

# C10PRO COMPETITION BRUSHLESS SPEED CONTROLLER

Thank you for your purchasing this Centro RC product. The C10 Pro Brushless ESC is a new generation of high performance, competition level, sensored brushless electronic speed controller with 32-bit processing and wireless programmability. High-power brushless RC systems can be very dangerous if not used correctly. Prior to its installation and use, please take some time to read this manual carefully. Centro RC and CML Distribution have no control over the installation, use, application or maintenance of this product, thus no liability shall be assumed nor accepted for any damages, losses or costs incurred from the use of this item.

### Caution:

- Those under the age of 14 should be supervised by an adult at all times when using this product.
- The ESC may become hot during operation. Please take additional care when handling this item after use.
- When soldering input/output wires or connectors to this ESC, a soldering iron with a minimum output rating of 60W should be used.
- Always disconnect the battery after use. Do not store this ESC with the battery connected, this may result in slow, deep discharge and irreparable damage to the battery.
- If the ESC overheats, emits smoke or burns, discontinue use immediately, disconnect the battery and seek assistance.
- Do not allow water, oil or other materials to make contact with or enter the ESC. Doing so may cause irreparable damage to the ESC and/or connected components.

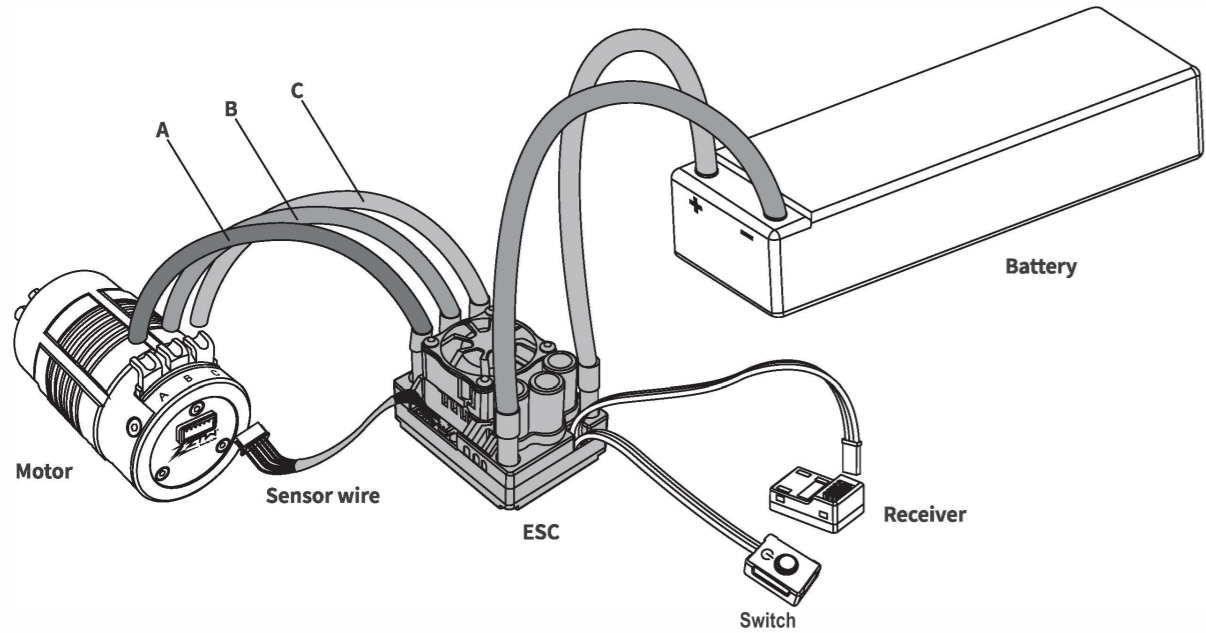
### Features:

- Sensored or sensorless operation.
- Full aluminium, low profile case for optimal heat dissipation.
- High performance 32-bit MCU for advanced computing ability.
- Enhanced throttle response with excellent acceleration, linearity and drivability characteristics.
- Wirelessly programmable via the ESC1 mobile application and optional Bluetooth® module.
- Data logging for real-time ESC temperature, battery voltage, motor RPM and more.
- Adjustable high/low voltage cut-off, thermal and signal loss protection.

### Specification:

Product Name	C10 Pro 160A	
Cont. Current	160A	
Burst Current	760A	
Input Voltage	2-3S LiPo	
BEC Output	6.0V/7.4V - 4A (Adjustable)	
Size(L*W*H)	38.0 x 30.5 x 16mm (Without fan)	
Weight	96g	
ESC Programming Via	Smartphone APP	
Firmware Upgrade	Supported	
Waterproof	No	
Car Applicable	1/10 Touring Car/Buggy Racing	

### Connection:



#### Battery Wire Connection

When connecting the battery, pay extra attention to its polarity. Incorrect connection with the ESC (reverse polarity) will permanently damage both the ESC and battery. Ensure the positive (+) ESC wire is connected to positive (+) battery terminal, and the negative (-) ESC wire is connected to the negative (-) battery terminal.

#### Motor Wire Connection

- Sensored Mode: When using a sensored brushless motor, the ESC's A, B and C wires must be connected to the corresponding A, B and C terminals of the brushless motor. In addition to this, a sensor lead must also be connected between the sensor ports on both the ESC and brushless motor.
- Sensorless Mode: When using a sensorless brushless motor, the ESC's A, B and C wires can be connected to any of the brushless motor's terminals. If the motor rotates in the opposite direction to the one desired, ANY 2 of these wires can be exchanged with one another to reverse the brushless motor's rotational direction.

#### Receiver Wire Connection

The ESC's RX lead has a standard BEC output of 6V, which is sufficient to power the model's receiver and steering servo. Do not connect additional sources of power directly to the model's receiver, doing so may cause irreparable damage to the ESC and/or receiver.

- Black wire Receiver Negative (-)
- Red wire Receiver Positive (+)
- White wire Receiver Signal

### Software Functions and Settings:

#### Power On/Off

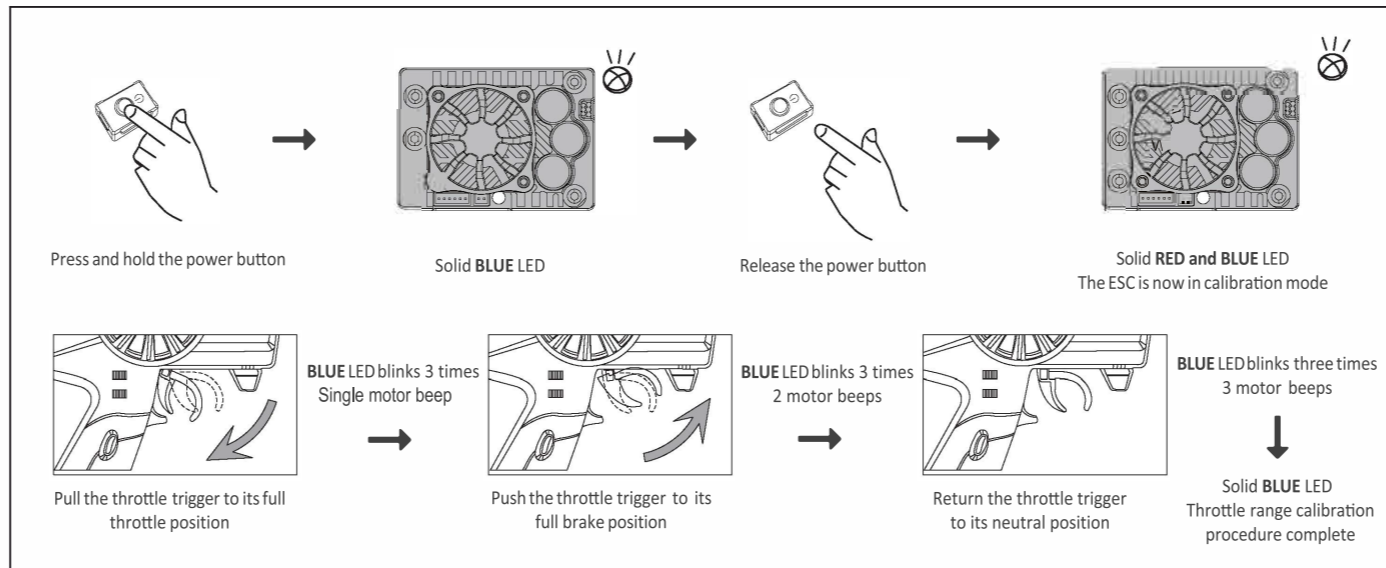
Power On - Press the ESC's power button once.  
Power Off - Press and hold the ESC's power button until all LEDs turn off. Release the power button.  
(Note: The ESC can be powered on/off using either the built-in, or detachable power button. The transmitter's throttle trigger must be in its neutral position in order for the ESC to power off.)

#### Throttle Calibration

- Ensure that all connections are complete and correct (receiver, motor, battery). Power on the transmitter.
- Press and hold the ESC's power button. The BLUE LED will turn solid and there will be a long beep from the model's motor. Release the power button, both the RED and BLUE LEDs will illuminate to confirm the ESC is now in calibration mode.
- Pull and hold the transmitter's throttle trigger to its full throttle position. The BLUE LED will blink 3 times followed by a single motor beep. The full throttle position has been saved.
- Push the transmitter's throttle trigger to its full brake position. The BLUE LED will blink 3 times followed by 2 motor beeps. The full brake position has been saved.
- Return the throttle trigger to its neutral position. The BLUE LED will blink 3 times followed by 3 beeps from the brushless motor. The neutral position has been saved and the throttle range calibration procedure is now complete.
- This ESC supports reverse throttle range calibration. If the transmitter's throttle channel is set to 'reverse', throttle range calibration can be completed as per the steps outlined above. This will not have an effect on the overall performance and functionality of the ESC.

**Note:** There is no need to restart the ESC after the throttle range calibration procedure has been completed.

**CENTRO** Centro is an exclusive brand of CML Distribution Ltd., Saxon House, Saxon Business Park, Hanbury Road, Bromsgrove. B60 4AD. United Kingdom.  
Email: info@CENTRO-rc.com Website: www.CENTRO-rc.com



#### LED Status

During operation:

Throttle Position	BLUE LED	RED LED
Neutral	ON - (Flashing when in Blinky mode)	OFF
Full Throttle	ON	ON
Full Brake	OFF	ON

**Note:** If throttle or brake inputs are applied, the BLUE LED will blink, increasing in frequency the further the trigger travels towards its end

point. When an error is detected and protection is activated:

- The RED LED will blink once in 1 second intervals to indicate that the battery voltage is abnormal - "□ □ □ □"
- The RED LED will blink twice in 1 second intervals to indicate that the ESC temperature is abnormal - "□ □ □ □ □ □"
- The RED LED will blink once, then twice repeatedly in 1 second intervals to indicate that both the battery voltage and ESC temperature are abnormal - "□ □ □ □ □ □ □ □ □ □"
- The RED LED will remain solid if the ESC cannot detect a signal, regardless of whether the battery voltage or ESC temperature are abnormal.
- The BLUE LED will blink twice in 1 second intervals to indicate that throttle input is abnormal (no throttle, or the throttle trigger is not in its neutral position) - "□ □ □ □ □ □"

#### Throttle Signal

- The ESC can support a throttle signal with a maximum PPM of 450Hz.
- The ESC's throttle protection will be activated in the following circumstances:
  - The throttle trigger was not in its neutral position when the ESC was powered on.
  - Throttle signal has been lost.
- If the ESC loses throttle signal during operation, the blue LED will blink twice in 1 second intervals. The ESC will not work again until throttle signal is restored.

#### Sensored & Sensorless

- Sensored mode is activated as soon as the ESC detects that a sensor cable is connected between the ESC and a brushless motor.
- If the ESC does not detect a sensored brushless motor, the ESC will continue to operate in sensorless mode.
- The ESC will experience a slight loss of power (which will be immediately restored) while switching between sensored and sensorless operation modes.
- The PWM driving frequency will return to its default setting automatically if the ESC is operated in sensorless mode. The manually programmed PWM value will be irrelevant at this time.
- The ESC's brake frequency cannot be set to less than 1KHz if the ESC is in sensorless mode.
- Boost and turbo functions are not available when operating in sensorless mode.

#### Boost & Turbo

- After boost or turbo timing is triggered, the amount of current delivered to the motor will be increased, resulting in a higher motor RPM output. Setting suitable boost and turbo values is imperative to ensure that the ESC, motor or battery do not overheat during use.
- The difference between boost and turbo timing:
  - Boost timing is activated throughout the throttle range, dependent upon user programmable setting.
  - Turbo timing is activated only when the throttle trigger is at its full throttle position.
- The ESC has a maximum timing setting of 60 degrees. If boost timing is set at 45 degrees and turbo at 50 degrees, when the throttle trigger reaches its maximum position, boost timing will be 45 degrees and turbo timing an additional 15 degrees – 60 degrees in total.
- If low voltage or thermal protection is activated, all timing will automatically be disabled.

#### Protection

- High voltage protection: If enabled, when the ESC detects that the input voltage is too high, high voltage protection mode will be activated and throttle output will be limited to a maximum of 50%. (High voltage protection mode will only be activated if input voltage levels are too high from the moment the ESC is powered on. It will not be activated if the input voltage increases during operation).
- Low voltage protection: If enabled, when the ESC detects that the input voltage is lower than the threshold for a specified amount of time, low voltage protection mode will be activated and throttle output will be limited to a maximum of 50%. Once low voltage protection mode has been activated, it will not automatically reset until the ESC is powered off and then on again.
- Thermal protection: If enabled, should the ESC reach its protection threshold temperature, throttle output from the ESC will be limited to a maximum of 50%. If the ESC temperature then drops below 60 degrees Celsius, thermal protection mode will be deactivated.
- If both voltage and thermal protection modes are disabled, the ESC's LED status will still indicate that abnormal voltages and/or temperatures have been detected but throttle output will not be reduced.
- If an issue arises where the ESC is unable to power the motor, the ESC will enter protection mode. The motor will continually beep 3 times in succession until the throttle trigger is returned to its neutral point for a minimum of 0.2 seconds.

#### Bluetooth®

- With the optional Bluetooth® adaptor connected to the ESC, using the ESC1 mobile app the end user can program multiple parameters, upgrade the ESC's firmware and analyse real-time data.
- The maximum operational distance of the Bluetooth® adaptor is approximately 10 metres from the connected mobile device. This maximum distance may be reduced by the presence of obstacles, or due to interference generated by them.
- The adaptor's Bluetooth® name cannot be changed.
- When performing the ESC's throttle range calibration procedure, Bluetooth® functionality will be disabled.

#### Programmable Items

- The user can adjust the ESC's programmable parameters at any time when the ESC is powered on. Once 'Save' is selected in the mobile app, any changes will immediately take effect with no requirement to restart the ESC. (Due to potential power drain or mechanical issues which may arise, it is not recommended that throttle boost or turbo settings are adjusted whilst the motor is rotating at high-speed).
- The programming parameters are saved in the ESC's embedded flash memory.

#### Real-time Data

- Real-time data can only be viewed if the ESC is receiving an active signal from the model's transmitter.
- Real-time data is for reference purposes only and has an accuracy level of ±10%.

#### Description of Real-Time Data Options:

Number	Item	Description
1	Input Throttle	% of throttle input from the receiver to the ESC
2	Output Throttle	% of throttle input from the ESC to the motor
3	Voltage	Input battery voltage
4	Min. Voltage	Minimum recorded voltage
5	Temperature	The current ESC temperature
6	Max. Temperature	The maximum recorded ESC temperature
7	RPM	Real-time motor RPM
8	Max. RPM	The maximum recorded motor RPM
9	Adv. Timing/Max. Timing	Real-time advance timing/The maximum recorded timing value (Boost& Turbo)

#### Firmware Upgrade

- ESC firmware upgrade is accessible via the ESC1 mobile application.
- If the ESC firmware update fails, power off the ESC and close the mobile application before attempting to restart the update process. ESC parameters cannot be adjusted during the firmware update process.
- When in firmware update mode, the ESC's red LED will be blink faintly. During ESC data transmission, the ESC's blue LED will blink faintly.
- Please do not turn off the ESC during the firmware update process. Once the firmware update process is complete, the ESC can be powered off by pressing/holding its power button for 5 seconds.  
(Note: Updating the ESC's firmware will restore all programmable settings to their default values.)

SECTION	PROGRAMMABLE ITEMS	PROGRAMMABLE ITEMS DESCRIPTION
THROTTLE	Throttle Response	A lower millisecond value will result in faster throttle response times and a more immediate power delivery. Higher millisecond values will allow for smoother power delivery and acceleration.
	Coast	When activated, as throttle input is reduced the car will gently coast to a stop. A higher value will increase this coasting effect.
	Neutral Range	The wider the neutral range, the further the throttle trigger must be moved away from its neutral position before power will be delivered to the motor.
	Min. Throttle	Determines the minimum amount of throttle which will be applied as the throttle trigger is moved away from its neutral position.
	Minus	Increasing this value decreases the model's speed in the Minus Range window (see below).
	Minus Range	Increasing this value increases the throttle application window in which the minus setting is applied (see above).
BRAKE	Max. Forward force	The lower the value, the slower the model's maximum speed will be as full throttle is applied.
	Max. Reverse force	The lower the value, the slower the model's maximum speed will be as full reverse is applied.
	Brake Response	The lower the value, the faster the ESC will respond to brake inputs.
	Min. Brake Force	The higher the value, the stronger the initial braking force will be.
	Max. Brake Force	The higher the value, the stronger the maximum braking force will be.
	Fwd. Drag Brake Force	As the throttle trigger is returned from forwards back to its neutral position, drag brake will be applied and the model will begin to slow. A higher value will increase this drag brake effect.
BOOST	Fwd. Drag Brake Response	A larger value will increase the delay between the throttle trigger returning to neutral and drag brake being applied.
	Rev. Drag Brake Force	As the throttle trigger is returned from reverse back to its neutral position, drag brake will be applied and the model will begin to slow. A higher value will increase this drag brake effect.
	Rev. Drag Brake Response	A larger value will increase the delay between the throttle trigger returning to neutral and drag brake being applied.
	PWM Freq.	The PWM frequency for braking – A higher PWM value will improve braking smoothness and linearity, whereas a lower PWM value will increase braking response times.
	Boost Timing	Electronic timing which can be applied at any point throughout the motor RPM range. The larger the value, the greater the amount of electronic timing.
	Trigger	Boost timing activation method – Either by throttle trigger position or motor RPM.
TURBO	Throttle Threshold	If 'Throttle' is selected under the 'Trigger' setting above, boost timing will be applied when the throttle trigger reaches a pre-determined position. The higher the value the further the throttle trigger will have to travel away from its neutral position before boost timing is applied.
	RPM Threshold	If 'RPM' is selected under the 'Trigger' setting above, boost timing will be applied when the motor reaches a user set RPM. The larger this value, the higher the motor's RPM must be before boost timing will be applied.
	Initial Angle	The level of boost timing that will be applied when the trigger condition is met. Higher values will allow for a more aggressive delivery or boost timing.
	Angle Inc. Rate	How quickly the level of boost timing will increase after the trigger condition is met. The higher the value, the greater the acceleration effect.
	Angle Dec. Rate	How quickly the level of boost timing will decrease as the model begins to decelerate. The higher the value, the greater the deacceleration effect.
	Turbo Timing	Electronic timing which will be applied only when the throttle trigger reaches its full throttle position. The higher the value, the greater the level of turbo timing.
GENERAL	Angle Inc. Rate	How quickly the level of turbo timing will increase after the trigger condition is met. The higher the value, the faster the delivery of turbo timing.
	Angle Dec. Rate	How quickly the level of turbo timing will decrease when the model begins to decelerate. The higher the value, the greater the deacceleration effect.
	Turbo Delay	The higher the value, the longer it will take for turbo to be activated once full throttle has been applied.
	Delay Reload	This setting will determine how quickly the ESC will reapply turbo timing when the throttle trigger reaches its full throttle position, is released, and then full throttle is reapplied. There are two options: Wait – Turbo timing will be reapplied once it has fully deactivated. Instant – As soon as the throttle trigger reaches its full throttle position, turbo timing will be instantly reapplied.
	Motor Rotation	The direction in which motor spins. With the factory default setting, the motor may run in the opposite direction to the one required. This function allows the user to switch the motor rotation direction if required.
	Motor Poles	Please ensure the pole count is set correctly prior to use. This setting allows the user to manually set the pole count of the motor. This will ensure the correct RPM levels are obtained to enable the application of both boost and turbo timing. This will also allow the user to analyse real-time motor RPM data within the ESC1 mobile application.
GENERAL	Running Mode	There are three available running modes: Forward/Brake, Forward/Brake/Reverse, Forward/Reverse. Reverse mode can only be set if the running mode is set to 'Forward/Brake/Reverse'. Two reverse mode options are available: One Shot – Push/Pull the throttle trigger once to initiate reverse. Two Shot – Push/Pull the throttle trigger twice in quick succession to initiate reverse.
	Reverse Mode	
	Drive PWM Freq.	The PWM frequency for acceleration. Higher PWN values will allow for smoother operation, power delivery and improve throttle linearity. Lower PWM values will decrease linearity but increase throttle response times.
	Cut-Off Voltage	The ESC will automatically reduce throttle output if the model's battery voltage falls below a preset level. This is automatically detected by default but can be manually adjusted by the user or disabled altogether.
	Cut-Off Thermal	The ESC will automatically reduce throttle output if its internal temperature exceeds a preset value. This value can be manually adjusted by the user or disabled altogether.
	BEC Output	The output voltage of the 'Battery Eliminator Circuit' can be selected depending on the voltage requirement of the model's receiver/servos.
A/C Swap	Exchanging motor wires, A and C. When set to 'NO', the ESC's output wires must connect to their corresponding motor terminals: A-A, B-B, C-C. When set to 'YES', the connecting sequence must be: A-C, B-B, C-A.	

### Trouble Shooting

Trouble Shooting	Possible causes	Solutions
The ESC will not power on.	<ol style="list-style-type: none"> <li>No power is supplied to the ESC.</li> <li>The ESC switch is damaged.</li> <li>The ESC is damaged internally.</li> </ol>	<ol style="list-style-type: none"> <li>Ensure that all ESC and battery connectors have been soldered adequately and are firmly connected, resoldering if necessary.</li> <li>Replace the damaged switch.</li> <li>Contact your original place of purchase for assistance.</li> </ol>
The motor suddenly stopped or significantly reduced its output during operation.	<ol style="list-style-type: none"> <li>The receiver is suffering from interference.</li> <li>The ESC's Low Voltage Cut Off protection mode has been activated.</li> <li>The ESC's Thermal Cut Off protection mode has been activated.</li> </ol>	<ol style="list-style-type: none"> <li>Ensure there are no possible causes of interference nearby, that the transmitter and receiver are bound and the batteries in both the transmitter and model are either fresh or fully charged.</li> <li>The RED LED will blink once in 1 second intervals.</li> <li>The model's battery should be replaced or recharged.</li> <li>The RED LED will blink twice in 1 second intervals. Power off the model and allow it to cool before usage is resumed.</li> </ol>
The motor stutters but will not start.	<ol style="list-style-type: none"> <li>The solder joints between the ESC and motor are not adequate.</li> <li>The ESC is damaged internally.</li> </ol>	<ol style="list-style-type: none"> <li>Ensure that all ESC and battery connectors have been soldered adequately and are firmly connected, resoldering if necessary.</li> <li>Contact your original place of purchase for assistance.</li> </ol>
The model moves forwards/backwards slowly when the throttle trigger is in its neutral position.	<ol style="list-style-type: none"> <li>The neutral position of the transmitter is not stable.</li> <li>The ESC throttle range calibration procedure has not been completed correctly.</li> <li>The transmitter's throttle trim is not set correctly.</li> </ol>	<ol style="list-style-type: none"> <li>Replace your transmitter.</li> <li>Re-calibrate the ESC's throttle range as per the steps outlined in this manual.</li> <li>Adjust the model's throttle trim back to its neutral setting, then, re-calibrate the ESC's throttle range as per the steps outlined in this manual.</li> </ol>

### WARRANTY:

Centro RC warrants this product to be free of material and workmanship defects when new. Centro RC will, at its sole discretion, repair or replace defective products free of charge should an issue arise within 180 days from the date of purchase. This warranty does not cover issues arising due to wear and tear, crash or impact damage, damage as a result of modifications, water ingress, the failure to perform maintenance, improper use or damage sustained to fans, wiring or other attached accessories. Proof of purchase will be required to action any warranty claims which should be directed to the user's original place of purchase. Should a warranty claim be approved, Centro RC's liability will not exceed the original value of the purchased product. Under no circumstances, unless otherwise required by law, shall Centro RC be liable to provide compensation for damages to secondary items, or for personal injury sustained due to the improper use of this item.