PACE-45R
ELECTRONIC SPEED CONTROL

Sensored/Sensorless Brushless Speed Controller for Car or Truck

Thank you for your purchasing the CORE R/C PACE-45R Electronic Speed Controller. This unit is specifically designed for operating Sensored/Sensorless brushless motors. High power systems for R/C models can be very dangerous and we strongly suggest that you read this manual carefully. We 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 malfunction 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.

Features:

- Enhanced throttle response, excellent acceleration, strong brakes and throttle linearity.
- Using advanced software interface to set up or update the software or using the optional programming card to make adjustments.
- Using PC or optional programming card to program forward or reverse throttle limit.
- Using PC or optional programming card to program braking percentage.
- Multiple protection features: Low voltage cut-off protection, over-heat protection, throttle signal loss protection and motor blocked protection.
- Compatible with most sensored brushless motors including; Speed Passion, Nosram, Thunder Power, GM, Novak, LRP & Orion.
- Zero Timing 'Blinky' Mode.

Begin to Use The PACE-45R :

Before using the PACE-45R please carefully check all connections are correct.

* Connected with Sensored Brushless motor

When using a Sensored Brushless motor, the Blue motor wire A, Yellow motor wire B and Orange motor wire C of the PACE-45R must be connected with the motor A,B,C respectively. It is necessary to connect the Sensor wire to the "Sensor" socket on the PACE-45R. Don't change the wires when running in sensored mode.

* Connected with Sensorless Brushless motor

When using a Sensorless Brushless motor, the Blue motor wire A, Yellow motor wire B and Orange motor wire C of the PACE-45R can be connected with the motor wires freely. If the motor runs in the opposite direction, please swap Blue motor wire A and Orange motor wire C.

* Connect the PACE-45R signal wire to the Receiver

Black wire   RX-

Red wire   RX+6.0V

White wire   RX-Signal

PACE-45R's indicating LEDs:

Conversion of Sensored and Sensorless function

* When the Power wires on the PACE-45R are connected with the battery pack, the PACE-45R can automatically identify the motor type (Sensored/Sensorless) via indicated LEDs.

*If the PACE-45R works with the status of Sensored, if the Sensor wire is removed, the PACE-45R will be automatically changed to the status of Sensorless.

Sensored/Sensorless PACE-45R 's Indicating LED		
Status of the function	**INDICATED LED**	**Status of the LED**
Zero Timing Mode	Red LED	Flashing, 'Blinky'
Over-heat of the PACE-45R and motor (95℃)	Orange LED	Flashing
Sensored motor	Red and Orange LED	ON
Sensorless motor	Orange LED	ON
Sensorless PACE-45R 's Indicating LED		
Status of the function	**INDICATED LED**	**Status of the LED**
Zero Timing Mode	Red LED	Flashing 'Blinky'
Over-heat of the PACE-45R and motor (95℃)	Orange LED	Flashing
Sensorless motor	Orange LED	ON

Throttle Range Calibration (For the first time using transmitter or changing the transmitter you must set Throttle Range Calibration)

1. Switch off the PACE-45R, then connect the PACE-45R with the battery and turn on the transmitter; set the direction of the throttle channel to REV; set the EPA/ATV value of the throttle channel to 100%.

2. Hold the "Set" button and switch on the PACE-45R, wait for about 4 seconds until the Orange LED is on solid, then release the "Set" button, apply full throttle until Red LED is on Solid and the motor beeps.

3. Apply Full Brake until the Orange LED blinks and will be on solid, the motor beeps.

4. Now return to Neutral, both of the Red LED and Orange LED blink simultaneously and will become solid, the motor beeps, both of Red LED and Orange LED flash. The Throttle Range Calibration is confirmed.

5. Turn off the PACE-45R.

6. Turn the PACE-45R back ON. The speed controller is now ready to use.

Programmable items and default settings

Default settings are shown in the grey boxes

programmable Items	Programmable Value								
	1	2	3	4	5	6	7	8	9
Cut-off Voltage	2.6V/cell	2.8V/cell	3.0V/cell	3.2V/cell	3.4V/cell	No cut-off			
Running Mode	Forward w/o Reverse	Forward with pause then Reverse	Forward/ Reverse						
Motor timing	'Blinky'	Low	Normal	High	Very High				
Initial Acceleration	Low	Medium	High	Very High					
Throttle Percent Reverse	20%	30%	40%	50%	60%	70%	80%	90%	100%
Throttle Limit	0%	20%	30%	40%	50%	60%	70%	80%	90%
Percentage Braking	10%	20%	30%	40%	50%	60%	70%	80%	100%
Percentage Drag Brake	0%	4%	8%	12%	15%	20%	25%	30%	
Motor Rotation	Normal	Reverse							
Neutral Range	2%	3%	4%	5%	6%	10%			

Sensored/Sensorless brushless PACE-45R general information

1. Cutoff Voltage

● **Automatically detect the number of the cells**

According to the type of your batteries, set up the type of the batteries and Low Voltage Cutoff Threshold via PC software or program card. The PACE-45R can detect the Voltage of the battery anytime and will stop working once the Voltage of the battery is lower than the preset Low Voltage Cutoff Threshold.

● **Customized Voltage Cutoff** (for NiMH or NiCd Batteries) you can select a starting cutoff voltage of 4, 5, or 6 volts. Then using the up/down to the right of the voltage you can increase the voltage stepping up 0.1V between the selectable settings.

*   When using any **Lithium or M1 (A123) batteries,** they must not be discharged to less than 3.0V per cell.

2. Running Mode

Forward w/o Reverse

Reverse is disabled.

Forward with pause then Reverse: (DEFAULT)

The PACE-45R requires 1 second of continuous neutral from the transmitter prior to allowing reverse to operate.

Note: There is automatic protection within the PACE-45R. Only after you have stopped and

returned to neutral will reverse become available.

Forward / Reverse

With this option activated, you have both forward and reverse, but NO brake.

3. 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.

- **'Blinky' (Default)** 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. "Zero Timing" mode. The Red LED light will be flashing 'Blinky' in the status of "Zero Timing" mode when the throttle is in neutral. The Red LED light will stop 'Blinky' when the throttle is on.

- **Low Provides** power for running through soft surfaces, having fun and longer run time.

- **Normal** 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 Controller (PACE-45R).

4. 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.

5. Throttle Percent Reverse - Use this to limit the power available using reverse throttle. The lower the percent or level the less speed will be available in reverse.

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

6. Throttle Limit – Use this to limit the power available using forward throttle.

The lower the percent the less forward throttle speed will be available.

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

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

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

8. Percentage 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.

9. Motor Rotation

Normal (default), Reverse

10. Neutral Range – This setting adjusts the amount of "Deadband" of neutral on the throttle.   This is in Milli-Seconds (MS) and is the amount of neutral when you apply throttle.

The smaller the value the less "Deadband" or movement is required off-center for the PACE-45R to begin throttle functions.

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

2%, 3%, 4% (Default), 5%, 6%, 10%

Using Program card

1. The Program card with LED display is easy to use and convenient to carry.   All of the programmable functions are shown on the program card.
2. Turn on the PACE-45R. Remove the Signal wire and plug it into the top right hand socket on the Program card, wait for 2 seconds until the LED is ON.
   The first programmable function will be shown, if an error occurs, please reconnect them.
3. If PACE-45R 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.
4. Press the button "Menu" on the Program card and circularly select each programmable function. At that time the number of the programmable function will be displayed on the left of the LED, the current 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 indicating LEDs of both program card and the PACE-45R blink. Turn off the PACE-45R; the modified settings will be saved in the PACE-45R's memory.
5. Press the button Reset to restore the default settings.

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