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检测
TESTING
CNAS L0681

CHPTL

TEST REPORT

№:CTQC/ZJ-23.0043

Test object name: Adhesive paper capacitive transformer bushing

Test object type: QXBRP(G)WD-L-252/1600-4

Entrusted by: Shandong Qixing High Voltage Electric CO., Ltd.

Manufacturer: Shandong Qixing High Voltage Electric CO., Ltd.

Kind of testing: Type tests

SHENYANG TRANSFORMER RESEARCH INSTITUTE CO., LTD.

CHINA NATIONAL TRANSFORMER QUALITY DETECTION AND TESTING CENTER

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Shenyang Transformer Research Institute Co., Ltd.

China National Transformer Quality Detection And Testing Center

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Test object name	Adhesive paper capacitive transformer bushing	Test object type	QXBRP(G)WD-L-252/1600-4
		Brand	/
Entrusted by	Shandong Qixing High Voltage Electric Co., Ltd.	Kind of testing	Type tests
Manufac-turer	Shandong Qixing High Voltage Electric Co., Ltd.	Sampling date	/
		Test date	Feb. 19, 2023~Feb. 24, 2023
Address	No. 1228, Pengcheng Industrial Park, Pingli Road, Xiazhuang Town, Gaomi City, Weifang City, Shandong Province	Serial №	2302PB002
Standards	IEC60137: 2017 GB/T4109-2022 Technical contract	Test items	Routine tests Type tests
Results	The test results of routine tests, type tests of QXBRP(G)WD-L-252/1600-4 are in accordance with standards and technical contract. The sample passed the above tests. Signing and issuing date: 2023.03.07		
Note			

Approved by: Lv Xiangpeng Checked by: Du Jiansong Compiled by: Jiang Anping

Statement: 1. Testing report is invalid without test special seal.
2. Testing report is invalid without compiler, checker and approver's signature.
3. Please inform CTQC in time after received the testing report if you have some disagreement to the testing report.
4. Testing or witnessing only apply to sample.
5. Copying testing certificate or testing report is forbidden without written permission from CTQC(except for copying all the testing report).

Test Report

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Test results

№	Test items	Specified values Standards (Technical contract)	Measured values	Conclu-sions
1	Measurement of dielectric dissipation factor (tanδ) and capacitances at ambient temperature (Before type test)	Applied voltage(kV): 2～20 tanδ: ≤0.007 Providing capacitance of the sample(pF)	10.0 0.00298 570.9	Passed
		Applied voltage(kV): $1.05U_m/\sqrt{3}$ tanδ: ≤0.007 Providing capacitance of the sample(pF)	152.8 0.00369 571.6	
		Applied voltage(kV): U_m tanδ: ≤0.008 Providing capacitance of the sample(pF)	252 0.00392 571.6	
2	Measurement of partial discharge quantity (Before type test)	Applied voltage(kV): U_m Partial discharge level(pC): ≤10	252 <6	Passed
		Applied voltage(kV): $1.5U_m/\sqrt{3}$ Partial discharge level(pC): ≤10	218.2 <5	
		Applied voltage(kV): $1.05U_m/\sqrt{3}$ Partial discharge level(pC): ≤5	152.8 <5	
3	Visual inspection and dimensions check (Type test)	According to standard	See 4.3	Passed
4	Dry lightning impulse voltage withstand test (Type test)	Full wave voltage Positive polarity(kV): 994.1(Corrected value) ±3% Negative polarity(kV): 1155 ±3% 15 positive and 15 negative polarity Chopped wave voltage (kV): 1270.5 ±3% 5 negative polarity	 969.99~996.20 1169.11~1180.09 Each 15 times 1247.03~1253.08 5 times	Passed
5	Dry switching impulse voltage withstand test (Type test)	Full wave voltage Positive polarity(kV): 816.6(Corrected value) ±3% Negative polarity(kV): 935 ±3% 15 positive and 15 negative polarity	 808.59~815.69 917.10~930.94 Each 15 times	Passed
6	Wet power-frequency voltage withstand test (Type test)	Applied voltage(kV): 462.8(Corrected value) Duration(s): 60	 462.8 60	Passed

Test Report

№	Test items	Specified values Standards (Technical contract)	Measured values	Conclu-sions
7	Long-duration power-frequency voltage withstand test (ACLD) (Type test)	$U_1=U_m$(kV) Duration(s): 60	252 60	Passed
		$U_2=1.5U_m/\sqrt{3}$ Duration(min): 60 Partial discharge level(pC): ≤10	218.2 60 <5	
		$1.1U_m/\sqrt{3}$ (kV) Duration(min): 5 Partial discharge level(pC): ≤5	160 5 <5	
8	Radio interference voltage test (Type test)	Applied voltage(kV): $1.1Um/\sqrt{3}$ Duration(min): 5 Radio interference level(μV): ≤500	160 5 316	Passed
9	Temperature rise test (Type test)	Temperature limit(℃): 120 Temperature rise limit(K): 75	46.6～78.9 35.1～67.4	Passed
10	Verification of thermal short-time current withstand (Type test)	Thermal short-time current(kA): $25I_r$ Duration(s): 2 Final temperature of the conductor (℃): ≤180	40 2 134.1	Passed
11	Cantilever load withstand test (Type test)	Applied load(N): 4000 Duration(s): 60 Successfully repeat check items	4108 60 Passed	Passed
12	Measurement of partial discharge quantity (After type test)	Applied voltage(kV): U_m Partial discharge level(pC): ≤10	252 <5	Passed
		Applied voltage(kV): $1.5U_m/\sqrt{3}$ Partial discharge level(pC): ≤10	218.2 <4	
		Applied voltage(kV): $1.05U_m/\sqrt{3}$ Partial discharge level(pC): ≤5	152.8 <4	
13	Measurement of dielectric dissipation factor (tanδ) and capacitances at ambient temperature (After type test)	Applied voltage(kV): 2～20 tanδ: ≤0.007 Providing capacitance of the sample(pF)	10.0 0.00296 571.0	Passed
		Applied voltage(kV): $1.05U_m/\sqrt{3}$ tanδ: ≤0.007 Providing capacitance of the sample(pF)	152.8 0.00370 571.6	
		Applied voltage(kV): U_m tanδ: ≤0.008 Providing capacitance of the sample(pF)	252 0.00393 571.6	

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№	Test items	Specified values Standards (Technical contract)	Measured values	Conclu-sions
14	Visual inspection and dimensions check (Routine test)	According to standard	See 4.14	Passed
15	Tests of tap insulation (Routine test)	Dry power-frequency voltage withstand test on the tap: Applied voltage(kV): ≥2 Duration(s): 60	 3 60	Passed
		Measurement of dielectric dissipation factor (tanδ) and capacitances at ambient temperature on the tap: Applied voltage(kV): ≥1 tanδ: ≤0.05 Capacitance(pF): ≤10000	 2 0.00498 696.3	
16	Dry lightning impulse voltage withstand test (Routine test)	Full wave voltage(kV): 1102.5 ±3% 3 negative polarity Chopped wave voltage(kV): 1207.5 ±3% 2 negative polarity	1090.71~1095.52 3 times 1193.78~1193.97 2 times	Passed
17	Dry power-frequency voltage withstand test (Routine test)	Applied voltage(kV): 505 Duration(s): 60	505 60	Passed
18	Tightness test at the flange (Routine test)	Applied medium Applied pressure(MPa): 0.4 ±0.01 Duration(min): 15 No leakage and damage	Compressed air 0.4 15 No leakage and damage	Passed
19	Measurement of partial discharge quantity (Routine test)	Applied voltage(kV): U_m Partial discharge level(pC): ≤10	252 <5	Passed
		Applied voltage(kV): $1.5U_m/\sqrt{3}$ Partial discharge level(pC): ≤10	218.2 <5	
		Applied voltage(kV): $1.05U_m/\sqrt{3}$ Partial discharge level(pC): ≤5	152.8 <4	
20	Measurement of dielectric dissipation factor (tanδ) and capacitances at ambient temperature (Routine test)	Applied voltage(kV): 2～20 tanδ: ≤0.007 Providing capacitance of the sample(pF)	10.0 0.00296 571.0	Passed
		Applied voltage(kV): $1.05U_m/\sqrt{3}$ tanδ: ≤0.007 Providing capacitance of the sample(pF)	152.8 0.00367 571.5	
		Applied voltage(kV): U_m tanδ: ≤0.008 Providing capacitance of the sample(pF)	252 0.00392 571.6	

Note: 1. All the tests were field tests;
2. Tested in Shandong Qixing High Voltage Electric Co., Ltd. laboratory.

1. Test object parameters

Highest voltage for equipment(kV): 252

Rated phase to earth voltage(kV): $252/\sqrt{3}$

Rated current(A): 1600

Rated frequency(Hz): 50

Altitude(m): ≤1000

Thermal class of insulation: E

Test tap(measured tap, tanδ): With

Insulation type of bushing: Adhesive paper

2. Sample condition description

Sample exterior construction and major dimensions(length, diameter) are in compliance with outline drawings.

Measured values: length 4285mm, outer diameter Φ550mm.

Outline dimensions	Rating plate
PCB22-920	8QX.860.008G

Rating plate and outline drawings see testing report annex.

The form, performance data, specifications of sample rating plate are in compliance with drawing.

The surface of the sample has no collision and damage.

3. Standards

IEC60137:2017, GB/T4109-2008 Insulated bushings for alternating voltage above 1000V

Technical contract

Test Report

4. Test items and conclusions

4.1 Measurement of dielectric dissipation factor(tanδ) and capacitances at ambient temperature(Before type test)

Test date: Feb. 19, 2023

Humidity: 39.0%; Ambient temperature: 11.2℃

Applied voltage (kV)	Dielectric dissipation factor (tanδ)	Capacitance(pF)	Result
10	0.00298	570.9	Passed
152.8	0.00369	571.6	
252	0.00392	571.6	

Note: tanδ(252kV)- tanδ(152.8kV)= 0.00023＜0.001(Standard value), passed.

4.2 Measurement of partial discharge quantity(Before type test)

Test date: Feb. 19, 2023

Humidity: 39.0%; Ambient temperature: 11.2℃; Atmospheric pressure: 101.9kPa

Prestress voltage (kV)	Duration(s)	Measured voltage (kV)	Partial discharge level (pC)	Result
505	60	252.0	＜6	Passed
		218.2	＜5	
		152.8	＜5	

Note: Background noise level was＜5pC before and after test.

4.3 Visual inspection and dimensional check(Type test)

Test date: Feb. 19, 2023

It has smooth surface, no cracks. Dimensional check is accordance with the drawing requirement.

Drawing values(mm): 4270±20 2265±10 1290±5 Ø550 100

Measured values(mm): 4285 2270 1291 Ø550 100

Arcing distance(mm): 2290 Creepage distance(mm): 9600

Result: Passed.

4.4 Dry lightning impulse voltage withstand test(Type test) Test date: Feb. 21, 2023

Test atmospheric conditions

Humidity: 37.0%; Ambient temperature: 11.5℃; Atmospheric pressure: 102.1kPa.

Rated lightning impulse withstand voltage(kV): Positive: 994.1(Corrected value)

Negative: 1155 15 positive and 15 negative polarity

Chopped lightning impulse withstand voltage(kV): 1270.5 5 negative polarity

Test sequence

One positive reference full wave impulse;
Fifteen positive rated full wave impulses;
One negative reference full wave impulse;
One negative rated full wave impulse;
Five negative rated chopped wave impulses;
Fourteen negative rated full wave impulses.

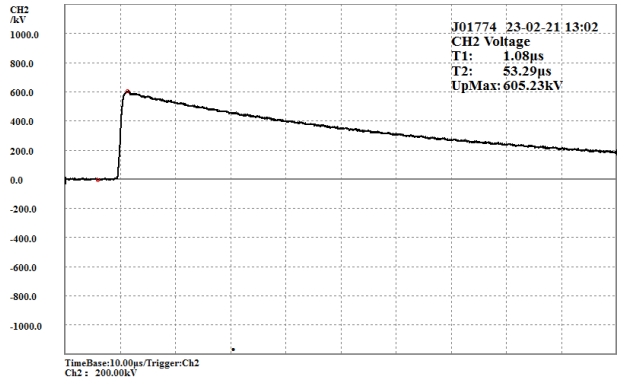
Test oscillogram records

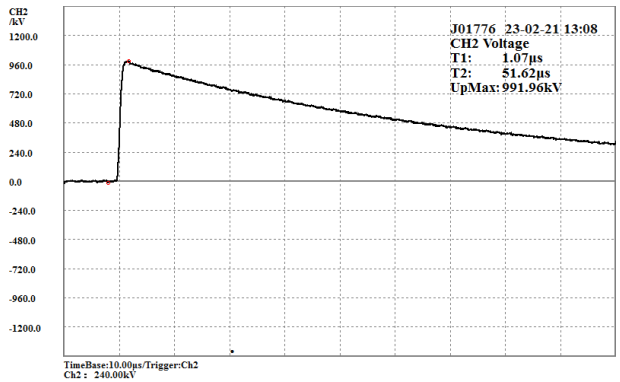
T1: Front time; T2: Time to half value; Up_{MAX}/ Up_{MIN}: Peak voltage;

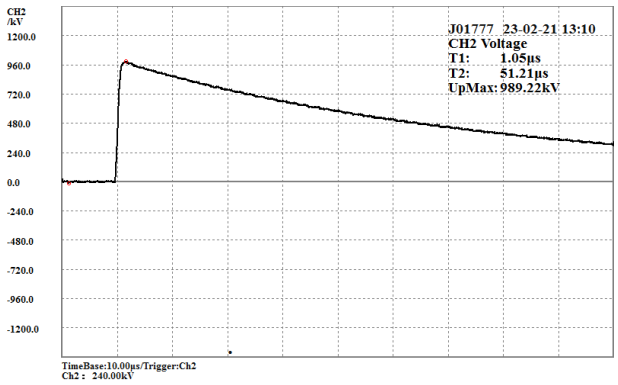
Tc: Time to chopping; K: Factor of over crossing.

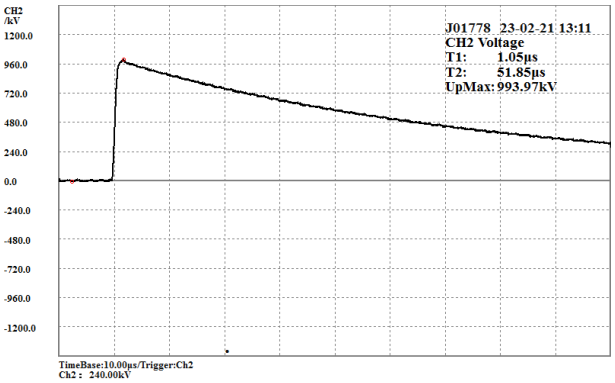
Result: Passed.

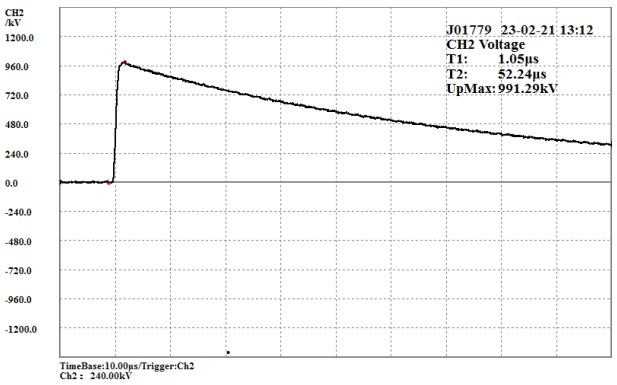
Tested terminal: To earth Test polarity: Positive CH1: Voltage wave

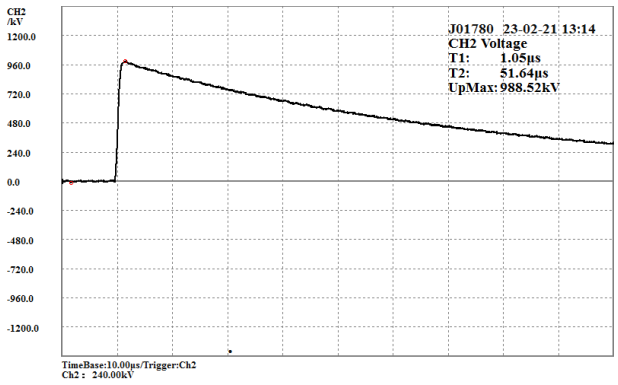


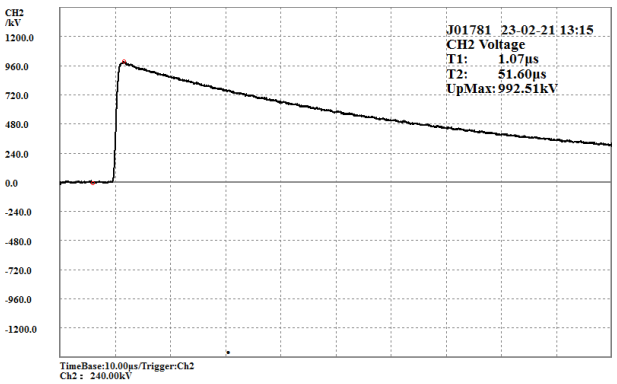


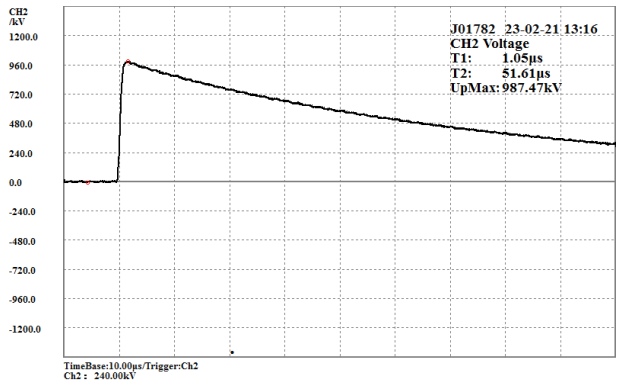




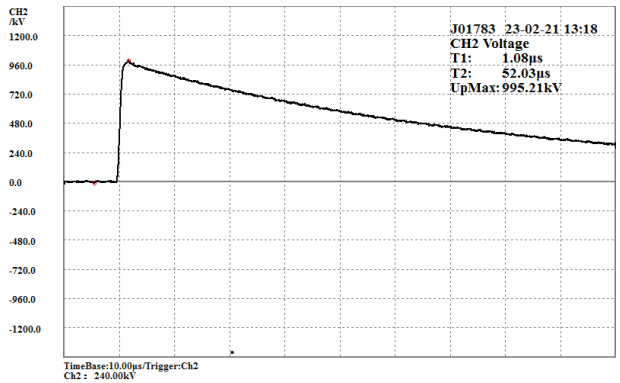


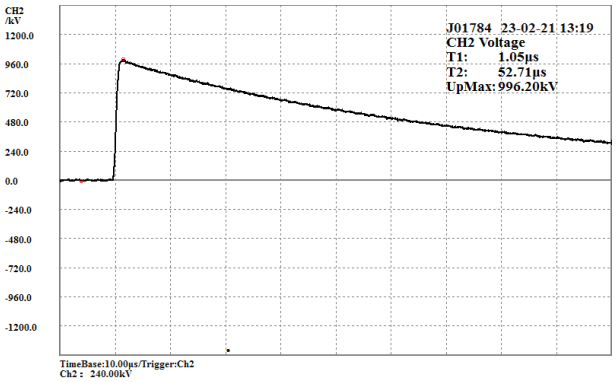


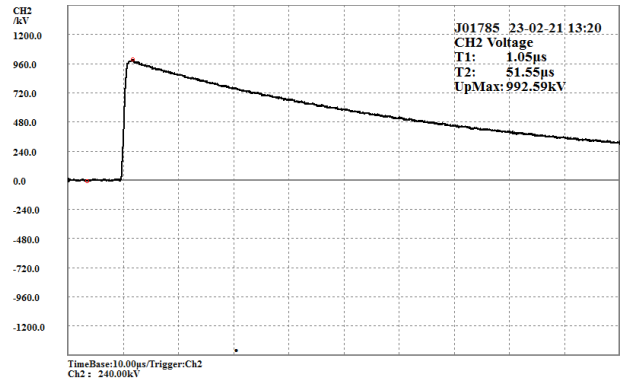


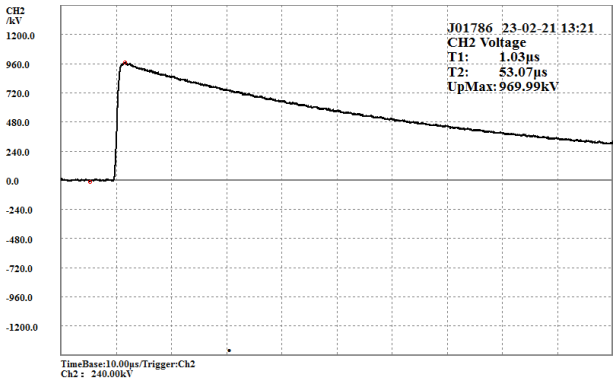


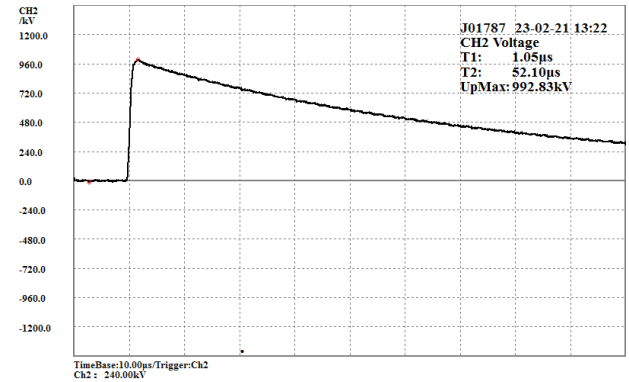
Tested terminal: To earth Test polarity: Positive CH1: Voltage wave

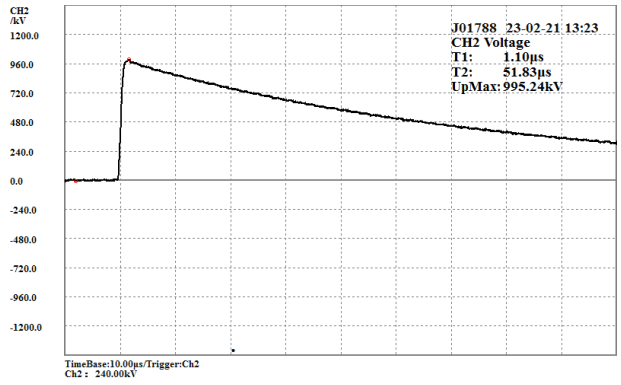


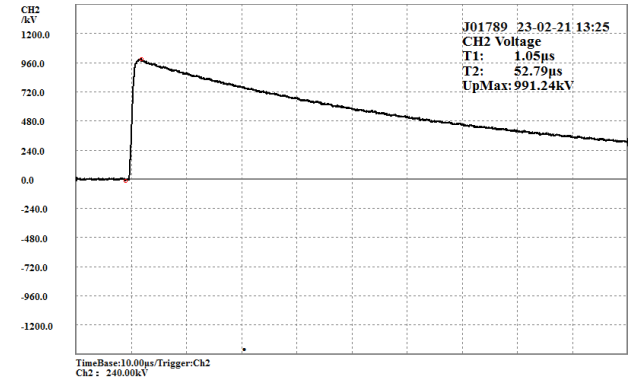


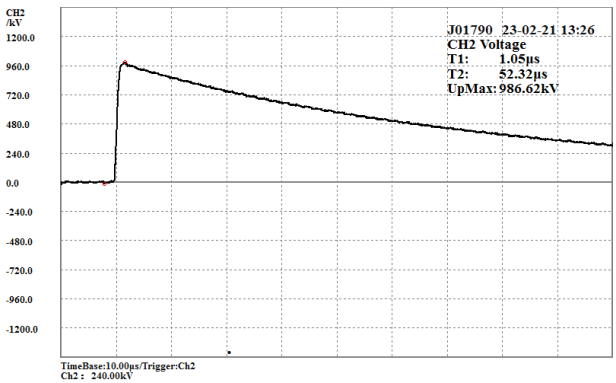








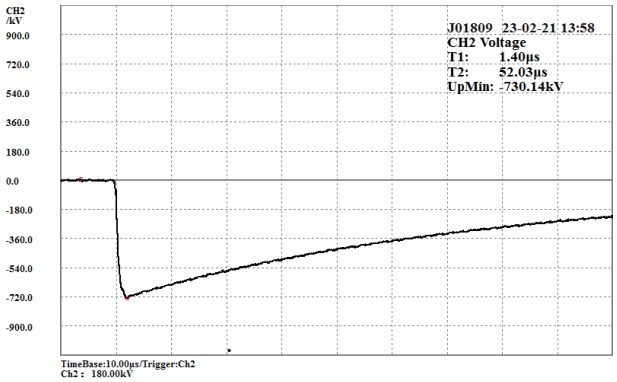


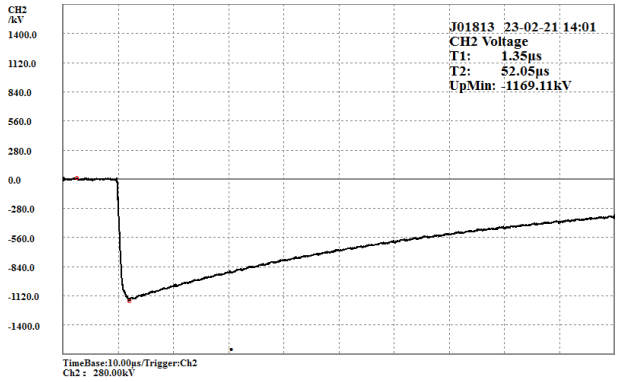


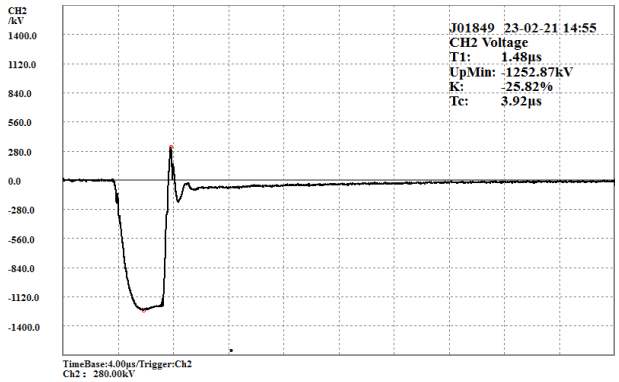
Tested terminal: To earth

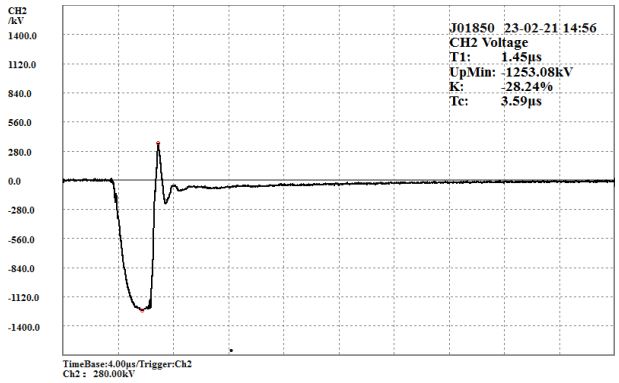
Test polarity: Negative

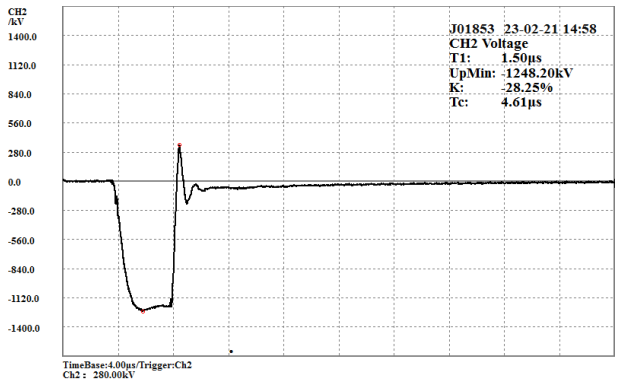
CH1: Voltage wave

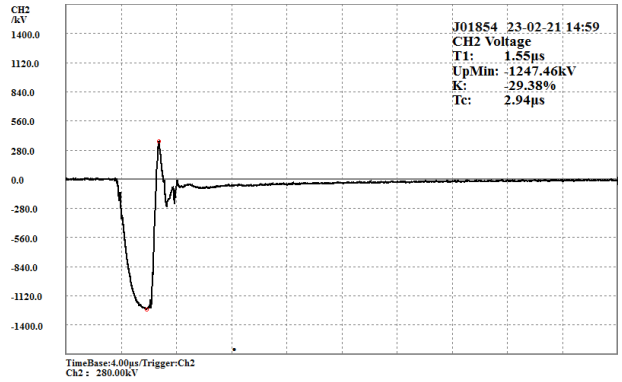


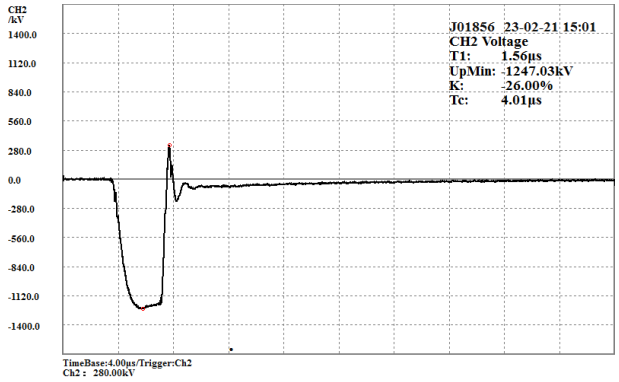




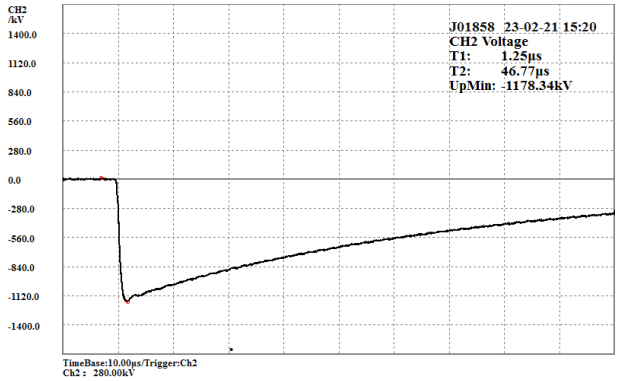


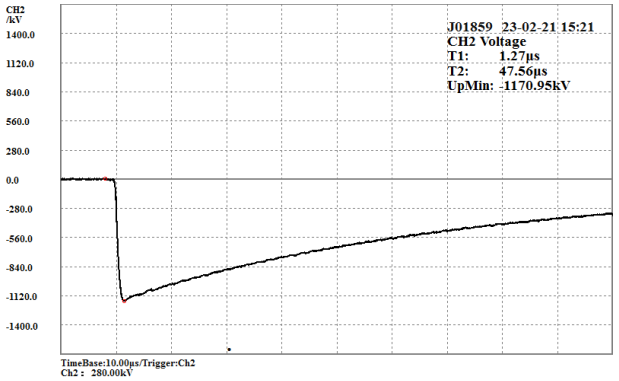


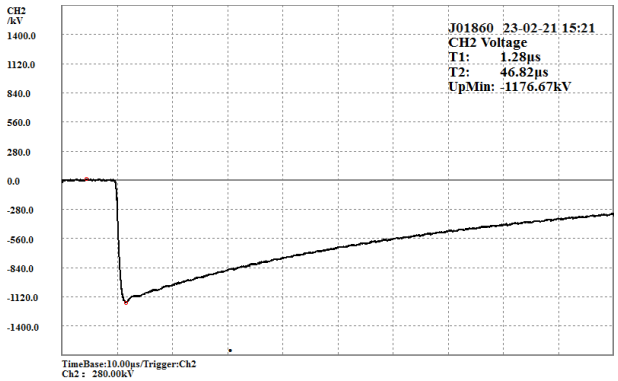


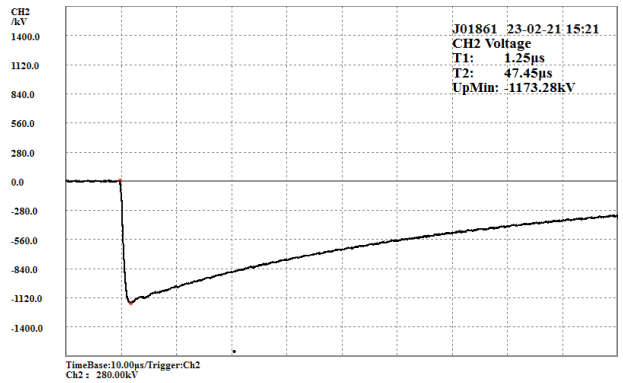


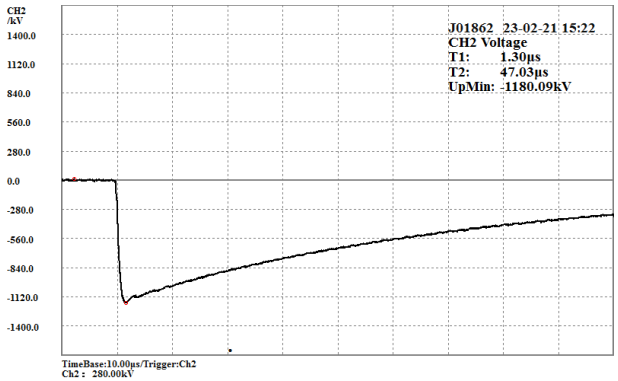
Tested terminal: To earth Test polarity: Negative CH1: Voltage wave

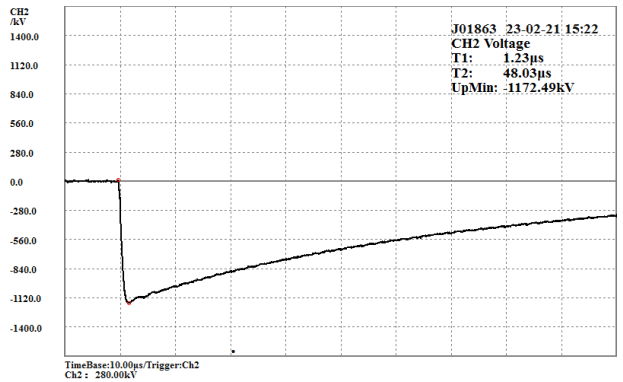


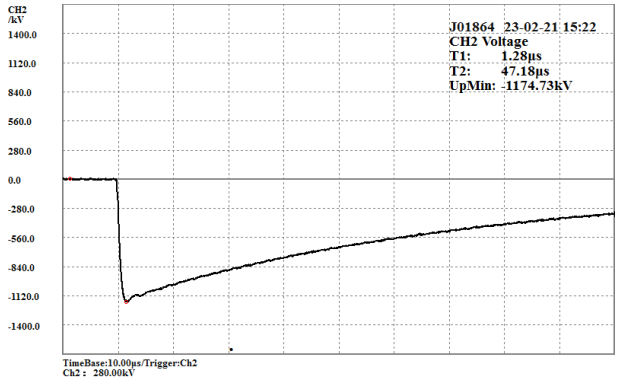


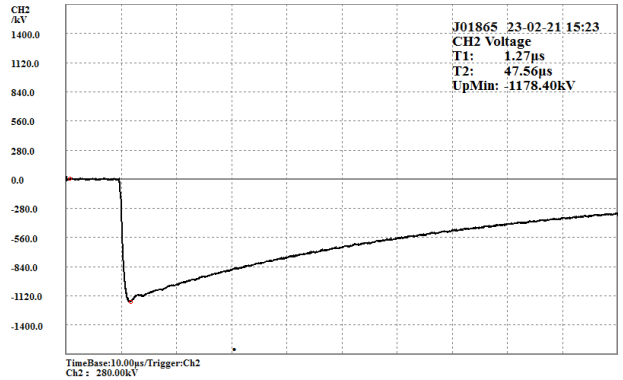




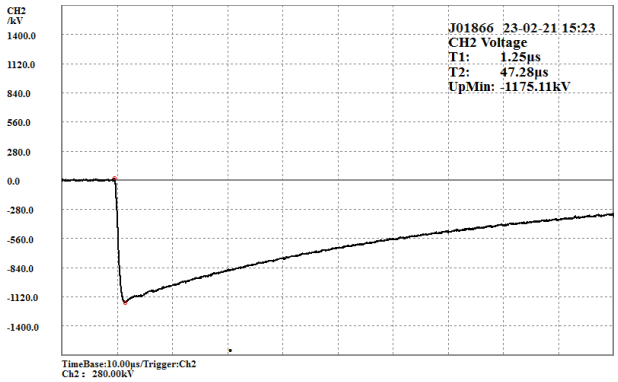


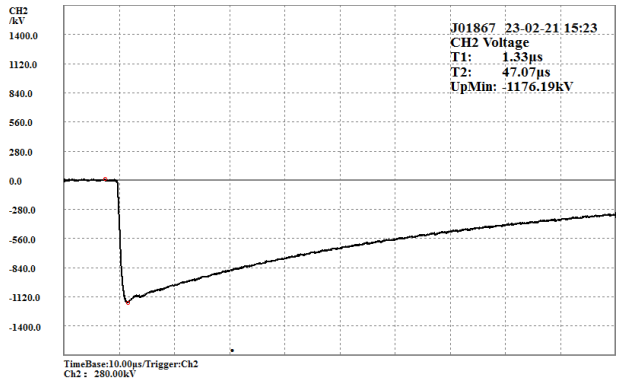


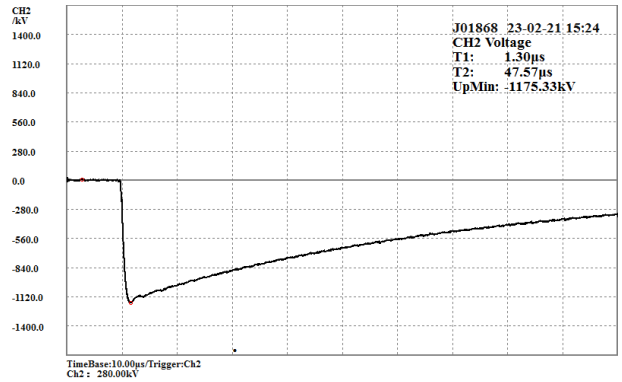


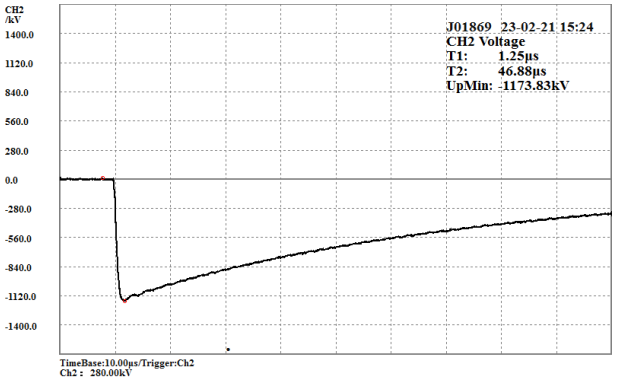


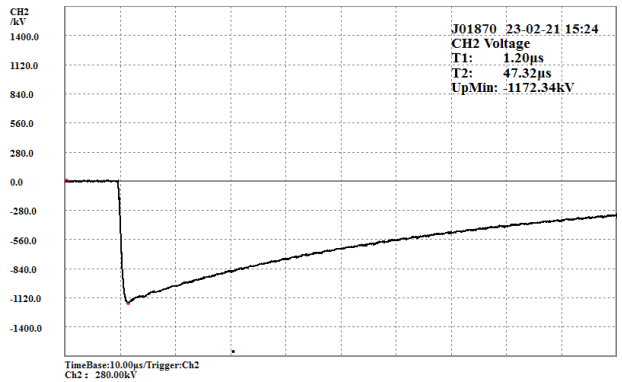
Tested terminal: To earth Test polarity: Negative CH1: Voltage

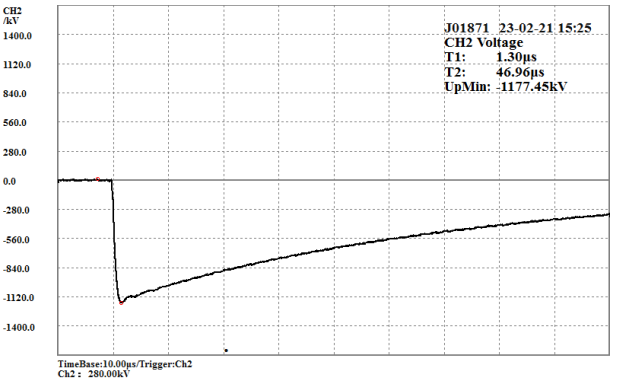












4.5 Dry switching impulse voltage withstand test(Type test) Test date: Feb. 21, 2023

Test atmospheric conditions

Humidity: 37.0%; Ambient temperature: 11.5℃; Atmospheric pressure: 102.1kPa.

Dry switching wave rated withstand voltage

Positive(kV): 816.6 (Corrected value)

Negative(kV): 935 15 positive and 15 negative polarity

Test sequence

One positive reference full wave impulse;

Fifteen positive rated full wave impulses;

One negative reference full wave impulse;

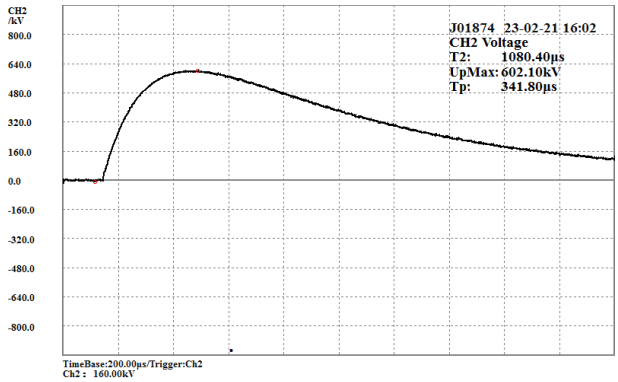
Fifteen negative rated full wave impulse.

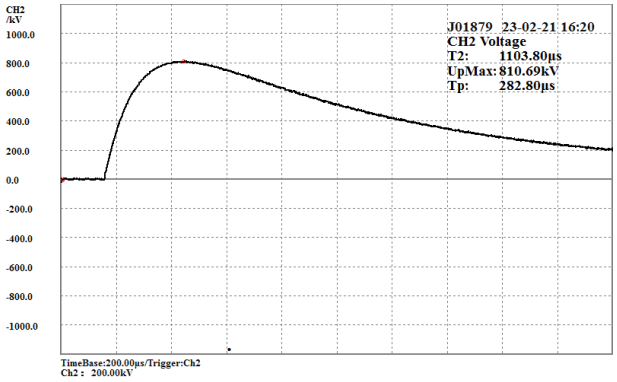
Test oscillogram records

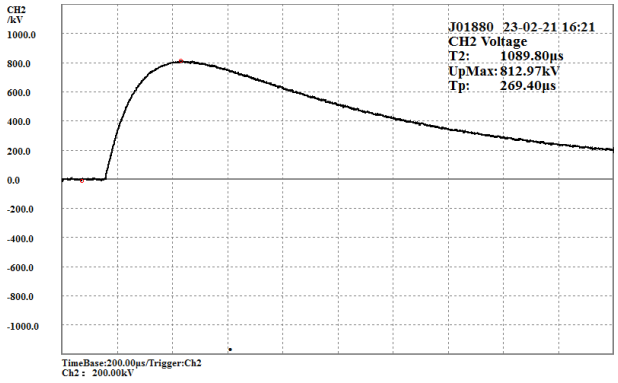
Tp: Front time; T2: Time to half value; Up_{MAX}/ Up_{MIN}: Peak voltage.

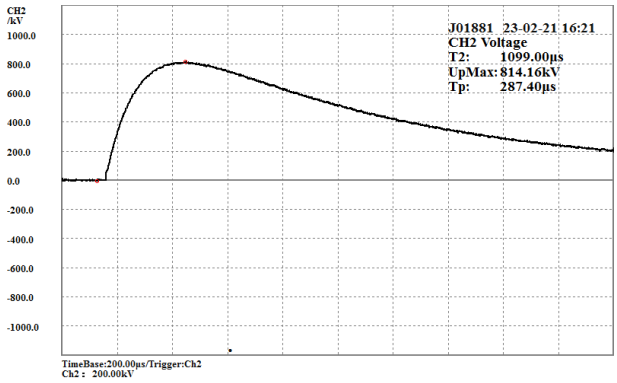
Result: Passed.

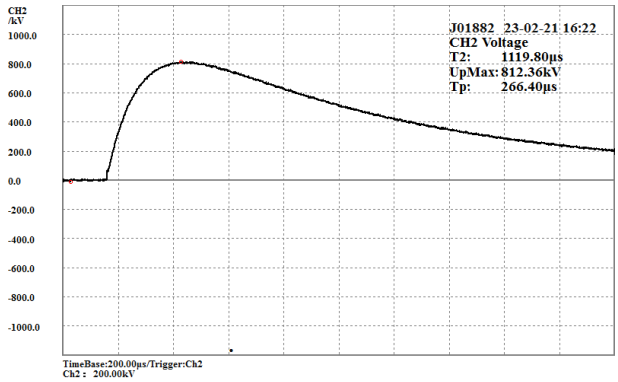
Tested terminal: To earth Test polarity: Positive CH1: Voltage wave

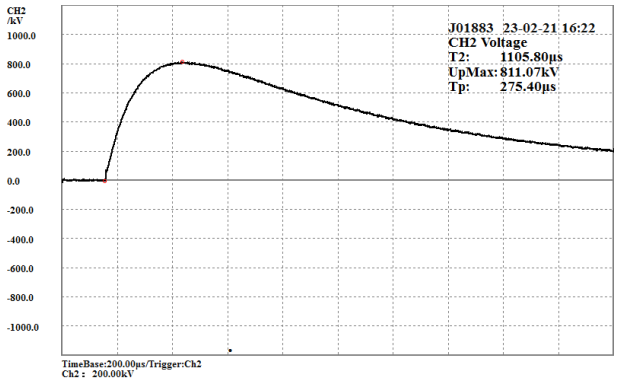


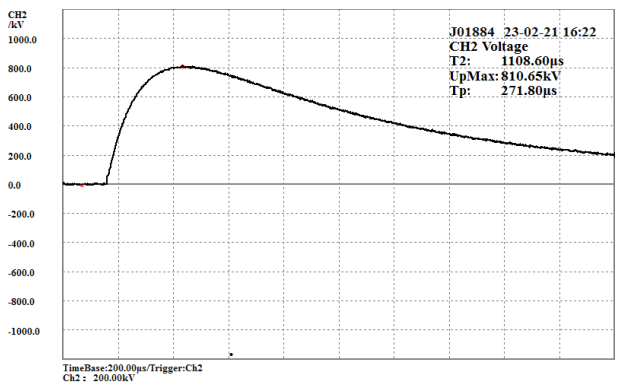


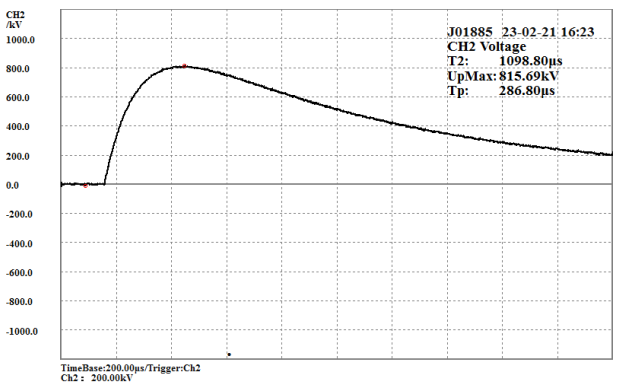




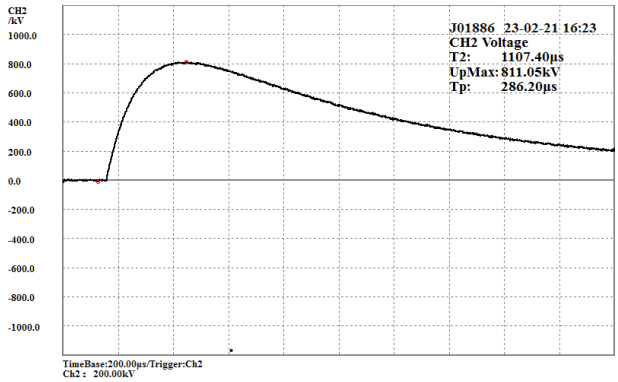


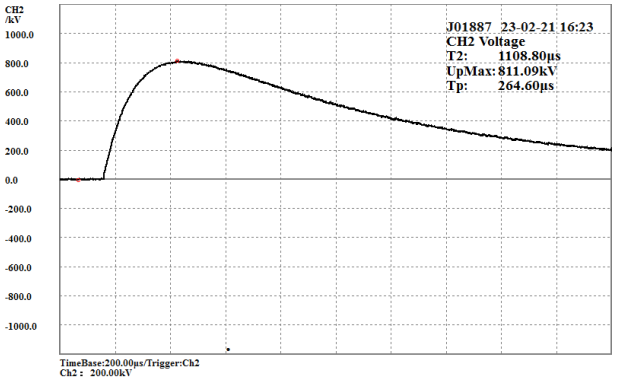


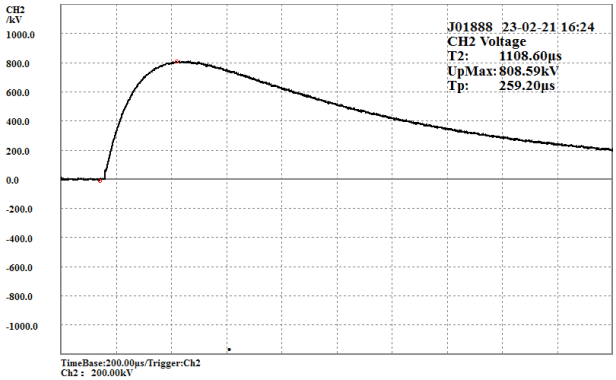


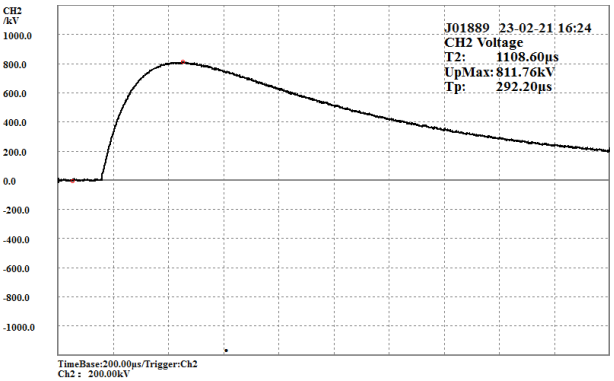


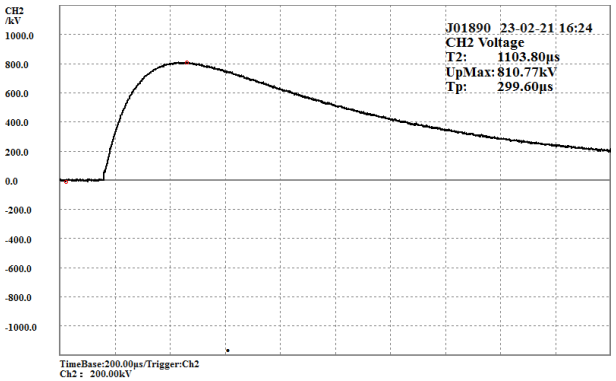
Tested terminal: To earth Test polarity: Positive CH1: Voltage wave

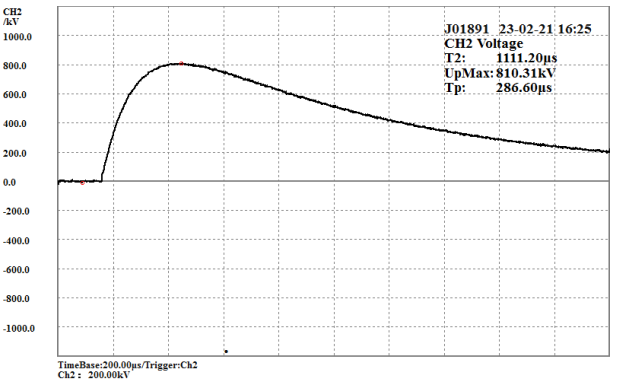


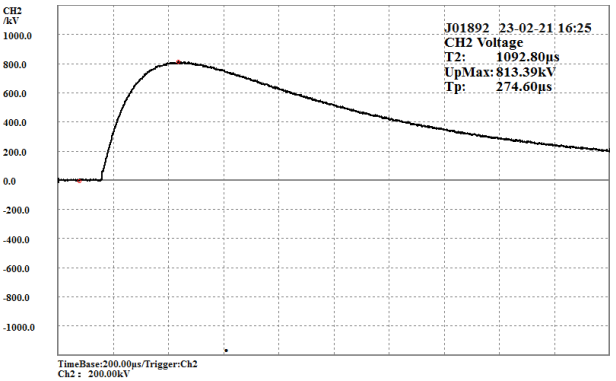


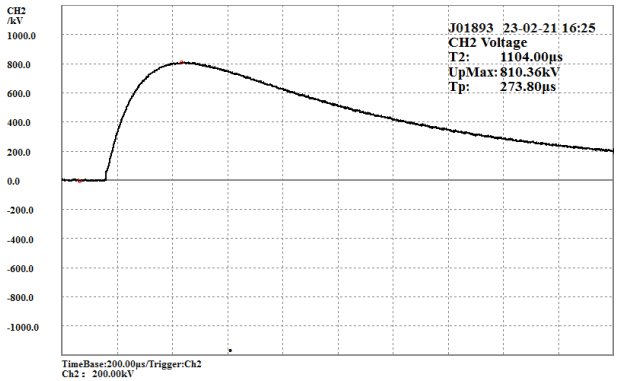




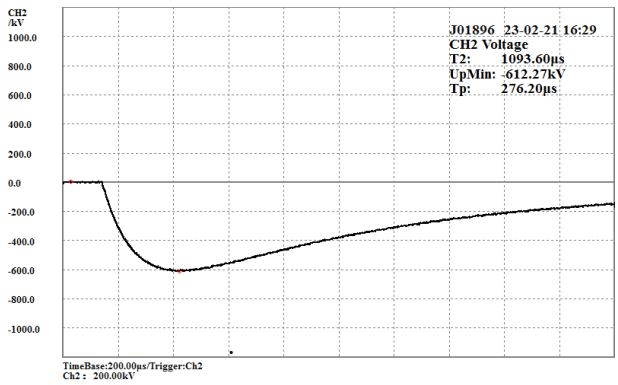


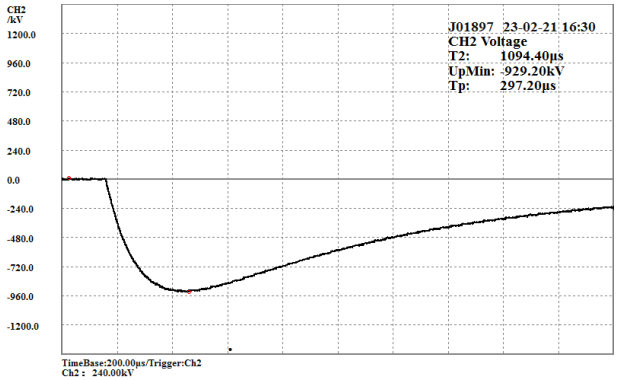


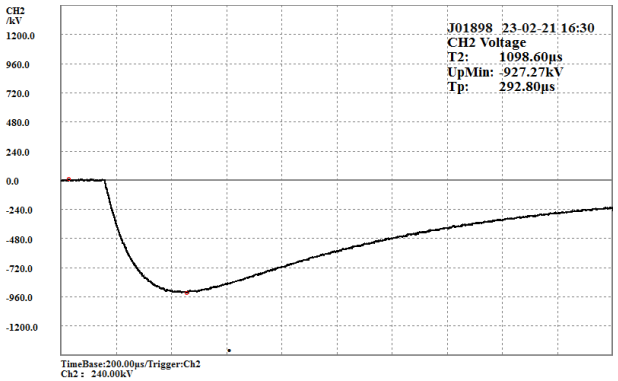


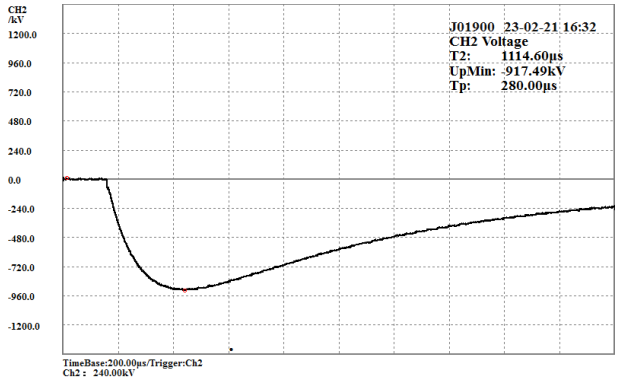


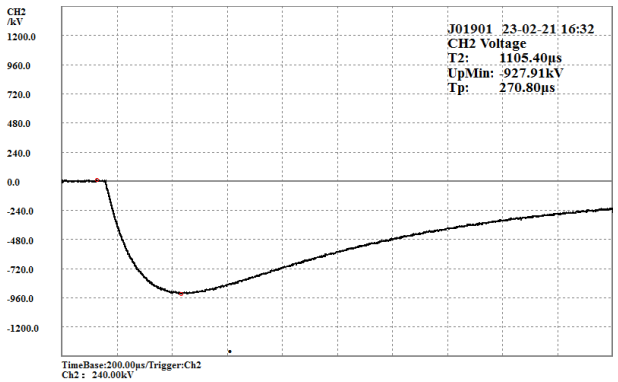
Tested terminal: To earth Test polarity: Negative CH1: Voltage wave

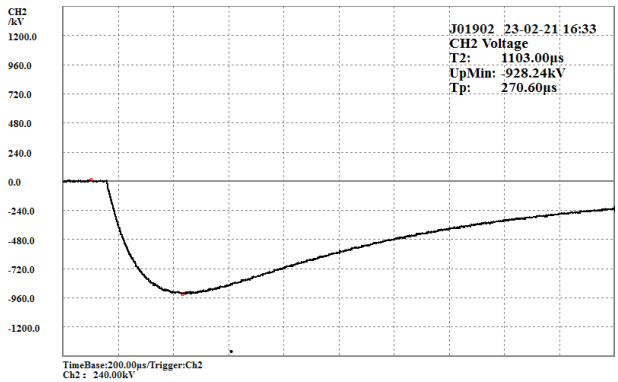


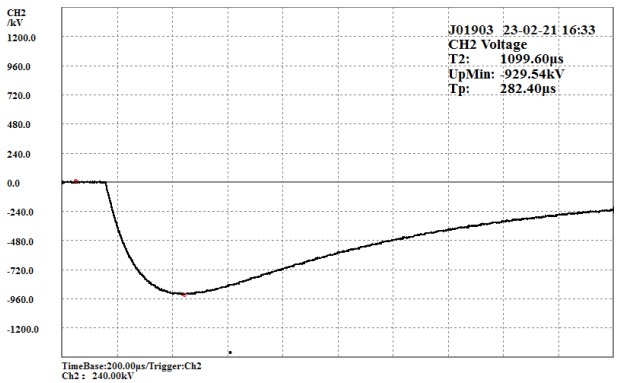


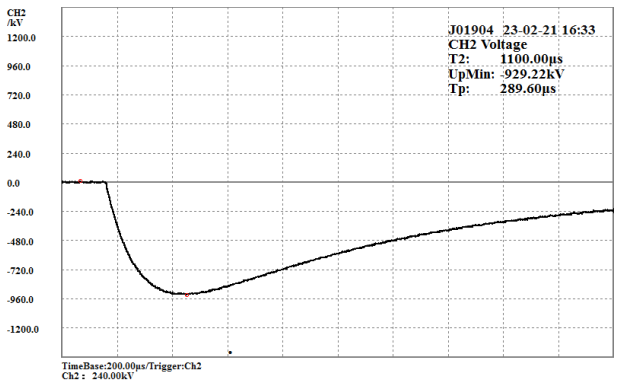






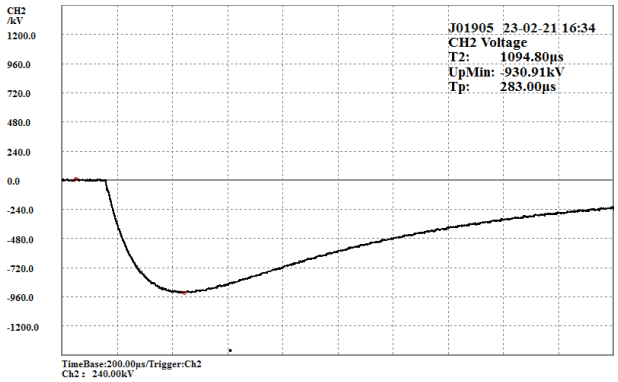


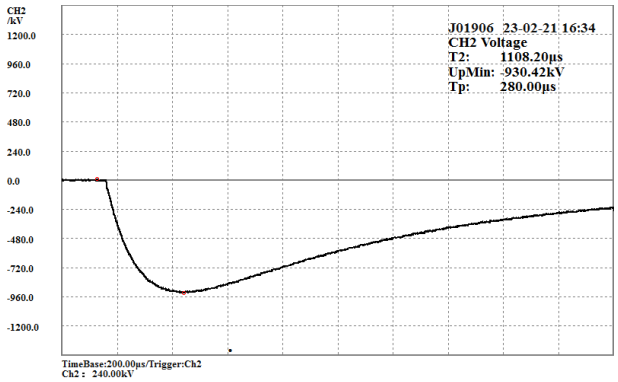


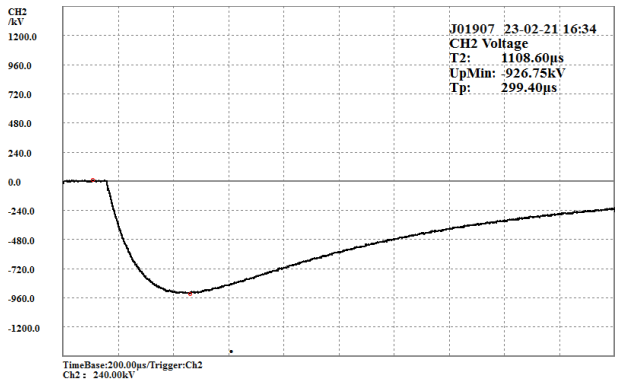


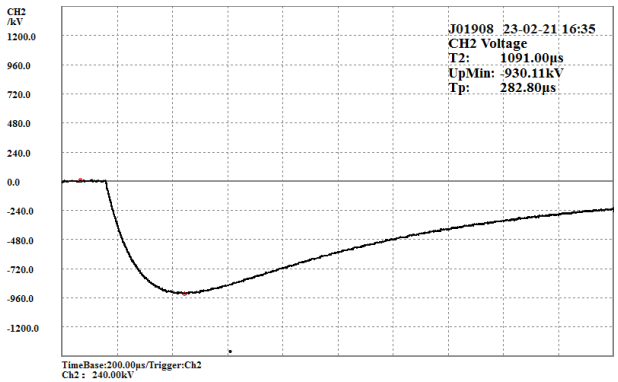
Test Report

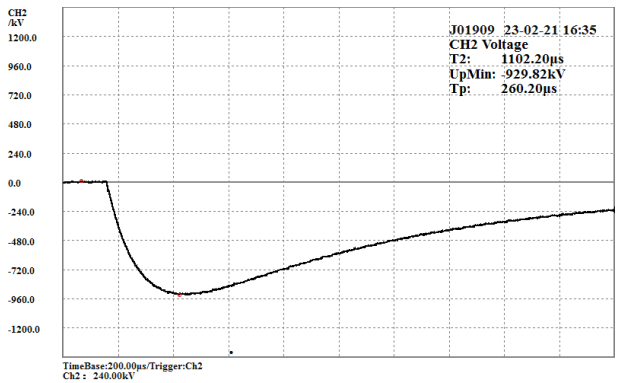
Tested terminal: To earth Test polarity: Negative CH1: Voltage wave

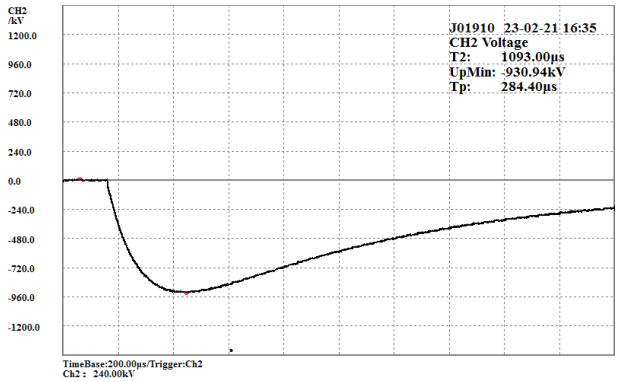


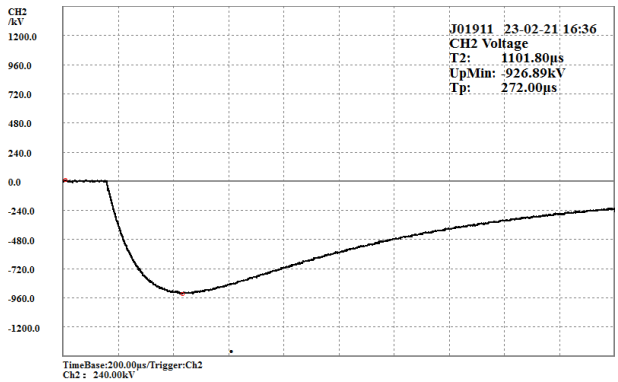


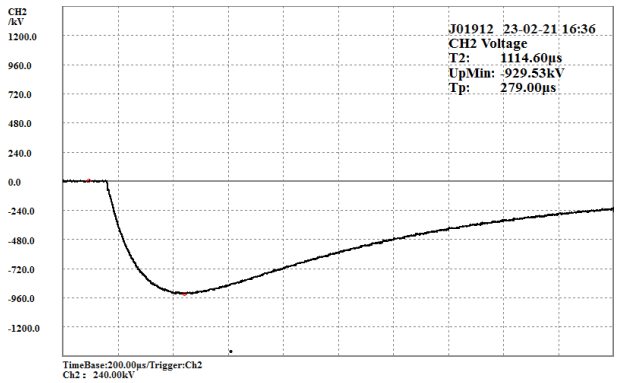












Test Report

4.6 Wet power-frequency voltage withstand test(Type test) Test date: Feb. 21, 2023

Humidity: 37.0%; Ambient temperature: 11.5℃; Atmospheric pressure: 102.1kPa

Applied position	Applied voltage(kV)			Frequency (Hz)	Duration (s)	Result
	Standard value	Atmospheric corrected value	Applied value			
Terminals-earth	460.0	462.8	462.8	50	60	Passed

Note: The conductivity of collected water is 100.4μS/cm at 20℃.

The average precipitation rate: Vertical component 1.3mm/min, horizontal component 1.1mm/min.

4.7 Long-duration power-frequency withstand voltage test(ACLD)(Type test)

Test date: Feb. 23, 2023

Ambient temperature: 11.8℃

Applied voltage		Duration(min)	Partial discharge level(pC)
Multiple	Phase-earth(kV)		
$1.1U_m/\sqrt{3}$	160.0	5	＜5
$U_2=1.5U_m/\sqrt{3}$	218.2	5	＜5
$U_1=U_m$	252.0	1	/
$U_2=1.5U_m/\sqrt{3}$	218.2	5	＜5
		10	＜5
		15	＜5
		20	＜5
		25	＜5
		30	＜5
		35	＜5
		40	＜5
		45	＜5
		50	＜5
		55	＜5
		60	＜5
$1.1U_m/\sqrt{3}$	160.0	5	＜5

Note: U_m =252kV; Background level is＜5pC before and after test.

Result: Passed.

Test Report

4.8 Radio interference voltage test(Type test)

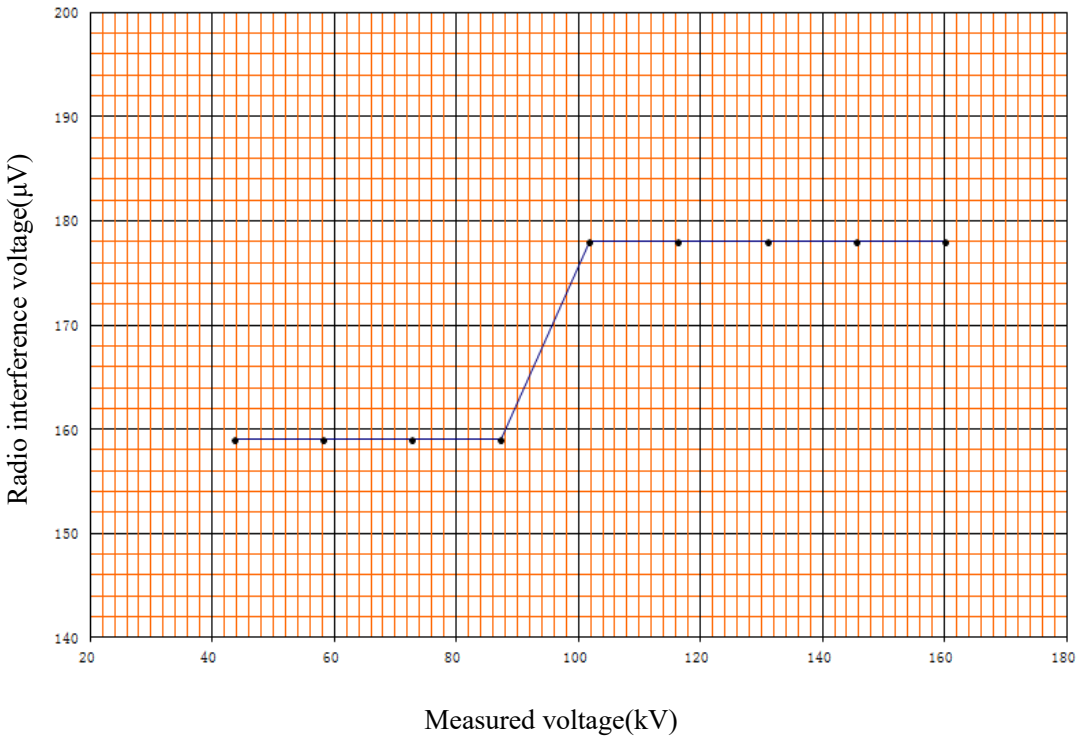
Test date: Feb. 23, 2023

Humidity: 41.0%; Ambient temperature: 11.8℃; Atmospheric pressure: 101.8kPa

Measured frequency (MHz)	Attenuation factor of measurement circuit (dB)	Attenuation factor of resistance network (dB)	Measured voltage (kV)	Duration (min)	Radio interference reading B_m (dB)	Radio interference level (μV)
1.0	14	22	160.0	5	14	316
			145.5	/	14	316
			130.9		14	316
			116.4		14	316
			101.8		13	282
			87.3		13	282
			72.7		13	282
			58.2		13	282
			43.6		13	282

Result: Passed.

Radio interference curve



4.9 Temperature rise test(Type test) Test date: Feb. 23, 2023

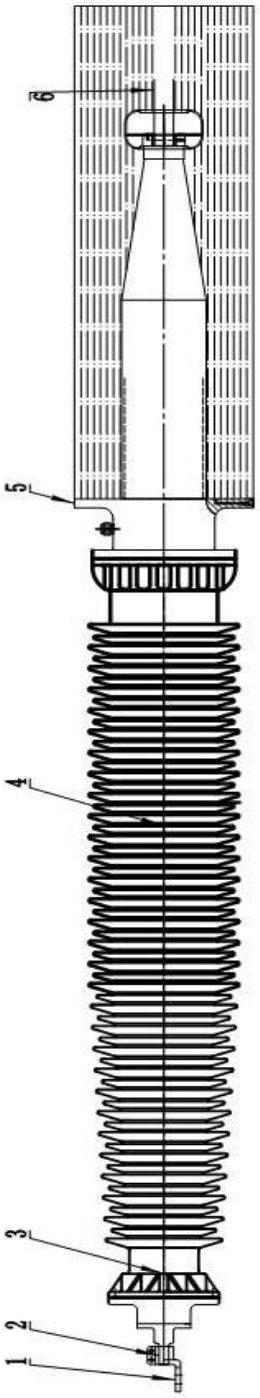
Specified current was 1600A, injected current was 1600A during test, the test duration was 7h, stability duration was 1h.

Calculated result of temperature rise

№.	Measured position	Temperature of bushing (℃)	Temperature rise of bushing (K)	Ambient temperature (℃)	Oil temperature (℃)	Result
1	Terminal in the air	57.8	46.3	11.5	72.8	Passed
2	Junction cover in the air	53.1	41.6			
3	Conducting rod top part	57.4	45.9			
4	Conducting rod middle part	66.3	54.8			
5	Flange	46.6	35.1			
6	Conducting rod tail part	78.9	67.4			

The schematic diagram of measured points shown in page 22.

Schematic diagram of measured point of temperature rise



1. Terminal in the air 2. Junction over in the air 3. Conducting rod top part 4. Conducting rod middle part
5. Flange 6. Transformer oil 7. Conducting rod tail part

Test Report

4.10 Verification of thermal short-time current withstand(Verified by the calculation)

(Type test) Test date: Feb. 24, 2023

The standard value of thermal short-time current of bushing I_{th}=40kA, duration t_{th}=2s. According to calculation final temperature of the conductor θ_f =134.1℃. If $\theta_f \leqslant$180℃, it was considered that the bushing could withstand the standard value I_{th} of thermal short-time current.

Sample parameters

Conductor material of sample	Copper
Conductor resistivity ρ(μΩ·cm)	1.75
Total cross section area S_t(cm^2)	11.3354
Measured temperature rise of the bushing(K)	67.4
Rated current I_r(A)	1600
Standard value of rated thermal short-time current I_{th}(kA)	40
Rated duration(s)	2
θ_0(℃)	107.4
Current penetration depth d(cm)	0.942
Diameter of the conductor D(cm)	3.8
α[(K/s)/(kA/cm^2)^2]	0.8
Equivalent cross section area considering the skin effect S_e(cm^2)	8.4536

Verify by the calculation:

$$\theta_f = \theta_0 + \alpha \frac{I_{th}^2}{S_t \times S_e} t_{th} = 134.1℃$$

Result: Passed.

4.11 Cantilever load withstand test(Type test) Test date: Feb. 24, 2023

Load direction	Applied position	Standard value		Applied value		Result
		Load(N)	Duration(s)	Load(N)	Duration(s)	
Vertical	Terminal	4000	60	4108	60	No damage,distortion, passed.

4.12 Measurement of partial discharge quantity(After type test) Test date: Feb. 24, 2023

Humidity: 38.0%; Ambient temperature: 10.9℃; Atmospheric pressure: 101.6kPa

Prestress voltage (kV)	Duration(s)	Measured voltage(kV)	Partial discharge level(pC)	Result
505	60	252.0	＜5	Passed
		218.2	＜4	
		152.8	＜4	

Note: Background noise level was＜4pC before and after test.

4.13 Measurement of dielectric dissipation factor(tanδ) and capacitances at ambient temperature(After type test) Test date: Feb. 24, 2023

Humidity: 38.0%; Ambient temperature: 10.9℃

Applied voltage(kV)	Dielectric dissipation factor(tanδ)	Capacitance (pF)	Result
10	0.00296	571.0	Passed
152.8	0.00370	571.6	
252	0.00393	571.6	

Note: tanδ(252kV)- tanδ(152.8kV)= 0.00023＜0.001(Standard value), passed.

4.14 Visual inspection and dimensional check(Routine test) Test date: Feb. 24, 2023

It has smooth surface, no cracks. Dimensional check is accordance with the drawing requirement. Dimensional check see 4.3.

Result: Passed.

4.15 Tests of tap insulation(Routine test) Test date: Feb. 24, 2023

Dry power-frequency voltage withstand test on the tap

Humidity: 38.0%; Ambient temperature: 10.9℃; Atmospheric pressure: 101.6kPa

Applied position	Applied voltage(kV)	Frequency(Hz)	Duration(s)	Result
Tap-earth	3	50	60	Passed

Measurement of dielectric dissipation factor (tanδ) and capacitances at ambient temperature on the tap

Humidity: 38.0%; Ambient temperature: 10.9℃

Applied voltage(kV)	Dielectric dissipation factor(tanδ)	Capacitance(pF)	Result
2	0.00498	519.7	Passed

4.16 Dry lightning impulse voltage withstand test(Routine test) Test date: Feb. 24, 2023

Test atmospheric conditions

Humidity: 38.0%; Ambient temperature: 10.9℃; Atmospheric pressure: 101.6kPa.

Rated lightning impulse withstand voltage(kV): 1102.5kV 3 negative polarity

Chopped lightning impulse withstand voltage(kV): 1207.5kV 2 negative polarity

Test sequence

One negative reference full wave impulse;

One negative rated full wave impulses;

Two negative rated chopped wave impulses;

Two negative rated full wave impulses.

Test records

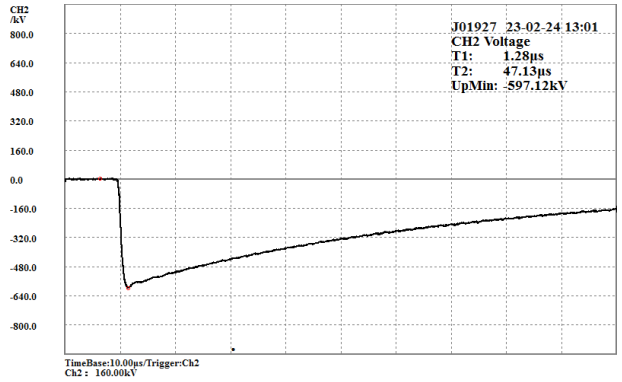
T1: Front time; T2: Time to half value; Up_{MAX}/ Up_{MIN}: Peak voltage;

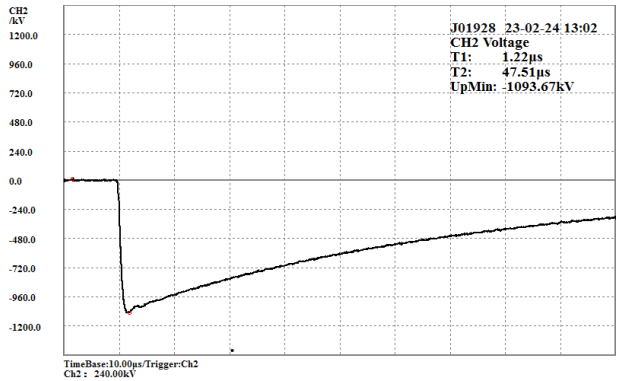
Tc: Time to chopping; K: Factor of over crossing.

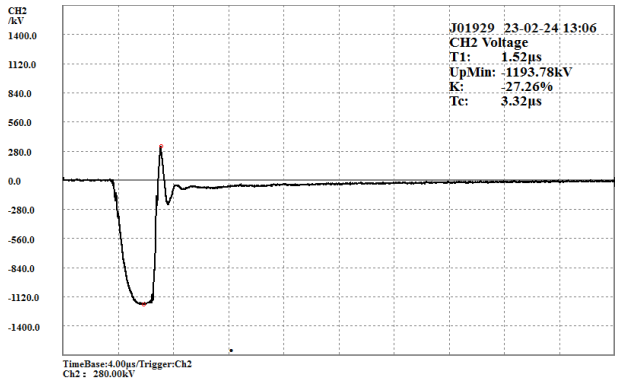
Result: Passed.

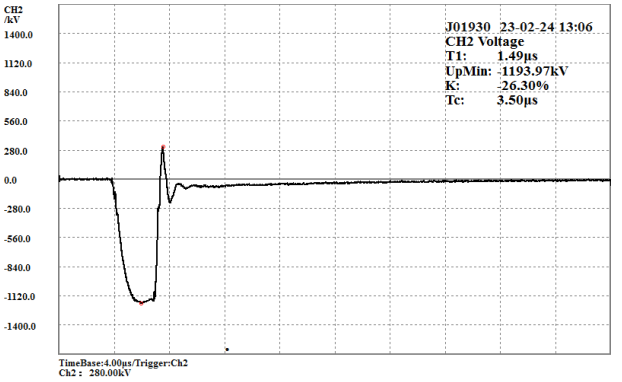
Test Report

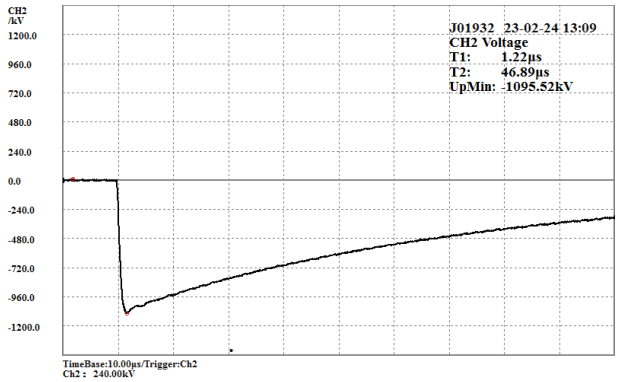
Tested terminal: To earth Test polarity: Negative CH1: Voltage wave

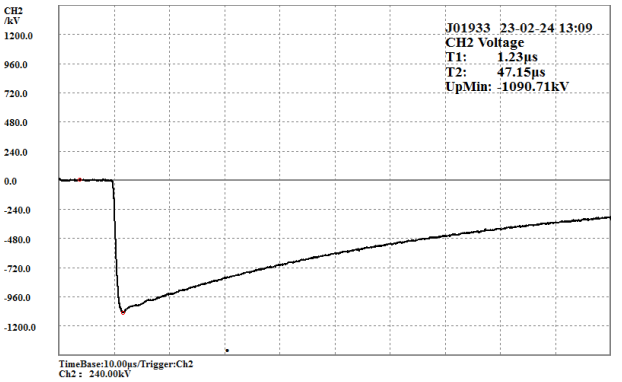












Test Report

4.17 Dry power-frequency voltage withstand test(Routine test) Test date: Feb. 24, 2023

Humidity: 38.0%; Ambient temperature: 10.9℃; Atmospheric pressure: 101.6kPa

Applied position	Applied voltage(kV)		Frequency (Hz)	Duration (s)	Result
	Standard value	Applied value			
Terminals-earth	505	505	50	60	Passed

4.18 Tightness test at the flange(Routine test) Test date: Feb. 24, 2023

Applied pressure(MPa)	Duration(min)	Residual pressure(MPa)	Result
0.4	15	0.4	No leakage and damage, passed.

4.19 Measurement of partial discharge quantity(Routine test) Test date: Feb. 24, 2023

Humidity: 38.0%; Ambient temperature: 10.9℃; Atmospheric pressure: 101.6kPa

Prestress voltage (kV)	Duration (s)	Measured voltage (kV)	Partial discharge level(pC)	Result
505	60	252	＜5	Passed
		218.2	＜5	
		152.8	＜4	

Note: Background level was＜4pC before and after test.

4.20 Measurement of dielectric dissipation factor(tanδ) and capacitances at ambient temperature(Routine test) Test date: Feb. 24, 2023

Humidity: 38.0%; Ambient temperature: 10.9℃

Applied voltage(kV)	Dielectric dissipation factor(tanδ)	Capacitance(pF)	Result
10	0.00296	571.0	Passed
152.8	0.00367	571.5	
252	0.00392	571.6	

Note: tanδ(252kV)- tanδ(152.8kV)= 0.00025＜0.001(Standard value), passed.

Annex 1

RATING PLATE AND OUTLINE PHOTOS

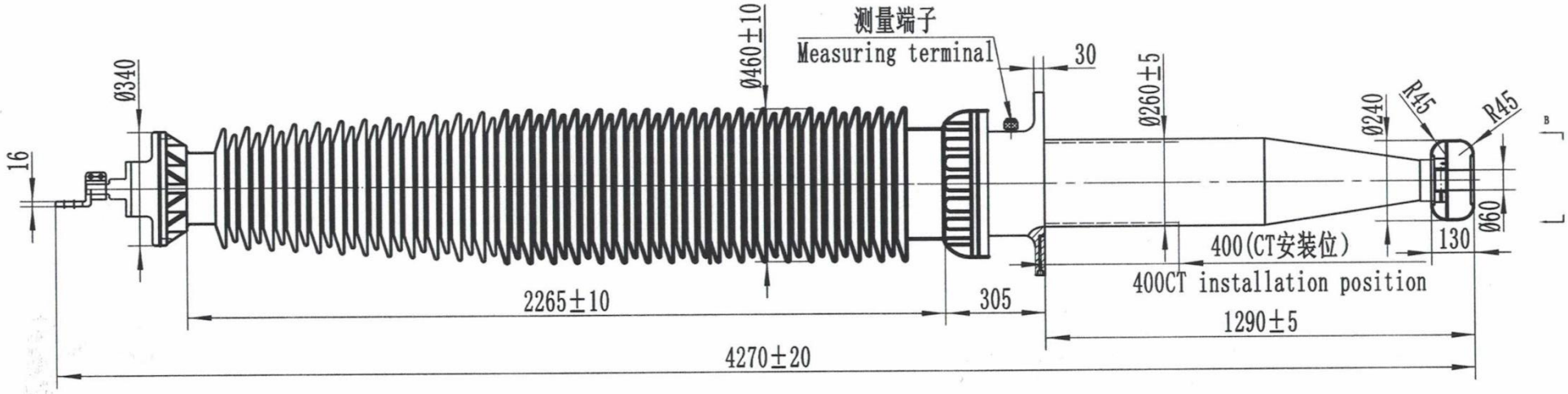
№: CTQC/ZJ-23.0043

Rating plate:

Outline:

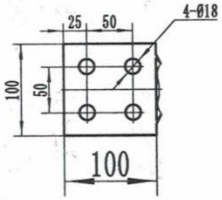
Annex 2

BUSHING DRAWINGS

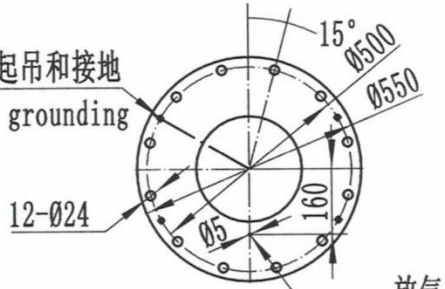


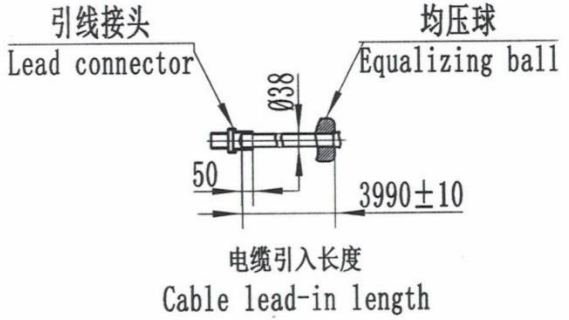
A-direction diagram

A向示意图



B-B direction diagram





Technical parameters

1. Rated voltage: 252kV, rated voltage: 220kV
2. Rated current :1600A
3. 1min power frequency withstand voltage: 505kV
4. Lightning impulse withstand voltage: 1050kV
5. Dielectric loss tangent: ≯ 0.4%
6. PD: Um measured ≯ 10
7. Bending load: 4000N
8. Creepage distance: 8600mm
9. Operating ambient temperature: +60℃~-60℃

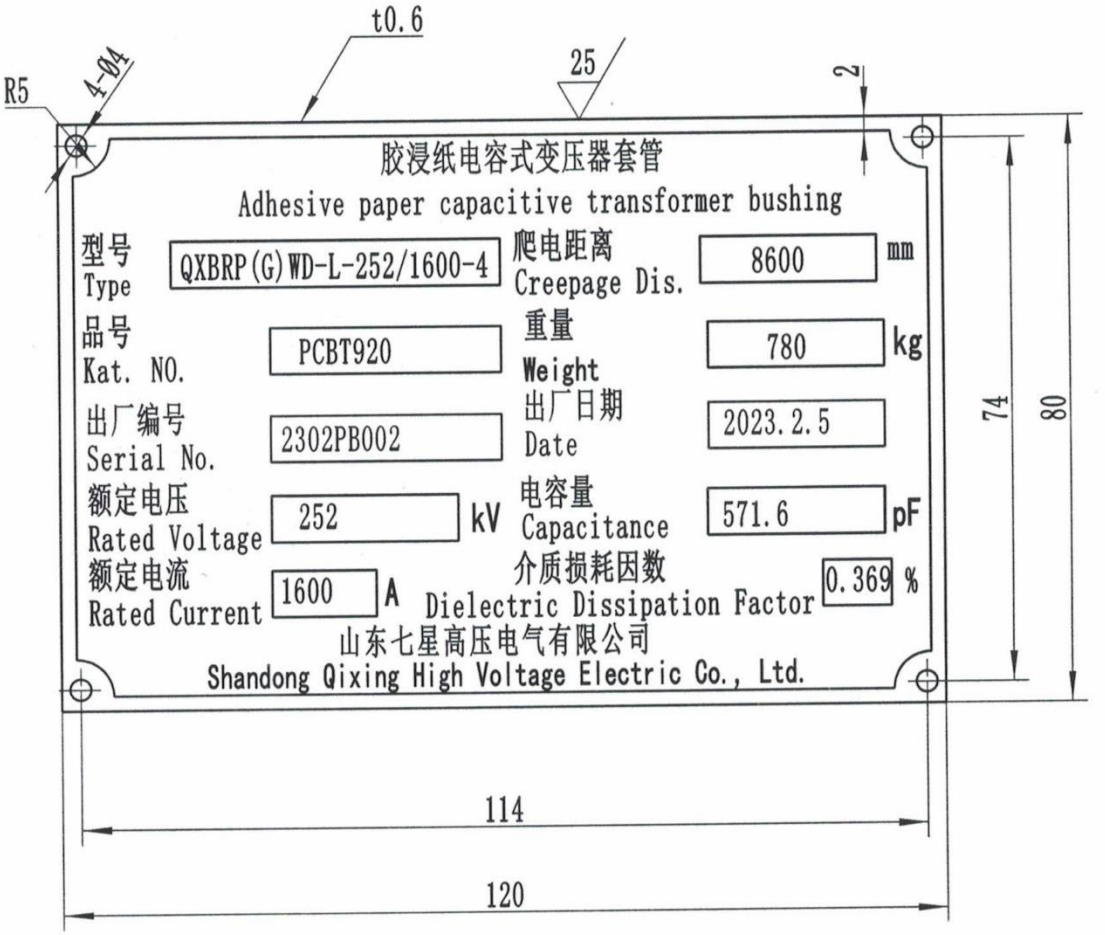
标记	处数	分区	更改文件号	签名	年、月、日
设计	张学明	2023.2.2	标准化		
审核	石孝刚	2023.2.2			
工艺			批准	曹明波	2023.2.2

QXBRP(G)WD-L-252/1600-4		
阶段标记	重量	比例
		1:18
共 张 第 张		

Shandong Qiring high voltage electricity co., ltd

Plastic paper transformer bushing outline

Product number: PCBT920



借（通）用件登记											
旧底图总号									产品型号		装配图代号	序号
底图总号									铭牌nameplate		8QX.860.008G	
签字											图样标记	重量 0.030	比例 1:1
日期	标记	处数	分区	更改文件号		签字	日期				共 张	第 张
	设计	张学明	2023.2.2	标准化					316L		Shandong Qixing High Voltage Electric Co. LTD山东七星高压电气有限公司	
档案员 日期	校核	石孝刚	2023.2.2	审定								
	会签			批准		曹明波	2023.2.2					

图纸验收专用章

CHPTL

中国大容量试验联盟(简称 CHPTL)是中国同类试验机构的唯一协作组织，隶属于中国电工技术学会.其主要目标是规范国家标准、行业标准及 IEC 标准在电力设备(交流 1000V 以上，直流 1200V 以上)型式试验中的协调应用.

China High Power Testing liaison (CHPTL) is the only organization in China which is formed to promote and coordinate the application of IEC/GB standard as well as industry standards in power electrical equipment type test (AC above 1000V, DC above 1200V). CHPTL is under the leadership and management of China Electro-technical Society.

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Xi'an High Voltage Apparatus Research Institute Co., Ltd. (XIHARI)

中国电力科学研究院(CEPRI)

China Electrical Power Research Institute (CEPRI)

辽宁高压电器产品质量检测有限公司(AQTC)

Liaoning High Voltage Apparatus Quality Test Co., Ltd. (AQTC)

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Shenyang Transformer Institute Co., Ltd Transformer Laboratory (STRI)

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