

# Instruction Manual

**PowerBox Systems**

World Leaders in RC  
Power Supply Systems

## **PowerBox BaseLog**



Universal power supply system for RC models  
with redundant electronic components, info-display,  
menu-based programming and telemetry link

Dear customer,

We are delighted that you have decided to purchase the **PowerBox BaseLog** RC power supply unit from our range.

We wish you every success with your new **PowerBox BaseLog**, and hope you have loads of fun with it.

## 1. Product description

The **PowerBox BaseLog** is a modern power supply system containing all the electronic components required to power modern receivers, servos and models. All the components which are essential to a reliable power supply, i.e. ICs, micro-controllers and electronic circuits, are **deduplicated**. The unit incorporates some of the latest electronic innovations, including a graphic OLED screen and the ability to transmit telemetry data from the **PowerBox BaseLog** to transmitters of various makes. The net result is that the unit provides unprecedented facilities for monitoring airborne batteries.

### Features:

- Dual regulated output voltage
- User-selectable output voltage of 5.9 V or 7.4 V, software-variable using the **SensorSwitch**
- Informative graphic OLED screen with a resolution of 128 x 64 pixels
- Facility for connecting Multiplex and Spektrum downlink bus systems
- Direct transmission of both batteries' voltage and capacity to the transmitter
- Voltage display for each battery
- Residual capacity display for both batteries
- Minimum value memory for both batteries
- Large heat-sink area for high regulator performance
- Supports all currently used battery types: LiPo, NiMH / NiCd, LiFePo
- Suppression of possible servo feedback currents
- Various patch-leads (MPX / JR / Futaba, MPX / MPX) available, allowing the use of all receiver types

This range of functions makes the **PowerBox BaseLog** the ideal battery backer for large model aircraft with wingspans in the range 2.0 m to 2.6 m, as well as for helicopters and gliders.

## 2. Controls:

The illustrations below show the essential control elements:



### 3. First steps, the unit in use

#### a) Connections

- First connect the receiver to the **PowerBox BaseLog** using the two **genuine, PowerBox Systems** patch-leads supplied in the set.
- If your model is fitted with a receiver featuring an MPX high-current input socket, use the MPX / MPX patch-lead for this connection; if you wish, the second socket can be plugged into any vacant servo socket on the receiver using an MPX / JR patch-lead.

**CAUTION:** if the receiver features an integral battery backer, connect both plugs to the servo sockets; this arrangement by-passes the receiver's battery backer function.

- Now connect the **SensorSwitch** to the appropriate socket on the unit, ensuring that the ribbon cable **faces up** as shown. In models subject to severe vibration we recommend that you secure the ribbon lead by at least one additional point to avoid any risk of the connector working loose. If the connector were to come adrift, it would have no effect on the switched state of the backer, but would prevent you switching the system off.
- If you wish, the optional ultra-bright external LEDs can now be connected to the unit. We urge you to connect them and mount them in the fuselage side, as they provide a useful visual warning of battery problems when the model is flying. This is particularly advisable if you are not using the unit's telemetry transmission facility.
- The final step is to connect the batteries to the backer's integral MPX sockets, taking care to **maintain correct polarity**. We recommend the use of the **PowerBox Battery 1500** or **PowerBox Battery 2800**, and for larger models even the **PowerBox Battery 4000**. If you prefer to use other makes of battery, or wish to make up your own packs, it is absolutely essential to maintain correct polarity. Connecting a battery with reversed polarity will instantly ruin the backer's regulator ICs. In order to minimise power losses, the backer does not feature reverse polarity protection. The + (positive) indicators are clearly marked on the case cover.
- The unit also offers a connection facility to radio control systems which support telemetry. If you wish to use this feature, be sure to connect the **PowerBox BaseLog** to the receiver or downlink transmitter **before** switching the system on.

## b) The procedure for switching on and off

Switching the unit on and off is very simple, and the process effectively eliminates the danger of changing the backer's status accidentally. This is the procedure:

To switch on, locate the SET button on the **SensorSwitch** and hold it pressed in until the central LED glows red, indicating that the unit is now ready to be switched. Continue to hold the SET button pressed in while you press buttons I and II in turn; the backer is now switched on, with both batteries active.

Repeat the procedure to switch off: hold the SET button pressed in, wait until the central LED glows red, then confirm by pressing buttons I and II in turn.

The **PowerBox BaseLog** stores (saves) the last switched state. This means that a backer switched off using the **SensorSwitch** remains switched off.

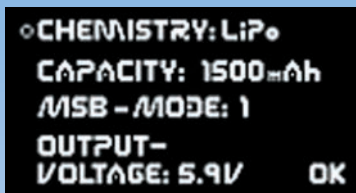
Once switched on, the backer can only be turned off again using the **SensorSwitch**. Intermittent contacts or interruptions in the power supply cannot cause the backer to be switched off.

## c) Entering battery data

No additional device is needed for entering further settings; all the values are entered using the **SensorSwitch** alone.

To ensure that the **PowerBox BaseLog** is always in a position to provide accurate information about the condition of the batteries, you must first enter the type, the nominal capacity and the output voltage of the packs you are using. This is the procedure:

- Switch on the **PowerBox BaseLog** with both batteries active.
- Hold the SET button pressed in for about five seconds until the screen changes to the menu shown below:



The menu control system used by **PowerBox Systems** is very simple and intuitive:

- Buttons I and II on the **SensorSwitch** are used to move the cursor up and down.
- Confirm your choice by pressing the Set button, and then adjust the selected value.

The cursor is now a solid white disc. Pressing button I or button II selects the available battery types in this sequence: LiPo, NiMH, LiFePo.



Press the SET button to confirm your choice of battery type; this action also stores the selected type.

The cursor now appears as a hollow circle, and you can move on to the next menu point - "CAPACITY" - by pressing button II. When the cursor is located before "CAPACITY", press the SET button to set the nominal capacity of the battery. The cursor turns solid again, and you can adjust the capacity using buttons I and II. It is also possible to hold buttons I or II pressed in if you want the value to change more swiftly.

Confirm your setting by pressing the SET button.

CHEMISTRY: LiFeP<sub>o</sub>

• CAPACITY: 1600 mAh

MSB - MODE: 1

OUTPUT-

VOLTAGE: 7.4V OK

The next point gives Multiplex pilots using the MSB Telemetrie, the choice of 4 address modes. You will see the different addresses below in a table.

CHEMISTRY: LiFeP<sub>o</sub>

CAPACITY: 1600 mAh

• MSB - MODE: 2

OUTPUT-

VOLTAGE: 7.4V OK

Press button II to move on to the next menu point: the output voltage for the PowerBox BaseLog - "OUTPUT VOLTAGE":

CHEMISTRY: LiFeP<sub>o</sub>

CAPACITY: 1600 mAh

MSB - MODE: 1

• OUTPUT-

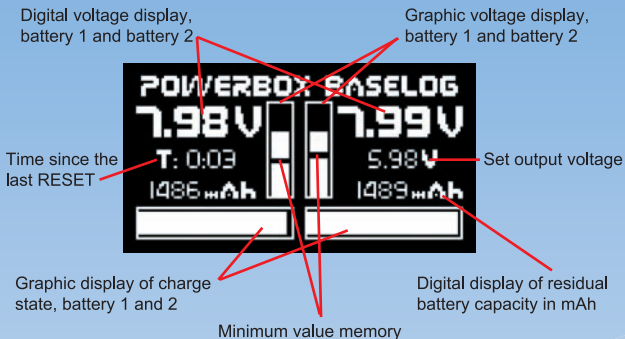
VOLTAGE: 7.4V OK

At this point you can set your preferred output voltage using buttons I and II.

**CAUTION:** if you intend to set this value to 7.4 V, it is essential to check that all the consumer units connected to the system - servos, receivers, gyros, etc. - are also compatible with 7.4 V. You will find information on this subject in the instructions supplied with these components.

Press the SET button to confirm your choice; this action also stores the setting.

## d) Key to the Parameters display



### - Digital voltage display:

This extremely accurate display shows the voltage present at the battery packer's input.

### - Graphic voltage display:

The graphic display also allows you to see the momentary voltage of the batteries at a glance. The scale of the display is designed in such a way that the batteries should be recharged when the bar falls to the bottom third. If the vertical bars disappear completely, the model cannot be flown with safety.

### - Minimum value memory:

The minimum value memory takes the form of a narrow black horizontal bar in the graphic voltage display. This feature lets you see at a glance the extent to which battery voltage has fallen during the flight. If the voltage has collapsed to below half of the scale, this is a clear warning that you should check your batteries, or use alternative, higher-performance packs. A collapse to this extent clearly indicates that the batteries are not "man enough" for the loads placed on them by your model, or by your flying style, or by the model's servos; the reason could be the effects of ageing, or your choice of unsuitable cells.

### - Operating time:

The operating time is reset to 0 every time you carry out a consumption reset, i.e. capacity and time are always coupled together. This enables you to determine accurately how much capacity (in mAh) the airborne system has consumed during the displayed operating time.



- Graphic charge state display:

The scaling used for this display relates to the battery capacity you have entered, i.e. if only half of the bar is displayed, the battery is still half-full, and this charge state is correct for the battery type you have set.

- Digital residual capacity:

Provided that you have set the battery capacity correctly, and that the cells are technically in perfect condition, this display accurately shows the residual capacity of the pack.

- Output voltage:

Shows the voltage present at the backer's output.

### e) Connections for telemetry-capable receiver systems.

The **PowerBox BaseLog** includes an entirely new feature: you can connect different radio control systems to the unit, so that all the battery data is transmitted directly to your RC transmitter's integral screen. The unit supports the Multiplex and the Spektrum telemetry.

You simply connect the receiver or the DownLink transmitter to the appropriate socket on the BaseLog battery backer; this must be carried out before you switch the receiver on. Nothing needs to be configured, as the correct settings and calibration are adopted automatically. Applies to the MSB connection: in this case you must ensure that additional sensors connected to the "bus" do not share the same addresses as the **PowerBox** battery backer. An overview of the addresses employed by the unit can be found in the table below. The unit outputs the battery voltage and residual capacity of both batteries. As an additional feature, alarms are triggered at the transmitter at a specific threshold, which varies according to the battery type. An alarm is also triggered at the transmitter when the residual capacity falls below 20%.

**PowerBox BaseLog** addresses used with the Multiplex bus:

display	Mode 1	Mode 2	Mode 3	Mode 4
battery voltage 1	3	3	6	6
battery voltage 2	4	6	7	9
capacity 1	6	4	9	7
capacity 2	7	7	10	10

#### f) Resetting the consumption display

The consumption display should be reset to “0” every time you recharge the batteries. This is the procedure:

Hold both buttons I and II on the switch pressed in until the following display appears on the screen:



Now release both buttons, and the consumption / time monitoring restarts at 0.

#### g) Regulator malfunction:

The **PowerBox BaseLog** battery packer constantly checks both voltage regulators independently of each other. If a fault should develop in one of these regulators, the following warning will appear on the screen:



There are two possible causes for this warning:

- One or both regulators is not generating an output voltage. This means that you could be flying the model with only one regulator working. For reasons of safety this is not recommended.
- One or both regulators is not working, and is passing the full battery voltage through. This means that the servos and receivers are operating on excessive voltage, which in the long-term may lead to component failure.

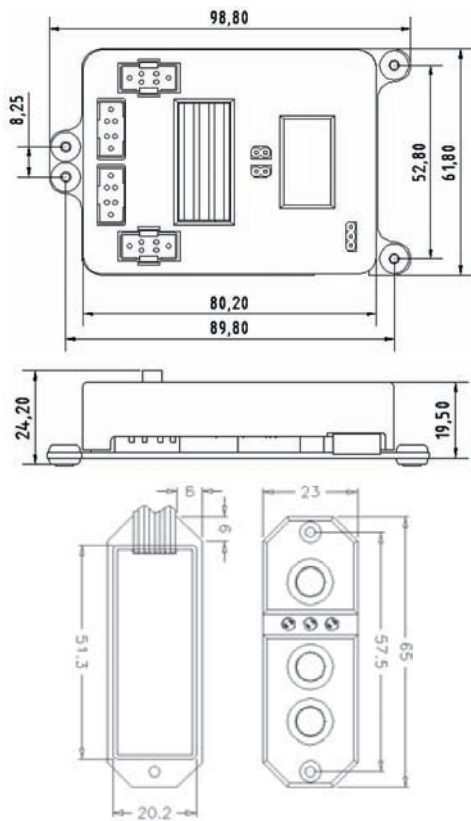
If you see this error message, send the unit to us at the Service Department address, together with the repair form, duly completed.

#### 4. Specification

Operating voltage:	4.0 Volt to 9.0 Volt
Power supply:	2 x 2-cell LiPo battery, 7.4 Volt, 2 x 5-cell NiCd or NiMH batteries, 2 x 2-cell LiFe battery (A123)
Current drain:	Switched on: approx. 85 mA Switched off: approx. 10 $\mu$ A
Dropout voltage:	approx. 0.25 V Max. receiver and 2 x 10 A (stabilised), according to cooling measures
servo / receiver current:	Peak 2 x 20 A
OLED screen resolution:	128 x 64 pixels
Bus systems:	Spektrum, Multiplex
Temperature range:	-30°C to +75°C
Dimensions:	93 x 67 x 19 mm (incl. base plate)
Weight:	88 g
SensorSwitch:	15 g
EMV approval:	EN 55014-1:2006
CE approval:	2004/108/EG
Registered design:	DE 203 13 420.6

**This battery backer fulfils the EMV protective requirements, EN 55014-1:2006 with certificate dated 16 January 2010. EMC approval 2004/108/EG.**

**The unit must not be connected to a mains PSU!**



## 5. Set contents

- **PowerBox BaseLog**
- **SensorSwitch**
- Two PowerPatch-leads to choice: MPX / MPX or MPX / JR, Futaba
- Two external LEDs and holders
- Four rubber grommets and brass spacers, factory-fitted
- Four retaining screws
- Operating instructions in English and German

## 6. Guarantee conditions

We take the maintenance of the highest quality standards very seriously. That is why **PowerBox Systems** GmbH is currently the only RC electronics manufacturer certified to the Industrial Norm **DIN ISO 9001:2008**.

As a result of this quality management, which applies to development and production, we are able to grant a guarantee of **36 months** on our products, commencing on the initial date of purchase. The guarantee covers proven material faults which occur during the guarantee period; such defects will be corrected by us at no charge to you.

**We expressly deny liability for damages which are caused by the device, or arise through the use of the device.**

We wish you every success using your new **PowerBox BaseLog**, and hope you are very successful with it.

Donauwörth, February 2010





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Power Supply Systems*

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