



## ELECTRICAL TESTING LABORATORY

Nexans Network Solutions N.V. – Div. EUROMOLD  
ZUID III, Industrielaan 12  
B-9320 EREMBODEGEM (AALST) (Site 2)

# TEST REPORT

**No. TE 113 21 06:** contains 31 pages including 7 appendices

Requestor:	Nexans Power Accessories Italy Contrada Tesino 181B 63035 OFFIDA, (AP) ITALY
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**SECURITY CLASSIFICATION: FOR PUBLICATION.**

<b>TEST OBJECT TYPE</b>	: 24 kV single core heat shrinkable indoor termination : <b>24MONOI1.630</b>
Rated voltage $U_0/U$	: 12/20 kV
Highest system voltage $U_m$	: 24 kV
Manufacturer	: Nexans Power Accessories Italy (NPAI)
Request number	: TRF A2021-014

Start and end date	Test specification
<b>26/05/2021 – 18/10/2021</b>	<b>CLC EN IEC 61442 Ed. 2:2005 – Test methods</b> <b>CLC HD 629.1 S3: 2019 – Test requirements</b> <b>Test series: Table 10-test sequence A1</b>

**TEST RESULT: the test object successfully passed the prescribed test series.**

ELAB

Certified Tester Approved by  D. Pennewaert	Technical Manager Reviewed by 	Strategic Lab Manager Authorised and released by  K. Weygaerts
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Erembodegem, 26<sup>th</sup> October 2021

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The results apply to the samples as received.

## **Résumé**

A type test in accordance with CLC HD 629.1 S3:2019, table 10 – A1, for the extension to larger cable cross section 630 mm<sup>2</sup>, was performed on heat shrinkable indoor terminations, with type designation 24MONOi1.630, manufactured by Nexans Power Accessories (NPAI)

These are intended for application on networks 12/20 (24) kV on single-core cables with extruded insulation.

The heat shrinkable indoor terminations, **24MONOi1.630**, **successfully passed the tests at level 12/20 (24) kV according to HD 629.1 S3:2019, table 10 – sequence A1**, as shown in this report.

*All the tests described in §4.1, were performed on the same samples (no changes of samples between test or during the test)*

## **Witnessing**

The examination of the test objects at the ELAB laboratory (Erembodegem) was witnessed by Mr. S.-M. Finello (NPAI) by means of Teams meeting.

## **Subcontracting**

*No subcontracting*

## **Deviations and exceptions**

*None*

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## 1 Test specifications

### **CENELEC EN IEC 61442 Ed. 2 (03/2005) - English version**

Test methods for accessories for power cables with rated voltages from 3.6/6 kV ( $U_m = 7.2$  kV) up to and including 20.8/36 kV ( $U_m = 42$  kV).

### **CENELEC HD 629-1-S3 (03/2019) – English version**

Test requirements on accessories for use on power cables of rated voltage from 3,6/6(7,2) kV up to 20,8/36(42) kV.

Part 1: Accessories for cables with extruded insulation.

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All measuring equipment used in the test series is calibrated, traceable to international standards.

The relevant measurement uncertainty has been determined and is listed in the ELAB document ELAB-QLST-015-01. This document can be consulted on simple request.

*Note: Decision rule is defined by the method, except where it is not defined the measurement uncertainty is taken into account.*

## **2 Technical data and identification of the test objects**

### **Technical data:**

**Test object** : 24 kV heat shrinkable indoor termination  
Designation : 24MONOi1.630  
Assembly instruction : IM1778EI.1 ed. 15/09/2020

Rated voltage  $U_0/U$  : 12/20 kV  
 $U_m$  : 24 kV

### **Identification of the test objects:**

*The test objects, identified as given here below were subject to the complete test sequence as given in §4.1*

#### *Test sequence A1*

Receiving date : 12/05/2021 (WK19-2021)  
Number of test objects : **2**  
Identification numbers : 2021-014-03, -04 (Loop nr. A1-630-01)

**Test object** : 24 kV heat shrinkable indoor termination  
*see appendix 6 -  
Information as provided by the customer*

**Conductor contact** : Cable lug  
*see appendix 6 -  
Information as provided by the customer*

**Cable** : 1x630 mm<sup>2</sup> Al 12/20 kV (code intern: 1x630Al20-44356)  
Manufacturer : FACAB  
Marking : <VDE> 0276 NA2XS(F)2Y 1x630/35RM 12/20KV 2014  
FACAB 06201

*More technical data in appendix 1*

### 3 Test arrangement

- For test series **table 10, sequence A1** the two heat shrinkable indoor terminations were installed on 1 test loop with cable type 1x630 mm<sup>2</sup> Al 12/20 kV.

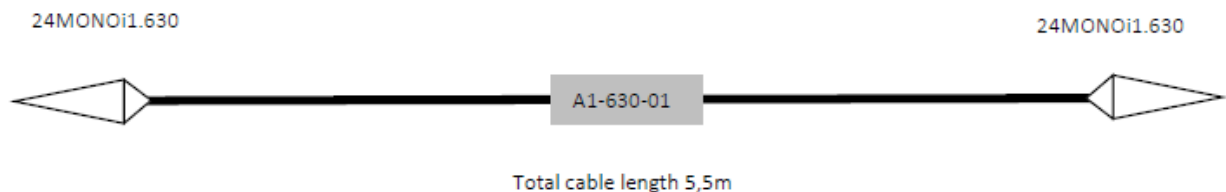
The cable loop was assembled by technical personnel of NPAI and delivered to ELAB Electrical Testing Laboratory (site 2) of NNS N.V. – div. Euromold on 12/05/2021.

The cable loop had a total length of approx. 5,5 m.

The tests started on 26/05/2021 not earlier than 24 hours after the reception of the test loops.

All test voltages were applied to the core against the cable screen, which was connected to the test earth.

*1x test arrangement*



**Fig. 1**

## 4 Test procedures, requirements and test results

### 4.1 Type test table 10, test sequence A1

Type test per HD 629.1 S3, series A1 - Table 10 on indoor terminations, for systems 12/20 (24) kV					ELAB-QREG-C17 Rev.007 03/06/2019
Test title	Procedure	Requirement	Result	Initials	Date
Assembly	IM1778EI.1 ed. 15/09/2020		OK	NPAI	delivery 12/05/2021
[1] AC withstand voltage test, dry (IEC61442-§ 4.1) (HD629.1 S3 - test no. 1)	Apply alternating voltage of $(4,5 U_0)$ 54 kV, during 5 minutes	No breakdown or flashover shall occur.	PASSED	DPEN	26/05/2021
[2] PD test at ambient temperature (IEC61442-§ 7.1) (HD629.1 S3 - test no. 2)	Raise the voltage to 27 kV and hold for less than 1 minute. Lower the voltage to $(2 U_0)$ 24 kV, and measure the PD magnitude.	PD level to be less than 10 pC.	PASSED	DPEN/ KWEY	07-06-21
[3] Impulse withstand voltage test at elevated temperature (IEC61442-§ 6) (HD629.1 S3 - test no. 3)	Stabilise the conductor temperature between 95 °C and 100 °C Apply 10 positive and 10 negative impulses $(1.2/50 \mu\text{sec})$ of 125 kV.	No breakdown or flashover shall occur.	PASSED	DPEN	10-06-21
[4] Electrical heat cycling in air (IEC61442-§ 9) (HD629.1 S3 - test no. 4)	Apply 126 thermal cycles in air of minimum 8 hours, with at least 2 hours at a conductor temperature between 95 °C and 100 °C, at an alternating voltage of $(2,5 U_0)$ 30 kV.	No breakdown or flashover shall occur.	PASSED	DPEN	start 11/06/2021  end 25/08/2021

### Type test table 10, test sequence A1 - continued

	Test title	Procedure	Requirement	Result	Initials	Date
[5]	PD test at elevated temperature (IEC61442-§ 7) (HD629.1 S3 - test no. 5)	Stabilise the conductor temperature between 95 °C and 100 °C Raise the voltage to 27 kV and hold for less than 1 minute. Lower the voltage to (2 U <sub>0</sub> ) 24 kV, and measure the PD magnitude.	PD level to be less than 10 pC.	PASSED	DPEN	13-09-2021
[6]	PD test at ambient temperature (IEC61442-§ 7.1) (HD629.1 S3 - test no. 5)	Raise the voltage to 27 kV and hold for less than 1 minute. Lower the voltage to (2 U <sub>0</sub> ) 24 kV, and measure the PD magnitude.	PD level to be less than 10 pC.	PASSED	DPEN	14-09-2021
[7]	Impulse withstand voltage test at ambient temperature (IEC61442-§ 6) (HD629.1 S3 - test no. 9)	Apply 10 positive and 10 negative impulses (1.2/50 μsec) of 125 kV.	No breakdown or flashover shall occur.	PASSED	DPEN	14-09-2021
[8]	AC withstand voltage test, dry (IEC61442-§ 4.1) (HD629.1 S3 - test no. 10)	Apply alternating voltage of (4,5 U <sub>0</sub> ) 54 kV, during 5 minutes.	No breakdown or flashover shall occur.	PASSED	DPEN	15-09-2021
[9]	PD test at ambient temperature (IEC61442-§ 7.1) (HD629.1 S3 - test no. 11)	Raise the voltage to 27 kV and hold for less than 1 minute. Lower the voltage to (2 U <sub>0</sub> ) 24 kV, and measure the PD magnitude.	PD level to be less than 10 pC.	PASSED	DPEN	15-09-2021

(All tests performed at site 2)

#### All test objects successfully passed the prescribed tests.

No breakdown or flashover occurred, no over current trips were experienced.



## 4.2 Visual inspection

Test title	Procedure	Requirement	Result	Initials	Date
<sup>[10]</sup> Examination (HD629.1 S3 - test no. 13)	(Annex C)	Shall be documented in the report	Performed	KWEY	18/10/2021

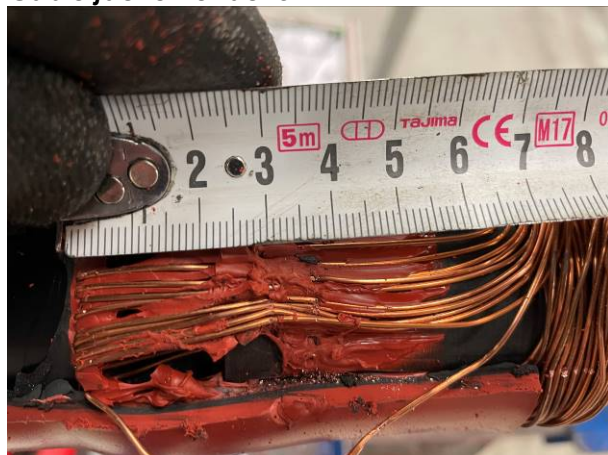
### Observations during the examination:

Aspect	2021-014-03	2021-014-04
<i>Presence of water or moisture beyond the sealing barriers</i>	none	NA
<i>Presence of corrosion on any metallic parts</i>	none	none
<i>Indication of possible electrical degradation in primary insulation of cable</i>	none	none
<i>Indication of possible electrical degradation in primary insulation of accessory</i>	none	none
<i>Indication of possible mechanical degradation of dielectric parts</i>	none	none
<i>Indication of possible mechanical degradation in water sealing areas</i>	none	none
<i>Indication of possible thermal degradation</i>	none	none
Leakage of insulating material	none	none
<i>Obvious shrinkage of cable components</i>	cable jacket retracted 2-3 cm (see pictures)	cable jacket retracted 2-3 cm (see pictures)
<i>Move between accessory components</i>	none	none
<i>Overheating</i>	none	none

Except from the obvious cable retraction no observations could be made. All looked clean without traces of aging.

## Pictures

### *Cable jacket retraction*



**Sample no. 2021-014-03**



**Sample no. 2021-014-04**

## 5 Appendices

Appendix	Reference:	Title	Pages
1.	<b>ELAB-QREG-D1</b> 1X630AI20-44356	Identification of the test cable.	1
2.	<b>Appendix 2</b>	Registration of lightning impulse wave shape.	4
3.	007023_210611_092800.GDS-007069_210704_092800.GDS.idx  007172_210823_231600.GDS-007174_210824_231600.GDS	Extract of registration of current, voltage and temperature during the Electrical heat cycling in air	2
4.	<b>Appendix 4</b>	Test arrangement (pictures) sequence A1.	1
5.	<b>ELAB-QREG-012-01</b>	List of equipment used.	3
6.	<b>ELAB-QFORM-005-03, -04</b>  <b>DOM6530I</b>	Identification of accessory test samples and connector  Components list	1  1
7.	<b>IM1778EI.2</b> ed. 15/09/2020	Installation instruction. <b>MONOi/MONOe-1</b> INDOOR/OUTDOOR SINGLE CORE HEAT SHRINKABLE TERMINATION	6

--- End of test report ---

# IDENTIFICATION OF THE TEST CABLE



Rated voltage / Nominale spanning	12/20 kV	Roll n°	NA
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Cross section / Doorsnede	630 mm <sup>2</sup>
Other cross section/ Andere doorsnedes	mm <sup>2</sup>

Cable type / Type kabel	Geëxtrudeerd	Code:	1x630Al20-44356
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	Aantal geleiders	Scherm
Construction / Constructie	1-core / 1-aderig	Individually screened / individueel scherm
Notes		

	Materiaal	Samenstelling	Vorm
Phase conductors / Fasegeleiders	Aluminium	Stranded / meerdradig	Round / rond
Notes			
Neutral conductor/ Neutrale geleider	NA	NA	NA
Notes			

	Materiaal	Type
Insulation / Isolatie	XLPE	

	Materiaal	Samenstelling	Vorm
Metallic screen / Metalen scherm	Copper / koper	Wire / draad	Individual / individueel
Notes			

	Materiaal	Samenstelling	Vorm
Armour / Wapening	NA	NA	NA
Notes			

	Materiaal	Samenstelling
Oversheath / Buitenmantel	PE	Single / enkel
Notes		

Waterblocking / Water barriere	Under oversheath / onder de mantel
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## Afmetingen / Dimensions

Diameters (in mm)	Conductor / Geleider	30,3
	Inner Semi-conductor	31
	Insulation / Isolatie	41,9
	Outer Semi-conductor	43,1
	Oversheath / Mantel	50,2

Measured by:	KVDB
Date:	20/5/2021

Marking	<VDE> 0276 NA2XS(F)2Y 1x630/35RM 12/20KV 2014 FACAB 06201
Manufacturer	FACAB

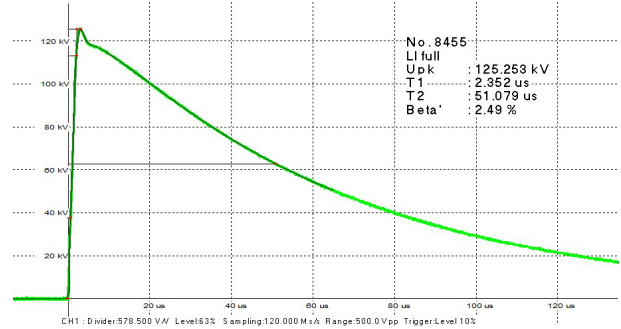
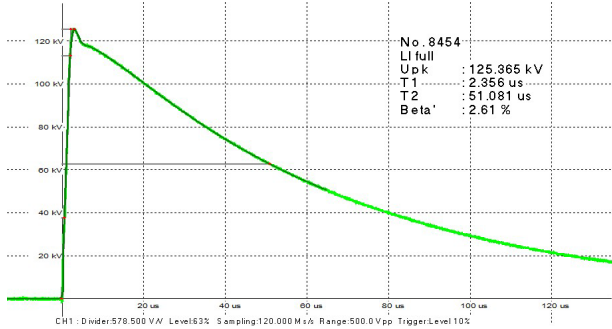
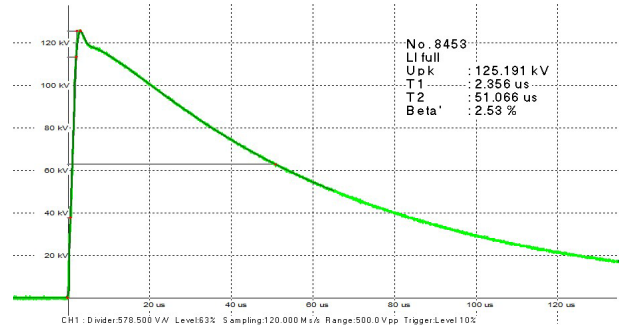
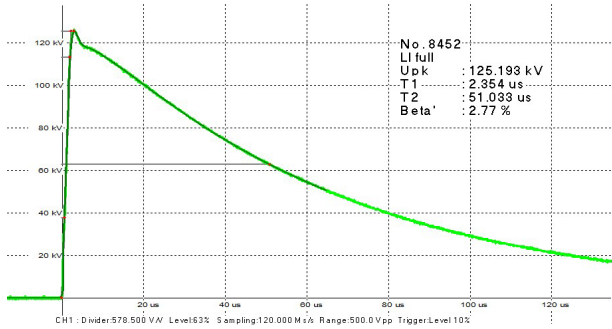
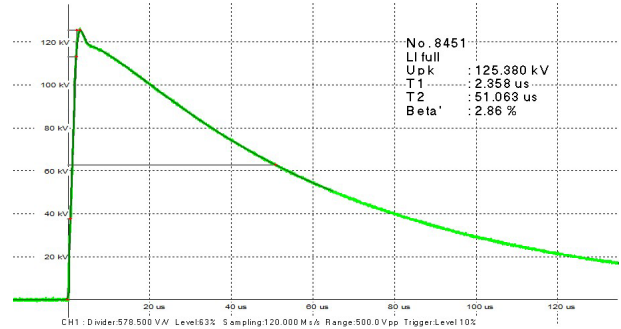
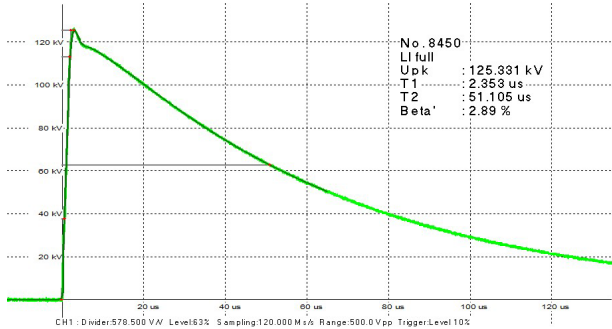
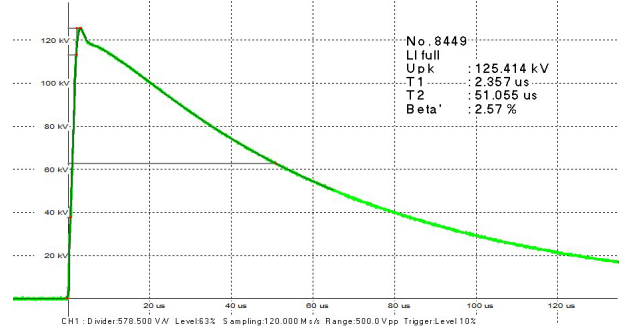
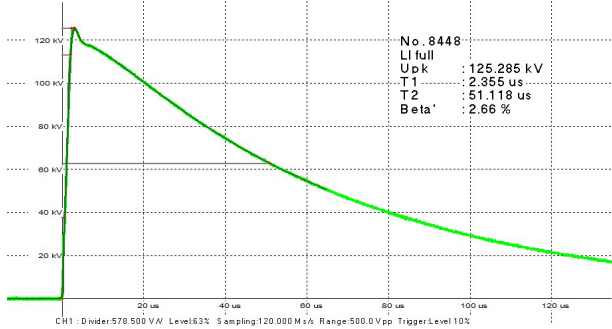
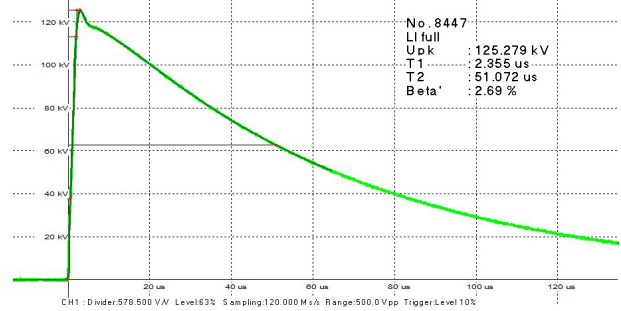
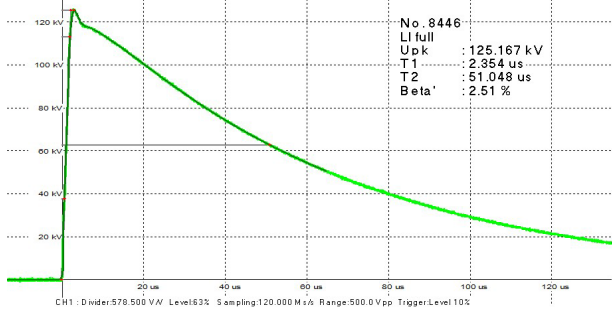
Max. current = 1500 A		@ T <sub>cc</sub> 97.5°C	
Thermal calibration versus jacket		Thermal calibration versus ambient	
A	B	A'	B'
10,51E-06	83,75E-09	38,35E-06	109,70E-09

Calculated by:	DPEN
Date:	09-06-21

# REGISTRATIONS OF LIGHTNING IMPULSE WAVE SHAPE



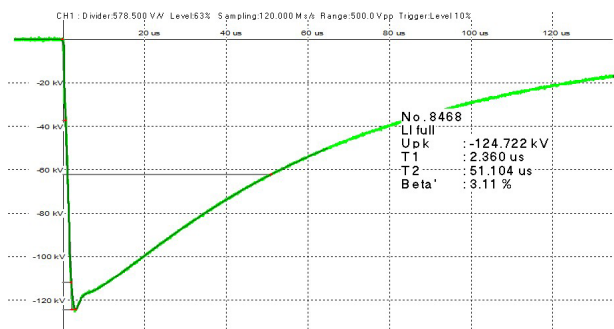
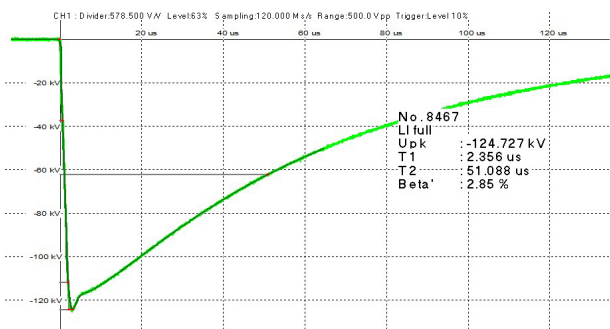
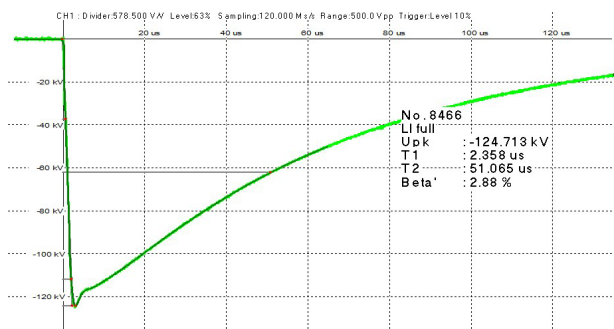
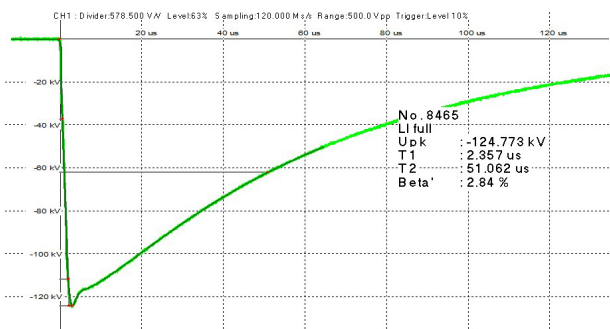
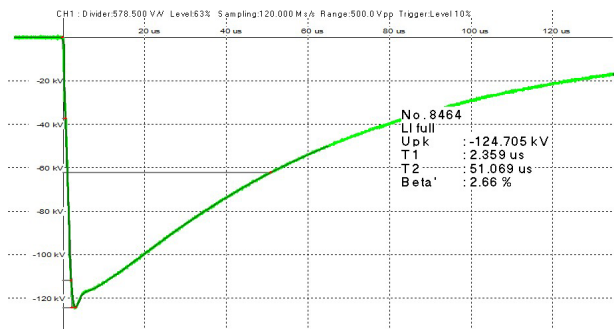
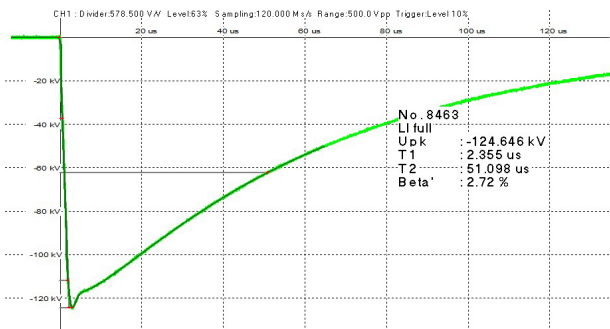
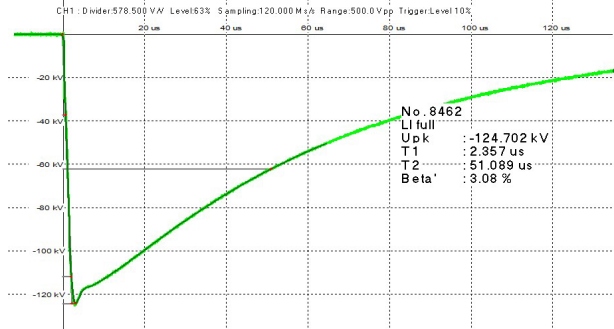
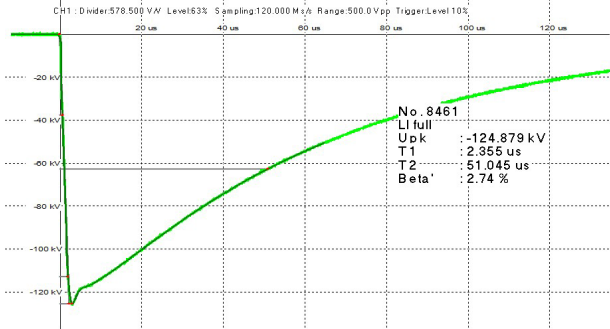
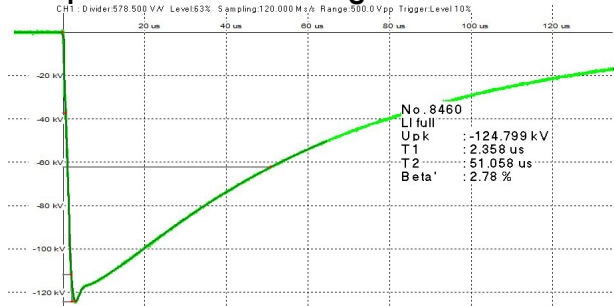
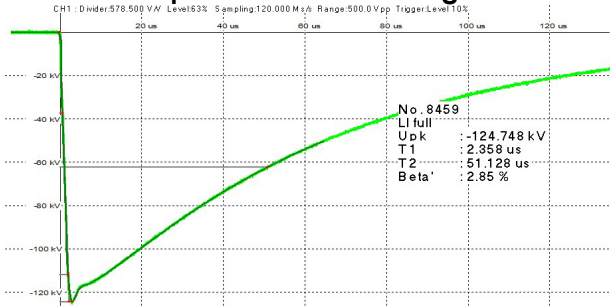
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# REGISTRATIONS OF LIGHTNING IMPULSE WAVE SHAPE



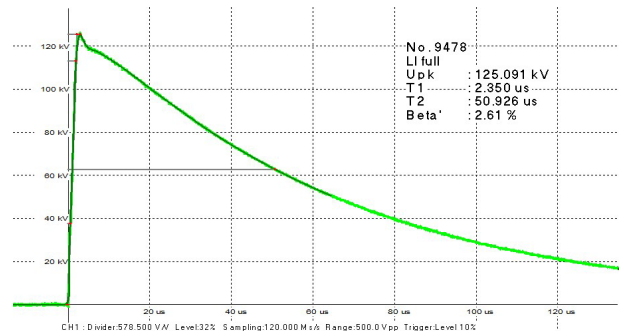
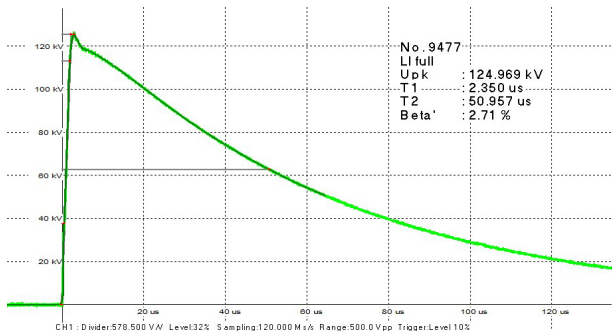
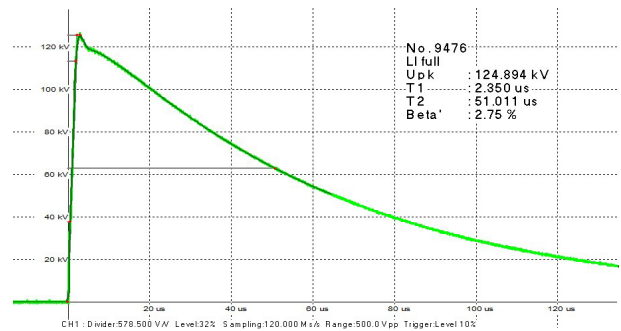
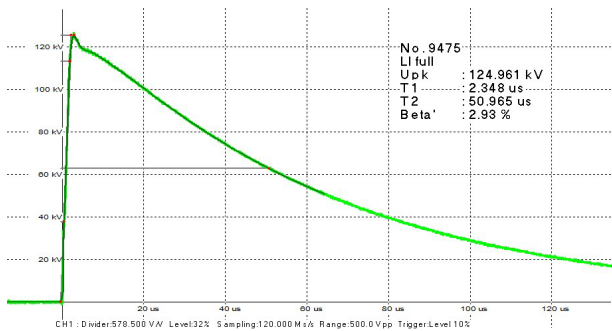
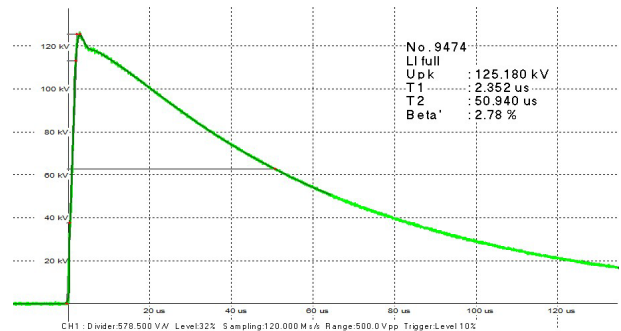
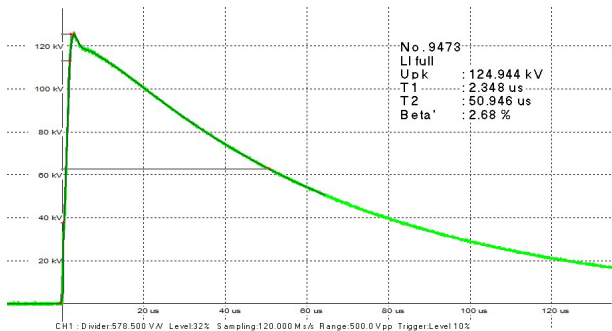
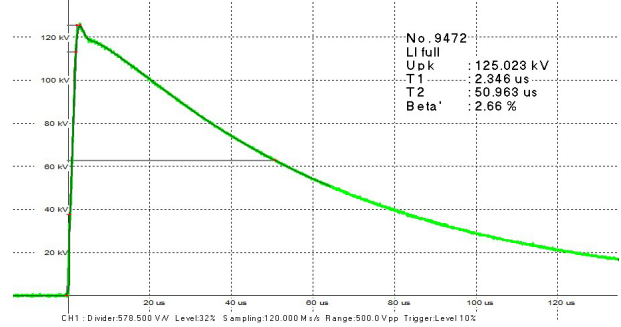
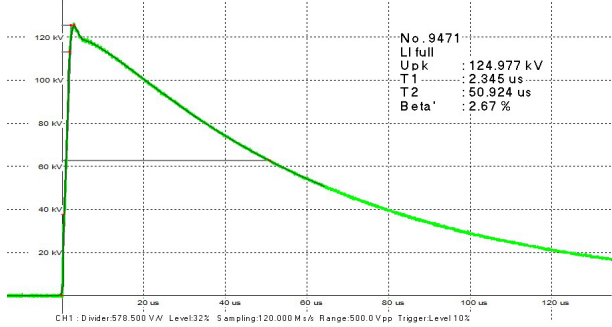
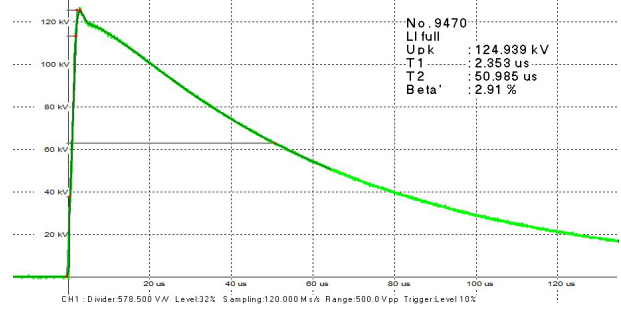
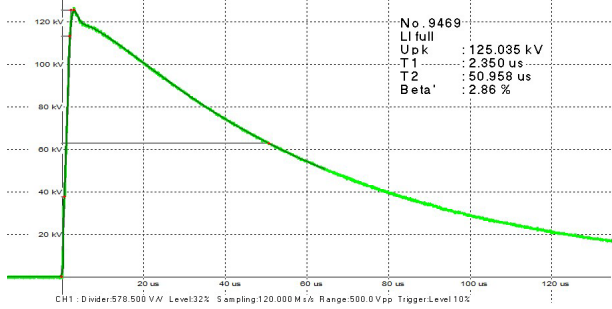
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# REGISTRATIONS OF LIGHTNING IMPULSE WAVE SHAPE



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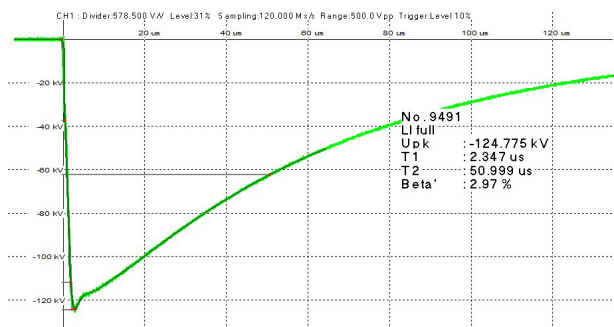
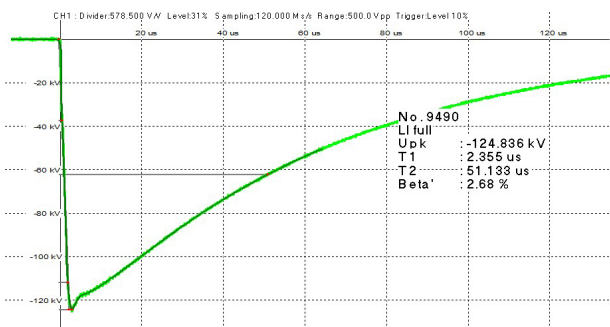
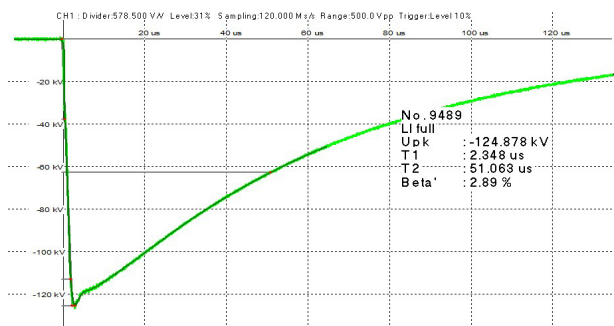
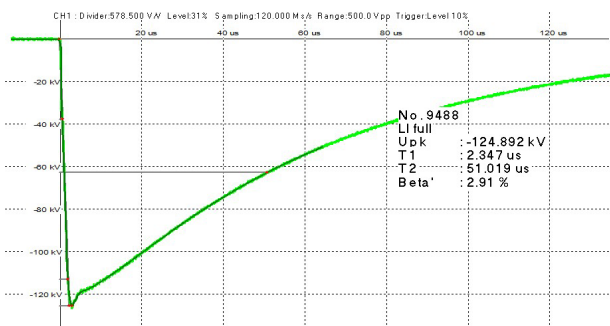
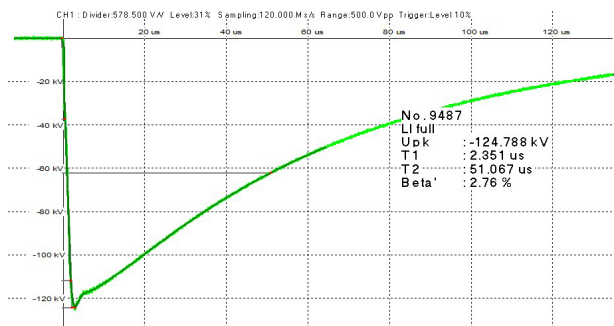
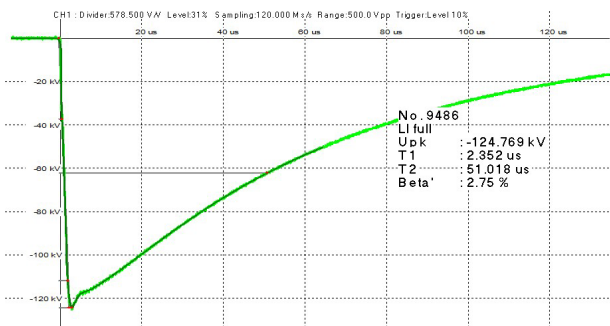
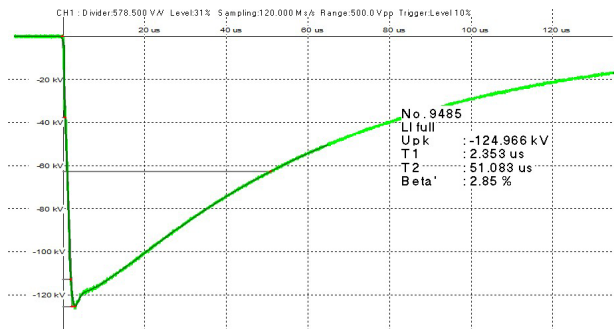
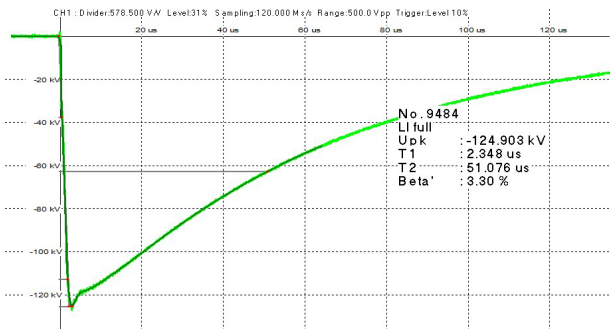
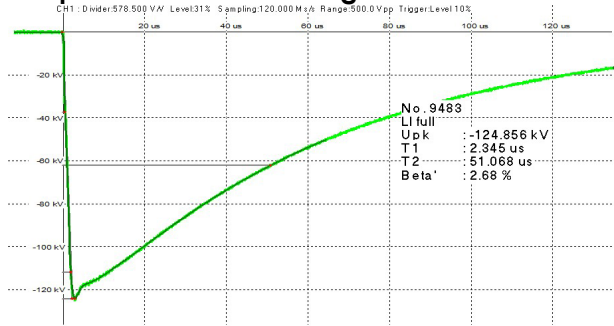
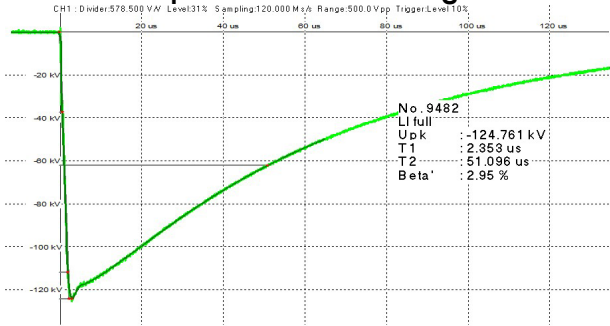




# REGISTRATIONS OF LIGHTNING IMPULSE WAVE SHAPE



## Test no. 7: Impulse withstand voltage test @ ambient temperature – 10 shots neg.





# EXTRACT OF REGISTRATIONS OF CURRENT, VOLTAGE AND TEMPERATURE DURING THE ELECTRICAL HEAT CYCLING IN AIR



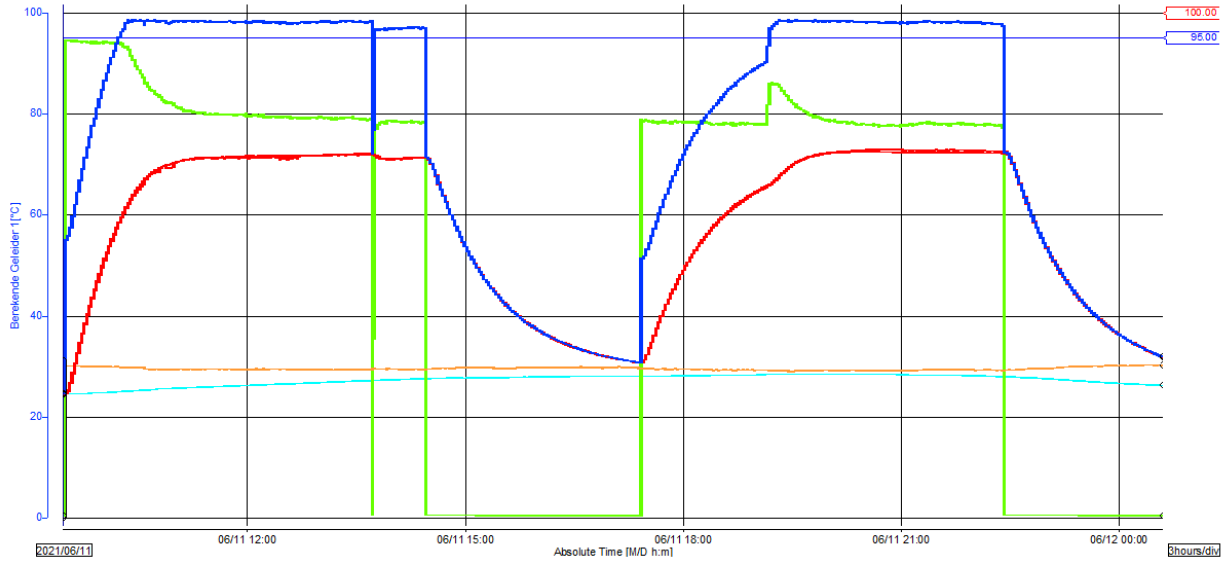
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 File Message :  
 Device Type : GX10  
 Serial No. : S5R710175  
 Time Correct : None  
 Starting Cond. : Auto  
 Dividing Cond. : Manual  
 Meas Ch. : 26  
 Math Ch. : 6  
 Comm Ch. : 0  
 Data Count : 23115  
 Calibration Corrected Ch. : None

Sampling Int. : 120.000 sec  
 Start Time : 2021/06/11 09:28:00.000 (UTC+01:00)  
 Stop Time : 2021/07/13 11:56:00.000 (UTC+01:00)  
 Trigger Time : 2021/07/13 11:56:00.000 (UTC+01:00)  
 Trigger No. : 23114  
 Damage Check : Not Damaged  
 Started by : [Key In]  
 Stopped by : [Key In]

1/1

Print Groups : STURING  
 Print Range : 2021/06/11 09:28:00.000 - 2021/06/12 00:36:00.000 (UTC+01:00)  
 Comment : TRF A2021-014\_test 5 - reg Electrical heat cycling in air



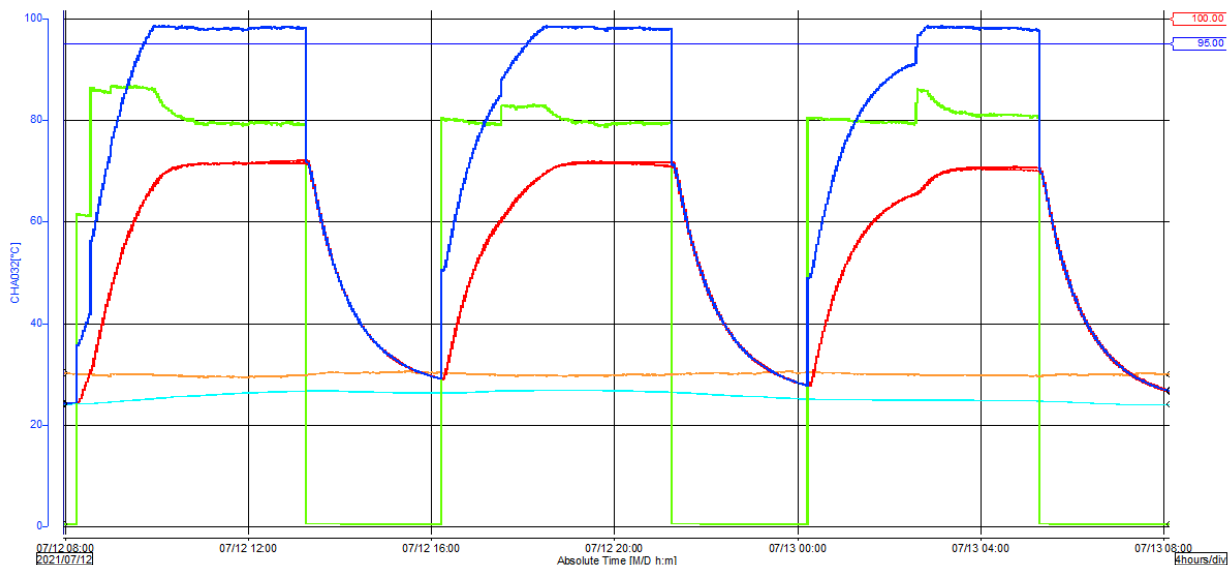
## Cycles nos. 60-62

File Name : 007023\_210611\_092800.GDS.....007087\_210713\_092800.GDS  
 File Message :  
 Device Type : GX10  
 Serial No. : S5R710175  
 Time Correct : None  
 Starting Cond. : Auto  
 Dividing Cond. : Manual  
 Meas Ch. : 26  
 Math Ch. : 6  
 Comm Ch. : 0  
 Data Count : 23115  
 Calibration Corrected Ch. : None

Sampling Int. : 120.000 sec  
 Start Time : 2021/06/11 09:28:00.000 (UTC+01:00)  
 Stop Time : 2021/07/13 11:56:00.000 (UTC+01:00)  
 Trigger Time : 2021/07/13 11:56:00.000 (UTC+01:00)  
 Trigger No. : 23114  
 Damage Check : Not Damaged  
 Started by : [Key In]  
 Stopped by : [Key In]

1/1

Print Groups : STURING  
 Print Range : 2021/07/12 07:58:00.000 - 2021/07/13 08:08:00.000 (UTC+01:00)  
 Comment : TRF A2021-014\_test 5-reg Electrical heat cycling in air



# EXTRACT OF REGISTRATIONS OF CURRENT, VOLTAGE AND TEMPERATURE DURING THE ELECTRICAL HEAT CYCLING IN AIR



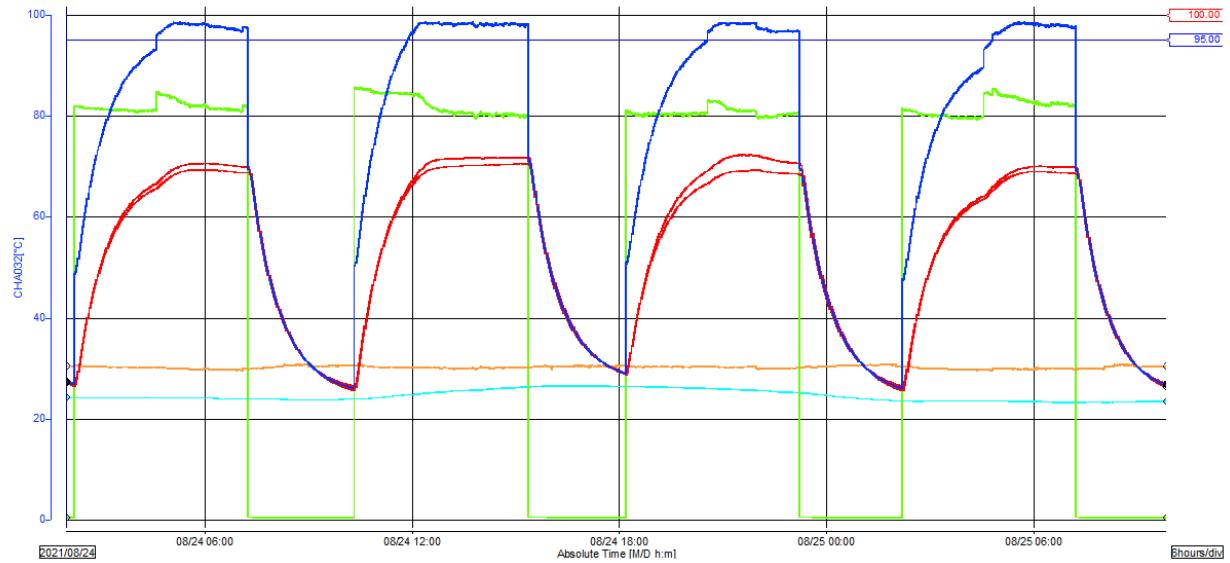
## Test no. 4: Electrical heat cycling in air – end of test

File Name : 007172\_210823\_231600.GDS,,,,,007174\_210824\_231600.GDS  
 File Message :  
 Device Type : GX10  
 Serial No. : 55R710175  
 Time Correct : None  
 Starting Cond. : Auto  
 Dividing Cond. : Manual  
 Meas Ch. : 26  
 Math Ch. : 6  
 Comm Ch. : 0  
 Data Count : 1038  
 Calibration Corrected Ch. : None

Sampling Int. : 120.000 sec  
 Start Time : 2021/08/23 23:16:00.000 (UTC+01:00)  
 Stop Time : 2021/08/25 09:50:00.000 (UTC+01:00)  
 Trigger Time : 2021/08/25 09:50:00.000 (UTC+01:00)  
 Trigger No. : 1037  
 Damage Check : Not Damaged  
 Started by : [Key In]  
 Stopped by : [Key In]

1/1

Print Groups : STURING  
 Print Range : 2021/08/24 02:00:00.000 - 2021/08/25 09:50:00.000 (UTC+01:00)  
 Comment : TRF A2021-014\_test 5-Reg Electrical heat cycling in air



- Current (0-1500 A)
- Calculated conductor temperature (0-100°C)
- Voltage (0-100 kV)
- Cable jacket temperature (0-100°C)

## TEST ARRANGEMENT (PICTURES) SEQUENCE A1



### Overall view



test set-up in air

## LIST OF EQUIPMENT USED



Equipment N°	Description	Brand	Type	Serial N°
<b><i>Test no. 1: AC withstand voltage test, dry</i></b>				
LI.502	Motorised control	NNS		
LI.534	Transformer, HV-	MPS	TEO 100/20	T-09349
LI.112	Resistive divider/readout	ENV/CGS		
LI.111	Resistive divider	ENV/CGS		
LI.641	Multimeter, Digital-	Yokogawa	TY530	TKP1037
<b><i>Test no. 2: Partial discharge test @ ambient temperature</i></b>				
LI.502	Motorised control	NNS		
LI.534	Transformer, HV-	MPS	TEO 100/20	T-09349
LI.112	Resistive divider/readout	ENV/CGS		
LI.704	PD detector	Omicron	MPD 500	LH225D
LI.705	PD detector	Omicron	MCU 502	NJ333B
LI.706	PD detector	Omicron	CPL 542	LH748D
LI.707	PD calibrator	Omicron	CAL 542	KM985G
LI.152	Capacitor, Blocking-	MWB	CK120	90/78472
LI.500	Transformer, Isolating-			
LI.111	Resistive divider	ENV/CGS		
LI.641	Multimeter, Digital-	Yokogawa	TY530	TKP1037
<b><i>Test no. 3a: Impulse withstand voltage test - heating</i></b>				
LI.621	Test control + recorder	NNS/Yokogawa	GX10	S5R710175
LI.356	AC power supply	REO	REOLAB	5351/1
LI.665	Transformer, induction-	Ruhrstrat	T-RFE_GAE_XXE	30000143
LI.464	Current measuring transformer	RS	B146E	07/315233/5
LI.559	Kalibrator / Multimeter	Metrawatt	Multical M245A	VC2542
LI.724	Current clamp meter, Digital -	HT	HT78	10079
<b><i>Test no. 3b: Impulse withstand voltage test @ elevated temperature</i></b>				
LI.592	Impulse divider	Haefely Hipotronics	CS 800-1000	13101206.60.1
LI.589	Impulse analysing system	Haefely Hipotronics	Dias 733	178673
LI.590	Impulse generator	Haefely Hipotronics	SGS 800/40	13101206.10.1
LI.591	Charging rectifier	Haefely Hipotronics	LGR 100/20	13101206.40.1
LI.588	Impulse generator control	Haefely Hipotronics	GC223	178964
<b><i>Test no. 4: Electrical heat cycling in air</i></b>				
LI.621	Test control + recorder	NNS/Yokogawa	GX10	S5R710175
LI.246	Transformer, HV-	MWB	TEO 100/50	376695
LI.340	Voltage regulator	REO	REOLAB	18 03132-01-1
LI.403	Resistive divider	ENV/Nicrom Electronics	NI500.50	
LI.356	AC power supply	REO	REOLAB	5351/1
LI.665	Transformer, induction-	Ruhrstrat	T-RFE_GAE_XXE	30000143
LI.464	Current measuring transformer	RS	B146E	07/315233/5
LI.111	Resistive divider	ENV/CGS		
LI.641	Multimeter, Digital-	Yokogawa	TY530	TKP1037
LI.721	Motorised control			

## LIST OF EQUIPMENT USED



Equipment N°	Description	Brand	Type	Serial N°
<b><i>Test no. 5a: Partial discharge test - heating</i></b>				
LI.621	Test control + recorder	NNS/Yokogawa	GX10	S5R710175
LI.356	AC power supply	REO	REOLAB	5351/1
LI.665	Transformer, induction-	Ruhrstrat	T-RFE_GAE_XXE	30000143
LI.464	Current measuring transformer	RS	B146E	07/315233/5
LI.722	Current clamp meter, Digital -	Fluke	381	47570010WS
<b><i>Test no. 5b: Partial discharge test @ elevated temperature</i></b>				
LI.340	Voltage regulator	REO	REOLAB	18 03132-01-1
LI.246	Transformer, HV-	MWB	TEO 100/50	376695
LI.403	Resistive divider	ENV/Nicrom Electronics	NI500.50	
LI.621	Test control + recorder	NNS/Yokogawa	GX10	S5R710175
LI.707	PD calibrator	Omicron	CAL 542	KM985G
LI.705	PD detector	Omicron	MCU 502	NJ333B
LI.706	PD detector	Omicron	CPL 542	LH748D
LI.143	Capacitor, Gas-			
LI.704	PD detector	Omicron	MPD 500	LH225D
LI.111	Resistive divider	ENV/CGS		
LI.641	Multimeter, Digital-	Yokogawa	TY530	TKP1037
<b><i>Test no. 6: Partial discharge test @ ambient temperature</i></b>				
LI.340	Voltage regulator	REO	REOLAB	18 03132-01-1
LI.246	Transformer, HV-	MWB	TEO 100/50	376695
LI.403	Resistive divider	ENV/Nicrom Electronics	NI500.50	
LI.621	Test control + recorder	NNS/Yokogawa	GX10	S5R710175
LI.707	PD calibrator	Omicron	CAL 542	KM985G
LI.705	PD detector	Omicron	MCU 502	NJ333B
LI.706	PD detector	Omicron	CPL 542	LH748D
LI.143	Capacitor, Gas-			
LI.704	PD detector	Omicron	MPD 500	LH225D
LI.111	Resistive divider	ENV/CGS		
LI.641	Multimeter, Digital-	Yokogawa	TY530	TKP1037
<b><i>Test no. 7: Impulse withstand voltage test @ ambient temperature</i></b>				
LI.592	Impulse divider	Haefely Hipotronics	CS 800-1000	13101206.60.1
LI.589	Impulse analysing system	Haefely Hipotronics	Dias 733	178673
LI.590	Impulse generator	Haefely Hipotronics	SGS 800/40	13101206.10.1
LI.591	Charging rectifier	Haefely Hipotronics	LGR 100/20	13101206.40.1
LI.588	Impulse generator control	Haefely Hipotronics	GC223	178964
<b><i>Test no. 8: AC withstand voltage test, dry</i></b>				
LI.340	Voltage regulator	REO	REOLAB	18 03132-01-1
LI.246	Transformer, HV-	MWB	TEO 100/50	376695
LI.403	Resistive divider	ENV/Nicrom Electronics	NI500.50	
LI.621	Test control + recorder	NNS/Yokogawa	GX10	S5R710175
LI.111	Resistive divider	ENV/CGS		
LI.641	Multimeter, Digital-	Yokogawa	TY530	TKP1037

## LIST OF EQUIPMENT USED



Equipment N°	Description	Brand	Type	Serial N°
<i>Test no. 9: Partial discharge test @ ambient temperature</i>				
LI.340	Voltage regulator	REO	REOLAB	18 03132-01-1
LI.246	Transformer, HV-	MWB	TEO 100/50	376695
LI.403	Resistive divider	ENV/Nicrom Electronics	NI500.50	
LI.621	Test control + recorder	NNS/Yokogawa	GX10	S5R710175
LI.707	PD calibrator	Omicron	CAL 542	KM985G
LI.705	PD detector	Omicron	MCU 502	NJ333B
LI.706	PD detector	Omicron	CPL 542	LH748D
LI.143	Capacitor, Gas-			
LI.704	PD detector	Omicron	MPD 500	LH225D
LI.111	Resistive divider	ENV/CGS		
LI.641	Multimeter, Digital-	Yokogawa	TY530	TKP1037

# IDENTIFICATION OF ACCESSORY TEST SAMPLES AND CONNECTOR



## Accessory test sample

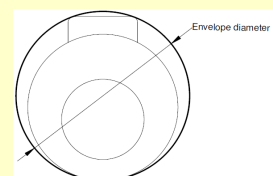
Type:	<input type="checkbox"/> straight joint <input type="checkbox"/> branch joint <input type="checkbox"/> stop-end <input checked="" type="checkbox"/> termination <input type="checkbox"/> Screened separable connector <input type="checkbox"/> Non screened separable connector <input type="checkbox"/> ?????				
Primary insulation over connectors (e.g. heat-shrink sleeve):	HS SLEEVE				
Protection (e.g. cast resin):	HS SLEEVE				
Overall dimensions:	OD 58mm				
Conductor size range for this accessory:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center;">400</td> <td style="text-align: center;">mm<sup>2</sup> to</td> <td style="text-align: center;">630</td> <td style="text-align: center;">mm<sup>2</sup></td> </tr> </table>	400	mm <sup>2</sup> to	630	mm <sup>2</sup>
400	mm <sup>2</sup> to	630	mm <sup>2</sup>		
Conductor size range for product family:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center;">400</td> <td style="text-align: center;">mm<sup>2</sup> to</td> <td style="text-align: center;">630</td> <td style="text-align: center;">mm<sup>2</sup></td> </tr> </table>	400	mm <sup>2</sup> to	630	mm <sup>2</sup>
400	mm <sup>2</sup> to	630	mm <sup>2</sup>		
Manufacturer/supplier:	NEXANS ITALIA				
Product reference:	24MONOi1.630i				
Lot Number	S1576 8295				
Expiry date	N/A				
Document with identification of primary seals	DOM6530I				

## Connector

Type:	<input type="checkbox"/> Straight <input type="checkbox"/> Branch <input checked="" type="checkbox"/> Lug <input type="checkbox"/> Circumferential conductor  <input type="checkbox"/> Plug-in  <input type="checkbox"/> Individual <input type="checkbox"/> Multi-polar (including ring type)  <input type="checkbox"/> Blocked <input type="checkbox"/> Non-blocked
Technology:	<input checked="" type="checkbox"/> Mechanical                    Torque if non shear bolt: .....
	<input type="checkbox"/> Compression <input type="checkbox"/> Hexagonal <input type="checkbox"/> Deep indent <input type="checkbox"/> Other: .....
	Tool and die used: .....
	<input type="checkbox"/> Insulation piercing

Material:	<input type="checkbox"/> Al <input type="checkbox"/> Cu <input type="checkbox"/> Bi-metallic <input type="checkbox"/> Brass <input checked="" type="checkbox"/> Tinned  <input type="checkbox"/> Non-insulated <input type="checkbox"/> Insulated description: .....
-----------	--

Manufacturer/Supplier:	GPH
Product reference:	C400-630X12
Marking:	C400-630X12
Specification which the connector complies to:	IEC61238-1
Max. & min. cross-sections:	400-630
Envelope diameter:	52mm
<i>Data sheet or drawing reference:</i>	SEE CAT PAGE



# COMPONENTS LIST



Components list N. DOM6530i



## N°3 KITS OF 24kV SINGLE CORE HEAT SHRINKABLE INDOOR TERMINATION FOR XLPE INSULATED CABLE

NEXANS type: **3x24MONO1.630i**

Suitable for 24kV Single Core XLPE Copper Wire Screen Cable  
Section 400+630 mm<sup>2</sup>

Q.ty	Description	Code
1	Installation Instructions	IM1778Ei.2
1	Component List	DOM6530i
3	Mono tubes (L=400 mm)	GT12-60T
3	<i>No. 4 kits consisting of:</i> Red mastic (L= 0,5 m)	MBA25
1	<i>No.3 kit consisting of:</i> Stress relief mastic pad (W=140; L=90 mm)	MACD140-2X0,09
1	PVC tape (L= 5 m)	NAE19
3	Solvent tissue	FAZZ-DET
3	Abrading cloth (L= 300 mm)	TELA30x300

Drawn FF	Checked	Date 14.04.21	Update
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# INSTALLATION INSTRUCTION



## **MONOi/MONOe-1** INDOOR/OUTDOOR SINGLE CORE HEAT SHRINKABLE TERMINATION

**Ref.: IM1778EI.2** ed. 15/09/2020

*(6 pages)*

# MONOi/MONOe-1

INDOOR/OUTDOOR SINGLE CORE  
HEAT SHRINKABLE TERMINATION

INSTALLATION INSTRUCTION IM1778EI.2

ed. 15/09/2020

TYPE OF CABLE: Solid insulation (XLPE-HEPR)  
SECTION: Up to 1600 mm<sup>2</sup> Cu/Al  
TYPE OF SCREEN: Copper wires  
VOLTAGE: U<sub>max</sub> 24 kV



ELAB has not checked the conformity in every detail.  
the tested object conforms to this installation instruction.

Client signature: *MFinello*

**Nexans**  
BRINGS ENERGY TO LIFE

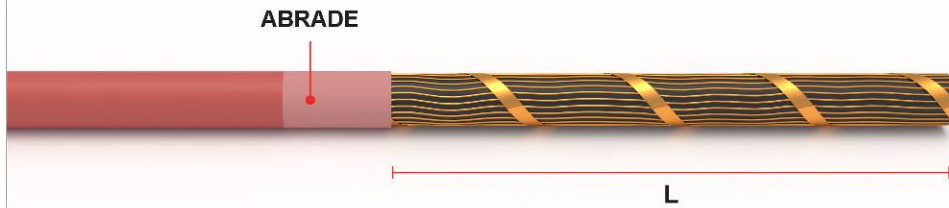
# 1 ASSEMBLY OF THE TERMINATION

## 1.1

Prepare the cable and cut the exceeding length.

## 1.2

Remove the outer sheath for the length "L" ("L" see the table).  
Abrade the outer sheath for 100 mm and clean with solvent.

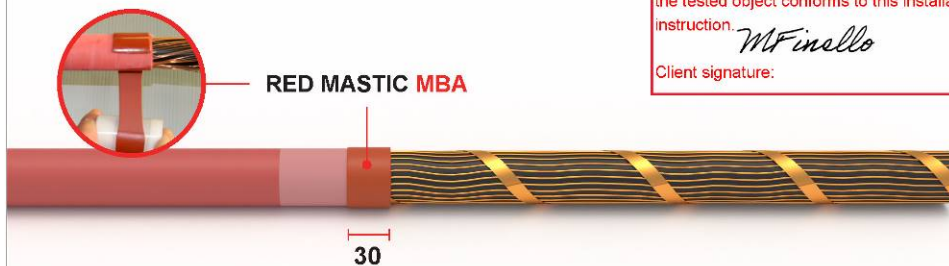


TYPE	INDOOR TYPE							
SECTION RANGE (mm <sup>2</sup> )	25 ÷ 95	70 ÷ 240	95 ÷ 300	185 ÷ 400	400 ÷ 630	630 ÷ 1000	800 ÷ 1200	1200 ÷ 1600
<b>L</b> (mm)	300	300	300	350	350	350	400	400

TYPE	OUTDOOR TYPE							
SECTION RANGE (mm <sup>2</sup> )	25 ÷ 95	70 ÷ 240	95 ÷ 300	185 ÷ 400	400 ÷ 630	630 ÷ 1000	800 ÷ 1200	1200 ÷ 1600
<b>L</b> (mm)	450	450	450	450	550	550	550	550

## 1.3

Apply a layer (20% overlap) of red mastic "MBA" for 30 mm length.



ELAB has not checked the conformity in every detail.  
the tested object conforms to this installation instruction.  
*M Finello*  
Client signature:

● 1.4

Fold back the copper screen wires and fix them temporarily at 150 mm from cut sheath with some turns of pvc tape.

● 1.5

Remove the semi-conductive layer leaving 40 mm out of the outer sheath taking care not to damage the insulation.



● 1.6

Bare the conductor for the length "C" ("C"= inside depth of lug) for bolted lug or "C+5mm" in case of compression lug.



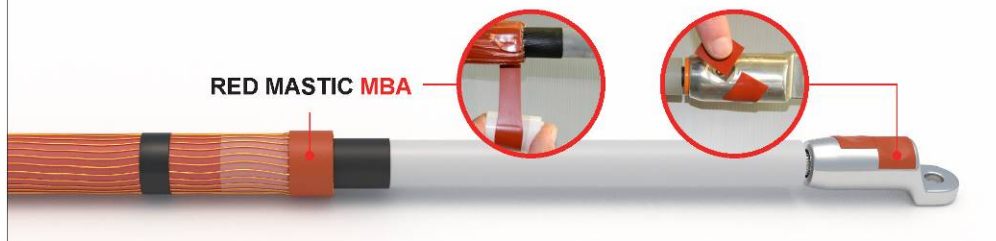
● 1.7

Position the lug and crimp it or break the screws in case of bolted lug following the manufacturer's instructions.



● 1.8

Apply a layer of red mastic "MBA" (20% overlap) over the screen wires covering the previous layer of "MBA". Fill the cavities over the lug with red mastic "MBA".



ELAB has not checked the conformity in every detail.  
the tested object conforms to this installation instruction.  
Client signature: *MFinello*

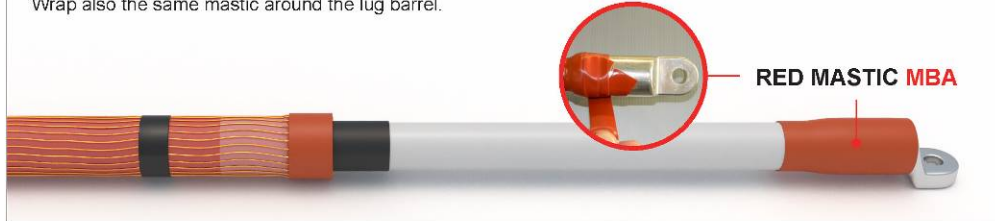


ELAB has not checked the conformity in every detail.  
the tested object conforms to this installation instruction.

Client signature: *M Finello*

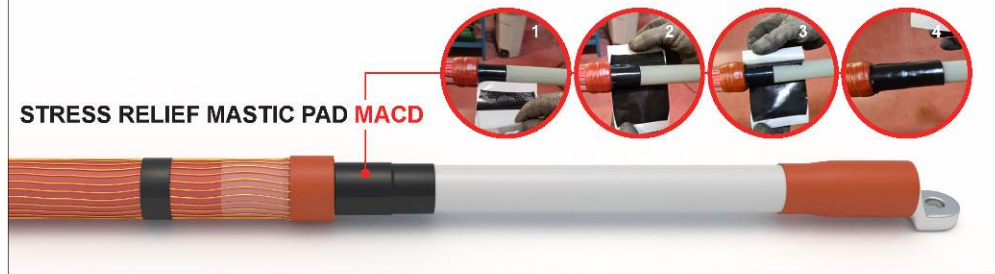
● 1.9

Wrap around the exposed conductor the red mastic "MBA" stretching it, wrap till reaching the lug barrel diameter. Wrap also the same mastic around the lug barrel.



● 1.10

Remove the protective paper (the one with the printing) from the MACD pad.  
Apply the stress relief mastic pad "MACD", lightly stretched, starting from the cut outer sheath.



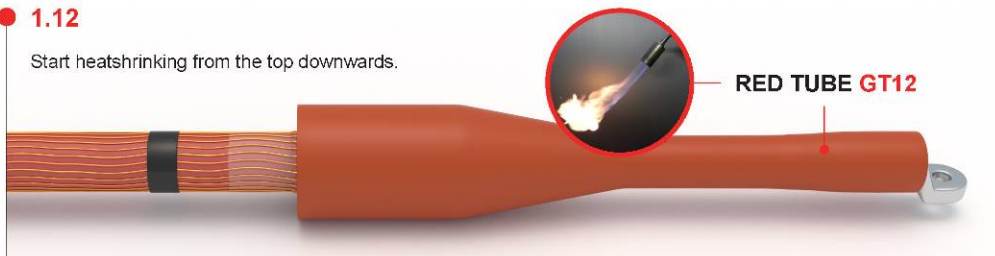
● 1.11

Slide the red tube "GT12" (stress control + insulation) till the TOP edge of red mastic "MBA" applied over the cable lug.



● 1.12

Start heatshrinking from the top downwards.



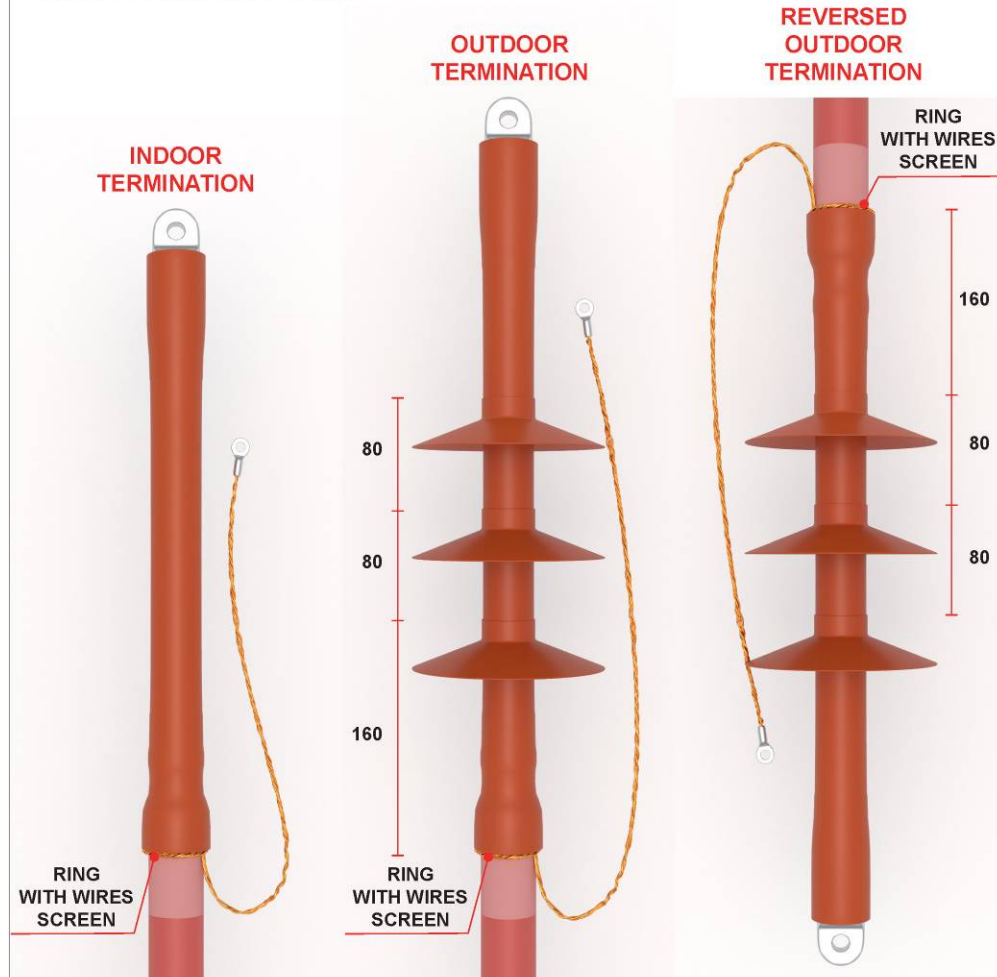
ELAB has not checked the conformity in every detail.  
the tested object conforms to this installation instruction.

Client signature: *M Finello*

● 1.13

Remove the PVC tape previously applied on the screen wires and split them into two parts; wrap the wires at the bottom of shrunk tube (one round) making a ring.  
Twist the screen wires, cut straight and crimp OR screw the grounding lug.

INDOOR TERMINATION IS FINISHED



● 1.14 ONLY FOR OUTDOOR TERMINATION

Slide the first antitracking shed at 160 mm from the bottom edge of shrunk tube and heatshrink.  
Slide the remaining shed and heatshrink. Different number of sheds and tail lengths available upon request.

OUTDOOR TERMINATION IS FINISHED





Adjust torch to give a soft blue flame with yellow tip.  
Heatshrink tubes uniformly avoiding wrinkles along the surface.  
Keep the flame moving continuously and maintain adequate distance to avoid over heating.

This product should be installed by competent personnel familiar with electrical equipment and safe operating practices. Parts contained in this kit should be visually inspected for possible damage, and installed in accordance with these instructions. These instructions are not intended as a substitute for adequate training and experience.



Please dispose of all waste according to environmental regulations.

The company reserves the right to alter without notice the information contained in this installation manual.

ELAB has not checked the conformity in every detail.  
the tested object conforms to this installation instruction.

Client signature: *M Finello*

**Nexans Italia S.p.A.**

[nexans.com/power\\_accessories](http://nexans.com/power_accessories)  
[sales.npai@nexans.com](mailto:sales.npai@nexans.com)



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