

# e-Stack

User Manual



**i-G3N**  
INNOVATION GENERATION

# CONTENTS

Contents	2
Specifications	1
Installation	1
Tools And Equipment Required	1
Quick Installation	2
Wire Connections	2
Recommended Layout Configurations	3
Start-Up Procedure	3
Additional	4
Restart Procedure For Fully Drained Battery	5
Communication Connection	5
External Connections	5
Stacking	6
Transportation And Storage	6
Transportation	6
Storage	6

# SPECIFICATIONS

Table 1 shows the specifications for the e-Stack for each additional

Product Name (E-Stack)	5	10	16	21	27
Cell Type	Lithium Iron Phosphate (LiFePo <sub>4</sub> ) battery				
Nominal Capacity [Ah]	105	210	315	420	525
Module Voltage [V]	51.2 V <sub>DC</sub> nominal				
Battery Nominal Capacity [kWh]	5.4	10.8	16.1	21.5	26.9
Capacity @ 80% DoD [kWh]	4.3	8.6	12.9	17.2	21.5
Design Life	>16 years (>5 500 cycles) expected life at 80% DoD				
Warranty	>10 years (4000 cycles)				
Max. Discharge Current (Continuous) [A]	100	200	300	400	500
Max. Discharge Current (not Continuous – 3 sec) [A]	125	250	375	500	625
Discharging cut-off voltage (LVD)	50V				
Operating Conditions					
Temperature range (recommended)	Charge – (0 °C ~ 55°C) Discharge – (-20 °C ~ 55°C)				
Protection Class	IP22 – no solid ingress and near vertical water droplets				
Dimensions					
E-Stack Storage Unit (L x H x W) [mm]	500 x 263 x 430				
E-Stack Storage Unit weight [kg]	± 50 kg				

Table 1: Specification sheet for e-Stack

# INSTALLATION

This section elaborates on the process to install the E-Stack energy storage system safely.

## Tools and equipment required

- Hammer
- Phillips screw driver
- 19 socket
- 70 – 95 mm<sup>2</sup> cabling with 70-95 to 12 lugs
- Cable size depending on inverter specifications

# QUICK INSTALLATION

## Wire Connections

Before connecting any wires, ensure the Battery is switched off, the main ON/OFF switch and all the breakers, and all external breakers / fuses are open.

Connect the provided busbars to the front of the units, as shown in Figure 1, if more than 1 unit is present. If only a master unit is present, no busbars are needed. The battery is connected to the inverter via the DC post on the back of the battery. To connect the battery to the inverter use cable sizing according to inverter specifications. The DC posts are M12 size.

Each secondary box has 2 x RJ45 ports. Use the provided RJ45 flyleads to connect the consecutive units. The bottom unit must have the RJ45 terminator plug connected.

Once all communication / power cables are connected, switch the battery on, but keep breaker / fuse going to the inverter open.

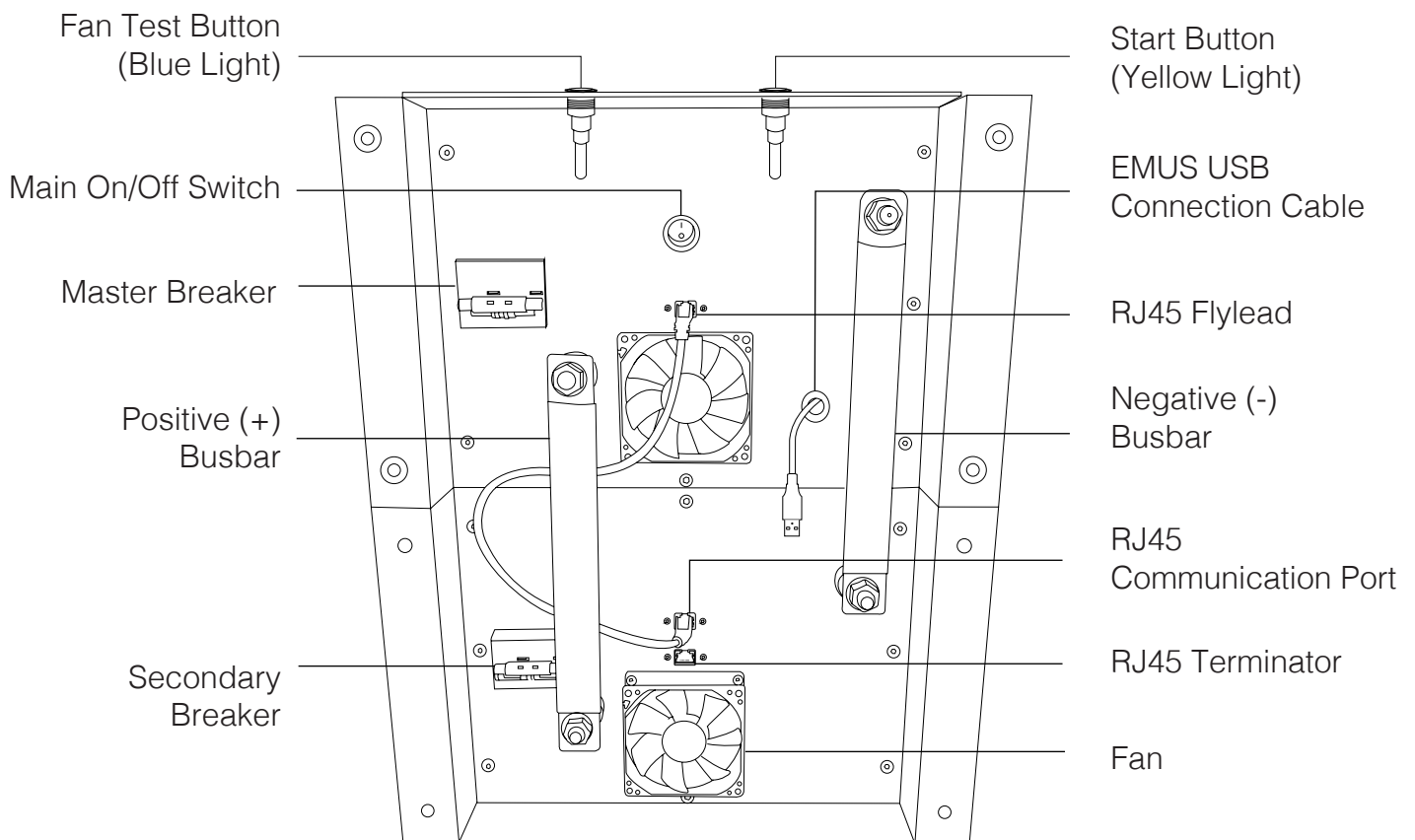
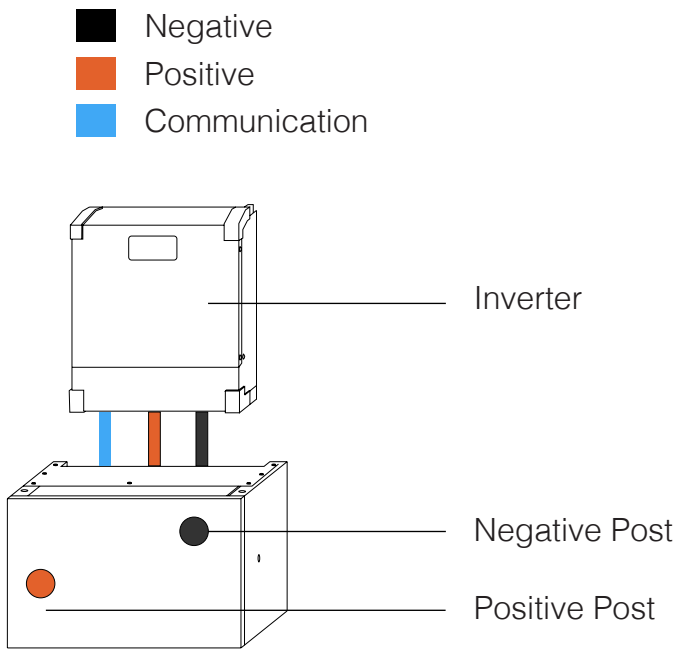


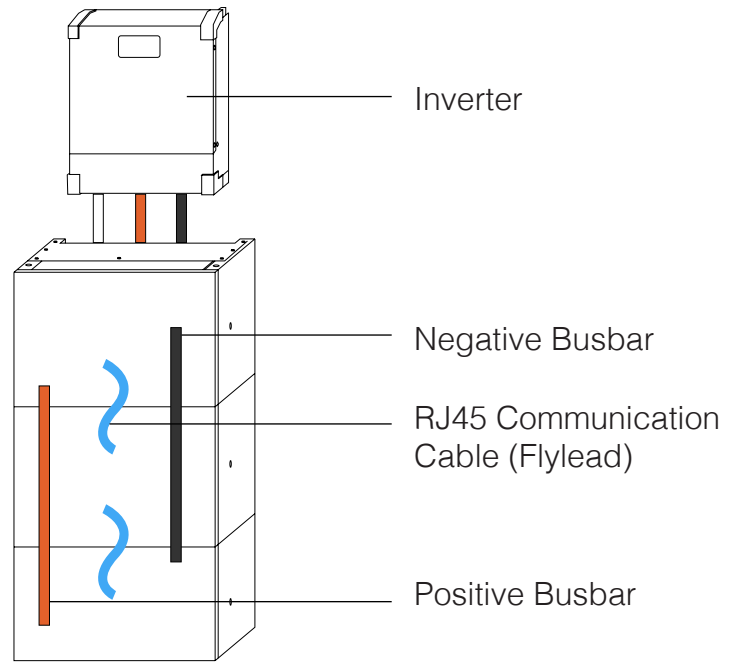
Figure 1

## Recommended Layout Configurations



e-Stack (5kWh)

Figure 2: Configuration for e-Stack 5 kWh



e-Stack x3 (16.2kWh)

Figure 3: Stacking Configuration for e-Stack 16 kWh

## Start-up procedure

### Follow the entire procedure closely before closing the fuses to the inverter

(See Figure 4 for a diagram showing the buttons used during the start-up procedure)

This procedure boots the BMS and runs a self-diagnostic procedure, including checks that the communication wires are connected correctly.

- 1 Verify polarity of connections between the units and the inverter
- 2 Close the breakers on the e-Stack to energise the battery.
- 3 Switch the ON/OFF button on the top unit to ON
  - o This brings the electronics out of storage mode / online

- 4 Press the “Start” button to initialise boot up.
  - o The button can be pressed momentarily
    - A yellow light will glow until the 48V relay is switched on. This will indicate if the Control Box receives power from the Battery Boxes.
  - o A blue light on the “Fan Test” button will illuminate to indicate that the system is powered
- 5 Should all be in order, a pre-charge sequence will be started and applied for 25 seconds after which the main contactor will be engaged
  - o During this stage a small click will be heard, after which a loud audible click can be heard.
- 6 After this, the “Start” button should be pressed to unlatch the button.
  - o The light should no longer be illuminated

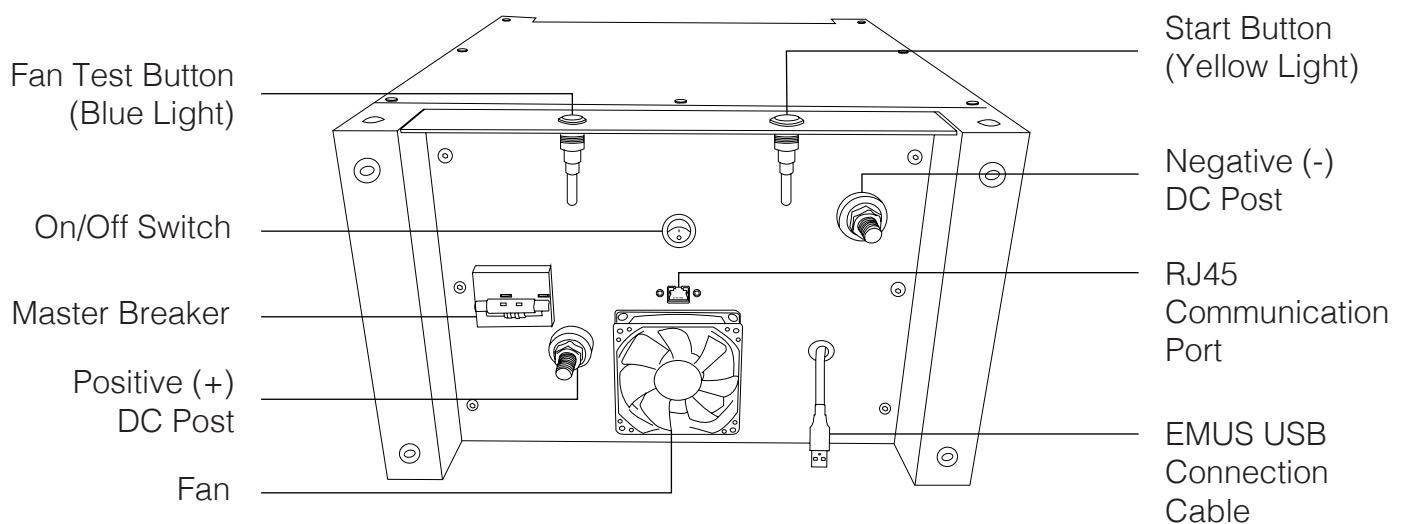


Figure 4: Buttons Used During The Start-Up Procedure

## Additional

- 1 Press the fan test button (inverter side) on the Control Box to check communication between the Control Box and the Expansion boxes.
- 2 The light on the fan test button is an indicator if the battery is on.
- 3 See Figure 4 for a diagram showing the buttons used during the start-up procedure.

Once a voltage of  $\pm 54$  V is measured on the inverter side of the battery can the inverter fuse be closed, and the inverter be switched on.

## Restart Procedure for Fully Drained Battery

- 1 Switch off the system
  - o Disconnect the MPPT (if applicable)
  - o Isolate the battery from the inverter
    - Open the fuse / breaker between the battery and the inverter
  - o Switch off the battery
- 2 Disconnect all loads on the inverter
  - o Switch off AC supply from inverter to DC board
- 3 Restart battery with the Start-up procedure
- 4 Once battery is ON, connect MPPT and allow battery to charge and keep the inverter OFF.
- 5 If no MPPT is present, switch ON the inverter and connect the battery to the inverter.
  - o Keep the loads disconnected during this stage
- 6 Loads can be added when the battery reaches 80% SOC

## Communication Connection

Battery communication is in a daisy chain methodology, with a termination at the very bottom unit. The blue lines in Figure 3 illustrates the wiring for the RJ45 cable between the 3 x e-Stack boxes. Figure 3 and 4 shows the RJ45 ports on the backside of the unit for communication between the battery and the inverter.

## External Connections

Figure 5 shows the back side of the e-Stack unit. These DC posts are used for the cabling connections to the inverter. When 3+ units are stacked, both studs must be used to connect to the inverter. Single use inverter can use either port, as the second port is for paralleling stacks.

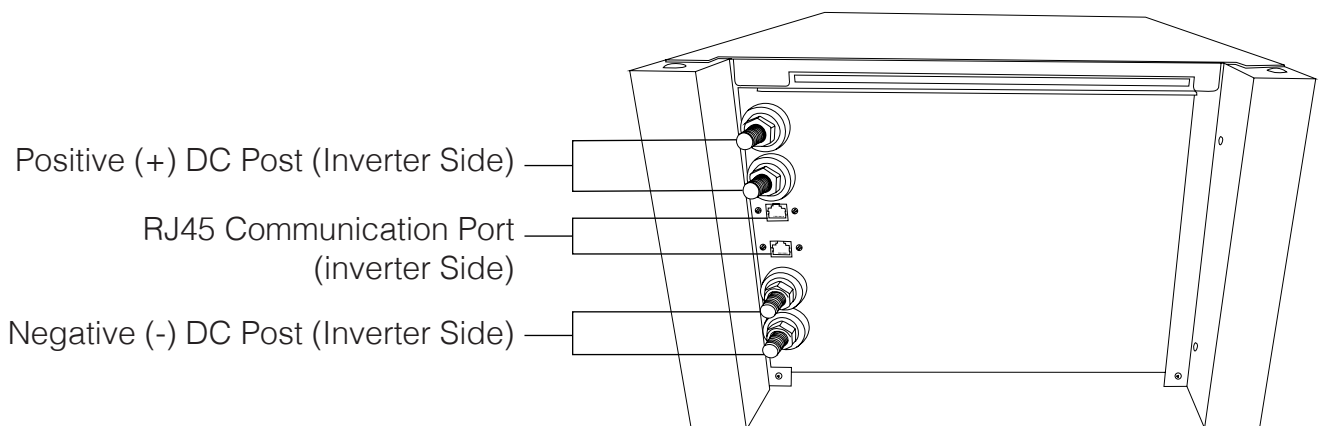


Figure 5: External Connections to Inverter

## Stacking

The subsequent units that are stacked use the locating pins and hole, as seen in Figure 6, to align the units when stacking. The studs are on the bottom of the units and the holes are on top of each unit.

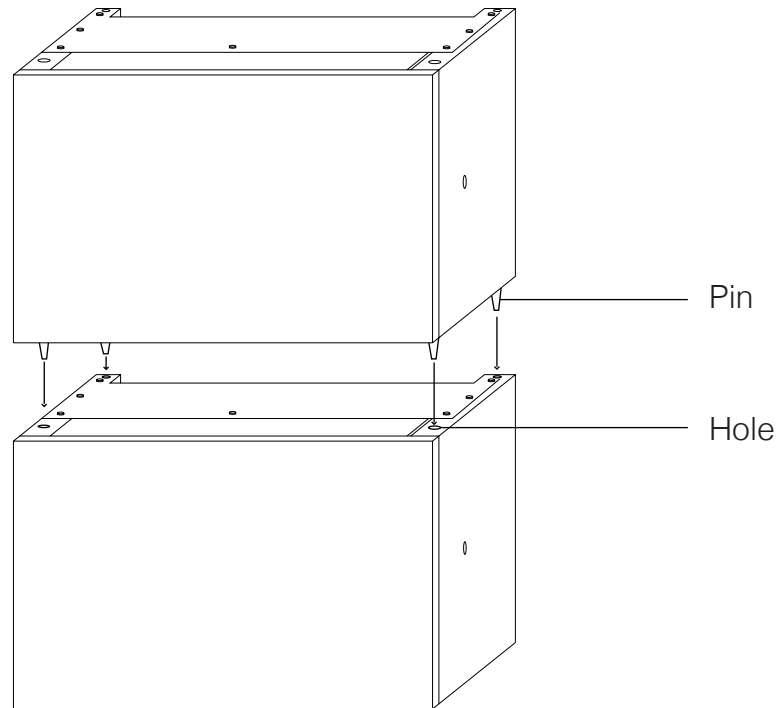


Figure 6: Bottom Locating Studs

# TRANSPORTATION AND STORAGE

This section elaborates more on conditions which are suitable to transport the e-Stack boxes, as well as storing the units while they are not in use.

## Transportation

Avoid serious vibration or shock during transport

## Storage

It is recommended that the e-Stack be stored at room temperature in a dry environment for a maximum period of 6 months with the isolators switched off. If the units are not stored under the correct conditions i-G3n will not be held liable for any damage to the system.

If the units have been in storage for a while, it is recommended that the “Restart Procedure for Fully Drained Battery” procedure be followed.

