REEDY POWER

BLACKBOX 880R

OWNER'S MANUAL

#27043
#27044
#27027

INTRODUCTION

Reedy's Blackbox 880R Competition ESC utilizes the latest electronics technology along with the design and engineering experience responsible for 30 IFMAR World Championship titles.

Track tested and competition proven, Reedy's Blackbox 880R is a versatile and powerful ESC specifically designed for those seeking maximum performance without compromise. Excellent throttle and brake feel, a wide range of adjustability, and robust hardware make the Blackbox 880R suitable for 1:8 Buggies, 1:8 Truggies, and 1:10 Short Course Trucks.

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

FEATURES

- CNC machined black aluminum case with integrated heat sink
- Fully adjustable brake, throttle, power, and safety functions*
- Precision throttle and brake control
- Ultra-low resistance FET board
- 32-bit microcontroller unit (MCU)
- Push-button power switch
- Solder tabs w/heavy-duty power wires
- Integrated power capacitors
- 30mm fan with CNC machined shroud
- RPM and ESC temp data logging*
- Firmware updateable*

*Requires Blackbox Programmer2 #27027

SPECIFICATIONS

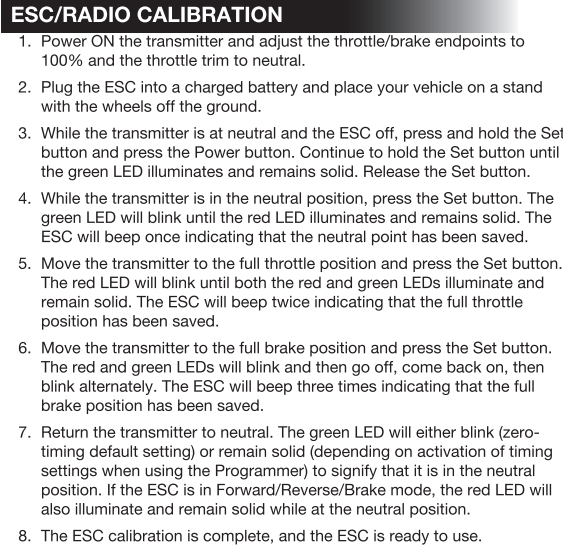|	Blackbox 880R
Voltage input	2S - 4S LiPo
On resistance (Ω)	0.00043
Continuous current (A)	180
Peak current (A)	700
Dimensions (mm)	54 x 37 x 23
Weight w/o wires & fan (g)	45
Motor limit (4S)	2400kV
BEC	6.0-7.4V/5A
Fan	30mm included

SAFETY PRECAUTIONS

This product is a sophisticated hobby product and not a toy. It must be operated with caution and common sense and requires some basic mechanical ability. Failure to operate this product in a safe and responsible manner could result in injury or damage to the product or property. This product is not intended to be used by children without direct adult supervision. It is essential to read and follow all instructions and warnings found in this manual prior to installation, set up, and use, for the product to operate properly and to avoid damage or injury.

WARNINGS

- **Never** expose your ESC to water
- **Never** operate your ESC/motor under no load at high RPM
- **Never** apply reverse voltage
- **Always** unplug the battery from the ESC when not in use or while in storage
- **Never** let children use this product without the strict supervision of an adult
- **Never** leave the ESC unattended while powered ON
- **Always** use caution when handling your ESC as it may become extremely hot during use
- **Always** disconnect the battery and stop using the ESC if it begins to act abnormally
- **Always** power ON your transmitter before the ESC and power OFF the ESC before the transmitter

IMPORTANT ESCs that display evidence of contact with moisture, reverse voltage, or internal/external modifications to wiring are not covered under warranty.

INSTALLATION

- Determine the most convenient location to mount your ESC and switch taking into consideration easy access to the battery connectors and Power button
- Determine the ideal sensor wire length and plug it into the ESC and motor sensor ports
- Cut the battery and motor wires to the desired length
- Solder high-quality battery connector(s) to the battery leads
- Plug the RX wire into the receiver (refer to radio manufacturer's manual)
- Solder the three ESC motor leads labeled A-B-C to the corresponding motor tabs labeled A-B-C

POWERING THE ESC ON/OFF

- To turn the ESC ON, press the Power button. The green LED will remain illuminated when the ESC is powered ON.
- To turn the ESC OFF, press and hold (.1 sec) the Power button or unplug the battery.

1. Fan/Programmer Port
2. Sensor Port
3. Green/Red LED
4. RX Wire
5. Power Switch
6. Set Button
7. Power Button

ESC/RADIO CALIBRATION

1. Power ON the transmitter and adjust the throttle/brake endpoints to 100% and the throttle trim to neutral.

2. Plug the ESC into a charged battery and place your vehicle on a stand with the wheels off the ground.

3. While the transmitter is at neutral and the ESC off, press and hold the Set button and press the Power button. Continue to hold the Set button until the green LED illuminates and remains solid. Release the Set button.

4. While the transmitter is in the neutral position, press the Set button. The green LED will blink until the red LED illuminates and remains solid. The ESC will beep once indicating that the neutral point has been saved.

5. Move the transmitter to the full throttle position and press the Set button. The red LED will blink until both the red and green LEDs illuminate and remain solid. The ESC will beep twice indicating that the full throttle position has been saved.

6. Move the transmitter to the full brake position and press the Set button. The red and green LEDs will blink and then go off, come back on, then blink alternately. The ESC will beep three times indicating that the full brake position has been saved.

7. Return the transmitter to neutral. The green LED will either blink (zero-timing default setting) or remain solid (depending on activation of timing settings when using the Programmer) to signify that it is in the neutral position. If the ESC is in Forward/Reverse/Brake mode, the red LED will also illuminate and remain solid while at the neutral position.

8. The ESC calibration is complete, and the ESC is ready to use.

IMPORTANT ESC/Radio calibration must be completed with new ESCs, when changing transmitters, after firmware updates, and after repair service.

DEFAULT SETTINGS

		Tuning Mode	Standard	Expert
Brake	1A	Drag Brake	4%	2%
	1B	Brake Strgth	80%	80%
	1C	Init Brake	=Drag Brake	=Drag Brake
	1D	Brake Freq	6KHz	6KHz
	1E	Brake Punch	Level 5	Level 6
	1F	Brake Mode	Traditional	Traditional
Throttle	3A	Punch Ctrl	Level 15	Level 15
	3B	Init Throttle	0%	0%
	3C	Drive Freq	12KHz	16KHz
	3D	Dead Band	6%	6%
	3E	Current Limit	100%	100%
Motor Power	4A	BT Soft Pwr	NA	15°
	4B	BT Soft Rng	NA	30%
	4C	Coast Value	NA	0%
	4D	Turbo Timing	NA	0°
	4E	Turbo Delay	NA	0.05
	4F	Slew Rate	NA	3°/0.1s
	4G	Release Rate	NA	Instant
	5A	Timing Level	Level 0	NA
Misc. Control	6A	Run Mode	For/Brake	For/Brake
	6B	Reverse Power	25%	25%
	6C	Batt Cutoff	3.4V/cell	3.4V/cell
	6D	ESC Temp Cut	257F/125C	257F/125C
	6E	Mot Rotation	Reverse	Reverse
	6F	BEC Voltage	6.0V	6.0V

PARTS LISTINGS

27043   Blackbox 880R Competition ESC
27044   Blackbox 880R Competition ESC w/Programmer2
27027   Blackbox Programmer2
27030   Blackbox ESC Programmer2 Connection Wire
27032   Blackbox 850R/880R 30x30x10mm Fan w/screws
27170   95mm Y-Connector (black)

Your Blackbox 880R ESC includes two modes that can be modified 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 who 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 settings and simplifies Timing Level options by offering pre-selected options as well as zero-timing blinky mode.

Expert (Expert) – Allows users to access and fine tune advanced timing settings. This selection is recommended for experienced racers and enthusiasts.

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. A setting over 100% will engage Active Braking which uses battery power to increase brake strength beyond what can typically be achieved.

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.

Brake Frequency (1D Brake Freq) – 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 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.

Brake Mode (1E Brake Mode) – Linear mode weakens brake action but provides excellent feel and control. Traditional mode provides the same braking action as the 510R and other Reedy Blackbox ESCs (recommended for most applications). Hybrid mode automatically switches from Traditional mode to Linear mode as vehicle speed decreases to help prevent loss of traction during heavy braking.

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 Deadband) – Adjusts the percentage of trigger movement available before the throttle/brake initially engages.

Current Limiter (3E Current Limit) – 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 Blackbox 880R ESC features advanced settings to fine tune power output for various track sizes, layouts, and grip levels. To operate in zero-timing blinky mode, the Turbo Timing, BT Soft Power and BT Soft Power Range values must all be set at 0.

BT Soft Power (4A BT Soft Pwr) - Useful for taming the bottom end power when using high-powered motors. A higher value reduces power for a less aggressive bottom end without sacrificing power at the mid-range and top end.

BT Soft Power Range (4B BT Soft Rng) - Sets the range in which the BT Soft Power setting is activated. A 10% setting, for example, means that BT Soft Power is activated in the first 10% of the throttle range.

Coast Value (4C Coast Value) - Reduces the speed at which the motor RPM is reduced from high-speed to neutral. This can help reduce unsettling of the chassis by altering weight transfer. A higher value increases the effect while a 0% setting deactivates it.

Turbo Timing (4D Turbo Timing) - The maximum timing added during Turbo Timing activation. Turbo Timing is activated at the full throttle position.

Turbo Delay (4E Turbo Delay) - Once maximum throttle is detected, the ESC delays Turbo Timing activation using this setting.

Slew Rate (4F 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. Selecting Instant adds timing immediately.

Release Rate (4G 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. Selecting Instant reduces timing immediately.

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) - 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. Selecting Level 0 means there is no timing advance, and the ESC will run in zero-timing blinky mode.

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) - Values between 6.0V and 7.4V can be chosen to match the input voltage requirements of the selected servo or to fine tune the servo's speed for the desired feel. 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.

Setup sheets obtained from Reedy team drivers can be found at www.ReedyPower.com. These can be extremely helpful in determining good starting setups for your application. Blank editable setup sheets are also available which can be filled out and printed or saved for future reference.

FIRMWARE UPDATES

Firmware for both the Blackbox 880R ESC and Programmer2 can be updated after downloading the appropriate firmware and Blackbox Link installation program. These, along with installation and operating instructions, can be found at www.ReedyPower.com.

WARRANTY

Your Reedy Blackbox ESC is warranted to the original purchaser for 120 days from the date of purchase, verified by the sales receipt, against defects in material and workmanship. Product that has been mishandled, abused, used incorrectly, used for an application other than intended, or damaged by the user are not covered under warranty. Associated Electrics Inc. is not liable for any loss or damage, whether direct or indirect, incidental or consequential, or from any special situation, arising from the use, misuse, or abuse of this product.

SETTINGS MENU

		Tuning Mode	**Standard, Expert**			
Brake	1A	Drag Brake	0% - 12%, (2% increments), Custom 0% - 100% (1% Increments)			
	1B	Brake Strgth	40% - 100% (5% increments)			
	1C	Init Brake	= Drag Brake, 0% - 6% (2% increments), Custom 0% - 50% (1% increments)			
	1D	Brake Freq	500Hz, 1KHz, 1.5KHz, 2KHz, 2.5KHz, 3KHz, 4KHz, 6KHz, 8KHz, 12KHz, 16KHz			
	1E	Brake Punch	Level 1-20			
	1F	Brake Mode	Linear, Traditional, Hybrid			
Throttle	3A	Punch Ctrl	Level 1-30			
	3B	Init Throttle	0% - 40% (1% increments)			
	3C	Drive Freq	1KHz, 2KHz, 3KHz, 4KHz, 6KHz, 8KHz, 12KHz, 16KHz, 24KHz, 32KHZ			
	3D	Deadband	2% - 12% (1% increments)			
	3E	Current Limit	50% - 100% (1% increments)			

		Standard		**Expert**		
Motor Power	5A	Timing Level	Level 0 - 0° Blinky	4A	BT Soft Pwr	0° - 20° (1° increments)
			Level 1 - 3°	4B	BT Soft Rng	0% - 75% (5% increments)
			Level 2 - 6°	4C	Coast Value	0% - 20% (1% increments)
			Level 3 - 9°	4D	Turbo Timing	0° Blinky - 20° (1° increments)
			Level 4 - 12°	4E	Turbo Delay	Off, 0.05s - 1.0s (0.05s increments)
			Level 5 - 15°	4F	Slew Rate	3°/0.1s - 30°/0.1s (1° increments), Instant
				4G	Release Rate	3°/0.1s - 30°/0.1s (1° increments), Instant
Misc. Control	6A	Run Mode	For/Brake, For/Brake/Rev			
	6B	Reverse Power	25%, 50%, 75%, 100%			
	6C	Batt Cutoff	None, 3.2V/cell, 3.4V/cell			
	6D	ESC Temp Cut	Off, 221F/105C, 257F/125C			
	6E	Mot Rotation	Normal/Reverse			
	6F	BEC Voltage	6.0V - 7.4V (0.1V increments)			
	6G	Reset Default	No/Yes			
Telemetry	7A	RPM Memory	(no selection required)			
	7B	Temp Memory	(no selection required)			

TROUBLESHOOTING

Problem	Cause	Solution
ESC overheats	Motor over-geared	Change final drive ratio (FDR)
	No ESC fan or damaged ESC fan	Install fan/new fan
	ESC Temp Cut set too low	Increase ESC Temp Cut value
	Lack of air flow	Reposition ESC
Motor overheats	Over-geared	Change final drive ratio (FDR)
	Insufficient motor cooling	Add motor fan and/or heatsink
	ESC timing settings too high	Reduce timing settings
	Weak rotor	Install new rotor
Poor speed/ performance	ESC not calibrated correctly	Recalibrate ESC
	Insufficient final drive ratio (FDR)	Change final drive ratio (FDR)
	Transmitter settings changed	Verify correct full throttle setting
	Incorrect ESC settings	Verify correct settings
	Motor damaged or defective	Inspect and repair necessary components
	Damaged ESC	Return ESC for repair
Motor stutters under acceleration	Damaged sensor wire	Replace sensor wire
	Damaged motor sensor board	Replace sensor board
	Damaged ESC	Return ESC for repair
No/reduced motor power, but servo functions	ESC plugged into RX incorrectly	Verify RX wire is plugged into Ch. 2
	ESC Temp or Batt Cutoff engaged	Wait for ESC to cool or re-charge battery
	Motor damaged or defective	Repair or install new motor
	Motor sensor wire missing or damaged	Install or replace motor sensor wire
	Damaged ESC	Return ESC for repair
No motor and servo power	Servo wire plugged in backwards	Plug the servo wire in correctly
	ESC RX wire plugged in backwards	Plug the RX wire in correctly
	Poor battery connection/defective battery	Improve connection or replace battery
	No radio signal	Check/re-bind TX/RX
	Damaged ESC	Return ESC for repair
ESC works intermittently	Dead or damaged battery	Charge or replace battery
	Bad battery connection	Improve connection or replace battery
	Damaged motor	Repair or replace motor
	Damaged ESC	Return ESC for repair

OPERATION AND WARNINGS

Operation	ESC Signal		
	Red	Green	
		0° Blinky	Timing
Neutral throttle position F/B Mode		blink	solid
Neutral throttle position F/B/R Mode	solid	blink	solid
Full throttle position		solid	solid
Full brake position	solid		

All LEDs should be off at any throttle/brake position other that neutral, full brake, or full throttle.

Warning	ESC Signal			Motor Power
	Red	Green		
		0° Blinky	Timing	
LVC engaged	blink			reduced*
ESC temp cutoff	solid			reduced*
No radio signal	blink alternately			
Sensor wire removed/failure	blink	blink		

*Full operation resumes when the ESC is powered OFF and ON, and the problem that signaled the shutdown has been resolved.

CE — 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 the product must be taken to separate collection at the product's end of life. Do not dispose of these products as unsorted municipal waste.

Reedy POWER

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