PowerBox Systems®

World Leaders in RC
Power Supply Systems

Instruction Manual

PBR-SXS

Dear PowerBox customer,

The **PBR-5XS** has been developed specifically for indoor model aircraft. With a weight of just 2g, the **PBR-5XS** is ideal for all models where minimum weight is vital. That is why the **PBR-5XS** is not housed in a case, has no integral sockets, and the circuit board thickness has also been reduced to the absolute minimum.

The receive section of the **PBR-5XS** utilises a chip antenna which is accommodated on the circuit board itself, where it is protected from mechanical influences. With its compact design and chip antenna, the **PBR-5XS** offers a range of more than 1000m.

One further special feature is the auxiliary analogue measurement input, to which the flight battery can be directly connected, e.g. using the balancer socket; the **PBR-5XS** then monitors the voltage of the pack (up to 3S / 12.6V), and passes that information directly to the transmitter via telemetry. This facility allows the pilot to monitor the voltage of the flight battery and the speed controller's BEC voltage via telemetry.

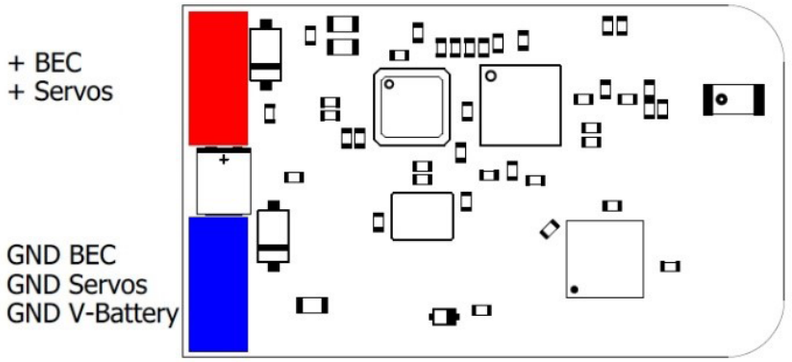
The BEC power supply, all the servos and the flight battery voltage monitor are soldered directly to the circuit board of the **PBR-5XS**. Once this is done, the receiver can be fitted with a heat-shrink sleeve for protection.

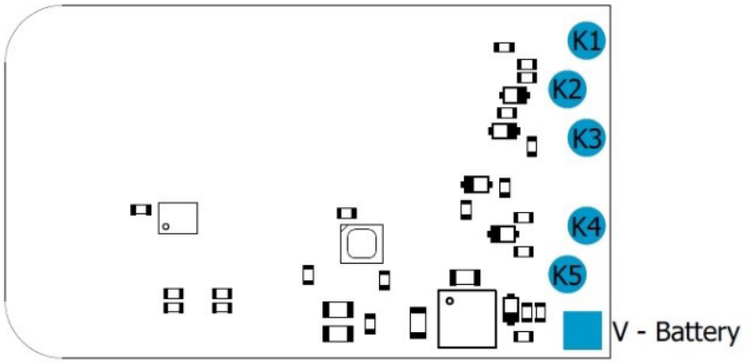
Features:

- 2.4 GHz receiver, compatible with the ATOM / CORE radio control system
- 5 channels
- Chip antenna

• Range of more than 1000m
• Direct monitoring of flight battery voltage
• Telemetry
• Extreme resistance to interference

2. LAYOUT AND CONNECTIONS





Note: soldering to the receiver
In order to minimise weight, the receiver has no case, leaving the electronics exposed. For this reason you should ensure that your body is statically discharged before you carry out any soldering work. You can do this by touching the earth terminal at any mains socket or any metal cold water pipe in the premises. We do not recommend wearing polyester clothing or insulated footwear. Ideally this work should be carried out at a suitable ESD (electro-static discharge) workstation.

a) Power supply

Power is fed to the **PBR-5XS** via the red (+) and blue (-) solder pads: solder the positive and negative outputs from the speed controller (BEC) or the receiver

battery at these points.

Important: the V-Battery pads are not used for the power supply; they are only intended for monitoring the voltage of the flight battery.

b) Servos

The positive and negative servo wires should also be soldered to the red and blue pads. The servo signal wires are soldered to the rear face of the **PBR-5XS**. The speed controller's signal wire is also connected on the rear face of the circuit board.

c) Flight battery voltage monitor

The simplest method of monitoring the voltage of the flight battery (max. 14V) is to connect just the positive battery terminal to the V-Battery pad. However, this does not take into account the losses which occur in the negative wire, so the displayed voltage does not reflect the actual value when the motor is running, and the inaccuracy varies with the motor current.
You can obtain an accurate measurement by also connecting the negative terminal of the flight battery to the blue solder pad.

3. BINDING

There are two ways of binding the receiver:

a) Connect the receiver first

The LED now flashes rapidly for about ten seconds. During this period press

"Bind" at the transmitter, and the receiver will bind to the transmitter. If you wait longer than ten seconds, the LED on the receiver changes to a slower flashing rate: from this point on it cannot be bound to the transmitter until the power supply is disconnected and re-connected.

b) Press "Bind" at the transmitter first

Then connect the receiver to a power source: the transmitter and receiver now bind to each other.

4. INSTALLATION

Once you have soldered all the power and signal wires to the receiver, place the unit in the heat-shrink sleeve supplied, and shrink the sleeve round it. The integral chip antenna has comprehensive 360° reception, so there are no other factors which need to be considered when positioning and installing the receiver.

In most models the receiver can simply be fixed to a smooth surface inside the model using double-sided tape.

Caution: we strongly recommend that you do not install the receiver inside a carbon fibre fuselage, as it is impossible to guarantee adequate reception in such conditions!

5. SETTINGS

The **PBR-5XS** offers two variable settings, both of which are addressed via the

Telemetry menu at the transmitter:

• **Frame rate:** this defines the servo signal repeat frequency. The default value for this setting is 18ms. Modern digital servos can offer better performance at 12ms, because the positional value is updated more quickly.

• **Hold / Failsafe:** this is set in the Function menu at the transmitter.

6. OPERATIONAL NOTES:

By default the **PBR-5XS** transfers battery voltage and reception quality.
The following telemetry values are transmitted:

• **Power supply voltage:**
This indicates the voltage present at the red and blue solder pads.

> **Note:** if you are using a regulated BEC, then the value shown is the regulated voltage - not the voltage of the flight battery.

• **Battery voltage:**
If the output of the flight battery (e.g. from the balancer connector) is connected to the V-Battery pads, then you will see the voltage of the flight battery displayed.

• **LQI:**
This value indicates the reception quality in the form of a percentage. The value is calculated in the receiver from the number of lost data packets and the power level over time.

The LQI is a very informative value, as it provides an important indication of the quality of the radio link. If you wish to monitor this value in the most efficient way, set up a widget showing the LQI value on the Telemetry display, and set an alarm threshold of 60% to 70%. This alerts you immediately if a reception problem arises.

- **RSSI:**
  This value indicates the antenna's input level. It is stated in dBm, which is a logarithmic power value.

7. KEY TO THE LED DISPLAY

The integral LED can indicate various states:

- Continuous blue light: the receiver is bound to the transmitter, and the signal strength is adequate.
- Rapid blue flashing: the receiver is waiting for a Bind signal.
- Slow red flashing: the receiver is picking up no signal.

8. SET CONTENTS

- PowerBox receiver
- Product label
- Heat-shrink sleeve
- Operating instructions in German and English

9. SERVICE NOTE

We are anxious to offer good service to our customers, and to this end we have set up a Support Forum which deals with all queries concerning our products. This gives you the opportunity to obtain help quickly all round the clock - even at weekends. All the answers are provided by the **PowerBox Team**, guaranteeing that the information is correct.

Please use the Support Forum before you telephone us. You will find the forum at the following address:
www.forum.powerbox-systems.com

10. GUARANTEE CONDITIONS

We grant a **24 month guarantee** on our **PowerBox receivers** from the initial date of purchase. The guarantee covers proven material faults, which will be corrected by us at no charge to you. The guarantee does not cover damage caused by incorrect usage, e.g. reverse polarity, excessive vibration, excessive voltage, damp, fuel, and short-circuits. The same applies to defects due to severe wear.

SERVICE ADDRESS

PowerBox-Systems GmbH
Ludwig-Auer-Straße 5
86609 Donauwoerth
Germany

11. LIABILITY EXCLUSION

We are not in a position to ensure that you observe our instructions regarding installation of **PowerBox receivers**, fulfil the recommended conditions when using the unit, or maintain the entire radio control system competently. For this reason we deny liability for loss, damage or costs which arise due to the use or operation of PowerBox receivers, or which are connected with such use in any way. Regardless of the legal arguments employed, our obligation to pay compensation is limited to the invoice total of our products which were involved in the event, insofar as this is deemed legally permissible.

12. FCC

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

13. IC

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions:

(1) This device may not cause interference.
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

Appareils radio exempts de licence (ISDE) L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. L’appareil ne doit pas produire de brouillage;
2. L’appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d’en compromettre le fonctionnement.

14. RF EXPOSURE STATEMENT (PORTABLE DEVICE)

This device complies with the RF exposure requirements for portable devices. The device is intended for handheld use, with the transmitter antennas kept more than 30mm from the hands in normal use.

14. DÉCLARATION D‘EXPOSITION AUX RF (APPAREIL PORTABLE)

Cet appareil est conforme aux exigences d‘exposition aux RF pour les appareils portables. L‘appareil est destiné à être utilisé à la main, les antennes de l‘émetteur étant maintenues à plus de 30 mm des mains en utilisation normale.

We wish you every success with your new **PowerBox receiver**.

Donauwoerth, March 2023

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