KING MAX®

TS-2/RC MULTIPLE TESTER

USER MANUAL

Thank you for choosing a KINGMAX product. It is important that you read the entire manual to become familiar with the unit befor you begin to operate. Save the receipt, warranty and these instructions.
TS-2 multi-function tester is elaborately produced by KINGMAX company. It is a multi-function tester specially designed for R/C models with the most comprehensive function on the current market, so that to provide the most comprehensive test requirements for R/C model players.

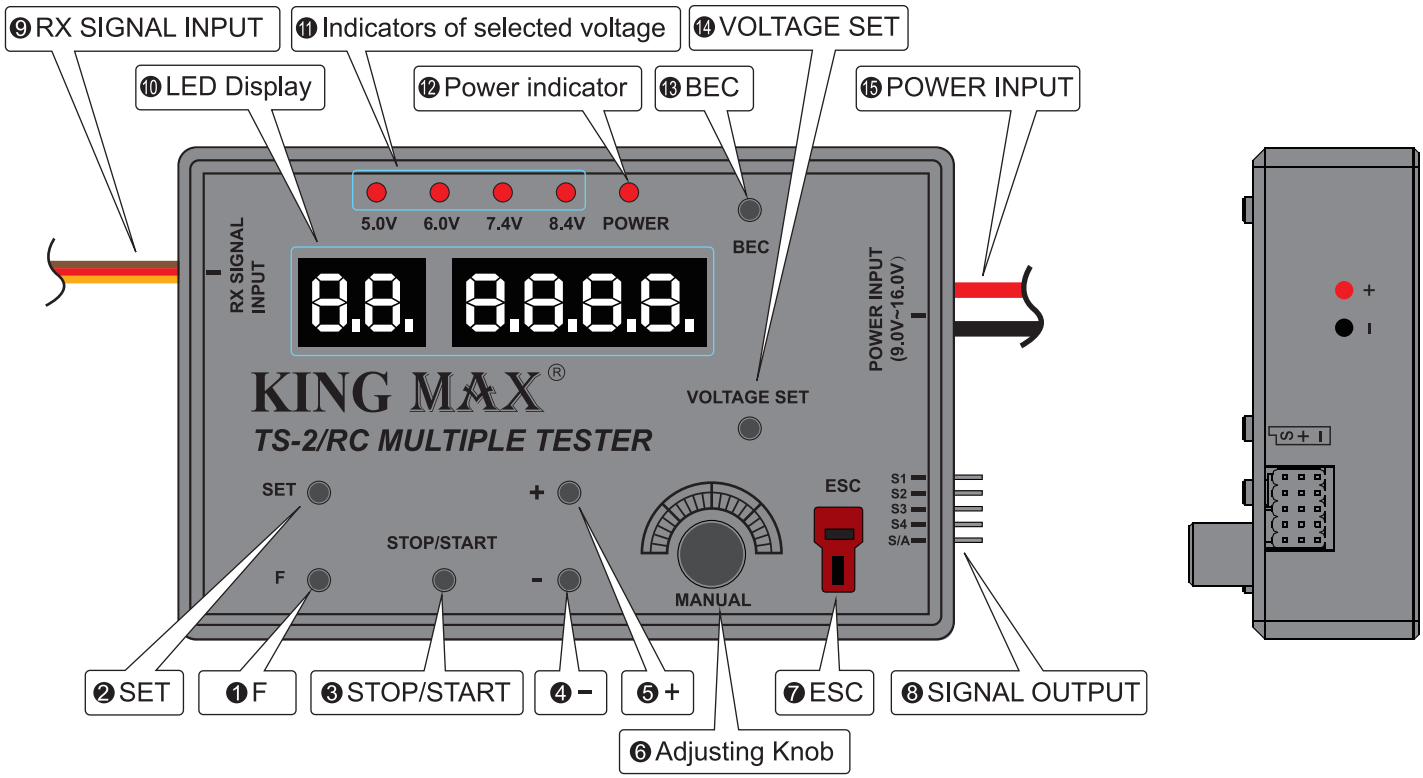
SPECIFICATION AND FEATURE

- Shiny 4 digits red LED to display the measured values;
- Input voltage range: 9V ~ 16.8V (support 3S ~ 4S);
- Comes with high-current BEC, and the output current can reach 10A;
- BEC output voltage is optional, four voltage 5V, 6V, 7.4V and 8.4V can be selected;
- The accuracy of output signal measurement can reach 1us;
- The output signal pulse width is flexible and adjustable. There are three modes for the servo signal output range, the first is1.0us ~ 2.0us, the second is 0.5us ~ 2.5us, the third is user-defined range(adjustable between 0.5 ~ 2.5). These three modes can be selected by pressing the SET key when connecting the battery.
- Product size: 127mm x 78mm x 34.6mm
- Product weight: 163g

PRODUCT FUNCTION

- To measure the directions/range of rotation of servo;
- To test the sensitivity of servo(1us per step minimum);
- To test the rotations of servo automatically or manually;
- To measure the pules width transmitted by transmitter;
- To record the cycles of life test of the servo;
- To test the accuracy of centering;
- To measure the speed of the servo;
- To test the ESC and discharge current of battery (≦ 40A).

FUNCTION INTRODUCTION



❶ F key: The main function options. Press the F key to select the F1-F9 main function options to switch.
❷ SET key: Setting the sub-function.
❸ STOP / START key: Start or pause the main function option which is already be selected.
❹ - key: Decrease progressively the fixed value of main function or sub-function.
❺ + key: Increase progressively the fixed value of main function or sub-function.
❻ MANUAL-Adjusting knob: Manually adjust the values of the output pulse width.
❼ ESC: ESC connection port.
❽ Output pulse signal port, from S1 ~ S4 and S / A, five servos can be connected for testing at the same time, S1 ~ S4 are for normal test. While testing the speed of the servo or operating current, the servo must be inserted into the S / A port.
❾ RX SIGNAL INPUT: Transmitter, receiver signal test channel.
❿ Display screen: Display every function table or test value.
⓫ VOLTAGE DISPLAY LIGHT: Display the voltage selected for the test.
⓬ POWER: Power indicator, the power has been connected if the light is on.
⓭ BEC: Use for turning on or off the power.
⓮ VOLTAGE SET key: Use for selecting the voltage for the test.
⓯ POWER INPUT: 9V-16V DC power（3S~4S Li-Po) input port.

OPERATING GUIDE

1. Select the width range of the pulse signal first:

The operating signal range of general servo is from 1ms ~ 2ms or 0.5ms ~ 2.5ms. This tester provide three modes for choice:
A1.0 2.0 The output width is 1.0 ~ 2.0ms, adjustment method: After connecting the battery, A 1.0 2.0 will be displayed and flash, then press the STOP / START key to confirm and it will be selected, then it will skip to test mode.
B 0.5 2.5 The output width is 0.5 ~ 2.5ms, adjustment method: When "A 1.02.0" is displayed and flash, press SET key and "B 0.5 ~ 2.5" will be displayed. Confirm STOP / START key and it will be selected, then it will skip to test mode.
C Free adjustment, the range is adjustable, the minimum value is between 0.5 ~ 1.3ms and the maximum value is between 1.7 ~ 2.5ms. Adjustment method: Press the SET key while "B 0.5 ~ 2.5" is displayed then "CL XXXX" will be displayed, which indicates the minimum value of the signal. Press the "+" "-" key to adjust the minimum value. After adjusting the CL value, then press the SET key and "CH XXXX" will be displayed, which indicates the maximum value of the signal. Press the "+" "-" key to adjust the maximum value. After the adjustment, press STOP / START to confirm and it will be selected, then enter to test function. Press the SET key for several times and it will switch between A B CL and CH.

2.The regulation of BEC output voltage:

Press the VOLTAGE SET key, the output voltage will circularly switch between the four voltage 5V, 6V, 7.4V, 8.4V and the corresponding indicator light will be on. Then press the BEC key to start the BEC output, only when the POWER indicator light is on will the voltage output. In order to protect servo, when the output voltage is adjusted, BEC will not have output, and needs to be started manually through pressing BEC key.

Note: Before starting the BEC, its output voltage must be confirmed that, whether it exceeds the operating voltage of servo, otherwise, it will burn the servo.

3.The selection and setting of main function and sub-function

F1: Use the knob to adjust the output pulse width.

Function Description:

Tester outputs the control signal, the signal cycle is 20mS (50Hz).Twist the potentiometer knob can adjust the output signal width. Press + - key to adjust the output signal width. Every time press it, the output will increase or decrease a step, the step will be determined by adjusting the "C3", and the range is 1 to 100.

Regulate the relevant parameters of F1 function

Adjustment of step "C3": Press the SET key, and then the relevant parameter step "C3" under the function F1will be displayed. After entering the adjustment state, C3 will be displayed on the left side, the step value will be shown on the right side. And the value on the right side is in the state of beating. Press the +/- key once

and the value on the right side will increase/decrease 1. Continuously press and hold on the +/- key can quickly adjust, the adjustable range is 1 to 100.

Exit the state of the parameter regulation of F1 function

In the state of parameter adjustment, press F key to exit the adjustment state and then return to the F1 normal state. The parameter set at the time of exiting will be stored regardless of the outage, and next time it will automatically load the former setting.

F2: Automatically regulate the output pulse width

Function Description:

The servo signal automatically changes from minimum to maximum and then to minimum. Press the STOP / START key can pause the operation during the automatic change.

Regulate the relevant parameters of F2 function

Automatically swing and regulate the speed "C5": Press the SET key and F2 related parameter "C5" will be displayed. At this time, number on the right side will flash, press +/- key can adjust it. The smaller the number, the faster the servo swings.

Exit the state of the parameter regulation of F2 function

In the state of the parameter regulation, press the F key to exit the adjustment state, and then it will return to the F2 normal state. The parameter set at the time of exiting will be stored regardless of the outage, and next time it will automatically load the former setting.

F3: Three-point Automatic Test

Function Description:

Continuously circulate from minimum value → intermediate value → maximum value → intermediate value → minimum value. Press STOP / START can pause and resume. In the paused state it can be switched through +/- key.

Regulate the relevant parameters of F3 function

Set the middle point "C4": Press the SET key to enter the middle point and set it, the data on the right side will be shown and flash, then press the +/- key to adjust to the needed value. Press and hold on it can quickly adjust. Adjust the three-point speed "C5": Press the SET key to enter the middle point "C4". After setting and pressing the SET key once, then will enter the setting of speed "C5", the right number will flash, then adjust the value by +/- key. The larger the value, the slower the speed. It will change once every 10 seconds when the value reach 100. Press the SET key can switch circularly between the setup modes of C4 and C5.

Exit the state of the parameter regulation of F3 function

Press the F key to exit the adjustment state then will return to the F3 normal state.

F4: Life Testing

Function Description:

During the testing process, the servo signal ranges back and forth between the maximum value and the minimum value. The digital tube will automatically add 1each time when the servo moves and it will stop when reaching the set value. During the life testing, F4 will not be displayed on the function window of the digital tube anymore, and the oscillation frequency will be displayed. The STOP / START key can be used to start or pause the testing.

Reset the test value:

Firstly, press the STOP / START key to pause the test. Press and hold on the "-" key in the paused state. After about 1 second, all the data will be changed to 0, and then press the STOP / START key to start the new test.

Regulate the relevant parameters of F4 function

There are two parameters in F4 life test, Operation and speed adjustment "C5": Press FSET key to enter the speed setting state of "C5", the right number will flash and the value can be adjusted by +/- key. The larger the value, the slower the speed, it will change every 10 seconds once when the value reach 100.

Set the action frequency of this test: Press "SET" key in the setting state of "C5". When pressing SET key, the two bits on the left side of the digital tube will beat, then the middle two bits will beat when pressing once again, they will beat on the right side when pressing once more. When bouncing, it indicates that the two bits are in the settable state. The +/- keys correspond to each jump bit respectively. Press the "-" key to adjust the left bit. Press the "+" key to adjust the right bit. When adjusting, it will change circularly from "0 ~ 9", then select the desired number. The maximum can be set to "999999" times. Press the FSET key can switch circularly between the operation and speed adjustment of "C5" and the action frequency setting.

Exit the state of the parameter regulation of F4 function

Press the F key to exit the adjustment state and return to the state of F4 life testing.

F5: Back-lash Test

Function Description: The servos signal will oscillate continuously in a relatively small range. Increase the swing range via the + key, or the - key to reduce the swing range. When the servo swings from no movement to a slight movement, the back-lash value unit is uS. That is, servo can not respond to the signal changes. Press the Model key to exit the back-lash test, then will skip to the state of F6 speed test.

F6: Servo speed test

Function Description: When measuring the speed, the servo must be inserted into the S / A port. After pressing the STOP / START key, the servo will start to swing, and the digital tube will flash during the testing. After stopping the oscillation, the speed value will be shown and stops flashing. The unit of m easurement result is: second / 60 degrees. Press F key to exit the test and skip to the state of F7 current test.

Note: When starting the servo speed test after testing other function, power source must be cut off and then reconnect new power for testing, which can better ensure the accuracy of measurement.

F7: Servo Current Test

Function Description: When measuring the current, the servo must be inserted into the speed / current port. The servo keep swinging, and the servo's current value will be shown on the data window. The unit is A. Press the Model key to exit the test and skip to F8 to measure the state of receiver's pulse width.

F8: The Measurement of Receiver's Pulse Width

Function Description: When receiver is inserted into the signal input and switch to the F8 function, the output signal width will be shown on the data window. The output port and measurement signal will synchronically output. Press the Model key to exit the pulse width measurement and skip to the state of F9 to measure ESC's current.

F9: The measurement of ESC's current

Function Description: Take care when testing motor and ESC's current. The motor should be firmly fixed to the bracket and cannot hold with hands. The tester's BEC output must be closed, otherwise, it will damage the ESC and tester. The power port of ESC must be plugged into the test socket, and the signal line can be plugged into any of the servo port. Rotate the signal control knob to make the ESC work, press the STOP / START key to switch and display current and output pulse width. Press the Model key to exit the current test and skip to F1.

Note: Be sure to remove the battery in time after using. If the tester needs to be used for a long time, please connect to BB low-voltage alarm equipment on the battery in case that the battery will be damaged due to the over-discharge.

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