

EU RO Mutual Recognition Technical Requirements

CIRCUIT BREAKERS (WITHOUT ELECTRONIC DEVICES)	Version	0.6
	Adoption Date	1 July 2018
	Application Date	1 January 2019
	Tier	1
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1. PRODUCT DESCRIPTION

1.a General description of the product

Description of product according to IEC IEV 441-14-20:

Circuit breaker: A mechanical switching device, capable of making, carrying and breaking currents under normal circuit conditions and also making, carrying for a specified time and breaking currents under specified abnormal circuit conditions such as those of short circuit.

1.b Application limitations†

- Restricted to LV air circuit-breakers (ACBs) and moulded-case circuit-breaker (MCCBs) according to IEC 60947-2 where the rated voltage does not exceed 1000V a.c. (50/60 Hz) or 1500 V d.c. and without electronic devices;
- Onboard ships with exceptions as per SOLAS Ch. I, Reg. 3;
- Installation on board ships within locations with climatic, biological, chemically active, mechanically active and mechanical environmental conditions not exceeding those for which performance has been proved according to IEC 60721-3-6 (1987) + A2 (1997).

† The EU MR type approved product is generally not used as a stand-alone product, but integrated as component in a sub-system or system. When a product is presented with an EU RO MR Type Approval Certificate for given application, its acceptability with regards to conditions defined in 1b, 1c and 1d of this Technical

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Requirement will be evaluated by the EU RO in charge of classing the ship or being in charge of the unit/system certification.

1.c Intended use

- a) Power supply system characteristics as per IEC 60092-101, 2.8;
- b) For equipment tested according to their respective environmental categories I-IV (see 7. Background information/ References);
- c) Circuit breaker shall have their energy for the tripping operation stored prior to the completion of the closing operation;
- d) Circuit breakers are to be of the trip-free type and be fitted with anti-pumping control;
- e) Circuit breakers are to be equipped with independent manual closing as per IEC 60947-2 Sub-clause 7.2.1.

1.d System context

See 1.c.

2. DESIGN EVALUATION

2.a Engineering evaluation requirements

2.a i. Technical Requirements

- a) Type, ratings and characteristics of circuit breakers for intended applications to be evaluated;
- b) In general, IEC 60947 series applies.

2.a.ii. Technical documents to be submitted

Prior to tests:

- a) Proposed test program and test schedule;
- b) Description of the test specimens and explanation of the selected test sample(s) providing evidence that the selected sample meets the most rigorous and demanding requirements;

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- c) Product descriptions, manuals, data sheets, assembly drawings, dimension drawings etc. clearly identifying the product;
- d) Complete accreditation certificate of the Test laboratory (prior the first test only; changes in the scope of accreditation must be informed);
- e) Details of production sites;
- f) Product specification;
- g) Application, working area;
- h) Instructions on fitting, assembly and operation;
- i) QM-certificate according to ISO 9001.

After completion of tests:

- j) The test report with an identification number must contain all relevant data and test results including place and date of the tests, the names of the responsible personnel carrying out the test;
- k) Type references and serial numbers of the products tested;
- l) Test reports and test records must be signed by the personnel members in charge of the test and are to be confirmed by the EU RO. by signing and marking the test report.

2.b Type testing requirements

- a) In general, the type test plan is to be agreed between the Manufacturer and the RO based on the characteristics of the product subject to testing;
- b) The type tests are intended to demonstrate the performance of the prototype according to the requirements of the applicable International Standards and the relevant Manufacturer's specification;
- c) The ability of the product to function as intended under the testing conditions specified in the latest revision of IACS UR E10 shall also be verified. Testing procedures according to the International Standards mentioned in this TR may be accepted by the RO, in lieu of those indicated in the IACS UR E10, provided that the test severity conditions set by the IACS UR E10 are fulfilled as a minimum;

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- d) Performance type tests according to the Manufacturer's specification and the applicable International Standards shall be carried out;
- e) Environmental tests should be carried out in accordance with last revision of IACS UR E10 (applicable items) or in accordance with IEC 60947-2 and IEC 60947-1 Annex Q - Category D, with the severity conditions set by the IACS UR E10 as a minimum, notably for the resulting recovery times;
- f) IEC 60947-2 Annex H, Test sequence for circuit-breakers for IT systems;
- g) All tests to be performed on agreed test samples. Test specimens shall be selected from production line or at random from stocks†;
- h) Tests shall be carried out in the presence of the EU RO Surveyor. In cases where the tests are conducted at Nationally Accredited Laboratories, the presence of the EU RO surveyor may be omitted†.

† For further clarification of witnessing of tests and sampling the test specimen(s), refer to paragraphs 6, 7 and 8 of the EU RO "Design Evaluation Scheme" procedure (Appendix V of EU RO Framework Document for the Mutual Recognition of Type Approval found on <https://www.euomr.org/technical-requirements>).

3. PRODUCTION REQUIREMENTS

3.a. General Requirements

Refer to EU RO "Product Quality Assurance (PQA)" procedure (Appendix VI of EU RO Framework Document for the Mutual Recognition of Type Approval).

3.b. Special Requirements

- a) Routine test according to IEC 60947-2 sub-clause 8.4;
- b) Production certification according to ISO 9001 by accredited certification bodies;
- c) QM/QS audit (annual) shall submitted to the EU RO. for review;
- d) Production of the equipment is limited to those facility listed on the EU RO. certificate;
- e) Changes to the product will void the EU RO MR TAC;

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- f) The EU RO shall be granted access to all manufacturing and testing facilities, and to be provided with all the information necessary to performance its duties;
- g) General terms and conditions of the EU RO shall be observed.

4. MARKING REQUIREMENTS

Marking as required by IEC 60947-2 (sub-clause 5.2).

5. TYPE APPROVAL CERTIFICATE CONTENT

The EU RO MR Type Approval Certificate shall contain the minimum information as defined in the EU RO Framework Document for the Mutual Recognition of Type Approval - see Appendix I EU RO MR Type Approval Certificate Information.

The following information is specifically applicable to products relevant to this technical requirement and shall be included on the relevant EU RO MR Type Approval Certificate:

- a) Technical data according to IEC marking;
- b) Reference to approved technical documents;
- c) Application and limitations.

6. APPROVAL DATE AND REVISION NUMBER

Date	Revision	Comment
8 July 2012	0.0	Accepted by Advisory Board
19 Sept 2012	0.1	Errors corrected
31 January 2014	0.2	CRF001 incorporated improvements proposed by industry. Added reference to EU RO Framework Document for the Mutual Recognition of Type Approval).
31 January 2015	0.3	CRF017 – Amendments to 2.b Type testing requirements CRF018 – Revision to par. 2.a.ii - Technical documents to be submitted in English; CRF020 – Revision to par. 5 - 'Type Approval Certificate Content'
1 April 2016	0.4	CRF025 – Updated to new MR TR document format incl. par. 8;

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		CRF026/026a – Witness testing & control of test specimen; CRF028 – addition of 6 month application clause.
1 October 2016	0.5	CRF034 – Test witnessing requirements aligned with TR Circuit Breakers (with electronic devices)
1 July 2018	0.6	Revision of par. 2.b – Type testing requirements (Alignment of Electrical TRs) Corrected reference to standard IEC 60721-3-6 (1987) + A2 (1997)

7. BACKGROUND INFORMATION / REFERENCES

- a) IEC 60092-101; 2.8;
- b) IEC 60721-3-6 (1987) + A2 (1997);
- c) IEC 60947;
- d) IEC IEV 441-14-20;
- e) ISO 17025;
- f) ISO 9001;
- g) SOLAS Ch. 1, Reg. 3;
- h) EU RO Framework Document for the Mutual Recognition of Type Approval);
- i) Environmental Categories (**Table 1**).

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Table 1 - Environmental Categories

Environmental Category	Environmental Conditions						Test Conditions					
	Closed Area			Open Deck Area			Temperature		Climate			Vibrations
	Temperature	Relative Humidity	Vibrations	Temperature	Relative Humidity	Vibrations	Dry Heat	Cold	Temperature	Relative Humidity	Salt mist	
I	0 °C to 45 °C	up to 100 %	0,7 g				55 °C	5 °C	55 °C	95 %	–	0,7 g
II	0 °C to 45 °C	up to 100 %	4 g				55 °C	5 °C	55 °C	95 %	–	4 g
III	0 °C to 55 °C	up to 100 %	0,7 g				70 °C	5 °C	55 °C	95 %	–	0,7 g
IV	0 °C to 55 °C	up to 100 %	4 g				70 °C	5 °C	55 °C	95 %	–	4 g

8. MAINTENANCE / CLARIFICATION OF TECHNICAL REQUIREMENTS

Anyone wishing to propose changes to this document or request clarification of technical issues should contact the EU RO MR Group Secretariat in the first instance: Secretariat@euomr.org.

Review and approval of change requests shall follow the EU RO MR Maintenance Process detailed in the EU RO Framework Document for the Mutual Recognition of Type Approval: <https://www.euomr.org/technical-requirements>.

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