eXTREME MOTOR CHECKER BMC-01
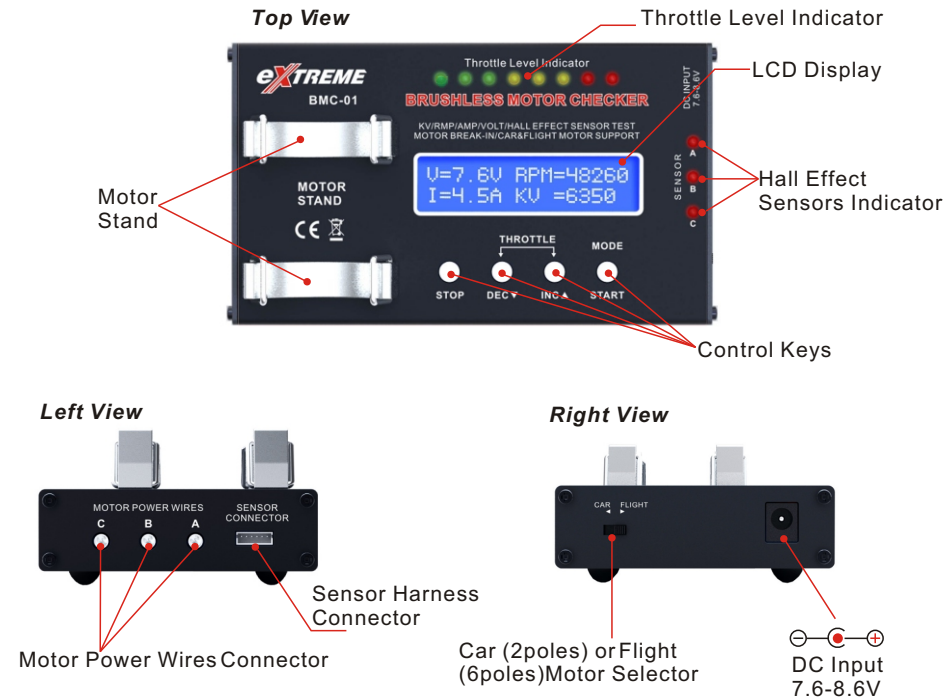
INSTRUCTION MANUAL

INTRODUCTION

Thank you for purchasing the Motor Checker BMC-01. We are confident you will find it to be an indispensable tools you use to make your hobby more funs and enjoyable.

Brushless motors are the most popular motor choice now in the RC Car and model aircraft industry. With their superior power to weight ratios, a large range of sizes, from under 5 grams to large motors rated at thousands of watts, they have revolutionized the market for electric-powered model field.

The motor checker is a precision electronic device that is especially designed for measuring the KV value, RMP, current drawn and checking the function of Hall Effect sensors of a brushless motor. It comes with a 2X16 characters LCD that is able to display real time measuring value of either sensor or sensor-less brushless motor.

Top View

- Throttle Level Indicator
- LCD Display
- Hall Effect Sensors Indicator
- Motor Stand
- Control Keys

Left View

- Motor Power Wires Connector
- Sensor Harness Connector

Right View

- Car (2poles) or Flight (6poles)Motor Selector
- DC Input 7.6-8.6V

FEATURES

Motor Checker is a very sophisticated electronic device. It has three main functions:

1. Brushless Motor Checking (Both Sensor & Sensor-less)
   KV Measurement(Accuracy tolerance 5%)
   RPM Measurement
   Ampere Measurement (Current Drawn by Testing Motor up to 18A)
2. Hall Effect Sensors Test
   Brushless Motor with Sensors Only
3. Motor/Car Diff Break-in
   Fix Voltage from 2.5V to 7.2V or 10 Steps Cycle with Variable Voltage Setting From 2.5V to 7.2V

SPECIFICATION

Input Voltage: 7.4 -8.6V (Suggested to use a 7.4V 2S1P LiPo Battery)
LCD Display Screen: Blue Backlight Background, White Text, 16 Characters X 2 Lines
Dimension: 136.5mm x 80.6mm x 47mm
Net Weight: 290gram
Supported Motor: Sensor or Sensor-less Brushless Motor
(a)Standard 540 Size RC Car Motor: 2.5 Turn or Over, 2 Poles (In-runner Motor)
(b)Flight Motor: Support Sensor-less Brushless Motor, 6 Poles (Out-runner Motor)
Current Drawn Less Than 18A at 8.4V Without Loading

MOTOR MAGNET POLES

In order to measure the RPM and KV value correctly, you need to select the magnet poles number according to the motor you are testing. The default values of this motor checker for Car Motors are 2 poles and Flight Motors are 6 poles.

For magnet poles other than 2 or 6, you still can measure the RPM and KV value by calculation. First, measure it under 2 poles mode and then using a simple formula to find the actual KV value and RPM of "n" poles motor.

Actual KV Value of "n" poles = KV Value under 2 poles / (no. of poles / 2)
n=2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24

For example, for 8 magnet poles motor, KV reading under 2 poles is 8000.
The actual KV value of 8 magnet poles motor= 8000 / (8/2) = 2000

CONNECTION DIAGRAM
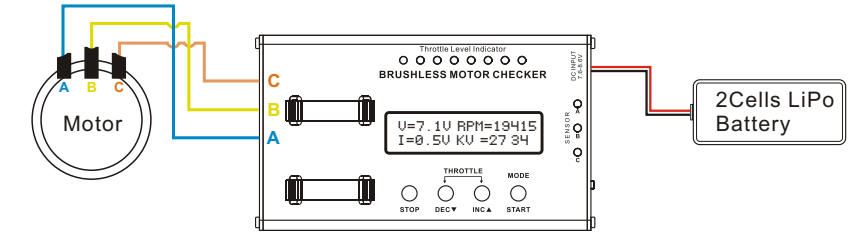
RC Car Brushless Motor with Sensor
(a)Move the Switch to "Car" Position
(b)Connect Sensor Cable and Motor Power Wires A, B, C
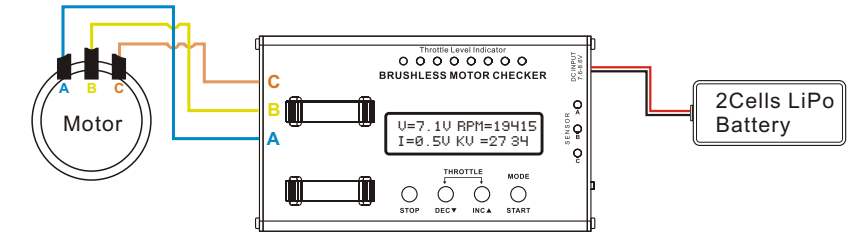(c)Connect to Power Source

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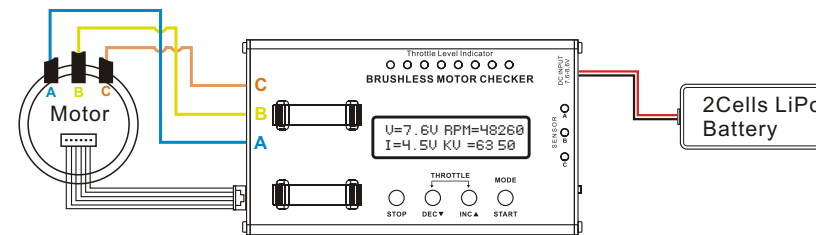
RC Car Brushless Motor without Sensor
(a)Move the Switch to "Car" Position
(b)Connect Motor Power Wires A, B, C to Motor Checker A, B, C
(c)Connect to Power Source

Flight Brushless Motor
(a)Move the Switch to "Flight" Position
(b)Connect Motor Power Wires A, B, C to Motor Checker A, B, C
(c)Connect to Power Source

CONNECTION PROCEDURES

(a)Connect Motor Checker to 7.6V-8.6V power source, the screen will be light up and display will show the input Voltage, Ampere, RPM and KV values.

(b)For sensor type motor, connect A, B, C wire cable from motor checker to motor A, B, C connector. Please make sure the wires should be connected properly before starting operation.
Connect sensor harness cable.

Wire A: Blue Color
Wire B: Yellow Color
Wire C: Orange Color

OPERATION MODES

There are 3 operation modes: Brushless Motor Checking, Hall Effect Sensor Test and Motor/Car Diff Break-in.

1. Brushless Motor Checking Mode
The descriptions of each parameter are explained below:

V (Voltage) Show the input voltage to motor checker

RPM (Revolution Per Minutes) Show the rotor revolution at a certain throttle power level

KV (RPM per Volt) Show the rotor RPM/Volt at a certain throttle power level. The KV rating of brushless motor is the constant relating the motors unloaded RPM to the peak voltage on the wires connected to the coils (the "back-EMF"). For example, a 6,350 KV motor, supplied with 7.6 V, will run at a nominal 48,260 rpm.

I (Ampere) Show the current drawn by the motor at a certain throttle power level.

The above picture shows the throttle power level is enclosed by a dot outline. In order to prevent from giving a max power to the motor from the start up, the default power level is 3 for every time to start running the motor. The maximum throttle power level is 8 and the minimum throttle power level is 1.

After power up the unit and press the START key, it will enter to the motor test mode and motor will start running. As the motor is running, the corresponding parameters will be measured and shown on the display screen.

At the start of motor running, the default throttle power level is 3. The **Inc** and **Dec** key can be used to increase or decrease the throttle power level.

When the STOP key is pressed, the motor will stop running immediately and the last data measured by motor checker will be recorded and kept on the display screen.

2.Hall Effect Sensor Test Mode (Brushless Motor with Sensor Only)
Sensored-type (motors with an extra six wires harness, connected to Hall Effect Sensors). Hall sensors are commonly used to time the speed of wheels and shafts, such as for internal combustion engine ignition timing or tachometers. They are used in brushless DC electric motors to detect the position of the permanent magnet.

After power up the motor checker or after the STOP key is pressed to stop the motor running, it will enter to the Hall Effect Sensor Test mode automatically. If the motor sensor harness is connect to the sensor connector of the unit, one or two of the sensor LEDs will be light up that show the corresponding sensors are function correctly.

Rotate the rotor for a step, and then the light up sensor LED will be changed. For example, if the sensor A LED is light up, after the rotor is rotated by a step, then the sensor A and B LEDs will be fight up at the same time. If rotating the rotor by a step again, sensor A LED will be light off and sensor B LED will be light up only.

For a proper sensor operation, LED should be light up according to the below sequence:
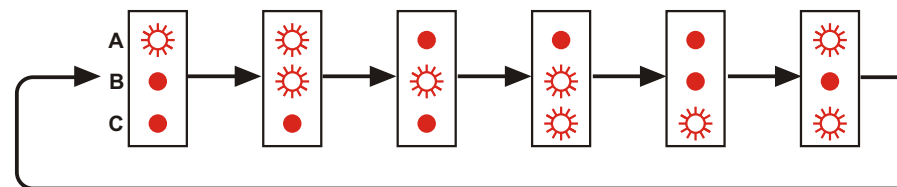
LED A-> LED A,B -> LED B -> LED B,C -> LED C -> LED C,A -> this sequence will be repeated if the hall effect sensors are functioned properly.

The following phenomenons that show the motor Hall Effect Sensor do not work properly.
-The LED light up sequence is not correct
-All LEDs light up at the same time
-All LEDs light off at the same time

3.Motor/Car Diff Break-in Mode
The diff break-in function can quickly and effectively break-in your new ball differential. Simply connect the motor checker to your car's brushless motor directly and holding the tire on one side only and run break in program. After the break in process is completed the diff will be smoother and have increased life and efficiency.

After power on the motor checker, press and hold the MODE key for 2 seconds, then it will enter to the Motor Break-in mode. In this mode, the display screen will be changed as shown in below.

V (Voltage) input voltage to the motor, the adjustable range is from 2.5V to 7.2V.
T (High to Low Voltage Ratio Step) the adjustable step range is from 1 to 10. If the step is set to 1, then the break-in hi-low speed is faster. On the other hand, if the step is set to 10, then the break-in hi-low speed is slower. When the step is set to F, it will set a fix selected voltage to break-in motor.
RPM (Revolution per Minutes) show the rotor revolution at a selected input voltage.
I (Ampere) show the current drawn by the motor at a selected input voltage.

In Motor Break-in mode, the voltage value V will be flashing for setting. This value can be set to different values through INC and DEC key.

After the voltage value V is set, press STOP key to change the setting of T value. As the T value is flashing, the value can be altered through INC and DEC key. When T is set at 1 and pressing the DEC key again, T value will become 'F' that will fix selected voltage to break-in the motor.

When both setting are confirmed, the motor break-in process can be activated by pressing the START key. To stop the motor break-in process, just press the STOP key to stop it.
To quit Motor Break-in mode, just press and hold MODE key for around 2 second.