Installation Guide and User Manual

- **ESS-GRID-200TS(DC100)**
- **ESS-BATT-215C**

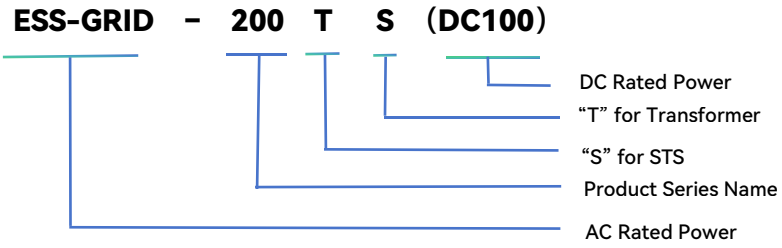
Version V1.0

1. Products

Optical storage all-in-one outdoor energy storage electrical cabinet integrates modular STS, modular PCS, modular DC/DC DC converter, energy management monitoring system, and power distribution system; DC cabinet integrates energy storage battery, environment control system, and fire control system. Adopting PCS and DC/DC DC converter modularization, it is easy to maintain and expand capacity, and the optical storage integrated outdoor adopts the electrical cabinet and DC cabinet in a way that can be moved, which can reduce the footprint and maintenance channel, and has the features of safety and reliability, rapid deployment, low cost, high energy efficiency, and intelligent management.

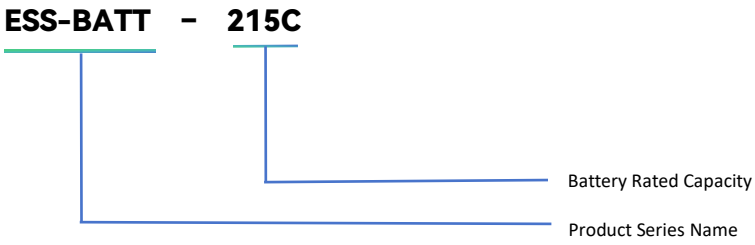
2. Model Description

Example: ESS-GRID-200TS (DC100)



Representative: AC power 200kW with next door transformer, with STS, DC power 100kW.

Example: ESS-BATT-215C



Representative: single cluster battery capacity of 215kWh.

3. Equipment Parameters

(1) Electrical Cabinet Parameter Table

Model	ESS-GRID-200TS(DC100)
PCS Rated AC Power	200kW
PCS Maximum AC Power	220kW
PCS DC working voltage range	580~1000V (three-phase three-wire) / 670~1000V (three-phase four-wire)
PCS DC side full load voltage range	625~950V (three-phase three-wire) / 670~950V (three-phase four-wire)
PCS rated AC current	288A
PCS maximum AC current	316A
PCS rated AC voltage	400VaC, 3W+N+PE/3W+PE
Rated AC frequency	50/60±5Hz
Total harmonic distortion of current THDI	<3% (rated power)
Power factor	-1 overrun ~ +1 hysteresis
Total Harmonic Distortion Rate of Voltage THDU	<3% (linear load)
PV rated power	100kW
PV DC voltage range (low voltage side)	312~500V
Maximum PV current	160*2A
Protection class	IP54
Protection grade	I
Isolation mode	Transformer isolation: 200kVA
Self-consumption	<100W (without transformer)
Display	Touch LCD touchscreen
Relative humidity	0~95% (non-condensing)
Noise level	Less than 78dB
Ambient Temperature	-25℃~60℃
Cooling method	(Derating above 45℃)
Altitude	Intelligent air cooling
BMS Communication	2000m (over 2000m derating)
EMS Communication	CAN
Dimension (W*D*H)	Ethernet / 485
Weight (with battery approx.)	1450*1000*2300mm

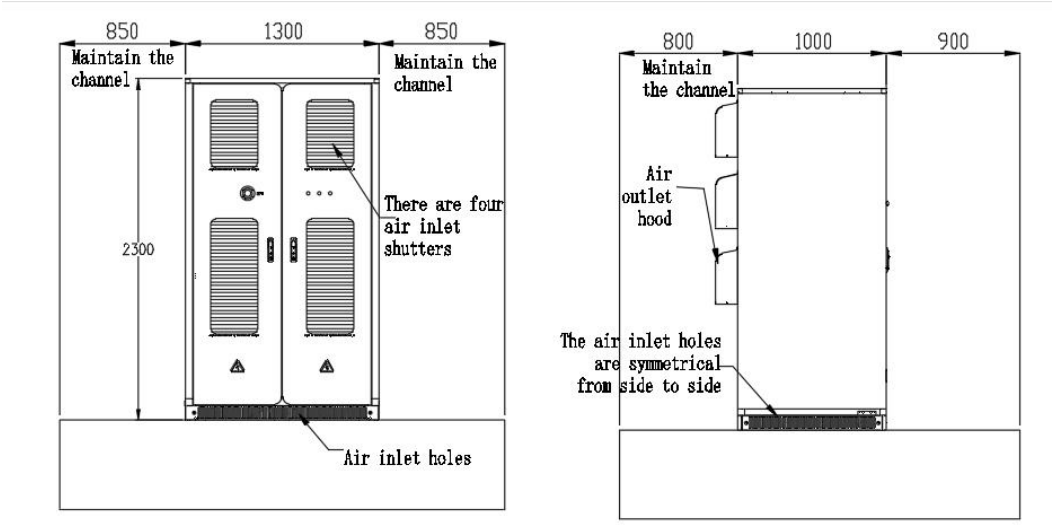
(2) DC Cabinet Parameter Table

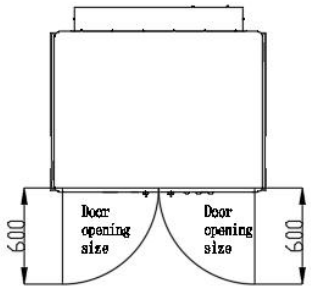
Model	ESS-BATT-215C	
Cells	Battery Type	Lithium Iron Phosphate (LFP)
	Nominal Voltagea	3.2V

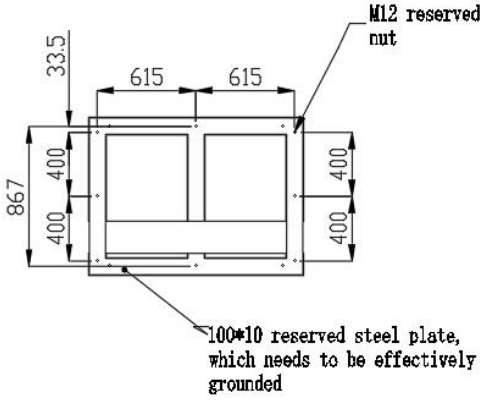
	Voltage Range	2.8V~3.55V
	Nominal Capacity	280Ah
	Maximum Operating Temperature Range, Charging	0~55℃
	Maximum Operating Temperature Range, Discharge	-20~55℃
Module	Series-parallel connection	1P16S
	Nominal energy	14.336kWh
	Nominal Voltage	51.2V
	Voltage range	44.8~56.8V
	Weight (Approx.)	87 kg
	Overall Dimension(W*D*H)	480*750*226±2mm
Battery pack	Rated Energy Storage	215kWh
	Rated System Voltage	768V
	System Voltage Range	672~852V
	Series-parallel connection	1P*16S*15S
	Number of electrical boxes included	15
	Weight (approx.)	1500kg
	Dimension (W*D*H)	1150*1100*2300mm
	BMS communication mode	CAN

4. Exterior Dimensions

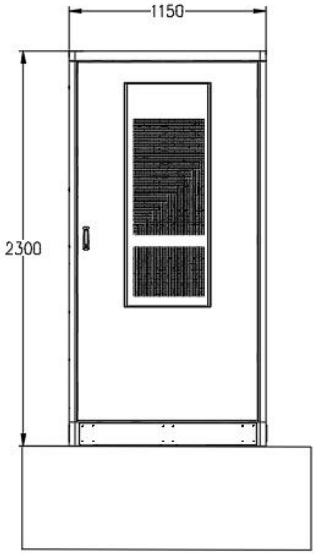
(1) Electrical Cabinet External Dimensions

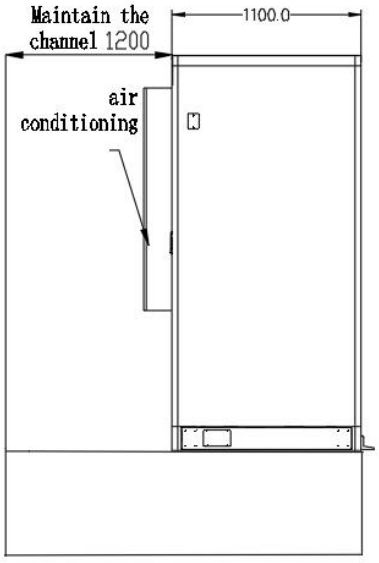


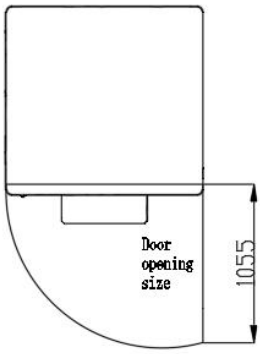


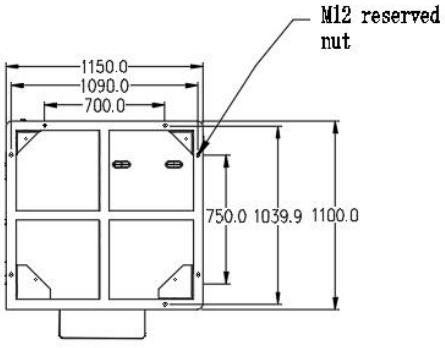


(2) DC Cabinet Exterior Dimensions

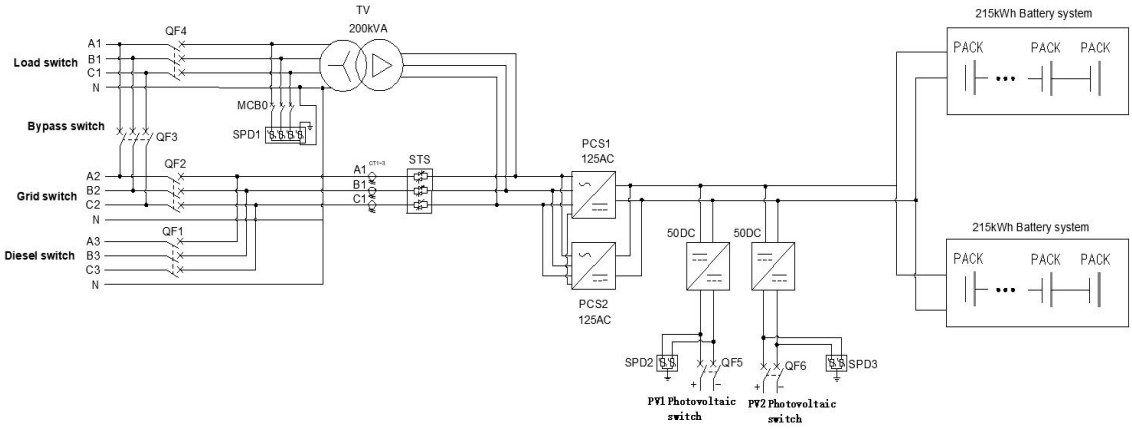








5. System Primary Schematic



6. Description of How The System Works

Optical storage integrated outdoor energy storage cabinet operation mode can be divided into three kinds: grid-connected manual mode, grid-connected automatic mode, and off-grid automatic switching.

1. Grid-tied Manual Mode:

The energy storage system operates in grid-connected mode, but system startup or shutdown must be manually operated by the user on the LCD touch screen. The charging and discharging active power, reactive power and power factor of the energy storage system can be set in the "Parameter Settings".

2. Grid-connected Automatic Mode:

① For peak shaving and valley filling application scenarios, the energy storage system automatically connects to the grid according to the pre-set time-sharing charging and discharging power.

② For backup mode application scenarios, when the battery SOC is lower than the backup SOC, the PV prioritizes charging the battery, and the load power is provided by the grid or the oil engine; when the battery SOC charging is ≥5% of the backup SOC, the PV power follows the load power (when the anti-reverse current is enabled); when the battery charging reaches the upper limit of 100%, the PV shuts down, and the battery SOC discharges to 96% PV turns on; when the PV power is greater than the load power, the excess is charged to the battery, and when the PV power is less than the load power, the PV turns on. When the PV power is greater than the load

power, the excess part is charged to the battery, and when the PV power is less than the load power, the PV+battery combine to supply power to the load.

3. Automatic Switching Between Parallel and Off-grid:

(1) Grid-connected to off-grid: when the system is running in grid-connected state with sudden power failure of the grid, STS detects the power failure of the grid, transmits the information of grid failure to PCS and performs the switching, and at the same time, PCS receives the signal of STS and switches from the grid-connected mode to the off-grid mode, and the system outputs a stable three-phase AC voltage of 400V/50Hz;

(2) Off-grid to grid-connected: the system operates in the off-grid state when the grid call, STS detects the grid call, the grid call information will be transmitted to the PCS, STS tracking grid phase, amplitude and off-grid operation of the PCS synchronization, the PCS notifies the STS to issue a closing command, at the same time, the PCS from the off-grid network mode automatically switches to the grid-connected mode of operation, the system performs the grid-connected strategy.

(3) The whole process of switching from off-grid to grid-connected: CH1 is the load current, CH2 is the grid-connected current, CH3 is the off-grid voltage, and CH4 is the grid-connected voltage.

Schematic diagram of grid-connected switching to off-grid deployment:

Schematic diagram of off-grid switching to grid-connected tentative opening: