

JP·EnErG Pro

B-SERIES BRUSHLESS ESC

Instruction Manual

SPECIFICATION

Description	Current Continuous/Burst	Battery cells		Weight (g)	BEC Output	Size (mm) W x L x H
EnErG Pro B-6 BEC	6A/8A	5-10	2-3	5	5V/1A	13 x 21 x 4
EnErG Pro B-12 BEC	12A/16A	5-12	2-4	13	5V/1A	21 x 22 x 4
EnErG Pro B-25 BEC	25A/35A	5-12	2-4	30	5V/2A	28 x 28 x 8
EnErG Pro B-35 BEC	35A/45A	5-12	2-4	35	5V/3A	28 x 38 x 8
EnErG Pro B-45 SBEC	45A/65A	5-18	2-6	58	5.0V,5.5V,6.0V/5A	30 x 56 x 11
EnErG Pro B-65 SBEC	65A/85A	5-18	2-6	63	5.0V,5.5V,6.0V/5A	34 x 46 x 13
EnErG Pro B-85 OPTO	85A/100A	5-18	2-6	60	-	34 x 46 x 13
EnErG Pro B-85 SBEC	85A/100A	5-18	2-6	63	5.0V,5.5V,6.0V/5A	34 x 46 x 13
EnErG Pro B-115 OPTO	115A/130A	5-18	2-6	60	-	34 x 46 x 13
EnErG Pro B-115 SBEC	115A/130A	5-18	2-6	63	5.0V,5.5V,6.0V/5A	34 x 36 x 13
EnErG Pro B-125 SBEC	125A/150A	5-18	2-6	150	5.0V,5.5V,6.0V/5A	55 x 72 x 17
EnErG Pro B-155 SBEC	155A/200A	5-18	2-6	150	5.0V,5.5V,6.0V/5A	55 x 72 x 17
EnErG Pro B-120 OPTO HV	120A/150A	18-38	6-12	145	-	55 x 72 x 17

FEATURES

- ▶ Uses the new generation of MOSFET chips to ensure smoother and cooler operation
- ▶ Extremely low internal resistance
- ▶ Adjustable BEC output available on some of the range
- ▶ Advanced Governor Mode ensure a smooth and consistent RPM
- ▶ Continuous 5A current supplies the servo with a continuous stable power supply
- ▶ More motor timing and soft acceleration options for smoother running motors
- ▶ Super smooth and accurate linear throttle
- ▶ Over-heat protection feature
- ▶ Auto throttle shut down at loss of signal
- ▶ Supports high RPM motors
- ▶ Power arming protection (prevents the motor from running when accidentally switched ON)
- ▶ Programmable using the B-Series Program Card (available separately)
- ▶ Sub menu for easier programming
- ▶ Advanced programming software

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⚠️ WARNING!

Model aircraft flying is a potentially hazardous sport which has the potential to endanger life, cause injury or damage property.

When you see this symbol in this manual, your attention is being drawn to a potential hazard and you should take particular note.

WARRANTY CONDITIONS

For a period of one year from time of purchase, J. Perkins Distribution Ltd will repair or replace, at its discretion, any items showing manufacturing or assembly defects that has been found faulty by our service department. This does not affect your statutory rights.

J Perkins Distribution Ltd does not accept any liability for any injury, damage or consequential damage arising as a result of failure to observe the procedures and precautions outlined in this manual. J Perkins Distribution Ltd does not accept any liability that may arise from any misuse or modification of this equipment. Please note that, whilst every effort is made to ensure the accuracy of instructions and materials included with this product, mistakes can occur and neither J. Perkins Distribution Ltd nor its distributors will be held liable for any loss or damage arising from the use of this system or for any loss or damage arising from omissions or inaccuracies in the associated instructions, references, web sites or materials included or referred to with this product.

We reserve the right to modify the design of this product, the box contents and manual without prior notification. E&OE
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EU REGULATIONS

J Perkins Distribution Ltd declares that this product is in compliance with the essential requirements and other relevant provisions of Directive 2004/108 EC on Electromagnetic Compatibility. A copy of the declaration(s) of conformity can be obtained from J Perkins Distribution Ltd, Ashford rd, Lenham, Kent. UK ME17 2DL. This system complies with the EU directive on Waste Electrical and Electronic Equipment. Do not dispose of this product in household waste. At the end of the products' life, dispose of it at a designated collection point for the recycling of waste electrical and electronic equipment. Please contact your supplier for any advice required on disposal.



JP•EnErG Pro

Thank you for purchasing the JP EnErG Pro B-Series Brushless Electronic Speed Controller (ESC).

High power systems for RC model can be very dangerous and we strongly suggest that you read this manual carefully and entirely before using the product.

The JP EnErG Pro ESC's high power BEC has been specifically designed for extreme aerobatics and therefore has the capability to support the higher momentary peak demand loads to eliminate the possibility of unwanted shutdowns. It is also capable of supporting continuous simultaneous multiple servo operations typically found in CCPM equipped hardcore 3D electric helicopters.

CONNECTION

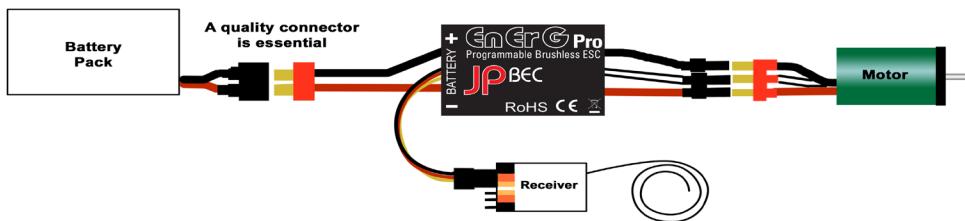
The speed controller can be connected to the motor by soldering directly or with high quality connectors. Always use new connectors, which should be soldered carefully to the cables and insulated with heat shrink tube. The maximum length of the battery pack wires should be within 6 inches.

- ▶ 1. Solder controller to the motor wires.
- ▶ 2. Solder appropriate connectors to the battery wires.
- ▶ 3. Insulate all solder connectors with heat shrink tubes.
- ▶ 4. Plug the connector into the receiver throttle channel.

WARNING!

⚠ Ensure the correct polarity is observed. The ESC Red and Black wires connect to the battery pack Red and Black wires respectively.

⚠ Improper polarity or short circuit will damage the ESC. It is your responsibility to double check all plugs for proper polarity and firm fit BEFORE connecting the battery pack.



USER PROGRAMMABLE SETTINGS

Our JP EnErG Pro ESC series can be programmed for all functions to fit your specific needs direct from the ESC which makes them very efficient and user friendly. A program card is also available separately.

The following settings can be adjusted directly using the ESC and transmitter:

- 1. Brake type (we recommend using brake for only folding props applications)
- 2. Battery type (LiPo, LiFe, NiCd/NiMh)
- 3. Low voltage protection threshold
- 4. Restore factory setup defaults
- 5. Motor timing setup (to enhance ESC efficiency and smoothness)
- 6. SBEC Voltage output
- 7. Governor mode (for helicopter applications)
- 8. Motor rotation (clockwise\counterclockwise)
- 9. Start up strength (for delicate gearbox and helicopter applications)
- 10. Low voltage cutoff type (power reduction or immediate shutdown)

1. BRAKE TYPE

OFF - Sets the motor brake to freewheel when the throttle stick is at the minimum position.

Recommended for folding props:

SOFT - Sets the motor brake to 30% when the throttle stick is at the minimum position

MID - Sets the motor brake to 60% when the throttle stick is at the minimum position

HARD - Sets the motor brake to 100% when the throttle stick is at the minimum position

2. BATTERY TYPE

NiCad/NiMh - Sets Low Voltage protection threshold for NiCad/NiMh cells.

LiPo - Sets Low voltage protection threshold for LiPo cells and automatically detects the number of cells within the pack.

LiFe - Sets Low voltage protection threshold for LiFe cells.

⚠ Note: Selecting the NiCad/NiMh option for the battery type, triggers the ESC to automatically set the cutoff threshold to the factory default of 60%. The cutoff threshold can then be subsequently altered through the Low Voltage protection function (3), if required. The ESC will read the initial voltage of the NiCad/NiMh pack once it is plugged in and the voltage read will then be used as a reference for the cutoff voltage threshold.

3. LOW VOLTAGE PROTECTION THRESHOLD

- 1) For LiPo packs- number of cells are automatically calculated and requires no user input apart from defining the battery type (2). This ESC provides 4 setting options for the low voltage protection threshold; Low (2.8V)/ Medium (3.0V)/ High (3.2V) and No protection. For example: the voltage cutoff options for an 11.1V/ 3 cell Li-Po pack would be 8.4V (Low)/ 9.0V(Med)/ 9.6V(High)
- 2) For Ni-xx/LiFe packs-low / medium / high cutoff voltages are 50%/60%/65% of the initial voltage of the battery pack. For example: A fully charged 6 cell NiMH pack's voltage is 1.44V x 6=8.64V, when "LOW" cutoff voltage is set, the cutoff voltage is: 8.64V x 50%=4.3V.

4. RESTORE FACTORY SETUP DEFAULTS

Restore- Sets the ESC back to factory default settings;

Brake.....	OFF
Battery type.....	LiPo with Automatic Cell Detection
Low voltage cutoff threshold	Medium (3.0V/65%)
Timing setup	Automatic
SBEC voltage output.....	5.0V
Governor mode	OFF
Motor rotation.....	Forward
Start up strength	Medium (25-35%)
Low voltage cutoff type.....	Reduce power

5. MOTOR TIMING

Automatic – ESC automatically determines the optimum motor timing

Low (2°, 8°) – Setting for most in-runners

Medium (15°, 22°) – Setting for motors with 6 or more poles.

High (30°) - Setting for motors with more than 6 poles.

⚠ In most cases, automatic timing works well for all types of motors. However for high efficiency we recommend the Low timing setting for 2 pole motors (generally in-runners) and high timing for 6 poles and above (generally out-runners). For higher speed, High timing can be set. Some motors require different timing setups therefore we suggest you to follow the manufacturer recommended setup or use the automatic timing setting if you are unsure.

⚠ Note: Run your motor on the ground first after making any changes to your motor timing!

6. SBEC VOLTAGE OUTPUT

This option is only for JP EnErG pro B-series ESC's. There are 3 different settings that can be selected for SBEC voltage output.

Level 1 - 5.0V

Level 2 - 5.5V

Level 3 - 6.0V

7. HELI GOVERNOR MODE

RPM control off

Soft Start 1: First range: Initially there will be a 5 second delay from start to full RPM. After this any further input from the throttle will be as normal.

Soft Start 2: Initially there will be a 15 second delay from start to full RPM. After this any further input from the throttle will be as normal.

Soft Start 3: Initially there will be a 20 second delay from start to full RPM. After this any further input from the throttle will be as normal.

Governor Mode: Apply full throttle for 15 seconds to stabilise governor. Governed RPM is now from min to 80% of max RPM. Any lost RPM under load during flight will now be compensated automatically by the ESC.

Note: In Soft start and Governor mode if you close the throttle within 3 seconds of starting then the motor will start up as normal next time. If the throttle is closed for more than 3 seconds the next start will be a soft start.

Note: Once the Governor Mode is enabled, the ESC's Brake (1) and Low Voltage Cutoff Type (10) settings will automatically be reset to No Brake and Reduce Power respectively regardless of what settings they were previously set.

8. MOTOR ROTATION: REVERSE

In most cases motor rotation is usually reversed by swapping two motor wires. However, in cases where the motor cables have been directly soldered to the ESC cables, motor rotation can be reversed by changing the value of this setting on the ESC.

9. START UP STRENGTH

Very Soft – Provides initial slow 1.5 sec ramp-up from start to full rpm intended to protect delicate gears from stripping under instant load. This setting is recommended for either fixed wing models equipped with gearboxes and/or helicopters.

Soft Acceleration- Provides initial slow 1 sec ramp-up from start to full rpm. This setting is recommended for either fixed wing models equipped with gearboxes and/or helicopters.

Start Acceleration – Provides quick acceleration start ups with a linear throttle response. This is recommended for fixed wing models fitted with direct drive setups.

10. LOW VOLTAGE CUTOFF TYPE

Reduce Power – ESC reduces motor power when the pre-set Low Voltage Protection Threshold value (3) is reached. (recommended).

Hard Cutoff – ESC instantly cuts motor power when the pre-set Low Voltage Protection Threshold value (3) is reached.

PROGRAMMING MODE AUDIBLE TONES

UPON POWER UP OF THE ESC (THROTTLE CALIBRATION) - ●● ●● ●● ●●

TONES FOR SELECTING A FUNCTION:

Function	Tone emitted by ESC	Description
1 Brake	●	1 short tone
2 Battery type	●●	2 short tones
3 Low Voltage Cutoff Threshold	●●●	3 short tones
4 Restore Factory Setup Defaults	●●●●	4 short tones
5 Timing Setup	—	1 long tone
6 Soft Acceleration Start Ups	—●	1 long and 1 short tone
7 Governor Mode	—●●	1 long and 2 short tones
8 Motor Rotation	—●●●	1 long and 3 short tones
9 Switching Frequency	—●●●●	1 long and 4 short tones
10 Low Voltage Cutoff Type	——	2 long tones

TONES FOR SETTING A FUNCTION:

Tone Emitted by ESC →	BEEP	BEEP BEEP	BEEP BEEP BEEP	BEEP BEEP BEEP BEEP	BEEP---	BEEP--- BEEP	BEEP--- BEEP BEEP	BEEP--- BEEP BEEP BEEP	BEEP--- BEEP BEEP BEEP BEEP
Function ↓									
1 Brake type	Brake Off*	Soft Brake	Mid Brake	Hard Brake					
2 Battery type	NiCd/ NiMH	LiPo*	LiFe						
3 Low Voltage Cutoff Threshold	2.8V/50%	3.0V/60%*	3.2V/65%	No Protection					
4 Restore Factory Setup Defaults	Restore								
5 Motor Timing	Auto*	2°	8°	15°	22°	30°			
6 SBEC Voltage Output	5.0V*	5.5V	6.0V						
7 Governor Mode	RPM Off*	Soft start 1	Soft start 2	Soft start 3	Governor Mode				
8 Motor Rotation	Forward*	Reverse							
9 Start Up Strength	10%	15%	20%	25%	30%*	35%	40%	45%	50%
10 Low Voltage Cutoff Type	Reduce power*	Cut off power							

* Denotes default settings

POWERING UP THE ESC FOR THE FIRST TIME

SETTING THE AUTOMATIC CALIBRATION

The JP EnErG Pro ESC features Automatic Throttle Calibration to attain the smoothest throttle response and resolution throughout the entire throttle range of your transmitter. This step is done once to allow the ESC to "learn and memorize" your Transmitter's throttle output signals and only repeated if you change your transmitter.

- ▶ 1. Switch your Transmitter ON and set the throttle stick to its maximum position.
- ▶ 2. Connect the battery pack to the ESC. Wait for about 2 seconds, the motor will beep for twice, then put the throttle in the minimum position, the motor will also beep, which indicates that your ESC has got the signal range of the throttle from your transmitter.

The throttle is now calibrated and your ESC is ready for operation.

NORMAL ESC START UP PROCEDURE

- ▶ 1. Switch your Transmitter ON and set the throttle to its minimum position.
- ▶ 2. Connect the battery pack to the ESC.
- ▶ 3. When the ESC is first powered up, it emits two sets of audible tones in succession indicating the status of its programming state.

The first set of tones denotes the number of cells in the LiPo pack connected to the ESC. (Three beeps (***) indicates a 3 cell LiPo pack while 4 beeps (****) indicates a 4 cell LiPo pack) etc.

The second set denotes Brake status (one beep (*) for Brake "ON" and two beeps (**) for Brake "OFF").

The ESC is now ready for use.

PROGRAMMING THE ESC

ENTERING PROGRAMMING MODE

- ▶ 1. Switch your Transmitter ON and set the throttle to its maximum position.
- ▶ 2. Connect the battery pack to the ESC.
- ▶ 3. Wait until you hear two short beeps (_ _ **) confirming that the ESC has now entered the programming mode.
- ▶ 4. If the throttle stick is lowered to its minimum position within 5 seconds, an audible tone is emitted confirming that the throttle calibration setting has changed.

If the throttle stick is left in the maximum position beyond 5 seconds, the ESC will begin the sequence from one function and its associated setting options to another. (Please refer to the table to cross reference the functions with the audible tones).

PROGRAMMING A FUNCTION

Once you have completed the steps above the ESC will start emitting beeps sequentially relating to the 10 programmable settings as per the table on page 6.

- ▶ 1. When the desired tone for the function you want to program is reached, move the throttle stick down to its minimum position. The ESC will emit a tone confirming the function has been selected.
- ▶ 2. The ESC will now begin start emitting a sequence of tones for the selected function as per the table on page 6. When the desired setting for that function is reached move the throttle to it's maximum position. The motor will emit a tone confirm the setting has been stored
- ▶ 3. If you want to continue programming more functions the ESC will now begin looping the function tones again as per step 1.

BUILT IN SAFETY FEATURES

ALERT TONES

The EnErG Pro ESC is equipped with audible alert tones to indicate abnormal conditions at power up.

- ▶ 1. If the ESC can't enter into working mode after powering up, it indicates that you have not setup throttle calibration.
- ▶ 2. Continuous beeping tone (*****) – Indicates that throttle stick is not in the minimum position.
- ▶ 3. A single beeping tone followed by a one second pause (* * * *) – Indicates that the battery pack voltage is not within the acceptable range. (The ESC automatically checks and verifies the battery voltage once the battery is connected).
- ▶ 4. A single beeping tone followed by a short pause (* * * *) – Indicates that the ESC is unable to detect the normal throttle signal from the receiver.

BUILT-IN INTELLIGENT ESC SAFETY FUNCTIONS

- ▶ 1. Over-heat protection:
When the temperature of ESC exceeds 110°C, the ESC will reduce the output power to allow it too cool.
- ▶ 2. Lost Throttle signal protection:
The ESC will automatically cut power to the motor when it detects a lost of throttle signal for more than 2 seconds.

GENERAL SAFETY PRECAUTIONS

 **Do not install the propeller (fixed wing) or drive pinion (helicopter) on the motor when you test the ESC and motor for the first time to verify the correct settings on your radio. Only install your propeller or pinion after you have confirmed that the settings on your radio are correct.**

- ▶ Never use damaged battery cells.
- ▶ Never use battery packs that are known to overheat.
- ▶ Never short circuit battery or motor terminals.
- ▶ Always use proper insulation material for cable insulation.
- ▶ Always use proper cable connectors.
- ▶ Do not exceed the number of cells or servos specified by the ESC.

WARNING!

Wrong battery polarity will damage the ESC and void the warranty.

- ▶ Install the ESC in a suitable location with adequate ventilation for cooling. This ESC has a built-in over heat protection feature that will reduce power to the motor once the ESC temperature exceeds the 230°F/ 110°C high temperature limit.
- ▶ Use only batteries that are supported by the ESC and ensure correct polarity is observed before connecting.
- ▶ Switch your Transmitter ON and ensure the throttle stick is in the minimum position before connecting the battery pack.
- ▶ Never switch your transmitter OFF while the battery is connected to your ESC.
- ▶ Only connect your battery pack just before flying and do not leave your battery pack connected after flying.
- ▶ Handle your model with extreme care once the battery pack is connected and keep away from the propeller at all times. Never stand in-line or directly in front of any rotating parts.
- ▶ Do not immerse the ESC underwater or allow it to get wet.
- ▶ Always fly at a designated flying site and abide by the rules and guidelines set by your flying club.

TROUBLE SHOOTING

Problem	Possible Cause	Solution
Motor doesn't work, but there are audible tones signalling the number of cells after powering up ESC.	The ESC throttle calibration has not set up.	Set up the ESC throttle calibration.
Motor doesn't work and no audible tone is emitted after connecting the battery. Servos are not working either.	Poor/loose connection between battery pack and ESC. No power Poor soldered connections (dry joints) Wrong battery cable polarity ESC throttle cable connected to receiver in the reverse polarity Faulty ESC	Clean connector terminals or replace connector. Replace with a freshly charged battery pack Re-solder the cable connections Check and verify cable polarity Check the ESC cable connected to the ESC to ensure the connectors are in the correct polarity. Replace ESC
Motor runs in reverse rotation.	Wrong cable polarity between the ESC and the motor.	Swap any two of the three cable connections between the ESC and the Motor or access the Motor Rotation function via the ESC programming mode and change the pre-set parameters.
Motor stops running in flight.	Lost throttle signal Battery Pack voltage has reached the Low Voltage Protection threshold. Possible bad cable connection	Check proper operation of the radio equipment. Check the placement of the ESC and the Receiver and check the route of the receiver's aerial and ESC cables to ensure there is adequate separation to prevent RF interference . Install a ferrite ring on the ESC's throttle cable. Land the model immediately and replace the battery pack. Check and verify the integrity of the cable connections

CONTINUED...

Motor restarts abnormally ESC Overheats	Possible RF Interference at the flying field.	The normal operation of the ESC may be susceptible to surrounding RF interference. Restart the ESC to resume normal operation on the ground to verify recurrence. If the problem persists, test the operation of the ESC at a different flying field.
	Inadequate Ventilation	Relocate the ESC to allow better ventilation
	Servos drawing too much current and over loading the ESC.	Use servos that are adequately sized for the ESC. The maximum BEC current drawn should be within the BEC limits.
	Over sized motor or prop	Reduce prop size or resize the motor

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www.jperkinsdistribution.co.uk