

# Users' Manual For MAYTECH Brushless Electronic Speed Controller (Version 2012.6) Cheetah Sensorless / Sensorless and sensed (MTC-CSD/CSL) Series CAR/TRUCK ESCs

## Purchasing Maytech Brushless Electronic Speed Controller (ESC).

The MAYTECH electronic speed controller (ESC) is specifically designed for operating Sensed/Sensoreless brushless motors. High power systems for RC model can be very dangerous and we strongly suggest that you read this manual carefully. MAYTECH have no control over the correct use, installation, application, or maintenance of these products, thus no liability shall be assumed nor accepted for any damages, losses of costs resulting from the use of this item. Any claims arising from the operating, failure or malfunctioning etc. will be denied. We assume no liability for personal injury, property damage or consequential damages resulting from our product or our workmanship. As far as is legally permitted, the obligation for compensation is limited to the invoice amount of the product in question.

### SPECIFICATION

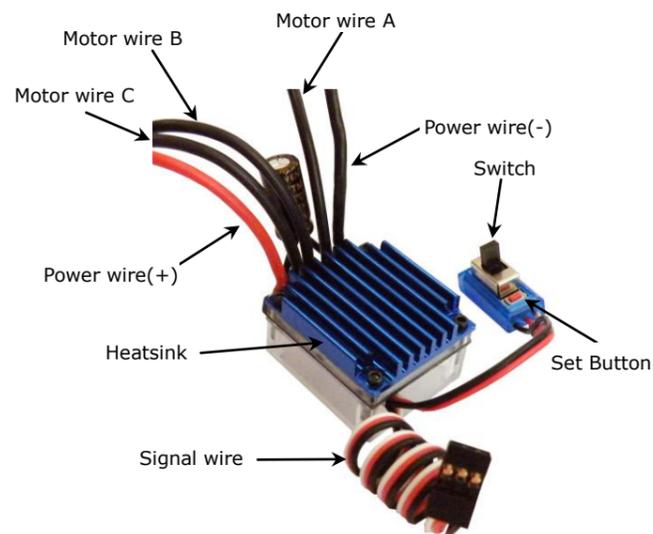
MTC Series ( for car or truck )			
Model No.	BEC	LIPO	NICD/NIMH
MTC25A-CSL	6V/2A	2-3Cell	5-10 Cell
MTC35A-CSL	6V/2A	2-3Cell	5-10 Cell
MTC45A-CSL	6V/2A	2-3Cell	5-10 Cell
MTC60A-CSL	6V/2A	2-3Cell	5-10 Cell
MTC45A-CSD	6V/3A	2-3Cell	5-10 Cell
MTC60A-CSD	6V/3A	2-3Cell	5-10 Cell
MTC80A-CSD	6V/3A	2-6 Cell	5-18 Cell
MTC120A-CSD	6V/3A	2-6 Cell	5-18 Cell
MTC150A-CSD	6V/3A	2-6 Cell	5-18 Cell

### 1. Features:

- ◆ Enhanced throttle response, excellent acceleration, strong brakes and throttle linearity.
- ◆ Using advanced software interface to set up or update the software or using programming card to make adjustments.
- ◆ Using PC or programming card to program forward or reverse throttle limit.
- ◆ Using PC to program braking percent.
- ◆ Multiple protection features: Low voltage cut-off protection, over-heat protection, throttle signal loss protection and motor blocked protection.
- ◆ Compatible with all brushless motor on market.
- ◆ Easily program with only one button.

### 2. Begin to Use The New ESC:

*Before using new ESC, please carefully check every connection is correct or not:*



#### ◆ Connected with Sensoreless Brushless motor

When using Sensoreless Brushless motor, the motor wire A, B and C of the ESC can be connected to the motor freely. If the motor runs in the opposite direction, please swap any two wire connections.

#### ◆ Connected with Sensed Brushless motor

When using Sensed Brushless motor, the Blue motor wire A, Yellow motor wire B and Orange motor wire C of the ESC must connect with the Sensed motor wire A,B,C respectively. It is necessary to connect the Sensor wire to the "Sensor" socket on the ESC. Don't change the wires sequence optionally.

#### ◆ Connect the ESC signal wire to the Receiver

Black wire RX-  
Red wire RX+6.0V  
White wire RX-Signal

### 3. ESC indication LEDs:

#### \* Conversion of Sensed and Sensoreless function

When Power-wires of the ESC are connected to battery pack, the ESC can automatically identify the motor type (Sensed/Sensoreless) via indicated LED. If the ESC works at the status of Sensed, remove the Sensor wire, the ESC can be automatically changed to the status of Sensoreless.

Sensed/Sensoreless ESC's indication LED		
Status of the fuction	INDICATED LED	Status of the LED
Low voltage of the battery	Red LED	Blinking
Over-heat of ESC and motor (95°C)	Red and Orange LED	Lighting
Sensed motor	Red and Orange LED	Lighting
Sensoreless motor	Orange LED	Lighting
Sensed ESC's indicated LED		
Status of the fuction	INDICATED LED	Status of the LED
Low voltage of the battery	Red LED	Blinking
Over-heat of ESC and motor (95°C)	Red and Orange LED	Lighting
Sensed motor	Red and Orange LED	Lighting
Forward	Red LED	Lighting
Forward/Reverse	Orange LED	Lighting
Sensoreless ESC's Indicate LED		
Status of the function	INDICATED LED	Status of the LED
Low voltage of the battery	Red LED	Blinking
Over-heat of ESC and motor (95°C)	Red and Orange LED	Lighting
Sensoreless motor	Orange LED	Lighting
Forward	Red LED	Lighting

### 4. Throttle Range Calibration:

- ◆ Switch off the ESC, connect it with battery pack, then turn on transmitter, set the direction of the throttle channel to REV; set Throttle Trim Setting to 0(zero); set the EPA/ATV value of the throttle channel to 100%.
- ◆ Hold the Set button and switch on the ESC until the Orange LED is On solid, then release the Set button, at that time pull throttle trigger to full throttle until Red LED is On solid and Motor beeps.
- ◆ Push the throttle trigger to Full Brake until the Orange LED blinks and will be On solid and Motor beeps.
- ◆ Now please return the throttle trigger to the Neutral position, the Red LED and Orange LED blink for about 3 seconds, then get solid. Both Red LED and Orange LED are off after motor beeps. The Throttle Range Calibration is confirmed.
- ◆ Turn off the ESC power.
- ◆ Turn the ESC back ON; you are now ready to use the ESC.

### 5. Low Voltage Cutoff Threshold:

- ◆ Automatically detect the number of cells. According to the type of your batteries, you can setup the type of the batteries and Low Voltage Cutoff Threshold, ESC can detect the Voltage of the battery anytime. ESC will stop working once the Voltege of the battery is lower than the Low Voltage Cutoff Threshold setuped.
- ◆ When using NiMH or NiCd batteries you do not need to set a cutoff voltage to protect the batteries.If you are using more than 6-cell NiMH or NiCd batteries, you must adjust the cutoff voltage, for example if you are using an 8-cell pack of NiMH batteries you would use a cutoff of 5.6V volts (8 x 0.7V = 5.6V). When the voltage of the batteries packs is within 9-12V, the ESC will automatically identify 3S LiPos. When the voltage of the batteries packs is less than 9V, the ESC will automatically identify 2S LiPos.
- ◆ Customize Voltage Cutoff (for NiMH or NiCd Batteries) you can select a starting cutoff voltage of 4, 5, 6, 9 or 12 volts. .

*Note: When using any Lithium or MI (A123) batteries, they must not be discharged to less than 3.0V per cell.*

### 6. Running Mode:

- ◆ Forward with pause then Reverse: (DEFAULT)  
General bashing around (FUN) or racing if reverse is allowed for the event. The Esc requires 2 seconds of continuous neutral from the transmitter prior to allowing reverse to operate.
- ◆ Forward w/o Reverse  
This is a Race setting - Reverse is disabled.
- ◆ Forward / Reverse  
If the option is activated, the RC car could go forward and backward, but couldn't brake.

*Note: There is automatic protection within the MAYTECH ESC. Only after you have stopped and returned the trigger to neutral will reverse become available. If traveling in reverse, pull the trigger to go forward. This is to help prevent serious damage to the drive train.*

### 7. Motor Timing:

This option affects the power band and efficiency (run time) of an electric motor. The default is "Normal" and is a good starting point to deliver power and provide good run time.

- ◆ **Very Low** Provides maximum efficiency with less power. Higher timing produces significantly more power but at the expense of efficiency (less run time) and typically the motor will generate more heat. Each brushless motor will respond to timing differently. Good for running around on paved, or harder surfaces, and racing with high Kv rated or low-turn motors.
- ◆ **Low** Provides power for running through soft surfaces, having fun and longer run time.
- ◆ **Normal (Default)** Good mix of power and efficiency using any motor.
- ◆ **High** More power than efficiency so run time will reduce, and you should be monitoring motor heat. The higher KV or lower turn motors will generate heat quickly using this setting. A safe high temperature range is 165F to 180F (74° - 82° Celsius), going higher may damage your motor.
- ◆ **Very High** This is maximum power and must be used with caution.  
*Note: Any motor has the potential to over-heat in this setting. Frequently check the motor temperature and make sure you're not operating higher than 165° and 180° Fahrenheit (74° - 82° Celsius), which may damage your motor, or damage your Electronic Speed Control (ESC).*

### 8. Initial Acceleration:

Use this to limit the initial power that is sent to the motor when starting from a complete stop. Using the low option, the vehicle will launch very slowly and provide the longest run times. When using the HIGH choice, you will have wheel-spinning acceleration at the cost of run time. This is also very tough on the batteries as the amperage draw can be very high. If your vehicle cuts out, hesitates or loses radio control, you should consider setting this at a lower value.

- ◆ **Low** Using this option will provide longer run times and is easiest on the batteries. It is a good choice for beginners.
- ◆ **Medium** Medium requires more from your batteries, and is good for low traction surfaces.
- ◆ **High** This option will provide full acceleration and requires stout batteries to supply the load required in this setting.
- ◆ **Very high** This option will provide full acceleration and requires stout batteries to supply the load required in this setting.

### Programmable Items and Default

Programmable Items	Programmable Value								
	1	2	3	4	5	6	7	8	9
Low voltage cutoff Threshold	2.6V/cell	2.8V/cell	3.0V/cell	3.2V/cell	3.4V/cell	No protection			
Running Mode	Forward w/o reverse	Forward with pause then Reverse	Forward / reverse						
Motor Timing	Very low	Low	Normal	High	Very high				
Initial Acceleration	Low	Medium	High	Very high					
Reverse Throttle Limit	20%	30%	40%	50%	60%	70%	80%	90%	100%
Throttle Limit	0%	20%	30%	40%	50%	60%	70%	80%	90%
Braking Percent	10%	20%	30%	40%	50%	60%	70%	80%	100%
Percent Drag Brake	0%	4%	8%	12%	15%	20%	25%	30%	
Motor Rotation	Normal	Reverse							
Neutral range	2%	3%	4%	5%	6%	10%			

*Note: The option marked in black is factory default value.*

### Program Method via Program Card

The LED Program Card is easy to use and convenient to carry. All of the programmable functions are shown on the program card.

1. Turn on the ESC. Connect the signal wire into the top-socket of the Program card, wait for 2 seconds until the LED ON. The first programmable function will be shown, if an error occurs, please reconnect them.

*Note: If ESC is not connected with the batteries, the Program card should be connected with other power supply, the range of power supply is within 5.0-6.3V.*

2. Press the button "Menu" on the Program Card and circularly select each programmable function. At that time the number of the programmable function displayed on the left of the LED, the relative value will be displayed on the right side. Then press the button "Value" to change the value and press the button "OK" to confirm. At the same time the Red LEDs of both program card and the ESC blink. Turn off the ESC, the modified settings will be saved.

3. Press the button Reset to restore the default settings.

### 9. Reverse Throttle Limit:

20%, 30%,40%,50%( Default),60%,70%,80%,90%,100%

Use this to limit the power available using reverse throttle. The lower the percent/level, the less speed will be available in reverse.

### 10. Throttle Limit:

0% (Default), 20%,30%,40%,50%,60%,70%,80%,90%

Use this to limit the power available using forward throttle. The lower the percent, the less forward throttle speed will be available.

### 11. Braking Percent:

10%,20%,30%,40%,50%(Default),60%,70%,80%,100%

Gives you the ability to have full control over the amount of brake your vehicle will have.

### 12. Percent Drag Brake:

0% ( Default), 4%, 8%,12%,15%,20%,25%,30%

The drag brake function provides the driver a set percentage of brake when you have the transmitter resting in neutral. This will create the "feel" of a brushed motor.

Drag brake are used in racing to slow a vehicle as you let off approaching a corner versus the driver having to push the brake at every corner.

Try working with this to get a sense of how you might use this for your track.

If you are running on a high traction track with tight corners, a stronger setting should work best.

If you are running in an open area, you will find a smaller percentage will result in better control.

If you are running in dusty or slippery surfaces, you will more than likely want to use the lowest option.

### 13. Motor Rotation: Normal (default), Reverse

### 14. Neutral Deadband: 2%, 3%,4%(Default),5%,6%,10%

This setting adjusts the amount of "Deadband" off neutral on the throttle trigger. This is in Milli-Seconds (MS) and is the amount of neutral when you pull the trigger.

The smaller the value the less "Deadband" or movement is required off-center for the ESC to begin throttle functions.

Using a higher value for this setting will provide a wider Deadband.

