

blueplanet hy-switch

Accessories
for blueplanet
hybrid inverters



Operating Instructions English translation of German original

Important safety instructions

These instructions form part of the product and must be carefully read, observed and stored in a place which is freely accessible at all times.

Legal provisions

The information contained in this document is the property of KACO new energy GmbH. Publication, in whole or in part, requires the written permission of KACO new energy GmbH.

KACO warranty

For current warranty conditions, contact your system integrator.

You can download the current warranty conditions on the Internet at <http://www.kaco-newenergy.com>.

Definitions on product designations

In these operating instructions, the product "hy-switch" is referred to as component for ease of reading.

Trademarks

All trademarks are recognised, even if not explicitly identified as such. A lack of identification does not mean that a product or designation/logo is free of trademarks.

1. Contents

2. General information	5
2.1. About this document	5
2.2. Design features	6
2.3. Target group	7
2.4. Identification	8
3. Safety	9
3.1. Proper use	10
4. Component description	11
4.1. Functionality	11
4.2. Available accessories	11
4.3. Structure of the component	12
5. Technical data	13
5.1. Electrical data	13
5.2. Environmental data	13
6. Delivery and transport	14
6.1. Scope of delivery	14
6.2. Transporting the component	14
6.3. Installation tool	15
7. Assembly and preparation	16
7.1. Unpacking the component	16
7.2. Installing the component	16
8. Installation and start-up	18
8.1. General information	18
8.2. Integration possibilities	19
8.3. Connection to the mains	22
8.4. Communication to the inverter	25
8.5. Start-up	26
9. Operation	27
9.1. General information	27
9.2. Selecting the current sensors	27
9.3. Firmware updates	27
10. Maintenance and troubleshooting	28
10.1. Visual inspection	28
10.2. Cleaning	28
10.3. Fault displays	29
10.4. Shutting down for troubleshooting	30
10.5. Manual reset of the mains relay	30

11. Decommissioning and dismantling 32

- 11.1. Shutting down the component.....32
- 11.2. Uninstalling the component.....32
- 11.3. Disassembling the component33
- 11.4. Packaging the component33
- 11.5. Storing the component.....33

12. Disposal 34

13. Service and warranty 34

2. General information

2.1. About this document



WARNING

Improper handling of the component can be hazardous!

You must read and understand the operating instructions in order to install and use the component safely.

Other applicable documents

During installation, observe all assembly and installation instructions for components and other parts of the system. These instructions also apply to the equipment, related components and other parts of the system.

Storing the documents

These instructions and other documents must be stored near the system and be available at all times.

English translation of German original

This document has been produced in several languages. The German-language version is the original version. All other language versions are translations of the original version.








WARNING

Improper handling of the component can be hazardous!

You must read and understand the operating instructions in order to install and use the component safely.

2.2. Layout of Instructions

2.2.1. Symbols used

	General hazard		Earthing – protective conductor
	Electrical voltage		Protect from moisture
	Authorized electrician	The tasks indicated with this symbol may only be carried out by an authorised electrician.	



DANGER

High risk

Failure to observe this warning will lead directly to serious bodily injury or death.



WARNING

Potential risk

Failure to observe this warning may lead to serious bodily injury or death.



CAUTION

Low-risk hazard

Failure to observe this warning will lead to minor or moderate bodily injury.



CAUTION

Risk of damage to property

Failure to observe this warning will lead to property damage.

2.2.2. Additional information symbols



NOTE

Useful information and notes

Information that is important for a specific topic or objective, but that is not safety-relevant.

2.2.3. Symbols for instructions

↳ Prerequisite for action note

- 1 Carry out the next step
 1. Additional action sequence
 - ⇒ Interim result of the action
 - » End result

2.3. Target group

All activities described in the document may only be carried out by specially trained personnel with the following qualifications:

- Knowledge about how an inverter functions and operates.
- Training in dealing with hazards and risks when installing and operating electrical components, devices and systems.
- Education concerning the installation and start-up of electrical devices and systems.
- Knowledge of applicable standards and directives.
- Knowledge and adherence to this document with all safety notices.

2.4. Identification

For the service and other setup-specific requirements, you will find the name plate with the following data on the left side panel of the product:

- Product name
- Part no.
- Serial number
- Date of manufacture
- Technical data
- Disposal information
- Certification marking, CE marking





KACO new energy GmbH Carl-Zeiss-Str. 1 74172 Neckarsulm		K A C O  new energy.	
Order no.	1001901		
Serial-no.	102191054321		
Type	KACO blueplanet 1.0 EMAS		
Device	Smart Switch		
Overvoltage Protection	Class III	U AC max	264,5 V
Protection Class	Class I	U nom	230 V
Temperature Range	5°C +40°C	I AC Nom	3P x 35 A
Environment	IP20	F nom	50 Hz
Production Date	Q4 / 2019		

Fig. 1 Name plate

3. Safety



NOTE

Before using the product for the first time, please read through the safety instructions carefully.



DANGER

Lethal voltages are still present in the connections and cables of the housing even after the component has been switched off and disconnected!

Severe injuries or death may occur if the cables and/or terminals/busbars in the component are touched.

- > Comply with all safety regulations and current technical connection specifications of the responsible power supply company.
- > The component is only permitted to be opened or serviced by a qualified electrician.
- > Switch off the grid voltage by turning off the external circuit breakers.
- > Check that no voltage is present using suitable voltage tester.
- > Keep the component closed when in operation.

The electrician is responsible for observing all existing standards and regulations. The following applies:

- Keep unauthorised persons away from the component and/or system.
- Ensure operational safety by providing proper grounding, conductor dimensioning and appropriate protection against short circuiting.
- Observe all safety instructions on the product and in these operating instructions.
- Switch off all voltage sources and secure them against being inadvertently switched back on before performing visual inspections and maintenance.
- When taking measurements on the live component:
 - Do not touch the electrical connections
 - Remove all jewellery from wrists and fingers
 - Ensure that the testing equipment is in safe operating condition.
- Modifications to the surroundings of the component must comply with the applicable national standards.

3.1. Proper use

The component is intended for indoor applications and may only be used in countries for which it has been approved or for which it has been released by KACO new energy and the grid operator.

Operate the component only with a permanent connection to the public power grid. The country and grid type selection must be commensurate with the respective location and grid type.

The requirements of the grid operator must be met for grid connection to take place. The permission of the relevant authorities may also be required in order to secure authorisation to connection to the grid.

The enclosed documentation is an integral part of the component. The documentation must be read, observed and stored in a place which is freely accessible at all times.

The name plate must be permanently attached to the component.

Any other or additional use of the device shall be regarded as improper.

This includes:

- Use without a blueplanet hybrid inverter
- Mobile use
- Use in rooms where there is a risk of explosion
- Outdoor use
- Operation outside the specification intended by the manufacturer
- Modification of the component

4. Component description

4.1. Mode of operation

The blueplanet hy-switch is a complementary component to the blueplanet hybrid inverter series. It is not functional without the blueplanet hybrid inverter.

The blueplanet hy-switch serves as a measuring point and all-pole disconnection point for the local network. It is connected to the three phases, the neutral conductor and the earth (PE).

The measuring point is required to record and compensate the consumption of the local installation in connection with the blueplanet hybrid inverter. This includes all loads installed behind the blueplanet hy-switch. Therefore, the installation location depends on the structure of the subnetwork to be compensated; in single-family houses, it is typically located at the grid connection point.

In addition, the measuring point enables no electricity from the batteries connected to the blueplanet hybrid to be exported to the public grid (flow direction sensor).

The all-pole disconnection point offers the possibility of disconnecting the local installation from the public power supply. This makes it possible to temporarily set up a stand-alone grid with the blueplanet hybrid inverter, e.g., if the public power supply is disrupted. This function must be enabled on the inverter. Activation is subject to a fee.

4.2. Available accessories

External current sensors are offered as accessories. These enable the measurement of higher powers, as well as a separation of measuring and switching point. The current sensors are designed with jack plugs, which are connected to the side of the component.

4.3. Structure of the component

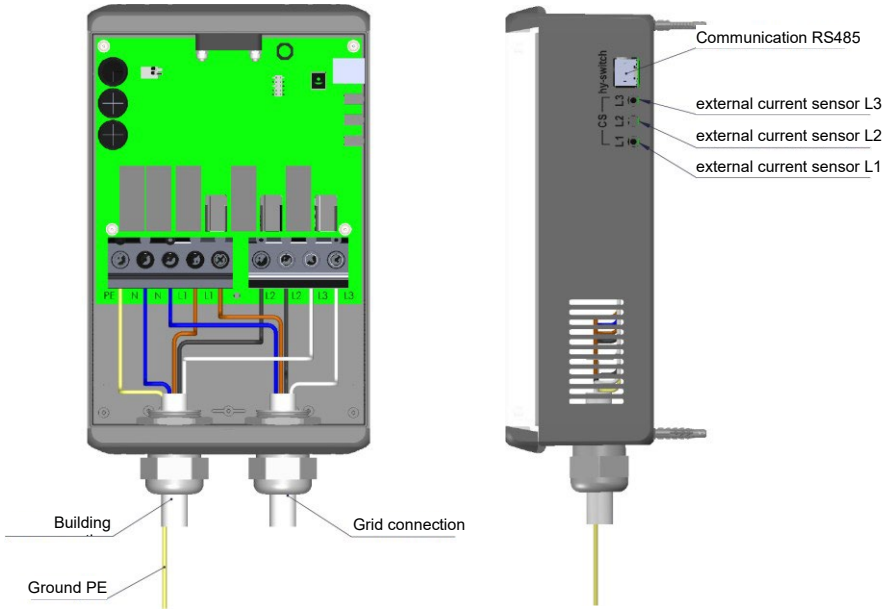


Fig. 2: Structure of the component with external connections

5. Technical data

5.1. Electrical data

isolator switch	hy-switch
Max. isolation voltage	264 V
Max. load current	50 A
Max. continuous power	30 000 W
Grid failure detection	200 ms
Switchover time from grid to standalone mode	< 3 s (depending on test sequence)
Current counter	
Measuring range of internal current sensors	35 A RMS
Measuring range of external current sensors	70 A RMS
Measuring accuracy of AC power (internal)	3%
Measuring accuracy of AC power (external)	5%
Measuring speed	Real-time
Installation	
Max. cable length to the blueplanet hy-switch	20 m
AC cable cross-section max.	35 mm ²
Communications connection	1 x RJ45 (RS485)
Connection for external current sensors	3 x 3.5 mm jack
General data	
Protection rating (IEC 60529)	IP20
Protection class (IEC 62109-1)	I
Certificates	VDE 0126, VDE AR-N 4105
Warranty	2 years
Dimensions (W x H x D)	170 x 280 x 92 mm
Weight	1.2 kg
Supported devices	
Inverter	blueplanet hybrid 10.0 TL3
Max. number of inverters	3

Tab. 1 Technical data

5.2. Environmental data

	blueplanet hy-switch
Ambient temperature	+5°C + 40°C
Protection rating (KACO installation location)	IP20
Humidity range (non-condensing) [%]	0 to 90 %

Tab. 2 Environmental data

6. Transportation and Delivery

Every product leaves our factory in perfect electrical and mechanical condition. Special packaging ensures that the devices are transported safely. The shipping company is responsible for any transport damage that occurs.

6.1. Scope of delivery

Check the equipment included

1. Inspect the component thoroughly.
2. Immediately notify the shipping company in case of the following:
 - Damage to the packaging that indicates that the component may have been damaged.
 - Obvious damage to the component.
3. Send a damage report to the shipping company immediately.
4. The damage report must be received by the shipping company in writing within six days following receipt of the component.
We will be glad to help you if necessary.

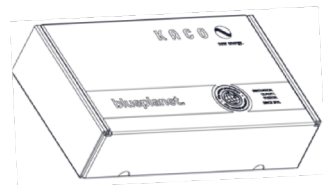
Scope of delivery

1x component in closed housing 1x
mounting kit, consisting of
4x fixings
4x screws 1x
operating instructions

6.2. Transporting the component

For safe transport of the product, please use the original packaging (cardboard box).

Packaging:	Folding cardboard box
Packaging size:	400 x 245 x 100 mm
Total weight	approx. 1.5 kg









CAUTION

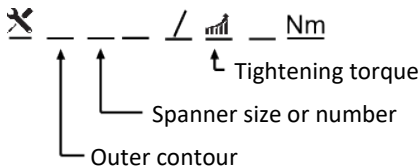
Hazard due to impact; risk of breakage to the component!

- > Pack the component securely for transport.
- > Do not subject the component to any shocks.

6.3. Installation tool

The codes given in the table below are used in all usage instructions for assembly/installation/maintenance and disassembly for the tools and tightening torques being used.

Code (s)	Shape of the connector
 W	External hexagon
 A	Internal hexagon
 D	Torx
 S	Slot



7. Assembly and preparation

7.1. Unpacking the component



CAUTION

Property damage as a result of condensation!

Faulty storage can form condensate in the component and impair its function (e.g., storage outside the ambient conditions or a brief change of location from a cold to a hot environment).

1. Open the packaging carefully. Be careful not to damage the component when using sharp objects.
2. Remove the operating instructions and installation bag
3. Remove the component from the packaging.
4. Place the protective packaging back into the carton.

» Continue installing the component.

7.2. Install the component

Choosing the installation location

Place the blueplanet hy-switch near the control cabinet or energy sub-distributor. Observe the environmental data under 5.2.

When mounting, keep a distance of at least 15 cm to all sides. The additional space required for the connection area of the AC cables below the hy-switch must be provided. Observe the permissible bending radii of the cables.



NOTE

Access by maintenance personnel for service

Any additional costs arising from unfavourable structural or mounting conditions shall be billed to the customer.

Securing the component

1. Insert the screwdriver [XS_1.0] into the central recess between the cover plate and the plastic hinge and carefully separate the two.
2. Store the cover plate carefully until installation is complete.
3. Attach the four dowels with the hole dimensions 153 mm x 247 mm to the mounting wall (cf Fig. 3)

» Component is mounted next to the switch box/control cabinet on the wall.



CAUTION

Avoid damage due to hard striking!

Hard strikes or an uneven surface can damage the component.

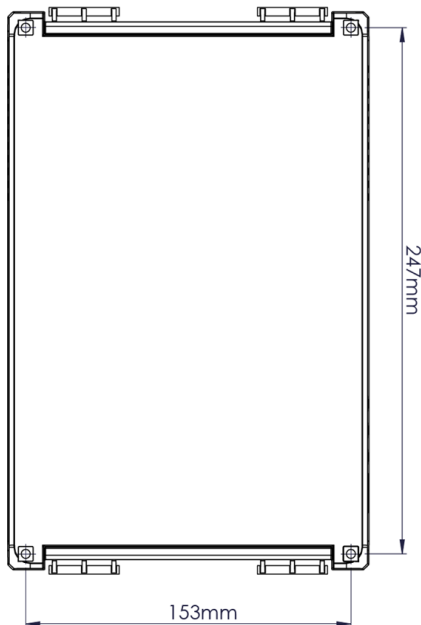


Fig. 3: Hole spacing for mounting

8. Installation and start-up

8.1. General information



DANGER

Serious injury or death may occur from touching the cables, busbars or terminals of the component or the control cabinet.

- > Comply with all safety regulations and current technical connection specifications of the responsible power supply company.
- > The component is only permitted to be opened or serviced by a qualified electrician.
- > Switch off the grid voltage by turning off the external circuit breakers.
- > Do not touch the cables and/or terminals/busbars when switching the device on and off.
- > Keep the component closed when in operation.



WARNING

To prevent the risk of fire,

Never cover the component completely or partially when it is in operation.



NOTE

Select conductor cross-section, safety type and safety value in accordance with the following basic conditions:

Country-specific installation standards; power rating of the component; cable length; type of cable installation; local temperatures.

Install the blueplanet hy-switch near the building connection or energy sub-distributor.

8.2. Integration options



The component has two different options for current measurement. The internal current sensors may be loaded with a maximum of 50 A. The external current sensors (optional) may be loaded up to a maximum of 100 A. Compensation control and feed-in limitation in connection with external feeders is possible up to a maximum of 35 A for internal current sensors and 70 A for external current sensors.

Only consumers that are installed downstream of the component on the grid connection side and in the same area of the local installation as the blueplanet hybrid inverter can be entitled to replacement power (if enabled, see 4.1).

No.	Description
1	Power supply company counter (bidirectional meter)
2	blueplanet hy-switch
3	Switchable line protection (4p 20A)
4	EVU counter for generation (optional)
5	RCD type B, 30 mA (required for backup power operation)
6	blueplanet hybrid inverter
7	Load

Installation of grid parallel and standby power operation (standard)

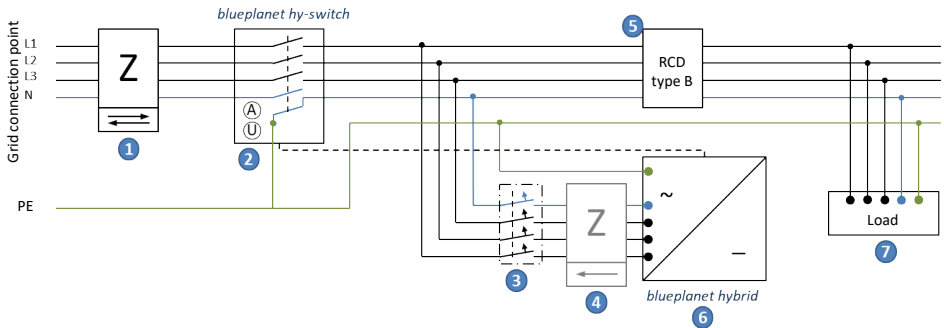


Fig. 4: Installation of grid parallel and standby power operation

Installation Grid parallel operation

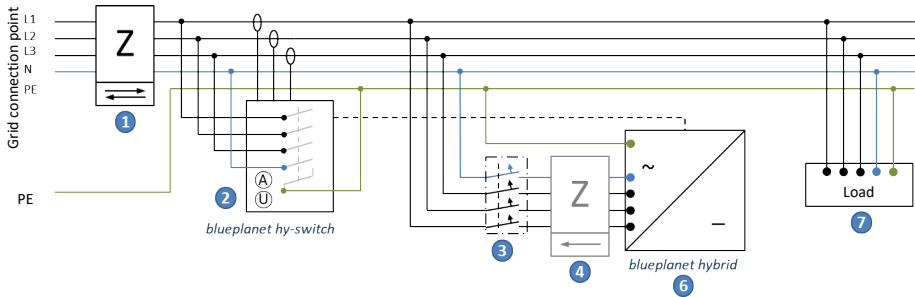


Fig. 5: Installation of grid parallel operation

Installation with separate external supply

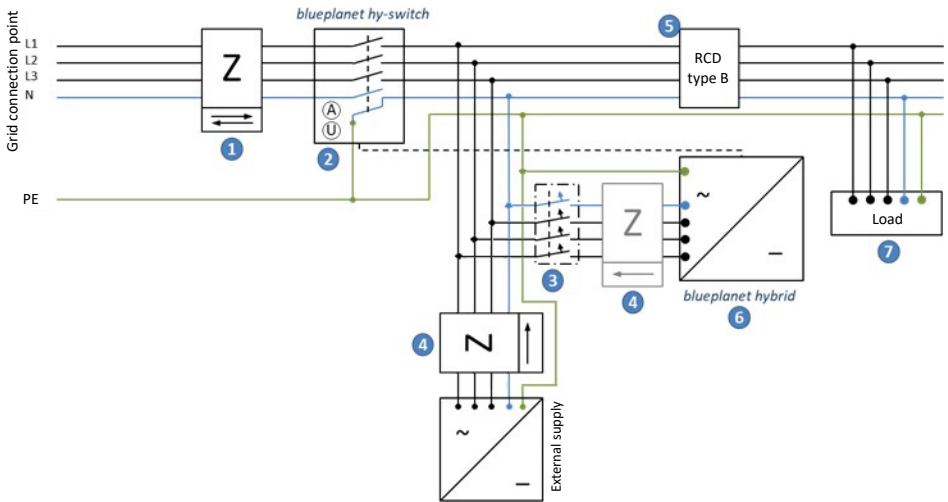


Fig. 6: Installation with separate external supply

Integration according to grid types:

The component is suitable for integration into various grid types. The wiring from the component in the local installation must always be a 5-core design.

Integration into TN grid

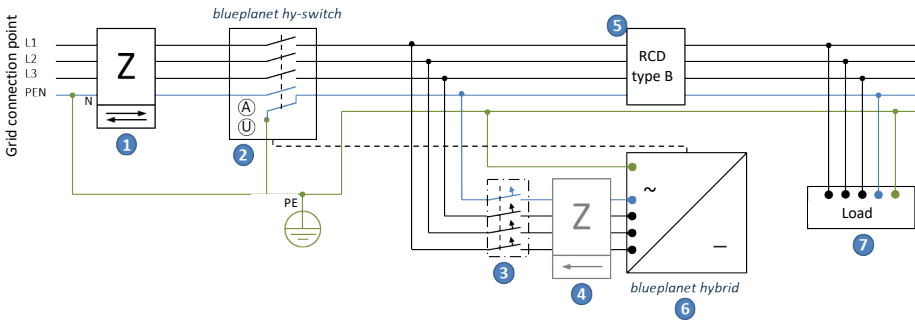


Fig. 7: Integration into TN grid

Integration in TT grid

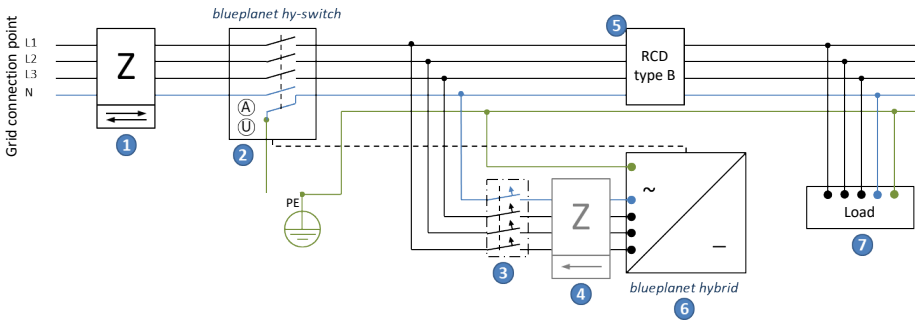


Fig. 8: Integration in TT grid

8.3. Connection to the power grid



DANGER

Serious injury or death from touching live parts.

- > Disconnect the electric circuits to be worked on from all power sources.
- > Switch off all inverters and all local generators.
- > Switch off grid connection



WARNING

To avoid the risk of fire or electric shock, make sure that

the wiring is in good condition and not undersized. Never install defective or inferior cables. Cable connections may only be connected or disconnected without power.



NOTE

Fuse protection of max. 50 A required

A fuse protection of max. 50 A is required in the connection line of the component. Higher currents can damage the component.



Authorised electrician

The integration of the component into the local installation must be chosen correctly. Typically, it is installed after the utility company's counter and before the first load output. Observe the integration options shown in 8.2 .

⤴ Component is securely mounted (see 7.2).

1. Determine the connection point for integrating the component into the local installation.
2. Switch off all inverters, all local generators and the grid connection.
3. Establish the connection points for the component in the control cabinet.
4. Note the required cable cross-sections:
5. Insert the cable into the component and into the control cabinet.
6. Insulate all wires of the cable properly.
7. Wire the component on the cable clamps with [X S_2.5] (see Fig. 9):
 1. Insert the cables through the cable gland.
 2. Connect PE

3. Connect the house grid (consumer) to "off-grid" (3p+N) and connect to the corresponding connection point in the control cabinet.
(only when using the component's internal current sensors)
4. Connect the grid connection to "grid" (3p+N) and connect to the corresponding connection point in the control cabinet.
5. Carefully close the cable gland [~~X~~W_36].
8. If you want to use external current sensors, install them and connect the cables to the CS connections on the side: L1, L2, L3 (see Fig. 10).
9. Check that the phases or current sensors are connected to the component in the correct order.
10. Check all cables for firm fit.
11. Hold the cover plate on the mounted housing and carefully engage the upper and lower plastic hinges. The component must be securely closed with this.
12. Switch the grid connection back on.

» Component is mounted next to the switch box/control cabinet on the wall.

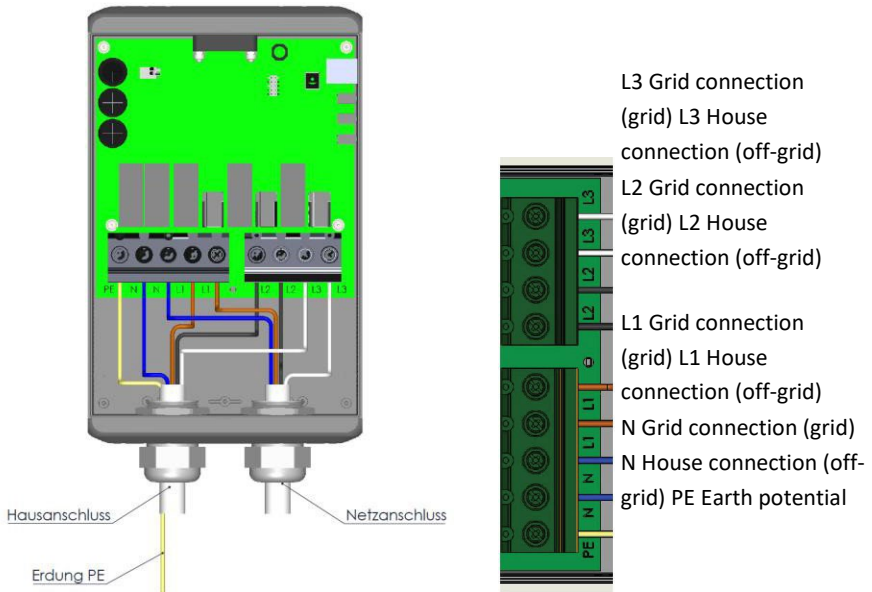


Fig. 9: Grid connection with cable gland and assignment

8.4. Communication to the inverter



The communication cable requires RJ45 plugs on both sides and must comply with CAT 5E S/FTP. The length depends on the installation location, but should not exceed 20 m. Cross-over assignments cannot be used.

1. The hy-switch connection of the blueplanet hybrid inverter must be connected to the hy-switch connection of the component.

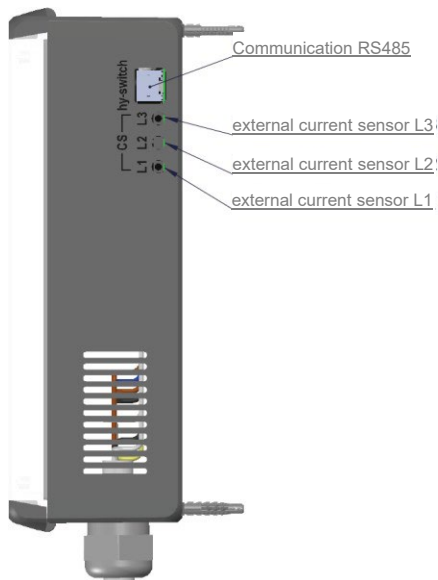


Fig. 10: External component connections for the external current sensors (jack plug) and the communication cable (RJ45)

8.5. Commissioning



The component is set to switch through grid and off-grid side of the connections in the delivery state. The component is activated when the blueplanet hybrid inverter is started. This can also be used to make settings on the component, e.g. the selection of the current sensors. Please refer to the manual of the blueplanet hybrid inverter.

The component is ready for operation when the green LED on the circuit board lights up.

Check whether the current firmware version is installed and update it if necessary. For more information, see 9.3.

9. Operation

9.1. General information

The component does not have a direct user interface. A status LED on the circuit board of the component indicates the operating status during operation of the blueplanet hybrid inverter.

Operating status display

Green = component is ready for operation

Red = there is a malfunction

Off = no/insufficient power supply

9.2. Selecting the current sensors



The component offers the possibility to use internal and external current sensors. Depending on the configuration, different functions and different maximum currents can be measured (see 8.2).

The current sensors can be selected on the blueplanet hybrid inverter via the user interface or the hy-sys software. For more information, please refer to the operating instructions of the inverter and the application note for the hy- sys software.

9.3. Firmware updates

The firmware of the component should be updated regularly. The update is carried out via the hy-sys software. This must be run on a computer connected to the blueplanet hybrid inverter.

The current firmware version can be found in the download area of the KACO homepage, under www.kaco-newenergy.de. A special update file with the file extension .EDU is required for the firmware update. Details on updating the firmware can be found in the hy-sys software application note in the *Update* section.

10. Maintenance and troubleshooting



DANGER

Dangerous voltage due to two operating voltages!

Severe injuries or death may occur if the cables and/or terminals/busbars in the component are touched.

10.1. Visual inspection

Inspect the product and the connected cables annually for visible external damage. In the event of damage, notify your installation engineer. Repairs may only be carried out by authorised electricians.

The air inlets of the component may not be covered during operation.

10.2. Cleaning

Clean the exterior of the housing with a dry cloth.



DANGER

Danger of death due to penetrating fluid!

Clean the component only from the outside. Only use dry objects to clean the component.



CAUTION

Damage to the housing parts when using cleaning agents!

If the component is dirty, clean the housing and the housing cover with a dry cloth only.



NOTE

The cleaning intervals must be adapted to the environmental conditions of the installation site.

10.3. Fault displays



The component does not have a direct user interface. A status LED on the circuit board of the component indicates the operating status during operation of the blueplanet hybrid inverter.

Operating status display

Red = there is a malfunction

Cause/solution:

1. Check the wiring to the inverter.
 - a. Is the cable damaged?
 - b. Are the plugs mounted correctly?
 - c. Cable type: CAT 5E S/FTP, no cross-over
 - d. Is the cable length at most approx. 20 m?

Test another communication cable, if available.

2. Check the correct connection to the grid and the correct earthing of the component.

Off = no/insufficient power supply

The blueplanet hybrid inverter supplies the component with power via the communication cable.

Cause/solution:

1. The blueplanet hybrid inverter is not in operation.
2. The wiring to the inverter is interrupted.

Error output via the inverter

Warning and error messages of the component can also be output via the connected blueplanet hybrid inverter and the associated hy-sys software. These are documented in the operating manual of the blueplanet hybrid inverter.

10.4. Shutting down for troubleshooting

 **Authorised electrician**

 **DANGER**



Lethal voltages are still present in the connections and cables of the housing even after the component has been switched off and disconnected!

Severe injuries or death may occur if the cables and/or terminals/busbars in the component are touched. Only appropriately qualified electricians authorised by the mains supply network operator are permitted to open and maintain the component.

- > Comply with all safety regulations and current technical connection specifications of the responsible power supply company.

Shutdown sequence

1. Switch off the blueplanet hybrid inverter.
2. Disconnect the communication cable to the blueplanet hybrid inverter.
 1. Carefully press down the retaining lug on the RJ45 plug.
 2. Pull the RJ45 plug out of the socket.
3. Switch off the grid voltage by turning off the external circuit breakers.

10.5. Manual reset of the mains relay

 **Authorised electrician**

In exceptional cases, it may be necessary to reset the mains relays so that the voltage supply to the local installation can be restored by the public grid. If a reset via the hy-sys software is not possible, proceed as follows:

↳ Switching off all voltages (see 10.4).

1. Disconnect the entire local installation from the power supply
2. Insert the screwdriver [XS_1.0] into the central recess between the cover plate and the upper plastic hinge and carefully separate the two.
3. Fold down the cover.
4. Check that no voltage is present using suitable voltage tester.
5. Apply a voltage of 9-12 V to the XS500 socket with a suitable power supply unit
Polarity: Outside "minus", inside "plus" (power supply unit not included)
6. Press S500 button (press for longer than 3 seconds)

» Switch grid relay

7. Remove the voltage source from the XS500 socket.
8. Place the cover plate upwards and snap the plastic hinge back into place.

» Component is closed again.

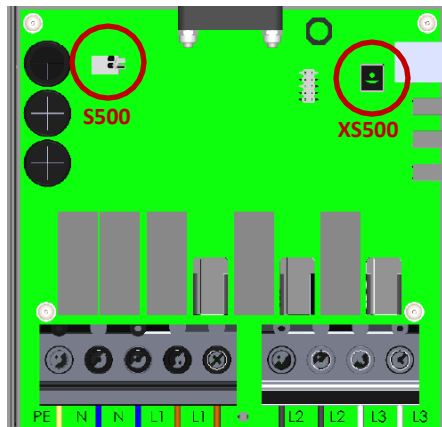


Fig. 11: Resetting the mains relays

11. Decommissioning and dismantling

11.1. Shutting down the component

see section 10.4 Shutting down for troubleshooting

11.2. Uninstalling the component



Authorised electrician



DANGER

Lethal voltages are still present in the connections and cables of the housing even after the component has been switched off and disconnected!

Severe injuries or death may occur if the cables and/or terminals/busbars in the component are touched. Only appropriately qualified electricians authorised by the mains supply network operator are permitted to open and maintain the component.

- > Comply with all safety regulations and current technical connection specifications of the responsible power supply company.

1. Ensure that the component is disconnected from the power supply.
2. Dismantle external current sensors (if present)
 3. Disconnect the working area from all power sources
 4. Unplug the current transformer from the component
 5. Dismantle the current transformer from the conductor
3. Insert the screwdriver [~~X~~S_1.0] into the central recess between the cover plate and the hinge and carefully separate the two.
4. Disconnect the wires from the terminals [~~X~~S_2.5], PE last.
5. Open the two cable glands [~~X~~W_36].
6. Pull the cables out downwards.
7. Carry out necessary work in the control cabinet in which the component was integrated.

The component is now electrically disconnected.

11.3. Disassembling the component

↪ Component must have been electrically uninstalled beforehand (see 11.2).

1. Unscrew the component from the wall with the four screws [X A_2.5].
2. Hold the cover plate on the housing and carefully engage the upper and lower plastic hinges.

11.4. Packaging the component

↪ Component is dismantled (see 11.3).

1. If possible, always pack the component in its original packaging. If this is no longer available, an alternative is to use equivalent packaging.
1. You must be able to close the box completely and it must be able to accommodate the weight and size of the product.

11.5. Storing the component

↪ Component is packed (see 11.4).

Store the component at a dry location, in accordance with the ambient temperature range. Environmental data [see chapter 5.2]

12. Disposal



CAUTION



Risk to the environment if disposal is not carried out in the correct manner

Both the component and the corresponding transport packaging are primarily made from recyclable raw materials.

Do not dispose of faulty components or accessories together with household waste. Ensure that the old unit and any accessories are disposed of in a proper manner.

Packaging: Ensure that the transport packaging is disposed of properly.

13. Service and warranty

If you need help solving a technical problem with one of our KACO products, please contact our service hotline.

Please have the following information ready so that we can help you quickly and efficiently:

- Component designation / serial number
- Date of installation / Start-up report
- Fault message shown by the LEDs / Description of the fault / Did you notice anything unusual? / What has already been done to analyse the fault?

You can find the following information and other items on our website

www.kaco-newenergy.de:

- our current warranty conditions,
- a complaint form,



NOTE

Observe our general warranty conditions for inverters and accessories. The maximum length of the warranty is based on the currently applicable national warranty conditions.

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