



IEC 61800-7-201

Edition 1.0 2007-11

INTERNATIONAL STANDARD

Adjustable speed electrical power drive systems –
Part 7-201: Generic interface and use of profiles for power drive systems –
Profile type 1 specification

Document Preview

IEC 61800-7-201:2007

<https://standards.iteh.ai/c/ta10/Standards/iec/14b10ab9-5b1d-4d2e-aa34-3b67ba2c251e/iec-61800-7-201-2007>



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2007 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 It also gives information on projects, withdrawn and replaced publications.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

<https://standards.iec.ch/standards/iec/14b10ab9-5b1d-4d2e-aa34-3b67ba2c251e/iec-61800-7-201-2007>

Tel.: +41 22 919 02 11

Fax: +41 22 919 03 00



IEC 61800-7-201

Edition 1.0 2007-11

INTERNATIONAL STANDARD

Adjustable speed electrical power drive systems –
Part 7-201: Generic interface and use of profiles for power drive systems –
Profile type 1 specification

Document Preview

[IEC 61800-7-201:2007](https://standards.iteh.ai/c/teh/Standards/iec/14b10ab9-5b1d-4d2e-aa34-3b67ba2c251e/iec-61800-7-201-2007)

<https://standards.iteh.ai/c/teh/Standards/iec/14b10ab9-5b1d-4d2e-aa34-3b67ba2c251e/iec-61800-7-201-2007>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE XG

ICS 29.200; 35.100.05

ISBN 2-8318-9375-5

CONTENTS

FOREWORD	14
INTRODUCTION	16
1 Scope	19
2 Normative references	19
3 Terms, definitions and abbreviated terms	19
3.1 Terms and definitions	19
3.2 Abbreviated terms	23
4 General	24
4.1 General considerations	24
4.2 Communication interface	24
4.3 Object dictionary	25
5 Data types	25
5.1 Standard data types	25
5.2 Record definitions	26
6 General object definitions	27
6.1 General	27
6.2 Communication parameter objects	27
6.3 Additional identification and information objects	28
6.3.1 Object 6402 _h : Motor type	28
6.3.2 Object 6403 _h : Motor catalogue number	29
6.3.3 Object 6404 _h : Motor manufacturer	29
6.3.4 Object 6405 _h : http motor catalogue address	30
6.3.5 Object 6406 _h : Motor calibration date	30
6.3.6 Object 6407 _h : Motor service period	31
6.3.7 Object 6503 _h : Drive catalogue number	31
6.3.8 Object 6505 _h : http drive catalogue address	32
7 Error codes and error behaviour	32
7.1 Error codes	32
7.2 Error behavior	36
8 Controlling the power drive system	37
8.1 General	37
8.2 Finite state automaton	37
8.3 Modes of operation	40
8.4 Detailed object specifications	41
8.4.1 Object 6040 _h : Controlword	41
8.4.2 Object 6041 _h : Statusword	42
8.4.3 Object 603F _h : Error code	43
8.4.4 Object 6007 _h : Abort connection option code	44
8.4.5 Object 605A _h : Quick stop option code	45
8.4.6 Object 605B _h : Shutdown option code	46
8.4.7 Object 605C _h : Disable operation option code	46
8.4.8 Object 605D _h : Halt option code	47
8.4.9 Object 605E _h : Fault reaction option code	48
8.4.10 Object 6060 _h : Modes of operation	49
8.4.11 Object 6061 _h : Modes of operation display	50

8.4.12 Object 6502 _h : Supported drive modes	50
9 Factor group	51
9.1 General	51
9.2 Detailed object definitions	51
9.2.1 Object 608F _h : Position encoder resolution.....	51
9.2.2 Object 6090 _h : Velocity encoder resolution	52
9.2.3 Object 6091 _h : Gear ratio	53
9.2.4 Object 6092 _h : Feed constant.....	54
9.2.5 Object 607E _h : Polarity	55
10 Profile position mode	56
10.1 General information.....	56
10.2 Functional description	57
10.2.1 General	57
10.2.2 Single set-point	58
10.2.3 Set of set-points	59
10.3 General definitions	60
10.4 Use of controlword and statusword.....	60
10.5 Detailed object definitions	61
10.5.1 Object 607A _h : Target position.....	61
10.5.2 Object 607B _h : Position range limit.....	62
10.5.3 Object 607D _h : Software position limit	62
10.5.4 Object 607F _h : Max profile velocity.....	64
10.5.5 Object 6080 _h : Max motor speed	64
10.5.6 Object 6081 _h : Profile velocity.....	65
10.5.7 Object 6082 _h : End velocity	65
10.5.8 Object 6083 _h : Profile acceleration	66
10.5.9 Object 6084 _h : Profile deceleration.....	66
10.5.10 Object 6085 _h : Quick stop deceleration	67
10.5.11 Object 6086 _h : Motion profile type	67
10.5.12 Object 60A3 _h : Profile jerk use	68
10.5.13 Object 60A4 _h : Profile jerk.....	69
10.5.14 Object 60C5 _h : Max acceleration	70
10.5.15 Object 60C6 _h : Max deceleration.....	71
11 Homing mode	72
11.1 General information.....	72
11.2 Functional description	72
11.3 General definitions	73
11.3.1 Method 1: Homing on negative limit switch and index pulse.....	73
11.3.2 Method 2: Homing on positive limit switch and index pulse	73
11.3.3 Method 3 and 4: Homing on positive home switch and index pulse	73
11.3.4 Method 5 and 6: Homing on negative home switch and index pulse.....	74
11.3.5 Method 7 to 14: Homing on home switch and index pulse.....	74
11.3.6 Method 15 and 16: Reserved.....	75
11.3.7 Method 17 to 30: Homing without index pulse.....	75
11.3.8 Method 31 and 32: Reserved.....	76
11.3.9 Method 33 and 34: Homing on index pulse	76
11.3.10 Method 35: Homing on index pulse.....	76
11.3.11 Method 36: Homing with touch-probe	76
11.4 Use of controlword and statusword.....	76

11.5	Detailed object definitions	77
11.5.1	Object 607Ch: Home offset	77
11.5.2	Object 6098h: Homing method	78
11.5.3	Object 6099h: Homing speeds.....	79
11.5.4	Object 609Ah: Homing acceleration.....	80
11.5.5	Object 60B8h: Touch probe function.....	80
11.5.6	Object 60B9h: Touch probe status.....	82
11.5.7	Object 60BAh: Touch probe pos1 pos value	82
11.5.8	Object 60BBh: Touch probe pos1 neg value	83
11.5.9	Object 60BCh: Touch probe pos2 pos value	83
11.5.10	Object 60BDh: Touch probe pos2 neg value	84
12	Position control function	84
12.1	General information.....	84
12.2	Functional description	85
12.3	Detailed object definitions	87
12.3.1	Object 6062h: Position demand value	87
12.3.2	Object 6063h: Position actual internal value.....	87
12.3.3	Object 6064h: Position actual value.....	88
12.3.4	Object 6065h: Following error window	88
12.3.5	Object 6066h: Following error time out	89
12.3.6	Object 6067h: Position window	90
12.3.7	Object 6068h: Position window time	90
12.3.8	Object 60F4h: Following error actual value	91
12.3.9	Object 60FAh: Control effort.....	91
12.3.10	Object 60FCh: Position demand internal value	92
12.3.11	Object 60F2h: Positioning option code	92
13	Interpolated position mode	94
13.1	General information	94
13.2	Functional description	95
13.2.1	General	95
13.2.2	Linear interpolated position mode with several axes	96
13.2.3	Buffer strategies for the interpolated position mode	97
13.2.4	Interpolated position mode FSA	98
13.3	General definitions	99
13.4	Use of controlword and statusword	99
13.5	Detailed object definitions	100
13.5.1	Object 60C0h: Interpolation sub mode select.....	100
13.5.2	Object 60C1h: Interpolation data record	101
13.5.3	Object 60C2h: Interpolation time period.....	102
13.5.4	Object 60C4h: Interpolation data configuration	103
14	Profile velocity mode	105
14.1	General information.....	105
14.2	Functional description	106
14.3	General definitions	107
14.4	Use of controlword and statusword	107
14.5	Detailed object definitions	108
14.5.1	Object 6069h: Velocity sensor actual value	108
14.5.2	Object 606Ah: Sensor selection code	108
14.5.3	Object 606Bh: Velocity demand value	109

14.5.4 Object 606Ch: Velocity actual value	110
14.5.5 Object 606Dh: Velocity window	110
14.5.6 Object 606Eh: Velocity window time	111
14.5.7 Object 606Fh: Velocity threshold	111
14.5.8 Object 6070h: Velocity threshold time	112
14.5.9 Object 60FFh: Target velocity	112
14.5.10 Object 60F8h: Max slippage	113
15 Profile torque mode	113
15.1 General information.....	113
15.2 Functional description	113
15.3 General definitions	114
15.4 Use of controlword and statusword.....	114
15.5 Detailed object definitions	115
15.5.1 Object 6071h: Target torque.....	115
15.5.2 Object 6072h: Max torque	116
15.5.3 Object 6073h: Max current	116
15.5.4 Object 6074h: Torque demand	117
15.5.5 Object 6075h: Motor rated current.....	117
15.5.6 Object 6076h: Motor rated torque.....	118
15.5.7 Object 6077h: Torque actual value	118
15.5.8 Object 6078h: Current actual value	119
15.5.9 Object 6079h: DC link circuit voltage	119
15.5.10 Object 6087h: Torque slope	120
15.5.11 Object 6088h: Torque profile type	120
16 Velocity mode.....	121
16.1 General information.....	121
16.2 Functional description	122
16.2.1 Velocity limit function.....	122
16.2.2 Ramp function	122
16.2.3 Velocity control function	122
16.2.4 Factor function	122
16.3 General definitions	123
16.4 Use of controlword and statusword.....	123
16.5 Detailed object definitions	124
16.5.1 Object 6042h: v/ target velocity.....	124
16.5.2 Object 6043h: v/ velocity demand	125
16.5.3 Object 6044h: v/ velocity actual value	125
16.5.4 Object 6046h: v/ velocity min max amount	126
16.5.5 Object 6049h: v/ velocity deceleration.....	127
16.5.6 Object 6048h: v/ velocity acceleration	128
16.5.7 Object 604Ah: v/ velocity quick stop	130
16.5.8 Object 604Bh: v/ set-point factor	131
16.5.9 Object 604Ch: v/ dimension factor	132
17 Cyclic synchronous position mode	133
17.1 General information.....	133
17.2 Functional description	134
17.3 Use of controlword and statusword.....	135
17.4 Detailed object definitions	136
17.4.1 Object 60B0h: Position offset	136

17.4.2 Object 60B1 _h : Velocity offset.....	136
17.4.3 Object 60B2 _h : Torque offset.....	137
18 Cyclic synchronous velocity mode	137
18.1 General information.....	137
18.2 General definitions	138
18.3 Functional description	138
18.4 Use of controlword and statusword.....	139
19 Cyclic synchronous torque mode	140
19.1 General information.....	140
19.2 General definitions	140
19.3 Functional description	140
19.4 Use of controlword and statusword.....	141
20 Optional application FE	141
20.1 General	141
20.2 Object 60FD _h : Digital inputs.....	141
20.3 Object 60FE _h : Digital outputs.....	142
 Bibliography.....	144
 Figure 1 – Structure of IEC 61800-7-201:2007.....	18
Figure 2 – Value definition	27
Figure 3 – Remote and local control.....	37
Figure 4 – Power drive system finite state automaton	38
Figure 5 – Relation between different value parameters.....	41
Figure 6 – Value definition	41
Figure 7 – Value definition	42
Figure 8 – Value definition	50
Figure 9 – Value definition	56
Figure 10 – Trajectory generator and position control function	56
Figure 11 – Trajectory generator for profile position mode	57
Figure 12 – Set-point example	58
Figure 13 – Handshaking procedure for the single set-point method	58
Figure 14 – Handshaking procedure for the set of set-points method	59
Figure 15 – Set-point handling for two set-points	59
Figure 16 – Controlword for profile position (pp) mode	60
Figure 17 – Statusword for profile position (pp) mode	61
Figure 18 – Velocity/time diagram with jerk positions	69
Figure 19 – Homing mode function	72
Figure 20 – Homing on negative limit switch and index pulse	73
Figure 21 – Homing on positive limit switch and index pulse	73
Figure 22 – Homing on positive home switch and index pulse	74
Figure 23 – Homing on negative home switch and index pulse	74
Figure 24 – Homing on home switch and index pulse – positive initial motion	75
Figure 25 – Homing on home switch and index pulse – negative initial motion	75
Figure 26 – Homing on positive home switch	76

Figure 27 – Homing on index pulse	76
Figure 28 – Controlword for homing mode	76
Figure 29 – Statusword for homing mode	77
Figure 30 – Home offset definition	77
Figure 31 – Position control function	85
Figure 32 – Following error (functional overview)	85
Figure 33 – Position reached (functional overview)	86
Figure 34 – Position reached (definitions)	86
Figure 35 – Following error (definitions)	87
Figure 36 – Object structure	92
Figure 37 – Interpolation controller	95
Figure 38 – Interpolated position mode for two axes	96
Figure 39 – Linear interpolation for one axis	97
Figure 40 – Input buffer organisation	98
Figure 41 – Input buffer examples	98
Figure 42 – Interpolated position mode FSA	99
Figure 43 – Controlword for interpolated position mode	99
Figure 44 – Statusword for interpolated position mode	100
Figure 45 – Profile velocity mode	107
Figure 46 – Controlword for profile velocity mode	107
Figure 47 – Statusword for profile velocity mode	108
Figure 48 – Structure of the profile torque mode	114
Figure 49 – Controlword for profile torque mode	114
Figure 50 – Statusword for profile torque mode	115
Figure 51 – Velocity mode with all objects	121
Figure 52 – Velocity mode with mandatory objects only	121
Figure 53 – Velocity profile	122
Figure 54 – Factor function	122
Figure 55 – Reverse factor function	123
Figure 56 – Controlword for profile velocity mode	123
Figure 57 – Usage of controlword bits in velocity mode	124
Figure 58 – Statusword for profile velocity mode	124
Figure 59 – Transfer characteristic of v/l velocity min max amount	126
Figure 60 – Transfer characteristic of the velocity deceleration	127
Figure 61 – Transfer characteristic of the velocity acceleration	129
Figure 62 – Transfer characteristic of the quick stop deceleration	130
Figure 63 – Cyclic synchronous position mode overview	134
Figure 64 – Cyclic synchronous position control function	135
Figure 65 – Statusword for profile cyclic synchronous position mode	135
Figure 66 – Cyclic synchronous velocity mode overview	138
Figure 67 – Cyclic synchronous velocity control function	139
Figure 68 – Statusword for profile cyclic synchronous velocity mode	139
Figure 69 – Cyclic synchronous torque mode overview	140

Figure 70 – Cyclic synchronous torque control function	141
Figure 71 – Statusword for profile cyclic synchronous torque mode	141
Figure 72 – Object structure	142
Figure 73 – Object structure	142
Table 1 – List of used data types	26
Table 2 – Interpolated time period	26
Table 3 – Interpolated data configuration	26
Table 4 – vI velocity acceleration/deceleration	26
Table 5 – Object description	27
Table 6 – Entry description	28
Table 7 – Value definition	28
Table 8 – Object description	29
Table 9 – Entry description	29
Table 10 – Object description	29
Table 11 – Entry description	29
Table 12 – Object description	30
Table 13 – Entry description	30
Table 14 – Object description	30
Table 15 – Entry description	30
Table 16 – Object description	31
Table 17 – Entry description	31
Table 18 – Object description	31
Table 19 – Entry description	31
Table 20 – Object description	32
Table 21 – Entry description	32
Table 22 – Object description	32
Table 23 – Entry description	32
Table 24 – Error codes	33
Table 25 – FSA states and supported functions	38
Table 26 – Transition events and actions	39
Table 27 – Command coding	41
Table 28 – Object description	42
Table 29 – Entry description	42
Table 30 – State coding	42
Table 31 – Object description	43
Table 32 – Entry description	43
Table 33 – Object description	44
Table 34 – Entry description	44
Table 35 – Value definition	44
Table 36 – Object description	44
Table 37 – Entry description	45
Table 38 – Value definition	45

Table 39 – Object description	45
Table 40 – Entry description	46
Table 41 – Value definition	46
Table 42 – Object description	46
Table 43 – Entry description	46
Table 44 – Value definition	47
Table 45 – Object description	47
Table 46 – Entry description	47
Table 47 – Value definition	47
Table 48 – Object description	48
Table 49 – Entry description	48
Table 50 – Value definition	48
Table 51 – Object description	48
Table 52 – Entry description	49
Table 53 – Value definition	49
Table 54 – Object description	49
Table 55 – Entry description	50
Table 56 – Object description	50
Table 57 – Entry description	50
Table 58 – Object description	51
Table 59 – Entry description	51
Table 60 – Object description	52
Table 61 – Entry description	52
Table 62 – Object description	53
Table 63 – Entry description	53
Table 64 – Object description	54
Table 65 – Entry description	54
Table 66 – Object description	55
Table 67 – Entry description	55
Table 68 – Object description	56
Table 69 – Entry description	56
Table 70 – Definition of bit 4, bit 5, and bit 9	60
Table 71 – Definition of bit 6 and bit 8	60
Table 72 – Definition of bit 10, bit 12, and bit 13	61
Table 73 – Object description	61
Table 74 – Entry description	61
Table 75 – Object description	62
Table 76 – Entry description	62
Table 77 – Object description	63
Table 78 – Entry description	63
Table 79 – Object description	64
Table 80 – Entry description	64
Table 81 – Object description	64

Table 82 – Entry description	65
Table 83 – Object description	65
Table 84 – Entry description	65
Table 85 – Object description	66
Table 86 – Entry description	66
Table 87 – Object description	66
Table 88 – Entry description	66
Table 89 – Object description	67
Table 90 – Entry description	67
Table 91 – Object description	67
Table 92 – Entry description	67
Table 93 – Value definition	68
Table 94 – Object description	68
Table 95 – Entry description	68
Table 96 – Object description	68
Table 97 – Entry description	69
Table 98 – Value assignments	69
Table 99 – Object description	69
Table 100 – Entry description	70
Table 101 – Object description	71
Table 102 – Entry description	71
Table 103 – Object description	71
Table 104 – Entry description	71
Table 105 – Definition of bit 4 and bit 8	77
Table 106 – Definition of bit 10, bit 12, and bit 13	77
Table 107 – Object description	78
Table 108 – Entry description	78
Table 109 – Value definition	78
Table 110 – Object description	78
Table 111 – Entry description	79
Table 112 – Object description	79
Table 113 – Entry description	79
Table 114 – Object description	80
Table 115 – Entry description	80
Table 116 – Value definition	81
Table 117 – Object description	81
Table 118 – Entry description	81
Table 119 – Value definition	82
Table 120 – Object description	82
Table 121 – Entry description	82
Table 122 – Object description	83
Table 123 – Entry description	83
Table 124 – Object description	83

Table 125 – Entry description	83
Table 126 – Object description	84
Table 127 – Entry description	84
Table 128 – Object description	84
Table 129 – Entry description	84
Table 130 – Object description	87
Table 131 – Entry description	87
Table 132 – Object description	88
Table 133 – Entry description	88
Table 134 – Object description	88
Table 135 – Entry description	88
Table 136 – Object description	89
Table 137 – Entry description	89
Table 138 – Object description	89
Table 139 – Entry description	89
Table 140 – Object description	90
Table 141 – Entry description	90
Table 142 – Object description	90
Table 143 – Entry description	91
Table 144 – Object description	91
Table 145 – Entry description	91
Table 146 – Object description	91
Table 147 – Entry description	92
Table 148 – Object description	92
Table 149 – Entry description	92
Table 150 – Value definition for bit 0 and bit 1	93
Table 151 – Value definition for bit 2 and bit 3	93
Table 152 – Value definition for bit 4 and bit 5	93
Table 153 – Object description	94
Table 154 – Entry description	94
Table 155 – Position calculation in interpolated position mode for several axes	96
Table 156 – FSA states and supported functions	99
Table 157 – Transition events and actions	99
Table 158 – Definition of bit 4 and bit 8	100
Table 159 – Definition of bit 10 and bit 12	100
Table 160 – Value definition	100
Table 161 – Object description	101
Table 162 – Entry description	101
Table 163 – Object description	101
Table 164 – Entry description	102
Table 165 – Object description	103
Table 166 – Entry description	103
Table 167 – Object description	104

Table 168 – Entry description	104
Table 169 – Definition of bit 8	107
Table 170 – Definition of bit 10, bit 12, and bit 13	108
Table 171 – Object description	108
Table 172 – Entry description	108
Table 173 – Value definition	109
Table 174 – Object description	109
Table 175 – Entry description	109
Table 176 – Object description	109
Table 177 – Entry description	110
Table 178 – Object description	110
Table 179 – Entry description	110
Table 180 – Object description	110
Table 181 – Entry description	111
Table 182 – Object description	111
Table 183 – Entry description	111
Table 184 – Object description	111
Table 185 – Entry description	112
Table 186 – Object description	112
Table 187 – Entry description	112
Table 188 – Object description	112
Table 189 – Entry description	113
Table 190 – Object description	113
Table 191 – Entry description	113
Table 192 – Definition of bit 8	115
Table 193 – Definition of bit 10	115
Table 194 – Object description	115
Table 195 – Entry description	115
Table 196 – Object description	116
Table 197 – Entry description	116
Table 198 – Object description	116
Table 199 – Entry description	116
Table 200 – Object description	117
Table 201 – Entry description	117
Table 202 – Object description	117
Table 203 – Entry description	117
Table 204 – Object description	118
Table 205 – Entry description	118
Table 206 – Object description	118
Table 207 – Entry description	118
Table 208 – Object description	119
Table 209 – Entry description	119
Table 210 – Object description	119