SOLUNA
POWER DESIGNED FOR NIGHT AND DAY

User manual

Smart Link-Hub1000

V1.1

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About this manual

This manual describes how to install and use the Smart Link. Read this manual before installed, and follow the instructions throughout the installation process. If you are uncertain about any of the requirements, recommendations, or safety procedures described in this manual, contact Soluna immediately for advice and clarification. the information included in this manual is accurate at the time of publication. However, with regards to the product design and technical specification updates, our company reserves the right to make changes at any time without prior notice. In addition, the illustrations in this manual are meant to help explain system configuration concepts and installation instructions. the illustrated Smart Link-Hub1000 maybe different from the actual Smart Link-Hub1000 at the installation location.

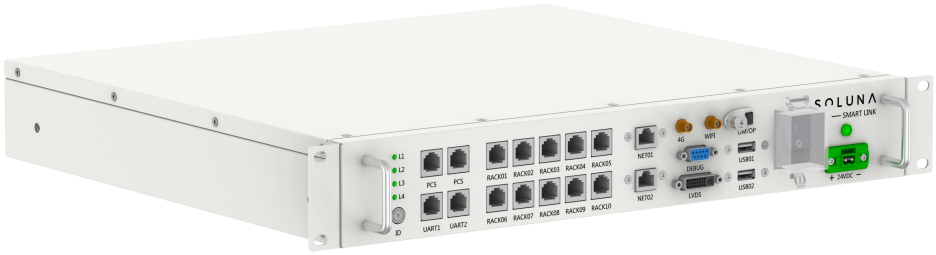
Content

1 Product Introduction

Smart Link-Hub 1000 is the CAN communication hub for multiple Soluna battery clusters in parallel connection.

Applicable to the following models.
Soluna EOS-5K Pack
Soluna 10K Pack LV
Soluna Bes-5K Pack
Soluna 6K Pack HV(L-E)
Soluna 10K Pack HV(L-E)
Soluna 15K Pack HV(L-E)

2 Outline Dimensions



3 Technical data

Physical Characteristics

Width	440 mm
Depth	400 mm
Height	65 mm
Weight	7.6 kg

Electrical Characteristics

Operating voltage range	11~26 VDC
Operating voltage（Rated)	24 VDC
System Consumption(Rated)	15 W
Communication	CAN,RS-485,4G,Wi-Fi,Ethernet
CAN	Max 10 clusters

Operating Conditions

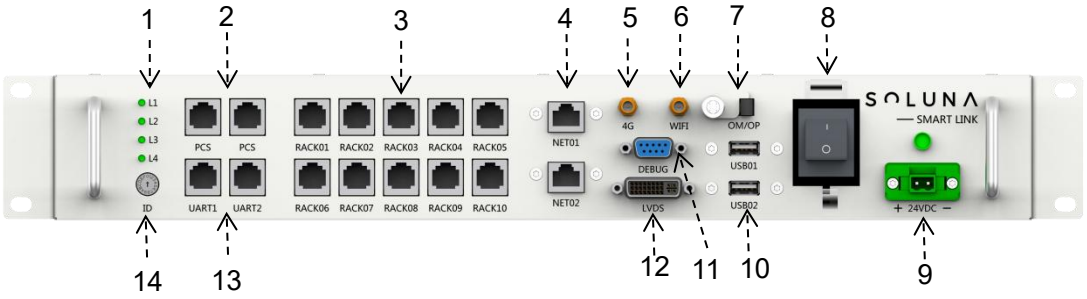
Installation Location	Indoor
Operating Temperature	-20~60℃
Storage Temperature	-30~60℃
Humidity	5%~95%RH
Altitude	Max. 2,000 m
Cooling Strategy	Natural Convection

Reliability & Certification

Certificates	TBD
	TBD

4 Ports

Please find the following information for the ports description.



Ports description		
No.	**Slik-screen**	**Function**
1	L1,L2,L3,L4	LED indicators instructionsc
2	PCS	Inverter communication port
3	RACK01,RACK02,RACK03, RACK04,RACK05,RACK06, RACK07,RACK08,RACK09, RACK10	Battery Rack communication port
4	NET01,NET02	Ethernet port
5	4G	4G connection port, the user can find the 4G
6	Wi-Fi	Wi-Fi connection port
7	OP/OM	Automatic or Manual mode
8	ON/OFF	Power ON/off switch
9	24VDC	DC input port
10	USB1,USB2	RS-485 communication port
11	DEBUG	Internal debugging
12	LVDS	Screen connection port
13	UART1,UART2	Data communication Settings port
14	ID	Battery Protocol Select

Remark:

1) NET01/02 port------Connect to an external network,the user can obtain some system operation data via this port.
2) OP/OM port-----Smart Link-Hub1000 have 2 modes of operation,namely OP and OM mode,OP mode is Automatic mode,OM is Manual mode.
3) 24VDC port-----The Smart Link-Hub1000 needs to be configured with a 24V power

supply by the user, the output power of this power supply should be greater than 15W.

4) 4G/Wi-Fi port------Battery system data monitoring,the user can contact Soluna to obtain the user manual.
5) DEBUG port-----Used by Soluna technicians only
6) LVDS port-----If the user needs local monitoring data, Please contact Soluna to obtain a Screen, the Screen will be connected this port.

5 Definition of RJ45 Port Pin

Please the table1 for details of definition of RJ45 Port Pin.

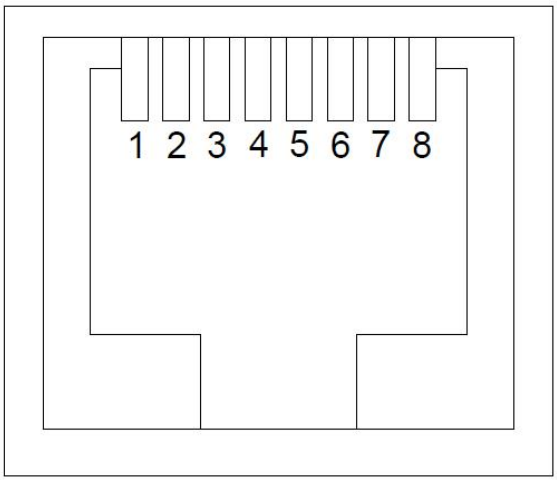


Table 1

Definition of RJ45 Port Pin				
PIN	NET 01/02	UART 1/2	PCS	RACK0 1~10
1	TX +	RS485A	---	---
2	TX-	RS485B	---	---
3	RX +	+24V	---	---
4	---	---	CANH	CANH
5	---	---	CANL	CANL
6	RX-	GND	---	---
7	---	---	RS485A	---
8	---	---	RS485B	---

6 LED indicators instructions

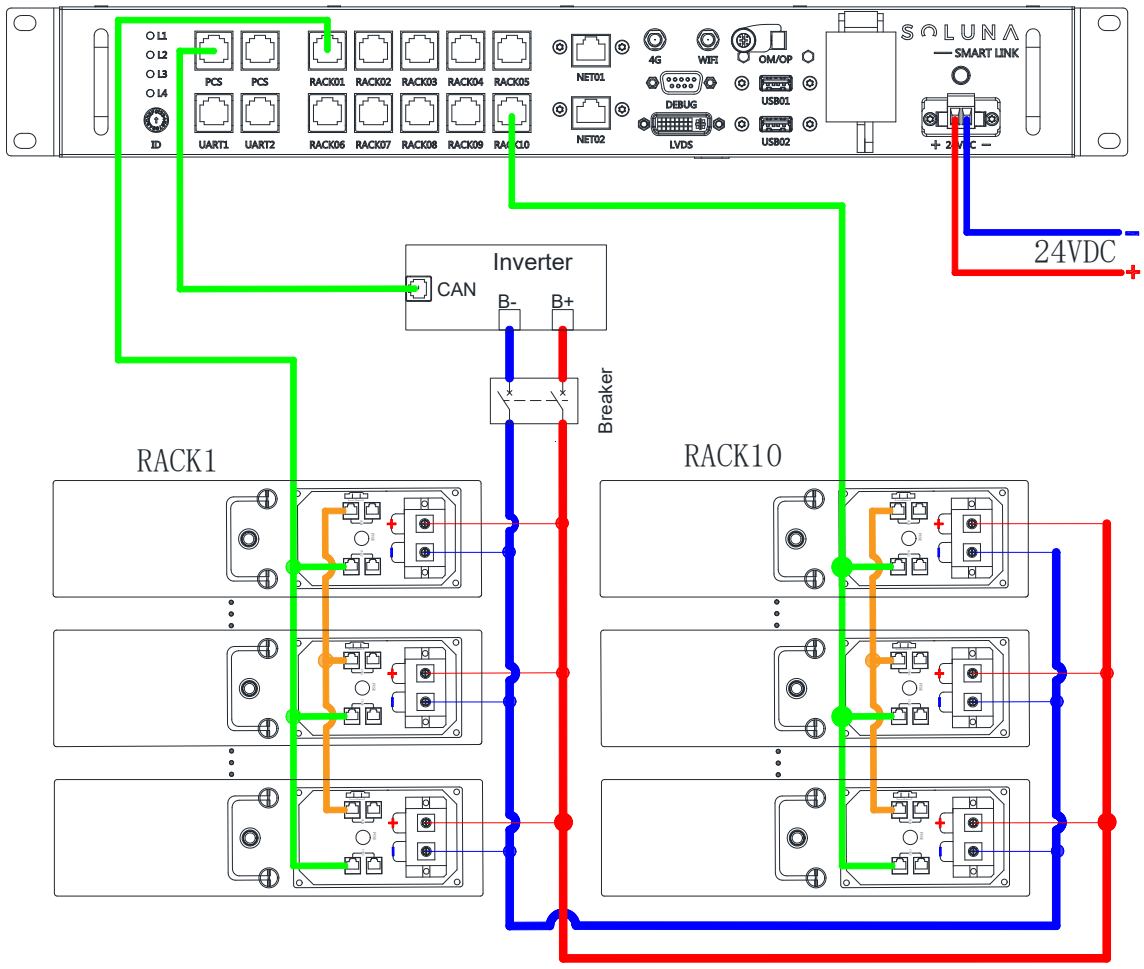
Please find the following table for the LED indicators instructions.

State	clusters number				Description
	L1	L2	L3	L4	
Operation and maintenance mode starts	●	●	●	●	30s, L1, L2, L3, L4 flow light type, one at each time, 0.5s interval
Run mode start	●	●	●	●	30s, L1, L2, L3, L4 flow light type, one at each time, 0.5s interval
System state (standby)	●	●	●	●	Each lamp represents 25% power, and is always bright according to the actual capacity
System Status (Charge)	●	◑	●	●	Each lamp represents 25% power, the highest power lamp cycle flash, flash 2 times (on 0.5s / out 0.5s), out once (1s)
System status (discharge)	●	◑	●	●	Each lamp represents 25% power, the highest power lamp cycle flash, flash 2 times (on 0.5s / out 0.5s), out once (1s)
Module level 3 alarm	●	●	●	◑	L4 flash, 0.5s out 0.5s, L3 is always bright
Inverter communication is abnormal	●	●	●	◑	L4 flash, 0.5s out 0.5s, L2 is always bright
cluster numbers are inconsistent within the clusters	●	●	●	◑	L4 flash, 0.5s out 0.5s, L1 is always bright
Cloud platform data transmission is abnormal	●	●	●	◑	L4 flash, 0.5s out 0.5s, L3 always bright, L2 always bright
BMS upgrade	◑	◑	◑	◑	L1, L2, L3, L1 at the same time; light 1s out 1s, cycle
Smart Link-Hub1000 upgrade	◑	◑	◑	◑	L1, L2, L3, L1 at the same time; light 0.5s out 0.5s, cycle

Remark: ● : Off
● : ON
◑ : Flicker

7 Operation

7.1 Please find the following cables connection for Soluna EOS-5K Pack/ Soluna 10K Pack LV under CANBUS.



1) Each cluster can be configured with up to 12 pcs Soluna EOS-5K Pack or Soluna 10K Pack LV.
2) It is recommended that each cluster use the same number of battery packs.
3) Smart Link can be configured with up to 10 clusters of batteries.
4) Please refer to the battery manual for battery DIP switch settings.

7.2 The following table lists the numbers of each item included. If anything is damaged or missing, please contact Soluna or your distributor.

Item	Name	Qty (pcs)	Remark
1	Smart Link-Hub1000	1	
2	antenna	2	
3	2P terminal	1	

7.3 After completing the connections of the battery,Smart Link-Hub1000 and inverter, start the following steps

1) Contact SOLUNA to obtain the ‘host computer ‘ PC software and ’CAN tool’. Please find the following picture 1 for details.

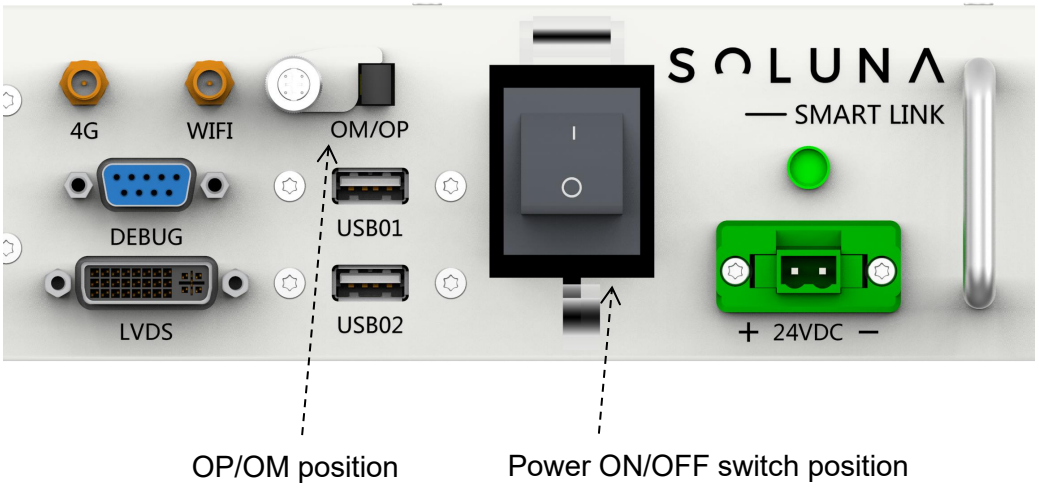
Picture 1

Host computer PC software	CAN tool
	

2）Move the dial switch from OP to OM to make sure the Smart Link-Hub1000 into manual mode, Please find the following picture 2 for details.

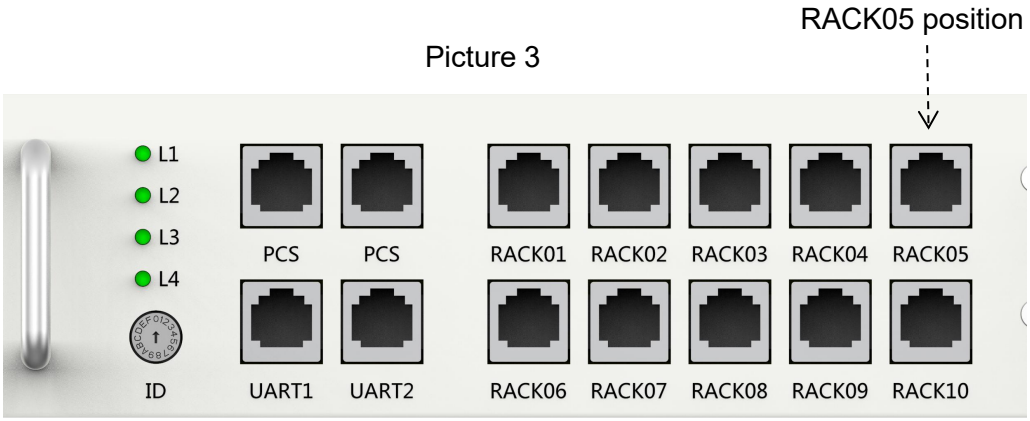
3）Press the Power ON/OFF Switch,Please find the following picture 2 for details.

Picture 2



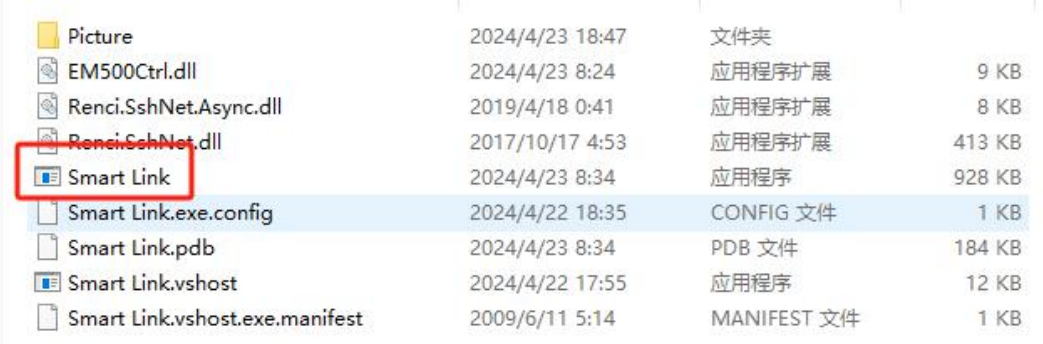
3）Connect the CAN Tool into the RACK01 port of the Smart Link-Hub1000, and connect the communication lines of a cluster of batteries to the RACK05. Please find the following picture 3 for details.

Picture 3

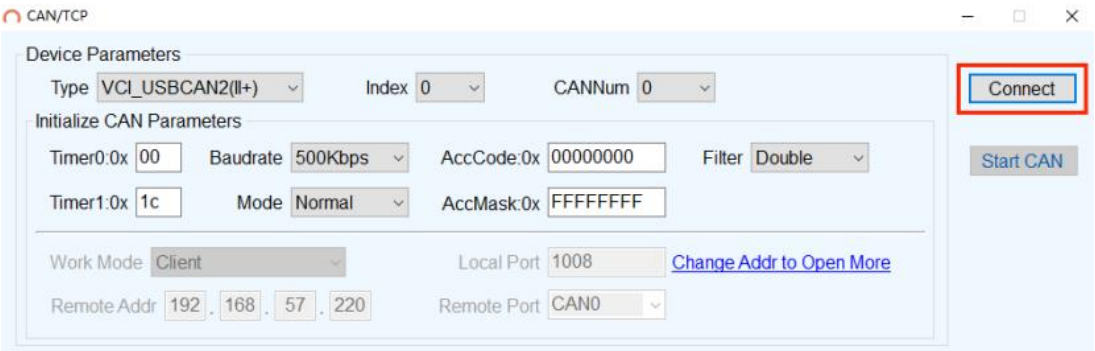


4）Open the Smart Link-Hub1000 'host computer' PC software,the user will can find the' Smart Link ' software, Please find the picture 4 for details. Open this file, after setting the parameters as shown below, click connect, log in to the host computer, and perform subsequent operations,please find the picture 5 for details.

Picture 4



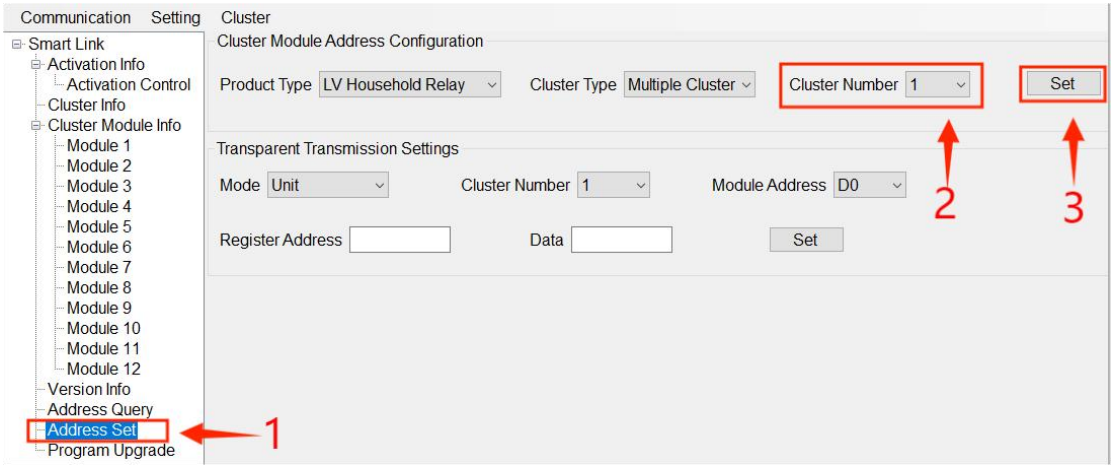
Picture 5



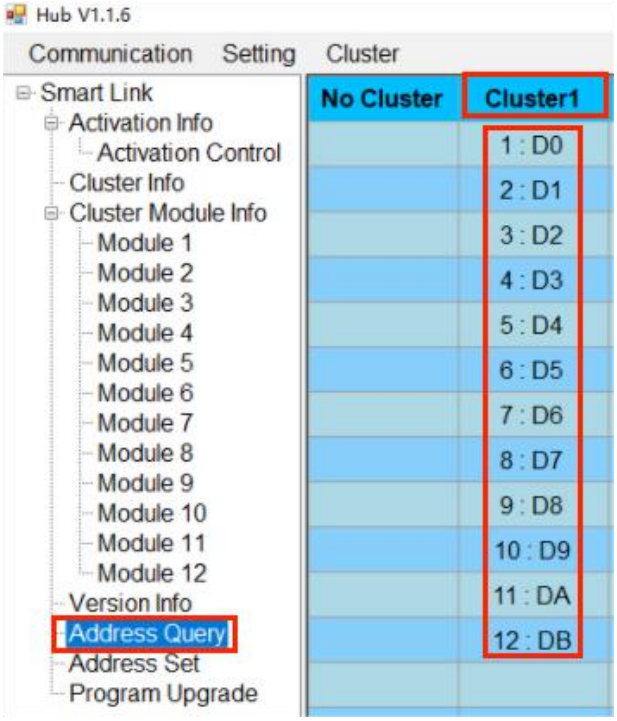
5）Assign battery cluster number. the battery cluster number needs to be configured separately. during the configuration process, turn on all the batteries in a cluster individually, and use the 'host computer' Address Set to set the cluster number.

First, set it to cluster 1, and then check the first cluster number to make sure all the batteries in this cluster are normal. when all 12 pcs batteries addresses are displayed, it means that the cluster number is assigned successfully. the figure shows the content after the assignment is successful.please find the picture 6 and 7 for details.

Picture 6



Picture 7



6）Turn off the switches of the 12 batteries that have been successfully assigned cluster numbers. and open the 12 batteries in the next cluster, repeat step (5) on the host computer, but the cluster number should be set to cluster 2, and check whether all the batteries in the second cluster are normal in the host computer, and then repeat this process. Until the cluster numbers of all batteries are set.

6）After all cluster numbers are set, turn on all battery switches and perform reverse connection detection. click activation control on the host computer, then check control CMD switch, change the number of batteries in each cluster to 12, check D0 in the first column, then check D1, click control set, the first cluster is first The relays of the first and second batteries will be closed to verify that the positive and negative poles are not reversed. then cancel D1, check D2, click control set again, close the relay of the third battery in the first cluster, and if there is no abnormality, cancel D2 , check D3, and click control set.... Until all batteries have their relays closed in sequence, there is no problem with the first battery, which proves that all lines are not connected reversely，Please find the picture 8 for details.

Picture 8

5）After there are no problem with the cluster number, return the manual/automatic switch of the Smart Link-Hub1000 to the OP position, turn on all batteries, and turn on the inverter at the same time.

8）The power-on is completed, and the whole system is running normally.

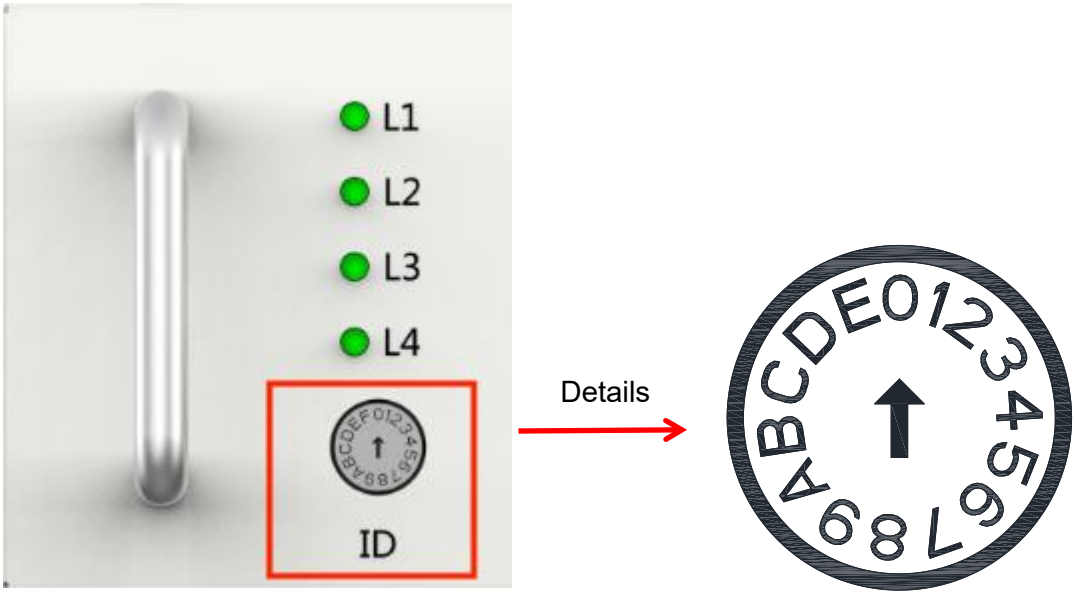
Remark：After the cluster address, cluster number and security detection are installed and configured for the first time, when the system is powered off and then powered on for the second time, if the battery installation has not been adjusted during the secondary installation, there is no need to configure the cluster number and cluster address again after powering on.

7.4 Battery power off

Turn off the Smart Link-Hub1000 Power ON/OFF switch first, Then turn off the Battery.

8 Protocol select

Rotate the dial switch as shown here.



When you use different inverters, you need to choose the inverter protocol, rotate the ID dial code, and make it correspond to the corresponding protocol, the protocol comparison table is as follows,Please find the table 2 for details.

Table 2

Dial switch position	Soluna LV Battery Protocol	Soluna HV Battery Protocol	Remark
0	Soluna	Soluna	
1	Victron	Soluna default	
2	(reserved)	(reserved)	
3	(reserved)	(reserved)	
4	(reserved)	(reserved)	
5	(reserved)	(reserved)	
6	(reserved)	(reserved)	
7	(reserved)	(reserved)	
8	(reserved)	(reserved)	

9	(reserved)	(reserved)	
A	(reserved)	(reserved)	
B	(reserved)	(reserved)	
C	(reserved)	(reserved)	
D	(reserved)	(reserved)	
E	(reserved)	(reserved)	
F	(reserved)	(reserved)	

Remark：about Smart-Link, we still have many unfinished features, such as cloud platform monitoring, 4G transmission, Wi-Fi connection, etc. If you want to know more about these features, please contact Soluna, and we will give you more detailed content about these features in the first time.

9 Trouble shooting guideline

Please find the following table for details.

Trouble	Possible root cause	How to target the root cause	Solution
The battery cannot be charged and discharged	Battery hardware fault.	Please change another inverter to try.	Contact with inverter manufacture.
	Communication cable is loose or not correct.	Please check the communication cable status.	Replug or change the communication cable.
	Battery firmware is not the latest reversion.	Please check the Soluna smart energy cloud for firmware reversion.	Update battery's firmware.
	Battery reach to 3rd level alarm such as battery over voltage.	1）Please check the inverter LCD/LED or APP for the battery alarm information. 2）Please check the Soluna smart energy cloud for battery alarm information.	Battery will shut down, please contact with Soluna for further action.
The battery has no communication	The inverter protocol selection is an error on Smart Link-Hub1000	ID dial code location error	Retrieve the ID number of the correct protocol and adjust the dialing position
Smart Link-Hub1000 does not start	Whether the power supply voltage is suitable for the Smart Link-Hub1000	Check that the power supply specification is within the specified voltage range	Replace the special Smart Link-Hub1000 power supply adapter
	The Smart Link-Hub1000 internal hardware problSmart Link-Hub1000	/	Please contact the local Soluna Technical after-sale service

10 Contact us

We hope that this manual has clearly demonstrated the product. If you still have any doubts or something not clear about it in the specifications, feel free contact to us please. we will do our best to support you!

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