



Technical manual

NKON ESS Eco - 51.2V 16.1kWh

OUR PRODUCTS ARE ALWAYS EVOLVING, SO THE UNIT DEPICTED BELOW MAY DIFFER SLIGHTLY FROM THE UNIT YOU RECEIVE.



* WHEN CONNECTING MULTIPLE BATTERIES WITH DIFFERENT FIRMWARE VERSIONS IN PARALLEL, ALWAYS CONTACT OUR SUPPORT TEAM BEFORE PROCEEDING.

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Disclaimer



This unit is heavy
This unit tips the scales at 119.5KG, please ensure you have adequate lifting / manoeuvring equipment in place. Before setting it up, make sure children and your (best) friends are not nearby.

- Do not disassemble the product without our express permission, otherwise the warranty will be voided. Wear proper safety gear such as gloves and eye protection
- Do not reverse polarity
- Do not connect with any batteries in series
- Ensure the system is properly grounded
- Always use insulated tools
- Do not work on battery with it turned on or with the grid turned on
- Do not connect battery to solar wiring directly
- Make sure all fasteners are properly torqued
- Ensure your chargers/inverters are appropriately programmed
- Use only on 48v nominal systems, do not connect with other batteries
- Ensure the installation follows applicable local, national and all legal electric stipulations
- Installation should be done by a qualified and knowledgeable person
- Make sure proper cable sizes and overcurrent protection are utilised
- Ensure the system is installed in a location suitable for electronics
- Keep the battery within safe operational temperatures
- Do not put the battery in a hazardous, hot or flammable environment
- Install your equipment in a location where children and pets are not present
- Do not paint, or spray paint the battery
- If there are any electrical smells or excessive heat, use your breaker switch and contact your local fire station
- Only clean the battery with a dry cloth - do not use any liquids, spray cleaners, aerosols or any type of solvents.

Datasheet

Specificatie	Waarde
Battery configuration	1P16S
Rated voltage	51.2V
Operating voltage range	43.2V ~ 57.6V
Rated capacity	314Ah
Rated	16.0768 kWh
Continuous charge/discharge current	157A / 157A @ 25±2°C
Maximum charge/discharge current	200A / 200A @ 25±2°C
Operating ambient temperature	0 ~ 40°C (Charge) -20 ~ 40°C (Discharge)
Storage temperature & humidity	-10°C ~ 35°C (≤1 month) 25±2°C (≤3 months) 65% ±10% RH
Size (L x W x H)	(739) × (410) × (250) mm
Weight	119.5 kg ±3 kg
Cycle life	6000 cycles @ 25°C, 157A charge/discharge current, 80% DOD
IP rating	IP20
Communication method	CAN & RS485
Altitude	0 – 3000 m
Humidity range	5 – 75%

Inverter settings (if applicable)

Function / Stage	Purpose	Settings
Battery Type	Selects manual lithium profile	User-defined (LiFePO ₄)
Nominal Voltage	Base system voltage	51.2 V
Bulk / Absorption Voltage	Full-charge voltage ($\approx 100\%$ SOC)	57.6 V
Float Voltage	Maintains full charge without stress	55.2 V
Absorption Time	Duration at bulk voltage for balancing	20 – 30 min
Re-bulk / Charge Return Voltage	Triggers recharge after drop	52.8 V
Low DC Cut-off Voltage	Protects cells from over-discharge	43.2 V
Low DC Restart Voltage	Allows discharge again after recovery	48.0 V
Equalization	Not used for LiFePO ₄	Disabled
Temperature Compensation	Prevents incorrect voltage shifts	0 mV / °C
Tail Current / Charge End Current	Defines charge completion	2 % of C
Dynamic Cut-off / Protection	Avoids deep discharge under load	Enabled (ESS)
Max Charge Current	Limits BMS and inverter stress	200A
Max Discharge Current	Limits output & BMS protection	200A
Over-Voltage Alarm	Prevents over-charge	58.0 V
Under-Voltage Alarm	Early warning before cut-off	46.4 V

Product Packing List

16kWh Battery

1 PCS



1.5m Power cables (+ & -)
50mm² (M8)

2 PCS



1.8m Computer connection cable
(for diagnostics/warranty)

1 PCS



1.5m Communication cable

1 PCS



Manual

1 PCS



Functional Introduction

Battery Voltage Calculation:

Voltage Sampling: The battery's voltage is measured with a deviation of $\pm 20\text{mV}$ over a 32-sample battery test.

Temperature Sensors:

The system has 2 temperature sensors monitoring the battery temperature.

- 1 sensor for ambient (surrounding) temperature.
- 1 sensor for the temperature of the MOS (Metal-Oxide-Semiconductor) components. Temperature
- Deviation: The deviation in temperature readings is $\pm 2^\circ\text{C}$.

Battery Capacity and Cycle Count:

Capacity Calibration: To determine the actual battery capacity, a full charge/discharge cycle is completed.

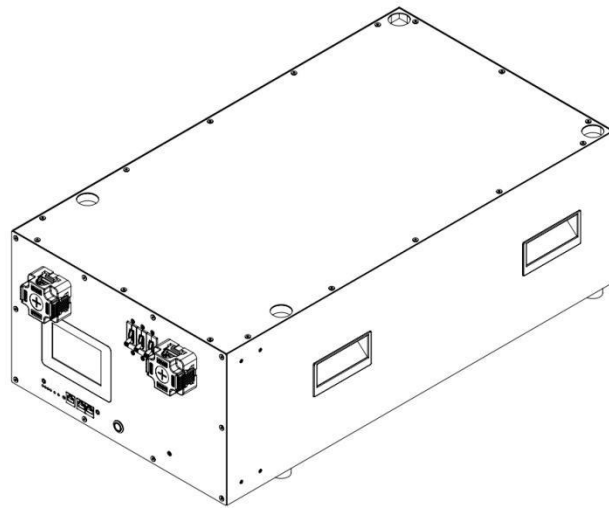
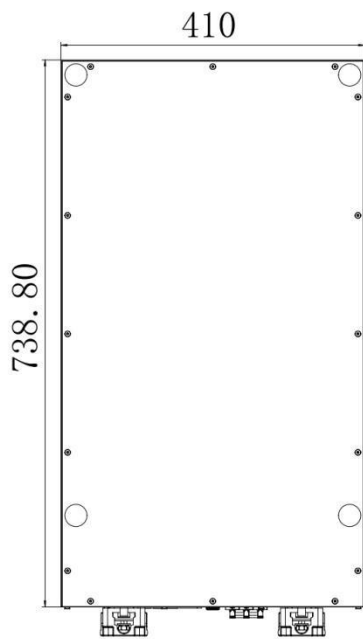
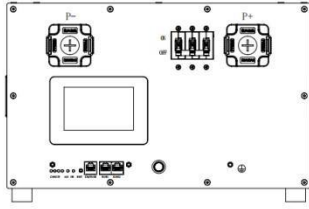
Remaining Capacity Estimation: The system estimates the remaining capacity with a deviation of $\pm 5\%$.

Battery Balancing

Charge the battery to full and keep it there for 24 hours at least once per month to maintain proper cell balance.

A full-charge voltage should be at least 56.1V, with 57.6V recommended to ensure the balancer can activate and function properly.

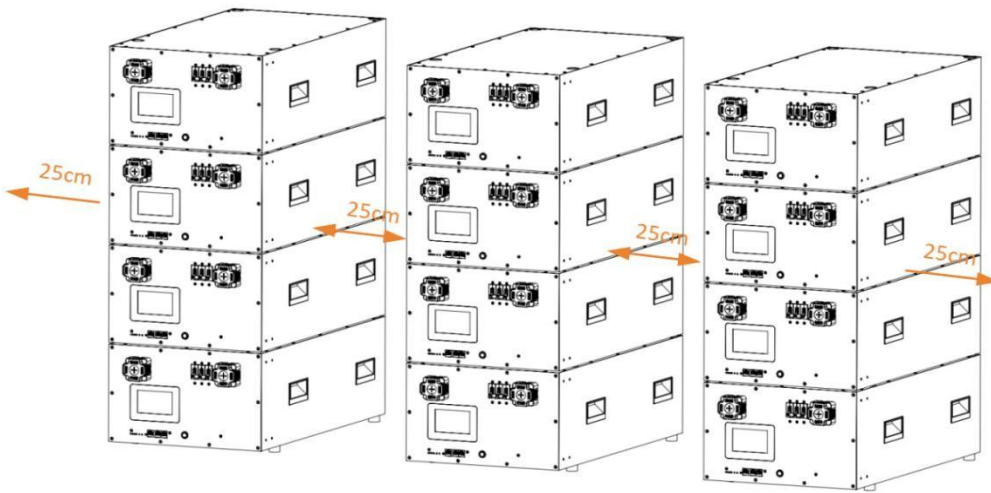
Dimensions



Choose a suitable installation location

- Do not place the battery on flammable building materials
- The temperature should be between 10°C and 30°C to maintain optimal operation.
- It is recommended to place the battery on a level surface.
- There should be some free space around the battery to dissipate heat (as shown below)

Suitable for placement on concrete or other non-flammable surfaces



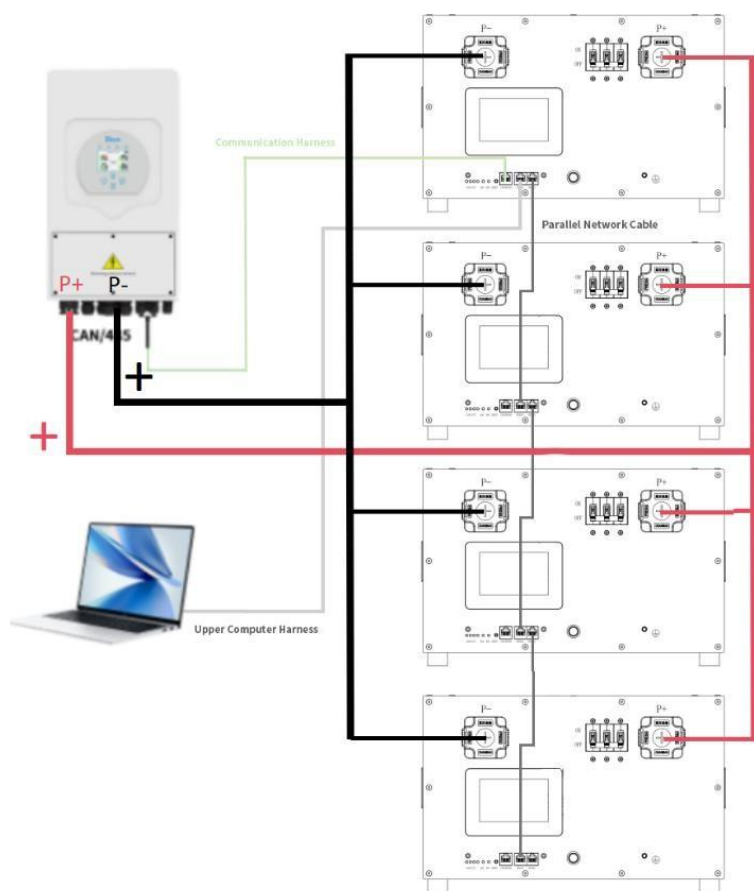
Batteries should be powered off before

Wiring connection

The battery should be powered off before connecting.

BMS has the function of automatically assigning addresses (the reserved DIP switch on the BMS is just for decoration, in order to be compatible with the original battery chassis port design, the DIP address is optional and does not affect the automatic address assignment of BMS);

When paralleling, just use a regular network cable. Any first RS485B is connected to the second RS485A (the first one is the host, the host CAN/485 is connected to the inverter communication), the second RS485B is connected to the third RS485A, and the next ones are all slaves. The following figure shows an example:



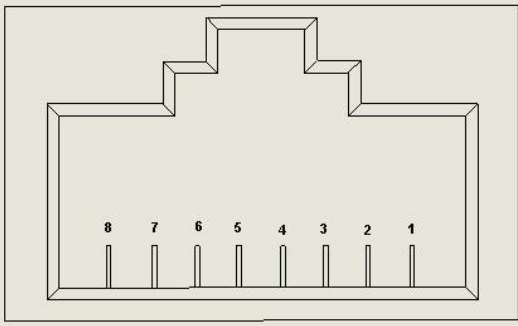
Only same model of battery is compatible. You can't mix it with other models / brands

Communication Instructions

Communication

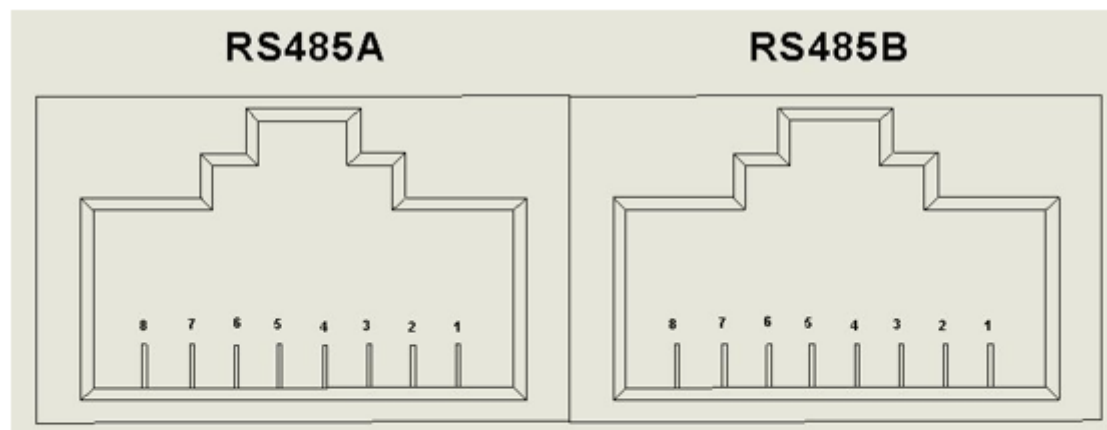
Matching inverter communication

The BMS communication interface is defined according to each inverter communication interface. The definition of the special inverter communication port is inconsistent with the BMS communication port definition, so you need to make your own network cable. If you use a regular network cable, the BMS may automatically start or fail to shut down. Generally, you can use a regular network cable for communication.。

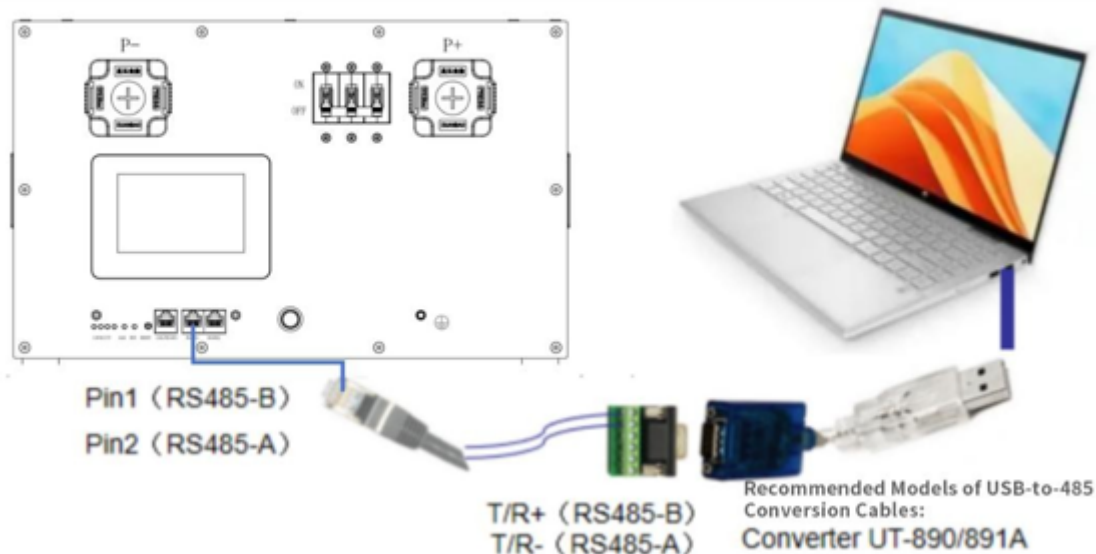
CAN/RS485	
	Pin
	Definition description
	1、8
	2、7
	4
	5
	3、6

Internal Communications

Select the corresponding port for BMS internal communication and 19200 baud rate



RS485A		RS485B	
Pin	Definition description	Pin	Definition description
1、8	RS485-B	1、8	RS485-B
2、7	RS485-A	2、7	RS485-A
3	Master flag enable	3	GND
4	Autocode address 2	4	Autocode address 1
5	GND	5	GND
6	GND	6	Salve flag enable



Basic working mode

Charging Mode

When the BMS detects that the charger is connected and the external charging voltage is greater than the internal battery voltage by more than 0.5V, it turns on the charging MOSFET for charging. When the charging current reaches the effective charging current, it enters the charging mode. In the charging mode, both the charging and discharging MOSFETs are closed.

Discharge mode

The BMS enters the discharge mode when it detects that the load is connected and the discharge current reaches the effective discharge current.

Standby mode

When neither of the above two modes is satisfied, it enters the standby mode.

Shutdown Mode

After 48 hours of normal standby, battery triggers undervoltage protection, key shutdown or external switch shutdown, the BMS enters shutdown mode.

Wake-up conditions for shutdown mode: 1. Charging activation; 2. 48V voltage activation; 3. Key startup.

LED light indication

LED light sequence

1 running light, 1 warning light, 4 capacity indicator lights

●	●	●	●	●	●
SOC				ALARM	RUN

Capacity indicator

Status		Charge				Discharge			
Capacity indicator		L4●	L3●	L2●	L1●	L4●	L3●	L2●	L1●
	0~25%	OFF	OFF	OFF	Blink	OFF	OFF	OFF	Green
	25~50%	OFF	OFF	Blink	Green	OFF	OFF	Green	Green
	50~75%	OFF	Blink	Green	Green	OFF	Green	Green	Green
	≥75%	Blink	Green	Green	Green	Green	Green	Green	Green
Running indicator light●		Green				Flash			

Flashing Description

Flashing mode	Bright	off
Flash 1	0.25s	3.75s
Flash 2	0.5s	0.5s
Flash 3	0.5s	1.5s

Status Indicator

System status	Running status	RUN	ALM	SOC				Illustrate
		●	●	●	●	●	●	
Power off	Sleep	Off	Off	Off	Off	Off	Off	All off
Standby	Normal	Flashing	Off	Off	Off	Off	Off	Standby mode
Charging	Normal	Solid on	Off	According to the power indicator				Maximum LED flash 2
	Overcurrent alarm	Solid on	Flash 2	According to the power indicator				Maximum LED flash 2
	Overvoltage protection	Flash 1	Off	Off	Off	Off	Off	
	Temperature, overcurrent protection	Flash 1	Off	Off	Off	Off	Off	
Discharging	Normal	Flash 3	Off	According to the power indicator				According to the constant light indicator
	Alarm	Flash 3	Flash 3					
	Temperature, overcurrent, short circuit, etc. protection	Off	Still on	Off	Off	Off	Off	Stop discharging, when the mains is offline, it will be forced to sleep after 48 hours without any action
	Undervoltage protection	Off	Off	Off	Off	Off	Off	Stop discharge

Battery protection parameters

Group	Parameter	Value
Pack Voltage	Pack High Voltage Alarm	57.6V
	Pack High Voltage Recovery	56.0V
	Pack High Voltage Trip	58.0V
	Pack High Voltage Trip Recovery	56.0V
	Pack Low Voltage Alarm	46.4V
	Pack Low Voltage Alarm Recovery	48.0V
	Pack Low Voltage Trip	43.2V
	Pack Low Voltage Trip Recovery	48.0V
Battery Voltage	Cell High Voltage Alarm	3.60V
	Cell High Voltage Alarm Recovery	3.45V
	Cell Over Voltage Trip	3.65V
	Cell Over Voltage Trip Recovery	3.45V
	Cell Low Voltage Alarm	2.9V
	Cell Low Voltage Alarm Recovery	3.0V
	Cell Under Voltage Trip	2.7V
	Cell Under Voltage Recovery	3.0V
Charging and Discharging	Charging Over Current Alarm	205A
	Charging Over Current Recovery	203A
	Charging Over Current Trip	210A
	Charging Over Current Time Delay	10s
	Secondary Charging Over Current Trip	300A
	Secondary Charging Over Current Delay	0.1s
	Discharging Over Current Alarm	-205A
	Discharging Over Current Recovery	-203A
	Discharging Over Current Trip	-210A
	Discharging Over Current Time Delay	10s
	Secondary Discharging Over Current Trip	-300
	Secondary Discharging Over Current Delay	0.1s
	Over Current Recovery Delay	60s
	Locks Number of Over Current	5
	Normal Circuit Pre-Charging Completion Rate	80A
	Abnormal Circuit Pre-Charge Completion Rate	20A
	Pre-Charge Timeout	5s

Group	Parameter	Value
Charging and Discharging	Charging High Temperature Alarm	50°C
	Charging High Temperature Alarm Recovery	47°C
	Charging Over Temperature Trip	55°C
	Charging Over Temperature Trip Recovery	50°C
	Charging Low Temperature Alarm	2°C
	Charging Low Temperature Alarm Recovery	5°C
	Charging Low Temperature Trip	0°C
	Charging Low Temperature Trip Recovery	2°C
	Discharging High Temperature Alarm	55°C
	Discharging High Temperature Alarm Recovery	50°C
	Discharging Over Temperature Trip	60°C
	Discharging Over Temperature Trip Recovery	55°C
	Discharging Low temperature Alarm	-5°C
	Discharging Low Temperature Alarm Recovery	3°C
	Discharging Low Temperature Trip	-10°C
	Discharging Low Temperature Recovery	-7°C
Environment	Environment High Temperature alarm	50°C
	Environment High Temperature Alarm Recovery	47°C
	Environment High Temperature Trip	60°C
	Environment High Temperature Trip Recovery	55°C
	Environment Low Temperature Alarm	0°C
	Environment Low Temperature Alarm Recovery	3°C
	Environment Under Temperature Trip	-13°C
	Environment Under Temperature Trip Recovery	-10°C
	PCB High Temperature Alarm	95°C
	PCB High Temperature Recovery	85°C
	PCB Over Temperature Trip	110°C
	PCB Over Temperature Trip Recovery	85°C
	Battery Requested Charge Voltage	57.6V
	Battery Requested Charging Current	157A
	Battery Requested Discharge Current	-157A
Balancer	Balancing Starts	3.45V
	Balancing Current	2A

Package

Packaged in a dry, dust and moisture proof packaging box. Package the product with plastic film/EPE and package it in a wooden box.

Specifications: 825mm*480mm*425mm Package quantity 1 unit Weight: 128kg



Getting in touch

Should you encounter a problem with your NKON ESS Pro unit it is important you contact our Customer Services team first and foremost. This gives us an opportunity to help you resolve the issue before any problems arise. By coming directly to us, before posting on forums or groups, we can help you resolve any issues or concerns quickly and efficiently.

Please send any images or screenshots, along with a description of your issue to cs@nkon.nl. If your issue is urgent and you need to talk with a member of the tech team immediately, please call +31403690600.