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Industrial communication networks – Profiles

Part 1: Fieldbus profiles (IEC 61784-1:2019)

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National foreword

This British Standard is the UK implementation of EN IEC 61784-1:2019. It is identical to IEC 61784-1:2019. It supersedes BS EN 61784-1:2014, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GEL/65, Measurement and control.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Date	Text affected

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English Version

Industrial communication networks - Profiles - Part 1: Fieldbus profiles (IEC 61784-1:2019)

Réseaux de communication industriels - Profils - Partie 1: Profils de bus de terrain (IEC 61784-1:2019)

Industrielle Kommunikationsnetze - Profile - Teil 1: Feldbusprofile (IEC 61784-1:2019)

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- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2022-05-15

This document supersedes EN 61784-1:2014.

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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60079-14	NOTE	Harmonized as EN 60079-14
IEC 60793 (series)	NOTE	Harmonized as EN 60793 (series)
IEC 61158-1	NOTE	Harmonized as EN 61158-1
IEC 61800-7-204	NOTE	Harmonized as EN 61800-7-204

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(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60079-11	-	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"	EN 60079-11	-
IEC 60079-25	-	Explosive atmospheres - Part 25: Intrinsically safe electrical systems	EN 60079-25	-
IEC 61010	series	Safety requirements for electrical equipment for measurement, control, and laboratory	-	series
IEC 61131-2	-	Programmable controllers	-	-
IEC 61158	series	Industrial communication networks - Fieldbus specifications	-	-
IEC 61158-2	2014	Industrial communication networks - Fieldbus specifications - Part 2: Physical layer specification and service definition	EN 61158-2	2014
IEC 61158-3-1	2014	Industrial communication networks - Fieldbus specifications - Part 3-1: Data-link layer service definition - Type 1 elements	EN 61158-3-1	2014
IEC 61158-3-2	2014	Industrial communication networks - Fieldbus specifications - Part 3-2: Data-lonk layer service definition - Type 2 elements	EN 61158-3-2	2014
+A1	2019		+A1	2019
IEC 61158-3-3	2014	Industrial communication networks - Fieldbus specifications - Part 3-3: Data-link layer service definition - Type 3 elements	EN 61158-3-3	2014
IEC 61158-3-4	2019	Industrial communication networks - Fieldbus specifications - Part 3-4: Data-link layer service definition - Type 4 elements	EN 61158-3-4	2019
IEC 61158-3-7	2007	Industrial communication networks - Fieldbus specifications - Part 3-7: Data-link layer service definition - Type 7 elements	EN 61158-3-7	2008
IEC 61158-3-8	2007	Industrial communication networks - Fieldbus specifications - Part 3-8: Data-link layer service definition - Type 8 elements	EN 61158-3-8	2008
IEC 61158-3-16	2007	Industrial communication networks - Fieldbus specifications - Part 3-16: Data-link layer service definition - Type 16 elements	EN 61158-3-16	2008
IEC 61158-3-18	2007	Industrial communication networks - Fieldbus specifications - Part 3-18: Data-link layer service definition - Type 18 elements	EN 61158-3-18	2008

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		specifications - Part 3-19: Data-link layer service definition - Type 19 elements		
IEC 61158-3-20	2014	Industrial communication networks - Fieldbus specifications - Part 3-20: Data-link layer service definition - Type 20 elements	EN 61158-3-20	2014
IEC 61158-3-24	2014	Industrial communication networks - Fieldbus specifications - Part 3-24: Data-link layer service definition - Type 24 elements	EN 61158-3-24	2014
IEC 61158-4-1	2014	Industrial communication networks - Fieldbus specifications - Part 4-1: Data-link layer protocol specification - Type 1 elements	EN 61158-4-1	2014
IEC 61158-4-2	2019	Industrial communication networks - Fieldbus specifications - Part 4-2: Data-link layer protocol specification - Type 2 elements	EN IEC 61158-4-2	2019
IEC 61158-4-3	2019	Industrial communication networks - Fieldbus specifications - Part 4-3: Data-link layer protocol specification - Type 3 elements	EN IEC 61158-4-3	2019
IEC 61158-4-4	2019	Industrial communication networks - Fieldbus specifications - Part 4-4: Data-link layer protocol specification - Type 4 elements	EN IEC 61158-4-4	2019
IEC 61158-4-7	2007	Industrial communication networks - Fieldbus specifications - Part 4-7: Data-link layer protocol specification - Type 7 elements	EN 61158-4-7	2008
IEC 61158-4-8	2007	Industrial communication networks - Fieldbus specifications - Part 4-8: Data-link layer protocol specification - Type 8 elements	EN 61158-4-8	2008
IEC 61158-4-16	2007	Industrial communication networks - Fieldbus specifications - Part 4-16: Data-link layer protocol specification - Type 16 elements	EN 61158-4-16	2008
IEC 61158-4-18	2010	Industrial communication networks - Fieldbus specifications - Part 4-18: Data-link layer protocol specification - Type 18 elements	EN 61158-4-18	2012
IEC 61158-4-19	2019	Industrial communication networks - Fieldbus specifications - Part 4 -19: Data-link layer protocol specification - Type 19 elements	EN IEC 61158-4-19	2019
IEC 61158-4-20	2014	Industrial communication networks - Fieldbus specifications - Part 4-20: Data-link layer protocol specification - Type 20 elements	EN 61158-4-20	2014
IEC 61158-4-24	2019	Industrial communication networks - Fieldbus specifications - Part 4-24: Data-link layer protocol specification - Type 24 elements	EN IEC 61158-4-20	2019
IEC 61158-5-2	2019	Industrial communication networks - Fieldbus specifications - Part 5-2: Application layer service definition - Type 2 elements	EN IEC 61158-5-2	2019
IEC 61158-5-3	2014	Industrial communication networks - Fieldbus specifications - Part 5-3: Application layer service definition - Type 3 elements	EN 61158-5-3	2014
IEC 61158-5-4	2019	Industrial communication networks - Fieldbus specifications - Part 5-4: Application layer service definition - Type 4 elements	-	-
IEC 61158-5-5	2014	Industrial communication networks - Fieldbus specifications - Part 5-5: Application layer service definition - Type 5 elements	EN 61158-5-5	2014
IEC 61158-5-7	2007	Industrial communication networks - Fieldbus specifications - Part 5-7: Application layer service definition - Type 7 elements	EN 61158-5-7	2008
IEC 61158-5-8	2007	Industrial communication networks - Fieldbus specifications - Part 5-8: Application layer service definition - Type 8 elements	EN 61158-5-8	2008

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		specifications - Part 5-9: Application layer service definition - Type 9 elements		
IEC 61158-5-16	2007	Industrial communication networks - Fieldbus specifications - Part 5-16: Application layer service definition - Type 16 elements	EN 61158-5-16	2008
IEC 61158-5-18	2010	Industrial communication networks - Fieldbus specifications - Part 5-18: Application layer service definition - Type 18 elements	EN 61158-5-18	2012
IEC 61158-5-19	2019	Industrial communication networks - Fieldbus specifications - Part 5-19: Application layer service definition - Type 19 elements	-	-
IEC 61158-5-20	2014	Industrial communication networks - Fieldbus specifications - Part 5-20: Application layer service definition - Type 20 elements	EN 61158-5-20	2014
IEC 61158-5-24	2014	Industrial communication networks - Fieldbus specifications - Part 5-24: Application layer service definition - Type 24 elements	EN 61158-5-24	2014
IEC 61158-6-2	2019	Industrial communication networks - Fieldbus specifications - Part 6-2: Application layer protocol specification - Type 2 elements	EN IEC 61158-6-2	2019
IEC 61158-6-3	2019	Industrial communication networks - Fieldbus specifications - Part 6-3: Application layer protocol specification - Type 3 elements	EN IEC 61158-6-3	2019
IEC 61158-6-4	2019	Industrial communication networks - Fieldbus specifications - Part 6-4: Application layer protocol specification - Type 4 elements	EN IEC 61158-6-4	2019
IEC 61158-6-5	2014	Industrial communication networks - Fieldbus specifications - Part 6-5: Application layer protocol specification - Type 5 elements	EN 61158-6-5	2014
IEC 61158-6-7	2007	Industrial communication networks - Fieldbus specifications - Part 6-7: Application layer protocol specification - Type 7 elements	EN 61158-6-7	2008
IEC 61158-6-8	2007	Industrial communication networks - Fieldbus specifications - Part 6-8: Application layer protocol specification - Type 8 elements	EN 61158-6-8	2008
IEC 61158-6-9	2014	Industrial communication networks - Fieldbus specifications - Part 6-9: Application layer protocol specification - Type 9 elements	EN 61158-6-9	2014
IEC 61158-6-16	2007	Industrial communication networks - Fieldbus specifications - Part 6-16: Application layer protocol specification - Type 16 elements	EN 61158-6-16	2008
IEC 61158-6-18	2010	Industrial communication networks - Fieldbus specifications - Part 6-18: Application layer protocol specification - Type 18 elements	EN 61158-6-18	2012
IEC 61158-6-19	2019	Industrial communication networks - Fieldbus specifications - Part 6-19: Application layer protocol specification - Type 19 elements	EN IEC 61158-6-19	2019
IEC 61158-6-20	2014	Industrial communication networks - Fieldbus specifications - Part 6-20: Application layer protocol specification - Type 20 elements	EN 61158-6-20	2014
IEC 61158-6-24	2014	Industrial communication networks - Fieldbus specifications - Part 6-24: Application layer protocol specification - Type 24 elements	EN 61158-6-24	2014
IEC 61784-2	2019	Industrial communication networks - Profiles - Part 2: Additional fieldbus profiles for real-time networks based on ISO/IEC/IEEE 8802-3	EN IEC 61784-2	2019
IEC 61784-5-2	2018	Industrial communication networks - Profiles - Part 5-2: Installation of fieldbuses - Installation profiles for CPF 2	EN IEC 61784-5-2	2018

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-	-		EN IEC 61918:2018/ AC:2019-03	
IEC 62026-3	2014	Low-voltage switchgear and controlgear - Controller-device interfaces (CDIs) - Part 3: DeviceNet	-	-
IEC 62591	2016	Industrial networks - Wireless communication network and communication profiles - WirelessHART™	EN 62591	2016
ISO/IEC 8482	-	Information technology - Telecommunications and information exchange between systems - Twisted pair multipoint interconnections	-	-
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/IEEE 8802-3	2017	Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 3: Standard for Ethernet	-	-
ISO/IEC 15802-3	-	Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Common specifications - Part 3: Media Access Control (MAC) Bridges	-	-
ISO 15745-3	2003	Industrial automation systems and integration - Open systems application integration framework - Part 3: Reference description for IEC 61158 based control systems	-	-
ANSI TIA/ EIA-485-A	-	Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Multipoint Systems	-	-
IETF RFC 768	-	User Datagram Protocol	-	-
IETF RFC 791	-	INTERNET PROTOCOL DARPA INTERNET PROGRAM PROTOCOL SPECIFICATION	-	-
IETF RFC 792	-	Internet Control Message Protocol	-	-
IETF RFC 793	-	TRANSMISSION CONTROL PROTOCOL DARPA INTERNET PROGRAM PROTOCOL SPECIFICATION	-	-
IETF RFC 826	-	Ethernet Address Resolution Protocol: Or Converting Network Protocol Addresses to 48.bit Ethernet Address for Transmission on Ethernet Hardware	-	-
IETF RFC 894	-	Standard for the Transmission of IP Datagrams over Ethernet Networks	-	-
IETF RFC 1112	-	Host Extensions for IP Multicasting	-	-
IETF RFC 1122	-	Requirements for Internet Hosts - Communication Layers	-	-
IETF RFC 1123	-	Requirements for Internet Hosts - Application and Support	-	-
IETF RFC 1127	-	A Perspective on the Host Requirements RFCs	-	-
IETF RFC 2236	-	Internet Group Management Protocol, Version 2	-	-

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CONTENTS

FOREWORD 15
INTRODUCTION 17
1 Scope 18
2 Normative references 19
3 Terms, definitions, abbreviated terms, symbols, and conventions 23
3.1 Terms and definitions 23
3.2 Abbreviations and symbols 24
3.2.1 IEC 61158 abbreviations and symbols 24
3.2.2 Other abbreviations and symbols 24
3.3 Conventions 24
3.3.1 Conventions common to all layers 24
3.3.2 Physical layer 26
3.3.3 Data-link layer 26
3.3.4 Application layer 27
4 Conformance to communication profiles 27
5 Communication Profile Family 1 (FOUNDATION™ fieldbus) 28
5.1 General overview 28
5.2 Profile 1/1 (FOUNDATION™ H1) 29
5.2.1 Physical layer 29
5.2.2 Data-link layer 45
5.2.3 Application layer 115
5.3 Profile 1/2 (FOUNDATION™ HSE) 117
5.3.1 Physical layer 117
5.3.2 Data-link layer 117
5.3.3 Network layer 117
5.3.4 Transport layer 117
5.3.5 Application layer 117
5.4 Profile 1/3 (FOUNDATION™ H2) 118
5.4.1 Physical layer 118
5.4.2 Data-link layer 121
5.4.3 Application layer 121
6 Communication Profile Family 2 (CIP™) 121
6.1 General overview 121
6.2 Profile 2/1 (ControlNet) 122
6.2.1 Physical layer 122
6.2.2 Data-link layer 123
6.2.3 Application layer 125
6.3 Profile 2/2 (EtherNet/IP) 126
6.3.1 Physical layer 126
6.3.2 Data-link layer 127
6.3.3 Application layer 128
6.4 Profile 2/3 (DeviceNet) 130
6.4.1 Physical layer 130
6.4.2 Data-link layer 131
6.4.3 Application layer 132
7 Communication Profile Family 3 (PROFIBUS & PROFINET) 134

This is a preview of "BS EN IEC 61784-1:20...". Click here to purchase the full version from the ANSI store.

7.1 General overview 134
7.2 Profile 3/1 (PROFIBUS DP) 135
7.2.1 Physical layer 135
7.2.2 Data-link layer 137
7.2.3 Application layer 162
7.3 Profile 3/2 (PROFIBUS PA) 219
7.3.1 Physical layer 219
7.3.2 Data-link layer 223
7.3.3 Application layer 235
8 Communication Profile Family 4 (P-NET®) 236
8.1 General overview 236
8.2 Profile 4/1 (P-NET RS-485) 236
8.2.1 Physical layer 236
8.2.2 Data-link layer 237
8.2.3 Application layer 238
9 Communication Profile Family 5 (WorldFIP®) 239
9.1 General overview 239
9.2 Profile 5/1 (WorldFIP) 240
9.2.1 Physical layer 240
9.2.2 Data-link layer 242
9.2.3 Application layer 245
9.3 Profile 5/2 (WorldFIP) 251
9.3.1 Physical layer 251
9.3.2 Data-link layer 251
9.3.3 Application layer 251
9.4 Profile 5/3 (WorldFIP) 257
9.4.1 Physical layer 257
9.4.2 Data-link layer 257
9.4.3 Application layer 257
10 Communication Profile Family 6 (INTERBUS®) 258
10.1 General overview 258
10.2 Profile 6/1 259
10.2.1 Physical layer 259
10.2.2 Data-link layer 261
10.2.3 Application layer 263
10.3 Profile 6/2 264
10.3.1 Physical layer 264
10.3.2 Data-link layer 265
10.3.3 Application layer 266
10.4 Profile 6/3 267
10.4.1 Physical layer 267
10.4.2 Data-link layer 267
10.4.3 Application layer 268
11 Communication Profile Family 7 – *Void* 269
12 Communication Profile Family 8 (CC-Link) 270
12.1 General overview 270
12.1.1 General 270
12.1.2 Profile 8/1 270

This is a preview of "BS EN IEC 61784-1:20...". Click here to purchase the full version from the ANSI store.

12.1.3 Profile 8/2 271
12.1.4 Profile 8/3 271
12.2 Profile 8/1 271
12.2.1 Physical layer 271
12.2.2 Data-link layer 273
12.2.3 Application layer 276
12.3 Profile 8/2 279
12.3.1 Physical layer 279
12.3.2 Data-link layer 279
12.3.3 Application layer 279
12.4 Profile 8/3 279
12.4.1 Physical layer 279
12.4.2 Data-link layer 281
12.4.3 Application layer 284
13 Communication Profile Family 9 (HART®) 287
13.1 General Overview 287
13.2 Profile 9/1, HART® 287
13.2.1 Physical layer 287
13.2.2 Data-link layer 288
13.2.3 Application layer 289
13.3 Profile 9/2, WirelessHART® 290
14 Communication Profile Family 16 (SERCOS) 290
14.1 General overview 290
14.2 Profile 16/1 (SERCOS I) 290
14.2.1 Physical layer selection 290
14.2.2 Data-link layer 291
14.2.3 Application layer 292
14.3 Profile 16/2 (SERCOS II) 292
14.3.1 Physical layer 292
14.3.2 Data-link layer 293
14.3.3 Application layer 294
15 Communication Profile Family 19 (MECHATROLINK) 294
15.1 General overview 294
15.2 Profile 19/1 (MECHATROLINK-II) 294
15.2.1 Physical layer selection 294
15.2.2 Data-link layer 296
15.2.3 Application layer 305
15.3 Profile 19/2 (M-III) 311
15.3.1 Physical layer 311
15.3.2 Data-link layer 312
15.3.3 Application layer 320
Annex A (informative) Communication concepts 326
A.1 CPF 1 (FOUNDATION Fieldbus) communication concepts 326
A.1.1 Overview 326
A.1.2 Physical layer characteristics 326
A.1.3 Data-link layer characteristics 326
A.1.4 Application layer characteristics 327
A.1.5 Management characteristics 327

This is a preview of "BS EN IEC 61784-1:20...". Click here to purchase the full version from the ANSI store.

A.2 CPF 2 (CIP) communication concepts 327
A.2.1 Overview 327
A.2.2 CIP common characteristics 328
A.2.3 ControlNet 328
A.2.4 EtherNet/IP 329
A.2.5 DeviceNet 330
A.3 CPF 3 (PROFIBUS & PROFINET) communication concepts 330
A.3.1 Basic characteristics 330
A.3.2 Physical layer profiles 331
A.3.3 Communication feature list (GSD) 332
A.4 CPF 4 (P-NET) communication concepts 332
A.5 CPF 5 (WorldFIP) communication concepts 333
A.5.1 Physical layer characteristics 333
A.5.2 Data-link layer characteristics 334
A.5.3 Application layer characteristics 334
A.6 CPF 6 (INTERBUS) communication concepts 334
A.7 CPF 8 (CC-LINK) communication concepts 336
A.7.1 Basic characteristics 336
A.7.2 Variants 336
A.8 CPF 9 (HART) communication concepts 337
A.9 CPF 16 (SERCOS) communication concepts 337
Annex B (informative) Added value of IEC 61784-1 339
Bibliography 340

Figure 1 – Communication profile families and profiles 18
Figure 2 – Example optical power budget for a 100/140 μm fiber system with a 16/16 optical passive star coupler 45
Figure 3 – CP 3/2 Slave devices usable in applications 135
Figure A.1 – Ring structure 337
Figure A.2 – Topology example 338

Table 1 – Relations of Communication Profile Families to type numbers 19
Table 2 – Layout of profile (sub)clause selection tables 25
Table 3 – Contents of (sub)clause selection tables 25
Table 4 – Layout of service selection tables 25
Table 5 – Contents of service selection tables 26
Table 6 – Layout of parameter selection tables 26
Table 7 – Contents of parameter selection tables 26
Table 8 – Layout of class attribute selection tables 27
Table 9 – Contents of class attribute selection tables 27
Table 10 – CPF 1: overview of profile sets 29
Table 11 – CP 1/1: PhL selection for communicating devices and their MAUs 29
Table 12 – CP 1/1: PhL classification of MAUs and attached devices 31
Table 13 – CP 1/1: PhL selection of Clause 16 for devices and their MAUs 32
Table 14 – CP 1/1: PhL selection of Clause 12 for devices and their MAUs 33
Table 15 – Void 33

This is a preview of "BS EN IEC 61784-1:20...". Click here to purchase the full version from the ANSI store.

Table 16 – CP 1/1: PhL selection of recommended IS parameters for MAU classes 111, 112, 121, 122, 511 and 512 34
Table 17 – CP 1/1: PhL selection for media components 35
Table 18 – CP 1/1: PhL selection of imperative IS parameters for media in FISCO systems 36
Table 19 – CP 1/1: PhL selection for power supplies 37
Table 20 – CP 1/1: PhL selection of power supply types 38
Table 21 – CP 1/1: PhL selection of permissible output voltage and IS parameters for FISCO power supplies 38
Table 22 – CP 1/1: PhL selection for terminators 39
Table 23 – CP 1/1: PhL selection of IS parameters for terminators 40
Table 24 – CP 1/1: PhL selection of Clause 12 for intrinsic safety barriers 40
Table 25 – CP 1/1: PhL selection of recommended IS parameters for intrinsic safety barriers and galvanic isolators (Entity model only) 41
Table 26 – CP 1/1: PhL selection of Clause 12 for intrinsically safe galvanic isolators 42
Table 27 – CP 1/1: PhL selection of Clause 15, recommended optical fiber types 43
Table 28 – CP 1/1: PhL selection of passive star couplers, recommended maximum insertion loss 43
Table 29 – CP 1/1: PhL selection of active star couplers 44
Table 30 – CP 1/1: Optical power budget considerations 44
Table 31 – CP 1/1: DLL service selection 46
Table 32 – CP 1/1: DLL service selection of Clause 5 46
Table 33 – CP 1/1: DLL service selection of 5.4 46
Table 34 – CP 1/1: DLL service selection of 5.4.1 47
Table 35 – CP 1/1: DLL service selection of 5.4.3 47
Table 36 – CP 1/1: DLL service selection of 5.4.6 48
Table 37 – CP 1/1: DLL service selection of Clause 6 48
Table 38 – CP 1/1: DLL service selection of the summary of 6.3, DL-connection QoS 49
Table 39 – CP 1/1: DLL service selection of Figures 9 to 14 of 6.4 49
Table 40 – CP 1/1: DLL service selection of 6.5 50
Table 41 – CP 1/1: DLL service selection: replacement for Table 13 of 6.5 51
Table 42 – CP 1/1: DLL service selection of 6.5, replacement for Table 14 52
Table 43 – CP 1/1: DLL service selection of 6.5 for use of addresses for peer DLC 52
Table 44 – CP 1/1: DLL service selection of 6.5 for use of addresses for multipeer DLC connect request at publisher 52
Table 45 – CP 1/1: DLL service selection of 6.5 for use of addresses for multipeer DLC connect request at subscriber 52
Table 46 – CP 1/1: DLL service selection of 6.6 53
Table 47 – CP 1/1: DLL service selection: replacement for Table 15 of 6.6 53
Table 48 – CP 1/1: DLL service selection of 6.7 54
Table 49 – CP 1/1: DLL service selection of 6.7, replacement for Table 16 54
Table 50 – CP 1/1: DLL service selection of 6.7, replacement for Table 17 54
Table 51 – CP 1/1: DLL service selection of 6.7, replacement for Table 18 55
Table 52 – CP 1/1: DLL service selection of Clause 7 55
Table 53 – CP 1/1: DLL service selection of 7.5, replacement for Table 23 56

This is a preview of "BS EN IEC 61784-1:20...". Click here to purchase the full version from the ANSI store.

Table 54 – CP 1/1: DLL service selection of Clause 8 57
Table 55 – CP 1/1: DLL service selection of 8.5, replacement for Table 28 57
Table 56 – CP 1/1: DLL protocol selection 58
Table 57 – CP 1/1: DLL protocol selection of Clause 4 58
Table 58 – CP 1/1: DLL protocol selection of 4.3 59
Table 59 – CP 1/1: DLL protocol selection of 4.3.2.1 for use of link designators 59
Table 60 – CP 1/1: DLL protocol selection of 4.3.2.2 for use of node designators 59
Table 61 – CP 1/1: DLL protocol selection of 4.3.3.1 for predefined flat non–local DL-addresses 60
Table 62 – CP 1/1: DLL protocol selection of 4.3.3.2 for predefined flat link–local DL-addresses 60
Table 63 – CP 1/1: DLL protocol selection of 4.3.3.3 for predefined node–local DL-addresses 60
Table 64 – CP 1/1: DLL protocol selection of 4.7 61
Table 65 – CP 1/1: DLL protocol selection of 4.7.4 62
Table 66 – CP 1/1: DLL protocol selection of 4.7.5 63
Table 67 – CP 1/1: DLL protocol selection of Clause 6 64
Table 68 – CP 1/1: DLL protocol selection, replacement for Table 10 of 6.0 65
Table 69 – CP 1/1: DLL protocol selection of 6.5 66
Table 70 – CP 1/1: DLL protocol selection of 6.7 69
Table 71 – CP 1/1: DLL protocol selection of 6.8 73
Table 72 – CP 1/1: DLL protocol selection of 6.11 74
Table 73 – CP 1/1: DLL protocol selection of 6.12 74
Table 74 – CP 1/1: DLL protocol selection of 6.15 75
Table 75 – CP 1/1: DLL protocol selection of 6.20 76
Table 76 – CP 1/1: DLL protocol selection of Clause 7 77
Table 77 – CP 1/1: DLL protocol selection of 7.4 78
Table 78 – CP 1/1: DLL protocol selection of Clause 8 79
Table 79 – CP 1/1: DLL protocol selection of 8.2 80
Table 80 – CP 1/1: DLL protocol selection of 8.2.2 90
Table 81 – CP 1/1: DLL protocol selection of 8.3 103
Table 82 – CP 1/1: DLL protocol selection of 8.4 103
Table 83 – CP 1/1: DLL protocol selection of Clause 9 105
Table 84 – CP 1/1: DLL protocol selection of 9.3 105
Table 85 – CP 1/1: DLL protocol selection of 9.3.5 107
Table 86 – CP 1/1: DLL protocol selection of 9.3.5.2.2, replacement for element encoding 108
Table 87 – CP 1/1: DLL protocol selection of Clause 10 109
Table 88 – CP 1/1: DLL protocol selection of 10.2 109
Table 89 – CP 1/1: DLL protocol selection of 10.3 110
Table 90 – CP 1/1: DLL protocol selection of 10.3.7, specification of errors 112
Table 91 – CP 1/1: DLL protocol selection of 10.4 113
Table 92 – CP 1/1: DLL protocol selection of 10.5 114
Table 93 – CP 1/1: DLL protocol selection of 10.6 115

This is a preview of "BS EN IEC 61784-1:20...". Click here to purchase the full version from the ANSI store.

Table 94 – CP 1/1: AL service selection 115
Table 95 – CP 1/1: AL data type selection of Clause 4 116
Table 96 – CP 1/1: AL protocol selection 116
Table 97 – CP 1/2: AL service selection 117
Table 98 – CP 1/2: AL protocol selection 118
Table 99 – CP 1/3: PhL selection for H2 devices 119
Table 100 – CP 1/3: PhL selection for H2 media and related components 120
Table 101 – CPF 2: overview of profile sets 122
Table 102 – CP 2/1: PhL selection 122
Table 103 – CP 2/1: DLL service selection 124
Table 104 – CP 2/1: DLL protocol selection 124
Table 105 – CP 2/1: DLL protocol selection of management objects 125
Table 106 – CP 2/1: AL service selection 125
Table 107 – CP 2/1: AL protocol selection 126
Table 108 – CP 2/2: DLL protocol selection 127
Table 109 – CP 2/2: DLL protocol selection of management objects 128
Table 110 – CP 2/2: AL service selection 129
Table 111 – CP 2/2: AL protocol selection 130
Table 112 – CP 2/3: DLL protocol selection 131
Table 113 – CP 2/3: DLL protocol selection of management objects 132
Table 114 – CP 2/3: AL service selection 132
Table 115 – CP 2/3: AL protocol selection 133
Table 116 – CPF 3: overview of profile sets 134
Table 117 – CP 3/1: PhL selection 135
Table 118 – CP 3/1: PhL selection of Clause 3 137
Table 119 – CP 3/1: PhL selection of Clause 4 137
Table 120 – CP 3/1: General DLL service selection 138
Table 121 – CP 3/1: DLL service selection for DP-V0 master (class 1) 139
Table 122 – CP 3/1: DLM service selection for DP-V0 master (class 1) 140
Table 123 – CP 3/1: DLL service selection for DP-V1 master (class 1) 141
Table 124 – CP 3/1: DLM service selection for DP-V1 master (class 1) 142
Table 125 – CP 3/1: DLL service selection for DP-V0 master (class 2) 143
Table 126 – CP 3/1: DLL service selection for DP-V1 master (class 2) 144
Table 127 – CP 3/1: DLL service selection for DP-V0 slave 145
Table 128 – CP 3/1: DLM service selection for DP-V0 slave 146
Table 129 – CP 3/1: DLL service selection for DP-V1 slave 147
Table 130 – CP 3/1: DLM service selection for DP-V1 slave 148
Table 131 – CP 3/1: General DLL protocol selection 149
Table 132 – CP 3/1: DLL protocol selection of Clause 5 149
Table 133 – CP 3/1: DLL protocol selection of Clause 6 150
Table 134 – CP 3/1: DLL protocol selection of Clause 7 150
Table 135 – CP 3/1: Time variable selection for DP-V0 master (class 1) 151
Table 136 – CP 3/1: Timer and counter selection for DP-V0 master (class 1) 152

This is a preview of "BS EN IEC 61784-1:20...". Click here to purchase the full version from the ANSI store.

Table 137 – CP 3/1: DLPDU selection for DP-V0 master (class 1) 152
Table 138 – CP 3/1: MAC state selection for DP-V0 master (class 1) 153
Table 139 – CP 3/1: Time selection for DP-V1 master (class 1) 154
Table 140 – CP 3/1: Timer and counter selection for DP-V1 master (class 1) 155
Table 141 – CP 3/1: DLPDU selection for DP-V1 master (class 1) 155
Table 142 – CP 3/1: MAC state selection for DP-V1 master (class 1) 156
Table 143 – CP 3/1: CS protocol selection for DP-V1 master (class 1) 156
Table 144 – CP 3/1: Time selection for DP-V1 master (class 2) 157
Table 145 – CP 3/1: Timer and counter selection for DP-V1 master (class 2) 157
Table 146 – CP 3/1: DLPDU selection for DP-V1 master (class 2) 158
Table 147 – CP 3/1: Time selection for DP-V0 slave 158
Table 148 – CP 3/1: Timer and counter selection for DP-V0 slave 159
Table 149 – CP 3/1: DLPDU selection for DP-V0 slave 159
Table 150 – CP 3/1: MAC state selection for DP-V0 slave 160
Table 151 – CP 3/1: Time selection for DP-V1 slave 160
Table 152 – CP 3/1: Timer and counter selection for DP-V1 slave 161
Table 153 – CP 3/1: DLPDU selection for DP-V1 slave 161
Table 154 – CP 3/1: CS protocol selection for DP-V1 slave 162
Table 155 – CP 3/1, 3/2: AL service selection 162
Table 156 – CP 3/1, 3/2: AL service selection of Clause 6 163
Table 157 – CP 3/1, 3/2: AL service selection of I/O data ASE 163
Table 158 – CP 3/1, 3/2: AL service selection of Diagnosis ASE 164
Table 159 – CP 3/1, 3/2: AL service selection of Context ASE 164
Table 160 – CP 3/1, 3/2: AL service selection of Management ASE 165
Table 161 – CP 3/1, 3/2: AL service selection of AR ASE 166
Table 162 – CP 3/1, 3/2: AL service selection of Clause 6 167
Table 163 – CP 3/1, 3/2: AL service selection of Process data ASE 167
Table 164 – CP 3/1, 3/2: AL service selection of I/O data ASE 168
Table 165 – CP 3/1, 3/2: AL service selection of Alarm ASE 168
Table 166 – CP 3/1, 3/2: AL service selection of Context ASE 168
Table 167 – CP 3/1, 3/2: AL service selection of Load region ASE 169
Table 168 – CP 3/1, 3/2: AL service selection of Function invocation ASE 169
Table 169 – CP 3/1, 3/2: AL service selection of Time ASE 169
Table 170 – CP 3/1, 3/2: AL service selection of AR ASE 170
Table 171 – CP 3/1, 3/2: AL service selection of Clause 6 171
Table 172 – CP 3/1, 3/2: AL service selection of I/O data ASE 171
Table 173 – CP 3/1, 3/2: AL service selection of Diagnosis ASE 172
Table 174 – CP 3/1, 3/2: AL service selection of Context ASE 172
Table 175 – CP 3/1, 3/2: AL service selection of Management ASE 172
Table 176 – CP 3/1, 3/2: AL service selection of AR ASE 173
Table 177 – CP 3/1, 3/2: AL service selection of Clause 6 174
Table 178 – CP 3/1, 3/2: AL service selection of Process data ASE 174
Table 179 – CP 3/1, 3/2: AL service selection of Context ASE 175

This is a preview of "BS EN IEC 61784-1:20...". Click here to purchase the full version from the ANSI store.

Table 180 – CP 3/1, 3/2: AL service selection of Load region ASE 175
Table 181 – CP 3/1, 3/2: AL service selection of Function invocation ASE 176
Table 182 – CP 3/1, 3/2: AL service selection of Time ASE 176
Table 183 – CP 3/1, 3/2: AL service selection of AR ASE 177
Table 184 – CP 3/1, 3/2: AL service selection of Clause 6 178
Table 185 – CP 3/1, 3/2: AL service selection of I/O data ASE 179
Table 186 – CP 3/1, 3/2: AL service selection of Diagnosis ASE 180
Table 187 – CP 3/1, 3/2: AL service selection of Context ASE 181
Table 188 – CP 3/1, 3/2: AL service selection of AR ASE 182
Table 189 – CP 3/1, 3/2: AL service selection of Clause 6 183
Table 190 – CP 3/1, 3/2: AL service selection of Process data ASE 183
Table 191 – CP 3/1, 3/2: AL service selection of I/O data ASE 184
Table 192 – CP 3/1, 3/2: AL service selection of diagnosis ASE 184
Table 193 – CP 3/1, 3/2: AL service selection of Alarm ASE 185
Table 194 – CP 3/1, 3/2: AL service selection of Context ASE 185
Table 195 – CP 3/1, 3/2: AL service selection of Load region ASE 186
Table 196 – CP 3/1, 3/2: AL service selection of Function invocation ASE 186
Table 197 – CP 3/1, 3/2: AL service selection of Time ASE 186
Table 198 – CP 3/1, 3/2: AL service selection of AR ASE 187
Table 199 – CP 3/1, 3/2: AL protocol selection 188
Table 200 – CP 3/1, 3/2: AL protocol selection of Clause 4 to 11 188
Table 201 – CP 3/1, 3/2: AL protocol selection of APDUs 190
Table 202 – CP 3/1, 3/2: AL protocol selection of FSPM services primitives 191
Table 203 – CP 3/1, 3/2: AL protocol selection of DMPM services primitives 192
Table 204 – CP 3/1, 3/2: AL protocol selection of Clause 4 to 11 192
Table 205 – CP 3/1, 3/2: AL protocol selection of APDUs 194
Table 206 – CP 3/1, 3/2: AL protocol selection of FSPM services primitives 196
Table 207 – CP 3/1, 3/2: AL protocol selection of DMPM services primitives 197
Table 208 – CP 3/1, 3/2: AL protocol selection of Clause 4 to 6 198
Table 209 – CP 3/1, 3/2: AL protocol selection of APDUs 200
Table 210 – CP 3/1, 3/2: AL protocol selection of FSPM services primitives 201
Table 211 – CP 3/1, 3/2: AL protocol selection of DMPM services primitives 201
Table 212 – CP 3/1, 3/2: AL protocol selection of Clause 4 to 11 202
Table 213 – CP 3/1, 3/2: AL protocol selection of APDUs 204
Table 214 – CP 3/1, 3/2: AL protocol selection of FSPM services primitives 206
Table 215 – CP 3/1, 3/2: AL protocol selection of DMPM services primitives 207
Table 216 – CP 3/1, 3/2: AL protocol selection of Clause 4 to 11 207
Table 217 – CP 3/1, 3/2: AL protocol selection of APDU selection 209
Table 218 – CP 3/1, 3/2: AL protocol selection of FSPM services primitives 210
Table 219 – CP 3/1, 3/2: AL protocol selection of DMPM services primitives 211
Table 220 – CP 3/1, 3/2: AL protocol selection of Clause 4 to 11 212
Table 221 – CP 3/1, 3/2: AL protocol selection of APDUs 214
Table 222 – CP 3/1, 3/2: AL protocol selection of FSPM services primitives 215

This is a preview of "BS EN IEC 61784-1:20...". Click here to purchase the full version from the ANSI store.

Table 223 – CP 3/1, 3/2: AL protocol selection of DMPM services primitives 217
Table 224 – CP 3/2: PhL selection 219
Table 225 – CP 3/2: PhL selection of Clause 12 for devices and their MAUs 221
Table 226 – CP 3/2: PhL selection of recommended IS parameters 222
Table 227 – CP 3/2: PhL selection of Clause 21 for devices and their MAUs 222
Table 228 – CP 3/2: General DLL protocol selection 224
Table 229 – CP 3/2: DLL protocol selection of Clause 4 224
Table 230 – CP 3/2: DLL protocol selection of Clause 5 225
Table 231 – CP 3/2: DLL protocol selection of Clause 6 225
Table 232 – CP 3/2: DLL protocol selection of Clause 7 226
Table 233 – CP 3/2: Time variable selection for DP-V0 master (class 1) 227
Table 234 – CP 3/2: Timer and counter selection for DP-V0 master (class 1) 227
Table 235 – CP 3/2: DLPDU selection for DP-V0 master (class 1) 228
Table 236 – CP 3/2: Time variable selection for DP-V1 master (class 1) 229
Table 237 – CP 3/2: Timer and counter selection for DP-V1 master (class 1) 230
Table 238 – CP 3/2: DLPDU selection for DP-V1 master (class 1) 230
Table 239 – CP 3/2: Time variable selection for DP-V1 master (class 2) 231
Table 240 – CP 3/2: Timer and counter selection for DP-V1 master (class 2) 232
Table 241 – CP 3/2: DLPDU selection for DP-V1 master (class 2) 232
Table 242 – CP 3/2: Time variable selection for DP-V0 slave 233
Table 243 – CP 3/2: Timer and counter selection for DP-V0 slave 233
Table 244 – CP 3/2: DLPDU selection for DP-V0 slave 234
Table 245 – CP 3/2: Time variable selection for DP-V1 slave 234
Table 246 – CP 3/2: Timer and counter selection for DP-V1 slave 235
Table 247 – CP 3/2: DLPDU selection for DP-V1 slave 235
Table 248 – CP 4/1: PhL selection 237
Table 249 – CP 4/1: DLL service selection 238
Table 250 – CP 4/1: DLL protocol selection 238
Table 251 – CP 4/1: AL service selection 239
Table 252 – CP 4/1: AL protocol selection 239
Table 253 – CPF 5: overview of profile sets 240
Table 254 – CPF 5: PhL selection 241
Table 255 – CPF 5: DLL service selection 242
Table 256 – CPF 5: DLL service selection of Clause 4 243
Table 257 – CPF 5: DLL protocol selection 243
Table 258 – CPF 5: DLL protocol selection of variables and resources 244
Table 259 – CPF 5: DLL protocol selection of DLPDUs 244
Table 260 – CP 5/1: AL service selection 245
Table 261 – CP 5/1: AL service selection of ASEs 245
Table 262 – CPF 5: AL service selection of MPS ASEs 245
Table 263 – CPF 5: AL service selection of variable elements 246
Table 264 – CPF 5: AL service selection of produced variable elements 246
Table 265 – CPF 5: AL service selection of consumed variable elements 246

This is a preview of "BS EN IEC 61784-1:20...". Click here to purchase the full version from the ANSI store.

Table 266 – CP 5/1: AL service selection of MPS services 247
Table 267 – CP 5/1, 5/2: AL service selection of A_Readloc service parameters 247
Table 268 – CP 5/1, 5/2: AL service selection of A_Readfar service parameters 247
Table 269 – CP 5/1, 5/2: AL service selection of A_Read service parameters 248
Table 270 – CP 5/1: AL service selection of MCS service classes 248
Table 271 – CP 5/1: AL service selection of QoS 248
Table 272 – CP 5/1: AL service selection of MCS services 248
Table 273 – CP 5/1, 5/2: AL service selection of A_Data parameters 249
Table 274 – CP 5/1: AL protocol selection 249
Table 275 – CPF 5/1: AL protocol selection of MPS data types 249
Table 276 – CPF 5/1: AL protocol selection of MPS PDUs 249
Table 277 – CPF 5/1: AL protocol selection of MPS encoding rules 250
Table 278 – CP 5/1, 5/2: AL protocol selection of MCS PDUs 250
Table 279 – CP 5/1: AL protocol selection of MCS state machines 251
Table 280 – CP 5/2: AL service selection 251
Table 281 – CP 5/2: AL service selection of ASEs 252
Table 282 – CP 5/2: AL service selection of MPS services 252
Table 283 – CP 5/2: AL service selection of MCS service classes 252
Table 284 – CP 5/2: AL service selection of QoS 253
Table 285 – CP 5/2: AL service selection of MCS services 253
Table 286 – CP 5/2: AL service selection of domain services 253
Table 287 – CP 5/2: AL service selection of domain object attributes 254
Table 288 – CP 5/2: AL service selection of program services 254
Table 289 – CP 5/2: AL service selection of program object attributes 254
Table 290 – CP 5/2: AL service selection of variable services 255
Table 291 – CP 5/2: AL service selection of variable classes 255
Table 292 – CP 5/2: AL service selection of variable class attributes 255
Table 293 – CP 5/2: AL protocol selection 255
Table 294 – CP 5/2: AL protocol selection of MCS state machines 256
Table 295 – CP 5/2: AL protocol selection of sub-MMS coding rules 256
Table 296 – CP 5/2: AL protocol selection of sub-MMS PDUs 257
Table 297 – CP 5/3: AL service selection 257
Table 298 – CP 5/3: AL service selection of ASEs 258
Table 299 – CP 5/3: AL protocol selection 258
Table 300 – CPF 6: device CP identifier assignment 259
Table 301 – CPF 6: PhL selection 260
Table 302 – CP 6/1: DLL service selection, assignment of DLL services to device types 262
Table 303 – CPF 6: DLL protocol selection of data widths supported by master 263
Table 304 – CP 6/1: AL service selection, assignment of AL services to device types 264
Table 305 – CP 6/2: DLL service selection, assignment of DLL services to device types 265
Table 306 – CP 6/2: AL service selection, assignment of AL services to device types 266

This is a preview of "BS EN IEC 61784-1:20...". Click here to purchase the full version from the ANSI store.

Table 307 – CP 6/2: AL service selection of AR-Data-Send-Acknowledge service parameters 267
Table 308 – CP 6/3: DLL service selection, assignment of DLL services to device types 268
Table 309 – CP 6/3: AL service selection, assignment of AL services to device types 269
Table 310 – CP 8/1 transmission support level 271
Table 311 – CP 8/1 PhL selection 272
Table 312 – CP 8/1 DLL services selection 274
Table 313 – CP 8/1 DLL protocol selection 275
Table 314 – CP 8/1 AL services selection 277
Table 315 – CP 8/1 AL protocol selection 278
Table 316 – CP 8/2 DLL protocol selection 279
Table 317 – CP 8/3 PhL selection 280
Table 318 – CP 8/3 DLL services selection 282
Table 319 – CP 8/3 DLL protocol selection 283
Table 320 – CP 8/3 AL services selection 285
Table 321 – CP 8/3 AL protocol selection 286
Table 322 – CP 9/1 PhL selection 288
Table 323 – CP 9/1: DLL service selection 288
Table 324 – CP 9/1: DLL protocol selection 289
Table 325 – CP 9/1: AL service selection 289
Table 326 – CP 9/1: AL protocol selection 289
Table 327 – CP 16/1: PhL selection 291
Table 328 – CP 16/1: DLL protocol selection 292
Table 329 – CP 16/1: AL service selection 292
Table 330 – CP 16/2: PhL selection 293
Table 331 – CPF 19: overview of profile sets 294
Table 332 – CP 19/1 profile: PhL selection 295
Table 333 – CP 19/1: DLL service selection 296
Table 334 – DLL service selection for C1 master of CP 19/1 298
Table 335 – DLL service selection for C2 master of CP 19//1 298
Table 336 – DLL service selection for slave of CP 19//1 299
Table 337 – CP 19/1: DLL protocol selection 299
Table 338 – DLL protocol selection for C1 master of CP 19/1 301
Table 339 – DLL protocol selection for C2 master of CP 19/1 303
Table 340 – DLL protocol selection for slave of CP 19/1 304
Table 341 – CP 19/1: AL service selection 306
Table 342 – Class selection for C1 master of CP 19/1 307
Table 343 – Master class attribute selection for C1 master of CP 19/1 307
Table 344 – Master class service selection 307
Table 345 – FDCMaster-AR class attribute selection for C1 master of CP 19/1 307
Table 346 – FDCMaster-AR class service selection 308
Table 347 – Class selection for C2 master of CP 19/1 308
Table 348 – Monitor class attribute selection for C2 master of CP 19/1 308

This is a preview of "BS EN IEC 61784-1:20...". Click here to purchase the full version from the ANSI store.

Table 349 – Monitor class service selection 308
Table 350 – FDCMonitor-AR class attribute selection for C2 master of CP 19/1 309
Table 351 – FDCMonitor-AR class service selection 309
Table 352 – Class selection for slave AP of CP 19/1 309
Table 353 – Slave class attribute selection for slave AP of CP 19/1 310
Table 354 – Slave class service selection 310
Table 355 – FDCSlave-AR class attribute selection for slave AP of CP 19/1 310
Table 356 – FDCSlave-AR class service selection 310
Table 357 – CP 19/1: AL protocol selection 311
Table 358 – CP 19/2: DLL service selection 312
Table 359 – DLL service selection for C1 master of CP 19/2 313
Table 360 – DLL service selection for C2 master of CP 19/2 314
Table 361 – DLL service selection for slave of CP 19/2 314
Table 362 – CP 19/2: DLL protocol selection 315
Table 363 – DLL protocol selection for C1 master of CP 19/2 317
Table 364 – DLL protocol selection for C2 master of CP 19/2 318
Table 365 – DLL protocol selection for slave of CP 19/2 319
Table 366 – CP 19/2: AL service selection 321
Table 367 – Class selection for C1 master of CP 19/2 322
Table 368 – EventManager class attribute selection for C1 master of CP 19/2 322
Table 369 – EventManager class service selection 322
Table 370 – Class selection for C2 master of CP 19/2 323
Table 371 – EventManager class attribute selection for C2 master of CP 19/2 323
Table 372 – EventManager class service selection 323
Table 373 – Class selection for slave AP of CP 19/2 324
Table 374 – EventManager class attribute selection for slave AP of CP 19/2 324
Table 375 – EventManager class service selection 324
Table 376 – CP 19/2: AL protocol selection 325
Table A.1 – Number of devices per CP16/1 and CP16/2 systems (examples) 338

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INDUSTRIAL COMMUNICATION NETWORKS – PROFILES –

Part 1: Fieldbus profiles

FOREWORD

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NOTE Combinations of protocol types are specified in IEC 61784-1 and IEC 61784-2.

International Standard IEC 61784-1 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation.

This fifth edition cancels and replaces the fourth edition published in 2014. This edition constitutes a technical revision.

This is a preview of "BS EN IEC 61784-1:20...". Click here to purchase the full version from the ANSI store.

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

- update of the dated references to the IEC 61158 series, to IEC 61784-2, to the IEC 61784-3 series, to the IEC 61784-5 series and to IEC 61918 throughout the document;
- update of selection tables CPF 2, CPF 4 and CPF 8.

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

FDIS	Report on voting
65C/942/FDIS	65C/951/RVD

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 document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 61784 series, published under the general title *Industrial communication networks – Profiles*, 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 "http://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.

A bilingual version of this publication may be issued at a later date.

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.

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INTRODUCTION

This document provides a set of Communication Profiles (CP) in the sense of ISO/IEC TR 10000-1. These answer the need of identifying the protocol families co-existing within the IEC 61158 series, as a result of the international harmonization of fieldbus technologies available on the market. More specifically, these profiles help to correctly state the compliance to the IEC 61158 series, and to avoid the spreading of divergent implementations, which would limit its use, clearness and understanding. Additional profiles to address specific market concerns, such as functional safety or information security, may be addressed by future parts of this standard.

This standard contains several Communication Profile Families (CPF), which specify one or more communication profiles. Such profiles identify, in a strict sense, protocol subsets of the IEC 61158 series via protocol specific communication profiles. They do not define device-type-specific communication profiles for the purpose of guiding manufacturers in feature set selection – for example, in selecting the minimum set of communication services and protocol to implement a specific class of devices, such as generic slaves or transmitters ("implementation profiles"). Neither do they define device profiles that specify communication profiles together with application functions needed to answer the need of a specific application ("application profiles").

It is agreed that these latter classes of profiles would help the use of the IEC 61158 series of standards; the profiles defined in this document are a necessary step to achieve that task.

It is also important to clarify that interoperability – defined as the ability of two or more network systems to exchange information and to make mutual use of the information that has been exchanged (see ISO/IEC TR 10000-1) – can be directly achieved on the same link only for those devices complying to the same communication profile.

Profiles contained in this International Standard are constructed of references to IEC 61158-2 and the IEC 61158-3, IEC 61158-4, IEC 61158-5 and IEC 61158-6 series, and other IS, TS or worldwide-accepted standards, as appropriate[1]. Each profile is required to reference at least one (sub)part of IEC 61158-2 through IEC 61158-6.

Two or more Profiles, which are related to a common family, are specified within a "Communication Profile Family" (CPF).

---

1 International Standardised Profiles may contain normative references to specifications other than International Standards; see ISO/IEC JTC 1 N 4047: *The Normative Referencing of Specifications other than International Standards in JTC 1 International Standardized Profiles – Guidelines for ISP Submitters*.

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INDUSTRIAL COMMUNICATION NETWORKS – PROFILES –

Part 1: Fieldbus profiles

1 Scope

This part of IEC 61784 defines a set of protocol specific communication profiles based primarily on the IEC 61158 series, to be used in the design of devices involved in communications in factory manufacturing and process control.

Each profile selects specifications for the communications protocol stack at a device. It contains a minimal set of required services at the application layer and specification of options in intermediate layers defined through references. If no application layer is included, then a minimal set of required services at the Data-link layer is specified. The appropriate references to the protocol specific types are given in each communication profile family or associated profiles.

NOTE All profiles are based on standards or draft standards or International Standards published by the IEC or from standards or International Standards established by other standards bodies or open standards processes.

The structure of communication profile families is specified in Figure 1.

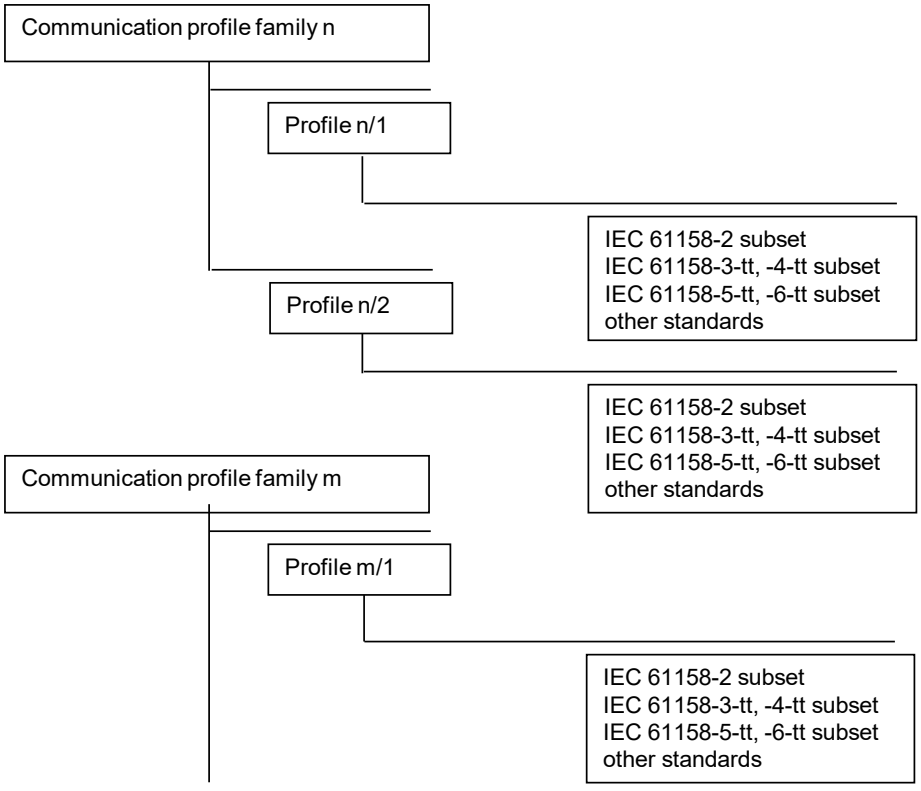

Figure 1 – Communication profile families and profiles