

PowerBox Systems

World Leaders in RC
Power Supply Systems

PowerBox Basic

Operating Instructions



Order No.: 4110 JR / Futaba

Dear customer,

We are delighted that you have decided to purchase the **PowerBox BASIC** from our range. Your valuable model aircraft can now be fitted with a modern, high-performance battery backer, capable of monitoring the voltage of both packs. In our opinion a highly accurate voltage display is the best insurance for your precious model, because even the very best power supply system can only be as good as its batteries. That's why even the **PowerBox BASIC** features an LED chain, an external LED and a minimum value memory for each battery, ensuring that you keep in touch with the actual state of your batteries.

Although this battery backer is simple to operate, you do need to understand certain points if you are to exploit its advantages to the full. Please read through these instructions, and you will quickly feel 'at home' with your new accessory.

We wish you every success using your new **PowerBox BASIC** battery backer, and hope you have loads of fun with it.

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1 Product description

The **PowerBox BASIC** is a **battery backer system** for small to medium-sized models, and includes de-coupling of the two batteries and two independent IC-controlled voltage monitors in addition to the normal functions of a battery backer. Each battery is monitored by a chain of five LEDs, an external LED (integral socket) and a minimum value memory. After each flight, these features allow you to check the lowest voltage of each battery during the flight.

After the flight you can call up this minimum value by pressing the marked button in the lower central area of the **PowerBox**, **before** you switch off. The value is indicated separately for each battery by means of two LED chains.

In our opinion this is an essential feature of any voltage monitor system, as it provides the most important item of information relating to your batteries. You may give your packs a brief test of their capability, e.g. during pre-flight checking, but the minimum value memory provides a long-term test, i.e. their performance during the whole flight.

The LEDs display the lowest voltage which lasted for at least 1.5 seconds during the flight. Voltage collapses of shorter duration are actually irrelevant in terms of the state of a battery, and are therefore not stored.

The two minimum value memories are **reset** when the backer is switched off. Next time you switch on, the unit automatically records the values for the next flight.

The total voltage loss caused by the **PowerBox BASIC** is only **0.25 Volts**, which is so low that you can safely bank on full battery performance. The maximum continuous current is **12.0 Amps**, and this is designed to cope easily with **8 - 10 standard servos** or **7 - 9 digital servos**. For model gliders the maximum servo count might easily be much higher, as wing-mounted servos are relatively small and servo loads relatively light.

The essential de-coupling of the two batteries is carried out by a special high-performance Dual Schottky Diode. This component is soldered to a heatsink, and has proved its worth in many of our battery backers.

We recommend that both batteries should have the same capacity and be of the same cell type, as well as the same cell count. We recommend that you select batteries with a capacity of at least 1700 mAh; for larger models you should consider packs of up to 3000 mAh. Both **Nickel-Cadmium batteries** (NiCd) and **Nickel-Metal-Hydride batteries** (NiMH) can be used.

We can supply our own range of high-quality batteries for a wide range of applications.

The **PowerBox BASIC** is designed for use with 4-cell and 5-cell batteries, so you can now decide for yourself whether you wish to employ **4 or 5 cells** in your model. A jumper (bridging plug) on the underside of the backer is used to set the cell count of the batteries you wish to install.

The **PowerBox BASIC** is supplied with the jumper fitted; this sets the voltage monitor for 5-cell operation.

If you wish to fly with 4-cell batteries, simply remove the jumper. Re-fit the jumper, and the monitor is set for 5 cells again. **The jumper has no effect on the battery's backer's primary function.**

Certain RC manufacturers (**JR, Graupner**) specify that their receivers and servos must not be used with 5-cell battery packs, because the components could be damaged by the voltage of **up to 7.3 Volts** which can occur with freshly charged packs. Please check the Specification of these products, as they may limit operation to a **maximum of 6.0 Volts**. However, please note that the maximum battery voltage of a 4-cell pack will only be around 5.5 Volts for a relatively short period even with freshly charged cells. This means that servos designed for 6.0 Volts will by no means deliver the performance (transit speed, power) promised in their published Specification.

If you wish to use 5-cell battery packs, but want to prevent the voltage to the receiver and servos rising above 6.0 Volts, we recommend connecting our **linear regulator** (Order No. 5610) between the receiver and the **PowerBox BASIC**. This regulates the voltage to **5.9 Volts**.

2 Specification

| | |
|--------------------------|---|
| Operating voltage: | 4.0 to 9.0 Volts |
| Power supply: | 2 x NiCd or NiMH batteries, each 4 or 5 cells |
| Max. continuous current: | 12.0 Amps |
| Voltage loss: | approx. 0.25 Volts |
| Current drain: | approx. 20 mA |
| Temperature range: | -10°C to +75°C |
| Weight: | 42 grammes |

3 Connections and controls

The **PowerBox BASIC** battery backer fulfils the EMV protective requirements, entitling it to bear the **CE** symbol.

The **CE** symbol guarantees that the device fulfils the statutory regulations for interference-free operation. This includes testing the unit's interference emission and interference rejection characteristics.

This unit is not susceptible to interference from other electrical devices, and generates absolutely no interference to other equipment (receiver, servos).

The battery backer is intended exclusively for use in modelling applications, and may only be used in radio-controlled models.

4 Connections

The two batteries are connected to the battery backer by means of an integral pair of MPX high-current sockets. These are fitted with our **security clips** for better vibration resistance.

When connecting the two batteries or switches it is essential to maintain **correct polarity**. Connecting a battery with reversed polarity will instantly destroy the electronic voltage monitor circuit.

We recommend that you use the high-security switches which we developed for our high-performance power backers. These are supplied ready to use, with all connectors factory-fitted. They are designed to be immune to vibration, and can cope with currents of up to 20 Amps. The switch is available complete with charge lead as the **PowerSwitch Set** in the colours **black** or **grey**; Order No. is **6210**.

The accessory pack includes two MPX sockets; these can be used if you wish to upgrade your existing switches to the high-current connector system.

Please take particular care over correct polarity (**+ and - are embossed on the rear face of the connectors**), and be sure to solder the joints competently.

The **PowerBox BASIC** is connected to the receiver by means of two cables with conductor cross-sections of 0.34 sq mm. Connect one of these plugs to the receiver battery socket, and the other to any vacant receiver channel. If there is no vacant socket, a Y-lead can be used.

There is no fundamental reason why you should not connect two receivers to the **PowerBox BASIC**. If you wish to do this be sure to observe the information supplied by your RC manufacturer concerning the use of two receivers in a model. (**The basic rule: make sure that the two receivers are physically separated by a distance of around 25 - 30 cm.**)

5 Installing the unit

We recommend that you install the battery backer in your model using the mounting plate (three-hole fixing) supplied in the set. Be sure to use the rubber grommets and tubular spacers supplied.

To ensure that you can check the voltage of your batteries, install the backer in the model in a position where you can see the LED chains (cockpit).

6 Guarantee conditions

During the production process each PowerBox *BASIC* battery backer undergoes a series of tests. We take the maintenance of the highest quality standards very seriously.

We grant a **24 month** guarantee on all our products, valid from the initial date of purchase. The guarantee covers proven material faults, which will be corrected by us at no charge to you. We wish to emphasise expressly that we reserve the right to replace the unit if a repair is impossible for economic reasons.

Repairs which our Service Department carries out for you do not extend the guarantee period.

Misuse, such as **reversed polarity**, excessive voltage, and the effects of damp and fuel, invalidates the guarantee. The same applies if a defect has been caused by severe wear or severe vibration.

We will not consider any claims beyond the limits described above, e.g. consequent damage. We deny liability arising from the device or the use of the device.

We accept no liability for transport damage or loss of your shipment. If you need to make a claim under guarantee, please send the unit to us at the following address, enclosing proof of purchase:

PowerBox Systems
Modellbau-Deutsch
Hindenburgstraße 33
86609 Donauwörth
Germany

Liability exclusion:

We are unable to ensure that this battery backer is installed and operated correctly, nor that the entire radio control system has been fitted and maintained properly.

For this reason we are unable to accept liability for loss, damages or costs which result from the use of the **PowerBox Basic**, or are connected with its use in any way. Unless otherwise prescribed by binding law, our obligation to pay compensation, regardless of the legal argument employed, is limited to the invoice value of that quantity of our products which was immediately and directly involved in the event which caused the damage.



Donauwörth, July 2004

Yours - the Modellbau-Deutsch team
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