Technical Report No.: 64.290.24.30714.01

Date: 2024-07-23

Client:	Anker Innovations Limited Unit 56, 8th Floor, Tower 2, Admiralty Centre, 18 Harcourt Road, Central and Western District, HONG KONG
Manufacturer:	Anker Innovations Limited Unit 56, 8th Floor, Tower 2, Admiralty Centre, 18 Harcourt Road, Central and Western District, HONG KONG
Factory:	Dongguan Luxshare Smart-Link Electronic Technology Co., Ltd Building 3, No. 313, Qingxi North Ring Road, Qingxi Town, 523642 Dongguan City, Guangdong Province, PEOPLE'S REPUBLIC OF CHINA
Test object:	Product: Hybrid Inverter with storage battery system Model: Inverter models: X1-H3.68K-S, X1-H4.6K-S, X1-H5K-S, X1-H6K-S Battery models:X1-B5-H, X1-B10-HC, X1-B15-HC, X1-B20-HC, X1-B25-HC, X1-B30-HC
Test specification:	CEI 0-21:2022 CEI 0-21:2022/V1:2022 CEI 0-21:2022/V2:2024
Purpose of examination:	• Testing and evaluation visual according to the test specification
Test result:	The test results show that the presented product is in compliance with the above listed test specifications.

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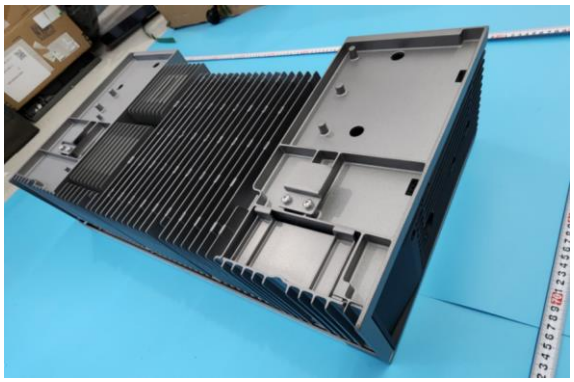
1. Description of the test object

1.1 Picture(s)

Inverter:

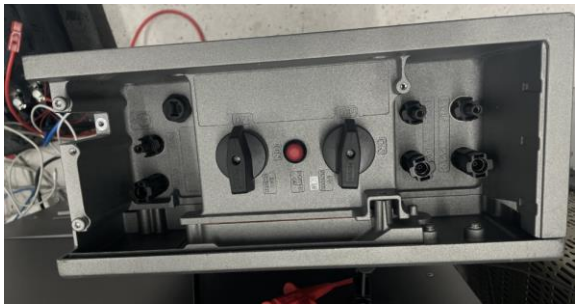
Overall view



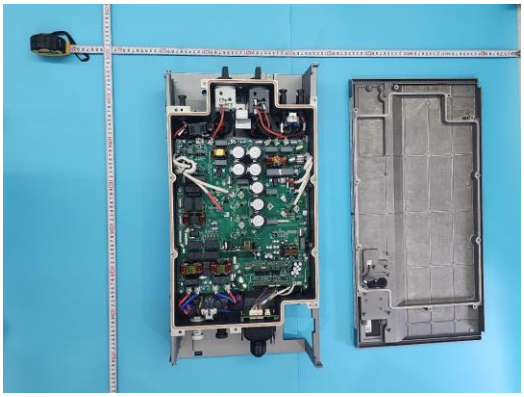
Bottom view

Left side view

AC port view



Right side view



Internal view

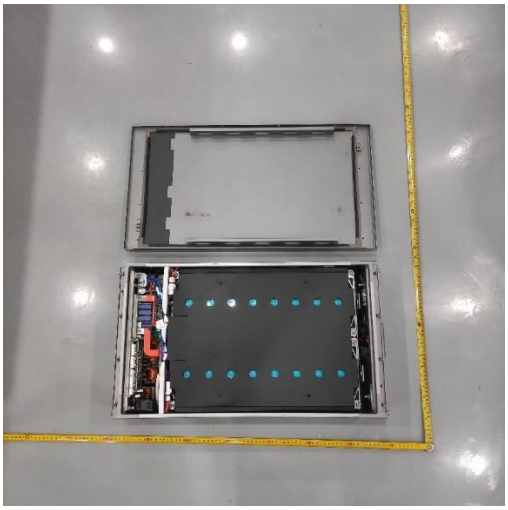
Battery:

Front view of X1-B5-H

Front view of X1-B30-HC

Overall view of X1-B5-H

Terminal view



Internal view

1.2 Function

Manufacturer's specification for intended use:
(1). The product is non-isolated (transformerless) Hybrid Inverter which works with battery to storage energy or converts PV/battery energy to the grid, it is a bidirectional inverter.
(2). If certain functions are not permitted by local regulation, the function shall be disabled by hardware or software setting (if applicable) by the manufacturer before putting into the market. For example, it's not permissible to draw electricity from the grid and then feed it back in order to claim statutory reimbursement in some nations.
(3). Low voltage electrical installations shall comply with national and local regulation. Only qualified electricians are allowed to install and maintain the converter.
(4). In order to protect the inverter, user and installer, external DC and AC circuit breaker shall be equipped for all source port (battery, AC grid) at the end-use application.
(5). Inverter software version: V1.0
Inverter firmware version: V1.0.0.33, (ARM: V1.0.0.33, DSP: V1.0.0.26)
BMS firmware version: V0.0.1.43
(6). The temperature and humidity ranges of the products are as follows:
Operation temperature range: -25°C to +60°C;
Storage temperature range: -30°C to +70°C;
Relative humidity range: 0% to 95 %;
(7). Back-up port connection and the working mode are not considered in this report. The use of stand-alone mode and electrical installations for unit shall comply with national and local regulation.
(8). For the battery system module, X1-B5-H is the base model of the battery system model, and subsequent models are stacked in X1-B5-H to get other models, with the maximum number of stacks being 6 pieces.

Model Differences

All the models have same electric circuits topology design, same enclosure structure design, same main control circuits and firmware. The output power and current are limited by software.

1.3 Consideration of the foreseeable use

☐ Not applicable
☒ Covered through the applied standard
☐ Covered by the following comment
☐ Covered by attached risk analysis

1.4 Technical Data

Model	X1-H3.68K-S	X1-H4.6K-S	X1-H5K-S	X1-H6K-S
PV terminal parameters				
Maximum PV voltage [V_{DC}]	600			
Rated voltage [V_{DC}]	360			
MPPT voltage range [V_{DC}]	80-550			
MPPT voltage range (full load) [V_{DC}]	200-530			
Maximum input current [A_{DC}]	16/16			
Isc PV [A_{DC}]	20/20			
MPPT tracker number	2			
Maximum input power [W]	7360	9200	10000	12000
Battery input/output parameters				
Battery type	LFP			
Maximum voltage [V_{DC}]	550			
Battery rated voltage [V_{DC}]	400			
Battery voltage range [V_{DC}]	Charge: 390-550 / Discharge: 370-500			
Maximum charge power [W]	3680	4600	5000	6000
Maximum discharge power [W]	3680	4600	5000	6000
Maximum charge current [A_{DC}]	9.4	11.7	12.8	15.3
Maximum discharge current [A_{DC}]	9.9	12.4	15.1	16.2
Maximum charge power from grid to battery [W]	3680	4600	5000	6000
Grid terminal input parameters				
Rated input voltage [V_{AC}]	1P+N+PE, 230			
Rated input frequency [Hz]	50			
Maximum continuous input current from grid to battery [A_{AC}]	16.7	20.9	22.7	27.2
Maximum continuous input current [A_{AC}]	31.3	40.0	40.0	40.0

Maximum continuous input power from grid to battery [W]	3680	4600	5000	6000
Maximum continuous input active power [W]	3680	4600	5000	6000
Maximum continuous input apparent power [VA]	7200	10000	10000	10000
Power factor range	0.8 inductive to 0.8 capacitive			
Grid terminal output parameters				
Rated output voltage [V_{AC}]	1P+N+PE, 230			
Rated output frequency [Hz]	50			
Rated output current [A_{AC}]	16.0	20.0	21.7	26.0
Maximum continuous output current [A_{AC}]	18.1	22.7	25.0	30.0
Rated output active power [W]	3680	4600	5000	6000
Maximum output active power [W]	3680	4600	5000	6000
Maximum output apparent power [VA]	4000	5000	5500	6600
Power factor range	0.8 inductive to 0.8 capacitive			
Operation temperature range	-25°C to +60°C			
Storage temperature range	-30°C to +70°C			

Remark: Maximum continuous output current is achieved based on low voltage ($220V_{AC}$)

Battery pack model:	X1-B5-H
Input/Output parameters	
Battery type	Li-ion
Maximum voltage [V_{DC}]	550
Rated voltage [V_{DC}]	400
Battery voltage range [V_{DC}]	350-550
Maximum charge/discharge current [A_{DC}]	7.6
Rate capacity of battery [kWh]	5.0
Usable capacity of battery [kWh]	5.0

Battery system model:	X1-B5-H	X1-B10-HC	X1-B15-HC	X1-B20-HC	X1-B25-HC	X1-B30-HC

Number of battery pack	1	2	3	4	5	6
Maximum voltage [V_{DC}]	550					
Rated voltage [V_{DC}]	400					
Battery voltage range [V_{DC}]	350-550					
Maximum charge/discharge current [A_{DC}]	7.6	15.2	22.8	30.4	38	45.6
Rate capacity of battery [kWh]	5	10	15	20	25	30
Usable capacity of battery [kWh]	5	10	15	20	25	30

Specificatition for CEI 0-21 is listed as in below:

DISPOSITIVO DI INTERFACCIA Interface Device	PROTEZIONE DI INTERFACCIA Interface Protection Device	DISPOSITIVO DI CONVERSIONE STATICA Static Conversion Device	DISPOSITIVO DI GENERAZIONE TOTANTE Rotating Device
☒	☐	☒	☐

Technical specifications of storage system				
Storage inverter system components				
Inverter				
Inverter manufacturer	Anker Innovations Limited			
Inverter model	X1-H3.68K-S	X1-H4.6K-S	X1-H5K-S	X1-H6K-S
Inverter type & number of phases	Bidirectional & Single-phase			
Nominal power P_{NINV}[W]	3680	4600	5000	6000
Maximum Apparent power [VA]	4000	5000	5500	6600
Battery				
Battery manufacturer	Anker Innovations Limited			

Battery system model	X1-B5-H	X1-B10-HC	X1-B15-HC	X1-B20-HC	X1-B25-HC	X1-B30-HC
Battery type	LFP					
Rated voltage [V_{DC}]	400					
Usable Capacity of battery [kWh]	5	10	15	20	25	30
Storage inverter system parameter						
Inverter model	X1-H3.68K-S					
Battery model	X1-B5-H	X1-B10-HC	X1-B15-HC	X1-B20-HC	X1-B25-HC	X1-B30-HC
Nominal discharge power P_{SN} [W]	3000	3680				
Nominal charge power P_{CN} [W]	-3000	-3680				
Maximum discharge power P_{SMAX} [W]	3000	3680				
Maximum charge power P_{CMAX} [W]	-3000	-3680				
Inverter model	X1-H4.6K-S					
Battery model	X1-B5-H	X1-B10-HC	X1-B15-HC	X1-B20-HC	X1-B25-HC	X1-B30-HC
Nominal discharge power P_{SN} [W]	3000	4600				
Nominal charge power P_{CN} [W]	-3000	-4600				
Maximum discharge power P_{SMAX} [W]	3000	4600				
Maximum charge power P_{CMAX} [W]	-3000	-4600				
Inverter model	X1-H5K-S					
Battery model	X1-B5-H	X1-B10-HC	X1-B15-HC	X1-B20-HC	X1-B25-HC	X1-B30-HC
Nominal discharge power P_{SN} [W]	3000	5000				
Nominal charge power P_{CN} [W]	-3000	-5000				
Maximum discharge power P_{SMAX} [W]	3000	5000				
Maximum charge power P_{CMAX} [W]	-3000	-5000				

Inverter model	X1-H6K-S					
Battery model	X1-B5-H	X1-B10-HC	X1-B15-HC	X1-B20-HC	X1-B25-HC	X1-B30-HC
Nominal discharge power P_{SN} [W]	3000	6000				
Nominal charge power P_{CN} [W]	-3000	-6000				
Maximum discharge power P_{SMAX} [W]	3000	6000				
Maximum charge power P_{CMAX} [W]	-3000	-6000				
Firmware version of the inverter	V1.0.0.33, (ARM: V1.0.0.33, DSP: V1.0.0.26)					
Firmware version of the BMS	V0.0.1.43					

Case A		Conversion subsystem power (W)			
		X1-H3.68K-S (P_{MAX}=3680W)	X1-H4.6K-S (P_{MAX}=4600W)	X1-H5K-S (P_{MAX}=5000W)	X1-H6K-S (P_{MAX}=6000W)
Storage subsystem capacity (kWh)	X1-B5-H (5kWh)	Partial tests Annex Bbis	No further tests are required	No further tests are required	Partial tests Annex Bbis
	X1-B10-HC (10kWh)	No further tests are required			
	X1-B15-HC (15kWh)	No further tests are required			
	X1-B20-HC (20kWh)	No further tests are required			
	X1-B25-HC (25kWh)	No further tests are required			
	X1-B30-HC (30kWh)	No further tests are required	No further tests are required	No further tests are required	Complete tests Annex Bbis

1.5 Rating Label

Note:

1. For application of this standard, the nominal voltage is 230 V_{AC}, nominal frequency is 50 Hz.
2. The maximum AC output current is the maximum current that can be withstood under low voltage(220 V_{AC}) conditions.
3. Backup is not considered in this report.

2. Order

2.1 Date of Purchase Order, Customer's Reference

2024-02-27

2.2 Test Sample(s)

- Reception date(s): 2024-03-15
- Location(s) of reception: B1F&2F of A4, D1 Buildings, No. 63 Chuangqi Road, Shilou Town, Panyu District, Guangzhou 511447, China
- Condition of test sample(s): Intact

2.3 Testing

- Testing date(s): 2024-03-20 to 2024-07-01
- Location(s) of testing: B1F&2F of A4, D1 Buildings, No. 63 Chuangqi Road, Shilou Town, Panyu District, Guangzhou 511447, China

2.4 Points of Non-Compliance or Exceptions of the Test Procedure

- None

3. Test Results

- "Decision rule according to IEC Guide 115:2023, clause 4.3.3 was applied."

3.1 Positive Test Results

Test specification(s)	Report no. / Rev. No.	Date	Remark
Grid Code compliance	64.290.24.30714.01	2024-07-23	--

3.2 Points of Non-Compliance according to the test specification

- None

4. Test History

- N/A

5. Remarks

5.1 General

The user manual has been examined according to the minimum requirements described in the product standard. The manufacturer is responsible for the accuracy of further particulars as well as of the composition and layout.

5.2 Factory surveillance cycle

Your production facility is currently on the following surveillance cycle.

☐ Annual (12 month)

☐ Bi-Annual (6 month)

☐ Quarterly (3 month)

☒ None

6. Documentation

- None

7. Summary

The test specifications are met.

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Tested by: Giesen Wan (Project Handler)
printed name, function & signature

Approved by: Jinjing Peng (Designated Reviewer)
printed name, function & signature

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