



POWERBOX RECEIVER



Dear customer, we are delighted that you have decided to purchase a **PowerBox receiver**, which almost certainly represents the most highly developed and most advanced transmitting and receiving system for your valuable models available anywhere in the modelling world. Unprecedented range in the 2.4 GHz band, and ultra-fast, ultra-precise data transfer in both directions - these are the outstanding features of this radio system.

1. PRODUCT DESCRIPTION

If you study the specifications closely, it is clear that **PowerBox receivers** are by no means "receivers" in the usual sense; they are "transceivers". They are capable of transmitting and receiving at the same data rate and the same range as the associated system transmitter. All **PowerBox receivers** feature a radio chip, but an essential difference is the integral pre-amplifier, which is one of the factors which make the system's extremely long range possible. The **PowerBox** radio link is a hopping system which uses at least 66 of 198 possible channels. An intelligent hopping sequence is employed, ensuring interference-free operation even when the frequency band is heavily used. The suffix 'S' or 'D/E' indicates the number of radio units installed in the **receiver**. The D and E types **PBR-**

8E, PBR-9D and **PBR-26D** incorporate two fully independent receive / transmit units. Other systems feature two aeriels, switching between them 50-50, but if one aerial loses the signal, 50% of the information is inevitably lost; our design does not suffer that drawback. There are also no switching diodes which have a damping effect on the signal as it arrives; this has a particularly adverse effect on the radio chip. In contrast, both the receive units in **PowerBox receivers** pick up the data packet in undamped form, and subject it to a full analysis. If one of the two packets contain errors, or if the signal strength is poor, or if the signal is completely absent, the data packet picked up by the other receive unit is used, and passed to the servo outputs or digital outputs. The result is a 100% signal even if one aerial is completely blocked.

- FEATURES:**
- + 2.4 GHz receiver matching the **CORE** radio control system
 - + one or two receive units
 - + extreme interference rejection
 - + ultra-long range
 - + high-performance real-time telemetry
 - + integral telemetry for reception quality and battery voltage

2. FEATURES AND CONNECTIONS



3. POWER SUPPLY

To ensure that **PBR receivers** are as compact as possible, they are not fitted with dedicated power supply sockets. The power supply should always be connected to one of the front servo outputs; use a Y-lead if none of these sockets is vacant. The data sockets of the **PBR-7S** and **PBR-9D** should not be used for the power supply, as the maximum current they can handle is 5A.

4. BINDING

The receivers can be bound using either of two methods:

a) Connect the receiver first
The LED now flashes rapidly for about ten seconds. Press "Bind" at the transmitter, and the transmitter and receiver are bound. If you do not press Bind within ten seconds, the receiver LED switches to a slower flashing rate. At this point the receiver can no longer be bound to the transmitter unless the power supply is first disconnected.

b) Press "Bind" at the transmitter first
After this you connect the receiver to a power supply: the transmitter now binds with the receiver.

5. DETAILED DESCRIPTION OF THE SOCKETS

a) PWM outputs A1 - 19
The PWM outputs are sequentially numbered from 1 - 9, but are also assigned the letters A - I. As an option, you can also set the receiver outputs to generate different channel numbers. For example, the **PBR-9D** can be set to generate outputs 10 - 19 as well as channels 1 - 9.*

b) P²-BUS
This interface is used for the external ultra-fast P²-BUS telemetry system and digital servo output. When the system is switched on, all the sensors connected to this socket are scanned, and displayed at the transmitter.
The P²-BUS socket can also be used for updating the receiver using the **USB interface adapter**.

c) FastTrack / Data
By default this socket is set to SRXL; this digital servo signal can be processed by many gyros and battery backers, and therefore acts as a universal interface for third-party accessories. However, this socket can also be employed for real-time sensors (**FastTrack**), which can be used for directly controlling or regulating the servo outputs. A typical use is for the **iGyro SAT**.*

6. MEANING OF THE LED DISPLAY

The integral LED can indicate various types of receiver status:

- continuous green light: the receiver is bound to the transmitter, signal strength is adequate
- flashing rapidly green: the receiver is waiting for a binding signal
- flashing slowly red: the receiver is picking up no signal

7. INSTALLATION, DEPLOYING THE AERIALS

All **PowerBox receivers** are manufactured using the SMT method, and are therefore extremely resistant to vibration and shock. In most models the receivers can simply be attached to a smooth surface inside the model using double-sided adhesive tape.

The ideal method of aerial deployment varies greatly according to the model, the fuselage material and the receiver's position in the model. For most cases we recommend routing the aeriels out of the fuselage, as this guarantees optimum reception regardless of the materials of which the model is made.

8. OTHER SETTINGS

The receiver offer a number of optional settings which can be selected at the transmitter and sent via the radio link

- **Frame rate**: this defines the servo signal repeat frequency. The default value for this setting is 18ms.
- As an option, the data output can be set to any of three types*: **FastTrack, SRXL, channel 8 / 10 (PBR7S / 9D)**

- **Hold / Failsafe**: this is selected in the transmitter's Function menu.

9. NOTES ON OPERATION

All **PowerBox receivers** are able to transmit battery voltage and reception quality by default. The following values are transmitted:

- **Battery voltage**: this shows the voltage present at the servo sockets. Please note: if you are using a regulated battery backer, the value shown here is the regulated voltage, not the battery voltage.
 - **RSSI**: this value shows the input level at the aerial, and is displayed in dBm - a logarithmic power value.
 - **LQI**: this value indicates the reception quality in percentage form. The value is calculated by the receiver, based on the number of lost data packets and the power level over time.
- LQI is a very instructive value providing information about the quality of the radio link. In order to monitor it fully, we recommend that you set up a widget at the Telemetry screen showing the LQI value, and set an alarm threshold of 60% to 70%. This ensures that any reception problem immediately triggers an alarm to make you aware of the situation.

10. SPECIFICATION

	PBR-5S	PBR-7S	PBR-8E	PBR-9D	PBR-26D
Frequency	2.4GHz				
Operating voltage	4.0 - 9.0V				
Number of transmitted channels	26 (at the P ² -BUS interface)				
Number of PWM outputs	5	7	8	9	0
Servo output resolution	4096 steps (12-bit)				
Number of receive units	1	1	2	2	2
Range (line of sight)	> 9km				
Telemetry	yes				

P ² -BUS telemetry interface	yes	yes	no	yes	yes
FastTrack interface	no	yes	no	yes	yes
Parameter setting from the radio	yes	yes	no	yes	yes
Dimensions	44x20x12mm	52x22x12mm	62x25x17mm	57x27x12mm	48x25x10mm
Weight	7g	12g	16g	17g	10g
Temperature range	-10°C to +85°C				

11. SET CONTENTS

- **PowerBox receiver**
- adhesive pad
- Operating instructions in German and English

12. SERVICE NOTE

We make every effort to provide a good service to our customers, and have established a Support Forum which covers all queries relating to our products. It 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 contact us by telephone:

www.forum.powerbox-systems.com

13. GUARANTEE CONDITIONS

We are able to grant a **36 month guarantee** on our **PowerBox receiver** 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.

14. LIABILITY EXCLUSION

We are not in a position to ensure that you observe our instructions regarding installation of the **PowerBox receiver**, fulfill 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 the **PowerBox receiver**, or which are connected with such use in any way. Regardless of the legal arguments employed, our obligation to pay damages is limited to the invoice total of our products which were involved in the event, insofar as this is deemed legally permissible.

We wish you loads of fun with your new **PowerBox receiver!**



Donauwoerth, February 2019

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PowerBox Systems®

*World Leaders in RC
Power Supply Systems*

FCC INFORMATION

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1. FCC Warning

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.

To maintain compliance with FCC's RF exposure guidelines, the distance must be at least 20cm between the radiator and your body, and fully supported by the operating and installation configurations of the transmitter and its antenna(s).

2. IC Warning

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie 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, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

The device has been evaluated to meet general RF exposure requirement. To maintain compliance with RSS-102 – Radio Frequency (RF) Exposure guidelines, this equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body.

le dispositif a été évalué à répondre général rf exposition exigence.pour maintenir la conformité avec les directives d'exposition du RSS-102-Radio Fréquence (RF). ce matériel doit être installé et exploité à une distance minimale de 20 cm entre le radiateur et votre corps.

Compliance Information for the European Union

PowerBox-Systems GmbH hereby declares that this product is in compliance with the essential requirements and other relevant provisions of the R&TTE, EMC and LVD Directives.

A copy of the EU Declaration of Conformity is available online at:
www.powerbox-systems.com

Instructions for disposal of WEEE by users in the European Union

This product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.