

ACE RC®

ACE RC BLC-40/BLC-65/BLC-75 BRUSHLESS MOTOR ELECTRIC SPEED CONTROL

Product no. #8041 / 8042 / 8043

INTRODUCTION

Congratulations on selecting the ACE RC BLC series brushless motor electric speed control. The BLC-40 is designed for mini-size electric aircraft/helicopter, while the BLC-65 and BLC-75 are designed for the mid-size electric aircraft/helicopter. These brushless motor speed controls can satisfy all your flying needs. They are capable of supplying up to 40Amps (BLC-40), 65Amps (BLC-65), and 75Amps (BLC-75) of continuous motor current. They are small and lightweight, but includes a large heat sink surface area. They are the most suitable ESC for the Thunder Tiger OBL series brushless motors. For safety considerations, there are built-in safety features to prevent accidental motor startup when powering on. Before using this speed control, please read the manual carefully so that setup can be done properly.

FEATURES

- Low battery voltage protection.
- Overheat protection.
- Motor timing adjustment.
- Brake control.
- Throttle response adjustment.
- Airplane and helicopter modes.
- Governor mode for helicopter.
- Soft start.
- Anti-interference ring.

SPECIFICATIONS

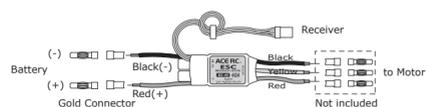
Product Name	BLC-40	BLC-65	BLC-75
Item No.	8041-A/8041-H	8042-A/8042-H	8043-A/8043-H
Voltage range	7.4~14.8 V (2S-4S Li-Po)	7.4~37 V (2S-10S Li-Po)	7.4~22.2 V (2S-6S Li-Po)
Resistance	0.0048 Ω	0.0044 Ω	0.003 Ω
Continuous Load (5 min)	40A	65A	75A
BEC Voltage	5V	Non	Non
BEC Current	2A	Non	Non
Reverse	No	No	No
Brake	Yes	Yes	Yes
Governor Mode	Yes	Yes	Yes
Over Load Protection	Temp. Protection	Temp. Protection	Temp. Protection
Setup Procedure	Digital	Digital	Digital
Weight	27g	46g	45.6g
Dimensions	52x24x7.9	60x34.5x11.5	50x34.5x11.5

CONTENT

- Speed Control x 1
- Gold Connectors x 2 sets
(for battery connecting)
- Anti-interference ring x1
- Instruction Manual x 1

CONNECTIONS

It is strongly recommended to use 3.5mm or 4.0mm gold connectors, which should be soldered firmly to the cables. Please refer to the diagram below on how to connect the ESC with battery and motor.



Note:

- 1) Ensure that all solder connections are of good quality.
- 2) Connect the ESC to the motor matching the corresponding wire colors. If the motor rotation is the opposite of what is desired, then simply reverse any two of the wires.
- 3) Make sure that the battery polarity is connected properly.

FUNCTIONS

There are 5 basic functions included in the BLC controller that have more options can be selected by special setting procedure. The following are the explanation for these functions.

BATTERY PROTECTION

It was a built in Battery Management System function of the speed control. The power cut off timing was based on the cell number and continues output current of the battery. There were 4 options defined in the battery management system in the BLC series controllers. 3 options were for Li-Polymer batteries and 1 option for using with NiCd/NiMH batteries. The battery management system allows you to protect your batteries from over discharge and moreover to extend the lifetime of your batteries. The 4 options are listed as below:

- Light discharge protection for Li-Po/Li-Ion
- Standard discharge protection for Li-Po/Li-Ion
- Heavy discharge protection for Li-Po/Li-Ion
- +5V cut-off protection for Ni-Mh/Ni-CD

MOTOR TIMING

There were 3 options in this function that allows you to maximize the performance of your motor output. You could chose from low/mid/high to fit with different brushless motors. Higher timing offers more power output at the expense of efficiency. Please check the current draw after changing the timing option in order to prevent overloading of battery. The 3 options are listed as below:

- Auto timing
- Soft timing
- Standard timing
- Hard timing

Brake Mode

There were 3 options in brake function that allows you to choose from no brake, soft brake, and hard brake option. The 3 options are listed as below:

- No brake
- Soft brake
- Hard brake

Throttle Sensitivity

The throttle sensitivity function offers you different throttle response time for different set up in different occasions. It could be an ideal function with different flying style. The faster throttle response time will offer you quick and sensitive throttle feedback. The 3 options are listed as below:

- Soft throttle response
- Standard throttle response
- Quick throttle response

Flying Mode

The flying mode offers you different options for different aircrafts. You could chose from airplane, helicopter, and helicopter with governor. The 3 options are listed as below:

- Airplane mode
- Helicopter mode with governor (see Note)
- Helicopter mode without governor (see Note)

Note:

1) For the battery protection function, technically the power cut off timing was based on the cell number and continues output current of the battery. The microprocessor will calculate the timing and to cut the power with two steps. Because the late stage of each battery discharge cycle has quick voltage change, such function will provide a safe process during the operation

1st step: enabled when the single cell reaches the low point, the motor will be forced to lower the RPM by microprocessor

2nd step: enabled when the single cell reaches the lowest point defined in the system, the

motor will be completely cut off. To regain the power, the user needs to adjust the throttle stick to the "stop" position until the battery voltage comes back to the safe level.

The following were the detailed definition of each option mode in battery protection function.

Protection Function Mode	1 st step voltage	2 nd step voltage
Light discharge protection for Li-Po/Li-Ion	3.2V	2.9V
Standard discharge protection for Li-Po/Li-Ion	2.9V	2.6V
Heavy discharge protection for Li-Po/Li-Ion	2.6V	2.3V
+5V cut-off protection for Ni-Mh/Ni-CD	No battery voltage protection defined	

2) Helicopter modes are equipped with a soft start function. However, the ESC will not activate the soft start function in the first 5 seconds after the throttle is shut down. This way, if the user shuts down the throttle by mistake during flight, it will allow the motor restart immediately and avoid a crash.

SETTING PROCEDURE

The following processes will explain the throttle calibration and the setting of ESC.

1. As a safety precaution, we recommend disengaging the pinion gear from the main gear during this procedure.
2. Also review the FUNCTION MODE CHART and select which modes you wish to use since the setting procedure immediately follows the calibration procedure.
3. Turn on the transmitter and put the throttle stick at full throttle position.
4. Turn on the receiver if no BEC.
5. Connect the battery and the ESC.
6. You will hear 6 tones () from the ESC, which means the full throttle position has been calibrated.
7. Move the throttle stick to the idle position (lowest position). You will hear 4 tones (), which means the idle throttle position has been calibrated and now the ESC will enter the setting mode.
8. While in the setting mode you will hear combinations of sounds, which represent various functions. Each sound consists of a long tone and a short tone. The long tone represents which function is being set, and the short tone represents the option mode for that particular function. You can check the FUNCTION MODE CHART to get the correlation for the difference function mode and the combination sounds.
9. Shortly after the idle position has been calibrated you will start to hear these setting tones. If you wish to select the setting of the mode then move the throttle stick to full throttle position and wait for the confirmation sound () means this mode you select has already been set. After that, move the stick to the idle position and waiting for the next function mode setting. If you do not wish to select this setting, leave the throttle stick in the idle position and wait for the subsequent setting mode.
10. The setting sequence for these 5 main functions will be (1) Battery Protection (2) Motor Timing (3) Brake Mode (4) Throttle Sensitivity (5) Flying Mode.
11. After setting is complete, please turn the power off by disconnecting the battery from the ESC. If you only change certain functions, the others will remain the factory setting.

START PROCEDURE

1. Turn on your transmitter and make sure that the throttle stick is at the idle position.
2. Turn on the receiver if no BEC.
3. Connect the battery to the ESC.
4. If the ESC is connected correctly and receives signals from the receiver, you will hear 3 rising tones (), which means the ESC is ready to go.
5. Go flying and have fun, but be mindful of your flying time.

CAUTION!!

High power motor systems could be very dangerous. High current could generate heat on wires, batteries, and motors. Always follow the instruction and use proper tools to set up the system within safe range. Always fly at a designed field with caution even though this controller is equipped with safety arming program.

FUNCTION MODE CHART

Function	Option Mode	Correlation combinations of sounds
Battery Protection	Light discharge protection for Li-Po/Li-Ion	()
	Standard discharge protection for Li-Po/Li-Ion	()
	Heavy discharge protection for Li-Po/Li-Ion	()
	+5V cut-off protection for Ni-Mh/Ni-CD	()
Motor Timing	Auto timing	()
	Soft timing	()
	Standard timing	()
	Hard timing	()
Brake Mode	No brake	()
	Soft brake	()
	Hard brake	()
Throttle Sensitivity	Soft throttle response	()
	Standard throttle response	()
	Quick throttle response	()
Flying Mode	Airplane mode	()
	Helicopter mode without governor	()
	Helicopter mode with governor	()

FACTORY DEFAULT SETTING

Due to the normal flying mode setting on the speed control is different from airplane and helicopter. So for each BLC series, there are 2 type can be chosen to match your flying requirement. Both of these 2 type have the same specification and full function. Just the factory default setting mode are different. The following table is the factory default setting mode for these 2 types of airplane and helicopter function.

Application	Airplane	Helicopter	
Item No	BLC-40 8041-A BLC-65 8042-A BLC-75 8043-A	8041-A 8042-A 8043-A	8041-H 8042-H 8043-H
Function Mode	Battery Protection +5V cut-off protection for Ni-Mh/Ni-CD Motor Timing Auto timing Brake Mode No brake Throttle Sensitivity Quick throttle response Flying Mode Airplane mode	Standard discharge protection for Li-Po/Li-Ion Auto timing No brake Standard throttle response	Standard discharge protection for Li-Po/Li-Ion Auto timing No brake Standard throttle response Helicopter mode without governor

OPTIONAL PARTS



SERVICE

Thank you for purchasing the BLC series brushless motor ESC. Thunder Tiger strives to bring you the highest level of quality and service we can provide. We race and test our products around the world to bring you state-of-the-art items. Thunder Tiger guarantees that you should enjoy many hours of trouble free use from our R/C products. Thunder Tiger products have been sold worldwide through the authorized distributors that are supported directly and rapidly from Thunder Tiger. You may find that Thunder Tiger is always pursuing to explore new items creatively with highest quality. To update the latest product information and to get the best technical support, please feel free to contact your local hobby shops or Thunder Tiger authorized distributor.

Manufactured by
THUNDER TIGER CORP.
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