PowerBox Systems ®

*World Leaders in RC
Power Supply Systems*

Ignition LED

SPARK SWITCH PRO

Dear customer,

we are delighted that you have selected the **SparkSwitch PRO** from **Power-Box-Systems**.

The **SparkSwitch PRO** is the logical development of the original **SparkSwitch**, which has been successful in the market since its introduction in 2008. The **SparkSwitch PRO** combines acknowledged reliability with new telemetry transmission options.

The **SparkSwitch PRO** incorporates a genuine bi-directional infra-red connection which physically isolates the receiving system from the ignition circuit, but at the same time sends telemetry information from ignition and engine to the telemetry interface via a light signal. This eliminates the danger of interference or static charge from the ignition circuit reaching the receiver.

The ignition switch is ready for immediate use, without any adjustment work. All you have to do is select the appropriate telemetry system using the **USB interface adapter** or the **BlueCom adapter**.

A two-position switch is required at the transmitter.

Please read through these instructions, as they will help you become familiar with your new accessory as speedily as possible.

We are confident that you will thoroughly enjoy using the **PowerBox SparkSwitch PRO**.
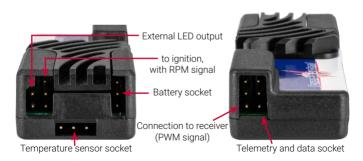
Specification
- Input voltage 4.0 – 13.0 V
- Regulated or open output voltage: 5.9 V / battery voltage
- Max. output current 2 A, peak 4.5 A

- External power-on LED
- Power circuits isolated using IRDA light transmission
- Two different switching modes
- Telemetry function for **PowerBox**, Jeti, Futaba, Graupner, Multiplex, JR
- Telemetry data includes battery voltage, current, consumed capacity, temperature and RPM
- Failsafe mode
- Stand-by current drain, ignition side: 60 µA
- Weight: 16 g

2. EXTERNAL CONTROLS

The illustrations below show the essential external elements:

External LED output

to ignition,
with RPM signal

Battery socket

Connection to receiver
(PWM signal)

Temperature sensor socket

Telemetry and data socket

3. FIRST STEPS BEFORE USING THE UNIT

3.1. CONNECTING

Complete all the electrical connections as shown in the wiring diagram above. The battery should be connected last.

For safety reasons the external LED **<u>must</u>** always be connected. It should be installed in such a position that the external LED is clearly visible to the pilot at all times when the engine is being started.

Caution: If the external LED is not installed, the pilot has no way of knowing whether the ignition is switched on or off. This involves unnecessary danger!

3.2. INSTALLED POSITION

Install the **SparkSwitch PRO** close to the ignition unit. Do not run the ignition power supply cables close to other wiring which is connected to the receiver.

3.3. SETTING THE TELEMETRY SYSTEM

Connect the **PowerBox USB interface adapter** or **BlueCom adapter** to the socket on the ignition switch marked DATA. A battery (max. voltage 8.4 V) must also be connected to the receiver socket. Run the **PowerBox** Terminal program on your PC, or the Mobile Terminal App on your smartphone, then follow the on-screen instructions.

3.4. IGNITION BATTERY

All types of ignition battery can be used: LiPo, Li-Ion and LiFe up to 3S, NiCd or NiMH up to 5S. Take care to maintain correct polarity when connecting the battery, as reversed polarity will ruin the electronics in the **SparkSwitch PRO**.
The unit's integral regulator basically limits the voltage to 5.9 V, which means that the **SparkSwitch PRO** is suitable for all battery types such as 4.8 V, 6.0 V. For all other types of ignition unit please disable the integral regulator using **PowerBox** Terminal.
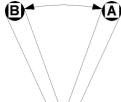
Note: if you wish to use batteries with a voltage higher than 8.4 V, it is essential to disable the 5.9 V voltage regulation circuit, otherwise the integral voltage regulator will overheat under load.

The ignition battery can be left connected permanently to the **SparkSwitch**. The current drain when switched off is so low (60 µA) that it will not discharge the battery even over a period of months

3.5. DEFINING THE SWITCH CHANNEL AT THE TRANSMITTER

Normal mode:
Switch position A is programmed to **0%** at the transmitter, and is always the **"OFF"** position.
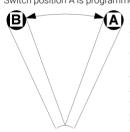
Switch position B is programmed to **+100%** at the transmitter, and always switches the **SparkSwitch "ON"**.

If no valid signal is present at the receiver, the **SparkSwitch** switches itself off. Ideally you should program the transmitter's fail-safe function so that the **SparkSwitch** cuts the engine if the signal is lost.

Safety mode:
Switch position A is programmed to **0%** at the transmitter.

Switch position B is programmed to **-100%** at the transmitter.

The switching procedure is as follows: move the switch from A to B to prepare the **SparkSwitch** for the switching process; this alters nothing at the **SparkSwitch**'s output. The unit's switched state only changes when the switch is moved back to the A position.

This means: if you accidentally operate the switch on the transmitter during a flight, this does not

switch off the **SparkSwitch**. Non-latching transmitter switches are ideal for this mode: pull the switch and release it in order to switch the ignition on; repeat the procedure to switch the ignition off again.

If there is a loss of voltage on the receiver side, the **SparkSwitch** always switches off, and stores the last switched state, i.e. if the signal is restored, the **SparkSwitch** will either be "ON" or "OFF" according to its previous switched state. This means: if there is intermittent contact in the signal wire, this will not cause the engine to cut.

We recommend that you set up fail-safe at the transmitter in such a way that the engine is stopped by the throttle flap.

3.6. TELEMETRY SETTING

You can use either the **PowerBox** BlueCom adapter or the **PowerBox** interface adapter to set the telemetry system. Alternatively the Jeti USB lead or the Multiplex equivalent also work. Please note the following points, which vary according to the telemetry system you select:

- PowerBox P²BUS
No adjustments required; the **SparkSwitch PRO** is simply connected to the socket marked *TELE* using a patch lead. Servo data and telemetry data are transmitted via the P²BUS. The default switch input channel is channel 12, but you can change the input channel using the telemetry set-up function.
The telemetry data are scanned when the system is switched on, and you can then organise the data on the main screen of the transmitter in your preferred arrangement.

- Jeti EX
The **SparkSwitch PRO** must be set to use the Jeti telemetry system. This can be accomplished using the Terminal program or the Jeti USB adapter.
Connect the **SparkSwitch** RX input to the receiver's switch channel. The receiver's Telemetry input must be set to JETI BOX. Connect the Telemetry output from the **SparkSwitch** to the receiver's Telemetry input using the second patch lead.
The telemetry data are displayed in the transmitter's Sensor menu.

- Futaba S.BUS 2
Once you have selected the Futaba telemetry system, you must connect the Futaba receiver's S.BUS 2 output to the DATA input of the **SparkSwitch**. This enables the transmission of servo <u>and</u> telemetry data. The default switch input is <u>channel 12</u>.
You will find a detailed, illustrated description of the procedure for setting up a Futaba transmitter for telemetry data in our **PowerBox** Support Forum.

- Graupner Hott
The **SparkSwitch PRO** must be set to the Graupner telemetry system.
Connect the RX input on the **SparkSwitch** to the receiver's switch channel, then connect the Telemetry output on the **SparkSwitch** to the receiver's Telemetry input using the second patch lead.
The telemetry data are displayed on the transmitter as Engine Modules.

- Multiplex M-Link
The **SparkSwitch PRO** must be set to the Multiplex telemetry system using either the Terminal program or the Multiplex USB adapter.
Connect the RX input on the **SparkSwitch** to the receiver's switch channel, then connect the Telemetry output on the **SparkSwitch** to the receiver's Telemetry input using the second patch lead.
The telemetry addresses can be set using the Terminal program.

- JR DMSS

The **SparkSwitch PRO** must be set to the JR telemetry system.
Connect the RX input on the **SparkSwitch** to the receiver's switch channel, then connect the Telemetry output on the **SparkSwitch** to the receiver's SENS input using the second patch lead.
The telemetry data are displayed on the transmitter as F-PACK (V, C, A), Temp. and RPM.

3.7. INSTALLING THE TEMPERATURE SENSOR

The temperature sensor is attached to the cylinder head using a ring-screw. This requires a 3.5 mm Ø hole to be drilled in one of the engine's cooling fins. You can then screw the temperature sensor in place using a suitable self-tapping screw or M4 machine screw. A small quantity of heat-conducting paste under the sensor will improve the temperature measurement. Ideally the attachment point should not be in the propeller's airflow, as the flow of air would tend to falsify the cylinder head temperature.

3.8. RPM MEASUREMENT

The Signal pin at the output of the **SparkSwitch**, which runs to the ignition unit's power supply, can be used for measuring engine RPM. Most ignition units (3W, DLE, DLA) have a "Tacho" output whose signal can be run directly to this pin. The **SparkSwitch** can measure the rotational speed pulses if the ignition unit's power

supply and Tacho output are linked using a Y-lead.
You will find detailed, illustrated instructions on the procedure for connecting the Tacho output in our **PowerBox** Support Forum.

4. SET CONTENTS

- **PowerBox SparkSwitch PRO**
- Temperature sensor
- Self-adhesive pad
- Three patch leads, 3-core
- 1 Y-lead
- 1 external LED
- Operating instructions

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 **SparkSwitch PRO** 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
Ludwig-Auer-Straße 5
D-86609 Donauwoerth
Germany

7. LIABILITY EXCLUSION

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

Donauwoerth, December 2020

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