IEC 61954

Edition 2.2 2017-04

FINAL VERSION

VERSION FINALE

Static var compensators (SVC) – Testing of thyristor valves

Compensateurs statiques de puissance réactive (SVC) – Essais des valves à thyristors

IEC 61954:2011-04+AMD1:2013-04+AMD2:2017-04 CSV(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

STATIC VAR COMPENSATORS (SVC) – TESTING OF THYRISTOR VALVES

FOREWORD

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This Consolidated version of IEC 61954 bears the edition number 2.2. It consists of the second edition (2011-04) [documents 22F/217/CDV and 22F/231A/RVC], its amendment 1 (2013-04) [documents 22F/274/CDV and 22F/287A/RVC] and its amendment 2 (2017-04) [documents 22F/409/CDV and 22F/418A/RVC]. The technical content is identical to the base edition and its amendments.

This Final version does not show where the technical content is modified by amendments 1 and 2. A separate Redline version with all changes highlighted is available in this publication.

International Standard IEC 61954 has been prepared by subcommittee 22F: Power electronics for electrical transmission and distribution systems, of IEC technical committee 22: Power electronics.

This edition includes the following significant technical changes with respect to the previous edition:

a) Definitions of terms “thyristor level”, “valve section”, “valve base electronics” and “”redundant thyristor levels” have been changed for clarification.

b) Conditions of testing thyristor valve sections instead of a complete thyristor valve have been defined.

c) The requirement has been added that if, following a type test, one thyristor level has become short-circuited, then the failed level shall be restored and this type test repeated.

d) The time period of increasing the initial test voltage from 50 % to 100 % during type a.c. dielectric tests on TSC, TCR or TSR valves has been set equal to approximately 10 s.

e) The duration of test voltage U_{ts2} during type a.c.-d.c. dielectric tests between TSC valve terminals and earth as well as the duration of test voltage U_{tvv2} during dielectric tests between TSC valves (for MVU only) has been changed from 30 min to 3 h.

f) The reference on the number of pulses per minute of the periodic partial discharge recorded during a.c.-d.c. dielectric tests on TSC valves and exceeding the permissible level has been deleted.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

STATIC VAR COMPENSATORS (SVC) – TESTING OF THYRISTOR VALVES

1 Scope

This International Standard defines type, production and optional tests on thyristor valves used in thyristor controlled reactors (TCR), thyristor switched reactors (TSR) and thyristor switched capacitors (TSC) forming part of static VAR compensators (SVC) for power system applications. The requirements of the standard apply both to single valve units (one phase) and to multiple valve units (several phases).

Clauses 4 to 7 detail the type tests, i.e. tests which are carried out to verify that the valve design meets the requirements specified. Clause 8 covers the production tests, i.e. tests which are carried out to verify proper manufacturing. Clauses 9 and 10 detail optional tests, i.e. tests additional to the type and production tests.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60060 (all parts), *High-voltage test techniques*

IEC 60060-1, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60060-2, *High-voltage test techniques – Part 2: Measuring systems*

IEC 60071 (all parts), *Insulation co-ordination*

IEC 60071-1:2006, *Insulation co-ordination – Part 1: Definitions, principles and rules*
IEC 60071-1:2006/AMD1:2010

IEC 60270, *High-voltage test techniques – Partial discharge measurements*

IEC 60700-1:2015, *Thyristor valves for high-voltage direct current (HVDC) power transmission – Part 1: Electrical testing*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply:

3.1
thyristor level
part of a thyristor valve comprising a thyristor, or thyristors connected in parallel or antiparallel, together with their immediate auxiliaries and reactor, if any

3.2
thyristor (series) string
series connected thyristors forming one direction of a thyristor valve