

# MT-1

MT-1, the Multi-Tester

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**A more advanced tester for servos and rotating propeller.**

ITEM NO. GWRMT001



## Functions & Applications

- To measure the directions/range of rotation of servo
- To test the sensitivity of Servo (1  $\mu$  S per step minimum).
- To test the rotations of Servo automatically or manually
- To measure the Pulse Width coming from Receiver.
- To measure the Pulse Width transmitted by Transmitter for up to 9 channels.
- To measure RPM of a spinning propeller - for 2 - 6 blades ones, to show the RPM measured promptly, and or set the peak RPM value as well
- To measure the spinning propeller up to RPM 99999.

## Features

- Shiny 4 digits red LED's to display the measured values.
- Power source can be from UM-4 / AAA cell x4, or an adapter with 7 -15V or BEC(5V) from an ESC.
- An output port for applying Positive/Negative signals of Pulse Width from this tester.
- Four buttons for setting up functions and modes.
- Portable and durable tester.

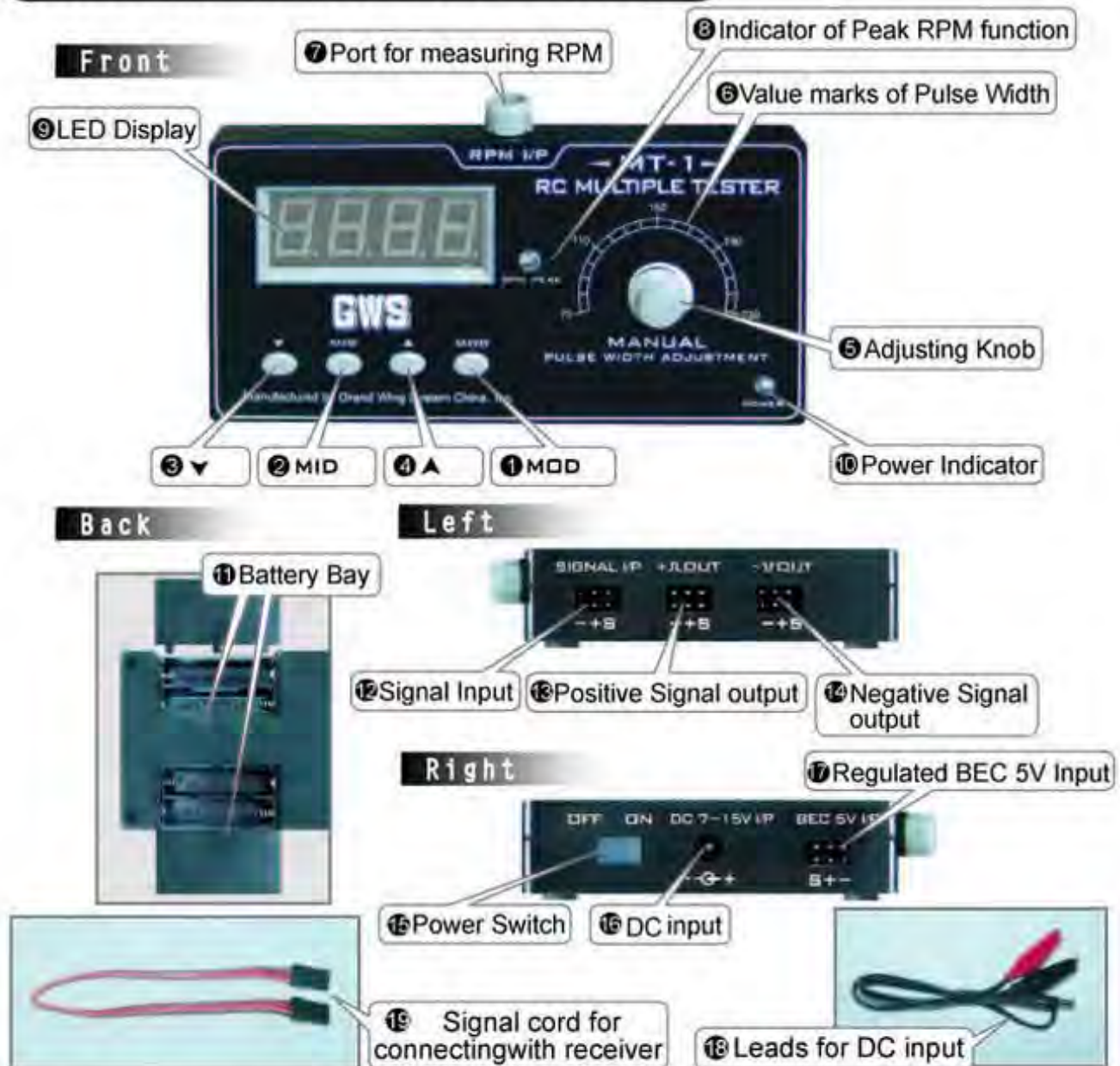
Size: 140 x 70 x 20mm ( 5.51 x 2.76 x 0.79")

Weight: 110g / 3.89 oz (Batteries not included)



Manufactured by Grand Wing System China, Inc.

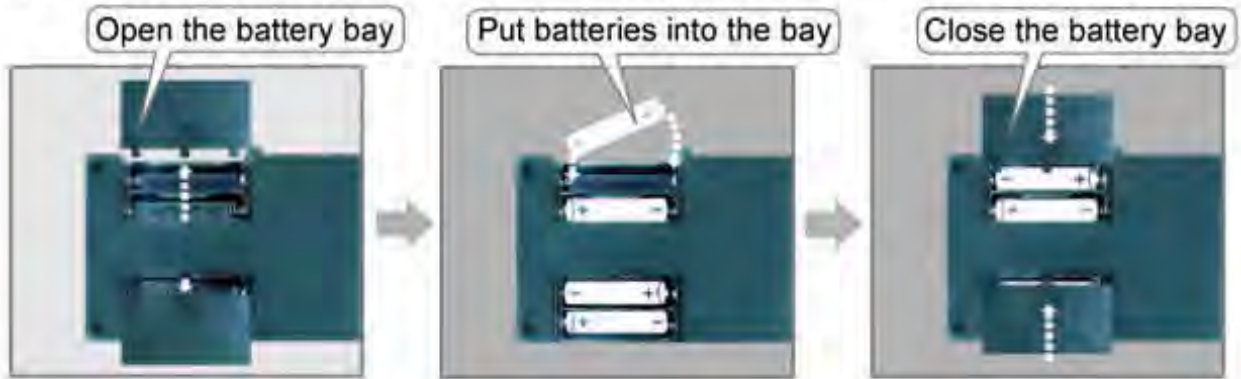
## 1. More illustrations are as below



**Note :** All ports but the DC 7-15V I/P one can all be used by plugging the 3-pin plug. You could plug in either upper pins or lower pins on each port with the right polarities as shown.

- ① MOD : To confirm the main function then to enter sub function.
- ② MID : To set/confirm sub function, and to control the pulse width of mid point.
- ③ ▼ : Browse down to check or set all functions.
- ④ ▲ : Browse up to check and/or set all functions.
- ⑤ Adjusting knob: to adjust the values of output pulse width.
- ⑥ Value marks of pulse width: To tell the actual values of pulse width adjusted by the knob.
- ⑦ Port for measuring RPM: Port for measuring RPM of a spinning propeller.
- ⑧ RPM PEAK: To indicate that the function of measuring RPM peak value has been set.

- ⑨ LED Display: To show all values measured, and main or sub functions set.
- ⑩ POWER: To indicate that the power is ON and well. If the light is ON, the power is ON.
- ⑪ Battery bay: Two battery bays are located at the back of this tester for inserting batteries in UM-4 or AAA size x 4 into. Be sure to put each battery in the right polarities as shown on each bay.
- ⑫ Signal I/P : Port for receiving signals coming from transmitter or receiver.



**⚠ You have to turn off the power switch when using power source from adapter or BEC, otherwise, the outside power source might cause the batteries damaged.**

- ⑬ +OUT: Port for providing signals of positive pulse width.
- ⑭ -OUT: Port for providing signals of negative pulse width.
- ⑮ ON/OFF switch: This switch only turns ON/OFF the battery power.

- ⑯ DC 7-15V I/P: Port for DC 7-15V input.
- ⑰ BEC 5V I/P: Port for regulated DC 5V currents input, ie. BEC 5V from a brushless motor ESC, a 3-pin plug, the servo one is needed.



Outside DC power source



## 2. How to use MT-1 multi tester

### 2.1 How to select/set main functions and sub functions

- a. There are 8 major functions, from F0 to F7, press ▲ or ▼ to select the desired one, then press MOD to confirm and enter the major function. Press MOD again to exit and select another major functions.
- b. After entering one of major functions, normally press ▲ or ▼ to select its sub functions, then press MID to confirm and set values needed. Press MID again to exit and select another sub functions. If this way could not make it, just press MOD again to exit then press ▲ or ▼ to select another major functions, then refer to the instructions stated below

### 2.2 Major function F0 : To set basic values for output signals of pulse width

*Set or adjust the values for performing the desired tests better.*

F0: To set up basic values of pulse width. There are F0-0 to F0-3 sub functions for setting up pulse widths of top/mid/low points run by major functions F1, F2 and F4

**F0-0:** To set the value for the low point of output pulse width controlled by major functions F1, F2 and F4. The setting range is between  $300 \mu\text{S} \sim 1998 \mu\text{S}$ . The default value was  $800 \mu\text{S}$ , if not, just follow the way said below to adjust the value.

Turn On this tester, press ▲ or ▼ to select F0, then press MOD to confirm and enter F0-1, then press ▲ or ▼ to select F0-0, then press MID, then press ▲ or ▼ to adjust the value for the desired low point. Press MID to exit and back to F0-0.

**F0-1:** To set the value for the mid point for output pulse width controlled by major functions F1 and F2. The setting range is between  $1000 \mu\text{S} - 1999 \mu\text{S}$ . The default value was  $1500 \mu\text{S}$ . Follow the same way as F0-0 to enter F0-1 then adjust the value.

**F0-2:** To set the value for output pulse width of top point controlled by major functions, F1, F2 and F4. The setting range is between  $1000 \mu\text{S} - 2699 \mu\text{S}$ . The default value was  $2200 \mu\text{S}$ . Follow the same way as F0-0 to enter F0-2 then adjust the value.

**F0-3:** To set the value of stepping pulse width controlled by major function F2. The setting range is between  $1 \mu\text{S} - 100 \mu\text{S}$ . The default value was  $5 \mu\text{S}$ . Setting up the value in  $1 \mu\text{S}$  could test the servo more precisely, Follow the same way as F0-0 to enter F0-3 then adjust the value.

- Note :** a. The maximum setting range of basic values applied on major function F0 (F0-3 not included) is between  $300 \mu S$  -  $2699 \mu S$ . The rule of  $F0-0 < F0-1 < F0-2$  needs to be taken when setting up the values of F0-0, F0-1 and F0-2.
- b. Pressing ▲ or ▼ longer to increase or decrease the setting values quickly, and the function numbers as well.

**2.3 Major function F1:** To make sure that if the servo rotates exactly according to the already set values for Top/Mid/Low points by pressing "▲ : MID : ▼".

**Note:** You have to set up the desired values of pulse width for Top/Mid/Low points of servo rotations at major function F0 before performing this test. The default values were  $2200 \mu S$  /  $1500 \mu S$  /  $800 \mu S$ .

*Take reference with the photos, and follow the steps stated.*

- Plug the servo into +OUT port, the signal output port.
- Press ▲ or ▼ to select major function F1, then press MOD. (The default value of mid point was  $1500 \mu S$  when entering major function F1).
- Press ▲, MID, ▼ one by one to make sure that the servo rotates according to the values which have already been set, the LED Display certainly shows the same set value when servo rotating to each point.



**2.4 Major function F2:** To test the sensitivity of servo

*To control the servo to rotate according to the stepping pulse width, then to test its sensitivity.*

**Note:** To further set the value of stepping pulse width at sub function F0-3 under major function F0, its default value was  $5 \mu S$ .

*Take reference with the photos, and follow the steps.*

- Plug the servo into +OUT port, the signal output port.
- Press ▲ or ▼ to select F2 major function, then press MOD.
- Press ▲ or ▼ to increase or decrease the value of stepping pulse width, the Led Display shows the total value after each pressing. Further test its sensitivity by setting up different value of the stepping pulse width further.



### **2.5 Major function F3: To test continuous rotations of servo**

*There are 6 speed rates (AU01- AU06), the servo rotates automatically to right and left according to the rate selected. This way could be used as "break in" the metal gears, or to measure the duration of a servo as well.*

- a. Plug the servo into +OUT port, the signal output port
- b. Press ▲ or ▼ to select main function F3, then press MOD.
- c. Press ▲ or ▼ to select speed rate, from AU01 to AU06, from the lowest rate to the fastest one. The servo rotates according to the selected rate, LED Display shows the speed rate.

### **2.6 Major function F4: To test rotations of the servo manually**

*To test rotations of servo by turning the adjusting knob to adjust the value of output pulse width, then perform the test.*

**Note: The range of the pulse width for manual control (top and low points) can be set at sub functions F0-0 and F0-2 under major function F0. The default range was 800  $\mu$ S - 2200  $\mu$ S.**

- a. Plug the servo into +OUT port, the signal output port.
- b. Press ▲ or ▼ to select major function F4, then press MOD.
- c. To turn the adjusting knob, the servo rotates according to the values turned into, the LED Display shows the values, too. You could select the different values shown around the knob, the servo certainly rotates in different range.



## 2.7 Major function F5: To test the pulse width for the channels/functions of R/C receiver

To measure the values of pulse width used by each channel/function. You have to turn ON the transmitter and receiver first.

- Connect the channel/function of the receiver with the Signal I/P port of MT-1 in parallel.
- Press ▲ or ▼ to select major function F5, and press MOD. The Led Display then shows the value of pulse width used by the channel/function.
- The Led Display shows OFF if no signal transmitted into MT-1.



Signal cord for connecting with receiver

## 2.8 Major function F6: To test the pulse width transmitted from the channels/functions of R/C transmitter for up to 9 channels.

To measure the values of pulse width transmitted from each channel of R/C transmitter.

- Apply a 3-pin signal cable with 3-pin plug on the end, and a stereo plug or trainer cord one on the other end as well (Refer to the photos but this cable is not included). Plug the stereo plug into the trainer cord port of the transmitter, and plug the 3-pin plug into Signal I/P port of MT-1.

Transmitter signal cord (not included)



- Press ▲ or ▼ to select main function F6, and press MOD.
- Press ▲ or ▼ to select the desired channel number, and press MID, then the LED Display shows the value of pulse width used by this channel. Press MID again to exit or select another channels by pressing ▲ or ▼ again.



## 2.9 Major function F7: To measure the RPM of a spinning propeller.

It is good for 2-6 blades propellers, can measure a spinning propeller for up to RPM 99,990 (Always use 10 times the value shown on the LED Display for the actually measured RPM. ie.  $10 \times$  the shown 9,999 = the actually measured RPM 99,990 )

- Press ▲ or ▼ to select major function F7, and press MOD.
- Press ▲ or ▼ to select the right sub function for the propeller, ie. F7-2 for 2-blade propeller, F7-3 for 3-blade one, F7-4 for 4-blade one.
- Put the spinning propeller in front of a stable light source. Sunlight in daytime is the best source.
- Point the Port for measuring RPM toward the spinning propeller as the photo shown though the photo one was not a spinning one. Be sure to keep them 5 - 10 cm. (2 - 4 inches) away from each other. And press MID, then the LED Display shows the measured value of RPM briefly.
- Press MID again going back to another blades options. Then press MOD to exit.



Actually measured RPM  $651 \times 10 = 6510$



### Warning!

For safety reason, you need to keep everything far away from the spinning propeller. But you have to keep the "Port for measuring RPM" 5 - 10 cm. (2 - 4 inches) away from the spinning propeller, also point it at this spinning propeller as the photo shown in order to measure the RPM correctly. Take note that this function may be interfered by another spinning propellers and twinkling lights, just keep far away from them during measuring propeller RPM. It's better to perform this function with sunlight in day time.

### Optional parts: Transmitter signal cords for using MT-1

- 1.GWHOS022A GWS DSC Cord
- 2.GWHOS022B GWS DSC Cord-JR
- 3.GWHOS022C GWS DSC Cord-FP(Square)
- 4.GWHOS022D GWS DSC Cord-FP(Round)

Grand Wing System China, Inc.  
Huatai Keji Yuanqu, Xiegang Town,  
Dongguan City, Guangdong, P.R.C.  
Tel :+86-769-8768-0000  
Fax:+86-769-8763-9555  
E-mail: china@gws.com.tw

Grand Wing Servo-Tech Co., Ltd.  
No.153, Sec.2, Datung Rd., Shijr City,  
Taipei 221, Taiwan.  
Tel :+886-2-8692-6255  
Fax:+886-2-8692-6845 or 43  
Int'l Inquiry: export@gws.com.tw  
After Service: service@gws.com.tw

Grand Wing System U.S.A. Inc.  
138 S. Brent Circle, City of Industry,  
CA 91789-3050, U.S.A.  
Tel :+1-909-594-4979  
Fax :+1-909-594-8051  
USA Inquiry: sales@gwsus.com  
After Service: service@gwsus.com