T-BOX/ iT-BOX

Installation & Communication Instruction

CONTENT

1. Introduction

T-BOX/iT-BOX is in the service of data management of battery system, compatible with various brands of inverters. This document provides the product introduction, installation and commissioning information for installer.
iT-BOX has a higher level of management. Through communicating with T-BOXs and inverter, it complete the control and management of large-scale energy storage system.

2. T-BOX/ iT-BOX

2.1 Product introduction

- Communication between battery and PCS
- Remote operation, parameter set, software update
- Display control of LCD screen (Optional)
- Indoor installation (IP20)
- Dimension: Width*Depth*Height=140*130.2*33.6 mm
- Only using T-BOX, can manage a cluster with 24 battery packs (Max)
- One iT-BOX can manage the 200 battery packs (Max) by controlling 10pcs T-BOX, which one manage up to 20 battery packs.

2.2 Appearance description

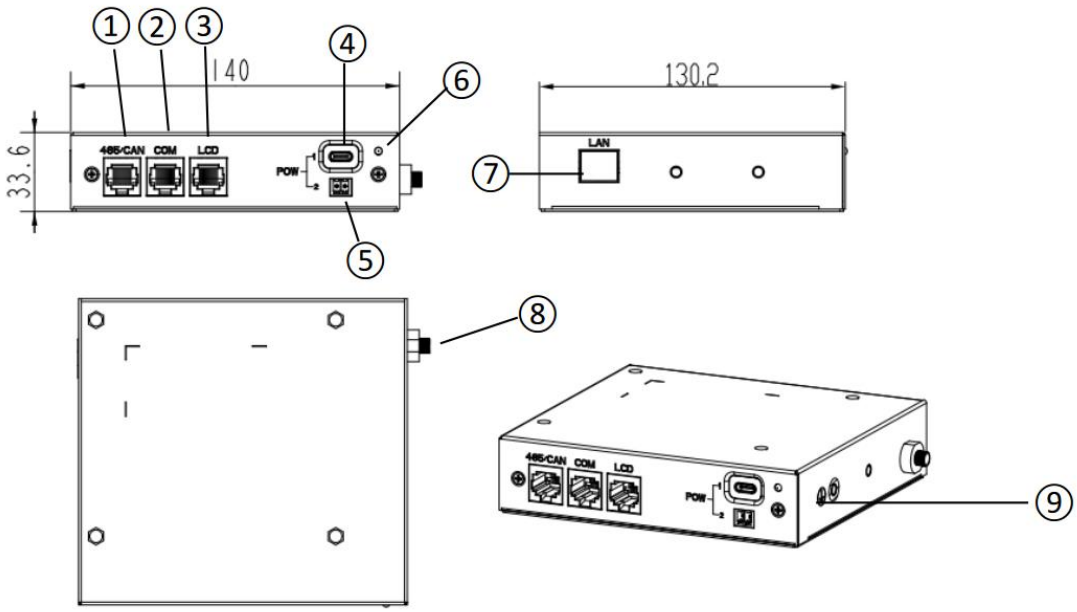
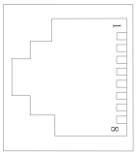
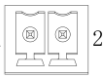


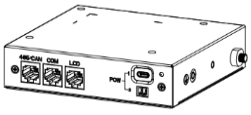
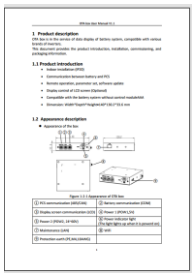
Figure 1-2-1 Appearance of T-BOX/ iT-BOX

① PCS/T-BOX communication (RS485/CAN)	② Battery communication (COM)
③ Display screen communication (LCD)	④ Power 1 (5V)
⑤ Power 2 (24~60V)	⑥ Power indicator light (The light lights up when it is powerd on)
⑦ Maintenance (LAN)	⑧ WiFi interface
⑨ Protection earth (PE,M4,18AWG)	

2.3 Definition of Port

No.	Port	Pin and Function	
1	485/CAN		1：CAN1L
			2：CAN1H
			4：CAN0H
			5：CAN0L
2	COM		1：CAN1L
			2：CAN1H
			4：CAN1H
			5：CAN1L
3	POW1	Type-C, 5V	
4	POW2		1：POSITIVE
			2：NEGATIVE

2.4 Packaging components

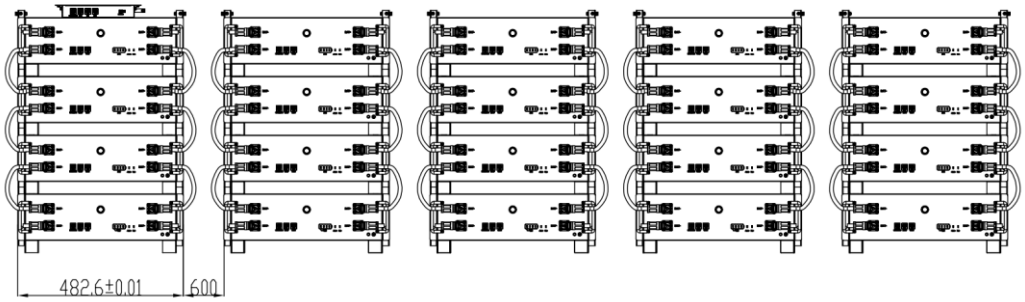
 OTA box (T-BOX/iT-BOX) X1	 User manual X1	 Grounding terminal X1
 Sucker antenna X1	 PCS-RS485/CAN Communication cable X1	 Power cable X1

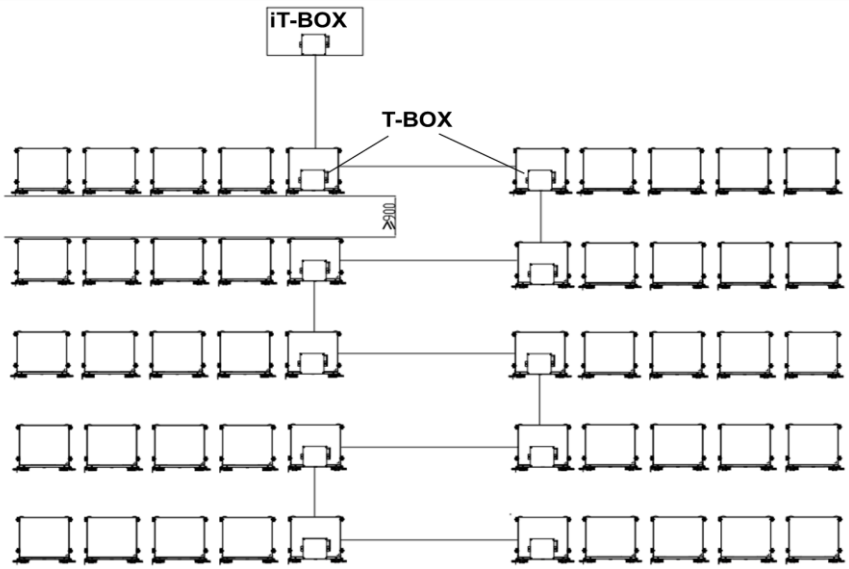
 Battery parallel booting long cable	 B-Communication cable (T-BOX to T-BOX)	 2-in-1 communication cable
 Long communication cable (BAT to BAT)	 Terminal resistance	

3. Installation

3.1 Installation requirements

- The spacing between battery rack installations should be at least 600mm.
- The spacing between battery clusters should be at least 900mm.

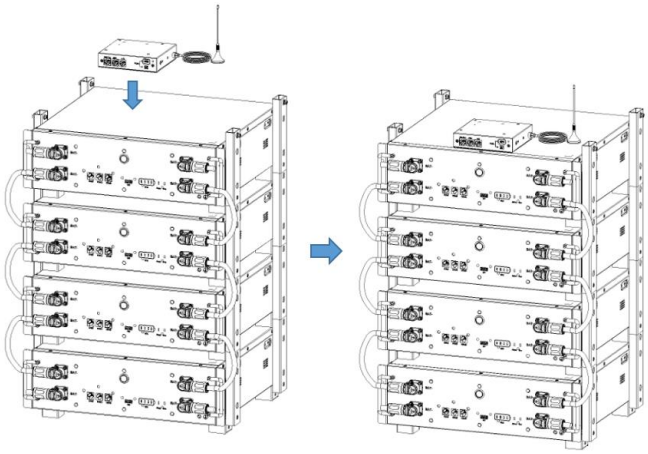




NOTE:

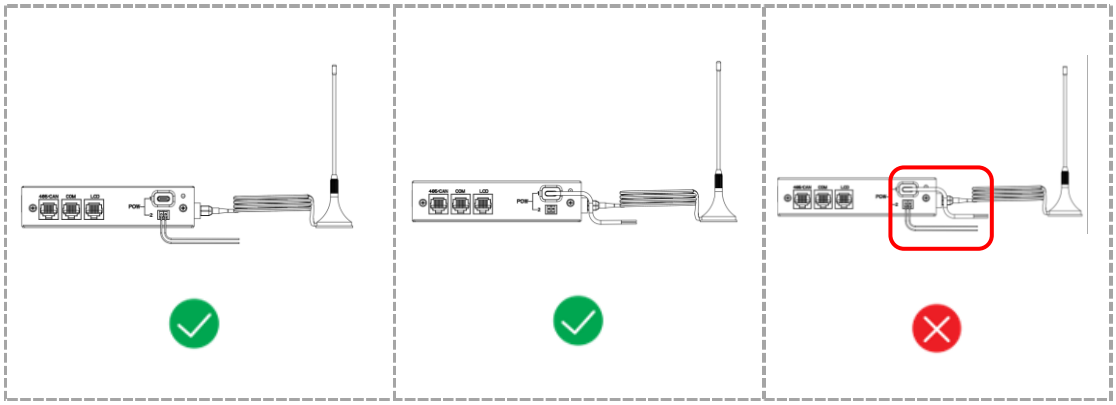
a. iT-BOX /T-BOX can fix on battery top with the bottom magnet.

b. Base on the magnet of antenna base bottom, the antenna base can be fixed on the battery, iT-BOX /T-BOX or other ferromagnetic objects.



3.2 Cable connection

(1) Do not power on the system during electrical connection.
(2) Do not use 2 power interfaces of T-BOX/ iT-BOX at the same time.



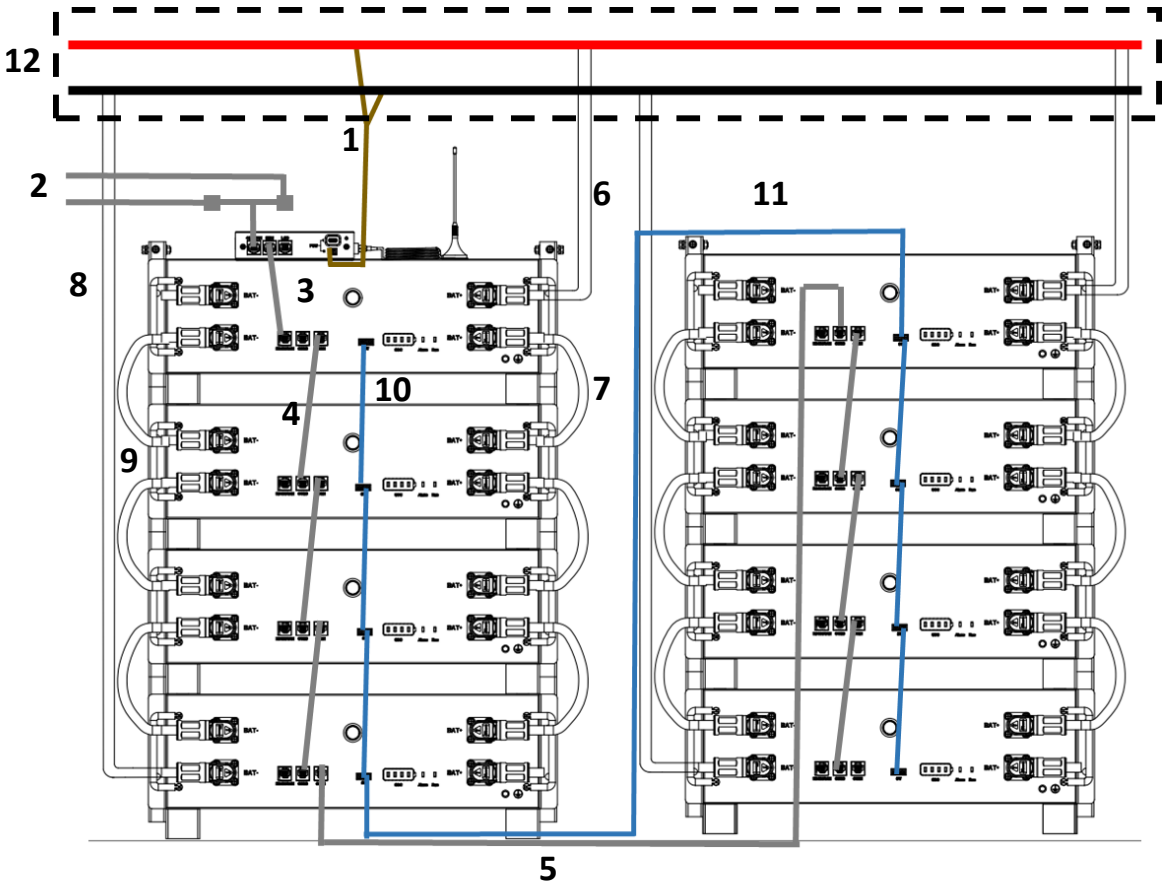
3.2.1 Grounding instructions

The recommended grounding cable specifications are as follows.

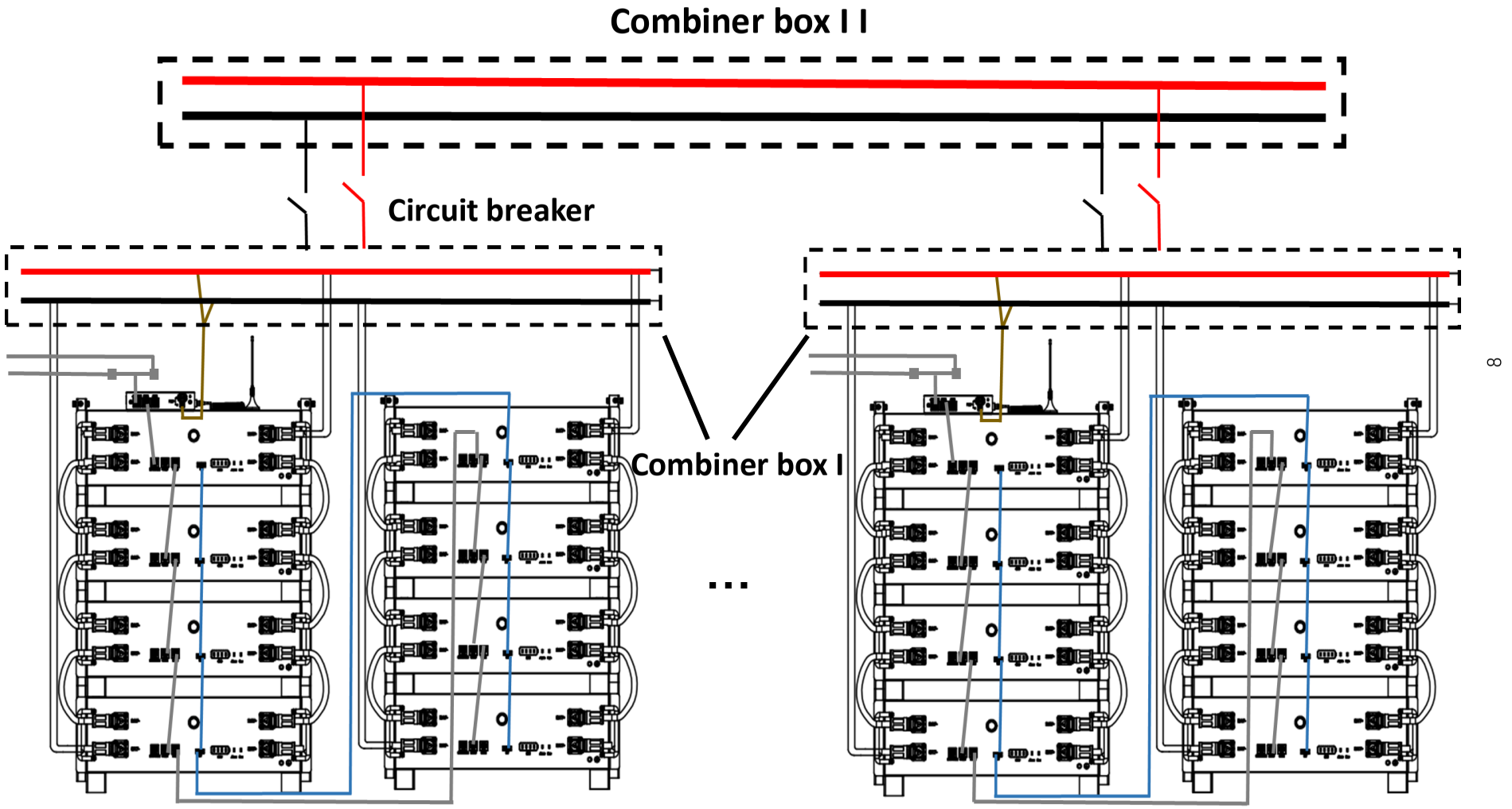
Ground cable	18AWG (yellow-green)
Ring terminal	M4
Screw	M4

3.2.2 Cable instructions

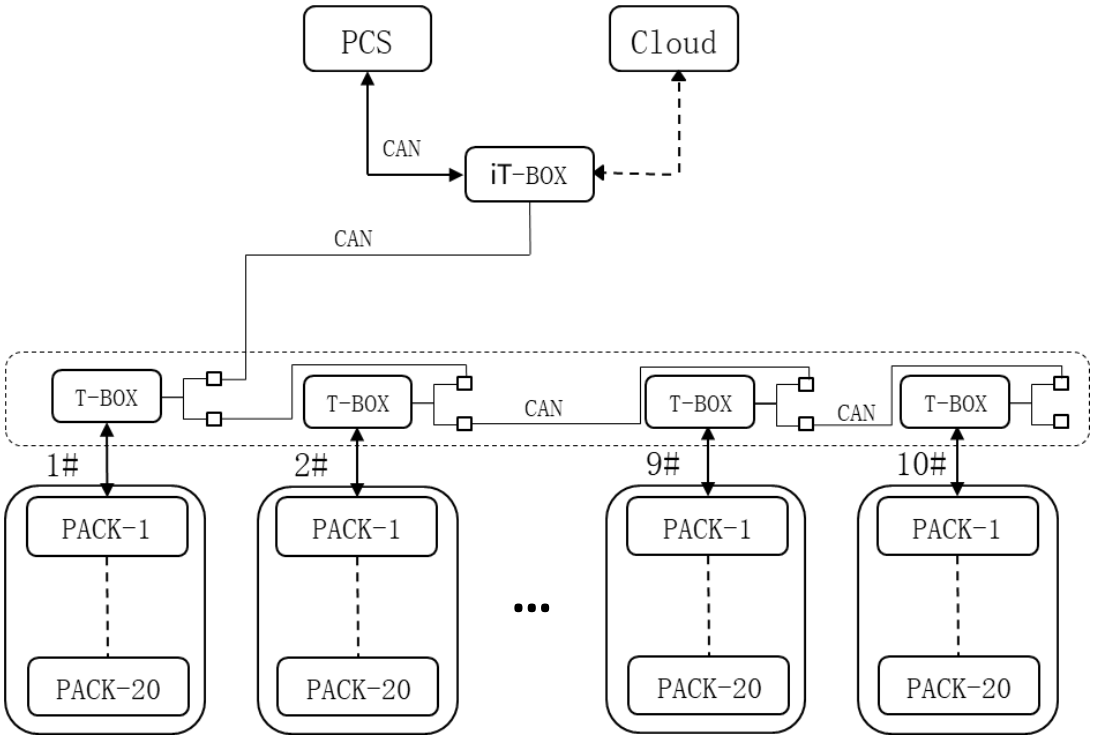
- This cable instruction applies to the system with more than 24 battery packs, one T-BOX device only can manage a cluster with up to 20 battery packs, the battery pack number of each cluster should be balanced.
- A maximum of 6 battery packs can be parallel in rack installation.
- Select an appropriate ground point based on the installation environment. Please connect the ground protection of battery and iT-BOX/T-BOX for safety.
- In a multi-clusters system, it is necessary to use combiner box to summarize the current. It must add the circuit breaker between Combiner box I and Combiner box II.
- The models of Combiner box I, Combiner box II, circuit breaker must be selected based on the actual installed current value.
- The connection diagrams of power cable/communication cable in one cluster/multiple clusters are shown below.

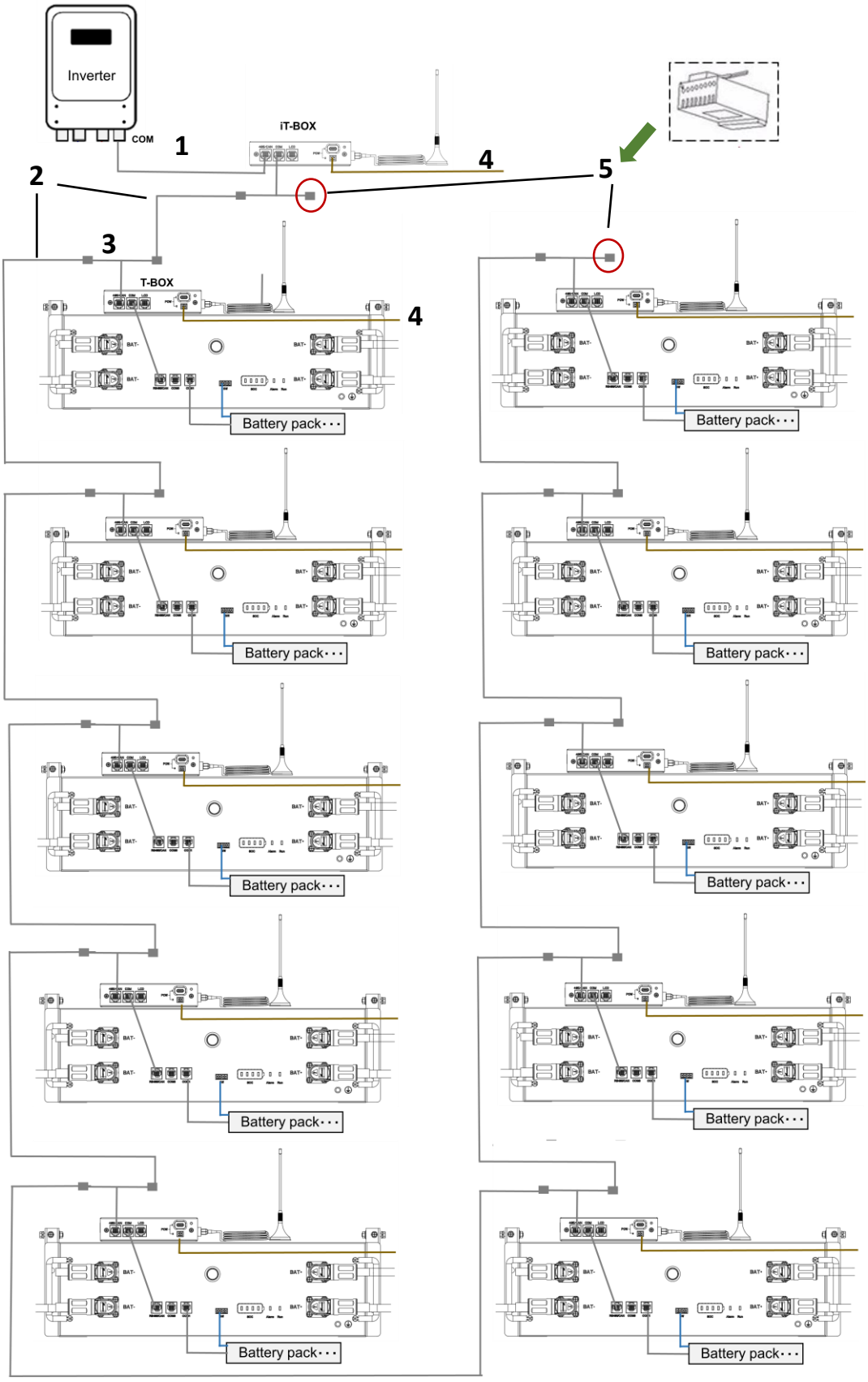


No.	Instruction	Remark
1	Power cable	POW2 to Combiner box, 2.4m, part number: 5619100049221
2	B-Communication cable	T-BOX to T-BOX. Retain only pin 4 and pin 5, 3m, part number: 5619100080401
3	PCS-RS485/CAN Communication cable	T-BOX – BAT, 8P8C, COM to COM1, 1.2m, part number: 5619100064331
4	Communication cable	BAT – BAT, COM3 to COM2, 220mm, part number: 5619100038551 (in battery cable kit)
5	Long communication cable	BAT – BAT,COM3 to COM2, 2m, part number: 5619100080831
6	Battery positive power cable	BAT+ to Combiner box+, 1.5m, part number: 5619100038591 (in battery cable kit)
7	Battery parallel positive power cable	BAT+ to BAT+, 320mm, part number: 5619100038561 (in battery cable kit)
8	Battery negative power cable	BAT- to Combiner box-, 1.5m, part number: 5619100038601 (in battery cable kit)
9	Battery parallel negative power cable	BAT- to BAT-, 320mm, part number: 5619100038571 (in battery cable kit)
10	Battery parallel booting cable	Batteries in one clusters, 250mm, part number: 5619100038531(in battery cable kit)
11	Battery parallel booting long cable	Batteries in different clusters, 2m, part number: 5619100080851
12	Combiner box	Model selection based on current value


Combiner box I I
Circuit breaker
Combiner box I
...

- The diagrams of communication topology and communication cable connection in multiple clusters between iT-BOX and T-BOX are shown below.




Inverter
COM
1
iT-BOX
4
2
5
3
T-BOX
4
Battery pack···
Battery pack···
Battery pack···
Battery pack···
Battery pack···
Battery pack···
Battery pack···
Battery pack···
Battery pack···
Battery pack···

No.	Instruction	Remark
1	PCS-RS485/CAN Communication cable	PCS to 485/CAN, 8P8C, (defined by PCS pin) 2m, part number: 5619100047941
2	B-Communication cable	iT-BOX to T-BOX /T-BOX to T-BOX. Retain only pin 4 and pin 5, 3m, part number: 5619100080401
3	2-in-1 communication cable	320mm, part number: 5619100080071
4	Power cable	POW2 to Combiner box,2400mm, part number: 5619100049221
5	Terminal resistance	120Ω, part number: 5619100045041

4. Commissioning

4.1 Precautions before commissioning

- A T-BOX manage one cluster cannot more than 20 battery packs.
- iT-BOX manage multi-clusters cannot more than 200 battery packs.
- For any cable connection, the battery system must be powered off.
- Cable connection must be performed by professionals and wearing the protection.

4.2 Commissioning procedures

1. Connect all the communication and power cables according to the above instructions.

2. Please check and ensure all cables installed correctly and firmly.

3. Turn on the battery clusters in turn, and ensure that the iT-BOX and T-BOXs are powered.

4. T-BOX communicates with one cluster battery system, and view the information of each battery.

Based on the environment and equipment conditions, select one way below for communication testing. It is recommend to use a/b for on-site installation and commissioning, c is mainly used for remote monitoring and maintenance.

a. Using **PowerLite Pro** app, this way is suitable for local communication. Mobile electronic device operate the battery system by bluetooth communication. See <Sunwoda-The Instruction for Monitor Platform--APP&Web Platform> for detailed operation.

b. Using **Ethernet Modbus**, this way is suitable for local communication. Laptop communicate or operate with battery system by network cable. See <Sunwoda-The Instruction for Ethernet Modbus> for detailed operation.

c. Using **PowerLite** app, this way is suitable for network communication. Mobile electronic device configure the network for T-BOX/iT-BOX, which required the WIFI at the installation site. See < Sunwoda-The Instruction for Monitor Platform--APP&Web Platform > for detailed operation.

Note:

- It is recommend to configure the network of iT-BOX and T-BOXs for better monitoring the batteries.
- Adding the iT-BOX and T-BOX device under one Plant, view and manage the system by entering different device control interface.

5. After finishing the T-BOXs communication with battery system, communicate iT-BOX with entire battery system by the communication way in step 4.

Note:

- iT-BOX only can view and manage the aggregated information collected by T-BOXs, cannot view the information of each battery pack.
- Only through T-BOX can view and manage each battery.

6. After finishing the commissioning of T-BOX and iT-BOX. Connect the communication between iT-BOX and inverter, then control and debug the energy storage system by inverter.

Note:

- In cable connection of battery system with inverter or combiner box, please ensure that the battery system is turned off or all cluster circuit breakers are disconnected.
- iT-BOX can automatically identify for communication parameter setting while matching the compatible inverter. Only need the configuration from inverter.