

TECHNICAL SPECIFICATION
SPÉCIFICATION TECHNIQUE
TECHNISCHE SPEZIFIKATION

CLC IEC/TS 61851-3-5

December 2023

ICS 43.120

English Version

Electric vehicles conductive charging system - Part 3-5: DC EV supply equipment where protection relies on double or reinforced insulation - Pre-defined communication parameters and general application objects
(IEC/TS 61851-3-5:2023)

Système de charge conductive pour véhicules électriques - Partie 3-5 : Exigences relatives aux véhicules électriques légers - Paramètres de communication prédéfinis et objets à application générale
(IEC/TS 61851-3-5:2023)

Konduktive Ladesysteme für Elektrofahrzeuge - Teil 3-5: Gleichstrom-Versorgungseinrichtungen für Elektrofahrzeuge mit Schutzwirkung durch doppelte oder verstärkte Isolierung - Vordefinierte Kommunikationsparameter und allgemeine Anwendungsgegenstände
(IEC/TS 61851-3-5:2023)

This Technical Specification was approved by CENELEC on 2023-12-04.

CENELEC members are required to announce the existence of this TS in the same way as for an EN and to make the TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

This document (CLC IEC/TS 61851-3-5:2023) consists of the text of IEC/TS 61851-3-5:2023, prepared by IEC/TC 69 "Electrical power/energy transfer systems for electrically propelled road vehicles and industrial trucks".

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a standardization request addressed to CENELEC by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Technical Specification IEC/TS 61851-3-5:2023 was approved by CENELEC as a European Technical Specification without any modification.

Annex ZA

(normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

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

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC/TS 61851-3-1	2023	Electric vehicles conductive charging system - Part 3-1: DC EV supply equipment where protection relies on double or reinforced insulation - General rules and requirements for stationary equipment	-	-
IEC/TS 61851-3-4	2023	Electric vehicles conductive charging system - Part 3-4: DC EV supply equipment where protection relies on double or reinforced insulation - General definitions and requirements for CANopen communication Industrial communications subsystem based on ISO 11898 (CAN) for controller-device interfaces - Part 4: CANopen	-	-
CiA 302-2	2009	CANopen additional application layer functions - Part 2: Network management	EN 50325-4 2002	-

TECHNICAL SPECIFICATION

**Electric vehicles conductive charging system –
Part 3-5: DC EV supply equipment where protection relies on double or
reinforced insulation – Pre-defined communication parameters and general
application objects**

CONTENTS

FOREWORD	12
INTRODUCTION	14
1 Scope	15
2 Normative references	15
3 Terms and definitions	15
4 Symbols and abbreviated terms	15
5 Pre-defined communication objects	16
5.1 General	16
5.1.1 Overview	16
5.1.2 Object 1000 _h : Device type	16
5.1.3 Object 1001 _h : Error register	17
5.1.4 Object 1003 _h : Pre-defined error field	17
5.1.5 Object 1005 _h : COB-ID SYNC	17
5.1.6 Object 1006 _h : Communication cycle period	17
5.1.7 Object 1007 _h : Communication window length	18
5.1.8 Object 1016 _h : Heartbeat consumer time	18
5.1.9 Object 1017 _h : Heartbeat producer time	18
5.1.10 Object 1018 _h : Identity	18
5.1.11 Object 1029 _h : Error behaviour	18
5.2 PDO communication	19
6 General application objects for CANopen devices	19
6.1 General	19
6.2 Application objects produced by CANopen devices with NMT slave functionality	20
6.2.1 General	20
6.2.2 Object 6000 _h : Supported virtual devices	20
6.2.3 Object 6002 _h : Status word	23
6.2.4 Object 6003 _h : Device capability	25
6.2.5 Object 6004 _h : System date and time (optional)	27
6.2.6 Object 6005 _h : Device unique part number (optional)	28
6.2.7 Object 6006 _h : Device electronic production date (optional)	28
6.2.8 Object 6007 _h : Device installation date (optional)	29
6.2.9 Object 6008 _h : Device nominal voltage (optional, mandatory for active devices)	30
6.2.10 Object 6009 _h : Device alarm status	32
6.2.11 Object 600A _h : Device alarm capability	33
6.2.12 Object 600B _h : Device warning status (optional)	35
6.2.13 Object 600C _h : Device warning capability (optional)	37
6.2.14 Object 600E _h : Implemented specification versions	39
6.2.15 Object 6020 _h : Device request dynamic voltage limitation	41
6.2.16 Object 6022 _h : Device request dynamic current input limitation	42

6.2.17	Object 6023 _h : Device request dynamic current output limitation	44
6.2.18	Object 6024 _h : Device maximum continuous input current	46
6.2.19	Object 6025 _h : Device maximum continuous output current	48
6.2.20	Object 6026 _h : Device maximum voltage	49
6.2.21	Object 6027 _h : Device minimum voltage	51
6.2.22	Object 6039 _h : Device actual external voltage (optional).....	52
6.2.23	Object 603A _h : Device peak input current	54
6.2.24	Object 603B _h : Device peak input current time (optional).....	55
6.2.25	Object 603C _h : Device peak output current (optional)	57
6.2.26	Object 603D _h : Device peak output current time (optional).....	58
6.2.27	Object 603E _h : Device actual current.....	59
6.2.28	Object 6040 _h : Device actual voltage	61
6.2.29	Object 6042 _h : Device internal temperature (optional)	62
6.2.30	Object 6043 _h : Device time on (optional)	64
6.2.31	Object 6044 _h : Device time standby (optional).....	64
6.2.32	Object 6045 _h : Device switch on counter (optional).....	65
6.2.33	Object 6060 _h : CANopen device measurement timing (optional)	65
6.2.34	Object 6064 _h : Device maximum AUX continuous input current (optional).....	69
6.2.35	Object 6065 _h : Device maximum AUX continuous output current (optional)	70
6.2.36	Object 6066 _h : Device maximum AUX voltage (optional).....	72
6.2.37	Object 6067 _h : Device minimum AUX voltage (optional).....	73
6.2.38	Object 6070 _h : Device actual AUX current (optional).....	75
6.2.39	Object 6071 _h : Device actual AUX voltage (optional)	77
6.2.40	Object 6072 _h : Device available output voltage	78
6.2.41	Object 6073 _h : Device available output current	79
6.2.42	Object 6074 _h : Device available input current (optional)	81
6.3	Security	82
6.3.1	General	82
6.3.2	Object 6311 _h : Locking status.....	83
6.4	Application objects consumed by CANopen devices with NMT slave functionality (mandatory).....	84
6.4.1	General	84
6.4.2	Object 6001 _h : Control word	85
6.4.3	Object 6046 _h : Device set maximum voltage.....	86
6.4.4	Object 6047 _h : Device set minimum voltage.....	88
6.4.5	Object 604A _h : Device set maximum continuous input current	89
6.4.6	Object 604B _h : Device set maximum continuous output current	90
6.4.7	Object 604C _h : Device set maximum peak input current	91
6.4.8	Object 604D _h : Device set maximum peak input current time	92
6.4.9	Object 604E _h : Device set maximum peak output current.....	93
6.4.10	Object 604F _h : Device set maximum peak output current time	94

6.5	Application objects consumed by CANopen devices with NMT slave functionality (optional).....	95
6.5.1	General	95
6.5.2	Object 600D _h : Error behaviour at process interface (optional)	95
6.5.3	Object 6058 _h : Device security key (optional)	96
6.5.4	Object 6059 _h : Devices' user name and address (optional)	97
6.5.5	Object 605A _h : Device password (optional).....	99
6.5.6	Object 6053 _h : Prefixes and SI units for analogue values (optional).....	100
7	Application objects relevant for fleet management (optional)	103
7.1	General.....	103
7.2	Object 63D5h: Travelled distance	103
7.3	Object 63D6h: Travelled distance current trip.....	104
7.4	Object 63D7 _h : Travelled time	105
7.5	Object 63D8 _h : Travelled time current trip	106
7.6	Object 63D9 _h : Transferred watt hours.....	107
7.7	Object 63DA _h : Current trip transferred watt hours	108
8	Stationary applications (optional).....	110
8.1	General application objects relevant for stationary applications	110
8.2	Object 6010 _h : Ambient temperature	110
8.3	Object 6011 _h : Phase 1 AC Current	111
8.4	Object 6012 _h : Phase 2 AC Current	113
8.5	Object 6013 _h : Phase 3 AC Current	114
8.6	Object 6014 _h : Phase 1 AC voltage.....	115
8.7	Object 6015 _h : Phase 2 AC voltage.....	117
8.8	Object 6016 _h : Phase 3 AC voltage.....	118
8.9	Object 6017 _h : Line 12 AC voltage	120
8.10	Object 6018 _h : Line 23 AC voltage	121
8.11	Object 6019 _h : Line 13 AC voltage	123
8.12	Object 601A _h : Phase 1 AC reactive power.....	124
8.13	Object 601B _h : Phase 2 AC reactive power.....	126
8.14	Object 601C _h : Phase 3 AC reactive power.....	127
8.15	Object 601D _h : Phase 1 AC apparent power	129
8.16	Object 601E _h : Phase 2 AC apparent power	130
8.17	Object 601F _h : Phase 3 AC apparent power.....	132
8.18	Object 6030 _h : Phase 1 AC real power.....	134
8.19	Object 6031 _h : Phase 2 AC real power.....	135
8.20	Object 6032 _h : Phase 3 AC real power.....	137
8.21	Object 6033 _h : Total AC reactive power	138
8.22	Object 6034 _h : Total AC apparent power.....	140
8.23	Object 6035 _h : Total AC real power.....	141
8.24	Object 6036 _h : Phase1 power factor (cos phi)	143
8.25	Object 6037 _h : Phase 2 power factor (cos phi)	144

8.26 Object 6038 _h : Phase 3 power factor (cos phi)	146
8.27 Object 6050 _h : AC Frequency	147
8.28 Object 6051 _h : Isolation resistance	149
8.29 Object 6052 _h : Rated power.....	150
Annex A (informative) Measured values	152
A.1 General.....	152
A.2 Actual voltage	152
Annex B (normative) Process data object (PDO) communication for EMS	153
B.1 General.....	153
B.2 Specification of messages	153
B.3 Allocation of PDOs to virtual devices	153
B.4 Detailed PDO parameters	159
B.4.1 General	159
B.4.2 PDO parameters for message number 1	159
B.4.3 PDO parameters for message number 2	162
B.4.4 PDO parameters for message number 3	164
B.4.5 PDO parameters for message number 4 to 9	167
B.4.6 PDO parameters for message number 10	168
B.4.7 PDO parameters for message number 12	170
Bibliography.....	173
 Figure 1 – Object structure	16
Figure 2 – Object structure supported virtual devices.....	20
Figure 3 – Object structure device status	23
Figure 4 – Value structure.....	25
Figure 5 – Value structure.....	32
Figure 6 – Value structure.....	33
Figure 7 – Value structure.....	35
Figure 8 – Value structure.....	37
Figure 9 – Value structure.....	39
Figure 10 – Object structure security status	83
Figure 11 – Value structure.....	85
Figure 12 – Object structure for prefixes	101
Figure A.1 – Voltage measurement at generic active device	152
 Table 1 – Value definition for the bit field additional information.....	16
Table 2 – Object description	17
Table 3 – Entry description	17
Table 4 – Default value definition object 1005 _h	17
Table 5 – Value definition	18
Table 6 – Object description (optional).....	18
Table 7 – Entry description	19
Table 8 – Value definition for bit fields	21
Table 9 – Object description	22

Table 10 – Entry description	22
Table 11 – Value definition device status	23
Table 12 – Object description	24
Table 13 – Entry description	24
Table 14 – Value definition	25
Table 15 – Object description	26
Table 16 – Entry description	26
Table 17 – Object description	27
Table 18 – Entry description	27
Table 19 – Object description	28
Table 20 – Entry description	28
Table 21 – Object description	28
Table 22 – Entry description	29
Table 23 – Object description	29
Table 24 – Entry description	30
Table 25 – Object description	30
Table 26 – Entry description	31
Table 27 – Value definition	32
Table 28 – Object description	33
Table 29 – Entry description	33
Table 30 – Value definition	34
Table 31 – Object description	35
Table 32 – Entry description	35
Table 33 – Value definition	36
Table 34 – Object description	37
Table 35 – Entry description	37
Table 36 – Value definition	37
Table 37 – Object description	38
Table 38 – Entry description	39
Table 39 – Value definition	39
Table 40 – Object description	40
Table 41 – Entry description	40
Table 42 – Value definition	41
Table 43 – Object description	41
Table 44 – Entry description	41
Table 45 – Value definition	43
Table 46 – Object description	43
Table 47 – Entry description	43
Table 48 – Value definition	45
Table 49 – Object description	45
Table 50 – Entry description	45
Table 51 – Object description	46
Table 52 – Entry description	47

Table 53 – Object description	48
Table 54 – Entry description	48
Table 55 – Object description	49
Table 56 – Entry description	50
Table 57 – Object description	51
Table 58 – Entry description	51
Table 59 – Object description	53
Table 60 – Entry description	53
Table 61 – Object description	54
Table 62 – Entry description	54
Table 63 – Object description	56
Table 64 – Entry description	56
Table 65 – Object description	57
Table 66 – Entry description	57
Table 67 – Object description	58
Table 68 – Entry description	59
Table 69 – Object description	60
Table 70 – Entry description	60
Table 71 – Object description	61
Table 72 – Entry description	61
Table 73 – Object description	63
Table 74 – Entry description	63
Table 75 – Object description	64
Table 76 – Entry description	64
Table 77 – Object description	64
Table 78 – Entry description	64
Table 79 – Object description	65
Table 80 – Entry description	65
Table 81 – Object description	66
Table 82 – Entry description	66
Table 83 – Object description	69
Table 84 – Entry description	69
Table 85 – Object description	70
Table 86 – Entry description	71
Table 87 – Object description	72
Table 88 – Entry description	72
Table 89 – Object description	74
Table 90 – Entry description	74
Table 91 – Object description	75
Table 92 – Entry description	75
Table 93 – Object description	77
Table 94 – Entry description	77
Table 95 – Object description	78

Table 96 – Entry description	78
Table 97 – Object description	80
Table 98 – Entry description	80
Table 99 – Object description	81
Table 100 – Entry description	81
Table 101 – Value definition security status	83
Table 102 – Object description.....	83
Table 103 – Entry description	84
Table 104 – Value definition.....	85
Table 105 – Object description.....	85
Table 106 – Entry description	86
Table 107 – Object description.....	87
Table 108 – Entry description	87
Table 109 – Object description.....	88
Table 110 – Entry description	88
Table 111 – Object description.....	89
Table 112 – Entry description	89
Table 113 – Object description.....	90
Table 114 – Entry description	90
Table 115 – Object description.....	91
Table 116 – Entry description	91
Table 117 – Object description.....	92
Table 118 – Entry description	92
Table 119 – Object description.....	93
Table 120 – Entry description	93
Table 121 – Object description.....	94
Table 122 – Entry description	94
Table 123 – Value definition.....	95
Table 124 – Object description.....	95
Table 125 – Entry description	96
Table 126 – Object description.....	97
Table 127 – Entry description	97
Table 128 – Object description.....	98
Table 129 – Entry description	98
Table 130 – Object description.....	99
Table 131 – Entry description	99
Table 132 – Additional units.....	101
Table 133 – Allocation of powerlines to sub-indices	101
Table 134 – Object description.....	101
Table 135 – Entry description	101
Table 136 – Object description.....	103
Table 137 – Entry description	104
Table 138 – Object description.....	105

Table 139 – Entry description	105
Table 140 – Object description.....	106
Table 141 – Entry description	106
Table 142 – Object description.....	107
Table 143 – Entry description	107
Table 144 – Object description.....	108
Table 145 – Entry description	108
Table 146 – Object description.....	109
Table 147 – Entry description	109
Table 148 – Object description.....	110
Table 149 – Entry description	110
Table 150 – Object description.....	111
Table 151 – Entry description	112
Table 152 – Object description.....	113
Table 153 – Entry description	113
Table 154 – Object description.....	114
Table 155 – Entry description	114
Table 156 – Object description.....	116
Table 157 – Entry description	116
Table 158 – Object description.....	117
Table 159 – Entry description	117
Table 160 – Object description.....	118
Table 161 – Entry description	119
Table 162 – Object description.....	120
Table 163 – Entry description	120
Table 164 – Object description.....	121
Table 165 – Entry description	122
Table 166 – Object description.....	123
Table 167 – Entry description	123
Table 168 – Object description.....	124
Table 169 – Entry description	124
Table 170 – Object description.....	126
Table 171 – Entry description	126
Table 172 – Object description.....	127
Table 173 – Entry description	128
Table 174 – Object description.....	129
Table 175 – Entry description	129
Table 176 – Object description.....	131
Table 177 – Entry description	131
Table 178 – Object description.....	132
Table 179 – Entry description	132
Table 180 – Object description.....	134
Table 181 – Entry description	134

Table 182 – Object description.....	135
Table 183 – Entry description	136
Table 184 – Object description.....	137
Table 185 – Entry description	137
Table 186 – Object description.....	138
Table 187 – Entry description	139
Table 188 – Object description.....	140
Table 189 – Entry description	140
Table 190 – Object description.....	141
Table 191 – Entry description	142
Table 192 – Object description.....	143
Table 193 – Entry description	143
Table 194 – Object description.....	144
Table 195 – Entry description	145
Table 196 – Object description.....	146
Table 197 – Entry description	146
Table 198 – Object description.....	147
Table 199 – Entry description	148
Table 200 – Object description.....	149
Table 201 – Entry description	149
Table 202 – Object description.....	150
Table 203 – Entry description	151
Table B.1 – PDO mapping entries	153
Table B.2 – PDO assignment for active devices	154
Table B.3 – PDO assignment for VCU 9 to 16	156
Table B.4 – Additional PDO assignment for some active devices	156
Table B.5 – PDO assignment for passive devices	158
Table B.6 – Object description	159
Table B.7 – Entry description	159
Table B.8 – Object description	161
Table B.9 – Entry description	161
Table B.10 – Object description	162
Table B.11 – Entry description	162
Table B.12 – Object description	164
Table B.13 – Entry description	164
Table B.14 – TPDO communication parameter.....	165
Table B.15 – Entry description	165
Table B.16 – Object description	166
Table B.17 – Entry description	167
Table B.18 – Object description	168
Table B.19 – Entry description	168
Table B.20 – Object description	169
Table B.21 – Entry description	170

Table B.22 – Object description	170
Table B.23 – Entry description	171
Table B.24 – Object description	172
Table B.25 – Entry description	172