

EU RO Mutual Recognition Technical Requirements

CIRCUIT BREAKERS WITH ELECTRONIC DEVICES	Version	0.1
	Adoption Date	1 April 2016
	Application Date	1 October 2016
	Tier	4
<p>This document is subject to controlled issue and can be found here: http://www.euromr.org/technical-requirements *** Uncontrolled if downloaded or printed ***</p>		

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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 and carrying currents for a specified time under specified abnormal circuit conditions, and breaking currents under specified abnormal circuit conditions such as those of short circuit.

1.b Application limitations

- a) 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.;
- b) On board ships with exceptions as per SOLAS Ch. I, Reg. 3;
- c) 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 (1993) + A2 (1997);
- d) Electronic or computerised protection devices for generators and consumers shall be designed in such way that the function of the protection equipment can be tested on board and that settings and adjustments are identifiable.

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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 shall be of the trip-free type and be fitted with anti-pumping control;
- e) Circuit breakers shall be equipped with independent manual closing as per IEC 60947-2 Sub-clause 7.2.1.;
- f) Circuit breaker with integrated protection functions shall be type tested according to relevant parts of IEC 60255 and IEC 60068, as applicable;
- g) Circuit breakers shall be equipped with independent manual opening and closing circuits.

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 shall be evaluated;
- b) In general, the IEC 60947 series and IEC 60255 series apply;
- c) Dependency of external control power shall be evaluated.

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2.a.ii. Technical documents to be submitted

IMPORTANT: The English Language shall be used for all submitted documents.

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;
- 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 shall also be advised);
- 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 shall 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 shall 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) Tests may be performed by accredited test laboratories;
- b) The test laboratory shall be accredited according to ISO 17025 for relevant IEC standards (incl. IEC 60947-2 sub-clause 8.2 and 8.3) by either a National Accreditation Body under the MLA regime of ILAC or one of the certification bodies under the LOVAG or IECEE Mutual Recognition Agreement. This applies to the Type Tests (including EMC) in compliance with the product standards;

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- c) Test laboratory shall be authorized to conduct type tests in accordance with the relevant IEC standards;
- d) Special tests in accordance with IEC 60947-2 sub-clause 8.5 and IEC 60947-1 Annex Q Special tests – Damp heat, salt mist, vibration and shock; Category D;
- e) All tests shall be performed on the agreed test samples. Test specimens shall be selected from production line or at random from stocks†;
- f) 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†;
- g) IEC 60947-2 Annex H, Test sequence for circuit-breakers for IT systems;
- h) IEC 60947-2 Annex J, Electromagnetic compatibility (EMC) –Requirements and test methods for circuit-breakers (modified according to IMO Resolution A.813(19):1995, IEC 60533, IEC 60945;
- i) IEC 60947-2 Annex N, Electromagnetic compatibility (EMC) – Additional requirements and test methods for devices not covered by Annexes B, F and M.

† 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

<http://www.euomr.org/Guidance%20for%20Mutual%20Recognition>)

3. PRODUCTION REQUIREMENTS

- a) Refer to EU RO "Product Quality Assurance (PQA)" procedure (Appendix VI of EU RO Framework Document for the Mutual Recognition of Type Approval); 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 be submitted to EU RO for review;
- d) Production of the equipment is limited to those facilities listed on the EU RO certificate;

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- e) Changes to the product, or its embedded software (firmware), if software changes of relevance, will void the EU RO certification. The EU RO shall be kept informed of all new version numbers including a description of change;
- f) The EU RO shall be granted access to all manufacturing and testing facilities, and to be provided with all the information necessary to perform 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 EU RO MR Type Approval Certificate:

- a) Technical data according to IEC marking;
- b) Software version, if applicable;
- c) Reference to approved technical documents;
- d) Application and limitations.

6. APPROVAL DATE AND REVISION NUMBER

Date	Revision	Comment
2015-01-31	0.0	Accepted by EU RO MR Advisory Board
1 April 2016	0.1	CRF025 – Updated to new MR TR document format incl. par. 8; CRF026/026a – Witness testing & control of test specimen; CRF028 – addition of 6 month application clause.

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7. BACKGROUND INFORMATION / REFERENCES

- a) EU RO Framework Document for the Mutual Recognition of Type Approval;
- b) IEC IEV 441-14-20;
- c) IEC 60947;
- d) SOLAS Ch. I, Reg. 3;
- e) IEC 60721-3-6 (1993) + A2 (1997);
- f) IEC 60092;
- g) IEC 60255;
- h) ISO 9001;
- i) ISO 17025;
- j) Environment category (**Table 1** below).

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: <http://www.euomr.org/Guidance%20for%20Mutual%20Recognition>.

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TABLE 1 - ENVIRONMENTAL CATEGORY

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%	0,7g				55°C	5°C	55°C	95%	-	0,7g
II	0°C to 45°C	up to 100%	4g				55°C	5°C	55°C	95%	-	4g
III	0°C to 55°C	up to 100%	0,7g				70°C	5°C	55°C	95%	-	0,7g
IV	0°C to 55°C	up to 100%	4g				70°C	5°C	55°C	95%	-	4g
EMC 1	IEC 60533 6.2.1											
EMC2	IEC 60533 6.2.2											

*) Ref. IEC 60947-1. Annex 'Q', Cat F

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