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1:2002/OprA2:2004**

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Low-voltage switchgear and controlgear -- Part 4-1: Contactors and motor-starters -
Electromechanical contactors and motor-starters

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Also of interest to the following committees Intéresse également les comités suivants		Supersedes documents Remplace les documents 17B/1299/CD and 17B/1323A/CC
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Titre :

Amendement 2 à la CEI 60947-4-1, Ed. 2:
Appareillage à basse tension – Partie 4-1:
Contacteurs et démarreurs de moteurs –
Contacteurs et démarreurs électromécaniques

Title :

Amendment 2 to IEC 60947-4-1, Ed. 2:
Low-voltage switchgear and controlgear – Part 4-1:
Contactors and motor-starters –
Electromechanical contactors and motor-starters

Note d'introduction

Introductory note

ATTENTION	ATTENTION
CDV soumis en parallèle au vote (CEI) et à l'enquête (CENELEC)	Parallel IEC CDV/CENELEC Enquiry

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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/XXXX/FDIS	17B/XXXX/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 the base publication and its amendments will remain unchanged until 2008. At this date, the publication will be:

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- withdrawn;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

Change, in the whole standard, “solid state” by “electronic”

Page 3 and amendment 1, page 3

CONTENTS

Modify the title of clause 3 to read:

3 Definitions, symbols and abbreviations

Insert the following:

3.4 Symbols and abbreviations

Replace “5.9 Switching overvoltages” by “5.9 Vacant”.

Add, on page 5, the title of the new annexes G, H and J:

Annex G (informative) Rated operational currents and rated operational powers of switching devices for electrical machines

Annex H (normative) Extended functions within electronic overload relays

Annex J (informative) Contactors for use with semiconductor controlled loads

Add, on page 5, the title of new figures 8 and H.1:

Figure 8 – Thermal memory test

Figure H.1 – Test circuit for the verification of the operating characteristic of a residual current electronic overload relay

Modify, on page 5, the title of table 2 to read:

Table 2 – Trip classes of overload relays

Modify, on page 5, the title of table 4 to read:

Table 4 – Limits of operation of three-pole time-delay overload relays when energized on two poles only

Add, on page 7, the title of new tables G.1 and H.1

Table G.1 – Rated operational power and currents

Table H.1 – Operating time of residual current electronic overload relays

Page 9

FOREWORD

Replace, on page 11, the two last paragraphs, by the following:

Annexes A, B, F and H form an integral part of this standard.

Annexes D, E, G and J are for information only.

Page 19 and amendment 1, page 5

2 Normative references

Replace the existing text of first paragraph by the following:

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.

Add, after IEC 60050(441), the following reference:

Amendment 1 (2000)

Replace the reference to IEC 60112:1979 by the following

IEC 60112:2003, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

Replace the reference to IEC 60947-1:1999 by the following:

IEC 60947-1:2004, *Low-voltage switchgear and controlgear – Part 1: General rules*

Replace the reference to IEC 60947-2:1995 by the following:

IEC 60947-2:2003, *Low-voltage switchgear and controlgear – Part 2: Circuit-breakers*

Replace the reference to IEC 60947-5-1:1997 by the following:

IEC 60947-5-1:2003, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices*

Replace the reference to IEC 61000-4-3:1995 by the following:

IEC 61000-4-3:2002, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated radio-frequency electromagnetic field immunity test Amendment 1 (2002)*

Replace the reference to IEC 61810-1:1998 by the following:

IEC 61810-1:2003, *Electromechanical elementary relays – Part 1: General and safety requirements*

Replace the reference to CISPR 11:1997, by the following:

CISPR 11:2003, *Industrial, scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement*

Page 21

3 Definitions

Replace the existing title by the following:

3 Definitions, symbols and abbreviations

Insert, after the first paragraph, the following alphabetical index of definitions:

	Reference
A	
Auto-transformer starter.....	3.2.5.2
C	
Close transition (with an auto-transformer starter or star-delta starter).....	3.2.23
Combination starter	3.2.8
Combination protected switching device	3.2.27
Contactors (mechanical).....	3.1.1
D	
Direct-on-line starter.....	3.2.2
E	
Electromagnetic contactor.....	3.1.2
Electromagnetic starter.....	3.2.10
Electronic overload relay with current or voltage asymmetry function.....	H.2.2
Electronic overload relay with phase reversal function.....	H.2.3
Electronic overload relay with residual current (earth fault) function.....	H.2.1
Electronically controlled coil for electromagnet	3.1.8
Electro-pneumatic contactor	3.1.4
Electro-pneumatic starter.....	3.2.13
I	
Inching (jogging).....	3.2.24
Inhibit current	H.2.5
Inhibit time.....	3.2.30
J	
Jam sensitive electronic overload relay.....	3.2.29
L	
Latched contactor	3.1.5
M	
Manual starter.....	3.2.9
Mirror contact	F.2.1
Motor-operated starter	3.2.11
N	
<i>n</i> -step starter	3.2.16
O	
Open transition (with an auto-transformer starter or star-delta starter).....	3.2.22
Over-voltage sensitive electronic overload relay	H.2.4
P	
Phase loss sensitive thermal overload relay or release	3.2.17
Plugging	3.2.25
Pneumatic contactor	3.1.3
Pneumatic starter	3.2.12
Position of rest (of a contactor).....	3.1.7
Protected starter.....	3.2.7

Protected switching device	3.2.26
R	
Reduced voltage starter	3.2.5
Reversing starter	3.2.3
Rheostatic rotor starter	3.2.6.2
Rheostatic starter	3.2.6
Rheostatic stator starter	3.2.6.1
S	
Single-step starter	3.2.14
Stall sensitive electronic overload relay	3.2.28
Star-delta starter	3.2.5.1
Starter	3.2.1
Starting time (of a rheostatic starter)	3.2.20
Starting time (of an auto-transformer starter)	3.2.21
T	
Two-direction starter	3.2.4
Two-step starter	3.2.15
U	
Under-current relay or release	3.2.18
Under-voltage relay or release	3.2.19
V	
Vacuum contactor (or starter)	3.1.6

Page 23

3.2 Definitions concerning starters

Replace, on page 27, the existing definitions 3.2.7 and 3.2.8 by the following:

3.2.7

protected starter

equipment consisting of a starter, a manually-operated switching device and a short-circuit protective device, rated as a unit by the manufacturer

NOTE 1 The protected starter may also include an isolating function.

NOTE 2 In the context of this standard, the term “manufacturer” means any person, company or organisation with ultimate responsibility as follows:

- to verify compliance with the appropriate standard;
- to provide the product information according to Clause 6.

NOTE 3 The manually operated switching device and the short-circuit protective device may be just one device and may also incorporate the starter overload protection.

3.2.8

combination starter (see Figure 3)

equipment consisting of a protected starter, as defined in 3.2.7, mounted and wired in a dedicated enclosure

NOTE A dedicated enclosure is a specifically designed and dimensioned enclosure in which all tests are conducted.

Replace, on page 29, the existing definition 3.2.18 by the following:

3.2.18

under-current relay or release

measuring relay or release which operates automatically when the current through it is reduced below a predetermined value

Add to the definition 3.2.19 the following note:

NOTE The starting time of a starter is shorter than the total starting time of the motor which also takes into account the last period of acceleration following the switching operation in the ON position.

Replace, on definition 3.2.20, the existing note by the following:

NOTE The starting time of a starter is shorter than the total starting time of the motor which also takes into account the last period of acceleration following the switching operation in the ON position.

Renumber definitions 3.2.19 to 3.2.24 as 3.2.20 to 3.2.25

Insert, on page 29, after definition 3.2.18, the following new definition 3.2.19:

3.2.19

under-voltage relay or release

measuring relay or release which operates automatically when the voltage applied to it is reduced below a predetermined value

Add, on page 29, after definition 3.2.25, the following new definitions 3.2.26 to 3.2.30:

3.2.26

protected switching device

equipment (for non motor loads) consisting of a contactor or a semiconductor controller, overload protection, a manually operated switching device and a short-circuit protective device, rated as a unit by the manufacturer

NOTE 1 The protected switching device may also include an isolating function.

NOTE 2 In the context of this standard, the term "manufacturer" means any person, company or organisation with ultimate responsibility as follows:

- to verify compliance with the appropriate standard;
- to provide the product information according to Clause 6.

NOTE 3 The manually operated switching device and the short-circuit protective device may be just one device and may incorporate the overload protection as well.

3.2.27

combination protected switching device

equipment consisting of a protected switching device, as defined in 3.2.26, mounted and wired in a dedicated enclosure

NOTE A dedicated enclosure is a specifically designed and dimensioned enclosure in which all tests are conducted.

3.2.28**stall sensitive electronic overload relay**

electronic overload relay which operates when the current has not decreased below a predetermined value for a specific period of time during start-up or when the relay receives the input indicating there is no rotation of the motor after a predetermined time in accordance with specified requirements

NOTE Explanation of stall: motor locked during start.

3.2.29**jam sensitive electronic overload relay**

electronic overload relay which operates in the case of overload and also when the current has increased above a predetermined value for a specific period of time during run in accordance with specified requirements

NOTE Explanation of jam: high overload occurring after the completion of starting which causes the current to reach the locked rotor current value of the motor being controlled.

3.2.30**inhibit time**

time-delay period during which the tripping function of the relay is inhibited (may be adjustable)

Page 31

Add, after definition 3.3.1, the following new subclause:

3.4 Symbols and abbreviations

EMC Electromagnetic compatibility

I_c Current made and broken

I_e Rated operational current

I_{er} Rated rotor operational current

I_{es} Rated stator operational current

I_{ic} Inhibit current

I_{th} Conventional free air thermal current

I_{the} Conventional enclosed thermal current

I_{thr} Conventional rotor thermal current

I_{ths} Conventional stator thermal current

I_u Rated uninterrupted current

SCPD Short-circuit protective device

T_p Tripping time

U_c Rated control circuit voltage

U_e Rated operational voltage

U_{er} Rated rotor operational voltage

U_{es} Rated stator operational voltage

U_i Rated insulation voltage

U_{imp} Rated impulse withstand voltage

U_{ir}	Rated rotor insulation voltage
U_{is}	Rated stator insulation voltage
U_r	Power frequency or d.c. recovery voltage
U_s	Rated control supply voltage

5.1 Summary of characteristics

Delete the eighth dashed item: “– switching overvoltages (5.9);”

Page 37

5.3.2.5 Rated operational currents (I_e) or rated operational powers

Insert, after the second paragraph, the following note:

NOTE Annex G gives values concerning the relationship between rated operational currents and rated operational powers.

Page 45

5.3.5.5.1 Starting characteristics of rheostatic rotor starters

Replace, for t_s , “(see 3.2.19)” by “(see 3.2.20)”.

Page 47

5.3.5.5.3 Starting characteristics for two-step auto-transformer starters

Replace, in the first sentence, “(see 3.2.20)” by “(see 3.2.21)”.

Page 53

5.7.2 Types of relay or release

Replace items c) 2) and c) 3) by the following new items c) 2) and c) 3):

- 2) dependent on previous load (e.g. thermal or electronic overload relay);
- 3) dependent on previous load (e.g. thermal or electronic overload relay) and also sensitive to phase loss (see 3.2.17).