

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Adjustable speed electrical power drive systems –
Part 7-204: Generic interface and use of profiles for power drive systems –
Profile type 4 specification**

**Entraînements électriques de puissance à vitesse variable –
Partie 7-204: Interface générique et utilisation de profils pour les entraînements
électriques de puissance – Spécification de profil de type 4**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2015 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.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

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

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

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

About IEC publications

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

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub

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 It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

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

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in 15 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

More than 60 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Catalogue IEC - webstore.iec.ch/catalogue

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - www.iec.ch/searchpub

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 15 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

Plus de 60 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Adjustable speed electrical power drive systems –
Part 7-204: Generic interface and use of profiles for power drive systems –
Profile type 4 specification**

**Entraînements électriques de puissance à vitesse variable –
Partie 7-204: Interface générique et utilisation de profils pour les entraînements
électriques de puissance – Spécification de profil de type 4**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.200; 35.100.05

ISBN 978-2-8322-2947-7

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	39
INTRODUCTION.....	41
1 Scope.....	45
2 Normative references	45
3 Terms, definitions and abbreviated terms	45
3.1 Terms and definitions.....	45
3.2 Abbreviated terms.....	50
4 General	51
5 Data types	51
6 Short description of SERCOS data exchange	51
6.1 General.....	51
6.2 Synchronization	52
7 Drive application functions.....	52
7.1 Drive operation modes	52
7.1.1 Operation mode selections	52
7.1.2 Torque/force control	56
7.1.3 Velocity control.....	58
7.1.4 Position control.....	61
7.1.5 Interpolation and positioning.....	64
7.2 Drive state machine	68
7.2.1 Description of the FG Drive state machine.....	68
7.2.2 Start-up	70
7.2.3 Shut-down	71
7.3 Drive parameters	73
7.3.1 Motor parameters (FG Motor)	73
7.3.2 Amplifier parameters (FG Amplifier).....	73
7.3.3 Motor feedback parameters (FG Motor feedback)	74
7.3.4 External feedback parameters (FG External feedback)	74
7.3.5 Mechanical parameters (FG Mechanics)	74
7.3.6 Power parameters (FG_Power_Limit)	75
7.3.7 Acceleration parameters (FG Acceleration limit)	75
7.3.8 Drive specifically diagnosis parameters (FG Drive diagnosis)	75
7.3.9 Temperature parameters with warning and shut-down diagnostics (FG_Drive_Warning).....	76
7.4 Drive synchronous operation (FG Drive synchronous operation)	76
7.4.1 General	76
7.4.2 Synchronization of the synchronous spindle to the lead spindle with a fixed angular offset.....	77
7.4.3 New synchronous position offset after synchronization	79
7.4.4 New speed ratio after synchronization	79
7.5 Homing	80
7.5.1 Description of FG Drive homing	80
7.5.2 Drive controlled homing	80
7.5.3 Control unit controlled homing	82
7.5.4 Set absolute position	86
7.6 Cyclic Marker Detection (FG Cyclic marker detection).....	89

7.7	Modification of the coordinate system (FG Modify coordinate system).....	90
7.8	Spindle positioning procedure (FG Position spindle)	91
7.8.1	General	91
7.8.2	Start conditions of spindle positioning.....	91
7.8.3	New position values while the procedure command is active.....	93
7.8.4	Switching the positioning mode angle position/relative offset while the procedure command is active	93
7.9	Velocity window	94
7.10	Park axis procedure command (FG Park axis).....	95
7.11	Move to Positive stop (FG Positive stop).....	96
7.12	Parameter sets and gear ratios	96
7.12.1	Definition of FG Parameter sets.....	96
7.12.2	Switching of parameter sets and gear ratio	97
7.13	Gear engaging procedure command (FG Gear engaging)	97
7.14	Position switches (FG Position switch).....	99
7.14.1	General	99
7.14.2	Position switch mode	100
7.14.3	Cam switch mode	100
8	Scaling of operation data.....	101
8.1	General.....	101
8.2	Scaling of position data.....	102
8.2.1	Description of FG Scale position.....	102
8.2.2	No scaling of position data.....	102
8.2.3	Scaling of linear position data.....	102
8.2.4	Scaling of rotational position data	103
8.3	Scaling of velocity data	103
8.3.1	Description of FG Scale velocity	103
8.3.2	No scaling of velocity data	104
8.3.3	Scaling of linear velocity data	104
8.3.4	Scaling of rotational velocity data	105
8.4	Scaling of torque/force data	105
8.4.1	Description of FG Scale torque	105
8.4.2	Percentage scaling of torque/force data.....	106
8.4.3	Scaling of force data.....	106
8.4.4	Scaling of torque data.....	107
8.5	Scaling of acceleration data and jerk data.....	107
8.5.1	Description of FG Scale acceleration	107
8.5.2	No scaling of acceleration data and jerk data.....	108
8.5.3	Scaling of linear acceleration/jerk data	108
8.5.4	Scaling of rotational acceleration/jerk data	109
8.5.5	Scaling of ramp time.....	109
8.6	Polarities	110
8.7	Scaling of temperature data	110
9	Status codes of drives	111
9.1	Overview.....	111
9.2	Priority of diagnosis classes.....	115
10	Drive classes.....	116
10.1	Overview.....	116
11	Identification numbers in numerical order	117

12	Description of identification numbers	132
12.1	IDN S-0-0005 Minimum feedback processing time (t_5)	132
12.1.1	Attributes	132
12.1.2	Description	132
12.2	IDN S-0-0007 Feedback acquisition capture point (t_4).....	132
12.2.1	Attributes	132
12.2.2	Description	132
12.3	IDN S-0-0011 Class 1 diagnostic (C1D)	133
12.3.1	Attributes	133
12.3.2	Description	133
12.4	IDN S-0-0012 Class 2 diagnostic (C2D)	135
12.4.1	Attributes	135
12.4.2	Description	135
12.5	IDN S-0-0013 Class 3 diagnostic (C3D)	137
12.5.1	Attributes	137
12.5.2	Description	137
12.6	IDN S-0-0015 Telegram type.....	138
12.6.1	Attributes	138
12.6.2	Description	138
12.7	IDN S-0-0016 Configuration list of AT	140
12.7.1	Attributes	140
12.7.2	Description	141
12.8	IDN S-0-0017 IDN-list of all operation data	141
12.8.1	Attributes	141
12.8.2	Description	141
12.9	IDN S-0-0018 IDN-list of operation data for CP2	141
12.9.1	Attributes	141
12.9.2	Description	142
12.10	IDN S-0-0019 IDN-list of operation data for CP3	142
12.10.1	Attributes	142
12.10.2	Description	142
12.11	IDN S-0-0020 IDN-list of operation data for CP4	142
12.11.1	Attributes	142
12.11.2	Description	143
12.12	IDN S-0-0021 IDN-list of invalid operation data for CP2	143
12.12.1	Attributes	143
12.12.2	Description	143
12.13	IDN S-0-0022 IDN-list of invalid operation data for CP3	143
12.13.1	Attributes	143
12.13.2	Description	144
12.14	IDN S-0-0023 IDN-list of invalid operation data for CP4	144
12.14.1	Attributes	144
12.14.2	Description	144
12.15	IDN S-0-0025 IDN-list of all procedure commands	144
12.15.1	Attributes	144
12.15.2	Description	145
12.16	IDN S-0-0026 Configuration list for signal status word	145
12.16.1	Attributes	145
12.16.2	Description	145

12.17	IDN S-0-0027 Configuration list for signal control word	145
12.17.1	Attributes	145
12.17.2	Description	146
12.18	IDN S-0-0030 Manufacturer version	146
12.18.1	Attributes	146
12.18.2	Description	146
12.19	IDN S-0-0031 Hardware version	146
12.19.1	Attributes	146
12.19.2	Description	147
12.20	IDN S-0-0032 Primary operation mode	147
12.20.1	Attributes	147
12.20.2	Description	147
12.21	IDN S-0-0033 Secondary operation mode 1	147
12.21.1	Attributes	147
12.21.2	Description	148
12.22	IDN S-0-0034 Secondary operation mode 2	148
12.22.1	Attributes	148
12.22.2	Description	148
12.23	IDN S-0-0035 Secondary operation mode 3	149
12.23.1	Attributes	149
12.23.2	Description	149
12.24	IDN S-0-0036 Velocity command value	149
12.24.1	Attributes	149
12.24.2	Description	149
12.25	IDN S-0-0037 Additive velocity command value	150
12.25.1	Attributes	150
12.25.2	Description	150
12.26	IDN S-0-0038 Positive velocity limit value	150
12.26.1	Attributes	150
12.26.2	Description	151
12.27	IDN S-0-0039 Negative velocity limit value	151
12.27.1	Attributes	151
12.27.2	Description	151
12.28	IDN S-0-0040 Velocity feedback value 1	151
12.28.1	Attributes	151
12.28.2	Description	152
12.29	IDN S-0-0041 Homing velocity	152
12.29.1	Attributes	152
12.29.2	Description	152
12.30	IDN S-0-0042 Homing acceleration	152
12.30.1	Attributes	152
12.30.2	Description	153
12.31	IDN S-0-0043 Velocity polarity parameter	153
12.31.1	Attributes	153
12.31.2	Description	153
12.32	IDN S-0-0044 Velocity data scaling type	154
12.32.1	Attributes	154
12.32.2	Description	154
12.33	IDN S-0-0045 Velocity data scaling factor	155

12.33.1	Attributes	155
12.33.2	Description	155
12.34	IDN S-0-0046 Velocity data scaling exponent.....	156
12.34.1	Attributes	156
12.34.2	Description	156
12.35	IDN S-0-0047 Position command value	156
12.35.1	Attributes	156
12.35.2	Description	157
12.36	IDN S-0-0048 Additive position command value	157
12.36.1	Attributes	157
12.36.2	Description	157
12.37	IDN S-0-0049 Positive position limit value.....	158
12.37.1	Attributes	158
12.37.2	Description	158
12.38	IDN S-0-0050 Negative position limit value	158
12.38.1	Attributes	158
12.38.2	Description	159
12.39	IDN S-0-0051 Position feedback value 1 (motor feedback).....	159
12.39.1	Attributes	159
12.39.2	Description	160
12.40	IDN S-0-0052 Reference distance 1	160
12.40.1	Attributes	160
12.40.2	Description	160
12.41	IDN S-0-0053 Position feedback value 2 (external feedback)	161
12.41.1	Attributes	161
12.41.2	Description	161
12.42	IDN S-0-0054 Reference distance 2	161
12.42.1	Attributes	161
12.42.2	Description	162
12.43	IDN S-0-0055 Position polarity parameters	162
12.43.1	Attributes	162
12.43.2	Description	162
12.44	IDN S-0-0057 Position window	163
12.44.1	Attributes	163
12.44.2	Description	163
12.45	IDN S-0-0058 Reversal clearance	164
12.45.1	Attributes	164
12.45.2	Description	164
12.46	IDN S-0-0059 Position switch flag parameter	164
12.46.1	Attributes	164
12.46.2	Description	164
12.47	IDN S-0-0060 to S-0-0075 Position switch points on 1-16	165
12.47.1	Attributes	165
12.47.2	Description	165
12.48	IDN S-0-0076 Position data scaling type	166
12.48.1	Attributes	166
12.48.2	Description	166
12.49	IDN S-0-0077 Linear position data scaling factor.....	167
12.49.1	Attributes	167

12.49.2	Description	168
12.50	IDN S-0-0078 Linear position data scaling exponent	168
12.50.1	Attributes	168
12.50.2	Description	168
12.51	IDN S-0-0079 Rotational position resolution	168
12.51.1	Attributes	168
12.51.2	Description	169
12.52	IDN S-0-0080 Torque command value	169
12.52.1	Attributes	169
12.52.2	Description	169
12.53	IDN S-0-0081 Additive torque command value	169
12.53.1	Attributes	169
12.53.2	Description	170
12.54	IDN S-0-0082 Positive torque limit value	170
12.54.1	Attributes	170
12.54.2	Description	170
12.55	IDN S-0-0083 Negative torque limit value	170
12.55.1	Attributes	170
12.55.2	Description	171
12.56	IDN S-0-0084 Torque feedback value	171
12.56.1	Attributes	171
12.56.2	Description	171
12.57	IDN S-0-0085 Torque polarity parameter	171
12.57.1	Attributes	171
12.57.2	Description	172
12.58	IDN S-0-0086 Torque/force data scaling type	172
12.58.1	Attributes	172
12.58.2	Description	173
12.59	IDN S-0-0091 Bipolar velocity limit value	173
12.59.1	Attributes	173
12.59.2	Description	174
12.60	IDN S-0-0092 Bipolar torque limit value	174
12.60.1	Attributes	174
12.60.2	Description	174
12.61	IDN S-0-0093 Torque/force data scaling factor	174
12.61.1	Attributes	174
12.61.2	Description	175
12.62	IDN S-0-0094 Torque/force data scaling exponent	175
12.62.1	Attributes	175
12.62.2	Description	175
12.63	IDN S-0-0095 Diagnostic message	176
12.63.1	Attributes	176
12.63.2	Description	176
12.64	IDN S-0-0097 Mask class 2 diagnostic	176
12.64.1	Attributes	176
12.64.2	Description	176
12.65	IDN S-0-0098 Mask class 3 diagnostic	177
12.65.1	Attributes	177
12.65.2	Description	177

12.66	IDN S-0-0099 Reset class 1 diagnostic	177
12.66.1	Attributes	177
12.66.2	Description	178
12.67	IDN S-0-0100 Velocity loop proportional gain	178
12.67.1	Attributes	178
12.67.2	Description	178
12.68	IDN S-0-0101 Velocity loop integral action time	179
12.68.1	Attributes	179
12.68.2	Description	179
12.69	IDN S-0-0102 Velocity loop differential time	179
12.69.1	Attributes	179
12.69.2	Description	179
12.70	IDN S-0-0103 Modulo value	179
12.70.1	Attributes	179
12.70.2	Description	180
12.71	IDN S-0-0104 Position loop K_V -factor	181
12.71.1	Attributes	181
12.71.2	Description	181
12.72	IDN S-0-0105 Position loop integral action time	181
12.72.1	Attributes	181
12.72.2	Description	181
12.73	IDN S-0-0106 Current loop proportional gain 1	181
12.73.1	Attributes	181
12.73.2	Description	182
12.74	IDN S-0-0107 Current loop integral action time 1	182
12.74.1	Attributes	182
12.74.2	Description	182
12.75	IDN S-0-0108 Feedrate override	182
12.75.1	Attributes	182
12.75.2	Description	183
12.76	IDN S-0-0109 Motor peak current.....	183
12.76.1	Attributes	183
12.76.2	Description	183
12.77	IDN S-0-0110 Amplifier peak current.....	183
12.77.1	Attributes	183
12.77.2	Description	184
12.78	IDN S-0-0111 Motor continuous stall current.....	184
12.78.1	Attributes	184
12.78.2	Description	184
12.79	IDN S-0-0112 Amplifier rated current	184
12.79.1	Attributes	184
12.79.2	Description	185
12.80	IDN S-0-0113 Maximum motor speed.....	185
12.80.1	Attributes	185
12.80.2	Description	185
12.81	IDN S-0-0114 Load limit of the motor	185
12.81.1	Attributes	185
12.81.2	Description	186
12.82	IDN S-0-0115 Position feedback 2 type.....	186

12.82.1	Attributes	186
12.82.2	Description	187
12.83	IDN S-0-0116 Resolution of feedback 1	188
12.83.1	Attributes	188
12.83.2	Description	188
12.84	IDN S-0-0117 Resolution of feedback 2	188
12.84.1	Attributes	188
12.84.2	Description	188
12.85	IDN S-0-0119 Current loop proportional gain 2.....	189
12.85.1	Attributes	189
12.85.2	Description	189
12.86	IDN S-0-0120 Current loop integral action time 2	189
12.86.1	Attributes	189
12.86.2	Description	189
12.87	IDN S-0-0121 Input revolutions of load gear.....	189
12.87.1	Attributes	189
12.87.2	Description	190
12.88	IDN S-0-0122 Output revolutions of load gear	190
12.88.1	Attributes	190
12.88.2	Description	190
12.89	IDN S-0-0123 Feed constant.....	190
12.89.1	Attributes	190
12.89.2	Description	191
12.90	IDN S-0-0124 Standstill window	191
12.90.1	Attributes	191
12.90.2	Description	191
12.91	IDN S-0-0125 Velocity threshold (n_x)	191
12.91.1	Attributes	191
12.91.2	Description	192
12.92	IDN S-0-0126 Torque threshold (T_x)	192
12.92.1	Attributes	192
12.92.2	Description	192
12.93	IDN S-0-0129 Manufacturer class 1 diagnostic.....	192
12.93.1	Attributes	192
12.93.2	Description	193
12.94	IDN S-0-0130 Probe value 1 positive edge.....	193
12.94.1	Attributes	193
12.94.2	Description	194
12.95	IDN S-0-0131 Probe value 1 negative edge	194
12.95.1	Attributes	194
12.95.2	Description	194
12.96	IDN S-0-0132 Probe value 2 positive edge.....	195
12.96.1	Attributes	195
12.96.2	Description	195
12.97	IDN S-0-0133 Probe value 2 negative edge	195
12.97.1	Attributes	195
12.97.2	Description	196
12.98	IDN S-0-0134 Drive control (Master control word)	196
12.98.1	Attributes	196

12.98.2	Description	196
12.99	IDN S-0-0135 Drive status word.....	199
12.99.1	Attributes	199
12.99.2	Description	200
12.100	IDN S-0-0136 Acceleration limit value	203
12.100.1	Attributes	203
12.100.2	Description	204
12.101	IDN S-0-0137 Deceleration limit value.....	204
12.101.1	Attributes	204
12.101.2	Description	204
12.102	IDN S-0-0138 Bipolar acceleration limit value	204
12.102.1	Attributes	204
12.102.2	Description	205
12.103	IDN S-0-0139 Park axis	205
12.103.1	Attributes	205
12.103.2	Description	205
12.104	IDN S-0-0140 Controller type	206
12.104.1	Attributes	206
12.104.2	Description	206
12.105	IDN S-0-0141 Motor type	206
12.105.1	Attributes	206
12.105.2	Description	206
12.106	IDN S-0-0142 Application type	206
12.106.1	Attributes	206
12.106.2	Description	207
12.107	IDN S-0-0144 Signal status word / Producer RTB word container.....	207
12.107.1	Attributes	207
12.107.2	Description	207
12.108	IDN S-0-0145 Signal control word / Consumer RTB word container.....	208
12.108.1	Attributes	208
12.108.2	Description	208
12.109	IDN S-0-0146 Control unit controlled homing procedure command.....	208
12.109.1	Attributes	208
12.109.2	Description	209
12.110	IDN S-0-0147 Homing parameter	209
12.110.1	Attributes	209
12.110.2	Description	209
12.111	IDN S-0-0148 Drive controlled homing procedure command.....	210
12.111.1	Attributes	210
12.111.2	Description	211
12.112	IDN S-0-0149 Positive drive stop procedure command.....	211
12.112.1	Attributes	211
12.112.2	Description	212
12.113	IDN S-0-0150 Reference offset 1	212
12.113.1	Attributes	212
12.113.2	Description	213
12.114	IDN S-0-0151 Reference offset 2	213
12.114.1	Attributes	213
12.114.2	Description	213

12.115 IDN S-0-0152 Position spindle procedure command.....	213
12.115.1 Attributes	213
12.115.2 Description	214
12.116 IDN S-0-0153 Spindle angle position.....	214
12.116.1 Attributes	214
12.116.2 Description	214
12.117 IDN S-0-0154 Spindle positioning parameter.....	214
12.117.1 Attributes	214
12.117.2 Description	215
12.118 IDN S-0-0155 Friction torque compensation.....	215
12.118.1 Attributes	215
12.118.2 Description	216
12.119 IDN S-0-0156 Velocity feedback value 2	216
12.119.1 Attributes	216
12.119.2 Description	216
12.120 IDN S-0-0157 Velocity window	216
12.120.1 Attributes	216
12.120.2 Description	217
12.121 IDN S-0-0158 Power threshold (P_x)	217
12.121.1 Attributes	217
12.121.2 Description	217
12.122 IDN S-0-0159 Monitoring window	217
12.122.1 Attributes	217
12.122.2 Description	218
12.123 IDN S-0-0160 Acceleration data scaling type	218
12.123.1 Attributes	218
12.123.2 Description	219
12.124 IDN S-0-0161 Acceleration data scaling factor	219
12.124.1 Attributes	219
12.124.2 Description	220
12.125 IDN S-0-0162 Acceleration data scaling exponent.....	220
12.125.1 Attributes	220
12.125.2 Description	220
12.126 IDN S-0-0163 Weight counterbalance	221
12.126.1 Attributes	221
12.126.2 Description	221
12.127 IDN S-0-0164 Acceleration feedback value 1	221
12.127.1 Attributes	221
12.127.2 Description	221
12.128 IDN S-0-0165 and S-0-0166 Distance-coded reference marks A and B	222
12.128.1 Attributes	222
12.128.2 Description	222
12.129 IDN S-0-0167 Frequency limit of feedback 1	222
12.129.1 Attributes	222
12.129.2 Description	222
12.130 IDN S-0-0168 Frequency limit of feedback 2	223
12.130.1 Attributes	223
12.130.2 Description	223
12.131 IDN S-0-0169 Probe control parameter	223

12.131.1	Attributes	223
12.131.2	Description	223
12.132 IDN	S-0-0170 Probing cycle procedure command	224
12.132.1	Attributes	224
12.132.2	Description	224
12.133 IDN	S-0-0171 Calculate displacement procedure command	225
12.133.1	Attributes	225
12.133.2	Description	225
12.134 IDN	S-0-0172 Displacement to the referenced system procedure command	225
12.134.1	Attributes	225
12.134.2	Description	226
12.135 IDN	S-0-0173 Marker position A	226
12.135.1	Attributes	226
12.135.2	Description	227
12.136 IDN	S-0-0174 Marker position B	227
12.136.1	Attributes	227
12.136.2	Description	228
12.137 IDN	S-0-0175 Displacement parameter 1	228
12.137.1	Attributes	228
12.137.2	Description	228
12.138 IDN	S-0-0176 Displacement parameter 2	228
12.138.1	Attributes	228
12.138.2	Description	229
12.139 IDN	S-0-0177 Absolute distance 1	229
12.139.1	Attributes	229
12.139.2	Description	229
12.140 IDN	S-0-0178 Absolute distance 2	229
12.140.1	Attributes	229
12.140.2	Description	230
12.141 IDN	S-0-0179 Probe status	230
12.141.1	Attributes	230
12.141.2	Description	230
12.142 IDN	S-0-0180 Spindle relative offset	231
12.142.1	Attributes	231
12.142.2	Description	231
12.143 IDN	S-0-0181 Manufacturer class 2 diagnostic	232
12.143.1	Attributes	232
12.143.2	Description	232
12.144 IDN	S-0-0182 Manufacturer class 3 diagnostic	232
12.144.1	Attributes	232
12.144.2	Description	233
12.145 IDN	S-0-0183 Synchronization velocity window	233
12.145.1	Attributes	233
12.145.2	Description	234
12.146 IDN	S-0-0184 Synchronization velocity error limit	234
12.146.1	Attributes	234
12.146.2	Description	234
12.147 IDN	S-0-0189 Following distance	234
12.147.1	Attributes	234

12.147.2	Description	235
12.148	IDN S-0-0190 Drive controlled gear engaging procedure command.....	235
12.148.1	Attributes	235
12.148.2	Description	235
12.149	IDN S-0-0191 Cancel reference point procedure command	236
12.149.1	Attributes	236
12.149.2	Description	236
12.150	IDN S-0-0192 IDN-list of all backup operation data	236
12.150.1	Attributes	236
12.150.2	Description	237
12.151	IDN S-0-0193 Positioning jerk	237
12.151.1	Attributes	237
12.151.2	Description	237
12.152	IDN S-0-0194 Acceleration command value	237
12.152.1	Attributes	237
12.152.2	Description	238
12.153	IDN S-0-0195 Acceleration feedback value 2	238
12.153.1	Attributes	238
12.153.2	Description	238
12.154	IDN S-0-0196 Motor rated current	238
12.154.1	Attributes	238
12.154.2	Description	239
12.155	IDN S-0-0197 Set coordinate system procedure command.....	239
12.155.1	Attributes	239
12.155.2	Description	239
12.156	IDN S-0-0198 Initial coordinate value.....	239
12.156.1	Attributes	239
12.156.2	Description	240
12.157	IDN S-0-0199 Shift coordinate system procedure command.....	240
12.157.1	Attributes	240
12.157.2	Description	240
12.158	IDN S-0-0200 Amplifier warning temperature	241
12.158.1	Attributes	241
12.158.2	Description	241
12.159	IDN S-0-0201 Motor warning temperature	241
12.159.1	Attributes	241
12.159.2	Description	242
12.160	IDN S-0-0202 Cooling error warning temperature.....	242
12.160.1	Attributes	242
12.160.2	Description	242
12.161	IDN S-0-0203 Amplifier shut-down temperature	243
12.161.1	Attributes	243
12.161.2	Description	243
12.162	IDN S-0-0204 Motor shut-down temperature	243
12.162.1	Attributes	243
12.162.2	Description	244
12.163	IDN S-0-0205 Cooling error shut-down temperature	244
12.163.1	Attributes	244
12.163.2	Description	244

12.164 IDN S-0-0206 Drive on delay time	245
12.164.1 Attributes	245
12.164.2 Description	245
12.165 IDN S-0-0207 Drive off delay time	245
12.165.1 Attributes	245
12.165.2 Description	246
12.166 IDN S-0-0208 Temperature data scaling type	246
12.166.1 Attributes	246
12.166.2 Description	246
12.167 IDN S-0-0209 Lower adaptation limit	246
12.167.1 Attributes	246
12.167.2 Description	247
12.168 IDN S-0-0210 Upper adaptation limit	247
12.168.1 Attributes	247
12.168.2 Description	247
12.169 IDN S-0-0211 Adaptation proportional gain	248
12.169.1 Attributes	248
12.169.2 Description	248
12.170 IDN S-0-0212 Adaptation integral action time	248
12.170.1 Attributes	248
12.170.2 Description	248
12.171 IDN S-0-0213 Engaging dither amplitude	249
12.171.1 Attributes	249
12.171.2 Description	249
12.172 IDN S-0-0214 Average engaging speed	249
12.172.1 Attributes	249
12.172.2 Description	249
12.173 IDN S-0-0215 Engaging dither period	249
12.173.1 Attributes	249
12.173.2 Description	250
12.174 IDN S-0-0216 Switch parameter set procedure command	250
12.174.1 Attributes	250
12.174.2 Description	250
12.175 IDN S-0-0217 Parameter set preselection	250
12.175.1 Attributes	250
12.175.2 Description	251
12.176 IDN S-0-0218 Gear ratio preselection	251
12.176.1 Attributes	251
12.176.2 Description	252
12.177 IDN S-0-0219 IDN–list of parameter set	252
12.177.1 Attributes	252
12.177.2 Description	253
12.178 IDN S-0-0220 Minimum spindle speed	253
12.178.1 Attributes	253
12.178.2 Description	253
12.179 IDN S-0-0221 Maximum spindle speed	254
12.179.1 Attributes	254
12.179.2 Description	254
12.180 IDN S-0-0222 Spindle positioning speed	254

12.180.1	Attributes	254
12.180.2	Description	254
12.181	IDN S-0-0223 Drive controlled synchronous operation procedure command.....	255
12.181.1	Attributes	255
12.181.2	Description	255
12.182	IDN S-0-0224 Lead spindle address.....	255
12.182.1	Attributes	255
12.182.2	Description	256
12.183	IDN S-0-0225 Synchronous operation parameter	256
12.183.1	Attributes	256
12.183.2	Description	256
12.184	IDN S-0-0226 Lead spindle revolutions	257
12.184.1	Attributes	257
12.184.2	Description	257
12.185	IDN S-0-0227 Synchronous spindle revolutions.....	257
12.185.1	Attributes	257
12.185.2	Description	257
12.186	IDN S-0-0228 Synchronization position window	258
12.186.1	Attributes	258
12.186.2	Description	258
12.187	IDN S-0-0229 Synchronization position error limit	258
12.187.1	Attributes	258
12.187.2	Description	259
12.188	IDN S-0-0230 Synchronous position offset.....	259
12.188.1	Attributes	259
12.188.2	Description	259
12.189	IDN S-0-0254 Actual parameter set.....	259
12.189.1	Attributes	259
12.189.2	Description	260
12.190	IDN S-0-0255 Actual gear ratio	260
12.190.1	Attributes	260
12.190.2	Description	260
12.191	IDN S-0-0256 Multiplication factor 1.....	261
12.191.1	Attributes	261
12.191.2	Description	261
12.192	IDN S-0-0257 Multiplication factor 2.....	261
12.192.1	Attributes	261
12.192.2	Description	262
12.193	IDN S-0-0258 Target position.....	262
12.193.1	Attributes	262
12.193.2	Description	262
12.194	IDN S-0-0259 Positioning velocity.....	263
12.194.1	Attributes	263
12.194.2	Description	263
12.195	IDN S-0-0260 Positioning acceleration.....	263
12.195.1	Attributes	263
12.195.2	Description	263
12.196	IDN S-0-0261 Coarse position window	264
12.196.1	Attributes	264

12.196.2	Description	264
12.197	IDN S-0-0262 Load defaults procedure command	264
12.197.1	Attributes	264
12.197.2	Description	265
12.198	IDN S-0-0263 Load working memory procedure command	265
12.198.1	Attributes	265
12.198.2	Description	265
12.199	IDN S-0-0264 Backup working memory procedure command	265
12.199.1	Attributes	265
12.199.2	Description	266
12.200	IDN S-0-0265 Language selection.....	266
12.200.1	Attributes	266
12.200.2	Description	266
12.201	IDN S-0-0266 List of available languages.....	267
12.201.1	Attributes	267
12.201.2	Description	267
12.202	IDN S-0-0267 Password.....	268
12.202.1	Attributes	268
12.202.2	Description	268
12.203	IDN S-0-0268 Angular setting	269
12.203.1	Attributes	269
12.203.2	Description	270
12.204	IDN S-0-0269 Storage mode	270
12.204.1	Attributes	270
12.204.2	Description	270
12.205	IDN S-0-0270 IDN list of selected backup operation data	270
12.205.1	Attributes	270
12.205.2	Description	271
12.206	IDN S-0-0271 Drive ID	271
12.206.1	Attributes	271
12.206.2	Description	271
12.207	IDN S-0-0272 Velocity window percentage.....	272
12.207.1	Attributes	272
12.207.2	Description	272
12.208	IDN S-0-0273 Maximum drive off delay time	272
12.208.1	Attributes	272
12.208.2	Description	272
12.209	IDN S-0-0275 Coordinate offset value.....	273
12.209.1	Attributes	273
12.209.2	Description	273
12.210	IDN S-0-0276 Return to modulo range procedure command.....	273
12.210.1	Attributes	273
12.210.2	Description	273
12.211	IDN S-0-0277 Position feedback 1 type.....	274
12.211.1	Attributes	274
12.211.2	Description	274
12.212	IDN S-0-0278 Maximum travel range	275
12.212.1	Attributes	275
12.212.2	Description	276

12.213 IDN S-0-0279 IDN list of password protected data	276
12.213.1 Attributes	276
12.213.2 Description	276
12.214 IDN S-0-0280 Underflow threshold.....	276
12.214.1 Attributes	276
12.214.2 Description	277
12.215 IDN S-0-0281 Overflow threshold.....	277
12.215.1 Attributes	277
12.215.2 Description	278
12.216 IDN S-0-0282 Positioning command value	278
12.216.1 Attributes	278
12.216.2 Description	279
12.217 IDN S-0-0283 Current coordinate offset	279
12.217.1 Attributes	279
12.217.2 Description	279
12.218 IDN S-0-0284 Secondary operation mode 4	280
12.218.1 Attributes	280
12.218.2 Description	280
12.219 IDN S-0-0285 Secondary operation mode 5	280
12.219.1 Attributes	280
12.219.2 Description	281
12.220 IDN S-0-0286 Secondary operation mode 6	281
12.220.1 Attributes	281
12.220.2 Description	281
12.221 IDN S-0-0287 Secondary operation mode 7	281
12.221.1 Attributes	281
12.221.2 Description	282
12.222 IDN S-0-0292 List of supported operation modes	282
12.222.1 Attributes	282
12.222.2 Description	282
12.223 IDN S-0-0293 Selectively backup working memory procedure command	283
12.223.1 Attributes	283
12.223.2 Description	283
12.224 IDN S-0-0294 Divider modulo value	283
12.224.1 Attributes	283
12.224.2 Description	283
12.225 IDN S-0-0295 Drive enable delay time	284
12.225.1 Attributes	284
12.225.2 Description	284
12.226 IDN S-0-0296 Velocity feed forward gain.....	284
12.226.1 Attributes	284
12.226.2 Description	284
12.227 IDN S-0-0297 Homing distance	285
12.227.1 Attributes	285
12.227.2 Description	285
12.228 IDN S-0-0298 Suggest home switch distance	285
12.228.1 Attributes	285
12.228.2 Description	286
12.229 IDN S-0-0299 Home switch offset 1	286

12.229.1	Attributes	286
12.229.2	Description	286
12.230 IDN S-0-0300	Real-time control bit 1	287
12.230.1	Attributes	287
12.230.2	Description	287
12.231 IDN S-0-0301	Allocation of real-time control bit 1	287
12.231.1	Attributes	287
12.231.2	Description	288
12.232 IDN S-0-0302	Real-time control bit 2	288
12.232.1	Attributes	288
12.232.2	Description	288
12.233 IDN S-0-0303	Allocation of real-time control bit 2	289
12.233.1	Attributes	289
12.233.2	Description	289
12.234 IDN S-0-0304	Real-time status bit 1	289
12.234.1	Attributes	289
12.234.2	Description	290
12.235 IDN S-0-0305	Allocation of real-time status bit 1	290
12.235.1	Attributes	290
12.235.2	Description	290
12.236 IDN S-0-0306	Real-time status bit 2	290
12.236.1	Attributes	290
12.236.2	Description	291
12.237 IDN S-0-0307	Allocation of real-time status bit 2	291
12.237.1	Attributes	291
12.237.2	Description	291
12.238 IDN S-0-0308	Synchronization operation status	292
12.238.1	Attributes	292
12.238.2	Description	292
12.239 IDN S-0-0309	Synchronization error status	292
12.239.1	Attributes	292
12.239.2	Description	293
12.240 IDN S-0-0310	Overload warning	293
12.240.1	Attributes	293
12.240.2	Description	294
12.241 IDN S-0-0311	Amplifier overtemperature warning	294
12.241.1	Attributes	294
12.241.2	Description	295
12.242 IDN S-0-0312	Motor overtemperature warning	295
12.242.1	Attributes	295
12.242.2	Description	295
12.243 IDN S-0-0313	Cooling error warning	296
12.243.1	Attributes	296
12.243.2	Description	296
12.244 IDN S-0-0315	Positioning velocity higher than n Limit	296
12.244.1	Attributes	296
12.244.2	Description	297
12.245 IDN S-0-0323	Target position outside of travel range	297
12.245.1	Attributes	297

12.245.2	Description	298
12.246	IDN S-0-0328 Bit number allocation list for signal status word.....	298
12.246.1	Attributes	298
12.246.2	Description	299
12.247	IDN S-0-0329 Bit number allocation list for signal control word	299
12.247.1	Attributes	299
12.247.2	Description	299
12.248	IDN S-0-0330 Status ' $n_{\text{feedback}} = n_{\text{command}}$ '.....	299
12.248.1	Attributes	299
12.248.2	Description	300
12.249	IDN S-0-0331 Status ' $n_{\text{feedback}} = 0$ '	300
12.249.1	Attributes	300
12.249.2	Description	301
12.250	IDN S-0-0332 Status ' $n_{\text{feedback}} < n_x$ '	301
12.250.1	Attributes	301
12.250.2	Description	302
12.251	IDN S-0-0333 Status ' $T \geq T_x$ '.....	302
12.251.1	Attributes	302
12.251.2	Description	302
12.252	IDN S-0-0334 Status ' $T \geq T_{\text{limit}}$ '	303
12.252.1	Attributes	303
12.252.2	Description	303
12.253	IDN S-0-0335 Status ' $n_{\text{command}} > n_{\text{limit}}$ '	303
12.253.1	Attributes	303
12.253.2	Description	304
12.254	IDN S-0-0336 Status 'In position'	304
12.254.1	Attributes	304
12.254.2	Description	305
12.255	IDN S-0-0337 Status ' $P \geq P_x$ '	305
12.255.1	Attributes	305
12.255.2	Description	305
12.256	IDN S-0-0338 Status "Position feedback = active target position".....	306
12.256.1	Attributes	306
12.256.2	Description	306
12.257	IDN S-0-0339 Status ' $n_{\text{feedback}} \leq$ minimum spindle speed'	307
12.257.1	Attributes	307
12.257.2	Description	307
12.258	IDN S-0-0340 Status ' $n_{\text{feedback}} \geq$ maximum spindle speed'	307
12.258.1	Attributes	307
12.258.2	Description	308
12.259	IDN S-0-0341 Status "In coarse position"	308
12.259.1	Attributes	308
12.259.2	Description	309
12.260	IDN S-0-0342 Status "Target position attained"	309
12.260.1	Attributes	309
12.260.2	Description	310
12.261	IDN S-0-0343 Status "Interpolator halted"	310
12.261.1	Attributes	310
12.261.2	Description	310

12.262 IDN S-0-0346 Positioning control	311
12.262.1 Attributes	311
12.262.2 Description	311
12.263 IDN S-0-0347 Velocity error	312
12.263.1 Attributes	312
12.263.2 Description	313
12.264 IDN S-0-0348 Acceleration feed forward gain.....	313
12.264.1 Attributes	313
12.264.2 Description	313
12.265 IDN S-0-0349 Bipolar jerk limit.....	313
12.265.1 Attributes	313
12.265.2 Description	314
12.266 IDN S-0-0356 Distance home switch – marker pulse	314
12.266.1 Attributes	314
12.266.2 Description	314
12.267 IDN S-0-0357 Marker pulse distance.....	315
12.267.1 Attributes	315
12.267.2 Description	315
12.268 IDN S-0-0358 Home switch offset 2	315
12.268.1 Attributes	315
12.268.2 Description	315
12.269 IDN S-0-0359 Positioning deceleration.....	316
12.269.1 Attributes	316
12.269.2 Description	316
12.270 IDN S-0-0360 and IDN S-0-0361 MDT data containers A1 (4 byte) and B (4 byte)	316
12.270.1 Attributes	316
12.270.2 Description	317
12.271 IDN S-0-0362 and IDN S-0-0363 MDT data container A and B list indexes.....	317
12.271.1 Attributes	317
12.271.2 Description	317
12.272 IDN S-0-0364 and IDN S-0-0365 AT data containers A1 (4 byte) and B (4 byte)	318
12.272.1 Attributes	318
12.272.2 Description	319
12.273 IDN S-0-0366 and IDN S-0-0367 AT data container A and B list indexes.....	319
12.273.1 Attributes	319
12.273.2 Description	319
12.274 IDN S-0-0368 and IDN S-0-0369 Data container A and B pointers	320
12.274.1 Attributes	320
12.274.2 Description	321
12.275 IDN S-0-0370 MDT data container configuration list.....	322
12.275.1 Attributes	322
12.275.2 Description	322
12.276 IDN S-0-0371 AT data container configuration list.....	322
12.276.1 Attributes	322
12.276.2 Description	322
12.277 IDN S-0-0372 Drive Halt acceleration bipolar	323
12.277.1 Attributes	323

12.277.2	Description	323
12.278	IDN S-0-0373 Service channel error list	323
12.278.1	Attributes	323
12.278.2	Description	323
12.279	IDN S-0-0374 Procedure command error list	324
12.279.1	Attributes	324
12.279.2	Description	324
12.280	IDN S-0-0375 Diagnostic numbers list	324
12.280.1	Attributes	324
12.280.2	Description	325
12.281	IDN S-0-0376 Baud rate	325
12.281.1	Attributes	325
12.281.2	Description	325
12.282	IDN S-0-0377 Velocity feedback monitoring window	326
12.282.1	Attributes	326
12.282.2	Description	326
12.283	IDN S-0-0378 Absolute encoder range 1	327
12.283.1	Attributes	327
12.283.2	Description	327
12.284	IDN S-0-0379 Absolute encoder range 2	327
12.284.1	Attributes	327
12.284.2	Description	328
12.285	IDN S-0-0380 DC bus voltage	328
12.285.1	Attributes	328
12.285.2	Description	328
12.286	IDN S-0-0381 DC bus current	328
12.286.1	Attributes	328
12.286.2	Description	329
12.287	IDN S-0-0382 DC bus power	329
12.287.1	Attributes	329
12.287.2	Description	329
12.288	IDN S-0-0383 Motor temperature	329
12.288.1	Attributes	329
12.288.2	Description	330
12.289	IDN S-0-0384 Amplifier temperature	330
12.289.1	Attributes	330
12.289.2	Description	330
12.290	IDN S-0-0385 Active power	330
12.290.1	Attributes	330
12.290.2	Description	331
12.291	IDN S-0-0386 Active position feedback value	331
12.291.1	Attributes	331
12.291.2	Description	331
12.292	IDN S-0-0387 Power overload	331
12.292.1	Attributes	331
12.292.2	Description	332
12.293	IDN S-0-0388 Braking current limit	332
12.293.1	Attributes	332
12.293.2	Description	332

12.294 IDN S-0-0389 Effective current	332
12.294.1 Attributes	332
12.294.2 Description	333
12.295 IDN S-0-0390 Diagnostic number	333
12.295.1 Attributes	333
12.295.2 Description	333
12.296 IDN S-0-0391 Position feedback monitoring window	335
12.296.1 Attributes	335
12.296.2 Description	336
12.297 IDN S-0-0392 Velocity feedback filter	336
12.297.1 Attributes	336
12.297.2 Description	336
12.298 IDN S-0-0393 Command value mode	337
12.298.1 Attributes	337
12.298.2 Description	337
12.299 IDN S-0-0394 List IDN	337
12.299.1 Attributes	337
12.299.2 Description	338
12.300 IDN S-0-0395 List index	338
12.300.1 Attributes	338
12.300.2 Description	338
12.301 IDN S-0-0396 Number of list elements	338
12.301.1 Attributes	338
12.301.2 Description	339
12.302 IDN S-0-0397 List segment	339
12.302.1 Attributes	339
12.302.2 Description	339
12.303 IDN S-0-0398 IDN list of configurable data in the signal status word	340
12.303.1 Attributes	340
12.303.2 Description	340
12.304 IDN S-0-0399 IDN list of configurable data in the signal control word	340
12.304.1 Attributes	340
12.304.2 Description	340
12.305 IDN S-0-0400 Home switch	341
12.305.1 Attributes	341
12.305.2 Description	341
12.306 IDN S-0-0401 Probe 1	341
12.306.1 Attributes	341
12.306.2 Description	342
12.307 IDN S-0-0402 Probe 2	342
12.307.1 Attributes	342
12.307.2 Description	343
12.308 IDN S-0-0403 Position feedback value status	343
12.308.1 Attributes	343
12.308.2 Description	343
12.309 IDN S-0-0404 Position command value status	345
12.309.1 Attributes	345
12.309.2 Description	345
12.310 IDN S-0-0405 Probe 1 enable	345

12.310.1	Attributes	345
12.310.2	Description	346
12.311	IDN S-0-0406 Probe 2 enable	346
12.311.1	Attributes	346
12.311.2	Description	347
12.312	IDN S-0-0407 Homing enable.....	347
12.312.1	Attributes	347
12.312.2	Description	347
12.313	IDN S-0-0408 Reference marker pulse registered	348
12.313.1	Attributes	348
12.313.2	Description	348
12.314	IDN S-0-0409 Probe 1 positive latched	349
12.314.1	Attributes	349
12.314.2	Description	349
12.315	IDN S-0-0410 Probe 1 negative latched	349
12.315.1	Attributes	349
12.315.2	Description	350
12.316	IDN S-0-0411 Probe 2 positive latched	350
12.316.1	Attributes	350
12.316.2	Description	351
12.317	IDN S-0-0412 Probe 2 negative latched	351
12.317.1	Attributes	351
12.317.2	Description	351
12.318	IDN S-0-0413 Bit number allocation of real-time control bit 1	352
12.318.1	Attributes	352
12.318.2	Description	352
12.319	IDN S-0-0414 Bit number allocation of real-time control bit 2	352
12.319.1	Attributes	352
12.319.2	Description	353
12.320	IDN S-0-0415 Bit number allocation of real-time status bit 1	353
12.320.1	Attributes	353
12.320.2	Description	353
12.321	IDN S-0-0416 Bit number allocation of real-time status bit 2	353
12.321.1	Attributes	353
12.321.2	Description	353
12.322	IDN S-0-0417 Positioning velocity threshold in modulo mode	354
12.322.1	Attributes	354
12.322.2	Description	354
12.323	IDN S-0-0418 Target position window in modulo mode.....	354
12.323.1	Attributes	354
12.323.2	Description	355
12.324	IDN S-0-0419 Positioning acknowledge.....	355
12.324.1	Attributes	355
12.324.2	Description	355
12.325	IDN S-0-0429 Emergency stop deceleration.....	356
12.325.1	Attributes	356
12.325.2	Description	356
12.326	IDN S-0-0430 Active target position	356
12.326.1	Attributes	356

12.326.2	Description	357
12.327	IDN S-0-0431 Spindle positioning acceleration bipolar	357
12.327.1	Attributes	357
12.327.2	Description	358
12.328	IDN S-0-0432 Serial number drive control	358
12.328.1	Attributes	358
12.328.2	Description	358
12.329	IDN S-0-0433 Serial number power stage	358
12.329.1	Attributes	358
12.329.2	Description	358
12.330	IDN S-0-0434 Serial number motor	359
12.330.1	Attributes	359
12.330.2	Description	359
12.331	IDN S-0-0435 Operating time drive control	359
12.331.1	Attributes	359
12.331.2	Description	359
12.332	IDN S-0-0436 Operating time power stage	359
12.332.1	Attributes	359
12.332.2	Description	360
12.333	IDN S-0-0437 Positioning status	360
12.333.1	Attributes	360
12.333.2	Description	360
12.334	IDN S-0-0438 Vendor name	362
12.334.1	Attributes	362
12.334.2	Description	362
12.335	IDN S-0-0439 Vendor code	362
12.335.1	Attributes	362
12.335.2	Description	362
12.336	IDN S-0-0440 Marker position feedback 1	362
12.336.1	Attributes	362
12.336.2	Description	363
12.337	IDN S-0-0441 Marker position feedback 2	363
12.337.1	Attributes	363
12.337.2	Description	363
12.338	IDN S-0-0442 Counter marker position feedback 1	363
12.338.1	Attributes	363
12.338.2	Description	364
12.339	IDN S-0-0443 Counter marker position feedback 2	364
12.339.1	Attributes	364
12.339.2	Description	364
12.340	IDN S-0-0446 Ramp reference velocity	364
12.340.1	Attributes	364
12.340.2	Description	365
12.341	IDN S-0-0447 Set absolute position procedure command	365
12.341.1	Attributes	365
12.341.2	Description	365
12.342	IDN S-0-0448 Set absolute position control word	366
12.342.1	Attributes	366
12.342.2	Description	366

12.343 IDN S-0-0460 to S-0-0475 Position switches (position switch points off 1-16)	367
12.343.1 Attributes	367
12.343.2 Description	367
12.344 IDN S-0-0476 Position switch control	367
12.344.1 Attributes	367
12.344.2 Description	368
12.345 IDN S-0-0477 Position switch hysteresis	368
12.345.1 Attributes	368
12.345.2 Description	369
12.346 IDN S-0-0478 Limit switch status	369
12.346.1 Attributes	369
12.346.2 Description	369
12.347 IDN S-0-0520 Axis control word	370
12.347.1 Attributes	370
12.347.2 Description	370
12.348 IDN S-0-0521 Axis status word	371
12.348.1 Attributes	371
12.348.2 Description	371
12.349 IDN S-0-0530 Clamping torque	372
12.349.1 Attributes	372
12.349.2 Description	372
12.350 IDN S-0-0532 Limit switch control	372
12.350.1 Attributes	372
12.350.2 Description	373
12.351 IDN S-0-0533 Motor continuous stall torque/force	373
12.351.1 Attributes	373
12.351.2 Description	374
12.352 IDN S-0-0534 Motor peak torque/force	374
12.352.1 Attributes	374
12.352.2 Description	374
12.353 IDN S-0-0535 Active velocity feedback value	374
12.353.1 Attributes	374
12.353.2 Description	375
12.354 IDN S-0-0536 Active acceleration feedback value	375
12.354.1 Attributes	375
12.354.2 Description	375
12.355 IDN S-0-0822 Torque/force ramp reference	376
12.355.1 Attributes	376
12.355.2 Description	376
12.356 IDN S-0-0823 Torque/force ramp time	376
12.356.1 Attributes	376
12.356.2 Description	376
12.357 IDN S-0-0824 Torque/force status	376
12.357.1 Attributes	376
12.357.2 Description	377
12.358 IDN S-0-0826 Torque/force window	377
12.358.1 Attributes	377
12.358.2 Description	377
12.359 IDN S-0-1601 List of drive classes & version	378

12.359.1 Attributes	378
12.359.2 Description	378
Bibliography.....	380
Figure 1 – Structure of IEC 61800-7.....	44
Figure 2 – Block diagram of operation modes	56
Figure 3 – Block diagram of torque/force control	57
Figure 4 – Block diagram of Velocity control	58
Figure 5 – Adaptation of the velocity loop proportional gain	60
Figure 6 – Adaptation of the velocity loop integral action time	60
Figure 7 – Block diagram Interpolation.....	64
Figure 8 – Block diagram Positioning	66
Figure 9 – Block transitions.....	68
Figure 10 – Drive state machine	70
Figure 11 – Bit sequence during start-up	71
Figure 12 – Bit sequence during shut-down	72
Figure 13 – Bit sequence for C1D error.....	73
Figure 14 – Synchronous spindle operation diagram.....	77
Figure 15 – Velocity diagram for lead and synchronous spindle	78
Figure 16 – Position feedback diagram for lead and synchronous spindle	79
Figure 17 – Bit sequence for drive controlled homing.....	81
Figure 18 – Drive controlled homing diagram	81
Figure 19 – Bit sequence for control unit controlled homing (case 1).....	83
Figure 20 – Bit sequence for control unit controlled homing (case 2.1).....	83
Figure 21 – Bit sequence for control unit controlled homing (case 2.2).....	84
Figure 22 – Incremental feedback system	85
Figure 23 – Distance-coded feedback system	85
Figure 24 – Bit sequence to activate the displacement to the referenced system	86
Figure 25 – Sequence of set absolute position procedure command	89
Figure 26 – Modification of coordinate system	91
Figure 27 – Velocity diagram for spindle positioning	92
Figure 28 – Velocity diagram for spindle positioning	92
Figure 29 – Velocity diagram for spindle positioning	93
Figure 30 – Bit sequence while writing new position values (S-0-0153 or S-0-0180).....	93
Figure 31 – Bit sequence for switching spindle positioning mode	94
Figure 32 – Velocity window	94
Figure 33 – $n_{\text{feedback}} = n_{\text{command}}$ depiction	95
Figure 34 – Bit sequence for park axis	96
Figure 35 – Bit sequence for positive stop drive.....	96
Figure 36 – Bit sequence for switching parameter sets and/or gear ratio.....	97
Figure 37 – Gear engaging	98
Figure 38 – Position switch mode.....	100
Figure 39 – Cam switch mode.....	101

Figure 40 – Position data scaling type diagram	102
Figure 41 – Velocity data scaling type diagram	104
Figure 42 – Torque/force data scaling type diagram.....	106
Figure 43 – Acceleration/jerk data scaling type diagram.....	108
Figure 44 – Polarity parameter.....	110
Figure 45 – General IDN structure	117
Figure 46 – Password modification	269
Table 1 – Data types.....	51
Table 2 – Elements of an IDN	52
Table 3 – Structure of drive operation modes.....	54
Table 4 – Codes of operation mode position control.....	62
Table 5 – Codes of operation mode Interpolation	65
Table 6 – Codes of operation mode positioning.....	67
Table 7 – Drive operating states	88
Table 8 – Scaling of linear position data	103
Table 9 – Preferred scaling of rotational position data.....	103
Table 10 – Preferred scaling of linear velocity data	104
Table 11 – Preferred scaling of rotational velocity data	105
Table 12 – Scaling of force data	106
Table 13 – Scaling of torque data	107
Table 14 – Scaling of linear acceleration/jerk data	108
Table 15 – Scaling of rotational acceleration/jerk data	109
Table 16 – Scaling of ramp time.....	109
Table 17 – Drive specific status codes	111
Table 18 – Overview on diagnosis classes.....	116
Table 19 – Detailed IDN structure	117
Table 20 – IDN list in numerical order	118
Table 21 – Attributes of IDN S-0-0005	132
Table 22 – Attributes for IDN S-0-0007	132
Table 23 – Attributes of IDN S-0-0011	133
Table 24 – Structure of C1D	134
Table 25 – Attributes of IDN S-0-0012	135
Table 26 – Structure of C2D	136
Table 27 – Attributes of IDN S-0-0013	137
Table 28 – Structure of C3D	138
Table 29 – Attributes of IDN S-0-0015	138
Table 30 – Structure of telegram type of CP16/1 and CP16/2.....	139
Table 31 – Structure of telegram type of CP16/3.....	140
Table 32 – Attributes of IDN S-0-0016	141
Table 33 – Attributes of IDN S-0-0017	141
Table 34 – Attributes for IDN S-0-0018	142
Table 35 – Attributes for IDN S-0-0019	142

Table 36 – Attributes for IDN S-0-0020	143
Table 37 – Attributes for IDN S-0-0021	143
Table 38 – Attributes for IDN S-0-0022	144
Table 39 – Attributes for IDN S-0-0023	144
Table 40 – Attributes for IDN S-0-0025	145
Table 41 – Attributes for IDN S-0-0026	145
Table 42 – Attributes for IDN S-0-0027	146
Table 43 – Attributes for IDN S-0-0030	146
Table 44 – Attributes for IDN S-0-0031	147
Table 45 – Attributes for IDN S-0-0032	147
Table 46 – Attributes for IDN S-0-0033	148
Table 47 – Attributes for IDN S-0-0034	148
Table 48 – Attributes for IDN S-0-0035	149
Table 49 – Attributes for IDN S-0-0036	149
Table 50 – Attributes for IDN S-0-0037	150
Table 51 – Attributes for IDN S-0-0038	150
Table 52 – Attributes for IDN S-0-0039	151
Table 53 – Attributes for IDN S-0-0040	151
Table 54 – Attributes for IDN S-0-0041	152
Table 55 – Attributes for IDN S-0-0042	152
Table 56 – Attributes for IDN S-0-0043	153
Table 57 – Structure of velocity polarity parameter	153
Table 58 – Attributes for IDN S-0-0044	154
Table 59 – Structure of velocity data scaling type	155
Table 60 – Attributes for IDN S-0-0045	155
Table 61 – Attributes for IDN S-0-0046	156
Table 62 – Structure of the scaling exponent	156
Table 63 – Attributes for IDN S-0-0047	157
Table 64 – Attributes for IDN S-0-0048	157
Table 65 – Attributes for IDN S-0-0049	158
Table 66 – Attributes for IDN S-0-0050	159
Table 67 – Attributes for IDN S-0-0051	160
Table 68 – Attributes for IDN S-0-0052	160
Table 69 – Attributes for IDN S-0-0053	161
Table 70 – Attributes for IDN S-0-0053	161
Table 71 – Attributes for IDN S-0-0055	162
Table 72 – Structure of velocity polarity parameter	163
Table 73 – Attributes for IDN S-0-0057	163
Table 74 – Attributes for IDN S-0-0058	164
Table 75 – Attributes for IDN S-0-0059	164
Table 76 – Structure of the position switch flag parameter	165
Table 77 – Attributes of IDN S-0-0060 to S-0-0075	165
Table 78 – Attributes for IDN S-0-0076	166

Table 79 – Structure of position data scaling type	167
Table 80 – Attributes for IDN S-0-0077	167
Table 81 – Attributes for IDN S-0-0078	168
Table 82 – Structure of position data scaling type	168
Table 83 – Attributes for IDN S-0-0079	169
Table 84 – Attributes for IDN S-0-0080	169
Table 85 – Attributes for IDN S-0-0081	170
Table 86 – Attributes for IDN S-0-0082	170
Table 87 – Attributes for IDN S-0-0083	171
Table 88 – Attributes for IDN S-0-0084	171
Table 89 – Attributes for IDN S-0-0085	172
Table 90 – Structure of torque polarity parameter	172
Table 91 – Attributes for IDN S-0-0086	173
Table 92 – Structure of torque/force data scaling type	173
Table 93 – Attributes for IDN S-0-0091	174
Table 94 – Attributes for IDN S-0-0092	174
Table 95 – Attributes for IDN S-0-0093	175
Table 96 – Attributes for IDN S-0-0094	175
Table 97 – Structure of the torque/force data scaling exponent	175
Table 98 – Attributes for IDN S-0-0095	176
Table 99 – Attributes for IDN S-0-0097	176
Table 100 – Structure of Mask C2D	177
Table 101 – Attributes for IDN S-0-0098	177
Table 102 – Structure of Mask C3D	177
Table 103 – Attributes for IDN S-0-0099	178
Table 104 – Attributes for IDN S-0-0100	178
Table 105 – Attributes for IDN S-0-0101	179
Table 106 – Attributes for IDN S-0-0102	179
Table 107 – Attributes for IDN S-0-0103	180
Table 108 – Attributes for IDN S-0-0104	181
Table 109 – Attributes for IDN S-0-0105	181
Table 110 – Attributes for IDN S-0-0106	182
Table 111 – Attributes for IDN S-0-0107	182
Table 112 – Attributes for IDN S-0-0108	183
Table 113 – Attributes for IDN S-0-0109	183
Table 114 – Attributes for IDN S-0-0110	184
Table 115 – Attributes for IDN S-0-0111	184
Table 116 – Attributes for IDN S-0-0112	185
Table 117 – Attributes for IDN S-0-0113	185
Table 118 – Attributes for IDN S-0-0114	186
Table 119 – Attributes for IDN S-0-0115	186
Table 120 – Structure of Position Feedback 2 Type	187
Table 121 – Attributes for IDN S-0-0116	188

Table 122 – Attributes for IDN S-0-0117	188
Table 123 – Attributes for IDN S-0-0119	189
Table 124 – Attributes for IDN S-0-0120	189
Table 125 – Attributes for IDN S-0-0121	190
Table 126 – Attributes for IDN S-0-0122	190
Table 127 – Attributes for IDN S-0-0123	191
Table 128 – Attributes for IDN S-0-0124	191
Table 129 – Attributes for IDN S-0-0125	192
Table 130 – Attributes for IDN S-0-0126	192
Table 131 – Attributes for IDN S-0-0129	193
Table 132 – Structure of manufacturer Class 1 diagnostic.....	193
Table 133 – Attributes for IDN S-0-0130	194
Table 134 – Attributes for IDN S-0-0131	194
Table 135 – Attributes for IDN S-0-0132	195
Table 136 – Attributes for IDN S-0-0133	195
Table 137 – Attributes for IDN S-0-0134	196
Table 138 – Structure of Drive control field (CP16/1, CP16/2 and CP12)	197
Table 139 – Structure of Drive control field (CP16/3)	199
Table 140 – Attributes for IDN S-0-0135	200
Table 141 – Structure of Drive status field (CP16/1, CP16/2 and CP12).....	201
Table 142 – Structure of Drive status field (CP16/3)	203
Table 143 – Attributes for IDN S-0-0136	204
Table 144 – Attributes for IDN S-0-0137	204
Table 145 – Attributes for IDN S-0-0138	205
Table 146 – Attributes for IDN S-0-0139	205
Table 147 – Attributes for IDN S-0-0140	206
Table 148 – Attributes for IDN S-0-0141	206
Table 149 – Attributes for IDN S-0-0142	207
Table 150 – Attributes for IDN S-0-0144	207
Table 151 –Structure of producer RTB word container	208
Table 152 – Attributes for IDN S-0-0145	208
Table 153 –Structure of consumer RTB word container.....	208
Table 154 – Attributes for IDN S-0-0146	209
Table 155 – Attributes for IDN S-0-0147	209
Table 156 – Structure of homing parameter	210
Table 157 – Attributes for IDN S-0-0148	211
Table 158 – Attributes for IDN S-0-0149	212
Table 159 – Attributes for IDN S-0-0150	212
Table 160 – Attributes for IDN S-0-0151	213
Table 161 – Attributes for IDN S-0-0152	213
Table 162 – Attributes for IDN S-0-0153	214
Table 163 – Attributes for IDN S-0-0154	215
Table 164 – Structure of spindle position parameter	215

Table 165 – Attributes for IDN S-0-0155	216
Table 166 – Attributes for IDN S-0-0156	216
Table 167 – Attributes for IDN S-0-0157	217
Table 168 – Attributes for IDN S-0-0158	217
Table 169 – Attributes for IDN S-0-0159	218
Table 170 – Attributes for IDN S-0-0160	218
Table 171 – Structure of the acceleration data scaling type	219
Table 172 – Attributes for IDN S-0-0161	220
Table 173 – Attributes for IDN S-0-0162	220
Table 174 – Structure of the Scaling Exponent	220
Table 175 – Attributes for IDN S-0-0163	221
Table 176 – Attributes for IDN S-0-0164	221
Table 177 – Attributes for IDN S-0-0165	222
Table 178 – Attributes for IDN S-0-0167	222
Table 179 – Attributes for IDN S-0-0168	223
Table 180 – Attributes for IDN S-0-0169	223
Table 181 – Structure of the probe control parameter	224
Table 182 – Attributes for IDN S-0-0170	224
Table 183 – Attributes for IDN S-0-0171	225
Table 184 – Attributes for IDN S-0-0172	226
Table 185 – Attributes for IDN S-0-0173	227
Table 186 – Attributes for IDN S-0-0174	227
Table 187 – Attributes for IDN S-0-0175	228
Table 188 – Attributes for IDN S-0-0176	229
Table 189 – Attributes for IDN S-0-0177	229
Table 190 – Attributes for IDN S-0-0178	230
Table 191 – Attributes for IDN S-0-0179	230
Table 192 – Structure of Probe Status	231
Table 193 – Attributes for IDN S-0-0180	231
Table 194 – Attributes for IDN S-0-0181	232
Table 195 – Structure of Manufacturer C2D	232
Table 196 – Attributes for IDN S-0-0182	233
Table 197 – Structure of Manufacturer C3D	233
Table 198 – Attributes for IDN S-0-0183	233
Table 199 – Attributes for IDN S-0-0184	234
Table 200 – Attributes for IDN S-0-0189	235
Table 201 – Attributes for IDN S-0-0190	235
Table 202 – Attributes for IDN S-0-0191	236
Table 203 – Attributes for IDN S-0-0192	236
Table 204 – Attributes for IDN S-0-0193	237
Table 205 – Attributes for IDN S-0-0194	237
Table 206 – Attributes for IDN S-0-0195	238
Table 207 – Attributes for IDN S-0-0196	238

Table 208 – Attributes for IDN S-0-0197	239
Table 209 – Attributes for IDN S-0-0198	240
Table 210 – Attributes for IDN S-0-0199	240
Table 211 – Attributes for IDN S-0-0200	241
Table 212 – Attributes for IDN S-0-0201	242
Table 213 – Attributes for IDN S-0-0202	242
Table 214 – Attributes for IDN S-0-0203	243
Table 215 – Attributes for IDN S-0-0204	244
Table 216 – Attributes for IDN S-0-0205	244
Table 217 – Attributes for IDN S-0-0206	245
Table 218 – Attributes for IDN S-0-0207	245
Table 219 – Attributes for IDN S-0-0208	246
Table 220 – Structure of temperature data scaling type	246
Table 221 – Attributes for IDN S-0-0209	247
Table 222 – Attributes for IDN S-0-0210	247
Table 223 – Attributes for IDN S-0-0211	248
Table 224 – Attributes for IDN S-0-0212	248
Table 225 – Attributes for IDN S-0-0213	249
Table 226 – Attributes for IDN S-0-0214	249
Table 227 – Attributes for IDN S-0-0215	250
Table 228 – Attributes for IDN S-0-0216	250
Table 229 – Attributes for IDN S-0-0217	251
Table 230 – Structure of parameter set preselection	251
Table 231 – Attributes for IDN S-0-0218	252
Table 232 – Structure of the gear ratio preselection	252
Table 233 – Attributes for IDN S-0-0219	253
Table 234 – Attributes for IDN S-0-0220	253
Table 235 – Attributes for IDN S-0-0221	254
Table 236 – Attributes for IDN S-0-0222	254
Table 237 – Attributes for IDN S-0-0223	255
Table 238 – Attributes for IDN S-0-0224	255
Table 239 – Attributes for IDN S-0-0225	256
Table 240 – Structure of the synchronous operation parameter	256
Table 241 – Attributes for IDN S-0-0226	257
Table 242 – Attributes for IDN S-0-0227	257
Table 243 – Attributes for IDN S-0-0228	258
Table 244 – Attributes for IDN S-0-0229	258
Table 245 – Attributes for IDN S-0-0230	259
Table 246 – Attributes for IDN S-0-0254	259
Table 247 – Structure of the actual parameter set	260
Table 248 – Attributes for IDN S-0-0255	260
Table 249 – Structure of the Actual Gear Ratio	261
Table 250 – Attributes for IDN S-0-0256	261

Table 251 – Attributes for IDN S-0-0257	262
Table 252 – Attributes for IDN S-0-0258	262
Table 253 – Attributes for IDN S-0-0259	263
Table 254 – Attributes for IDN S-0-0260	263
Table 255 – Attributes for IDN S-0-0261	264
Table 256 – Attributes for IDN S-0-0262	264
Table 257 – Attributes for IDN S-0-0263	265
Table 258 – Attributes for IDN S-0-0264	266
Table 259 – Attributes for IDN S-0-0265	266
Table 260 – Structure of the language selection: language codes	267
Table 261 – Attributes for IDN S-0-0266	267
Table 262 – Attributes for IDN S-0-0267	268
Table 263 – Attributes for IDN S-0-0268	269
Table 264 – Attributes for IDN S-0-0269	270
Table 265 – Structure of Storage Mode.....	270
Table 266 – Attributes for IDN S-0-0270	271
Table 267 – Attributes for IDN S-0-0271	271
Table 268 – Attributes for IDN S-0-0272	272
Table 269 – Attributes for IDN S-0-0273	272
Table 270 – Attributes for IDN S-0-0275	273
Table 271 – Attributes for IDN S-0-0276	273
Table 272 – Attributes for IDN S-0-0277	274
Table 273 – Structure of the position feedback 1 type.....	275
Table 274 – Attributes for IDN S-0-0278	276
Table 275 – Attributes for IDN S-0-0279	276
Table 276 – Attributes for IDN S-0-0280	277
Table 277 – Attributes for IDN S-0-0281	278
Table 278 – Attributes for IDN S-0-0282	279
Table 279 – Attributes for IDN S-0-0283	279
Table 280 – Attributes for IDN S-0-0284	280
Table 281 – Attributes for IDN S-0-0285	280
Table 282 – Attributes for IDN S-0-0286	281
Table 283 – Attributes for IDN S-0-0287	282
Table 284 – Attributes for IDN S-0-0292	282
Table 285 – Attributes for IDN S-0-0293	283
Table 286 – Attributes for IDN S-0-0294	283
Table 287 – Attributes for IDN S-0-0295	284
Table 288 – Attributes for IDN S-0-0296	284
Table 289 – Attributes for IDN S-0-0297	285
Table 290 – Attributes for IDN S-0-0298	286
Table 291 – Attributes for IDN S-0-0299	286
Table 292 – Attributes for IDN S-0-0300	287
Table 293 – Structure of real-time control bit 1	287

Table 294 – Attributes for IDN S-0-0301	288
Table 295 – Attributes for IDN S-0-0302	288
Table 296 – Structure of the real-time control bit 2.....	289
Table 297 – Attributes for IDN S-0-0303	289
Table 298 – Attributes for IDN S-0-0304	289
Table 299 – Structure of real-time status bit 1.....	290
Table 300 – Attributes for IDN S-0-0305	290
Table 301 – Attributes for IDN S-0-0306	291
Table 302 – Structure of Real-Time Status Bit 2	291
Table 303 – Attributes for IDN S-0-0307	291
Table 304 – Attributes for IDN S-0-0308	292
Table 305 – Structure of the synchronization Operation status.....	292
Table 306 – Attributes for IDN S-0-0309	293
Table 307 – Structure of the synchronization error status	293
Table 308 – Attributes for IDN S-0-0310	294
Table 309 – Structure of Overload Warning	294
Table 310 – Attributes for IDN S-0-0311	294
Table 311 – Structure of amplifier overtemperature warning	295
Table 312 – Attributes for IDN S-0-0312	295
Table 313 – Structure of motor overtemperature warning.....	296
Table 314 – Attributes for IDN S-0-0313	296
Table 315 – Cooling error warning	296
Table 316 – Attributes for IDN S-0-0315	297
Table 317 – Structure of the warning positioning velocity > n Limit.....	297
Table 318 – Attributes for IDN S-0-0323	298
Table 319 – Structure of the warning target position outside of travel range.....	298
Table 320 – Attributes for IDN S-0-0328	299
Table 321 – Attributes for IDN S-0-0329	299
Table 322 – Attributes for IDN S-0-0330	300
Table 323 – Structure of status ' $n_{feedback} = n_{command}$ '.....	300
Table 324 – Attributes for IDN S-0-0331	301
Table 325 – Structure of status ' $n_{feedback} = 0$	301
Table 326 – Attributes for IDN S-0-0332	301
Table 327 – Structure of status ' $n_{feedback} < n_x$ '	302
Table 328 – Attributes for IDN S-0-0333	302
Table 329 – Structure of status ' $T \geq T_x$ '.....	303
Table 330 – Attributes for IDN S-0-0334	303
Table 331 – Structure of status ' $T \geq T_{limit}$ '	303
Table 332 – Attributes for IDN S-0-0335	304
Table 333 – Structure of Status ' $n_{command} > n_{limit}$ '	304
Table 334 – Attributes for IDN S-0-0336	304
Table 335 – Structure of status 'in position'.....	305
Table 336 – Attributes for IDN S-0-0337	305

Table 337 – Structure of status ' $P \geq P_x$ '	306
Table 338 – Attributes for IDN S-0-0338	306
Table 339 – Structure of position feedback = active target position	306
Table 340 – Attributes for IDN S-0-0339	307
Table 341 – Structure of ' $n_{\text{feedback}} \leq$ minimum spindle speed'	307
Table 342 – Attributes for IDN S-0-0340	308
Table 343 – Structure of ' $n_{\text{feedback}} \geq$ maximum spindle speed'	308
Table 344 – Attributes for IDN S-0-0341	309
Table 345 – Structure of Status 'in position'	309
Table 346 – Attributes for IDN S-0-0342	309
Table 347 – Structure of status 'target position attained'	310
Table 348 – Attributes for IDN S-0-0343	310
Table 349 – Structure of status 'interpolator halted'	311
Table 350 – Attributes for IDN S-0-0346	311
Table 351 – Structure of Positioning control	312
Table 352 – Attributes for IDN S-0-0347	313
Table 353 – Attributes for IDN S-0-0348	313
Table 354 – Attributes for IDN S-0-0349	314
Table 355 – Attributes for IDN S-0-0356	314
Table 356 – Attributes for IDN S-0-0357	315
Table 357 – Attributes for IDN S-0-0358	315
Table 358 – Attributes for IDN S-0-0359	316
Table 359 – Attributes for IDN S-0-0360, IDN S-0-0361	316
Table 360 – Attributes for IDN S-0-0362, S-0-0363	317
Table 361 – MDT data container A list index structure	318
Table 362 – MDT data container B list index structure	318
Table 363 – Attributes for IDN S-0-0364, IDN S-0-0365	318
Table 364 – Attributes for IDN S-0-0366, IDN S-0-0367	319
Table 365 – AT data container A list index structure	320
Table 366 – AT data container B list index structure	320
Table 367 – Attributes for IDN S-0-0368, S-0-0369	320
Table 368 – Data container A pointer structure	321
Table 369 – Data container B pointer structure	321
Table 370 – Attributes for IDN S-0-0370	322
Table 371 – Attributes for IDN S-0-0371	322
Table 372 – Attributes for IDN S-0-0372	323
Table 373 – Attributes for IDN S-0-0373	323
Table 374 – Service channel error list structure	324
Table 375 – Attributes for IDN S-0-0374	324
Table 376 – Procedure command error list structure	324
Table 377 – Attributes for IDN S-0-0375	325
Table 378 – Attributes for IDN S-0-0376	325
Table 379 – Baud rate structure	326

Table 380 – Attributes for IDN S-0-0377	326
Table 381 – Attributes for IDN S-0-0378	327
Table 382 – Attributes for IDN S-0-0379	328
Table 383 – Attributes for IDN S-0-0380	328
Table 384 – Attributes for IDN S-0-0381	329
Table 385 – Attributes for IDN S-0-0382	329
Table 386 – Attributes for IDN S-0-0383	330
Table 387 – Attributes for IDN S-0-0384	330
Table 388 – Attributes for IDN S-0-0385	331
Table 389 – Attributes for IDN S-0-0386	331
Table 390 – Attributes for IDN S-0-0387	332
Table 391 – Attributes for IDN S-0-0388	332
Table 392 – Attributes for IDN S-0-0389	333
Table 393 – Attributes for IDN S-0-0390	333
Table 394 – Prioritization of diagnostic events	334
Table 395 – Structure of the diagnostic number	335
Table 396 – Attributes for IDN S-0-0391	336
Table 397 – Attributes for IDN S-0-0392	336
Table 398 – Attributes for IDN S-0-0393	337
Table 399 – Command value mode structure	337
Table 400 – Attributes for IDN S-0-0394	338
Table 401 – Attributes for IDN S-0-0395	338
Table 402 – Attributes for IDN S-0-0396	339
Table 403 – Attributes for IDN S-0-0397	339
Table 404 – Attributes for IDN S-0-0398	340
Table 405 – Attributes for IDN S-0-0399	340
Table 406 – Attributes for IDN S-0-0400	341
Table 407 – Structure of home switch	341
Table 408 – Attributes for IDN S-0-0401	342
Table 409 – Structure of Probe 1	342
Table 410 – Attributes for IDN S-0-0402	342
Table 411 – Structure of Probe 2	343
Table 412 – Attributes for IDN S-0-0403	343
Table 413 – Structure of position feedback values status	344
Table 414 – Attributes for IDN S-0-0404	345
Table 415 – Structure of position command value status	345
Table 416 – Attributes for IDN S-0-0405	346
Table 417 – Structure of probe 1 enable	346
Table 418 – Attributes for IDN S-0-0406	346
Table 419 – Structure of probe 2 enable	347
Table 420 – Attributes for IDN S-0-0407	347
Table 421 – Structure of homing enable	348
Table 422 – Attributes for IDN S-0-0408	348

Table 423 – Structure of reference marker pulse registered	348
Table 424 – Attributes for IDN S-0-0409	349
Table 425 – Structure of probe 1 positive latched	349
Table 426 – Attributes for IDN S-0-0410	350
Table 427 – Structure of probe 1 negative latched	350
Table 428 – Attributes for IDN S-0-0411	350
Table 429 – Structure of probe 2 positive latched	351
Table 430 – Attributes for IDN S-0-0412	351
Table 431 – Structure of probe 2 negative latched	352
Table 432 – Attributes for IDN S-0-0413	352
Table 433 – Attributes for IDN S-0-0414	352
Table 434 – Attributes for IDN S-0-0415	353
Table 435 – Attributes for IDN S-0-0416	353
Table 436 – Attributes for IDN S-0-0417	354
Table 437 – Attributes for IDN S-0-0418	355
Table 438 – Attributes for IDN S-0-0419	355
Table 439 – Structure of positioning acknowledge	356
Table 440 – Attributes for IDN S-0-0429	356
Table 441 – Attributes for IDN S-0-0430	357
Table 442 – Attributes for IDN S-0-0431	357
Table 443 – Attributes for IDN S-0-0432	358
Table 444 – Attributes for IDN S-0-0433	358
Table 445 – Attributes for IDN S-0-0434	359
Table 446 – Attributes for IDN S-0-0435	359
Table 447 – Attributes for IDN S-0-0436	360
Table 448 – Attributes for IDN S-0-0437	360
Table 449 – Structure of positioning status	361
Table 450 – Attributes for IDN S-0-0438	362
Table 451 – Attributes for IDN S-0-0439	362
Table 452 – Attributes for IDN S-0-0440	363
Table 453 – Attributes for IDN S-0-0441	363
Table 454 – Attributes for IDN S-0-0442	364
Table 455 – Attributes for IDN S-0-0443	364
Table 456 – Attributes for IDN S-0-0446	365
Table 457 – Attributes for IDN S-0-0447	365
Table 458 – Attributes for IDN S-0-0448	366
Table 459 – Structure of set absolute position control	367
Table 460 – Attributes for IDN S-0-0460 to S-0-0475	367
Table 461 – Attributes for IDN S-0-0476	368
Table 462 – Structure of the position switch control	368
Table 463 – Attributes for IDN S-0-0476	369
Table 464 – Attributes for IDN S-0-0478	369
Table 465 – Structure of limit switch status	370

Table 466 – Attributes for IDN S-0-0520	370
Table 467 – Structure of the axis control word	371
Table 468 – Attributes for IDN S-0-0521	371
Table 469 – Structure of the axis status word	372
Table 470 – Attributes for IDN S-0-0530	372
Table 471 – Attributes for IDN S-0-0532	373
Table 472 – Structure of the limit switch control	373
Table 473 – Attributes for IDN S-0-0533	374
Table 474 – Attributes for IDN S-0-0534	374
Table 475 – Attributes for IDN S-0-0535	375
Table 476 – Attributes for IDN S-0-0536	375
Table 477 – Attributes for IDN S-0-0822	376
Table 478 – Attributes for IDN S-0-0823	376
Table 479 – Attributes for IDN S-0-0824	377
Table 480 – Structure of the torque/force status	377
Table 481 – Attributes for IDN S-0-0826	377
Table 482 – Attributes for IDN S-0-1601	378
Table 483 – Structure of drive class & version	379

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ADJUSTABLE SPEED ELECTRICAL POWER DRIVE SYSTEMS –**Part 7-204: Generic interface and use of profiles
for power drive systems – Profile type 4 specification**

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.

International Standard IEC 61800-7-204 has been prepared by subcommittee SC 22G: Adjustable speed electric drive systems incorporating semiconductor power converters, of IEC technical committee TC 22: Power electronic systems and equipment.

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

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

- update of drive parameters and their specification

The text of this standard is based on the following documents:

FDIS	Report on voting
22G/310/FDIS	22G/325/RVD

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

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

A list of all parts of the IEC 61800 series, under the general title *Adjustable speed electrical power drive systems*, can be found on the IEC website.

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

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

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.

INTRODUCTION

The IEC 61800 series is intended to provide a common set of specifications for adjustable speed electrical power drive systems.

IEC 61800 7 specifies profiles for power drive systems (PDS) and their mapping to existing communication systems by use of a generic interface model.

IEC 61800-7 describes a generic interface between control systems and power drive systems. This interface can be embedded in the control system. The control system itself can also be located in the drive (sometimes known as "smart drive" or "intelligent drive").

A variety of physical interfaces is available (analogue and digital inputs and outputs, serial and parallel interfaces, fieldbuses and networks). Profiles based on specific physical interfaces are already defined for some application areas (e.g. motion control) and some device classes (e.g. standard drives, positioner). The implementations of the associated drivers and application programmers interfaces are proprietary and vary widely.

IEC 61800-7 defines a set of common drive control functions, parameters, and state machines or description of sequences of operation to be mapped to the drive profiles.

IEC 61800-7 provides a way to access functions and data of a drive that is independent of the used drive profile and communication interface. The objective is a common drive model with generic functions and objects suitable to be mapped on different communication interfaces. This makes it possible to provide common implementations of motion control (or velocity control or drive control applications) in controllers without any specific knowledge of the drive implementation.

There are several reasons to define a generic interface:

For a drive device manufacturer

- less effort to support system integrators;
- less effort to describe drive functions because of common terminology;
- the selection of drives does not depend on availability of specific support;

For a control device manufacturer

- no influence of bus technology;
- easy device integration;
- independent of a drive supplier;

For a system integrator

- less integration effort for devices;
- only one understandable way of modeling;
- independent of bus technology.

Much effort is needed to design a motion control application with several different drives and a specific control system. The tasks to implement the system software and to understand the functional description of the individual components may exhaust the project resources. In some cases, the drives do not share the same physical interface. Some control devices just support a single interface which will not be supported by a specific drive. On the other hand, the functions and data structures are often specified with incompatibilities. This requires the system integrator to write special interfaces for the application software and this should not be his responsibility.

Some applications need device exchangeability or integration of new devices in an existing configuration. They are faced with different incompatible solutions. The efforts to adapt a solution to a drive profile and to manufacturer specific extensions may be unacceptable. This will reduce the degree of freedom to select a device best suited for this application to the selection of the unit which will be available for a specific physical interface and supported by the controller.

IEC 61800-7-1 is divided into a generic part and several annexes as shown in Figure 1. The drive profile types for CiA® 402¹, CIP Motion™², PROFIdrive³ and SERCOS®⁴ are mapped to the generic interface in the corresponding annex. The annexes have been submitted by open international network or fieldbus organizations which are responsible for the content of the related annex and use of the related trademarks.

This part of IEC 61800-7 specifies the profile type 4 (SERCOS®).

The profile types 1, 2 and 3 are specified in IEC 61800-7-201, IEC 61800-7-202 and IEC 61800-7-203.

¹ CiA® 402 is a registered trade mark of CAN in Automation e.V. (CiA). This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade mark holder or any of its products. Compliance to this profile does not require use of the registered trade mark CiA® 402. Use of the registered trade mark CiA® 402 requires permission of CAN in Automation e.V. (CiA).

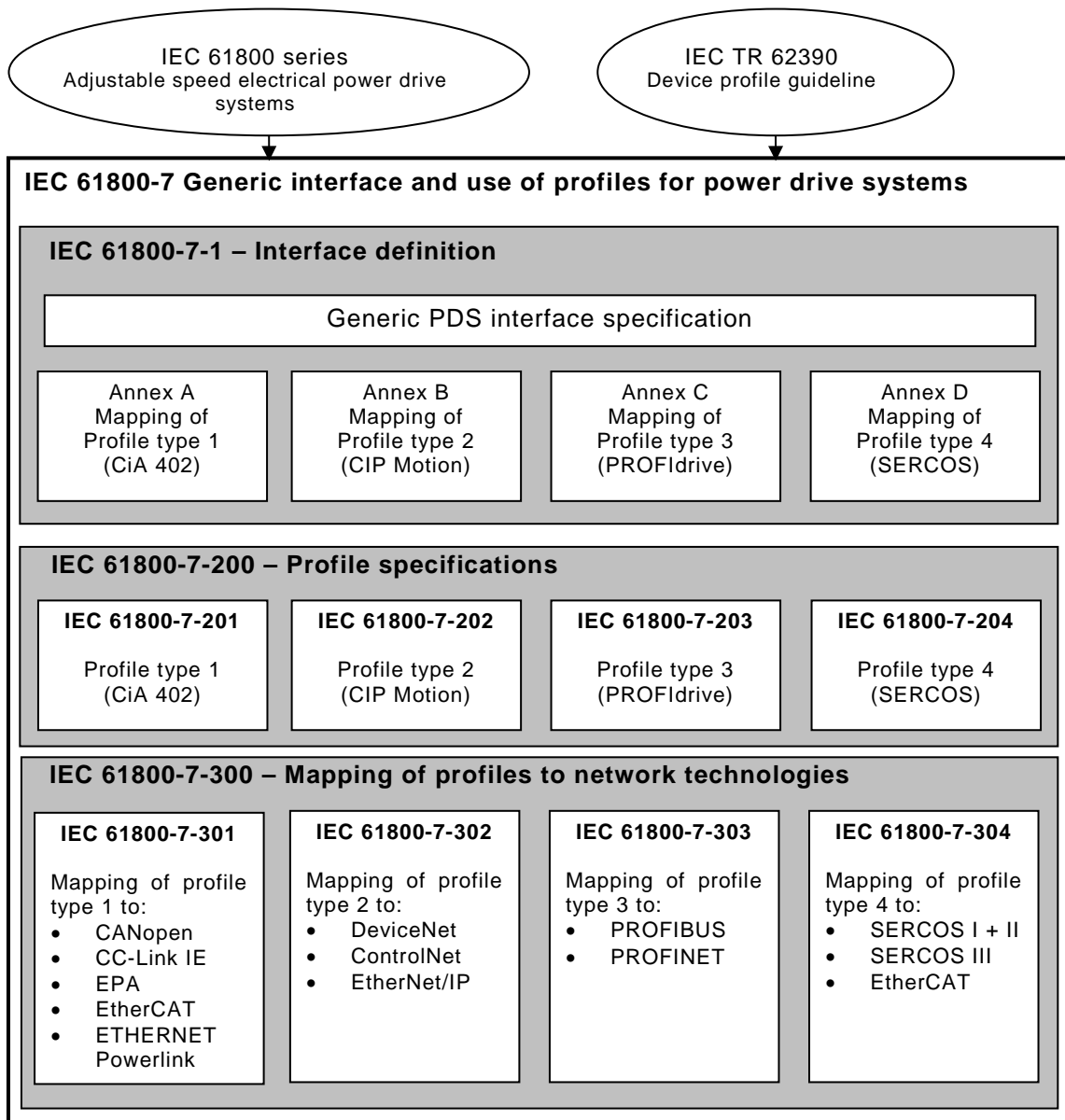
² CIP Motion™ is a trade mark of ODVA, Inc. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade mark holder or any of its products. Compliance to this profile does not require use of the trade mark CIP Motion™. Use of the trade mark CIP Motion™ requires permission of ODVA, Inc.

³ PROFIdrive is a trade name of PROFIBUS & PROFINET International. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade name holder or any of its products. Compliance to this profile does not require use of the trade name PROFIdrive. Use of the trade name PROFIdrive requires permission of PROFIBUS & PROFINET International.

⁴ SERCOS® is a registered trade mark of SERCOS International e.V. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade mark holder or any of its products. Compliance to this profile does not require use of the registered trade mark SERCOS®. Use of the registered trade mark SERCOS® requires permission of the trade mark holder.

IEC 61800-7-301, IEC 61800-7-302, IEC 61800-7-303 and IEC 61800-7-304 specify how the profile types 1, 2, 3 and 4 are mapped to different network technologies (such as CANopen⁵, CC-Link IE⁶ Field Network⁶, EPA⁷, EtherCAT⁸, Ethernet Powerlink⁹, DeviceNet¹⁰, ControlNet¹¹, EtherNet/IP¹², PROFIBUS¹³, PROFINET¹⁴ and SERCOS[®]).

-
- ⁵ CANopen[®] is a registered trade mark of CAN in Automation e.V. (CiA). This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade mark holder or any of its products. Compliance to this profile does not require use of the registered trade mark CANopen[®]. Use of the registered trade mark CANopen[®] requires permission of CAN in Automation e.V. (CiA). CANopen[®] is an acronym for Controller Area Network *open* and is used to refer to EN 50325-4.
- ⁶ CC-Link IE[®] Field Network is a registered trade mark of Mitsubishi Electric Corporation. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade mark holder or any of its products. Compliance to this profile does not require use of the registered trade mark CC-Link IE[®] Field Network. Use of the registered trade mark CC-Link IE[®] Field Network requires permission of Mitsubishi Electric Corporation.
- ⁷ EPA[™] is a trade mark of SUPCON Group Co. Ltd. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade mark holder or any of its products. Compliance to this profile does not require use of the trade mark EPA[™]. Use of the trade mark EPA[™] requires permission of the trade mark holder.
- ⁸ EtherCAT[®] is a registered trade mark of Beckhoff, Verl. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade mark holder or any of its products. Compliance to this profile does not require use of the registered trade mark EtherCAT[™]. Use of the registered trade mark EtherCAT[™] requires permission of the trade mark holder.
- ⁹ Ethernet Powerlink[™] is a trade mark of B&R, control of trade mark use is given to the non profit organization EPSG. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade mark holder or any of its products. Compliance to this profile does not require use of the trade mark Ethernet Powerlink[™]. Use of the trade mark Ethernet Powerlink[™] requires permission of the trade mark holder.
- ¹⁰ DeviceNet[™] is a trade mark of ODVA, Inc. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade mark holder or any of its products. Compliance to this profile does not require use of the trade mark DeviceNet[™]. Use of the trade mark DeviceNet[™] requires permission of ODVA, Inc.
- ¹¹ ControlNet[™] is a trade mark of ODVA, Inc. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade mark holder or any of its products. Compliance to this profile does not require use of the trade mark ControlNet[™]. Use of the trade mark ControlNet[™] requires permission of ODVA, Inc.
- ¹² EtherNet/IP[™] is a trade mark of ODVA, Inc. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade mark holder or any of its products. Compliance to this profile does not require use of the trade mark EtherNet/IP[™]. Use of the trade mark EtherNet/IP[™] requires permission of ODVA, Inc.
- ¹³ PROFIBUS is a trade name of PROFIBUS & PROFINET International. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade name holder or any of its products. Compliance to this profile does not require use of the trade name PROFIBUS. Use of the trade name PROFIBUS requires permission of PROFIBUS & PROFINET International.
- ¹⁴ PROFINET is a trade name of PROFIBUS & PROFINET International. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade name holder or any of its products. Compliance to this profile does not require use of the trade name PROFINET. Use of the trade name PROFINET requires permission of PROFIBUS & PROFINET International.



IEC

Figure 1 – Structure of IEC 61800-7

ADJUSTABLE SPEED ELECTRICAL POWER DRIVE SYSTEMS –

Part 7-204: Generic interface and use of profiles for power drive systems – Profile type 4 specification

1 Scope

This part of IEC 61800 specifies profile type 4 for power drive systems (PDS). Profile type 4 can be mapped onto different communication network technologies.

The functions specified in this part of IEC 61800 are not intended to ensure functional safety. This requires additional measures according to the relevant standards, agreements and laws.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61158-4-16, *Industrial communication networks – Fieldbus specifications – Part 4-16: Data-link layer protocol specification – Type 16 elements*

IEC 61158-4-19, *Industrial communication networks – Fieldbus specifications – Part 4-19: Data-link layer protocol specification – Type 19 elements*

IEC 61158-6-16, *Industrial communication networks – Fieldbus specifications – Part 6-16: Application layer protocol specification – Type 16 elements*

IEC 61800-7-304:2015, *Adjustable speed electrical power drive systems – Part 7-304: Generic interface and use of profiles for power drive systems – Mapping of profile type 4 to network technologies*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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

3.1.1

acknowledge telegram

AT

telegram, in which each slave inserts its data

Note 1 to entry: The English abbreviation AT is also used in French.

3.1.2

actual value

value of a variable quantity at a given instant

Note 1 to entry: Actual value is used in this document as input data of the application control program to monitor variables of the PDS (e.g. feedback variables).