UAV Power System Testing LY-Micro-30KGF

5.0

Quick Start Use

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Dear Client,

Thank you for choosing our products. Really appreciated it.

Established since 2017, we always believe that Expertise creates quality and insist on Customer First. Continuous investment in research and development, pursuit of precise attitude, and high efficient and excellent service enable us to continuously innovate and launch products that could satisfy our customers requirements.

This manual will guide you to use the LY-Micro-30KGF UAV power system testing safely and efficiently. Before operating, please make sure to read this manual carefully and follow the instruction in the manual. Any questions, welcome to contact us at any time. We will listen carefully.

Thank you so much.

Best regards,

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I. Precautions For Use

Before you are going to start your test, please pay attention to the safety. High-speed rotating propeller may cause a certain degree of injury and damage to personal property, so please pay attention to safety when testing. The company will not be responsible for product damage or personal risk caused by non-compliance with the manual.

1. LY-Micro-30KGF thrust stand should be placed in a separate space. Before the Power test, the test stand should be fixed and ensure the safety of the surrounding environment. During the testing, no other people are allowed to enter without the permission of the operator, so as to avoid personal injury.

2. Please undergo the test within the measure range, and do not exceed the max test range.

3. Use the test stand in strictly accordance with the user manual. Do not violet the rules to avoid the electrical shock.

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

5. Before starting the actual test, please check if the propeller and motor are firmly assembled and the rotation direction is right.

6. Before use, please check weather all the parts are in good condition. If any parts are aging or damaged, please replace them with new.

7. The operator shall not operate under the condition of drinking, drug anesthesia, dizziness, fatigue, nausea or other poor physical or mental conditions so as to avoid injury.

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

II. Flowchart of the thrust stand

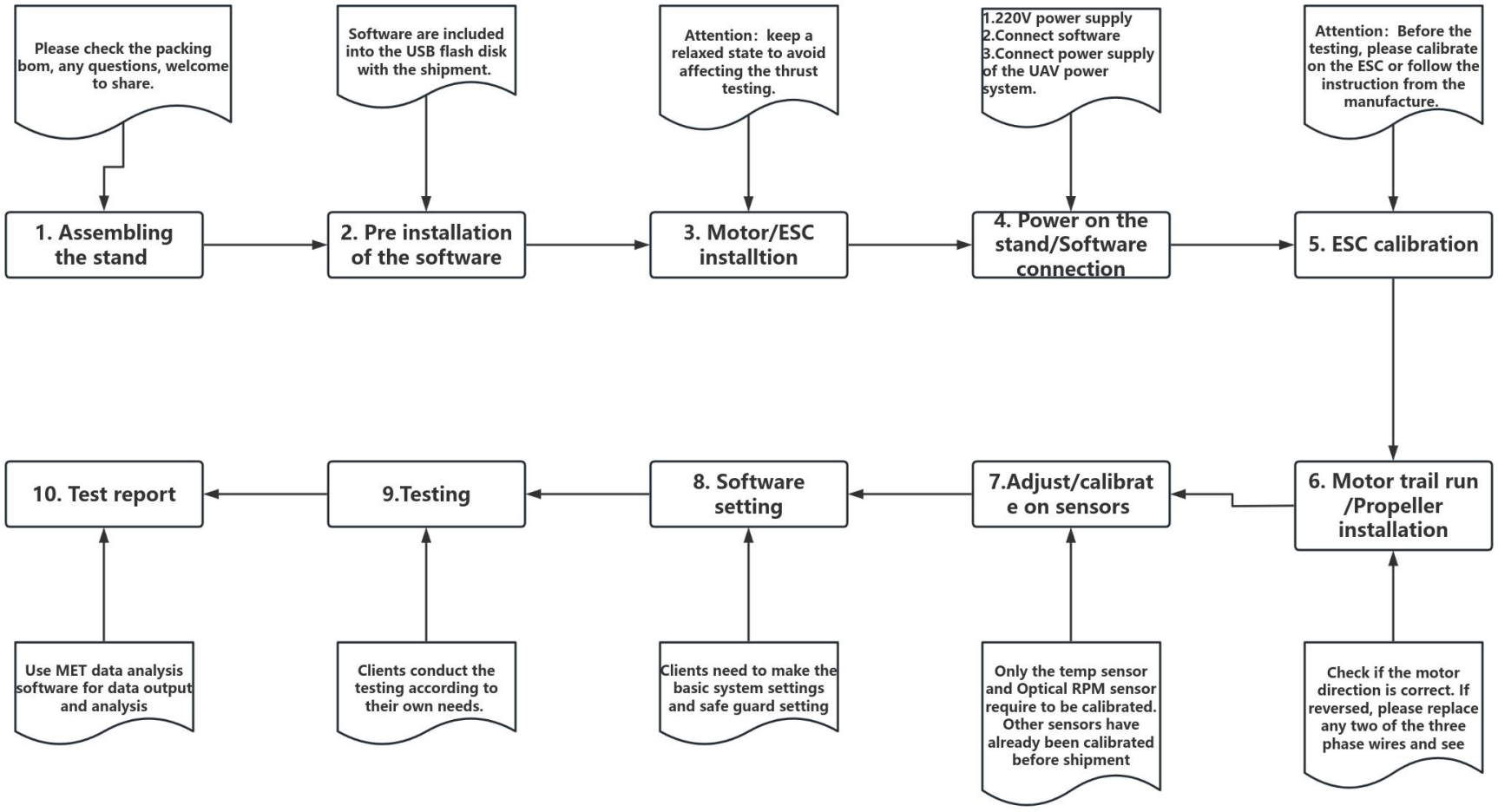


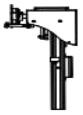
FIG 2-1 Flowchart of the thrust stand

*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.

III.Installation guide

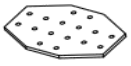
Step 1：Prepare installation material



Head of LY-30KGF

Base*4

Reinforced Angle code*8



Fixed Botton Plate*1

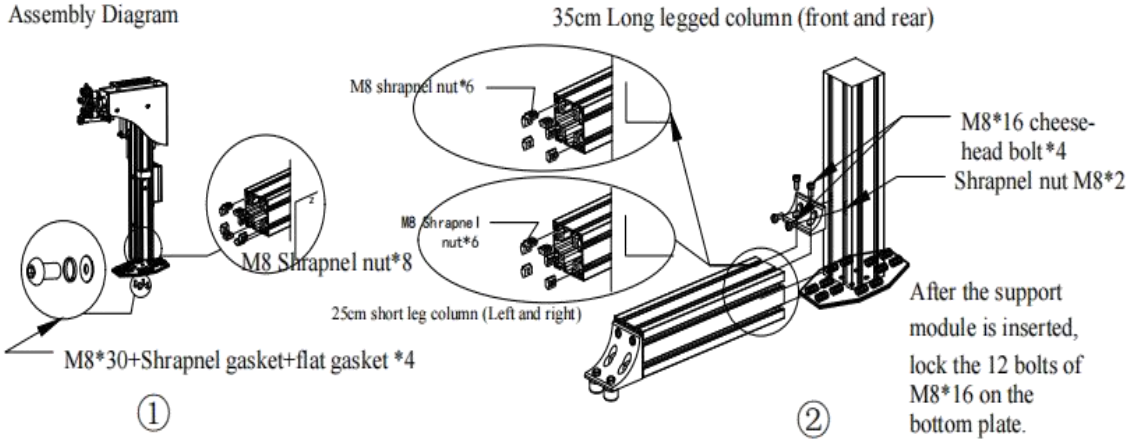
M8*30 Fastening bolt*4

M8*16Fastening bolt*32

Shrapnel Nut*32

5mmLockingwrench*1

Step 2：Assembly Diagram



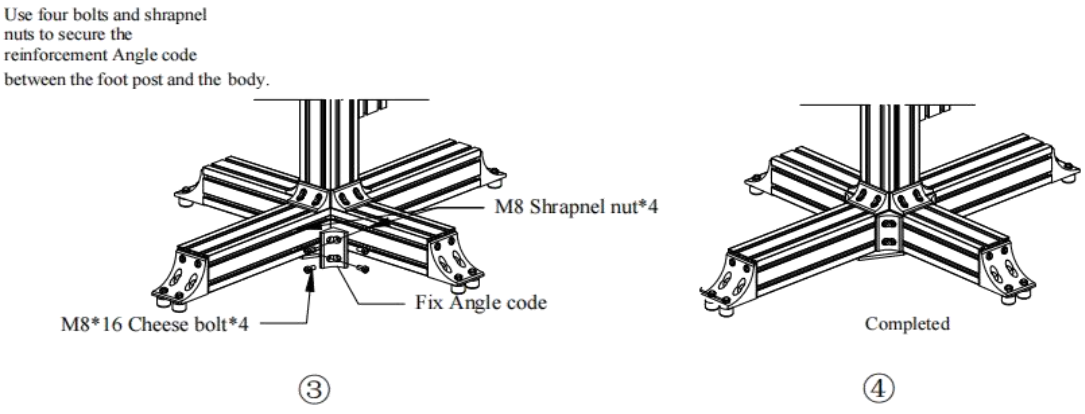


FIG 3-1 Flowchart of the installation（take the LY-30KGF as an example）

*After the assembly of the LY-Micro test stand is completed, there is no need for customers to assemble it separately. The assembly method for LY-10KGF is the same as that for LY-Micro-30KGF.

*During the installation process, if you encounter any problems, please contact WING LFYING and we will provide you with installation guidance.

IV、Software download and installation

I> Software Operating environment

◎CPU：2Ghz and above
◎Memory：2G and above

◎Graphics Card：no requirement

◎Screen：1366*768 resolution or above（recommend the 1080P，Screen display ratio is 100%）

◎OS：Windows 7 and above

◎Running framework：in the U disk, client can install directly.

◎Output condition of the test data: Excel/WPS

II> Software, runtime framework, and driver installation

1. Software installation

MET-V6 is the professional software of LY-Micro-30kgf. The product packaging box is equipped with a USB flash drive. User can open up the U disk and it contains three program files:MET-V6（software program）、running framework and serial driver. Please click MET-V6 to run the installer and follow the prompts to install.

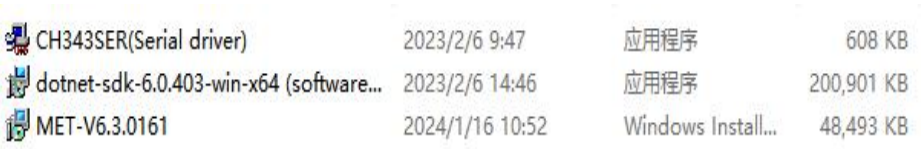


FIG 4-2-1 Software program in the U disk

After installation, shortcuts named "MET-V6" 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 the built-in test data analysis in the software, which is used for auxiliary analysis on the test data, including chart curve analysis, average throttle point output, data tables, graphical display and processing, etc.

2.Run frame and drive installation

Install the software running framework and serial driver in the USB drive in sequence. After installation, the MET software can connect to the stand to achieve data testing and processing.

*The USB installation package provided by WING FLYING includes software runtime framework driver installation files, which users can install according to their needs. The user is unable to open the software during their first installation. Please install this installation package.

3.Software prompts "initialization write failed"

1) When software prompts “initialization write failed” , authorization settings need to be made to the installation directory. Open the “C drive - Program Files- LYFH”.

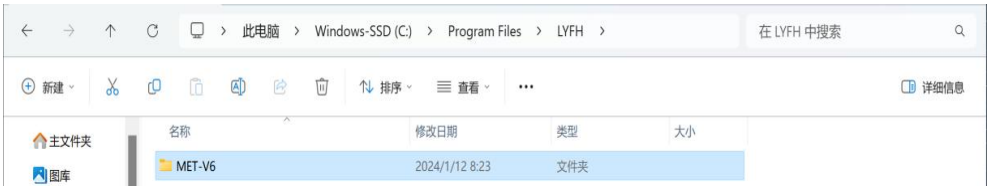


FIG 4-2-2 LYFH file Position

2) Right click on MET-V6, Click on Properties, click on Security and enter into Edit. Click on the red box, check the box below for Full Control and apply. Once the settings are completed, the software can be used normally. (Attention: all items in the red box need to be clicked and checked for full control).

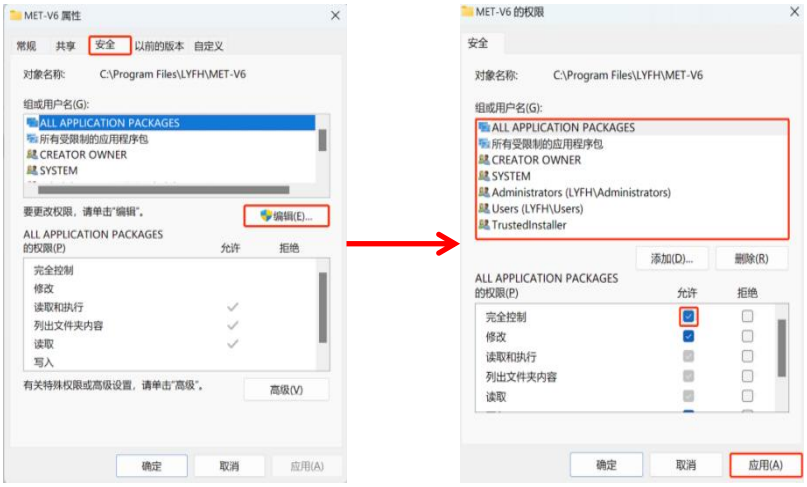


FIG 4-2-3 Security setting in the computer

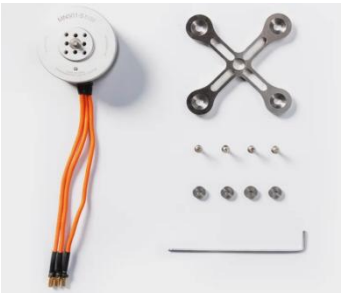
4.Window adaptive adjustment of the software

If users want to make the display window normal, it is advised to set the screen resolution to 1920*1080， the screen display ratio is 100%， or adjust the screen resolution and screen display ratio according to your own habits.

V. Power System Installation and debugging

I> Install Motor

Select a suitable motor base, assemble and fix the tested motor with the motor base, with the motor base counter bore facing the front of the motor. Select a suitable special gasket and bolt for assembly, install the motor onto the equipment head, tighten the bolts in sequence, and then the motor installation is completed.



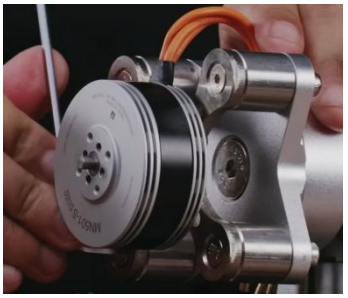


FIG 5-1-1 Install motor

II> Install ESC

1. Place the ESC on the installation board, use the commutation speed connection wire to connect the motor with the ESC. Use the zip tie to fix the ESC on the board.

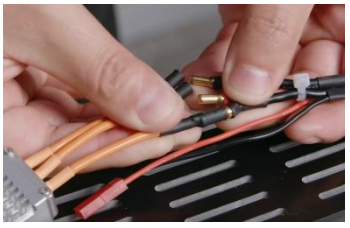




FIG 5-2-1 ESC installation and commutation speed line connection

*Attention：It is necessary to maintain a relaxed state of the circuit to avoid affecting the thrust test.

2. Connect the input line of the ESC power supply to the AS150 female connector of the current sensor output line.

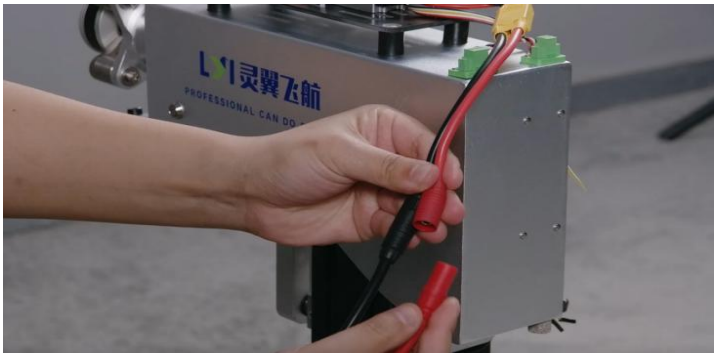


FIG 5-2-2 Power supply of ESC connected to current sensor output line

3. Insert the signal line of the ESC into the PWM Out wiring interface.

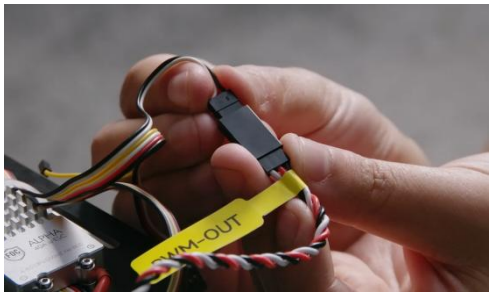


FIG 5-2-3 Signal line to PWM out

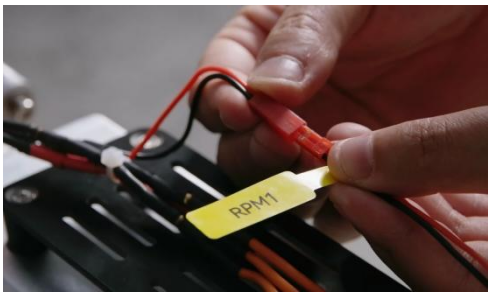


FIG5-2-4 connected RPM line to RPM 1 port

*Do not reverse the signal wire (white represents the signal).

*Install the propeller after ESC calibration and motor trail run.

III> Power on the test stand and software connection

1. For the power adapter, one end is inserted into the power supply port of the acquisition card, and the other end is connected to the 220V power socket. After powering on, you can hear three sounds: "beep, beep, beep", indicating that the stand is successfully powered on.

FIG 5-3-1 Connection of Power adapter

2. Connect one end of the network cable and data cable to the communication module, the other end of the network cable to the acquisition motherboard, and the other end of the data cable to the computer. Open the MET software, the system will pop up a stand type selection window. Select the correct stand model based on the purchased device model, confirm it is correct, and then click the confirm button to enter into the main interface.

FIG 5-3-2 Commutation Module Connection

* If the test model is selected incorrectly or needs to be replaced with another model, click on the toolbar "File" in the software toolbar, open the folder "Database", choose in the software, and then delete the configuration file in the "Database" folder. At this point, restarting the software will enter the model selection window interface.

Note: Delete the configuration file in "Database" and the software settings will be initialized. It is recommended that each computer be matched with only one test bench model.

3.The user clicks on the port in the upper right corner, selects the port to connect, and after the software connection is successful, the device emits a "beep" sound.

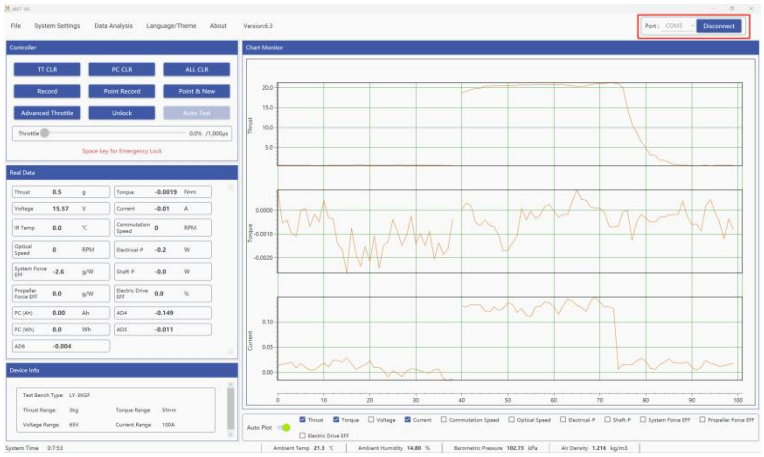


FIG 5-3-3 Click Port to connect

*When the software is connected for the first time, there may be inconsistency in the refresh rate matching of the real-time chart. In this situation, User need to set in the basic settings, set the collection frequency, and click "Save Parameters", and at this moment, the software will automatically restart. The real-time chart refresh rate will be automatically adapted.

IV> ESC Calibration

1. Click on the System Settings to the Basic settings interface: generally, for the ESC available for calibration, the setting range is 1000-2000μs, after setting, calibrate on the ESC. For the ESC that cannot be calibrated, user can refer to the ESC manual for setting and calibration.

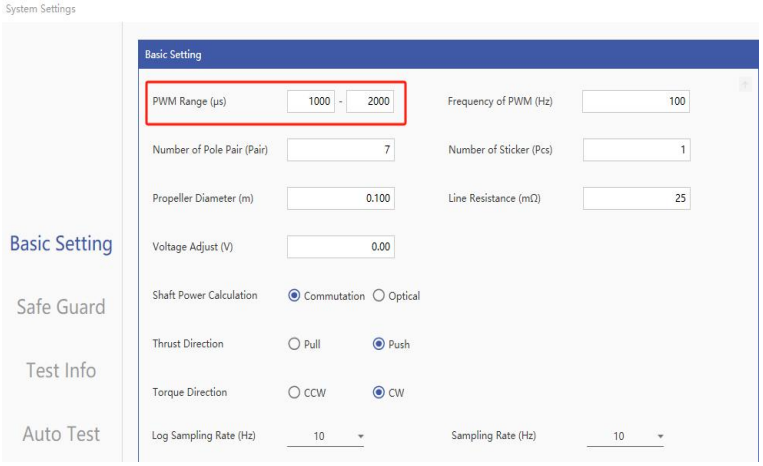


FIG 5-4-1 Setting Range of Throttle PWM

2. Without the power supply on the motor and ESC, click “Unlock”, fully pull the throttle, connect the power supply on the motor and ESC, that is, connect the current sensor to the AS150 male end of the battery or DC power supply, and the motor will emit a calibration prompt sound. After hearing the prompt sound, click to lock the throttle. The throttle stroke calibration is completed.

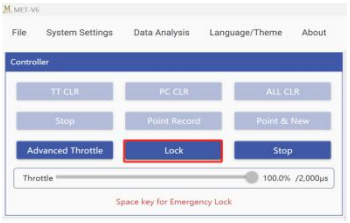


FIG 5-4-2 Calibration on ESC stoke

V> Motor steering adjustment

Click on "Lock" (shows Unlock) in the control window, drag the throttle to check if the motor rotates normally and if the motor direction is correct. If the motor direction is incorrect, disconnect the power supply, replace any two of the three-phase wires of the motor, and drag the throttle again to check if the direction is correct.

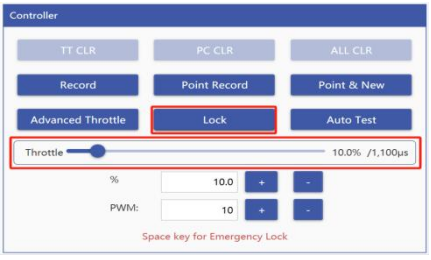


FIG 5-5-1 Unlock the throttle and drag it

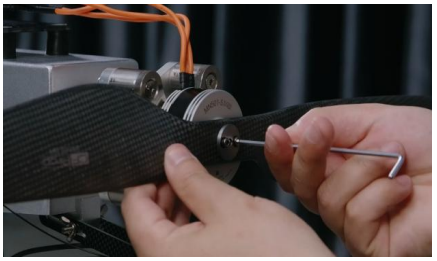


FIG 5-5-2 Check the motor rotate direction

FIG 5-5-3 Disconnect Power Supply

FIG 5-5-4 Replace any two of the wire

VI> Propeller Installation

Cutoff the power supply of the motor and ESC, add the propeller on the motor to ensure the secure installation. The overall power installation and debugging have been completed.

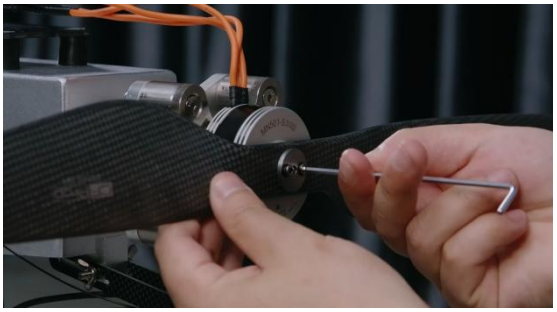


FIG 5-6-1 Propeller Installation

*When the power system is in a power-off state, manually rotate the propeller to ensure that the propeller rotation does not interfere with any test stand or other components.

VI. Sensor Calibration before the first testing

I> Temp sensor position

The test bench adopts an infrared detection temperature acquisition method. Align the mirror surface of the infrared sensor with the motor casing, at a distance of 1-2cm, and pay attention to keeping the lens clean to avoid oil stains blocking it.

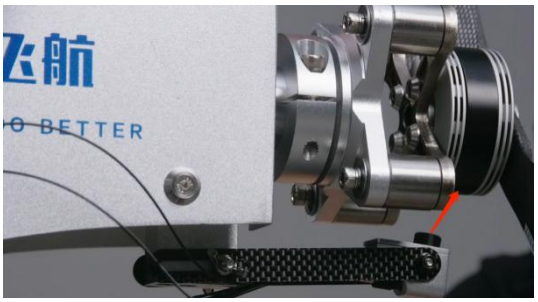


FIG 6-1-1 Adjust the temp sensor

II> Calibration on the Optical speed sensor

1. The Optical speed sensor testing probe and temperature sensor are integrated devices. Adjust the position of the temperature sensor, maintain this position, and stick the reflective sticker to the position where the optical speed sensor beam is focused on the propeller (blade root), ensuring that the beam always falls on the reflective sticker when it touches the propeller. Rotate the blade and complete the pasting of reflective stickers on the other side of the blade.

FIG 6-2-1 Stickers on the Propeller

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.

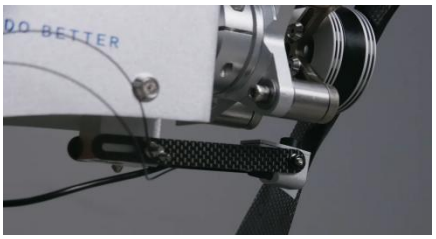


FIG 6-2-2 Optical sensor beam is aimed at the air

FIG 6-2-3 Press Set Button

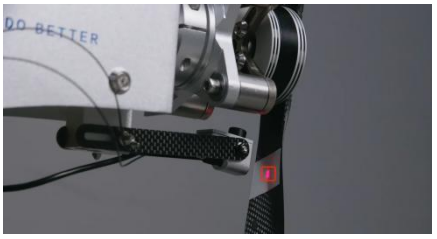


FIG 6-2-4 Beam face to the sticker

FIG 6-2-5 Press Set Button once again

All sensor calibration and debugging have been completed.

*All other sensors have been calibrated and debugged before leaving the factory, so there is no need to calibrate them again.

VII. Introduction of the Software Interface

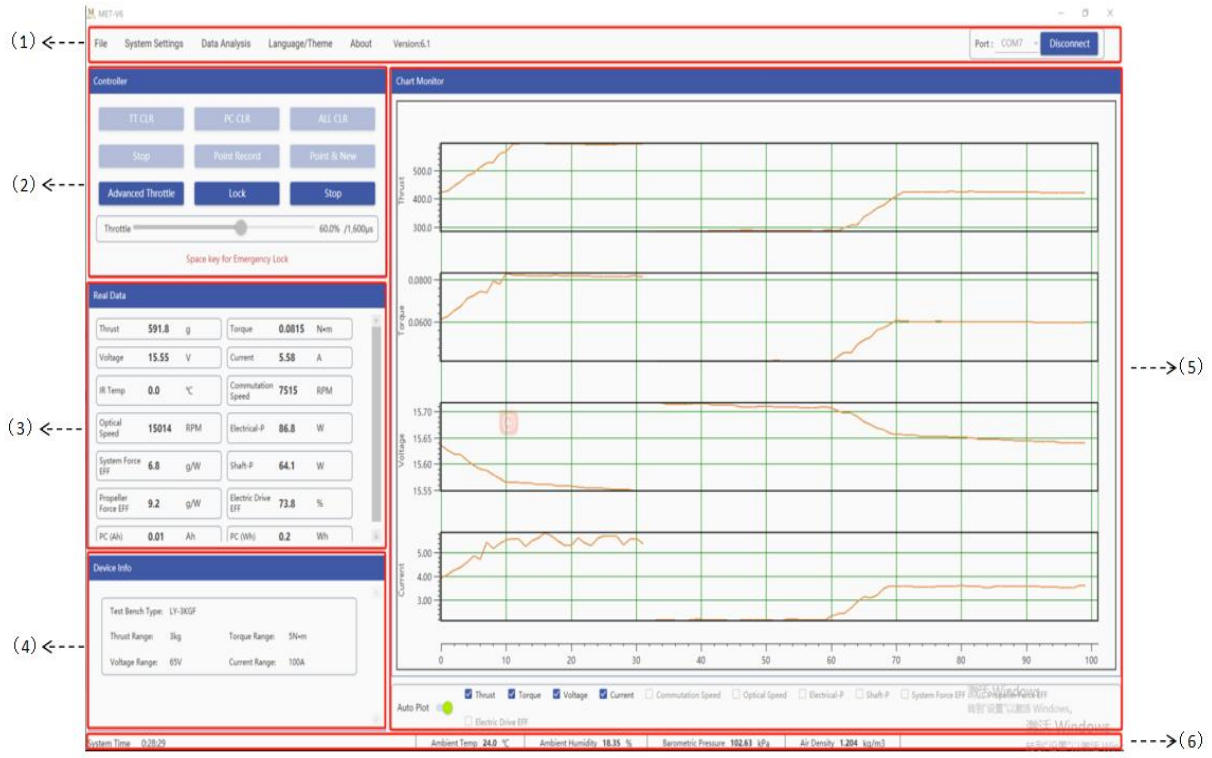


FIG 5-1 Main Interface of the software

（1）Tool bar　　（2）Control panel　　（3）Real-time data

（4）Device info　　（5）Chart Monitor　　（6）Environment parameter display

1.Tool bar

Tool bar consists in File、 System Setting、 Data Analysis、 Language/Theme、 About、 Version and connection port. It can realize the functions of data search, system basic parameter setting, data analysis and so on.

2. Control panel

The control window includes 9 commands: TT CLR, PC CLR, ALL CLR, Record, Point, Point & New, Advanced Throttle, throttle Lock, and Auto Test.

3. Real-time data window

After unlocking the throttle, dragging the throttle and achieve the real-time data changes in the real-time data window.

4. Device info

Device Info window shows the basic info such as Motor Type、Thrust Range、torque range、voltage range and current range.

5. Chart Monitor

In the Chart Monitor, after the throttle is unlocked, drag the throttle to display data curves such as thrust, torque, voltage, current, and speed in real time. Select the data box below as required to realize chart display (a maximum of four groups of data can be displayed).

6. Environment parameter display

The ambient parameters display window displays four environmental parameters, including ambient temperature, ambient humidity, barometric, and air density, as well as the operating time of the lower computer system.

VIII. Preliminary software settings

Before conducting the testing, it is necessary to make preliminary settings based on the parameters and usage habits of the power system.

I> System Setting

System Settings consists in the Basic Setting、Safe Guard、Test info、Auto Test、Data Setting and Factory Setting.

1. Basic Setting

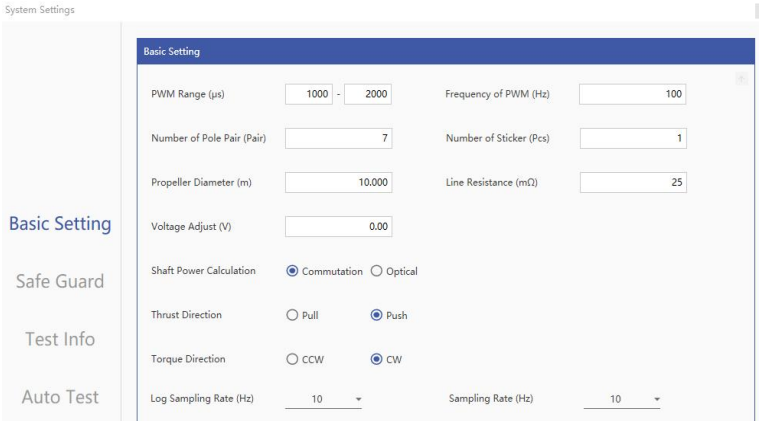


FIG 8-1-1 Basic Setting

①Throttle PWM Range (Pulse Width Modulation) : In general for the ESC which supports the calibration， the setting range is from 1100 to 1940**μs** (FUTABA standard stroke) or 1000-2000**μs** (Flight control standard stroke)， after the setting, it is required to calibrate on ESC. For ESC which is not supported the stroke calibration, it can refer to the ESC instruction to finish the calibrated process.

②PWM output Frequency: It refers to the PWM change period, generally 72Hz or 400Hz, the software system preset value is 400Hz, except for special cases, the user does not need to set it separately.

③Pole pair number (Pair): It stands for motor poles in pair. Before testing, it is required to set the pole pair number. For example, if the number of motor slot poles is "12N14P", enter "7" into the Pole pair number.

*It must be set before the testing. If the pole pair number is wrong, the commutation speed data will have the error.

④Number of the stickers (Pcs)：It refers to the number of reflective stickers affixed to the propeller or motor when it is required to test Optical Speed. For example: For the two blade propeller, generally posted two reflective stickers, we enter 2 in the system. For the three-blade propeller , the reflective sticker posted is generally 3, required to keep same number, enter 3 in the software.

*It must be set before the testing. If the Optical stickers are set wrong, the Optical speed data will have the error.

⑤Shaft Power Calculation: Users can choose commutation speed or Optical speed to calculate the shaft power calculation. We advice that LY-Micro-30KGF to use commutation speed while LY-70KGF-MAX to use optical speed.

⑥Thrust Direction: The forward force generated by the motor and propeller (the back end of the test stand points in the direction of the motor) is the pull force. At this time, if the thrust direction is set to "Pull" direction. The backward force generated by the motor and propeller (the motor points to the back end of the test stand) is the Push direction.

⑦Torque Direction: The left-handed helix theorem in the direction of pull is CW (clockwise rotation) while the right-handed helix theorem is CW (Counterclockwise rotation). When CW is selected, the propeller torque of CW steering will be displayed as +, the propeller torque of CCW steering will be displayed as -, and the polarity will be reversed when CCW is selected.

⑧Sampling rate: For Sine, Linear, Step, Frequency sweeping test mode, we advice to set 100Hz, other modes, use 10Hz.

⑨Log Sampling Rate (Hz)： Refers to the rate at which raw data (Log) is recorded. User can set according to their own requirements.

*The 100Hz high-frequency acquisition version can record data in five modes of 0.1, 1,10, 50, and 100Hz, while the 10Hz version can record data in three modes of 0.1, 1, and 10Hz.

*Other parameters generally do not need to be set separately by users. If there are parameters that need to be measured separately, users can obtain detailed definitions of the parameters according to the user manual.

2. Safe Guard

The user can set 9 parameters including thrust, voltage, current, IR Temp (infrared temperature), commutation speed, optical speed, Electrical-P (total power), PC (power consumption (Ah)), and PC (power consumption (Wh)).

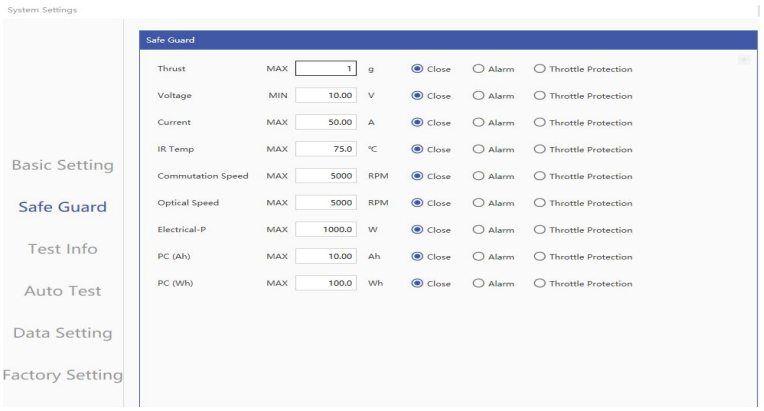


FIG 8-1-2 Safe Guard Interface

Two modes for Safe Guard： One is “Alarm”, when the test value reaches the protection value, the software will alarm (the real-time data display position will flash red and the device will make an alarm sound), but the throttle lock operation will not be performed. One is "Throttle Protection", after checking, when the test value reaches the protection value, the alarm is executed and the throttle is locked.

*When the throttle is below 20%, the software will lock directly. When the throttle is higher than 20%, the throttle will slow down to 20%, and then perform the locking operation.

3. Test Info

Test Info part includes: Motor Type、Propeller Type、ESC Type、Tester and other notes. User can input info according to the test requirement. Log will synchronous record the related info.

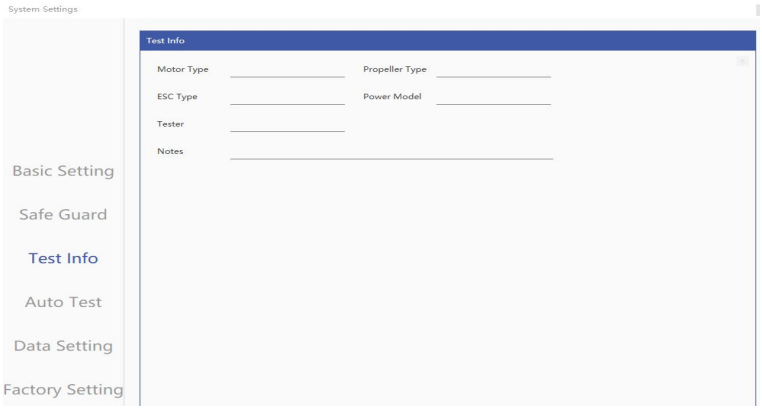


FIG 8-1-3 Test Info Interface

4. Auto Test

Auto Test includes seven modes in total: Increase、 Cycle、 Custom、 Sine、 Linear、 Step and Frequency sweeping. Users can select the test mode according to the requirements, after setting, save the parameters, click "Auto Test" after "Throttle unlock" in the control panel, and the software will automatically record the data.

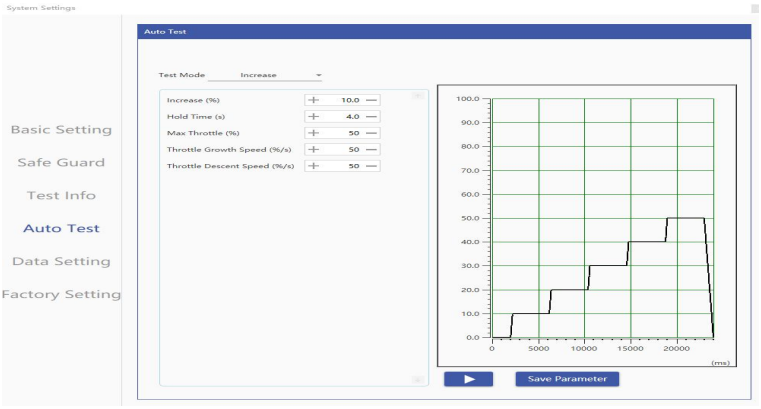


FIG 8-1-4 Auto Test Setting Interface

5. Data Setting

In the Data Setting, there are multiple types of data can be set. You can select Real-time or Log to display data in the real-time data window and save logs.

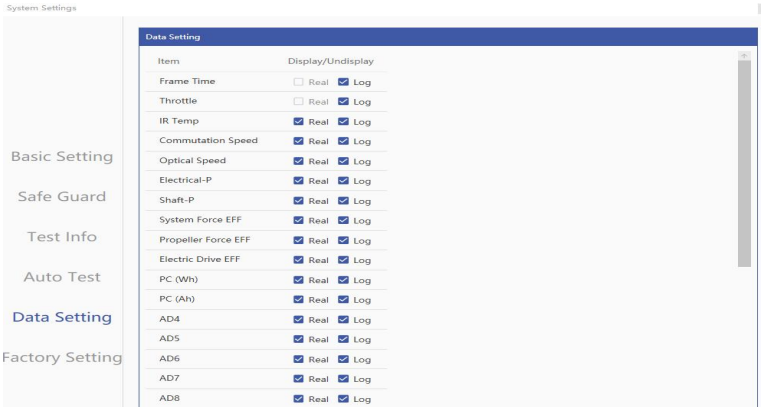


FIG 8-1-5 Data Setting Interface

*General data parameters have been preset in the initial version, and users generally do not need to set them separately except for special parameters or customized parameters that need to be tested.

6. Factory Setting

The parameters in factory Settings are set by the manufacturer. You need to enter a password to set the parameters. Users do not need to set the parameters separately.

7. Language/Theme

Software can be set into two language mode: simplified Chinese and English and a variety of colors can be configured according to users' requirement.

IX. Data Testing

I> Controller

Users can reset data, lock and unlock throttle, control throttle, and record data by using the control window function.

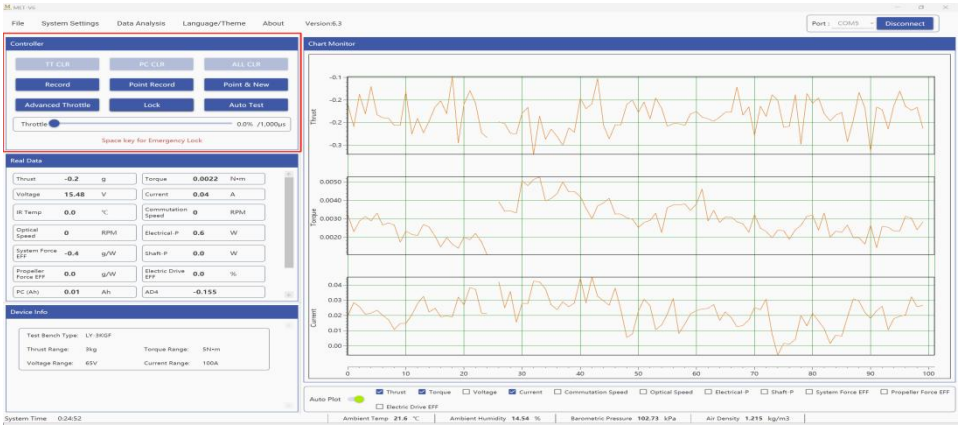


FIG 9-1-1 Controller Interface

1. TT CLR: click “TT CLR”, it can achieve Thrust and Torque data reset to 0.

*It is recommended to clear zero before each test to ensure the accuracy of data testing.

2. PC CLR: click “PC CLR”, it can achieve Power Consumption data reset to 0.

*This function can be used if you need to test the power consumption in a single instance.

3. ALL CLR: click “ALL CLR”, it can achieve the data of the thrust、 torque、 current、 power consumption reset to 0.

4. Record: click “Record”， it can achieve the real time data record, the testing data will be stored into the **File** (File-METData-Log) , user can open the **File** to find the recorded data directly. After clicking "Record", "Record" will be displayed as "Stop record". Click again to stop the recording data.

*Manual test needs to record data, auto test will automatically record data, there is no need to click to **Record.**

5. Point: click “Point”, the software will record a piece of data at the current time (the average value of the data collected in 1 second) and save it in the Log. Click "Point" again, and the software will record the data again in the same Log saved by the previous data.

6. Point and New: click “Point & New”, the software will record a piece of data at the current time (the average value of the data collected in 1 second) and save it in the new Log.

7. Advanced Throttle: click “Advanced Throttle”, the dialog will pop up the advanced throttle window, which can realize the precise control of the throttle (the maximum adjustment accuracy of the throttle is 0.1% and 1μs).

8. Unlock: click “Unlock”, it can realize the function of unlocking the throttle and control the throttle.

After clicking the “Unlock”, this position is displayed as "Lock", and clicking again can realize the throttle lock.

*Under the unlocked state, press the space bar to realize emergency lock.

9. Auto Test: After the throttle is unlocked, you can click "Auto Test" to execute the automatic test program, which includes seven test modes: Increase, Custom, Cycle, Sine, Linear, Step and Sine Sweeping. You can select and set the Auto test mode in (System Setting - Auto Test) .

II> The procedure of the reset before testing*

To ensure the accuracy of test data, the thrust and torque data (TT CLR button) should be reset to zero before testing. After ensuring that the data is reset, the test can be conducted

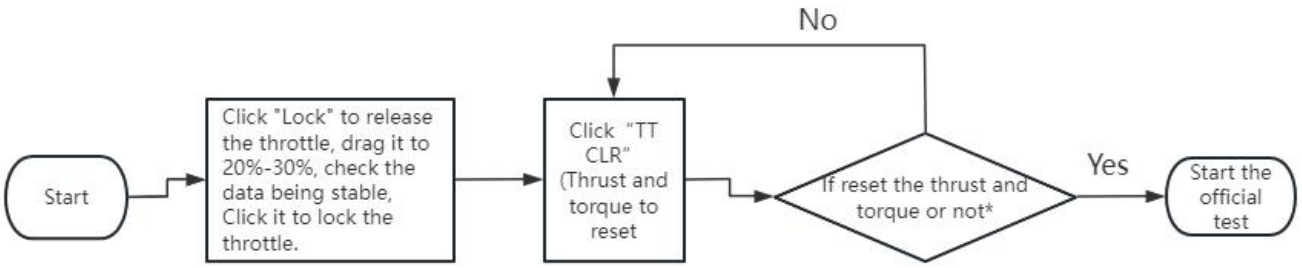


FIG 9-2-1 The procedure of the reset before testing

*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.

X. 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.

If you have any questions about this manual, please contact us:
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