POLIPAR	Test Report	FUSE CUT-OUT

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General

Test category	Type test
Type and name of the samples	Fuse cutouts
Manufacturer	Erkan Elektromekanik A.Ş (Polipar Brand Owner)
Address	1203. Street No: 38/L-5/D Ostim Organized Industrial Area, Ankara/Türkiye, Postcode: 06374
Manufacturing date	2021-12

Main technical parameters of the samples	
Rated voltage (kV)	12
Rated current (A)	100
Rated frequency (Hz)	50
Fuse base rated current (A)	100
Equipped fuse rated current (A)	6，100
Rated breaking current (kA)	8
Power-frequency voltage dry tests（phase to earth）(kV)	35
Power-frequency voltage dry tests（fracture）(kV)	39
Power-frequency voltage wet tests（phase to earth）(kV)	30
Lightning impulse voltage dry tests（phase to earth）(kV) Peak	95
Lightning impulse voltage dry tests（fracture）(kV) Peak	105
Fuse class	Class B

Description	12kV Porcelain Fuse Cutout

Test period: From June. 8, 2022 to June. 15, 2022

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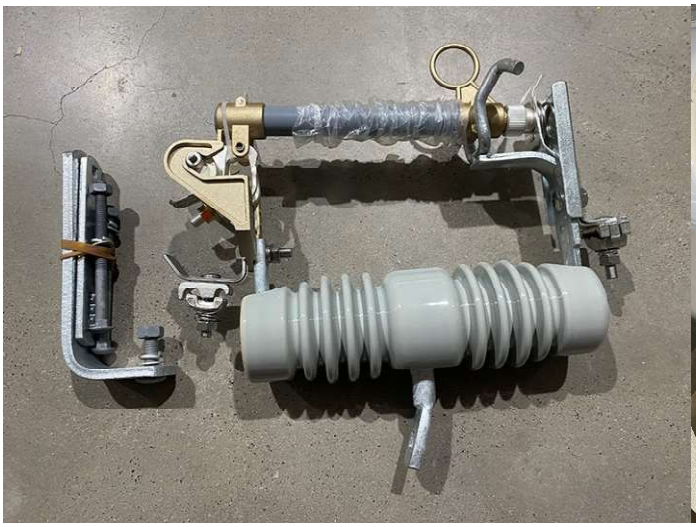
Photos of the samples





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Test conclusion

Manufacturer	Erkan Elektromekanik A.Ş (Polipar Brand Owner)	
Type of the samples	FUSE CUT-OUT	
Name of the samples	Fuse cutouts	
Manufacturer	Erkan Elektromekanik A.Ş (Polipar Brand Owner)	
Test items and results	Power-frequency voltage dry tests [phase to earth: 35kV 1min; fracture: 39kV 1min]	PASS
	Lightning impulse voltage dry tests [phase to earth: 95kVPeak;fracture: 105kVPeak]	PASS
	Power-frequency voltage wet tests [phase to earth:30kV 1min]	PASS
	Temperature-rise test[100A]	PASS
	Breaking tests1[12kV, 8kA, 6A and 100A 3 times each]	PASS
	Breaking tests2[12kV, 4.8~6.4kA, 6A and 100A 3 times each]	PASS
	Breaking tests3[12kV, 1.6~2.4kA, 6A and 100A 1 time each]	PASS
	Breaking tests4[12kV, 400~500A, 6A 2 times each]	PASS
	Breaking tests5[12kV, 162~198A, 6A 2 times each]	PASS
	Pre-arcing time-current characteristics test	PASS
	Operating time-current characteristics test	PASS
	Mechanical tests: Mechanical testing of fuse bases and fuse-carrying parts [500times"CO"]	PASS
	Thermal Cycle test	PASS
	Torque test	PASS
	Dimensional and Galvanising test	PASS
	Radio interference voltage (r.i.v.) tests	PASS
	Measurement of Resistance of fuse-links	PASS
Test standards	IEEEStdC 37.41 IEEE Standard Design Tests for High-Voltage(＞1000V)Fuses and Accessories	
	IEEE Std C 37.42 IEEE Standard Specifications for High-Voltage(＞ 1000V)Fuses and Accessories	
Test conclusion	The tests have been carried out from 6/8-6/15/2022. the test items meet the relevant clauses of above test standards and technical specifications, and the samples have passed the tests	

Compiled by:	Proofread by:	Checked by:	Approved by:
Date: 2022/6/18	Date: 2022/6/18	Date: 2022/6/19	Date:2022/6/20

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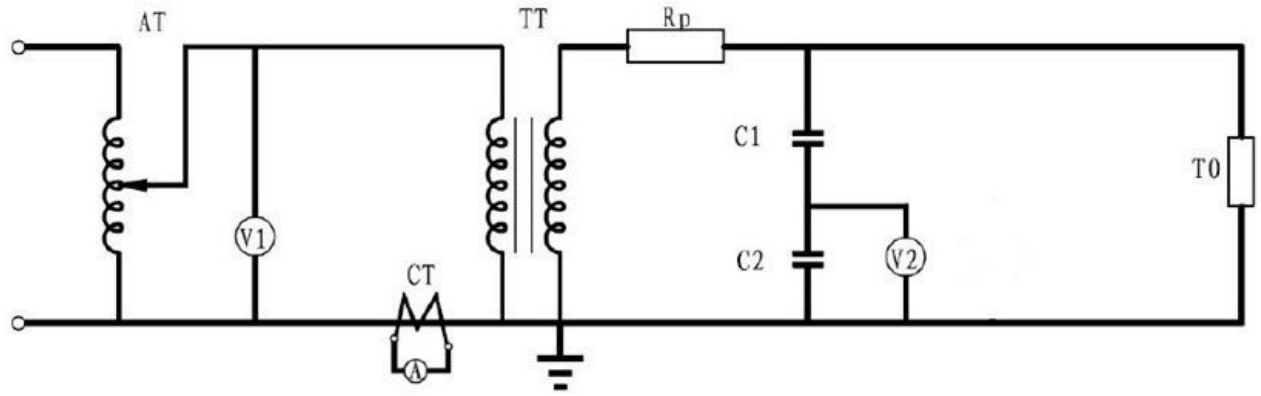
Power-frequency voltage tests

Test date: June.8, 2022

Test arrangement and requirement:

1. The test object is a completely assembled new sample;
2. External surface of sample insulating components is clean before the test;
3.Phase to earth: 35kV 1min, Fusefracture: 39kV 1min。

Test schematic diagram:



AT	Booster	Rp	Protected resistance
CT	Current transform	TT	Power-frequency test transform
TO	Test object	A	Ammeter
C1	HV arm capacitance	C2	LV arm capacitance
V2	Peak voltmeter (voltmeter)		

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Power-frequency voltage tests

Test date: June.8, 2022

Test result:

Sample condition	Voltage applied to	Earth connected to	1min power-frequency withstand voltage			
			Applied voltage (kV)	Measured voltage (kV)	Applied times	Puncture times
Fuse in closed position	Aa	F	35±1%	35.0	1	0
Fuse carrier in drop position	A	aF	35±1%	35.1	1	0
	a	AF		35.0	1	0
Fuse carrier in drop position	A	a	39±1%	39.1	1	0
	a	A		39.1	1	0

Test result: PASS.

Note: A——one side terminal of tested parts; a——the other side terminal of tested parts; F——enclosure and base.

The data in the table has been corrected into the standard atmospheric conditions.

Atmospheric conditions of test zone	P= 101.9kPa; Ambient temperature t=25℃; Relative humidity:60% Atmospheric correction factor Kt=0.9553(corrected by 1.0000) Altitude correction factor Ka= /

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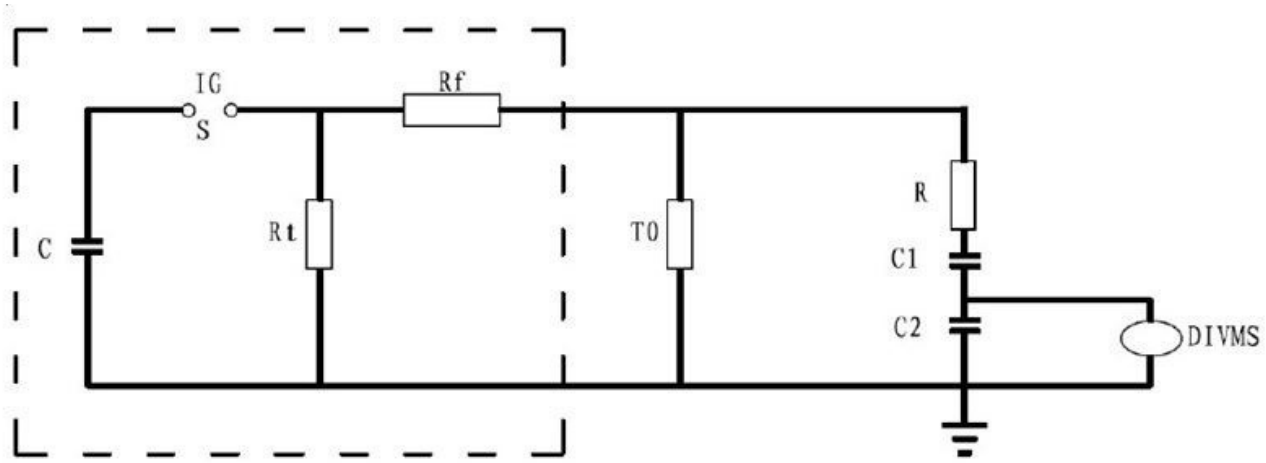
Lightning impulse voltage tests

Test date: June.9, 2022

Test arrangement and requirement:

1. The test object is a completely assembled new sample;
2. External surface of sample insulating components is clean before the test;
3. Phase to earth:95kV, isolating distance:105kV.

Test schematic diagram:



C	Main capacitance of the impulse generator	R_f	Resistance on head of wave	DIVMS	Oscilloscope
R_t	Resistance on end of wave	S	Impulse ignition clearance		
R	Damped resistance	C1	HV arm capacitance		
TO	Test object	C2	LV arm capacitance		

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Lightning impulse voltage tests

Test date: June.9, 2022

Test result:

Status of samples or test parts	Voltage applied to	Earth connected to	Applied voltage (kV)	Measured voltage (kV)																Applied times	Puncture times	Typical oscillogram No
				Polarity	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
Fuse in closed	Aa	F	95±3%	Pos.	94.1	94.8	94.6	/	/	/	/	/	/	/	/	/	/	/	/	3	0	LD01
				Neg.	95.0	94.8	94.1	/	/	/	/	/	/	/	/	/	/	/	/	3	0	LD02
Fuse carrier in drop position	A	aF	95±3%	Pos.	94.6	94.7	94.0	/	/	/	/	/	/	/	/	/	/	/	/	3	0	LD03
				Neg.	95.0	94.8	95.1	/	/	/	/	/	/	/	/	/	/	/	/	3	0	LD04
	a	AF		Pos.	95.0	94.3	94.5	/	/	/	/	/	/	/	/	/	/	/	/	3	0	LD05
				Neg.	95.0	94.8	94.8	/	/	/	/	/	/	/	/	/	/	/	/	3	0	LD06
Fuse carrier in drop position	A	a	105±3%	Pos.	104.	104.	105.0	/	/	/	/	/	/	/	/	/	/	/	/	3	0	LD07
				Neg.	104.	105.	105.1	/	/	/	/	/	/	/	/	/	/	/	/	3	0	LD08
	a	A		Pos.	104.	104.	104.3	/	/	/	/	/	/	/	/	/	/	/	/	3	0	LD09
				Neg.	104.	104.	105.1	/	/	/	/	/	/	/	/	/	/	/	/	3	0	LD10

Test result: Pass

Note: A——one side terminal of tested parts; a——the other side terminal of tested parts; F——enclosure and base.

The data in the table has been corrected into the standard atmospheric conditions.

Atmospheric conditions of test zone	P= 102.1kPa; Ambient temperature t=25℃; Relative humidity: 60% Atmospheric correction factor Kt=0.9788(corrected by 1.0000) Altitude correction factor Ka= /

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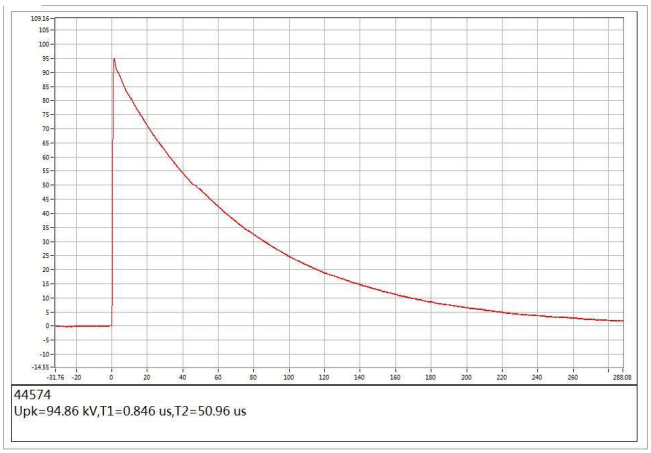
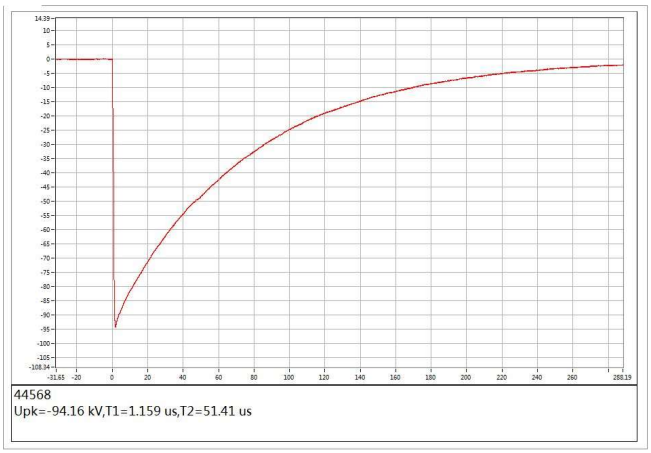
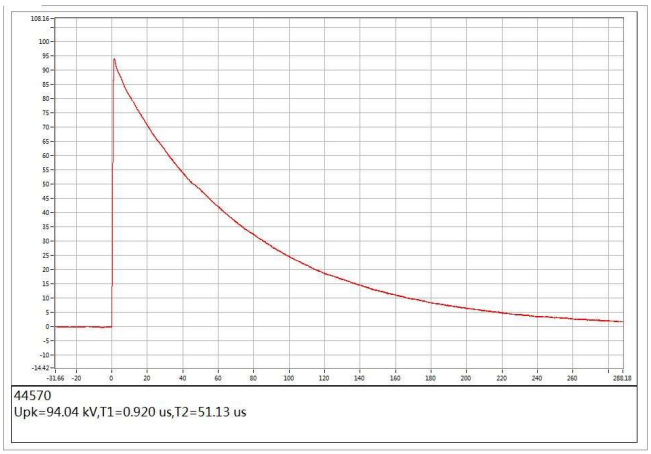
Oscillogram of lightning impulse voltage tests



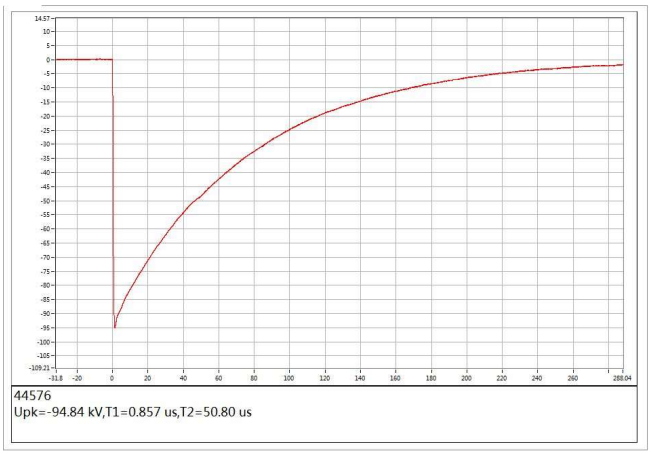
/-LD01



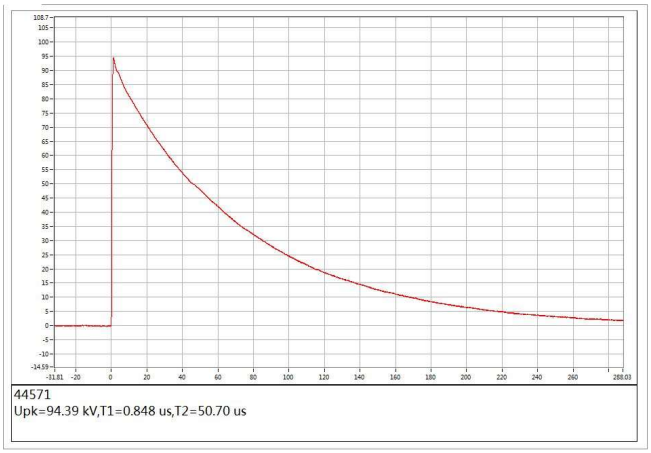
/-LD02



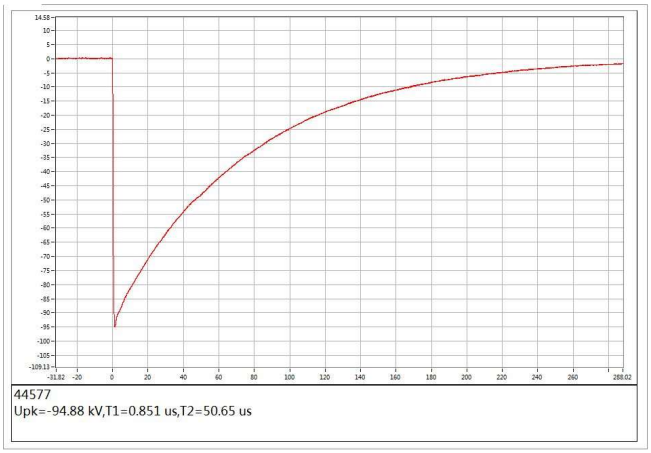
/-LD03



/-LD04



/-LD05



/-LD06

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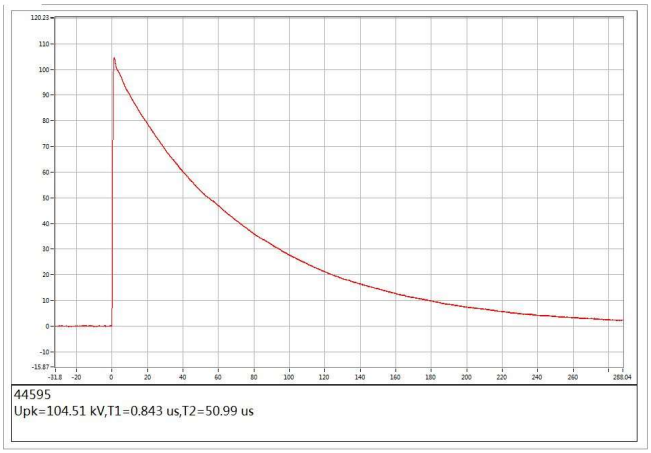
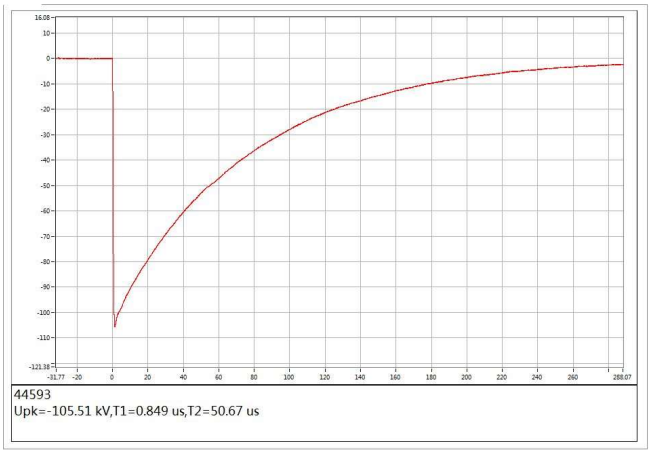
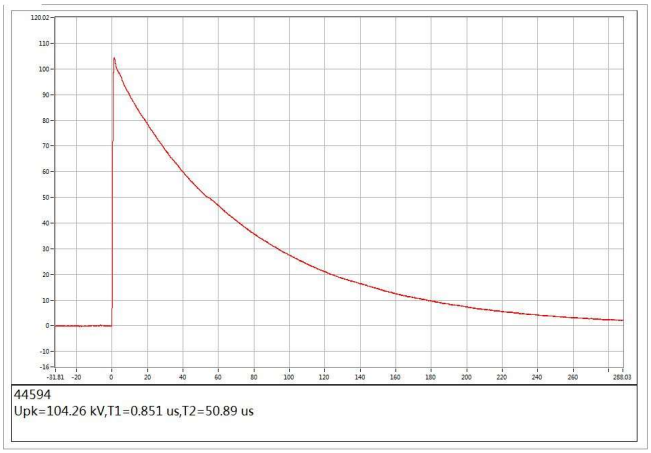
Oscillogram of lightning impulse voltage tests



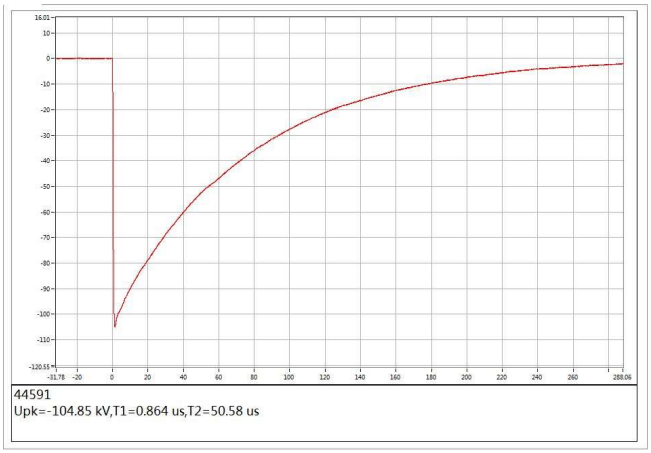
/-LD07



/-LD08



/-LD09



/-LD10

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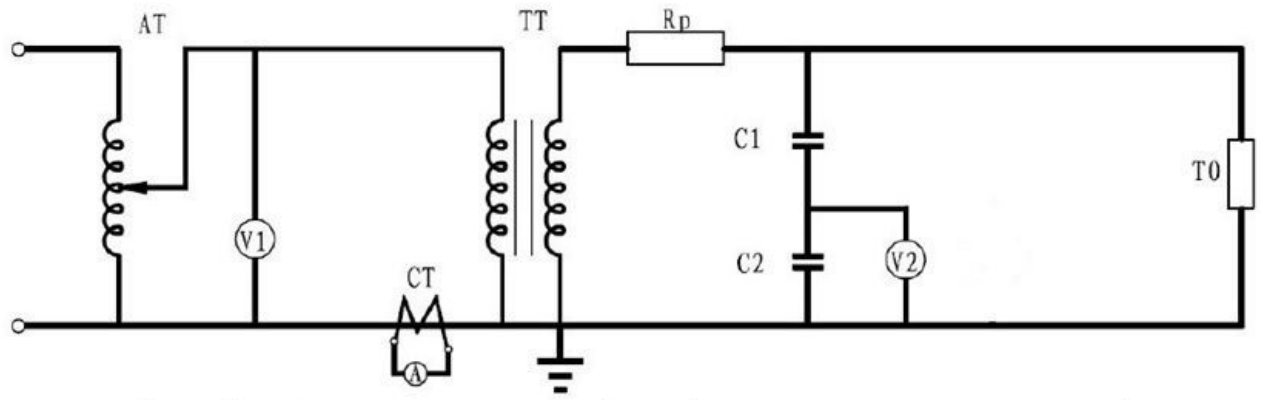
Power-frequency voltage wet tests

Test date: June.9, 2022

Test arrangement and requirement:

1. A clean fuse for the test;
2. phase to earth: 30kV 1min;
3. Average rainfall rate: horizontal component: 1.0～2.0mm/min, vertical component: 1.0～2.0mm/min；
4. conductivity of water: 100±15μS/cm；
5. temperature of water: ambient temperature ±15℃。

Test schematic diagram:



AT	Booster	Rp	Protected resistance
CT	Current transform	TT	Power-frequency test transform
TO	Test object	A	Ammeter
C1	HV arm capacitance	C2	LV arm capacitance
V2	Peak voltmeter (voltmeter)		

POLIPAR	Test Report	FUSE CUT-OUT

Power-frequency voltage wet tests

Test date: June.10, 2022

Test result:

Average rainfall rate	horizontal component: 1.6mm/min vertical component: 1.7mm/min	conductivity of water: 108μS/cm	temperature of water: 13.4℃

Sample condition	Voltage applied to	Earth connected to	1min power-frequency withstand voltage			
			Applied voltage (kV)	Measured voltage (kV)	Applied times	Puncture times
Fuse in closed position	Aa	F	30±1%	30.2	1	0
Fuse carrier in drop position	A	aF	30±1%	30.2	1	0
	a	AF		30.2	1	0
/	/	/	/	/	/	/
	/	/		/	/	/

Test result: Pass

Note: A——one side terminal of tested parts; a——the other side terminal of tested parts; F——enclosure and base.

The data in the table has been corrected into the standard atmospheric conditions.

Atmospheric conditions of test zone	P= 102.5kPa; Ambient temperature t=26℃; Relative humidity: 65% Atmospheric correction factor Kt=1.0341 Altitude correction factor Ka= /

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Temperature-rise test

Test date: June.12, 2022

Test current（A）:	100	Test poles:	3 poles	Current frequency:	50Hz
Connecting conductor（mm^2×m）:	160×2		Ambient wind speed:	0.04m/s	

Measured data of temperature-rise (K)

Numbers or names of measuring parts	（Ambient temperature 19.7℃）	Permitted temperature-rise value（K）	Remark
1	2.3	/	Reference point
2	5.6	65	
3	7.0	75	
4	12.8	65	
5	17.7	65	
6	16.4	/	Reference point
7	105.4	/	Reference point
8	16.1	35	
9	19.8	50	
10	4.4	50	
11	3.6	65	
12	1.2	/	Reference point

Note: for the numbers of measuring parts and the measuring parts of thermocouple, see sketch map

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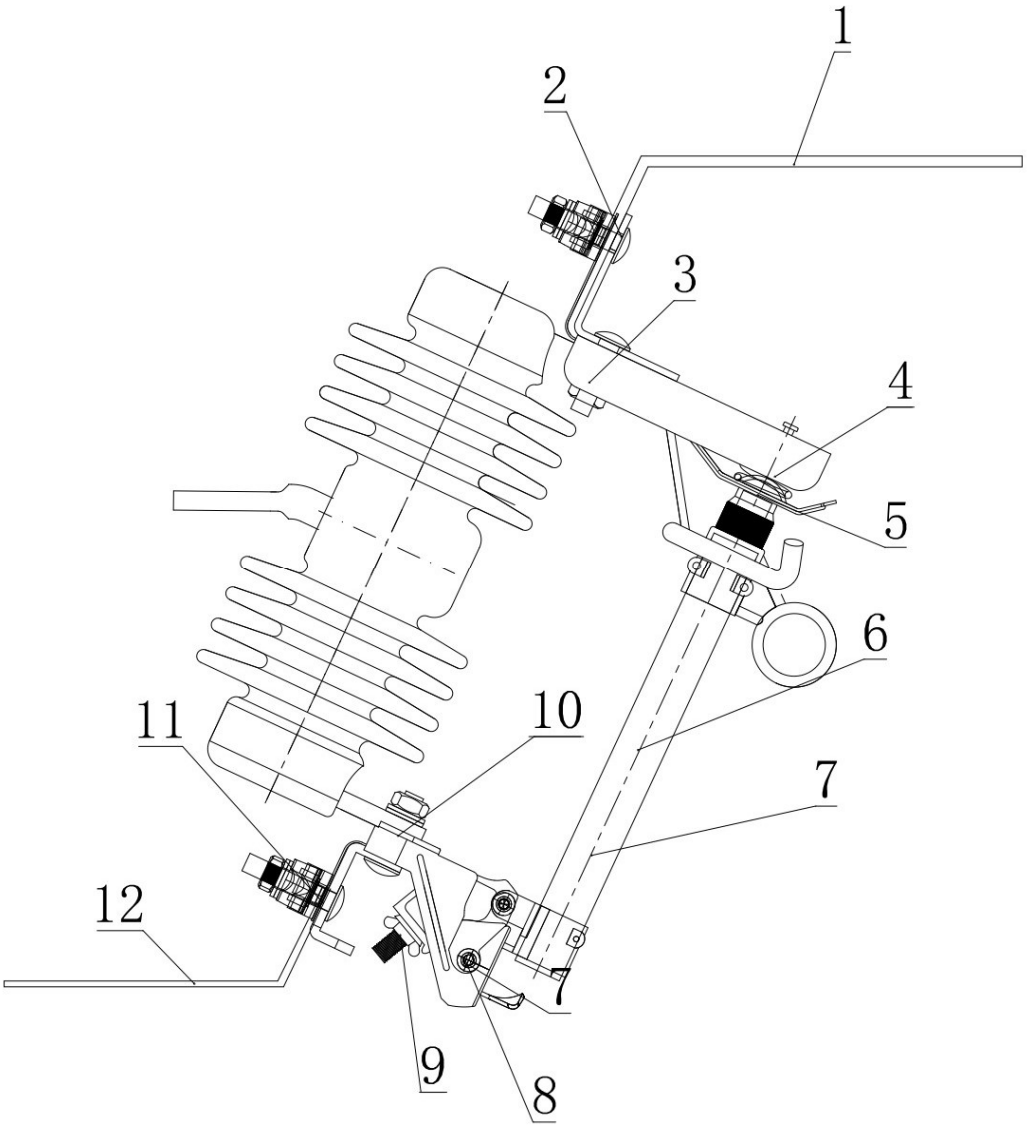
Diagram of measuring points of temperature-rise



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Breaking tests test method 1

Test date: June.11,2022

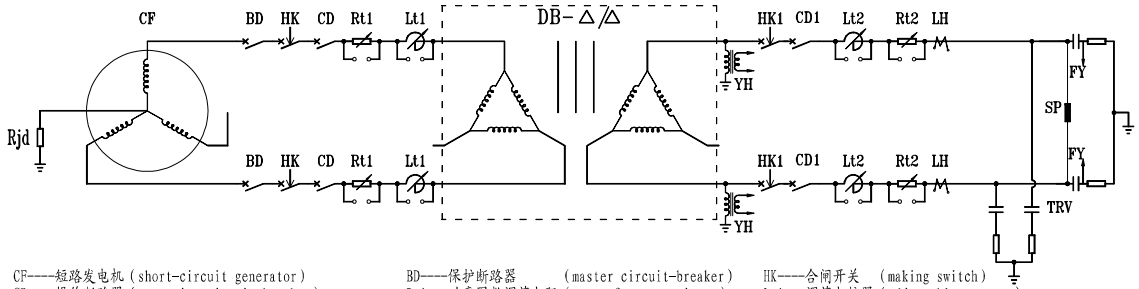
Pre-test status:

The test sample is a complete fuse.

Test parameters:

Test operation sequence	Test times	Test voltage (kV)	Prospective current (kA)	Closing phase angle relative to voltage zero angle (electrical angle)			X/R	power-frequency recovery voltage (kV)	Prospective TRV of test line				
				first time	second time	third time			Uc kV	t_3 μs	t_d μs	f kHz	Peak factor
O	6	12	8	-5~15	85~105	130~150	⩾15	12	30.7	156.25	/	3.2	1.4

Test schematic diagram:



CF----短路发电机 (short-circuit generator)
CD----操作断路器 (operation circuit-breaker)
DB----短路变压器 (boostershort-circuit transformer)
FY----分压器 (divider)
Rjd---接地电阻 (earthing resistor)
CD1---操作断路器 (operation circuit-breaker)
BD----保护断路器 (master circuit-breaker)
Rt1---功率因数调节电阻 (power factor resistor)
YH----电压互感器 (voltage transformer)
Rt2---功率因数调节电阻 (power factor resistor)
SP----试品 (test object)
HK1----合闸开关 (making switch)
HK----合闸开关 (making switch)
Lt1---调节电抗器 (adjustable reactor)
LH----电流互感器 (current transformer)
Lt2---调节电抗器 (adjustable reactor)
TRV---暂态恢复电压 (transient recovery voltage)

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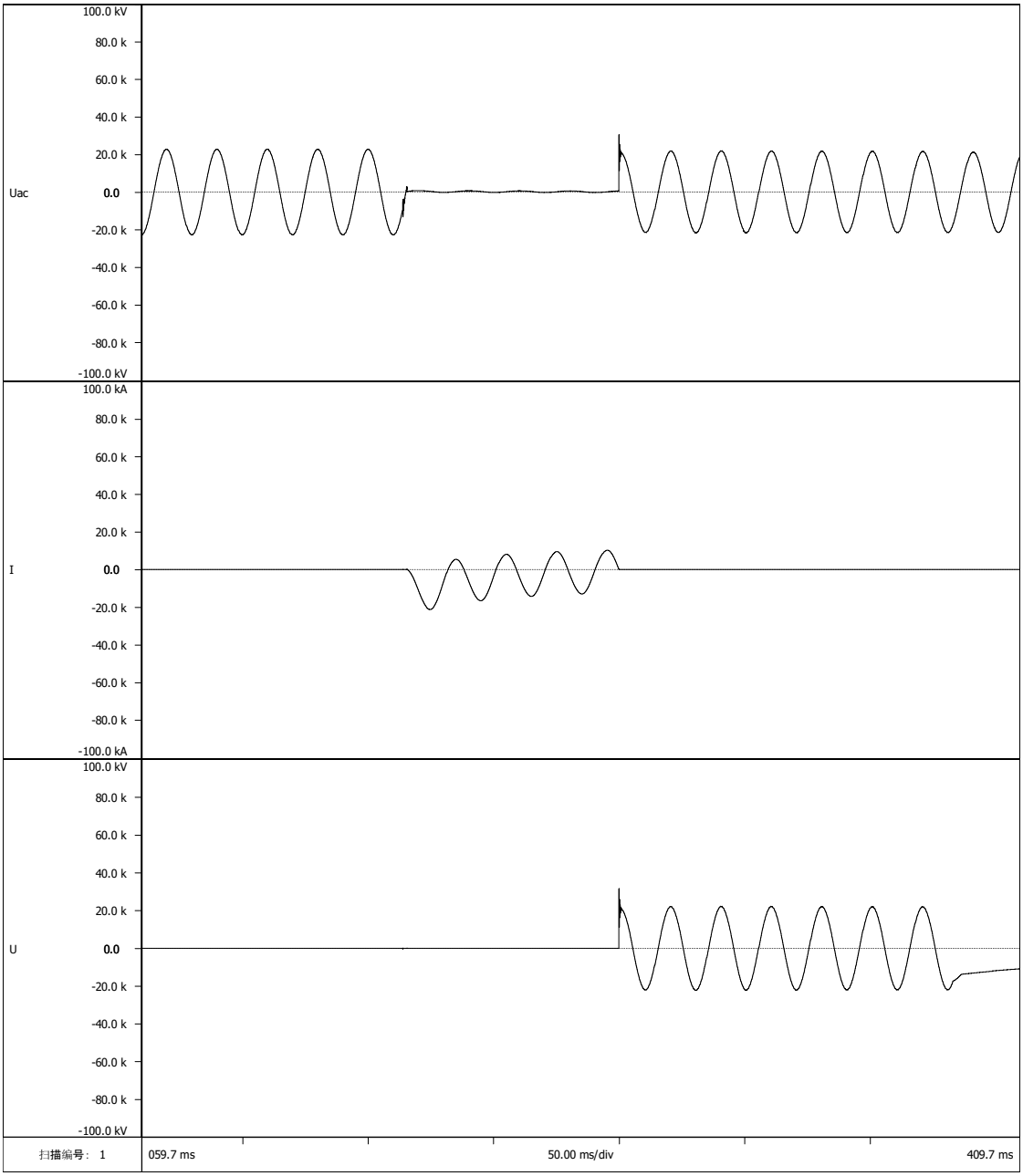
Breaking tests test method 1

Test date: June.11,2022



Calibration test oscillogram number		/-S-Y001
test voltage	kV	16.1
(Prospective)break	kA	8.1

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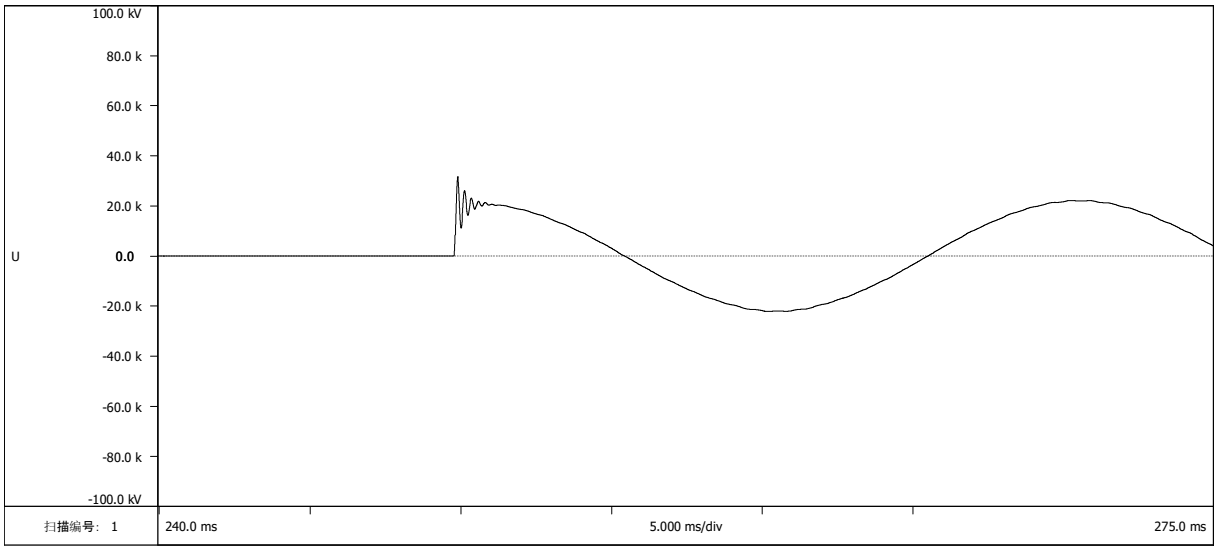
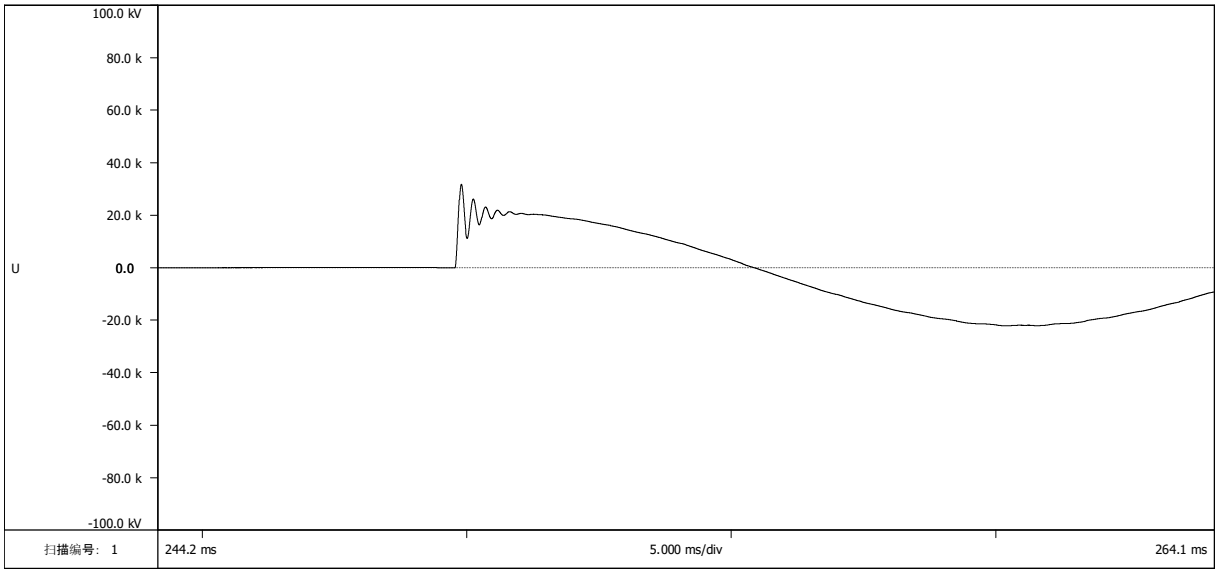
Breaking tests test method 1

Test date: June.11,2022





Prospective TRV Oscillogram Number		/-S-TRV001
U_c	kV	31.2
t_3	μs	151
t_d	μs	- - -
f	kHz	3.23
Peak factor	/	1.42

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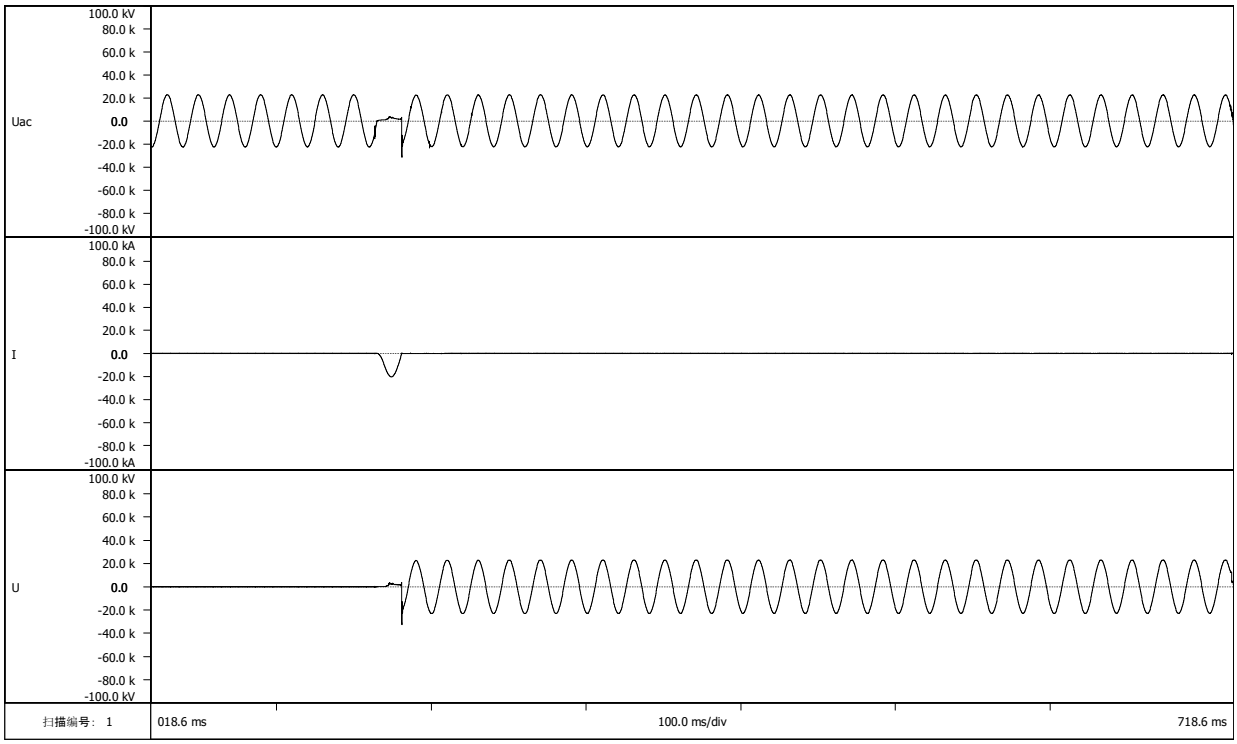
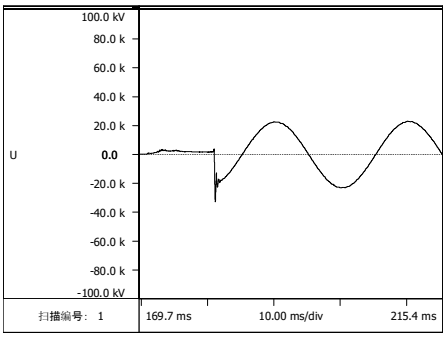
Breaking tests test method 1

Test date: June.11,2022



Oscillogram number		/-S-T001
operating time		1st time
Sample code: (base)	/	/-S-#1
Sample code: (fuse carrier)	/	- - -
Sample code: (fusing part)	/	- - -
Fusing part current	A	100.0
test voltage	kV	16.1
(Prospective)breaking current	kA	8.1
Cut-off current	kA	20.6
Power factor	/	16.50
Pre-arc time	ms	5.8
Arcing-time	ms	10.1
Action time	ms	15.9
Closing angle after voltage zero-crossing	°	2
Power-frequency recovery voltage	kV	15.9
Duration of power-frequency recovery voltage	ms	537.2



Status after test:

The sample is normally breaking without abnormality.

The test is valid.

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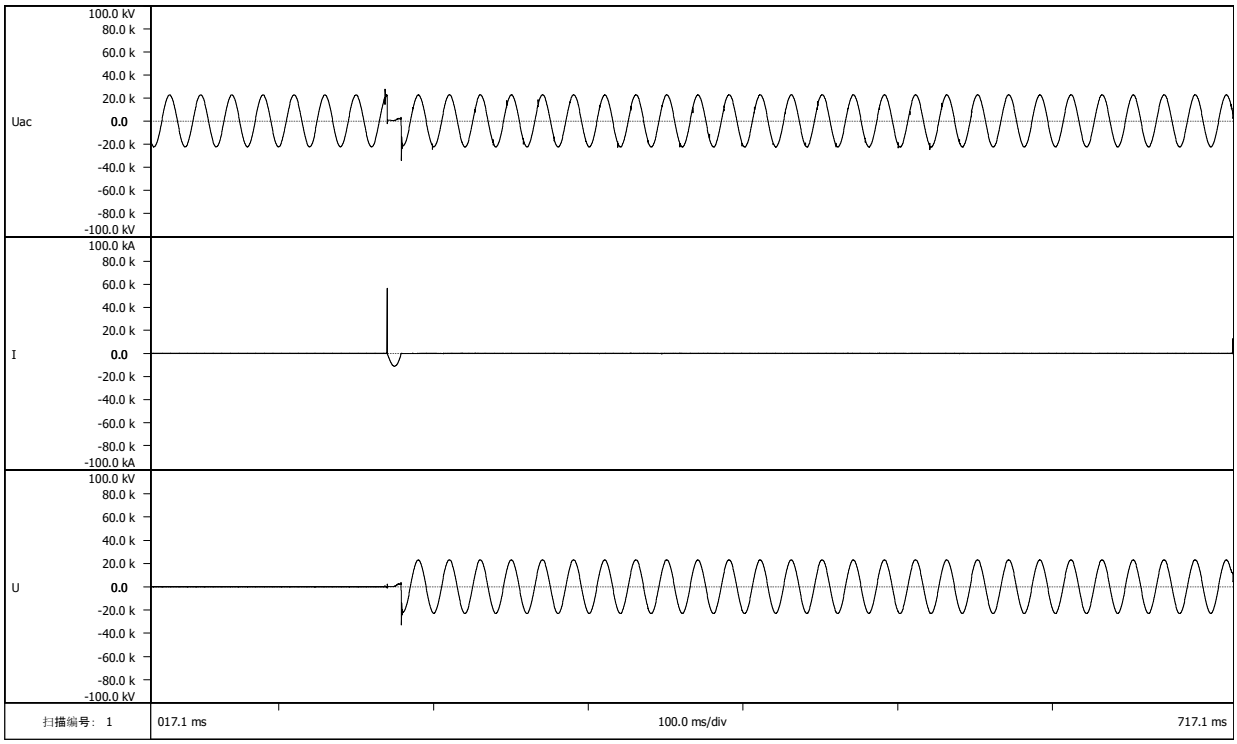
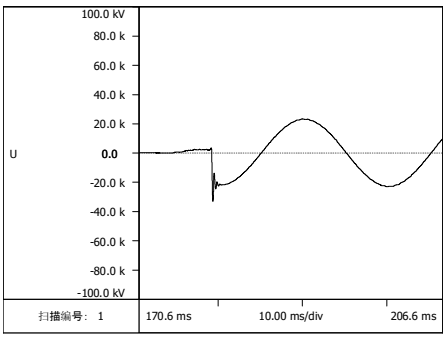
Breaking tests test method 1

Test date: June.11,2022



Oscillogram number		/-S-T002
operating time		2nd time
Sample code: (base)	/	/-#1
Sample code: (fuse carrier)	/	- - -
Sample code: (fusing part)	/	- - -
Fusing part current	A	100.0
test voltage	kV	16.1
(Prospective)breaking current	kA	8.1
Cut-off current	kA	11.3
Power factor	/	16.50
Pre-arc time	ms	4.5
Arcing-time	ms	4.5
Action time	ms	9.0
Closing angle after voltage	°	88
Power-frequency recovery voltage	kV	15.9
Duration of power-frequency recovery voltage	ms	538.2



Status after test:

The sample is normally breaking without abnormality.

The test is valid.

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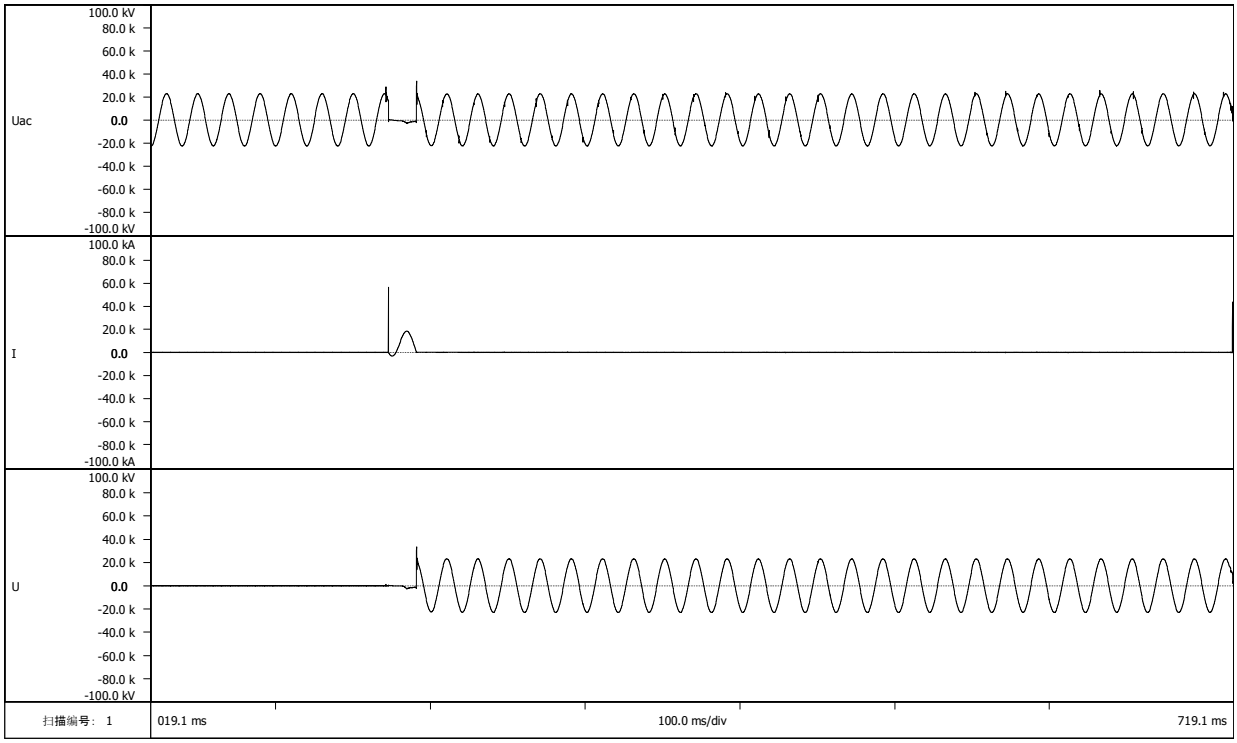
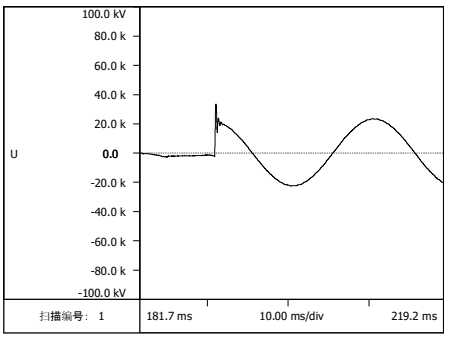
Breaking tests test method 1

Test date: June.11,2022



Oscillogram number		/-S-T003
operating time		3rd time
Sample code: (base)	/	/-#1
Sample code: (fuse carrier)	/	- - -
Sample code: (fusing part)	/	- - -
Fusing part current	A	100.0
test voltage	kV	16.1
(Prospective)breaking current	kA	8.1
Cut-off current	kA	18.4
Power factor	/	16.50
Pre-arc time	ms	8.9
Arcing-time	ms	9.0
Action time	ms	17.9
Closing angle after voltage	°	137
Power-frequency recovery voltage	kV	15.9
Duration of power-frequency recovery voltage	ms	527.4



Status after test:

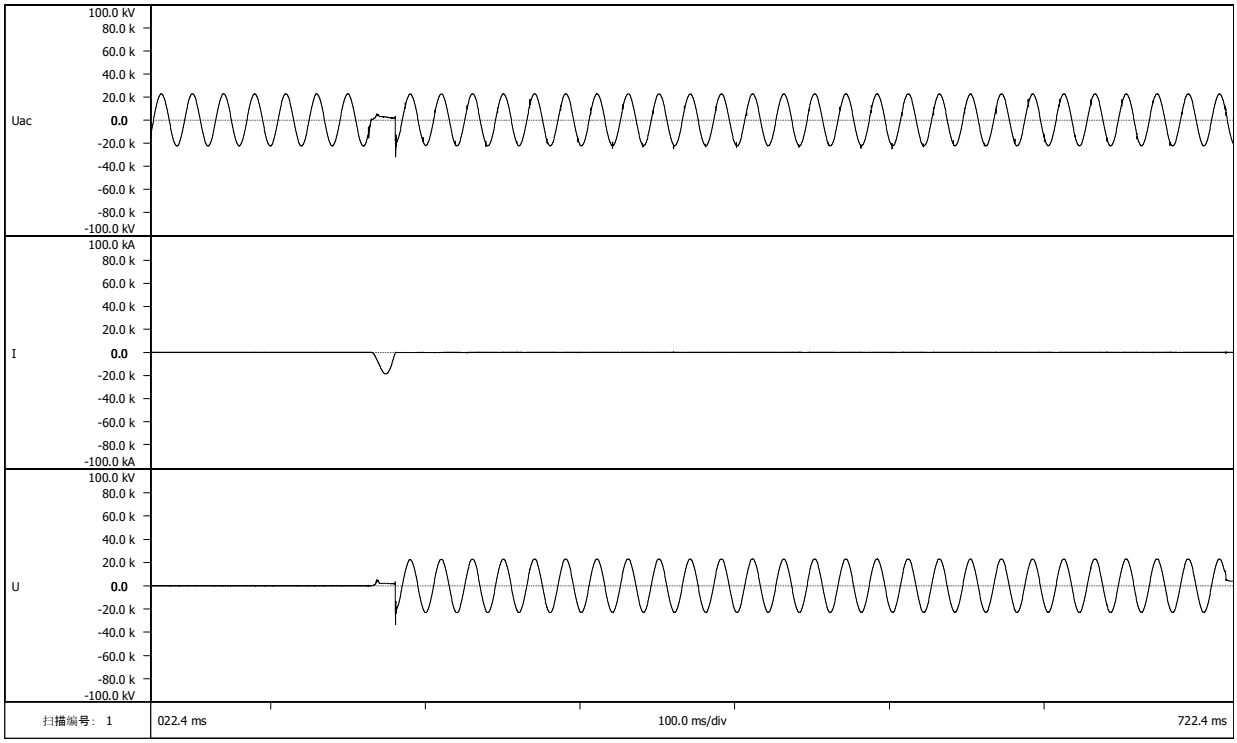
The sample is normally breaking without abnormality.

The test is valid.

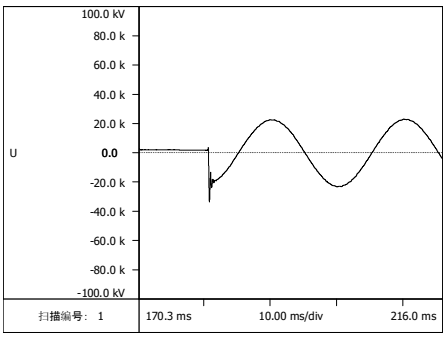
POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 1

Test date: June.11,2022



Oscillogram number		/-S-T004
operating time		1st time
Sample code: (base)	/	/-#2
Sample code: (fuse carrier)	/	- - -
Sample code: (fusing part)	/	- - -
Fusing part current	A	6.0
test voltage	kV	16.1
(Prospective)breaking current	kA	8.1
Cut-off current	kA	18.9
Power factor	/	16.50
Pre-arc time	ms	1.5
Arcing-time	ms	14.0
Action time	ms	15.5
Closing angle after voltage zero-crossing	°	2
Power-frequency recovery voltage	kV	15.9
Duration of power-frequency recovery voltage	ms	536.6



Status after test:

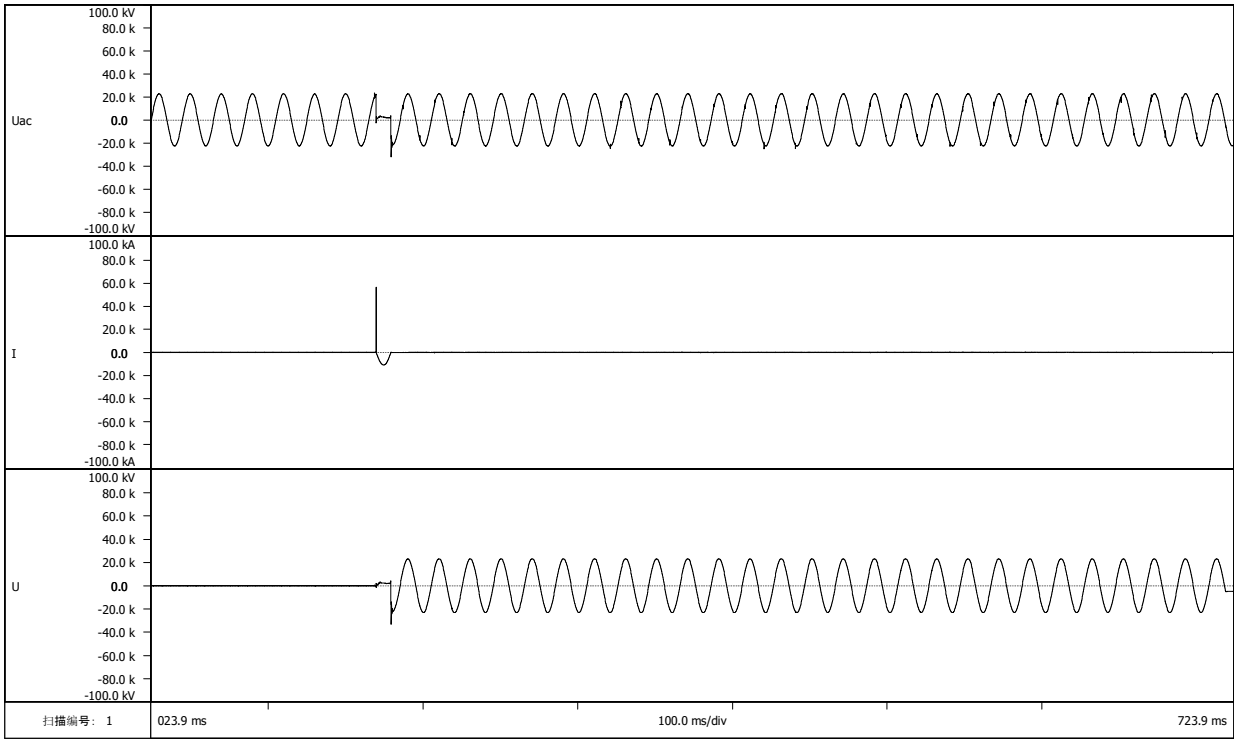
The sample is normally breaking without abnormality.

The test is valid.

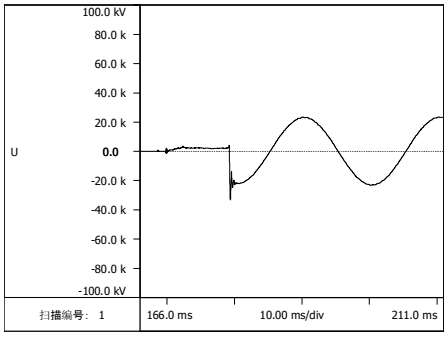
POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 1

Test date: June.11,2022



Oscillogram number		/-S-T005
operating time		2nd time
Sample code: (base)	/	/-#2
Sample code: (fuse carrier)	/	- - -
Sample code: (fusing part)	/	- - -
Fusing part current	A	6.0
test voltage	kV	16.1
(Prospective)breaking current	kA	8.1
Cut-off current	kA	11.2
Power factor	/	16.50
Pre-arc time	ms	0.5
Arcing-time	ms	8.8
Action time	ms	9.3
Closing angle after voltage	°	86
Power-frequency recovery voltage	kV	15.9
Duration of power-frequency recovery voltage	ms	539.7



Status after test:

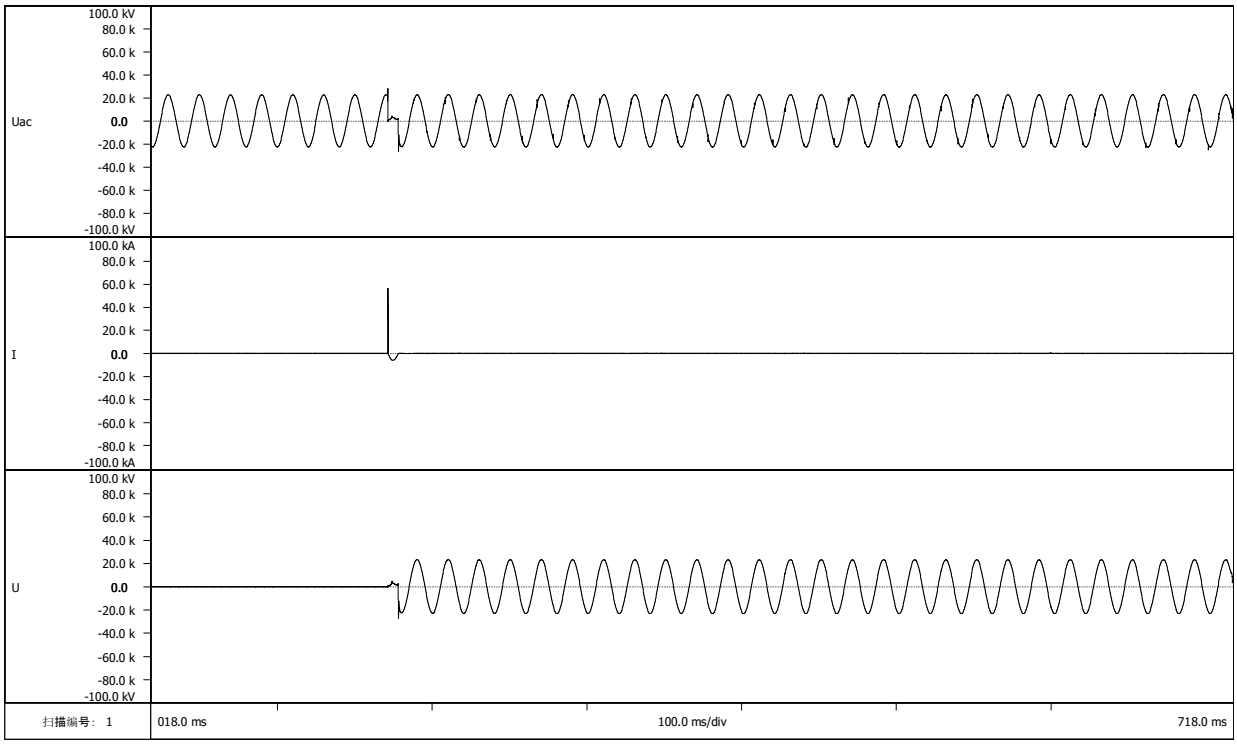
The sample is normally breaking without abnormality.

The test is valid.

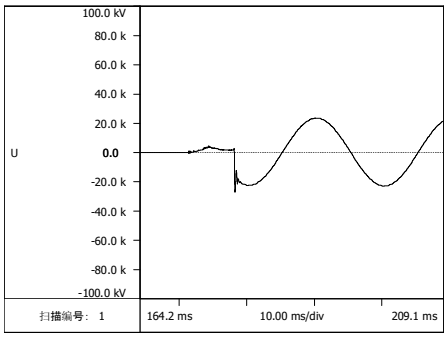
POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 1

Test date: June.11,2022



Oscillogram number		/-S-T006
operating time		3rd time
Sample code: (base)	/	/-#2
Sample code: (fuse carrier)	/	- - -
Sample code: (fusing part)	/	- - -
Fusing part current	A	6.0
test voltage	kV	16.1
(Prospective)breaking current	kA	8.1
Cut-off current	kA	6.1
Power factor	/	16.50
Pre-arc time	ms	0.6
Arcing-time	ms	5.9
Action time	ms	6.5
Closing angle after voltage	°	131
Power-frequency recovery voltage	kV	15.9
Duration of power-frequency recovery	ms	539.8



Status after test:

The sample is normally breaking without abnormality.

The test is valid.

POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 2

Test date: June.11,2022

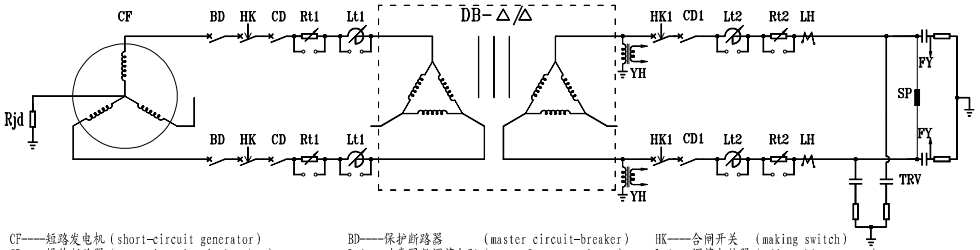
Pre-test status:

The test sample is a complete fuse.

Test parameters:

Test operation sequence	Test times	Test voltage (kV)	Prospective current（kA)	Closing phase angle relative to voltage zero angle（electrical angle）			X/R	power-frequency recovery voltage (kV)	Prospective TRV of test line				
				first time	second time	third time			Uc kV	t_3 μs	t_d μs	f kHz	Peak factor
O	6	12	4.8~6.4	-5~15	85~105	130~150	≥15	12	30.7	156.25	/	3.2	1.4

Test schematic diagram:

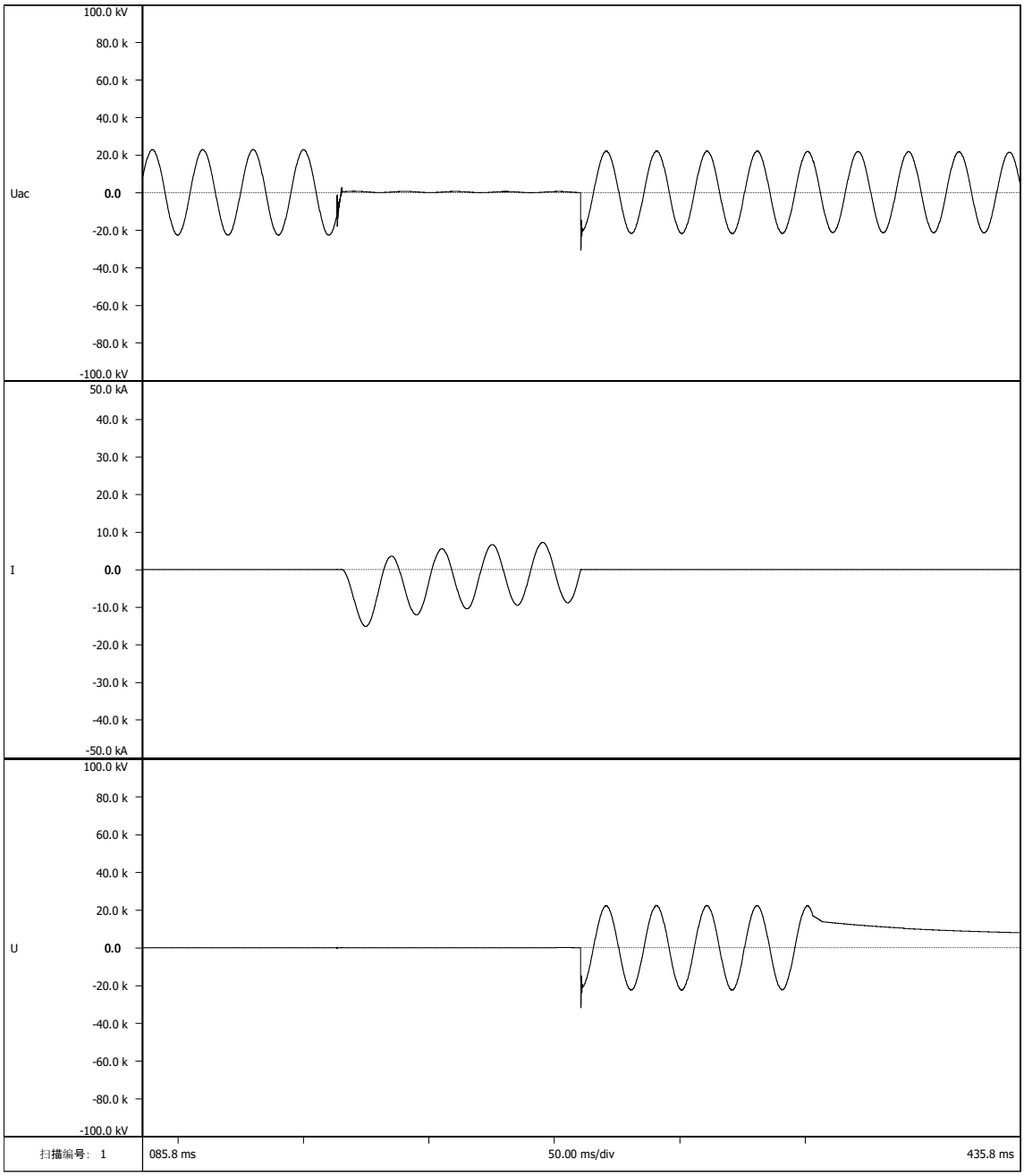


CF----短路发电机 (short-circuit generator)
CD----操作断路器 (operation circuit-breaker)
DB----短路变压器 (boostershort-circuit transformer)
FY----分压器 (divider)
Rjd----接地电阻 (earthing resistor)
CD1---操作断路器 (operation circuit-breaker)
BD----保护断路器 (master circuit-breaker)
Rt1---功率因数调节电阻 (power factor resistor)
YH----电压互感器 (voltage transformer)
Rt2---功率因数调节电阻 (power factor resistor)
SP----试品 (test object)
HK1---合闸开关 (making switch)
HK----合闸开关 (making switch)
Lt1---调节电抗器 (adjustable reactor)
LH----电流互感器 (current transformer)
Lt2---调节电抗器 (adjustable reactor)
TRV---暂态恢复电压 (transient recovery voltage)

POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 2

Test date: June.11,2022

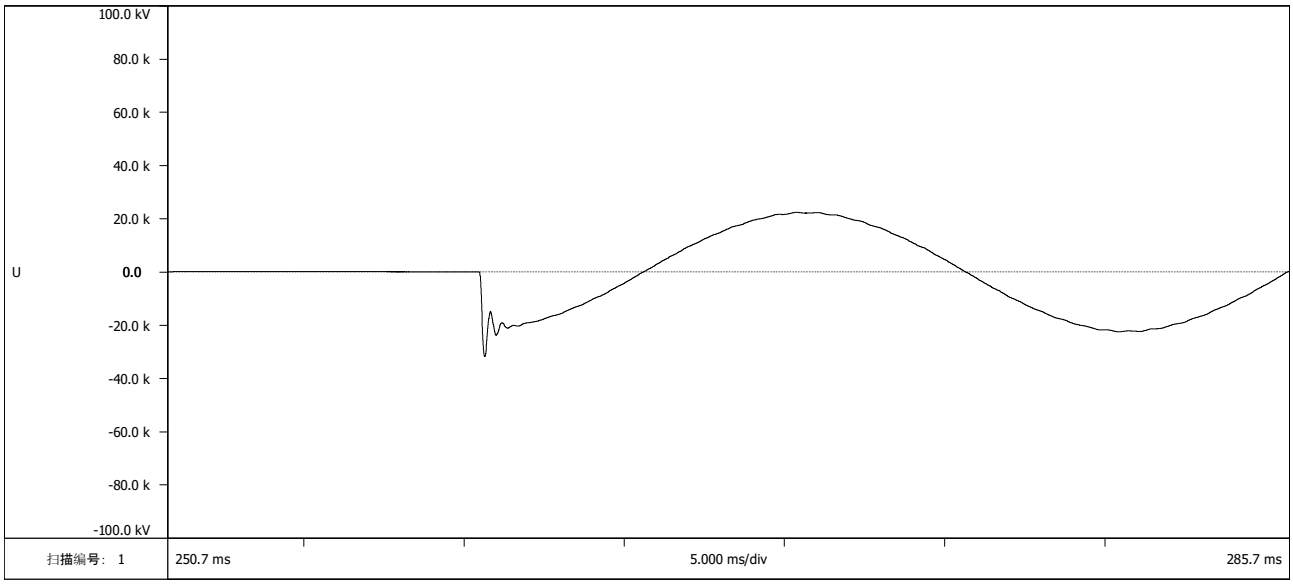


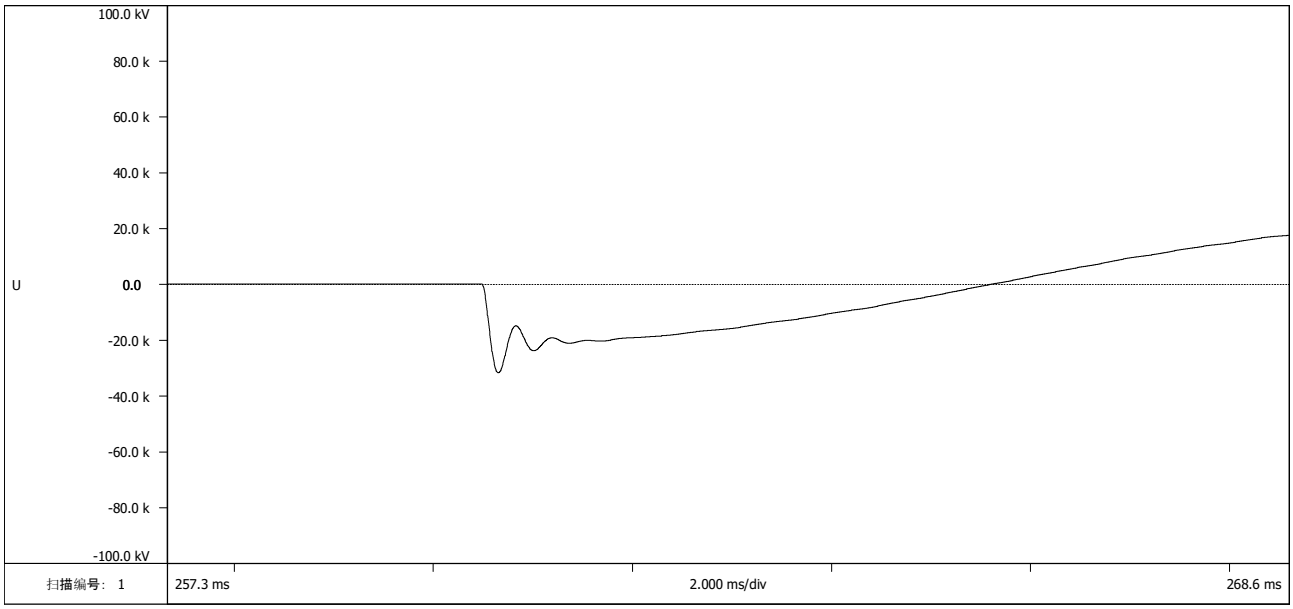
Calibration test oscillogram number		/-S-Y002
test voltage	kV	16.1
(Prospective)break	kA	5.7

POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 2

Test date: June.11,2022



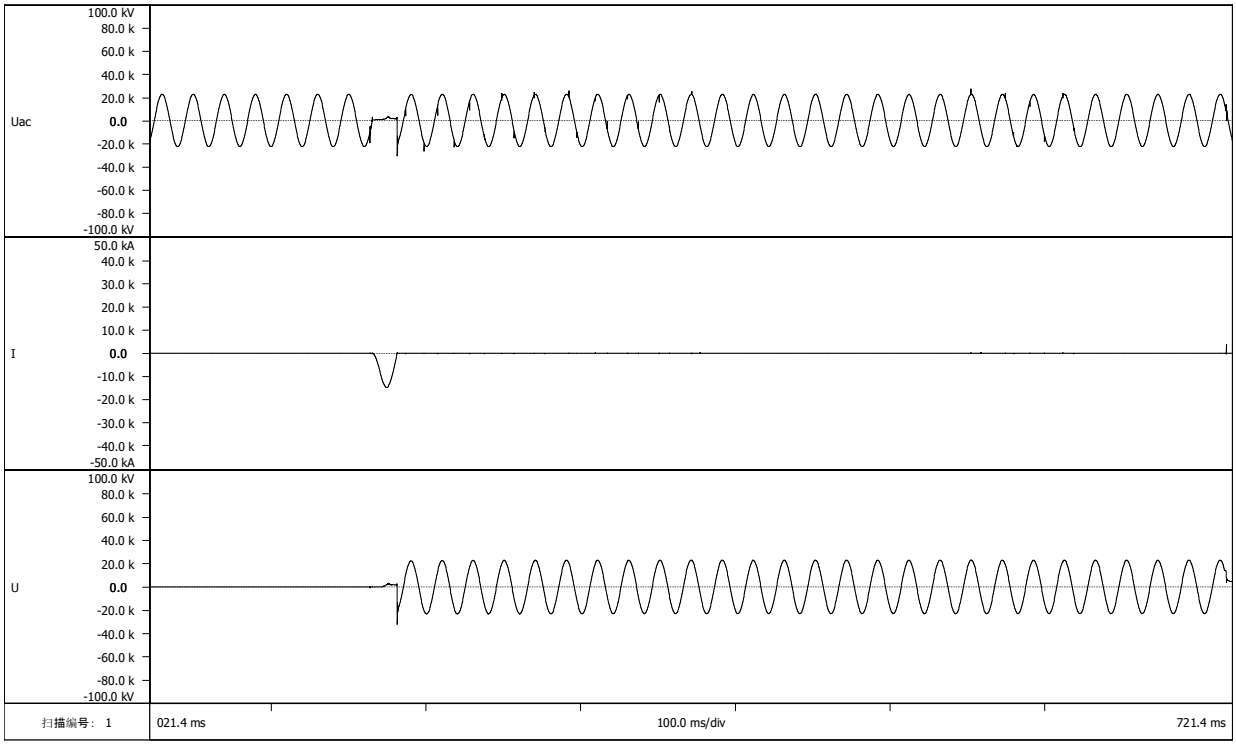


Prospective TRV Oscillogram Number		/-S-TRV002
U_c	kV	31.8
t_3	μs	150
t_d	μs	- - -
f	kHz	3.21
Peak factor	/	1.43

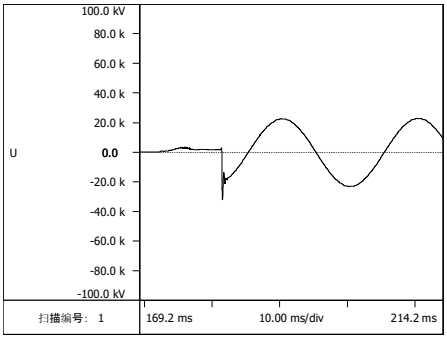
POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 2

Test date: June.11,2022



Oscillogram number		/-S-T007
operating time		1st time
Sample code: (base)	/	/-#3
Sample code: (fuse carrier)	/	- - -
Sample code: (fusing part)	/	- - -
Fusing part current	A	100.0
test voltage	kV	16.1
(Prospective)breaking current	kA	5.7
Cut-off current	kA	14.9
Power factor	/	15.40
Pre-arc time	ms	6.8
Arcing-time	ms	9.1
Action time	ms	15.9
Closing angle after voltage zero-crossing	°	7
Power-frequency recovery voltage	kV	15.8
Duration of power-frequency recovery voltage	ms	536.6



Status after test:

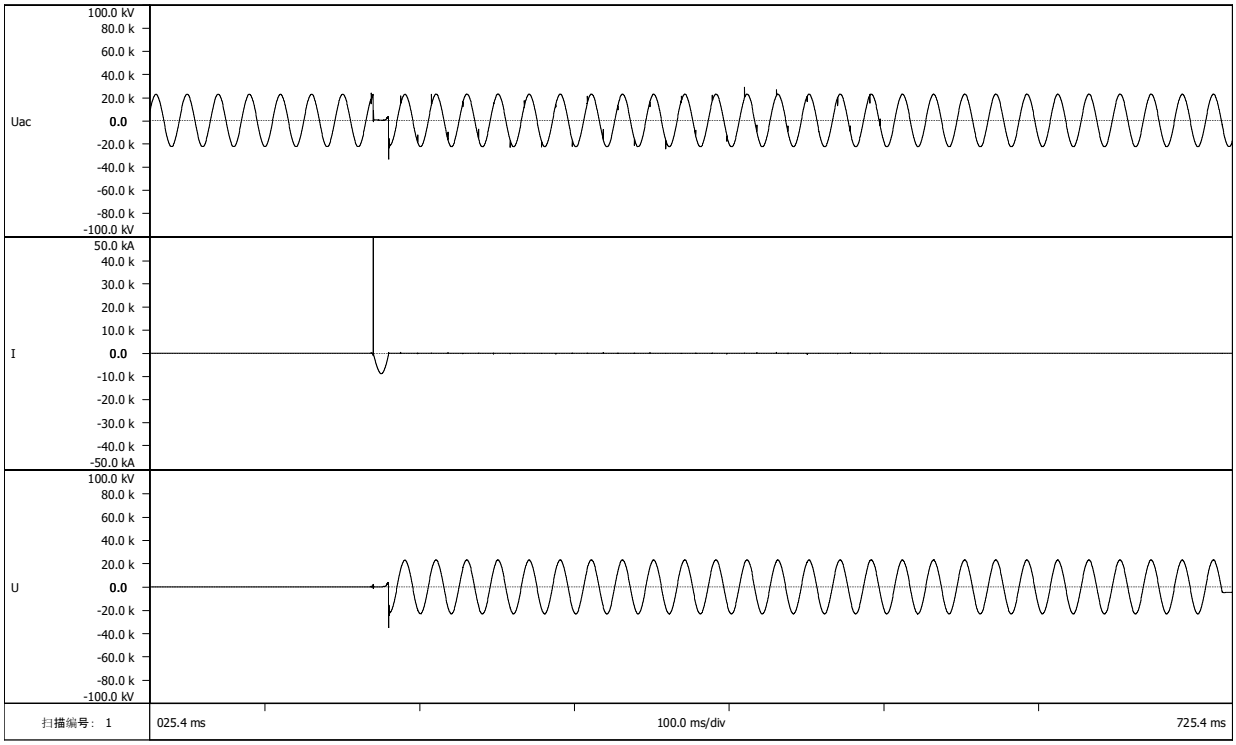
The sample is normally breaking without abnormality.

The test is valid.

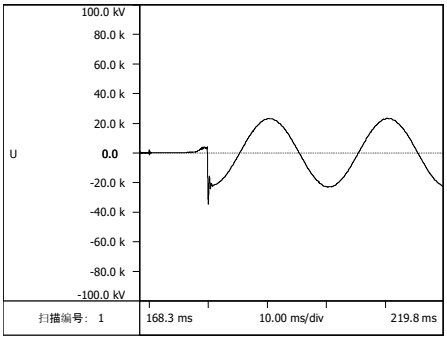
POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 2

Test date: June.11,2022



Oscillogram number		/-S-T008
operating time		2nd time
Sample code: (base)	/	/-#3
Sample code: (fuse carrier)	/	- - -
Sample code: (fusing part)	/	- - -
Fusing part current	A	100.0
test voltage	kV	16.1
(Prospective)breaking current	kA	5.7
Cut-off current	kA	8.9
Power factor	/	15.40
Pre-arc time	ms	6.3
Arcing-time	ms	3.5
Action time	ms	9.8
Closing angle after voltage	°	86
Power-frequency recovery voltage	kV	15.9
Duration of power-frequency recovery voltage	ms	538.6



Status after test:

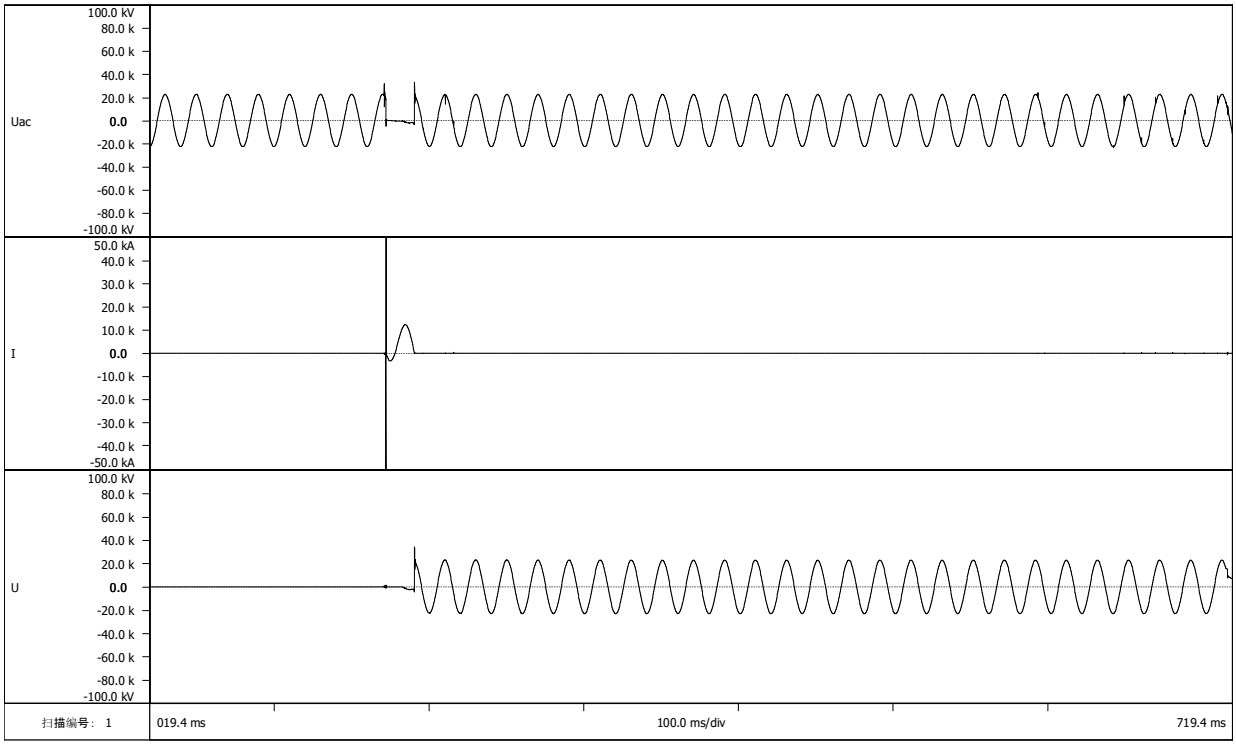
The sample is normally breaking without abnormality.

The test is valid.

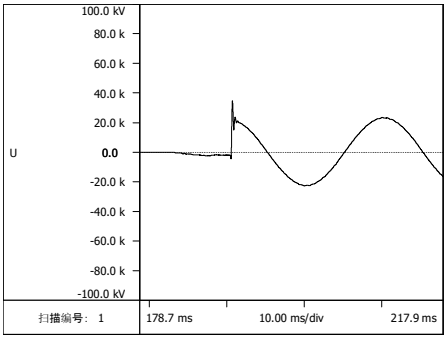
POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 2

Test date: June.11,2022



Oscillogram number		/-S-T009
operating time		3rd time
Sample code: (base)	/	/-#3
Sample code: (fuse carrier)	/	- - -
Sample code: (fusing part)	/	- - -
Fusing part current	A	100.0
test voltage	kV	16.1
(Prospective)breaking current	kA	5.7
Cut-off current	kA	12.4
Power factor	/	15.40
Pre-arc time	ms	10.8
Arcing-time	ms	7.5
Action time	ms	18.3
Closing angle after voltage zero-crossing	°	131
Power-frequency recovery voltage	kV	15.9
Duration of power-frequency recovery voltage	ms	526.6



Status after test:

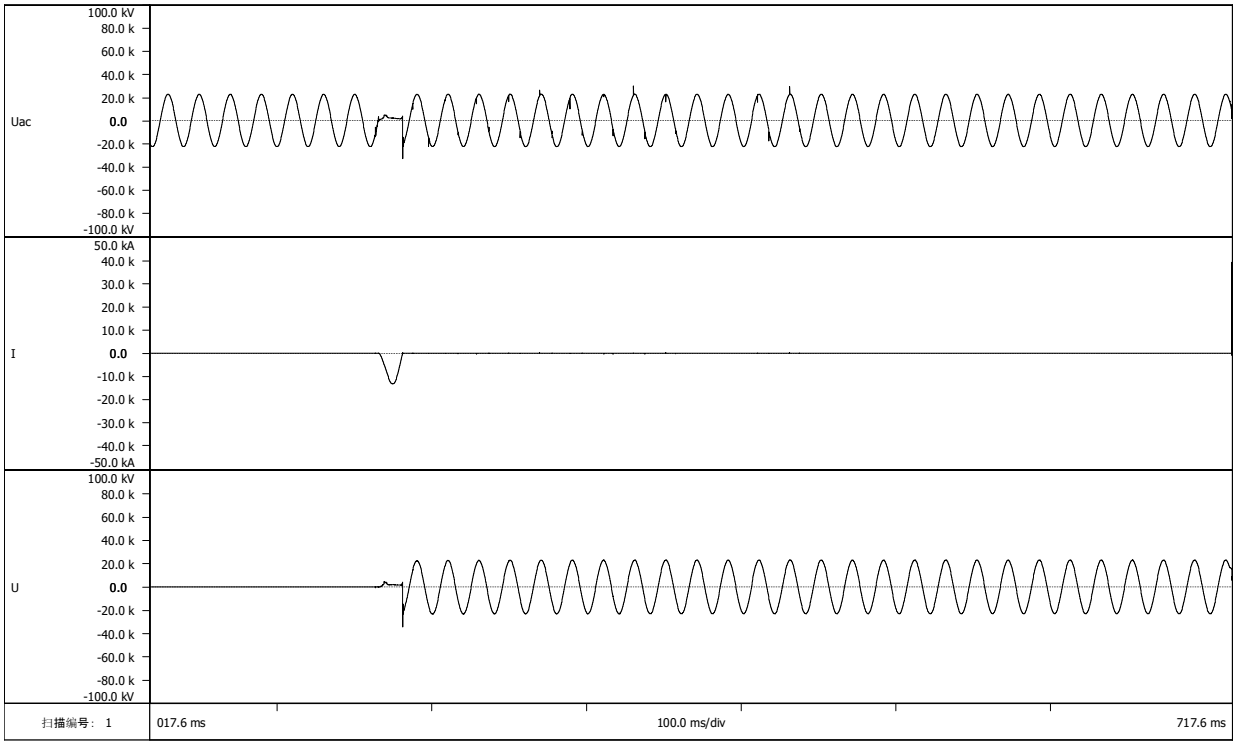
The sample is normally breaking without abnormality.

The test is valid.

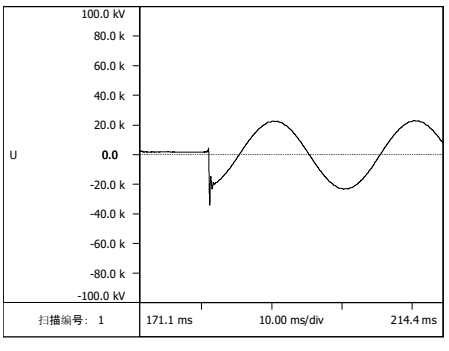
POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 2

Test date: June.11,2022



Oscillogram number		/-S-T010
operating time		1st time
Sample code: (base)	/	/-#4
Sample code: (fuse carrier)	/	- - -
Sample code: (fusing part)	/	- - -
Fusing part current	A	6.0
test voltage	kV	16.1
(Prospective)breaking current	kA	5.7
Cut-off current	kA	13.4
Power factor	/	15.40
Pre-arc time	ms	1.7
Arcing-time	ms	13.7
Action time	ms	15.4
Closing angle after voltage zero-crossing	°	7
Power-frequency recovery voltage	kV	15.8
Duration of power-frequency recovery voltage	ms	538.2



Status after test:

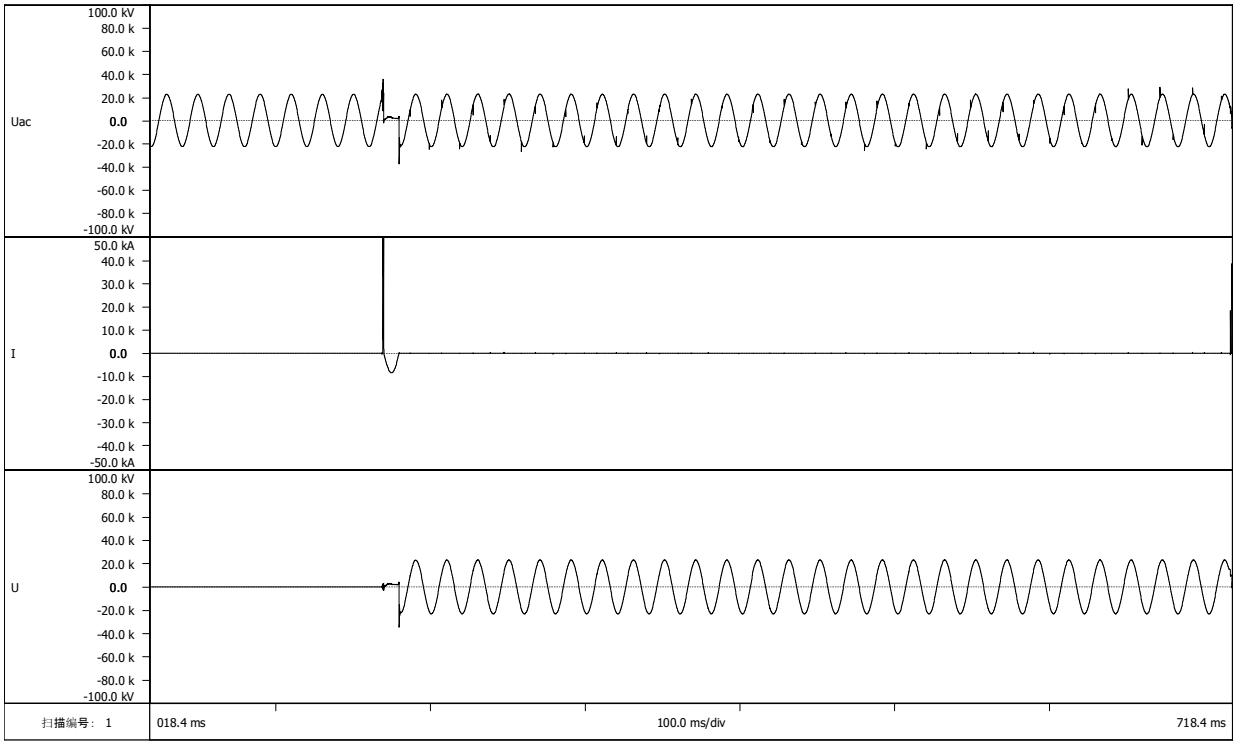
The sample is normally breaking without abnormality.

The test is valid.

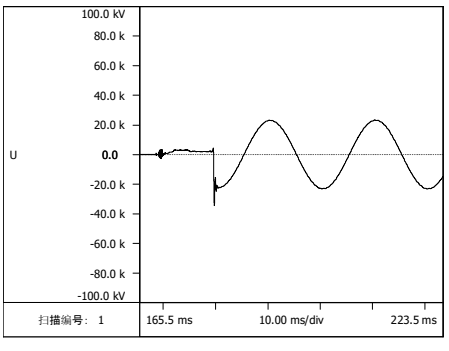
POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 2

Test date: June.11,2022



Oscillogram number		/-S-T011
operating time		2nd time
Sample code: (base)	/	/-#4
Sample code: (fuse carrier)	/	- - -
Sample code: (fusing part)	/	- - -
Fusing part current	A	6.0
test voltage	kV	16.1
(Prospective)breaking current	kA	5.7
Cut-off current	kA	8.5
Power factor	/	15.40
Pre-arc time	ms	0.6
Arcing-time	ms	9.2
Action time	ms	9.8
Closing angle after voltage zero-crossing	°	86
Power-frequency recovery voltage	kV	15.8
Duration of power-frequency recovery voltage	ms	538.4



Status after test:

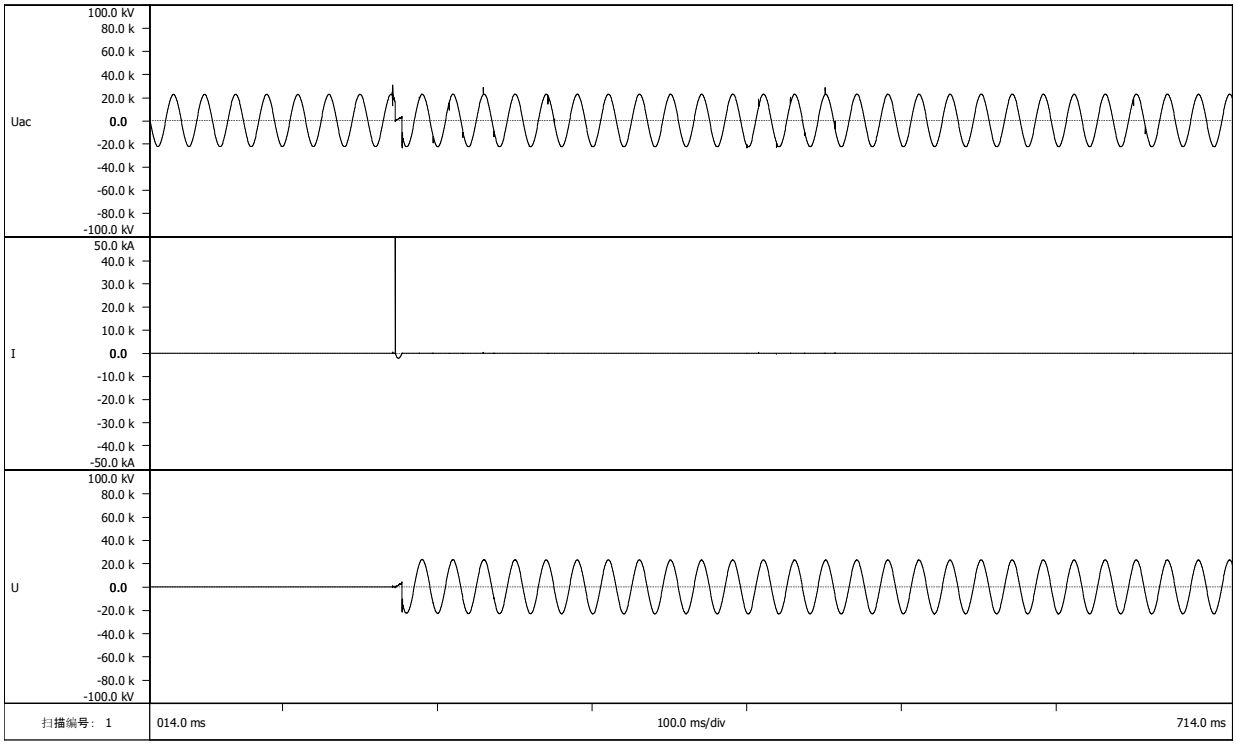
The sample is normally breaking without abnormality.

The test is valid.

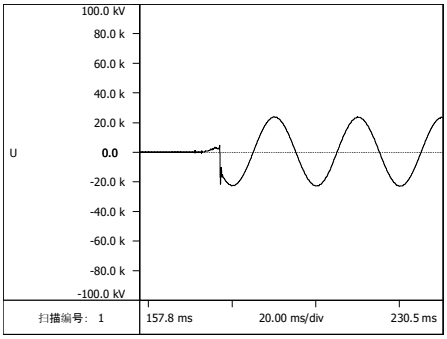
POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 2

Test date: June.11,2022



Oscillogram number		/-S-T012
operating time		3rd time
Sample code: (base)	/	/-#4
Sample code: (fuse carrier)	/	- - -
Sample code: (fusing part)	/	- - -
Fusing part current	A	6.0
test voltage	kV	16.1
(Prospective)breaking current	kA	5.7
Cut-off current	kA	2.2
Power factor	/	15.40
Pre-arc time	ms	0.9
Arcing-time	ms	3.4
Action time	ms	4.3
Closing angle after voltage	°	137
Power-frequency recovery voltage	kV	15.9
Duration of power-frequency recovery voltage	ms	538.7



Status after test:

The sample is normally breaking without abnormality.

The test is valid.

POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 3

Test date: June.11,2022

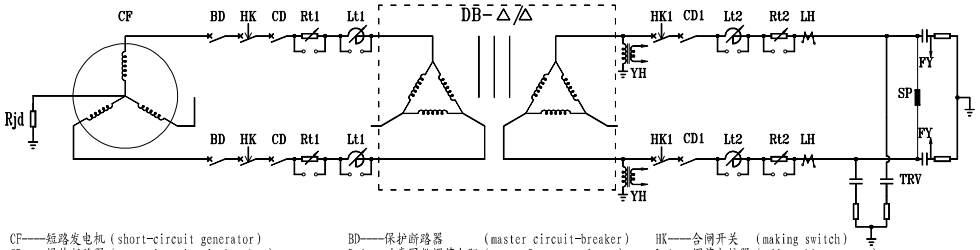
Pre-test status:

The test sample is a complete fuse.

Test parameters:

Test operation sequence	Test times	Test voltage (kV)	Prospective current（kA)	Closing phase angle relative to voltage zero angle （electrical angle）	X/R	power-frequency recovery voltage (kV)	Prospective TRV of test line				
							Uc kV	t_3 μs	t_d μs	f kHz	Peak factor
O	2	12	2.5～3.75	85~105	＜0.10	12	23.8	121	/	3.2	1.4

Test schematic diagram:

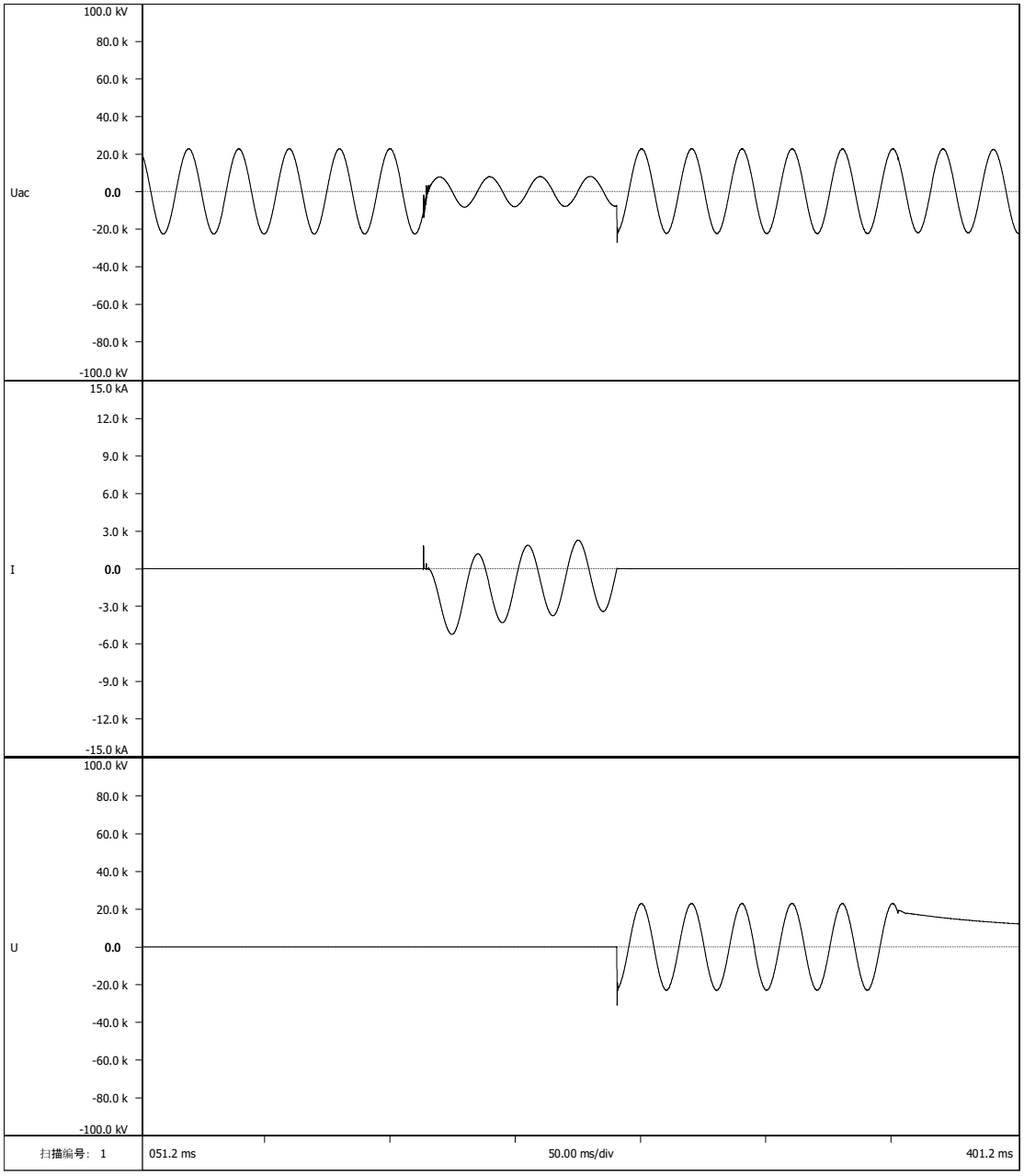


CF——短路发电机（short-circuit generator）
CD——操作断路器（operation circuit-breaker）
DB——短路变压器（boostershort-circuit transformer）
FY——分压器 （divider）
Rjd——接地电阻 （earthing resistor）
CD1——操作断路器（operation circuit-breaker）
BD——保护断路器 （master circuit-breaker）
Rt1——功率因数调节电阻（power factor resistor）
YH——电压互感器 （voltage transformer）
Rt2——功率因数调节电阻（power factor resistor）
SP——试品 （test object）
HK1——合闸开关 （making switch）
HK——合闸开关 （making switch）
Lt1——调节电抗器（adjustable reactor）
LH——电流互感器（current transformer）
Lt2——调节电抗器（adjustable reactor）
TRV——暂态恢复电压（transient recovery voltage）

POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 3

Test date: June.11,2022

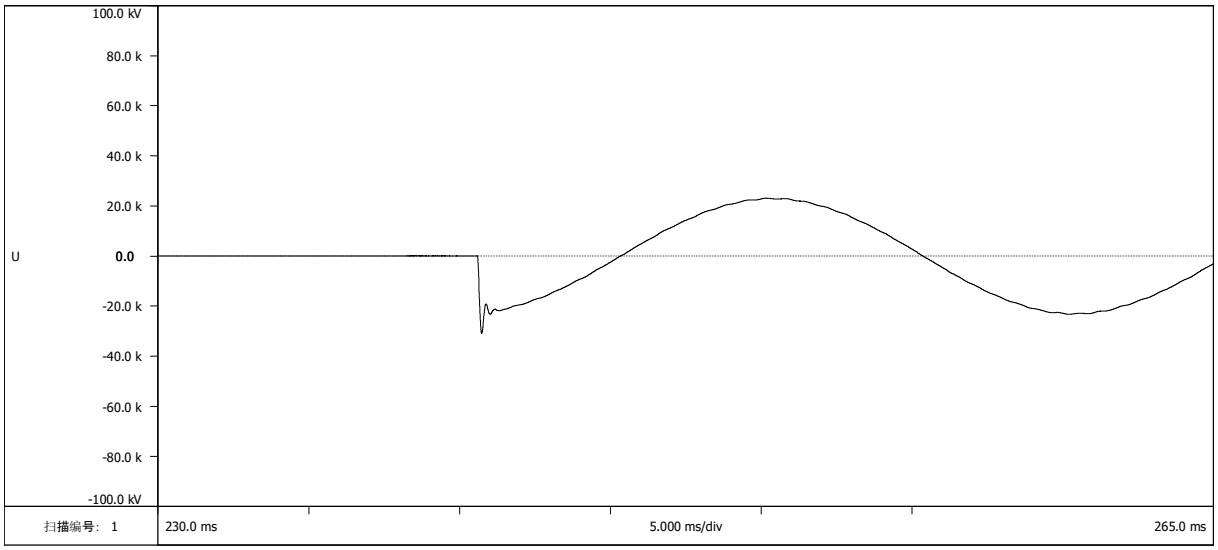


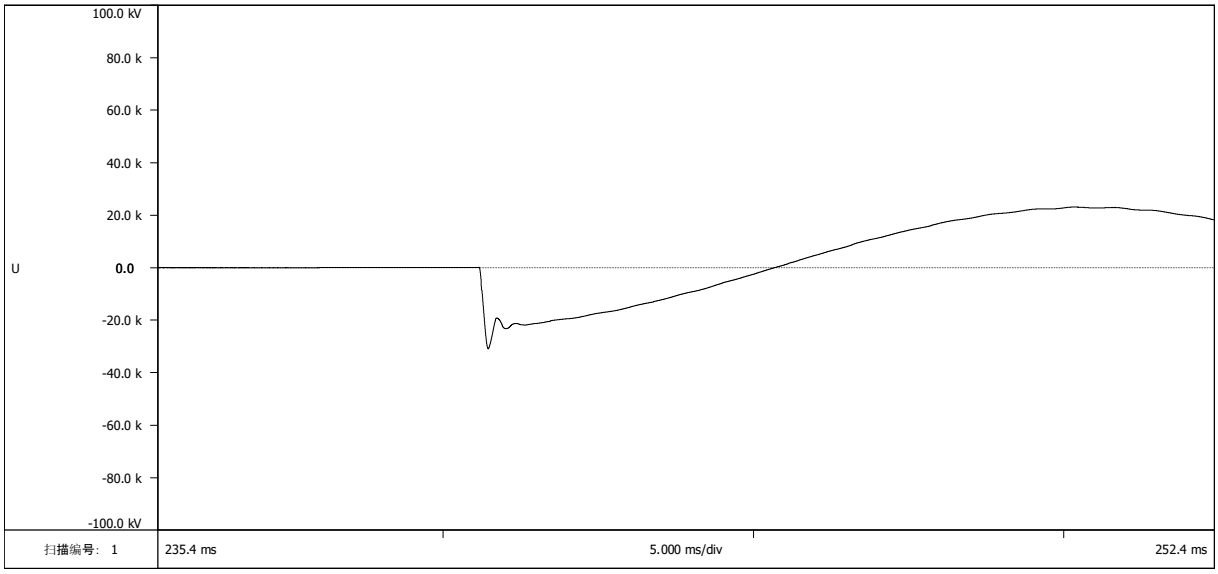
Calibration test oscillogram		/-S-Y003
test voltage	kV	16.1
(Prospective)break	kA	2.1

POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 3

Test date: June.11,2022



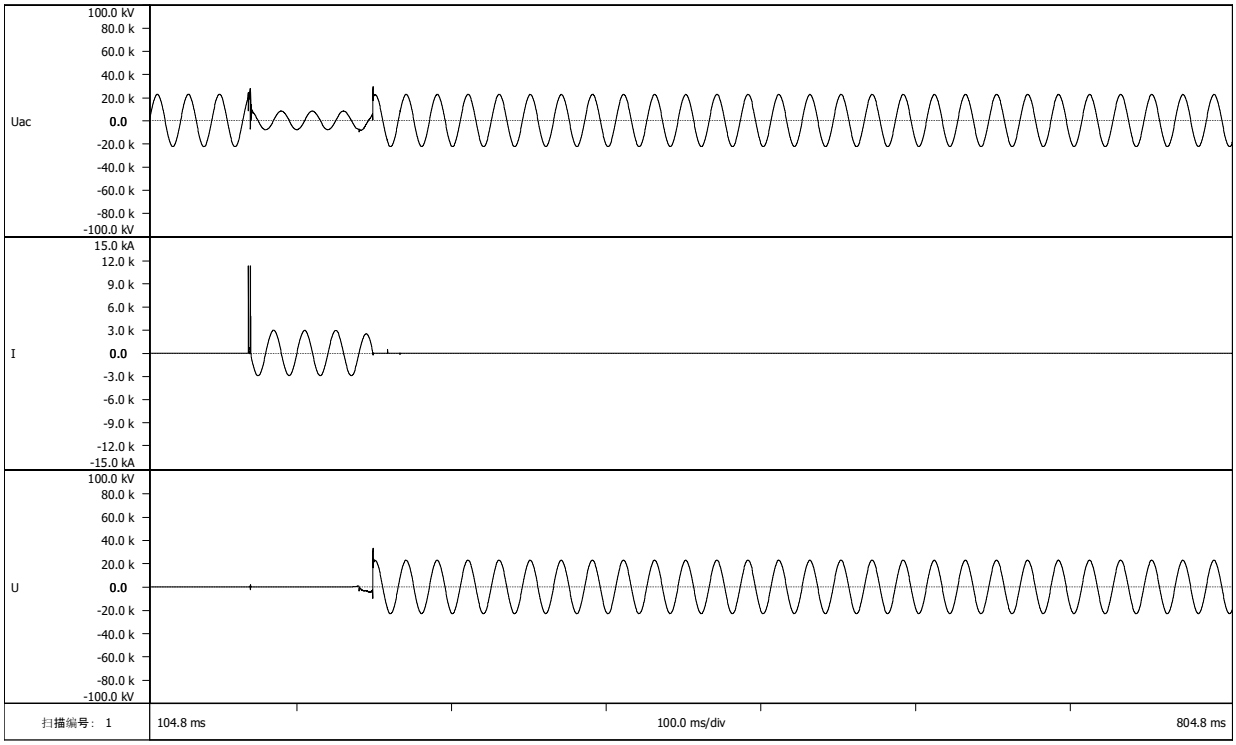


Prospective TRV Oscillogram Number		/-S-TRV003
U_c	kV	31.1
t_3	μs	148
t_d	μs	- - -
f	kHz	3.24
Peak factor		1.41

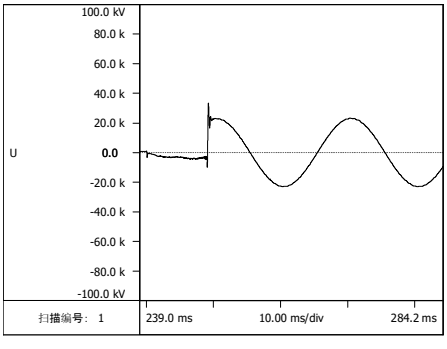
POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 3

Test date: June.11,2022



Oscillogram number		/-S-T013
operating time		1st time
Sample code: (base)	/	/-#5
Sample code: (fuse carrier)	/	- - -
Sample code: (fusing part)	/	- - -
Fusing part current	A	100.0
test voltage	kV	16.1
(Prospective)breaking current	kA	2.1
Cut-off current	kA	3.0
Power factor	/	15.20
Pre-arc time	ms	65.6
Arcing-time	ms	13.3
Action time	ms	78.9
Closing angle after voltage	°	90
Power-frequency recovery voltage	kV	15.8
Duration of power-frequency recovery voltage	ms	555.8



Status after test:

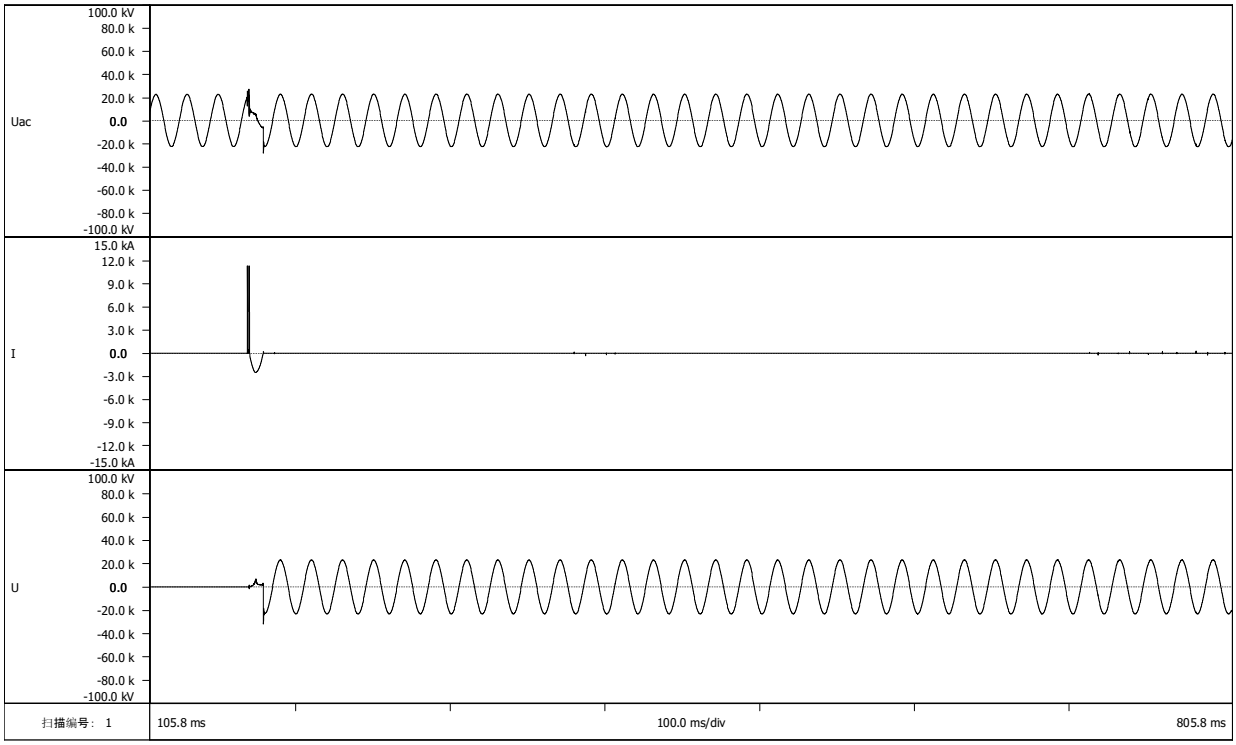
The sample is normally breaking without abnormality.

The test is valid.

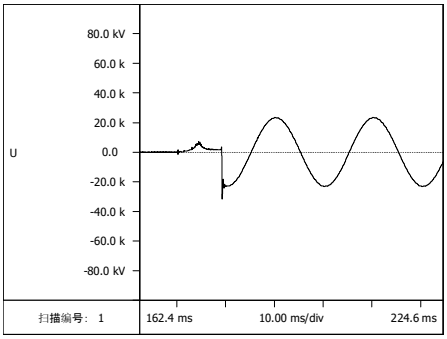
POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 3

Test date: June.11,2022



Oscillogram number		/-S-T014
operating time		1st time
Sample code: (base)	/	/-#5
Sample code: (fuse carrier)	/	- - -
Sample code: (fusing part)	/	- - -
Fusing part current	A	6.0
test voltage	kV	16.1
(Prospective)breaking current	kA	2.1
Cut-off current	kA	2.5
Power factor	/	15.20
Pre-arc time	ms	1.3
Arcing-time	ms	7.6
Action time	ms	8.9
Closing angle after voltage	°	89
Power-frequency recovery voltage	kV	15.9
Duration of power-frequency recovery voltage	ms	627.5



Status after test:

The sample is normally breaking without abnormality.

The test is valid.

POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 4

Test date: June.11,2022

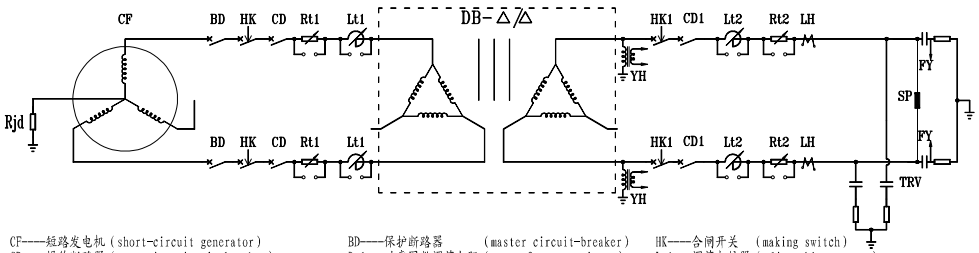
Pre-test status:

The test sample is a complete fuse.

Test parameters:

Test operation sequence	Test times	Test voltage (kV)	Prospective current（kA)	Closing phase angle relative to voltage zero angle （electrical angle）	X/R	power-frequency recovery voltage (kV)	Prospective TRV of test line				
							Uc kV	t_3 μs	t_d μs	f kHz	Peak factor
O	2	12	0.4~0.5	-5～15	≥8	12	36.2	27.8		18	1.65

Test schematic diagram:

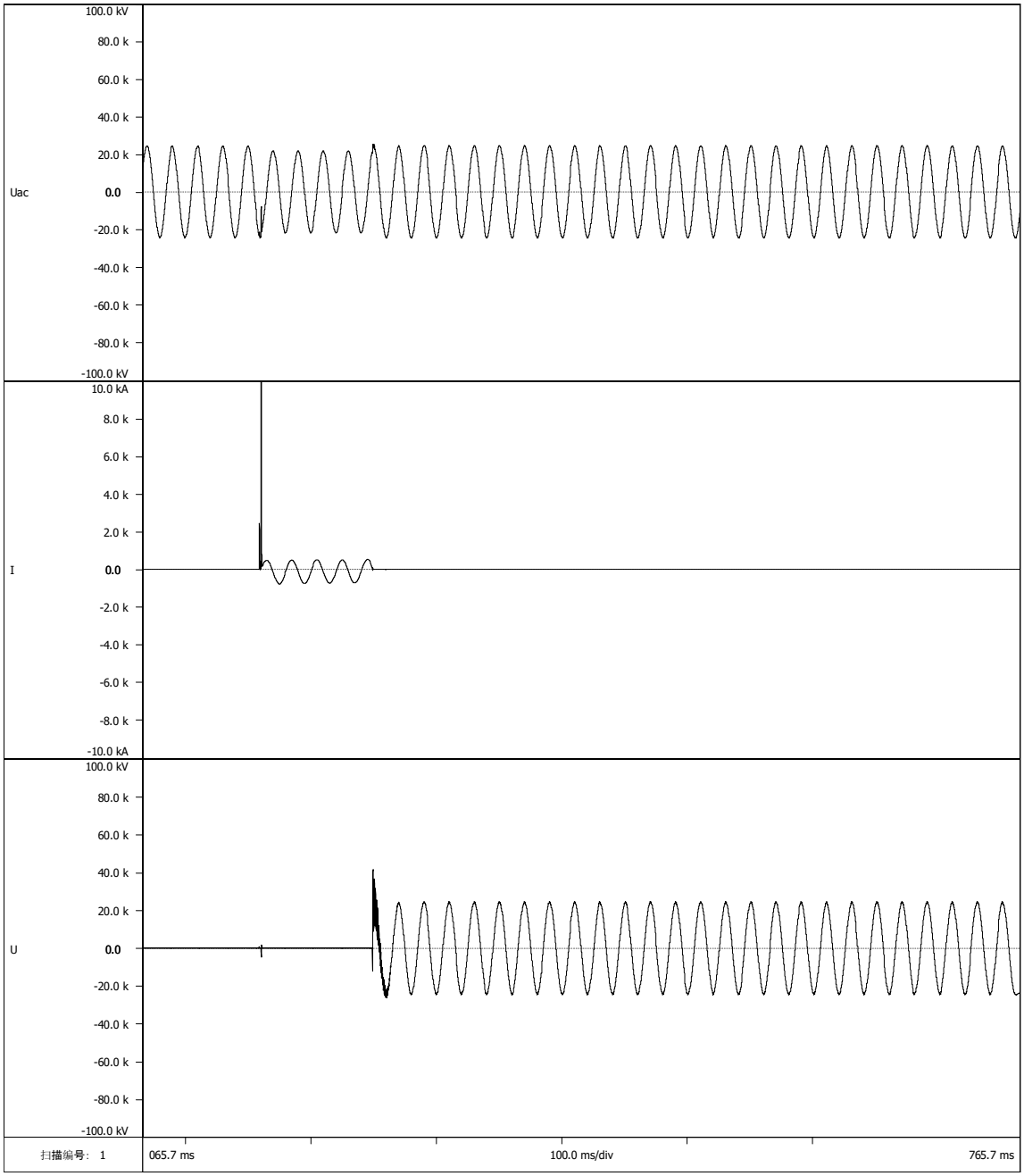


CF----短路发电机（short-circuit generator）
CD----操作断路器（operation circuit-breaker）
DB----短路变压器（boostershort-circuit transformer）
FY----分压器 （divider）
Rjd---接地电阻 （earthing resistor）
CD1---操作断路器（operation circuit-breaker）
BD----保护断路器 （master circuit-breaker）
Rt1---功率因数调节电阻（power factor resistor）
YH----电压互感器 （voltage transformer）
Rt2---功率因数调节电阻（power factor resistor）
SP----试品 （test object）
HK1----合闸开关 （making switch）
HK----合闸开关 （making switch）
Lt1---调节电抗器（adjustable reactor）
LH----电流互感器（current transformer）
Lt2---调节电抗器（adjustable reactor）
TRV---暂态恢复电压（transient recovery voltage）

POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 4

Test date: June.11,2022

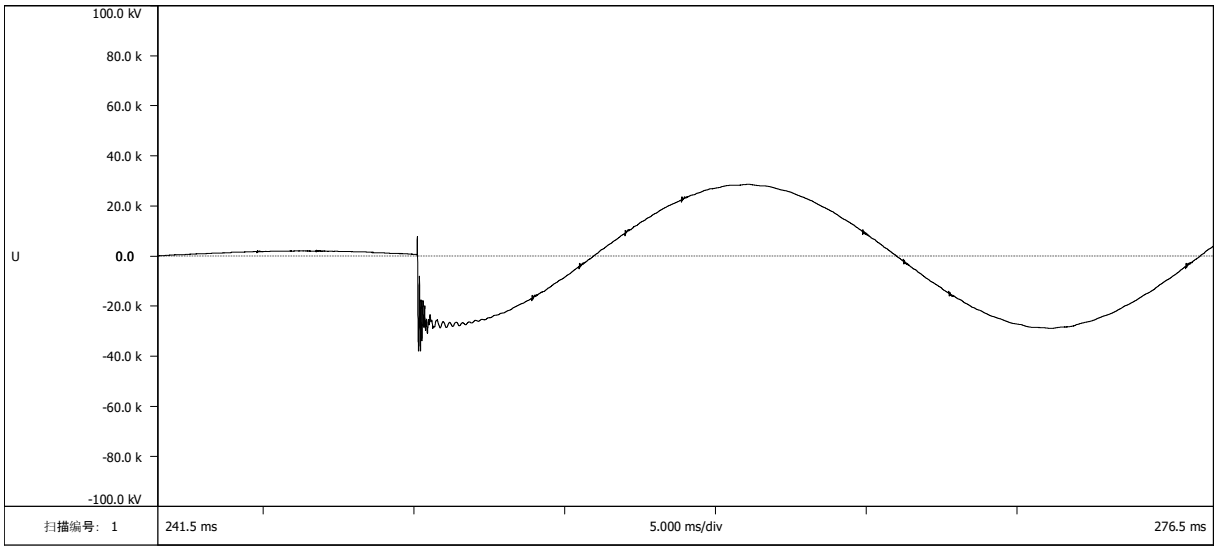


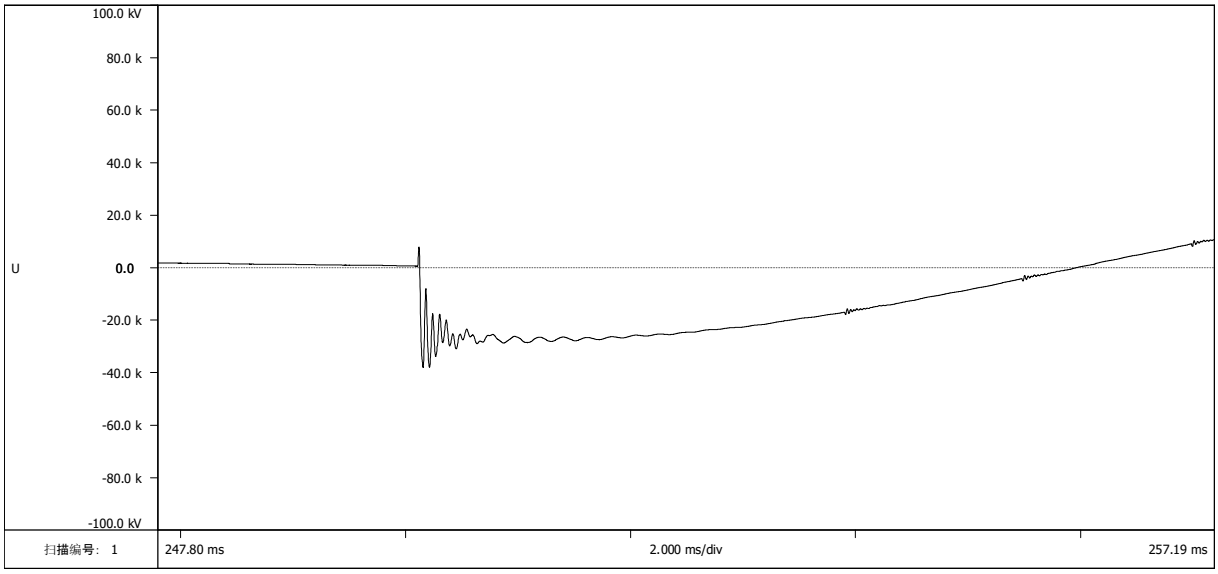
Calibration test oscillogram number		/-S-Y004
test voltage	kV	16.1
(Prospective)break	kA	0.5

POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 4

Test date: June.11,2022



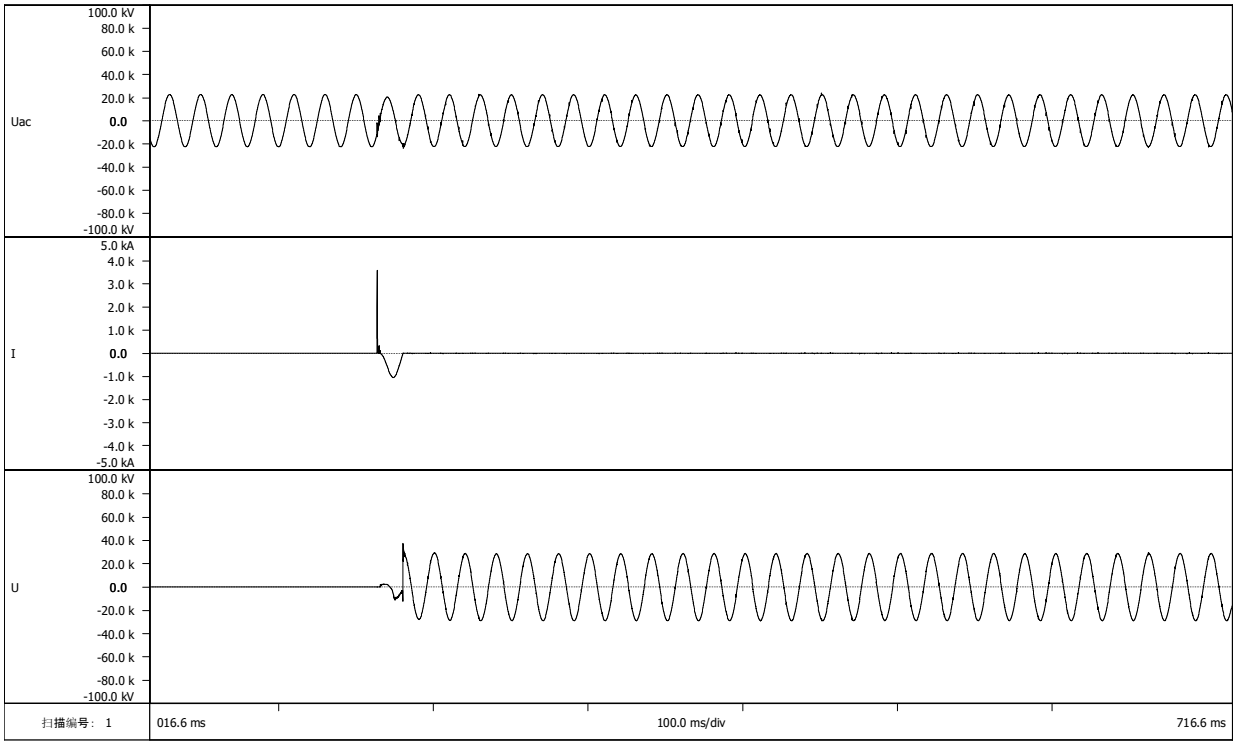


Prospective TRV Oscillogram Number		/-S-TRV004
U_c	kV	38.0
t_3	μs	28
t_d	μs	- - -
f	kHz	18.2
Peak factor	/	1.66

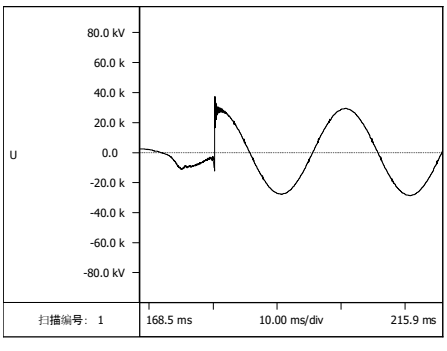
POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 4

Test date: June.11,2022



Oscillogram number		/-S-T015
operating time		1st time
Sample code: (base)	/	/-#6
Sample code: (fuse carrier)	/	- - -
Sample code: (fusing part)	/	- - -
Fusing part current	A	6.0
test voltage	kV	16.1
(Prospective)breaking current	kA	0.5
Cut-off current	kA	1.1
Power factor	/	8.30
Pre-arc time	ms	9.2
Arcing-time	ms	5.5
Action time	ms	14.7
Closing angle after voltage	°	9.0
Power-frequency recovery voltage	kV	15.8
Duration of power-frequency recovery voltage	ms	539.9



Status after test:

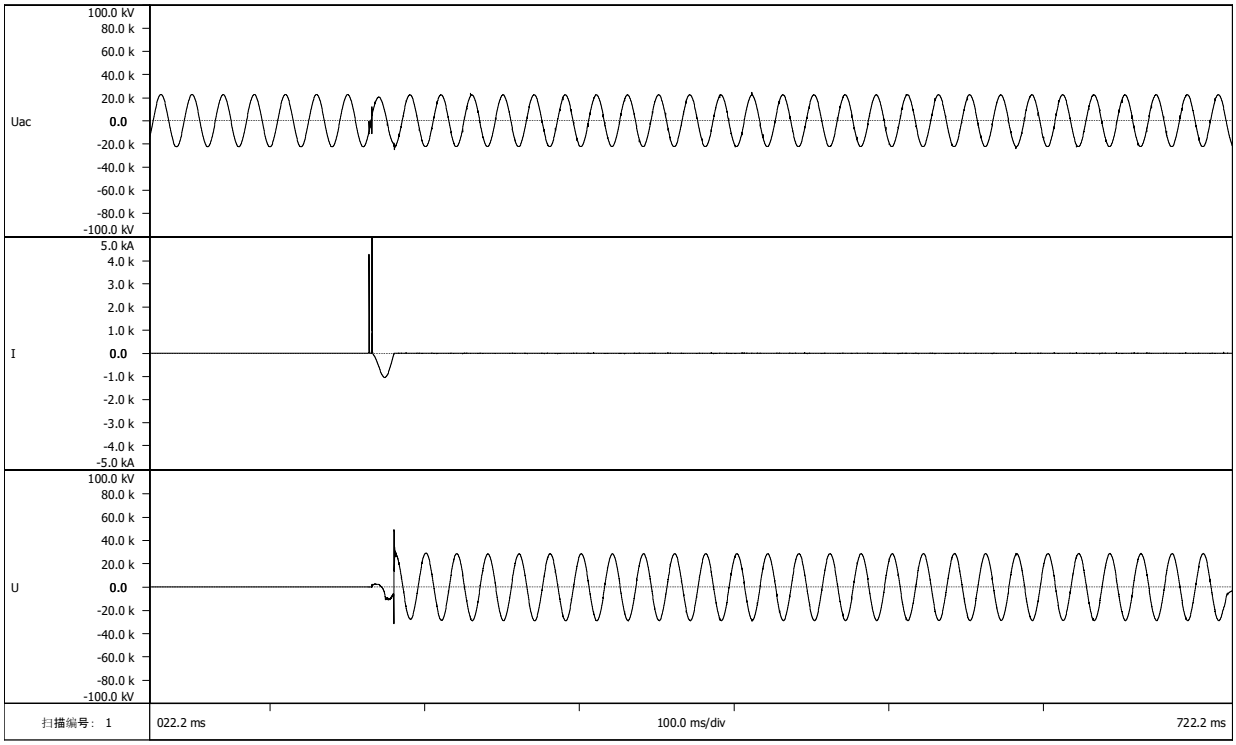
The sample is normally breaking without abnormality.

The test is valid.

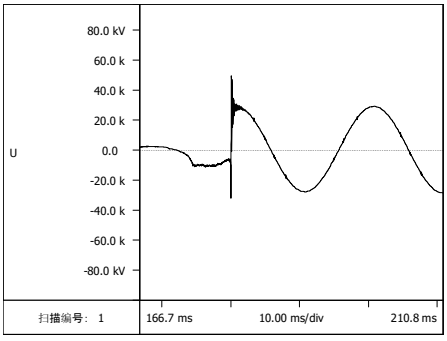
POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 4

Test date: June.11,2022



Oscillogram number		/-S-T016
operating time		2nd time
Sample code: (base)	/	/-#6
Sample code: (fuse carrier)	/	- - -
Sample code: (fusing part)	/	- - -
Fusing part current	A	6.0
test voltage	kV	16.1
(Prospective)breaking current	kA	0.5
Cut-off current	kA	1.1
Power factor	/	8.30
Pre-arc time	ms	8.9
Arcing-time	ms	5.6
Action time	ms	14.5
Closing angle after voltage zero-crossing	°	7.2
Power-frequency recovery voltage	kV	15.9
Duration of power-frequency recovery voltage	ms	540.1



Status after test:

The sample is normally breaking without abnormality.

The test is valid.

POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 5

Test date: June.12,2022

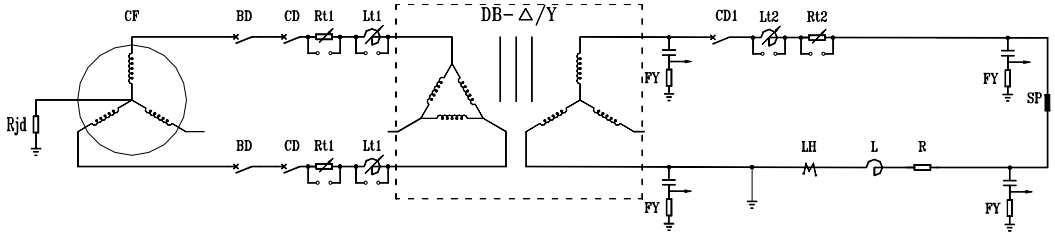
Pre-test status:

The test sample is a complete fuse.

Test parameters:

Test operation sequence	Test times	Test voltage (kV)	Prospective current（kA)	Closing phase angle relative to voltage zero angle（electrical angle）	Power factor	power-frequency recovery voltage (kV)	Prospective TRV of test line				
							Uc kV	t_3 μs	t_d μs	f kHz	Peak factor
O	2	12	0.0162~0.0198	Random	/	12	/	/	/	/	/

Test schematic diagram:

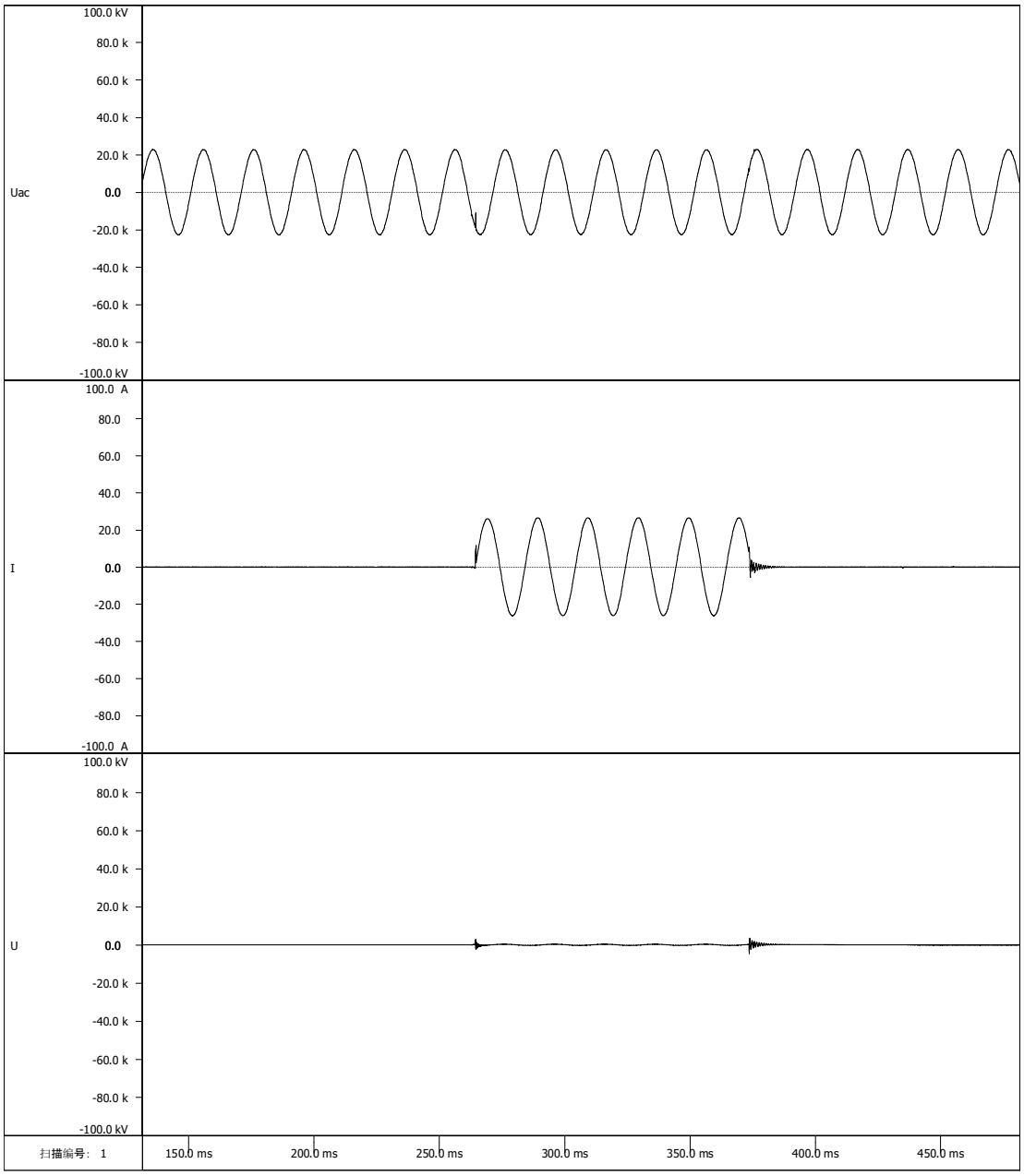


CF----短路发电机 (short-circuit generator)
BD----保护断路器 (master circuit-breaker)
CD----操作断路器 (operation circuit-breaker)
Rt1---功率因数调节电阻 (power factor resistor)
Lt1---调节电抗器 (adjustable reactor)
DB----短路变压器 (boostershort-circuit transformer)
FY----分压器 (divider)
CD1---操作断路器 (operation circuit-breaker)
Lt2---调节电抗器 (adjustable reactor)
Rt2---功率因数调节电阻 (power factor resistor)
SP----试品 (test object)
LH----电流线圈 (current coil)

POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 5

Test date: June.12,2022

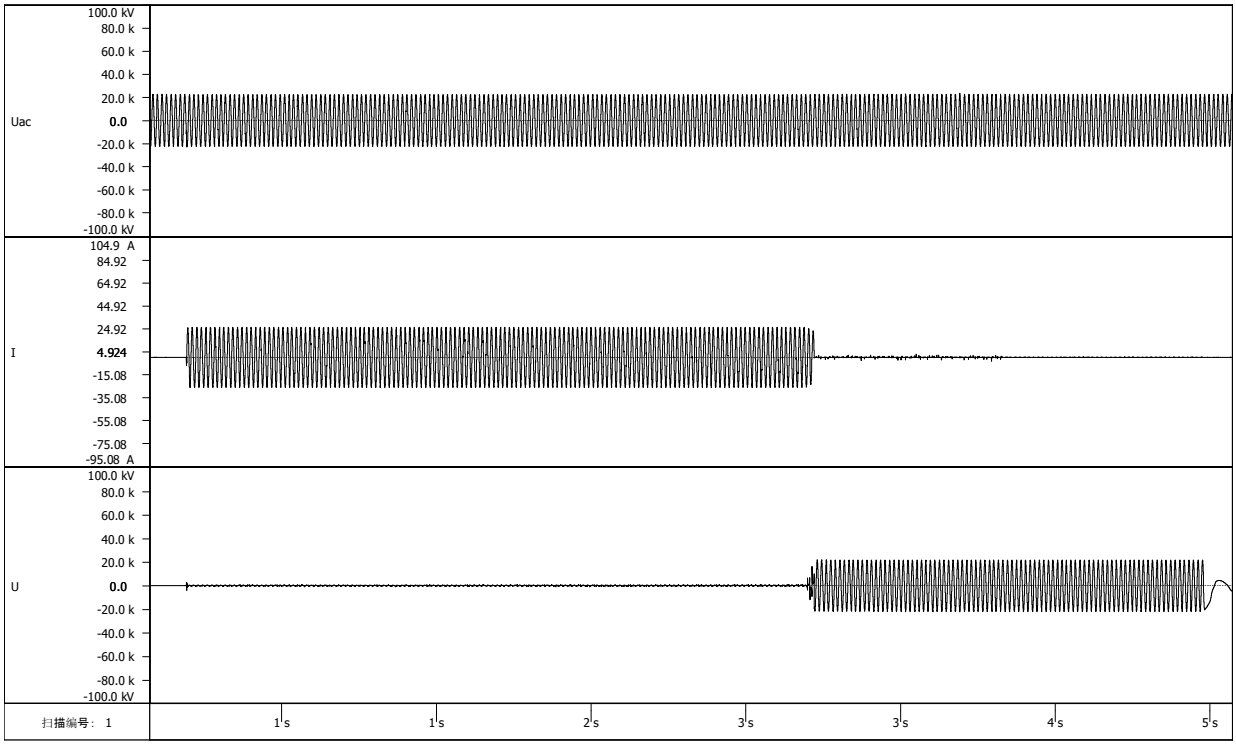


Calibration test oscillogram number		/-S-Y005
test voltage	kV	16.1
(Prospective)breaking current	A	0.0186

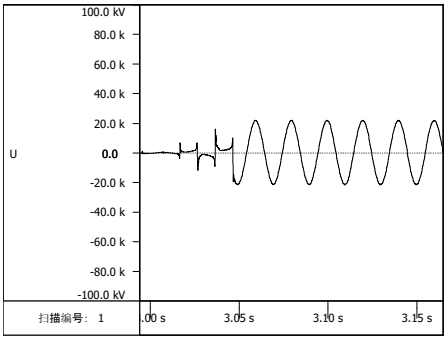
POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 5

Test date: June.11,2022



Oscillogram number		/-S-T017
operating time		1st time
Sample code: (base)	/	/-#6
Sample code: (fuse carrier)	/	- - -
Sample code: (fusing part)	/	- - -
Fusing part current	A	6.0
test voltage	kV	16.0
(Prospective)breaking current	A	0.0
Cut-off current	kA	0.0
Power factor	/	- - -
Pre-arc time	ms	2752.2
Arcing-time	ms	29.8
Action time	ms	2782.0
Closing angle after voltage zero-crossing	°	47
Power-frequency recovery voltage	kV	15.8
Duration of power-frequency recovery voltage	ms	1728.5



Status after test:

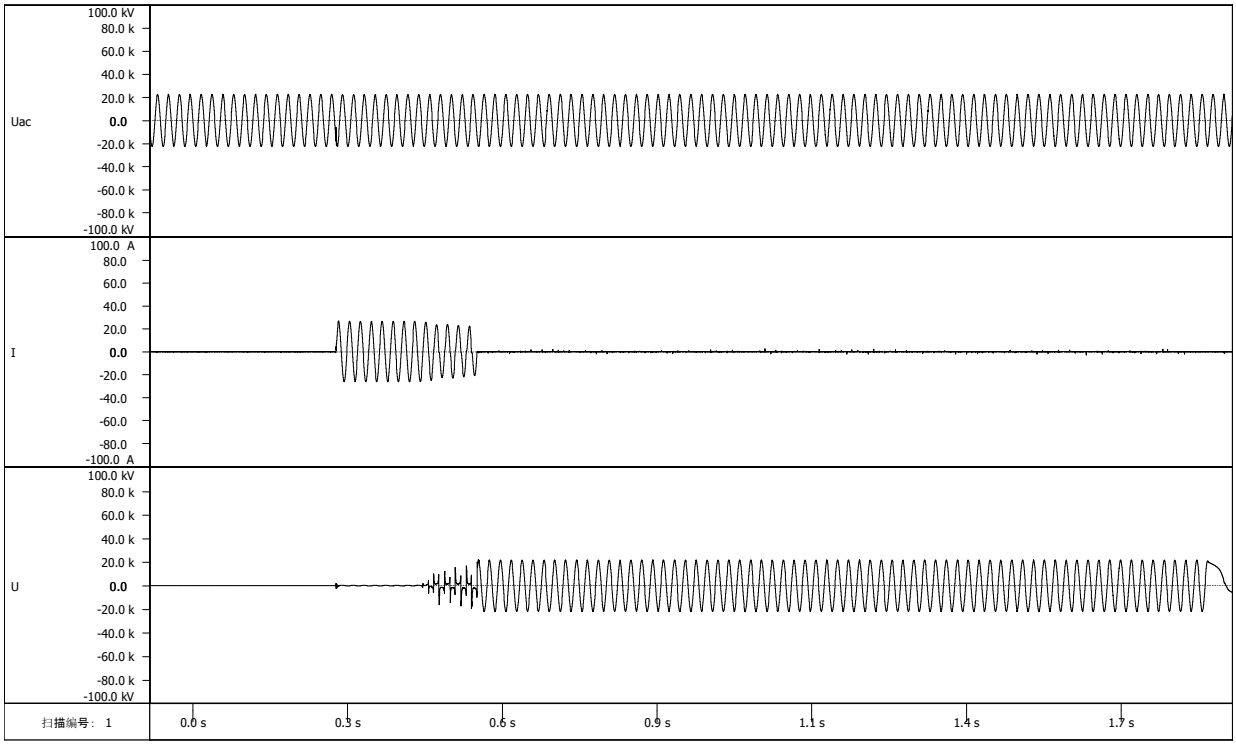
The sample is normally breaking without abnormality.

The test is valid.

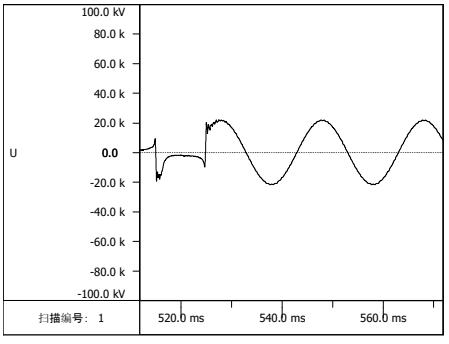
POLIPAR	Test Report	FUSE CUT-OUT

Breaking tests test method 5

Test date: June.11,2022



Oscillogram number		/-S-T018
operating time		2nd time
Sample code: (base)	/	/-#6
Sample code: (fuse carrier)	/	- - -
Sample code: (fusing part)	/	- - -
Fusing part current	A	6.0
test voltage	kV	16.1
(Prospective)breaking current	A	0.0
Cut-off current	kA	0.0
Power factor	/	- - -
Pre-arc time	ms	161.0
Arcing-time	ms	99.9
Action time	ms	260.9
Closing angle after voltage	°	45
Power-frequency recovery voltage	kV	15.8
Duration of power-frequency recovery voltage	ms	1349.3



Status after test:

The sample is normally breaking without abnormality.

The test is valid.

POLIPAR	Test Report	FUSE CUT-OUT

Pre-arcing time-current characteristics test

Test date: June. 15, 2022

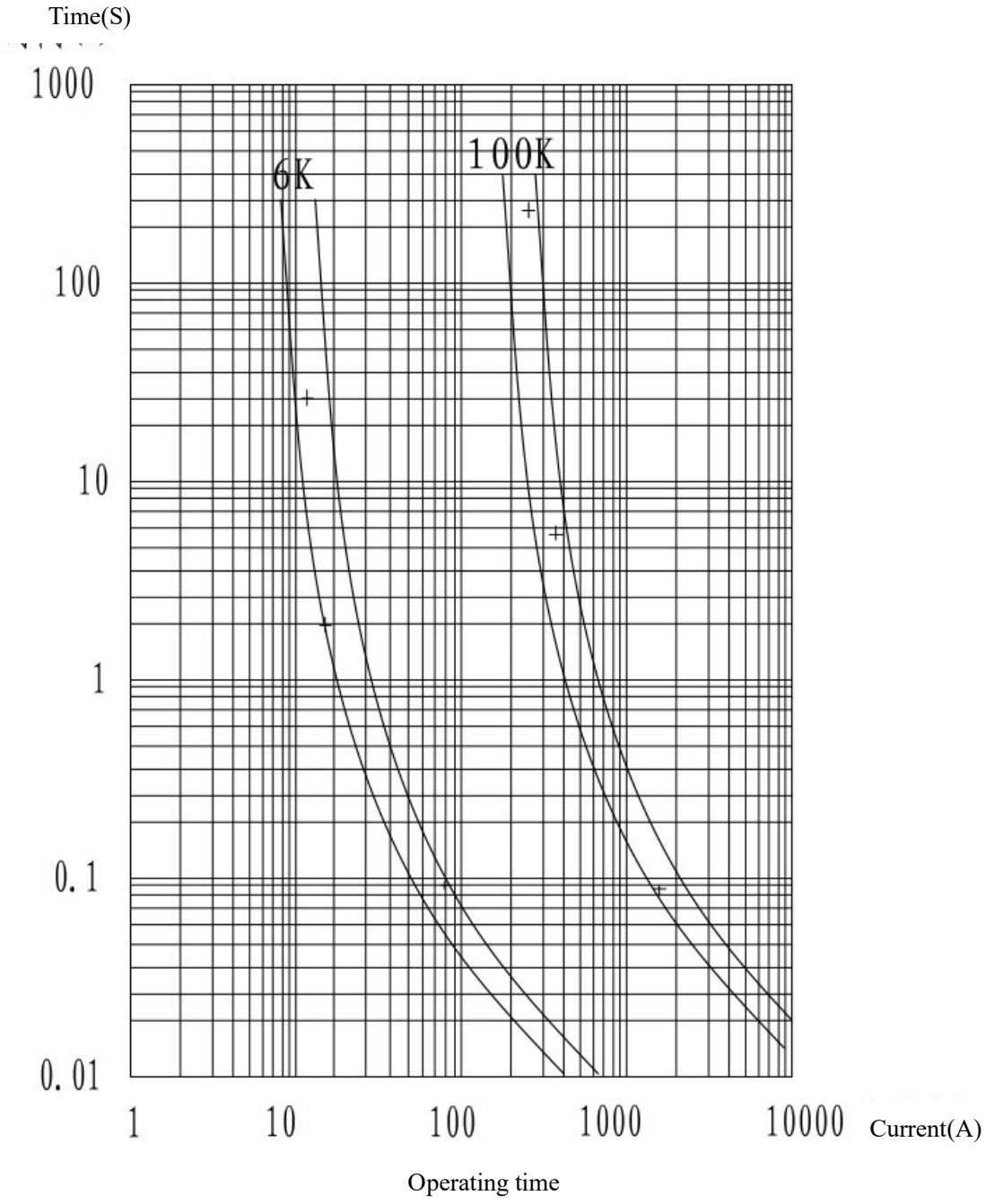
Ambient temperature:20.4℃

Connect lead length	Length: 2.0m			
Test current (A)	Rated current of the fuse (A)	Measured melting time (s)	Test times	Connect lead dimension (mm^2)
247.8	100	78.0	1	160
354.5	100	7.39	1	160
1638	100	0.168	1	160
12.7	6	5.49	1	160
18.0	6	3.21	1	160
79.9	6	0.41	1	160

Status of the sample before the test: no maintainance.

Note:

Pre-arcing time-current characteristics test	
	No: /



POLIPAR	Test Report	FUSE CUT-OUT

Operating time-current characteristics test

Test date: June. 13, 2022

Ambient temperature: 21.5℃

Connect lead length	Length: ＞1m				
Test current (A)	Rated current of the fuse (A)	Measured melting time (ms)	Test times	Connect lead dimension (mm^2)	Oscillogram No
247.8	100	78.0	1	160	/-001
354.5	100	7.39	1	160	/-002
1638	100	0.168	1	160	/-003
12.7	6	5.49	1	160	/-004
18.0	6	3.21	1	160	/-005
79.9	6	0.41	1	160	/-006

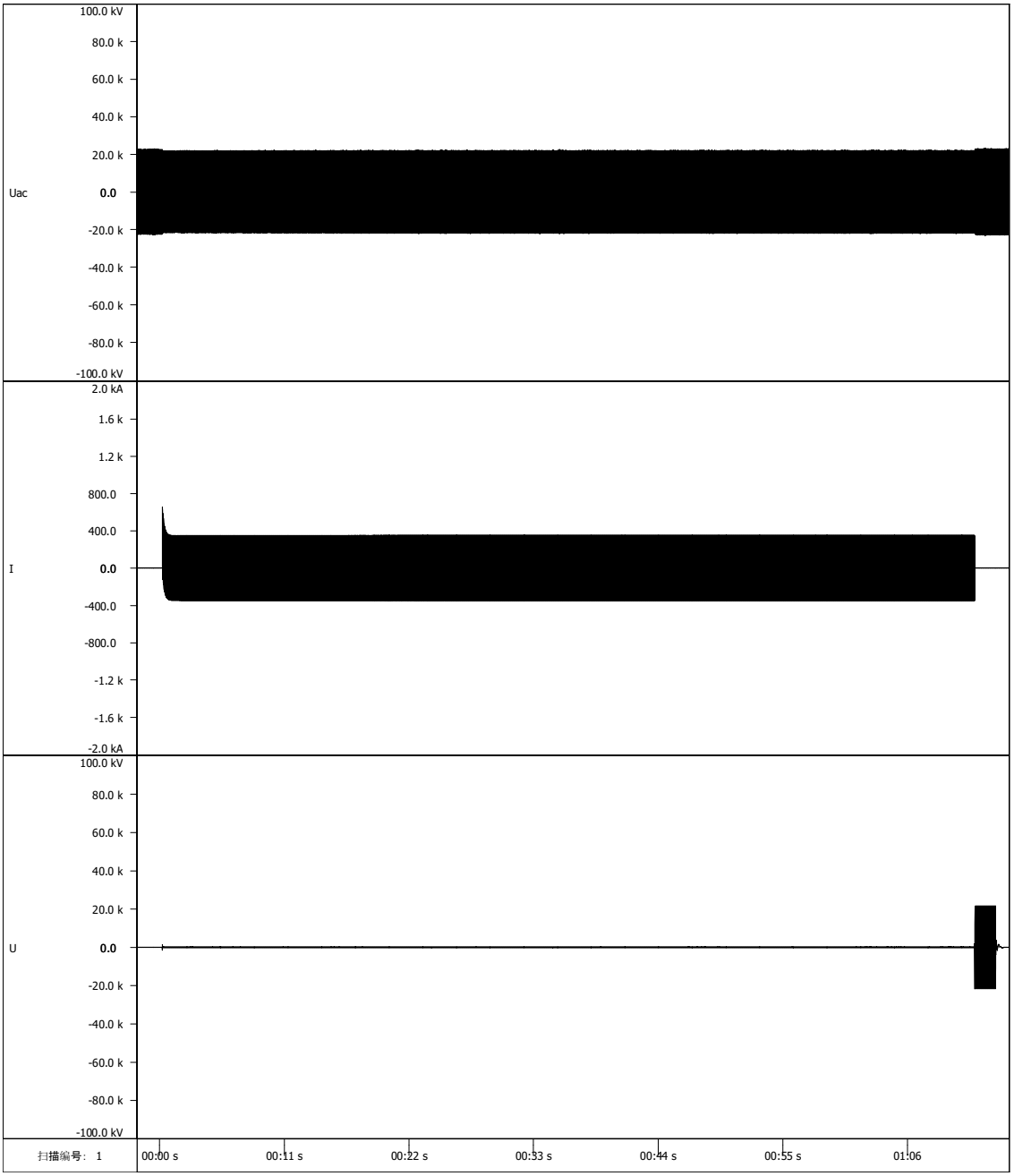
Status of the sample before the test: no maintainance.

Note:

POLIPAR	Test Report	FUSE CUT-OUT

Operating time-current characteristics test

Test date: June. 13, 2022

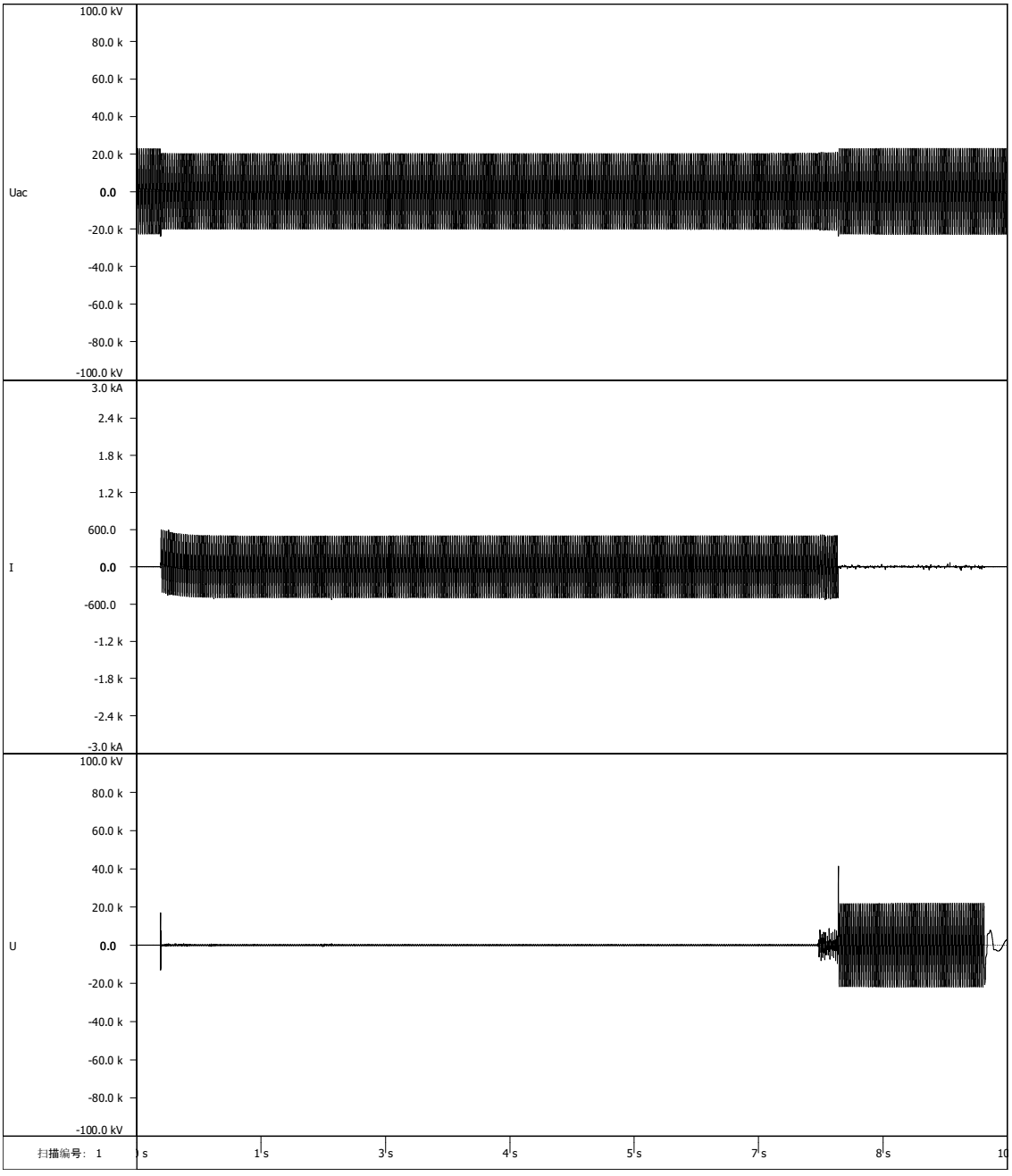


Oscillogram No		/-001	
Rated current of the fuse A	Test Voltage kV	Test Current A	Test timess
100	15.82	247.8	71.97

POLIPAR	Test Report	FUSE CUT-OUT

Operating time-current characteristics test

Test date: June. 13, 2022

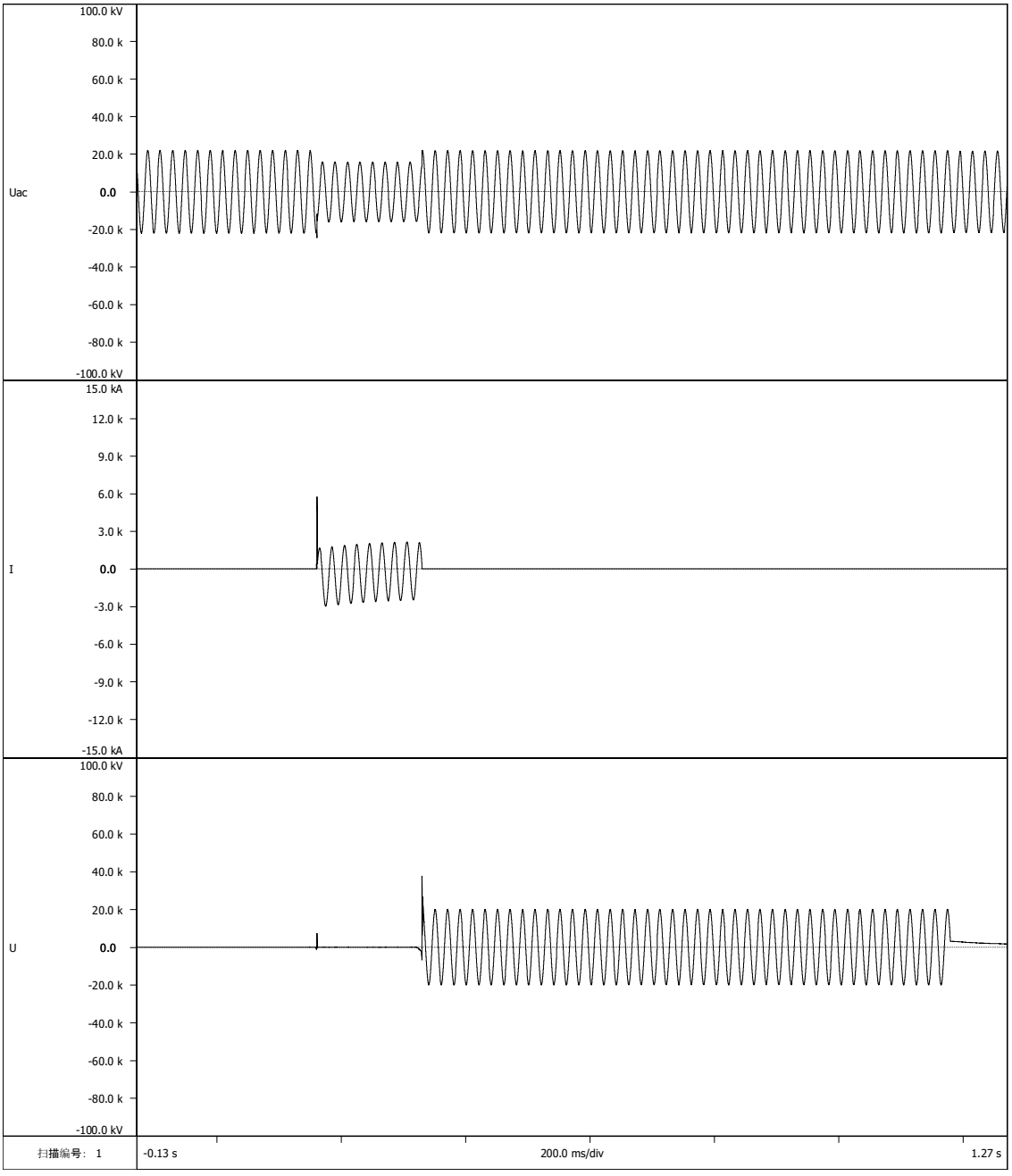


Oscillogram No		/-002	
Rated current of the fuse A	Test Voltage kV	Test Current A	Test timess
100	15.78	354.5	7.39

POLIPAR	Test Report	FUSE CUT-OUT

Operating time-current characteristics test

Test date: June. 13, 2022

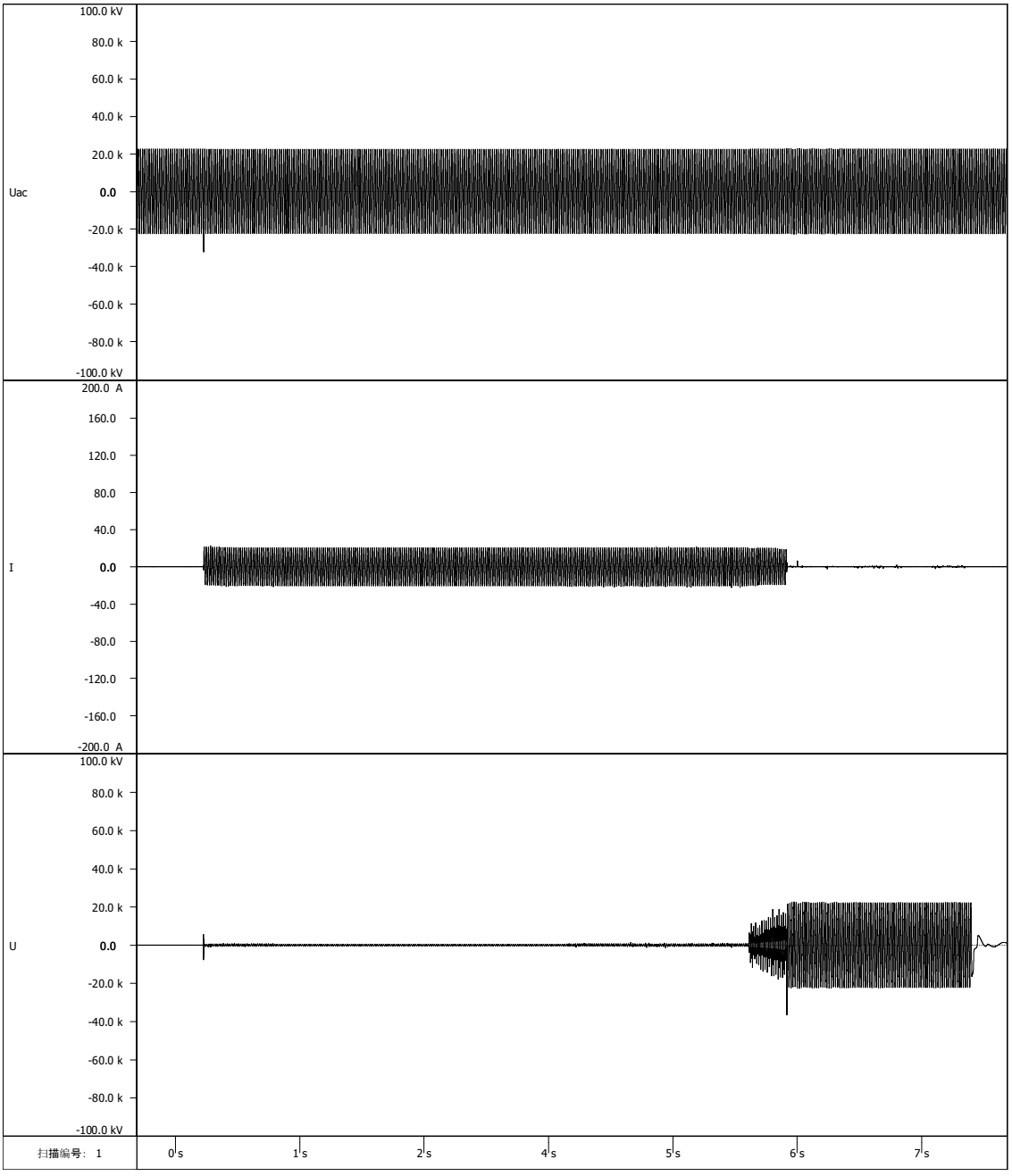


Oscillogram No		/-003	
Rated current of the fuse A	Test Voltage kV	Test Current A	Test timess
100	15.79	1638	0.168

POLIPAR	Test Report	FUSE CUT-OUT

Operating time-current characteristics test

Test date: June. 13, 2022

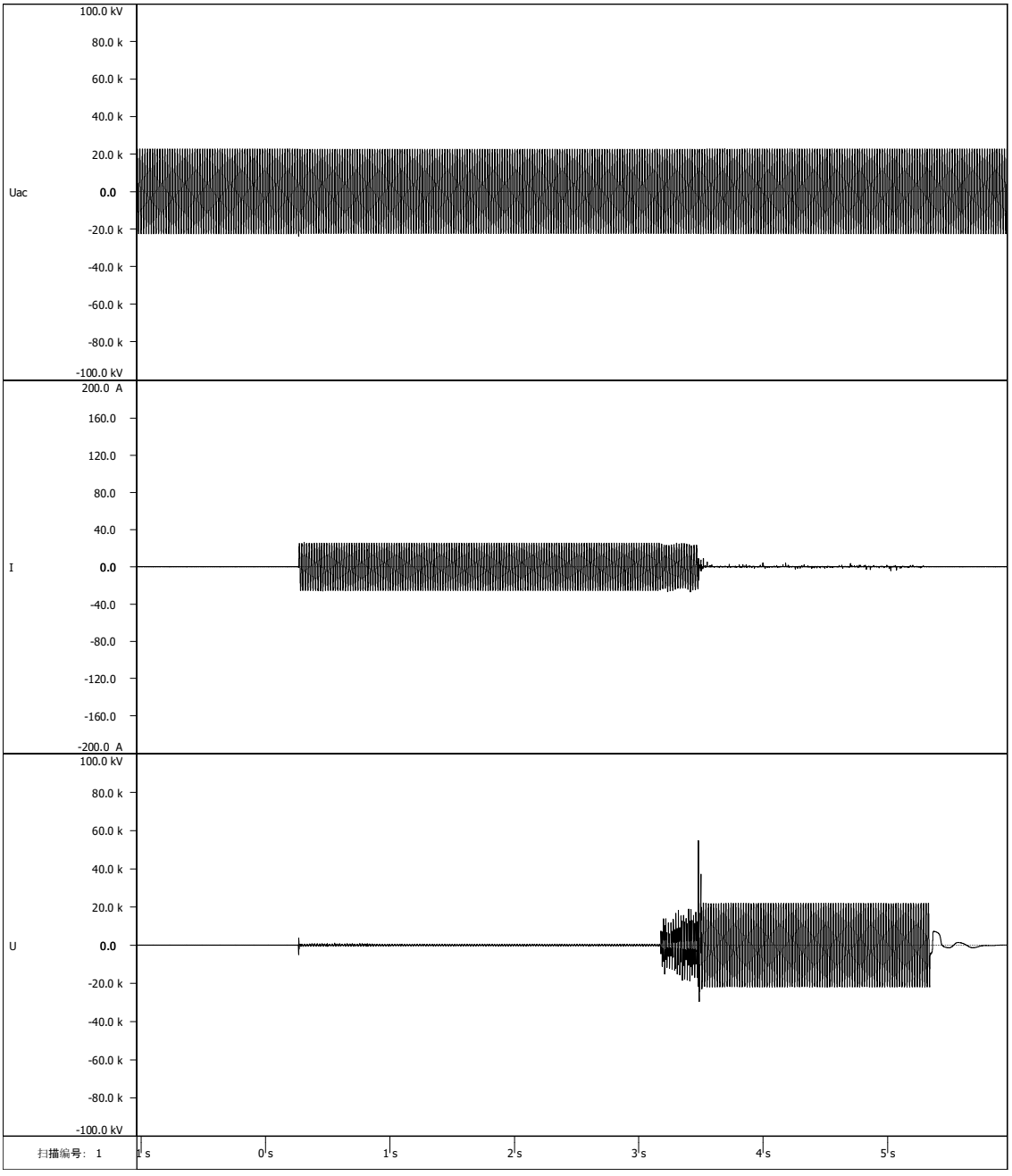


Oscillogram No		/-004	
Rated current of the fuse A	Test Voltage kV	Test Current A	Test timess
6	15.78	12.86	5.49

POLIPAR	Test Report	FUSE CUT-OUT

Operating time-current characteristics test

Test date: June. 13, 2022

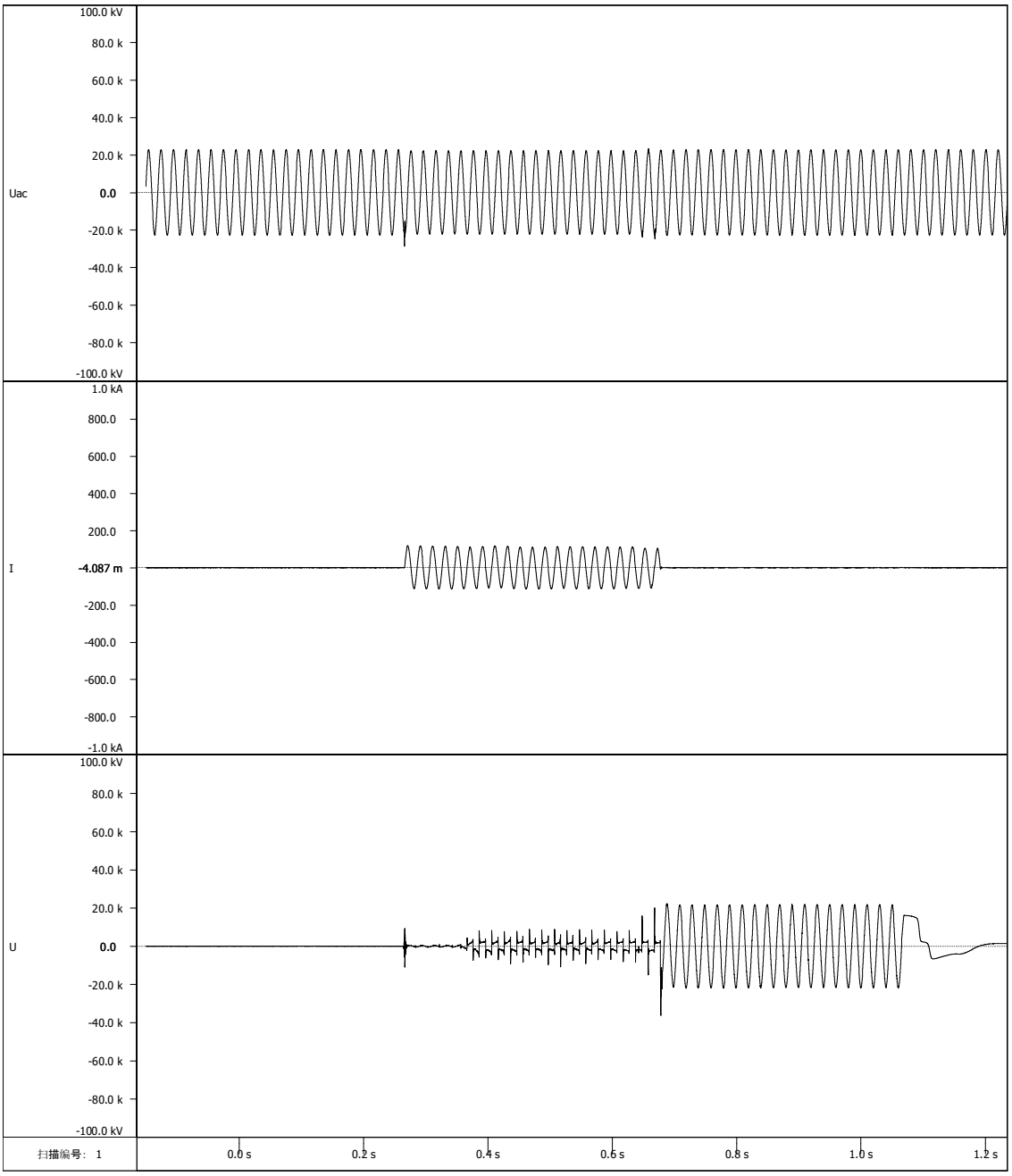


Oscillogram No		/-005	
Rated current of the fuse A	Test Voltage kV	Test Current A	Test timess
6	15.81	18.01	3.21

POLIPAR	Test Report	FUSE CUT-OUT

Operating time-current characteristics test

Test date: June. 13, 2022



Oscillogram No		/-006	
Rated current of the fuse A	Test Voltage kV	Test Current A	Test timess
6	15.79	79.94	0.41

POLIPAR	Test Report	FUSE CUT-OUT

Mechanical tests

Test date: June 9., 2022

1. Mechanical testing of fuse bases and fuse-carrying parts

The three fuses are closed and opened 500 times each.

At the end of the operation, the fuse was in an operable condition without any damage to the insulator or mechanical properties.

Test date: June 9., 2022

2. Mechanical strength of fused parts

a）Static tension test:

Apply 125%*60N axial tension to five fuses gradually, without sudden movement.

No damage to the fused parts (e.g. broken, loose, dislodged connections, or significantly elongated components) was detected.

Note: The test Passed.

POLIPAR	Test Report	FUSE CUT-OUT

Thermal cycle and torque tests

Test date: June.9, 2022

Test Procedure:

Each cycle consists of the following:

a. The fuse cutout samples were immersed in water for a minimum of 1h. Water temperature is from 5 to 35 ℃. The depth of immersion provides a minium water level of 13mm above any porcelain cavity, filled or open, or any hardware.

b. The fuse cutout samples were removed from water. The tempperature of the air surrounding the device is lowered from ambient romm temperature to -40℃ at a rate controlled to prevent thermal shock. A temperature of -40℃ to -50℃ was mantained for a minimum of 2h.

c. The temperature of the air surrounding the fuse was raised from -40℃ to 60℃ at a rate controlled to prevent thermal shock. A temperature of 60℃ to 70℃ was maintained for a minimum of 2h. The device shall be permitted to return to room temperature before reimmersing it in water for subsequent test cycles.

Test date: June.9, 2022

Acceptance of criteria:

There shall be no cracks in the insulator or loose hardware after above tests.

Note: The fuse cutout samples are in good condition after above tests. Test passed.

POLIPAR	Test Report	FUSE CUT-OUT

Torque tests

Test date: June.9, 2022

Test Procedure:

Torque tests were performed on fuses that utilize threaded fasteners to attach the hardware to the insulator. Five new fuse cutouts were tested.

Test date: June.9, 2022

Acceptance of criteria:

A torque of 125% of the nominal values specified by manufacturer YIKUN should be applied to the threaded fasteners that attach the hardware to the insulators. The specified value by YIKUN is 20kN, so 25kN torque was tested. The condition of the device after testing must be no damage to the insulators, thread failures, or loose components.

Note: The fuse cutout samples are in good condition after above tests. The test passed.

POLIPAR	Test Report	FUSE CUT-OUT

Radio interference voltage (r.i.v.) tests

Test date: June.9, 2022

Sample condition	Voltage applied to	Earth connected to	Measurement frequency（MHz）	Test applied voltage（kV）	Measured interference level（dBm）	Radio interference level U（μV）	Maximum allowable interference level（μV）
Fuse in closed position	Aa	F	1	9.4	30.8	41.8	≤250
Fuse in opened position	A	aF	1	9.4	30.6	44.6	≤250
	a	AF	1	9.4	30.5	45.1	≤250

Condition of test object before test: The test sample is working properly.

Note: A——one side terminal of tested parts; a——the other side terminal of tested parts; F——enclosure and base.

The data in the table has been corrected into the standard atmospheric conditions.

Atmospheric conditions of test zone	P= 102.5kPa; Ambient temperature t= 26℃; Relative humidity: 60% Atmospheric correction factor Kt= / Altitude correction factor Ka= /

POLIPAR	Test Report	FUSE CUT-OUT

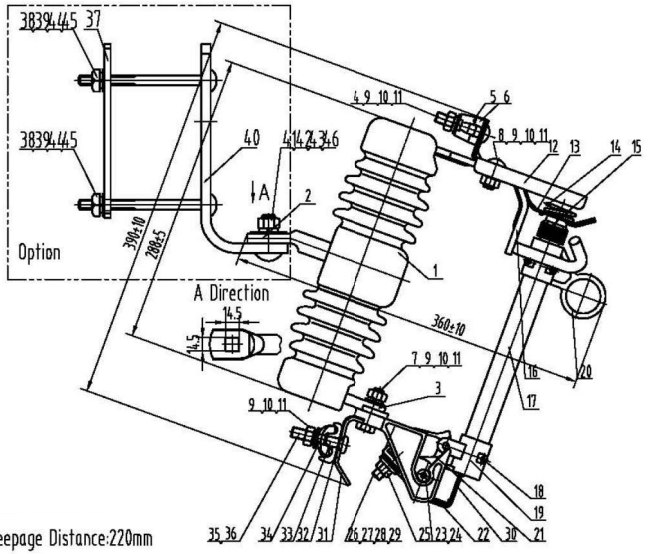
Annex

No.	Content	No.
1	Assembly	

Report No:: PL2543A

Assembly

No:



Sr		Description	Qty	Material			
							(kg)
33	6255.6-3	lower connector	1	bronze			
32	6255.6-2	lower connector plate	1	bronze			
31	6255.6-1	lower connector base	1	SS			
30		fuse link	1				Note offered
29	GB/T 867-1986	pin 3X9	4	bronze			
28	6251.6-3	auxiliary contact	2	SS			
27	6251.6-2	conduct contact	2	bronze			
26	6251.6-11	Hinge	1	brass			
25	6266.5.1-4	nut	1	bronze			
24	GB/T 867-1986	rivet pin 5X82	1	SS			
23	6255.3.3-3	tweak spring	1	SS			
22	6251.5.1-2A	latch spring	1	SS			
21	6251.5.1-3	trunnion	1	brass			
20	6251.5-2A	pull ring	1	brass			
19	6270.5-5	tube holder	1	brass			
18	GB/T 119.1-2000B	column pin4X26	3	SS			
17	6262.2-1A	fuse tube	1	Fiber glass			
16	6270.1.1	hook	1	Galv.steel			
15	6251.5-1A	upper cap	1	bronze			
14	6270.3-3	Spring	1	SS			
13	6270.3-4	upper contact plate	1	bronze			
12	6270.3-2	upper contact	1	Galv.steel			
11	GB/T 6170-2000	nut M10	4	SS			
10	GB/T 93-1987	spring washer 10	4	SS			
9	GB/T 95-2002	flat washer 10	4	SS			
8	GB/T 12-1988	bolt M10X25	1	SS			
7	GB/T 12-1988	bolt M10X40	1	SS			
6	6251.2-2B	lower connector	1	bronze			
5	6251.2-1A	upper connector	1	bronze			
4	GB/T 12-1988	bolt M10X50	1	SS			
3	6255.1-3	fittings	1	Galv.steel			
2	6255.1-2	Mounting pin	1	Galv.steel			
1	6255.1-1	Insulator	1	Procelain			

46	GB/T 93-1987	Spring washer 12	1	65Mn			
45	GB/T 93-1987	Spring washer 10	2	65Mn			
44	GB/T 95-2002	flat washer 10	2	20#			
43	6256.3-7	club washer	1	20#			
42	6256.3-6	Nut	1	20#			
41	6256.3-5	Flat Bolt	1	20#			
40	6256.3-4	Connecting bracket	1	Q235			
39	6256.3-3	Long bolt	2	Q235			
38	6256.3-2	Square Nut	2	20#			
37	6256.3-1	Connecting Plate	1	Q235			
36	6255.6-6	lower connector	1	bronze			Tin plated 8um
35	6255.6-5	flat bolt	1	SS			
34	6255.6-4	upper connector	1	bronze			

Outline drawing

QTY

SCALE 1:4

Date 02-16-2012

POLIPAR

12 kV PORCELAIN CUTOUT

100A

6270E.0

POLIPAR	Test Report	FUSE CUT-OUT

Dimensional and Galvanising Test

Test date: June.10, 2022

No.	Content	Test Value
1	Creepage distance >216mm	222mm, 228mm, 226mm
2	Length of fuse tube at 287 ± 2	287.5mm, 287.8mm, 286.8mm
3.	Length of Bracket's bolt at 152mm	152.86mm, 151.99mm, 152.16mm
4.	Galvanising thickness > 86 μ m	128 μ m, 99 μ m, 118 μ m
	Conclusion:	Test Passed.

POLIPAR	Test Report	FUSE CUT-OUT

Measurement of Resistance of fuse-links is for resistance test

Test date: June.10, 2022

Test Procesure: Applied 100A current, check the resistance values

Acceptance of criteria: the resistance measurement value is no later than 2000 μΩ specified by manufacturer

Samples	Test datas	Test Result
#1	158μΩ	Passed
#2	127μΩ	Passed
#3	135μΩ	Passed
#4	118μΩ	Passed
#5	116μΩ	Passed
#6	130μΩ	Passed