Solis Standard Operating Procedure

S6-EO1P4-5K-Offgrid Parallel Function Setup Guide version 1.0

Table of Contents

1. Overview

This standard operating procedure describes the settings required to be able to parallel up to 6x S6 EPO1P Off-grid inverters. These inverters are able to be paralleled in both single or three phase configurations. This document only describes the single-phase configuration but three phase is similar.

2. Single Phase Parallel Mode

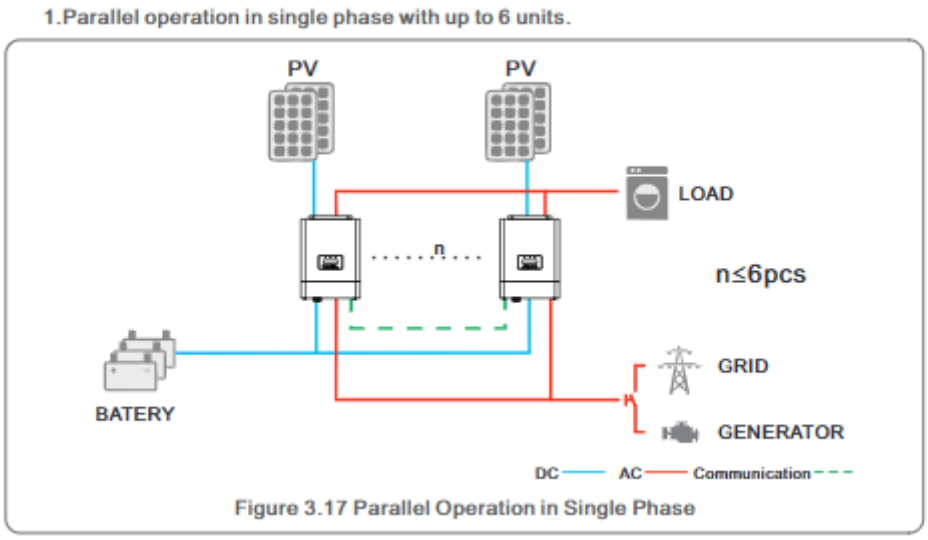


Figure 2.1-1 – Single Phase Parallel System Wiring Diagram

2.1. Parallel Terminal Connections

Up to 6 inverter units of the inverter can be connected in parallel. The inverters parallel communication P-A and P-B terminals should be connected in a daisy chain configuration as per the below diagram. The same communication config should also be used for **three-phase** setup.

E.g. Inverters Master P-A >> Slave 1 P-B || Slave 1 P-A >> Slave 2 P-B

NB. Standard CAT5/6 ethernet cable can be used.

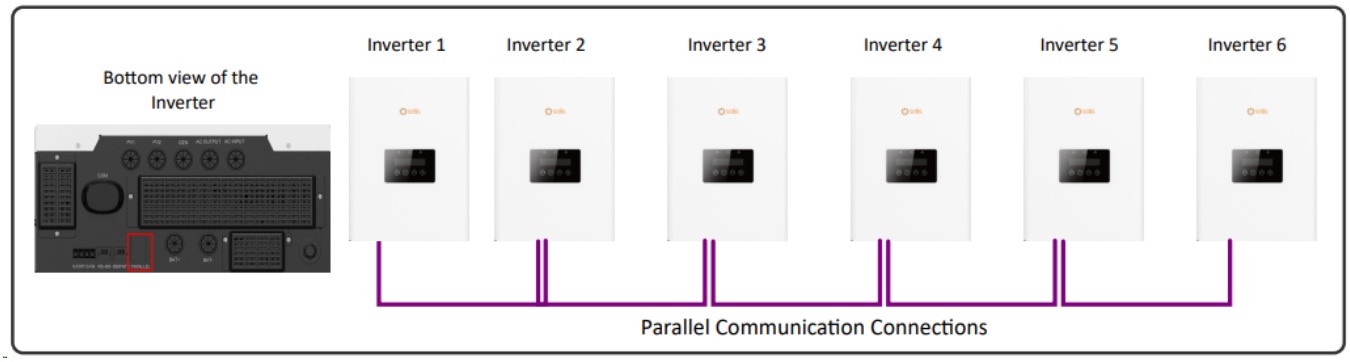


Figure 2.1-1 - P-A & P-B Master/Slave Wiring

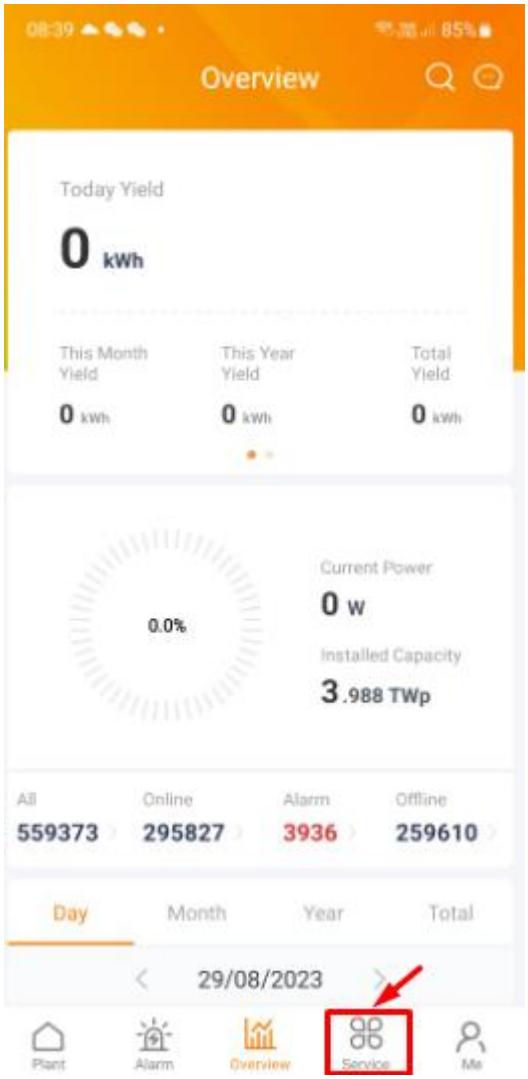
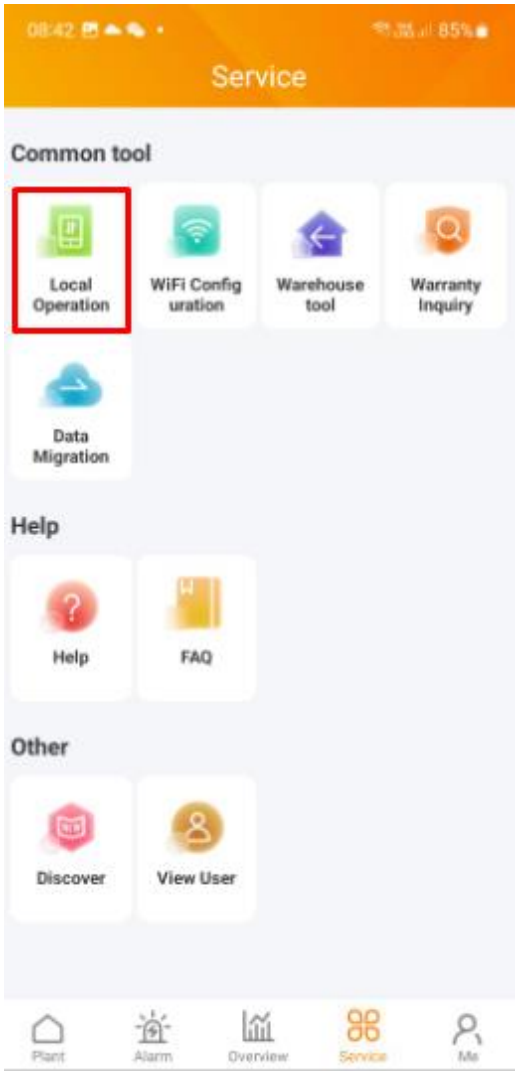
The communication cables are supplied with the inverter. Standard straight ethernet cables with RJ45 plugs can also be used for the parallel cables between the inverters.

Figure 2.1-2 – Communication terminals indicated in red on this image

NOTE: Only use one Wi-Fi logger when in Parallel.

The additional Wi-Fi logger/s can be left on site, in case of firmware updates.

2.2. Connecting to the Inverter via Bluetooth

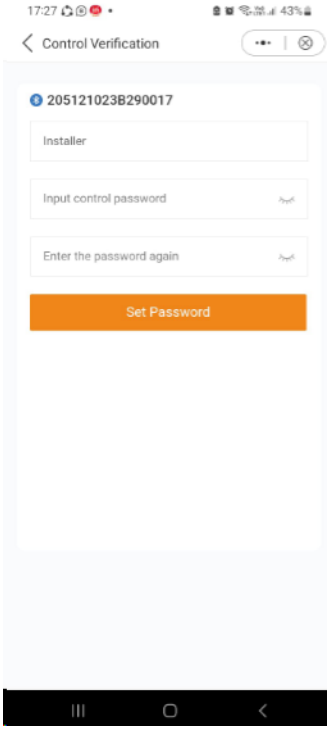
Step 1: Open Solis Cloud App and select the **"Services"** icon as per below.	**Step 2:** Select the "Local Operations" menu
	

Step 4: Select “Connect with Bluetooth” option

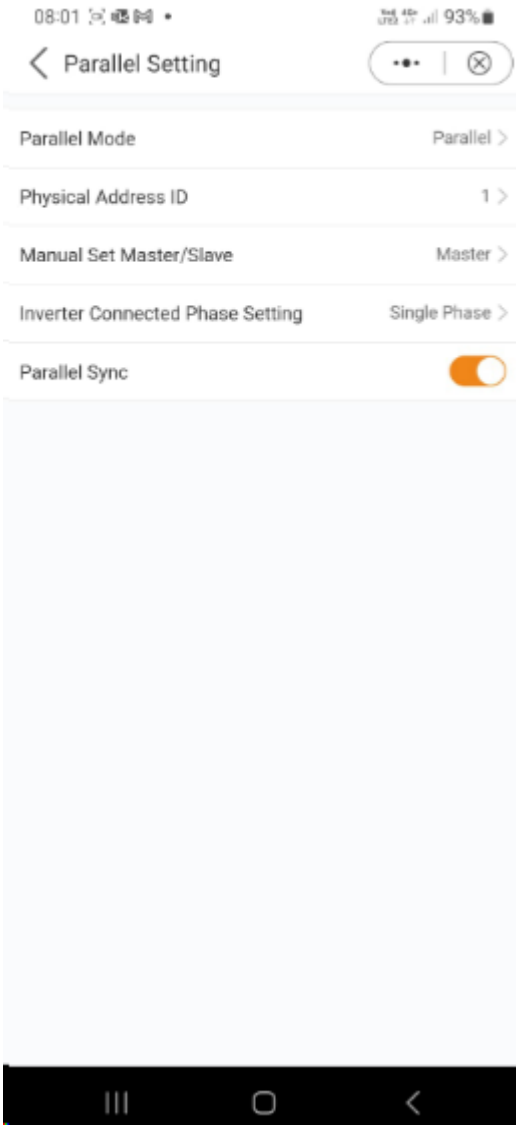
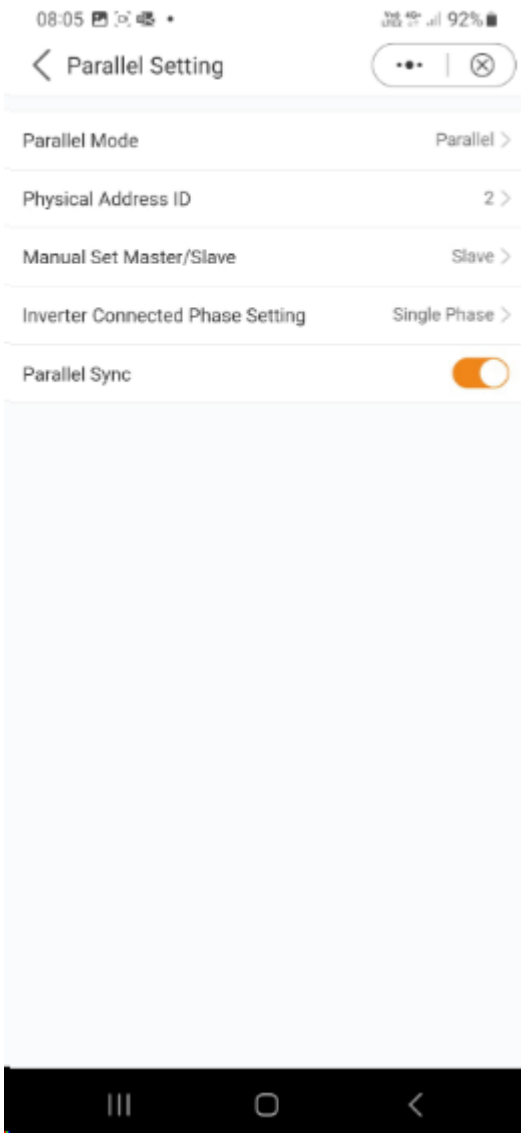
Step 5: Select the correct inverter serial number

Step 6: Log into the inverter

NB. First time users must create a password



2.3. 1Phase - Inverter Parallel Settings

Step 1: Set Parallel Mode to “Parallel” MASTER INV1 • Physical ID 1 • Manual Set Master/Slave to Master • Inverter connected Phase to Single phase	**Step 2:** Set Parallel Mode to “Parallel” SLAVE INV2 • Physical ID 2 • Manual Set Master/Slave to SLAVE • Inverter connected Phase to Single phase
	

3. Three Phase Parallel Mode

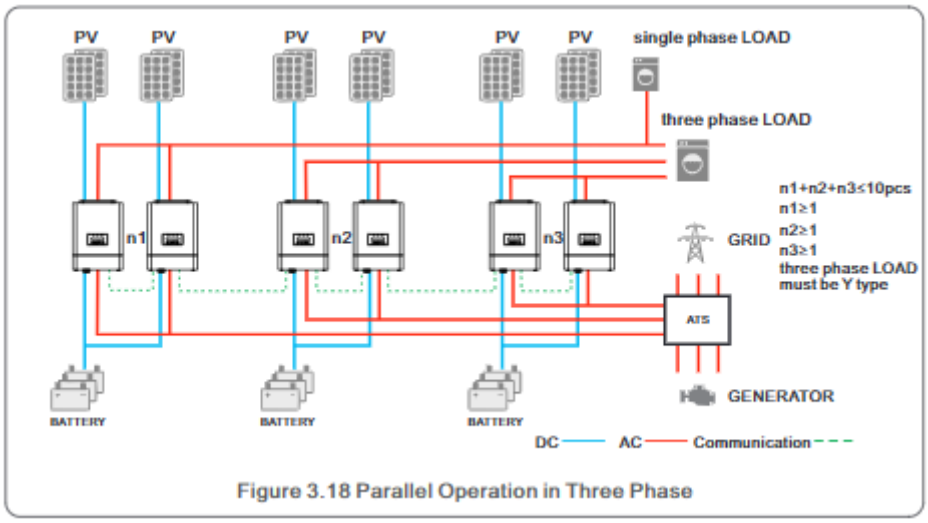


Figure 2.3-1: Three Phase Parallel Line Diagram

4. Setting the Parallel Dip Switches

Before starting and running a single or 3 phase parallel system ensure that both parallel dip switches 1 & 2 marked in figure 3.4-1 below are both set to the “ON” position.

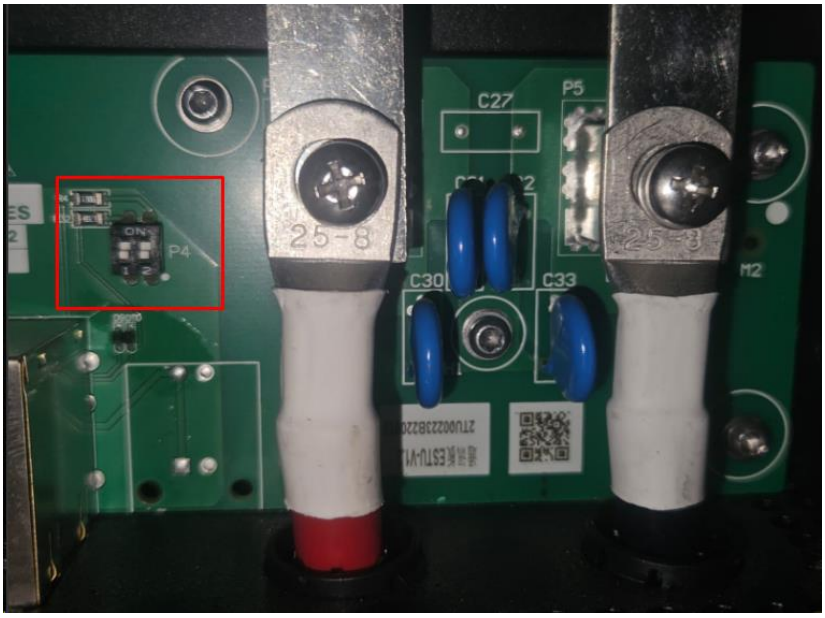


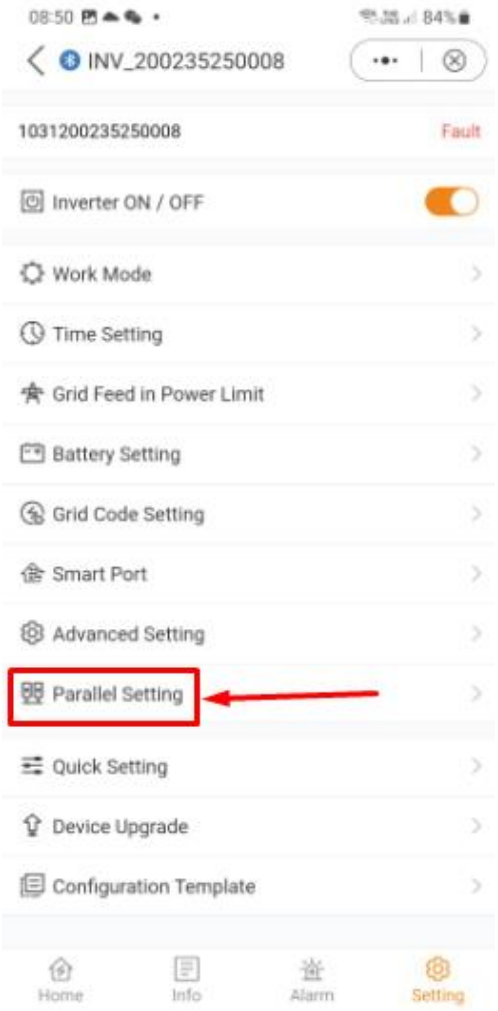
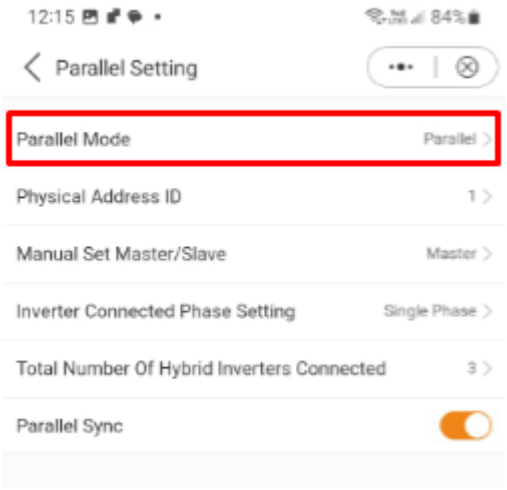
Figure 2.3-1 - Parallel DIP Switches

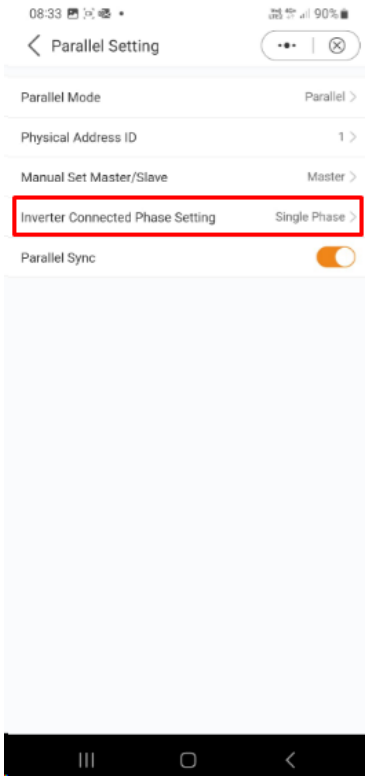
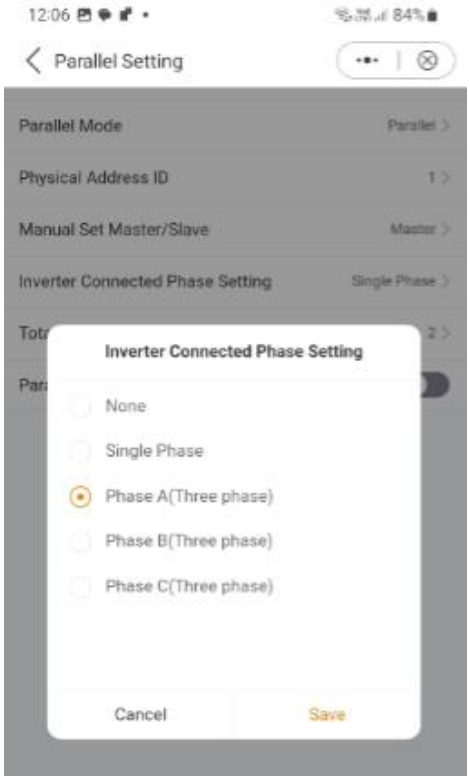
3.1. Communication Wiring

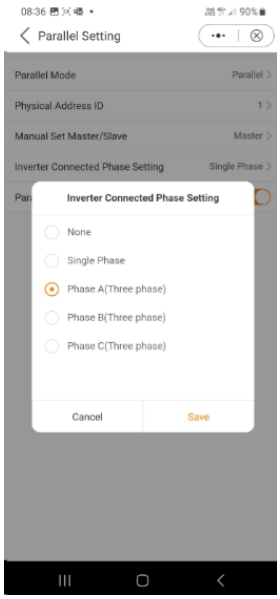
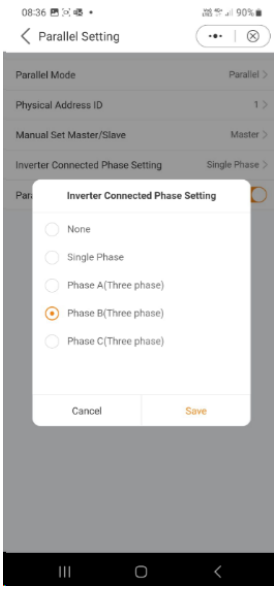
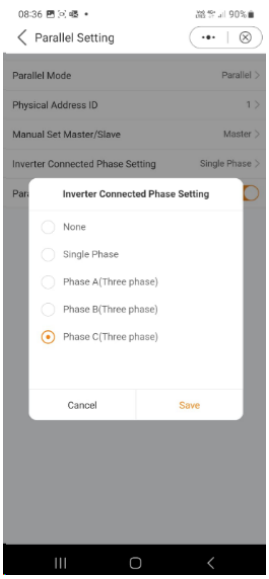
The PA and PB parallel communication wiring should be completed as per the description in section 2.1 for single phase systems.

3.2. Master Inverter Settings

The settings for a 3-phase system are the same as per the single-phase system in section 2 except for the steps below in selecting the 3 individual phases for each inverter.

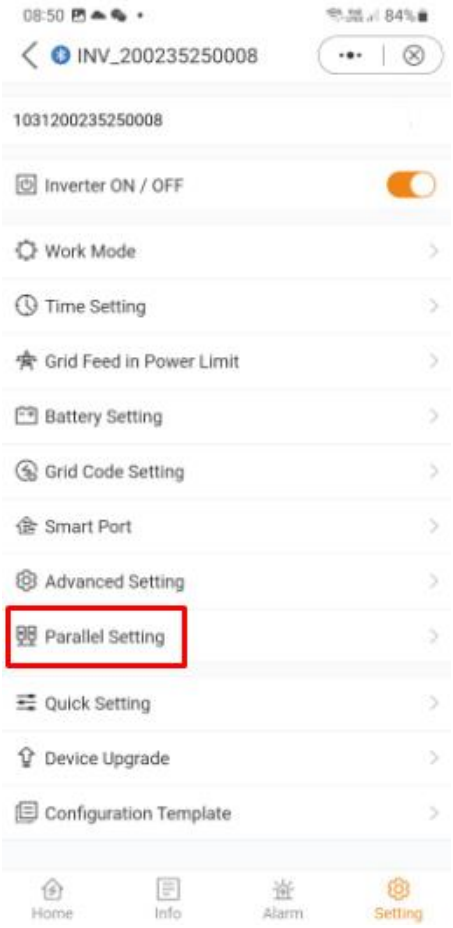
Step 1: Select the Parallel settings menu item	**Step 2:** Select Parallel Mode menu item.
	

Step 6: Select the **"Inverter Connected Phase Setting**" menu item	**Step 7:** Select the **"Phase A(Three Phase)"** menu item and tap on **"Save"**
	

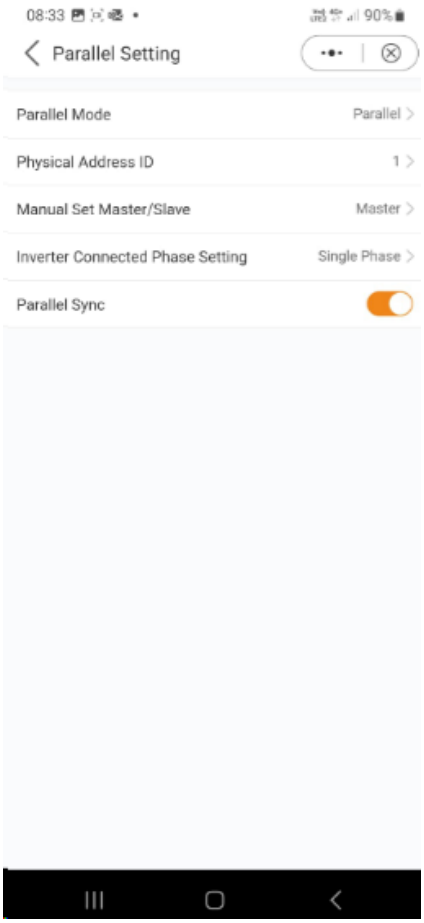
Phase A-Master Inv 1	Phase B-Slave Inv 2	Phase C-Slave Inv 3
		

3.3. Enable Parallel Synchronization on Master

Step 1: Once all the settings are complete on all the Master and Slave inverters, log back on to the master inverter and open the **"Parallel Settings"** menu item



Step 2: Enable the Parallel Syncronization" switch on the master inverter.
From here on any settings changed on the master will be filtered through to all the slave inverters.



LED Indicates

There are three LED indicators on the EO series inverter which indicate the working status.

Light	Color	Status	Description
STATUS	Green	FLASHING	The inverter is in standby(Slow flashing for 3S).
			The inverter is in self-test(Fast flashing for 0.5S).
		ON	The inverter is normal operation. Or The inverter is operating normally.
		OFF	The inverter is deenergized.
BATTERY	Green/Yellow	GREEN FLASHING	Battery is charging.
		GREEN CONSTANT	Battery is discharging.
		OFF	Battery is not installed or in the off position.
		YELLOW CONSTANT	Battery failure.
ALARM	Yellow/Red	YELLOW CONSTANT	There is an alarm but system is operational.
		RED CONSTANT	There is an alarm and the system has stopped.
		OFF	No Alarm.

Troubleshooting

Alarm Message	Failure description	Solution
G_AB Over Volt G_BC Over Volt G_CA Over Volt G_AB Over Volt2 G_BC Over Volt2 G_CA Over Volt2 G_AB Trans Ov_V G_BC Trans Ov_V G_AB 10min Ov_V G_BC 10min Ov_V G_CA 10min Ov_V Grid Trans Ov_V	Gird Overvoltage	1. Resistant of AC cable is too high, Change AC cable for larger size. 2. Adjust the protection limit if it's allowed by electrical company.
G_AB Under Volt G_BC Under Volt G_CA Under Volt G_AB Under Volt2 G_BC Under Volt2 G_CA Under Volt2	Grid Undervoltage	1. Adjust the protection limit In user define setting if it's allowed by electrical company.
Grid Over Freq. Grid Over Freq.2	Grid Overfrequency	1. Adjust the protection limit In user define setting if it's allowed by electrical company.
Grid Under Freq. Grid Under Fre.2	Grid Underfrequency	1. Adjust the protection limit In user define setting if it's allowed by electrical company.
Grid Over Imp.	Grid Impedance is too large	1. Adjust the protection limit In user define setting if it's allowed by electrical company.
No Grid	NO Grid Voltage	1. Check connection and grid switch. 2. Check grid voltage on the inverter terminals.
Grid Unbalance	Grid voltage is unbalanced	1. Restart inverter or contact installers.
Grid Freq. Spark	Grid frequency is sparking	1. Check whether Grid is abnormal. 2. Confirm connnection of AC cable is normal. 3. Restart System and ensure whether the fault is existing.
Grid A Over Curr Grid B Over Curr Grid C Over Curr Phase Over Curr	Grid overcurrent	1. Restart inverter. 2. Change power board.
Ig Tracking Err	Grid current tracking fail	1. Restart inverter or contact installers.
Pv1 Over Volt PV2 Over Volt PV3 Over Volt PV4 Over Volt	DC Overvoltage	1. Reduce the module number in series.
Bus Over Volt	DC Bus overvoltage	1. Check inductor connection of inverter. 2. Check driver connection.
Vbus Unbalance	DC Bus is unbalanced voltage	1. Restart System and ensure whether the fault is existing.

Troubleshooting

Alarm Message	Failure description	Solution
Bus Under Volt	DC Bus is undervolgage	1. Restart System and ensure whether the fault is existing.
Vbus Unbalance2	DC Bus is unbalanced voltage 2	1. Restart System and ensure whether the fault is existing.
Pv1 Over Curr	Pv1 overcurrent	1. Restart inverter. 2. Identify the fault and remove the strings from fault MPPT. 3. Change power board.
Pv2 Over Curr	Pv2 overcurrent	
PV Input Disturb	DC input disturbs	1. Restart inverter. 2. Change power board.
PV Connect Err	DC polarity reverse fault	1. Check whether the polarity of PV cable has reversed connection.
PV Mid Iso	PV midpoint grounding fault	1. Check whether PV strings have trouble in insulation.
Pv1 Under Volt	Pv1 undervoltage	1. Check whether the DC cable is damaged. 2. Restart system and ensure whether the fault is existing.
Pv2 Under Volt	Pv2 undercurrent	1. Check whether the DC cable is damaged. 2. restart system and ensure whether the fault is existing.
Vbus Sample Err	Bus voltage sampling fault	1. Restart System and ensure whether the fault is existing.
Boost Over Curr	Boost overcurrent	1. Restart System and ensure whether the fault is existing.
Grid Disturb	Gird disturbing	1. Restart inverter. 2. Change power board.
Dsp Init Err	DSP initializing protection	1. Restart inverter or contact installers.
Module Over Temp System Over Temp	Over temperature protection	1. Check whether the environment around inverter is poor heat dissipation. 2. Confirm whether inverter installation is satisfied with requirements.
PV Iso Pro	PV isolation protection	1. Remove all DC inputs then restart and reconnect to inverter one by one. 2. Identify the faulty string and check the string isolation.
Ig Leak Pro1 Ig Leak Pro2 Ig Leak Pro3 Ig Leak Pro4	Leakage current protection	1. Check AC and DC connection. 2. Check the connections inside the inverter.
Input Relay Err	Realy fault	1. Restart inverter or contact installers.
Dsp B Fault	Communication fault betweent main DSP and slave DSP	1. Restart inverter or contact installers.
Ig DC Err	DC component fault	1. Restart inverter or contact installers.

Troubleshooting

Alarm Message	Failure description	Solution
12V Power Err	12V power undervoltage	1. Restart System and ensure whether the fault is existing.
Leak Sensor Err	Leakage self-detection fault	1. Restart System and ensure whether the fault is existing.
Under Temp	Undertemperature protection	1. Check the environment temperature around inverter. 2. Restart System and ensure whether the fault is existing.
AFCI Check Err	Arc self-detection fault	1. Check whether there is arc in PV connection and restart inverter.
AFCI Err	Arc protection	1. Restart inverter or contact installers.
Dsp Ram Err	Abnormal SRAM of DSP board	1. Restart inverter or contact installers.
Dsp Flash Err	Abnormal FLASH of DSP board	1. Restart inverter or contact installers.
Dsp PC Err	Abnormal PC pointer of DSP board	1. Restart inverter or contact installers.
Dsp Reg Err	Abnormal key register of DSP	1. Restart inverter or contact installers.
Grid Disturb2	Grid disturbing 02	1. Restart inverter. 2. Change power board.
Ig AD Err	Abnormal sampling of Grid current	1. Restart inverter or contact installers.
Output Short Circuit	IGBT overcurrent	1. Restart inverter. 2. Change power board.
Grid Resonance	Grid resonance	1. Restart inverter or contact installers.
Trans Ov-Ig	Transient overcurrent of AC side	1. Restart inverter. 2. Return to factory for repairing.
Hw Ov-Vbatt	Battery overvoltage and firmware fault	1. Restart the battery and contact battery manufacture for handling if the fault still exists.
LLC Over Curr	LLC firmware overcurrent	1. Restart inverter. 2. Return to factory for repairing.
Batt Over Volt	Battery overvoltage detection	1. Check whether battery breaker has tripped. 2. Check whether battery is damaged. 3. Check whether battery parameter settings are reasonable.
Batt Under Volt	Battery undervoltage detection	1. Check whether battery breaker has tripped. 2. Check whether battery is damaged. 3. Check whether battery parameter settings are reasonable.
No Battery	Battery module is not connected	1. Check whether the power line of battery is connected correctly. 2. Check whether the output voltage of battery is correct.

Troubleshooting

Alarm Message	Failure description	Solution
Backup Over Volt	Bypass overvoltage fault	1. Check whether Backup port wire is normal. 2. Restart system and comfirm whether the fault is existing.
Dsp SelfCk Err	Abnormal self-detection of DSP	1. Restart inverter or contact installers.
Backup Over Curr	Bypass overcurrent fault	1. Restart inverter or contact installers.
Soft Start Err	Soft start failure	1. Restart inverter. 2. Return to factory for repairing.
Nbus Earthing Err	Impedance of N-Ground fault	1. Check whether the Grounding line is connected correctly.
Pbus Earthing Err	Impedance of L-Ground fault	1. Check whether the Grounding line is connected correctly.
Eeprom Init Err	Eeprom initializing fault	1. Restart inverter or contact installers.
Bus & Batt Over Volt	Overvoltage fault of Bus and battery	1. Restart System and ensure whether the fault is existing.
Ig AD Check Err	Abnormal self-detection of Grid current	1. Restart inverter or contact installers.
BMS Over Volt	Battery overvoltage of BMS	1. Restart the battery and contact battery manufacture for handling if the fault still exists.
BMS Under Volt	Battery undervoltage of BMS	
BMS Over Temp	Battery overtemperature of BMS	
BMS Under Temp	Battery undertemperature of BMS	
BMS Dischg. Ov_C	Discharge overcurrent of BMS	
BMS Chg. Ov_C	Charge overcurrent of BMS	
BMS Internal	External fault of BMS	
BMS Imbalance	Battery unbalance of BMS	
Fail safe	CT or Meter failure	1. Confirm whether connection of meter or CT is correct.
Meter Comm Fail	Meter communication fault	1. Check whether the communication cable of meter is damaged. 2. Confirm whether DRM cable connection is reliable. 3. Check whether meter is damaged.
Can Comm Fail	Battery communication fault	1. Check whether the communication cable of meter is damaged.

Troubleshooting

Alarm Message	Failure description	Solution
Dsp Comm Fail	DSP communication fault	1. Restart DSP to ensure whether the fault is existing.
BMS Alarm	Alarm fault of BMS	1. Restart the Battery to ensure whether the fault is existing.
Batt Name Err	Uncorrespondence of battery select	1. Confirm whether the selected battery brand in inverter is consistent with the actual battery.
Heatsink Ntc Err	External temperature sensor failure	1. Check whether temperature sensor has been installed in the Lead-acid battery. 2. Check whether the NTC cable is connected to the inverter correctly. 3. Restart system and confirm whether the fault still exists.
Buck Boost Ov_C	Buckboost overcurrent	1. Restart system and confirm whether the fault still exists.
AC Reverse	AC connected reversely	1. Check the cable polarity of AC side.
Lead-acid batt UTP	Undertemperature of lead-acid battery	1. Check whether the environment temperature of Lead-acid is in the normal range.
Lead-acid batt OTP	Overtemperature of lead-acid battery	1. Check whether the environment temperature of Lead-acid is in the normal range.

NOTE:
If the inverter displays any alarm message as listed in Table 7.1; please turn off the inverter and wait for 5 minutes before restarting it . If the failure persists, please contact your local distributor or the service center.

Please keep ready with you the following information before contacting us.

1. Serial number of Solis Inverter;
2. The distributor/dealer of Solis Inverter (if available);
3. Installation date.
4. The description of problem (i.e. the alarm message displayed on the LCD and the status of the LED status indicator lights. Other readings obtained from the Information submenu (refer to Section 3.10) will also be helpful.);
5. The PV array configuration (e.g. number of panels, capacity of panels, number of strings, etc.);
6. Your contact details.