# "Q at Night" Function Introduction GoodWe 1500V HT Series

**(SA-B-20220106-001)**

## 1. Importance of Reactive Power Supply in Utility PV Project

With the increasing amount of utility PV power plants connected to the grid, the demand of high reactive power at the grid connected points is also growing rapidly, and here are the general reasons:

1) As the internal reason, reactive power is required by transformers and corresponding cabling during the operation of the utility PV project, which will affect the power factor if the reactive demand is only supplied by the grid.

2) As the external reason, the large utility PV project deployed has the role of supporting the grid in the power transmission and regional grid stability, by generating sufficient reactive power.

## 2. Importance of "Q at Night" Function

Compared with the traditional reactive power compensation equipment SVC, the grid-tied string inverter utilizing PWM topology can supply the reactive power to the grid with less harmonics. However, the reactive power generated by the inverters in the day time cannot meet the demand from the reactive power consumption equipment in the night. Also, the grid operator requires the utility PV project to be able to supply reactive power through AVC which is standby for 24 hours, and the inverters installed in decentralized PV array need to respond to the reactive power compensation command received within the required time.

## 3. GoodWe "Q at Night" Function

GoodWe HT 1500V series inverter uses reactive current vector control to achieve the phase difference between the inverter's output voltage and the grid voltage to achieve the required reactive power compensation. As the PF of the inverter ranges from -0.8~+0.8, the reactive power output capability of GW250K-HT ranges from **-150kVar to +150kVar**, which also is applicable for "Q at Night" function.
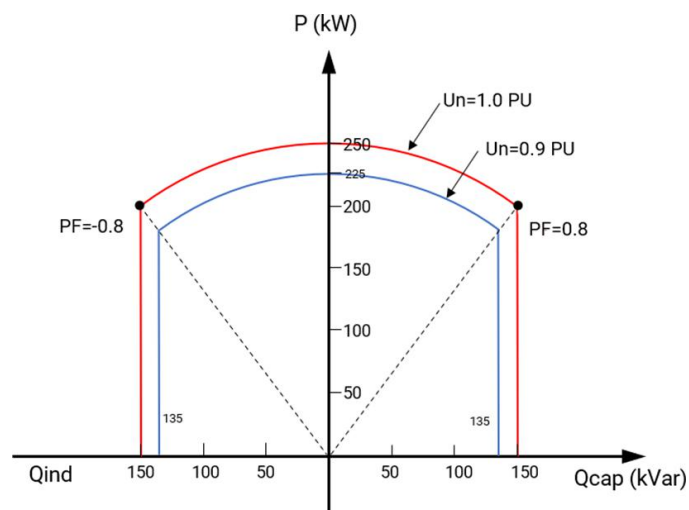


*Figure 1. PQ Curve of GoodWe 250K-HT*

During the day time, as the DC power comes into the inverter, the reactive power generated by the inverter as the current source. When the DC power is absent in the night, the module of "Q at Night" function can monitor and respond to the reactive power compensation command using the electrical components parallelly connected to the grid.

# "Q at Night" Function Introduction
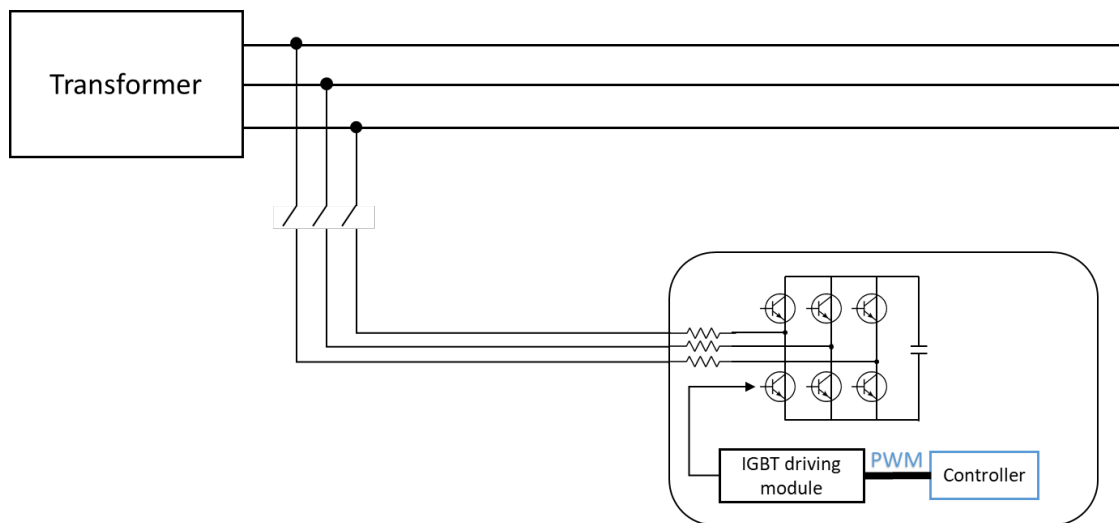# GoodWe 1500V HT Series

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*Figure 2. Functional parts of the inverter of Q at Night function*

DSP as CPU has advanced logic control arithmetic, could fast respond to the reactive power output command delivered from background system and calculates the reactive power rapidly and accurately, then sends PWM signal to IGBT's driver board to control IGBT on and off at certain frequency. Finally inductive or capacitive power compensation current is generated on inverter induction.

**To enable the reactive power output in the night in the utility PV project:**

1. **The communication between the SCADA system and the sub-array communication box SCB3000 should be IEC104,**
2. **Switch the communication protocol of all the inverters connected to SCB3000 to Modbus RTU using Promate, or switch each inverter's communication protocol using the App SolarGO or on the screen.**
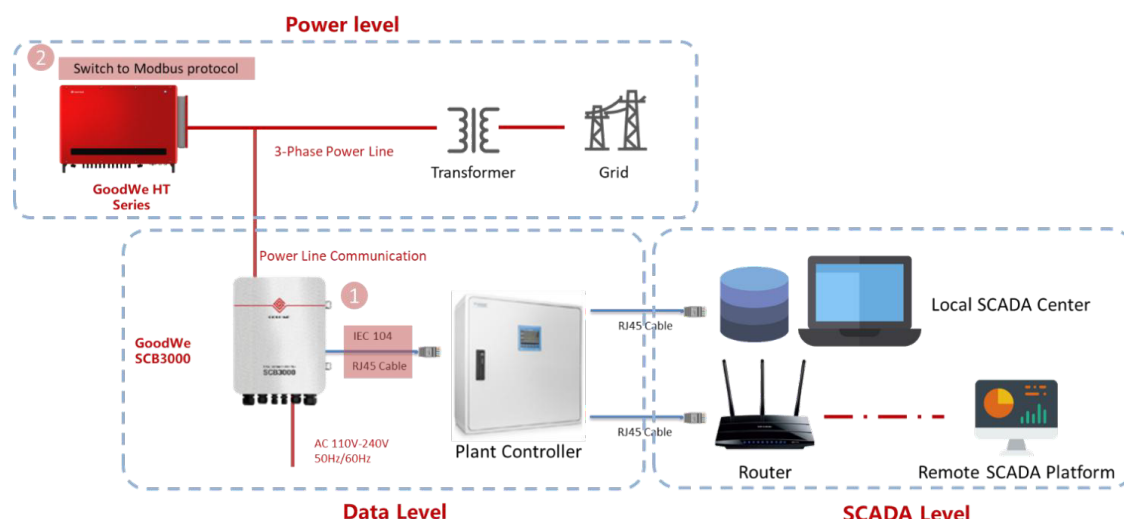


*Figure 3. SCADA System Communication Diagram*

## 1.Configure the communication settings of SCB3000 using Promate:

-- Discover the inverters connected in the system

1) Connect the laptop's LAN port to SCB3000's LAN port;
2) Revise the IP address of laptop to "192.168.1.XXX"(1 ≤ XXX ≤ 254 and XXX ≠200);
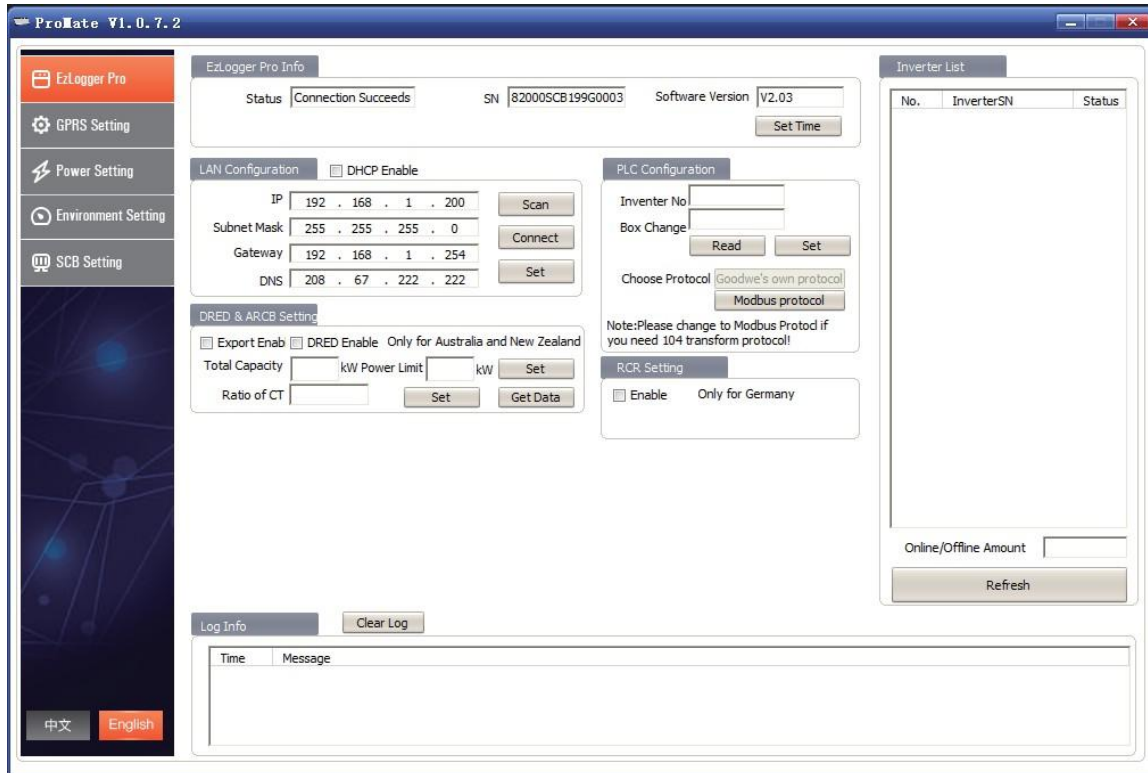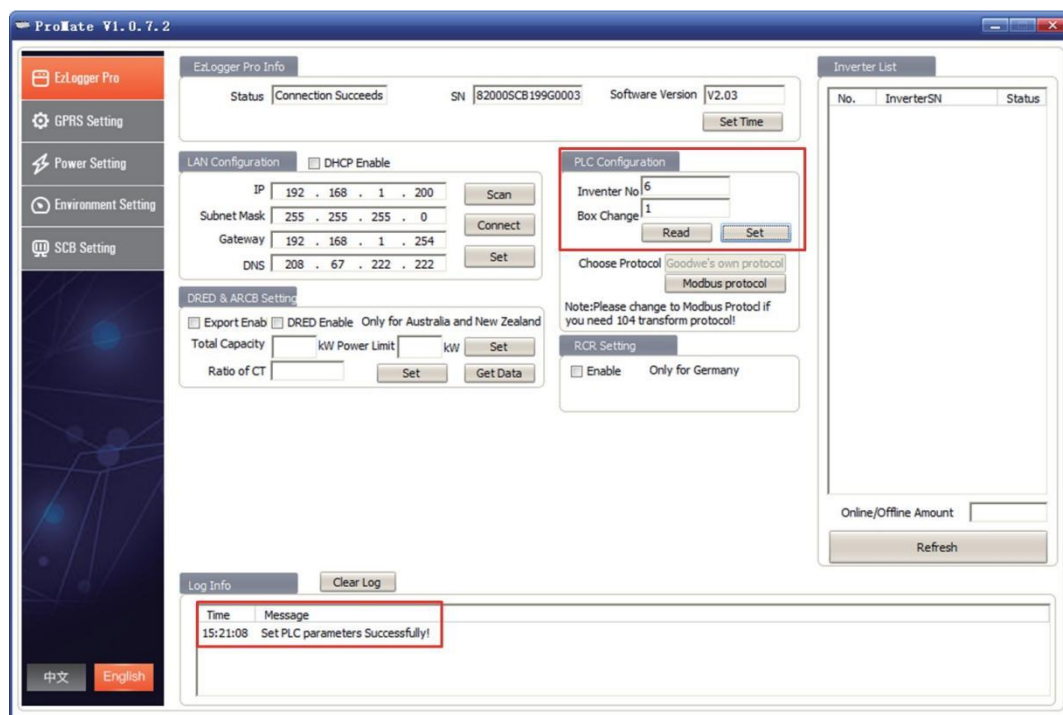
3) Run ProMate



*Figure 4.  ProMate Home Page*

4) At EzLogger Pro setting page, enter the transformer No. (connected with this SCB3000) in the blank of Box Change and in Inverter No, enter the number of inverters that are connected to this transformer. Then click Set. It would say "Set PLC parameters Successfully!" when parameters are set correctly.

*Figure 5. ProMate Home Page – PLC Configuration*

5) Click Read. The SN and status of inverters connected to the transformer are presented at Inverter List. Moreover, the number of online/offline inverters is displayed at the bottom.
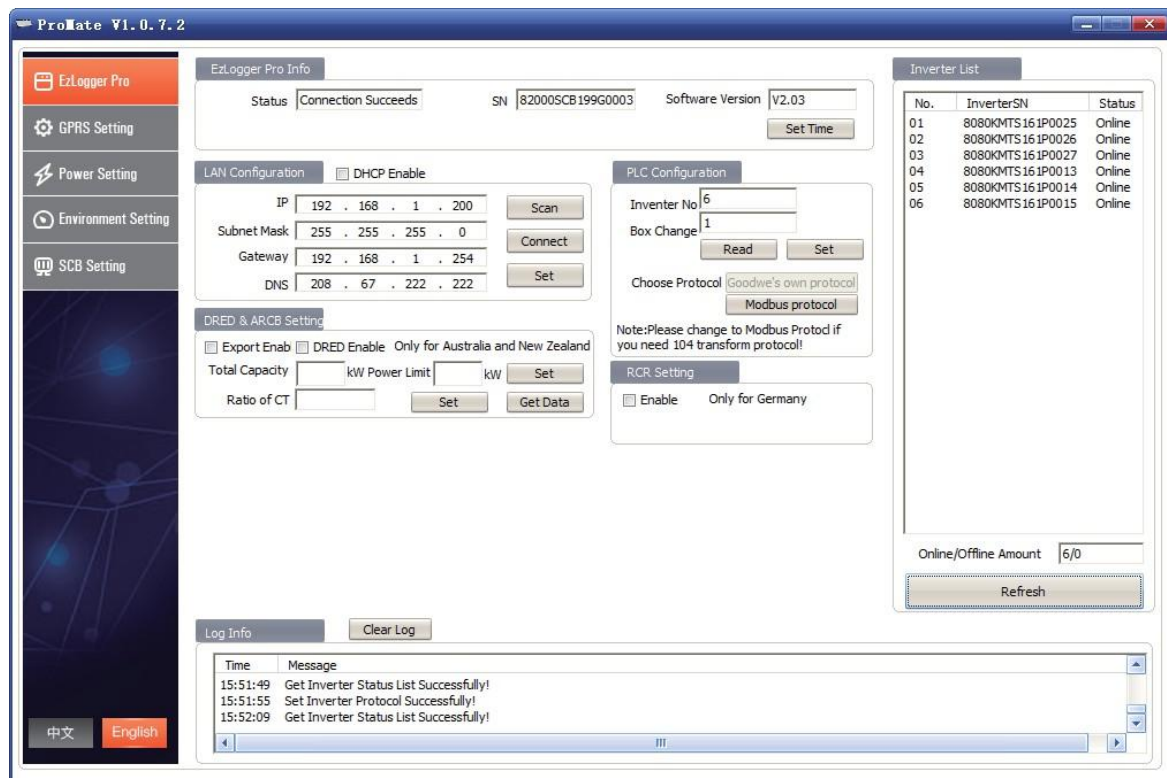


*Figure 6. ProMate Home Page – Inverter List*

---Set Modbus address for inverter

1) At SCB Setting page, click Get to read information of inverters including SN, Box (transformer) No, address and ARM version (of PLC). Crosscheck the information. Then click One key config to assign Modbus addresses to all inverters.
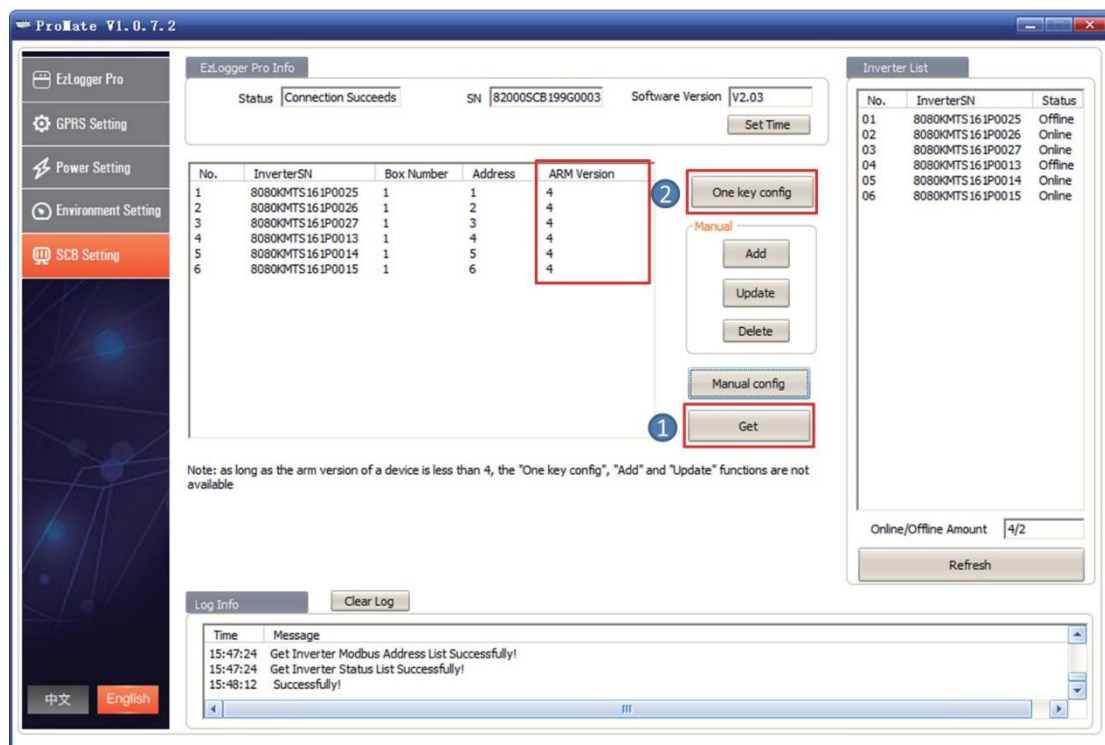
*Figure 7. ProMate Home Page – Set Modbus Address*

2) To set Modbus address of inverter one by one, select one inverter in the list and then click Update. In the pop-up window modify Modbus address and click OK. To confirm this step, click Manual config
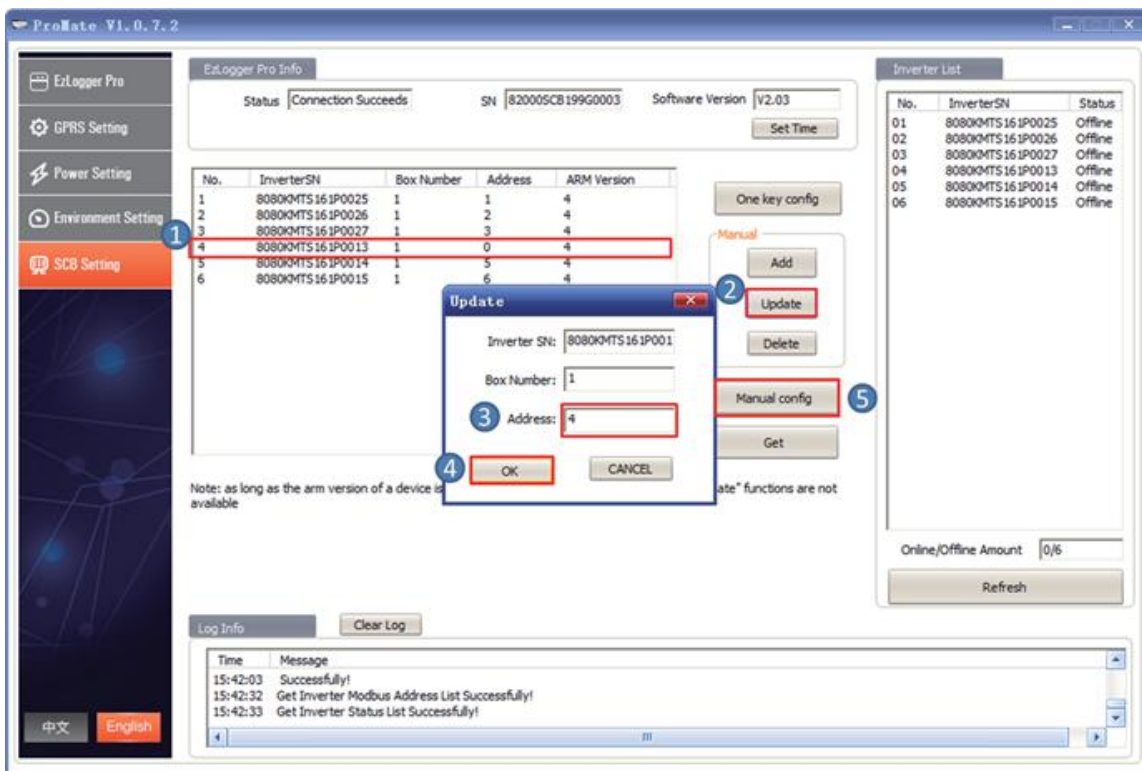


*Figure 8. ProMate Home Page –Set Modbus Address*

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---Switch the protocol of SCB3000

1) Return to EzLogger Pro setting page. Click Modbus protocol at PLC Configuration section to change the communication protocol between inverters and SCB3000 into Modbus RTU protocol and then click OK in the pop-up window to confirm.
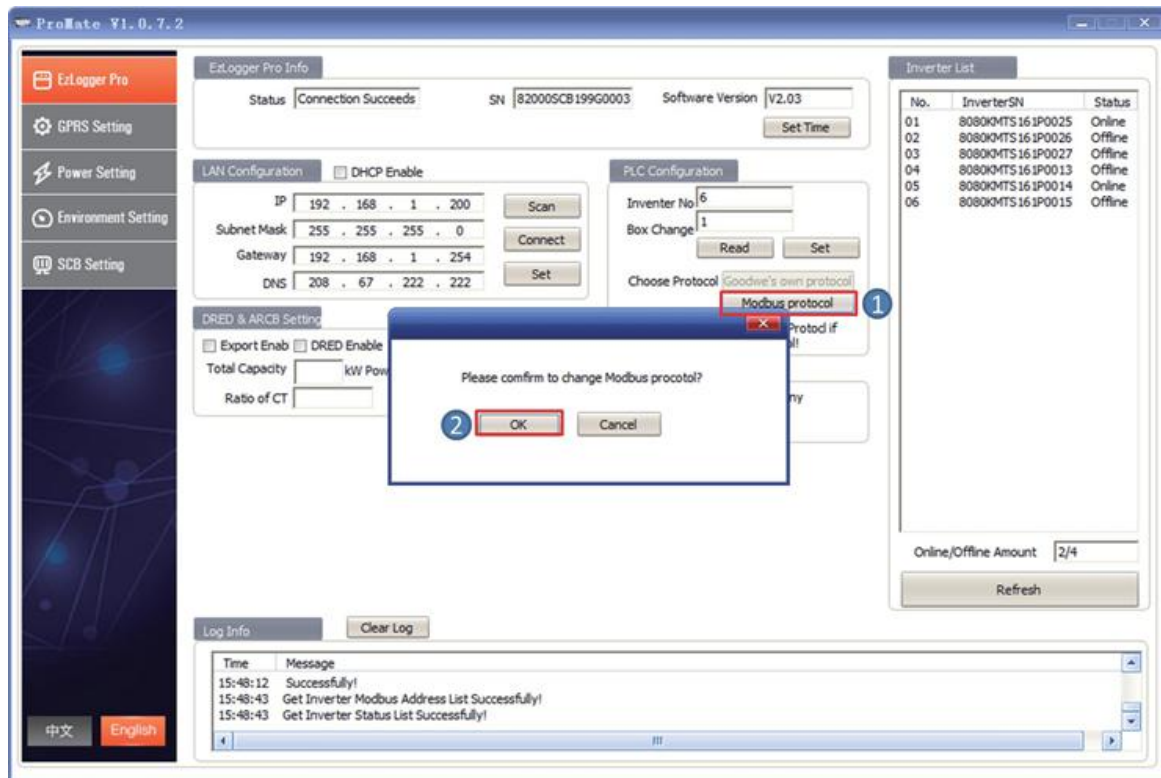


*Figure 9. ProMate Home Page – Change Modbus Protocol*

2) Wait for a few minutes as SCB3000 will reboot, and then it is ready to connect to SCADA system.

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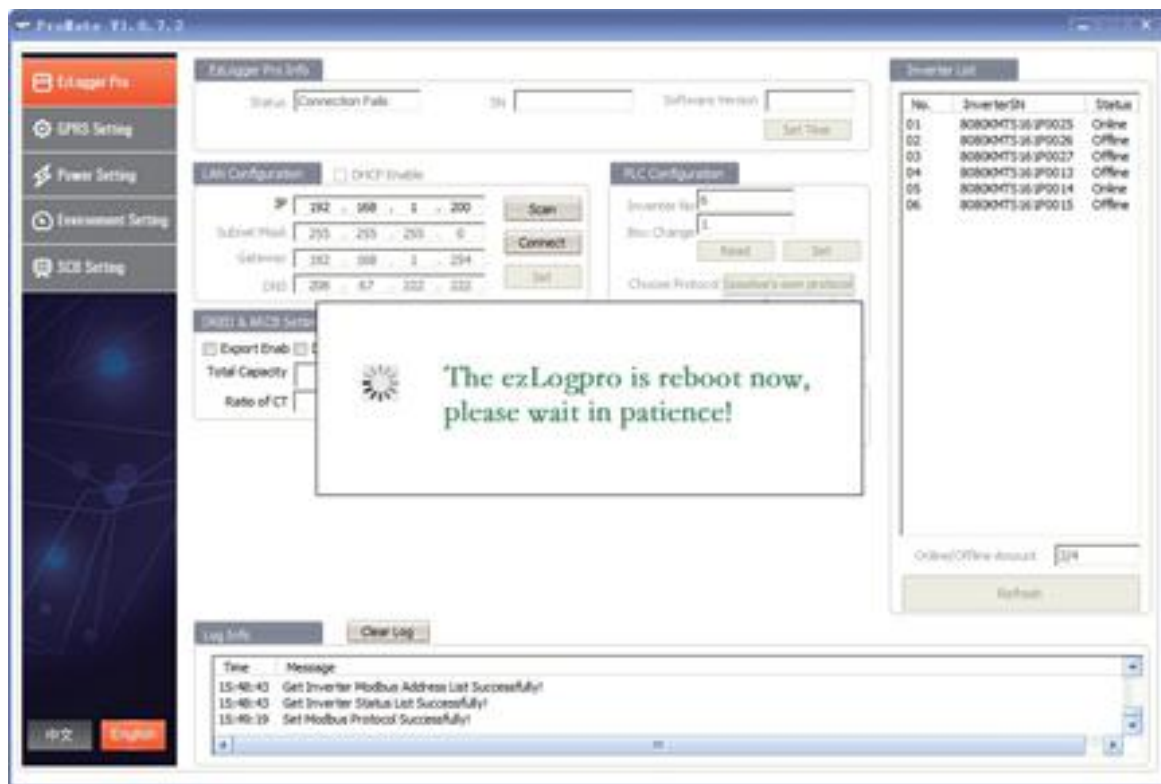# GoodWe 1500V HT Series

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*Figure 10. Reboot of SCB3000 to switch to Modbus communication*

## 2. Available methods of setting Modbus address of the inverter

### --For setting the Modbus address on LCD screen (for screen version):

Configure the Modbus address under "Set Modbus address" in the main menu on the LCD of the inverter.
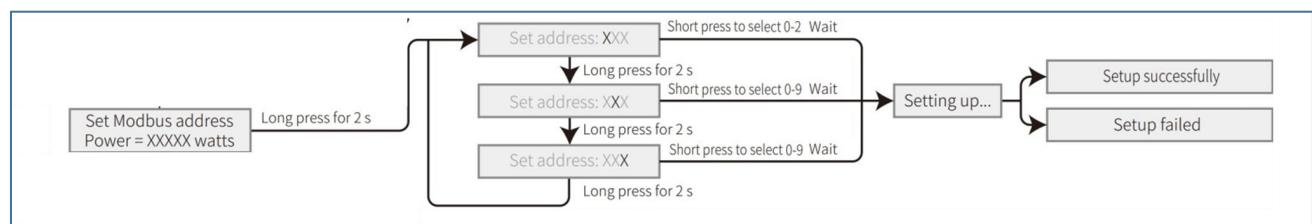


*Figure 11. Primary and secondary menus for Modbus address settings on the LCD of the inverter*

### --For setting the Modbus address using SolarGo:

To configure the inverter's Modbus address, GoodWe Bluetooth communication module need to be installed on the inverter. Detailed information could be found in the User Manual of the HT series.

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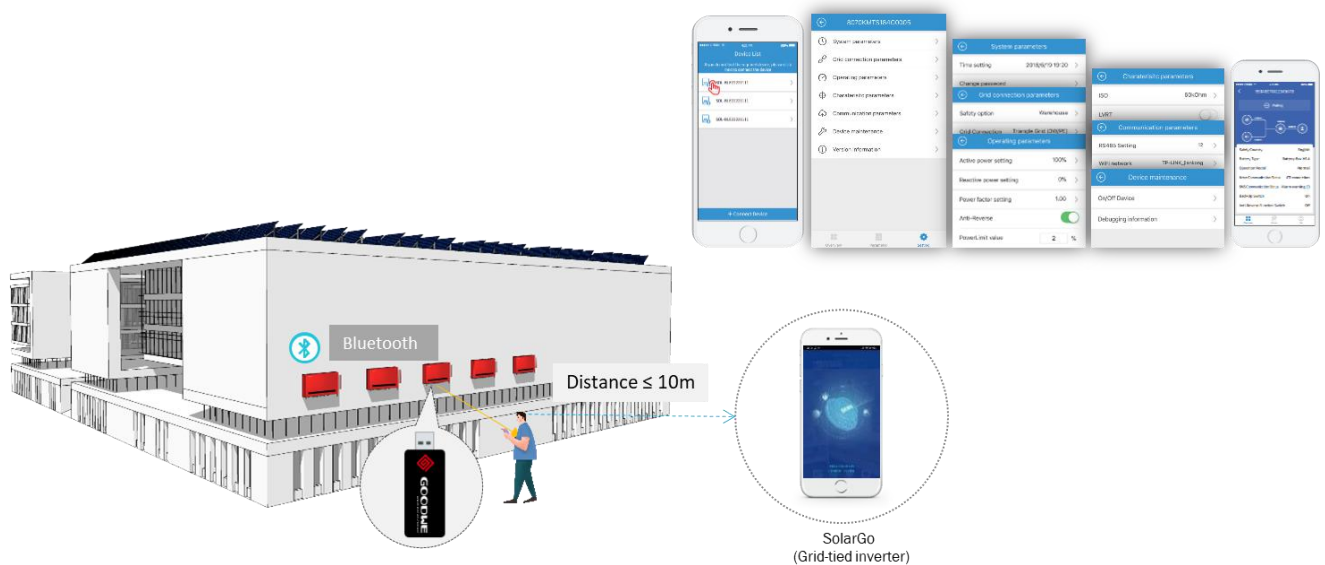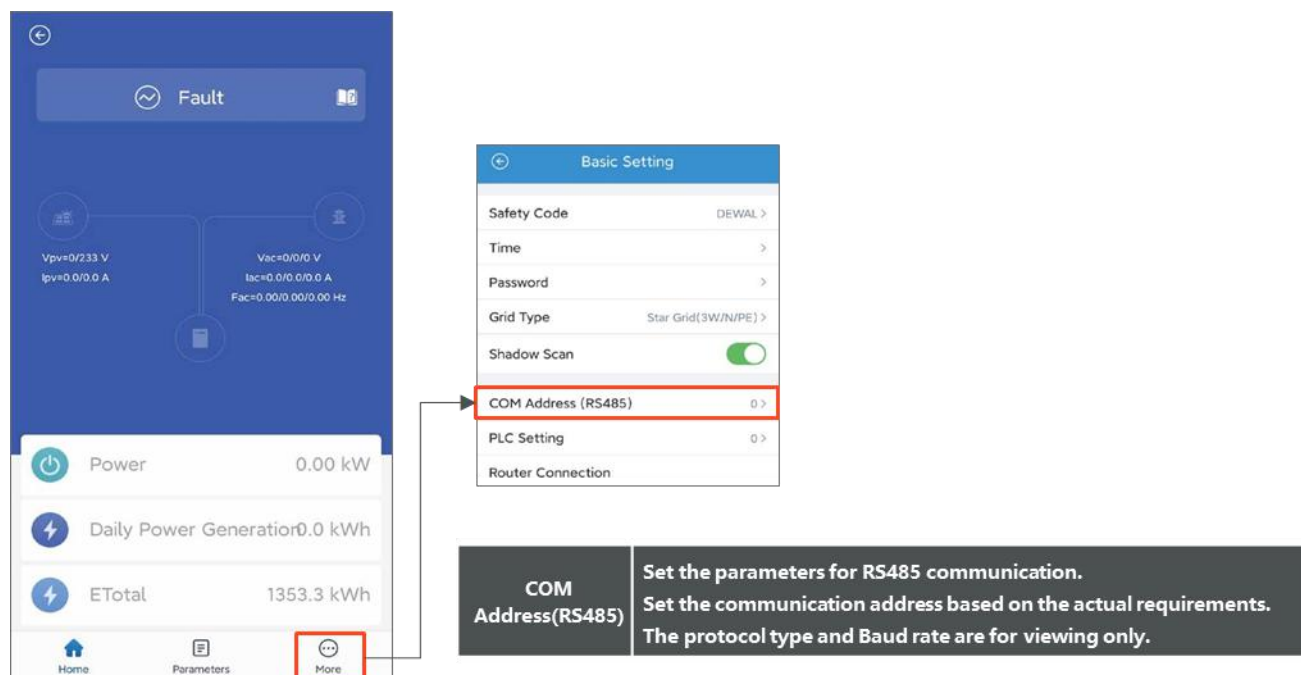# GoodWe 1500V HT Series

*Figure 12. Diagram of Blue Communication of HT series.*

After installation of the communication module, run the SolarGo and configure the Modbus address of the inverter in "Basic Settings" as shown in the picture



## 3. Activation of "Q at Night" function

1) If SCB3000 is used in the subarray (under IEC-104 protocol), send the reactive power output command based on GoodWe IEC-104 Point List;

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2)  If 3<sup>rd</sup> party controller is used in the subarray (under Modbus RTU protocol), send the reactive power output command based on GoodWe official HT series Modbus Protocol.

To access the protocol documents above from GoodWe, please contact your sales window.

**Resource Reference:**

1.  Software Promate Download Link: https://en.goodwe.com/downloads.asp

**GW_SCB3000 PROMATE_V2.0.0** — Download

2.  SCB3000 User Manual Download Link: https://en.goodwe.com/downloads.asp

**GW_SCB3000_USER MANUAL-EN** V1.1 — View | Download

3.  GoodWe HT Series User Manual Download Link: https://en.goodwe.com/downloads.asp

**GW_HT 1500V_USER MANUAL-EN** V2.0 — View | Download

4.  SolarGo App User Manual Download Link: https://en.goodwe.com/downloads.asp

**GW_SOLARGO_USER MANUAL-EN** V1.0 — View | Download

5.  For IEC-104 Protocol and GoodWe HT Modbus RTU Protocol, please contact the sales window to access.