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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Programmable controllers –
IEC STANDARD PREVIEW
Part 3: Programming languages
(standards.iteh.ai)

Automates programmables –
IEC 61131-3:2013
Partie 3: Langages de programmation
<https://standards.iteh.ai/catalog/standards/sist/d44024f3-d345-4126-a5f8-21442d41d3bc/iec-61131-3-2013>





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CONTENTS

FOREWORD	7
1 Scope	9
2 Normative references	9
3 Terms and definitions	9
4 Architectural models	18
4.1 Software model	18
4.2 Communication model	19
4.3 Programming model	20
5 Compliance	22
5.1 General	22
5.2 Feature tables	22
5.3 Implementer's compliance statement	22
6 Common elements	24
6.1 Use of printed characters	24
6.1.1 Character set	24
6.1.2 Identifiers	24
6.1.3 Keywords	24
6.1.4 Use of white space	25
6.1.5 Comments	25
6.2 Pragma	26
6.3 Literals – External representation of data	26
6.3.1 General	26
6.3.2 Numeric literals and string literals	26
6.3.3 Character string literals	28
6.3.4 Duration literal	29
6.3.5 Date and time of day literal	30
6.4 Data types	30
6.4.1 General	30
6.4.2 Elementary data types (BOOL, INT, REAL, STRING, etc.)	30
6.4.3 Generic data types	33
6.4.4 User-defined data types	34
6.5 Variables	47
6.5.1 Declaration and initialization of variables	47
6.5.2 Variable sections	49
6.5.3 Variable length ARRAY variables	51
6.5.4 Constant variables	53
6.5.5 Directly represented variables (%)	54
6.5.6 Retentive variables (RETAIN, NON_RETAIN)	56
6.6 Program organization units (POUs)	58
6.6.1 Common features for POU s	58
6.6.2 Functions	70
6.6.3 Function blocks	99
6.6.4 Programs	117
6.6.5 Classes	118

6.6.6	Interface	137
6.6.7	Object oriented features for function blocks	146
6.6.8	Polymorphism.....	152
6.7	Sequential Function Chart (SFC) elements.....	155
6.7.1	General	155
6.7.2	Steps.....	155
6.7.3	Transitions	157
6.7.4	Actions	160
6.7.5	Rules of evolution.....	168
6.8	Configuration elements.....	176
6.8.1	General	176
6.8.2	Tasks	180
6.9	Namespaces	186
6.9.1	General	186
6.9.2	Declaration	186
6.9.3	Usage.....	192
6.9.4	Namespace directive USING	192
7	Textual languages	195
7.1	Common elements.....	195
7.2	Instruction list (IL)	195
7.2.1	General	195
7.2.2	Instructions.....	195
7.2.3	Operators, modifiers and operands	196
7.2.4	Functions and function blocks.....	198
7.3	Structured Text (ST)	201
7.3.1	General	21442d41d3hc/iec-61131-3-2013
7.3.2	Expressions.....	201
7.3.3	Statements	203
8	Graphic languages	208
8.1	Common elements.....	208
8.1.1	General	208
8.1.2	Representation of variables and instances.....	209
8.1.3	Representation of lines and blocks	211
8.1.4	Direction of flow in networks	212
8.1.5	Evaluation of networks	213
8.1.6	Execution control elements.....	214
8.2	Ladder diagram (LD)	215
8.2.1	General	215
8.2.2	Power rails	216
8.2.3	Link elements and states	216
8.2.4	Contacts	216
8.2.5	Coils	218
8.2.6	Functions and function blocks.....	219
8.2.7	Order of network evaluation.....	219
8.3	Function Block Diagram (FBD)	219
8.3.1	General	219
8.3.2	Combination of elements	219
8.3.3	Order of network evaluation.....	220
	Annex A (normative) Formal specification of the languages elements	221

Annex B (informative) List of major changes and extensions of the third edition.....	228
Bibliography.....	229
Figure 1 – Software model	18
Figure 2 – Communication model.....	20
Figure 3 – Combination of programmable controller language elements.....	21
Figure 4 – Implementer’s compliance statement (Example).....	23
Figure 5 – Hierarchy of the generic data types	34
Figure 6 – Initialization by literals and constant expressions (Rules)	35
Figure 7 – Variable declaration keywords (Summary).....	50
Figure 8 – Usage of VAR_GLOBAL, VAR_EXTERNAL and CONSTANT (Rules).....	51
Figure 9 – Conditions for the initial value of a variable (Rules).....	57
Figure 10 – Formal and non-formal representation of call (Examples)	63
Figure 11 – Data type conversion rules – implicit and/or explicit (Summary)	67
Figure 12 – Supported implicit type conversions	68
Figure 13 – Usage of function block input and output parameters (Rules)	108
Figure 14 – Usage of function block input and output parameters (Illustration of rules)	109
Figure 15 – Standard timer function blocks – timing diagrams (Rules)	116
Figure 16 – Overview of inheritance and interface implementation	119
Figure 17 – Inheritance of classes (Illustration).....	128
Figure 18 – Interface with derived classes (Illustration).....	138
Figure 19 – Inheritance of interface and class (Illustration) <small>IEC 61131-3:2013 https://standards.iteh.ai/catalog/standards/sist/d44024b-d345-4f26-a518</small>	143
Figure 20 – Function block with optional body and methods (Illustration)	149
Figure 21 – Inheritance of function block body with SUPER() (Example).....	151
Figure 22 – ACTION_CONTROL function block – External interface (Summary)	165
Figure 23 – ACTION_CONTROL function block body (Summary).....	166
Figure 24 – Action control (Example)	168
Figure 25 – SFC evolution (Rules)	174
Figure 26 – SFC errors (Example)	175
Figure 27 – Configuration (Example).....	177
Figure 28 – CONFIGURATION and RESOURCE declaration (Example)	180
Figure 29 – Accessibility using namespaces (Rules)	189
Figure 30 – Common textual elements (Summary)	195
Table 1 – Character set	24
Table 2 – Identifiers	24
Table 3 – Comments	25
Table 4 – Pragma	26
Table 5 – Numeric literals	27
Table 6 – Character string literals	28
Table 7 – Two-character combinations in character strings	29
Table 8 – Duration literals.....	29
Table 9 – Date and time of day literals	30

Table 10 – Elementary data types	31
Table 11 – Declaration of user-defined data types and initialization	35
Table 12 – Reference operations	46
Table 13 – Declaration of variables	48
Table 14 – Initialization of variables	49
Table 15 – Variable-length ARRAY variables.....	52
Table 16 – Directly represented variables	54
Table 17 – Partial access of ANY_BIT variables	60
Table 18 – Execution control graphically using EN and ENO	65
Table 19 – Function declaration	72
Table 20 – Function call.....	74
Table 21 – Typed and overloaded functions	76
Table 22 – Data type conversion function	78
Table 23 – Data type conversion of numeric data types	80
Table 24 – Data type conversion of bit data types	82
Table 25 – Data type conversion of bit and numeric types.....	83
Table 26 – Data type conversion of date and time types	85
Table 27 – Data type conversion of character types	86
Table 28 – Numerical and arithmetic functions.....	87
Table 29 – Arithmetic functions.....	88
Table 30 – Bit shift functions	89
Table 31 – Bitwise Boolean functions https://standards.iec.org/catalog/standards/sist/d44024f3-d345-4126-a5f8	89
Table 32 – Selection functions ^d https://standards.iec.org/catalog/standards/sist/d44024f3-d345-4126-a5f8	90
Table 33 – Comparison functions	91
Table 34 – Character string functions.....	92
Table 35 – Numerical functions of time and duration data types	93
Table 36 – Additional functions of time data types CONCAT and SPLIT	94
Table 37 – Function for endianess conversion	98
Table 38 – Functions of enumerated data types	98
Table 39 – Validate functions	99
Table 40 – Function block type declaration	100
Table 41 – Function block instance declaration	104
Table 42 – Function block call.....	105
Table 43 – Standard bistable function blocks ^a	112
Table 44 – Standard edge detection function blocks	113
Table 45 – Standard counter function blocks.....	113
Table 46 – Standard timer function blocks	115
Table 47 – Program declaration	117
Table 48 – Class	120
Table 49 – Class instance declaration.....	122
Table 50 – Textual call of methods – Formal and non-formal parameter list	125
Table 51 – Interface	137
Table 52 – Assignment attempt.....	146

Table 53 – Object oriented function block	147
Table 54 – SFC step	156
Table 55 – SFC transition and transition condition	158
Table 56 – SFC declaration of actions	160
Table 57 – Step/action association	162
Table 58 – Action block.....	163
Table 59 – Action qualifiers.....	163
Table 60 – Action control features.....	168
Table 61 – Sequence evolution – graphical.....	169
Table 62 – Configuration and resource declaration	178
Table 63 – Task	182
Table 64 – Namespace	191
Table 65 – Nested namespace declaration options	192
Table 66 – Namespace directive USING.....	194
Table 67 – Parenthesized expression for IL language	197
Table 68 – Instruction list operators	197
Table 69 – Calls for IL language	199
Table 70 – Standard function block operators for IL language.....	201
Table 71 – Operators of the ST language.....	202
Table 72 – ST language statements	203
Table 73 – Graphic execution control elements.....	215
Table 74 – Power rails and link elements	216
Table 75 – Contacts.....	217
Table 76 – Coils.....	218

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International Standard IEC 61131-3 has been prepared by subcommittee 65B: Measurement and control devices, of IEC technical committee 65: Industrial-process measurement, control and automation.

This third edition of IEC 61131-3 cancels and replaces the second edition, published in 2003. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

This third edition is a compatible extension of the second edition. The main extensions are new data types and conversion functions, references, name spaces and the object oriented features of classes and function blocks. See Annex B.

The text of this standard is based on the following documents:

FDIS	Report on voting
65B/858/FDIS	65B/863/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

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

A list of all the parts in the IEC 61131 series, published under the general title *Programmable controllers* can be found on the IEC website.

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PROGRAMMABLE CONTROLLERS –

Part 3: Programming languages

1 Scope

This part of IEC 61131 specifies syntax and semantics of programming languages for programmable controllers as defined in Part 1 of IEC 61131.

The functions of program entry, testing, monitoring, operating system, etc., are specified in Part 1 of IEC 61131.

This part of IEC 61131 specifies the syntax and semantics of a unified suite of programming languages for programmable controllers (PCs). This suite consists of two textual languages, Instruction List (IL) and Structured Text (ST), and two graphical languages, Ladder Diagram (LD) and Function Block Diagram (FBD).

An additional set of graphical and equivalent textual elements named Sequential Function Chart (SFC) is defined for structuring the internal organization of programmable controller programs and function blocks. Also, configuration elements are defined which support the installation of programmable controller programs into programmable controller systems.

In addition, features are defined which facilitate communication among programmable controllers and other components of automated systems.

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The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61131-1, *Programmable controllers – Part 1: General information*

IEC 61131-5, *Programmable controllers – Part 5: Communications*

ISO/IEC 10646:2012, *Information technology – Universal Coded Character Set (UCS)*

ISO/IEC/IEEE 60559, *Information technology – Microprocessor Systems – Floating-Point arithmetic*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61131-1 and the following apply.

3.1

absolute time

combination of time of day and date information

3.2**access path**

association of a symbolic name with a variable for the purpose of open communication

3.3**action**

Boolean variable or a collection of operations to be performed, together with an associated control structure

3.4**action block**

graphical language element which utilizes a Boolean input variable to determine the value of a Boolean output variable or the enabling condition for an action, according to a predetermined control structure

3.5**aggregate**

structured collection of data objects forming a data type

[SOURCE: ISO/AFNOR:1989]

3.6**array**

aggregate that consists of data objects, with identical attributes, each of which may be uniquely referenced by subscripting

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[SOURCE: ISO/AFNOR:1989] ([standards.iteh.ai](https://standards.iteh.ai/catalog/standards/sist/d44024f3-d345-4126-a5f8-21442d41d3bc/iec-61131-3-2013))

3.7**assignment**

[IEC 61131-3:2013](#)

[mechanism to give a value to a variable or to an aggregate](https://standards.iteh.ai/catalog/standards/sist/d44024f3-d345-4126-a5f8-21442d41d3bc/iec-61131-3-2013)

[SOURCE: ISO/AFNOR:1989]

3.8**base type**

data type, function block type or class from which further types are inherited/derived

3.9**based number**

number represented in a specified base other than ten

3.10**binary coded decimal**

BCD

encoding for decimal numbers in which each digit is represented by its own binary sequence

3.11**bistable function block**

function block with two stable states controlled by one or more inputs

3.12**bit string**

data element consisting of one or more bits

3.13**bit string literal**

literal that directly represents a bit string value of data type BOOL, BYTE, WORD, DWORD, or LWORD

3.14**body**

set of operations of the program organization unit

3.15**call**

language construct causing the execution of a function, function block, or method

3.16**character string**

aggregate that consists of an ordered sequence of characters

3.17**character string literal**

literal that directly represents a character or character string value of data type CHAR, WCHAR, STRING, or WSTRING

3.18**class**

program organization unit consisting of:

- the definition of a data structure,
- a set of methods to be performed upon the data structure, and

3.19**iTeh STANDARD PREVIEW****comment**

language construct for the inclusion of text having no impact on the execution of the program

[SOURCE: ISO/AFNOR:1989]

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3.20**configuration**

language element corresponding to a programmable controller system

3.21**constant**

language element which declares a data element with a fixed value

3.22**counter function block**

function block which accumulates a value for the number of changes sensed at one or more specified inputs

3.23**data type**

set of values together with a set of permitted operations

[SOURCE: ISO/AFNOR:1989]

3.24**date and time**

date within the year and the time of day represented as a single language element

3.25**declaration**

mechanism for establishing the definition of a language element

3.26**delimiter**

character or combination of characters used to separate program language elements

3.27**derived class**

class created by inheritance from another class

Note 1 to entry: Derived class is also named extended class or child class.

3.28**derived data type**

data type created by using another data type

3.29**derived function block type**

function block type created by inheritance from another function block type

3.30**direct representation**

means of representing a variable in a programmable controller program from which an implementation-specified correspondence to a physical or logical location may be determined directly

3.31**double word****iTeh STANDARD PREVIEW
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[IEC 61131-3:2013](#)

situation in which ~~the instance of a method call is retrieved during execution~~ according to the actual type of an instance or interface [E2d41d3bc/iec-61131-3-2013](#)

3.33**evaluation**

process of establishing a value for an expression or a function, or for the outputs of a network or function block instance, during program execution

3.34**execution control element**

language element which controls the flow of program execution

3.35**falling edge**

change from 1 to 0 of a Boolean variable

3.36**function**

language element which, when executed, typically yields one data element result and possibly additional output variables

3.37**function block instance**

instance of a function block type

3.38**function block type**

language element consisting of:

- the definition of a data structure partitioned into input, output, and internal variables; and
- a set of operations or a set of methods to be performed upon the elements of the data structure when an instance of the function block type is called

3.39**function block diagram**

network in which the nodes are function block instances, graphically represented functions or method calls, variables, literals, and labels

3.40**generic data type**

data type which represents more than one type of data

3.41**global variable**

variable whose scope is global

3.42**hierarchical addressing**

direct representation of a data element as a member of a physical or logical hierarchy

EXAMPLE A point within a module which is contained in a rack, which in turn is contained in a cubicle, etc.

3.43**identifier****iTeh STANDARD PREVIEW**

combination of letters, numbers, and underscore characters which begins with a letter or underscore and which names a language element
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3.44**IEC 61131-3:2013****implementation**

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product version of a PLC or the programming and debugging tool provided by the Implementer

3.45**Implementer**

manufacturer of the PLC or the programming and debugging tool provided to the user to program a PLC application

3.46**inheritance**

creation of a new class, function block type or interface based on an existing class, function block type or interface, respectively

3.47**initial value**

value assigned to a variable at system start-up

3.48**in-out variable**

variable which is used to supply a value to a program organization unit and which is additionally used to return a value from the program organization unit

3.49**input variable**

variable which is used to supply a value to a program organization unit except for class