



# GivEnergy<sup>®</sup>

**INSTALLER TRAINING MANUAL 2022**

Version 10.0



## Who are we?

- Part of a group of electrical product manufacturing companies.
- We've been manufacturing energy storage products for over 10 years
- GivEnergy has been operational in the UK for over 3 years.
- GivEnergy facilities in HK, China, UK and now Australia.
- Small domestic right through to grid scale energy storage systems
- Final assembly of our battery systems to commence in the UK soon
- One of the largest energy storage companies in the UK

## UK Based Technical Support

### GENERAL ENQUIRIES

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

support@givenergy.co.uk  
**01377 252 874**  
*(option 2)*

### COMMISSIONING

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

support@givenergy.co.uk  
**01377 252 874**  
*(option 1)*

### KNOWLEDGEBASE

<https://kb.givenergy.cloud/>

**Marketing Materials**  
marketing@givenergy.co.uk  
**01377 252 874**  
*(option 5)*

## Where to buy?






Other distributors are available



# Training Certificate

At the end of this training, you will get a copy of this manual, some useful guides, and a training certificate.

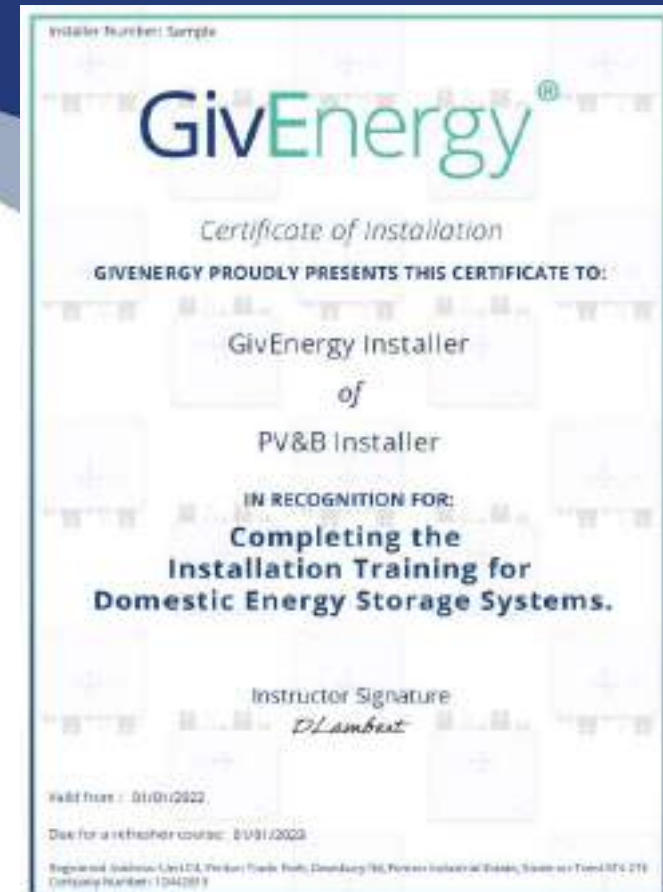
To do so, we will need your details:

-  Name
-  Email
-  Company

Please provide these by email directly, the email address is the same as the one the training invite was sent from.

## Please note

It is a requirement that all people 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.



# Tools and Equipment Required



**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



AC Output Cover



BMS< RS485 Come Wire Cover



CT Clamp  
(AC Coupled only)



BAT Wire Cover



Mounting Frame



Inverter



MC4 Connector Pack x2  
(Hybrid only)



# Inverter Specifications

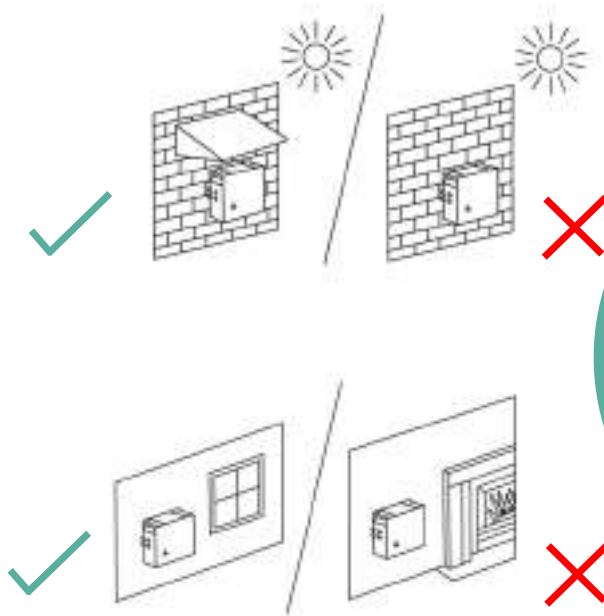


	Hybrid Gen1 3.6 / 5.0	Hybrid Gen2 3.6 / 5.0	Hybrid Gen2 (New casing)	AC Coupled 3.0
<b>Max DC Power</b>	4.7 / 6.5kWp	4.7 / 6.5kWp		No Direct PV Input
<b>Min/Max DC Voltages</b>	100 – 580v	150 – 600V		
<b>Start up Voltages</b>	120v	150V		
<b>MPPT Voltage Range</b>	120 – 550v	150 – 550V		
<b>Max Input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

# 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.











## 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

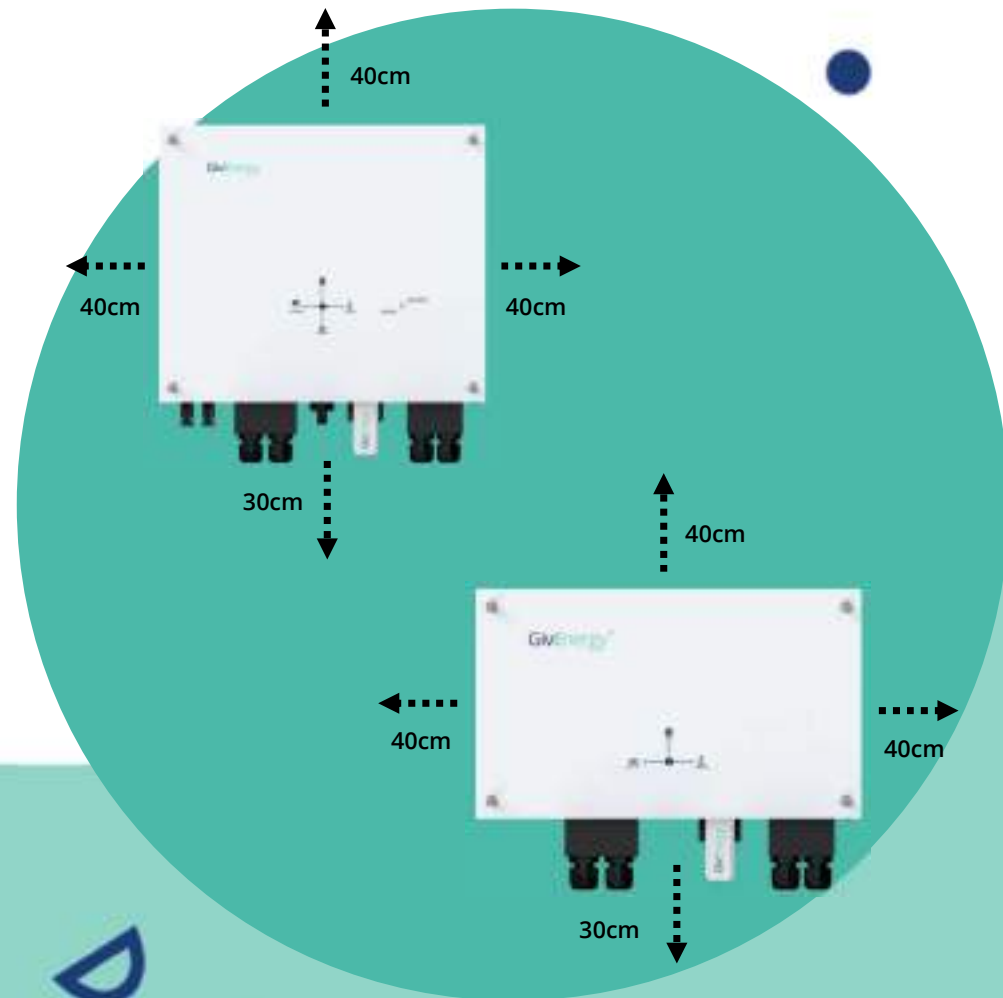
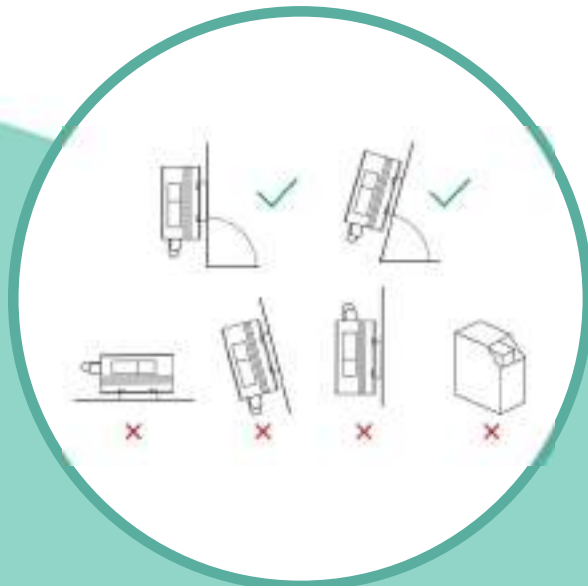
# Mounting

## Minimum Clearance

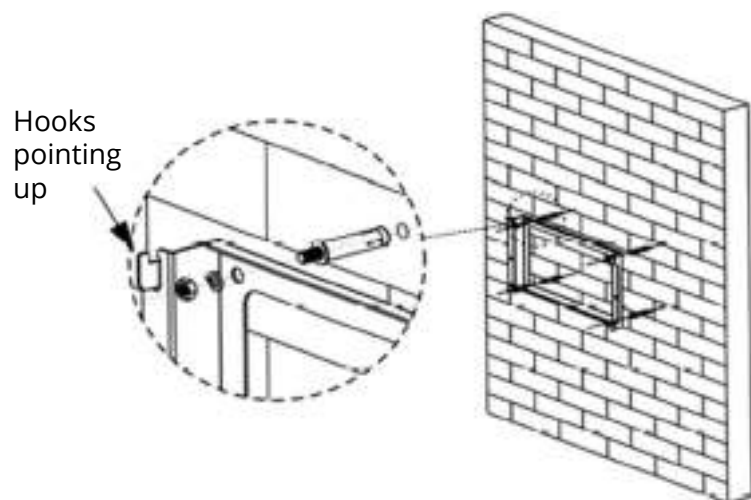
Systems must always be installed so that they are accessible for future maintenance as per BS7671.

The inverter should be installed with the minimum clearances as shown.

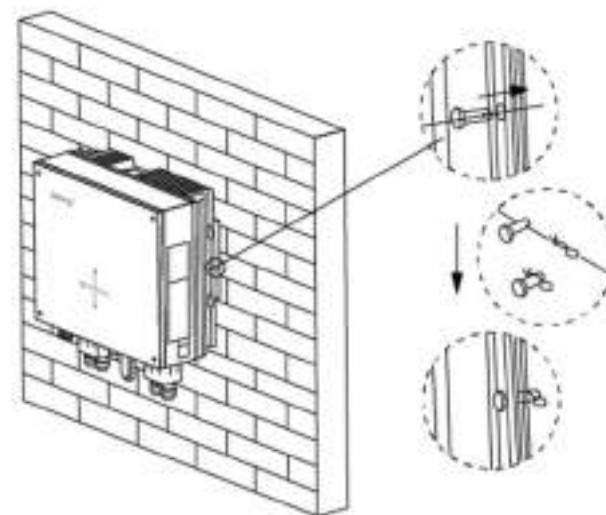
Inverters should be in a vertical position, a 50° backwards tilt is permitted if required.



# Mounting Brackets



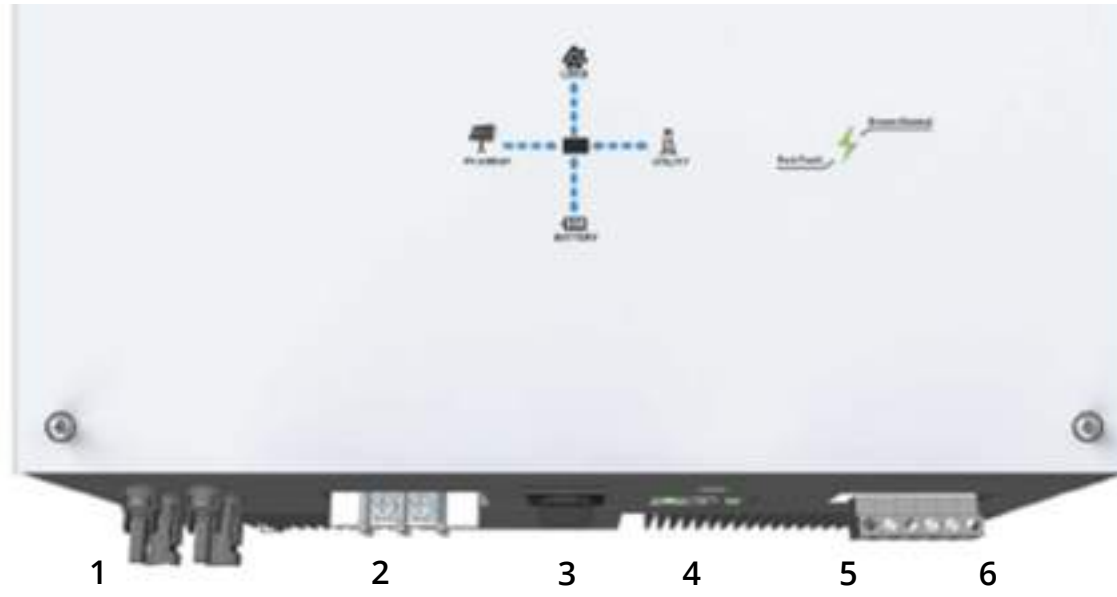
Brackets should be installed with the hooks pointing upwards and secured using the 4 fixings points provided.



Once the inverter is securely mounted onto the bracket, the locking pin should be installed on the left hand and right hand side.

The pin should be inserted from the front and then secured using the 'R clip'.

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

2

3

4



1. Battery terminals

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

3. EPS terminals

4. Grid terminals

# Electrical Connections - AC

	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

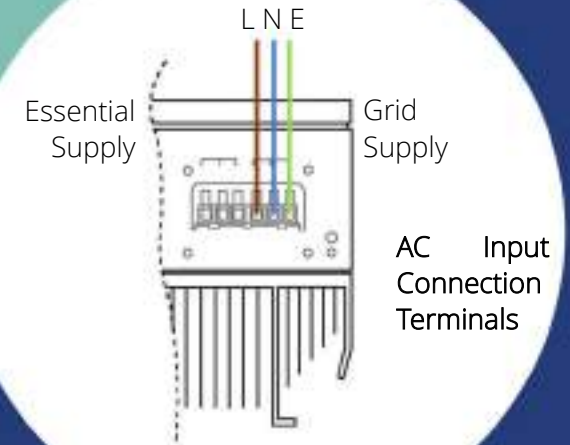
*\*This is the minimum size cable, large CSA may be required – Refer to BS7671*  
*\*\*See separate RCD declaration*

## 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.

Find our RCD declaration on our knowledge base.



## Local Isolation



All inverters must have local AC isolation for maintenance purposes



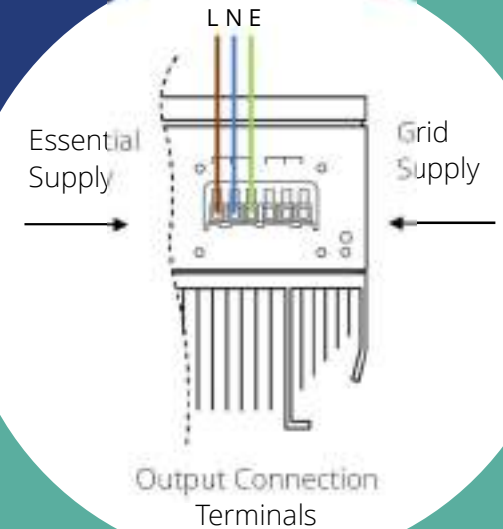
Earth all GivEnergy casing to each other



# 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).

More information is available on our knowledge base.



## Electrical Connections

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

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

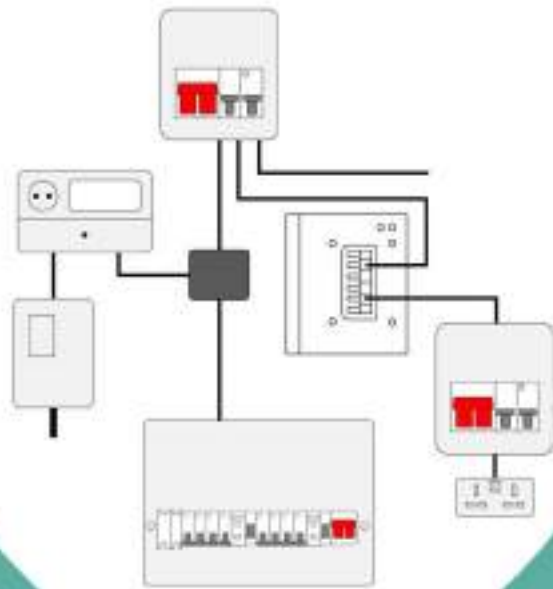
## Earthing

- 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

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	1.3
All other batteries	2.6	3.6	3.0
All batteries with solar	3.6 / 5	3.6 / 5	-

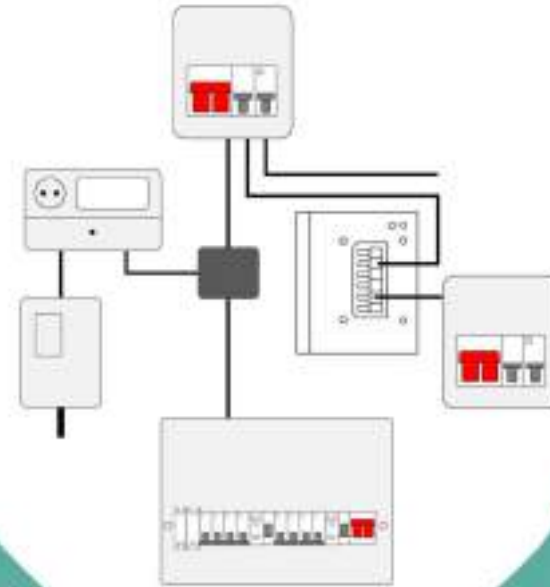
\*Please note that the EPS output of multiple inverters must not be joined

# Inverters Specific Circuit Backup



**Method 1**

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

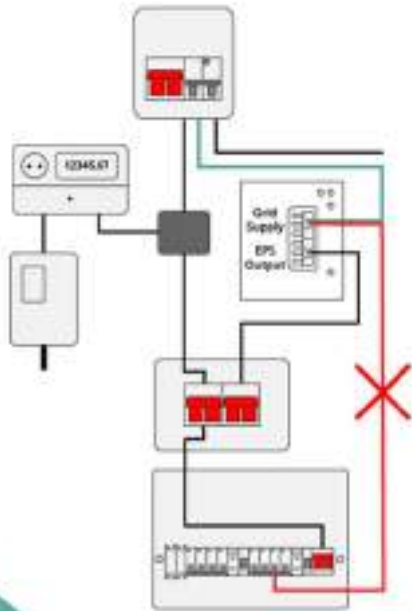


**Method 2**

Dedicated consumer unit supplying essential circuits only

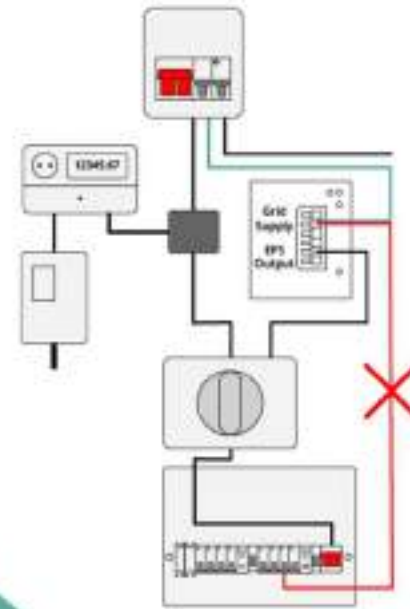
More detailed information and diagrams are available on our Knowledge Base

# Inverters Full Property Backup



**Method 3**

Full property backup with manual changeover switch



**Method 4**

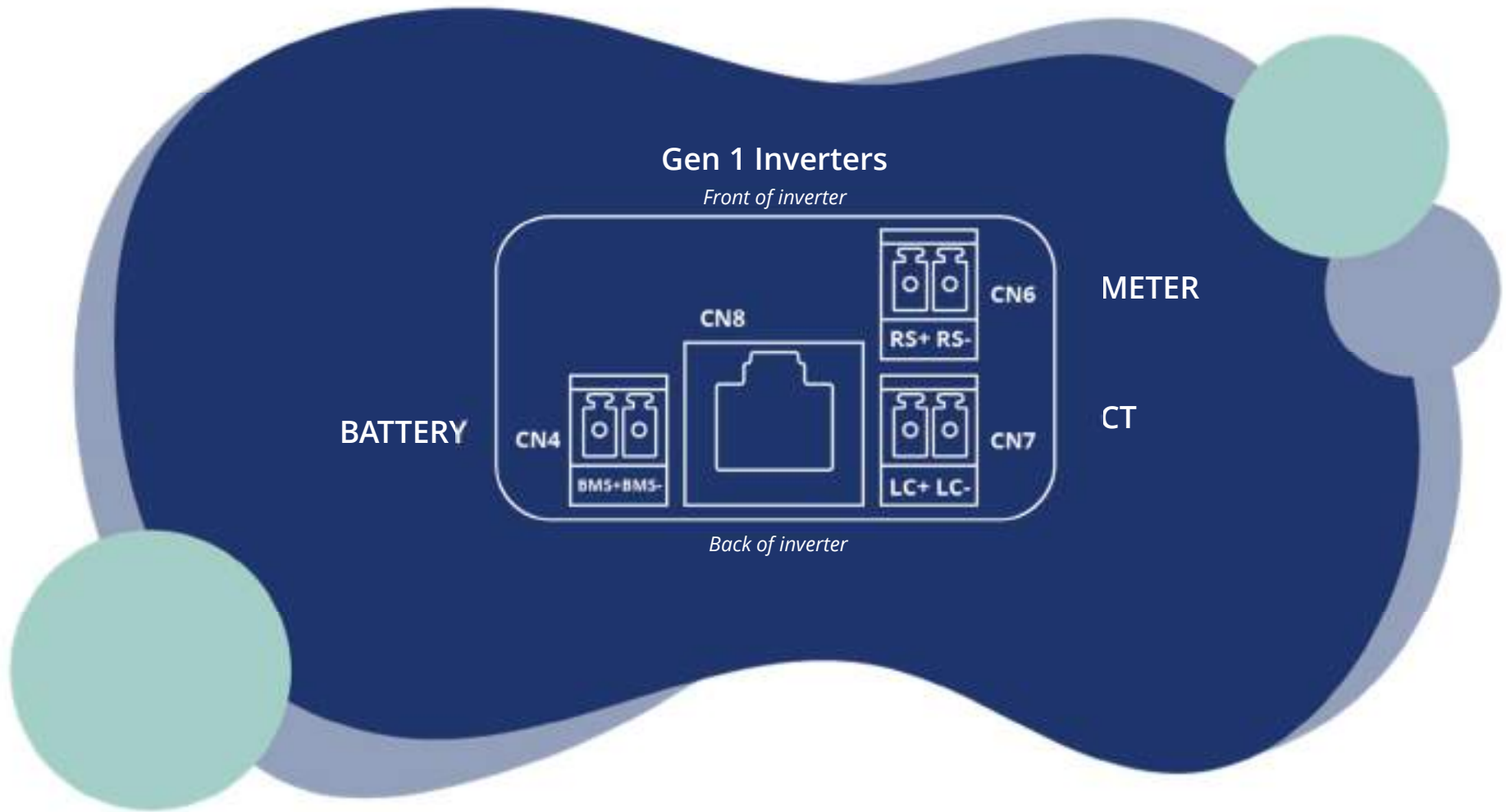
Full property backup with auto changeover switch

More detailed information and diagrams are available on our Knowledge Base

## Important

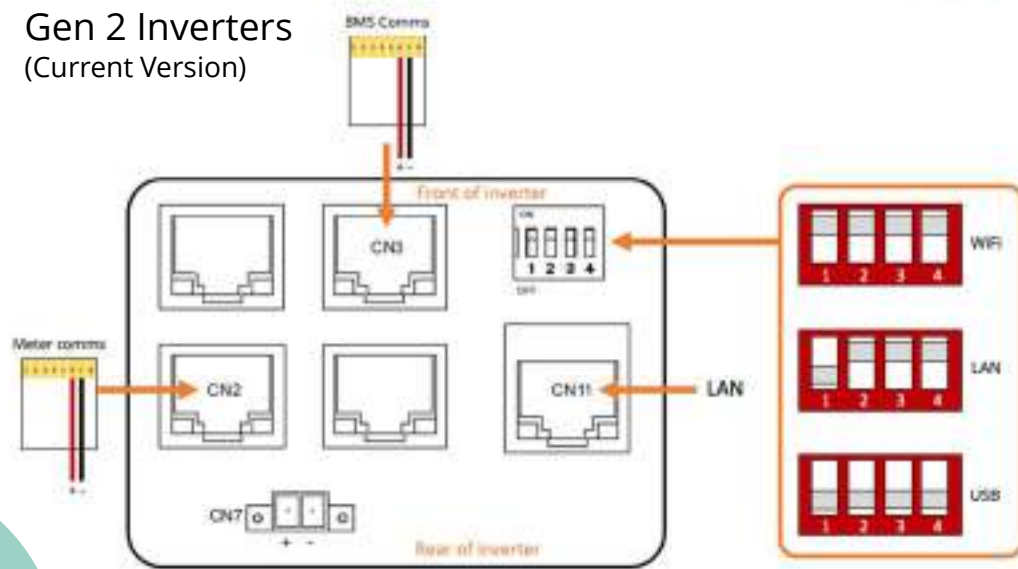
- The grid supply to the GivEnergy inverter **must** come from the **grid side** of the changeover switch
- On AC Coupled systems the PV inverter must not be run against the EPS output

# Data Connection Inverters



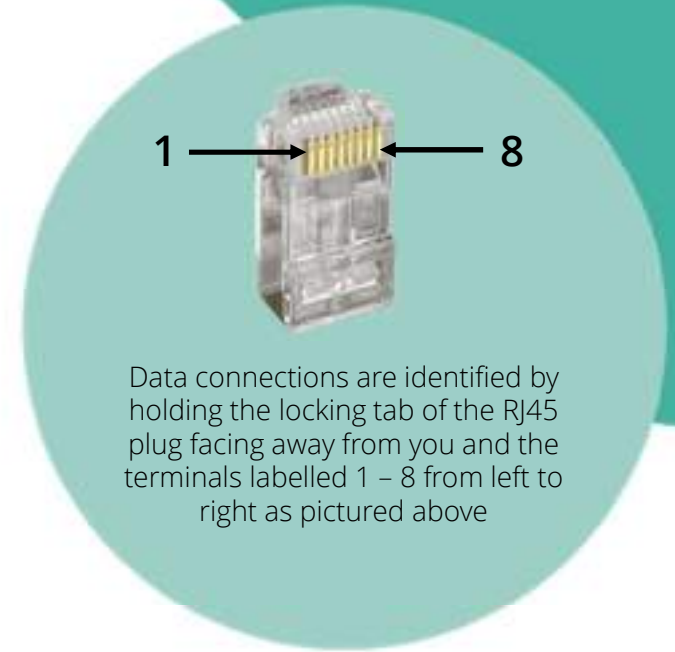
# Data Connection Inverters

Gen 2 Inverters  
(Current Version)



**Note**  
The pre-made cables provided have the White as +/Positive and Brown as -/Negative

**GEN 2 data connections**  
*Applicable for firmware version 902 or above*



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

## Gen 2 Inverters (Round corner)

In the near future we will have our round corner Gen 2. This new casing has been designed with both the installer and end user in mind.



- |                                     |                                     |
|-------------------------------------|-------------------------------------|
| 1. All-in-one battery connector     | 5. Communication and LAN connectors |
| 2. Quick connect removable DC input | 6. AC and EPS connections           |
| 3. DC input isolation switch        | 7. Cable clamps                     |
| 4. Built in WiFi ariel              | 8. IP65 cable entry glands          |



# Lights and Operation Hybrid



## Solar PV

When solar PV generation is detected the inverter will indicate that the energy is being converted from DC to AC energy and can be used within the home.



## 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 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

## AC Coupled



### 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

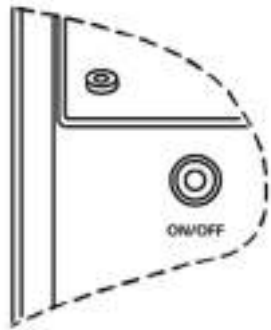
When energy is being imported from the grid the arrows pointing toward the centre will be lit. When energy is being exported to the grid the arrows pointing toward the grid will be lit.



### 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.

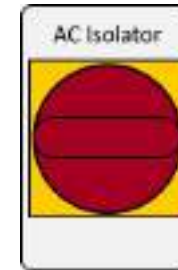
# Shutdown Instructions Batteries



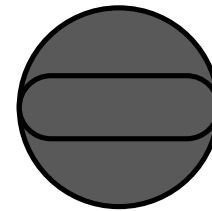
Isolate battery by pressing the On/Off switch on the side for 5 seconds



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

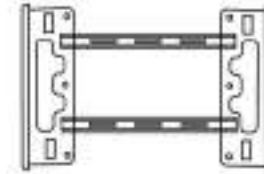


# **BATTERIES**

# Box Contents Gen 1 batteries



A



B



C



D

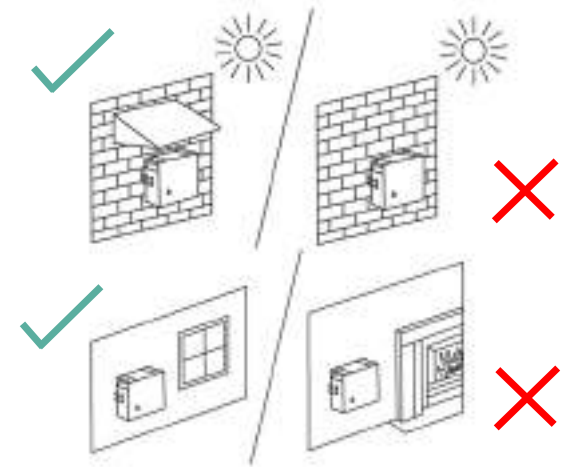
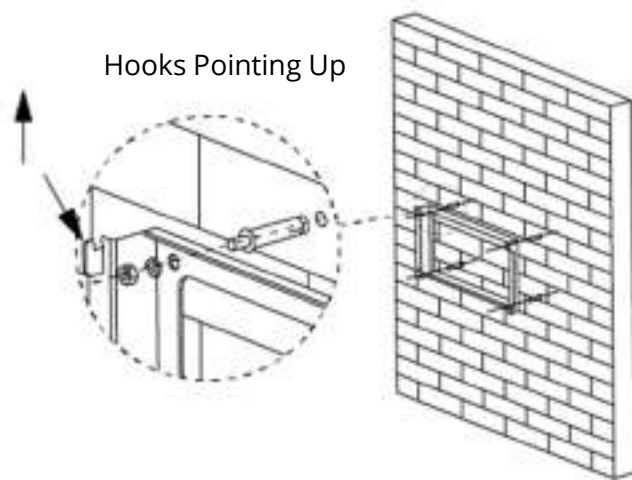
Item	Name	Quantity
A	Battery	1
B	Mounting Frame	1
C	Cable Pack <i>(Gen 1 batteries only)</i>	2
D	USB Memory Stick	1

# Specifications Batteries



	2.6kWh	5.2kWh	8.2kWh	Gen 2 - 9.5kWh
<b>Nominal voltage</b>	51.2V			
<b>Max charge/discharge rate (Hybrid)</b>	1250w*/2600w	2600w	2600/3600w**	
<b>Max charge/discharge rate (AC Coupled)</b>	1250w*/3000w	2600w	3000w	
<b>Maximum DOD</b>	90%	90%	100%	100%
<b>IP rating</b>	IP65			
<b>Operating temperature</b>	-10 – 50 °C			
<b>Nominal AC Output</b>	480 / 300 / 235	480 / 515 / 205	480 / 620 / 198	480 / 800 / 223
<b>Max Battery Charge/Discharge</b>	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 even if the weight of the battery is sat on the floor using the fixings provided.

Wall depth should be at least 120mm.

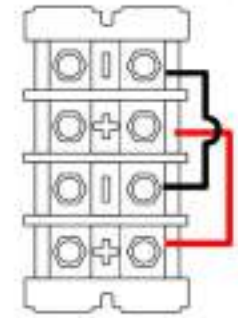
Batteries should not have the weight hung on a wall bracket when fixing to plasterboard or Thermolite blocks.

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

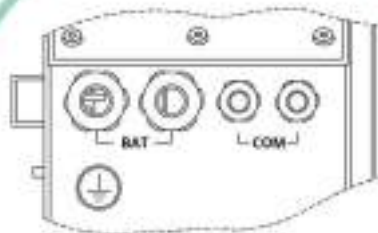
The cables supplied in the battery boxes should be used whenever possible. If a longer length is required 16mm<sup>2</sup> Tri-rated cable must be used and can be up to a maximum length of:

5m maximum length  
(Single battery)

2m between batteries  
(Cables provided)



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



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)



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

Tight and sound connection 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.

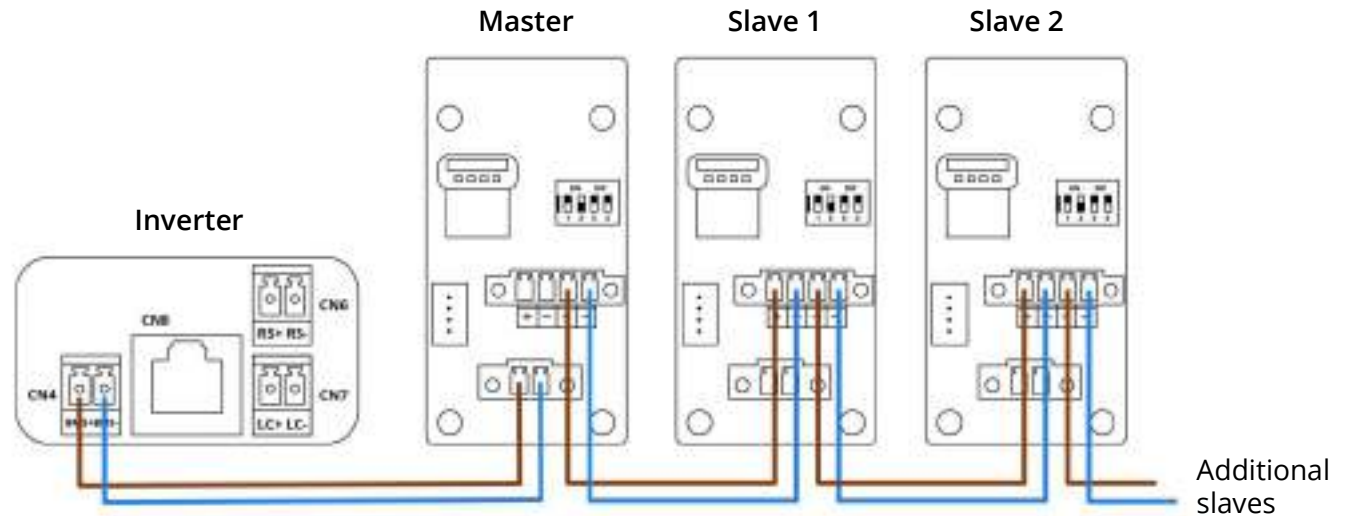


DC MCB



# 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

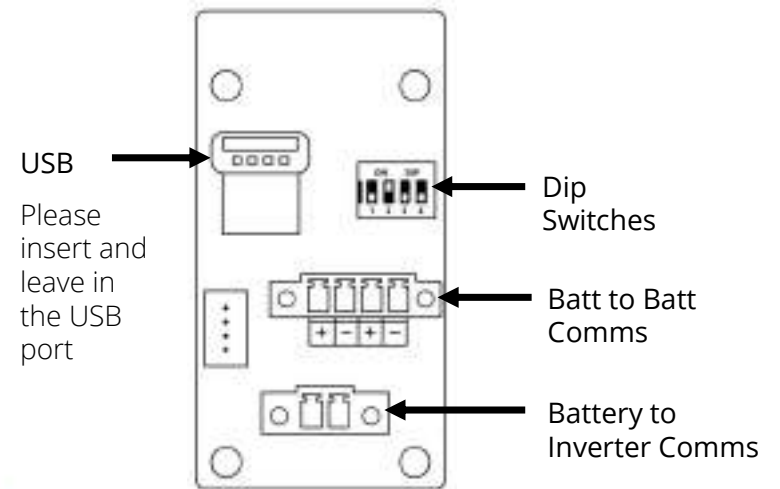


## Size of batteries

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

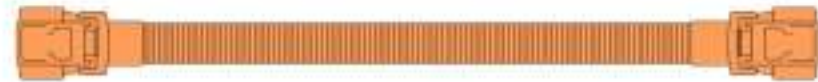


# Gen 2 Batteries

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

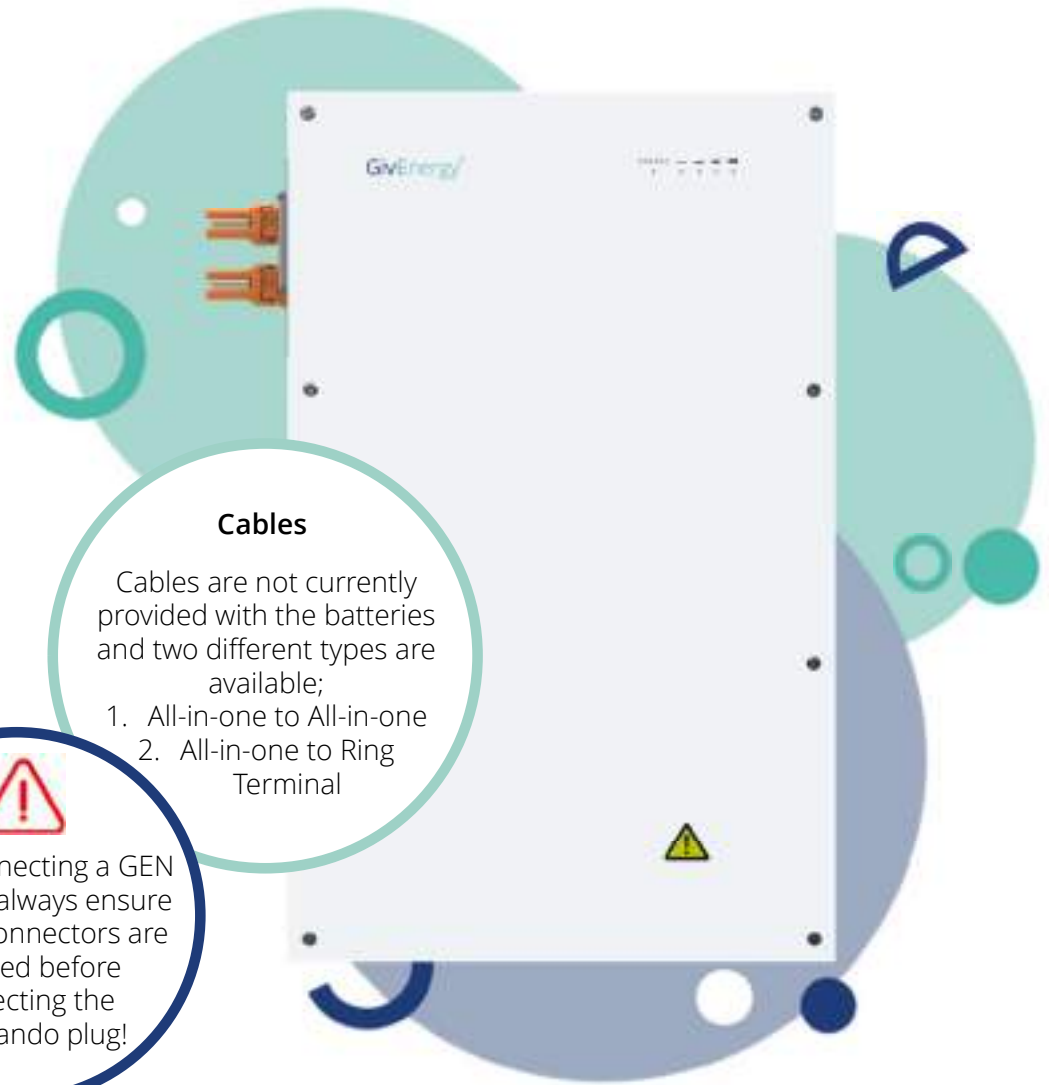
All GivEnergy batteries must be installed in size order, with the largest wired closest to the inverter. This means the 9.5kWh will always be wired in between the inverter and any Gen 1 batteries, removing the need for an external DC MCB.



1



2



## Cables

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

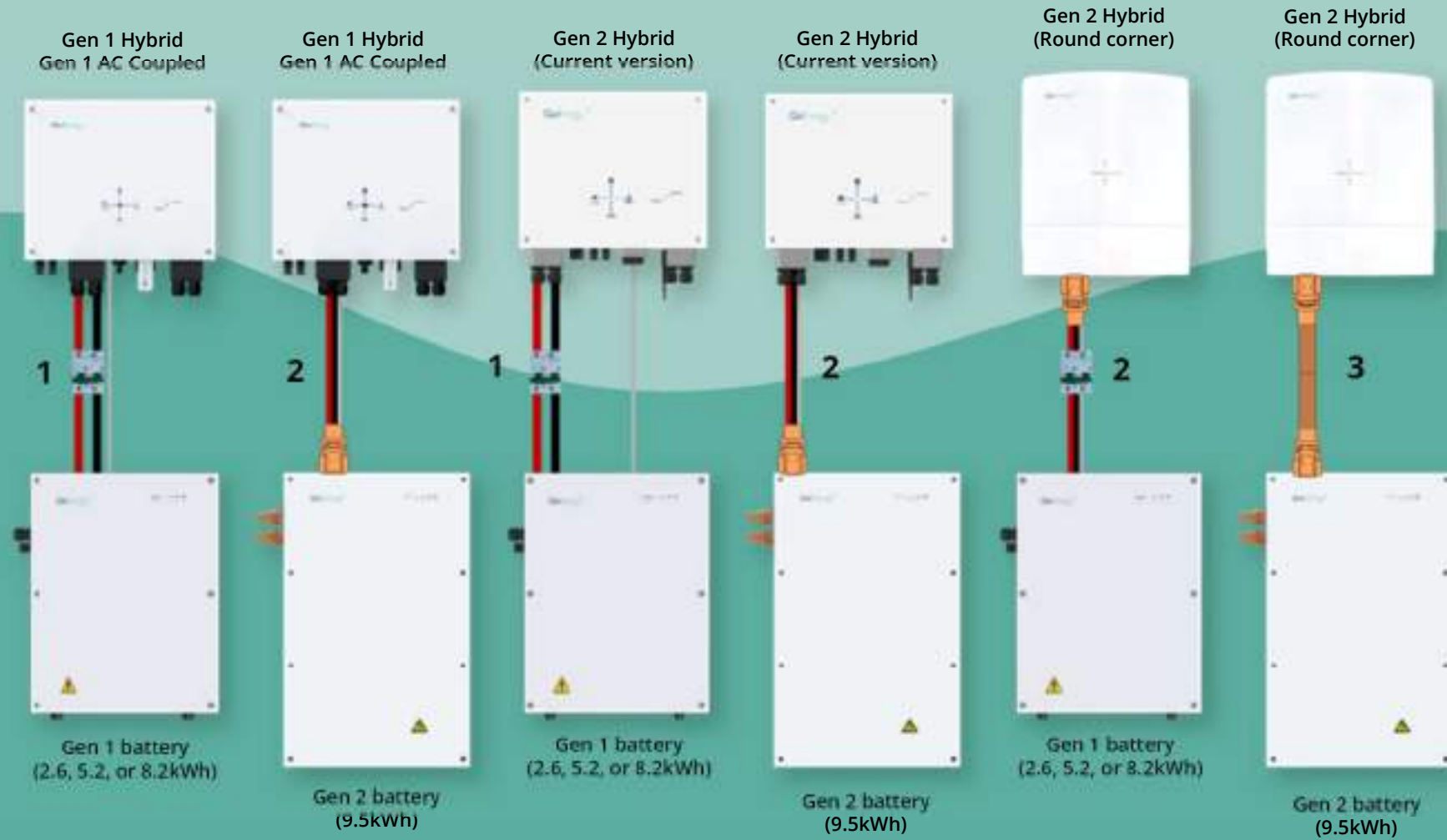
1. All-in-one to All-in-one
2. All-in-one to Ring Terminal



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

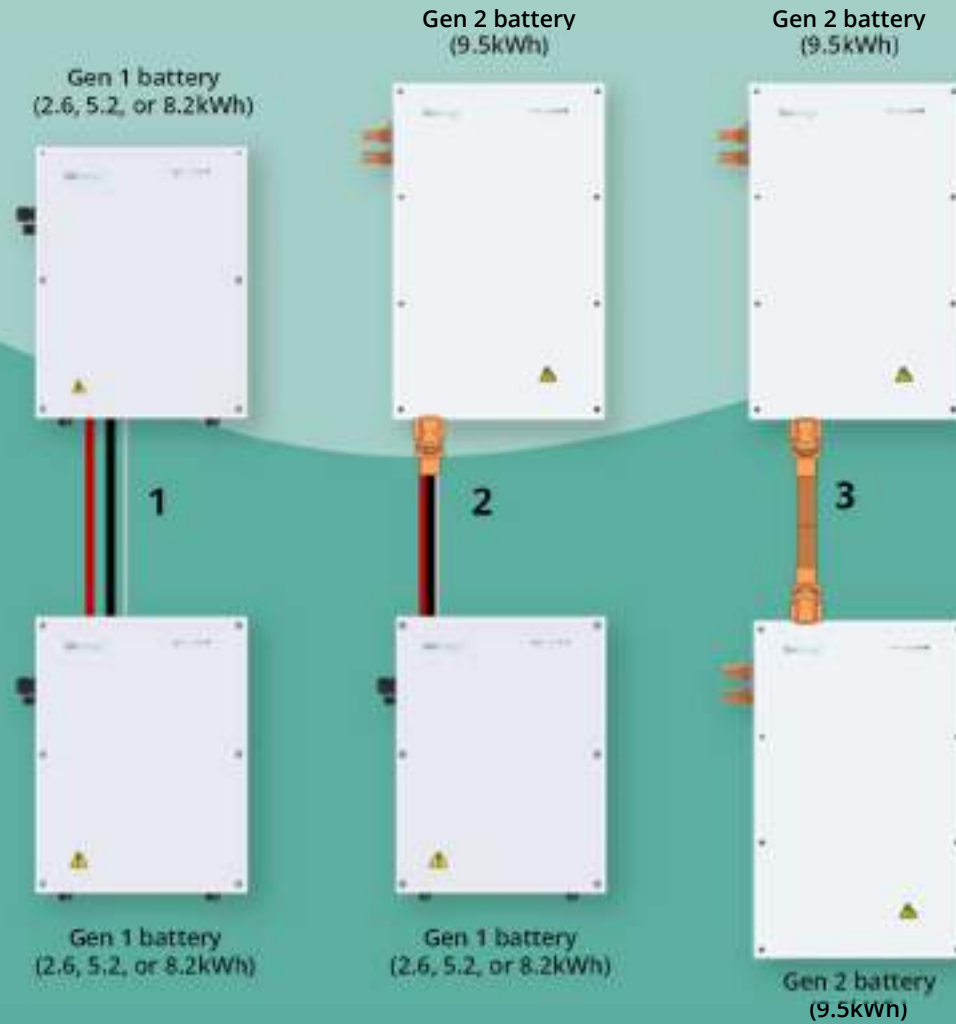
# Battery to Inverter Wiring

- 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

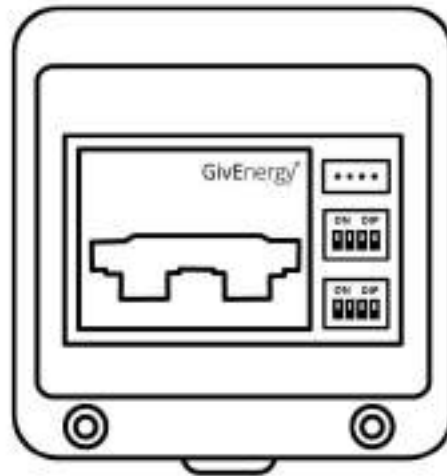
- 1 - Cable pack (In battery packaging)
- 2 - All-in-one to Ring Terminal (not included)
- 3 - All-in-one to All-in-one (not included)



# Gen 2 Batteries

Gen 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 CT'S**



# 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.

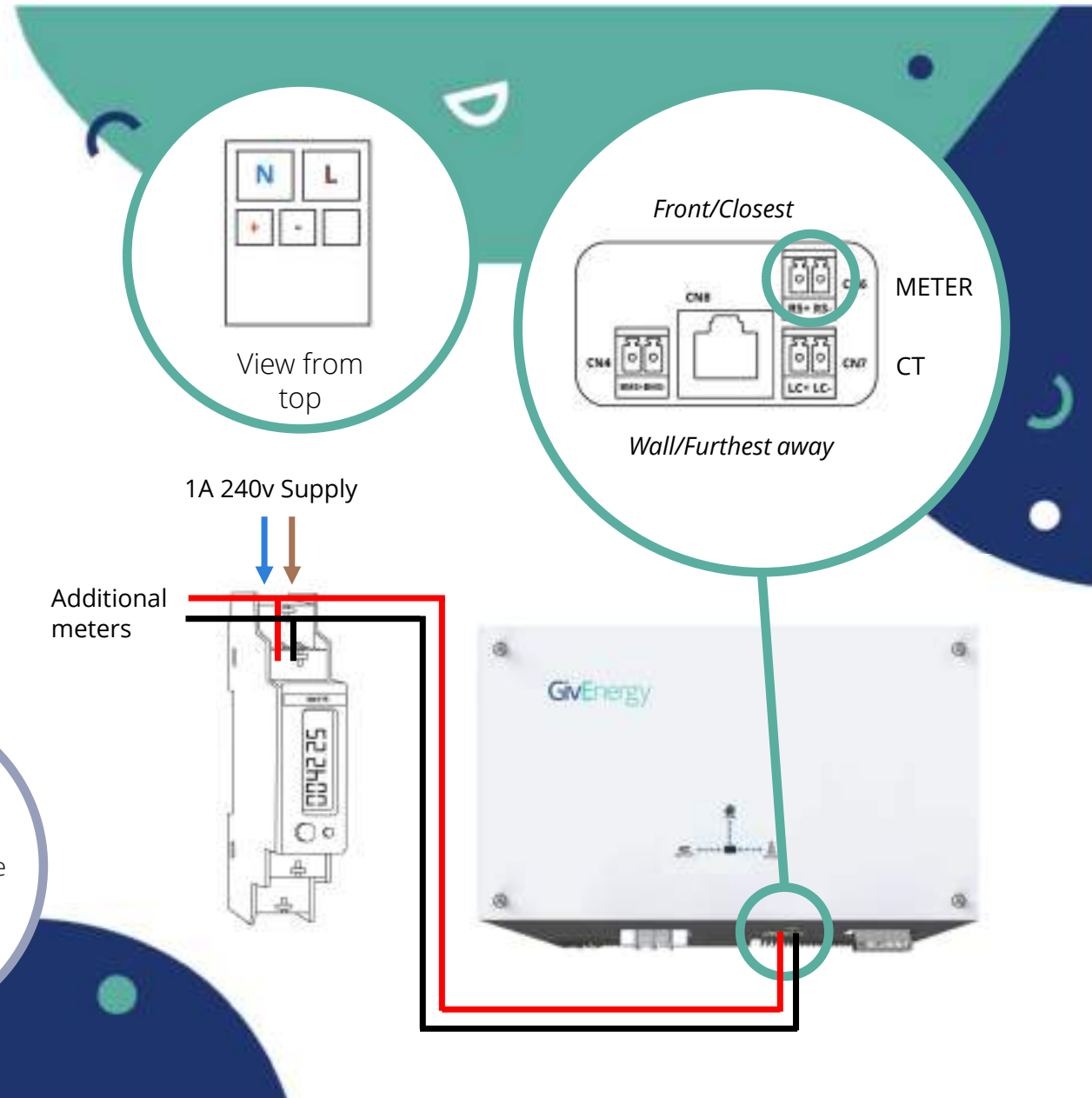
*This could be a dedicated supply from a 6A, for example.*

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.

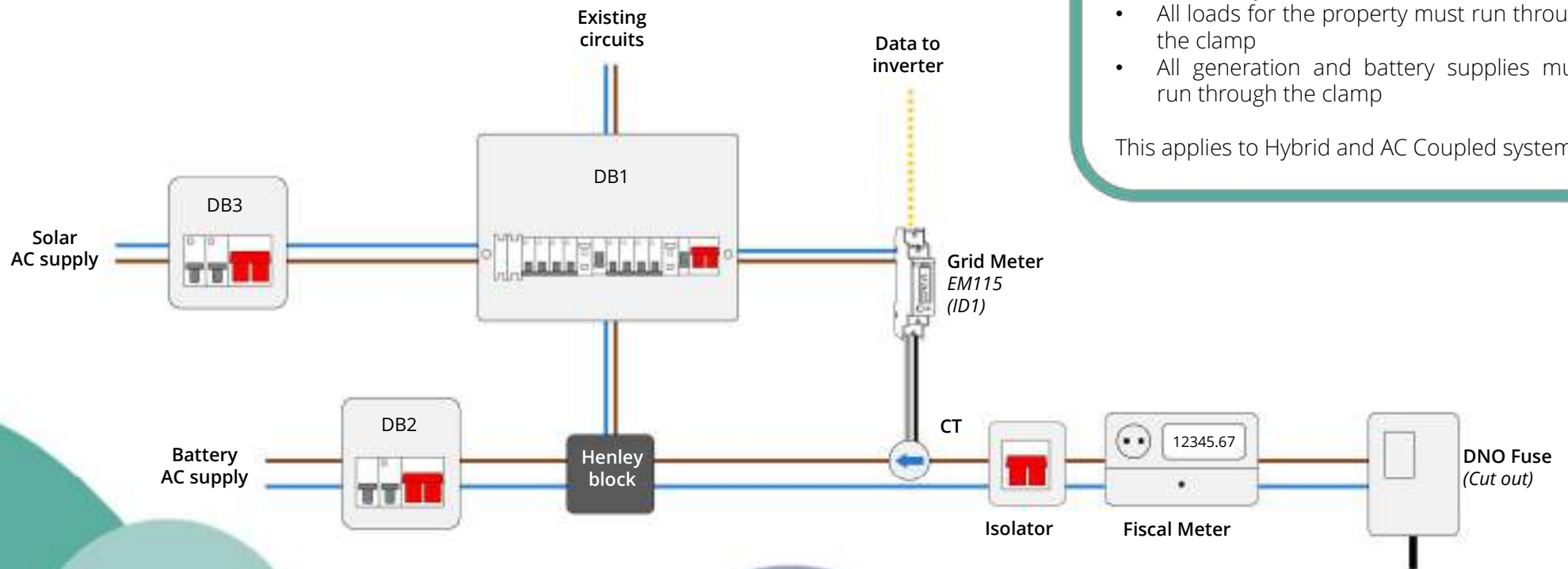
*Data connection should be twisted pair cable, for example cat5/6 ethernet or Belden type cable.*

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

EM115 meter 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.

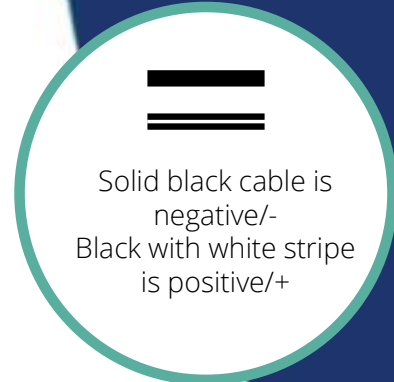
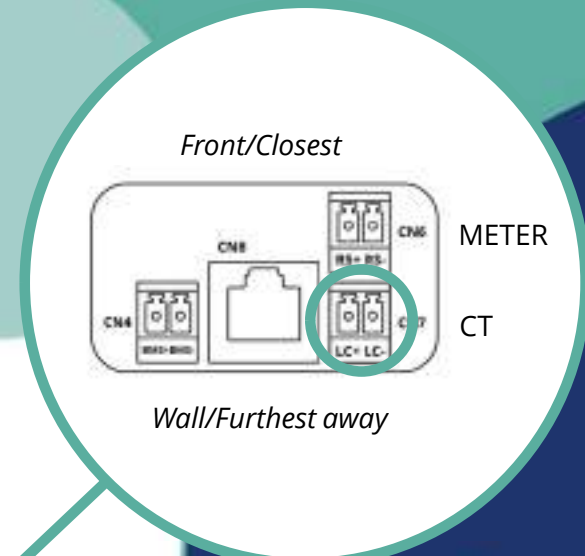
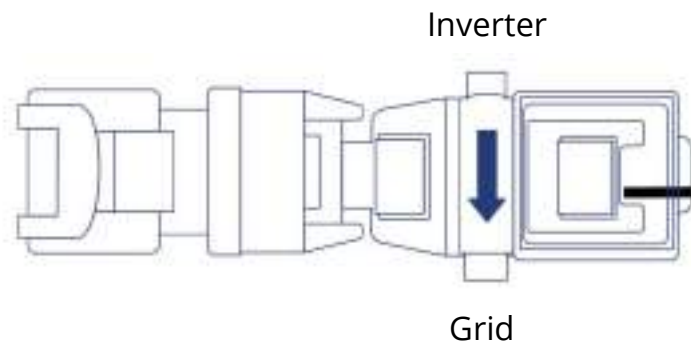
# AC Coupled Inverters

## 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.

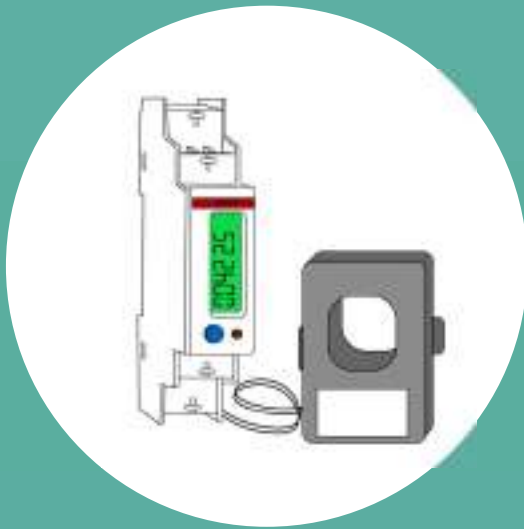
This clamp does not require a meter and wires directly back to the inverter.

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



# Metering EM115 Meter

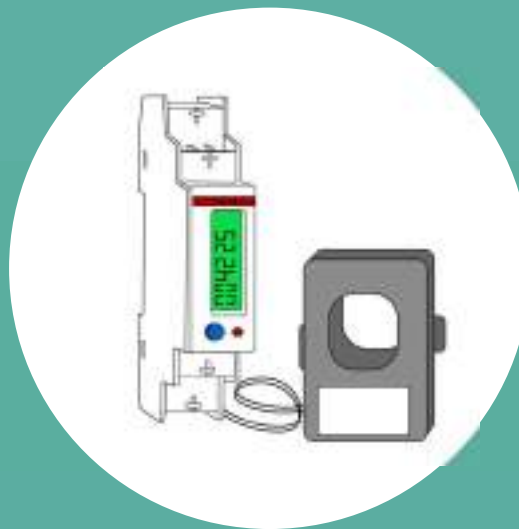
ID1



## Grid - Import/Export meter

Used for Hybrid and AC Coupled systems

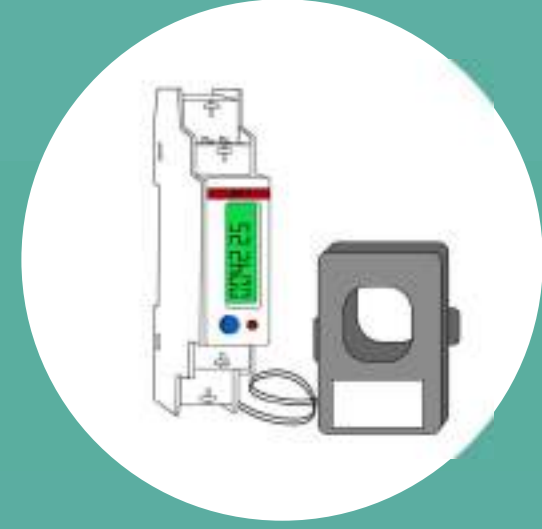
ID2



## PV monitoring meter

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

ID3



## PV monitoring meter

Used for AC Coupled systems to monitor a second PV system

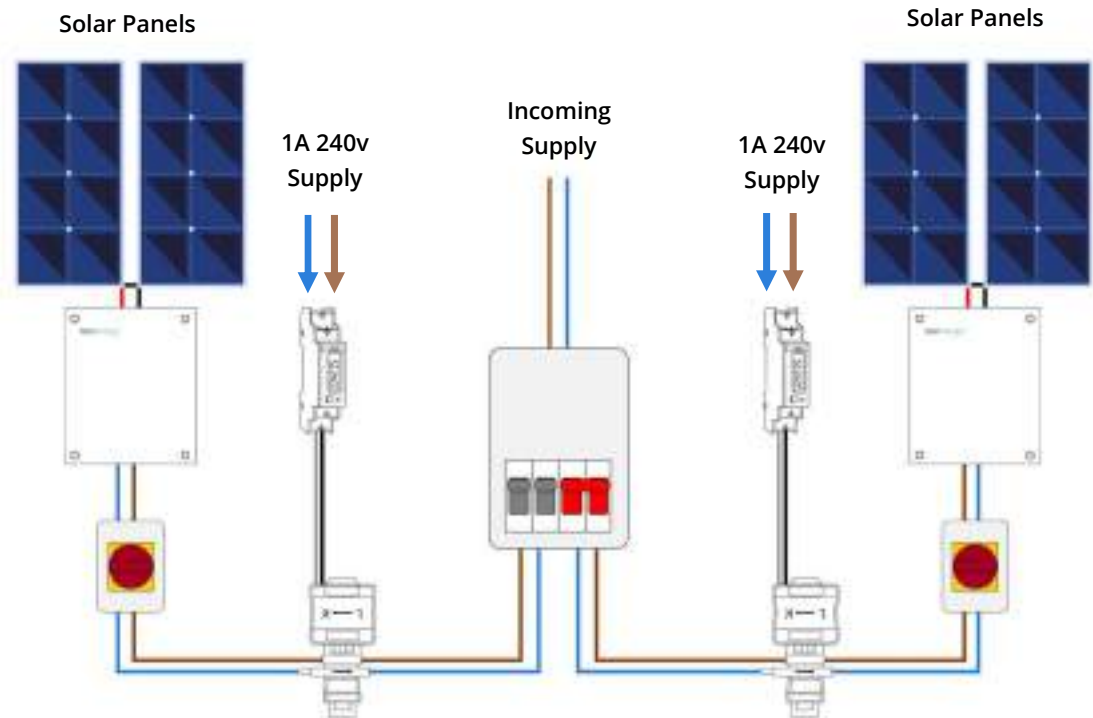
# Metering EM115 ID2 and ID3 (PV) meter

When the Blue CT clamp is not suitable or multiple generation sources need to be monitored a 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 that 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

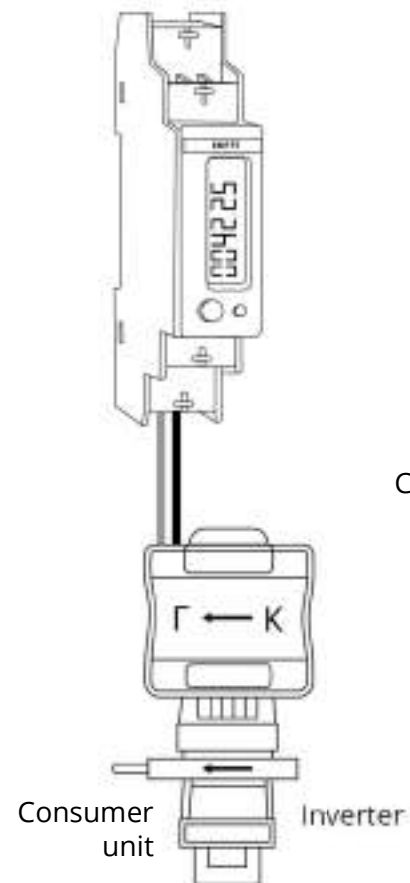


CT clamp cables must not be cut down or extended!

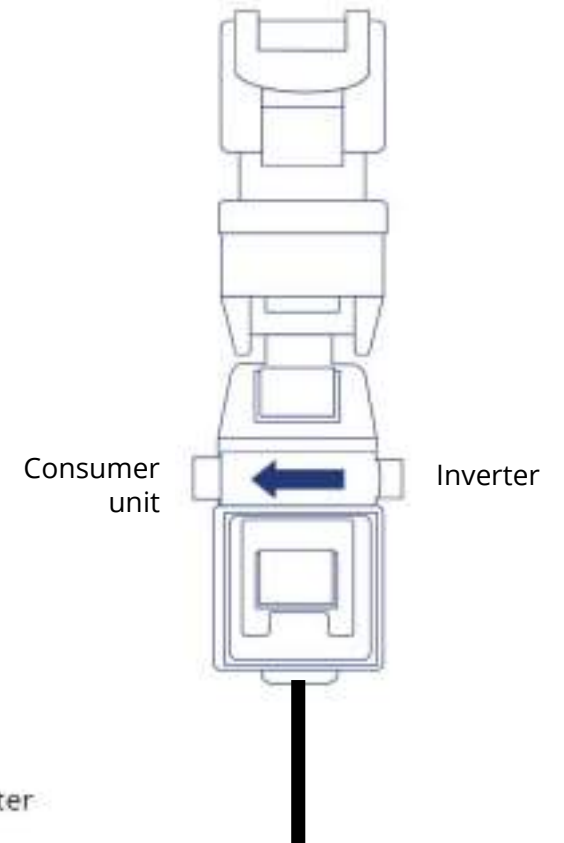
Grid (ID1)



PV (ID2 & 3)



Blue CT (PV)

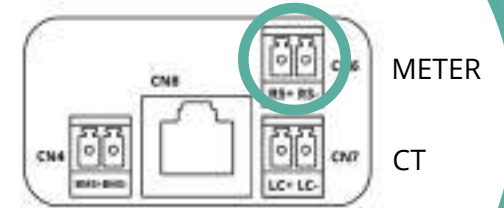


# Metering LoRa devices

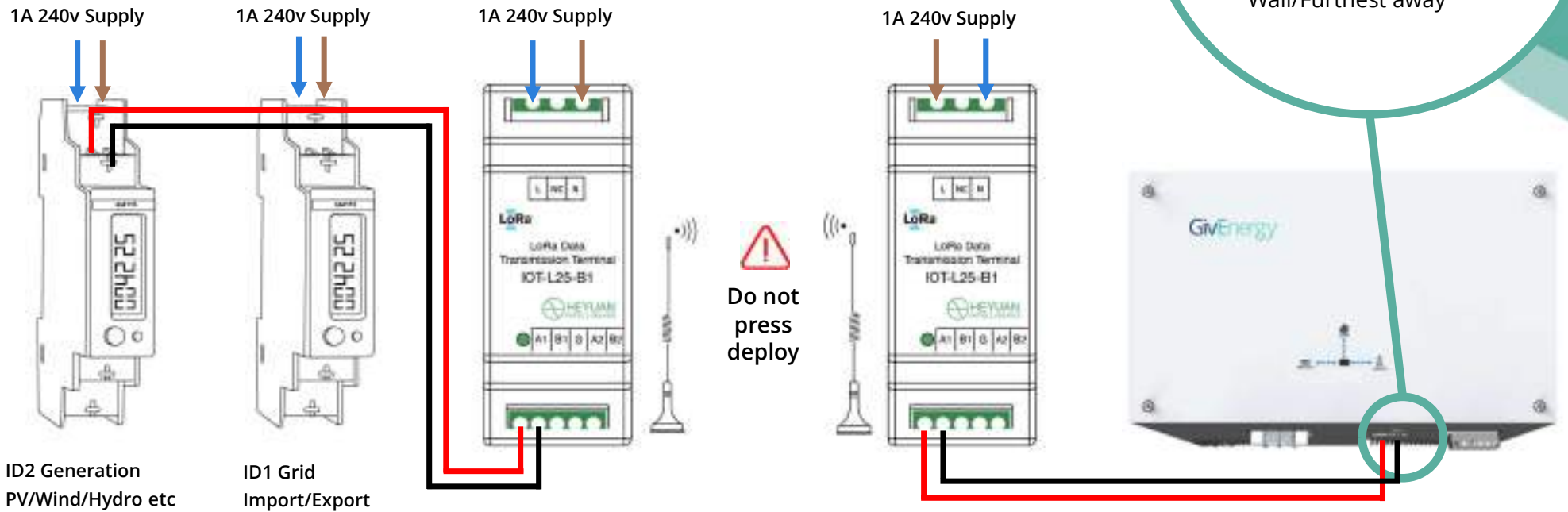
- LoRa units come in pairs and are pre-tuned to each other
- 1 LoRa sender can send multiple meters data to a single receiver
- Wireless frequency can be altered if receiver has interference

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.

Front/Closest



Wall/Furthest away





# **ACCOUNT AND SUPPORT**

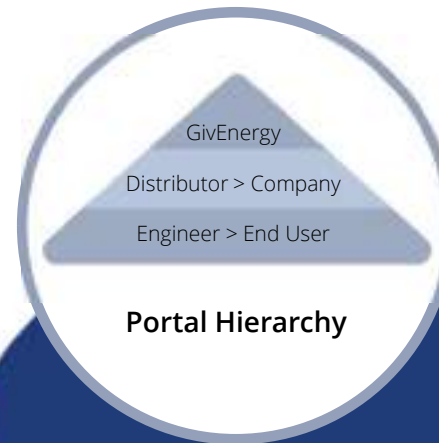


# Setting up a GivEnergy Cloud account

You can request a company account to be setup via your distributor.

*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](mailto:support@givenergy.co.uk) with your company information for us to create you an account.*

Once logged in you will need to create an Engineer Account for each of your installers/on-site engineers.



## GivEnergy Engineers

An engineers account will allow you to commission a system via the GivEnergy online portal – This is a step by step process to ensure all meter and battery communication as well as CT clamp positioning is correct.

# Monitoring communications Commissioning and Setup

**Before** commissioning a system, the end user account must be setup on the GivEnergy portal, and the serial number of the dongle added to the account.

We will not be able to offer commissioning support unless the end user account is created.

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.

## 2. Link a dongle

Enter dongle serial number and verify code, along with selecting customers' account from the list.

## 1. Create an Account

Logged in as a Company  
> Create Engineers account

Logged in as an Engineer  
> Create End User account



# Monitoring communications

## WiFi Dongles

### 4G Dongles

Ensure the Sim Card is inserted correctly in the dongle then simply plug the dongle into the inverter

### WiFi dongles

The GivEngineer app will take you through the steps required to tune the dongle in to the end users WiFi network.

If the app isn't available , please follow the WiFi Comms Guide on the Knowledge Base.

#### Important note on WiFi dongles

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



# Need Help?








Call GivEnergy  
commissioning line  
01377 252 874  
(Option 1)

## Operating hours

**Mon – Fri**  
8.30am – 7.00pm  
**Sat** 9.00am – 7.00pm  
**Sun** Closed



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

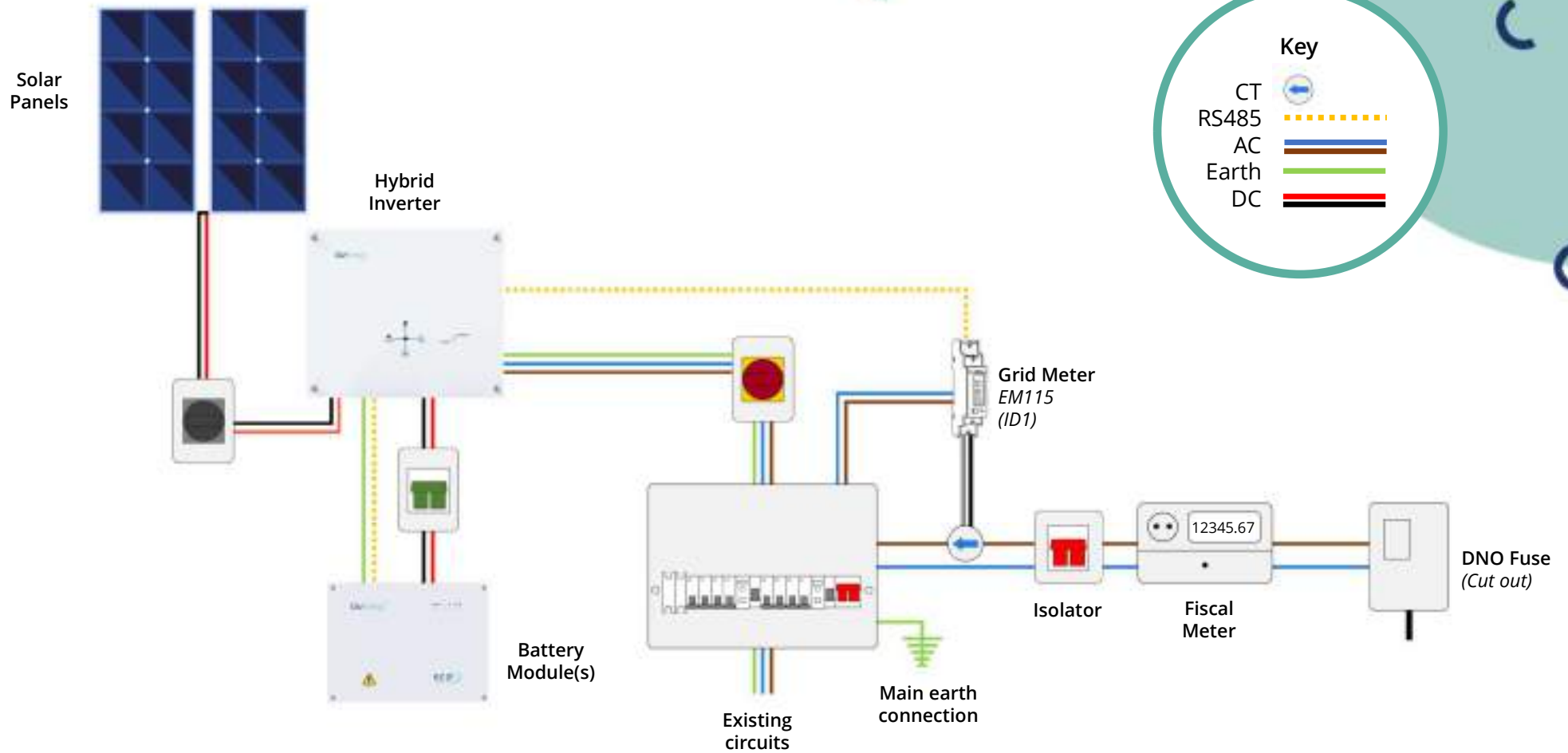
-  Make/Model/Wattage and quantity of panels

## For AC Coupled

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

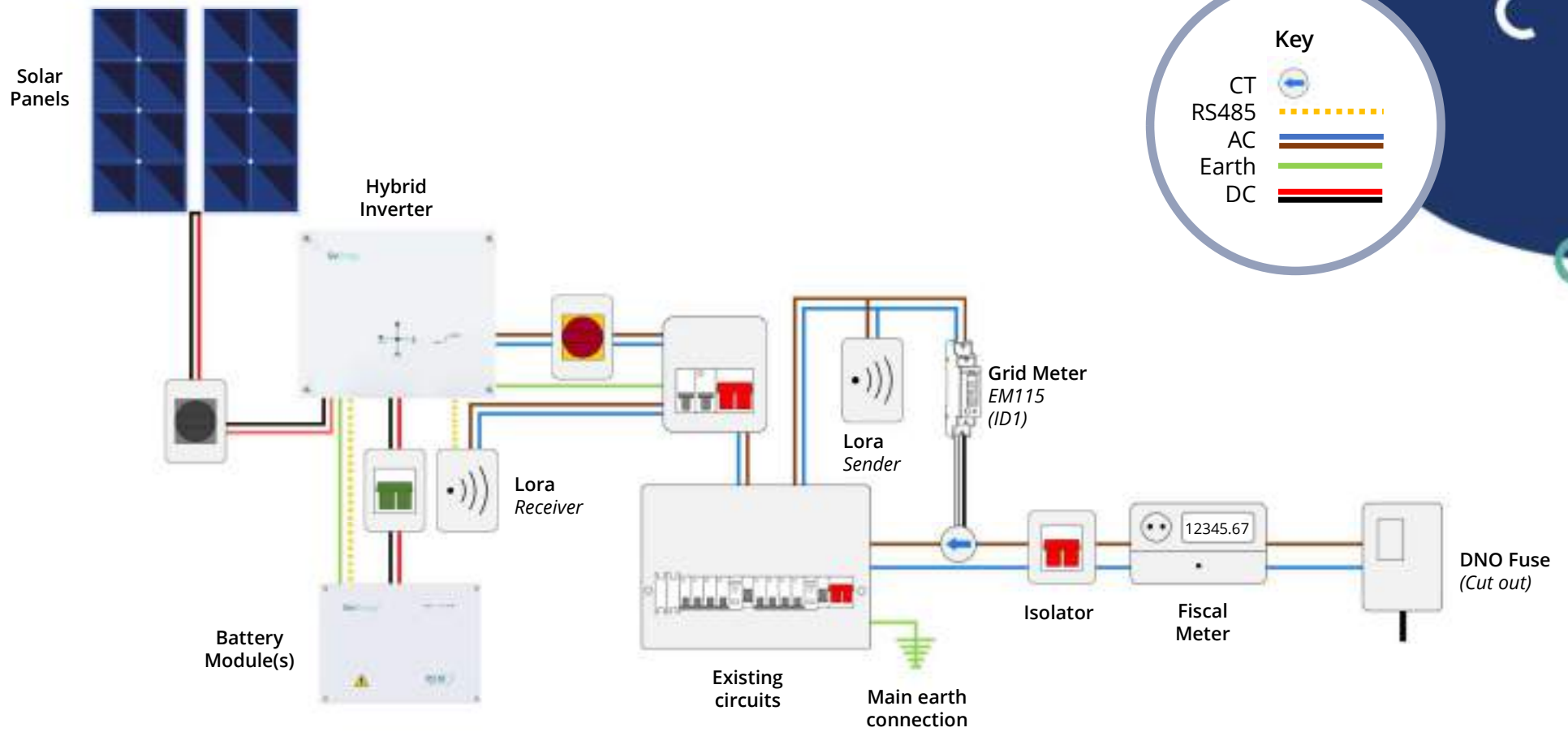
# Schematics

## Hybrid with EM115



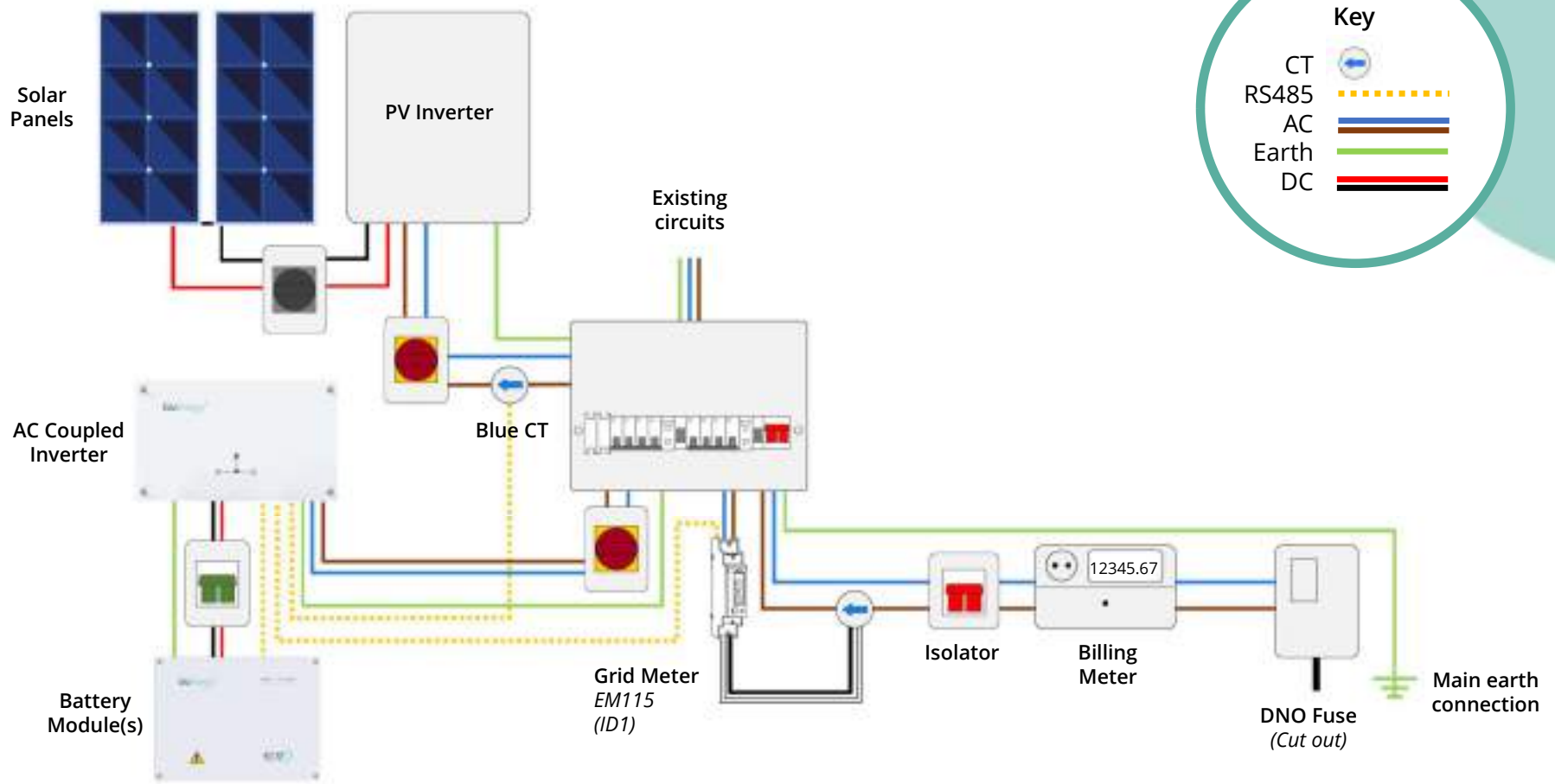
# Schematics

## Hybrid with EM115 (LoRa)



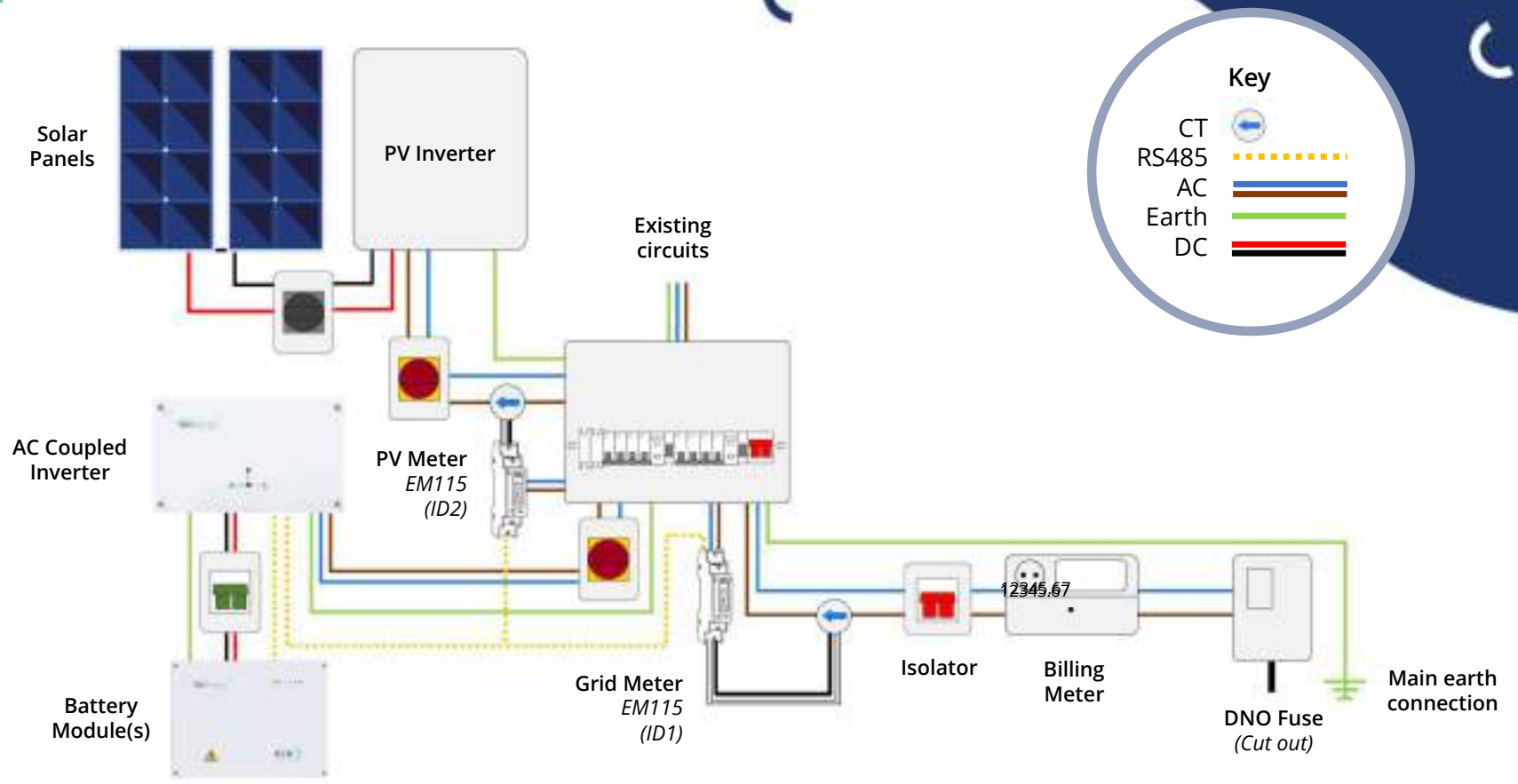
# Schematics

## AC coupled with EM115 and Blue CT



# Schematics

## AC Coupled with 2 x EM115





# Recording Your Attendance

- At the end of this training you will get a copy of this manual, some useful guides and a training certificate.

To do so we will need your details:

- Name
- Email
- Company

Please provide these by email directly, the email address is the same as the one the training invite was sent from.

