17.5/24kV 250A
Deadbreak Elbow
Type Test Report

Others

Report Number:	Test Start Date:	Test Complete Date:
RN-R7607-OTHERS	2015 / 01 /26	2015/ 01 / 29

Chardon Taiwan
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1. Screen Resistance Measurement

Object

verify the connectors that the parts meet the resistance requirements of IEC 60502.4/HD629.1S2, R≤5000Ω

Testing Samples

Deadbreak Elbow	CHARDON 24-CE250	4 pcs

Procedures and Test Spec

The test shall be carried out on a separable connector which does not need to be installed on either a cable or a mating bushing. Silver painted or wraparound electrodes shall be installed at each end of the separable connector.

The screen resistance of the separable connector shall be measured at ambient temperature between the two electrodes. The power dissipation of the test circuit shall not exceed 100 mW.

The sample shall then be subjected to thermal ageing in an air oven at (120 ± 2) ℃ for 168 h under the conditions described in 8.1 of IEC 60811-1-2. The separable connector screen resistance at ambient temperature shall be measured again as above.

Results

Sample number	Screen Resistance
A12	1000.7Ω
A13	1192.4Ω
A14	1048.2Ω
A15	1093.5Ω

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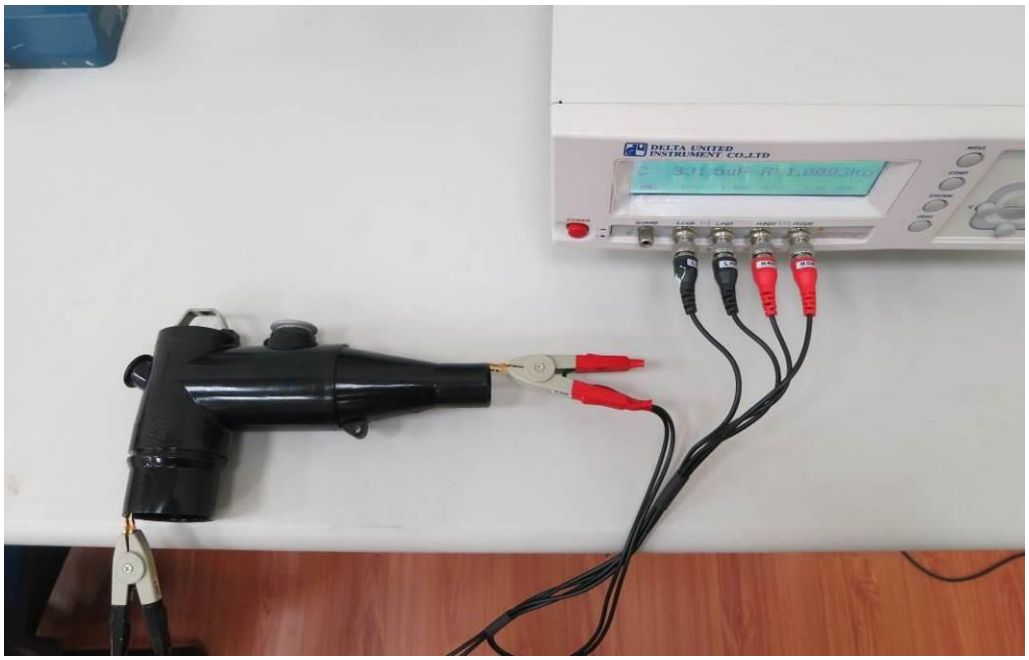
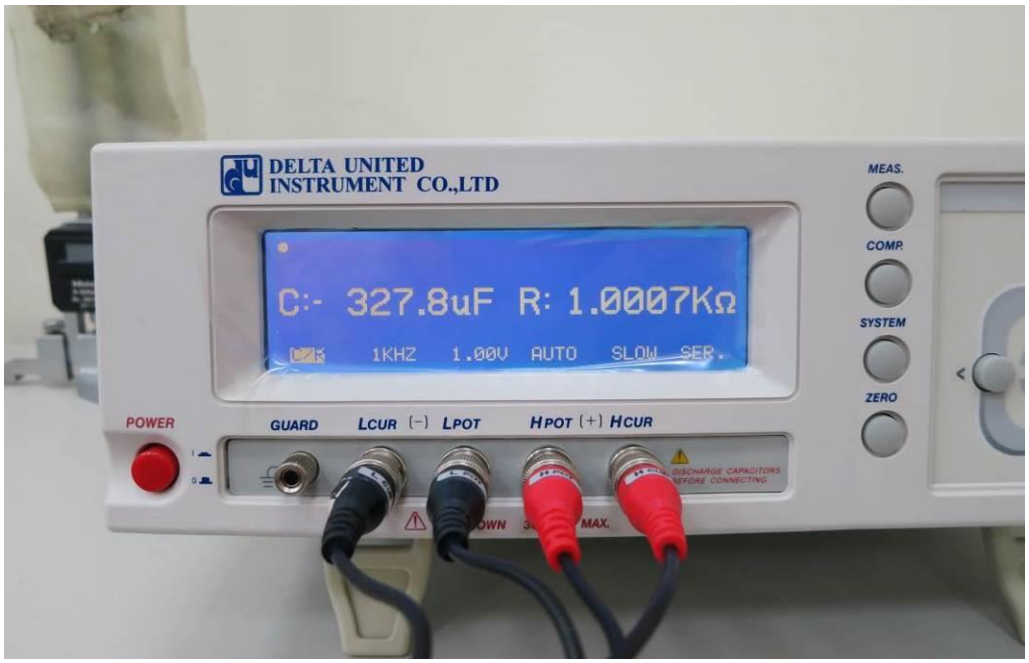


Test in Progress



Readings of the Instrument

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Temperature Setup of Oven

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2. Leakage Current Measurement

Object

To verify the connectors that the parts meet the Leakage Current Measurement requirements of 60502.4/HD629.1S2, when parts are energized to 24 kV, the leakage current shall not exceed 0.5 mA.

Testing Samples

Deadbreak Elbow	CHARDON 24-CE250	4 pcs

Mating Parts

Deadbreak Bushing	CHARDON 24-DIB250
Cable	20kV YJV 1*50

Procedures and Test Spec

A separable connector shall be installed on a length of cable and connected to its mating bushing. The test shall be carried out at ambient temperature.

A metal foil of 50 mm ×50 mm, shall be fixed without any air gap to the outer screen of the separable connector as far as possible from the earthing points:

- in the case of separable connectors with an earthed metal flange (see Figure 9a), the metal foil shall be placed mid-way between the metal flange and the earth bond of the cable screen;
- in the case of separable connectors without a metal flange (see Figure 9b), the metal foil shall be placed at the end of the separable connector opposite to the earth bond of the cable screen.

In both cases, the metal foil shall be earthed through a millimeter and a resistance of 2 000 Ω, as shown in the test arrangement below.
The leakage current shall be measured with an a.c. test voltage of Um applied between conductor and earth.(≤0.5mA)

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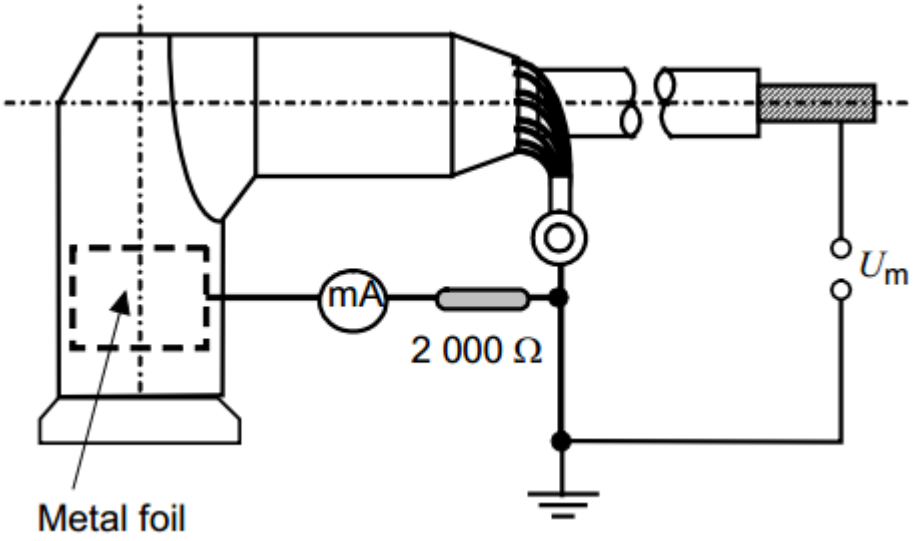
Results

Sample number	Leakage Current
A12	7.64μA
A13	7.84μA
A14	8.23μA
A15	7.95μA



Test Arrangement

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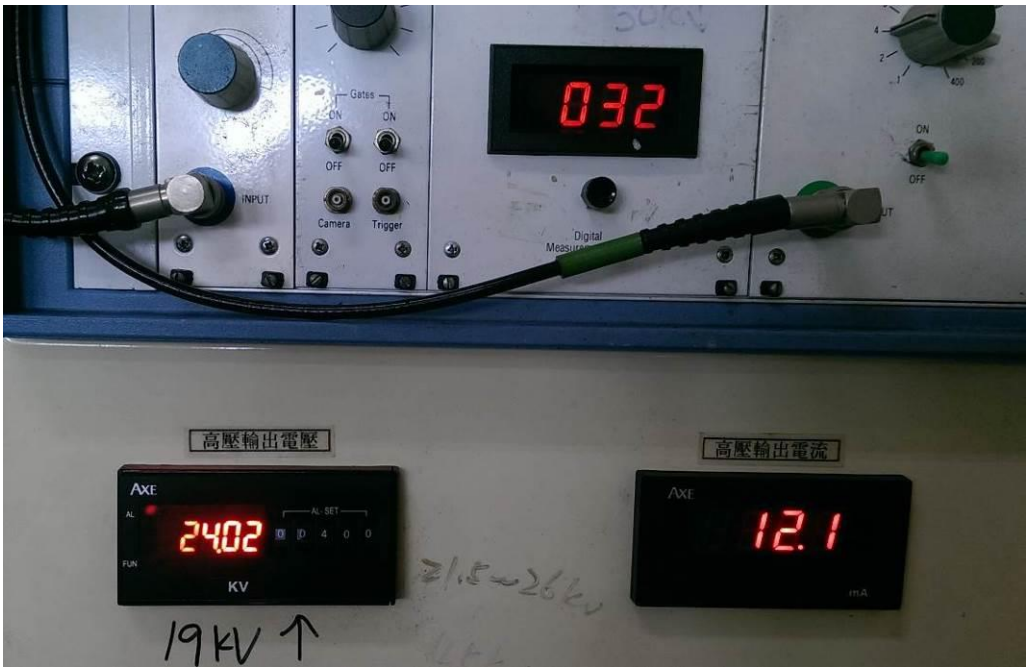
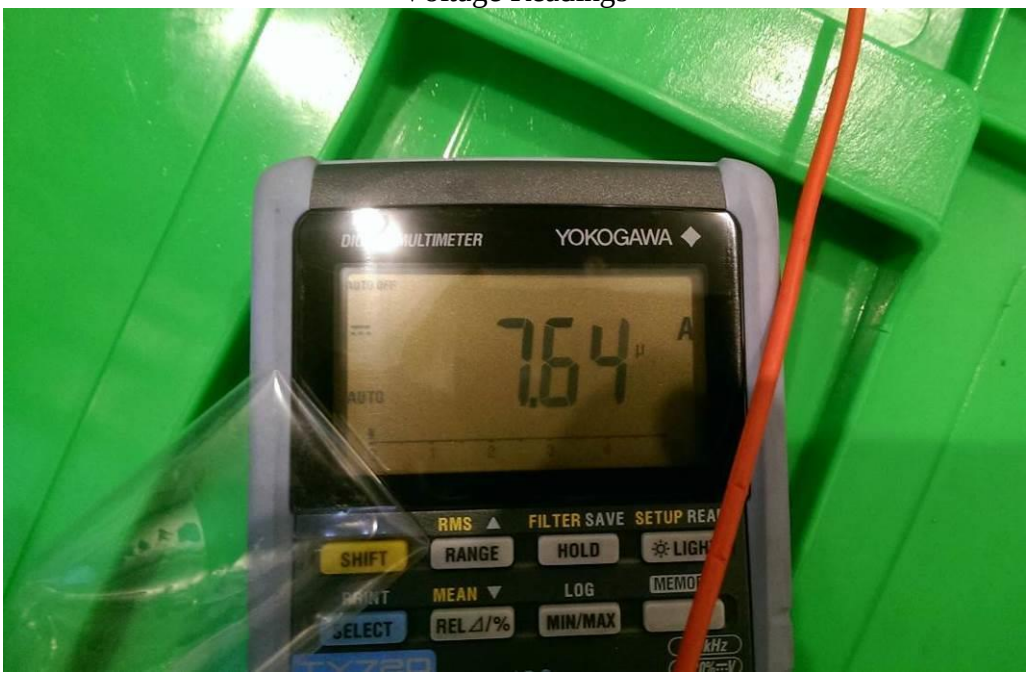


Voltage Readings



Current Readings

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3. Screen Fault Current Initiation

Object

To verify the connectors that the parts meet the Screen Fault Current Intonation requirements of IEEE 592-2007.(60502.4/HD629.1S2)

Testing Samples

Loadbreak Elbow	CHARDON 25-LE200	2 pcs

Procedure and Test Spec

The tests were performed in accordance with IEEE Standard 592, section 4.3.

Results

Two Connector Samples successfully passed Fault-Current Initiation Tests at 10kArms. See the test summary of Powertech in Appendix.

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4. Operating Force

Object

To verify the Operating Force requirements of IEC 60502.4/HD629.1S2, the operating force shall be less than 900N.

Testing Samples

Deadbreak Elbow	CHARDON 24-CE250	4 pcs

Mating Parts

Deadbreak Bushing	CHARDON 24-DIB250
Cable	20kV YJV 1*50

Procedures and Test Spec

A separable connector shall be assembled in accordance with the manufacturer's instructions and connected to its mating bushing, using the lubricant supplied by the manufacturer.

The separable connector assembly shall be conditioned at (–20 ± 2) ℃ for at least 12 h. The test shall be carried out within 5 min after removal from the conditioning chamber. The separable connector shall be clamped by means of a suitable tool which allows operation along the axis of the separable connector and mating bushing interface.

A force shall be gradually applied to the separable connector in the axial direction. The force to open and close the separable connector/bushing interface shall be measured.

Results

Sample number	Open Force＜900N	Close Force＜900N
A12	PASS	PASS
A13	PASS	PASS
A14	PASS	PASS
A15	PASS	PASS

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Test in Progress - Close

Test in Progress - Open

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5. Capacitive Test Point Performance

Object

To verify the connectors that the parts meet the Capacitive Test Point Performance requirements in IEC 60502.4/HD629.1S2, capacitance of test point to cable conductor C_{tc}>1.0pF, ratio of capacitance of test point to earth C_{te} and capacitance of test point to cable conductor C_{te}/C_{tc}⩽12.0.

Testing Samples

Deadbreak Elbow	CHARDON 24-CE250	4 pcs

Mating Parts

Cable	20kV YJV 1*50

Procedures and Test Spec

A separable connector shall be installed on a cable and the outer screen earthed in accordance with the manufacturer's instructions. The separable connector need not be connected to its mating bushing. It is recommended that the length of cable used be as short as possible.

The following capacitances shall be measured at ambient temperature:

- C_{tc}: capacitance between the test point and the cable conductor;
- C_{te}: capacitance between the test point and the earth.

Results

Sample number	C_{tc}>1.0pF	C_{te}/C_{tc}⩽12.0	Result
A12	7.46 pF	1.22	PASS
A13	7.70 pF	1.30	PASS
A14	7.62 pF	1.24	PASS
A15	7.92 pF	1.32	PASS

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Test in Progress I

Test in Progress II

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6. Examination

Object

To verify the connectors that parts meet the requirement of IEC 60502.4/HD629.1S2 about examination of the tested samples.

Testing Samples

Deadbreak Elbow CHARDON 24-CE250 4 pcs

Procedure and Test Spec

The accessories shall be examined and the following information included in the test report:

(i) Cracking in the filling media and/or tape or tube components;
(ii) A moisture path bridging a primary seal;
(iii) Corrosion and/or tracking and/or erosion which would, in time, lead to failure of the accessory.

Results

Sample number	Examination
A12	PASS
A13	PASS
A14	PASS
A15	PASS

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APPENDIX – External Test Report Summary

Powertech Labs Inc. • 12388 - 88th Avenue, Surrey, B.C. Canada • V3W 7R7

Test Report № PL-26015B

The tests were performed in accordance with
IEEE Standard 592-2007, section 4.3

Project №:	PL-26015	**Test Date:**	13 September 2013
Tested equipment:	Two Separable Insulated Connectors manufactured by Chardon Taiwan Corporation, prefaulted in accordance with IEEE Standard 592-2007, Figure 1. The samples were numbered by the client.		
Voltage rating:	15.2 $kV_{phase\text{-}to\text{-}ground}$		
Test voltage:	11.7 $kV_{phase\text{-}to\text{-}ground}$		
Test current:	10 kA_{rms}		
Markings:	Elbow- Chardon, 15.2/26.3 kV, 200A Load Break Cable- TPC. 25 kV 1/C #1AWG CU, XLPE 260 mils		
Tests performed:	Fault-Current Initiation Tests per Section 4.3. Each sample was subjected to two current pulses at 10 kA_{rms}, 10 cycles.		
Test results:	All tested samples passed the tests.		
Remarks:	Identification of the tested Connectors was based on the markings on the samples. The samples were supplied already prefaulted.		

Tested by:

Oct. 21, 2013

K.Tabarraee M.A.SC., EIT
Electrical Engineer, High Power Lab

Reviewed by:

21 October 2013

T. Stefanski M.Sc., P. Eng.
Head of High Power Lab