

REEDY POWER BLACKBOX 850R MANUAL SUPPLEMENT

Your 850R DR Version ESC comes with drag racing specific firmware B468317 already installed and ready to use in conjunction with the Blackbox Programmer 2 #27027 (requires firmware version EE460121).

Please read the following instructions before installing and operating your ESC.



Your Blackbox ESC includes two modes that can be modified and saved independently from one another. Standard mode offers a wide variety of tuning options while Expert mode takes it one step further and opens additional options for more experienced racers and/or racing classes that can take advantage of these advanced settings. To switch between Standard and Expert modes, or to make and save changes to the settings in either mode, you must use Blackbox Programmer2 #27027.

CHANGE SETTINGS

1. Plug the Programmer2 extension wire into the programmer port on the ESC.
2. Power ON the ESC.
3. Press OK after the Blackbox Programmer, PB Firmware Version, and ESC Firmware Version splash screens.
4. Select Standard or Expert tuning mode using the up/down arrows to select the mode and OK to make the selection.
5. Use the ESC and OK buttons to scroll to the desired setting option to be changed.
6. Use the up/down arrow buttons to select the value for that setting.
7. When a custom value is available, press and hold OK until the value flashes, then use the arrow buttons to change the value. When you are satisfied with your selection, press and hold the OK button for approximately one second until the value stops flashing.
8. Changes are saved immediately. Once all changes are completed, unplug the Programmer2 extension wire from the ESC.
9. Power OFF the ESC. The new settings will take effect the next time the ESC is powered ON.

NOTE: Asterisks indicate the ESC's default settings.

TUNING MODE

Standard (Standard) – Disables complex Dynamic Drag Brake settings and simplifies Timing Level options by offering pre-selected options as well as zero-timing blinky mode. This selection is recommended for Spec class racers and most off-road classes.

Expert (Expert) – Allows users to access and fine tune advanced timing settings. Dynamic Drag Brake settings are also made available to fine tune braking settings for optimum feel. This selection is recommended for modified on-road, carpet off-road, and oval classes.

NOTE: Tuning Mode can only be selected when the Programmer2 is initially connected to the ESC.

BRAKE

Drag Brake (1A Drag Brake) – Drag Brake is a percentage of the Brake Strength and provides automatic braking when the throttle trigger is returned to the neutral position. The Drag Brake value requires adjustment when changes to the Brake Frequency and Brake Strength are made.

Brake Strength (1B Brake Strgth) – Changes the maximum brake strength of the ESC which in turn affects the feel of the Drag Brake and Initial Brake.

Initial Brake (1C Init Brake) – Determines the percentage of brake the ESC applies the moment the trigger is moved from the neutral range to the brake range. A setting of =Drag Brake is recommended for most applications. A setting greater than the selected drag brake setting will provide a more aggressive initial brake feel. The Initial Brake setting should never be lower than the Drag Brake setting.

Drag Brake Frequency (1D Drag Freq) – When drag brake is engaged, a lower frequency will provide a more aggressive feel while a higher frequency will provide a smoother, more precise braking feel but may result in higher ESC temperatures.

Brake Frequency (1E Brake Freq) – At brake positions other than drag brake, a lower frequency will provide a more aggressive feel while a higher frequency will provide a smoother, more precise braking feel but may result in higher ESC temperatures. A setting of =Drag Brake is recommended for most applications.

Brake Punch (1F Brake Punch) – Use to adjust the ESC's response to brake input. Higher values provide faster response while lower values slow response and produce a smoother braking effect.

DYNAMIC DRAG BRAKE

In some situations, like entering corners at high speed, the use of additional drag brake instead of push brake, is more desirable.

Dynamic Drag (2A Drag SW RPM) – Set the amount of drag brake added to the traditional Drag Brake (1A).

Drag Switchover RPM (2B Drag SW RPM) – The motor RPM at which the Dynamic Drag activates. Above the RPM, the total drag brake is the sum of Drag Brake and Dynamic Drag settings.

Maximum Dynamic Drag RPM (2C Max Ddrag RPM) – The motor RPM at which maximum Dynamic Drag is applied which should equal the RPM of the motor at the end of the longest straight (determined using RPM Memory).

Example: Drag SW RPM = 50000, Max Drag RPM = 60000, Drag Brake = 5%, Dynamic Drag = 10%
If the throttle is returned to neutral when motor rpm is 60000 or higher, total drag brake = 15% (5% + 10%). If the throttle is returned to neutral when motor rpm = 55000, total drag brake = 10% (5% + 5%).

Drag Release Rate (2D Drag Rel Rate) – The speed at which Dynamic Drag is released when the motor RPM falls below the Drag Switchover RPM. Set a lower value for a faster release rate, Hold to maintain the rate, and Fastest to release immediately.

Example: Drag SW RPM = 50000, Max Ddrag RPM = 60000, Drag Brake = 5%, Dynamic Drag Brake = 10%, Drag Off = 2000 RPM/%.
If the throttle is returned to neutral when motor RPM = 60000, Total drag brake = 15%. The total drag brake is 15% effective between 60000 to 50000 RPM, 14% at 48000 RPM, 10% at 40000 RPM, 6% at 32000 RPM, 5% between 30000 to 0 RPM.

THROTTLE

Punch Control (3A Punch Ctrl) - By reducing the Throttle Punch setting, you will experience slower throttle response which may be advantageous in low traction conditions.

Initial Throttle (3B Init Throttle) – Determines the percentage of throttle the ESC applies the moment the trigger is moved from the neutral range to the throttle range. A setting of 0% is typical and enables a smooth transition from a standing start. Higher values can be advantageous to spec racers who want instant power from neutral. For example, a setting of 15% means that the moment the throttle trigger is moved, the ESC immediately delivers 15% throttle.

Drive Frequency (3C Drive Freq) - A lower frequency will provide a more aggressive throttle feel. A higher frequency will provide a smoother, more precise throttle feel but may also result in higher ESC temperatures.

Dead Band (3D Dead Band) – Adjusts the percentage of trigger movement available before the throttle/brake initially engages.

Current Limiter (3E Current Limiter) – Adjusts the maximum amount of current allowed upon motor start up. Limiting current can reduce wheel spin, lower temperatures, and increase run time. A value of 100% means the limiter is disabled while reducing the value provides increased limiting.

MOTOR POWER - EXPERT

The ESC features advanced settings that allow individual adjustment of acceleration (Boost) and top speed (Turbo) timing. These are particularly useful in applications where ESC timing is permitted. Each setting can be used individually or together to achieve maximum speed. If you choose to leave both the Boost and Turbo timing settings at 0, the ESC will operate in blinky zero-timing mode.

Boost Timing (4A Boost Timing) - Sets the maximum advanced timing when the motor reaches the Boost End RPM.

Boost Start RPM (4B Boost ST RPM) - Sets the RPM at which Boost Timing begins.

Boost End RPM (4C Boost End RPM) - Sets the RPM at which Boost Timing ends.

Boost Throttle Limit (4D B. TH Limit) - When activated, this setting sets the maximum Boost Timing available in proportion to the throttle position. The setting value represents the maximum Boost Timing at 50% throttle.

Turbo Timing (4E Turbo Timing) - The maximum timing added during Turbo Timing activation.

Turbo Start RPM (4F Turbo ST RPM) - Sets the RPM at which Turbo Timing is activated and only if the Boost ST RPM is set to RPM or Full TH+RPM.

Turbo Activation (4G Turbo Act) - Determines how Turbo Timing is activated. The Full TH setting activates Turbo Timing when the throttle is kept at 100% and the Turbo Delay time has elapsed. When backing off the throttle to less than 100%, Turbo Timing is deactivated. The RPM setting activates Turbo Timing when the motor RPM reaches the Turbo ST RPM value. When motor RPM drops below the defined Turbo ST RPM value, Turbo Timing is deactivated. Full TH+RPM activates Turbo Timing when both the Full TH and RPM conditions are met and is deactivated when one of the conditions is no longer met.

Turbo Delay (4H Turbo Delay) - Once maximum throttle is detected, the ESC delays Turbo Timing activation using this setting and is only enabled when Turbo Activation is set to Full TH or Full TH+RPM.

Slew Rate (4J Slew Rate) - Sets the rate at which the ESC adds Turbo Timing. A higher value adds timing faster while a lower value adds timing more slowly.

Release Rate (4K Release Rate) - Sets the rate at which the ESC reduces Turbo Timing. A higher value reduces timing faster while a lower value reduces timing more slowly.

MOTOR POWER - STANDARD

For those that need additional power but who prefer not to deal with complicated timing settings, the detailed settings have already been worked out for you.

Timing Level (5A Timing Level) - When racing Spec classes and classes that require the use zero-timing blinky mode, select Level 0. Level 1-10 activates Turbo Timing to increase power output and top speed which is useful when racing on larger and/or high-grip tracks.

MISCELLANEOUS CONTROL

Run Mode (6A Run Mode) - Select the appropriate mode depending on if the ESC is used for racing or for practice.

Reverse Power (6B Reverse Power) - Adjusts reverse power when For/Brake/Rev has been selected as the Run Mode.

Low Voltage Battery Cutoff (6C Batt Cutoff) - Select the cell voltage at which the ESC will power off to prevent over-discharge of the battery. Disabling the cutoff is an option but not recommended for most racing applications.

ESC Temperature Cutoff (6D ESC Temp Cut) - The temperature at which the ESC will cut power to the motor to prevent permanent damage to the ESC. Disabling the cutoff is an option but not recommended and doing so will void the warranty.

Motor Rotation (6E Mot Rotation) - Reverses the motors direction of rotation if required by a vehicle's design.

BEC Voltage (6F BEC Voltage) - Either 6.0V or 7.4V can be chosen to match the input voltage requirements of the selected servo. Unless HV servos are being used, 6.0V is recommended.

Reset Default Settings (6G Reset Default) - Restores the factory default settings.

TELEMETRY

Motor RPM Memory (7A RPM Memory) - Recall the maximum motor RPM from your most recent run. The data is stored in memory until the next time the ESC is powered on and operated.

ESC Temperature Memory (7B Temp Memory) - Recall the maximum ESC temperature from your most recent run. The data is stored in memory until the next time the ESC is powered on and operated.

SETTINGS MENU						
		Tuning Mode	Standard, Expert			
Brake	1A	Drag Brake	0%, 4%, 8%, 10%, 12%, 16%, 20%, Custom 0% - 100% (1% Increments)			
	1B	Brake Strgth	Custom 0% - 100% (1% Increments), 40% - 100% (5% increments)			
	1C	Init Brake	= Drag Brake, 0%, 6%, 12%, 15%, Custom 0% - 100% (1% increments)			
	1D	Drag Freq	=Brk Freq, 800Hz, 1KHz, 1.5KHz, 2KHz, 2.5KHz, 3KHz, 4KHz, 6KHz, 8KHz, 12KHz			
	1E	Brake Freq	800Hz, 1KHz, 1.5KHz, 2KHz, 2.5KHz, 3KHz, 4KHz, 6KHz, 8KHz, 12KHz			
	1F	Brake Punch	Level 1-10			
Dynamic Drag Brake	Standard		Expert			
	Unavailable		2A	Dynamic Drag	0% - 100% (1% increments)	
			2B	Drag SW RPM	500, 1000 - 69000 (1000 increments)	
			2C	Max Ddrag RPM	1000 - 70000 (1000 increments)	
2D			Drag Rel Rate	Fastest, 100RPM/% - 5000RPM/% (100RPM/% increments), Hold		
Throttle	3A	Punch Ctrl	Level 1-10			
	3B	Init Throttle	0% - 15% (1% increments)			
	3C	Drive Freq	1KHz, 2KHz, 3KHz, 4KHz, 6KHz, 8KHz, 12KHz, 16KHz, 24KHz, 32KHZ			
	3D	Dead Band	2% - 12% (1% increments)			
	3E	Current Limit	20% - 100% (1% increments)			
Motor Power	Standard		Expert			
	5A	Timing Level	Level 0 - 0° Blinky	4A	Boost Timing	0° Blinky - 60° (1° increments)
			Level 1 - 3°	4B	Boost ST RPM	0 - 55000 (1000 increments)
			Level 2 - 6°	4C	Boost End RPM	2000 - 65000 (1000 increments)
			Level 3 - 9°	4D	B. TH Limit	Off, 1° - 60° (1° increments)
			Level 4 - 12°	4E	Turbo Timing	0° - 60° (1° increments)
			Level 5 - 15°	4F	Turbo ST RPM	5000 - 60000 (1000 increments)
			Level 6 - 18°	4G	Turbo Act	Full TH, RPM, Full TH+RPM
			Level 7 - 21°	4H	Turbo Delay	Off, 0.05s - 0.4s (.05s increments)
			Level 8 - 24°	4J	Slew Rate	3°/0.1s - 22°/0.1s (1° increments), Fastest
			Level 9 - 27°	4K	Release Rate	3°/0.1s - 22°/0.1s (1° increments)
			Level 10 - 30°			
Misc. Control	6A	Run Mode	For/Brake, For/Brake/Rev			
	6B	Reverse Power	25% - 100% (25% increments)			
	6C	Batt Cutoff	None, 3.2V/cell, 3.4V/cell			
	6D	ESC Temp Cut	Off, 176F/80C, 194F/90C			
	6E	Mot Rotation	Normal/Reverse			
	6F	BEC Voltage	6.0V, 7.4V			
	6G	Reset Default	No/Yes			
Telemetry	7A	RPM Memory	(no selection required)			
	7B	Temp Memory	(no selection required)			
Profiles	8A	Save Profile	Profile A, Profile B, Profile C, Profile D, Profile E, ESC			
	8B	Load Profile	Profile A, Profile B, Profile C, Profile D, Profile E			



Associated Electrics, Inc. declares that this product complies with the essential requirements and other relevant provisions of the European directive 2014/30/EU.

The crossed-out wheeled bin means that within the European Union, this product must be taken to a separate waste collection facility at the product's end of life. Do not dispose of this product as unsorted municipal waste.

FCC Note:
This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications or change to this equipment. Such modifications or change could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular

installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help. To maintain compliance with FCC's RF exposure guidelines, this equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body.15 Subpart B.