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

GB/T 15969.3-2017

Replacing GB/T 15969.3-2005

**Programmable controllers -- Part 3: Programming languages
(English Translation)**

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Appendix A (Normative) Language Elements of the formal specification

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Reference

Foreword

GB/T 15969 "programmable logic controller" contains the following sections.

- Part 1. General information;
- Part 2. Equipment requirements and testing;
- Part 3. Programming language;
- Part 4. User Guide;
- Part 5. Communication;
- Part 6. Functional safety;
- Part 7. Fuzzy control programming;
- Part 8. Programming language application and implementation guidelines.

This section GB/T 15969 Part 3.

This section drafted in accordance with GB/T 1.1-2009 given rules.

This Part replaces GB/T 15969.3-2005 "programmable logic controller Part 3. Programming Language." this section compared with GB/T 15969.3-2005 main increase object-oriented programming content. The main changes are as follows.

- The type of direct literal (value) as part of the amount to represent, to facilitate the application of the amount;
- Relaxed on the function (not a function block) does not allow the existence of side effects due to its implementation requirements, as long as the function of the set it is not harmful to note that the side effects produced are as follows.
- Improve the syntax of a programming language such as Structured Text (ST) so that multi-output links of functions and function blocks can have A flexibility that is equivalent to multi-output linking of Function Block Diagrams (FBDs);
- A new string data type WSTRING is specified to accommodate the wide characters defined in ISO/IEC 10646 (ie Double-byte) string.

This section uses the translation method identical with IEC 61131-3-2013 "programmable logic controller Part 3. Programming Language." the documents of our country that are consistent with the corresponding international documents that are normative references in this section are as follows.

- GB 13000-2010 Information technology common multi-octet-coded character set (UCS)

(ISO/IEC 10646:2003, IDT)

--- GB/T 15969.1-2007 programmable logic controller Part 1. General Information (IEC 61131-1:2003, IDT)

--- GB/T 15969.5-2002 Programmable controller Part 5. Communication (IEC 61131-5:2000, IDT)

--- GB/T 17966-2000 binary floating-point arithmetic microprocessor system (IEC 60559:1989, IDT) Please note that some of this document may be patentable. The issuing agencies of this document do not bear the responsibility of identifying these patents.

This part is proposed by China Machinery Industry Federation.

This part of the National Industrial Process Measurement Control and Automation Standardization Technical Committee (SAC/TC124) centralized.

This section is drafted unit. Hangzhou University of Electronic Science and Technology, Beijing Institute of Machinery Industry Automation, Hangzhou Automation System Co., Ltd. excellent.

1 Scope

This section GB/T 15969 specifies the programmable logic controller (as defined in part 1 of GB/T 15969) programming language Law and semantics.

Part 1 of GB/T 15969 specifies the functions of program loading, testing, monitoring, operating system and so on.

This part of the programmable logic controller for the provisions of a unified programming language and semantics of the language contains two text languages.

Order List (IL) and Structured Text (ST) and includes two image languages. Ladder Diagram (LD) and Functional Block Diagram (FBD).

Another set of diagram and class text elements is defined for the internal organization of programmable controller programs and function modules, which are named in order Function Chart (SFC). At the same time, the definition of configuration elements supports the installation of programmable controller programs into the programmable controller system.

In addition, some functions are defined to facilitate communication between the programmable controller and other automation system components.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version applies to this article Pieces. For undated references, the

latest edition (including all amendments) applies to this document.

IEC 61131-1 Programmable Controllers Part 1. General Information
(Programmablecontrollers-Part 1: Generalin-formation IEC 61131-5 Programmable
Controllers Part 5. Communications (Programmablecontrollers-Part 5: Communica-tions
ISO/IEC 10646:2012 Information technology - universal coding character set
[Informationtechnology - UniversalCoded CharacterSet (UCS)] ISO/IEC/IEEE60559
Information Technology Microprocessor System Floating Point Algorithm
(Informationtechnology-Micropro-cessorSystems-Floating-Pointarithmetic)

3 Terms and definitions

IEC 61131-1 defines the following terms and definitions apply to this document.

Note 1: The symbol "(ISO)" after the definition statement indicates that the definition is taken from the ISO/AFNOR Computer Science Dictionary.

Note 2: Terms not defined in this section should be consulted in the ISO/AFNOR Computer Science Dictionary and IEC 60050.

Absolute time the combination of date and time information.

Access path the combination of symbolic names and variables for the purpose of open communication.

Action

Boolean variables to be executed or a set of operations and related control structures.