Accessories for Wind Power Inverter

WINDY BOY PROTECTION BOX 400 / 500 / 600

Installation Guide
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1 Notes on this Guide

1.1 Validity
This guide applies to the following device types:
- WBP-Box 400-11
- WBP-Box 500-11
- WBP-Box 600-11

1.2 Target Group
This guide is for qualified personnel. The tasks described in this guide may only be performed by qualified personnel.

1.3 Additional Information
You will find further information on the Windy Boy Protection Box in the download area of www.SMA.de/en.
1.4 Symbols Used

The following types of safety warnings and general information are used in this guide:

⚠️ **DANGER**

"DANGER" indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠️ **WARNING**

"WARNING" indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠️ **CAUTION**

"CAUTION" indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

⚠️ **NOTICE**

"NOTICE" indicates a situation that can result in property damage if not avoided.

ℹ️ **Important**

"Important" indicates important information.
2 Safety

2.1 Appropriate Usage

The Windy Boy Protection Box converts the variable AC voltage of a small wind turbine system into DC voltage. The Windy Boy Protection Box sends the DC voltage to the wind power inverter. At the same time, the Windy Boy Protection Box protects the wind power inverter against overvoltage. Depending on the device type, the Windy Boy Protection Box restricts the DC voltage to 400 V, 500 V or 600 V (see section 10 “Technical Data”, page 22).

The Windy Boy Protection Box has been designed to allow up to 3 wind power inverters to be connected. Various combinations with SMA wind power inverters are possible (see the Technical Information "Windy Boy Protection Box" at www.SMA.de/en).

The output voltage and output current of the small wind turbine system, among other factors, determine the systems for which the Windy Boy Protection Box is suitable. Observe all restrictions imposed by the manufacturer. Ensure that the permitted operating range of all components is maintained at all times.

The Windy Boy Protection Box is only suitable for use with original SMA accessories or with accessories recommended by SMA Solar Technology AG.

Do not use the Windy Boy Protection Box for purposes other than those described here. Modifications and the installation of components void the warranty claims and operation permit.

This guide forms part of the Windy Boy Protection Box. Follow all tasks in this guide. Keep this guide in a convenient place for future reference.

Principle of a small wind turbine system with Windy Boy Protection Box
## 2.2 Safety Precautions

Danger to life due to high voltages.
- All work on the Windy Boy Protection Box must be carried out exclusively by qualified personnel.

## 2.3 Symbols on the Type Label

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Symbol" /></td>
<td>Beware of dangerous electrical voltage. The Windy Boy Protection Box operates at high voltages. All work on the Windy Boy Protection Box must be carried out exclusively by qualified personnel.</td>
</tr>
<tr>
<td><img src="image2" alt="Symbol" /></td>
<td>Beware of hot surface. The Windy Boy Protection Box can become hot during operation. Avoid contact during operation.</td>
</tr>
<tr>
<td><img src="image3" alt="Symbol" /></td>
<td>Observe all documentation included with the Windy Boy Protection Box.</td>
</tr>
<tr>
<td><img src="image4" alt="Symbol" /></td>
<td>The Windy Boy Protection Box must not be disposed of together with the household waste. For more information on disposal, see section 9.4 “Disposing of the Windy Boy Protection Box”, page 21.</td>
</tr>
<tr>
<td><img src="image5" alt="Symbol" /></td>
<td>CE mark. The Windy Boy Protection Box complies with the requirements of the applicable EC guidelines.</td>
</tr>
<tr>
<td><img src="image6" alt="Symbol" /></td>
<td>Direct Current (DC).</td>
</tr>
<tr>
<td><img src="image7" alt="Symbol" /></td>
<td>Alternating Current (AC).</td>
</tr>
</tbody>
</table>
3 Scope of Delivery

Figure 1: Components included in delivery

<table>
<thead>
<tr>
<th>Position</th>
<th>Quantity</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>Windy Boy Protection Box</td>
</tr>
<tr>
<td>B</td>
<td>1</td>
<td>M25 cable gland</td>
</tr>
<tr>
<td>C</td>
<td>4</td>
<td>M20 cable gland</td>
</tr>
<tr>
<td>D</td>
<td>1</td>
<td>M12 cable gland</td>
</tr>
<tr>
<td>E</td>
<td>3</td>
<td>Multiple seal inserts for M20 cable gland</td>
</tr>
<tr>
<td>F</td>
<td>2</td>
<td>Sealing plugs for enclosure opening</td>
</tr>
<tr>
<td>G</td>
<td>1</td>
<td>EC Declaration of Conformity</td>
</tr>
<tr>
<td>H</td>
<td>1</td>
<td>Installation Guide</td>
</tr>
</tbody>
</table>
4 Mounting the Windy Boy Protection Box

Requirements for the mounting location:
- Mount on a solid surface.
- The mounting surface and surrounding area are non-flammable.
- The mounting surface is suitable for the weight and dimensions of the Windy Boy Protection Box.
- The mounting location is accessible at all times.
- The ambient temperature is between −25 °C and 65 °C.
- The mounting location is not at risk of explosion.

Mounting position:

- Figure 2: Permitted and prohibited mounting positions

Minimum clearances:

- Figure 3: Obligatory clearances
Fixing points:

Figure 4: Fixing point distances

**NOTICE**

**Destruction of the Windy Boy Protection Box due to overheating.**

If you mount the load resistor directly in line with the Windy Boy Protection Box on the rear of the wall, this will adversely affect the functionality of the Windy Boy Protection Box.

- Mount the load resistor in an offset position to the Windy Boy Protection Box on the rear of the wall.
1. Mark the position of the drill holes. Observe the fixing point distances when doing so.

2. Drill the holes according to the markings and insert wall anchors.

3. Insert 2 screws into the 2 upper holes. Leave the screws protruding out by 3 mm.

4. Hang the Windy Boy Protection Box onto the upper screws using the mounting links.

5. Secure the Windy Boy Protection Box using the lower fixing points.

6. Tighten both upper screws.
5 Electrical Connection

5.1 Overview of the Connection Area

5.1.1 Interior View

Figure 5: Connection terminals

<table>
<thead>
<tr>
<th>Position</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td><strong>Alternator</strong> connection terminal for small wind turbine system</td>
</tr>
<tr>
<td>B</td>
<td><strong>DC+</strong> connection terminal for wind power inverter</td>
</tr>
<tr>
<td>C</td>
<td><strong>DC –</strong> connection terminal for wind power inverter</td>
</tr>
<tr>
<td>D</td>
<td><strong>LR+</strong> and <strong>LR –</strong> connection terminals for load resistor</td>
</tr>
<tr>
<td>E</td>
<td><strong>PE</strong> connection terminal for grounding the Windy Boy Protection Box, the load resistor and its cable shield</td>
</tr>
</tbody>
</table>
5.1.2 View from Below

Figure 6: Enclosure openings for connections

<table>
<thead>
<tr>
<th>Position</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Enclosure opening for small wind turbine system</td>
</tr>
<tr>
<td>B</td>
<td>Enclosure openings for wind power inverter</td>
</tr>
<tr>
<td>C</td>
<td>Enclosure opening for load resistor</td>
</tr>
<tr>
<td>D</td>
<td>Enclosure opening for grounding the Windy Boy Protection Box, the load resistor and its cable shield</td>
</tr>
</tbody>
</table>

5.2 Grounding the Windy Boy Protection Box

1. Stop the small wind turbine system and secure against restart.
2. Disconnect the wind power inverter from voltage sources (see the manual for the wind power inverter).
3. Ensure that no voltage is present in the system.
4. Loosen the screws of the enclosure lid and carefully remove the lid. Disconnect the enclosure lid PE from the Windy Boy Protection Box when doing so.
5. Attach the M12 cable gland to the enclosure opening for grounding.
6. Unscrew the cable gland's lock nut and pass it over the PE of the Windy Boy Protection Box.
7. Pass the PE through the cable gland and connect to the PE connection terminal.
8. Tighten the lock nut firmly to the cable gland.
5.3 Connecting the Small Wind Turbine System

Grounding the small wind turbine system:
The small wind turbine system is not grounded through the Windy Boy Protection Box. You must ground the small wind turbine system by other means than the Windy Boy Protection Box. Observe all manufacturer instructions when doing so.

```
NOTICE

Destruction of the Windy Boy Protection Box due to excessive power from the small wind turbine system.

- Observe the maximum power that can be connected (see section 10 “Technical Data”, page 22).
- If the power of the small wind turbine system exceeds the maximum power that can be connected to the Windy Boy Protection Box, use several Windy Boy Protection Boxes in the system.
```

1. If there are rectifiers and overvoltage protection between the small wind turbine system and the wind power inverter, remove the rectifiers and overvoltage protection.
2. Attach the M25 cable gland to the enclosure opening for the small wind turbine system.
3. Unscrew the cable gland's lock nut and pass it over the cable.
4. Pass L1, L2, and L3 of the small wind turbine system through the cable gland and connect to the Alternator connection terminal.
5. Tighten the lock nut firmly to the cable gland.
5.4 Connecting the Wind Power Inverter

Cable sizing:
- The cable has been sized for the maximum power of the wind power inverter.
- A stranded lead of type Silivolt-E 4 mm² or a comparable lead is used.
- Maximum length is 2 m.
- Maximum cross section is 6 mm².

Connect each wind power inverter as per the following procedure.

1. Attach the M20 cable gland to the enclosure opening for the wind power inverter.
2. Unscrew the cable gland’s lock nut and pass it over the cable.
3. Remove the seal from the cable gland.
4. Pass the multiple seal insert over DC+ and DC − and press into the cable gland.
5. Connect DC+ to the DC+ connection terminal.
6. Connect DC − to the DC − connection terminal.
7. Tighten the lock nut firmly to the cable gland.
8. Close all enclosure openings that are not required with sealing plugs.
5.5 Connecting the Load Resistor

Requirements:
- Load resistor never exceeds 54 Ω at the operating temperature.
- Load resistor never drops below 30 Ω when switched off.
- Load resistor has been designed for the maximum voltage of the Windy Boy Protection Box.
- The heat from the load resistor is permanently conducted away.

Cable sizing:
- Cable of type "RADOX GKW - LW/S 3x2.5 mm²" or a comparable cable used.
- Maximum length is 3 m.
- Maximum cross section is 6 mm².

1. Measure the resistance of the load resistor.
   - ☑ The resistance is above 30 Ω.
   - ❌ The resistance is below 30 Ω?
     - The load resistor is not suitable for connection to the Windy Boy Protection Box.
       - Select another load resistor. Observe the requirements when doing so.

2. Attach the M20 cable gland to the enclosure opening for the load resistor.
3. Unscrew the cable gland's lock nut and pass it over the cable.
4. Connect PE to the PE connection terminal.
5. Connect the cable shield to the PE connection terminal.
6. Connect LR+ to the LR+ connection terminal.
7. Connect LR− to the LR− connection terminal.
8. Tighten the lock nut firmly to the cable gland.
6 Commissioning the Windy Boy Protection Box

Requirements:
☐ The small wind turbine system is correctly connected.
☐ The wind power inverter and load resistor are correctly connected.
☐ The Windy Boy Protection Box, load resistor and load resistor cable shield are grounded.
☐ The small wind turbine system is grounded according to the manufacturer specifications.
☐ All unused enclosure openings are closed with sealing plugs.

1. Mount the enclosure lid onto the enclosure. Connect the PE of the enclosure lid to the Windy Boy Protection Box when doing so.
2. Secure the enclosure lid with screws.
3. Commission the small wind turbine system. Observe all manufacturer specifications when doing so.
4. Commission the wind power inverter (see the manual for the wind power inverter).
☑ Green LED is glowing.
✖ Green LED and red LED are glowing?
   The Windy Boy Protection Box restricts overvoltage. As soon as the wind power inverter feeds into the public distribution grid, the red LED will go out.
✖ All LEDs are off?
   There is probably a fault.
   • Eliminate the fault (see section 8 “Troubleshooting”, page 20).
7 Cleaning the Cooling Fins of the Windy Boy Protection Box

• If the cooling fins of the Windy Boy Protection Box are very dirty, clean them with a soft brush.
# 8 Troubleshooting

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Corrective measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>○ All LEDs are off. ○ All LEDs are off.</td>
<td>The small wind turbine system is stopped; there is no voltage. There is no voltage.</td>
<td>• Commission the small wind turbine system. Observe all manufacturer specifications when doing so. • Check the connection of the small wind turbine system. See section 5.3 “Connecting the Small Wind Turbine System”, page 15 for this. • If the Windy Boy Protection Box is permanently in this state, contact the SMA Serviceline.</td>
</tr>
</tbody>
</table>


9 Decommissioning

9.1 Removing the Windy Boy Protection Box

1. Stop the small wind turbine system (see the manufacturer manual).
2. Decommission the wind power inverter (see the manual for the wind power inverter).
3. Loosen the screws of the enclosure lid and carefully remove the lid. Disconnect the enclosure lid PE from the Windy Boy Protection Box when doing so.
4. Disconnect the small wind turbine system from the Windy Boy Protection Box.
5. Disconnect the wind power inverter from the small wind turbine system (see the manual for the wind power inverter).
6. Disconnect the load resistor and the load resistor cable shield from the Windy Boy Protection Box.
7. Disconnect PE from the Windy Boy Protection Box.
8. Place the enclosure lid onto the enclosure and secure with screws.
9. Loosen all fixing screws.
10. Lift the Windy Boy Protection Box from the upper fixing screws.

9.2 Packaging the Windy Boy Protection Box

- Package the Windy Boy Protection Box in the original packaging if available.
- If the original packaging is not available, use a box that is suited to the weight and dimensions of the Windy Boy Protection Box.

9.3 Storing the Windy Boy Protection Box

Requirements for the storage location:
- The storage location is dry.
- The ambient temperature is between −25 °C and 65 °C.

9.4 Disposing of the Windy Boy Protection Box

- Dispose of the Windy Boy Protection Box in accordance with the applicable disposal regulations for electronic waste.
  or
- Return the Windy Boy Protection Box to SMA Solar Technology AG with shipping paid by the sender. When doing so, label the packaging "ZUR ENTSORGUNG" ("FOR DISPOSAL").
10 Technical Data

10.1 Windy Boy Protection Box 400

Small wind turbine system connection

<table>
<thead>
<tr>
<th>Quantity</th>
<th>1 x 3-phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>3 x 0 V ... 500 V</td>
</tr>
<tr>
<td>Current</td>
<td>3 x 0 A ... 11.5 A</td>
</tr>
<tr>
<td>Frequency</td>
<td>0 Hz ... 400 Hz</td>
</tr>
<tr>
<td>Nominal power</td>
<td>1 kW ... 3 kW</td>
</tr>
</tbody>
</table>

Wind power inverter connection

<table>
<thead>
<tr>
<th>Maximum number</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage limitation</td>
<td>400 V</td>
</tr>
<tr>
<td>Total power</td>
<td>3 kW</td>
</tr>
</tbody>
</table>

Load resistor connection

<table>
<thead>
<tr>
<th>Quantity</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>400 V</td>
</tr>
<tr>
<td>Continuous power</td>
<td>3 kW</td>
</tr>
</tbody>
</table>

General data

<table>
<thead>
<tr>
<th>Width x height x depth</th>
<th>280 mm x 220 mm x 130 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>5 kg</td>
</tr>
<tr>
<td>Rectifier</td>
<td>Integrated</td>
</tr>
<tr>
<td>Peak efficiency</td>
<td>99.95 %</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>− 25 °C ... 65 °C</td>
</tr>
<tr>
<td>Protection rating *</td>
<td>IP54</td>
</tr>
<tr>
<td>Load loss at continuous power</td>
<td>15 W</td>
</tr>
</tbody>
</table>

* According to IEC 60529
### 10.2 Windy Boy Protection Box 500

**Small wind turbine system connection**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>1 x 3-phase</td>
</tr>
<tr>
<td>Voltage</td>
<td>3 x 0 V ... 500 V</td>
</tr>
<tr>
<td>Current</td>
<td>3 x 0 A ... 11.5 A</td>
</tr>
<tr>
<td>Frequency</td>
<td>0 Hz ... 400 Hz</td>
</tr>
<tr>
<td>Nominal power</td>
<td>3 kW ... 5 kW</td>
</tr>
</tbody>
</table>

**Wind power inverter connection**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum number</td>
<td>1</td>
</tr>
<tr>
<td>Voltage limitation</td>
<td>500 V</td>
</tr>
<tr>
<td>Voltage limitation with connection to a Windy Boy 5000TL</td>
<td>550 V</td>
</tr>
<tr>
<td>Total power</td>
<td>5 kW</td>
</tr>
</tbody>
</table>

**Load resistor connection**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>1</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>500 V</td>
</tr>
<tr>
<td>Continuous power</td>
<td>5 kW</td>
</tr>
</tbody>
</table>

**General data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width x height x depth</td>
<td>280 mm x 220 mm x 130 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>5 kg</td>
</tr>
<tr>
<td>Rectifier</td>
<td>Integrated</td>
</tr>
<tr>
<td>Peak efficiency</td>
<td>99.95 %</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>− 25 °C ... 65 °C</td>
</tr>
<tr>
<td>Protection rating</td>
<td>IP54</td>
</tr>
<tr>
<td>Load loss at continuous power</td>
<td>20 W</td>
</tr>
</tbody>
</table>

* According to IEC 60529
## 10.3 Windy Boy Protection Box 600

**Small wind turbine system connection**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>1 x 3-phase</td>
</tr>
<tr>
<td>Voltage</td>
<td>3 x 0 V ... 500 V</td>
</tr>
<tr>
<td>Current</td>
<td>3 x 0 A ... 11.5 A</td>
</tr>
<tr>
<td>Frequency</td>
<td>0 Hz ... 400 Hz</td>
</tr>
<tr>
<td>Nominal power</td>
<td>2 kW ... 7 kW</td>
</tr>
</tbody>
</table>

**Wind power inverter connection**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum number</td>
<td>2</td>
</tr>
<tr>
<td>Voltage limitation</td>
<td>600 V</td>
</tr>
<tr>
<td>Total power</td>
<td>7 kW</td>
</tr>
</tbody>
</table>

**Load resistor connection**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>1</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>600 V</td>
</tr>
<tr>
<td>Continuous power</td>
<td>7 kW</td>
</tr>
</tbody>
</table>

**General data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width x height x depth</td>
<td>280 mm x 220 mm x 130 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>5 kg</td>
</tr>
<tr>
<td>Rectifier</td>
<td>Integrated</td>
</tr>
<tr>
<td>Peak efficiency</td>
<td>99.95 %</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>− 25 °C ... 65 °C</td>
</tr>
<tr>
<td>Protection rating</td>
<td>IP54</td>
</tr>
<tr>
<td>Load loss at continuous power</td>
<td>30 W</td>
</tr>
</tbody>
</table>

* According to IEC 60529
11 Contact

If you have technical problems concerning our products, contact the SMA Serviceline. We require the following information in order to provide you with the necessary assistance:

- Device type (see "Type/Model" on the type label)
- Serial number (see "SerialNo." on the type label)
- Type of connected small wind turbine system
- Type and number of connected wind power inverters
- Technical data of the connected load resistor

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Fax: +49 561 9522 4699
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- Damages during transportation
- Improper or inappropriate use of the product
- Operating the product in an unintended environment
- Operating the product whilst ignoring relevant, statutory safety regulations in the deployment location
- Ignoring safety warnings and instructions contained in all documents relevant to the product
- Operating the product under incorrect safety or protection conditions
- Altering the product or supplied software without authority
- The product malfunctions due to operating attached or neighboring devices beyond statutory limit values
- In case of unforeseen calamity or force majeure

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- SMA Solar Technology AG rejects any liability for direct or indirect damages arising from the use of software developed by SMA Solar Technology AG. This also applies to the provision or non-provision of support activities.
- Supplied software not developed by SMA Solar Technology AG is subject to the respective licensing and liability agreements of the manufacturer.

**SMA Factory Warranty**

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