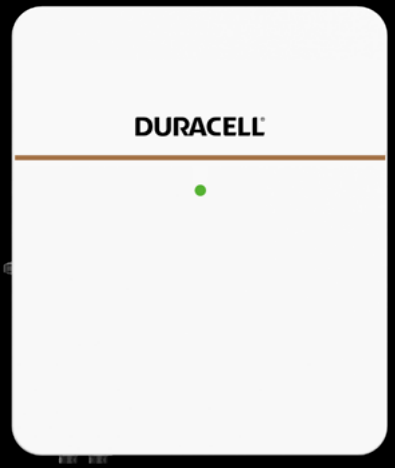
Parallel Setup Guide For Dura-i G3

DURACELL®
ENERGY



V0.4

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Contents

1. Inverter Requirements

In order for the system to function correctly, all the inverters must be identical models. This means they must have:

- The same power limitations i.e. 3.6K, 4.6K, 5K or 6K
- Been installed on the same phase
- Firmware should be the same across all inverters
- The same model of battery each side with correct model selected
- Been set up correctly as individual inverters before being switched to parallel mode
- The correct, most up to date CT installed (black arrow sticker) on the primary inverter
- Up to 9 inverters

It is also important to note that serial numbers must be of a similar generation as hardware changes in later models make certain models incompatible. Serial numbers are broken down as follows:

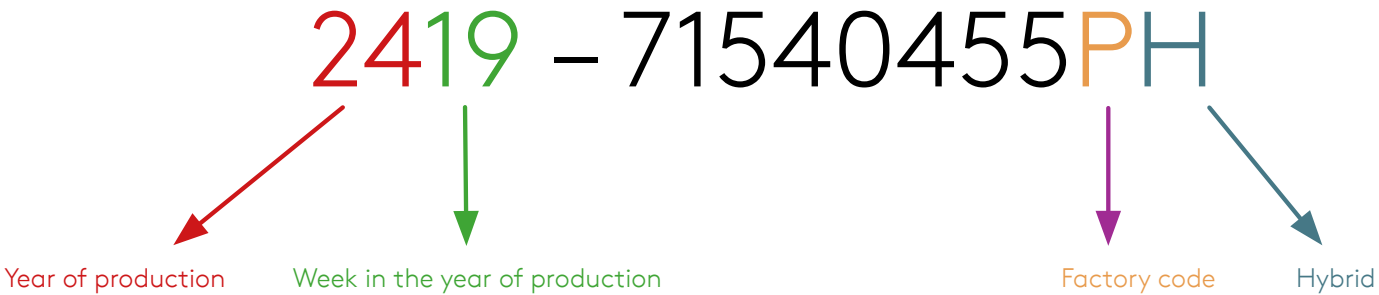


Figure 1. *Inverter serial number code*

It is recommended that only models made in the same year be used together in parallel systems.

2. Setup Process

Step 1. Power inverter on

Using the correct startup procedure, power on all the inverters and their connected batteries.

This procedure is: **PV > Battery > AC**

Without Parallel cable connected

Step 2. Download app

Scan the following QR code to download the Dura-i installers app.

DURACELL ENERGY Dura-i

3. Parallel Inverter Settings

For each inverter in the ESS repeat the steps on the following pages **5 -12.**

- Connect via Bluetooth to add Wi-Fi details - **page 5**
- Check the alarms - **page 6**
- Check each inverter on the same firmware - **page 6**
- Check all inverter settings - **page 7**
- Engage Parallel - **page 8**
- Select the battery type - **page 9**
- Add the Parallel cable and engage dip switch - **page 12**

Step 3. Connect to WIFI

Each inverter in the system will need to be connect to WIFI individually before the commission process is started. Follow screen shots below:

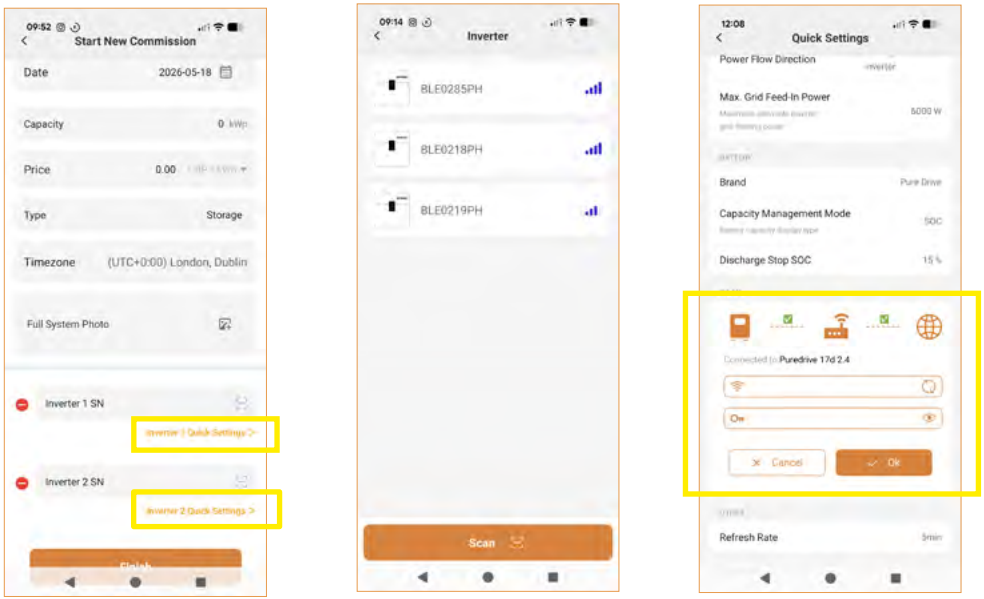


Figure 2.

Step 4. Check for alarms

At this stage there should be no alarms other than "CJ – No meter" on the secondary inverter. This is because the CT should be going only to the primary inverter. If there are other alarms, solve those before continuing.

Step 5. Check Firmware versions

Navigate to the **Overview** page then tap the dropdown for **Inverters** and check that the firmware matches on all inverters. If firmware update is needed, contact support. uk@duracellenergy.com.

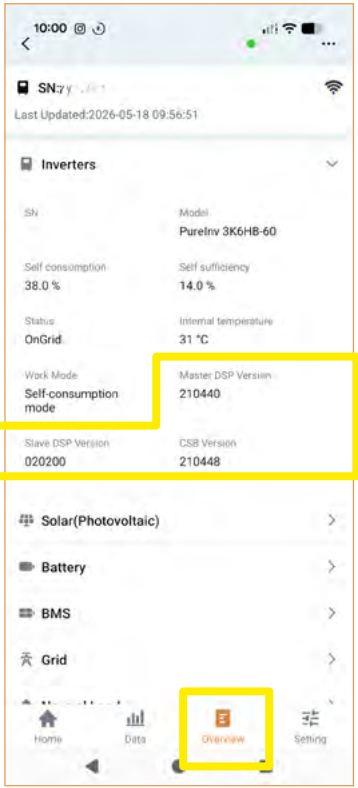


Figure 3.

Step 6. Inverter Setting Requirements

In order for the system to function correctly, both the inverters must have identical settings set.

Below is a list of key settings and their parameters which must be identical across both inverters:

Setting	Parameter
Parallel System Battery Connect Type	Two options. Parameter depends on battery configuration. Must be set the same on each inverter. Usually "Battery Connect Independence". Refer to pages **Figure 6. on page 10** and **Figure 7. on page 11**.
Parallel Mode	On
Set phase position	Select 'Unknown'
Power control	CT Sensor/Digital Power Meter
Date and Time	Sync to phone

Step 7. Engage Parallel mode

For each inverter navigate to parallel mode via **Setting** then **Inverter** then **Parallel** and switch on **Parallel Mode.**

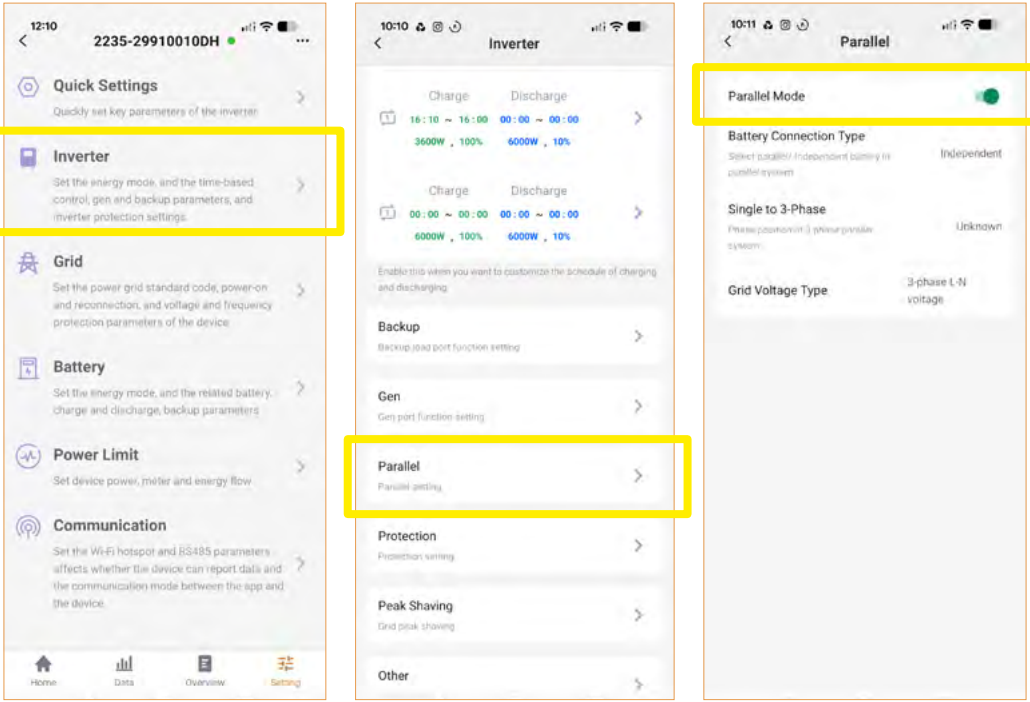


Figure 4.

Step 8. Parallel System - Battery Connection Type

For most installations this parallel setting should be set to **"Independent"** with up to nine inverters. - See **Figure 6 (p10).**

However, if the battery array is combined to both inverters **(this is only possible with two inverters)** as per **Figure 7 (p11)**, then **"Parallel"** should be selected.

⚠	NOTE	**If the system consists of only one string of solar between two inverters**, the solar input will not be balanced between inverters. **So in this case select "Parallel" for the Battery Connection Type**, as this will ensure all batteries can receive a charge from the available Solar.
⚠	NOTE	No matter what the setting, it should be the same for all inverters.

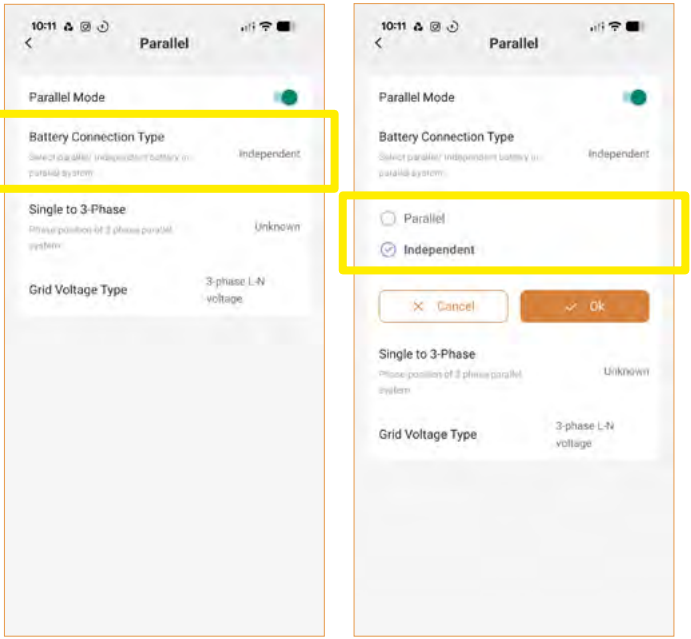


Figure 5.

4. Battery Connect Independence

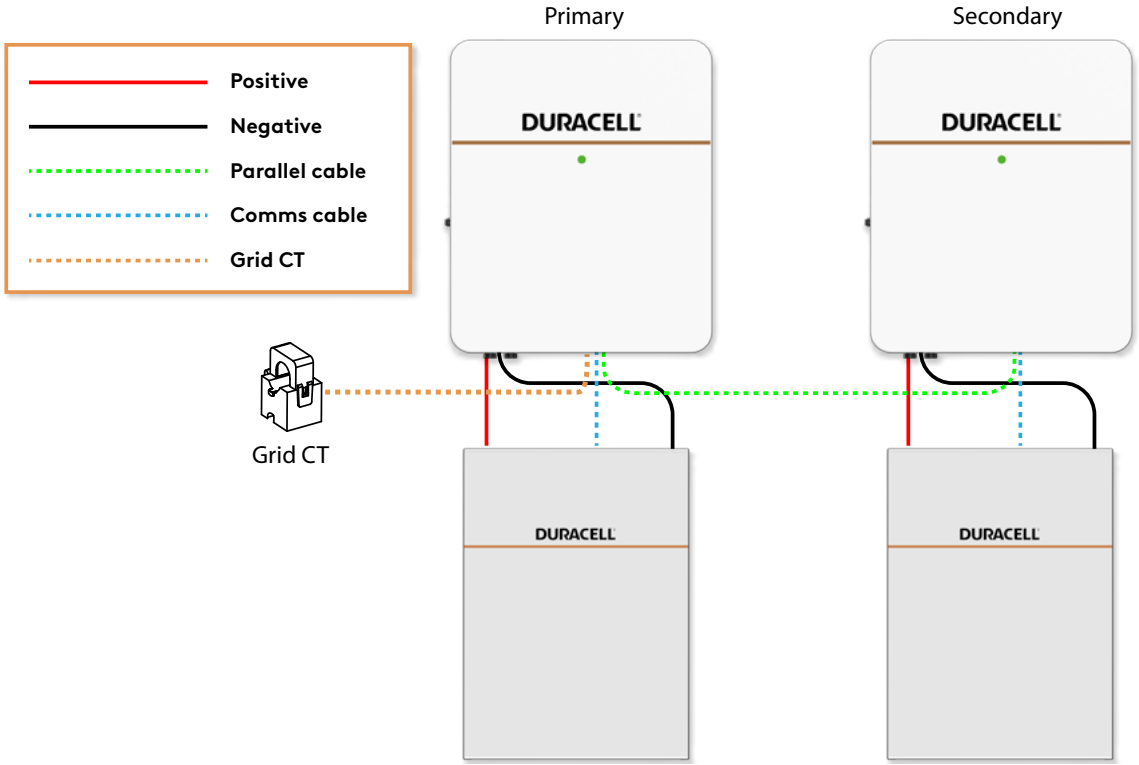


Figure 6.

5. Battery Connect Parallel

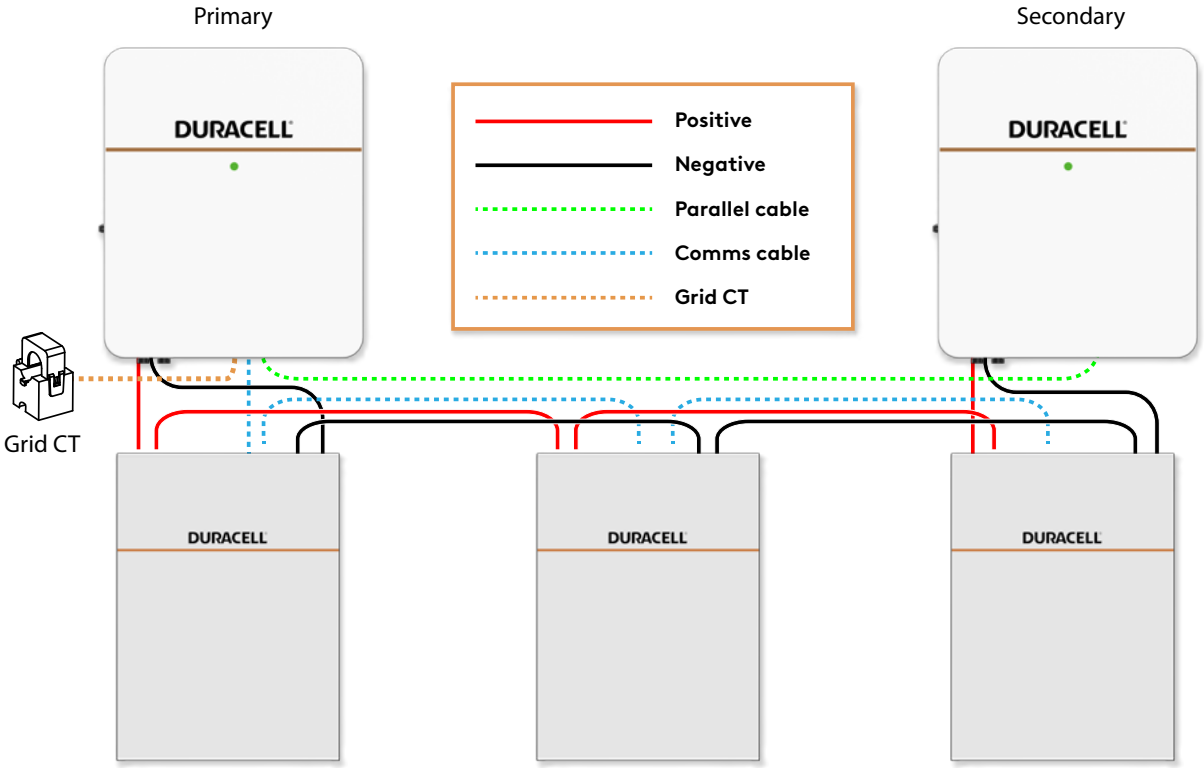


Figure 7.

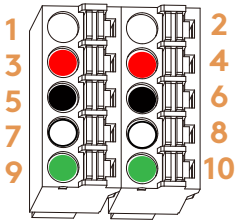
Step 9. Add the parallel cable

Using the provided parallel cable, connect the parallel ports of all inverters. Check the cable over for damage and ensure it is fitted properly in the ports of both inverters (**Figure 10** blue boxes). The cores of the cable have already been terminated for you, with a 10-port terminal block on each side. Continuity runs between the opposing numbered ports in the block.

If the system includes more than two inverters in Parallel, the centre inverter(s) would have both sides of their 10-port terminal block populated , the first and final inverters would have only one side.

Figure 8.

5.1. Parallel Communication Connection



Pin (Terminal)	Function Description	Pin (Terminal)	Function Description
1	NC	2	NC
3	GND_S	4	GND_S
5	PARA_SYNC	6	PARA_SYNC
7	CAN_L	8	CAN_L
9	CAN_H	10	CAN_H

Figure 9. Pin definition of terminal

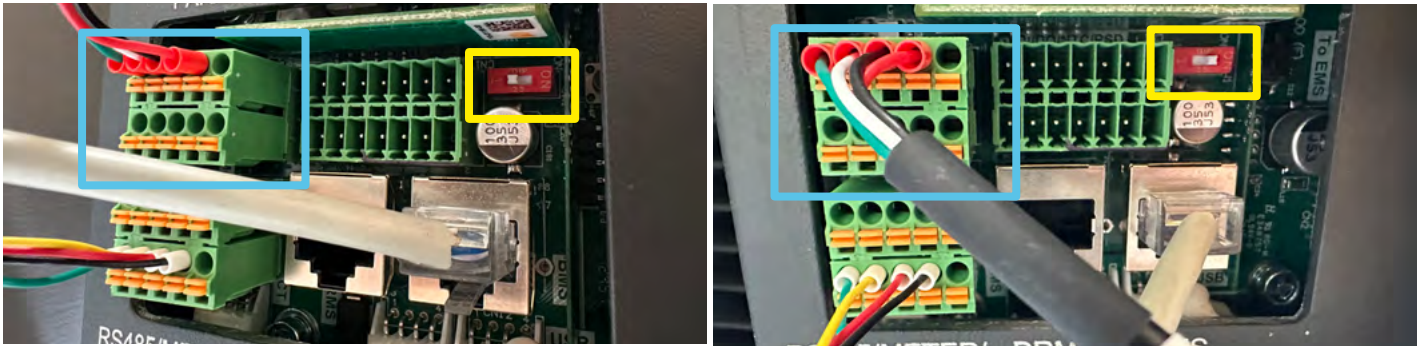
NOTE

When connecting the Parallel cable to the inverter(s);

Inside the COM waterproof cover, there are slits in the rubber grommet within the gland, which means **you do not need to remove the cores from the pre-terminated 10-port block in order to pass the cable through the gland.**

Step 10. Engage dip switches

On the underside of the inverter engage the red dip switch for parallel mode by clicking it towards you, away from the wall (**Figure 10** yellow boxes).



Before - OFF

After - ON

Figure 10.

5.2. Log into the Service Account.

(Installer Account provided after training)

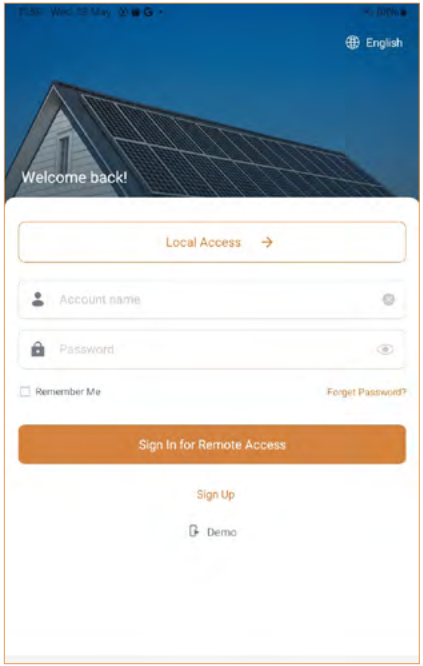


Figure 11.

If you do not have login credentials, contact **sales.uk@duracellenergy.co.uk** or call **01386 577845**.

5.3. Access Account Management

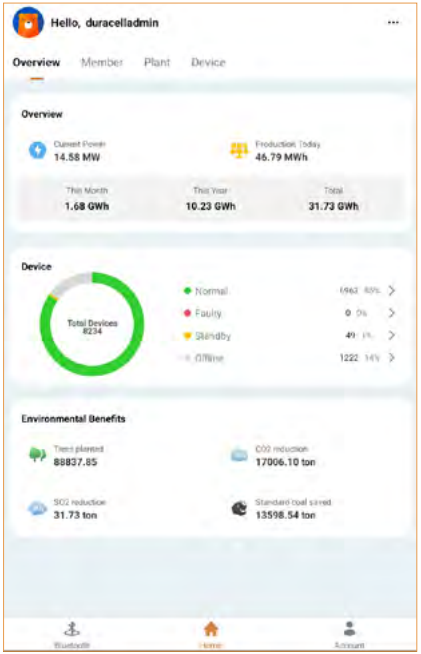


Figure 12.

This section shows all your previous plants and installations

5.4. Create Plant

1. Click on the '...' ('meatballs' in the top right).

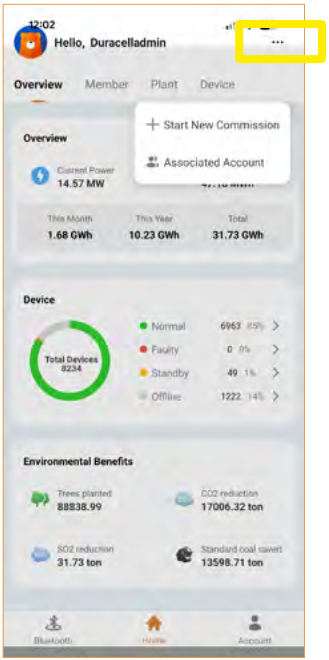


Figure 13.

5.5. Add Inverter

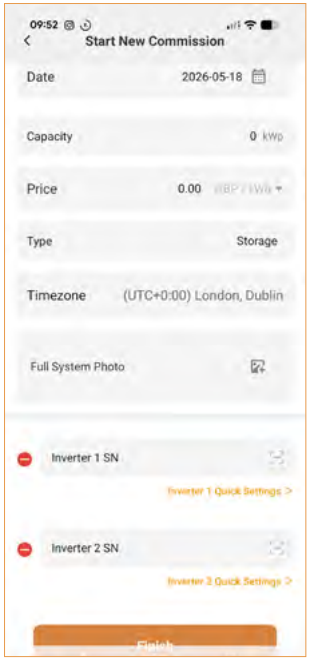


Figure 14.

1. Fill in the plant-specific details. For parallel installations, select the correct number of inverters and scan/input all of their serial numbers. Add a full system photo.

The first inverter serial number entered (the inverter with the CT) will act as the primary.

2. Scan or input the inverter serial number.

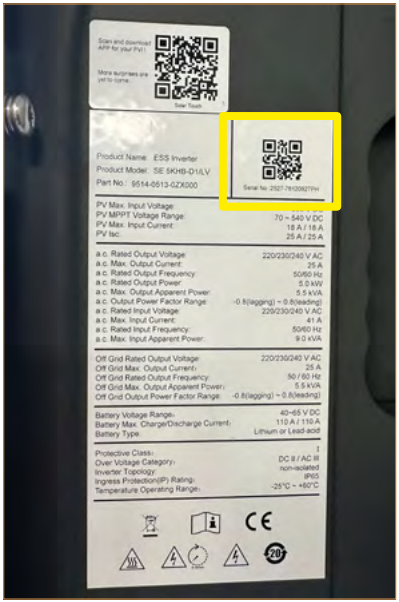


Figure 15.

5.6. Enable Bluetooth & Select the Primary Inverter

3. Turn on Bluetooth on your mobile device and select the inverter serial number you will be commissioning.

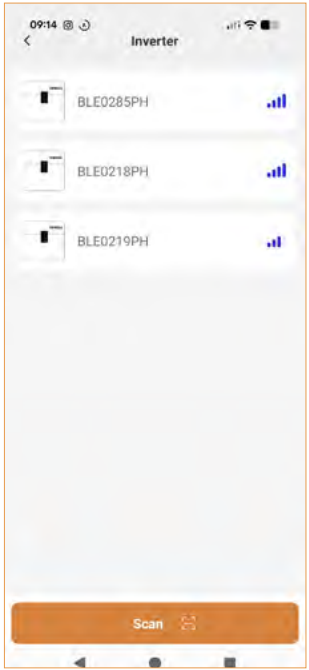


Figure 16.

Step 11. Quick Setup

Connect to the Primary inverter using the Bluetooth local connection and complete the steps of the quick setup page for all inverters on the Dura-i app. The quick setup is not required for any subsequent inverters as they will reflect the Primary inverters settings.

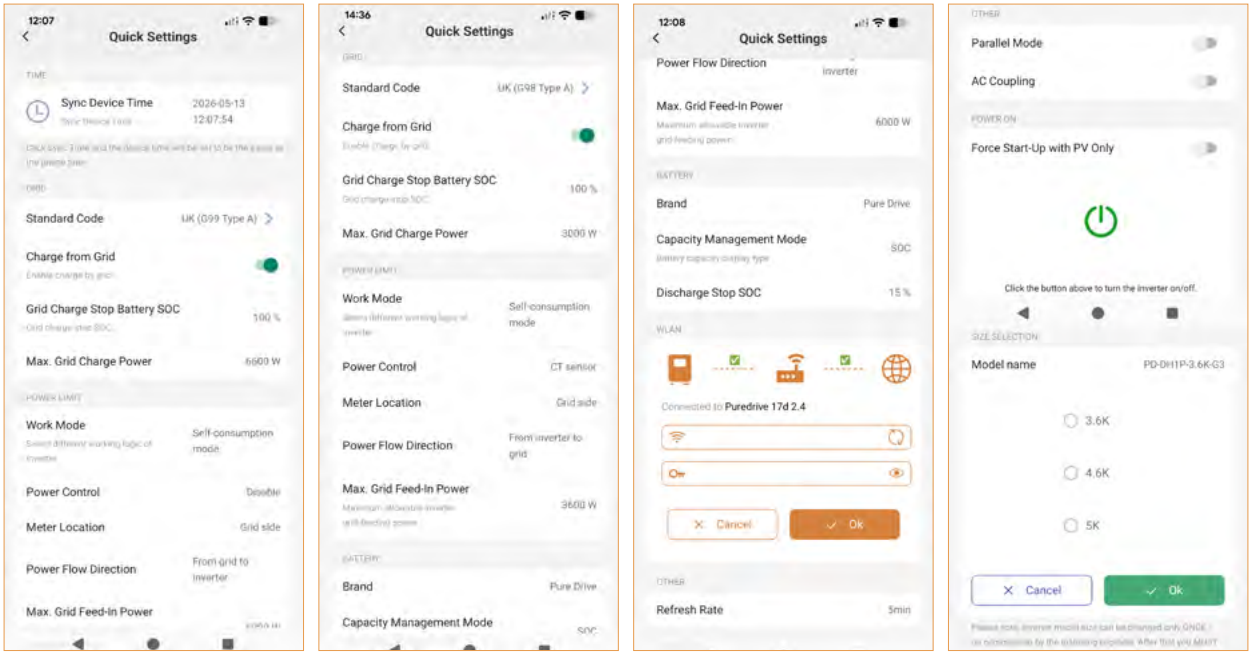


Figure 17.

Step 12. Turn on Primary inverter

Navigate back to Step 5 of the Quick Setup page and turn the inverter on.

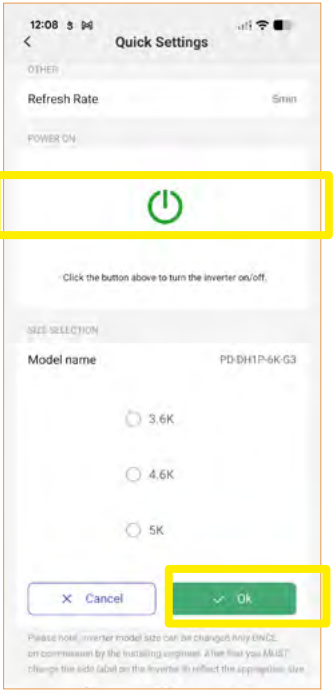


Figure 18.

6. Alarms & Troubleshooting

Alarm	Name	Cause & Solution
Cj	Meter Loss	CT/Meter not reading. Likely due to poor CT extension, faulty CT or incorrect CT installation. This alarm is normal on Secondary inverter before switching parallel mode on.
P1	Parallel ID	System doesn't know which inverter in the system is primary and which is secondary. Likely due to CT not being read as this is what indicates to the system which inverter is Primary and which is Secondary.
P2	SYN parallel warning	Parallel synchronization signal is abnormal. Check whether the parallel communication cable is properly connected and red dip switches are on.

6.1. Parallel Application (Between Two & Nine Inverters)

NOTE

- BMS communication connection is only for the Dura5 battery .
- It is necessary to turn the matched resistance switch of inverter No. 1 and inverter No. N to "ON" in parallel connection mode.
- With parallel connection mode, it is necessary to connect the app to all of the inverters and then go to **Setting** > **Inverter** > **Parallel** page to enable **Parallel mode** on app. Setting/modifying these parameters requires logging into an administrator account.
- In one parallel system, the smart load is only allowed to be connected to GEN port in a non-parallel way.
- In one parallel system, the batteries can be connected independently or in parallel, this manual only shows the batteries connected in parallel. In a system connected with independent batteries, the CT/meter cable can be connected to any inverter of the parallel system and this inverter is the main inverter, i.e., Inverter No. 1.
- For one parallel system, ensure the conductor's materials, cross-sectional areas, and lengths of AC cables between Inverter No. 1 and other inverters of the system on the BACK-UP port are the same. It is recommended that the length of the cable be less than or equal to 2 m.

Inverter	Battery breaker	BACK-UP breaker/Gen breaker	AC breaker	Normal load breaker	Main breaker
3K6	100 A / 80 V DC	≥ 40 A / 230 V AC	≥ 50 A / 230 V AC	Depends on household loads	Depends on household loads
4K6	150 A / 80 V DC				
5K					
6K					

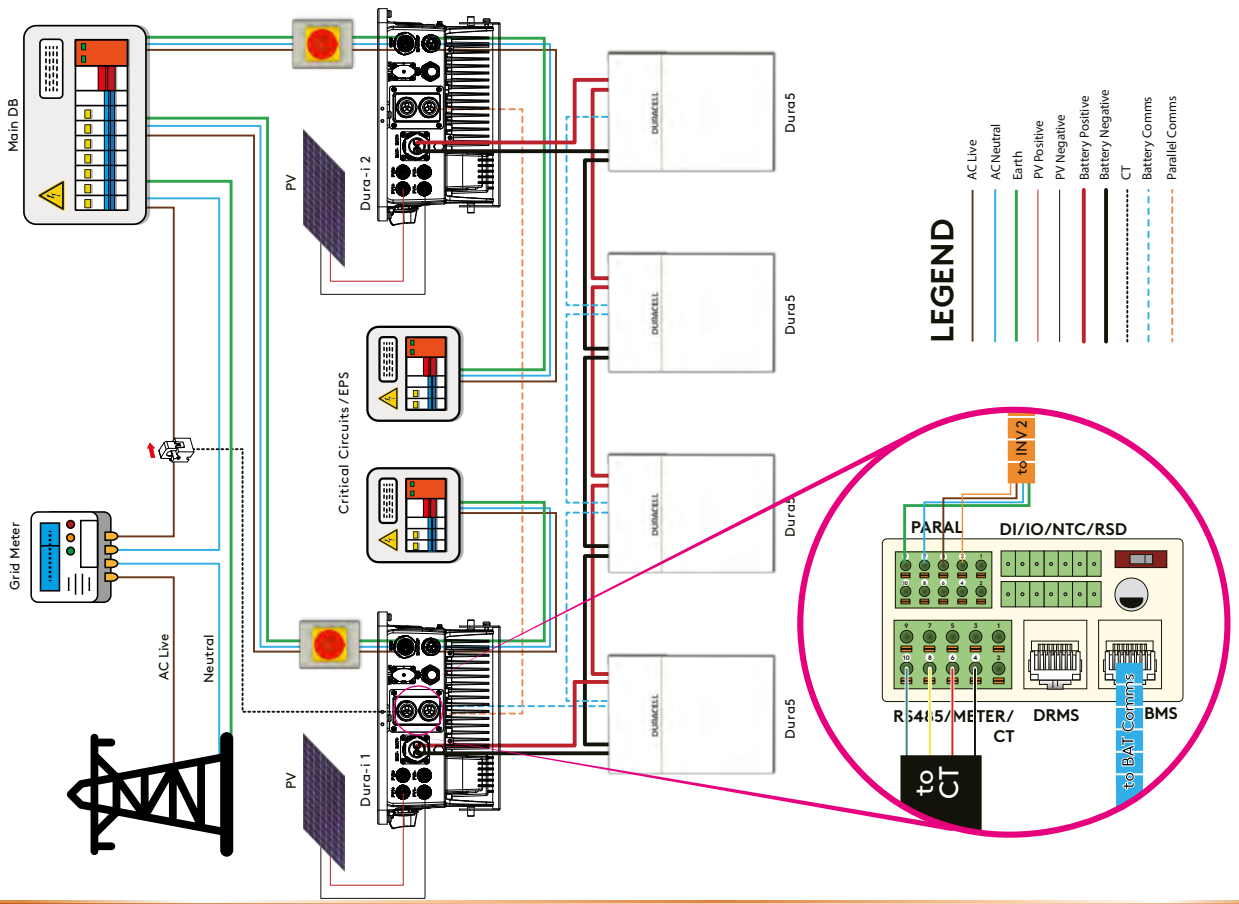


Figure 19. Single phase with batteries in parallel

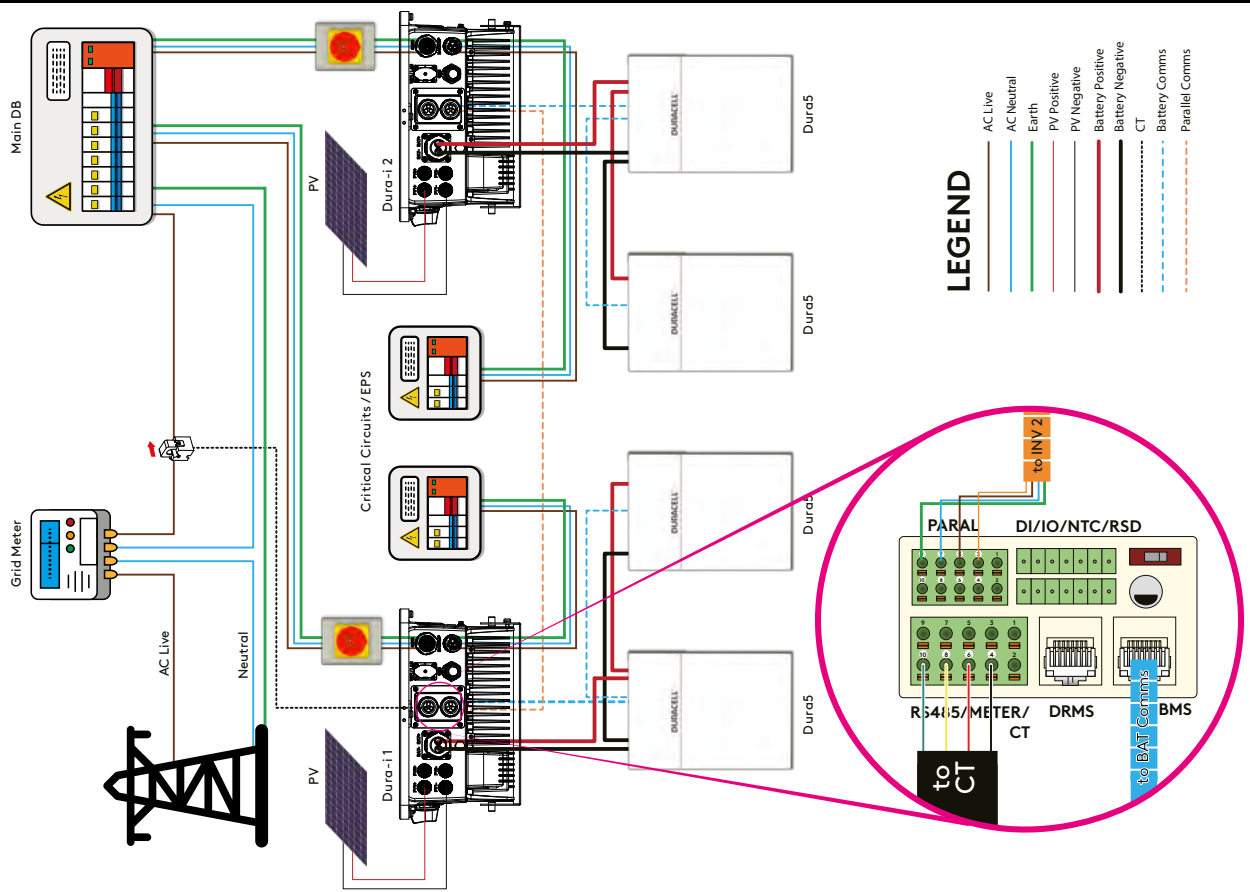


Figure 20. Single Phase parallel with batteries independent

6.2. Three-Phase Equipment Connection

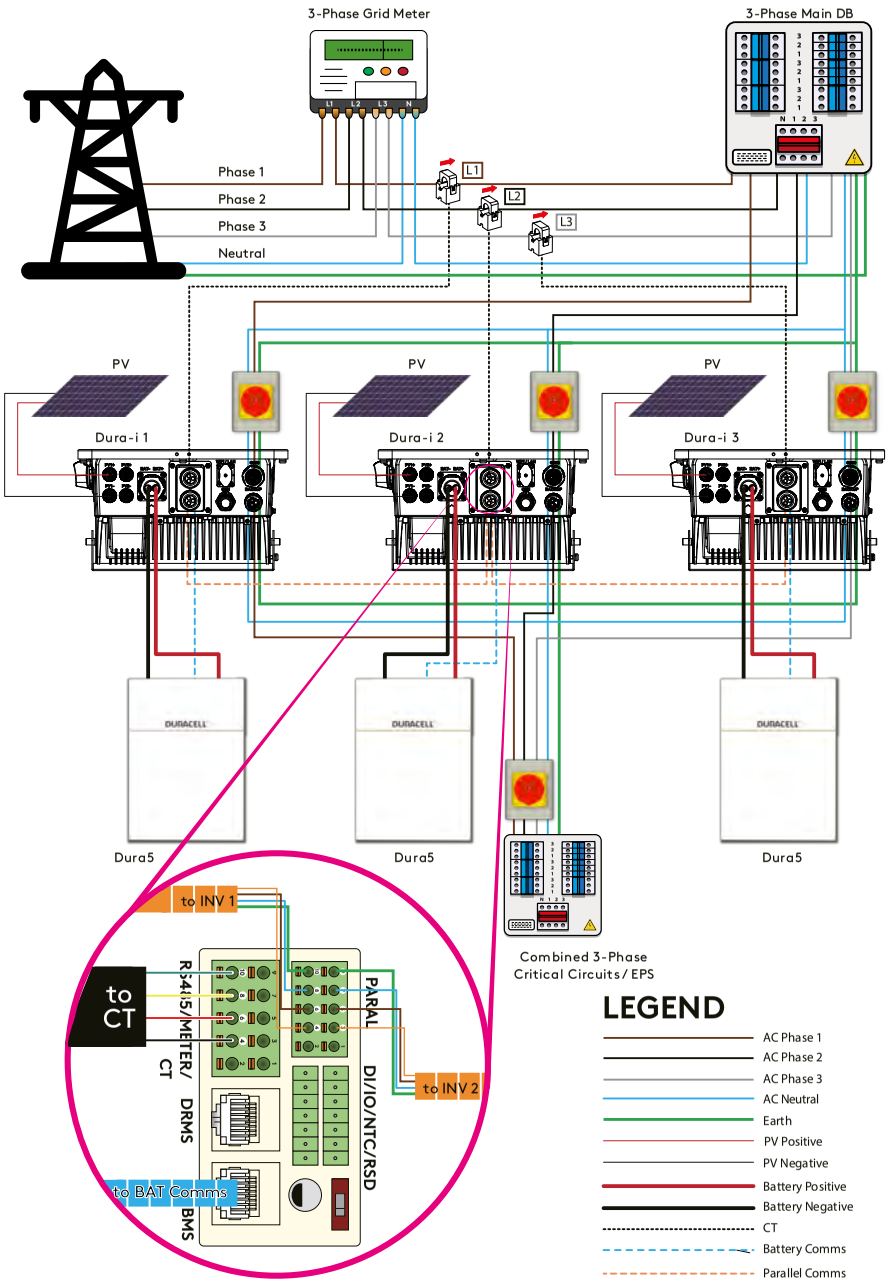


Figure 21. Three-phase Equipment Connection Wiring Diagram (N=3)

NOTE

- Make sure all inverters in parallel have the same firmware version by verifying the 'Primary DSP', 'Secondary DSP', and 'CSB' version numbers on the app. It is recommended to update the firmware before three-phase connection to ensure the same parameter for each inverter.
- A maximum of 3 single-phase inverters are connected to form a three-phase system and each inverter supports one phase only.
- BMS connection is only applicable to the Dura5 battery .
- For shared the Dura5 battery connection, please refer to Three-phase equipment connection wiring diagram on page 23 to connect the BMS communication cable.
- For independent Dura5 battery connection, the BMS communication cable should be connected to every inverter.

6.2.1. App Setting Guide For Three-Phase Connection

Under three-phase connection mode, it is necessary to connect the app to each inverter and set related parameters. The following is an example for three inverters.

Step 1. Login as an administrator.

Step 2. Go to Setting > Inverter > Parallel to enable parallel mode.

Step 3. Set the phase position accordingly: Go to Setting > Inverter > Parallel > Set phase position. Notice that all three inverters should be set in this step.
See Figure 22, (a)-(c).

Step 4. Set the battery connect type: Setting > Inverter > Parallel > Parallel System Battery Connect Type > Select Parallel or Independent.

Step 5. Set the other basic parameters of the inverter. For full commission please complete the Quick Setup.

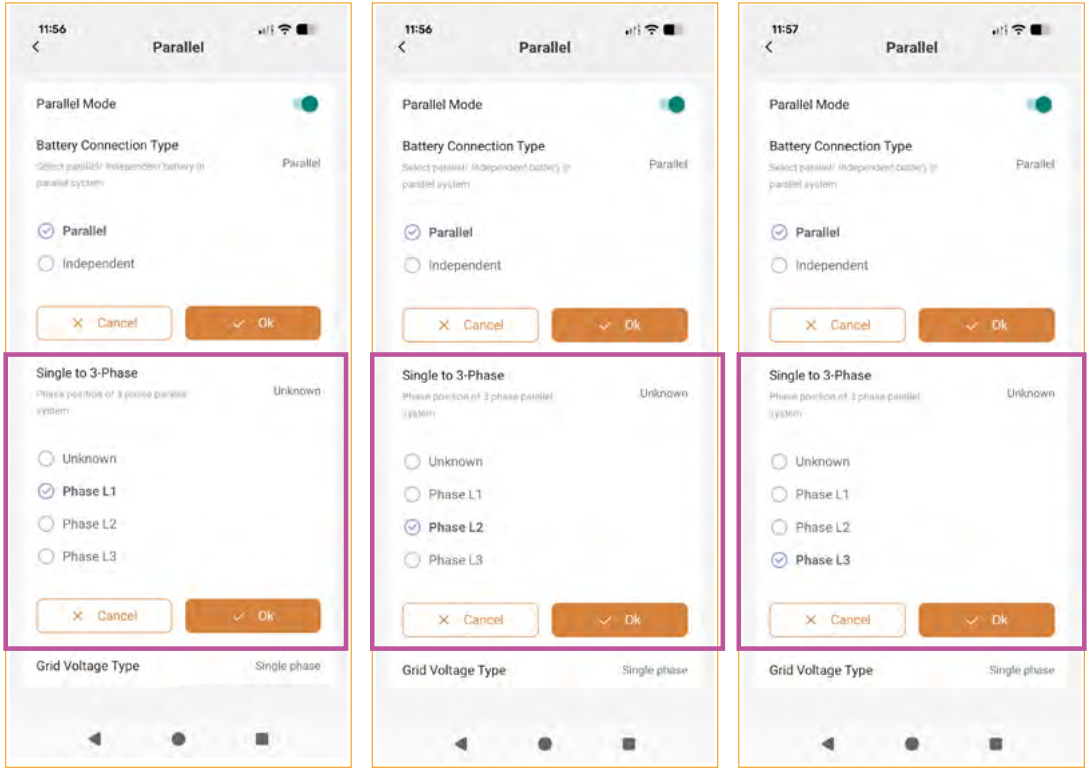


Figure 22. *Left (a) - P1-Phase L1. Centre -(b) P2-Phase L2. Right -(c) P3-Phase L3*

Notes

Notes

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