

Số 65558262 _1

Tp. Hồ Chí Minh, ngày 02/12/2019

**THƯ GIẢI TRÌNH VỀ KẾT QUẢ KIỂM TRA
ĐIỆN TRỞ CÁCH ĐIỆN RECLOSER E38****Kính gửi Quý khách hàng,**

Trước tiên, Schneider Electric Việt Nam xin chân thành cảm ơn Quý công ty đã sử dụng sản phẩm và dịch vụ của chúng tôi trong thời gian qua.

Ngày 30/11/2019, Quý khách hàng có yêu cầu chúng tôi làm rõ về vấn đề kết quả kiểm tra điện trở cách điện Recloser E38, chúng tôi xin có phúc đáp như sau:

1. Khả năng cách điện của Recloser E38:

Theo tiêu chuẩn IEC 62271 – 111: 2012, khả năng cách điện của thiết bị được thông qua 2 thông số là thử nghiệm xung điện áp và thử nghiệm điện áp tại tần số công nghiệp trong 2 trạng thái ướt (wet) & khô (dry) trong thời gian 60s:

Details	Rating	Test Standard	Hyperlinked Reports
Impulse withstand	170kV	IEC62271-111 2012	CESI B8002209
Power Frequency Dry (60s)	70kV	IEC62271-111 2012	CESI B8002209
Power Frequency Wet (60s)	70kV	IEC62271-111 2012	CESI B8002209

Recloser E38 của Schneider Electric hoàn toàn đáp ứng thử nghiệm với các tiêu chuẩn này (đính kèm tiêu chuẩn IEC 62271-111: 2012 & bản thí nghiệm điển hình ESI B8002209).

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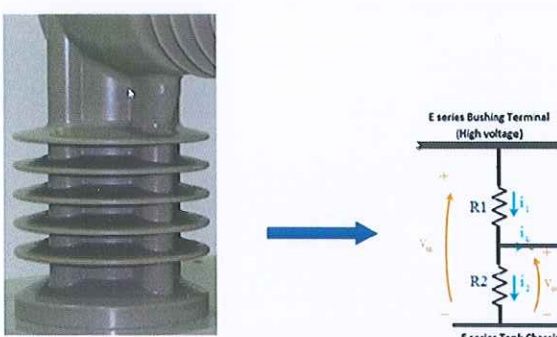
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2. Giải thích về giá trị điện trở cách điện của Recloser E38 khi đo bằng Megger:

Không giống như các mô hình thiết bị đóng cắt khác, Recloser E series sử dụng công nghệ RVD (Bộ chia điện áp điện trở) như một phần của sơ đồ đo điện áp. Vui lòng tham khảo sơ đồ đơn tuyến đính kèm dưới đây để hiểu cách thức hoạt động của Recloser E Series.

	<p>* R1 là điện trở được lắp bên trong sứ xuyên epoxy- Giá trị của nó là 100 Mega Ohms (E27) hoặc 200 Mega Ohms (E38).</p> <p>* R2 là điện trở phân chia điện áp được lắp nối tiếp với R1 và được tích hợp trong một PCB nhỏ được lắp đặt bên trong máy cắt - Điện trở này khoảng 100 KOhms (rất nhỏ so với điện trở sứ xuyên).</p>
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Khi sử dụng Megger đo điện trở giữa đầu cực sứ xuyên và thân máy cắt Recloser, bởi vì điện trở cách điện epoxy thực tế rất cao so với giá trị R1, Megger thực sự đo điện trở ($R1 + R2$) - khoảng 100 MOhms (E27) hoặc 200 MOhms (E38).

Tất nhiên, các giá trị trên được ước tính khi thử nghiệm Megger đo điện trở giữa đầu cực (bushing terminal) và thân máy cắt Recloser khi Recloser ở vị trí mở. Các số liệu sẽ thay đổi tương ứng khi đo điện trở trong các tình huống đo khác nhau.

Ví dụ: Đo cách điện của nhiều cực cùng lúc hoặc thiết bị đóng cắt ở vị trí mở hoặc đóng.

Do vậy, kiểm tra khả năng cách điện bằng cách đo điện trở cách điện với Megger là không phù hợp với Recloser E38.

Theo tiêu chuẩn IEC62271-111 : 2012 - Thử nghiệm xung điện áp và thử nghiệm điện áp tại tần số công nghiệp là các thử nghiệm đáng tin cậy hơn để xác nhận tính chất cách điện của thiết bị đóng cắt điện (Chi tiết vui lòng xem phần highlight các file đính kèm).

Một lần nữa, Schneider Electric xác nhận rằng Recloser E38 hoàn toàn đáp ứng thử nghiệm với các tiêu chuẩn kiểm tra khả năng cách điện tuân theo tiêu chuẩn IEC 62271-111: 2012.

Chúng tôi xin cam kết rằng sản phẩm Recloser E38 với các kết quả đo điện trở cách điện bằng Megger với giá trị ~200MOhm hoàn toàn đáp ứng đủ điều kiện để đóng điện vận hành trên lưới điện Việt Nam.

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Và thực tế, các Recloser E38 với chủng loại như trên đã đóng điện thành công cũng như vận hành bình thường ở các Điện Lực trên thị trường Việt Nam.

Chúng tôi cũng xác nhận tất cả sản phẩm cung cấp bởi Schneider Electric, đều được sản xuất và giám sát bởi quy trình quản lý chất lượng chặt chẽ, đảm bảo sự đồng nhất trong chất lượng và được hưởng chế độ bảo hành như hãng đã cam kết.

Nếu có thắc mắc, xin vui lòng liên hệ với chúng tôi theo tổng đài 1800 58 58 58 (miễn cước cuộc gọi) hoặc Hộp thư: customercare.vn@schneider-electric.com. Chúng tôi rất hân hạnh được phục vụ!



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6.2 Dielectric tests

Subclause 6.2 of IEEE Std C37.100.1-2007 or IEC 62271-1:2007 is applicable with the following additions and modifications:

The tests shall be performed with the test voltages given in Table 2 or Table 3.

Rated insulation levels for cutout mounted reclosers are based in part on the rating of the fuse support or base identified by the manufacturer in 6.1.1 and 6.1.2. See 6.2.5.2 for special test conditions for the cutout mounted recloser.

Reclosers/FIs shall be capable of withstanding, without damage to the recloser/FI and associated control apparatus, if any, the test voltages of 6.2 when tested in accordance with 6.1.

Insulation tests of reclosers/FIs shall be performed only when the recloser/FI is completely isolated from all system voltages. Refer to Clause 101 for field-testing.

WARNING

When performing tests involving open contacts in vacuum, adequate precautions such as shielding or distance should be used to protect test personnel against the possible occurrences of higher X-radiation due, for example, to incorrect contact spacing, or to the application of voltages in excess of those specified. For example, maintaining a distance of 2 m to 3 m between the recloser/FI and all test personnel is a typical basic precaution to reduce the risk of excess X-radiation exposure. Further discussion of shielding, adequate distances and personnel exposure limits are found in ANSI C37.85 [20], American National Standard for Switchgear Alternating-Current High-Voltage Power Vacuum Interrupters – Safety Requirements for X-Radiation Limits.

6.2.1 Ambient air conditions during tests

Subclause 6.2.1 of IEEE Std C37.100.1-2007 or IEC 62271-1:2007 is applicable.

6.2.2 Wet test procedure

Subclause 6.2.2 of IEEE Std C37.100.1-2007 or IEC 62271-1:2007 is applicable with the additions given in 6.2.6.1.

6.2.3 Conditions of switchgear and controlgear during dielectric tests

Subclause 6.2.3 of IEEE Std C37.100.1-2007 or IEC 62271-1:2007 is applicable with the following additions:

- a) on overhead reclosers electrical connections shall be made by means of bare wire, inserted in each terminal. These bare wires shall project in such a manner as not to decrease the withstand value. Any necessary bends may be made at the terminals. The test lead connections shall be made to the wires projecting from the terminals. Terminals shall be representative of those used in service;
- b) on pad mounted, submersible and dry vault reclosers/FIs connections shall be made through a cable termination similar to that for which the recloser/FI was designed. If terminations capable of meeting the specified dielectric voltage are not available, other terminations (bushing or connectors, or both) may be substituted for the purpose of performing these tests.

6.2.4 Criteria to pass the test

Subclause 6.2.4 of IEEE Std C37.100.1-2007 or IEC 62271-1:2007 is applicable with the following addition:

Refer also to IEEE Std C37.100.1-2007, clause 6.2.6.2 or IEC 62271-1:2007:2007, 6.2.4 Note 3.

6.2.5 Application of the test voltage and test conditions

Subclause 6.2.5 of IEEE Std C37.100.1-2007 or IEC 62271-1:2007 is applicable.

6.2.5.1 General case

Subclause 6.2.5.1 of IEEE Std C37.100.1-2007 or IEC 62271-1:2007 is applicable with the following addition:

Single-phase reclosers/FIs shall be tested for conditions 1, 4 and 7 of Table 9 of IEEE Std C37.100.1-2007 or IEC 62271-1:2007. The connections of the terminals for phases B and C are not applicable.

6.2.5.2 Special case

The open position tests for cutout mounted reclosers are given for the device in the "dropped-out" position.

If the operating sequence allows the device to rest with an open interrupter gap and a closed disconnecter gap, both the isolation gap alone and the interrupter gap alone shall be tested for the open position test cases.

6.2.6 Tests of switchgear and controlgear of $U_r \leq 245$ kV

Subclause 6.2.6 of IEEE Std C37.100.1-2007 or IEC 62271-1:2007 is applicable with the following modifications:

The tests shall be performed with the test voltages given in Table 2 or Table 3.

NOTE The scope of this standard is limited to the voltage range of 1 000 V up to 38 000 V.

6.2.6.1 Power-frequency voltage tests

Subclause 6.2.6.1 of IEEE Std C37.100.1-2007 or IEC 62271-1:2007 is applicable with the following addition:

- a) IEEE values of rated maximum voltage, column (2) of Table 2 and Table 3: Power-frequency withstand test voltages shall be applied in accordance with IEEE Std 4, with a peak value equal to 1,414 times the rated power-frequency withstand dry and wet test values given in Columns (5) and (6) of Table 2 and Table 3. The test duration shall be 60 s for the dry test.

The preferred method for wet tests shall be the "conventional procedure-practice in the US" of IEEE Std 4 with a test duration of 10 s. The "standard test procedure" of IEEE Std 4 is allowed as an alternate. Wet tests shall not apply to reclosers/FIs utilizing submersible cables and terminations.

NOTE Future designs should standardize the wet test procedure by adopting the "standard test procedure" as defined in IEEE Std 4.

- b) IEC Values of rated maximum voltage, Column (3) Table 2 and Table 3.

6.2.6.2 Lightning impulse voltage tests

Subclause 6.2.6.2 of IEEE Std C37.100.1-2007 or IEC 62271-1:2007 is applicable with the following addition to IEC 62271-1:

The voltage levels shall be equal to or greater than those that are specified.

6.2.6.101 DC withstand test voltage

On reclosers/FIs using pad mounted, dry vault, and submersible cable connectors, a d.c. withstand test shall be performed in addition to the power-frequency withstand test in 6.2.6.1 above. When used, the test voltage applied shall be the value given in column (7) of Table 3. DC or very low frequency test voltages are used on cables that still may be connected to the switchgear. This design test is included to verify that the switchgear can also withstand the same test voltage.

Refer to Clause 101 for a discussion on field tests.

The d.c. power source for the d.c. withstand test shall be capable of supplying a minimum of 10 mA before tripping out on overload. The test shall be considered to have failed if there is:

- a) a leakage current of more than 10 mA, or
- b) the test device is unable to withstand the voltage.

The test shall be considered to have passed if the test device withstands the test voltage with a leakage current that does not exceed 10 mA. Non-sustained disruptive discharges (NSDD) may occur and are allowed.

NOTE These test criteria recognize the likelihood that a small leakage current may pass through an insulating medium or across an insulating surface while still supporting the high d.c. voltage. This is particularly true of vacuum interrupters.

6.2.7 Test of switchgear and controlgear of $U_r > 245$ kV

Subclause 6.2.7 of IEEE Std C37.100.1-2007 and IEC 62271-1:2007 are not applicable, since the scope of this standard is limited to 38 kV and below.

6.2.8 Artificial pollution tests for outdoor insulators

No artificial pollution tests are necessary when the creepage distances of the insulators comply with the requirements of IEC 60815.

If the creepage distances do not comply with the requirements of IEC 60815, artificial pollution tests should be performed according to IEC 60507, using the rated voltage and the application factors given in IEC 60815.

6.3 Radio interference voltage (r.i.v.) test

Subclause 6.3 of IEEE Std C37.100.1-2007 and IEC 62271-1:2007 are not applicable. RIV tests are not a requirement of this standard.

6.4 Measurement of the resistance of circuits

6.4.1 Main circuit

Subclause 6.4.1 of IEEE Std C37.100.1-2007 or IEC 62271-1:2007 is applicable.

Type Test Report

Document No. B8002209 Copy No. 1 Number of pages 44

Apparatus Three-phase automatic circuit vacuum recloser for overhead line distribution circuits having the following ratings: 38kV – 800A – 50/60Hz – 16kA x 3s

Designation Auto Recloser E Series

Serial Number PR317120257

Manufacturer Schneider Electric (Australia) Pty Ltd, Eagle Farm QLD, Australia

Client Schneider Electric (France) Technopole 37 quai Paul Louis Merlin 38050 Grenoble cedex 9, France

Tested for ----

Date(s) of tests January 31, February 1-2, 2018

Tested by CESI S.p.A. - Via Rubattino, 54 - 20134 Milano - Italy

Test performed Lightning impulse voltage tests (clause 6.2.6.2)
Power-frequency voltage tests (clause 6.2.6.1) – dry and wet

The apparatus, constructed in accordance with the description, drawings and photographs incorporated in this document has been subjected to the series of proving tests in accordance with:
IEC 62271-111:2012(E) & IEEE Std C37.60-2012(E)

The results are shown in the record of proving tests and the oscillograms attached hereto. The values obtained and the general performance are considered to comply with the above Standard(s). The ratings assigned by the Manufacturer are listed on the ratings page.
The document applies only to the apparatus tested. The responsibility for conformity of any apparatus having the same designations with that tested rests with the Manufacturer.

February 22, 2018

Del Giorgio Carlo
B8002209 2969 AUT

The Manager - Arcidiaco Lorenzo
B8002209 821814 APP

Date

Test Engineer in charge

Approved By Document Digitally Signed

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Notes

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CESI Group Test Documents description

Type Test Certificate of

Issued for type tests of high voltage products ($> 1 \text{ kV}_{ac}$; $> 1,5 \text{ kV}_{dc}$), which have successfully been carried out in full compliance with the relevant specifications or standards and STL Guides valid at the time of the test. The Type Test Certificate consists of documents unequivocally identifying the test object and describes all conditions under which the tests were conducted. It gives evidence of the unobjectionable behavior of the test object during the tests in line with the normative documents applied as well as of the results of successful testing.

Test Certificate of (complete / selected) Type Tests

Issued if type tests of low voltage products ($< 1 \text{ kV}_{ac}$; $< 1,5 \text{ kV}_{dc}$) requested by the relevant product standard were passed. For these tests the equipment under test must be clearly identified by technical description, drawings, and additional specifications.

Certificate of Design Verification

Issued for passed design verification tests according to IEC 61439. For these tests the equipment under test must be clearly identified by technical description, drawings, and additional specifications.

Type Test Report

Issued for high and low voltage products if parts of selected type tests have been passed; those shall be carried out in full compliance with the relevant standards but (for high voltage products) do not fulfill all STL requirements for issuing a Type Test Certificate. For these tests the equipment under test must be clearly identified by technical description, drawings, and additional specifications.

Test Report

Issued for all other tests on high and low voltage products which have been carried out according to specifications, standards and/or client instructions

On-Site Test Record

Issued as a record of results acquired during the on-site tests / measurements

Test Award

Can be additionally issued for all named types of test documents above if the tests to be referenced were passed

UJ2
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CH N
NEID
VIỆ
RINH

Tests witnessed by:

Mr Sushant Birje
Mr Srikishan Mohan

- Schneider Electric Bangalore (India)
- Schneider Electric Bangalore (India)

Identification of the object: effected

The Manufacturer guarantees that the tested object is manufactured according to the submitted drawings. CESI checked that these drawings adequately represent in shape and dimensions the essential details and the parts of the tested object.

These drawings, identified by CESI and numbered **B8003211 No.1 to 6**, have been returned to the Client.

Test evaluation

With reference to the Standards/Specifications listed in the first page and the characteristics of the tested sample assigned by manufacturer, the carried out tests passed SUCCESSFULLY.

Revision No.	Date	Reference
0	February 22, 2018	B8002209

The data necessary to permit repetition of the tests are contained in the document marked: -----

The reported expanded uncertainties are determined in accordance with the Publication JCGM 100 "Evaluation of measurement data - Guide to the expression of uncertainty in measurement" and are based on a standard uncertainty multiplied by a coverage factor $k = 2$, which for a normal distribution provides a level of confidence of approximately 95 %.

Peak voltage (impulse tests)	$\pm 3,0 \%$
Voltage a.c., d.c. (dielectric tests)	$\pm 3,0 \%$
Peak current (impulse tests)	$\pm 3,0 \%$
Time parameters (impulse tests)	$\pm 10 \%$
Time parameters (a.c., d.c. dielectric tests)	$\pm 3,5 \%$
Partial discharge measurement	up to 10 pC: $\pm 1,0 \text{ pC}$ above 10 pC: $\pm 10 \%$
Atmospheric conditions:	

Temperature; Pressure; Relative Humidity (30 % to 95 % RH) $\pm 2,0 \text{ }^{\circ}\text{C}$; $\pm 1,0 \text{ hPa}$; $\pm 5 \%$

Laboratory information

Receipt date of the sample	January 31, 2018
Test location	CESI – Via Rubattino 54 – Milan
CESI testing team	Mr L.Tiziani – Mr M. Folchini
Test laboratory	P180 (100 kJ)
ODV	70007713

[illegible]

Rated characteristics of the tested object assigned by the Client

Three-phase overhead vacuum automatic circuit recloser

Manufacturer	Schneider Electric (Australia) Pty Ltd, Eagle Farm QLD, Australia
Type	Auto Recloser E Series
Serial number	PR317120257
Rated maximum voltage (V or U_r)	38 kV
Rated insulation level:	
- Rated lightning impulse withstand voltage (U_p)	170 kV
- Rated short-duration power-frequency withstand voltage – 1 min dry	70 kV
- Rated short-duration power-frequency withstand voltage – 1 min wet	70 kV
Rated frequency (f_r)	50/60 Hz
Rated normal current (I_r)	800 A
Rated short-time withstand current (I_k)	16 kA
Rated peak withstand current (I_p)	41,6 kA
Rated duration of short-circuit (t_k)	3 s
Rated supply voltage of closing and opening devices and of auxiliary circuit (U_a)	DC 155-160 V
Rated symmetrical interrupting current (short-circuit breaking current) (I_{sc})	16 kA
Rated symmetrical making current (short-circuit making current)	41,6 kA
Rated operating sequence	O-0,5s-CO-2s-CO-2s-CO
Rated line charging interrupting current	5 A
Rated cable charging interrupting current	40 A
Operating type	opened by handle, opened and closed by controller
Gross weight	197 kg
Mechanical classification	10000 operations
Altitude	up to 1000 m
Normal service conditions	outdoor
Control apparatus type	ADVC3
Control apparatus serial number	800494
Supply	AC 230 V

Vacuum Interrupters:

Manufacturer	ABB
Type	VG10K
Serial numbers	(A) 055-66599; (B) 055-66628; (C) 055-66598
Opening gap dimension	14 ±1 mm
Maximum permissible wear	2,5 mm

Name and signature of Client's witness: Mr Sushant Birje