ORCA® Oe101

Professional speed control

Instruction Manual

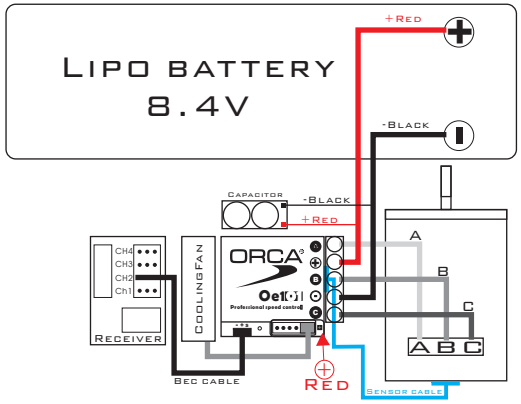
Version 1.1

Thank you for choosing ORCA Products. Welcome to the power and convenience of Brushless RC. By purchasing the Oe101 Competition Brushless Electronic Pro stock Speed Control ("ESC") you have chosen one of the most advanced speed controls in RC Racing. The Oe101 allows customization for multipleprogrammable parameters (using the ESC's Program Card which can be purchased separately).
Please read this manual thoroughly to familiarize yourself with the installation, setup and operation. By operating this product, you accept the ORCA Warranty

Specification

*** 32 bit processor	*** Low resistance FET
*** Continuous current	*** Auto Fan control
System:	Brushless
Forward/Brake/Reverse:	Yes (Factory preset at Forward/Brake)
Dimensions:	30.45(L) x30.35(W) x 10.35(H)mm
Weight:	20.80g (excluding wires)
Voltage Input:	6V-11V
Peak Current:	380A
Continuous current :	100A
Motor Limit:	Over 10.5Turns
Motor Type:	Sensored 540 sized brushless motors
B.E.C.:	4A_6V/7.2V
Multi Protection System:	Yes

Installation & Connectors



* Install/Solder the relevant battery connector (Battery Specific) to the battery wires. Red to +ve and Black to -ve. (*WARNING!* Reversing the battery polarity will destroy your ESC and void the warranty.)
* Connect supplied BEC wire(100mm) to 3pin port match the (- + s) between the receiver connector and ESC.
* Connect the 3 motor wires to the motor; you can either solder the wires directly to the motor or use your favorite connectors. Match the label of the ESC Output (A, B, C) to the Tablabels on the motor when soldering. Avoid soldering each joint for longer than 5 seconds. Prior to operation make sure you have not created a short by either creating a wire bridge or solder bridge on the solder tabs on the motor. (*WARNING!* Improper wiring may damage the ESC and void the warranty.)
* Connect the sensor cable between the ESC sensor plug and the Motor sensor plug.
* Connect the receiver plug to the CH2/throttle pin of the receiver.
* Secure the on/off switch in a place where it will not be accidentally knocked to the ??off??position during a crash.
* The Fan port voltage is drawn directly from the battery.
* The Motor configuration A-B-C can be changed to C-B-A in the ??ESC motor link??. Enter program and before setup of the program. Ensure that your physical wiring configuration of A-B-C match the Initial Setup options of the Program Card. (*WARNING!* Improper configuration may damage the ESC.)

Radio & Esc setup

Transmitter Settings:
Throttle Travel Maximum / 100%
Brake Travel Maximum / 100%
Throttle Exponential Start with 0%
Throttle Neutral Trim Center / 0
Throttle Servo Reverse Reverse (Futaba, KO, Sanwa)
Initial set-up of the throttle end-points of the ESC:

* Connect the power wires of the ESC to a fully charged battery set; making sure the polarity is correct.
* Bind your receiver and transmitter first if your radio requires you to do so.
* Turn on the transmitter and hold the throttle at full brake position.
* Turn on ESC and listen for 2 beeps.
* After you hear the 2 beeps, apply full throttle and listen for another 2 beeps.
* Once you hear the 2 beeps, release the throttle to neutral position.
* A beep will then sound, signifying that the ESC endpoints have been successfully set.

Note! If you do not hear the beeping sound as described above, try reversing the throttle reverse setting in the transmitter.

Customizing the Esc

Due to the different requirements of each style and class of racing, it is important to customize your ESC for each use case. Customization of the ESC is done using the Program Card (Sold Separately):

To begin, connect the battery wires to a charged battery, then connect supplied 4pin wire (200mm) to the ESC setting port (4pin port) and Program Card. Turn on the ESC and the Program Card will activate automatically. Note that the screen will show "Loading?? during initialization -indicating that the ESC is copying the current setup in the ESC to the Program Card. Once loading is completed, the screen will show "ORCA Oe101" and "Program". You can now begin programming your ESC.
Press "Enter" to access Program Mode.
There are 2 Modes available: Blinky and Open Stock Brushless profiles are pre-loaded within the firmware.

TIPS! Whenever in doubt, double check your ESC setting by initializing the Program Card again and checking each menu setting.
Navigation around the Program Menu is done using the 4 buttons on the right hand side of the Program Card. The function of each button varies depending on which screen the display is showing:
"Select" button----------go to next select
P r e s s a n d H o l d "Select" button two second -------go to back page
" ▲button - Scroll up
" ▼button - Scroll down
"Enter" button - Send Changes from Program Card to the ESC and overwrite old data in the ESC
NOTE! The Program Card is not included and is sold separately.
The Program Card will compare the Parameters within the card and ESC before sending. If changes are detected, you will hear a series of beeps and the Program Card will display:

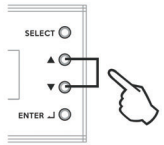
TIPS! Do not worry about making mistakes. You will not damage the ESC during setting. If in doubt, you can always reload the default set up and start over again.

Operation

Getting started
Turn on the on/off swithch, the screen will display:

Use "▲" button and "▼" button to find [Program], [Data Record] or [Update].
Press "◿" button to choose. Each mode presented are independent from each other and will require setup.

Press "SELECT" button for 2 seconds to go back to the previous screen.



ORCA OE101
3: Update

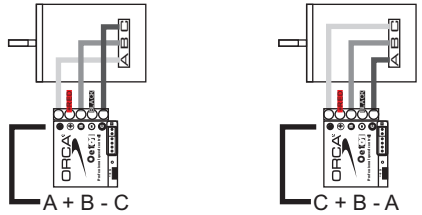
ORCA OE101
2: Data Record

ORCA OE101
1: Program

1. Program

ESC motor Link
A + B - C

Use " " button and "▼" button to find the right Position of the motor link
A+B - C or C + B - A and then press "◿" Enter.



A+B-C or C+B -C must match the Initial Setup options of the Program Card.
(*WARNING!* Improper configuration may damage the ESC.)

BLINKY MODE
1: Quick Setup

Use "SELECT" button to find "BLINKY MODE" or "OPENSTOCK MODE"

2. Data Record

Existing: *Battery voltage* *Esc Temperature* *Motor Temperature*

T hrottle position 8.38V 34 35 1.35ms 0rpm *Motor rpm*

Press "▲" button

Record the last: *Battery min voltage* *Max Esc Temperature*

Max motor rpm 7.62V MAX E 95 RPM:48370 M89 *Motor Temperature*

Please double press "Enter" button to clear the data, otherwise this data will keep Forever.

3. Update

Updating of ESC Firmware:
" Scroll to the "Update"menu and press "Enter". This will show the current ESC Firmware Version.
" Press "Enter" again to access the SD cards Firmware folder. Select the firmware Version that you would like to use to update the ESC. Press"Enter" again and the update will commence (It will take around 1 minute to complete the update).

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Updating of Program Card Firmware:
" Depress and hold the Program card "Enter" button while turning on the ESC. It will display the current Program card firmware Version.
" Press "Enter" again to access the SD cards Firmware folder. Select the Firmware Version that you would like to use to update the Program Card. Press "Enter" again and the update will commence (It will take around 1 minute to complete the update).

Preparing the SD card for use:
Format a microSD card using FAT32 file structure using a personal computer. If you are using a Micro SD Card larger than 32GB, you will need to use a 3rd party SW Package to do this. Create a new folder called "Firmware". Download the latest firmware from www.orcarc.com/firmware/ and copy the file to the "Firmware" folder on the Micro SD card. Once completed, install the MicroSD card into the microSD card slot of the Program Card. Both the Program Card and ESC Firmware Files need to be copied in to the "Firmware" Folder. A maximum of 10 of each ESC/Program card firmware can be present in the folder at any one time.

Operating Tips

Multi Protection System -- In addition to the Low Voltage and Overheat Protection that were described above, the ESC is protected in 2 more ways.

Motor Lock Protection:
" The ESC is protected against damage when the motor is stuck and does not turn at all. Power will not be applied in this situation.
" CAUTION! Since the ESC relies on the feed back of the 3 motor wires to deploy this protection, it ONLY works if the motor does not turn AT ALL. If the rotor has any rotation, the ESC will consider the motor to be operational and the power to the motor will not be cut off.
Fail Signal Protection:
" In case the radio signal to the ESC is interrupted for over 1 second during a run, the ESC will cut off until the signal resumes.

ROAR Stock Spec Racing:
ROAR has announced the new class of Stock Spec Racing using a zero degree timing ESC with Spec Motors known commonly as 'Blinky' classes. The Oe101 ESC satisfies the ROAR
requirement showing a blinking LED when set at 0 timing and 0 turbo timing.

Misc. Tips:
" Connect the ESC to the battery pack only when you are ready to run. This will avoid draining the battery pack. Always disconnect the battery after your run.
" A small spark may occur when the battery is initially connected to the ESC. This is normal and is due to the charging of the capacitors.

1. PROGRAM
A + B - C
C + B - A

Press "Enter" buttom

Press "Select" buttom

BLINKY MODE

Quick Setup	1.Punch	Level 1-15	15
	2.Party mode	0% ~ 30%	20%
	3.PWM(Pulse Width)	2000 ~ 32000	8000
	4.DragBrake	1% ~ 30%	4%
	5.Compress	0% ~ 50%	12%
	6. Brake Type	1 ~ 2	Type - 2
Advance Setup	1.PunchFineTune	-5	Normal
		-4	
		-3	
		-2	
		-1	
		Normal	
		1	
		2	
		3	
		4	
		5	
	2.Brake Freq	200 ~ 5000Hz	2000Hz
	3.Initial Brake	0% ~ 60%	50%
	4.Initial Brake range	0% ~ 100%	50%
	5. Max Brake Force	0% ~ 100%	94%
Initial Setup	1.Running Mode	Forward/Brake	Forward/Brake
		Forward/Rev	
		For/Brake/Rev	
		For/Hold/Rev	
	2.Battery	LiPolymer	LiPolymer
		Li-Fe	
		Ni-XX	
	3.Cut Off Voltage	Off	Low
		Low "2.9V"	
		Middle "3.2V"	
		High "3.4V"	
	4.EscOverHeat	95	120
		105	
		120	
		No Protection	
	5.MotorOverHeat	95	120
		105	
		120	
		No Protection	
	6.Neutral Range	2% ~ 15%	6%
	7.BEC	6V	6V
		7.2V	
	9.Motor Action	CCW	CCW
		CW	

OPEN STOCK MODE

Quick Setup	1.Throttle Feel	Soft"1" ~ "5" Aggressive	5
	2.Punch	Level 1-15	14
	3.Party mode	0% ~ 30%	15%
	4.Timing	off "0"~ 100	45
	5.Turbo Timing	off "0"~ 100	100
	6.Turbo down Rake	0 ~ -30	-15
	7. DragBrake	0% ~ 30%	4%
	8. Brake Type	1 ~ 2	Type - 1
Advance Setup	1.PunchFineTune	-5	Normal
		-4	
		-3	
		-2	
		-1	
		Normal	
		1	
		2	
		3	
		4	
		5	
	2.PWM(Pulse Width)	2000 ~ 32000Hz	8000Hz
	3.Compress(Throttle)	0% ~ 50%	10%
	4.Timing Start	0% ~ 90%	20%
	5.Timing Range	0% ~ 50%	45%
	6.Turbo Delay	0's ~ 0.1's	0.02's
	7.Turbo Start	40% ~ 100%	92%
	8. Turbo Punch	-5	Normal
		-4	
		-3	
		-2	
		-1	
		Normal	
		1	
		2	
		3	
		4	
		5	
	9. Brake Freq	800 ~ 5000Hz	1600Hz
	10.Initial Brake	0% ~ 60%	34%
	11.InitialBrakeRange	0% ~ 100%	30%
	12.MaxbrakeForce	0% ~ 100%	74%
Initial Setup	1.Running Mode	Forward/Brake	Forward/Brake
		Forward/Rev	
		For/Brake/Rev	
		For/Hold/Rev	
	2.Battery	LiPolymer	LiPolymer
		Li-Fe	
		Ni-XX	
	3.Cut Off Voltage	Off	Low
		Low "2.9V"	
		Middle "3.2V"	
		High "3.4V"	
	4.EscOverHeat	95	120
		105	
		120	
		No Protection	
	5.MotorOverHeat	95	120
		105	
		120	
		No Protection	
	6.Neutral Range	2% ~ 15%	6%
	7.BEC	6V	6V
		7.2V	
	9.Motor Action	CCW	CCW
		CW	

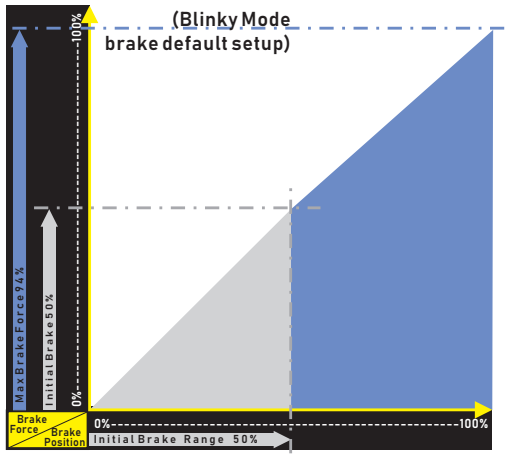
Detailed Explanation of each ESC Menu items

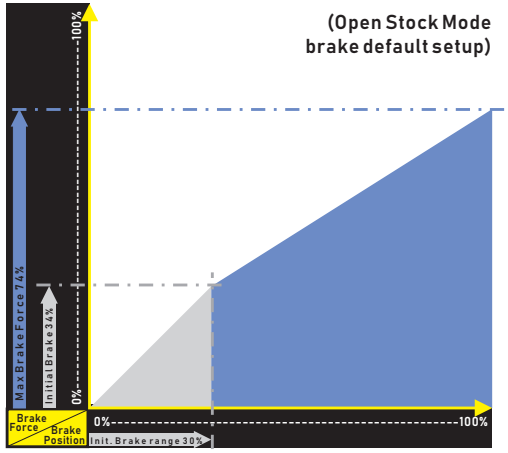
Quick Setup:

1. ***Throttle Feel*** – Throttle response more soften (1) More Aggressive (5). Normally (1,2,3) for On Road, (3,4,5) for Off Road.
2. ***Punch*** – Allows you to change the punch of the ESC (Level 1 to Level 15):
   * Level 1 has the least punch and Level 15 has the highest punch.
   * Adjust punch level to maximize acceleration speed with minimum wheel spin.
3. Party Mode - This is a new function develop on 2019, This mode will let you get faster respone to push up the thottle when you after brake or release the throttle..
4. *Timing* (Except "Blinky Mode") – Allows you to adjust the timing of the motor (0r-100r Mode 1r increments):
   * Generally speaking, in brushless systems, an increase in timing will result in an increase in the RPM of the motor. However, increase in timing can also decrease the efficiency of the system, thus generating heat on the ESC and motor.
   * Lower timing has the most torque and the lowest RPM; Higher timing has the least torque and the highest RPM.
5. *Turbo Timing* (Except "Blinky Mode") □ V Turbo Timing is unique to brushless systems because the ESC can simulate motor timing advance. While mechanical timing advance in a brushed motor system is limited by the physical phasing of the motor, brushless ESC timing advance canre sulting in a sensation of having a 2nd gear/Turbo for top speed. This menu allows you to adjust the amount of Turbo Timing in your rake ESC in 1r increments. (The "Turbo Timing" should never be greater in value than Timing)
6. *Turbo down rake* (Except "Blinky Mode") – This is an opposite side Turbo timing for braking, preset -10, if you set the value to -1, this will smooth the throttle response as you slow from top speed, if you value set to -30, this will have more drag brake effect when you release throttle from top speed
7. *Drag Brake* – Also known as trail braking - allows you to set the automatic brake force applied when the throttle returns to neutral position (30 steps from 0% to 30%):
   * Drag Brake affects how a car handles off-throttle (entering a corner). With drag brake on, there will be more weight shift to the front tires thus increasing the front end grip when you let go the throttle.
   * Experiment with different settings to find the setting that fits your driving style.
8. Brake *Type* – Brake Type-1 is a traditional brake system in ORCA ESC, it can provide most aggressive brake feeling for driver. Brake Type -2 is a new brake system, most smooth feeling, predictable and will not lock the car suddenly, most suitable for blinky class.

Advance Setup:

1. *Punch fine tune* – Allows you fine tune your Punch setting more detail, if you set (+1) your punch will up to 7.1 when the punch setup is 7, if you set (-1) your punch will down to 6.9 when you setup is 7.
2. *Pulse Width Modulation (PWM)* (This function can be found in the "Advance setup" except Blinky mode) Allows you to change the forward drive frequency of the ESC (2K to 32K step by 500HZ)
   * The 2K setup will give you good punch at the low end.
   * The 32K setup will result in strong mid to top end.
   * Experiment to find out what suits your driving style best. (Lower PWM will lower ESC temperatures while higher PWM settings may increase ESC temperatures and Higher PWM will course ESC more heat.) Ensure that your physical wiring configuration of A-B-C match Initial Setup options of the Program Card.
3. *Compress* (found in "Advance Setup" menu, Except for Blinky mode where it can be found in "Quick Setup") - This is for throttle curve, the higher the number, the more responsive the throttle feels at bottom end. 0% is linear throttle response. That's mean throttle compress, than will course you more sensitive in the throttle bottom
4. *Timing start* – Allows you to adjust early or later to add timing in bottom power, this will make it easy to get a smooth power band in bottom power.
5. *Timing range* – Allows you to adjust a smooth power band in middle power.
6. *Turbo delay* – Delay how long to start your turbo timing when you touch the throttle turbo point.
7. *Turbo start* – Allows you to adjust which throttle point to start the turbo and not only full throttle to start turbo and let it easy to get a smooth power band for all kind of motors.
8. *Turbo Punch* – let you adjust the top speed power band of turbo, turbo punch + get more aggressive and turbo punch – get more smooth of top end power.
9. *Brake Freq.* – Brake Frequency operates similar to PWM except it affects the braking instead of the throttle (100hz / step from 600hz to 5000hz)
   * At 1k Hz, the Drag brake and the Brake force will feel the punchiest.
   * At 5k Hz, the Drag brake and the Brake will feel very smooth.
10. *Initial Brake*
11. *Initial Brake range* — see diagrams below.
12. *Maxbrake Force*





LIMITED WARRANTIES / REPAIR PROCEEDURES

All ORCA products are manufactured in accordance with the highest quality standards. ORCA guarantees this product to be free from defects in materials or workmanship for 60 days from the original date of purchase verified by sales receipt. This limited warranty does not cover damages resulting from abnormal wear, misuse or improper maintenonce of the product. To avoid unnecessary service and mailing charges, always eliminate all other possibilities and check all components for malfunctions before sending in your unit for repair. Products sent in for repair that operate perfectly will be charge a service fee. When sending in the product, always pack carefully and include the original sales receipt, a description of the problem encountered, your return address and contact information. Since we do not have control over the installation and use of this product, we cannot accept any liability for any damages resulting from the usage of this product. Therefore, using this product is at your own risk, and the user accepts all resulting liability from installing and using of the product.