



Test Report

Report No.: XZ 289 F 004

Copy No.: 1

Contents: 19 Sheets

Test object: Metal-enclosed, oil-insulated switchgear equipped with three-position switch disconnecter.

Designation: Ring Main Unit Type T3GF3

Rated voltage: 6.6 / 11 kV Rated normal current: 400 / 630 A Rated frequency: 50 Hz

Manufacturer: Long and Crawford Ltd., Manchester, United Kingdom of Great Britain

Client: EPS UK Ltd., Loughborough, United Kingdom of Great Britain

Date of test: 04th June 2014

Applied test specifications:

The tests have been carried out in accordance to client's instructions based on:
IEC 62271-200 / Ed. 2.0 / 2011-10, Clause 6.6

Tests performed:

Three-phase short-time withstand current and peak withstand current test of the main circuit for a peak current of 37.5 kA and a short-time current of 15 kA – 1.5 s at 50 Hz.

Three-phase peak withstand current test of the main circuit for a peak current of 50 kA

Measurement of the resistance of the main circuit before and after the tests.

Test results:

The test object passed the first test performed in accordance with the applied test specifications with a peak current of 37.5 kA and a short-time current of 15 kA – 1.5 s.

The Test object failed the peak withstand current test of the main circuit for a peak withstand current of 50kA.



Dr. Martin Wember
Manager of Laboratory

Matthias Kinast
Test Engineer

Ratingen, 16th January 2015

Notes

Accreditation:

ABB AG – Calor Emag Medium Voltage Products is certified according to ISO 9001:2008 and 14001:2004 and BS OHSAS 18001:2007 by DEKRA Certification GmbH under Reg. No. 51210777.

ABB Laboratories Ratingen are accredited according to DIN EN ISO/IEC 17025 by Deutsche Akkreditierungsstelle GmbH (DAkKS) under Reg.No. D-PL-12115-01-01 for tests of high-voltage equipment.

Uncertainty of the measurement systems:

The method of presentation of measuring results does not indicate an accuracy. As long as no explicit statements are made, the uncertainties required by the relevant standards have been complied with.

Addresses:

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Manufacturer: Long & Crawford Ltd.
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Client: EPS UK Ltd
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United Kingdom of Great Britain

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List of Test Participants

Test Engineer / Test Operator:

Mr. Uwe Lisseck and Mr. Matthias Kinast (Test Engineer)	ABB Laboratories Ratingen, Germany
Mr. Joachim Köhler (Measurement and Machine Operator)	ABB Laboratories Ratingen, Germany

Representatives of Client:

Mr. Andy Michel	EPS UK Ltd.,Loughborough, United Kingdom of Great Britain
Mrs. Carolina Garzón	EPS UK Ltd.,Loughborough, United Kingdom of Great Britain
Mr. Ben Sigsworth	EPS UK Ltd.,Loughborough, United Kingdom of Great Britain
Mr. David Curtis	EPS UK Ltd.,Loughborough, United Kingdom of Great Britain

Further Participants:

Mr. Ian-David Bonam	Bowers Electricals Ltd., Heanor Derbyshire, United Kingdom of Great Britain
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**Technical Data of Test Object
Switchgear**

Test object: Metal-enclosed, oil-insulated switchgear equipped with three-position switch disconnecter.
Designation: Ring Main Unit Type T3GF3.
Manufacturer: Long and Crawford Ltd., Manchester, United Kingdom of Great Britain
Serial No.: 762828
Year of manufacture: -
Drawing No.: A209-0331

Ratings assigned by the manufacturer:

Rated voltage	6.6 / 11	kV
Rated normal current	630	A
Rated frequency	50	Hz
Rated lightning impulse withstand voltage	-	kV
Rated switching impulse withstand voltage	-	kV
Rated power-frequency withstand voltage	-	kV
Rated peak withstand current	33.4	kA
Rated short-time withstand current	13.1	kA
Rated duration of short-circuit	3	s
Insulating medium	oil	
Rated filling pressure for insulation	-	MPa abs. at 20 °C
Minimum functional pressure for insulation	-	MPa abs. at 20 °C

Permissible values for internal arc faults:

Peak current	-	kA
Short-circuit current	-	kA
Duration of short-circuit	-	s

Further data: -

Essential characteristics and installed devices: -

List of Identified Drawings

The manufacturer has guaranteed, that the equipment submitted for test has been manufactured in full accordance with the following drawings. ABB Test Lab has verified that these drawings adequately represent the equipment tested. These drawings have been stamped and signed by ABB Test Lab representatives and are kept

- with the test documents at the test laboratory.
 at the client.

The drawings contained in this document are identical with the checked, stamped and signed drawings.

Drawing No.	Rev.	P/D *)	Title	Additional remarks
A209-0331	16-11-90	D	GENERAL ARRANGEMENT OF TRANSFORMER MOUNTED & FREE STANDING TYPE T4GF3 RING MAIN UNIT FITTED WITH COMPOUND INSULATED CABLE BOXES:	Included in this test report

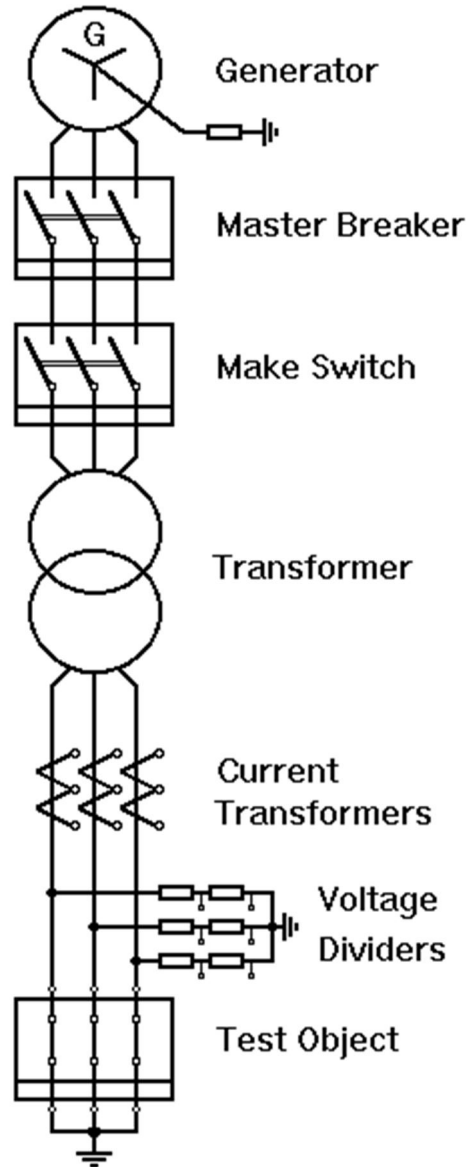
*) P: Parts list, D: Drawing

Technical Data of Test Circuit Short-Time Withstand Current and Peak Withstand Current Test

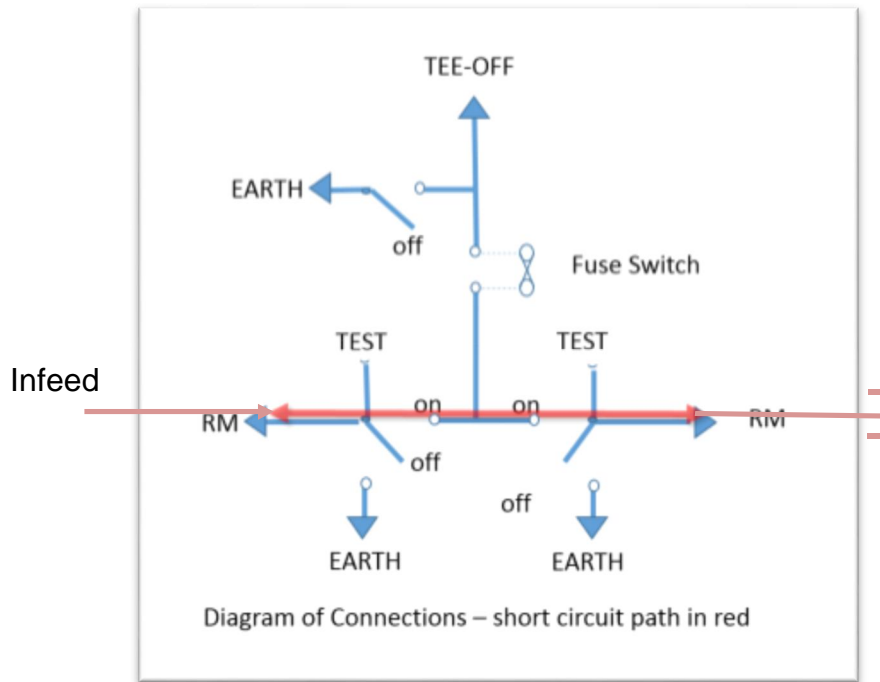
Test performed		STC	-
Test No.	XZ 289 F 004 /	02 - 10	-
Test circuit			
Circuit diagram	Sheet No.	9	-
Current circuit			
Number of phases		3	-
Power frequency	Hz	50	-
Power factor		< 0.15	-
Earthing conditions			
Generator / System		earthed via 5 kΩ	-
Transformer		not earthed	-
Short-circuit point		earthed	-
Test object		earthed	-
Test object (test values)			
Number of phases		3	-
Measurement			
Voltage measurement		Voltage Dividers 1000 V / 1 V	-
Current measurement		Current Transf. 50 kA / 5 A	-

Remarks: -

Circuit Diagram Short-Time Withstand Current and Peak Withstand Current Test



Test Setup Short-Time Withstand Current and Peak Withstand Current Test



Test Results

Short-Time Withstand Current and Peak Withstand Current Test

Test performed:	Short-Time Withstand Current and Peak Withstand Current Test
Date of test:	06 th June 2014
Condition of test object before test:	Unproved.
Test arrangement:	Direct test circuit, three-position switch disconnecter in metal-enclosed, oil-insulated switchgear.
Connections to test object:	Infeed via cables to the cable-terminals on the left hand side of the switchgear. Short-circuited at the cables connected on the cable-terminals of the right hand side of the switchgear, short-circuit point and switchgear earthed via cable.
Gas pressure (abs. rel. to 20 °C):	- MPa

Test No.	XZ 289 F 004 /		05	06	07	08	09	10	
Peak withstand current	L1	kA	32.9	19.3	37.1	21.3	37.0	50.1	
	L2	kA	31.1	21.6	35.2	23.9	35.4	47.3	
	L3	kA	25.9	19.5	29.0	21.7	28.5	39.5	
Short-circuit current	First cycle	L1	kA	17.6	13.0	19.8	14.5	19.4	16.4
		L2	kA	18.4	14.4	21.0	16.0	20.8	15.9
		L3	kA	16.8	13.1	19.2	14.6	19.0	14.8
	Last cycle	L1	kA	16.4	13.5	18.6	14.9	18.2	-
		L2	kA	17.7	14.5	20.1	15.9	19.8	20.4
		L3	kA	16.3	13.3	18.5	14.5	18.2	21.9
Equivalent current	L1	kA	16.3	13.2	18.5	14.6	18.1	-	
	L2	kA	17.7	14.3	20.1	15.8	19.8	-	
	L3	kA	16.2	13.1	18.5	14.5	18.2	-	
Average value	kA	16.7	13.5	19.0	15.0	18.7	-		
Duration of short-circuit		s	0.32	1.57	0.319	1.57	0.32	0.32	
Short-time withstand current	L1	kA	-	16.5	-	18.3	-	-	
	L2	kA	-	17.8	-	19.7	-	-	
	L3	kA	-	16.3	-	18.1	-	-	
	Average value	kA	-	16.9	-	18.7	-	-	
Related to rated duration of short-circuit		s	-	1.0	-	1.0	-	-	
Duration of short-circuit		s	-	1.5	-	1.5	-	-	
Related to rated short-time withstand current		kA	-	13.8	-	15.3	-	-	
Emission of flame/gas/oil			no	no	no	no	no	no	
Test result (P/N)			P	P	P	P	P	N	
Resistance of the main circuit before test	L1	μΩ	222	-	-	-	-	-	
	L2	μΩ	185	-	-	-	-	-	
	L3	μΩ	266	-	-	-	-	-	
Test current: 100 A (d.c.)									
Ambient air temperature		°C	21.5	-	-	-	-	-	
Resistance of the main circuit after test	L1	μΩ	-	-	-	-	-	140.2	
	L2	μΩ	-	-	-	-	-	131.1	
	L3	μΩ	-	-	-	-	-	133.8	
Ambient air temperature		°C	-	-	-	-	-	21.0	

Legend: P: Passed in terms of the applied standard N: Not passed in terms of the applied standard

Remarks: XZ 289 F 004 / 01: Current calibration
 XZ 289 F 004 / 02 and 04: Tests with reduced values
 XZ 289 F 004 / 10: Contact separations in L1 and L2 starts at 160 ms.

Condition of test object after test: Test object not inspected (oil immersed contacts)

Photos

Photo No. 01:
Before test XZ 289 F 004 / 02
Test object, front view

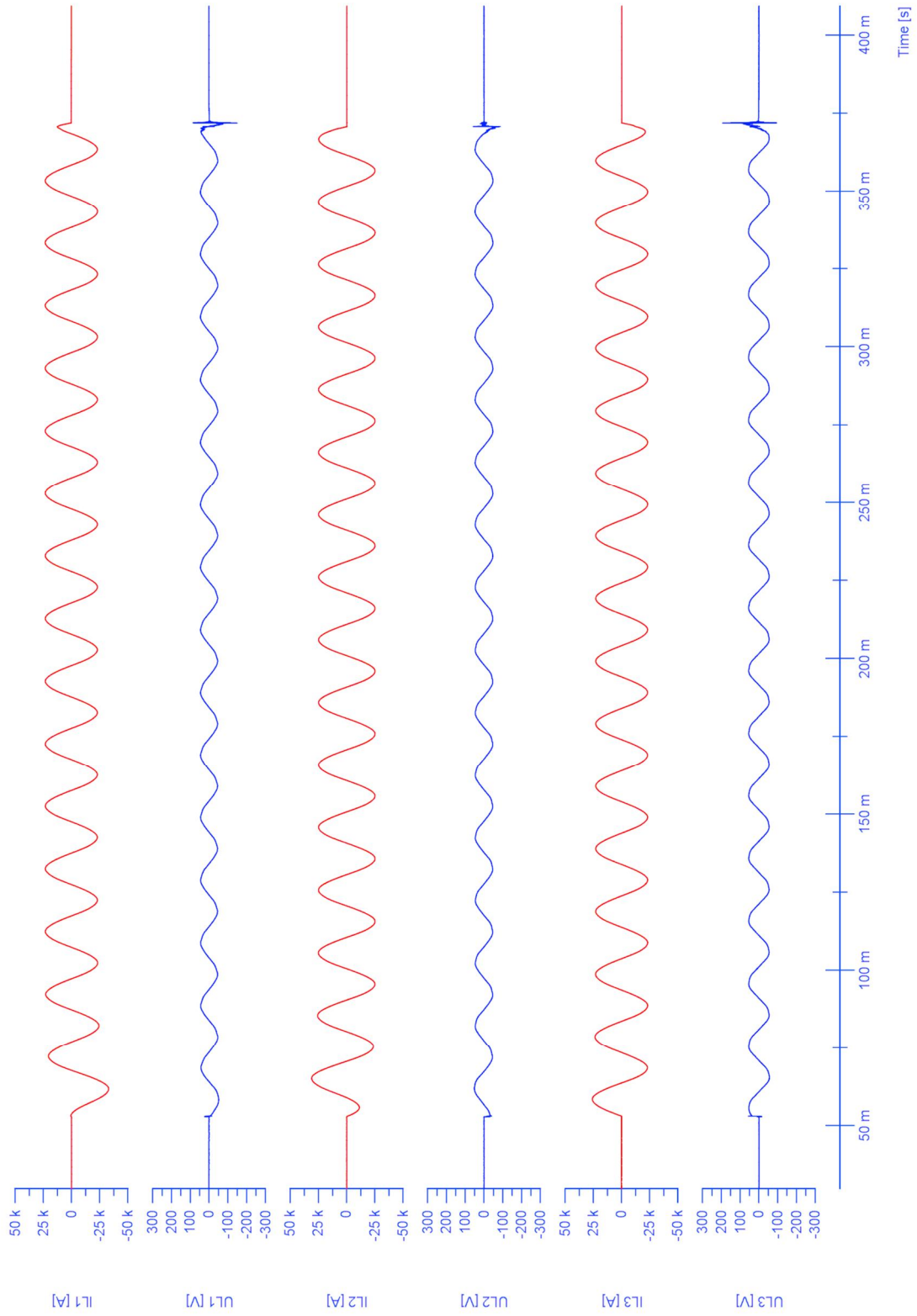


Photo No. 02:
Before test XZ 289 F 004 / 02
Test object, rear view

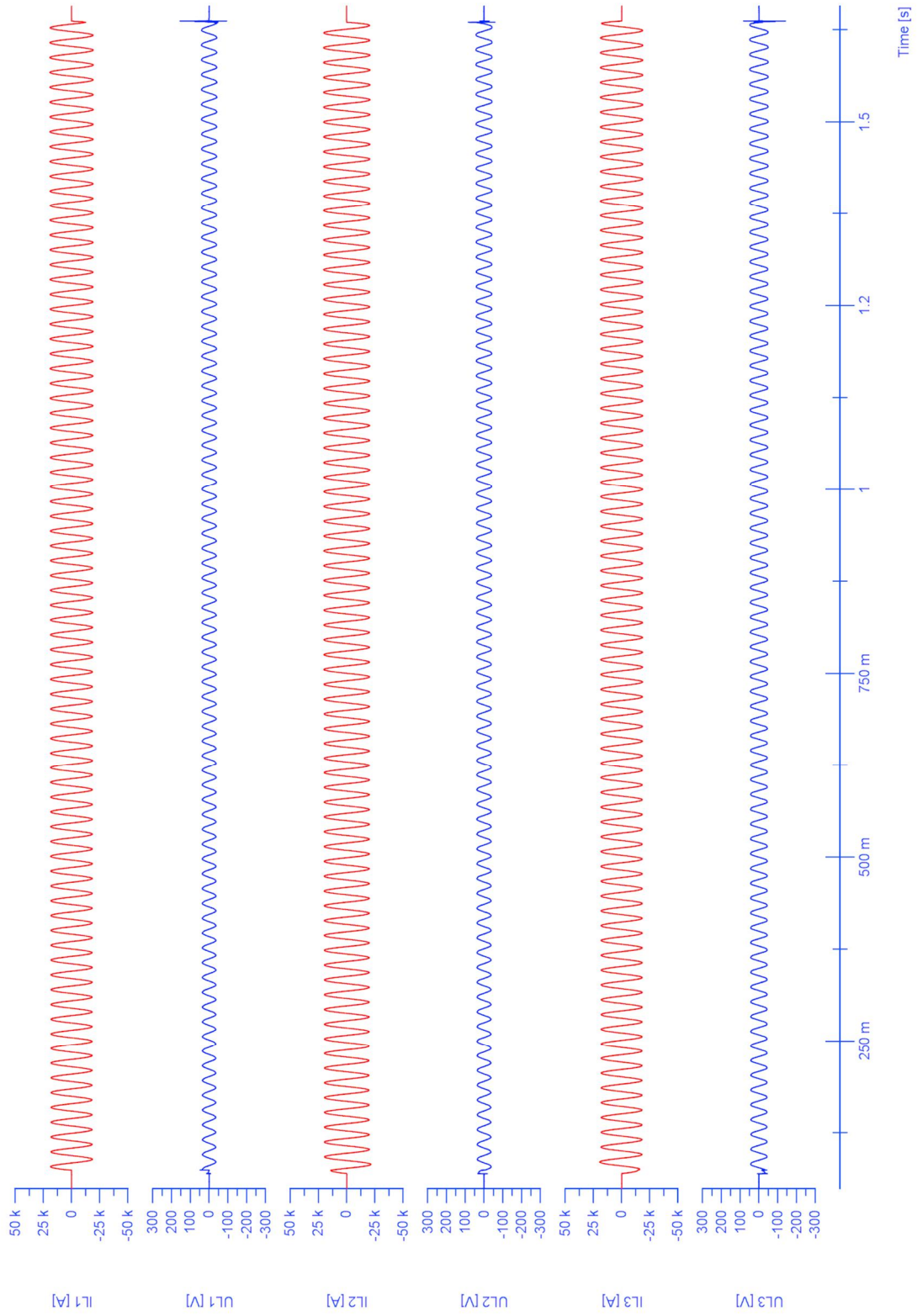
Photos

Photo No. 03:
Before test XZ 289 F 004 / 02
Test object, side view

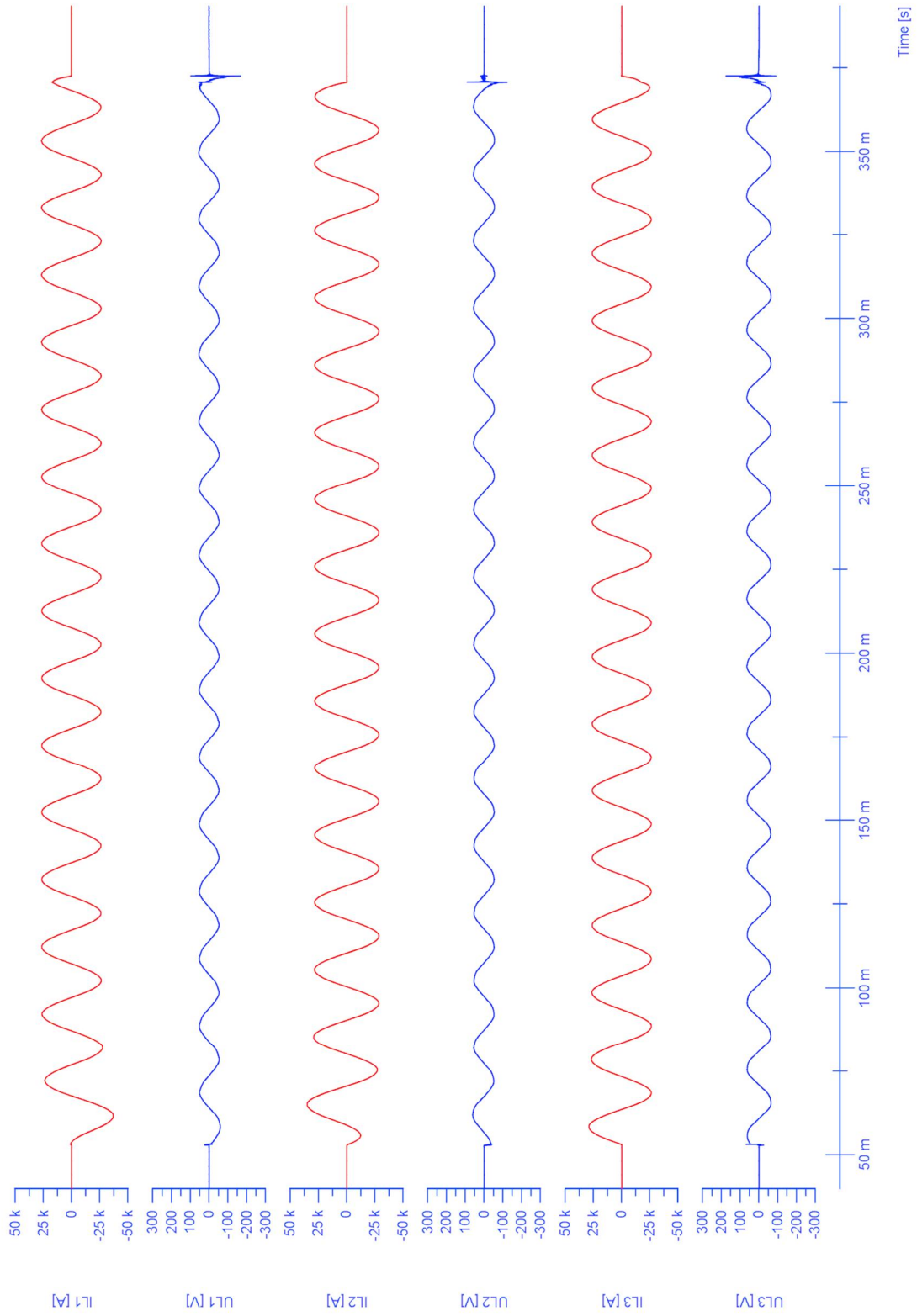
Oscillogram No. XZ 289 F 004 / 05 Peak Withstand Current Test



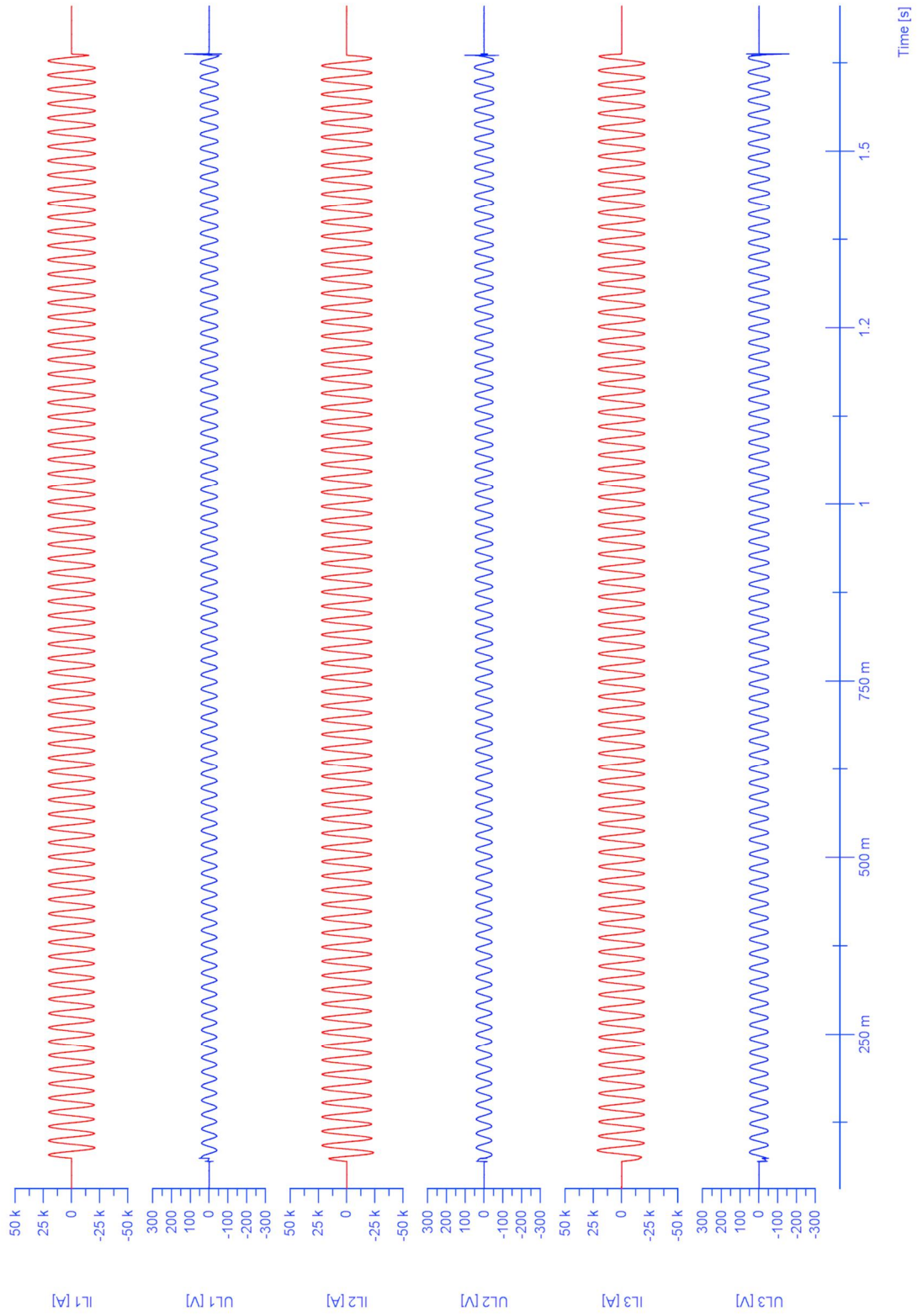
Oscillogram No. XZ 289 F 004 / 06 Short-Time Withstand Current Test – 1.5s



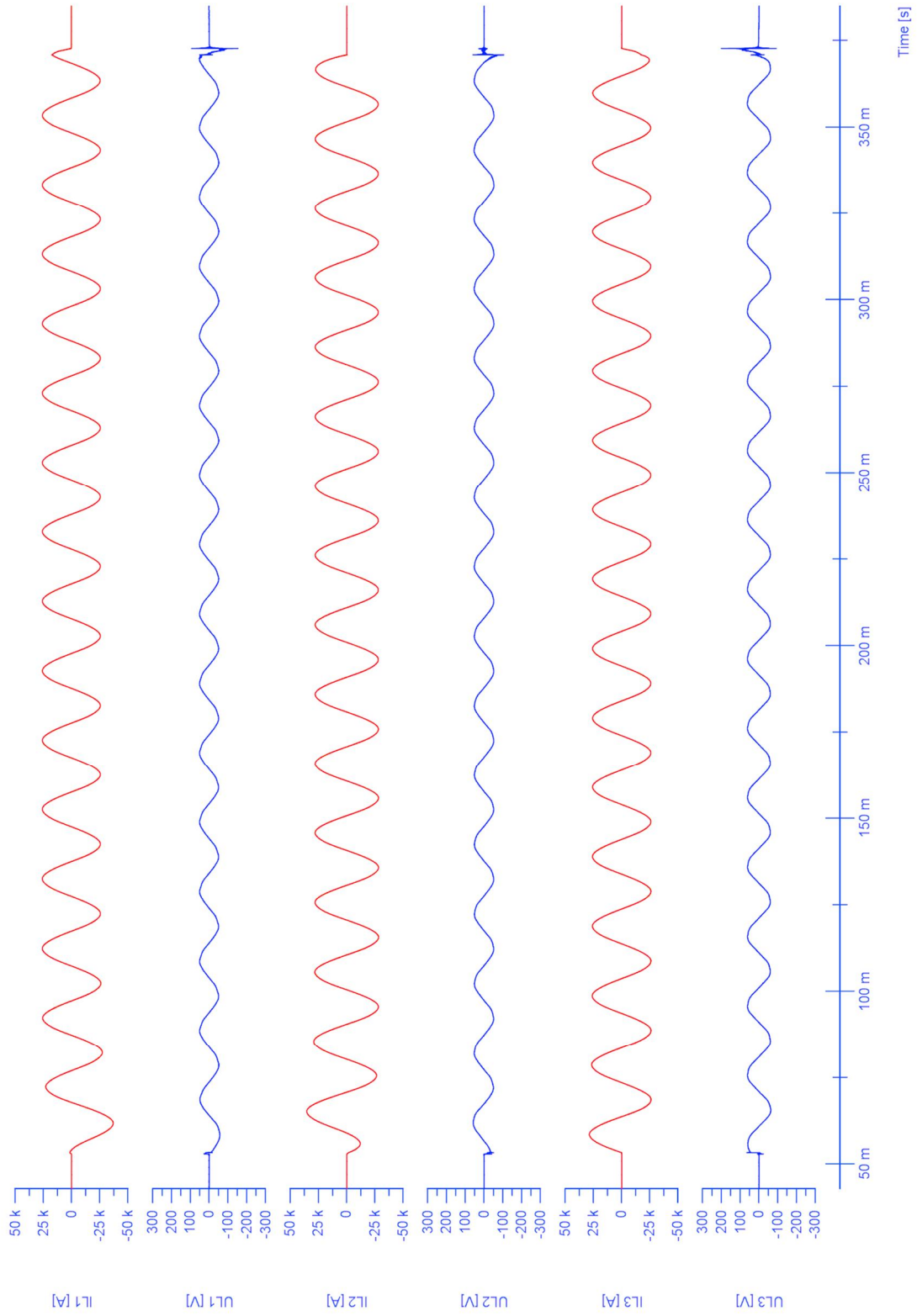
Oscillogram No. XZ 289 F 004 / 07 Peak Withstand Current Test



Oscillogram No. XZ 289 F 004 / 08 Short-Time Withstand Current Test – 1.5s



Oscillogram No. XZ 289 F 004 / 09 Peak Withstand Current Test



Oscillogram No. XZ 289 F 004 / 10 Peak Withstand Current Test

