中国认可
国际互认
检测
TESTING
CNAS L0153

No. DY263177

TEST REPORT

Name of product	Voltage detecting and indicating system
Type Specification	DXN8D-7.2~40.5/Q50S
Applicant	Jiangshan Xinyuan Electrical Co., Ltd.
Testing category	Type tests



GUANGDONG TESTING INSTITUTE OF PRODUCT QUALITY SUPERVISION

Guangdong Testing Institute Of Product Quality Supervision
(GQI)
(D1)

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No. DY263177

Guangdong Testing Institute of Product Quality Supervision

Validity check

TEST REPORT

Name of product	Voltage detecting and indicating system	Date of manufacturing / expiry	———/———
Type, Specification, Trade mark, Class	DXN8D-7.2~40.5/Q50S	Batch No.	3-1: 260813101, 3-2: 260813102, 3-3: 260813103
Applicant	Jiangshan Xinyuan Electrical Co., Ltd.	No. of testing / sampling plan	YYJ26/001391/ ———
Address of applicant	No.2-1 Huiyuan Road, Shanhai Cooperation Zone, Jiangshan	Testing category	Type tests
Inspected unit	———	Location of sampling	———
Manufacturer	Jiangshan Xinyuan Electrical Co., Ltd.	Basic quantity of sampling	———
Address of Manufacturer	No.2-1 Huiyuan Road, Shanhai Cooperation Zone, Jiangshan	Way of sample incoming Personnel performing sending / sampling	Sample delivery
Quantity of sample	3	Date of receipt of sample / sampling	2026-08-18/ ———
Status of sample	Good condition	Date(s) of performance of tests	2026-08-21 to 2026-10-16
Testing reference	IEC 62271-213:2021 High-voltage switchgear and controlgear-Part 213:Voltage detecting and indicating system		
Judgment reference	The requirements provided by the client		
Conclusion	**The samples were tested according to the testing standard and product technical specification. All items were tested positive.** Official testing stamp of the institute Date of issue: 2026-10-16		
Notes	———		

Approved by: 李旭 Reviewed by: 黄宗盛 Tested by: 梅志威

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Test items and results summary

No.	Test items	Test results
1	Inspection	Complied
2	Lightning impulse voltage test	Complied
3	Power-frequency voltage test	Complied
4	Maximum current of coupling element	Complied
5	Conditions on testing points	Complied
6	Indication of VDIS	Complied
7	Clear perceptibility of visual indication	Complied
8	Phase shift	Complied
9	Response time	Complied
10	Non response to DC voltage	Complied
11	Connecting leads	Complied
12	Temperature dependence of indication	Complied
13	Voltage limiting element	Complied
14	Degree of protection (IP code)	Complied
15	Damp heat	Complied
16	Insulation resistance under pollution	Complied
17	Composite temperature/humidity cyclic test	Complied
18	Vibration	Complied
19	Mechanical impact (IK code)	Complied
20	Electrostatic discharge	Complied
21	Radiated electromagnetic fields	Complied

The technical data of the main components in the test product	
1. Coupling system	
Rated voltage (U_r)	7.2kV
Rated short-duration power-frequency withstand voltage	32kV
Rated lightning impulse withstand voltage	60kV
Nominal voltage (U_n)	4.8~7.2kV
2. Coupling system	
Rated voltage (U_r)	12kV
Rated short-duration power-frequency withstand voltage	42kV
Rated lightning impulse withstand voltage	75kV
Nominal voltage (U_n)	7.2~12kV
3. Coupling system	
Rated voltage (U_r)	24kV
Rated short-duration power-frequency withstand voltage	68kV
Rated lightning impulse withstand voltage	125kV
Nominal voltage (U_n)	12~24kV
4. Coupling system	
Rated voltage (U_r)	40.5kV
Rated short-duration power-frequency withstand voltage	95kV
Rated lightning impulse withstand voltage	185kV
Nominal voltage (U_n)	24~40.5kV
5. Indicator	
Auxiliary power supply voltage	AC/DC24~230V
Rated frequency	50/60Hz
Degree of protection	Testing points: IP2X
NOTE The technical data of major components above were provided by the client.	

Photos of test objects



7.2kV coupling system



12kV coupling system



24kV coupling system

Photos of test objects



40.5kV coupling system

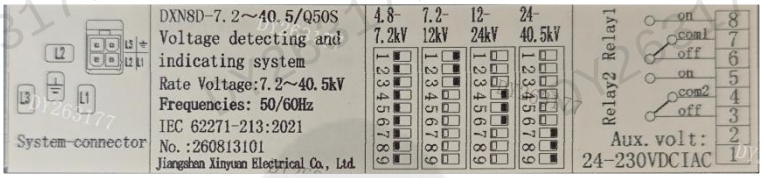


Indicator

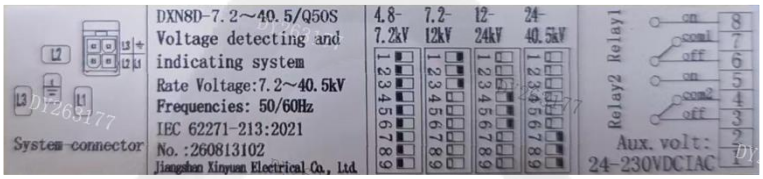


Interface

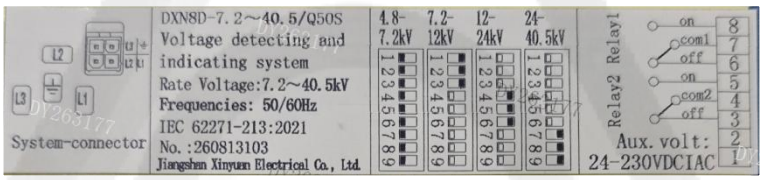
Photos of test objects



Nameplate of test object 3-1



Nameplate of test object 3-2



Nameplate of test object 3-3

Inspection

Test requirements	Test records and remarks		
	3-1	3-2	3-3
A VDIS shall include for each phase: a coupling system, a voltage limiting element, an indicator, a testing point, a connecting lead, a connecting point(as an option).	Complied		
Each testing point shall have an earthing socket-outlet at a distance between the axes of the earthing socket-outlet and phase socket-outlet of (14 ±0.1) mm.	(13.97~14.00)mm	(13.97~14.02)mm	(13.96~14.03)mm
Marking shall be legible and permanent.	Complied		

Lightning impulse voltage test

Coupling system	Sample number	Voltage applied to	Earthed terminal	Expected voltage (peak) (kV)	Application number	Positive		Negative	
						Measured voltage (peak) (kV)	Discharge number	Measured voltage (peak) (kV)	Discharge number
7.2kV	3-1	A	BCFP	60	3	59.9~60.5	0	59.9~60.7	0
		B	ACFP	60	3	59.5~60.5	0	59.3~60.1	0
		C	ABFP	60	3	59.4~60.3	0	59.5~59.7	0
		A	BCF	60	3	59.8~60.5	0	59.9~60.9	0
		B	ACF	60	3	59.5~60.3	0	59.3~60.2	0
		C	ABF	60	3	59.4~60.7	0	59.8~60.5	0
	3-2	A	BCFP	60	3	59.6~59.9	0	59.7~60.4	0
		B	ACFP	60	3	60.0~60.6	0	59.8~60.5	0
		C	ABFP	60	3	59.6~60.1	0	60.1~60.5	0
		A	BCF	60	3	59.4~60.6	0	59.7~60.2	0
		B	ACF	60	3	60.0~60.8	0	59.7~60.3	0
		C	ABF	60	3	59.6~60.5	0	59.7~60.0	0
	3-3	A	BCFP	60	3	59.4~60.6	0	59.4~60.8	0
		B	ACFP	60	3	60.0~60.8	0	59.4~60.6	0
		C	ABFP	60	3	59.4~60.3	0	59.7~60.7	0
		A	BCF	60	3	60.0~60.9	0	59.4~60.1	0
		B	ACF	60	3	59.8~60.6	0	60.1~60.4	0
		C	ABF	60	3	59.4~60.6	0	59.5~60.4	0

Relative humidity	69%	Temperature	29.5℃	Atmospheric pressure	100.3kPa
Atmospheric correction factor	K_t= 0.959		Altitude correction factor	K_a=1.000	

Condition of the test object before the test: Normal.

NOTE 1 A, B, C-----high voltage terminals; F----- enclosure and frame; P----- testing points and connecting points.
NOTE 2 Expected voltage = Rated short-duration power-frequency withstand voltage×Kt×Ka, make K_t=1.000 during the test.

Lightning impulse voltage test

Coupling system	Sample number	Voltage applied to	Earthed terminal	Expected voltage (peak) (kV)	Application number	Positive		Negative	
						Measured voltage (peak) (kV)	Discharge number	Measured voltage (peak) (kV)	Discharge number
12kV	3-1	A	BCFP	75	3	74.5~75.6	0	75.0~75.7	0
		B	ACFP	75	3	74.4~75.7	0	74.6~75.4	0
		C	ABFP	75	3	74.8~75.8	0	74.5~75.4	0
		A	BCF	75	3	75.2~75.7	0	74.7~75.6	0
		B	ACF	75	3	74.5~75.5	0	74.2~75.1	0
		C	ABF	75	3	75.3~75.4	0	74.4~75.4	0
	3-2	A	BCFP	75	3	74.4~75.8	0	74.3~75.4	0
		B	ACFP	75	3	74.8~75.3	0	74.7~75.8	0
		C	ABFP	75	3	74.2~75.0	0	74.2~75.4	0
		A	BCF	75	3	75.1~75.7	0	74.5~75.6	0
		B	ACF	75	3	74.5~75.5	0	74.3~75.2	0
		C	ABF	75	3	74.9~75.8	0	75.2~75.8	0
	3-3	A	BCFP	75	3	74.8~75.3	0	74.6~75.5	0
		B	ACFP	75	3	74.3~75.6	0	74.5~75.6	0
		C	ABFP	75	3	74.4~75.6	0	74.7~75.6	0
		A	BCF	75	3	75.0~75.2	0	74.4~75.8	0
		B	ACF	75	3	74.7~75.5	0	74.2~75.4	0
		C	ABF	75	3	74.2~75.7	0	74.6~75.7	0

Relative humidity	69%	Temperature	29.5℃	Atmospheric pressure	100.3kPa
Atmospheric correction factor	K_t= 0.959		Altitude correction factor	K_a=1.000	

Condition of the test object before the test: Normal.

NOTE 1 A, B, C-----high voltage terminals; F----- enclosure and frame; P----- testing points and connecting points.
NOTE 2 Expected voltage = Rated short-duration power-frequency withstand voltage×Kt×Ka, make K_t=1.000 during the test.

Lightning impulse voltage test

Coupling system	Sample number	Voltage applied to	Earthed terminal	Expected voltage (peak) (kV)	Application number	Positive		Negative	
						Measured voltage (peak) (kV)	Discharge number	Measured voltage (peak) (kV)	Discharge number
24kV	3-1	A	BCFP	125	3	124.9~125.0	0	124.3~125.0	0
		B	ACFP	125	3	124.5~125.7	0	124.3~125.8	0
		C	ABFP	125	3	124.3~125.7	0	124.4~124.8	0
		A	BCF	125	3	124.2~125.6	0	124.8~125.4	0
		B	ACF	125	3	124.4~125.0	0	124.3~125.0	0
		C	ABF	125	3	124.5~125.6	0	124.6~125.6	0
	3-2	A	BCFP	125	3	124.2~125.3	0	124.4~124.7	0
		B	ACFP	125	3	125.6~125.8	0	124.3~125.6	0
		C	ABFP	125	3	124.8~125.4	0	124.4~125.8	0
		A	BCF	125	3	125.1~125.3	0	124.1~124.7	0
		B	ACF	125	3	124.6~125.9	0	125.4~125.8	0
		C	ABF	125	3	124.3~125.2	0	124.5~125.8	0
	3-3	A	BCFP	125	3	124.8~125.1	0	124.6~125.4	0
		B	ACFP	125	3	124.5~125.5	0	124.8~125.8	0
		C	ABFP	125	3	124.8~125.4	0	124.6~125.2	0
		A	BCF	125	3	124.6~124.9	0	124.6~125.3	0
		B	ACF	125	3	124.6~125.2	0	124.6~125.5	0
		C	ABF	125	3	124.3~125.2	0	124.4~125.0	0

Relative humidity	69%	Temperature	29.5℃	Atmospheric pressure	100.3kPa
Atmospheric correction factor	K_t= 0.959	Altitude correction factor	K_a=1.000		

Condition of the test object before the test: Normal.

NOTE 1 A, B, C-----high voltage terminals; F----- enclosure and frame; P----- testing points and connecting points.
NOTE 2 Expected voltage = Rated short-duration power-frequency withstand voltage×Kt×Ka, make K_t=1.000 during the test.

Lightning impulse voltage test

Coupling system	Sample number	Voltage applied to	Earthed terminal	Expected voltage (peak) (kV)	Application number	Positive		Negative	
						Measured voltage (peak) (kV)	Discharge number	Measured voltage (peak) (kV)	Discharge number
40.5kV	3-1	A	BCFP	185	3	184.3~186.7	0	184.4~185.2	0
		B	ACFP	185	3	184.4~185.4	0	184.4~185.8	0
		C	ABFP	185	3	184.6~185.0	0	185.3~185.6	0
		A	BCF	185	3	184.8~185.7	0	185.5~186.9	0
		B	ACF	185	3	184.8~185.6	0	184.3~185.8	0
		C	ABF	185	3	184.2~185.1	0	184.2~184.8	0
	3-2	A	BCFP	185	3	184.9~185.3	0	184.5~185.8	0
		B	ACFP	185	3	184.5~185.4	0	184.4~185.3	0
		C	ABFP	185	3	184.6~185.4	0	185.1~185.9	0
		A	BCF	185	3	184.6~185.2	0	184.2~185.8	0
		B	ACF	185	3	185.6~185.7	0	184.1~185.6	0
		C	ABF	185	3	184.4~185.6	0	184.3~185.6	0
	3-3	A	BCFP	185	3	184.2~185.6	0	184.4~185.6	0
		B	ACFP	185	3	184.8~185.7	0	184.9~185.7	0
		C	ABFP	185	3	184.7~185.2	0	184.9~185.4	0
		A	BCF	185	3	184.6~185.3	0	184.6~185.7	0
		B	ACF	185	3	184.6~185.5	0	184.7~185.8	0
		C	ABF	185	3	184.5~185.3	0	184.2~185.3	0

Relative humidity	69%	Temperature	29.5°C	Atmospheric pressure	100.3kPa
Atmospheric correction factor	K_t= 0.959		Altitude correction factor	K_a=1.000	

Condition of the test object before the test: Normal.

NOTE 1 A, B, C-----high voltage terminals; F----- enclosure and frame; P----- testing points and connecting points.
NOTE 2 Expected voltage = Rated short-duration power-frequency withstand voltage×Kt×Ka, make K_t=1.000 during the test.

Power-frequency voltage test

Coupling system	Sample number	Voltage applied to	Earthed terminal	Power frequency voltage dry tests for 1min			
				Expected voltage (r.m.s.) (kV)	Measured voltage (r.m.s.) (kV)	Application number	Discharge number
7.2kV	3-1	A	BCFP	32	32.1	1	0
		B	ACFP	32	32.0	1	0
		C	ABFP	32	32.2	1	0
		A	BCF	32	32.4	1	0
		B	ACF	32	32.1	1	0
		C	ABF	32	32.2	1	0
	3-2	A	BCFP	32	32.3	1	0
		B	ACFP	32	32.1	1	0
		C	ABFP	32	32.4	1	0
		A	BCF	32	32.1	1	0
		B	ACF	32	32.0	1	0
		C	ABF	32	32.3	1	0
	3-3	A	BCFP	32	32.1	1	0
		B	ACFP	32	32.3	1	0
		C	ABFP	32	32.2	1	0
		A	BCF	32	32.1	1	0
		B	ACF	32	32.1	1	0
		C	ABF	32	32.4	1	0

Relative humidity	69%	Temperature	29.5℃	Atmospheric pressure	100.3kPa
Atmospheric correction factor	K_t= 0.959		Altitude correction factor	K_a=1.000	

Condition of the test object before the test: Normal.

NOTE 1 A, B, C-----high voltage terminals; F----- enclosure and frame; P----- testing points and connecting points.
NOTE 2 Expected voltage = Rated short-duration power-frequency withstand voltage×Kt×Ka, make K_t=1.000 during the test.

Power-frequency voltage test

Coupling system	Sample number	Voltage applied to	Earthed terminal	Power frequency voltage dry tests for 1min			
				Expected voltage (r.m.s.) (kV)	Measured voltage (r.m.s.) (kV)	Application number	Discharge number
12kV	3-1	A	BCFP	42	42.1	1	0
		B	ACFP	42	42.2	1	0
		C	ABFP	42	42.2	1	0
		A	BCF	42	42.2	1	0
		B	ACF	42	42.3	1	0
		C	ABF	42	42.1	1	0
	3-2	A	BCFP	42	42.1	1	0
		B	ACFP	42	42.3	1	0
		C	ABFP	42	42.2	1	0
		A	BCF	42	42.0	1	0
		B	ACF	42	42.1	1	0
		C	ABF	42	42.2	1	0
	3-3	A	BCFP	42	42.3	1	0
		B	ACFP	42	42.3	1	0
		C	ABFP	42	42.1	1	0
		A	BCF	42	42.1	1	0
		B	ACF	42	42.0	1	0
		C	ABF	42	42.2	1	0

Relative humidity	69%	Temperature	29.5℃	Atmospheric pressure	100.3kPa
Atmospheric correction factor	K_t= 0.959		Altitude correction factor	K_a=1.000	

Condition of the test object before the test: Normal.

NOTE 1 A, B, C-----high voltage terminals; F----- enclosure and frame; P----- testing points and connecting points.
NOTE 2 Expected voltage = Rated short-duration power-frequency withstand voltage×Kt×Ka, make K_t=1.000 during the test.

Power-frequency voltage test

Coupling system	Sample number	Voltage applied to	Earthed terminal	Power frequency voltage dry tests for 1min			
				Expected voltage (r.m.s.) (kV)	Measured voltage (r.m.s.) (kV)	Application number	Discharge number
24kV	3-1	A	BCFP	68	68.1	1	0
		B	ACFP	68	68.0	1	0
		C	ABFP	68	68.2	1	0
		A	BCF	68	68.2	1	0
		B	ACF	68	68.3	1	0
		C	ABF	68	68.1	1	0
	3-2	A	BCFP	68	68.2	1	0
		B	ACFP	68	68.1	1	0
		C	ABFP	68	68.1	1	0
		A	BCF	68	68.3	1	0
		B	ACF	68	68.0	1	0
		C	ABF	68	68.2	1	0
	3-3	A	BCFP	68	68.2	1	0
		B	ACFP	68	68.3	1	0
		C	ABFP	68	68.1	1	0
		A	BCF	68	68.3	1	0
		B	ACF	68	68.4	1	0
		C	ABF	68	68.3	1	0

Relative humidity	69%	Temperature	29.5℃	Atmospheric pressure	100.3kPa
Atmospheric correction factor	K_t= 0.959		Altitude correction factor	K_a=1.000	

Condition of the test object before the test: Normal.

NOTE 1 A, B, C-----high voltage terminals; F----- enclosure and frame; P----- testing points and connecting points.
NOTE 2 Expected voltage = Rated short-duration power-frequency withstand voltage×Kt×Ka, make K_t=1.000 during the test.

Power-frequency voltage test

Coupling system	Sample number	Voltage applied to	Earthed terminal	Power frequency voltage dry tests for 1min			
				Expected voltage (r.m.s.) (kV)	Measured voltage (r.m.s.) (kV)	Application number	Discharge number
40.5kV	3-1	A	BCFP	95	95.2	1	0
		B	ACFP	95	95.3	1	0
		C	ABFP	95	95.1	1	0
		A	BCF	95	95.2	1	0
		B	ACF	95	95.3	1	0
		C	ABF	95	95.1	1	0
	3-2	A	BCFP	95	95.2	1	0
		B	ACFP	95	95.1	1	0
		C	ABFP	95	95.1	1	0
		A	BCF	95	95.2	1	0
		B	ACF	95	95.2	1	0
		C	ABF	95	95.3	1	0
	3-3	A	BCFP	95	95.4	1	0
		B	ACFP	95	95.4	1	0
		C	ABFP	95	95.3	1	0
		A	BCF	95	95.2	1	0
		B	ACF	95	95.2	1	0
		C	ABF	95	95.0	1	0

Relative humidity	69%	Temperature	29.5℃	Atmospheric pressure	100.3kPa
Atmospheric correction factor	K_t= 0.959		Altitude correction factor	K_a=1.000	

Condition of the test object before the test: Normal.

NOTE 1 A, B, C-----high voltage terminals; F----- enclosure and frame; P----- testing points and connecting points.
NOTE 2 Expected voltage = Rated short-duration power-frequency withstand voltage×Kt×Ka, make K_t=1.000 during the test.

Maximum current of coupling element

Test requirements	Test records and remarks		
	3-1	3-2	3-3
When the main circuit is energised at its rated voltage, the maximum current through the coupling element shall not exceed 1 mA.	0.03mA	0.03mA	0.03mA

NOTE The test of the 7.2kV coupling system.

Maximum current of coupling element

Test requirements	Test records and remarks		
	3-1	3-2	3-3
When the main circuit is energised at its rated voltage, the maximum current through the coupling element shall not exceed 1 mA.	0.05mA	0.05mA	0.04mA

NOTE The test of the 12 kV coupling system.

Maximum current of coupling element

Test requirements	Test records and remarks		
	3-1	3-2	3-3
When the main circuit is energised at its rated voltage, the maximum current through the coupling element shall not exceed 1 mA.	0.09mA	0.09mA	0.10mA

NOTE The test of the 24 kV coupling system.

Maximum current of coupling element

Test requirements	Test records and remarks		
	3-1	3-2	3-3
When the main circuit is energised at its rated voltage, the maximum current through the coupling element shall not exceed 1 mA.	0.16mA	0.15mA	0.16mA

NOTE The test of the 40.5 kV coupling system.

Conditions on testing points

Test requirements	Test records and remarks		
	3-1	3-2	3-3
Frequency: 50Hz			
The main circuit shall be connected to a voltage source. The pole of the testing point of the VDIS carrying the voltage signal shall be earthed through an impedance of $X_{c\,max}$: 2.4 MΩ and an ammeter. The voltage shall be increased until a current of $I_{t\,min}$: 1.67 μA is reached. That equivalent threshold voltage shall be recorded as U_{et1}. The test is considered as passed if the voltage U_{et1} equals or exceeds $U_{t\,min}$, where $U_{t\,min}$ is 10 % of U_n or of $U_{n\,max}$.	X_c: 2.4 MΩ		
	I_t: 1.67 μA		
	U_{et1}: 1.22kV	U_{et1}: 1.23kV	U_{et1}: 1.22kV
The main circuit shall be connected to a voltage source. The pole of the testing point of the VDIS carrying the voltage signal shall be earthed through an impedance of $X_{c\,min}$: 2.0 MΩ and an ammeter. The voltage shall be increased until a current of $I_{t\,max}$: 2.50 μA is reached. That voltage shall be recorded as U_{et2}. After that, the test voltage shall be increased up to 120 % of U_n or of $U_{n\,max}$. The test is considered as passed if the voltage U_{et2} is lower than or equal to $U_{t\,max}$, where $U_{t\,max}$ is 45 % of U_n or of $U_{n\,min}$, and the current remains higher than $I_{t\,max}$ in the voltage range from U_{et2} to 1.2 U_n or 1.2 $U_{n\,max}$.	X_c: 2.0 MΩ		
	I_t: 2.50 μA		
	U_{et2}: 1.42 kV	U_{et2}: 1.43kV	U_{et2}: 1.43kV
	The current remains higher than $I_{t\,max}$ in the voltage range from U_{et2} to 1.2 U_n.		
Frequency: 60Hz			
The main circuit shall be connected to a voltage source. The pole of the testing point of the VDIS carrying the voltage signal shall be earthed through an impedance of $X_{c\,max}$: 2.0 MΩ and an ammeter. The voltage shall be increased until a current of $I_{t\,min}$: 2.00 μA is reached. That equivalent threshold voltage shall be recorded as U_{et1}. The test is considered as passed if the voltage U_{et1} equals or exceeds $U_{t\,min}$, where $U_{t\,min}$ is 10 % of U_n or of $U_{n\,max}$.	X_c: 2.0 MΩ		
	I_t: 2.00 μA		
	U_{et1}: 1.17kV	U_{et1}: 1.18kV	U_{et1}: 1.17kV
The main circuit shall be connected to a voltage source. The pole of the testing point of the VDIS carrying the voltage signal shall be earthed through an impedance of $X_{c\,min}$: 1.7 MΩ and an ammeter. The voltage shall be increased until a current of $I_{t\,max}$: 2.94 μA is reached. That voltage shall be recorded as U_{et2}. After that, the test voltage shall be increased up to 120 % of U_n or of $U_{n\,max}$. The test is considered as passed if the voltage U_{et2} is lower than or equal to $U_{t\,max}$, where $U_{t\,max}$ is 45 % of U_n or of $U_{n\,min}$, and the current remains higher than $I_{t\,max}$ in the voltage range from U_{et2} to 1.2 U_n or 1.2 $U_{n\,max}$.	X_c: 1.7 MΩ		
	I_t: 2.94 μA		
	U_{et2}: 1.31kV	U_{et2}: 1.33kV	U_{et2}: 1.30kV
	The current remains higher than $I_{t\,max}$ in the voltage range from U_{et2} to 1.2 U_n.		
NOTE The test of the 7.2kV coupling system.			

Conditions on testing points

Test requirements	Test records and remarks		
	3-1	3-2	3-3
Frequency: 50Hz			
The main circuit shall be connected to a voltage source. The pole of the testing point of the VDIS carrying the voltage signal shall be earthed through an impedance of $X_{c\,max}$: 2.4 MΩ and an ammeter. The voltage shall be increased until a current of $I_{t\,min}$: 1.67 μA is reached. That equivalent threshold voltage shall be recorded as U_{et1}.	X_c: 2.4 MΩ		
	I_t: 1.67 μA		
The test is considered as passed if the voltage U_{et1} equals or exceeds $U_{t\,min}$, where $U_{t\,min}$ is 10 % of U_n or of $U_{n\,max}$.	U_{et1}: 1.73kV	U_{et1}: 1.74kV	U_{et1}: 1.73kV
The main circuit shall be connected to a voltage source. The pole of the testing point of the VDIS carrying the voltage signal shall be earthed through an impedance of $X_{c\,min}$: 2.0 MΩ and an ammeter. The voltage shall be increased until a current of $I_{t\,max}$: 2.50 μA is reached. That voltage shall be recorded as U_{et2}. After that, the test voltage shall be increased up to 120 % of U_n or of $U_{n\,max}$.	X_c: 2.0 MΩ		
	I_t: 2.50 μA		
The test is considered as passed if the voltage U_{et2} is lower than or equal to $U_{t\,max}$, where $U_{t\,max}$ is 45 % of U_n or of $U_{n\,min}$, and the current remains higher than $I_{t\,max}$ in the voltage range from U_{et2} to 1.2 U_n or 1.2 $U_{n\,max}$.	U_{et2}: 2.06kV	U_{et2}: 2.09kV	U_{et2}: 2.06kV
	The current remains higher than $I_{t\,max}$ in the voltage range from U_{et2} to 1.2 U_n.		
Frequency: 60Hz			
The main circuit shall be connected to a voltage source. The pole of the testing point of the VDIS carrying the voltage signal shall be earthed through an impedance of $X_{c\,max}$: 2.0 MΩ and an ammeter. The voltage shall be increased until a current of $I_{t\,min}$: 2.00 μA is reached. That equivalent threshold voltage shall be recorded as U_{et1}.	X_c: 2.0 MΩ		
	I_t: 2.00 μA		
The test is considered as passed if the voltage U_{et1} equals or exceeds $U_{t\,min}$, where $U_{t\,min}$ is 10 % of U_n or of $U_{n\,max}$.	U_{et1}: 1.62kV	U_{et1}: 1.63kV	U_{et1}: 1.63kV
The main circuit shall be connected to a voltage source. The pole of the testing point of the VDIS carrying the voltage signal shall be earthed through an impedance of $X_{c\,min}$: 1.7 MΩ and an ammeter. The voltage shall be increased until a current of $I_{t\,max}$: 2.94 μA is reached. That voltage shall be recorded as U_{et2}. After that, the test voltage shall be increased up to 120 % of U_n or of $U_{n\,max}$.	X_c: 1.7 MΩ		
	I_t: 2.94 μA		
The test is considered as passed if the voltage U_{et2} is lower than or equal to $U_{t\,max}$, where $U_{t\,max}$ is 45 % of U_n or of $U_{n\,min}$, and the current remains higher than $I_{t\,max}$ in the voltage range from U_{et2} to 1.2 U_n or 1.2 $U_{n\,max}$.	U_{et2}: 1.93kV	U_{et2}: 1.94kV	U_{et2}: 1.94kV
	The current remains higher than $I_{t\,max}$ in the voltage range from U_{et2} to 1.2 U_n.		
NOTE The test of the 12kV coupling system.			

Conditions on testing points

Test requirements	Test records and remarks		
	3-1	3-2	3-3
Frequency: 50Hz			
The main circuit shall be connected to a voltage source. The pole of the testing point of the VDIS carrying the voltage signal shall be earthed through an impedance of $X_{c\,max}$: 2.4 MΩ and an ammeter. The voltage shall be increased until a current of $I_{t\,min}$: 1.67 μA is reached. That equivalent threshold voltage shall be recorded as U_{et1}. The test is considered as passed if the voltage U_{et1} equals or exceeds $U_{t\,min}$, where $U_{t\,min}$ is 10 % of U_n or of $U_{n\,max}$.	X_c: 2.4 MΩ		
	I_t: 1.67 μA		
	U_{et1}: 2.57kV	U_{et1}: 2.59kV	U_{et1}: 2.58kV
The main circuit shall be connected to a voltage source. The pole of the testing point of the VDIS carrying the voltage signal shall be earthed through an impedance of $X_{c\,min}$: 2.0 MΩ and an ammeter. The voltage shall be increased until a current of $I_{t\,max}$: 2.50 μA is reached. That voltage shall be recorded as U_{et2}. After that, the test voltage shall be increased up to 120 % of U_n or of $U_{n\,max}$. The test is considered as passed if the voltage U_{et2} is lower than or equal to $U_{t\,max}$, where $U_{t\,max}$ is 45 % of U_n or of $U_{n\,min}$, and the current remains higher than $I_{t\,max}$ in the voltage range from U_{et2} to 1.2 U_n or 1.2 $U_{n\,max}$.	X_c: 2.0 MΩ		
	I_t: 2.50 μA		
	U_{et2}: 3.10kV	U_{et2}: 3.12kV	U_{et2}: 3.11kV
	The current remains higher than $I_{t\,max}$ in the voltage range from U_{et2} to 1.2 U_n.		
Frequency: 60Hz			
The main circuit shall be connected to a voltage source. The pole of the testing point of the VDIS carrying the voltage signal shall be earthed through an impedance of $X_{c\,max}$: 2.0 MΩ and an ammeter. The voltage shall be increased until a current of $I_{t\,min}$: 2.00 μA is reached. That equivalent threshold voltage shall be recorded as U_{et1}. The test is considered as passed if the voltage U_{et1} equals or exceeds $U_{t\,min}$, where $U_{t\,min}$ is 10 % of U_n or of $U_{n\,max}$.	X_c: 2.0 MΩ		
	I_t: 2.00 μA		
	U_{et1}: 2.58kV	U_{et1}: 2.59kV	U_{et1}: 2.58kV
The main circuit shall be connected to a voltage source. The pole of the testing point of the VDIS carrying the voltage signal shall be earthed through an impedance of $X_{c\,min}$: 1.7 MΩ and an ammeter. The voltage shall be increased until a current of $I_{t\,max}$: 2.94 μA is reached. That voltage shall be recorded as U_{et2}. After that, the test voltage shall be increased up to 120 % of U_n or of $U_{n\,max}$. The test is considered as passed if the voltage U_{et2} is lower than or equal to $U_{t\,max}$, where $U_{t\,max}$ is 45 % of U_n or of $U_{n\,min}$, and the current remains higher than $I_{t\,max}$ in the voltage range from U_{et2} to 1.2 U_n or 1.2 $U_{n\,max}$.	X_c: 1.7 MΩ		
	I_t: 2.94 μA		
	U_{et2}: 3.01kV	U_{et2}: 3.02kV	U_{et2}: 3.01kV
	The current remains higher than $I_{t\,max}$ in the voltage range from U_{et2} to 1.2 U_n.		

NOTE The test of the 24kV coupling system.

Conditions on testing points

Test requirements	Test records and remarks		
	3-1	3-2	3-3
Frequency: 50Hz			
The main circuit shall be connected to a voltage source. The pole of the testing point of the VDIS carrying the voltage signal shall be earthed through an impedance of $X_{c\,max}$: 2.4 MΩ and an ammeter. The voltage shall be increased until a current of $I_{t\,min}$: 1.67 μA is reached. That equivalent threshold voltage shall be recorded as U_{et1}. The test is considered as passed if the voltage U_{et1} equals or exceeds $U_{t\,min}$, where $U_{t\,min}$ is 10 % of U_n or of $U_{n\,max}$.	X_c: 2.4 MΩ		
	I_t: 1.67 μA		
	U_{et1}: 6.46kV	U_{et1}: 6.47kV	U_{et1}: 6.47kV
The main circuit shall be connected to a voltage source. The pole of the testing point of the VDIS carrying the voltage signal shall be earthed through an impedance of $X_{c\,min}$: 2.0 MΩ and an ammeter. The voltage shall be increased until a current of $I_{t\,max}$: 2.50 μA is reached. That voltage shall be recorded as U_{et2}. After that, the test voltage shall be increased up to 120 % of U_n or of $U_{n\,max}$. The test is considered as passed if the voltage U_{et2} is lower than or equal to $U_{t\,max}$, where $U_{t\,max}$ is 45 % of U_n or of $U_{n\,min}$, and the current remains higher than $I_{t\,max}$ in the voltage range from U_{et2} to 1.2 U_n or 1.2 $U_{n\,max}$.	X_c: 2.0 MΩ		
	I_t: 2.50 μA		
	U_{et2}: 7.70kV	U_{et2}: 7.74kV	U_{et2}: 7.75kV
	The current remains higher than $I_{t\,max}$ in the voltage range from U_{et2} to 1.2 U_n.		
Frequency: 60Hz			
The main circuit shall be connected to a voltage source. The pole of the testing point of the VDIS carrying the voltage signal shall be earthed through an impedance of $X_{c\,max}$: 2.0 MΩ and an ammeter. The voltage shall be increased until a current of $I_{t\,min}$: 2.00 μA is reached. That equivalent threshold voltage shall be recorded as U_{et1}. The test is considered as passed if the voltage U_{et1} equals or exceeds $U_{t\,min}$, where $U_{t\,min}$ is 10 % of U_n or of $U_{n\,max}$.	X_c: 2.0 MΩ		
	I_t: 2.00 μA		
	U_{et1}: 6.26kV	U_{et1}: 6.25kV	U_{et1}: 6.28kV
The main circuit shall be connected to a voltage source. The pole of the testing point of the VDIS carrying the voltage signal shall be earthed through an impedance of $X_{c\,min}$: 1.7 MΩ and an ammeter. The voltage shall be increased until a current of $I_{t\,max}$: 2.94 μA is reached. That voltage shall be recorded as U_{et2}. After that, the test voltage shall be increased up to 120 % of U_n or of $U_{n\,max}$. The test is considered as passed if the voltage U_{et2} is lower than or equal to $U_{t\,max}$, where $U_{t\,max}$ is 45 % of U_n or of $U_{n\,min}$, and the current remains higher than $I_{t\,max}$ in the voltage range from U_{et2} to 1.2 U_n or 1.2 $U_{n\,max}$.	X_c: 1.7 MΩ		
	I_t: 2.94 μA		
	U_{et2}: 7.32kV	U_{et2}: 7.33kV	U_{et2}: 7.31kV
	The current remains higher than $I_{t\,max}$ in the voltage range from U_{et2} to 1.2 U_n.		

NOTE The test of the 40.5 kV coupling system.

Indication of VDIS

Test requirements	Test records and remarks		
	3-1	3-2	3-3
The voltage shall be increased until the indication "voltage present" appears. The applied line-to-earth voltage U_{et} shall be registered.	0.89kV	0.88kV	0.89kV
The test is considered as passed, if the voltage U_{et} is in the range of 10 % of U_n to 45 % of U_n in three-phase systems, and if the indication "voltage present" is given in the voltage range from U_{et} to 1.2 U_n.	Complied		
Additionally, in the case of repetitive indication, it shall be verified, that the frequency of repetition is equal to or higher than 1 Hz in the voltage range from 45 % to 120 % of the nominal voltage U_n.	Always indication/ Complied		

NOTE The test of the 7.2kV coupling system.

Indication of VDIS

Test requirements	Test records and remarks		
	3-1	3-2	3-3
The voltage shall be increased until the indication "voltage present" appears. The applied line-to-earth voltage U_{et} shall be registered.	1.41kV	1.42kV	1.42kV
The test is considered as passed, if the voltage U_{et} is in the range of 10 % of U_n to 45 % of U_n in three-phase systems, and if the indication "voltage present" is given in the voltage range from U_{et} to 1.2 U_n.	Complied		
Additionally, in the case of repetitive indication, it shall be verified, that the frequency of repetition is equal to or higher than 1 Hz in the voltage range from 45 % to 120 % of the nominal voltage U_n.	Always indication/ Complied		

NOTE The test of the 12kV coupling system.

Indication of VDIS

Test requirements	Test records and remarks		
	3-1	3-2	3-3
The voltage shall be increased until the indication "voltage present" appears. The applied line-to-earth voltage U_{et} shall be registered.	2.46kV	2.45kV	2.46kV
The test is considered as passed, if the voltage U_{et} is in the range of 10 % of U_n to 45 % of U_n in three-phase systems, and if the indication "voltage present" is given in the voltage range from U_{et} to 1.2 U_n.	Complied		
Additionally, in the case of repetitive indication, it shall be verified, that the frequency of repetition is equal to or higher than 1 Hz in the voltage range from 45 % to 120 % of the nominal voltage U_n.	Always indication/ Complied		

NOTE The test of the 24kV coupling system.

Indication of VDIS

Test requirements	Test records and remarks		
	3-1	3-2	3-3
The voltage shall be increased until the indication "voltage present" appears. The applied line-to-earth voltage U_{et} shall be registered.	5.96kV	5.94kV	5.97kV
The test is considered as passed, if the voltage U_{et} is in the range of 10 % of U_n to 45 % of U_n in three-phase systems, and if the indication "voltage present" is given in the voltage range from U_{et} to 1.2 U_n.	Complied		
Additionally, in the case of repetitive indication, it shall be verified, that the frequency of repetition is equal to or higher than 1 Hz in the voltage range from 45 % to 120 % of the nominal voltage U_n.	Always indication/ Complied		

NOTE The test of the 40.5kV coupling system.

Clear perceptibility of visual indication

Test requirements	Test records and remarks		
	3-1	3-2	3-3
External light source: 10 lx ± 1 lx.	10 lx		
The test is considered as passed, when each of the three observers has perceived all indications without doubt or error.	Complied		
External light source: 1 000 lx ± 100 lx.	1027 lx		
The test is considered as passed, when each of the three observers has perceived all indications without doubt or error.	Complied		

NOTE The test of the 7.2kV coupling system.

Clear perceptibility of visual indication

Test requirements	Test records and remarks		
	3-1	3-2	3-3
External light source: 10 lx ± 1 lx.	10 lx		
The test is considered as passed, when each of the three observers has perceived all indications without doubt or error.	Complied		
External light source: 1 000 lx ± 100 lx.	1027 lx		
The test is considered as passed, when each of the three observers has perceived all indications without doubt or error.	Complied		

NOTE The test of the 12kV coupling system.

Clear perceptibility of visual indication

Test requirements	Test records and remarks		
	3-1	3-2	3-3
External light source: 10 lx ± 1 lx.	10 lx		
The test is considered as passed, when each of the three observers has perceived all indications without doubt or error.	Complied		
External light source: 1 000 lx ± 100 lx.	1027 lx		
The test is considered as passed, when each of the three observers has perceived all indications without doubt or error.	Complied		

NOTE The test of the 24kV coupling system.

Clear perceptibility of visual indication

Test requirements	Test records and remarks		
	3-1	3-2	3-3
External light source: 10 lx ± 1 lx.	10 lx		
The test is considered as passed, when each of the three observers has perceived all indications without doubt or error.	Complied		
External light source: 1 000 lx ± 100 lx.	1027 lx		
The test is considered as passed, when each of the three observers has perceived all indications without doubt or error.	Complied		

NOTE The test of the 40.5kV coupling system.

Phase shift

Test requirements	Test records and remarks		
	3-1	3-2	3-3
The testing point shall be connected to a load impedance and a series connected measuring resistor. The load impedance shall be in the range of X_c. The measuring resistor shall not exceed X_c min/ 100. The test voltage at the live part shall be set at 0.6 U_n and rated frequency. The phase angle between the voltage of the live part and the voltage at the measuring resistor shall be determined considering the phase rotation of the measuring resistor.The test is considered as passed, if the phase difference created by all elements constituting the VDIS, between the voltage of the main circuit and the voltage at the testing points, shall not exceed more than 5° in normal operating conditions. NOTE The test requirements was provided by the client.	X_c: 2.4 MΩ Measuring resistor: 4 kΩ Test frequency: 50 Hz		
	Test voltage: 4.3 kV Phase difference: 0.9°	Test voltage: 4.3 kV Phase difference: 1.0°	Test voltage: 4.3 kV Phase difference: 0.9°
	X_c: 2.0 MΩ Measuring resistor: 4 kΩ Test frequency: 50 Hz		
	Test voltage: 4.3 kV Phase difference: 1.1°	Test voltage: 4.3 kV Phase difference: 1.0°	Test voltage: 4.3 kV Phase difference: 1.0°
	X_c: 2.0 MΩ Measuring resistor: 4 kΩ Test frequency: 60 Hz		
	Test voltage: 4.3 kV Phase difference: 0.9°	Test voltage: 4.3 kV Phase difference: 0.9°	Test voltage: 4.3 kV Phase difference: 1.0°
	X_c: 1.7 MΩ Measuring resistor: 4 kΩ Test frequency: 60 Hz		
	Test voltage: 4.3 kV Phase difference: 1.1°	Test voltage: 4.3 kV Phase difference: 1.1°	Test voltage: 4.3 kV Phase difference: 0.9°

NOTE The test of the 7.2kV coupling system.

Phase shift

Test requirements	Test records and remarks		
	3-1	3-2	3-3
The testing point shall be connected to a load impedance and a series connected measuring resistor. The load impedance shall be in the range of X_c. The measuring resistor shall not exceed X_c min/ 100. The test voltage at the live part shall be set at 0.6 U_n and rated frequency. The phase angle between the voltage of the live part and the voltage at the measuring resistor shall be determined considering the phase rotation of the measuring resistor.The test is considered as passed, if the phase difference created by all elements constituting the VDIS, between the voltage of the main circuit and the voltage at the testing points, shall not exceed more than 5° in normal operating conditions. NOTE The test requirements was provided by the client.	X_c: 2.4 MΩ Measuring resistor: 4 kΩ Test frequency: 50 Hz		
	Test voltage: 7.2 kV Phase difference: 1.0°	Test voltage: 7.2 kV Phase difference: 1.1°	Test voltage: 7.2 kV Phase difference: 1.1°
	X_c: 2.0 MΩ Measuring resistor: 4 kΩ Test frequency: 50 Hz		
	Test voltage: 7.2 kV Phase difference: 1.2°	Test voltage: 7.2 kV Phase difference: 1.1°	Test voltage: 7.2 kV Phase difference: 1.1°
	X_c: 2.0 MΩ Measuring resistor: 4 kΩ Test frequency: 60 Hz		
	Test voltage: 7.2 kV Phase difference: 1.0°	Test voltage: 7.2 kV Phase difference: 1.1°	Test voltage: 7.2 kV Phase difference: 1.1°
	X_c: 1.7 MΩ Measuring resistor: 4 kΩ Test frequency: 60 Hz		
	Test voltage: 7.2 kV Phase difference: 1.1°	Test voltage: 7.2 kV Phase difference: 1.2°	Test voltage: 7.2 kV Phase difference: 1.2°

NOTE The test of the 12kV coupling system.

Phase shift

Test requirements	Test records and remarks		
	3-1	3-2	3-3
The testing point shall be connected to a load impedance and a series connected measuring resistor. The load impedance shall be in the range of X_c. The measuring resistor shall not exceed X_c min/ 100. The test voltage at the live part shall be set at 0.6 U_n and rated frequency. The phase angle between the voltage of the live part and the voltage at the measuring resistor shall be determined considering the phase rotation of the measuring resistor.The test is considered as passed, if the phase difference created by all elements constituting the VDIS, between the voltage of the main circuit and the voltage at the testing points, shall not exceed more than 5° in normal operating conditions. NOTE The test requirements was provided by the client.	X_c: 2.4 MΩ Measuring resistor: 4 kΩ Test frequency: 50 Hz		
	Test voltage: 14.4 kV Phase difference: 1.2°	Test voltage: 14.4 kV Phase difference: 1.3°	Test voltage: 14.4 kV Phase difference: 1.2°
	X_c: 2.0 MΩ Measuring resistor: 4 kΩ Test frequency: 50 Hz		
	Test voltage: 14.4 kV Phase difference: 1.1°	Test voltage: 14.4 kV Phase difference: 1.0°	Test voltage: 14.4 kV Phase difference: 1.1°
	X_c: 2.0 MΩ Measuring resistor: 4 kΩ Test frequency: 60 Hz		
	Test voltage: 14.4 kV Phase difference: 1.3°	Test voltage: 14.4 kV Phase difference: 1.2°	Test voltage: 14.4 kV Phase difference: 1.1°
	X_c: 1.7 MΩ Measuring resistor: 4 kΩ Test frequency: 60 Hz		
	Test voltage: 14.4 kV Phase difference: 1.2°	Test voltage: 14.4 kV Phase difference: 1.1°	Test voltage: 14.4 kV Phase difference: 1.2°

NOTE The test of the 24kV coupling system.

Phase shift

Test requirements	Test records and remarks		
	3-1	3-2	3-3
The testing point shall be connected to a load impedance and a series connected measuring resistor. The load impedance shall be in the range of X_c. The measuring resistor shall not exceed X_c min/ 100. The test voltage at the live part shall be set at 0.6 U_n and rated frequency. The phase angle between the voltage of the live part and the voltage at the measuring resistor shall be determined considering the phase rotation of the measuring resistor.The test is considered as passed, if the phase difference created by all elements constituting the VDIS, between the voltage of the main circuit and the voltage at the testing points, shall not exceed more than 5° in normal operating conditions. NOTE The test requirements was provided by the client.	X_c: 2.4 MΩ Measuring resistor: 4 kΩ Test frequency: 50 Hz		
	Test voltage: 24.3 kV Phase difference: 1.3°	Test voltage: 24.3 kV Phase difference: 1.3°	Test voltage: 24.3 kV Phase difference: 1.2°
	X_c: 2.0 MΩ Measuring resistor: 4 kΩ Test frequency: 50 Hz		
	Test voltage: 24.3 kV Phase difference: 1.2°	Test voltage: 24.3 kV Phase difference: 1.3°	Test voltage: 24.3 kV Phase difference: 1.0°
	X_c: 2.0 MΩ Measuring resistor: 4 kΩ Test frequency: 60 Hz		
	Test voltage: 24.3 kV Phase difference: 1.3°	Test voltage: 24.3 kV Phase difference: 1.2°	Test voltage: 24.3 kV Phase difference: 1.1°
	X_c: 1.7 MΩ Measuring resistor: 4 kΩ Test frequency: 60 Hz		
	Test voltage: 24.3 kV Phase difference: 1.2°	Test voltage: 24.3 kV Phase difference: 1.1°	Test voltage: 24.3 kV Phase difference: 1.1°

NOTE The test of the 40.5kV coupling system.

Response time

Test requirements	Test records and remarks		
	3-1	3-2	3-3
The test voltage shall be set to a value equal to 45 % of U_n.	2.16kV		
The test voltage shall be switched on and off five times.	5 times		
The duration of the on and off periods shall be varied and be at least of 3 s duration.	>3s		
The indicator shall indicate the change of the state of the voltage within 1 s.	563ms	562ms	559ms

NOTE The test of the 7.2kV coupling system.

Response time

Test requirements	Test records and remarks		
	3-1	3-2	3-3
The test voltage shall be set to a value equal to 45 % of U_n.	3.24kV		
The test voltage shall be switched on and off five times.	5 times		
The duration of the on and off periods shall be varied and be at least of 3 s duration.	>3s		
The indicator shall indicate the change of the state of the voltage within 1 s.	567ms	569ms	568ms

NOTE The test of the 12kV coupling system.

Response time

Test requirements	Test records and remarks		
	3-1	3-2	3-3
The test voltage shall be set to a value equal to 45 % of U_n.	5.41kV		
The test voltage shall be switched on and off five times.	5 times		
The duration of the on and off periods shall be varied and be at least of 3 s duration.	>3s		
The indicator shall indicate the change of the state of the voltage within 1 s.	582ms	584ms	583ms

NOTE The test of the 24kV coupling system.

Response time

Test requirements	Test records and remarks		
	3-1	3-2	3-3
The test voltage shall be set to a value equal to 45 % of U_n.	10.82kV		
The test voltage shall be switched on and off five times.	5 times		
The duration of the on and off periods shall be varied and be at least of 3 s duration.	>3s		
The indicator shall indicate the change of the state of the voltage within 1 s.	595ms	595ms	595ms

NOTE The test of the 40.5kV coupling system.

Non response to DC voltage

Test requirements	Test records and remarks		
	3-1	3-2	3-3
The DC voltage applied shall have a value equivalent to 2 U_n.	DC+14.4 kV		
A duration of at least 10 s.	>10s		
The test is considered as passed, if the indication "voltage present" does not appear for longer than 1 s.	"voltage present" does not appear/ Complied		
Repeated with reverse polarity after earthing of the live part:			
The DC voltage applied shall have a value equivalent to 2 U_n.	DC-14.4 kV		
A duration of at least 10 s.	>10s		
The test is considered as passed, if the indication "voltage present" does not appear for longer than 1 s.	"voltage present" does not appear/ Complied		

NOTE The test of the 7.2kV coupling system.

Non response to DC voltage

Test requirements	Test records and remarks		
	3-1	3-2	3-3
The DC voltage applied shall have a value equivalent to 2 U_n.	DC+24 kV		
A duration of at least 10 s.	>10s		
The test is considered as passed, if the indication "voltage present" does not appear for longer than 1 s.	"voltage present" does not appear/ Complied		
Repeated with reverse polarity after earthing of the live part:			
The DC voltage applied shall have a value equivalent to 2 U_n.	DC-24 kV		
A duration of at least 10 s.	>10s		
The test is considered as passed, if the indication "voltage present" does not appear for longer than 1 s.	"voltage present" does not appear/ Complied		

NOTE The test of the 12kV coupling system.

Non response to DC voltage

Test requirements	Test records and remarks		
	3-1	3-2	3-3
The DC voltage applied shall have a value equivalent to 2 U_n.	DC+48.0 kV		
A duration of at least 10 s.	>10s		
The test is considered as passed, if the indication "voltage present" does not appear for longer than 1 s.	"voltage present" does not appear/ Complied		
Repeated with reverse polarity after earthing of the live part:			
The DC voltage applied shall have a value equivalent to 2 U_n.	DC-48.0 kV		
A duration of at least 10 s.	>10s		
The test is considered as passed, if the indication "voltage present" does not appear for longer than 1 s.	"voltage present" does not appear/ Complied		

NOTE The test of the 24kV coupling system.

Non response to DC voltage

Test requirements	Test records and remarks		
	3-1	3-2	3-3
The DC voltage applied shall have a value equivalent to 2 U_n.	DC+81 kV		
A duration of at least 10 s.	>10s		
The test is considered as passed, if the indication "voltage present" does not appear for longer than 1 s.	"voltage present" does not appear/ Complied		
Repeated with reverse polarity after earthing of the live part:			
The DC voltage applied shall have a value equivalent to 2 U_n.	DC-81 kV		
A duration of at least 10 s.	>10s		
The test is considered as passed, if the indication "voltage present" does not appear for longer than 1 s.	"voltage present" does not appear/ Complied		

NOTE The test of the 40.5kV coupling system.

Connecting leads

Test requirements	Test records and remarks		
	3-1	3-2	3-3
Precondition:			
Temperature: 70℃	(70.0~70.4)℃		
Duration: 6h	6 h		
Tensile:			
Force: 50N	50 N		
Duration: 1 min	1 min		
The test is considered as passed if there is no apparent damage and neither the lead nor the screen (if present) is broken and neither the connecting lead is extracted from the fixed part of the connection.	Complied		

Temperature dependence of indication

Test requirements	Test records and remarks		
	3-1	3-2	3-3
In the first test run:			
Temperature: -25℃	(-25.1~-25.0)℃		
Duration: 16h	16 h		
The test is considered as passed, if the VDIS is working properly according to conditions on testing points and indication shall pass.	Complied		
In the second test run:			
Temperature: +40℃	(+40.0~+40.1)℃		
Duration: 16h	16 h		
The test is considered as passed, if the VDIS is working properly according to conditions on testing points and indication shall pass.	Complied		

Voltage limiting element

Test requirements	Test records and remarks
	3-2
The test is considered as passed, when flashover, breakdown or limitation has occurred at the voltage limiting element by observing a rapid change of voltage or current, and the test voltage shall not be higher than 90 V AC before breakdown and shall not be higher than 60 V RMS after breakdown.	Before breakdown: 75.2 V After breakdown: 58.5 V

Degree of protection (IP code)

Test requirements		Test records and remarks
		3-2
Testing points:IP2X	A hinged test finger with a diameter of 12mm and a length of 80mm should have sufficient clearance with hazardous components.	Complied
	A spherical object specimen with a diameter of 12.5mm shall not completely enter the shell.	Complied

Damp heat	
Test requirements	Test records and remarks 3-2
– temperature: 40 ℃ ±2 ℃; – relative humidity: 93 % ±3 %; – test duration: 96 h. The test is considered as passed, if the VDIS has no damage and is working properly according to the test for indication of VDIS.	(39.5~40.4) ℃ 92.4%~93.5% 96 h Complied

Insulation resistance under pollution

Test requirements	Test records and remarks
	3-2
– temperature: 35 ℃ ±2 ℃;	35 ℃
– salt concentration: 5 % ±1 %;	5 %
– pH: between 6.5 and 7.2;	6.8
– duration: 3 h.	3 h
The insulation resistance during and after the test shall not be lower than 20MΩ.	>200MΩ

Composite temperature/humidity cyclic test

Test requirements	Test records and remarks
	3-1
– low temperature: -10 ℃ ±2 K;	(-10.2~-10.0) ℃
– high temperature: + 40 ℃ ±2 K;	(+39.9~+40.2) ℃
– relative humidity: 93 % ±3 %;	93.2%~93.4%
– cycle time: 24 h;	24 h
– number of cycles: 21.	21
The test is considered as passed, if the VDIS has no damage and is working properly according to the test for indication of VDIS.	Complied

Vibration

Test requirements	Test records and remarks
	3-2
– frequency sweep: 10 Hz to 150 Hz (sinusoidal); – amplitude sweep: ±0.15 mm(10 Hz to 58 Hz); – acceleration sweep: 2.0 g(58 Hz to 150 Hz); – sweep time: 1 octave/min; – dwell time: 3.5 h (each direction); – orientation: all directions (x / y / z axis); – number of cycles: 10. The test is considered as passed, if the VDIS has no damage and is working properly according to the test for indication of VDIS after the test.	10 Hz to 150 Hz (sinusoidal) ±0.15 mm(10 Hz to 58 Hz) 2.0 g(58 Hz to 150 Hz) 1 octave/min 3.5 h (each direction) all directions (x / y / z axis) 10 Complied

Mechanical impact (IK code)

Test requirements	Test records and remarks
	3-2
All accessible parts of the VDIS and the separable indicator shall respect an impact level of IK07.	Complied

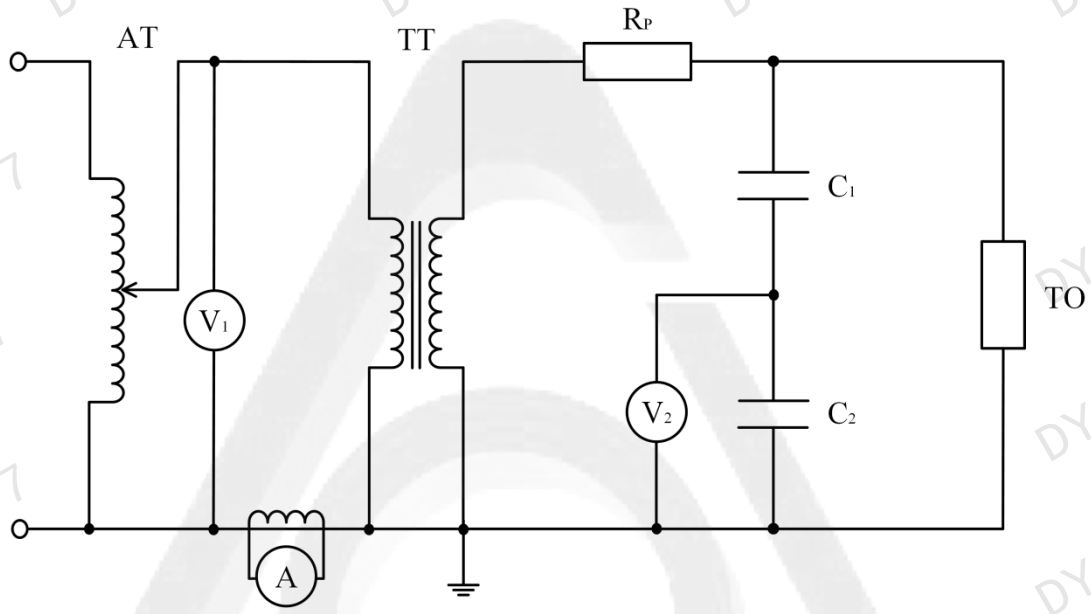
Electrostatic discharge

Test requirements	Test records and remarks
	3-3
Test level: 3;	Level 3
Classification: B;	Complied
Test location: Pilot lamp and enclosure (in air 8kV),coupling plate(contact 6 kV);	Contact : ±6 kV, in air: ±8kV
The test is considered as passed, if the VDIS is working properly according to the test for indication of VDIS after the test.	Complied

Radiated electromagnetic fields

Test requirements	Test records and remarks
	3-3
Test level: 3; Field strength: 10V/m; Frequency range: 80 MHz to 3GHz; Classification: B. The test is considered as passed, if the VDIS is working properly according to the test for indication of VDIS after the test.	Level 3 10V/m 80 MHz ~ 3GHz Complied Complied

Test circuit of lightning impulse voltage test



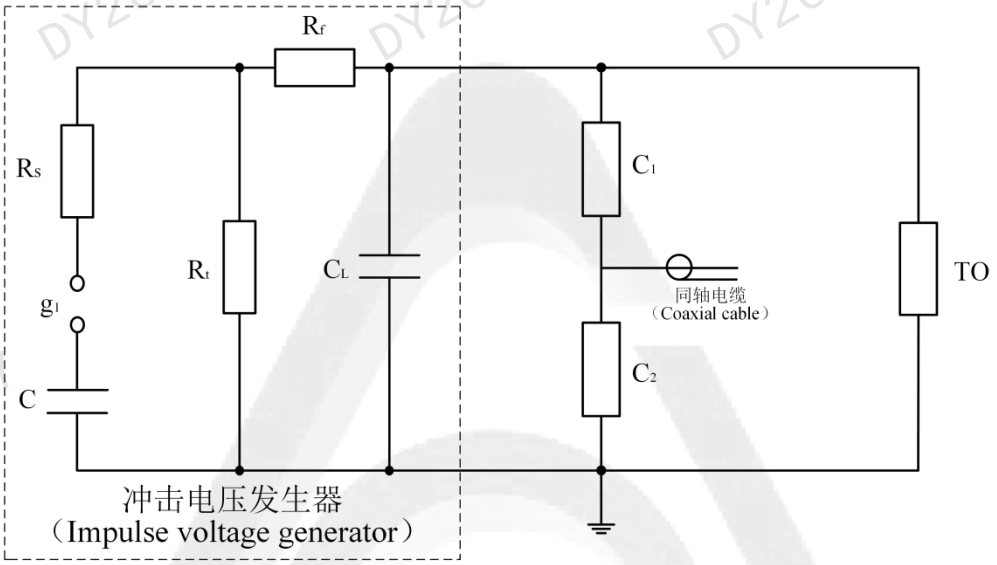
AT：调压器(Voltage regulator)　　TT：工频试验变压器(Power frequency transformer)

R_P：保护电阻(Protective resistor)　　V_1：电压表(Voltmeter)　　A：电流表(Ammeter)

C_1：分压器高压臂(HV arm capacitor)　　C_2：分压器低压臂(LV arm capacitor)

V_2：峰值电压表(Peak voltmeter)　　TO：试品(Test object)

Test circuit of power-frequency voltage test



C：发生器电容(Generator capacitor)

R_s：内部串联电阻(Internal series resistor)

R_t：波尾电阻(Tail resistor)

C_1、C_2：分压器高、低压臂电容(Voltage divider capacitor)

g_1：放电球隙(Discharge gap)

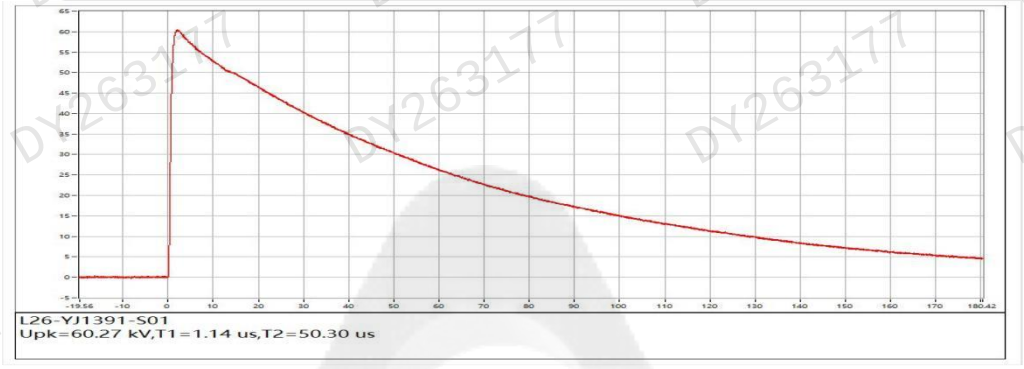
R_f：波头电阻(Front resistor)

C_L：负载电容(Load capacitor)

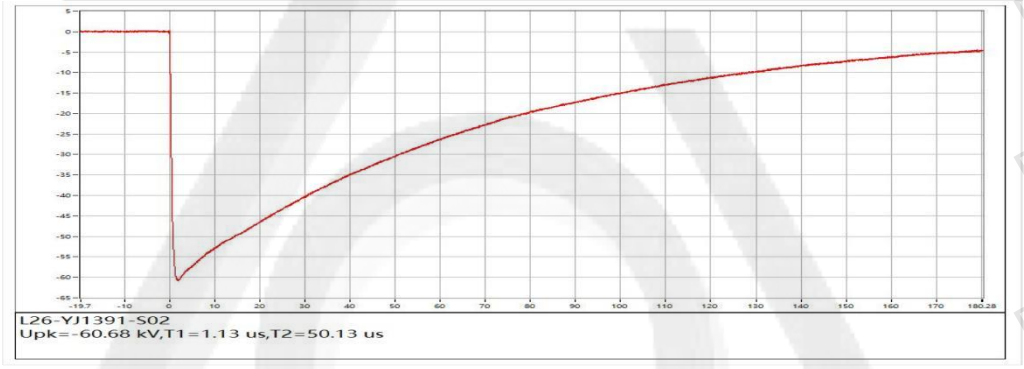
TO：试品(Test object)

Typical oscillograms of Lightning impulse voltage test

Testing points and connecting points are connected to the earth of the installation:



(60kV positive) L26-YJ1391-S01



(60kV negative) L26-YJ1391-S02

Testing points and connecting points are not connected to the earth of the installation:



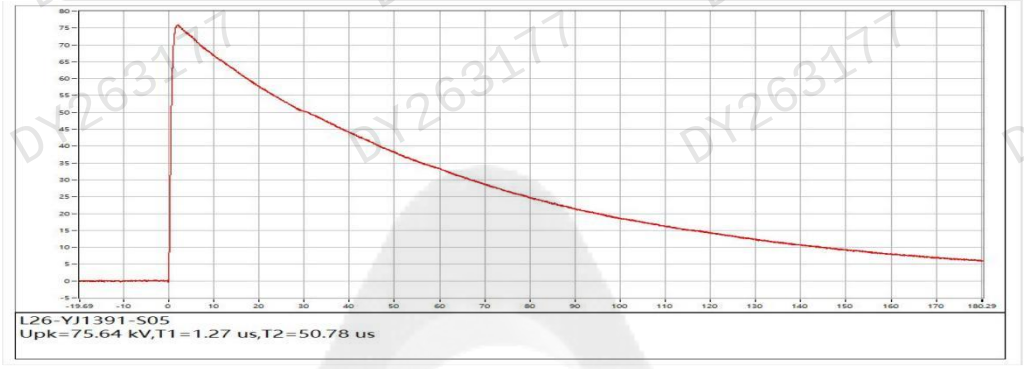
(60kV positive) L26-YJ1391-S03



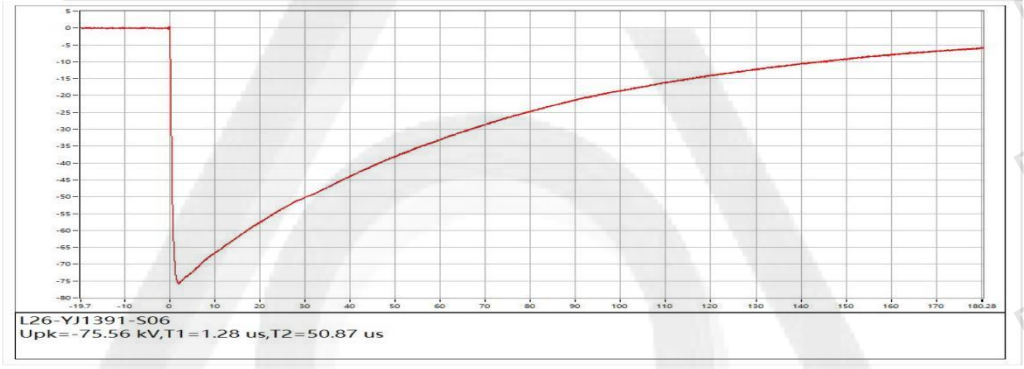
(60kV negative) L26-YJ1391-S04

Typical oscillograms of Lightning impulse voltage test

Testing points and connecting points are connected to the earth of the installation:



(75kV positive) L26-YJ1391-S05



(75kV negative) L26-YJ1391-S06

Testing points and connecting points are not connected to the earth of the installation:



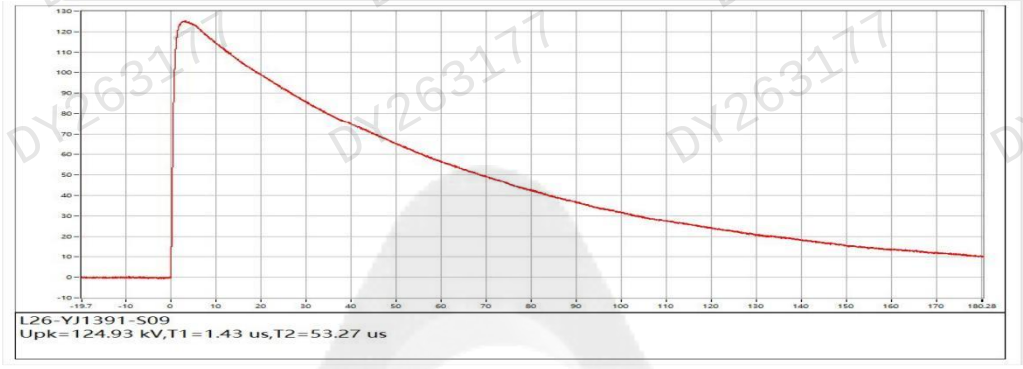
(75kV positive) L26-YJ1391-S07



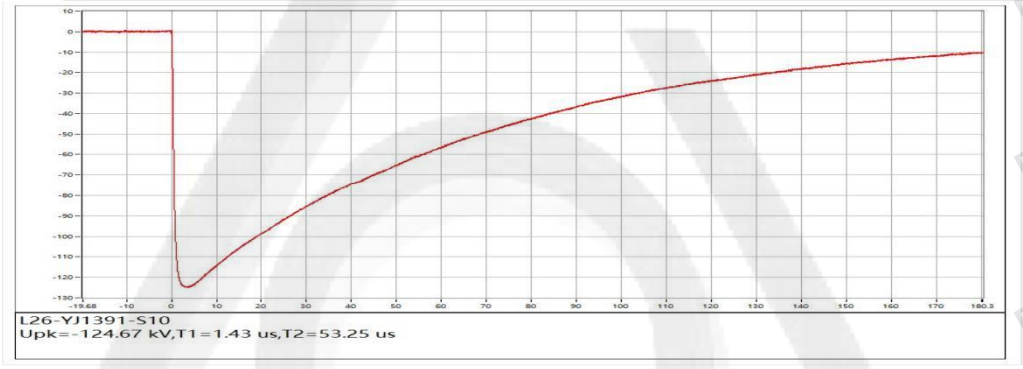
(75kV negative) L26-YJ1391-S08

Typical oscillograms of Lightning impulse voltage test

Testing points and connecting points are connected to the earth of the installation:

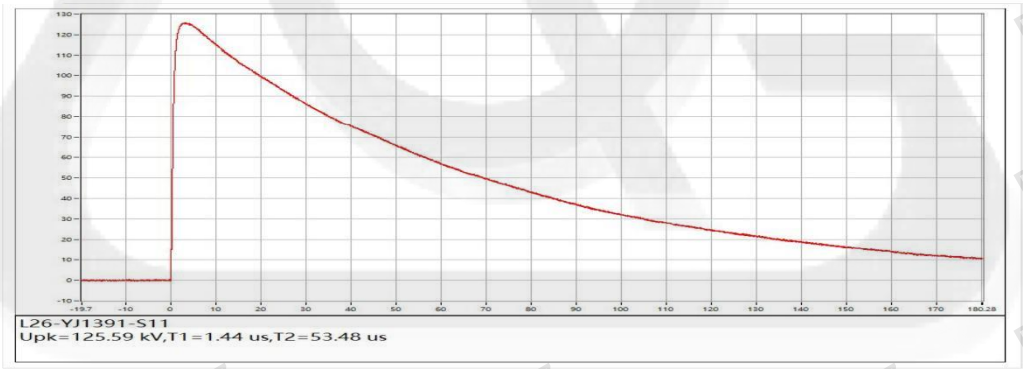


(125kV positive) L26-YJ1391-S09

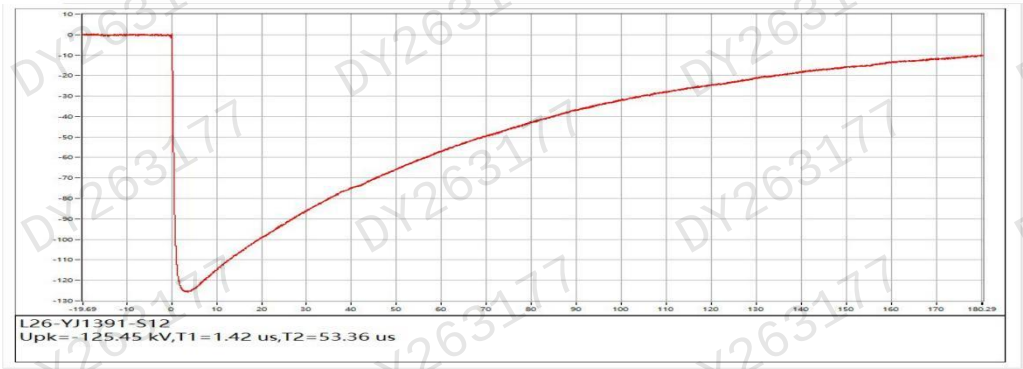


(125kV negative) L26-YJ1391-S10

Testing points and connecting points are not connected to the earth of the installation:



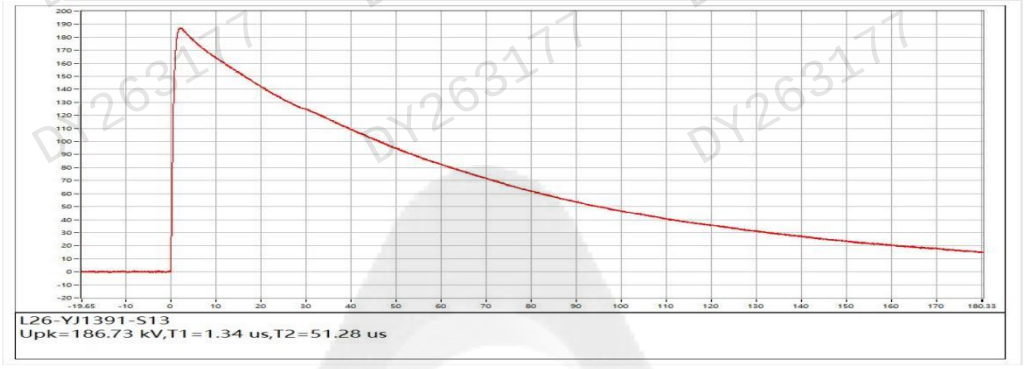
(125kV positive) L26-YJ1391-S11



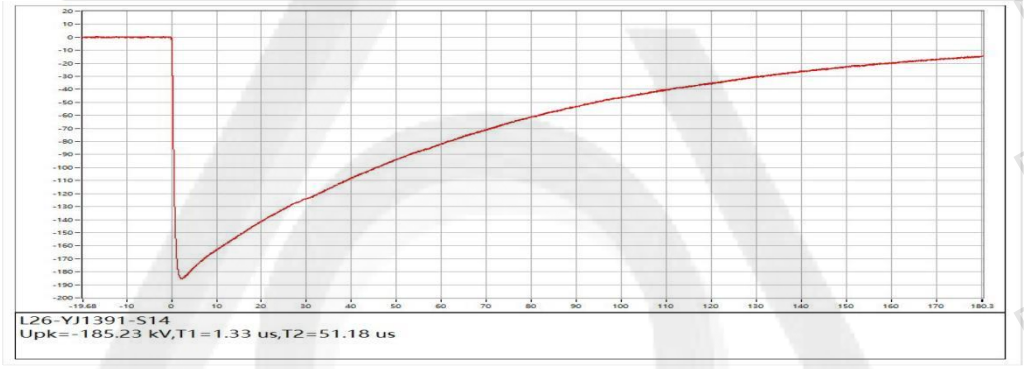
(125kV negative) L26-YJ1391-S12

Typical oscillograms of Lightning impulse voltage test

Testing points and connecting points are connected to the earth of the installation:

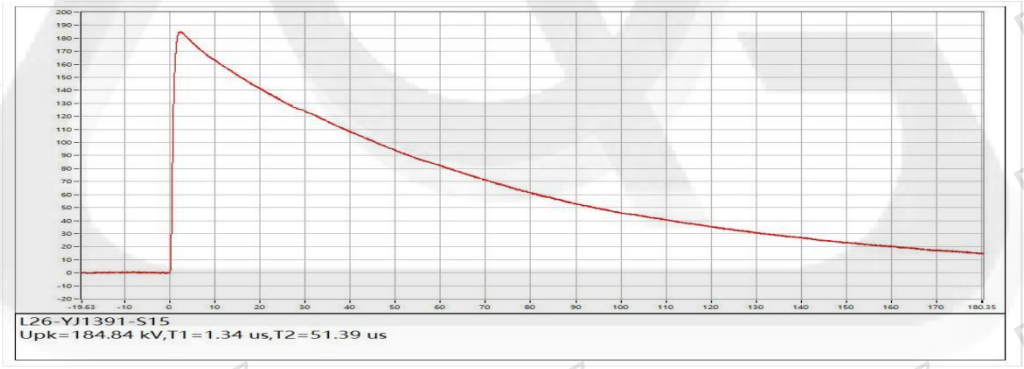


(185kV positive) L26-YJ1391-S13



(185kV negative) L26-YJ1391-S14

Testing points and connecting points are not connected to the earth of the installation:



(185kV positive) L26-YJ1391-S15



(185kV negative) L26-YJ1391-S16

Notes:

1.Testing location/ address: No.68, XiHu East Road, ShiLong Town, Dongguan City, Guangdong Province, China No.10, Science Avenue,Science city,Huang pu Di strict,Guang zhou,Guang dong,china (Radiated electromagnetic fields)

2.Address of applicant: No.2-1 Huiyuan Road, Shanhai Cooperation Zone, Jiangshan

3.Environmental conditions (if applicable):

Temperature (24.6~33.5) ℃, Relative humidity 43%~73% , Other ———

4.Sampling procedure (if applicable): ———

5.The interpretation of the deviation(s) from standard method(s) (if applicable): ———

6.The interpretation of the measurement uncertainty of the result(s) (if applicable): ———

7.Subcontract items and subcontractor (if applicable): ———

广东产品质量监督检验研究院

GUANGDONG TESTING INSTITUTE OF PRODUCT QUALITY SUPERVISION

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GQI is a legal third party institute specializing in product testing, inspection and certification;it is subordinate to Guangdong Administration for Market Regulation (Administration for Intellectual Property); it is a national-level testing and inspecting organization accredited by China National Accreditation Service for Conformity Assessment (CNAS); it is an international CB testing laboratory recognized by International Electrotechnical Commission System for Conformity Assessment Schemes for Electrotechnical Equipment and Components(IECEE); it is the national compulsory CCC testing organization designated by Certification and Accreditation Administration of the People's Republic of China(CNCA).

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- China National Quality Testing and Inspection Center for Smart Grid Transmission and Distribution Equipment (Guangdong)
- China National Quality Testing and Inspection Center for Paintings and Dopes (Guangdong)
- China National Quality Testing and Inspection Center for Food (Guangdong)
- China National Quality Testing and Inspection Center for Machinery Safety
- China National Quality Testing and Inspection Center for Fire Fighting Products (Guangdong)
- China National Quality Testing and Inspection Center for Solar Energy Photovoltaic Products (Guangdong)
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