Power Supply Systems



Operating Instructions



Brief description of the PowerBox 40/24 Champion

This power supply system, based on the **PowerBox Competition**, offers a range of new, valuable and practical features in addition to those of its predecessor, which will be of great advantage to many model applications.

Naturally the unit features **double voltage stabilisation** of the battery voltage for servos and receiver at **5.9 Volts**, as featured by the **PowerBox Competition**. The two **electronic switches** can be operated by the **SensorSwitch**. The **voltage monitor** system makes use of two LED chains and external LEDs, together with a **low voltage memory** which monitors each battery. Viewed overall, this represents the **most reliable** and **sophisticated** method of voltage monitoring available in any power supply system.

The **PowerBox Champion** also features a facility for **individual servo adjustment** on **3 channels** and **12 servos (Servo Match Control)**. An **Adjustor Board** can be connected and disconnected from the unit at any time using the captive cable (approx. 1 metre long), and the board is used to adjust and program the individual channels and servos. One **Adjustor Board** can be used for any number of **PowerBox Champions**, and this provides a useful cost saving when you purchase additional units.

The system provides 7 channels which are accessed remotely from the receiver. All channels are equipped with the latest **short-circuit protected signal amplifiers** (advanced push-pull), and a separate signal is fed to each of the 24 servo sockets. The signal amplifiers are voltage-independent; **we also stabilise the servo signal**. Before you use the **PowerBox Champion** in your model it is necessary to carry out an **initialisation process** in order to obtain optimum results in terms of servo operating characteristics. This process is necessary because every radio control system manufacturer uses a slightly different neutral pulse width and end-points, and tolerances in the stick units may also arise. The advantage of the initialisation process is that the **PowerBox Champion** can be used with all radio control systems, as it is capable of compensating for any **inaccuracy** or **wear** in the potentiometers of the **stick units**.

The first time you use the backer you must start by initialising the unit.

- Connect both receiving system batteries to the backer with correct polarity.
- Connect all the servos to the PowerBox Champion in the appropriate sequence.
- Switch on the transmitter and receiving system.
- Connect the Adjustor Board to the PowerBox Champion.
- Make sure you understand how the controls of the Adjustor Board are used.

The upper rotary knob is the **channel select switch**. The lower rotary knob is the **servo select switch**. Servo travels are adjusted using the two press-buttons + and -. The **red LEDs** indicate that you have not yet stored the last process. The **yellow LEDs** indicate that you have adjusted the **servo centre** setting.

Now to initialise the PowerBox Champion:

- 1. Move the channel select switch to "A".
- 2. Move the servo select switch to "reset".

Start with the channel of your transmitter which is used to control socket bank "A" on the backer, and check that the **trim is at centre**!

3. Leave this stick at "neutral" and press the + button. The first red LED will glow, together with the yellow LED associated with this channel.

4. Move the stick to the right-hand end-point and press the + button.

5. Move the stick to the left-hand end-point and press the + button. The provisional result: the yellow LED goes out.

6. Move the servo select switch to the "save" position, and press the + button. The red LED goes out. This completes the initialisation of channel "A".

This channel of the backer is now set up correctly to match the values of your radio control system.

Repeat the whole process with the channels for socket banks "B" and "C".

- 1. Set the channel select switch to "B".
- 2. Set the servo select switch to "reset".
- 3. Stick neutral, trim central, press + button, yellow and red light up.
- 4. Stick right, press + button.
- 5. Stick left, press + button.
- 6. Set servo select switch to "save", press + button, job done.

Both LEDs (red and yellow) should now go out, confirming that the initialisation process of this backer channel is also concluded.

Repeat the procedure with socket bank "C" and the associated transmitter stick.

If you make a mistake, set the servo select switch to "**reset**" and press the **+ and buttons simultaneously**. This **resets** the values for the channel concerned, and you can **re-start** the set-up procedure for that channel.

Now you want to adjust the servos of one channel:

Select the appropriate socket bank on the Adjustor Board (A, B, C).

Select the servo to be adjusted using the servo select switch. The servo socket at the **outer edge** of the **PowerBox Champion** is **Servo "1"**; the **innermost servo** of the bank of four sockets is **Servo "4"**.

You can now adjust the centre, right and left servo end-points for that servo. To adjust the end-points you must hold the corresponding transmitter stick in the appropriate position.

You can now set the servo travels precisely using the + and - buttons. Note that it is also possible to set non-symmetrical values. For **coarse adjustments** you can **hold the button pressed in**, and the servo will move continuously in the desired direction. For fine adjustments press the button briefly.

To reverse the servo move the transmitter stick to one end-point, then hold one button pressed in until the servo runs to the opposite end-point. This may take **up to 30 seconds**. This means that you can watch what is happening; after all, you don't have to reverse servos every day. Move the stick to the opposite end-point, then hold the other button pressed in and allow the servo to run to the other endpoint.

It is possible to set **any (I)** servo travel that you wish, **but please take care!** In principle you can set up any servo to move through an angular travel of 180°. **However:** not every servo is mechanically capable of such travels (gearbox end-stops). Check carefully that the **servo pot and gearbox** do not strike their mechanical end-stops. You can ensure this by initially setting the maximum travel, then **reducing the value by about 10%**.

Note: the maximum travel may only be 140° depending on servo type, but many servos are capable of 180° travel without problem.

Once the servo set-up is complete, you have to store the new values (red LED).

Set the servo select switch to "save" and press the + button: the red LED goes out, and the job is done!

If you wish to re-start the entire servo set-up procedure, move the servo select switch to "**reset**" and press the **+ button**. This resets all the values for the set channel (A, B or C).

If you wish to fine-tune multiple servos on one channel so that they run exactly identically - usually because they are all actuating the same control surface - use this procedure: first set a common centre, then a common right end-point, and finally a common left end-point.

You may well find during a flying season that you have to **re-adjust the set servo** values. This does not indicate a problem in the **PowerBox Champion**, but is evidence of **differential rates of wear** in the servos, e.g. gearbox, pot and motor.

Setting up multiple servos identically has many advantages: it greatly reduces the current drain of the servos, avoids premature servo damage (especially to motor and pot), increases the useful life of the servos considerably, and allows the servos to bring their full power to bear on the control surface.

One additional advantage of remote servo adjustment is that you can often save one or more channels when setting up the transmitter. For example, one popular application for multiple servos is airbrakes in a model glider, where two channels are normally used to provide separate servo adjustment. Now you can connect both servos (right and left airbrake) to one channel of the **PowerBox Champion**, and use the **Servo-Match-Control** facility (A, B, C) to fine-tune both servos at the backer, rather than at the transmitter.

In this way you can often combine several functions to work in sequence using just one channel, using the backer to set up each servo accurately. This may apply to retract systems, where the retract units and the wheel doors require different servo directions and servo travels, or spoilers, or many other auxiliary functions. There are also positive implications in terms of flight safety, because you can control multiple functions simultaneously using just one switch.

After every set-up process the **Adjustor Board** should be disconnected from the **PowerBox Champion**. This avoids subjecting the controls to vibration, and saves the airborne weight of the extra unit.

We wish you every success using your new PowerBox 40/24 Champion.

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