



USER MANUAL

NKON ESS Pro - 51.2V 32kWh

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 233KG, 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 51.2v 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

Battery configuration	2P16S
Rated voltage	51.2V
Operating voltage range	43.2V ~ 57.6V
Rated capacity	628Ah
Energy	32.15 kWh
Standard charge/discharge current	300A @ 25±2°C
Operating temperature	0 ~ 40°C (Charge) -20 ~ 40°C (Discharge)
Storage temperature & humidity	-10°C ~ 35°C (≤1 month) 25±2°C (≤3 months) 65% ±20% RH
Dimensions (L × W × H)	(538) × (416) × (818) mm
Weight	230 kg ±3 kg
Cycle life	8000 cycles at 70% SOH (25°C ± 1P 2.5V ~ 3.65V)
IP rating	IP20
Communication	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	300A
Max Discharge Current	Limits output & BMS protection	300A
Over-Voltage Alarm	Prevents over-charge	58.0 V
Under-Voltage Alarm	Early warning before cut-off	46.4 V

Product Packing List

Name	Quantity	Image
32kWh Battery	1 PCS	
1.5m Power cable 95mm ² (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.

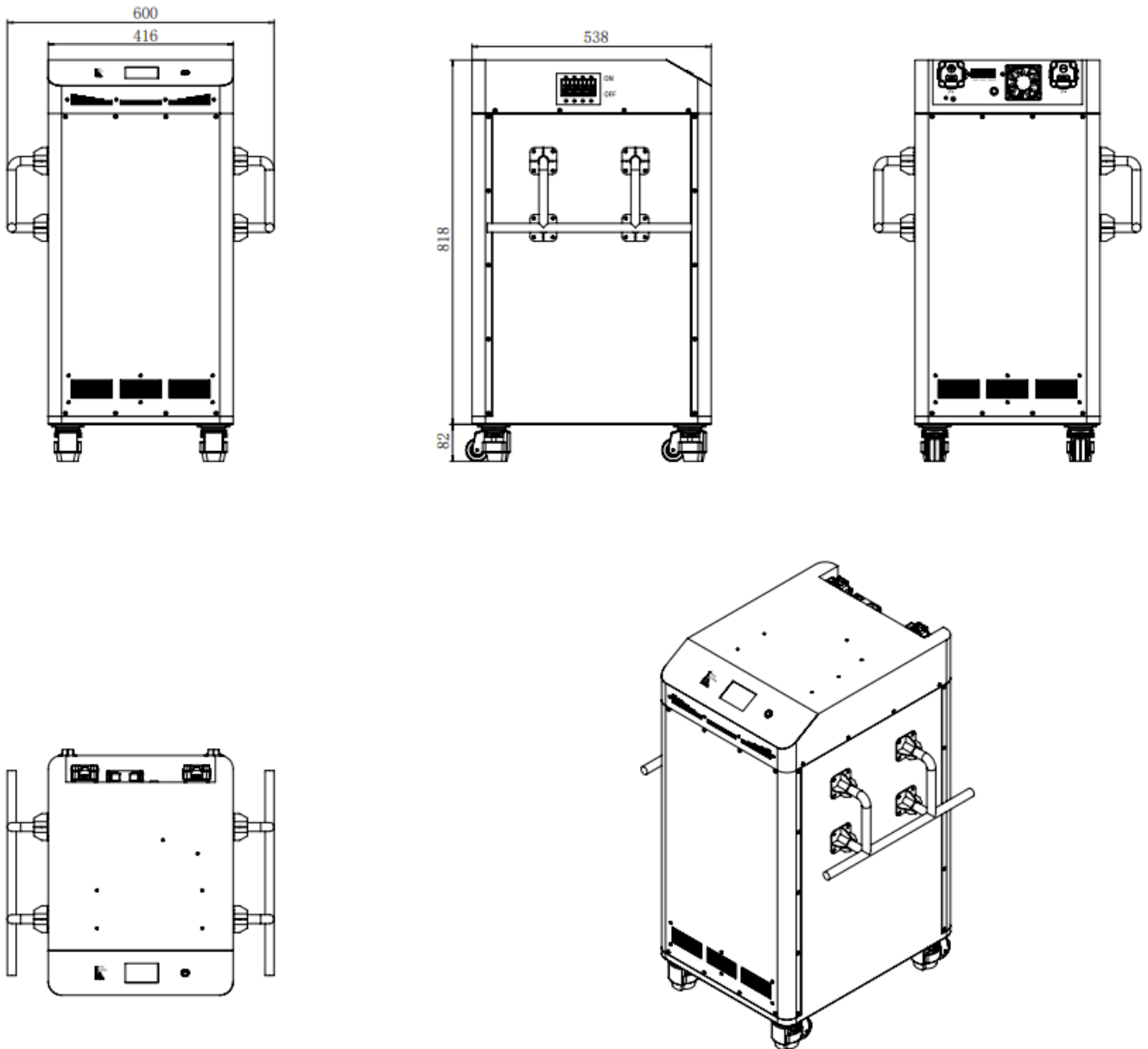
Remaining Capacity Estimation: The system estimates the remaining capacity with a deviation of $\pm 5\%$.

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



Installation Instructions

Choose a suitable installation location

- Do not place batteries 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 in the figure below)

Suitable for placement on concrete or other non-flammable surfaces

- In special environments, the heat dissipation space (battery spacing) can be appropriately adjusted.

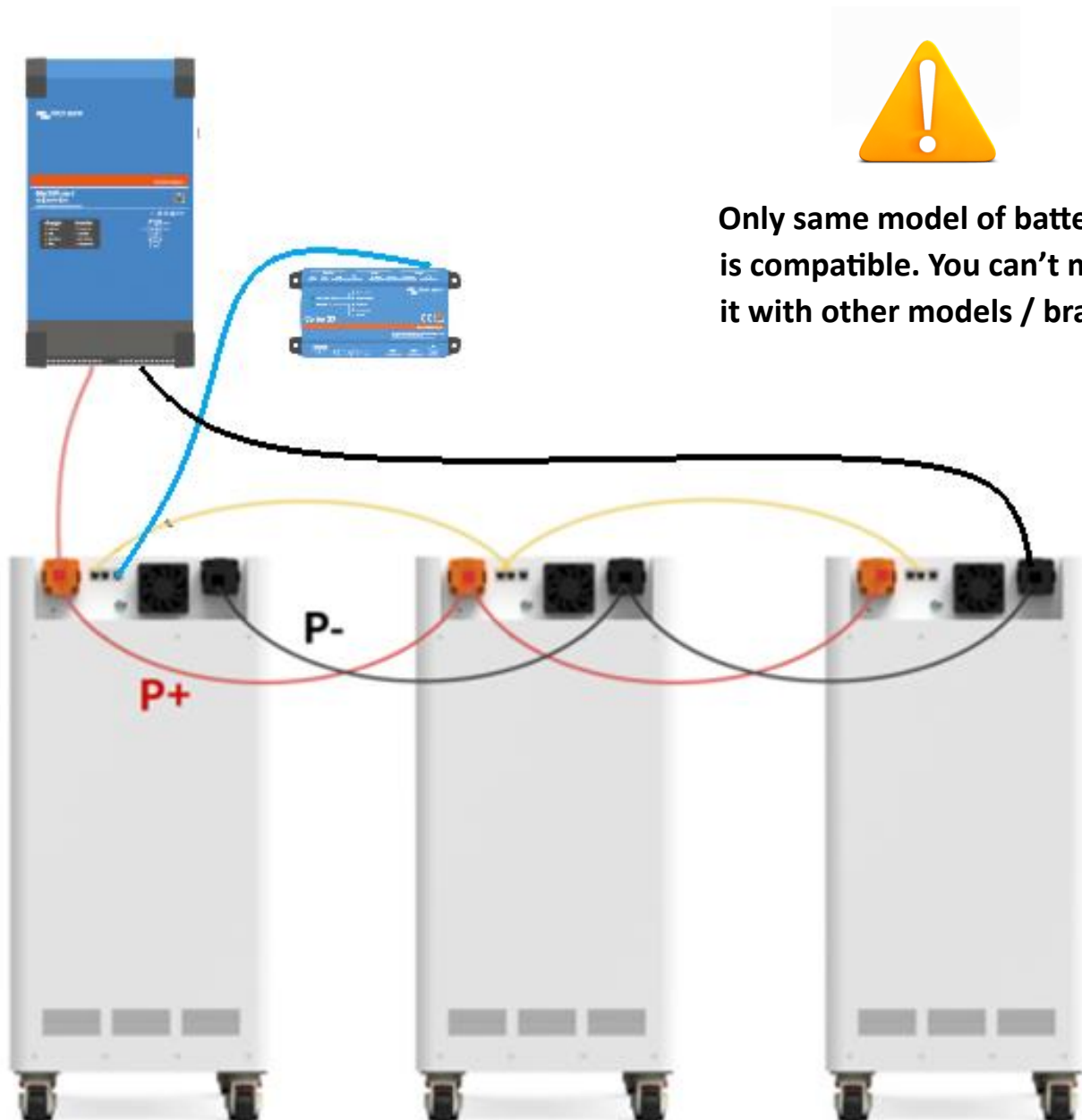


Parallel communication

No dial required

The battery should be powered off before connecting.

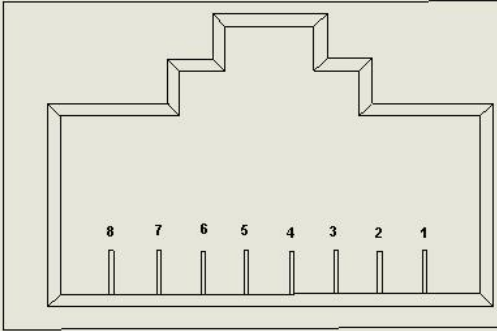
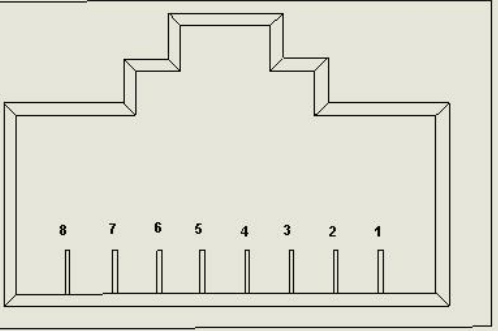
BMS has the function of automatically allocating addresses. When connecting them parallel, just use a regular network cable. The first RS485B is connected to the second RS485A (the first is the host, and the host CAN/485 is connected to the inverter communication), the second RS485B is connected to the third RS485A, and the following are all slaves. The following figure shows an example:



Communication Description

Communication

Matching inverter communication

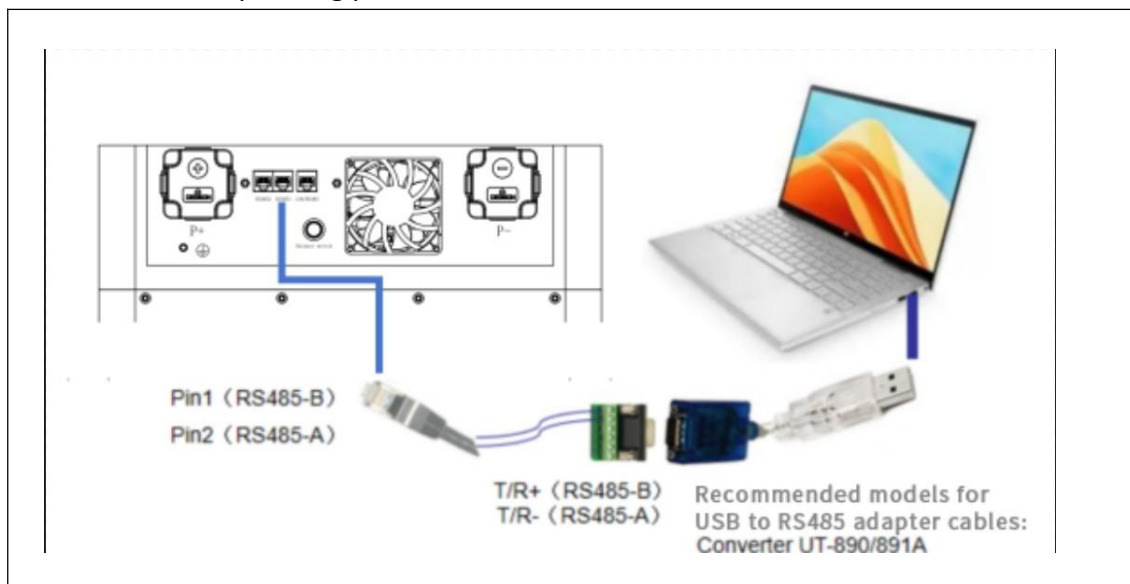
RS485A		RS485B	
			
RS485A		RS485B	
Pin	Definition description	Pin	Definition description
1、8	RS485-B	1、8	RS485-B
2、7	RS485-A	2、7	RS485-A
3	Master flag enable	3	GND
4	Autocode address 2	4	Autocode address 1
5	GND	5	GND
6	GND	6	Salve flag enable

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	RS485-B
2, 7	RS485-A
4	CAN-H
5	CAN-L
3, 6	GND

Internal Communications

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



Basic working modes

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

The BMS enters shutdown mode after 48 hours of normal standby, battery undervoltage protection, key shutdown or external switch shutdown.

Wake-up conditions from shutdown mode:

1. Charging activation;
2. 48V voltage activation;
3. Press button to turn on.

LED light indication

LED light sequence

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

Capacity indication

state		Charge				Discharge			
Capacity indicator light		L4 ●	L3 ●	L2 ●	L1 ●	L4 ●	L3 ●	L2 ●	L1 ●
	0~25%	OFF	OFF	OFF	Flash	OFF	OFF	OFF	Always on
	25~50%	OFF	OFF	Flash	Always on	OFF	OFF	Always on	Always on
	50~75%	OFF	Flash	Always on	Always on	OFF	Always on	Always on	Always on
	≥75%	Flash	Always on	Always on	Always on	Always on	Always on	Always on	Always on
Running indicator light		always on				Flash			

Flashing instructions

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

Status Indication

System Status	Running status	RUN	ALM	SOC				illustrate
								
Shutdown	Hibernation	OFF	OFF	OFF	OFF	OFF	OFF	Total destruction
Standby	normal	Flash	OFF	OFF	OFF	OFF	OFF	Standby mode
Charge	normal	Always on	OFF	According to the power indicator				Maximum LED flash 2
	Overcurrent alarm	Always on	Flash 2	According to the power indicator				Maximum LED flash 2
	Overvoltage protection	Flash 1	OFF	OFF	OFF	OFF	OFF	
	Temperature and overcurrent protection	Flash 1	OFF	OFF	OFF	OFF	OFF	
Discharge	normal	Flash 3	OFF	According to the power indicator				According to the constant light indicator
	Alerts	Flash 3	Flash 3					
	Temperature, over current, short circuit, etc. protection	OFF	Always 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	305A
	Charging Over Current Recovery	303A
	Charging Over Current Trip	310A
	Charging Over Current Time Delay	10s
	Secondary Charging Over Current Trip	400A
	Secondary Charging Over Current Delay	0.1s
	Discharging Over Current Alarm	-305A
	Discharging Over Current Recovery	-303A
	Discharging Over Current Trip	-310A
	Discharging Over Current Time Delay	10s
	Secondary Discharging Over Current Trip	-400
	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
	Cell Heating On	2°C
	Cell Heating Off	10°C
	Battery Requested Charge Voltage	57.6V
	Battery Requested Charging Current	280A
	Battery Requested Discharge Current	-280A
Balancer	Balancing Starts	3.45V
	Balancing Current	2A

Packaging

Packed in a dry, dust and moisture proof packaging box. Pack the product in plastic film/EPE and pack in wooden box.

Specifications: L 92cm*W 66cm*H 106cm Packing quantity 1 unit Weight: 280kg



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.