

Your supplier



The right battery

GACELL A/S · Sletten 17 · 7500 Holstebro · DK  
+45 961 02 961 · [www.gacell-power.dk](http://www.gacell-power.dk)

Parallel Installation Guide

## Parallel Installation Guide

4KVA/5KVA

## Table Of Contents

<b>1. Introduction</b> .....	<b>1</b>
<b>2. Package Contents</b> .....	<b>1</b>
<b>3. Mounting the unit</b> .....	<b>1</b>
<b>4. Wiring Connection</b> .....	<b>2</b>
<b>4-1. Parallel Operation in Single phase</b> .....	<b>3</b>
<b>4-2. Support 3-phase equipment</b> .....	<b>5</b>
<b>5. PV Connection</b> .....	<b>5</b>
<b>6. Fault code display</b> .....	<b>6</b>
<b>7. Commissioning</b> .....	<b>7</b>
<b>8. Trouble shooting</b> .....	<b>9</b>

## 8. Trouble shooting

Situation		Solution
Fault Code	Fault Event Description	
80	CAN data loss	1.Check if communication cables are connected well and restart the inverter. 2.If the problem remains, please contact your installer.
81	Host data loss	
82	Synchronization data loss	
83	The battery voltage of each inverter is not the same.	1.Make sure all inverters share same groups of batteries together. 2.If the problem remains, please contact your installer.
84	AC input voltage and frequency are detected different	1.Check the utility wiring connection and restart the inverter. 2.If the problem remains, please contact your installer.
85	AC output current unbalance	1.Restart the inverter. 2.If the problem remains, please contact your installer
86	AC output mode setting is different	1.Switch off the inverter and check the DIP switch setting. 2.If the problem remains, please contact your installer.
87	Current feedback into the inverter is detected.	1.Restart the inverter. 2.If the problem remains, please contact your installer.
88	The firmware version of each inverter is not the same.	1.Update all inverter firmware to the same version. 2.If the problem remains, please contact your installer.
89	The output current of each inverter is different.	1.Check if communication cables are connected well and restart the inverter. 2.If the problem remains, please contact your installer.
90	CAN ID setting Error	1.Switch off the inverter and check the DIP switch setting. 2.If the problem remains, please contact your

## Support three-phase equipment

Step 1: Check the following requirements before commissioning:

- Correct wire connection
- Ensure all breakers in Line wires of load side are open and each Neutral wires of each unit are connected together.

Step 2: On the bottom panel of inverter, there are 5 pins DIP switches, you can set it as follow Figure 2 .

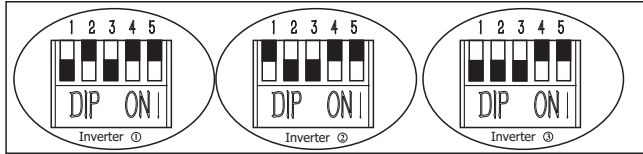



Figure 2

**NOTE:** It's necessary to turn off the machines when setting the DIP switches.

Otherwise, the setting can not be programmed.

Step 3: Turn on all units sequentially

LCD display in L1-phase unit	LCD display in L2-phase unit	LCD display in L3-phase unit

Step 4: Switch on all AC breakers of Line wires in Grid. If Grid is detected and three phases are matched with unit setting, they will work normally. Otherwise, the AC icon  will flash and they will not work in line mode.

LCD display in L1-phase unit	LCD display in L2-phase unit	LCD display in L3-phase unit

Step 5: If there is no more fault alarm, the system to support 3-phase equipment is completely installed.

Step 6: Please switch on all breakers of Line wires in load side. This system will start to provide power to the load.

**Note 1:** To avoid overload occurring, before turning on breakers in load side, it's better to have whole system in operation first.

**Note 2:** Transfer time for this operation exists. Power interruption may happen to critical devices, which cannot bear transfer time.

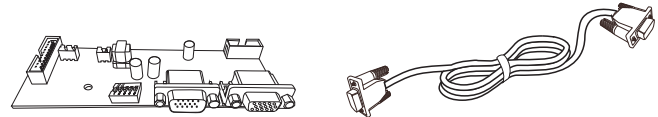
## 1. Introduction

This inverter can be used in parallel with two different operation modes.

- (1). Parallel operation in single phase with up to 3 units. The supported maximum output power is 15KVA(for 5KVA inverter)/12KVA (for 4KVA inverter).
- (2). Maximum three units work together to support three-phase equipment. The supported maximum output power is 15KVA(for 5KVA inverter)/12KVA (for 4KVA inverter).

## 2. Package Contents

In the case, you will find the following items in the package:

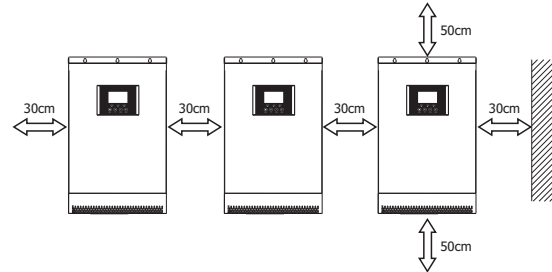


Parallel board

Parallel communication cable

## 3. Mounting the unit

When installing multiple units, please follow below chart.



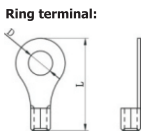
**NOTE:** For proper air circulation to dissipate heat, allow a clearance of approx. 30 cm to the side and approx. 50 cm above and below the unit. Be sure to install each unit in the same level.

#### 4. Wiring Connection

The cable size of each inverter is shown as below:

**Recommended battery breaker, cable and terminal size for each inverter:**

Model	Wire Size	Cable mm <sup>2</sup>	Ring Terminal Dimensions		Torque value
			D (mm)	L (mm)	
4KVA	1*4AWG	22	6.4	33.2	2~ 3 Nm
	2*8AWG	14	6.4	29.2	
5KVA	1*4AWG	22	6.4	33.2	2~ 3 Nm
	2*8AWG	14	6.4	29.2	



**WARNING:** Be sure the length of all battery cables is the same. Otherwise, there will be voltage difference between inverter and battery to cause parallel inverters not working:

**Recommended Grid and Load cable size for each inverter:**

Model	AWG no.	Torque
4KVA	10AWG	1.4~1.6Nm
5KVA	8AWG	1.4~1.6Nm

You need to connect the cables of each inverter together. Take the battery cables for example: You need to use a connector or bus-bar as a joint to connect the battery cables together, and then connect to the battery terminal. The cable size used from joint to battery should be X times cable size in the tables above. "X" indicates the number of inverters connected in parallel. Regarding Grid and Load, please also follow the same principle.

**CAUTION!!** Please install the breaker at the battery and Grid side. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of battery or Grid. The recommended mounted location of the breakers is shown in the figures in 4-1 and 4-2.

\*If you want to use only one breaker at the battery side for the whole system, the rating of the breaker should be X times current of 1 unit. "X" indicates the number of inverters connected in parallel.

**Recommended breaker specification of Grid side with single phase:**

Model	2 units	3 units
4KVA	80A/230VAC	120A/230VAC
5KVA	100A/230VAC	150A/230VAC

**Note 1:** Also, you can use 40A breaker (50A for 5KVA), for only 1 unit, and each inverter has a breaker at its AC input.

**Note 2:** Regarding three phase system, you can use 4 poles breaker, the rating is up to the current of the phase which has the maximum units. Or you can follow the suggestion of note 1.

#### 7. Commissioning

**Parallel in single phase**

Step 1: Check the following requirements before commissioning:

- Correct wire connection
- Ensure all breakers in Line wires of load side are open and each Neutral wires of each unit are connected together.

Step 2: On the bottom panel of inverter, there are 5 pins DIP switches, you can set it as follow Figure 1.

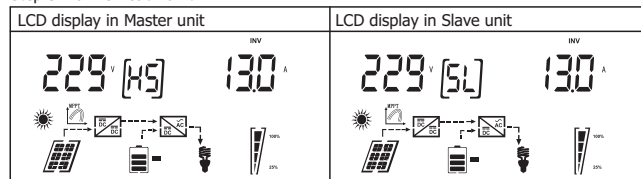


Figure 1

**NOTE 1:** If there are two inverter in parallel, you Only need to set inverter ① and inverter ②.

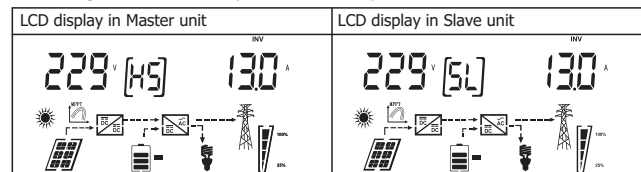
**NOTE 2:** It's necessary to turn off the machines when setting the DIP switches. Otherwise, the setting can not be programmed.

Step 3: Turn on each unit.



**NOTE:** Master and slave units are randomly defined.












Step 4: Switch on all AC breakers of Line wires in Grid. It's better to have all inverters connect to Grid at the same time. If not, it will display fault 82 in following-order inverters. However, these inverters will automatically restart. If detecting AC connection, they will work normally.



Step 5: If there is no more fault alarm, the parallel system is completely installed.

Step 6: Please switch on all breakers of Line wires in load side. This system will start to provide power to the load.

## 6. Fault code display:

Fault Code	Fault Event	Icon on
80	CAN fault	
81	Host loss	
82	Synchronization loss	
83	Battery voltage detected different	
84	AC input voltage and frequency detected different	
85	AC output current unbalance	
86	AC output mode setting is different	
87	Power feedback protection	
88	Firmware version inconsistent	
89	Current sharing fault	
90	CAN ID setting Error	

## Recommended battery capacity

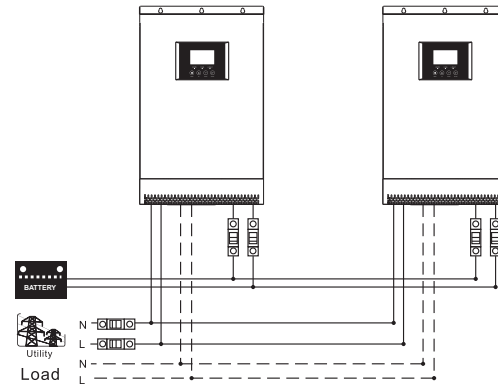
Inverter parallel numbers	2	3
Battery Capacity	400AH	600AH

**WARNING!** Be sure that all inverters will share the same battery bank. Otherwise, the inverters will transfer to fault mode.

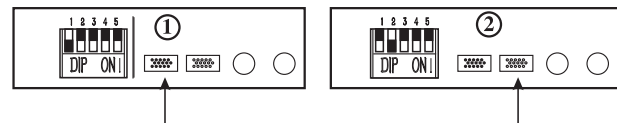
### 4-1. Parallel Operation in Single phase

- Two inverters in parallel:

#### Power Connection



#### Communication Connection

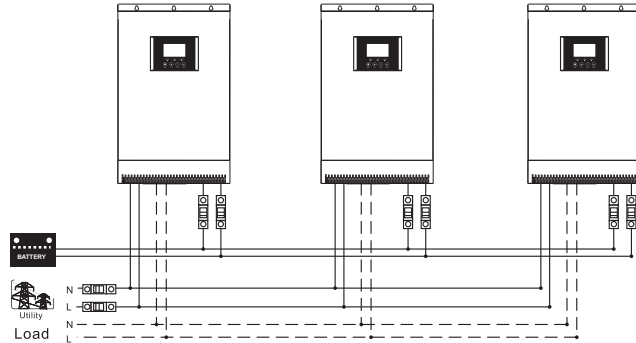


INVERTER①: Setting the key 1 of DIP Switch to the bottom position, and the key 2,3,4,5 of DIP Switch to the top position.

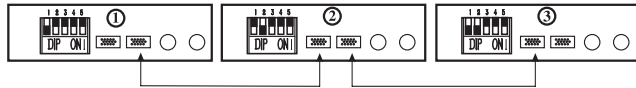
INVERTER②: Setting the key 2 of DIP Switch to the bottom position, and the key 1,3,4,5 of DIP Switch to the top position.

- Three inverters in parallel:

### Power Connection



### Communication Connection



INVERTER①: Setting the key 1 of DIP Switch to the bottom position, and the key 2,3,4,5 of DIP Switch to the top position.

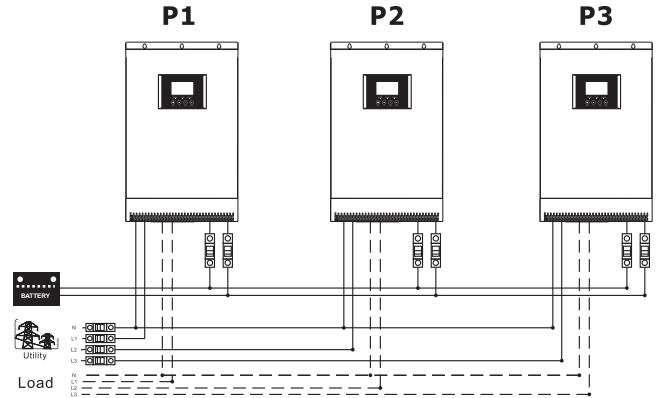
INVERTER②: Setting the key 2 of DIP Switch to the bottom position, and the key 1,3,4,5 of DIP Switch to the top position.

INVERTER③: Setting the key 1,2 of DIP Switch to the bottom position, and the key 3,4,5 of DIP Switch to the top position.

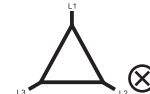
### 4-2. Support 3-phase equipment

One inverter in each phase:

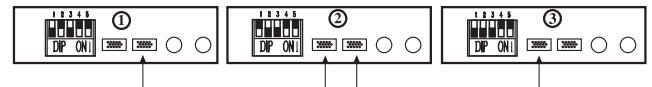
### Power Connection



**NOTE:** No connect 3-phase equipment of delta connection



### Communication Connection



INVERTER①: Setting the key 1,3 of DIP Switch to the bottom position, and the key 2,4,5 of DIP Switch to the top position.

INVERTER②: Setting the key 2,3 of DIP Switch to the bottom position, and the key 1,4,5 of DIP Switch to the top position.

INVERTER③: Setting the key 1,2,3 of DIP Switch to the bottom position, and the key 4,5 of DIP Switch to the top position.

### 5. PV Connection

Please refer to user manual of single unit for PV Connection.

**CAUTION:** Each inverter should connect to PV modules separately.