

**PowerBox Systems®**

*World Leaders in RC  
Power Supply Systems*

# INSTRUCTION MANUAL

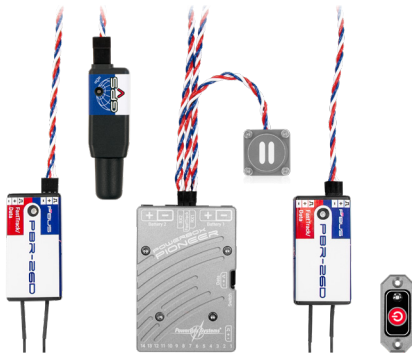


**PIONEER**

## Dear PowerBox customer,

Congratulations on your decision to install a **PowerBox Pioneer** in your model. This unit is currently the most modern integrated power management system available anywhere in the model world. The **Pioneer** offers full telemetry capability in addition to a high-performance power supply featuring electronic switches. Furthermore, in conjunction with an **iGyro SAT** the **Pioneer** operates as a highly sophisticated gyro system. Nine gyro axes can be set up in just a few minutes, while the multitude of expert settings enable you to fine-tune the unit perfectly to meet your personal preferences.

We wish you many hours of pleasure and success with the **PowerBox Pioneer**!



## FEATURES

- + 14 channels
- + High-performance battery backer with high continuous load capacity
- + Duplicated circuitry for the entire power electronics
- + Redundant electronic switch
- + All features can be controlled using PowerBox and Jeti transmitters
- + All systems can be operated using **PowerBox USB Interface Adapter**
- + Integrated iGyro technology of the latest type, with iGyro SAT as gyro sensor
- + Nine independent gyro outputs for: 3x aileron, 3x elevator, 3x rudder
- + Special regulatory algorithm for fixed-wing models
- + Detects all transmitter mixers
- + Ultra-simple gyro programming in just a few minutes
- + Optional GPS mode for speed-dependent gyro compensation
- + Telemetry data for **PowerBox P<sup>2</sup>BUS**, Futaba S.BUS2, Jeti Ex-Tele and Spektrum SRXL2
- + Transmission of voltage, current, capacity, lost frames and holds
- + User-variable servo frame rate: 10 ms, 12 ms, 14 ms, 16 ms, 18 ms
- + Suppression of servo feedback currents
- + Ultra-modern 32-bit microprocessor ensures swift, accurate signal processing
- + Efficient heat dissipation via the high-quality machined and anodised aluminium case
- + Machined and anodised aluminium switch housing
- + Space-saving low-profile format
- + Ultra-lightweight construction

## 1. INSTALLATION, CONNECTIONS

In order to minimise the **Pioneer's** physical size the case does not feature mounting lugs; the unit is simply installed using the self-adhesive pad supplied. This mounting method is extremely secure since the unit is so light and compact.

The Pioneer can be used with three types of radio control system: **PowerBox P2-BUS**, Futaba S.BUS2, Jeti EX-BUS and Spektrum SRXL2. These four systems share one common attribute: servo signals and telemetry data are carried on a single bus cable. This eliminates the need for a second patch lead for telemetry data, as required with older systems.

**The Pioneer automatically detects the system to which it is connected** – the first time you plug it in, it may take a few seconds until it unambiguously recognises the system. However, the system type is stored once detected, and the unit subsequently starts without delay the next time it is switched on.

This means that the basic system is Plug'n Play, and no further adjustments are required to operate it. This does not apply if an **iGyro SAT** is installed, or if you wish to change the frame rate or the capacity reset channel.

Users of **PowerBox** and Jeti systems have the facility to carry out all adjustments at the transmitter. The alternative - which must be used by Futaba/Spektrum pilots - is to use a USB lead.

## Connecting the receivers

### - PowerBox ATOM/CORE

Connect the P<sup>2</sup>BUS output of one or two receivers to RX1 and RX2. If only one receiver is connected, then it must be connected to RX1 for telemetry transmission. If you have connected a **GPS-V** to the FastTrack input, the **Pioneer** also sends the GPS information to the transmitter.

### - Jeti EX-BUS

Set one output of the receivers you wish to use to EX-BUS. The frame rate should be set to 10 ms, and the Failsafe function must be set to **OFF**. If only one receiver is connected, then it must be connected to RX1 for telemetry transmission. If you have connected a **GPS-V** to the FastTrack input, the **Pioneer** also sends the GPS information to the transmitter.

### - Futaba S.BUS2

Connect the S.BUS2 output of one or two receivers to RX1 and RX2. If only one receiver is connected, then it must be connected to RX1 for telemetry transmission. This receiver must also be set as the telemetry receiver at the transmitter. If you have connected a **GPS-V** to the FastTrack input, the **Pioneer** also sends the GPS information to the transmitter.

In order to receive telemetry data you must enter the Telemetry Sensor menu at the transmitter, and carry out a **Load New** process; this completely erases the list of sensors. Now move to Slot 16 of the sensor list and select **PowerBox**. The telemetry data are now displayed in Slot 16 and above. If you have connected a **GPS-V** to the FastTrack input, the **Pioneer** also sends the GPS information to the transmitter.

## - Spektrum SRXL2

Connect one or two SPM4651T satellites to the **Pioneer** using the optional adapter lead set (#9192). If only one receiver is connected, it must be connected to RX1 for telemetry transmission. At the transmitter you will now see the battery data displayed for the **PowerBox** sensor. If you have connected a **GPS-V** to the FastTrack input, the **Pioneer** also sends the GPS information to the transmitter.

By default the **Pioneer** operates in DX18 compatibility mode. The DX18 and DX20 mode can be selected using Terminal via USB Interface Adapter.

## Connecting the batteries

Ideally the two batteries connected to the **Pioneer** should be of the same type and capacity. It is essential to maintain correct polarity. It is also possible to connect batteries of different capacity, but this always results in a more severe load on the larger battery. The basic rule is that each battery should be of a size capable of securely supplying power to the model on its own.

## Connecting the switch

Plug the switch into the appropriate socket. As an option, the **Pioneer** is supplied with a button switch or a **MicroMag** magnetic switch.

The method of operating the button switch is the same for all **PowerBox** systems: press the button until the LED starts to flash green at a high rate. Release the button for a moment, then press the button again briefly: the LED now lights up solid green to indicate that it is switched on. Repeat the procedure when switching off.

Using the **MicroMag** switch: hold the magnet against the switch until the **Pioneer** is switched on. The LED lights up blue as soon as a magnet is detected, then changes to red to indicate the end of the switching process. After this the LED lights solid green to indicate that the system is switched on.

## Connecting an iGyro SAT

If you wish to exploit the **Pioneer's** gyro functionality by fitting an **iGyro SAT**, it is essential to install the unit at the correct angle in the model.

In turbinepowered models the **iGyro SAT** should be located as far as possible from the engine in order to prevent turbine noise influencing the sensor. The lead attached to the **iGyro SAT** can be extended to any length. The **iGyro SAT** should be connected to the **Pioneer's** FastTrack input.

## Connecting the GPS for the gyro

Use a Y-lead to connect the **GPS-V** to the FastTrack input together with the **iGyro SAT**. The **GPS-V** automatically detects that it is connected to a FastTrack input. The **GPS-V** has two functions when connected to the **Pioneer**:

1. The iGyro operates with speed compensation. This means that the gyro gain for all axes is adjusted to suit the model's airspeed. This increases the gyro's sensitivity when the model is flying slowly, thereby improving its stability.
2. The GPS telemetry data are sent to the transmitter; this applies to all systems.

## Connecting the USB Interface Adapter

Plug the **USB Interface Adapter** into the Data input. For ease of access this input is located separately on the top of the case. The adapter can be plugged in at any time – even when the system is operating. Now start the program on your PC. You can download the **PowerBox Terminal App** to your PC from our website.

## 2. BASIC SETTINGS

If you are not using an **iGyro** with the **PowerBox Pioneer**, only a few settings have to be entered. You will find all the settings either in the transmitter menu (**PowerBox**, Jeti) or the Mobile App and the PC program.

To access the menu on the **PowerBox** transmitter, create any Telemetry widget for the **Pioneer**; you will then find the **Menu** button in the widget.

On a Jeti transmitter you will find the **Jetibox** point under **Additional functions**. Select this point, then select **MX** at far right. If you now press at the bottom, you will find yourself in the **Pioneer** menu again.

### a) Frame rate

This menu point allows you to set the servo signal repeat rate. If you are using older analogue servos, use the 18 ms setting. For more recent digital servos the 12 ms setting can be selected. The default setting is 16 ms.



### b) Capacity reset channel

The purpose of this function is to select the channel you wish to use for resetting consumed battery capacity; the default setting is Channel 16. This channel resets the consumed capacity as soon as the travel exceeds 100 %. You can use a switch or button for this and reset the capacity every time you charge the batteries.

### c) Reset Gyro

Selecting this function resets all gyro settings.

**Caution:** there is no security query for this function!

### d) Failsafe

This menu is used to select an output which will move to a pre-defined servo position if the radio signal is lost. Always use this function for Throttle. It is a legal requirement in many countries!

Select the output you wish to use, and set the Failsafe mode to **Failsafe**. Pressing the **Teach** button stores the current servo positions for all outputs for which Failsafe has been set.

### 3. GYRO SETTINGS

None of the **iGyro** settings have a function unless an **iGyro SAT** is connected. The procedure differs according to whether the model is new, or has already been test-flown without a gyro:

#### a) A new model

- Set all model functions including a channel for gyro gain
- Set up all model functions (travel, centre, Expo, etc.)
- Test-fly the model, including trims, differential etc.
- Assign the gyro outputs
- Learn the installed position
- Learn the centre and end-points
- Adjust the **iGyro** in flight using the gain control
- Fine-tune the individual axes if necessary
- Store the established gain value on a switch

#### b) An already test-flown model

- Assign the gyro outputs
- Learn the installed position
- Learn the centre and end-points
- Adjust the **iGyro** in flight using the gain control
- Fine-tune the individual axes if necessary
- Store the established gain value on a switch

As you can see, while you are carrying out basic adjustments to a new model, or test-flying a new model without the gyro, no adjustments of any kind are required at the **iGyro SAT** or the **Pioneer**.

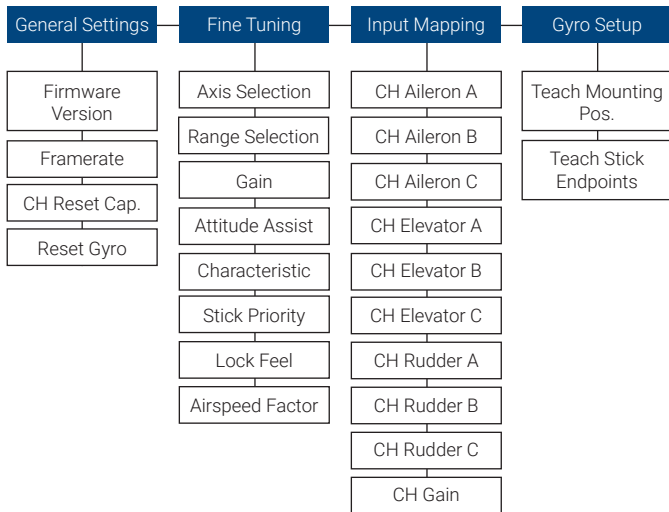
For this reason we start the set-up procedure in the menu where the gyro outputs are assigned.

**Note:** **PowerBox** and Jeti transmitter menus are arranged identically, and differ only in their appearance and the method of operation using touch-screen or buttons.

The **Pioneer**'s gyro functions are identical to the settings in **PowerBox** PBR receivers with an **iGyro SAT** connected. The only difference is that the Pioneer provides nine gyro axes, whereas the PBR receivers provide six.

Start with setting up the **iGyro** as described in the **iGyro SAT** Instructions, starting at Point 3.2.

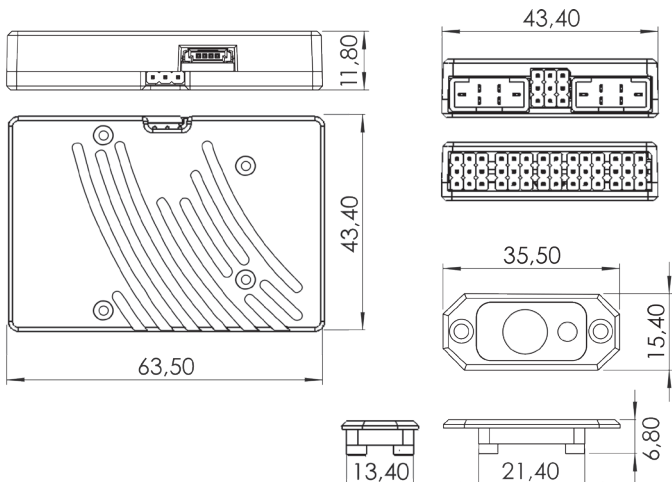
## 4. MENU STRUCTURE



## 5. SPECIFICATION

Operating voltage:	4.0 V – 9.0 V
Power supply:	2S LiPo, 2S Li-Ion, 2S LiFePo, 5S NiMH
Current drain Power-on state:	105 mA
Current drain Standby:	30 $\mu$ A
Maximum load current:	Continuous 2x10 A (<30 s 2x 20 A)
Drop-out voltage:	0.3 V
Output voltage:	unregulated
Signal input:	serial
Supported RC systems:	PowerBox, Futaba, Jeti, Spektrum
Receiver redundancy:	SRS
Channels:	26
Servo sockets:	14
Servo signal resolution:	0,5 $\mu$ s
Signal frame rate:	10 ms, 12 ms, 14 ms, 16 ms, 18 ms
Gyro regulation:	Heading- and Normalmode
Gyro sensor type:	external iGyro SAT
Number of sensor axes:	9
Supported telemetry systems:	P <sup>2</sup> BUS, S.BUS2, EX-Tele, SRXL2
Dimensions:	63 x 44 x 12 mm
Weight:	40 g
Weight Sensor Switch:	6 g
Temperature range:	-30 °C to +75 °C

## 6. DIMENSIONS



## 7. SET CONTENTS

- **PowerBox Pioneer**
  - **PowerBox MicroSwitch**
  - 2 patch leads 22 cm
  - 2 retaining screws
  - Adhesive tape
  - Operating instructions in English and German
- **PowerBox Pioneer**
  - **PowerBox MicroMag**
  - Magnet
  - 2 patch leads 22 cm
  - 2 retaining screws
  - White adhesive tape
  - Sticker MagSensor
  - Key ring
  - Operating instructions in English and German

## 8. SERVICE NOTE

We make every effort to provide a good service to our customers, and have now established a Support Forum which covers all queries relating to our products. This helps us considerably, as we no longer have to answer frequently asked questions again and again. At the same time it gives you the opportunity to obtain assistance all round the clock, and even at weekends. The answers come from the **PowerBox team**, which guarantees that the answers are correct.

Please use the Support Forum **before** you contact us by telephone.

You will find the forum at the following address:

**[www.forum.powerbox-systems.com](http://www.forum.powerbox-systems.com)**

## 9. GUARANTEE CONDITIONS

At **PowerBox-Systems** we insist on the highest possible quality standards in the development and manufacture of our products. They are guaranteed **“Made in Germany”**!

That is why we are able to grant a **24 month guarantee** on our **PowerBox Pioneer** from the initial date of purchase. The guarantee covers proven material faults, which will be corrected by us at no charge to you. As a precautionary measure, we are obliged to point out that we reserve the right to replace the unit if we deem the repair to be economically unviable.

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

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.

We accept no liability for transit damage or loss of your shipment. If you wish to make a claim under guarantee, please send the device to the following address, together with proof of purchase and a description of the defect:

### SERVICE ADDRESS

**PowerBox-Systems GmbH**  
Dr.-Friedrich-Drechsler-Str. 35  
86609 Donauwörth  
Germany



## 10. LIABILITY EXCLUSION

We are not in a position to ensure that you observe our instructions regarding installation of the **PowerBox Pioneer**, fulfil 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 Pioneer**, 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 every success using your new **PowerBox Pioneer**!



Donauwörth, July 2023

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