Hybrid Parallel Model Installation Guidance

2022-11-21

Contents

Hybrid Parallel Model In	nstallation Guidance	1
PART1: Single Phase	e Parallel System Wiring	1
PART2: Three Phase	e System Wiring	7
PART3: Troubleshoo	oting	

PART1: Single Phase Parallel System Wiring

Lux power inverter support "Parallel Connection", which means you can combine multiple inverters together to get bigger back-up power. As parallel model is different from standard one, please make it clear to the distributor if you want a parallel unit. This document is used to show how to set up a parallel system.

Step1. Single unit installation

Install each single phase inverter as user manual. Before installation, please make sure the distance between each inverter meet the requirements of user manual.

Step2. Parallel system wiring

If you paralleling the system as single phase system, the most important thing is to make sure the L & N lines of each unit (AC port And EPS port) are correctly connected, please check with multi-meter to make sure L cable of each units are connected. Do not connect one inverter's L cable to another inverter's N cable.

Wiring the parallel system as below suggestions for safety and cost reasons. Three single phase inverters in parallel diagram:

Battery shared mode is suggested, and if it is lithium type with communication , only the inverter master will communicate with the battery master unit.

Note: For CT clamp, only need to install one CT clamp in a single phase paralleling system. You can connect CT clamp RJ45 terminal to any inverters in the system.





✓ Cross Section of connection cable:

Position	Cross Section (Length \leq 20m)	Note					
AC Connector to Grid Distribution Box	\geq 5.26 mm ²	Maximum Grid current is 25A					
EPS Connector to EPS Load Distribution Box	\geq 3.332 mm ²	Nominal EPS current is 16A					
Grid Distribution Box to Air Joints	\geq (5.26*3) mm ²	Maximum Grid current is 25A * 3 inverters output together					
EPS Load Distribution Box to Air Joints	\geq (3.332*3) mm ²	Nominal EPS current is 16A * 3 inverters output together					
Battery lines	$\geq_{20} \mathrm{mm}^2$	Maximum Battery current is 70A					

**1) Copper wire 1 mm^2 safe current carrying capacity is 5 amps (within 20 meters distance)

2) The PE line can be chosen between 6~10 $\ensuremath{mm^2}$

Step3. Set up the parallel CAN communication balance resistance.

- Connect parallel communication cable. The port4 are used for parallel connection.
- Switch ③ are used for the parallel communication balance resistance.
- If there are only two inverters parallel in your system, all PINs of switch ③ must be dialed



If there are more than two inverters parallel in your system, only two of longest distance of need to be dialed toward "on" position: ¹, and others keep off: ⁰, ⁰



The maximum parallel quantity is 10, so $2 \leqslant n \leqslant \! 10$

- For other ports' definition, please refer to user manual.
- Please double check if the wirings are correct.
- If the cable is not long enough inside the carton, please make cable as the picture below:



Step4. Set up the monitor system and do settings

- Power on the inverter and connect Wi-Fi dongle to internet.
- Please set one of them to '1 Phase Primary' via Web (http://server.luxpowertek.com) or App (Luxpowerview) and others as 'Subordinates'. when you run parallel model as stand-alone inverter, please set it to "1 Phase Primary ".

Application Setting					
EPS Frequency Set(Hz) (?)	50	✓ Set			
Power Backup (?)	Enable Disable		Seamless EPS switching	Enable Disable	
Micro-Grid	Enable Disable		PV Grid Off (?)	Enable Disable	
Feed-in Grid	Enable Disable		Feed-in Grid Power(%)	0	Set
Fast Zero Export	Enable Disable		Normal / Standby	Normal Standby	
Set System Type (?)	1 Phase Primary	✓ Set	Battery Shared	Enable Disable	
Set Composed Phase (?)	1 Phase Primary	Set			
Max. AC Input Power	3 Phase Primary	Set			

■ Since multiple inverters are shared with one battery bank , please enable "Battery shared". Also you make sure the inverter master unit well communicate with the battery master

Application Setting							
EPS Frequency Set(Hz) (?)	50	~	Set				
Power Backup (?)	Enable Disable			Seamless EPS switching	Enable	Disable	
Micro-Grid	Enable Disable			PV Grid Off (?)	Enable	Disable	
Feed-in Grid	Enable Disable			Feed-in Grid Power(%)	0		Set
Fast Zero Export	Enable Disable			Normal / Standby	Normal	Standby	
Set System Type (?)	3 Phase Primary	~	Set	Battery Shared	Enable	Disable	
Set Composed Phase (?)	Phase R	~	Set				
Max. AC Input Power	65535		Set				

■ Please enable "power backup" as below if required.

EPS Frequency Set(Hz) (?)	50	•	Set				
Power Backup (?)	Enable Disable			Seamless EPS switching	Enable	Disable	
Micro-Grid	Enable Disable			PV Grid Off (?)	Enable	Disable	
Feed-in Grid	Enable Disable			Feed-in Grid Power(%)	0		Set
Fast Zero Export	Enable Disable			Normal / Standby	Normal	Standby	
Set System Type (?)	1 Phase Primary	•	Set	Battery Shared	Enable	Disable	
Set Composed Phase (?)	Phase R	•	Set				
Max. AC Input Power	65535		Set				

Please combine the inverters as one group in the monitor system so that you can see the whole system running status easily. Please input the number from 1 to the number you have.

LU [®] POWER [™]	Mon	itor 🛄 Di	ata 🔹 Config	uration	🛄 Overvi	ew 📔 I					r 🏦		
Station Overview	ParaTest2	3 ~ All	Status 🔻 🔲 Orde	r by paralle	4						er SN	×	Q
Device Overview	Serial nu	mber Status	Para Tar a	Text of	and the second		Te v et	ען	Consumption	nEi Plant name	Parallel	A	
2	1 0010014	001 🛛 🖉 Offline	Parallel					×	82.9 kWh	ParaTest2		Parall	lel
	2 0022014	007 💋 Offline							350.1 kWh	ParaTest2		Parall	lel
	3 0022014	012 💋 Offline	Serial number	001001/	1001			- 1	0 kWh	ParaTest2		Parall	lei
	4 0102004	050 💋 Offline	Senarhamber	0010014	001				0 kWh	ParaTest2		Parall	lel
	5 0252016	029 💋 Offline	* Parallel Group						0 kWh	ParaTest2		Parall	lei
	6 0252016	030 💋 Offline	Faraner Group	A				<u></u>	0 kWh	ParaTest2		Parall	lel
	7 0252016	033 💋 Offline	* Parallel Index	Daralle	d Indey: [1-100]				0 kWh	ParaTest2		Parall	lel
	8 0252016	034 💋 Offline	T druiter maex	Faland	a maex. [1-100]	5		_	0 kWh	ParaTest2		Parall	lel
	9 0252016	035 💋 Offline						-	0 kWh	ParaTest2		Parall	lel
	10 0252016	037 💋 Offline							0 kWh	ParaTest2		Parall	lel
	11 0252016	038 💋 Offline				Bave	Clear	Cancel	0 kWh	ParaTest2		Parall	lel
	12 0252016	039 💋 Offline	U W U W	UW	U.W.	U KWN	U KWN	UKWN	0 kWh	ParaTest2		Parall	lel
	13 0460022	009 🕑 Normal	6 kW 5 kW	0 W	5 W	3.8 kWh	0 kWh	0.5 kWh	-0.5 kWh	ParaTest2		Parall	lel
	14 1214324	353 💋 Offline	0 W 0 W	0 W	0 W	0 kWh	188 kWh	0.2 kWh	162.4 kWh	ParaTest2		Parall	lel
	15 2323232	323 💋 Offline	0 W 0 W	0 W	0 W	0.9 kWh	62.9 kWh	23.6 kWh	241.8 kWh	ParaTest2		Parall	lel
	16 6767676	767 💋 Offline	0 W 0 W	0 W	0 W	15.5 kWh	89.4 kWh	48.9 kWh	255.8 kWh	ParaTest2		Parall	lei

If you want to explore more about settings, please refer to 'LXP Hybrid Inverter Website Setting'.

> Step5. Running the system

- Turn on the primary Unit and sub Units to check if all EPS outputs are OK
- Turn on all breakers in the Grid Distribution Box and EPS Load Distribution Box



PART2: Three Phase System Wiring

Step1. Install each single inverter as user manual

Lux power inverter support three phase system, which means 3 pcs or more inverters can be used to compose a three phase system. Please note that this model is different from the standard one, please make it clear to distributor to get parallel unit. This document is used to show you how to set up a three phase system.

Step2. Parallel connection

Wiring the parallel system as below suggestions for safety and cost reasons.

When paralleling the system as three phase system, make sure there is at least one inverter in each phase. DO NOT connect EPS terminals all together when used in 3 phase system, otherwise you will short the grid/utility.

Battery shared mode is suggested, and if it is lithium type with communication , only the inverter master will communicate with the battery master unit.

For three phase system, we need to install 3 CT clamps in each phase to measure the power of each phase, and the RJ45 terminal of CT clamp need to be connected to the inverter which is in the same phase. For example, one CT is used to measure the current of R phase, so its RS45 terminal need to connect to the inverter which is in R phase.



Three phase system composed by three inverters diagram:

The suggested wiring:



 Cross Section of L1,L2,L3&I 	N lines:					
Position	Cross Section (Length \leq 20m)	Note				
AC Connector(L1,L2,L3&N) to	> 5.26 mm ²	Maximum Grid current is 25A				
Grid Distribution Box	<i>≥</i> 5.26 IIIII					
EPS Connector(L1,L2,L3&N) to	$>$ 2 222 mm^2	Nominal EPS current is 16A				
EPS Load Distribution Box	≥ 3.332 mm					
Grid Distribution Box (L1,L2,L3)	2	Maximum Grid current is 25A				
to Air Joints	≥ 5.26 mm					
Grid Distribution Box (N) to Air	$>$ mm^2	Maximum Grid current is 25A *				
Joints	≥ 20 IIIII	3 inverters output together				
EPS Load Distribution	2	Nominal EPS current is 16A				
Box(L1,L2,L3) to Air Joints	≥ 3.332 mm ⁻					
EPS Load Distribution Box(N)	2 222*22	Nominal EPS current is 16A * 3				
to Air Joints	≥ (3.332*3) IIIII	inverters output together				
Battery lines	2	Maximum Batttery current is				
	< 20 mm	70A				

**1) Copper wire 1 $\,\mathrm{mm}^2\,$ safe current carrying capacity is 5 amps (within 20 meters distance) for AC and EPS lines.

2) The PE line can be chosen between 6~10 $\ensuremath{mm^2}$

Step3. Set up the parallel CAN communication balance resistance.

- Connect parallel communication cable. The port4 are used for parallel connection.
- Switch ③ are used for the parallel communication balance resistance,
- If there are only three inverters parallel in this three-phase system, Switch ③ of No.1 and

No.3 need to be dialed toward "on" position: $1^{1} 1^{1}$, and No.2 keeps off: $0^{1} 0^{1}$



If there are more than three inverters parallel in this three-phase system, only two of the longest distance need to be dialed toward "on" position: $1^{1} 1^{1}$, and others keep off: $0^{1} 0^{1}$



The maximum parallel quantity is 10, so $3 \le n \le 10$

For other ports' definition, please refer to user manual.

Please double check if the wirings are correct.

Step4. Set up the monitor system and do settings

- Power on the inverter and connect Wi-Fi dongle to internet.
- The inverters are set as 'sub' by default. Please set one of them to 'Phase 3 primary' via Web (http://server.luxpowertek.com) or App (Luxpowerview).

Application Setting							
EPS Frequency Set(Hz) (?)	50 🗸][Set				
Power Backup (?)	Enable Disable			Seamless EPS switching	Enable	Disable	
Micro-Grid	Enable			PV Grid Off (?)	Enable	Disable	
Feed-in Grid	Enable Disable			Feed-in Grid Power(%)	0		Set
Fast Zero Export	Enable Disable			Normal / Standby	Normal	Standby	
Set System Type (?)	1 Phase Primary 🗸	•	Set	Battery Shared	Enable	Disable	
Set Composed Phase (?)	1 Phase Primary	1	Set				
Max. AC Input Power	3 Phase Primary		Set				
Two ways for com	posed phase setting	:					

- Composed phase will be automatically set according to the grid once connected with grid successfully, and it will store it in the system memory.
- If there is no grid input ever, composed phase need to be set manually as below. For primary inverter, the composed phase should be "Phase R".

Application Setting						
EPS Frequency Set(Hz) (?)	50 ~	Set				
Power Backup (?)	Enable Disable		Seamless EPS switching	Enable Disabl	9	
Micro-Grid	Enable Disable		PV Grid Off (?)	Enable Disabl	9	
Feed-in Grid	Enable Disable		Feed-in Grid Power(%)	0		Set
Fast Zero Export	Enable Disable		Normal / Standby	Normal Stand	by	
Set System Type (?)	3 Phase Primary	Set	Battery Shared	Enable Disabl	•	
Set Composed Phase (?)	Phase R 🗸	Set				
Max. AC Input Power	Clear Detected Phases	Set				
Grid Connect Setting	Phase S Phase T					

- If there is a phase inconsistency problem, please check if there is any phase without inverter connected.
- If the wiring is correct, please clear the phase detection as below.

Application Setting						
EPS Frequency Set(Hz) (?)	50 ~	Set				
Power Backup (?)	Enable Disable		Seamless EPS switching	Enable	Disable	
Micro-Grid	Enable		PV Grid Off (?)	Enable	Disable	
Feed-in Grid	Enable Disable		Feed-in Grid Power(%)	0		Set
Fast Zero Export	Enable Disable		Normal / Standby	Normal	Standby	
Set System Type (?)	3 Phase Primary	Set	Battery Shared	Enable	Disable	
Set Composed Phase (?)	Phase R 🗸	Set				
Max. AC Input Power	Clear Detected Phases	Set				
Grid Connect Setting	Phase S Phase T					

■ Since multiple inverters are shared with one battery bank , please enable "Battery shared". Also you make sure the inverter master unit well communicate with the battery master

Application Setting							
EPS Frequency Set(Hz) (?)	50	~	Set				
Power Backup (?)	Enable Disable			Seamless EPS switching	Enable	Disable	
Micro-Grid	Enable Disable			PV Grid Off (?)	Enable	Disable	
Feed-in Grid	Enable Disable			Feed-in Grid Power(%)	0		Set
Fast Zero Export	Enable Disable			Normal / Standby	Normal	Standby	
Set System Type (?)	3 Phase Primary	*	Set	Battery Shared	Enable	Disable	
Set Composed Phase (?)	Phase R	~	Set				
Max. AC Input Power	65535		Set				

■ Please enable "power backup" as below if required.

Application Setting							
EPS Frequency Set(Hz) (?)	50	~	Set				
Power Backup (?)	Enable Disable			Seamless EPS switching	Enable	Disable	
Micro-Grid	Enable			PV Grid Off (?)	Enable	Disable	
Feed-in Grid	Enable Disable			Feed-in Grid Power(%)	0		Set
Fast Zero Export	Enable Disable			Normal / Standby	Normal	Standby	
Set System Type (?)	1 Phase Primary	~	Set	Battery Shared	Enable	Disable	
Set Composed Phase (?)	Phase R	~	Set				
Max. AC Input Power	65535		Set				

Please combine the inverters as one group in the monitor system so that you can see the whole system running status easily. Please input the number from 1 to the number you have.

LUISPOWER™	•	Monitor	👪 Da	ita 🤹		uration	Cvervie	ew 📔	Maintain				*	
Station Overview	ParaTest2 3 V All Status V Order by parallel										Search by inverter SN		×Q	
		Serial number	Status		c) - c			- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1		ען	Consumption	nEi Plant name	Parallel	Antine
- 2	1	0010014001	Ø Offline	Parallel						×	82.9 kWh	ParaTest2		4 Parallel
	2	0022014007	Ø Offline							_	350.1 kWh	ParaTest2		Parallel
	3	0022014012	Ø Offline	Corial nu	mbor	0010014001					0 kWh	ParaTest2		Parallel
	4	0102004050	Ø Offline	Senaria	amper						0 kWh	ParaTest2		Parallel
	5	0252016029	💋 Offline	+ Danallal Coours	Channe A					0 kWh	ParaTest2		Parallel	
	6		Ø Offline	* Parallel Index		A				<u></u>	0 kWh	ParaTest2		Parallel
	7		Ø Offline			Parallel Index [1, 100]					0 kWh	ParaTest2		Parallel
	8	0252016034	Ø Offline	raranei	Index	5			_	0 kWh	ParaTest2		Parallel	
	9	0252016035	💋 Offline							-	0 kWh	ParaTest2		Parallel
	10		Ø Offline								0 kWh	ParaTest2		Parallel
	11	0252016038	Ø Offline					Bave	Clear	Cancel	0 kWh	ParaTest2		Parallel
	12	0252016039	Ø Offline	UW	UW	UW	0.W	U KWN	U KVVN	UKWN	0 kWh	ParaTest2		Parallel
	13	0460022009	🕑 Normal	6 kW	5 kW	o w	5 W	3.8 kWh	0 kWh	0.5 kWh	-0.5 kWh	ParaTest2		Parallel
	14	1214324353	Ø Offline	0 W	0 W 0	0 W	0 W	0 kWh	188 kWh	0.2 kWh	162.4 kWh	ParaTest2		Parallel
	15		💋 Offline	0 W	0 W	0 W	0 W	0.9 kWh	62.9 kWh	23.6 kWh	241.8 kWh	ParaTest2		Parallel
	16	6767676767	Ø Offline	0 W	0 W	0 W 0	0 W	15.5 kWh	89.4 kWh	48.9 kWh	255.8 kWh	ParaTest2		Parallel

If you want to explore more about settings, please refer to \langle LXP Hybrid Inverter Website Setting \rangle

Step5. Running the system

- Turn ON the primary Unit and sub Units and Check the all EPS output is OK
- Turn on all breakers in the Grid Distribution Box and EPS Load Distribution Box

PART3: Troubleshooting

LCD Display	Description	Troubleshooting					
Error Code:008 Error: 100	CAN communication Fault in Parallel System	 Please check if the parallel communication cables are firmly connected. Please check if the 2-PIN DIP switches are well configured. Please check the white label on the cables , marking with "Parallel-CAN" is the correct cable for parallel connection. Please make sure the PINs are correct if you extend or redo the cable. 					
Error Code:009 Error: 200	Primary Inverter Lost in Parallel System	 Please check if you have set one of units as 1-phase or 3-phase primary inverter, one primary inverter and others should be sub inverters. Please check if the cable to the primary is well connected. 					
Error Code:008,009 Error: 300	Compound error codes	Please follow the guidance above					
Error Code:010 Error: 400	Muti Primary unit in Parallel System	There are more than one primary inverter in this parallel system, please find out the unexpected inverters and reset them to be subordinates.					
Error Code:011 Error: 800	AC input Inconsistent in Parallel System	Please check if the AC input voltage between the inverters are not synchronous . For example , some of them are 230Vac and some of them are 0Vac.					
Error Code:012 Error: 1000	UPS output short circuit	Please check if the UPS output are shorted with multi-meter, you can turn off the inverter and check the resistance of the UPS output, L-N, and L-PE.					
Error Code:013 Error: 2000	UPS output current reversed	Please check if the L,N cables are correctly installed , if you reverse the LN connection of one of them, there will have reversed current among the inverters. Thus please make sure the LN connections are correct.					
Error Code:015 Error: 8000	Phase Error in 3 Phase System	 Please check if you have configured 1-phase primary inverter for 3-phase parallel connection. Please check if LN connection in one phase is reversed. Please check the detected phase via APP or Webpage if the physical connections are correct. Select "clear detected phase" and click set if the detected phase is wrong. Please reset the primary inverter if the error is still there after step3. 					