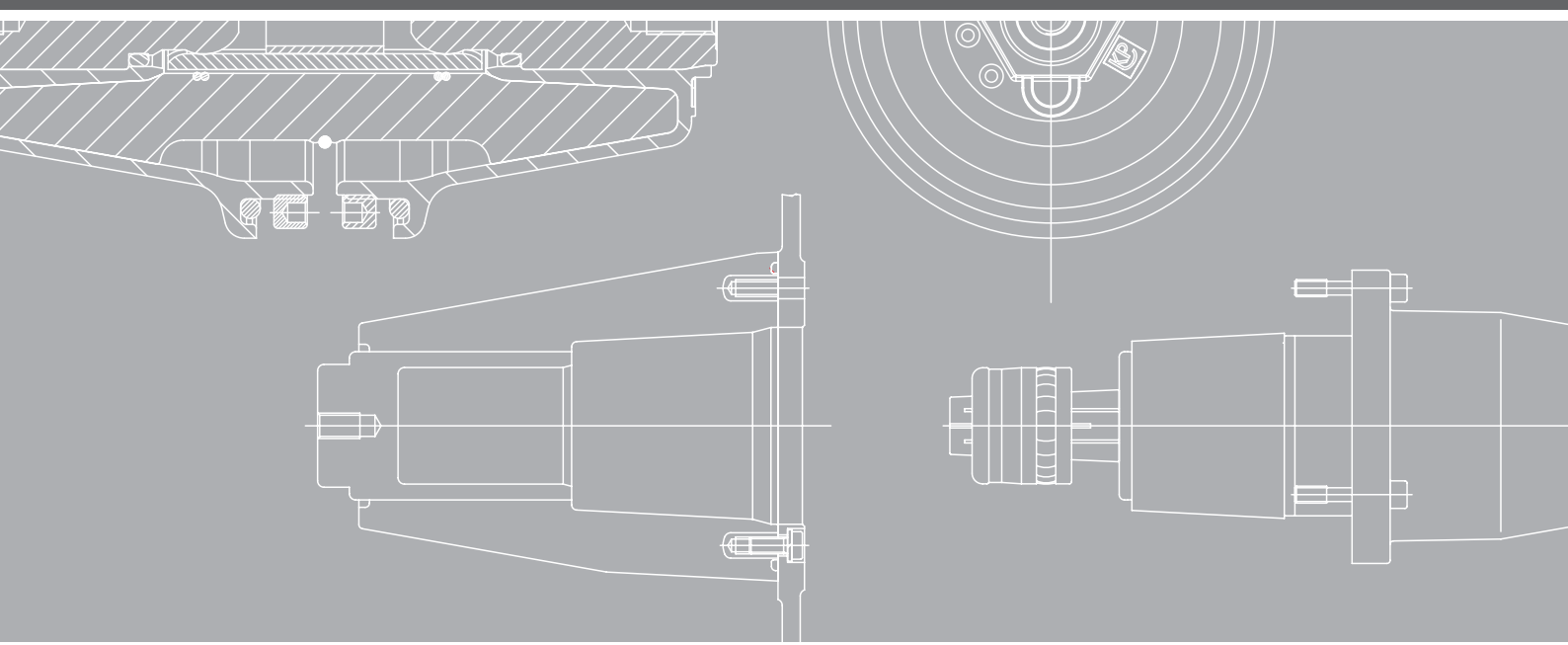


PFISTERER



EDITION 2014

CABLE SYSTEMS

Cable fittings for medium voltage networks

THE POWER CONNECTION



Cable Fittings for Medium Voltage Networks.

Our range of cable accessories offers solutions for virtually all applications in the area of medium voltage engineering. All accessories use silicone rubber as insulating medium because of its outstanding properties. We offer components and complete systems.

MV-CONNEX. A Dry, Separable Connector System for Medium Voltage Networks.

CONNEX meets all your requirements to an universal system of separable connectors: fully insulated with metal housing and providing touch-proof properties. It is maintenance-free, suitable for outdoor use and waterproof. This means MV-CONNEX can be used even in the most extreme conditions.

MV-CONNEX components are factory tested and are surprisingly simple to install. Complex oil and gas work during installation and commissioning of transformers and switchgears are finally a thing of the past.

MV-CONNEX for medium voltage systems comes in a wide range of variations. It includes traditional plug and socket combinations, multiple sockets, bus-bar connectors, surge arresters and voltage detecting systems.



Silicone – a Key Material in Medium Voltage Engineering.

Water, dirt, grease and oil-resistant, completely maintenance-free, shock-resistant and unbreakable: silicone rubber is the perfect material for cable terminations and far superior to traditional materials such as porcelain. When used as a stress-relief device in sealed applications, silicone evens out temperature variations and unevenness in the cable surface

much better than harder materials such as EPDM do. Dangerous partial discharges caused by air gaps are safely avoided. PFISTERER makes silicone products primarily using advanced LSR (Liquid Silicone Rubber) designs; special variations are designed using RTV (Room-Temperature Vulcanizing Silicone).

Continuous voltage indicator for enclosed equipment.

With the increasing use of enclosed switchgear, voltage testing systems, that indicate the presence of voltage without directly contacting live parts, are becoming increasingly important. The principle of the DSA continuous voltage indicator that was

developed by us has become a standard. In line with the trend towards integrated systems we have incorporated these plug-in display devices in the compact DSA-i3 system.



MV-CONNEX up to 52 kV

The MV-CONNEX range is ideal for use in ring main units, circuit-breaker switchgear, high-voltage motors, transformers, capacitors, transducers and sealing boxes. The connectors on the equipment-side are designed to meet EN 50180, 50181, and DIN 47637. The plug is suitable for all kinds of insulated plastic cables. As well as a wide range of standard types there are also customer-specific versions for every cable type. The MV-CONNEX system features numerous variations: in addition to the standard plug and socket combination, there are many other versions for testing purposes and special applications.

Advantages

- no liquid insulating medium
- no need to open the cable termination at the installation site
- deckwater-proof
- suitable for outdoor use
- thorough transformer and GIS testing by manufacturer possible
- metal enclosed
- fully insulated
- touch proof
- free from arcing
- high short-circuit protection
- maintenance free
- soil- and offshore-proof (optional)

A Contact system

- 1 contact ring
- 2 tension cone
- 3 thrust piece

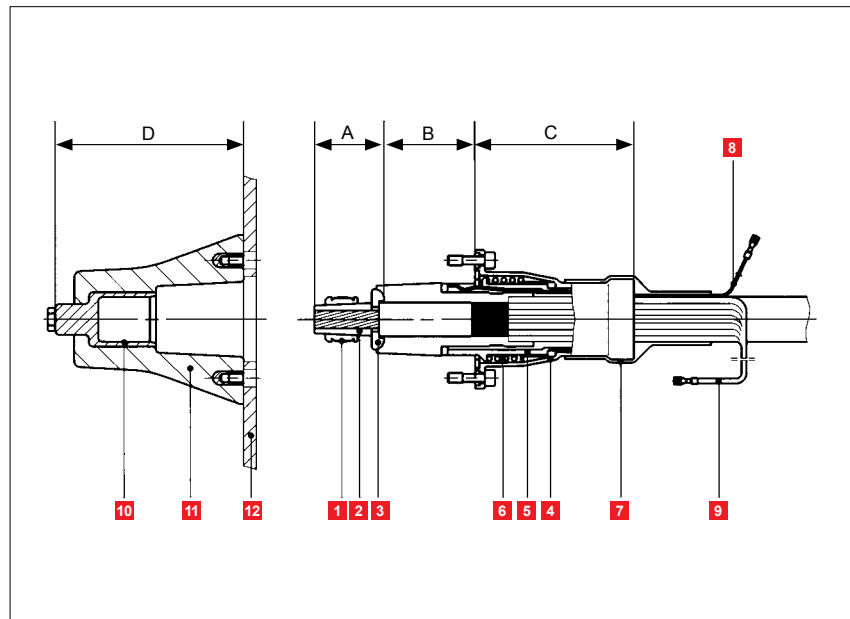
B Insulating and field-control part

C Housing

- 4 bell flange
- 5 pressure sleeve
- 6 pressure spring
- 7 heat-shrink
- 8 test lead (depends on design)
- 9 cable screen

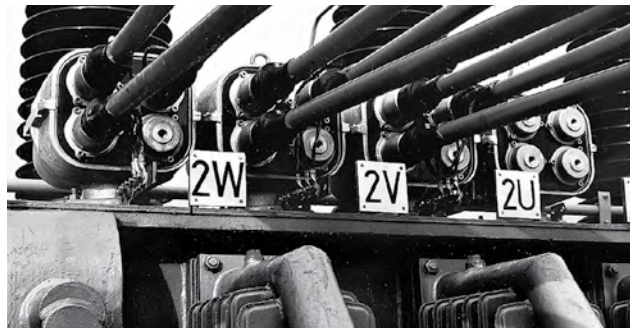
D Socket

- 10 female contact part
- 11 insulating socket
- 12 housing



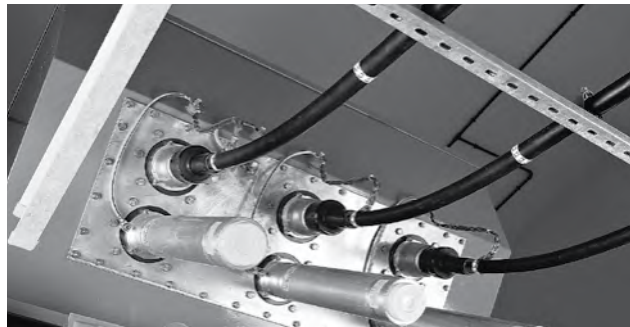
MV-CONNEX Multi-Contact Elbow Bushing up to 52 kV

Multi-contact elbow bushings are used instead of DIN-standard porcelain versions on the medium-voltage side of power transformers. They distribute the current over two or four cables, thus accommodating higher power loads using more manageable cable cross sections.



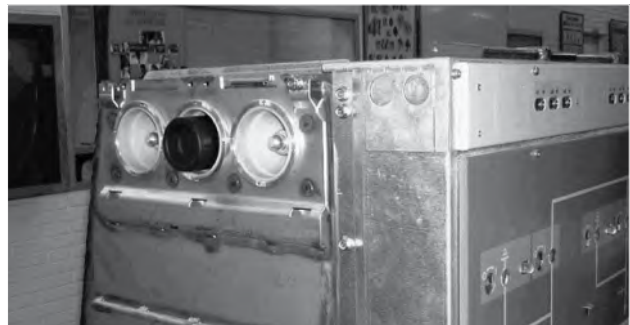
MV-CONNEX Surge Arrester up to 52 kV

CONNEX surge arresters are used to protect metal-enclosed switchgear fitted with cable terminations in accordance with EN 50180/EN 50181. The surge arresters are connected to the switchgear transformer and prevent the entry of excessively high surges. The surge arresters are particularly effective in limiting surges caused by reflected travelling waves and switching overvoltages.



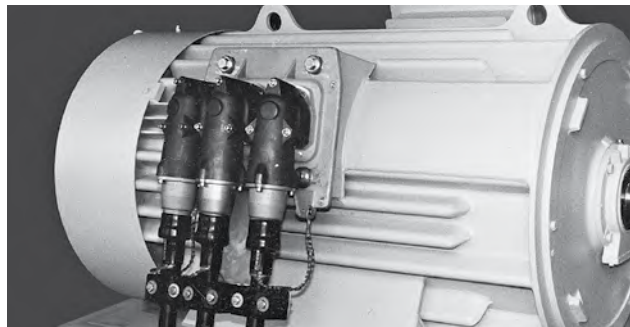
MV-CONNEX Busbar Connectors up to 42 kV

Busbar connectors facilitate the modular construction and on-site expansion of SF6 insulated switchgear, because the gas compartment does not have to be opened during installation. The range includes 24 kV to 42 kV versions.



CMA-MV-CONNEX Motor Connector up to 13,8 kV

The CMA-MV-CONNEX motor connector allows the quick and easy connection of high-voltage motors, with the connection area being fully metal-enclosed and intrinsically safe. The system is easily installed in place of the motor connection box.



Voltage Detecting Systems

The integrated capacitive potential point makes it easy to check the connection for the absence of voltage. The PFISTERER range includes mobile and stationary continuous voltage indicators, as well as phase comparators and performance testing equipment.





MV-CONNEX Separable Connectors, Size 0 - 3-S Technical Data and Size Classification List

■ type tested in accordance to IEC 60 502-4:2005 / DIN VDE 0278-629-1:2006

- ¹⁾ If not required, the voltage tap must be earthed separately.
- ²⁾ The min. and max. cross sections can only be achieved by maintaining the min. or max. diameter across the conductors and the min. or max. diameter across the insulation.
- ³⁾ The entire diameter range is covered by various components.

Size	0			1			2			3			3-S						
Max. operating voltage	U_m	(kV)		24	36		42			42			52						
Rated voltage	U	(kV)		20	30		36			36			45						
Line-to-earth-voltage	U_0	(kV)		12	18		20,8			20,8			26						
Nominal current	I_n	(A)		250	630		800			1250			1250						
Conductor		RM	RE	RF	RM	RE	RF	RM	RE	RF	RM	RE	RF	RM	RE	RF			
Cross section (Guide value) ²⁾	Min.	(mm ²)		25	35	16	25	70	16	25	70	16	35	95	25	35	95	25	
	Max.	(mm ²)		70	70	50	240	240	185	400	325	240	800	1000	400	800	1000	400	
Diameter (Set value) ³⁾	Min.	(mm)		5,6	5,6	5,6	4,9	8,3	6,5	4,9	8,3	6,5	6,1	10,5	6,5	17,5	10,5	6,5	
	Max.	(mm)		11,9	11,9	11,9	20,1	20,1	18,3	24,1	22,0	20,6	36,0	36,0	26,8	36,0	36,0	26,8	
Voltage tap		without		with ¹⁾		with- out	with ^{1)/} without		without (XL)		with ^{1)/} without		without (XL)		with ^{1)/} without		without (XL)		
Diameter of insulation ³⁾ after removing the outer semi-conducting layer	Min.	(mm)		12,7		13,5	13,5		13,5	36,0		15,5		46,0		15,5		46,0	
	Max.	(mm)		23,5		31,5	36,0		36,0		44,0		46,0		55,0		46,0		55,0
Rated AC voltage	5 min.	(kV)		54	81		95			95			117						
Partial discharge level at $2 \times U_0$		(pC)		≤ 10		≤ 10		≤ 10			≤ 10			≤ 10					
Rated lightning impulse withstand voltage (BIL)		(kV)		125		170		200			200			250					
DC voltage test	15 min.	(kV)		72	108		125			125			156						
Rated short time current	1 s	(kA)		16	31,5		40			60			60						
	3 s	(kA)		-	16		25			40			40						
Rated impulse current		(kA)		40	125		125			150			150						

Form to determine MV-CONNEX Cable Connectors

Company: _____ **Name:** _____

Telephone: _____ **Date:** _____

E-mail: _____ **Signature:** _____

Cable manufacturer: _____ **Cable type:** _____

cable connector: Size 0 Size 1 Size 2 Size 3 / 3-S

Application: (Cable Connectors) indoor outdoor offshore (saltwater-proof) soil-resistant ATEX/IECEX
(only size 1 $U_m = 11$ kV)

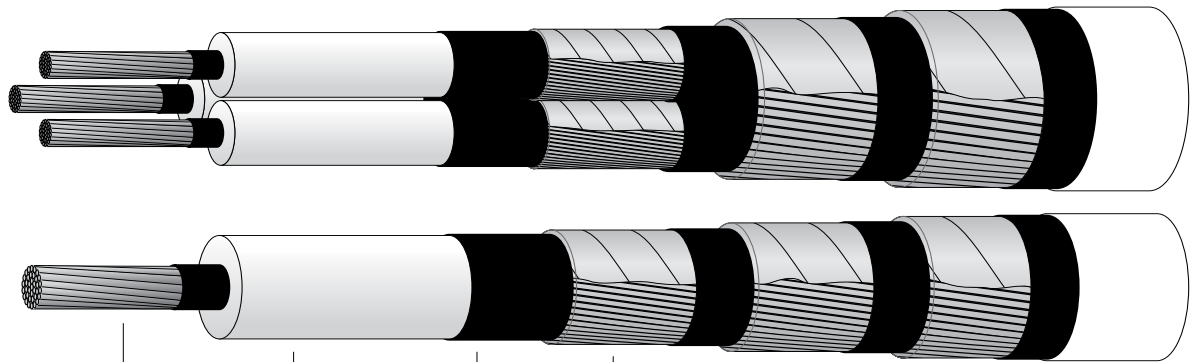
ambient temperature, deepest temperature: down to -25°C -25°C to -50°C (only without voltage tap)

Position of installation: vertical from above other

Capazitive voltage tap: yes no

Voltages: U_0 (phase-earth) _____ kV U_n (phase-phase) _____ kV U_m (max. operating voltage $2 \times U_0$) _____ kV

Cable design: single core cable three core cable








conductor insulation conducting layer cable screen 1. armouring 2. armouring outer jacket

Diameter (mm) _____

Cross Section (mm²) _____

Thickness (mm) _____

stranded circular RM <input type="checkbox"/> 	XLPE <input type="checkbox"/>	fully bonded <input type="checkbox"/>	Cu-wire <input type="checkbox"/>	Cu-wire <input type="checkbox"/>	Cu-wire <input type="checkbox"/>	PE <input type="checkbox"/>
stranded sector SM <input type="checkbox"/> 	EPR <input type="checkbox"/>	easy strip <input type="checkbox"/>	Cu-tape <input type="checkbox"/>	Cu-tape <input type="checkbox"/>	Cu-tape <input type="checkbox"/>	PVC <input type="checkbox"/>
solid circular RE <input type="checkbox"/> 		graphite <input type="checkbox"/>	Al-wire <input type="checkbox"/>	Al-wire <input type="checkbox"/>	Al-wire <input type="checkbox"/>	
solid sector SE <input type="checkbox"/> 		without semi-conducting layer <input type="checkbox"/>	Al-tape <input type="checkbox"/>	Al-tape <input type="checkbox"/>	Al-tape <input type="checkbox"/>	
superflexible stranded RF <input type="checkbox"/> 			Lead sheath <input type="checkbox"/>	steel-wire <input type="checkbox"/>	steel-wire <input type="checkbox"/>	
			Cu-corr. sheath <input type="checkbox"/>	steel-tape <input type="checkbox"/>	steel-tape <input type="checkbox"/>	
			Al-corr. sheath <input type="checkbox"/>	Lead sheath <input type="checkbox"/>	Lead sheath <input type="checkbox"/>	
			Fibre optic cable <input type="checkbox"/>	Cu-corr. sheath <input type="checkbox"/>	Cu-corr. sheath <input type="checkbox"/>	
			up to 3 earth braid <input type="checkbox"/>	Al-corr. sheath <input type="checkbox"/>	Al-corr. sheath <input type="checkbox"/>	
				Inner sheath <input type="checkbox"/>	Inner sheath <input type="checkbox"/>	
				Filling compound <input type="checkbox"/>	Filling compound <input type="checkbox"/>	
				Cu-foil <input type="checkbox"/>	Cu-foil <input type="checkbox"/>	
				Al-foil <input type="checkbox"/>	Al-foil <input type="checkbox"/>	
				Fibre optic cable <input type="checkbox"/>		

Remark: _____

CABLE CONNECTOR

CABLE DESIGN

2013-03



MV-CONNEX Separable Connectors, Size 0, $U_m = 24 \text{ kV}$, $I_N = 250 \text{ A}$

Standard article no.

- for DIN VDE cables
- for RM-conductor (stranded circular) of aluminium or copper
- for single core cable with copper wire shield without armouring
- with sealing system (bell flange seal and shrink tubing)
- for indoor and outdoor applications
- not soil-resistant and not offshore-proof
- Packaging unit: set with three separable connectors
- 3-core version on request (see page 17: product configurator)

No.	Max. operating voltage U_m (kV)	for cable cross section (mm ²)	for diameter over conductor (mm)	Insulation thickness (nominal value) (mm)	for diameter over XLPE insulation Ø (mm)
870 010 025	12	25	5.6 - 6.5	3.5	12.7 - 16.3
870 010 035	12	35	6.6 - 7.5	3.4	12.7 - 16.3
870 010 050	12	50	7.7 - 8.6	3.4	15.0 - 19.2
870 010 070	12	70	9.3 - 10.2	3.4	15.0 - 19.2
870 020 025	24	25	5.6 - 6.5	5.5	15.0 - 19.2
870 020 035	24	35	6.6 - 7.5	5.5	18.0 - 21.7
870 020 050	24	50	7.7 - 8.6	5.5	18.0 - 21.7
870 020 070	24	70	9.3 - 10.2	5.5	20.0 - 23.5

MV-CONNEX Separable Connectors, Size 1, $U_m = 36 \text{ kV}$, $I_N = 630 \text{ A}$

Standard article no.

- for DIN VDE cables
- for RM-conductor (stranded circular) of aluminium or copper
- for single core cable with copper wire shield without armouring
- with sealing system (bell flange seal and shrink tubing)
- for indoor and outdoor applications
- not soil-resistant and not offshore-proof
- offshore version on request (see page 17: product configurator)
- Packaging unit: set with three separable connectors
- 3-core version on request (see page 17: product configurator)

The picture shows MV-CONNEX separable connector without voltage tap



No.	No.	Max. operating voltage	for cable cross section	for diameter over conductor	Insulation thickness (nominal value)	for diameter over XLPE insulation
with voltage tap	without voltage tap	U_m (kV)	(mm ²)	(mm)	(mm)	Ø (mm)
850 110 035	870 110 035	12	35	6.0 - 7.3	3.4	13.5 - 17.5
850 110 050	870 110 050	12	50	7.5 - 8.8	3.4	13.5 - 17.5
850 110 070	870 110 070	12	70	9.3 - 10.6	3.4	16.0 - 19.5
850 110 095	870 110 095	12	95	10.8 - 12.1	3.4	18.0 - 21.5
850 110 120	870 110 120	12	120	12.3 - 13.6	3.4	18.0 - 21.5
850 110 150	870 110 150	12	150	13.8 - 15.1	3.4	20.0 - 23.5
850 110 185	870 110 185	12	185	15.3 - 16.6	3.4	22.0 - 25.5
850 110 240	870 110 240	12	240	17.8 - 19.1	3.4	25.0 - 28.5
850 120 035	870 120 035	24	35	6.0 - 7.3	5.5	18.0 - 21.5
850 120 050	870 120 050	24	50	7.5 - 8.8	5.5	18.0 - 21.5
850 120 070	870 120 070	24	70	9.3 - 10.6	5.5	20.0 - 23.5
850 120 095	870 120 095	24	95	10.8 - 12.1	5.5	22.0 - 25.5
850 120 120	870 120 120	24	120	12.3 - 13.6	5.5	23.5 - 27.0
850 120 150	870 120 150	24	150	13.8 - 15.1	5.5	25.0 - 28.5
850 120 185	870 120 185	24	185	15.3 - 16.6	5.5	26.5 - 30.0
850 120 240	870 120 240	24	240	17.8 - 19.1	5.5	28.0 - 31.5
850 130 050	870 130 050	36	50	7.5 - 8.8	8.0	23.5 - 27.0
850 130 070	870 130 070	36	70	9.3 - 10.6	8.0	25.0 - 28.5
850 130 095	870 130 095	36	95	10.8 - 12.1	8.0	26.5 - 30.0
850 130 120	870 130 120	36	120	12.3 - 13.6	8.0	28.0 - 31.5
-	870 130 150	36	150	13.8 - 15.1	8.0	30.0 - 33.5
-	870 130 185	36	185	15.3 - 16.6	8.0	31.0 - 34.5



MV-CONNEX Separable Connectors, Size 2, $U_m = 42 \text{ kV}, I_N = 800 \text{ A}$

Standard article no.

- for DIN VDE cables
- for RM-conductor (stranded circular) of aluminium or copper
- for single core cable with copper wire shield without armouring
- with sealing system (bell flange seal and shrink tubing)
- for indoor and outdoor applications
- not soil-resistant and not offshore-proof
- offshore version on request (see page 17: product configurator)
- Packaging unit: set with three separable connectors
- 3-core version on request (see page 17: product configurator)
- rotatable flange

The picture shows MV-CONNEX separable connector with voltage tap.

No.	No.	Max. operating voltage	for cable cross section	for diameter over conductor	Insulation thickness (nominal value)	for diameter over XLPE insulation	Rem.
with voltage tap	without voltage tap	U_m (kV)	(mm ²)	(mm)	(mm)	Ø (mm)	
850 210 050	870 210 050	12	50	7.5 - 8.8	3.4	13.5 - 17.5	
850 210 070	870 210 070	12	70	9.3 - 10.6	3.4	16.0 - 19.5	
850 210 095	870 210 095	12	95	10.8 - 12.1	3.4	18.0 - 21.5	
850 210 120	870 210 120	12	120	12.3 - 13.6	3.4	18.0 - 21.5	
850 210 150	870 210 150	12	150	13.8 - 15.1	3.4	20.0 - 23.5	
850 210 185	870 210 185	12	185	15.3 - 16.6	3.4	22.0 - 25.5	
850 210 240	870 210 240	12	240	17.8 - 19.1	3.4	25.0 - 28.5	
850 210 300	870 210 300	12	300	19.2 - 20.9	3.4	26.5 - 30.0	
850 220 050	870 220 050	24	50	7.5 - 8.8	5.5	18.0 - 21.5	
850 220 070	870 220 070	24	70	9.3 - 10.6	5.5	20.0 - 23.5	
850 220 095	870 220 095	24	95	10.8 - 12.1	5.5	22.0 - 25.5	
850 220 120	870 220 120	24	120	12.3 - 13.6	5.5	23.5 - 27.0	
850 220 150	870 220 150	24	150	13.8 - 15.1	5.5	25.0 - 28.5	
850 220 185	870 220 185	24	185	15.3 - 16.6	5.5	26.5 - 30.0	
850 220 240	870 220 240	24	240	17.8 - 19.1	5.5	28.0 - 31.5	
850 220 300	870 220 300	24	300	19.2 - 20.9	5.5	31.0 - 34.5	
850 230 035	870 230 035	36	35	6.0 - 7.3	8.0	16.0 - 19.5	
850 230 050	870 230 050	36	50	7.5 - 8.8	8.0	23.5 - 27.0	
850 230 070	870 230 070	36	70	9.3 - 10.6	8.0	25.0 - 28.5	
850 230 095	870 230 095	36	95	10.8 - 12.1	8.0	26.5 - 30.0	
850 230 120	870 230 120	36	120	12.3 - 13.6	8.0	28.0 - 31.5	
850 230 150	870 230 150	36	150	13.8 - 15.1	8.0	29.5 - 33.0	
850 230 185	870 230 185	36	185	15.3 - 16.6	8.0	31.0 - 34.5	
850 230 240	870 230 240	36	240	17.8 - 19.1	8.0	32.5 - 36.0	
-	870 235 300	36	300	19,7 - 21,4	8.0	36.0 - 38.5	(XL)

MV-CONNEX Separable Connectors, Size 3, $U_m = 42 \text{ kV}, I_N = 1250 \text{ A}$

Standard article no.

- for DIN VDE cables
- for RM-conductor (stranded circular) of aluminium or copper
- for single core cable with copper wire shield without armouring
- with sealing system (bell flange seal and shrink tubing)
- for indoor and outdoor applications
- not soil-resistant and not offshore-proof
- offshore version on request (see page 17: product configurator)
- Packaging unit: set with three separable connectors
- 3-core version on request (see page 17: product configurator)
- rotatable flange

The picture shows MV-CONNEX separable connector without voltage tap



No.	No.	Max. operating voltage	for cable cross section	for diameter over conductor	Insulation thickness (nominal value)	for diameter over XLPE insulation	Rem.
with voltage tap	without voltage tap	U_m (kV)	(mm ²)	(mm)	(mm)	Ø (mm)	
850 310 800	870 310 120	12	120	12.5 - 14.7	3.4	19.0 - 23.0	
850 310 150	870 310 150	12	150	13.5 - 15.7	3.4	19.0 - 23.0	
850 310 185	870 310 185	12	185	15.0 - 17.2	3.4	22.5 - 26.5	
850 310 240	870 310 240	12	240	17.5 - 19.7	3.4	24.5 - 28.5	
850 310 300	870 310 300	12	300	19.5 - 21.7	3.4	26.0 - 30.0	
850 310 400	870 310 400	12	400	22.6 - 24.8	3.4	30.0 - 34.0	
850 310 500	870 310 500	12	500	25.4 - 27.6	3.4	32.0 - 36.0	
850 310 630	870 310 630	12	630	28.9 - 31.1	3.4	36.0 - 39.5	
850 320 050	870 320 050	24	50	7.2 - 9.4	5.5	19.0 - 23.0	
850 320 070	870 320 070	24	70	9.0 - 11.2	5.5	19.0 - 23.0	
850 320 095	870 320 095	24	95	10.5 - 12.7	5.5	22.5 - 26.5	
850 320 120	870 320 120	24	120	12.5 - 14.7	5.5	22.5 - 26.5	
850 320 150	870 320 150	24	150	13.5 - 15.7	5.5	24.5 - 28.5	
850 320 185	870 320 185	24	185	15.0 - 17.2	5.5	26.0 - 30.0	
850 320 240	870 320 240	24	240	17.5 - 19.7	5.5	28.0 - 32.0	
850 320 300	870 320 300	24	300	19.5 - 21.7	5.5	30.0 - 34.0	
850 320 400	870 320 400	24	400	22.6 - 24.8	5.5	34.0 - 38.0	
850 320 500	870 320 500	24	500	25.4 - 27.6	5.5	36.0 - 39.5	
850 320 630	870 320 630	24	630	28.9 - 31.1	5.5	40.0 - 43.0	
850 330 050	870 330 050	36	50	7.2 - 9.4	8.0	22.5 - 26.5	
850 330 070	870 330 070	36	70	9.0 - 11.2	8.0	24.5 - 28.5	
850 330 095	870 330 095	36	95	10.5 - 12.7	8.0	26.0 - 30.0	
850 330 120	870 330 120	36	120	11.5 - 13.7	8.0	28.0 - 32.0	
850 330 150	870 330 150	36	150	13.5 - 15.7	8.0	30.0 - 34.0	
850 330 185	870 330 185	36	185	15.0 - 17.2	8.0	30.0 - 34.0	
850 330 240	870 330 240	36	240	17.5 - 19.7	8.0	34.0 - 38.0	
850 330 300	870 330 300	36	300	19.5 - 21.7	8.0	36.0 - 39.5	
850 330 400	870 330 400	36	400	22.6 - 24.8	8.0	38.0 - 41.0	
850 330 500	870 330 500	36	500	25.4 - 27.6	8.0	42.0 - 44.5	
-	870 335 630	36	630	28.9 - 31.1	8.0	44.5 - 47.0	(XL)
-	870 335 631	36	630	28,9 - 31,1	8,0	46.5 - 49.0	(XL)

Order Information

ATTENTION! Important information!

Special tools are required for the installation of the contact system of the MV-CONNEX separable connectors. Installation on round fine-wire conductors furthermore requires tools for round crimping sleeves on the RF conductor.

Only qualified personnel should work on or with the product. Qualified personnel includes employees who are able to evaluate the tasks assigned to them and to recognize possible dangers due to the technical training, skills, and experiences as well as knowledge of the relevant regulations. The qualified personnel can be trained and certified by PFISTERER or instructors authorized by PFISTERER on the installation of CONNEX separable connectors. The certificate is valid for 5 years.

For separable connectors with standard items, the selected operating voltage must match the maximum operating voltage of the DIN VDE cable because the operating voltage is correlated to the wall thickness of the insulating, based on which the matching insulating part assigned.

Due to the fact that the separable connector are intended for outdoor use in bushings installed „vertically from the above“, they must be installed with a sealing kit.

For separable connectors size 2 ^{*)}		Sealing kit for plug and Dummy plug	Sealing kit for Surge Arrester and Protection Cap
with standard item no. (from page 14)	1 set = 3 pieces	559 218 002	-
for replacement purposes	1 piece	559 218 012	559 218 111
configured with the product configurator and the selected application range "outdoor vertically from above" in the form defining MV-CONNEX separable connector		included	

*) in combination with sockets size 2 with item no. 827 104 005 or 827 104 205.

For cable terminations heads size 3 ^{*)}		Sealing kit for plug and Dummy plug	Sealing kit for Surge Arrester and Protection Cap
with standard item no. (from page 15)	1 set = 3 pieces	559 218 001	-
for replacement purposes	1 piece	559 218 011	559 218 112
configured with the product configurator and the selected application range "outdoor vertically from above" in the form defining MV-CONNEX separable connector		included	

*) in combination with socket size 3 with item no. 827 110 012 bzw. 827 110 212.

The characteristics of separable connectors for offshore and underground applications can only be selected via the product configurator. To do so, select „Offshore“ in the form defining MV-CONNEX separable connectors (see page 11).