

ICS 29.120.40,29.130.20
CCS K 31



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

GB/T 14048.25-2025

**Low-voltage switchgear and controlgear - Part 9-2: Active
arc-fault mitigation systems - Optical-based internal
arc-detection and mitigation devices**

低压开关设备和控制设备 第9-2部分：电弧故障主动抑制系统 基于光信号的内部
电弧探测和抑制设备

(English Translation)

Issued on: December 31, 2025

Implemented on: July 1, 2026

Issued by: State Administration for Market Regulation

Table of Contents

Preface	
Introduction	
1 Scope	
2 Normative References	
3 Terms and Definitions	4.
4 Classification	6.
4.1 Types of IACDs	
4.2 Sensor Combination	
4.3 Switch Output Types	
5 Characteristics	
5.1 Maximum arc fault detection time	
5.2 Maximum arc fault extinction time	
5.3 Minimum Arc Fault Detection Current Value	
5.4 Maximum expected short-circuit current value	
6 Product Information	
6.1 Types of Information	
6.2 Mark	
6.3 Installation, Operation, Maintenance, Shutdown and Disassembly Instructions	
7 Normal use, installation and transportation conditions	
8 Structural and performance requirements	
8.1 Structural Requirements	
8.2 Performance Requirements	
8.3 Electromagnetic Compatibility (EMC)	
9 Experiment	
9.1 General Requirements - Test Types	
9.2 Consistency of Structural Requirements	
9.3 Type Testing	
9.4 Routine Test	
10 Test Report	
Appendix A (Normative) Testing under Low-Energy Arcs	
A.1 General requirement	
A.2 Electrical test circuit, electrodes and arc parameters	

A.3 Preparation and Maintenance

A.4 Adjustment and Positioning of Optical Sensors

A.5 IACD Maintenance Instructions During the Test Procedure

Appendix B (Normative) Detection and Arc Extinguishing Tests for High-Energy Electric Arcs

B.1 General requirement

B.2 Sample, electrical test circuit, arc parameters

B.3 Environmental Conditions

B.4 Adjustment and Positioning of Optical Sensors

B.5 Maintenance Instructions

Appendix C (Normative) Arc Current Parameters

C.1 Preface

C.2 Different phases of the electric arc

C.3 Arc Ignition Detection (t_0)

C.4 Arc Continuity

C.5 Arc extinguishing detection

C.6 Measuring device

C.7 Waveform Consistency

Appendix D (Informative) IACD Optical Measurement

D.1 Preface

D.2 Different optical units

D.3 Measurement of Light

D.4 Measuring the sensitivity and bandwidth of the IACD optical sensor

Appendix E (Normative) Ambient Light Immunity Test

E.1 Generally requires

E.2 Test Method

Appendix F (Informative) Terms and Conditions of Agreement Between Manufacturer and User

References

Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document is Part 9-2 of GB/T 14048 "Low-voltage switchgear and controlgear". GB/T 14048 has been published as follows.

Part 2.

---Part 1: General Provisions;

---Part 2: Circuit Breakers;

---Part 3: Switches, Isolators, Disconnecting Switches and Fuse Combinations;

---Part 4-1. Contactors and Motor Starters Electromechanical contactors and motor starters (including motor protectors);

---Part 4-2. Contactors and Motor Starters. Semiconductor Controllers and Starters (including Soft Starters) for AC Motors;

---Part 4-3. Contactors and Motor Starters. AC Semiconductor Controllers and Contactors for Non-Motor Loads;

---Part 5-1. Control Circuit Appliances and Switching Elements - Electromechanical Control Circuit Appliances;

---Part 5-2. Control Circuits, Electrical Appliances, and Switching Elements (Proximity Switches);

---Part 5-3. Control Circuitry and Switching Elements. Proximity Switches (PDDBs) with Defined Functionality under Fault Conditions Require;

---Part 5-4. Special Tests for Performance Evaluation of Small-Capacity Contacts in Control Circuits and Switching Elements;

---Part 5-5. Electrical emergency braking devices with mechanical latching function, including control circuitry and switching elements;

---Parts 5-6. Control Circuit Electrical Appliances and Switching Elements DC Interface for Proximity Sensors and Switching Amplifiers (NAMUR);

---Parts 5-7. Requirements for control circuit electrical appliances and switching elements for proximity devices with analog outputs;

---Parts 5-8. Control Circuit Electrical Appliances and Switching Elements - Three-position Enable Switch;

---Parts 5-9. Control Circuits, Electrical Appliances, and Switching Elements; Flow Switches;

---Part 6-1. Multifunctional Electrical Transfer Switches;

---Part 6-2. Multifunctional Electrical Appliances (Equipment) Control and Protection Switchgear (Equipment) (CPS);

- Part 7-1. Terminal blocks for copper conductors of auxiliary devices;
- Part 7-2. Protective conductor terminal blocks for copper conductors of auxiliary devices;
- Part 7-3. Safety requirements for auxiliary device fuse terminal blocks;
- Part 7-4. PCB terminal blocks for copper conductors of auxiliary components;
- Part 7-5. Terminal blocks for aluminum conductors in auxiliary components;
- Part 8: Built-in Thermal Protection (PTC) Control Unit for Rotating Electrical Machines;
- Part 9-1. Arc-extinguishing devices for active arc fault suppression systems;
- Part 9-2. Active Arc Fault Suppression System. Internal Arc Detection and Suppression Device Based on Optical Signals.

This document is modified to adopt IEC 60947-9-2:2021 "Low-voltage switchgear and controlgear - Part 9-2. Active suppression of arc faults".

The system is an internal arc detection and suppression device based on optical signals.

The technical differences between this document and IEC 60947-9-2:2021, and the reasons therefor, are as follows.

- The scope of application has been expanded (see Chapter 1);
- IEC 60947-9-1:2019 (see 9.3.6.1 and 9.4.1) has been replaced with the normatively referenced GB/T 14048.23-2022.

Adapt to my country's national conditions.

The following editorial changes have been made to this document.

---Figure 6 shows a multi-functional IACD (hardware) architecture. The "minimum system under consideration" represented by the dashed line contains IEC original text editing errors.

Incorrect, corrected to include only one auxiliary processor.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Electrical Equipment Industry Association.

This document is under the jurisdiction of the National Technical Committee on Standardization of Low Voltage Electrical Appliances (SAC/TC189).

Introduction

Low-voltage switchgear and control equipment are produced in large quantities and are widely used, including circuit breakers, isolators, disconnect switches and fuse