PowerBox Systems ®

World Leaders in RC
Power Supply Systems

iGYRO® SAT

The **iGyro SAT** acts as gyro sensor unit for the iGyro function in a whole range of our products, including the **Royal SR2**, **Competition SR2**, **Mercury SR2**, **Pioneer** and all receivers from the **PBR7S** up.

When operating, the **iGyro SAT** supplies sensor data to the device via the FastTrack bus, and the iGyro software then delivers the requisite signals to the servos. Every aspect of the set-up phase for all devices can be carried out from the transmitter; an advantage of the high-performance telemetry system of the Core transmitter. There are various methods of setting up PowerBox power supply units: from the transmitter if using a PowerBox or Jeti system, using the Display if connected to the system, using the Mobile Terminal or even with a PC and USB cable.

The set-up process is simple, and consists of three steps: assigning the channels, detecting the installed orientation, and establishing the end-points. If Delta or V-tail mixers are present, they are detected automatically.

Additional features are available, including Attitude Assist, Smart Assist, Stick-priority and Lock-in feel, and these facilities provide experts with all the tools for fine-tuning the **iGyro** to meet their specific needs.

One absolute highlight of all iGyros is that a **GPS III** or **PBS-TAV** can be connected to provide speed-dependent gain control. At the same time these sensors supply telemetry information!

1. INSTALLATION, CONNECTIONS

In the next section the term primary device is used to denote the receivers or Power-Boxes in which the iGyro settings are entered.

The **iGyro SAT** can be installed in any position in the model – provided that it is parallel to or at an angle of 90° to the direction of flight. Installing it at any other angle would typically cause an unwanted response, e.g. a gust of wind affecting the ailerons could generate a control response on the elevator and rudder.

Stick the iGyro to a clean, smooth surface, and connect it to the *FastTrack* socket on the primary device. If the connecting lead is too short, there is no problem in using an Uni extension lead up to a length of 3 m. This means that the **iGyro SAT** can be installed at any point in the model you wish; ideally it should be positioned away from vibration or turbine noise.

The iGyro can be used to control 6, 9 or 12 gyro functions, depending on the primary device.

If you are using a PowerBox system, please refer to the instructions supplied with the device for connecting and assigning the servos. In the case of receivers the functions are programmed at the transmitter in the standard way, and assigned to the gyro in the Telemetry menu as described later.

If you are using a **GPS III** or **PBS-TAV**, there are different connection scenarios depending on the primary device you intend to use:

a) PBR receiver: the **GPS** or the **TAV** is connected to the P²-BUS like any other telemetry sensor, and will be detected automatically by the receiver.

b) PowerBox system: the **GPS** or the **TAV** should be connected to the FastTrack socket on the PowerBox using a Y-lead. The telemetry data from the speed sensor are passed to the transmitter with the PowerBox.

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2. SETTING UP

The following set-up procedure uses a Pioneer simply as an example. The menus at the PowerBox transmitter are absolutely identical for a **PBR receiver** or other **PowerBox system**.

If you wish to operate the **iGyro SAT** and a PowerBox with a Jeti system, you will find the same menu system in your transmitter's JetiBox menu. For pilots using other systems you will find all the menu points 1:1 the same on the **Mobile Terminal**. The same applies to PowerBox systems such as the Royal, Competition or Mercury with a display connected: the menu system and set-up operations are always the same.

The next part of the procedure varies according to the state of the model, i.e. whether the model has already been test-flown without a gyro, or is still unflown.
The procedure is also different if you are using a Royal, Competition or Mercury, since these provide a set-up Assistant on their own display. If you are using any of these three PowerBox systems it is absolutely essential that you read the operating instructions supplied with them.

a) New model
- Assigning all model functions, including a channel for gyro gain
- Setting up all model functions (travel, centre, Expo, etc.)
- Test-flying the model, including trims, differential, etc.
- Assigning the gyro outputs
- Setting the installed orientation
- Learning the centre and end-points
- Adjusting the iGyro in flight using the gain adjustor
- Fine-tuning the individual axes, if necessary
- Storing the established gain value on a switch

b) Test-flown model
- Assigning the gyro outputs
- Setting the installed orientation
- Learning the centre and end-points
- Adjusting the iGyro in flight using the gain adjustor
- Fine-tuning the individual axes, if necessary
- Storing the established gain value on a switch

As you can see, no adjustments of any kind are required at the **iGyro SAT** or the **primary device** in order to enter the basic model settings, or to test-fly the model without the gyro. For this reason we start the set-up procedure with assigning the gyro channels in the Telemetry menu:

2.1 CREATING A TELEMETRY WIDGET

If you have not already done so, the first step is to create a Telemetry widget for the primary device. This widget provides access to the Telemetry menu:
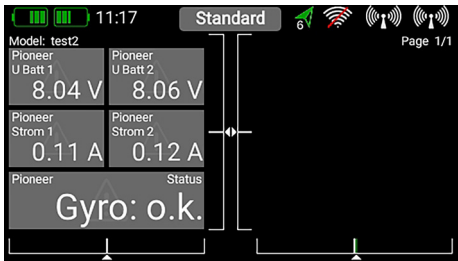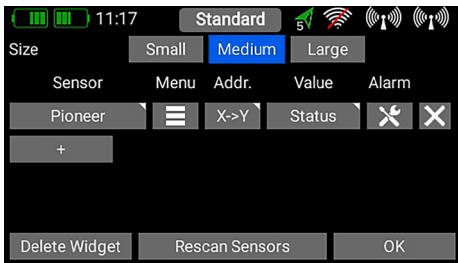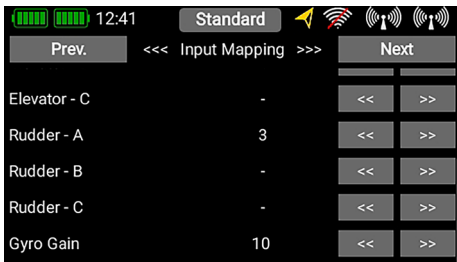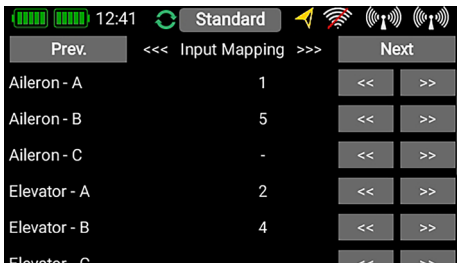
The menu is designed in such a way that frequently needed screen displays are further forward, while basic set-up menus are further back.

Important point regarding **PBR receivers:** in the first Telemetry menu it is essential to set the *Data* output to *FAST TRACK*.
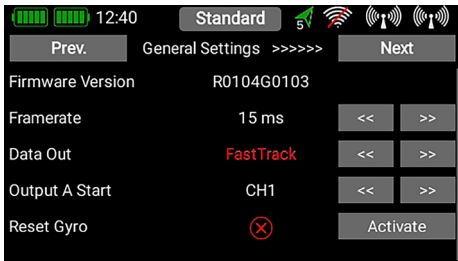
2.2 CHANNEL ASSIGNMENT

Tap repeatedly on the right until you arrive at the Channel Assignment screen.

12:41	Standard	
Prev.	<<< Input Mapping >>>	**Next**
Aileron - A	1	<< >>
Aileron - B	5	<< >>
Aileron - C	-	<< >>
Elevator - A	2	<< >>
Elevator - B	4	<< >>
Elevator - C	-	<< >>

12:41	Standard	
Prev.	<<< Input Mapping >>>	**Next**
Elevator - C	-	<< >>
Rudder - A	3	<< >>
Rudder - B	-	<< >>
Rudder - C	-	<< >>
Gyro Gain	10	<< >>

Here you set the outputs which you wish to be connected to each Gyro output. This means: if you have assigned your two aileron servos to 1 and 5, at this point you should enter 1 at **Aileron-A**, and 5 at **Aileron-B**. Repeat the procedure for the elevator and rudder.

Setting up a gain channel is <u>absolutely essential</u>. At the transmitter all you have to do is set up a function with a rotary or linear control and a servo output (up to +/- 200%). This servo output can now be assigned to **GyroGain** at this point.

Note for Core and Atom pilots: take care not to tap too quickly in succession in the Telemetry menu, as all values are sent to the receiver by radio, and the set value received back from the receiver. Many settings also affect other functions in the menu, so you need to allow the menu a little time to refresh. If you wish to make further adjustment to a value, simply stay on the button, and the value will start to change more and more quickly.

Always keep a little distance between transmitter and receiver. If they are too close together, radio transmission is poor, and this can slow down the procedure.

If reception is good, the delays mentioned above are scarcely noticeable.

Special feature: Delta and V-tail

Deltas and V-tail models are set up at the transmitter in the usual way. The only special point concerns the iGyro assignment:

The following connection schemes need to be observed in the case of deltas and V-tail models. The system can cope with deltas and V-tail models with up to four control surfaces:

Delta A: Assignment of the two pairs of control surfaces to Aileron-A and Elevator-A

Delta B: Assignment of the two pairs of control surfaces to Aileron-B and Elevator-B

V-tail A: Assignment of the two pairs of control surfaces to Elevator-A and Rudder-A

V-tail B: Assignment of the two pairs of control surfaces to Elevator-B and Rudder-B

Delta − thrust vector models: Delta A should be assigned as described above, while Elevator-B can be used for thrust vector.

Differential travels present no problems; the 3D algorithm detects their presence, and ensures that the control commands are separated correctly.

> **Note:** If your model is fitted with four separate ailerons, it is sufficient to assign iGyro control to the outboard ailerons only.

If your model is fitted with two ailerons actuated mechanically by four or six servos, then they should not be controlled with individual gyro channels. In this case you should also set up two gyro channels, and adjust the servos at the PowerBox using the Servo Matching function.

2.3 SETTING THE INSTALLED ORIENTATION

Once the assignment is complete, switch to the *Gyro Basic Setup* screen:
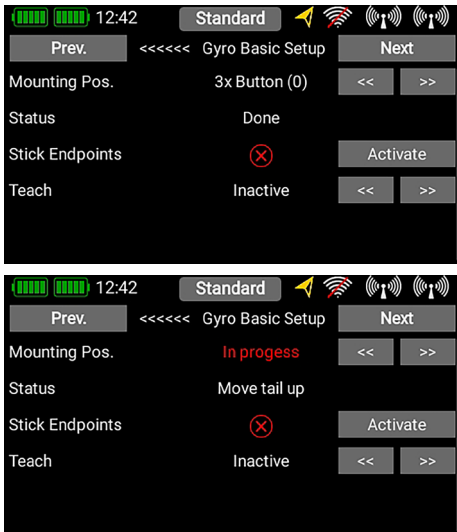
At this display the installed orientation of the **iGyro SAT** is established, together with the zero point and end-points of the transmitter sticks.

The installed orientation of the **iGyro SAT** is detected by defined movements of the model. The first step is to press three times on one of the two buttons to the right of the ***Installed position*** point. The triple press ensures that you do not actuate the process accidentally. Wait a moment until you see the message ***Tail up*** at Status.

Now move the tail of the model up and down smoothly two or three times, before holding it still in the **up** position. The elevator outputs carry out the same movements – but there is no need to check correct direction of servo rotation at this point.
Once the iGyro has detected the movement, the elevator outputs quickly return to neutral, and the transmitter screen will show the message ***Tail to the right***.
If the elevators slowly return to the neutral position, this indicates that you did not move the model a sufficient distance. If this should happen, repeat the procedure.

The next step is to move the tail of the model smoothly to left and right two or three times, then hold the tail to the **right**. Just as described previously, the rudder will also move in a random direction in parallel with the movement. Once the movement has been detected, the rudder returns to the neutral position, and the screen shows the message ***Finished***.

2.4 LEARNING THE CENTRE AND END-POINTS

In this procedure the iGyro learns the stick neutral position and end-points. The system also employs a complex three-dimensional algorithm to determine whether delta or V-tail mixers are present. It makes no difference if differential or unequal travels are programmed into the mixers. They can even include ailerons operating as landing flaps without the flap travel having any effect on the aileron gyro function.

To start the Learning mode, locate **Stick end-points** and press **Activate**.
Wait until you see **Hold right aileron** after **Learn** on the screen. Move the transmitter's aileron stick to the right end-point, and press one of the two arrow buttons.
After a moment the screen switches to **Hold left aileron**: move the aileron stick to the left, and press one of the buttons.
Repeat the procedure for the elevator at the **Up elevator/Down elevator** display, and for the rudder at **Hold right/left rudder**.

The iGyro is now ready for the model's set-up flight. Increase the gain control setting at the transmitter, and – to be on the safe side – check that the directions of gyro effect are correct. The directions will be correct unless you made an error with the installed orientation or the stick end-points.

Note: If you subsequently alter the trims or end-points (travels), you should repeat the stick end-point learning procedure. In most cases minor changes to the trims or the end-points will have a barely noticeable effect. However, if – for example – you use Attitude Assist on ailerons, a change to the trim will disable this feature, as Attitude Assist is only active at the learned Centre position; this applies to all iGyros.

2.5 SET-UP FLIGHT

As mentioned earlier, the model should always be test-flown and trimmed before the gyro is used. Start the flight with the gyro switched off, i.e. with the gain control at Centre.

The default setting is for Smart Assist to be active on aileron and elevator in **Range A** (0% to +100%), while rudder operates in Normal mode.
In **Range B** (0% to -100%) **Attitude Assist** is activated on aileron. The elevator works in Smart Assist mode, the rudder in Normal mode. We recommend that you use this mode for normal flying manoeuvres.
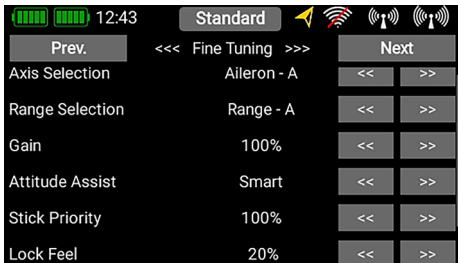
Fly the model straight and level at a safe height, then turn the gain control slowly in one of the two directions to the point where the model starts to oscillate around one of its flight axes. At this point reduce the gain control setting slightly until the model resumes stable flight.

> **Note:** If you do not feel confident about this, we recommend that you ask an assistant to make the adjustments to the gain control. Carry out several passes with the model, making small changes, in order gradually to set the gyro gain correctly. When you are satisfied, you should fly high-speed passes, loops and knife-edge flight to test the gyro's stability in all flight situations.

Once you have set gyro sensitivity to the optimum point, land the model and select the Function menu at the transmitter. You can now swap the rotary or linear control for a switch, and assign the percentage value established during the flight to the switch by adjusting the Rate value.

2.6 FINE-TUNING THE GAIN OF INDIVIDUAL AXES

The most common requirement is to fine-tune the gain of individual flight axes. While the Gain channel at the transmitter affects the gyro gain for all axes simultaneously, the *Fine Tuning* menu can be used to adjust each axis separately.

▮▮▮▮▮ ▮▮▮▮▮ 12:43	Standard	🔴 📶 ((T)) ((T))
Prev.	<<< Fine Tuning >>>	Next
Axis Selection	Aileron - A	<< >>
Range Selection	Range - A	<< >>
Gain	100%	<< >>
Attitude Assist	Smart	<< >>
Stick Priority	100%	<< >>
Lock Feel	20%	<< >>

At *SELECT axes* you select the axis which is to be adjusted. At *Select range* you choose the range you wish to adjust. The two ranges can be used to set up two different settings, either of which can be selected in flight using a switch. *Range A* should be selected for gain values between 0% and +100%, while *Range B* runs from 0% to -100%. At 0% the iGyro is completely disabled.

This facility enables you to set up, for example, two ranges: one range with *Attitude Assist* and a second range without *Attitude Assist*; you can switch between these two in flight.

2.7 ADDITIONAL FEATURES

By default the iGyro in the receiver is set up to suit the vast majority of pilots perfectly. Nevertheless, we have integrated additional expert functions in order to cater for all possible cases in the optimum way.

- Attitude/Smart Assist:

ON/OFF:
We decided to use the term Attitude Assist because "Heading" in the iGyro differs significantly from the Heading modes employed by other manufacturers. Attitude Assist can immediately be used on aileron and elevator for normal flight situations, and is active only at the Centre position of the sticks. As soon as the stick is moved, Attitude Assist is disabled, and the model provides the same feeling of response to commands as without a gyro.

In this way inverted flight is possible without requiring elevator correction. For knife-edge flight the aileron and elevator are held, so the pilot only has to control the rudder.

SMART ASSIST:
The new Smart Assist is a further development of Attitude Assist, and can be considered as a hybrid between Attitude Assist and Normal mode. Smart Assist can be switched on for all flight manoeuvres. By default Smart Assist is active in Range A for aileron and elevator. Smart Assist can also be used for the rudder; the only negative effect of this is a slight 'tail down' attitude.

Inverted flight without requiring elevator correction is possible in this mode, but this does depend on the model. In knife-edge flight aileron and elevator are held up to a certain point, but rudder needs to be controlled manually.

- Stickpriority:

This setting enables you to alter the degree of override of the gyro function.

The default setting is 100%, which means that the gyro function is completely suppressed when the transmitter stick is at its end-point. However, if you set Stick-priority to 200%, for example, then the gyro function is fully suppressed when the stick is only half-way to its end-point. This makes the model more agile, but at the same time reduces gyro effect more quickly as the stick is moved away from centre.

At lower settings the gyro effect is retained for longer when the stick is moved, and the model feels less responsive.

- Lock-in feel:

This setting affects the response of the gyro after the pilot gives a control input. The default value is 20%.

The effect can best be felt during a high-speed four-point roll in which the model stops quickly at each point. If this value is set too high, the result is that the model "rolls back" at the moment when the stick is released. If the value is set too low, the "locking" effect may not be sufficiently pronounced.

- Airspeed Factor:

This value defines the rate at which gyro gain is reduced by a change in airspeed. The setting only has a function if the model is fitted with a **GPS III** or a **PBS-TAV**. You should increase the Airspeed Factor if the model displays good gyro performance at low and medium speed, but tends to oscillate at high speed.

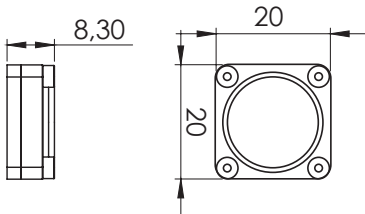> **Important:** An Airspeed Factor of 5 reduces gyro gain to zero at maximum speed!

3. SET CONTENTS

- iGyro SAT
- 2x adhesive pad
- Operating instructions

4. DIMENSIONS

5. 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

6. 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 **iGyro SAT** 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

7. LIABILITY EXCLUSION

We are not in a position to ensure that you observe our instructions regarding installation of the **iGyro SAT,** 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 **iGyro SAT**, 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 **iGyro SAT**.

Donauwörth, September 2024

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