

Electrocar Brushlessmotor Controller Tester Instruction Manual

Forward

Thanks for your use of the product of this company. It is the greatest honor to provide our service to you. Please carefully read the following contents before your use of this product so as to facilitate your operation.

Introduction to the Product

Electrocar brushlessmotor controller tester is a simple and portable instrument specially designed by our company for quickly testing good or bad of the electrocar brushlessmotors (including testing good or bad of motor winding and Hall), 60° or 120° of phase angle, phase sequence of brushless motor and brushless controller. It is a necessary tool for electrocar factories, controller manufacturers, motor manufacturers, steering and braking handles manufactures, electrocar sales agents, electrocar testing personnel and electrocar maintenance people.

Points for Attention

1. Please don't forget to turn off the switch of this tester when not use so as to keep the capacity of the battery. Turn on the switch when use (turn on of switch is not needed when testing winding of motors. For testing the Hall and phase of motors, switch is needed to be turned on).

2. This tester should be put in ventilated, dry and no corrosion place and should be reduced vibration.

3. The battery of this tester is a consumptive article. If electricity is used up, no quality guarantee for the battery and you need to change the battery at your expenses. Due to constant tests, the plug-in components are easy to be worn, so, customers should keep them well and make regular maintenance. Generally speaking, few faults would happen in other components of the tester, if a customer needs us to repair the tester, we suggest him/her to firstly check the capacity of the battery, or change the battery to try, and then check the connections of the plug-in components to see whether there is poor connection. If no fault is found in the above examinations, the customer may get the tester to be repaired at our service center.

When use of the tester, customers should pay special attention to: the steer testing wire and the main wire of controller cannot be wrongly connected, steer testing wire can only bear 5V of electricity, but the output of the main wire is 24V~60V, if wrong connection, the steer testing wire will be burnt, at this time, tests of hall and steer will all not be effective or will result in the power indicating light is not lit (even you change the battery, it is not lit either). Faults resulting from incorrect operations will cause no quality guarantee for the tester, we hope customers can understand.

Methods of Use

Please turn off the switch when non-use and turn on it when use (turn on of switch is not needed when testing winding of motors. For testing the Hall and phase of motors, switch is needed to be turned on).

1. Test the winding of motor: Use the three alligator clips of yellow, green and blue to connect the winding of the motor (there is no need to consider the color and sequence of the three thick wires of the motor, they can be randomly connected), then turn the motor clockwise (along the normal advance direction of the electrocar), you can see that the three indicating lights (LED) in the first row of the tester flash, this means normal status. If one, or two, or three don't flash, that means abnormal status (if the indicating light is not lit, that means such winding has fault or has poor connection).

2. Test the Hall of motor: Use the hexawire plug of the signal wire of motor Hall to connect the hexawire plug-in component of motor (the color of the five thin wires of the motor is red, black, yellow, green and blue respectively), except for the red and black wires which must be correctly connected, others can be connected randomly, and then slowly turn the motor clockwise (along the normal advance direction of electrocar), you can see that the three indicating lights of a, b and c (LED) of the second row of the tester alternately flashes, this means normal status; if one, or two, or three all are continuously lit or continuously not lit, this means that such the Hall of motor has fault or has poor connection.

3. Test whether the motor phase angle is 60° or 120° : Under the condition of Hall is normal, if the indicating light of 60° is lit, that indicates such motor is 60° , and if the indicating light of 60° is not lit, that indicates such motor is 120° .

4. Test the phase sequence of motor

(1) Test the phase sequence of Hall:

(a) 60° motor: Use the hexawire plug of this tester to connect the hexawire plug-in component of the motor (the color of the five thin wires of the motor is red, black, yellow, green and blue respectively), except for the red and black wires which must be correctly connected, others can be connected randomly, then slowly turn the motor clockwise (along the normal advance direction of the electrocar), you can see that the three indicating lights (LED) in the second row of the tester alternately flashes.

From left to right, if the three a, b, c indicating lights change in 6 statuses: $100 \rightarrow 110 \rightarrow 111 \rightarrow 011 \rightarrow 001 \rightarrow 000$, and if status changing order is opposite, then randomly exchange any two leads of the three yellow, green and blue leads (at this time, if slowly turn the motor clockwise, you can discover that from left to right, the three a, b, c indicating lights are normal, and its order is: $100 \rightarrow 110 \rightarrow 111 \rightarrow 011 \rightarrow 001 \rightarrow 000$). At this time, remember the color order of the three thin wires of the motor corresponding to the three yellow, green and blue thin wires of the tester. This color order is the phase sequence of Ha, Hb and Hc.

60°	120°	
abc	abc	
100	100	1abc
110	110	2acb
111	010	3bac
011	011	4bca
001	001	5cab
000	101	6cba

(b) 120° motor: Use the hexawire plug of the tester to connect the hexawire plug-in component of the motor (the color of the five thin wires of the motor is red, black, yellow, green and blue respectively), except for the red and black wires which must be correctly connected, others can be connected randomly, then slowly turn the motor clockwise (along the normal advance direction of the electrocar), you can see that the three indicating lights (LED) in the second row of the tester alternately flashes. From left to right, if the three a, b, c indicating lights change into statuses: 100→110→010→011→001→101, and if status changing order is opposite, then randomly exchange any two leads of the three yellow, green and blue leads (at this time, if slowly turn the motor clockwise, you can discover that from left to right, the three a, b, c indicating lights are normal, and its order is: 100→110→010→011→001→101). At this time, remember the color order of the three thin wires of the motor corresponding to the three yellow, green and blue thin wires of the tester. This color order is the phase sequence of Ha, Hb and Hc.

(2) Test the phase sequence of winding: Through the above tests, we know that the phase sequence and color order of Ha, Hb and Hc are identical, therefore, motor winding phase sequence and Hall phase sequence of most manufacturers have been set up, but there are still some motor manufactures whose winding phase sequence and Hall phase sequence color order are not identical (some are opposite and some have no law). Because when we connect the testing motor with the standard controller, we will know the phase sequence and color order of Ha, Hb and Hc, and because we know the phase sequence color and order of Ha, Hb and Hc, we can connect Ha, Hb and Hc with the standard controller to judge the winding sequence of the motor. We can make different connections (change the windings) to judge it (six times at most) (If correct, motor operation is stable, noiseless and small idling current, generally not exceeding 1A). In such a way, winding phase sequence and hall phase sequence and color order of all manufactures can be set up.

5. Test the steer: Use the three red, black and blue (signal wires) alligator clips of the tester to connect the three leads of the steer and then turn the steer, the indicating light of the steer will change in accordance with three statuses: green light flashes → light extinguishes → red light flashes. When green indicating light of the steer flashes (the voltage of steer is 0.86~1.20V), if at this time, the light does not flash, general fault is that steer magnetic steel falls off. Continuously turn the steer, indicating light extinguishes (the voltage of the steer is 1.20~3.60V, motor enters into operation status and progressive acceleration), turn again the steer, the red indicating light flashes (the voltage of the steer is 3.60~4.20V). If indicating lights do not change in accordance with these three laws, that means there is fault of the steer or of the leads. Note: Some manufactures set their highest voltage of the steer under 3.60V, in that case, the red indicating light of the tester will not light.

6. Test the controller: This tester is suitable for testing 24V、36V、48V、60V brushless controllers.

(1) Connect the Hall signal input end of the controller with the hall signal line testing end of the tester

(2) Connect the main wire output end of the controller with the three yellow, green and blue alligator clips of the main wire testing end of the tester. Turn on the switch of the controller, the 5V indicating light of the controller (smaller than LED) should flash. If it does not flash, that means there is fault in the 5V power output of the controller; turn the steer, the six indicating lights of the testing controller of the tester should flashes one by one in accordance with the order. If it does not flash one by one or two lights flash at the same time, that may consider the controller has burnt out.

This function can also be used as function of signal generator to repair controllers.

Change of Battery

1. Turn on the switch of the tester, if the power light (LED) is obviously not bright enough, that indicates insufficiency of electricity in the battery and change of battery is needed.

Note: The rate of fault of this tester is very few, if there is problem, please change the battery in time.

2. Use small screw driver to take down the four screws at the back cover of the tester. Take care to open the back cover and take down the old battery and fix in the new battery (Type: 6F22-9V, 9V special universal battery), and then install the cover. Note: don't screw it too tight.

Main technical parameters of the product

Name: portable electrocar brushless motor controller tester

Model: SP-WS-03

Suitable motors: 24V/36V/48V/60V

Work environment: temperature-20°C—50°C Relative temperature ≤80%

Size: 85mm×90mm×28mm

Advantages of the product

1. Can quickly test good or bad of the brushless controllers.
2. Can quickly test good or bad of the brushless motors
3. Can quickly test out whether the phase angle is 60° or 120°
4. Can quickly test brushless motor phase sequence ABC and abc colors.
5. Can quickly test good or bad of the steer (precise testing)

Manufacturer:

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