SLOVENSKI STANDARD
SIST EN 60947-6-1:1995/A11:1998

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Low-voltage switchgear and controlgear assemblies - Part 6: Multiple function equipment - Section 1: Automatic transfer switching equipment - Amendment A11

Low-voltage switchgear and controlgear -- Part 6-1: Multiple function equipment - Automatic transfer switching equipment

Niederspannungsschaltgeräte -- Teil 6-1: Mehrfunktions-Schaltgeräte - Automatische Netzumschalter

Appareillage à basse tension -- Partie 6-1: Matériels à fonctions multiples - Matériels de connexion de transfert automatique

Ta slovenski standard je istoveten z: **EN 60947-6-1:1991/A11:1997**

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Descriptors: Low-voltage switchgear and controlgear, multiple function equipment, switching, automatic transfer

English version

Low-voltage switchgear and controlgear
Part 6: Multiple function equipment
Section 1: Automatic transfer switching equipment

Appareillage à basse tension
Partie 6: Matériels à fonctions multiples
Section 1: Matériels de connexion de transfert automatique

Niederspannungsschaltgeräte
Teil 6: Mehrfunktionsschaltgeräte
Hauptabschnitt 1: Automatische Netzumschalter

This amendment A11 modifies the European Standard EN 60947-6-1:1991; it was approved by CENELEC on 1996-07-02. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This amendment exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC
European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

This amendment was prepared by the Technical Committee CENELEC TC 17B, Low-voltage switchgear and controlgear including dimensional standardization.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as amendment A11 to EN 60947-6-1:1991 on 1996-07-02.

The following dates were fixed:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1997-10-01

- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 1997-10-01

This amendment covers the requirements of EMC for automatic transfer switching equipment. It contains additional requirements corresponding to subclause 7.3 of EN 60947-1.

CONTENTS

Add the titles of the new subclauses as follows :

5 Product information

5.1 *Nature of information*

Add the following new items at the end of this subclause:

Electromagnetic compatibility :

q) environment 1 or 2;

r) special requirements, if applicable, for example shielded or twisted conductors.

NOTE : Unshielded or untwisted conductors are considered as normal installation conditions.

5.3 *Instructions for installation, operation and maintenance*

Add the following second paragraph :

Information shall be provided by the manufacturer to advise the user on the measures to be taken with regard to the ATSE, if any, concerning EMC.

7 Constructional and performance requirements

Add new subclauses :

7.3 *Electromagnetic compatibility (EMC)*

7.3.1 *General*

Subclause 7.3.1 of Part 1 applies with the following addition :

The environmental condition 1 or 2 shall be stated in the manufacturer's documentation.

All emission and immunity tests are type tests and shall be carried out under representative conditions, both operational and environmental, including any measures specified by the manufacturer, such as enclosures, wiring methods.

7.3.2 *Immunity*

The test results are specified using the performance criteria of IEC 1000-4-1 as listed below :

1 Normal performance within the specification limits.

2 Temporary degradation or loss of function or performance which is self recoverable.

3 Temporary degradation or loss of function or performance which requires operator's intervention or system reset. Normal functions must be restorable by simple intervention, e.g. by manual reset or restart. There must not be any damaged component.

Example for criterion 2: unwanted LED illumination
Example for criterion 3: tripping of the overload relay

Power frequency magnetic field tests are not required because the devices are naturally submitted to such fields. Immunity is demonstrated by the successful completion of the operating capability tests (see 8.3.3.5 and 8.3.3.6).

7.3.2.1 *Equipment not incorporating electronic circuits*

Subclause 7.3.2.1 of Part 1 applies with the following addition :

Equipment incorporating only components such as diodes, varistors, resistors or capacitors is not required to be tested.

7.3.2.2 *Equipment incorporating electronic circuits*

Subclause 7.3.2.2 of Part 1 applies.

7.3.3 *Emission*

The levels of severity required for environment 1 cover those required for environment 2.

7.3.3.1 *Equipment not incorporating electronic circuits*

Subclause 7.3.3.1 of Part 1 applies with the following addition :

Equipment incorporating only components such as diodes, varistors, resistors or capacitors is not required to be tested (e.g. in surge suppressors).

The frequency and levels of these emissions are considered provisionally and until further study as part of the normal electromagnetic environment of low voltage switchgear.

7.3.3.2 *Equipment incorporating electronic circuits*

Subclause 7.3.3.2 of Part 1 applies with the following addition :

Radiated radio frequency emission tests are only required for equipment incorporating circuits with fundamental switching frequency greater than 9 kHz, e.g. chopped supplies or high frequency clocks of microprocessors.

8 Tests

8.3 *Performance*

Modify 8.3.1 1) to read :

1) Tests a) to e) and test l) can be ...

Table V, add the following test sequence :

l) EMC	8.5	8.5

Add new subclauses :

8.5 *EMC tests*

8.5.1 *General*

Subclauses 8.3.2.1, 8.3.2.3 and 8.3.2.4 of Part 1 apply with the following additions :

With the agreement of the manufacturer more than one EMC-test or all EMC-tests may be conducted on one and the same sample, which may initially be new or may have passed test sequences according to 8.3.1. The sequence of the EMC-tests may be at any convenience.

Unless otherwise stated in this standard or specified by the manufacturer, performance criterion 2 applies and it shall be noted in the test report.

The test report shall include any special measures that have been taken to achieve compliance, e.g. the use of shielded or special cables. If auxiliary equipment is used with the device in order to comply with immunity or emission requirements, it shall be included in the report.

The test sample shall be in the open or closed position, whichever is worse, and shall be operated with the rated control supply voltage U_S or its rated current, if applicable.

8.5.2 *Immunity*

The tests of table X are required. Special requirements are specified in 8.5.2.1 to 8.5.2.6.

If during the EMC-tests conductors are to be connected to the test sample the cross-section and the type of the conductors are optional but shall be in accordance with the manufacturer's literature.

Table X: EMC immunity tests

Type of test	Severity level required 1)
1,2/50 µs surges IEC 1000-4-5	2 kV (CM) *) 1 kV (DM) *)
Fast transient bursts IEC 1000-4-4	2 kV
Electromagnetic field IEC 1000-4-3	10 V/m
Electrostatic disturbances IEC 1000-4-2	8 kV/air discharge 4 kV/contact discharge

1) This corresponds to level 3 in IEC 1000-4-1

*) CM : Common mode
DM : Differential mode

8.5.2.1 *Electrostatic discharge*

The test shall be conducted using the methods of IEC 1000-4-2. Ten positive and ten negative pulses shall be applied to each selected point, the time interval between each successive single discharge being 1 second. Terminals are not required to be tested.

Except for control supply voltage terminals, connections are not required to be made to other terminals.

Tests are not possible if the device is an open frame or of degree of protection IP 00. In this case, the manufacturer shall attach a label to the unit advising of the possibility of damage due to static discharges.

8.5.2.2 *Electromagnetic field*

The tests shall be conducted using the methods of IEC 1000-4-3. The test procedure of clause 6 of IEC 1000-4-3 shall apply. The test level shall be 10 V/m swept over the frequency range 26 MHz to 1 GHz. The device shall comply with performance criterion 1.

8.5.2.3 *Fast transient bursts*

The test shall be conducted using the methods of IEC 1000-4-4. The bursts shall be applied to all main, control or auxiliary terminals whether comprising electronic or conventional contacts.
The test voltage shall be applied for a duration of 1 minute.

8.5.2.4 *Surges* (1,2/50 µs)

The test shall be conducted using the methods of IEC 1000-4-5. Capacitive coupling shall be preferred. The surges shall be applied to all main, control or auxiliary terminals whether comprising electronic or conventional contacts.
The repetition rate shall be 1 per minute, with the number of pulses being five positive and five negative.

8.5.2.5 *Harmonics*

Under consideration.

8.5.2.6 *Voltage dips and short time interruptions*

This equipment is inherently responsive to voltage dips and short-time interruptions; it shall react within the limits of 7.2.1.2 and this is verified by the operating test limits given in 8.3.3.2.

8.5.2.7 *Performance of the test sample during and after the test*

For each test, the corresponding performance criteria shall be fulfilled. Unless otherwise specified in the relevant subclause, after the test, the operating limits of 8.3.3.2 shall be verified.

8.5.3 *Emission*

For equipment designed for environment 2, a suitable warning shall be given to the user (e.g. in the instruction manual) stipulating that the use of this equipment in environment 1 may cause radio interference in which case the user may be required to employ additional mitigation methods.

8.5.3.1 *Conducted radio frequency emission tests*

A description of the test, the test method and the test set-up are given in CISPR 11.

To pass, the equipment shall not exceed the levels given in table XI.

Table XI: Conducted radio-frequency emission test limits

Frequency band	Environment 2	Environment 1
0,15-0,5 MHz	79 dB (μV) quasi-peak 66 dB (μV) average	66-56 dB(μV) quasi-peak 56-46 dB(μV) average (Decrease with log of frequency)
0,5-5,0 MHz	73 dB (μV) quasi-peak 60 dB (μV) average	56 dB(μV) quasi-peak 46 dB(μV) average
5-30 MHz	73 dB (μV) quasi-peak 60 dB (μV) average	60 dB (μV) quasi-peak 50 dB (μV) average

8.5.3.2 *Radiated radio frequency emission tests*

A description of the test, the test method and the test set-up are given in CISPR 11.

Tests are required where the control and auxiliary circuits contain components with fundamental switching frequencies greater than 9 kHz, e.g. switch-mode power supplies etc.

To pass, the equipment shall not emit at higher levels than those given in table XII.

Table XII: Radiated emission test limits

Frequency band	Environment 2	Environment 1
30-230 MHz	30 dB (μV/m) quasi-peak at 30 m *	30 dB(μV/m) quasi-peak at 10 m
230-1000 MHz	37 dB (μV/m) quasi-peak at 30 m *	37 dB(μV/m) quasi-peak at 10 m
* These tests may be made at 10 m distance with the limits increased by 10 dB.		