



Handover Documents

600kWh / 250kW

Consall Hall Gardens,
Consall, Stoke-on-Trent

ST9 0AG

SME Start-up and Shutdown procedure

Site: Consall Hall Gardens, Consall, Stoke-on-Trent ST9 0AG

System type and size: 600kWh / 200kW

System configuration;

- 1 x 200KW PCS
- 3 x 204kWh Battery Racks each with;
 - 19 x 10.752kWh batteries
 - 1 x High voltage box

Power on procedure

1. Turn on G99 Panel (Supplied by others if applicable)
2. Release all emergency stop button(s)

At the PCS;

3. Open the PCS door and turn on the AC Supply MCCB (QAC2)
4. Wait for the screen to power up and display grid voltage¹
5. Turn on the EPS output MCCB (QAC1)
6. Wait for the screen to show voltage on 'load'

At the battery rack(s);

7. Open the door of each unit and turn on the MCB located at the top of the battery cabinet
8. Turn ON the MCCB on the high voltage box at the bottom of the battery cabinet
9. Press the power on button on the high voltage box at the bottom of the battery cabinet

At the DC Cabinet;

10. Open the DC Cabinet door and turn on all MCB's
11. Tap the ON/OFF button on the UPS then press and hold it to power it up
12. Check the screen on the door to ensure that all battery racks are reporting data²
13. Press the RESET and then ON button to the top left of the DC Cabinet screen

Back at the PCS;

14. Turn on the DC Switch (QDC) and check for the correct DC voltage on the screen

¹ On first start up/initial commissioning it is advised that the Operational settings are checked after step 3 before proceeding to next steps.

² Select **Operator** as a username and **1357** as a password for the DC Cabinet screen.

**In an emergency
press the emergency stop button on the PCS first
then all other cabinets.**

Turn off procedure

It is recommended in none emergency situations to stop the system from charging/discharging prior to operating any switches or On/Off buttons. This can be achieved by remotely stopping the system, please speak to GivEnergy for further information.

1. Press the emergency stop button on the PCS then open the door and turn off all switches within the PCS (QAC1, QAC2 and QDC)
2. Press the emergency stop on the DC Cabinet, then open the door and turn off all MCB's and press and hold the On/Off button on the UPS
3. Press the emergency stop on each battery cabinet, then open the door(s) and turn off all MCB's and On/Off buttons
4. Turn off G99 Panel (Supplied by others)

Caution: Always wait at least 15 minutes for the internal capacitors to discharge within the PCS before unplug any cables or removing safety covers.

Commissioning checklist

Project code	EMS238G148	Date	06/12/2023
Project location	Consall Hall Gardens, Consall, Stoke-on-Trent ST9 0AG		
Engineer(s)	James Shaw/ Darren Brown		
General checks			
Battery racking and PCS are installed on level, flat ground		✓	
System size (Capacity)		600kWh	
System size (Power)		200kW	
PCS			
AC supply to PCS is connected and tested?		✓	
Are all cable entry covers and blanking plates correctly installed?		✓	
Can AC and DC voltage can be seen on the PCS screen?		✓	
Has the PCS basic configuration inputted per PCS installation manual?		✓	
Operational testing			
10kW charge / discharge performed for 10 minutes in each direction?		✓	
Full power charge / discharge performed for 30 minutes in each direction?		LIM	
Automatic operation (Time periods, self consumption etc)		✓	
EMS			
Meter communications working correctly? Number of meters.		✓	1
EMS is connected to network and communicating with GivEnergy servers?		✓	
Clients operating parameters entered into EMS?		LIM due to ComAp	
Demonstration to client of components and online portal		LIM	
EMS serial number		EMS238G148	
EMS communication reference		FO2308G148	
Online portal username		Consall_Hall	
Comments or notes			
Full power testing of the system was discharging to load at 55kW (load at time of testing) during automatic operation testing. This site is currently off grid so generators and battery is needed to power site load. ComAp controller is sinking up the battery and generator power to best run the site efficiently. Portal access will be given so that they can check on the system performance.			

Commissioning checklist

Battery racking 1

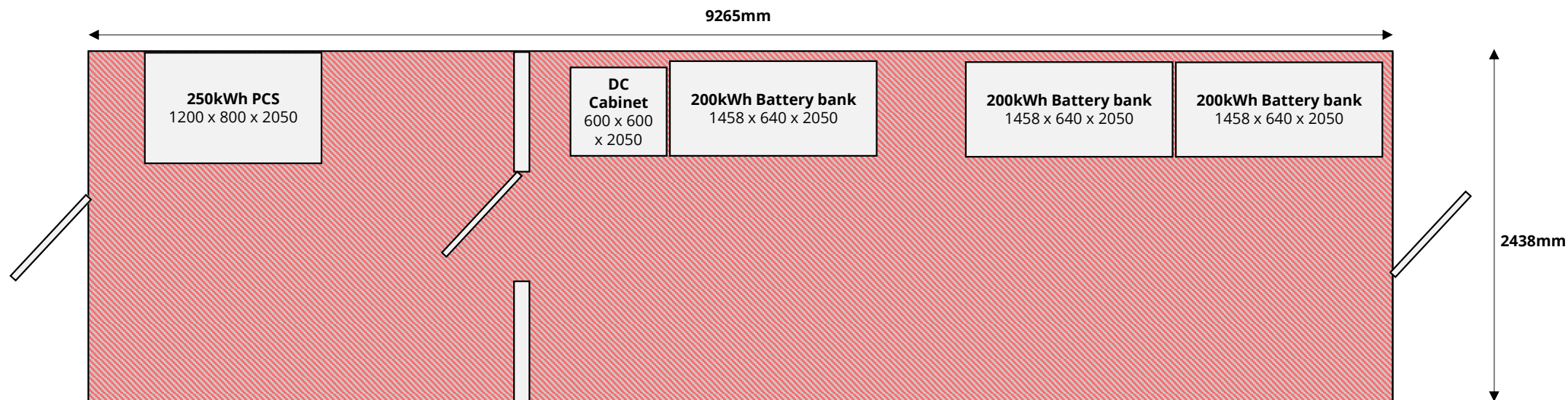
	Voltage (VDC)			Polarity	DC voltage and polarity at high voltage box	731V	
	Column 1	Column 2	Column 3			Polarity	✓
Row 7	38.43	38.45	38.43	✓	DC voltage and polarity at PCS	731V	
Row 6	38.43	38.45	38.43	✓		731V	
Row 5	38.45	38.44	38.43	✓		Polarity	✓
Row 4	38.42	38.44	38.43	✓	A DC power cable 'tug test' has been performed on all connections	✓	
Row 3	38.42	38.43	38.44	✓			
Row 2	38.44	38.43	38.44	✓			
Row 1	38.43	-	HV Box	✓	Is cabling secured and blank plate fitted over spare slot?	✓	

Battery racking 2

	Voltage (VDC)			Polarity	DC voltage and polarity at high voltage box	731V	
	Column 1	Column 2	Column 3			Polarity	✓
Row 7	38.43	38.45	38.43	✓	DC voltage and polarity at PCS	731V	
Row 6	38.43	38.45	38.43	✓		731V	
Row 5	38.45	38.44	38.43	✓		Polarity	✓
Row 4	38.42	38.44	38.43	✓	A DC power cable 'tug test' has been performed on all connections	✓	
Row 3	38.42	38.43	38.44	✓			
Row 2	38.44	38.43	38.44	✓			
Row 1	38.43	-	HV Box	✓	Is cabling secured and blank plate fitted over spare slot?	✓	

Battery racking 3

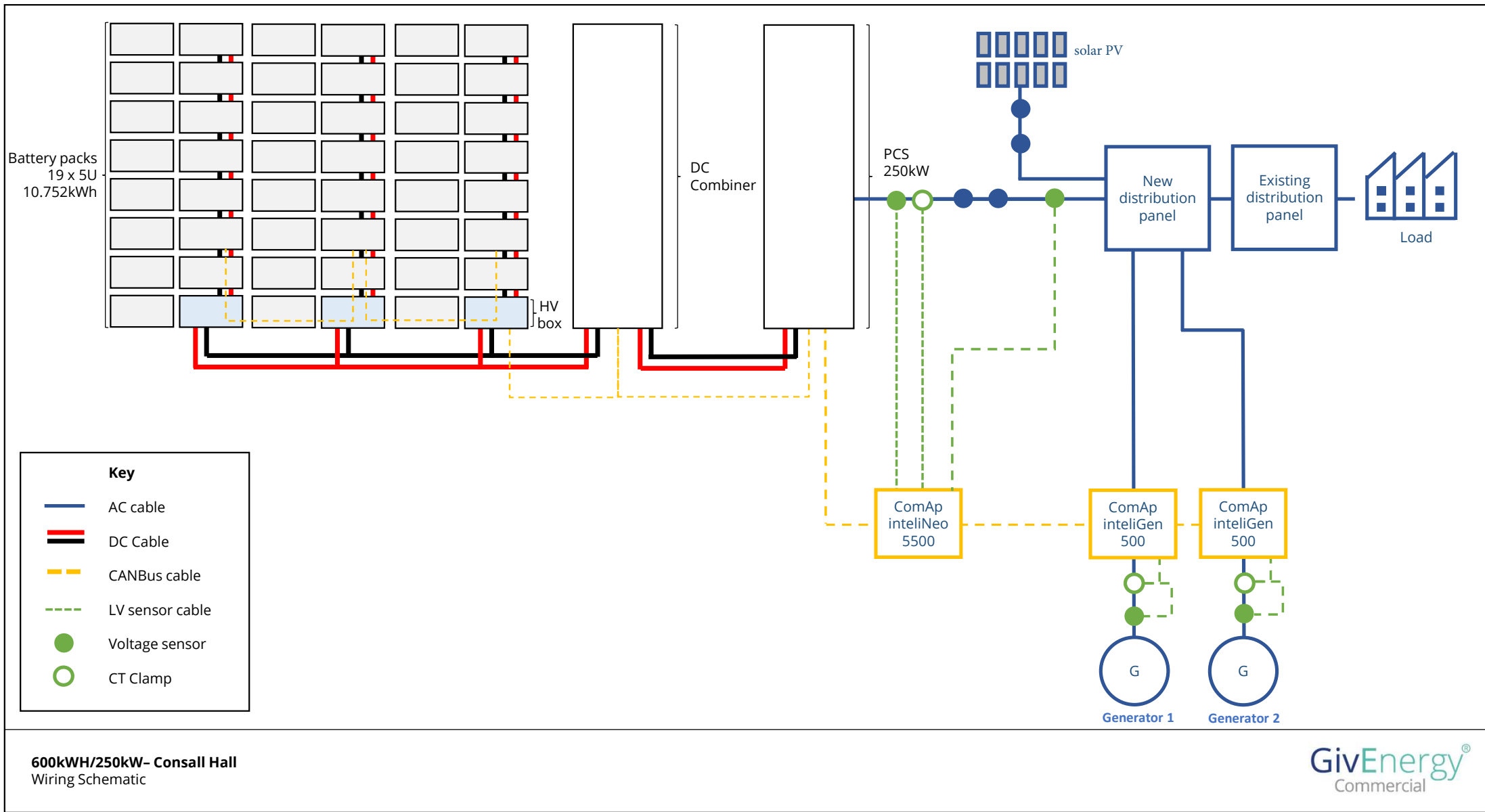
	Voltage (VDC)			Polarity	DC voltage and polarity at high voltage box	731V	
	Column 1	Column 2	Column 3			Polarity	✓
Row 7	38.43	38.45	38.43	✓	DC voltage and polarity at PCS	731V	
Row 6	38.43	38.45	38.43	✓		731V	
Row 5	38.45	38.44	38.43	✓		Polarity	✓
Row 4	38.42	38.44	38.43	✓	A DC power cable 'tug test' has been performed on all connections	✓	
Row 3	38.42	38.43	38.44	✓			
Row 2	38.44	38.43	38.44	✓			
Row 1	38.43	-	HV Box	✓	Is cabling secured and blank plate fitted over spare slot?	✓	

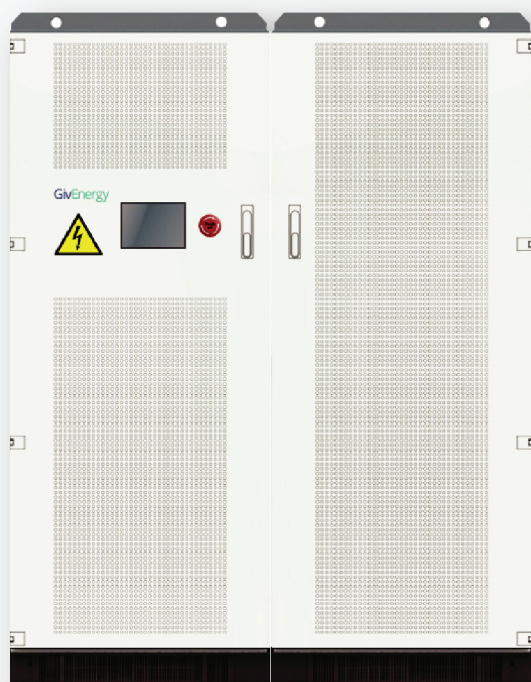


Key

-  Access area,
No storage
-  Concrete pad
-  Door

600kWh/250kW – Consall Hall
System Layout





Our Power Conversion System (PCS) provides a wide range of operating modes to meet the requirements of your installation.

Compatible with our high voltage battery packs, almost any size of storage capacity is possible. Built-in black start functionality can provide resilience to sites with power supply taken from both AC and DC to ensure they can always stay energised.



Flexible Control

Control and monitor the system via GivEnergy cloud or via an external signal.



Adjustable Power Rating

With our EMS, control the charge and discharge rates based on pre-defined parameters.



Industrial & Commercial

Suitable for a wide range of applications. Can be installed internally or in a custom-built container.



Modular Design

Need a larger capacity? Modular design allows for multiple units to be installed in parallel.

PCS

with Transformer

ALL MODELS

AC (ON-GRID)

Rated Voltage	400V
Voltage Range	320V - 460V
Rated Frequency	50 / 60Hz
Frequency Range	45 - 55 / 55 - 65Hz
Total Harmonic Distortion (THDi, Rated Power)	<3%
PF	1 lagging - 1 leading
AC Connection	3 L + N + PE

AC (OFF-GRID)

Rated Voltage	400V
THDU	<1% linear <5% non-linear
Rated Frequency	50 / 60Hz
Overload Capability	110%-continuous

GENERAL DATA

Protection Degree	IP21
Noise Emission	<65dB
Operational Temperature	-30°C - 55°C
Cooling	Forced Air
Relative Humidity	0-95% non-condensing
Max. Altitude	5000m (derated above 3000m)
Transformer	Yes
Self-consumption	<10W
On/Off Grid Transfer	Manual (default) - Automatic (Optional)

COMMUNICATION

Display	Touch Screen LCD
BMS Interface	RS485/CAN
Device Interface	RS485, TCP/IP
Certificates	CGC TUV

GIV-PCS-030T

Battery Voltage Range	300V - 850V
Max. Current	43A
Max. Output Power	33kVA
Rated Power	30kW
Rated Current	43A
Max. Output Current	48A
Efficiency	96.3%
Dimensions (WxDxH)	800 x 800 x 2050mm
Weight	600Kg

GIV-PCS-050T

Battery Voltage Range	300V - 850V
Max. Current	167A
Max. Output Power	55kVA
Rated Power	50kW
Rated Current	72A
Max. Output Current	80A
Efficiency	96.5%
Dimensions (WxDxH)	800 x 800 x 2050mm
Weight	650Kg

GIV-PCS-100T

Battery Voltage Range	300V - 850V
Max. Current	334A
Max. Output Power	110kVA
Rated Power	100kW
Rated Current	144A
Max. Output Current	160A
Efficiency	97.1%
Dimensions (WxDxH)	800 x 800 x 2050mm
Weight	910Kg

GIV-PCS-150T

Battery Voltage Range	300V - 850V
Max. Current	501A
Max. Output Power	165kVA
Rated Power	150kW
Rated Current	216A
Max. Output Current	240A
Efficiency	97.2%
Dimensions (WxDxH)	800 x 800 x 2050mm
Weight	950Kg

GIV-PCS-250T

Battery Voltage Range	400V - 850V
Max. Current	570A
Max. Output Power	275kVA
Rated Power	250kW
Rated Current	361A
Max. Output Current	400A
Efficiency	97.3%
Dimensions (WxDxH)	1200 x 800 x 2050mm
Weight	1350Kg

GIV-PCS-500T

Battery Voltage Range	500V - 850V
Max. Current	1200A
Max. Output Power	550kVA
Rated Power	500kW
Rated Current	722A
Max. Output Current	800A
Efficiency	97.5%
Dimensions (WxDxH)	1600 x 1050 x 2050mm
Weight	2460Kg



Our DC Cabinet is used when multiple battery racks are installed.

The DC Cabinet is used to combine the supplies from up to 4 battery racks/cabinets to a PCS.



Expandable

Multiple DC Cabinets can be fitted with larger systems.



High power

200 – 1000A to suite the battery systems power requirements



Easy to install

Pre-made sockets for data connections and accessible bus bar system for power.



5 Year warranty

Supplied with a full manufacturers warranty. Our UK based support team are on hand to help you should any issues arise.

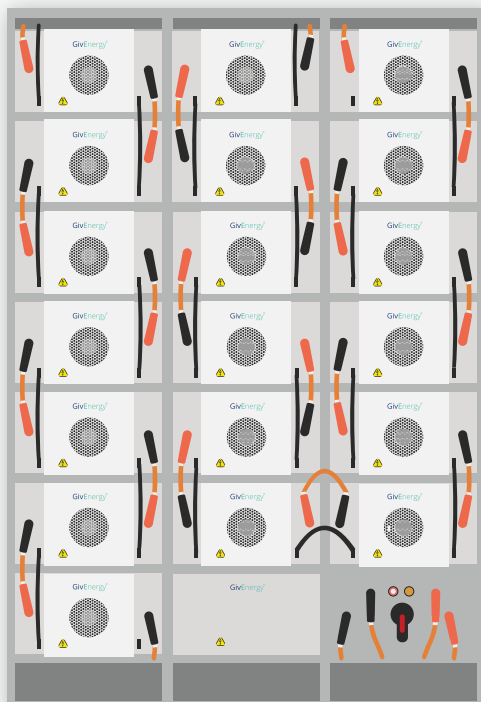
DC Cabinet

200A SME

Dimensions $W \times D \times H$	600 x 800 x 2050mm
Weight $kg - (Without\ batteries)$	200
IP grade	IP20
Current rating A	200
Advantages	Robust steel construction Built in display
Voltage range DC	600 – 850V
Safety	Robust Multi Point Monitoring BMS. On/Off button, DC MCB, Emergency stop
Connections	AC Supply DC Input DC Output CAN bus in CAN bus out
Communication protocol	CAN bus / RS485

1000A

Dimensions $W \times D \times H$	600 x 800 x 2050mm
Weight $kg - (Without\ batteries)$	200
IP grade	IP20
Current rating A	1000
Advantages	Robust steel construction Built in display
Voltage range DC	600 – 850V
Safety	Robust Multi Point Monitoring BMS. On/Off button, DC MCB, Emergency stop
Connections	AC Supply DC Input DC Output CAN bus in CAN bus out
Communication protocol	CAN bus / RS485



Our commercial systems are designed for installation in commercial or industrial applications.

An ideal solution for those who need more storage capacity and power, whether it is a large commercial/industrial building or a containerised solution.

Utilising Lithium Iron Phosphate our batteries are extremely safe and can be installed in a wide range of locations. The battery chemistry does not contain Cobalt, making it non-flammable and the battery pack is 99% recyclable.



Expandable

Each battery rack contains 200kWh of batteries, with a DC cabinet 3 units are installed together offering 600Wh of storage, this can be expanded to any side in 600kWh increments.



High Power

Coupled with any of our PCS up to a maximum rating of 0.8c (i.e. 600kWh - 500KW or 2.4MWH - 2MW)



Easy to Install

The open rack mounting system makes it easy for the battery packs to be slid into place. Accessible power and data connection make the connection simple to install and maintain.



10 Year Warranty

Supplied with a full manufacturers warranty. Our UK based support team are on hand to help should any issues arise.

Battery Rack

Commercial

200KWH BATTERY RACK

Dimensions (WxDxH)	1458 x 640 x 2050mm
Weight (without batteries)	200 kg
Advantages	Robust steel frame Pre-drilled fixing points on all sides

HIGH VOLTAGE BOX

Dimensions (WxDxH)	483 x 692 x 221mm
Weight	40kg
Nominal Voltage	730V DC
Voltage Range	600 - 850V DC
Safety	Robust Multi Point Monitoring BMS On/Off button and DC MCB
Connections	AC Supply DC Input DC Output CAN bus in CAN bus out
Communication Protocol	CAN bus

10.8KWH BATTERY

Dimensions (WxDxH)	483 x 692 x 221mm
Weight	89kg
IP Grade	IP20
Nominal Voltage	38.4V DC
Voltage Range	33.6 - 43.8V DC
Chemistry	LiFePO ₄
Rated Capacity	280Ah
Nominal Capacity	10.752kWh @25°C
Depth of Discharge	80%
Operating Temperature	0°C - 55°C*
Connections	+ and - DC power 2 x CAN bus
Safety	Robust Multi Point Monitoring BMS
Communication Protocol	CAN bus
Warranty	70% remaining capacity after the first of 10 years or 10MWh per kWh throughput

*Charge/discharge rate and capacity reduced at lower and higher temperatures