TEST REPORT
EN 61851-24
Electric vehicle conductive charging system – Digital communication between a d.c. EV charging station and an electric vehicle for control of d.c. charging

Report Number. :	SHES240601275201-03
Date of issue :	2024-07-03
Total number of pages :	49
Name of Testing Laboratory preparing the Report :	SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. 588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China.
Applicant's name :	Shanghai SUNNIC New Energy Technology Co., Ltd
Address :	6/F, building C3, district C, Changyang chuanggu, 1687 Changyang Road, Yangpu District, Shanghai, China
Test specification:	
Standard :	EN 61851-24:2014/AC:2015 for use in conjunction with EN 61851-23:2014/AC:2016-06
Test procedure :	SGS-CSTC
Non-standard test method :	N/A
Test item description :	EV DC Charging Station
Trade Mark :	SUNNIC
Manufacturer :	Shanghai SUNNIC New Energy Technology Co., Ltd 6/F, building C3, district C, Changyang chuanggu, 1687 Changyang Road, Yangpu District, Shanghai, China
Model/Type reference :	See Page 8 to 14
Ratings :	See Page 8 to 14

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**Testing Laboratory:**	SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.	
Testing location/ address.....:		588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China.	
Tested by (name, function, signature).....:		Jazz Yan	
Approved by (name, function, signature)...:		Vince Cheng	
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address.....:			
Tested by (name, function, signature).....:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address.....:			
Tested by (name + signature) .....:			
Witnessed by (name, function, signature) .:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address.....:			
Tested by (name, function, signature).....:			
Witnessed by (name, function, signature) .:			
Approved by (name, function, signature)...:			
Supervised by (name, function, signature) :			

List of Attachments (including a total number of pages in each attachment):

See SGS Report No.: SHES240601275201-01

Summary of testing:

This report was based on original test report no. SHES240200338904-03, issued on 2024-07-02, only with following changes:

-- change the applicant and manufacturer to Shanghai SUNNIC New Energy Technology Co., Ltd

6/F, building C3, district C, Changyang chuanggu, 1687 Changyang Road, Yangpu District, Shanghai, China

-- change the trademark to 

-- change referred Report Number from SHES240200338904-01 to SHES240601275201-01

-- change the model number to SKBDC240KE-xx(x), SKBDC180KE-xx(x), SKBDC160KE-xx(x), SKBDC150KE-xx(x), SKBDC120KE-xx(x), SKBDC80KE-xx(x), SKBDC60KE-xx(x), SKBDC50KE-xx(x) which are identical with the previous models no. YLUXD240KE-xx(x), YLUXD180KE-xx(x), YLUXD160KE-xx(x), YLUXD150KE-xx(x), YLUXD120KE-xx(x), YLUXD80KE-xx(x), YLUXD60KE-xx(x), YLUXD50KE-xx(x) in the original report and only different on the models no., see below for details

Report No.	SHES240601275201-03	SHES240200338904-03
Model No.	SKBDC240KE-xx(x)	YLUXD240KE-xx(x)
	SKBDC180KE-xx(x)	YLUXD180KE-xx(x)
	SKBDC160KE-xx(x)	YLUXD160KE-xx(x)
	SKBDC150KE-xx(x)	YLUXD150KE-xx(x)
	SKBDC120KE-xx(x)	YLUXD120KE-xx(x)
	SKBDC80KE-xx(x)	YLUXD80KE-xx(x)
	SKBDC60KE-xx(x)	YLUXD60KE-xx(x)
	SKBDC50KE-xx(x)	YLUXD50KE-xx(x)
Note: 1. “xx(x)” in sample model can be: “xx” can be 01, 02, 05, 06, 13 or 14. “(x)” only can be A. 2. For example, SKBDC240KE-01 is identical with YLUXD240KE-01, SKBDC240KE-01(A) is identical with YLUXD240KE-01(A). Based on the above two examples, the models correspond one by one.		

After inspection, no additional tests were considered necessary.

Tests performed (name of test and test clause):	**Testing location:**
Full test.	SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. No. 588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Summary of compliance with National Differences (List of countries addressed):

UK Differences

☒The product fulfils the requirements of EN 61851-24:2014,EN 61851-24:2014/AC:2015 for use in conjunction with EN 61851-23:2014/AC:2016-06 which are EQV with IEC 61851-24:2014,IEC 61851-24:2014/COR1:2015 for use in conjunction with IEC 61851-23:2014/COR1:2016.

Copy of marking plate:

See SGS Report No.: SHES240601275201-01

Test item particulars .....:	
Equipment mobility .....:	☐ movable ☐ hand-held ☐ transportable ☒ stationary ☐ for building-in ☐ direct plug-in
Connection to the mains.....:	☐ pluggable equipment ☐ type A ☐ type B ☒ permanent connection ☐ detachable power supply cord ☐ non-detachable power supply cord ☐ not directly connected to the mains
EV charging modes .....:	☐ Mode 1 charging ☐ Mode 2 charging ☐ Mode 3 charging ☒ Mode 4 charging
Type of EV connection .....:	☐ Case A ☐ Case B ☒ Case C
Access location .....:	☒ operator accessible ☐ service access area ☐ restricted access location
Over voltage category (OVC) .....:	☐ OVC I ☐ OVC II ☒ OVC III ☐ OVC IV ☐ other:
Mains supply tolerance (%) or absolute mains supply values .....:	±10%
Tested for IT power systems .....:	☐ Yes ☒ No
IT testing, phase-phase voltage (V) .....:	N/A
Class of equipment .....:	☒ Class I ☐ Class II ☐ Class III ☐ Not classified
Considered current rating (A) .....:	See model list
Pollution degree (PD) .....:	☐ PD 1 ☐ PD 2 ☒ PD 3
IP protection class .....:	IP54
Altitude during operation (m) .....:	2000
Altitude of test laboratory (m) .....:	<200m
Mass of equipment (kg) .....:	<500kg

Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item .....:	2024-01-10(Original date)
Date (s) of performance of tests.....:	2024-01-11 to 2024-01-31(Original date)

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report a ☒ comma / ☐ point is used as the decimal separator.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Manufacturer's Declaration:

The application for obtaining a Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided .....:	☐ **Yes** ☒ **Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies).....:	Winline Technology (Changshu) Co., Ltd. Buildings 10-3 and 12-3, Jiadi Industrial Park, No. 1150, Dongnan Avenue, Changshu City, Suzhou City, Jiangsu Province, 215500, P. R. China

General product information:

1.The DUT(Equipment Under Test) used for EV Battery charging. The DC EV charger could provide IEC CCS2 connector and CHAdeMO connector for mode 4 DC charging.

2. The EUT can operate under 2000m altitude. The operation environment temperature is -30 to 50°C.

3. The EUT is Class I appliance with protection degree IP54 and IK10 for indoor/outdoor use.

4. The charging system is comprised of SPD, circuit breaker, power modules, control board, communication board, RCD, emergency stop switch, one or two vehicle connectors(CHAdeMO or CCS2) with cable (case C connection), touch screen, contactors, etc. Live parts separated from the earthed metal frame inside enclosure by B.I. And live parts separated from accessible plastic enclosure by R.I. or D.I. The touch screen on enclosure is supplied by SELV output voltage of switch mode power supply.

5. CCS2 connector of system C and CHAdeMO connector of system A can be parallel loop, they can charge simultaneously. In case of dual connectors charging, the maximum power of single CCS connector is half of the rate power of identical EV charger, and the maximum power of single CHAdeMO connector is 62,5 kW or half of the rate power of the identical EV charger.

6. There are eight series in the model list: 240kw series, 180kw series, 160kw series, 150kw series, 120kw series, 80kw series, 60kw series and 50kw series. The difference between these series is charging modules quantity and the size of DC EV charger. 240kw series and 180kw series has 6 pcs charging modules. 160kw series, 150kw series and 120kw series has 4 pcs charging modules. 80kw series, 60kw series and 50kw series has 2 pcs charging modules. For 160kw series, 80kw series, 50kw series models, power is limited by software.
Size of 240kw series and 180kw series is 850 * 2000 * 800 mm^3.
Size of 160kw series, 150kw series, 120kw series is 850 * 2000 * 610 mm^3.
Size of 80kw series, 60kw series and 50kw series is 800 * 1800 * 500 mm^3.

7. When two charging guns are charging simultaneously, each module can only be connected to one charging.

Model list

Model	Input Rating	Rated Output Rating	Balancer connector hanging	IC/POS
SKBDC240KE-01	240kw series: 400VAC±10%, 3P+N+PE 50/60Hz Max. 368 A	CCS2(Connector A): Max.240kW Max.1000VDC/Max.300A CCS2(Connector B): Max.240kW Max.1000VDC/Max.300A	Yes	IC(RFID) card
SKBDC240KE-01A			No	IC(RFID) card
SKBDC240KE-02			Yes	POS
SKBDC240KE-02A			No	POS

Model	Input Rating	Rated Output Rating	Balancer connector hanging	IC/POS
SKBDC240KE-05	240kw series: 400VAC±10%, 3P+N+PE 50/60Hz Max. 368 A	CCS2(Connector A): Max.240kW Max.1000VDC/Max.300A CHAdeMO(Connector B): Max.62.5kW/Max.500VDC/ Max.125A	Yes	IC(RFID) card
SKBDC240KE-05A			No	IC(RFID) card
SKBDC240KE-06			Yes	POS
SKBDC240KE-06A			No	POS
SKBDC240KE-13		CCS2(Connector A): Max.240kW Max.1000VDC/Max.300A	Yes	IC(RFID) card
SKBDC240KE-13A			No	IC(RFID) card
SKBDC180KE-01	180kw series: 400VAC±10%, 3P+N+PE 50/60Hz Max. 276 A	CCS2(Connector A): Max.180kW Max.1000VDC/Max.300A CCS2(B): Max.180kW Max.1000VDC/Max.300A	Yes	IC(RFID) card
SKBDC180KE-01A			No	IC(RFID) card
SKBDC180KE-02			Yes	POS
SKBDC180KE-02A			No	POS
SKBDC180KE-05		CCS2(Connector A): Max.180kW Max.1000VDC/Max.300A CHAdeMO(Connector B): Max.62.5kW/Max.500VDC/ Max.125A	Yes	IC(RFID) card
SKBDC180KE-05A			No	IC(RFID) card
SKBDC180KE-06			Yes	POS
SKBDC180KE-06A			No	POS

Model	Input Rating	Rated Output Rating	Balancer connector hanging	IC/POS
SKBDC180KE-13	180kw series: 400VAC±10%, 3P+N+PE 50/60Hz Max. 276 A	CCS2(Connector A): Max.180kW Max.1000VDC/Max.300A	Yes	IC(RFID) card
SKBDC180KE-13A			No	IC(RFID) card
SKBDC160KE-01	160kw series: 400VAC±10%, 3P+N+PE 50/60Hz Max. 246 A	CCS2(Connector A): Max.160kW Max.1000VDC/Max.200A CCS2(Connector B): Max.160kW Max.1000VDC/Max.200A	Yes	IC(RFID) card
SKBDC160KE-01A			No	IC(RFID) card
SKBDC160KE-02			Yes	POS
SKBDC160KE-02A			No	POS
SKBDC160KE-05		CCS2(Connector A): Max.160kWMax.1000VDC/ Max.200A CHAdeMO(Connector B): Max.62.5kW/Max.500VDC/ Max.125A	Yes	IC(RFID) card
SKBDC160KE-05A			No	IC(RFID) card
SKBDC160KE-06			Yes	POS
SKBDC160KE-06A			No	POS
SKBDC160KE-13		CCS2(Connector A): Max.160kW Max.1000VDC/Max.200A	Yes	IC(RFID) card
SKBDC160KE-13A			No	IC(RFID) card
SKBDC150KE-01	150kw series: 400VAC±10%, 3P+N+PE 50/60Hz Max. 230 A	CCS2(Connector A): Max.150kW Max.1000VDC/Max.200A CCS2(Connector B): Max.150kW Max.1000VDC/Max.200A	Yes	IC(RFID) card
SKBDC150KE-01A			No	IC(RFID) card

Model	Input Rating	Rated Output Rating	Balancer connector hanging	IC/POS
SKBDC150KE-02	150kw series: 400VAC±10%, 3P+N+PE 50/60Hz Max. 230 A	CCS2(Connector A): Max.150kW Max.1000VDC/Max.200A CCS2(Connector B): Max.150kW Max.1000VDC/Max.200A	Yes	POS
SKBDC150KE-02A			No	POS
SKBDC150KE-05		CCS2(Connector A): Max.150kW Max.1000VDC/Max.200A CHAdeMO(Connector B): Max.62.5kW/Max.500VDC/ Max.125A	Yes	IC(RFID) card
SKBDC150KE-05A			No	IC(RFID) card
SKBDC150KE-06			Yes	POS
SKBDC150KE-06A			No	POS
SKBDC150KE-13		CCS2(Connector A): Max.150kW Max.1000VDC/Max.200A	Yes	IC(RFID) card
SKBDC150KE-13A			No	IC(RFID) card
SKBDC120KE-01	120kw series: 400VAC±10%, 3P+N+PE 50/60Hz Max. 184 A	CCS2(A): Max.120kW Max.1000VDC/Max.200A CCS2(B): Max.120kW Max.1000VDC/Max.200A	Yes	IC(RFID) card
SKBDC120KE-01A			No	IC(RFID) card
SKBDC120KE-02			Yes	POS
SKBDC120KE-02A			No	POS
SKBDC120KE-05		CCS2(Connector A): Max.120kW Max.1000VDC/Max.200A CHAdeMO(Connector B): Max.62.5kW Max.500VDC/Max.125A	Yes	IC(RFID) card
SKBDC120KE-05A			No	IC(RFID) card

Model	Input Rating	Rated Output Rating	Balancer connector hanging	IC/POS
SKBDC120KE-06	120kw series: 400VAC±10%, 3P+N+PE 50/60Hz Max. 184 A	CCS2(Connector A): Max.120kW Max.1000VDC/Max.200A CHAdeMO(Connector B): Max.62.5kW Max.500VDC/Max.125A	Yes	POS
SKBDC120KE-06A			No	POS
SKBDC120KE-13		CCS2(Connector A): Max.120kW Max.1000VDC/Max.200A	Yes	IC(RFID) card
SKBDC120KE-13A			No	IC(RFID) card
SKBDC80KE-01	80kw series: 400VAC±10%, 3P+N+PE 50/60Hz Max. 123 A	CCS2(Connector A): Max.80kW Max.1000VDC/Max.200A CCS2(Connector B): Max.80kW Max.1000VDC/Max.200A	Yes	IC(RFID) card
SKBDC80KE-01A			No	IC(RFID) card
SKBDC80KE-02			Yes	POS
SKBDC80KE-02A			No	POS
SKBDC80KE-05		CCS2(Connector A): Max.80kW Max.1000VDC/Max.200A CHAdeMO(Connector B): Max.62.5kW Max.500VDC/Max.125A	Yes	IC(RFID) card
SKBDC80KE-05A			No	IC(RFID) card
SKBDC80KE-06			Yes	POS
SKBDC80KE-06A			No	POS
SKBDC80KE-13		CCS2(Connector A): Max.80kW Max.1000VDC/Max.200A	Yes	IC(RFID) card
SKBDC80KE-13A			No	IC(RFID) card

Model	Input Rating	Rated Output Rating	Balancer connector hanging	IC/POS
SKBDC80KE-14	80kw series: 400VAC±10%, 3P+N+PE 50/60Hz Max. 123 A	CCS2(Connector A): Max.80kW Max.1000VDC/Max.200A	Yes	POS
SKBDC80KE-14A			No	POS
SKBDC60KE-01	60kw series: 400VAC±10%, 3P+N+PE 50/60Hz Max. 92 A	CCS2(Connector A): Max.60kW Max.1000VDC/Max.200A CCS2(Connector B): Max.60kW Max.1000VDC/Max.200A	Yes	IC(RFID) card
SKBDC60KE-01A			No	IC(RFID) card
SKBDC60KE-02			Yes	POS
SKBDC60KE-02A			No	POS
SKBDC60KE-05		CCS2(Connector A): Max.60kW Max.1000VDC/Max.200A CHAdeMO(Connector B): Max.60kW Max.500VDC/Max.125A	Yes	IC(RFID) card
SKBDC60KE-05A			No	IC(RFID) card
SKBDC60KE-06			Yes	POS
SKBDC60KE-06A			No	POS
SKBDC60KE-13		CCS2(Connector A): Max.60kW Max.1000VDC/Max.200A	Yes	IC(RFID) card
SKBDC60KE-13A			No	IC(RFID) card
SKBDC60KE-14			Yes	POS
SKBDC60KE-14A			No	POS

Model	Input Rating	Rated Output Rating	Balancer connector hanging	IC/POS
SKBDC50KE-01	50kw series: 400VAC±10%, 3P+N+PE 50/60Hz Max. 77 A	CCS2(Connector A): Max.50kW Max.1000VDC/Max.167A CCS2(Connector B): Max.50kW Max.1000VDC/Max.167A	Yes	IC(RFID) card
SKBDC50KE-01A			No	IC(RFID) card
SKBDC50KE-02			Yes	POS
SKBDC50KE-02A			No	POS
SKBDC50KE-05		CCS2(Connector A): Max.50kW Max.1000VDC/Max.167A CHAdeMO(Connector B): Max.50kW Max.500VDC/Max.125A	Yes	IC(RFID) card
SKBDC50KE-05A			No	IC(RFID) card
SKBDC50KE-06			Yes	POS
SKBDC50KE-06A			No	POS
SKBDC50KE-13		CCS2(Connector A): Max.50kW Max.1000VDC/Max.167A	Yes	IC(RFID) card
SKBDC50KE-13A			No	IC(RFID) card
SKBDC50KE-14			Yes	POS
SKBDC50KE-14A			No	POS

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Clause	Requirement + Test	Result - Remark	Verdict
4	**SYSTEM CONFIGURATION**		P
	The system configuration is in accordance with 102.2 of IEC 61851-23.	The model with CHAdeMO charging connector comply with System AA. The model with IEC CCS charging connector comply with System CC.	P
5	**DIGITAL COMMUNICATION ARCHITECTURE**		P
	Two digital communication architectures are used:		P
	– one, 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; and	For the model with CHAdeMO charging connector	P
	– the other, based on Homeplug Green PHY™[1] over the control pilot line; refer to Annex C for specific implementation details.	For the model with CCS charging connector	P
6	**CHARGING CONTROL PROCESS**		P
	The charging control process is in accordance with 102.5 of IEC 61851-23.		P
7	**OVERVIEW OF CHARGING CONTROL**		P
	The digital communication of d.c. charging control covered by this standard is as shown in Figure 1.		P
8	**EXCHANGED INFORMATION FOR D.C. CHARGING CONTROL**		P
	Information which is exchanged between a d.c. EV charging station and a vehicle during the charging process according to IEC 61851-23.	(see appended Table 1)	P
	The information in Table 1 is common to all systems described in Annexes A, B and C.		P
	Each information listed in Table 1 is defined as a parameter in each annex.		P
	Each system may need additional parameters, and these parameters are defined in each annex.		P
ANNEX A	**DIGITAL COMMUNICATION FOR CONTROL OF D.C. EV CHARGING SYSTEM A**		P
A.1	**General**		P
	The specification of digital communication for control of the d.c EV charging station of system A (in this annex, referred to as "system A station" or "station") as specified in Annex AA of IEC 61851-23. More detailed information on system A is defined in JIS/TSD0007.		P
A.2	**Digital communication actions during charging control process**		P
	The communication actions and parameters according to the charging control process as defined in Table 103 of IEC 61851-23 are shown in Table A.1.	(see appended Table A.1)	P
A.3	**Digital communication of d.c. charging control**		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The parameters for digital communication of d.c. charging control are exchanged according to the sequence diagram as shown in Figure A.1.		P
A.4	**Parameter definition**		P
	The definition of parameters during d.c. charging control process are shown in Table A.2.	(see appended Table A.2)	P
A.5	**Physical/data link layer**		P
A.5.1	Specifications		P
	The physical/data link layer specifications are shown in Table A.3.	(see appended Table A.3)	P
A.5.2	Communication circuit		P
	The CAN communication circuit is established to exchange parameters, i.e. voltage, current, status flags, and fault flags, which are necessary for the charging control.		P
	– Terminating resistor 1:1 communication is assumed.		P
	The vehicle and the d.c. EV charging station are equipped with terminating resistors.		P
	– Noise filter The vehicle and the d.c. EV charging station are equipped with noise filters to reduce the conducted noise of the common mode and differential mode.		P
	– Twisted-pair line Twisted pair line are utilized as the communication line that links the d.c. EV charging station with the vehicle so as to reduce differential mode noise.		P
	– CAN transceiver CAN transceiver is equipped to send and receive CAN communication data.		P
	The CAN-bus circuit is established independently for d.c. charging, as shown in Figure A.2.		P
A.5.3	Transmission		P
	Data frames are transmitted in ascending order of ID number specified in Table A.2.		P
	The data frames are continuously transmitted at 100 ms (± 10 %) interval through the charging process.		P
	Interval duration (ms)……..:		--
A.5.4	Reception		P
	When the vehicle or the d.c. EV charging station receives data frames from the other party, the received frames are echoed.		P
	Furthermore, the received error frames are destroyed.		P

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Clause	Requirement + Test	Result - Remark	Verdict
A.5.5	CAN communication		P
	Figure A.3 shows the basic specifications related to the dedicated CAN communication between the vehicle and the d.c. EV charging station.		P
ANNEX B	**DIGITAL COMMUNICATION FOR CONTROL OF D.C. EV CHARGING SYSTEM B**		N/A
B.1	**General**		N/A
	The specification of d.c. charging control digital communication for the d.c EV charging station of system B (in this annex, referred to as "System B station" or "charger") as specified in Annex BB of IEC 61851-23.		N/A
B.2	**Digital communication of d.c. charging control**		N/A
	The parameters for digital communication of d.c. charging control are exchanged according to the sequence diagram as shown in Figure B.1.		N/A
B.3	**Digital communication actions during charging control process**		N/A
	The communication actions and parameters during d.c. charging control process are shown in Table B.1.	(see appended Table B.1)	N/A
B.4	**Parameter definition**		N/A
	The definition of parameters during d.c. charging control process are shown in Tables B.2, B.3, B.4, B.5 and B.6.	(see appended Tables B.2 , B.3, B.4, B.5,and B.6)	N/A
B.5	**Physical/data link layer**		N/A
	The physical/data link layer specifications are shown in Table B.7.	(see appended Table B.7)	N/A
	The physical/data link layer refers to SAE J1939-11 and SAE J1939-21.		N/A
	The application layer refers to GB/T 27930.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
ANNEX C	**DIGITAL COMMUNICATION FOR CONTROL OF D.C. CHARGING SYSTEM C (COMBINED SYSTEM)**		**P**
C.1	**General**		P
	The digital communication for the d.c EV charging station of system C as specified in Annex CC of IEC 61851-23 is defined in the following standards: DIN SPEC 70121, ISO/IEC 15118-1, ISO/IEC 15118-2 and ISO/IEC 15118-3.	For the model with IEC CCS charging connector DIN SPEC 70121	P
	The following SAE specifications can also be used as information: SAE J2836/2™, SAE J2847/2, SAE J2931/1 and SAE J2931/4.		P
	Systems implementing these specifications incorporate the following features:		P
	• security concept including encryption, signing, key management, etc.		P
	• robust PLC-based communications,		P
	• automatic address assigning and association,		P
	• IPv6-based communications,		P
	• compressed XML messages,		P
	• client-server approach,		P
	• safety concept including cable check, welding detection, etc.		P
	• extension concept for added-value services.		P
C.2	**Required exchange parameters**		P
	The parameters to be exchanged for d.c. charging control are shown in Table C.1, corresponding to Table 1.	(see appended Table C.1)	P
	Additional parameters can be found in DIN SPEC 70121 and ISO/IEC 15118-2.		P

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Clause	Requirement + Test	Result - Remark	Verdict

8	TABLE 1: Exchanged information for d.c. charging control				P
No.	**Information**	**Description**	**Relevant requirement in IEC 61851-23 (unless specified as IEC 61851-1)**	**Other remarks**	**Verdict**
a-1	Current request for the controlled current charging (CCC) system	Exchange of current value requested by EV	6.4.3.101, DC supply		P
a-2	Voltage request for the controlled voltage charging (CVC) system	Exchange of voltage value requested by EV	6.4.3.101, DC supply		P
a-3	Maximum rated voltage of d.c. EV charging station	Exchange of maximum rated voltage value of d.c. EV charging station	6.4.3.101, DC supply		P
			6.4.3.105, Compatibility assessment		P
			6.4.3.107, Protection against overvoltage at the battery		P
a-4	Maximum rated current of d.c. EV charging station	Exchange of maximum rated current value of d.c. EV charging station	6.4.3.101, DC supply for EV		P
			6.4.3.105, Compatibility assessment		P
b-1	Communication protocol	Exchange of software version of a charging system	6.4.3.105, Compatibility assessment		P
b-2	Maximum voltage limit of EV	Exchange of maximum voltage limit value of vehicle.	6.4.3.105, Compatibility assessment		P
b-3	EV minimum current limit, only for the controlled voltage charging (CVC) system	not defined yet	6.4.3.105, Compatibility assessment		P
c	Insulation test result	Exchange of the result of insulation test before charging	6.4.3.106, Insulation test before charging		P

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Clause	Requirement + Test		Result - Remark		Verdict
		- If insulation test fails, a signal is sent that charging is not allowed.	6.4.3.106, Insulation test before charging		P
d	Short circuit test before charging	Exchange of information on short circuit test before charging	6.4.3.110, Short circuit test before charging		P
e	Charging stopped by user	Exchange of information on charge stop command by the user of d.c. EV charging station	6.4.3.111, User initiated shutdown		P
f	EVSE real time available load current (optional)	Exchange of EVSE real time available load current for demand management. Required for system providing that function.	6.4.4.2 (of IEC 61851-1), Detection/adjustment of the real time available load current of EVSE		P
g	Loss of digital communication	Detection of loss of digital communication	9.4, Breaking capacity		P
		- If a receiver does not get information expected to receive within time out period, it is considered as loss of digital communication.	9.4, Breaking capacity		P
h-1	Zero current confirmed	Notification of zero current confirmed	102.5, Charging control process and state		P
		- Station informs EV that low current condition has been met (to allow connector unlocking)	102.5, Charging control process and state		P

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Clause	Requirement + Test	Result - Remark	Verdict

h-2	Welding detection	Exchange of information on the whole process of welding detection	102.5, Charging control process and state		P
Supplementary information:					

EN 61851-24			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX A.2	TABLE A.1 – Communication actions and parameters during d.c. charging control process between system A station and vehicle	P

Charging control stage		State	High level action at system level [a]	Digital communication action	Parameter		Other remarks	Verdict
					From d.c. EV charging station	From vehicle		
Initialization	Handshaking	DC-A	Vehicle unconnected	None	N/A	N/A		N/A
		DC-B1	Connector plugged in	None	N/A	N/A		N/A
		DC-B1	Wake up of DCCCF and VCCF	None	None	(default CAN)		N/A
			Communication data initialization	Preparation for digital communication	(default CAN)	(default CAN)		P
		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	- Control protocol number - Rated capacity of battery - Maximum battery voltage - Maximum charging time - Target battery voltage - Vehicle charging enabled		P
	Charge preparation	DC-B2 → DC-B3	Connector locked	Notification of connector locked status	- Vehicle connector lock	None		P
		DC-B3	Insulation test for d.c. power line	None	Charging system malfunction	None		P

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Clause	Requirement + Test				Result - Remark		Verdict
	DC-B3	Pre-charge (depending on the system architecture)	N/A	N/A	N/A		N/A
Energy transfer	DC-C or DC-D	Vehicle side contactors closed	Notification of vehicle main contactor closed status	None	None		P
	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 malfunction - Charging system malfunction	- Charging current request - Charging system fault - Vehicle shift lever position		P
	DC-C or DC-D	Charging by voltage demand (for CVC)	N/A	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		P
Shutdown	DC-B'1	Zero current confirmed	Notification of energy transfer shut-off	- Station status - Charging system malfunction	-		P
	DC-B'1 → DC-B'2	Welding detection (by vehicle)	-	None	None		N/A
	DC-B'2	Vehicle side contactors open	None	None	None		N/A
	DC-B'2	DC power line voltage verification	Notification of present voltage	Output voltage	None		P

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Clause	Requirement + Test				Result - Remark		Verdict
	DC-B'3	Connector unlocked	Notification of connector unlocked status	Vehicle connector lock	None		P
	DC-B'4	End of charge at communication level	Terminate the digital communication	None	None		P
	DC-A	Connector unplugged		N/A	N/A		N/A
[a] The order of actions does not refer to the procedure of charging control process.							
Supplementary information:							

EN 61851-24			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX A.4	TABLE A.2 – Exchanged parameter during d.c. charging control process between system A station and vehicle	N/A

Item in Table 1	Parameter	Content	CAN ID ID.byte (bit)	Source	Destination	Data update rate	Unit	Status flag	Resolution (range)	Other remarks	Verdict
b-2	Maximum battery voltage	The maximum voltage value at the vehicle inlet terminals, at which the station stops charging to protect the vehicle battery	H'100.4 H'100.5	EV	System A station	100 ms	V	-	1 V/bit	500V 01F41	P
	Rated capacity of battery	Rated capacity of battery	H'101.5 H'101.6	EV	System A station	100 ms	kWh	-	0,1 kWh /bit		N/A
	Constant of charging rate indication	Fixed value for charging rate indication, which is the maximum charging rate (100 %) of vehicle battery	H'100.6	EV	System A station	100 ms	%	-	1 %/bit, 100 % (fixed)		P
	Maximum charging time (set by 10 s)	Maximum charging time permitted by EV, set by 10 s	H'101.1	EV	System A station	100 ms	s	-	10 s/bit (0 to 2 540 s)	FFH	P

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Clause	Requirement + Test							Result - Remark			Verdict
	Maximum charging time (set by minute)	Maximum charging time permitted by EV, set by minute	H'101.2	EV	System A station	100 ms	min	-	1 min/bit (0 to 255 min)	FFH	P
	Estimated charging time	Estimated remaining time before the end of charging calculated by EV	H'101.3	EV	System A station	100 ms	min	-	1 min/bit (0 to 254 min)	FFH	P
b-1	Control protocol number	Software version of control protocol to which EV corresponds	H'102.0	EV	System A station	100 ms	-	-	1 /bit (0 to 255)		P
	Target battery voltage	Targeted charging voltage at the vehicle inlet terminals	H'102.1 H'102.2	EV	System A station	100 ms	V	-	1 V/bit (0 to 600 V)	500V 01F4H	P
a-1	Charging-current-request	Current value requested by EV during charging	H'102.3	EV	System A station	100 ms	A	-	1 A/bit (0 to 255 A)		P
	Charging rate	Charging rate of vehicle battery	H'102.6	EV	System A station	100 ms	%	-	1 %/bit (0 % to 100 %)		P
g	Vehicle charging enabled	Status flag indicating charge permission status of EV	H'102.5(0)	EV	System A station	-	-	**0:** disabled **1:** enabled	-	Enable 1	P

EN 61851-24											
Clause	Requirement + Test							Result - Remark			Verdict
	Vehicle shift lever position	Status flag indicating the shift lever position	H'102.5(1)	EV	System A station	-	-	**0:** "Parking" position **1:** other position	-	Parking 0	P
	Charging system fault	Status flag indicating a malfunction caused by EV or the station, and detected by EV	H'102.5(2)	EV	System A station	-	-	**0:** normal **1:** fault	-	Normal 0	P
	Vehicle status	Status flag indicating the EV contactor status	H'102.5(3)	EV	System A station	-	-	**0:** EV contactor closed or during welding detection, **1:** EV contactor open or welding detection finished	-		P

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Clause	Requirement + Test							Result - Remark			Verdict
	Normal stop request before charging	Status flag indicating the request of EV to stop charging control	H'102.5(4)	EV	System A station	-	-	**0:** no request **1:** request to stop	-		P
	Battery overvoltage	Status flag indicating whether or not the vehicle battery voltage exceeds the maximum limit specified by EV	H'102.4(0)	EV	System A station	-	-	**0:** normal, **1:** fault	-	Normal 0	P
	Battery undervoltage	Status flag indicating whether or not the vehicle battery voltage is less than the lower limit specified by EV	H'102.4(1)	EV	System A station	-	-	**0:** normal **1:** fault	-	Normal 0	P
	Battery current deviation error	Status flag indicating whether or not the output current deviates from EV requested current	H'102.4(2)	EV	System A station	-	-	**0:** normal **1:** fault	-	Normal 0	P

EN 61851-24											
Clause	Requirement + Test						Result - Remark				Verdict
	High battery temperature	Status flag indicating whether or not the temperature of vehicle battery exceeds the maximum limit	H'102.4(3)	EV	System A station	-	-	**0:** normal **1:** fault	-	Normal 0	P
	Battery voltage deviation error	Status flag indicating whether or not the vehicle battery voltage deviates from the output voltage measured by the station	H'102.4(4)	EV	System A station	-	-	**0:** normal, **1:** fault	-	Normal 0	P
h-2	EV contactor welding detection support identifier	Identifier indicating whether or not the station deals with EV contactor welding detection	H'108.0	System A station	EV	100 ms	-	**0:** not supporting vehicle welding detection, **1 or more:** supporting vehicle welding detection	-	Supporting 01H	P
a-3	Available output voltage	Maximum output voltage value at the vehicle connector terminals	H'108.1 H'108.2	System A station	EV	100 ms	V	-	1 V/bit (0 to 600 V)	500V 01F4H	P

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Clause	Requirement + Test							Result - Remark			Verdict
a-4	Available output current	Maximum output current value of the station	H'108.3	System A station	EV	100 ms	A	-	1 A/bit (0 to 255 A)		P
b-2	Threshold voltage	Threshold voltage to stop the charging process in order to protect vehicle battery	H'108.4 H'108.5	System A station	EV	100 ms	V	-	1 V/bit (0 to 600 V)	500V 01F4H	P
b-1	Control protocol number	Software version number of control protocol or charging sequences that the station deals with	H'109.0	System A station	EV	100 ms	-	-	1 / bit (0 to 255)		P
	Output voltage	Supply voltage value of the output circuit in the station	H'109.1 H'109.2	System A station	EV	100 ms	V	-	1 V/bit (0 to 600 V)		P
	Output current	Supply current value of the output circuit in the station	H'109.3	System A station	EV	100 ms	A	-	1 A/bit (0 to 255 A)		P
	Remaining charging time (counted by 10 s)	Remaining time before the end of charging (counted by 10 s)	H'109.6	System A station	EV	100 ms	s	-	10 s/bit (0 to 2540 s)		P
	Remaining charging time (counted by min)	Remaining time before the end of charging (counted by min)	H'109.7	System A station	EV	100 ms	min	-	1 min/bit (0 to 255 min)		P

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Clause	Requirement + Test							Result - Remark			Verdict
c h-1	Station status	Status flag indicating the energy transfer from the station	H'109.5(0)	System A station	EV	100 ms	-	**0:** standby **1:** charging	-	Charging 1	P
	Station malfunction	Status flag indicating whether or not there is a malfunction caused by the station	H'109.5(1)	System A station	EV	100 ms	-	**0:** normal, **1:** fault	-	Normal 0	P
	Vehicle connector lock	Status flag indicating the electromagnetic lock status of vehicle connector	H'109.5(2)	System A station	EV	100 ms	-	**0:** unlocked **1:** locked	-	Locked 1	P
	Battery in-compatibility	Status flag indicating the compatibility of vehicle battery with the output voltage of station	H'109.5(3)	System A station	EV	100 ms	-	**0:** compatible **1:** in compatible	-	Compatible 0	P
d	Charging system malfunction	Status flag indicating whether or not there is a problem with EV, such as improper connection	H'109.5(4)	System A station	EV	100 ms	-	**0:** normal **1:** mal function	-	Normal 0	P

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Clause	Requirement + Test							Result - Remark			Verdict
e	Charger stop control	Status flag indicating whether or not the station proceeds with shutdown process	H'109.5(5)	System A station	EV	100 ms	-	**0:** operating, **1:** shutdown or stop charging	-	Operating 0	P

EN 61851-24			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 5.1	**TABLE A.3 – The physical/data link layer specifications for system A**			**P**
			Other remarks	**Verdict**
Communication system	Communication protocol	ISO 11898-1 and ISO 11898-2 The extension bit (12 - 29 bit) is not used.		P
	Transmission rate (kbps)	500	500kbps	P
	Cycle	100 ms ± 10 %	100ms± 5%	P
Supplementary information:				

EN 61851-24			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX B.3	**TABLE B.1 – Communication actions and parameters during d.c. charging control process between system B station and vehicle**						**N/A**
Charging control stage (process)	**Digital communication action**	**Information**	**Source**	**Destination**	**Parameter cycle**	**Other remarks**	**Verdict**
Handshaking	Confirm the necessary parameters of battery and charger.	Charger recognition parameter	Charger	Vehicle	250 ms		N/A
		Vehicle recognition parameter	Vehicle	Charger	250 ms		N/A
Charging parameter configuration	Exchange of charging control parameters.	Battery charge parameter	Vehicle	Charger	500 ms		N/A
		Charger time synchronization	Charger	Vehicle	500 ms		N/A
		Charger max/min output parameter	Charger	Vehicle	250 ms		N/A
		Vehicle charge ready	Vehicle	Charger	250 ms		N/A
		Charger output ready	Charger	Vehicle	250 ms		N/A
Charging stage	Send charging status to each other, according to the battery charge level requirements sent by Vehicle; the charger adjusts the charging process.	Battery charge requirement	Vehicle	Charger	50 ms		N/A
		Charger charge status	Charger	Vehicle	50 ms		N/A
		Battery charge status 1	Vehicle	Charger	250 ms		N/A
		Battery charge status 2	Vehicle	Charger	250 ms		N/A
		Battery cell voltage	Vehicle	Charger	1 s		N/A
		Battery temperature	Vehicle	Charger	1 s		N/A
		Vehicle stopping command	Vehicle	Charger	10 ms		N/A
		Charger stopping command	Charger	Vehicle	10 ms		N/A

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Clause	Requirement + Test			Result - Remark			Verdict
Charging ending stage	Energy transfer shut-off.	Vehicle statistic data	Vehicle	Charger	250 ms		N/A
		Charger statistic data	Charger	Vehicle	250 ms		N/A
Communication error	Restart communication program or stop charging process.	Vehicle receiving error	Vehicle	Charger	250 ms		N/A
		Charger receiving error	Charger	Vehicle	250 ms		N/A
Supplementary information:							

EN 61851-24			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX B.4	**TABLE B.2 – Parameters in charge handshake stage for system B**							**N/A**
Information	**Parameter**	**M[a] /O[b]**	**Unit**	**Resolution**	**Status flag**	**Item in Table 1**	**Other remarks**	**Verdict**
Charger recognition parameter	Recognition result	M	-	-	0x00: unre-cognized 0xAA: re-cognized	-		N/A
	Charger number	M	-	-	-	-		N/A
	Charger/charge station location code	O	-	-	-	-		N/A
Vehicle recognition parameter	Vehicle communication protocol version	M	-	-	-	b-1		N/A
	Battery type code	M	-	-	-	-		N/A
	Battery system rated capacity	M	Ah	0,1 Ah/bit	-	-		N/A
	Battery system rated voltage	M	V	0,1 V/bit	-	-		N/A
	Battery manufacturer code, ASCII	O	-	-	-	-		N/A

[a] M = Mandatory
[b] O = Optional
NOTE The communication protocol version includes 3 bytes. The current version is V1.0, which is expressed: Byte 3, Byte 2 – 0001H; Byte1 – 00H.

Supplementary information:

EN 61851-24			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX B.4	**TABLE B.3 – Parameters in charge parameter configuration stage for system B**							**N/A**
Information	**Parameter**	**M[a] /O[b]**	**Unit**	**Resolution**	**Status flag**	**Item in Table 1**	**Other remarks**	**Verdict**
Battery charge parameter	Maximum permissible charge voltage of battery cell	M	V	0,01 V/bit	-	-		N/A
	Maximum permissible charge current	M	A	0,1 A/bit	-	-		N/A
	Maximum permissible charge energy	M	kWh	0,1 kWh/bit	-	-		N/A
	Maximum permissible charge voltage of battery system	M	V	0,1 V/bit	-	b-2		N/A
	Maximum permissible temperature	M	°C	1 °C/bit	-	-		N/A
	The initial SOC	M	%	0,1 %/bit	-	-		N/A
	Total voltage of battery system	M	V	0,1 V/bit	-	-		N/A
Charger time synchronization	Year/month/date/hour/minute/ second	O	-	-	-	-		N/A
Charger max/min output parameter	Maximum output voltage	M	V	0,1 V/bit	-	a-3		N/A
	Minimum output voltage	M	V	0,1 V/bit	-	-		N/A
	Maximum output current	M	A	0,1 A/bit	-	a-4		N/A
Vehicle charge ready	If the vehicle is ready to be charged	M	-	-	0x00: unready 0xAA: ready	-		N/A
Charger output ready	If the charger is ready to charge	M	-	-	0x00: unready 0xAA: ready	-		N/A

EN 61851-24			
Clause	Requirement + Test	Result - Remark	Verdict

[a] M = Mandatory
[b] O = Optional

Supplementary information:

EN 61851-24			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX B.4	**TABLE B.4 – Parameters in charging stage for system B**							**N/A**
Information	**Parameter**	**M[a] /O[b]**	**Unit**	**Resolution**	**Status flag**	**Item in Table 1**	**Other remarks**	**Verdict**
Battery charge requirement	Voltage requirement	M	V	0,1 V/bit	-	a-2		N/A
	Current requirement	M	A	0,1 A/bit	-	a-1		N/A
	Charge mode	M	-	-	-	-		N/A
Charger charge state	Output voltage	M	V	0,1 V/bit	-	-		N/A
	Output current	M	A	0,1 A/bit	-	h-1		N/A
	Accumulated charge time	M	min	1 min/bit	-	-		N/A
Battery charge state 1	Measured charge voltage	M	V	0,1 V/bit	-	-		N/A
	Measured charge current	M	A	0,1 A/bit	-	-		N/A
	Maximum cell voltage and corresponding battery pack number[c]	M	V	0,01 V/bit	-	-		N/A
	SOC	M	%	1 %/bit	-	-		N/A
	Estimated remainder time	M	min	1 min/bit	-	-		N/A
Battery charge state 2	Cell number of maximum cell voltage	M	-	-	-	-		N/A
	Maximum battery temperature	M	°C	1 °C/bit	-	-		N/A
	Test point number of maximum temperature	M		-	-	-		N/A
	Minimum battery temperature	M	°C	1 °C/bit	-	-		N/A
	Test point number of minimum temperature	M	-	-	-	-		N/A

EN 61851-24								
Clause	Requirement + Test				Result - Remark			Verdict
	Cell voltage over-high	M	-	-	**0:** normal **1:** over-high	-		N/A
	Cell voltage over-low	M	-	-	**0**: normal **1**: over-low	-		N/A
	Battery charge overcurrent	M	-	-	**0:** normal **1:** over-current	-		N/A
	Battery temperature overhigh	M	-	-	**0:** normal **1**: over-high	-		N/A
	Battery insulation state	M	-	-	**0**: normal **1:** abnormal	-		N/A
	Connection state of battery output connector	M	-	-	**0**: normal **1:** abnormal	-		N/A
	Charge permission	M	-	-	**0:** forbidden **1:** permission	c, d		N/A
Battery cell voltage	Voltage of each battery cell	O	V	0,01 V/bit	-	-		N/A

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Clause	Requirement + Test					Result - Remark		Verdict
Battery temperature	Temperature of each test point	O	°C	1 °C/bit	-	-		N/A
Vehicle stopping command	Vehiclestopping reason	M	-	-	-	-		N/A
	Vehiclestopping failure reason	M	-	-	-	h-2		N/A
	Vehicle stopping error reason	M	-	-	-	-		N/A
Charger stopping command	Charger stopping reason	M	-	-	-	e		N/A
	Charger stopping failure reason	M	-	-	-	-		N/A
	Charger stopping error reason	M	-	-	-	-		N/A
[a] M = Mandatory [b] O = Optional [c] Maximum cell voltage and corresponding battery pack number includes 2 bytes. 1 – 12 bit: the maximum cell voltage in the battery system, 0,01 V/bit; 13 – 16 bit: the battery pack number in which the maximum cell voltage has occurred, 1/bit.								
Supplementary information:								

EN 61851-24			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX B.4	TABLE B.5 – Parameters in charge ending stage for system B							N/A
Information	**Parameter**	**M[a] /O[b]**	**Unit**	**Resolution**	**Status flag**	**Item in Table 1**	**Other remarks**	**Verdict**
Vehicle statistic data	The final SOC	M	%	1 % /bit	-	-		N/A
	Minimum cell voltage	M	V	0,01 V/bit	-	-		N/A
	Maximum cell voltage	M	V	0,01 V/bit	-	-		N/A
	Minimum battery temperature	M	°C	1 °C/bit	-	-		N/A
	Maximum battery temperature	M	°C	1 °C/bit	-	-		N/A
Charger statistic data	Accumulated charge time	M	min	1 min/bit	-	-		N/A
	Accumulated output energy	M	kWh	0,1 kWh/bit	-	-		N/A
[a] M = Mandatory [b] O = Optional								
Supplementary information:								

EN 61851-24			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX B.4	**TABLE B.6 – Error parameters for system B**							**N/A**
Information	**Parameter**	**M[a] /O[b]**	**Unit**	**Resolution**	**Status flag**	**Item in Table 1**	**Other remarks**	**Verdict**
Vehicle receiving error	Receiving timeout of information from charger	M	-	-	-	g		N/A
Charger receiving error	Receiving timeout of information from vehicle	M	-	-	-	g		N/A
[a] M = Mandatory [b] O = Optional								
Supplementary information:								

ANNEX B.5	**TABLE B.7 – Physical/data link layer specifications for system B**			**N/A**
			Other remarks	**Verdict**
Communication system	Communication protocol	CAN 2,0 B, ISO 11898-1		N/A
	Transmission rate (kbps)	250		N/A
	Cycle	10/50/250/500/1 000 ms ± 10 %		N/A
Supplementary information:				

EN 61851-24			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX C.2	**TABLE C.1 – Required exchanged parameters for d.c. charging control for system C**			**P**
Item in Table 1	**Information**	**Parameter name (ISO/IEC 15118-2)**	**Other remarks**	**Verdict**
a-1	Current request for the controlled current charging (CCC) system	CurrentDemandReq/EVTargetCurrent	EV target current is set at 150 A. EVTargetCurrent=1500 (3 -1)	P
a-2	Voltage request for the controlled voltage charging (CVC) system	CurrentDemandReq/EVTargetVoltage	EV target voltage is set at 400 V. EVTargetVoltage=4000 (5 -1)	P
a-3	Maximum rated voltage of d.c. EV charging station	CurrentDemandRes/EVSEMaximumVoltageLimit	EVSE Maximum Voltage Limit is set at 1000 V. EVSEMaximumVoltageLimit=1000 (5 -1)	P
a-4	Maximum rated current of d.c. EV charging station	CurrentDemandRes/EVSEMaximumCurrentLimit	EVSE Maximum Current Limit is set at 150 A. EVSEMaximumCurrentLimit=1500 (3 -1)	P

EN 61851-24				
Clause	Requirement + Test		Result - Remark	Verdict
b-1	Communication protocol	supportedAppProtocol{Req,Res}	V2G: <-- ApplicationProtocolHandshake Protocol entry #=1 ProtocolNamespace=urn:din:70121:2012:MsgDef Version=2.0 SchemaID=1 Priority=1 Supported SchemaID(DIN)=1 Protocol entry #=2 ProtocolNamespace=urn:iso:15118:2:2013:MsgDef Version=2.0 SchemaID=2 Priority=2 Supported SchemaID(V2G)=2 V2G: Protocol=DIN(schemaID=1) V2G: --> ApplicationProtocolHandshake EVSE: state=STATE_EVSE_ISO15118	P
b-2	Maximum voltage limit of EV	CurrentDemandReq/EVMaximumVoltageLimit	Maximum voltage limit of EV is 1000V. EVMaximumVoltageLimit: Multiplier:0 Unit: V Value:1000	P

EN 61851-24				
Clause	Requirement + Test		Result - Remark	Verdict
b-3	EV minimum current limit, only for the controlled voltage charging (CVC) system	ChargeParameterDiscoveryRes / DC_EVSEChargeParameter / EVSEMinimumCurrentLimit	EVSE minimum current limit is 5A EVSEMinimumCurrentLimit: Multiplier:-1 Unit: A Value:50	P
c	Insulation test result	{PowerDeliveryRes, CableCheckRes, PreChargeRes, CurrentDemandRes, WeldingDetectionRes} / DC_EVSEStatus / EVSEIsolationStatus	PreChargeRes data: SessionID=39:36:33:4D:36:50:4C:34 ResponseCode=0 EVSEStatus: EVSEIsolationStatus=1 EVSEStatusCode=1 EVSENotification=None_ EVSENotificationType NotificationMaxDelay=0 EVSEPresentVoltage=400 (5 -1)	P

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Clause	Requirement + Test	Result - Remark		Verdict
d	Short circuit test before charging	CableCheck{Req,Res}	CableCheckReq: DC_EVStatus: EVReady: true EVErrorCode: NO_ERROR EVRESSSOC:50 CableCheckRes: ResponseCode: FAILED DC_EVSEStatus: EVSEIsolationStatus: Invalid EVSEStatusCode: EVSE_Malfunction NotificationMaxDelay: 0 EVSENotification: None EVSEProcessing: Finished	P
e	Charging stopped by user	{ChargeParameterDiscoveryRes,PowerDeliveryR es, CableCheckRes, PreChargeRes, CurrentDemandRes, WeldingDetectionRes} / DC_EVSEStatus / EVSEStatusCode / EVSE_Shutdown {ChargeParameterDiscoveryRes, PowerDeliveryRes, CableCheckRes, PreChargeRes, CurrentDemandRes, WeldingDetectionRes} / DC_EVSEStatus / EVSENotification / StopCharging	DC_EVSEStatus: EVSEStatusCode: EVSE_Shutdown EVSENotification: StopCharging	P
f	EVSE real time available load current (optional)	CurrentDemandRes/EVSEMaximumCurrentLimit		N/A

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Clause	Requirement + Test		Result - Remark	Verdict
g	Loss of digital communication	Message timers Control pilot state	Message timers accord with the requirments in DIN 70121 After direct change of pilot from state C to state A, the output current can be less than 5 A within 30 ms and De-energization of the system can be done within 100 ms.	P
h-1	Zero current confirmed	PowerDeliveryRes/ResponseCode CurrentDemandRes/EVSEPresentCurrent	PowerDeliveryRes: ResponseCode: OK CurrentDemandRes: EVSEPresentCurrent: Multiplier: -1 Unit: A Value: 20	P

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Clause	Requirement + Test		Result - Remark	Verdict
h-2	Welding detection	WeldingDetection{Req, Res}	WeldingDetectionReq: DC_EVStatus: EVReady:true EVErrorCode: NO_ERROR EVRESSSOC: 50 WeldingDetectionRes: ResponseCode: OK DC_EVSEStatus: EVSEIsolationStatus: Valid EVSEStatusCode: EVSE_NotReady NotificationMaxDelay: 0 EVSENotification: None EVSEPresentVoltage: Multiplier: -1 Unit: V Value: 5005	P
Supplementary information:				

--- End of Report ---