IEC 61158-6-3

Edition 4.0 2019-06

INTERNATIONAL STANDARD

Industrial communication networks – Fieldbus specifications – Part 6-3: Application layer protocol specification – Type 3 elements

iTeh STANDARD PREVIEW
(standards.iteh.ai)
IEC 61158-6-3:2019
https://standards.iteh.ai/catalog/standards/sist/35f266cf-1073-44e8-9ffc-8b652d4e358f/iec-61158-6-3-2019

IEC 61158-6-3:2019-06(en)

THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2019 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.

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

Tel.: +41 22 919 02 11
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 corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform
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 It also gives information on projects, replaced and withdrawn publications.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 once a month by email.

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: sales@iec.ch.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary
67 000 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.

iTeh STANDARD Preview
(standards.iteh.ai)
IEC 61158-6-3:2019
https://standards.iteh.ai/catalog/standards/sist/35f266cf-1073-44e8-9ffc-8b652d4e358f/iec-61158-6-3-2019

IEC 61158-6-3

Edition 4.0 2019-06

INTERNATIONAL STANDARD

Industrial communication networks – Fieldbus specifications – Part 6-3: Application layer protocol specification – Type 3 elements

iTeh STANDARD PREVIEW
(standards.iteh.ai)
IEC 61158-6-3:2019
https://standards.iteh.ai/catalog/standards/sist/35f266cf-1073-44e8-9ffc-8b652d4e358f/iec-61158-6-3-2019

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ICS 25.040.40; 35.100.70; 35.110

ISBN 978-2-8322-7008-0

Warning! Make sure that you obtained this publication from an authorized distributor.

® Registered trademark of the International Electrotechnical Commission

CONTENTS

FOREWORD 14
INTRODUCTION 16
1 Scope 17
1.1 General 17
1.2 Specifications 18
1.3 Conformance 18
2 Normative references 18
3 Terms, definitions, abbreviations, symbols and conventions 19
3.1 Referenced terms and definitions 19
3.1.1 ISO/IEC 7498-1 terms 19
3.1.2 ISO/IEC 8822 terms 19
3.1.3 ISO/IEC 9545 terms 19
3.1.4 ISO/IEC 8824-1 terms 20
3.1.5 Fieldbus Data Link Layer terms 20
3.2 Additional definitions 20
3.3 Abbreviations and symbols 23
3.4 Conventions 25
3.4.1 General concept 25
3.4.2 Abstract syntax conventions 25
3.4.3 Convention for the encoding of reserved bits and octets 26
3.4.4 Conventions for the common coding s of specific field octets 26
3.5 Conventions used in state machines 27
3.5.1 State machine conventions 27
4 FAL syntax description 29
4.1 APDU abstract syntax 29
4.2 Data types 34
4.2.1 Notation for the Boolean type 34
4.2.2 Notation for the Integer type 34
4.2.3 Notation for the Unsigned type 34
4.2.4 Notation for the Floating Point type 35
4.2.5 Notation for the OctetString type 35
4.2.6 Notation for VisibleString type 35
4.2.7 Notation for BinaryDate type 35
4.2.8 Notation for TimeOfDay type 35
4.2.9 Notation for TimeDifference type 35
4.2.10 Notation for Network Time type 35
4.2.11 Notation for Network Time Difference type 35
5 Transfer syntax 35
5.1 Coding of basic data types 35
5.1.1 Encoding of a Boolean value 35
5.1.2 Encoding of an Integer value 36
5.1.3 Encoding of an Unsigned value 36
5.1.4 Encoding of a Floating-Point value 36
5.1.5 Encoding of a Visible String value 36
5.1.6 Encoding of an Octet String value 36
5.1.7 Encoding of a BinaryDate value 36

iTeh STANDARD PREVIEW
(standards.iteh.ai)
IEC 61158-6-3:2019
https://standards.iteh.ai/catalog/standards/sist/35f266cf-1073-44e8-9ffc-8b652d4e358f/iec-61158-6-3-2019

5.1.8 Encoding of a TimeOfDay with and without date indication value 36
5.1.9 Encoding of a Time Difference with and without date indication value 37
5.1.10 Encoding of a Network Time value 37
5.1.11 Encoding of a Network Time Difference value 37
5.1.12 Encoding of a Null value 37
5.2 Coding section related to data exchange PDUs 37
5.2.1 General 37
5.2.2 Coding of the field Outp_Data 37
5.2.3 Coding of the field Inp_Data 37
5.3 Coding section related to slave diagnosis PDUs 37
5.3.1 Coding of the field Station_status_1 37
5.3.2 Coding of the field Station_status_2 38
5.3.3 Coding of the field Station_status_3 39
5.3.4 Coding of the field Diag_Master_Add 39
5.3.5 Coding of the field Ident_Number 39
5.3.6 Coding of the field Header_Octet 39
5.3.7 Coding of the field Alarm_Type 40
5.3.8 Coding of the field Status_Type 41
5.3.9 Coding of the field Slot_Number 41
5.3.10 Coding of the field Alarm_Specifier 41
5.3.11 Coding of the field Status_Specifier 42
5.3.12 Coding of the field Diagnosis_User_Data 43
5.3.13 Coding of the field Modul_Status_Array 43
5.3.14 Coding of the field Identifier_Diagnosis_Data_Array 44
5.3.15 Coding of the field Identifier_Number 45
5.3.16 Coding of the field Channel_Number 45
5.3.17 Coding of the field Type_of_Diagnosis 46
5.3.18 Coding of the field Revision_Number 46
5.3.19 Coding of the field Publisher_Address 47
5.3.20 Coding of the field Publisher_Status 47
5.3.21 Coding of the field RedSpecifier 47
5.3.22 Coding of the field Function 47
5.3.23 Coding of the field Red_Status1 48
5.3.24 Coding of the field Red_Status2 48
5.3.25 Coding of the field Red_Status3 49
5.4 Coding section related to parameterization PDU 49
5.4.1 Coding of the field Station_status 49
5.4.2 Coding of the field WD_Fact_1 50
5.4.3 Coding of the field WD_Fact_2 50
5.4.4 Coding of the field min_T_{SDR} 50
5.4.5 Coding of the field Group_Ident 50
5.4.6 Coding of the field User_Prm_Data_Element 51
5.4.7 Coding of the field DPV1_Status_1 51
5.4.8 Coding of the field DPV1_Status_2 52
5.4.9 Coding of the field DPV1_Status_3 52
5.4.10 Coding of the field Structure_Length 53
5.4.11 Coding of the field Structure_Type 53
5.4.12 Coding of the field Version 53
5.4.13 Coding of the field Publisher_Addr 54

iTeh STANDARD PREVIEW
(standards.iteh.ai)
IEC 61158-6-3:2019
https://standards.iteh.ai/catalog/standards/sist/35f266cf-1073-44e8-9ffc-8b052a4c5...iec-61158-6-3-2019

5.4.14 Coding of the field Publisher_Length 54
5.4.15 Coding of the field Sample_Offset 54
5.4.16 Coding of the field Sample_Length 54
5.4.17 Coding of the Dest_Slot_Number 54
5.4.18 Coding of the Offset_Data_Area 54
5.4.19 Coding of the field T_{BASE_DP} 54
5.4.20 Coding of the field T_{DP} 55
5.4.21 Coding of the field T_{MAPC} 55
5.4.22 Coding of the field T_{BASE_IO} 55
5.4.23 Coding of the field T_I 55
5.4.24 Coding of the field T_O 55
5.4.25 Coding of the field T_{DX} 55
5.4.26 Coding of the field T_{PLL_W} 55
5.4.27 Coding of the field T_{PLL_D} 55
5.4.28 Coding of the field Specifier 55
5.4.29 Coding of the field Function 55
5.4.30 Coding of the field Properties 56
5.4.31 Coding of the field Output Hold Time 56
5.4.32 Coding of the field Clock Sync Interval 56
5.4.33 Coding of the field CS Delay Time 56
5.5 Coding section related to configuration PDUs 57
5.5.1 Coding of the field Cfg_Identifier 57
5.5.2 Coding of the field Special_Cfg_Identifier 57
5.5.3 Coding of the fields Length_Octet 58
5.5.4 Coding of the field Manufacturer_Specific_Data 58
5.5.5 Coding of the field Extended_Length_Octet 58
5.5.6 Coding of the field Data_Type 59
5.6 Coding section related to global control PDUs 59
5.6.1 Coding of the field Control_Command 59
5.6.2 Coding of the field Group_Select 60
5.7 Coding section related to clock-value-PDUs 61
5.7.1 Coding of the field Clock_value_time_event 61
5.7.2 Clock_value_previous_TE 61
5.7.3 Coding of the field Clock_value_status1 61
5.7.4 Coding of the field Clock_value_status2 61
5.8 Coding section related to function identification and errors 62
5.8.1 Coding of the field Function_Num 62
5.8.2 Coding of the field Error_Decode 64
5.8.3 Coding of the field Error_Code_1 64
5.8.4 Coding of the field Error_Code_2 65
5.9 Coding section related to master diagnosis PDU 65
5.9.1 Coding of the field MDiag_Identifier 65
5.9.2 Coding of the field System_Diagnosis 66
5.9.3 Coding of the field USIF_State 66
5.9.4 Coding of the field Hardware_Release_DP 67
5.9.5 Coding of the field Firmware Release_DP 67
5.9.6 Coding of the field Hardware_Release_User 67
5.9.7 Coding of the field Firmware Release_User 67
5.9.8 Coding of the field Data_Transfer_List 67

iTeh STANDARD PREVIEW
(standards.iteh.ai)
IEC 61158-6-3:2019
https://standards.iteh.ai/catalog/standards/sist/35f2b0cf-1073-44e8-9ffc-8b052d4e35ad/iec-61158-6-3-2019

5.10 Coding section related to upload/download/act para PDUs 68
5.10.1 Coding of the field Area_Code_UpDownload 68
5.10.2 Coding of the field Timeout 68
5.10.3 Coding of the field Max_Len_Data_Unit 68
5.10.4 Coding of the field Add_Offset 68
5.10.5 Coding of the field Data 68
5.10.6 Coding of the field Data_Len 68
5.10.7 Coding of the field Area_CodeActBrct 69
5.10.8 Coding of the field Area_CodeAct 69
5.10.9 Coding of the field Activate 69
5.11 Coding section related to the bus parameter set 70
5.11.1 Coding of the field Bus_Para_Len 70
5.11.2 Coding of the field DL_Add 70
5.11.3 Coding of the field Data_rate 70
5.11.4 Coding of the fields T_{SL}, min T_{SDR}, max T_{SDR} 70
5.11.5 Coding of the fields T_{QUI}, T_{SET}, G, HSA, max_retry_limit 71
5.11.6 Coding of the field T_{TR} (Target Token Rotation time) 71
5.11.7 Coding of the field Bp_Flag (Busparameter flag) 71
5.11.8 Coding of the field Min_Slave_Interval 71
5.11.9 Coding of the field Poll_Timeout 71
5.11.10 Coding of the field Data_Control_Time 71
5.11.11 Coding of the field Alarm_Max 71
5.11.12 Coding of the field Max_User_Global_Control 72
5.11.13 Coding of the field Master_User_Data_Len 72
5.11.14 Coding of the field Master_Class2_Name 72
5.11.15 Coding of the field Master_User_Data 72
5.11.16 Coding of the field T_{CT} 72
5.11.17 Coding of the field maxT_{SH} 72
5.12 Coding section related to the slave parameter set 72
5.12.1 Coding of the field Slave_Para_Len 72
5.12.2 Coding of the field Sl_Flag (slave flag) 72
5.12.3 Coding of the field Slave_Type 73
5.12.4 Coding of the field Max_Diag_Data_Len 73
5.12.5 Coding of the field Max_Alarm_Len 73
5.12.6 Coding of the field Max_Channel_Data_Length 73
5.12.7 Coding of the field Diag_Upd_Delay 74
5.12.8 Coding of the field Alarm_Mode 74
5.12.9 Coding of the field Add_Sl_Flag 74
5.12.10 Coding of the field MS1_Timeout 74
5.12.11 Coding of the field Prm_Data_Len 74
5.12.12 Coding of the field Prm_Data 74
5.12.13 Coding of the field Cfg_Data_Len 75
5.12.14 Coding of the field Cfg_Data 75
5.12.15 Coding of the field Add_Tab_Len 75
5.12.16 Coding of the field Number_of_Entries 75
5.12.17 Coding of the field Add_Tab_Entry_Header 75
5.12.18 Coding of the field I/O_Data_Length 75
5.12.19 Coding of the field I/O_Config_Address 75
5.12.20 Coding of the field Host_Address 75

iTeh STANDARD PREVIEW
(standards.iteh.ai)
IEC 61158-6-3:2019
https://standards.iteh.ai/catalog/standards/sist/351266cf-1073-44e8-9ffc-8b0352df3368/iec-61158-6-3-2019

5.12.21 Coding of the field Slave_User_Data_Len 76
5.12.22 Coding of the field Slave_User_Data 76
5.12.23 Coding of the field Ext_Prm_Data_Len 76
5.12.24 Coding of the field Ext_Prm_Data 76
5.13 Coding section related to statistic counters 76
5.13.1 Coding of the field DLPDU_sent_count and SD_count 76
5.13.2 Coding of the field Error_count and SD_error_count 76
5.14 Coding section related to set slave address PDU 76
5.14.1 Coding of the field New_Slave_Add 76
5.14.2 Coding of the field No_Add_Change 76
5.14.3 Coding of the field Rem_Slave_Data 76
5.15 Coding section related to initiate/abort PDUs 77
5.15.1 Coding of the field Features_Supported_1 77
5.15.2 Coding of the field Features_Supported_2 77
5.15.3 Coding of the field Profile_Features_Supported_1 77
5.15.4 Coding of the field Profile_Features_Supported_2 77
5.15.5 Coding of the field Profile_Ident_Number 77
5.15.6 Coding of the field S_Type (source type) 77
5.15.7 Coding of the field D_Type (destination type) 77
5.15.8 Coding of the field S_Len (source length) 78
5.15.9 Coding of the field D_Len (destination length) 78
5.15.10 Coding of the field S_API (source application identifier) 78
5.15.11 Coding of the field D_API (destination application identifier) 78
5.15.12 Coding of the field S_SCL (source security level) 78
5.15.13 Coding of the field D_SCL (destination security level) 78
5.15.14 Coding of the field S_Network_Address 78
5.15.15 Coding of the field D_Network_Address 78
5.15.16 Coding of the field S_MAC_Address 78
5.15.17 Coding of the field D_MAC_Address 78
5.15.18 Coding of the field Send_Timeout 78
5.15.19 Coding of the field Server_SAP 78
5.15.20 Coding of the field Subnet 79
5.15.21 Coding of the field Instance_Reason_Code 79
5.16 Coding section related to read/write/data transport PDUs 80
5.16.1 Coding of the field Index 80
5.16.2 Coding of the field Length 80
5.17 Coding section related to load region and function invocation PDUs 80
5.17.1 Coding of the field Extended_Function_Num 80
5.17.2 Coding of the field Options 80
5.17.3 Coding of the field Sequence_Number 81
5.17.4 Coding of the field LR_Data 81
5.17.5 Coding of the field Max_Segment_Length 81
5.17.6 Coding of the field LR_Index 81
5.17.7 Coding of the field LR_Length 81
5.17.8 Coding of the field Max_Response_Delay 81
5.17.9 Coding of the field Intersegment_Request_Timeout 81
5.17.10 Coding of the field User_Specific 81
5.17.11 Coding of the field FI_Index 81
5.17.12 Coding of the field Entity Number 82

iTeh STANDARD PREVIEW
(standards.iteh.ai)
IEC 61158-6-3:2019
https://standards.iteh.ai/catalog/standards/sist/35f266cf-1075-44e8-9ffc-86e2e4e3588e/iec-61158-6-3-2019

5.17.13 Coding of the field Execution_Argument 82
5.17.14 Coding of the field Result_Argument 82
5.17.15 Coding of the field FI_State 82
5.17.16 Coding of the field IMData_Execution_Argument 83
5.17.17 Coding of the field IMData_Result_Argument 83
5.18 Examples of Diagnosis-RES-PDUs 84
5.19 Example of Chk_Cfg-REQ-PDU 86
5.20 Examples of Chk_Cfg-REQ-PDUs with DPV1 data types 86
5.21 Example structure of the Data_Unit for Data_Exchange 88
6 FAL protocol state machines 90
6.1 Overall structure 90
6.1.1 Fieldbus Service Protocol Machines (FSPM) 90
6.1.2 Master to Slave cyclic (MS0) 90
6.1.3 Master (class 1) to Slave acyclic (MS1) 90
6.1.4 Master (class 2) to Slave acyclic (MS2) 90
6.1.5 Master to Slave clock synchronisation (MS3) 90
6.1.6 Master Master acyclic (MM1/MM2) 91
6.1.7 DLL Mapping Protocol Machines (DMPM) 91
6.2 Assignment of state machines to devices 91
6.3 Overview DP-slave 92
6.4 Overview DP-master (class 1) 93
6.5 Overview DP-master (class 2) 94
6.6 Cyclic communication between DP-master (class 1) and DP-slave 95
6.7 Acyclic communication between DP-master (class 2) and DP-master (class 1) 97
6.8 Acyclic communication between DP-master (class 1) and DP-slave 99
6.9 Application relationship monitoring 101
6.9.1 Monitoring of the MS0 – AR 101
6.9.2 Monitoring of the MS2 – AR 102
7 AP-context state machine 106
8 FAL service protocol machines (FSPMs) 107
8.1 FSPMS 107
8.1.1 Primitive definitions 107
8.1.2 State machine description 112
8.1.3 FSPMS state table 115
8.1.4 Functions 141
8.2 FSPMM1 142
8.2.1 Primitive definitions 142
8.2.2 State machine description 148
8.2.3 FSPMM1 state table 151
8.2.4 Functions 177
8.3 FSPMM2 177
8.3.1 Primitive definitions 177
8.3.2 State machine description 182
8.3.3 FSPMM2 state table 182
8.3.4 Functions 194
9 Application relationship protocol machines (ARPMs) 195
9.1 MSCY1S 195
9.1.1 Primitive definitions 195

iTeh STANDARD PREVIEW
(standards.iteh.ai)
IEC 61158-6-3:2019
https://standards.iteh.ai/catalog/standards/sist/35f266cf-1073-44e8-9ffc-8b052d4e5581/iec-61158-6-3-2019

9.1.2 State machine description 196
9.1.3 MSCY1S state table 202
9.1.4 Functions 222
9.2 MSAC1S 225
9.2.1 Primitive definitions 225
9.2.2 State machine description 227
9.2.3 MSAC1S state table 228
9.2.4 Functions 237
9.3 SSCY1S 238
9.3.1 Primitive definitions 238
9.3.2 State machine description 239
9.3.3 SSCY1S state table 239
9.3.4 Functions 241
9.4 MSRM2S 241
9.4.1 Primitive definitions 241
9.4.2 State machine description 242
9.4.3 MSRM2S state table 245
9.5 MSAC2S 247
9.5.1 Primitive definitions 247
9.5.2 State machine description 250
9.5.3 MSAC2S state table 252
9.6 MSCS1S 264
9.6.1 Primitive definitions 264
9.6.2 State machine description 264
9.6.3 MSCS1S state table 265
9.7 MSCY1M 266
9.7.1 Primitive definitions 266
9.7.2 State machine description 268
9.7.3 MSCY1M state table 270
9.8 MSAL1M 284
9.8.1 Primitive definitions 284
9.8.2 State machine description 286
9.8.3 MSAL1M state table 289
9.9 MSAC1M 294
9.9.1 Primitive definitions 294
9.9.2 State machine description 295
9.9.3 MSAC1M state table 301
9.10 MMAC1 306
9.10.1 Primitive definitions 306
9.10.2 State machine description 308
9.10.3 MMAC1 state table 308
9.11 MSCS1M 313
9.11.1 Primitive definitions 313
9.11.2 State machine description 314
9.11.3 MSCS1M state table 315
9.12 MSAC2M 318
9.12.1 Primitive definitions 318
9.12.2 State machine description 320
9.12.3 MSAC2M state table 323

iTeh STANDARD PREVIEW
(standards.iteh.ai)
IEC 61158-6-3:2019
https://standards.iteh.ai/catalog/standards/sist/351266cf-1073-44e8-9ffc-8b652d4e358f/iec-61158-6-3-2019

9.13 MMAC2 333
9.13.1 Primitive definitions 333
9.13.2 State machine description 334
9.13.3 MMAC2 state table 335
10 DLL mapping protocol machines (DMPMs) 340
10.1 DMPMS 340
10.1.1 Primitive definitions 340
10.1.2 State machine description 346
10.1.3 DMPMS state table 346
10.1.4 Functions 352
10.2 DMPMM1 353
10.2.1 Primitive definitions 353
10.2.2 State machine description 360
10.2.3 DMPMM1 state table 361
10.2.4 Functions 368
10.3 DMPMM2 369
10.3.1 Primitive definitions 369
10.3.2 State machine description 373
10.3.3 DMPMM2 state table 373
10.3.4 Functions 376
11 Parameters for a DP-slave 377
Bibliography 378

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Figure 1 – Common structure of specific fields 26
Figure 2 – Example Modul_Status_Array 44
Figure 3 – Example of Ext_Diag_Data in case of DPV1 diagnosis format with alarm and status PDU 84
Figure 4 – Example of Ext_Diag_Data in case of the basic diagnosis format 86
Figure 5 – Example of a special identifier format 86
Figure 6 – Example of a special identifier format with data types 87
Figure 7 – Example of a special identifier format with data types 87
Figure 8 – Example of an empty slot with data types 88
Figure 9 – Example for multi-variable device with AI and DO function blocks 88
Figure 10 – Identifiers (ID) 89
Figure 11 – Identifier list 89
Figure 12 – Structure of the Data_Unit for the request- and response-DLPDU 89
Figure 13 – Structuring of the protocol machines and adjacent layers in a DP-slave 93
Figure 14 – Structuring of the protocol machines and adjacent layers in a DP-master (class 1) 94
Figure 15 – Structuring of the protocol machines and adjacent layers in a DP-master (class 2) 95
Figure 16 – Sequence of the communication between DP-master and DP-slave 97
Figure 17 – Sequence of communication between DP-master (class 2) and DP-master (class 1) 99
Figure 18 – Sequence of acyclic communication between DP-master (class 1) and DP-slave 101
Figure 19 – Example for connection establishment on MS2 104

IEC 61158-6-3:2019
https://standards.iteh.ai/catalog/standards/sist/35f266cf-1073-44e8-9ffc-8b652d4e358f/iec-61158-6-3-2019

Figure 20 – Idle at master-side on MS2 105
Figure 21 – Idle at slave-side on MS2 106
Figure 22 – Example for connection establishment on MS2(server-side) 243
Figure 23 – Structure of RM entries in the RM_Registry 244

Table 1 – State machine description elements 27
Table 2 – Description of state machine elements 27
Table 3 – Conventions used in state machines 28
Table 4 – APDU syntax 30
Table 5 – Substitutions 32
Table 6 – Block_Length for Selection:= 0 39
Table 7 – Block_Length for Selection:= 1 40
Table 8 – Block_Length for Selection:= 2 40
Table 9 – Block_Length for Selection:= 3 40
Table 10 – Selection range 40
Table 11 – Alarm_Type range 41
Table 12 – Status_Type value range 41
Table 13 – Alarm_Specifier 42
Table 14 – Additional_Acknowledge 42
Table 15 – Status_Specifier 42
Table 16 – Range of Modul_Status_Entry (1-4) 44
Table 17 – Input_Output_Selection 46
Table 18 – Error type 46
Table 19 – Channel_Type 46
Table 20 – Specification of the bits Lock_Req and Unlock_Req 50
Table 21 – Range of Length_of_Manufacturer_Specific_Data if used in Chk_Cfg-REQ-PDU 57
Table 22 – Range of Length_of_Manufacturer_Specific_Data if used in Get_Cfg-RES-PDU 58
Table 23 – Input_Output_Selection 58
Table 24 – Data types 59
Table 25 – Specification of the bits for Un-/Freeze 60
Table 26 – Specification of the bits for Un-/Sync 60
Table 27 – Coding of the Function_Code/ Function_Num 62
Table 28 – Coding of the Error_Code / Function_Num 63
Table 29 – Values of Error_Decode 64
Table 30 – Coding of Error_Code_1 at DPV1 65
Table 31 – Values of MDiag_Identifier 66
Table 32 – Values for Area_Code_UpDownload 68
Table 33 – Values for Area_CodeActBrct 69
Table 34 – Values for Area_CodeAct 69
Table 35 – Values for Activate 70
Table 36 – Values for Data_rate 70
Table 37 – DPV1_Data_Types 73

iTeh STANDARD PREVIEW
(standards.iteh.ai)
IEC 61158-6-3:2019
https://standards.iteh.ai/catalog/standards/sist/35f266cf-1073-44e8-9ffc-8b652d4e358f/iec-61158-6-3-2019

Table 38 – Values for Slave_Type 73
Table 39 – Values for Alarm_Mode 74
Table 40 – Values for Subnet 79
Table 41 – Values of reason code if instance is DLL 79
Table 42 – Values of reason code if instance is MS2 79
Table 43 – Values of Extended_Function_Num 80
Table 44 – Values of FI_Index 82
Table 45 – Values of FI_State 82
Table 46 – IMData_Execution_Argument 83
Table 47 – IMData_Result_Argument 83
Table 48 – Assignment of state machines 92
Table 49 – Primitives issued by AP-Context to FSPMS 107
Table 50 – Primitives issued by FSPMS to AP-Context 109
Table 51 – FSPMS state table 116
Table 52 – Functions used by the FSPMS 141
Table 53 – Primitives issued by AP-Context to FSPMM1 142
Table 54 – Primitives issued by FSPMM1 to AP-Context 145
Table 55 – FSPMM1 state table 151
Table 56 – Functions used by the FSPMM1 177
Table 57 – Primitives issued by AP-Context to FSPMM2 177
Table 58 – Primitives issued by FSPMM2 to AP-Context 179
Table 59 – FSPMM2 state table 182
Table 60 – Functions used by the FSPMM2 194
Table 61 – Primitives issued by FSPMS to MSCY1S 195
Table 62 – Primitives issued by MSCY1S to FSPMS 195
Table 63 – Rules for DPV1_Status_1, DPV1_Status_2 and DPV1_Status_3 check 197
Table 64 – MSCY1S state table 202
Table 65 – Functions used by the MSCY1S 223
Table 66 – Primitives issued by FSPMS to MSAC1S 225
Table 67 – Primitives issued by MSAC1S to FSPMS 226
Table 68 – Primitives issued by MSCY1S to MSAC1S 226
Table 69 – Primitives issued by MSAC1S to MSCY1S 226
Table 70 – Parameter used with primitives exchanged between MSAC1S and MSCY1S 227
Table 71 – MSAC1S state table 228
Table 72 – Functions used by the MSAC1S 238
Table 73 – Primitives issued by FSPMS to SSCY1S 238
Table 74 – Primitives issued by SSCY1S to FSPMS 238
Table 75 – SSCY1S state table 240
Table 76 – Functions used by the SSCY1S 241
Table 77 – Primitives issued by FSPMS to MSRM2S 241
Table 78 – Primitives issued by MSRM2S to FSPMS 242
Table 79 – MSRM2S state table 245
Table 80 – Primitives issued by FSPMS to MSAC2S 248

iTeh STANDARD PREVIEW
(standards.iteh.ai)
IEC 61158-6-3:2019
https://standards.iteh.ai/catalog/standards/sist/35f266cf-1073-44e8-9ffc-8b6324f63284/iec-61158-6-3-2019

Table 81 – Primitives issued by MSAC2S to FSPMS 249
Table 82 – Primitives issued by MSRM2S to MSAC2S 249
Table 83 – Primitives issued by MSAC2S to MSRM2S 250
Table 84 – Parameter used with primitives exchanged with MSAC2S 250
Table 85 – MSAC2S state table 253
Table 86 – Primitives issued by MSCS1S to FSPMS 264
Table 87 – MSCS1S state table 265
Table 88 – Primitives issued by FSPMM1 to MSCY1M 266
Table 89 – Primitives issued by MSCY1M to FSPMM1 267
Table 90 – Parameters used with primitives exchanged between FSPMM1 and MSCY1M 267
Table 91 – MSCY1M state table 270
Table 92 – Primitives issued by FSPMM1 to MSAL1M 285
Table 93 – Primitives issued by MSAL1M to FSPMM1 285
Table 94 – Primitives issued by MSCY1M to MSAL1M 285
Table 95 – Primitives issued by MSAL1M to MSCY1M 285
Table 96 – Parameter used with primitives exchanged between MSAL1M and MSCY1M 286
Table 97 – Possible values in the Alarm_State_Table 287
Table 98 – MSAL1M state table 289
Table 99 – Primitives issued by FSPMM1 to MSAC1M 294
Table 100 – Primitives issued by MSAC1M to FSPMM1 294
Table 101 – Primitives issued by MSAL1M to MSAC1M 295
Table 102 – Primitives issued by MSAC1M to MSAL1M 295
Table 103 – Parameter used with primitives exchanged between MSAL1M and MSCY1M 295
Table 104 – MSAC1M state table 301
Table 105 – Primitives issued by FSPMM1 to MMAC1 307
Table 106 – Primitives issued by MMAC1 to FSPMM1 307
Table 107 – MMAC1 state table 309
Table 108 – Primitives issued by FSPMM1 to MSCS1M 314
Table 109 – Primitives issued by MSCS1M to FSPMM1 314
Table 110 – MSCS1M state table 316
Table 111 – Primitives issued by FSPMM2 to MSAC2M 318
Table 112 – Primitives issued by MSAC2M to FSPMM2 319
Table 113 – Parameters used with primitives exchanged with MSAC2M 319
Table 114 – MSAC2M state table 323
Table 115 – Primitives issued by FSPMM2 to MMAC2 333
Table 116 – Primitives issued by MMAC2 to FSPMM2 334
Table 117 – Parameters used with primitives exchanged with MMAC2 334
Table 118 – MMAC2 state table 336
Table 119 – Primitives issued by FSPMS to DMPMS 341
Table 120 – Primitives issued by DMPMS to FSPMS 341
Table 121 – Primitives issued by MSCY1S to DMPMS 341
Table 122 – Primitives issued by DMPMS to MSCY1S 342

iTeh STANDARD PREVIEW
(standards.iteh.ai)
IEC 61158-6-3:2019
https://standards.iteh.ai/catalog/standards/sist/35f266cf-1073-44e8-9ffc-8b652d4e358f/iec-61158-6-3-2019

Table 123 – Primitives issued by DMPMS to SSCY1S 342
Table 124 – Primitives issued by MSAC1S, MSRM2S, MSAC2S to DMPMS 343
Table 125 – Primitives issued by DMPMS to MSAC1S, MSRM2S, MSAC2S 343
Table 126 – Primitives issued by DMPMS to MSCS1S 343
Table 127 – Primitives issued by DMPMS to DL 344
Table 128 – Primitives issued by DL to DMPMS 344
Table 129 – Parameters used with primitives exchanged with DMPMS 345
Table 130 – DMPMS state table 347
Table 131 – Functions used by the DMPMS 352
Table 132 – Primitives issued by FSPMM1 to DMPMM1 354
Table 133 – Primitives issued by DMPMM1 to FSPMM1 354
Table 134 – Primitives issued by MSCY1M to DMPMM1 355
Table 135 – Primitives issued by DMPMM1 to MSCY1M 355
Table 136 – Primitives issued by MSAL1M, MSAC1M to DMPMM1 356
Table 137 – Primitives issued by DMPMM1 to MSAL1M, MSAC1M 356
Table 138 – Primitives issued by MMAC1 to DMPMM1 356
Table 139 – Primitives issued by DMPMM1 to MMAC1 356
Table 140 – Primitives issued by MSCS1M to DMPMM1 357
Table 141 – Primitives issued by DMPMM1 to MSCS1M 357
Table 142 – Primitives issued by DMPMM1 to DL 357
Table 143 – Primitives issued by DL to DMPMM1 358
Table 144 – Parameters used with primitives exchanged with DMPMM1 359
Table 145 – Possible values of status 360
Table 146 – DMPMM1 state table 361
Table 147 – Functions used by the DMPMM1 369
Table 148 – Primitives issued by FSPMM2 to DMPMM2 370
Table 149 – Primitives issued by DMPMM2 to FSPMM2 370
Table 150 – Primitives issued by MSAC2M to DMPMM2 371
Table 151 – Primitives issued by DMPMM2 to MSAC2M 371
Table 152 – Primitives issued by MMAC2 to DMPMM2 371
Table 153 – Primitives issued by DMPMM2 to MMAC2 371
Table 154 – Primitives issued by DMPMM2 to DL 372
Table 155 – Primitives issued by DL to DMPMM2 372
Table 156 – Parameters used with primitives exchanged with DMPMM2 373
Table 157 – DMPMM2 state Table 373
Table 158 – Functions used by DMPMM2 377
Table 159 – Bus parameter/reaction times for a DP-slave 377

iTeh STANDARD PREVIEW
(standards.iteh.ai)
IEC 61158-6-3:2019
https://standards.iteh.ai/catalog/standards/sist/351266cf-1073-44e8-9ffc-6d052d4e358f/iec-61158-6-3-2019