



Please read the manual carefully before using

Thanks for purchasing our Electronic Speed Controller (ESC). As brushless systems are with strong power, to avoid equipment damage and personal injury caused by improper use, it is strongly recommended that users should read this manual before using the product, and strictly follow the prescribed operating procedures.

No liability shall be assumed for any equipment damage and personal injury resulting from the improper use of the product, including but not limited to compensation for indirect loss.

At the same time, we assume no liability for any equipment damage and personal injury caused by unauthorized modification of the product.

We reserve the right to change the design, appearance, features, and use requirements without notice.

Our company POLARIS-DR-120Ax3 Electronic Speed Controller (ESC) have been divided into STOCK version (professional competition version) and MOD version (standard version).
STOCK version: suitable for true mechanical zero-timing motor (parameters for Turbo Timing and Boost Timing can be adjusted according to vehicle type, motor, gear ratio until satisfied)
MOD version: suitable for all 1/10 drift cars and on-road cars (Lack of two functions: the Boost Start RPM and Boost Timing Acceleration, than the STOCK version)

If the motor used in STOCK version is not professional mechanical zero-timing motor but is a normal motor, Turbo Timing and Boost Timing parameters should be set to 0 deg.

WARNING1 Raise the parameters of Turbo Timing according to different motors until appropriate. During adjusting Turbo Timing parameters, if the full throttle is interrupted, indicating that the parameters is too high and readjusting is required. Parameters of Boost Timing do not need to be adjusted. They are automatically adjusted according to the motor speed.

Product features

- ◇ Specially for top competitions, built-in 3 common modes, suitable for all competitions Modes available:
General practicing mode
Competition mode
Crawlers mode
- ◇ Aluminum metal case with CNC precise engraving. Three colour for choose.
- ◇ Unique heat sink slot design, better heat dissipation performance.
- ◇ One-piece touch electronic power switch and setting button.
- ◇ With world - leading technologies such as dynamic Turbo Timing and Boost timing, and the settable timing parameters are very detail, adapting to the different demands of different drivers.
- ◇ Powerful throttle and brake adjustment functions
- ◇ Multiple protection functions: low voltage protection, motor and ESC overheat protection, and throttle out of control protection.
- ◇ Support LCD parameter programming

SPECIFICATIONS

Model:OMG-POLARIS-DR-120Ax3
Continuous Current: 120A Burst Current: 760A
Motor Type Supported: Sensored Brushless Motors
BEC output: 6-5V@3-5 Linear regulator mode
Cars Applicable: Drifts/on-road cars/off-road cars
Fan: 5V@0.16A, Max: 13V
(Direct voltage from battery without DC regulating)
Dimension (fan included): 41x39x32mm
Weight (accessories included): 112g
Battery cell qty: 2-35 lithium battery

Brushless Motor Limit	
2S	3S
≥3.5T(1/10 Touring)	≥5.5T(1/10 Touring)
≥5.5T(1/10 Buggy)	≥8.5T(1/10 Buggy)
10.5T(1/10 Drift)	15.5T(1/10 Drift)

Step 1: According to the motor used, connect according to the following pictures and check to make sure there is no error, then go to the next step.

Sensored brushless motor wiring : When using Hall Sensor brushless motor, it is necessary to connect the sensor cable of motor to the "SENSOR" socket on the ESC.

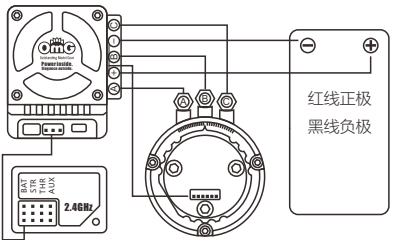
The ESC can automatically identify the motor type (sensored or sensorless) by detecting the signal coming from the "SENSOR" socket.

WARNING! For sensored brushless motor, the #A, #B, #C wires of the ESC MUST be connected with the motor wire #A, #B, #C respectively. Do not change the wires sequence!

WARNING2 The positive and negative poles of the power supply must not be reversed, otherwise the ESC will be damaged instantly. Please unplug the battery when not in use for a long time to avoid accidents.

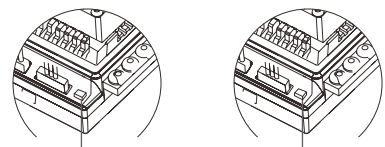
Step 2: Start the ESC and set throttle range

Note: The throttle range must be reset when the first time the ESC used or the remote control has changed the throttle midpoint, ATV, EPA and other parameters. Otherwise, it may become unusable or malfunction. Take Futaba remote as example as following to show the process of setting the throttle range:



1 Put the battery into the ESC, turn on the remote controller, set the throttle channel direction to "REV", the throttle fine adjustment to "0", and the EPA / ATV forward and reverse of the throttle channel to 100%.

Be sure to turn off the ABS brake function that comes with the remote control.



LED/按键开关
Connect the battery to ESC,off state

Hold the switch button until the red LED starts to flash

2. Press the switch button for 0.5 seconds and start the ESC.

(1) If you release the button at this time, the ESC enters the working state.

(2) Hold the switch button for 3 seconds and go on setting throttle range. At this time the red LED on the ESC starts to flash (motor beeps also), then release the button immediately and ready to set the throttle range. (The motor beep sounds may be small, in this case, just watching the LED status.)

3 Set the 3 points as follow:

A. Throttle stick at neutral position

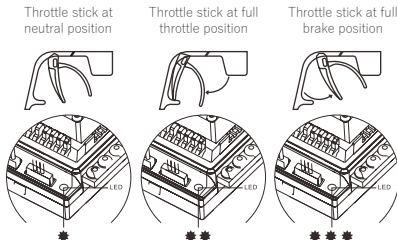
B. full throttle position

C. full brake throttle position

(1) Keep the throttle stick at the neutral position, press the switch button, the red light goes out, the green LED flashes once, and the motor beeps once, indicating that the neutral position has been stored;

(2) Move the throttle stick to the full throttle position, press the switch button once, the green LED flashes twice, and the

motor sounds "Beep Beep" twice, indicating that the full throttle has been stored;
(3) Move the throttle stick to the full brake throttle position, press the switch button, the green LED flashes 3 times, and the motor beeps 3 times "beep-beep-beep", indicating that the full brake throttle position has been stored;



1st click, the green LED flashes once
2nd click, the green LED flashes twice
3rd click, the green LED flashes thrice
Finally wait 3 seconds, the motor can be operated normally.

Step 2: The motor is running normally after wiring and basic settings are completed.

The use of the switch and the description of the status of the indicator light (LED) during driving: When the throttle stick is in the midpoint position, both the red and green LEDs are off. When forwarding and reversing, the red LED is always on. When the throttle is at the highest point in the forward direction, the green LED will also be on.

		Name of Items		Set Value										
General Setting	1	Runing Mode		FORWARD/BRAKE (Competition Mode)				FORWARD/BRAKE/REVERSE (Practice Mode)				FORWARD/REVERSE (Crawler Mode)		
	2	Drag Brake		0%	5%	10%	15%	20%	25%	30%	100%	=Drag brake		
	3	Voltage Prot		No protection		2.6V/Cell		2.8V/Cell		3.0V/Cell		3.2V/Cell	3.4V/Cell	
	4	"DRRS" Punch		Level1	Level12	Level3	Level14	Level5	Level6	Level17	Level8	Level19		
	5	Brake Force		12.5%	25%	37.5%		50%	62.5%	75%	87.5%	100%		
	6	Reverse Force		25%		50%			75%			100%		
	7	Initial Brake		=Drag brake		0%			20%			40%		
	8	Neutral Range		6%			9%				12%			
Advanced Setting	9	Boost Timing		MOD Version: 0-16° adjustable, 1°/time					Stock Version:0-64° adjustable, 1°/time					
	10	Turbo Slope		3	6		12		18		24		Release all	
	11	Over-Heat Prot		Protection					No Protection					
	12	Turbo Timing		MOD Version:0-20° adjustable,1°/time					STOCK Version:0-40° adjustable,1°/tim					
	13	Start RPM		1000-15000 RPM (1000 RPM/time)					No MOD version					
	14	Turbo Delay		Instant	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
	15	Timing Acc		50-750RPM (50RPM/time)					NO MOD version					

编程设定参数表

PROGRAMMING INSTRUCTION

1. Running Mode

"Forward Only with Brake" Mode. The car will only go forward and have brakes, but reverse is disabled. This mode is suitable for competition purposes.

"Forward / Reverse with Brake" Mode. This provides a reverse function, which is suitable for practice. The reverse function is engaged by a Double click method. On the first application of backwards throttle, only brakes are applied. On returning to the neutral point, and then applying the backwards throttle for a second time, if the motor stop now, the reverse function will be engaged. However, if at this time the motor is still moving forward the ESC will not go into reverse and just brake. The motor must be at 0 rpm to engage reverse. This is a protection function to prevent vehicle from back up by mistake when users just try to brake and click several times.

"Forward / Reverse" Mode. The reverse function is engaged by one click method. When moving from the forward zone to the backward zone, the ESC will engage reverse immediately. This mode is intended for crawlers or other special vehicles.

2. Drag Brake Strength

Drag brake refers to the generation of a small amount of braking force on the motor when the throttle stick is turned from the forward area to the neutral area. This can simulate the resistance of the brushed motor's carbon brush to the motor rotor, suitable for slowing down into corners, etc. occasion. (It is worth noting that the drag brake will consume more power, just choose the appropriate drag brake strength).

3. Low Voltage Protection

This function is to prevent the lipo from excessive discharge and irreparable damage. The ESC will always monitor the battery

voltage. Once the voltage is lower than the set threshold, the power output will gradually drop to 30% of the normal power within 3 seconds. At this time, the driver should pull over and withdraw from the race immediately.

The power will be completely shut off after 10 seconds. When entering the voltage protection, the red LED will flash like "☆-☆-, ☆-☆-, ☆-☆-". You can select the battery type by using a professional programming card (choosing accessories).

4. Start Mode / Punch"

According to personal habits, grounds, tire grip characteristics and other conditions, you can choose from 9 starting accelerations from level 1 ("very soft") to level 9 ("very aggressive"). This function can prevent the tire from slipping when starting, and can achieve the effect of ejecting and chasing the car during the competition. In addition, when using the "Level 7"- "Level 9" mode, the discharge capacity of the battery required high. If the battery discharge capacity is poor and cannot provide instantaneous high current, it will affect the startup effect. A pause or instantaneous loss of power during startup, it may be caused by insufficient battery discharge capacity. At this time, it is necessary to reduce the startup acceleration or increase the gear reduction ratio.

5. Brake Force

The ESC provides a proportional braking function. The braking force is related to the position of the throttle stick. The maximum braking force refers to the braking force generated when the throttle stick is in the braking limit position.

Please select the appropriate maximum braking force parameters according to the specific conditions of the vehicle and personal usage habits.

6. Reverse Force

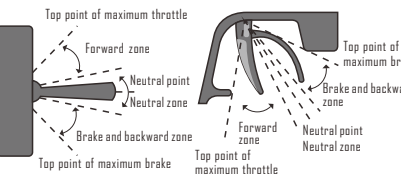
Choosing different parameter can produce different reversing speeds. (In general, it is recommended to use a lower reversing speed to avoid running out of control due to reversing too fast).

7. Initial Brake Force

Also called the minimum braking force. It refers to the braking force acting on the motor at the initial position of the brake. Under its action, it can achieve an effect similar to a point brake. The default value is equal to the drag brake strength, to form a soft brake effect.

8. Neutral Range

The throttle neutral point area is as shown in the following figure. Please adjust it according to your personal habits.



9. Boost Timing

This timing is effective in the entire throttle range and directly affects the speed of curved roads and straight roads. (When this value is set, the actual timing of the ESC during operation changes dynamically according to the motor speed, not a fixed constant.)

10. Turbo Slope Rate

This setting relates to the rate of engagement when the activation conditions are met. The rate is defined in points added per 0.1s. A higher value means faster addition of Turbo timing.

11. Over-Heat Protection

After this function is enabled, the output will be automatically turned off when the temperature rise of the ESC or the sensored brushless motor reaches a specific value preset by the factory, and the green LED will flash. The output will not be restored until the temperature reduction. If it is motor temperature protection, the green flashing mode is double flashing, namely "☆-☆-, ☆-☆-, ☆-☆-". If it is ESC overheating protection, the green LED flashes in a single flash: "☆-, ☆-, ☆-". (Note: The motor temperature protection function is only applicable to the inductive brushless motors of our factory. Other brands may not have this function because there is no temperature sensor in the motor, or the protection points are inconsistent due to the different built-in temperature sensor parameters. If Motor premature protection, please turn off the temperature protection function.)

12. Turbo Timing

This is also the size setting item of the timing. However, this timing is only activated after full throttle started, allowing the motor to achieve faster speeds on long straight tracks. 12. This is also the size setting item of the timing. However, this timing is only activated after full throttle started, allowing the motor to achieve faster speeds on long straight tracks.

13. Boost Start RPM

Because the Boost value is dynamically allocated according to the motor speed, the actual opening value of Boost is 0 when the motor speed is lower than the start speed. When the speed is between the start speed and the end speed, Boost changes dynamically according to the current speed. If the setting item "Boost varies with RPM" is set to linear, the Boost value is distributed linearly within this range.

For example, assuming that Boost Timing is set to 5 degrees and the starting speed is 10000, the Boost timing values are shown in the table below. If the speed is higher than the end speed, the actual start value of Boost is the Boost setting value. The stock version changes with the full range of speed 0-64 degrees.

(so in the STOCK version, the timing of ordinary motors is not 0 degree. If you manually set the boost timing, the motor timing will exceed the limit of 64 degrees. Therefore, you must follow the warning setting showed above).

14. Full Throttle Delay

Refers to the delay of the turbo starting. Turbo will be started only when the full throttle duration reaches the preset delay.

15. Boost Timing Acceleration

Boost Timing, RPM, indicates how much speed the motor increases, the ESC will increase by 1 degree Boost Timing. Accordingly, the lower the value is set, the faster the Boost Timing increment rate of the ESC, the more violent the motor starts, and the higher the temperature of the motor.

WARNING3 Turning on Boost timing and Turbo timing can effectively increase the output power of the motor, which is usually used in competitions. Please check the manual and reference, setting carefully in advance. Monitor the temperature of the motor and ESC during the testing run, and adjust the appropriate timing setting and correct gear ratio. Excessive timing setting and incorrect gear ratio will cause the ESC or motor burned. The following table lists the recommended Boost and Turbo timing ranges for various motor turns.

MOD Version Demo.

Motor Turns	3.5T	4.5T	6.5T	8.5T	10.5T	≥13.5T
Max. Boost Timing	0deg.	0deg.	5deg.	10deg.	16deg.	16deg.
Max. Turbo Timing	5deg.	10deg.	10deg.	15deg.	20deg.	20deg.

Because the greater the timing, the greater the power of the motor, also the higher the heat generation of the motor, if you turn on too much timing at a lower motor speed, the motor will overheat severely and even burned.

Therefore, we adopted a dynamic timing method. At low speeds, a smaller timing is turned on. After the speed is increased, the timing will increase with the increase of the speed. By adjusting the initial speed and the acceleration of the timing, it can be realized that during the motor operation, the low speed corresponds to the low timing, and the high speed corresponds to the high timing.

STOCK Version Demo.

The Timing (degree) in the table refers to item 9 in the programming parameter table. (Normal motors with non-mechanically adjustable 0 timing must have Boost timing set to 0 degrees, and the ESC will automatically increase the timing following the motor speed.)

Initial RPM=4000 Timing=200/deg.		Initial RPM=9000 Timing=200/deg.		Initial RPM=4000 Timing=200/deg.		Initial RPM=9000 Timing=200/deg.	
RPM	The Timing(deg.)	RPM	The Timing(deg.)	RPM	The Timing(deg.)	RPM	The Timing(deg.)
<4000	0	<9000	0	8800	24	18600	24
4200	1	9400	1	9000	25	19000	25
4400	2	9800	2	9200	26	19400	26
4600	3	10200	3	9400	27	19800	27
4800	4	10600	4	9600	28	20200	28
5000	5	11000	5	9800	29	20600	29
5200	6	11400	6	10000	30	21000	30
5400	7	11800	7	10200	31	21400	31
5600	8	12200	8	10400	32	21800	32
5800	9	12600	9	10600	33	22200	33
6000	10	13000	10	10800	34	22600	34
6200	11	13400	11	11000	35	23000	35
6400	12	13800	12	11200	36	23400	36
6600	13	14200	13	11400	37	23800	37
6800	14	14600	14	11600	38	24200	38
7000	15	15000	15	11800	39	24600	39
7200	16	15400	16	12000	40	25000	40
7400	17	15800	17	12200	41	25400	41
7600	18	16200	18	12400	42	25800	42
7800	19	16600	19	12600	43	26200	43
8000	20	17000	20	12800	44	26600	44
8200	21	17400	21	13000	45	27000	45
8400	22	17800	22	13200	46	27400	46
8600	23	18200	23	13400	47	27800	47

Correspondence table of speed and timing

(Normal motors with non-mechanically adjustable 0 timing must have Boost timing set to 0 degrees, and the ESC will automatically increase the timing following the motor speed.)

Initial RPM=4000 Timing=200/deg.		Initial RPM=9000 Timing=200/deg.	
PM	The Timing(deg.)	RPM	The Timing(deg.)
8800	24	18600	24
9000	25	19000	25
9200	26	19400	26
9400	27	19800	27
9600	28	20200	28
9800	29	20600	29
10000	30	21000	30
10200	31	21400	31
10400	32	21800	32
10600	33	22200	33
10800	34	22600	34
11000	35	23000	35
11200	36	23400	36
11400	37	23800	37
11600	38	24200	38
11800	39	24600	39
12000	40	25000	40
12200	41	25400	41
12400	42	25800	42
12600	43	26200	43
12800	44	26600	44
13000	45	27000	45
13200	46	27400	46
13400	47	27800	47