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

GB/T 15969.2-2024

Replacing GB/T 15969.2-2008

**Programmable controllers - Part 2: Equipment requirements
and tests**

(English Translation)

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is Part 2 of GB/T 15969 "Programmable Controllers". GB/T 15969 has published the following parts.

- Part 1: General information;
- Part 2: Equipment requirements and tests;
- Part 3: Programming languages;
- Part 4: User Guide;
- Part 5: Communications;

- Part 6: Functional safety;
- Part 7: Fuzzy control programming;
- Part 8: Application and implementation guidelines for programming languages;
- Part 9: Single-point digital communication interface (SDCI) for small sensors and actuators;
- Part 10: XML open exchange format for PLCs.

This document replaces GB/T 15969.2-2008 "Programmable controllers Part 2: Equipment requirements and tests" and GB/T 15969.2-Compared with 2008, in addition to structural adjustments and editorial changes, the main technical changes are as follows.

- Deleted the safety requirements and quoted IEC 61010-2-201 (see Chapter 11 to Chapter 14 of the 2008 edition);
- Added negative logic digital input and output (see 6.4.3, Appendix F);
- Added 3-D digital input (see 6.4.4.3);
- Added the requirements for radio frequency electromagnetic amplitude modulation immunity from 2.7 GHz to 6 GHz (see 7.3, Appendix C);
- Added temperature test instructions (see 4.2.6);
- Added type test instructions (see 4.2.1, 4.2.10);
- Deleted some technologies that are no longer recommended (see Chapter 10 of the 2008 edition);
- Changed various functional requirements and EMC requirements (see Chapter 6 to Chapter 7, Chapter 5, Chapter 8 and Chapter 9 of the 2008 edition);
- Changed some clauses to more closely link requirements and verification (see Chapter 4, Chapter 5, Chapter 8, Chapter 4, 2008 Edition Chapter 6, Chapter 7).

This document is equivalent to IEC 61131-2:2017 "Industrial process measurement and control programmable controllers Part 2: Equipment requirements and test".

The following minimal editorial changes were made to this document.

- To be consistent with the existing standards, the name of the standard is changed to "Programmable Controllers Part 2: Equipment Requirements and Tests".

Introduction

Since its introduction, programmable controllers have been widely used in various fields of industrial automation and have become an important component of industrial automation systems.

The development of programmable controller technology is very rapid. The application range has expanded from logic control to motion control, process control, batch control, etc.

control, recipe control, etc.; the control range is expanded from a single machine to the entire workshop and even the entire factory and radio remote control, thus covering a part of the application fields of programmable controllers are divided into distributed control systems (DCS), numerical control systems (NC), and robot control systems. In short, programmable controllers have been continuously Expand towards vertical and horizontal integration.

GB/T 15969 PLC series standards have been continuously revised and expanded with the development of PLC technology.

The software, hardware, peripherals and related guidelines of the programmable logic controller (PLC) are systematically standardized and are intended to be composed of ten parts.

--- Part 1: General information. The purpose is to establish the relevant definitions of programmable controllers and their peripherals, and to confirm the Key features relevant to the selection and application of program controllers and their peripherals.

--- Part 2: Equipment requirements and tests. The purpose is to provide equipment requirements and related tests for programmable controllers and their peripherals.

Inspection regulations.

--- Part 3: Programming languages. The purpose is to define the semantics and syntax of the most commonly used programming languages for programmable controllers.

--- Part 4: User Guide. The purpose is to provide PLC end users with general information about GB/T 15969 and to help them Select PLC equipment and technical specifications according to GB/T 15969 series standards.

--- Part 5: Communication. The purpose is to define the communication between programmable controllers and other electronic systems.

--- Part 6: Functional safety. The functional safety requirements for programmable controllers and related peripherals are specified.

The purpose is to establish and describe the safety lifecycle elements of functional safety programmable controllers and to integrate them with IEC 61508 Parts 1, 2 and 3.

The general safety lifecycle identified in the

--- Part 7: Fuzzy control programming. Fuzzy control programming language, fuzzy control application integration GB/T 15969.3 programming the basic methods in the language are specified to provide a basis for the interactive transplantation of fuzzy control programs between different programming systems.

Provide basis.

--- Part 8: Application and implementation guidelines for programming languages. The purpose is to help users use the programming languages defined in Part 3.

language for software development.

--- Part 9: Single-point digital communication interface (SDCI) for small sensors and actuators. For PLC master stations and devices the Single-Point Digital Communications Interface (SDCI) specifies the communications services and protocols for the digital communications interface in Part 2.

The IO interface is expanded to SDCI.

--- Part 10: XML open interaction format for PLC. The purpose is to define the XML interaction format of GB/T 15969.3.

It can realize the exchange of GB/T 15969.3 programs or even the entire GB/T 15969.3 project in different development environments.

This document is part of a series of standards for programmable controllers and should be read in conjunction with the other parts of the series, but can also be read independently.

If there is a conflict between this document and other IEC standards, the provisions of this document shall prevail.

The field of industrial control equipment includes programmable controllers and related peripherals.

This document specifies the following equipment requirements and tests for industrial control equipment.

--- Test and verification methods (Chapter 4);

---Operating conditions (5.2);

--- Temperature and climate test (5.2.1);

--- Mechanical requirements and tests (5.3);

--- Functional requirements and tests for power supplies, I/O and other components (Chapter 6);

--- Electromagnetic compatibility (EMC) requirements and tests (Chapter 7);

--- Marking and documentation requirements (Chapter 8).

The product safety requirements for PLCs and other types of industrial control equipment currently within the scope of this document are in IEC 61010-2-201.

2017, this document directly quotes these provisions, thereby replacing Chapters 11 to 14