

## Hybrid and AC Connect EPS (Island Mode)

### Overview

All inverters come with the option for providing 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, on Hybrid inverters only).

| Maximum output             | Hybrid 3.6 | Hybrid 5.0 | AC Connect 3.0 |
|----------------------------|------------|------------|----------------|
|                            | (kW)       |            |                |
| 2.6kWh battery only        | 1.3        | 1.3        | 1.3            |
| 5.2, 8.2kWh batteries only | 2.6        | 2.6        | 3.0            |
| All batteries with solar   | 3.6        | 5.0        | N/A            |

An overload of the EPS circuit may damage the inverter, if the EPS circuit is overloaded backup power will be lost for a minimum of 5 minutes or until a manual restart is performed on the system. Multiple backup overloads may cause permanent damage to the inverter.

Care should be taken to ensure that the EPS installation meets wiring regulations set out in BS7671 and the IET Electrical Energy Storage Systems (2<sup>nd</sup> Edition). The inverter creates a Neutral-Earth bond internally upon loss of grid, this means an external relay is not required.

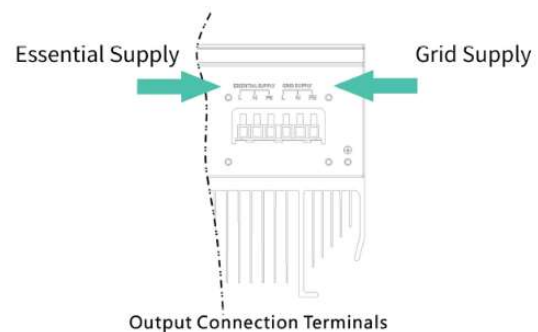
Please note that a small delay will be experienced following loss of grid before the EPS system energises this should be 5 approximately seconds.

### Electrical connections

The EPS connection can be found under the same cover as the AC input, the EPS terminals are on the left side with the grid terminals on the right. The EPS output cable must be protected as close as possible to the inverter with at least;

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

**Note:** The EPS terminals will be live whilst the inverter is powered from AC, Battery, PV or any combination – Ensure safe isolation procedure is followed before removing the terminal covers.



### Earthing

In island mode EPS circuits must not rely on a TNS or TN-C-S earthing system as when grid is lost earth and neutral may also be lost. A TNS or TN-C-S earthing system may be left connected when operating in island mode. Some key points to consider are;

- Earth electrode resistance ( $Z_{EE}$ ) should be as low as possible and not exceed 200Ω.
- An earth bond should be provided between the inverter casing and all batteries.
- Earthing must be provided to the EPS output circuit(s) as the earth terminals for grid and EPS are not linked within the inverter.

### Further support

If you have any further queries or are unsure of any points covered in this document, please send them to [support@givenergy.co.uk](mailto:support@givenergy.co.uk).

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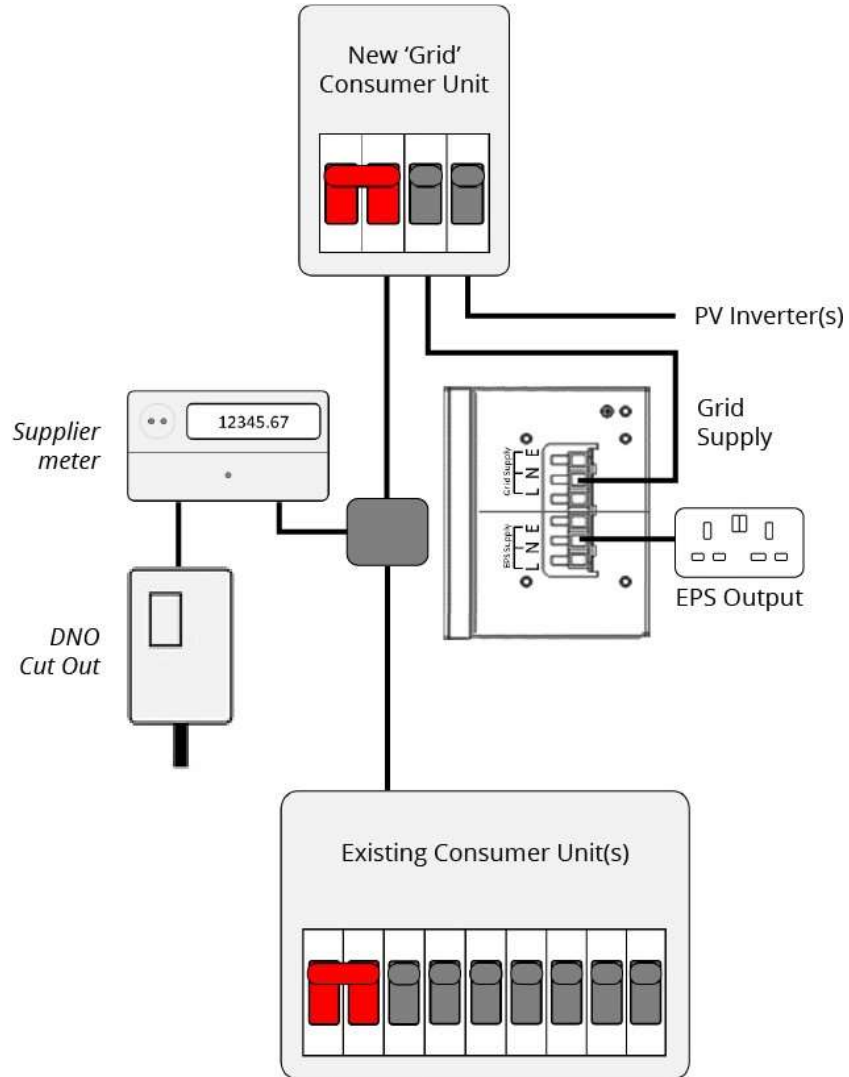
**Method 1**

Socket connected directly to EPS output terminals

**Advantages** Easy to install, simple to explain.

**Disadvantages** Requires manual intervention by end user.

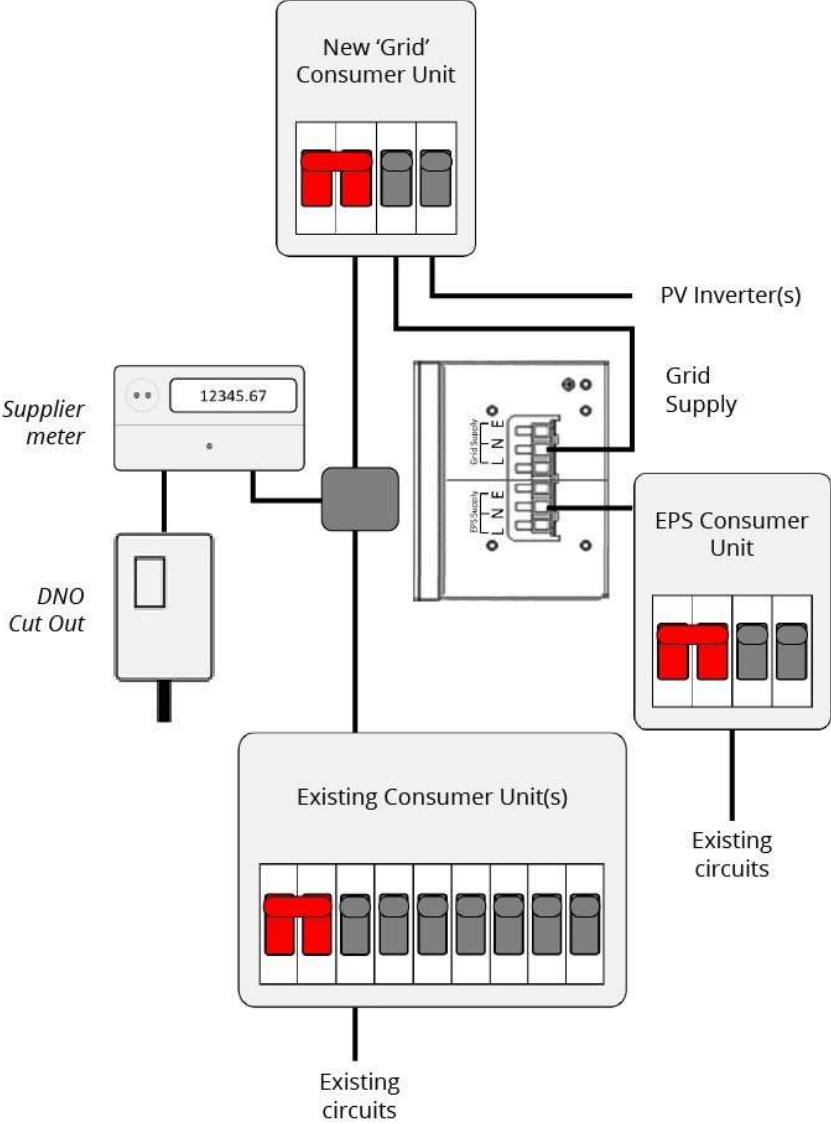
Install a single/double RCD and fused socket close to the inverter that is fed by the EPS output. The socket will be powered via the inverter during normal operation and in the event of a power failure will automatically switch to EPS mode. The end user can plug in devices of their choice.



**Earthing** Socket will require TT earthing method.

**Note** With method 1 the AC supply to the GivEnergy inverter, and any other grid tied generation may be supplied from an existing consumer unit.

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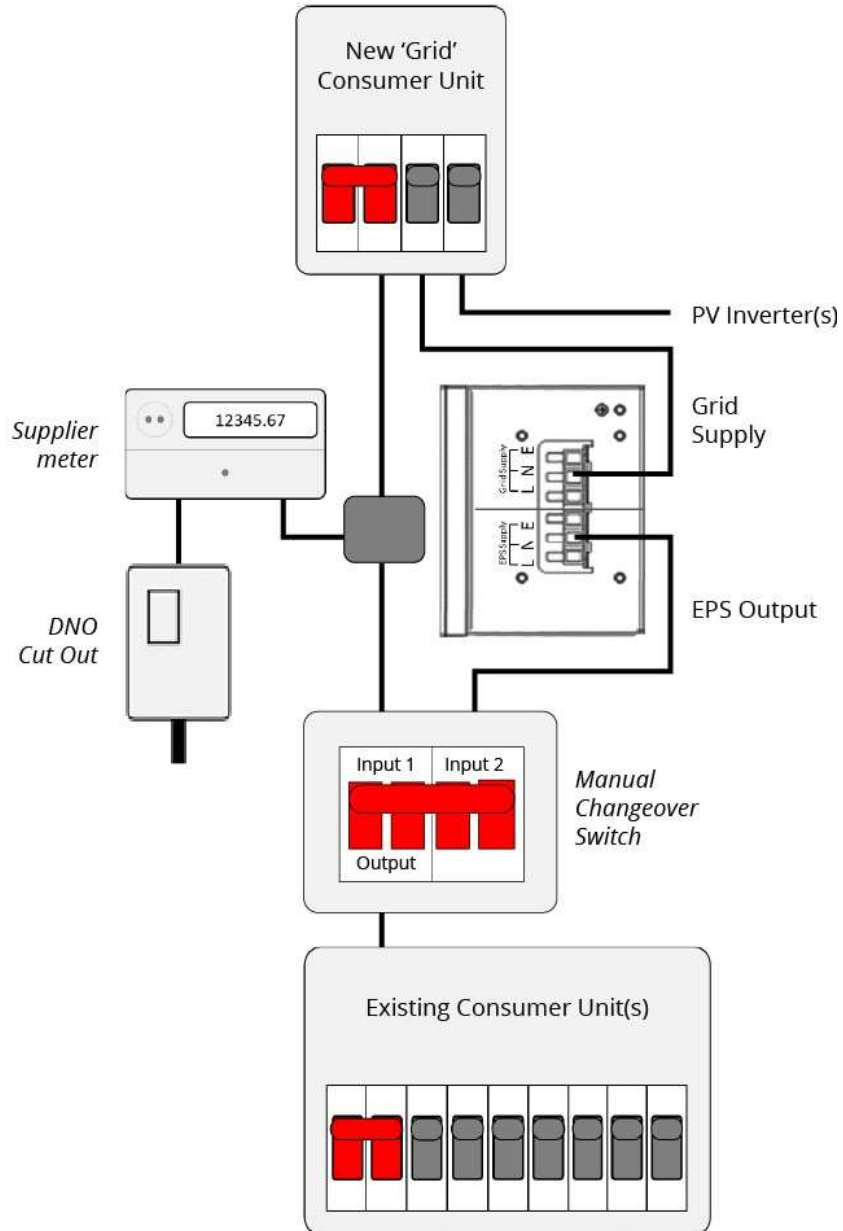
|   |   |
|---|---|
| <p><b>Method 2</b></p> <p><i>EPS consumer unit supplying dedicated EPS circuits</i></p> | <p><b>Advantages</b> Backup of dedicated circuits only, less risk of accidental overload.</p> <p><b>Disadvantages</b> Does not backup whole property, requires re-wiring of existing circuits or new circuits to be installed.</p> <p>Install a small consumer unit that is fed by the EPS output. This consumer unit can have new or existing circuits installed into it. All circuits connected to this consumer unit will be powered via the inverter during normal operation and in the event of a power failure will automatically switch to EPS mode.</p>  <p><b>Earthing</b> At a minimum EPS consumer unit will require TT earthing method.</p> <p><b>Note</b> With method 2 the AC supply to the GivEnergy inverter, and any other grid tied generation may be supplied from an existing consumer unit.</p> |
| <p><b>Method 3</b></p>  | <p><b>Advantages</b> Fully property backup, manual changeover acts as a reminder to turn off heavy loads before switching to backup mode.</p>   |

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Full property backup with manual changeover switch

**Disadvantages** Requires manual intervention by end user.

Install a manual change over switch at the point of the incoming supply. In the event of a power failure the end user can switch over to EPS mode. All circuits in the property can then be supplied by the EPS output.



**Earthing** Whole property will require TT earthing method for off grid operation.

**Note** With method 4 the AC supply to the GivEnergy inverter, and any other grid tied generation **must** be supplied from the **grid side** of the manual changeover switch.

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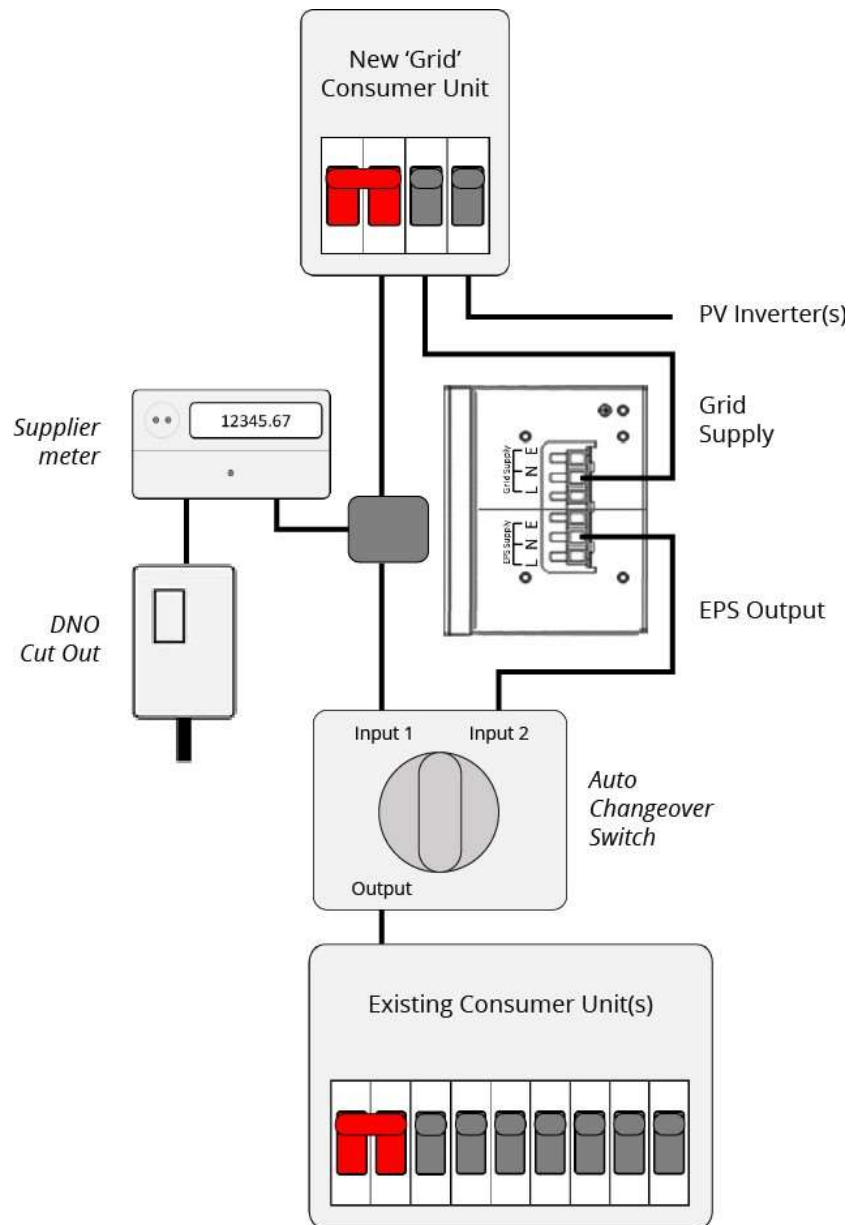
**Method 4**

*Full property backup with auto changeover switch*

**Advantages** Fully property backup, auto changeover means no intervention required by end user for backup mode.

**Disadvantages** Risk of accidental overload if a heavy load was switched on prior to grid failure.

Install an auto change over switch at the point of the incoming supply. In the event of a power failure the supply will automatically switch over to EPS mode. All circuits in the property are then automatically supplied by the EPS output.



**Earthing** Whole property will require TT earthing method for off grid operation.

**Note** With method 4 the AC supply to the GivEnergy inverter, and any other grid tied generation **must** be supplied from the **grid side** of the auto changeover switch.