



51.2V MODULAR BATTERY STACK

TECHNICAL MANUAL

VERSION 2



THIS UNIT IS HEAVY

Please ensure you have adequate lifting equipment in place.



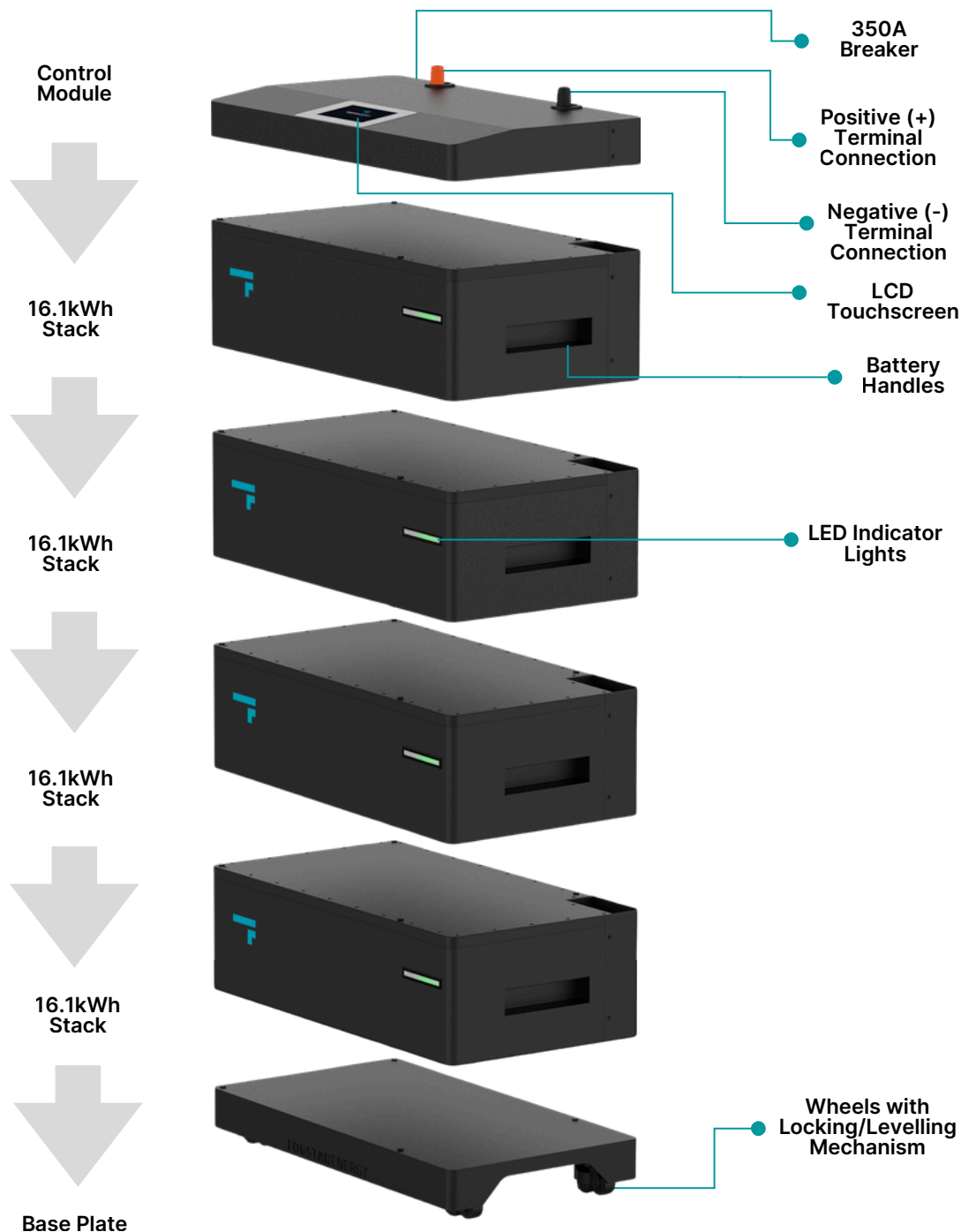
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YOUR BATTERY

This modular battery system is designed for scalable energy storage across a wide range of applications. Each Modular Battery Stack can achieve 64.4kWh of capacity, with an integrated control unit managing the system as a single, unified solution. Multiple stacks can be combined to scale total storage up to 1.28MWh. IP-rated and heated, the system is built for reliable performance in demanding environments.



64.4kWh



SAFETY



This unit is heavy

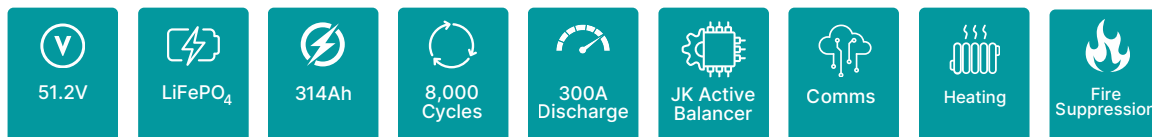
Each 16.1kg battery weighs 123Kg, please ensure you have adequate lifting / manoeuvring equipment in place. Before setting it up, make sure children and furry friends are not nearby.

- Wear proper safety gear such as gloves and eye protection
- These batteries are HEAVY (123kg per battery) - always get help to lift them
- 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 (such as 15S)
- 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.

SAFETY

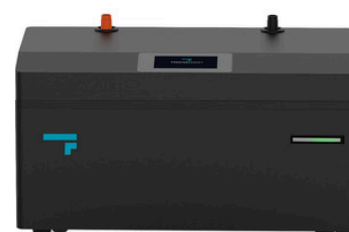


SPECIFICATIONS



This modular battery system is designed for scalable energy storage across a wide range of applications. Each stack delivers 16.1kWh, 32.2kWh, 48.3kWh or 64.4kWh of capacity, with an integrated control unit managing the system as a single, unified solution. Multiple stacks can be combined to scale total storage up to 1.28MWh. IP-rated and heated, the system is built for reliable performance in demanding environments.

Specifications	16.1kWh	32.2kWh	48.3kWh	64.4kWh
Rated Voltage (V)	51.V			
Charger Voltage (V)	57.6			
Nominal Capacity (Ah)	314Ah	628Ah	942Ah	1,256Ah
Maximum Charge Current (A)	150A	300A	300A	300A
Total Wh	16,076	32,152	48,228	64,304
Maximum Discharge	150A	300A	300A	300A
Discharge Cut-off Voltage	43.2V			
Discharge Temperature	-20°C to 45°C			
Charging Temperature	-15°C to 45°C			
Relative Humidity	5% - 65%			
Cell Configuration	16S1P	2*16S1P	3*16S1P	4*16S1P
Cycle Life	8000 @ 91% DOD			
Communication Ports	CAN/RS485			
Weight	148kg	271kg	394kg	517kg
IP-Rating	IP65			
Preloaded Inverter Protocols	Compatible with multiple LV inverters, including but not limited to LuxPower, Sunsynk, Victron and more.			



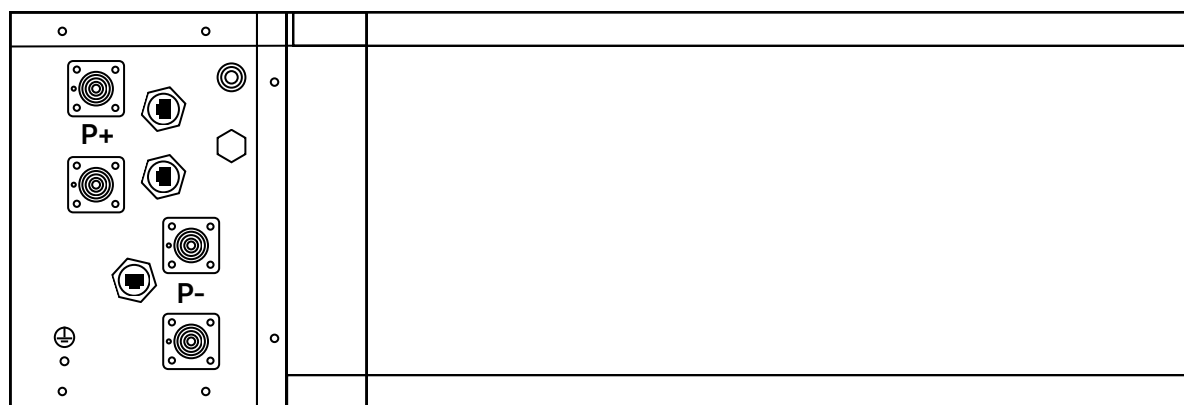
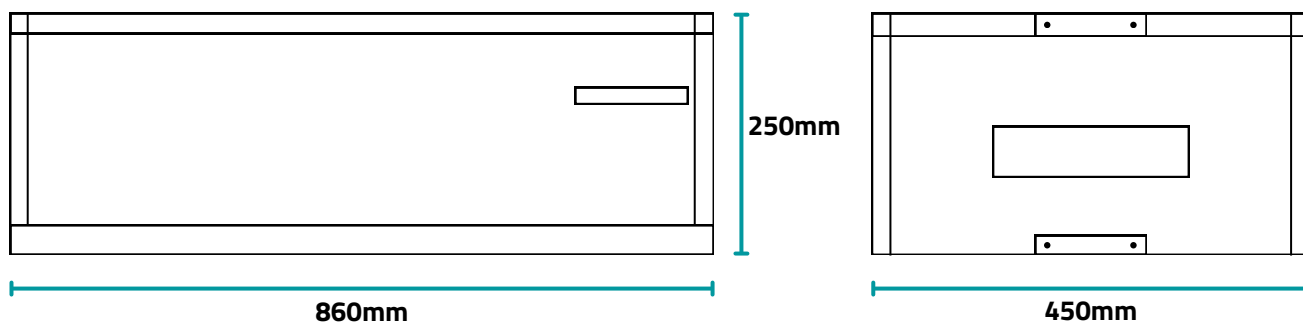
Built-In Fire Suppression Unit

Our ultra-thin, built-in aerosol unit stops fires the moment they start. When temperatures spike to 170°C, the system releases a fast-acting potassium aerosol that instantly disrupts the fire's chemical reaction. Result: rapid suppression, zero maintenance, and reliable protection for enclosed electrical spaces.

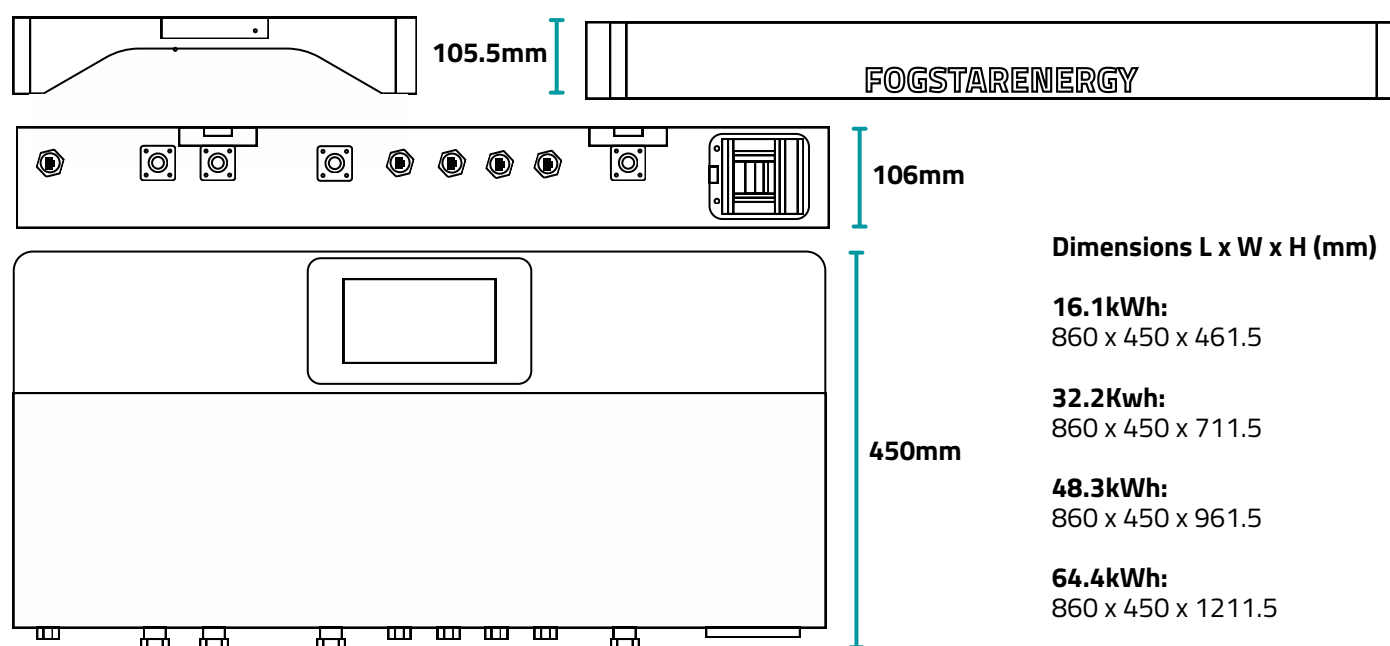


DIMENSIONS

BATTERY



BASEPLATE AND CONTROL MODULE





INSTALLATION

Placement and Environmental Requirements

For safe installation, reliable operation and maximum service life, the following installation requirements should be observed:

- Install the battery on a level, non-flammable surface, such as concrete.
- Do not install the battery on combustible building materials.
- Maintain an operating ambient temperature between -20°C and 60°C.
- Allow a minimum clearance of 300mm around the battery to ensure adequate ventilation and service access.
- Avoid locations with excessive dust, vibration or poor ventilation.

Although the battery is IP-rated for outdoor installation, it should be installed in a sheltered location wherever possible. Suitable locations include beneath an overhang, canopy, purpose-built enclosure or other protective structure that shields the battery from prolonged direct sunlight, heavy rainfall, snow and other extreme environmental conditions while maintaining adequate airflow.

Do not install the battery where it may be exposed to standing water, flooding or conditions that could result in prolonged water ingress.

Prolonged exposure to direct sunlight, particularly during periods of high ambient temperature, can significantly increase the battery's internal operating temperature. If safe operating limits are exceeded,

Battery and Inverter Power Connections

Whether a busbar is used will depend on the battery configuration and the installer's preferred connection method.

Where multiple Fogstar Energy batteries are connected in parallel without a busbar, connect the inverter positive cable to the master battery positive terminal and the inverter negative cable to the negative terminal of the last battery in the parallel chain. This connection method helps promote balanced current distribution across the battery bank, supporting optimum performance and long-term reliability.

Where a busbar is used, connect each battery to the positive and negative busbars first, then connect the inverter directly to the busbars using appropriately sized cables and any required DC protection devices, isolators or overcurrent protection specified for the installation.



INSTALLATION

Parallel Configuration and BMS Addressing

The Fogstar Energy Modular Battery Stack utilises a BMS with automatic address allocation. No DIP switch configuration is required.

When connecting multiple batteries in parallel:

- Use a standard network cable between units.
- Follow this wiring sequence:
 - The first unit's RS485B connects to the second unit's RS485A.
 - The second unit's RS485B connects to the third unit's RS485A.
 - Continue this pattern for any additional units.
 - The first unit acts as the host, with its CAN/485 communication line connecting to the inverter.

All subsequent units operate as slaves within the communication chain.

Installation Time

Additional system integration, including inverter connection, protection devices, and grid-related work, will vary according to installation design and site conditions.

Electrical Installation Responsibility

Fogstar is a battery manufacturer and supplier. Specific installation procedures, regulatory compliance, and any electrical work must be carried out by a qualified electrician.

The installer must ensure that all wiring, protection devices, terminations, and commissioning steps meet local electrical regulations and safety standards.

32.2kWh INSTALLATION



1 Unpack and check parts

Carefully unpack the battery system and check that all parts are present before beginning installation.

The control panel and base will arrive together in one crate and will be screwed together. Before installation, the control panel will need to be unscrewed and separated from the base. The individual 16.1kWh battery modules will arrive separately. The cables will be packed in the same crate as the control panel and base.

Check that the battery modules, control panel, base, power cables and communication cables are all present and undamaged. Do not begin installation if any parts are missing, damaged, or appear to have been mishandled during delivery.

If you experience any issues, please contact us:

✉ customerservice@fogstar.co.uk
☎ 01527 757980



2 Assemble the battery stack

2.1 Position the base

Place the base on a level, stable, non-flammable surface, such as concrete. Ensure there is at least 30cm of clearance around the battery for ventilation, cable access and servicing. Once positioned, lock or level the base using the wheel/levelling mechanism.

2.2 Stack the battery modules

Carefully place each 16.1kWh battery module onto the base one at a time. Due to the weight of the modules (**123kg**), this should not be attempted alone. Ensure each module is seated correctly and aligned properly before placing the next module on top.

As each module is stacked, secure it using the supplied metal joining plates before continuing to the next module.

2.3 Remove the side access panels

Unscrew and remove the side access panels to expose the battery connection ports. Keep the screws and panels safe, as they will need to be refitted after installation.

2.4 Confirm the system is switched off

Before connecting any cables, make sure the main breaker is switched OFF and all battery modules are switched OFF using their power buttons. Do not connect communication or power cables while the system is live.

2.5 Remove the terminal covers

The battery terminals are fitted with Amphenol terminal covers protected by screw-on rubber caps. Remove the caps only when ready to connect the cables and keep them safe for future use.

3 Connect the communication cables

Before installing the power cables, connect the communication cables between the control panel and battery modules. It is recommended to install the communication cables first, as the larger power cables can make access to the communication ports more difficult once installed.

For the 32.2kWh system (2 modular stacks), the supplied communication cables are:



Starting from the control panel, connect the far-left RS485 port to the CAN/RS485 port on the top battery module.

Then connect the RS4852 port on the top battery module to the RS4851 port on the battery module below.

Ensure all communication connectors are fully inserted and secure before continuing. Follow the wiring diagram carefully during installation.

4 Prepare the power cables

The supplied power cables are thick 95mm² cables and are not very flexible, so it is recommended to gently pre-shape the cables before installation to help align them with the terminals more easily. **Do not sharply bend, kink, or force the cables, as this may damage the cable or connectors.**

For the 32.2kWh system (2 modular stacks), the supplied power cables are:



1x Positive (+) 95mm² Cable:
Cable Length: 110mm



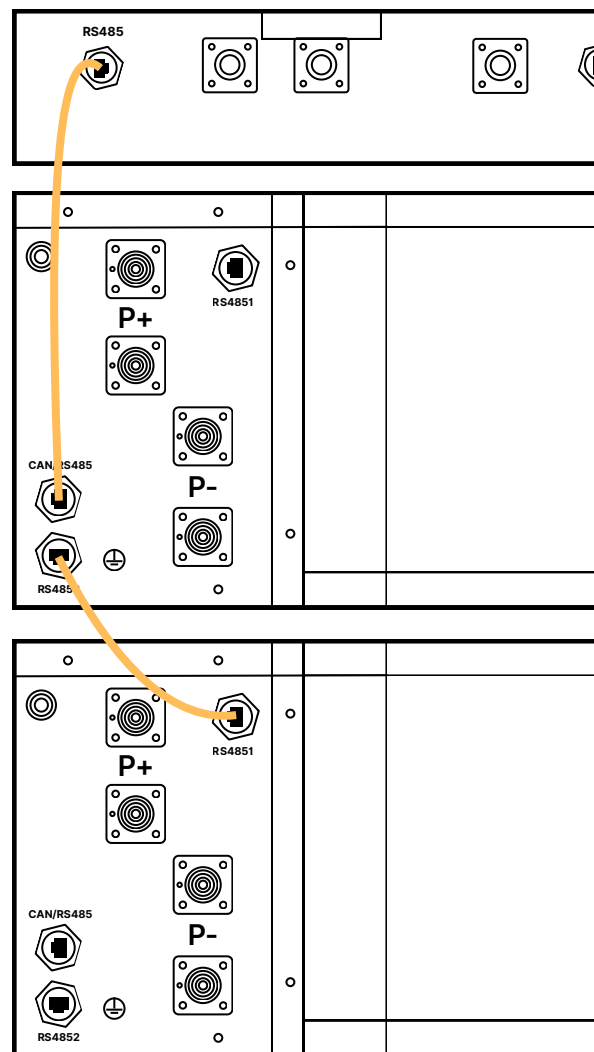
1x Positive (+) 95mm² Cable:
Cable Length: 210mm



1x Negative (-) 95mm² Cable:
Cable Length: 110mm



1x Negative (-) 95mm² Cable:
Cable Length: 505mm



5 Connect the power cables

Before connecting the power cables, remove the rubber terminal caps from the required terminals only. Keep the caps safe for future use or protection of unused terminals.

5.1 Connect the main negative cable

Connect the 505mm Negative 95mm² cable from the control panel **B-** terminal to the very bottom battery module **P-** terminal.

5.2 Connect the battery-to-battery negative cable

Connect the 110mm Negative 95mm² cable from the top battery module **P-** terminal to the battery module below **P-** terminal.

5.3 Connect the main positive cable

Connect the 210mm Positive 95mm² cable from the control panel **B+** terminal to the top battery module **P+** terminal.

5.4 Connect the battery-to-battery positive cable

Connect the 110mm Positive 95mm² cable from the top battery module **P+** terminal to the battery module below **P+** terminal.

Ensure all power cable connections are fully inserted, secure, and correctly matched **positive-to-positive** (+ to +) and **negative-to-negative** (- to -).

Follow the wiring diagram below for the correct power cable layout and routing.

6 Connect the inverter

Before powering on the battery system, the inverter must be connected to the control panel using the supplied inverter power and communication cables.

For the 32.2kWh system (2 modular stacks), the supplied inverter cables are:



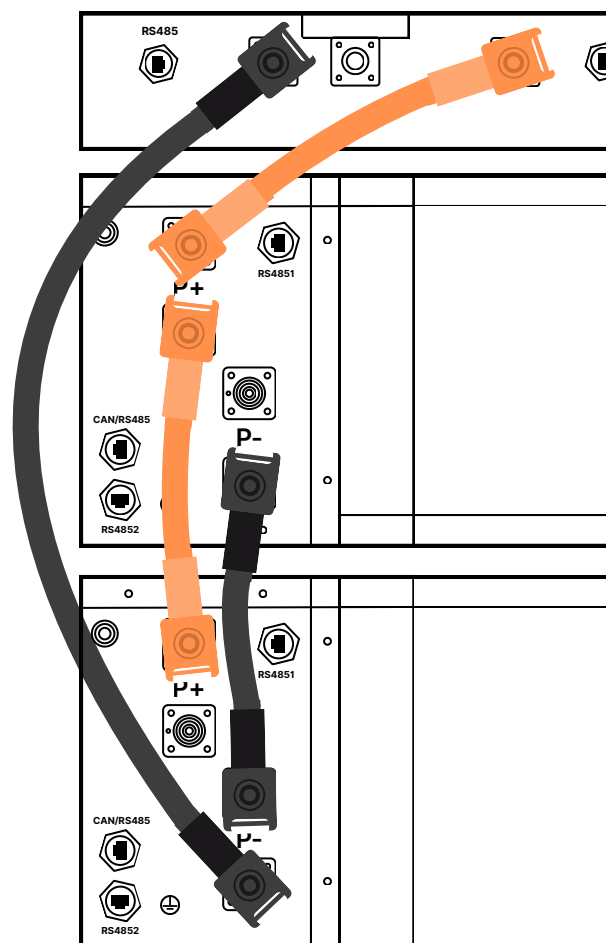
1x Positive (+) 95mm² Cable:
Cable Length: 1500mm



1x Negative (-) 95mm² Cable:
Cable Length: 1500mm



1x communication Cable:
Cable Length: 1500mm



Please note: The supplied inverter cables may not be suitable for every inverter model or installation configuration. Always verify inverter terminal type, cable sizing requirements, current ratings, fuse protection, and communication compatibility prior to installation. Due to the high power capability of this battery system, additional or upgraded cabling may be required depending on inverter specification, installation distance, and system design. Installation should only be carried out by a suitably qualified installer familiar with high-current battery systems.

6.1 Connect the inverter negative cable

Connect the 1500mm Negative (-) inverter cable from the inverter negative terminal to the control panel inverter negative terminal.

6.2 Connect the inverter positive cable

Connect the 1500mm Positive (+) inverter cable from the inverter positive terminal to the control panel inverter positive terminal.

6.3 Connect the inverter communication cable

Connect the 1500mm communication cable between the inverter communication port and the control panel communication port.

6.4 Configure the inverter communication protocol

The 48V Module battery is compatible with a wide range of low-voltage inverters, including but not limited to LuxPower, Sunsynk, Victron and more. Refer to your inverter manufacturer's setup instructions for the correct battery communication settings and protocol selection.

7 Power on the system

7.1 Switch on the breaker

Once all communication and power cable connections have been checked, switch the main breaker to the ON position. This helps prevent inverter inrush current during startup.

7.2 Power on the battery modules

Switch on each battery module using the power buttons.

Check that the LED indicators and control panel display power on correctly.

7.3 Refit the side access panels

Once the system has powered on successfully and all checks have been completed, refit the side access panels using the original screws.

Ensure no cables are trapped or pinched before tightening the panels fully.

8 Packing list



1x Positive (+) 95mm² Cable:
Cable Length: 110mm



1x Negative (-) 95mm² Cable:
Cable Length: 110mm



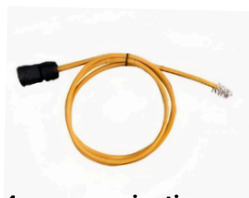
1x Positive (+) 95mm² Cable:
Cable Length: 110mm



1x Positive (+) 95mm² Cable:
Cable Length: 210mm



1x Negative (-) 95mm² Cable:
Cable Length: 505mm



**1x communication
Inverter Cable:**
Cable Length: 1500mm



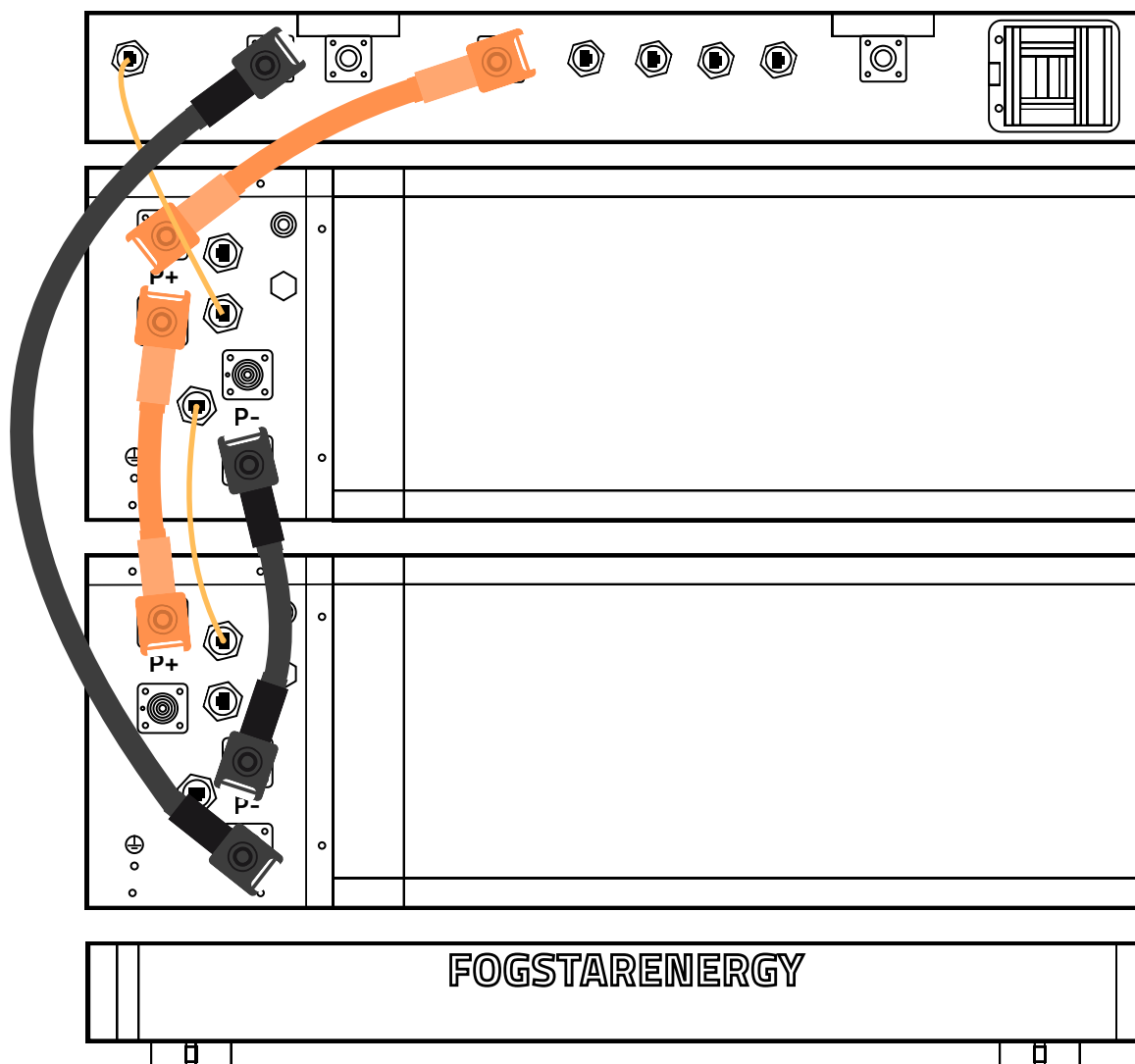
**1x Positive (+) 95mm²
Inverter Cable:**
Cable Length: 1500mm



**1x Negative (-) 95mm²
Inverter Cable:**
Cable Length: 1500mm



1x RS232 Cable:
Cable Length: 1500mm



48.3kWh INSTALLATION



1 Unpack and check parts

Carefully unpack the battery system and check that all parts are present before beginning installation.

The control panel and base will arrive together in one crate and will be screwed together. Before installation, the control panel will need to be unscrewed and separated from the base. The individual 16.1kWh battery modules will arrive separately. The cables will be packed in the same crate as the control panel and base.

Check that the battery modules, control panel, base, power cables and communication cables are all present and undamaged. Do not begin installation if any parts are missing, damaged, or appear to have been mishandled during delivery.

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☎ 01527 757980



2 Assemble the battery stack

2.1 Position the base

Place the base on a level, stable, non-flammable surface, such as concrete. Ensure there is at least 30cm of clearance around the battery for ventilation, cable access and servicing. Once positioned, lock or level the base using the wheel/levelling mechanism.

2.2 Stack the battery modules

Carefully place each 16.1kWh battery module onto the base one at a time. Due to the weight of the modules (**123kg**), this should not be attempted alone. Ensure each module is seated correctly and aligned properly before placing the next module on top.

As each module is stacked, secure it using the supplied metal joining plates before continuing to the next module.

2.3 Remove the side access panels

Unscrew and remove the side access panels to expose the battery connection ports. Keep the screws and panels safe, as they will need to be refitted after installation.

2.4 Confirm the system is switched off

Before connecting any cables, make sure the main breaker is switched OFF and all battery modules are switched OFF using their power buttons. Do not connect communication or power cables while the system is live.

2.5 Remove the terminal covers

The battery terminals are fitted with Amphenol terminal covers protected by screw-on rubber caps. Remove the caps only when ready to connect the cables and keep them safe for future use.

3 Connect the communication cables

Before installing the power cables, connect the communication cables between the control panel and battery modules. It is recommended to install the communication cables first, as the larger power cables can make access to the communication ports more difficult once installed.

For the 48.3kWh system (3 modular stacks), the supplied communication cables are:



2x Positive (+) 95mm²

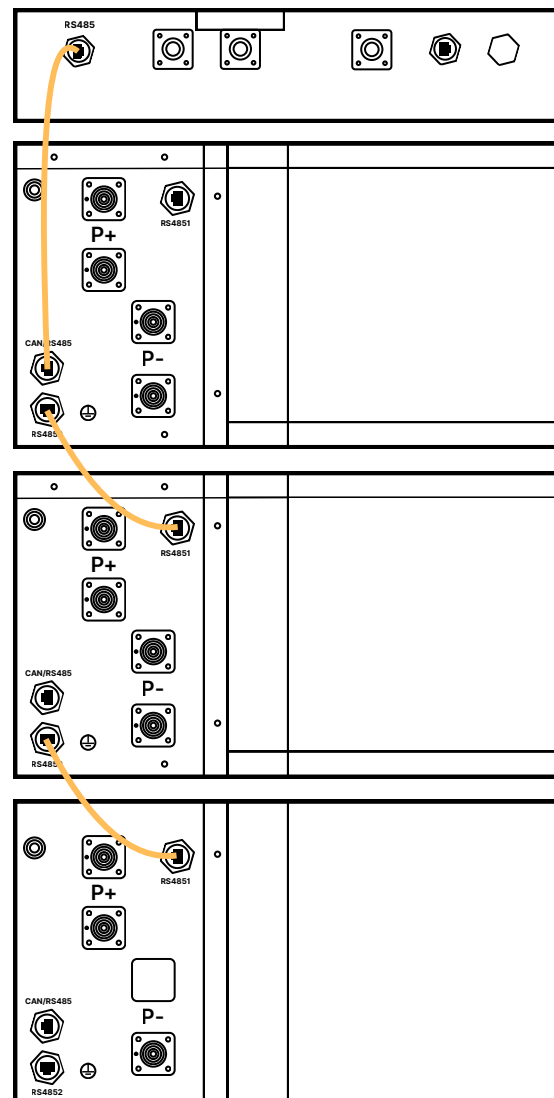
Cable:

Cable Length: 110mm

Starting from the control panel, connect the far-left RS485 port to the CAN/RS485 port on the top battery module.

Then connect the RS4852 port on the top battery module to the RS4851 port on the battery module below.

Ensure all communication connectors are fully inserted and secure before continuing. Follow the wiring diagram carefully during installation.



4 Prepare the power cables

The supplied power cables are thick 95mm² cables and are not very flexible, so it is recommended to gently pre-shape the cables before installation to help align them with the terminals more easily. **Do not sharply bend, kink, or force the cables, as this may damage the cable or connectors.**

For the 48.3kWh system (3 modular stacks), the supplied power cables are:



2x Positive (+) 95mm² Cable:

Cable Length: 110mm



1x Positive (+) 95mm² Cable:

Cable Length: 210mm



2x Negative (-) 95mm² Cable:

Cable Length: 110mm



1x Negative (-) 95mm² Cable:

Cable Length: 505mm

5 Connect the power cables

Before connecting the power cables, remove the rubber terminal caps from the required terminals only. Keep the caps safe for future use or protection of unused terminals.

5.1 Connect the main negative cable

Connect the 505mm Negative 95mm² cable from the control panel B- terminal to the very bottom battery module P- terminal.

5.2 Connect the battery-to-battery negative cable

Connect the 110mm Negative 95mm² cable from the top battery module P- terminal to the battery module below P- terminal.

5.3 Connect the main positive cable

Connect the 210mm Positive 95mm² cable from the control panel B+ terminal to the top battery module P+ terminal.

5.4 Connect the battery-to-battery positive cable

Connect the 110mm Positive 95mm² cable from the top battery module **P+** terminal to the battery module below **P+** terminal.

Ensure all power cable connections are fully inserted, secure, and correctly matched **positive-to-positive** (+ to +) and **negative-to-negative** (- to -).

Follow the wiring diagram below for the correct power cable layout and routing.

6 Connect the inverter

Before powering on the battery system, the inverter must be connected to the control panel using the supplied inverter power and communication cables.

For the 48.3kWh system (3 modular stacks), the supplied inverter cables are:



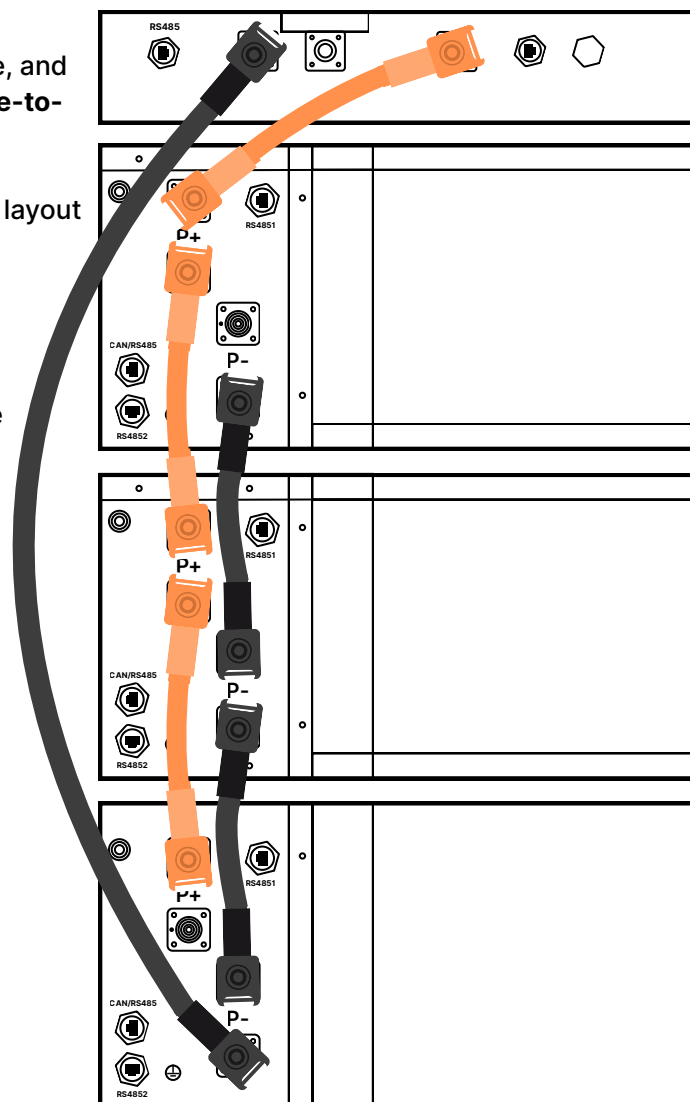
1x Positive (+) 95mm² Cable:
Cable Length: 1500mm



1x Negative (-) 95mm² Cable:
Cable Length: 1500mm



1x communication Cable:
Cable Length: 1500mm



Please note: The supplied inverter cables may not be suitable for every inverter model or installation configuration. Always verify inverter terminal type, cable sizing requirements, current ratings, fuse protection, and communication compatibility prior to installation. Due to the high power capability of this battery system, additional or upgraded cabling may be required depending on inverter specification, installation distance, and system design. Installation should only be carried out by a suitably qualified installer familiar with high-current battery systems.

6.1 Connect the inverter negative cable

Connect the 1500mm Negative (-) inverter cable from the inverter negative terminal to the control panel inverter negative terminal.

6.2 Connect the inverter positive cable

Connect the 1500mm Positive (+) inverter cable from the inverter positive terminal to the control panel inverter positive terminal.

6.3 Connect the inverter communication cable

Connect the 1500mm communication cable between the inverter communication port and the control panel communication port.

6.4 Configure the inverter communication protocol

The 48V Module battery is compatible with a wide range of low-voltage inverters, including but not limited to LuxPower, Sunsynk, Victron and more. Refer to your inverter manufacturer's setup instructions for the correct battery communication settings and protocol selection.

7 Power on the system

7.1 Switch on the breaker

Once all communication and power cable connections have been checked, switch the main breaker to the ON position. This helps prevent inverter inrush current during startup.

7.2 Power on the battery modules

Switch on each battery module using the power buttons.

Check that the LED indicators and control panel display power on correctly.

7.3 Refit the side access panels

Once the system has powered on successfully and all checks have been completed, refit the side access panels using the original screws.

Ensure no cables are trapped or pinched before tightening the panels fully.

8 Packing list



2x Positive (+) 95mm² Cable:
Cable Length: 110mm



2x Negative (-) 95mm² Cable:
Cable Length: 110mm



2x Positive (+) 95mm² Cable:
Cable Length: 110mm



1x Positive (+) 95mm² Cable:
Cable Length: 210mm



1x Negative (-) 95mm² Cable:
Cable Length: 505mm



1x communication Inverter Cable:
Cable Length: 1500mm



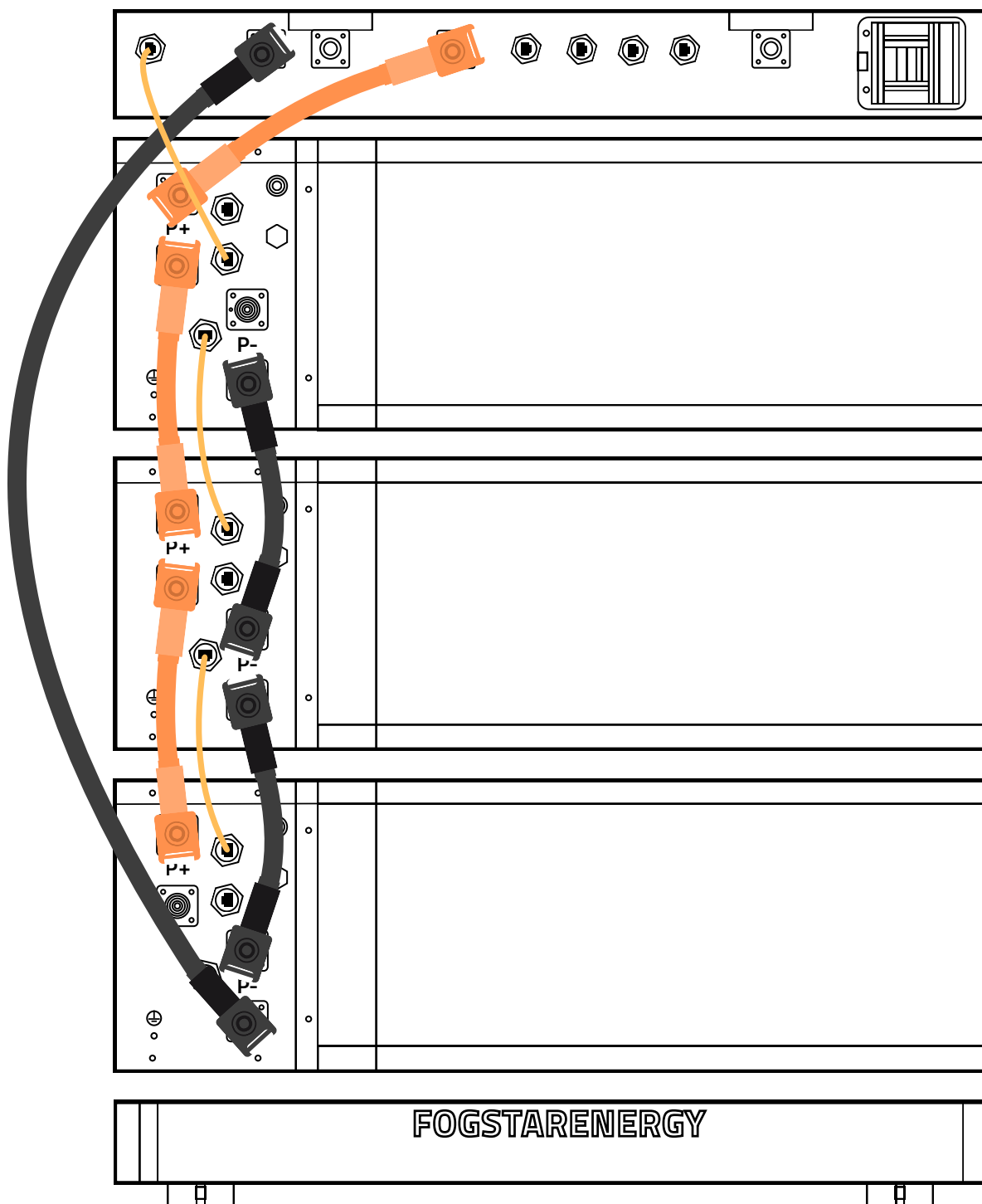
1x Positive (+) 95mm² Inverter Cable:
Cable Length: 1500mm



1x Negative (-) 95mm² Inverter Cable:
Cable Length: 1500mm



1x RS232 Cable:
Cable Length: 1500mm



64.4kWh INSTALLATION



1 Unpack and check parts

Carefully unpack the battery system and check that all parts are present before beginning installation.

The control panel and base will arrive together in one crate and will be screwed together. Before installation, the control panel will need to be unscrewed and separated from the base. The individual 16.1kWh battery modules will arrive separately. The cables will be packed in the same crate as the control panel and base.

Check that the battery modules, control panel, base, power cables and communication cables are all present and undamaged. Do not begin installation if any parts are missing, damaged, or appear to have been mishandled during delivery.

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☎ 01527 757980



2 Assemble the battery stack

2.1 Position the base

Place the base on a level, stable, non-flammable surface, such as concrete. Ensure there is at least 30cm of clearance around the battery for ventilation, cable access and servicing. Once positioned, lock or level the base using the wheel/levelling mechanism.

2.2 Stack the battery modules

Carefully place each 16.1kWh battery module onto the base one at a time. Due to the weight of the modules (**123kg**), this should not be attempted alone. Ensure each module is seated correctly and aligned properly before placing the next module on top.

As each module is stacked, secure it using the supplied metal joining plates before continuing to the next module.

2.3 Remove the side access panels

Unscrew and remove the side access panels to expose the battery connection ports. Keep the screws and panels safe, as they will need to be refitted after installation.

2.4 Confirm the system is switched off

Before connecting any cables, make sure the main breaker is switched OFF and all battery modules are switched OFF using their power buttons. Do not connect communication or power cables while the system is live.

2.5 Remove the terminal covers

The battery terminals are fitted with Amphenol terminal covers protected by screw-on rubber caps. Remove the caps only when ready to connect the cables and keep them safe for future use.

3 Connect the communication cables

Before installing the power cables, connect the communication cables between the control panel and battery modules. It is recommended to install the communication cables first, as the larger power cables can make access to the communication ports more difficult once installed.

For the 64.4kWh system (4 modular stacks), the supplied communication cables are:



Starting from the control panel, connect the far-left RS485 port to the CAN/RS485 port on the top battery module.

Then connect the RS4852 port on the top battery module to the RS4851 port on the battery module below.

Ensure all communication connectors are fully inserted and secure before continuing. Follow the wiring diagram carefully during installation.

4 Prepare the power cables

The supplied power cables are thick 95mm² cables and are not very flexible, so it is recommended to gently pre-shape the cables before installation to help align them with the terminals more easily. **Do not sharply bend, kink, or force the cables, as this may damage the cable or connectors.**

For the 64.4kWh system (4 modular stacks), the supplied power cables are:



5 Connect the power cables

Before connecting the power cables, remove the rubber terminal caps from the required terminals only. Keep the caps safe for future use or protection of unused terminals.

5.1 Connect the main negative cable

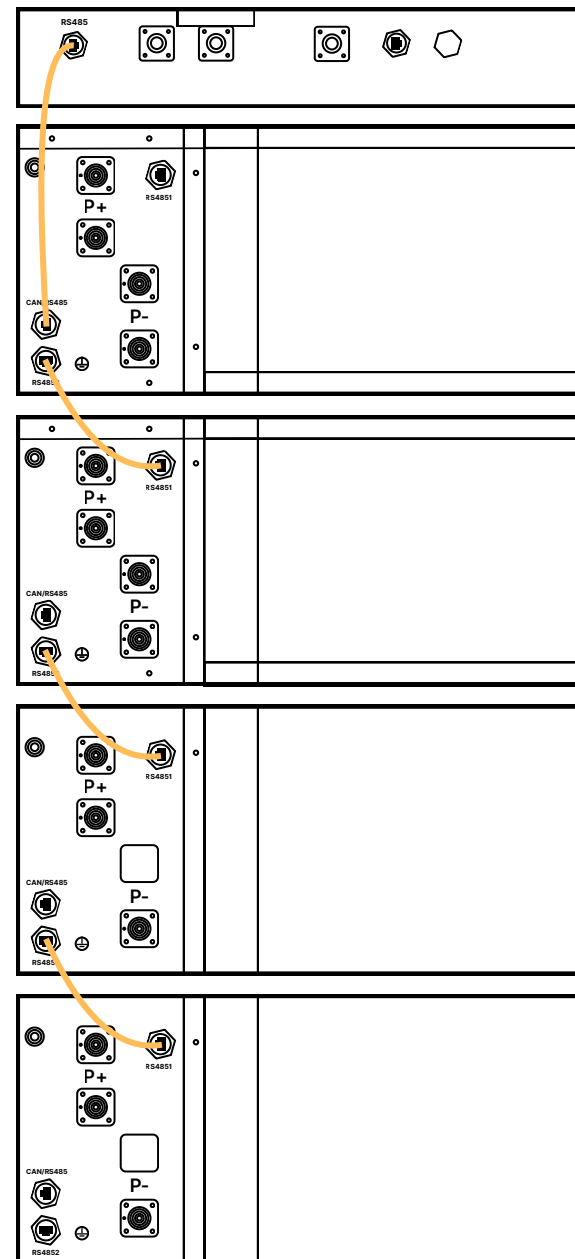
Connect the 505mm Negative 95mm² cable from the control panel **B-** terminal to the very bottom battery module **P-** terminal.

5.2 Connect the battery-to-battery negative cable

Connect the 110mm Negative 95mm² cable from the top battery module **P-** terminal to the battery module below **P-** terminal.

5.3 Connect the main positive cable

Connect the 210mm Positive 95mm² cable from the control panel **B+** terminal to the top battery module **P+** terminal.



5.4 Connect the battery-to-battery positive cable

Connect the 110mm Positive 95mm² cable from the top battery module **P+** terminal to the battery module below **P+** terminal.

Ensure all power cable connections are fully inserted, secure, and correctly matched **positive-to-positive (+ to +)** and **negative-to-negative (- to -)**.

Follow the wiring diagram below for the correct power cable layout and routing.

6 Connect the inverter

Before powering on the battery system, the inverter must be connected to the control panel using the supplied inverter power and communication cables.

For the 64.4kWh system (4 modular stacks), the supplied inverter cables are:



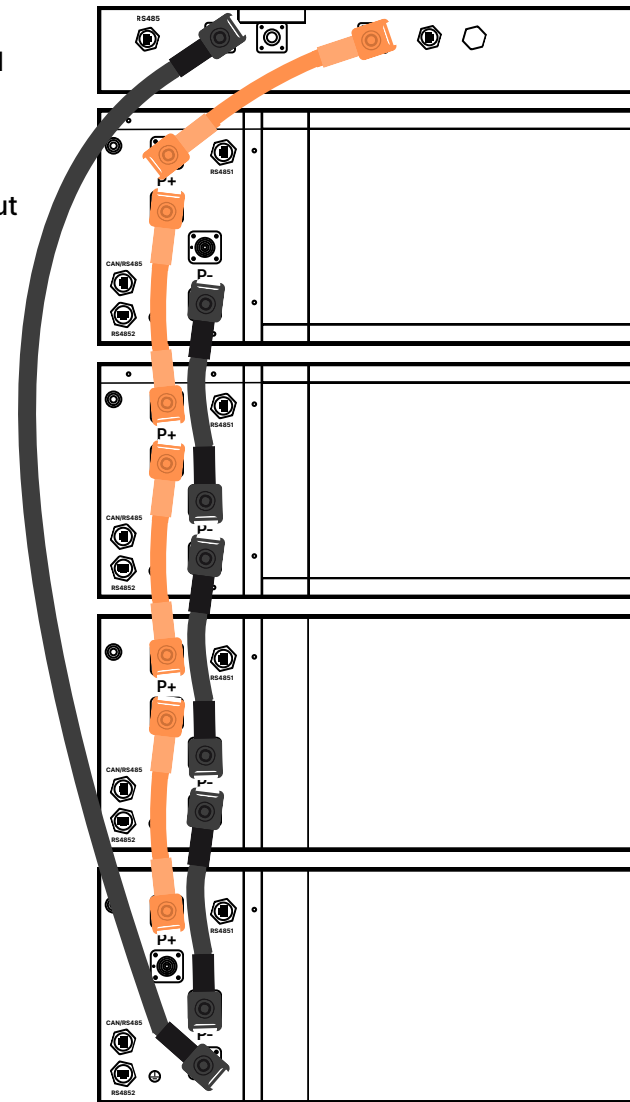
1x Positive (+) 95mm² Cable:
Cable Length: 1500mm



1x Negative (-) 95mm² Cable:
Cable Length: 1500mm



1x communication Cable:
Cable Length: 1500mm



Please note: The supplied inverter cables may not be suitable for every inverter model or installation configuration. Always verify inverter terminal type, cable sizing requirements, current ratings, fuse protection, and communication compatibility prior to installation. Due to the high power capability of this battery system, additional or upgraded cabling may be required depending on inverter specification, installation distance, and system design. Installation should only be carried out by a suitably qualified installer familiar with high-current battery systems.

6.1 Connect the inverter negative cable

Connect the 1500mm Negative (-) inverter cable from the inverter negative terminal to the control panel inverter negative terminal.

6.2 Connect the inverter positive cable

Connect the 1500mm Positive (+) inverter cable from the inverter positive terminal to the control panel inverter positive terminal.

6.3 Connect the inverter communication cable

Connect the 1500mm communication cable between the inverter communication port and the control panel communication port.

6.4 Configure the inverter communication protocol

The 48V Module battery is compatible with a wide range of low-voltage inverters, including but not limited to LuxPower, Sunsynk, Victron and more. Refer to your inverter manufacturer's setup instructions for the correct battery communication settings and protocol selection.

7 Power on the system

7.1 Switch on the breaker

Once all communication and power cable connections have been checked, switch the main breaker to the ON position. This helps prevent inverter inrush current during startup.

7.2 Power on the battery modules

Switch on each battery module using the power buttons.

Check that the LED indicators and control panel display power on correctly.

7.3 Refit the side access panels

Once the system has powered on successfully and all checks have been completed, refit the side access panels using the original screws.

Ensure no cables are trapped or pinched before tightening the panels fully.

8 Packing list



3x Positive (+) 95mm² Cable:
Cable Length: 110mm



3x Negative (-) 95mm² Cable:
Cable Length: 110mm



1x Positive (+) 95mm² Cable:
Cable Length: 110mm



1x Positive (+) 95mm² Cable:
Cable Length: 210mm



1x Negative (-) 95mm² Cable:
Cable Length: 505mm



1x communication Inverter Cable:
Cable Length: 1500mm



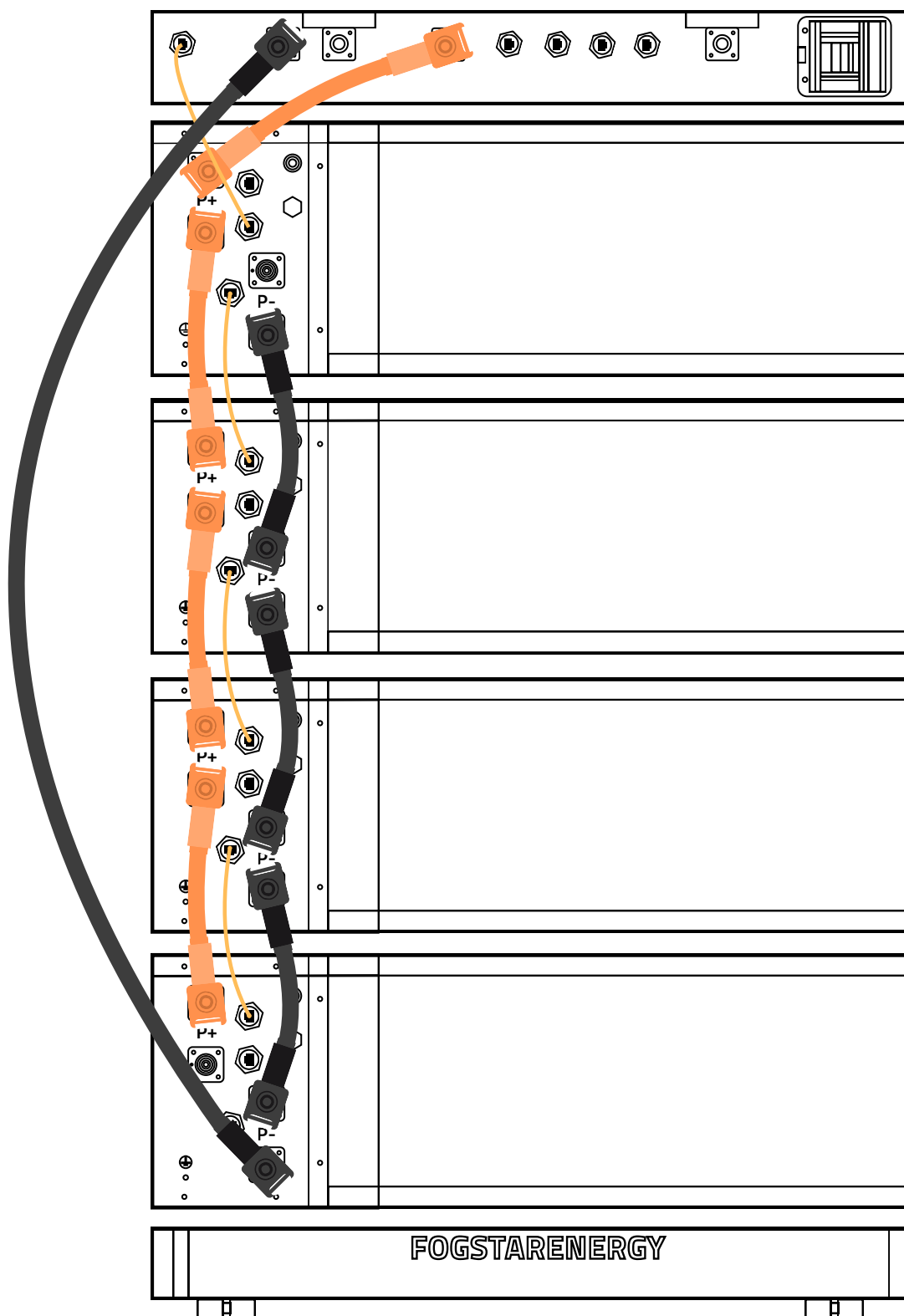
1x Positive (+) 95mm² Inverter Cable:
Cable Length: 1500mm



1x Negative (-) 95mm² Inverter Cable:
Cable Length: 1500mm



1x RS232 Cable:
Cable Length: 1500mm

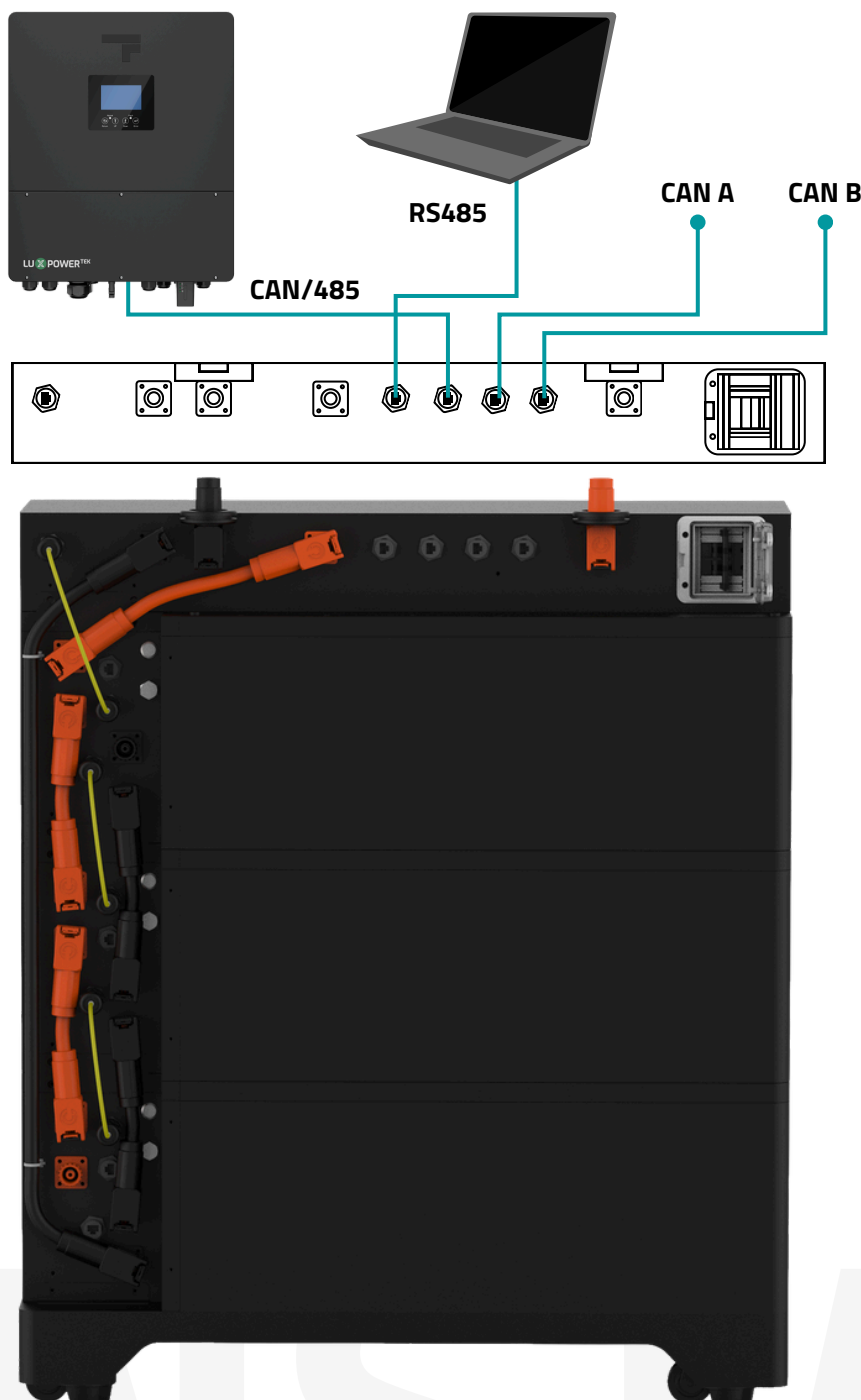




COMMUNICATION

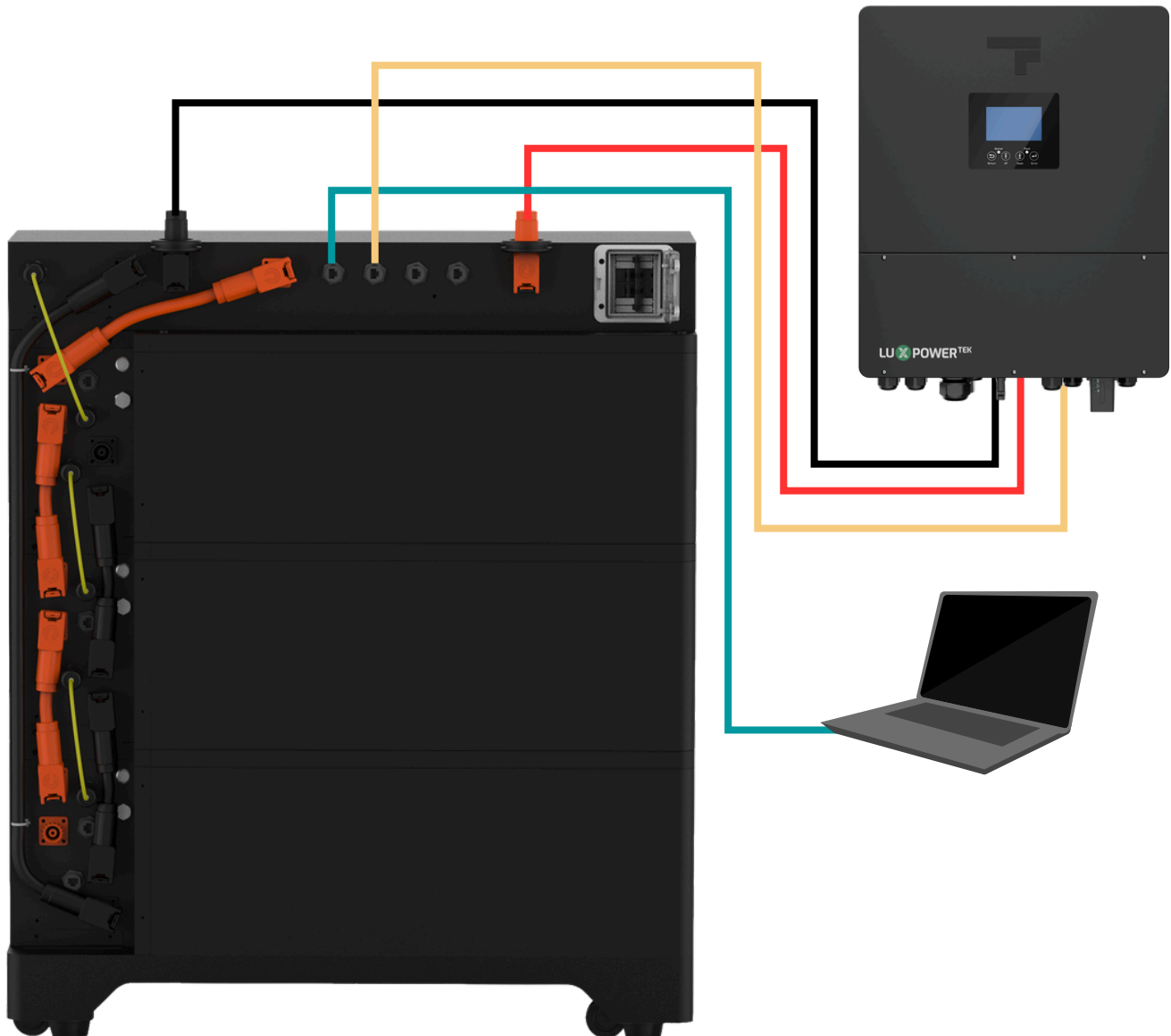
Parallel Communication Wiring

The BMS supports automatic address assignment, so no DIP switch configuration is required. Use standard network cables for parallel communication. Connect RS485-B of the first unit to RS485-A of the second unit, RS485-B of the second unit to RS485-A of the third unit, and so on. The first unit acts as the host and connects to the inverter CAN/RS485 port. All other units operate as slave units. Refer to page 3 for the battery layout and port location diagram.





COMMUNICATION



Before connecting it should be completely disconnected and powered-down.

Battery Placement Requirements

Maintain a minimum spacing of 30cm between batteries when installing. Ensure all battery modules are placed securely and remain in the shutdown state before connecting communication cables.

PC Communication Connection

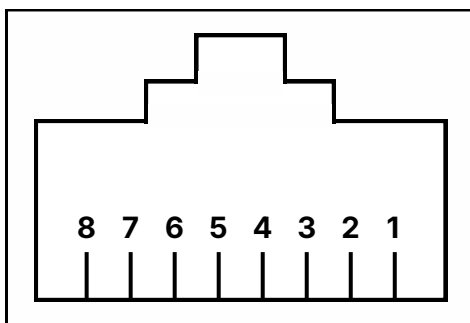
For monitoring or configuration, the BMS can be connected to a computer using a USB-to-RS485 adapter. Connect RS485-B to T/R+ and RS485-A to T/R-. Recommended adapter models include UT-890 and UT-891A.



COMMUNICATION

The BMS communication interface is defined according to the communication requirements of the connected inverter. Different inverter brands may use communication ports with pin definitions that do not match the standard BMS layout. In these cases, a custom communication cable is required. Incorrect cable wiring can cause communication errors or unexpected system behaviour. In most applications, a standard network cable can be used, provided the wiring matches the required pinout.

CAN/RS485

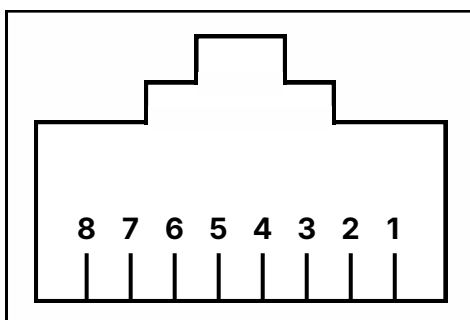


CAN/RS485

Pin	Description
1, 8	RS485-B
2, 7	RS485-A
4	CAN-H
5	CAN-L
3, 6	GND

Internal Communications: Select the appropriate RS485 port for BMS internal communication. The internal communication link operates at a baud rate of 19200, meaning data is transmitted at 19,200 bits per second. Both communicating devices must use the same baud rate for stable communication.

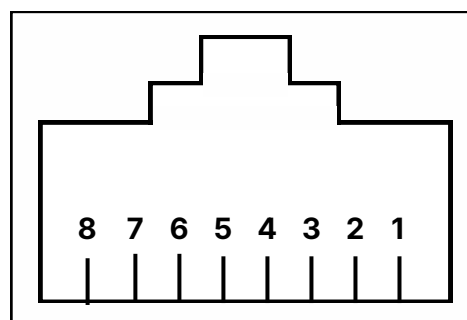
RS485A



RS485A

Pin	Description
1, 8	RS485-B
2, 7	RS485-A
3	Master Enable Pin
4	Auto Address Pin 2
5	GND
6	GND

RS485B



RS485B

Pin	Description
1, 8	RS485-B
2, 7	RS485-A
3	GND
4	Auto Address Pin 1
5	GND
6	Slave Enabled Pin



FIRE SUPPRESSION

Overview

This device is a compact, heat-activated aerosol fire suppression unit designed for small enclosed spaces such as electrical cabinets. When the surrounding temperature reaches its trigger point, the internal agent rapidly converts into an extinguishing aerosol that disrupts combustion and suppresses the fire.

How it works

Once the temperature-sensitive element activates, the suppression compound breaks down and releases fine aerosol particles. These particles absorb flame radicals and interrupt the combustion process, quickly stopping the spread of fire.

When the device activates, the suppression compound breaks down and produces a fine aerosol made up of potassium-based particles, including potassium carbonate (K_2CO_3), potassium hydroxide (KOH), and potassium bicarbonate ($KHCO_3$). These particles disrupt the combustion process by absorbing flame radicals. This halts the chemical chain reaction and quickly extinguishes the fire.

Technical Specifications

- Activation temperature: $170^{\circ}\text{C} \pm 10^{\circ}\text{C}$
- Operating temperature range: -20°C to $+70^{\circ}\text{C}$
- Relative humidity tolerance: $\leq 95\%$
- Discharge duration: ≤ 3 seconds
- Dimensions: $117 \times 68 \times 8$ mm (including bracket)
- Agent mass: $11 \text{ g} \pm 1 \text{ g}$

Operation

The unit is fully automatic. If a fire occurs and temperatures rise to the activation point, the device will release its aerosol agent and suppress the fire. No manual action is required.

Safety Information

- Do not dismantle or modify the unit.
- Keep it away from heat sources before installation.
- Do not expose the device to impact or strong vibration.
- Keep out of reach of children.
- If accidental discharge occurs, ventilate the area.
- For fires involving re-ignition risks, follow up with additional suppression measures.
- Replace the device if the casing is damaged.
- Do not cover or obstruct the activation surface.



OPERATING MODES

Charging mode

When the BMS detects a connected charger and the external charge voltage exceeds the internal battery voltage by more than 0.5 V, the charging MOSFET is enabled. Once the charging current rises above the minimum effective threshold, the system enters Charging Mode. In Charging Mode, both the charge and discharge MOSFETs remain closed.

Discharging mode

The BMS enters Discharge Mode when a load is detected and the discharge current exceeds the effective discharge threshold.

Standby mode

If neither charging nor discharging conditions are met, the BMS switches to Standby Mode.

Shutdown mode

The BMS enters Shutdown Mode after 48 hours in normal standby, or when undervoltage protection, key shutdown, or an external switch shutdown is triggered.

Wake-up conditions for Shutdown mode

Charging activation / 48V Voltage activation / Power button Activation

LED Indicator Sequence

The BMS uses four (4) SOC LEDs, one (1) ALARM LED, and one (1) RUN LED to indicate system status. The SOC LEDs display battery capacity during charging and discharging. The ALARM LED signals protection events or abnormal conditions, and the RUN LED indicates normal operation. LED states such as solid, flashing, or off are used to represent operating status and fault conditions.

					
SOC				ALARM	RUN



OPERATING MODES

Capacity Indicator

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

LED Flashing Modes

Flashing Mode	On Time	Off Time
Flash 1	0.25s	3.75s
Flash 2	0.5s	0.5s
Flash 3	0.5s	1.5s



OPERATING MODES

Status Indicator

System Status	Running Status	RUN	ALM	SOC				Description
		●	●	●	●	●	●	
Power Off	Sleep	Off	OFF	OFF	OFF	OFF	OFF	All Indicators Off
Standby	Normal	Flashing	OFF	OFF	OFF	OFF	OFF	Standby Mode
Charging	Normal	Solid On	OFF	According to the Capacity Indicator				Normal charging state
	Over Current Alarm	Solid On	Flash Mode 2	According to the Capacity Indicator				Overcurrent protection active
	Overvoltage Protection	Flash Mode 1	OFF	OFF	OFF	OFF	OFF	Overvoltage protection active
	Temperature or overcurrent protection	Flash Mode 1	OFF	OFF	OFF	OFF	OFF	Temperature or overcurrent protection active
Discharging	Normal	Flash Mode 3	OFF	According to the capacity indicator				Normal discharging state
	Alarm	Flash Mode 3	Flash Mode 3					Alarm active
	Temperature, overcurrent, or short circuit protection	OFF	Solid on	OFF	OFF	OFF	OFF	Protection active. Forced sleep after 48 hours without activity.
	Undervoltage protection	OFF	OFF	OFF	OFF	OFF	OFF	Undervoltage protection active. Discharge disabled.

FUNCTION DESCRIPTION



Battery Protection and Monitoring Functions

The Battery Management System (BMS) continuously monitors cell voltage, pack voltage, current flow, and temperature to protect the battery from abnormal operating conditions. These protection mechanisms are active by default unless otherwise stated and are designed to prevent damage, ensure operational safety, and extend battery service life.

Cell Voltage Monitoring, Alarms, and Protection

Single-Cell Voltage Alarms: The BMS monitors the voltage of each individual cell and provides early warning alarms before protection thresholds are reached. These alarms act as advance indicators and do not immediately interrupt charging or discharging.

A single-cell high voltage alarm is triggered when any individual cell reaches 3.50V. The alarm condition is cleared automatically once the affected cell voltage drops to 3.40V.

A single-cell low voltage alarm is triggered when any individual cell reaches 2.90V. The alarm condition is cleared automatically once the affected cell voltage rises to 3.10V.

Single-Cell Overvoltage Protection: If any individual cell reaches the overvoltage protection threshold of **3.65V**, the BMS disables charging to prevent cell damage.

Charging is restored only when **all recovery conditions are met simultaneously**. These recovery conditions are as follows:

- The affected cell voltage falls to 3.40V
- The remaining battery capacity is lower than 96%
- A discharge current greater than 1A is detected

Single-Cell Undervoltage Protection: Single-cell undervoltage protection activates when any individual cell voltage falls to 2.70V. When this occurs, the BMS disables discharge output and the system enters a protective shutdown state.

After undervoltage protection is triggered, the system shuts down while maintaining communication for approximately 1 minute. Recovery occurs when the cell voltage rises to 3.10V and a charging current greater than 1A is detected.

Pack (Total) Voltage Monitoring and Protection

Total Pack Voltage Alarms: The BMS monitors total pack voltage and provides warning alarms before protection thresholds are reached.

- A total pack high voltage alarm is triggered at 56.0V and clears once voltage drops to 54.0V.
- A total pack low voltage alarm is triggered at 46.4V and clears once voltage rises to 48.0V.

These alarms provide advance indication and do not immediately stop system operation.

Total Pack Overvoltage Protection: Total pack overvoltage protection activates when the battery voltage reaches 57.6V. When triggered, charging is disabled to protect the battery system.

Charging resumes only when all recovery conditions are met. Recovery occurs once pack voltage drops to 54.0V, the remaining capacity is lower than 96%, and a discharge current greater than 1A is detected.

Total Pack Undervoltage Protection: Total pack undervoltage protection activates when pack voltage falls to 43.2V. When triggered, the BMS disables discharge and enters shutdown mode.

After undervoltage protection, the system shuts down and maintains communication for approximately 1 minute. Recovery occurs when pack voltage rises to 48.0V and a charging current greater than 1A is detected.

Temperature Monitoring and Protection

Battery Cell Temperature Charging Protection: Charging is restricted based on cell temperature conditions to prevent damage.

- A charging high temperature alarm is triggered at 50°C and clears at 47°C. Charging over-temperature protection activates at 60°C and clears at 55°C.
- A charging low temperature alarm is triggered at -10°C and clears at 3°C. Charging under-temperature protection activates at -15°C and clears at 0°C.

Battery Core Temperature Discharge Protection: The BMS monitors battery core temperature during discharge.

- A discharge high temperature alarm is triggered at 55°C and clears at 50°C.
- Discharge over-temperature protection activates at 60°C and clears at 55°C.
- A discharge low temperature alarm is triggered at -10°C and clears at 3°C.
- Discharge under-temperature protection activates at -15°C and clears at 0°C.

Ambient Temperature Protection: The ambient temperature sensor monitors the surrounding environment.

- An ambient high temperature alarm is triggered at 50°C and clears at 47°C.
- Ambient over-temperature protection activates at 60°C and clears at 55°C.
- An ambient low temperature alarm is triggered at 0°C and clears at 3°C.
- Ambient under-temperature protection activates at -10°C and clears at 0°C.

Power Temperature Protection: Power component temperature is monitored independently.

- A power high temperature alarm is triggered at 95°C and clears at 85°C.
- Power over-temperature protection activates at 110°C and clears at 85°C.

Charging Current Limiting and Overcurrent Protection

Charging Current Limiting: The BMS supports both active and passive current limiting. When enabled, current limiting activates when charging current exceeds 10A. After current limiting is activated, the system rechecks the current limit status after 5 minutes.

Charging Overcurrent Alarm and Protection: A charging overcurrent alarm is triggered at 305A and clears at 303A.

- Charging overcurrent protection activates at 310A with a delay of 10 seconds.
- Charging resumes immediately or automatically after 60 seconds once conditions return to normal.

Discharge Overcurrent Protection

A discharge overcurrent alarm is triggered at -305A and clears at -303A.

Discharge overcurrent protection activates at -310A with a delay of 10 seconds. Recovery occurs immediately or automatically after 60 seconds.

Transient Overcurrent Protection: Transient overcurrent protection activates at -500A with a delay of 300ms. Charging or discharging resumes immediately or automatically after 60 seconds.

If transient overcurrent occurs continuously and exceeds the lock threshold, the system enters a lock state. The overcurrent lock activates after 5 occurrences and can be released by connecting a charger.

Short Circuit Protection

Output short circuit protection is enabled by default and is not configurable. When a short circuit is detected, output is immediately disabled.

Recovery occurs immediately or automatically after 60 seconds. If continuous short circuits exceed the lock threshold, the system enters a lock state. The lock activates after 5 occurrences and can be released by connecting a charger.

Cell Balancing Function

Cell balancing operates during standby, charging, and floating charge states.

- Balancing starts when cell voltage reaches 3.350V and the voltage difference exceeds 30mV.
- Balancing ends when the voltage difference falls to 20mV.

Balancing is permitted only within defined temperature limits. Balancing is prohibited when cell temperature exceeds 50°C or falls below 0°C.

Battery Capacity Management

The battery rated capacity is set to 628Ah. Remaining capacity is estimated based on cell voltage.

A remaining capacity warning is triggered at 10%. Remaining capacity protection activates at 2%, at which point output is disabled.

Control, Power Management, and Auxiliary Functions

Reset Button Functions: When the BMS is in sleep mode, pressing the reset button for 1 second activates the system and returns it to normal operation. When the BMS is active or in standby mode, pressing the reset button for 3 seconds places the system into sleep mode.

Pre-Charge Function: The pre-charge function is enabled with a default delay of 2000ms and can be set between 0 and 5000ms.

BMS Power Consumption Management: The maximum standby time is 48 hours when no charger is present and no effective discharge current is detected.

Low Temperature Cell Heating: Cell heating is disabled by default. Heating activates when cell temperature reaches 0°C and clears at 10°C. Heating occurs only when a charger is connected and does not operate during standby or discharge.

External Switch and Display: An external switch can be used to turn the BMS on or off while in standby mode. The LCD screen provides simplified monitoring of cell voltage, temperature, current, and system status.

WARRANTY

The Fogstar Energy Modular Battery Stack comes with a 6-year warranty and 10-year customer support, covering BMS failure, cell failure, temperature sensors, charging/discharging faults, and internal corrosion. Excludes misuse, tampering, incompatible systems, or accidental damage. You can find a full warranty document on our website.

Reporting an Issue

If you experience a problem with your Fogstar unit, please contact our Customer Services team first so we can help resolve it quickly and efficiently. Please send any images or screenshots, along with a description of the issue, to: customerservice@fogstar.co.uk.

PAS 63100:2024 INSTALLATION GUIDANCE

Battery energy storage systems installed within domestic premises in the United Kingdom should be designed and installed in accordance with applicable regulations and guidance, which may include PAS 63100:2024, BS 7671, Building Regulations, and other relevant requirements.

Fogstar recommends that all installations are carried out by a suitably qualified electrician or competent energy storage installer familiar with current UK regulations and industry best practices.

When selecting an installation location, installers should consider:

- Fire safety and means of escape.
- Location relative to doors, windows, ventilation openings, and other building features.
- Suitable mounting surfaces and structural support.
- Ventilation requirements.
- Environmental conditions and weather exposure.
- Accessibility for maintenance, inspection, and emergency isolation.
- The presence of combustible materials, fuels, or ignition sources nearby.

Where practicable, installation in a dedicated utility space, plant room, garage, outbuilding, or external location should be considered in accordance with current industry guidance.

The battery system should be installed on a stable, non-combustible surface with adequate clearance to allow airflow, servicing, and safe operation. Fogstar recommends maintaining a minimum clearance of 30cm around the battery system.

This battery system incorporates an integrated Battery Management System (BMS), heating functionality, IP-rated enclosure protection, and an automatic aerosol fire suppression system designed to provide additional protection against internal battery faults.

The installer remains responsible for ensuring that the completed installation complies with all applicable regulations, standards, planning requirements, and electrical safety requirements in force at the time of installation. Fogstar does not provide site-specific installation design services and cannot determine compliance based solely on equipment supply.



FAQ'S

Can the Modular Battery Stack system be expanded?

The system is fully modular and stackable. Multiple stacks can be combined to scale total storage capacity up to 1.28MWh, all managed as a single unified system through the integrated control module.

Does the system include fire suppression?

The battery includes an integrated, automatic aerosol fire suppression system.

If internal temperatures reach the activation threshold, the unit releases a potassium-based aerosol that interrupts the combustion process and suppresses fire without manual intervention.

Do I need to configure DIP switches?

The Fogstar Energy Modular Battery Stack utilises a BMS with automatic address allocation. No DIP switch configuration is required.

Does the battery need to be powered off before connecting?

Yes. All batteries must remain in the shutdown state before connecting communication or power cables.

What does the IP65 rating mean?

The Fogstar Energy Modular Battery Stack enclosure is rated IP65, meaning it is fully protected against dust ingress and resistant to low-pressure water jets from any direction. This allows the system to be installed in demanding indoor or outdoor environments, provided it is not submerged and is installed in accordance with the manufacturer's installation guidelines.

Can these batteries work with other inverter brands?

Yes. The BMS seamlessly integrates with a wide range of popular inverters, containing pre-loaded protocols for popular LV inverter brands including but not limited to LuxPower, Sunsynk, Solis, Victron and more.

Can I mix different battery capacities or models in the same system?

No. Only identical battery models with the same capacity and BMS configuration should be connected in parallel.

What is the warranty period?

The Fogstar Energy Modular Battery Stack includes a 6-year product warranty and 10-year customer support. For full warranty terms and conditions, please refer to the Fogstar website.