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Electricity metering data exchange – The DLMS®/COSEM suite – Part 6-2: COSEM interface classes

Échange des données de comptage de l'électricité – La suite DLMS/COSEM – Partie 6-2: Classes d'interfaces COSEM



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CONTENTS

FOREWORD 12
INTRODUCTION 14
1 Scope 16
2 Normative references 16
3 Terms, definitions and abbreviated terms 18
3.1 Terms and definitions related to the Image transfer process (see 4.4.6) 19
3.2 Terms and definitions related to the S-FSK PLC setup classes (see 4.10) 20
3.3 Terms and definitions related to the PRIME NB OFDM PLC setup ICs (see 4.12) 21
3.4 Terms and definitions related to the ISO/IEC 14908 setup ICs (see 4.18) 22
3.5 Terms and definitions related to ZigBee® (see 4.15) 23
3.6 Terms and definitions related to Payment metering interface classes (see 4.6) 24
3.7 Terms and definitions related to the Arbitrator IC (see 4.5.12) 28
3.8 Abbreviated terms 29
4 The COSEM interface classes 33
4.1 Basic principles 33
4.1.1 General 33
4.1.2 Referencing methods 34
4.1.3 Reserved base_names for special COSEM objects 35
4.1.4 Class description notation 35
4.1.5 Common data types 38
4.1.6 Data formats 39
4.1.7 The COSEM server model 44
4.1.8 The COSEM logical device 45
4.1.9 Information security 46
4.2 Overview of the COSEM interface classes 47
4.3 Interface classes for parameters and measurement data 53
4.3.1 Data (class_id = 1, version = 0) 53
4.3.2 Register (class_id = 3, version = 0) 54
4.3.3 Extended register (class_id = 4, version = 0) 58
4.3.4 Demand register (class_id = 5, version = 0) 60
4.3.5 Register activation (class_id = 6, version = 0) 64
4.3.6 Profile generic (class_id = 7, version = 1) 66
4.3.7 Utility tables (class_id = 26, version = 0) 72
4.3.8 Register table (class_id = 61, version = 0) 73
4.3.9 Status mapping (class_id = 63, version = 0) 76
4.3.10 Compact data (class_id: 62, version: 1) 77
4.4 Interface classes for access control and management 85
4.4.1 Overview 85
4.4.2 Client user identification 85
4.4.3 Association SN (class_id = 12, version = 4) 86
4.4.4 Association LN (class_id = 15, version = 3) 91
4.4.5 SAP assignment (class_id = 17, version = 0) 98
4.4.6 Image transfer (class_id = 18, version = 0) 98
4.4.7 Security setup (class_id = 64, version = 1) 106
4.4.8 Push interface classes and objects 112

4.4.9 COSEM data protection (class_id = 30, version = 0) 125
4.4.10 Function control (class_id: 122, version: 0) 140
4.4.11 Array manager (class_id = 123, version = 0) 142
4.4.12 Communication port protection (class_id = 124, version = 0) 147
4.5 Interface classes for time- and event bound control 150
4.5.1 Clock (class_id = 8, version = 0) 150
4.5.2 Script table (class_id = 9, version = 0) 154
4.5.3 Schedule (class_id = 10, version = 0) 155
4.5.4 Special days table (class_id = 11, version = 0) 158
4.5.5 Activity calendar (class_id = 20, version = 0) 160
4.5.6 Register monitor (class_id = 21, version = 0) 164
4.5.7 Single action schedule (class_id = 22, version = 0) 165
4.5.8 Disconnect control (class_id = 70, version = 0) 166
4.5.9 Limiter (class_id = 71, version = 0) 170
4.5.10 Parameter monitor (class_id = 65, version = 1) 172
4.5.11 Sensor manager (class_id = 67, version = 0) 176
4.5.12 Arbitrator (class_id = 68, version = 0) 180
4.5.13 Modelling examples: tariffication and billing 184
4.6 Payment metering related interface classes 186
4.6.1 Overview of the COSEM accounting model 186
4.6.2 Account (class_id = 111, version = 0) 188
4.6.3 Credit interface class (class_id = 112, version = 0) 197
4.6.4 Charge (class_id = 113, version = 0) 208
4.6.5 Token gateway (class_id = 115, version = 0) 214
4.7 Interface classes for setting up data exchange via local ports and modems 216
4.7.1 IEC local port setup (class_id = 19, version = 1) 216
4.7.2 IEC HDLC setup (class_id = 23, version = 1) 218
4.7.3 IEC twisted pair (1) setup (class_id = 24, version = 1) 220
4.7.4 Modem configuration (class_id = 27, version = 1) 223
4.7.5 Auto answer (class_id = 28, version = 2) 224
4.7.6 Auto connect (class_id = 29, version = 2) 228
4.7.7 GPRS modem setup (class_id = 45, version = 0) 230
4.7.8 GSM diagnostic (class_id: 47, version: 2) 231
4.7.9 LTE monitoring (class_id: 151, version: 1) 233
4.8 Interface classes for setting up data exchange via M-Bus 236
4.8.1 Overview 236
4.8.2 M-Bus slave port setup (class_id = 25, version = 0) 237
4.8.3 M-Bus client (class_id = 72, version = 1) 238
4.8.4 Wireless Mode Q channel (class_id = 73, version = 1) 242
4.8.5 M-Bus master port setup (class_id = 74, version = 0) 243
4.8.6 DLMS®/COSEM server M-Bus port setup (class_id = 76, version = 0) 244
4.8.7 M-Bus diagnostic (class_id = 77, version = 0) 246
4.9 Interface classes for setting up data exchange over the Internet 248
4.9.1 TCP-UDP setup (class_id = 41, version = 0) 248
4.9.2 IPv4 setup (class_id = 42, version = 0) 250
4.9.3 IPv6 setup (class_id = 48, version = 0) 253
4.9.4 MAC address setup (class_id = 43, version = 0) 257
4.9.5 PPP setup (class_id = 44, version = 0) 257
4.9.6 SMTP setup (class_id = 46, version = 0) 262

4.9.7 NTP setup (class_id = 100, version = 0) 263
4.10 Interface classes for setting up data exchange using S-FSK PLC 264
4.10.1 General 264
4.10.2 Overview 265
4.10.3 S-FSK Phy&MAC set-up (class_id = 50, version = 1) 267
4.10.4 S-FSK Active initiator (class_id = 51, version = 0) 272
4.10.5 S-FSK MAC synchronization timeouts (class_id = 52, version = 0) 274
4.10.6 S-FSK MAC counters (class_id = 53, version = 0) 276
4.10.7 IEC 61334-4-32 LLC setup (class_id = 55, version = 1) 279
4.10.8 S-FSK Reporting system list (class_id = 56, version = 0) 280
4.11 Interface classes for setting up the LLC layer for ISO/IEC 8802-2 281
4.11.1 General 281
4.11.2 ISO/IEC 8802-2 LLC Type 1 setup (class_id = 57, version = 0) 281
4.11.3 ISO/IEC 8802-2 LLC Type 2 setup (class_id = 58, version = 0) 282
4.11.4 ISO/IEC 8802-2 LLC Type 3 setup (class_id = 59, version = 0) 283
4.12 Interface classes for setting up and managing DLMS®/COSEM narrowband OFDM PLC profile for PRIME networks 285
4.12.1 Overview 285
4.12.2 Mapping of PRIME NB OFDM PLC PIB attributes to COSEM IC attributes 286
4.12.3 61334-4-32 LLC SSCS setup (class_id = 80, version = 0) 288
4.12.4 PRIME NB OFDM PLC Physical layer parameters 289
4.12.5 PRIME NB OFDM PLC Physical layer counters (class_id = 81, version = 0) 289
4.12.6 PRIME NB OFDM PLC MAC setup (class_id = 82, version = 0) 290
4.12.7 NB OFDM PLC MAC functional parameters (class_id = 83 version = 0) 292
4.12.8 PRIME NB OFDM PLC MAC counters (class_id = 84, version = 0) 294
4.12.9 PRIME NB OFDM PLC MAC network administration data (class_id = 85, version = 0) 295
4.12.10 PRIME NB OFDM PLC MAC address setup (class_id = 43, version = 0) 298
4.12.11 PRIME NB OFDM PLC Application identification (class_id = 86, version = 0) 298
4.13 Interface classes for setting up and managing the DLMS®/COSEM narrowband OFDM PLC profile for G3-PLC networks 299
4.13.1 Overview 299
4.13.2 Mapping of G3-PLC PIB attributes to COSEM IC attributes 300
4.13.3 G3-PLC MAC layer counters (class_id = 90, version = 1) 301
4.13.4 G3-PLC MAC setup (class_id = 91, version = 2) 303
4.13.5 G3-PLC 6LoWPAN adaptation layer setup (class_id = 92, version = 2) 311
4.14 Interface classes for setting up and managing DLMS®/COSEM HS-PLC ISO/IEC 12139-1 neighbourhood networks 318
4.14.1 Overview 318
4.14.2 HS-PLC ISO/IEC 12139-1 MAC setup (class_id = 140, version = 0) 318
4.14.3 HS-PLC ISO/IEC 12139-1 CPAS setup (class_id = 141, version = 0) 320
4.14.4 HS-PLC ISO/IEC 12139-1 IP SSAS setup (class_id = 142, version = 0) 320
4.14.5 HS-PLC ISO/IEC 12139-1 HDLC SSAS setup (class_id = 143, version = 0) 321
4.15 ZigBee® setup classes 322
4.15.1 Overview 322
4.15.2 ZigBee® SAS startup (class_id = 101, version = 0) 324
4.15.3 ZigBee® SAS join (class_id = 102, version = 0) 326

4.15.4 ZigBee® SAS APS fragmentation (class_id = 103, version = 0) 327
4.15.5 ZigBee® network control (class_id = 104, version = 0) 328
4.15.6 ZigBee® tunnel setup (class_id = 105, version = 0) 334
4.16 Interface classes for setting up and managing the DLMS®/COSEM profile for LPWAN networks 335
4.16.1 General 335
4.16.2 Generic interface classes 335
4.16.3 LPWAN specific interface classes 341
4.17 Interface classes for setting up and managing the DLMS®/COSEM profile for Wi-SUN networks 348
4.17.1 Wi-SUN setup (class_id = 95, version 0) 348
4.17.2 Wi-SUN diagnostic (class_id = 96, version 0) 352
4.17.3 RPL diagnostic (class_id = 97, version 0) 356
4.17.4 MPL diagnostic (class_id = 98, version 0) 358
4.18 Interface classes for setting up and managing the DLMS®/COSEM profile for ISO/IEC 14908 PLC networks 360
4.18.1 General 360
4.18.2 ISO/IEC 14908 identification (class_id = 130, version = 0) 360
4.18.3 ISO/IEC 14908 protocol setup (class_id = 131, version = 0) 361
4.18.4 ISO/IEC 14908 protocol status (class_id = 132, version = 0) 361
4.18.5 ISO/IEC 14908 diagnostic (class_id = 133, version = 0) 363
5 Previous versions of interface classes 366
5.1 General 366
5.1.1 New versions of interface classes 366
5.1.2 New interface classes 366
5.1.3 Removal of interface classes 366
5.2 Previous versions of interface classes – general 366
5.3 Previous versions of interface classes for parameters and measurement data 366
5.3.1 Profile generic (class_id = 7, version = 0) 366
5.3.2 Compact data (class_id = 62, version = 0) 370
5.4 Previous versions of interface classes for access control and management 373
5.4.1 Association SN (class_id = 12, version = 0) 373
5.4.2 Association SN (class_id = 12, version = 1) 375
5.4.3 Association SN (class_id = 12, version = 2) 378
5.4.4 Association SN (Class_id = 12, version =3) 382
5.4.5 Association LN (class_id = 15, version = 0) 387
5.4.6 Association LN (class_id = 15, version = 1) 392
5.4.7 Association LN (class_id = 15, version = 2) 397
5.4.8 Security setup (class_id = 64, version = 0) 403
5.4.9 Push Setup (class_id = 40, version = 0) 405
5.4.10 Push Setup (class_id = 40, version = 1) 410
5.5 Previous versions of interface classes for time- and event-bound control 417
5.5.1 Parameter monitor (class_id = 65, version = 0) 417
5.6 Previous versions of payment metering related interface classes 418
5.7 Previous versions of interface classes for setting up data exchange via local ports and modems 419
5.7.1 IEC local port setup (class_id = 19, version = 0) 419
5.7.2 IEC HDLC setup, (class_id = 23, version = 0) 420
5.7.3 IEC twisted pair (1) setup (class_id = 24, version = 0) 422

5.7.4 PSTN modem configuration (class_id = 27, version = 0) 424
5.7.5 Auto answer (class_id = 28, version = 0) 426
5.7.6 PSTN auto dial (class_id = 29, version = 0) 428
5.7.7 Auto connect (class_id = 29, version = 1) 429
5.7.8 GSM diagnostic (class_id = 47, version = 0) 431
5.7.9 GSM diagnostic (class_id: 47, version: 1) 433
5.7.10 LTE monitoring (class_id: 151, version: 0) 435
5.8 Previous versions of interface classes for setting up data exchange via M-Bus 436
5.8.1 M-Bus client (class_id = 72, version = 0) 436
5.9 Previous versions of interface classes for setting up data exchange over the internet 441
5.10 Previous versions of interface classes for data exchange using S-FSK PLC 441
5.10.1 S-FSK Phy&MAC setup (class_id = 50, version = 0) 441
5.10.2 S-FSK IEC 61334-4-32 LLC setup (class_id = 55, version = 0) 446
5.11 Previous versions of interface classes for setting up the LLC layer for ISO/IEC 8802-2 447
5.12 Previous versions of interface classes for setting up and managing DLMS®/COSEM narrowband OFDM PLC profile for PRIME networks 447
5.13 Previous versions of interface classes for setting up and managing DLMS®/COSEM narrowband OFDM PLC profile for G3-PLC networks 447
5.13.1 Mapping of G3-PLC IB attributes to COSEM IC attributes (Original version) 447
5.13.2 G3 NB OFDM PLC MAC layer counters (class_id = 90, version = 0) 449
5.13.3 G3 NB OFDM PLC MAC setup (class_id = 91, version = 0) 450
5.13.4 G3 NB OFDM PLC 6LoWPAN adaptation layer setup (class_id = 92, version = 0) 454
5.13.5 Mapping of G3-PLC PIB attributes to COSEM IC attributes (previous version) 460
5.13.6 G3-PLC MAC setup (class_id = 91, version = 1) 462
5.13.7 G3-PLC 6LoWPAN adaptation layer setup (class_id = 92, version = 1) 468
5.14 Previous versions of interface classes for setting up and managing DLMS®/COSEM HS-PLC ISO/IEC 12139-1 neighbourhood networks 474
5.15 Previous versions of ZigBee® setup classes 474
6 Relation to OBIS 474
6.1 General 474
6.2 Abstract COSEM objects 475
6.2.1 Use of value group C 475
6.2.2 Data of historical billing periods 476
6.2.3 Billing period values / reset counter entries 478
6.2.4 Other abstract general purpose OBIS codes 478
6.2.5 Clock objects (class_id = 8) 479
6.2.6 Modem configuration and related objects 479
6.2.7 Script table objects (class_id = 9) 480
6.2.8 Special days table objects (class_id = 11) 481
6.2.9 Schedule objects (class_id = 10) 481
6.2.10 Activity calendar objects (class_id = 20) 482
6.2.11 Register activation objects (class_id = 6) 482
6.2.12 Single action schedule objects (class_id = 22) 482
6.2.13 Register monitor objects (class_id = 21) 483
6.2.14 Parameter monitor objects (class_id = 65) 483

6.2.15 Limiter objects (class_id = 71) 483
6.2.16 Array manager objects (class_id = 123) 483
6.2.17 Payment metering related objects 483
6.2.18 IEC local port setup objects (class_id = 19) 484
6.2.19 Standard readout profile objects (class_id = 7) 484
6.2.20 IEC HDLC setup objects (class_id = 23) 485
6.2.21 IEC twisted pair (1) setup objects (class_id = 24) 485
6.2.22 Objects related to data exchange over M-Bus 486
6.2.23 Objects to set up data exchange over the Internet 487
6.2.24 Objects to set up Push Setup (class_id = 40) 488
6.2.25 Objects for setting up data exchange using S-FSK PLC 489
6.2.26 Objects for setting up the ISO/IEC 8802-2 LLC layer 489
6.2.27 Objects for data exchange using narrowband OFDM PLC for PRIME networks 490
6.2.28 Objects for data exchange using narrow-band OFDM PLC for G3-PLC networks 490
6.2.29 ZigBee® setup objects 491
6.2.30 Objects for setting up and managing data exchange using ISO/IEC 14908 PLC networks 491
6.2.31 Objects for data exchange using HS-PLC ISO/IEC 12139-1 ISO/EC 12139-1 networks 491
6.2.32 Objects for data exchange using Wi-SUN networks 492
6.2.33 Association objects (class_id = 12, 15) 492
6.2.34 SAP assignment object (class_id = 17) 493
6.2.35 COSEM logical device name object 493
6.2.36 Information security related objects 493
6.2.37 Image transfer objects (class_id = 18) 494
6.2.38 Function control objects (class_id = 122) 494
6.2.39 Communication port protection objects (class_id = 124) 494
6.2.40 Utility table objects (class_id = 26) 494
6.2.41 Compact data objects (class_id = 62) 495
6.2.42 Device ID objects 495
6.2.43 Metering point ID objects 496
6.2.44 Parameter changes and calibration objects 496
6.2.45 I/O control signal objects 496
6.2.46 Disconnect control objects (class_id = 70) 496
6.2.47 Arbitrator objects (class_id = 68) 497
6.2.48 Status of internal control signals objects 497
6.2.49 Internal operating status objects 497
6.2.50 Battery entries objects 498
6.2.51 Power failure monitoring objects 498
6.2.52 Operating time objects 499
6.2.53 Environment related parameters objects 499
6.2.54 Status register objects 499
6.2.55 Event code objects 499
6.2.56 Communication port log parameter objects 500
6.2.57 Consumer message objects 500
6.2.58 Currently active tariff objects 500
6.2.59 Event counter objects 500
6.2.60 Profile entry digital signature objects 501

6.2.61 Profile entry counter objects 501
6.2.62 Meter tamper event related objects 501
6.2.63 Error register objects 502
6.2.64 Alarm register, Alarm filter and Alarm descriptor objects 502
6.2.65 General list objects 503
6.2.66 Event log objects (class_id 7) 503
6.2.67 Inactive objects 504
6.3 Electricity related COSEM objects 504
6.3.1 Value group D definitions 504
6.3.2 ID numbers – Electricity 504
6.3.3 Billing period values / reset counter entries 505
6.3.4 Other electricity related general purpose objects 505
6.3.5 Measurement algorithm 506
6.3.6 Metering point ID (electricity related) 508
6.3.7 Electricity related status objects 508
6.3.8 List objects – Electricity (class_id = 7) 508
6.3.9 Threshold values 509
6.3.10 Register monitor objects (class_id = 21) 510
6.4 Coding of OBIS identifications 510
Annex A (informative) Additional information on Auto answer and Auto connect ICs 512
Annex B (informative) Additional information to M-Bus client (class_id = 72, version 1) 514
Annex C (informative) Additional information on IPv6 setup class (class_id = 48, version = 0) 516
C.1 General 516
C.2 IPv6 addressing 516
C.3 IPv6 header format 517
C.4 IPv6 header extensions 519
C.4.1 Overview 519
C.4.2 Hop-by-Hop options 519
C.4.3 Destination options 520
C.4.4 Routing options 520
C.4.5 Fragment options 520
C.4.6 Security options 520
Annex D (informative) Overview of the narrow-band OFDM PLC technology for PRIME networks 521
Annex E (informative) Overview of the narrow-band OFDM PLC technology for G3-PLC networks 522
Annex F (informative) Significant technical changes with respect to IEC 62056-6-2, Edition 3.0:2017 523
Bibliography 524

Figure 1 – The meaning of the definitions concerning the Image 19
Figure 2 – An interface class and its instances 34
Figure 3 – The COSEM server model 44
Figure 4 – Combined metering device 45
Figure 5 – Overview of the interface classes – Part 1 48
Figure 6 – Overview of the interface classes – Part 2 49
Figure 7 – Overview of the interface classes – Part 3 50

Figure 8 – The time attributes when measuring sliding demand 60
Figure 9 – The attributes in the case of block demand 61
Figure 10 – The attributes in the case of sliding demand (number of periods = 3) 61
Figure 11 – Image transfer process flow chart 104
Figure 12 – COSEM model of push operation 113
Figure 13 – Push windows and delays 115
Figure 14 – COSEM model of data protection 126
Figure 15 – Example: Read *protection_buffer* attribute 128
Figure 16 – Example of managing an array 143
Figure 17 – The generalized time concept 151
Figure 18 – State diagram of the Disconnect control IC 167
Figure 19 – Definition of upper and lower thresholds 180
Figure 20 – COSEM tariffication model (example) 185
Figure 21 – COSEM billing model (example) 185
Figure 22 – Outline Account model 187
Figure 23 – Diagram of attribute relationships 188
Figure 24 – Credit States when priority >0 198
Figure 25 – Operation of current_credit_status flags 201
Figure 26 – Interaction of current_credit_amount and available_credit with Token “Credit” and Emergency “Credit” 207
Figure 27 – Object model of DLMS®/COSEM servers 265
Figure 28 – Object model of DLMS®/COSEM servers 286
Figure 29 – Example of a ZigBee® network 323
Figure 30 – Push windows and delays 406
Figure 31 – Data of historical billing periods – example with module 12, VZ = 5 477
Figure A.1 – Network connectivity example for a GSM/GPRS network 512
Figure B.1 – Encryption key status diagram 514
Figure C.1 – IPv6 address formats 517
Figure C.2 – IPv6 header format 518
Figure C.3 – Traffic class parameter format 518

Table 1 – Reserved base_names for SN referencing 35
Table 2 – Interface class overview 35
Table 3 – Common data types 38
Table 4 – List of interface classes by class_id 50
Table 5 – Enumerated values for physical units 56
Table 6 – Examples for scaler_unit 58
Table 7 – Parameters for selective access to the buffer attribute 70
Table 8 – Parameters for selective access to the buffer attribute 72
Table 9 – Daily billing data 81
Table 10 – Attributes of the “Compact data“ object 81
Table 11 – A-XDR encoding of the data (SEQUENCE OF Get-Data-Result) 82
Table 12 – Diagnostic and Alarm data 82

Table 13 – Attributes of the “Compact data” object 83
Table 14 – Encoding the data read from the buffer attribute of a “Profile generic” object 83
Table 15 – Logbook data 83
Table 16 – Attributes of the “Compact data” object 84
Table 17 – Attributes of the “Compact data” object 84
Table 18 – A-XDR encoding of the data read from the *buffer* attribute 85
Table 19 – Parameters for selective access to the object_list and access_rights_list attribute 89
Table 20 – Parameters for selective access to the object_list attribute 93
Table 21 – Encoding of selective access parameters with data_index 124
Table 22 – Key information required to establish data protection keys 135
Table 23 – Protection parameters of *protection_parameters_get* attribute 136
Table 24 – Protection parameters of *protection_parameters_set* attribute 137
Table 25 – Protection parameters of *get_protected_attributes* method 138
Table 26 – Protection parameters of *set_protected_attributes* method 139
Table 27 – Protection parameters of *invoke_protected_method* method 140
Table 28 – Example values for NCA and CLT 149
Table 29 – Schedule 155
Table 30 – Special days table 155
Table 31 – Disconnect control IC – states and state transitions 168
Table 32 – Explicit presentation of threshold value arrays 180
Table 33 – Explicit presentation of action_sets 180
Table 34 – Credit states 198
Table 35 – Credit state transitions 199
Table 36 – ADS address elements 222
Table 37 – Fatal error register 223
Table 38 – Mapping IEC 61334-4-512:2001 MIB variables to COSEM IC attributes / methods 266
Table 39 – MAC addresses in the S-FSK profile 272
Table 40 – Mapping of PRIME NB OFDM PLC PIB attributes to COSEM IC attributes 287
Table 41 – Mapping of G3-PLC IB attributes to COSEM IC attributes 300
Table 42 – Use of ZigBee® setup COSEM interface classes 323
Table 43 – C/D Rule 1 339
Table 44 – Parameters for selective access to the object_list attribute 376
Table 45 – Parameters for selective access to the *object_list* and *access_rights_list* attribute 381
Table 46 – Parameters for selective access to the object_list attribute 385
Table 47 – Parameters for selective access to the *object_list* attribute 391
Table 48 – Encoding of selective access parameters with data_index 410
Table 49 – ADS address elements 423
Table 50 – Mapping of G3-PLC IB attributes specified in ITU-T G.9903:2017 to COSEM IC attributes 448
Table 51 – Mapping of G3-PLC IB attributes to COSEM IC attributes 461
Table 52 – Use of value group C for abstract objects in the COSEM context 475

Table 53 – Representation of various values by appropriate ICs 504
Table 54 – Measuring algorithms – enumerated values 507
Table 55 – Threshold objects, electricity 509
Table 56 – Register monitor objects, electricity 510
Table B.1 – Encryption key is preset in the slave and cannot be changed 515
Table B.2 – Encryption key is preset in the slave and new key is set after installation 515
Table B.3 – Encryption key is not preset in the slave, but can be set, case a) 515
Table B.4 – Encryption key is not preset in the slave, but can be set, case b) 515
Table C.1 – IPv6 header vs. IPv6 IC 519
Table C.2 – Optional IPv6 header extensions vs. IPv6 IC 519

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRICITY METERING DATA EXCHANGE – THE DLMS®/COSEM SUITE –

Part 6-2: COSEM interface classes

FOREWORD

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IEC 62056-6-2 has been prepared by IEC technical committee 13: Electrical energy measurement and control. It is an International Standard.

This fourth edition cancels and replaces the third edition of IEC 62056-6-2 published in 2017. It constitutes a technical revision.

The significant technical changes with respect to the previous edition are listed in Annex F (Informative).

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

Draft	Report on voting
13/1891/FDIS	13/1906/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all the parts in the IEC 62056 series, published under the general title *Electricity metering data exchange – The DLMS®/COSEM suite*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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

IMPORTANT – The "colour inside" logo on the cover page of this document 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 fourth edition of IEC 62056-6-2 has been prepared by IEC TC13 WG14 with a significant contribution of the DLMS® User Association, its A-type liaison partner.

This edition is in line with the DLMS® UA Blue Book Edition 14. The main new features are the “Array manager” IC, version 1 of the “Compact data” IC, version 1 of the “GSM diagnostic” IC, the “LTE monitoring” IC, the “NTP setup” IC, the HS-PLC setup ICs and the related new OBIS codes.

Object modelling and data identification

Driven by the business needs of the energy market participants – generally in a liberalized, competitive environment – and by the desire to manage natural resources efficiently and to involve the consumers, the utility meter became part of an integrated metering, control and billing system. The meter is not any more a simple data recording device but it relies critically on communication capabilities. Ease of system integration, interoperability and data security are important requirements.

COSEM, the *Companion Specification for Energy Metering*, addresses these challenges by looking at the utility meter as part of a complex measurement and control system. The meter has to be able to convey measurement results from the metering points to the business processes which use them. It also has to be able to provide information to the consumer and manage consumption and eventually local generation.

COSEM achieves this by using *object modelling* techniques to model all functions of the meter, without making any assumptions about which functions need to be supported, how those functions are implemented and how the data are transported. The formal specification of COSEM interface classes forms a major part of COSEM.

To process and manage the information it is necessary to uniquely identify all data items in a manufacturer-independent way. The definition of OBIS, the *Object Identification System* is another essential part of COSEM. It is based on DIN 43863-3:1997, *Electricity meters – Part 3: Tariff metering device as additional equipment for electricity meters – EDIS – Energy Data Identification System.* The set of OBIS codes has been considerably extended over the years to meet new needs.

COSEM models the utility meter as a *server* application – see 4.1.7 – used by *client* applications that retrieve data from, provide control information to, and instigate known actions within the meter via controlled access to the COSEM objects. The *clients* act as agents for third parties, i.e. the business processes of energy market participants.

The standardized COSEM interface classes form an extensible library. Manufacturers use elements of this library to design their products that meet a wide variety of requirements.

The server offers means to retrieve the functions supported, i.e. the COSEM objects instantiated. The objects can be organized to *logical devices and application associations* and to provide specific access rights to various clients.

The concept of the standardized interface class library provides different users and manufacturers with a maximum of diversity while ensuring interoperability.

The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this International Standard may involve the use of a maintenance service concerning the stack of protocols on which the present standard IEC 62056-6-2 is based.

The IEC takes no position concerning the evidence, validity and scope of this maintenance service.

The provider of the maintenance service has assured the IEC that he is willing to provide services under reasonable and non-discriminatory terms and conditions for applicants throughout the world. In this respect, the statement of the provider of the maintenance service is registered with the IEC. Information may be obtained from:

DLMS[1] User Association
www.dlms.com

Acknowledgement

The actual document has been established by the WG Maintenance of the DLMS® UA.

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[1] Device Language Message Specification.

ELECTRICITY METERING DATA EXCHANGE – THE DLMS®/COSEM SUITE –

Part 6-2: COSEM interface classes

1 Scope

This part of IEC 62056 specifies a model of a meter as it is seen through its communication interface(s). Generic building blocks are defined using object-oriented methods, in the form of interface classes to model meters from simple up to very complex functionality.

Annexes A to F (informative) provide additional information related to some interface classes.

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.

EN 13757-2:2004, *Communication system for and remote reading of meters – Part 2: Physical and link layer*

EN 13757-3:2004, *Communication systems for and remote reading of meters – Part 3: Dedicated application layer*

NOTE This standard is referenced in the “M-Bus client setup” interface class version 0.

EN 13757-3:2013, *Communication systems for and remote reading of meters – Part 3: Dedicated application layer*

NOTE This standard is referenced in the M-Bus client setup interface class version 1.

EN 13757-4:2013, *Communication system for and remote reading of meters – Part 4: Wireless meter (Radio meter reading for operation in SRD bands)*

EN 13757-5:2015, *Communication systems for meters – Part 5: Wireless M-Bus relaying*

IEC 61334-4-32:1996*, Distribution automation using distribution line carrier systems – Part 4: Data communication protocols – Section 32: Data link layer – Logical link control (LLC)*

IEC 61334-4-41:1996, *Distribution automation using distribution line carrier systems – Part 4: Data communication protocols – Section 41: Application protocols – Distribution line message specification*

IEC 61334-4-511:2000, *Distribution automation using distribution line carrier systems – Part 4-511: Data communication protocols – Systems management – CIASE protocol*

IEC 61334-4-512:2001, *Distribution automation using distribution line carrier systems – Part 4-512: Data communication protocols – System management using profile 61334-5-1 – Management Information Base (MIB)*

IEC 61334-5-1:2001*, Distribution automation using distribution line carrier systems – Part 5-1: Lower layer profiles – The spread frequency shift keying (S-FSK) profile*

IEC TR 62055-21:2005, *Electricity metering – Payment systems – Part 21: Framework for standardization*

IEC 62056-21:2002, *Electricity metering – Data exchange for meter reading, tariff and load control – Part 21: Direct local data exchange*

IEC 62056-31:1999, *Electricity metering – Data exchange for meter reading, tariff and load control – Part 31: Using local area networks on twisted pair with carrier signalling*

NOTE This Edition is referenced in the interface class “IEC twisted pair (1) setup” (class_id: 24, version: 0).

IEC 62056-3-1:2013, *Electricity metering data exchange – The DLMS®/COSEM suite – Part 3-1: Use of local area networks on twisted pair with carrier signalling*

NOTE This Edition is referenced in the interface class “IEC twisted pair (1) setup” (class_id: 24, version: 1).

IEC 62056-3-1:2021, *Electricity metering data exchange – The DLMS®/COSEM suite – Part 3-1: Use of local area networks on twisted pair with carrier signalling*

IEC 62056-46:2002/AMD1:2006 ,*Electricity metering – Data exchange for meter reading, tariff and load control – Part 46: Data link layer using HDLC protocol*

IEC 62056-5-3:2023*, Electricity metering data exchange – The DLMS®/COSEM suite – Part 5-3: DLMS®/COSEM application layer*

IEC 62056-6-1:2023, *Electricity metering data exchange – The DLMS®/COSEM suite – Part 6-1: Object identification system (OBIS)*

IEC 62056-7-3:2017, *Electricity metering data exchange – The DLMS®/COSEM suite – Part 7-3: Wired and wireless M-Bus communication profiles for local and neighbourhood networks*

IEC 62056-8-3:2013, *Electricity metering data exchange – The DLMS®/COSEM suite – Part 8-3: Communication profile for PLC S-FSK neighbourhood networks*

IEC 62056-8-4:2018, *Electricity metering data exchange – The DLMS®/COSEM suite – Part 8-4: Communication profiles for narrow-band OFDM PLC PRIME neighbourhood networks*

IEC 62056-8-6:2017, *Electricity metering data exchange – The DLMS®/COSEM suite – Part 8-6: High speed PLC ISO/IEC 12139-1 profile for neighbourhood networks*

IEC 62056-8-8:2020, *Electricity metering data exchange – The DLMS®/COSEM suite – Part 8-8: Communication profile for ISO/IEC 14908 series networks*

IEEE 802.15.4:2006, *Standard for Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 15.4: Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Low-Rate Wireless Personal Area Networks (WPANs)*

NOTE This standard is also available as ISO/IEC/IEEE 8802-15-4:2010.

IETF STD 51, *The Point-to-Point Protocol (PPP)*, 1994. (Also RFC 1661, RFC 1662)

ISO/IEC 8802-2:1998, *Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 2: Logical Link Control*

ISO/IEC 12139-1:2009, *Information technology – Telecommunications and information exchange between systems – Powerline communication (PLC) – High speed PLC medium access control (MAC) and physical layer (PHY) – Part 1: General requirements*

ISO/IEC 14908-1:2012, *Information technology – Control network protocol – Part 1: Protocol stack*

ISO/IEC 60559:2020, *Information technology – Microprocessor Systems – Floating-Point arithmetic*

ISO 4217, *Codes for the representation of currencies*

ITU-T E.212 (05.2008), *Series E: Overall network operation,telephone service, service operation and human factors – International operation – Maritime mobile service and public land mobile service – The international identification plan for public networks and subscriptions*

ITU-T G.9903 Amd. 1:2013, *Series G: Transmission systems and media, digital systems and networks – Access networks – In premises networks – Narrow-band orthogonal frequency division multiplexing power line communication transceivers for G3-PLC networks*

NOTE This Recommendation is referenced in version 0 of the G3-PLC setup classes.

ITU-T G.9903:2014, *Series G: Transmission systems and media, digital systems and networks – Access networks – In premises networks – Narrow-band orthogonal frequency division multiplexing power line communication transceivers for G3-PLC networks*

NOTE This Recommendation is referenced in version 1 of the G3-PLC setup classes.

ITU-T G.9903 Amd. 1:2017, *Series G: Transmission systems and media, digital systems and networks – Access networks – In premises networks – Narrow-band orthogonal frequency division multiplexing power line communication transceivers for G3-PLC networks*

ITU-T G.9904:2012, *Series G: Transmission systems and media, digital systems and networks – Access networks – In premises networks – Narrow-band orthogonal frequency division multiplexing power line communication transceivers for PRIME networks*

ETSI GSM 05.08:1996, *Digital cellular telecommunications system (Phase 2+); Radio subsystem link control*

3 Terms, definitions and abbreviated terms

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp