# WF-EN-15 ENGINE TEST BENCH

3.0

## Quick Start Guide(QSG)

Wing Flying Tech Co.,Ltd

# I. Notice and Disclaimer

Please read following terms carefully before taking any operation:

1.DO NOT exceed the rated power and max ranges specified in the specification.

2. There is little static friction between the spindle and guide rails, usually less than 1%, which will not affect the accuracy. The engine range should between 60cc and 200cc to avoid deviation of the test result.

3. Place the test stand in an open area. Well fixed the test bench on concrete flooring before test. Ensure no floaters(like plastic bags) around the test area.

4. Ensure the fuel tank is well fixed, keep it away from the test bench and wires before test. Ensure NO leakage of the tank and NO inflammable around the tool. Fire extinguisher is NECCESSARY.

5.Ensure the engine is always off before entering the test area or touching the test stand. Ensure ECU/EFI system is NOT working.

6. The test bench will generate strong vibration during test. Check the tool according to the regular checklist to avoid any safety issue caused by bolts loosening;

7.Operation **MUST** be strictly follow the user manual. Wing Flying has no liability for any issue caused by wrong operation(eg. Approach or touch the rotating motor and propeller).

## II. Installation

Small-sized aero-engine features with high power and vibration. Please install small-sized engine strictly in accordance with the instruction below.

### 1.Install the engine

(1).The engine mount has been installed on the head of test bench. Remove the 4 screws on engine mount, then ready to install the engine (if a vibration sensor is selected, it is also installed in place)

(2). Check if the mounting holes match with your engine. DO NOT fasten the screws if the engine mount is not suitable. Please contact manufacturer to change the mount. Tighten screws with low-strength thread locker if need duration test(continuous working more than 6 hours, total duration 30 hours) to avoid screws loosening, as shown in Fig.2.1.1.



Fig 2.1.1 Engine Mount

(3). Need NOT to detach the mount if your engine covers those 4 screws. User can directly hang the engine on the test bench.

(4). After fixed the engine, install the engine with the mount on the test stand.(For duration test, please apply some low-strength thread locker.
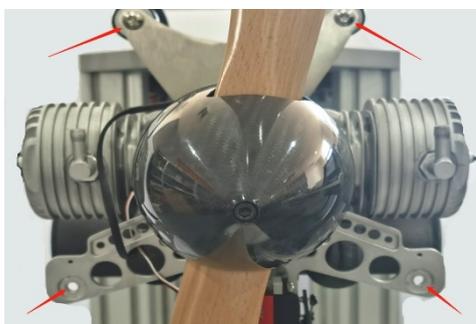


Fig.2.1.2 Install engine on the mount

## 2. Optical Speed Sensor
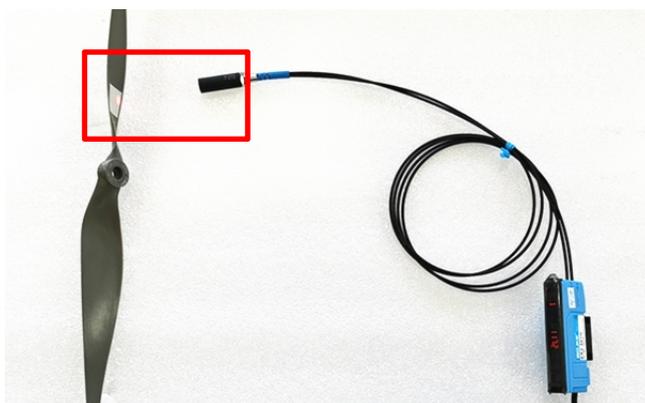


Fig.2.2.1 Reflective Stickers on propeller

The optical speed sensor has been installed on WE-EN-15 engine test stand. User can use it after following instructions.

(1). stick reflective stickers on proper position of the propeller(usually at the middle or the hub)

(2). Infrared reflector points at the sticker and keep a distance around 3-5cm. Far distance will affect the accuracy.

(3). Open the cover of the sensor, keep the focus on non-reflective surface(eg. dark parts on the engine), press "set", then it displays "set" on the screen, as shown in Fig.2.2.2
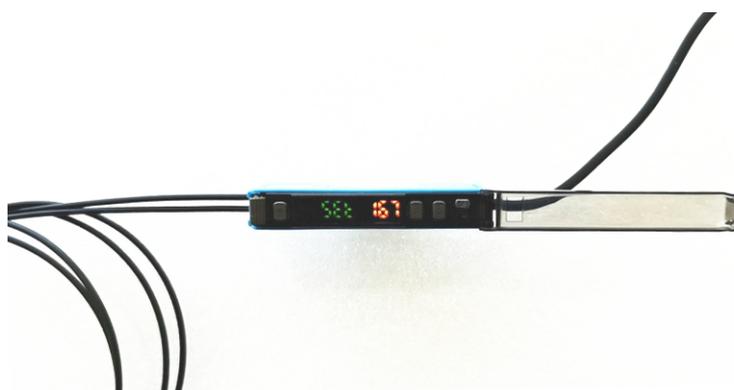


Fig 2.2.2

(4). Turn the propeller to test surface. Keep the infrared focused on test surface. It will display the accuracy, as shown in Fig 2.2.3.

Fig.2.2.3 Accuracy Display

(5)Press "set" again to complete the setting.

This method is suitable to test propeller. User can stick reflective stickers on outer wall of the engine(or the rear of the fairing) to improve the accuracy, then repeat above steps.

It will improve the accuracy if use 3-blades, 4-blades propeller or more patches. User should set the correct blades or patches in the software.
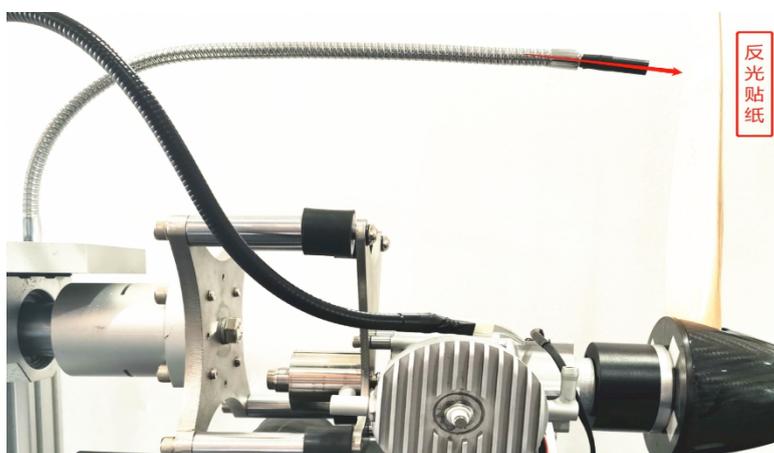


Fig.2.2.4 Optical Speed Sensor Debug

Note: It is easy to bend the Optical fiber, but DO NOT bend it thoroughly, otherwise it will affect the test accuracy.

## 3. Installation of Infrared Temperature Probe

WF-EN-15KGF measure temperature by infrared detection. The probe should point at the cylinder head and keep the distance around 1-3cm (keep the lens clean without greasy covered). Ensure the temperature probe has been well fixed and will not shock with the engine vibration.

Infrared temperature probe detects temperature without touching the object. There will be a deviation due to the emissivity of the object. Therefore, the test area should be in dark (black tape or black marker can be used). Besides, the probe may also detect the ambient

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temperature,  install the sensor inside the bracket and keep good ventilation,as shown in Fig. 2.3.1



对准缸头位置
1-3cm
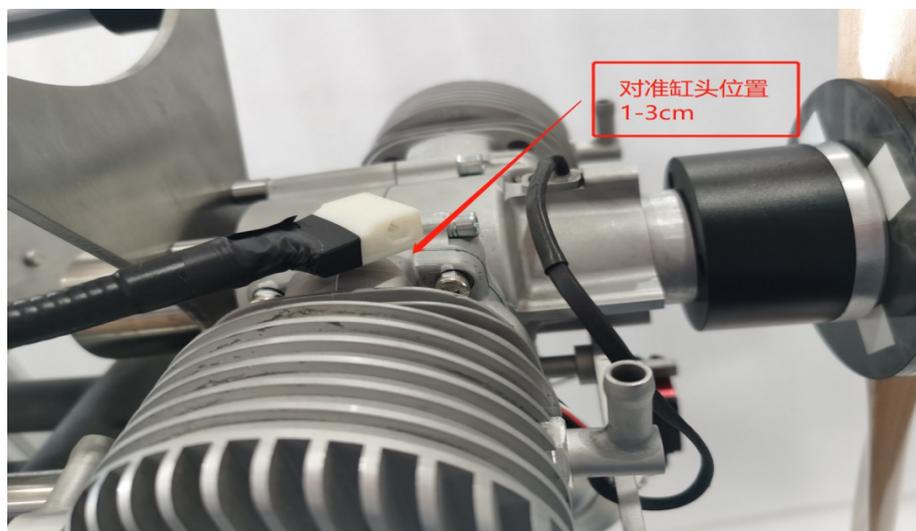
Fig.2.3.1 Temperature probe location

## 4.Install Propeller

Install propellers according to your manual and ensure each propeller is well fixed. User should test each propeller for first-time installation. Check the vibration and ensure each propeller is well balanced.

# III. Software Debugging

## 1. Power On the Test Stand

Connect with 220V input, then Power adapter connects to DC input(12V) on the test stand.  You will hear "DiDiDi"after powered on, as shown in Fig. 3.1.1 and Fig. 3.1.2:



Fig.3.1.1 Power Adapter



Fig 3.1.2 DC input on test stand

## 2. Connect with PC

(1) Software installation: Win7 / Win8 / Win8.1 / Win10 system

(2) Connection: connect the data cables or wireless data transmission. USB cable connects to your computer.

(3) Driver Debugging: Right click "My Computer" to "Computer management" , click "Device Manager". User can find "USB Serial Port (COM XX)" which indicates driver has been installed automatically , as shown in Fig. 3.2.1
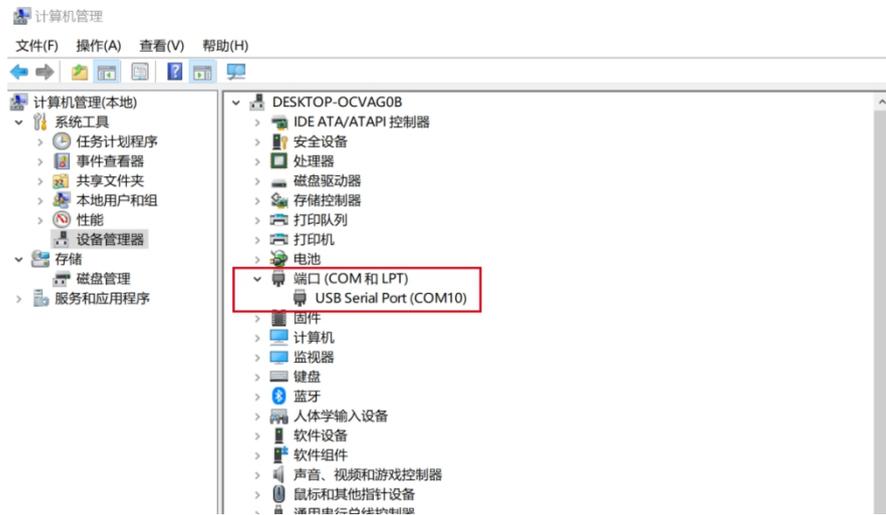


Fig. 3.2.1

NOTE: Failed to install the drive when it comes with ⚠ .Please check your computer and driver installation.(right-click to update)

(4) Software Connection: Open the software, user will see the COM XX , then click "Connect". Connection succeeded when hearing "Di", as shown in Fig. 3.2.2:

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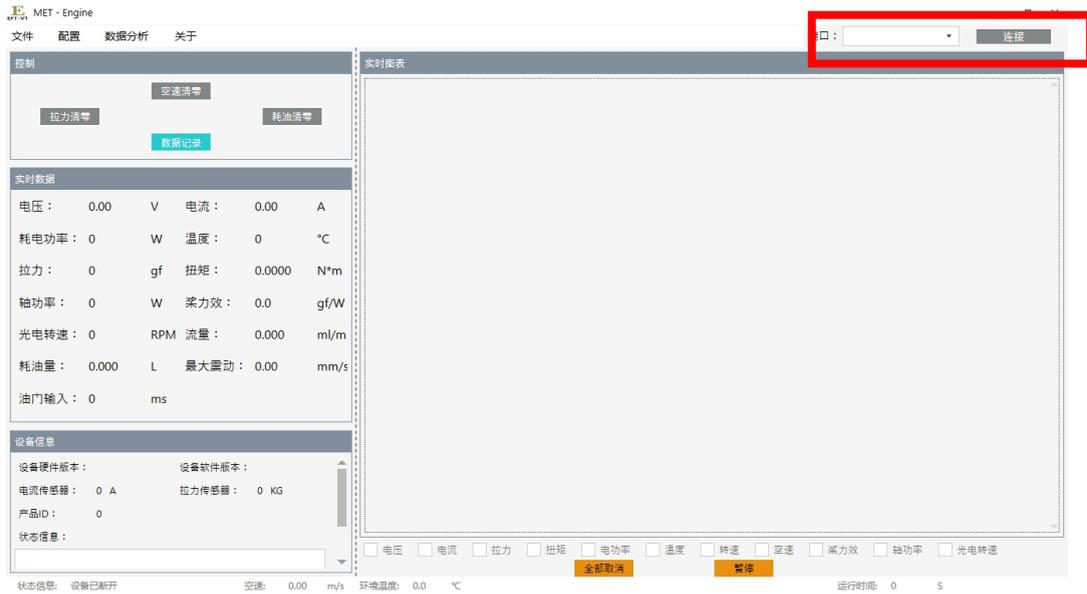
Fig.3.2.2 Software Connection

<span style="color:red">Note：Always connect USB cable to Computer before running the software, otherwise the device can't be recognized.</span>

## 3.Data Record

The data in Excel is recorded in Manual Control mode. User can click"Recording"to start recording. Click"Stop"to stop data recording. Open the File →File Storage, to check the raw data.

# IV. Regular Checklist

| Item | Each Test | Detach engine | 30 times test /month | Remarks |
|---|---|---|---|---|
| Screws on holding structure | x | x | √ | This data is obtained from3W-110cc engine with 2500-6000RPM. Please make proper adjustment if the vibration of your engine is far different from it. |
| Screws on motor mount | √ | √ | √ | |
| Linear bearing  lubrication | x | x | √ | |
| Screws on thrust/torque sensor | x | x | √ | |
| Airspeed components | x | x | √ | |
| Thrust/Torque sensor | x | x | √ | |

(1) Linear bearing lubrication：Spray the low viscosity lubricant (WD-40 high performance white lithium grease is recommended) into the oil inlet (**DO NOT** use mechanical lubricating oil with

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high viscosity).

(2).Thrust/torque sensor inspection: use a simple tension meter on the end plate. Compare the data with the test bench. It's qualified if the error is less than 500g ( Thrust<10KGF). Generally, the sensor will not be damaged or flailed to work as long as the data are almost the same.