InstaGen Quick Guide

HYBRID SYSTEM

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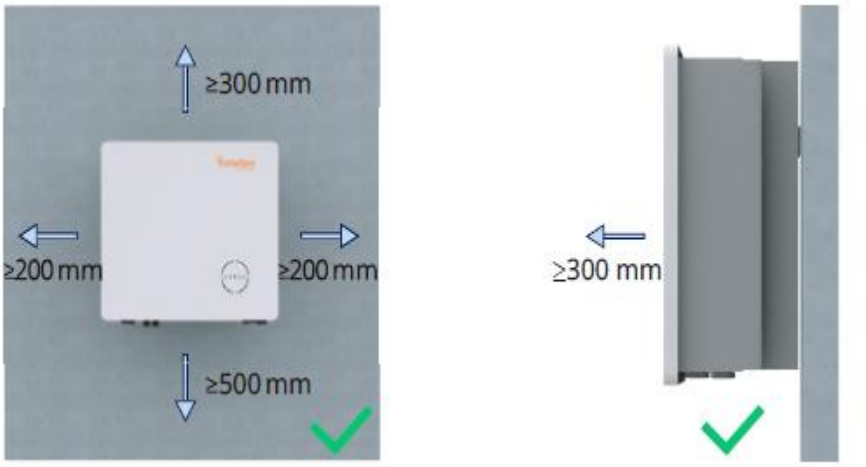
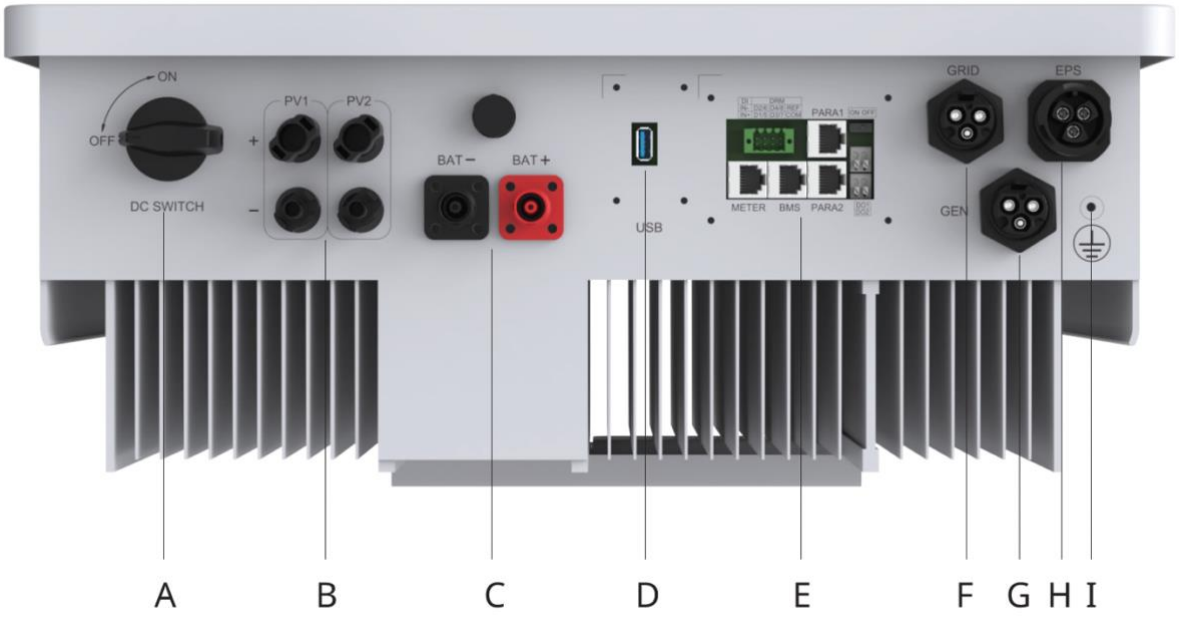
1. Product Overview

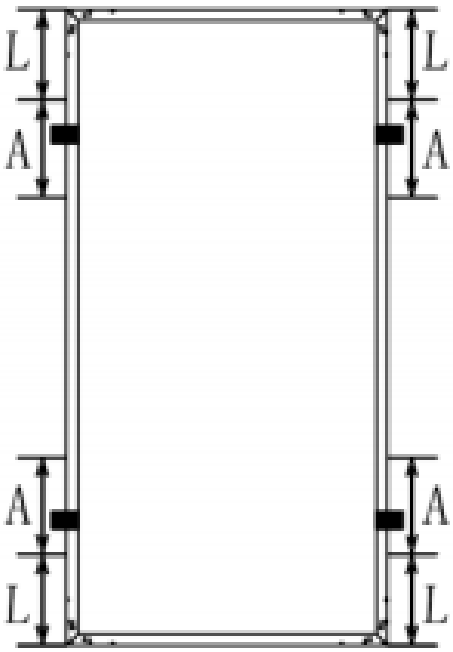




*The image shown here is for reference only. The actual product received may differ.

Object	Description
A	DC Switch
B	PV Terminals
C	Battery Terminals
D	Data Transfer Stick (DTS) Port
E	Communication Port
F	GRID Connector
G	Generator (GEN) Connector
H	Emergency Power Supply (EPS) Connector
I	PE Terminal

2. Solar Panel Clamping Zone



L = 250mm

Clamp zone: A = 200mm

MUST NOT be clamped on the short edge of the panel

Use Hexagon Socket M8

*The recommended torque for Universal Clamps in the **End Clamp** position is 13~14N.m.*

*The recommended torque for Universal Clamps in the **Inter Clamp** position is 16~20N.m.*

3. Smart Meter Installation Guide

3.1 CT Clamp

Arrow on the CT clamp to point towards the grid

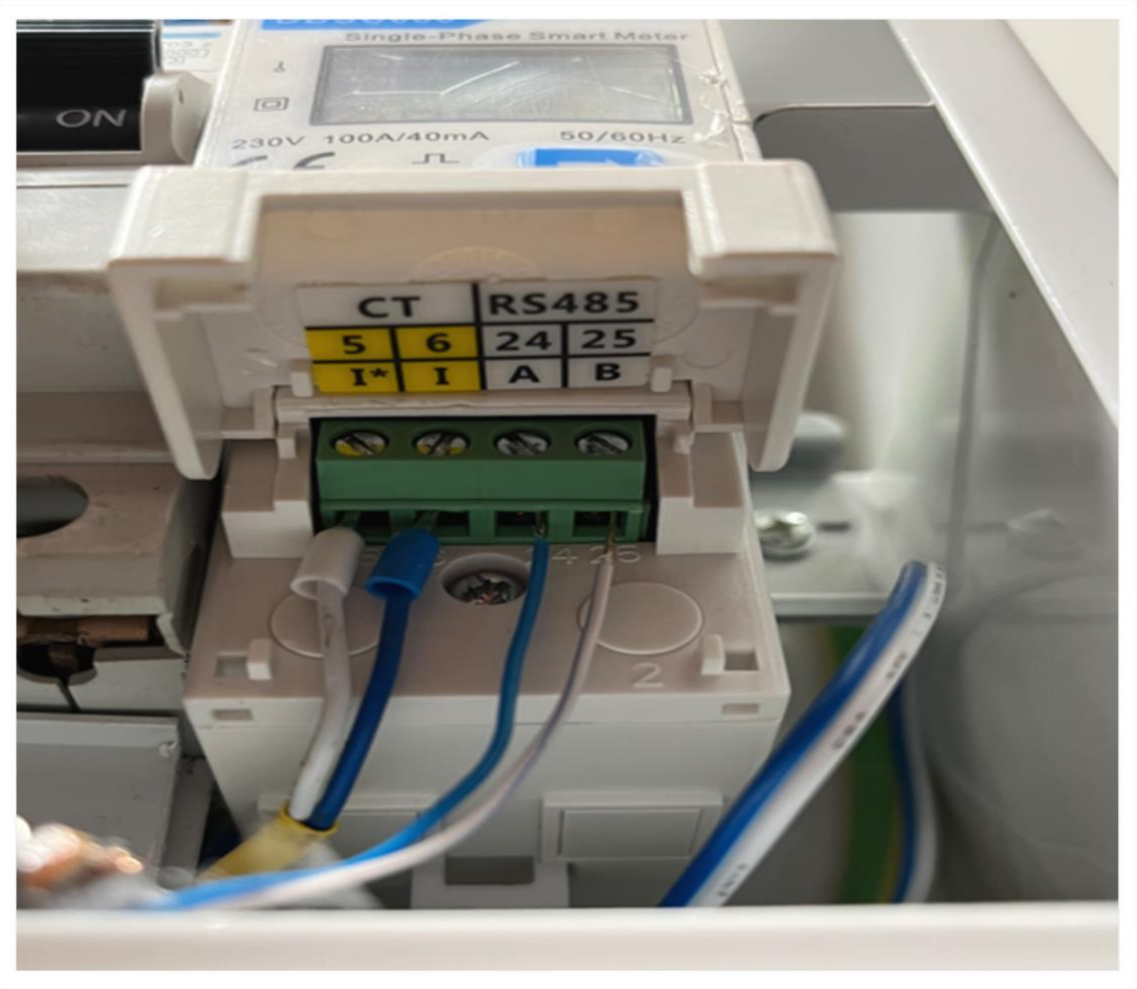
3.2 CT Cable

Do not extend the CT cable. The CT cable is 5 meters in length, so ensure the Chint Smart Meter is installed within this range.

3.3 Polarity

Based on the above, make sure the correct cables are terminated to the corresponding port on the meter (see below).

Use the blue and blue-white cables to link the smart meter to the RS485 port on the inverter. It is recommended 0.5mm ferrules be used to avoid poor connections.

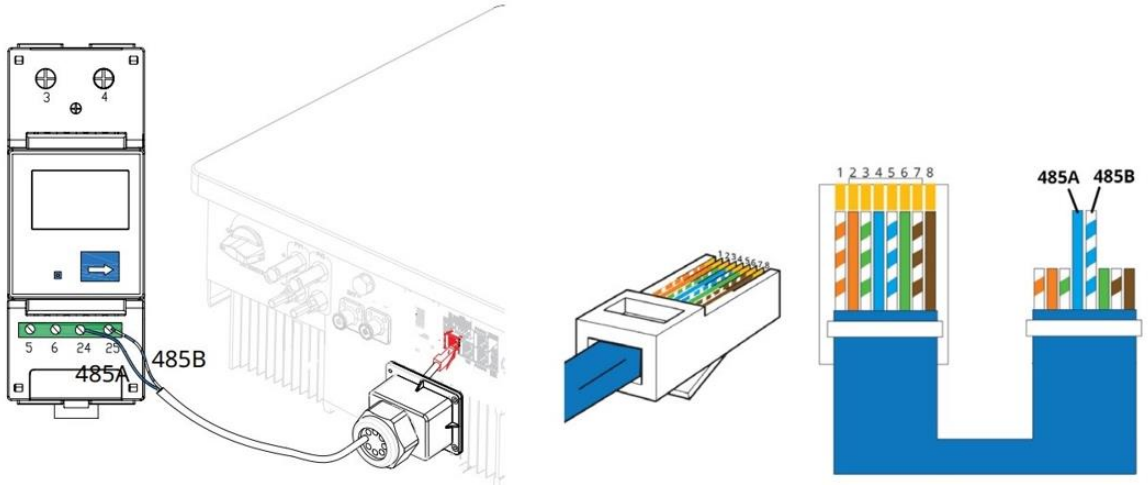


3.4 RS485 to Inverter

Recommended CAT 5 cable to link the smart meter with the inverter.

3.5 RJ45 Termination

Make sure the corresponding colours are correctly positioned when terminating the RJ45 (failure to do so can lead to the system failing).



3.6 InstaGen App Commissioning Serial Number/Meter Location

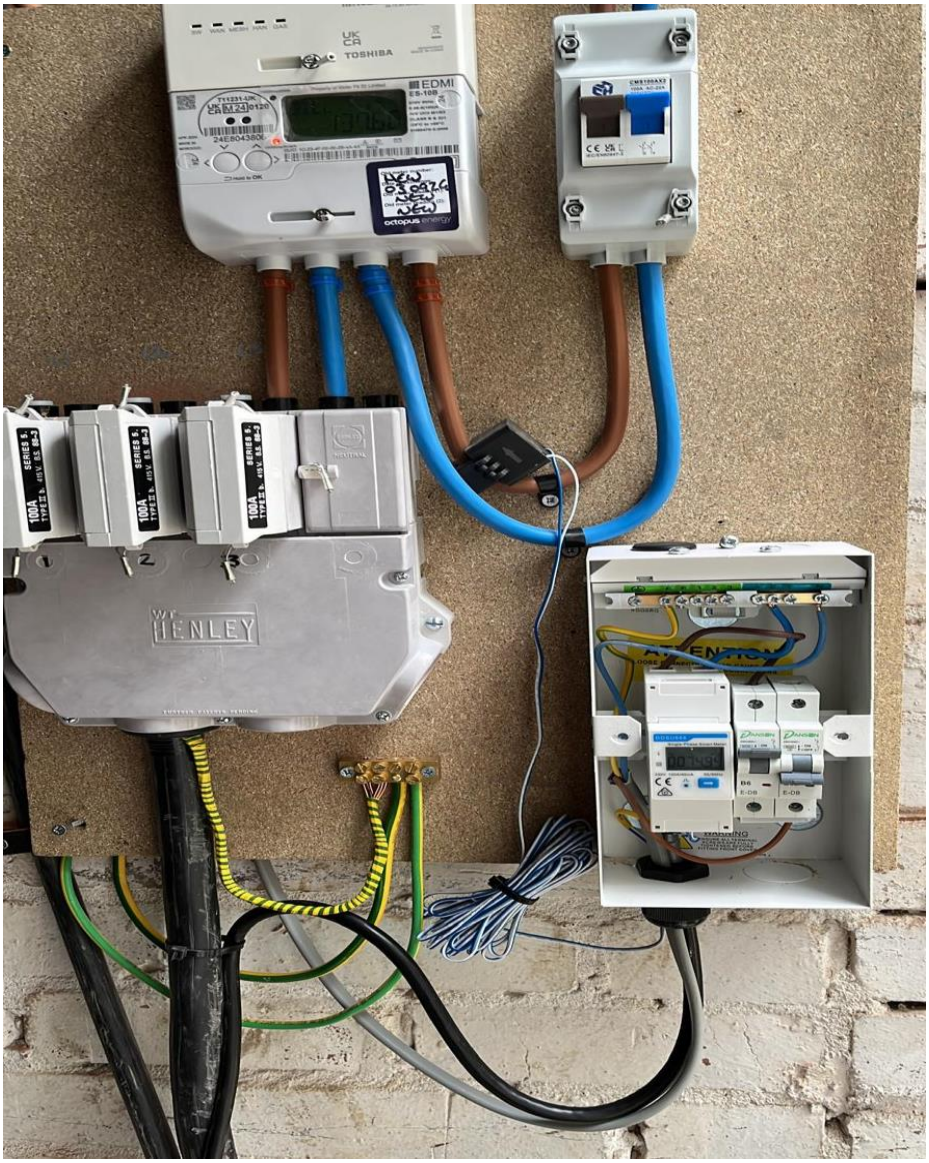
This can be found on the side of the meter and needs to be programmed in using the InstaGen Installer App. Ensure the serial number is programmed in the grid bar (see images below).

3.7 Smart Meter Circuit Breaker

It is important that there is a dedicated 6A MCB installed before the smart meter for protection and isolation measures.

3.8 Smart Meter and CT Location

The Chint smart meter must be installed close to the main incomer to allow proper placement of the CT. The CT needs to be placed straight after the homeowner's utility meter, and before the consumer unit – as seen in the diagram below. The CT cable (blue & white 5m) should never be extended; however, the RS485/CAT 5 cable can be up to a length of 200m for it to be connected to the inverter.



4. Smart Meter Settings

The settings on the Chint smart meter need to be programmed and set correctly to ensure the plant is configured and working correctly.

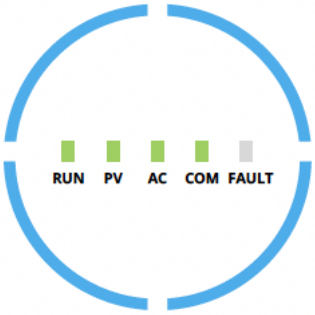
By holding down the arrow button on the meter for several seconds, you will access the settings mode. After you have accessed the settings mode, press the same button to scroll through the pages.

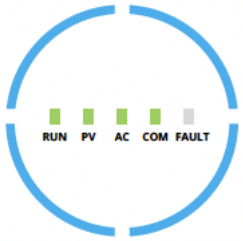
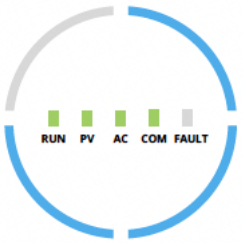
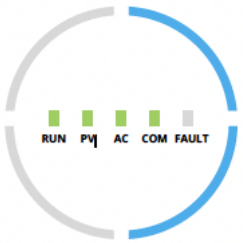
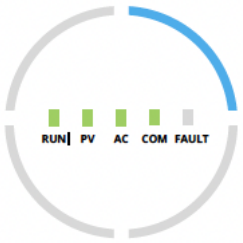
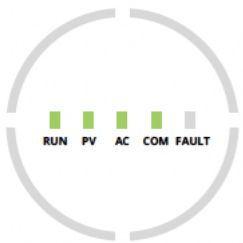
Ensure the settings on the Chint meter match the images displayed below.

For further details on these settings, download this document:

https://www.instagroup.co.uk/wp-content/uploads/2025/01/InstaGen-Smart-Meter-User-Manual.pdf

5. Battery LED Guide



Indicator	Status	Explanation
SOC		Full-circle LEDs on – SOC is 75-100%; battery is discharging or in standby. Full-circle LEDs blink – SOC is 75-100%; battery is charging
		3/4-circle LEDs on – SOC is 50-75%; battery is discharging or in standby. 3/4-circle LEDs blink – SOC is 50-75%; battery is charging
		2/4-circle LEDs on – SOC is 25-50%; battery is discharging or in standby. 2/4-circle LEDs blink – SOC is 25-50%; battery is charging
		1/4-circle LEDs on – SOC is 0-25%; battery is discharging or in standby. 1/4-circle LEDs blink – SOC is 0-25%; battery is charging
		Full-circle LEDs off – No BMS communication

Indicator	Status	Explanation
RUN		Off – Inverter is shut down Blink 1 – Inverter is booting Blink 2 – Inverter is in bypass mode On – Inverter is turned on
PV		Off – PV voltage is low Blink 1 – PV power is low On – PV is generating power
AC		Off – Gris is disconnected and EPS is off Blink 1 – Grid is disconnected but EPS is on On – Grid is connected
COM		Off – Communication error of both meter and BMS Blink 1 – Communication failed to meter Blink 2 – Communication failed to BMS On – Both meter and BMS communications are normal
FAULT		Off – No fault On – Fault occurred Blink 1 – EPS port overload Blink 2 – ISO/RCD fault Blink 3 – Arc fault

For further details on these settings, download this document:

https://www.instagroup.co.uk/wp-content/uploads/2025/01/InstaGen-Single-Phase-Hybrid-Inverter-User-Manual.pdf

6. Battery Smart Controls

6.1 Economy Mode

Also known as Time-of-Use mode, which maximize electricity saving by shifting battery usage to avoid using grid electricity at peak hours.

Energy Flow Priority:

- Peak periods: Battery → Load → Grid
- Off-peak periods: PV → Load → Grid

Pros:

- Aligns well with time-of-use tariffs (e.g., Economy 7 or 10).
- Reduces energy costs significantly in areas with peak/off-peak pricing.
- Decreases strain on the grid during peak hours.

Cons:

- Relies on accurate scheduling of peak and off-peak times.
- Less effective if grid pricing does not significantly vary.

UK Recommendations: Recommended in areas with distinct peak and off-peak pricing.

6.2 Full Backup Mode

Use for areas with frequent grid outages, battery only discharges during a grid outage.

Energy Flow Priority:

1. PV → Load
2. PV → Battery
3. Grid → Load (if battery is full)

Pros:

- Ensures power availability during grid failures.
- Protects critical appliances during outages.
- Reduces downtime risks in areas with unreliable grids.

Cons:

- Wastes battery capacity during stable grid conditions.

- Increases reliance on grid electricity, potentially raising costs.

UK Recommendations: Most suitable for areas with frequent outages.

6.3 Pure Off-Grid Mode

Use if there is no access to grid.

Energy Flow Priority:

1. PV → Load
2. PV → Battery

Pros:

- Provides complete energy independence.
- Ideal for rural or remote areas without grid connectivity.
- Promotes renewable energy use and reduces carbon footprint.

Cons:

- Requires a larger system, increasing upfront costs.
- Challenging during extended low sunlight periods.
- Demands higher maintenance and system monitoring.

UK Recommendations: Best suited for areas without grid access.

6.4 Force Charge Mode

Use if battery falls below safe SoC, or during commissioning.

Energy Flow Priority:

1. PV → Load
2. PV → Battery
3. Grid → Battery

Pros:

- Prevents the battery from reaching critically low levels.
- Protects battery health and prolongs its lifespan.
- Useful for system setup and calibration.

Cons:

- May result in higher grid costs if charging occurs during peak hours.
- Overrides energy-saving modes.

UK Recommendations: Recommended during commissioning or initial setup.

6.5 Force Discharge Mode

Use if battery rises above safe SoC, or during commissioning.

Energy Flow Priority:

1. Battery → Load
2. Battery → Grid

Pros:

- Prevents overcharging and maintains battery safety.
- Useful for verifying discharge performance during setup.

Cons:

- Can waste stored energy if discharged unnecessarily.
- Conflicts with energy-saving strategies.

UK Recommendations: Primarily recommended for testing and commissioning.

6.6 Peak Shaving Mode

Forcibly charge the battery.

Energy Flow Priority:

1. PV → Load
2. PV → Grid
3. PV → Battery

Pros:

- Contributes to grid stability by reducing peak demand.
- May lower costs in areas with demand-based pricing.
- Helps households manage energy spikes effectively.

Cons:

- Limited financial benefits for households without demand-based tariffs.
- Requires intelligent prediction of peak demand periods.

UK Recommendations: Not widely applicable unless demand-based pricing is implemented.

6.7 Time of Use Mode

In this mode, the export priority of PV energy is:

1. Load
2. Battery
3. Grid

Energy Flow Priority:

- During charging periods: PV → Load → Battery
- During discharging periods: Battery → Load

Pros:

- Customizable for up to 8 charging/discharging periods per day.
- Optimizes battery use based on daily price periods.

Cons:

- Requires detailed planning and setup for effective use.

UK Recommendations: Recommended for households with flexible energy consumption patterns.

For further details on these settings, download this document:

https://www.instagroup.co.uk/wp-content/uploads/2025/01/InstaGen-Single-Phase-Hybrid-Inverter-User-Manual.pdf

7. Labelling and Advise

This is to be treated as a guide only and is not to be treated as comprehensive.

7.1 Earth Spike and Testing: If applicable refer to BS7671

Perform and document the resistance test values. Ensure the resistance value ideally meets <100 Ohms.

Take photographic evidence illustrating the resistance test results.

Take photographic evidence of earth spike location with Earthing label (if fitted).

7.2 System Labelling

Take photographic evidence of labelled components, including:

7.2.1 Inverters

Label must be placed clearly on the front panel.

And: Photograph of the model and serial number plate on the side of the inverter.

7.2.2 Batteries

The label below must be placed on the front panel of the inverter.

And: Photograph of the battery model and serial number.

7.2.3 AC Isolators and Battery Isolators

Ensure labels are attached directly adjacent to the isolator switches, indicating their function.

7.2.4 Smart Meter

- Label as “PV meter”.
- Photo of serial number and reading before leaving site.

7.2.5 Chint (Modbus) Meter and/or CT

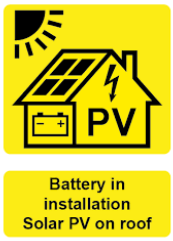
- Photo of serial number(s)
- Data terminations
- C.T. position and arrow if possible

7.2.6 DC Isolator(s) and Cables

- Labels should be fixed along the cables every 5 to 10 meters
- Isolators labelled identifying string if applicable
- Red (+) and white tape (-) at inverter indicating polarity

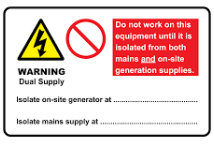
7.2.7 Meter Cupboard or Near the DNO Main Cut-Out Fuse

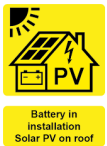
Solar PV on Roof and/or *Battery in Installation* sticker.



7.2.8 Distribution Board

- Circuit identification for all circuits
- Warning label at all DBs in the property
- *Battery in Installation* sticker





E.G.
***Isolate On-site generator at: Battery storage inverter (Garage), Solar Inverter (loft)*
***Isolate mains supply at: Supply side Isolator near supply meter*

7.2.9 Other Photographic Evidence

- Circuit identification for all circuits

- Cable routes Inc. MC4 connection location(s)
- Meter cupboard
- Solar panels on the roof
- Inside distribution boards worked on and Isolators
- Labelling of distribution boards
- Finished installation of Inverter, battery and switchgear in one picture

7.3 Provide to the Customer

- Schematic of the system
- Startup and shutdown procedures

8. Useful Tips and Information

8.1 Solar Panels and DC

- Roof tile solar flashing – PV cables to enter roof cavity
- Roof cover/membrane not to be cut open for DC cables to enter roof cavity space – but to rather run between flaps in felt.
- DC cable labelling – to illustrate live cables during the day, runs of less than 5m with one at either end. If run is more than 5m, one should be placed at the point of entry followed by every 5m.
- DC cables to be supported on wooden trusses at point of entry to roof cavity
- Fire rated clips to be used to secure DC cables.
- If 3rd party/PV DC isolators are used, all cables in & out need to be fitted with bootlace ferrules & all terminals torqued to manufacturers spec.

8.2 Battery to Inverter

- No DC isolator between batteries and inverter – sufficient protection provided on BMS.
- All batteries must be securely tightened together using clamps provided with kit.
- Battery tower must be secured against the wall by using bracket provided with kit.
- Battery & inverter to be bonded together by means of 6mm earth cable.
- Cat 5 data cable to be used for comms between BMS and inverter – cable included in battery cable kit.
- Data gland to be used to secure RJ45 comms cable to BMS termination point.

8.3 AC supply

- Suitable form of isolation at point of origin (ideally located after utility meter)
    - Homeowner will need to request with energy provider to supply & install an isolator on main incoming tails, after the utility meter **before** PV/battery installation commences.
- Dedicated 6-way sub-board to be installed within 3m of the main incomer, by splitting incoming tails using 100amp henley blocks, 25mm tails and 16mm earthing cable. The sub board is to include the following:
    - Switchgear to be included - Double pole 100amp main switch; surge protection; B20/B32amp bi-directional RCBO type A (solar/PV supply); type-B 6amp MCB (chint meter supply)
- Din rail mounted blanks
- Chint Meter (Occupying 2 ways)

- Labels on all/any switchgear installed, must be clearly indicated/labelled.
- 4mm cable & earth (4mm Earth cable is required) to be used regardless of inverter size.
- All connections to be torqued to Inverter manufacturer specifications.
  AC 1.2N-m, EPS 1.2N-m.
- AC feed from consumer unit to AC isolator(s) then tariff meter, then to the Inverter.
- Suitable cable to be used for connection between AC isolator and Inverter. If stranded cable is used, all cables must be fitted with ferrules.
- Two isolators are required should the inverter and sub board be in separate rooms.
- If using the EPS port on the inverter, the following must be taken into consideration:
  - One Double socket supply – Must use RCD front plate. Only for use within the property and MUST contain a label “NOT be taken outdoors”.
  - EPS for multiple points – Must install an earth rod with resistance <100 Ohms

8.4 Comms

- CT clamp arrow must point toward the grid
- CT cable must NOT be extended beyond its standard 5m.
- Refer to wiring diagram for connecting CT to modbus meter bellow.
- Check modbus meter parameters are as follows: 8n1, 002, Baud-5
- Communication cable from modbus meter to inverter should be minimum Cat5 using blue & blue/white cores for connection. Connections into modbus meter MUST be fitted with ferrules.
- RJ45 connector should be used at inverter connection end following the InstaGen wiring diagram see below:
- Wi-Fi signal strength should be checked prior to confirming the installation location.

8.5 Schematic Diagram

- A system schematic diagram of your system must be placed at point of installation, clearly illustrating the entire PV system along with startup and shutdown procedures.
- Labelling as per attached commissioning document.

For further details on these settings, download this document:

https://www.instagroup.co.uk/wp-content/uploads/2025/01/InstaGen-Single-Phase-Hybrid-Inverter-Installation-Guide.pdf

9. Start-up and Shut down Procedures

9.1 Shutting Down the System

1. Turn off the AC Isolator located beside the inverter
2. Turn off the breaker inside the fuse board labelled Solar PV or similar
3. Turn off the DC Isolator(s). This should be located beside the inverter and or on the inverter located underneath
4. Wait 5 minutes before working on the system

9.2 Restarting the System

1. Turn on the DC Isolator(s) located beside the inverter and or on the inverter located underneath
2. Turn on the breaker inside the fuse board labelled Solar PV or similar
3. Turn on the breaker inside the fuse board labelled Solar PV or similar
4. Wait 5 minutes for the system to reset

9.3 Maintenance of the System

1. Rainfall will clean the panels sufficiently
2. There are no user serviceable parts to the system
3. Under no circumstances should the inverter be opened
4. To confirm the operation of the system, check the power produced by the panels on your App during daylight hours
5. Only trained and competent electricians should work on this system
6. If there any safety concerns, shut down the system and consult an electrician.

10. Checklist

Item	Check	Tick
PV	Check polarity of PV strings and label with Red (+) White (-)	
	Check DC voltage matches the calculated voltage for the string(s) usually within 5% to 10%	
	Check the DC Isolators are switched on	
	Check the DC Isolator on the Inverter is switched on	
	Check the PV LED on the Inverter is solid green	
Battery	Check that the DC breaker on the battery is switched on	
	Check that the LED on the battery is on	
	Check that the "Battery LED" on the Inverter is solid green	
Comms	Check the Modbus (smart meter) settings. 8n1, 002 grid CT, *(2nd meter for PV if applicable set to 001)*, bAUd-3	
	CT arrow pointing towards the grid	
	Check current clamp meter reading at CT position corresponds with the Modbus (smart meter) under load (Kettle test)	
	Check the RS485 cable is consistent with T568B wiring standard for the battery and Modbus	
	Check at Modbus the connection going to the inverter (Blue - 24, Blue/White - 25)	
	Check that the COM LED is solid green	
Grid	Check that the breaker and all AC Isolators are switched on	
	Check that the ASC LED is solid green	
EPS	Check there are no neutral parallel paths	
	Check if the EPS works when disconnecting incoming supply	
Earth Cabling	Check 6mm earth bonding cable is connected between Inverter and battery	
Data dongle (DTS)	Check all 3 LEDs are solid blue	
Site documents	Check that the **Schematic** and **Startup-Shut down** procedures are on-site	

Our comprehensive technical resource library can be found at:

https://www.instagroup.co.uk/resource-hub/technical-documents/