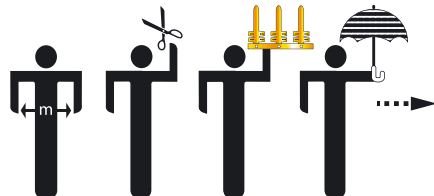
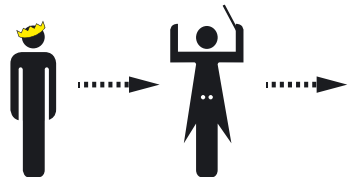
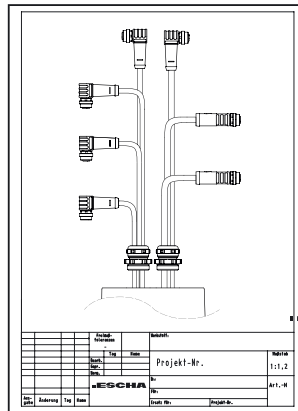
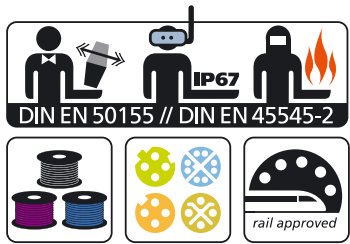
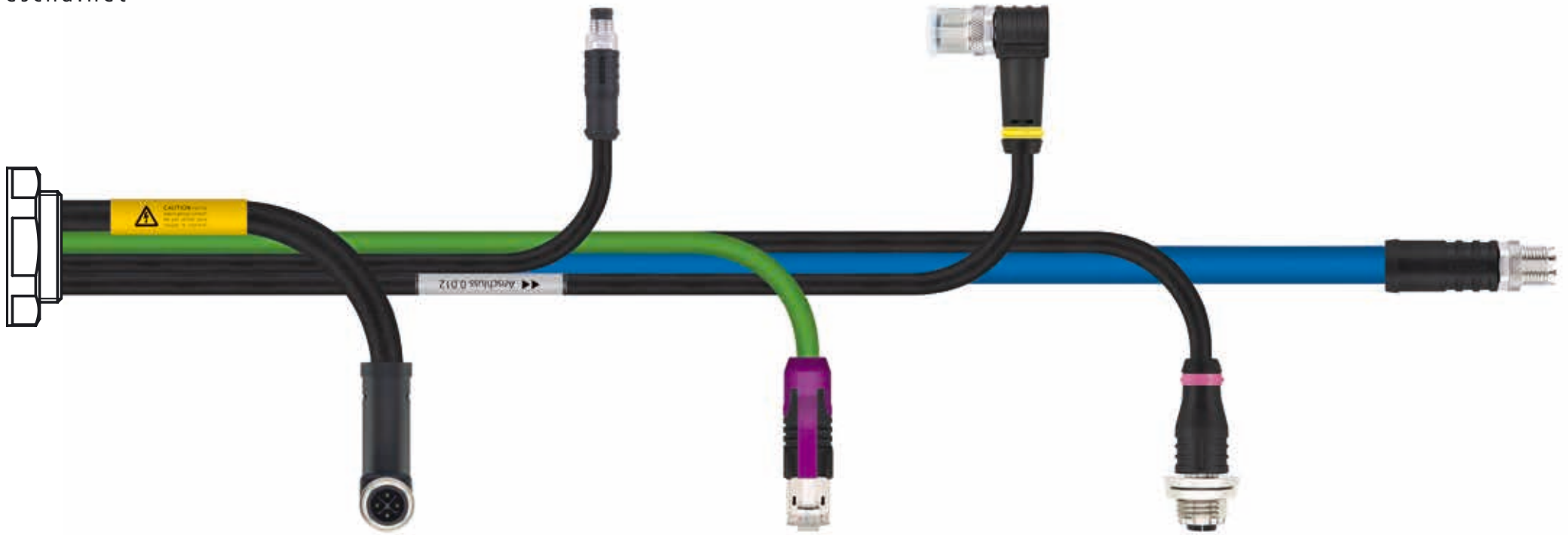


**12 A**  
630 VAC  
1.5 mm<sup>2</sup>



**10**  
GBit/s





In the area of Bus&Rail, there is no easy way of rework during operation. There is no room for error and all components must perform to avert any dangerous incidents. Therefore, safety requirements are extremely high. On the one hand, specific **rules and standards** have to be complied with. On the other hand, environmental conditions like temperature variations, vibration, or electromagnetic impacts are particularly challenging.

At ESCHA, we accepted this challenge and placed a comprehensive product portfolio on the market, matching up to the high rail-specific security demands and permanently withstanding the extreme environmental impacts. We designated these products as 'rail approved'.

#### Exclusive services for the rail industry

As almost each wagon is different, we do not specify any standard cable lengths for our 'rail approved' products and supply inch-perfect instead. Moreover, our connectors can be equipped with custom-made pooled harnesses and markings upon request facilitating the installation for fitters.

We also offer special solutions like an M12x1-grip body with a thread. This grip body with thread facilitates a protective hose on cables. It is well suited for applications outside the train exposed to extremely extensive pollution, damages, or stone-chipping.

#### INDUSTRIAL ETHERNET 10Gbit/s

Fast data transmission for ETB  
RJ45, M12x1 | 8 pins, X-coded  
Cat6A

06

#### INDUSTRIAL ETHERNET 100Mbit/s

Secure data transmission for ECN  
RJ45, M12x1 | 4 pins, D-coded  
Cat5e

12

#### SENSOR/ACTUATOR

Stable device supply  
M8x1, M12x1 | A-coded

22

#### M12x1 POWER

Power supply  
M12x1 | S-coded

32

#### ACCESSORIES

Safety-caps, mounting-solutions,  
marking rings, un- and locking clips,  
spare nuts for receptacles, protective hose

36

#### CABLE QUALITIES

Technical data

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#### TECHNICAL INFORMATION

Standards, certifications, wiring instructions,  
shielding concept, pinouts,  
degrees of Protection IP, AWG vs. mm²

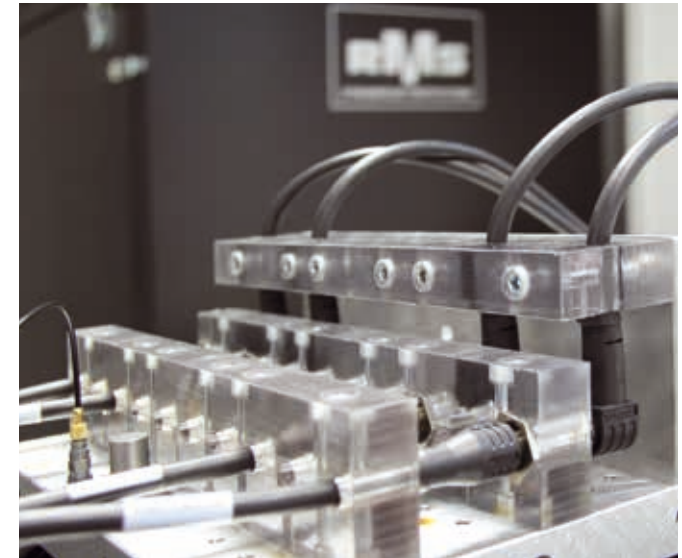
46



Protection-class test



High-frequency test



Vibration- and shock test

### ESCHA – specialist in connectivity.

For more than 35 years, the ESCHA Group has been developing, manufacturing, and marketing qualitatively high-grade connectivity and housing technology. Our solutions are implemented in automation technology as well as in machinery- and plant engineering. Moreover, we continue to extend our portfolio by new products for various applications.

At ESCHA you get all from one hand: innovative standard connectivity, individual and special solutions, and custom-made automation components in highest protection classes.

Take advantage of our years of experience in connector-, housing-, and tool design, a professional project management, our efficient and modern tool shop as well as the certified production for injection molding, cable manufacturing, and overmolding technology.

### Networked worldwide

Our headquarters are based in Germany – where we develop, test and manufacture our products. Through our global sales network and production sites in Europe, America, and Asia, we guarantee consistent product-, quality-, and service standards worldwide.

ESCHA has 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 want you to experience the extraordinary. Pleasure in service, innovation, and engineering are our road to economic success. Social commitment and sustainable economic operation are our benchmark.

### Overmolded connectivity

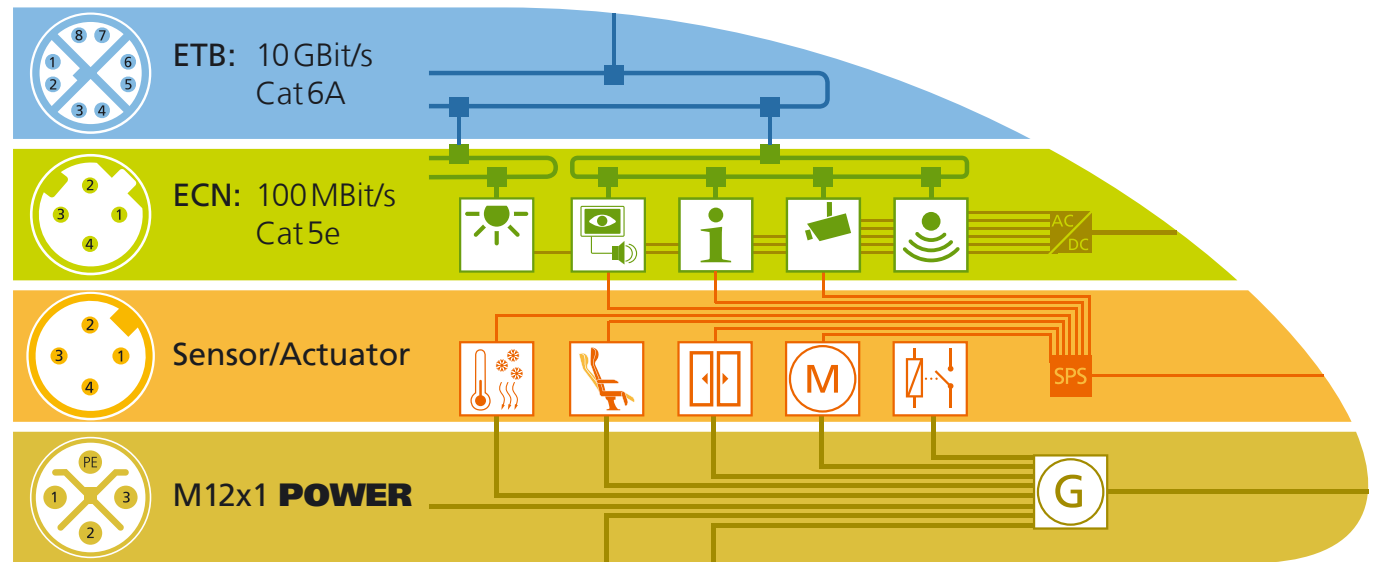
Coming from automation engineering, ESCHA masters the technology of dust- and waterproof connectivity- and housing solutions. The advantages of this technology can be transferred to the bus- and rail industry: Overmolded connectivity stands for safety, velocity, and economies of scale.

Despite serial production we offer customer-specific cable lengths to facilitate the installation of our cables and to accelerate production sequences on customer side. ESCHA patented 360° double-shell shielding concept (2SSK) and crimped contacts guarantee a safe connection and enhance the reliability of the whole onboard network system.

See technical information on page 49.



Climatic test



## ESCHA test lab

All necessary tests to guarantee a safe and reliable use of our products in bus and rail applications are carried out and documented in the ESCHA test lab. This includes IP-tests for highest protection classes, customer-specific shock- and vibration requirements as well as application related climatic tests and temperature shocks.

Furthermore, we have our own high-frequency lab to carry out all tests to secure a stable and durable data transmission with ESCHA connectivity.

As required, we also cooperate with accredited test labs and have our products certified by an independent authority.

## rail approved

ESCHA products with the 'rail approved' seal consist of connectors and cables which are tested according the following standards:

- DIN EN 45545-2 (fire performance)
- DIN EN 50155 (mechanical stresses, vibration, shock)
- IEC 61076-2-109 or IEC 61076-2-101 (type-test connector)
- IEC 60529 (IP protection class)

Manufacturer's declaration on testing-processes and results can be seen at [escha.net](http://escha.net).

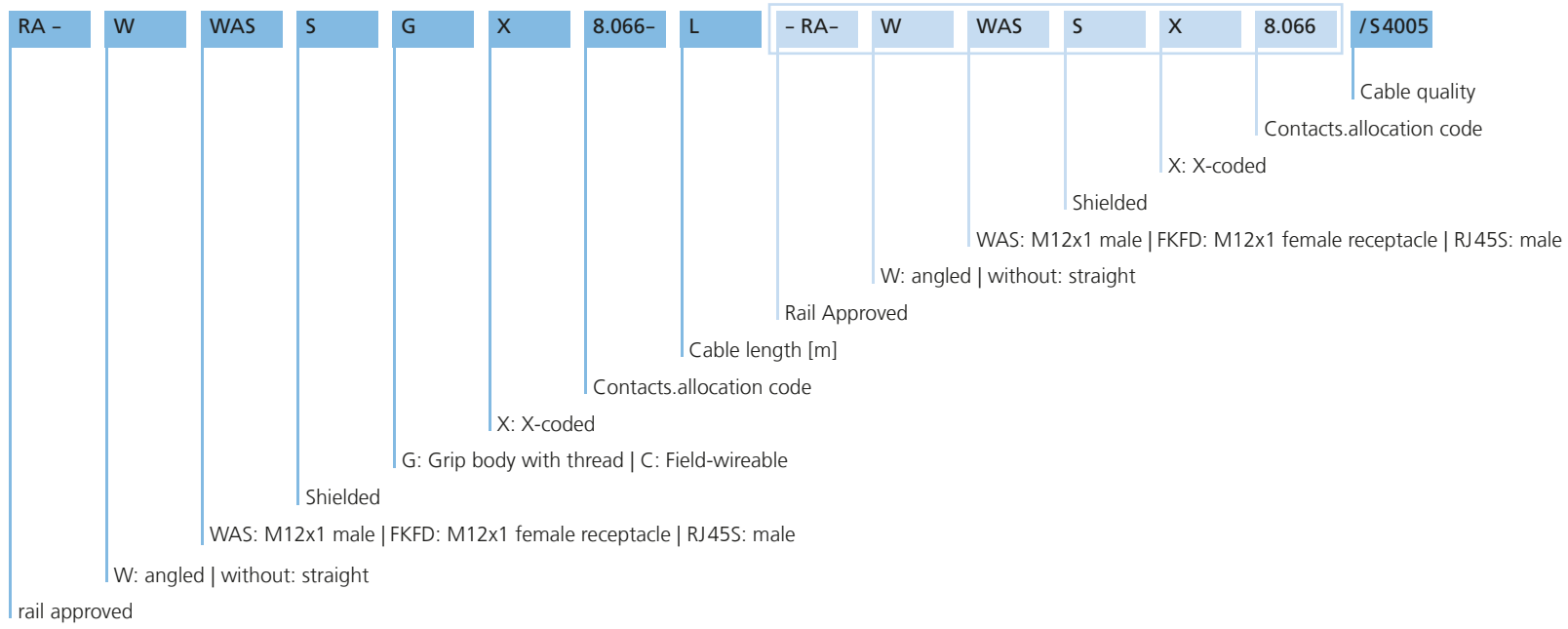
## bus approved

The 'bus approved' seal combines all products which are adapted to bus applications and are tested according the following standards:

- ECE R118 (fire performance cable)
- IEC 61076-2-109 or IEC 61076-2-101 (type-test connector)
- IEC 60529 (IP protection class)

As standard, ESCHA connectors are electrically tested and comply with categories Cat6A or Cat5e with regard to their transmission properties.

Nomenclature of patched connectors


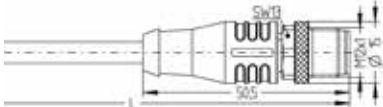

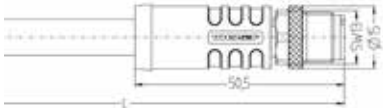

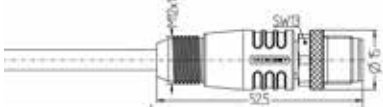

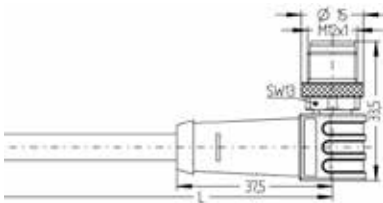

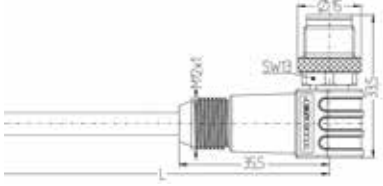

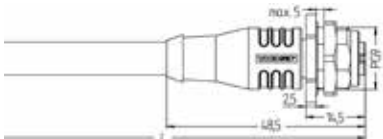

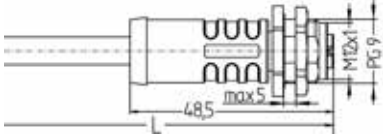

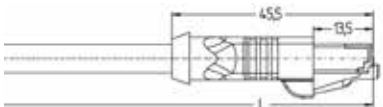


Cable	Color	Transmission features	Wire cross-section   Features	Rail Approved	Bus Approved
S4005, RADOX®	BU	Cat7	4 x 2 x AWG24   Robust	✓	✓
S5006VT, BETAtrans®	VT	Cat7	4 x 2 x AWG26   Reduced Wire	✓	✓


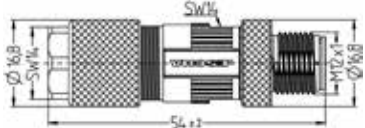









### Industrial Ethernet 10 GBit/s

Technical data	M12x1	RJ45	Wiring connector	Panel feed through	Adapter	Receptacle
	8 pins   X-coded	Molded	8 pins	M12x1/RJ45   8X	M12x1   4D/8X, 8X/8X	M12x1   8X
Rated voltage	50V <sub>AC</sub>   60V <sub>DC</sub>	50V	60V	60V	50V <sub>AC</sub>   60V <sub>DC</sub>	50V <sub>AC</sub>   60V <sub>DC</sub>
Current load (at 40°C)	0.5A	1A	0.5A	0.5A	0.5A	0.5A
Insulation resistance	≥10 <sup>8</sup> Ω	≥10 <sup>8</sup> Ω	≥10 <sup>8</sup> Ω	≥10 <sup>8</sup> Ω	≥10 <sup>8</sup> Ω	≥10 <sup>8</sup> Ω
Standards	IEC 61076-2-109 DIN EN 50155 DIN EN 45545-2	IEC 60603-7-5	DIN EN 50155	IEC 61076-2-109 IEC 60603-7-5 DIN EN 50155	IEC 61076-2-109 DIN EN 50155	IEC 61076-2-109 DIN EN 50155 DIN EN 45545-2
Ambient temperature product	-40°C...+90°C	-40°C...+70°C	-40°C...+85°C	-25°C...+85°C	-40°C...+85°C	-40°C...+90°C
Degree of pollution	2	1	3/2	2	2	2
Degree of protection (mounted)	IP67 (-30°C...+90°C) IP65 (-40°C...+90°C)	IP20	IP65/IP67	M12x1: IP67 RJ45: IP20	IP65   IP67	IP67 (-30°C...+90°C) IP65 (-40°C...+90°C)
Mechanical life-cycle	>100 mating cycles	>750 mating cycles	10 connections	>100 mating cycles	>100 mating cycles	>100 mating cycles
Connecting cross-section	AWG26/7-AWG22/7 AWG24/1-AWG22/1		AWG26/7-AWG22/7 AWG26/1-AWG22/1			
Cable outlet	Ø 5.0...9.7mm		Ø 5.0...9.7mm			
Connecting type	Insulation displacement contact		Insulation displacement contact			


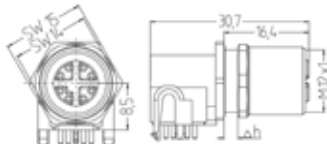

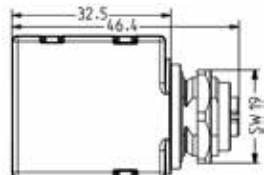

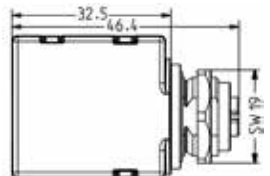

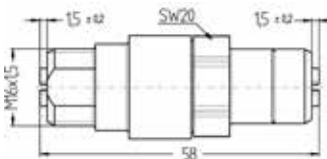

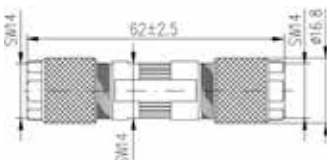
			Pins	Cable / Δh[mm]	Color	Item description
		Single-ended cordset male, straight, M12x1 shielded Cat6A	8, X	S5006VT, BETAtrans®, Reduced Wire	VT	RA-WASSX8.066-L/S5006VT
		Single-ended cordset male, straight, M12x1 shielded Cat6A	8, X	S4005, RADOX®, Robust	BU	RA-WASSX8.066-L/S4005
		Single-ended cordset male, straight, M12x1, grip body with thread shielded Cat6A	8, X	S5006VT, BETAtrans®, Reduced Wire	VT	RA-WASSGX8.066-L/S5006VT
		Single-ended cordset male, angled, M12x1 shielded Cat6A	8, X	S5006VT, BETAtrans®, Reduced Wire	VT	RA-WWASSX8.066-L/S5006VT
		Single-ended cordset male, angled, M12x1, grip body with thread shielded Cat6A	8, X	S5006VT, BETAtrans®, Reduced Wire	VT	RA-WWASSGX8.066-L/S5006VT
		Receptacle Single-ended cordset female, straight, M12x1 Back wall-mounting shielded Cat6A	8, X	S5006VT, BETAtrans®, Reduced Wire	VT	RA-FKFDSX8.066-L/S5006VT
		Receptacle Single-ended cordset female, straight, M12x1 Back wall-mounting shielded Cat6A	8, X	S4005, RADOX®, Robust	BU	RA-FKFDSX8.066-L/S4005
		Single-ended cordset male, straight, RJ45 shielded Cat6A	8	S5006VT, BETAtrans®, Reduced Wire	VT	RA-RJ45SS8.002-L/S5006VT



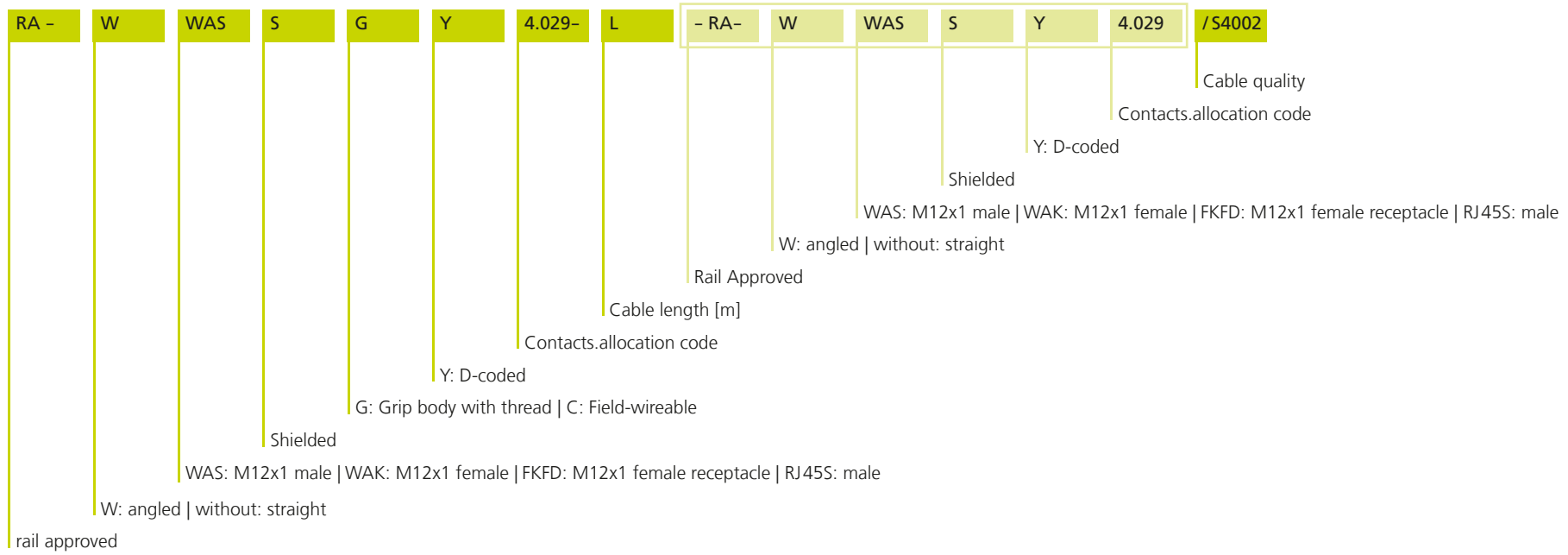
			Pins	Cable / Δh[mm]	Color	Item description
		Field-wireable connector male, straight, M12x1 Insulation displacement contact shielded Cat6A	8, X			IE-WASCSX8S
		Double-ended cordset male, straight, M12x1 male, straight, M12x1 shielded Cat6A	8, X 8, X	S5006VT, BETAtrans®, Reduced Wire	VT	RA-WASSX8.066-L-RA-WASSX8.066/S5006VT
		Double-ended cordset male, straight, M12x1 male, straight, M12x1 shielded Cat6A	8, X 8, X	S4005, RADOX®, Robust	BU	RA-WASSX8.066-L-RA-WASSX8.066/S4005
		Double-ended cordset male, angled, M12x1 male, straight, M12x1 shielded Cat6A	8, X 8, X	S5006VT, BETAtrans®, Reduced Wire	VT	RA-WWASSX8.066-L-RA-WASSX8.066/S5006VT
		Double-ended cordset male, angled, M12x1 male, angled, M12x1 shielded Cat6A	8, X 8, X	S5006VT, BETAtrans®, Reduced Wire	VT	RA-WWASSX8.066-L-RA-WWASSX8.066/S5006VT
		Double-ended cordset female, straight, M12x1 male, straight, M12x1 shielded Cat6A	8, X 8, X	S5006VT, BETAtrans®, Reduced Wire	VT	RA-FKFDX8.066-L-RA-WASSX8.066/S5006VT
		Double-ended cordset female, straight, M12x1 male, straight, M12x1 shielded Cat6A	8, X 8, X	S4005, RADOX®, Robust	BU	RA-FKFDX8.066-L-RA-WASSX8.066/S4005
		Double-ended cordset female, straight, M12x1 male, angled, M12x1 shielded Cat6A	8, X 8, X	S5006VT, BETAtrans®, Reduced Wire	VT	RA-FKFDX8.066-L-RA-WWASSX8.066/S5006VT

			Pins	Cable / Δh[mm]	Color	Item description
		Double-ended cordset male, straight, M12x1 male, straight, RJ45 shielded Cat6A	8, X 8	S5006VT, BETAtrans®, Reduced Wire	VT	RA-WASSX8.066-L-RA-RJ45SS8.002/S5006VT
		Double-ended cordset male, angled, M12x1 male, straight, RJ45 shielded Cat6A	8, X 8	S5006VT, BETAtrans®, Reduced Wire	VT	RA-WWASSX8.066-L-RA-RJ45SS8.002/S5006VT
		Double-ended cordset male, straight, RJ45 male, straight, RJ45 shielded Cat6A	8 8	S5006VT, BETAtrans®, Reduced Wire	VT	RA-RJ45SS8.002-L-RA-RJ45SS8.002/S5006VT
		Receptacle female, straight, M12x1 Print contact Insert connector Cat6A	8, X			IE-EKSX8P
		Receptacle female, straight, M12x1 Print contact Front wall-mounting Cat6A	8, X	0,9...2,5 mm		IE-FKDSX8-P/12
		Receptacle female, straight, M12x1 Print contact Front wall-mounting modular Cat6A	8, X	0,9...2,5 mm		IE-FKDHSX8-P/12
		Receptacle female, straight, M12x1 Print contact Back wall-mounting Cat6A	8, X	0,9...2,5 mm		IE-FKFDSX8-P
		Receptacle female, straight, M12x1 Print contact Back wall-mounting modular Cat6A	8, X	0,9...2,5 mm		IE-FKFDHSX8-P

\* We deliver individual cable lengths 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/S5006

			Pins	Cable / Δh[mm]	Color	Item description
		Receptacle female, angled, M12x1	8, X	1,0...2,5 mm		IE-WKFSX8-P/12/S3525
		Print contact		2,5...4,0 mm		IE-WKFSX8-P/12/S3540
		Back wall-mounting Cat6A		4,0...5,0 mm		IE-WKFSX8-P/12/S3550
		Panel feed through female, straight, M12x1	8, X	0,9...4,0 mm		IE-FKFSX8-RJ45KS
		female, straight, RJ45 Back wall-mounting Cat6A	8			
		Panel feed through female, angled, M12x1	8, X	0,9...4,0 mm		IE-WKFSX8-RJ45KS
		female, straight, RJ45 Back wall-mounting Cat6A	8			
		Adapter female, straight, M12x1	8, X	1,0...4,0 mm		IE-WAKSX8-IE-WAKSX8
		female, straight, M12x1 Cat6A	8, X			
		Wiring connector Insulation displacement contact shielded Cat7	8			IE-LVCS8

Nomenclature of patched connectors






Industrial Ethernet 100MBit/s





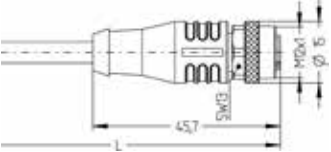

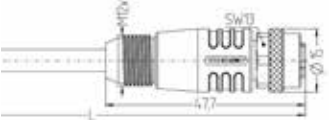

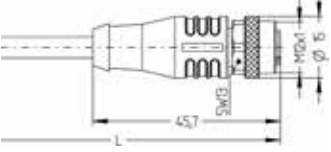

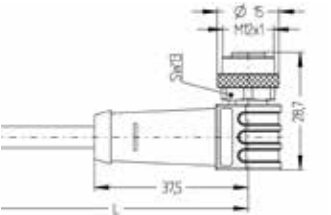

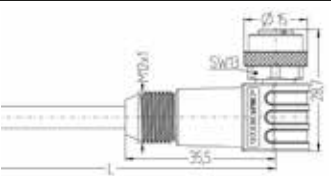

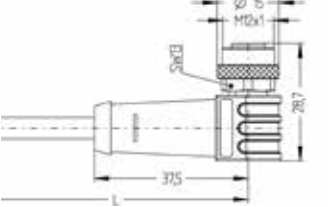

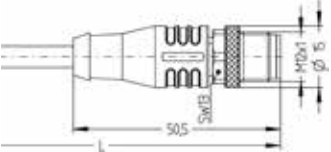
Cable	UL	Color	Transmission features	Wire cross-section   Features	Rail Approved	Bus Approved
S2171, PUR	✓	GN	Cat5e	1 x 4 x AWG22, star quad		✓
S4002, RADOX®		BK	Cat5e	1 x 4 x AWG22, star quad   Reduced Wire	✓	✓
S4002BU, RADOX®		BU	Cat5e	1 x 4 x AWG22, star quad   Reduced Wire	✓	✓
S4003, RADOX®		BK	Cat5e	1 x 4 x AWG22, star quad   Robust	✓	✓
S4004, RADOX®		BU	Cat5e	1 x 4 x AWG22, star quad   ECO	✓	✓
S5002BU, BETAtrans®		BU	Cat5e	1 x 4 x AWG22, star quad   Reduced Wire	✓	✓



## Industrial Ethernet 100 MBit/s

Technical data	M12x1 4 pins   D-coded	RJ45 Molded	Panel feed through M12x1/RJ45   4D	Adapter M12x1   4D/4D	Adapter M12x1   4D/8X	Receptacle 4 pins   D-coded
Rated voltage	250V	50V	50V <sub>AC</sub>   60V <sub>DC</sub>	250V	50V <sub>AC</sub>   60V <sub>DC</sub>	250V
Current load (at 40°C)	4A	1A	0.2A	4A	0.5A	4A
Insulation resistance	≥10 <sup>8</sup> Ω	≥10 <sup>8</sup> Ω	≥10 <sup>8</sup> Ω	≥10 <sup>8</sup> Ω	≥10 <sup>8</sup> Ω	≥10 <sup>8</sup> Ω
Standards	IEC 61076-2-101 DIN EN 50155 DIN EN 45545-2	IEC 60603-7-5	IEC 61076-2-101 IEC 60603-7-5	IEC 61076-2-101 DIN EN 50155	IEC 61076-2-101 IEC 61076-2-109 DIN EN 50155	IEC 61076-2-101 DIN EN 50155 DIN EN 45545-2
Ambient temperature product	-40°C...+90°C	-40°C...+70°C	-25°C...+85°C	-40°C...+85°C	-40°C...+85°C	-40°C...+90°C
Degree of pollution	3	1	2	2	2	3
Degree of protection (mounted)	IP67 (-30°C...+90°C) IP65 (-40°C...+90°C)	IP20	M12x1: IP65   IP67 RJ45: IP20	IP65   IP67	IP65   IP67	IP67 (-30°C...+90°C) IP65 (-40°C...+90°C)
Mechanical life-cycle	>100 mating cycles	>750 mating cycles	>100 mating cycles	>100 mating cycles	>100 mating cycles	>100 mating cycles
Connecting cross-section 	AWG 26/7-AWG 22/7 AWG 24/1-AWG 22/1					
Cable outlet 	Ø 5...9.7mm					
Connecting type 	Insulation displacement contact					


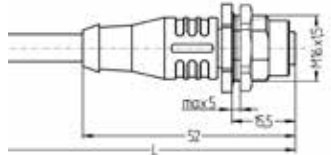

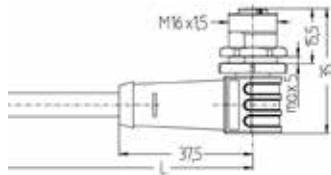

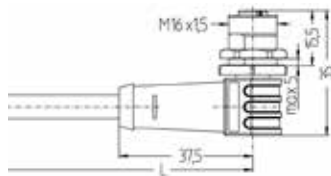

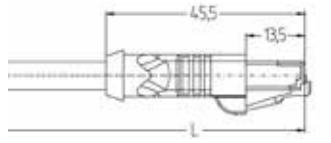

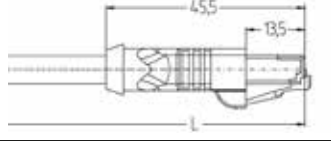

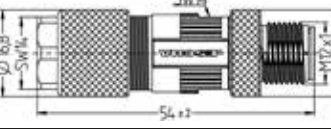




 field-wireable

			Pins	Cable / Δh[mm]	Color	Item description
		Single-ended cordset female, straight, M12x1 shielded Cat5e	4, D	S4002, RADOX®, Reduced Wire	BK	RA-WAKSY4.029-L/S4002
				S4002BU, RADOX®, Reduced Wire	BU	RA-WAKSY4.029-L/S4002BU
				S4003, RADOX®, Robust	BK	RA-WAKSY4.029-L/S4003
				S4004, RADOX®, ECO	BU	RA-WAKSY4.029-L/S4004
				S5002BU, BETAtans®, Reduced Wire	BU	RA-WAKSY4.029-L/S5002BU
		Single-ended cordset female, straight, M12x1, grip body with thread shielded Cat5e	4, D	S4002, RADOX®, Reduced Wire	BK	RA-WAKSGY4.029-L/S4002
				S4002BU, RADOX®, Reduced Wire	BU	RA-WAKSGY4.029-L/S4002BU
				S4003, RADOX®, Robust	BK	RA-WAKSGY4.029-L/S4003
				S4004, RADOX®, ECO	BU	RA-WAKSGY4.029-L/S4004
				S5002BU, BETAtans®, Reduced Wire	BU	RA-WAKSGY4.029-L/S5002BU
		Single-ended cordset female, straight, M12x1 shielded Cat5e	4, D	S2171, PUR, UL bus approved	GN	IE-WAKSY4.029-L/S2171
		Single-ended cordset female, angled, M12x1 shielded Cat5e	4, D	S4002, RADOX®, Reduced Wire	BK	RA-WWAKSY4.029-L/S4002
				S4002BU, RADOX®, Reduced Wire	BU	RA-WWAKSY4.029-L/S4002BU
				S4003, RADOX®, Robust	BK	RA-WWAKSY4.029-L/S4003
				S4004, RADOX®, ECO	BU	RA-WWAKSY4.029-L/S4004
				S5002BU, BETAtans®, Reduced Wire	BU	RA-WWAKSY4.029-L/S5002BU
		Single-ended cordset female, angled, M12x1, grip body with thread shielded Cat5e	4, D	S4002, RADOX®, Reduced Wire	BK	RA-WWAKSGY4.029-L/S4002
				S4002BU, RADOX®, Reduced Wire	BU	RA-WWAKSGY4.029-L/S4002BU
				S4003, RADOX®, Robust	BK	RA-WWAKSGY4.029-L/S4003
				S4004, RADOX®, ECO	BU	RA-WWAKSGY4.029-L/S4004
				S5002BU, BETAtans®, Reduced Wire	BU	RA-WWAKSGY4.029-L/S5002BU
		Single-ended cordset female, angled, M12x1 shielded Cat5e	4, D	S2171, PUR, UL bus approved	GN	IE-WWAKSY4.029-L/S2171
		Single-ended cordset male, straight, M12x1 shielded Cat5e	4, D	S4002, RADOX®, Reduced Wire	BK	RA-WASSY4.029-L/S4002
				S4002BU, RADOX®, Reduced Wire	BU	RA-WASSY4.029-L/S4002BU
				S4003, RADOX®, Robust	BK	RA-WASSY4.029-L/S4003
				S4004, RADOX®, ECO	BU	RA-WASSY4.029-L/S4004
				S5002BU, BETAtans®, Reduced Wire	BU	RA-WASSY4.029-L/S5002BU






\* We deliver individual cable lengths 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/S5006

			Pins	Cable / Δh[mm]	Color	Item description
		Single-ended cordset male, straight, M12x1, grip body with thread shielded Cat5e	4, D	S4002, RADOX®, Reduced Wire	BK	RA-WASSGY4.029-L/S4002
				S4002BU, RADOX®, Reduced Wire	BU	RA-WASSGY4.029-L/S4002BU
				S4003, RADOX®, Robust	BK	RA-WASSGY4.029-L/S4003
				S4004, RADOX®, ECO	BU	RA-WASSGY4.029-L/S4004
				S5002BU, BETAtans®, Reduced Wire	BU	RA-WASSGY4.029-L/S5002BU
		Single-ended cordset male, straight, M12x1 shielded Cat5e	4, D	S2171, PUR, UL bus approved	GN	IE-WASSY4.029-L/S2171
		Single-ended cordset male, angled, M12x1 shielded Cat5e	4, D	S4002, RADOX®, Reduced Wire	BK	RA-WWASSY4.029-L/S4002
				S4002BU, RADOX®, Reduced Wire	BU	RA-WWASSY4.029-L/S4002BU
				S4003, RADOX®, Robust	BK	RA-WWASSY4.029-L/S4003
				S4004, RADOX®, ECO	BU	RA-WWASSY4.029-L/S4004
				S5002BU, BETAtans®, Reduced Wire	BU	RA-WWASSY4.029-L/S5002BU
		Single-ended cordset male, angled, M12x1, grip body with thread shielded Cat5e	4, D	S4002, RADOX®, Reduced Wire	BK	RA-WWASSGY4.029-L/S4002
				S4002BU, RADOX®, Reduced Wire	BU	RA-WWASSGY4.029-L/S4002BU
				S4003, RADOX®, Robust	BK	RA-WWASSGY4.029-L/S4003
				S4004, RADOX®, ECO	BU	RA-WWASSGY4.029-L/S4004
				S5002BU, BETAtans®, Reduced Wire	BU	RA-WWASSGY4.029-L/S5002BU
		Single-ended cordset male, angled, M12x1 shielded Cat5e	4, D	S2171, PUR, UL bus approved	GN	IE-WWASSY4.029-L/S2171
		Receptacle Single-ended cordset female, straight, M12x1 Back wall-mounting shielded Cat5e	4, D	S4002, RADOX®, Reduced Wire	BK	RA-FKFDSY4.029-L/S4002
				S4002BU, RADOX®, Reduced Wire	BU	RA-FKFDSY4.029-L/S4002BU
				S4003, RADOX®, Robust	BK	RA-FKFDSY4.029-L/S4003
				S4004, RADOX®, ECO	BU	RA-FKFDSY4.029-L/S4004
				S5002BU, BETAtans®, Reduced Wire	BU	RA-FKFDSY4.029-L/S5002BU






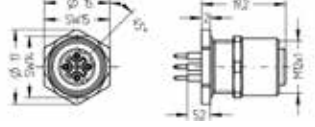

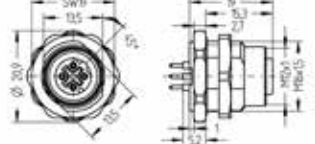

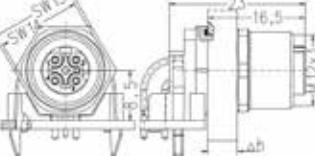

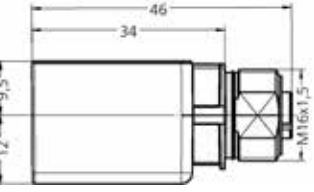
\* We deliver individual cable lengths upon request. Just add item description and cable length [L] in meters to your order. For example: cable length L = 5.2m (see dimensioned drawing) | RA-WASSX8.066-5,2-RA-WASSX8.066/S5006

			Pins	Cable / Δh[mm]	Color	Item description
		Receptacle Single-ended cordset female, straight, M12x1 Back wall-mounting shielded Cat5e	4, D	S2171, PUR, UL bus approved	GN	IE-FKFDYSY4.029-L/16/S2171
		Receptacle Single-ended cordset female, angled, M12x1 Back wall-mounting shielded Cat5e	4, D	S4002, RADOX®, Reduced Wire	BK	RA-WFKFDYSY4.029-L/S4002
				S4002BU, RADOX®, Reduced Wire	BU	RA-WFKFDYSY4.029-L/S4002BU
				S4003, RADOX®, Robust	BK	RA-WFKFDYSY4.029-L/S4003
				S4004, RADOX®, ECO	BU	RA-WFKFDYSY4.029-L/S4004
				S5002BU, BETAtans®, Reduced Wire	BU	RA-WFKFDYSY4.029-L/S5002BU
		Receptacle Single-ended cordset female, angled, M12x1 Back wall-mounting shielded Cat5e	4, D	S2171, PUR, UL bus approved	GN	IE-WFKFDYSY4.029-L/16/S2171
		Single-ended cordset male, straight, RJ45 shielded Cat5e	4	S4002, RADOX®, Reduced Wire	BK	RA-RJ45SS4.003-L/S4002
				S4002BU, RADOX®, Reduced Wire	BU	RA-RJ45SS4.003-L/S4002BU
				S5002BU, BETAtans®, Reduced Wire	BU	RA-RJ45SS4.003-L/S5002BU
		Single-ended cordset male, straight, RJ45 shielded Cat5e	4	S2171, PUR, UL bus approved	GN	IE-RJ45SS4.003-L/S2171
		Field-wireable connector male, straight, M12x1 Insulation displacement contact shielded Cat5e	4, D			IE-WASCSY45
		Double-ended cordset female, straight, M12x1 male, straight, M12x1 shielded Cat5e	4, D 4, D	S4002, RADOX®, Reduced Wire	BK	RA-WAKSY4.029-L-RA-WASSY4.029/S4002
				S4002BU, RADOX®, Reduced Wire	BU	RA-WAKSY4.029-L-RA-WASSY4.029/S4002BU
				S4003, RADOX®, Robust	BK	RA-WAKSY4.029-L-RA-WASSY4.029/S4003
				S4004, RADOX®, ECO	BU	RA-WAKSY4.029-L-RA-WASSY4.029/S4004
				S5002BU, BETAtans®, Reduced Wire	BU	RA-WAKSY4.029-L-RA-WASSY4.029/S5002BU
		Double-ended cordset female, straight, M12x1 male, straight, M12x1 shielded Cat5e	4, D 4, D	S2171, PUR, UL bus approved	GN	IE-WAKSY4.029-L-IE-WASSY4.029/S2171


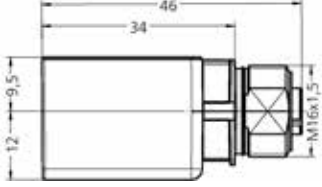

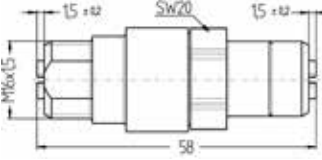

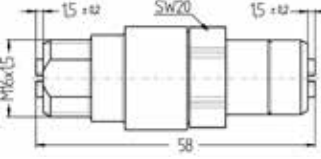


		Pins	Cable / Δh[mm]	Color	Item description
	Double-ended cordset female, straight, M12x1 shielded Cat5e	4, D	S4002, RADOX®, Reduced Wire	BK	RA-WAKSY4.029-L-RA-WWASSY4.029/S4002
		4, D	S4002BU, RADOX®, Reduced Wire	BU	RA-WAKSY4.029-L-RA-WWASSY4.029/S4002BU
			S4003, RADOX®, Robust	BK	RA-WAKSY4.029-L-RA-WWASSY4.029/S4003
			S4004, RADOX®, ECO	BU	RA-WAKSY4.029-L-RA-WWASSY4.029/S4004
			S5002BU, BETAtans®, Reduced Wire	BU	RA-WAKSY4.029-L-RA-WWASSY4.029/S5002BU
	Double-ended cordset female, straight, M12x1 shielded Cat5e	4, D	S2171, PUR, UL bus approved	GN	IE-WAKSY4.029-L-IE-WWASSY4.029/S2171
		4, D			
	Double-ended cordset female, angled, M12x1 shielded Cat5e	4, D	S4002, RADOX®, Reduced Wire	BK	RA-WWAKSY4.029-L-RA-WASSY4.029/S4002
		4, D	S4002BU, RADOX®, Reduced Wire	BU	RA-WAKSY4.029-L-RA-WWASSY4.029/S4002BU
			S4003, RADOX®, Robust	BK	RA-WWAKSY4.029-L-RA-WASSY4.029/S4003
			S4004, RADOX®, ECO	BU	RA-WWAKSY4.029-L-RA-WASSY4.029/S4004
			S5002BU, BETAtans®, Reduced Wire	BU	RA-WAKSY4.029-L-RA-WWASSY4.029/S5002BU
	Double-ended cordset female, angled, M12x1 shielded Cat5e	4, D	S2171, PUR, UL bus approved	GN	IE-WWAKSY4.029-L-IE-WASSY4.029/S2171
		4, D			
	Double-ended cordset male, straight, M12x1 shielded Cat5e	4, D	S4002, RADOX®, Reduced Wire	BK	RA-WASSY4.029-L-RA-WASSY4.029/S4002
		4, D	S4002BU, RADOX®, Reduced Wire	BU	RA-WASSY4.029-L-RA-WASSY4.029/S4002BU
			S4003, RADOX®, Robust	BK	RA-WASSY4.029-L-RA-WASSY4.029/S4003
			S4004, RADOX®, ECO	BU	RA-WASSY4.029-L-RA-WASSY4.029/S4004
			S5002BU, BETAtans®, Reduced Wire	BU	RA-WASSY4.029-L-RA-WASSY4.029/S5002BU
	Double-ended cordset male, straight, M12x1 shielded Cat5e	4, D	S2171, PUR, UL bus approved	GN	IE-WASSY4.029-L-IE-WASSY4.029/S2171
		4, D			
	Double-ended cordset male, angled, M12x1 shielded Cat5e	4, D	S4002, RADOX®, Reduced Wire	BK	RA-WWASSY4.029-L-RA-WASSY4.029/S4002
		4, D	S4002BU, RADOX®, Reduced Wire	BU	RA-WWASSY4.029-L-RA-WASSY4.029/S4002BU
			S4003, RADOX®, Robust	BK	RA-WWASSY4.029-L-RA-WASSY4.029/S4003
			S4004, RADOX®, ECO	BU	RA-WWASSY4.029-L-RA-WASSY4.029/S4004
			S5002BU, BETAtans®, Reduced Wire	BU	RA-WWASSY4.029-L-RA-WASSY4.029/S5002BU

			Pins	Cable / Δh[mm]	Color	Item description
	Double-ended cordset male, angled, M12x1 male, straight, M12x1 shielded Cat5e	4, D 4, D	S2171, PUR, UL bus approved	GN	IE-WWASSY4.029-L-IE-WASSY4.029/S2171	
	Double-ended cordset male, angled, M12x1 male, angled, M12x1 shielded Cat5e	4, D 4, D	S4002, RADOX®, Reduced Wire	BK	RA-WWASSY4.029-L-RA-WWASSY4.029/S4002	
			S4002BU, RADOX®, Reduced Wire	BU	RA-WWASSY4.029-L-RA-WWASSY4.029/S4002BU	
			S4003, RADOX®, Robust	BK	RA-WWASSY4.029-L-RA-WWASSY4.029/S4003	
			S4004, RADOX®, ECO	BU	RA-WWASSY4.029-L-RA-WWASSY4.029/S4004	
			S5002BU, BETAtans®, Reduced Wire	BU	RA-WWASSY4.029-L-RA-WWASSY4.029/S5002BU	
	Double-ended cordset male, angled, M12x1 male, angled, M12x1 shielded Cat5e	4, D 4, D	S2171, PUR, UL bus approved	GN	IE-WWASSY4.029-L-IE-WWASSY4.029/S2171	
	Receptacle Double-ended cordset female, straight, M12x1 male, straight, M12x1 shielded Cat5e	4, D 4, D	S4002, RADOX®, Reduced Wire	BK	RA-FKFDSY4.029-L-RA-WASSY4.029/S4002	
			S4002BU, RADOX®, Reduced Wire	BU	RA-FKFDSY4.029-L-RA-WASSY4.029/S4002BU	
			S4003, RADOX®, Robust	BK	RA-FKFDSY4.029-L-RA-WASSY4.029/S4003	
			S4004, RADOX®, ECO	BU	RA-FKFDSY4.029-L-RA-WASSY4.029/S4004	
			S5002BU, BETAtans®, Reduced Wire	BU	RA-FKFDSY4.029-L-RA-WASSY4.029/S5002BU	
	Receptacle Double-ended cordset female, angled, M12x1 male, straight, M12x1 shielded Cat5e	4, D 4, D	S4002, RADOX®, Reduced Wire	BK	RA-WFKFDSY4.029-L-RA-WASSY4.029/S4002	
			S4002BU, RADOX®, Reduced Wire	BU	RA-WFKFDSY4.029-L-RA-WASSY4.029/S4002BU	
			S4003, RADOX®, Robust	BK	RA-WFKFDSY4.029-L-RA-WASSY4.029/S4003	
			S4004, RADOX®, ECO	BU	RA-WFKFDSY4.029-L-RA-WASSY4.029/S4004	
			S5002BU, BETAtans®, Reduced Wire	BU	RA-WFKFDSY4.029-L-RA-WASSY4.029/S5002BU	
	Double-ended cordset male, straight, RJ45 male, straight, RJ45 Cat5e	4 4	S4002, RADOX®, Reduced Wire	BK	RA-RJ45SS4.003-L-RA-RJ45SS4.003/S4002	
			S4002BU, RADOX®, Reduced Wire	BU	RA-RJ45SS4.003-L-RA-RJ45SS4.003/S4002BU	
			S5002BU, BETAtans®, Reduced Wire	BU	RA-RJ45SS4.003-L-RA-RJ45SS4.003/S5002BU	
	Double-ended cordset male, straight, RJ45 male, straight, RJ45 shielded Cat5e	4 4	S2171, PUR, UL bus approved	GN	IE-RJ45SS4.003-L-IE-RJ45SS4.003/S2171	

			Pins	Cable / Δh[mm]	Color	Item description
		Double-ended cordset male, straight, M12x1 male, straight, RJ45 shielded Cat5e	4, D 4	S4002, RADOX®, Reduced Wire	BK	RA-WASSY4.029-L-RA-RJ45SS4.003/S4002
				S4002BU, RADOX®, Reduced Wire	BU	RA-WASSY4.029-L-RA-RJ45SS4.003/S4002BU
				S5002BU, BETAtrens®, Reduced Wire	BU	RA-WASSY4.029-L-RA-RJ45SS4.003/S5002BU
		Double-ended cordset male, straight, M12x1 male, straight, RJ45 shielded Cat5e	4, D 4	S2171, PUR, UL bus approved	GN	IE-WASSY4.029-L-IE-RJ45SS4.003/S2171
		Double-ended cordset male, angled, M12x1 male, straight, RJ45 shielded Cat5e	4, D 4	S4002, RADOX®, Reduced Wire	BK	RA-WWASSY4.029-L-RA-RJ45SS4.003/S4002
				S4002BU, RADOX®, Reduced Wire	BU	RA-WWASSY4.029-L-RA-RJ45SS4.003/S4002BU
				S5002BU, BETAtrens®, Reduced Wire	BU	RA-WWASSY4.029-L-RA-RJ45SS4.003/S5002BU
		Double-ended cordset male, angled, M12x1 male, straight, RJ45 shielded Cat5e	4, D 4	S2171, PUR, UL bus approved	GN	IE-WWASSY4.029-L-IE-RJ45SS4.003/S2171
		Receptacle female, straight, M12x1 Print contact Back wall-mounting Cat5e	4, D	1,0...2,5 mm		IE-FHM12KUD4-P/M12/S3525
				2,5...4,0 mm		IE-FHM12KUD4-P/M12/S3540
				4,0...5,0 mm		IE-FHM12KUD4-P/M12/S3550
		Receptacle female, straight, M12x1 Print contact Back wall-mounting Cat5e	4, D	1,0...5,0 mm		IE-FHM12KUD4-P/M16
		Receptacle female, angled, M12x1 Print contact Back wall-mounting	4, D	1,0...2,5 mm		IE-WFKFSY4-P/12/S3525
				2,5...4,0 mm		IE-WFKFSY4-P/12/S3540
				4,0...5,0 mm		IE-WFKFSY4-P/12/S3550
		Panel feed through female, straight, M12x1 female, straight, RJ45 Back wall-mounting Cat5e	4, D 8	1,0...2,5 mm		IE-FKFDSY4-RJ45KS

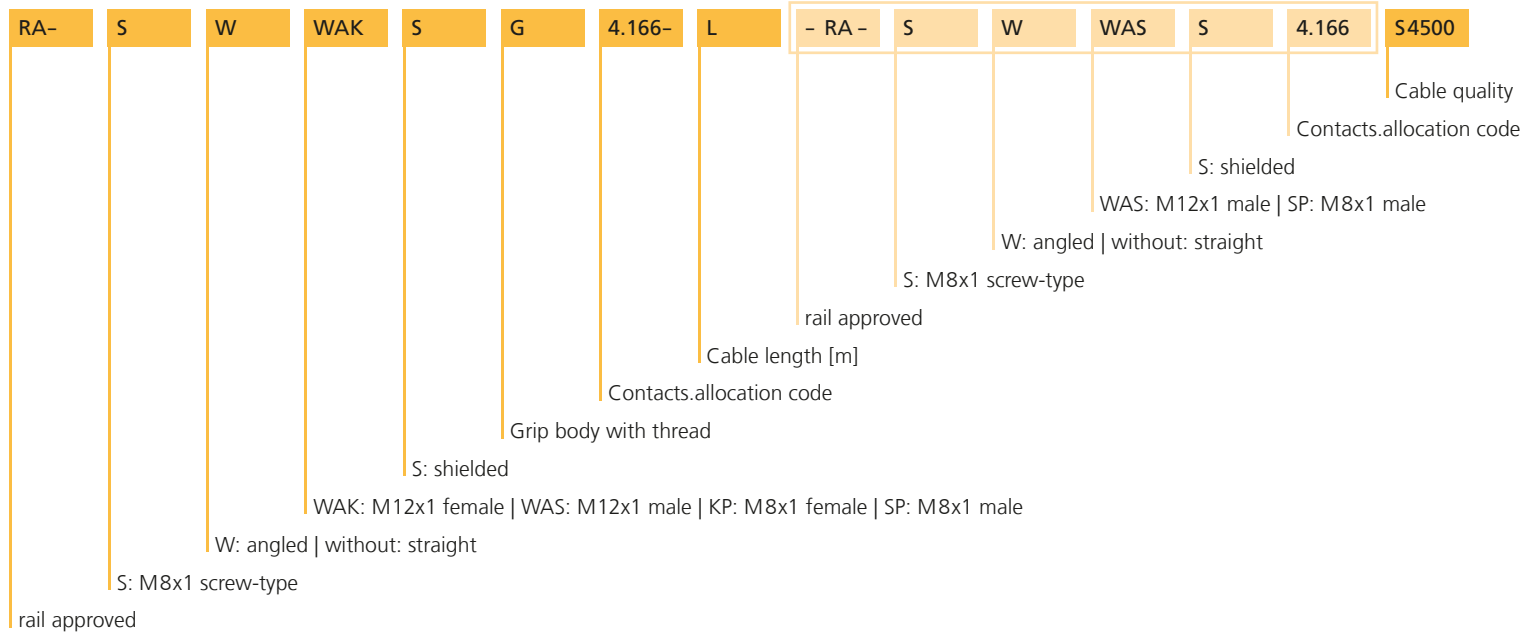
\* We deliver individual cable lengths upon request. Just add item description and cable length [L] in meters to your order. For example: cable length L = 5.2m (see dimensioned drawing) | RA-WASSX8.066-5,2-RA-WASSX8.066/S5006

			Pins	Cable / Δh[mm]	Color	Item description
		Panel feed through female, angled, M12x1 female, straight, RJ45 Back wall-mounting Cat5e	4, D 8	1,0...2,5 mm		IE-WFKFDSY4-RJ45KS
		Adapter female, straight, M12x1 female, straight, M12x1 Cat5e	4, D 4, D	1,0...4,0 mm		IE-WAKSY4-IE-WAKSY4
		Adapter female, straight, M12x1 female, straight, M12x1 Cat5e	8, X 4, D	1,0...4,0 mm		IE-WAKSX8-IE-WAKSY4



Nomenclature of patched connectors

Double-ended cordset




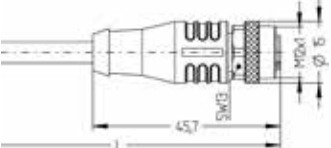

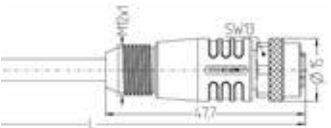

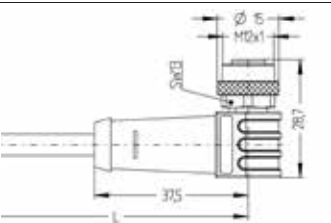

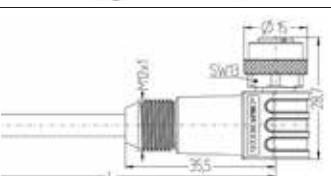

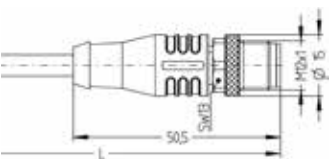

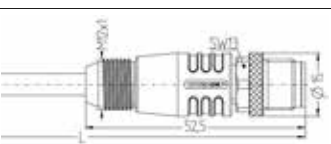
Sensor/Actuator

Cable	Color	Shielding	Wire cross-section   Features	Rail Approved	Bus Approved
S3327, RADOX®	BK		3 x 0.5 mm <sup>2</sup>	✓	✓
S4500, RADOX®	BK		4 x 0.5 mm <sup>2</sup>   EN 50306-4	✓	✓
S4500, RADOX®	BK	✓	4 x 0.5 mm <sup>2</sup>   EN 50306-4	✓	✓
S4501, RADOX®	BK		4 x 0.75 mm <sup>2</sup>   EN 50306-4	✓	✓
S4501, RADOX®	BK	✓	4 x 0.75 mm <sup>2</sup>   EN 50306-4	✓	✓
S4502, RADOX®	BK		4 x 1 mm <sup>2</sup>   EN 50306-4	✓	✓
S4502, RADOX®	BK	✓	4 x 1 mm <sup>2</sup>   EN 50306-4	✓	✓
S5550, SABIX®	GY		8 x 0.25 mm <sup>2</sup>	✓	✓
S5550, SABIX®	GY	✓	8 x 0.25 mm <sup>2</sup>	✓	✓
S5555, CFSPECIAL	BK		4 x 0.34 mm <sup>2</sup>   drag-chain capability, 1 million bending cycles	✓	✓


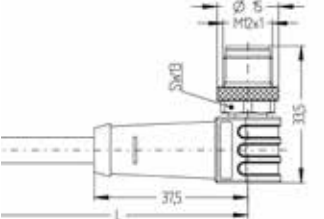

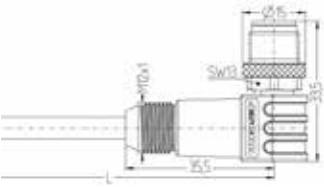










## Sensor/Actuator


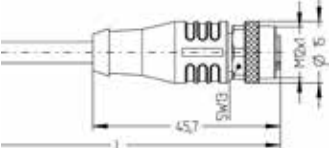

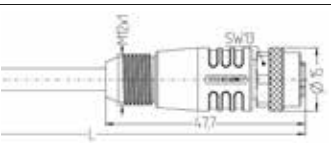

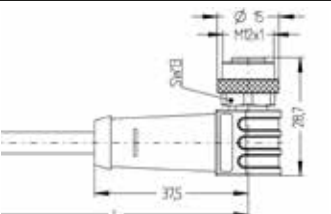

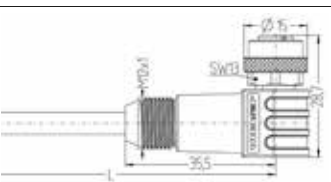

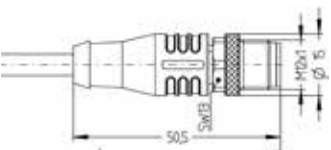

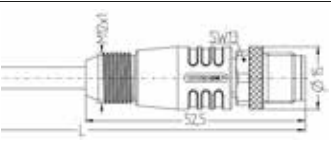

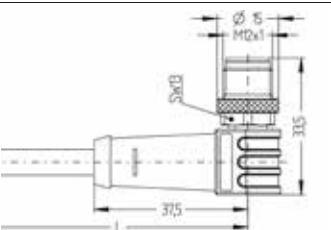
Technical data	M12x1 4 pins   8 pins   A-coded	M8x1 3 pins   4 pins	Receptacle 4 pins   A-coded
Rated voltage	250V   30V	60V	250V
Current load (at 40°C)	4A   2A	4A	4A
Insulation resistance	≥10 <sup>8</sup> Ω	≥10 <sup>8</sup> Ω	≥10 <sup>8</sup> Ω
Standards	IEC 61076-2-101 DIN EN 50155 DIN EN 45545-2	IEC 61076-2-104 DIN EN 50155 DIN EN 45545-2	IEC 61076-2-101 DIN EN 50155 DIN EN 45545-2
Ambient temperature product	-40°C...+90°C	-40°C...+90°C	-40°C...+90°C
Degree of pollution	3	3	3
Degree of protection (mounted)	IP67 (-30°C...+90°C) IP65 (-40°C...+90°C)	IP67 (-30°C...+90°C) IP65 (-40°C...+90°C)	IP67 (-30°C...+90°C) IP65 (-40°C...+90°C)
Mechanical life-cycle	>100 mating cycles	>100 mating cycles	>100 mating cycles

			Pins	Cable / Δh[mm]	Color	Item description
		Single-ended cordset female, straight, M12x1	4, A	S4500, RADOX®	BK	RA-WAK4.166-L/S4500
				S4501, RADOX®	BK	RA-WAK4.166-L/S4501
				S4502, RADOX®	BK	RA-WAK4.166-L/S4502
				S5555, CFSPECIAL.414	BK	RA-WAK4.001-L/S5555
			8, A	S5550, SABIX®	GY	RA-WAK8-L/S5550
		Single-ended cordset female, straight, M12x1, grip body with thread	4, A	S4500, RADOX®	BK	RA-WAKG4.166-L/S4500
				S4501, RADOX®	BK	RA-WAKG4.166-L/S4501
				S4502, RADOX®	BK	RA-WAKG4.166-L/S4502
				S5555, CFSPECIAL.414	BK	RA-WAKG4.001-L/S5555
			8, A	S5550, SABIX®	GY	RA-WAKG8-L/S5550
		Single-ended cordset female, angled, M12x1	4, A	S4500, RADOX®	BK	RA-WWAK4.166-L/S4500
				S4501, RADOX®	BK	RA-WWAK4.166-L/S4501
				S4502, RADOX®	BK	RA-WWAK4.166-L/S4502
				S5555, CFSPECIAL.414	BK	RA-WWAK4.001-L/S5555
			8, A	S5550, SABIX®	GY	RA-WWAK8-L/S5550
		Single-ended cordset female, angled, M12x1, grip body with thread	4, A	S4500, RADOX®	BK	RA-WWAKG4.166-L/S4500
				S4501, RADOX®	BK	RA-WWAKG4.166-L/S4501
				S4502, RADOX®	BK	RA-WWAKG4.166-L/S4502
				S5555, CFSPECIAL.414	BK	RA-WWAKG4.001-L/S5555
			8, A	S5550, SABIX®	GY	RA-WWAKG8-L/S5550
		Single-ended cordset male, straight, M12x1	4, A	S4500, RADOX®	BK	RA-WAS4.166-L/S4500
				S4501, RADOX®	BK	RA-WAS4.166-L/S4501
				S4502, RADOX®	BK	RA-WAS4.166-L/S4502
				S5555, CFSPECIAL.414	BK	RA-WAS4.001-L/S5555
			8, A	S5550, SABIX®	GY	RA-WAS8-L/S5550
		Single-ended cordset male, straight, M12x1, grip body with thread	4, A	S4500, RADOX®	BK	RA-WASG4.166-L/S4500
				S4501, RADOX®	BK	RA-WASG4.166-L/S4501
				S4502, RADOX®	BK	RA-WASG4.166-L/S4502
				S5555, CFSPECIAL.414	BK	RA-WASG4.001-L/S5555
			8, A	S5550, SABIX®	GY	RA-WASG8-L/S5550




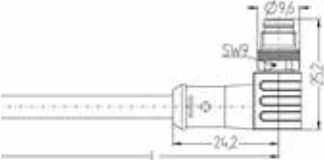









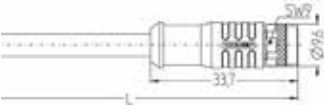

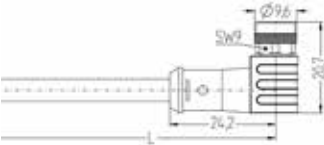

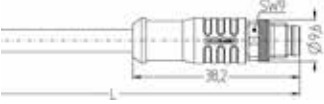

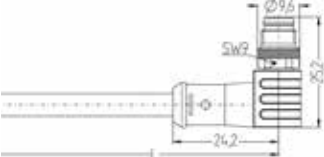
			Pins	Cable / Δh[mm]	Color	Item description
 	Single-ended cordset male, angled, M12x1		4, A	S4500, RADOX®	BK	RA-WWAS4.166-L/S4500
				S4501, RADOX®	BK	RA-WWAS4.166-L/S4501
				S4502, RADOX®	BK	RA-WWAS4.166-L/S4502
				S5555, CFSPECIAL.414	BK	RA-WWAS4.001-L/S5555
			8, A	S5550, SABIX®	GY	RA-WWAS8-L/S5550
 	Single-ended cordset male, angled, M12x1, grip body with thread shielded		4, A	S4500, RADOX®	BK	RA-WWASG4.166-L/S4500
				S4501, RADOX®	BK	RA-WWASG4.166-L/S4501
				S4502, RADOX®	BK	RA-WWASG4.166-L/S4502
				S5555, CFSPECIAL.414	BK	RA-WWASG4.001-L/S5555
			8, A	S5550, SABIX®	GY	RA-WWASG8-L/S5550
 	Double-ended cordset female, straight, M12x1 male, straight, M12x1		4, A	S4500, RADOX®	BK	RA-WAK4.166-L-RA-WAS4.166/S4500
				S4501, RADOX®	BK	RA-WAK4.166-L-RA-WAS4.166/S4501
				S4502, RADOX®	BK	RA-WAK4.166-L-RA-WAS4.166/S4502
				S5555, CFSPECIAL.414	BK	RA-WAK4.001-L-RA-WAS4.001/S5555
			8, A 8, A	S5550, SABIX®	GY	RA-WAK8-L-RA-WAS8/S5550
 	Double-ended cordset female, straight, M12x1 male, angled, M12x1		4, A	S4500, RADOX®	BK	RA-WAK4.166-L-RA-WWAS4.166/S4500
				S4501, RADOX®	BK	RA-WAK4.166-L-RA-WWAS4.166/S4501
				S4502, RADOX®	BK	RA-WAK4.166-L-RA-WWAS4.166/S4502
				S5555, CFSPECIAL.414	BK	RA-WAK4.001-L-RA-WWAS4.001/S5555
			8, A 8, A	S5550, SABIX®	GY	RA-WAK8-L-RA-WWAS8/S5550
 	Double-ended cordset female, angled, M12x1 male, straight, M12x1		4, A	S4500, RADOX®	BK	RA-WWAK4.166-L-RA-WAS4.166/S4500
				S4501, RADOX®	BK	RA-WWAK4.166-L-RA-WAS4.166/S4501
				S4502, RADOX®	BK	RA-WWAK4.166-L-RA-WAS4.166/S4502
				S5555, CFSPECIAL.414	BK	RA-WWAK4.001-L-RA-WAS4.001/S5555
			8, A 8, A	S5550, SABIX®	GY	RA-WWAK8-L-RA-WAS8/S5550
 	Double-ended cordset female, angled, M12x1 male, angled, M12x1		4, A	S4500, RADOX®	BK	RA-WWAK4.166-L-RA-WWAS4.166/S4500
				S4501, RADOX®	BK	RA-WWAK4.166-L-RA-WWAS4.166/S4501
				S4502, RADOX®	BK	RA-WWAK4.166-L-RA-WWAS4.166/S4502
				S5555, CFSPECIAL.414	BK	RA-WWAK4.001-L-RA-WWAS4.001/S5555
			8, A 8, A	S5550, SABIX®	GY	RA-WWAK8-L-RA-WWAS8/S5550






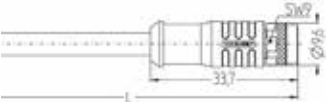



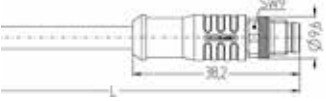




\* We deliver individual cable lengths upon request. Just add item description and cable length [L] in meters to your order. For example: cable length L = 5.2m (see dimensioned drawing) | RA-WASSX8.066-5,2-RA-WASSX8.066/S5006

			Pins	Cable / Δh[mm]	Color	Item description			
		Single-ended cordset female, straight, M12x1 shielded	4, A	S4500, RADOX®	BK	RA-WAKS4.166-L/S4500			
				S4501, RADOX®	BK	RA-WAKS4.166-L/S4501			
				S4502, RADOX®	BK	RA-WAKS4.166-L/S4502			
			8, A	S5550, SABIX®	GY	RA-WAKS8-L/S5550			
					Single-ended cordset female, straight, M12x1, grip body with thread shielded	4, A	S4500, RADOX®	BK	RA-WAKSG4.166-L/S4500
							S4501, RADOX®	BK	RA-WAKSG4.166-L/S4501
S4502, RADOX®	BK	RA-WAKSG4.166-L/S4502							
8, A	S5550, SABIX®	GY				RA-WAKSG8-L/S5550			
		Single-ended cordset female, angled, M12x1 shielded				4, A	S4500, RADOX®	BK	RA-WWAKS4.166-L/S4500
							S4501, RADOX®	BK	RA-WWAKS4.166-L/S4501
			S4502, RADOX®	BK	RA-WWAKS4.166-L/S4502				
			8, A	S5550, SABIX®	GY	RA-WWAKS8-L/S5550			
					Single-ended cordset female, angled, M12x1, grip body with thread shielded	4, A	S4500, RADOX®	BK	RA-WWAKSG4.166-L/S4500
							S4501, RADOX®	BK	RA-WWAKSG4.166-L/S4501
S4502, RADOX®	BK	RA-WWAKSG4.166-L/S4502							
8, A	S5550, SABIX®	GY				RA-WWAKSG8-L/S5550			
		Single-ended cordset male, straight, M12x1 shielded				4, A	S4500, RADOX®	BK	RA-WASS4.166-L/S4500
							S4501, RADOX®	BK	RA-WASS4.166-L/S4501
			S4502, RADOX®	BK	RA-WASS4.166-L/S4502				
			8, A	S5550, SABIX®	GY	RA-WASS8-L/S5550			
					Single-ended cordset male, straight, M12x1, grip body with thread shielded	4, A	S4500, RADOX®	BK	RA-WASSG4.166-L/S4500
							S4501, RADOX®	BK	RA-WASSG4.166-L/S4501
S4502, RADOX®	BK	RA-WASSG4.166-L/S4502							
8, A	S5550, SABIX®	GY				RA-WASSG8-L/S5550			
		Single-ended cordset male, angled, M12x1 shielded				4, A	S4500, RADOX®	BK	RA-WWASS4.166-L/S4500
							S4501, RADOX®	BK	RA-WWASS4.166-L/S4501
			S4502, RADOX®	BK	RA-WWASS4.166-L/S4502				
			8, A	S5550, SABIX®	GY	RA-WWASS8-L/S5550			




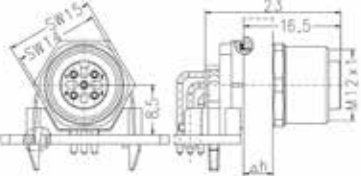

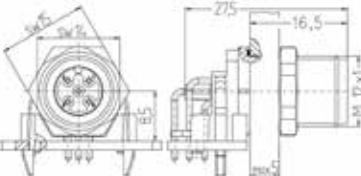

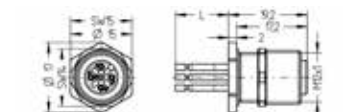



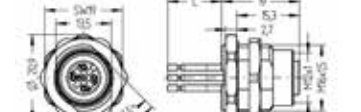
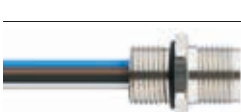
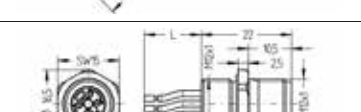
			Pins	Cable / Δh[mm]	Color	Item description
		Single-ended cordset male, angled, M12x1, grip body with thread shielded	4, A	S4500, RADOX®	BK	RA-WWASSG4.166-L/S4500
				S4501, RADOX®	BK	RA-WWASSG4.166-L/S4501
				S4502, RADOX®	BK	RA-WWASSG4.166-L/S4502
			8, A	S5550, SABIX®	GY	RA-WWASSG8-L/S5550
		Double-ended cordset female, straight, M12x1	4, A	S4500, RADOX®	BK	RA-WAKS4.166-L-RA-WASS4.166/S4500
			4, A	S4501, RADOX®	BK	RA-WAKS4.166-L-RA-WASS4.166/S4501
				S4502, RADOX®	BK	RA-WAKS4.166-L-RA-WASS4.166/S4502
		Double-ended cordset male, straight, M12x1 shielded	8, A	S5550, SABIX®	GY	RA-WAKS8-L-RA-WASS8/S5550
			4, A	S4500, RADOX®	BK	RA-WAKS4.166-L-RA-WWASS4.166/S4500
			4, A	S4501, RADOX®	BK	RA-WAKS4.166-L-RA-WWASS4.166/S4501
		Double-ended cordset female, straight, M12x1		S4502, RADOX®	BK	RA-WAKS4.166-L-RA-WWASS4.166/S4502
			8, A	S5550, SABIX®	GY	RA-WAKS8-L-RA-WWASS8/S5550
			8, A			
		Double-ended cordset female, angled, M12x1	4, A	S4500, RADOX®	BK	RA-WAKS4.166-L-RA-WWASS4.166/S4500
			4, A	S4501, RADOX®	BK	RA-WAKS4.166-L-RA-WWASS4.166/S4501
				S4502, RADOX®	BK	RA-WAKS4.166-L-RA-WWASS4.166/S4502
		Double-ended cordset male, angled, M12x1 shielded	8, A	S5550, SABIX®	GY	RA-WAKS8-L-RA-WWASS8/S5550
			4, A	S4500, RADOX®	BK	RA-WWAKS4.166-L-RA-WASS4.166/S4500
			4, A	S4501, RADOX®	BK	RA-WWAKS4.166-L-RA-WASS4.166/S4501
		Double-ended cordset female, angled, M12x1		S4502, RADOX®	BK	RA-WWAKS4.166-L-RA-WASS4.166/S4502
			8, A	S5550, SABIX®	GY	RA-WWAKS8-L-RA-WWASS8/S5550
			8, A			
		Double-ended cordset male, angled, M12x1 shielded	4, A	S4500, RADOX®	BK	RA-WWAKS4.166-L-RA-WWASS4.166/S4500
			4, A	S4501, RADOX®	BK	RA-WWAKS4.166-L-RA-WWASS4.166/S4501
				S4502, RADOX®	BK	RA-WWAKS4.166-L-RA-WWASS4.166/S4502
		Double-ended cordset female, angled, M12x1	8, A	S5550, SABIX®	GY	RA-WWAKS8-L-RA-WWASS8/S5550
			8, A			
		Single-ended cordset female, straight, M8x1	3	S3327, RADOX®	BK	RA-SKP3.036-L/S3327
		Single-ended cordset female, straight, M8x1	3	S3327, RADOX®	BK	RA-SWKP3.036-L/S3327
		Single-ended cordset male, straight, M8x1	3	S3327, RADOX®	BK	RA-SSP3.036-L/S3327



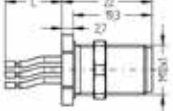


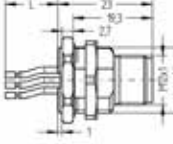
\* We deliver individual cable lengths upon request. Just add item description and cable length [L] in meters to your order. For example: cable length L = 5.2m (see dimensioned drawing) | RA-WASSX8.066-5,2-RA-WASSX8.066/S5006

			Pins	Cable / Δh[mm]	Color	Item description
		Single-ended cordset male, angled, M8x1	3	S3327, RADOX®	BK	RA-SWSP3.036-L/S3327
		Double-ended cordset female, straight, M8x1	3	S3327, RADOX®	BK	RA-SKP3.036-L-RA-SSP3.036/S3327
		Double-ended cordset male, straight, M8x1	3	S3327, RADOX®	BK	RA-SKP3.036-L-RA-SWSP3.036/S3327
		Double-ended cordset female, straight, M8x1	3	S3327, RADOX®	BK	RA-SKP3.036-L-RA-SWSP3.036/S3327
		Double-ended cordset male, angled, M8x1	3	S3327, RADOX®	BK	RA-SKP3.036-L-RA-SWSP3.036/S3327
		Double-ended cordset female, angled, M8x1	3	S3327, RADOX®	BK	RA-SWKP3.036-L-RA-SSP3.036/S3327
		Double-ended cordset male, straight, M8x1	3	S3327, RADOX®	BK	RA-SWKP3.036-L-RA-SSP3.036/S3327
		Double-ended cordset female, angled, M8x1	3	S3327, RADOX®	BK	RA-SWKP3.036-L-RA-SWSP3.036/S3327
		Double-ended cordset male, angled, M8x1	3	S3327, RADOX®	BK	RA-SWKP3.036-L-RA-SWSP3.036/S3327
		Single-ended cordset female, straight, M8x1	4	S4500, RADOX®	BK	RA-SKP4.065-L/S4500
				S5555, CFSPECIAL.414	BK	RA-SKP4.057-L/S5555
		Single-ended cordset female, angled, M8x1	4	S4500, RADOX®	BK	RA-SWKP4.065-L/S4500
				S5555, CFSPECIAL.414	BK	RA-SWKP4.057-L/S5555
		Single-ended cordset male, straight, M8x1	4	S4500, RADOX®	BK	RA-SSP4.065-L/S4500
				S5555, CFSPECIAL.414	BK	RA-SSP4.057-L/S5555
		Single-ended cordset male, angled, M8x1	4	S4500, RADOX®	BK	RA-SWSP4.065-L/S4500
				S5555, CFSPECIAL.414	BK	RA-SWSP4.057-L/S5555

			Pins	Cable / Δh[mm]	Color	Item description
		Double-ended cordset female, straight, M8x1	4	S4500, RADOX®	BK	RA-SKP4.065-L-RA-SSP4.065/S4500
			4	S5555, CFSPECIAL.414	BK	RA-SKP4.057-L-RA-SSP4.057/S5555
		Double-ended cordset female, straight, M8x1	4	S4500, RADOX®	BK	RA-SKP4.065-L-RA-SWSP4.065/S4500
			4	S5555, CFSPECIAL.414	BK	RA-SKP4.057-L-RA-SWSP4.057/S5555
		Double-ended cordset female, angled, M8x1	4	S4500, RADOX®	BK	RA-SWKP4.065-L-RA-SSP4.065/S4500
			4	S5555, CFSPECIAL.414	BK	RA-SWKP4.057-L-RA-SSP4.057/S5555
		Double-ended cordset female, angled, M8x1	4	S4500, RADOX®	BK	RA-SWKP4.065-L-RA-SWSP4.065/S4500
			4	S5555, CFSPECIAL.414	BK	RA-SWKP4.057-L-RA-SWSP4.057/S5555
		Single-ended cordset female, straight, M8x1 shielded	4	S4500, RADOX®	BK	RA-SKPS4.065-L/S4500
		Single-ended cordset female, angled, M8x1 shielded	4	S4500, RADOX®	BK	RA-SWKPS4.065-L/S4500
		Single-ended cordset male, straight, M8x1 shielded	4	S4500, RADOX®	BK	RA-SSPS4.065-L/S4500
		Single-ended cordset male, angled, M8x1 shielded	4	S4500, RADOX®	BK	RA-SWSPS4.065-L/S4500
		Double-ended cordset female, straight, M8x1 shielded	4	S4500, RADOX®	BK	RA-SKPS4.065-L-RA-SSPS4.065/S4500
			4	S4500, RADOX®	BK	RA-SKPS4.065-L-RA-SWSPS4.065/S4500
		Double-ended cordset female, straight, M8x1 shielded	4	S4500, RADOX®	BK	RA-SKPS4.065-L-RA-SWSPS4.065/S4500
			4	S4500, RADOX®	BK	RA-SKPS4.065-L-RA-SWSPS4.065/S4500

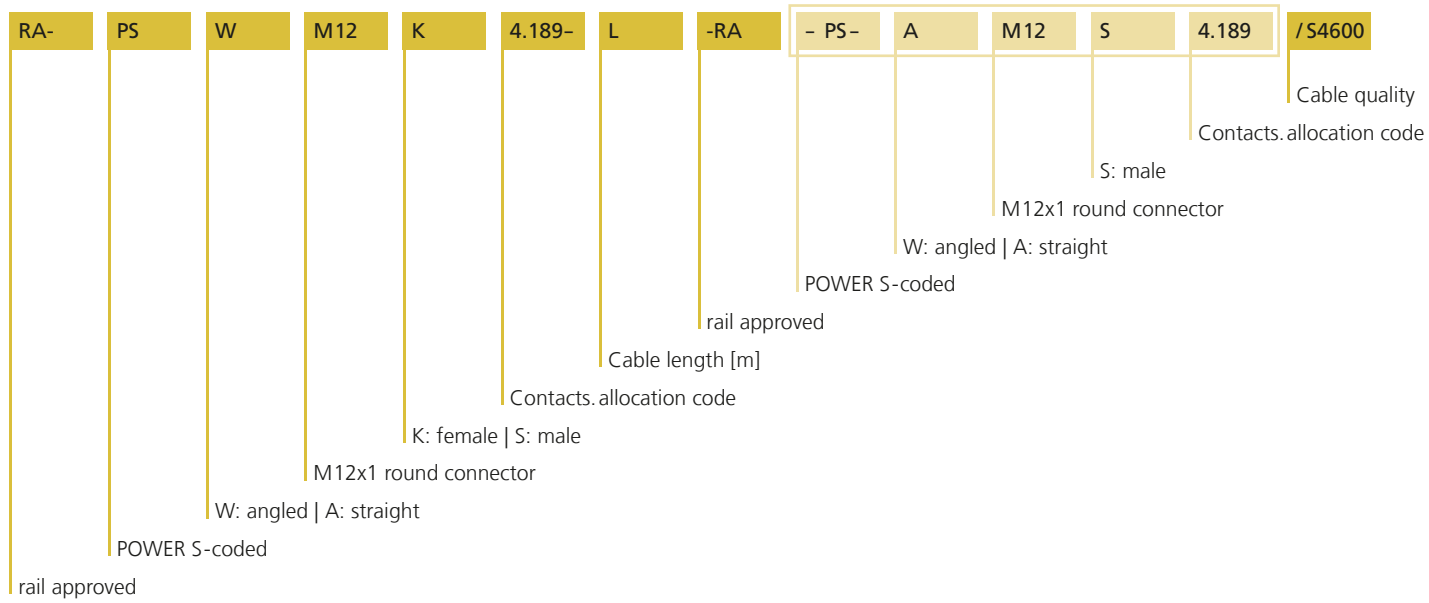
\* We deliver individual cable lengths upon request. Just add item description and cable length [L] in meters to your order. For example: cable length L = 5.2m (see dimensioned drawing) | RA-WASSX8.066-5,2-RA-WASSX8.066/S5006

			Pins	Cable / Δh[mm]	Color	Item description
			4 4	S4500, RADOX®	BK	RA-SWKPS4.065-L-RA-SSPS4.065/S4500
			4 4	S4500, RADOX®	BK	RA-SWKPS4.065-L-RA-SWSPS4.065/S4500
			4, A	1,0...2,5 mm		EC-WFKF4-P/12/S3525
				2,5...4,0 mm		EC-WFKF4-P/12/S3540
				4,0...5,0 mm		EC-WFKF4-P/12/S3550
			4, A	1,0...5,0 mm		EC-WFSF4-P/12
			4, A	1,0...2,5 mm		RA-FHM12KUA4-0,5/M12/S3525
				2,5...4,0 mm		RA-FHM12KUA4-0,5/M12/S3540
				4,0...5,0 mm		RA-FHM12KUA4-0,5/M12/S3550
			4, A	1,0...5,0 mm		RA-FVM12KUA4-0,5/M12
			4, A	1,0...5,0 mm		RA-FHM12KUA4-0,5/M16
			4, A	1,0...5,0 mm		RA-FVM12SUA4-0,5/M12

			Pins	Cable / Δh[mm]	Color	Item description
			4, A	1,0...5,0 mm		RA-FHM12SUA4-0,5/M12
			4, A	1,0...5,0 mm		RA-FHM12SUA4-0,5/M16

\* We deliver individual cable lengths 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/S5006

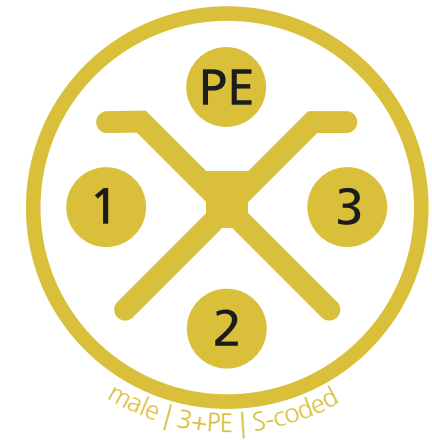
Nomenclature of patched connectors



Cable	Color	Wire cross-section   Features	Rail Approved	Bus Approved
S4600, RADOX®	BK	4 x 1,5 mm²   EN 50306-4	✓	✓


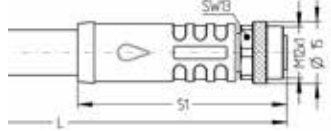

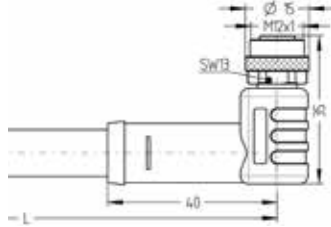

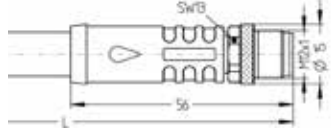

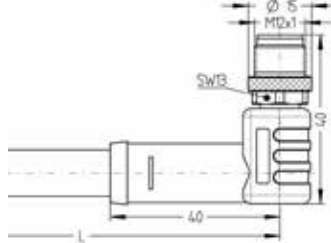






M12x1 POWER






## M12x1 POWER


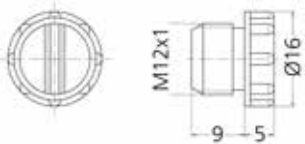
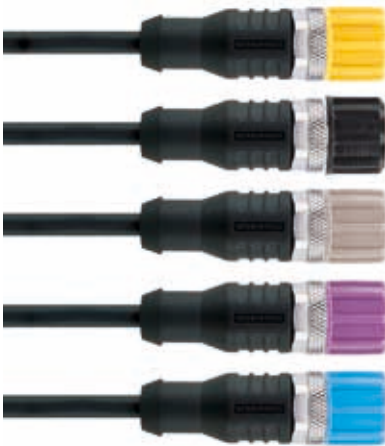
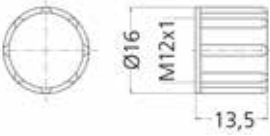

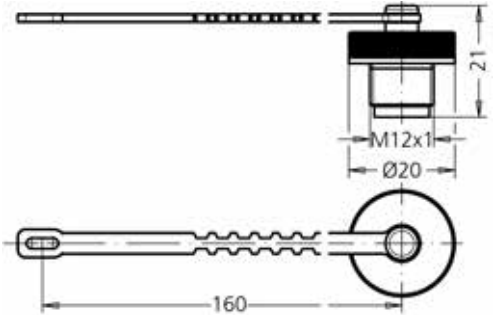
Technical data	M12x1 3+PE   S-coded
Rated voltage	630V <sub>AC</sub>   600V <sub>AC</sub> (UL)
Current load (at 40°C)	12A
Insulation resistance	≥10 <sup>8</sup> Ω
Standards	IEC 61076-2-111 DIN EN 50155 DIN EN 45545-2
Ambient temperature product	-40°C...+90°C
Degree of pollution	2
Degree of protection (mounted)	IP67 (-30°C...+90°C) IP65 (-40°C...+90°C)
Mechanical life-cycle	>100 mating cycles


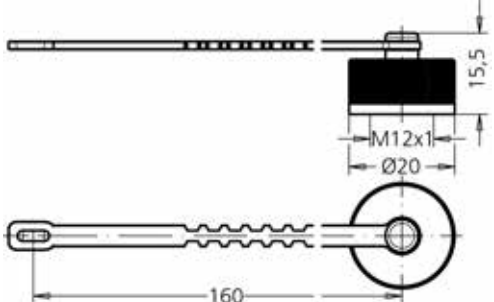

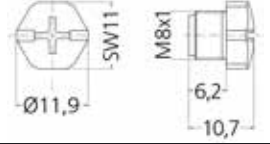

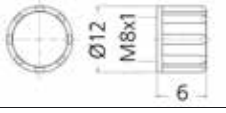

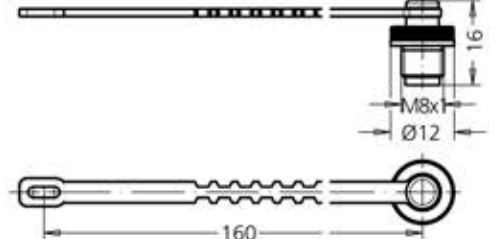

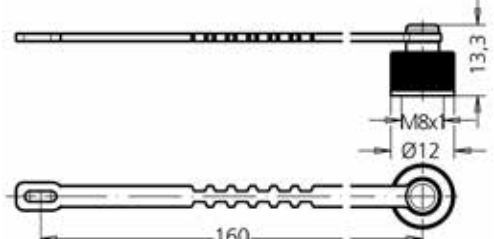

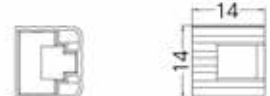
			Pins	Cable / Δh[mm]	Color	Item description
		Single-ended cordset female, straight, M12x1	3+PE, S	S4600, RADOX®	BK	RA-PSAM12K4.189-L/S4600
		Single-ended cordset female, angled, M12x1	3+PE, S	S4600, RADOX®	BK	RA-PSWM12K4.189-L/S4600
		Single-ended cordset male, straight, M12x1	3+PE, S	S4600, RADOX®	BK	RA-PSAM12S4.189-L/S4600
		Single-ended cordset male, angled, M12x1	3+PE, S	S4600, RADOX®	BK	RA-PSWM12S4.189-L/S4600
		Double-ended cordset female, straight, M12x1	3+PE, S	S4600, RADOX®	BK	RA-PSAM12K4.189-L-RA-PSAM12S4.189/S4600
		Double-ended cordset male, straight, M12x1	3+PE, S	S4600, RADOX®	BK	
		Double-ended cordset female, straight, M12x1	3+PE, S	S4600, RADOX®	BK	RA-PSAM12K4.189-L-RA-PSWM12S4.189/S4600
		Double-ended cordset male, angled, M12x1	3+PE, S	S4600, RADOX®	BK	
		Double-ended cordset female, angled, M12x1	3+PE, S	S4600, RADOX®	BK	RA-PSWM12K4.189-L-RA-PSAM12S4.189/S4600
		Double-ended cordset male, straight, M12x1	3+PE, S	S4600, RADOX®	BK	

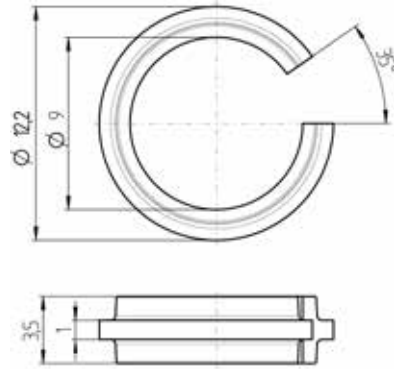
M12x1 POWER

\* We deliver individual cable lengths 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/S5006

			Pins	Cable / Δh[mm]	Color	Item description
		Double-ended cordset female, angled, M12x1 male, angled, M12x1	3+PE, S 3+PE, S	S4600, RADOX®	BK	RA-PSWM12K4.189-L-RA-PSWM12S4.189/S4600


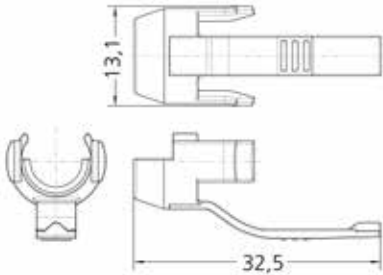
				Packaging unit   Item-No.				
				Material   Color	1	10	100	500
		Screw plug cover for M12x1 female		BK, similar RAL9005	8000004		8081767	8081768
				VT, similar RAL4001	8041992		8081773	8081774
				BU, similar RAL5012	8041993		8081775	8081776
				GN, similar RAL6018	8059233		8081777	8081778
		Screw cap cover for M12x1 male		YE, similar RAL1021	8000031		8081751	8081752
				BK, similar RAL9005	8036742		8081753	8081754
				GY, similar RAL7035	8041994		8081755	8081756
				VT, similar RAL4001	8041995		8081757	8081758
				BU, similar RAL5012	8041996		8081759	8081760
		Screw plug captiv cover for M12x1 female		BK, similar RAL9005	8048568			


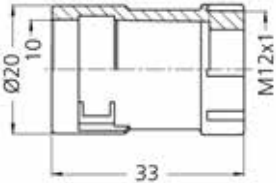


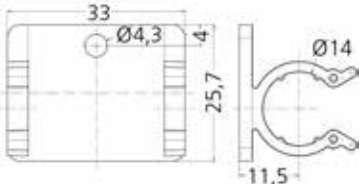


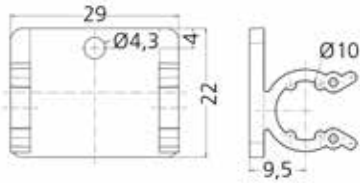


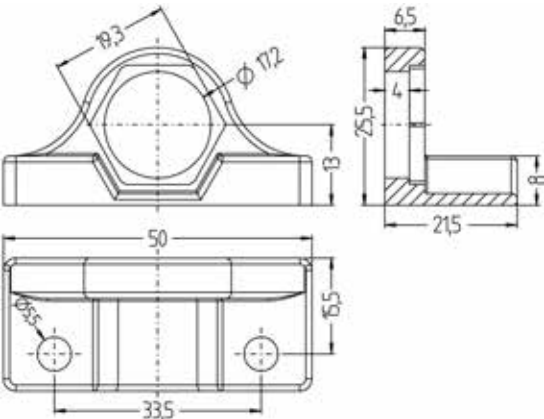

				Packaging unit   Item-No.				
				Material   Color	1	10	100	500
		Screw cap captiv cover for M12x1 male	BK, similar RAL9005	8048569				
		Screw plug cover for M8x1 female	BK, similar RAL9005	8015075		8081771	8081772	
		Screw cap cover for M8x1 male	BK, similar RAL9005	8041582		8081761	8081762	
		Screw plug captiv cover for M8x1 female	BK, similar RAL9005	8048567				
		Screw cap captiv cover for M8x1 male		8048566				
		Dustproof-cap cover for RJ45	Plastic   transparent	8064715				



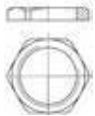
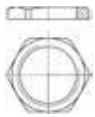
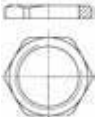

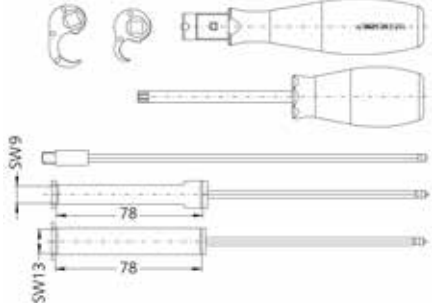


Marking ring  $\varnothing$  9mm  
for color-coded cables and connectors (M12x1,  
M12x1 shielded, RJ45, overmolded receptacle  
connector with cable: FKFDYSY, M8x1 shielded)

Material   Color	Packaging unit   Item-No.			
	1	10	100	500
POM WH, similar RAL9002			8063523	
POM RD, similar RAL3020			8063524	
POM BU, similar RAL5012			8063525	
POM YE, similar RAL1018			8063526	
POM GN, similar RAL6018			8063527	
POM BK, similar RAL9004			8063528	
POM OG, similar RAL2008			8063529	
POM VT, similar RAL4006			8063530	
POM GY, similar RAL7035			8063531	
POM PK, similar RAL4003			8063532	
POM similar RAL1002			8063533	

				Packaging unit   Item-No.				
				Material   Color	1	10	100	500
		Unlocking clip for RJ45		POM RD, similar RAL3020	8071939			
				POM OG, similar RAL2008	8071944			
				POM YE, similar RAL1018	8071941			
				POM similar RAL1002	8071948			
				POM GN, similar RAL6018	8071942			
				POM BU, similar RAL5012	8071940			
				POM VT, similar RAL4006	8071945			
				POM PK, similar RAL4003	8071947			
				POM GY, similar RAL7035	8071946			
				POM WH, similar RAL9002	8071938			
				POM BK, similar RAL9004	8071943			

				Packaging unit   Item-No.				
				Material   Color	1	5	10	100
		Adapter M12x1	BK, similar RAL9005	8081747				
		Protective hose 50m	BK, similar RAL9005	8081621				
		Mounting-clip M12x1	POM	8047660				
		Mounting-set M12x1 Clip + screw M4x8	POM	8047664				
		Mounting-clip M8x1	POM	8047658				
		Mounting-set M8x1 Clip + screw M4x8	POM	8047663				
		Wall bracket for IE-adapter for item-no. 8065952, 8065950 and 8065951	Plastic	8065953				
								



				Packaging unit   Item-No.				
				Material   Color	1	10	100	500
				Spare nuts for receptacle For Receptacle M12x1   M12x1 A/F14	Metal, CuZn, nickel-plated	8045651		
				Spare nuts for receptacle For Receptacle M12x1   PG9 A/F18	Metal, CuZn, nickel-plated	8004913		
				Spare nuts for receptacle For Receptacle M12x1   M16x1,5 A/F19	Metal, CuZn, nickel-plated	8029359		
				Torque-wrench-set in wallet fully fitted for M8x1, M12x1 (knurl, hexagon-nut)		8055431		
				Cable Stripping Tool for PUR halogen-free-, highly flexible TPE-U-, PUR-, PUR /PVC-, PVC, shielded and unshielded cables, multi-stranded 4.40 – 7.00mm		8066215		
				Cable Stripping Tool for PUR halogen-free-, highly flexible TPE-U-, PUR-, PUR /PVC-, PVC, shielded and unshielded cables, multi-stranded 3.20 – 4.40mm		8066216		



		S4005	S5006VT	S4002	S4002BU
Materials	Connector	M12x1   8X RJ45 field-wireable	M12x1   8X RJ45 molded	M12x1   4D RJ45 molded	M12x1   4D RJ45 molded
	Cable-jacket	RADOX® EM104	BETAtans® Polyolefin Copolymer	RADOX® EM104	RADOX® EM104
	Wire insulation	RADOX® FOAM	BETAtans® Cell PE	RADOX® FOAM	RADOX® FOAM
Setup	Color outer-jacket	BU	VT	BK	BU
	Wire color	WH/OG, WH/GN, WH/BN, WH/BU	WH/OG, WH/GN, WH/BN, WH/BU	WH, BU, OG, YE	WH, BU, OG, YE
	Conductor structure	7x 0,20mm	7x 0,16mm	7x 0,25mm	7x 0,25mm
	Outer diameter of jacket	Ø 8,10mm	Ø 6,60mm	Ø 6,60mm	Ø 6,60mm
Features	Wire cross-section	4x 2x AWG24	4x 2x AWG26	1x 4x AWG22	1x 4x AWG22
	Rated voltage	125V <sub>AC</sub>	125V <sub>AC</sub>	300V <sub>AC</sub>	300V <sub>AC</sub>
	Bending radius (infrequently moved)	—	—	—	—
	Bending radius (fixed)	4xØ	6xØ	6xØ	6xØ
	Temperature range (infrequently moved)	—	—	—	—
	Temperature range (fixed)	-50°C...+70°C	-40°C...+80°C	-50°C...+90°C	-50°C...+90°C
	Shielding	✓	✓	✓	✓
Transmission features	Cat7	Cat7	Cat5e	Cat5e	
Certifications	EN 45545-2	HL 1-3	HL 1-3	HL 1-3	HL 1-3
	NFPA 130	✓	✓	✓	✓
	EN 50306-4	—	—	—	—
	UNECER 118	✓	✓	✓	✓
	UL	—	—	—	—
Application	Application	Rail   Bus	Rail   Bus	Rail   Bus	Rail   Bus
	Item-No. 100m cable	8063117	8081244	8063114	8088059



S4003	S4004	S5002BU	S2171		
M12x1   4D RJ45 field-wireable	M12x1   4D RJ45 field-wireable	M12x1   4D RJ45 molded	M12x1   4D RJ45 molded	Connector	
RADOX® EM104	RADOX® EM104	BETAtrans® Polyolefin Copolymer	PUR	Cable-jacket	Materials
RADOX® COM	RADOX® COM	BETAtrans® Cell PE	PE	Wire insulation	
BK	BU	BU	GN	Color outer-jacket	Setup
WH, BU, OG, YE	WH, BU, OG, YE	WH, BU, OG, YE	WH, BU, OG, YE	Wire color	
7x 0,25mm	7x 0,25mm	7x 0,254mm	7x 0,25mm	Conductor structure	
Ø 7,25mm	Ø 7,25mm	Ø 6,60mm	Ø 6,50mm	Outer diameter of jacket	
1x 4x AWG22	1x 4x AWG22	1x 4x AWG22	1x 4x AWG22	Wire cross-section	Features
300VAC	300VAC	125VAC	600V (UL rating)	Rated voltage	
10xØ	10xØ	6xØ	7,5xØ	Bending radius (infrequently moved)	
6xØ	6xØ	5xØ	5xØ	Bending radius (fixed)	
-40°C...+90°C	-40°C...+90°C	-25°C...+70°C	-30°C...+70°C	Temperature range (infrequently moved)	
-50°C...+90°C	-50°C...+90°C	-40°C...+85°C	-40°C...+75°C	Temperature range (fixed)	
✓	✓	✓	✓	Shielding	Certifications
Cat5e	Cat5e	Cat5e	Cat5e	Transmission features	
HL 1-3	HL 1-3	HL 1-3	—	EN 45545-2	
✓	✓	✓	—	NFPA 130	
—	—	—	—	EN 50306-4	
✓	✓	✓	✓	UNECER118	
—	—	—	CMX	UL	
Rail   Bus	Rail   Bus	Rail   Bus	Bus	Application	
8063115	8063116	8086570	8036284	Item-No. 100m cable	



		S3327	S4500	S4500	S4501	S4501
Connector		M8x1	M12x1   4A, M8x1	M12x1   4A, M8x1 shielded	M12x1   4A	M12x1   4A shielded
Materials	Cable-jacket	RADOX®	RADOX® EM104	RADOX® EM104	RADOX® EM104	RADOX® EM104
	Wire insulation	RADOX®	RADOX® EI 306	RADOX® EI 306	RADOX® EI 306	RADOX® EI 306
	Color outer-jacket	BK	BK	BK	BK	BK
Setup	Wire color	WH1, WH2, WH3	WH1, WH2, WH3, WH4	WH1, WH2, WH3, WH4	WH1, WH2, WH3, WH4	WH1, WH2, WH3, WH4
	Conductor structure	19 x 0,18mm	19 x 0,18mm	19 x 0,18mm	19 x 0,23mm	19 x 0,23mm
	Outer diameter of jacket	Ø 4,60mm	Ø 4,90mm	Ø 5,40mm	Ø 5,40mm	Ø 5,90mm
	Wire cross-section	3 x 0,5mm <sup>2</sup>	4 x 0,5mm <sup>2</sup>	4 x 0,5mm <sup>2</sup>	4 x 0,75mm <sup>2</sup>	4 x 0,75mm <sup>2</sup>
Features	Rated voltage	U0/U: 600V/1000V	U0/U: 300V/500V	U0/U: 300V/500V	U0/U: 300V/500V	U0/U: 300V/500V
	Bending radius (infrequently moved)	4xØ	4xØ	4xØ	4xØ	4xØ
	Bending radius (fixed)	3xØ	3xØ	3xØ	3xØ	3xØ
	Temperature range (infrequently moved)	-25°C...+90°C	-25°C...+90°C	-25°C...+90°C	-25°C...+90°C	-25°C...+90°C
	Temperature range (fixed)	-50°C...+120°C	-40°C...+120°C	-50°C...+120°C	-40°C...+120°C	-50°C...+120°C
	Shielding	—	—	✓	—	✓
	Drag-chain capability	—	—	—	—	—
Certifications	EN 45545-2	HL 1-3	HL 1-3	HL 1-3	HL 1-3	HL 1-3
	NFPA 130	✓	—	✓	—	✓
	EN 50306-4	—	✓	✓	✓	✓
	UNECER 118	✓	✓	✓	—	✓
	UL	—	—	—	—	—
Application	Rail   Bus	Rail   Bus	Rail   Bus	Rail   Bus	Rail   Bus	
Item-No. 100m cable	8088060	8074876	8074873	8074877	8074874	



S4502	S4502	S5550	S5550	S5555	S4600	
M12x1   4A	M12x1   4A shielded	M12x1   8A	M12x1   8A shielded	M12x1   4A, M8x1	M12x1   3+PE S	Connector
RADOX® EM104	RADOX® EM104	SABIX®	SABIX®	CFSPECIAL.414	RADOX® EM104	Cable-jacket
RADOX® EI 306	RADOX® EI 306	SABIX®	SABIX®	CFSPECIAL.414	RADOX® EI 306	Wire insulation
BK	BK	GY	GY	BK	BK	Color outer-jacket
WH1, WH2, WH3, WH4	WH1, WH2, WH3, WH4	WH, BN, GN, YE, GY, PK, BU, RD	WH, BN, GN, YE, GY, PK, BU, RD	BK1, BK2, BK3, BK4	WH1, WH2, WH3, GNYE	Wire color
19 x 0,26mm	19 x 0,26mm	14 x 0,15mm	14 x 0,15mm	43 x 0,10mm	19 x 0,31mm	Conductor structure
Ø 5,70mm	Ø 6,30mm	Ø 5,20mm	Ø 6,10mm	Ø 5,00mm	Ø 6,70mm	Outer diameter of jacket
4 x 1,0mm <sup>2</sup>	4 x 1,0mm <sup>2</sup>	8 x 0,25mm <sup>2</sup>	8 x 0,25mm <sup>2</sup>	4 x 0,34mm <sup>2</sup>	4 x 1,5mm <sup>2</sup>	Wire cross-section
U0/U: 300V/500V	U0/U: 300V/500V	500VAC	500VAC	U0/U: 300V/500V	U0/U: 300V/500V	Rated voltage
4xØ	4xØ	10xØ	10xØ	7,5 - 10xØ	4xØ	Bending radius (infrequently moved)
3xØ	3xØ	5xØ	5xØ	5 - 10xØ	3xØ	Bending radius (fixed)
-25°C...+90°C	-25°C...+90°C	-30°C...+90°C	-30°C...+90°C	-20°C...+80°C	-25°C...+90°C	Temperature range (infrequently moved)
-40°C...+120°C	-50°C...+120°C	-40°C...+90°C	-40°C...+90°C	-30°C...+80°C	-40°C...+120°C	Temperature range (fixed)
—	✓	—	✓	—	—	Shielding
—	—	—	—	1 million bending cycles	—	Drag-chain capability
HL 1-3	HL 1-3	HL 1-3	HL 1-3	HL 1-3	HL 1-3	EN 45545-2
—	✓	—	—	—	—	NFPA 130
✓	✓	—	—	—	✓	EN 50306-4
✓	✓	✓	✓	✓	✓	UNECER118
—	—	—	—	—	—	UL
Rail   Bus	Rail   Bus	Rail   Bus	Rail   Bus	Rail   Bus	Rail   Bus	Application
8074878	8074875	8095948	8095947	8095949	8088061	Item-No. 100m cable

## TECHNICAL INFORMATION

### 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.

### ECE R118 | Fire behavior

This regulation specifies the burning behavior of interior materials and cables in busses.

### 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.

### IEC60529; 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.

### IEC60512; 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 catalog 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.

## TECHNICAL INFORMATION

Characteristic	Standard <sup>1)</sup>	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)

	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 a wire. Protected against dust.	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		Protected against water by high-pressure steam-jet cleaning

## Supplementary Technical Data

<sup>1)</sup>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.

## TECHNICAL DATA

### Conversion of American Wire Gauge, AWG in mm<sup>2</sup>

In some industrial areas, the American Wire Gauge is also used for cables. The following table serves the conversion from AWG in mm<sup>2</sup>. 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 [mm <sup>2</sup> ]
30	1 x 0.25   7 x 0.10	0.25   0.36	0.05   0.06
28	1 x 0.32   7 x 0.13	0.32   0.38	0.08   0.09
26	1 x 0.4   7 x 1.16   19 x 0.10	0.40   0.48   0.51	0.13   0.14   0.15
24	1 x 0.51   17 x 0.20   19 x 0.13	0.51   0.61   0.64	0.21   0.22   0.25
22	1 x 0.64   7 x 0.25   19 x 0.16	0.64   0.76   0.81	0.33   0.34   0.38
20	1 x 0.81   7 x 0.32   19 x 0.20	0.81   0.97   1.02	0.52   0.56   0.60
18	1 x 1.02   19 x 0.25	1.02   1.27	0.82   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

### Overview Pg-thread vs. metric thread

(wrench width for cable screwing according to EN50262)

The interim period for DIN46320 "screwing for cables and conducting-lines with Pg-thread" expired on 31 December 1999. Since then, screwing for cables and conductinglines had to comply with the national standard 46319 before this was replaced by EN50262 on 1 March 2001.

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

## 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 market.

### 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 2011/65/EU (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.

### CE marking

The CE marking indicates the conformity of a product with harmonized EU standard and therein defined requirements.





In addition to the renowned connectors with solder connection, the crimp connection is still considered reliable connectivity and an ideal solution especially in industries with large number of connectors and few variants. This connection method is distinguished through:

- A high repeatability due to adjustable- and controlled process parameters.
- A safe- and reliable connection with good electrical- and mechanical values.
- Maintaining cable flexibility after crimping.
- No damage to wire insulation due to heat effect.
- A wide range of cable cross-sections.

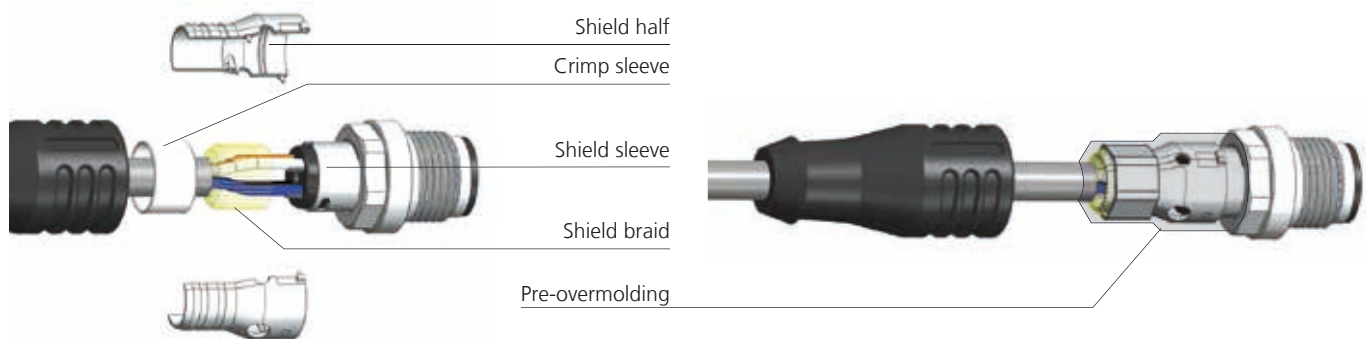
ESCHA 'rail approved' connectors dispose of a safe crimp connection and thus meet another criterion for rail-cars approvals. Considering our in-house process parameters and the perfectly tuned crimping tool, we generate a gas-tight and electrically as well as mechanically flawless connection. The process parameters are regularly monitored and the qualitatively high-grade crimp connection is checked by microsections and tensile tests.



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.



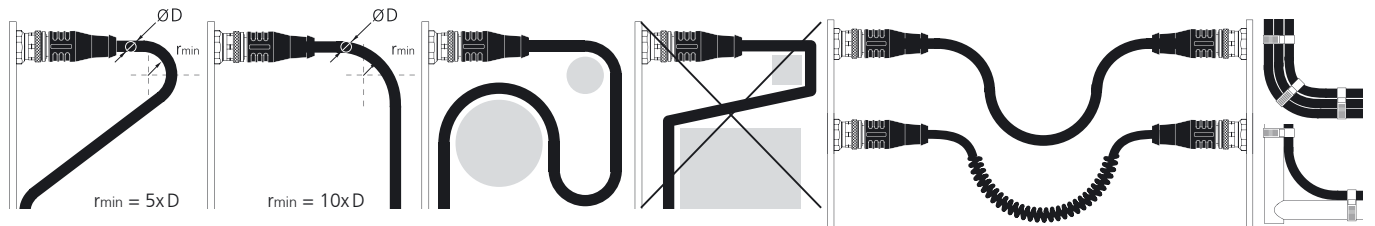
Shielding | ESCHA 360° two-shell shielding concept (ESCHA 2SSK)

## 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. In order to avoid damage to a round connector and cable, the minimum bending radius of the cable ( $r_{min}$ ) is to be observed during the wiring.

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

In case of double-ended cordsets, sufficient cable length between the connections should be observed in order to absorb the generated energy during movement. The use of cable loops, spiral lines or cable chains guarantees a high life cycle of the round connector system.



## Recommended tightening torque

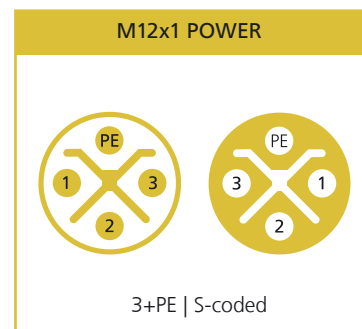
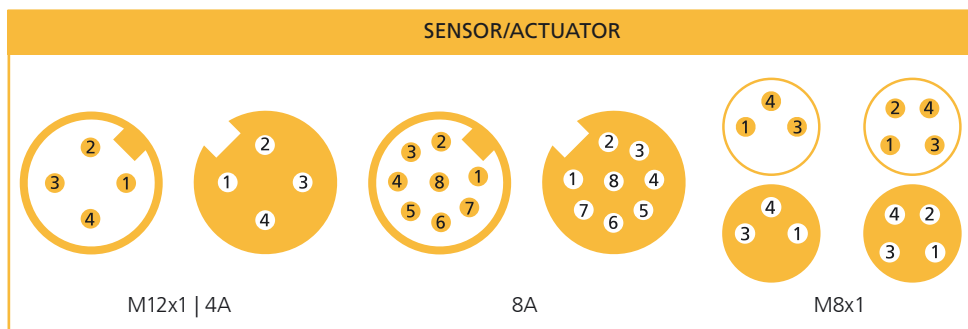
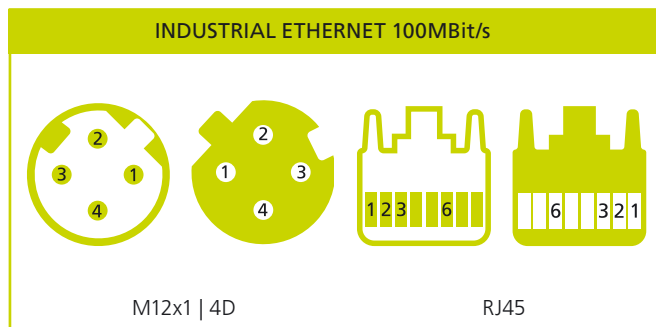
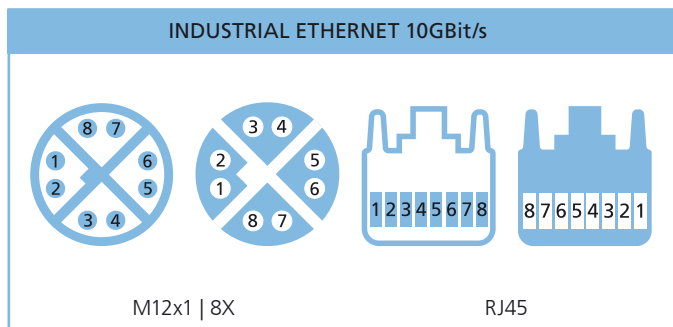
The use of a torque application tool is recommended for tightening and loosening of round connectors. The recommendations base on internal tests and cover a majority of applications and product combinations. Due to the design variety of products available on the market, specifications have to be checked in individual cases.

Recommended tightening torque according to IEC 61076-2 test requirements:  
**0.6Nm for M8x1 round connectors | 1.0Nm for M12x1 round connectors**

Recommended tightening torque for receptacles according to IEC 61076-2 test requirements:  
**1.5Nm for M8x1 round connectors | 2.0Nm for M12x1 round connectors**

**Torque-wrench set M8x1 | M12x1**  
in wallet fully fitted for M8x1 | M12x1 (knurl, hexagon-nut)

**Item-No.**  
8055431



Type	Pins	Coding	Allocation code	Pin							
				1	2	3	4	5	6	7	8
M12x1	8	X	8.066	WH	OG	WH	GN	WH	BN	WH	BU
RJ45	8		8.002	WH	OG	WH	BU	WH	GN	WH	BN
M12x1	4	D	4.029	YE	WH	OG	BU				
RJ45	4		4.003	YE	OG	WH			BU		
M12x1	4	A	4.001	BK1	BK2	BK3	BK4				
M12x1	4	A	4.166	WH1	WH2	WH3	WH4				
M12x1	8	A	8	WH	BN	GN	YE	GY	PK	BU	RD
M8x1	3		3.036	WH1	WH2	WH3					
M8x1	4		4.057	BK1	BK2	BK3	BK4				
M8x1	4		4.065	WH1	WH2	WH3	WH4				
M12x1	3+PE	S	4.189	WH1	WH2	WH3	GNYE				



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