

**PowerBox Systems**

*World Leaders in RC  
Power Supply Systems*

**PowerBox Battery**

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## Operating Instructions



**PowerBox Battery 2800**

**2800 mAh / 7.4 Volt**

Order No: 2810 JR / Futaba

Order No: 2820 PowerBox – green connectors

***PowerBox Systems***

**POWER BOX Battery**

Dear Customer,

We are delighted that you have decided to purchase a **PowerBox Battery** from our range, fitted with genuine IONITY Lithium-Polymer cells.

This is a new, world-leading battery design which we have developed especially for use as a power supply for the receivers and servos in our models.

The only German manufacturer of Lithium-Polymer cells is IONITY AG, based at Kamenz near Dresden, and we have collaborated closely with the company in order to offer the latest high-performance polymer cells for your receiver power supply. These cells have been developed specifically for this application in modelling.

The outstanding features of IONITY Lithium-Polymer batteries are their very high energy density, long useful life (500 charge cycles @ 80% of initial capacity) and ultra-low internal resistance.

IONITY Lithium-Polymer cells are much smaller and lighter than competing types, and currently offer about 25% higher capacity relative to their size than Lithium-Polymer cells from Asian sources.

These batteries are a guaranteed product - "Made in Germany"! IONITY cells are certified and accredited according to ISO 9000 and UNDOT, and all bear UL certification.

IONITY AG is currently the only manufacturer of Lithium-Polymer cells capable of supplying a wide range of high-quality products suitable for our demanding electronic applications.

IONITY AG was the only company prepared to supply us with customer-specific products suitable for the needs of modellers.

### **Features of IONITY Lithium-Polymer cells:**

- Assembled from high-quality electrodes, manufactured in-house
- Ceramic separator - a world's first - exclusive to IONITY cells
- Highest energy density of all Li-Po cells currently available
- Minimum internal resistance
- 2800 mAh capacity: suitable even for F3A-X models (up to 24 servos)
- Very broad temperature range (-20° to +60°C)
- Very long useful life (500 cycles @ 80% of initial capacity)
- Certified to ISO 9000
- UL certified
- UNDOT
- Made in Germany!

### Charge process :

**1. Switch off all electrical devices! Switch off the PowerBox “Sensor”, PowerBox “Competition” or PowerBox “Champion” using the sensor buttons. The battery pack can be left connected to these systems during the charge process.**

We recommend that you use the mains PSU which we supply, which features two outputs for simultaneous charging of two batteries. Using this unit ensures that the charge process is correct for the battery type, and is carried out safely. The PSU is an exact match in terms of performance and voltage for the battery pack's integral IC-controlled charger.

The result is Li-Po batteries which are properly charged and above all safely charged, which will deliver a long useful life (see also Guarantee Conditions).

**2. Connect one of the two plugs to the appropriate green barrel socket on the front panel of the battery case. The red LED now lights up to indicate that the correct charge process is in progress.**

If the red LED goes out during the charge process (green LED also off), the security electronics have cut off the charge process. The cause could be some relatively harmless event during the charge process, e.g. a slight difference between cell voltages, a minor voltage fluctuation at the charger (+/- 0.1 V), or excessive temperature inside the battery case due to sunshine, the proximity of a silencer or similar.

**However, the reason for the shut-down could also be serious, safety-relevant damage!**

Attempt to re-start the charge process by disconnecting the charge plug and plugging in the mains PSU again. This process can be repeated several times without danger.

**If the electronic charge circuit cannot be persuaded to charge the battery, even though all the conditions for a correct charge (temperature etc.) are fulfilled, we recommend that you send the battery and PSU to us for checking.**

### **Please note!**

**During a normal charge process the silver heatsink on the top of the battery will heat up to around 80°C.** This surface should therefore not be covered with foam or similar material while the battery is on charge. **During the charge process please ensure that there is a good flow of cooling air over this heatsink.**

**3. The charge process has been completed in accordance with the internal charge program. The battery is now fully charged, and its full capacity is available for you to use.**

The green LED lights up to confirm that the charge process has been completed successfully.

You can now disconnect the battery pack from the mains PSU.

### Specification:

Capacity:	2800 mAh / 7,40 Volts
Final charge voltage:	8,40 Volts
Discharge cut-off at 5.80 Volts, no load	
Discharge cut-off at 6.20 Volts (receiver and servos as load)	
Charge voltage for internal charger:	10,0 Volts +/- 0,1 Volt
Temperature range during discharge:	0° C to +60° C
Temperature range during charge process:	0° C to 60° C
Weight including connecting lead:	158 grammes
Dimensions:	107 x 65 x 15 mm (L,W,H)
Length of cable:	270 mm
Weight of mounting frame:	18 grammes

### Description:

The battery contains an innovative and sophisticated electronic security circuit, controlled by an IC and supported by an SMT temperature sensor, which is embedded in the circuit board between the two battery cells. This circuit monitors voltage and time and controls the entire charge process.

The integral electronic circuit means that you need nothing more than a mains PSU in order to charge this battery pack perfectly. The result is a simple and safe charge cycle matched perfectly to the IONITY batteries, as employed nowadays for all manner of modern electronic devices which we use every day, such as mobile phones, laptops, digicams etc.; equipment whose use is now second nature to us.

The glass fibre reinforced protective case (glass fibre content 20%) is incredibly robust, and virtually provides armour-plating for your valuable Lithium-Polymer battery, shielding it from all external influences, but in particular from mechanical stresses in the model.

The security of this battery system is further enhanced by the use of the dedicated battery mount, which has been specially developed for our battery pack.

We supply the mount at no extra charge with each **PowerBox Battery 2800**.

The battery mount provides an excellent method of installing your battery pack in any model with absolute security and good protection from vibration. The four mounting points are arranged in a special triangular format with sides of unequal

length. The unique, carefully calculated geometry of the mounting points ensures that the battery mount can be screwed securely and safely to any surface without any risk of distortion, even if the sub-surface is completely irregular or curved.

The **PowerBox Battery** locks into its dedicated mount, held securely and without distortion.

We don't trust simple cable-ties, fuel tubing or serendipity for mounting the **Power-Box Battery** in a model!

The battery mount is also available separately for use in other models.

The **PowerBox Battery** 2800 battery pack 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 battery generates absolutely no interference to other devices (receiver, servos)!

The battery pack is intended exclusively for use in modelling applications, and may only be used as the power supply for the receiving system (receiver, servos, ignition, CPU) in radio-controlled models.

The **PowerBox Battery** 2800 is not designed to be used as a drive battery for electric motors.

### **Safety notes, hazards and warnings:**

#### **Hazard Information:**

- Do not connect the positive terminal to the negative terminal (short-circuit)
- Do not dispose of the battery in an open fire
- Do keep the battery well away from any heat source (engine, silencer)
- Do not allow the battery to contact water or model fuel
- Do charge the battery only under suitable conditions (not above 40°C if possible)
- Do not use a battery which is obviously damaged or distorted
- Do not use the battery for any purpose other than the intended application
- If the battery should leak, do not allow the electrolyte to touch your skin

#### **Warning Notes:**

- Never connect the battery pack directly to a receiver or servos, as the voltage of up to 8.40 Volts could destroy these components.
- The basic rule is that the battery pack should only be connected to a PowerBox system approved by us, such as the PowerBox "Sensor", PowerBox "Competition", PowerBox "Champion" or the Voltage Regulator.
- When charging is complete, terminate the process by disconnecting the charge lead.
- Do not place the battery in a microwave oven or any pressurised container.
- If the battery should leak, or produce an unusual smell, keep it well away from any open flame (the electrolyte is inflammable).
- Never connect the pack to a 12 Volt car battery, either directly or via the charge socket.
- Do not use the battery in conjunction with any other make or type of battery (NiMH, NC, Li-Ion).
- The battery can be charged using an external charger connected to the battery cable, but we wish to point out expressly that such a method disables all the electronic safety measures which we have provided to ensure a safe charge!



### **Safety Notes:**

- Do not subject the battery to high temperatures, as this runs the risk of compromising the guaranteed performance and life expectancy of the battery.
- The battery contains integral safety elements. Do not use the battery in a location which is subject to powerful static electrical charges.
- The guaranteed temperature range on charge is between 0°C and 60°C.
- The integral battery guard circuit controls over-voltage and under-voltage, temperature, maximum charge time and maximum current, but only if the pack is charged via the standard charge socket.
- Store the battery out of the reach of children.
- When the battery reaches the end of its useful life, insulate the working contacts to guard against short-circuit.
- Stop using the battery if it emits an unusual smell, feels hot to the touch or has changed shape.
- Don't open the battery pack! Opening the case will wreck it, and this in turn presents the risk that the Lithium-Polymer battery inside it will be damaged.

### Guarantee Conditions:

Every **PowerBox Battery** is subjected to several checks during the production process. **We place special emphasis on the highest standards of quality.**

We guarantee this product for a period of **12 months** from date of purchase. If there is a proven material defect, we guarantee to correct it at no charge. If repair of the battery pack is not possible for economic reasons, we reserve the right to replace it.

Any repairs which we carry out for you in our Service Department do not extend the guarantee period.

**This guarantee is only valid if the battery pack is charged using the original mains PSU supplied by us, using the standard charge socket.** In principle, the pack can be charged via the connecting lead using a different charger, but in this case we are unable to ensure that the charger, and the settings of the charger, are correct for this battery. Using this method of charging completely circumvents all the electronic safety measures which we have provided.

Misuse, e.g. reversed **polarity, excessive final charge voltage, excessive charge currents, damp and fuel** invalidates any guarantee claim. 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  
Hindenburgstraße 33  
86609 Donauwoerth  
Germany**

**Liability exclusion:**

We are unable to ensure that the **PowerBox Battery** is installed and operated correctly, nor that the entire radio control system has been maintained properly. For this reason we are unable to accept liability for loss, damages or costs which result from the use of the **PowerBox Battery**, 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.

Donauwoerth, August 2004

Yours - the Modellbau-Deutsch Team  
**PowerBox Systems, Germany**

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