IEC 60947-8

Edition 1.0 2011-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 2
AMENDEMENT 2

Low-voltage switchgear and controlgear – Part 8: Control units for built-in thermal protection (PTC) for rotating electrical machines

Appareillage à basse tension – Partie 8: Unités de commande pour la protection thermique incorporée (CTP) aux machines électriques tournantes

IEC 60947-8:2003/A2:2011

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FOREWORD

This amendment has been prepared by subcommittee 17B: Low-voltage switchgear and controlgear, of IEC technical committee 17: Switchgear and controlgear.

The text of this amendment is based on the following documents:

FDIS	Report on voting
17B/1732/FDIS	17B/1739/RVD

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

The committee has decided that the contents of this publication 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- withdrawn,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.

2 Normative references

Add the following references:

IEC 60068-2-1, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60947-1:2007, *Low-voltage switchgear and controlgear – Part 1: General rules*

Update the existing normative references as follows:

IEC 61000-4-2:2008, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3:2006, *Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test*
Amendment 1 (2007)
Amendment 2 (2010)

IEC 61000-4-4:2004, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*
Amendment 1 (2010)

IEC 61000-4-5:2005, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*
Corrigendum 1 (2009)

IEC 61000-4-6:2008, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-8:2009, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61000-4-11:2004, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

IEC 61000-4-13:2002, *Electromagnetic compatibility (EMC) – Part 4-13: Testing and measurement techniques – Harmonics and interharmonics including mains signalling at a.c. power port, low-frequency immunity tests*
Amendment 1 (2009)

CISPR 11:2009, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*
Amendment 1 (2010)

CISPR 22:2008, *Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement*

6.1 Nature of information

Replace item c by the following:

c) 60947-8

The Mark A control units shall be additionally marked “Mark A control unit”.

8.1 Constructional requirements

Add the following subclause number and title to the existing text under 8.1:

8.1.1 General

Add the following subclauses at the end of the new Subclause 8.1.1:

8.1.2 Materials

8.1.2.1 General materials requirements

Subclause 7.1.2.1 of IEC 60947-1:2007 applies.

8.1.2.2 Glow wire testing

Subclause 7.1.2.2 of IEC 60947-1:2007 applies with the following addition.

When tests on the equipment or on sections taken from the equipment are used, parts of insulating materials necessary to retain current-carrying parts in position shall conform to the glow-wire tests of 8.2.1.1.1 of IEC 60947-1:2007 at a test temperature of 850 °C.

8.1.2.3 Test based on flammability category

Subclause 7.1.2.3 of IEC 60947-1:2007 applies.

8.1.3 Current-carrying parts and their connections

Subclause 7.1.3 of IEC 60947-1:2007 applies.

8.1.4 Clearances and creepage distances

Subclause 7.1.4 of IEC 60947-1:2007 applies.

8.2.9 Damp heat

Replace the existing Subclause 8.2.9, including the title, by the following:

8.2.9 Environmental testing

Clause B.2 applies.

8.3.2.2 Equipment incorporating electronic circuits

Replace the third paragraph of Subclause 8.3.2.2 by the following:

Performance criteria are based on the acceptance criteria given in Table 24 of IEC 60947-1:2007 and are changed as follows:

Performance criterion A:
On line "Operation of power and control circuits",
replace:
"No unwanted operation"
by:
"During the tests, the output state of the switching element shall not change."

Performance criterion B:
On line "Operation of power and control circuits",
replace:
"Temporary degradation or loss of performance which is self-recoverable"
by:
"During the tests, the output state of the switching element shall not change for more than 1 ms for d.c. devices or one half-wave of supply frequency for a.c. devices."

Performance criterion C:
On line "Operation of power and control circuits",
replace:
"Temporary degradation or loss of performance which requires operator intervention or system reset."
by:
"Temporary degradation or loss of performance which is self recoverable or requires system reset."

The performance criteria shall be performance criterion A in general, except as follows:

- for electrostatic discharges, for fast transient/burst, for surges and for voltage dips “0 % during 0,5 cycle and 0 % during 1 cycle”, performance criterion B shall be fulfilled;
- for voltage dips “70 % during 25/30 cycles” and for short time interruptions, performance criterion C shall be fulfilled.

Table 1 – Tests for EMC – Immunity

Replace the existing Table 1 by the following new Table 1:

Type of test	Test level required
Electrostatic discharge immunity test IEC 61000-4-2	8 kV / air discharge or 4 kV / contact discharge
Radiated radio-frequency electromagnetic field immunity test 80 MHz to 1 GHz IEC 61000-4-3	10 V/m [d]
Radiated radio-frequency electromagnetic field immunity test 1 GHz to 2 GHz IEC 61000-4-3	3 V/m
Radiated radio-frequency electromagnetic field immunity test 2 GHz to 2,7 GHz IEC 61000-4-3	1 V/m
Electrical fast transient/burst immunity test IEC 61000-4-4	2 kV on power ports [a] 1 kV on signal ports [b]
1,2/50 µs – 8/20 µs surge immunity test IEC 61000-4-5 [c]	2 kV (line to earth) 1 kV (line to line)
Conducted radio-frequency immunity test (150 kHz to 80 MHz) IEC 61000-4-6	10 V
Power-frequency magnetic field immunity test IEC 61000-4-8 [f]	30 A/m
Voltage dips immunity test IEC 61000-4-11	Class 2 [g, h] 0 % during 0,5 cycle and 0 % during 1 cycle 70 % during 25/30 cycles
Voltage interruptions immunity test IEC 61000-4-11	Class 2 [g, h] 0 % during 250/300 cycles
Immunity to harmonics in the supply IEC 61000-4-13	No requirements [e]

[a] Power port: the point at which a conductor or cable carrying the primary electrical power needed for the operation of an equipment or associated equipment is connected.

[b] Signal port: the point at which a conductor or cable carrying information for transferring data or signals is connected to the equipment.

[c] Not applicable for ports with a rated voltage of 24 V d.c. or less.

[d] Except for the ITU broadcast frequency bands 87 MHz to 108 MHz, 174 MHz to 230 MHz and 470 MHz to 790 MHz, where the level shall be 3 V/m.

[e] Future requirements are under study.

[f] Applicable only to equipment containing devices sensitive to power frequency magnetic fields.

[g] The given percentage means percentage of the rated operational voltage, e.g. 0 % means 0 V.

[h] The value in front of the slash mark (/) is for 50 Hz and the value behind is for 60 Hz tests.

B.2 Damp heat

Replace the existing Clause B.2 in Amendment 1 by the following new Clause B.2:

B.2 Special tests- Damp heat, salt mist, vibration and shock

For these special tests, Annex Q of IEC 60947-1:2007 applies with the following additions.

Where Table Q.1 of IEC 60947-1:2007 calls for verification of operational capability, this shall be made by carrying out the “Verification of switch on and switch off of Mark A control units”.

The test is done while a variable resistance is inserted between each pair of terminals intended for the connection of the thermistor detectors. The following conditions a) to c) shall be met.

a) For any resistance value of 750 Ω or less, the control unit shall be switched on, or shall be able to be reset. Compliance with this condition shall be checked by testing with a variable resistance set to this value. In case of doubt, this check shall also be carried out at a lower value of resistance.

b) When the resistance value is increased (at a uniform rate of approximately 250 Ω/s), the control unit shall switch off when the resistance value is in the range of 1650 Ω to 4000 Ω.

c) The control unit shall be left in tripped condition for 1 min; after which the resistance value shall be lowered at a uniform rate of no more than 250 Ω/s; the control unit shall switch on, or shall be able to be reset, when the resistance value is in the range of 1650 Ω to 750 Ω.

The vibration tests shall be done on the equipment in the ‘ON’ and ‘OFF’ positions.

The control unit shall not trip during the test. To check the auxiliary contacts, tests can be done under any current / voltage value.

The shock test on the equipment shall be done in the ‘OFF’ position.

For the dry heat test Bd, damp heat test and low temperature test Ab or Ad as appropriate according to IEC 60068-2-1, the equipment shall not trip during the conditioning period. Functional tests from a) to c) shall be done.

Functional test for dry heat and low temperature tests shall be done during the last hour at the test temperature.

For low temperature tests, the equipment shall not be energized during conditioning and testing, except for functional tests.

For dry heat tests, the equipment shall be energized during conditioning and testing and for functional tests.

With the agreement of the manufacturer, the duration of the recovery periods may be reduced.

After the salt mist test the product may be washed where agreed by the manufacturer.

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