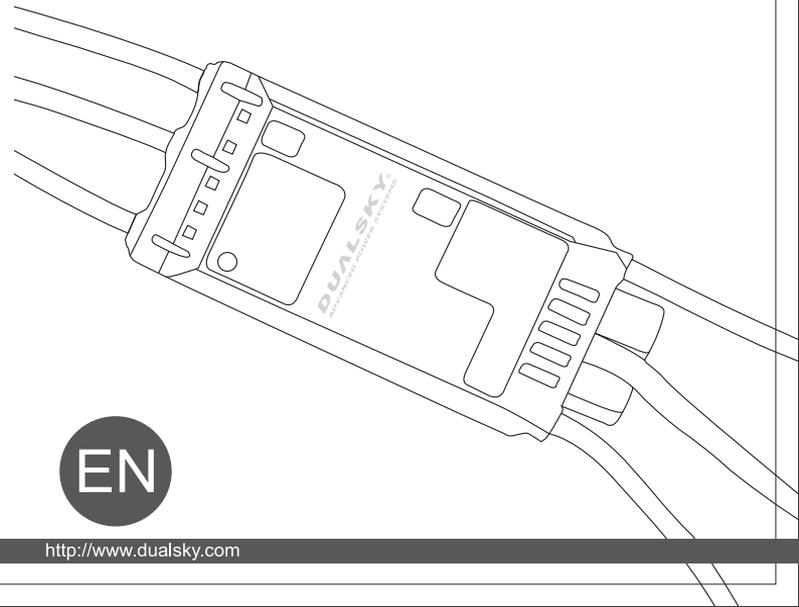# DUALSKY®
ADVANCED POWER SYSTEMS

ultra
Brushless Speed Controller

Programmable Electronic Speed Controller
Instruction Manual

DUALSKY®
ADVANCED POWER SYSTEMS

Shanghai Dualsky Models Co.,Ltd.

Rm.1016,No.201,Xin Jin Qiao Rd.,Shanghai,China.

Tel: +86 21 50322162   Fax: +86 21 50322163

上海双天模型有限公司
中国上海市新金桥路201号1016室
电话：+86 21 50322162   传真：+86 21 50322163
网址：http://www.dualsky.com

EN

HIGHLIGHTS:

•Optional programming (No. 41273) for clear and easy adjustment of functions.
•Option of setting the controller for use with inrunner or outrunner motors; LED indicator.
•Timing mode for matching the number of motor poles.
•Switchable brake, with user-variable braking power.
•High clock frequency for ultra-fine control, e.g. when torque rolling
•Integral temperature monitor protects against thermal damage.
•Like all dualsky speed controllers features the usual protective and filter functions, including power-on guard and RX-filter.
•Designed expressly for the Dualsky brushless motors, but also suitable for other brushless motors, since these controllers feature virtually no restriction on the number of motor poles.
•User-variable soft-start
•Adjustable Acceleration
•DGM2 - 2nd Generation Dualsky Governor Mode
•Throttle signal is compatible with PWM and S.BUS(Adaptively)

Carefully read through these instructions before connecting and using the unit for the first time.

1.Connections, Special Features

Prepare the red (positive) wire and the black (negative) wire for connecting to the flight battery by fitting matching connectors. Insulate each individual soldered joint with a piece of heat-shrink sleeve. Connect the three high-current wires to the wires attached to the motor. If the motor spins in the wrong direction, swap over any two wires. Connect the receiver lead to the receiver's channel 3 socket or S.BUS socket.
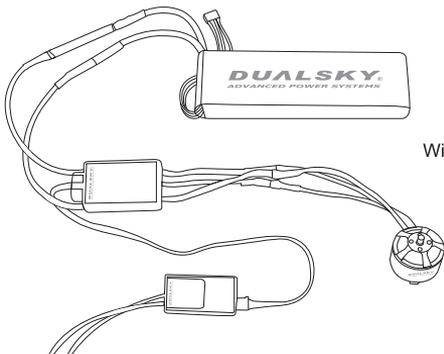
Wiring Diagram
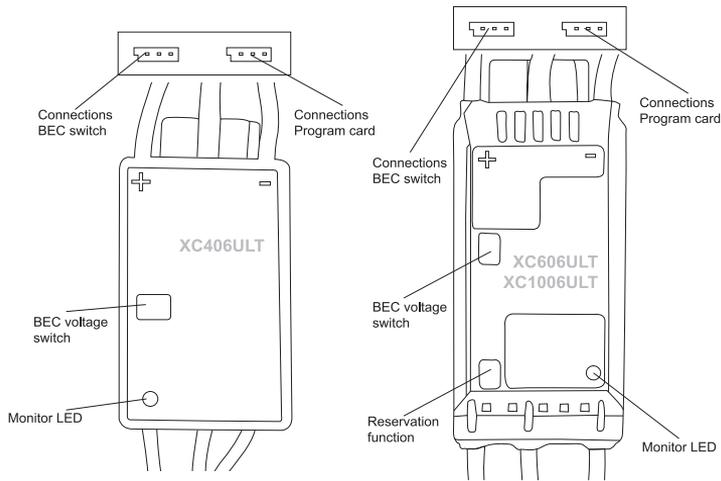
2.Specification

Specifications of ULTRA series	XC406ULT NO. 41268
Dimensions (L x W x D)	63 x 34 x 15.8 mm
Weight w/ wire(g)	52
Number of Cell	6...18 NiMH, 7.2...21.6V 2...6 LiPo, 7.4...22.2V
Continuous Current(A)	40
Burst Current(A)	60
Resistance (Ri)(Ohm)	0.0028
Signal Inputs	PWM & S.BUS
Signal frequency	Up to 433Hz
BEC specification	5A switching mode, 5V-7.4V adjustable

Specifications of ULTRA series	XC606ULT NO. 41269	XC1006ULT NO. 41270
Dimensions (L x W x D)	77 x 33.5 x 15 mm	77 x 33.5 x 15 mm
Weight w/ wire(g)	76	78
Number of Cell	6...18 NiMH, 7.2...21.6V 2...6 LiPo, 7.4...22.2V	6...18 NiMH, 7.2...21.6V 2...6 LiPo, 7.4...22.2V
Continuous Current(A)	60	100
Burst Current(A)	80	120
Resistance (Ri)(Ohm)	0.0018	0.0012
Signal Inputs	PWM & S.BUS	PWM & S.BUS
Signal frequency	Up to 433Hz	Up to 433Hz
BEC specification	8A switching mode, 5V-7.4V adjustable	8A switching mode, 5V-7.4V adjustable

3.Setting BEC Voltage

The BEC voltage can be adjusted to suit the servos connected to the receiver using the two micro-switches on the front of the controller(see picture below).Default setting:5V.
The voltage can be set by using a small slot-head screwdriver to move the switches to the appropriate position. Please refer to the table for the switch positions and the corresponding voltages.

Note:
Refer to the operating instructions supplied with the servos for information on their safe voltage range.

Switch Position	Voltage
	5V
	6V
	6.4V
	7.4V

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Switching off the BEC Supply

If you wish to switch off the BEC voltage completely, you must connect a FSS-2(NO.46726) to the socket marked "Switch"; the switch must short the signal (white) and negative (black) wires.

Note:
If the BEC voltage is switched off, the monitor LED on the speed controller flashes green at one-second intervals.

Example:

4.Overview of monitor LED displays

	LED	connection / status
Working status	No light	No signal
	green	S.BUS input
	flashing green	S.BUS signal lost
	blue	PWM input
	flashing blue	PWM signal lost
program card pro- gramming status	Single green flash	Parameter alterati- on successful
connection to s.Bus socket	Yellow	Data transmission between transmitter
BEC off	Flashing green every second	BEC voltage switched off

5.programming the stick positions

1.Connect the controller as shown in the wiring diagram(refer to Page 1),do not connect battery.
2. If you are using a Futaba transmitter, set the throttle channel to "Reverse" * .
3. Switch the transmitter on, and move the throttle stick to the full- throttle position (away from you).
4. Connect the power supply to the controller.

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5. The controller emits a long beep to confirm that it has registered the full-throttle position.
6. Move the throttle stick to the Stop position; a brief beep confirms that the Stop position has been programmed successfully.

Note:
If you prefer "full-throttle back", do not set the throttle channel to "Reverse". In this case the full-throttle position is back (towards you), and the "Stop" position is forward (away from you).

6. programming the controller parameters without a programming card

A total of seven parameters can be programmed.

Entering programming mode:
1. Connect the speed controller as shown in the wiring diagram (apart from the power supply).
2. Switch the transmitter on, and move the throttle stick to the forward position.
3. Connect the power supply to the controller.
4. After about four seconds the controller confirms programming mode with a long beep.
5. After a further four seconds you will hear a melody (5-6-5).

The parameters are now available in an endless loop indicated by a sequence of beeps; see table.

parameter table		
	Beep sequence	**parameter**
1.	1 x	Braking power
2.	2 x	Battery type
3.	3 x	Cut-off mode
4.	4 x	Cut-off voltage
5.	5 x	Motor start
6.	6 x	Motor timing
7.	7 x	Reset all data
8.	8 x	End

To select a parameter you must move the throttle stick to the Stop-position when you hear the appropriate sequence of beeps.
This action takes you into the corresponding sub-menu, where you can alter the settings; see table. The grey fields are the factory default settings.

settings table				
	parameter	**Beep 1 x**	**Beep 2 x**	**Beep 3 x**
1.	**Braking power**	Off	50%	100%
2.	**Battery type**	LiPo	NiCd /NiMH	LiFe
3.	**cut-off mode**	Slow Reduce	Switch off	-
4.	**cut-off voltage**	Low	Medium	High
5.	**motor start**	Normal	Soft	Super-soft
6.	**motor timing**	Low	Medium	High

In this sub-menu the various settings are also available in an endless loop indicated by the beeper.
To select a setting, move the throttle stick to the full-throttle position. You will hear a melody (5-6-5) which indicates that the setting has been stored.
After the melody the controller emits the next sequence of beeps for the Parameter menu.
Once you have entered all the settings, leave programming mode using the "End" function (8 x beep), and switch the controller off.

Explanation of parameter 4: "cut-off voltage"
To program the appropriate cut-off voltage for the type of battery in the model, please refer to the following table.

Note:
For NiCd / NiMH batteries the settings are as follows: Low / Medium and High correspond to 25% (min. 4.6 V), 50% and 60% of the initial battery voltage.

Battery type	low	medium	High
lipo	3.0V	3.2V	3.4V
NiCd/NiMH	25%	50%	60%
LiFe	2.5V	2.8V	2.9V

7.programming example

The following example explains the method of programming the "Battery type / lipo" parameter.

Entering parameter programming mode
1. Connect the speed controller as shown in the wiring diagram (apart from the power supply).
2. Switch the transmitter on, and move the throttle stick to the forward position.
3. Connect the power supply to the controller.
4. After about four seconds the controller confirms programming mode with a long beep.
5. After a further four seconds you will hear a melody (5-6-5).

selecting the parameter
1. 1 x beep; leave throttle stick at full-throttle position.
2. 2 x beep; move throttle stick to Stop position.

selecting the setting
1. The parameters are now available in an endless loop indicated by the beeper.
2. The controller beeps 1 x (LiPo setting).
3. Move the throttle stick to the full-throttle position.
4. A melody is emitted (5-6-5).
5. The controller reverts to the Parameter menu, and indicates the next parameter (3 x beep = cut-off mode).

Quitting programming mode
"EXIT" mode should be used to quit programming mode and save the data.
1. Wait until the controller beeps 8 x.
2. Move the throttle stick to the Stop position.
3. You will hear a confirmation melody (6-5-6).

8. changing the s.Bus channel

To change the S.BUS channel you can either use your transmitter or the free "PC-link"software.

> **Note:**
> At present it is only possible to change the S.BUS channel with T14SG / FX-22 transmitters with update V4.0. The software of the other telemetry transmitters is currently being updated.

**Changing the s.Bus channel on your transmitter:**
- First connect the receiver lead to the S.BUS socket on the transmitter.
- At this point a five-cell NiCd / NiMH battery must be connected to the speed controller's flight battery socket.
- Open the "SBUS SERVO" menu in the transmitter's System menu.
- Move to page 3 of the menu and press "CALL UP". The following display appears:

```
SBUS CH
ID      223-00000
    CH   3
                WRITE
                RECALL
```
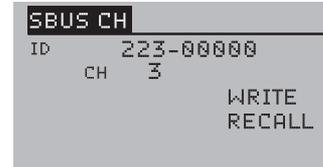
The "CH" function can now be used to set your preferred channel (default setting: channel 3).

```
SBUS CH
ID      223-00000
    CH   3
                WRITE
                RECALL
```
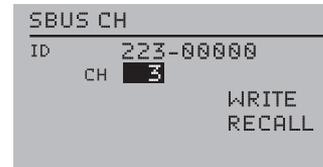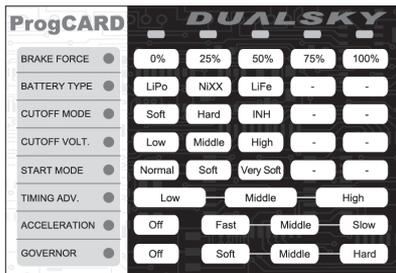
Once you have set the channel, move to the "WRITE" function in order to transfer the data to the speed controller.

```
SBUS CH
ID      223-00000
    CH   3
                WRITE
                RECALL
```
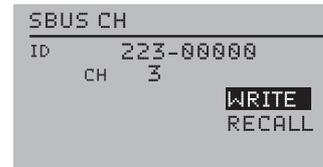
Optional accessories
Dualsky ProgCARD V3 (NO.41273) .
It is convenient for customers to set ULTRA ESC at flying field.It also adds two programmable items besides the same setting items as throttle.
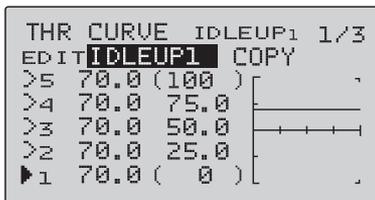
ProgCARD **DUALSKY**

	0%	25%	50%	75%	100%
BRAKE FORCE	0%	25%	50%	75%	100%
BATTERY TYPE	LiPo	NiXX	LiFe	-	-
CUTOFF MODE	Soft	Hard	INH	-	-
CUTOFF VOLT.	Low	Middle	High	-	-
START MODE	Normal	Soft	Very Soft	-	-
TIMING ADV.	Low		Middle		High
ACCELERATION	Off	Fast		Middle	Slow
GOVERNOR	Off	Soft		Middle	Hard

Acceleration： This function decides how fast motor accelerates, "fast" means that motor can make quick response to throttle; "slow" means opposite and prevents motor speed from severely changing.
Governor: Head speed governing, usually for helicopters. Governing the rotational speed despite motor load changing (i.e blade pitch change, maneuver flights) .

How to use governor function:
1. Use dualsky program card to activate "Governor" function, four governor levels ranging from soft to hard are available, the third level is recommended.
2. In "Governor" mode, motor only starts when throttle is over 20%.
3. When throttle switches to over 20%, the motor starts and accelerates slowly (It will take 15 seconds to reach the full speed from standstill, the setting of acceleration will be ignored).
4. When the motor speeds up to rotational speed correspond to current throttle, it will enter "Governor" mode. ESC keeps the motor rotational speed stable as long as throttle unchanged.

In order to avoid changing throttle value when operating Pitch,set the throttle curve for the horizon line on the transmitter.


```
 THR CURVE  IDLEUP1 1/3
EDITIDLEUP1 COPY
>5 70.0(100 )
>4 70.0 75.0
>3 70.0 50.0
>2 70.0 25.0
►1 70.0(  0 )
```

5. When the throttle changes (still above 20%), ESC will identify new rotational speed correspond to new throttle and enter "Governor" mode again.

⚠ **SAFETY NOTES**
- Keep within the limits stated in the speed controller specification.
- maintain correct polarity of all connecting leads.
- take great care to avoid short-circuits.
- install and protect the speed controller in such a way that it cannot come into contact with grease, oil or water.
- ensure that air circulation is adequate.
- Keep well clear of the rotational plane of the propeller when the battery is connected
- Injury Hazard.

DISPOSAL
This symbol means that it is essential to dispose of electrical and electronic equipment separately from the domestic refuse when it reaches the end of its useful life. Take your unwanted equipment to your local communal collection point or recycling centre. This applies to all countries of the European Union, and to other European countries with separate waste collection systems.

Guarantee
Naturally dualsky electronic products are guaranteed for 12 months as required by law. If you wish to make a justified claim under guarantee, please contact your dealer in the first instance, as he is responsible for the guarantee and for processing guarantee claims. You will need the till receipt from the model shop where you purchased the system as proof of the commencement and conclusion of the guarantee period. Please note that any repairs do not extend the original guarantee period. During the guarantee period we will rectify any functional defects, production faults or material flaws at no cost to you. We will not accept any further claims, e.g. for consequential damage.
Goods must be sent to us carriage-paid; we will pay return carriage costs. We will not accept any packages sent without prepaid postage. We accept no liability for transport damage, nor for the loss of your shipment. We recommend that you take out appropriate insurance. Send your device to the approved Service Centre in your country. The following requirements must be fulfilled before we can process your guarantee claim:
•You must include proof of purchase (till receipt) with the returned product.
•You must have operated the product in accordance with the operating instructions.
•You must have used recommended power sources and genuine dualsky accessories exclusively.
•The unit must not exhibit damage caused by moisture, unauthorised intervention, reversed polarity, overloading or mechanical stress.
•Please include a concise, accurate description of the fault to help us locate the problem.
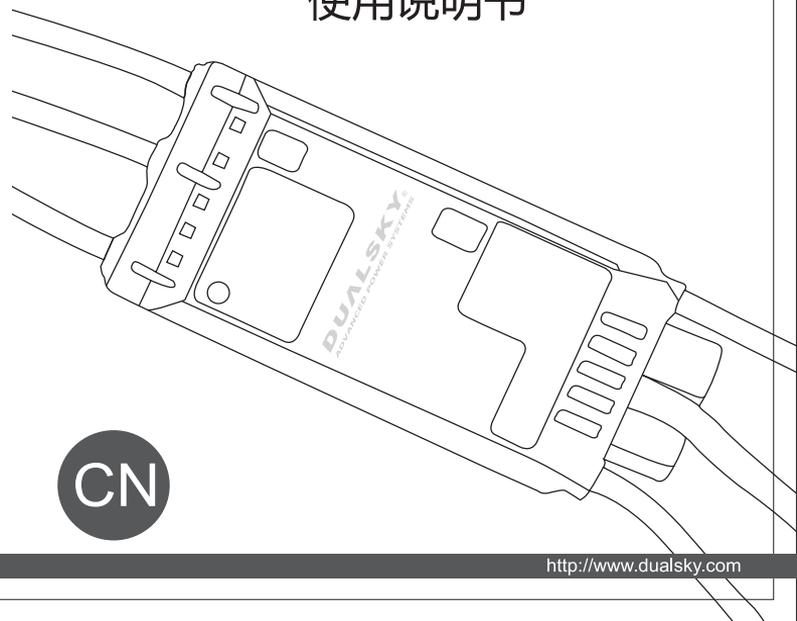
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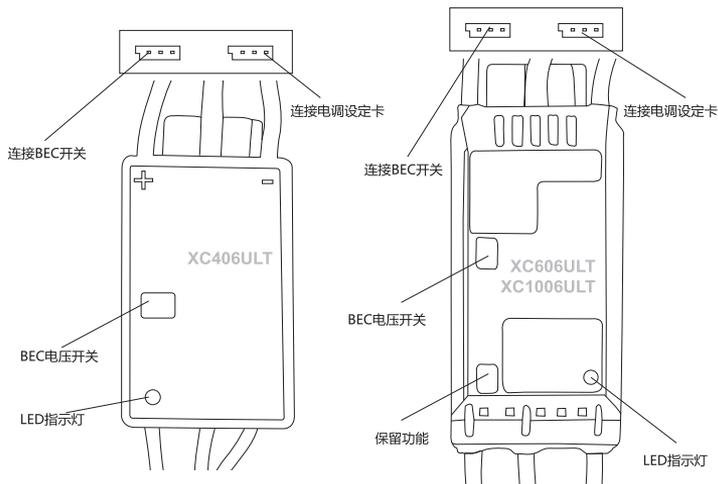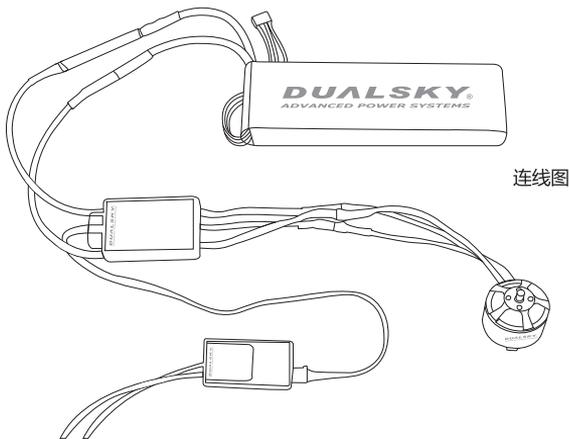## Brushless Speed Controller

可编程电子调速控制器
使用说明书

CN

产品亮点:

- 具有清晰和易使用的编程卡（选购，NO.41273）
- 适用于内转子或外转子无刷马达; 带LED指示灯
- 可调节进角功能能匹配各种极对数的马达
- 可关闭的刹车功能，刹车力度可调节
- 较高的时钟频率提供良好的控制精度，例如在做"吊机"动作时的油门控制
- 集成的温度传感器提供过热保护功能
- 具有多种保护和滤波功能，比如电池低电压保护和输入信号滤波等
- 针对双天无刷电机优化，同时也适用于其他无刷马达，对马达极数没有限制
- 可调节的缓启动功能
- 可调节加速度
- DGM2 - 第二代双天定速模式
- 油门信号兼容PWM和S.BUS两种制式（自适应）

第一次连接前请仔细阅读这些说明。

1.连接方法,特殊功能

在ESC的红色连接线（正极）和黑色连接线（负极）焊接适当的插头，以连接电池。
连接处使用热塑套管绝缘。
将三根输出线连接到马达。如果电机旋转方向不对,可任意交换其中的两根输出线。
将输入线插到接收机的ch3或S.BUS端口。

连接BEC开关
连接电调设定卡
BEC电压开关
LED指示灯
XC406ULT

连接BEC开关
连接电调设定卡
BEC电压开关
保留功能
LED指示灯
XC606ULT
XC1006ULT

连线图

2.技术参数

ULTRA 系列规格参数	XC406ULT NO. 41268
尺寸	63 x 34 x 15.8 mm
重量	52g
适用电池	6...18 NiMH, 7.2...21.6V 2...6 LiPo, 7.4...22.2V
持续电流	40A
瞬时电流	60A
电阻	0.0028Ohm
信号输入	PWM & S.BUS
信号频率	Up to 433Hz
BEC规格	5A 开关模式， 5V - 7.4V 输出可调节。

ULTRA 系列规格参数	XC606ULT NO. 41269	XC1006ULT NO. 41270
尺寸	77 x 33.5 x 15 mm	77 x 33.5 x 15 mm
重量	76g	78g
适用电池	6...18 NiMH, 7.2...21.6V 2...6 LiPo, 7.4...22.2V	6...18 NiMH, 7.2...21.6V 2...6 LiPo, 7.4...22.2V
持续电流	60A	100A
瞬时电流	80A	120A
电阻	0.0018Ohm	0.0012Ohm
信号输入	PWM & S.BUS	PWM & S.BUS
信号频率	Up to 433Hz	Up to 433Hz
BEC规格	8A 开关模式， 5V - 7.4V 输出可调节	8A 开关模式， 5V - 7.4V 输出可调节

3.设置BEC电压

BEC电压可以通过调速器正面的微型开关调节以适应舵机和接收机。BEC的默认电压:5 V。
电压可以通过使用小一字螺丝刀将开关移动到适当的位置。请参阅下表的开关位置和对应的电压。

注意:
舵机的安全工作电压范围请参考对应的舵机操作说明书。

连接位置	电压
	5V
	6V
	6.4V
	7.4V

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关掉BEC
如果想完全关掉BEC, 必须连接 FSS-2 （ NO. 46726 ）到"BEC开关"端口。
开关必须短接信号线(白色)和电源负线(黑色)。

举例

注意：
如果BEC电压关闭，速度控制器上的主指示灯每隔1秒绿灯闪烁。

4.主指示灯概述

		LED	连接/状态
工作状态		无灯	无信号
		绿灯	S.BUS输入
		绿灯闪烁	没有S.BUS信号
		蓝灯	PWM输入
		蓝灯闪烁	没有PWM信号
编程卡状态		绿灯闪一次	参数变更成功
S.BUS插口连接		黄色	发射机间数据传输
BEC关闭		每秒绿灯闪烁	BEC电压关闭

5.校准油门行程

1.按照连线图连接ESC（见第13页），先不要连接电池。
2.如果您使用Futaba发射机,设置油门通道"反向" * 。
3.打开发射机，将油门杆推至最高（远离你的位置）。
4.将电源连接到ESC，发出初始化声音。
5.几秒后，控制器发出"哔"长声，代表全油门的位置已经记录。
6.油门拉杆拉至最低，"哔"短声后代表最小油门（停止位置）已经记录成功。

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6.无编程卡时可设置的调速器参数
总共可设置七个参数。

进入编程模式:
1.按接线图连接速度控制器(除了电源)
2.打开发射机，将油门拉杆推至最高位置
3.将电源连接到控制器
4.大约4秒钟后，发出"哔"长声后进入编程模式
5.再过4秒后你会听到一个哔哔声(5-6-5)

进入编程设定后，会听到以下鸣叫音，按下图顺序循环鸣叫

参数表		
	滴滴声	参数
1.	1声	刹车力度
2.	2声	电池类型
3.	3声	低压保护模式
4.	4声	低压保护点
5.	5声	马达启动速度
6.	6声	马达进角
7.	7声	恢复默认值
8.	8声	结束

在听到正确的哔哔声后，将油门拉杆推至最低位置，就可进入相应的子菜单，改变设定参数。见下表。灰色部分是工厂默认值。

设定参数表			
	参数	1声滴	2声滴	3声滴
1.	刹车力度	关闭	50%	100%
2.	电池类型	锂电池	镍氢/镍镉电池	锂铁电池
3.	低压保护模式	逐渐降低功率	立即关闭动力	
4.	低压保护点	低	中	高
5.	马达启动速度	普通启动	柔和启动	超柔和启动
6.	马达进角	低	中	高

在这个子菜单中，设定项提示将无限循环
将油门拉杆推至全油门，选择参数。听到提示音（5-6-5）后表明参数已设置。
提示音（5-6-5）后，控制器发出提示音进入下一个参数菜单。
设置完参数后,使用"结束"功能退出设定（8 声 哔），并关闭控制器。

参数4的解释:"低压保护阀值"
根据电池类型设置合适的低压保护阀值。请参考下表。

电池类型	低	中	高
锂电池	3.0v	3.2v	3.4v
镍氢/镍镉电池	25%	50%	60%
锂铁电池	2.5v	2.8v	2.9v

7.编程设定示例

下面的例子解释了"电池类型/锂电池"参数设定方法。

进入参数设定模式

1.按接线图连接速度控制器(除了电源)
2.打开发射机，将油门拉杆推至最高位置
3.将电池连接到控制器
4.大约4秒钟后，发出"哔"长声后进入编程模式
5.再过4秒后你会听到一个哔哔声(5-6-5)

选择参数

1.1声哔：油门杆不动，保持在全油门位置
2.2声哔：油门杆拉到停止位置

设定参数

1.无限循环的响声表明所有的可用设定值
2.控制器发出1声哔声后（锂电池）
3.将油门拉杆推至最高位置
4.发出提示音（5-6-5）
5.控制器恢复到参数菜单，发出3声哔表明下个设定项目（低压保护模式）

退出设定模式

使用"退出"选项来退出并保存设定
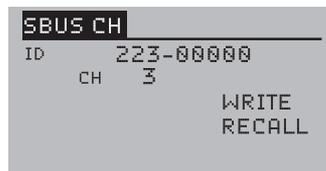1.等待ESC发出8声哔后
2.将油门杆拉至停止位置
3.听到提示音（5-6-5），表示退出设定

8.改变S-BUS通道

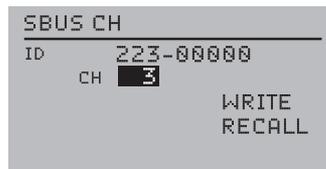可以使用发射机或免费的"PC-link"软件改变S.BUS通道。

注意:

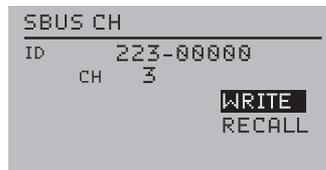目前只有V4.0固件版本的T14SG/FX-22发射机能改变S.BUS通道。其他带回传功能发射机的固件正在更新中。

在发射机上改变S.BUS通道

首先将接收机连接到发射机上的S.BUS插口
连接5节镍氢/镍镉电池到电调的动力电端口
在发射机系统菜单上打开"SBUS 舵机"菜单
切换到第3页菜单，按"call up".屏幕显示如下：

```
SBUS CH
ID      223-00000
    CH    3
              WRITE
              RECALL
```

这时，你可以通过"CH"功能选择需要的通道（默认：通道3）

```
SBUS CH
ID      223-00000
    CH    3
              WRITE
              RECALL
```

一旦选择了通道，切换到"WRITE"功能，将数据传输到调速器上。

```
SBUS CH
ID      223-00000
    CH    3
              WRITE
              RECALL
```

可选配件

**双天设定卡(NO.41273)。方便用户在外场对双天ULTRA系列调速器进行设定。除了与油门设定相同的设定项以外，还新增了两个设定项。**
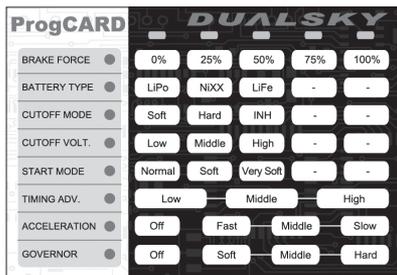
Acceleration：控制电机加速的快慢，fast表明电机会较快的响应油门；slow 表示较柔和的油门响应，避免电机转速剧烈变化。
Governor：定速模式，常用于直升机。即使在电机负载变化（如桨螺距变化，大机动动作）时也能保持电机转速恒定。

Governor使用方法：
1.使用双天设定卡开启Governor功能，从soft到hard共有4档调节定速力度，推荐使用第3档。
2.在Governor模式下，电机只有在20%以上油门时才会启动。
3.当输入油门信号从0%切换到20%以上时，电机会启动并缓慢加速(从停止到全速需要15秒的时间，Acceleration中的设定会默认无效)。
4.当电机加速到当前油门对应转速时，进入定速控制。此时，只要油门不发生变化，电调就会控制电机转速保持恒定。

为了避免操作Pitch时油门值变化，需要在遥控器上设定"油门曲线"为水平线，如下图：
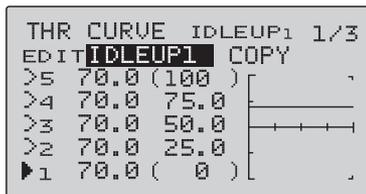
5.当油门变化时(始终高于20%)，电调会识别新油门对应的转速并重新进入定速控制。

⚠ 安全警告

- 在规定参数内使用电子调速器
- 保证所有插头连接的极性准确
- 特别要注意防止短路
- 不能接触到油脂、油或水
- 确保足够的空气流通
- 在电池连接后请远离桨平面，防止受伤

处理
当调速器使用寿命结束时，和城市生活垃圾区分处理，将不需要的设备返到当地的公共集合点或回收中心。这适用于欧盟所有国家,和其他欧洲国家独立的废物收集系统。

保修条例
双天电子类产品自售出之日起提供12个月的保修服务。如果你想在保修期内索赔,请立即联系您的经销商。
模型店的收银台收据可证明货物是否在保修期内。请注意,任何情况下保修期都不会延长。在保修期内，任何功能缺陷、生产故障或材料缺陷都会免费提供保修服务。我们不会接受任何进一步索赔,如间接损害货物返回时需自行承担运费，我们将支付回程费用。运费未预付，我们将不会接受货物。我们不接受运输造成的损害,也不弥补运输损失。我们建议您投运输险,将你的设备发送到服务中心。
满足以下条件，我们才能处理您的索赔：

- 提供收银台收据
- 按说明书正确操作调速器
- 使用推荐的电源和配件
- 不是因为进水，反极性，重载而造成的损害
- 请提供一个简洁、准确的故障描述,帮助我们解决问题

$C\epsilon$

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