

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Static var compensators (SVC) – Testing of thyristor valves

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



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CONTENTS

FOREWORD.....	5
1 Scope.....	7
2 Normative references.....	7
3 Terms and definitions	7
4 General requirements for type, production and optional tests.....	9
4.1 Summary of tests.....	9
4.2 Objectives of tests	10
4.2.1 General	10
4.2.2 Dielectric tests	10
4.2.3 Operational tests	10
4.2.4 Electromagnetic interference tests	11
4.2.5 Production tests.....	11
4.2.6 Optional tests	11
4.3 Guidelines for the performance of type and optional tests.....	11
4.4 Test conditions	12
4.4.1 General	12
4.4.2 Valve temperature at testing	13
4.4.3 Redundant thyristor levels	13
4.5 Permissible component failures during type testing	14
4.6 Documentation of test results.....	14
4.6.1 Test reports to be issued	14
4.6.2 Contents of a type test report.....	15
5 Type tests on TCR and TSR valves.....	15
5.1 Dielectric tests between valve terminals and earth	15
5.1.1 General	15
5.1.2 AC test	16
5.1.3 Lightning impulse test	16
5.2 Dielectric tests between valves (MVU only)	17
5.2.1 General	17
5.2.2 AC test	17
5.2.3 Lightning impulse test	18
5.3 Dielectric tests between valve terminals.....	18
5.3.1 General	18
5.3.2 AC test	18
5.3.3 Switching impulse test	20
5.4 Operational tests	21
5.4.1 Periodic firing and extinction test.....	21
5.4.2 Minimum a.c. voltage test	22
5.4.3 Temperature rise test.....	23
6 Type tests on TSC valves	23
6.1 Dielectric tests between valve terminals and earth	23
6.1.1 General	23
6.1.2 AC-DC test	24
6.1.3 Lightning impulse test	26

6.2	Dielectric tests between valves (for MVU only)	26
6.2.1	General	26
6.2.2	AC-DC test	26
6.2.3	Lightning impulse test	28
6.3	Dielectric tests between valve terminals	29
6.3.1	General	29
6.3.2	AC-DC test	29
6.3.3	Switching impulse test	31
6.4	Operational tests	32
6.4.1	Overcurrent tests	32
6.4.2	Minimum a.c. voltage test	35
6.4.3	Temperature rise test	36
7	Electromagnetic interference tests	36
7.1	Objectives	36
7.2	Test procedures	36
7.2.1	General	36
7.2.2	Switching impulse test	37
7.2.3	Non-periodic firing test	37
8	Production tests	37
8.1	General	37
8.2	Visual inspection	37
8.3	Connection check	37
8.4	Voltage-dividing/damping circuit check	38
8.5	Voltage withstand check	38
8.6	Check of auxiliaries	38
8.7	Firing check	38
8.8	Cooling system pressure test	38
8.9	Partial discharge tests	38
9	Optional tests on TCR and TSR valves	38
9.1	Overcurrent test	38
9.1.1	Overcurrent with subsequent blocking	38
9.1.2	Overcurrent without blocking	39
9.2	Positive voltage transient during recovery test	39
9.2.1	Objectives	39
9.2.2	Test values and waveshapes	39
9.2.3	Test procedures	40
9.3	Non-periodic firing test	40
9.3.1	Objectives	40
9.3.2	Test values and waveshapes	40
9.3.3	Test procedures	42
10	Optional tests on TSC valves	42
10.1	Positive voltage transient during recovery test	42
10.1.1	Test objective	42
10.1.2	Test values and waveshapes	42
10.1.3	Test procedures	42
10.2	Non-periodic firing test	43
10.2.1	Objectives	43
10.2.2	Test values and waveshapes	43
10.2.3	Test procedures	44

Figure 1 – TSC branch	33
Figure 2 – One-loop overcurrent	34
Figure 3 – Two-loop overcurrent	35
Table 1 – List of tests	9
Table 2 – Number of thyristor levels permitted to fail during type tests	15

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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 consists of the second edition (2011) [documents 22F/217/CDV and 22F/231A/RVC] and its amendment 1 (2013) [documents 22F/274/CDV and 22F/287A/RVC]. It bears the edition number 2.1.

The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience. A vertical line in the margin shows where the base publication has been modified by amendment 1. Additions and deletions are displayed in red, with deletions being struck through.

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 amendment will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

IEC 60700-1:2008, *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