



IEC 61784-2

Edition 2.0 2010-07

INTERNATIONAL STANDARD



Industrial communication networks – Profiles –
Part 2: Additional fieldbus profiles for real-time networks based
on ISO/IEC 8802-3

<https://standards.iehl.ai/catalog/standards/3ff3d11c48d-243a-4af0-9da9-b4a299e70790/iec-61784-2-2010>



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2010 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.

If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

- Catalogue of IEC publications: www.iec.ch/searchpub

The IEC on-line Catalogue enables you to search by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: www.iec.ch/online_news/vstpub

Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

- Electropedia: www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 20 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary online.

- Customer Service Centre: www.iec.ch/webstore/custserv

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: csc@iec.ch

Tel.: +41 22 919 02 11

Fax: +41 22 919 03 00



IEC 61784-2

Edition 2.0 2010-07

INTERNATIONAL STANDARD



Industrial communication networks – Profiles –
Part 2: Additional fieldbus profiles for real-time networks based
on ISO/IEC 8802-3

<https://standards.iec.ch/catalog/standards/3fd311e48d-243a-4af0-9da9-b4a299e70790/iec-61784-2-2010>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE XH

ICS 35.100.20, 35.240.50

ISBN 978-2-88912-053-6

CONTENTS

FOREWORD	13
INTRODUCTION	15
1 Scope	16
2 Normative references	16
3 Terms, definitions, abbreviated terms, acronyms, and conventions	21
3.1 Terms and definitions	21
3.2 Abbreviated terms and acronyms	24
3.3 Symbols	27
3.3.1 CPF 2 symbols	27
3.3.2 CPF 3 symbols	28
3.3.3 CPF 4 symbols	29
3.3.4 CPF 6 symbols	29
3.3.5 CPF 10 symbols	30
3.3.6 CPF 11 symbols	31
3.3.7 CPF 12 symbols	32
3.3.8 CPF 13 symbols	32
3.3.9 CPF 14 symbols	33
3.3.10 CPF 15 symbols	34
3.3.11 CPF 16 symbols	34
3.3.12 CPF 17 symbols	35
3.3.13 CPF 18 symbols	36
3.4 Conventions	36
3.4.1 Conventions common to all layers	36
3.4.2 Physical layer	37
3.4.3 Data-link layer	38
3.4.4 Application layer	38
4 Conformance to communication profiles	38
5 RTE performance indicators	39
5.1 Basic principles of performance indicators	39
5.2 Application requirements	40
5.3 Performance indicators	40
5.3.1 Delivery time	40
5.3.2 Number of RTE end-stations	41
5.3.3 Basic network topology	41
5.3.4 Number of switches between RTE end-stations	41
5.3.5 Throughput RTE	41
5.3.6 Non-RTE bandwidth	41
5.3.7 Time synchronization accuracy	41
5.3.8 Non-time-based synchronization accuracy	42
5.3.9 Redundancy recovery time	42
6 Conformance tests	42
6.1 Concept	42
6.2 Methodology	43
6.3 Test conditions and test cases	43
6.4 Test procedure and measuring	43
6.5 Test report	44

7	Communication Profile Family 2 (CIP™) - RTE communication profiles	44
7.1	General overview	44
7.2	Profile 2/2	45
7.2.1	Physical layer	45
7.2.2	Data-link layer	45
7.2.3	Application layer	45
7.2.4	Performance indicator selection	45
7.3	Profile 2/2.1	49
7.3.1	Physical layer	49
7.3.2	Data-link layer	49
7.3.3	Application layer	50
7.3.4	Performance indicator selection	52
8	Communication Profile Family 3 (PROFIBUS & PROFINET) – RTE communication profiles	54
8.1	General overview	54
8.1.1	CPF 3 overview	54
8.1.2	Administrative numbers	54
8.1.3	Node Classes	54
8.1.4	Application classes	57
8.1.5	Communication classes	57
8.1.6	Redundancy classes	58
8.1.7	Media classes	58
8.1.8	Records	59
8.1.9	Communication feature list	64
8.1.10	Conformance class behaviors	65
8.2	Profile 3/4	68
8.2.1	Physical layer	68
8.2.2	Data-link layer	68
8.2.3	Application layer	69
8.2.4	Performance indicator selection	74
8.3	Profile 3/5	81
8.3.1	Physical layer	81
8.3.2	Data-link layer	81
8.3.3	Application layer	82
8.3.4	Performance indicator selection	87
8.4	Profile 3/6	88
8.4.1	Physical layer	88
8.4.2	Data-link layer	88
8.4.3	Application layer	89
8.4.4	Performance indicator selection	93
9	Communication Profile Family 4 (P-NET) - RTE communication profiles	95
9.1	General overview	95
9.2	Profile 4/3, P-NET on IP	96
9.2.1	Physical layer	96
9.2.2	Data-link layer	96
9.2.3	Application layer	97
9.2.4	Performance indicator selection	98
10	Communication Profile Family 6 (INTERBUS®) - RTE communication profiles	101
10.1	General overview	101

10.2	Profile 6/4	103
10.2.1	Mapping	103
10.2.2	Type 10 service and protocol selection	104
10.2.3	Type 8 service and protocol selection	104
10.2.4	Performance indicator selection.....	104
10.3	Profile 6/5	105
10.3.1	Mapping	105
10.3.2	Type 10 service and protocol selection	106
10.3.3	Type 8 service and protocol selection.....	106
10.3.4	Performance indicator selection.....	106
10.4	Profile 6/6	107
10.4.1	Mapping	107
10.4.2	Type 10 service and protocol selection	107
10.4.3	Type 8 service and protocol selection.....	107
10.4.4	Performance indicator selection.....	107
11	Communication Profile Family 10 (Vnet/IP) - RTE communication profiles.....	108
11.1	General overview	108
11.2	Profile 10/1.....	109
11.2.1	Physical layer	109
11.2.2	Data link layer	109
11.2.3	Application layer.....	111
11.2.4	Performance indicator selection.....	112
12	Communication Profile Family 11 (TCnet) - RTE communication profiles	117
12.1	General overview	117
12.2	Profile 11/1.....	118
12.2.1	Physical layer	118
12.2.2	Data-link layer	118
12.2.3	Application layer.....	120
12.2.4	Performance indicator selection.....	121
12.3	Profile 11/2.....	126
12.3.1	Physical layer	126
12.3.2	Data-link layer	126
12.3.3	Application layer.....	128
12.3.4	Performance indicator selection.....	128
13	Communication Profile Family 12 (EtherCAT) - RTE communication profiles	134
13.1	General overview	134
13.2	Profile CP 12/1.....	134
13.2.1	Physical layer	134
13.2.2	Data-link layer	135
13.2.3	Application layer.....	138
13.2.4	Performance indicator selection.....	139
13.3	Profile CP 12/2.....	142
13.3.1	Physical layer	142
13.3.2	Data-link layer	142
13.3.3	Application layer.....	145
13.3.4	Performance indicator selection.....	147
14	Communication Profile Family 13 (ETHERNET Powerlink) - RTE communication profiles	149
14.1	General overview	149

14.2	Profile 13/1.....	149
14.2.1	Physical layer	149
14.2.2	Data-link layer	150
14.2.3	Application layer.....	150
14.2.4	Performance indicator selection.....	150
15	Communication Profile Family 14 (EPA)- RTE communication profiles.....	155
15.1	General overview	155
15.2	CPF 14 (EPA) communication concept	156
15.2.1	General	156
15.2.2	Network Topology.....	156
15.2.3	EPA devices	157
15.3	Profile 14/1.....	158
15.3.1	Physical layer	158
15.3.2	Data-link layer	158
15.3.3	Network Layer	158
15.3.4	Transport Layer	158
15.3.5	Application layer.....	158
15.3.6	Performance indicator selection.....	159
15.4	Profile 14/2.....	163
15.4.1	Physical layer	163
15.4.2	Data-link layer	163
15.4.3	Network Layer	163
15.4.4	Transport Layer	163
15.4.5	Application layer.....	164
15.4.6	Performance indicator selection.....	164
15.5	Profile 14/3.....	167
15.5.1	Physical layer	167
15.5.2	Data-link layer	167
15.5.3	Network Layer	168
15.5.4	Transport Layer	168
15.5.5	Application layer.....	168
15.5.6	Performance indicator selection.....	169
16	Communication Profile Family 15 (MODBUS-RTPS)- RTE communication profiles	174
16.1	General overview	174
16.2	Profile 15/1.....	174
16.2.1	Physical layer	174
16.2.2	Data-link layer	174
16.2.3	Application layer.....	174
16.2.4	Performance indicator selection.....	175
16.3	Profile 15/2.....	179
16.3.1	Physical layer	179
16.3.2	Data-link layer	179
16.3.3	Application layer.....	179
16.3.4	Performance indicator selection.....	180
17	Communication Profile Family 16 (SERCOS)- RTE communication profiles	184
17.1	General overview	184
17.2	Profile 16/3 (SERCOS III).....	185
17.2.1	Physical layer	185
17.2.2	Data-link layer	185

17.2.3 Application layer.....	185
17.2.4 Performance indicator selection.....	186
18 Communication Profile Family 17(RAPIEnet) - RTE communication profiles	192
18.1 General overview	192
18.2 Profile 17/1.....	193
18.2.1 Physical layer.....	193
18.2.2 Datalink layer	193
18.2.3 Application layer.....	193
18.2.4 Performance indicator selection.....	194
19 Communication Profile Family 18 (SafetyNET p) – RTE communication profiles	198
19.1 General overview	198
19.2 Profile 18/1.....	199
19.2.1 Physical layer.....	199
19.2.2 Data link layer	199
19.2.3 Application layer.....	202
19.2.4 Performance indicator selection.....	203
19.3 Profile 18/2.....	205
19.3.1 Physical layer.....	205
19.3.2 Data link layer	205
19.3.3 Application layer.....	208
19.3.4 Performance indicator selection.....	209
Annex A (informative) Performance Indicator calculation	212
A.1 CPF 2 (CIP) - Performance indicator calculation.....	212
A.1.1 Profile 2/2 EtherNet/IP	212
A.1.2 Profile 2/2.1 EtherNet/IP with Time Synchronization	213
A.2 CPF 3 - Performance indicator calculation.....	214
A.2.1 Application Scenario.....	214
A.2.2 Structural examples used for calculation	214
A.2.3 Principles used for calculation	220
A.3 CPF 4/3 P-NET on IP - Performance indicator calculation.....	223
A.3.1 Application scenario	223
A.3.2 Delivery time calculation.....	223
A.3.3 Non-RTE throughput calculation	224
A.3.4 Non time-base synchronization accuracy.....	226
A.3.5 RTE throughput calculation	226
A.3.6 CPF 4/3, Derivation of delivery time formula.....	227
A.3.7 CPF 4/3, Ethernet characteristics	229
Bibliography.....	230
Figure 1 – Example of graphical representation of consistent indicators.....	40
Figure 2 – Conformance test overview	42
Figure 3 – Example of network topology using CP 3/4, CP 3/5, and CP 3/6 components	68
Figure 4 – Example of network topology with wireless segment	71
Figure 5 – Calculation basis for delivery time and throughput RTE.....	77
Figure 6 – Linking-device communication profiles RTE-network context.....	102
Figure 7 – Linking-device mapping principle	103
Figure 8 – Data Mapping.....	103

Figure 9 – Throughput RTE and non-RTE bandwidth	124
Figure 10 – CP 11/2: Throughput RTE and non-RTE bandwidth	131
Figure 11 – EPA system network topology example	157
Figure A.1 – CP 3/4: Example of line structure	214
Figure A.2 – CP 3/4: Example of ring structure	214
Figure A.3 – CP 3/4: Example of a wireless segment	215
Figure A.4 – CP 3/4: Example of an integrated wireless client	215
Figure A.5 – CP 3/5: Example of line structure	216
Figure A.6 – CP 3/5: Example of ring structure	216
Figure A.7 – CP 3/6: Example of line structure	217
Figure A.8 – CP 3/6: Example of ring structure	218
Figure A.9 – CP 3/6: Example of tree structure	219
Figure A.10 – CP 3/6: Example of comb structure	220
Figure A.11 – Definition of bridge delay	221
Figure A.12 – Example of a switch structure	222
Figure A.13 – Application configuration	223
Figure A.14 – Non-RTE throughput calculation	225
Figure A.15 – Non time-base synchronization accuracy	226
Table 1 – Layout of profile (sub)clause selection tables	36
Table 2 – Contents of (sub)clause selection tables	36
Table 3 – Layout of service selection tables	37
Table 4 – Contents of service selection tables	37
Table 5 – Layout of parameter selection tables	37
Table 6 – Contents of parameter selection tables	37
Table 7 – Layout of class attribute selection tables	38
Table 8 – Contents of class attribute selection tables	38
Table 9 – Basic network topology types	41
Table 10 – CP 2/2: performance indicator overview	45
Table 11 – CP 2/2: Performance indicator dependency matrix	46
Table 12 – CP 2/2: consistent set of performance indicators for factory automation	49
Table 13 – CP 2/2.1: DLL protocol selection	49
Table 14 – CP 2/2.1: DLL protocol selection of management objects	50
Table 15 – CP 2/2.1: AL service selection	50
Table 16 – CP 2/2.1: AL protocol selection	51
Table 17 – CP 2/2.1: performance indicator overview	52
Table 18 – CP 2/2.1: performance indicator dependency matrix	53
Table 19 – CP 2/2.1: Consistent set of performance indicators for motion control	53
Table 20 – Administrative numbers assignment	54
Table 21 – IP layer parameters for IO controller	55
Table 22 – IP layer parameters for IO device	55
Table 23 – Timeout values for name resolution	56
Table 24 – Reaction time for an IO device	56

Table 25 – Timeout values for PTCP.....	57
Table 26 – Maximum time values for PTCP.....	57
Table 27 – Communication classes applicable in conformance classes.....	58
Table 28 – Redundancy class applicable in conformance classes	58
Table 29 – Index (user specific)	59
Table 30 – Index (subslot specific).....	59
Table 31 – Index (slot specific)	61
Table 32 – Index (AR specific)	62
Table 33 – Index (API specific)	63
Table 34 – Index (device specific).....	64
Table 35 – Communication feature list	64
Table 36 – Conformance class behaviors.....	65
Table 37 – Conformance class behaviors for network components.....	67
Table 38 – CP 3/4: AL service selection for an IO device	69
Table 39 – CP 3/4: AL protocol selection for an IO device and Network component	72
Table 40 – CP 3/4: AL protocol selection for an IO controller	73
Table 41 – CP 3/4, CP 3/5 and CP 3/6: performance indicator overview	75
Table 42 – CP 3/4, CP 3/5 and CP 3/6: performance indicator dependency matrix	75
Table 43 – Manager parameters	78
Table 44 – Client parameters	79
Table 45 – CP 3/4: Consistent set of PI for MinDeviceInterval = 128 ms	80
Table 46 – CP 3/4: Assumed values for consistent set of PI calculation	81
Table 47 – CP 3/5: AL service selection for an IO device	82
Table 48 – CP 3/5: AL protocol selection for an IO device and Network component	84
Table 49 – CP 3/5: AL protocol selection for an IO controller	85
Table 50 – CP 3/5: Consistent set of PI for MinDeviceInterval = 128 ms	87
Table 51 – CP 3/5: Assumed values for consistent set of PI calculation	88
Table 52 – CP 3/6: AL service selection for an IO device	89
Table 53 – Buffering capacity.....	90
Table 54 – CP 3/6: AL protocol selection for an IO device and network component.....	91
Table 55 – CP 3/6: AL protocol selection for an IO controller	92
Table 56 – CP 3/6: Consistent set of PI for MinDeviceInterval=1ms with 64 end-stations.....	94
Table 57 – CP 3/6: Assumed values for consistent set of PI calculation	95
Table 58 – CP 4/3: DLL service selection.....	96
Table 59 – CP 4/3: DLL protocol selection	97
Table 60 – CP 4/3: AL service selection.....	97
Table 61 – CP 4/3: AL protocol selection	97
Table 62 – CP 4/3: Performance indicator overview	98
Table 63 – CP 4/3: Performance indicator dependency matrix	98
Table 64 – CP 4/3: Consistent set of performance indicators	101
Table 65 – Parameters for calculation of consistent set of performance indicators	101
Table 66 – CPF 6: device CP identifier assignment.....	102

Table 67 – Linking-device Type 10 network performance indicator overview	105
Table 68 – OSI layers and CPF 10 layers	108
Table 69 – Overview of CPF 10 profile	109
Table 70 – CP 10/1: DLL service selection	110
Table 71 – CP 10/1: DLL protocol selection	110
Table 72 – Transport Layer Parameter selection	111
Table 73 – CP 10/1: AL service selection	112
Table 74 – CP 10/1: AL protocol selection	112
Table 75 – CP 10/1: Performance indicator overview	112
Table 76 – CP 10/1: Performance indicator dependency matrix	113
Table 77 – CP 10/1: Consistent set of performance indicators for the communication between two end-stations belonging to the same domain	116
Table 78 – CP 10/1: Consistent set of performance indicators for the communication between two end-stations belonging to different domains	116
Table 79 – CP 10/1: Consistent set of performance indicators for the communication between two end-stations belonging to the same domain with one lost name	117
Table 80 – CP 10/1: Consistent set of performance indicators for the communication between two end-stations belonging to different domains with one lost name	117
Table 81 – CPF 11: Overview of profile sets	118
Table 82 – CP 11/1: DLL service selection	118
Table 83 – CP 11/1: DLL protocol selection	119
Table 84 – CP 11/1: DLL protocol selection of Clause 5	119
Table 85 – CP 11/1: DLL protocol selection of Clause 6	120
Table 86 – CP 11/1: AL service selection	121
Table 87 – CP 11/1: AL protocol selection	121
Table 88 – CP 11/1: Performance indicator overview	121
Table 89 – CP 11/1: Performance indicator dependency matrix	122
Table 90 – CP 11/1: TCC data service selection	122
Table 91 – CP 11/1: Consistent set of PIs preferential for RTE communications	126
Table 92 – CP 11/1: Consistent set of PIs both for RTE and non-RTE communications	126
Table 93 – CP 11/2: DLL protocol selection	127
Table 94 – CP 11/2: DLL protocol selection of Clause 5	127
Table 95 – CP 11/2: DLL protocol selection of Clause 6	128
Table 96 – CP 11/2: Performance indicator overview	129
Table 97 – CP 11/2: Performance indicator dependency matrix	129
Table 98 – CP 11/2: TCC data service selection	130
Table 99 – CP 11/2: Consistent set of PIs preferential for RTE communications	133
Table 100 – CP 11/2: Consistent set of PIs both for RTE and non-RTE communications	133
Table 101 – CP 12/1: PhL selection of preferred physical layer	134
Table 102 – CP 12/1: PhL selection of an optimized physical layer	135
Table 103 – CP 12/1: DLL service selection	135
Table 104 – CP 12/1: DLL protocol selection	136
Table 105 – CP 12/1: DLL service selection	137
Table 106 – CP 12/1: DLL protocol selection	137

Table 107 – CP 12/1: AL service selection	138
Table 108 – CP 12/1: AL protocol selection	138
Table 109 – CP 12/1: AL service selection	139
Table 110 – CP 12/1: AL protocol selection	139
Table 111 – CP 12/1: Performance indicator overview	140
Table 112 – CP 12/1: Performance indicator dependency matrix	140
Table 113 – CP 12/1: Performance indicator ranges	141
Table 114 – CP 12/1: Consistent set of performance indicators for mid size automation systems	142
Table 115 – CP 12/2: DLL service selection	143
Table 116 – CP 12/2: DLL protocol selection	143
Table 117 – CP 12/2: DLL service selection	144
Table 118 – CP 12/2: DLL protocol selection	144
Table 119 – CP 12/2: AL service selection	145
Table 120 – CP 12/2: AL protocol selection	146
Table 121 – CP 12/2: AL service selection	146
Table 122 – CP 12/2: AL protocol selection	147
Table 123 – CP 12/2: Performance indicator overview	147
Table 124 – CP 12/2: Performance indicator dependency matrix	148
Table 125 – CP 12/2: Consistent set of performance indicators	149
Table 126 – CPF 13: Overview of profile sets	149
Table 127 – CP 13/1: DLL service selection	150
Table 128 – CP 13/1: DLL protocol selection	150
Table 129 – CP 13/1: AL service selection	150
Table 130 – CP 13/1: AL protocol selection	150
Table 131 – CP 13/1: Performance indicator overview	151
Table 132 – CP 13/1: Performance indicator dependency matrix	151
Table 133 – CP 13/1: Consistent set of PIs small size automation system	154
Table 134 – CP 13/1: Consistent set of PIs medium size automation system	155
Table 135 – CP 13/1: Consistent set of PIs large size automation system	155
Table 136 – CP 14/1: AL service selection	159
Table 137 – CP 14/1: AL protocol selection	159
Table 138 – CP 14/1: Performance indicator overview	160
Table 139 – CP 14/1: Performance indicator dependency matrix	160
Table 140 – CP 14/1: Consistent set of performance indicators	162
Table 141 – CP 14/2: DLL service selection	163
Table 142 – CP 14/2: DLL protocol selection	163
Table 143 – CP 14/2: AL service selection	164
Table 144 – CP 14/2: AL protocol selection	164
Table 145 – CP 14/2: Performance indicator overview	165
Table 146 – CP 14/2: Performance indicator dependency matrix	165
Table 147 – CP 14/2: Consistent set of performance indicators	167
Table 148 – CP 14/3: DLL service selection	168

Table 149 – CP 14/3: DLL protocol selection	168
Table 150 – CP 14/3: AL service selection	169
Table 151 – CP 14/3: AL protocol selection	169
Table 152 – CP 14/3: Performance indicator overview	169
Table 153 – CP 14/3: Performance indicator dependency matrix.....	170
Table 154 – CP 14/3: Consistent set of performance indicators	172
Table 155 – CP 14/3: Consistent set of performance indicators	173
Table 156 – CP 14/3: Consistent set of performance indicators	173
Table 157 – CP 15/1: AL service selection	175
Table 158 – CP 15/1: AL protocol selection	175
Table 159 – CP 15/1: Performance indicator overview	175
Table 160 – CP 15/1: Performance indicator dependency matrix.....	176
Table 161 – CP 15/2: AL service selection.....	180
Table 162 – CP 15/2: AL protocol selection	180
Table 163 – CP 15/2: Performance indicator overview	180
Table 164 – CP 15/2: Performance indicator dependency matrix.....	181
Table 165 – CP 16/3: DLL service selection.....	185
Table 166 – CP 16/3: DLL protocol selection	185
Table 167 – CP 16/3: AL service selection.....	185
Table 168 – CP 16/3: AL protocol selection	186
Table 169 – CP 16/3: Performance indicator overview	186
Table 170 – CP 16/3: Performance indicator dependency matrix.....	187
Table 171 – CP 16/3: scenario with a minimum cycle time of 31,25 µs	190
Table 172 – CP 16/3: scenario with a cycle time of 500 µs (real-time only)	191
Table 173 – CP 16/3: Scenario with a cycle time of 500 µs (real-time and non-real-time)....	191
Table 174 – CP 16/3: scenario with non symmetrical data throughput and a cycle time of 500 µs (real-time and non-real-time)	192
Table 175 – CPF 17: Overview of profile sets	192
Table 176 – CP 17/1: DLL service selection.....	193
Table 177 – CP 17/1: DLL protocol selection	193
Table 178 – CP 17/1: AL service selection.....	193
Table 179 – CP 17/1: AL protocol selection	194
Table 180 – CP 17/1: Performance indicator overview	194
Table 181 – CP 17/1: Performance indicator dependency matrix.....	195
Table 182 – Consistent set of PIs small size automation system	198
Table 183 – Parameters for Calculation of Consistent set of performance indicators.....	198
Table 184 – CP 18/1: DLL service selection.....	200
Table 185 – CP 18/1: DLL protocol selection	201
Table 186 – CP 18/1: AL service selection.....	202
Table 187 – CP 18/1: AL protocol selection	202
Table 188 – CP 18/1: Performance indicator overview	203
Table 189 – CP 18/1: Performance indicator dependency matrix.....	203
Table 190 – CP 18/2: DLL service selection.....	206

Table 191 – CP 18/2: DLL protocol selection	207
Table 192 – CP 18/2: AL service selection	208
Table 193 – CP 18/2: AL protocol selection	209
Table 194 – CP 18/2: Performance indicator overview	209
Table 195 – CP 18/2: Performance indicator dependency matrix.....	210



INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INDUSTRIAL COMMUNICATION NETWORKS –
PROFILES –****Part 2: Additional fieldbus profiles for real-time
networks based on ISO/IEC 8802-3****FOREWORD**

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

NOTE Use of some of the associated protocol Types in the IEC 61158 family are restricted by their intellectual-property-right holders. In all cases, the commitment to limited release of intellectual property rights made by the holders of those rights permits a particular data-link layer protocol Type to be used with physical layer and application layer protocols in Type combinations as specified explicitly in the IEC 61784 series. Use of the various protocol Types in other combinations may require permission from their respective intellectual property right holders.

International Standard IEC 61784-2 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: industrial process measurement, control and automation.

This second edition cancels and replaces the first edition published in 2007. This edition constitutes a technical revision.

The main changes with respect to the previous edition are listed below: