

DIN EN 61784-1: 2011-04(E)

Industrial communication networks_- Profiles_- Part_1: Fieldbus profiles (IEC_61784-1:2010); English version EN_61784-1:2010, only on CD-ROM

CONTENTS

	Page
INTRODUCTION.....	14
1 Scope.....	15
2 Normative references	16
3 Definitions	19
3.1 Terms and definitions	19
3.2 Abbreviations and symbols	20
3.2.1 IEC 61158 abbreviations and symbols	20
3.2.2 Other abbreviations and symbols	20
3.3 Conventions	21
3.3.1 Conventions common to all layers	21
3.3.2 Physical layer	22
3.3.3 Data-link layer	22
3.3.4 Application layer	23
4 Conformance to communication profiles	23
5 Communication Profile Family 1 (FOUNDATION® Fieldbus).....	24
5.1 General overview	24
5.2 Profile 1/1 (FF H1).....	25
5.2.1 Physical layer	25
5.2.2 Data-link layer	40
5.2.3 Application layer.....	104
5.3 Profile 1/2 (FF HSE).....	105
5.3.1 Physical layer	105
5.3.2 Data-link layer	105
5.3.3 Network layer	105
5.3.4 Transport layer	105
5.3.5 Application layer.....	106
5.4 Profile 1/3 (FF H2).....	106
5.4.1 Physical layer	106
5.4.2 Data-link layer	108
5.4.3 Application layer.....	108

6	Communication Profile Family 2 (CIP™)	108
6.1	General overview	108
6.2	Profile 2/1 (ControlNet)	109
6.2.1	Physical layer	109
6.2.2	Data-link layer	110
6.2.3	Application layer	112
6.3	Profile 2/2 (EtherNet/IP)	113
6.3.1	Physical layer	113
6.3.2	Data-link layer	113
6.3.3	Application layer	114
6.4	Profile 2/3 (DeviceNet)	115
6.4.1	Physical layer	115
6.4.2	Data-link layer	115
6.4.3	Application layer	116
7	Communication Profile Family 3 (PROFIBUS & PROFINET)	118
7.1	General overview	118
7.2	Profile 3/1 (PROFIBUS DP)	120
7.2.1	Physical layer	120
7.2.2	Data-link layer	122
7.2.3	Application layer	141
7.3	Profile 3/2 (PROFIBUS PA)	187
7.3.1	Physical layer	187
7.3.2	Data-link layer	190
7.3.3	Application layer	200
7.4	Profile 3/3 (PROFINET CBA)	200
7.4.1	Physical layer	200
7.4.2	Data-link layer	200
7.4.3	Application layer	201
8	Communication Profile Family 4 (P-NET®)	202
8.1	General overview	202
8.2	Profile 4/1 (P-NET RS-485)	202
8.2.1	Physical layer	202
8.2.2	Data-link layer	203
8.2.3	Application layer	204
8.3	Profile 4/2 (P-NET RS-232)	205
8.3.1	Physical layer	205
8.3.2	Data-link layer	206
8.3.3	Application layer	206
9	Communication Profile Family 5 (WorldFIP®)	206
9.1	General overview	206
9.2	Profile 5/1 (WorldFIP)	207
9.2.1	Physical layer	207
9.2.2	Data-link layer	208
9.2.3	Application layer	210
9.3	Profile 5/2 (WorldFIP)	215
9.3.1	Physical layer	215
9.3.2	Data-link layer	215
9.3.3	Application layer	215
9.4	Profile 5/3 (WorldFIP)	219
9.4.1	Physical layer	219
9.4.2	Data-link layer	220
9.4.3	Application layer	220

10	Communication Profile Family 6 (INTERBUS®)	221
10.1	General overview	221
10.2	Profile 6/1	222
10.2.1	Physical layer	222
10.2.2	Data-link layer	223
10.2.3	Application layer	224
10.3	Profile 6/2	225
10.3.1	Physical layer	225
10.3.2	Data-link layer	225
10.3.3	Application layer	226
10.4	Profile 6/3	228
10.4.1	Physical layer	228
10.4.2	Data-link layer	228
10.4.3	Application layer	229
11	Communication Profile Family 7 (This Clause has been removed)	230
12	Communication Profile Family 8 (CC-Link)	230
12.1	General overview	230
12.1.1	General	230
12.1.2	Profile 8/1	230
12.1.3	Profile 8/2	231
12.1.4	Profile 8/3	231
12.2	Profile 8/1	231
12.2.1	Physical layer	231
12.2.2	Data-link layer	232
12.2.3	Application layer	234
12.3	Profile 8/2	237
12.3.1	Physical layer	237
12.3.2	Data-link layer	237
12.3.3	Application layer	237
12.4	Profile 8/3	237
12.4.1	Physical layer	237
12.4.2	Data-link layer	238
12.4.3	Application layer	240
13	Communication Profile Family 9 (HART)	242
13.1	General Overview	242
13.2	Profile 9/1, universal command	242
13.2.1	Physical layer	242
13.2.2	Data-link layer	242
13.2.3	Application layer	242
14	Communication Profile Family 16 (SERCOS)	243
14.1	General overview	243
14.2	Profile 16/1 (SERCOS I)	244
14.2.1	Physical layer selection	244
14.2.2	Data-link layer	244
14.2.3	Application layer	245
14.3	Profile 16/2 (SERCOS II)	245
14.3.1	Physical layer	245
14.3.2	Data-link layer	246
14.3.3	Application layer	246

Annex A (informative) Communication concepts	247
Annex B (informative) Added value of IEC 61784-1.....	260
Bibliography.....	261
Annex ZA (normative) Normative references to international publications with their corresponding European publications	263
Figure 1 – Communication profile families and profiles	15
Figure 2 – Example optical power budget for a 100/140 μm fiber system with a 16/16 optical passive star coupler.....	39
Figure 3 – CP 3/2 Slave devices usable in applications.....	120
Figure A.1 – Ring structure	258
Figure A.2 – Topology example.....	259
Table 1 – Relations of Communication Profile Families to type numbers	16
Table 2 – Layout of profile (sub)clause selection tables	21
Table 3 – Contents of (sub)clause selection tables	21
Table 4 – Layout of service selection tables.....	21
Table 5 – Contents of service selection tables	22
Table 6 – Layout of parameter selection tables	22
Table 7 – Contents of parameter selection tables	22
Table 8 – Layout of class attribute selection tables	23
Table 9 – Contents of class attribute selection tables.....	23
Table 10 – CPF 1: overview of profile sets	24
Table 11 – CP 1/1: PhL selection for communicating devices and their MAUs.....	25
Table 12 – CP 1/1: PhL classification of MAUs and attached devices.....	27
Table 13 – CP 1/1: PhL selection of Clause 16 for devices and their MAUs	27
Table 14 – CP 1/1: PhL selection of Clause 12 for devices and their MAUs	28
Table 15 – CP 1/1: PhL selection of Clause 21 for devices and their MAUs (denigrated).....	29
Table 16 – CP 1/1: PhL selection of recommended IS parameters for FF MAU classes 111, 112, 121, 122, 511 and 512	30
Table 17 – CP 1/1: PhL selection for media components.....	31
Table 18 – CP 1/1: PhL selection of imperative IS parameters for media in FISCO systems..	31
Table 19 – CP 1/1: PhL selection for power supplies	32
Table 20 – CP 1/1: PhL selection of power supply types	32
Table 21 – CP 1/1: PhL selection of permissible output voltage and IS parameters for FISCO power supplies.....	33
Table 22 – CP 1/1: PhL selection for terminators	34
Table 23 – CP 1/1: PhL selection of IS parameters for terminators	34
Table 24 – CP 1/1: PhL selection of Clause 12 for intrinsic safety barriers.....	35
Table 25 – CP 1/1: PhL selection of recommended IS parameters for intrinsic safety barriers and galvanic isolators (Entity model only)	36
Table 26 – CP 1/1: PhL selection of Clause 12 for intrinsically safe galvanic isolators	37
Table 27 – CP 1/1: PhL selection of Clause 15, recommended optical fiber types	38
Table 28 – CP 1/1: PhL selection of passive star couplers, recommended maximum insertion loss	38

Table 29 – CP 1/1: PhL selection of active star couplers	38
Table 30 – CP 1/1: Optical power budget considerations	39
Table 31 – CP 1/1: DLL service selection.....	40
Table 32 – CP 1/1: DLL service selection of Clause 5	40
Table 33 – CP 1/1: DLL service selection of 5.4.....	40
Table 34 – CP 1/1: DLL service selection of 5.4.1.....	41
Table 35 – CP 1/1: DLL service selection of 5.4.3.....	41
Table 36 – CP 1/1: DLL service selection of 5.4.6.....	42
Table 37 – CP 1/1: DLL service selection of Clause 6	42
Table 38 – CP 1/1: DLL service selection of the summary of 6.3, DL-connection QoS.....	43
Table 39 – CP 1/1: DLL service selection of figures 9–14 of 6.4.....	43
Table 40 – CP 1/1: DLL service selection of 6.5.....	43
Table 41 – CP 1/1: DLL service selection: replacement for Table 13 of 6.5	44
Table 42 – CP 1/1: DLL service selection of 6.5, replacement for Table 14	44
Table 43 – CP 1/1: DLL service selection of 6.5 for use of addresses for peer DLC	45
Table 44 – CP 1/1: DLL service selection of 6.5 for use of addresses for multipeer DLC connect request at publisher	45
Table 45 – CP 1/1: DLL service selection of 6.5 for use of addresses for multipeer DLC connect request at subscriber	45
Table 46 – CP 1/1: DLL service selection of 6.6.....	45
Table 47 – CP 1/1: DLL service selection: replacement for Table 15 of 6.6	46
Table 48 – CP 1/1: DLL service selection of 6.7.....	46
Table 49 – CP 1/1: DLL service selection of 6.7, replacement for Table 16	46
Table 50 – CP 1/1: DLL service selection of 6.7, replacement for Table 17	46
Table 51 – CP 1/1: DLL service selection of 6.7, replacement for Table 18	47
Table 52 – CP 1/1: DLL service selection of Clause 7	47
Table 53 – CP 1/1: DLL service selection of 7.5, replacement for Table 23	48
Table 54 – CP 1/1: DLL service selection of Clause 8	48
Table 55 – CP 1/1: DLL service selection of 8.5, replacement for Table 28	48
Table 56 – CP 1/1: DLL protocol selection	49
Table 57 – CP 1/1: DLL protocol selection of Clause 4.....	49
Table 58 – CP 1/1: DLL protocol selection of 4.3	50
Table 59 – CP 1/1: DLL protocol selection of 4.3.2.1 for use of link designators.....	50
Table 60 – CP 1/1: DLL protocol selection of 4.3.2.2 for use of node designators	50
Table 61 – CP 1/1: DLL protocol selection of 4.3.3.1 for predefined flat non-local DL-addresses	50
Table 62 – CP 1/1: DLL protocol selection of 4.3.3.2 for predefined flat link-local DL-addresses	51

Table 63 – CP 1/1: DLL protocol selection of 4.3.3.3 for predefined node–local DL-addresses	51
Table 64 – CP 1/1: DLL protocol selection of 4.7	51
Table 65 – CP 1/1: DLL protocol selection of 4.7.4	52
Table 66 – CP 1/1: DLL protocol selection of 4.7.5	53
Table 67 – CP 1/1: DLL protocol selection of Clause 6	54
Table 68 – CP 1/1: DLL protocol selection, replacement for Table 10 of 6.0	55
Table 69 – CP 1/1: DLL protocol selection of 6.5	56
Table 70 – CP 1/1: DLL protocol selection of 6.7	59
Table 71 – CP 1/1: DLL protocol selection of 6.8	63
Table 72 – CP 1/1: DLL protocol selection of 6.11	64
Table 73 – CP 1/1: DLL protocol selection of 6.12	64
Table 74 – CP 1/1: DLL protocol selection of 6.15	65
Table 75 – CP 1/1: DLL protocol selection of 6.20	66
Table 76 – CP 1/1: DLL protocol selection of Clause 7	67
Table 77 – CP 1/1: DLL protocol selection of 7.4	68
Table 78 – CP 1/1: DLL protocol selection of Clause 8	69
Table 79 – CP 1/1: DLL protocol selection of 8.2	70
Table 80 – CP 1/1: DLL protocol selection of 8.2.2	80
Table 81 – CP 1/1: DLL protocol selection of 8.3	92
Table 82 – CP 1/1: DLL protocol selection of 8.4	92
Table 83 – CP 1/1: DLL protocol selection of Clause 9	94
Table 84 – CP 1/1: DLL protocol selection of 9.3	94
Table 85 – CP 1/1: DLL protocol selection of 9.3.5	96
Table 86 – CP 1/1: DLL protocol selection of 9.3.5.2.2, replacement for element encoding	97
Table 87 – CP 1/1: DLL protocol selection of Clause 10	98
Table 88 – CP 1/1: DLL protocol selection of 10.2	98
Table 89 – CP 1/1: DLL protocol selection of 10.3	99
Table 90 – CP 1/1: DLL protocol selection of 10.3.7, specification of errors	101
Table 91 – CP 1/1: DLL protocol selection of 10.4	102
Table 92 – CP 1/1: DLL protocol selection of 10.5	103
Table 93 – CP 1/1: DLL protocol selection of 10.6	103
Table 94 – CP 1/1: AL service selection	104
Table 95 – CP 1/1: AL data type selection of Clause 4	104
Table 96 – CP 1/1: AL protocol selection	105
Table 97 – CP 1/2: AL service selection	106
Table 98 – CP 1/2: AL protocol selection	106
Table 99 – CP 1/3: PhL selection for FF H2 devices	107
Table 100 – CP 1/3: PhL selection for FF H2 media and related components	108
Table 101 – CPF 2: overview of profile sets	109
Table 102 – CP 2/1: PhL selection	110
Table 103 – CP 2/1: DLL service selection	111
Table 104 – CP 2/1: DLL protocol selection	111
Table 105 – CP 2/1: DLL protocol selection of management objects	111

Table 106 – CP 2/1: AL service selection.....	112
Table 107 – CP 2/1: AL protocol selection	112
Table 108 – CP 2/2: DLL protocol selection	113
Table 109 – CP 2/2: DLL protocol selection of management objects	114
Table 110 – CP 2/2: AL service selection.....	114
Table 111 – CP 2/2: AL protocol selection	115
Table 112 – CP 2/3: DLL protocol selection	116
Table 113 – CP 2/3: DLL protocol selection of management objects	116
Table 114 – CP 2/3: AL service selection.....	117
Table 115 – CP 2/3: AL protocol selection	118
Table 116 – CPF 3: overview of profile sets	119
Table 117 – CP 3/1: PhL selection.....	121
Table 118 – CP 3/1: PhL selection of Clause 3	122
Table 119 – CP 3/1: PhL selection of Clause 4	122
Table 120 – CP 3/1: General DLL service selection	123
Table 121 – CP 3/1: DLL service selection for DP-V0 master (class 1).....	123
Table 122 – CP 3/1: DLM service selection for DP-V0 master (class 1).....	124
Table 123 – CP 3/1: DLL service selection for DP-V1 master (class 1).....	125
Table 124 – CP 3/1: DLM service selection for DP-V1 master (class 1).....	126
Table 125 – CP 3/1: DLL service selection for DP-V0 master (class 2).....	126
Table 126 – CP 3/1: DLL service selection for DP-V1 master (class 2).....	127
Table 127 – CP 3/1: DLL service selection for DP-V0 slave	128
Table 128 – CP 3/1: DLM service selection for DP-V0 slave	129
Table 129 – CP 3/1: DLL service selection for DP-V1 slave	130
Table 130 – CP 3/1: DLM service selection for DP-V1 slave	131
Table 131 – CP 3/1: General DLL protocol selection	131
Table 132 – CP 3/1: DLL protocol selection of Clause 5.....	132
Table 133 – CP 3/1: DLL protocol selection of Clause 6.....	132
Table 134 – CP 3/1: DLL protocol selection of Clause 7.....	133
Table 135 – CP 3/1: Time variable selection for DP-V0 master (class 1).....	133
Table 136 – CP 3/1: Timer and counter selection for DP-V0 master (class 1).....	134
Table 137 – CP 3/1: DLPDU selection for DP-V0 master (class 1)	134
Table 138 – CP 3/1: MAC state selection for DP-V0 master (class 1).....	134
Table 139 – CP 3/1: Time selection for DP-V1 master (class 1)	135
Table 140 – CP 3/1: Timer and counter selection for DP-V1 master (class 1).....	135
Table 141 – CP 3/1: DLPDU selection for DP-V1 master (class 1)	136
Table 142 – CP 3/1: MAC state selection for DP-V1 master (class 1).....	136
Table 143 – CP 3/1: CS protocol selection for DP-V1 master (class 1).....	136
Table 144 – CP 3/1: Time selection for DP-V1 master (class 2)	137
Table 145 – CP 3/1: Timer and counter selection for DP-V1 master (class 2).....	137
Table 146 – CP 3/1: DLPDU selection for DP-V1 master (class 2)	138
Table 147 – CP 3/1: Time selection for DP-V0 slave	138
Table 148 – CP 3/1: Timer and counter selection for DP-V0 slave	139
Table 149 – CP 3/1: DLPDU selection for DP-V0 slave	139
Table 150 – CP 3/1: MAC state selection for DP-V0 slave	139
Table 151 – CP 3/1: Time selection for DP-V1 slave	140
Table 152 – CP 3/1: Timer and counter selection for DP-V1 slave	140

Table 153 – CP 3/1: DLPDU selection for DP-V1 slave	141
Table 154 – CP 3/1: CS protocol selection for DP-V1 slave	141
Table 155 – CP 3/1, 3/2: AL service selection	141
Table 156 – CP 3/1, 3/2: AL service selection of data types	142
Table 157 – CP 3/1, 3/2: AL service selection of Clause 6	143
Table 158 – CP 3/1, 3/2: AL service selection of I/O data ASE	144
Table 159 – CP 3/1, 3/2: AL service selection of Diagnosis ASE	144
Table 160 – CP 3/1, 3/2: AL service selection of Context ASE	145
Table 161 – CP 3/1, 3/2: AL service selection of Management ASE	145
Table 162 – CP 3/1, 3/2: AL service selection of AR ASE	146
Table 163 – CP 3/1, 3/2: AL service selection of Clause 6	147
Table 164 – CP 3/1, 3/2: AL service selection of Process data ASE	147
Table 165 – CP 3/1, 3/2: AL service selection of I/O data ASE	147
Table 166 – CP 3/1, 3/2: AL service selection of Alarm ASE	148
Table 167 – CP 3/1, 3/2: AL service selection of Context ASE	148
Table 168 – CP 3/1, 3/2: AL service selection of Load region ASE	148
Table 169 – CP 3/1, 3/2: AL service selection of Function invocation ASE	148
Table 170 – CP 3/1, 3/2: AL service selection of Time ASE	149
Table 171 – CP 3/1, 3/2: AL service selection of AR ASE	149
Table 172 – CP 3/1, 3/2: AL service selection of Clause 6	150
Table 173 – CP 3/1, 3/2: AL service selection of I/O data ASE	150
Table 174 – CP 3/1, 3/2: AL service selection of Diagnosis ASE	151
Table 175 – CP 3/1, 3/2: AL service selection of Context ASE	151
Table 176 – CP 3/1, 3/2: AL service selection of Management ASE	151
Table 177 – CP 3/1, 3/2: AL service selection of AR ASE	152
Table 178 – CP 3/1, 3/2: AL service selection of Clause 6	153
Table 179 – CP 3/1, 3/2: AL service selection of Process data ASE	153
Table 180 – CP 3/1, 3/2: AL service selection of Context ASE	153
Table 181 – CP 3/1, 3/2: AL service selection of Load region ASE	154
Table 182 – CP 3/1, 3/2: AL service selection of Function invocation ASE	154
Table 183 – CP 3/1, 3/2: AL service selection of Time ASE	154
Table 184 – CP 3/1, 3/2: AL service selection of AR ASE	155
Table 185 – CP 3/1, 3/2: AL service selection of Clause 6	156
Table 186 – CP 3/1, 3/2: AL service selection of I/O data ASE	156
Table 187 – CP 3/1, 3/2: AL service selection of Diagnosis ASE	157
Table 188 – CP 3/1, 3/2: AL service selection of Context ASE	157
Table 189 – CP 3/1, 3/2: AL service selection of AR ASE	158

Table 190 – CP 3/1, 3/2: AL service selection of Clause 6	159
Table 191 – CP 3/1, 3/2: AL service selection of Process data ASE.....	159
Table 192 – CP 3/1, 3/2: AL service selection of I/O data ASE.....	159
Table 193 – CP 3/1, 3/2: AL service selection of diagnosis ASE	160
Table 194 – CP 3/1, 3/2: AL service selection of Alarm ASE	160
Table 195 – CP 3/1, 3/2: AL service selection of Context ASE	161
Table 196 – CP 3/1, 3/2: AL service selection of Load region ASE.....	161
Table 197 – CP 3/1, 3/2: AL service selection of Function invocation ASE	162
Table 198 – CP 3/1, 3/2: AL service selection of Time ASE	162
Table 199 – CP 3/1, 3/2: AL service selection of AR ASE	163
Table 200 – CP 3/1, 3/2: AL protocol selection	164
Table 201 – CP 3/1, 3/2: AL protocol selection of Clause 4 to 11	164
Table 202 – CP 3/1, 3/2: AL protocol selection of APDUs	166
Table 203 – CP 3/1, 3/2: AL protocol selection of FSPM services primitives	166
Table 204 – CP 3/1, 3/2: AL protocol selection of DMPM services primitives.....	167
Table 205 – CP 3/1, 3/2: AL protocol selection of Clause 4 to 11	167
Table 206 – CP 3/1, 3/2: AL protocol selection of APDUs	169
Table 207 – CP 3/1, 3/2: AL protocol selection of FSPM services primitives	170
Table 208 – CP 3/1, 3/2: AL protocol selection of DMPM services primitives.....	171
Table 209 – CP 3/1, 3/2: AL protocol selection of Clause 4 to 6	171
Table 210 – CP 3/1, 3/2: AL protocol selection of APDUs	173
Table 211 – CP 3/1, 3/2: AL protocol selection of FSPM services primitives	173
Table 212 – CP 3/1, 3/2: AL protocol selection of DMPM services primitives.....	174
Table 213 – CP 3/1, 3/2: AL protocol selection of Clause 4 to 11	174
Table 214 – CP 3/1, 3/2: AL protocol selection of APDUs	175
Table 215 – CP 3/1, 3/2: AL protocol selection of FSPM services primitives	177
Table 216 – CP 3/1, 3/2: AL protocol selection of DMPM services primitives.....	177
Table 217 – CP 3/1, 3/2: AL protocol selection of Clause 4 to 11	178
Table 218 – CP 3/1, 3/2: AL protocol selection of APDU selection	179
Table 219 – CP 3/1, 3/2: AL protocol selection of FSPM services primitives	180
Table 220 – CP 3/1, 3/2: AL protocol selection of DMPM services primitives.....	180
Table 221 – CP 3/1, 3/2: AL protocol selection of Clause 4 to 11	181
Table 222 – CP 3/1, 3/2: AL protocol selection of APDUs	183
Table 223 – CP 3/1, 3/2: AL protocol selection of FSPM services primitives	184
Table 224 – CP 3/1, 3/2: AL protocol selection of DMPM services primitives.....	185
Table 225 – CP 3/2: PhL selection	187
Table 226 – CP 3/2: PhL selection of Clause 12 for devices and their MAUs.....	189
Table 227 – CP 3/2: PhL selection of recommended IS parameters	189
Table 228 – CP 3/2: PhL selection of Clause 21 for devices and their MAUs.....	190
Table 229 – CP 3/2: General DLL protocol selection	191
Table 230 – CP 3/2: DLL protocol selection of Clause 4.....	191
Table 231 – CP 3/2: DLL protocol selection of Clause 5.....	192
Table 232 – CP 3/2: DLL protocol selection of Clause 6.....	192
Table 233 – CP 3/2: DLL protocol selection of Clause 7.....	193
Table 234 – CP 3/2: Time variable selection for DP-V0 master (class 1).....	193

Table 235 – CP 3/2: Timer and counter selection for DP-V0 master (class 1).....	194
Table 236 – CP 3/2: DLPDU selection for DP-V0 master (class 1)	194
Table 237 – CP 3/2: Time variable selection for DP-V1 master (class 1)	195
Table 238 – CP 3/2: Timer and counter selection for DP-V1 master (class 1).....	195
Table 239 – CP 3/2: DLPDU selection for DP-V1 master (class 1)	196
Table 240 – CP 3/2: Time variable selection for DP-V1 master (class 2)	196
Table 241 – CP 3/2: Timer and counter selection for DP-V1 master (class 2).....	197
Table 242 – CP 3/2: DLPDU selection for DP-V1 master (class 2)	197
Table 243 – CP 3/2: Time variable selection for DP-V0 slave.....	198
Table 244 – CP 3/2: Timer and counter selection for DP-V0 slave	198
Table 245 – CP 3/2: DLPDU selection for DP-V0 slave	198
Table 246 – CP 3/2: Time variable selection for DP-V1 slave.....	199
Table 247 – CP 3/2: Timer and counter selection for DP-V1 slave	199
Table 248 – CP 3/2: DLPDU selection for DP-V1 slave	200
Table 249 – CP 3/3: AL service selection.....	201
Table 250 – CP 3/3: AL protocol selection	201
Table 251 – CP 4/1: PhL selection	203
Table 252 – CP 4/1: DLL service selection.....	204
Table 253 – CP 4/1: DLL protocol selection	204
Table 254 – CP 4/1: AL service selection.....	204
Table 255 – CP 4/1: AL protocol selection	205
Table 256 – CP 4/2: PhL selection	205
Table 257 – CPF 5: overview of profile sets	206
Table 258 – CPF 5: PhL selection.....	207
Table 259 – CPF 5: DLL service selection	208
Table 260 – CPF 5: DLL service selection of Clause 4	209
Table 261 – CPF 5: DLL protocol selection	209
Table 262 – CPF 5: DLL protocol selection of variables and resources	210
Table 263 – CPF 5: DLL protocol selection of DLPDUs.....	210
Table 264 – CP 5/1: AL service selection.....	211
Table 265 – CP 5/1: AL service selection of ASEs	211
Table 266 – CPF 5: AL service selection of MPS ASEs.....	211
Table 267 – CPF 5: AL service selection of variable elements	211
Table 268 – CPF 5: AL service selection of produced variable elements	212
Table 269 – CPF 5: AL service selection of consumed variable elements.....	212
Table 270 – CP 5/1: AL service selection of MPS services.....	212
Table 271 – CP 5/1, 5/2: AL service selection of A_Readloc service parameters	212
Table 272 – CP 5/1, 5/2: AL service selection of A_Readfar service parameters.....	212
Table 273 – CP 5/1, 5/2: AL service selection of A_Read service parameters	213
Table 274 – CP 5/1: AL service selection of MCS service classes.....	213
Table 275 – CP 5/1: AL service selection of QoS	213
Table 276 – CP 5/1: AL service selection of MCS services	213
Table 277 – CP 5/1, 5/2: AL service selection of A_Data parameters.....	213

Table 278 – CP 5/1: AL protocol selection	214
Table 279 – CPF 5/1: AL protocol selection of MPS data types	214
Table 280 – CPF 5/1: AL protocol selection of MPS PDUs	214
Table 281 – CPF 5/1: AL protocol selection of MPS encoding rules	214
Table 282 – CP 5/1, 5/2: AL protocol selection of MCS PDUs	215
Table 283 – CP 5/1: AL protocol selection of MCS state machines.....	215
Table 284 – CP 5/2: AL service selection.....	215
Table 285 – CP 5/2: AL service selection of ASEs	216
Table 286 – CP 5/2: AL service selection of MPS services.....	216
Table 287 – CP 5/2: AL service selection of MCS service classes.....	216
Table 288 – CP 5/2: AL service selection of QoS	216
Table 289 – CP 5/2: AL service selection of MCS services	216
Table 290 – CP 5/2: AL service selection of domain services.....	217
Table 291 – CP 5/2: AL service selection of domain object attributes.....	217
Table 292 – CP 5/2: AL service selection of program services	217
Table 293 – CP 5/2: AL service selection of program object attributes	217
Table 294 – CP 5/2: AL service selection of variable services.....	218
Table 295 – CP 5/2: AL service selection of variable classes	218
Table 296 – CP 5/2: AL service selection of variable class attributes	218
Table 297 – CP 5/2: AL protocol selection	218
Table 298 – CP 5/2: AL protocol selection of MCS state machines.....	219
Table 299 – CP 5/2: AL protocol selection of sub-MMS coding rules	219
Table 300 – CP 5/2: AL protocol selection of sub-MMS PDUs	219
Table 301 – CP 5/3: AL service selection.....	220
Table 302 – CP 5/3: AL service selection of ASEs	220
Table 303 – CP 5/3: AL protocol selection	220
Table 304 – CPF 6: device CP identifier assignment.....	221
Table 305 – CPF 6: PhL selection.....	222
Table 306 – CP 6/1: DLL service selection, assignment of DLL services to device types.....	223
Table 307 – CPF 6: DLL protocol selection of data widths supported by master.....	224
Table 308 – CP 6/1: AL service selection, assignment of AL services to device types.....	225
Table 309 – CP 6/2: DLL service selection, assignment of DLL services to device types.....	226
Table 310 – CP 6/2: AL service selection, assignment of AL services to device types.....	227
Table 311 – CP 6/2: AL service selection of AR-Data-Send-Acknowledge service parameters.....	227
Table 312 – CP 6/3: DLL service selection, assignment of DLL services to device types.....	228
Table 313 – CP 6/3: AL service selection, assignment of AL services to device types.....	229
Table 314 – CP 8/1 transmission support level	231
Table 315 – CP 8/1 PhL selection	232
Table 316 – CP 8/1 DLL services selection	232
Table 317 – CP 8/1 DLL protocol selection	233
Table 318 – CP 8/1 AL services selection	235
Table 319 – CP 8/1 AL protocol selection	236

Table 320 – CP 8/2 DLL protocol selection	237
Table 321 – CP 8/3 PhL selection	238
Table 322 – CP 8/3 DLL services selection	238
Table 323 – CP 8/3 DLL protocol selection	239
Table 324 – CP 8/3 AL services selection	240
Table 325 – CP 8/3 AL protocol selection	241
Table 326 – CP 9/1: AL service selection	243
Table 327 – CP 9/1: AL protocol selection	243
Table 328 – CP 16/1: PhL selection	244
Table 329 – CP 16/1: DLL protocol selection	245
Table 330 – CP 16/1: AL service selection	245
Table 331 – CP 16/2: PhL selection	246
Table A.1 – Number of devices per CP16/1 and CP16/2 systems (examples)	259