

**SLOVENSKI
STANDARD**

SIST EN 61804-2:2004

december 2004

Function Blocks (FB) for process control - Part 2: Specification of FB concept and
Electronic Device Description Language (EDDL)

**iTeh STANDARD PREVIEW
(standards.iteh.ai)**

SIST EN 61804-2:2004

<https://standards.iteh.ai/catalog/standards/sist/83a2d8b9-a657-4703-a8da-74f9f05d4267/sist-en-61804-2-2004>

ICS 25.040.40; 35.240.50

Referenčna številka
SIST EN 61804-2:2004(en)

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 61804-2:2004

<https://standards.iteh.ai/catalog/standards/sist/83a2d8b9-a657-4703-a8da-74f9f05d4267/sist-en-61804-2-2004>

EUROPEAN STANDARD

EN 61804-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2004

ICS 25.040.40;35.240.50

English version

**Function Blocks (FB) for process control
Part 2: Specification of FB concept and
Electronic Device Description Language (EDDL)
(IEC 61804-2:2004)**

Blocs-Fonctions (FB) pour la commande
de processus
Partie 2 : Spécification du concept de bloc
et du langage descriptif des dispositifs
électroniques (EDDL)
(CEI 61804-2:2004)

Funktionsbausteine
für die Prozessautomation
Teil 2: Festlegung des
Funktionsbausteinskonzepts
und der Gerätebeschreibungssprache
(EDDL)

**iTeh STANDARD PREVIEW
(IEC 61804-2:2004)**
(standards.iteh.ai)

This European Standard was approved by CENELEC on 2004-06-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.
<https://www.cenelec.eu/docatalog/standard/61804-2-2004>

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 65C/324/FDIS, future edition 1 of IEC 61804-2, prepared by SC 65C, Digital communications, of IEC TC 65, Industrial-process measurement and control, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61804-2 on 2004-06-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2005-03-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2007-06-01

Annex ZA has been added by CENELEC.

The International Electrotechnical Commission (IEC) and CENELEC draw attention to the fact that it is claimed that compliance with this document may involve the use of patents

U.S. Patent No. 5,333,114

U.S. Patent No. 5,485,400

U.S. Patent No. 5,825,664

iTeh STANDARD PREVIEW
(standards.iteh.ai)

U.S. Patent No. 5,909,368

U.S. Patent Pending No. 08/916,178

Australian Patent No. 638507

SIST EN 61804-2:2004

Canadian Patent No. 2,066,743

<https://standards.iteh.ai/catalog/standards/sist/83a2d8b9-a657-4703-a8da-74f9f05d4267/sist-en-61804-2-2004>

European Patent No. 0495001

Validated in:

UK – Patent No. 0495001

France – Patent No. 0495001

Germany – Patent No. 69032954.7

Netherlands – Patent No. 0495001

Japan Patent No. 3137643

The IEC and CENELEC take no position concerning the evidence, validity and scope of this patent right. The holder of this patent right has assured the IEC that he is willing to negotiate licenses under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with IEC. Information may be obtained from:

Fieldbus Foundation,
9390 Research Boulevard, Suite II-250,
Austin, Texas, USA 78759,
Attention: President.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights other than those identified above. IEC and CENELEC shall not be held responsible for identifying any or all such patent rights.

Parts of this standard are derived from "Fieldbus Foundation Specification FF-890 rev. 1.5) (undated)" and "Fieldbus Foundation Specification FF-900 rev. 1.4 (dated 1999-06-29)" and are used with permission of the Fieldbus Foundation.¹⁾

Parts of this standard are derived from "HART Device Description Language Specification, rev. 11.0 August 5, 1996)" and "HART Device Description Language Method Builtins Library, rev. 10.1 (August 5, 1996)" and are used with the permission of the HART Communication Foundation.²⁾

Endorsement notice

The text of the International Standard IEC 61804-2:2004 was approved by CENELEC as a European Standard without any modification.

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 61804-2:2004

<https://standards.iteh.ai/catalog/standards/sist/83a2d8b9-a657-4703-a8da-74f9f05d4267/sist-en-61804-2-2004>

-
- 1) For additional information on Fieldbus Foundation, please contact: The Fieldbus Foundation, 9390 Research Boulevard, Austin, Texas 78759, USA. Tel: +1 512 794 8890. URL: www.fieldbusfoundation.org.)
 - 2) For additional information on HART Communication Foundation, please contact: HART Communication Foundation, 9390 Research Boulevard, Suite I-350, Austin, Texas 78759, USA. Tel: +1 512 794 0369. URL: www.hartcomm.org.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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

NOTE Where an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-351	1998	International Electrotechnical Vocabulary Part 351: Automatic control	-	-
IEC 60584-1	- 1)	Thermocouples Part 1: Reference tables	EN 60584-1	1995 2)
IEC 61131-3	2003	Programmable controllers Part 3: Programming languages	EN 61131-3	2003
IEC 61158	Series	Digital data communications for measurement and control - Fieldbus for use in industrial control systems <i>(See STANDARD REVIEW (standards.tech.ai))</i>	EN 61158	Series
IEC/PAS 61499-1	2000	Function blocks for industrial-process measurement and control systems https://standards.techai/catalog/standards/sist/83a2d8b9-a657-4703-a8da-749f05d4267/sist-en-61804-2-2004 Part 1: Architecture	-	-
IEC/PAS 61499-2	2001	Part 2: Software tools requirements	-	-
IEC/TS 61804-1	2003	Function blocks (FB) for process control Part 1: Overview of system aspects	-	-
ISO/IEC 2022	1994	Information technology - Character code structure and extension techniques	-	-
ISO/IEC 2375	2003	Information technology - Procedure for registration of escape sequences and coded character sets	-	-
ISO/IEC 7498-1	1994	Information technology - Open systems interconnection - Basic reference model Part 1: The basic model	-	-
ISO/IEC 8859-1	1998	Information technology - 8-bit single-byte coded graphic character sets Part 1: Latin alphabet No.1	-	-
ISO/IEC 9899	1999	Programming languages - C	-	-

1) Undated reference.

2) Valid edition at date of issue.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ISO/IEC 10646-1	2000	Information technology - Universal Multiple-Octet Coded Character Set (UCS) Part 1: Architecture and Basic Multilingual Plane	-	-
IEEE 754	1985	Binary Floating-Point Arithmetic (R1990)	-	-

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 61804-2:2004

<https://standards.iteh.ai/catalog/standards/sist/83a2d8b9-a657-4703-a8da-74f9f05d4267/sist-en-61804-2-2004>

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 61804-2:2004

<https://standards.iteh.ai/catalog/standards/sist/83a2d8b9-a657-4703-a8da-74f9f05d4267/sist-en-61804-2-2004>

INTERNATIONAL STANDARD

IEC
61804-2

First edition
2004-05

Function blocks (FB) for process control –

**Part 2:
Specification of FB concept and Electronic
Device Description Language (EDDL)**

**iTeh STANDARD PREVIEW
(standards.iteh.ai)**

SIST EN 61804-2:2004

<https://standards.iteh.ai/catalog/standards/sist/83a2d8b9-a657-4703-a8da-74f9f05d4267/sist-en-61804-2-2004>

© IEC 2004 — Copyright - all rights reserved

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE **XN**

For price, see current catalogue

CONTENTS

FOREWORD.....	22
INTRODUCTION.....	24
1 Scope	25
2 Normative references	26
3 Terms and definitions, abbreviated terms and acronyms, and conventions for lexical structures	27
3.1 Terms and definitions	27
3.2 Abbreviated terms and acronyms	34
3.3 Conventions for lexical structures	34
4 General Function Block (FB) definition and EDD model	36
4.1 Device structure (device model).....	36
4.1.1 Device model description	36
4.1.2 FB type.....	40
4.1.3 FB execution.....	41
4.1.4 Reference between IEC/PAS 61499-1, IEC/PAS 61499-2 and IEC 61804 models	42
4.1.5 UML specification of the device model.....	42
4.1.6 Classification of the algorithms	44
4.1.7 Algorithm description	45
4.1.8 Input and output variables and parameter definition	45
4.1.9 Choice of variables and parameters.....	46
4.1.10 Mode, Status and Diagnosis.....	46
4.2 Block combinations.....	46
4.2.1 Measurement channel	46
4.2.2 Actuation channel	47
4.2.3 Application.....	48
4.3 EDD and EDDL model	49
4.3.1 Overview of EDD and EDDL	49
4.3.2 EDD architecture	49
4.3.3 Concepts of EDD	49
4.3.4 Principles of the EDD development process.....	49
4.3.5 Interrelations between the lexical structure and formal definitions	50
4.3.6 Builtins	51
4.3.7 Profiles	51
5 Detailed block definition.....	51
5.1 General.....	51
5.2 Application FBs	51
5.2.1 Analog Input FB	51
5.2.2 Analog Output FB	53
5.2.3 Discrete Input FB	54
5.2.4 On/Off Actuation (Output) FB Discrete Output FB	56
5.2.5 Calculation FB	57
5.2.6 Control FB	58
5.3 Component FBs.....	59
5.4 Technology Block	59
5.4.1 Temperature Technology Block	59

5.4.2	Pressure Technology Block	62
5.4.3	Modulating Actuation Technology Block.....	64
5.4.4	On/Off Actuation Technology Block	66
5.5	Device (Resource) Block	68
5.5.1	Identification	68
5.5.2	Device state.....	69
5.5.3	Message.....	71
5.5.4	Initialization	71
5.6	Algorithms common to all blocks	71
5.6.1	Data Input/Data Output status	71
5.6.2	Validity	71
5.6.3	Restart Initialization	71
5.6.4	Fail-safe	72
5.6.5	Remote Cascade Initialization	72
6	FB Environment.....	73
7	Mapping to System Management	73
8	Mapping to Communication.....	73
9	Electronic Device Description Language	75
9.1	Overview.....	75
9.1.1	EDDL features	75
9.1.2	Syntax representation	75
9.1.3	EDD language elements	75
9.1.4	Basic construction elements	75
9.1.5	Common attributes SIST.EN.61804-2:2004	81
9.1.6	Special elements	81
9.1.7	Rules for instances	81
9.1.8	Rules for list of VARIABLES	81
9.2	EDD identification information.....	82
9.2.1	General structure	82
9.2.2	Specific attributes	82
9.3	BLOCK.....	84
9.3.1	BLOCK_A	84
9.3.2	BLOCK_B	88
9.4	COLLECTION.....	90
9.4.1	General structure	90
9.4.2	Specific attributes - item-type	90
9.5	COMMAND	91
9.5.1	General structure	91
9.5.2	Specific attributes	92
9.6	CONNECTION	96
9.6.1	General structure	96
9.6.2	Specific attribute - APPINSTANCE	96
9.7	DOMAIN.....	97
9.7.1	General structure	97
9.7.2	Specific attribute - HANDLING.....	97
9.8	EDIT_DISPLAY	98
9.8.1	General structure	98
9.8.2	Specific attributes	98

9.9 IMPORT	100
9.9.1 General structure	100
9.9.2 Specific attributes – attribute-redefinition	102
9.10 LIKE	108
9.11 MENU	108
9.11.1 General structure	108
9.11.2 Specific attributes	109
9.11.3 Sequence diagrams for actions	114
9.12 METHOD	118
9.12.1 General structure	118
9.12.2 Specific attributes	118
9.13 PROGRAM	119
9.13.1 General structure	119
9.13.2 Specific attributes - ARGUMENT	119
9.14 RECORD	120
9.15 REFERENCE_ARRAY	120
9.15.1 General structure	120
9.15.2 Specific attributes - ELEMENTS	121
9.16 Relations	121
9.16.1 General structure	121
9.16.2 REFRESH	121
9.16.3 UNIT	122
9.16.4 WRITE_AS_ONE	122
9.17 RESPONSE_CODES	122
9.18 VALUE_ARRAY	123
9.18.1 General structure	123
9.18.2 Specific attributes	123
9.19 VARIABLE	124
9.19.1 General structure	124
9.19.2 Specific attributes	125
9.20 VARIABLE_LIST	138
9.21 Common attributes	138
9.21.1 DEFINITION	138
9.21.2 HELP	139
9.21.3 LABEL	139
9.21.4 MEMBERS	139
9.21.5 RESPONSE_CODES	140
9.22 Output redirection (OPEN and CLOSE)	141
9.23 Conditional expression	141
9.24 Referencing	142
9.24.1 Referencing an EDD instance	142
9.24.2 Referencing members of a RECORD	142
9.24.3 Referencing elements of a VALUE_ARRAY	143
9.24.4 Referencing members of a COLLECTION	143
9.24.5 Referencing elements of a REFERENCE_ARRAY	144
9.24.6 Referencing members of a VARIABLE_LISTS	144
9.24.7 Referencing elements of BLOCK_A PARAMETERS	145
9.24.8 Referencing elements of BLOCK_A PARAMETER_LISTS	145
9.24.9 Referencing BLOCK_A CHARACTERISTICS	146

9.25	Strings	146
9.25.1	Specifying a string as a string literal	146
9.25.2	Specifying a string as a string variable	146
9.25.3	Specifying a string as an enumeration value	146
9.25.4	Specifying a string as a dictionary reference	147
9.25.5	Referencing HELP and LABEL attributes of EDD instances	147
9.25.6	String operations.....	147
9.25.7	Prompt String Formats	148
9.26	Expression.....	148
9.26.2	Primary expressions.....	148
9.26.3	Unary expressions	150
9.26.4	Binary expressions.....	150
9.27	Text dictionary	153
10	Conformance statement.....	154
Annex A (informative)	Parameter description	155
Annex B (normative)	IEC 61804 Conformance Declaration.....	160
Annex C (normative)	EDDL Formal Definition	161
C.1	EDDL Preprocessor.....	161
C.1.1	General structure	161
C.1.2	Directives.....	161
C.1.3	Predefined macros.....	164
C.1.4	NEWLINE characters	164
C.1.5	Comments	164
C.2	Conventions.....	164
C.2.1	Integer constants	164
C.2.2	Floating point constants	165
C.2.3	String literals	165
C.2.4	Using language codes in string constants	166
C.3	Operators	166
C.4	Keywords	167
C.5	Terminals	169
C.6	letter (letter digit _)*Formal EDDL syntax	169
C.6.1	General	169
C.6.2	EDD identification information	169
C.6.3	BLOCK_A and BLOCK_B	171
C.6.4	COLLECTION	173
C.6.5	COMMAND	173
C.6.6	CONNECTION	177
C.6.7	DOMAIN	177
C.6.8	EDIT_DISPLAY.....	178
C.6.9	IMPORT	179
C.6.10	LIKE	180
C.6.11	MENU.....	182
C.6.12	METHOD	185
C.6.13	PROGRAM	185
C.6.14	RECORDS.....	186
C.6.15	REFERENCE_ARRAY.....	186
C.6.16	Relations	187

C.6.17	RESPONSE_CODES	188
C.6.18	VALUE_ARRAY	189
C.6.19	VARIABLE	189
C.6.20	VARIABLE_LIST	197
C.6.21	Common attributes.....	197
C.6.22	OPEN, CLOSE.....	199
C.6.23	Expression.....	199
C.6.24	C-Grammer.....	201
C.6.25	Redefinition	204
C.6.26	References	216
Annex D (normative)	EDDL Builtin Library	218
D.1	General.....	218
D.2	Conventions for Builtin descriptions	218
D.3	Builtin abort.....	218
D.4	Builtin abort_on_all_comm_errors	219
D.5	Builtin ABORT_ON_ALL_COMM_STATUS	219
D.6	Builtin ABORT_ON_ALL_DEVICE_STATUS	220
D.7	Builtin ABORT_ON_ALL_RESPONSE_CODES	220
D.8	Builtin abort_on_all_response_codes	221
D.9	Builtin abort_on_comm_error	221
D.10	Builtin ABORT_ON_COMM_ERROR	222
D.11	Builtin ABORT_ON_COMM_STATUS	222
D.12	Builtin ABORT_ON_DEVICE_STATUS	223
D.13	Builtin ABORT_ON_NO_DEVICE	223
D.14	Builtin ABORT_ON_RESPONSE_CODE	224
D.15	Builtin abort_on_response_code	225
D.16	Builtin ACKNOWLEDGE	225
D.17	Builtin acknowledge.....	225
D.18	Builtin add_abort_method (version A)	226
D.19	Builtin add_abort_method (version B)	226
D.20	Builtin assign.....	227
D.21	Builtin assign_double.....	227
D.22	Builtin assign_float	228
D.23	Builtin assign_int	228
D.24	Builtin assign_var	228
D.25	Builtin atof.....	229
D.26	Builtin atoi.....	229
D.27	Builtin dassign.....	229
D.28	Builtin Date_to_DayOfMonth	230
D.29	Builtin Date_to_Month	230
D.30	Builtin Date_to_Year.....	231
D.31	Builtin DELAY	231
D.32	Builtin delay	231
D.33	Builtin DELAY_TIME.....	232

D.34	Builtin delayfor	232
D.35	Builtin DICT_ID	233
D.36	Builtin discard_on_exit.....	233
D.37	Builtin display.....	234
D.38	Builtin display_builtin_error.....	234
D.39	Builtin display_comm_error.....	234
D.40	Builtin display_comm_status.....	235
D.41	Builtin display_device_status	235
D.42	Builtin display_dynamics.....	236
D.43	Builtin display_message	236
D.44	Builtin display_response_code.....	237
D.45	Builtin display_response_status	238
D.46	Builtin display_xmtr_status	238
D.47	Builtin edit_device_value	238
D.48	Builtin edit_local_value	239
D.49	Builtin ext_send_command	240
D.50	Builtin ext_send_command_trans.....	240
D.51	Builtin fail_on_all_comm_errors.....	241
D.52	Builtin fail_on_all_response_codes	242
D.53	Builtin fail_on_comm_error	242
D.54	Builtin fail_on_response_code	243
D.55	Builtin fassign..... SIST EN 61804-2:2004 https://standards.iteh.ai/catalog/standards/sist/83a2d8b9-a657-4703-a8da-749f05d4267/sist-en-61804-2-2004	243
D.56	Builtin fgetval	244
D.57	Builtin float_value	244
D.58	Builtin fsetval	244
D.59	Builtin ftoa.....	245
D.60	Builtin fvar_value.....	245
D.61	Builtin get_acknowledgement.....	245
D.62	Builtin get_comm_error.....	246
D.63	Builtin get_comm_error_string	247
D.64	Builtin get_date	247
D.65	Builtin get_date_value	247
D.66	Builtin get_dds_error	248
D.67	Builtin GET_DEV_VAR_VALUE	249
D.68	Builtin get_dev_var_value.....	249
D.69	Builtin get_dictionary_string	250
D.70	Builtin get_double.....	250
D.71	Builtin get_double_value.....	251
D.72	Builtin get_float	251
D.73	Builtin get_float_value	252
D.74	Builtin GET_LOCAL_VAR_VALUE	252
D.75	Builtin get_local_var_value	253
D.76	Builtin get_more_status	253