SmartACBox 12-In 1-Out Smart AC Combiner Box

Quick Guide

HUAWEI TECHNOLOGIES CO., LTD.

HUAWEI

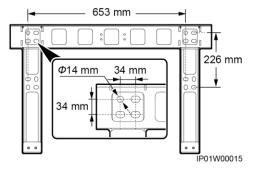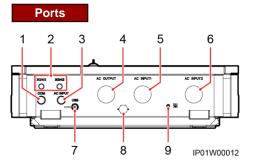# 1 Overview

Appearance

(1) Handles
(2) Monitoring compartment door
(3) Enclosure door lock
(4) Power compartment door
(5) Mounting plate
(6) Mounting bracket

IP01H00023

Enclosure Dimensions

995 mm
225 mm
750 mm
65 mm

IP01S00011

Mounting Bracket Dimensions

653 mm
226 mm
Φ14 mm
34 mm
34 mm

IP01W00015

IP01W00012
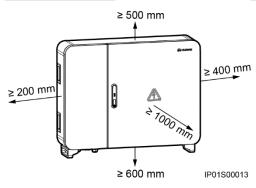
(1) Cable gland for the RS485 communications cable (COM)

(2) Cable gland for the 3G/4G antenna (3G/4G)

(3) Cable gland for the single-phase power cable (AC INPUT)

(4) Cable hole for the AC output power cable (AC OUTPUT)

(5) Cable hole 1 for the AC input power cable (AC INPUT1)

(6) Cable hole 2 for the AC input power cable (AC INPUT2)

(7) USB port (USB)

(8) Ventilation valve

(9) PE point
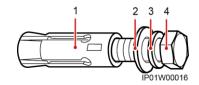
2 Installing the SmartACBox

2.1 Installation Preparations

Installation Space

≥ 500 mm
≥ 400 mm
≥ 200 mm
≥ 1000 mm
≥ 600 mm
IP01S00013

Expansion Bolt

IP01W00016

(1) Expansion sleeve
(2) Flat washer
(3) Spring washer
(4) M12x60 bolt

📖 **NOTE**

The M12x60 expansion bolts and M12x40 bolt assemblies are supplied with the SmartACBox. M12x40 bolt assemblies are used for support-mounting and pole-mounting the SmartACBox. Such a bolt assembly consists of a flat washer, a spring washer, and an M12x40 bolt.

2.2 Installing the Mounting Bracket

📖 **NOTE**

The mounting bracket has four groups of tapped holes, each group containing four tapped holes. Mark any hole in each group based on site requirements and mark four holes in total. Two round holes are preferred.

Wall-mounted Installation
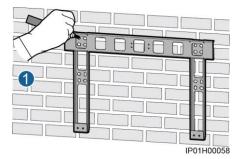
⚠ **DANGER**

Avoid drilling holes in the utility pipes and/or cables attached to the back of the wall.
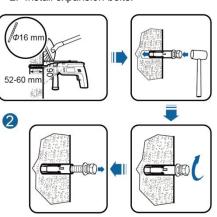
1. Mark hole positions.

IP01H00058
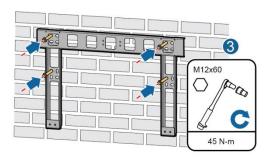
2. Install expansion bolts.

3. Secure the mounting bracket.

Φ16 mm
52-60 mm

M12x60
45 N·m
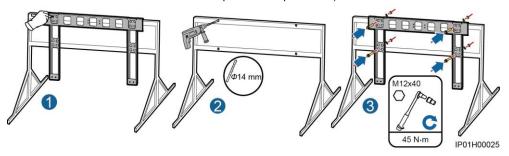
IP01H00026

Support-mounted Installation
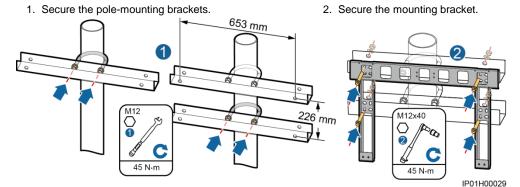
1. Mark hole positions.

2. Drill holes. (You are advised to apply anti-rust paint on the hole positions for protection.)

3. Secure the mounting bracket.

Φ14 mm

M12x40
45 N·m

IP01H00025
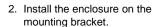
📖 **NOTE**
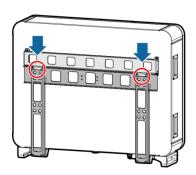
- To pole-mount a SmartACBox, you need to prepare pole-mounting brackets by yourself based on the SmartACBox dimensions. You are advised to use M12 U-shaped bolts to secure the pole-mounting brackets.
- Figures are for reference only. The actual poles and pole-mounting brackets prevail.

1. Secure the pole-mounting brackets.

2. Secure the mounting bracket.

IP01H00029
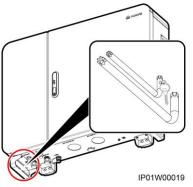
2.3 Securing the Enclosure
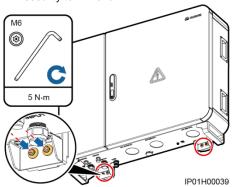
1. Remove the security torx wrench and enclosure door key from the base of the enclosure and save them for later use.

IP01W00019

2. Install the enclosure on the mounting bracket.

3. Tighten the security torx screws using a security torx wrench.

IP01H00039
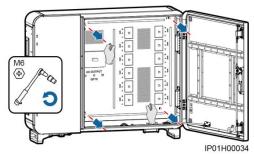
3 Opening the Enclosure Door

> **⚠ WARNING**
>
> - Before opening the enclosure door, turn off all upstream switches for the SmartACBox. If you have to operate an energized SmartACBox, wear insulation gloves and take preventive measures.
> - If you need to open the enclosure door on rainy or snowy days, take protective measures to prevent rain or snow from entering the enclosure. If it is impossible to take protective measures, do not open the enclosure door on rainy or snowy days.

1. Insert the key into the lock hole in the enclosure door and open the lock.

2. Open the enclosure door and install the support bar.

3. Hold the handles on the cover and remove the cover.

IP01H00034

> **📖 NOTE**
>
> Remove the four screws from the cover. Start from the one at the lower left corner, and then the rest in counterclockwise sequence.

4 Installing the Router

> **📖 NOTE**
>
> - The SmartACBox is not factory-installed with a router, so you need to purchase and install a router by yourself.
> - This document introduces how to install an SC-RRX230 or SC-RRX280 router produced by SUN DENSI in Japan.
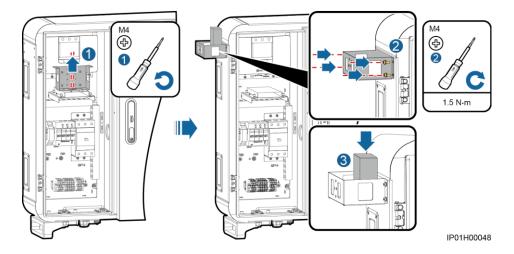
## 4.1 Installing the Router Antenna

> **📖 NOTE**
>
> An SC-RRX230 or SC-RRX280 router is supplied with a 1P184-FMM800W-5M5 or 1P184-DP-BR0-RE remote outdoor antenna.

1P184-FMM800W-5M5 Antenna

1. Remove the screw assemblies from the router tray and remove the antenna support.

2. Install the antenna support in the upper part of the left wall of the enclosure and secure it using the removed M4 screw assemblies.

3. Secure the router antenna on the support by attaching the antenna base to it.

IP01H00048
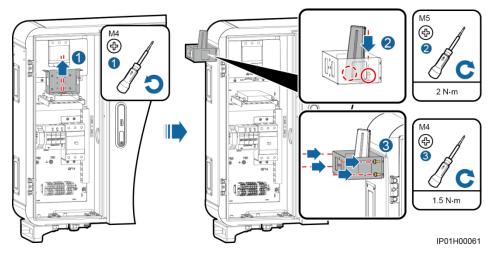
1P184-DP-BR0-RE Antenna

1. Remove the screw assemblies from the router tray and remove the antenna support.

2. Align the fixing holes in the antenna base with the holes in the antenna support and secure the antenna base to the antenna support using screws.

📖 **NOTE**
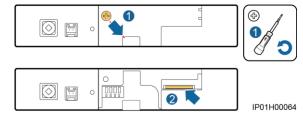
The screws used for tightening are supplied M5 screw assemblies.

3. Install the antenna support in the upper part of the left wall of the enclosure and secure it using the removed M4 screw assemblies.

IP01H00061
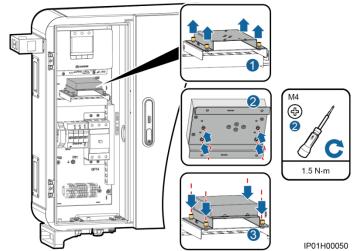
4.2 Installing the Router SIM Card

1. Remove the SIM card shielding cover from the router panel.
2. Insert the SIM card.
3. Reinstall the SIM card shielding cover.

IP01H00064

4.3 Securing the Router

1. Loosen the captive screws and remove the router tray.
2. Horizontally place the router on the tray and ensure that the DC-IN port on the router faces the power compartment. Then, secure the router by routing the supplied M4 Phillips screws through the holes at the bottom of the router tray and the holes at the bottom of the router.
3. Place the router tray back onto the router support and tighten the captive screws.

M4

1.5 N·m

IP01H00050
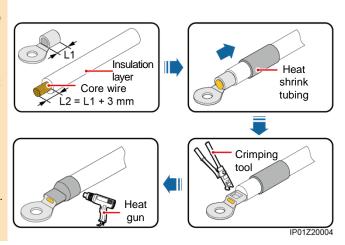
5 General Operations

5.1 Crimping an OT Terminal

NOTICE
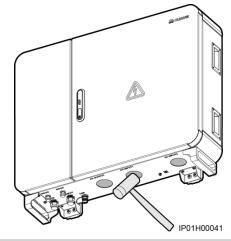
- Pay attention not to damage the core wire when stripping a cable.
- The cavity formed after the conductor crimp strip of the OT terminal is crimped must wrap the core wires completely. The core wires must contact the OT terminal closely.
- Wrap the wire crimping area with heat shrink tubing or PVC insulation tape. The following figure uses heat shrink tubing as an example.
- When using the heat gun, protect devices from being scorched.

L2 = L1 + 3 mm

IP01Z20004

7

5.2 Knocking Off the Barrier Chip from a Cable Hole
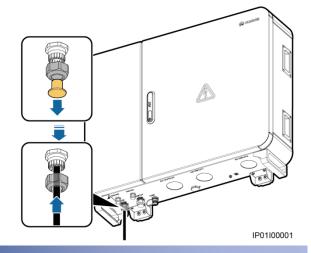
NOTICE

- Before connecting the PE cable, AC input power cable, and AC output power cable for the first time, knock off the barrier chips from the cable holes 1 and 2 for the AC input power cable and the cable hole for the AC output power cable.
- The edges of the cable holes for the AC input and output power cables are sharp. Recommended: Use a file to smooth the edge of the cable hole. Protect yourself during operation from being hurt.
- The FEK-65B cable glands of Mirai Industry Co., Ltd. are recommended for the cable holes for the AC input and output power cables.

IP01H00041

5.3 Routing a Cable Through a Cable Gland (COM)

1. Remove the gland and cap from the cable gland.
2. Route the cable through the gland and then cable gland.
3. Connect the cable.
4. Tighten the gland.

IP01I00001

6 Installing Cables

6.1 Preparing Cables

Prepare cables and OT terminals based on site requirements.

No.	Cable	Recommended Model or Specifications	Cross-sectional Area Range of the Cable
1	AC input power cable	Three-core outdoor copper armored cable with an OT-M5 terminal	3.5–8 mm^2
2	AC output power cable	Three-core outdoor copper armored cable with an OT-M12 terminal	150–200 mm^2
3	Single-phase input power cable	Three-core outdoor copper armored cable with an OT-M4 terminal (protective earthing)	2–5.5 mm^2

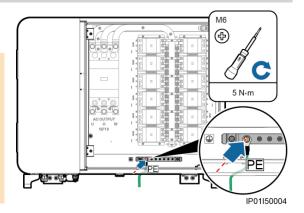| No.	Cable	Recommended Model or Specifications	Cross-sectional Area Range of the Cable
4	RS485 communications cable	Two-core outdoor shielded RS485 communications cable (single-core rigid cable recommended)	0.5–1 mm^2
5	PE cable	Single-core green outdoor copper cable with an OT-M6 terminal	3.5–22 mm^2

6.2 Installing the PE Cable

1. Crimp an OT terminal.
2. Secure the PE cable.

> **NOTE**
>
> • Recommended: Route the PE cable through the cable hole 1 for the AC input power cable then to the ground bar.
> • Connect the PE cable to the nearest ground bar.
> • Recommended: To enhance the corrosion resistance of a ground terminal, apply silica gel or paint.

IP01I50004
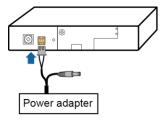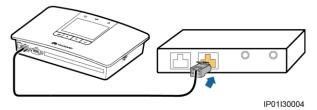
6.3 Installing the Router Cable

> **NOTE**
>
> This document introduces how to install cables for an SC-RRX230 or SC-RRX280 router produced by SUN DENSI in Japan.

1. Insert the (two-core white) output terminal of the factory-installed power adapter into the DC-IN port of the router.

2. Remove the network cable bound to the monitoring compartment, and connect the U02-GE1/LAN1 connector to the WAN/LAN2 port on the router.

Power adapter

IP01I30004
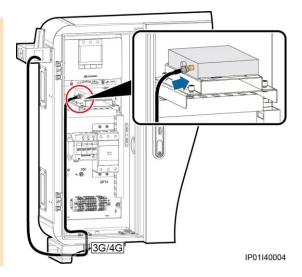
> **NOTE**
>
> The SmartACBox is factory-installed with two power adapter output terminals. Select an appropriate output terminal based on the router type.

3. Connect the router antenna.

IP01I40004

4. Use clips to secure the router antenna cable.

IP01S00016
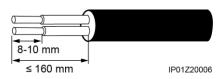
6.4 Installing the RS485 Communications Cable
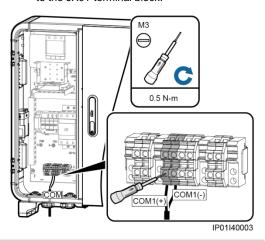
Connect the peripheral RS485 communications cable to the RS485-1 or RS485-2 port on the JX01 terminal block.

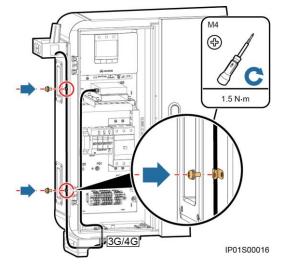| No.	Port on the JX01 Terminal Block	Definition
1	RS485-1(+)_COM1(+)	RS485-1, RS485 differential signal+
2	RS485-1(–)_COM1(–)	RS485-1, RS485 differential signal–
3	RS485-2(+)_COM2(+)	RS485-2, RS485 differential signal+
4	RS485-2(–)_COM2(–)	RS485-2, RS485 differential signal–

1. Prepare an RS485 communications cable.

2. Connect the RS485 communications cable to the JX01 terminal block.

IP01Z20006

M3

0.5 N·m

COM1(+) COM1(-)

IP01I40003

6.5 Installing the Single-Phase Power Cable
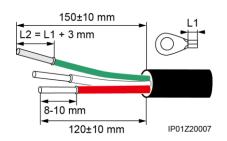
📖 **NOTE**

The power cables from the SmartACBox to the SmartLogger1000 and router have been factory-installed. If an external power source is required to power the SmartLogger1000 and router, disconnect the power cable from the JX02 terminal block, and then connect the external single-phase power cable to the JX02 terminal block.

1. Prepare a single-phase power cable.
2. Crimp an OT terminal on the ground end.
3. Disconnect cables JX02-1-BOT and JX02-2-BOT from the JX02 terminal block.

⚠ **WARNING**
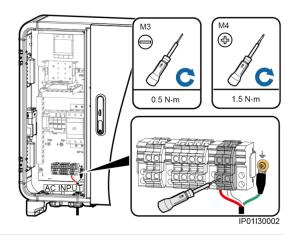
Insulate the disconnected cables JX02-1-BOT and JX02-2-BOT.

150±10 mm

L2 = L1 + 3 mm

L1

8-10 mm

120±10 mm

IP01Z20007

4. Connect the single-phase power cable to the JX02 terminal block.

> **NOTICE**
>
> Use a torque screwdriver with an M3 flat-head to secure the JX02 terminal block cable and use a torque screwdriver with an M4 Phillips head to secure the protective earthing cable.

6.6 Installing the AC Input Power Cable
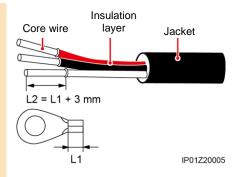
> **NOTE**
>
> Connect the AC input power cable from the SmartACBox to input circuit breakers QF01 to QF12. Recommended: Route the AC input power cables to input circuit breakers QF01 to QF06 through cable hole 1; route the AC input power cables to input circuit breakers QF07 to QF12 through cable hole 2.

1. Remove an appropriate length of the jacket and insulation layer from the AC input power cable using a wire stripper.

> **NOTICE**
>
> - The lengths of the jackets and insulation layers that need to be removed from the AC input power cables to input circuit breakers QF01 to QF06 are different. When connecting a stripped cable, ensure that the exposed insulation layer is all in the enclosure, and the jacket is all outside the enclosure.
> - For the lengths of the jackets and insulation layers that need to be removed from the AC input power cables to input circuit breakers QF07 to QF12, refer to the AC input power cables to input circuit breakers QF01 to QF06.

$L2 = L1 + 3 \text{ mm}$

2. Crimp an OT terminal.
3. Route the cable through the cable holes 1 and 2 for the AC input power cable.

4. Connect the AC input power cable to the U, O, and W terminals on the circuit breaker, and tighten the bolts using a torque screwdriver.

IP01I20007

6.7 Installing the AC Output Power Cable

1. Remove an appropriate length of the jacket and insulation layer from the AC output power cable using a wire stripper.

IP01Z20005

2. Crimp an OT terminal.
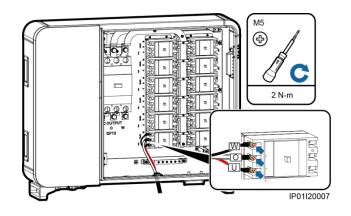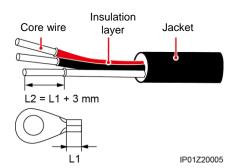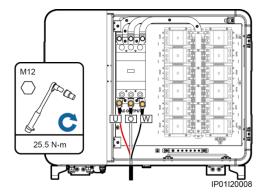
3. Route the cable through the cable hole for the AC output power cable.

4. Connect the AC output power cable to the U, O, and W terminals on circuit breaker QF13, and tighten the bolts using a torque wrench.

IP01I20008
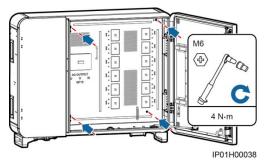
7 Verifying the Installation

1. The SmartACBox is installed correctly and securely.	Yes □ No □ N/A □
2. All cables are connected correctly and securely and bound neatly, without exposed metal.	Yes □ No □ N/A □
3. All used cable glands and cable holes at the enclosure bottom are blocked by fireproof material.	Yes □ No □ N/A □
4. Unused USB ports are locked by watertight caps.	Yes □ No □ N/A □
5. Unused cable glands are plugged with caps and the glands are tightened.	Yes □ No □ N/A □
6. All switches in the enclosure are off.	Yes □ No □ N/A □
7. The enclosure interior is clean, without dust, dirt, or foreign matter.	Yes □ No □ N/A □
8. The paint on the enclosure exterior is intact. If paint has flaked off, repaint that area to prevent corrosion.	Yes □ No □ N/A □

8 Installing the Cover

IP01H00038

9 Powering On the System

⚠ DANGER

Put on insulation gloves before powering on the system.

1. Switch circuit breaker QF13 on the AC output side to ON.
2. Switch circuit breakers QF01 to QF12 on the AC input side to ON one by one.
3. Switch circuit breaker QF14 in the monitoring compartment to ON.

10 Commissioning the Monitoring System

10.1 Configuring the Router Network

Log in to the router management user interface (UI) and configure router network parameters.

📖 NOTE

For details about how to set router network parameters, see the instructions of the router or the *SmartACBox 12-In 1-Out Smart AC Combiner Box User Manual*.
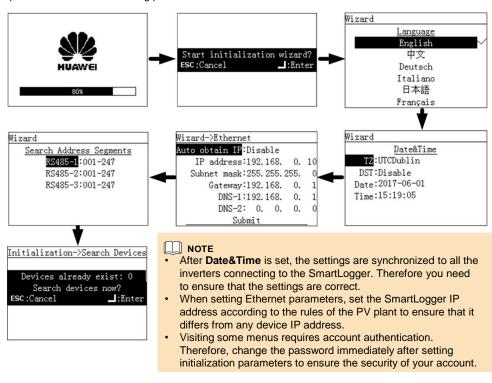
> 📖 **NOTE**
>
> - You can set SmartLogger1000 communications parameters, including Ethernet, RS485, and NetEco parameters over the monitoring panel or embedded WebUI.
> - This section describes how to set communications parameters over the monitoring panel. For details about how to set parameters over the embedded WebUI, see the *SmartACBox 12-In 1-Out Smart AC Combiner Box User Manual*.
> - The communications parameters are available on only SmartLogger V100R001C00SPC111 and later versions. The screenshots in this document are from SmartLogger V100R001C00SPC111.

Setting Initialization Parameters

When powering on the SmartLogger1000 for the first time, set initialization parameters such as the system language, system time, the address search scope for the RS485 port, and Ethernet parameters on the monitoring panel.

> 📖 **NOTE**
>
> - After **Date&Time** is set, the settings are synchronized to all the inverters connecting to the SmartLogger. Therefore you need to ensure that the settings are correct.
> - When setting Ethernet parameters, set the SmartLogger IP address according to the rules of the PV plant to ensure that it differs from any device IP address.
> - Visiting some menus requires account authentication. Therefore, change the password immediately after setting initialization parameters to ensure the security of your account.
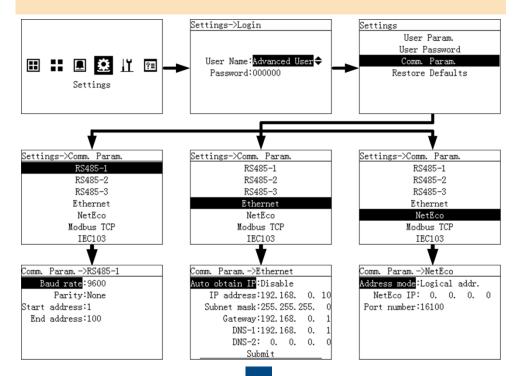
On the main menu, choose **Settings** > **Comm. Param.**, and set RS485, Ethernet, and NetEco parameters.

📖 **NOTE**

- Because of permission restriction, set **User Name** to **Advanced User**. The initial password for **Advanced User** is **000001**.
- Use the initial password upon first power-on and change it immediately after login. To ensure account security, change the password periodically and keep the new password in mind. Not changing the initial password may cause password disclosure. A password left unchanged for a long period of time may be stolen or cracked. If a password is lost, devices cannot be accessed. In these cases, the user is liable for any loss caused to the PV plant.
- **RS485-1**, **RS485-2**, and **RS485-3** correspond to communications ports COM1, COM2, and COM3 respectively. This section shows how to set **RS485-1**.
- When setting Ethernet parameters, note that:
  - If you set **Auto obtain IP** to **Enable**, IP addresses are assigned by the DHCP server on the network. In this case, you must ensure that at least one DHCP server is working on the network.
  - The gateway address should be set to the router IP address.
  - The SmartLogger1000 IP address must be in the same network segment as the gateway address.
  - The domain name server (DNS) address should be set to the router IP address or obtained from the network operator.
- When setting NetEco parameters, set **Address mode** to **Comm. addr.** or **Logical addr.**. If the devices connecting to the three RS485 ports of the SmartLogger1000 have duplicate addresses, **Logical addr.** must be selected.

11 Closing the Enclosure Door

1. Retrieve the support bar.

2. Close the monitoring compartment door and then the power compartment door.

3. Rotate the enclosure door lock to lock the door.

IP01H00063