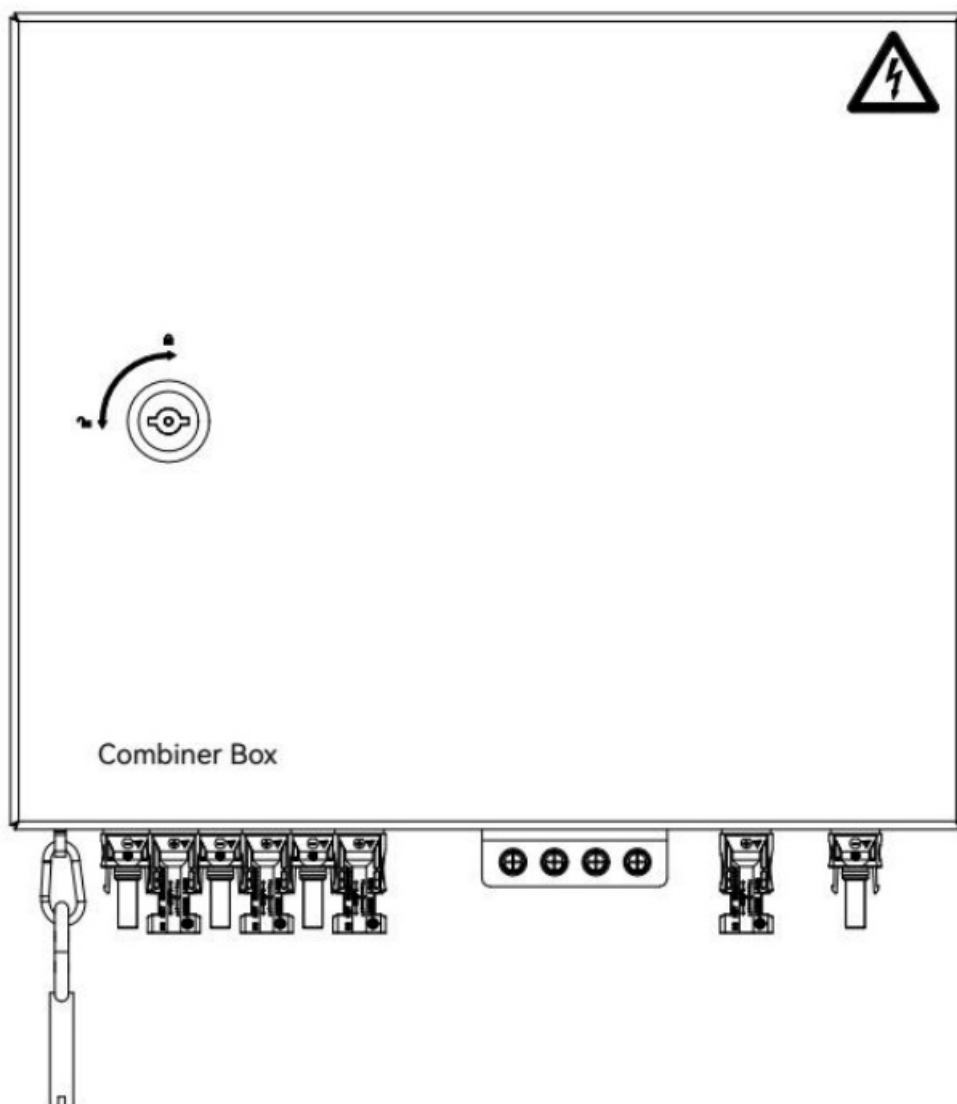




BYD CB-03A03S-A Core Battery Combiner Box 3 Instruction Manual

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BYD CB-03A03S-A Core Battery Combiner Box 3



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Address: No.1, Yan'an Road, Kuichong, Dapeng, Shenzhen, Guangdong Province, 518118, P.R. China.

Information on this Document

Validity

This document is valid for the Combiner Box **CB-03A03S-A/CB-03A06S-A**.






Target Group

The instructions in this document may only be performed by qualified persons who must have the following skills:

- Knowledge of how batteries work and are operated
- Knowledge of how an inverter works and is operated
- Knowledge of, and adherence to the locally applicable connection requirements, standards, and directives
- Knowledge of, and adherence to this document and the associated system documentation, including all safety instructions
- Training in dealing with the hazards associated with the installation and operation of electrical equipment and batteries
- Training in the installation and commissioning of electrical equipment.

Failure to do so will make any manufacturer's warranty, guarantee or liability null, and void unless you can prove that the damage was not due to non-compliance.







Symbols

Symbol	Explanation
	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
	Indicates a hazardous situation which, if not avoided, can result in death or serious injury.
	Indicates a hazardous situation which, if not avoided, can result in minor or moderate injury.
	Indicates a situation which, if not avoided, can result in property damage.
	Packaging instructions.

Safety

Instructions and Warnings

Failure to follow these instructions may have serious consequences, such as the destruction of the device, personal injury or death due to electric shock. Therefore, the following safety instructions must be read and understood prior to installation and use of the Combiner Box. For any clarifications or additional information, contact the BYD service.

Symbol	Explanation
	Once the product has been removed from its original packaging, visually inspect for damage that may have occurred during shipment. If damage is found, contact the distributor or manufacturer.
	This product must only be used for the purpose for which it has been designed. Any other use is considered improper and therefore dangerous. The manufacturer is not liable for possible damage caused by improper, incorrect or unreasonable use.
	BYD holds itself responsible only for the product in its original configuration. BYD declines all responsibility for consequences deriving from non-original spare parts.
	Any intervention that alters the structure or the operating cycle of the product must be carried out or authorized by Shenzhen BYD Electronics Co., LTD.
	This manual is an integral and essential part of the product. Carefully read the recommendations contained in it since they provide important information on safe use and maintenance.
	BYD may make technical changes in this manual and to the product at anytime without notice. In case of typing errors or other types of errors, the corrections will be included in the new versions of the manual.

Position and securing

Failure to follow these instructions may have serious consequences, such as the destruction of the device, personal injury or death due to electric shock. Therefore, the following safety instructions must be read and understood prior to installation and use of the Combiner Box. For any clarifications or additional information, contact BYD service.

Symbol	Explanation
NOTICE	If positioning in a closed environment, make sure the area is ventilated and allows regular recirculation of air. If installing in an open environment, position the enclosure in an area that is constantly shaded and protected from exposure to direct sunlight. These measures are important for preventing unnecessary and excessive overheating, which prolonged in time impairs the duration and operation of parts inserted inside.
NOTICE	Make sure the wall where the enclosure is to be mounted is suitable to support the weight. The weight is around 8.1kg.

Safety Precautions

This section contains safety precautions that must be observed at all times when working on or with the product. To prevent personal injury and property damage and to ensure long-term operation of the product, read this section carefully and follow all safety precautions at all times.



Danger to life from electric shock due to live voltage.

High voltages are present in the live components of the Combiner Box. Touching live components results in death or serious injury due to electric shock.

- Wear personal protective equipment when working on the Combiner Box.
- Do not touch live components.
- Before performing any work, always disconnect the Combiner Box from voltage sources unless supply voltage is absolutely necessary.
- Ensure that the device cannot be reconnected.
- Ensure that no voltage is present.
- Ground and short-circuit.
- Cover or isolate any adjacent live components. Protective covers must always be mounted.

Danger to life from electric shock due to live DC cables.

Touching live DC cables from batteries or an inverter results in death or serious injury.

- Prior to connecting the DC cables, ensure that the DC cables are voltage-free.
- Wear suitable personal protective equipment when working on the Combiner Box.



Danger to life from electric shock if the Combiner Box is damaged.

If the Combiner Box is damaged, dangerous situations may arise during operation that results in death or serious injury from electric shock.

- Only use the Combiner Box when it is in a technically faultless condition and safe to operate.
- Regularly check the Combiner Box for visual damage.
- Make sure that all external safety equipment is freely accessible at all times.

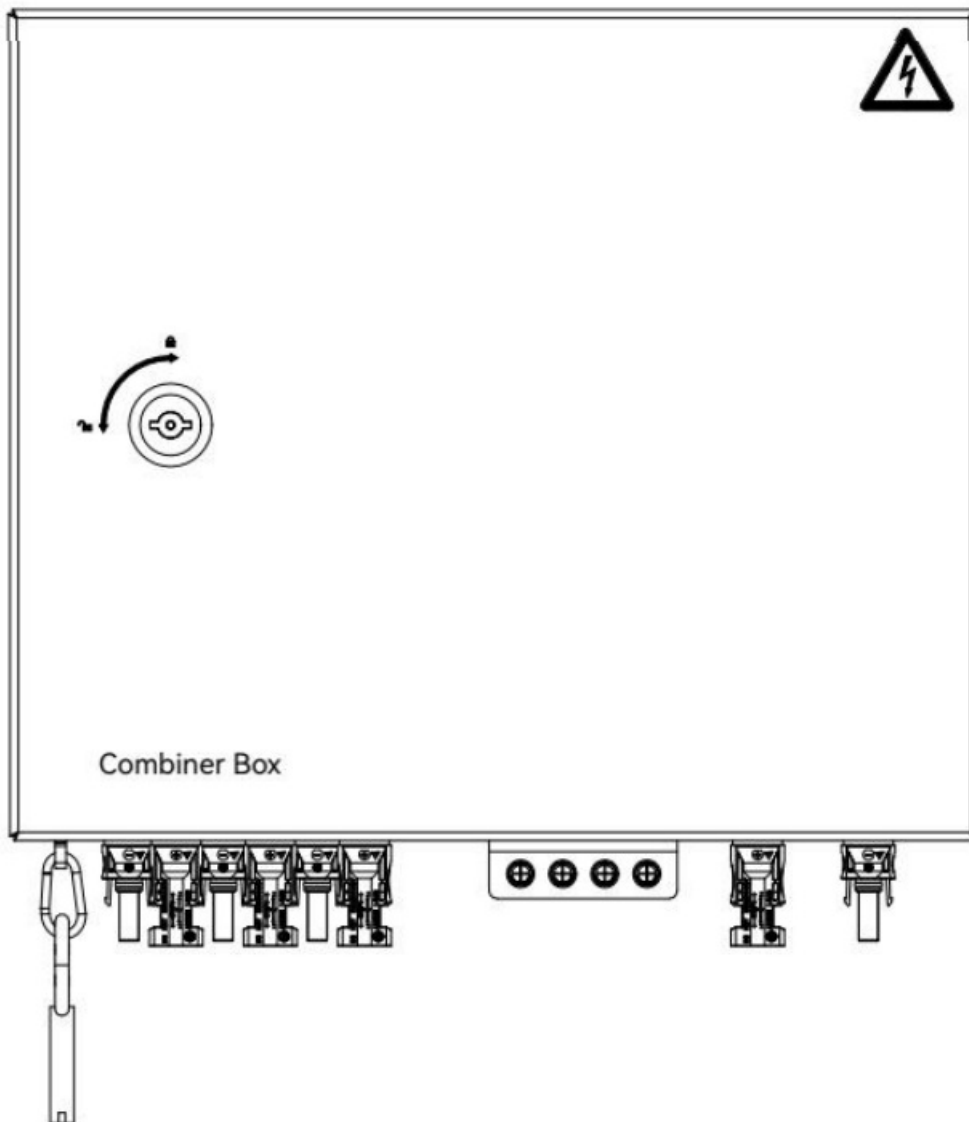
- Make sure that all safety equipment is in good working order.

Scope of delivery

Check the scope of delivery for completeness and any externally visible damage. Contact your distributor if the scope of delivery is incomplete or damaged.

Figure 1 CB-03A03S-A Combiner Box

- 1 – CB-03A03S-A Combiner Box



- 1 – Documents



- 4 – Positive power cable connector



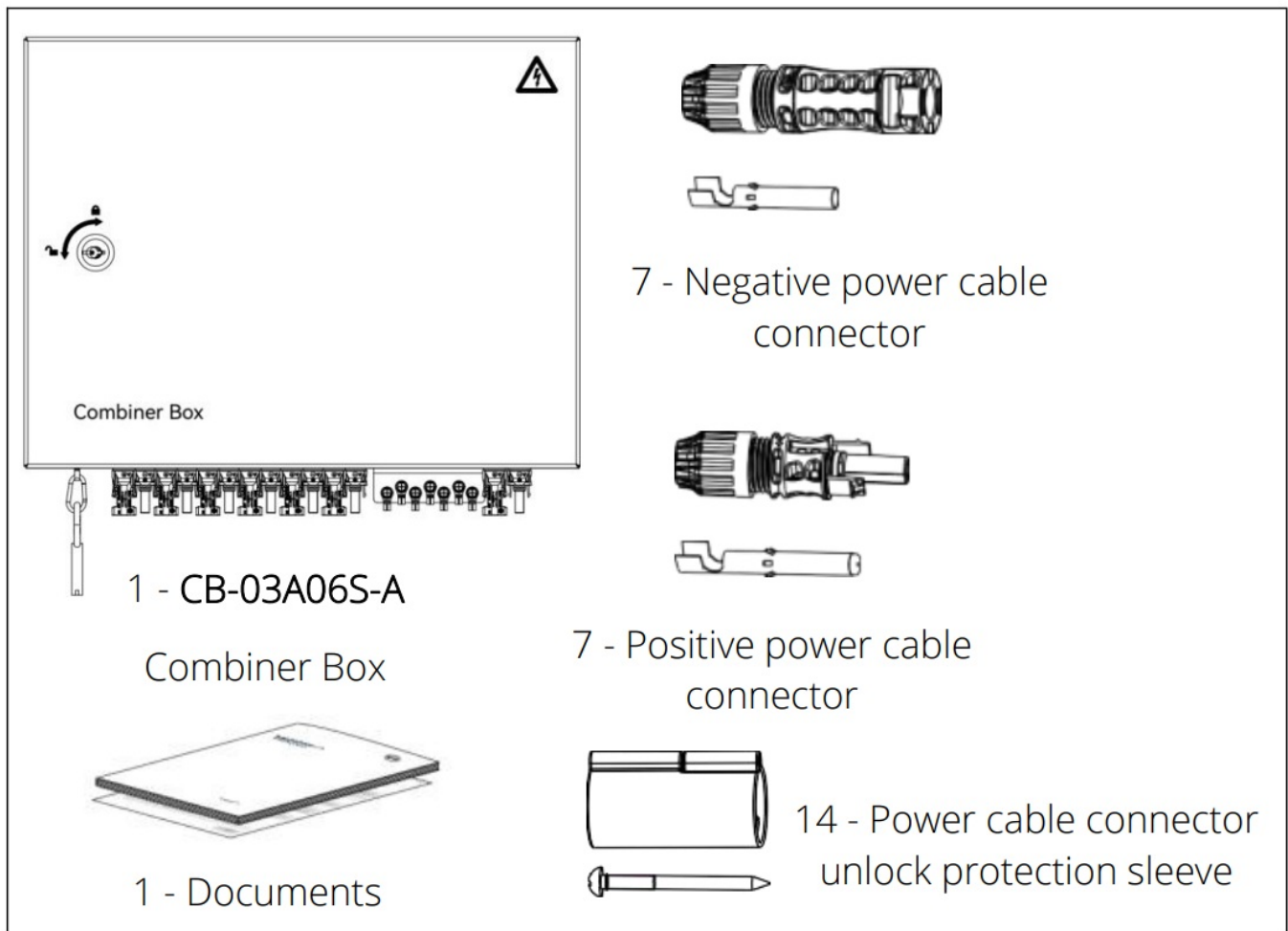
- 4 – Negative power cable connector



- 8 – Power cable connector unlock protection sleeve



Figure 2 CB-03A06S-A Combiner Box

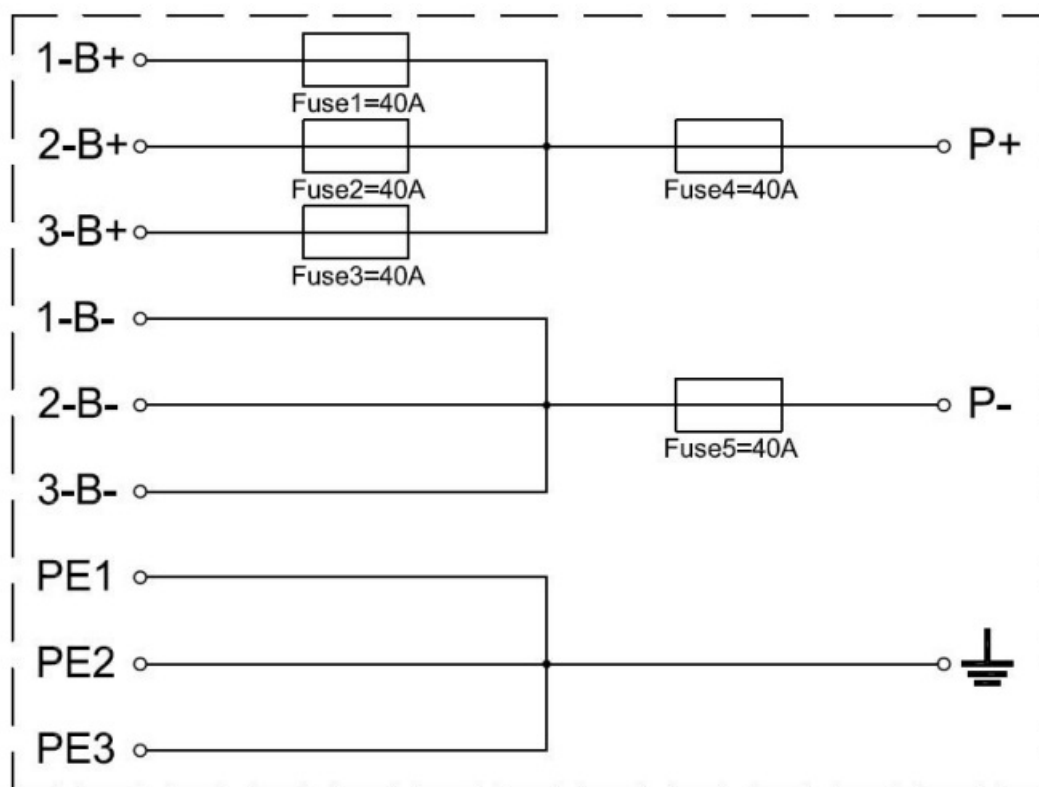


Product Description

Circuit Diagram

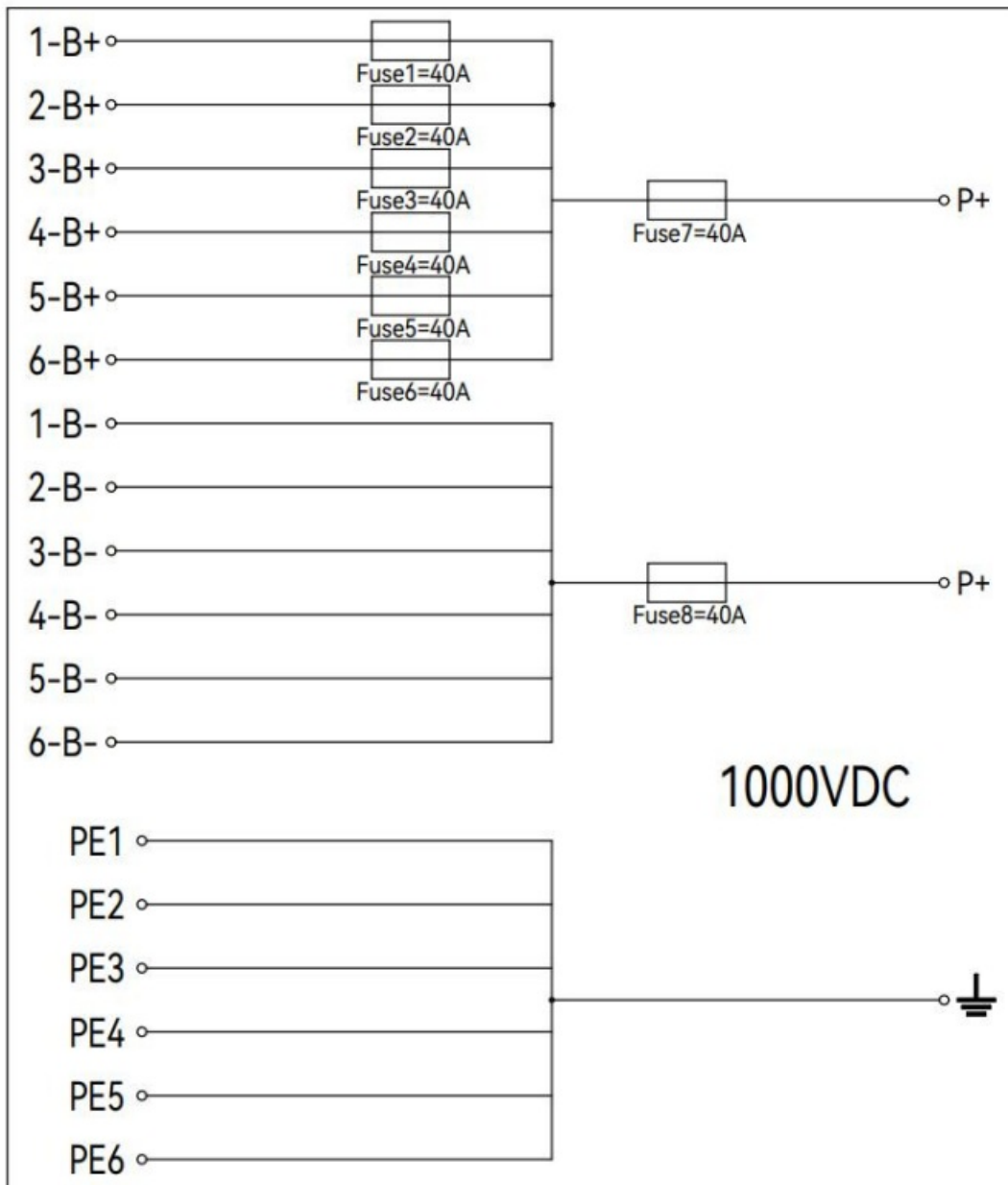
The **CB-03A03S-A** Combiner Box is a battery system junction box to an inverter. Up to 3 battery towers could be connected in parallel with this Combiner Box.

Figure 3 Block circuit diagram of the CB-03A03S-A Combiner Box



The **CB-03A06S-A** Combiner Box is a battery system junction box to an inverter. Up to 6 battery towers could be connected in parallel with this Combiner Box.

Figure 4 Block circuit diagram of the CB-03A06S-A Combiner Box



“1-B+”, “1-B-” and “PE 1” in the diagram above mean the positive power cable, negative power cable, and grounding cable from the battery tower Number 1.

Type Label

There is one type label attached to the Combiner Box. The type label is located on the left upside of the Combiner Box.






Production date: Year Month Day

You will find the following information on the type label:

- Manufacturer
- Device type
- Serial number
- Device-specific characteristics
- Production date

You will require the information on the type label to use the product safely and when seeking customer support from the BYD local service. The type label must remain permanently attached to the product.

Symbols on the Type Label

Symbol	Explanation
	Beware of electrical voltage.
	Disposal: Do not dispose of the system together with household waste, please contact BY D service (contact information at the end of this document) to dispose of it in accordance with regulations for electronic waste and used batteries.
	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

Assembly

Wall Mounting

Selecting the Mounting Location



Fire hazard due to wrong choice of mounting location

Under fault conditions electric arcs may occur in the Combiner Box. Electric arcs can cause fires if the Combiner Box is mounted on flammable materials.

- Do not mount the Combiner Box on flammable construction materials.
- Do not mount the Combiner Box near highly flammable materials.
- Do not mount the Combiner Box in potentially explosive atmospheres.

Requirements for the mounting location:

- The mounting location must not be in a living or office area.
- The mounting location must not block any escape routes.
- The mounting location must be freely and safely accessible at all times without the necessity for any auxiliary equipment (such as scaffolding or lifting platforms). Non-fulfillment of these criteria may restrict servicing.
- The mounting location must be suitable for the weight and dimensions of the Combiner Box.
- The mounting location must not be exposed to direct solar irradiation.
- The recommended height of the location is higher than 1.6 meters from the ground.
- Make sure that the Combiner Box enclosure is not mounted in the path of rainwater.

Requirements for mounting:

- Mount the Combiner Box in such a way that the connection area is facing downwards.

- The recommended height of the wall box should not exceed 3000mm
- Do not mount the Combiner Box in an inclined position.

Mounting the Combiner Box

CAUTION

Danger of crushing if the Combiner Box is dropped

- When mounting the Combiner Box, take the weight of up to 8.1 kg into account.
- Installer should use personal protective equipment.

NOTICE

Damage to cable glands and plug connections due to improper transport and installation
The cable glands and plug connections protrude from the enclosure.

- When transporting and mounting the Combiner Box, ensure that the cable glands and plug connections are not damaged.

Additionally required mounting material (not included in the scope of delivery):

- 2 expansion screws. Take wall properties into account when choosing the screw type.
- Three washers.
- If necessary, four screw anchors. Take wall properties into account when choosing the screw anchor type.

Figure 5 Dimensions of the CB-03A03S-A Combiner Box

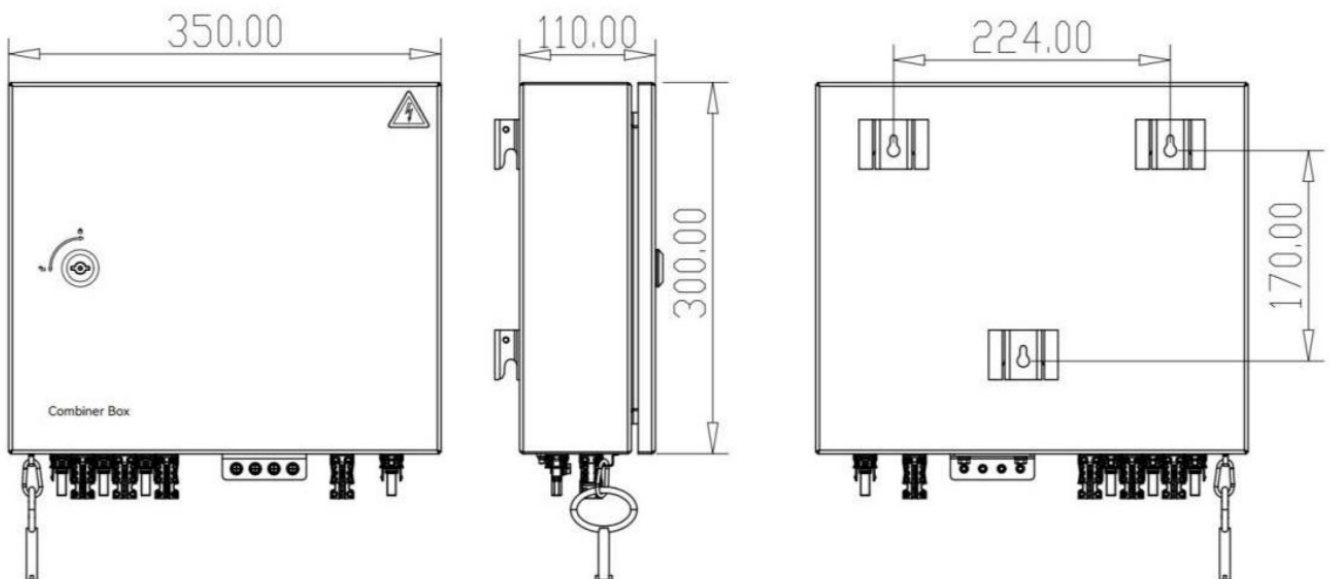
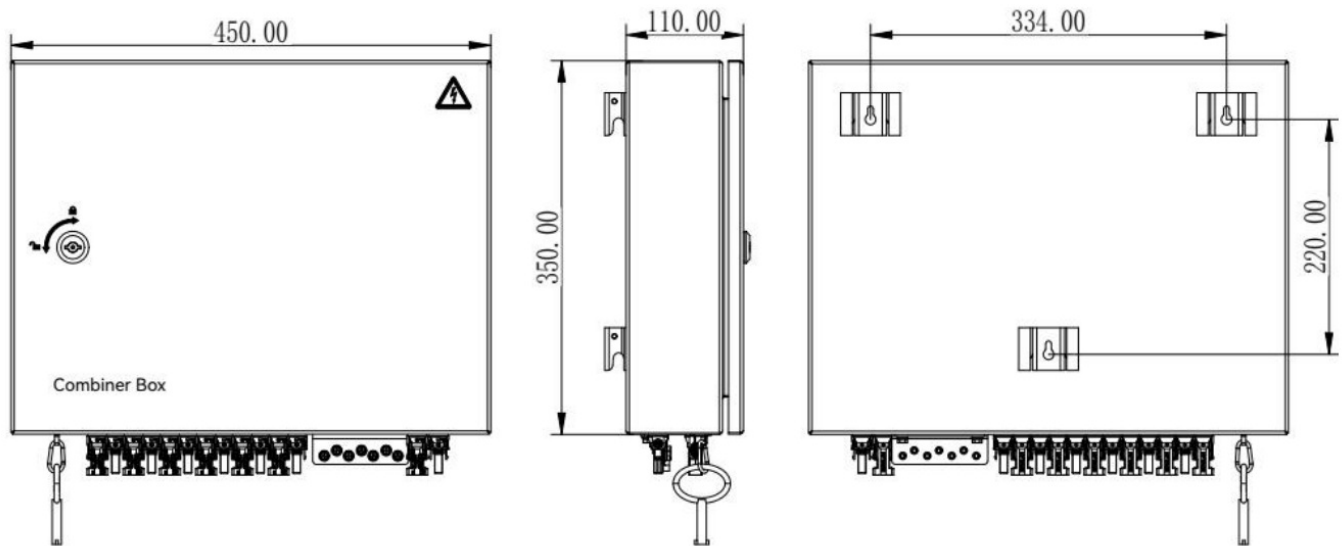


Figure 6 Dimensions of the CB-03A06S-A Combiner Box



Procedure:

1. Mark the position of the drill holes on the wall or stand.
2. Drill holes at the marked positions and fix rack with using suitable screws and washers.
3. If necessary, insert the screw anchors.
4. Put and fasten the Combiner Box on to the wall
5. Ensure that the Combiner Box is securely fixed.

Electrical Connection

Connection Instructions

Preliminary Checks



Before connecting the Combiner Box to the battery and inverter, make sure that:

- The Combiner Box is in good condition and there was no damage during transport.
- The Combiner Box is firmly anchored to walls and stable supports.



After performing the checks listed in the points above, proceed to wire the cables according to what is shown in the wiring diagram, making sure to use suitable sizes and colors.



Make sure that the DC connections are properly secured inside the terminals in order to prevent possible overheating that may lead to dangerous situations.

Safety during Electrical Connection

⚠ DANGER

Danger to life due to electric shock

High voltages are present in the live components of the Combiner Box. Therefore, work on the Combiner Box is only allowed if the power is disconnected and the guidelines that apply at the installation location are strictly followed.

- Disconnect from voltage sources:
- Ensure that the device cannot be reconnected.
- Ensure that no voltage is present.
- Ground and short-circuit.
- Cover or isolate any adjacent live components. Protective covers must always be mounted.

Inserting the Cables into the Switch Cabinet

Bottom view of Combiner Box with cable glands

Figure. 5 Bottom view of Combiner Box CB-03A03S-A with cable glands

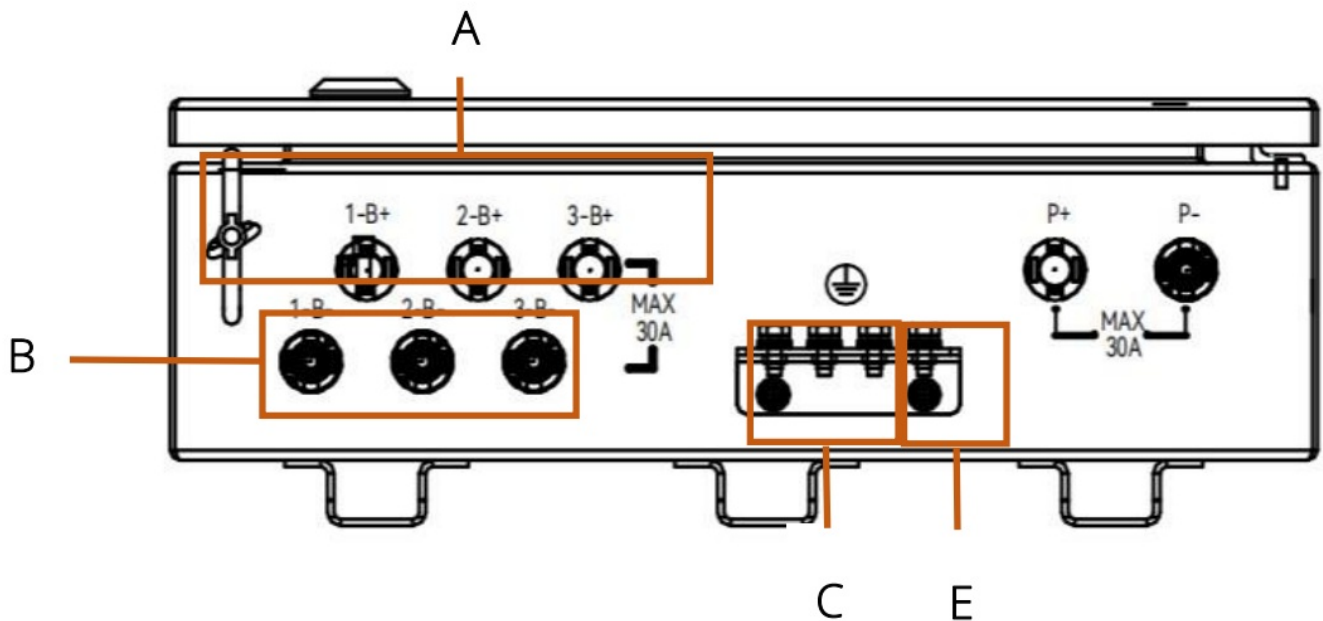
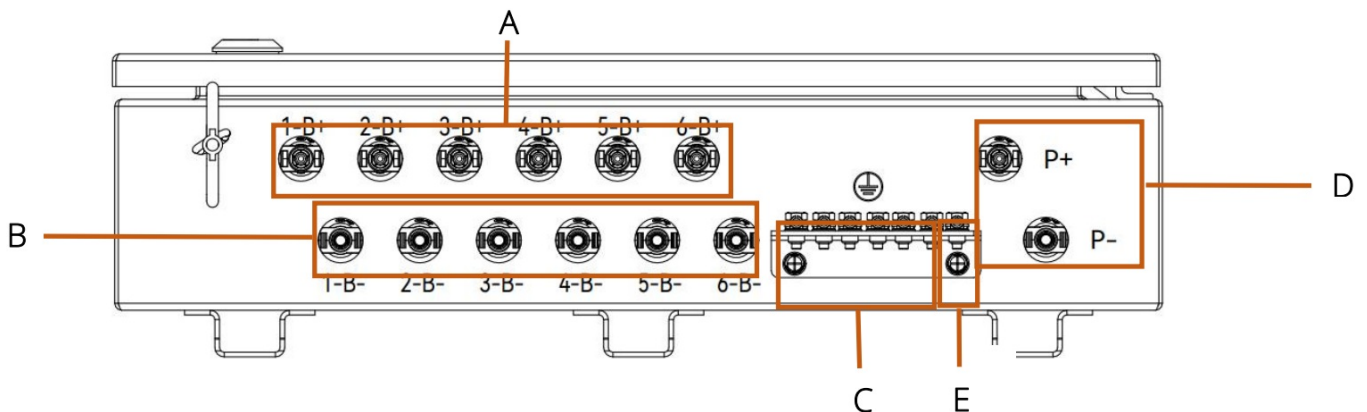


Figure. 6 Bottom view of Combiner Box CB-03A06S-A with cable glands

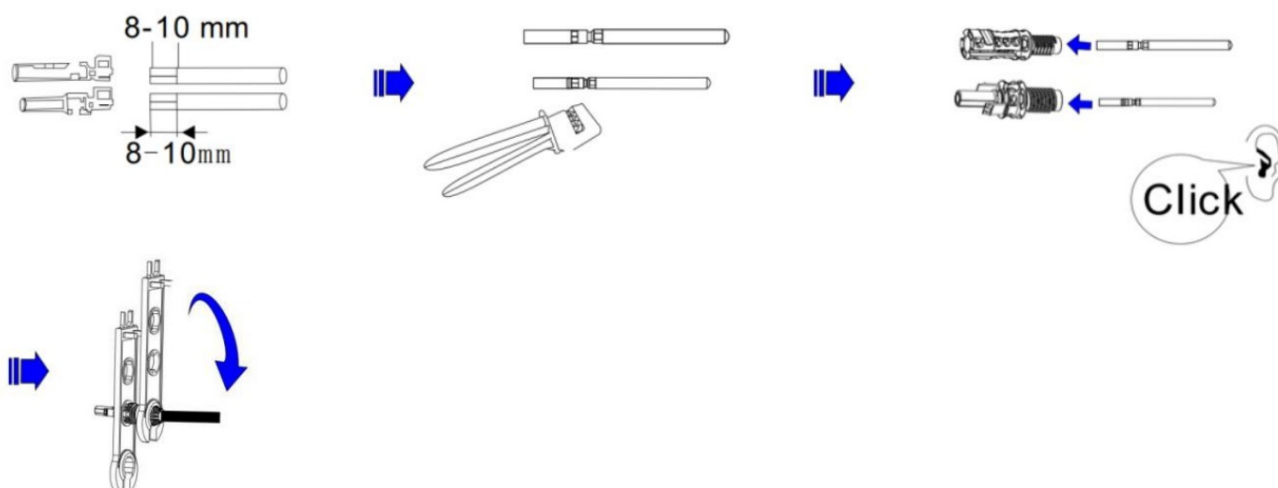


Position	Description
A	Cable entry for connecting positive power cables from battery towers
B	Cable entry for connecting negative power cables from battery towers
C	Grounding cables input from battery towers
D	Output DC cable glands to an inverter
E	Grounding cable output gland to a common ground point

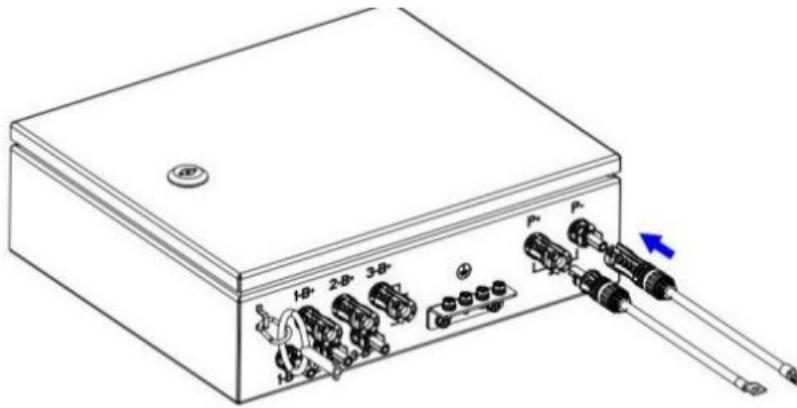
Connecting the DC Cables

Procedure:

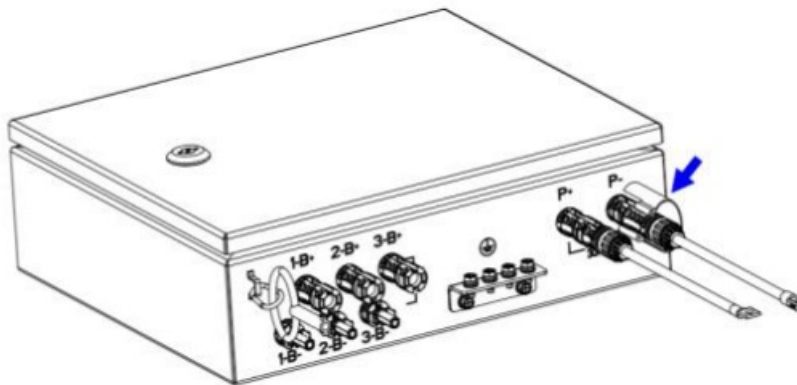
1. Open the clamp and hold. Place the contact in the appropriate cross-section range. Turn the crimp lugs upwards. Release the clamp. The contact is fixed.
2. Press the pliers gently together until the crimp lugs are properly located within the crimping die.
3. Insert the stripped cable end until the insulation comes up against the crimp insert. Completely close the crimping pliers.
4. Insert the crimped-on contact into the insulator of the male or female coupler until it clicks into place.
5. Insert the appropriate end of the test pin into the male or female coupler as far as it will go.
6. Screw up the cable gland hand-tight with the tools PV-MS.
7. The tightening torque must be appropriate for the solar cables used.
8. Plug the parts of the cable coupler together until they click in place. Check that they have engaged properly by pulling on the cable coupler.



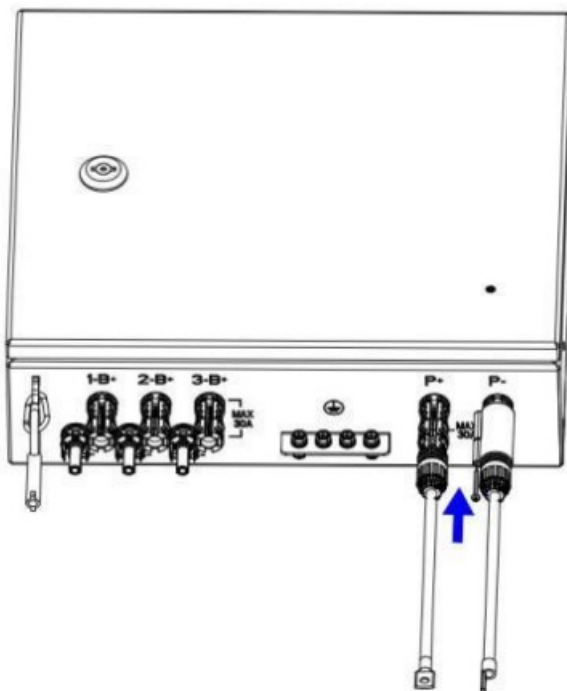
9. Plug the connectors into the corresponding DC cable ports.



10. Cover each power cable connector with a plastic sleeve.



11. Fix the sleeve with the bundled bolt.



Connecting the Grounding Cable

Cable requirement

- Conductor cross-section: equal or higher than 10 mm²

- Outer diameter: 6.8 mm

Procedure:

1. Un-shield the cable, strip conductor in line with insertion depth.
2. Insert the conductor fully into the barrel of the cable lug. (Lug size UL3577 or 9AWG)
3. Ensure that the palm of the cable lug is oriented towards the terminal of the equipment, to which the connection is to be made.
4. Select suitable crimping dies and tools to ensure that the joints made are mechanically strong.
5. Ensure proper crimping series.
6. When the cable lug has been crimped onto the conductor a heat shrink sleeve should be applied.
7. Use appropriate nuts, bolts, washers for a firm and secure electrical connectivity.
8. Loose the original nut and washer on the ground post.
9. Put the grounding cable in the ground post.
10. Tighten the nut and washer. (torque: 5.5 Nm).
11. Ensure that the grounding cable is securely fixed.

Maintenance

Periodic Maintenance

It is recommended to periodically inspect the panel and check the following points:

- There are no evident signs of rust or corrosion which may impair functioning and safety.
(Yearly – Visual inspection)
- There are no water infiltrations and excessive dust infiltration.
(Yearly – Visual inspection)
- The mass grounding and drains are efficient.
(Yearly – Visual inspection)
- There is insulation between the electrical circuits and masses.
(5 Year – Insulation test)
- All the DC connections are correctly tightened.
(Yearly – Dynamometric torque tool)
- There are no burn marks on the terminals.
(Yearly – Visual inspection)
- The door panel of the enclosure is firmly closed at the end of all the checks and after any maintenance.
(Yearly – Visual inspection)

Extraordinary Maintenance

If damaged components need to be replaced only use materials identical to those originally supplied.

If the electrical connections are damaged due to mechanical or electrical causes or due to rodents, immediately disconnect the system or at least the damaged part. After verifying that no failures were caused to the equipment, proceed with the replacement of the wires using similar materials.

CAUTION

All the maintenance operations must be performed by taking into account all safety instructions, checking beforehand that the components are not powered.

Decommissioning

Disassembling the Combiner Box

DANGER

Danger to life due to electric shock when touching live components of the Combiner Box

- Observe the following safety rules when disconnecting:
 - Disconnect from voltage sources.
 - Ensure that the device cannot be reconnected.
 - Check that no voltage or current is present.
 - Ground and short-circuit.
 - Cover or isolate any adjacent live components.

CAUTION

Risk of burns from touching hot components

- Wear personal safety equipment when working on the device.

Requirement:

The Combiner Box must be disconnected from voltage sources.

Procedure:

1. Remove bolt on the plastic sleeve with a screwdriver.
2. The cable coupler can be disconnected only with the tool PV-MS.
3. Press the latches together with the tool PV-MS and pull the halves of the coupler apart.
4. Disconnect the grounding cables.
5. Put the combiner off the rack.

Disposing of the Combiner Box

Dispose of the Combiner Box in accordance with the applicable disposal regulations for electronic waste.

Technical Data

General Data	CB-03A03S-A / CB-03A06S-A
Maximum Operating Voltage (Un)	1000 V DC
Rated Insulation Voltage (Ui)	1000 V DC
Rated Impulse Voltage (Uimp)	3.5 kv
Maximum input current per battery tower	30A
Maximum output current	30A
Rated Current of the ASSEMBLY (InA):	30A
Rated short-time withstand current (Icw)	< 45A
Pollution degree	3
Fuse holder	Rail Mounting -1,500 voe
Fuse type	40/22×58 – 1,500 voe -gPV
Fuse size	40A

MECHANICAL DATA	
Enclosure	SGCC (Galvanized Cold Rolled Steel)
Length/ Width/ Height	350x300x110 mm /450x350x110 mm
Weight	A
Degree of Protection	IP 55
Type of electrical connection	FFF – fixed connection
Form of separation	Form1 (no internal separation)

ENVIRONMENT DATA	
Ambient temperature during normal operation	-10-+50°C (Note 1)
Ambient temperature during storage	-10-+50°C
Humidity	0 % to 95 % non-condensing
Altitude	up to 3,000 m (Note 2)

DC INPUT DATA	
Maximum number of battery towers	3/6
Input cable glands entry	6 / 12
Input connection	Directly on terminal blocks
Conductor cross-section	6.63 mm ²

DC OUTPUT DATA	
Output cable glands entry	2
Input connection	Directly on terminal blocks
Conductor cross-section	6.63 mm ²


(Note 1): Derating of 0.5%/K of max. current from 40°C to so0 c.
(Note 2): Derating of maximum voltage versus altitude. 1.5 % per 100 m from 2001 m to 3000m.

Contact Information

Service in Europe desupport@byd.com
Telephone: +49 711 25513677
Address: Zettachring 6, 70567 Stuttgart, Germany
Global Service
Telephone: +86 755 89888888-47175
Address: No.3009, BYD Road, Pingshan, Shenzhen, 518118, P.R. China 24



Documents / Resources

	<p>BYD CB-03A03S-A Core Battery Combiner Box 3 [pdf] Instruction Manual CB-03A03S-A Core Battery Combiner Box 3, CB-03A03S-A, Core Battery Combiner Box 3, Co mbiner Box 3</p>
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