INSTRUCTION MANUAL

VOLTAGE REGULATOR

MAXBEC2D PLUS EX

Released by JETI model s.r.o. 29. 10. 2014

CONTENT

1. Introduction

The MAXBEC2D PLUS is a linear voltage regulator, to provide power for the receiver and servos used in your models. For increased safety and reliability of this device, a magnetic switch (eventually an RC Switch as optional accessory) is used to switch the unit on and off. The MAXBEC2D PLUS is fully compatible with the JETI Duplex system and can also be operated using the JETIBOX terminal.

To provide power to the MAXBEC2D PLUS, a 2-cell LiPo/LiIon battery can be used or a 5 to 6-cell NiMh/NiCd battery pack. The voltage regulator supplies a constant voltage to your receiver and servos, providing smooth servo motion regardless of the discharge state of batteries. For maximum reliability, two battery packs can be used to provide power and the MAXBEC2D PLUS features two LED's, indicating the connection state of the connected packs.

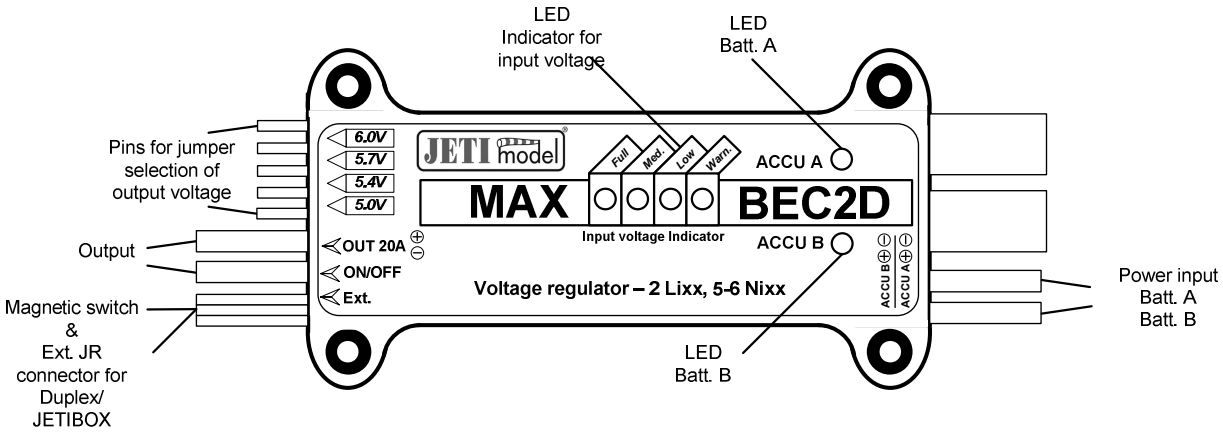
The MAXBEC2D PLUS can be monitored and configured via the JETIBOX, either by direct connection, or wirelessly using the JETI Duplex system. This allows the input voltage, temperature and output voltage to be monitored but also, the output voltage can be configured and alarms can be set for input voltage and temperature as required.

The system uses the 2.4GHz band to communicate, which allows not only data transmission, but also the receiving of data back from the system. During operation, telemetry data allows the condition of the system and any measured values to be displayed on the JETIBOX. Switching the MAXBEC2D PLUS on and off is performed via the special magnetic switch and key, which simply needs to make contact with the face-plate in the correct orientation for a short period of time to switch the unit on or off. For switching the MAXBEC2D PLUS on and off more comfortably, the magnetic switch can be replaced by the RC Switch for wireless control (optional accessory).

2. Description

2.1 MAXBEC2D PLUS

The supply batteries are connected to the MAXBEC2D PLUS via the two pairs of 1.5mm2 wires. These wires do not have a plug fitted. The stabilized output power is delivered via one pair of 1.5mm2 wires with an MPX type plug already fitted for your convenience. The output voltage may be adjusted by using the jumper next to the output wires. For programming and monitoring the unit can be connected either to the data socket of your Duplex receiver, or directly to your JETIBOX. Connecting the MAXBEC2D PLUS to your JETIBOX does not require that a separate power-supply is connected to the JETIBOX, if the MAXBEC2D PLUS is switched-on.



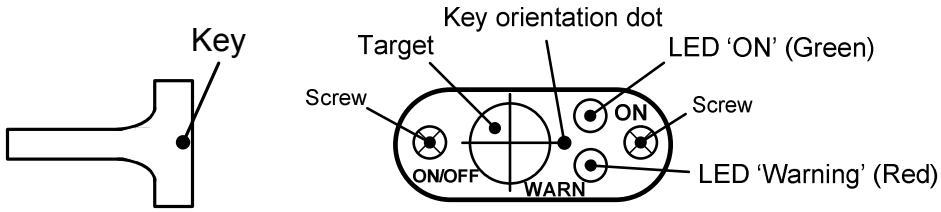
2.2 Magnetic switch

The magnetic switch is used to switch the MAXBEC2D PLUS on or off. The switch consists of a switch-plate, which receives the magnetic key and also the magnetic key itself. The switch-plate is connected to the MAXBEC2D by a three-wire cable with a connector and features two LED's. The green LED indicates that the MAXBEC2D PLUS is active. The Red LED indicates a warning condition.

LED 'ON' – If the green LED is blinking, this indicates that the magnetic key is present, but the unit is not switched on.

- If the green LED is continuously active, this indicates that the MAXBEC2D PLUS is active and ready to power your receiver and servos.

LED 'WARNING'– If the red LED is continuously active, this indicates that the input voltage is below the preset threshold. (This LED has the same function as the Warning LED on the main unit)



2.3 RC switch

MAXBEC2D PLUS supports on / off via RC Switch. It can be easily installed.

1. Disconnect the connector with a lock on the three-wire cable and separate the magnetic switch.

2. Connect MAXBEC2D PLUS with RC Switch using three-wire cable.

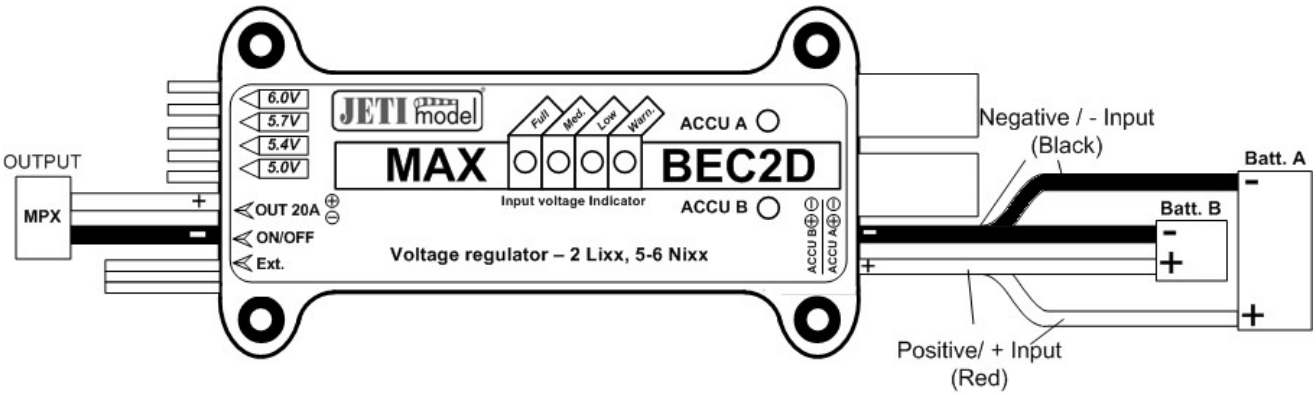
3. Pair the RC Switch with your transmitter and configure it in the transmitter.

3. Circuits

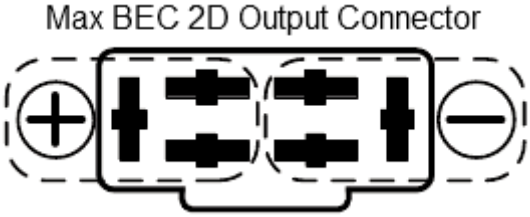
3.1 Powering the MAXBEC2D PLUS

The MAXBEC2D PLUS can be powered by up to two batteries. These can vary by cell-count and chemistry and the MAXBEC2D PLUS will always take power from the battery with the highest voltage. If both batteries have the same voltage, then the MAXBEC2D PLUS will take power from both batteries together. LED Batt. A and/or LED Batt. B will indicate which battery the power is being drawn from. This can also be determined from the JETIBOX.

If only one battery is to be used, it can be connected to battery input A or input B.



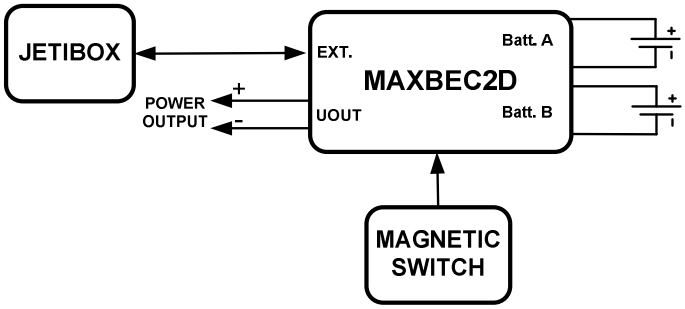
To connect your device(s) to the MAXBEC2D PLUS, either solder your wires (Please use wire of at least 1mm2 diameter or larger, depending on your anticipated load) to the MPX output connector of the MAXBEC2D PLUS or use the JETI MPX/3xJR cable, available separately. The Duplex EPC receivers, such as the R6 EPC, R8 EPC, R12, R14 and R18 are already fitted with a compatible MPX plug.



3.2 Communication with the MAXBEC2D PLUS

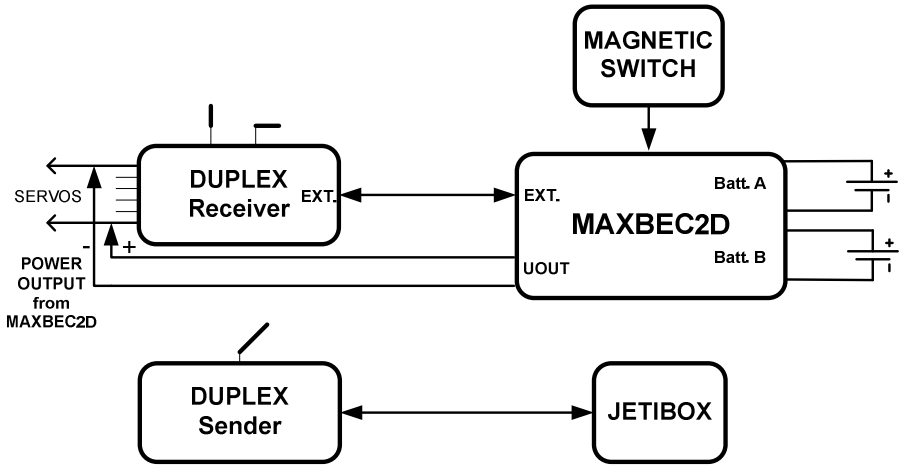
3.2.1 Connecting MAXBEC2D PLUS to the JETIBOX

Connect the MAXBEC2D PLUS to the JETIBOX using the red JR connector from the MAXBEC2D PLUS. Plug this into the appropriate socket of the JETIBOX (The socket marked signal, +, -). Connect the power-supply battery to the MAXBEC2D PLUS and switch-on the MAXBEC2D using the magnetic switch. **For this setup, there is no need to connect a supply battery to the JETIBOX as it will be powered by the MAXBEC2D PLUS.** There is no wireless data transfer in this scenario. Please note that in this configuration, no alarms will be generated because these rely on the wireless data transfer and acoustic alarm of your Duplex transmitter module.



3.2.2 Connecting the MAXBEC2D PLUS to a DUPLEX receiver

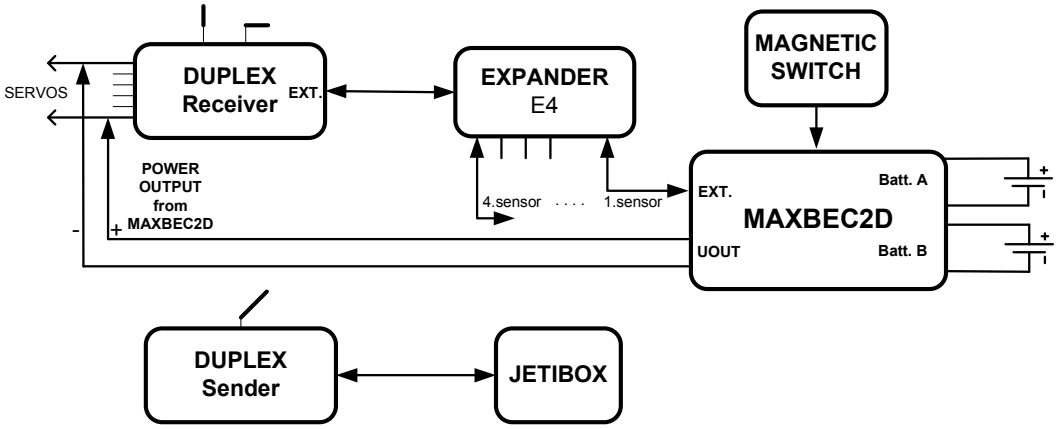
Connect the MAXBEC2D PLUS to the receiver using the red JR connector from the MAXBEC2D PLUS. Plug this into the socket marked 'Ext.' on the Duplex receiver. **Connect the supply battery to the MAXBEC2D PLUS, not forgetting to connect the power output of the MAXBEC2D PLUS to your receiver!** Now the JETIBOX can be connected to your transmitter module for programming and monitoring of the system. Switch on your transmitter and then use the magnetic key to switch-on the MAXBEC2D PLUS.



3.2.3 Connecting MAXBEC2D PLUS to a DUPLEX Expander

Connect the MAXBEC2D PLUS to the Expander using the red JR connector from the MAXBEC2D PLUS. Plug this into any of the sockets on the Duplex Expander. Connect the Expander to the Duplex Receiver into the socket marked 'Ext.'. **Do not forget to connect the MAXBEC2D PLUS to the receiver.** Connect the power-supply battery to the MAXBEC2D PLUS and connect the JETIBOX to the transmitter module and switch-

on the transmitter. The MAXBEC2D PLUS can now be switched-on using the magnetic key.



4. Menu navigation

For parameter setting and monitoring of the MAXBEC2D PLUS, the JETIBOX is used. After connecting the JETIBOX according to the above instructions, the screen shows the identification of the unit, the temperature and the voltage of each supply battery. The active power-supply input is marked by a "*" character.

By pressing the 'D' (Down) button on the JETIBOX, we enter the menu for the MAXBEC2D PLUS.

4.1 ACTUAL VALUE

MAXBEC MENU: *Actual Value* – By pressing the 'D' (Down) button of the JETIBOX, we can view the actual measured values.

Acc. Input Volt – Shows the actual voltage of the power-supply batteries A and B.

Temperature – Shows the temperature of the MAXBEC2D PLUS.

Output voltage – Shows the actual voltage being output by the MAXBEC2D PLUS.

4.2 MIN / MAX – Minimum and Maximum Values

MAXBEC MENU: *MIN / MAX* - By pressing the 'D' (Down) button, we can view the extremes of temperature and voltage. Please note that these values are deleted automatically or can be deleted manually using the “Erase Data” menu option. The values are automatically erased when the unit is switched on and the input voltages exceed those specified in the Trigger Level menu option.

Accum. A MIN/MAX – Shows the minimum and maximum voltage of the battery connected to input A

Accum. B MIN/MAX – Shows the minimum and maximum voltage of the battery connected to input B

Temp. MIN/MAX – Shows the minimum and maximum temperature of the MAXBEC2D PLUS.

4.3 SETTING - Configuration Options

MAXBEC MENU: *SETTING* – By pressing the 'D' (Down) button, we can see the individual parameter settings of the MAXBEC2D PLUS.

Erase Data – By simultaneously pressing the Left and Right button of the JETIBOX, all minimum and maximum recorded values are erased (See also section *"MIN / MAX – Minimum and Maximum Values"*)

Trigger level – Set the voltage values, the first overshoot of which, the previously recorded minimum and maximum values are erased and recording begins again (See also section *"MIN / MAX – Minimum and Maximum Values")*

Output (x.x) Volt – Set the output voltage of the MAXBEC2D. Note **that the output voltage of the MAXBEC2D PLUS can be "set by jumper" or programmed using the JETIBOX. By pushing the 'L' (Left) button, the MAXBEC2D PLUS can be configured purely by Jumper. By pushing 'R' (Right), the MAXBEC2D PLUS output voltage can be set directly from the JETIBOX, overriding the physical position of the Jumper.**

Beep Volt. Alarm – Set the letter of the alphabet to be acoustically signaled from the transmitter module when the input voltage falls below that specified by "*ALARMS->Voltage Alarm*".

Beep Temp. Alarm – Set the letter of the alphabet to be acoustically signaled from the transmitter module when the temperature of the MAXBEC2D PLUS exceeds the limit specified by "*ALARMS-> Temp. Alarm*" (In the Alarm menu - See section 4.4)

Beep Error – Set up of a morse code letter representing a battery error. If in the time between switch-on and switch-off of the MAXBEC2D PLUS a change of the number of cells of the connected batteries occurs, a battery error will be generated and this error will be announced acoustically by emitting the above mentioned morse code letter. This function may be deactivated by pushing and holding of the button L (left).

Trig. Level for WARN LED <x.xV> – The input voltage at which the red warning LED on the magnetic switch-plate and on the MAXBEC2D PLUS should become active. This is also the voltage at which the first green LED should deactivate.

Step Value – The voltage value of each step between the green input voltage LED's on the MAXBEC2D PLUS (5.5-8.4V). **The table below shows an example, assuming a step value of 0.4V and a trigger level of 6.6V.**

Input voltage	LED Full	LED Med.	LED Low	LED Warn.
> 7,4V	*	*	*	
7,4 - 7 V		*	*	
7 - 6,6 V			*	
< 6,6V				*

4.4 ALARMS

MAXBEC MENU: *ALARMS* – By pressing the 'D' (Down) button, we can scroll through the available alarms offered by the MAXBEC2D PLUS.

Voltage Alarm A – Set the voltage at which point the alarm specified by the Beep Volt. Alarm setting, will be sounded by the transmitter module for battery A. (See '4.3 SETTING - Configuration Options')

Voltage Alarm B – Set the voltage at which point the alarm specified by the Beep Volt. Alarm setting, will be sounded by the transmitter module for battery B. (See '4.3 SETTING - Configuration Options')

Temp. Alarm – Set the temperature at which point the alarm specified by the Beep Temp. Alarm setting, will be sounded by the transmitter module. (See '4.3 SETTING - Configuration Options')

4.5 SERVICE

MAXBEC MENU: *SERVICE* – by pressing button D (arrow down) you will change to depiction of the firmware version and to renewal of the sensor default setting.

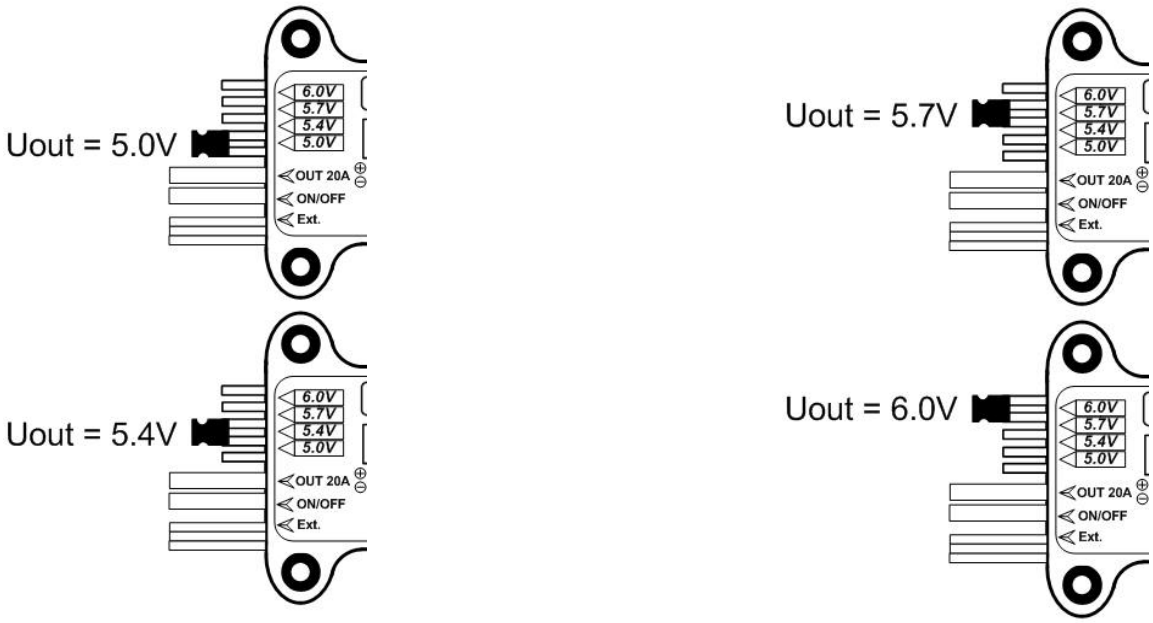
Factory Defaults – by simultaneous pressing of arrows R and L (right and left) the factory settings of the MAXBEC2D PLUS are loaded.

MBEC2D v. xx.xx ID xxxxx:xxxxx – product marking with firmware version and series number (ID).

5. Output Voltage Adjustment

The output voltage of the MAXBEC2D PLUS can be adjusted in two ways:

- Using the short-circuit (or 'jumper') plug directly on the unit, the output voltage can be adjusted from 5.0, 5.4, 5.7 to 6.0 volts. **For this approach, the MAXBEC2D PLUS must be configured appropriately (See section 4.3 and refer to the *Output (x.x) Volt* configuration option)**



Using the JETIBOX terminal, navigate to the *Output (x.x) Volt* setting (See section "*SETTING - Configuration Options*") and change to your desired value. This can be done in steps of 0.1V independently of the position of the short-circuit/jumper plug.

The factory-default setting is that the output voltage is set using the short-circuit/jumper plug.

6. Powering On

The system is activated by an external magnetic switch that contains the circuitry for the evaluation of magnetic fields with a diametrically polarized magnet. Since the magnet is polarized, the orientation of the magnetic key is important when being offered to the switch-plate. The magnet is supplied with an aluminium housing, which marks the correct orientation in which it should be offered to the switch-plate. Please refer to the safety precautions outlined in section *"Safety Precautions for the Manipulation of Magnets"* for correct handling of magnets.

The switch is designed to be mounted on the fuselage of your model. When the key is offered to the switch, the green LED will flash and after approximately 1 second, the LED will be continuously lit, indicating that the MAXBEC2D PLUS is now active.

For de-activating the MAXBEC2D PLUS, the same principles apply. Offer the key to the switch in the correct orientation. The green LED will flash and after approximately 1 second, the LED will go out, at which point the MAXBEC2D PLUS is now switched-off.

The whole system remembers whether it has been switched-off or modified. If the MAXBEC2D PLUS is switched-on and the battery is disconnected, then the next time the battery is connected, the MAXBEC2D PLUS will immediately be switched-on. **For safety and security, the MAXBEC2D PLUS should always be switched-off via the magnetic switch before disconnecting the battery power.**

After connecting the power-supply battery and switching the MAXBEC2D PLUS on via the magnetic switch, the unit automatically checks the number of connected batteries. The MAXBEC2D PLUS acknowledges a battery connection if the input voltage on either input exceeds 1 volt. If at any time the input voltage drops below 1 volt, then an error message 'X input error' is displayed, where X is A or B, to indicate on which input the problem was detected. The error condition remains until the unit is switched-off and the battery is disconnected.

Always follow the same procedure when switching on/off. To switch-on, first connect the batteries and then use the magnetic switch to activate the unit. To switch-off, always use the magnetic switch to turn-off the unit before disconnecting the batteries.

7. Installation

The MAXBEC2D PLUS can be mounted in your model using the 4 mounting holes on the unit, along with the rubber-grommets to reduce vibrations. The magnetic switch offers two mounting holes and the upper-lid (or face-plate) should be used as a mounting template for this part of the unit. The latter is designed to be mounted on the outside of the unit, being mechanically secured by the screws included. This allows for easy switching on/off of the MAXBEC2D PLUS and at the same time allows good visibility of the green and red LED's on the face-plate of the switch.

To ensure safe and reliable operation of your MAXBEC2D PLUS, please ensure an adequate flow of cooling air to allow the heat-sink to dissipate heat.

8. Firmware Update

The equipment firmware may be updated by a PC via the converter unit JETI USB Adapter. In the USB Adapter instructions you will find a description of the installation procedure of the USB Adapter controller as well as the update program.

9. Safety Precautions for the Manipulation of Magnets

Since the MAXBEC2D PLUS contains magnetic components, it is necessary to follow some simple rules for the handling of magnets. The magnet is contained within a special holder made of aluminium.

1. Keep the magnet a safe distance from all devices that could be damaged by magnetic interference: Televisions, Credit Cards, PC's and Pacemakers!

2. Keep magnets away from children, due to the risk of ingestion or injury!

10. Technical Specification of the MAXBEC2D PLUS

Technical data:	MAXBEC2D PLUS
Recommended input voltage	5.5 – 8.4 V
Maximum input voltage	16 V
Number of possible power supply batteries	1 or 2
Adjustable output voltage	5.0 - 6.0 V (0.1V step)
Maximum current (pulse)	20 A
Continuous current	12 A table bellow
Quiescent current	240 µA
Maximum power dissipation	20 W
Operating Temperature	- 10°C až +130°C
Weight	85 g
Dimensions	100 x 29 x 16 mm

Table showing the dependency between input voltage, output voltage and continuous current capability

Number of power supply cells (input voltage)	Output voltage [V] / Continuous current [A] *			
	5 V	5.4 V	5.7 V	6 V
2 Lixx / 6 NiXX	8.33 A	10.00 A	11.76 A	12.00 A
3 LiXX / 10 NiXX	3.28 A	3.51 A	3.70 A	3.92 A
12 NiXX	2.44 A	2.56 A	3.70 A	3.92 A

11. Warranty

The MAXBEC2D PLUS carries a warranty valid 24 months from the date of purchase under the condition that it has been operated as per these instructions and there is no mechanical damage. All servicing and repairs during and after the warranty period is carried out by the manufacturer.

The manufacturer hopes you enjoy this product: JETI model s.r.o. Příbor, www.jetimodel.cz

12. Menu Diagram of MAXBEC2D PLUS