

AI LCG

SPEED CONTROL

Produced By **ARROWMAX**

Instruction Manual

Thank you for choosing Dash Products. Welcome to the power and convenience of Brushless RC. By purchasing the AI LCG Competition Brushless Electronic Speed Control ("ESC") you have chosen one of the most advanced speed controls in RC Racing. The AI LCG allows customization for multiple programmable 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 Dash Warranty Terms.

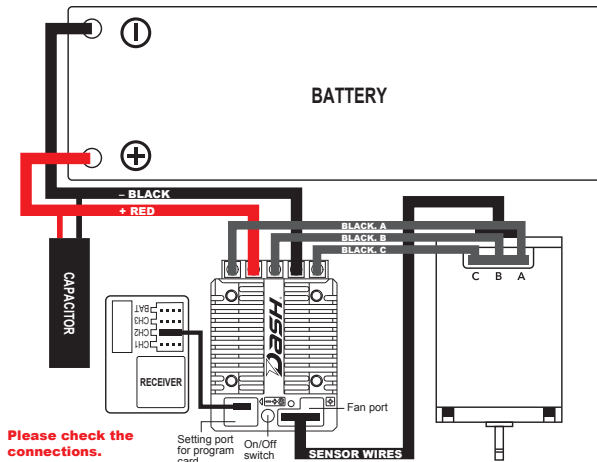
Specification

*** 32 bit processor
*** Continuous current System:
Forward/Brake/Reverse:
Dimensions:
Weight:
Voltage Input:

Continuous Current:
Maximum Current:
Motor Limit:
Motor Type:
B.E.C. Output:
Multi Protection System:

*** Low resistance FET
*** Auto Fan control
Brushless
Yes (Factory preset at Forward/Brake)
35.8(L) x 29.5(W) x 13.85(H)mm
27g (excluding wires)
(4.8 – 8.7V DC)
6 Cells NiCD/NiMH
2-Cell LIPO / 2-3 Cell LiFe
100A
400A
Over 10.5 Turns
Sensored 540 sized brushless motors
6V / 7A / 3A
Yes

Installation & Connectors



Please check the connections.

- 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 to -ve. (**WARNING!** Reversing the battery polarity will destroy your ESC and void the warranty.)
- Connect supplied BEC wire(180mm) to 3pin port match the "- + s" between the receiver connector and ESC.
- Connect supplied Switch wire to 2pin port (- o).
- 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 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 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 Initial Setup section of the Program Card. 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)

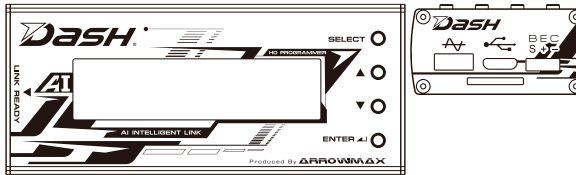
Initial set-up of the throttle end-points of the ESC:

- 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 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 (100mm) 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 "DASH AI LCG" and "Program". You can now begin programming your ESC.

Press "Enter" to access Program, Update or Data Record.

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
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 beeps and the Program Card will display:

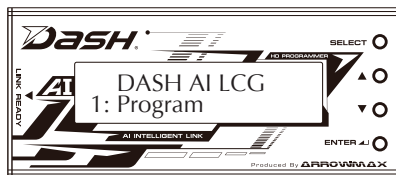
Send Success

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

Operation

Getting started

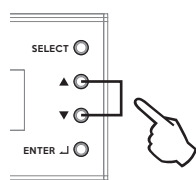
Turn on the on/off switch, the screen will display:



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.



- DASH AI LCG 3: Data Record
- DASH AI LCG 2: Update
- DASH AI LCG 1: Program

1. Program

A + B – C
C + B – A

Blinky Mode

Quick Setup	1.Torque Feel	Level:1-15	15
	2.Pulse Width Modulation (PWM)	2000-32000Hz	8000HZ
	3.DragBrake	OFF	OFF
		1%-30%	
	4.Compress	0%-50%	10%
Advance Setup	1.TorqueFineTune	-5	Normal
		-4	
		-3	
		-2	
		-1	
		Normal	
		+1	
		+2	
		+3	
		+4	
+5			
	2.BrakeFreq	800-5000Hz	800
	3.InitialBrake	0-60%	60%
	4.Initial Brake range	0-100%	50%
	5.MaxbrakeForce	0-100%	100%
Initial Setup	1.RunningMode	Forward/Brake	Forward/Brake
		Forward/Rev	
		For/Brake/Rev	
		For/Hold/Rev	
	2.Battery (Type)	LiPolymer	LiPolymer
		LI-FE	
	3.CutOffVolage	NI-XX	OFF
		OFF	
		LOW	
	4.EscOverHeat	MIDDLE	120°
		HIGH	
		95°	
		105°	
	5.MotorOverHeat	120°	120°
		No Protection	
		95°	
	6.NeutralRange	2%-15%	5%
		Auto	
40%			
60%			
7.Fan Mode	80%	Auto	
	100%		
	6V		
	7V		
8.BEC Voltage	7V	7V	
	CCW		
9.Motor Direction	CW	CCW	

1. Program

BLINKY MODE
1: Quick Setup

Use "SELECT" button to find [BLINKY MODE].

Use "▲" 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.

2. Update

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:

DASH AI LCG
21.10.180508A

Depress and hold the Program card's "Enter" button while turning 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 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.dash-rc.com 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 FW

Open Stock Mode			
Quick Setup	1.Throttle Value	Level:1-5	5
	2.Torque Feel	Level:1-15	15
	3.Boost	OFF	45
		100°	
	4.Turbo	OFF	100
100°			
5.Turbo Down Rate	Fastest	-15	
5.DragBrake	OFF	5%	
	1%-30%		
AdvanceSetup	1.Torque Fine Tune	-5	Normal
		-4	
		-3	
		-2	
		-1	
		Normal	
		+1	
		+2	
		+3	
		+4	
	+5		
	2.Pulse Width Modulation (PWM)	2000-32000	8000
3.Compress	0%-50%	15%	
4.Boost Start	0%-90%	15%	
5.Boost Range	0-50%	18%	
6.TurboDelay	OFF	0.02	
	0.01s		
7.TurboStart	40%-100%	95%	
8.TurboPunch	-5	4	
	-4		
	-3		
	-2		
	-1		
	Normal		
	+1		
	+2		
	+3		
	+4		
+5			
9.BrakeFreq	800-5000Hz	1000	
10.InitialBrake	0-60%	38%	
11.Initial Brake range	0-100%	60%	
12.MaxbrakeForce	0-100%	68%	
Initial Setup	1.RunningMode	Forward/Brake	Forward/Brake
		Forward/Rev	
		For/Brake/Rev	
		For/Hold/Rev	
	2.Battery Type	LiPolymer	LiPo
		LI-FE	
		NI-XX	
	3.CutOffVoltage	OFF	OFF
		LOW	
MIDDLE			
HIGH			
4.EscOverHeat	95°	120°	
	105°		
	120°		
	No Protection		
5.MotorOverHeat	95°	120°	
	105°		
	120°		
	No Protection		
6.NeutralRange	2%-15%	6%	
	Auto		
	40%		
	60%		
	80%		
7.Fan Mode	Auto	Auto	
	40%		
	60%		
	80%		
8.BEC Voltage	6V	6V	
	7V		
9.Motor Direction	CCW	CCW	
	CW		

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

7.65V 30°
0.00ms 0rpm

Press "▲" button

7.64V MAXE30°
RMH:xxxxx M30

This will show the last pack of run, the min Battery Voltage, max ESC Temperature max Motor Temperature.

Off Road Mode			
Quick Setup	1.Throttle Value	Level:1-5	5
	2.Torque Feel	Level:1-15	10
	3.Pulse Width Modulation (PWM)	2000-32000	12000
		OFF	
	3.Boost	OFF	Off
		100°	
4.Turbo	OFF	Off	
6.DragBrake	OFF	5%	
	1%-30%		
AdvanceSetup	1.Torque Fine Tune	-5	Normal
		-4	
		-3	
		-2	
		-1	
		Normal	
		+1	
		+2	
		+3	
		+4	
	+5		
	2.ReverseForce	0%-100%	35%
3.Compress	0%-50%	5%	
4.Boost Start	0%-90%	55%	
5.Boost Range	0-50%	40%	
6.TurboDelay	OFF	0.02	
7.TurboStart	40%-100%	95%	
8.TurboPunch	-5	Normal	
	-4		
	-3		
	-2		
	-1		
	Normal		
	+1		
	+2		
	+3		
	+4		
+5			
9.BrakeFreq	800-5000Hz	2000	
10.InitialBrake	0-60%	20%	
11.Initial Brake Range	0-100%	50%	
12.MaxBrakeForce	0-100%	80%	
Initial Setup	1.RunningMode	Forward/Brake	Forward/Brake
		Forward/Rev	
		For/Brake/Rev	
		For/Hold/Rev	
	2.Battery Type	LiPolymer	LiPo
		LI-FE	
		NI-XX	
	3.CutOffVoltage	OFF	OFF
		LOW	
MIDDLE			
HIGH			
4.EscOverHeat	95°	120°	
	105°		
	120°		
	No Protection		
5.MotorOverHeat	95°	120°	
	105°		
	120°		
	No Protection		
6.NeutralRange	2%-15%	6%	
	Auto		
	40%		
	60%		
	80%		
7.Fan Mode	Auto	Auto	
	40%		
	60%		
	80%		
8.BEC Voltage	6V	6V	
	7V		
9.Motor Direction	CCW	CCW	
	CW		

Please double press "⏏" 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 known commonly as 'Blinky' classes. The AI LCG ESC satisfies the ROAR requirement showing a blinking LED.

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.

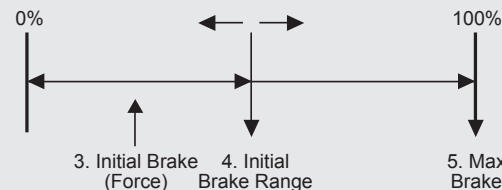
Detailed Explanation of each ESC Menu items

Quick Setup:

- Torque Feel** – 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.
- 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.
- 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.
- 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.

Advance Setup:

- Torque 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.
- Brake Freq** – Lower Freq will get short brake distance, higher Freq will get smooth and long brake distance.
- Initial Brake**
- Initial Brake Range** – see diagram below.
- MaxbrakeForce**



Limited Warranties / Repair Procedures

All Dash products are manufactured in accordance with the highest quality standards. Dash 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 operate perfectly will be charged 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.