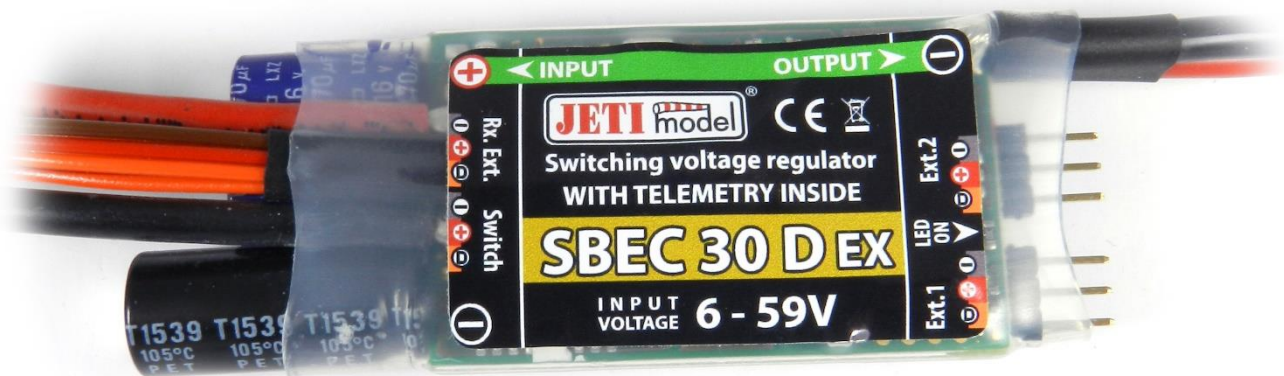# INSTRUCTION MANUAL

SWITCHING VOLTAGE REGULATOR

SBEC30D

1. Description

The switching voltage regulator SBEC is supposed to act as a current supply for receivers and servos. It makes possible to use a wide range of input voltages from 2S up to 10S Li-XX cells. Setup of the output voltage between 5 and 8.4V is accomplished in the JETI transmitter via EX BUS or in the JETIBOX. This implies that the SBEC is also prepared for use with new „higher" voltage servos. The SBEC is due to its maximum current of 30A suitable for medium and larger models. SBEC30D measures input and output voltage of the BEC, current, and consumed capacity of the battery. Measured data can be observed by displaying the telemetry in the JETI Duplex transmitter.

2. Wiring

The voltage regulator SBEC comprises two battery input cables with cross-sections of 2.5mm^2 used to connect the battery, and two three-wire cables with JR connector, where the red connector is the main EXT and the black connector is used for connecting the external switch (such as Universal Magnetic Switch - JMS-MSW or RC Switch - JDEX-RCSW). Three-wire cable is connected to a magnetic switch for switching the regulator on. This switch is wired in a so called „safety" mode which ensures continuous function of the regulator even if soldering joints or cables become mechanically damaged.

On the output there are two cables with cross-sections of 2.5mm^2, which are connected to the receiver via MPX connector. In addition SBEC 30D has two EXT connectors that may serve as an expander for other sensors or logical inputs.

Fig. 1: Inputs and outputs of SBEC30D

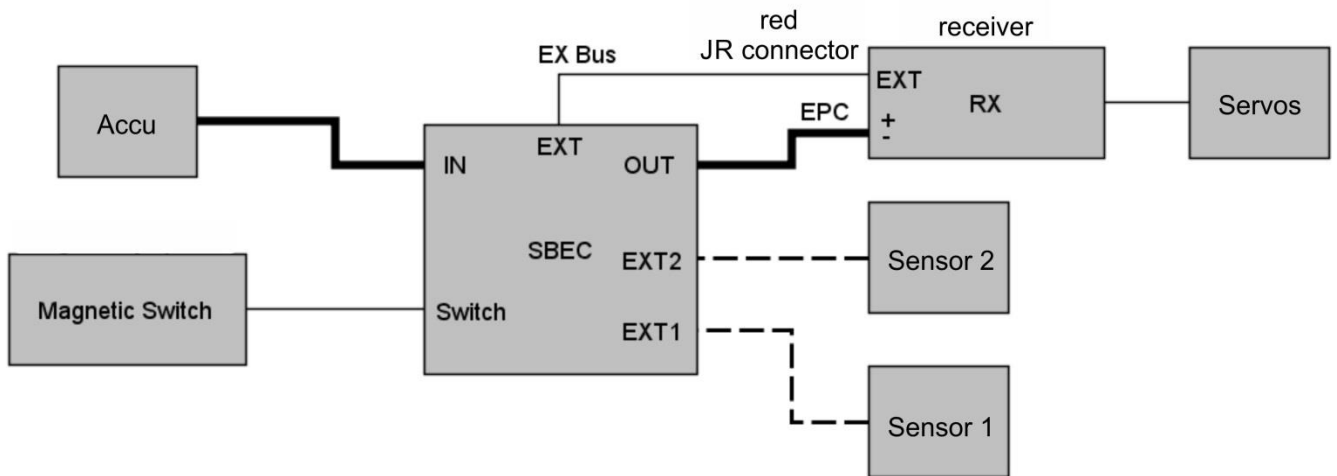## 2.1. e block diagram of voltage regulator connection:

Fig. 2: Block diagram of voltage regulator connection

To connect the sensor to the EXT 1 or EXT 2, the particular output must be configured as Expander, see "Setup".

> **Do not connect another voltage source (e.g. Accu or the output of another regulator) to the output of the regulator. Be sure to connect the power supply wires properly, always connect the red cable to the Accu + pole and the black cable to the - pole. Pay close attention when connecting outputs and inputs, they must not be confused. Failure to follow these conditions may result in irreversible damage to the stabilizer!!**

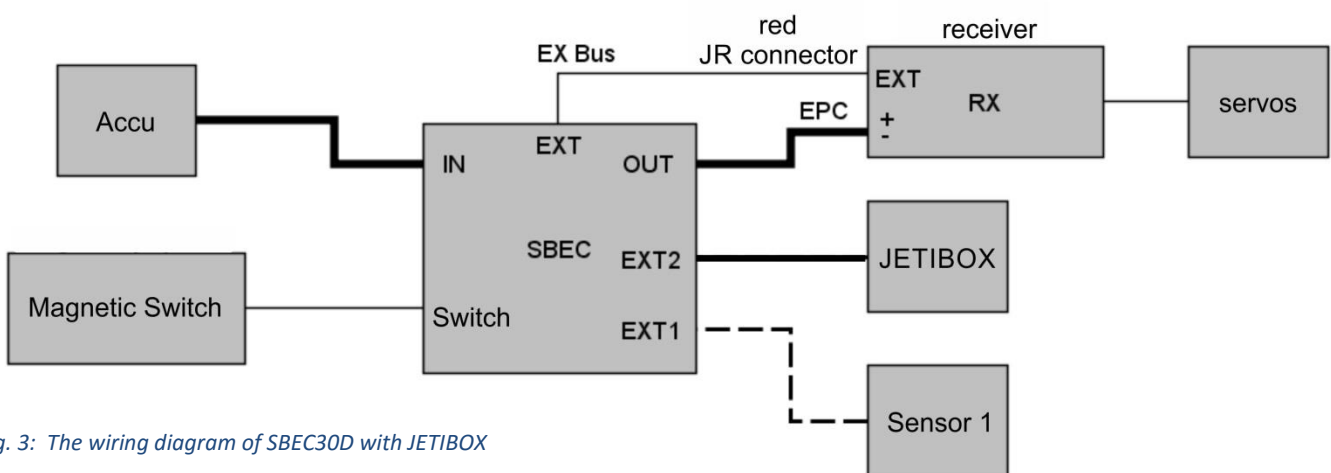## 2.2. The wiring diagram of SBEC30D with JETIBOX

Fig. 3: The wiring diagram of SBEC30D with JETIBOX

JETIBOX can be connected to any EXT output. If connected to EXT1 or EXT2, they must be configured as Expander, see „Setup".

2.3.   Update

SBEC30D allows firmware update via a PC. The update is performed using the JETI USBa.

Procedure:

o   Find the program to update to the latest firmware on the manufacturer's website under "downloads". Download it to your PC.

o   Connect the USB adapter to your computer. The procedure of installing drivers for the USB adapter is to be found in the user manual for the USB adapter.

o   Start the firmware update program on your PC.

o   Connect the USB adapter via three-wire cable to the main EXT of the SBEC30D (red JR connector).

o   Connect the power supply to SBEC30D, then the update starts. If magnetic switch or RC switch is connected, it is necessary to switch it on.
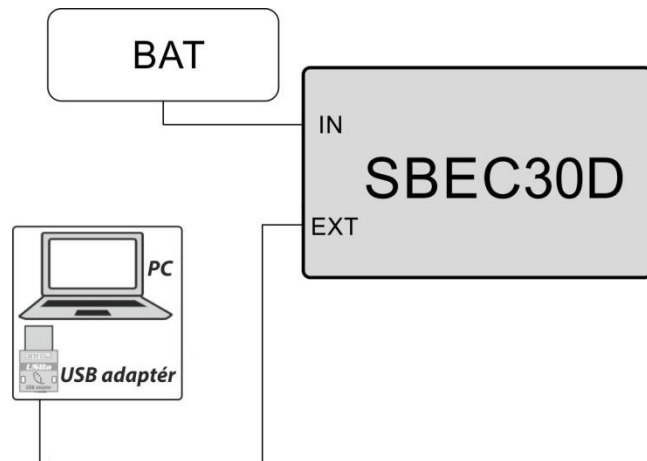

Fig. 4: Update

3. Setup

The condition of correct voltage is sufficient supply. The input supply voltage from the batteries must always be higher than the desired output voltage. We recommend that the power supply is at least of 2V higher. Otherwise, the output voltage may decline during the load. The switch on state of the regulator is signaled by the green LED.

Always make sure that all the connected devices, such as receivers, sensors and especially servos have the range of permitted input voltage in the value of input voltage set by you.

Always adjust the output voltage when the devices are disconnected.

3.1.   Configuration via JETIBOX

After connecting the SBEC30D to the JETIBOX, a startup screen appears that contains identification of the device and the value of consumed capacity of the battery in the first line of the JETIBOX display. The second line contains the data (from the left) of the input voltage (e.g. battery voltage) and the value of output voltage.

Using buttons U and D (down and up arrows) of the JETIBOX it is possible to browse through the menu (direction to the main screen).

By pushing the R button (right arrow) and L button (left arrow) it is possible to set individual items. The menu will then show these settings:

The items of „**ACTUAL VALUES**":

Accu Voltage – actual input voltage value, battery voltage

Accu Current – actual current flowing from the battery

Accu Capacity – actual value of consumed capacity from the battery, resetting is performed via "MIN / MAX" section

Output Voltage – actual value of BEC´s output voltage

Temperature – actual temperature value (in °C)

The items of „**MIN/MAX**":

Reset MIN/MAX – by pushing the arrows **R** and **L** (left and right) together, the minimum and maximum are reset, as well as the data of consumed capacity

AccuV MIN/MAX – data of the minimum and maximum voltages, i.e. battery voltage

AccuI MAX – indicates the maximum current from the battery

Temp. MIN/MAX – data of the minimum and maximum temperature of SBEC30D

The items of „**SETTING**":

Output Voltage – setting the output voltage of the BEC

Ext1 Mode and **Ext2 Mode** – setting the EXT1 output according to the requirements as:

Expander – expander EX BUS, possibility to connect devices that support EX Bus Protocol

Log. Input – reading the logical input, see the chapter „Alternative functions – logical input"

Off – switched off, EXT1 output is not used

To switch between items, press left or right arrow for a longer period.

Capacity Alarm – setting the level of capacity taken from the battery at which the alarm will sound

Current Alarm – setting the level of current drawn from the battery at which the alarm wil sound

MinVoltage Alarm – if the battery voltage drops below the set level, the alarm will sound

OverTemp Alarm – indicates alarm fort the SBEC30D overheating

The items of „**SERVICE**":

Factory Defaults – pushing arrows L and R (left and right) together leads to loading the default settings of the SBEC30D

SBEC30D v. xx.xx ID xxxxx:xxxxx – designation of the product with the firmware version and the serial number (ID).

The values can also be displayed and set using JETI model transmitter, the communication between SBEC30D and the receiver has to be carried out via EX BUS.

3.1.1. Alternative functions logical input

Using a pin as the input is useful because of simple feedback, without the use of telemetry sensors. If you install, for example, limit switches on a retractable undercarriage, you can have feedback about its condition during operation. The condition of digital inputs is transmitted via EX telemetry and sounds or alarms can be assigned to the events.

- This way the pin is configured as the input and its condition (disconnected, connected to the ground) is transmitted to the transmitter as other telemetry values from the sensors.
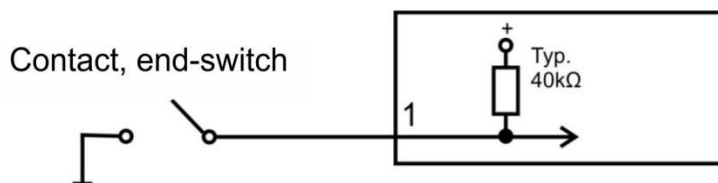

Fig. 5: Example of logical input connection

- Only keep the pin disconnected or connected to the common ground of theSBEC30D.

Never connect to a different voltage. The pin works exclusively on the Pull-Up mode.

3.2. Configuration via the DC/DS transmitter

The SBEC30D can be configured by a DC/DS transmitter via the *Device Explorer* menu. It is necessary to follow these rules for configuring the SBEC30D via transmitter:

- Receiver firmware version Duplex 3.12 and newer (with setting
- Output mode->EX Bus)
- The receiver must be connected to the SBEC30D via EX bus
- Transmitter firmware version 2.02 and newer + the device profile
- (SBEC30D.bin) recorded in the Devices directory on the SD card

When everything is properly connected and configured, the SBEC30D item appears in the Device Explorer menu. Entering the item moves you to the configuration menu.


Fig. 6: Device explorer (SBEC30D)

- **Reset to factory settings** - loading the default settings of the SBEC30D

6

3.2.1. General settings

- **Voltage settings** – setting the output voltage of the BEC.
- **Expander settings** – setting the alternative functions of Ext1, Ext2 outputs.
  Off- EXT is not used, *Expander* – EX Bus, possibility to connect a sensor and other devices supporting the EX Bus protocol, *Log.input* – logical input
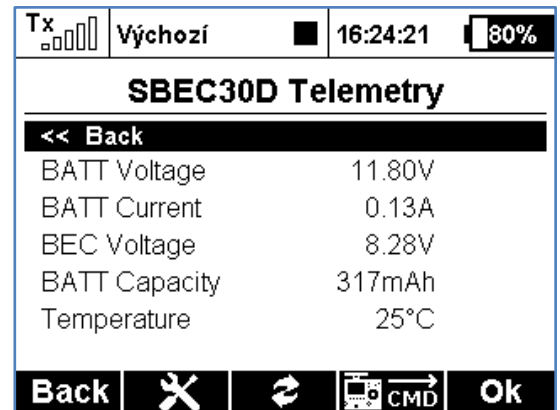

Fig. 7: Device explorer - Settings
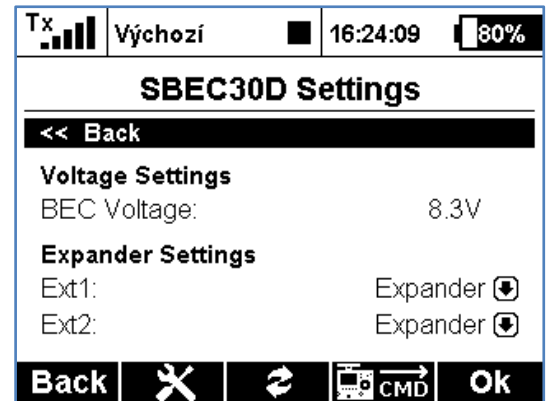
3.2.2. Telemetry

- **BATT Voltage** – actual battery voltage, input voltage
- **BATT Current** – actual current drawn from the battery
- **BEC Voltage** – actual output voltage of the BEC
- **BATT Capacity** – actual capacity taken from the battery
- **Temperature** – actual temperature of the BEC

Fig. 8: Device Explorer - Telemetry

3.2.3. Telemetry Min/Max

- **Clear Min/Max switch** – here you can assign a control on the DC/DS transmitter which clears battery capacity and the recorded minimum/maximum values of the SBEC30D.
- **Clear now** – allows you to immediately clear the recorded battery capacity and minimum/maximum values in the SBEC30D.
- **Min. BATT Voltage** – the data of minimum input value, e.g. battery voltage
- **Max. BATT Voltage**- the data of maximum input voltage, e.g. battery voltage
- **Max. BATT Current** – the data of maximum current from the battery
- **Min. Temperature**- the data of minimum temperature of the SBEC30D
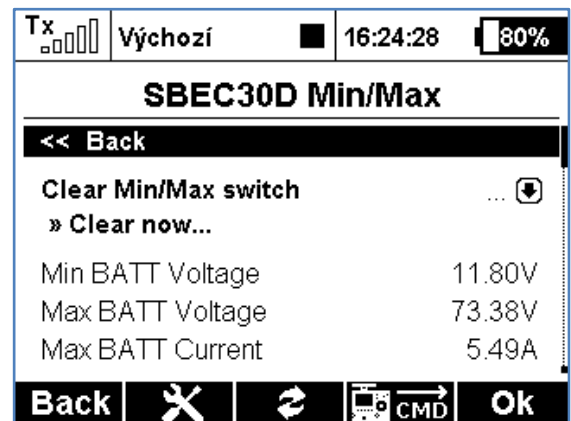- **Max. Temperature** – the data of maximum temperature of the SBEC30D

Fig. 9: Device Explorer – Telemetry minimums and maximums

4. Installation and heat protection

The switching voltage regulator SBE contains a heat protection means which prohibits destruction of the regulator by long time effects of excessive current or by a short circuit. This phenomena may, for instance, arise if a servo is short circuited or by an excessive output load. If the heat protection is activated, the regulator „switches off" for a short time necessary to cool down. After cooling down the SBEC switches automatically on again.

In order to ensure a proper function of the regulator always take care of an sufficient amount of cooling air through flow.

5. Technical data of the SBEC-Regulator

Technical data:	
Recommended input value	6 – 59 V
Maximum allowed amounts of cells	2-15 LiXX
Adjustable output voltage	5.0 up 8.4 V in interval of 0.1V
Output pulse current	30 A (1s)
Switch-off current consumption in the connection with JMS-MSW magnetic switch	130uA (power supply 15LiXX) 70uA (power supply 2LiXX)
Operation temperature	- 20°C up to +85°C
Weight	50 g
Dimensions	72 x 28 x 14 mm

Table showing dependence of sustained current loads on input voltages

Number of Lixx Cells	2	3	4	5	6	7	8	9	10
Sustained output current* [A]	8.2	7.4	6.4	5.8	5.4	5	4.5	3.8	3.5
Number of Lixx Cells	11	12	13	14	15				
Sustained output current* [A]	3	2.6	2.2	1.8	1.8				

* Sustained current values are valid only for operating conditions with sufficient cooling airflow

6. Warranty

For the product we grant a warranty of 24 months from the day of purchase under the assumption that it has been operated in conformity with these instructions at recommended voltages and that it has not been damaged mechanically. Warranty and post warranty service is provided by the manufacturer.

We wish you successful flying with the products of: JETI model s.r.o. Příbor, **www.jetimodel.cz**

7. Diagram menu of the JETIBOX

SBEC30D 0.00A 00.00V 0.00V	1}.................. 2..................

SBEC30 MENU ACTUAL VALUES ->	*SBEC30 MENU* <- MIN/MAX ->	*SBEC30 MENU* <- SETTING ->	*SBEC30 MENU* <- SERVICE
Accu Voltage 00.00V	Reset MIN/MAX Press <- ->	Output Voltage 0.0V	PresetToSetup <--> Factory Defaults
Accu Current 0.00A	AccuV MIN/MAX 00.00V/00.00V	EXT1 Mode <<- Expander ->>	SBEC30D V.0.00 ID XXXXX:XXXXX
Accu Capacity 0mAh	AccuI MAX 0.00A	EXT2 Mode <<- Expander ->>	
Output Voltage 0.00V	Temp. MIN/MAX 00/00°C	Capacity Alarm Off ->	
Temperature 00°C		Current Alarm Off ->	
		MinVoltage Alarm Off ->	
		OverTemp Alarm Off ->	