4Test report no.: *Prüfbericht Nr.:*	**CN261O83 001**	**Order No.:** *Auftrags-Nr.:*	**326175180**	Page 1 of 78 *Seite 1 von 78*
Client Reference No.: *Kunden-Referenz-Nr.:*	2605338	**Order date:** *Auftragsdatum:*	2026-03-04	
Client: *Auftraggeber:*	Hangzhou Weltrus New Energy Technology Co.,Ltd. Room 510, Building 1, Yuanjian Building, Xiaohe Street, Gongshu District, Hangzhou,Zhejiang,China			
Test item: *Prüfgegenstand:*	DC Energy Storage System			
Identification/ Type No.: *Bezeichnung / Typ-Nr.*	FX-ESD1331-05P5015, FX-ESD1331-05P4179, FX-ESD1331-05P3343 FX-ESD1331-05P5015-B, FX-ESD1331-05P4179-B, FX-ESD1331-05P3343-B			
Order content: *Auftrags-Inhalt:*	Product Design Verfication			
Test specification: *Prüfgrundlage:*	AS/NZS 3000:2018+A1+A2+A3 AS/NZS 5139:2019 AS/NZS 3008.1.1:2017			

Date of sample receipt: *Wareneingangsdatum:*	N/A
Test sample No: *Prüfmuster-Nr.:*	N/A
Testing period: *Prüfzeitraum:*	19-03-2026 – 21-03-2026
Place of testing: *Ort der Prüfung:*	See page 3 for details
Testing laboratory: *Prüflaboratorium:*	TÜV Rheinland (Shanghai) Co., Ltd.
Test result*: *Prüfergebnis*:*	Pass. Only product deisgn review as per client's request

tested by: *geprüft von:*	Zhen Chen zhen chen	**authorized by:** / *genehmigt von:*	Mike Ge Mike
Date: 2026-05-18 *Datum:*		**Issue Date:** 2026-05-18 *Ausstellungsdatum:*	
Position / *Stellung:*	Expert	**Position** / *Stellung:*	Expert

Other / *Sonstiges:* This report is based on report no. CN25KTKR 001, the product models beginning with FX-ESD are completely identical to the models in the original report, except for the model names.

Condition of the test item at delivery: Prüfmuster vollständig und unbeschädigt
Zustand des Prüfgegenstandes bei Anlieferung: *Test item complete and undamaged*

* Legend:	P(ass) = passed a.m. test specification(s)	F(ail) = failed a.m. test specification(s)	N/A = not applicable	N/T = not tested
* *Legende:*	*P(ass) = entspricht o.g. Prüfgrundlage(n)*	*F(ail) = entspricht nicht o.g. Prüfgrundlage(n)*	*N/A = nicht anwendbar*	*N/T = nicht getestet*

Remarks

1	The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.
2	As contractually agreed, this document has been signed digitally only. TUV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TUV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged.
3	Test clauses with remark of * are subcontracted to qualified subcontractors and descripted under the respective test clause in the report. Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.
4	The decision rule for statements of conformity in this test report is based on the “Zero Guard Band Rule” and “Simple Acceptance” in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report.
5	This test report is based on assessment and tests applied to the specific test item(s) as submitted by the client. TUV Rheinland (Shanghai) Co., Ltd disclaims any and all responsibility or obligation for any other item.
6	This test report (No. CN261O83 001) covers below assessment according to client’s request. • Product design review according to AS/NZS 3000:2018+A1+A2+A3, AS/NZS 5139:2019, AS/NZS 3008.1.1:2017 standards was performed on the DC Energy Storage System(container energy storage system) model FX-ESD1331-05P5015, FX-ESD1331-05P4179, FX-ESD1331-05P3343 • FX-ESD1331-05P5015-B, FX-ESD1331-05P4179-B, FX-ESD1331-05P3343-B. Inpection was performed only on model FX-ESD1331-05P5015. • This DC Energy Storage System in not within the scope of AS 2067 standard and hence no design review was performed. The targeted market of this product is Australia and hence no compliance check is performed per AS/NZS 3008.1.2:2017. • The review was performed completely based on the product manuals; electrical diagrams and other relevant documentation provided by the client. Visual inspection was also performed to review the construction of the ESS. No testing on actual sample was performed.

Product description

1	**Product details:**	DC Energy Storage System(container energy storage system)
2	**Dimensions / Weight:**	6058mm×2438mm×2896mm; approx.44000kg
3	**Operating elements:**	The DC ESS is designed to be connected to external PCS and external auxiliary AC mains power supply.
4	**Equipment / Accessories:**	N/A
5	**Used materials:**	N/A
6	**Other:**	Test sample(s), as well sample information, description, product details and intended usage was provided by customer.
7	**Test sample obtaining:**	☐ Sending by customer ☐ Sampling by TÜV Rheinland Group ☒ others: Visual inspection performed in client's factory
8	**Model Variations:**	N/A

Product ratings

Identification / Type No.	FX-ESD1331-05P5015, FX-ESD1331-05P5015-B	FX-ESD1331-05P4179, FX-ESD1331-05P4179-B	FX-ESD1331-05P3343, FX-ESD1331-05P3343-B
Configuration	Subassembly with 12 Battery Rack	Subassembly with 10 Battery Rack	Subassembly with 8 Battery
Rated capacity [kWh]	5015.9kWh	4179 kWh	3343kWh
Voltage Range [Vd.c.]	1040~1497.6Vdc	1040~1497.6Vdc	1040~1497.6Vdc
Recommend charging method declared by the manufacturer	≤0.5P	≤0.5P	≤0.5P
Recommend discharging method declared by the manufacturer	≤0.5P	≤0.5P	≤0.5P
Maximum continuous charge power(DC)	2507.5 kW	2089.5 kW	1671.5 kW
Maximum continuous discharge power(DC)	2507.5 kW	2089.5 kW	1671.5 kW
Overvoltage Category of DC circuit(OVC)	II	II	II
Nominal voltage of Auxiliary AC Power	400Vac		
Number of Phases	Three-phase four-wire system		
Peak Power of Auxiliary AC Power	47kW		
Nominal frequency of Auxiliary AC Power	50Hz		
Overvoltage Category(OVC) of	II		
Ambient temperature	-35~45 °C		
IP rating/ Enclosure index / type	P55(Battery Room) IP55(Electrical Room)		
Protective Class	Class I		
Pollution degree (PD)	PD3 (outside), PD2 (inside)		
Battery Cooling type	liquid cooling system		
Coolant type and design pressure	Design maximum pressure rating is 300 kPa, operating value is 150 kPa		
Marine Environments	Severity 2		
Output short circuit ratings	131.5kA	109.6kA	87.7kA

Product ratings

Fire suppression system	Yes, Aerosol Extinguishing System		
Altitude	<2000m (3000m upgrade option available)		
Dimension	W*D*H: 6058[0, -6]mm*2438[0, -5]mm*2896[0, -5]mm		
Nominal mass	43500 ±500 kg	38000±500 kg	32500±500 kg

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
Part 1:	**Scope, application, and fundamental principles**		-
SECTION 1	**SCOPE, APPLICATION AND FUNDAMENTAL PRINCIPLES**		-
1.1	SCOPE		-
1.2	APPLICATION	Applied to Battery DC Energy Storage System	-
1.3	REFERENCED DOCUMENTS		-
1.4	DEFINITIONS		-
1.5	FUNDAMENTAL PRINCIPLES		P
1.5.1	Protection against dangers and damage		P
1.5.2	Control and isolation	There are main isolators/ circuit breakers provided inside the ESS container for disconnection of DC circuit, single phase AC circuit and three phase AC circuit. EMERGENCY STOP BUTTON is provided externally in case of emergency to disconnect the electrical connections inside the ESS container to disconnect from the external power supply. Fire protection circuits is either connected to separate independent fire power supply or to an installed UPS to supply power.	P
1.5.3	Protection against electric shock		P
1.5.3.1	General	All live parts are enclosed by an earthed metal enclosure of the BESS. They are not accessible in normal conditions or under single fault conditions. Only authorized people are allowed to access the BESS.	P
1.5.3.2	Methods of protection		P
1.5.4	Basic protection		P
1.5.4.1	General		P
1.5.4.2	Methods of protection		P

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
1.5.4.3	Protection by insulation	The whole system is inside an earthed metal enclosure. Only professionally trained technicians are allowed to install or maintain the BESS.	P
1.5.4.4	Protection by barriers or enclosures	The container is marked with IP55. All-important safety instructions and precautions are specified in the user manual. A key is required to open both AC control door and battery chamber door. Visual inspection performed on actual sample, for details refer to photo documentation	P
1.5.4.5	Protection by obstacles		P
1.5.4.6	Protection by placing out of reach	“Operators also need to comply with relevant international, national, or regional standards and industry practices” Live parts which are not protected are placed out of reach	P
1.5.5	Fault protection		P
1.5.5.1	General		P
1.5.5.2	Methods of protection		P

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
1.5.5.3	Protection by automatic disconnection of supply	The whole system is contained inside a earthed metal enclosure. The battery system is provided with the ground fault detection feature to detect the fault through insulation test in the PDU when powering ON the system. After PCS is powered ON, PCS will continue to detect the earth fault but the PCS is not the part of the whole product. For AC circuit, the protection relies on external RCDs or protection devices. Circuit breakers and other protective devices are provided in the AUX power cabinet and fuse is provided in the PDU of battery rack.	P
1.5.5.4	Protection by the use of Class II equipment or by equivalent insulation	Some of the components such as the switch mode power supply are using Class II construction.	P
1.5.5.5	Protection by electrical separation	Isolation transformers are used as part of AC circuit except for liquid cooling system. External RCDs that meet requirements from AS/NZS 3000 needs to be provided for the AC circuit.	P
1.5.6	Additional protection by the use of RCDs	No such use of RCD for socket outlets is used considered in the BESS.	N/A
1.5.6.1	Basic protection		P
1.5.6.2	Fault protection		P
1.5.6.3	Where required		P
1.5.7	Basic and fault protection by use of extra-low voltage	All the cabinets are earthed and protective devices for all circuits are provided. The communication wire is considered in the range of using extra-low voltage.	P
1.5.8	Protection against thermal effects in normal service	Air conditioning system is provided. Active ventilation system is provided.	P

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
1.5.9	Protection against overcurrent	Circuit breakers are provided across AC circuit to prevent the occurrence of over currents in the live conductors. DC circuits are protected by BMS when overcurrent and by Fuses when short-circuit happening.	P
1.5.10	Protection against earth fault current		P
1.5.11	Protection against abnormal voltages		P
1.5.11.1	General		P
1.5.11.2	Circuits operating at different voltages		P
1.5.11.3	Voltage disturbance and electromagnetic influences	Clients provided the IEC 61000 series test results and reports assessed by TUV SUD	P
1.5.11.4	Voltage in unused conductors	No such conductors	N/A
1.5.11.5	Different circuits and installations		P
1.5.12	Protection against the spread of fire	Fire suppression system comprising temperature sensing, smoke sensing, combustible gas detection, cabin level aerosols, ventilation system and fire protection devices are provided as part of the BESS.	P
1.5.13	Protection against injury from mechanical movement	The fan of chiller is protected with anti-finger nets, for details refer to the photo documentation. Hazardous moving parts are protected.	P
1.5.14	Protection against external influences		P
1.6	DESIGN OF AN ELECTRICAL INSTALLATION		P
1.6.1	General		P
1.6.2	Supply characteristics	Refer to ratings	P
1.6.3	Maximum demand	Refer to ratings	P
1.6.4	Utilization voltage	The BESS is intended for connection to compatible PCS. The utilization voltage needs to be assessed at the PCS load terminals as part of the electrical installation	N/A
1.6.5	Electrical installation circuit arrangement		P

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
1.7	SELECTION AND INSTALLATION OF ELECTRICAL EQUIPMENT		P
1.7.1	General	This BESS is assessed as part of the electrical installation	P
1.7.2	Installation work practise	Refer to user manual	P
1.7.3	Equipment selection	On client's needs, some of the breakers are chosen per IEC/UL requirements which are not precisely complied to AS/NZS 3820.	N/A
1.7.4	Damp situations	No such equipment	N/A
1.8	VERIFICATION (INSPECTION AND TESTING)	User manual indicates that when system electrical wiring is carried out, any electrical equipment circuits, and devices shall only be put into operation with inspection and verification.	P
1.9	MEANS OF COMPLIANCE		P
1.9.1	Compliance with Part 2 of this standard	On client's needs, some of the clauses are not assessed.	N/A
1.9.2	Compliance with the requirement of other standards	Safety: IEC 62477-1:2012 Client provided report assessed by TUV SUD, report no. 64.290.24.30815.06	P
1.9.3	Alterations and repairs	Only professional personnel authorized by the manufacturer are allowed to do alterations and repairs	P
1.9.4	Compliance by specific design and installation	AS/NZS 5139	P
Part 2:	**Installation practices – Sections 2 to 8**		-
SECTION 2	GENERAL ARRANGEMENT, CONTROL AND PROTECTION		-
2.1	GENERAL	Switchgear and control gear of the auxiliary control cabinet is assessed	P
2.1.1	Application		P
2.1.2	Selection and installation		P
2.2	ARRANGEMENT OF ELECTRICAL INSTALLATION		P
2.2.1	Circuits	All internal circuits are installed separately and provided with dedicated protective devices	P

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
2.2.1.1	General	The electrical installation inside the BESS is arranged appropriately into separate circuits.	P
2.2.1.2	Origin of submains and final subcircuits		P
2.2.1.3	Common neutral	All neutral connection points of the BESS circuit come from the control cabinet. All come to the same neutral point.	P
2.2.1.4	Electric vehicle charging circuits	No such charging circuit	N/A
2.2.2	Maximum demand	The maximum demand is determined by the current rating of fixed setting circuit-breakers for all mains and sub circuits.	P
2.2.3	Selection and installation of conductors		P
2.2.4	Operating characteristics of equipment		P
2.2.4.1	General		P
2.2.4.2	Voltage		P
2.2.4.3	Current		P
2.2.4.4	Frequency		P
2.2.4.5	Power		P
2.2.4.6	Effects on operator or other equipment		P
2.3	CONTROL OF ELECTRICAL INSTALLATION		P
2.3.1	General		P
2.3.2	Common control requirements		P
2.3.2.1	General		P
2.3.2.1.1	All systems	All internal circuits inside the BESS are provided with dedicated circuit breakers for isolation purposes	P
2.3.2.1.2	Alternating current systems	According to the power distribution diagram, all active and neutral conductors are isolated by circuit breakers. And there are no consumer mains connection.	P
2.3.2.1.3	Direct current systems		P
2.3.2.2	Devices for isolation		P

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
2.3.2.2.1	General	Isolation switch in series with fuses are connected to DC bus bars at the input and breakers used in AC circuits.	P
2.3.2.2.2	Identification		P
2.3.3	Main switches		P
2.3.3.1	Introduction	Provided for both DC and AC circuits.	P
2.3.3.2	General	The AC isolation switch and DC isolation switch are incorporated into the control cabinet	P
2.3.3.3	Number of main switches		P
2.3.3.4	Location and operation		P
2.3.3.5	Identification		P
2.3.3.6	Remote control	There is no direct remote control of the isolation switches. The local control which is dc relay and remote control which is based on the command from BMS are not connected to each other. A switch is used to select between local and remote control. Local control: need manual control isolation switch or through host computer. Remote control: control is via communication system But during maintenance, the remote-control function is banned.	P
2.3.4	Additional isolating switches		N/A
2.3.4.1	Electrical installation in an outbuilding	No outbuilding electrical installations	N/A
2.3.4.2	Submains and final subcircuits greater than 100A		N/A
2.3.4.3	Alternative supply		N/A
2.3.4.4	Identification		N/A
2.3.4.5	Appliances and accessories		N/A
2.3.5	Emergency switching including emergency stopping		P

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
2.3.5.1	General	Emergency stop buttons are provided.	P
2.3.5.2	Emergency switching devices	The energy storage system of single battery compartment stops suddenly when the emergency stop button is pressed. When this button is pressed, the ACC will issue a stop instruction to PCS and a corresponding control and protection instruction to BMS. To restart the ACC, please follow the following sequence: 1. Turn the emergency stop switch counterclockwise to release the locking state. 2. Push the moulded case circuit breaker to "OFF" first and then to "ON". 3, meet the boot conditions after the equipment automatically boot operation.	P
2.3.5.3	Installation		P
2.3.5.4	Identification		P
2.3.6	Shutting down for mechanical maintenance		P
2.3.6.1	General	Safety measures for equipment maintenance: During equipment maintenance, hang "no closing" signboards on upper and lower-level switches and post warning signs to prevent accidental power-on. Manufacturer only authorised professional personnel to do the maintenance	P
2.3.6.2	Devices for shutting down		P
2.3.6.3	Installation	All switching devices are in the AUX power cabinet. The power on and power off procedure describing the sequence to turn ON and turn OFF switches/ CBs is provided in the operation and installation manual	P
2.3.6.4	Identification		P
2.3.7	Functional (control) switching		P
2.3.7.1	General		P

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
2.3.7.2	Functional switching devices		P
2.3.7.3	Identification	Detailed function and identification of the switches are mentioned in the user manual.	P
2.3.7.4	Control circuits		P
2.4	FAULT PROTECTION		P
2.4.1	General	For AC circuit, manual requires and RCD with 30mA to be connected external to the system but also the MCCB can provide such function and the MCCB has the fault protection. For DC circuit, the product has the earth leakage monitoring circuit inside the PDU. It will disconnect the system and send error code to the management unit.	P
2.4.2	Protection by automatic disconnection of supply	On client's needs, this is not assessed as the Australian certificates are required. But the BMS can act like that function and the BMS has been evaluated per IEC 62619 safety parts and functional safety parts per relevant standards in report no. 64.280.24.60289.01 by TUV SUD.	N/A
2.4.3	Types of devices	On client's needs, this is not assessed as the Australian certificates are required.	N/A
2.4.4	Auto-reclose devices		N/A
2.5	PROTECTION AGAINST OVERCURRENT		P
2.5.1	General		P
2.5.1.1	General requirements		P
2.5.1.2	Consumer mains	No Consumer mains	N/A
2.5.1.3	Submains and final subcircuits - General arrangement	Circuits inside the BESS are considered. Both AC and DC	P
2.5.1.4	Omission of protective device for safety reasons		N/A

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
2.5.2	Devices for protection against both overload and short-circuit currents	Circuit breakers are used as part of the AC circuit in the control cabinet	P
2.5.3	Protection against overload current	Only complied for DC circuit, the BMS can act as overload protection	P
2.5.3.1	Coordination between conductors and protective devices		P
2.5.3.2	Position of overload protective device – General arrangement		P
2.5.3.3	Alternative position of overload protective device		P
2.5.3.4	Omission of overload protective device		N/A
2.5.4	Protection against short-circuit current	Fuses used in DC circuits and CB used in AC circuits	P
2.5.4.1	Determination of prospective short-circuit current		P
2.5.4.2	Characteristics of short-circuit protective devices		P
2.5.4.3	Postion of devices for short-circuit protection		P
2.5.4.4	Alternative position of short-circuit protective device		N/A
2.5.4.4.1	General		N/A
2.5.4.4.2	Condition 1		N/A
2.5.4.4.3	Condition 2		N/A
2.5.4.5	Omission of devices for short-circuit protection		N/A
2.5.5	Protection against switchboard internal arcing fault currents	Arc flash assessment report provided by the client, but TUV doesn't have responsibility to check the assessment of the report.	P
2.5.5.1	General		P
2.5.5.2	Reduction of the probability of the initiation of a switchboard internal arcing fault	On client's needs, this is not assessed as Switchboard DC circuit of the BESS needs to meet the internal separation requirements in accordance with AS/NZS 3439.1 or AS/NZS 61439.2	N/A
2.5.5.3	Limitation of the harmful effects of a switchboard internal arcing fault	Fuses used in DC circuits and CB used in AC circuits	P

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
2.5.6	Coordination of overload and short-circuit protective devices		P
2.5.6.1	Protection afforded by one device	Fuses used in DC circuits and CB used in AC circuits	P
2.5.6.2	Protection afforded by separate devices		N/A
2.5.7	Reliability of supply	Not in the product	N/A
2.5.7.1	General		P
2.5.7.2	Coordination of protective devices		P
2.5.7.2.1	General		P
2.5.7.2.2	Safety service circuit discrimination (selectivity)	All safety service circuits are discriminated by dedicated circuit breakers	P
2.5.7.2.3	General supply circuit discrimination (selectivity)	For DC circuit, there is only one isolation device provided. Discrimination of circuit breakers is not applicable. But the BMS can act like that. For AC circuits, the tripping currents of downstream circuit breakers and upstream circuit breakers are different. Hence the discrimination is already provided between the protective devices. Hence no further time curve analysis is required for protective devices.	P
2.6	ADDITIONAL PROTECTION BY RESIDUAL CURRENT DEVICES		N/A
2.6.1	General	This whole clause is not relevant to this BESS but the external AUX power supply circuit shall have RCD with 30mA protection and it's unclear that circuit after has earthing fault protection.	N/A
2.6.2	Selection and arrangement of devices		N/A
2.6.2.1	General		N/A
2.6.2.2	Types of RCD		N/A
2.6.2.2.1	General		N/A

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
2.6.2.2.2	Australia only		N/A
2.6.2.2.3	New Zealand only		N/A
2.6.2.3	Protection against initiation of fire		N/A
2.6.2.4	Arrangement		N/A
2.6.3	Additional protection by residucal current devices		N/A
2.7	PROTECTION AGAINST OVERVOLTAGE		P
2.7.1	General		P
2.7.2	Protection by insulation or separation	All conductors are segregated using trunking systems according to high voltage, low voltage and extra low voltage levels	P
2.7.3	Protection by protective devices	SPD used	P
2.8	PROTECTION AGAINST UNDERVOLTAGE		P
2.8.1	General	Undervoltage protection is not necessary for the DC circuit since the voltage is present based on batteries charge capacity or protected by BMS which is evaluated per IEC 62619 and IEC 63056 by TUV SUD provided by client. No dangers because of the undervoltage of AC circuit is assumed.	P
2.8.2	Selection of protective device		N/A
2.9	PROTECTION AGAINST FIRE HAZARD DUE TO ARCING FAULTS		P
2.9.1	General	Only fuse and CB can interrupt the Arc fault current	P
2.9.2	Type		P
2.9.3	Rating		P
2.9.4	Arrangement		P
2.9.5	Alterations		P

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
2.9.6	Final subcircuits in Australia		P
2.9.7	Final subcircuits in New Zealand		N/A
2.10	SWITCHBOARDS		P
2.10.1	General	Control cabinet is installed with all the switch gear and control gear of the system	P
2.10.2	Location of switchboards		P
2.10.2.1	General	The BESS container must be installed according to manufacturer's instructions. To ensure optimal air intake for the air inlet, it is recommended to allocate sufficient space (3000mm) around the ESS container installation location.	P
2.10.2.2	Accessibility and emergency exit facilities	Control cabinet is on the readily accessible side of the container	P
2.10.2.3	Location of main switchboard		P
2.10.2.4	Identification of main switchboard		P
2.10.2.5	Restricted locations	The installation manual states that BESS shall not be installed in restricted locations as defined in this standard	P
2.10.3	Constructions		P
2.10.3.1	Access to live parts	Container enclosure is earthed	P
2.10.3.2	Suitability		P
2.10.3.3	Minimum clearance and creepage distances	BESS is tested to IEC 62477-1 thus meets the requirements of AS/NZS 61439.1	P
2.10.3.4	Orientation and location of fuses and circuit-breakers		P
2.10.3.4.1	Orientation of circuit-breakers		P
2.10.3.4.2	Location of fuses and circuit-breakers		P
2.10.3.5	Srew-in fuses		N/A
2.10.4	Bars		P

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
2.10.4.1	General		P
2.10.4.2	Tunnel-type terminals	These terminals are not provided	N/A
2.10.4.3	Neutral bars	Only DC bus bars are provided in the control cabinet. For AC circuit. Input terminal block is provided	P
2.10.5	Equipment identification	Visual inspected	P
2.10.5.1	General	Visual inspected	P
2.10.5.2	Relationship of electrical equipment	Visual inspected	P
2.10.5.3	Bars	Visual inspected	P
2.10.5.4	Terminal of switchboard equipment	Visual inspected	P
2.10.5.5	Common neutral	Visual inspected	P
2.10.5.6	Fuse	Visual inspected	P
2.10.6	Wiring	Visual inspected	P
2.10.7	Fire-protectice measures	Visual inspected	P
SECTION 3	SELECTION AND INSTALLATION OF WIRING SYSTEMS		-
3.1	GENERAL		P
3.1.1	Application		P
3.1.2	Selection and installation		P
3.2	TYPES OF WIRING SYSTEMS		P
3.3	EXTERNAL INFLUENCES	Visual inspection needed in final installation	P
3.3.1	General		P
3.3.2	Particular influences	Visual inspection needed in final installation	N/A
3.3.2.1	Ambient temperature	Chiller provided and the product has its using ambient temperature	P
3.3.2.2	External heat sources	Not considered	N/A
3.3.2.3	Water or high humidity	IP55 rated	P
3.3.2.4	Solid foreign bodies	IP55 rated	P

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
3.3.2.5	Corrosive or polluting substances	Product complied with IEC 62477-1 and IEC 62477-1 has such requirements. The installation environment requirements from the user manual states that the container should be far away from where toxic and hazardous gases are concentrated and from flammable, explosive and corrosive substances	P
3.3.2.6	Mechanical damage	Metal enclosure	P
3.3.2.7	Vibration	Fix equipment, not relevant	N/A
3.3.2.8	Other mechanical stresses	Metal enclosure	P
3.3.2.9	Flora	Not relevant	N/A
3.3.2.10	Fauna	Not relevant	N/A
3.3.2.11	Solar radiation (direct sunlight)		P
3.3.2.12	Hazardous areas	The installation environment requirements from the user manual states that the container should be far away from where toxic and hazardous gases are concentrated and from flammable, explosive and corrosive substances	N/A
3.3.2.13	Themal insulation	Not relevant	N/A
3.4	CURRENT-CARRYING CAPACITY		P
3.4.1	General		P
3.4.2	Operating temperature limits	Cross linked polyethylene: 20°C~70°C, polyvinyl chloride: 20°C ~50°C	P
3.4.3	Conductors in parallel	No parallel conductors	N/A
3.4.4	Coordination between conductors and protective devices		P
3.5	CONDUCTOR SIZE		P
3.5.1	General		P
3.5.2	Neutral conductor	Only the internal wiring of the BESS is assessed in this report. External mains are not considered for assessment	P

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
3.5.3	Earthing conductor		P
3.6	VOLTAGE DROP		N/A
3.6.1	General	Voltage drop is not considered and assessed for this BESS due to shorter route lengths of cables used inside as per AS/NZS 3008.1.1 & AS/NZS 3008.1.2 standards	N/A
3.6.2	Value		N/A
3.6.3	Conductors in parallel		N/A
3.7	ELECTRICAL CONNECTIONS		P
3.7.1	General	All the electrical connections in the BESS are performed by the manufacturer and authorised professional personnel	P
3.7.2	Connection methods		P
3.7.2.1	General		P
3.7.2.1.1	Common requirements		P
3.7.2.1.2	Aluminium conductors		N/A
3.7.2.2	Preparation for connection		P
3.7.2.3	Loosening of connections		P
3.7.2.3.1	General		P
3.7.2.3.2	Crimp joints (compression joints)	All the electrical connections in the BESS are performed by the manufacturer and authorised professional personnel	P
3.7.2.4	Mechanical connection devices	All the electrical connections in the BESS are performed by the manufacturer and authorised professional personnel	P
3.7.2.5	Retention of stranded conductors		P
3.7.2.6	Mechanical stress	considered	P
3.7.2.7	Soldered connections		N/A
3.7.2.8	Flexible cords		P
3.7.2.9	Aerial conductors	No such part	N/A

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
3.7.2.9.1	Joints and connections		N/A
3.7.2.9.2	Prohibited joints		N/A
3.7.2.10	Underground cables	No such part inside the BESS. The underground cables are used to connected with PCS.	N/A
3.7.2.11	Earthing conductors	No soldered connections and tunnel-type connections are used. Grounding connections are made through welding only	N/A
3.7.3	Joints in cables	All internal wiring is enclosed into the container	P
3.7.4	Instalallation couplers	Couplers used in the PDU complied with IEC standards	P
3.8	IDENTIFICATION		P
3.8.1	General		P
3.8.2	Colour identification	Visual inspected	P
3.8.2.1	Colour identification by sleeving or other means	Visual inspected	P
3.8.2.2	Sleeving of existing earthing and bonding conductors	Visual inspected	P
3.8.2.3	Sleeving of existing live conductors	Visual inspected	P
3.8.3	Exceptions and special applications	Visual inspected	P
3.8.3.1	General		P
3.8.3.2	Protective earthing and equipotential conductors	Visual inspected	P
3.8.3.3	Active and neutral conductors	Visual inspected	P
3.8.3.4	Alternative and European cable identification colours	Visual inspected	P
3.8.3.5	Aerial earthing conductors		P
3.9	INSTALLATION REQUIREMENTS		P
3.9.1	General	Visual inspected	P
3.9.2	Methods of installation		P
3.9.3	Support and fixing	All cables inside the BESS are adequately trunked, fixed and supported	P

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
3.9.3.1	General	All cables inside BESS are adequately protected from disturbances	P
3.9.3.2	Suspended ceilings	No such ceilings	N/A
3.9.3.3	Wiring systems likely to be disturbed	Since all the wiring is enclosed inside the container, it is assumed that they are not disturbed during normal use	P
3.9.3.3.1	Location	Visual inspected	P
3.9.3.3.2	Support and protection	Visual inspected	P
3.9.4	Protection against mechanical damage	Visual inspected	P
3.9.4.1	General	Visual inspected	P
3.9.4.2	Wiring systems near building surfaces		N/A
3.9.4.3	Wiring systems under wall lining or roofing material		N/A
3.9.4.3.1	Prohibited locations		N/A
3.9.4.3.2	Protection required		P
3.9.4.4	Protection method	Visual inspected	P
3.9.5	Wiring systems installed vertically		P
3.9.6	Change of direcition	Not relevant	N/A
3.9.7	Particular installation requirements		N/A
3.9.7.1	Consumer mains	Consumer mains which is external to the BESS is not assessed	N/A
3.9.7.1.1	Protected		N/A
3.9.7.1.2	Unprotected		N/A
3.9.7.2	Insulated and sheathed cables	No cables are installed in concrete.	N/A
3.9.7.3	Mineral insulated metal sheathed (MIMS) cable	No such cables used	N/A
3.9.7.4	Flexible cords used as installation wiring	BESS is provided with terminals and busbars for connection to external power supply and mains. No flexible cords used as installation wiring are provided	N/A
3.9.7.5	Low voltage track systems	No such use	N/A

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
3.9.7.6	Under-carpet wiring systems	No such use	N/A
3.9.8	Prevention of mutual detrimental effects between services		P
3.9.8.1	General		P
3.9.8.2	Different electrical installations	All internal circuits inside the BESS are provided with dedicated circuit breakers for isolation purposes	P
3.9.8.2.1	Common enclosure/cable		P
3.9.8.2.2	Segregation		N/A
3.9.8.3	Segregation of different voltage levels		P
3.9.8.4	Proximity to non-electrical services	Visual inspection needed in final installation	N/A
3.9.9	Selection and installation to minimize the spread of fire	Visual inspection needed in final installation	N/A
3.9.9.1	General		N/A
3.9.9.2	Precautions		N/A
3.9.9.3	Penetration of fire barriers		N/A
3.9.10	Limitation of circulating and eddy currents		N/A
3.9.10.1	General		N/A
3.9.10.2	Cables for a.c. circuits - Electromagnetic effects	EMC report result is PASS	N/A
3.9.10.3	Cables with non-ferrous metal sheeting	No such sheathings used	N/A
3.9.11	Minimization of electromagnetic interference		N/A
3.10	ENCLOSURE OF CABLES		P
3.10.1	General		P
3.10.1.1	Insulated, unsheathed cables		P
3.10.1.2	Insulated and sheathed cables		P
3.10.2	Wiring enclosures		P
3.10.2.1	Types		P

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
3.10.2.2	Change of wiring enclosures		P
3.10.2.3	Entry of water		P
3.10.3	Installation of wiring enclosures		P
3.10.3.1	General		P
3.10.3.2	Support		P
3.10.3.3	Continuity		P
3.10.3.4	Bending		P
3.10.3.5	Passage for conductors		P
3.10.3.6	Terminations		P
3.10.3.7	Installation in direct sunlight		P
3.10.3.8	Provison for expansion		P
3.10.3.9	Cable trunking		P
3.11	UNDERGROUND WIRING SYSTEMS		N/A
3.11.1	Suitability and protection		N/A
3.11.2	Classification of wiring systems		N/A
3.11.3	Arrangements		N/A
3.11.4	Installatiion requirements		N/A
3.11.5	Spacing from other underground services		N/A
3.12	AERIAL WIRING SYSTEMS		N/A
3.12.1	Types of conductor		N/A
3.12.2	Arrangements		N/A
3.12.3	Clearances		N/A
3.12.4	Distance between supports (spans)		N/A
3.12.5	Aerial conductor supports		N/A
3.12.6	Poles and posts (including supports, structs and extensions to structures)		N/A

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
3.12.7	Joints and connections		N/A
3.13	CABLES SUPPORTED BY A CATENARY		N/A
3.13.1	Types of cables		N/A
3.13.2	Catenary supports		N/A
3.13.3	Clearances		N/A
3.14	SAFETY SERVICES	BESS fire protection system is not in the scope of this clause.	N/A
3.15	BUSWAYS, INCLUDING RISING MAINS SYSTEMS		N/A
3.16	EARTH SHEATH RETURN (ESR) SYSTEM		N/A
SECTION 4	SELECTION AND INSTALLATION OF ELECTRICAL EQUIPMENT		P
4.1	GENERAL		P
4.1.1	Application		P
4.1.2	Selection and installation	Equipment installed inside the BESS is considered for assessment. All the equipment installed inside the BESS is only subjected to the internal influences inside the container. The BESS container's internal environment is maintained by chiller.	P
4.1.3	External influences		P
4.1.4	Adverse effects and interference		P
4.1.5	Air extraction systems	There are no combustion appliances inside the BESS	N/A
4.2	PROTECTION AGAINST THERMAL EFFECTS		P
4.2.1	General	Internal air conditioning system and ventilation are provided for the whole BESS	P
4.2.2	Preventison of fire hazard		P
4.2.2.1	Installation of electrical equipment		P

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
4.2.2.2	Storage of flammable materials	Fire suppression system including fire warning and alarm system, aerosol fire extinguishing system, active ventilation system, ESS water fire protection and explosion-proof pressure relief system may be provided due to final demands	P
4.2.2.3	Protection from high temperatures	Chiller works	P
4.2.2.4	Emission of arcs or sparks	The upper part of the isolation switch in the control cabinet is located around the fuse inside the high-voltage box. These locations use fiberglass panels (FR-4). The positive and negative poles of the isolation switch and the phase partition of the moulded case circuit breaker are made of insulating plastic material.	P
4.2.2.5	Electrical equipment enclosures		P
4.2.2.6	Prevention of spread of fire	Fire suppression system including fire warning and alarm system, aerosol fire extinguishing system, active ventilation system, ESS water fire protection and explosion-proof pressure relief system are provided	P
4.2.2.7	Thermal insulation- New Zealand only	Not relevant	N/A
4.2.3	Protection against burns	BESS is tested to IEC 62477-1. Please refer to test report	P
4.3	CONNECTION OF ELECTRICAL EQUIPMENT		N/A
4.3.1	General		N/A
4.3.2	Direct connection		N/A
4.3.2.1	General		N/A
4.3.2.2	Installation coupler		N/A
4.3.3	Installation wiring connected by an installation coupler (s)		N/A
4.3.4	Socket-outlets in installation wiring		N/A
4.3.5	Other connecting devices		N/A
4.3.6	Equipment wiring		N/A

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
4.4	SOCKET-OUTLETS		N/A
4.4.1	Types	No socket outlets	N/A
4.4.2	Location		N/A
4.4.3	Earthing contacts		N/A
4.4.4	Switching device		N/A
4.4.5	Polarization and phase sequence		N/A
4.5	LIGHTING EQUIPMENT AND ACCESSORIES	No luminaires or lighting equipment	N/A
4.5.1	Lampholders, including lampholders incorporated in a luminaire		N/A
4.5.1.1	Location		N/A
4.5.1.2	Edison screw lampholders		N/A
4.5.1.3	Festoon lighting		N/A
4.5.2	Lamps and luminaires		N/A
4.5.2.1	General		N/A
4.5.2.2	Lamps near flammable materials		N/A
4.5.2.3	Recessed luminaires		N/A
4.5.2.3.1	General requirements		N/A
4.5.2.3.2	Warning sign		N/A
4.5.2.3.3	Installation		N/A
4.5.2.3.4	Classifications of recessed luminaires		N/A
4.5.2.3.5	Requirements for specific classifications		N/A
4.5.2.4	Suspended ceilings		N/A
4.6	SMOKE ALARMS	Need to follow the Australian national building codes and state legislation regarding the installation of smoke alarms including location, number required and interconnection for alarm purposes	P
4.7	COOKING APPLIANCES	No such parts	N/A

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
4.7.1	Switching devics		N/A
4.7.2	Connection- New Zealand only		N/A
4.7.3	Clearance from open cooking surfaces		N/A
4.8	APPLIANCES PRODUCING HOT WATER OR STEAM	No such parts	N/A
4.8.1	General		N/A
4.8.2	Water heaters		N/A
4.9	ROOM HEATERS		N/A
4.9.1	General		N/A
4.9.2	Isolating switches		N/A
4.9.3	Functional switches		N/A
4.10	ELECTRIC HEATING CABLES FOR FLOORS AND CEILINGS AND TRACE HEATING APPLICATIONS	No such parts	N/A
4.10.1	General		N/A
4.10.2	Heating cables		N/A
4.10.3	Isolating switches		N/A
4.10.4	Functional switches		N/A
4.10.5	Additional protection		N/A
4.10.6	Signs		N/A
4.11	ELECTRIC DUCT HEATERS	No such parts	N/A
4.12	ELECTRICITY CONVERTERS	UPS and switch mode power supply	P
4.12.1	General		P
4.12.2	Selection and installation		P
4.12.3	Control	UPS controlled internally	P
4.12.4	Isolation	Isolation devices/ circuit breakers are provided at the input and all Output connections of the UPS.	P
4.12.4.1	General		P

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
4.12.4.2	Electricity converters incorporating batteries		P
4.12.5	Overcurrent protection		P
4.12.5.1	Electricity converter protection	Unexpected interruption of the supply could cause a greater danger than overcurrent in this BESS. Hence overcurrent protective devices shall not be provided.	P
4.12.5.2	Circuit protection		N/A
4.12.5.2.1	General		P
4.12.5.2.2	RCDs		N/A
4.12.6	Earthing	Certified UPS	N/A
4.12.7	Neutral continuity	Certified UPS	N/A
4.12.8	Electrical equipment connected to output		P
4.13	MOTORS		P
4.13.1	Protection against injury from mechanical movement		P
4.13.2	Protection against overload		P
4.13.3	Protection against overtemperature		P
4.14	TRANSFORMERS		N/A
4.14.1	General		N/A
4.14.2	Secondary circuit		N/A
4.14.3	Low voltage transformer supply		N/A
4.14.4	Autotransformers		N/A
4.14.5	Step-up transformers		N/A
4.15	CAPACITORS		N/A
4.15.1	General	No special/ stand-alone capacitors are used in the BESS	N/A
4.15.2	Electrical equipment		N/A
4.15.3	Provision for discharge and control		N/A

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
4.16	ELECTRICAL EQUIPMENT CONTAINING LIQUID DIELECTRICS		N/A
4.16.1	General	No such part	N/A
4.16.2	Liquid dielectrics having a flashpoint not exceeding 250°C		N/A
4.17	BATTERIES		P
4.18	GAS APPLIANCES AND EQUIPMENT		N/A
4.18.1	Gas appliances	No such part	N/A
4.18.2	Gas cylinders containing heavier-than-air gases-outdoors		N/A
4.18.3	Gas cylinders-Indoors-New Zealand only		N/A
4.18.4	Gas relief vent terminal-Natural gas, LP gas or Biogas		N/A
4.18.5	Reticulated lighter-than air gas system, metering systemn and regulators-New Zealand only		N/A
4.19	AIRCONDITIONING AND HEAT PUMP SYSTEMS	No such part	N/A
4.20	LIFTS	No such part	N/A
4.20.1	General		N/A
4.20.2	Lift supply arrangement		N/A
4.20.3	Labelling		N/A
4.20.4	Motor-room-less lifts (MRLs)		N/A
SECTION 5	EARTHING ARRANGEMENTS AND EARHTING CONDUCTORS		P
5.1	GENERAL		P
5.1.1	Application		P
5.1.2	Selection and installation		P

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
5.1.3	MEN earthing system	As per user manual, the BESS shall be permanently connected to a protective earth. Uses TN-S protective earthing system. But the DC main circuit is IT system.	N/A
5.1.4	Other earthing systems		N/A
5.2	EARTHING FUNCTIONS		P
5.2.1	Protective earthing	Protection needs to be incorporated at mains supply to prevent the leakage faults that may occur in the BESS according to the manual	P
5.2.2	Functional earthing (FE)		P
5.2.3	Earthing for combined protective and functional purposes		N/A
5.3	EARTHING SYSTEM PARTS		P
5.3.1	General	The BESS is provided with grounding means along with earthing conductors	P
5.3.2	Earthing conductor material and type		P
5.3.2.1	Conductor material		P
5.3.2.1.1	Copper conductors		P
5.3.2.1.2	Aluminium conductors		N/A
5.3.2.1.3	Other materials		N/A
5.3.2.2	Conductor type	Some earthing conductors are separately installed, and some are installed in a common enclosure with live conductors	P
5.3.2.3	Special conditions	Conductive framework is used for earthing continuity between battery pack bracket, battery cluster column, high pressure box, and container enclosure. No catenary wires are used	P
5.3.2.4	Insulation	PVC insulation is used for grounding/ earthing conductor	P
5.3.2.5	Identification	Green & Yellow colours are used	P

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
5.3.3	Earthing conductor size (cross-sectional area)		P
5.3.3.1	Protective earthing conductors		P
5.3.3.1.1	General		P
5.3.3.1.2	Selection	Meet the min requirements	P
5.3.3.1.3	Calculation		N/A
5.3.3.2	Main earthing conductor	Not considered in this report	N/A
5.3.3.3	Aerial earthing conductor		N/A
5.3.3.4	Earthing conductors in cables, flexible cables or flexible cords		P
5.3.4	Main earthing terminal/connection or bar	The grounding bar is provided at the control cabinet	P
5.3.5	MEN connection	The MEN connection is extremal tothe BESS and not considered for assessment	P
5.3.6	Earth electrodes	Earth electrodes connection external to the BESS is not considered for assessment	N/A
5.3.7	Functional earthing conductors		P
5.4	EARTHING OF EQUIPMENT		P
5.4.1	General		P
5.4.1.1	Exposed conductive parts	Connection for external grounding of the container is provided on one side. Two connecting points, each point using 316 stainless steel plate are provided. The cross-sectional area of flat steel shall not be less than 250mm^2 according to the manufacturer. M10 screws should be used to connect and fix the connection.	P
5.4.1.2	Conductive building materials		P
5.4.1.3	Connection of electrical equipment to earth		P
5.4.2	Socket-outlets		N/A
5.4.3	Lighting points	Not relevant	N/A
5.4.4	Luminaires	Not relevant	N/A

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
5.4.5	Conductive supports for aerial conducts	No such part	N/A
5.4.6	Structural metalwork including conductive building materials		P
5.4.6.1	General	All the structural metalwork of the container is earthed. The cross-sectional area of the largest active conductor is 26 mm^2 for the power supply connection at control cabinet. The cross-sectional area of the control cabinet ground wire is 26 mm^2.Meets the table 5.1 requirements,	P
5.4.6.2	Connection to protective earthing conductors		P
5.4.7	Submersible pumps		N/A
5.4.8	Variable frequency devices		N/A
5.5	EARTHING ARRANGEMENTS		P
5.5.1	Main earthing conductor	Main earthing conductor is external to the BESS and not considered for assessment.	N/A
5.5.1.1	Arrangement		N/A
5.5.1.2	Connection to earth electrode		N/A
5.5.1.3	Labelling		N/A
5.5.1.4	Resistance		N/A
5.5.2	Protective earthing conductors		P
5.5.2.1	Arrangement	The grounding bar is provided at the control cabinet for earthing of all equipment internal to the BESS	P
5.5.2.2	Restricted connections		P
5.5.2.2.1	Circuits		P
5.5.2.2.2	Earthing of equipment		P
5.5.2.2.3	Earthing facitlites for distribution boards	Only control cabinet is provided for the distribution purposes internal to the BESS	N/A
5.5.3	Particular methods of earthing		N/A
5.5.4	Continuity		P

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
5.5.4.1	General		P
5.5.4.2	Conductive wiring enclosures		N/A
5.5.4.3	Conductive sheaths, armours and screens of cables		N/A
5.5.4.4	Connecting devices		N/A
5.5.5	Installation	Visual inspection in final installation needed	N/A
5.5.5.1	General		N/A
5.5.5.2	Protection against mechanical damage		N/A
5.5.5.3	Protection against corrosion		P
5.5.5.4	Aerial earthing conductors		N/A
5.5.5.5	Burred earthing conductors		N/A
5.5.6	Connections		P
5.5.6.1	Conductors		P
5.5.6.2	Constructional components	The external grounding part is done using a welded copper plate with a thickness of 4mm and a cross-sectional area of 250mm² according to the manufacturer. M10 screws should be used to connect and fix the connection.	P
5.6	EQUIPOTENTIAL BONDING		N/A
5.6.1	General	Only the accessible enclosure and the diagram of the container have been checked as PASS.	N/A
5.6.2	Arrangement		N/A
5.6.2.1	General		N/A
5.6.2.2	Conductive water piping		N/A
5.6.2.3	Other conductive piping systems		N/A
5.6.2.4	Conductive cable sheaths and conductive wiring enclosure		N/A
5.6.2.5	Showers and bathroom		N/A
5.6.2.6	Swimming and spa pools		N/A

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
5.6.2.6.1	Bonding arrangement		N/A
5.6.2.6.2	Conductive pool structures		N/A
5.6.2.6.3	Pool equipotential boding conductor connection point		N/A
5.6.2.6.4	Electrical equipment		N/A
5.6.2.6.5	Conductive fixtures and fittings		N/A
5.6.2.7	Telephone and telecommunication earthing systems		N/A
5.6.3	Bonding conductors		N/A
5.6.3.1	General		N/A
5.6.3.2	Size		N/A
5.7	EARTH FAULT-LOOP IMPEDANCE		P
5.7.1	General	Such protection with similar appliances provided	P
5.7.2	Disconnection times		P
5.7.3	Earth fault-loop		P
5.7.4	Impedance		P
5.7.5	Supplementary equipotential bonding		P
5.8	OTHER EARTHING ARRANGEMENTS	Not relevant	N/A
SECTION 6	DAMP SITUATIONS		N/A
6.1	GENERAL	Not for this use	N/A
6.1.1	Application		N/A
6.1.2	Selection and installation		N/A
6.2	BATHS, SHOWERS AND OTHER FIXED WATER CONTAINERS		N/A
6.2.1	Scope		N/A
6.2.2	Classification of zones		N/A
6.2.3	Protection against electric shock – Prohibited measures		N/A

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
6.2.4	Selection and installation of electrical equipment		N/A
6.3	SWIMMING POOLS, PADDLING POOLS AND SPA POOLS OR TUBS		N/A
6.3.1	Scope		N/A
6.3.2	Classification of zones		N/A
6.3.3	Protection against electric shock		N/A
6.3.4	Selection and installation of electrical equipment		N/A
6.4	FOUNTAINS AND WATER FEATURES		N/A
6.4.1	Scope		N/A
6.4.2	Classification of zones		N/A
6.4.3	Protection against electric shock		N/A
6.4.4	Selection and installation of electrical equipment		N/A
6.5	SAUNAS		N/A
6.5.1	Scope		N/A
6.5.2	Classification of zones		N/A
6.5.3	Protection against electric shock		N/A
6.5.4	Selection and installation of electrical equipment		N/A
6.6	REFRIGERATION ROOMS		N/A
6.6.1	Scope		N/A
6.6.2	Protection against electric shock		N/A
6.6.3	Selection and installation of electrical equipment		N/A
6.7	SANITIZATION AND GENERAL HOSING-DOWN OPERATION		N/A
6.7.1	Scope		N/A
6.7.2	Classification of zones		N/A
6.7.3	Protection against electric shock		N/A

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
6.7.4	Selection and installation of electrical equipment		N/A
SECTION 7	SPECIAL ELECTRICAL INSTALLATIONS		P
7.1	GENERAL		P
7.1.1	Application		P
7.1.2	Selection and installation		P
7.2	SAFETY SERVICES		N/A
7.2.1	Scope and general		N/A
7.2.1.1	Scope	These requirements are specifically for electrical installation of building services. The fire extinguishing system inside the BESS is not within the scope and should be assessed separately	N/A
7.2.1.2	General		N/A
7.2.2	Supply systems		N/A
7.2.2.1	General		N/A
7.2.2.2	Wiring systems		N/A
7.2.2.2.1	WS classification provided		N/A
7.2.2.2.2	WS classification is not provided		N/A
7.2.2.3	Alternative supply systems		N/A
7.2.2.3.1	Continued occupation		N/A
7.2.2.3.2	Fire management system		N/A
7.2.3	Main switchboard and switchgear		N/A
7.2.3.1	General		N/A
7.2.3.2	Switchgear		N/A
7.2.3.3	Cables in the same enclosure		N/A
7.2.3.4	Arrangement		N/A
7.2.3.5	Discrimination (selecticity) of circuit-protective devices		N/A

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
7.2.4	Mains switches		N/A
7.2.4.1	General		N/A
7.2.4.2	Arrangement of main switches		N/A
7.2.4.3	Mechanical protection		N/A
7.2.4.4	Identification		N/A
7.2.4.5	Electrical installation in outbuildings		N/A
7.2.4.6	Fire separated portions of a building		N/A
7.2.5	Fire pumps and fire pump control equipment		N/A
7.2.5.1	General		N/A
7.2.5.2	Wiring systems supplying fire pumps and fire pump control equipment		N/A
7.2.5.2.1	Types of wiring systems		N/A
7.2.5.2.2	Segregation of cables		N/A
7.2.5.3	Switchgear for fire pumps and fire pump control equipment		N/A
7.2.5.4	Interposing switches for fire pumps and fire pump control equipment		N/A
7.2.5.5	Pump rooms for fire pumps and fire pump control equipment		N/A
7.2.5.6	Fire-pump motors		N/A
7.2.5.6.1	Isolating switches for fire-pump motors		N/A
7.2.5.6.2	Overcurrent protection for fire-pump motors		N/A
7.2.5.6.3	Overtemperature protection for fire-pump motors		N/A
7.2.5.6.4	Control circuits for fire-pump motors		N/A
7.2.6	Fire and smoke detection equipment and fire alarm systems		N/A
7.2.6.1	General		N/A

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
7.2.6.2	Wiring systems for fire detection and alarm systems		N/A
7.2.6.2.1	Types of wiring systems for fire detection and alarm systems		N/A
7.2.6.2.2	Segregation of cables for fire detection and alarm systems		N/A
7.2.6.3	Interposing switches for fire detection and alarm systems		N/A
7.2.7	Air-handling systems		N/A
7.2.8	Evacuation equipment		N/A
7.2.8.1	General		N/A
7.2.8.2	Wiring systems for evacuation equipment		N/A
7.2.8.2.1	Types of wiring system for evacuation equipment		N/A
7.2.8.2.2	Segregation of cables for evacuation equipment		N/A
7.2.8.3	Interposing switches for evacuation equipment		N/A
7.2.9	Emergency lifts		N/A
7.2.9.1	General		N/A
7.2.9.1.1	In Australia		N/A
7.2.9.1.2	In New Zealand		N/A
7.2.9.2	Control and protection		N/A
7.2.9.3	Wiring systems for emergency lifts		N/A
7.2.9.3.1	Types of wiring system for emergency lifts		N/A
7.2.9.3.2	Segregation of cables		N/A
7.2.9.4	Interposing switches		N/A
7.2.9.5	Switchgear		N/A
7.2.10	Emergency motor-room-less lifts		N/A
7.2.10.1	General		N/A
7.2.10.2	Switchboards		N/A

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
7.2.10.3	Switchgear		N/A
7.2.10.4	Wiring systems		N/A
7.2.10.4.1	Types of wiring systems for MRL lifts		N/A
7.2.10.4.2	Segregation of cables		N/A
7.3	ELECTRICITY GENERATION SYSTEMS	Not this use	N/A
7.3.1	General		N/A
7.3.2	Selection and installation of system		N/A
7.3.3	Control		N/A
7.3.3.1	Basic protection and fault protection		N/A
7.3.4	Isolation		N/A
7.3.4.1	General		N/A
7.3.4.2	Electricity generation systems incorporating batteries		N/A
7.3.5	Overcurrent protection		N/A
7.3.5.1	Electricity generation system protection		N/A
7.3.5.2	Circuit protection		N/A
7.3.5.2.1	General		N/A
7.3.5.2.2	RCDs		N/A
7.3.6	Earthing		N/A
7.3.7	Connected electrical equipment		N/A
7.3.8	Connection to electrical installation		N/A
7.3.8.1	Alternative supplies		N/A
7.3.8.1.1	General		N/A
7.3.8.1.2	Switching		N/A
7.3.8.2	Grid-connected inverter systems		N/A
7.3.8.2.1	General		N/A

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
7.3.8.2.2	Switching		N/A
7.3.8.2.3	Connection		N/A
7.3.8.3	Stand-alone power systems		N/A
7.3.8.3.1	General		N/A
7.3.8.3.2	Switching		N/A
7.3.8.3.3	Connection		N/A
7.4	PROTECTION BY ELECTRICAL SEPARATION (ISOLATED SUPPLY)		N/A
7.4.1	General	All isolated supply inside the BESS is certified to certain standards so this clause is not assessed.	N/A
7.4.2	Source of supply		N/A
7.4.3	Arragement of circuits		N/A
7.4.4	Switching devices		N/A
7.4.5	Supply to single item of electrical equipment		N/A
7.4.6	Supply to multiple items of electrical equipment		N/A
7.4.7	Variable speed drive (VSD) EMI filters		N/A
7.4.8	Testing		N/A
7.5	EXTRA-LOW VOLTAGE ELECTRICAL INSTALLATIONS		P
7.5.1	Scope	Communication and LV control circuit	P
7.5.2	Application		P
7.5.3	Sources of supply to SELV and PELV systems		P
7.5.4	Separation requirements for SELV and PELV circuits		P
7.5.5	Arrangement of SELV circuits		P
7.5.6	Arrangement of PELV circuits		P
7.5.7	Voltage drop in conductors	No risk assessed	P

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
7.5.8	Control of an electrical installation		P
7.5.9	Overcurrent protection	No risk when this occurs so no need to use overcurrent protection	N/A
7.5.10	Connecting devices		P
7.5.11	Wiring systems		P
7.5.12	Testing	Only visual inspection performed	N/A
7.6	HIGH VOLTAGE ELECTRICAL INSTALLATIONS		N/A
7.6.1	Scope		N/A
7.6.2	Application		N/A
7.6.3	Issues relevant to high voltage installations		N/A
7.7	HAZARDOUS AREAS (EXPLOSIVE GAS OR COMBUSTIBLE DUSTS)		N/A
7.7.1	Scope		N/A
7.7.2	Classification of hazardous areas		N/A
7.8	STANDARDS FOR SPECIFIC ELECTRICAL INSTALLATIONS		N/A
7.8.1	Scope		N/A
7.8.2	Standards containing requirment that are additional to, replace, or modify the general requirements of this Standard		N/A
7.8.3	Standards containing guidance		N/A
7.9	SUPPLIES FOR ELECTRICL VEHICLES (NZ ONLY)		N/A
7.9.1	Scope		N/A
7.9.2	Supply (NZ only)		N/A
7.9.3	Domestic electrical installations (NZ only)		N/A
7.9.4	Other electrical installations (NZ only)		N/A
SECTION 8	VERIFICATION		P

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
8.1	GENERAL		P
8.1.1	Application	Visual inspection and testing are needed to evaluate this clause. Not assessed as part of this design review	N/A
8.1.2	General requirements		P
8.1.3	Periodic inspection and testing	Provided in the user manual	P
8.2	VISUAL INSPECTION		P
8.2.1	General		P
8.2.2	Checklist		P
8.3	TESTING		P
8.3.1	General	Mentioned in the maintenance manual	P
8.3.2	Test menthods		P
8.3.3	Mandatory tests	Not performed	N/A
8.3.4	Sequence of tests	Mentioned in the maintenance manual	P
8.3.5	Continuity of the earthing system		N/A
8.3.6	Insulation resisitance		N/A
8.3.7	Polarity		N/A
8.3.8	Correct circuit connections		N/A
8.3.9	Verification of earth fault-loop impedance (EFLI)		N/A
8.3.10	Operation of RCDs		N/A
8.4	VERIFICATION RECORS		N/A
APPENDICES			-
A	REFERENCED DOCUMENTS		-
B	CIRCUIT PROTECTION GUIDE		-
C	CIRCUIT ARRANGEMENTS		-

AS/NZS 3000:2018+A1+A2+A3

Clause	Requirements - Tests	Measuring results - Remarks	Result
D	MINIMUM SIZES OF POSTS, POLES AND STRUTS FOR AERIAL LINE CONDUCTORS		-
E	ELECTRICAL INSTALLATION REQUIREMENTS IN NATIONAL CONSTRUCTION CODES		-
F	SURGE PROTECTIVE DEVICES		-
G	DEGREES OF PROTECTION OF ENCLOSED EQUIPMENT		-
H	WS CLASSIFICATION OF WIRING SYSTEMS		-
I	PROTECTIVE DEVICE RATINGS AND METRIC EQUIVALENT SIZES FOR IMPERAL CABLES USED IN ALTERATIONS AND REPAIRS		-
J	SYMBOLS USED IN THIS STANDARD		-
K	SWITCHBOARD REQUIEMENT SUMMARY		-
L	(Deleted)		-
M	REDUCING THE IMPACT OF POWER SUPPLY OUTAGES-CONTINUITY OF SUPPLY FOR ACTIVE ASSISTED LIVING AND HOMECARE MEDICAL SITUATIONS		-
N	ELECTRICAL CONDUITS		-
O	INSTALLATION OF ARC FAULT DETECTION DEVICES (AFDDs)		-
P	GUIDANCE FOR INSTALLATION AND LOCATION OF ELECTRICAL VEHICLE SOCKET-OUTLETS AND CHARGING STATIONS		-
Q	D.C. CIRCUIT PROTECTION APPLICATION GUIDE		-

SECTION 2	**Battery energy storage system (BESS) configurations**		-
2.1	General		-
2.2	Battery energy storage systems	Battery system, parameters refer to product specification table	-
2.3	BESS: Application	The product is a battery system and does not include PCE	N/A
Section 3	**Battery energy storage system hazards**		
3.1	General		P
3.2	Hazards associated with a BESS		P
3.2.1	General	Installation requirements that are necessary to eliminate health and safety risks, and if that is not possible, minimizing the risks so far as is reasonably practicable from these hazards are included in section 5	P
3.2.2	Hazards classification by battery type	The battery storage system only comprises one battery type – Lithium-ion battery	P
3.2.3	Electrical hazard		P
3.2.3.1	General		P
3.2.3.2	Decisive voltage classification (DVC)	DVC A for communication circuit DVC C for main AC and battery circuit	P
3.2.3.3	Battery system prospective fault current/ short-circuit current	Battery system prospective fault current: 107.28kA	P
3.2.4	Energy hazard	Refer to evaluation report provided by client for Arc Flash Analysis	P
3.2.4.1	General		P
3.2.4.2	Determining arc flash incident energy	Refer to evaluation report provided by client for Arc Flash Analysis	P
3.2.4.3	Multiplying factor	Refer to evaluation report provided by client for Arc Flash Analysis	P
3.2.4.4	Selecting personal protective equipment (PPE)	Refer to evaluation report provided by client for Arc Flash Analysis	P
3.2.5	Mechanical hazard	Installation Manual and Operation and Maintenance Manual provide detailed information to avoid Mechanical Hazard	P

3.2.6	Fire hazard	Based on table 3.1, The manufacturer claims Lithium-ion battery confirms best practice guide, no Fire hazard.	P
3.2.6.1	General		P
3.2.6.2	Batteries that emit flammable gases		N/A
3.2.6.3	Lithium-ion batteries	The Battery cell is a certified product and meet relevant requirements of fire risk. Manufacturer also declares that the battery system conforms to the Best Practice Guide, so the battery system is not applicable for fire hazard.	P
3.2.7	Explosive gas hazard	The container is equipped with an active ventilation system, which, in conjunction with the combustible gas monitoring module, quickly mitigates safety hazards caused by excessive concentrations of combustible gases.	P
3.2.8	Chemical hazard		N/A
3.2.9	Toxic fume hazard	The product is for outdoor installed only. The ventilation and exhaust system will activate when detecting toxic gas, and both audible and visual alarms will be triggered.	P
Section 4	**Pre-assembled integrated BESSs – Installation, commissioning and documentation**		**N/A**
Section 5	**Pre-assembled integrated battery systems – Installation, commissioning and documentation**		
5.1	General	Manufacturer declared battery system is conforming with the Best Practice Guide: battery storage equipment by using method 1.	P
5.2	Installation requirement		P
5.2.1	General		P
5.2.2	Location		P
5.2.2.1	General	Please refer to Installation manual for Installation Space Requirements. Further assessment is required on the actual object. For outdoor only. ≤ 2000 Altitude	P
5.2.2.2	Restricted locations	Please refer to Installation manual for Restricted locations.	P

5.2.3	Environmental requirement		P
5.2.3.1	General	Operating temperature: Charge/Discharge -35°C ~ 45°C Operating humidity: 0-95%	P
5.2.3.2	IP rating	The container without Liquid cooling system installed is rated IP55. Refer to report SHES240601178171 provided by client which is not performed by TUV RH. Liquid cooling system has its own IP rating. Client states that a proper method applied between the container and the liquid cooling system will not derate the IP protection. Further assessment will be conducted on the actual locations to determine if a higher rating is required.	P
5.2.4	Protection against the spread of fire		P
5.2.4.1	General	The Battery cell is a certified product and meets requirements of fire risk in the standard. The products also incorporate thermal management system and fire suppression system to prevent the spread of fire.	P
5.2.4.2	Barrier to habitable rooms	System is for outdoor use.	N/A
5.2.5	Pre-assembled battery system room requirement	System is for outdoor use.	N/A
5.2.6	Seismic (earthquake) forces	Need to confirm the installation location whether required to be designed for earthquake action	N/T
5.3	Installation hazards		P
5.3.1	Electrical hazards		P
5.3.1.1	General	Battery circuit and control cabinet circuit are DVC-C	P
5.3.1.2	Overcurrent protection from battery system		P

5.3.1.2.1	General	Each pre-assemble battery rack system, consisting of 1 PDU and 4 battery modules connected in series, is protected by fuses integrated into the pre-assembled battery system. A main circuit fuse provides overcurrent protection to all pre-assembled battery racks connected in parallel as the whole battery storage system. **Main circuit:** EUGARD, model ESH7065.F2: 1500VDC / 1800A, approved by TUV RH with license no. J 50589689 0001. EUGARD, model ESH5550, 1500V/315, assessed by TUV SUD in IEC 62477-1:2012 report no. 64.290.24.30815.06 in CDF. EUGARD, model EVN6041, 750V DC, 315A, approved by TUV RH with license no. R 50657246 0001. Manufacturer provides only EN 60269 certificate instead of IEC 60269 certificate required by AS/NZS 3000. The EN 60269 certificate confirms that the fuse meets all the requirements of this clause.	
5.3.1.2.2	Requirements for circuit breaker	No circuit breaker for battery system	N/A
5.3.1.2.3	Requirement for HRC fuse and holder		N/A
5.3.1.2.4	Pre-assembled battery systems which include overcurrent protection		P
	(a) the pre-assembled battery system includes overcurrent protection in all live conductors (excluding control and monitoring circuits)	The fuse is connected to both battery DC+ and DC-.	P
	(b) the pre-assembled battery system includes overcurrent protection that is a readily available circuit-breaker or HRC fuse	Only authorized personnel can operate.	N/A
	(c) the pre-assembled battery system manufacturer's instructions permit the use of the preassembled battery system overcurrent protection to meet the overcurrent protection requirements of the battery system output cables; and		P

	(d) the output cables have a current-carrying capacity greater than the rating of the protection device	No output cable is connected. Further assessment is required for output cable selection in the actual project.	N/A
5.3.1.2.5	Location of overcurrent protection devices	If an external protection device is required, further assessment shall be conducted.	N/A
5.3.1.3	Isolation of the pre-assembled battery system from the PCE		P
5.3.1.3.1	General	Each pre-assemble battery rack system, consisting of 1 PDU and 4 battery modules connected in series, is protected by an isolation switch integrated into the pre-assembled battery system. A main circuit isolation switch isolates the whole battery storage system to PCE. **Main circuit:** SHANGHAI LIANGXIN ELECTRICAL CO LTD : model NDW2GZ-1600 , 1600A DC1500V **PDU of Battery circuit:** SHANGHAI LIANGXIN ELECTRICAL CO LTD : model NDG3VH-250	
5.3.1.3.2	Disconnection methods	Isolation switches are integrated into pre-assembled battery system.	P

5.3.1.3.3	Requirement for battery system – switch disconnector	**According to the calculation report performed by ETAP and provided by the client:** The report shows that the Device Capability of the Battery Rack dc Fuse is only 20kA, but the fault current is more than 70kA. The report here shows that the fuse. Battery Rack dc Fuse has failed the verification. In actual situations, when a short circuit occurs in the lower section of the HVB, the Battery HVB dc Fuse will blow before the Battery Rack dc Fuse and cut off the short-circuit current flowing into the HVB from other lines. At this time, the short-circuit current borne by the Battery Rack dc Fuse is below **13.51kA**, which meets the breaking current threshold of **20kA** and can work normally.	P
5.3.1.3.4	Additional requirement for an adjacent and physically separate disconnection device		N/A
5.3.1.3.5	Additional requirements for a disconnection device integrated into PCE		N/A
5.3.1.3.6	Additional requirement for a disconnection device integrated into pre-assembled battery system		P
5.3.1.3.7	Location of isolation devices	Isolation device located inside the Battery system	P
5.3.1.3.8	BESS with multiple PCEs		N/A
5.3.1.3.9	Parallel battery systems	The battery modules in each pre-assembled battery rack system are connected in series. The entire battery system consists of 12 battery rack systems connected in parallel. Each pre-assembled battery rack system incorporates an isolation switch.	P
5.3.1.4	Battery systems wiring to PCE	Assessment for battery system only, the wiring to PCE shall be assessed after final installation	N/A
5.3.1.5	Segregation of circuits	DC circuit and AC circuit are located in separate tiers.	P
5.3.1.6	Earthing of battery systems		P
5.3.1.6.1	General	Floating	P

5.3.1.6.2	Floating/separated	Battery is floating with no battery conductors connected to earth.	P
5.3.1.6.3	Earth connection requirements – Direct earthed		N/A
5.3.1.6.4	Earth connection requirements – Resistive earthed		N/A
5.3.1.6.5	Battery system connected to a non-separated PCE		N/A
5.3.1.6.6	Battery system earth location	Assessment is performed on Battery system only, no PCE	N/A
5.3.1.6.7	Size of earth cable		N/A
5.3.1.7	Earthing system		
5.3.1.7.1	General		P
5.3.1.7.2	Battery system not earthed - bonding	Only battery pack uses Protective Grounding through grounding flat steel with size 38mm x 97 mm. But the battery system is not earthed.	P
5.3.1.7.3	Battery system is directly earthed		N/A
5.3.1.7.4	Battery system resistively earthed		N/A
5.3.1.8	Earth fault alarm – monitoring alarm	Client states that the following procedure applies for detecting earth faults. The BCMS detects whether there is an insulation fault based on the insulation value of each cluster before operation. If an earth fault is detected, the BCMS will report the fault to BAMS, the PDU will remain open, and an alarm will be triggered. The assessment is only applied on the battery system per IEC 62477-1, further assessment is required after the PCS is installed with battery system.	P
5.3.2	Energy hazard – Arc flash	Please refer to the Operation and Maintenance Manual for detailed procedures and safety measure. And proper PPE shall be weared.	P
5.3.3	Mechanical hazard	Refer to the foundation requirements in Installation Manual. Foundation plan shall also be assessed by client before installation.	P
5.3.4	Fire hazards	The product is for outdoor use only.	N/A

5.3.5	Explosive gas hazard	The container is additionally equipped with an active ventilation system, which, in conjunction with the combustible gas monitoring module, quickly eliminates safety hazards caused by excessive concentrations of combustible gases.	P
5.3.6	Chemical hazard	According to table 3.1, lithium-ion battery does not have chemical hazard	N/A
5.3.7	Toxic fume hazard	The ventilation and exhaust system will activate when detecting toxic gas, and both audible and visual alarms will be triggered.	P
5.3.8	Battery alarm system	System incorporating alarm system	P
5.4	System documentation, verification and commissioning		P
5.4.1	Documentation		P
5.4.1.1	General		P
5.4.1.2	System manual		P
5.4.2	Verification	This is not part of the assessment	N/A
5.4.3	Commissioning	This is not part of the assessment	N/A
Section 6	**Battery systems and BESSs not covered by section 4 and 5– Installation, commissioning and documentation**		N/A
Section 7	**Labels and safety signage**		**P**
7.1	General		-
7.2	Requirement for signs and labels	Artwork provided by client	P
7.3	Battery type general labelling		P
7.4	Signs for battery system location	Need to access after installation	NT
7.5	Restricted access		P
7.6	Voltage and current		P
7.7	Safety data sheet (SDS)		P
7.8	Explosive gas hazard		P
7.9	Toxic fume hazard		P
7.10	Chemical hazard	Need to access after installation	NT
7.11	Arc flash		P
7.12	Disconnection device		P
7.13	Overcurrent devices		P
7.14	Battery system cables		P
7.15	Segregation		P
7.16	Shutdown procedure		P
7.17	Battery labelling		P

7.18	Other equipment labelling		P
7.19	Spill containment		P
Appendix A	Decisive voltage classification (DVC)		-
Appendix B	Safety signs		-
Appendix C	Typical layout of battery rooms and stands		-
Appendix D	Battery system enclosures examples for battery types classified as explosive gas hazards		-
Appendix E	Typical layouts for location and barriers requirements		-
Appendix F	Arc flash calculation		-
Appendix G	Risk assessment	Risk assessment performed by manufacturer	-
Appendix H	Inspection and maintenance		-

AS/NZS 3008.1.1:2017 & AS/NZS 3008.1.2:2017

Clause	Requirements - Tests	Measuring results - Remarks	Result
SECTION 2	**CABLE SELECTION PROCEDURE**		
2.1	General	Already installed alternating current carrying cables inside the BESS are considered as part of this assessment.	-
2.2	Selection process	Only current carrying capacity requirements are determined to be predominant to assess this BESS	P
2.3	Determination of minimum cable size based on current carrying capacity considerations.	All the alternating current carrying cables already installed in the BESS are predetermined. So, sizes of cables are given by the manufacturer. For evaluation, worst case considerations include group of circuits, ambient temperature and derating factor. Only 2.3 (d) is determined for evaluation.	P
2.4	Determination of minimum cable size based on voltage drop considerations	No longer route length cables are used in the BESS	N/A
2.5	Determination of minimum cable size based on the short-circuit temperature considerations		N/A
2.6	Determination of cable size based on the economic optimization considerations (optional)		N/A
SECTION 3	**CURRENT-CARRYING CAPACITY**		
3.1	RATINGS		P
3.1.1	General		P
3.1.2	Basis	No thermal insulation surrounding the AC cables is used	P
3.2	TYPES OF CONDUCTORS		P
3.2.1	Conductor material		P
3.2.2	Insulation material operating temperatures	“Normal use temperature” 75°C is considered for worst case evaluation	P

AS/NZS 3008.1.1:2017 & AS/NZS 3008.1.2:2017

Clause	Requirements - Tests	Measuring results - Remarks	Result
3.3	TYPES OF CABLE		P
3.3.1	Sheather or unsheathed thermoplastic, cross-linked elastomeric and XLPE insulated cables		P
3.3.1.1	General	AC cables only with PVC insulation are used in the BESS	P
3.3.1.2	Method of installation	Table 3(1) for cables unenclosed in air, cables of the one circuit touching and installed in a switchboard or similar enclosure was applied	P
3.3.2	Flexible cords and cables	All AC cables in the BESS are considered as flexible cables.	P
3.3.2.1	Used for installation wiring		P
3.3.2.2	Other than installation wiring		N/A
3.3.3	Mineral-insulated metal-sheathed (MIMS) cables	No such cables	N/A
3.3.4	Aerial cables	No such cables	N/A
3.3.5	Neutral-screened cables		N/A
3.3.6	High temperature cross-linked elatomeric, polymeric or fibrous insulated cables and flexible cords	All AC cables used in the BESS are PVC insulated	N/A
3.3.7	Other cable types	Thermoplastic insulated cables are considered	P
3.4	INSTALLATION CONDITIONS		P
3.4.1	General		P
3.4.2	Cables installed in air	Unenclosed cables installed in an enclosure is considered	P
3.4.3	Cables installed in thermal insulation	No thermal insulation is used	N/A
3.4.4	Cables buried direct in the ground	No such cables	N/A
3.4.5	Cables installed in underground wiring enclosures	No such cables	N/A
3.4.6	Variation of installation conditions along cable run	All cables inside the BESS enclosure are considered as unenclosed cables	N/A

AS/NZS 3008.1.1:2017 & AS/NZS 3008.1.2:2017

Clause	Requirements - Tests	Measuring results - Remarks	Result
3.5	EXTERNAL INFLUENCES ON CABLES		P
3.5.1	Application of rating factors	Table 7 was applied for AC power cable connected to air conditioning, sockets, lighting, switches, UPS, fire protection, BCMS, cameras in the control cabinet. Table 7 was applied for AC power cables located inside the high voltage box of the PDU. For all other AC power cables in the container, Table 13 was applied. Worst case derating factor of 0.38 from table 22, derating factor of 1.07 (for AS/NZS 3008.1.1) & 0.94 (for AS/NZS 3008.1.2) from table 27(1), and conductor temperature of 75°C were considered for assessment. The derating factors were applied to given operating current values to determine the minimum conductor size and then assessed against the given actual conductor size.	P
3.5.2	Effect of grouping of cables	All cables are assessed to be cables of the one circuit touching and installed in a switchboard or similar enclosure. Hence table 22, derating factors for bunched circuits is applied to all cables.	P
3.5.2.1	General		P
3.5.2.2	Installation conditions that avoid derating		N/A
3.5.2.3	Cables run horizontally	Horizontally running cables inside the BESS are considered. Cables trunking and other arrangements are used in the BESS.	P
3.5.2.4	Cables run vertically	Vertically running cables inside the BESS are considered. Cables trunking and other arrangements are used in the BESS.	P

AS/NZS 3008.1.1:2017 & AS/NZS 3008.1.2:2017

Clause	Requirements - Tests	Measuring results - Remarks	Result
3.5.2.5	Cables buried direct in the ground	No such cables	N/A
3.5.2.6	Cables in wiring enclosures		P
3.5.2.7	Conductors connected in parallel or passing more than once within a group or enclosure		N/A
3.5.2.8	Cables on drums or reels		N/A
3.5.3	Effect of ambient temperature	Rating factor of 1.07 for 35°C from Table 27(1) was considered	
3.5.4	Effect of depth of laying	No such cable arrangement	N/A
3.5.5	Effect of thermal resistivity of soil	No such cable arrangement	N/A
3.5.6	Effect of varying loads	Assessment is based on the continuous loading. No other loading conditions were considered.	P
3.5.7	Effect of thermal insulation	No thermal insulation is used.	N/A
3.5.8	Effect of direct sunlight	Cables are not exposed to any direct sunlight.	N/A
3.5.9	Effect of harmonic currents on balanced three-phase systems	No balanced three phase systems	N/A
3.5.10	Effect of parallel cables	Three phase supply cables from control cabinet and liquid cooling were considered	P
3.5.11	Effect of electromagnetic interference	Client provided report assessed by TUV SUD	P
SECTION 4	**VOLTAGE DROP**		**N/A**
4.1	GENERAL		N/A
4.2	DETERMINATION OF VOLTAGE DROP FROM MILLIVOLTS PER AMPERE METRE		N/A
4.3	DETERMINATION OF VOLTAGE DROP FROM CIRCUIT IMPEDANCE		N/A
4.3.1	General		N/A
4.3.2	Single-phase, two-wire supply system		N/A

AS/NZS 3008.1.1:2017 & AS/NZS 3008.1.2:2017

Clause	Requirements - Tests	Measuring results - Remarks	Result
4.3.2	Three-phase, three-wire or four-wire supply system		N/A
4.3.4	Two-phase, three-wire, earthed neutral 120° supply system		N/A
4.3.5	Single-phase, three-wire, earthed centre-tapped 180° supply system		N/A
4.4	DETERMINATION OF VOLTAGE DROP FROM CABLE OPERATING TEMPERATURE		N/A
4.5	DETERMINATION OF VOLTAGE DROP FROM LOAD POWER FACTOR		N/A
4.6	DETERMINATION OF VOLTAGE DROP IN UNBALANCED MULTIPHASE CIRCUITS		N/A
SECTION 5	**SHORT-CIRCUIT PERFORMANCE**		**N/A**
5.1	GENERAL		N/A
5.2	FACTORS GOVERNING THE APPLICATION OF THE TEMPERATURE LIMITS		N/A
5.3	CALCULATION OF PERMISSIBLE SHORT-CIRCUIT CURRENTS		N/A
5.4	INFLUENCE OF METHOD OF INSTALLATION		N/A
5.5	MAXIMUM PERMISSIBLE SHORT-CIRCUIT TEMPERATURES		N/A
5.5.1	General		N/A
5.5.2	Insulating materials		N/A
5.5.3	Outer sheath and bedding materials		N/A
5.5.4	Conductor and metallic sheath materials and components		N/A
APPENDIX A	**EXAMPLES OF THE SELECTION OF CABLES TO SATISFY CURRENT-CARRYING CAPACITY, VOLTAGE DROP AND SHORT-CIRCUIT PERFORMANCE REQUIREMENTS**		-
APPENDIX B	**LIST OF TABLES**		-
APPENDIX C	**EXAMPLES OF THE APPLICATION OF REDUCTION FACTORS FOR HARMONIC CURRENTS**		-

AS/NZS 3008.1.1:2017 & AS/NZS 3008.1.2:2017

Clause	Requirements - Tests	Measuring results - Remarks	Result
APPENDIX D	**RECOMMENDED CIRCUIT CONFIGURATION FOR THE INSTALLATION OF SINGLE-CORE CABLES IN PARALLEL**		-

Photo documentation

Side view with chiller and AUX power cabinet

Door-open view

Photo documentation

Door panel

Left side view

Photo documentation

Right side view

Fire panel

Photo documentation

Main isolation switch

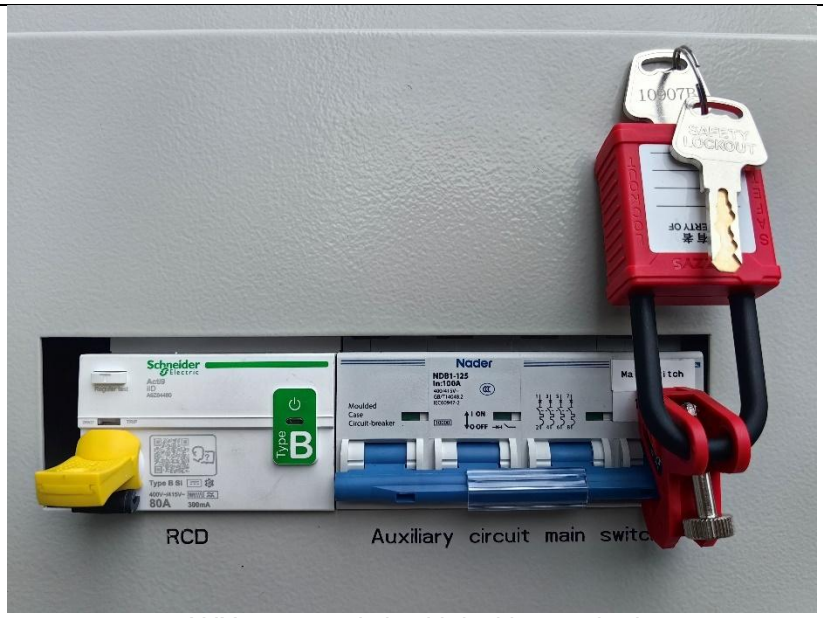
AUX power earthing connection

Photo documentation

External fire alarm panel with protection

AUX power cabinet switch with locking method

Photo documentation



AUX power switch with locking method

Battery cabinet without battery pack equipped

Photo documentation

Battery cabinet without battery pack equipped

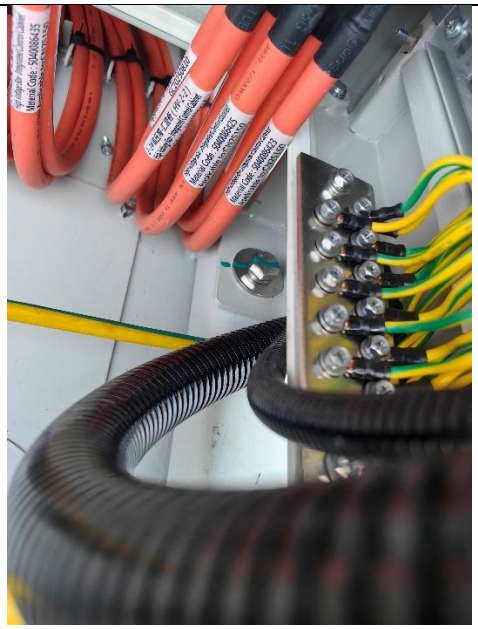
Water fire protection

Photo documentation

Emergency stop

Rating label

Photo documentation



Earthing connection

Earthing connection

Photo documentation

Earthing connection

Earthing connection

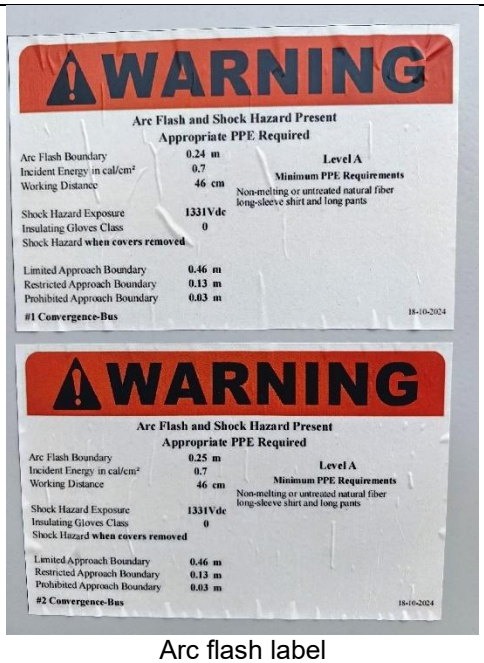
Photo documentation

Earthing connection

Container earthing terminal

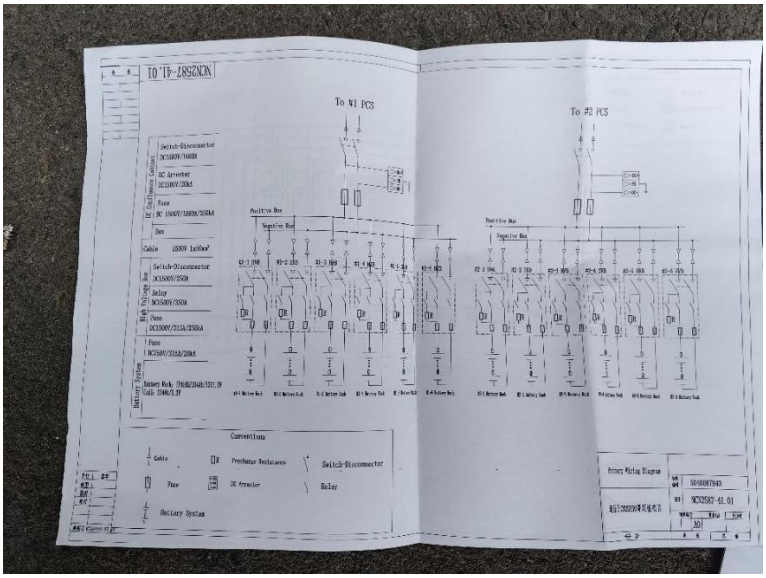
Photo documentation

Container earthing terminal



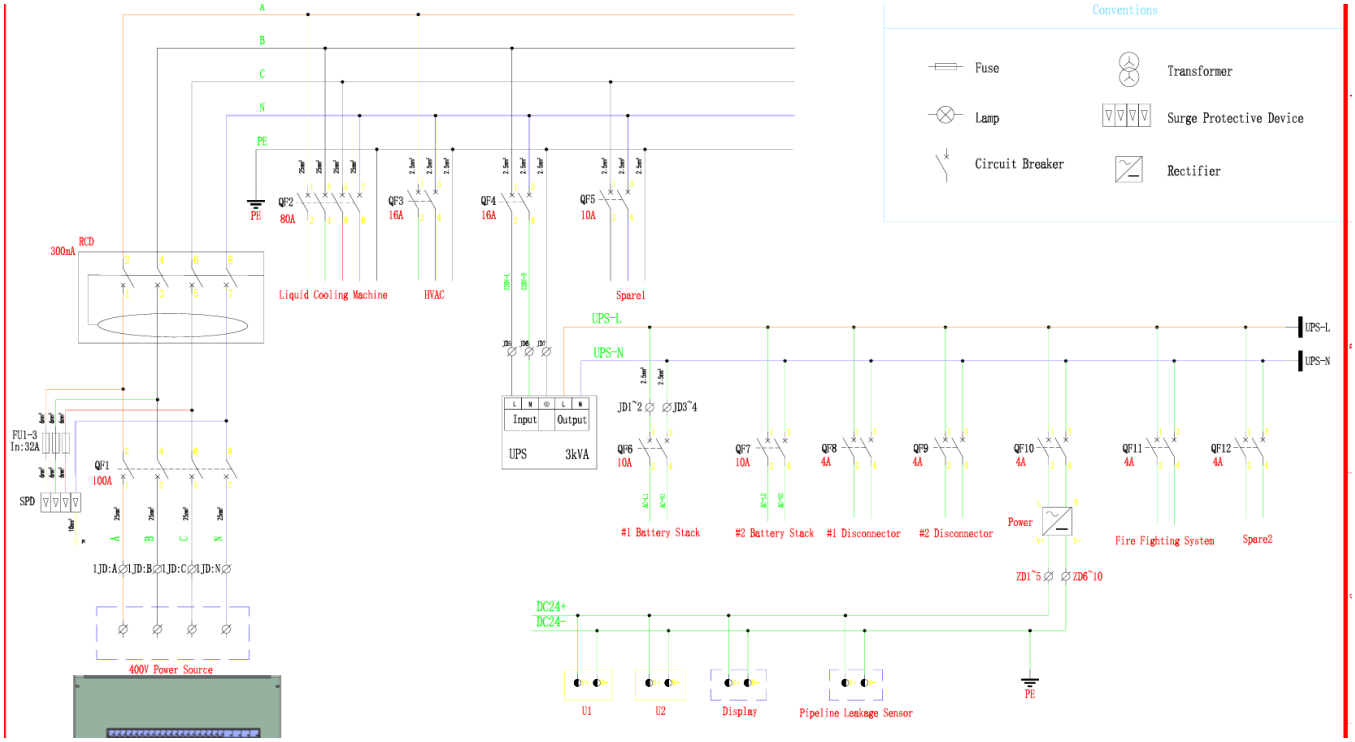
Arc flash label

Photo documentation



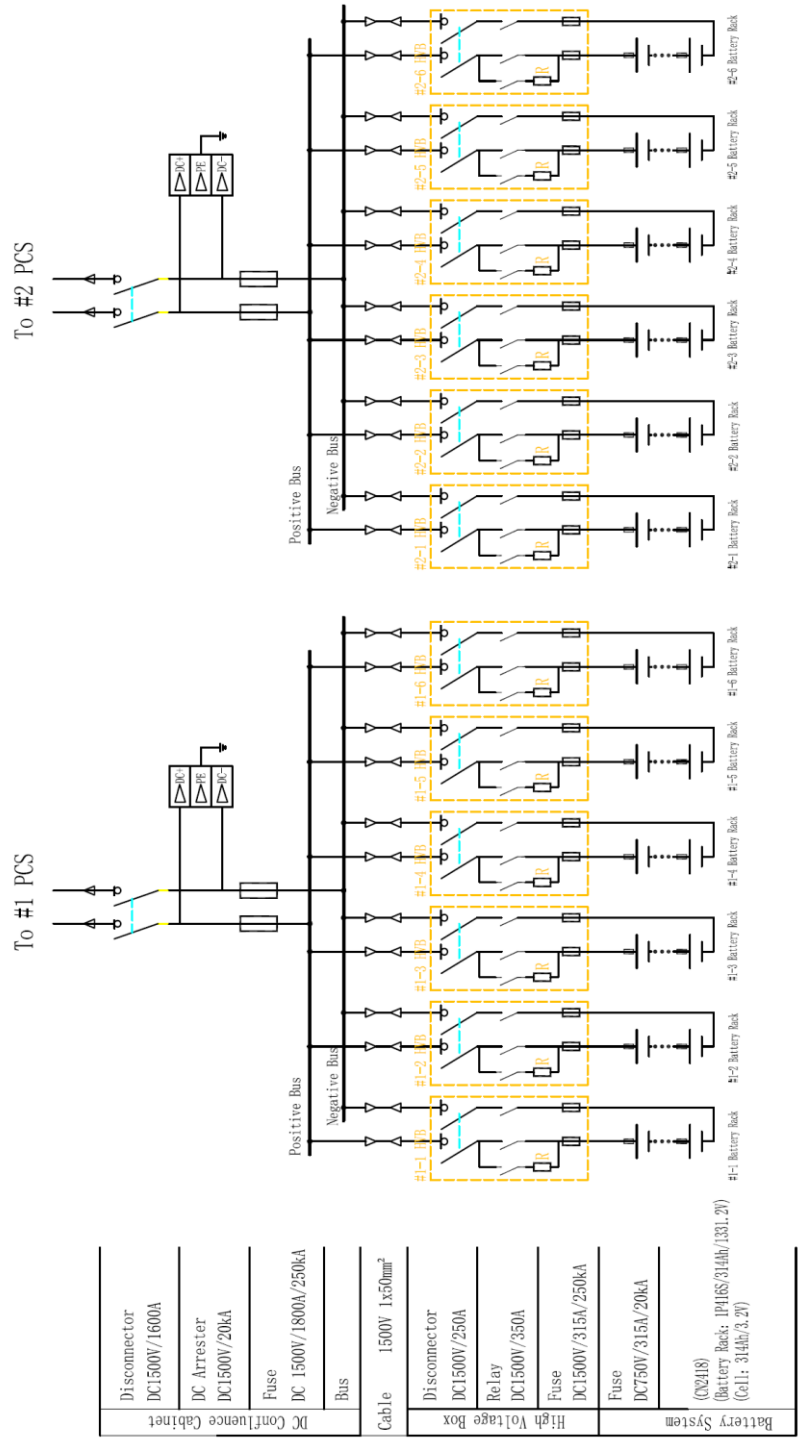
Single line diagram provided with container

Electrical diagram



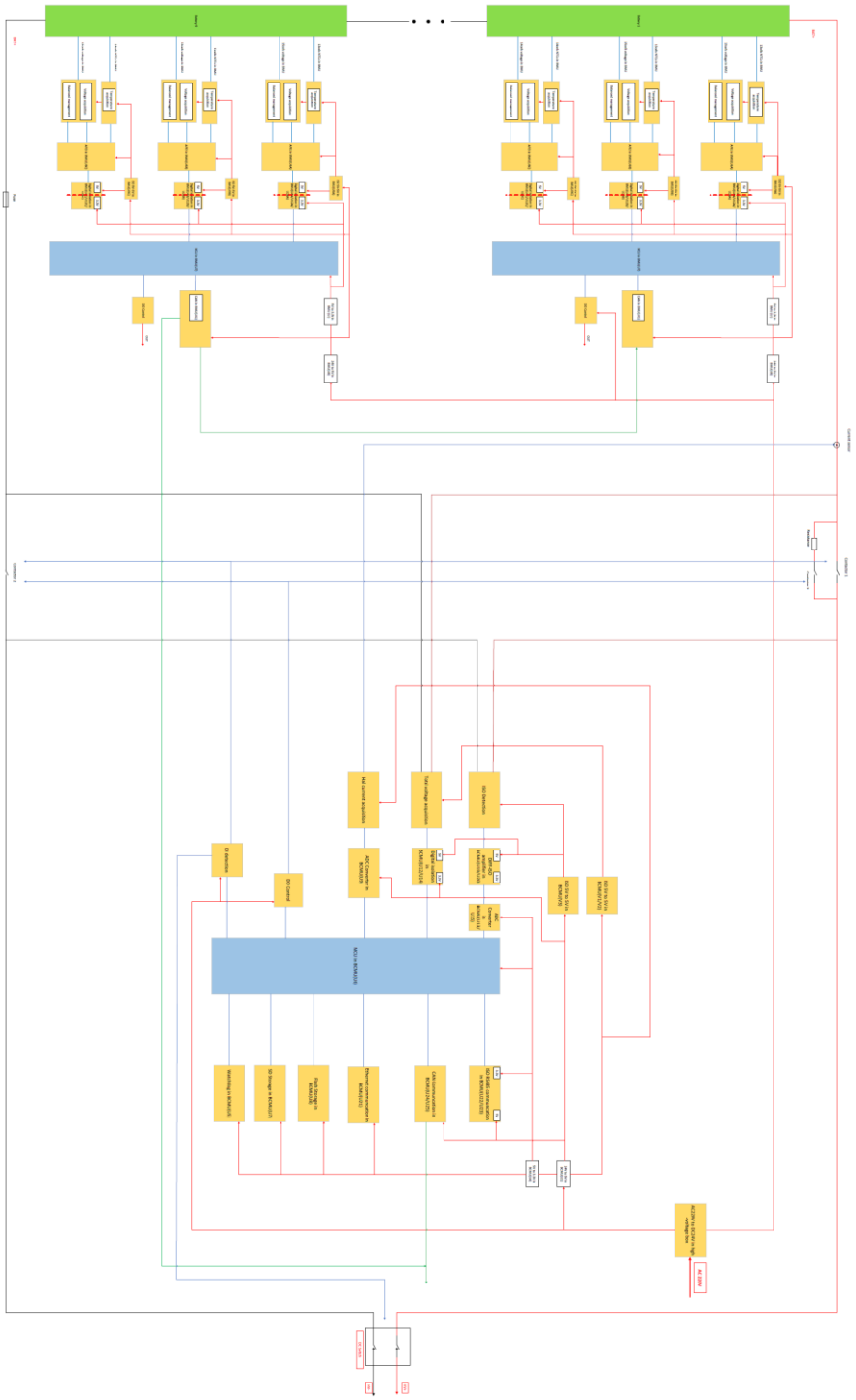
Updated : AUX power cabinet diagram

Electrical diagram



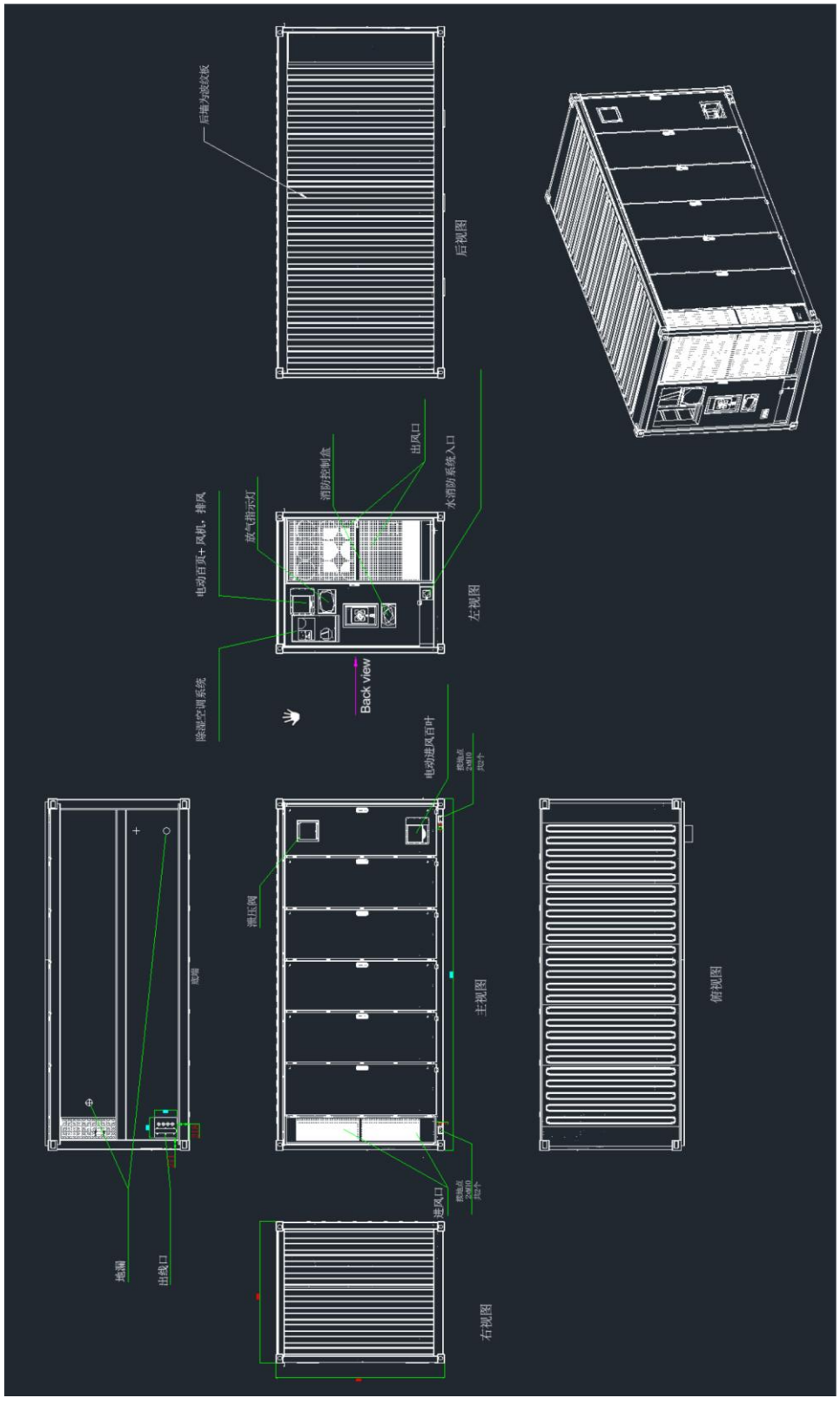
DC main circuit diagram (12 rack fully equipped)

Electrical diagram



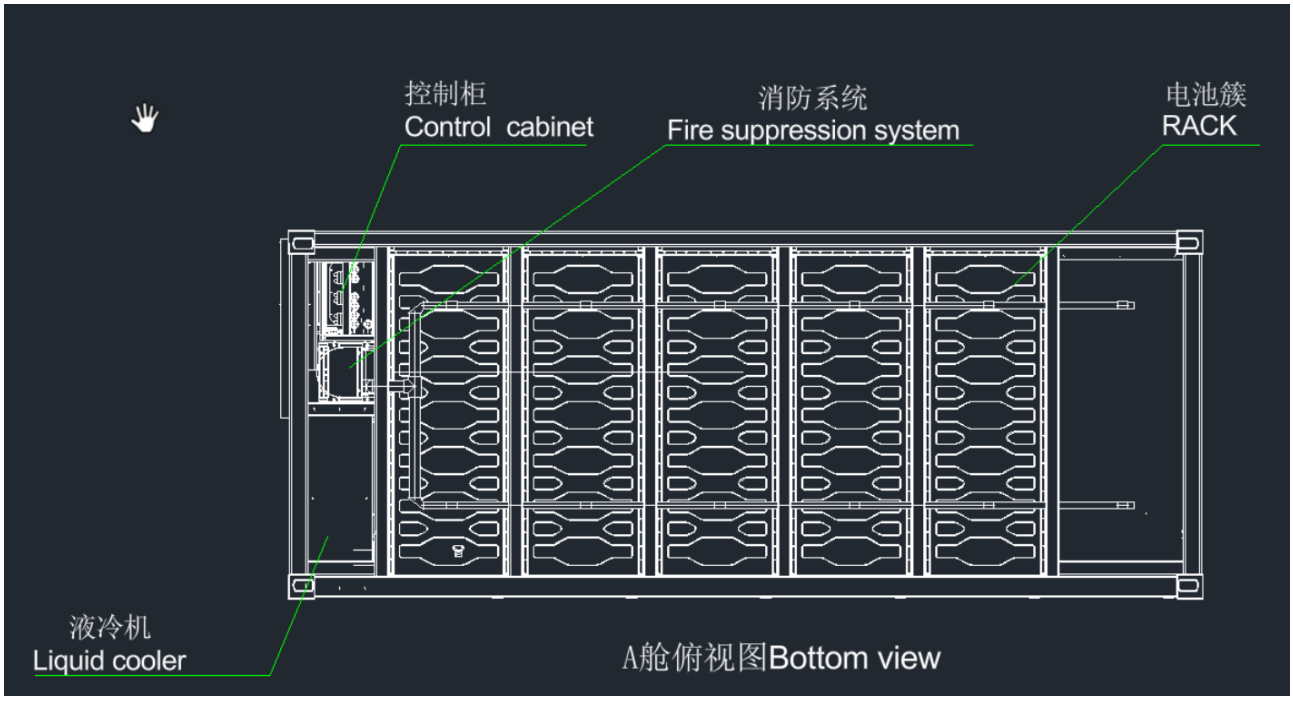
Block diagram of EMS

Electrical diagram



Product overview and construction and design diagram

Electrical diagram



Product interior layout

--End of test report--