IEC 60947-4-1

Edition 3.1 2012-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

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

Appareillage à basse tension –
Partie 4-1: Contacteurs et démarreurs de moteurs – Contacteurs et démarreurs électromécaniques

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FOREWORD

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This consolidated version of IEC 60947-4-1 consists of the third edition (2009) [documents 17B/1674/FDIS and 17B/1677/RVD] and its amendment 1 (2012) [documents 17B/1769/FDIS and 17B/1780/RVD]. It bears the edition number 3.1.

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 60947-4-1 has been prepared by subcommittee 17B: Low-voltage switchgear and controlgear, of IEC technical committee 17: Switchgear and controlgear.

This edition includes the following significant technical changes with respect to the previous edition (2000) and its Amendments 1 (2002) and 2 (2005):

- deletion of the test at –5 °C and +20 °C for thermal overload relays that are not compensated for ambient air temperature;
- addition of conditions of the tests according to Annex Q of IEC 60947-1;
- EMC tests: clarification of acceptance criteria and alignment with IEC 60947-1 for fast transient severity level;
- Annex B, test for Icd: modification of the duration of the dielectric test voltage from 5 s to 60 s;
- Annex B, electrical durability: improvement of the statistical aspects;
- Annex H: clarification and introduction of new extended functions within electronic overload relays;
- Annex K, procedure to determine data for electromechanical contactors used in functional safety applications: creation of this new annex.

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

A list of all parts of the IEC 60947 series can be found, under the general title *Low-voltage switchgear and controlgear*, on the IEC website.

This standard shall be read in conjunction with IEC 60947-1, *Low voltage switchgear and controlgear – Part 1: General rules*. The provisions of the general rules are applicable to this standard, where specifically called for.

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.

IMPORTANT – The "colour inside" logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this publication using a colour printer.

INTRODUCTION
(to amendment 1)

This amendment includes the following significant technical changes with respect to the previous edition 3 (2009):

- introduction of the motor management starter;
- definitions and measurement method of the power consumption of the control circuit during holding and pick-up operations;
- measurement method of the pole impedance;
- requirements for screwless terminals;
- performance requirements for latched contactors;
- alignments to Amendment 1 of IEC 60947-1:2007;
- harmonisation with IEC 60947-2 of the operation tests of under-voltage relays and shunt releases;
- short-circuit tests harmonisation with North America;
- test requirements for utilisation AC-6b capacitor load;
- polarity for DC contactors;
- dielectric test method in presence of built-in varistor;
- addition of an extended function for electronic overload relay: control functions.

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 4-1: Contactors and motor-starters – Electromechanical contactors and motor-starters

1 Scope and object

1.1 Scope

This part of IEC 60947 applies to the types of equipment listed in 1.1.1 and 1.1.2 whose main contacts are intended to be connected to circuits the rated voltage of which does not exceed 1 000 V a.c. or 1 500 V d.c.

Starters and/or contactors dealt with in this standard are not normally designed to interrupt short-circuit currents. Therefore, suitable short-circuit protection (see 9.3.4) forms part of the installation but not necessarily of the contactor or the starter.

In this context, this standard gives requirements for:

– contactors associated with overload and/or short-circuit protective devices;
– starters associated with separate short-circuit protective devices and/or with separate short-circuit and integrated overload protective devices;
– contactors or starters combined, under specified conditions, with their own short-circuit protective devices. Such combinations, e.g. combination starters or protected starters are rated as units.

For circuit-breakers and fuse-combination units used as short-circuit protective devices in combination starters and in protected starters, the requirements of IEC 60947-2 and IEC 60947-3 respectively apply.

Equipment covered by this standard is as follows.

1.1.1 AC and DC contactors

AC and DC contactors intended for closing and opening electric circuits and, if combined with suitable relays (see 1.1.2), for protecting these circuits against operating overloads which may occur therein.

NOTE For contactors combined with suitable relays and which are intended to provide short-circuit protection, the relevant conditions specified for circuit-breakers (IEC 60947-2) additionally apply.

This standard applies also to the actuators of contactor relays and to the contacts dedicated exclusively to the coil circuit of a contactor.

Contactors or starters with an electronically controlled electromagnet are also covered by this standard.

1.1.2 AC motor-starters

AC motor-starters (including motor management starter) intended to start and accelerate motors to normal speed, to ensure continuous operation of motors, to switch off the supply from the motor and to provide means for the protection of motors and associated circuits against operating overloads.