GivEnergy®

Installer Training Manual

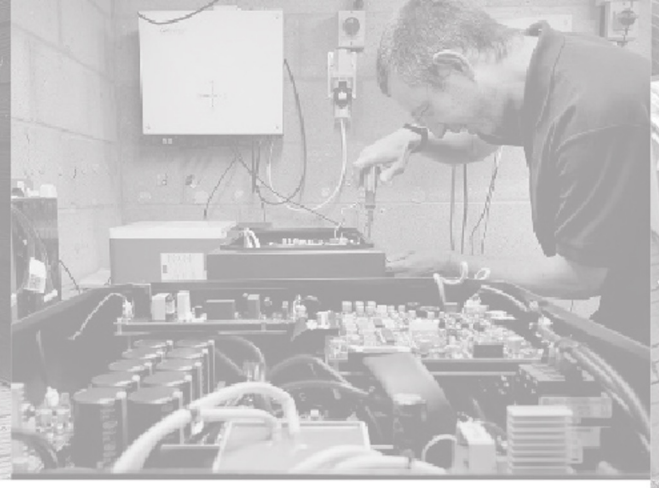
01

Who are GivEnergy?

In 2016, JMHing Power, based in the UK with manufacturing facilities in China manufactured white labelled energy storage systems for various companies across the globe.

Following great success, they launched their own brand called GivEnergy.

The GivEnergy brand became extremely popular across the industry for its innovation and its world leading software and support network and so in 2018, GivEnergy Ltd was born in the UK.



Making Waves

Since then, the brand has gone from strength to strength and the company has experienced hyper growth.

Boasting one of the highest quality, yet competitively priced product portfolios in the marketplace, GivEnergy has quickly become a leader of the industry with its unified Energy Storage System.

Support

UK based support staff that are more than happy to assist with the entire system (both installer and end user support).

Installer training is **FREE** of charge and hosted online.

Pre-sales support for installation and system queries.

On-site support if necessary.

Lifetime access to **Monitoring Portal**.

Contact Us

GENERAL ENQUIRIES

Mon - Fri	8:30 – 5:30pm
Emergencies	24/7

Support@givenergy.co.uk

01377 252 874

(option 2)

COMMISSIONING

Mon - Fri	8:30 – 5:30pm
Sat	9am – 7pm
Sun	Closed

Support@givenergy.co.uk

01377 252 874

(option 1)

KNOWLEDGEBASE

https://kb.givenergy.cloud/

01377 252 874

(option 5)

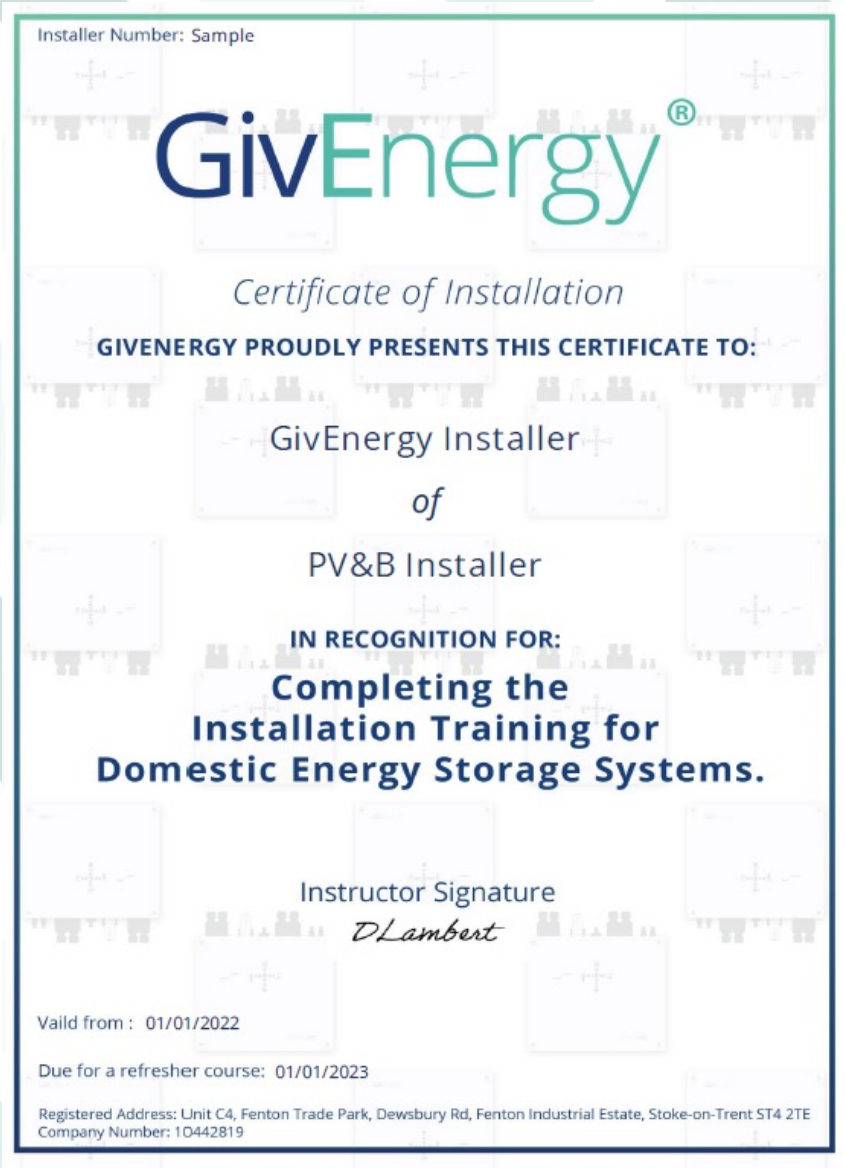
Training Certificate

At the end of this training, you will be sent a link to confirm your attendance. You will receive a copy of this training manual, some useful guides, and a training certificate.

Please note

It is a requirement that all individuals attending this course and installing our products are **trained and qualified electricians**, preferably with previous solar / battery installation experience.

Note that if we are made aware of non qualified individuals installing GivEnergy equipment then **warranties may be void** and we reserve the right to remove associated parties from our approved installer program.


Installer Number: Sample

GivEnergy®

Certificate of Installation

GIVENERGY PROUDLY PRESENTS THIS CERTIFICATE TO:

GivEnergy Installer

of

PV&B Installer

IN RECOGNITION FOR:

Completing the Installation Training for Domestic Energy Storage Systems.

Instructor Signature

DLambert

Vaild from : 01/01/2022

Due for a refresher course: 01/01/2023

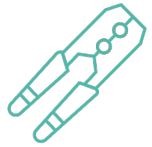
Registered Address: Unit C4, Fenton Trade Park, Dewsbury Rd, Fenton Industrial Estate, Stoke-on-Trent ST4 2TE
Company Number: 10442819

Tools and Equipment Required

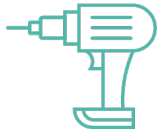
06

VDE Screwdriver Set
Electrical Connections

Allen Keys
To remove battery front panels



Wire Stripper
Strip wire



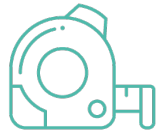
Hammer Drill
Used to drill holes for mounting brackets

Cut Resistant Gloves
To protect hands from sharp edges

Level
To ensure mounting brackets are level

Multi Meter
Checking connections

Crimping Tools
For ferrules, ring terminals, and RJ45



Tape Measure
To ensure correct clearance

Marker Pen
To plot brackets

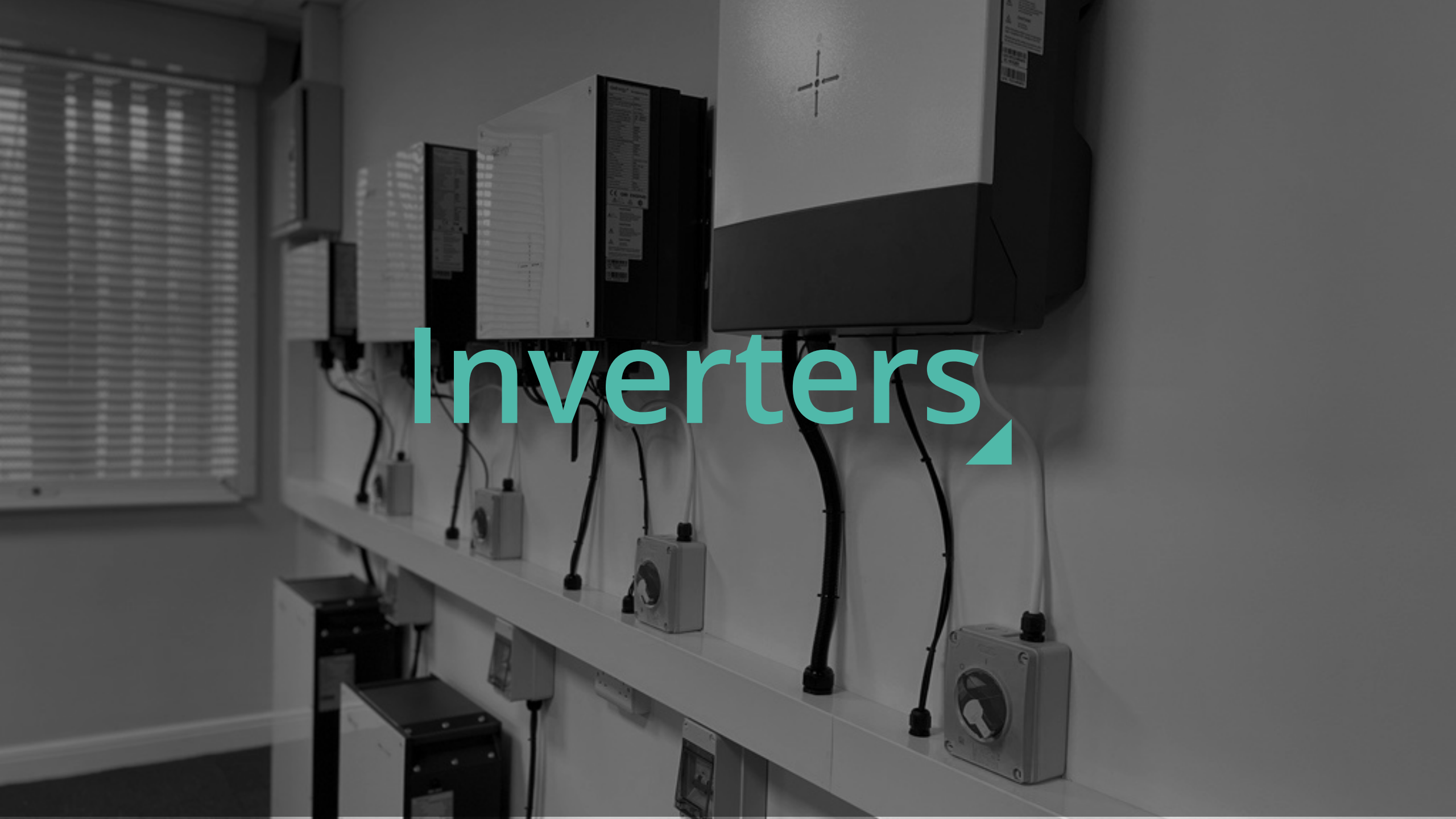
Additional Equipment

RS485-USB Adaptor
Software Update

USB Stick
Update inverter and battery firmware

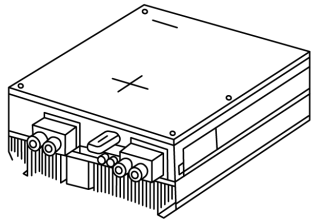
Laptop
Checking web portal

DC Clamp Meter
Testing

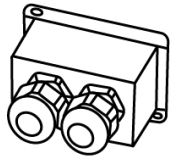

Inverters

Box Contents

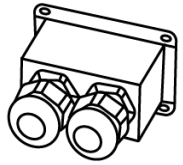
INVERTERS



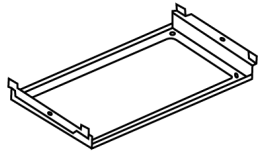
Inverter



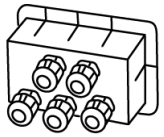
BAT Wire Cover



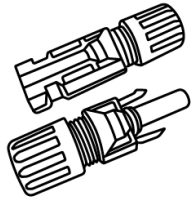
AC Output Cover



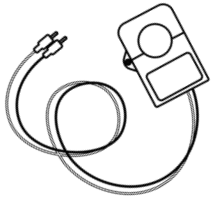
Wall Mounting Bracket



Communication Cover

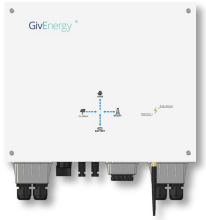


MC4 Connector Pack x2
(Hybrid only)



CT Clamp
(AC Coupled only)

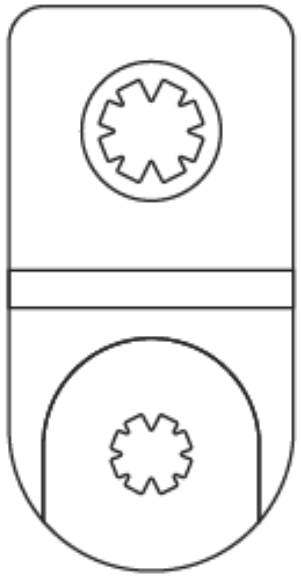
Inverter Specifications

	Hybrid Gen1 3.6 / 5.0	Hybrid Gen2 3.6 / 5.0	Hybrid Gen3 3.6 / 5.0	AC Coupled 3.0
Max DC Power	4.7 / 6.5kWp	4.7 / 6.5kWp	4.7 / 6.5kWp	No Direct PV Input
Min/Max DC Voltages	100 – 580v	150 – 600V	150 – 600V	
Start up Voltages	120v	150V	150V	
MPPT Voltage Range	120 – 550v	150 – 550V	150 – 550V	
Max Input Current Per String	11A / 11A	13A / 13A	15A / 15A	
Number of MPPT's	2	2	2	
Nominal AC Output	3680w / 5000w	3680w / 5000w	3680w / 5000w	3000w
Max Battery Charge/Discharge	2600w	3600w	3600w	3000w
IP Rating	IP65			IP65
Dimensions W/H/D (mm)	480 / 440 / 260	480 x 410 x 210	588 x 214 x 480	480 x 290 x 260
Weight	32Kg	27.5Kg	32Kg	19Kg
Connectivity	USB port for 4G or WiFi dongle	Built in WiFi, LAN or USB port for 4G and WiFi dongle	Built in WiFi, LAN or USB port for 4G and WiFi dongle	USB port for 4G or WiFi dongle

Earth Bonding

The bonding kit is to be installed after final connections have been made to the inverter and the bottom connection cover is ready to be reinstalled.



1. Unscrew the hex screw from the inverter's bottom cover on the left hand side and remove the screw from the external earthing point.

2. Align the bonding plate with the fixing holes on the bottom of the inverter, then fix in place with the M6 x 12 hex screw and serrated washer supplied with the kit.

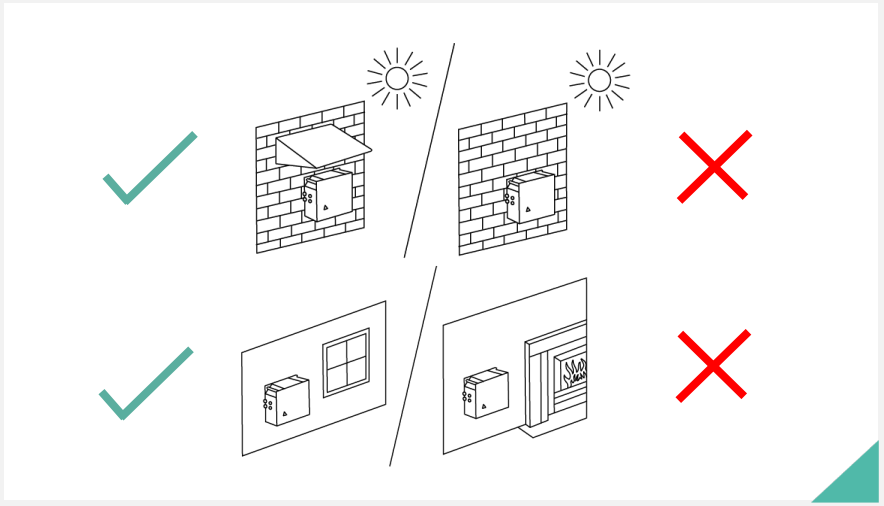
3. Fasten the other end of the bonding plate by reinserting the earthing point screw (please ensure that the serrated washer is secure).

4. Test continuity between earth bonding screw and the supply earth at the AC isolator and record the resistance value (required later for commissioning). A value around 0.1 ohms is acceptable.

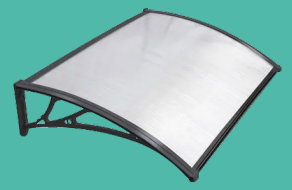
5. Take a photo of the earth bonding kit installed, as this needs to be submitted during the commissioning process.

Mounting

All systems are IP65, meaning they can be installed outdoors if required.
When installing outdoors, systems must be protected against direct sun, rain and snow.



Canopy Example



www.manomano.co.uk
(Search for 'canopy')

IP (Ingress Protection) Ratings Guide

Solids

1 — Protected against a solid object greater than 50 mm, such as a hand.

2 — Protected against a solid object greater than 12.5 mm, such as a finger.

3 — Protected against a solid object greater than 2.5 mm, such as a screwdriver.

4 — Protected against a solid object greater than 1mm, such as a wire.

5 — Dust Protected. Limited ingress of dust permitted. Will not interfere with operation of the equipment. Two to eight hours.

6 — Dust tight. No ingress of dust. Two to eight hours.

Water

1 — Protected against vertically falling drops of water. Limited ingress permitted.

2 — Protected against vertically falling drops of water with enclosure tilted up to 15 degrees from the vertical. Limited ingress permitted.

3 — Protected sprays of water up to 60 degrees from the vertical. Limited ingress permitted for three minutes.

4 — Protected against water splashed from all directions. Limited ingress permitted.

5 — Protected against jets of water. Limited ingress permitted.

6 — Water from heavy seas or water projected in powerful jets shall not enter the enclosure in harmful quantities.

7 — Protection against the effects of immersion in water between 15 cm and 1 m from 30 minutes.

8 — Protection against the effects of immersion in water under pressure for long periods.

Rating Example:

IP65

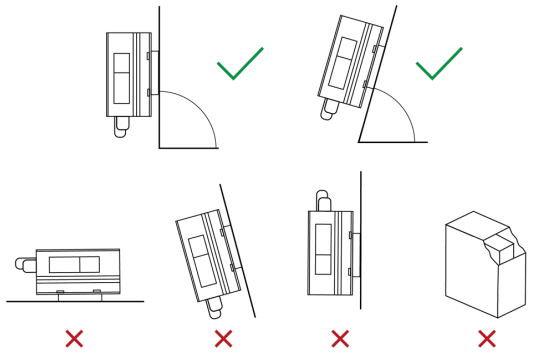
Ingress Protection

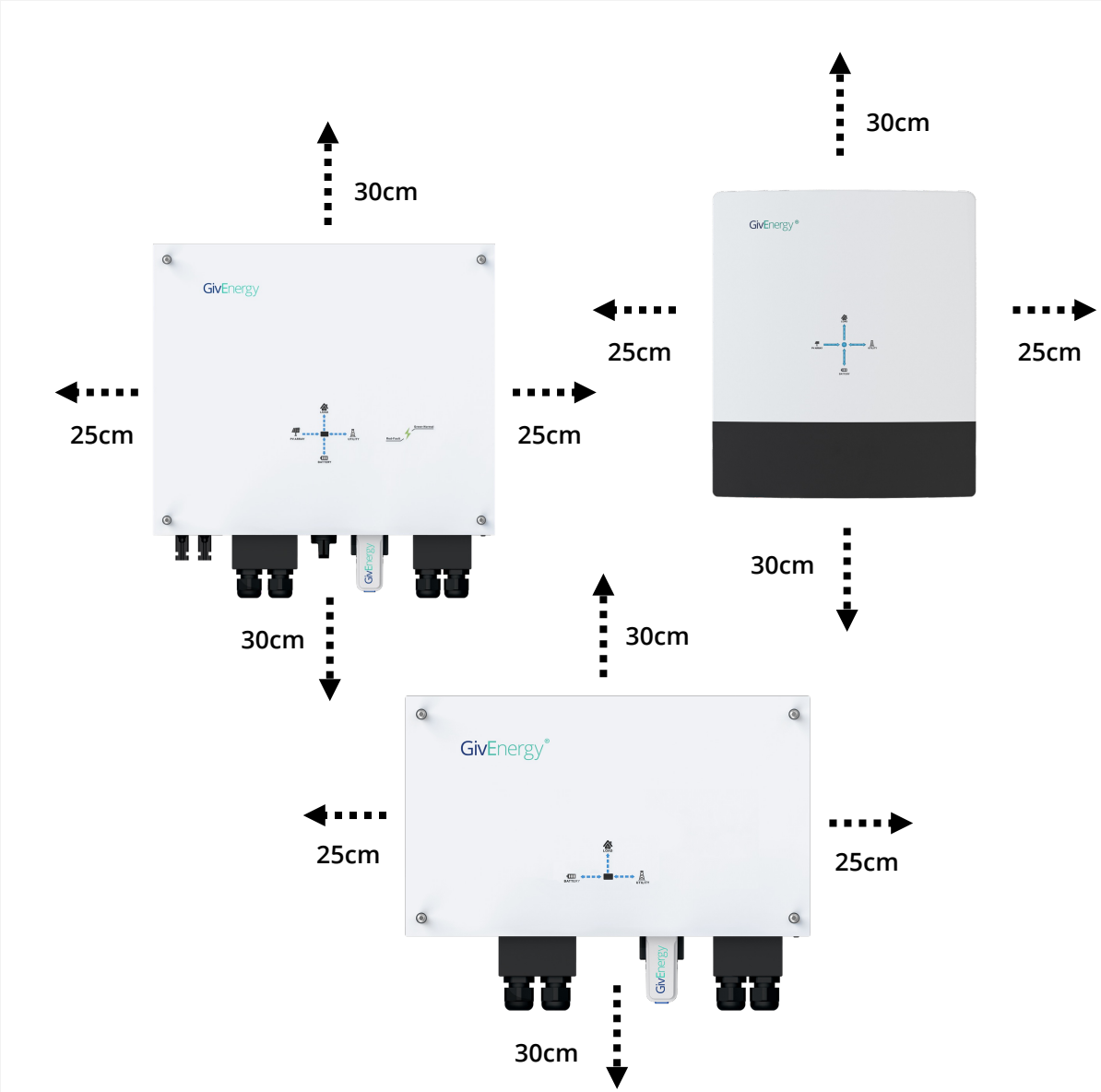
Mounting

MINIMUM CLEARANCE

Systems must always be installed so that they are accessible for future maintenance as per BS7671

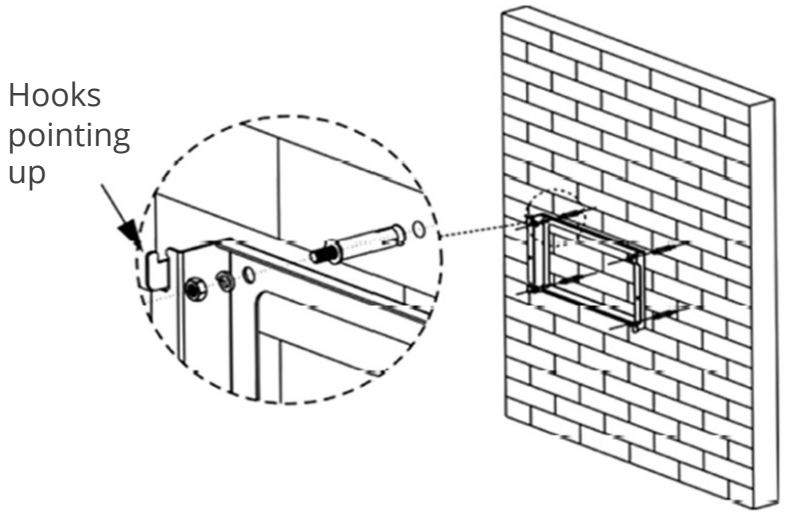
The inverter should be installed with the minimum clearances as shown.
Inverters should be in a vertical position, a 50˚ backwards tilt is permitted if required.



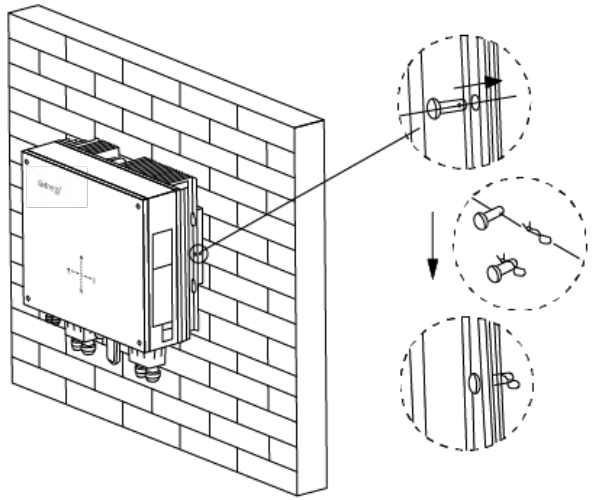


Mounting

BRACKETS



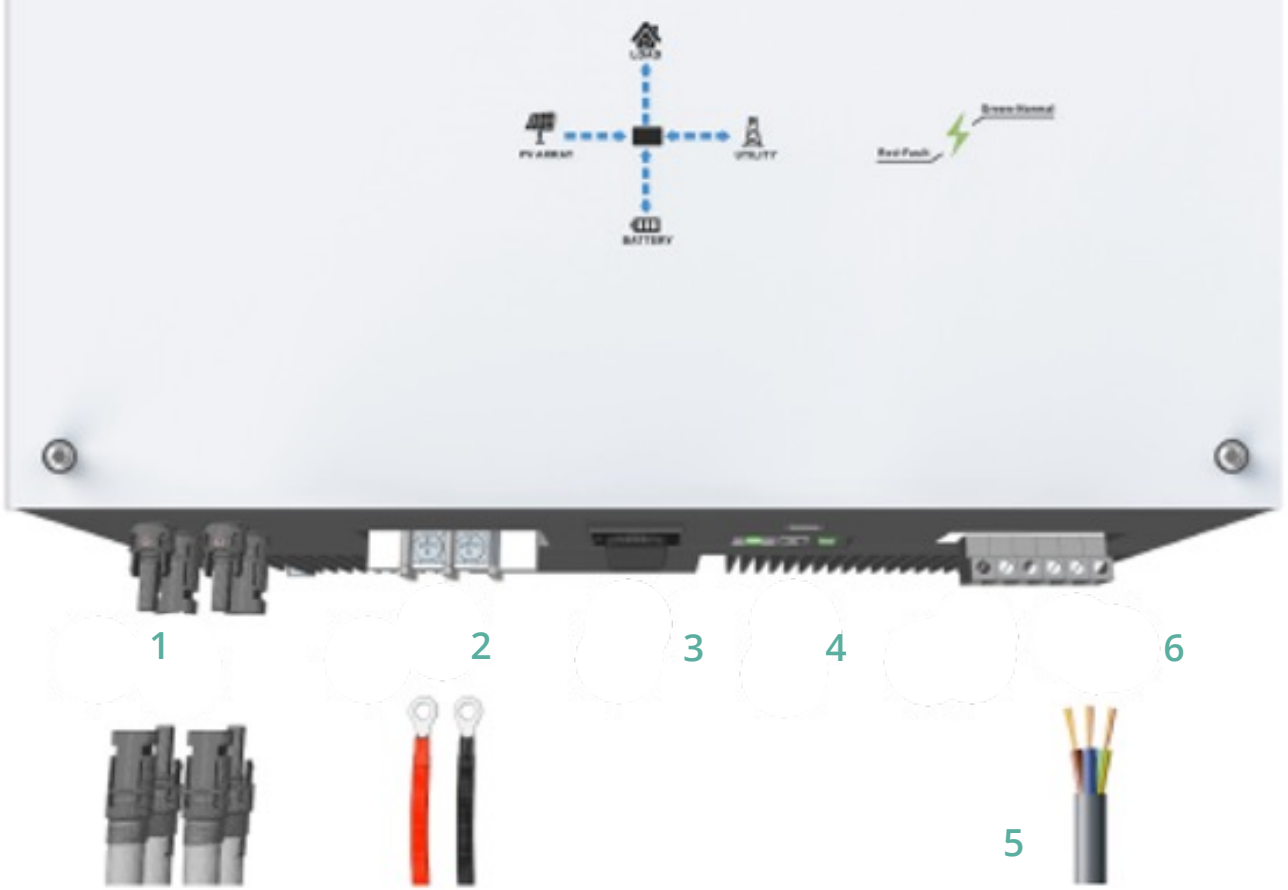
Brackets should be installed with the hooks pointing upwards and secured using the 4 fixings points provided.



Once the inverter is securely mounted onto the bracket, the locking pin should be installed on both sides.

The pin should be inserted from the front and then secured using the ‘R clip’ at the rear.

A set of long nose pliers may help with this.



1. 2 x MC4 inputs

2. Battery Terminals

3. PV DC Switch

4a. CT, Meter and battery data connections
PV DC Switch

4b. USB port for WiFi/4G dongle

5. EPS terminals

6. Grid terminals

1. Battery terminals

2a. CT, Meter and battery data connections
2b. USB port for WiFi/4G dongle

3. EPS terminals

4. Grid terminals

1. All-in-One Battery Connector (Battery Comms cable integrated)

2. PV input

3. Built-in WiFi Aerial

4. Meter Communication and LAN Connectors for router

5. EPS Connection

6. AC Connection

7. DC Input Isolation Switch

8. Cable Clamps

Electrical Connections - AC

Find our RCD declaration on our Knowledge Base

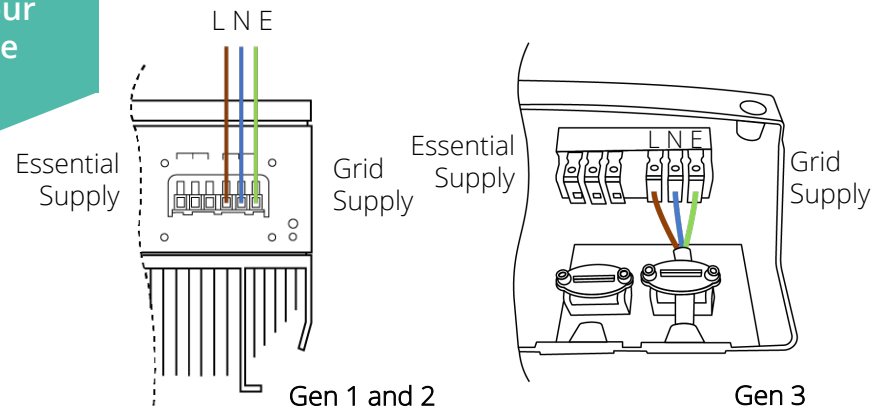
	Maximum Output	Overcurrent Protection	RCD Protection (if required**)	Minimum cable size*
Hybrid 3.6kW	16.4A	C20	Type A 30mA	2.5mm
Hybrid 5.0kW	22.8A	C25 or C32		4.0mm
AC Connect 3.0kW	13A	C20		2.5mm

**This is the minimum size cable, large CSA may be required – Refer to BS7671*
***See separate RCD declaration*

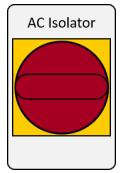
RCD's

If an RCD is required all GivEnergy inverters must be on their own RCD that is not shared with any other circuits.

This applies to all points of the installation and special attention must be taken when installing in buildings remote from the incoming electrical supply.

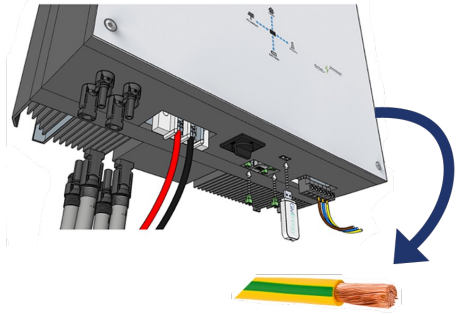


AC Input Connection Terminals



All inverters must have local AC isolation for maintenance purposes

Local Isolation



Earth all GivEnergy casing to each other

Electrical Connections - EPS

All inverters come with the option for an emergency power supply (EPS). This can be used to provide power in the event of a grid outage. The EPS terminals are powered from the grid supply whenever it is available, when the inverter detects a grid outage it will automatically switch to take power from the batteries and solar (if available).

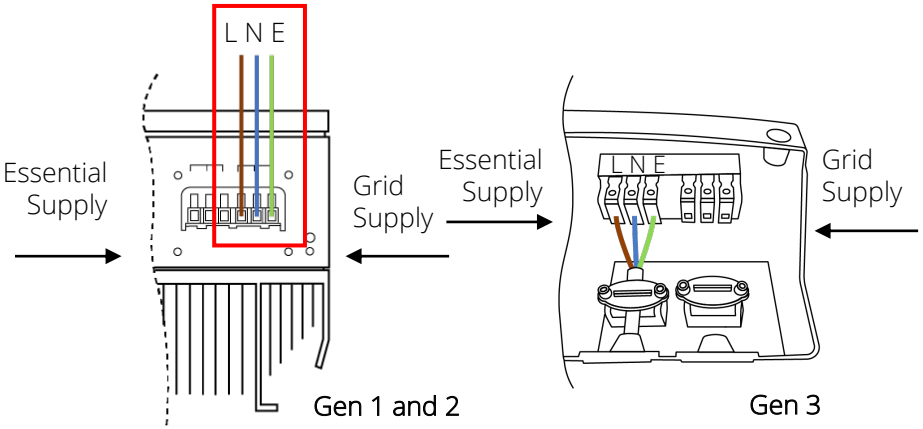
Electrical Connections

The EPS connection can be found under the same cover as the AC input terminals, the output cable must be protected as close as possible to the inverter with;

- Double pole RCD protection at a maximum of 30mA
- Overload protection between 6 – 25A

Earthing

- The back-up supply must not rely on earthing provided by the grid
- An earth rod should be installed to protect the backup circuits
- The earth electrode resistance should be lower than 200Ω
- If using an existing earth rod this should be checked for its suitability



Output Connection Terminals

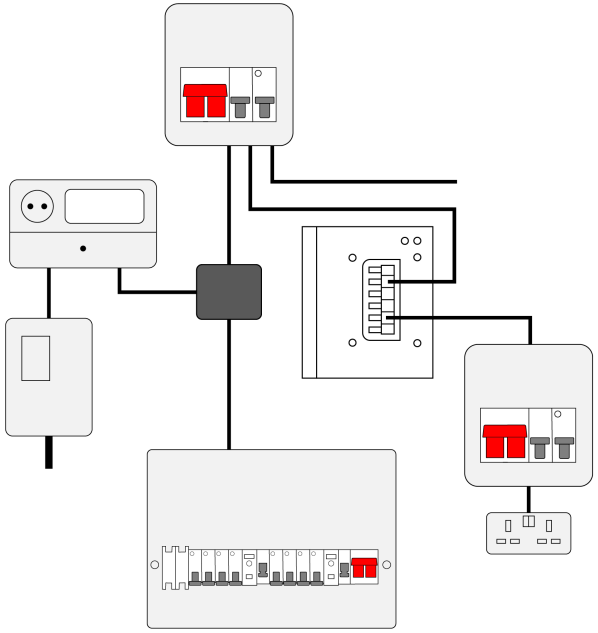
Maximum Output (kW)	Gen 1 Hybrid 3.6 / 5kW	Gen 2 Hybrid 3.6 / 5kW	AC Coupled 3 kW
2.6kWh battery only	1.25	1.25	1.25
All other batteries	2.6	3.6	3.0
All batteries with solar	3.6 / 5	3.6 / 5	-

More information is available on our Knowledge Base

Specific Circuit Backup

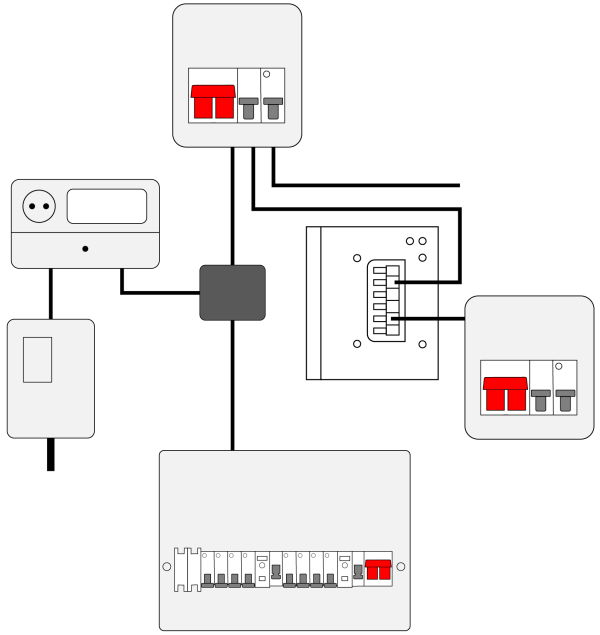
INVERTERS

More detailed information and diagrams are available on our Knowledge Base



Method 1

Single / Double socket connected to EPS output terminals via consumer unit



Method 2

Dedicated consumer unit supplying essential circuits only

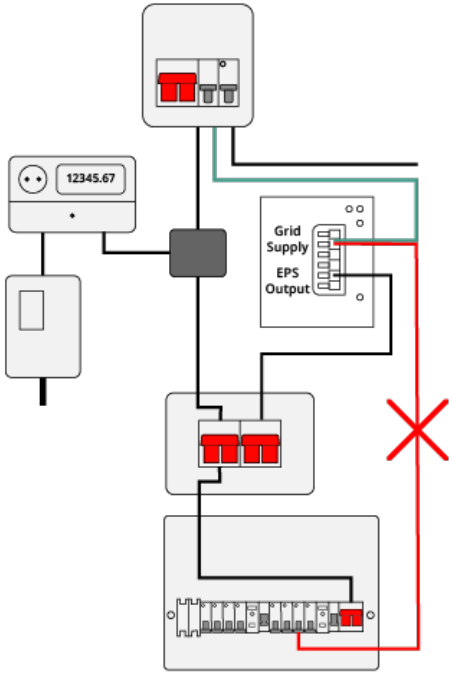
Full Property Backup

INVERTERS

More detailed information and diagrams are available on our Knowledge Base

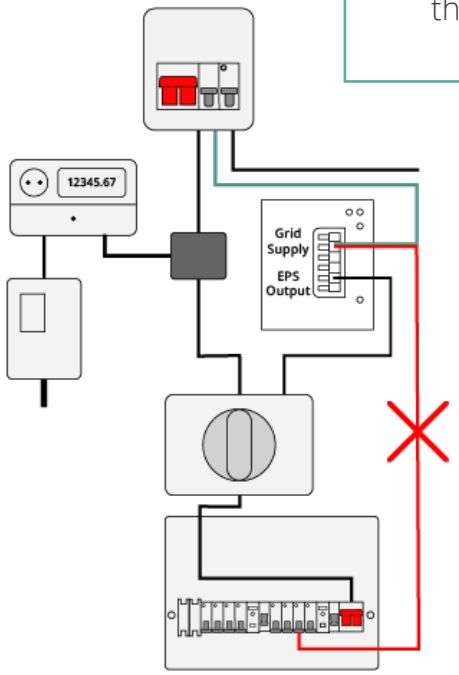
Important

- The grid supply to the GivEnergy inverter must come from the grid side of the changeover switch
- On AC Coupled systems, no source of generation may be connected to the EPS output



Method 3

Full property backup with manual changeover switch

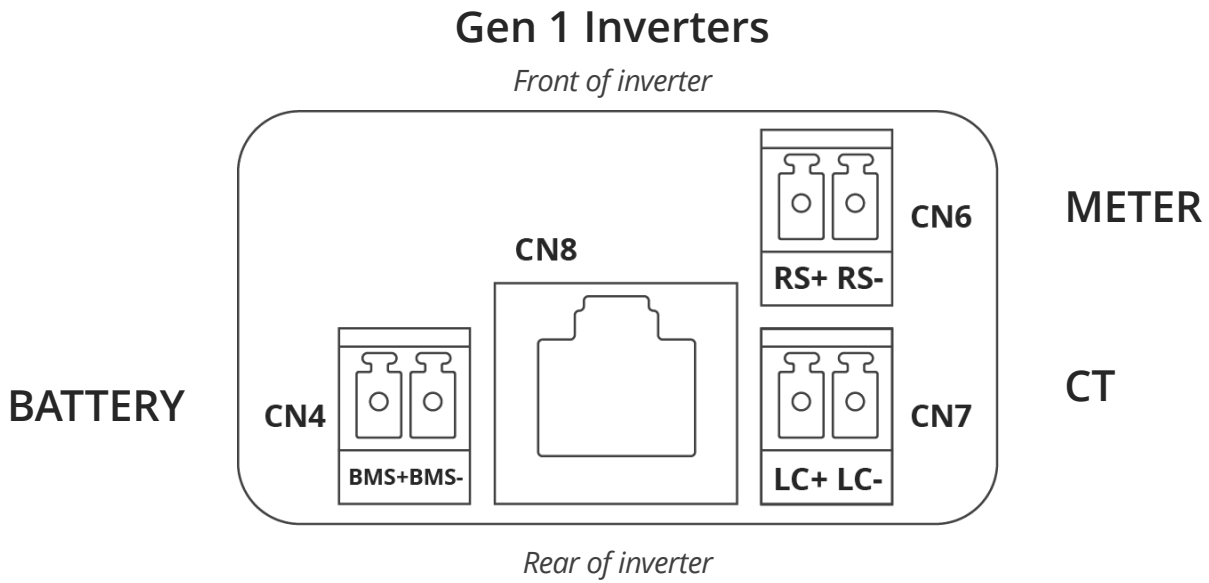


Method 4

Full property backup with auto changeover switch

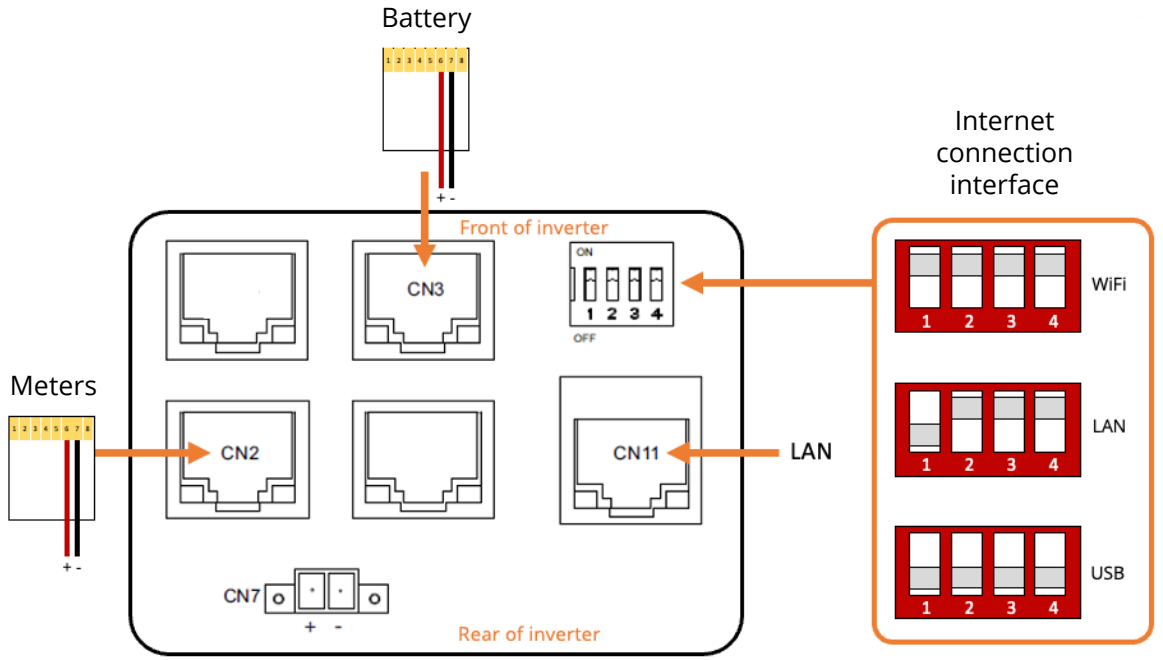
Data Connections

GEN 1 HYBRID AND AC COUPLED INVERTERS



Data Connections

GEN 2 HYBRID INVERTERS



GEN 2 data connections

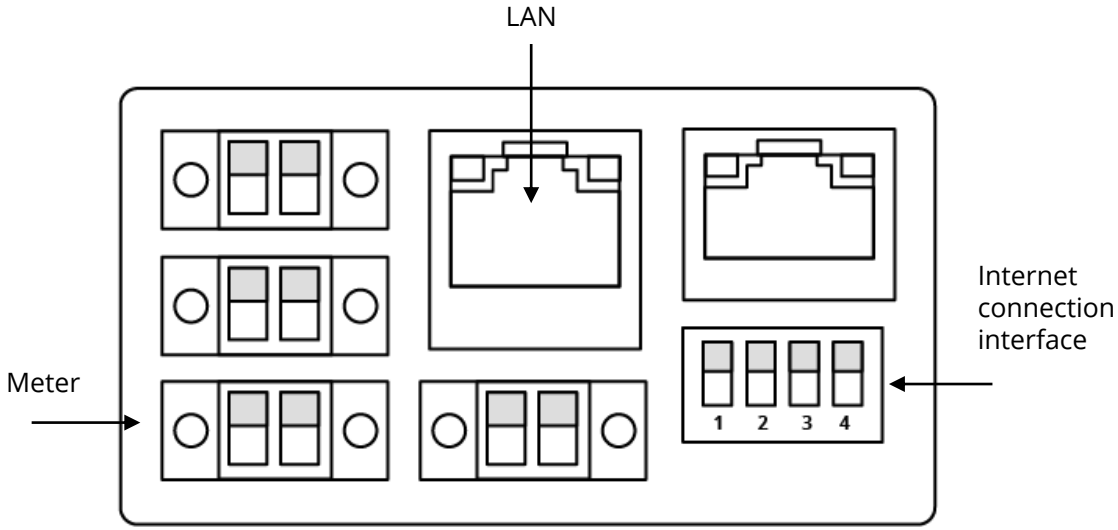
Applicable for firmware version 902 or above

NOTE: The pre-made cables provided have the white as +/Positive and Brown as -/Negative

Data connections are identified by holding the locking tab of the RJ45 plug facing away from you and the terminals labelled 1 – 8 from left to right as pictured above

Data Connections

GEN 3 HYBRID INVERTERS



GEN 3 data connections

Applicable for firmware version 902 or above

Lights and Operation

HYBRID GEN 1| 2 | 3

Solar PV

When solar PV voltage is detected, the inverter will indicate with all four blue lights.

Home demand

This is a calculation made by our smart energy management system and is lit up when a load is detected within the property.

Inverter status

Green (Solid) – Normal

Green (Flashing)

– The system waiting for available power

Yellow – Communications issue

Red - Fault

Grid

When energy is being imported from the grid the arrows pointing toward the centre will be lite. When energy is being export to the grid the arrows point toward the grid will be lit.

Battery

When the battery is being charged the arrows will point toward the battery pack. When the battery is discharging the arrows will point towards the inverter.

Batteries Lights and Operation

HYBRID GEN 3

Home Demand

This is a calculation made by our smart energy management system and is lit up when a load is detected within the property.

Inverter Status

Green (Solid) – Normal

Green (Flashing) – The system waiting for available power

Yellow– Communications issue

Red - Fault

Grid

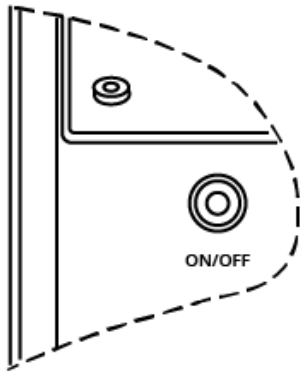
When energy is being imported from the grid the arrows pointing toward the centre will be lit. When energy is being exported to the grid the arrows pointing toward the grid will be lit.

Battery

When the battery is being charged the arrows will point toward the battery pack. When the battery is discharging the arrows will point towards the inverter.

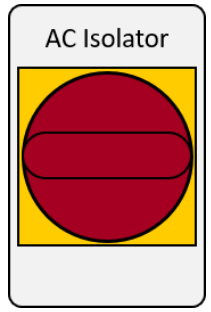
Shutdown Instructions

FULL SYSTEM

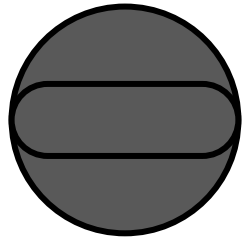


Isolate battery by pressing the On/Off switch on the side for 5 seconds

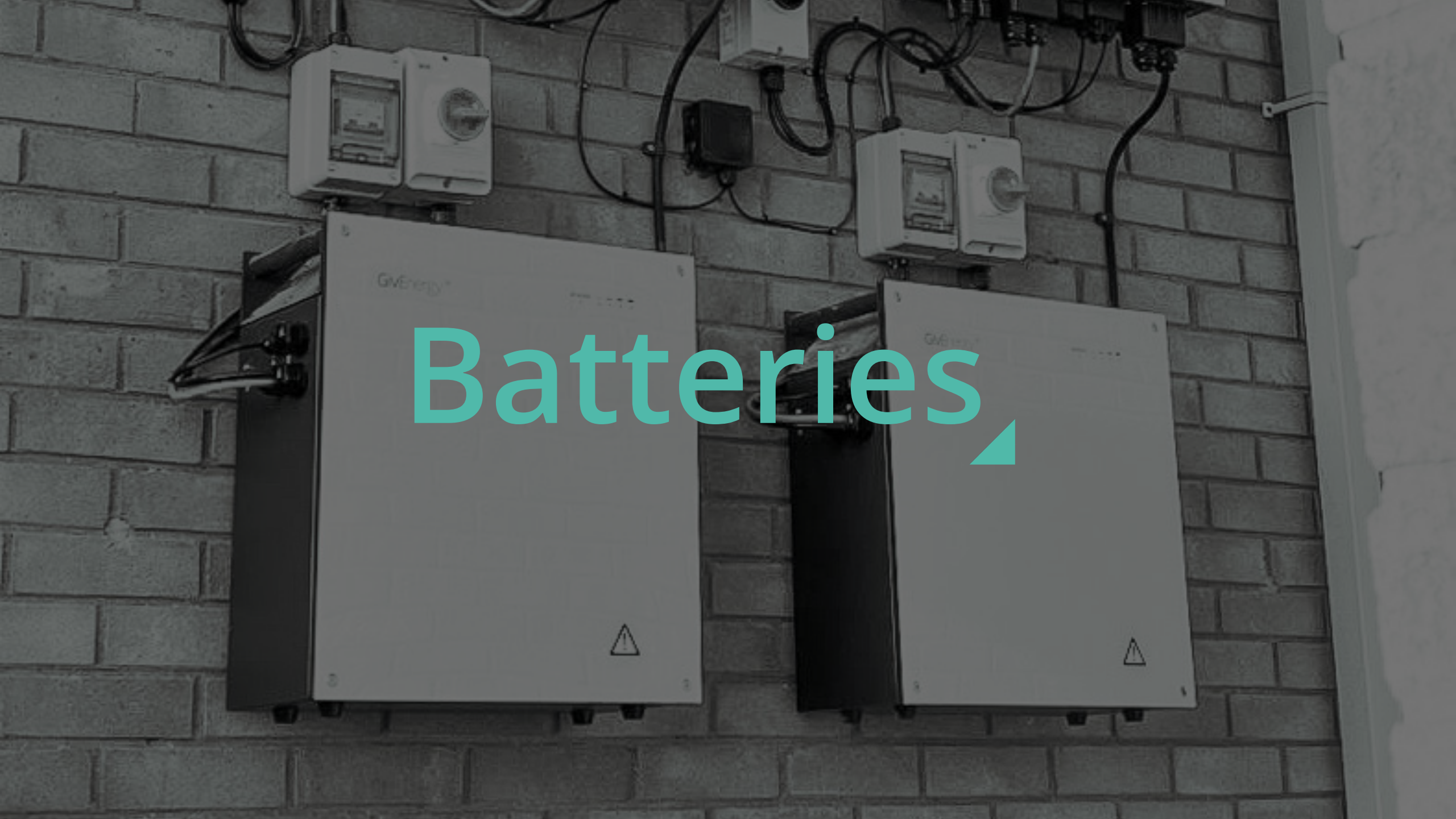
Turn off the battery DC isolator



Turn off the AC



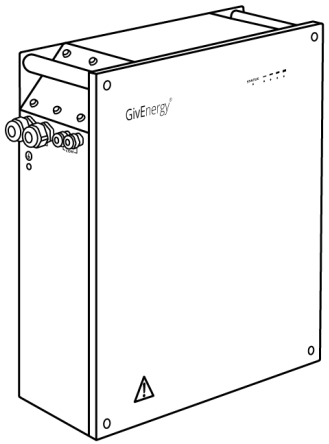
Turn off the PV with the external isolator first (if fitted) then the built in isolator



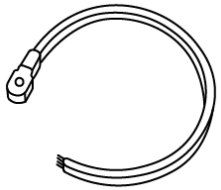
Batteries

Box Contents

INVERTERS

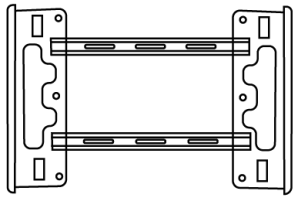


Battery



Cable Pack (x2)

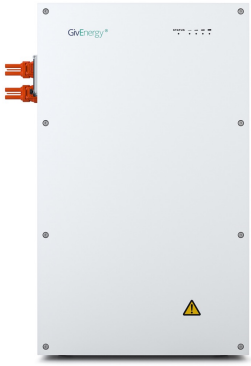
(Gen 1 batteries only)



Mounting Frame

USB Memory Stick

Battery Specifications

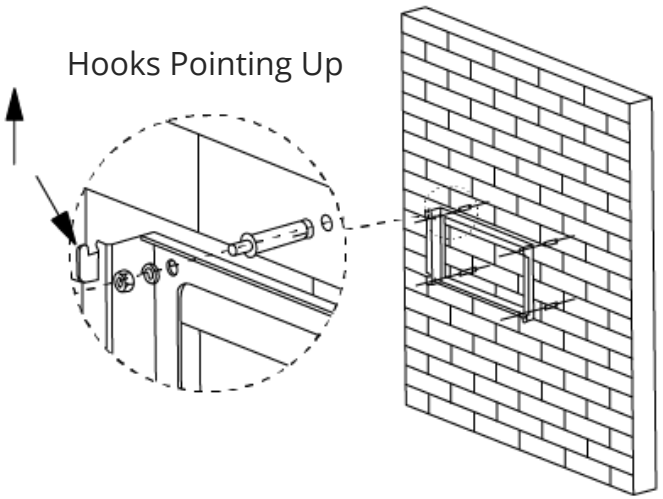


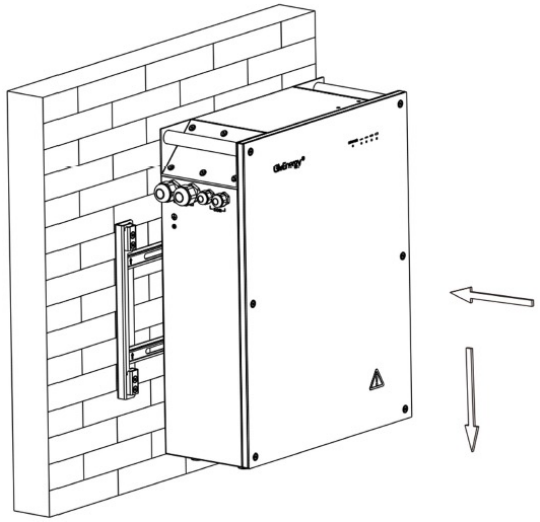
	2.6kWh	5.2kWh	8.2kWh	Gen 2 - 9.5kWh
Nominal voltage	51.2V			
Max charge/discharge rate (Hybrid)	1250w*/2600w	2600w	2600/3600w**	
Max charge/discharge rate (AC Coupled)	1250w*/3000w	2600w	3000w	
Maximum DOD	80%	80%	100%	100%
IP rating	IP65			
Operating temperature	-10 – 50˚C			
Dimensions (W x H x D) (mm)	480 / 300 / 235	480 / 515 / 205	480 / 620 / 198	480 / 800 / 223
Weight	30Kg	54Kg	94Kg	110Kg

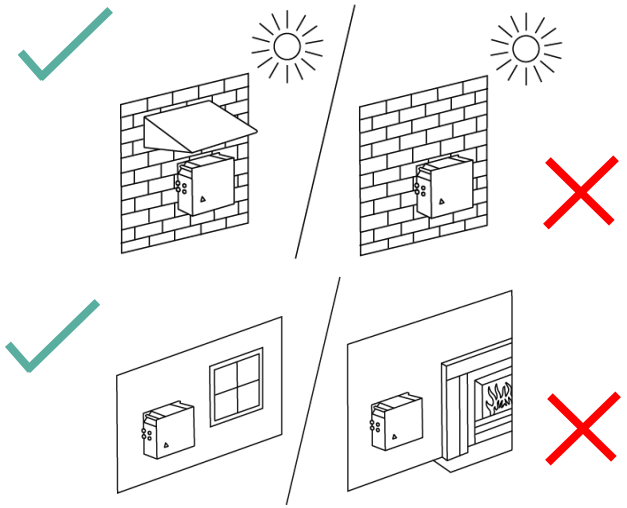
*A single 2.6kWh battery is limited to a maximum charge/discharge rate of 1250w on any inverter
**With Gen 2 Hybrid inverter only

Mounting

BATTERIES







All batteries must be secured to the wall using the fixings provided, even if the weight of the battery is on the floor.

Wall depth should be at least 120mm.

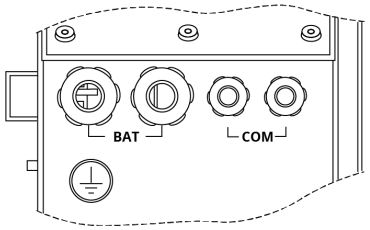
Batteries should not have their weight hung on a wall bracket when fixing to plasterboard or Thermolite blocks.

Batteries must be mounted at least 50mm from ground level when outside or in areas at risk of flooding.

The cables supplied in the Gen 1 battery boxes should be used whenever possible. If a longer length is required 16mm²
Tri-rated cable must be used and can be up to a maximum length of:

5m maximum length
(Single battery)

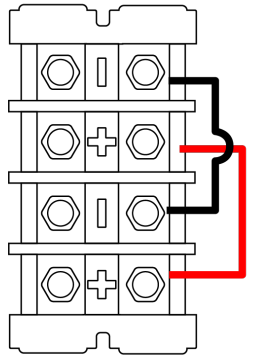
2m between batteries
(Cables provided)



All batteries must be earth bonded together back to the inverter.

DO NOT use impact drivers on the battery covers or terminals

Cable inlet glands must be blanked off when not used
(Blanks provided)



Note:
Positive and negative connections may be laid out differently.

A DC MCB is required between the inverter and (master) battery, this will be rated at 100A.

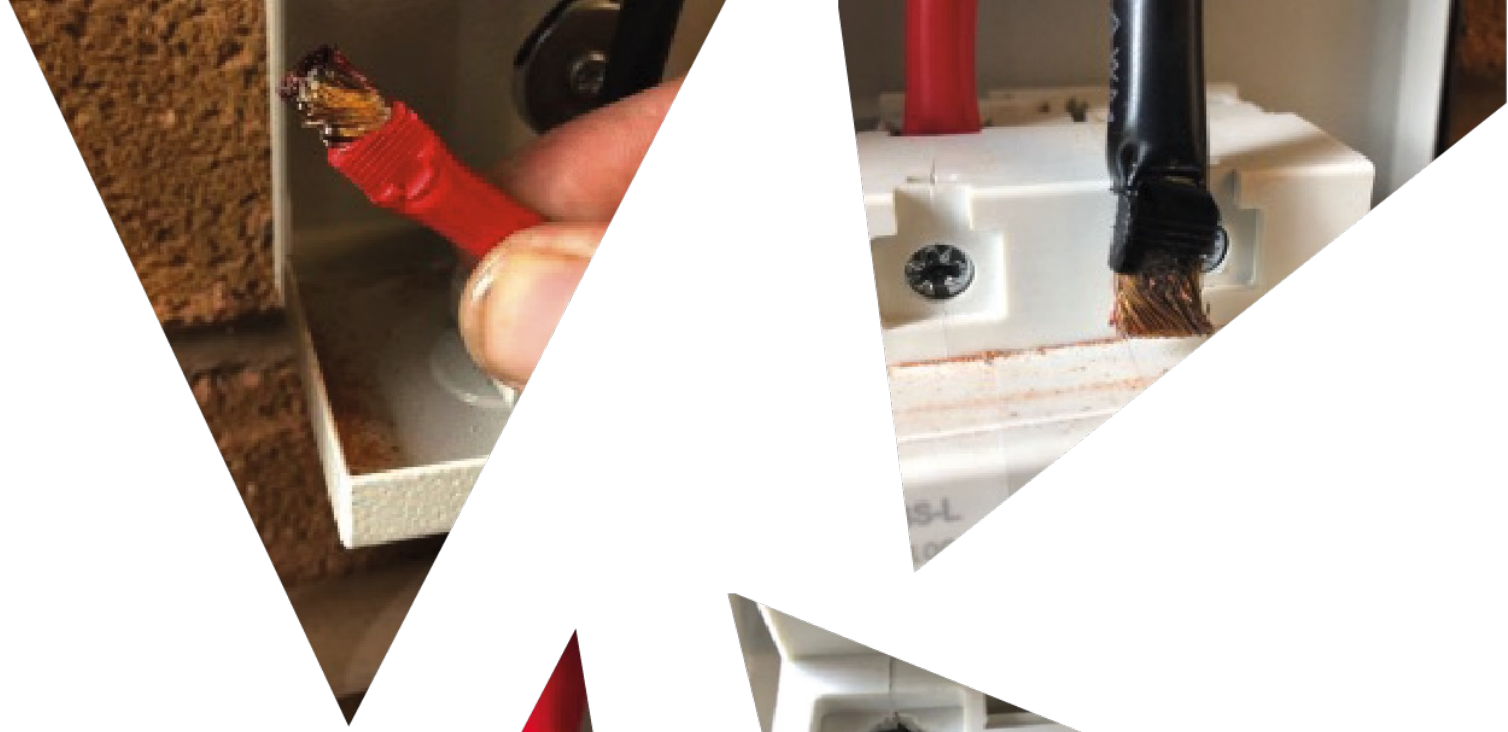
Tight and sound connections are vital to ensure correct operation and reliability of the installation.
The ferrules provided must be used to ensure that the cable doesn't end up clamped on its outer insulation.

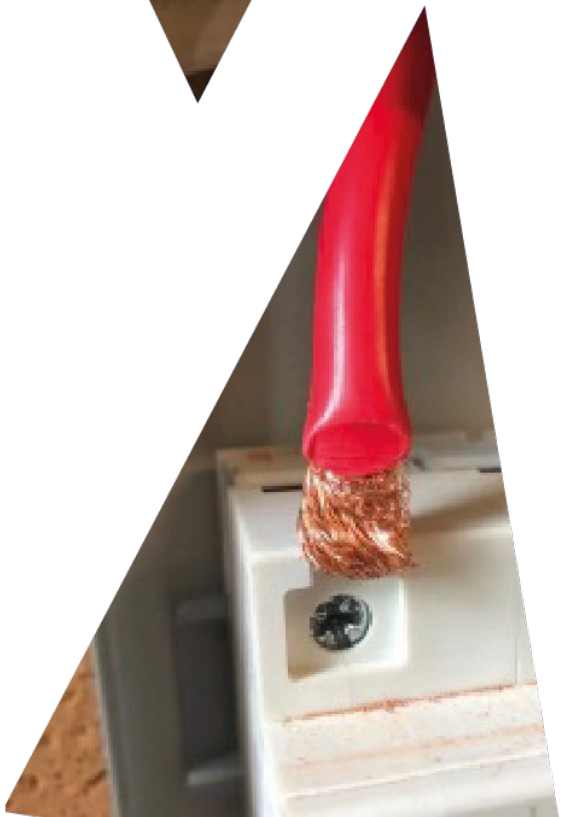
Connection should be tightened to 3.5Nm.

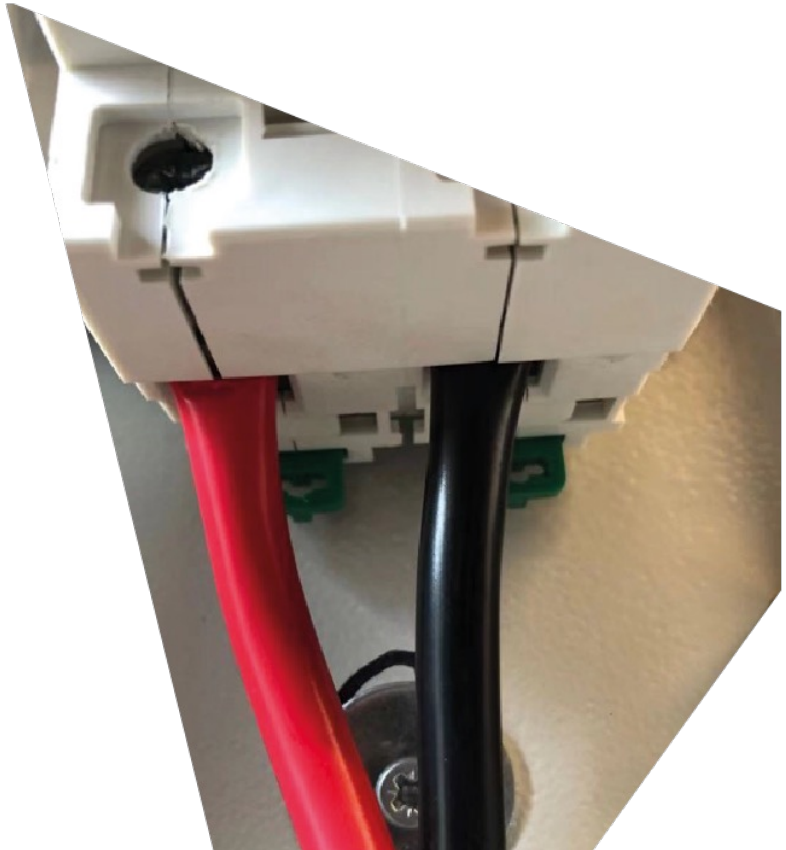
An enclosure will need to be provided that is suitably IP rated for the installation environment.

DC MCB

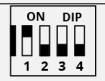
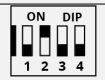
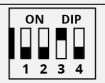
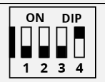
A separate DC MCB is not required when installing a Gen 2 battery







Gen 1 Data Connections

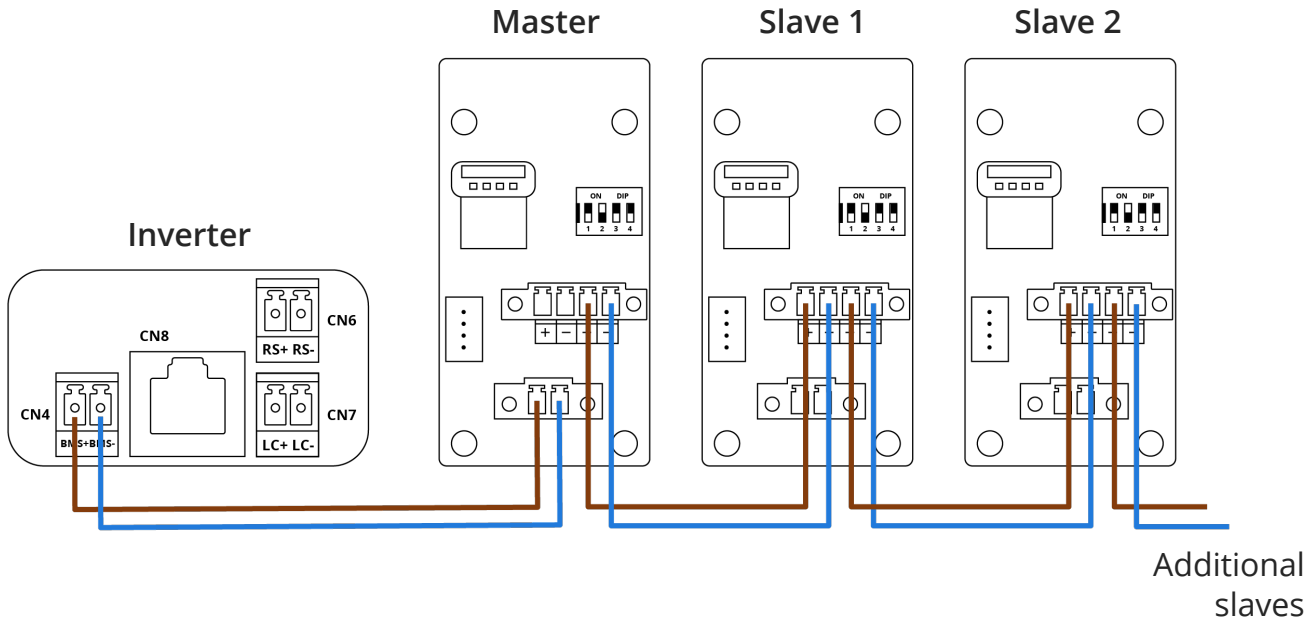
Battery	ID	Description
Master		0, 0, 0, 0
Slave 1		1, 0, 0, 0
Slave 2		0, 1, 0, 0
Slave 3		0, 0, 1, 0
Slave 4		0, 0, 0, 1

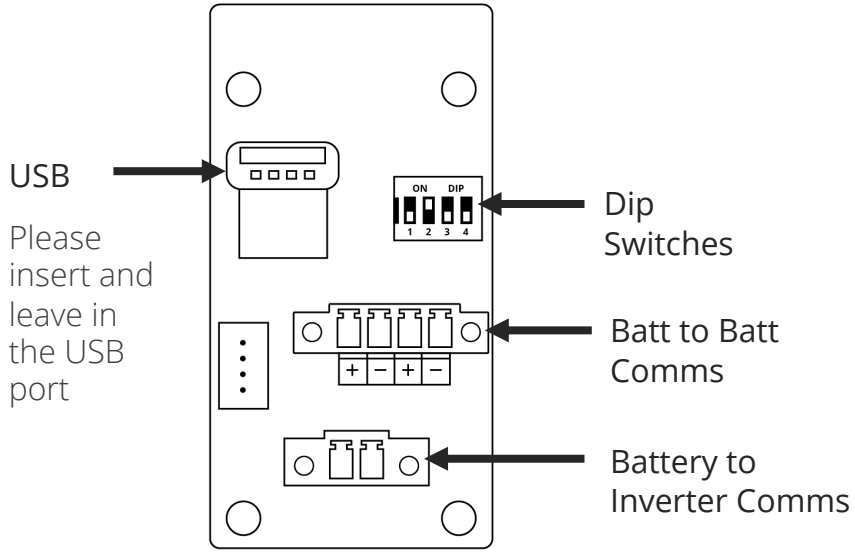
Size of batteries

When installing multiple batteries, the largest must be closest to the inverter

Remove Firmware

It is vital that the USB stick is fitted to the port to allow for remote firmware updates in the future





Gen 2 Batteries

(ROUND CORNER)

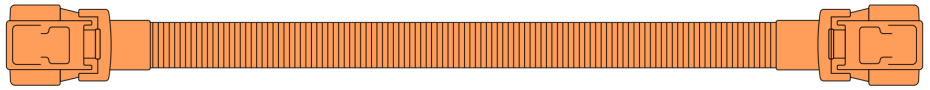
We have just released the new 9.5kWh battery pack to distributors.

All other battery packs will be updated in the future to include the same features.

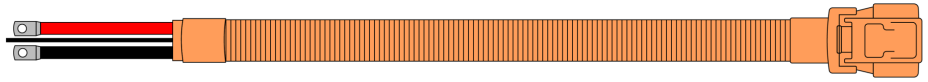
- No need to remove the front cover
- All-in-one connector for combined DC and data connection
- Built in DC MCB

All GivEnergy batteries must be installed in size order, with the largest wired closest to the inverter. This means the 9.5kWh will always be wired in between the inverter and any Gen 1 batteries, removing the need for an external DC MCB.

1



2



Cables

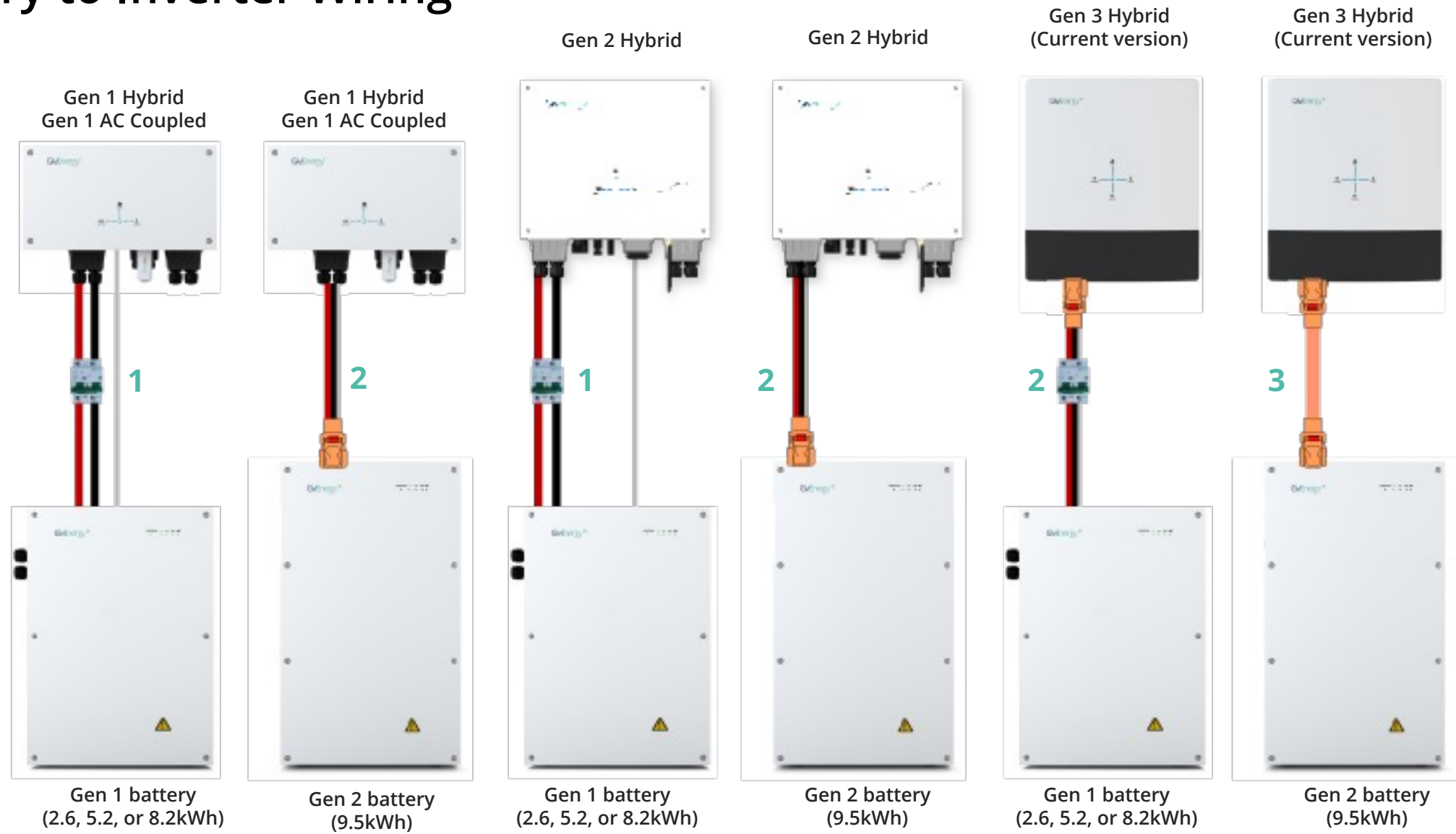
Cables are not currently provided with the batteries and two different types are available;

1. All-in-one to All-in-one
2. All-in-one to Ring Terminal

When connecting a GEN 2 battery, always ensure the ring connectors are attached before connecting the commando plug!

Battery to Inverter Wiring

1 - Cable pack (In battery packaging)
2 - All-in-one to Ring Terminal (not included)
3 - All-in-one to All-in-one (not included)

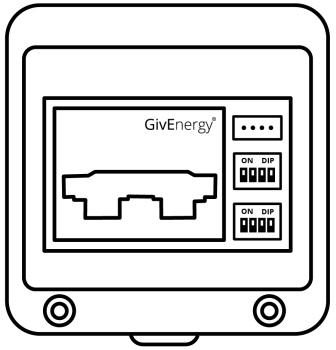


Battery to Battery Wiring

1 - Cable pack (In battery packaging)
2 - All-in-one to Ring Terminal (not included)
3 - All-in-one to All-in-one (not included)

Gen 2 Batteries

GEN 1 HYBRID AND AC COUPLED INVERTERS

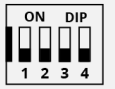
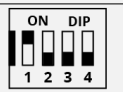
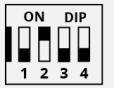
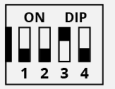
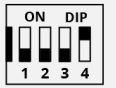
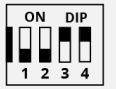


Gen 2 batteries have 2 sets of dipswitches.

- SW1 (Top) sets the battery ID
- SW2 (Bottom) sets Master or Slave

Blanks

Please make sure the blanking plugs are inserted in any un-used All-in-One sockets!

Battery	ID	Description
Master		0, 0, 0, 0
		1, 1, 0, 0
Slave 1		1, 0, 0, 0
		0, 0, 1, 1
Slave 2		0, 1, 0, 0
		0, 0, 1, 1
Slave 3		0, 0, 1, 0
		0, 0, 1, 1
Slave 4		0, 0, 0, 1
		0, 0, 1, 1

Metering and CTs

Metering

Every system will need at least 1 EM115 (ID1) meter installing to monitor the import and export of the building. Every EM115 meter needs a power supply or voltage reference point.

This could be a dedicated supply from a 6A, for example.

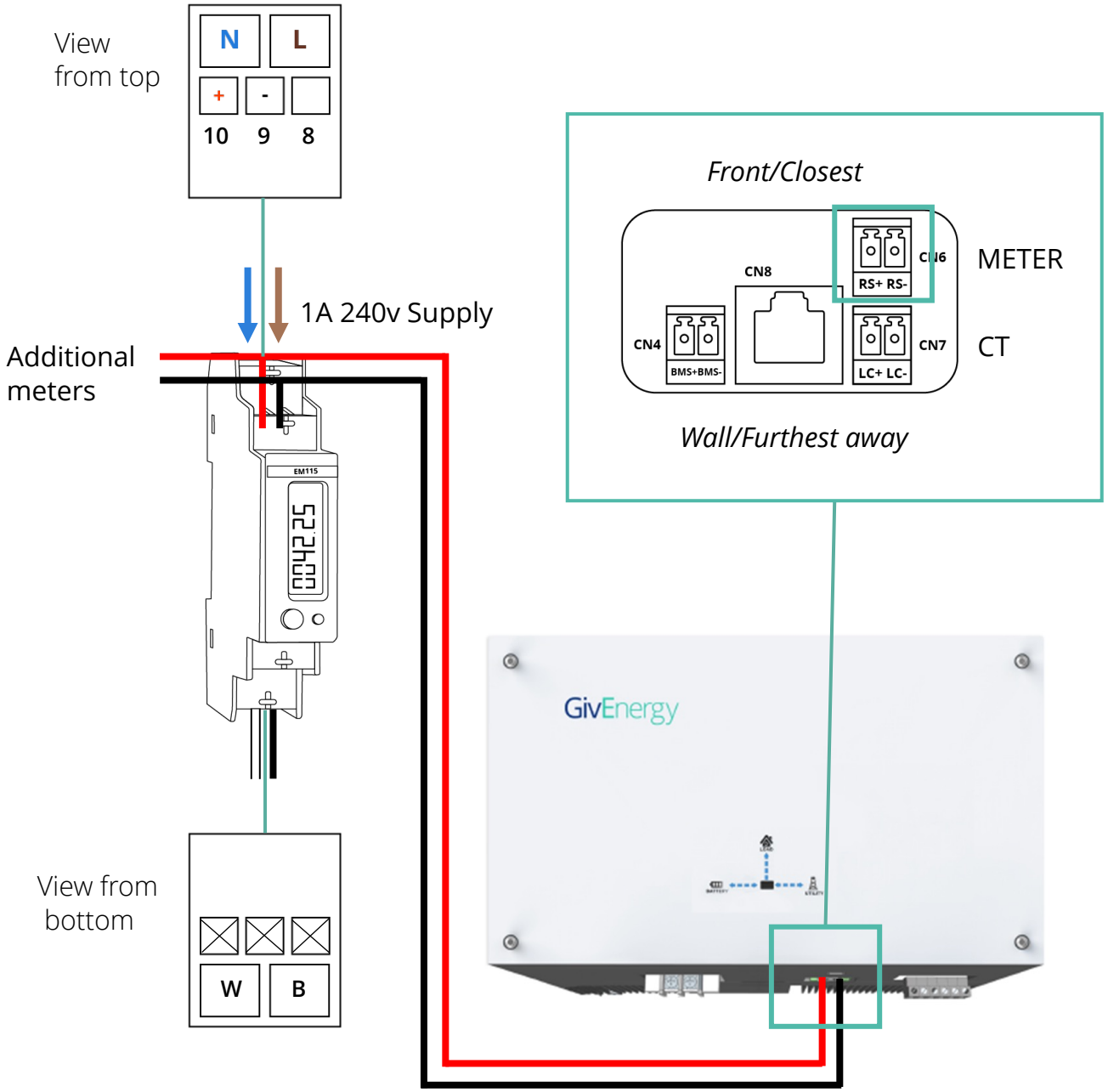
Every EM115 meter will need a data connection back to the inverters meter communication port. This is on the right hand side at the front or closest to you.

Data connection should be twisted pair cable, for example, Belden multi-stranded cable.

If installing multiple meters both the data and power supply can be linked together in series.

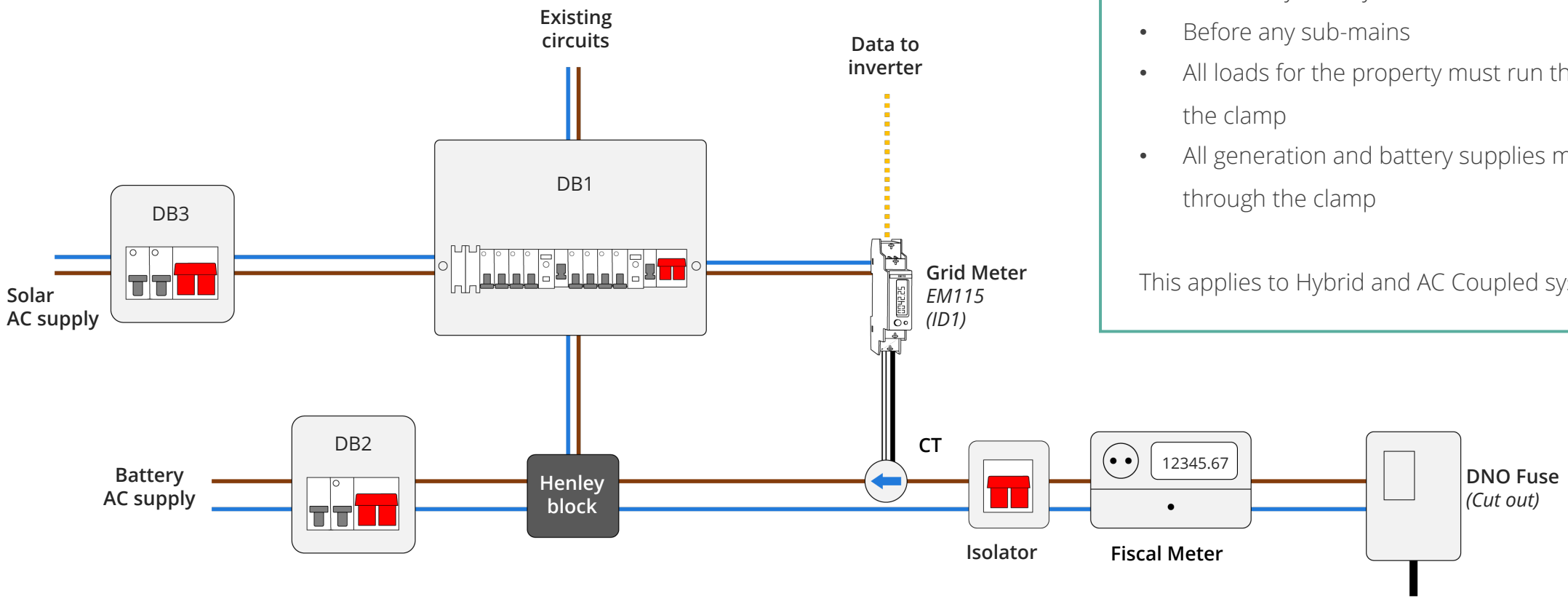
EM115 meters come with a split core CT that has a 2m cable

This must not be cut down or extended



EM115 ID1 Grid (Import/Export) Meter

CT CLAMP POSITIONING



Clamp Location

- Next to the incoming supply
- Before any Henley blocks
- Before any sub-mains
- All loads for the property must run through the clamp
- All generation and battery supplies must run through the clamp

This applies to Hybrid and AC Coupled systems.

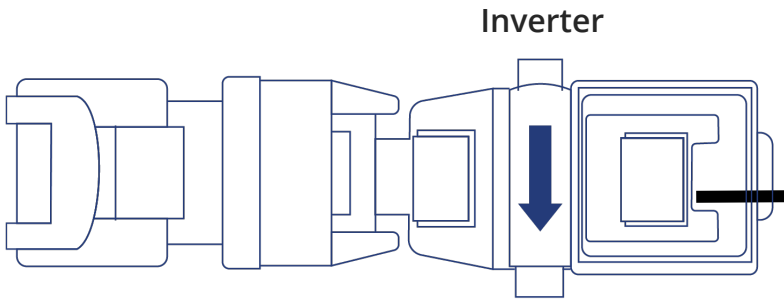
AC Coupled Inverters

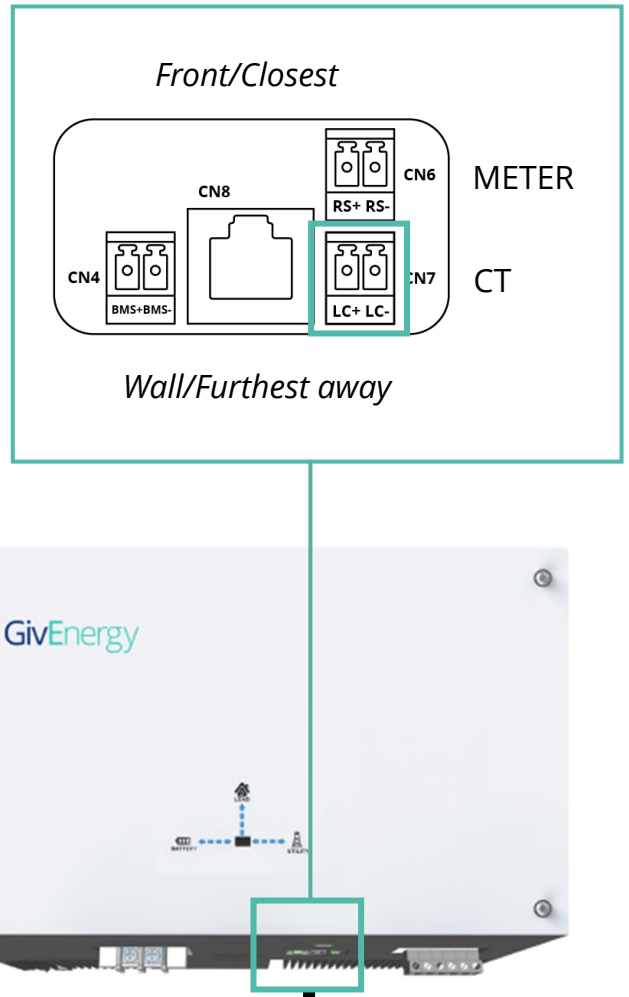
BLUE CT CLAMP

The Blue CT clamp allows one source of generation to be monitored, it can be found in the box with all AC Coupled inverters and comes with a 5m cable.

This clamp does not require a meter and wires directly back to the inverter.

The 5m cable must not be cut down or extended!

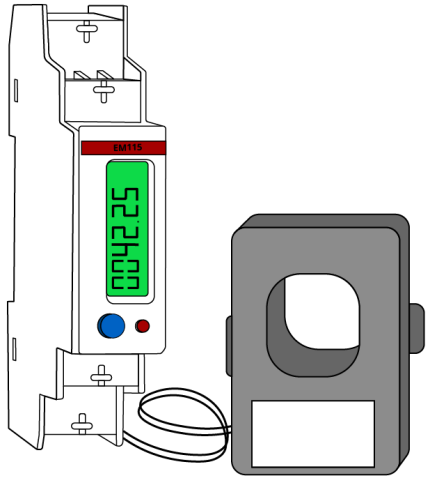


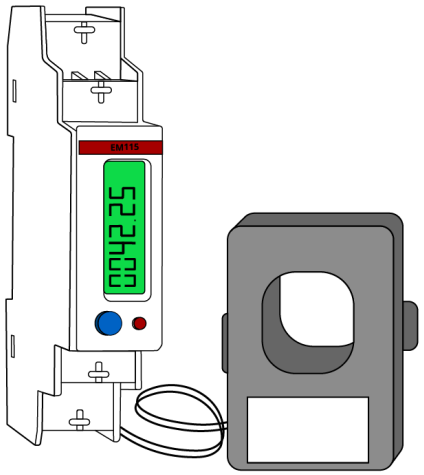


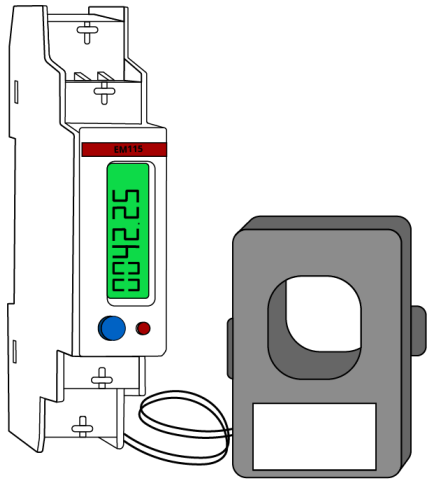
Solid black cable is negative/-
Black with white stripe is positive/+

Metering

EM115 METER







ID1

Grid – Import/Export meter

Used for AC Coupled systems to monitor a single or first PV system

ID2

PV monitoring meter

Used for AC Coupled systems

ID3

PV monitoring meter

Used for AC Coupled systems to monitor a second PV system

Metering

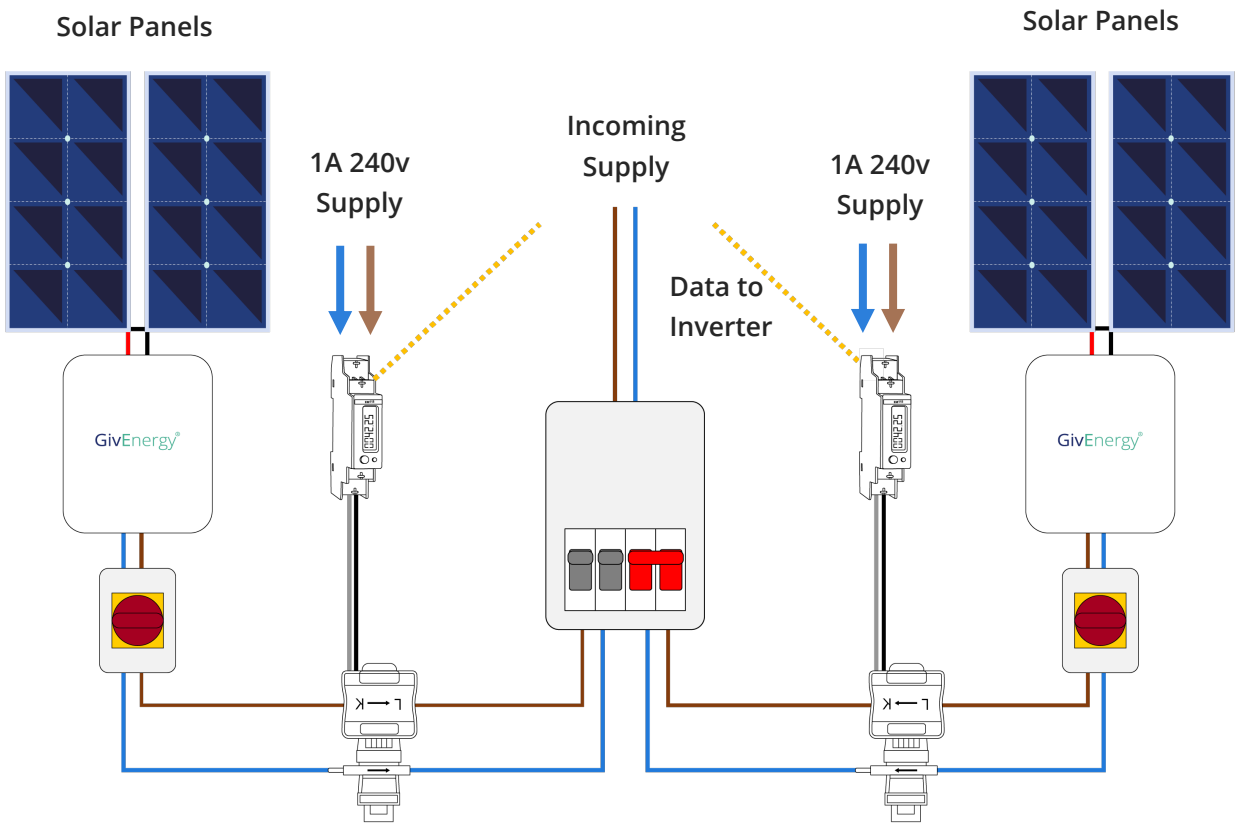
EM115 IS2 AND ID3 (PV) METER

When the Blue CT clamp is not suitable or multiple generation sources need to be monitored, an ID2 EM115 meter can be installed.

An ID3 EM115 meter can be used to monitor a second source of generation.

These are exactly the same meter as the ID1 grid import/export meter with a different ID number.

Note: *To change the ID of the meter, a laptop with the correct software, and a RS485-USB adapter will be required.*



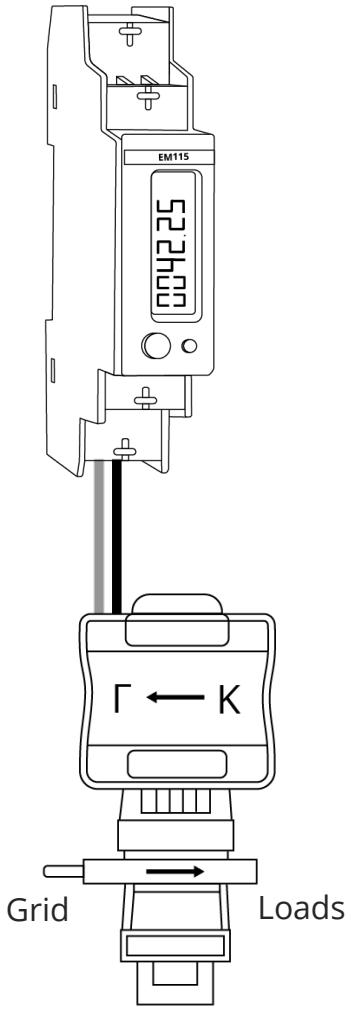
Metering

CT CLAMP DIRECTIONS

Arrow always points towards load

CT clamp cables must not be cut down or extended!

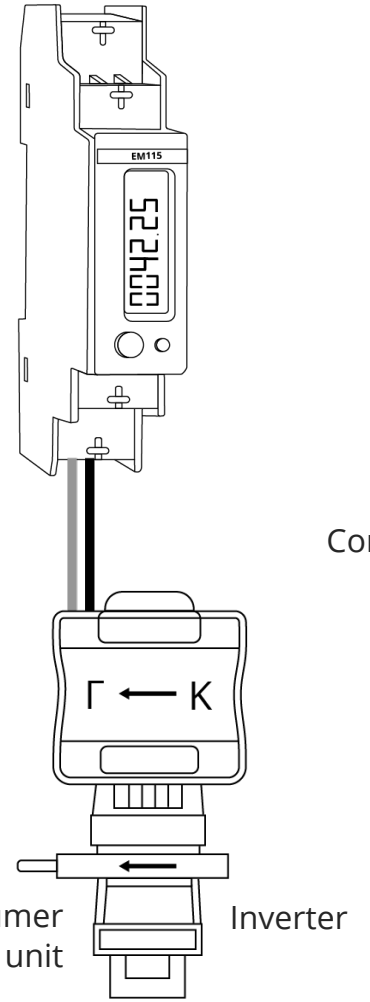
Grid (ID1)



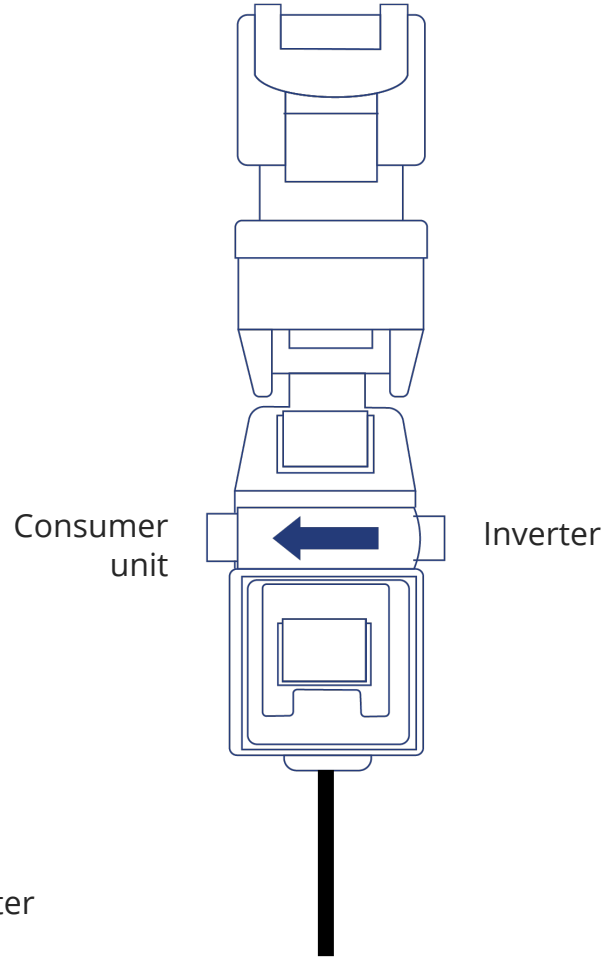
ID1 follows flow of import

Change arrow

PV (ID2 & 3)



Blue CT (PV)



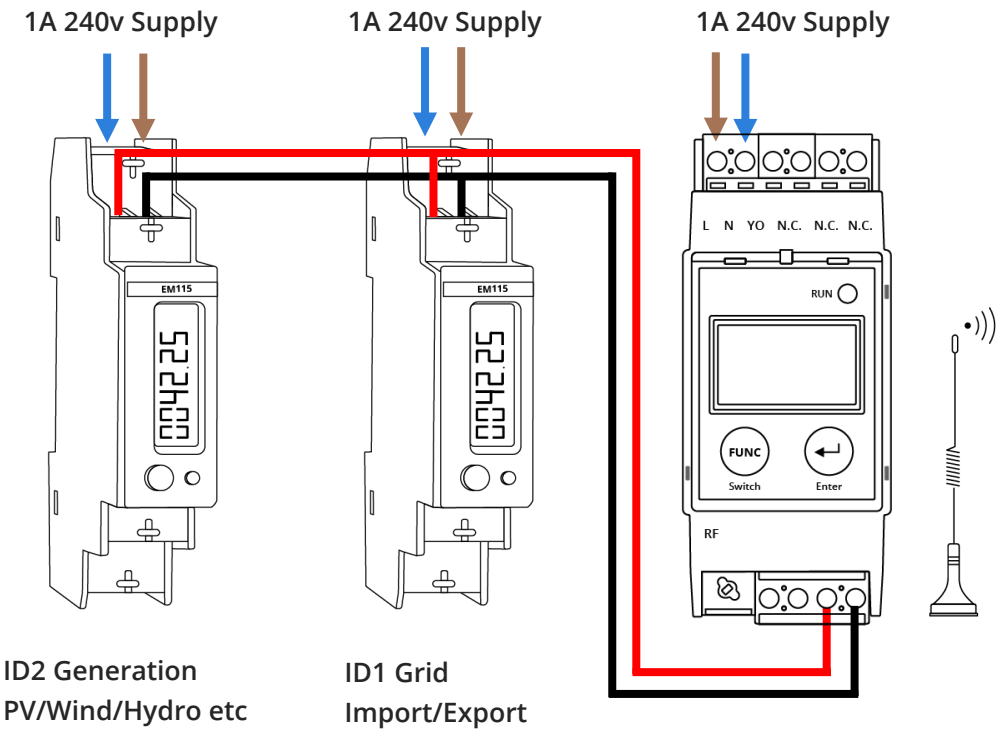
ID2&3 and Blue CT follow flow of generation

Metering

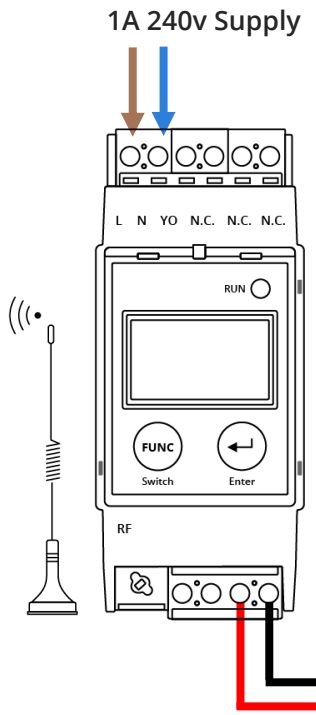
LoRa DEVICES

- LoRa units come in pairs and are pre-tuned to each other
- 1 LoRa sender can send multiple meters data to a single receiver
- Wireless frequency can be altered if receiver has interference

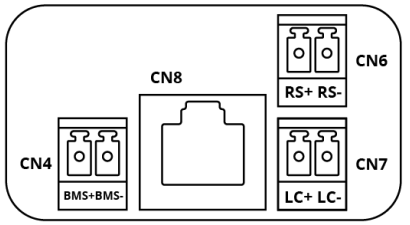
LoRa units come in pairs and are pre-tuned to each other
1 LoRa sender can send multiple meters data to a single receiver.
Wireless frequency can be altered if single has interference.



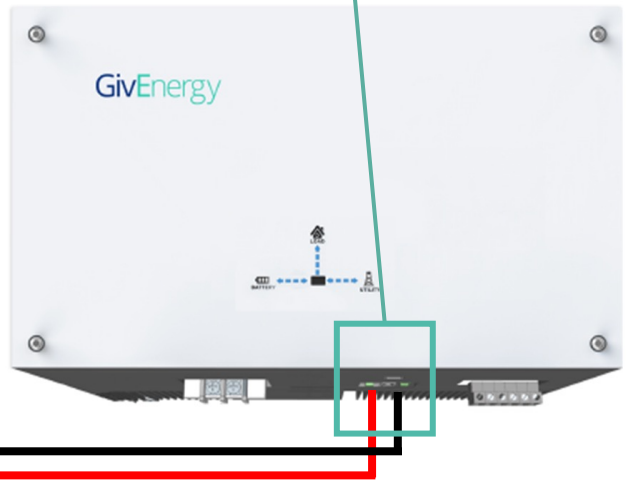
Do not press deploy



Front/Closest



Wall/Furthest away



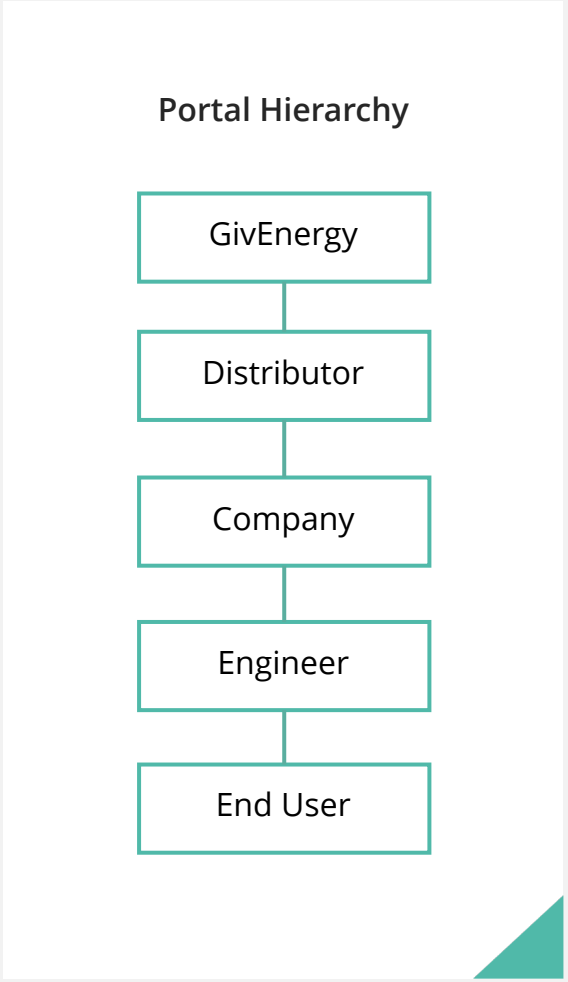
Account and Support

Setting up a GivEnergy Cloud Account

To be able to commission a system, you will need an account on the GivEnergy Cloud.

You can request a company account to be setup via your distributor. From this company account, you will need to create an Engineer Account for each of your Installers / on-site Engineers.

Note: *If you are purchasing from Segen you will need to get an account directly from us, please send an email to* ***support@givenergy.co.uk*** *with your company information for us to create you an account.*



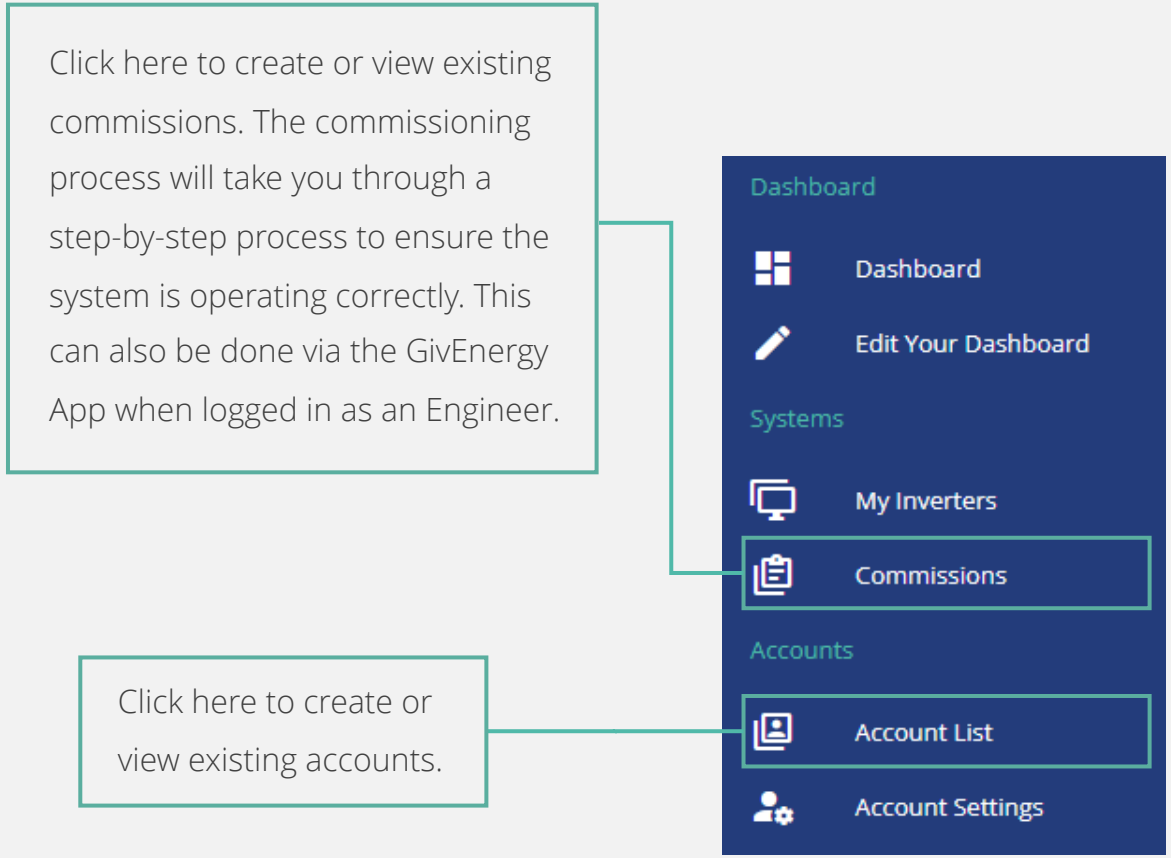
Commissioning and Setup

Before commissioning a system, the end user account must be set up on the GivEnergy portal. This can be done via the Account List on the Portal, or during the commissioning process on the GivEnergy App when logged in as an Engineer.

We will not be able to offer commissioning support unless the end user account is created and a commissioning process has been started.

All systems **MUST** be commissioned before leaving site to ensure correct operation.

If a system is part installed (i.e. Hybrid without a battery) then this should still be commissioned.



Monitoring Communications

WIFI DONGLES

LAN

Our Gen 2 Inverters include a LAN port to allow hard-wired data connections. No additional set up is required.

Built-in WiFi / WiFi Dongles

The GivEnergy App will take you through the steps required to set up the WiFi connection to the customers network.

If the App isn't available , please follow the WiFi Comms Guide attached with your training certificate, or on the Knowledge Base.

4G Dongles

Ensure the Sim Card is inserted correctly in to the dongle.

Important note on WiFi set up

- Note that the Inverters' WiFi network must be password protected to ensure the security of the clients WiFi.
- Most dongles are 2.4gHz only
- A signal strength of 50% or greater is recommended for a reliable connection

Dongle available in WiFi or 4G versions

Need Help?

Need some help? Information we will need from you:

- Username of the customers GivEnergy account
- Metering configuration
- Amount and size(s) of batteries
- If the EPS is being used
- How is the EPS being used?

For Hybrid inverters

- Make/Model/Wattage and quantity of panels

For AC Coupled

- How many panels per string and number of strings
- Size of new/existing PV inverter(s)

COMMISSIONING LINE

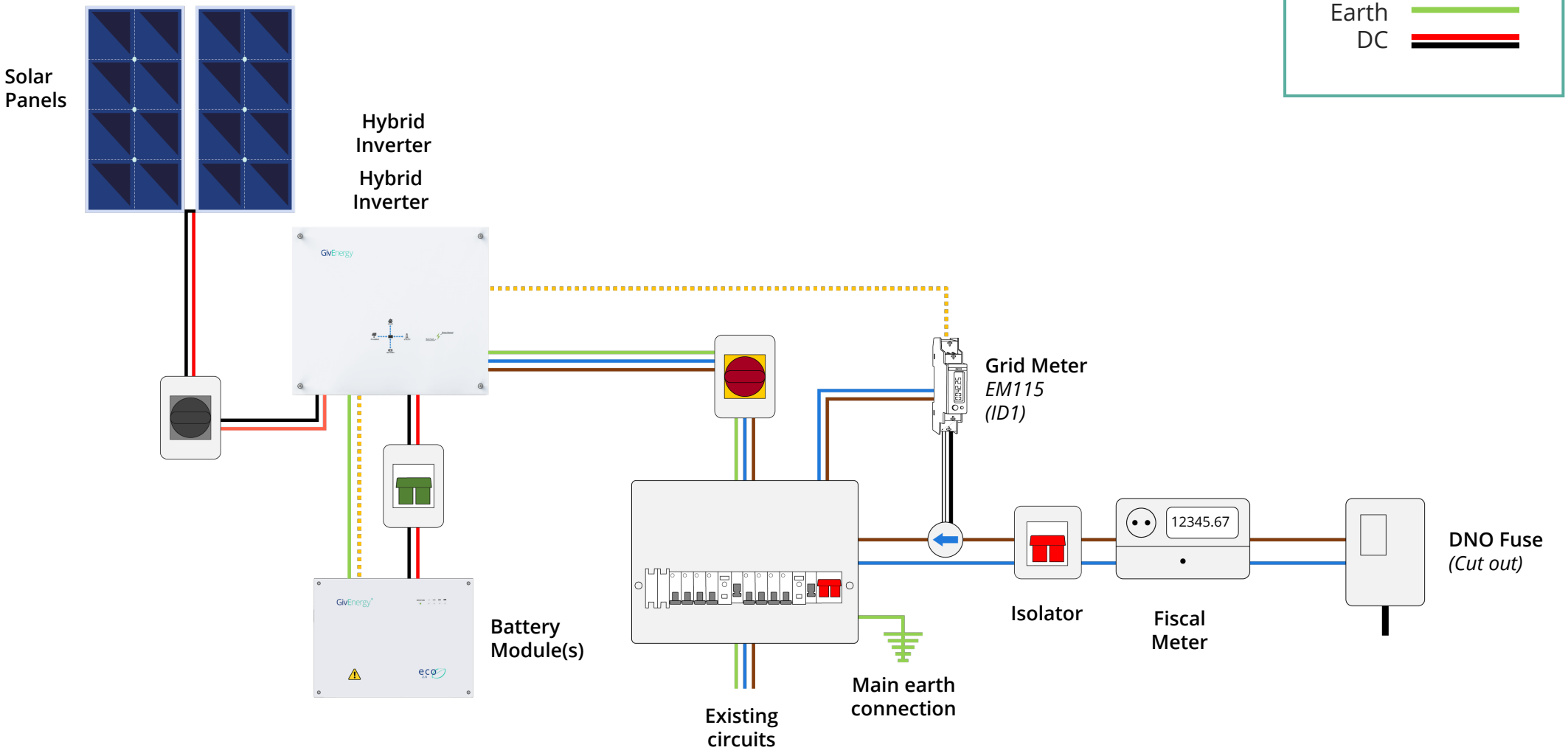
01377 252 874 (Option 1)

OPERATING HOURS

Mon - Fri	8:30 – 5:30pm
Sat	9am – 7pm
Sun	Closed

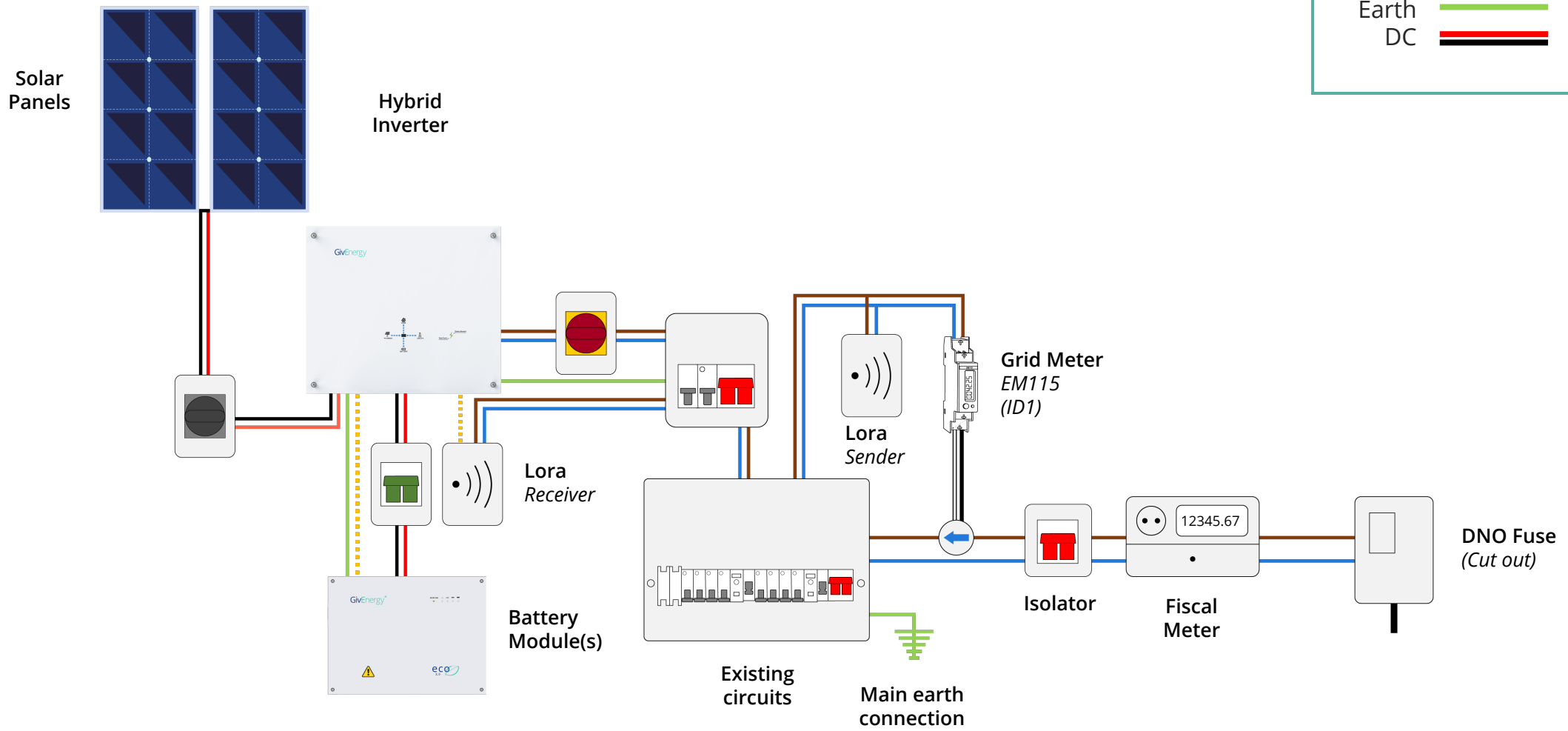
Schematics

HYBRID WITH EM115



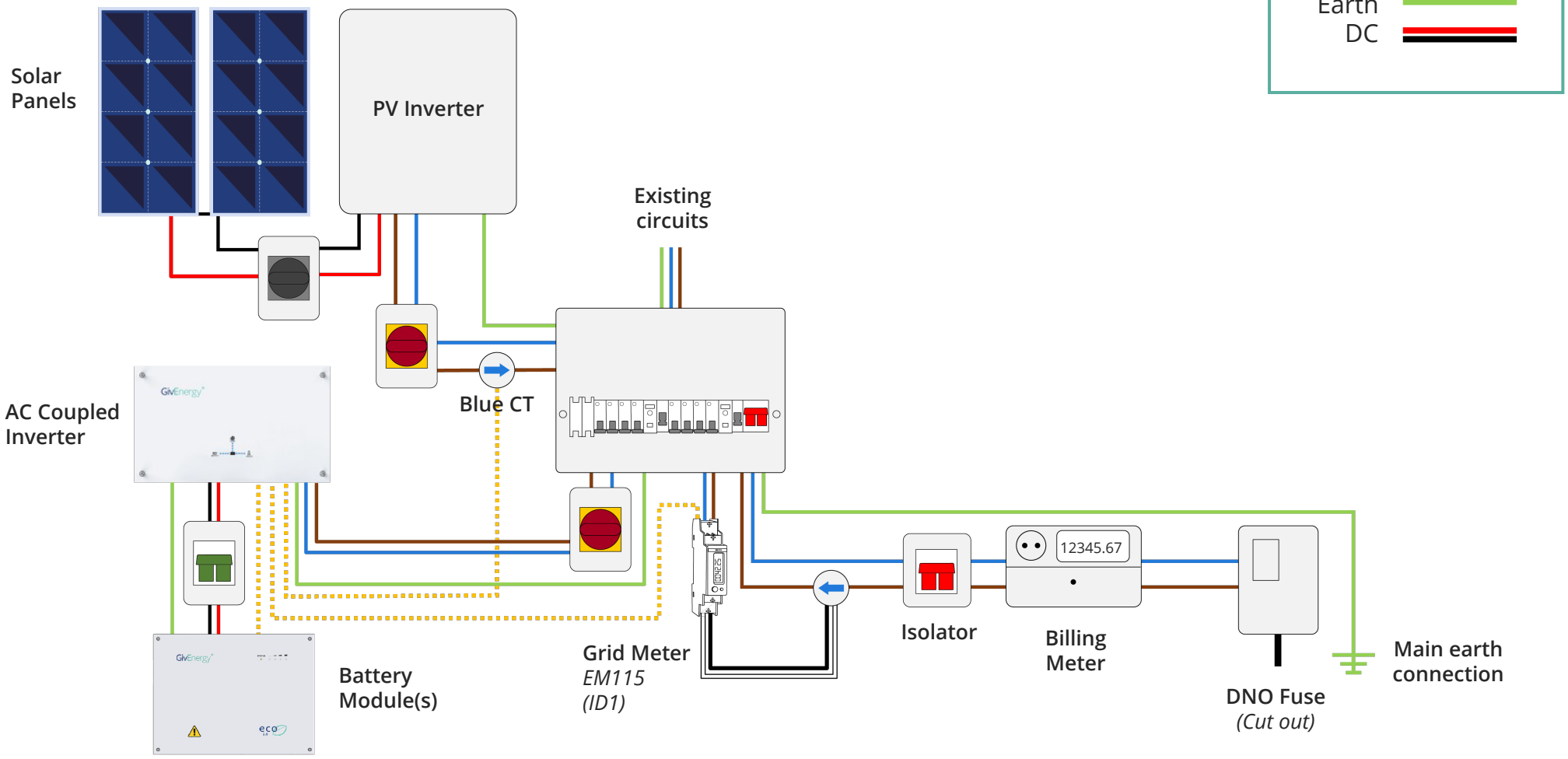
Schematics

HYBRID WITH EM115 (LoRa)



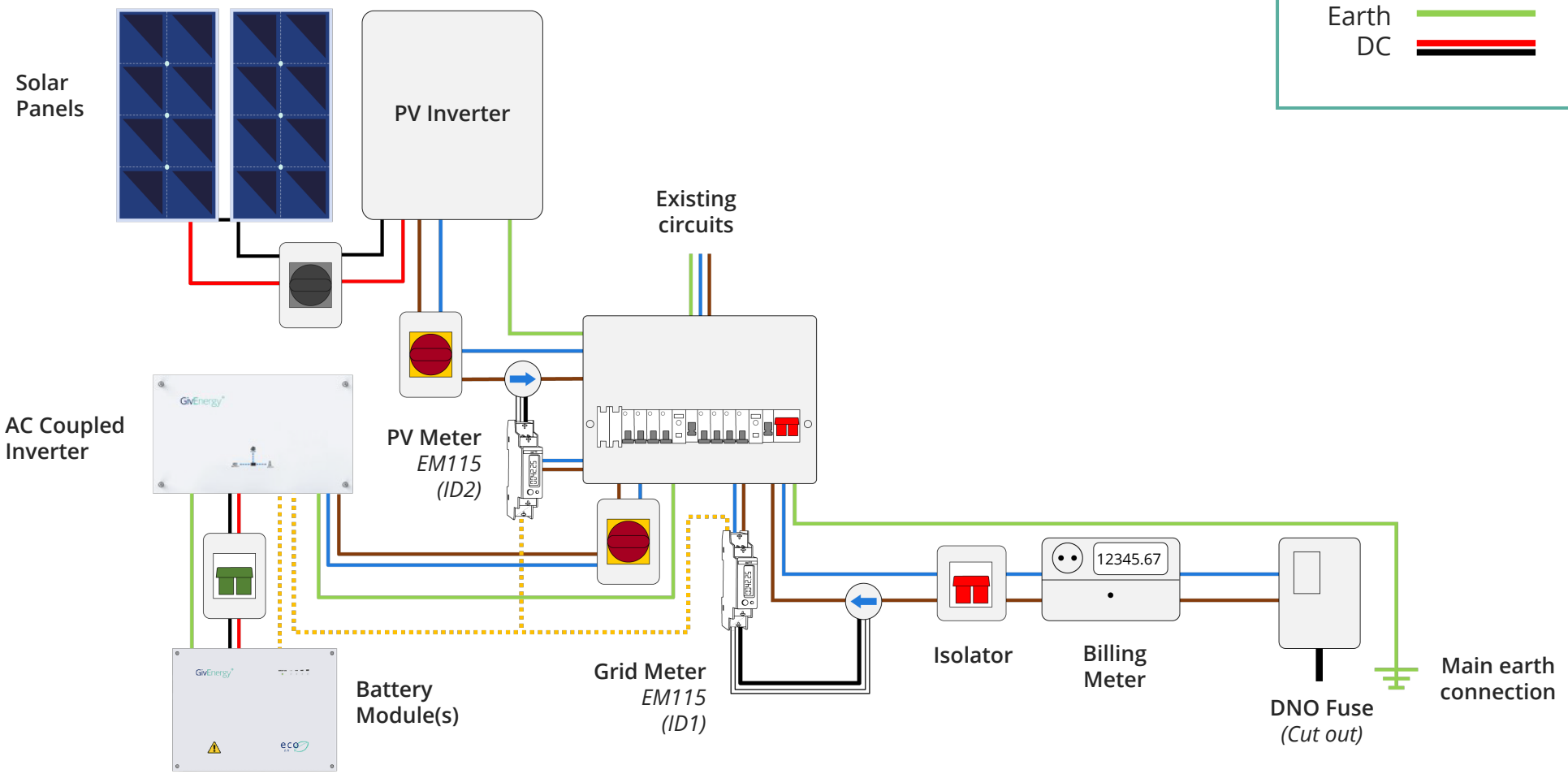
Schematics

AC COUPLED WITH EM115 AND BLUE CT



Schematics

AC COUPLED WITH 2 X EM115



Record your attendance

At the end of this training, you will be sent a link to confirm your attendance. You will receive a copy of this training manual, some useful guides, and a training certificate.