

Technical Report No.: 6:230b

Date: 2024-12-02

Client: Huawei Technologies Co., Ltd.
Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, 518129 Shenzhen, PEOPLE'S REPUBLIC OF CHINA

Manufacturer: Huawei Technologies Co., Ltd.
Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, PEOPLE'S REPUBLIC OF CHINA

Factory: For PCS:
Factory 1: Shenzhen Fugui Precision Industry Co., Ltd.
Address: Building B4, Foxconn Science and Technology Industrial Park, East side of Min Longhua District, Longhua Subdistrict, Shenzhen. PEOPLE'S REPUBLIC OF CHINA

Factory 2: Huawei Technologies Co., Ltd. Dongguan Branch
Address: Nanfang Factory, High-tech Industrial Development Zone, Songshan Lake Management Committee, Dongguan City, Guangdong Province

Factory 3: Lucky Harvest (Dongguan) Amperex Technology Co., LTD.
Address: Mac Town, Dongguan City, Guangdong Province

For BESS:
Factory 1: Huizhou Sunwoda Energy Technology Co., Ltd.
Address: Building A and B, Shiwan Town, Boluo County, Huizhou City, Guangdong Province, PEOPLE'S REPUBLIC OF CHINA

Factory 2: Huizhou Sunwoda Energy Technology Co., Ltd.
Address: "Jiweidu" (Tuming Section), Lixi Economic Union, Yuanzhou Town, Boluo County, Huizhou City, Guangdong Province PEOPLE'S REPUBLIC OF CHINA

Test object: Product: Energy storage system
(Power conversion system + Battery energy storage system)
Model: LUNA2000-213KTL-H0 (Power conversion system) + LUNA2000-4472-2S (Battery energy storage system)

Doc No.: ITC-TTW0902.02E - Rev. 16

Test specification: IEC 62933-5-2:2020

Purpose of examination: • Testing and evaluation 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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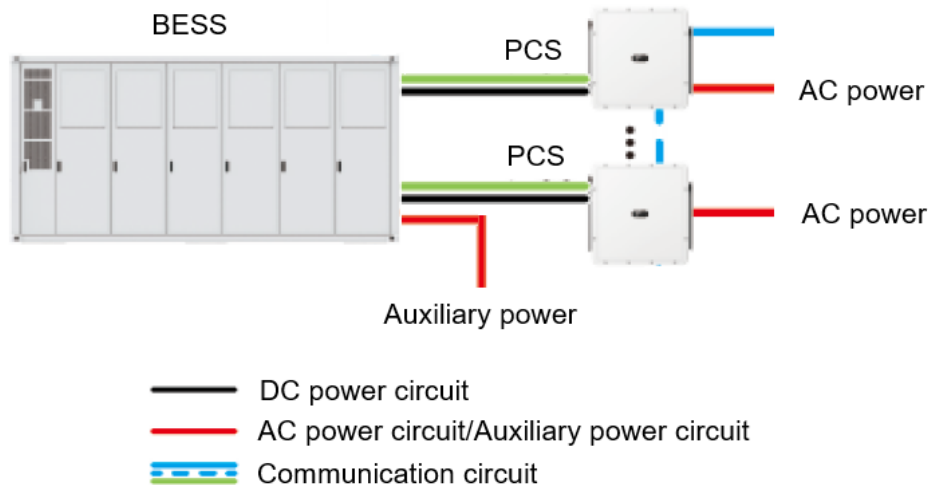
1. Description of the test object

1.1 Picture(s)

Refer to photo documentation.

1.2 Function

- The Energy storage system (ESS) is consisted of power conversion system (PCS) and battery energy storage system (BESS). The BESS includes 6 independent battery strings and 6 independent input/output bus-bars, each independent battery strings can connect to 1 PCS, 2 or 4 PCSs in parallel independently through input/output bus-bars. When 1 BESS configured with 12 PCSs (each battery string with 2 PCSs in parallel) or 24 PCSs (each battery string with 4 PCSs in parallel) can achieve the maximum charging/discharging power of the BESS.



- The PCS is non-isolated (transformerless) grid-interactive DC-AC inverter for connection with public low voltage grid.
- The BESS is mainly consisted of Electrochemical accumulation subsystem, Management subsystem, Auxiliary subsystem.
 - Electrochemical accumulation subsystem: The BESS include 6 Rechargeable Lithium-ion Battery Strings (certificated according to IEC 62619:2022), each Rechargeable Lithium-ion Battery String is consisted of 1 high voltage controlling box and 8 Rechargeable Lithium-ion Battery modules connected in series.
 - Management subsystem: the Central Monitoring Unit (Model: SmartMonitorB01) is considered as the Energy management system.
 - Auxiliary subsystem includes heat/smoke/combustible gas detection system, fire suppression system, fire extinguisher, ventilation system, liquid cooled system, auxiliary power system.

4. The conditions for operation of ESS (PCS+BESS) are specified as below:
 - Outdoor.
 - Ambient temperature range: -25 °C to +55 °C (PCS derating above 40°C).
 - Relative humidity range: 0 % - 100%.
 - Altitude ≤ 4700m (Only clearance for insulation requirement for using at altitude up to 5000m is considered in this report, required by customer)
 - Overvoltage category: I (Battery side, reduced by SPD circuit), III (PCS grid side, max 800 V a.c., IT system), II (Auxiliary power supply side).
 - Environment pollution degree: less than or equal to 3.
5. The decisive voltage class of all communication circuits is defined as DVC A. The decisive voltage class of all Battery power circuits and auxiliary power supply circuits are defined as DVC C.
6. Low voltage electrical installations shall comply with national and local regulation. The connection wiring between PCS and BESS shall be provided enhanced protection through or protected by a metallic cable duct or conduit. The metallic cable duct or conduit shall be connected with the equipotential bonding system and comply with IEC 62477-1 clause 4.4.4.2.2.
7. Only electrically skilled persons and electrically instructed persons with the proper authorization are permitted to install, operate, and maintain according to the user manual.
8. Combustible gas detection system and ventilation system are provided in the BESS, the gas detection system will activate the ventilation system on detection of combustible gas no more than 10 percent of the LFL of the gas mixture.
9. The BESS can generate toxic and explosion gas during abnormal condition. Safety precaution, ventilation and clearance shall be considered for final installation according to local installation codes.

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

Rating for BESS:

Model:	LUNA2000-4472-2S
Rated energy [kWh]:	4472
Rated voltage [V d.c.]:	1331.2
Voltage range [V d.c.]:	1123~1497
Maximum continuous charging power [kW]:	372.72 × 6
Maximum continuous charging current [A d.c.]:	331 × 6
Maximum continuous discharging power [kW]:	372.72 × 6
Maximum continuous discharging current [A d.c.]:	331 × 6
Battery String parameters:	
Battery String model:	LUNA2000-745-2R
Battery type:	LFP
Battery module model:	ESM-166560AS1
Rated Energy [kWh]:	745.44
Rated capacity [Ah]:	560
Rated voltage [V d.c.]:	1331.2
Voltage range [V d.c.]:	1123~1497
Maximum continuous charging power [kW]:	372.72
Maximum continuous charging current [A d.c.]:	331
Maximum continuous discharging power [kW]:	372.72
Maximum continuous discharging current [A d.c.]:	331
Auxiliary power supply parameters:	
Rated input voltage [V a.c.]:	380/400, 3P/N/PE
Rated input frequency [Hz]:	50/60
Maximum input current [A a.c.]:	57.7
General	
Protective class:	I
Ingress protection rating:	IP55 (Battery Cabin and Control Unit Cabin)
Ambient temperature range [°C]:	-30 ~ +55

Rating for PCS:

Model:	LUNA2000-213KTL-H0
DC terminal parameters:	
Maximum voltage [Vd.c.]	1500
Rated voltage [Vd.c.]	1331.2
Operating Voltage range [Vd.c.]	800~1500
Rated Power DC Voltage Range [Vd.c.]	1100~1500
Maximum continuous current [Ad.c.]	218.5
AC terminal parameters:	
Rated voltage [Va.c.]	800/3N+PE
Rated frequency [Hz]	50 / 60
Maximum continuous current [Aa.c.]	170.6
Maximum continuous active power [kW]	236.4
General	
Protective class	I
Ingress protection	IP66
Operating temperature range [°C]	-25 ~ 60 (Derating above 40°C)

1.5 Rating Label

智能组串式储能系统 Smart String ESS
型号 Model: LUNA2000-4472-2S

标称能量 Nominal Energy Capacity: 4472 kWh
 额定功率 Rated Power: 2236 kW
 最大功率 Max.Power: 2236 kW
 额定直流电压 Rated DC Voltage: 1331.2 Vd.c.
 最大直流电压 Max.DC Voltage: 1500 Vd.c.
 额定充放电电流 Rated Charging/Discharging Current: 280 A×6
 最大充放电电流 Max.Charging/Discharging Current: 331 A×6
 电池电压范围 Battery Voltage Range: 1123 – 1497 Vd.c.
 辅助供电 Auxiliary Supply: 3Ø ~ 380/400 Va.c.; 3W+N+PE; 50/60 Hz
 电池类型 Battery Type: LFP
 防护等级 Enclosure: IP55 (Battery Cabin and Control Unit Cabin)
 保护等级 Protection Class: I
 温度范围 Operating Temperature Range: -30 – +55 °C
 海拔 Altitude: 4700 m
 重量 Weight: <42000 kg
 冷却液类型 Type of coolant: 50%乙二醇水溶液 50% glycol solution
 冷却液工作压力 Working pressure of coolant: 2.4 bar
 冷却液最大压力 Maximum pressure of coolant: 4.2 bar
 尺寸(宽×高×深) Dimensions (W×H×D): 6058 mm×2896 mm×2438 mm

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华为技术有限公司
HUAWEI TECHNOLOGIES CO., LTD.
HQ of Huawei, Bantian, Longgang District, Shenzhen, P.R.C

中国制造
MADE IN CHINA
5.1.2e P.R.C

For the BESS

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2.3 Testing

- Testing date(s): 2024-05-10 to 2024-09-27, 2024-11-26 to 2024-11-31
- Location(s) of testing: TÜV SÜD Testing Center, D1 building, No. 5.1.2e Shilou Town, Panyu District, Guangzhou 5.1.2e, P.R. 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
Electrical safety:	64. 6:230b 155.01 / Rev.01	2024-12-02	-

3.2 Points of Non-Compliance according to the test specification

- None

4. Test History

Revision No.01 (64.290.24.30155.01 Rev. 01):

The original Test Report Ref. No. 64. 6:230b Rev. 00, dated 2024-10-10 was modified on 2024-12-02 to include the following changes and additions, which were considered technical modifications:

1. Added explosion prevention measure assessment to the TRF according to NFPA 69.
2. Added more details photos of battery system to the photo documentation.

After construction review and verification of electrical spacing, no additional tests were considered necessary.



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)
N/A

5.3 Additional information for routine tests to be performed by the factory(ies)

Routine tests for electrical appliances / equipment:

Routine test requirements for production are described in IEC 62933-5-2:2020

- Required
Not Required
Reason for non-requirement:
Class III product
Other: D type certification

6. Documentation

Table with 3 columns: File, File name / Rev. No., Date. Rows include Data form (CDF) and Photo documentation.

7. Summary

The test specifications are met.

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TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
TÜV SÜD Group

Tested by:

5.1.2e

(Project Handler)

printed name, function & signature

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Approved by:

5.1.2e

(Designated Reviewer)

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Legenda toegepaste uitzonderingsgrondslagen

In dit document zijn gegevens definitief geanonimiseerd op grond van:

Wet	Artikel	Omschrijving	Pagina's
Wet open overheid	Art. 5.1 lid 2 sub e	De eerbiediging van de persoonlijke levenssfeer	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Burgerlijk wetboek 6	Art. 6:230b BW	Dit gegeven hoeft volgens art. 6:230b BW alleen verstrekt te worden aan de afnemer van de verleende diensten.	1, 4, 6, 8, 9, 10