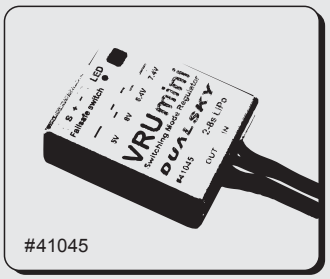
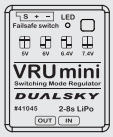
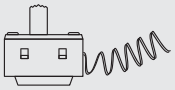


DUALSKY®
ADVANCED POWER SYSTEMS

VRU mini Instruction Manual 说明书

Packing List

(a) VRU mini linear regulator x1	(b) Velcro(50mm×30mm) x1 (c) FSS-4 switch x1
 (a)	(b)  (c) 

Design Features

- Miniaturised design, input and output using Dupont RC plug, plug-and-play.
- Built-in tri-color voltage monitor with low voltage memory function.
- Output voltage is switchable, supports HV servos (7.4V).
- FSS-4 lightweight switch(#46814) is included in the pack, also supports FSS-3, the failure safety switch with status indicator (#46813).
- Full metal case, good heat dissipation.

Electrical Features

- Switching mode regulator, high efficiency, low temperature.
- Advanced overload protection technology, output power will be reduced when overload, but the output voltage will never be cut off (when chipset temperature is lower than 125℃).
- Built-in MCU precisely controls FSS-3 and internal voltage monitor.
- Indicate cell quantity and battery status when power-on.
- Fail safe design, ensuring Non-stop work.
- SMT manufacturing process, ensuring high quality.
- Input & output port all use high quality tantalum capacitors.
- Dualsky Shanghai factory assembled, fully tested before dispatch.

Specification

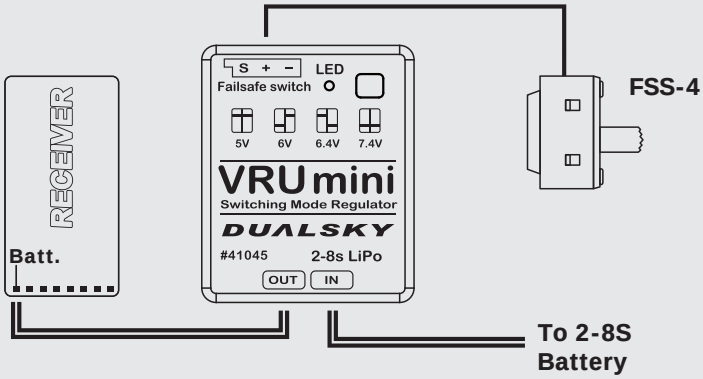
Input voltage:	DC 6V - 33.6V, MAX 33.6V (2-8S LiPo)
Output voltage:	5V, 6V, 6.4V, 7.4V (Switchable, Tolerance + 3%)
Output current:	DC 4.5A
Maximum differential voltage:	≤2V
Power effect:	%0.3
Voltage effect:	%0.3
Output ripple:	≤50mV
Size:	28.6mm X 23.5mm X 9.2mm
Weight:	20g (excluding accessories)

Caution

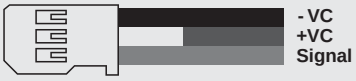
- This product supports switching voltage. Please select the voltage according to the supply voltage of your receiver, servo or other equipment.
- Do not change the output voltage while VRU mini is working.
- Output port short circuit will damage VRU mini.
- Input voltage higher than 33.6V will damage VRU mini.
- Please do not cover VRU mini while using it.
- Do not use VRU mini in high temperature or humid environment.
- When using this product in strong vibration environment, vibration mitigation measures should be used.
- The voltage indication and alarm is preset according to the lithium polymer battery.
- If you don't use the regulator in 24 hours, you'd better disconnect it from the battery because a 2mA(3S LiPo) - 7mA(8S LiPo) quiescent current draw remains.
- Suggested to use with mainstream 2.4G radio.
- Not suitable for children under 14 years old without adult guidance.

Instructions

1. **Input/output connection:** VRU mini has welded input and output wires for you. As shown on the metal case, left side is output wire, right side is input wire. Input wire connects to battery, output wire connects to receiver to supply power to receiver, flight control unit and other electronic devices. Top port is used to connect FSS-4 switch, as shown in the below picture:



If you use VRU mini on electric RC airplanes, please disable the BEC function in ESC. You can do it by disconnect the BEC positive pole wire as shown in the below picture.

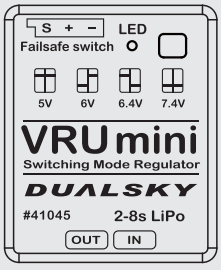


(ESC CONNECTOR PLUG)

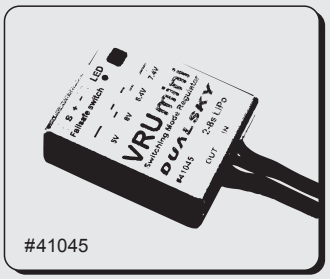
Switch on the FSS-4, VRU mini will start to work immediately. LED will indicate status as below chart:

Red	Flashing	Initial start, detect battery voltage.
Blue	Flashing	Flash times indicate battery cell quantity
Green	Always on	Working normally
Yellow	Always on	Low battery warning
Red	Always on	Battery capacity too low
Red	Keep Flashing	Battery voltage abnormal, battery capacity too low.

2. **Select output voltage:** You can select the output voltage by the DIP switch on the back side of VRU mini. As shown in the below picture, there are 4 different voltage you can set.

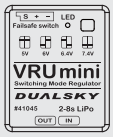
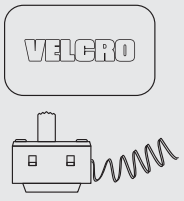


3. **Failsafe port:** This port can connect to Dualsky FSS switches. Output voltage will be cut off when the FSS switch turned on. This port can also be used to connect 2A high-power LED indicator to display the battery status. When single battery cell voltage is higher than 3.5V, LED will remain lit. When single battery cell voltage is between 3.4 - 3.5V, LED will flash twice a time. When single battery cell voltage is lower than 3.4V, LED will flash once a time.
4. **Built-in LED indicator:** After powered on, red light will flash 2 sec, then blue light will flash the same times as the battery cell quantity. During working, built-in tri-color indicator will display single battery cell voltage: over 3.5V with green light, 3.4V to 3.5V with yellow light, lower than 3.5V with the red light. When the red light on, the user should stop using as soon as possible. The red light warning has memory function, it indicates that the battery has problem (low voltage, bad contact or overload). Turning off the FSS switch can clear up the memory.
5. FSS-4 switch, the voltage display circuit and the output voltage select switch are all using the "fail safe" design. Any fault will not take the initiative to turnoff VRU mini power output. When the voltage select switch fails, the output voltage will be set to 5V.



VRU mini Instructions Manual 说明书

物品清单

(a) VRU mini 线性稳压器 x 1	(b)尼龙搭扣(50mm×30mm) x 1 (c)FSS-4 开关 x 1
	

产品特点

- 小型化设计，输入、输出采用杜邦RC插头，即插即用；
- 内置3色输入电压监视器，对低电压有记忆功能；
- 支持HV伺服系统（7.4V），可开关切换；
- 标配FSS-4（#46814）轻量开关，支持带状态指示的FSS-3（#46813）失效安全开关；
- 采用全金属外壳，具有良好的散热性能。

电气特点

- 开关稳压，效率高，发热量小；
- 采用先进的过载保护技术，过载时降低输出功率，不会关断输出电压（芯片温度不超过125℃的情况下）；
- 内置MCU，精确控制FSS-3和内置电压监视器工作；
- 接通电源能指示电池节数和电池状态；
- 整个系统采用Fail safe设计，确保不间断工作(Non-stop)；
- 主板采用SMT贴片工艺生产，保证质量；
- 输入采用优质电解电容，输出端采用高品质钽电容；
- 双天上海工厂组装，全检出厂。

主要技术参数

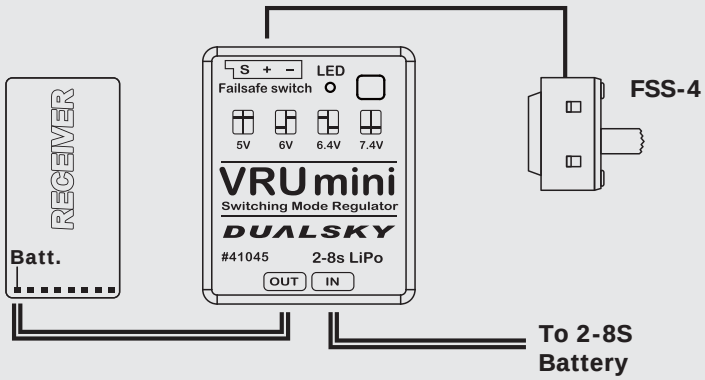
输入电压：DC 6V-33.6V, MAX 33.6V (2-8S LiPo)
输出电压：5V、6V、6.4V、7.4V (Switchable, Tolerance ±3%)
输出电流：DC 4.5A
最小压差：≤2V
电源效应：%0.3
电压效应：%0.3
输出纹波：≤50mV
外形尺寸：28.6mm X 23.5mm X 9.2mm
主机重量：20g（不含配件）

注意事项

- 本产品支持电压切换，使用此电压时，请确认你的接收机、舵机或其他设备支持该电压；
- 不要在稳压器工作时切换输出电压；
- 连接前请确认电池单体电压在3.7V以上；
- 确保输出端没有短路；
- 确保输入端电压不超过33.6V；
- 请勿将VRU mini整个包裹后使用；
- 请勿在高温、潮湿的环境下使用；
- 在强烈振动环境使用本产品时，应做好缓振措施；
- 该产品电压指示和报警按照锂聚合物电池预设；
- 如果你长时间（24小时内）不使用VRU mini，请断开和电池的连接，因为待机状态下也会有2mA（3S电池）-7mA(8S电池)耗电；
- 建议和当前的2.4GHz遥控系统一起使用；
- 本品不是玩具，14岁以下儿童使用需要有成人监护。

使用说明

1. 输入输出接线：VRU mini在出厂时已经为客户焊接好输入输出线，如外壳标签所示，左边为输出线，右边为输入线。输入线接电池，输出端连接接收机，给舵机、飞控等电子设备，顶端连接FSS-4开关,如下图：



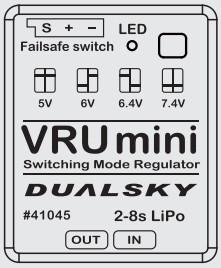
如果模型为电动飞机，采用VRU mini后，需要禁用ESC的BEC功能，可以通过断开BEC的正极线来禁用，如下图：

(ESC 连接线插头)

打开FSS-4开关，VRU mini立即工作。LED指示灯状：

红灯	闪烁	初始化，检测电池电压。
蓝灯	闪烁	闪烁次数代表电池节数
绿灯	常亮	正常工作
黄灯	常亮	电量不足预报警
红灯	常亮	电池电量过低
红灯	一直闪烁	电池电压异常，电池电量过低。

2. 电压调节：可以通过VRU mini 上盖DIP开关调节输出电压，通过不同DIP开关位置，可以设定4种电压等级。具体设置如下图：



3. Fallsafe接口：该接口可以连接双天的FSS开关，开关接通输出电压被关断，同时该接口具有驱动2A大功率LED指示灯的功能，用于显示电池电压状态，当单体电压高于3.5V时，连接在该接口的LED处于长亮状态，当单体电压在3.4V到3.5V之间时，连接在该接口的LED处于双闪状态，当单体电压低于3.4V时，连接在该接口的LED处于单闪状态。
4. 内部LED指示：通电后红灯闪烁2s后蓝灯随即闪烁的次数为电池节数，工作中，内置3色监视器显示电池电压：3.5V以上，绿灯亮，3.5V-3.4V，黄灯亮，如果电压低于3.4V，红灯亮，此时应尽快停止使用。红灯警告有记忆功能，表示电池曾经故障（电量低、接触不良或系统过载），关闭开关后重开可以消除记忆。
5. FSS-4电源开关、电压显示电路和输出电压选择开关均采用Fail safe“失效安全”设计。任何故障不会主动关断VRU mini的电力输出。当电压选择开关失效后，输出电压被设定在5V。

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