

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Function blocks (FB) for process control and electronic device description
language (EDDL) –
Part 5: EDDL Built-in library**

**Blocs fonctionnels (FB) pour les procédés industriels et le langage de
description électronique de produit (EDDL) –
Partie 5: Bibliothèque de Built-in EDDL**



THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2015 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, 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 either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in 15 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

More than 60 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Catalogue IEC - webstore.iec.ch/catalogue

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - www.iec.ch/searchpub

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 15 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

Plus de 60 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Function blocks (FB) for process control and electronic device description
language (EDDL) –
Part 5: EDDL Built-in library**

**Blocs fonctionnels (FB) pour les procédés industriels et le langage de
description électronique de produit (EDDL) –
Partie 5: Bibliothèque de Built-in EDDL**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 25.040.40; 35.240.50

ISBN 978-2-8322-2702-2

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	19
INTRODUCTION.....	21
1 Scope.....	22
2 Normative references.....	22
3 Terms, definitions, acronyms and abbreviated terms	22
3.1 Terms and definitions	22
3.2 Acronyms and abbreviated terms.....	22
4 EDDL Builtin library	23
4.1 General.....	23
4.2 Conventions for Builtin descriptions	23
4.3 Builtin categories	24
4.3.1 Overview	24
4.3.2 User interface Builtins	25
4.3.3 Communication Builtins	26
4.3.4 Action Builtins	28
4.4 Builtin _ERROR	28
4.5 Builtin _TRACE	29
4.6 Builtin _WARNING	29
4.7 Builtin abort	29
4.8 Builtin abort_on_all_comm_errors.....	30
4.9 Builtin ABORT_ON_ALL_COMM_STATUS.....	30
4.10 Builtin ABORT_ON_ALL_DEVICE_STATUS	31
4.11 Builtin ABORT_ON_ALL_RESPONSE_CODES	31
4.12 Builtin abort_on_all_response_codes.....	32
4.13 Builtin ABORT_ON_COMM_ERROR.....	32
4.14 Builtin abort_on_comm_error.....	33
4.15 Builtin ABORT_ON_COMM_STATUS.....	33
4.16 Builtin ABORT_ON_DEVICE_STATUS.....	34
4.17 Builtin ABORT_ON_NO_DEVICE.....	34
4.18 Builtin ABORT_ON_RESPONSE_CODE	35
4.19 Builtin abort_on_response_code.....	36
4.20 Builtin abortTransferPort	36
4.21 Builtin abs.....	37
4.22 Builtin ACKNOWLEDGE	37
4.23 Builtin acknowledge	37
4.24 Builtin acos	38
4.25 Builtin add_abort_method (version A)	38
4.26 Builtin add_abort_method (version B)	38
4.27 Builtin AddTime.....	39
4.28 Builtin asin	39
4.29 Builtin assign	40
4.30 Builtin assign_double	40
4.31 Builtin assign_float	41
4.32 Builtin assign_int.....	41
4.33 Builtin assign_var.....	41
4.34 Builtin assign2	42
4.35 Builtin atan.....	42

4.36	Builtin atof	43
4.37	Builtin atoi.....	43
4.38	Builtin browselidentity	43
4.39	Builtin BUILD_MESSAGE	44
4.40	Builtin ByteToDouble.....	44
4.41	Builtin ByteToFloat.....	45
4.42	Builtin ByteToLong	45
4.43	Builtin ByteToShort	45
4.44	Builtin cbrt	46
4.45	Builtin ceil	46
4.46	Builtin closeTransferPort	46
4.47	Builtin cos	47
4.48	Builtin cosh	47
4.49	Builtin dassign	47
4.50	Builtin DATE_AND_TIME_VALUE_to_string.....	48
4.51	Builtin Date_to_DayOfMonth.....	48
4.52	Builtin DATE_to_days.....	49
4.53	Builtin Date_to_Month	49
4.54	Builtin DATE_to_string	49
4.55	Builtin Date_To_Time	50
4.56	Builtin Date_to_Year	50
4.57	Builtin days_to_DATE.....	50
4.58	Builtin DELAY	51
4.59	Builtin delay	51
4.60	Builtin DELAY_TIME	52
4.61	Builtin delayfor	52
4.62	Builtin delayfor2	53
4.63	Builtin DICT_ID	53
4.64	Builtin dictionary_string	54
4.65	Builtin DiffTime	54
4.66	Builtin discard_on_exit	55
4.67	Builtin DISPLAY	55
4.68	Builtin display	56
4.69	Builtin display_bitenum.....	56
4.70	Builtin display_builtin_error	57
4.71	Builtin display_comm_error	57
4.72	Builtin display_comm_status.....	58
4.73	Builtin display_device_status.....	58
4.74	Builtin display_dynamics	58
4.75	Builtin display_dynamics2	59
4.76	Builtin display_message	60
4.77	Builtin display_message2	61
4.78	Builtin display_response_code	61
4.79	Builtin display_response_status.....	62
4.80	Builtin display_xmtr_status	62
4.81	Builtin DoubleToByte.....	63
4.82	Builtin drand.....	63
4.83	Builtin dseed	64
4.84	Builtin edit_device_value	64

4.85	Builtin edit_device_value2	65
4.86	Builtin edit_local_value.....	66
4.87	Builtin edit_local_value2.....	67
4.88	Builtin exp.....	68
4.89	Builtin ext_send_command.....	68
4.90	Builtin ext_send_command_trans	69
4.91	Builtin fail_on_all_comm_errors.....	70
4.92	Builtin fail_on_all_response_codes.....	70
4.93	Builtin fail_on_comm_error.....	71
4.94	Builtin fail_on_response_code	71
4.95	Builtin fassign	72
4.96	Builtin fGetByte.....	72
4.97	Builtin fgetval	72
4.98	Builtin float_value.....	73
4.99	Builtin FloatToByte	73
4.100	Builtin floor	74
4.101	Builtin fmod.....	74
4.102	Builtin fpclassify	74
4.103	Builtin From_DATE_AND_TIME_VALUE	75
4.104	Builtin From_TIME_VALUE.....	75
4.105	Builtin fsetval	76
4.106	Builtin ftoa	76
4.107	Builtin fvar_value	76
4.108	Builtin get_acknowledgement	77
4.109	Builtin get_acknowledgement2	77
4.110	Builtin get_block_instance_by_object_index.....	78
4.111	Builtin get_block_instance_by_tag	78
4.112	Builtin get_block_instance_by_name.....	79
4.113	Builtin get_comm_error	79
4.114	Builtin get_comm_error_string	80
4.115	Builtin get_date.....	80
4.116	Builtin get_date_1elem	81
4.117	Builtin get_date_1elem2	81
4.118	Builtin get_date_value	82
4.119	Builtin get_date_value2	82
4.120	Builtin GET_DD_REVISION.....	83
4.121	Builtin get_dds_error	83
4.122	Builtin GET_DEV_VAR_VALUE	84
4.123	Builtin get_dev_var_value	84
4.124	Builtin GET_DEVICE_REVISION	85
4.125	Builtin GET_DEVICE_TYPE	85
4.126	Builtin get_dictionary_string.....	86
4.127	Builtin get_double	86
4.128	Builtin get_double_1elem	86
4.129	Builtin get_double_1elem2	87
4.130	Builtin get_double_value	87
4.131	Builtin get_double_value2	88
4.132	Builtin get_enum_string.....	89
4.133	Builtin get_float.....	89

4.134	Builtin get_float_lelem	89
4.135	Builtin get_float_lelem2	90
4.136	Builtin get_float_value	90
4.137	Builtin get_float_value2	91
4.138	Builtin GET_LOCAL_VAR_VALUE	91
4.139	Builtin get_local_var_value	92
4.140	Builtin GET_MANUFACTURER	92
4.141	Builtin get_more_status	93
4.142	Builtin get_resolve_status	93
4.143	Builtin get_response_code	94
4.144	Builtin get_response_code_string	94
4.145	Builtin get_rspcode_string	95
4.146	Builtin get_rspcode_string_by_id	95
4.147	Builtin get_signed	96
4.148	Builtin get_signed_lelem	96
4.149	Builtin get_signed_lelem2	97
4.150	Builtin get_signed_value	97
4.151	Builtin get_signed_value2	98
4.152	Builtin get_status_code_string	98
4.153	Builtin get_status_string	99
4.154	Builtin get_stddict_string	99
4.155	Builtin get_string	100
4.156	Builtin get_string_lelem	101
4.157	Builtin get_string_lelem2	101
4.158	Builtin get_string_value	102
4.159	Builtin get_string_value2	102
4.160	Builtin GET_TICK_COUNT	103
4.161	Builtin get_transfer_status	103
4.162	Builtin get_unsigned	104
4.163	Builtin get_unsigned_lelem	104
4.164	Builtin get_unsigned_lelem2	105
4.165	Builtin get_unsigned_value	105
4.166	Builtin get_unsigned_value2	106
4.167	Builtin get_variable_string	107
4.168	Builtin GetCurrentDate	107
4.169	Builtin GetCurrentDateAndTime	108
4.170	Builtin GetcurrentTime	108
4.171	Builtin iassign	108
4.172	Builtin igetval	109
4.173	Builtin IGNORE_ALL_COMM_STATUS	109
4.174	Builtin IGNORE_ALL_DEVICE_STATUS	109
4.175	Builtin IGNORE_ALL_RESPONSE_CODES	110
4.176	Builtin IGNORE_COMM_ERROR	110
4.177	Builtin IGNORE_COMM_STATUS	111
4.178	Builtin IGNORE_DEVICE_STATUS	111
4.179	Builtin IGNORE_NO_DEVICE	112
4.180	Builtin IGNORE_RESPONSE_CODE	112
4.181	Builtin int_value	113
4.182	Builtin is_NaN	113

4.183	Builtin isetval	114
4.184	Builtin isOffline.....	114
4.185	Builtin ITEM_ID.....	114
4.186	Builtin itoa (version A)	115
4.187	Builtin itoa (version B).....	115
4.188	Builtin ivar_value.....	115
4.189	Builtin lassign.....	116
4.190	Builtin lgetval	116
4.191	Builtin ListDeleteElementAt	116
4.192	Builtin ListDeleteElementAt2	117
4.193	Builtin ListInsert	117
4.194	Builtin ListInsert2	118
4.195	Builtin log.....	118
4.196	Builtin LOG_MESSAGE	119
4.197	Builtin log10.....	119
4.198	Builtin log2.....	119
4.199	Builtin long_value.....	120
4.200	Builtin LongToByte	120
4.201	Builtin lsetval	121
4.202	Builtin lvar_value.....	121
4.203	Builtin Make_Time.....	121
4.204	Builtin MEMBER_ID	122
4.205	Builtin MenuDisplay.....	122
4.206	Builtin method_abort	123
4.207	Builtin nan.....	123
4.208	Builtin NaN_value	124
4.209	Builtin nanf.....	124
4.210	Builtin ObjectReference.....	125
4.211	Builtin openTransferPort.....	125
4.212	Builtin pop_abort_method.....	126
4.213	Builtin pow	126
4.214	Builtin process_abort	126
4.215	Builtin push_abort_method.....	127
4.216	Builtin put_date	127
4.217	Builtin put_date_value	127
4.218	Builtin put_date_value2	128
4.219	Builtin put_double	129
4.220	Builtin put_double_value	129
4.221	Builtin put_double_value2	130
4.222	Builtin put_float.....	130
4.223	Builtin put_float_value	131
4.224	Builtin put_float_value2	131
4.225	Builtin PUT_MESSAGE	132
4.226	Builtin put_message.....	133
4.227	Builtin put_signed.....	134
4.228	Builtin put_signed_value.....	134
4.229	Builtin put_signed_value2.....	135
4.230	Builtin put_string	135
4.231	Builtin put_string_value	136

4.232	Builtin put_string_value2	136
4.233	Builtin put_unsigned	137
4.234	Builtin put_unsigned_value	138
4.235	Builtin put_unsigned_value2	138
4.236	Builtin re_read_file	139
4.237	Builtin re_write_file	139
4.238	Builtin read_value	140
4.239	Builtin read_value2	140
4.240	Builtin ReadCommand	141
4.241	Builtin readItemFromDevice	141
4.242	Builtin remove_abort_method (version A)	142
4.243	Builtin remove_abort_method (version B)	142
4.244	Builtin remove_all_abort_methods	142
4.245	Builtin resolve_array_ref	143
4.246	Builtin resolve_array_ref2	143
4.247	Builtin resolve_block_ref	144
4.248	Builtin resolve_block_ref2	145
4.249	Builtin resolve_list_ref	145
4.250	Builtin resolve_local_ref	146
4.251	Builtin resolve_local_ref2	146
4.252	Builtin resolve_param_list_ref	147
4.253	Builtin resolve_param_ref	147
4.254	Builtin resolve_param_ref2	148
4.255	Builtin resolve_record_ref	148
4.256	Builtin resolve_record_ref2	149
4.257	Builtin ret_double_value	149
4.258	Builtin ret_double_value2	150
4.259	Builtin ret_float_value	150
4.260	Builtin ret_float_value2	151
4.261	Builtin ret_signed_value	151
4.262	Builtin ret_signed_value2	152
4.263	Builtin ret_unsigned_value	152
4.264	Builtin ret_unsigned_value2	152
4.265	Builtin retry_on_all_comm_errors	153
4.266	Builtin RETRY_ON_ALL_COMM_STATUS	153
4.267	Builtin RETRY_ON_ALL_DEVICE_STATUS	154
4.268	Builtin RETRY_ON_ALL_RESPONSE_CODES	154
4.269	Builtin retry_on_all_response_codes	155
4.270	Builtin RETRY_ON_COMM_ERROR	155
4.271	Builtin retry_on_comm_error	156
4.272	Builtin RETRY_ON_COMM_STATUS	156
4.273	Builtin RETRY_ON_DEVICE_STATUS	157
4.274	Builtin RETRY_ON_NO_DEVICE	157
4.275	Builtin RETRY_ON_RESPONSE_CODE	158
4.276	Builtin retry_on_response_code	158
4.277	Builtin round	159
4.278	Builtin save_on_exit	159
4.279	Builtin save_values	160
4.280	Builtin seconds_to_TIME_VALUE	160

4.281	Builtin seconds_to_TIME_VALUE8	160
4.282	Builtin SELECT_FROM_LIST	161
4.283	Builtin select_from_list	161
4.284	Builtin select_from_menu	162
4.285	Builtin select_from_menu2	163
4.286	Builtin send	163
4.287	Builtin send_all_values	164
4.288	Builtin send_command	164
4.289	Builtin send_command_trans	165
4.290	Builtin send_on_exit	165
4.291	Builtin send_trans	166
4.292	Builtin send_value	166
4.293	Builtin send_value2	167
4.294	Builtin SET_NUMBER_OF_RETRIES	168
4.295	Builtin sgetval	168
4.296	Builtin ShortToByte	168
4.297	Builtin sin	169
4.298	Builtin sinh	169
4.299	Builtin sqrt	169
4.300	Builtin ssetval	170
4.301	Builtin strcmp	170
4.302	Builtin strleft	170
4.303	Builtin strlen	171
4.304	Builtin strlwr	171
4.305	Builtin strmid	171
4.306	Builtin strright	172
4.307	Builtin strstr	172
4.308	Builtin strtrim	172
4.309	Builtin strupr	173
4.310	Builtin tan	173
4.311	Builtin tanh	173
4.312	Builtin Time_To_Date	174
4.313	Builtin TIME_VALUE_to_Hour	174
4.314	Builtin TIME_VALUE_to_Minute	174
4.315	Builtin TIME_VALUE_to_Second	175
4.316	Builtin TIME_VALUE_to_seconds	175
4.317	Builtin TIME_VALUE_to_string	176
4.318	Builtin timet_to_string	176
4.319	Builtin timet_to_TIME_VALUE	177
4.320	Builtin timet_to_TIME_VALUE8	177
4.321	Builtin To_Date	177
4.322	Builtin To_Date_and_Time	178
4.323	Builtin To_Time	178
4.324	Builtin To_TIME_VALUE	179
4.325	Builtin To_TIME_VALUE8	179
4.326	Builtin trunc	180
4.327	Builtin VARID	180
4.328	Builtin vassign	181
4.329	Builtin WriteCommand	181

4.330	Builtin writeltemToDevice	181
4.331	Builtin XMTR_ABORT_ON_ALL_COMM_STATUS	182
4.332	Builtin XMTR_ABORT_ON_ALL_DATA	182
4.333	Builtin XMTR_ABORT_ON_ALL_DEVICE_STATUS	183
4.334	Builtin XMTR_ABORT_ON_ALL_RESPONSE_CODES	183
4.335	Builtin XMTR_ABORT_ON_COMM_ERROR	184
4.336	Builtin XMTR_ABORT_ON_COMM_STATUS	184
4.337	Builtin XMTR_ABORT_ON_DATA	185
4.338	Builtin XMTR_ABORT_ON_DEVICE_STATUS	185
4.339	Builtin XMTR_ABORT_ON_NO_DEVICE	186
4.340	Builtin XMTR_ABORT_ON_RESPONSE_CODE	186
4.341	Builtin XMTR_IGNORE_ALL_COMM_STATUS	187
4.342	Builtin XMTR_IGNORE_ALL_DATA	187
4.343	Builtin XMTR_IGNORE_ALL_DEVICE_STATUS	188
4.344	Builtin XMTR_IGNORE_ALL_RESPONSE_CODES	188
4.345	Builtin XMTR_IGNORE_COMM_ERROR	189
4.346	Builtin XMTR_IGNORE_COMM_STATUS	189
4.347	Builtin XMTR_IGNORE_DATA	190
4.348	Builtin XMTR_IGNORE_DEVICE_STATUS	190
4.349	Builtin XMTR_IGNORE_NO_DEVICE	191
4.350	Builtin XMTR_IGNORE_RESPONSE_CODE	191
4.351	Builtin XMTR_RETRY_ON_ALL_COMM_STATUS	192
4.352	Builtin XMTR_RETRY_ON_ALL_DATA	192
4.353	Builtin XMTR_RETRY_ON_ALL_DEVICE_STATUS	193
4.354	Builtin XMTR_RETRY_ON_ALL_RESPONSE_CODE (removed)	193
4.355	Builtin XMTR_RETRY_ON_ALL_RESPONSE_CODES	193
4.356	Builtin XMTR_RETRY_ON_COMM_ERROR	194
4.357	Builtin XMTR_RETRY_ON_COMM_STATUS	194
4.358	Builtin XMTR_RETRY_ON_DATA	195
4.359	Builtin XMTR_RETRY_ON_DEVICE_STATUS	195
4.360	Builtin XMTR_RETRY_ON_NO_DEVICE	196
4.361	Builtin XMTR_RETRY_ON_RESPONSE_CODE	196
5	Builtins return codes	197
Annex A	(normative) Profiles of Builtins	199
A.1	Conventions for profiles of Builtins	199
A.2	Profiles for PROFIBUS and PROFINET	199
A.3	Profiles for FOUNDATION™ Fieldbus	208
A.4	Profiles for HART®	216
A.5	Profiles for Communication Servers	225
Table 1	– Format for the Builtins lexical element tables	23
Table 2	– Contents of the lexical element table	24
Table 3	– Usage of Builtins	24
Table 4	– User interface Builtins	25
Table 5	– Communication Builtins	26
Table 6	– Action Builtins	28
Table 7	– Builtin _ERROR	28
Table 8	– Builtin _TRACE	29

Table 9 – Builtin _WARNING.....	29
Table 10 – Builtin abort.....	30
Table 11 – Builtin abort_on_all_comm_errors.....	30
Table 12 – Builtin ABORT_ON_ALL_COMM_STATUS.....	31
Table 13 – Builtin ABORT_ON_ALL_DEVICE_STATUS.....	31
Table 14 – Builtin ABORT_ON_ALL_RESPONSE_CODES.....	32
Table 15 – Builtin abort_on_all_response_codes.....	32
Table 16 – Builtin ABORT_ON_COMM_ERROR.....	32
Table 17 – Builtin abort_on_comm_error.....	33
Table 18 – Builtin ABORT_ON_COMM_STATUS.....	34
Table 19 – Builtin ABORT_ON_DEVICE_STATUS.....	34
Table 20 – Builtin ABORT_ON_NO_DEVICE.....	35
Table 21 – Builtin ABORT_ON_RESPONSE_CODE.....	36
Table 22 – Builtin abort_on_response_code.....	36
Table 23 – Builtin abortTransferPort.....	36
Table 24 – Builtin abs.....	37
Table 25 – Builtin ACKNOWLEDGE.....	37
Table 26 – Builtin acknowledge.....	37
Table 27 – Builtin acos.....	38
Table 28 – Builtin add_abort_method.....	38
Table 29 – Builtin add_abort_method.....	39
Table 30 – Builtin AddTime.....	39
Table 31 – Builtin asin.....	40
Table 32 – Builtin assign.....	40
Table 33 – Builtin assign_double.....	40
Table 34 – Builtin assign_float.....	41
Table 35 – Builtin assign_int.....	41
Table 36 – Builtin assign_var.....	42
Table 37 – Builtin assign2.....	42
Table 38 – Builtin atan.....	43
Table 39 – Builtin atof.....	43
Table 40 – Builtin atoi.....	43
Table 41 – Builtin browselidentity.....	44
Table 42 – Builtin BUILD_MESSAGE.....	44
Table 43 – Builtin ByteToDouble.....	44
Table 44 – Builtin ByteToFloat.....	45
Table 45 – Builtin ByteToLong.....	45
Table 46 – Builtin ByteToShort.....	46
Table 47 – Builtin cbrt.....	46
Table 48 – Builtin ceil.....	46
Table 49 – Builtin closeTransferPort.....	47
Table 50 – Builtin cos.....	47
Table 51 – Builtin cosh.....	47

Table 52 – Builtin dassign	48
Table 53 – Builtin DATE_AND_TIME_VALUE_to_string	48
Table 54 – Builtin Date_to_DayOfMonth	48
Table 55 – Builtin DATE_to_days	49
Table 56 – Builtin Date_to_Month.....	49
Table 57 – Builtin DATE_to_string.....	50
Table 58 – Builtin Date_To_Time	50
Table 59 – Builtin Date_to_Year.....	50
Table 60 – Builtin days_to_DATE	51
Table 61 – Builtin DELAY	51
Table 62 – Builtin delay.....	52
Table 63 – Builtin DELAY_TIME	52
Table 64 – Builtin delayfor	53
Table 65 – Builtin delayfor2.....	53
Table 66 – Builtin DICT_ID.....	54
Table 67 – Builtin dictionary_string.....	54
Table 68 – Builtin DiffTime	54
Table 69 – Builtin discard_on_exit.....	55
Table 70 – Builtin DISPLAY.....	56
Table 71 – Builtin display	56
Table 72 – Builtin display_bitenum	56
Table 73 – Builtin display_builtin_error	57
Table 74 – Builtin display_comm_error	57
Table 75 – Builtin display_comm_status	58
Table 76 – Builtin display_device_status	58
Table 77 – Builtin display_dynamics	59
Table 78 – Builtin display_dynamics2.....	60
Table 79 – Builtin display_message	60
Table 80 – Builtin display_message2.....	61
Table 81 – Builtin display_response_code	62
Table 82 – Builtin display_response_status	62
Table 83 – Builtin display_xmtr_status	63
Table 84 – Builtin DoubleToByte	63
Table 85 – Builtin drand	63
Table 86 – Builtin dseed	64
Table 87 – Builtin edit_device_value	65
Table 88 – Builtin edit_device_value2	66
Table 89 – Builtin edit_local_value	67
Table 90 – Builtin edit_local_value2	68
Table 91 – Builtin exp	68
Table 92 – Builtin ext_send_command	69
Table 93 – Builtin ext_send_command_trans.....	69
Table 94 – Builtin fail_on_all_comm_errors	70

Table 95 – Builtin fail_on_all_response_codes	70
Table 96 – Builtin fail_on_comm_error	71
Table 97 – Builtin fail_on_response_code.....	72
Table 98 – Builtin fassign	72
Table 99 – Builtin fGetByte	72
Table 100 – Builtin fgetval.....	73
Table 101 – Builtin float_value	73
Table 102 – Builtin FloatToByte	73
Table 103 – Builtin floor	74
Table 104 – Builtin fmod	74
Table 105 – Builtin fpclassifyd.....	75
Table 106 – Builtin From_DATE_AND_TIME_VALUE.....	75
Table 107 – Builtin From_TIME_VALUE	76
Table 108 – Builtin fsetval.....	76
Table 109 – Builtin ftoa	76
Table 110 – Builtin fvar_value	77
Table 111 – Builtin get_acknowledgement.....	77
Table 112 – Builtin get_acknowledgement2.....	78
Table 113 – Builtin get_block_instance_by_object_index	78
Table 114 – Builtin get_block_instance_by_tag.....	79
Table 115 – Builtin get_block_instance_count	79
Table 116 – Builtin get_comm_error.....	80
Table 117 – Builtin get_comm_error_string.....	80
Table 118 – Builtin get_date.....	81
Table 119 – Builtin get_date_lelem.....	81
Table 120 – Builtin get_date_lelem2.....	82
Table 121 – Builtin get_date_value.....	82
Table 122 – Builtin get_date_value2.....	83
Table 123 – Builtin GET_DD_REVISION	83
Table 124 – Builtin get_dds_error.....	84
Table 125 – Builtin GET_DEV_VAR_VALUE.....	84
Table 126 – Builtin get_dev_var_value	85
Table 127 – Builtin GET_DEVICE_REVISION.....	85
Table 128 – Builtin GET_DEVICE_TYPE	85
Table 129 – Builtin get_dictionary_string	86
Table 130 – Builtin get_double	86
Table 131 – Builtin get_double_lelem.....	87
Table 132 – Builtin get_double_lelem2	87
Table 133 – Builtin get_double_value.....	88
Table 134 – Builtin get_double_value2	88
Table 135 – Builtin get_enum_string	89
Table 136 – Builtin get_float.....	89
Table 137 – Builtin get_float_lelem.....	90

Table 138 – Builtin get_float_lelem2.....	90
Table 139 – Builtin get_float_value.....	91
Table 140 – Builtin get_float_value2.....	91
Table 141 – Builtin GET_LOCAL_VAR_VALUE.....	92
Table 142 – Builtin get_local_var_value	92
Table 143 – Builtin GET_MANUFACTURER	92
Table 144 – Builtin get_more_status	93
Table 145 – Builtin get_resolve_status	93
Table 146 – Builtin get_response_code	94
Table 147 – Builtin get_response_code_string.....	95
Table 148 – Builtin get_rspcode_string.....	95
Table 149 – Builtin get_rspcode_string_by_id.....	96
Table 150 – Builtin get_signed	96
Table 151 – Builtin get_signed_lelem	97
Table 152 – Builtin get_signed_lelem2	97
Table 153 – Builtin get_signed_value	98
Table 154 – Builtin get_signed_value2	98
Table 155 – Builtin get_status_code_string	99
Table 156 – Builtin get_status_string.....	99
Table 157 – Builtin get_stddict_string.....	100
Table 158 – Builtin get_string.....	100
Table 159 – Builtin get_string_lelem.....	101
Table 160 – Builtin get_string_lelem2.....	102
Table 161 – Builtin get_string_value.....	102
Table 162 – Builtin get_string_value2.....	103
Table 163 – Builtin GET_TICK_COUNT.....	103
Table 164 – Builtin get_transfer_status	104
Table 165 – Builtin get_unsigned	104
Table 166 – Builtin get_unsigned_lelem	105
Table 167 – Builtin get_unsigned_lelem2	105
Table 168 – Builtin get_unsigned_value	106
Table 169 – Builtin get_unsigned_value2	107
Table 170 – Builtin get_variable_string.....	107
Table 171 – Builtin GetCurrentDate.....	107
Table 172 – Builtin GetCurrentDateAndTime	108
Table 173 – Builtin GetCurrentTime	108
Table 174 – Builtin iassign	108
Table 175 – Builtin igetval.....	109
Table 176 – Builtin IGNORE_ALL_COMM_STATUS	109
Table 177 – Builtin IGNORE_ALL_DEVICE_STATUS	110
Table 178 – Builtin IGNORE_ALL_RESPONSE_CODES.....	110
Table 179 – Builtin IGNORE_COMM_ERROR	111
Table 180 – Builtin IGNORE_COMM_STATUS	111

Table 181 – Builtin IGNORE_DEVICE_STATUS	112
Table 182 – Builtin IGNORE_NO_DEVICE	112
Table 183 – Builtin IGNORE_RESPONSE_CODE	113
Table 184 – Builtin int_value	113
Table 185 – Builtin is_NaN	113
Table 186 – Builtin isetval	114
Table 187 – Builtin isOffline	114
Table 188 – Builtin ITEM_ID	115
Table 189 – Builtin itoa (version A)	115
Table 190 – Builtin itoa (version B)	115
Table 191 – Builtin ivar_value	116
Table 192 – Builtin lassign	116
Table 193 – Builtin lgetval	116
Table 194 – Builtin ListDeleteElementAt	117
Table 195 – Builtin ListDeleteElementAt2	117
Table 196 – Builtin ListInsert	118
Table 197 – Builtin ListInsert2	118
Table 198 – Builtin log	119
Table 199 – Builtin LOG_MESSAGE	119
Table 200 – Builtin log10	119
Table 201 – Builtin log2	120
Table 202 – Builtin long_value	120
Table 203 – Builtin LongToByte	120
Table 204 – Builtin lsetval	121
Table 205 – Builtin lvar_value	121
Table 206 – Builtin Make_Time	122
Table 207 – Builtin MEMBER_ID	122
Table 208 – Builtin MenuDisplay	123
Table 209 – Builtin method_abort	123
Table 210 – Builtin nan	124
Table 211 – Builtin NaN_value	124
Table 212 – Builtin nanf	125
Table 213 – Builtin ObjectReference	125
Table 214 – Builtin openTransferPort	126
Table 215 – Builtin pop_abort_method	126
Table 216 – Builtin pow	126
Table 217 – Builtin process_abort	127
Table 218 – Builtin push_abort_method	127
Table 219 – Builtin put_date	127
Table 220 – Builtin put_date_value	128
Table 221 – Builtin put_date_value2	129
Table 222 – Builtin put_double	129
Table 223 – Builtin put_double_value	130

Table 224 – Builtin put_double_value2	130
Table 225 – Builtin put_float.....	131
Table 226 – Builtin put_float_value.....	131
Table 227 – Builtin put_float_value2.....	132
Table 228 – Format options.....	132
Table 229 – Builtin PUT_MESSAGE.....	133
Table 230 – Builtin put_message.....	133
Table 231 – Builtin put_signed	134
Table 232 – Builtin put_signed_value	134
Table 233 – Builtin put_signed_value2	135
Table 234 – Builtin put_string.....	136
Table 235 – Builtin put_string_value.....	136
Table 236 – Builtin put_string_value2.....	137
Table 237 – Builtin put_unsigned	138
Table 238 – Builtin put_unsigned_value	138
Table 239 – Builtin put_unsigned_value2	139
Table 240 – Builtin re_read_file.....	139
Table 241 – Builtin re_write_file	140
Table 242 – Builtin read_value	140
Table 243 – Builtin read_value2	141
Table 244 – Builtin ReadCommand	141
Table 245 – Builtin readItemFromDevice	141
Table 246 – Builtin remove_abort_method.....	142
Table 247 – Builtin remove_abort_method.....	142
Table 248 – Builtin remove_all_abort_methods.....	143
Table 249 – Builtin resolve_array_ref	143
Table 250 – Builtin resolve_array_ref2	144
Table 251 – Builtin resolve_block_ref	144
Table 252 – Builtin resolve_block_ref2	145
Table 253 – Builtin resolve_list_ref.....	145
Table 254 – Builtin resolve_local_ref.....	146
Table 255 – Builtin resolve_local_ref2	146
Table 256 – Builtin resolve_param_list_ref	147
Table 257 – Builtin resolve_param_ref	147
Table 258 – Builtin resolve_param_ref2.....	148
Table 259 – Builtin resolve_record_ref	149
Table 260 – Builtin resolve_record_ref2	149
Table 261 – Builtin ret_double_value.....	150
Table 262 – Builtin ret_double_value2.....	150
Table 263 – Builtin ret_float_value	151
Table 264 – Builtin ret_float_value2	151
Table 265 – Builtin ret_signed_value.....	151
Table 266 – Builtin ret_signed_value2.....	152

Table 267 – Builtin ret_unsigned_value	152
Table 268 – Builtin ret_unsigned_value2	153
Table 269 – Builtin retry_on_all_comm_errors	153
Table 270 – Builtin RETRY_ON_ALL_COMM_STATUS	154
Table 271 – Builtin RETRY_ON_ALL_DEVICE_STATUS	154
Table 272 – Builtin RETRY_ON_ALL_RESPONSE_CODES	155
Table 273 – Builtin retry_on_all_response_codes	155
Table 274 – Builtin RETRY_ON_COMM_ERROR	156
Table 275 – Builtin retry_on_comm_error	156
Table 276 – Builtin RETRY_ON_COMM_STATUS	157
Table 277 – Builtin RETRY_ON_DEVICE_STATUS	157
Table 278 – Builtin RETRY_ON_NO_DEVICE	158
Table 279 – Builtin RETRY_ON_RESPONSE_CODE	158
Table 280 – Builtin retry_on_response_code	159
Table 281 – Builtin round	159
Table 282 – Builtin save_on_exit	160
Table 283 – Builtin save_values	160
Table 284 – Builtin seconds_to_TIME_VALUE	160
Table 285 – Builtin seconds_to_TIME_VALUE	161
Table 286 – Builtin SELECT_FROM_LIST	161
Table 287 – Builtin select_from_list	162
Table 288 – Builtin select_from_menu	162
Table 289 – Builtin select_from_menu2	163
Table 290 – Builtin send	164
Table 291 – Builtin send_all_values	164
Table 292 – Builtin send_command	165
Table 293 – Builtin send_command_trans	165
Table 294 – Builtin send_on_exit	166
Table 295 – Builtin send_trans	166
Table 296 – Builtin send_value	167
Table 297 – Builtin send_value2	167
Table 298 – Builtin SET_NUMBER_OF_RETRIES	168
Table 299 – Builtin sgetval	168
Table 300 – Builtin ShortToByte	169
Table 301 – Builtin sin	169
Table 302 – Builtin sinh	169
Table 303 – Builtin sqrt	170
Table 304 – Builtin ssetval	170
Table 305 – Builtin strcmp	170
Table 306 – Builtin strleft	171
Table 307 – Builtin strlen	171
Table 308 – Builtin strlwr	171
Table 309 – Builtin strmid	172

Table 310 – Builtin strright	172
Table 311 – Builtin strstr	172
Table 312 – Builtin strtrim	173
Table 313 – Builtinstrupr	173
Table 314 – Builtin tan	173
Table 315 – Builtin tanh	174
Table 316 – Builtin Time_To_Date	174
Table 317 – Builtin TIME_VALUE_to_Hour	174
Table 318 – Builtin TIME_VALUE_to_Minute	175
Table 319 – Builtin TIME_VALUE_to_Second	175
Table 320 – Builtin TIME_VALUE_to_seconds	176
Table 321 – Builtin TIME_VALUE_to_string	176
Table 322 – Builtin timet_to_string	177
Table 323 – Builtin timet_to_TIME_VALUE	177
Table 324 – Builtin timet_to_TIME_VALUE8	177
Table 325 – Builtin To_Date	178
Table 326 – Builtin To_Date_and_Time	178
Table 327 – Builtin To_Time	179
Table 328 – Builtin To_TIME_VALUE	179
Table 329 – Builtin To_TIME_VALUE8	180
Table 330 – Builtin trunc	180
Table 331 – Builtin VARID	180
Table 332 – Builtin vassign	181
Table 333 – Builtin WriteCommand	181
Table 334 – Builtin writeltemToDevice	182
Table 335 – Builtin XMTR_ABORT_ON_ALL_COMM_STATUS	182
Table 336 – Builtin XMTR_ABORT_ON_ALL_DATA	183
Table 337 – Builtin XMTR_ABORT_ON_ALL_DEVICE_STATUS	183
Table 338 – Builtin XMTR_ABORT_ON_ALL_RESPONSE_CODES	184
Table 339 – Builtin XMTR_ABORT_ON_COMM_ERROR	184
Table 340 – Builtin XMTR_ABORT_ON_COMM_STATUS	185
Table 341 – Builtin XMTR_ABORT_ON_DATA	185
Table 342 – Builtin XMTR_ABORT_ON_DEVICE_STATUS	186
Table 343 – Builtin XMTR_ABORT_ON_NO_DEVICE	186
Table 344 – Builtin XMTR_ABORT_ON_RESPONSE_CODE	187
Table 345 – Builtin XMTR_IGNORE_ALL_COMM_STATUS	187
Table 346 – Builtin XMTR_IGNORE_ALL_DATA	188
Table 347 – Builtin XMTR_IGNORE_ALL_DEVICE_STATUS	188
Table 348 – Builtin XMTR_IGNORE_ALL_RESPONSE_CODES	189
Table 349 – Builtin XMTR_IGNORE_COMM_ERROR	189
Table 350 – Builtin XMTR_IGNORE_COMM_STATUS	190
Table 351 – Builtin XMTR_IGNORE_DATA	190
Table 352 – Builtin XMTR_IGNORE_DEVICE_STATUS	191

Table 353 – Builtin XMTR_IGNORE_NO_DEVICE	191
Table 354 – Builtin XMTR_IGNORE_RESPONSE_CODE.....	192
Table 355 – Builtin XMTR_RETRY_ON_ALL_COMM_STATUS	192
Table 356 – Builtin XMTR_RETRY_ON_ALL_DATA.....	193
Table 357 – Builtin XMTR_RETRY_ON_ALL_DEVICE_STATUS	193
Table 358 – Builtin XMTR_RETRY_ON_ALL_RESPONSE_CODES	194
Table 359 – Builtin XMTR_RETRY_ON_COMM_ERROR	194
Table 360 – Builtin XMTR_RETRY_ON_COMM_STATUS.....	195
Table 361 – Builtin XMTR_RETRY_ON_DATA.....	195
Table 362 – Builtin XMTR_RETRY_ON_DEVICE_STATUS	196
Table 363 – Builtin XMTR_RETRY_ON_NO_DEVICE	196
Table 364 – Builtin XMTR_RETRY_ON_RESPONSE_CODE.....	197
Table 365 – Contents of the return codes description table	197
Table 366 – Return code descriptions	198
Table 367 – Return code descriptions	198
Table A.1 – Builtin profile for PROFIBUS and PROFINET	199
Table A.2 – Builtin profile for FOUNDATION fieldbus	208
Table A.3 – Builtin profile for HART	216
Table A.4 – Builtin profile for Communication Servers.....	225

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**FUNCTION BLOCKS (FB) FOR PROCESS CONTROL AND
ELECTRONIC DEVICE DESCRIPTION LANGUAGE (EDDL) –****Part 5: EDDL Builtin library**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61804-5 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation.

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

FDIS	Report on voting
65E/450/FDIS	65E/461/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 parts in the IEC 61804 series, published under the general title *Function blocks (FB) for process control and Electronic Device Description Language (EDDL)*, can be found on the IEC website.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

This part of IEC 61804 is an extension to IEC 61804-3. In earlier editions of IEC 61804-3 the EDDL Builtin library was part of the Electronic Device Description Language (EDDL) document IEC 61804-3. Because of editorial problems, the EDDL Builtin library is now moved to this separate part of IEC 61804.

FUNCTION BLOCKS (FB) FOR PROCESS CONTROL AND ELECTRONIC DEVICE DESCRIPTION LANGUAGE (EDDL) –

Part 5: EDDL Builtin library

1 Scope

This part of IEC 61804 specifies the EDDL Builtin library and provides the profiles of the various fieldbuses.

2 Normative references

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 61804-3:2015, *Function blocks (FB) for process control and Electronic Device Description Language (EDDL) – Part 3: EDDL syntax and semantics*

IEEE 754, *Standard for Binary Floating-Point Arithmetic for microprocessor systems*

3 Terms, definitions, acronyms and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61804-3 apply.

3.2 Acronyms and abbreviated terms

CP	Communication profile
CPF	Communication profile family
DD	Device Description
EDD	Electronic Device Description
EDDL	Electronic Device Description Language
HCF	HART [®] 1 Communication Foundation
I/O	Input/output
ID	Identifier

¹ HART[®] is a registered trademark of the consortium HART Communication Foundation (HCF) (non-profit organization). This information is given for the convenience of users of this standard and does not constitute an endorsement by IEC of the trade name holder or any of its products. Compliance to this profile does not require use of the trade name. Use of the trade names requires permission from the trade name holder.