ORCA OE1 WLE ESC Brushless Speed Controller Instruction Manual

Contents

1 ORCA OE1 WLE ESC Brushless Speed Controller
2 Instruction Manual
3 Specification
4 Installation & Connectors
5 Radio & ESC Set-Up
6 Customizing the ESC
7 Operation
8 Limited Warranties / Repair Procedure
9 Documents / Resources
9.1 References
10 Related Posts

TURBRO

ORCA OE1 WLE ESC Brushless Speed Controller

Specifications

- 32 bit processor
- Continuous current System: Forward/Brake/Reverse (Forward/Brake)
- Dimensions:
- Weight:
- Voltage Input: LIPO 2cells 7.4V
- Peak Current: 160A
- Motor Limit: Brushless
- Motor Type: Yes (Factory preset at Installation & Connectors)
- BEC: Multi Protection System

Instruction Manual

World Limited Edition (WLE) ESC would be a limited production run ESC that ORCA has created after the IFMAR Spec Class winning ESC. This “NEW” ESC would have a new CPU paired with the new circuit board and a new Ver.6.0 firmware that will first debut on the WLE ESC makes it the most advanced ESC in all types of motor that ORCA has created.

Specification

- 32-bit processor
- Low resistance FET
- Continuous current 160A
- System: Brushless
- Forward/Brake/Reverse: Yes (Factory preset at

- Forward/Brake)
- Dimensions: 33.3(L) x 40.1(W) x 20.8(H)mm
- Weight: 43g (excluding wires)
- Voltage Input: (7.4V – 14.8V DC)
- 2Cells LiPO
- Peak Current: 760A
- Motor Limit: Over 4.5 Turns (2 cells)
- Motor Type: Sensored brushless motors
- Under 540size
- BEC: 5A_6V/7V
- Multi-Protection System: Yes

Installation & Connectors

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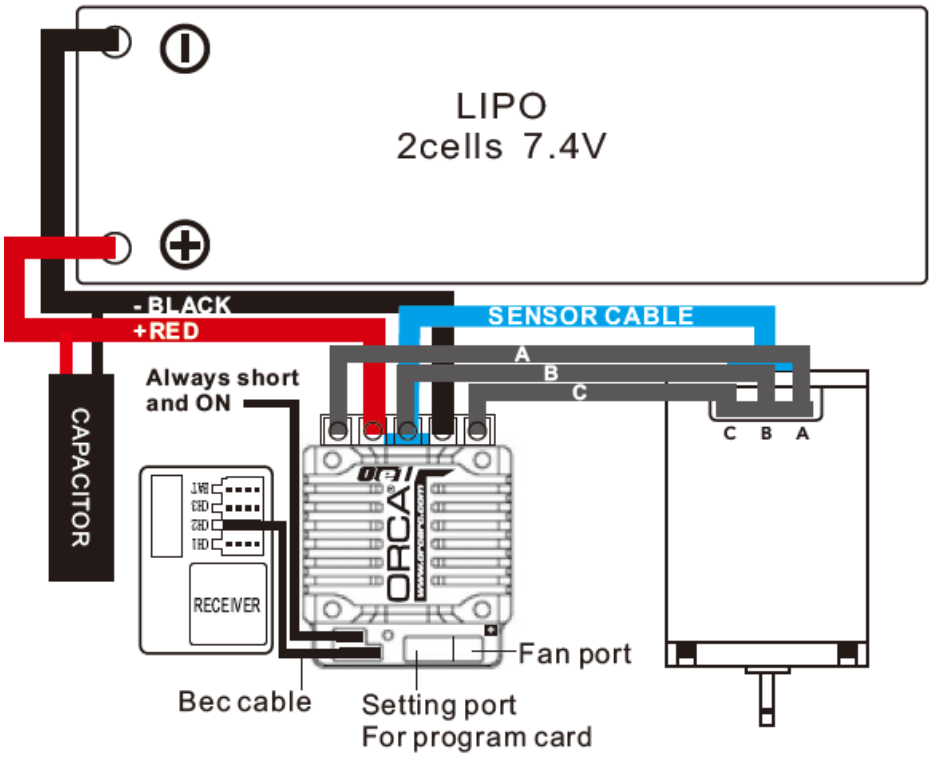


Position the ESC where it is protected in the event of a crash. Use the supplied double sided tape to secure the ESC to the chassis.

- Install/Solder the relevant battery connector (battery Specific) to the battery wires. RED to +ve and BLACK -ve. (WARNING! Reversing the battery polarity will destroy your ESC and void the warranty.)
- Connect supplied BEC wire to 3pin port match the “-+s” between the to the motor or use your favorite connectors. Match the label of the ESC Output (A,B,C) to the Tab labels 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 any 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 Set-Up

- 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)

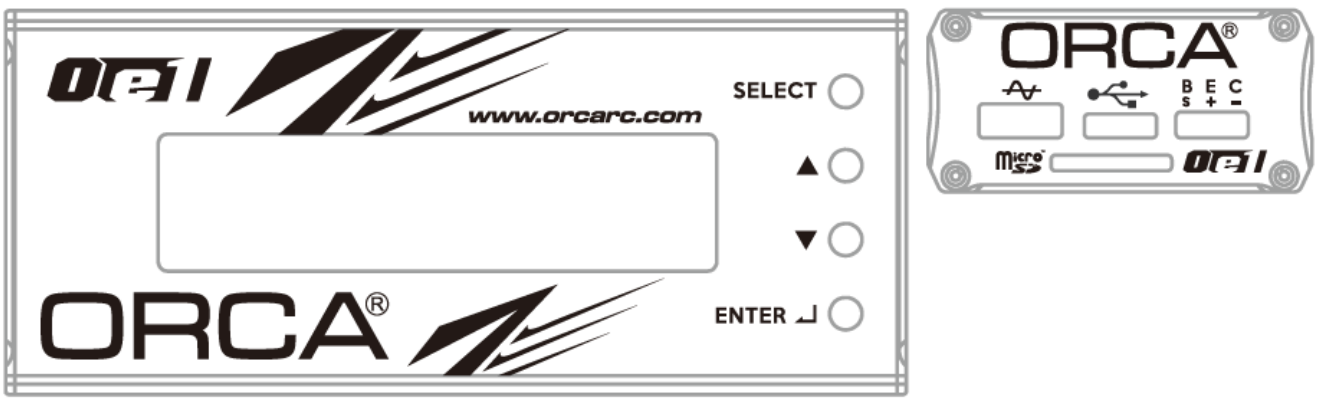
Initial set-up of the throttle end-points of the ESC

- 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 ful 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 Oe1.2″ and “Program” You can now begin programming your ESC.
- Press “Enter” to access Program Mode or Data Reading.
- There are 4 Modes available: Blinky, Modified, Open Stock Brushless and Off-road profiles are pre-loaded within the firmware.
- Tips! Whenever in doubt, doubt 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:
- Press “Select” button ————————————-go to next select Press and Hold “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 beep and the Program Card will display:

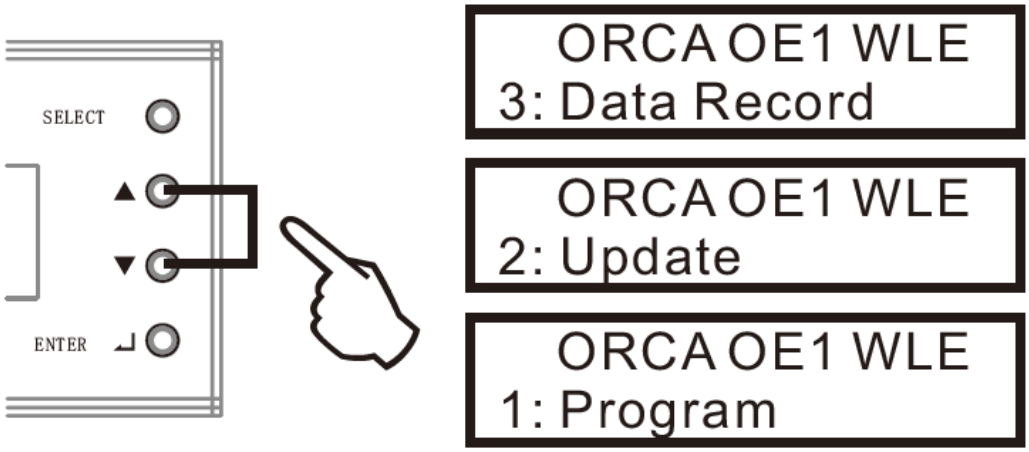
Send Success

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

Operation

Getting started
Turn on the on/off switch, the screen will display

Use▲ button and ▼ button to find [Program], [Update] or [Data Record]. 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.



Us ▲e button and “ “ button to find the right position of the motor link.
Press ▼ “ button to set up your ESC after you choose the right motor link.

1. Program

   Updating of ESC Firmware:

   Scroll to the “Update” menu and press “Enter”. This will show the current ESC FW Version. Press :Enter” again to access the SD cards Firmware folder. Select the FW 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).

   Updating of Program Card Firmware to:

   (Oe1 WLE ESC firmware Version is start from V6.0, it can’t to downgrade to 5.X or below)

2. Update

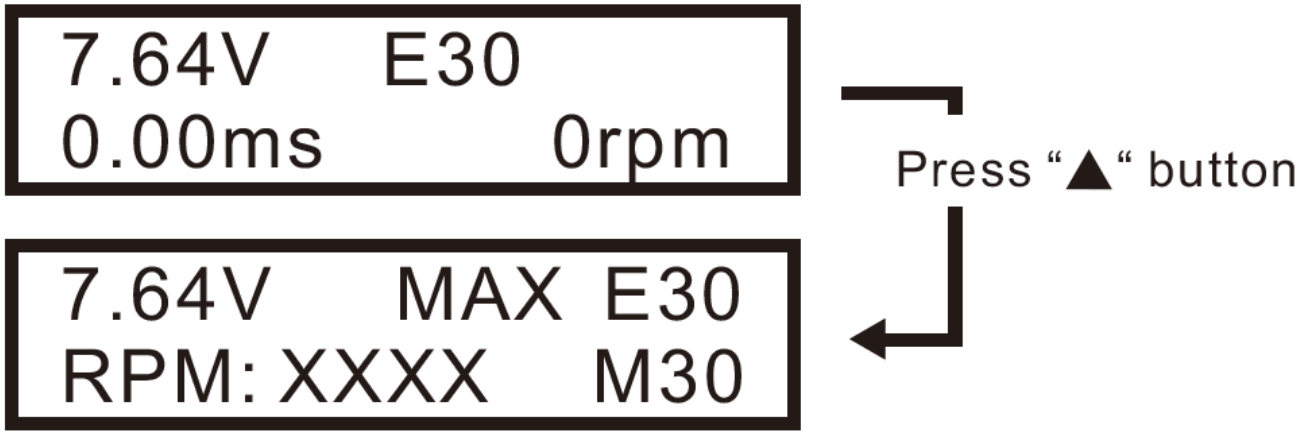
   Depress and hod the Program card’s “Enter” button while timing on the ESC. It Will display the current Program card FW Version. Press “Enter” again to access the SD cards Firmware folder. Select the FW Version that you would like to use

   To update the Program Card. Press “Enter” again and update will commence (It will take around 1 minute to complete the update).

   Preparing the SD card for use:

   Format a micro SD 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 Micro SD card into the micro SD card slot of the Program Card. Both the Program Card and ESC FW 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.

3. Data Record



- This will show the last pack of run, the min Battery Voltage, Max ESC Temperature
- Max Motor Temperature.
- Please double " " Enter button to clear the data, otherwise this data will keep forever.

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 know commonly as "Blinky" classes. The Oe1 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 batter pack. Always disconnect the battery after you 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.

PROGRAM
A + B - C
C + B - A

Blinky Mode			
Quick Setup	1.Punch	Level 1-15	11
	2.Party mode	-30% ~ 30%	Normal
	3.PM Limiter	0% ~ 70%	15%
	4.PWM(Pulse Width)	2000 ~ 32000Hz	4500
	5.DragBrake	1% ~ 30%	8%
	6.Compress	0% ~ 50%	0%
	7. Brake Type	1 ~ 2	Type – 2

Advance Setup	1.Brake Freq	1 00 ~ 8000Hz	900Hz
	2.Initial Brake	0% ~ 60%	0%
	3.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
		7V	
	9.Motor Action	CCW	CCW
		CW	

Detailed Explanation of each ESC Menu items

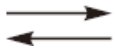
Quick Setup:

1. Throttle Feel – Level 1_Throttle response more “Soften”.
   Level 5_ Throttle response more “Aggressive”.
2. Punch – Allows to change the punch of the ESC from Level 1 to Level 15.

Level 1_ Get less initial power when acceleration speed with minimum wheel spin.
Level 15_Get highest initial power but more easy to get wheel spin.

3. Party Mode – Allows to easy adjust the curve of power by party mode, it must use with “PM limiter” together, it can increase or decrease how many % (Party mode) of power from throttle 0% to XX% (Party mode limiter)
4. PM Limiter – This is a limiter to limit the throttle from 0% to XX%, function with “Party Mode” only.
5. Timing – Allows you to adjust the timing of the motor (0º-100º Mode 1º 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.
6. Turbo Timing – 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 can push beyond that physical limit. As a result, motors can run at a super-high RPM in the Turbo Timing mode, resulting 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 1º increments. (The “Turbo Timing” should never be greater in value than Timing)
7. Turbo down rank – This is an opposite side Turbo timing for braking, preset
8. if you set the value to -1, this will smooth the throttle response as you show from top speed. If you value set to -30 this will have more drag brake effect when you release throttle from top speed (Suggest use between -4 to -14).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.
9. 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.

Press "Select" button



MOD MODE			
Quick Setup	1.Throttle Feel	Soft"1" ~ Aggressive "5"	4
	2.Punch	Level 1-15	5
	3.Party mode	-30% ~ +30%	-4%
	4.PM Limiter	0% ~ 70%	15%
	5.Timing	off "0"~ 100	4
	6.Turbo Timing	off "0"~ 100	28
	7.Turbo down Rake	0 ~ -30	-8
	8. DragBrake	0% ~ 30%	11%
	9. Brake Type	1 ~ 2	Type - 1
Advance Setup	1.PWM(Pulse Width)	2000 ~ 32000Hz	10000Hz
	2.(Throttle)Compress	0% ~ 50%	0%
	3.Timing Start	0% ~ 90%	18%
	4.Timing END	0% ~ 50%	35%
	5.Turbo Delay	0's ~ 0.1's	0.02's
	6.Turbo Start	40% ~ 100%	92%
	7. Turbo Punch	-5	-5
		-4	
		-3	
		-2	
		-1	
		Normal	
		1	
		2	

		3	
		4	
		5	
	8. Brake Freq	800 ~ 5000Hz	1600Hz
	9.Initial Brake	0% ~ 60%	0%
	10.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/S"	
		Middle "3.2/S"	
		High "3.4V/S"	
	4.EscOverHeat	95	120
		105	
		120	
		No Protection	
	5.MotorOverHeat	95	120
		105	
		120	
		No Protection	
	6.Neutral Range	2% ~ 15%	6%
		No Protection	
	5.MotorOverHeat	95	120
		105	
		120	
		No Protection	
	6.Neutral Range	2% ~ 15%	6%
	7.BEC	6V	6V
		7V	
	8.Motor Action	CCW	CCW
		CW	

I .PROGRAM
A + B - C
C + B - A

Press "Enter" button

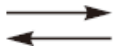
OPEN STOCK MODE			
Quick Setup	1.Throttle Feel	Soft"1" ~ Aggressive"5"	5
	2.Punch	Level 1-15	10
	3.Party mode	-30% ~ +30%	Normal
	4.PM Limiter	0% ~ 70%	25%
	5.Timing	off "0"~ 100	45
	6.Turbo Timing	off "0"~ 100	96
	7.Turbo down Rake	0 ~ -30	-6
	8. DragBrake	0% ~ 30%	8%
	9. Brake Type	1 ~ 2	Type - 1

Advance Setup	1.PWM(Pulse Width)	2000 ~ 32000Hz	8000Hz
	2.(Throttle)Compress	0% ~ 50%	0%
	3.Timing Start	0% ~ 90%	16%
	4.Timing END	0% ~ 50%	28%
	5.Turbo Delay	0's ~ 0.1's	0's
	6.Turbo Start	40% ~ 100%	96%
	7. Turbo Punch	-5	-4
		-4	
		-3	
		-2	
		-1	
		Normal	
		1	
		2	
		3	
		4	
		5	
	8. Brake Freq	800 ~ 5000Hz	1600Hz
	9.Initial Brake	0% ~ 60%	0%
	10.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/S"	
		Middle "3.2/S"	
		High "3.4V/S"	
	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
		7V	
	8.Motor Action	CCW	CCW
		CW	

Off-Road Mode

Press "Select" button



Advance Setup	1.PWM(Pulse Width)	2000 ~ 32000Hz	8000Hz
	2.(Throttle)Compress	0% ~ 50%	0%
	3.Timing Start	0% ~ 90%	16%
	4.Timing END	0% ~ 50%	28%
	5.Turbo Delay	0's ~ 0.1's	0's
	6.Turbo Start	40% ~ 100%	96%
	7. Turbo Punch	-5	-4
		-4	
		-3	
		-2	
		-1	
		Normal	
		1	
		2	
		3	
		4	
		5	
	8. Brake Freq	800 ~ 5000Hz	1600Hz
	9.Initial Brake	0% ~ 60%	0%
	10.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/S"	
		Middle "3.2/S"	
		High "3.4V/S"	
	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
		7V	
	8.Motor Action	CCW	CCW
		CW	

		2	
		3	
		4	
		5	
	8. Brake Freq	800 ~ 8000Hz	2000Hz
	9.Initial Brake	0% ~ 60%	0%
	10.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/S"	
		Middle "3.2/S"	
		High "3.4V/S"	
	4.EscOverHeat	95	120
		105	
		120	
		No Protection	
	5.MotorOverHeat	95	120
		105	
		120	
		No Protection	

Quick Setup	1.Throttle Feel	Soft"1" ~ Aggressive"5"	4
	2.Punch	Level 1-15	10
	3.Party mode	-30% ~ +30%	-4%
	4.PM Limiter	0% ~ 70%	15%
	5.PWM	2000~32000Hz	10000Hz
	6.Timing	off "0"~ 100	0
	7.Turbo Timing	off "0"~ 100	0
	8. DragBrake	0% ~ 30%	0%
	9. Brake Type	1 ~ 2	Type - 1
Advance Setup	1.Reverse Force	Off "0" ~ 100%	35%
	2.(Throttle)Compress	0% ~ 50%	0%
	3.Timing Start	0% ~ 90%	25%
	4.Timing END	0% ~ 50%	38%
	5.Turbo Delay	0's ~ 0.1's	0.02's
	6.Turbo Start	40% ~ 100%	92%
	7. Turbo Punch	-5	-5
		-4	
		-3	
		-2	
		-1	
		Normal	
		1	
		2	
		3	
Setup	4.EscOverHeat	105	120
		120	
		No Protection	
	5.MotorOverHeat	95	120
		105	
		120	
		No Protection	
	6.Neutral Range	2% ~ 15%	6%
	7.BEC	6V	6V
		7V	
	8.Motor Action	CCW	CCW
		CW	

Advance Setup:

1. PWM(Pulse Width Modulation) – 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

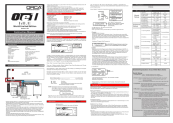
match Initial Setup options of the Program Card.

2. (Throttle)Compress – 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.
3. 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.
4. Timing End – Set the end point of timing, this will affect the power band in middle power. the turbo will start after the timing end point.
5. Turbo delay – Delay how long to start your turbo timing when you touch the throttle turbo point.
6. 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.
7. 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.
8. Brake Freq. – Brake Frequency operates similar to PWM except it affects the braking instead of the throttle (100hz / step from 800hz to 8000hz)
    - At 1k Hz, the Drag brake and the Brake force will feel the punchiest.
    - At 8K Hz, the Drag brake and the Brake will feel very smooth.
9. Initial Brake – When the Initial brake setup in 0 %, the initial brake force start same with drag brake.
   When the initial brake leave 0%, the initial brake force will start with your initial brake setup.
   *(This function item 9 explain is suitable for firmware version 6.3 or above.)
10. Maxbrake Force – Control the maximum brake force when you full brake.

Limited Warranties / Repair Procedure

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 maintenance 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 operates ideally will be charge a service fee.
When sending in the product, 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 the product.

Documents / Resources

	**ORCA OE1 WLE ESC Brushless Speed Controller** [pdf] Instruction Manual OE1 WLE ESC Brushless Speed Controller, OE1 WLE ESC, Brushless Speed Controller, Speed Controller

References

- FIRMWARE | ORCA Team Ltd.
- User Manual