

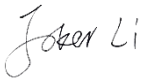
Test Report issued under the responsibility of:



TEST REPORT IEC 62109-2 Safety of Power Converter for use in Photovoltaic Power Systems Part 2: Particular requirements for inverters	
Report Number.....	GZES241202371802
Date of issue	2025-06-23
Total number of pages.....	45
Name of Testing Laboratory preparing the Report.....	SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch
Address	198 Kezhu Road, Science City, Economic & Technology Development Area, Guangzhou, Guangdong, China.
Applicant's name	Shenzhen EEnovance Energy Technology Co., Ltd.
Address	Room 401, Building 2, Yufengda Industrial Park, No. 1008 Guangqiao Avenue, Yulv Community, Yutang Streets, Guangming District, Shenzhen, Guangdong, China
Test specification:	
Standard	IEC 62109-2: 2011 EN 62109-2: 2011
Test procedure	SGS-CSTC
Non-standard test method	N/A
Test Report Form No.....	IEC62109_2B
Test Report Form(s) Originator	SGS-CSTC
Master TRF	Dated 2016-11
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Test item description	Rechargeable Lithium ion Battery Cabinet
Trade Mark.....	
Manufacturer	Shenzhen EEnovance Energy Technology Co., Ltd.
Address	Room 401, Building 2, Yufengda Industrial Park, No. 1008 Guangqiao Avenue, Yulv Community, Yutang Streets, Guangming District, Shenzhen, Guangdong, China
Model/Type reference	E-MATE 50-61-A, E-MATE 50-5.12-A, E-MATE 50-10.24-A, E-MATE 50-15.36-A, E-MATE 50-20.48-A, E-MATE 50-25.60-A, E-MATE 50-30.72-A, E-MATE 50-35.84-A, E-MATE 50-40.96-A, E-MATE 50-46.08-A, E-MATE 50-51.20-A, E-MATE 50-56.32-A, E-MATE 29.9-61-A, E-MATE 29.9-5.12-A, E-MATE 29.9-10.24- A, E-MATE 29.9-15.36-A, E-MATE 29.9-20.48-A, E-MATE 29.9- 25.60-A, E-MATE 29.9-30.72-A, E-MATE 29.9-35.84-A, E- MATE 29.9-40.96-A, E-MATE 29.9-46.08-A, E-MATE 29.9- 51.20-A, E-MATE 29.9-56.32-A, E-MATE 30-61-A, E-MATE 30- 5.12-A, E-MATE 30-10.24-A, E-MATE 30-15.36-A, E-MATE 30- 20.48-A, E-MATE 30-25.60-A, E-MATE 30-30.72-A, E-MATE 30-35.84-A, E-MATE 30-40.96-A, E-MATE 30-46.08-A, E-MATE 30-51.20-A, E-MATE 30-56.32-A, E-MATE 37.5-61-A, E-MATE 37.5-5.12-A, E-MATE 37.5-10.24-A, E-MATE 37.5-15.36-A, E- MATE 37.5-20.48-A, E-MATE 37.5-25.60-A, E-MATE 37.5- 30.72-A, E-MATE 37.5-35.84-A, E-MATE 37.5-40.96-A, E- MATE 37.5-46.08-A, E-MATE 37.5-51.20-A, E-MATE 37.5- 56.32-A, E-MATE 40-61-A, E-MATE 40-5.12-A, E-MATE 40- 10.24-A, E-MATE 40-15.36-A, E-MATE 40-20.48-A, E-MATE 40-25.60-A, E-MATE 40-30.72-A, E-MATE 40-35.84-A, E-MATE 40-40.96-A, E-MATE 40-46.08-A, E-MATE 40-51.20-A, E-MATE 40-56.32-A
Ratings	Refer to the rating on page 9 to page 25 of the report. Serial number: SQEC006110E0118001

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):

☒	Testing Laboratory:	SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch
Location/ address :	198 Kezhu Road, Science City, Economic & Technology Development Area, Guangzhou, Guangdong, China	
Tested by (name, function, signature)	Joker Li (Project Engineer)	
Approved by (name, function, signature ...)	Colin Chen (Technical Reviewer)	

List of Attachments (including a total number of pages in each attachment): N/A	
Summary of testing:	
Tests performed (name of test and test clause): The equipment has been tested according to the standard: IEC 62109-2:2011 and EN 62109-2: 2011. Testing has been carried out at 50 Hz. All applicable tests according to the above specified standard have been carried out. From the result of inspection and tests on the submitted sample, we conclude that it complies with the requirements of the standard.	Testing location: Dongguan BALUN Testing Technology Co., Ltd. Room 104, 204, 205, Building 1, No. 6, Industrial South Road, Songshan Lake District, Dongguan, Guangdong, China.
Summary of compliance with National Differences (List of countries addressed): No National Differences are addressed to this test report.	

Copy of marking plate:

EENOVANCE Rechargeable Lithium ion Battery Cabinet
Model: E-MATE 50-61-A

Battery Parameters	100Ah,61.44kWh,480V~700.8V DC	PV Parameters	50kW,150Vdc~850Vdc
Bat.Max.Charge/Discharge Current	80A/80A	Bat.Max.Charge/Discharge Power	50kW/50kW
Grid Parameters	50kW/400VAC/3P+N+PE	Back-up Parameters	50kW/400VAC/3P+N+PE
Rated AC Current	76A	Antiseptic rank	C4
Rated AC Frequency	50Hz/60Hz	Protection class	Class I
Series Number	SQEC006110E0118001	IP Level	IP55

Shenzhen EEnovance Energy Technology co.,LTD
Room 401,Building 2,Yufengda Industrial Park,No.1008 Guangqiao Avenue,
Yulv Community,Yutang Streets,Guangming District,SHENZHEN.PRC.

CE    

EENOVANCE Rechargeable Lithium ion Battery Cabinet
Model: E-MATE 40-61-A

Battery Parameters	100Ah,61.44kWh,480V~700.8V DC	PV Parameters	40kW,150Vdc~850Vdc
Bat.Max.Charge/Discharge Current	66A/66A	Bat.Max.Charge/Discharge Power	40kW/40kW
Grid Parameters	40kW/400VAC/3P+N+PE	Back-up Parameters	40kW/400VAC/3P+N+PE
Rated AC Current	60.8A	Antiseptic rank	C4
Rated AC Frequency	50Hz/60Hz	Protection class	Class I
Series Number	SQEC006110E0818001	IP Level	IP55

Shenzhen EEnovance Energy Technology co.,LTD
Room 401,Building 2,Yufengda Industrial Park,No.1008 Guangqiao Avenue,
Yulv Community,Yutang Streets,Guangming District,SHENZHEN.PRC.

CE    

EENOVANCE

Rechargeable Lithium ion Battery Cabinet

Model: E-MATE 37.5-61-A

Battery Parameters	100Ah,61.44kWh,480V~700.8V DC	PV Parameters	37.5kW,150Vdc~850Vdc
Bat.Max.Charge/Discharge Current	62A/62A	Bat.Max.Charge/Discharge Power	37.5kW/37.5kW
Grid Parameters	37.5kW/400VAC/3P+N+PE	Back-up Parameters	37.5kW/400VAC/3P+N+PE
Rated AC Current	57A	Antiseptic rank	C4
Rated AC Frequency	50Hz/60Hz	Protection class	Class I
Series Number	SQEC006110E0918001	IP Level	IP55

Shenzhen EEnovance Energy Technology co.,LTD

Room 401,Building 2,Yufengda Industrial Park,No.1008 Guangqiao Avenue,
Yulu Community,Yutang Streets,Guangming District,SHENZHEN.PRC.**EENOVANCE**

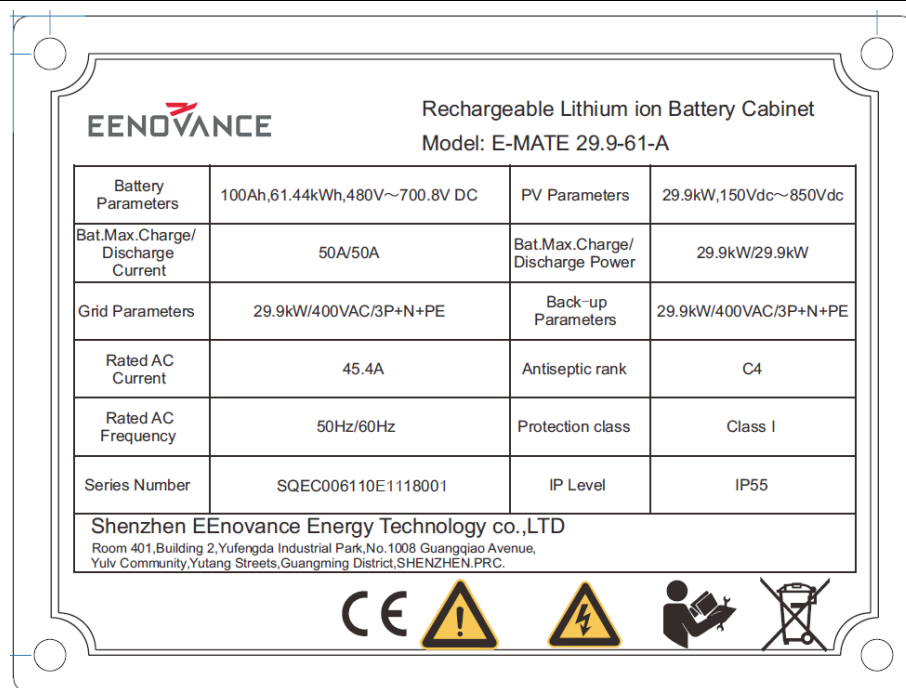
Rechargeable Lithium ion Battery Cabinet

Model: E-MATE 30-61-A

Battery Parameters	100Ah,61.44kWh,480V~700.8V DC	PV Parameters	30kW,150Vdc~850Vdc
Bat.Max.Charge/Discharge Current	50A/50A	Bat.Max.Charge/Discharge Power	30kW/30kW
Grid Parameters	30kW/400VAC/3P+N+PE	Back-up Parameters	30kW/400VAC/3P+N+PE
Rated AC Current	45.6A	Antiseptic rank	C4
Rated AC Frequency	50Hz/60Hz	Protection class	Class I
Series Number	SQEC006110E1018001	IP Level	IP55

Shenzhen EEnovance Energy Technology co.,LTD

Room 401,Building 2,Yufengda Industrial Park,No.1008 Guangqiao Avenue,
Yulu Community,Yutang Streets,Guangming District,SHENZHEN.PRC.

**Note:**

1. The above markings are the minimum requirements required by the safety standard. For the final production samples, the additional markings which do not give rise to misunderstanding may be added.
2. Label is attached on the side surface of enclosure and visible after installation.
3. Labels of other models are as the same with **E-MATE 50-61-A**, **E-MATE 40-61-A**, **E-MATE 37.5-61-A**, **E-MATE 30-61-A** and **E-MATE 29.9-61-A**'s except the parameters of rating.
4. As declared by the applicant, the importer (and manufacturer, if it is different)'s name, registered trade name or registered trademark and the postal address will be marked on the products before being place on the market. The contact details shall be in a language easily understood by end-users and market surveillance authorities.

Test item particulars	
Equipment mobility	☐ movable ☐ hand-held ☐ stationary ☒ fixed ☐ transportable ☐ for building-in
Connection to the mains	☐ pluggable equipment ☐ direct plug-in ☒ permanent connection ☐ for building-in
Environmental category	☒ outdoor ☐ indoor unconditional ☐ indoor conditional
Over voltage category Mains	☐ OVC I ☐ OVC II ☒ OVC III ☐ OVC IV
Over voltage category PV	☐ OVC I ☒ OVC II ☐ OVC III ☐ OVC IV
Mains supply tolerance (%)	-90 / +110 %
Tested for power systems	TN systems
IT testing, phase-phase voltage (V)	N/A
Class of equipment	☒ Class I ☐ Class II ☐ Class III ☐ Not classified
Mass of equipment (kg)	1200 kg
Pollution degree	Outside PD3; Inside PD2
IP protection class	IP55
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: 2025-01-28 Date (s) of performance of tests: 2025-03-03 to 2025-05-06	

General remarks:

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

"(See appended table)" refers to a table appended to the report.

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

Manufacturer's Declaration per sub-clause 4.2.5 of IEC62109-2:

The application for obtaining a CB 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) Dongguan EEnovance Energy Technology Co., Ltd.
Room 501, Building1, Songhu Zhigu Science and Technology Industrial Park, No.11, Liaobu Yanhe Road, Liaobu Town, Dongguan City, Guangdong Province. PRC.

General product information:

The solar-storage and off-grid energy storage system consists of two parts: a hybrid inverter and a lithium battery system (also called a battery cabinet). It is a small and medium-power PV energy storage system developed for areas without or with little electricity, achieving the functional characteristics of efficient power generation, reliable power supply, and intelligent operation and maintenance. This system provides a systematic solution that supports solar PV access, energy storage battery access, load access, and grid access. The system mainly consists of battery cabinet, hybrid inverter, HV switch box, etc.

Equipment Under Testing:

- E-MATE 50-61-A
- E-MATE 29.9-61-A
- E-MATE 30-61-A
- E-MATE 37.5-61-A
- E-MATE 40-61-A

Variant models:

- E-MATE 50-5.12-A, E-MATE 50-10.24-A, E-MATE 50-15.36-A,
E-MATE 50-20.48-A, E-MATE 50-25.60-A, E-MATE 50-30.72-A, E-MATE 50-35.84-A,
E-MATE 50-40.96-A, E-MATE 50-46.08-A, E-MATE 50-51.20-A, E-MATE 50-56.32-A,
- E-MATE 29.9-5.12-A, E-MATE 29.9-10.24-A, E-MATE 29.9-15.36-A,
E-MATE 29.9-20.48-A, E-MATE 29.9-25.60-A, E-MATE 29.9-30.72-A, E-MATE 29.9-35.84-A,
E-MATE 29.9-40.96-A, E-MATE 29.9-46.08-A, E-MATE 29.9-51.20-A, E-MATE 29.9-56.32-A,
- E-MATE 30-5.12-A, E-MATE 30-10.24-A, E-MATE 30-15.36-A,
E-MATE 30-20.48-A, E-MATE 30-25.60-A, E-MATE 30-30.72-A, E-MATE 30-35.84-A,
E-MATE 30-40.96-A, E-MATE 30-46.08-A, E-MATE 30-51.20-A, E-MATE 30-56.32-A,
- E-MATE 37.5-5.12-A, E-MATE 37.5-10.24-A, E-MATE 37.5-15.36-A,
E-MATE 37.5-20.48-A, E-MATE 37.5-25.60-A, E-MATE 37.5-30.72-A, E-MATE 37.5-35.84-A,
E-MATE 37.5-40.96-A, E-MATE 37.5-46.08-A, E-MATE 37.5-51.20-A, E-MATE 37.5-56.32-A,
- E-MATE 40-5.12-A, E-MATE 40-10.24-A, E-MATE 40-15.36-A,
E-MATE 40-20.48-A, E-MATE 40-25.60-A, E-MATE 40-30.72-A, E-MATE 40-35.84-A,
E-MATE 40-40.96-A, E-MATE 40-46.08-A, E-MATE 40-51.20-A, E-MATE 40-56.32-A

The variant models have been included in this test report without tests because the following features don't change regarding to the tested model:

- Same connection system and hardware topology.
- Same control algorithm.
- Same Firmware Version.

Information within this section has been provided by the client.

The models of E-MATE 50-61-A, E-MATE 50-5.12-A, E-MATE 50-10.24-A, E-MATE 50-15.36-A, E-MATE 50-20.48-A, E-MATE 50-25.60-A, E-MATE 50-30.72-A, E-MATE 50-35.84-A, E-MATE 50-40.96-A, E-MATE 50-46.08-A, E-MATE 50-51.20-A, E-MATE 50-56.32-A, E-MATE 29.9-61-A, E-MATE 29.9-5.12-A, E-MATE 29.9-10.24-A, E-MATE 29.9-15.36-A, E-MATE 29.9-20.48-A, E-MATE 29.9-25.60-A, E-MATE 29.9-30.72-A, E-MATE 29.9-35.84-A, E-MATE 29.9-40.96-A, E-MATE 29.9-46.08-A, E-MATE 29.9-51.20-A, E-MATE 29.9-56.32-A, E-MATE 30-61-A, E-MATE 30-5.12-A, E-MATE 30-10.24-A, E-MATE 30-15.36-A, E-MATE 30-20.48-A, E-MATE 30-25.60-A, E-MATE 30-30.72-A, E-MATE 30-35.84-A, E-MATE 30-40.96-A, E-MATE 30-46.08-A, E-MATE 30-51.20-A, E-MATE 30-56.32-A, E-MATE 37.5-61-A, E-MATE 37.5-5.12-A, E-MATE 37.5-10.24-A, E-MATE 37.5-15.36-A, E-MATE 37.5-20.48-A, E-MATE 37.5-25.60-A, E-MATE 37.5-30.72-A, E-MATE 37.5-35.84-A, E-MATE 37.5-40.96-A, E-MATE 37.5-46.08-A, E-MATE 37.5-51.20-A, E-MATE 37.5-56.32-A, E-MATE 40-61-A, E-MATE 40-5.12-A, E-MATE 40-10.24-A, E-MATE 40-15.36-A, E-MATE 40-20.48-A, E-MATE 40-25.60-A, E-MATE 40-30.72-A, E-MATE 40-35.84-A, E-MATE 40-40.96-A, E-MATE 40-46.08-A, E-MATE 40-51.20-A and E-MATE 40-56.32-A are identical on topological schematic circuit diagram and control solution codes except for input/output rating.

The results obtained apply only to the particular sample tested that is the subject of the present test report. The most unfavorable result values of the verifications and tests performed are contained herein.

Following table shows the full ratings of all the models referenced in this report, marked in **bold letters** the ones subjected to testing:

0Product Model	E-MATE 50-61-A	E-MATE 50-5.12-A	E-MATE 50-10.24-A	E-MATE 50-15.36-A
System Parameters				
Battery module	5.12 kWh, 51.2 Vd.c.			
Number of packs	12	1	2	3
Battery system rated capacity	61.44kWh	5.12kWh	10.24 kWh	15.36kWh
Battery system rated voltage	614.4Vd.c.	51.2Vd.c.	102.4Vd.c.	153.6Vd.c.
Battery system rated current	80 A			
Battery system voltage range	480V - 700.8 Vd.c	40V - 58.4Vd.c	80V - 116.8 Vd.c	120V - 175.2 Vd.c
PV Side Parameter				
PV side voltage range	150 V - 850 Vd.c. (full power above 500 Vd.c.)			
DC maximum current	4*40A			
DC maximum power	96 kW			
MPPT quantity	4			
AC Side Parameters				
Rated output power	50 kW			
Rated grid voltage	3L / N / PE, 230 / 400Va.c.			
Maximum output current	76 A			
Allowable grid voltage range	230 V - 400 Va.c.			
Rated grid frequency	50Hz / 60Hz			
Power factor	-1~1			
System Parameter				
Dimension (W×D×H)	740×1040×2330 mm			
Weight	1080kg	596kg	640kg	684kg
Operating temperature	-30℃~+55℃			
Relative humidity	0~95% (No condensation)			
Maximum working altitude	3000 m (> 2000 m Derating)			
Ingress protection rating	IP55			
Heat dissipation method	Forced air cooling			

Product Model	E-MATE 50- 20.48-A	E-MATE 50- 25.60-A	E-MATE 50- 30.72-A	E-MATE 50- 35.84-A
System Parameters				
Battery module	5.12 kWh, 51.2 Vd.c.			
Number of packs	4	5	6	7
Battery system rated capacity	20.48kWh	25.60kWh	30.72kWh	35.84kWh
Battery system rated voltage	204.8Vd.c.	256.0Vd.c.	307.2Vd.c.	358.4Vd.c.
Battery system rated current	80 A			
Battery system voltage range	160V - 233.6Vd.c	200V - 292.0Vd.c	240V - 350.4Vd.c	280V - 408.8Vd.c
PV Side Parameter				
PV side voltage range	150 V - 850 Vd.c. (full power above 500 Vd.c.)			
DC maximum current	4*40A			
DC maximum power	96 kW			
MPPT quantity	4			
AC Side Parameters				
Rated output power	50 kW			
Rated grid voltage	3L / N / PE, 230 / 400Va.c.			
Maximum output current	76 A			
Allowable grid voltage range	230 V - 400 Va.c.			
Rated grid frequency	50Hz / 60Hz			
Power factor	-1~1			
System Parameter				
Dimension (W×D×H)	740×1040×2330 mm			
Weight	728kg	772kg	816kg	860kg
Operating temperature	-30℃~+55℃			
Relative humidity	0~95% (No condensation)			
Maximum working altitude	3000 m (> 2000 m Derating)			
Ingress protection rating	IP55			
Heat dissipation method	Forced air cooling			

Product Model	E-MATE 50-40.96-A	E-MATE 50-46.08-A	E-MATE 50-51.20-A	E-MATE 50-56.32-A
System Parameters				
Battery module	5.12 kWh, 51.2 Vd.c.			
Number of packs	8	9	10	11
Battery system rated capacity	40.96kWh	46.08kWh	51.20kWh	56.32kWh
Battery system rated voltage	409.6Vd.c.	460.8Vd.c.	512.0Vd.c.	563.2Vd.c.
Battery system rated current	80 A			
Battery system voltage range	320V - 467.2Vd.c	360V - 525.6Vd.c	400V - 584.0Vd.c	440V - 642.4Vd.c
PV Side Parameter				
PV side voltage range	150 V - 850 Vd.c. (full power above 500 Vd.c.)			
DC maximum current	4*40A			
DC maximum power	96 kW			
MPPT quantity	4			
AC Side Parameters				
Rated output power	50 kW			
Rated grid voltage	3L / N / PE, 230 / 400Va.c.			
Maximum output current	76 A			
Allowable grid voltage range	230 V - 400 Va.c.			
Rated grid frequency	50Hz / 60Hz			
Power factor	-1~1			
System Parameter				
Dimension (W×D×H)	740×1040×2330 mm			
Weight	904kg	948kg	992kg	1036kg
Operating temperature	-30℃~+55℃			
Relative humidity	0~95% (No condensation)			
Maximum working altitude	3000 m (> 2000 m Derating)			
Ingress protection rating	IP55			
Heat dissipation method	Forced air cooling			

Product Model	E-MATE 29.9-61-A	E-MATE 29.9-5.12-A	E-MATE 29.9-10.24-A	E-MATE 29.9-15.36-A
System Parameters				
Battery module	5.12 kWh, 51.2 Vd.c.			
Number of packs	12	1	2	3
Battery system rated capacity	61.44kWh	5.12kWh	10.24 kWh	15.36kWh
Battery system rated voltage	614.4Vd.c.	51.2Vd.c.	102.4Vd.c.	153.6Vd.c.
Battery system rated current	50 A			
Battery system voltage range	480V - 700.8 Vd.c	40V - 58.4Vd.c	80V - 116.8Vd.c	120V - 175.2 Vd.c
PV Side Parameter				
PV side voltage range	150 V - 850 Vd.c. (full power above 500 Vd.c.)			
DC maximum current	3*40A			
DC maximum power	59.8 kW			
MPPT quantity	3			
AC Side Parameters				
Rated output power	29.9 kW			
Rated grid voltage	3L / N / PE, 230 / 400Va.c.			
Maximum output current	45.4 A			
Allowable grid voltage range	230 V - 400 Va.c.			
Rated grid frequency	50Hz / 60Hz			
Power factor	-1~1			
System Parameter				
Dimension (W×D×H)	740×1040×2330 mm			
Weight	1080kg	596kg	640kg	684kg
Operating temperature	-30℃~+55℃			
Relative humidity	0~95% (No condensation)			
Maximum working altitude	3000 m (> 2000 m Derating)			
Ingress protection rating	IP55			
Heat dissipation method	Forced air cooling			

Product Model	E-MATE 29.9-20.48-A	E-MATE 29.9-25.60-A	E-MATE 29.9-30.72-A	E-MATE 29.9-35.84-A
System Parameters				
Battery module	5.12 kWh, 51.2 Vd.c.			
Number of packs	4	5	6	7
Battery system rated capacity	20.48kWh	25.60kWh	30.72kWh	35.84kWh
Battery system rated voltage	204.8Vd.c.	256.0Vd.c.	307.2Vd.c.	358.4Vd.c.
Battery system rated current	50 A			
Battery system voltage range	160V - 233.6Vd.c	200V - 292.0Vd.c	240V - 350.4Vd.c	280V - 408.8Vd.c
PV Side Parameter				
PV side voltage range	150 V - 850 Vd.c. (full power above 500 Vd.c.)			
DC maximum current	3*40A			
DC maximum power	59.8 kW			
MPPT quantity	3			
AC Side Parameters				
Rated output power	29.9 kW			
Rated grid voltage	3L / N / PE, 230 / 400Va.c.			
Maximum output current	45.4 A			
Allowable grid voltage range	230 V - 400 Va.c.			
Rated grid frequency	50Hz / 60Hz			
Power factor	-1~1			
System Parameter				
Dimension (W×D×H)	740×1040×2330 mm			
Weight	728kg	772kg	816kg	860kg
Operating temperature	-30℃~+55℃			
Relative humidity	0~95% (No condensation)			
Maximum working altitude	3000 m (> 2000 m Derating)			
Ingress protection rating	IP55			
Heat dissipation method	Forced air cooling			

Product Model	E-MATE 29.9-40.96-A	E-MATE 29.9-46.08-A	E-MATE 29.9-51.20-A	E-MATE 29.9-56.32-A
System Parameters				
Battery module	5.12 kWh, 51.2 Vd.c.			
Number of packs	8	9	10	11
Battery system rated capacity	40.96kWh	46.08kWh	51.20kWh	56.32kWh
Battery system rated voltage	409.6Vd.c.	460.8Vd.c.	512.0Vd.c.	563.2Vd.c.
Battery system rated current	50 A			
Battery system voltage range	320V - 467.2Vd.c	360V - 525.6Vd.c	400V - 584.0Vd.c	440V - 642.4Vd.c
PV Side Parameter				
PV side voltage range	150 V - 850 Vd.c. (full power above 500 Vd.c.)			
DC maximum current	3*40A			
DC maximum power	59.8 kW			
MPPT quantity	3			
AC Side Parameters				
Rated output power	29.9 kW			
Rated grid voltage	3L / N / PE, 230 / 400Va.c.			
Maximum output current	45.4 A			
Allowable grid voltage range	230 V - 400 Va.c.			
Rated grid frequency	50Hz / 60Hz			
Power factor	-1~1			
System Parameter				
Dimension (W×D×H)	740×1040×2330 mm			
Weight	904kg	948kg	992kg	1036kg
Operating temperature	-30℃~+55℃			
Relative humidity	0~95% (No condensation)			
Maximum working altitude	3000 m (> 2000 m Derating)			
Ingress protection rating	IP55			
Heat dissipation method	Forced air cooling			

Product Model	E-MATE 30-61-A	E-MATE 30-5.12-A	E-MATE 30-10.24-A	E-MATE 30-15.36-A
System Parameters				
Battery module	5.12 kWh, 51.2 Vd.c.			
Number of packs	12	1	2	3
Battery system rated capacity	61.44kWh	5.12kWh	10.24 kWh	15.36kWh
Battery system rated voltage	614.4Vd.c.	51.2Vd.c.	102.4Vd.c.	153.6Vd.c.
Battery system rated current	50 A			
Battery system voltage range	480V - 700.8 Vd.c	40V - 58.4Vd.c	80V - 116.8Vd.c	120V - 175.2 Vd.c
PV Side Parameter				
PV side voltage range	150 V - 850 Vd.c. (full power above 500 Vd.c.)			
DC maximum current	3*40A			
DC maximum power	60 kW			
MPPT quantity	3			
AC Side Parameters				
Rated output power	30 kW			
Rated grid voltage	3L / N / PE, 230 / 400Va.c.			
Maximum output current	45.6 A			
Allowable grid voltage range	230 V - 400 Va.c.			
Rated grid frequency	50Hz / 60Hz			
Power factor	-1~1			
System Parameter				
Dimension (W×D×H)	740×1040×2330 mm			
Weight	1080kg	596kg	640kg	684kg
Operating temperature	-30℃~+55℃			
Relative humidity	0~95% (No condensation)			
Maximum working altitude	3000 m (> 2000 m Derating)			
Ingress protection rating	IP55			
Heat dissipation method	Forced air cooling			

Product Model	E-MATE 30-20.48-A	E-MATE 30-25.60-A	E-MATE 30-30.72-A	E-MATE 30-35.84-A
System Parameters				
Battery module	5.12 kWh, 51.2 Vd.c.			
Number of packs	4	5	6	7
Battery system rated capacity	20.48kWh	25.60kWh	30.72kWh	35.84kWh
Battery system rated voltage	204.8Vd.c.	256.0Vd.c.	307.2Vd.c.	358.4Vd.c.
Battery system rated current	50 A			
Battery system voltage range	160V - 233.6Vd.c	200V - 292.0Vd.c	240V - 350.4Vd.c	280V - 408.8Vd.c
PV Side Parameter				
PV side voltage range	150 V - 850 Vd.c. (full power above 500 Vd.c.)			
DC maximum current	3*40A			
DC maximum power	60 kW			
MPPT quantity	3			
AC Side Parameters				
Rated output power	30 kW			
Rated grid voltage	3L / N / PE, 230 / 400Va.c.			
Maximum output current	45.6 A			
Allowable grid voltage range	230 V - 400 Va.c.			
Rated grid frequency	50Hz / 60Hz			
Power factor	-1~1			
System Parameter				
Dimension (W×D×H)	740×1040×2330 mm			
Weight	728kg	772kg	816kg	860kg
Operating temperature	-30℃~+55℃			
Relative humidity	0~95% (No condensation)			
Maximum working altitude	3000 m (> 2000 m Derating)			
Ingress protection rating	IP55			
Heat dissipation method	Forced air cooling			

Product Model	E-MATE 30-40.96-A	E-MATE 30-46.08-A	E-MATE 30-51.20-A	E-MATE 30-56.32-A
System Parameters				
Battery module	5.12 kWh, 51.2 Vd.c.			
Number of packs	8	9	10	11
Battery system rated capacity	40.96kWh	46.08kWh	51.20kWh	56.32kWh
Battery system rated voltage	409.6Vd.c.	460.8Vd.c.	512.0Vd.c.	563.2Vd.c.
Battery system rated current	50 A			
Battery system voltage range	320V - 467.2Vd.c	360V - 525.6Vd.c	400V - 584.0Vd.c	440V - 642.4Vd.c
PV Side Parameter				
PV side voltage range	150 V - 850 Vd.c. (full power above 500 Vd.c.)			
DC maximum current	3*40A			
DC maximum power	60 kW			
MPPT quantity	3			
AC Side Parameters				
Rated output power	30 kW			
Rated grid voltage	3L / N / PE, 230 / 400Va.c.			
Maximum output current	45.6 A			
Allowable grid voltage range	230 V - 400 Va.c.			
Rated grid frequency	50Hz / 60Hz			
Power factor	-1~1			
System Parameter				
Dimension (W×D×H)	740×1040×2330 mm			
Weight	904kg	948kg	992kg	1036kg
Operating temperature	-30℃~+55℃			
Relative humidity	0~95% (No condensation)			
Maximum working altitude	3000 m (> 2000 m Derating)			
Ingress protection rating	IP55			
Heat dissipation method	Forced air cooling			

Product Model	E-MATE 37.5-61-A	E-MATE 37.5-5.12-A	E-MATE 37.5-10.24-A	E-MATE 37.5-15.36-A
System Parameters				
Battery module	5.12 kWh, 51.2 Vd.c.			
Number of packs	12	1	2	3
Battery system rated capacity	61.44kWh	5.12kWh	10.24 kWh	15.36kWh
Battery system rated voltage	614.4Vd.c.	51.2Vd.c.	102.4Vd.c.	153.6Vd.c.
Battery system rated current	62 A			
Battery system voltage range	480V - 700.8 Vd.c	40V - 58.4Vd.c	80V - 116.8Vd.c	120V - 175.2 Vd.c
PV Side Parameter				
PV side voltage range	150 V - 850 Vd.c. (full power above 500 Vd.c.)			
DC maximum current	4*40A			
DC maximum power	75 kW			
MPPT quantity	4			
AC Side Parameters				
Rated output power	37.5kW			
Rated grid voltage	3L / N / PE, 230 / 400Va.c.			
Maximum output current	57A			
Allowable grid voltage range	230 V - 400 Va.c.			
Rated grid frequency	50Hz / 60Hz			
Power factor	-1~1			
System Parameter				
Dimension (W×D×H)	740×1040×2330 mm			
Weight	1080kg	596kg	640kg	684kg
Operating temperature	-30℃~+55℃			
Relative humidity	0~95% (No condensation)			
Maximum working altitude	3000 m (> 2000 m Derating)			
Ingress protection rating	IP55			
Heat dissipation method	Forced air cooling			

Product Model	E-MATE 37.5-20.48-A	E-MATE 37.5-25.60-A	E-MATE 37.5-30.72-A	E-MATE 37.5-35.84-A
System Parameters				
Battery module	5.12 kWh, 51.2 Vd.c.			
Number of packs	4	5	6	7
Battery system rated capacity	20.48kWh	25.60kWh	30.72kWh	35.84kWh
Battery system rated voltage	204.8Vd.c.	256.0Vd.c.	307.2Vd.c.	358.4Vd.c.
Battery system rated current	62 A			
Battery system voltage range	160V - 233.6Vd.c	200V - 292.0Vd.c	240V - 350.4Vd.c	280V - 408.8Vd.c
PV Side Parameter				
PV side voltage range	150 V - 850 Vd.c. (full power above 500 Vd.c.)			
DC maximum current	4*40A			
DC maximum power	75 kW			
MPPT quantity	4			
AC Side Parameters				
Rated output power	37.5kW			
Rated grid voltage	3L / N / PE, 230 / 400Va.c.			
Maximum output current	57A			
Allowable grid voltage range	230 V - 400 Va.c.			
Rated grid frequency	50Hz / 60Hz			
Power factor	-1~1			
System Parameter				
Dimension (W×D×H)	740×1040×2330 mm			
Weight	728kg	772kg	816kg	860kg
Operating temperature	-30℃~+55℃			
Relative humidity	0~95% (No condensation)			
Maximum working altitude	3000 m (> 2000 m Derating)			
Ingress protection rating	IP55			
Heat dissipation method	Forced air cooling			

Product Model	E-MATE 37.5-40.96-A	E-MATE 37.5-46.08-A	E-MATE 37.5-51.20-A	E-MATE 37.5-56.32-A
System Parameters				
Battery module	5.12 kWh, 51.2 Vd.c.			
Number of packs	8	9	10	11
Battery system rated capacity	40.96kWh	46.08kWh	51.20kWh	56.32kWh
Battery system rated voltage	409.6Vd.c.	460.8Vd.c.	512.0Vd.c.	563.2Vd.c.
Battery system rated current	62 A			
Battery system voltage range	320V - 467.2Vd.c	360V - 525.6Vd.c	400V - 584.0Vd.c	440V - 642.4Vd.c
PV Side Parameter				
PV side voltage range	150 V - 850 Vd.c. (full power above 500 Vd.c.)			
DC maximum current	4*40A			
DC maximum power	75 kW			
MPPT quantity	4			
AC Side Parameters				
Rated output power	37.5kW			
Rated grid voltage	3L / N / PE, 230 / 400Va.c.			
Maximum output current	57A			
Allowable grid voltage range	230 V - 400 Va.c.			
Rated grid frequency	50Hz / 60Hz			
Power factor	-1~1			
System Parameter				
Dimension (W×D×H)	740×1040×2330 mm			
Weight	904kg	948kg	992kg	1036kg
Operating temperature	-30℃~+55℃			
Relative humidity	0~95% (No condensation)			
Maximum working altitude	3000 m (> 2000 m Derating)			
Ingress protection rating	IP55			
Heat dissipation method	Forced air cooling			

Product Model	E-MATE 40-61-A	E-MATE 40-5.12-A	E-MATE 40-10.24-A	E-MATE 40-15.36-A
System Parameters				
Battery module	5.12 kWh, 51.2 Vd.c.			
Number of packs	12	1	2	3
Battery system rated capacity	61.44kWh	5.12kWh	10.24 kWh	15.36kWh
Battery system rated voltage	614.4Vd.c.	51.2Vd.c.	102.4Vd.c.	153.6Vd.c.
Battery system rated current	66A			
Battery system voltage range	480V - 700.8 Vd.c	40V - 58.4Vd.c	80V - 116.8Vd.c	120V - 175.2 Vd.c
PV Side Parameter				
PV side voltage range	150 V - 850 Vd.c. (full power above 500 Vd.c.)			
DC maximum current	4*40A			
DC maximum power	80 kW			
MPPT quantity	4			
AC Side Parameters				
Rated output power	40kW			
Rated grid voltage	3L / N / PE, 230 / 400Va.c.			
Maximum output current	60.8A			
Allowable grid voltage range	230 V - 400 Va.c.			
Rated grid frequency	50Hz / 60Hz			
Power factor	-1~1			
System Parameter				
Dimension (W×D×H)	740×1040×2330 mm			
Weight	1080kg	596kg	640kg	684kg
Operating temperature	-30℃~+55℃			
Relative humidity	0~95% (No condensation)			
Maximum working altitude	3000 m (> 2000 m Derating)			
Ingress protection rating	IP55			
Heat dissipation method	Forced air cooling			

Product Model	E-MATE 40- 20.48-A	E-MATE 40- 25.60-A	E-MATE 40- 30.72-A	E-MATE 40- 35.84-A
System Parameters				
Battery module	5.12 kWh, 51.2 Vd.c.			
Number of packs	4	5	6	7
Battery system rated capacity	20.48kWh	25.60kWh	30.72kWh	35.84kWh
Battery system rated voltage	204.8Vd.c.	256.0Vd.c.	307.2Vd.c.	358.4Vd.c.
Battery system rated current	66 A			
Battery system voltage range	160V - 233.6Vd.c	200V - 292.0Vd.c	240V - 350.4Vd.c	280V - 408.8Vd.c
PV Side Parameter				
PV side voltage range	150 V - 850 Vd.c. (full power above 500 Vd.c.)			
DC maximum current	4*40A			
DC maximum power	80 kW			
MPPT quantity	4			
AC Side Parameters				
Rated output power	40kW			
Rated grid voltage	3L / N / PE, 230 / 400Va.c.			
Maximum output current	60.8A			
Allowable grid voltage range	230 V - 400 Va.c.			
Rated grid frequency	50Hz / 60Hz			
Power factor	-1~1			
System Parameter				
Dimension (W×D×H)	740×1040×2330 mm			
Weight	728kg	772kg	816kg	860kg
Operating temperature	-30°C~+55°C			
Relative humidity	0~95% (No condensation)			
Maximum working altitude	3000 m (> 2000 m Derating)			
Ingress protection rating	IP55			
Heat dissipation method	Forced air cooling			

Product Model	E-MATE 40-40.96-A	E-MATE 40-46.08-A	E-MATE 40-51.20-A	E-MATE 40-56.32-A
System Parameters				
Battery module	5.12 kWh, 51.2 Vd.c.			
Number of packs	8	9	10	11
Battery system rated capacity	40.96kWh	46.08kWh	51.20kWh	56.32kWh
Battery system rated voltage	409.6Vd.c.	460.8Vd.c.	512.0Vd.c.	563.2Vd.c.
Battery system rated current	66 A			
Battery system voltage range	320V - 467.2Vd.c	360V - 525.6Vd.c	400V - 584.0Vd.c	440V - 642.4Vd.c
PV Side Parameter				
PV side voltage range	150 V - 850 Vd.c. (full power above 500 Vd.c.)			
DC maximum current	4*40A			
DC maximum power	80 kW			
MPPT quantity	4			
AC Side Parameters				
Rated output power	40kW			
Rated grid voltage	3L / N / PE, 230 / 400Va.c.			
Maximum output current	60.8A			
Allowable grid voltage range	230 V - 400 Va.c.			
Rated grid frequency	50Hz / 60Hz			
Power factor	-1~1			
System Parameter				
Dimension (W×D×H)	740×1040×2330 mm			
Weight	904kg	948kg	992kg	1036kg
Operating temperature	-30℃~+55℃			
Relative humidity	0~95% (No condensation)			
Maximum working altitude	3000 m (> 2000 m Derating)			
Ingress protection rating	IP55			
Heat dissipation method	Forced air cooling			

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Clause	Requirement + Test	Result - Remark	Verdict

4	GENERAL TESTING REQUIREMENTS		P
4.4.4	Single fault conditions to be applied		P
4.4.4.15	Fault-tolerance of protection for grid-interactive inverters		P
4.4.4.15.1	Fault-tolerance of residual current monitoring according to 4.8.3.5: the residual current monitoring system operates properly	See appended table 4.4.4.15.1	P
	a).- The inverter ceases to operate		P
	- Indicates a fault in accordance with §13.9		P
	- Disconnect from the mains		P
	- not re-connect after any sequence of removing and reconnecting PV power		P
	- not re-connect after any sequence of removing and reconnecting AC power		P
	- not re-connect after any sequence of removing and reconnecting both PV and AC power		P
	b) .- The inverter continues to operate		N/A
	- the residual current monitoring system operates properly under single fault condition		N/A
	- Indicates a fault in accordance with §13.9		N/A
	c).- The inverter continues to operate regardless of loss of residual current monitoring functionality		N/A
	- not re-connect after any sequence of removing and reconnecting PV power		N/A
	- not re-connect after any sequence of removing and reconnecting AC power		N/A
	- not re-connect after any sequence of removing and reconnecting both PV and AC power		N/A
	- Indicates a fault in accordance with §13.9		N/A
4.4.4.15.2	Fault-tolerance of automatic disconnecting means		P
4.4.4.15.2.1	The means provided for automatic disconnection of a grid-interactive inverter from the mains shall:		P
	- disconnect all grounded current-carrying conductors from the mains		P
	- disconnect all ungrounded current-carrying conductors from the mains		P
	- be such that with a single fault applied to the disconnection means or to any other location in the inverter, at least basic insulation or simple separation is maintained between the PV array and the mains when the disconnecting means is intended to be in the open state.	See appended table 4.4.4.15.2 Fault-tolerance of automatic disconnecting	P
4.4.4.15.2.2	Design of insulation or separation complies with		P

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Clause	Requirement + Test	Result - Remark	Verdict
	requirements of 7.3.7 of Part 1: report here Part 1 comment and verdict.		
4.4.4.15.2.3	For non-isolated inverter, automatic checking of the isolation provided by a disconnect means after single fault.	See appended test table 4.4.4.15.2 Fault-tolerance of automatic disconnecting.	P
	If the check fail: - any still-functional disconnection means shall be left in the open position		P
	- at least basic or simple separation shall be maintained between the PV input and the mains		P
	- the inverter shall not start operation		P
	- the inverter shall indicate a fault in accordance with 13.9		P
4.4.4.16	A stand-alone inverter with a transfer switch to transfer AC loads from the mains or other AC bypass source to the inverter output:		P
	- shall continue to operate normally		P
	- shall not present a risk of fire as the result of an out-of-phase transfer		P
	- shall not present a risk of shock as the result of an out-of-phase transfer		P
	- And having control preventing switching: components for malfunctioning:		P
4.4.4.17	Cooling system failure – Blanketing test No hazards according to the criteria of sub-clause 4.4.3 of Part 1 shall result from blanketing the inverter This test is not required for inverters restricted to use only in closed electrical operating areas.	See appended test table Cooling system failure – Blanketing test.	P
	Test stop condition: time duration value or stabilized temperature:		P
4.7	ELECTRICAL RATINGS TESTS		P
4.7.4	Stand-alone Inverter AC output voltage and frequency		P
4.7.4.1	General		P
4.7.4.2	Steady state output voltage at nominal DC input The steady-state AC output voltage shall not be less than 90 % or more than 110 % of the rated nominal voltage with the inverter supplied with its nominal value of DC input voltage.		P
4.7.4.3	Steady state output voltage across the DC input range The steady-state AC output voltage shall not be less than 85 % or more than 110 % of the rated nominal voltage with the inverter supplied with any value within the rated range of DC input voltage.		P
4.7.4.4	Load step response of the output voltage at nominal DC input The AC output voltage shall not be less than 85 % or more than 110 % of the rated nominal		P

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Clause	Requirement + Test	Result - Remark	Verdict
	voltage for more than 1,5 s after application or removal of a resistive load.		
4.7.4.5	Steady state output frequency The steady-state AC output frequency shall not vary from the nominal value by more than +4 % or –6 %.		P
4.7.5	Stand-alone inverter output voltage waveform		P
4.7.5.1	General		P
4.7.5.2	The AC output voltage waveform of a sinusoidal output stand-alone inverter shall have a total harmonic distortion (THD) not exceeding of 10 % and no individual harmonic at a level exceeding 6 %.	Refer table 4.7.2.	P
4.7.5.3	Non-sinusoidal output waveform requirements		N/A
4.7.5.3.1	General		N/A
4.7.5.3.2	The total harmonic distortion (THD) of the voltage waveform shall not exceed 40 %.		N/A
4.7.5.3.3	The slope of the rising and falling edges of the positive and negative half-cycles of the voltage waveform shall not exceed 10 V/μs measured between the points at which the waveform has a voltage of 10 % and 90 % of the peak voltage for that half-cycle.		N/A
4.7.5.3.4	The absolute value of the peak voltage of the positive and negative half-cycles of the waveform shall not exceed 1,414 times 110 % of the RMS value of the rated nominal AC output voltage.		N/A
4.7.5.4	Information requirements for non-sinusoidal waveforms The instructions provided with a stand-alone inverter not complying with 4.7.5.2 shall include the information in 5.3.2.6.		N/A
4.7.5.5	Output voltage waveform requirements for inverters for dedicated loads. For an inverter that is intended only for use with a known dedicated load, the following requirements may be used as an alternative to the waveform requirements in 4.7.5.2 to 4.7.5.3.		N/A
	The combination of the inverter and dedicated load shall be evaluated to ensure that the output waveform does not cause any hazards in the load equipment and inverter, or cause the load equipment to fail to comply with the applicable product safety standards.	See attached document: 4.7.5.5 Evaluation of inverter for dedicated load	N/A
	The inverter shall be marked with symbols 9 and 15 of Table C.1 of Part 1.		N/A
	The installation instructions provided with the inverter shall include the information in 5.3.2.13.		N/A
4.8	ADDITIONAL TESTS FOR GRID-INTERACTIVE INVERTERS		P
4.8.1	General requirements regarding inverter isolation and array grounding		P
	- Type of Array grounding supported:		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Inverter isolation		P
4.8.2	Array insulation resistance detection for inverters for ungrounded and functionally grounded arrays	(See attached table)	P
4.8.2.1	Array insulation resistance detection for inverters for ungrounded arrays	See below.	P
	Inverter shall have means to measure DC insulation resistance from PV input (array) to ground before starting operation		P
	Or Inverter shall be provided with instruction in accordance with 5.3.2.11.		P
	Measured DC insulation resistance:		P
	Inverter measurement circuit shall be capable of detecting insulation resistance below the limit value $R = V_{max}/30mA$ under normal conditions		P
	Inverter measurement circuit shall be capable of detecting insulation resistance below the limit value $R = V_{max}/30mA$ with ground fault in the PV array		P
	Isolated inverters shall indicate a fault if the insulation resistance is less than the limit value		N/A
	Isolated inverter fault indication maintained until insulation resistance has recovered to a value higher than the limit value	Non-isolated inverter	N/A
	Non-isolated inverters, or inverters with isolation not complying with the leakage current limits in the minimum inverter isolation requirements in Table 30:		P
	- shall indicate a fault in accordance with 13.9		P
	- shall not connect to the mains		P
4.8.2.2	Array insulation resistance detection for inverters for functionally grounded arrays	Inverters connected to ungrounded arrays.	N/A
	a-1) The value of the total resistance, including the intentional resistance for array functional grounding, the expected insulation resistance of the array to ground, and the resistance of any other networks connected to ground (for example measurement networks) must not be lower than $R = (V_{MAX} PV/30 mA)$ ohms.		N/A
	a-2) The installation instructions shall include the information required in 5.3.2.12.		N/A
	b-1) As an alternative to a), or if a resistor value lower than in a) is used, the inverter shall incorporate means to detect, during operation, if the total current through the resistor and any networks (for example measurement networks) in parallel with it, exceeds the residual current values and times in Table 31		N/A
	b-2) Inverter shall either disconnect the resistor or limit the current by other means		N/A
	b-3) If the inverter is a non-isolated inverter, or has isolation not complying with the leakage current limits in the minimum inverter isolation requirements in Table 30, it shall also disconnect from the mains.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	c) The inverter shall have means to measure the DC insulation resistance from the PV input to ground before starting operation, in accordance with 4.8.2.1.		N/A
4.8.3	Array residual current detection		P
4.8.3.1	General		P
4.8.3.2	30 mA touch current type test for isolated inverters		N/A
4.8.3.3	Fire hazard residual current type test for isolated inverters		N/A
4.8.3.4	Protection by application of RCD's	The Hybrid inverter considered	P
	- The requirement for additional protection in 4.8.3.1 can be met by provision of an RCD with a residual current setting of 30 mA, located between the inverter and the mains..		P
	- The selection of the RCD type to ensure compatibility with the inverter must be made according to rules for RCD selection in Part 1.		P
	- The RCD provided integral to the inverter, or		P
	- The RCD provided by the installer if details of the rating, type, and location for the RCD are given in the installation instructions per 5.3.2.9.		P
4.8.3.5	Protection by residual current monitoring	RCMU used for monitoring the residual current.	P
4.8.3.5.1	General		P
	Where required by Table 30, the inverter shall provide residual current monitoring that functions whenever the inverter is connected to the mains with the automatic disconnection means closed.		P
	The residual current monitoring means shall measure the total (both a.c. and d.c. components) RMS current.		P
	As indicated in Table 30 for different inverter types, array types, and inverter isolation levels, detection may be required for excessive continuous residual current, excessive sudden changes in residual current, or both, according to the following limits:		P
	a) Continuous residual current: The inverter shall disconnect within 0,3 s and indicate a fault in accordance with 13.9 if the continuous residual current exceeds:		P
	- maximum 300 mA for inverters with continuous output power rating ≤ 30 kVA;		P
	- maximum 10 mA per kVA of rated continuous output power for inverters with continuous output power rating > 30 kVA.		N/A
	The inverter may attempt to re-connect if the array insulation resistance meets the limit in 4.8.2.		P
	b) Sudden changes in residual current: The inverter shall disconnect from the mains within the time		P

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Clause	Requirement + Test	Result - Remark	Verdict
	specified in Table 31		
	The inverter indicates a fault in accordance with 13.9, if a sudden increase in the RMS residual current is detected exceeding the value in the table.		P
	The inverter may attempt to re-connect if the array insulation resistance meets the limit in 4.8.2.		P
4.8.3.5.2	Test for detection of excessive continuous residual current: test repeated 5 times and time to disconnect shall not exceed 0,3 s.	See appended test table 4.8.3.5.2 Test for detection of excessive continuous residual current	P
4.8.3.5.3	Test for detection of sudden changes in residual current repeated 5 times and each of the 5 results shall not exceed the time limit indicated in for each row (30mA, 60mA and 150mA) of Table 31.		P
4.8.3.6	Systems located in closed electrical operating areas	Not specified to be located in closed electrical operating area.	N/A
	The protection against shock hazard is not required if the installation information provided with the inverter indicates the restriction for use in a closed electrical operating area, and		N/A
	Installation information indicates what forms of shock hazard protection are and are not provided integral to the inverter, in accordance with 5.3.2.7.		N/A
	The inverter shall be marked as in 5.2.2.6.		N/A
5	MARKING AND DOCUMENTATION		P
5.1	Marking		P
5.1.4	Equipment ratings		P
	PV input ratings:		P
	- V _{max} PV (absolute maximum) (d.c. V)		P
	- I _{sc} PV (absolute maximum) (d.c. A)		P
	a.c. output ratings:		P
	- Voltage (nominal or range) (a.c. V)		P
	- Current (maximum continuous) (a.c. A)		P
	- Frequency (nominal or range) (Hz)		P
	- Power (maximum continuous) (W or VA)		P
	- Power factor range		P
	a.c. input ratings:		P
	- Voltage (nominal or range) (a.c. V)		P
	- Current (maximum continuous) (a.c. A)		P
	- Frequency (nominal or range) (Hz)		P
	d.c. output ratings:		P
	- Voltage (nominal or range) (d.c. V)		P
	- Current (maximum continuous) (d.c. A)		P
	Protective class (I or II or III)		P
	Ingress protection (IP) rating per part 1		P
	An inverter that is adjustable for more than one		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	nominal output voltage shall be marked to indicate the particular voltage for which it is set when shipped from the factory.		
5.2	Warning markings		P
5.2.2	Content for warning markings		P
5.2.2.6	Inverters for closed electrical operating areas		P
	Where required by 4.8.3.6, an inverter not provided with full protection against shock hazard on the PV array shall be marked with a warning that the inverter is only for use in a closed electrical operating area, and referring to the installation instructions.		P
5.3	Documentation		P
5.3.2	Information related to installation		P
5.3.2.1	Ratings. Subclause 5.3.2 of Part 1 requires the documentation to include ratings information for each input and output. For inverters this information shall be as in Table 33 below. Only those ratings that are applicable based on the type of inverter are required.		P
	PV input quantities :		P
	- Vmax PV (absolute maximum) (d.c. V)		P
	- PV input operating voltage range (d.c. V)		P
	- Maximum operating PV input current (d.c. A)		P
	- Isc PV (absolute maximum) (d.c. A)		P
	- Isc PV (absolute maximum) (d.c. A)		P
	- Max. inverter backfeed current to the array (a.c. or d.c. A)		P
	a.c. output quantities:		P
	- Voltage (nominal or range) (a.c. V)		P
	- Current (maximum continuous) (a.c. A)		P
	- Current (inrush) (a.c. A, peak and duration)		P
	- Frequency (nominal or range) (Hz)		P
	- Power (maximum continuous) (W or VA)		P
	- Power factor range		P
	- Maximum output fault current (a.c. A, peak and duration or RMS)		P
	- Maximum output overcurrent protection (a.c. A)		P
	a.c. input quantities:		P
	- Voltage (nominal or range) (a.c. V)		P
	- Current (maximum continuous) (a.c. A)		P
	- Current (inrush) (a.c. A, peak and duration)		P
	- Frequency (nominal or range) (Hz)		P
	d.c input (other than PV) quantities:		P
	- Voltage (nominal or range) (d.c. V)		P
	- Nominal battery voltage (d.c. V)		P
	- Current (maximum continuous) (d.c. A)		P
	d.c. output quantities:		P
	- Voltage (nominal or range) (d.c. V)		P
	- Nominal battery voltage (d.c. V)		P
	- Current (maximum continuous) (d.c. A)		P
	Protective class (I or II or III)		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Ingress protection (IP) rating per part 1		P
5.3.2.2	Grid-interactive inverter setpoints	The Hybrid inverter considered	P
	For a grid-interactive unit with field adjustable trip points, trip times, or reconnect times, the presence of such controls, the means for adjustment, the factory default values, and the limits of the ranges of adjustability shall be provided in the documentation for the PCE or in other format such as on a website. Provided solution:		P
	The setting of field adjustable setpoints shall be accessible from the PCE		P
5.3.2.3	Transformers and isolation		P
	whether an internal isolation transformer is provided, and if so, what level of insulation (functional, basic, reinforced, or double) is provided by that transformer. The instructions shall also indicate what the resulting installation requirements are regarding such things as earthing or not earthing the array, providing external residual current detection devices, etc.	The Hybrid inverter considered	P
	An inverter shall be provided with information to the installer regarding:		-
	- providing of internal isolation transformer		N/A
	- the level of insulation (functional, basic, reinforced, or double)		N/A
	The instructions shall also indicate what the resulting installation requirements are regarding:		N/A
	- earthing or not earthing the array		N/A
	- providing external residual current detection devices		N/A
	- requiring an external isolation transformer,		N/A
5.3.2.4	Transformers required but not provided		N/A
	An inverter that requires an external isolation transformer not provided with the unit, shall be provided with instructions that specify, and for the external isolation transformer with which it is intended to be used:		N/A
	- the configuration type		N/A
	- electrical ratings		N/A
	- environmental ratings		N/A
5.3.2.5	PV modules for non-isolated inverters		P
	Non-isolated inverters shall be provided with installation instructions that require PV modules that have an IEC 61730 Class A rating		P
	If the maximum AC mains operating voltage is higher than the PV array maximum system voltage then the instructions shall require PV modules that have a maximum system voltage rating based upon the AC mains voltage.		P
5.3.2.6	Non-sinusoidal output waveform information	Grid-connection inverter.	N/A
	The instruction manual for a stand-alone inverter not complying with 4.7.5.2 shall include a warning that:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- the waveform is not sinusoidal,		N/A
	- some loads may experience increased heating,		N/A
	- the user should consult the manufacturers of the intended load equipment before operating that load with the inverter		N/A
	The inverter manufacturer shall provide information regarding:		-
	- what types of loads may experience increased heating		N/A
	- recommendations for maximum operating times with such loads		N/A
	The inverter manufacturer shall specify for the waveforms as determined by the testing in 4.7.5.3.2 through 4.7.5.3.4.:		-
	- THD		N/A
	- slope		N/A
	- peak voltage		N/A
5.3.2.7	Systems located in closed electrical operating areas	Not specified to be located in closed electrical operating area.	N/A
	Where required by 4.8.3.6, an inverter not provided with full protection against shock hazard on the PV array shall be provided with installation instructions:		N/A
	- requiring that the inverter and the array must be installed in closed electrical operating areas		N/A
	- indicating which forms of shock hazard protection are and are not provided integral to the inverter (for example the RCD, isolation transformer complying with the 30 mA touch current limit, or residual current monitoring for sudden changes)		N/A
5.3.2.8	Stand-alone inverter output circuit bonding		P
	Where required by 7.3.10, the documentation for an inverter shall include the following:		P
	- if output circuit bonding is required but is not provided integral to the inverter, the required means shall be described in the installation instructions, including which conductor is to be bonded and the required current carrying capability or cross-section of the bonding means;		P
	- if the output circuit is intended to be floating, the documentation for the inverter shall indicate that the output is floating.		N/A
5.3.2.9	Protection by application of RCD's	Integrated RCM provided in inverter.	N/A
	Where the requirement for additional protection in 4.8.3.1 is met by requiring an RCD that is not provided integral to the inverter, as allowed by 4.8.3.4, the installation instructions shall state the need for the RCD,.		N/A
	and shall specify its rating, type, and required circuit location		N/A
5.3.2.10	Remote indication of faults		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The installation instructions shall include an explanation of how to properly make connections to (where applicable), and use, the electrical or electronic fault indication required by 13.9.		P
5.3.2.11	External array insulation resistance measurement and response		N/A
	The installation instructions for an inverter for use with ungrounded arrays that does not incorporate all the aspects of the insulation resistance measurement and response requirements in 4.8.2.1, must include:		N/A
	- for isolated inverters: an explanation of what aspects of array insulation resistance measurement and response are not provided, and		N/A
	- an instruction to consult local regulations to determine if any additional functions are required or not;		N/A
	- for non-isolated inverters: an explanation of what external equipment must be provided in the system, and		N/A
	- what the setpoints and response implemented by that equipment must be, and:		N/A
	- how that equipment is to be interfaced with the rest of the system.		N/A
5.3.2.12	Array functional grounding information		N/A
	Where approach a) of 4.8.2.2 is used, the installation instructions for the inverter shall include all of the following:		N/A
	a) the value of the total resistance between the PV circuit and ground integral to the inverter		N/A
	b) the minimum array insulation resistance to ground that system designer or installer must meet when selecting the PV panel and system design, based on the minimum value that the design of the PV functional grounding in the inverter was based on		N/A
	c) the minimum value of the total resistance $R = V_{MAX} PV/30 \text{ mA}$ that the system must meet, with an explanation of how to calculate the total		N/A
	d) a warning that there is a risk of shock hazard if the total minimum resistance requirement is not met.		N/A
5.3.2.13	Stand-alone inverters for dedicated loads	Grid-connection inverter.	N/A
	Where the approach of 4.7.5.5 is used, the installation instructions for the inverter shall include a warning that the inverter is only to be used with the dedicated load for which it was evaluated, and		N/A
	shall specify the dedicated load.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.3.2.14	Identification of firmware version(s)		P
	An inverter utilizing firmware for any protective functions shall provide means to identify the firmware version.		P
	This can be a marking, but the information can also be provided by a display panel, communications port or any other type of user interface.....		P
7	PROTECTION AGAINST ELECTRIC SHOCK AND ENERGY HAZARDS		P
7.3	Protection against electric shock		P
7.3.10	Additional requirements for stand-alone inverters		P
	One circuit conductor bonded to earth to create a grounded conductor and an earthed system.		P
	The means used to bond the grounded conductor to protective earth provided within the inverter or as part of the installation	External earthing needed.	N/A
	If not provided integral to the inverter, the required means shall be described in the installation instructions as per 5.3.2.8.		P
	The means used to bond the grounded conductor to protective earth shall comply with the requirements for protective bonding in Part 1,		P
	If the bond can only ever carry fault currents in stand-alone mode, the maximum current for the bond is determined by the inverter maximum output fault current.		N/A
	Output circuit bonding arrangements shall ensure that in any mode of operation, the system only has the grounded circuit conductor bonded to earth in one place at a time.		P
	Switching arrangements may be used, in which case the switching device used is to be subjected to the bond impedance test along with the rest of the bonding path		N/A
	Inverters intended to have a circuit conductor bonded to earth shall not impose any normal current on the bond except for leakage current.		P
	Outputs that are intentionally floating with no circuit conductor bonded to ground, must not have any voltages with respect to ground that are a shock hazard in accordance with Clause 7 of Parts 1 and 2.		N/A
	The documentation for the inverter shall indicate that the output is floating as per 5.3.2.8.		P
7.3.11	Functionally grounded arrays		N/A
	All PV conductors in a functionally grounded array shall be treated as being live parts with respect to protection against electric shock.		N/A
9	PROTECTION AGAINST FIRE HAZARDS		P
9.3	Short-circuit and overcurrent protection		P

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Clause	Requirement + Test		Verdict
9.3.4	Inverter backfeed current onto the array		P
	The backfeed current testing and documentation requirements in Part 1 apply, including but not limited to the following.		P
	Inverter backfeed current onto the PV array maximum value.....		P
	This inverter backfeed current value shall be provided in the installation instructions regardless of the value of the current, in accordance with Table 33.		P
13	PHYSICAL REQUIREMENTS		P
13.9	Fault indication		P
	Where this Part 2 requires the inverter to indicate a fault, both of the following shall be provided:		P
	a) a visible or audible indication, integral to the inverter, and detectable from outside the inverter, and	LED panel is available for fault indication.	P
	b) an electrical or electronic indication that can be remotely accessed and used.		P
	The installation instructions shall include information regarding how to properly make connections (where applicable) and use the electrical or electronic means in b) above, in accordance with 5.3.2.10.		P

4.4.4	TABLE: Single fault condition to be applied					P
	Ambient temperature (°C):		--		—	
	Power source for EUT: Manufacturer, model/type, output rating:		--		—	
4.4.4.15.1	Fault-tolerance of residual current monitoring					
Component No.	Fault	Supply voltage (V)	Test time	Fuse #	Fuse current (A)	Observation
--	--	--	--	--	--	--
--	--	--	--	--	--	--
Check that the residual current monitoring operates properly					--	
Legend						
FID	Fault Indication			MT	Max. Temperature	
SD	PCE Shut Down:			DG	Disconnection To Grid	
RO	Recovered to Operate after removing the single fault setting			NCD	No Comp. or parts Damaged	
NH	No Hazards occurred			PEST	Pass the Electric Strength Test.	
BI	Basic insulation			SI	Supplementary insulation	
DI	Double insulation			RI	Reinforced insulation	
FI	Functional insulation			o-l	over-load.	
s-c	short-circuited			o-c	open-circuited	
Supplementary information:						
The Hybrid inverter has passed CE safety certification.						

4.4.4	TABLE: Single fault condition to be applied					P
	Ambient temperature (°C)		--			—
	Power source for EUT: Manufacturer, model/type, output rating		-			—
4.4.4.15.2	Fault-tolerance of automatic disconnecting means					
Component No.	Fault	Supply voltage (V)	Test time	Fuse #	Fuse current (A)	Observation
--	--	--	--	--	--	--
Check that the relays fulfil the basic insulation or simple separation based on the PV circuit working voltage.						--
Each active phase can be switched. (L and N)						--
Legend						
FID	Fault Indication			MT	Max. Temperature	
SD	PCE Shut Down:			DG	Disconnection To Grid	
RO	Recovered to Operate after removing the single fault setting			NCD	No Comp. or parts Damaged	
NH	No Hazards occurred			PEST	Pass the Electric Strength Test.	
BI	Basic insulation			SI	Supplementary insulation	
DI	Double insulation			RI	Reinforced insulation	
FI	Functional insulation			o-l	over-load.	
s-c	short-circuited			o-c	open-circuited	
Supplementary information:						
The Hybrid inverter has passed CE safety certification.						

4.4.4.17	TABLE: cooling system failure - blanketing test		P
	test voltage (V)	See supplementary information	
	t1 (°C)	55	
	t2 (°C)	55	
Max. temperature T of part/at:		T (°C)	permitted T (°C)
Ambient		55.0	--
Enclosure – front		79.3	90
Enclosure – back		64.0	90
Enclosure – right side		68.9	90
Enclosure – left side		63.3	90
Handle		59.7	90
Emergency Button		61.0	90
PCS Screen		68.2	90
Supplementary information:			
Note 1: Run the device at min. MPP input and full load output conditions until steady condition established (no derating to steady condition) with the entire inverter including any external heatsink provided shall be covered in surgical cotton with an uncompressed thickness of minimum 2 cm, covering all heatsink fins and air channels until steady condition established.			
Note 2: Operating ambient range: -30°C ...+55°C.			
Note 3: No over temperature observed in components, no other hazard observed.			

4.7.4	TABLE: Steady state Inverter AC output voltage and frequency			P
	Nominal DC input (V)		600/725/850	
	Nominal output AC voltage (V) :		400V	
AC output U (V)	Frequency (Hz)	Condition/status	Comments	
400	50	Without load	600Vdc PV input	
400	50	Max.Resistive load application	600Vdc PV input	
400	50	Without load	725Vdc PV input	
400	50	Max.Resistive load application	725Vdc PV input	
400	50	Without load	850Vdc PV input	
400	50	Max.Resistive load application	850Vdc PV input	
400	50	Max.Resistive load application	725Vdc PV input, t=1.5s	
400	50	Max.Resistive load removal	725Vdc PV input, t=1.5s	
Supplementary information:				

4.7.5	TABLE: Output Harmonic Distortion				P
Harmonics	Measurements [%]			Limits [%]	Verdict
	5%	50%	100%		
THD (to the 40 th)	1.524	1.664	1.756	10	P
2 nd	0.231	0.195	0.177	6	P
3 rd	0.711	0.159	0.161	6	P
4 th	0.129	0.053	0.047	6	P
5 th	1.133	1.176	1.285	6	P
6 th	0.077	0.035	0.029	6	P
7 th	0.633	0.863	0.854	6	P
8 th	0.109	0.035	0.028	6	P
9 th	0.471	0.054	0.053	6	P
10 th	0.110	0.038	0.027	6	P
11 th	0.296	0.530	0.513	6	P
12 th	0.065	0.029	0.027	6	P
13 th	0.465	0.415	0.420	6	P
14 th	0.072	0.033	0.029	6	P
15 th	0.065	0.084	0.032	6	P
16 th	0.087	0.034	0.027	6	P
17 th	0.174	0.290	0.286	6	P
18 th	0.039	0.032	0.027	6	P
19 th	0.244	0.263	0.252	6	P
20 th	0.050	0.033	0.027	6	P
21 th	0.216	0.057	0.037	6	P
22 th	0.055	0.033	0.027	6	P
23 th	0.058	0.185	0.187	6	P
24 th	0.030	0.034	0.027	6	P
25 th	0.168	0.160	0.168	6	P
26 th	0.069	0.035	0.027	6	P
27 th	0.243	0.041	0.027	6	P
28 th	0.056	0.037	0.026	6	P
29 th	0.155	0.122	0.128	6	P
30 th	0.040	0.037	0.026	6	P
31 th	0.164	0.099	0.120	6	P
32 th	0.078	0.040	0.025	6	P
33 th	0.266	0.044	0.025	6	P
34 th	0.048	0.038	0.026	6	P
35 th	0.101	0.086	0.102	6	P
36 th	0.035	0.038	0.026	6	P
37 th	0.048	0.057	0.081	6	P
38 th	0.065	0.035	0.024	6	P
39 th	0.026	0.034	0.024	6	P
40 th	0.040	0.032	0.024	6	P
Note(s):					

4.8.2	TABLE: Array insulation resistance detection for inverters for ungrounded and functionally grounded arrays				P
4.8.2.1	Array insulation resistance detection for inverters for ungrounded arrays				P
DC Voltage below minimum operating voltage (V)	DC Voltage for inverter begin operation (V)	Resistance between ground and PV input terminal (kΩ)	Required Insulation resistance R = (V _{MAX PV} / 30mA) (kΩ)	Identification	
DC+					
120	150	30.0	33.3	Isolation Fault	
120	150	33.3	33.3	Normal Operation	
120	150	36.7	33.3	Normal Operation	
DC-					
120	150	30.0	33.3	Isolation Fault	
120	150	33.3	33.3	Normal Operation	
120	150	36.7	33.3	Normal Operation	
Note: For isolated inverters, shall indicate a fault in accordance with 13.9 (operation is allowed); the fault indication shall be maintained until the array insulation resistance has recovered to a value higher than the limit above. For non-isolated inverters, or inverters with isolation not complying with the leakage current limits in the minimum inverter isolation requirements in Table 30, shall indicate a fault in accordance with 13.9, and shall not connect to the mains; the inverter may continue to make the measurement, may stop indicating a fault and may connect to the mains if the array insulation resistance has recovered to a value higher than the limit above. It is not required to test all PV input terminals if analysis of the design indicates that one or more terminals can be expected to have the same result, for example where multiple PV string inputs are in parallel.					
Supplementary information:					

4.8.3.5	TABLE: Protection by residual current monitoring			P
Test conditions:		Output power (kW):50kW Input voltage (V _{DC}): 725Vdc Frequency (Hz) 50Hz Output AC Voltage (V _{AC}): 400Vac		
4.8.3.5.2	Test for detection of excessive continuous residual current			P
Fault Current (mA)		Disconnection time (ms)		
Measured Fault Current	Limit 300mA for output power ≤ 30 kVA 10mA per kVA for output power > 30 kVA	Measured Disconnection time	Limit	
+ PV to N:				
150.0	300	231.8	300	
149.8	300	219.6	300	
148.5	300	226.8	300	
149.5	300	226.9	300	
149.3	300	226.9	300	
- PV to N:				
141.7	300	127.0	300	
141.1	300	132.6	300	
148.9	300	218.8	300	
149.4	300	221.8	300	
141.9	300	120.0	300	
Note: – maximum 300mA for inverters with continuous output power rating ≤30 kVA; – maximum 10mA per kVA of rated continuous output power for inverters with continuous output power rating > 30 kVA. This test shall be repeated 5 times, and for all 5 tests the time to disconnect shall not exceed 0,3s. The test is repeated for each PV input terminal. It is not required to test all PV input terminals if analysis of the design indicates that one or more terminals can be expected to have the same result, for example where multiple PV string inputs are in parallel.				
Supplementary information:				

4.8.3.5.3	TABLE: Test for detection of sudden changes in residual current		P
+PV to N			
Limit (mA)	U _N		Limit (ms)
	Disconnection time (ms)		
30	236.7		300
30	236.4		300
30	233.7		300
30	224.8		300
30	238.1		300
60	131.1		150
60	120.6		150
60	129.2		150
60	123.4		150
60	131.2		150
150	35.0		40
150	34.5		40
150	37.1		40
150	38.7		40
150	36.3		40
+PV to N			
Limit (mA)	U _N		Limit (ms)
	Disconnection time (ms)		
30	228.5		300
30	239.7		300
30	238.8		300
30	227.1		300
30	229.1		300
60	136.9		150
60	125.4		150
60	130.7		150
60	141.6		150
60	126.1		150
150	27.7		40
150	32.7		40
150	33.0		40
150	42.7		40
150	34.2		40
Note: The capacitive current is raised until disconnection. Test condition: I _c + 30/60/150mA ≤ I _{cmax} . R ₁ is set that 30/60/150mA Flow and switch S is closed.			
Supplementary information:			

List of test equipment used:

No,	Equipment	Internal No,	Type/ Characteristics	Last Calibration	Due Data
1	Oscilloscope	BZ-DGD-L064	MS04054B	2025/01/06	2026/01/05
2	Voltage probe	BZ-DGD-L241-1	VP5200A	2025/01/07	2026/01/06
3	Current probe	BZ-DGD-L026-1	CT6863-05	2025/01/07	2026/01/06
4	Current probe	BZ-DGD-L026-2	CT6863-05	2025/01/07	2026/01/06
5	Current probe	BZ-DGD-L026-3	CT6863-05	2025/01/07	2026/01/06
6	AC power supply	BZ-DGD-L204	WPLA-330200KVA	2024/09/10	2025/09/09
7	Two-way DC analog power supply	BZ-DGD-L002	WDGC-1000KW	2024/08/02	2025/08/01
8	Pull and push	BZ-DGD-L080	ZP-1000	2025/01/08	2026/01/07
9	Vernier Caliper	BZ-DGB-L043	(0-150) mm	2025/01/14	2026/01/13
10	Tape measure	BZ-DGB-L058	(0-5) m	2025/01/14	2026/01/13
11	Stopwatch	BZ-DGD-L217	PS-1003A	2025/01/16	2026/01/15
12	Heating Recoder	BZ-DGD-L331	34970A	2025/01/07	2026/01/06
13	IR tester	BZ-DGD-L334	CS9922ESI	2025/01/09	2026/01/08
14	Surge generator	BZ-DGE-L143-3	HIM 412	2025/01/07	2026/01/06
15	Noise meter	BZ-DGD-L029	TES-1357	2025/01/09	2026/01/08
16	Test finger	BZ-DGD-L081-2	/	2025/01/10	2026/01/09
17	Thermostat	BZ-DGB-L028	16m ³	2025/01/10	2026/01/09
18	Electronic Scale	BZ-DGB-L257	YH-T1	2024/08/02	2025/08/01
19	Temperature and humidity meter	BZ-DGD-L005	DT-322	2025/01/14	2026/01/13
20	Leakage Current Test Network	BZ-DGD-L091	/	2024/08/01	2025/07/31
21	Power Analyzer	BZ-DGD-L059	PA6000H	2024/08/08	2025/08/07
22	Ground Resistance Tester	BZ-DGD-L095	LK2678	2024/08/01	2025/07/31
23	Sand and dust chamber	BZ-KKX-L010	SC-500	2024/09/08	2025/09/07
24	Diving test device	BZ-KKX-L008	JL-122	2024/09/07	2025/09/06

-----End of report-----