

Procedure for the Control
of LOVAG Test Instructions and Report Forms
for Testing, Comparison and Assessment


CONTENT

Page

Procedure for the Control of LOVAG Test Instructions and LOVAG Report Forms	2
Preparation of new LOVAG Test Instructions and Report Forms	3
Maintenance of LOVAG Instructions and Report Forms	3
Issue of Documents	4
Control of revised Editions	5
Identification of Published Documents	5
Identification of Draft Documents and Comments Papers	6
Overview and Classification of LOVAG Documents (Appendix 1)	7
Formatting Guidelines for LOVAG Instructions and LOVAG Report Forms (Appendix 2)	8
Format of LOVAG Test Instructions (Appendix 3)	9
Example of LOVAG Test Instruction	10
Format of Test Report Forms and Signature of Test Reports (Appendix 4)	11
Format of Assessment and Comparison Report Forms and Signature of Reports (Appendix 5)	14
Example of LOVAG Test Report Forms (Appendix 6)	15
Example of LOVAG Assessment Report Forms (Appendix 7)	24
Example of LOVAG Comparison Report Forms (Appendix 8)	26

Remark:

Changes in comparison to LOVAG OD 01-01, Editions 1.4 are given in blue colour and highlighted by a blue line at the left side.

<p>LOVAG OD 01-01</p> <p>Edition 1.5</p>	<p>Approved by LOVAG Management Committee</p> <p>in December 2015</p> <p>Signed: </p>
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Procedure for the Control of LOVAG Test Instructions and LOVAG Report Forms

Objective

The purpose of this procedure is to ensure the identification, review, creation, authorization; control and issue of all LOVAG Instructions and Report Forms.

An overview and classification of all LOVAG Documents is given in Appendix 1

<u>Document Types</u>	<u>Review</u>	<u>Approval</u>	<u>Authorisation</u>
LOVAG Test Instructions	LTC	LTC	Chairman of LTC
LOVAG Test Report Forms	LTC	LTC	Chairman of LTC
LOVAG Comparison Report Forms	LTC	LTC	Chairman of LTC
LOVAG Assessment Report Forms	LTC	LTC	Chairman of LTC
LOVAG General Instructions	LMC	LMC	Chairman of LMC
LOVAG Operational Documents	LMC	LMC	Chairman of LMC
LOVAG Rules	LMC	LMC	Chairman of LMC
LOVAG Licence Agreement	LMC	LMC	All Signatories of LOVAG Agreement
LOVAG Agreement	LMC	LMC	All Signatories of LOVAG Agreement

LTC = LOVAG Technical Committee

LMC = LOVAG Management Committee

LOVAG Test Instructions shall hereinafter be referred to as LTIs.

LOVAG Test Report Forms, Comparison Report Forms and Assessment Report Forms shall hereinafter be referred to as TRFs, CRFs and ARFs, respectively.

Responsibility

Approval/Authorisation - As above.

Control/Issue - Administration.

Terms and Definitions

Author and Co-author –The LTC shall appoint a nominated representative, as ‘Author’ responsible for the preparation of new and revised documents. The LTC shall appoint a second representative as ‘Co-Author. Wherever possible the Author shall assume responsibility for producing both the LTI and TRF. The Co-Author has to check and to comment to a draft LOVAG Test Instruction or LOVAG Report Form within an appropriate time and his approval is necessary before the issue of LOVAG Instructions or Report Forms

Secretariat - the signatory responsible for providing a secretary to the LOVAG Committees (LTC and LMC).

Preparation of New LTIs and TRFs

1. The author of any new document will prepare the document in accordance with the guidelines detailed in Appendices 2, 3 and 4 as appropriate.
2. LOVAG Instructions shall be produced in accordance with the guidelines and examples shown in Appendix 3.
3. If the LOVAG Instructions given in the LTIs, are different from the CTL Decisions of the IECEE CB Scheme and/or from the OSM-decisions of CENELEC a note should be given about that difference.
4. Report Forms shall be produced in accordance with the guidelines and examples shown in Appendix 4.
5. The authors shall circulate the draft document to the LTC for review, discussion and comment.
6. The LTC shall review the document and agree any amendments as appropriate.
7. The authors will amend the document in accordance with any comments made and re-circulate the document in accordance with steps 4 and 5.
8. Once the approval of the LTC has been granted the author shall submit the final document (electronic version in actual PDF- and WORD format) to the Secretary of the LTC who shall ensure that the document is duly authorized.

Maintenance of LOVAG Test Instructions and Report Forms

1. The authors of the original document shall be responsible for ensuring that the document is maintained up to date in accordance with new editions, amendments and corrigenda to the relevant standard.
2. The authors and Secretariat shall continuously monitor and review the status of published standards listed within the scope of LOVAG.
3. When a change to a published standard is identified:
 - a) the authors shall review the change and prepare a new edition of the document and
 - b) the Secretariat shall notify the authors of the change, to review the change and prepare a new edition of the document.
4. Any change to the existing document resulting from a new edition or an amendment or corrigendum to the published standard shall be prepared within 6 months of the change to the standard and shall be circulated to the LTC for comments within 2 months, to the author. If no adverse comments are received and the co-author has given his approval, the author will forward the change to the Secretariat for signature and issue. If any adverse comments are received, the author shall circulate the change and comments to the Secretariat for discussion at the next meeting of the LTC. The issue by the Secretariat shall be done within 1 month after receiving the final documents from the author.
5. All documents covered by this procedure shall remain in force until such time as the published standard is withdrawn, where a date of withdrawal is specified by the issuing authority, or, until a

LOVAG Operational Document OD 01-01, Ed. 1.5

date specified by the LTC following the issue of a superseding standard, which shall not be less than 12 months after the date that superseding standard comes into force. Superseding documents shall indicate the date of withdrawal of the document to be superseded.

6. Any editorial changes to the documents shall be advised to the Secretariat, with a revised document indicated by the Edition No. followed by a, b, c etc. and immediately issued.
7. The authors of the original document shall be responsible for ensuring that, at least once every two years, document is maintained up to date taking into account all the editorial mistakes or improvements suggested by the certification bodies and/or laboratories. The new issue of the document shall be circulated to the LTC for comment within 1 month, to the author. If no adverse comments are received and the co-author has given his approval, the author will forward the change to the Secretariat for signature and issue. If any adverse comments are received the author shall circulate the change and comments to the Secretariat for discussion at the next meeting of the LTC.
8. The authors of the original document shall be responsible for ensuring that all detected technical mistakes are quickly deleted from the document. The author shall prepare and circulate the corrected document to the LTC members and, if within one month no adverse comments are received, and the co-author has given his approval the author will forward the document to the Secretariat for signature and issue.

Issue of Documents

1. The issue of the document is made by the LOVAG Secretariat by placing it on the LOVAG Website in PDF-format to be downloaded by each signatory. The Comment shall be made that only the PDF version published on the website is the valid master copy.
2. The decision for signature and issue of a LOVAG Document (LOVAG Test Instructions or Report Forms) has to be made by the LTC. If the approval of a co-author is available this decision can be made even beside the meetings (e.g. by agreement by e-mail); but in cases where no co-author is nominated the approval has to be given by an official meeting of LTC.
3. A controlled list of all documents shall be maintained by the Secretariat. This list shall include the following details:
 - a) Document reference.
 - b) Title of document.
 - c) Edition No
 - d) Date of issue.
 - e) Issue status of the standard including corrigenda/amendments and dates.
 - f) Authors.
 - g) Review date.
4. The LOVAG Secretariat shall maintain a list (Document Issue List, DIL) for control and documentation of issued documents.
5. Master copies of all documents will be maintained by and located in the Secretariat. The master copies shall be saved on a separate electronic storage device.

Control of revised Editions

1. The procedures above shall be used for the control of changes to issued documents.
2. Changes shall be in the form of a new edition of the document with the new edition number for all pages. The changes shall be approved and authorised by the LTC.
3. The nature of the change will be recorded in the DIL.
4. New editions of documents may not require the previous edition to be rendered obsolete as, in some cases, standards remain in force for a moratorium period after the new edition comes into force.

Identification of Published Documents

All documents will be identified by reference to the published standard to which they refer, by utilising the numbers of the standard, as follows:

LTI, indicating LOVAG Test Instruction,

And TRF, ARF or CRF indicating Test Report Form, Assessment Report Form or Comparison Report Form

followed by

IEC #####-##-# indicating Standard, number, part and sub-part of standard

For example:

- a) The reference for the LTI to IEC 60947-2 would be LTI IEC 60947-2 and the Test Report Form would be referenced TRF IEC 60947-2.
- b) The reference for the LTI to EN 60439-1 would be LTI EN 60439-1 and the Test Report Form would be referenced TRF EN 60439-1.
- c) The reference for the LTI to IEC 60947-3 and EN 60947-3 would be LTI IEC/EN 60947-3 and the TRF would be referenced: TRF IEC/EN 60947-3.

The edition of a LTI, TRF, ARF or CRF shall be marked in accordance to the consolidated IEC.

For example:

“LTI IEC 60947-2 **Edition 2.1**” according to the IEC 60947-2 Edition 2 consolidated with amendment 1.

If the LTI and TRF are based on an EN only, which has no edition number but only the year of issue, then take this year as the Edition number:

For example:

LTI EN 50298 **Edition 1998** according to the EN 50298 (1998)

Changes to the LOVAG-document not caused by the referred standard or for special purpose shall be marked by an additional letter.

For example:

“TRF IEC 60947-2 Edition 2.1a” added by several items required by meanwhile experience.

For not to cause a new marking of the existing documents the new marking system is obvious by the word order changing from “TRF IEC 60947-2 **4th Edition**” to “TRF IEC 60947-2 **Edition 2.1a**”.

Using this system of marking the user of a LOVAG document can recognise the connection to the relevant standard without additional information.

Identification of Draft Documents and Comments Papers

1. All such documents shall be identified by a unique reference indicating the author, committee reference and paper number. The author of the paper shall assign this reference to the document and the document shall have an issue date and, if appropriate, an issue status.
2. The author shall maintain a controlled list of documents circulated including the details specified in 1 above and the title of the document.
3. The Secretariat of the LTC shall maintain a controlled list of all documents circulated and shall register new documents on the list, upon receipt.

An example of a paper reference is given below for

Papers submitted by members of the LTC.

Country code: ES = Spain, FR = France, IT = Italy (from ACAE), ITA=Italy (from IMQ),
DE = Germany, SE = Sweden, BE = Belgium

followed by,

CT = Technical Committee followed by,
(LOVAG) followed by,

Year (last two digits) e.g. 12. and document number (three digits)

e.g. 134

The complete reference may be therefore FR/CT(LOVAG)12.134. This would apply to all types of documents e.g. draft instructions/test report forms or comment documents

Overview and Classification of LOVAG Documents

APPENDIX 1

LOVAG Agreement including LOVAG M1(Agreement), M2(Assessment and Recognition of Signatories), M3(Insurance) , M4(Supervised Testing), M5(Objectives, Principles of Operation and Membership Requirements)	LOVAG Licence Agreement between ASEFA and LOVAG signatories
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LOVAG Rules (Management Committee, Technical Committee, LOVAG reg. Laboratories, Sub contracting)

LOVAG General Instructions	LOVAG G1 Certificates and Test Reports	LOVAG G2 Measurement Uncertainty	LOVAG G3 LOVAG Mark Certification Rules (for products in Full Compliance with applicable standards)				LOVAG G4 LOVAG Certification Scheme	
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LOVAG Operational Documents	LOVAG OD 01-01 LOVAG Procedure for the Control of Instructions and Report Forms		LOVAG OD 03-01 LOVAG Mark Senior Supervisor (LOVAG MSS)	LOVAG OD 03-02 Surveillance tests for mass products bearing LOVAG Mark	LOVAG OD 03-03 Classification of License holder for Surveillance periods	LOVAG OD 03-04 LOVAG's Procedure for WMT Testing	LOVAG OD 03-06 Requirements for granting the LOVAG Mark, based on test reports issued by an European Test Lab. Recogn. LOVAG CB	LOVAG OD 00-05 Peers Assessment of Certification Bodies (Checklists)	
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LOVAG Test Instructions	LTI, Documents for the applicable Standards (e.g. LTI IEC/EN 60947-2 Edition 4.0)
LOVAG Report Forms	TRF, ARF or CRF Documents for the applicable Standards (e.g. TRF IEC/EN 60947-2 Edition 4.0a)

System of numbering: LOVAG OD 03-01 means, that that the OD belongs to LOVAG G3

Formatting Guidelines for LOVAG Test Instructions and LOVAG Test Report Forms

To gain a unique appearance the following format recommendations shall be kept:

File format: MS Word (6.0 or higher)

Font:

Main Heading :	Arial 14 pt bolt (Title of a test sequence)
Sub-heading:	ARIAL 10 PT BOLD (TITLE OF A TEST)
Sub-sub-heading:	Arial 10 pt bold (Title of a sub clause of a test)
Normal text:	Arial 10 pt Standard (Requirements)
Footer:	Arial 8 pt Standard (Footer)

Line spacing: exact: 14 pt

The line spacing shall be strictly kept, to avoid different Word-wraps when different printers are used; only in cases where graphics are inserted the line spacing has to be changed to the setting single line.

Paper size: A4 (210 x 297 mm)

Margins: Top: 2 cm, Bottom: 2 cm, Left: 3 cm, Right: 1 cm

LOVAG Logo: The LOVAG logo (6.0 cm length) shall be given on the top left side of the first page of the LOVAG Test Instructions, the auditing survey and the front page (form 1) of the LOVAG Test Report Forms. All following pages (Form 2 and higher) shall bear a small LOVAG logo (2.4 cm length) on the top left side. Example for both sizes are given below:



FORMAT OF TEST INSTRUCTIONS

Front Sheet

An example of a standard front sheet for a Test Instruction is given on the next page.
This shall contain:

- a) the number of the test instruction
- b) a title
- c) the standards to which it refers
- d) the name and title of the person authorising the document and the date of signature
(= date of issue = valid from)
- e) number of edition
- f) document date
- g) the author
- h) page number and total number of pages

Item a) shall be in the header of the document and items e) to h) shall be in the footer.

Page 2

The first paragraph of Page 2 shall be the standard PREAMBLE as follows:

“For convenience in the use of this test instruction, the paragraphs are numbered according to the clauses in the referred standard (IEC and/or EN as indicated)

Tests must be carried out according to the standard; the test instruction only adds a few specific details.”

This shall then be followed by clause number, title and the additional information on the clause but only where required. It is not necessary to repeat the text of the clause in the standard unless it is required to clarify the requirements.

Formatting guidelines are shown in Appendix 2



LTI IEC/EN 60947-2 Ed.4.2

LOVAG

TEST INSTRUCTION IEC/EN 60947-2 Ed. 4.2

CONDITIONS FOR TESTING LOW VOLTAGE SWITCHGEAR AND CONTROLGEAR

PART 2. SWITCHGEAR AND CONTROLGEAR

This test instruction is based on the following standards:

General Rules:

IEC 60947-1 Edition 4.0 (2007)

EN 60947-1: (2008)

Specific Requirements:

IEC 60947-2 Edition 4.2 (2013)

EN 60947-2: (2006) +A1(2009) +A2(2013)

S. MANGANARO

A handwritten signature in blue ink, appearing to read 'S. Manganaro', enclosed in a white rectangular box.

Chairman of LOVAG Technical Committee

Valid from: 01/06/2014

Edition 4.2
December 2013
Page 10 of 13

FORMAT of TEST REPORT FORMS and SIGNATURE of TEST REPORTS

Examples of the first few pages of a **Test Report Form** are shown on the following pages and must be provided with each complete Test Report (except the auditing survey).

- a) Auditing Survey – indicates the **date** of making of the Test Report Form (TRF), the **test Object**, the **test specification** with its issue date and (for IEC) its edition number, the **content** of the TRF (only numbers of the page forms for Front sheet and overview pages for each sequence), the total number of page forms, the date of issue of the **TRF (valid from)**, the **signature of the Chairman of the Technical Committee**, the **Author** of the TRF, and shall be updated each time a new edition of the TRF is issued.
- b) Test Report Form **front sheet** (form 1) – identifies the report number, testing laboratory (LOVAG code, name and complete address), client, manufacturer, test object, dates of tests, standards, contents of the report, etc.
Additionally the following statement has to be given on the front sheet: “All the measurement uncertainties are within the limits of LOVAG General Instruction G2 – Measurement Uncertainties”.

At the bottom, there shall be the “Note: The test result relates only to the items tested. The test report shall not be reproduced except in full without the written approval of the test laboratory”.

In the completed test report, this **front page** has to be signed

- 1) By the authorized representative of the LOVAG Certification Body (LOVAG Observer or LOVAG Technical Witness (LTW)). The name, function and signature have to be given.
 - 2) By the authorized representative of the laboratory (person from the laboratory being responsible for the correctness of the test report and being authorised by the accreditation body in the accreditation certificate or authorised by the certification body, which is responsible for the qualification of the laboratory according to ISO/IEC 17025). The name, position and signature have to be given.
- c) Because not each page of the test report has to be signed, with the **second page** of each test report (form 2) a **listing** has to be given, where the names and signatures of the persons (assigned to the related sequences, pages of the test report) are listed, who have performed the testing, respectively filled in the TRFs.
- This listing **shall be signed** by the observer (name, position, company, address and date and signature). By giving the position, company and address of the observer, it became obvious whether testing has been performed under LOVAG Supervised Testing (SMT) or LOVAG Witnessed Manufacturer’s Testing (WMT).
- d) On the **third page** (form 3) of each test report a list of samples under test should be given. (As far as this page form is not available in the TRFs, the blank page should be used).

An example is given below:

THE SAMPLES UNDER TEST							
SAMPLE		Sequence or subclause	Ratings			Page No.	Comments
N°	Identification no.		U_e (V)	I...* (A)	Specific ratings		
1							
2							
3							

*) Give the index according to the Standard (e.g. For IEC 60947-2: I_{th} or I_n; for IEC 61439-2: I_{nA} or I_{inc} etc, etc.)

- e) On the **fourth page form** (form 4) a description and characterisation of the test object – provides all the details of the product tested supported by supplementary sheets/drawings where required should follow.
- f) All Test Report Forms shall follow the format given as an example in the following pages. Formatting guidelines are shown in Appendix 2.
- g) The TRF page forms, which have not been used, are to be excluded from the test report.
- h) The progressive numbering of the test report page forms is to be considered as an identification code only since some pages may be omitted. As a consequence, the test report pages shall have their own progressive numbering, which has to be used for any internal reference. The identification code of the page form shall never be used for references.
- i) In order to keep the handling of the test report more flexible a reference in the test report to an additional page (e.g. to an oszillogram) should be made to a numbered annex instead to a page number.
- j) The front pages of all test sequences, giving the Sub-clause, Test and page form shall additionally give the number of the first page of the relevant test.
(see example below)

Sub-clause	Test	Page-form	Test Report Page no.

- k) In many cases, the results have to be given by “yes” or “no”. To make it quite clear there shall be in the previous column the request to give a “yes” or “no”, and then there shall be a “yes” or “no” in the column for the result:
Example:

	Passed	(yes or no)	<i>yes</i>
--	--------	-------------	------------

- l) In cases where a test diagram has to be included in the TRF (e.g. according to Figs. 3 to 6 of IEC 609474-1) the **actual** test diagram has to be used, not the copy of the figure from the standard.

Example for the second page including the signatures:

<u>SIGNATURES OF THE COMPETENT PERSON</u>				
<u>WHO PERFORMED THE TESTS</u>				
Listing of test sequence or subclause (*)	Test item description	Signature of the competent person who performed the tests		
		Name	Date	Signature
Sequence I		G. Lloyd	}	
Sequence II				
8.3.5.1	Verification of overload releases	G. Lloyd	2007-01-12	<i>G. Lloyd</i>
8.3.4.1	Rated service short-circuit breaking capacity	G. Lloyd	}	
8.3.4.2	Verification of operational capability	G. Lloyd		
8.3.4.3	Verification of dielectric withstand	G. Lloyd		
8.3.4.4	Verification of temperature rise	J. Lennon	2007-01-14	<i>J. Lennon</i>
8.3.4.5	Verification of overload releases	G. Lloyd	2007-01-18	<i>G. Lloyd</i>
	Calibration of test circuit	G. Lloyd	2007-01-18	<i>G. Lloyd</i>
	Test and measuring devices	G. Lloyd	2007-01-18	<i>G. Lloyd</i>

(*) See page form 3 for sample/s under testing identification and report page

<u>Responsible Observer</u>			
Name:	John Mc Arthur		
Position:	Director Test Laboratory	2009-01-24	<i>J. Mc Arthur</i>
Organisation:	Manufacturer-Company Ltd.	-----	-----
Address:	Street, 12345 City, COUNTRY	Date	Signature

FORMAT of ASSESSMENT- and COMPARISON REPORT FORMS and SIGNATURE of REPORTS

Examples of the first two pages of a **Assessment Report Forms** and **Comparison Report Forms** are shown in Appendix 6 and Appendix 7.

- a) The front page gives an Auditing Survey – indicates the date of making of the Assessment Report Form (ARF) or the Comparison Report Form (CRF), the test Object, the test specification with its issue date and (for IEC) its edition number, the content of the ARF or CRF (only numbers of the page forms for Front sheet and overview pages for each sequence), the total number of page forms, the date of issue of the Report Forms (valid from), the signature of the Chairman of the Technical Committee, the Author of the Report Form, and shall be updated each time a new edition of the Report Form is issued.
- b) The Assessment and Comparison Report Form front sheet (form 1) – identifies the report number, original manufacturer (name and complete address), apparatus, type designation, standard, verification results, content of report and date of issue.

In the completed assessment or comparison report, this **front page** has to be signed

- 1) By the responsible client of the assessment or comparison proposal. The name, function and signature have to be given.
 - 2) By the authorized representative of the LOVAG Certification Body, confirming the correctness and accuracy of the verification report. The name, position and signature have to be given.
 - 3) Each page of the LOVAG CRF and ARF has to be signed by the assessor performing the verification by assessment or comparison.
- c) At the bottom of the first page (form 1) there shall be the “Note: The verification result relates only to the items verified. The Assessment report (or Comparison report, respectively) shall not be reproduced except in full without the written approval of the Assessor”.
 - d) All Report Forms shall follow the format given as an example in the following pages. Formatting guidelines are shown in Appendix 2.
 - e) The progressive numbering of the test report page forms is to be considered as an identification code only since some pages may be omitted. As a consequence, the test report pages shall have their own progressive numbering, which has to be used for any internal reference. The identification code of the page form shall never be used for references.
 - f) In order to keep the handling of the test report more flexible a reference in the test report to an additional page (e.g. to an oscillogram) should be made to a numbered annex instead to a page number.



Test report form: IEC/EN 60947-2 Edition 4.2b


Document Date: 2014/10/07

Test object: Circuit-breakers

Test specification: IEC 60947-2:2013-01 – EN 60947-2:(2006-08)+A1(2009-07)+A2(2013-01)

Content:	Description	form
	Front Sheet	1
	Signatures of the competent persons	2
	The samples under test	3
	Overall schema of test sequences	4
	Description of test object	5-16
	Type test Test sequence I	17-44
	Test sequence II	45-51
	Test sequence III	52-56
	Test sequence IV	57-62
	Test sequence V	63-69
	Test sequence VI (combined)	70
Annex A	Discrimination	71-72
	Back-up protection	73
Annex B	Test sequence I for CBRs	76-77
	Test sequence II for CBRs	78-79
	Test sequence III for CBRs	80-81
	Test sequence IV for CBRs	82
	Test sequence V for CBRs	83
	Combined test sequence for CBRs	84
	Test sequence B.I	85-102
	Test sequence B.II	103-106
	Test sequence B.III	107-108
	Test sequence B.IV	109-119
Annex C	Individual pole short-circuit test sequence	120-121
Annex F	Immunity tests	123-138
	Emission tests	139-140
	Suitability for multiple frequencies	141-143
	Dry heat test	144-146
	Damp heat test	147-149
	Temperature variation cycles	150-151
Annex H	Test sequence for IT-systems	152-153
Annex M	Test sequence MI	154-182
	Test sequence MII	183-190
	Test sequence MIII	191
	Test sequence MIV	192
Annex N	Immunity test on auxiliaries	193-201
Annex O	Rated service short-circuit breaking capacity	202
	Rated ultimate short-circuit breaking capacity	203
	Constructional requirements	205-221
	Calibration of the test circuit	222
	Figures	223-276
	Additional page	277

Number of page forms : 277

LOVAG Test report Form sheet	Valid from:	2014-10-30	TRF IEC/EN 60947-2 Ed. 4.2b 2014-10-07 Author: ACAE
	Chairman of Technical Committee Saverio MANGANARO		



Test report N°

Test laboratory :

:

Applicant :

:

Manufacturer :

:

Test object :

Type designation :

Date(s) of test(s) :

Standard for test : IEC 60947-2: Ed. 4.2 (2013-01)
: EN 60947-2: (2006-08) + A1 (2009-07) + A2 (2013-01)

Test sequence(s) :

:

Test results: :

:

This Test Report consists of:
.... pages LOVAG test report forms and
.... other pages
Date of issue:

All the measurement uncertainties are
within the limits of LOVAG General
Instruction G2 – Measurement Uncertainties

**Authorized Representative of
LOVAG Certification Body**

Responsible of the Laboratory

Name:

Name:

Function:

Function:

Signature:

Signature:

Note: The test result relates only to the items tested.
The test report shall not be reproduced except in full
without the written approval of the test laboratory

TRF IEC/EN 60947-2
Ed. 4.2b form 1



OVERALL SCHEMA OF TEST SEQUENCES

Overall schema of test sequences are carried out on : 4 pole variant (table 9)
 (Clause 8.3.1) : 3 pole variant (table 9)
 : 2 pole variant (table 9)
 : 1 pole variant (table 9)
 : DC variant (table 9)

If the tests included in this report are carried out as an alternative test program, these are referred at:

Alternative test programme 1 carried out on : 4-2-1 pole variants (table 9b)
 (Clause 8.3.1.4)

Alternative test programme 2 carried out on : 3-2-1 pole variants (table 9c)
 (Clause 8.3.1.4)

Remarks :
 :



Description and characterization of the test object - Characteristics

Type of circuit-breaker:

- Version (Withdrawable or Fixed)
- Total poles numbers
- Kind of current
- Number of phases if a.c.
- rated frequency f_n Hz
- Utilization category
- Reference temperature °C
- Suitable for environment
- Suitability for isolation (if yes indicate type actuator)
 -type of the actuator (a-b-c-d-e-f-g)
- Actuator opening force (F) N
- Degree of protection (if enclosure declared) (if any see page)
- Pollution degree
- Material group
- Terminals cable or bar tightening torque Nm
- for $I_n \leq 20A$ (if different than table 9 of IEC 60947-1) Nm
- Rated and limiting values: (according to test volume) :Main circuit:
- Rated impulse withstand voltage U_{imp} kV
- Rated insulation voltage U_i V
- Conventional thermal current I_{th} / I_{the} A
- Rated current I_n A
- Rated current in the neutral pole (if applicable) A

Short-circuit characteristics:

U_e/V	I_{cm}/kA	I_{cu}/kA	I_{cs}/kA	I_{cw}/kA	I_{su}/kA	I_{IT}/kA

Test laboratory:

TRF IEC/EN 60947-2
Ed. 4.2b form 5



Control circuits:

Electrical control circuits:

Kind of current
 Rated frequency if a.c. Hz
 Rated control circuit voltage U_c V
 Rated control supply voltage U_s V
 Rated impulse withstand voltage U_{imp} kV
 Rated insulation voltage U_i V

Air-supply control circuits:

Rated supply pressure kP
 Limits of pressure kP
 Required volume for each closing operation m³
 Required volume for each opening operation m³

Auxiliary circuits:

Rated operational voltage U_e V
 Rated impulse withstand voltage U_{imp} kV
 Rated insulation voltage U_i V
 Rated frequency if a.c. Hz
 Rated operational current I_e A
 Number of circuits
 Number and kind of contact elements

Test laboratory:

TRF IEC/EN 60947-2

Ed. 4.2c form 6



Standard and clause	Kind of tests and requirements	Test value results	
<p>TEST SEQUENCE I</p> <p>General performance characteristics</p> <p>Test sequence I comprises the following tests:</p> <p>Overall schema of test sequence : : Table : <input type="checkbox"/> 9</p> <p>Alternative test programme : : Table : <input type="checkbox"/> 9b</p> <p> : : Table : <input type="checkbox"/> 9c</p>			
	<p>Test</p> <p>Pageform</p>	<p>Test Report Page no.</p>	
8.3.3.1	Tripping limits and characteristics	18-28	....
8.3.3.2	Dielectric properties		
	-verification of impulse withstand voltage	29	....
	-power-frequency withstand verification	30	....
	-verification of creepage distances	30	....
8.3.3.3	Verification of leakage current (if applicable)	31	....
	Mechanical operation and operational performance capability	32-36	....
8.3.3.4	Overload performance (if applicable)	37	....
8.3.3.5	Verification of dielectric withstand	38	....
	Verification of leakage current (if applicable)	31	....
8.3.3.6	Verification of temperature-rise	39-40	....
8.3.3.7	Verification of overload releases	41	....
8.3.3.8	Verification of undervoltage and shunt releases (if applicable)	42	....
8.3.3.9	Verification of main contact position (if applicable)	43-44	....

Test laboratory:.....

TRF /EN 60947-2

Ed. 4.2b form 17



Test report N°

Page /

Type test according to: IEC 60947-2

Type:

Additional page

Test laboratory:.....

TRF IEC/EN 60947-2
Ed. 4.2b form 277



Assessment Report Form : IEC 61439-2 Edition 2.0c


Document date : 2014-10-13

Test Object : Power switchgear and controlgear assemblies

**Test Specifications : IEC 61439-2: Ed. 2.0 (2011-08)
EN 61439-2 (2011)**

Content :	Description	Pageform
	Front sheet	ARF 1
	Description and characteristics of the apparatus	ARF 2
	Description and thermal characteristics of the built-in components	ARF 3
	Other characteristics	ARF 4
	Configuration of the Assembly	ARF 5
	Resistance to abnormal heat and fire due to internal electric effects	ARF 6
	Resistance to ultra-violet (UV) radiation	ARF 7
	Degree of protection of enclosures	ARF 8
	Incorporating of switching devices and components	ARF 9-12
	Internal electrical circuits and connections	ARF 13-15
	Terminals for external conductors	ARF 16
	Internal separation of PSC assemblies	ARF 17-18
	Dielectric properties-Impulse withstand voltage	ARF 19
	Verification of temperature-rise	
	Single compartment assembly with rated current not exceeding 630A	ARF 20÷24
	Multiple compartment assembly with rated current not exceeding 1600A	ARF 25÷31
	Electromagnetic compatibility (EMC)	ARF 32
	Additional page	ARF 33

Number of page forms : 33

LOVAG Assessment report Form sheet	Valid from:	2014-10-30	ARF IEC/EN 61439-2 Ed. 2.0c 2014-10-13 Author: ACAE
	Chairman of Technical Committee Saverio MANGANARO		



Assessment report N°

Applicant :

:

Original manufacturer :

:

Apparatus :

:

Type designation :

Standard for the Assessment : IEC 61439-2: Ed. 2.0 (2011-8)

: EN 61439-2: 2011-8

Verification results: :

:

This Assessment Report consists of:
 pages LOVAG assessment report forms
 other pages
 Date of issue:

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**Client responsible of the assessment
 proposal**

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Note: The verification result relates only to the items verified.
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ARF IEC/EN 60947-2
 Ed. 2.0c form 1



APPENDIX: 8

Comparison Report Form : IEC 61439-2 Edition 2.0c


Document date : 2014-10-13

Test Object : Power switchgear and controlgear assemblies

**Test Specifications : IEC 61439-2: Ed. 2.0 (2011-08)
EN 61439-2 (2011)**

Content :	Description	Pageform
	Front sheet	CRF 1
	Description and characteristics of the apparatus	CRF 2
	Description and thermal characteristics of the built-in components	CRF 3
	Other characteristics	CRF 4
	Configuration of the Assembly	CRF 5
	Short-circuit withstand strength of the protective circuit	CRF 6
	Temperature-rise limit	CRF 7
	Short-circuit withstand strength by check list	CRF 8
	Short-circuit withstand strength by calculation	CRF 9
	Additional page	CRF 10

Number of page forms : 10

LOVAG Comparison report Form sheet	Valid from:	2014-10-30	CRF IEC/EN 61439-2 Ed. 2.0c 2014-10-13 Author: ACAE
	Chairman of Technical Committee Saverio MANGANARO		



Comparison Report N°

Applicant :

:

Original manufacturer :

:

Apparatus :

:

Type designation :

Standard for the

Comparison : IEC 61439-2: Ed. 2.0 (2011-8)

: EN 61439-2: 2011-8

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 Ed. 2.0c form 1