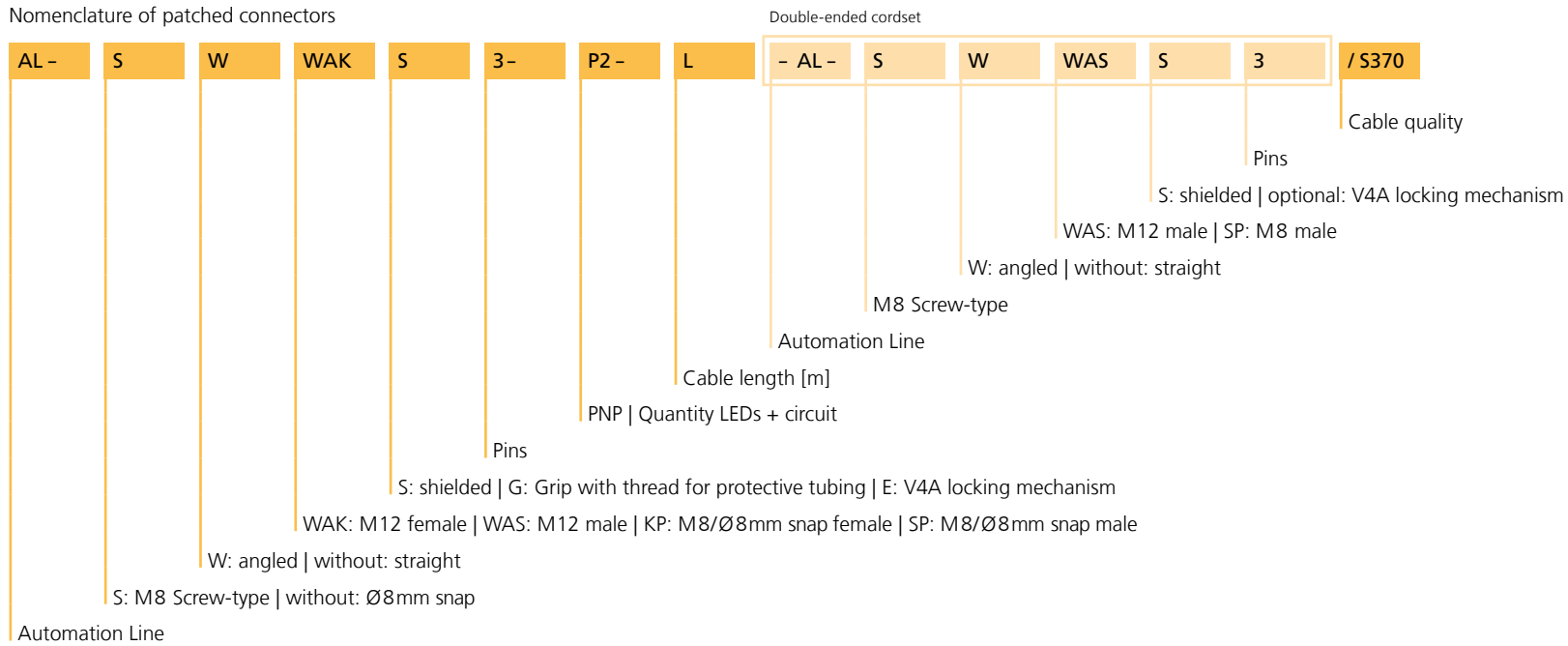


# **AUTOMOTIVE** Connectivity for body construction and vehicle assembly

Nomenclature of patched connectors



Cable	Material	UL	Colour	Feature	Drag chain-adapted	Torsion resistant	Welding sparks resistant
S740	PUR/PP	✓	OG	Enlarged jacket-Ø for very good welding sparks resistance	5million bending cycles	≥2 million bending cycles (±360°/m)	★★★★★
S740YE	PUR/PP	✓	YE	Safety   Enlarged jacket-Ø for very good welding sparks resistance	3million bending cycles	≥1 million bending cycles (±180°/m)	★★★★★
S370	PUR/PP	✓	BK		5million bending cycles	≥2 million bending cycles (±360°/m)	★★★★
S370YE	PUR/PP	✓	YE	Safety	3million bending cycles	≥1 million bending cycles (±360°/m)	★★★★












## Connectivity for Automotive Industry

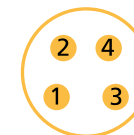
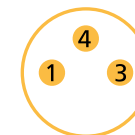
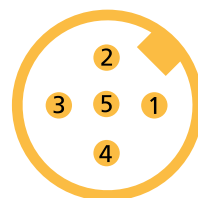
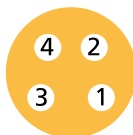
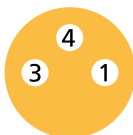
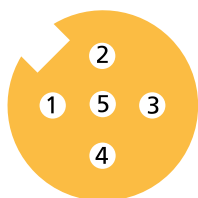
Technical data	M12	M8	M12 Safety
Insulation resistance	$\geq 10^8 \Omega$	$\geq 10^8 \Omega$	$\geq 10^8 \Omega$
Resistance	$\leq 5 m\Omega$	$\leq 5 m\Omega$	$\leq 5 m\Omega$
Ambient temperature product	-30°C...+90°C	-30°C...+90°C	-30°C...+90°C
Contact material	Metal, gold-plated	Metal, gold-plated	Metal, gold-plated
Contact-carrier material	Plastic, TPU	Plastic, TPU	Plastic, TPU
Grip body material	Plastic, TPU	Plastic, TPU	Plastic, TPU
Coupling nut material	Metal, nickel-plated	Metal, nickel-plated	Metal, nickel-plated
Sealing (female) material	FPM/FKM	FPM/FKM	FPM/FKM
Standards	IEC 61076-2-101	IEC 61076-2-101	IEC 61076-2-101
Degree of protection (mounted)	IP65, IP67, IP68	IP65, IP67, IP68	IP65, IP67, IP68
Mechanical life-cycle	>100 mating cycles	>100 mating cycles	>100 mating cycles
Degree of pollution	3	3	3

ESCHA offers ready-made single-ended- and double-ended cord sets in M8 and M12 housing style for automobile production. Our components are ideally suited for the different demands in body construction as well as vehicle assembly. You can choose from different cable qualities, which offer e.g. excellent welding sparks resistance or good drag-chain- and torsion resistance. You can get yellow cables with yellow connector-bodies for safety applications. Suitable accessories like T-splitters, dustproof caps and mounting sets complement our range.

		Body				Cable			Item description	L = cable length*		
		Pins	U[max]	I[max]	LED	Material	Color	UL		2m / 1m	5m / 2m	10m / 5m
	Single-ended cordset female, straight, M12	3	250V	4A		PUR	OG	•	AL-WAK3-L/S740	8092633	8092634	8092635
		4	250V	4A		PUR	OG	•	AL-WAK4-L/S740	8092495	8092496	8092497
		5	60V	4A		PUR	OG	•	AL-WAK4.5-L/S740	8092501	8092502	8092503
	Single-ended cordset female, angled, M12, with LED	3	30V	4A	3P2	PUR	OG	•	AL-WWAK3P2-L/S740	8092621	8092622	8092623
		4	30V	4A	4P3.1	PUR	OG	•	AL-WWAK4P3.1-L/S740	8092624	8092625	8092626
		5	30V	4A	5P3.1	PUR	OG	•	AL-WWAK4.5P3.1-L/S740	8092627	8092628	8092629
	Single-ended cordset female, angled, M12	3	250V	4A		PUR	OG	•	AL-WWAK3-L/S740	8095455	8095456	8095457
		4	250V	4A		PUR	OG	•	AL-WWAK4-L/S740	8092498	8092499	8092500
		5	60V	4A		PUR	OG	•	AL-WWAK4.5-L/S740	8092618	8092619	8092620
	Single-ended cordset male, straight, M12	3	250V	4A		PUR	OG	•	AL-WAS3-L/S740	8092630	8092631	8092632
		4	250V	4A		PUR	OG	•	AL-WAS4-L/S740	8092636	8092637	8092638
		5	60V	4A		PUR	OG	•	AL-WAS4.5-L/S740	8092639	8092640	8092641
	Double-ended cordset female, straight, M12	4	250V	4A		PUR	OG	•	AL-WAK4-L-AL-WAS4/S740	8092655	8092656	8092657
	Double-ended cordset male, straight, M12	5	60V	4A		PUR	OG	•	AL-WAK4.5-L-AL-WAS4.5/S740	8092643	8092644	8092645
	Double-ended cordset female, angled, M12	4	250V	4A		PUR	OG	•	AL-WWAK4-L-AL-WAS4/S740	8092658	8092659	8092660
	Double-ended cordset male, straight, M12	5	60V	4A		PUR	OG	•	AL-WWAK4.5-L-AL-WAS4.5/S740	8092646	8092647	8092648
	Double-ended cordset female, angled, M12, with LED	4	30V	4A	4P3.1	PUR	OG	•	AL-WWAK4P3.1-L-AL-WAS4/S740	8092661	8092662	8092663
	Double-ended cordset male, straight, M12	5	30V	4A	4.5P3.1	PUR	OG	•	AL-WWAK4.5P3.1-L-AL-WAS4.5/S740	8092649	8092650	8092651
	Single-ended cordset female, straight, M8	3	60V	4A		PUR	OG	•	AL-SKP3-L/S740/S77	8094219	8094220	8094221
		4	60V	4A		PUR	OG	•	AL-SKP4-L/S740/S77	8094228	8094229	8094230
	Single-ended cordset female, angled, M8	3	60V	4A		PUR	OG	•	AL-SWKP3-L/S740/S77	8094222	8094223	8094224
		4	60V	4A		PUR	OG	•	AL-SWKP4-L/S740/S77	8094231	8094232	8094233
	Single-ended cordset female, angled, M8, with LED	3	30V	4A	3P2	PUR	OG	•	AL-SWKP3P2-L/S740/S77	8094225	8094226	8094227
		4	30V	4A	4P3.1	PUR	OG	•	AL-SWKP4P3.1-L/S740/S77	8095103	8095104	8095105
	Double-ended cordset female, straight, M8	3	60V	4A		PUR	OG	•	AL-SKP3-L-AL-WAS3/S740/S77	8094234	8094235	8094236
	Double-ended cordset male, straight, M12	4	60V	4A		PUR	OG	•	AL-SKP4-L-AL-WAS4/S740/S77	8094243	8094244	8094245
	Double-ended cordset female, angled, M8	3	60V	4A		PUR	OG	•	AL-SWKP3-L-AL-WAS3/S740/S77	8094237	8094238	8094239
	Double-ended cordset male, straight, M12	4	60V	4A		PUR	OG	•	AL-SWKP4-L-AL-WAS4/S740/S77	8094246	8094247	8094248

\* Standard cable-lengths for single-ended cordset: 2m, 5m, or 10m. For double-ended cordset: 1m, 2m, or 5m. Wire length for receptacles: 0.5m (0.2m for POWER). Other cable- and wire lengths are available upon request.

		Body				Cable			Item description	L = cable length*		
		Pins	U[max]	I[max]	LED	Material	Color	UL		2m / 1m	5m / 2m	10m / 5m
	Double-ended cordset female, angled, M8, with LED	3	30V	4A	3P2	PUR	OG	•	AL-SWKP3P2-L-AL-WAS3/S740/S77	8094240	8094241	8094242
	Double-ended cordset male, straight, M12	4	30V	4A	4P3.1	PUR	OG	•	AL-SWKP4P3.1-L-AL-WAS4/S740/S77	8095106	8095107	8095108
	Single-ended cordset female, straight, M12	5	60V	4A		PUR	YE	•	AL-WAK4.5-L/S740YE/S600	8095452	8095453	8095454
	Single-ended cordset female, angled, M12	5	60V	4A		PUR	YE	•	AL-WWAK4.5-L/S740YE/S600	8094434	8094435	8094436
 	Double-ended cordset female, straight, M12	5	60V	4A		PUR	YE	•	AL-WAK4.5-L-AL-WAS4.5/S740YE/S600	8092652	8092653	8092654
	Double-ended cordset male, straight, M12											
 	Double-ended cordset female, angled, M12	5	60V	4A		PUR	YE	•	AL-WWAK4.5-L-AL-WAS4.5/S740YE/S600	8094437	8094438	8094439
	Double-ended cordset male, straight, M12											










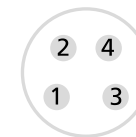
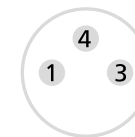
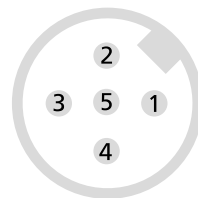
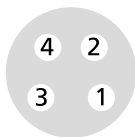
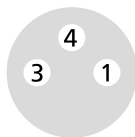
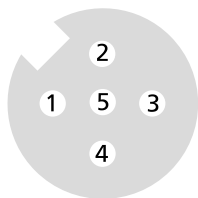
		Contact							
Pins	Coding	1	2	3	4	5	6	7	8
3	A	BN		BU	BK				
4	A	BN	WH	BU	BK				
5	A	BN	WH	BU	BK	GY			

\* Standard cable-lengths for single-ended cordset: 2m, 5m, or 10m. For double-ended cordset: 1m, 2m, or 5m. Wire length for receptacles: 0.5m (0.2m for POWER). Other cable- and wire lengths are available upon request.

		Body				Cable			Item description	L = cable length*		
		Pins	U[max]	I[max]	LED	Material	Color	UL		2m / 1m	5m / 2m	10m / 5m
	Single-ended cordset female, straight, M12	3	250V	4A		PUR	BK	•	AL-WAK3-L/S370	8043798	8043799	8043800
		4	250V	4A		PUR	BK	•	AL-WAK4-L/S370	8043811	8043812	8043813
		5	60V	4A		PUR	BK	•	AL-WAK4.5-L/S370	8043823	8043824	8043825
	Single-ended cordset female, angled, M12, with LED	3	30V	4A	3P2	PUR	BK	•	AL-WWAK3P2-L/S370	8044219	8045217	8044523
		4	30V	4A	4P3.1	PUR	BK	•	AL-WWAK4P3.1-L/S370	8045911	8045912	8045913
		5	30V	4A	5P3.1	PUR	BK	•	AL-WWAK4.5P3.1-L/S370	8084856	8088214	8088215
	Single-ended cordset female, angled, M12	3	250V	4A		PUR	BK	•	AL-WWAK3-L/S370	8043801	8043802	8043803
		4	250V	4A		PUR	BK	•	AL-WWAK4-L/S370	8043814	8043815	8043816
		5	60V	4A		PUR	BK	•	AL-WWAK4.5-L/S370	8043826	8043827	8043828
	Single-ended cordset male, straight, M12	3	250V	4A		PUR	BK	•	AL-WAS3-L/S370	8043804	8043805	8043806
		4	250V	4A		PUR	BK	•	AL-WAS4-L/S370	8043817	8043818	8043819
		5	60V	4A		PUR	BK	•	AL-WAS4.5-L/S370	8043829	8043830	8043831
	Double-ended cordset female, straight, M12	4	250V	4A		PUR	BK	•	AL-WAK4-L-AL-WAS4/S370	8044813	8044041	8044042
		5	60V	4A		PUR	BK	•	AL-WAK4.5-L-AL-WAS4.5/S370	8050226	8044053	8044054
	Double-ended cordset female, angled, M12	4	250V	4A		PUR	BK	•	AL-WWAK4-L-AL-WAS4/S370	8044664	8044050	8044051
		5	60V	4A		PUR	BK	•	AL-WWAK4.5-L-AL-WAS4.5/S370	8050444	8044062	8044063
	Double-ended cordset female, angled, M12, with LED	4	30V	4A	4P3.1	PUR	BK	•	AL-WWAK4P3.1-L-AL-WAS4/S370	8051884	8045926	8045927
		5	30V	4A	4.5P3.1	PUR	BK	•	AL-WWAK4.5P3.1-L-AL-WAS4.5/S370	8088216	8084857	8088217
	Single-ended cordset female, straight, M8	3	60V	4A		PUR	BK	•	AL-SKP3-L/S370/S77	8066001	8070632	8094252
		4	60V	4A		PUR	BK	•	AL-SKP4-L/S370/S77	8066003	8077261	8080113
	Single-ended cordset female, angled, M8	3	60V	4A		PUR	BK	•	AL-SWKP3-L/S370/S77	8065999	8070633	8094253
		4	60V	4A		PUR	BK	•	AL-SWKP4-L/S370/S77	8066002	8077262	8094254
	Single-ended cordset female, angled, M8, with LED	3	30V	4A	3P2	PUR	BK	•	AL-SWKP3P2-L/S370/S77	8094209	8094210	8094211
		4	30V	4A	4P3.1	PUR	BK	•	AL-SWKP4P3.1-L/S370/S77	8095097	8095098	8095099
	Double-ended cordset female, straight, M8	3	60V	4A		PUR	BK	•	AL-SKP3-L-AL-WAS3/S370/S77	8095443	8095444	8095445
		4	60V	4A		PUR	BK	•	AL-SKP4-L-AL-WAS4/S370/S77	8094212	8094213	8094214
	Double-ended cordset female, angled, M8	3	60V	4A		PUR	BK	•	AL-SWKP3-L-AL-WAS3/S370/S77	8096855	8096856	8096857
		4	60V	4A		PUR	BK	•	AL-SWKP4-L-AL-WAS4/S370/S77	8094215	8094216	8094217

\* Standard cable-lengths for single-ended cordset: 2m, 5m, or 10m. For double-ended cordset: 1m, 2m, or 5m. Wire length for receptacles: 0.5m (0.2m for POWER). Other cable- and wire lengths are available upon request.

		Body				Cable			Item description	L = cable length*		
		Pins	U[max]	I[max]	LED	Material	Color	UL		2m / 1m	5m / 2m	10m / 5m
	Double-ended cordset female, angled, M8, with LED	3	30V	4A	3P2	PUR	BK	•	AL-SWKP3P2-L-AL-WAS3/S370/S77	8096701	8096702	8096703
	male, straight, M12	4	30V	4A	4P3.1	PUR	BK	•	AL-SWKP4P3.1-L-AL-WAS4/S370/S77	8095100	8095101	8095102
	Single-ended cordset female, straight, M12	5	60V	4A		PUR	YE	•	AL-WAK4.5-L/S370YE/S600	8084535	8084536	8084537
	Single-ended cordset female, angled, M12	5	60V	4A		PUR	YE	•	AL-WWAK4.5-L/S370YE/S600	8094428	8094428	8094430
	Double-ended cordset female, straight, M12	5	60V	4A		PUR	YE	•	AL-WAK4.5-L-AL-WAS4.5/S370YE/S600	8084538	8084539	8084540
	male, straight, M12											
	Double-ended cordset female, angled, M12	5	60V	4A		PUR	YE	•	AL-WWAK4.5-L-AL-WAS4.5/S370YE/S600	8094431	8094432	8094433
	male, straight, M12											



Pins	Coding	Contact							
		1	2	3	4	5	6	7	8
3	A	BN		BU	BK				
4	A	BN	WH	BU	BK				
5	A	BN	WH	BU	BK	GY			

\* Standard cable-lengths for single-ended cordset: 2m, 5m, or 10m. For double-ended cordset: 1m, 2m, or 5m. Wire length for receptacles: 0.5m (0.2m for POWER). Other cable- and wire lengths are available upon request.

## Nomenclature of 2-way splitters

Exit 0

Exit1 = Exit2

MB-	SSP	4-	2	SKP	3-	P3	/S00
-----	-----	----	---	-----	----	----	------

S00: Different locking nut for marking a port (type MB) | S55: Splitter type S55 | S89: Splitter type S89

PNP | Quantity LEDs + circuit

Contacts.allocation code

SKP: M8x1 female | SSP: M8x1 male | FKM: M12x1 female | FSM: M12x1 male

2x subsequent type of port

Pins


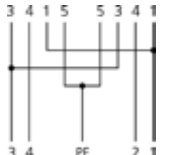
SKP: M8x1 female | SSP: M8x1 male | FKM: M12x1 female | FSM: M12x1 male

Splitter type MB


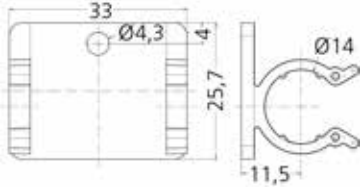

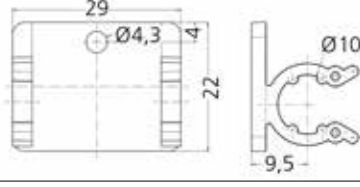

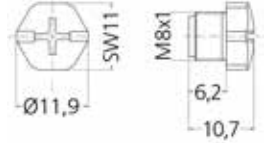

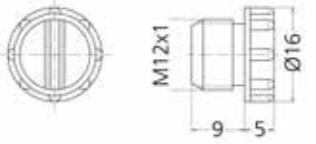


### Technical data Y-splitters

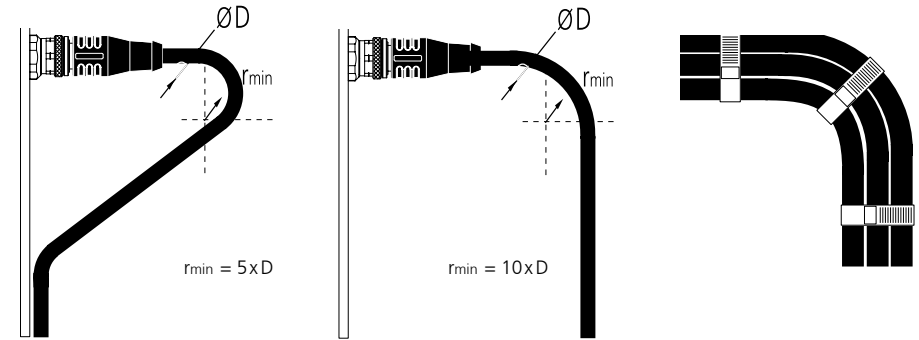
Insulation resistance	$\geq 10^8 \Omega$	Sealing (female) material	Plastic, TPU
Ambient temperature product	-30°C...+90°C	Standards	IEC 61076-2-101/-104
Contact material	Metal, gold-plated	Degree of protection (mounted)	IP65, IP67, IP68
Contact-carrier material	Plastic, TPU	Mechanical life-cycle	>100 mating cycles
Grip body material	Plastic, TPU	Degree of pollution	3

			Port			U[max]	I[max]	Item description	Item-No.
			E0	E1	E2				
		Y-splitter M12 S89	male, M12 5 Pins, A	female, M12 4 Pins, A	female, M12 4 Pins, A	60V	4A	FSM5-2FKM5.4/S89/S2087	8029837



				Packaging unit   Item-No.				
				Material   Color	1	10	100	500
		Mounting-clip   M12   1 clip	POM	8047660				
		Mounting-set   M12   Clips + screws M4x8	POM	8047664				
		Mounting-clip   M8   1 clip	POM	8047658				
		Mounting-set   M8   Clips + screws M4x8	POM	8047663				
		Screw plug   M8 cover for M8 female	BK, similar RAL9005	8081771				
		Screw plug   M12 cover for M12 female	BK, similar RAL9005	8081767				

		S740®	S740YE®	S370®	S370YE®	
Materials	Jacket	PUR	PUR	PUR	PUR	
	Insulation	PP	PP	PE	PP	
	Color outer-jacket (similar)	RAL2003	RAL1018	RAL9005	RAL1018	
Applications	Machinery manufacturing	★★★★	★★★★	★★★★	★★★★	
	Automotive industry	★★★★	★★★★	★★★★	★★★★	
	Robotics	★★★★	★★★★	★★★★	★★★★	
	Food and beverage industry	★	★	★	★	
	Packaging and filling systems	★	★	★	★	
	Building installations	★★	★★	★★	★★	
Resistance	Wind power plants	★★★★	★★★★	★★★★	★★★★	
	Flame retardant	★★★★	★★★★	★★★★	★★★★	
	Oil resistance	★★★★	★★★★	★★★★	★★★★	
	Welding sparks resistant	★★★★★	★★★★★	★★★★	★★★★	
	Drag chain-adapted	★★★★	★★★★	★★★★	★★★★	
	Torsion resistant	★★★★	★★★★	★★★	★★★★	
	Acids- and alkali resistance	★	★	★	★	
	Seawater-resistant	★★	★★	★★	★★	
	Ozone- and UV-resistance	★★★★	★★★★	★★★★	★★★★	
	Hydrolysis strength	★★	★★	★★	★★	
	Microbes strength	★★	★★	★★	★★	
	Features	Rated voltage	≤300V	≤300V	≤300V	≤300V
		Bending strength (repeated)	10xØ	10xØ	10xØ	10xØ
Bending strength (single)		5xØ	5xØ	5xØ	5xØ	
Temperature range (repeated)		-30°C...+90°C	-30°C...+90°C	-30°C...+90°C	-30°C...+90°C	
Temperature range (single)		-40°C...+90°C	-40°C...+90°C	-40°C...+90°C	-40°C...+90°C	
halogen-free		✓	✓	✓	✓	
Certifications	ROHS	✓	✓	✓	✓	
	UL and/or CSA	✓	✓	✓	✓	
	GOST	✓	✓	✓	✓	
	ESCHA Product line	AL	AL	AL	AL	



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

## 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.



For relevant ESCHA products, component approvals (UL Recognized Component) apply, qualifying them as UL-approved components for installation into UL-approved systems. This component approval also holds for relevantly used cable qualities. Single cable qualities (see Standard Cable qualities table) carry the UL-Listing-certification mark (device approval), which guarantees compliance with the valid UL-safety 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.



### Guideline SJ/T 11364-2014 (China RoHS Standard)

For ESCHA items, compliance with the guidelines is established with EUP-Label (Environmentally friendly Use Period). Permissible residues of hazardous substances in the product according to RoHS guidelines are chemically ligated in such a way that they do not escape in a period of 50 years (number in EUP-Label) under normal environmental conditions.



### CE-Designation

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



### EAC-marking

With the EAC-marking, the manufacturer, distributor or authorized representative declares that the product complies with the current safety requirements as laid down in the Technical Regulations of the Eurasian Economic Union. EAC is an abbreviation for Eurasian Conformity. The EAC mark was introduced in August 2013. The EAC mark is similar in content to the European CE mark.



### Directive 2012/19/EU on Waste Electrical and Electronic Equipment

The WEEE-Directive 2012/19/EU (Waste Electrical and Electronic Equipment) serves to avoid wastes of Electrical- and Electronic devices and the reduction of such wastes through recycling and other forms of further processing. It specifies minimum standards for handling Waste Electrical and Electronic Equipment in the EU. ESCHA is a registered manufacturer (EAR-Registration No. DE58790594).



## ESCHA – specialist in connectivity.

ESCHA develops, manufactures and markets high-grade connectivity- and housing technology. Coming from automation engineering, we master the technology of dust- and waterproof connectivity. We regularly transfer the advantages of this technology to new applications and develop product portfolios for different industries.

Through our global sales network and production sites in Europe, Asia and America we are close to our customers and guarantee consistent standards worldwide.

Our strengths are many years of experience, innovative product development, a modern tool- and equipment shop, highly in-depth manufacturing and many motivated employees.

We carry out IP-tests, climate tests or mechanical stress tests in our in-house test lab. Before leaving the company, we check all our products for 100% electrical function.

For the growing requirements of high-performance data networks, we develop connectors that take high-frequency transmission properties into account and check this in our own HF lab.

ESCHA is well known to find smart solutions for customer-specific connectivity issues – from the development of individual housing technology up to the production of various highly-complex harnesses.

ESCHA is AEO and REX certified and an approved »Know Consignor«. Together with our in-house customs this means fast and flexible delivery 24/7.

