1. About the solution

In a storage system where multiple hybrid inverter ETs are connected to the grid in parallel, SEC1000 takes the role of energy controller in the system. Data of each ET in the system are collected by SEC1000, Operation mode and output power of each ET are under control of SEC1000. Within the power limit, batteries in the system can reach fully-charged status or discharge to the SOC protective points respectively almost simultaneously. There is no much difference in SOC status or charging/discharging status of any battery in the system if their SOC protective points are set at proper values.

2. System diagram and connection

2.1 Special instruction on wiring of paralleling system

Please refer to "Electrical Wiring & Connection" section in ET User Manual for installation and wiring of single ET first (for connection to grid and RS485, please use instruction in this document).

Please refer to sections 3.1, 3.2.1, 3.2.2, 3.3.2 in SEC1000 User Manual for installation of SEC1000 and refer to section 3.3.5 in SEC1000 User Manual for configuration once installation steps complete.

Note: No separate Smart Meter is required in ET paralleling system along with SEC1000 (for hybrid only) deployed. This solution is only applicable to the paralleling of on-grid side not to back-up side. There are special requirements on the version of firmware of ET applied in this solution, with DSP version 01 or newer and ARM version 09 or newer. The firmware version of SEC1000 designated for ET paralleling application should be 01 or newer.

It is allowed to connect maximum 10 pieces of ETs in parallel in the same system. When there are more than 3 pieces of ETs in the paralleling system, only communication connection is different from that of paralleling system with no more than 3 pieces of ETs.

Moreover, ratio of CTs used in ET paralleling system should be determined by actual application scenario. The current range of CTs should be determined by the maximum capacity of loads connected in the system or by system capacity when the total capacity of loads is lower than system capacity. Please refer to CT instruction on how to use and connect CT.

When ET is used in paralleling application, the original Meter & EMS cover should be taken out and replaced by new cover with splitter attached. You may find the new cover in the accessory box of SEC1000 (for hybrid only).

Step.1 take out new Meter & EMS cover (with splitter attached) from the accessory box of SEC1000

Step.2 remove the original Meter & EMS cover from ET

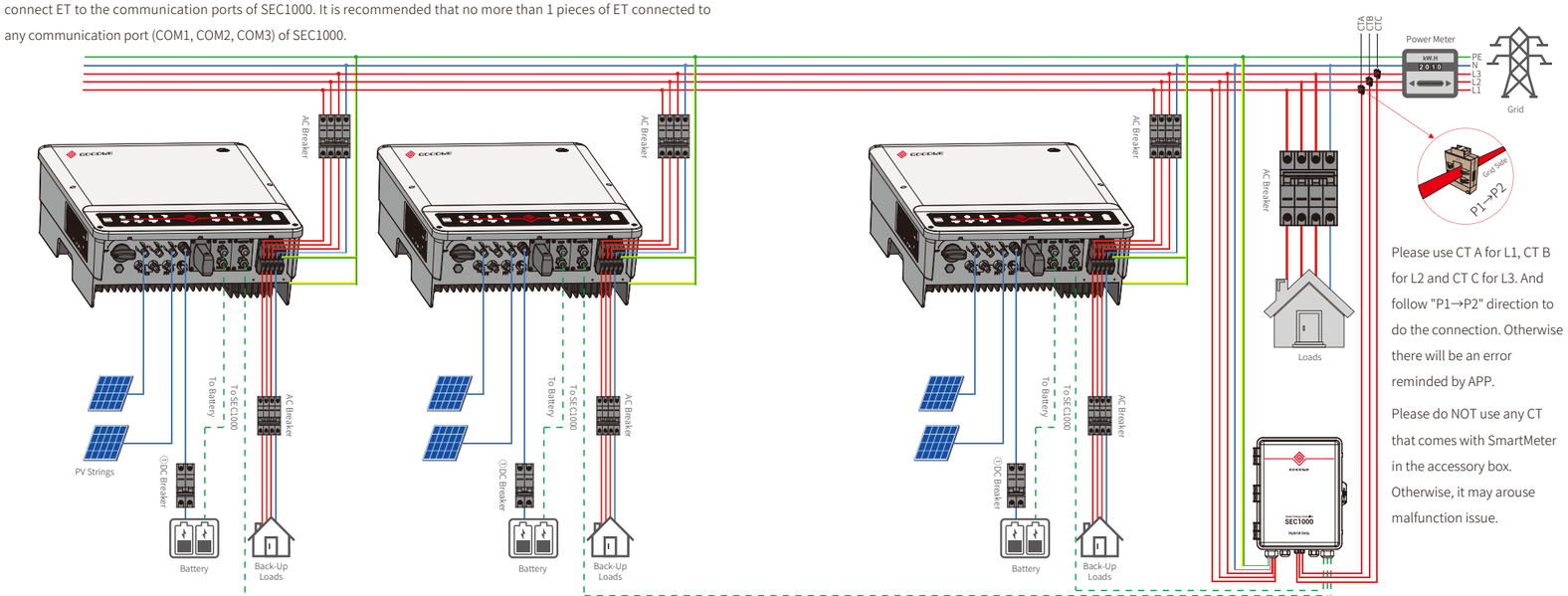
Step.3 connect the cable of new Meter & EMS cover to the RJ45 port of ET

Step.4 tighten the cover to ET with screws

Note: If you want to use the original Meter cable as communication cable, please cut the external end from the RJ45 connector, then take out the original cover and re-inject wires into an RJ45 connector as per standard network cable.

2.2 Instruction on paralleling system composition

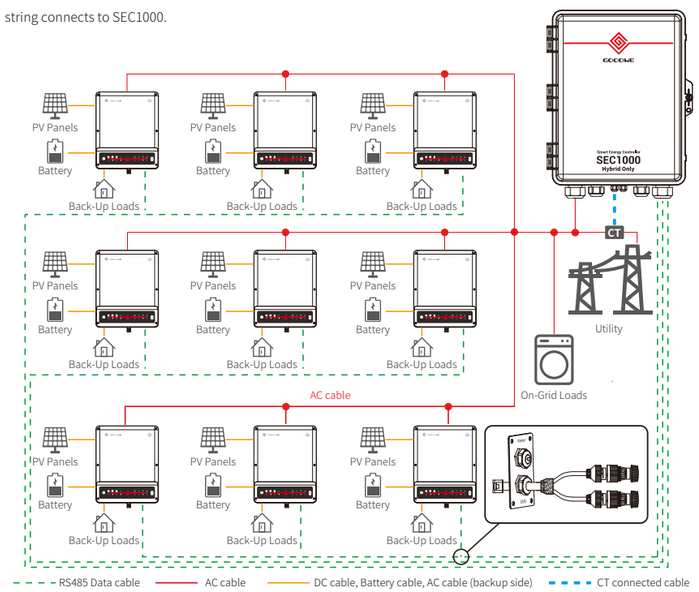
When there are no more than 3 pieces of ETs connected to the grid, connection of PV, battery, On-Grid & Back-Up for individual ET in the system is same with single ET. You may refer to "Electrical Wiring & Connection" section in ET User Manual for detailed instruction. However, a new cover with splitter, which comes along with SEC1000 (for hybrid only), should replace the original EMS & Meter cover attached on ET. Communication cables should go through EMS ports and connect ET to the communication ports of SEC1000. It is recommended that no more than 1 pieces of ET connected to any communication port (COM1, COM2, COM3) of SEC1000.



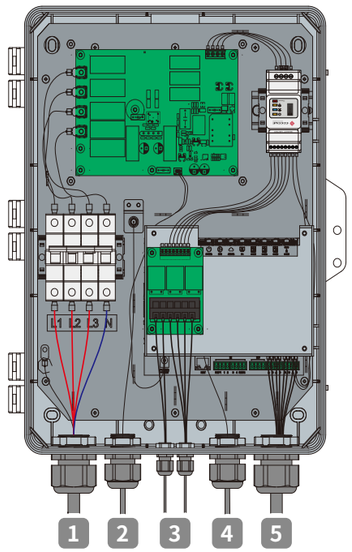
Please use CT A for L1, CT B for L2 and CT C for L3. And follow "P1→P2" direction to do the connection. Otherwise there will be an error reminded by APP.

Please do NOT use any CT that comes with SmartMeter in the accessory box. Otherwise, it may arouse malfunction issue.

When there are more than 3 pieces of ETs in the paralleling system, connection of PV, battery, on-grid & backup for individual ET in the system is same with single ET. You may refer to "Electrical wiring & Connection" section in ET User Manual for detailed instruction. However, a new cover with splitter, which comes along with SEC1000 (for hybrid only), should replace the original EMS & Meter cover attached on ET. Communication cables should go through EMS ports and connect ET to the communication ports of SEC1000. Since more than 1 pieces of ET may connect to the same communication port of SEC1000, the amount of ETs to each communication port (COM1, COM2, COM3) should be even in order to improve communication performance and speed. Multiple ETs communicate in series and the last ET in the string connects to SEC1000.



2.3 Port description & connection instruction



1

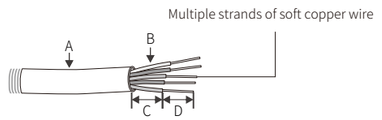
Voltage Input Port(L1\L2\L3\(N)\PE)

L1 L2 L3 N

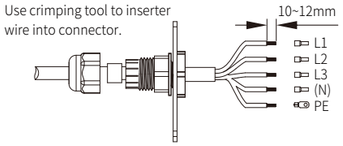
Input phase voltage range: AC60V-AC280V

Input line voltage range: AC100V-AC480V

AC Frequency: 50/60Hz



Use crimping tool to inserter wire into connector.



No.	Description	Content
A	Wire Diameter	No more than 25 mm
B	Cross Sectional Area of Copper Wire	Recommend:2.5-4mm²
C	Wire Length	About 45 mm
D	Length of Bare Copper Wire	About 12mm(10mm for PE)

2

GPRS Antenna Output Port

Antenna port is reserved for connection of SEC1000 (GPRS version).

3

Current Input Port

(three sets of CT: A&B&C) Connect three sets of external CT to the connector at the position shown in figure 3-1 （A+A-\B+B-\C+C-). The input current of each CT input must be lower than 5A .

Note: Correction method for misconnecting each CT.

Please follow below instruction to rectify if the polarities of CT are reversed. Take an example that B+ and B- are reversely connected, please do correction as illustrated in Figure 3-2 to Figure 3-5.

Figure3-1

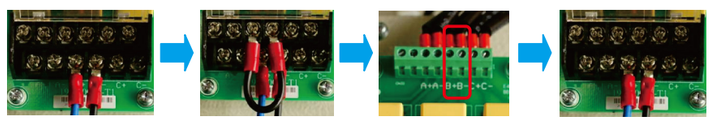


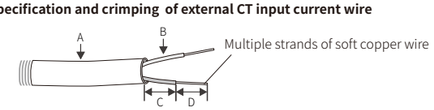
Figure3-2
(B+ and B- are reversed)

Figure3-3
(Connect the corresponding position with a short wire)

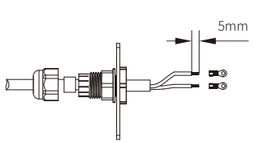
Figure3-4
(Switch the corresponding output terminal)

Figure3-5
(Remove the short wire)

Specification and crimping of external CT input current wire



No.	Description	Content
A	Wire Diameter	No longer than 6 mm
B	Cross Sectional Area of Copper Wire	0.75-2.0 mm²(recommended)
C	Wire Length	45mm(more or less)
D	Length of Bare Copper Wire	5mm(more or less)



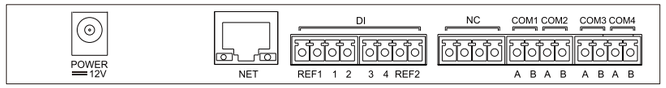
Use wire crimper to press

CT cable is 3m as default ,could be extended to max 5m.

Please do not leave CT in open circuit status, otherwise it may cause damage or danger. You have to make sure other parts of CT is well connected before you connect it to the grid.

4

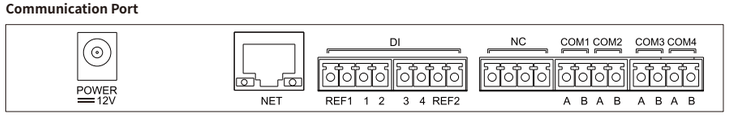
LAN Network port



LAN SEC1000 uses this port when accessing a network cable; The access point is as shown in the "NET" position in the figure above.

5

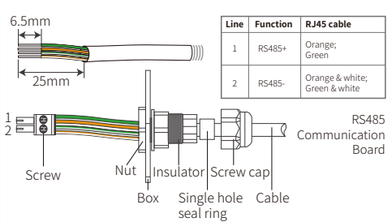
Communication Port



The description of bottom label inside SEC1000 is as follows

Wire specification and installation: It is recommended to use shielded twisted pair cables with conductor area 1mm2 for RS485 communication cables.

No.	Port	Description
1	POWER	DC Power Input (Occupied)
2	NET	Ethernet Interface
3	DI	DRED or RCR functional interface
4	NC	reserve
5	COM1	485 interface1 with Inverter
6	COM2	485 interface2 with Inverter
7	COM3	485 interface3 with Inverter
8	COM4	485 interface4 with SEC1000 internal Meter(Occupied)



Line	Function	RJ45 cable
1	RS485+	Orange; Green
2	RS485-	Orange & white; Green & white

It is recommended to use Cat5E data cables. After wiring, use the fire-proof mud to seal the port, to ensure its protective performance.

3. Configuration

3.1 Promate configuration for ET paralleling application (SEC1000)

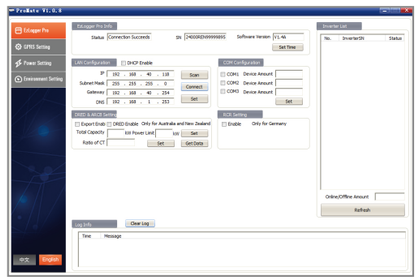
In application of multiple inverters connected to the grid, with SEC1000 it is able to have such functions as control of paralleling storage system (2.2 Instruction on paralleling system composition) and export power limit. SEC1000 will have the functions of Reactive Power Compensation,Active Power Regulation and Backflow prevention, etc.

You may do configuration and debugging based on the corresponding parameters of inverter on Promate, which is a GoodWe software designed for function configuration of Ezlogger Pro and SEC1000, such as IP address modification, port to inverter connection configuration, time setting, RCR setting, DRED setting and onsite debugging.

This software is available on GoodWe website http://www.goodwe-power.com/files/ProMate.rar. You should download ProMate and install it on your computer before you do any configuration regarding to Ezlogger Pro or SEC1000. Based on user's network connection situation, please do configuration for SEC1000 according to dynamic IP (DHCP) or static IP mode.

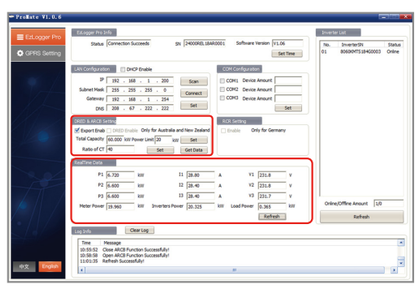
1. In dynamic IP mode, please connect SEC1000 NET port to router LAN port with standard network cable. No more configuration is required.
2. In static IP mode, please change SEC1000 into static IP mode (default static IP address: 192.168.1.200) first by pressing RELOAD button for 10 seconds when the LED lights (from right to left) of EzLogger Pro board in SEC1000 blink in sequence. Then connect SEC1000 NET port to computer directly through standard network cable and change IP address of computer into an address within the network segment range of default gateway which should be 192.168.1.XXX (1≤ XXX ≤250 and XXX≠ 200). For example, you may set the static IP address of computer as 192.168.1.100 and the default gateway address 192.168.1.254.

ProMate Configuration Page



On "COM Configuration" part, you should enter the number of ET connected to each communication port of SEC1000. For example, you should enter "3" if there are 3 pieces of ETs communicate to COM1, enter "2" if there are 2 pieces of ETs communicate to COM2.

SEC1000 Commissionings



On "DRED & ARCB Setting" part, enter total capacity of the paralleling system and ratio of CT (external) and power limit into grid.

Note: the above steps are mandatory to set up the whole system.

Please check the option "Export Enable" if you want to apply export power limit function in your system. With this function enabled, you can monitor real-time data of grid connection such as output active power, output current, and output voltage.

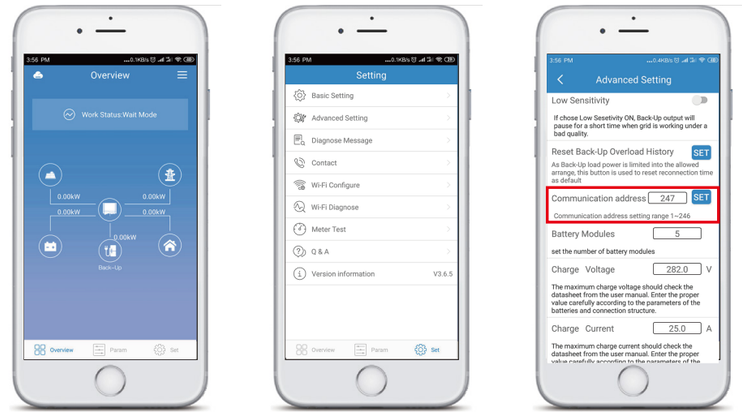
Specification of CT recommended to use in paralleling application.

GoodWe provides the following specification of CT which is based on the external current range, for reference only.

No	Range of current tested	Content	Remark
1	Imax<250A	CT 200A Acrel/AKH-0.66(200A/5A)	CT,closed type (Hole size31mm*11mm,Φ22mm)
		CT 250A/5A Acrel/AKH-0.66-K-30x20-250/5	CT,open type(Opening size:32mm*22mm),accuracy 0.5%
		CT 250A/5A Acrel/AKH-0.66-K-60x40-250/5	CT,open type(Opening size:62mm*42mm),accuracy 1.0%
2	250A≤Imax<1000A	CT 1000A/5A Acrel/AKH-0.66-K-60x40-1000/5	CT,open type(Opening size:62mm*42mm),accuracy 0.5%
		CT 1000A/5A Acrel/AKH-0.66-K-80x40-1000/5	CT,open type(Opening size:82mm*42mm),accuracy 0.5%
		CT 1000A/5A Acrel/AKH-0.66-K-80x80-1000/5	CT,open type(Opening size:82mm*82mm),accuracy 0.5%
3	1000A≤Imax<5000A	CT 5000A/5A Acrel/AKH-0.66-K-140x60-5000/5	CT,open type(Opening size:142mm*62mm),accuracy 0.2%
		CT 5000A/5A Acrel/AKH-0.66-K-160x80-5000/5	CT,open type(Opening size:162mm*82mm),accuracy 0.2%

Note: the maximum current may differ due to different system AC output current and the load consumption current. Please use the higher value from the two to select proper CT.

3.2 PV Master configuration for paralleling application (inverter)



You should set communication address for every ET in the paralleling system, and the address should be different from each other. For example, you may set the address for ea ch ET from 1 to 10 if there are 10 ETs in the paralleling system. The ID of inverter connected to the communication port should not be duplicate. To monitoring the whole system, all ETs should be registered under the same power plant on GoodWe monitoring platform SEMS Portal.

PV Master APP

SEMS Portal APP

SEMS Portal website
www.semsportal.com

LinkedIn

Company's offical website

340-00332-01