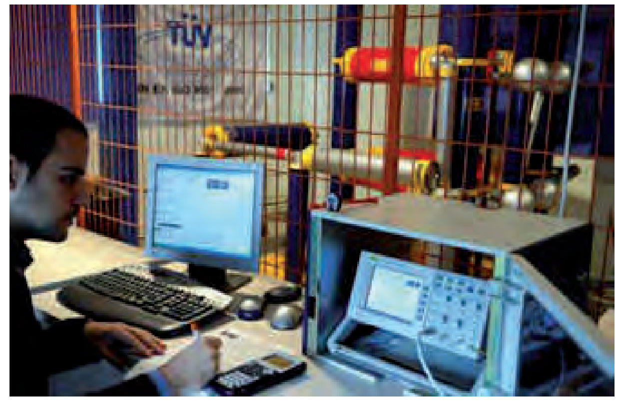
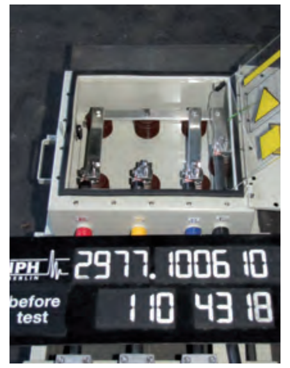
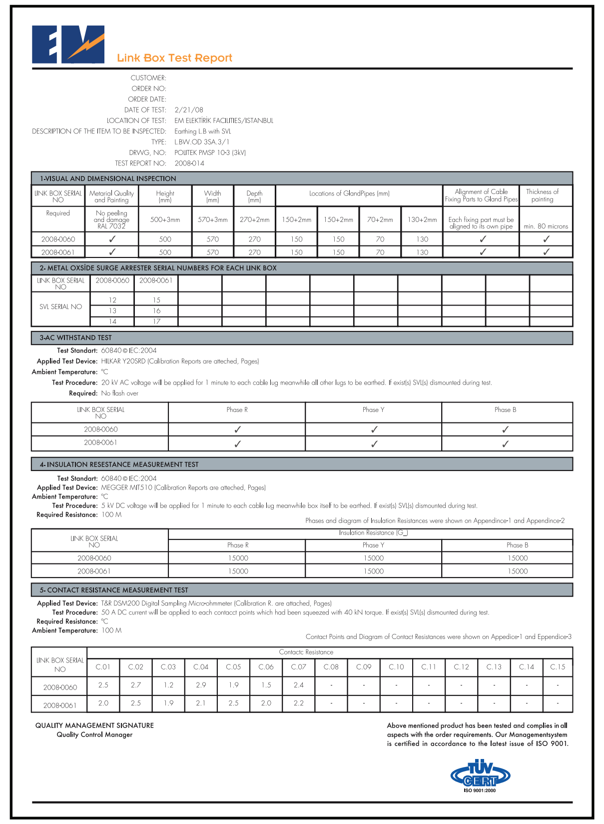
Routine Test

All our of Link Boxes are tested in our factory before delivered to our customers. Applied tests involve visual and dimensional inspection followed by electrical tests such as, AC Withstand Test, Insulation Resistance Measurement Test, Contact Resistance Measurement Test.

Beside these test, for underground types (IP 68) water sealing test is also applied. Each Link Box tested with water and subject to 0.3 bar pressure for 15 minutes.






Link Box Test Report


CERTIFICATE

TIC

for the management system according to ISO 9001:2008

The proof of the conforming application with the regulation was furnished and in accordance with certification procedure it is certified for the company

EM ELEKTRİK MALZEMELERİ YÜKLENİM SAN.VE TİC. LTD. ŞTİ.
Eski Ankara Asfaltı İstanbul Tuzla Org. San. Böl. 4.Cad. No:25 34959 Tepeören
Tuzla – İstanbul / Turkey

Scope

Design, production, sales, engineering and installation services of high voltage cable systems and supply of cable accessories and special tools

Certificate Registration No. TIC 15 100 42444 — Valid until 2013-11-30

Audit Report No. 3330 252Q G0 — Initial certification 2004

This certification was conducted in accordance with the TIC auditing and certification procedures and is subject to regular surveillance audits.

TÜV Thüringen e.V. Certification body for systems and personnel

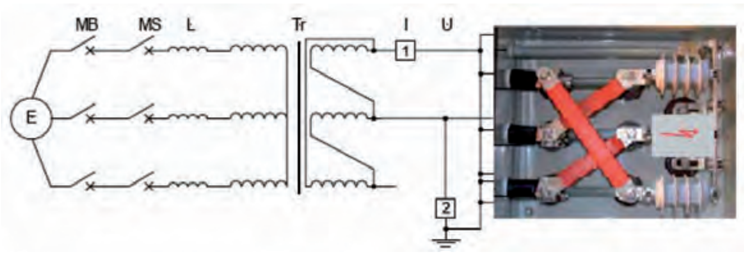
Jena, 2010-12-08

Type Test

- **All our products were tested at IPH - Berlin Laboratories**

Test Product: Cross Bounding Link Box underground use (IP 68).

Required Test Parameter: Internal Power Arcing 40 kA-0,1 sec.



E	Supply	I	Current measurement
MB	Master breaker	U	Voltage measurement
MS	Making switch	1-2	Measurement points
L	Current-limiting reactor	TO	Test object
Tr	Short-circuit transformer		

- **Water Immersion Test-IP 68**

Test Product: Cross Bounding Link Box for earthing through arrestors.

Test Procesure: The box assembly shall be immersed in water at 25°C and heated up to 60°C for 8 hours. After switching of the heater, water cooled down to the ambient temreraure. Total time of water immersion cycle is 24 hours. The water coloum shall be 2m. above the link box. After removal, there shall be no visible water ingress in the link box.


Test object in the dust test chamber after the dust test - no dust penetrated.


Test object during the water jet test - no water recognized inside cover and housing.


IPH BERLIN

Independent, accredited testing station · Member laboratory of STL and LOVAG

TEST REPORT

NO. 2977.2100555.0295

EM Electrical Materials Contracting Co. Tavukcuyolu, Türker Cad. No. 08 Y. Dudullu-Umraniye 34776 Istanbul TURKEY	CLIENT
EM Electrical Materials Contracting Co.	MANUFACTURER
Cross bonding link box	TEST OBJECT
LBU.CB.3SA.3.1	TYPE
Test sample	SERIAL NO.
Rated DC withstand voltage 25 kV Rated lightning impulse withstand voltage 40 (60) kV Rated short-time withstand current 50 kA Rated duration of short-circuit 1 s Permissible values for internal arcing Symmetrical short-circuit current 40 kA Duration of short-circuit 0.1 s IP code IPX8	RATED CHARACTERISTICS GIVEN BY THE CLIENT
Clients instructions	NORMATIVE DOCUMENT
• Dielectric tests • Leakage current test • IPX8 code test • Short-time withstand current tests • Test under conditions of arcing due to an internal fault • Measurement of contact resistance • Measurement of residual voltage	RANGE OF TESTS PERFORMED
1 June to 2 July 2010	DATE OF TEST
See Clause 11	TEST RESULT

H. GLABSCH, Senior engineer — M. THOM, Test engineer in charge

Berlin, 21 July 2010

DAT - P - 019/92


IPH BERLIN

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TEST REPORT

NO. 2977.2090932.0636

EM Electrical Materials Contracting Co. Tavukcuyolu, Türker Cad.No.08 Y.Dudullu-Umraniye 34776 Istanbul TURKEY	CLIENT
EM Electrical Materials Contracting Co.	MANUFACTURER
Earthing bonding link box	TEST OBJECT
LB.WiD.3E.3.1	TYPE
2009/1301 and 2009/1302	SERIAL NO.
Rated DC withstand voltage 25 kV Rated power-frequency withstand voltage U 20 kV Rated lightning impulse withstand voltage U 40 (60) kV Rated short-time withstand current I 40 kV Rated duration of short-circuit t 1 s Permissible values for internal arcing Symmetrical short-circuit current 20 kA Duration of short-circuit 0.1 s	RATED CHARACTERISTICS GIVEN BY THE CLIENT
Client's instructions	NORMATIVE DOCUMENT
• Dielectric tests • Short-time withstand current test • Test under conditions of arcing due to an internal fault • IP66 code test	RANGE OF TESTS PERFORMED
06 August to 25 September 2009	DATE OF TEST
See Sub-clause 8	TEST RESULT

H. GLABSCH, Senior engineer — M. THOM, Test engineer in charge

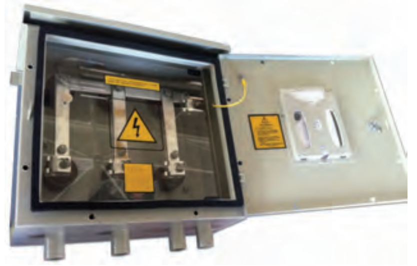
Berlin, 15 October 2009

DAT - P - 019/92

Link Box desing classification

1- Type of Mounting

Indoor/outdoor wall mounted (IP 66)

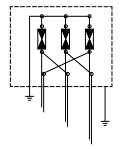


Outdoor, pedestal mounted (IP 66)

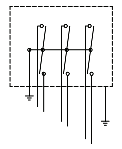
Underground mounted (IP 68)

2- Type of Screen Bonding

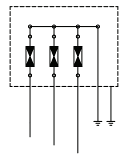
Cross bonding with SVL



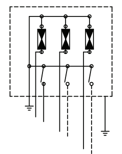
Direct earthing without SVL



Earthing with SVL

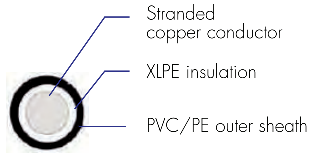


Single Point Bonding with SVL

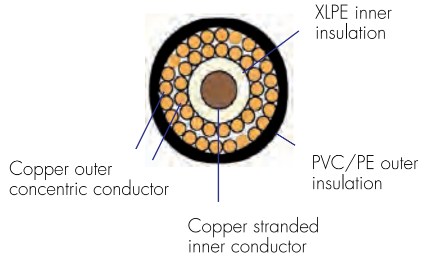


3- Types of Bonding Cable

Single core



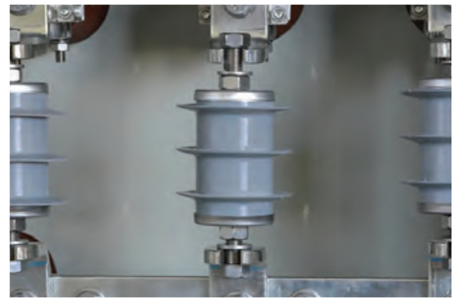
Coaxial (concentric)



Surge arrestors: Sheath voltage limiters (SVL)

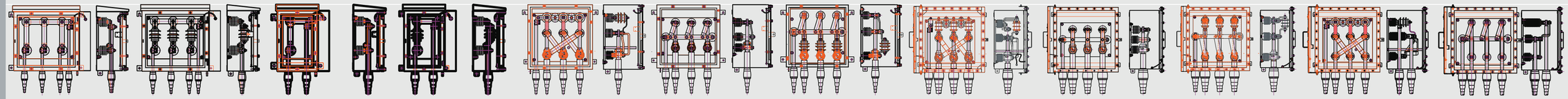
SVL is protective device to limit induce voltages appearing on the bonded cable system due to short circuit. It is necessary to fit SVL's between the metallic screen and ground inside the link box. The screen seperation of power cable joint (insulated joint) will be protected against possible damages as a result of induced voltages coused by short circuit/break down.

SVL rated voltages are per client specification/bonding system design, which can be supplied from well established manufacturers by EM Elektrik.



P: 1300 780 831 **E:** info@cablegrid.com.au **W:** www.cablegrid.com.au

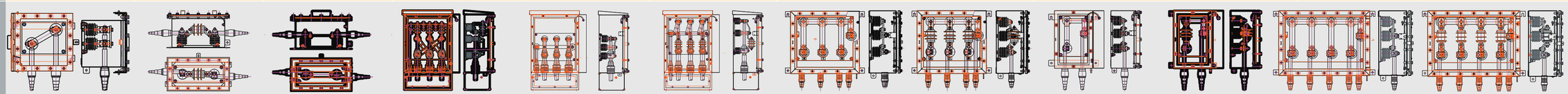
	MOUNTING SYSTEM	WALL / GANTRY / STRUCTURE TYPE (IP 66)							UNDERGROUND TYPE (IP 68)				
1	Bonding	"Earthing Bonding Link Box for Single Cable"	"Earthing Bonding Link Box with SVL for Single Cable"	"Earthing Link Box for Single Cable"	"Earthing Link Box With SVL for Single Cable"	"Cross Bonding Link Box for Coaxial Cable"	"Earthing for Coaxial Cable"	"Single Point Bonding Link box for Coaxiel Cable"	"Cross Bonding for Coaxial Cable"	"Earthing Bonding for Coaxiel Cable"	"Single Point Bonding for Coaxiel Cable"	"Cross Bonding for Single Cable"	"Earthing Bonding for Single Cable"
2	Type	LB.W.OD.E.3.1/LB.W.ID.E.3.1	LB.W.OD.3SA.3.1 / LB.W.ID.3SA.3.1	LB.W.OD.E.1.1 / LB.W.ID.E.1.1	LB.W.OD.1SA.1.1 / LB.W.ID.1SA.1.1	LB.AG.CB.3SA.3.1	LB.AG.E.3.1	LB.AG.SB.3SA.3.1	LB.U.CB.3SA.3.1	LB.U.E.3.1	LB.U.SB.3SA.3.1	LB.U.CB.3SA.6.1	LB.U.E.6.1
3	Drawing no.	04.08.02REVC / 04.09.02.REV.C	04.08.03REVC / 04.09.03.REV.C	04.08.05REVC	04.08.04REVD	05.04.08REVC	05.04.09REVB	05.05.05REVB	04.09.06REVD	04.09.07REVC	04.07.04REVA	08.01.06REVB	08.01.07REVA
4	Protection class	IP 66	IP 66	IP 66	IP 66	IP 66	IP 66	IP 66	IP 68	IP 68	IP 68	IP 68	IP 68
5	Use at	Outdoor (Indoor type is without rain shed)	Outdoor (Indoor type is without rain shed)	Outdoor (Indoor type is without rain shed)	Outdoor (Indoor type is without rain shed)	Indoor (Outdoor type is with rain shed)	Indoor (Outdoor type is with rain shed)	Indoor (Outdoor type is with rain shed)	Underground	Underground	Underground	Underground	Underground
6	Size of enclosure	"H - 500 mm W- 570 mm D -270 mm Thickness-2 mm"	"H - 500 mm W- 570 mm D -270 mm Thickness-2 mm"	"H - 550 mm W- 350 mm D -270 mm Thickness-2 mm"	"H - 550 mm W- 350 mm D -270 mm Thickness-2 mm"	"H- 590 mm W- 590 mm D- 368 mm Thickness-2 mm"	"H- 590 mm W- 590 mm D- 368 mm Thickness-2 mm"	"H- 590 mm W- 590 mm D- 368 mm Thickness-2 mm"	"H - 670 mm W- 670 mm D - 334 mm Thickness-2 mm cover 3 mm"	"H- 670 mm W- 670 mm D - 334 mm Thickness-2 mm cover 3 mm"	"H - 670 mm W- 670 mm D - 334 mm Thickness-2 mm cover 3 mm"	"H - 670 mm W- 670 mm D - 389 mm Thickness-2 mm cover 3 mm"	"H - 670 mm W- 670 mm D - 389 mm Thickness-2 mm cover 3 mm"
	Material of enclosure	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
8	Finish of enclosure	RAL 7032	RAL 7032	RAL 7032	RAL 7032	RAL 7032	RAL 7032	RAL 7032	RAL 7032	RAL 7032	RAL 7032	RAL 7032	RAL 7032
9	Total weight (gross)	42 KG	43 KG	27 KG	27 KG	50 KG	50 KG	50 KG	67 KG	70 KG	77 KG	55 KG	55 KG
10	Bonding cable size	1x95-1x400 mm²	1x95-1x400 mm²	1x95-1x400 mm²	1x95-1x400 mm²	1x95+95-1x400+400 mm2	1x95+95-1x400+400 mm2	1x95+95-1x400+400 mm2	1x95+95-1x400+400 mm²	1x95+95-1x400+400 mm²	1x95+95-1x400+400 mm²	1x95-1x400 mm²	1x95-1x400 mm²
11	Connecting material link	Tinned Copper	Tinned Copper	Tinned Copper	Tinned Copper	Tinned Copper	Tinned Copper	Tinned Copper	Tinned Copper	Tinned Copper	Tinned Copper	Tinned Copper	Tinned Copper
12	Conductor fixing	Cable Flexcon	Cable Flexcon	Cable Flexcon	Cable Flexcon	Screwed clamping	Screwed clamping	Screwed clamping	Screwed clamping	Screwed clamping	Screwed clamping	Cable End Fixing Clamp	Cable End Fixing Clamp
13	Sheath voltage limiter	N/A	"Optional 1.8-7.2 kV "	N/A	"Optional 1.8-7.2 kV "	"Optional 1.8-7.2 kV"	N/A	"Optional 1.8-7.2 kV "	"Optional 1.8-7.2 kV "	N/A	"Optional 1.8-7.2 kV "	"Optional 1.8-7.2 kV "	N/A
14	AC/DC with stand test	20 kV AC,1 min./25 kV DC, 5 min.	20 kV AC , 1 min. / 25 kV DC, 5 min.	20 kV AC,1 min. / 25 kV DC , 5 min.	20 kV AC, 1 min./25 kV DC, 5 min.	20 kV AC, 1 min./25 kV DC, 5 min.	20 kV AC, 1 min./25 kV DC, 5 min.	20 kV AC,1 min./25 kV DC, 5 min.	20 kV AC,1 min./25 kV DC, 5 min.	20 kV AC,1 min./25 kV DC,5 min.	20 kV AC,1 min./25 kV DC,5 min.	20 kV AC,1 min./25 kV DC, 5 min.	20 kV AC,1 min./25 kV DC, 5 min.
15	AC impulse test	40 kV between PHASE TO EARTH"	"75 kV between PHASE TO PHASE 40 kV between PHASE TO EARTH"	40 kV between PHASE TO EARTH	"75 kV between PHASE TO PHASE 40 kV between PHASE TO EARTH"	"75 kV between PHASE TO PHASE 40 kV between PHASE TO EARTH"	40 kV between PHASE TO EARTH	"75 kV between PHASE TO PHASE 40 kV between PHASE TO EARTH"	"75 kV between PHASE TO PHASE 40 kV between PHASE TO EARTH"	"75 kV between PHASE TO PHASE 40 kV between PHASE TO EARTH"	"75kV between PHASE TO PHASE 40 kV between PHASE TO EARTH"	"75 kV between PHASE TO PHASE 40 kV between PHASE TO EARTH"	40 kV between PHASE TO EARTH
16	Short circuit test	50 kA-1 Sec Symmetrical	N/A	50 kA-1 Sec Symmetrical	N/A	50 kA-1 Sec Symmetrical	50 kA-1 Sec Symmetrical	50 kA-1 Sec Symmetrical	50 kA-1 Sec Symmetrical	50 kA-1 Sec Symmetrical	50 kA-1 Sec Symmetrical	50 kA-1 Sec Symmetrical	50 kA-1 Sec Symmetrical
17	Internal Power Arching	20 kA - 0.1 sec	20 kA - 0.1 sec	20 kA - 0.1 sec	20 kA - 0.1 sec	20 kA - 0.1 sec	20 kA - 0.1 sec	20 kA - 0.1 sec	40 kA-0.1 sec	40 kA-0.1 sec	40 kA-0.1 sec	40 kA - 0.1 sec	40 kA - 0.1 sec



KEY WORD TABLE

LB	Link Box
W	Wall
E	Earthing
U	Underground
P	Pedestal
OD	Outdoor
ID	Indoor
AG	Aboveground
SB	Single Bonding
SA	Surge Arrester

	MOUNTING SYSTEM	UNDERGROUND TYPE (IP 68)			PEDESTAL (IP 66)			WALL / UNDERGROUND TYPE (IP68)					
1	Bonding	"Earthing Bonding for Single Cable"	"Earthing with SVL for Single Cable"	"Earthing With SVL for Single Cable"	"Cross Bonding for Coaxial Cable"	"Earthing Bonding for Coaxial Cable"	"Single Point Bonding for Coaxiel Cable"	"Earthing Bonding for Single Cable"	"Earthing Bonding with SVL for Single Cable"	"Earthing Bonding for Single Cable"	"Earthing Bonding with SVL for Single Cable"	"Earthing Bonding for Single Cable"	"Earthing Bonding with SVL for Single Cable"
2	Type	LB.U.E.1.1	LB.U.1SA.1.1	LB.U.E1.1	LB.P.CB.3SA.3.1	LB.P.E.3.1	LB.P.SB.3SA.3.1	LB.W.E.3.1	LB.W.3SA.3.1	LB.W.E.1.1	LB.W.1SA.1.1	LB.W.E.4.1	LB.W.4SA.4.1
3	Drawing no.	04.10.11REVA	09.12.11	09.12.10	04.08.06REVC	04.09.01REVB	08.04.11REVB	10.04.05	10.04.06	04.08.12REVA	04.08.11REVA	10.04.08	10.04.07
4	Protection class	IP 68	IP 68	IP 68	IP 66	IP 66	IP 66	IP 68	IP 68	IP 68	IP 68	IP 68	IP 68
5	Use at	Underground	Underground	Underground	Pedestal	Pedestal	Pedestal	Outdoor / Underground	Outdoor / Underground	Outdoor / Underground	Outdoor / Underground	Outdoor / Underground	Outdoor / Underground
6	Size of enclosure	"H - 380 mm W- 380 mm D - 290 mm Thickness-box 2 mm cover 3 mm"	"H - 275 mm W- 505 mm D - 264 mm Thickness-box 2 mm cover 3 mm"	"H - 275 mm W- 505 mm D - 264 mm Thickness-box 2 mm cover 3 mm"	"H - 810 mm W - 630 mm D - 370 mm Thickness-2 mm"	"H - 810 mm W - 630 mm D - 370 mm Thickness-2 mm"	"H - 810 mm W - 630 mm D - 370 mm Thickness-2 mm"	"H - 500 mm W - 550 mm D - 250 mm Thickness-3 mm"	"H - 500 mm W - 550 mm D - 250 mm Thickness-3 mm"	"H - 500 mm W - 330 mm D - 250 mm Thickness-3 mm"	"H - 500 mm W - 330 mm D - 250 mm Thickness-3 mm"	"H - 500 mm W - 700 mm D - 250 mm Thickness-3 mm"	"H - 500 mm W - 700 mm D - 250 mm Thickness-3 mm"
	Material of enclosure	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
8	Finish of enclosure	RAL 7032	RAL 7032	RAL 7032	RAL 7032	RAL 7032	RAL 7032	RAL 7032	RAL 7032	RAL 7032	RAL 7032	RAL 7032	RAL 7032
9	Total weight (gross)	25 KG	23 KG	23 KG	65 KG	65 KG	65 KG	50 KG	50 KG	34 KG	34 KG	64 KG	66 KG
10	Bonding cable size	1x95-1x400 mm²	1x95-1x400 mm²	1x95-1x400 mm²	1x95+95-1x400+400 mm²	1x95+95-1x400+400 mm²	1x95+95-1x400+400 mm²	1x95-1x400 mm²	1x95-1x400 mm²	1x95-1x400 mm²	1x95-1x400 mm²	1x95-1x400 mm²	1x95-1x400 mm²
11	Connecting material link	Tinned Copper	Tinned Copper	Tinned Copper	Tinned Copper	Tinned Copper	Tinned Copper	Tinned Copper	Tinned Copper	Tinned Copper	Tinned Copper	Tinned Copper	Tinned Copper
12	Conductor fixing	Cable End Fixing Clamp	Cable End Fixing Clamp	Cable End Fixing Clamp	Screwed clamping	Screwed clamping	Screwed clamping	Cable Flexcon	Cable Flexcon	Cable Flexcon	Cable Flexcon	Cable Flexcon	Cable Flexcon
13	Sheath voltage limiter	N/A	"Optional 1.8-7.2 kV "	N/A	"Optional 1.8-7.2 kV "	N/A		N/A	"Optional 1.8-7.2 kV "	N/A	"Optional 1.8-7.2 kV "	N/A	"Optional 1.8-7.2 kV "
14	AC/DC with stand test	20 kV AC,1 min./25 kV DC, 5 min.	20 kV AC, 1 min./25 kV DC, 5 min.	20 kV AC,1 min./25 kV DC, 5 min.	20 kV AC,1 min./25 kV DC,5 min.	20 kV AC, 1 min./25 kV DC,5 min.	20 kV AC, 1 min. /25 kV DC,5 min.	20 kV AC,1 min./25 kV DC, 5 min.	20 kV AC,1 min./25 kV DC, 5 min.	20 kV AC , 1 min./ 25 kV DC, 5 min.	20 kV AC, 1 min./ 25 kV DC, 5 min.	20 kV AC, 1 min./ 25 kV DC, 5 min.	20 kV AC, 1 min./ 25 kV DC, 5 min.
15	AC impulse test	40 kV between PHASE TO EARTH	"75 kV between PHASE TO PHASE 40 kV between PHASE TO EARTH"	40 kV between PHASE TO EARTH	"75 kV between PHASE TO PHASE 40 kV between PHASE TO EARTH"	40 kV between PHASE TO EARTH	"75 kV between PHASE TO PHASE 40 kV between PHASE TO EARTH"	40 kV between PHASE TO EARTH	"75 kV between PHASE TO PHASE 40 kV between PHASE TO EARTH"	40 kV between PHASE TO EARTH	40 kV between PHASE TO EARTH	40 kV between PHASE TO EARTH	"75 kV between PHASE TO PHASE 40 kV between PHASE TO EARTH"
16	Short circuit test	50 kA-1 Sec Symmetrical	N/A	50 kA-1 Sec Symmetrical	50 kA-1 Sec Symmetrical	50 kA-1 Sec Symmetrical	50 kA-1 Sec Symmetrical	50 kA-1 Sec Symmetrical	N/A	50 kA-1 Sec Symmetrical	N/A	50 kA-1 Sec Symmetrical	N/A
17	Internal Power Arching	40 kA - 0.1 sec	40 kA - 0.1 sec	40 kA - 0.1 sec	20 kA - 0.1 sec	20 kA - 0.1 sec	20 kA - 0.1 sec	40 kA - 0.1 sec	40 kA - 0.1 sec	40 kA - 0.1 sec	40 kA - 0.1 sec	40 kA - 0.1 sec	40 kA - 0.1 sec



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