

ICS 29.120.40
CCS K 31



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 14048.5-2017

**Low-voltage switchgear and controlgear -- Part 5-1: Control
circuit devices and switching element -- Electromechanical
control circuit devices
(English Translation)**

Issued on: November 1, 2017

Implemented on: May 1, 2018

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine of the PRC**

Table of Contents

Foreword...	4
1 General...	8
2 Terms and definitions...	12
3 Classification...	22
4 Characteristics...	23
5 Product information...	29
6 Normal service, mounting and transport conditions...	32
7 Constructional and performance requirements...	34
8 Tests...	45
Annex A (Normative) Electrical ratings based on utilization categories (see 3.1)...	66
Annex B (Normative) Example of inductive test loads for d.c. contacts...	68
Annex C (Normative) Special tests - Durability tests...	70
Annex D Vacant...	74
Annex E (Normative) Items subject to agreement between manufacturer and user..	75

Foreword

"Low-voltage switchgear and controlgear" consists of the following parts.

- Part 1.General rules;
- Part 2.Circuit-breakers;
- Part 3.Switches, disconnectors, switch-disconnectors and fuse-combination units;
- Part 4-1.Contactors and motor-starters - Electromechanical contactors and motor-starters (Including motor protector);
- Part 4-2.Contactors and motor starters - Semiconductor controllers and starters for AC motors (including soft starters);
- Part 4-3.Contactors and motor-starters - AC semiconductor controllers and contactors for non-motor loads;
- Part 5-1.Control circuit devices and switching element - Electromechanical

control circuit devices;

- Part 5-2.Control circuit appliances and switching elements - Proximity switches;
- Part 5-3.Control circuit devices and switching elements - Requirements for proximity devices with defined behaviour under fault conditions (PDDB);
- Part 5-4.Control circuit devices and switching elements - Method of assessing the performance of low-energy contacts - Special tests;
- Part 5-5.Control circuit devices and switching elements - Electrical emergency stop device with mechanical latching function;
- Part 5-6.Control circuit devices and switching elements - DC interface for proximity sensors and switching amplifiers (NAMUR);
- Part 5-7.Control circuit devices and switching elements - Requirements for proximity devices with analogue output;
- Part 5-8.Control circuit devices and switching elements - Three-position enabling switches;
- Part 5-9.Control circuit devices and switching elements - Flow rate switches;
- Part 6-1.Multiple function equipment - Transfer switching equipment;
- Section 6-2.Multiple function equipment control and protective switching devices (or equipment) (CPS);
- Part 7-1.Ancillary equipment - Terminal blocks for copper conductors;
- Part 7-2.Ancillary equipment - Protective conductor terminal blocks for copper conductors;
- Part 7-3.Ancillary equipment - Safety requirements for fuse terminal blocks;
- Part 8.Control units for built-in thermal protection (PTC) for rotating electrical machines.

This Part is Part 5-1 of "Low-voltage switchgear and controlgear".

This Part is drafted in accordance with the rules given in GB/T 1.1-2009.

This Part replaces GB/T 14048.5-2008 "Low-voltage switchgear and controlgear - Part 5-1. Control circuit devices and switching element - Electromechanical control circuit devices".

As compared with GB/T 14048.5-2008, the main technical changes of this Part are as follows.

- Delete the characteristic requirements related to the overvoltage of make-break operation (see 4.9 of the 2008 edition);
- ADD polarity requirements for contact elements (see 4.10);
- ADD the information content which the manufacturer shall provide [see 5.1 o)~5.1 p)];
- Modify the marking requirements for terminals, emergency stop, etc. (see 5.2.1~5.2.4; 5.2.1~5.2.4 of the 2008 edition);
- ADD the requirements for glow-wire testing and test based on flammability category (see 7.1.2.2, 7.1.2.3);
- Modify the requirements for clearances and creepage distances; and directly QUOTE the corresponding provisions of IEC 60947-1 (see 7.1.4;

7.1.3 of the 2008 edition);

- ADD requirements related to maximum recovery time (see 7.2.8);
- Modify the requirements related to immunity (see 7.3.2; 7.3 of the 2008 edition);
- ADD types of special tests which can be performed, including damp heat, salt mist, vibration, and shock tests, etc. (see 8.1.5);
- ADD requirements of electrical performance and ageing test for screwless-type clamping units (see 8.2.4.7~8.2.4.8);
- ADD speed requirements for movement rotary switches (see 8.3.2.1);
- Modify the requirements for adjustment of prospective current in the test circuit and test quantities (see 8.3.4.3; 8.3.4.3 of the 2008 edition);
- ADD EMC tests (see 8.4);

- ADD Figure 10 "Voltage drop measurement at contact point of the clamping unit or terminal" (see 8.4.4);
- Delete Annex D "Clearances and creepage distances of control circuit devices" and left vacant;
- Modify the provisions of pulling force for cable in the pull-out test (see G.8.2.2; G.8.1.1 of the 2008 edition);
- Modify the general requirements for EMC verification test and immunity test of control circuit devices with semiconductor switching elements (see H.8.7.1~H.8.7.2; H.8.7.1~H.8.7.2 of the 2008 edition);
- Delete the requirements related to lens color (see Annex J);
- ADD the provisions of terminal marking, distinctive number, and distinctive letter for control circuit devices (see Annex M);
- ADD the provisions of "Procedure to determine reliability data for electromechanical devices in control circuits used in functional safety applications" (see Annex N).

This Part uses redraft law to modify and adopt IEC 60947-5-1:2016 "Low-voltage switchgear and controlgear - Part 5-1. Control circuit devices and switching elements - Electromechanical control circuit devices".

The technical differences between this Part and IEC 60947-5-1:2016 and their reasons are as follows.

- About normative references, this Part has made adjustments with technical differences, to adapt to the technical conditions of China. The adjustments are reflected in Clause 2 "Normative references". The specific adjustment is as follows.

lambda ADD the national standard GB/T 14048.1-2012 "Low-voltage switchgear and controlgear - Part 1. General rules".

- In 7.1.2.1 "General requirements", the requirement for humidity resisting qualities of materials is changed to "in accordance with the provisions of