

UAV Power System Testing

WF-EN-17-MAX

Quick Start Guide

5.0

WING FLYING (TIANJIN) TECHNOLOGY CO.,LTD.

Add: 7th Floor, B2#, Animation Building, Sino-Singapore Tianjin ECO-CITY 300480, China

Website: <https://www.wingflyingtech.com>

QSG of WF-EN-17-MAX Engine Test Bench

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Dear user,

Thank you for your trust in choosing WING FLYING products.

WING FLYING has always believed that professionalism creates quality, adheres to customer first, continues to invest in product research and development, pursues a precise attitude, and provides efficient and excellent services, allowing us to continue to innovate and launch products that satisfy customers.

This guide will guide you to use the WF-EN-17-MAX UAV power test system safely and efficiently. Before operation, please be sure to read this guide and operate according to the guide.

Thank you so much.

Contact us:

WING FLYING (TIANJIN) TECHNOLOGY CO.,LTD.

E-mail: sandy@wing-flying.com

Cell phone & WhatsApp No.: 0086 13042251024

Add.: 7th Floor, B2#, Animation Building, Sino-Singapore Tianjin ECO-CITY, China

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I. Precautions For Use

When the WF-EN-17-MAX engine test system is working, the high-speed rotating propeller may cause a certain degree of injury and damage to personal property. Therefore, when using the system, please pay attention to safety. The company is not responsible for product damage or personal risk caused by failure to follow the manual regulations.

1. The WF-EN-17-MAX engine test system should be placed in an independent space. Before conducting a power test, ensure that the surrounding environment is safe. During the test, no one is allowed to enter without the operator's permission to avoid personal injury.

2. Please test within the range allowed by the engine test system and do not exceed the maximum range of the test bench.

3. Use the test equipment strictly in accordance with the manual and do not operate it in violation of regulations to avoid electric shock.

4. Do not get close to or touch the rotating engine or propeller to avoid being cut by the rotating propeller.

5. Before use, please check whether the propeller and engine are installed and tightened.

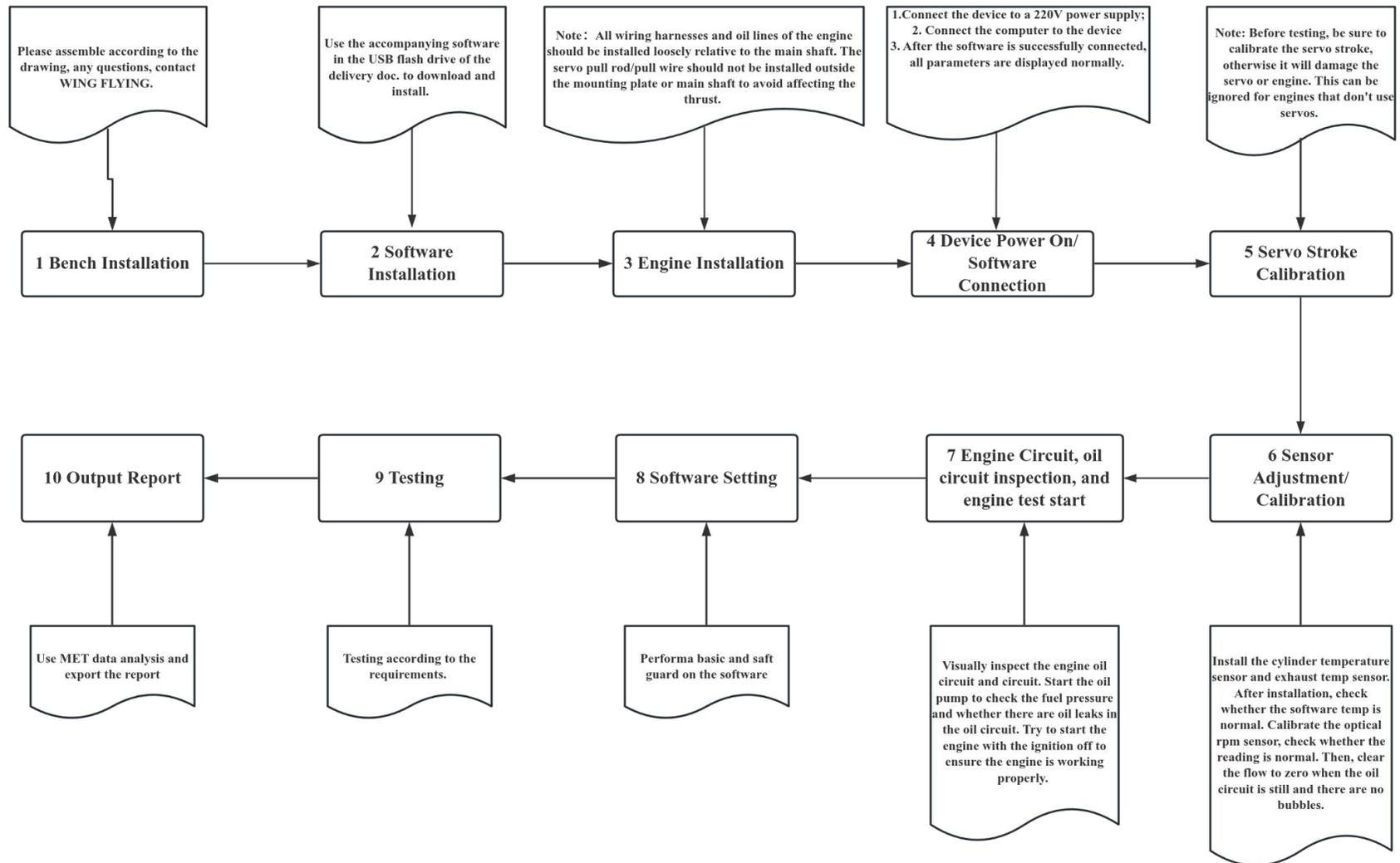
6. Before use, please check whether all parts are intact. If any parts are aged or damaged, please replace them with new ones.

7. Operators must not operate the machine while drinking, taking drugs, feeling dizzy, weak, nauseous, or in other poor physical or mental conditions to avoid injury.

8. When the software issues an alarm, the operation should be stopped immediately.

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II. Flowchart of the thrust stand



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FIG 2-1 Flowchart of the test bench

*The testing environment should be an open and non flowing testing site, ensuring that the site is clean and free of easily blown debris. The test stand should be firmly fixed to the ground (contact surface below). If there is any shaking gap found on the main body of the test bench by hand, it needs to be re fixed.

*Please follow the testing process during testing to avoid affecting testing accuracy.

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III. Software download and installation

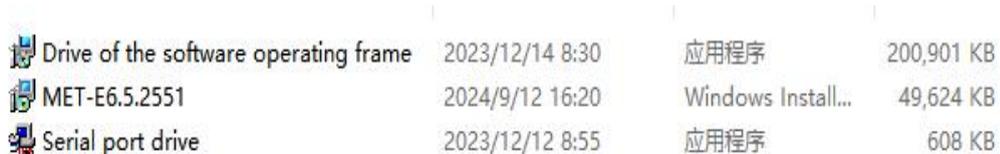
I>Software operating environment

- ◎CPU: 2GHz or above
- ◎Memory: 2G or above
- ◎Graphics card: No requirement
- ◎Display: 1366*768 resolution or above (1080P recommended, display ratio 100%)
- ◎Operating system: Windows7 and above
- ◎Software running framework: The software running framework is included in the U disk, and the user can install it by himself
- ◎Test data output conditions: Excel/WPS office software

II>Software, runtime framework, and driver installation

1. Software installation

The WF-EN-17-MAX test bench is equipped with professional test software MET-E6 series software. The product packaging box is equipped with a USB flash drive. The user opens the USB flash drive file, as shown in Figure 3-2-1. The file contains three program files: MET-E6 (software program), software running framework driver and serial port driver. Please double-click MET-E to run the installation program. Then install it according to the prompts.



Drive of the software operating frame	2023/12/14 8:30	应用程序	200,901 KB
MET-E6.5.2551	2024/9/12 16:20	Windows Install...	49,624 KB
Serial port drive	2023/12/12 8:55	应用程序	608 KB

FIG3-2-1 Software program in the U disk

After installation, shortcuts named “MET-E6” and “DataAnalyzer” will be created on the desktop. After connecting the software to the device, users can achieve to control the throttle, display real-time data, and store the test data. The software has built-in test data analysis software for auxiliary analysis of test bench test data, including chart trend analysis, throttle mean analysis, data charts, graphical display and processing, etc.

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2. Run frame and drive installation

Install the software running framework and serial port driver in the USB disk in sequence. After the installation is completed, right-click the MET software icon, click Properties, select Compatibility, check "Run this program as an administrator", click Apply, click OK to open the MET software to connect to the device and realize test data processing.

*The U disk installation package provided by WING FLYING is equipped with a software running framework driver installation file, which users can install according to their needs. If the user cannot open the software when installing it for the first time, please install this installation package.

3. Software window adaptation adjustment



For the software window to display normally or comfortably, the user needs to set the screen resolution to 1920*1080 and the screen display ratio/zoom to 100%, or adjust the screen resolution and screen display ratio according to their own way.

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IV. Engine installation and commissioning

I>Engine installation material preparation

Prepare the engine to be installed, engine-related accessories, and tools required for installation.



FIG 4-1-1 Preparation of engine installation materials

II>Installation of the engine on the test bench

Assemble the four buffer pads to the buffer pad of the engine base, install the engine mounting seat so that the servo pull rod can pass through the mounting seat hole, fasten the engine mounting seat and the buffer pad with the matching bolts, install the four mounting studs on the mounting end plate at the front end of the test bench, and fasten them with the matching bolts. Adjust the engine position so that the engine mounting seat hole is aligned with the test bench mounting stud hole, and fasten them with the matching bolts.

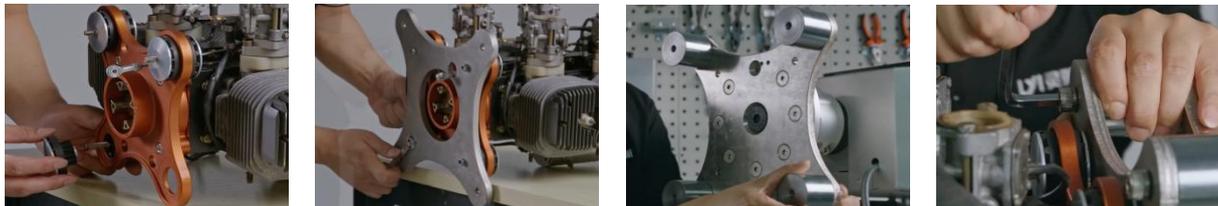


FIG 4-2-1 Engine Installation

*If the engine is subjected to endurance testing (continuous working time exceeds 6 hours, cumulative working time exceeds 30 hours), medium-low strength thread glue should be applied to the fastening bolts to prevent the bolts from loosening.

*Each engine has different installation holes, and the installation method in the figure is for reference only.

III>Installation of the propeller

When installing the propeller, keep the heading on the propeller consistent with the heading of the aircraft; use the matching mounting bolts and propeller pads for assembly, and tighten the bolts in sequence.

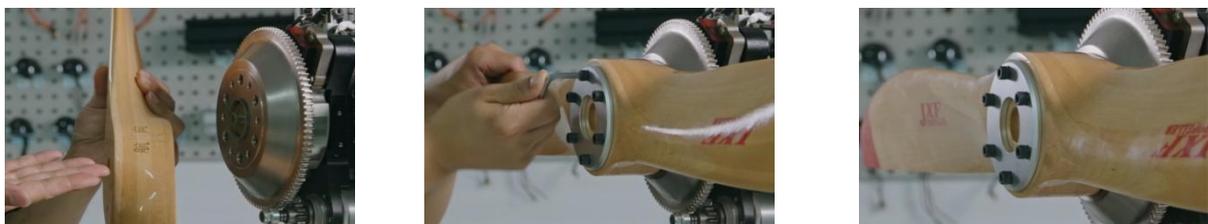


FIG 4-3-1 Engine Installation

*When tightening bolts, tighten them in stages diagonally and clockwise in sequence.

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IV>Engine electrical control assembly and connection

1. Removal of steering gear tie rod and wiring connection

Remove the bolts of the pull rod of the servo rocker arm. After the servo stroke is calibrated, install the servo rocker arm on the servo. It does not need to be installed before calibration. Connect the servo aviation plug (servo signal line) to the throttle control signal interface of the test bench.

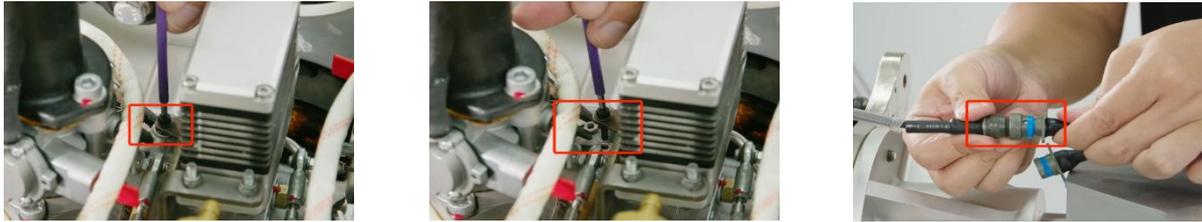


FIG 4-4-1 Removal of steering gear tie rod and wiring connection

*Since there is a risk that the initial position of the servo is not in the throttle range after the servo is powered on, be sure to remove the tie rod bolts of servo rocker arm end tie rod.

*The servo is an optional accessory and users can choose it according to their own situation.

2. Ignition (flame-off) control circuit connection

The ignition (flame-off) control circuit has been connected through the ground wire of the power supply circuit inside the control box, and no other circuit connection configuration is required.

3. Starter motor circuit installation

Connect the positive pole of the power cord to the positive terminal of the starter motor, and the negative pole of the power cord to the negative terminal of the starter motor. Use a cable tie to fix the starter motor power cord.

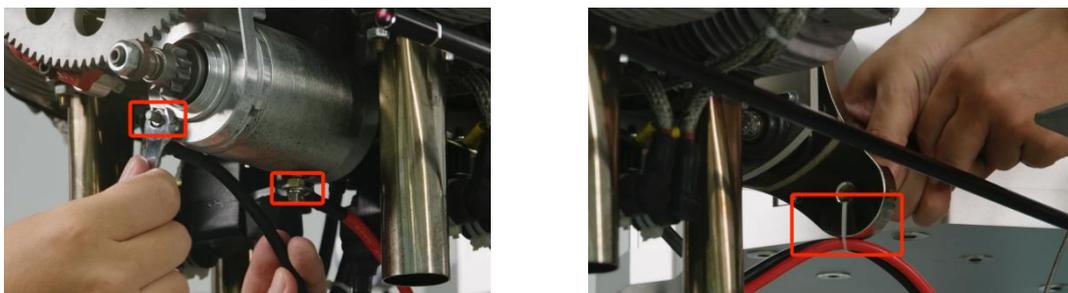


FIG 4-4-3 Starter motor circuit installation

V>Engine rectifier installation (customized)

Place the rectifier on the top mounting plate of the test bench, connect the generator power connector to the rectifier, connect the rectifier output connector to the load meter, place the load on one side of the test bench to facilitate the test personnel to view the data, and use a strap to fix the rectifier.

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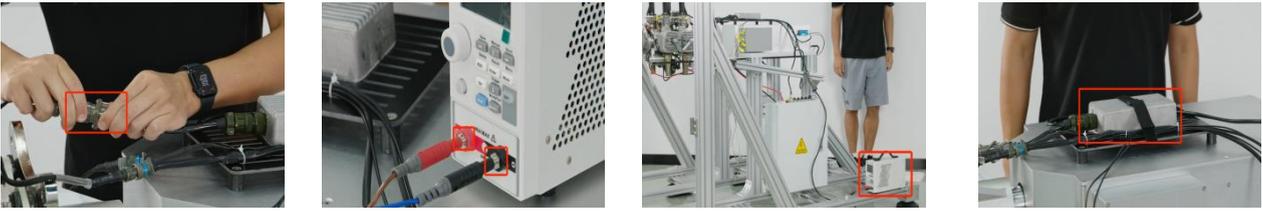


FIG 4-5-1 Engine cowling installation process

VI>Engine oil circuit connection

Connect one end of the engine oil inlet pipe to the oil level sensor outlet and install the other end at the engine oil inlet.

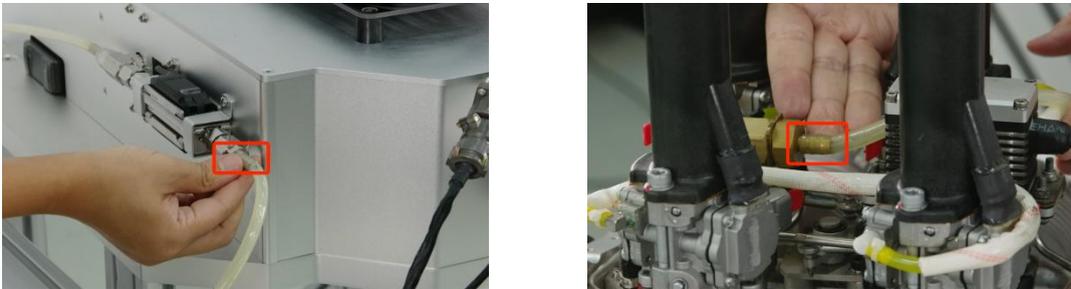


FIG 4-6-1 Engine oil circuit connection

VII>Bench power-on and software connection

1. Connect the power line under the power control box, turn on the UPS power and the main switch respectively, press the power button on the collection box, and hear three "beep, beep, beep" sounds, indicating that the equipment is powered on successfully.



FIG 4-7-1 Power on the bench

2. The wireless data transmission device module has been connected to the device. Connect the wireless data transmission computer module to the computer USB port.

3. Open the MET software and enter the main interface. After the software automatically connects, it will make a "beep" sound, indicating that the connection is successful.

VIII>Set throttle travel calibration

1. Adjust the servo rocker arm position to align with the tie rod mounting hole.

Push the throttle lever to the fully closed state, that is, the minimum throttle position. In the software relay control window, click the motor servo power switch to power the servo. Click "Allow Ignition" and drag the throttle 1 until the servo rocker arm is aligned with the mounting hole of the lever.

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FIG 4-8-1 Adjust the servo rocker arm position to align with the tie rod mounting hole.

2. Record and save the settings of the software throttle minimum opening value parameter

At this time, the PWM value corresponding to throttle 1 displayed in the software is $1390\mu\text{s}$, which is the minimum throttle opening value. Click "Disable ignition", click system settings, enter the throttle curve setting interface, set the minimum value of throttle 1 to $1390\mu\text{s}$, click to save parameters, and after saving successfully, the servo keeps the throttle closed.

3. Adjust the throttle position to the fully open state

The servo rocker arm and the throttle lever are connected and tightened. Click on the main interface of the software, click "Allow ignition", slowly drag the throttle, and the servo follows the throttle to change slowly until the throttle is in the "fully open" state, that is, the maximum throttle position.

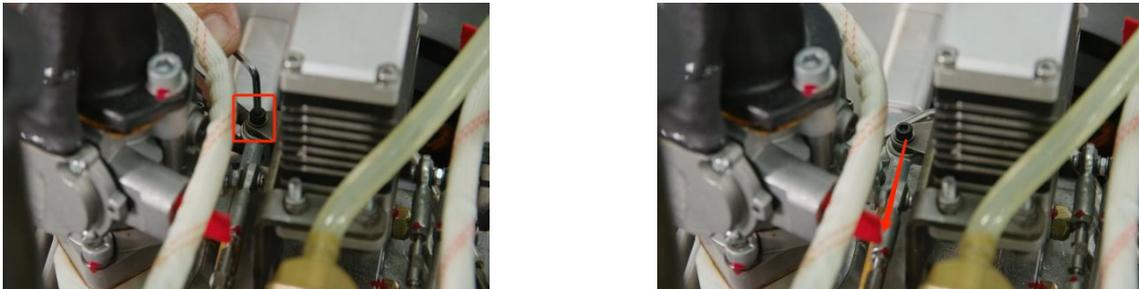


FIG 4-8-2 Adjust the stacking rocker arm position to align with the tie rod installation hole

4. Record the software throttle maximum opening value parameter and save the setting

In the software, record the PWM value corresponding to this throttle 1 as $1620\mu\text{s}$, that is, the maximum throttle opening value. Click "Forbid Ignition", click System Settings, enter the throttle curve setting interface, set the maximum value of throttle 1 to $1620\mu\text{s}$, and click Save Parameters.

The throttle travel calibration is completed.

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V.Sensor calibration and debugging

I>Optical RPM Sensor Calibration

1. Adjust the test probe of the Optical RPM sensor and keep it in this position. Stick the reflective sticker to the position where the optical RPM sensor beam is focused on the propeller, making sure that the beam always falls on the reflective sticker when it touches the propeller; turn the blade and stick the reflective sticker on the other side of the blade (Note: it should be fully pasted according to the FIG 5-1-1).

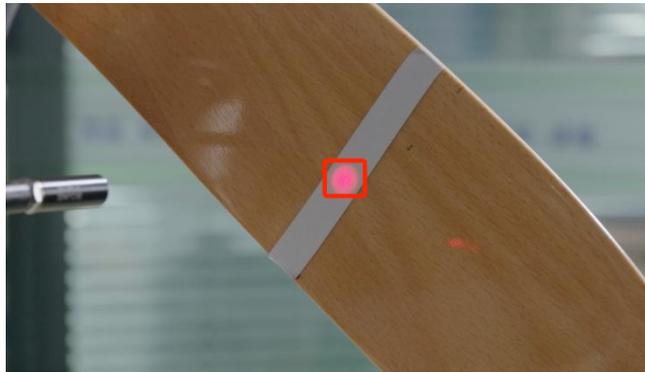


FIG 5-1-1 Attach reflective stickers to propellers

2. Move the propeller away from the beam, align the optical speed sensor beam with the non sensing surface (air), open the sensor calibration cover, press the **SET** button at once, and the sensor will display **SET**. Move the optical speed sensor beam to the reflective sticker on the propeller, and press the **SET** button again to complete the calibration of the optical speed sensor.



FIG 5-1-2 Optical sensor beam is aimed at the air

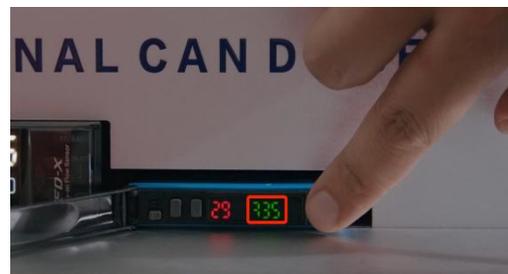


FIG 5-1-3 Press Set button

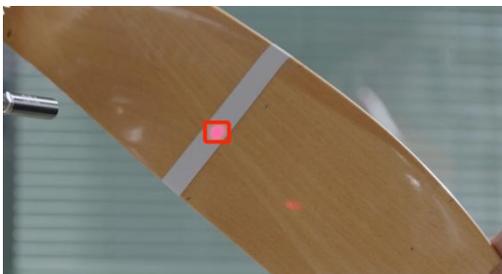


FIG 5-1-4 Beam face to the sticker



FIG 5-1-5 Press Set Button once again

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II>Cylinder temperature and exhaust temperature installation and debugging

The engine test bench can be equipped with a total of 8 temperature sensors, 4 cylinder temperatures and 4 exhaust temperatures, which are respectively configured to the left front, left rear, right front and right rear cylinder positions of the engine.

Among them, 4 are cylinder temperatures, T1 and T2 are the left front and left rear cylinder temperatures directly output by the engine, and T3 and T4 are 2 cylinder temperature sensors. Respectively connect the T3 and T4 cylinder temperature sensors to the right front and right rear cylinders.

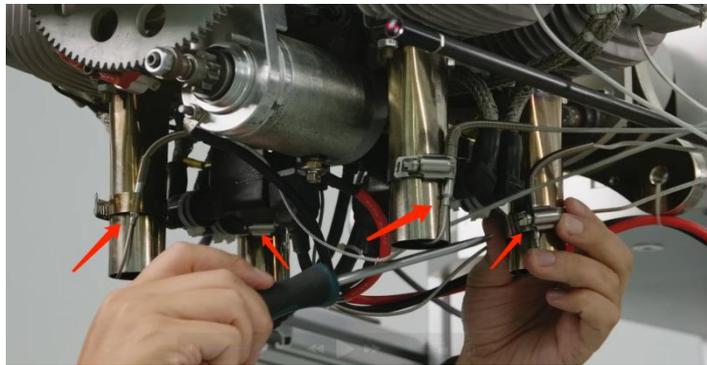


FIG 5-2-1 Cylinder temperature installation position

Connect the T5, T6, T7, and T8 exhaust temperature sensors to the left front, left rear, right front, and right rear exhaust pipes respectively, and fix them. After the temperature sensors are installed, use cable ties to fix the wiring harness.

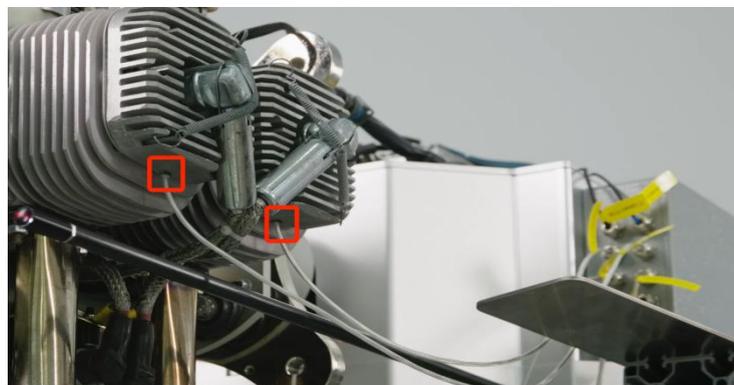


FIG 5-2-2 Exhaust temperature Installation location

Temperature sensor assembly completed.

All sensors calibrated and debugged completed.

*The test bench is equipped with two routes of PT100 and two routes of K-type temperature sensors as standard.

*Other sensors have been calibrated and debugged before leaving the factory and do not need to be calibrated again.

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VI. Software interface introduction



FIG 6-1 Main Interface of the software

(1) Tool window (2) Control window (3) Real-time data window

(4) Device info window (5) Chart monitor window (6) Environmental parameter display window

(7) Relay control window

1.Tool window

The tool window contains eight modules: File, System settings, Data analysis, Language / Theme, About, Version, Relay control, and Port. It can realize data search, system basic parameter setting, and data analysis and other functions.

2.Control window

The control window contains 9 commands: TT CLR (Thrust and torque reset), FC CLR (fuel consumption reset) , ALL CLR (one-key reset), Record (start recording), Point Record (point sampling), Point & New (point sampling and new creation), Advanced control, Allow Fire Up (Forbid Fire Up) , and Auto Test (start automatic test).

3.Real-time data window

After the throttle is unlocked, drag the throttle, and the real-time data window can realize real-time data changes.

4. Device Info

The device information window can display the basic parameter information of the test bench model, thrust range, and torque range.

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5. Chart Monitor window

In the real-time chart window, after the ignition switch is unlocked, drag the throttle to display the data curves of thrust, torque, speed, etc. in real time. Check the data box below according to the needs to realize the chart display (up to 4 groups of data are displayed).

6. Environmental parameter display window

The environmental parameter display window can display four environmental parameters: ambient temperature, ambient humidity, atmospheric pressure, and air density, and display the running time of the lower computer system at the same time.

VII. Preliminary software settings

I> System Setting

Before testing, the software needs to be preliminary configured according to the engine parameters and usage habits.

1. Basic Setting:

In the basic setting, parameters such as Thrust Direction, Torque Direction, Open/close loop mode, Number of Stickers, and Sampling Rate can be set.

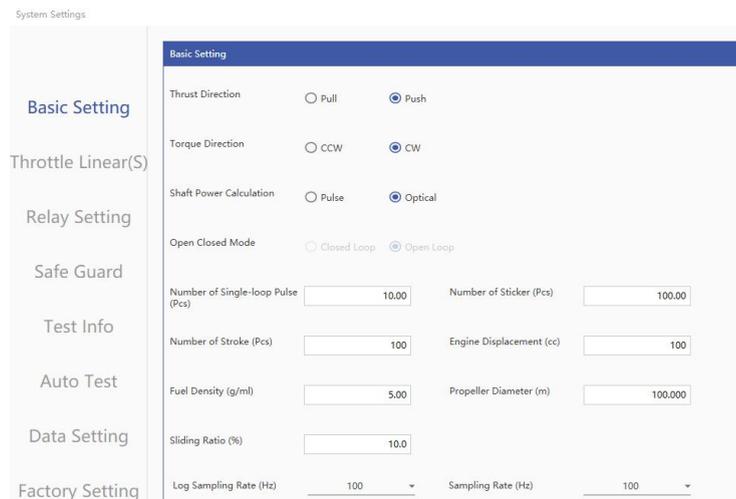


FIG 7-1-1 Basic Settings interface

① **Thrust direction:** the forward force generated by the engine and propeller (the back end of the test table points to the engine) is the pull force. At this time, set the thrust direction to "Pull": the thrust display value in the real-time data is +, set the thrust direction is "Push", the thrust display value is -; the backward force generated by the engine and the propeller (the engine points to the back end of the test table) is the push force. When setting the thrust direction is "Pull", the thrust display value is -, set the thrust direction is "Push", and the thrust display value is +.

② **Torque direction:** the left hand spiral theorem with the pull direction is CW (clockwise

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rotation), the right hand theorem is CCW (counterclockwise rotation), select CW, CW steering propeller torque will display +, CCW steering propeller torque will be displayed as-, select CCW shows the opposite polarity.

③**Shaft power calculation enables:** choose to use the pulse speed or optical speed to calculate the shaft power.

④ **Open/closed loop mode:** Open loop mode refers to the test bench control engine is not locked due to communication disconnection, and can be continued through the software, the closed loop mode is opposite, and the communication of the upper machine will be automatically locked to ensure the safety of the test platform, generally open loop mode is used for long time test or poor communication situation.

Switching of open/closed loop mode: Please turn off the power supply of the acquisition box before switching, and then make a mechanical position switch on the control panel of the acquisition box (Open-loop / Closed-loop).

The closed loop mode is the conventional test mode, the relay mechanical switch in the control box should be set to the engine shutdown state, that is, the ECU power supply and the ignition are off (OFF), and the default state setting of the relay on the software. The open loop mode requires the relay mechanical switch in the control box to the engine ignitable state, that is, the ECU power supply and ignition are closed (ON), and the default state setting of the relay on the software.

Note: open loop state, after the test bench powered, the engine will be in an ignition state, the tester must pay attention to safety risks, to prevent danger!!

* Open / closed loop cannot be set, only display the switch status on the acquisition box.

⑤**Number of single loop pulses:** the number of pulses emitted in a circle at the pulse speed, similar to the polar logarithm of a brushless motor.

* It must be set before the test. If the number of pulses per cycle is set correctly, the pulse speed measurement error will occur.

⑥**Number of stickers:** refers to the number of reflective stickers posted on the propeller or engine when using the speed of optical measurement. For example: two-blade speed measurement, the general posted reflective sticker is 2, input 2 in the "optical sticker number", such as the three-blade speed, generally posted reflective sticker is 3 in the "optical sticker number" input 3.

* It must be set before the test. If the number of stickers is set wrong, the Optical RMP measurement will be wrong.

⑦**Number of Stroke:** the number of strokes of the engine cycle, and used to calculate the effective cylinder pressure.

⑧**Engine displacement:** the total engine cylinder volume, used to calculate the effective cylinder pressure.

⑨**Fuel density:** fuel density, used to calculate the fuel consumption rate and specific fuel

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consumption parameter.

⑩**Propeller diameter:** here the propeller diameter input value, used to calculate the thrust coefficient and the power coefficient, if the user does not need to measurement the related parameters, it is not required to set.

⑪**Sliding ratio:** fuel to oil ratio.

⑫**Sampling rate:** refers to the data acquisition frequency of the data acquisition box, the standard version is 10Hz, the 100Hz version can compatible with 10,50,100Hz, and the random noise will increase with the acquisition frequency. It is recommended to use 100Hz for testing sweep frequency and response, and 10Hz for other tests.

Logging rate: refers to the recording rate of raw data (Log).

*The 100Hz high-frequency acquisition version can support 0.1,1,10,50,100Hz, and the 10Hz version can select three modes of 0.1,1, and 10Hz.

2.The Throttle linearity setting

In the throttle linear setting, multiple linear correspondence can be realized for the PWM output frequency, throttle 1 opening and the corresponding PWM, throttle 2 opening and the corresponding PWM. By adjusting the PWM linearity, the linear correspondence between the throttle curve and the valve opening can be realized.



FIG 7-1-2 The throttle linearity setting

①**Frequency of PWM:** refers to the update speed of PWM signal, range of 50-500Hz (general remote control is 72 Hz, flight control is 400 Hz, rudder standard signal is 333 Hz, theoretically the update speed change will not have much impact on the control system).

②**Throttle 1 opening:** refers to the air door opening, generally 0-100% throttle corresponds to the air door and the air door fully open.

③**Throttle 1 PWM:** the throttle valve controls the actual signal of the steering gear, which can adjust the throttle in a linear relationship with the linearity.

④**Throttle 2 opening:** refers to the valve opening, generally 0-100% throttle 2 corresponds to the

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valve fully open and closed.

⑤**Corresponding PWM:** the shutter controls the actual signal of the steering gear, and the throttle 2 and the shutter are linear by adjusting the linearity.

3. Relay Setting

There are eight modules: ECU power supply, electric start, ignition 1, ignition 2, oil pump 1, oil pump 2, servo power and alarm, and the relay should be consistent with the relay switch in the control box. The relay lock and reset setting, which can control the relay switch with software lock (no ignition state).

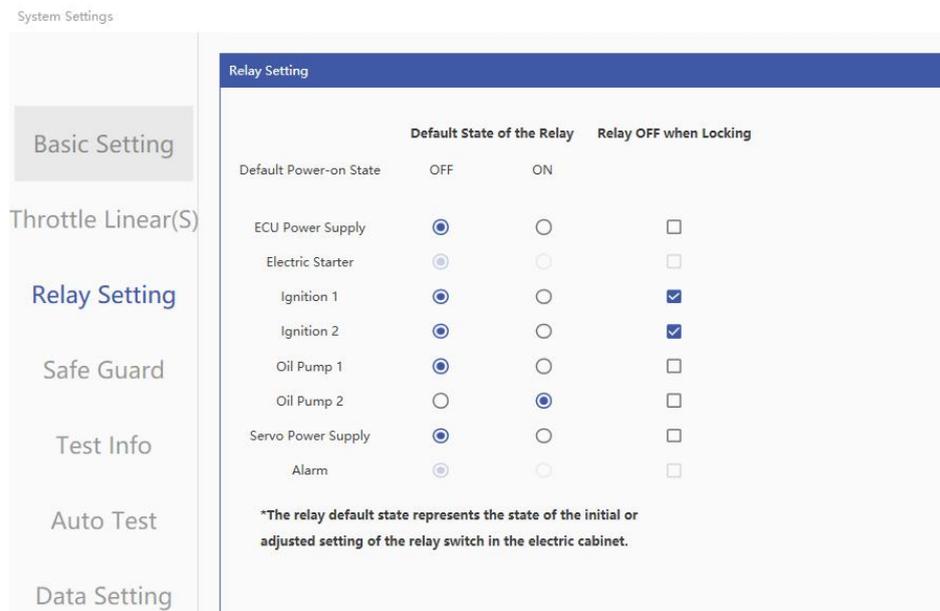


FIG 7-1-3 Relay setting interface

- ①ECU power supply: ECU power supply switch
- ②Electric start: the starter power supply switch, the user can not set it
- ③Ignition 1: Ignition switch, default OFF short to ground
- ④Ignition 2: Ignition switch, default OFF short to ground
- ⑤Oil pump 1: Oil pump power supply switch 1
- ⑥Oil pump 2: oil pump power supply switch 2
- ⑦Servo Power: power supply switch for steering gear
- ⑧Alarm: software alarm synchronization, the user can not set.

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4.Safe Guard

In the Safe Guard, you can set protection for parameter values such as thrust, torque, optical RPM, pulse RPM, fuel consumption, temperature, etc.

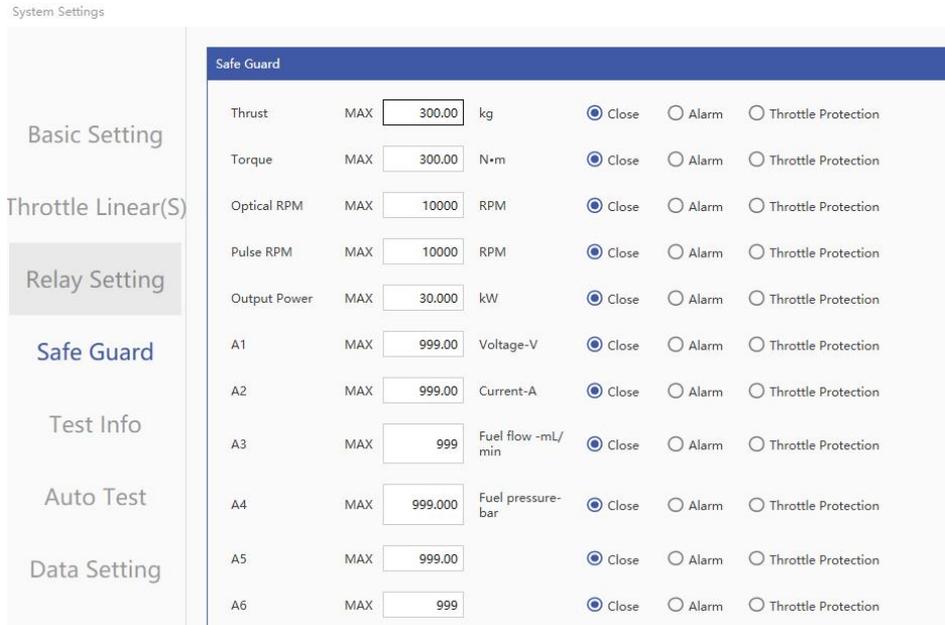


FIG 7-1-4 Security protection settings interface

There are **two modes** of Safe Guard:

One is "alarm". After selecting, when the test value reaches the protection value, the software will execute an alarm (the real-time data display position will turn red and flash, and the device will sound an alarm), but the throttle lock operation will not be executed.

The other is "throttle protection". After selecting, when the test value reaches the protection value, the alarm will be executed and the throttle lock operation will be executed.

* When the throttle is lower than 20%, the software will directly lock. When the throttle is higher than 20%, the throttle will slowly drop to 20% and then perform the lock operation.

5.Test Info

The test info includes engine model, propeller model, drive model, tester and other information that needs to be noted. Users can choose to fill in according to the test situation, and the output test data will simultaneously record relevant information.

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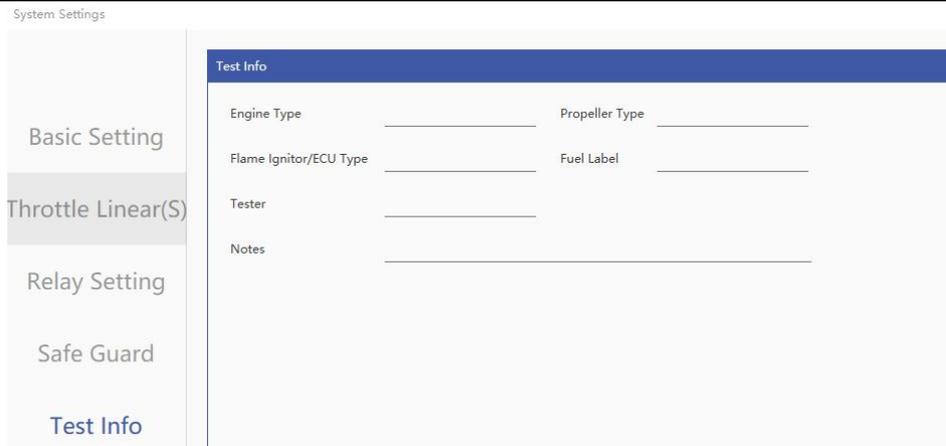


FIG 7-1-5 Test Info Setup Interface

6.Auto Test

The Auto test includes 7 test modes: increase, cycle, custom, sine, linear, step, and frequency sweeping test. Users can select the test mode according to their needs, save the parameters, and click "Auto Test" after "unlocking the throttle" in the control window. The software will automatically record the data.

7.Data setting

There are multiple data channels that can be set in the data settings. You can check the box in front of "Real-time" or "Log" to display the data in the real-time data window and storage log.

* The initial version has preset general data parameters. Unless there are special parameters or customized parameters that need to be tested, users generally do not need to set them separately.

8.Factory Setting

The parameters in the factory settings are factory set parameters, which require a password to set. Users do not need to set them separately.

9.Custom Setting

In the custom settings interface, A1-A8 corresponds to the ADC1-8 interfaces of the acquisition card, of which A1-A4 is the system default sensor and cannot be modified by the user. For A5-A8, customers can connect different analog sensors (0-20ma/±5V) and enter the corresponding name, unit and decimal place to be displayed, and the data can be displayed in the software interface. Similarly, T1-T8 corresponds to the 8-channel temperature of the temperature acquisition card, and users can customize the name.

II>Language/Theme

The software can be set in two language modes: Simplified Chinese and English. There are multiple colors that can be configured, and users can set it according to their own needs.

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VIII.Engine test preparation and testing

I>Fuel tank layout and connections

Place the fuel tank at the rear side of the test bench, and connect the outlet fuel pipe to the input end of the fuel level sensor.



FIG 8-1-1 Connect the oil outlet pipe to the input end of the fuel level sensor

*WF-EN-MAX needs to connect the fuel level sensor and the fuel tank outlet pipe. WF-EN-17 and WF-EN-55 are already connected before leaving the factory and do not need to be connected separately.

II>Blower layout and installation

The blower is arranged at the rear of the test bench. First, assemble and fasten the two-way exhaust ducts to the blower outlet, align the air outlets of the two-way exhaust ducts with the engine block, and assemble them on the duct bracket.

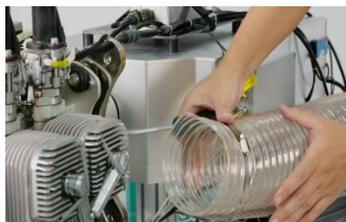


FIG 8-2-1 Blower layout and installation

* To test the engine thrust, a blower needs to be installed to dissipate heat from the engine cylinder to prevent the cylinder temperature from being too high.

*The blower is optional. If the user does not select it, it does not need to be installed.

III>Engine start preparation

1.Engine placement

The test bench needs to be placed in an open area and fixed horizontally; when testing engines with greater thrust, it is necessary to use clamps or weights to fix the test bench.

2. Fill the fuel tank

Open the fuel tank cap, pour the fuel with a mixture ratio of 1:50 into the tank, and turn on the switch at the tank outlet (ON).

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FIG 8-3-1 Fill the fuel tank and open the fuel tank switch

3. Engine fuel absorption

Click the servo power switch in the relay control window; click "Allow ignition", switch the button to "Forbid ignition", and the test bench switches to the ignition-allowed state. At this time, the electric start and ignition buttons in the relay control window switch from an inoperable state to an operable state; adjust the throttle value of throttle from 1 to 50%; click the electric start when the ECU is powered and the ignition is turned off; observe whether the starter motor can drive the engine to rotate normally, and check whether there is fuel inhalation in the transparent fuel pipe.



FIG 8-3-2 Engine oil absorption

*New engines or engines that have not been used recently require multiple starting attempts until the carburetor's built-in diaphragm pump can pump enough fuel; to ensure that the starting motor is well cooled during multiple starts, the starting motor should not work for more than 8 seconds each time, and the starting interval should not be less than 2 to 3 minutes.

4. Check and calibrate the fuel flow sensor

After the engine has finished absorbing fuel, the fuel flow sensor has static fuel, and make sure there are no bubbles in the fuel circuit. Observe the fuel flow sensor display. When the display exceeds the range of ± 1 , the fuel flow sensor needs to be calibrated. Open the control panel, press the up and down buttons at the same time, and the lower display will display "Calibrate or not". Select "yes" and press the "MODE" button to complete the calibration.

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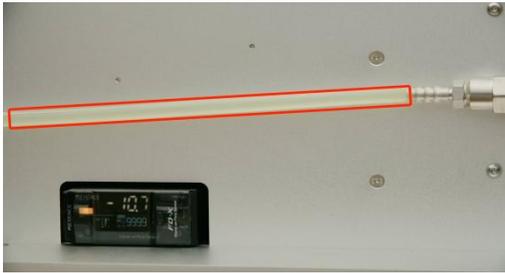


FIG 8-3-3 Make sure there are no bubbles in the fuel circuit

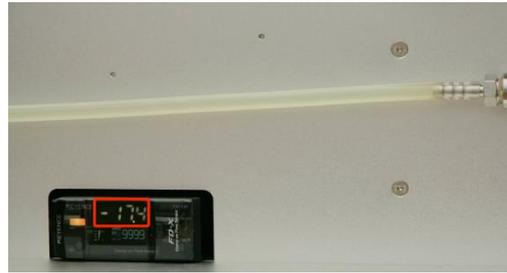


FIG 8-3-4 Observe the sensor readings

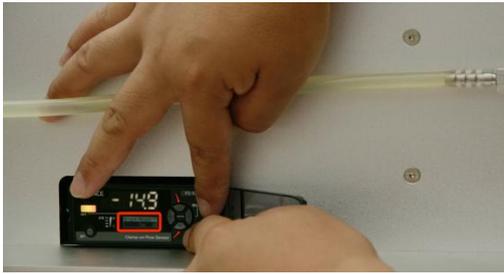


FIG 8-3-5 Press and hold the up and down buttons



FIG 8-3-6 Press the "MODE" key to complete it.

*After calibration, if the reading exceeds ± 1 , there may be bubbles in the sensor. You can ignite the engine and then turn it off to calibrate.

IV>Engine data test

1. Before the engine test, the blower is powered on and started.
2. In the control window, click "TT CLR", "PC CLR", "ALL CLR", click "Allow Fire Up", and adjust the throttle to 15%; in the relay control window, turn on the ECU power supply and ignition 1, and the button changes from red to green; click "Record"; click the electric start button to start the engine, release the start button after the engine starts, and after the engine runs smoothly, the engine speed can be controlled by increasing or decreasing the throttle. The engine start is completed, and the user can test according to the test requirements.
3. After the test is completed, terminate the test, slowly adjust the throttle to the "idle" position, that is, the throttle gradually decreases to 0%, click "Prohibit Fire Up", you can see the relay control window, the ignition switches to the red off state, the engine is turned off, the data is automatically saved and the recording stops.

*If the engine is worn for a long time, the throttle needs to be placed in the "idle" position for a few minutes, and the ignition switch needs to be turned off after the engine cools down.

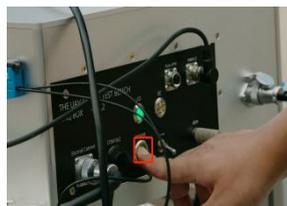
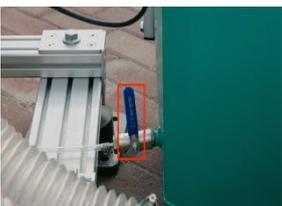


FIG 8-4-1 Close the fuel tank outlet and turn off the power switch

After the engine is turned off, if there is no other test content, turn off the fan, turn off the

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switch at the fuel tank outlet (OFF), turn off the power of the acquisition box, turn off the total power of the control box, and finally turn off the UPS power.

**After the test, please turn off the UPS power to prevent the built-in power supply loss.*

V>The procedure of the reset before testing*

To ensure the accuracy of the test data, the thrust and torque data (click the TT CLR button) should be cleared before testing, and the test can be carried out only after the data is cleared.

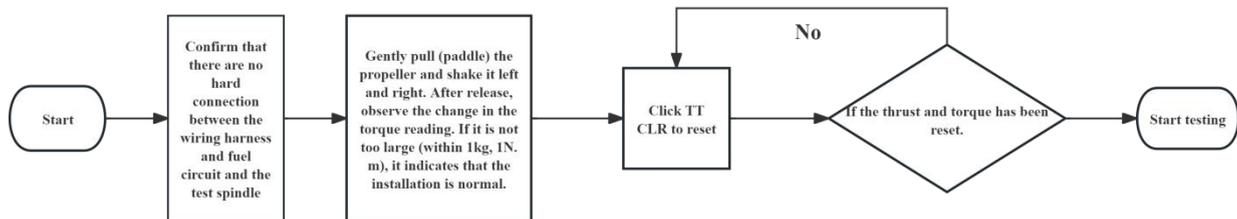


FIG 8-2-1 Flowchart of clearing before testing

**Observe the last decimal place of the thrust and torque values to see if they are reset to zero (or if there is a small value jumping), and maintain it for 3 seconds.*

IX.Data observation and storage

1.Users can view the data changes during testing through Real-time data windows and Chart-Monitor windows. The Chart-Monitor window can display the curve changes of multiple values, and users can select data according to their needs. (Up to 4 data can be displayed).

2.After the data testing is completed (Auto test, Point (point sampling), Point & New (point sampling and creating), manual testing clicking Record to start recording data), the data will be stored in the File. Users can open the File in the toolbar and directly find the storage location.

3.Users can click on the data analysis button in the toolbar to enter the data analysis. They can output the average throttle point, curve analysis, and test report.

**Further details software introduction and functional testing. Users can refer to the User Manual.*

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If you have any questions about this manual, please contact us:
sandy@wing-flying.com.

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