



Commercial Energy Storage Solutions

GivEnergy Commercial Ltd

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Commercial Battery Rack

Installation Manual

V1.0

200kWh

Safety

It is critical that the below safety instructions are fully read and understood. High DC voltage may be present within the battery rack even when turned off.

- Only trained and qualified electricians should install or maintain the battery rack.
- The battery rack & batteries are heavy and will require lifting equipment in all circumstances.
- The battery rack must only be moved when it is empty, under no circumstances can it be moved once the batteries are installed.
- Before removing any covers or batteries the battery rack should be isolated from the PCS and DC Cabinet if fitted.
- Before installing or removing any cables from the battery packs ensure all components are correctly isolated.
- The installation order of the battery packs and high voltage box is critical, incorrect installation could result in serious damage.

Signs and symbols in this guide



Pay particular attention to this instruction, risk of damage to the product or injury.



DANGER – High DC voltage, wear appropriate PPE and pay particular care to instructions.

Required tools and equipment

- Gloves
- Screwdrivers
- Socket/Spanner set
- Suitably rated lifting equipment¹

¹ The battery packs weigh 89kg, it is advised that these are not lifted manually and the use of a lifting device is recommended. Please speak to a GivEnergy representative if uncertain.

Delivery and unpackaging

The battery rack and battery packs are delivered on separate pallets.

The battery rack will be delivered palletised in a cardboard box;

1. Remove all packaging and foam protection.
2. Lift the battery rack to allow removal of the pallet being careful not to put any body part in a potential trap area/drop zone.
3. The battery rack can now be positioned using the lifting equipment or a standard pallet truck.

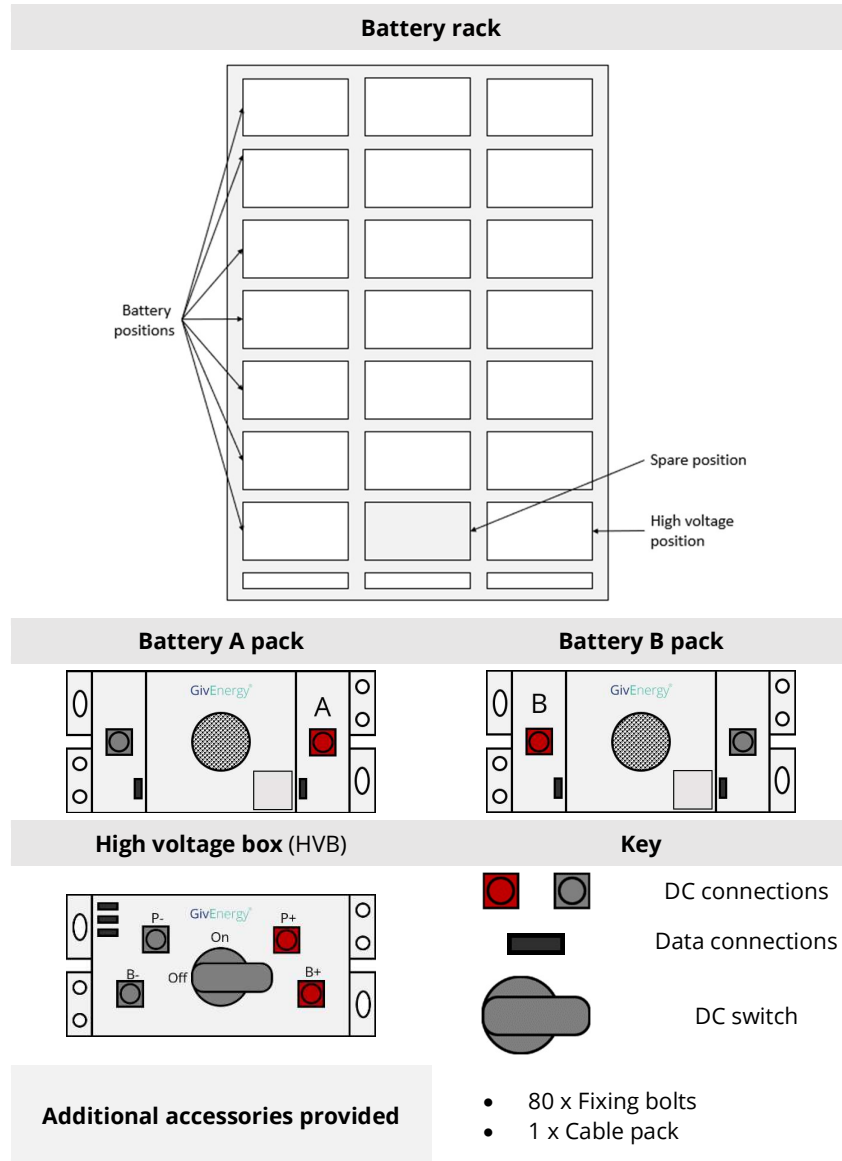
The battery packs and high voltage box (HVB) are delivered on pallets of up to 8 units per pallet;

1. Remove all outer packaging
2. Carefully lower the battery boxes one at a time, using a lifting aid if required.
3. Unbox batteries one at a time, taking care not to drop them.
4. Remove all foam and plastic protection.
5. Install each pack before unpackaging the next, paying attention to each batteries number.

Key dimensions

Component	Battery rack	Battery pack (10.8kWh)	HVB
Size (W X D X H)	1458 x 640 x 2050mm	483 x 692 x 221mm	483 x 692 x 221mm
Weight (kg)	200	89	40

Battery rack components



Ref	Cable pack contents	
D1	Data 1 x End of line resister	
A	DC - + to - 16 x Short, 1 x Medium, 1 x Long	
D2	Data - Battery to battery 18 x Short, 2 x Long	
B1	DC + to + 1 x HVB to Battery 19 (+)	
B2	DC - to - 1 x HVB to Battery 1 (-)	
D3	Data 1 x HVB to DC cabinet/PCS	
AC1	AC 1 x HVB to DC cabinet/PCS	
C1	DC + to ring 1 x HVB to DC cabinet/PCS	
C2	DC - to ring 1 x HVB to DC cabinet/PCS	

Installation environment

To ensure optimal operation and lifetime of the system it must be installed in an environment that meets the following criteria at a minimum;

- 0°C to 40°C
- 0 to 95% non-condensing humidity
- <5000m altitude
- In an area with adequate ventilation

The battery rack must only be installed internally on level flat ground. The battery rack must be fixed to the floor using the holes in the base and fixings suitable for the flooring construction.

Ventilation

The battery rack must have a suitable airflow to ensure optimal operation. All the battery packs have fan assistance so a flow of air is essential.

Access

It is required that access to the area the system is located within is restricted due to accessible DC power connectors.

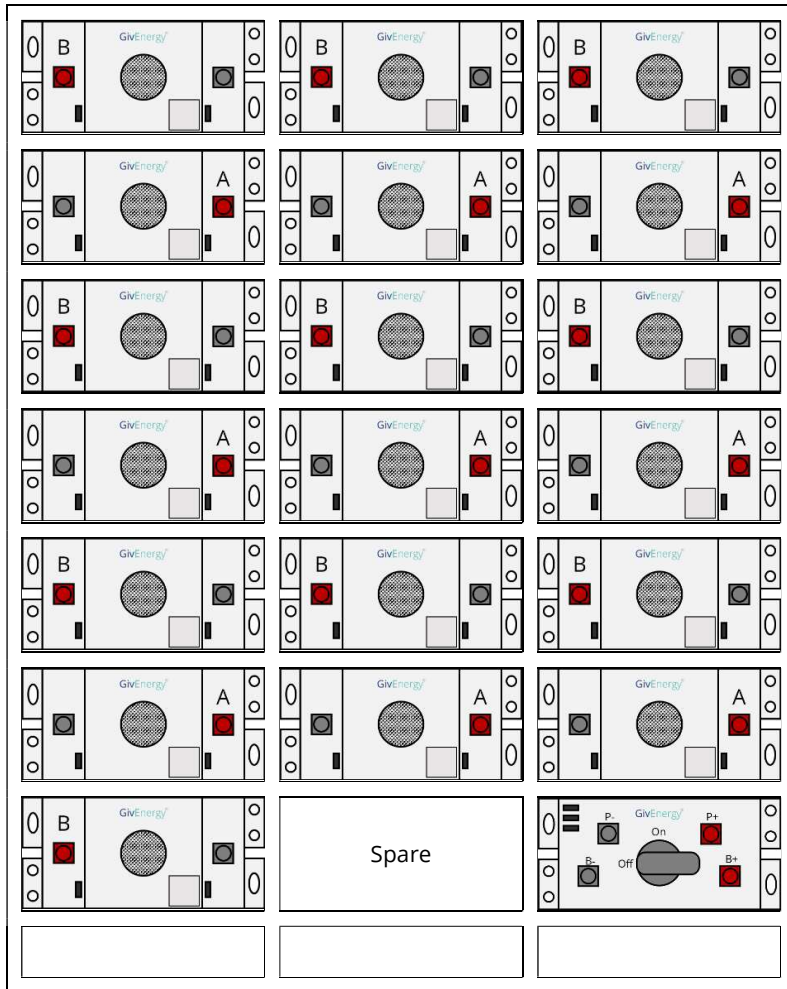
Battery pack order

Battery modules are either A or B, the only difference is the positioning of the positive + and negative – connections, working up the battery rack these must be arranged alternately.

1. Ensure the battery rack is installed on flat level ground and secured to the floor using the fixing holes in the bottom of the racking.
2. Each battery has a number on the front cover.
3. Using a lifting aid and starting from the bottom row following the diagram below and on the next page, install each pack in its correct position¹.
4. Secure each unit with 4 fixing bolts provided.

B7	B8	B19
A6	A9	A18
B5	B10	B17
A4	A11	A16
B3	B12	B15
A2	A13	A14
B1	Spare	HVB

¹ A or B orientation always takes priority over the numbering system.



DC power and data connections



The order of the following steps is critical to ensure a safe installation process.

Connections to and from the high voltage box must be made before any battery to battery connection are made. Battery to battery connections must only be made with the high voltage box turned off.

Every DC connection must click as it is inserted, a tug test should also then be performed on each connection to ensure it is firmly connected.

Each battery pack must be tested for voltage and polarity before making any DC connections, this information should be recorded on the commissioning checklist provided. Voltage should be with 0.1V across all batteries – speak to a GivEnergy representative if it is not.

AC Supply to HVB

Using cable 'AC1' connect one end to 220V AC in the HVB to either the DC cabinet¹ if one is installed or the PCS' EPS output².

¹ See DC cabinet installation manual for details

² See PCS installation manual for details

A DC cabinet is required when more than 1 battery rack is to be installed. This cabinet offers an additional level of control and protection as well as a position to connect the battery racks together.

When a DC cabinet is provided the battery racks will take AC supply from here, the DC cabinet is then powered from the PCS' EPS output terminals¹.

¹ See DC Cabinet Installation Manual for more details.

HVB to DC cabinet or PCS

Turn OFF the DC switch and Power button on the high voltage box.

Install cables 'C1' and 'C2' between the HVB P+ and P- and DC cabinet (if fitted) or PCS, ensuring correct polarity.

Install cable 'D3' from HVB BAU to DC cabinet (if fitted) or PCS.

HVB to B1 and B19

Install power cable 'B1' between HVB and B19 + then power cable 'B2' between HVB and B1 -.

Install data cable 'D2 - long' between HVB BMU and COM1 on B1

Battery to battery

DC power

1. Starting from B1, bottom left, use 'A- short' cables to connect the + to the - of the battery above. Continue up to B7, top left.
2. Moving to B8, top centre, use 'A - short' cables to connect the + to the - of the battery below. Continue down to A13, bottom centre.
3. Moving to A14, bottom right, use 'A- short' cables to connect the + to the - of the battery above. Continue up to B19, top right.
4. Connect battery A13 +, bottom centre, to A14 -, bottom right using cable 'A - medium'.
5. Connect battery B7, top left, to B8 top centre, using cable 'A - long'.

Data

1. Starting from B1, bottom left, use 'D2- short' cables to connect COM2 to COM1 of the battery above. Continue up to B7, top left.
2. Moving to B8, top centre, use 'D2 - short' cables to connect COM2 to COM1 of the battery below. Continue down to A13, bottom centre.
3. Moving to A14, bottom right, use 'D2- short' cables to connect COM2 to COM1 of the battery above. Continue up to B19, top right.
4. Connect battery A13 COM2, bottom centre, to A14 COM 1, bottom right using cable 'D2 - short'.
5. Connect battery B7 COM2, top left, to B8 COM1, top centre, using cable 'D2 - long'.

System setup

For single battery rack installations - The EMS is located in the bottom of the battery rack, it provides control to the whole system

For multiple battery rack installations - Only one EMS is utilised and this will be located within the DC cabinet.

The EMS communicates with all battery packs, high voltage boxes, PCS, metering and the internet via either LAN or WiFi.

The GivEnergy engineer will help install and configure the LAN or WiFi connectivity and ensure communication with the online portal. Power on procedure

Power On Procedure

Once all connections are terminated correctly with satisfactory test results the following turn on procedure should be followed;

1. Turn on the PCS following its power on procedure
2. Turn on the DC cabinet following its power on procedure
3. Turn on the switch on the HVB.
4. Press the power on button on the HVB
5. Repeat steps for additional battery racks

In an emergency press the emergency stop button on the PCS first then all battery cabinets/racks then follow the below instructions.

1. Turn the PCS off first
2. Turn OFF the switch on the HVB
3. Press the power button on the HVB
4. Repeat for additional battery racks

Initial testing/commissioning

All GivEnergy commercial storage solutions include an on-site commissioning service, our engineer will ensure correct communication with meter, battery packs, EMS and PCS. To aid in this testing the engineer will initially run a low power test in 'manual' mode setting the system to complete a 5 minute charge followed by a 5 minute discharge and a rate of 10kW.

Once this is complete where electrical supply parameters allow a full power charge and discharge will be ran for a period of 15 minutes each. If electrical limitations on site do not allow this test will be adjusted to power levels with site tolerance.

Any additional tests can now be completed include system specific operation such as back up power.

Once above testing is successfully completed the system will be set to run in its agreed operational modes and a demonstration can be given to the client and/or installer.

Our engineer will supply commissioning paperwork once complete, the date of which will commence the PCS warranty.

Maintenance

Ensure that the ventilation holes on the front of the battery packs do not become blocked with dust.

Support

Free remote support is included with all systems for the period of the warranty.

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