IEC 61804-5

Edition 2.0 2020-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Devices and integration in enterprise systems – Function blocks (FB) for process control and electronic device description language (EDDL) – Part 5: EDDL Builtin library

Les dispositifs et leur intégration dans les systèmes de l'entreprise – blocs fonctionnels (FB) pour les procédés industriels et le langage de description électronique de produit (EDDL) – Partie 5: Bibliothèque de Builtin EDDL

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 25.040.40; 35.240.50

ISBN 978-2-8322-8446-9

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.

® Registered trademark of the International Electrotechnical Commission
Marque déposée de la Commission Electrotechnique Internationale

CONTENTS

FOREWORD 20
INTRODUCTION 23
1 Scope 24
2 Normative references 24
3 Terms, definitions, acronyms and abbreviated terms 24
3.1 Terms and definitions 24
3.2 Acronyms and abbreviated terms 24
4 Conventions for builtin descriptions 25
5 Builtin categories 26
5.1 Overview 26
5.2 User interface builtins 36
5.3 Communication builtins 37
5.4 Action builtins 39
6 EDDL builtin library 42
6.1 General 42
6.2 User interface builtins 42
6.2.1 Builtin ACKNOWLEDGE 42
6.2.2 Builtin acknowledge 43
6.2.3 Builtin DELAY 44
6.2.4 Builtin delay 44
6.2.5 Builtin delayfor 45
6.2.6 Builtin delayfor2 46
6.2.7 Builtin DISPLAY 48
6.2.8 Builtin display 49
6.2.9 Builtin display_bitenum 49
6.2.10 Builtin display_builtin_error 50
6.2.11 Builtin display_comm_error 50
6.2.12 Builtin display_comm_status 51
6.2.13 Builtin display_device_status 52
6.2.14 Builtin display_dynamics 52
6.2.15 Builtin display_dynamics2 53
6.2.16 Builtin display_message 54
6.2.17 Builtin display_message2 55
6.2.18 Builtin display_response_code 57
6.2.19 Builtin display_response_status 58
6.2.20 Builtin display_xmtr_status 58
6.2.21 Builtin edit_device_value 59
6.2.22 Builtin edit_device_value2 60
6.2.23 Builtin edit_local_value 62
6.2.24 Builtin edit_local_value2 63
6.2.25 Builtin get_acknowledgement 64
6.2.26 Builtin get_acknowledgement2 65
6.2.27 Builtin GET_DEV_VAR_VALUE 66
6.2.28 Builtin get_dev_var_value 67
6.2.29 Builtin GET_LOCAL_VAR_VALUE 68
6.2.30 Builtin get_local_var_value 68

6.2.31 Builtin Menu 69
6.2.32 Builtin MenuDisplay (version A) 70
6.2.33 Builtin MenuDisplay (version B) 71
6.2.34 Builtin PUT_MESSAGE 72
6.2.35 Builtin put_message 73
6.2.36 Builtin SELECT_FROM_LIST 75
6.2.37 Builtin select_from_list 76
6.2.38 Builtin select_from_menu 76
6.2.39 Builtin select_from_menu2 78
6.2.40 Prompt string formats 79
6.3 Communication builtins 80
6.3.1 Builtin abort_on_all_comm_errors 80
6.3.2 Builtin ABORT_ON_ALL_COMM_STATUS 81
6.3.3 Builtin ABORT_ON_ALL_DEVICE_STATUS 81
6.3.4 Builtin ABORT_ON_ALL_RESPONSE_CODES 82
6.3.5 Builtin abort_on_all_response_codes 82
6.3.6 Builtin ABORT_ON_COMM_ERROR 83
6.3.7 Builtin abort_on_comm_error 83
6.3.8 Builtin ABORT_ON_COMM_STATUS 84
6.3.9 Builtin ABORT_ON_DEVICE_STATUS 85
6.3.10 Builtin ABORT_ON_NO_DEVICE (deprecated) 85
6.3.11 Builtin ABORT_ON_RESPONSE_CODE 86
6.3.12 Builtin abort_on_response_code 87
6.3.13 Builtin ext_send_command 87
6.3.14 Builtin ext_send_command_trans 88
6.3.15 Builtin fail_on_all_comm_errors 89
6.3.16 Builtin fail_on_all_response_codes 90
6.3.17 Builtin fail_on_comm_error 90
6.3.18 Builtin fail_on_response_code 91
6.3.19 Builtin get_more_status 92
6.3.20 Builtin IGNORE_ALL_COMM_STATUS 92
6.3.21 Builtin IGNORE_ALL_DEVICE_STATUS 93
6.3.22 Builtin IGNORE_ALL_RESPONSE_CODES 93
6.3.23 Builtin IGNORE_COMM_ERROR 94
6.3.24 Builtin IGNORE_COMM_STATUS 95
6.3.25 Builtin IGNORE_DEVICE_STATUS 95
6.3.26 Builtin IGNORE_NO_DEVICE (deprecated) 96
6.3.27 Builtin IGNORE_RESPONSE_CODE 96
6.3.28 Builtin read_value 97
6.3.29 Builtin read_value2 97
6.3.30 Builtin ReadCommand 98
6.3.31 Builtin retry_on_all_comm_errors 99
6.3.32 Builtin RETRY_ON_ALL_COMM_STATUS 99
6.3.33 Builtin RETRY_ON_ALL_DEVICE_STATUS 100
6.3.34 Builtin RETRY_ON_ALL_RESPONSE_CODES 100
6.3.35 Builtin retry_on_all_response_codes 101
6.3.36 Builtin RETRY_ON_COMM_ERROR 102
6.3.37 Builtin retry_on_comm_error 102
6.3.38 Builtin RETRY_ON_COMM_STATUS 103

6.3.39 Builtin RETRY_ON_DEVICE_STATUS 103
6.3.40 Builtin RETRY_ON_NO_DEVICE (deprecated) 104
6.3.41 Builtin RETRY_ON_RESPONSE_CODE 105
6.3.42 Builtin retry_on_response_code 105
6.3.43 Builtin send 106
6.3.44 Builtin send_all_values 107
6.3.45 Builtin send_command 107
6.3.46 Builtin send_command_trans 108
6.3.47 Builtin send_trans 108
6.3.48 Builtin send_value 109
6.3.49 Builtin send_value2 110
6.3.50 Builtin SET_NUMBER_OF_RETRIES 111
6.3.51 Builtin WriteCommand 111
6.3.52 Builtin XMTR_ABORT_ON_ALL_COMM_STATUS 112
6.3.53 Builtin XMTR_ABORT_ON_ALL_DATA 112
6.3.54 Builtin XMTR_ABORT_ON_ALL_DEVICE_STATUS 113
6.3.55 Builtin XMTR_ABORT_ON_ALL_RESPONSE_CODES 113
6.3.56 Builtin XMTR_ABORT_ON_COMM_ERROR 114
6.3.57 Builtin XMTR_ABORT_ON_COMM_STATUS 114
6.3.58 Builtin XMTR_ABORT_ON_DATA 115
6.3.59 Builtin XMTR_ABORT_ON_DEVICE_STATUS 116
6.3.60 Builtin XMTR_ABORT_ON_NO_DEVICE (deprecated) 116
6.3.61 Builtin XMTR_ABORT_ON_RESPONSE_CODE 117
6.3.62 Builtin XMTR_IGNORE_ALL_COMM_STATUS 117
6.3.63 Builtin XMTR_IGNORE_ALL_DATA 118
6.3.64 Builtin XMTR_IGNORE_ALL_DEVICE_STATUS 118
6.3.65 Builtin XMTR_IGNORE_ALL_RESPONSE_CODES 119
6.3.66 Builtin XMTR_IGNORE_COMM_ERROR 119
6.3.67 Builtin XMTR_IGNORE_COMM_STATUS 120
6.3.68 Builtin XMTR_IGNORE_DATA 120
6.3.69 Builtin XMTR_IGNORE_DEVICE_STATUS 121
6.3.70 Builtin XMTR_IGNORE_NO_DEVICE (deprecated) 121
6.3.71 Builtin XMTR_IGNORE_RESPONSE_CODE 122
6.3.72 Builtin XMTR_RETRY_ON_ALL_COMM_STATUS 123
6.3.73 Builtin XMTR_RETRY_ON_ALL_DATA 123
6.3.74 Builtin XMTR_RETRY_ON_ALL_DEVICE_STATUS 124
6.3.75 Builtin XMTR_RETRY_ON_ALL_RESPONSE_CODES 124
6.3.76 Builtin XMTR_RETRY_ON_COMM_ERROR 125
6.3.77 Builtin XMTR_RETRY_ON_COMM_STATUS 125
6.3.78 Builtin XMTR_RETRY_ON_DATA 126
6.3.79 Builtin XMTR_RETRY_ON_DEVICE_STATUS 126
6.3.80 Builtin XMTR_RETRY_ON_NO_DEVICE (deprecated) 127
6.3.81 Builtin XMTR_RETRY_ON_RESPONSE_CODE 127
6.4 Action builtins 128
6.4.1 Builtin fgetval 128
6.4.2 Builtin fsetval 128
6.4.3 Builtin get_date 129
6.4.4 Builtin get_double 130
6.4.5 Builtin get_float 130

6.4.6 Builtin get_signed 131
6.4.7 Builtin get_string 132
6.4.8 Builtin get_unsigned 132
6.4.9 Builtin igetval 133
6.4.10 Builtin isetval 133
6.4.11 Builtin isOffline 134
6.4.12 Builtin lgetval 134
6.4.13 Builtin lsetval 135
6.4.14 Builtin put_date 135
6.4.15 Builtin put_double 136
6.4.16 Builtin put_float 137
6.4.17 Builtin put_signed 137
6.4.18 Builtin put_string 138
6.4.19 Builtin put_unsigned 139
6.4.20 Builtin sgetval 139
6.4.21 Builtin ssetval 140
6.5 Variable access builtins 140
6.5.1 Builtin assign 140
6.5.2 Builtin assign_double 141
6.5.3 Builtin assign_float 142
6.5.4 Builtin assign_int 142
6.5.5 Builtin assign_var 143
6.5.6 Builtin assign2 143
6.5.7 Builtin dassign 145
6.5.8 Builtin fassign 145
6.5.9 Builtin float_value 145
6.5.10 Builtin fvar_value 146
6.5.11 Builtin get_date_value 146
6.5.12 Builtin get_date_value2 147
6.5.13 Builtin get_double_value 148
6.5.14 Builtin get_double_value2 149
6.5.15 Builtin get_float_value 150
6.5.16 Builtin get_float_value2 151
6.5.17 Builtin get_signed_value 152
6.5.18 Builtin get_signed_value2 152
6.5.19 Builtin get_string_value 153
6.5.20 Builtin get_string_value2 154
6.5.21 Builtin get_unsigned_value 155
6.5.22 Builtin get_unsigned_value2 156
6.5.23 Builtin iassign 157
6.5.24 Builtin int_value 157
6.5.25 Builtin ivar_value 158
6.5.26 Builtin lassign 158
6.5.27 Builtin long_value 159
6.5.28 Builtin lvar_value 159
6.5.29 Builtin put_date_value 159
6.5.30 Builtin put_date_value2 160
6.5.31 Builtin put_double_value 161
6.5.32 Builtin put_double_value2 162

6.5.33 Builtin put_float_value 163
6.5.34 Builtin put_float_value2 164
6.5.35 Builtin put_signed_value 165
6.5.36 Builtin put_signed_value2 165
6.5.37 Builtin put_string_value 166
6.5.38 Builtin put_string_value2 167
6.5.39 Builtin put_unsigned_value 168
6.5.40 Builtin put_unsigned_value2 169
6.5.41 Builtin ret_double_value 170
6.5.42 Builtin ret_double_value2 171
6.5.43 Builtin ret_float_value 171
6.5.44 Builtin ret_float_value2 172
6.5.45 Builtin ret_signed_value 172
6.5.46 Builtin ret_signed_value2 173
6.5.47 Builtin ret_unsigned_value 174
6.5.48 Builtin ret_unsigned_value2 174
6.5.49 Builtin vassign 175
6.6 Normal termination builtins 175
6.6.1 Builtin discard_on_exit 175
6.6.2 Builtin save_on_exit 176
6.6.3 Builtin save_values 177
6.6.4 Builtin send_on_exit 178
6.7 Abnormal termination builtins 179
6.7.1 Builtin abort 179
6.7.2 Builtin add_abort_method (version A) 179
6.7.3 Builtin add_abort_method (version B) 180
6.7.4 Builtin method_abort 180
6.7.5 Builtin pop_abort_method 181
6.7.6 Builtin process_abort 181
6.7.7 Builtin push_abort_method 182
6.7.8 Builtin remove_abort_method (version A) 182
6.7.9 Builtin remove_abort_method (version B) 183
6.7.10 Builtin remove_all_abort_methods 183
6.8 String builtins 184
6.8.1 Builtin atof 184
6.8.2 Builtin atoi 184
6.8.3 Builtin BUILD_MESSAGE 185
6.8.4 Builtin dictionary_string 185
6.8.5 Builtin ftoa 186
6.8.6 Builtin get_comm_error_string 186
6.8.7 Builtin get_dictionary_string 187
6.8.8 Builtin get_enum_string 188
6.8.9 Builtin get_response_code_string 188
6.8.10 Builtin get_rspcode_string 189
6.8.11 Builtin get_rspcode_string_by_id 190
6.8.12 Builtin get_status_code_string (deprecated) 190
6.8.13 Builtin get_status_string 191
6.8.14 Builtin get_stddict_string 192
6.8.15 Builtin get_variable_string 192

6.8.16 Builtin itoa (version A) 193
6.8.17 Builtin itoa (version B) 193
6.8.18 Builtin strleft 194
6.8.19 Builtin strcmp 194
6.8.20 Builtin strlen 195
6.8.21 Builtin strlwr 196
6.8.22 Builtin strmid 196
6.8.23 Builtin strright 197
6.8.24 Builtin strstr 197
6.8.25 Builtin strtrim 198
6.8.26 Builtin strupr 199
6.8.27 Builtin trunc 199
6.9 Date time builtins 200
6.9.1 Builtin AddTime 200
6.9.2 Builtin DATE_AND_TIME_VALUE_to_string 200
6.9.3 Builtin Date_to_DayOfMonth 201
6.9.4 Builtin DATE_to_days 201
6.9.5 Builtin Date_to_Month 202
6.9.6 Builtin DATE_to_string 202
6.9.7 Builtin Date_To_Time 203
6.9.8 Builtin Date_to_Year 203
6.9.9 Builtin days_to_DATE 204
6.9.10 Builtin DELAY_TIME 204
6.9.11 Builtin DiffTime 204
6.9.12 Builtin From_DATE_AND_TIME_VALUE 205
6.9.13 Builtin From_TIME_VALUE 205
6.9.14 Builtin GetCurrentDate 206
6.9.15 Builtin GetCurrentDateAndTime 206
6.9.16 Builtin GetCurrentTime 207
6.9.17 Builtin GET_TICK_COUNT 207
6.9.18 Builtin Make_Time 207
6.9.19 Builtin seconds_to_TIME_VALUE 208
6.9.20 Builtin seconds_to_TIME_VALUE8 209
6.9.21 Builtin Time_To_Date 209
6.9.22 Builtin TIME_VALUE_to_Hour 209
6.9.23 Builtin TIME_VALUE_to_Minute 210
6.9.24 Builtin TIME_VALUE_to_Second 210
6.9.25 Builtin TIME_VALUE_to_seconds 211
6.9.26 Builtin TIME_VALUE_to_string 211
6.9.27 Builtin timet_to_string 212
6.9.28 Builtin timet_to_TIME_VALUE 213
6.9.29 Builtin timet_To_TIME_VALUE 213
6.9.30 Builtin timet_to_TIME_VALUE8 214
6.9.31 Builtin To_Date 214
6.9.32 Builtin To_Date_and_Time 215
6.9.33 Builtin To_Time 215
6.9.34 Builtin To_TIME_VALUE 216
6.9.35 Builtin To_TIME_VALUE8 216
6.10 Diagnostic builtins 217

6.10.1 Builtin get_comm_error 217
6.10.2 Builtin get_dds_error 217
6.10.3 Builtin get_response_code 218
6.11 Math builtins 219
6.11.1 Builtin abs 219
6.11.2 Builtin acos 219
6.11.3 Builtin asin 220
6.11.4 Builtin atan 220
6.11.5 Builtin ByteToDouble 221
6.11.6 Builtin ByteToFloat 221
6.11.7 Builtin ByteToLong 222
6.11.8 Builtin ByteToShort 222
6.11.9 Builtin cbrt 223
6.11.10 Builtin ceil 223
6.11.11 Builtin cos 224
6.11.12 Builtin cosh 224
6.11.13 Builtin DoubleToByte 225
6.11.14 Builtin drand 225
6.11.15 Builtin dseed 226
6.11.16 Builtin exp 226
6.11.17 Builtin FloatToByte 226
6.11.18 Builtin floor 227
6.11.19 Builtin fmod 227
6.11.20 Builtin fpclassify 228
6.11.21 Builtin is_NaN 229
6.11.22 Builtin log 229
6.11.23 Builtin log10 229
6.11.24 Builtin log2 230
6.11.25 Builtin LongToByte 230
6.11.26 Builtin nan 231
6.11.27 Builtin NaN_value 232
6.11.28 Builtin nanf 232
6.11.29 Builtin pow 233
6.11.30 Builtin round 233
6.11.31 Builtin ShortToByte 234
6.11.32 Builtin sin 234
6.11.33 Builtin sinh 235
6.11.34 Builtin sqrt 235
6.11.35 Builtin tan 235
6.11.36 Builtin tanh 236
6.12 List builtins 236
6.12.1 Builtin get_date_lelem 236
6.12.2 Builtin get_date_lelem2 237
6.12.3 Builtin get_double_lelem 238
6.12.4 Builtin get_double_lelem2 239
6.12.5 Builtin get_float_lelem 240
6.12.6 Builtin get_float_lelem2 241
6.12.7 Builtin get_signed_lelem 242
6.12.8 Builtin get_signed_lelem2 242

6.12.9 Builtin get_string_lelem 243
6.12.10 Builtin get_string_lelem2 244
6.12.11 Builtin get_unsigned_lelem 245
6.12.12 Builtin get_unsigned_lelem2 246
6.12.13 Builtin ListDeleteElementAt (version A) 247
6.12.14 Builtin ListDeleteElementAt (version B) 248
6.12.15 Builtin ListDeleteElementAt2 248
6.12.16 Builtin ListInsert (version A) 249
6.12.17 Builtin ListInsert (version B) 250
6.12.18 Builtin ListInsert2 250
6.13 Translation builtins 251
6.13.1 Builtin DICT_ID 251
6.13.2 Builtin get_block_instance_by_object_index 252
6.13.3 Builtin get_block_instance_by_tag 253
6.13.4 Builtin get_block_instance_count 254
6.13.5 Builtin get_resolve_status 254
6.13.6 Builtin ITEM_ID 255
6.13.7 Builtin MEMBER_ID 255
6.13.8 Builtin ObjectReference 256
6.13.9 Builtin resolve_array_ref 257
6.13.10 Builtin resolve_array_ref2 258
6.13.11 Builtin resolve_block_ref 258
6.13.12 Builtin resolve_block_ref2 259
6.13.13 Builtin resolve_list_ref 260
6.13.14 Builtin resolve_local_ref 260
6.13.15 Builtin resolve_local_ref2 261
6.13.16 Builtin resolve_param_list_ref 262
6.13.17 Builtin resolve_param_ref 262
6.13.18 Builtin resolve_param_ref2 263
6.13.19 Builtin resolve_record_ref 264
6.13.20 Builtin resolve_record_ref2 264
6.13.21 Builtin VARID 265
6.14 Block transfer builtins 265
6.14.1 Builtin abortTransferPort 265
6.14.2 Builtin closeTransferPort 266
6.14.3 Builtin fGetByte 266
6.14.4 Builtin get_transfer_status 267
6.14.5 Builtin openTransferPort 268
6.14.6 Builtin readItemFromDevice 268
6.14.7 Builtin writeItemToDevice 269
6.15 File builtins 269
6.15.1 Builtin browseIdentity 269
6.15.2 Builtin re_read_file 270
6.15.3 Builtin re_write_file 270
6.16 Identification builtins 271
6.16.1 Builtin GET_DD_REVISION 271
6.16.2 Builtin GET_DEVICE_REVISION 271
6.16.3 Builtin GET_DEVICE_TYPE 271
6.16.4 Builtin GET_MANUFACTURER 272

6.17 Development support builtins 272
6.17.1 Builtin _ERROR 272
6.17.2 Builtin _TRACE 273
6.17.3 Builtin _WARNING 273
6.17.4 Builtin LOG_MESSAGE 274
6.18 DDL references 274
6.18.1 Direct referencing of VARIABLEs 274
6.18.2 Accessing standard dictionary strings 275
6.18.3 String support using DD_STRING 276
6.18.4 Referencing DD item attributes 276
6.19 Method functions 277
7 Builtins return codes 278

Figure 1 – A sample METHOD 278
Figure 2 – DD_STRING parameters passed by reference 278

Table 1 – Format for the builtin overview table 25
Table 2 – Contents of the builtin overview table 25
Table 3 – Format for the builtins lexical element tables 25
Table 4 – Contents of the lexical element table 26
Table 5 – Builtin overview 26
Table 6 – Usage of builtins 36
Table 7 – User interface builtins 36
Table 8 – Communication builtins 37
Table 9 – Action builtins 39
Table 10 – Builtin ACKNOWLEDGE 43
Table 11 – Builtin acknowledge 43
Table 12 – Builtin DELAY 44
Table 13 – Builtin delay 45
Table 14 – Builtin delayfor 45
Table 15 – Builtin delayfor2 47
Table 16 – Builtin DISPLAY 48
Table 17 – Builtin display 49
Table 18 – Builtin display_bitenum 49
Table 19 – Builtin display_builtin_error 50
Table 20 – Builtin display_comm_error 51
Table 21 – Builtin display_comm_status 51
Table 22 – Builtin display_device_status 52
Table 23 – Builtin display_dynamics 53
Table 24 – Builtin display_dynamics2 54
Table 25 – Builtin display_message 55
Table 26 – Builtin display_message2 56
Table 27 – Builtin display_response_code 57
Table 28 – Builtin display_response_status 58

Table 29 – Builtin display_xmtr_status 59
Table 30 – Builtin edit_device_value 59
Table 31 – Builtin edit_device_value2 61
Table 32 – Builtin edit_local_value 62
Table 33 – Builtin edit_local_value2 64
Table 34 – Builtin get_acknowledgement 65
Table 35 – Builtin get_acknowledgement2 66
Table 36 – Builtin GET_DEV_VAR_VALUE 67
Table 37 – Builtin get_dev_var_value 68
Table 38 – Builtin GET_LOCAL_VAR_VALUE 68
Table 39 – Builtin get_local_var_value 69
Table 40 – Builtin Menu 70
Table 41 – Builtin MenuDisplay 71
Table 42 – Builtin MenuDisplay 72
Table 43 – Builtin PUT_MESSAGE 73
Table 44 – Builtin put_message 74
Table 45 – Builtin SELECT_FROM_LIST 75
Table 46 – Builtin select_from_list 76
Table 47 – Builtin select_from_menu 77
Table 48 – Builtin select_from_menu2 79
Table 49 – Format options 80
Table 50 – Builtin abort_on_all_comm_errors 80
Table 51 – Builtin ABORT_ON_ALL_COMM_STATUS 81
Table 52 – Builtin ABORT_ON_ALL_DEVICE_STATUS 82
Table 53 – Builtin ABORT_ON_ALL_RESPONSE_CODES 82
Table 54 – Builtin abort_on_all_response_codes 83
Table 55 – Builtin ABORT_ON_COMM_ERROR 83
Table 56 – Builtin abort_on_comm_error 84
Table 57 – Builtin ABORT_ON_COMM_STATUS 84
Table 58 – Builtin ABORT_ON_DEVICE_STATUS 85
Table 59 – Builtin ABORT_ON_NO_DEVICE 86
Table 60 – Available abort and retry masks 86
Table 61 – Builtin ABORT_ON_RESPONSE_CODE 87
Table 62 – Builtin abort_on_response_code 87
Table 63 – Builtin ext_send_command 88
Table 64 – Builtin ext_send_command_trans 89
Table 65 – Builtin fail_on_all_comm_errors 90
Table 66 – Builtin fail_on_all_response_codes 90
Table 67 – Builtin fail_on_comm_error 91
Table 68 – Builtin fail_on_response_code 91
Table 69 – Builtin get_more_status 92
Table 70 – Builtin IGNORE_ALL_COMM_STATUS 93
Table 71 – Builtin IGNORE_ALL_DEVICE_STATUS 93

Table 72 – Builtin IGNORE_ALL_RESPONSE_CODES 94
Table 73 – Builtin IGNORE_COMM_ERROR 94
Table 74 – Builtin IGNORE_COMM_STATUS 95
Table 75 – Builtin IGNORE_DEVICE_STATUS 96
Table 76 – Builtin IGNORE_NO_DEVICE 96
Table 77 – Builtin IGNORE_RESPONSE_CODE 97
Table 78 – Builtin read_value 97
Table 79 – Builtin read_value2 98
Table 80 – Builtin ReadCommand 99
Table 81 – Builtin retry_on_all_comm_errors 99
Table 82 – Builtin RETRY_ON_ALL_COMM_STATUS 100
Table 83 – Builtin RETRY_ON_ALL_DEVICE_STATUS 100
Table 84 – Builtin RETRY_ON_ALL_RESPONSE_CODES 101
Table 85 – Builtin retry_on_all_response_codes 101
Table 86 – Builtin RETRY_ON_COMM_ERROR 102
Table 87 – Builtin retry_on_comm_error 103
Table 88 – Builtin RETRY_ON_COMM_STATUS 103
Table 89 – Builtin RETRY_ON_DEVICE_STATUS 104
Table 90 – Builtin RETRY_ON_NO_DEVICE 104
Table 91 – Builtin RETRY_ON_RESPONSE_CODE 105
Table 92 – Builtin retry_on_response_code 106
Table 93 – Builtin send 106
Table 94 – Builtin send_all_values 107
Table 95 – Builtin send_command 108
Table 96 – Builtin send_command_trans 108
Table 97 – Builtin send_trans 109
Table 98 – Builtin send_value 110
Table 99 – Builtin send_value2 111
Table 100 – Builtin SET_NUMBER_OF_RETRIES 111
Table 101 – Builtin WriteCommand 112
Table 102 – Builtin XMTR_ABORT_ON_ALL_COMM_STATUS 112
Table 103 – Builtin XMTR_ABORT_ON_ALL_DATA 113
Table 104 – Builtin XMTR_ABORT_ON_ALL_DEVICE_STATUS 113
Table 105 – Builtin XMTR_ABORT_ON_ALL_RESPONSE_CODES 114
Table 106 – Builtin XMTR_ABORT_ON_COMM_ERROR 114
Table 107 – Builtin XMTR_ABORT_ON_COMM_STATUS 115
Table 108 – Builtin XMTR_ABORT_ON_DATA 115
Table 109 – Builtin XMTR_ABORT_ON_DEVICE_STATUS 116
Table 110 – Builtin XMTR_ABORT_ON_NO_DEVICE 117
Table 111 – Builtin XMTR_ABORT_ON_RESPONSE_CODE 117
Table 112 – Builtin XMTR_IGNORE_ALL_COMM_STATUS 118
Table 113 – Builtin XMTR_IGNORE_ALL_DATA 118
Table 114 – Builtin XMTR_IGNORE_ALL_DEVICE_STATUS 119

Table 115 – Builtin XMTR_IGNORE_ALL_RESPONSE_CODES 119
Table 116 – Builtin XMTR_IGNORE_COMM_ERROR 120
Table 117 – Builtin XMTR_IGNORE_COMM_STATUS 120
Table 118 – Builtin XMTR_IGNORE_DATA 121
Table 119 – Builtin XMTR_IGNORE_DEVICE_STATUS 121
Table 120 – Builtin XMTR_IGNORE_NO_DEVICE 122
Table 121 – Builtin XMTR_IGNORE_RESPONSE_CODE 122
Table 122 – Builtin XMTR_RETRY_ON_ALL_COMM_STATUS 123
Table 123 – Builtin XMTR_RETRY_ON_ALL_DATA 123
Table 124 – Builtin XMTR_RETRY_ON_ALL_DEVICE_STATUS 124
Table 125 – Builtin XMTR_RETRY_ON_ALL_RESPONSE_CODES 125
Table 126 – Builtin XMTR_RETRY_ON_COMM_ERROR 125
Table 127 – Builtin XMTR_RETRY_ON_COMM_STATUS 126
Table 128 – Builtin XMTR_RETRY_ON_DATA 126
Table 129 – Builtin XMTR_RETRY_ON_DEVICE_STATUS 127
Table 130 – Builtin XMTR_RETRY_ON_NO_DEVICE 127
Table 131 – Builtin XMTR_RETRY_ON_RESPONSE_CODE 128
Table 132 – Builtin fgetval 128
Table 133 – Builtin fsetval 129
Table 134 – Builtin get_date 129
Table 135 – Builtin get_double 130
Table 136 – Builtin get_float 131
Table 137 – Builtin get_signed 131
Table 138 – Builtin get_string 132
Table 139 – Builtin get_unsigned 133
Table 140 – Builtin igetval 133
Table 141 – Builtin isetval 134
Table 142 – Builtin isOffline 134
Table 143 – Builtin lgetval 135
Table 144 – Builtin lsetval 135
Table 145 – Builtin put_date 136
Table 146 – Builtin put_double 136
Table 147 – Builtin put_float 137
Table 148 – Builtin put_signed 138
Table 149 – Builtin put_string 138
Table 150 – Builtin put_unsigned 139
Table 151 – Builtin sgetval 140
Table 152 – Builtin ssetval 140
Table 153 – Builtin assign 141
Table 154 – Builtin assign_double 141
Table 155 – Builtin assign_float 142
Table 156 – Builtin assign_int 142
Table 157 – Builtin assign_var 143

Table 158 – Builtin assign2 144
Table 159 – Builtin dassign 145
Table 160 – Builtin fassign 145
Table 161 – Builtin float_value 146
Table 162 – Builtin fvar_value 146
Table 163 – Builtin get_date_value 147
Table 164 – Builtin get_date_value2 148
Table 165 – Builtin get_double_value 149
Table 166 – Builtin get_double_value2 150
Table 167 – Builtin get_float_value 150
Table 168 – Builtin get_float_value2 151
Table 169 – builtin get_signed_value 152
Table 170 – Builtin get_signed_value2 153
Table 171 – Builtin get_string_value 154
Table 172 – Builtin get_string_value2 155
Table 173 – Builtin get_unsigned_value 156
Table 174 – Builtin get_unsigned_value2 157
Table 175 – Builtin iassign 157
Table 176 – Builtin int_value 158
Table 177 – Builtin ivar_value 158
Table 178 – Builtin lassign 158
Table 179 – Builtin long_value 159
Table 180 – Builtin lvar_value 159
Table 181 – Builtin put_date_value 160
Table 182 – Builtin put_date_value2 161
Table 183 – Builtin put_double_value 162
Table 184 – Builtin put_double_value2 163
Table 185 – Builtin put_float_value 163
Table 186 – Builtin put_float_value2 164
Table 187 – Builtin put_signed_value 165
Table 188 – Builtin put_signed_value2 166
Table 189 – Builtin put_string_value 167
Table 190 – Builtin put_string_value2 168
Table 191 – Builtin put_unsigned_value 169
Table 192 – Builtin put_unsigned_value2 170
Table 193 – Builtin ret_double_value 171
Table 194 – Builtin ret_double_value2 171
Table 195 – Builtin ret_float_value 172
Table 196 – Builtin ret_float_value2 172
Table 197 – Builtin ret_signed_value 173
Table 198 – Builtin ret_signed_value2 173
Table 199 – Builtin ret_unsigned_value 174
Table 200 – Builtin ret_unsigned_value2 174

Table 201 – Builtin vassign 175
Table 202 – Builtin discard_on_exit 176
Table 203 – Builtin save_on_exit 177
Table 204 – Builtin save_values 177
Table 205 – Builtin send_on_exit 178
Table 206 – Builtin abort 179
Table 207 – Builtin add_abort_method 179
Table 208 – Builtin add_abort_method 180
Table 209 – Builtin method_abort 181
Table 210 – Builtin pop_abort_method 181
Table 211 – Builtin process_abort 182
Table 212 – Builtin push_abort_method 182
Table 213 – Builtin remove_abort_method 183
Table 214 – Builtin remove_abort_method 183
Table 215 – Builtin remove_all_abort_methods 184
Table 216 – Builtin atof 184
Table 217 – Builtin atoi 185
Table 218 – Builtin BUILD_MESSAGE 185
Table 219 – Builtin dictionary_string 186
Table 220 – Builtin ftoa 186
Table 221 – Builtin get_comm_error_string 187
Table 222 – Builtin get_dictionary_string 187
Table 223 – Builtin get_enum_string 188
Table 224 – Builtin get_response_code_string 189
Table 225 – Builtin get_rspcode_string 190
Table 226 – Builtin get_rspcode_string_by_id 190
Table 227 – Builtin get_status_code_string 191
Table 228 – Builtin get_status_string 191
Table 229 – Builtin get_stddict_string 192
Table 230 – Builtin get_variable_string 193
Table 231 – Builtin itoa (version A) 193
Table 232 – Builtin itoa (version B) 194
Table 233 – Builtin strleft 194
Table 234 – Builtin strcmp 195
Table 235 – Builtin strlen 195
Table 236 – Builtin strlwr 196
Table 237 – Builtin strmid 197
Table 238 – Builtin strright 197
Table 239 – Builtin strstr 198
Table 240 – Builtin strtrim 198
Table 241 – Builtin strupr 199
Table 242 – Builtin trunc 199
Table 243 – Builtin AddTime 200

Table 244 – Builtin DATE_AND_TIME_VALUE_to_string 201
Table 245 – Builtin Date_to_DayOfMonth 201
Table 246 – Builtin DATE_to_days 202
Table 247 – Builtin Date_to_Month 202
Table 248 – Builtin DATE_to_string 203
Table 249 – Builtin Date_To_Time 203
Table 250 – Builtin Date_to_Year 203
Table 251 – Builtin days_to_DATE 204
Table 252 – Builtin DELAY_TIME 204
Table 253 – Builtin DiffTime 205
Table 254 – Builtin From_DATE_AND_TIME_VALUE 205
Table 255 – Builtin From_TIME_VALUE 206
Table 256 – Builtin GetCurrentDate 206
Table 257 – Builtin GetCurrentDateAndTime 206
Table 258 – Builtin GetCurrentTime 207
Table 259 – Builtin GET_TICK_COUNT 207
Table 260 – Builtin Make_Time 208
Table 261 – Builtin seconds_to_TIME_VALUE 208
Table 262 – Builtin seconds_to_TIME_VALUE 209
Table 263 – Builtin Time_To_Date 209
Table 264 – Builtin TIME_VALUE_to_Hour 210
Table 265 – Builtin TIME_VALUE_to_Minute 210
Table 266 – Builtin TIME_VALUE_to_Second 211
Table 267 – Builtin TIME_VALUE_to_seconds 211
Table 268 – Builtin TIME_VALUE_to_string 212
Table 269 – Builtin timet_to_string 213
Table 270 – Builtin timet_to_TIME_VALUE 213
Table 271 – Builtin timet_To_TIME_VALUE 214
Table 272 – Builtin timet_to_TIME_VALUE8 214
Table 273 – Builtin To_Date 214
Table 274 – Builtin To_Date_and_Time 215
Table 275 – Builtin To_Time 215
Table 276 – Builtin To_TIME_VALUE 216
Table 277 – Builtin To_TIME_VALUE8 216
Table 278 – Builtin get_comm_error 217
Table 279 – Builtin get_dds_error 218
Table 280 – Builtin get_response_code 219
Table 281 – Builtin abs 219
Table 282 – Builtin acos 220
Table 283 – Builtin asin 220
Table 284 – Builtin atan 221
Table 285 – Builtin ByteToDouble 221
Table 286 – Builtin ByteToFloat 222

Table 287 – Builtin ByteToLong 222
Table 288 – Builtin ByteToShort 223
Table 289 – Builtin cbrt 223
Table 290 – Builtin ceil 223
Table 291 – Builtin cos 224
Table 292 – Builtin cosh 224
Table 293 – Builtin DoubleToByte 225
Table 294 – Builtin drand 225
Table 295 – Builtin dseed 226
Table 296 – Builtin exp 226
Table 297 – Builtin FloatToByte 227
Table 298 – Builtin floor 227
Table 299 – Builtin fmod 228
Table 300 – Builtin fpclassify 228
Table 301 – Builtin is_NaN 229
Table 302 – Builtin log 229
Table 303 – Builtin log10 230
Table 304 – Builtin log2 230
Table 305 – Builtin LongToByte 231
Table 306 – Builtin nan 231
Table 307 – Builtin NaN_value 232
Table 308 – Builtin nanf 233
Table 309 – Builtin pow 233
Table 310 – Builtin round 233
Table 311 – Builtin ShortToByte 234
Table 312 – Builtin sin 234
Table 313 – Builtin sinh 235
Table 314 – Builtin sqrt 235
Table 315 – Builtin tan 236
Table 316 – Builtin tanh 236
Table 317 – Builtin get_date_lelem 237
Table 318 – Builtin get_date_lelem2 238
Table 319 – Builtin get_double_lelem 239
Table 320 – Builtin get_double_lelem2 240
Table 321 – Builtin get_float_lelem 240
Table 322 – Builtin get_float_lelem2 241
Table 323 – Builtin get_signed_lelem 242
Table 324 – Builtin get_signed_lelem2 243
Table 325 – Builtin get_string_lelem 244
Table 326 – Builtin get_string_lelem2 245
Table 327 – Builtin get_unsigned_lelem 246
Table 328 – Builtin get_unsigned_lelem2 247
Table 329 – Builtin ListDeleteElementAt 248

Table 330 – Builtin ListDeleteElementAt 248
Table 331 – Builtin ListDeleteElementAt2 249
Table 332 – Builtin ListInsert 250
Table 333 – Builtin ListInsert 250
Table 334 – Builtin ListInsert2 251
Table 335 – Builtin DICT_ID 252
Table 336 – Builtin get_block_instance_by_object_index 252
Table 337 – Builtin get_block_instance_by_tag 253
Table 338 – Builtin get_block_instance_count 254
Table 339 – Builtin get_resolve_status 255
Table 340 – Builtin ITEM_ID 255
Table 341 – Builtin MEMBER_ID 256
Table 342 – Builtin ObjectReference 256
Table 343 – Builtin resolve_array_ref 257
Table 344 – Builtin resolve_array_ref2 258
Table 345 – Builtin resolve_block_ref 259
Table 346 – Builtin resolve_block_ref2 260
Table 347 – Builtin resolve_list_ref 260
Table 348 – Builtin resolve_local_ref 261
Table 349 – Builtin resolve_local_ref2 261
Table 350 – Builtin resolve_param_list_ref 262
Table 351 – Builtin resolve_param_ref 263
Table 352 – Builtin resolve_param_ref2 263
Table 353 – Builtin resolve_record_ref 264
Table 354 – Builtin resolve_record_ref2 265
Table 355 – Builtin VARID 265
Table 356 – Builtin abortTransferPort 266
Table 357 – Builtin closeTransferPort 266
Table 358 – Builtin fGetByte 267
Table 359 – Builtin get_transfer_status 267
Table 360 – Builtin openTransferPort 268
Table 361 – Builtin readItemFromDevice 268
Table 362 – Builtin writeItemToDevice 269
Table 363 – Builtin browseIdentity 269
Table 364 – Builtin re_read_file 270
Table 365 – Builtin re_write_file 270
Table 366 – Builtin GET_DD_REVISION 271
Table 367 – Builtin GET_DEVICE_REVISION 271
Table 368 – Builtin GET_DEVICE_TYPE 272
Table 369 – Builtin GET_MANUFACTURER 272
Table 370 – Builtin _ERROR 273
Table 371 – Builtin _TRACE 273
Table 372 – Builtin _WARNING 274

Table 373 – Builtin LOG_MESSAGE 274
Table 374 – Referencable EDD item attributes 276
Table 375 – Contents of the return codes description table 279
Table 376 – Return code descriptions 279
Table 377 – Return code descriptions 279

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

DEVICES AND INTEGRATION IN ENTERPRISE SYSTEMS – 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.

This second edition cancels and replaces the first edition published in 2015. This edition constitutes a technical revision.

This edition was developed by merging material from multiple variants of existing EDDL specifications including those from FieldComm Group (Foundation™ Fieldbus[1], HART®[2]), PROFIBUS™[3] Nutzerorganisation e.V. (PNO), and ISA100_Wireless™[4] Compliance Institute (ISA100 WCI). As a result, the formatting and numbering of this edition may be different from any of the individual specifications from which this edition was derived.

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

- Communication profiles ISA100 and GPE were added.
- The following builtins have been deprecated:
  - ABORT_ON_NO_DEVICE
  - IGNORE_NO_DEVICE
  - RETRY_ON_NO_DEVICE
  - XMTR_ABORT_ON_NO_DEVICE
  - XMTR_IGNORE_NO_DEVICE
  - XMTR_RETRY_ON_NO_DEVICE
  - get_status_code_string

The text of this International Standard is based on the following documents:

CDV	Report on voting
65E/634/CDV	65E/691/RVC

Full information on the voting for the approval of this International 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 *Devices and integration in enterprise systems – 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.

---

1 FOUNDATION™ Fieldbus is the trademark of FieldComm Group. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the product named. Equivalent products may be used if they can be shown to lead to the same results.

2 HART® is the registered trademark of FieldComm Group. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the product named. Equivalent products may be used if they can be shown to lead to the same results.

3 PROFIBUS and PROFINET are the trademarks of the PROFIBUS Nutzerorganisation e.V. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the product named. Equivalent products may be used if they can be shown to lead to the same results.

4 ISA100_Wireless™ is the trademark of ISA100 Wireless Compliance Institute. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the product named. Equivalent products may be used if they can be shown to lead to the same results.

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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

This part of IEC 61804

- contains a list of builtins that can be used inside of EDDL methods;
- defines the functionality and parameters for each builtin;
- decribes how EDDL variables can be referenced from inside EDDL methods;

EDDL features are limited by profile for each of the communication technologies. The descriptions in this part of IEC 61804 refer to these features in a general sense and not all communication technologies will support all of the features described. The profile definitions in the overview of this part and in IEC 61804-3 are referred to in order to understand the features supported by each communication technology.

DEVICES AND INTEGRATION IN ENTERPRISE SYSTEMS – 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 are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 61804-3:2020, *Devices and integration in enterprise systems – Function blocks (FB) for process control and electronic device description language (EDDL) – Part 3: EDDL syntax and semantics*

ISO/IEC 9899, *Information technology – Programming Languages – C*

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

SOMMAIRE

AVANT-PROPOS 298
INTRODUCTION 301
1 Domaine d'application 302
2 Références normatives 302
3 Termes, définitions, acronymes et abréviations 302
3.1 Termes et définitions 302
3.2 Acronymes et abréviations 302
4 Conventions pour les descriptions de builtin 303
5 Catégories de builtins 304
5.1 Vue d'ensemble 304
5.2 Builtins de l'interface utilisateur 314
5.3 Builtins de communication 315
5.4 Builtins d'action 317
6 Bibliothèque de builtin EDDL 320
6.1 Généralités 320
6.2 Builtins de l'interface utilisateur 321
6.2.1 Builtin ACKNOWLEDGE 321
6.2.2 Builtin acknowledge 321
6.2.3 Builtin DELAY 322
6.2.4 Builtin delay 322
6.2.5 Builtin delayfor 323
6.2.6 Builtin delayfor2 324
6.2.7 Builtin DISPLAY 326
6.2.8 Builtin display 327
6.2.9 Builtin display_bitenum 327
6.2.10 Builtin display_builtin_error 328
6.2.11 Builtin display_comm_error 329
6.2.12 Builtin display_comm_status 329
6.2.13 Builtin display_device_status 330
6.2.14 Builtin display_dynamics 330
6.2.15 Builtin display_dynamics2 331
6.2.16 Builtin display_message 333
6.2.17 Builtin display_message2 334
6.2.18 Builtin display_response_code 335
6.2.19 Builtin display_response_status 336
6.2.20 Builtin display_xmtr_status 337
6.2.21 Builtin edit_device_value 337
6.2.22 Builtin edit_device_value2 339
6.2.23 Builtin edit_local_value 341
6.2.24 Builtin edit_local_value2 342
6.2.25 Builtin get_acknowledgement 343
6.2.26 Builtin get_acknowledgement2 344
6.2.27 Builtin GET_DEV_VAR_VALUE 346
6.2.28 Builtin get_dev_var_value 346
6.2.29 Builtin GET_LOCAL_VAR_VALUE 347
6.2.30 Builtin get_local_var_value 348

6.2.31 Builtin Menu 349
6.2.32 Builtin MenuDisplay (version A) 350
6.2.33 Builtin MenuDisplay (version B) 351
6.2.34 Builtin PUT_MESSAGE 352
6.2.35 Builtin put_message 354
6.2.36 Builtin SELECT_FROM_LIST 355
6.2.37 Builtin select_from_list 356
6.2.38 Builtin select_from_menu 357
6.2.39 Builtin select_from_menu2 358
6.2.40 Formats de chaîne d'invite 361
6.3 Builtins de communication 361
6.3.1 Builtin abort_on_all_comm_errors 361
6.3.2 Builtin ABORT_ON_ALL_COMM_STATUS 362
6.3.3 Builtin ABORT_ON_ALL_DEVICE_STATUS 362
6.3.4 Builtin ABORT_ON_ALL_RESPONSE_CODES 363
6.3.5 Builtin abort_on_all_response_codes 364
6.3.6 Builtin ABORT_ON_COMM_ERROR 364
6.3.7 Builtin abort_on_comm_error 365
6.3.8 Builtin ABORT_ON_COMM_STATUS 365
6.3.9 Builtin ABORT_ON_DEVICE_STATUS 366
6.3.10 Builtin ABORT_ON_NO_DEVICE (déconseillé) 367
6.3.11 Builtin ABORT_ON_RESPONSE_CODE 367
6.3.12 Builtin abort_on_response_code 369
6.3.13 Builtin ext_send_command 369
6.3.14 Builtin ext_send_command_trans 370
6.3.15 Builtin fail_on_all_comm_errors 371
6.3.16 Builtin fail_on_all_response_codes 372
6.3.17 Builtin fail_on_comm_error 373
6.3.18 Builtin fail_on_response_code 373
6.3.19 Builtin get_more_status 374
6.3.20 Builtin IGNORE_ALL_COMM_STATUS 375
6.3.21 Builtin IGNORE_ALL_DEVICE_STATUS 376
6.3.22 Builtin IGNORE_ALL_RESPONSE_CODES 376
6.3.23 Builtin IGNORE_COMM_ERROR 377
6.3.24 Builtin IGNORE_COMM_STATUS 377
6.3.25 Builtin IGNORE_DEVICE_STATUS 378
6.3.26 Builtin IGNORE_NO_DEVICE (déconseillé) 379
6.3.27 Builtin IGNORE_RESPONSE_CODE 379
6.3.28 Builtin read_value 380
6.3.29 Builtin read_value2 380
6.3.30 Builtin ReadCommand 381
6.3.31 Builtin retry_on_all_comm_errors 382
6.3.32 Builtin RETRY_ON_ALL_COMM_STATUS 382
6.3.33 Builtin RETRY_ON_ALL_DEVICE_STATUS 383
6.3.34 Builtin RETRY_ON_ALL_RESPONSE_CODES 384
6.3.35 Builtin retry_on_all_response_codes 384
6.3.36 Builtin RETRY_ON_COMM_ERROR 385
6.3.37 Builtin retry_on_comm_error 385
6.3.38 Builtin RETRY_ON_COMM_STATUS 386

6.3.39 Builtin RETRY_ON_DEVICE_STATUS 387
6.3.40 Builtin RETRY_ON_NO_DEVICE (déconseillé) 387
6.3.41 Builtin RETRY_ON_RESPONSE_CODE 388
6.3.42 Builtin retry_on_response_code 389
6.3.43 Builtin send 389
6.3.44 Builtin send_all_values 390
6.3.45 Builtin send_command 391
6.3.46 Builtin send_command_trans 391
6.3.47 Builtin send_trans 392
6.3.48 Builtin send_value 393
6.3.49 Builtin send_value2 394
6.3.50 Builtin SET_NUMBER_OF_RETRIES 395
6.3.51 Builtin WriteCommand 395
6.3.52 Builtin XMTR_ABORT_ON_ALL_COMM_STATUS 396
6.3.53 Builtin XMTR_ABORT_ON_ALL_DATA 396
6.3.54 Builtin XMTR_ABORT_ON_ALL_DEVICE_STATUS 397
6.3.55 Builtin XMTR_ABORT_ON_ALL_RESPONSE_CODES 398
6.3.56 Builtin XMTR_ABORT_ON_COMM_ERROR 398
6.3.57 Builtin XMTR_ABORT_ON_COMM_STATUS 399
6.3.58 Builtin XMTR_ABORT_ON_DATA 399
6.3.59 Builtin XMTR_ABORT_ON_DEVICE_STATUS 400
6.3.60 Builtin XMTR_ABORT_ON_NO_DEVICE (déconseillé) 401
6.3.61 Builtin XMTR_ABORT_ON_RESPONSE_CODE 401
6.3.62 Builtin XMTR_IGNORE_ALL_COMM_STATUS 402
6.3.63 Builtin XMTR_IGNORE_ALL_DATA 402
6.3.64 Builtin XMTR_IGNORE_ALL_DEVICE_STATUS 403
6.3.65 Builtin XMTR_IGNORE_ALL_RESPONSE_CODES 403
6.3.66 Builtin XMTR_IGNORE_COMM_ERROR 404
6.3.67 Builtin XMTR_IGNORE_COMM_STATUS 405
6.3.68 Builtin XMTR_IGNORE_DATA 405
6.3.69 Builtin XMTR_IGNORE_DEVICE_STATUS 406
6.3.70 Builtin XMTR_IGNORE_NO_DEVICE (déconseillé) 406
6.3.71 Builtin XMTR_IGNORE_RESPONSE_CODE 407
6.3.72 Builtin XMTR_RETRY_ON_ALL_COMM_STATUS 408
6.3.73 Builtin XMTR_RETRY_ON_ALL_DATA 408
6.3.74 Builtin XMTR_RETRY_ON_ALL_DEVICE_STATUS 409
6.3.75 Builtin XMTR_RETRY_ON_ALL_RESPONSE_CODES 409
6.3.76 Builtin XMTR_RETRY_ON_COMM_ERROR 410
6.3.77 Builtin XMTR_RETRY_ON_COMM_STATUS 410
6.3.78 Builtin XMTR_RETRY_ON_DATA 411
6.3.79 Builtin XMTR_RETRY_ON_DEVICE_STATUS 412
6.3.80 Builtin XMTR_RETRY_ON_NO_DEVICE (déconseillé) 412
6.3.81 Builtin XMTR_RETRY_ON_RESPONSE_CODE 413
6.4 Builtins d'action 413
6.4.1 Builtin fgetval 413
6.4.2 Builtin fsetval 414
6.4.3 Builtin get_date 414
6.4.4 Builtin get_double 415
6.4.5 Builtin get_float 416

6.4.6 Builtin get_signed 416
6.4.7 Builtin get_string 417
6.4.8 Builtin get_unsigned 418
6.4.9 Builtin igetval 418
6.4.10 Builtin isetval 419
6.4.11 Builtin isOffline 419
6.4.12 Builtin lgetval 420
6.4.13 Builtin lsetval 420
6.4.14 Builtin put_date 421
6.4.15 Builtin put_double 422
6.4.16 Builtin put_float 422
6.4.17 Builtin put_signed 423
6.4.18 Builtin put_string 424
6.4.19 Builtin put_unsigned 424
6.4.20 Builtin sgetval 425
6.4.21 Builtin ssetval 426
6.5 Builtins d'accès aux variables 426
6.5.1 Builtin assign 426
6.5.2 Builtin assign_double 427
6.5.3 Builtin assign_float 428
6.5.4 Builtin assign_int 428
6.5.5 Builtin assign_var 429
6.5.6 Builtin assign2 429
6.5.7 Builtin dassign 431
6.5.8 Builtin fassign 431
6.5.9 Builtin float_value 432
6.5.10 Builtin fvar_value 432
6.5.11 Builtin get_date_value 432
6.5.12 Builtin get_date_value2 433
6.5.13 Builtin get_double_value 434
6.5.14 Builtin get_double_value2 435
6.5.15 Builtin get_float_value 436
6.5.16 Builtin get_float_value2 437
6.5.17 Builtin get_signed_value 438
6.5.18 Builtin get_signed_value2 438
6.5.19 Builtin get_string_value 439
6.5.20 Builtin get_string_value2 440
6.5.21 Builtin get_unsigned_value 441
6.5.22 Builtin get_unsigned_value2 442
6.5.23 Builtin iassign 443
6.5.24 Builtin int_value 444
6.5.25 Builtin ivar_value 444
6.5.26 Builtin lassign 445
6.5.27 Builtin long_value 445
6.5.28 Builtin lvar_value 445
6.5.29 Builtin put_date_value 446
6.5.30 Builtin put_date_value2 447
6.5.31 Builtin put_double_value 448
6.5.32 Builtin put_double_value2 449

6.5.33 Builtin put_float_value 450
6.5.34 Builtin put_float_value2 451
6.5.35 Builtin put_signed_value 452
6.5.36 Builtin put_signed_value2 452
6.5.37 Builtin put_string_value 453
6.5.38 Builtin put_string_value2 454
6.5.39 Builtin put_unsigned_value 455
6.5.40 Builtin put_unsigned_value2 456
6.5.41 Builtin ret_double_value 458
6.5.42 Builtin ret_double_value2 458
6.5.43 Builtin ret_float_value 459
6.5.44 Builtin ret_float_value2 459
6.5.45 Builtin ret_signed_value 460
6.5.46 Builtin ret_signed_value2 460
6.5.47 Builtin ret_unsigned_value 461
6.5.48 Builtin ret_unsigned_value2 462
6.5.49 Builtin vassign 462
6.6 Builtins d'achèvement normal 463
6.6.1 Builtin discard_on_exit 463
6.6.2 Builtin save_on_exit 464
6.6.3 Builtin save_values 465
6.6.4 Builtin send_on_exit 465
6.7 Builtins d'achèvement anormal 466
6.7.1 Builtin abort 466
6.7.2 Builtin add_abort_method (version A) 467
6.7.3 Builtin add_abort_method (version B) 467
6.7.4 Builtin method_abort 468
6.7.5 Builtin pop_abort_method 469
6.7.6 Builtin process_abort 469
6.7.7 Builtin push_abort_method 470
6.7.8 Builtin remove_abort_method (version A) 470
6.7.9 Builtin remove_abort_method (version B) 471
6.7.10 Builtin remove_all_abort_methods 471
6.8 Builtins de chaîne 472
6.8.1 Builtin atof 472
6.8.2 Builtin atoi 472
6.8.3 Builtin BUILD_MESSAGE 473
6.8.4 Builtin dictionary_string 473
6.8.5 Builtin ftoa 474
6.8.6 Builtin get_comm_error_string 474
6.8.7 Builtin get_dictionary_string 475
6.8.8 Builtin get_enum_string 476
6.8.9 Builtin get_response_code_string 477
6.8.10 Builtin get_rspcode_string 478
6.8.11 Builtin get_rspcode_string_by_id 478
6.8.12 Builtin get_status_code_string (déconseillé) 479
6.8.13 Builtin get_status_string 479
6.8.14 Builtin get_stddict_string 480
6.8.15 Builtin get_variable_string 481

6.8.16 Builtin itoa (version A) 481
6.8.17 Builtin itoa (version B) 482
6.8.18 Builtin strleft 482
6.8.19 Builtin strcmp 483
6.8.20 Builtin strlen 483
6.8.21 Builtin strlwr 484
6.8.22 Builtin strmid 485
6.8.23 Builtin strright 485
6.8.24 Builtin strstr 486
6.8.25 Builtin strtrim 486
6.8.26 Builtin strupr 487
6.8.27 Builtin trunc 488
6.9 Builtins de date et heure 488
6.9.1 Builtin AddTime 488
6.9.2 Builtin DATE_AND_TIME_VALUE_to_string 489
6.9.3 Builtin Date_to_DayOfMonth 489
6.9.4 Builtin DATE_to_days 490
6.9.5 Builtin Date_to_Month 490
6.9.6 Builtin DATE_to_string 490
6.9.7 Builtin Date_To_Time 491
6.9.8 Builtin Date_to_Year 491
6.9.9 Builtin days_to_DATE 492
6.9.10 Builtin DELAY_TIME 492
6.9.11 Builtin DiffTime 493
6.9.12 Builtin From_DATE_AND_TIME_VALUE 493
6.9.13 Builtin From_TIME_VALUE 494
6.9.14 Builtin GetCurrentDate 494
6.9.15 Builtin GetCurrentDateAndTime 494
6.9.16 Builtin GetCurrentTime 495
6.9.17 Builtin GET_TICK_COUNT 495
6.9.18 Builtin Make_Time 496
6.9.19 Builtin seconds_to_TIME_VALUE 496
6.9.20 Builtin seconds_to_TIME_VALUE8 497
6.9.21 Builtin Time_To_Date 497
6.9.22 Builtin TIME_VALUE_to_Hour 498
6.9.23 Builtin TIME_VALUE_to_Minute 498
6.9.24 Builtin TIME_VALUE_to_Second 499
6.9.25 Builtin TIME_VALUE_to_seconds 499
6.9.26 Builtin TIME_VALUE_to_string 500
6.9.27 Builtin timet_to_string 501
6.9.28 Builtin timet_to_TIME_VALUE 501
6.9.29 Builtin timet_to_TIME_VALUE 502
6.9.30 Builtin timet_to_TIME_VALUE8 502
6.9.31 Builtin To_Date 503
6.9.32 Builtin To_Date_and_Time 503
6.9.33 Builtin To_Time 504
6.9.34 Builtin To_TIME_VALUE 504
6.9.35 Builtin To_TIME_VALUE8 505
6.10 Builtins de diagnostic 505

6.10.1 Builtin get_comm_error 505
6.10.2 Builtin get_dds_error 506
6.10.3 Builtin get_response_code 507
6.11 Builtins mathématiques 508
6.11.1 Builtin abs 508
6.11.2 Builtin acos 509
6.11.3 Builtin asin 509
6.11.4 Builtin atan 510
6.11.5 Builtin ByteToDouble 510
6.11.6 Builtin ByteToFloat 511
6.11.7 Builtin ByteToLong 511
6.11.8 Builtin ByteToShort 512
6.11.9 Builtin cbrt 512
6.11.10 Builtin ceil 512
6.11.11 Builtin cos 513
6.11.12 Builtin cosh 513
6.11.13 Builtin DoubleToByte 514
6.11.14 Builtin drand 514
6.11.15 Builtin dseed 515
6.11.16 Builtin exp 515
6.11.17 Builtin FloatToByte 516
6.11.18 Builtin floor 516
6.11.19 Builtin fmod 517
6.11.20 Builtin fpclassify 517
6.11.21 Builtin is_NaN 518
6.11.22 Builtin log 519
6.11.23 Builtin log10 519
6.11.24 Builtin log2 519
6.11.25 Builtin LongToByte 520
6.11.26 Builtin nan 520
6.11.27 Builtin NaN_value 521
6.11.28 Builtin nanf 522
6.11.29 Builtin pow 522
6.11.30 Builtin round 523
6.11.31 Builtin ShortToByte 523
6.11.32 Builtin sin 524
6.11.33 Builtin sinh 524
6.11.34 Builtin sqrt 524
6.11.35 Builtin tan 525
6.11.36 Builtin tanh 525
6.12 Builtins de liste 526
6.12.1 Builtin get_date_lelem 526
6.12.2 Builtin get_date_lelem2 527
6.12.3 Builtin get_double_lelem 528
6.12.4 Builtin get_double_lelem2 528
6.12.5 Builtin get_float_lelem 529
6.12.6 Builtin get_float_lelem2 530
6.12.7 Builtin get_signed_lelem 531
6.12.8 Builtin get_signed_lelem2 532

6.12.9 Builtin get_string_lelem 533
6.12.10 Builtin get_string_lelem2 533
6.12.11 Builtin get_unsigned_lelem 534
6.12.12 Builtin get_unsigned_lelem2 535
6.12.13 Builtin ListDeleteElementAt (version A) 536
6.12.14 Builtin ListDeleteElementAt (version B) 537
6.12.15 Builtin ListDeleteElementAt2 537
6.12.16 Builtin ListInsert (version A) 538
6.12.17 Builtin ListInsert (version B) 539
6.12.18 Builtin ListInsert2 539
6.13 Builtins de traduction 540
6.13.1 Builtin DICT_ID 540
6.13.2 Builtin get_block_instance_by_objet_index 541
6.13.3 Builtin get_block_instance_by_tag 542
6.13.4 Builtin get_block_instance_count 543
6.13.5 Builtin get_resolve_status 543
6.13.6 Builtin ITEM_ID 544
6.13.7 Builtin MEMBER_ID 544
6.13.8 Builtin ObjectReference 545
6.13.9 Builtin resolve_array_ref 546
6.13.10 Builtin resolve_array_ref2 547
6.13.11 Builtin resolve_block_ref 547
6.13.12 Builtin resolve_block_ref2 548
6.13.13 Builtin resolve_list_ref 549
6.13.14 Builtin resolve_local_ref 549
6.13.15 Builtin resolve_local_ref2 550
6.13.16 Builtin resolve_param_list_ref 551
6.13.17 Builtin resolve_param_ref 551
6.13.18 Builtin resolve_param_ref2 552
6.13.19 Builtin resolve_record_ref 553
6.13.20 Builtin resolve_record_ref2 553
6.13.21 Builtin VARID 554
6.14 Builtins de transfert de blocs 555
6.14.1 Builtin abortTransferPort 555
6.14.2 Builtin closeTransferPort 555
6.14.3 Builtin fGetByte 555
6.14.4 Builtin get_transfer_status 556
6.14.5 Builtin openTransferPort 557
6.14.6 Builtin readItemFromDevice 557
6.14.7 Builtin writeItemToDevice 558
6.15 Builtins de fichier 558
6.15.1 Builtin browseIdentity 558
6.15.2 Builtin re_read_file 559
6.15.3 Builtin re_write_file 559
6.16 Builtins d'identification 560
6.16.1 Builtin GET_DD_REVISION 560
6.16.2 Builtin GET_DEVICE_REVISION 560
6.16.3 Builtin GET_DEVICE_TYPE 561
6.16.4 Builtin GET_MANUFACTURER 561

6.17 Builtins d'aide au développement 561
6.17.1 Builtin _ERROR 561
6.17.2 Builtin _TRACE 562
6.17.3 Builtin _WARNING 563
6.17.4 Builtin LOG_MESSAGE 563
6.18 Références DDL 564
6.18.1 Référencement direct de VARIABLEs 564
6.18.2 Accès à des chaînes du dictionnaire normalisé 565
6.18.3 Prise en charge de chaîne à l'aide de DD_STRING 565
6.18.4 Référencement d'attributs d'éléments DD 566
6.19 Fonctions de méthode 566
7 Codes de retour de builtins 568

Figure 1 – Exemple de METHOD 567
Figure 2 – Paramètres DD_STRING transmis par référence 568

Tableau 1 – Format du tableau de vue d'ensemble de builtin 303
Tableau 2 – Contenu du tableau de vue d'ensemble de builtin 303
Tableau 3 – Format des tableaux d'éléments lexicaux des builtins 304
Tableau 4 – Contenu du tableau d'éléments lexicaux 304
Tableau 5 – Vue d'ensemble de builtin 304
Tableau 6 – Usage des builtins 314
Tableau 7 – Builtins de l'interface utilisateur 314
Tableau 8 – Builtins de communication 315
Tableau 9 – Builtins d'action 317
Tableau 10 – Builtin ACKNOWLEDGE 321
Tableau 11 – Builtin acknowledge 322
Tableau 12 – Builtin DELAY 322
Tableau 13 – Builtin delay 323
Tableau 14 – Builtin delayfor 323
Tableau 15 – Builtin delayfor2 326
Tableau 16 – Builtin DISPLAY 327
Tableau 17 – Builtin display 327
Tableau 18 – Builtin display_bitenum 328
Tableau 19 – Builtin display_builtin_error 328
Tableau 20 – Builtin display_comm_error 329
Tableau 21 – Builtin display_comm_status 330
Tableau 22 – Builtin display_device_status 330
Tableau 23 – Builtin display_dynamics 331
Tableau 24 – Builtin display_dynamics2 332
Tableau 25 – Builtin display_message 333
Tableau 26 – Builtin display_message2 335
Tableau 27 – Builtin display_response_code 336
Tableau 28 – Builtin display_response_status 337

Tableau 29 – Builtin display_xmtr_status 337
Tableau 30 – Builtin edit_device_value 338
Tableau 31 – Builtin edit_device_value2 340
Tableau 32 – Builtin edit_local_value 341
Tableau 33 – Builtin edit_local_value2 343
Tableau 34 – Builtin get_acknowledgement 344
Tableau 35 – Builtin get_acknowledgement2 345
Tableau 36 – Builtin GET_DEV_VAR_VALUE 346
Tableau 37 – Builtin get_dev_var_value 347
Tableau 38 – Builtin GET_LOCAL_VAR_VALUE 348
Tableau 39 – Builtin get_local_var_value 348
Tableau 40 – Builtin Menu 349
Tableau 41 – Builtin MenuDisplay 351
Tableau 42 – Builtin MenuDisplay 352
Tableau 43 – Builtin PUT_MESSAGE 353
Tableau 44 – Builtin put_message 355
Tableau 45 – Builtin SELECT_FROM_LIST 356
Tableau 46 – Builtin select_from_list 357
Tableau 47 – Builtin select_from_menu 358
Tableau 48 – Builtin select_from_menu2 360
Tableau 49 – Options de format 361
Tableau 50 – Builtin abort_on_all_comm_errors 362
Tableau 51 – Builtin ABORT_ON_ALL_COMM_STATUS 362
Tableau 52 – Builtin ABORT_ON_ALL_DEVICE_STATUS 363
Tableau 53 – Builtin ABORT_ON_ALL_RESPONSE_CODES 364
Tableau 54 – Builtin abort_on_all_response_codes 364
Tableau 55 – Builtin ABORT_ON_COMM_ERROR 365
Tableau 56 – Builtin abort_on_comm_error 365
Tableau 57 – Builtin ABORT_ON_COMM_STATUS 366
Tableau 58 – Builtin ABORT_ON_DEVICE_STATUS 367
Tableau 59 – Builtin ABORT_ON_NO_DEVICE 367
Tableau 60 – Masques d'interruption et de relance disponibles 368
Tableau 61 – Builtin ABORT_ON_RESPONSE_CODE 368
Tableau 62 – Builtin abort_on_response_code 369
Tableau 63 – Builtin ext_send_command 370
Tableau 64 – Builtin ext_send_command_trans 371
Tableau 65 – Builtin fail_on_all_comm_errors 372
Tableau 66 – Builtin fail_on_all_response_codes 372
Tableau 67 – Builtin fail_on_comm_error 373
Tableau 68 – Builtin fail_on_response_code 374
Tableau 69 – Builtin get_more_status 375
Tableau 70 – Builtin IGNORE_ALL_COMM_STATUS 375
Tableau 71 – Builtin IGNORE_ALL_DEVICE_STATUS 376

Tableau 72 – Builtin IGNORE_ALL_RESPONSE_CODES 377
Tableau 73 – Builtin IGNORE_COMM_ERROR 377
Tableau 74 – Builtin IGNORE_COMM_STATUS 378
Tableau 75 – Builtin IGNORE_DEVICE_STATUS 378
Tableau 76 – Builtin IGNORE_NO_DEVICE 379
Tableau 77 – Builtin IGNORE_RESPONSE_CODE 380
Tableau 78 – Builtin read_value 380
Tableau 79 – Builtin read_value2 381
Tableau 80 – Builtin ReadCommand 382
Tableau 81 – Builtin retry_on_all_comm_errors 382
Tableau 82 – Builtin RETRY_ON_ALL_COMM_STATUS 383
Tableau 83 – Builtin RETRY_ON_ALL_DEVICE_STATUS 383
Tableau 84 – Builtin RETRY_ON_ALL_RESPONSE_CODES 384
Tableau 85 – Builtin retry_on_all_response_codes 385
Tableau 86 – Builtin RETRY_ON_COMM_ERROR 385
Tableau 87 – Builtin retry_on_comm_error 386
Tableau 88 – Builtin RETRY_ON_COMM_STATUS 386
Tableau 89 – Builtin RETRY_ON_DEVICE_STATUS 387
Tableau 90 – Builtin RETRY_ON_NO_DEVICE 388
Tableau 91 – Builtin RETRY_ON_RESPONSE_CODE 388
Tableau 92 – Builtin retry_on_response_code 389
Tableau 93 – Builtin send 390
Tableau 94 – Builtin send_all_values 391
Tableau 95 – Builtin send_command 391
Tableau 96 – Builtin send_command_trans 392
Tableau 97 – Builtin send_trans 393
Tableau 98 – Builtin send_value 393
Tableau 99 – Builtin send_value2 395
Tableau 100 – Builtin SET_NUMBER_OF_RETRIES 395
Tableau 101 – Builtin WriteCommand 396
Tableau 102 – Builtin XMTR_ABORT_ON_ALL_COMM_STATUS 396
Tableau 103 – Builtin XMTR_ABORT_ON_ALL_DATA 397
Tableau 104 – Builtin XMTR_ABORT_ON_ALL_DEVICE_STATUS 397
Tableau 105 – Builtin XMTR_ABORT_ON_ALL_RESPONSE_CODES 398
Tableau 106 – Builtin XMTR_ABORT_ON_COMM_ERROR 399
Tableau 107 – Builtin XMTR_ABORT_ON_COMM_STATUS 399
Tableau 108 – Builtin XMTR_ABORT_ON_DATA 400
Tableau 109 – Builtin XMTR_ABORT_ON_DEVICE_STATUS 400
Tableau 110 – Builtin XMTR_ABORT_ON_NO_DEVICE 401
Tableau 111 – Builtin XMTR_ABORT_ON_RESPONSE_CODE 402
Tableau 112 – Builtin XMTR_IGNORE_ALL_COMM_STATUS 402
Tableau 113 – Builtin XMTR_IGNORE_ALL_DATA 403
Tableau 114 – Builtin XMTR_IGNORE_ALL_DEVICE_STATUS 403

Tableau 115 – Builtin XMTR_IGNORE_ALL_RESPONSE_CODES 404
Tableau 116 – Builtin XMTR_IGNORE_COMM_ERROR 404
Tableau 117 – Builtin XMTR_IGNORE_COMM_STATUS 405
Tableau 118 – Builtin XMTR_IGNORE_DATA 406
Tableau 119 – Builtin XMTR_IGNORE_DEVICE_STATUS 406
Tableau 120 – Builtin XMTR_IGNORE_NO_DEVICE 407
Tableau 121 – Builtin XMTR_IGNORE_RESPONSE_CODE 407
Tableau 122 – Builtin XMTR_RETRY_ON_ALL_COMM_STATUS 408
Tableau 123 – Builtin XMTR_RETRY_ON_ALL_DATA 409
Tableau 124 – Builtin XMTR_RETRY_ON_ALL_DEVICE_STATUS 409
Tableau 125 – Builtin XMTR_RETRY_ON_ALL_RESPONSE_CODES 410
Tableau 126 – Builtin XMTR_RETRY_ON_COMM_ERROR 410
Tableau 127 – Builtin XMTR_RETRY_ON_COMM_STATUS 411
Tableau 128 – Builtin XMTR_RETRY_ON_DATA 411
Tableau 129 – Builtin XMTR_RETRY_ON_DEVICE_STATUS 412
Tableau 130 – Builtin XMTR_RETRY_ON_NO_DEVICE 413
Tableau 131 – Builtin XMTR_RETRY_ON_RESPONSE_CODE 413
Tableau 132 – Builtin fgetval 414
Tableau 133 – Builtin fsetval 414
Tableau 134 – Builtin get_date 415
Tableau 135 – Builtin get_double 415
Tableau 136 – Builtin get_float 416
Tableau 137 – Builtin get_signed 417
Tableau 138 – Builtin get_string 417
Tableau 139 – Builtin get_unsigned 418
Tableau 140 – Builtin igetval 419
Tableau 141 – Builtin isetval 419
Tableau 142 – Builtin isOffline 420
Tableau 143 – Builtin lgetval 420
Tableau 144 – Builtin lsetval 421
Tableau 145 – Builtin put_date 421
Tableau 146 – Builtin put_double 422
Tableau 147 – Builtin put_float 423
Tableau 148 – Builtin put_signed 423
Tableau 149 – Builtin put_string 424
Tableau 150 – Builtin put_unsigned 425
Tableau 151 – Builtin sgetval 425
Tableau 152 – Builtin ssetval 426
Tableau 153 – Builtin assign 427
Tableau 154 – Builtin assign_double 427
Tableau 155 – Builtin assign_float 428
Tableau 156 – Builtin assign_int 428
Tableau 157 – Builtin assign_var 429

Tableau 158 – Builtin assign2 430
Tableau 159 – Builtin dassign 431
Tableau 160 – Builtin fassign 431
Tableau 161 – Builtin float_value 432
Tableau 162 – Builtin fvar_value 432
Tableau 163 – Builtin get_date_value 433
Tableau 164 – Builtin get_date_value2 434
Tableau 165 – Builtin get_double_value 435
Tableau 166 – Builtin get_double_value2 436
Tableau 167 – Builtin get_float_value 436
Tableau 168 – Builtin get_float_value2 437
Tableau 169 – Builtin get_signed_value 438
Tableau 170 – Builtin get_signed_value2 439
Tableau 171 – Builtin get_string_value 440
Tableau 172 – Builtin get_string_value2 441
Tableau 173 – Builtin get_unsigned_value 442
Tableau 174 – Builtin get_unsigned_value2 443
Tableau 175 – Builtin iassign 444
Tableau 176 – Builtin int_value 444
Tableau 177 – Builtin ivar_value 444
Tableau 178 – Builtin lassign 445
Tableau 179 – Builtin long_value 445
Tableau 180 – Builtin lvar_value 446
Tableau 181 – Builtin put_date_value 446
Tableau 182 – Builtin put_date_value2 448
Tableau 183 – Builtin put_double_value 449
Tableau 184 – Builtin put_double_value2 450
Tableau 185 – Builtin put_float_value 450
Tableau 186 – Builtin put_float_value2 451
Tableau 187 – Builtin put_signed_value 452
Tableau 188 – Builtin put_signed_value2 453
Tableau 189 – Builtin put_string_value 454
Tableau 190 – Builtin put_string_value2 455
Tableau 191 – Builtin put_unsigned_value 456
Tableau 192 – Builtin put_unsigned_value2 457
Tableau 193 – Builtin ret_double_value 458
Tableau 194 – Builtin ret_double_value2 458
Tableau 195 – Builtin ret_float_value 459
Tableau 196 – Builtin ret_float_value2 460
Tableau 197 – Builtin ret_signed_value 460
Tableau 198 – Builtin ret_signed_value2 461
Tableau 199 – Builtin ret_unsigned_value 461
Tableau 200 – Builtin ret_unsigned_value2 462

Tableau 201 – Builtin vassign 463
Tableau 202 – Builtin discard_on_exit 464
Tableau 203 – Builtin save_on_exit 465
Tableau 204 – Builtin save_values 465
Tableau 205 – Builtin send_on_exit 466
Tableau 206 – Builtin abort 467
Tableau 207 – Builtin add_abort_method 467
Tableau 208 – Builtin add_abort_method 468
Tableau 209 – Builtin method_abort 469
Tableau 210 – Builtin pop_abort_method 469
Tableau 211 – Builtin process_abort 470
Tableau 212 – Builtin push_abort_method 470
Tableau 213 – Builtin remove_abort_method 471
Tableau 214 – Builtin remove_abort_method 471
Tableau 215 – Builtin remove_all_abort_methods 472
Tableau 216 – Builtin atof 472
Tableau 217 – Builtin atoi 473
Tableau 218 – Builtin BUILD_MESSAGE 473
Tableau 219 – Builtin dictionary_string 474
Tableau 220 – Builtin ftoa 474
Tableau 221 – Builtin get_comm_error_string 475
Tableau 222 – Builtin get_dictionary_string 476
Tableau 223 – Builtin get_enum_string 476
Tableau 224 – Builtin get_response_code_string 477
Tableau 225 – Builtin get_rspcode_string 478
Tableau 226 – Builtin get_rspcode_string_by_id 479
Tableau 227 – Builtin get_status_code_string 479
Tableau 228 – Builtin get_status_string 480
Tableau 229 – Builtin get_stddict_string 481
Tableau 230 – Builtin get_variable_string 481
Tableau 231 – Builtin itoa (version A) 482
Tableau 232 – Builtin itoa (version B) 482
Tableau 233 – Builtin strleft 483
Tableau 234 – Builtin strcmp 483
Tableau 235 – Builtin strlen 484
Tableau 236 – Builtin strlwr 484
Tableau 237 – Builtin strmid 485
Tableau 238 – Builtin strright 486
Tableau 239 – Builtin strstr 486
Tableau 240 – Builtin strtrim 487
Tableau 241 – Builtin strupr 487
Tableau 242 – Builtin trunc 488
Tableau 243 – Builtin AddTime 488

Tableau 244 – Builtin DATE_AND_TIME_VALUE_to_string 489
Tableau 245 – Builtin Date_to_DayOfMonth 489
Tableau 246 – Builtin DATE_to_days 490
Tableau 247 – Builtin Date_to_Month 490
Tableau 248 – Builtin DATE_to_string 491
Tableau 249 – Builtin Date_To_Time 491
Tableau 250 – Builtin Date_to_Year 492
Tableau 251 – Builtin days_to_DATE 492
Tableau 252 – Builtin DELAY_TIME 492
Tableau 253 – Builtin DiffTime 493
Tableau 254 – Builtin From_DATE_AND_TIME_VALUE 493
Tableau 255 – Builtin From_TIME_VALUE 494
Tableau 256 – Builtin GetCurrentDate 494
Tableau 257 – Builtin GetCurrentDateAndTime 495
Tableau 258 – Builtin GetCurrentTime 495
Tableau 259 – Builtin GET_TICK_COUNT 496
Tableau 260 – Builtin Make_Time 496
Tableau 261 – Builtin seconds_to_TIME_VALUE 497
Tableau 262 – Builtin seconds_to_TIME_VALUE 497
Tableau 263 – Builtin Time_To_Date 497
Tableau 264 – Builtin TIME_VALUE_to_Hour 498
Tableau 265 – Builtin TIME_VALUE_to_Minute 498
Tableau 266 – Builtin TIME_VALUE_to_Second 499
Tableau 267 – Builtin TIME_VALUE_to_seconds 500
Tableau 268 – Builtin TIME_VALUE_to_string 500
Tableau 269 – Builtin timet_to_string 501
Tableau 270 – Builtin timet_to_TIME_VALUE 502
Tableau 271 – Builtin timet_To_TIME_VALUE 502
Tableau 272 – Builtin timet_to_TIME_VALUE8 502
Tableau 273 – Builtin To_Date 503
Tableau 274 – Builtin To_Date_and_Time 503
Tableau 275 – Builtin To_Time 504
Tableau 276 – Builtin To_TIME_VALUE 504
Tableau 277 – Builtin To_TIME_VALUE8 505
Tableau 278 – Builtin get_comm_error 506
Tableau 279 – Builtin get_dds_error 507
Tableau 280 – Builtin get_response_code 508
Tableau 281 – Builtin abs 508
Tableau 282 – Builtin acos 509
Tableau 283 – Builtin asin 509
Tableau 284 – Builtin atan 510
Tableau 285 – Builtin ByteToDouble 510
Tableau 286 – Builtin ByteToFloat 511

Tableau 287 – Builtin ByteToLong 511
Tableau 288 – Builtin ByteToShort 512
Tableau 289 – Builtin cbrt 512
Tableau 290 – Builtin ceil 513
Tableau 291 – Builtin cos 513
Tableau 292 – Builtin cosh 514
Tableau 293 – Builtin DoubleToByte 514
Tableau 294 – Builtin drand 515
Tableau 295 – Builtin dseed 515
Tableau 296 – Builtin exp 516
Tableau 297 – Builtin FloatToByte 516
Tableau 298 – Builtin floor 517
Tableau 299 – Builtin fmod 517
Tableau 300 – Builtin fpclassify 518
Tableau 301 – Builtin is_NaN 518
Tableau 302 – Builtin log 519
Tableau 303 – Builtin log10 519
Tableau 304 – Builtin log2 520
Tableau 305 – Builtin LongToByte 520
Tableau 306 – Builtin nan 521
Tableau 307 – Builtin NaN_value 521
Tableau 308 – Builtin nanf 522
Tableau 309 – Builtin pow 523
Tableau 310 – Builtin round 523
Tableau 311 – Builtin ShortToByte 523
Tableau 312 – Builtin sin 524
Tableau 313 – Builtin sinh 524
Tableau 314 – Builtin sqrt 525
Tableau 315 – Builtin tan 525
Tableau 316 – Builtin tanh 526
Tableau 317 – Builtin get_date_lelem 526
Tableau 318 – Builtin get_date_lelem2 527
Tableau 319 – Builtin get_double_lelem 528
Tableau 320 – Builtin get_double_lelem2 529
Tableau 321 – Builtin get_float_lelem 530
Tableau 322 – Builtin get_float_lelem2 531
Tableau 323 – Builtin get_signed_lelem 531
Tableau 324 – Builtin get_signed_lelem2 532
Tableau 325 – Builtin get_string_lelem 533
Tableau 326 – Builtin get_string_lelem2 534
Tableau 327 – Builtin get_unsigned_lelem 535
Tableau 328 – Builtin get_unsigned_lelem2 536
Tableau 329 – Builtin ListDeleteElementAt 537

Tableau 330 – Builtin ListDeleteElementAt 537
Tableau 331 – Builtin ListDeleteElementAt2 538
Tableau 332 – Builtin ListInsert 539
Tableau 333 – Builtin ListInsert 539
Tableau 334 – Builtin ListInsert2 540
Tableau 335 – Builtin DICT_ID 541
Tableau 336 – Builtin get_block_instance_by_object_index 541
Tableau 337 – Builtin get_block_instance_by_tag 542
Tableau 338 – Builtin get_block_instance_count 543
Tableau 339 – Builtin get_resolve_status 544
Tableau 340 – Builtin ITEM_ID 544
Tableau 341 – Builtin MEMBER_ID 545
Tableau 342 – Builtin ObjectReference 545
Tableau 343 – Builtin resolve_array_ref 546
Tableau 344 – Builtin resolve_array_ref2 547
Tableau 345 – Builtin resolve_block_ref 548
Tableau 346 – Builtin resolve_block_ref2 549
Tableau 347 – Builtin resolve_list_ref 549
Tableau 348 – Builtin resolve_local_ref 550
Tableau 349 – Builtin resolve_local_ref2 550
Tableau 350 – Builtin resolve_param_list_ref 551
Tableau 351 – Builtin resolve_param_ref 552
Tableau 352 – Builtin resolve_param_ref2 552
Tableau 353 – Builtin resolve_record_ref 553
Tableau 354 – Builtin resolve_record_ref2 554
Tableau 355 – Builtin VARID 554
Tableau 356 – Builtin abortTransferPort 555
Tableau 357 – Builtin closeTransferPort 555
Tableau 358 – Builtin fGetByte 556
Tableau 359 – Builtin get_transfer_status 556
Tableau 360 – Builtin openTransferPort 557
Tableau 361 – Builtin readItemFromDevice 558
Tableau 362 – Builtin writeItemToDevice 558
Tableau 363 – Builtin browseIdentity 559
Tableau 364 – Builtin re_read_file 559
Tableau 365 – Builtin re_write_file 560
Tableau 366 – Builtin GET_DD_REVISION 560
Tableau 367 – Builtin GET_DEVICE_REVISION 560
Tableau 368 – Builtin GET_DEVICE_TYPE 561
Tableau 369 – Builtin GET_MANUFACTURER 561
Tableau 370 – Builtin _ERROR 562
Tableau 371 – Builtin _TRACE 562
Tableau 372 – Builtin _WARNING 563

Tableau 373 – Builtin LOG_MESSAGE 564
Tableau 374 – Attributs d'éléments EDD référençables 566
Tableau 375 – Contenu du tableau de descriptions de codes de retour 568
Tableau 376 – Descriptions de codes de retour 569
Tableau 377 – Descriptions de codes de retour 569

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

_____

LES DISPOSITIFS ET LEUR INTÉGRATION DANS LES SYSTÈMES DE L'ENTREPRISE – BLOCS FONCTIONNELS (FB) POUR LES PROCÉDÉS INDUSTRIELS ET LE LANGAGE DE DESCRIPTION ÉLECTRONIQUE DE PRODUIT (EDDL) –

Partie 5: Bibliothèque de Builtin EDDL

AVANT-PROPOS

1) La Commission Electrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. A cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
2) Les décisions ou accords officiels de l'IEC concernant les questions techniques représentent, dans la mesure du possible, un accord international sur les sujets étudiés, étant donné que les Comités nationaux de l'IEC intéressés sont représentés dans chaque comité d'études.
3) Les Publications de l'IEC se présentent sous la forme de recommandations internationales et sont agréées comme telles par les Comités nationaux de l'IEC. Tous les efforts raisonnables sont entrepris afin que l'IEC s'assure de l'exactitude du contenu technique de ses publications; l'IEC ne peut pas être tenue responsable de l'éventuelle mauvaise utilisation ou interprétation qui en est faite par un quelconque utilisateur final.
4) Dans le but d'encourager l'uniformité internationale, les Comités nationaux de l'IEC s'engagent, dans toute la mesure possible, à appliquer de façon transparente les Publications de l'IEC dans leurs publications nationales et régionales. Toutes divergences entre toutes Publications de l'IEC et toutes publications nationales ou régionales correspondantes doivent être indiquées en termes clairs dans ces dernières.
5) L'IEC elle-même ne fournit aucune attestation de conformité. Des organismes de certification indépendants fournissent des services d'évaluation de conformité et, dans certains secteurs, accèdent aux marques de conformité de l'IEC. L'IEC n'est responsable d'aucun des services effectués par les organismes de certification indépendants.
6) Tous les utilisateurs doivent s'assurer qu'ils sont en possession de la dernière édition de cette publication.
7) Aucune responsabilité ne doit être imputée à l'IEC, à ses administrateurs, employés, auxiliaires ou mandataires, y compris ses experts particuliers et les membres de ses comités d'études et des Comités nationaux de l'IEC, pour tout préjudice causé en cas de dommages corporels et matériels, ou de tout autre dommage de quelque nature que ce soit, directe ou indirecte, ou pour supporter les coûts (y compris les frais de justice) et les dépenses découlant de la publication ou de l'utilisation de cette Publication de l'IEC ou de toute autre Publication de l'IEC, ou au crédit qui lui est accordé.
8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
9) L'attention est attirée sur le fait que certains des éléments de la présente Publication de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets et de ne pas avoir signalé leur existence.

La Norme internationale IEC 61804-5 a été établie par le sous-comité 65E: Les dispositifs et leur intégration dans les systèmes de l'entreprise, du comité d'études 65 de l'IEC: Mesure, commande et automation dans les processus industriels.

Cette deuxième édition annule et remplace la première édition parue en 2015. Cette édition constitue une révision technique.

La présente édition a été élaborée en fusionnant le contenu de plusieurs variantes des spécifications de l'EDDL existantes, y compris celles du FieldComm Group (Foundation™ Fieldbus[1], HART®[2]), du PROFIBUS™[3] Nutzerorganisation e.V. (PNO), et de l'ISA100_Wireless™[4] Compliance Institute (ISA100 WCI). Par conséquent, le formatage et la numérotation de la présente édition peuvent différer des spécifications individuelles desquelles elle est issue.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- ajout des profils de communication ISA100 et GPE;
- les builtins suivants ne sont plus conseillés:
  - ABORT_ON_NO_DEVICE
  - IGNORE_NO_DEVICE
  - RETRY_ON_NO_DEVICE
  - XMTR_ABORT_ON_NO_DEVICE
  - XMTR_IGNORE_NO_DEVICE
  - XMTR_RETRY_ON_NO_DEVICE
  - get_status_code_string

Le texte de cette Norme internationale est issu des documents suivants:

CDV	Rapport de vote
65E/634/CDV	65E/691/RVC

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Cette publication a été rédigée selon les Directives ISO/IEC, Partie 2.

Une liste de toutes les parties de la série IEC 61804, publiées sous le titre général *Les dispositifs et leur intégration dans les systèmes de l'entreprise – Blocs fonctionnels (FB) pour les procédés industriels et le langage de description électronique de produit (EDDL)*, peut être consultée sur le site web de l'IEC.

Les futures normes de cette série porteront dorénavant le nouveau titre général cité ci-dessus. Le titre des normes existant déjà dans cette série sera mis à jour lors de la prochaine édition.

_____

1 FOUNDATION™ Fieldbus est l'appellation commerciale du FieldComm Group. Cette information est donnée à l'intention des utilisateurs du présent document et ne signifie nullement que l'IEC approuve ou recommande l'emploi exclusif du produit ainsi désigné. Des produits équivalents peuvent être utilisés s'il est démontré qu'ils conduisent aux mêmes résultats.

2 HART® est une marque déposée du FieldComm Group. Cette information est donnée à l'intention des utilisateurs du présent document et ne signifie nullement que l'IEC approuve ou recommande l'emploi exclusif du produit ainsi désigné. Des produits équivalents peuvent être utilisés s'il est démontré qu'ils conduisent aux mêmes résultats.

3 PROFIBUS et PROFINET sont les appellations commerciales du PROFIBUS Nutzerorganisation e.V. Cette information est donnée à l'intention des utilisateurs du présent document et ne signifie nullement que l'IEC approuve ou recommande l'emploi exclusif du produit ainsi désigné. Des produits équivalents peuvent être utilisés s'il est démontré qu'ils conduisent aux mêmes résultats.

4 ISA100_Wireless™ est l'appellation commerciale de l'ISA100 Wireless Compliance Institute. Cette information est donnée à l'intention des utilisateurs du présent document et ne signifie nullement que l'IEC approuve ou recommande l'emploi exclusif du produit ainsi désigné. Des produits équivalents peuvent être utilisés s'il est démontré qu'ils conduisent aux mêmes résultats.

Le comité a décidé que le contenu de cette publication ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "http://webstore.iec.ch" dans les données relatives à la publication recherchée. A cette date, la publication sera

- reconduite,
- supprimée,
- remplacée par une édition révisée, ou
- amendée.

IMPORTANT – Le logo *"colour inside"* qui se trouve sur la page de couverture de cette publication indique qu'elle contient des couleurs qui sont considérées comme utiles à une bonne compréhension de son contenu. Les utilisateurs devraient, par conséquent, imprimer cette publication en utilisant une imprimante couleur.

INTRODUCTION

La présente partie de l'IEC 61804

- contient une liste des builtins qui peuvent être utilisés dans des méthodes EDDL;
- définit la fonctionnalité et les paramètres de chaque builtin;
- décrit comment des variables EDDL peuvent être référencées à partir de méthodes EDDL.

Les fonctions EDDL dépendent du profil de chacune des technologies de communication. Les descriptions que contient la présente partie de l'IEC 61804 renvoient à ces fonctions d'une manière générale et les technologies de communication ne prennent pas toutes en charge l'ensemble des fonctions décrites. Les définitions de profils indiquées dans la présentation de cette partie et dans l'IEC 61804-3 sont mentionnées de manière à comprendre les fonctions prises en charge par chaque technologie de communication.

LES DISPOSITIFS ET LEUR INTÉGRATION DANS LES SYSTÈMES DE L'ENTREPRISE – BLOCS FONCTIONNELS (FB) POUR LES PROCÉDÉS INDUSTRIELS ET LE LANGAGE DE DESCRIPTION ÉLECTRONIQUE DE PRODUIT (EDDL) –

Partie 5: Bibliothèque de Builtin EDDL

1 Domaine d'application

La présente partie de l'IEC 61804 spécifie la bibliothèque de builtin EDDL et fournit les profils des différents bus de terrain.

2 Références normatives

Les documents suivants cités dans le texte constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 61804-3 :2020, *Les dispositifs et leur intégration dans les systèmes de l'entreprise – Blocs fonctionnels (FB) pour les procédés industriels et le langage de description électronique de produit (EDDL) – Partie 3: Sémantique et syntaxe EDDL*

ISO/IEC 9899, *Information technology – Programming Languages – C* (disponible en anglais seulement)

IEEE 754, *IEEE Standard for Binary Floating-Point Arithmetic* (disponible en anglais seulement)