



Circular modular connectors: M1 and M3 Series

M1 and M3 Series universal industrial connectors are designed for safety and reliability also in harsh environments. Vibration, dust, aggressive liquids or vapours are often the cause of failures and serious safety problems. Sealed to IP67 or IP69K, our M1 and M3 Series circular connectors are dustproof, pressure proof and water protected when mated. They are also largely resistant to the effects of most acids and alkalis as well as the extremes of temperature.

Features

The modular connector design allows many variations of assembly to fit your application:

Common features of M1 and M3 Series connectors:

- Modular design: Customized and cost-effective realisation of your application
- Shells: Various kinds of assembly, e.g. plug and receptacle shells with and without strain relief, with flange, for use with heat shrink boots or backshells with thread and cable gland, also flange-mount angled receptacle. Materials used:
 - Fibre glass reinforced polyamide: impact resistant
 - Non-halogen, UL listed.
- **Design flexibility:** Plug and receptacle shell can be fitted with either pin or socket insert, i.e. fully insulated socket inserts can be mounted on the live part.

Special features of M1 Series:

- Number of contacts: 4 and 6 + PE
- 5,000 mating cycles at constant low contact resistance
- Current rating: 16 A max.

- Orientation: Pin and socket inserts can be located in the shell in two different positions, thus preventing mismating. It also allows for the unmistakable connection of for example two connectors with different voltages to one and the same piece of equipment.
- Contacts:
 - High-quality screw machine contacts
 - Silver or gold plated
 - Crimp terminals for wire gauges from AWG20 ... AWG9 (0,5 ... 6 mm²)

Special features of M3 Series:

- Number of contacts: 6 + PE, 5+3 + PE, 12 + PE and 7+7 + PE
- 5,000 mating cycles at constant low contact resistance
- Current rating: 50 A max.

Configure the connector that suits your application				
Inse	erts	Contacts	Shells	Accessories
M14	+ PE	4x16 A	Receptacle with strain relief	Cable gland PG threaded
M1 6	+ PE	6x16 A	Cable receptacle	Cable gland metric threaded
M3 6	+ PE	6x32 A	Plug with strain relief	Protection cap for plugs
M3 5+	3 + PE	5x16 A / 3x50 A	Flange plug	Protection cap for receptacles
M3 12	2 + PE	12x12 A	90° receptacle	Cable sleeve

Application

Standards*, approvals

Series M1, M3

You can use our M1 and M3 Series connectors for various applications, especially where high reliability under harsh environmental conditions is important. Typical applications are: mining, ship-building, power plant construction, mechanical and traffic engineering, environmental technology or food processing. We hold numerous official approvals.

IEC 61984	Connectors - Safety requirements and tests
EN 60529	Ingress protection rating of enclosures (IP-Code)
UL 94-V0	Material flammability rating
c N ° us	UL approval, UL files E242089
PG	GOST R certificate
	Germanic Lloyd approval

Series M1, M3

Specifications

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Series	M1 M3						
Number of contacts max.	4 + PE	6 + PE	6 + PE	5+3 + PE	12 + PE	7+7 + PE	
Contact arrangement Contact identification as marked on insert: Pin insert: Rear view Socket insert: Front view							
Contacts / Identification as marked on insert: Pin insert: Rear view Socket insert: Front view	PE 1 4 2 3	PE 1 6 5 2 3 4	1 5 2 4 3 PE	⁵⁶⁷ 428 31 PE	9 ¹ 2 8 10 3 7 12 11 4 6 _{PE} 5	9 ¹ 2 8 ₁₃ ¹⁰ ₁₄ 3 7 12 11 4 6 _{PE} 5	
Rated voltage (IEC 60038) at Pollution Degree PD3 and altitude correction factor 1 (IEC 60664-1)	 230 V/400 V Earth contact 	 250 V Earth contact 	 230 V/400 V Earth contact 	 230 V/400 V 25 V Earth contact 	 250 V Earth contact 	 250 V 200 V Earth contact 	
Orientations	2	2	2	2	2	2	
Current rating of individual contact, max. *1 Type of contact *2: A Pin SAC-x / Socket BAC-x B Pin SBC-x / Socket BBC-x C Pin SCC-x / Socket BCC-x	A 4x16A	A 6x16A	B 6 x 32 A	A 5x16A C 3x50A	A 12x16A	A 14x16A	
Current rating of individual contact: *3 Wire gauge AWG20 (0.50 mm²) AWG18 17 (0.75 1.00 mm²) AWG15 (1.50 mm²) AWG13 (2.50 mm²) AWG11 (4.00 mm²) AWG9 (6.00 mm²)	A 7.5 A 10 A 16 A 16 A 	A 7.5 A 10 A 16 A 16 A 	B 7.5 A 10 A 16 A 27.5 A 32 A 35 A	A C 7.5 A 10 A 16 A 16 A 27.5 A 35 A 50 A	A 7.5 A 10 A 16 A 16 A 	A 7.5 A 10 A 16 A 16 A 	
Contact resistance (IEC 60512-2)			<3	mΩ			
Insulation resistance (IEC 60512-3)			10	GΩ			
Range of operating temperature *4	-50°C +100°C						
IP rating (IEC 60529 – IP code) when mated/ unmated only with closed protection cap	IP67, IP69K						
Mechanical endurance ,mating cycles (IEC 60512-9, test 9a)	5,000						
Shells Material / colour Inserts / colour Seals / colour Flammability rating (UL 94-V0)	PA6.6 GF30 non-halogen / black PA6.6 GF30 non-halogen / black NBR, CR / black ●						
Contacts Material Finish Terminals	Copper wrought alloy Ag / Au Crimp						
Approvals *5			c 🗣 us 🥡	PG 🛞			
				<u> </u>		SCHALTBAU	
 *1 Dependent on wire gauge and operating temperature, see »Derating diagrams«, page 19 *2 See »Inserts«, MI Series, page 12 / M3 Series, page 17 *3 See »Contacts«, page 18 *4 Operating temperatures exceeding 25°C account for lower rated current values, see derating diagrams on page 19 *5 For M3 5+3+PE UL approval pending Specifications are subject to alteration without prior notice 							







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How to order

Our M1 and M3 Series connectors consist of various components which you can order individually, thus assembling a connector that suits your application to a T.

Our "Overview" on pages 4 and 5 will help you with the details of the

assembly. The following table is a summary of all available individual components of our M1 and M3 Series connectors.

Please note that according to our price list minimum order quantities apply. For orders below that minimum our distributors will be at your service.

Itom	Doniction	Ordering code		Brief description	
nem	Depiction	M1	M3	brier description	
Shell Part 1 Receptacles		M11 Z M11 ZB	M31 Z M31 ZB	Cable receptacle with backshell, strain relief and cable gland ZB: Kit of loosely packed components	
		M11		Cable receptacle with backshell and cable gland	
	þ	M13	M33	Flange mount receptacle	
			M33 W	Receptacle for use with shrink boot	
		M14 Pg13.5 M14 M20	M34 Pg21 M34 M30	PG threaded receptacle for use with PG threaded backshell Metric threaded receptacle for use with metric threaded backshell	
		M18	M38	Flange mount angled receptacle	
Shell Part 1 Plugs		M16 Z M16 ZB	M36 Z M36 ZB	Cable plug with strain relief ZB: Kit of loosely packed components	
		M16		Cable plug with cable gland	
		M16 W	M36 W	PG threaded plug for use with PG threaded backshell or shrink boot	
		M15	M35	Flange plug	
Shell Part 2 Backshells, cable sleeves/		202K142-15 (Raychem)	202K163-15 (Raychem)	Shrink boot, straight (order direct from Raychem or other OEMs)	
seals		222K142-15 (Raychem)	222K163-15 (Raychem)	Shrink boot, 90° (order direct from Raychem or other OEMs)	
		M1 Pg13.5	M3 Pg16 M3 Pg21	Backshell with PG threaded front and rear skirt	
		M1 M20	M3 M25	Backshell with PG threaded front skirt and metric threaded rear skirt	
		M1 M20D	M3 M25D	Backshell with PG threaded front skirt and metric threaded rear skirt	
		T1-4/6 T1-6/8 T1-8/10 T1-10/12 T1-12/13 T1-14.5	T28-10/13 T28-13/16 T28-16/18.5 T28-18.5/20.5 T28-20.5/22 	Cable-Ø T1 (M1) T28 (M3) 4 6 mm 10 13 mm 6 8 mm 13 16 mm 8 10 mm 16 18,5 mm 10 12 mm 18,5 20,5 mm 12 13 mm 20,5 22 mm 14 15 mm	
Cable glands		M1 VPg13.5 10-12	M3 VPg16 12-14 M3 VPg21 14-18	PG threaded cable gland	
		M1 VM20 8-13	M3 VM25 11-17	Metric threaded cable gland	

(continued on page 7)

(Continued from page 6)

	5 :	Ordering code		Distinguish	
Item	Depiction	M1	M3	Brief description	
Protection caps		M1 KS M1 DS	M3 KS M3 DS	Protection cap with cord for plugs Protection cap with cord for receptacles	
		M1 K M1 D	M3 K M3 D	Protection cap with plastic strap for plugs Protection cap with plastic strap for receptacles	
Inserts	600	M1 E-4P+PE M1 E-4S+PE		4 + PE pin insert for contacts SAC-x / PE: BAC-x 4 + PE socket insert for contacts BAC-x / PE: SAC-x	
		M1 E-6P+PE M1 E-6S+PE		6 + PE pin insert for contacts SAC-x / PE: BAC-x 6 + PE socket insert for contacts BAC-x / PE: SAC-x	
			M3 E-6P+PE M3 E-6S+PE	6 pole+ PE pin insert for contacts SBC-x / PE: BBC-x 6 pole+ PE socket insert for contacts BBC-x / PE: SBC-x	
			M3 E-5P+3P+PE M3 E-5S+3S+PE	5+3 + PE pin insert for contacts SCC-x, SAC-x / PE: BCC-x 5+3 pole+ PE socket insert for contacts BCC-x, BAC-x / PE: SCC-x	
			M3 E-12P+PE M3 E-12S+PE	12 + PE pin insert for contacts SAC-x / PE: BAC-x 12 + PE socket insert for contacts BAC-x / PE: SAC-x	
			M3 E-7P+7P+PE M3 E-7S+7S+PE	7+7 + PE pin insert for contacts SAC-x / PE: BAC-x 7+7 + PE socket insert for contacts BAC-x / PE: SAC-x	
Contacts Type A		SAC-0.50-Ag SAC-1.00-Ag SAC-1.50-Ag SAC-2.50-AG	SAC-0.50-Ag SAC-1.00-Ag SAC-1.50-Ag SAC-2.50-AG	Wire gauge AWG20 (0.50 mm²) AWG18 17 (0.75 1.00 mm²) AWG15 (1.50 mm²) AWG13 (2.50 mm²)	
		BAC-0.50-Ag BAC-1.00-Ag BAC-1.50-Ag BAC-2.50-Ag	BAC-0.50-Ag BAC-1.00-Ag BAC-1.50-Ag BAC-2.50-Ag	AWG20 (0.50 mm ²) AWG18 17 (0.75 1.00 mm ²) AWG15 (1.50 mm ²) AWG13 (2.50 mm ²) ឆ្នាំ ខ្ លី	
	- DeC	BS-A-V10	BS-A-V10	Filler plug for unused contact cavities	
Contacts Type B			SBC-0.50-Ag SBC-1.00-Ag SBC-1.50-Ag SBC-2.50-Ag SBC-4.00-Ag SBC-6.00-Ag	Wire gauge AWG20 (0.50 mm²) true provide and provide	
			BBC-0.50-Ag BBC-1.00-Ag BBC-1.50-Ag BBC-2.50-Ag BBC-4.00-Ag BBC-6.00-Ag	AWG20 (0.50 mm²) id. AWG1817 (0.75 1.00 mm²) upunt AWG15 (1.50 mm²) upunt AWG13 (2.50 mm²) upunt AWG11 (4.00 mm²) upunt AWG9 (6.00 mm²) upunt	
			BS-B-V10	Filler plug for unused contact cavities	
Contacts Type C			SCC-2.50-Ag SCC-4.00-Ag SCC-6.00-Ag	Wire gauge AWG13 (2.50 mm ²) 두 한 AWG11 (4.00 mm ²) AWG9 (6.00 mm ²)	
			BCC-2.50-Ag BCC-4.00-Ag BCC-6.00 Ag	AWG13 (2.50 mm ²) AWG11 (4.00 mm ²)	

Note:

(i)

Presented in this catalogue are only stock items which can be supplied in short delivery time. For some variants minimum quantities apply. Please do not hesitate to ask for the conditions..



BS-C-V10

Special variants:

If you need a special variant, please do not hesitate to contact us. Maybe the type of connector you are looking for is among our many special designs. If not, we can also supply customized designs. In this case, however, minimum ordering quantities apply.

Filler plug for unused contact cavities

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M16 Z, M16 ZB, M16, M15, M16 W Plug shells, Part 1

• M16 Z, M16 ZB Cable plug with backshell, strain relief and cable gland



• M16 Cable plug with backshell and cable gland





• M15 Flange plug





• M16 W Plug with threaded rear skirt (for use with backshell or shrink boot)





Ordering code	Description
M16 Z	Cable plug with backshell, strain relief and cable gland**
M16 ZB	Kit M16 Z All components loosely packed**

Note:

* To prevent the strain relief from loosening use two self-tapping cylinder head screws 2.2 x 9.5 (not included in delivery)

** Cable sleeve T1-x required All M1 inserts can be used with these plugs

Ordering code	Description		
M16	Plug with backshell and cable gland**		

Note:

** Cable sleeve T1-x required

All M1 inserts can be used with this plug

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nge plug

Note:

• All M1 inserts can be used with this plug

• Mounted with M3 screws, torque 2.5 Nm.

Ordering code	Description		
M16 W	Plug with threaded rear skirt for use with backshell M1 Pg13,5 and M1 M20 or shrink boot		

Note:

• All M1 inserts can be used with this plug

• Plug can also be box mounted, torque 2.5 Nm.

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Series M1

M11 Z, M11 ZB, M11, M13, M14 xx Receptacle shells, Part 1

• M11 Z, M11 ZB Cable receptacle with backshell, strain relief and cable gland



• M11 Cable receptacle with backshell and with cable gland





• M13 Flange mount receptacle





• M14 Pg13,5, M14 M20 Receptacle with threaded rear skirt (for use with backshell)





Ordering code	Description
M14 Pg13,5	Receptacle with Pg13.5 threaded rear skirt for use with backshell M1 Pg13,5
M14 M20	Receptacle with M20x1.5 threaded rear skirt for use with backshell M1 M20D

Note:

• All M1 inserts can be used with these receptacles

• Receptacle can also be box mounted, torque 2.5 Nm.

Ordering code	Description
M11 Z	Cable receptacle with back-shell, strain relief and cable gland**
M11 ZB	Kit M11Z All components loosely packed**

Note:

* To prevent the strain relief from loosening use two self-tapping cylinder head screws 2.2 x 9.5 (not included in delivery)

** Cable sleeve T1-x required All M1 inserts can be used with these receptacles

Ordering code	Description		
M11	Cable receptacle with back-shell and cable gland**		

Note:

** Cable sleeve T1-x required

Ordering code

All M1 inserts can be used with this receptacle

Note:

M13

• All M1 inserts can be used with this receptacle

Description

Flange mount receptacle

• Mounted with M3 screws, torque 2.5 Nm.



M18 Receptacle shells, Part 1 (continued)

• M18 Flange mount angled receptacle





Ordering code	Description	
M18	Flange mount angled receptacle	
 Note: All M1 inserts can be used with this receptacle 		

M1 Pg13,5, M1 M20, M1 M20D Backshells, Part 2

• M1 Pg13,5 Pg13.5 threaded backshell



Ordering code	Description	
M1 Pg13,5	Backshell with Pg13.5 threaded front and rear skirt for use with plug M16 W and receptacle M14 Pg13.5	

• M1 M20, M1 M20D M20x1.5 threaded backshell



Ordering code	Description	
M1 M20	Backshell with Pg13.5 threaded front skirt and M20x1.5 threaded rear skirt for use with plug M16 W	
M1 M20D	Backshell with M20x1.5 threaded front and rear skirt for use with receptacle M14 M20	

M1 VPg13,5..., M1 VM20... Cable glands

Series M1





Ordering code	Description
M1 VPg13,5 10-12	Pg13.5 threaded cable gland for use with backshell M1 Pg13.5

• M1 VM20 8-13 M20x1.5 threaded cable gland



Ordering code	Description	
M1 VM20 8-13	M20x1.5 threaded cable gland for use with backshell M1 M20 and M1 M20D	

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Series M1

Series M1



222K142-15, 202K142-15 Shrink boots, Shells Part 2

• 222K142-15 Shrink boot, 90°



• 202K142-15 Shrink boot, straight



Ø31

Ordering code Description 222K142-15 * Shrink boot, 90° 202K142-15 * Shrink boot, straight

Note:

• For use with M16 W Series plug

• Cable diameter Ø 7.1 mm min.

Order direct from Raychem *

M1 KS, M1 K Protection caps for plugs



Ordering code	Description	
M1 KS	Protection cap with cord for plugs	
M1 K	Protection cap with plastic strap for plugs	

M1 DS, M1 D Protection caps for receptacles

Tr26x2 85 cord plastic strap Ø25 Ø24.5 M1 DS M1 D

Ordering code	Description
M1 DS	Protection cap with cord for receptacles
M1 D	Protection cap with plastic strap for receptacles



M1 E-4P+PE, M1 E-6P+PE Pin inserts 4 and 6 pole + PE M1 E-4S+PE, M1 E-6S+PE Socket inserts 4 and 6 pole + PE

Series M1

• Pin insert M1 E-4P+PE







①…④ 4x Socket BAC-x ⑮ 1x Pin SAC-x



32.3

• Pin insert M1 E-6P+PE



①…⑥ 6x Pin SAC-x 환 1x Socket BAC-x



Ø17.1

Ø17.1

①…⑥ 6x Socket BAC-x ⑲ 1x Pin SAC-x

M1 Series: Number of contacts, max.	4 + PE	6 + PE	
Ordering code Pin	sert M1 E-4P+PE	M1 E-6P+PE	
Socket	nsert M1 E-4S+PE	M1 E-6S+PE	
Contact arrangement	R		
Contact identification as marked on insert			
Pin insert: Rea	view (2) (3)	(2) (4)	
Socket insert: Fron	view		
Rated voltage (IEC 60038) At pollution degree PD3 (IEC 60512)	230 V / 400 V	250 V	
Orientations	2 (A, B)	2 (A, B)	
Contacts			
Current rating of individual contacts, ma	.*1 4x 16 A	6x 16 A	
Contact diameter	Ø 1.58 mm	Ø 1.58 mm	
Contact Type ^{*2} Pin	nsert Pins SAC-x / PE socket BAC-x	Pins SAC-x / PE socket BAC-x	
Socket	sert Sockets BAC-x / PE pin SAC-x	Sockets BAC-x / PE pin SAC-x	

*1 Depending on wire gauge (see »Specifications«, page 3) as well as operating temperature (see»Derating diagrams«, page 19)

*2 For a detailed description see »Contacts«, page 18



Empty cavities should be fitted with filler plugs. See also page 18.

M36 Z, M36 ZB, M36, M35, M36 W Plug shells, Part 1

• M36 Z, M36 ZB Cable plug with backshell, strain relief and cable gland





 Ordering code
 Description

 M36 Z
 Cable plug with backshell, strain relief and cable gland**

 M36 ZB
 Kit M36 Z All components loosely packed.**

Note:

* To prevent the strain relief from loosening use two selftapping cylinder head screws 2.9x 13 (not included in delivery)

** Cable sleeve T28-x required

All M3 inserts can be used with these plugs

• M35 Flange plug





Ordering code	Description
M35	Flange plug

Note:

• All M3 inserts can be used with this plug

• Mounted with M4 screws, torque 2.5 Nm.

• M36 W Plug with threaded rear skirt (for use with backshell or shrink boot)





Ordering code	Description
M36 W	Plug with threaded rear skirt for use with backshells M3 Pg16, M3 Pg21, M3 M25, or shrink boot

Note:

• All M3 inserts can be used with this plug

• Plug can also be box mounted, torque 2.5 Nm.



M31 Z, M31 ZB, M33, M33 W, M34 xx Receptacle shells, Part 1

• M31 Z, M31 ZB Cable receptacle with backshell, strain relief and cable gland



• M33 Flange mount receptacle





• M33 W Receptacle for use with shrink boot Insertion depth 15





• M34 Pg21, M34 M30 Receptacle with Pg21 or M30x1.5 threaded rear skirt Insertion depth 15





Ordering code	Description
M31 Z	Cable receptacle with back-shell, strain relief and cable gland**
M31 ZB	Kit M31 Z All components loosely packed.**

Note:

Ø40

 To prevent the strain relief from loosening use two selftapping cylinder head screws 2.9x 13 (not included in delivery)

** Cable sleeve T28-x required All M3 inserts can be used with these receptacles

Ordering code	Description
M33	Flange mount receptacle

Note:

• All M3 inserts can be used with this receptacle

• Mounted with M4 screws, torque 2.5 Nm.

Ordering code	Description		
M33 W	Receptacle for use with shrink boot		

Note:

• All M3 inserts can be used with this receptacle

Ordering code	Description
M34 Pg21	Receptacle with Pg21 threaded rear skirt for use with: backshell M3 Pg16 backshell M3 Pg21 backshell M3 M25D
M34 M30	Receptacle with M30x1.5 threaded rear skirt for use with backshell M3 M25D

Note:

• All M3 inserts can be used with these receptacles

• Receptacle can also be box mounted, torque 2.5 Nm.

M38 Receptacle shells, Part 1 (continued)





M3 Pg16, M3 Pg21, M3 M25, M3 M25D Backshells, Part 2

• M3 Pg16, M3 Pg21 Pg16 or Pg21 threaded backshells



Ordering code	Description
M3 Pg16	Backshell with Pg21 threaded front and Pg16 threaded rear skirt for use with plug M36 W and receptacle M34 Pg21
M3 Pg21	Backshell with Pg21 threaded front and rear skirt for use with plug M36 W and receptacle M34 Pg21

• M3 M25, M3 M25D M25x1.5 threaded backshells



Ordering code	Description
M3 M25	Backshell with Pg21 threaded front and M25x1.5 threaded rear skirt for use with plug M36 W
M3 M25D	Backshell with Pg21 threaded front and M25x1.5 threaded rear skirt for use with receptacle M34 Pg21

M3 VPg16..., M3 VM25... Cable glands

• M3 VPg16 12-14, M3 VPg21 14-18 Pg16 or Pg21 threaded cable glands



Ordering code	Description	
	Pg16 threaded cable gland (OEM part)	
M3 VPg21 14-18	Pg21 threaded cable gland for use with backshell M3 Pg21	

• M3 VM25 11-17 M25x1.5 threaded cable gland



Ordering code Description M3 VM25 11-17

M25x1.5 threaded cable gland for use with backshells M3 M25 and M3 M25D

Series M3

Series M3

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Description

Flange mount angled receptacle



T28-xx/xx Cable sleeves, Shells Part 2

• T28-xx/xx Cable sleeves



Ordering code	Description
T28-10/13	cable-Ø 10 13 mm
T28-13/16	cable-Ø 13 16 mm
T28-16/18.5	cable-Ø 16 18.5 mm
T28-18.5/20.5	cable-Ø 18.5 20.5 mm
T28-20.5/22	cable-Ø 20.5 22 mm

Note:

• For use with M36, M36 Z, M36 ZB Series cable plugs

• For use with M31 Z, M31 ZB Series cable receptacles

222K163-15, 20	2K163-15 Shrink boots, Shells Part 2	Series M3
• 222K163-15 Shrir	nk boot, 90° • 202K163-15	Shrink boot, straight





Ordering code Description 222K163-15* Shrink boot, 90° 202K163-15* Shrink boot, straight

Note:

• For use with M36 W Series plug and M33 W Series receptacle

- Cable diameter Ø 9.9 mm min.
- * Order direct from Raychem

M3 KS, M3 K Protection caps for plugs



M3 KS

M3 K

Ordering code	Description
M3 KS	Protection cap with cord for plugs
M3 K	Protection cap with plastic strap for plugs



Ordering code	Description
M3 DS	Protection cap with cord for receptacles
M3 D	Protection cap with plastic strap for receptacles

Series M3



M3 E-6P+PE / -5P+3P+PE / -12P+PE / -7P+7P+PE Pin inserts 6, 5+3, 12 and 7+7 pole + PE **M3 E-6S+PE / -5S+3S+PE / -12S+PE / -7S+7S+PE** Socket inserts 6, 5+3, 12 and 7+7 pole + PE

Series M3



SUCKET INSERT.	FIGHT NEW	(PE)	VPEV		C C C
Rated voltage (IEC 60038) At pollution degree PD3 (I	EC 60512)	230 V / 400 V 1 6	230 V / 400 V 25 V 1 3 4 8	250 V 1 12	250 V 200 V 1, 2, 4, 5, 6, 7, 9 3,8,10 14
Orientations		2	1	2	2
Contacts Current rating of individua Contact diameter Contact Type *2	Il contacts, max. *1 Pin insert Socket insert	6x 32 A Ø 2.30 mm SBC-x / PE: BBC-x BBC-x / PE: SBC-x	3x 50 A 5x 16 A Ø 4.0 mm Ø 1.58 mm SCC-x / dto. PE*3 SAC-x BCC-x / dto. PE*3 BAC-x	12x 16 A Ø 1.58 mm SAC-x / PE: BAC-x BAC-x / PE: SAC-x	14x 16 A Ø 1.58 mm SAC-x / PE: BAC-x BAC-x / PE: SAC-x

*1 Depending on wire gauge (see »Specifications«, page 3) as well as operating temperature (see»Derating diagrams«, page 19)

*2 For a detailed description see »Contacts«, page 18

*3 Mind that only with the 8 pole inserts the PE contact is of the same contact gender. With the other inserts it is of the opposite gender.

Construction See also page 18.

Contacts Crimp contacts (pin/socket) and filler plugs

• SAC-x, BAC-x, BS-A-V10 Crimp contacts (pin/socket) and filler plug, type



Pin contacts, silver plated

Ordering code	L1	Identification
SAC-0.50-Ag	28.6	No groove
SAC-1.00-Ag	28.6	1 groove
SAC-1.50-Ag	28.6	2 grooves
SAC-2.50-Ag	28.6	3 grooves

Pin contacts, gold plated				
Ordering code	L1	Identification		
SAC-0.50-Au	28.6	No groove		
SAC-1.00-Au	28.6	1 groove		
SAC-1.50-Au	28.6	2 grooves		

28.6



Socket contacts, silver plated

Ordering code	L2	Identification
BAC-0.50-Ag	28.6	No groove
BAC-1.00-Ag	28.6	1 groove
BAC-1.50-Ag	28.6	2 grooves
BAC-2.50-Ag	28.6	3 grooves

Socket contacts, gold plated

Ordering code	L2	Identification
BAC-0.50-Au	28.6	No groove
BAC-1.00-Au	28.6	1 groove
BAC-1.50-Au	28.6	2 grooves
BAC-2.50-Au	28.6	3 grooves



BS-A-V10: Empty cavities can be

fitted with filler plugs

Specifications

Wire gauge	Current rating
AWG 20 (0.5 mm ²)	7.5 A
AWG1817 (0.75 1 mm ²)	10 A
AWG15 (1.5 mm ²)	16 A
AWG13 (2.5 mm ²)	16 A

Specifications

Wire gauge	Current rating
AWG 20 (0.5 mm ²)	75 A
AWG1817 (0.75 1 mm ²)	10 A
AWG15 (1.5 mm ²)	16 A
AWG13 (2.5 mm ²)	16 A

• SBC-x, BBC-x, BS-B-V10 Crimp contacts (pin/socket) and filler plug, type

3 grooves



Pin contacts, silver plated

SAC-2.50-Au

Ordering code	L1	Identification
SBC-0.50-Ag	40.4	No groove
SBC-1.00-Ag	40.4	1 groove
SBC-1.50-Ag	40.4	2 grooves
SBC-2.50-Ag	39.0	3 grooves
SBC-4.00-Ag	39.0	1 wide groove
SBC-6.00-Ag	39.0	2 wide grooves

Pin contacts, gold plated

Ordering code	L1	Identification
SBC-0.50-Au	40.4	No groove
SBC-1.00-Au	40.4	1 groove
SBC-1.50-Au	40.4	2 grooves
SBC-2.50-Au	39.0	3 grooves
SBC-4.00-Au	39.0	1 wide groove
SBC-6.00-Au	39.0	2 wide grooves



Socket contacts, silver plated

Ordering code	L2	Identification
BBC-0.50-Ag	37.0	No groove
BBC-1.00-Ag	37.0	1 groove
BBC-1.50-Ag	37.0	2 grooves
BBC-2.50-Ag	35.6	3 grooves
BBC-4.00-Ag	35.6	1 wide groove
BBC-6.00-Aq	35.6	2 wide grooves

Socket contacts, gold plated

Ordering code	L2	Identification
BBC-0.50-Au	37.0	No groove
BBC-1.00-Au	37.0	1 groove
BBC-1.50-Au	37.0	2 grooves
BBC-2.50-Au	35.6	3 grooves
BBC-4.00-Ag	35.6	1 wide groove
BBC-6.00-Ag	35.6	2 wide grooves

31 BS-B-V10: Empty cavities can be

fitted with filler plugs

• • • • • •

Specifications

Filler plug:

Wire gaug	e	Current rating
AWG 20	(0.5 mm ²)	7.5 A
AWG17	(1.0 mm ²)	10 A
AWG15	(1.5 mm²)	16 A
AWG13	(2.5 mm ²)	27.5 A
AWG 11	(4.0 mm ²)	35 A
AWG9	(6.0 mm ²)	35 A

Specifications Daten

-	
Wire gauge	Current rating
AWG 20 (0.5 mm ²)	7.5 A
AWG17 (1.0 mm ²)	10 A
AWG15 (1.5 mm ²)	16 A
AWG13 (2.5 mm ²)	27.5 A
AWG 11 (4.0 mm ²)	35 A
AWG9 (6.0 mm ²)	35 A

• SCC-x, BCC-x, BS-C-V10 Crimp contacts (pin/socket) and filler plug, type



Pin contacts, silver plated

Ordering code	L1	Identification
SCC-2.50-Ag	37.5	3 grooves
SCC-4.00-Ag	37.5	1 wide groove
SCC-6.00-Ag	37.5	2 wide grooves



Socket contacts, silver plated

Ordering code	L2	Identification
BCC-2.50-Ag	32.6	3 grooves
BCC-4.00-Ag	32.6	1 wide groove
BCC-6.00-Ag	32.6	2 wide grooves



Filler plug:

Specifications



fitted with filler plugs

Specifications				
Wire gauge		Current rating		
AWG13	(2.5 mm ²)	27.5 A		
AWG 11	(4.0 mm ²)	35 A		
AWG9	(6.0 mm²)	50 A		

Note:

- Schaltbau recommends the use of crimp tool CWZ-600-1 (see page 21) for all contacts except SAC-2.50-xx and BAC-2.50-xx. For SAC-2.50-xx and BAC-2.50-xx contacts we recommend the Buchanan M22520/1-01(-02) crimp tool.
- Schaltbau recommends CuSn conductors (tinned) when the connectors are used:
 under extreme ambient air temperatures of +60°C ... +100°C or -25°C ... 0°C
 or under conditions of extreme fluctuation of temperature and humidity
- PE (protection earth) contacts must be of the same AWG size as the main contacts.

- Fill the empty cavities with filler plugs from the mating face
- Cavities of pin inserts can only be filled with half a filler plug
- Packaging unit: 10 pieces

Series M1, M3

Contacts

Contacts Ordering code

Series M1, M3



Derating diagrams

M1, M3 series



• Derating curve M3 E6P+PE and M3 E6S+PE







Notes:

 According to VDE 0298-4 the wire gauge of the conductor should be determined in this way that within the limits of its specified current carrying capacity there will be no heating of the conductor exceeding the permissible operating temperature at any place or at any time.

- The derating diagrams show the permissible operating range.
- Control and test procedures according to IEC 60512-3, test 5b.

Derating curve M1 E6P+PE and M1 E6S+PE



• Derating curve M3 E5P+3P+PE and M3 E5S+3S+PE







Notes: * For AWG sizes refer to

Specifications are subject to alteration without prior notice / Dimensions in mm



M1, M3 series

• Insertion tools for socket inserts



Ordering code	Insertion tools for
VW-M1 E-4S	Contact insert M1 E-4S+PE
VW-M1 E-6S	Contact insert M1 E-6S+PE
VW-M3 E-6S	Contact insert M3 E-6S+PE
VW-M3 E-5S+3S	Contact insert M3 E-5S+3S+PE
VW-M3 E-12S	Contact insert M3 E-12S+PE, M3 14S+PE

• Insertion tools for pin inserts



• Crimp tool

Ordering code	Insertion tools for
VW-M1 E-4P	Contact insert M1 E-4P+PE
VW-M1 E-6P	Contact insert M1 E-6P+PE
VW-M3 E-6P	Contact insert M3 E-6P+PE
VW-M3 E-5P+3P	Contact insert M3 E-5P+3P+PE
VW-M3 E-12P	Contact insert M3 E-12P+PE, M3 14P+PE

• Extraction tool



Ordering code	Extraction tool for
AWZ-A	Contacts type A
AWZ-B	Contacts type B
AWZ-C/H	Contacts type C/H

Ordering code	Crimp tool for
CWZ-600-1	Contacts SAC-x*, BAC-x*, SBC-x, BBC-x, SCC-x, BCC-x * Do not use for contacts SAC-2.50-xx, BAC-2.50-xx
Tool frame M22520/1-01 & Turret M22520/1-02 (No fig.)	For contacts SAC-2.50-xx, BAC-2.50-xx only. Crimp tool and turret from DMC or Buchanan. Order direct from OEM.

Mounting holes

• Flange mount receptacles and plugs



M13, M15



• Receptacles with threaded rear skirts



M14

• Flange mount angled receptacles



M38

M1, M3 series

Tools



Installation and safety instructions

The circular industrial connectors dealt with in this catalogue are intended for use with low-voltage systems and special installations. They are designed and tested in compliance with the generally recognised state of the art. However, the improper use, operation, handling, maintenance of or tampering with electric equipment can cause serious or fatal injury to the user or others, and the appliance or other property can be damaged. Only authorized and trained personnel are allowed to plan and carry out all mechanical and electrical installations, transport, commissioning, as well as maintenance and repair work. This applies to the observation of the general installation and safety regulations for low-voltage systems as well as the proper use of tools approved for this purpose. Electric equipment requires protection from moisture and dust during installation, operation and storage.

Electrical hazards: Any exposure to the connector's

Observe all applicable national provisions, all safety,

accident prevention and environmental regulations

as well as the recognized technical rules for safe and

live parts. Risk of electrical shock!

 Due to our continuous improvement programme, the design of our products can be modified at any time.
 So some features may differ from the descriptions, specifications and drawings in the catalogue.

You can download the latest update of the catalogue at <u>schaltbau.info/download1en</u>. The updated catalogue renders the previous issue invalid.

Installation instructions

- Work on electric equipment may only be performed by a qualified electrician or trained personnel working under the direction and supervision of a qualified electrician according to the applicable rules of electrical engineering.
- The connectors supply power and signals. They are intended for plugin and detachable connections of components, devices and systems only.
- In order to comply with IEC 61984 make sure that always the currentcarrying part of the connector – no matter whether plug or receptacle – is fitted with socket contacts.
- For optimum protection of the cable connection make sure the connector is supplied with a strain relief.
- According to IEC 60352-2 "Solderless connections" crimp contacts are required.
- Make sure that there is no undue strain, pressure, flexing and torsion on the cable connection.

Installation and maintenance instructions M Series



For a detailed list of all safety, installation and maintenance instructions, download our manual <u>A10-M.en</u>!

Visual inspections

Be sure to make visual inspections regularly. Improper handling of the connector, e.g. when hitting the floor with some impact, can result in breakage, visible cracks and deformation..



Defective and/or leaky parts must be replaced instantaneously!

Safety instructions

proper working.

- Carry out regular inspections of all protection and safety devices to see if they work properly.
- According to IEC 61984 connectors used as intended must not be engaged or disengaged when live or under load.
- A connector that does not engage easily requires special attention: Check for the correct orientation or if its contacts got bent or polluted. Never use force! The connector should always engage easily.
- To prevent dust and moisture from entering, make sure that the connector, when not mated, is covered by the protective cap.
- When disengaging a connector, pull the plug and never the cable.
- Use the connector only according to its intended use. Replace or repair damaged parts exclusively with original parts. Any other usage of or tampering with the connector is considered contrary to its intended use. No liability is assumed for damages and accidents caused due to non-compliance with the instructions or improper use of the connector.
- The connectors are designed for special environmental conditions as defined by "Specifications" on page 3 of this catalogue. Any use which goes beyond the limits of these specifications is not regarded as the intended use of the connector.

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Phone +49 89 9 30 05-0 Fax +49 89 9 30 05-350 Internet www.schaltbau-gmbh.com e-Mail contact@schaltbau.de	RoHS Image: Constraint of the production facilities of schattbau GmbH manufactures in compliance with RoHS. The production facilities of schattbau GmbH have been IRIS certified since 2008. Certified to DIN EN ISO 14001 since 2002. For the most recent certificate visit our website.	Schulbau GmbH Certified and Tsy DIN EN ISO 9001 Since 1994. For the most recent certificate visit our website.	
Electrical Components and Syste Railway Engineering and Industr	ms for ial Applications		
Connectors	 Connectors manufactured to industry standards Connectors to suit the special requirements of communications engineering (MIL connectors) Charging connectors for battery-powered machines and systems Connectors for railway engineering, including UIC connectors Special connectors to suit customer requirements 		
Snap-action switches	 Snap-action switches with positive opening opera Snap-action switches with self-cleaning contacts Enabling switches Special switches to suit customer requirements 	ation	
Contactors	 Single and multi-pole DC contactors High-voltage AC/DC contactors Contactors for battery powered vehicles and pow Contactors for railway applications Terminal bolts and fuse holders DC emergency disconnect switches Special contactors to suit customer requirements 	<i>i</i> er supplies	
Electrics for rolling stock	 Equipment for driver's cab Equipment for passenger use High-voltage switchgear High-voltage heaters High-voltage roof equipment Equipment for electric brakes 		

Design and engineering of train electrics to customer requirements