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Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



69/1077/CD

COMMITTEE DRAFT (CD)

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IEC TC 69 : ELECTRICAL POWER/ENERGY TRANSFER SYSTEMS FOR ELECTRICALLY PROPELLED ROAD VEHICLES AND INDUSTRIAL TRUCKS	
SECRETARIAT: Belgium	SECRETARY: Mr Peter Van den Bossche
OF INTEREST TO THE FOLLOWING COMMITTEES:	HORIZONTAL FUNCTION(S):
ASPECTS CONCERNED:	

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TITLE:

Conductive power and energy transfer systems for electric vehicles - Part 24: Digital communication between a DC EV supply equipment and an electric vehicle for control of DC charging

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ELECTRIC VEHICLE CONDUCTIVE CHARGING SYSTEM –**Part 24: Digital communication between a DC EV supply equipment and an electric vehicle for control of DC charging****FOREWORD**

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International Standard IEC 61851-24 has been prepared by IEC technical committee 69: Electrical power/energy transfer systems for electrically propelled road vehicles and industrial trucks.

This second edition cancels and replaces the first edition published in 2014. This edition constitutes a technical revision.

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

- a) Annex A and Annex B have been updated in line with IEC 61851-23:202X and relevant standards;

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

CD	Report on voting
69/XX/CD	69/XX/CC

164
165 Full information on the voting for the approval of this document can be found in the report on
166 voting indicated in the above table.

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

168 A list of all parts in the IEC 61851 series, published under the general title *Electric vehicle*
169 *conductive charging system*, can be found on the IEC website.

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

- 173 • reconfirmed,
- 174 • withdrawn,
- 175 • replaced by a revised edition, or
- 176 • amended.

177

178 The National Committees are requested to note that for this publication the stability date
179 is 2026.

180 THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED
181 AT THE PUBLICATION STAGE.

182

ELECTRIC VEHICLE CONDUCTIVE CHARGING SYSTEM –

Part 24: Digital communication between a DC EV supply equipment and an electric vehicle for control of DC charging

1 Scope

This part of IEC 61851, together with IEC 61851-23, applies to digital communication between a DC EV supply equipment and an electric road vehicle (EV) for control of conductive DC power transfer, with a rated supply voltage up to 1 000 V AC or up to 1 500 V DC and a rated output voltage up to 1 500 V DC.

This document also applies to digital communication between the DC EV charging/discharging station and the EV for system A, as specified in Annex A.

The EV charging mode is mode 4, according to IEC 61851-23.

Annex A, Annex B, and Annex C give descriptions of digital communications for control of DC charging specific to DC EV charging systems A, B and C as defined in IEC 61851-23.

2 Normative references

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.

IEC 61851-23:202X, *Electric vehicle conductive charging system – Part 23: DC electric vehicle supply equipment*

ISO TR 8713, *Electric propelled road vehicles – Vocabulary*

ISO 11898-1:2015, *Road vehicles – Controller area network (CAN) – Part 1: Data link layer and physical signaling*

ISO 11898-2:2016, *Road vehicles – Controller area network (CAN) – Part 2: High-speed medium access unit*

ISO 15118-2:2014, *Road vehicles – Vehicle to grid communication interface – Part 2: Network and application protocol requirements*

ISO 15118-20:2022, *Road vehicles – Vehicle to grid communication interface – Part 20: 2nd generation network layer and application layer requirements*

ISO 15118-20:202X AMD1, *Road vehicles – Vehicle to grid communication interface – Part 20: 2nd generation network layer and application layer requirements AMENDMENT 1: AC DER service, MCS service, and improved security concept*

ISO 15118-202:2022, *Road vehicles – Vehicle to grid communication interface – Part 202: Extensible SECC Discovery Protocol and Event Notification Protocol*

DIN TS 70121:2024, *Electromobility – Digital communication between a DC EV charging station and an electric vehicle for control of DC charging in the combined charging system*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO TR 8713 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

This clause of IEC 61851-23:202X is applicable except as follows:

Addition:

3.1

parameter

single piece of information relevant to charging control, and that is exchanged between a DC EV supply equipment and an EV using a form of digital communication

3.2

signal

data element that is communicated between a DC EV supply equipment and an EV using any means other than digital communication

4 System configuration

The system configuration shall be in accordance with GG.2(TBD) of IEC 61851-23:202X.

5 Digital communication architecture

In this document, two digital communication architectures are used:

- based on CAN using a dedicated data communication circuit; CAN protocol is given in ISO 11898-1. Refer to Annex A and Annex B for specific implementation details.
- based on Homeplug® Green PHY™¹ (see IEEE 1901) over the control pilot line; refer to Annex C for specific implementation details.

6 Charging control process

GG.3 (TBD) of IEC 61851-23:202X provides general information on the charging process and the state of DC EV supply equipment.

Specific requirements of charging process are given in A.4 and A.6.3 for system A, B.4 and B.6 for system B, and C.3 for system C in IEC 61851-23:202X respectively.

7 Overview of charging control

The digital communication of DC charging control covered by this document is as shown in Figure 1, identifying the SECC (supply equipment communication controller) and EVCC (EV communication controller), as defined in IEC 61851-23. This document does not cover the

¹ Homeplug® and Green PHY™ are examples of suitable products available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of these products.

control protocol internal to the DC EV supply equipment, nor the vehicle, such as power control protocol for AC/DC inverter of DC EV supply equipment and battery management control in the vehicle.

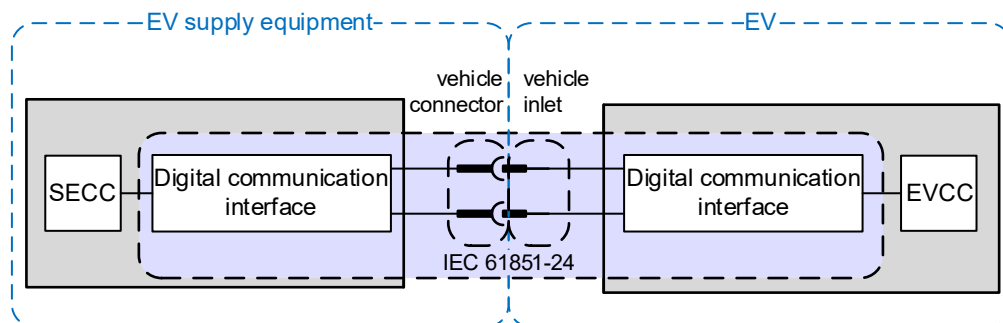


Figure 1 – Digital communication between a DC EV supply equipment and an electric vehicle for control of DC charging

8 Exchanged information for DC charging control

This clause describes information which shall be exchanged between a DC EV supply equipment and a vehicle during the charging process according to IEC 61851-23. The information in Table 1 is common to all systems described in Annex A, Annex B and Annex C. Each information listed in Table 1 is defined as a parameter in each annex. Each system can have additional parameters, and these parameters are defined in each annex.

SecNote: References to -23 to be updated.

Table 1 – Exchanged information for DC charging control

No.	Information	Description	Relevant requirement in IEC 61851-23: 202X
a-1	Current request for the controlled current charging (CCC) system	Exchange of current value requested by EV	6.3.1.101
a-2	Voltage request for the controlled voltage charging (CVC) system	Exchange of voltage value requested by EV	
a-3	Maximum rated voltage of DC EV supply equipment	Exchange of maximum rated voltage value of DC EV supply equipment	6.3.1.101 6.3.1.104
a-4	Maximum rated current of DC EV supply equipment	Exchange of maximum rated current value of DC EV supply equipment	6.3.1.101 6.3.1.104
b-1	Communication protocol	Exchange of software version of a charging system	6.3.1.104 6.3.1.106
b-2	Maximum voltage limit of EV	Exchange of maximum voltage limit value of vehicle.	
b-3	EV minimum current limit, only for the controlled voltage charging (CVC) system	Under consideration	
b-4	Implementation of optional control function	Exchange information about available optional function, such as high current control and dynamic control.	6.3.1.104 6.3.2.102
c	Insulation check result	Exchange of the result of insulation check before charging - If insulation check fails, a signal is sent that charging is not allowed.	6. 3.1.105

No.	Information	Description	Relevant requirement in IEC 61851-23: 202X
d	Short circuit test before charging	Exchange of information on short circuit test before charging	6.3.1.109
e	Charging stopped by user	Exchange of information on charge stop command by the user of DC EV supply equipment	6.3.1.110
f	EV supply equipment real time available load current (optional)	Exchange of EV supply equipment real time available load current for demand management. Required for system providing that function.	6.3.2.102
g	Loss of digital communication	Detection of loss of digital communication - If a receiver does not get information expected to receive within time out period, it is considered as loss of digital communication.	6.3.1.5
h-1	Zero current confirmed	Notification of zero current confirmed - Station informs EV that low current condition has been met (to allow the opening and welding check of EV contactors by EV)	6.3.1.113 GG.3.4
h-2	Welding detection	Exchange of information on the whole process of welding detection	
i-1	Normal shutdown	Termination of the charging process not caused by a failure	6.3.1.113.2
i-2	Error shutdown	Termination of the charging process caused by a failure	6.3.1.113.3

Annex A
(normative)

**Digital communication for control
of DC EV charging system A**

A.1 General

This annex shows the specification of digital communication for control of the DC EV supply equipment of system A (in this annex, referred to as "System A station" or "station") as specified in Annex A of IEC 61851-23:20—. More detailed information on System A is defined in IEEE 2030.1.1.

This annex is also applicable to the DC EV charging/discharging station of system A.

NOTE Technical Specifications of CHAdeMO 2.0.1, Amendment 1 2020, provides additional information on system A. Available at <https://www.chademo.com>.

A.2 Digital communication actions during charging control process

The communication actions and parameters according to the charging control process as defined in Table A.15 of IEC 61851-23:20— are shown in Table A.1.

Table A.1 – Communication actions and parameters during DC charging control process between system A station and vehicle (1 of 3)

Charging control stage		State	High level action at system level ^a	Digital communication action	Parameter	
					From DC EV supply equipment	From vehicle
Initialization	Handshaking	DC-A	Vehicle unconnected	None	N/A	N/A
		DC-B1	Connector plugged in	None	N/A	N/A
		DC-B1	Wake up of DCCCF and VCCF	None	None	(default CAN)
			Communication data initialization	Preparation for digital communication	(default CAN)	(default CAN)
		DC-B1→DC-B2	Communication established, parameters exchanged, and compatibility checked	Exchange of charging control parameters	- Control protocol number - Available output voltage - Available output current - Battery incompatibility - Energizing state - Identifier of welding detection - Threshold voltage - Charging stop control	- Control protocol number - Total capacity of battery - Maximum battery voltage - Maximum charging time - Target battery voltage - Vehicle charging enabled - Minimum charge current - Estimated charging time - Vehicle status - Charged rate
	Charge preparation	DC-B2→DC-B3	Connector latched	Notification of state of charging progress	– Energizing state	None
		DC-B3	Insulation resistance check for DC power line	None	– Charging system error	None
		DC-B3	Pre-charge (depending on the system architecture)	N/A	N/A	N/A

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Table A.1 (2 of 3)

Charging control stage	State	High level action at system level ^a	Digital communication action	Parameter	
				From DC EV supply equipment	From vehicle
Energy transfer	DC-C or DC-D	Vehicle side contactors closed	Notification of vehicle main contactor closed status	None	– Vehicle status
	DC-C or DC-D	Charging by current demand (for CCC)	Notification of request value of charging current (or voltage)	– Station status – Output voltage – Output current – Remaining charging time – Station error – Charging system error – Charging stop control	– Charging current request – Charging system error – Parking status of the vehicle
	DC-C or DC-D	Charging by voltage demand (for CVC)	N/A	N/A	N/A
	DC-C,(D) →DC-B'1	Current suppression	Request of energy transfer shut-off	– Station status – Charging stop control – Output voltage – Output current	– Vehicle charging enabled
Shutdown (case 1)	DC-B'1	Zero current confirmed	Notification of energy transfer shut-off	– Station status – Charging system error	
	DC-B'1 → DC-B'2	Welding detection (by vehicle)		None	None
	DC-B'2	Vehicle side contactors open	None	None	– Vehicle status
	DC-B'2	DC power line voltage verification	Notification of present voltage	– Output voltage – Energizing state	None
	DC-B'3	Connector unlatched	Notification of connector unlatch status	None	None
	DC-B'4	End of charge at communication level	Terminate the digital communication	None	None
	DC-A	Connector unplugged		N/A	N/A

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Table A.1 (3 of 3)

Charging control stage	State	High level action at system level ^a	Digital communication action	Parameter	
				From DC EV supply equipment	From vehicle
Shutdown (case 2)	DC-B'1	Zero current confirmed	Notification of energy transfer shut-off	- Station status - Charging system error	
	DC-B'1→DC-B'2	Welding detection (by vehicle)		None	None
	DC-B'2	Vehicle side contactors open	None	None	- Vehicle status
	DC-B'2	DC power line voltage verification	Notification of present voltage	- Output voltage - Energizing state	None
	DC-B'3-1	Connector remain latched	Notification of connector unlatch status	None	None
	DC-B'4-1	End of charge at communication level	Terminate the digital communication	None	None
	DC-B'4-2	Connector unlatched or remain latched		N/A	N/A
	DC-A or DC-B1	Connector unplugged or remain plugged in		N/A	N/A
^a The order of actions does not refer to the procedure of charging control process.					

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300 to the sequence diagram as shown in Figure A.1.



NOTE For symbols, see Table AA.1 of IEC 61851-23: 20—.

303 **Figure A.1 – Sequence diagram of DC charging control communication for system A**

A.4 Parameter definition

The definition of parameters during DC charging control process are shown in Table A.2 and Table A.3. Table A.2 and Table A.3 include the mandatory parameters and the optional parameters. The optional parameters are applied to the optional charging functions, such as dynamic control (see AA.7 of IEC 61851-23:20—) and charging with thermal management system (see A.9 of IEC 61851-23:20—). The optional charging functions may be used when the station and the vehicle confirm the availability, specification and compatibility of functions by exchanging the optional parameters each other.

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Table A.2 – Exchanged parameter during DC charging control process from vehicle to system A station (1 of 4)

CAN ID (H')	Period (ms)	DLC	Byte	Bit	Parameter	Content	Signed or Unsigned	Unit	LSB	Initial	Min	Max	Item in Table1	Status flag
100	100	8	0	0-7	Minimum charging current	The minimum current value to conduct charging	U	A	1	0	0	254	a-1	—
			1-3	0-7	—	—	—	—	—	—	—	—	—	—
			4	0-7	Maximum battery voltage	The maximum voltage value at the vehicle inlet terminals, at which the station stops charging to protect the vehicle battery	U	V	1		0	1 200	b-2	—
			5	0-7										
			6	0-7	Constant of charging rate indication	Fixed value for charging rate indication, which is the maximum charging rate (100 %) of vehicle battery	U	-	1	100	0	255	b-2	—
			7	0-7	—	—	—	—	—	—	—	—	—	—
101	100	8	0	0-7	—	—	—	—	—	—	—	—	—	—
			1	0-7	Maximum charging time (set by 10 s)	Maximum charging time permitted by EV, set by 10 s	U	s	10	0	0	2 540	b-2	—
			2	0-7	Maximum charging time (set by 1 min)	Maximum charging time permitted by EV, set by minute	U	min	1	0	0	255	b-2	—
			3	0-7	Estimated charging time (set by 1 min)	Estimated remaining time before the end of charging calculated by EV	U	min	1		0	254	b-2	—
			4	0-7	—	—	—	—	—	—	—	—	—	—
			5	0-7	Rated capacity of battery	Rated capacity of battery	U	kWh	0,1		0	6 553,5	b-2	—
			6											
			7	0-7	—	—	—	—	—	—	—	—	—	—

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Table A.2 (2 of 4)

ID (H')	Period (ms)	DLC	Byte	Bit	Parameter	Content	Signed or Unsigned	Unit	LSB	Initial	Min	Max	Item in Table 1	Status flag
102	100	8	0	0-7	Control protocol number	Software version of control sequence to which EV corresponds	U	—	1		0	255	b-1	—
			1	0-7	Target battery voltage	Targeted charging voltage at the vehicle inlet terminals	U	V	1		0	1 200	b-2	—
			2	0-7										
			3	0-7	Charging current request	Current value requested by EV during charging	U	A	1	0	0	200	a-1	—
			4	0	Battery overvoltage	Status flag indicating whether or not the vehicle battery voltage exceeds the maximum limit specified by EV	—	—	1	0	0	1	i-2	0: normal 1: fault
				1	Battery undervoltage	Status flag indicating whether or not the vehicle battery voltage is less than the lower limit specified by EV	—	—	1	0	0	1	i-2	0: normal 1: fault
				2	Battery current deviation error	Status flag indicating whether or not the output current deviates from EV requested current	—	—	1	0	0	1	i-2	0: normal 1: fault
				3	High battery temperature	Status flag indicating whether or not the temperature of vehicle battery exceeds the maximum limit	—	—	1	0	0	1	i-2	0: normal 1: fault
				4	Battery voltage deviation error	Status flag indicating whether or not the vehicle battery voltage deviates from the output voltage measured by the station	—	—	1	0	0	1	i-2	0: normal 1: fault
				5-7	—	—	—	—	—	—	—	—	—	—