Arkasil

CABLE ACCESSORIES

60-500 kV

www.arkasil.ch

Arkasil

HISTORY OF THE COMPANY

Arkasil was founded in 2010. Starting production of terminations and joints 110 kV in 2011, nowadays we offer a wide range of cable accessories including GIS plug-in terminations for 72-550 kV.

MAIN INFORMATION

Arkasil produces and supplies accessories for 72 - 550 kV XLPE cables. Applicable innovation design methods and more than 10-years experience of our employees in delivery, mounting and tests of HV and EHV cables and cable accessories make Arkasil the leader in the domestic market. Dynamic development of the company, optimization of technological processes and flexible pricing policy allow us to set ambitious objectives and gain strong foothold in many countries.

Aspiring to leading positions in the market of the cable accessories producers, our company pays much attention to development of new products. As a result of innovation Arkasil has launched different types of accessories for 72 - 245 kV within 8 years.The company continuously carries out different tests of new products for proving engineering solutions, quality of materials and production processes.

Manufacturing of high-quality products that meet modern standards, satisfying customer needs is our priority. That's why we co-operate only with the leading international and domestic producers of insulation materials and components. Quality management system is developed and implemented in the company in accordance with ISO 9001 requirements. Continuous control of material quality, production processes and extended routine test procedure ensure our customers the compliance of our products with the stated specification and requirements of international and local standards.

The key factor of company innovative development is the involvement of all employees. The implemented system of continuous improvements allow us to optimize production processes and further improve the quality of our products.

Due to individual approach to the assigned tasks, flexibility, strict fulfillment of contractual obligations our company built strong relationship with our customers. On customers' demands Arkasil develops and implements individual solution for construction of cable lines. Own design department enables us to implement the most sophisticated projects in the shortest possible time taking into account their specific requirements.

Together with assurance of our products quality we pay much attention to environment and energy efficiency issues. Environment management system is implemented and certified in the company in accordance with ISO 14001.

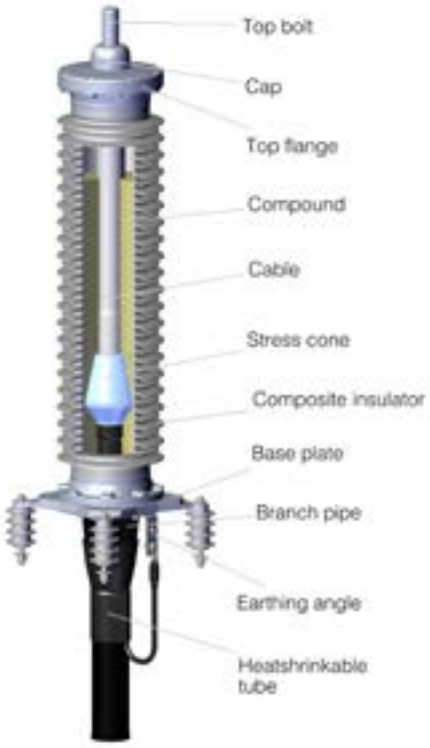
LIST OF CONTENT

Outdoor terminations MKB

Arkasil outdoor terminations MKB 72 - 550 kV with composite type or porcelain insulator are used for cable lines connection with power-supply systems. Terminations are used for outdoor and indoor installation for XLPE cables. Terminations can be installed on XLPE cable with optical fibers (OF) in the screen which are used for temperature monitoring.

Main parts

- composite type insulator with glass fiber, reinforced epoxy resin tube and silicone rubber sheds, the color of sheds - light gray; top and bottom flanges glued and sealed to the composite insulator. Porcelain insulator as an option.
- pre-molded and factory-tested silicone stress cone;
- base plate;
- branch pipe with flange;
- supporting insulators;
- seals and fixing materials;
- polybuthene or silicon oil as an insulating compound;
- optical fiber output for connection to equipment (option).



Marking of outdoor terminations MKB

MKB 123 - Cu 1000 ___ / 185 - B M O OO P H C C2 A - 40 - 4025

- MKB - High voltage outdoor cable termination
- 72,5; 123; 145; 170; 245; 362; 420; 550 - Maximum system voltage, kV
- Cu, Al - Conductor material
- 95...3000 - Conductor cross-section, sq mm
- M - Round solid conductor (RE)
- Cu 35...400 - Cu wire screen cross-section, sq mm
  Al 35...400 - Al wire screen cross-section, sq mm
  Pb - Lead sheath with indication of thickness, mm
  CAS - Corrugated aluminum sheath with indication of thickness, mm
  SAS - Smooth Al sheath with indication of thickness, mm
- () - pressed connector (default)
  B - screw connector
  M - welded connection
- O - optical fiber outlet (max 2 modules)
  OO - optical fiber outlet (max 4 modules)
  P - design with porcelain insulator
  H - including termination of armour wires
  C - design with corona ring on the top flange of termination
  C2 - design with corona rings on the top and bottom flanges of termination
  A - design with arcing horns
- Diameter of the top bolt, mm:
  -40
  -50 (default)
  -60
- Minimum guaranteed creepage distance, mm
  Default values of creepage distance:
  2350 mm-for MKB 72.5
  3460 mm for MKB 123
  3870 mm for MKB 145
  4480 mm-for MKB 170
  6548 mm-for MKB 245
  13000 mm-for MKB 362
  18600 mm-for MKB 420
  18600 mm-for MKB 550

Area of application

Type		MKB 72,5	MKB 123	MKB 145	MKB 170	MKB 245	MKB 362	MKB 420	MKB 550
Phase to ground voltage U0	kV	36	64	76	87	127	190	220	290
Rated voltage	kV	66	110	132	150	220	330	380	500
Maximum system voltage	kV	72,5	123	145	170	245	362	420	550
Cable conductor cross-section range	mm^2	95 ÷ 1600	185 ÷ 2500	185 ÷ 2500	185÷ 2500	400÷2500	500÷3000	500÷3000	800÷3000
Maximum cable oversheath diameter	mm	115	124 (op. 140)	124 (op. 140)	124 (op. 140)	124 (op. 140)	170	170	170
Maximum prepared insulation diameter	mm	75	93	93	95	110	140	140	140

Installation options	MKB 72,5	MKB 123	MKB 145	MKB 170	MKB 245	MKB 362	MKB 420	MKB 550
On framework	+	+	+	+	+	+	+	+
On tower of overhead line *	+	+	+	+	+	-	-	-
Maximum angle to vertical	45°	45°	45°	30°	30°	0°	0°	0°

* Installation can be simplified by assembling the termination horizontally on the ground before lifting it into place.

Technical data

Electrical parameters	MKB 72,5	MKB 123	MKB 145	MKB 170	MKB 245	MKB 362	MKB 420	MKB 550
AC voltage withstand test	90 kV for 30 min	160 kV for 30 min	190 kV for 30 min	218 kV for 30 min	318 kV for 30 min	420 kV for 60 min	440 kV for 60 min	580 kV for 60 min
Partial discharge level	<5 pC at 54 kV	<5 pC at 96 kV	<5 pC at 114 kV	<5 pC at 131 kV	<5 pC at 190 kV	<5 pC at 285 kV	<5 pC at 330 kV	<5 pC at 435 kV
Lightning impulse voltage (10+/10- impulses)	325 kV	550 kV	650 kV	750 kV	1050 kV	1175 kV	1425 kV	1550 kV
Switching impulse voltage (10+/10- impulses)	-	-	-	-	-	950 kV	1050 kV	1175 kV

Rated current	Limited by cable specification

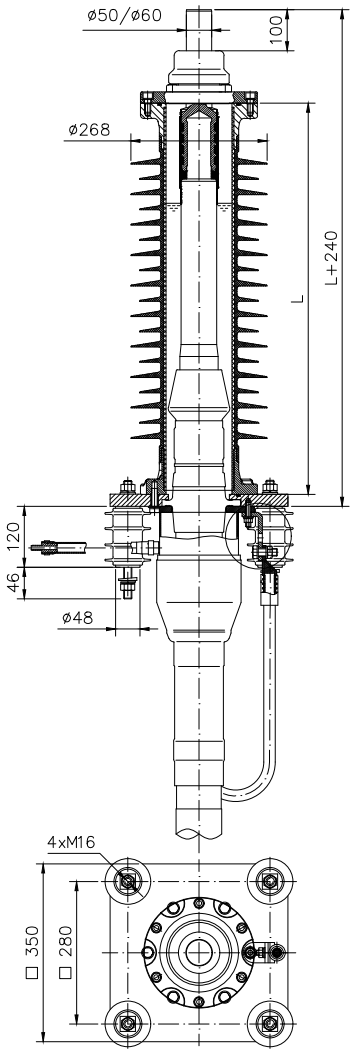
Climatic characteristics	MKB 72,5	MKB 123	MKB 145	MKB 170	MKB 252	MKB 362	MKB 420	MKB 550
Operation temperature	-45/+50°C	-45/+50°C	-45/+50°C	-45/+50°C	-45/+50°C	-45/+50°C	-45/+50°C	-45/+50°C

Technical parameters		MKB 72,5		MKB 123				MKB 145			
Hollow-core insulator type		comp.	porc.	comp.		porc.		comp.		porc.	
Termination length (L)	mm	770	778	1240	1240	1280	1280	1365	1390	1450	1450
Overall height	mm	1122	1130	1600	1600			1725	1750		
Creepage distance	mm	2350	3695	3460	4025	3150	3906	3870	4605	3625	4495
Pollution level in accordance with IEC 60815		IV	IV	III	IV	III	IV	III	IV	III	IV
Net weight (appr.)	kg	50	98	115	117	332	362	121	124	355	362
Maximum allowed load on top connector	kN	4	4	3,5	3,5	2,8	2,8	3,2	3,2	2,8	2,8

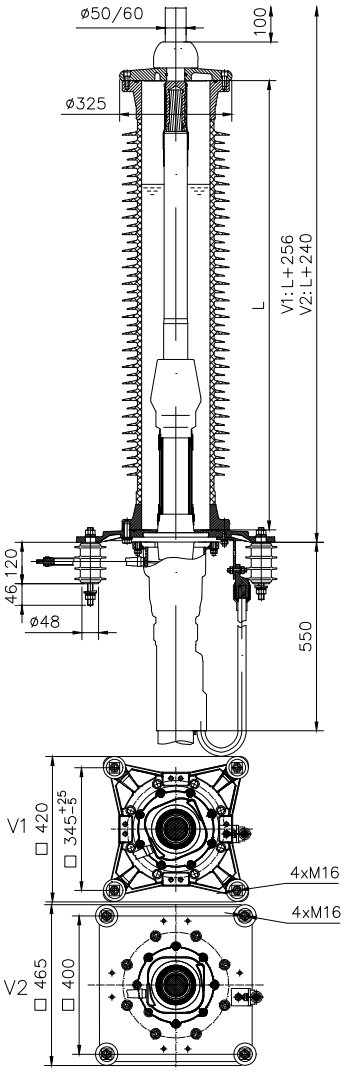
Technical parameters		MKB 170					MKB 245			
Hollow insulator type			comp.		porc.		comp.		porc.	
Termination length (L)	mm	1552	1590	1640	1640	1640	2356	2356	2300	2300
Overall height	mm	1912	1950	2000						
Creepage distance	mm	4480	5370	5562	4250	5270	6548	8163	6300	7812
Pollution level in accordance with IEC 60815		III	IV	IV	III	IV	III	IV	III	IV
Net weight (appr.)	кg	130	134	137	680	690	306	313	690	770
Maximum allowed load on top connector	кN	2,7	2,7	2,7	2,6	2,6	5	5	5	5

Drawings

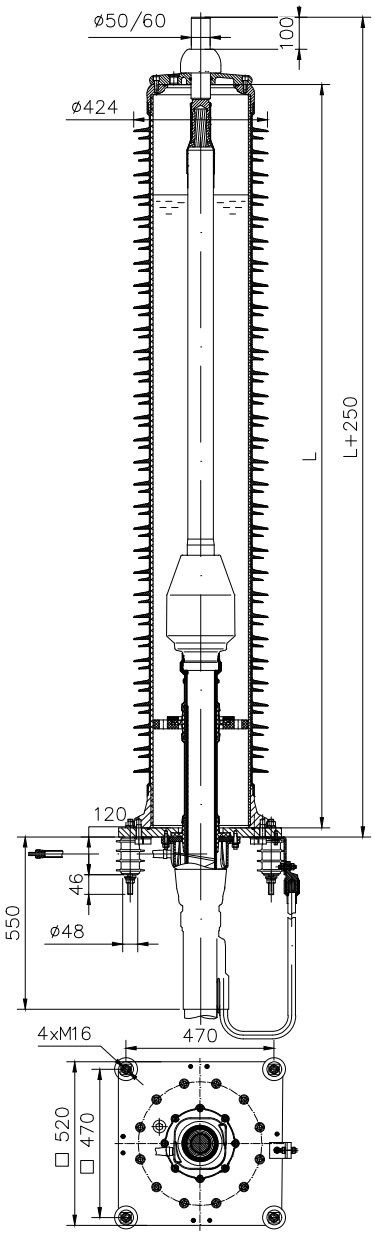
MKB 72,5



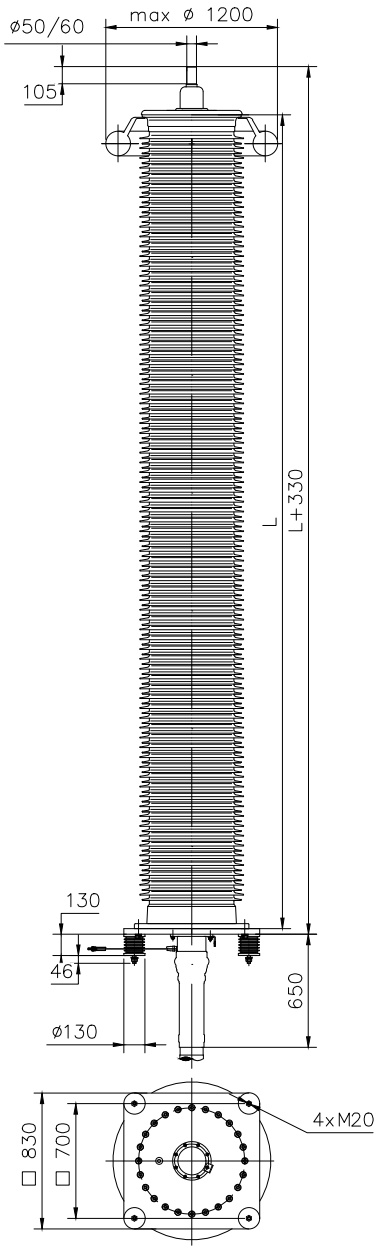
MKB 123 / 145 / 170



MKB 245



MKB 362 / 420 / 550



Technical parameters		MKB 362	MKB 420	MKB 550
Hollow insulator type		comp.	comp.	comp.
Termination length (L)	mm	3650	5050	5050
Overall height	mm			
Creepage distance	mm	13000	18600	18600
Pollution level in accordance with IEC 60815		IV	IV	IV
Net weight (appr.)	кg	900	1150	1150
Maximum allowed load on top connector	кN	5	5	5

Dry-type outdoor terminations MKBC

Arkasil dry-type outdoor terminations MKBC 72 - 145 kV are designed for connection of HV cable lines with overhead lines or substation equipment. Dry-type terminations are suitable for indoor and outdoor installation with HV XLPE cables. Terminations for XLPE cable with optical fibers (OF) which are used for temperature monitoring are optionally available.

Main parts

Insulator:

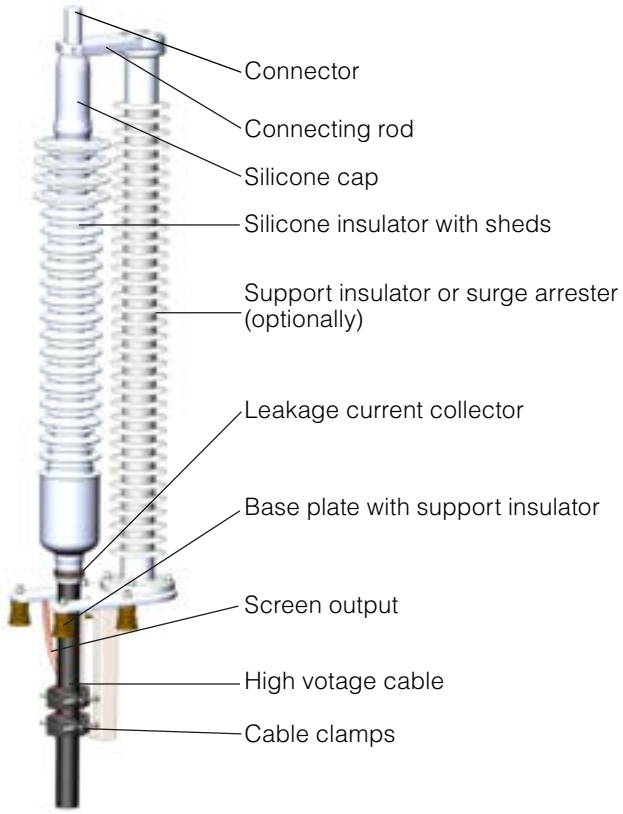
- Premoulded and factory tested silicone rubber insulator with sheds;
- Leakage current collector.

Cable end:

- Conductor connector;
- Bottom plate;
- Support insulators;
- Screen output;
- Optical fiber output (optional).

Support:

- Composite type support insulator with solid glass fiber rod and silicone rubber sheds;
- Composite type support surge arrester with silicone rubber sheds.



Marking of dry-type outdoor terminations MKBC

MKBC 123 - Cu 1000 / 185 - B M O H

- B M O H — Types of cable terminations:
  B-screw connector
  M-welding connection between conductor and termination connector
  O-Termination has optical fiber output
  H-Termination without support
- 185 — Minimum guaranteed creepage distance.
- Cu 35...400 - Cu wire screen cross-section, sq mm
  Al 35...400 - Al wire screen cross-section, sq mm
  Pb - Lead sheath with indication of thickness, mm
  CAS - Corrugated aluminum sheath with indication of thickness, mm
  SAS - Smooth Al sheath with indication of thickness, mm
- M - Round solid conductor (RE)
- 1000 — 95...2000 - Conductor cross-section, sq mm
- Cu — Cu, Al - Conductor material
- 123 — 72,5; 123; 145 - Maximum system voltage, kV
- MKBC — MKBC - High voltage dry outdoor cable termination

Area of application

Type		MKBC 72,5	MKBC 123	MKBC 145
Phase to ground voltage U0	kV	36	64	76
Rated voltage	kV	66	110	132
Maximum system voltage	kV	72,5	123	145
Cable conductor cross-section range	mm^2	95 ÷ 1600	185 ÷ 2000	185 ÷ 2000
Maximum cable diameter	mm	115	125	125
Prepared insulation diameter range	mm	32-75	44-93	44-93
Installation options		**MKBC 72,5**	**MKBC 123**	**MKBC 145**
On framework or tower of OHL		+	+	+
On high voltage busbar		+	+	+
Maximum angle to vertical		0..90°	0..90°	0..90°

Technical data

Electrical parameters	MKBC 72,5	MKBC 123	MKBC 145
AC voltage withstand test	90 kV for 30 min	160 kV for 30 min	190 kV for 30 min
Partial discharges	< 5 pC at 54 kV	< 5 pC at 96 kV	< 5 pC at 114 kV
Impulse withstand voltage (10+/10- impulses)	325 kV	550 kV	650 kV

Rated current	Limited by cable specification

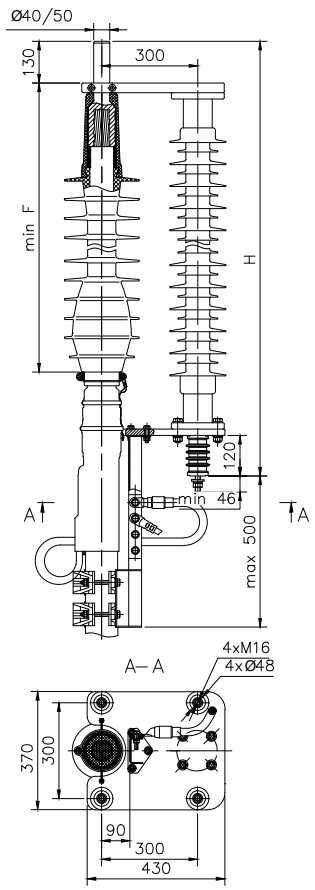
Climatic characteristics	MKBC 72,5	MKBC 123	MKBC 145
Operation temperature	-45/+50°C	-45/+50°C	-45/+50°C

Technical parameters		MKBC 72,5		MKBC 72,5 H	
Termination legnth (L)	mm	1400	1520	920	1030
Creepage distance	mm	1850	2290	1850	2290
Pollution level in accordance with IEC 60815		III	IV	IV	IV
Net weight (appr.)	kg	80	90	30	33
Maximum allowed load on top connector	kN	5	5	-	-

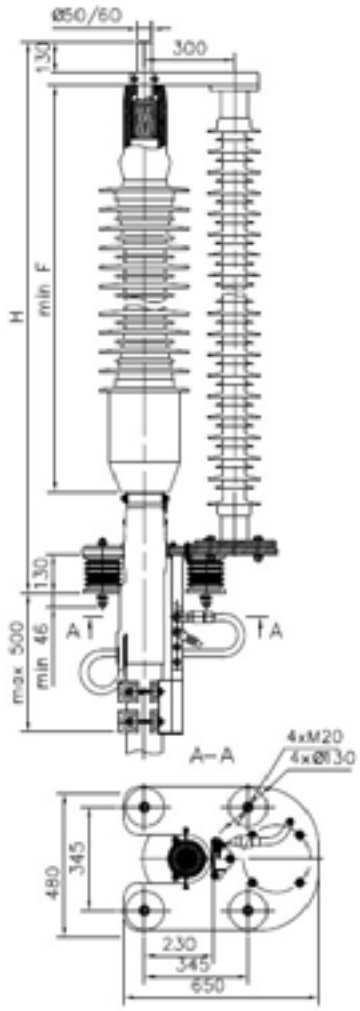
Technical parameters		MKBC 123	MKBC 123 H	MKBC 145	MKBC 145 H
Termination legnth (L)	mm	2100	1750	2200	1870
Creepage distance	mm	4365	4365	4897	4897
Pollution level in accordance with IEC 60815		IV	IV	IV	IV
Net weight (appr.)	kg	100	66	110	70
Maximum allowed load on top connector	kN	6	-	6	-

Drawings

MKBC 72,5



MKBC 123



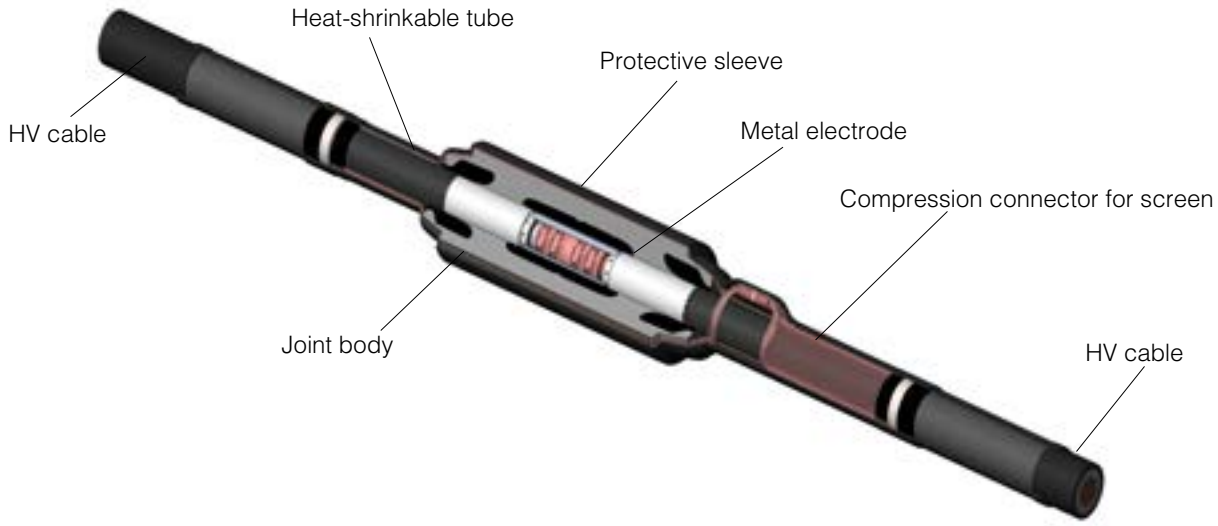
Joints MCB

Straight joints MCB

Arkasil stright joints 72 - 550 kV are prefabricated silicone joints, designed to connect high-voltage cables with XLPE insulation with direct connection of screens. Factory produced and tested silicone joint-body is the main element of the joint. Joint body is made of high quality silicone rubber (LSR) and contains conductive deflectors and middle electrode for electrical stress control. Straight joints can be produced with different outer covering.

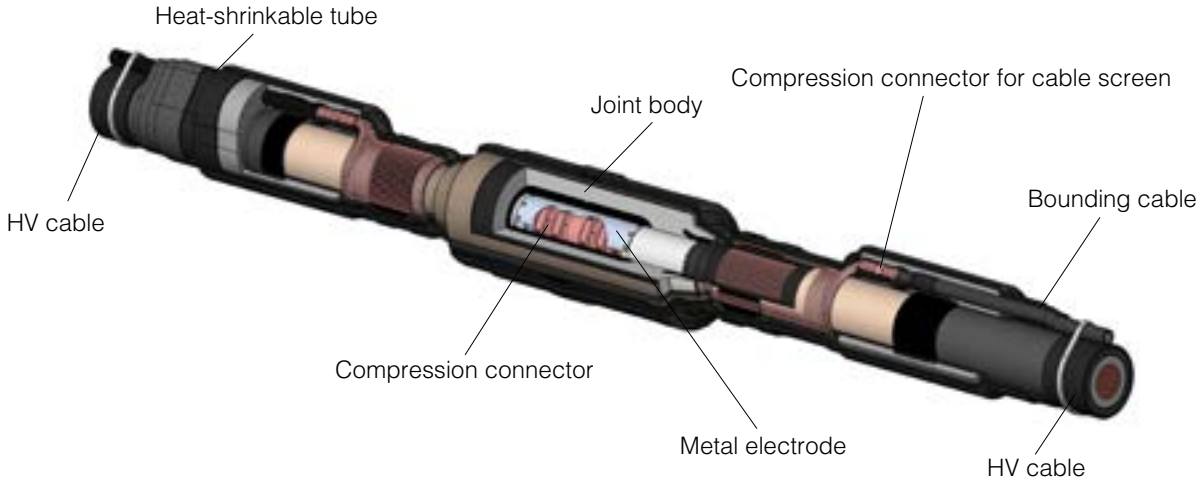
Main parts

- screw connector or compression connector;
- pre-molded silicone insulator - joint body;
- sealing materials;
- tapes (semiconductive, sealing);
- heat-shrinkable protective tubes and sleeves;
- coffin box;
- copper case.



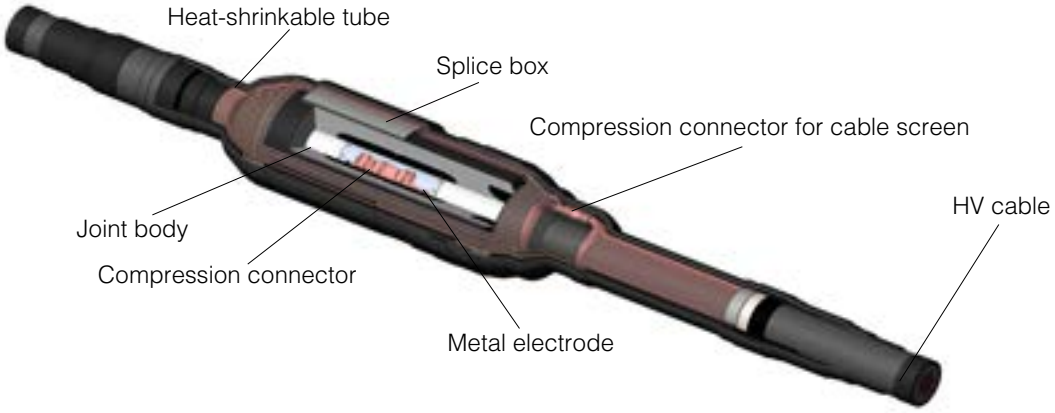
Cross-bonding joints MCB X

Arkasil cross-bonding joints 72 - 550 kV are prefabricated silicone joints, designed to connect high-voltage cables with XLPE insulation with integrated screen interruption. Joint body has dielectric gap. Cable screen interruption is organized by 2 single-wire bonding cables or by one coaxial cable.



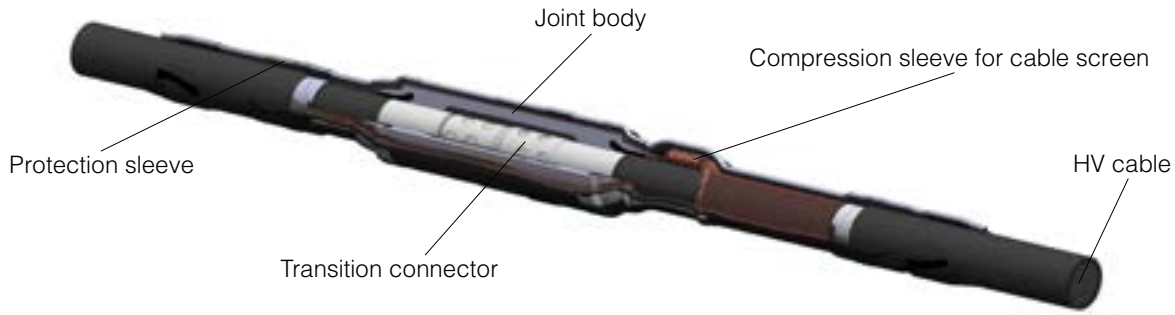
Joints with splice-box for optical fiber connection MCB O

Arkasil joints 72 - 550 kV with connector (splice-box) of optical fiber integrated in screen are prefabricated silicone joints, designed to connect high-voltage cables with XLPE insulation. Splice-box includes all necessary components for splicing and mechanical protection.



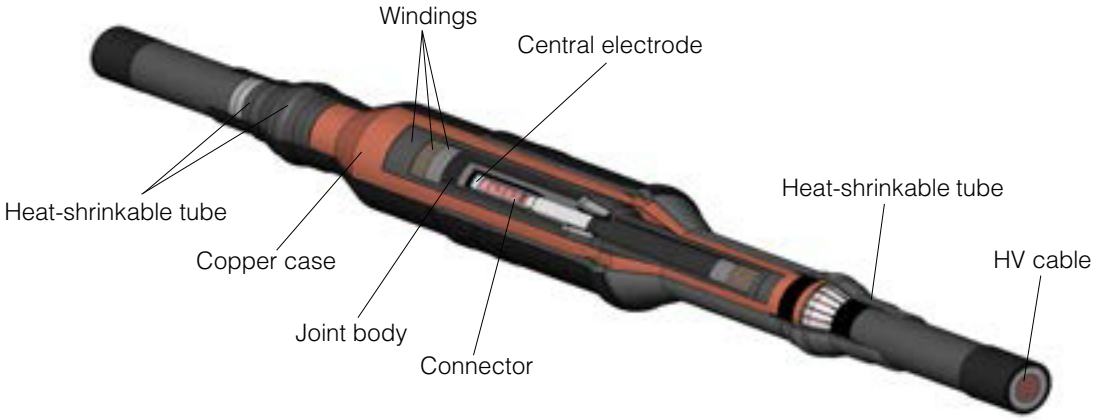
Transition joints MCB T

Arkasil transition joints 72 - 550 kV are prefabricated silicone joints, designed to connect high-voltage cables with XLPE insulation with different design, different cross-sections of the conductor and screen, insulation thickness, conductor material etc. Transition joint dimensions depend on cables designs.



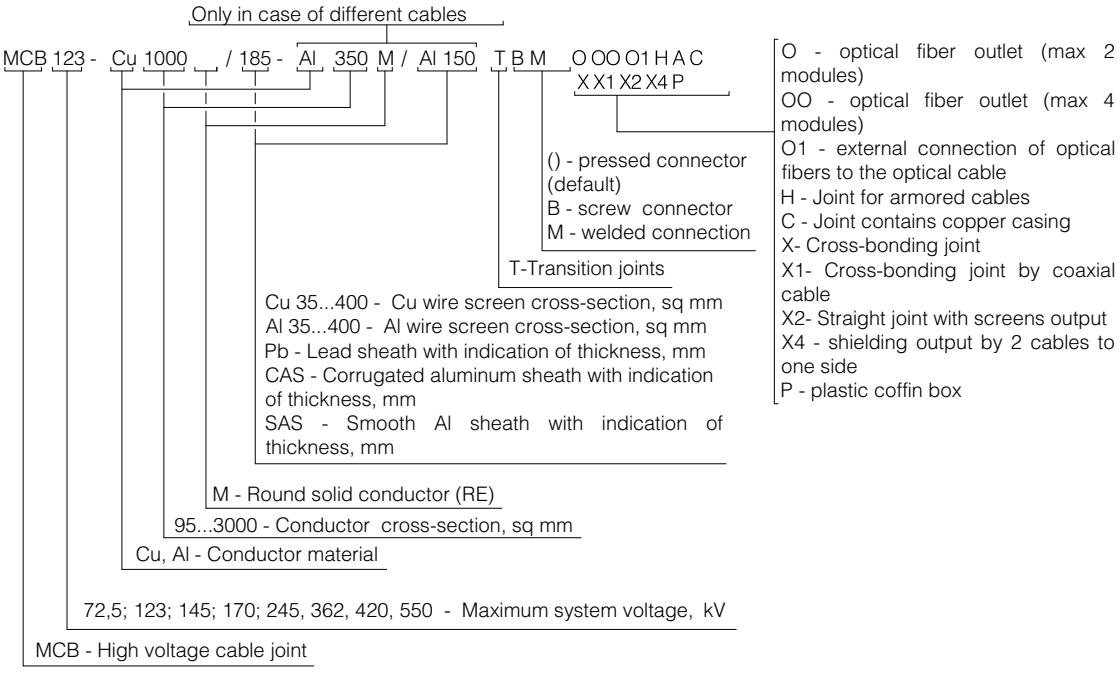
Joints with copper cases and coffin-boxes MCB C (X), MCB P (X)

Arkasil joints with copper cases (index C) and coffin-boxes (index P) are premolded silicone joints which are used for XLPE cables connection. Cases serve for mechanical protection and additional protection against water penetration.



MCB 123 P (X1)

Marking of high-voltage cable joints MCB



Area of application

Type		MCB 72,5	MCB 123	MCB 145	MCB 170	MCB 245	MCB 362	MCB 420	MCB 550
Phase tp ground voltage U0	kV	36	64	76	87	127	190	220	290
Rated voltage	kV	66	110	132	150	220	330	380	500
Maximum system voltage	kV	72,5	123	145	170	245	362	420	550
Cable conductor cross-section range	mm^2	95÷1600	185÷2500	185÷2500	185÷2500	400÷2500	500÷3000	500÷3000	800÷3000
Maximum cable oversheath diameter	mm	120	150	150	150	150	170	170	170
Maximum prepared insulation diameter	mm	75	93	93	93	110	140	140	140

Installation options	MCB 72,5	MCB 123	MCB 145	MCB 170	MCB 245	MCB 362	MCB 420	MCB 550
Underground	+	+	+	+	+	+	+	+
Outdoor	+	+	+	+	+	+	+	+
Indoor	+	+	+	+	+	+	+	+

Technical data

Electrical parameters	MCB 72,5	MCB 123	MCB 145	MCB 170	MCB 245	MCB 362	MCB 420	MCB 550
AC voltage withstand test	90 kV for 30 min	160 kV for 30 min	190 kV for 30 min	218 kV for 30 min	318 kV for 30 min	420 kV for 60 min	440 kV for 60 min	580 kV for 60 min
Partial discharges level	<5 pC at 54 kV	<5 pC at 96 kV	<5 pC at 114 kV	<5 pC at 131 kV	<5 pC at 190 kV	<5 pC at 285 kV	<5 pC at 330 kV	<5 pC at 435 kV
Lighting impulse voltage (10+/10- impulses)	325 kV	550 kV	650 kV	750 kV	1050 kV	1175 kV	1425 kV	1550 kV
Switching impulse voltage (10+/10- impulses)	-	-	-	-	-	950 kV	1050 kV	1175 kV

Rated current	Limited by cable specification

Climatic characteristics	MCB 72,5	MCB 123	MCB 145	MCB 170	MCB 245	MCB 362	MCB 420	MCB 550
Temperature	-45/+50°C	-45/+50°C	-45/+50°C	-45/+50°C	-45/+50°C	-45/+50°C	-45/+50°C	-45/+50°C

Mechanical characteristics		MCB 72,5	MCB 72,5 X/X1	MCB 123/145/170	MCB 123/145/170 X/X1
Length	mm	1800	2200/1800	2200	2450/2200
Net weight	kg	34	50	38	59

Mechanical characteristics		MCB 245	MCB 245 X/X1	MCB 362/420/550 CP	MCB 362/420/550 CXP
Length	mm	2450	2450	2650	2650
Net weight	kg	75	110	215	215

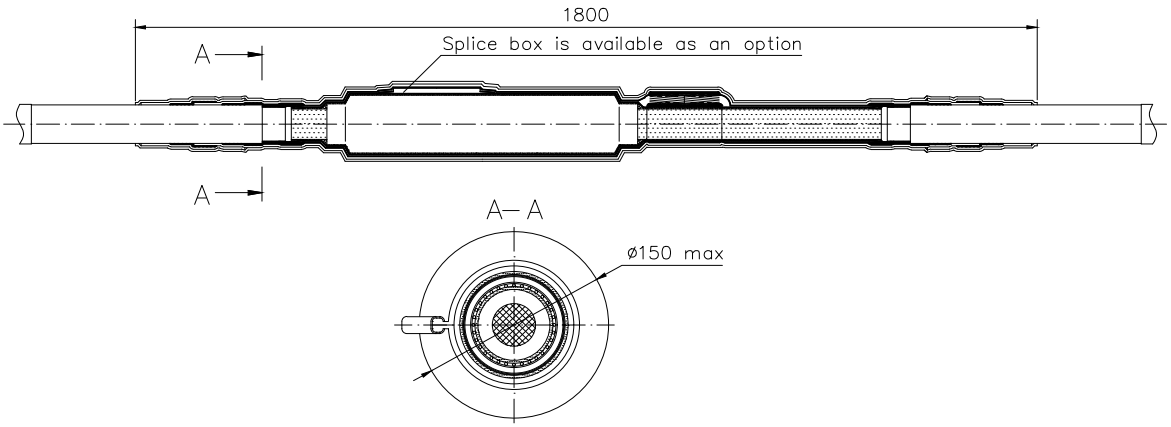
Cable sheath test voltage	MCB 72,5	MCB 123	MCB 145	MCB 170	MCB 245	MCB 362	MCB 420	MCB 550
AC voltage	10 kV within 1 min	10 kV within 1 min	10 kV within 1 min	10 kV within 1 min	10 kV within 1 min	10 kV within 1 min	10 kV within 1 min	10 kV within 1 min
DC voltage	20 kV within 1 min	20 kV within 1 min	20 kV within 1 min	20 kV within 1 min	20 kV within 1 min	20 kV within 1 min	20 kV within 1 min	20 kV within 1 min

Test voltages of the cross-bonding joints	MCB 72,5 X	MCB 123 X	MCB 145 X	MCB 170 X	MCB 245 X	MCB 362 X	MCB 420 X	MCB 550 X
Impulse voltage (10+/10- impulses)	30 kV	37,5 kV	37,5 kV	37,5 kV	47,5 kV	62,5 kV	62,5 kV	72,5 kV
DC voltage	25 kV within 1 min	25 kV within 1 min	25 kV within 1 min	25 kV within 1 min	25 kV within 1 min	25 kV within 1 min	25 kV within 1 min	25 kV within 1 min

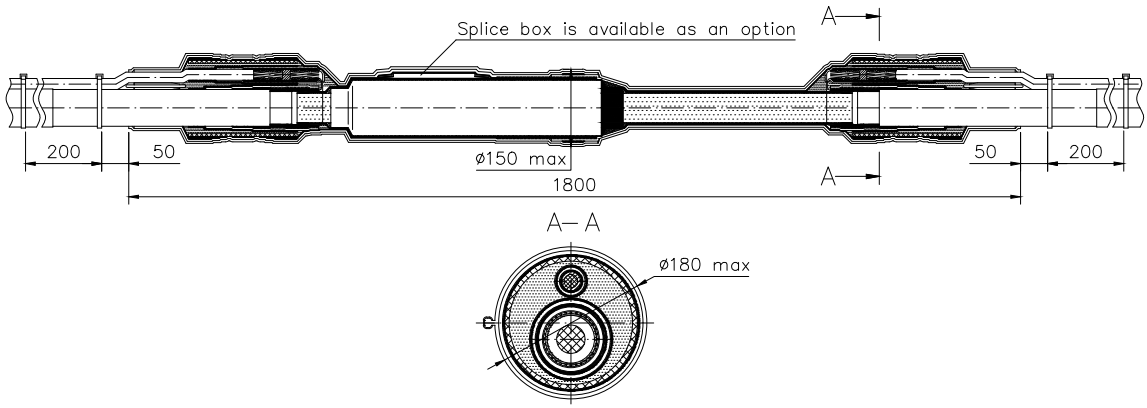
Test voltages between cross-bonding cables	MCB 72,5 X	MCB 123 X	MCB 145 X	MCB 170 X	MCB 245 X	MCB 362 X	MCB 420 X	MCB 550 X
Impulse voltage (10+/10- impulses)	60 kV	75 kV	75 kV	95 kV	95 kV	125 kV	125 kV	145 kV
DC voltage	25 kV within 1 min	25 kV within 1 min	25 kV within 1 min	25 kV within 1 min	25 kV within 1 min	25 kV within 1 min	25 kV within 1 min	25 kV within 1 min

Drawings

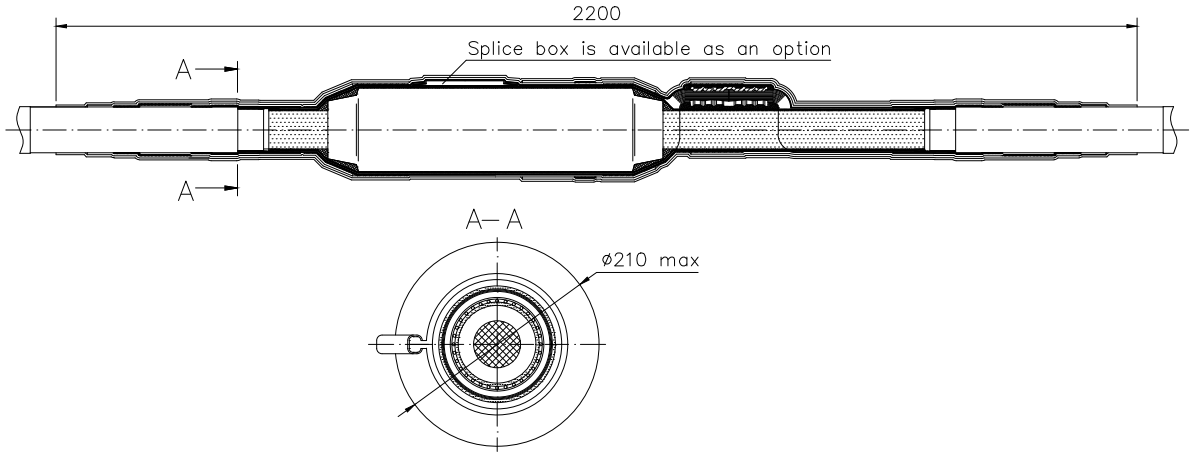
MCB 72,5



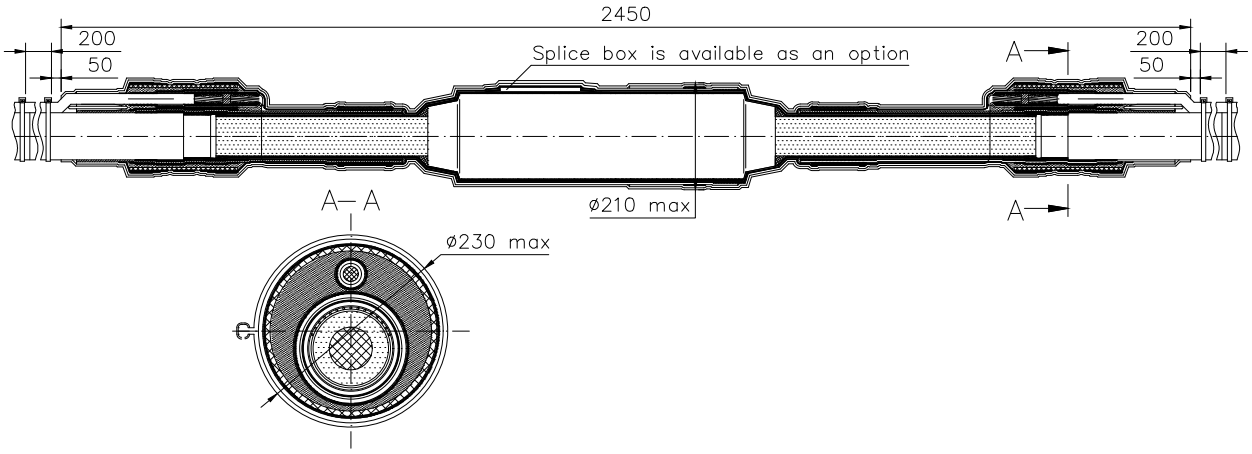
MCB 72,5 X



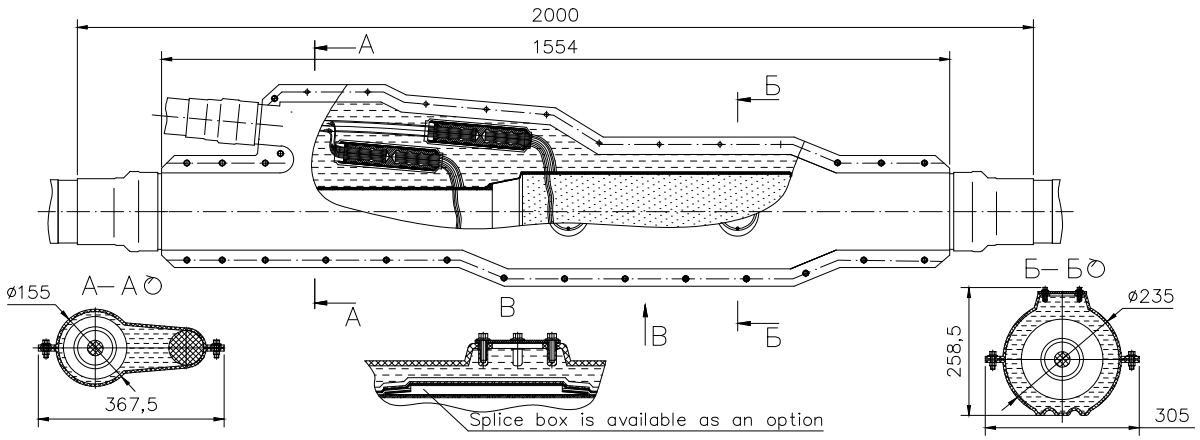
MCB 123 / 145 / 170



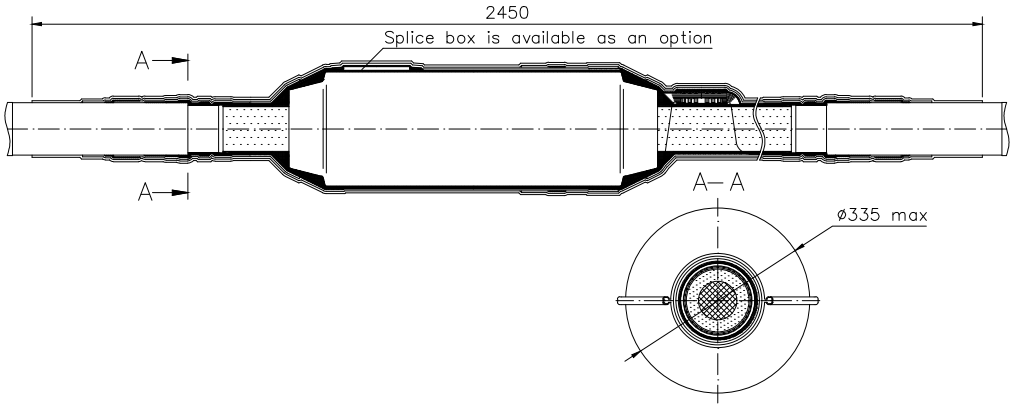
MCB 123 X / 145 X / 170 X



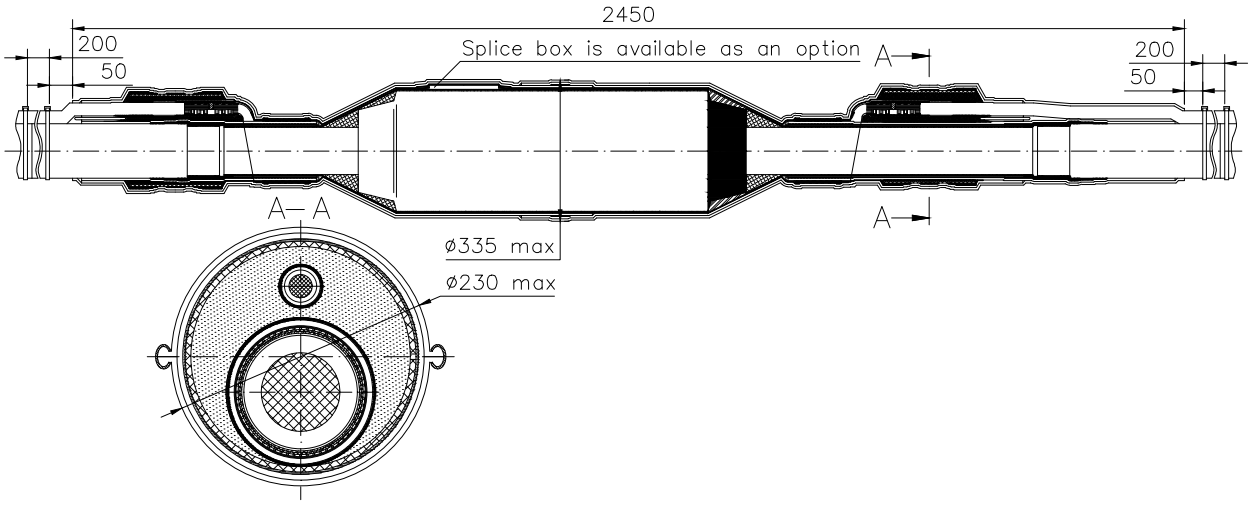
MCB 123 X1P / 145 X1P/ 170 X1P



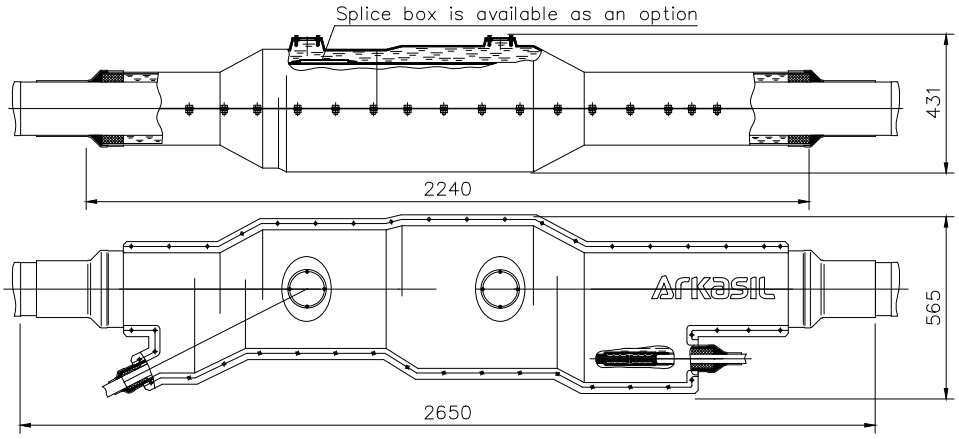
MCB 245



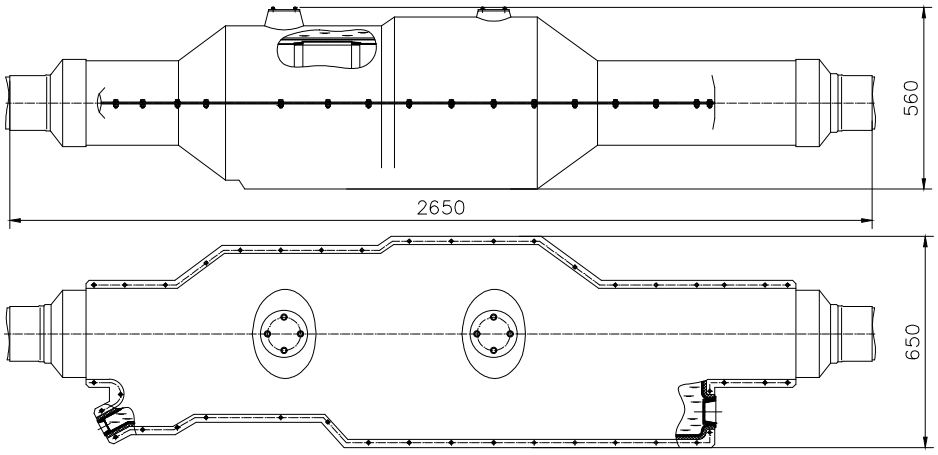
MCB 245 X



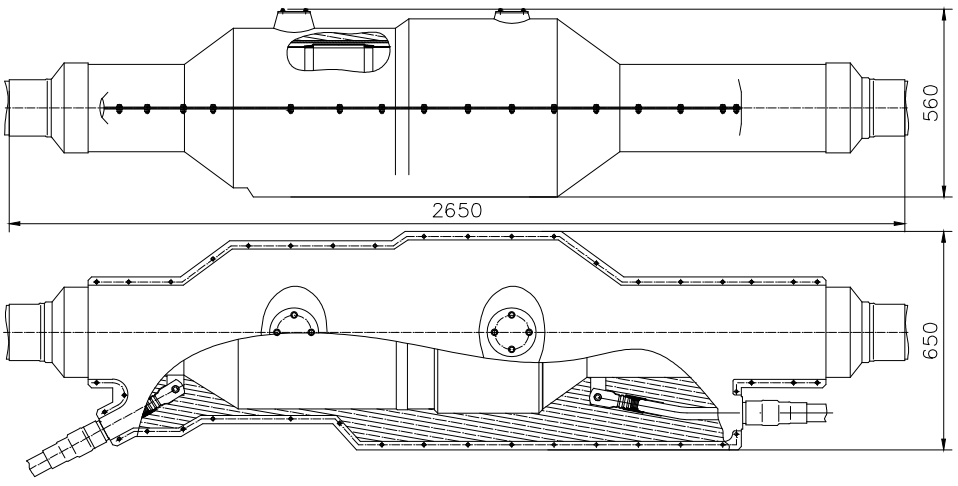
MCB 245 XP



MCB 362 CP / 420 CP / 550 CP

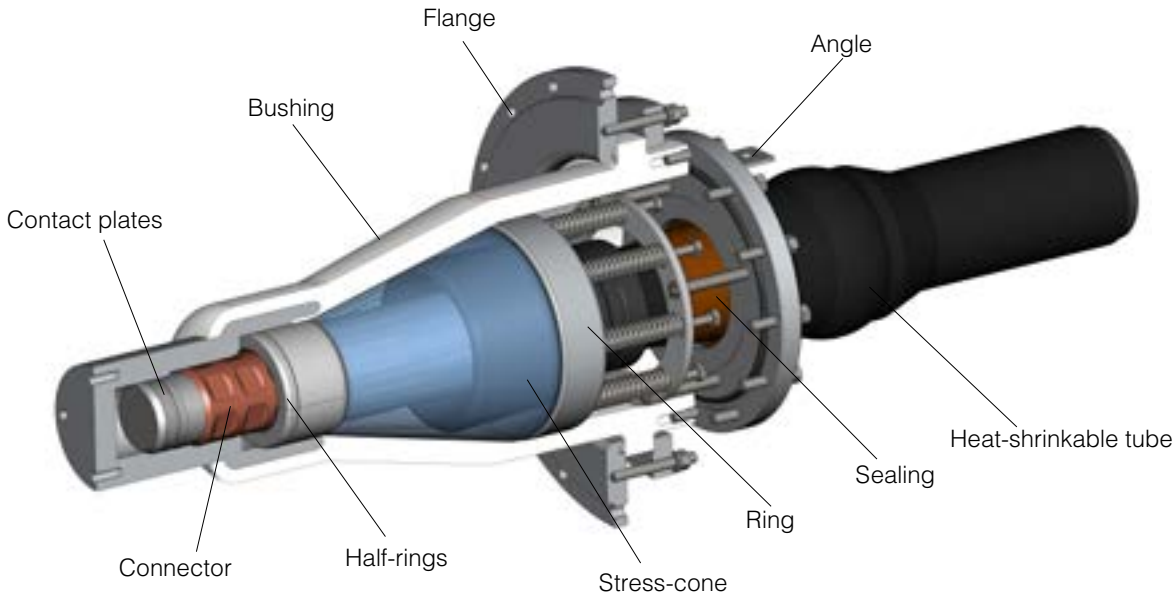


MCB 362 CXP / 420 CXP / 550 CXP



GIS terminations

Arkasil GIS terminations are used for cable lines connection to gas-insulated switchgears and transformers. MBB 123 - 550 kV are used for indoor installation for XLPE cables. GIS terminations could be produced for XLPE cable with optical fibers in screen which are used for temperature monitoring. All types of GIS terminations are made in accordance with IEC 62271-209 and could be used with switchgears for dry type and oil filled GIS terminations. GIS termination consists of epoxy insulator and plug-in part. Due to such design cable can be disconnected from the GIS and connected again without SF6 or oil evacuation. The epoxy insulator can be delivered with GIS (epoxy insulator installed in switchgear by the manufacturer).



Marking of GIS terminations MBB

MBB A 123 - Cu 1000 / 185 E B M O OO H

- MBB - GIS cable termination
- Size of epoxy insulator A/B
- Put in case of separate delivery: P -epoxy insulator set / C - plug-in set
- 123; 145; 170; 245; 362; 420; 550 - Maximum system voltage, kV
- Cu, Al - Conductor material
- 185...3000 - Conductor cross-section, sq mm
- M - Round solid conductor (RE)
- Cu 35...400 - Cu wire screen cross-section, sq mm
  Al 35...400 - Al wire screen cross-section, sq mm
  Pb - Lead sheath with indication of thickness, mm
  CAS - Corrugated aluminum sheath with indication of thickness, mm
  SAS - Smooth Al sheath with indication of thickness, mm
- Unmarked - short adapter (IEC 62271-209 Fig.5)
  E- extension adapter (IEC 62271-209 Fig.3)
  T - adapted for use in transformer cable glands T-470/T-620/T-960 - adapted for use in transformer cable glands of short type.
  -410 - gland with contact length 410 mm
- () - pressed connector (default)
  B - screw connector
  M - welded connection
- O - optical fiber outlet (max 4 modules)
  OO - optical fiber outlet (max 8 modules)
  H - including termination of armour wires

Area of application

Type		MBB 123	MBB 145	MBB 170	MBB 245	MBB 362	MBB 420	MBB 550
Phase to ground voltage U0	kV	64	76	87	127	190	220	290
Rated voltage	kV	110	132	150	220	330	380	500
Maximum system voltage	kV	123	145	170	245	362	420	550
		MBB A 123	MBB A 145	MBB A 170				
Cable conductor cross-section range	mm^2	185÷1600	185÷1600	185÷1600	400÷2500	500÷3000	500÷3000	800÷3000
Maximum cable overheath diameter	mm	124	124	124	124 (opt. 140)	170	170	170
Prepared insulation diameter range	mm	41÷84	41÷84	41÷84	64÷118	74÷140	86÷140	86÷140
		MBB B 123	MBB B 145	MBB B 170				
Cable conductor cross-section range	mm^2	400÷2500	400÷2500	400÷2500	-	-	-	-
Maximum cable overheath diameter	mm	124 (opt. 140)	124 (opt. 140)	124 (opt. 140)	-	-	-	-
Prepared insulation diameter range	mm	55÷103	55÷103	55÷103	-	-	-	-

Technical data

Electrical parameters	MBB 123	MBB 145	MBB 170	MBB 245	MBB 362	MBB 420	MBB 550
AC voltage withstand test	160 kV for 30 min	190 kV for 30 min	218 kV for 30 min	318 kV for 30 min	420 kV for 60 min	440 kV for 60 min	580 kV for 60 min
Partial discharge level	<5 pC at 96 kV	<5 pC at 114 kV	<5 pC at 131 kV	<5 pC at 190 kV	<5 pC at 285 kV	<5 pC at 330 kV	<5 pC at 435 kV
Lightning impulse voltage (10+/10- impulses)	550 kV	650 kV	750 kV	1050 kV	1175 kV	1425 kV	1550 kV
Switching impulse voltage (10+/10- impulses)	-	-	-	-	950 kV	1050 kV	1175 kV

Rated current	Limited by cable specification

Climatic characteristics	MBB 123	MBB 145	MBB 170	MBB 245	MBB 362	MBB 420	MBB 550
Operational temperature	-45/+50°C	-45/+50°C	-45/+50°C	-45/+50°C	-45/+50°C	-45/+50°C	-45/+50°C

Mechanical characteristics		MBB A 123/145/170	MBB B 123/145/170	MBB 245	MBB 362	MBB 420	MBB 550
Length inside/outside GIS	mm	470/730	470/730	620/830	960/840	960/840	960/840
Net weight (appr.)	kg	50	54	96	230	230	230
IEC compliance IEC 62271-209 Fig.5		+	+	+	+	+	+
IEC compliance IEC 60859 Fig.4		+	-	+	+	+	+

Mechanical characteristics		MBB A 123/145/170 E	MBB B 123/145/170 E	MBB 245 E
Length inside/outside GIS	mm	757/730	757/730	960/830
Net weight (appr.)	kg	60	64	112
IEC compliance IEC 62271-209 Fig.3		+	+	+
IEC compliance IEC 60859 Fig.2		+	-	+

Mechanical characteristics		MBB 362 E	MBB 420 E	MBB 550 E
Length inside/outside GIS	mm	1400/840	1400/840	1400/840
Net weight (appr.)	kg	250	250	250
IEC compliance IEC 62271-209 Fig.3		+	+	+
IEC compliance IEC 60859 Fig.2		+	+	+

Transformer terminations

Type		MBB 123 T	MBB 145 T	MBB 170 T	MBB 245 T
Phase to ground voltage U0	kV	64	76	87	127
Rated voltage	kV	110	132	150	220
Maximum system voltage	kV	123	145	170	245
		MBB A 123 T	MBB A 145 T	MBB A 170 T	
Cable conductor cross-section range	mm^2	185÷1600	185÷1600	185÷1600	400÷2500
Maximum cable overheath diameter	mm	124	124	124	124 (opt. 140)
Prepared insulation diameter range	mm	41÷84	41÷84	41÷84	64÷118
		MBB B 123 T	MBB B 145 T	MBB B 170 T	
Cable conductor cross-section range	mm^2	400÷2500	400÷2500	400÷2500	-
Maximum cable overheath diameter	mm	124 (opt. 140)	124 (opt. 140)	124 (opt. 140)	-
Prepared insulation diameter range	mm	55÷103	55÷103	55÷103	-

Electrical parameters	MBB 123 T	MBB 145 T	MBB 170 T	MBB 245 T
AC voltage withstand test	160 kV for 30 min	190 kV for 30 min	218 kV for 30 min	318 kV for 30 min
Partial discharge level	<5 pC at 96 kV	<5 pC at 114 kV	<5 pC at 131 kV	<5 pC at 190 kV
Lightning impulse voltage (10+/10- impulses)	550 kV	650 kV	750 kV	1050 kV
Switching impulse voltage (10+/10- impulses)	-	-	-	-

Rated current	Limited by cable specification

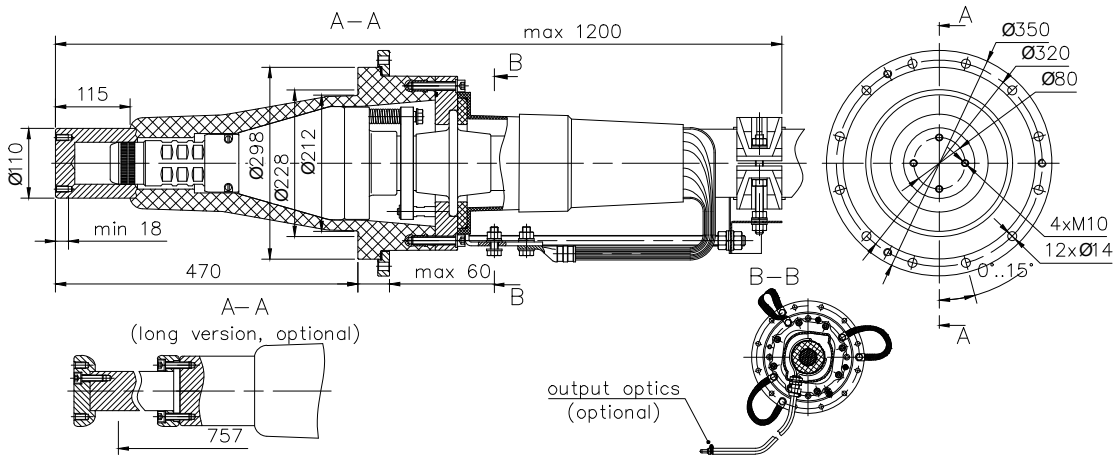
Climatic characteristics	MBB 123	MBB 145	MBB 170	MBB 245
Operational temperature	-45/+50°C	-45/+50°C	-45/+50°C	-45/+50°C

Mechanical characteristics		MBB A 123/145/170 T	MBB B 123/145/170 T	MBB 245 T
Length inside/outside GIS	mm	757/730	757/730	960/830
Net weight (appr.)	kg	55	70	120
Corona screen dimensions (max O.D. x offset)	mm	218x120	218x120	350x160
IEC compliance EN 50299:2002		+	-	+
IEC compliance EN50299-1:2014		+	+	+

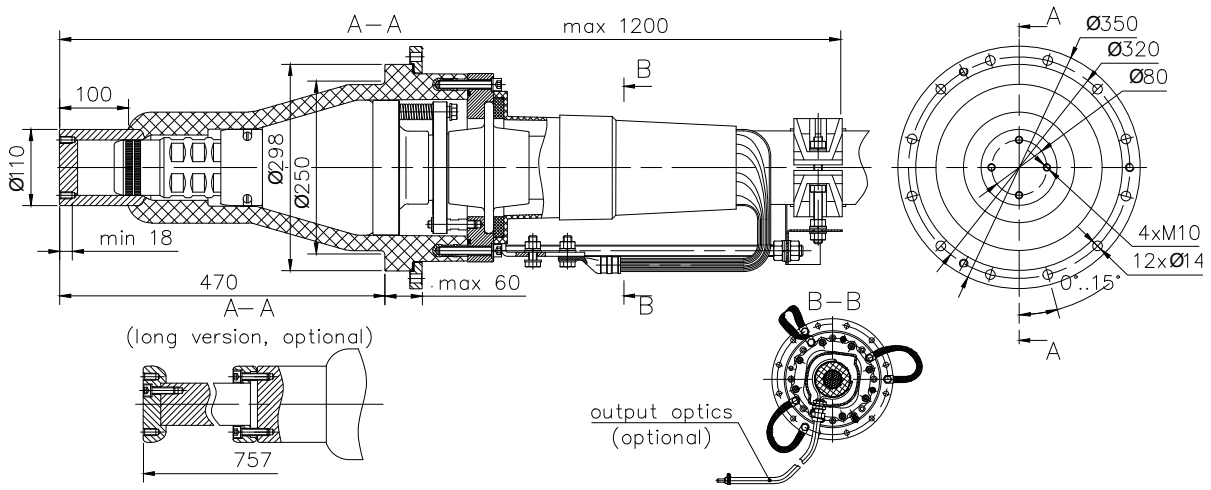
Mechanical characteristics		MBB A 123/145/170 T-470	MBB B 123/145/170 T-470	MBB 245 T-620
Length inside/outside GIS	mm	470/730	470/730	620/830
Net weight (appr.)	kg	65	60	105
Corona screen dimensions (max O.D. x offset)	mm	218x120	218x120	350x160
IEC compliance EN 50299:2002		-	-	-
IEC compliance EN50299-1:2014		+	+	+

Drawings

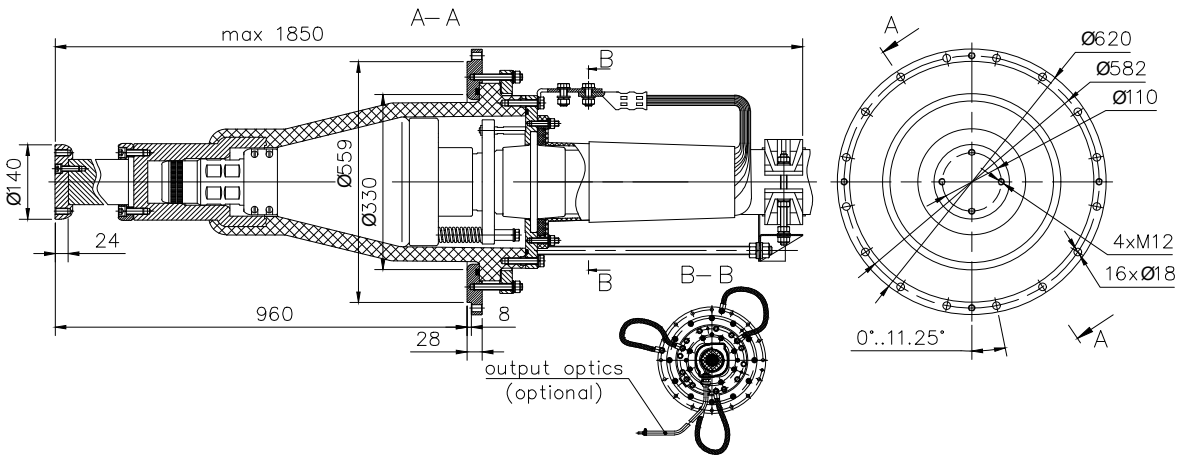
MBB A 123 / 145 / 170 (E)



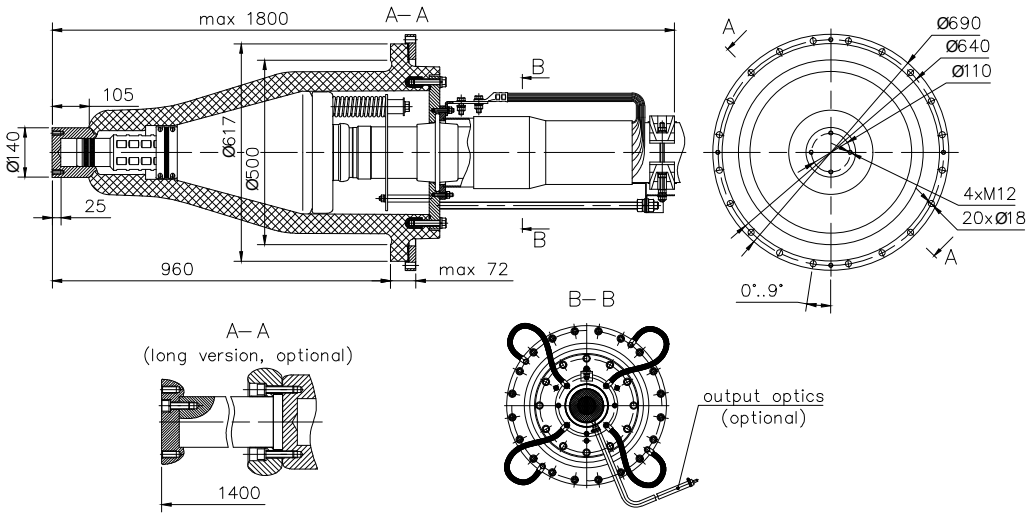
MBB B 123 / 145 / 170 (E)



MBB 245 E



MBB 362 / 420 / 550 (E)



TYPE TESTS OF CABLE SYSTEM 123 kV, 145 kV


CESI

CESI, Italy

- heating cycle voltage test;
- partial discharge test at ambient temperature;
- partial discharge test at high temperature;
- tan Δ measurement;
- lightning impulse voltage test followed by power frequency voltage test;
- examination of the cable system;
- test of outer protection of joint.


KEMA

TYPE TEST CERTIFICATE OF COMPLETE TYPE TEST

KEMA, The Netherlands

Tests were made according to the program of the harmonized European standard HD 632 S2, part 1, analogue of IEC 60840 edition 3 (2004), in the test laboratory of KEMA (Netherlands).

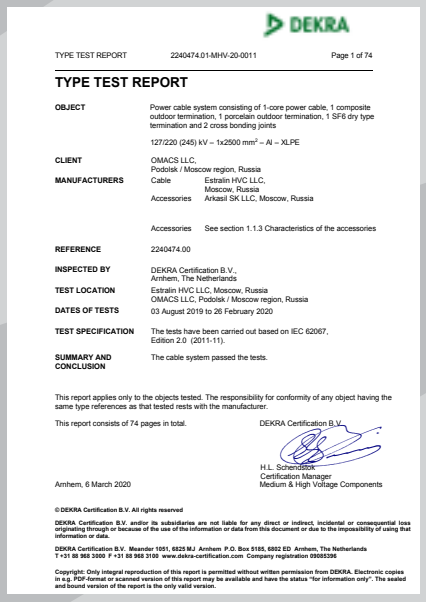

KEMA

INSPECTION REPORT

TIC 3240-13

KEMA, The Netherlands

TYPE TESTS OF CABLE SYSTEM 245 kV



DEKRA

TYPE TEST REPORT 2240474.01-MHV-20-0011 Page 1 of 74

TYPE TEST REPORT

OBJECT	Power cable system consisting of 1-core power cable, 1 composite outdoor termination, 1 porcelain outdoor termination, 1 SF6 dry type termination and 2 cross bonding joints 127/220 (245) kV – 1x2500 mm² – Al – XLPE
CLIENT	OMACS LLC, Podolsk / Moscow region, Russia
MANUFACTURERS	Cable Estralin HVC LLC, Moscow, Russia Accessories Arkasil SK LLC, Moscow, Russia Accessories See section 1.1.3 Characteristics of the accessories
REFERENCE	2240474.00
INSPECTED BY	DEKRA Certification B.V., Arnhem, The Netherlands
TEST LOCATION	Estralin HVC LLC, Moscow, Russia OMACS LLC, Podolsk / Moscow region, Russia
DATES OF TESTS	03 August 2019 to 26 February 2020
TEST SPECIFICATION	The tests have been carried out based on IEC 62067, Edition 2.0 (2011-11).
SUMMARY AND CONCLUSION	The cable system passed the tests.

This report applies only to the objects tested. The responsibility for conformity of any object having the same type references as that tested rests with the manufacturer.

This report consists of 74 pages in total.

DEKRA Certification B.V.

H.L. Schenkhuis
Certification Manager
Medium & High Voltage Components

Arnhem, 6 March 2020

DEKRA,
The Netherlands

PREQUALIFICATION TESTS OF CABLE SYSTEM 245 kV

DEKRA,
The Netherlands

TEST CERTIFICATE

OF COMPLETE PREQUALIFICATION TEST

OBJECT	Power cable system consisting of 1-core power cable, 2 terminations, 2 SF6 dry type terminations and 1 cross bonding joint
TYPE	Cable: ЭСТРАГИН ЗВК ПвПу2г 1x2500СГЖ/200-127/220КВ ОП-158 2015г Outdoor termination type MKB 252 GIS termination type MBB 252 Cross bonding joint type MCB 252 X

Rated voltage, U_0/U (U_m)	127/220 (245) kV	Conductor material	Cu
Conductor cross-section	1x2500 mm²	Insulation material	XLPE

MANUFACTURERS	Cable: Estralin HVC LLC, Moscow, Russia Accessories: Arkasil SK LLC, Moscow, Russia
CLIENT	Arkasil SK LLC Moscow, Russia
TESTED BY	DEKRA Certification B.V. Arnhem, the Netherlands
DATE OF TESTS	30 March 2016 to 20 July 2017

The object(s), constructed in accordance with the description, drawings and photographs incorporated in this Certificate, have been subjected to the series of proving tests in accordance with

IEC 62067 Edition 2.0 2011-11

This Test Certificate, with Certificate no. 2192315.100, has been issued by DEKRA Certification B.V. and is granted based on the results as laid down in Prequalification Test Report no. 2192315.01 17-0051-MVHV, dated 2 November 2017.

This Certificate applies only to the object(s) tested. The responsibility for conformity of any object having the same designations with the object(s) tested rests with the manufacturer.

This Certificate consists of 1 page in total.

DEKRA Certification B.V.

Frank Thon
Certification Manager
Medium & High Voltage Components

Arnhem, 2 November 2017

HEAT-SHRINKABLE COMPONENTS

Heat shrinkable cable end caps

Heat Shrinkable cable End Caps are used to seal the ends of all types of cables to protect cables from penetration of water/moisture. The caps are manufactured from high quality cross linked polyolefin material. Compatible with most commonly used Cable Jackets i.e. XLPE, PVC, PILC or Rubber Sheathed Cable. Hot Melt adhesive lining provides seal from irregular cable sheaths. Excellent resistance to weathering, moisture, contamination and adverse environmental conditions.

Area of application

- valved end caps available for pressurized application for telecom cables;
- special relief valved end caps available for degassing application in High Voltage Power cables;
- high voltage (non tracking) end caps available for sealing live parts;
- conductive end caps.

Technical specification

Type		Standard
Physical		
Tensile Strength	12 H/mm^2 (Mpa)	ASTM D638
Ultimate Elongation	350%	ASTM D638
Density	1,05 ± 0,2 g/cm^3	ASTM D792
Hardness	45 ± 10 Shore D	ASTM D2240
Water Absorption	0,2 % (max)	ASTM D570

Type		Standard
Low Temperature Flexibility		
(-40°C for 4 hrs.)	No Cracking	ASTM D2671
Heat Shock (250°C for 30 min.)	No cracking or flowing	ESI 09-11
Shrink Temperature	125°C	IEC 216
Temperature range	-40°C to +110°C	IEC 216

Thermal		
Accelerated Ageing	(120°C for 500 h)	ASTM D2671
Tensile Strength	11 H/mm^2 (Mpa)	ASTM D638
Ultimate Elongation	300 %	ASTM D638

Electrical		
Dielectric Strength	12 кВ/mm	ASTM D149
Volume Resistivity	1·10^{14} Ohm·cm	ASTM D257
Dielectric Constant (E)	5 (max)	ASTM D150

Code	D min (mm)	D max (mm)	T±10 (mm)	Length (min)	Cable diameter
ASEC 001S	6	2.0	2.0	25	2-4
ASEC 001	12	4.0	2.3	38	4-8
ASEC 001L	12	4.0	2.3	58	4-8
ASEC 001A	14	4.0	2.3	58	4-11
ASEC 101	20	7.5	2.3	55	8-16
ASEC 101 L	20	7.5	2.5	75	8-16
ASEC 101 A*	25	8.0	2.3	75	8-20
ASEC 102	30	11	2.5	75	12-26
ASEC 102 A	35	11	2.5	75	12-30
ASEC 201*	40	15	3.3	90	16-35
ASEC 201 L	40	15	3.3	120	16-35
ASEC 201 AL	45	15	3.3	120	16-40
ASEC 301*	55	25	3.8	122	25-47
ASEC 301 L	55	25	3.8	170	25-47
ASEC 301 AL	63	25	3.8	170	25-55
ASEC 401*	75	35	3.8	140	35-68
ASEC 401 L	75	35	4.0	180	35-68
ASEC 501 S	85	45	4.0	160	45-80
ASEC 501*	100	45	4.0	160	45-90
ASEC 501 L	100	45	4.0	200	45-90
ASEC 501 AL*	120	45	4.0	200	45-110
ASEC 601*	130	60	4.6	160	64-120
ASEC 701*	154	60	4.6	165	70-145
ASEC 801	230	120	5.5	220	140-200
ASEC 901	310	120	5.5	220	140-280
ASEC 1001	400	200	6.0	220	230-380

* Widely applied

HEAT-SHRINKABLE TUBES

Heat-shrinkable tubes ASMW and ASHW are medium wall and heavy wall black tubes. ASMW tubes are used for protection of cable termination and insulating the connectors for straight through joints/splice. ASHW tubes are used for mechanical protection and outer sealing of underground straight through cable joints/splices.

Technical specification

- these tubes are manufactured from high quality cross linked polyolefin material;
- optional hot melt adhesive lining for complete environmental protection and insulation;
- excellent resistance to weathering, UV rays, chemical and solvents;
- maximum cut length available up to 1500 mm;
- custom dimensions, thickness, length & colors available on request;
- conform to IEC standard.

Heat-shrinkable tubes	45/13 (250 mm)
Heat-shrinkable tubes	52/13 (1000 mm)
Heat-shrinkable tubes	130/35 (1000 mm)
Heat-shrinkable tubes	160/50 (900 mm)
Heat-shrinkable tubes	180/50 (1000 mm)
Heat-shrinkable tubes	200/55 (1300 mm)
Heat-shrinkable tubes	227/77 (1300 mm)
Heat-shrinkable tubes	300/90 (1200 mm)
Heat-shrinkable tubes	350/110 (1500 mm)

Type		Standard
Physical		
Tensile Strength	12 H/mm^2 (Mpa)	ASTM D638
Ultimate Elongation	350%	ASTM D638
Longitudinal Change	-10% (max)	ASTM D2671
Density	1,15 ± 0,2 g/cm^3	ASTM D792
Hardness	45 ± 10 Shore D	ASTM D2240
Water Absorption	0,5 % (max)	ASTM D570
Thermal		
Accelerated Ageing	(120°C for 500 h)	ASTM D2671
Tensile Strength	11 H/mm^2 (Mpa)	ASTM D 638
Ultimate Elongation	300 %	ASTM D 638
Low temperature Flexibility (-40°C for 4 h.)	No Cracking	ASTM D2671
Heat Shock (250°C for 30 min.)	No Cracking or flowing	ESI 09-11
Shrink Temperature	125°C	IEC 216
Temperature range	-55°C to + 105°C	IEC 216
Electrical		
Dielectric Strength	12 кВ/mm	ASTM D 149
Volume Resistivity	1·10^{14} Ohm·cm	ASTM D257
Dielectric Constant (E)	5 (max)	ASTM D150

HEAT-SHRINKABLE SLEEVES

Heat-shrinkable sleeves are polyolefin tubes with metal zipper that can be mounted on installed cable without cutting.

Technical specification

- hot melt adhesive provides complete sealing and insulation;
- high resistance to UV rays, chemicals, corrosion, fungus, etc.;
- temperature sensitive paint changes color when heat shrinking process is completed;
- maximum length available up to 1500 mm.

Heat-shrinkable sleeve	198/55 (2200 mm)
Heat-shrinkable sleeve	198/55 (2450 mm)

Type		Standard
Physical characteristics		
Tensile Strength	17 H/mm^2 (Mpa)	ASTM D638
Ultimate Elongation	300%	ASTM D638
Longitudinal Change	-10% (max)	ASTM D2671
Water Absorption	0,2 % (max)	ASTM D570

For the protection of Cable joint

For Cable Repairs

For corrosion protection of Oil, Water & Gas pipeline

Thermal characteristics		
Accelerated Ageing	(120°C for 500 h)	ASTM D2671
Tensile Strength	15 H/mm^2 (Mpa)	ASTM D 638
Ultimate Elongation	220 % (min.)	ASTM D 638

Thermomarker color change		
150°C for 30 min.	No change	Visual
250°C for 5 min.	Color change	Visual

Electrical		
Dielectric Strength	12 кВ/mm (min.)	ASTM D149

CABLE CLAMPS FOR HIGH-VOLTAGE CABLES

BKK3 and BKK cable clamps provide reliable fixing of high voltage cables.

Cable clamp BKK3

Cable clamp BKK

CABLE CLAMPS FOR MEDIUM VOLTAGE CABLES

YKK3 and YKK-60 universal cable clamps as well as PKK cable clamps are designed for fixing of all types of medium voltage cables.

Cable clamp RKK

Cable clamp YKK3

Cable clamps YKK-60 and YKK2-60

SILICONE GASKET HEAT RESISTANT PST-80

Gasket PST-80 is used for fastening the cable on the vertical sections. Gaskets are made of organosilicone rubber (silicone).

EARTHING AND CROSS-BONDING BOXES

Earthing and cross-bonding boxes are used for cross-connection of six single - core wires and for grounding of 60-500 kV cable screens.

Earthing box

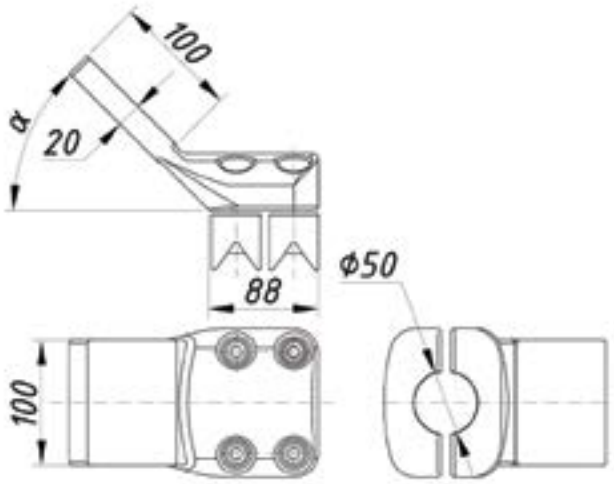
Cross-bonding box

JOINT SUPPORTING STRUCTURE

Joint supporting structure is designed for installation of joints and consists of angle iron with supporting stand for installation of joints.

AERIAL LUGS

For connection of termination to overhead conductor it is necessary to use aerial lugs. Arkasil SK delivers aluminum, bronze and bimetallic aerial lugs.



TERMINATIONS SPLICE BOXES

It is used for connection of fiber-optical modules embded in cable screen.

Splice box is the metal box, safety class IP66, with 4 inputs for optical fiber modules, 2,5 - 5,5 mm^2 in diameter. It protects the connection and is applied to store the fiber stock necessary for repair works.

JOINTS SPLICE BOXES

It is applied for connection of fiber-optical modules embed in cable screen. A joint splice box is the rubber base with slots and channels for the optical fibers, it provides connection of the modules, protects the connection. It is fixed during the joint installation. The complete set includes all necessary accessories for the optical modules connection and protection.

TOOLS FOR CABLE ACCESSORIES INSTALLATION

Installation Tool Kits 1010

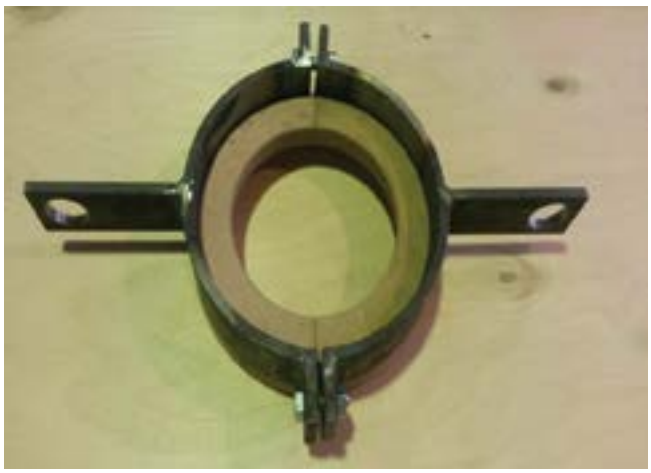
Set of installation tools.

HV cable cutting and stripping tool MAS 130

MAS 130 is multi-purpose tool for cutting and stripping insulation and semiconductive layer of the cable with XLPE insulation. The range of diameters is 18-130 mm.

1000 kg Belt Winch

For pulling the silicone insulator on the cable.



Cable heating kit 1080 kit

This instrument is used for cable heating.

Winch-to-cable fixing device

The device is fixed on the cable, and has terminals for fixing the winches.

SUPERVISION SERVICE

INSTALLATION AND SUPERVISION SERVICE

- general technical control;
- quality control of installation done by jointers, certified by Arkasil;
- preparation of the documents related to installed accessories;
- advising for installation.

INSTALLATION SERVICE

- installation of Arkasil cable accessories by the specialists certified by Arkasil;
- guarantee on the installed Arkasil cable accessories;
- Arkasil cable accessories related consultations.

TRAINING FOR INSTALLATION

Training takes place at the training center of Arkasil. It can also be provided on customer site.

INSTALLATION TRAINING

THE TRAINING SHALL INCLUDE

- theoretical training;
- practical training;
- tests;
- sample preparation for certification;
- granting of certificates.

ARKASIL

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Version 2024