

TYPE TESTS CERTIFICATE

No. 14-01060024 Issued on 27/01/2014

Client: **AI ELECTRICALS - INDIA**

Objects tested : **AXLVJA-03 HEAT SHRINK LV JOINTS Size 4X 25 to 50 sqmm Cu or Al**

Cables type: **Underground cables for LV Networks**

Conform to IEC 60502

Cross section: 4x25 4x35

All conductors shaped stranded (Class 2).

Aluminum Conductors, PVC Insulated, Steel Wire Armoured

PVC Sheated Cables

Marking: AL/PVC/PVC/SWA/PVC GULF CABLES

Objects Identification: The objects have been identified as follow:

AXLVJA-03 HEAT SHRINK LV JOINTS Size 4X 25 AL

AXLVJA-03 HEAT SHRINK LV JOINTS Size 4X 35 AL

Normative documents: **EN 50393 May 2012**

Cenelec Harmonization Document HD 623 S1 Feb. 1996

Specification for joints, stop ends and outdoor terminations for distribution cables of rated voltage 0,6/1,0 kV.

Test place: Tests have been performed c/o University of Rome, Italy , with the supervision of CESI.

Tests date: Form 11/2013 to 01/2014

Test loops:

Loop n. 1, n. 2 joints of AXLVJA-03 were assembled on cable cross section of 4x25 AL

loop n. 2, n. 1 joint of AXLVJA-03 was assembled on cable cross section of 4x25 AL

Loop n. 3, n. 2 joints of AXLVJA-03 were assembled on cable cross section of 4x35 AL

loop n. 4, n. 1 joint of AXLVJA-03 was assembled on cable cross section of 4x35 AL

Tests results and evaluation: The joints completed positively the tests.
The requirements of tests loop 1, 2, 3 & 4 are met.

Test Report n. : mosd-14-01060024

Date : 27/01/2014

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Page 1/12


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Test sequences, requirements and results :

TESTS performed on: AXLVJA-03		REQUIREMENTS	TEST METHODS	TEST SEQUENCES AND RESULTS			
Section: 4X25 AL				loop1	loop2	loop 1	Loop 2
1	Verication of protection degree provided by connectors (IP2X) <i>Verification de l'IP2X</i>	Protected against solid foreign objects of 12,5 mm diameter or greater	NF EN 60529	X		positive	
2	Impulse withstand 1,2/50 μs <i>Chocs de foudre</i>	10 impulses of each polarity at 20 kV peak	HD 623 S1	X		positive	
3	AC voltage withstand (in air) <i>Dielectrique 50 Hz dans l'air</i>	4 kV/1minute , between the bunched phase cores and all metallic parts. 4 kV/1minute , between each phase core in turn and all other phase cores metallic parts.	HD 623 S1	X		positive	
4	Insulation resistance (in air) <i>Résistance d'isolement dans l'air</i>	R ≥ 50 MΩ at 500 Volt C.C.	HD 623 S1	X		positive	
5	Impact at ambient temperature <i>Choc mécanique</i>	4 impacts of 40J from a height of 1 mt	HD 623 S1	X		positive	
6	Load cycling in air <i>Cycles thermiques dans l'air</i>	63 cycles 8h. each at (97,5 ± 2,5)°C	HD 623 S1 HM62/98/185/A 6.6.2.6	X		positive	
7	Water penetration behavior inside the cable cores <i>Comportement en presence d'eau dans les âmes des cables</i>	10 cycles 8h. each at (90 ± 2,5)°C, with 1 mt water height inside the main and branch cable cores.	HM62/98/185/A 6.6.3.4		X		positive
8	AC voltage withstand (in air) <i>Dielectrique 50 Hz dans l'air</i>	4 kV/1minute , between the bunched phase cores and all metallic parts. 4 kV/1minute , between each phase core in turn and all other phase cores metallic parts.	HD 623 S1 NFC33-002 6.6.4	X	X	positive	positive
9	Insulation resistance (in air) <i>Résistance d'isolement dans l'air</i>	R ≥ 50 MΩ at 500 Volt C.C.	HD 623 S1 NFC33-002 6.6.7	X	X	positive	positive
10	Load cycling in water (oversheath not damaged) <i>Cycles thermiques dans l'eau</i>	63 cycles 8h. each at (97,5 ± 2,5)°C with water pressure equivalent to 2 bar gauge.	HD 623 S1 NFC33-002 6.6.8 HM62/98/185/A 6.6.2.6	X		positive	
11	AC voltage withstand (in water with 2 bar pressure) <i>Dielectrique 50 Hz dans l'eau</i>	4 kV/1minute , between the bunched phase cores and all metallic parts. 4 kV/1minute , between each phase core in turn and all other phase cores metallic parts.	HD 623 S1 NFC33-002 6.6.4	X		positive	
12	Insulation resistance (in water with 2 bar pressure) <i>Résistance d'isolement dans l'eau</i>	R ≥ 50 MΩ at 500 Volt C.C.	HD 623 S1 NFC33-002 6.6.7	X		positive	
13	Examination <i>Examen visuel</i>	No cracking of filling compouond, no moisture path are observed	HD 623 S1 NFC33-002 6.6.12	X	X	positive	positive

Test Report n. : mosd-14-01060024

Date : 27/01/2014



MOSDORFER
CCL

Mosdorfer CCL Systems Ltd.

Industrial Estate, Market Overton,
Oakham, Rutland LE15 7 PP
England

Telephone: +44 (0) 1572 768381

Fax: +44 (0) 1572 767531

office@mosdorferccl.co.uk

TESTS performed on: AXLVJA-03 Section: 4X35 AL		REQUIREMENTS	TEST METHODS	TEST SEQUENCES AND RESULTS			
				Loop 3	Loop 4	loop 3	Loop 4
1	Verication of protection degree provided by connectors (IP2X) <i>Verification de l'IP2X</i>	Protected against solid foreign objects of 12,5 mm diameter or greater	NF EN 60529	X		positive	
2	Impulse withstand 1,2/50 μs <i>Chocs de foudre</i>	10 impulses of each polarity at 20 kV peak	HD 623 S1 NFC33-002 6.6.3	X		positive	
3	AC voltage withstand (in air) <i>Dielectrique 50 Hz dans l'air</i>	4 kV/1minute , between the bunched phase cores and all metallic parts. 4 kV/1minute , between each phase core in turn and all other phase cores metallic parts.	HD 623 S1 NFC33-002 6.6.4	X		positive	
4	Insulation resistance (in air) <i>Résistance d'isolement dans l'air</i>	R ≥ 50 MΩ at 500 Volt C.C.	HD 623 S1 NFC33-002 6.6.7	X		positive	
5	Impact at ambient temperature <i>Choc mécanique</i>	4 impacts of 40J from a height of 1 mt	HD 623 S1 NFC33-002 6.6.6	X		positive	
6	Load cycling in air <i>Cycles thermiques dans l'air</i>	63 cycles 8h. each at (97,5 ± 2,5)°C	HD 623 S1 NFC33-002 6.6.8 HM62/98/185/ A 6.6.2.6	X		positive	
7	Water penetration behavior inside the cable cores <i>Comportement en presence d'eau dans les âmes des cables</i>	10 cycles 8h. each at (90 ± 2,5)°C, with 1 mt water height inside the main and branch cable cores.	HM62/98/185/ A 6.6.3.4		X		positive
8	AC voltage withstand (in air) <i>Dielectrique 50 Hz dans l'air</i>	4 kV/1minute , between the bunched phase cores and all metallic parts. 4 kV/1minute , between each phase core in turn and all other phase cores metallic parts.	HD 623 S1 NFC33-002 6.6.4	X	X	positive	positive
9	Insulation resistance (in air) <i>Résistance d'isolement dans l'air</i>	R ≥ 50 MΩ at 500 Volt C.C.	HD 623 S1 NFC33-002 6.6.7	X	X	positive	positive
10	Load cycling in water (oversheat) not damaged) <i>Cycles thermiques dans l'eau</i>	63 cycles 8h. each at (97,5 ± 2,5)°C with water pressure equivalent to 2 bar gauge.	HD 623 S1 NFC33-002 6.6.8 HM62/98/185/ A 6.6.2.6	X		positive	
11	AC voltage withstand (in water with 2 bar pressure) <i>Dielectrique 50 Hz dans l'eau</i>	4 kV/1minute , between the bunched phase cores and all metallic parts. 4 kV/1minute , between each phase core in turn and all other phase cores metallic parts.	HD 623 S1 NFC33-002 6.6.4	X		positive	
12	Insulation resistance (in water with 2 bar pressure) <i>Résistance d'isolement dans l'eau</i>	R ≥ 50 MΩ at 500 Volt C.C.	HD 623 S1 NFC33-002 6.6.7	X		positive	
13	Examination <i>Examen visuel</i>	No cracking of filling compuond, no moisture path are observed	HD 623 S1 NFC33-002 6.6.12	X	X	positive	positive

Test Report n. : mosd-14-01060024

Date : 27/01/2014

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Page 3/12

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Note:
The uplisted loops performed the whole test sequences as mentioned before in the test tables and gave positive results.

The following test equipments have been used during the tests:

<u>HEATING TRASFORMERS:</u> PIVI Milano type : induction type 1°) N°28201 - KVA 10 - Hz 50 - P.Volt 220/380 2°) N°25828 - KVA 10 - Hz 50 - P.Volt 220/380 3°) N°25814 - KVA 10 - Hz 50 - P.Volt 220/380 4°) N°25826 - KVA 10 - Hz 50 - P.Volt 220/380	<u>IMPULSE GENERATOR:</u> Type ELETTROMECCANICA TIRONI - mod.G.14/5/400 - matr.n°014 Vmax = 400KV - Voltage per Stadium = 100KV - energy = 5KWs - V ausiliary = 24V - alimentazione 220 V
<u>PRESSURE VESSEL:</u> N°1 pressure regulator type RR3, max 20atm. - n°1 manometer from 0 to 4 bar - Sferic valves - pressure tube type PA 11 RILSAN DIN74324 Φ10x8m	<u>AMPEROMETRIC SHUNT:</u> typeo DATA PRECISION mod. IP 1000-IP 1001
<u>TEMPERATURE RECORDER:</u> type YOKOGAWA HR 1300 HYBRID RECORDER YOKOGAWA type B9855AY(folding chart)	<u>CONTROL PANEL:</u> N°1 Electronic digital temperature controlle TYPE TECNOLOGIC THP 48 N°1 counter TECNOLOGIC TC 48 N°1 timer TECNOLOGIC TT 48
<u>THERMOCOUPLE PROBES:</u> cable type RS 151-209 K type plugs RS type 467-829	<u>VOLTAGE VARIATORS:</u> 1°) Belotti Milano type V40N 220V 2°) Belotti Milano type V70N 380V
<u>MULTIMETER:</u> type DATA PRECISION 935	<u>MEGAOHMMETER:</u> DIGITAL INSULATION TESTER tipo YIKOGAWA 2426A
<u>DIELECTRIC METER:</u> type PESATORI Milano mod.PA1"K" 20sec.x div. KV 0 - 20	<u>CAPACITOR:</u> mod. DUCATI ITALIA - discharge type - V nominal 100.000V - V test 120.000V - C nominal 0,25μF - C mesured a 20° 0,26μF - tollerance -5+10% - connection E - temperature -25+40°C
<u>ALIMENTATION C.C:</u> type C.C - alimentation voltage C.A. 0-220V , V exit = C.C max 100KV , I = 0,095A	<u>OSCILLOSCOPE:</u> type INTRON DSO-2021 RS232C
<u>SPINTEROMETER:</u> Type VM 25 - V nominal KV 395 - minimum distance 0mm - 250mm max distance - diameter sphere 1 = 250mm - diameter sphere 2 = 250mm	<u>BENCH TEST IMPULSE GENERATOR:</u> typeo ELETTROMECCANICA TIRONI

Test Report n. : mosd-14-01060024

Date : 27/01/2014



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Page 4/12



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Some tests charts and pictures have been included in this test report:



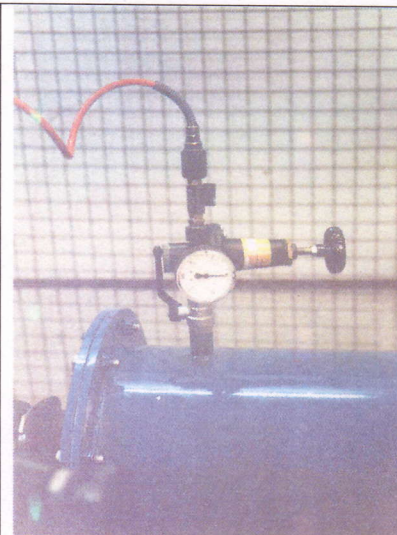
Components of AXLVJA-03



Components of AXLVJA-03

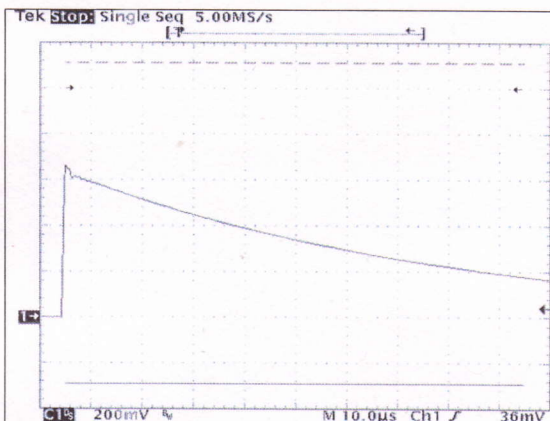


Load cycling in water
2 bar water pressure

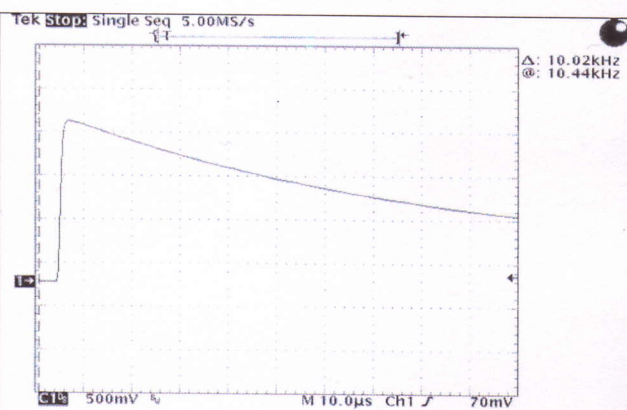


Water pressure 2 bar

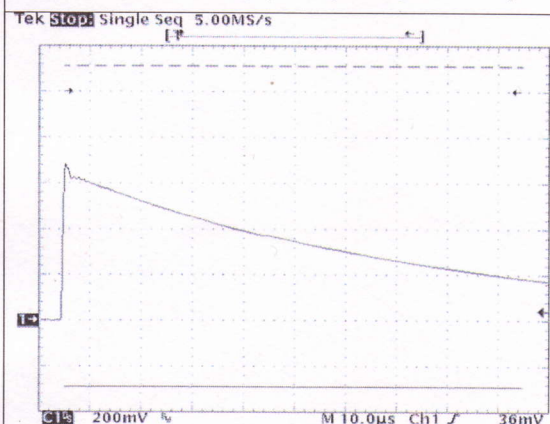
Some waves charts during impulse tests:



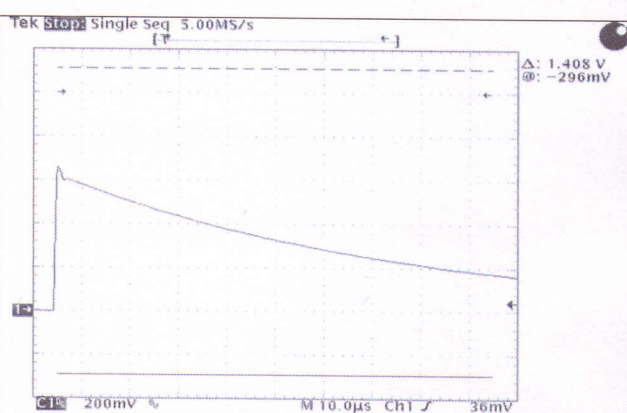
Impulse of positive polarity at 20kV peak



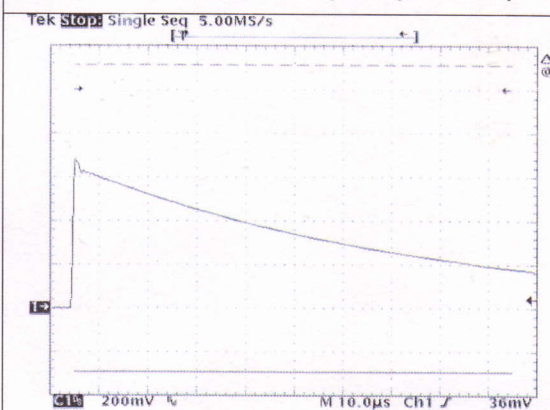
Impulse of positive polarity at 20kV peak



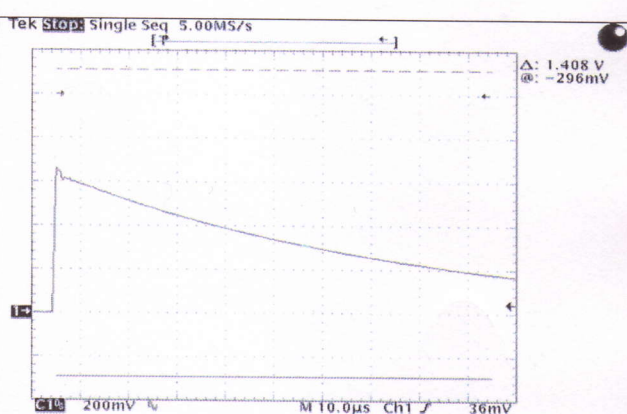
Impulse of positive polarity at 20kV peak



Impulse of positive polarity at 20kV peak



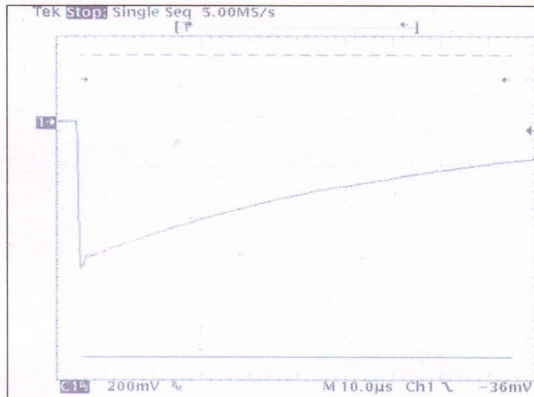
Impulse of positive polarity at 20kV peak



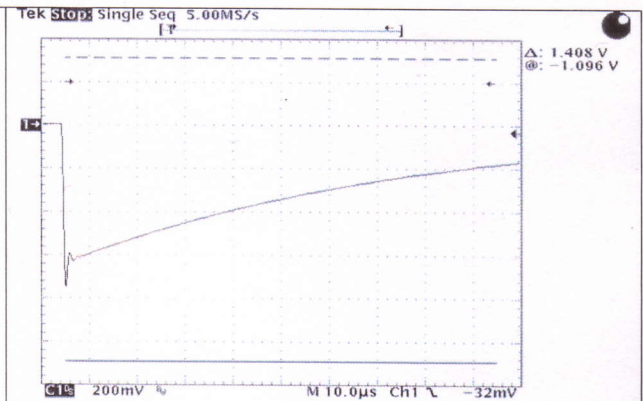
Impulse of positive polarity at 20kV peak

Test Report n. : mosd-14-01060024

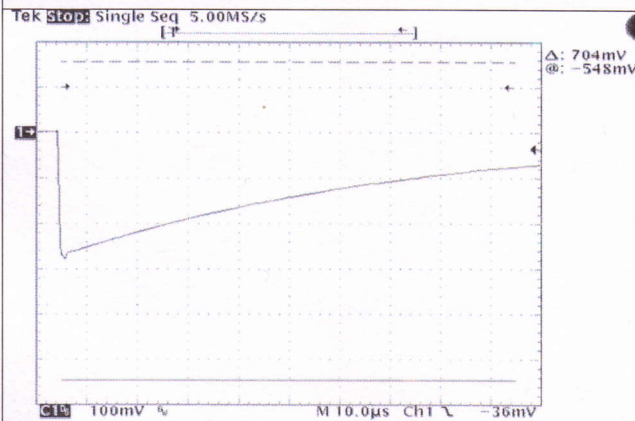
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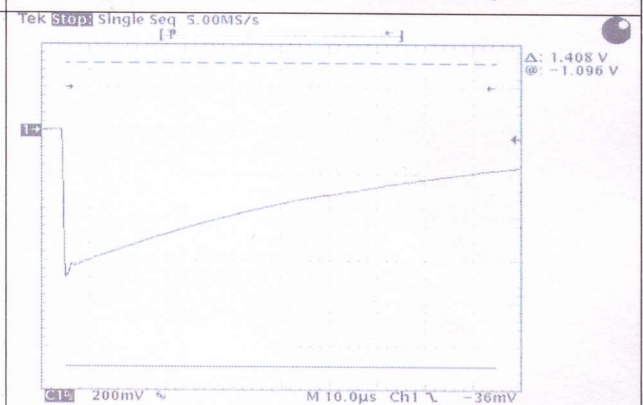
Impulse of negative polarity at 20kV peak



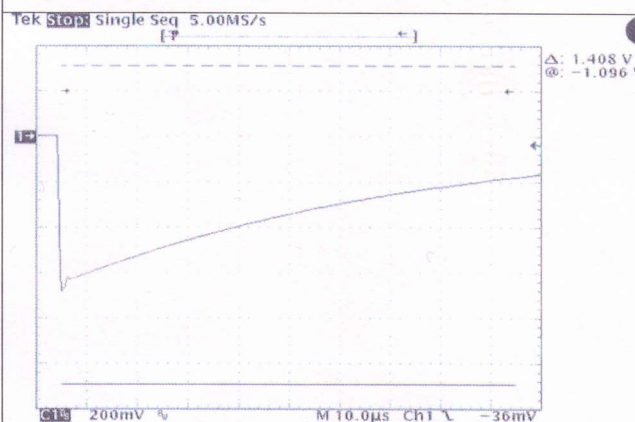
Impulse of negative polarity at 20kV peak



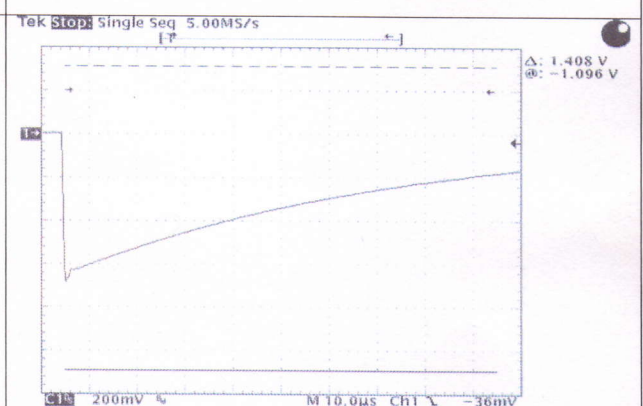
Impulse of negative polarity at 20kV peak



Impulse of negative polarity at 20kV peak



Impulse of negative polarity at 20kV peak



Impulse of negative polarity at 20kV peak

Test Report n. : mosd-14-01060024

Date : 27/01/2014

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Page 7/12

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MOSDORFER
CCL

Mosdorfer CCL Systems Ltd.

Industrial Estate, Market Overton,
Oakham, Rutland LE15 7 PP
England

Telephone: +44 (0) 1572 768381

Fax: +44 (0) 1572 767531

office@mosdorferccl.co.uk

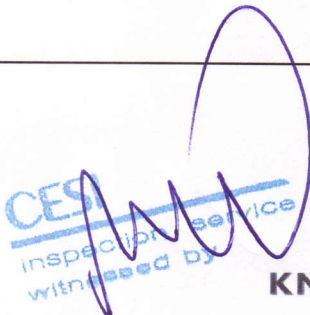
A-1 ELECTRICALS						
KIT CONTENTS						
DESCRIPTION:	HEAT SHRINK LV STRAIGHT JOINT FOR INSULATED, STEEL WIRE ARMoured AND IN LINE CONNECTORS			Item: 1	Qty	600
				Cleint		FEWA
				P/N:		AXLVJA-03
ITEM	DESCRIPTION	TYPE	SIZE (mm)	LENGTH (mm)	U/M	QTY
1	HS OUTER TUBE	AFM 45/12	45/12	610	NOS	2
2	HS INNER TUBING	AFM 13/4	13/4	130	NOS	4
3	AL FERRULES	ALSIXL25	25	70	NOS	4
4	GI WIRE MESH	-	-	-	NOS	1
5	ARMOUR RING	-	-	-	NOS	2
6	J. CLIPS	-	-	-	NOS	2
7	TINNED CU BRAID	-	-	-	NOS	1
8	MASTIC TAPE	-	-	-	NOS	1
9	INST.INSTRUCTION	-	-	-	NOS	1

A-1 ELECTRICALS						
KIT CONTENTS						
DESCRIPTION:	HEAT SHRINK LV STRAIGHT JOINT FOR INSULATED, STEEL WIRE ARMoured AND IN LINE CONNECTORS			Item: 2	Qty	500
				Cleint		FEWA
				P/N:		AXLVJA-03
ITEM	DESCRIPTION	TYPE	SIZE (mm)	LENGTH (mm)	U/M	QTY
1	HS OUTER TUBE	AFM 51/16	51/16	610	NOS	2
2	HS INNER TUBING	AFM 13/4	13/4	135	NOS	4
3	AL FERRULES	ALSIXL35	35	90	NOS	4
4	GI WIRE MESH	-	-	-	NOS	1
5	ARMOUR RING	-	-	-	NOS	2
6	J. CLIPS	-	-	-	NOS	2
7	TINNED CU BRAID	-	-	-	NOS	1
8	MASTIC TAPE	-	-	-	NOS	1
9	INST.INSTRUCTION	-	-	-	NOS	1

Test Report n. : mosd-14-01060024

Date : 27/01/2014

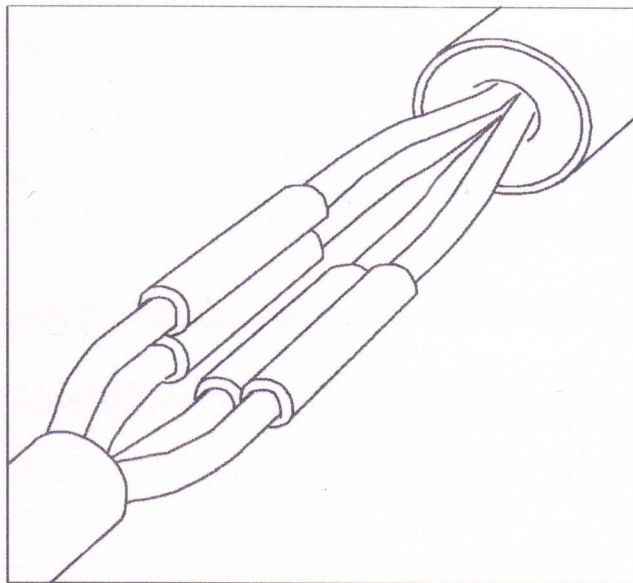

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Page 8/12


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A-1 ELECTRICALS



INSTALLATION INSTRUCTIONS
STRAIGHT JOINT FOR 3 ½ & 4 CORE
PVC/XLPE/RUBBER INSULATED
CABLES WITH FLAT WIRE ARMOUR
UPTO 1100 VOLTS

20 Alankar Chambers
Dhebar Chowk, Trikon Baug
Rajkot - 360001, Gujarat, India
Tel: +91 281 2581855 Fax: +91 281 2582486
Email: [info @ a1electricals.com](mailto:info@a1electricals.com)
Web: www.a1electricals.com



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Date : 27/01/2014

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Page 9/12



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GENERAL INSTRUCTIONS:

Check the cable for presence of water/moisture. An oxidized conductor, corroded screen/armour etc, are all indicative of moisture presence. A cable containing water is vulnerable and can fail much before its rated service life.

Insulation resistance values before and after jointing should be taken.

Use yellow bushy flame. Do not use pencil type flame. Use the yellow portion of flame for shrinking.

Direct the flame of the LP gas torch or blow lamp in shrink direction.

Keep the flame moving in a brush like motion to avoid scorching of the tubes and other shrinkable parts.

Ensure that each heat shrinkable components is shrunk uniformly and is free from wrinkles.

A well shrunk tube has inner profile of the substrate clearly defined.

Allow joint to cool before applying mechanical strain.

IMPORTANT NOTICE TO PURCHASER:

Sellers and manufacturer's only obligation shall be to replace such quantity of the product proved to be defective. Neither the seller nor manufacturer shall be liable for any injury, loss or damage, direct or consequential, arising out of the use or inability to use the product. Before using, user shall determine the suitability of the product for his or her intended use and user assumes all risk and liability whatsoever in connection therewith.



Test Report n. : mosd-14-01060024

Date : 27/01/2014

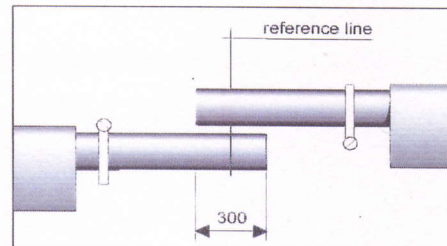
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Page 10/12

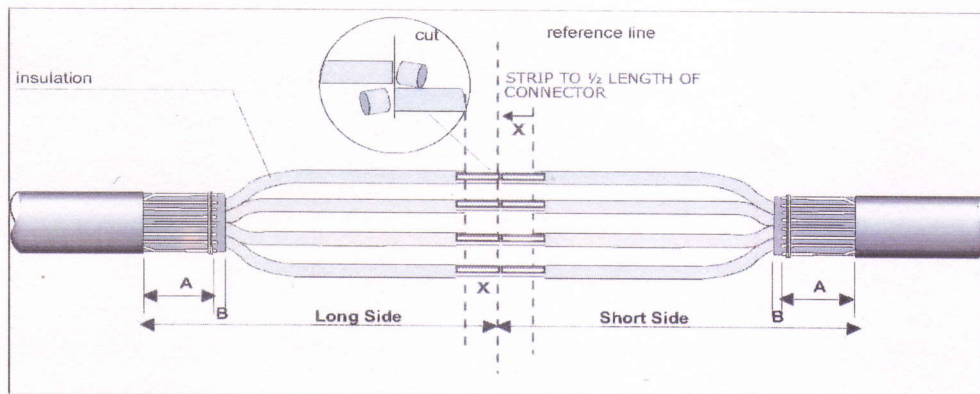


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Straighten and align the cables. Keep an overlap of 300mm. Mark a reference line at center of the overlap. Slide outer jacketing insulating tubing and J.Clips over each end.



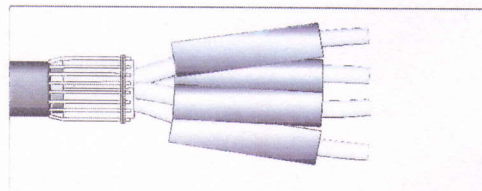
Prepare the cable as per drawing and tables.



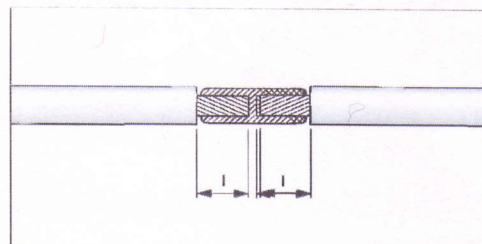
CONDUCTOR SIZE (mm ²)	LONG SIDE (mm)	SHORT SIDE (mm)	BEDDING B (mm)	ARMOUR A (mm)	X
1.5-6	200	150	10	30	HALF CONNECTOR LENGTH
10-16	200	150	15	35	
25-50	250	200	20	45	
70-150	350	250	20	50	
185-300	500	350	20	60	
400-500	650	500	30	75	

Bend back armour wires and apply mastic tape around the cable bedding. Fit armour support ring towards end of bedding.

Position the inner insulating tubing down the longer cores.



Joint the conductors by crimping. Remove sharp edges if any. Clean and degrease the insulation and the connectors.



Test Report n. : mosd-14-01060024

Date : 27/01/ 2014

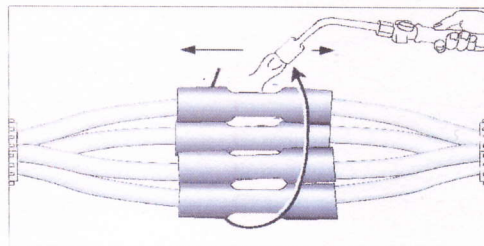
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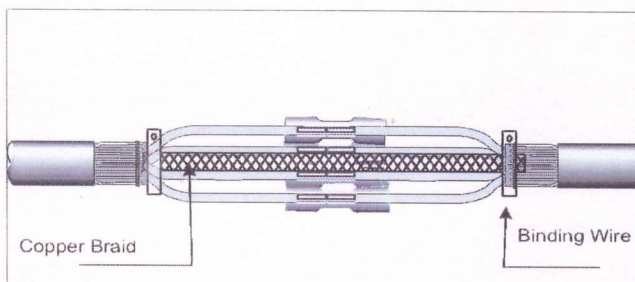
Page 11/12


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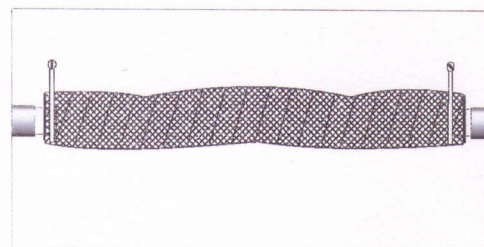
Centre the insulating sleeves over the connectors.
Shrink them into place starting in the centre and working
towards the ends.



Place the copper braid across the joint over
the armour of both ends and hold in place with
binding wire.

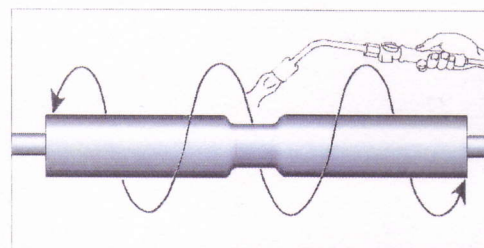


Wrap the GI wire mesh around the cores with 50% overlap
starting from one side of the armour going over to the armour
on other side. Tighten the wire mesh and earth braid over
armour at both ends with J. Clips. Cover the J. Clips with
mastic tape.



Abrade the outer jacket for 100mm from each end on either
sides of cable. Stretching to half its width. Shrink the outer
jacketing tubing as follow:

- In case outer jacketing tubing is supplied in one length,
position it centrally over joint. Shrink in place. Start from the
center and proceed towards end.
- In case outer jacketing tubing is supplied in two lengths,
position one over the joint so that it overlaps the outer jacketing
tube of one cable and balance over joint. Start from the cable
end and proceed towards the joint.



Joint completed. Allow to cool before applying any mechanical
strain.

