MET-V5 Software User Manual

5. 3

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Catalogue

I. Disclaimer

This disclaimer applies to Wing Flying's users and authorized distributors who have purchased the product. Read the disclaimer carefully before using this product. By using this product, you hereby agree to this disclaimer and signify that you have read it fully. Please use this product in strict accordance with the manual and Wing Flying's guidance. Wing Flying assumes no liability for damage or injuries incurred directly or indirectly from using, installing or refitting this product improperly.

1. User should set the parameters in accordance with the manual.
2. User can update the software.
3. Manufacturer parameters are used for initial calibration . User CAN NOT change the settings.
4. Any alteration or destruction of the internal components is prohibited. Wing Flying assumes no liability.
5. MUST use the correct software in case of any unnecessary damage caused by compatibility difference.

II. Notice

The high-speed spinning propeller may cause injury or damage to the product or other property. Ensure safety when using the test bench.

1. The test bench should be placed in a separate space. Ensure safety before any operation. Without operator's permission, other people are NOT allowed to approach in case of any personal injury.

2. DO NOT exceed the max range of the test stand.

3. DO NOT touch or approach to the rotating motor or propeller.

4. Check the propeller and motor rotation before using the test bench .

5. Ensure all components are in good condition and replace the aging or damaged component.

6. Make sure operator is NOT under the influence of anesthesia, alcohol, drugs or suffering from dizziness, fatigue, nausea or any other conditions, whether physical or mental, that could impair your ability to operate the test stand safely.

7. Stop the operation when the software issues an alarm.

III. Introduction

1.The software is designed for data acquisition and data process.

2. The software can acquire the data of thrust, torque, power consumption, motor efficiency, propeller efficiency and engine efficiency.

3. Real-time data display and data storage, storage frequency up to 10Hz.

4. Throttle control included. User can clear data, read data and set parameters, etc.

5.Compatible with **Windows system**. Contact Wing Flying to download the correct software.

6. History data can be read in Chart. User can see the relevant curves and process the data.

IV. Installation

1. Operating System

◎CPU: 2Ghz and above

◎Memory：2G and above

◎Video card: No requirement

◎Screen：1366*768 resolution or above

◎Operation system：Windows7,Windows8,Windows10

◎Software dependencies：Excel , .NetFrameWork4, .NetFrameWork4.6.2

2. Installation and Initialization

Fig 2. Software Install Pack

Double Click MET-V5.3.msi to run the installer. Follow the instructions to complete installation.

V. Operation

Met-V5.3 software supports LY Single motor and WF-CO Coaxial motors testing.

Open the software, user can choose the type under "Bench Type" Tab, as shown in Fig.2. Click "Apply", it will prompt "Done. Please restart". Click "OK", it will restart and switch to the correct type.

Fig.2 System Setting

(I) LY Single Motor Testing

1. Main interface

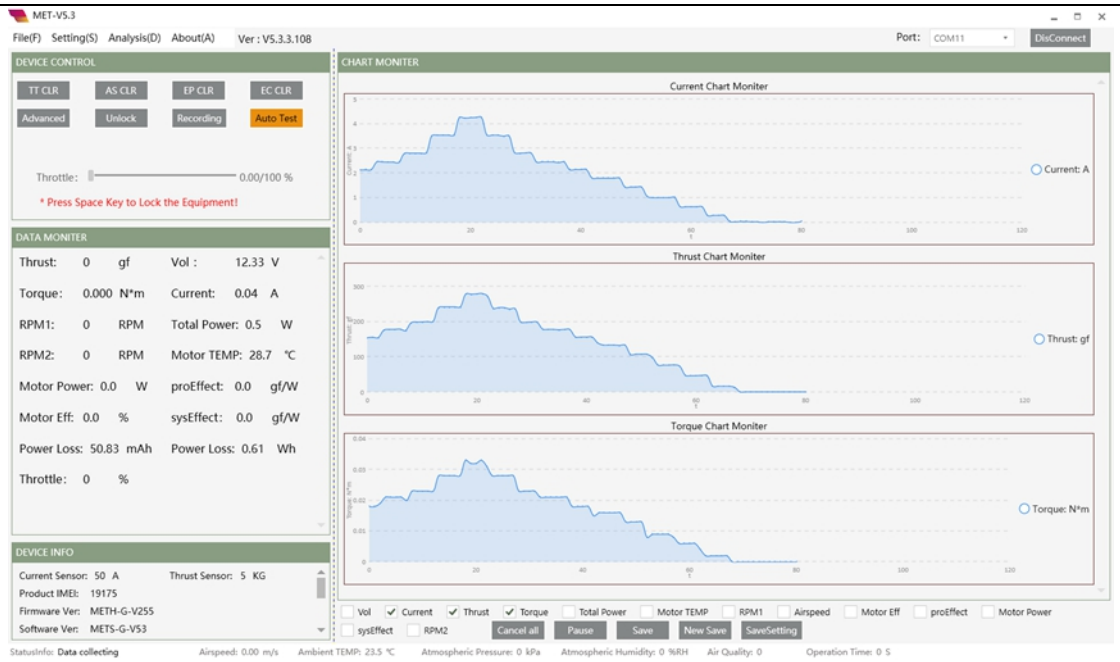

Fig.3 LY Single Motor Testing

Fig. 3 shows the main interface of the software ,which includes device control,data monitor, chart monitor, and device information,etc.

Device Control Settings:

"TT CLR"--Clear Thrust and Torque

"AS CLR"--Clear Airspeed

"EP CLR"--Clear Power Consumption

"EC CLR"--Clear Current

"Advanced"--Advanced Throttle

"Unlock"--Unlock Throttle

Note: Function disable when the button in orange.

(1) Clear Thrust and Torque

Clear thrust and torque before test, otherwise the test data may not accurate. There may be a difference during the test due to ESC connection or other reasons. User can move the throttle and then stop to check the thrust.

(2) Clear Airspeed

Clear airspeed before test.

(3) Clear Power Consumption

Clear Power Consumption before test if user needs to recalculate power consumption.

(4) Lock/Unlock Throttle

User **CAN NOT** issue a command when throttle is locked. Throttle output is constantly the min value. The duration of the tool will be cleared while throttle unlocking. The background data will be saved as a log. When throttle is unlocked, user CAN NOT clear thrust/torque, airspeed, and power consumption, but able to do automatic test. When throttle is locked, user CAN NOT do automatic test, but able to clear thrust/torque, airspeed, and power consumption.

Note: The command will be rejected if there's a throttle input signal.

"Data Monitor": shows the data acquired from the test bench,data update frequency is 3Hz

"Device Information": shows the information of the test bench and warning information.

"Chart Monitor": shows the data in the chart, data refresh frequency is 1Hz

Note 1: Some information may not be displayed, such as optical speed, air speed, barometric pressure, air humidity, etc. These can be displayed only if they are included in hardware configuration.

Note 2: Connect the USB cable after running the software, the software will detect the tool and connect automatically.

2. Test data

◎Voltage (V): Supply Voltage of the motor(Collected at power plug)

◎Current (A): The current of propulsion system. (ESC DC input)

◎Thrust (g): Axial tension generated by the spinning propeller.

◎Torque (N*M): The Anti-torque generated by air on motor and propeller

◎Total Power(W): The power consumption of the propulsion system

◎Speed (rpm): Revolutions per minute

◎Motor Temperature (℃): Real-time temperature of the infrared temperature point (usually irradiates on the motor case)

◎Throttle input (%): ESC Throttle input. (Throttle input is proportional to PWM)

◎Motor output (W): Equals to the shaft power, (torque* PWM)

◎Motor efficiency (%): Shaft power/ Total Power.(It refers to the efficiency of Motor and ESC)

◎Propeller efficiency(g/w): The unit power / thrust generated by the propeller. Unit: g/w

◎System efficiency(g/w): The unit power/ the thrust generated by the propulsion system(Unit:g/w). System efficiency=propeller efficiency*Motor efficiency.

Test data below is for Wind Tunnels Testing

◎Propeller Output Power(W): thrust*airspeed

◎Propeller Efficiency(%): Propeller output power/Shaft power.

◎System Efficiency(%)： Propeller Output Power/Total Power or Propeller efficiency*Motor efficiency.

3. Throttle Control

User can move the throttle slider to control the throttle

Advanced throttle control: increase throttle, PWM and set throttle output. User can Input PWM, then press “Enter” to set PWM value.

Notice: **DO NOT** exceed max PWM range.

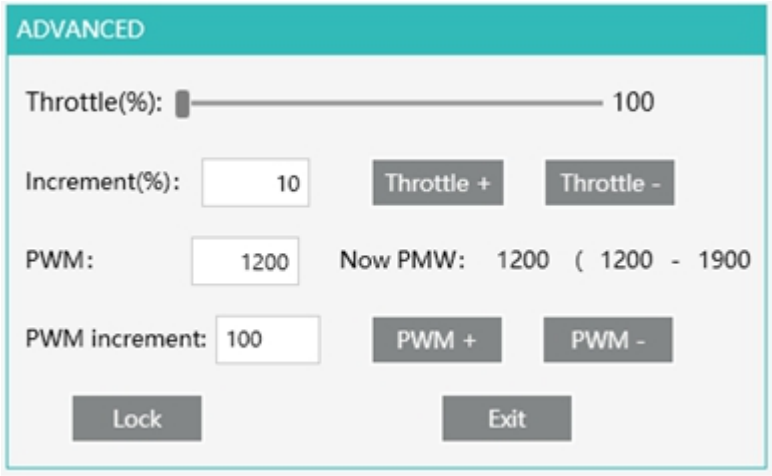

Fig.4 Advanced Throttle Interface

Note: Unlock the tool first, otherwise user CAN NOT control throttle.

4. Data Acquisition and Storage

MET-V5.3 support automatic and manual data acquisition and storage. User can click ”Save” to save a record, which is the average within the certain time.

When user runs Automatic data acquisition, the software will store the data automatically.

Manual data acquisition, click “start/stop“ to record and save data

As shown in Fig. 5.

Click “Save”, it will save a record. “Save”and “New Save” are disable until data acquisition completed. Each record will be saved in the same file. Click “Save New”, it will start a new record and a new file . Click “Set” to set the average value, for example, set “10” , click “Save”, it will collect 10 records continuously.

Fig. 5

5. Automatic test

Click “Auto Test” to start the test; Click“Stop” to stop testing immediately.

User can set different throttle and keep time as shown in Fig. 6:

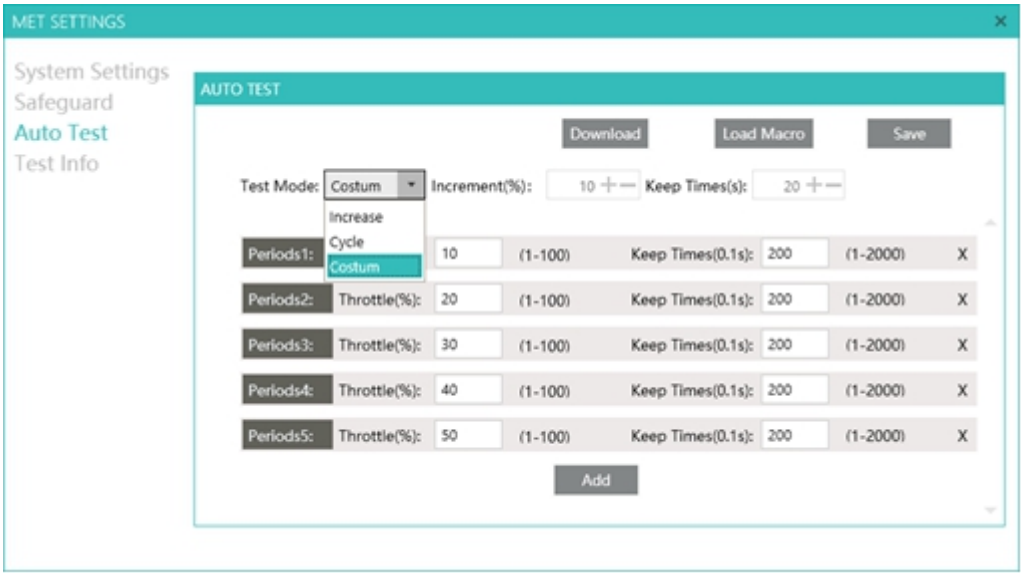

Fig. 6 Automatic Test

Test modes: increase, cycle and custom modes.

Increase mode: stop testing when throttle range reaches 100%.

Cycle mode: hold up the “Keep time” when throttle reaches 100%, and then decrease to 0% and stop testing.

Custom mode: “ Increment” and “Keep Time” are invalid. User can set the throttle and keep time of each period. Additionally, user can define the settings in custom mode.

6. Data Analysis

The log(CSV file) will be saved in “My computer/Document/MET Chart/Log” after test finished and the tool locked.

（1） Data Analysis (Chart):

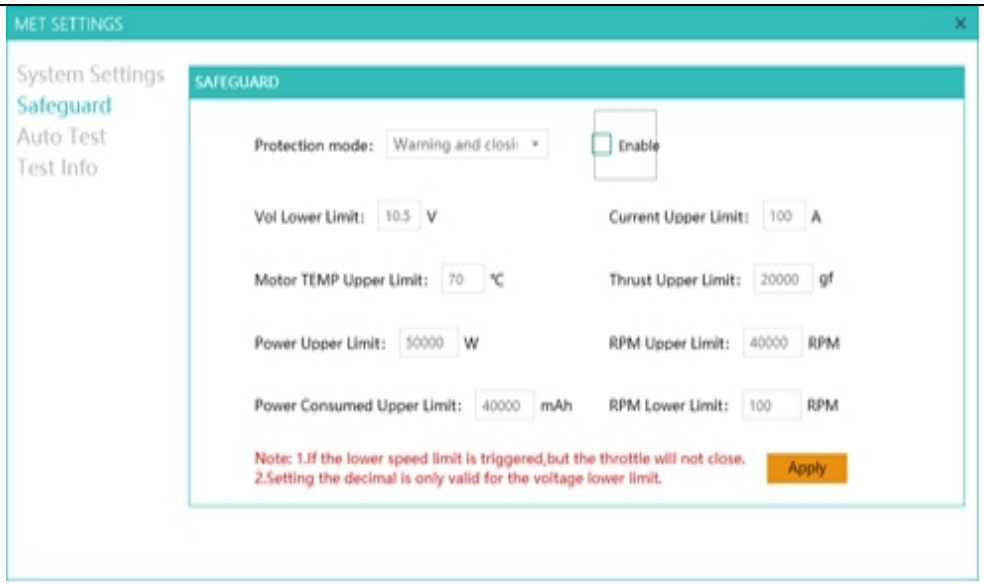

Fig.7 Data Analysis

The system will automatically open and load the last record after running the program.

Data Analysis displays in Chart.

User can drag the graph by pressing your Mouse. Press "Ctrl"+ Mouse to zoom in and out the curves.

User will see the detailed parameters of a specific point when move your mouse there.

Click " data view " to view the specific test data, as shown in Fig. 8 below:

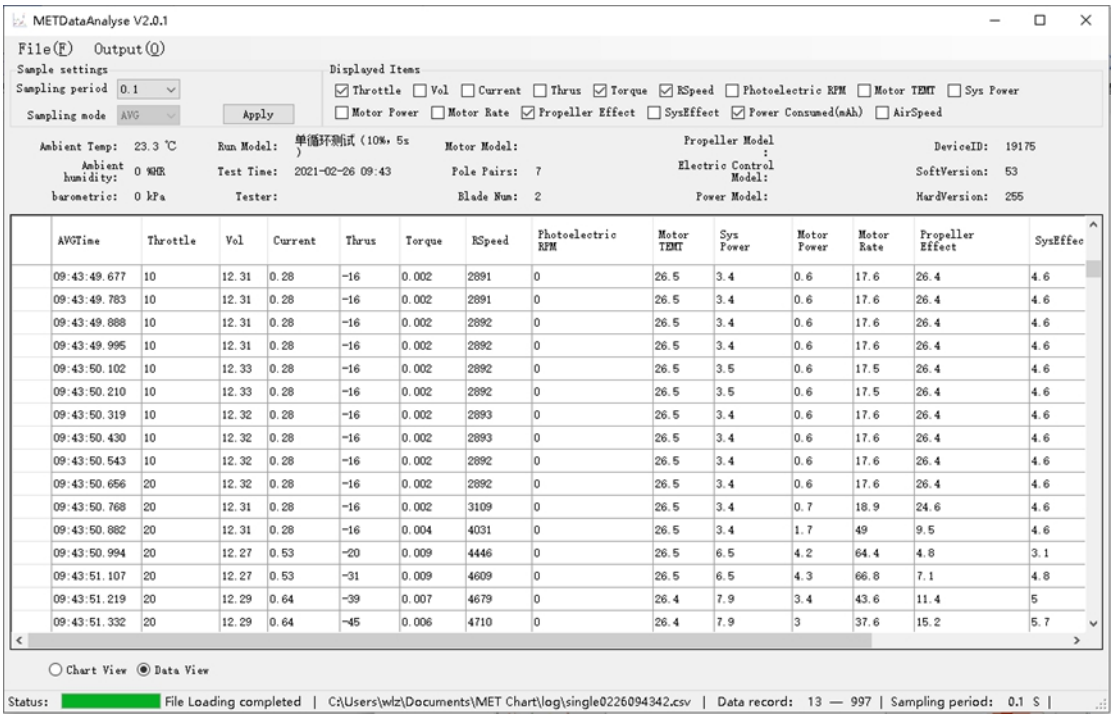

Fig. 8 Data Analysis (data view)

Click "File" and select a log, it will be displayed in data sheet or chart.

(2) Throttle Average

The software records the test data and eliminates unstable data by Filter setting. It calculates

the average of each throttle and forms a file.

Click “Throttle AVG”, the throttle average can be saved in Excel, as shown in Fig.9 .

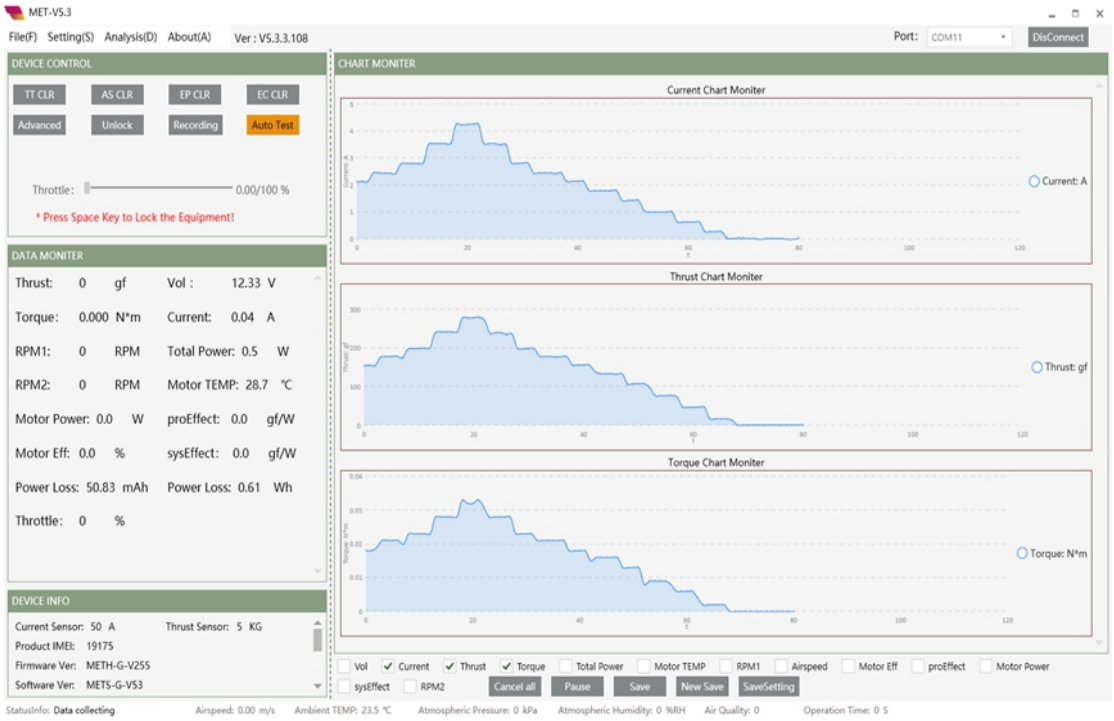

Fig. 9 Throttle Average

Note: user can adjust the filter setting according his own propulsion system to optimize the test data.

7. Other Settings

“System Setting” contains the software and test bench configuration.

“Safeguard”, it will alarm and throttle off when reaches the limits, as shown in Fig. 10 below:

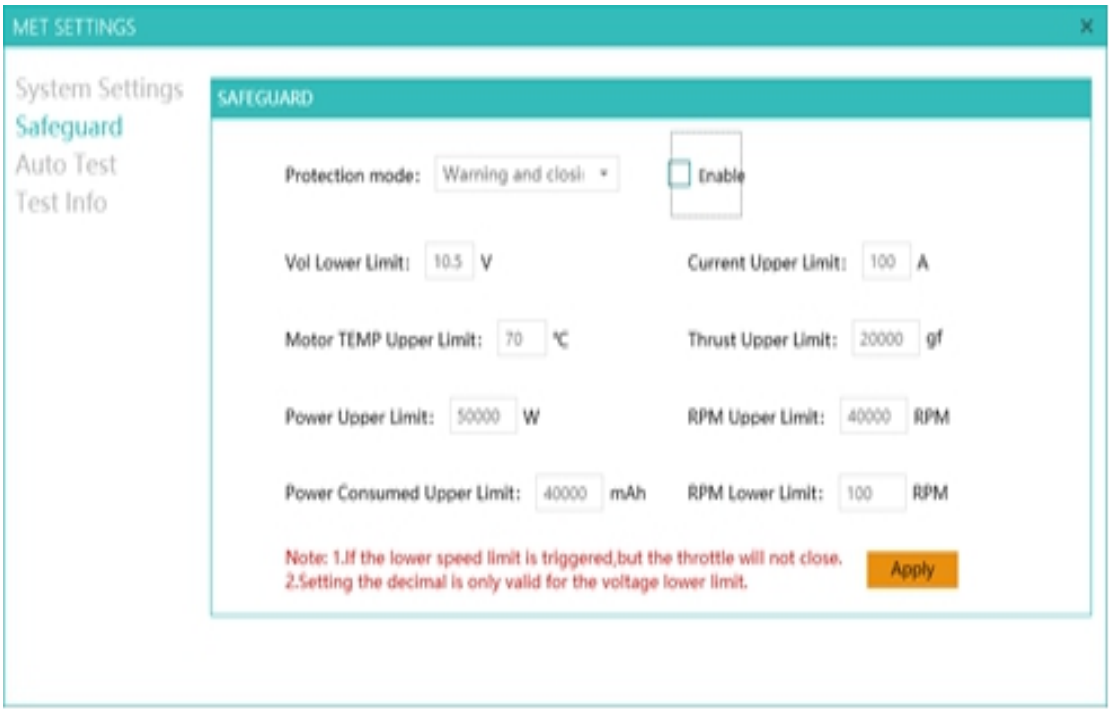

Fig. 10 Safeguard

"Test Information", set the information of the motor, propeller,etc so that the system can generate the test report automatically.

(II) WF-CO Coaxial Motors Testing

1. Main interface

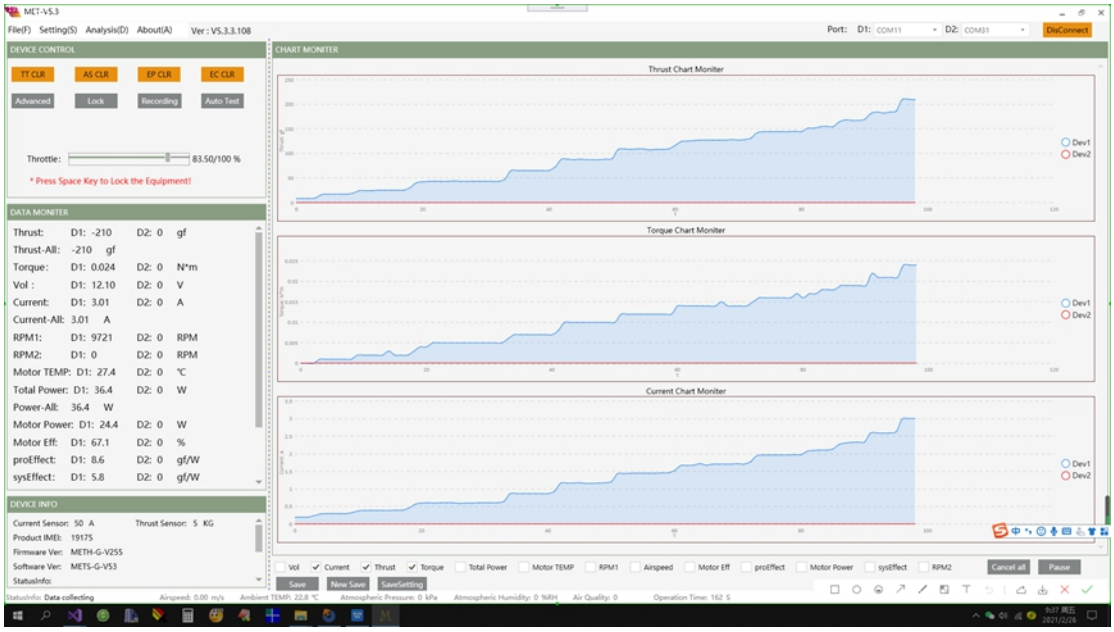

Fig.11 WF-CO Coaxial motors testing

Fig. 11 shows the main interface of the software ,which includes device control,data monitor, chart monitor, and device information,etc.

Note: Function disable when the button in orange.

(2) Clear Thrust and Torque

Clear thrust and torque before test, otherwise the test data may not accurate. There may be a difference during the test due to ESC connection or other reasons. User can pull throttle and then stop to check the thrust.

(2) Clear Airspeed

Clear airspeed before test.

(3) Power Consumption Reset

Clear Power Consumption before test if user needs to recalculate power consumption.

(4) Lock/Unlock Throttle

User **CAN NOT** issue a command when throttle is locked. Throttle output is constantly the

min value. The duration of test bench will be reset while unlocking. The background data will be saved as a log. When throttle is unlocked, user CAN NOT clear thrust/torque, airspeed, and power consumption, but able to do automatic test. When throttle is locked, user CAN NOT do automatic test, but able to clear thrust/torque, airspeed, and power consumption.

Note: The command will be rejected if there's throttle input signal.

"Real-time Data" Display the data of two motors at the same time.(distinguished by D1 and D2),data update frequency is 3Hz.

"Chart Monitor", able to display the data of two motors in same chart. Data refresh frequency is 1Hz.

"Device Information"shows the information of the test bench and warning information.

Note: Some information may not be displayed, such as photoelectric speed, air speed, barometric pressure, air humidity, etc. These can be displayed only if they are included in hardware configuration.

2. Test data

◎Voltage (V): Supply Voltage of the motor(Collected at power plug)

◎Current (A): The current of propulsion system. (ESC DC input)

◎Thrust (g): Axial tension generated by the spinning propeller.

◎Torque (N*M): The Anti-torque generated by air on motor and propeller

◎Total Power(W): The power consumption of the propulsion system

◎Speed (rpm): Revolutions per minute

◎Motor Temperature (℃): Real-time temperature of the infrared temperature point (usually irradiates on the motor case)

◎Throttle input (%): ESC Throttle input. (Throttle input is proportional to PWM)

◎Motor output (W): Equals to the shaft power, (torque* PWM)

◎Motor efficiency (%): Shaft power/ Total Power.(It refers to the efficiency of Motor and ESC)

◎Propeller efficiency(g/w): The unit power/ the thrust generated by the propeller. Unit: g/w

◎System efficiency(g/w): The unit power / the thrust generated by the propulsion system(Unit:g/w). System efficiency=propeller efficiency*Motor efficiency.

Test data below is for Wind Tunnels Testing

◎Propeller Output Power(W): thrust*airspeed

◎Propeller Efficiency(%): Propeller output power/Shaft power.

◎System Efficiency(%): Propeller Output Power/Total Power or Propeller efficiency*Motor efficiency.

3. Throttle Control

User can move the throttle slider to control the throttle. It is able to control the throttle of two motors.(Two motors have the same throttle input)

Advanced throttle control: Two motors can be controlled separately. User can increase throttle, PWM and set throttle output. User can input PWM, then press “Enter” to set PWM. (as shown in Fig.12)

Notice: **DO NOT** exceed max PWM range

Note: Unlock the tool first, otherwise user CAN NOT control throttle.

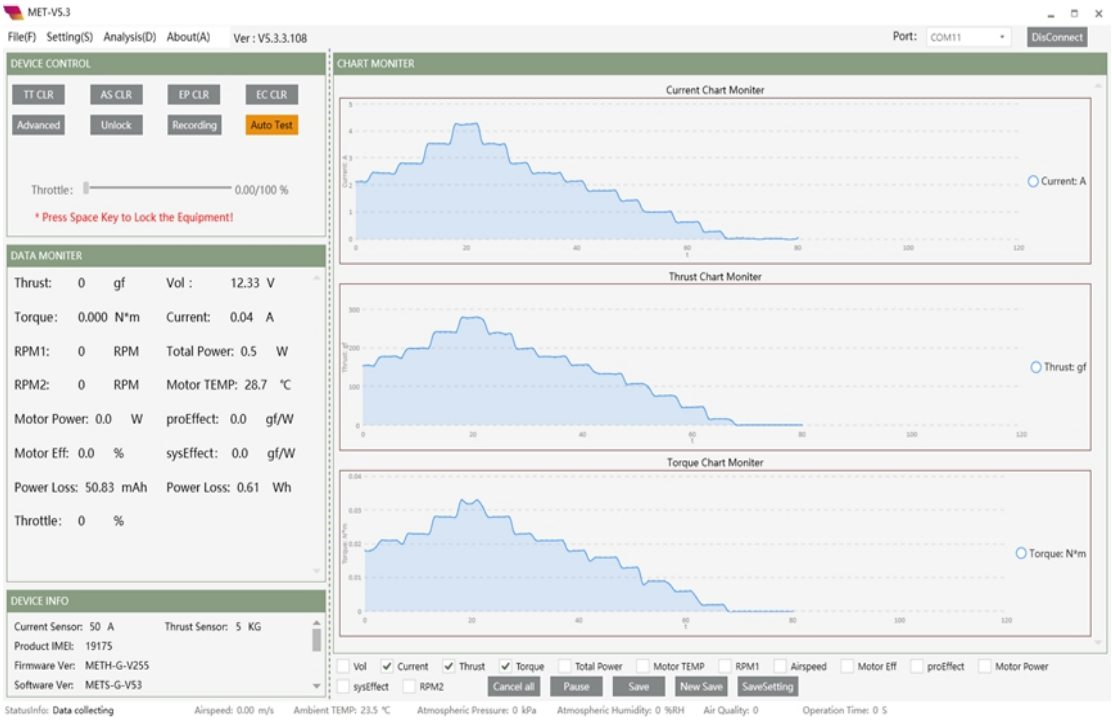

Fig. 12 Advanced Throttle Interface

4. Data Acquisition and Storage

MET-V5.3 support automatic and manual data acquisition and storage. User can click”Save” to save a record, which is the average within the certain time.

When user runs Automatic data acquisition, the software will store the testing data automatically.

Manual data acquisition, click “start/stop“ to record and save data

Click “Save”, it will save a record. “Save”and “New Save” are disable until data acquisition completed. Each record will be saved in the same file. Click “Save New”, it will start a new record and a new file . Click “Set” to set the average value, for example, set “10” , click “Save”, it will collect 10 records continuously.(As shown in Fig. 13.)

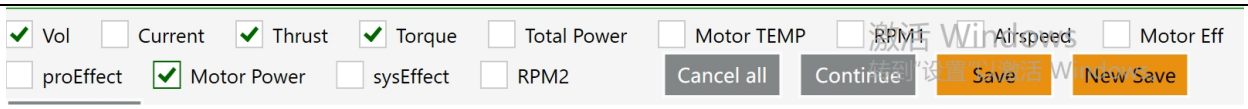

Fig. 13 Function Interface of "Click Acquisition (Save)"

5. Automatic test

Click "Auto Test" to start the test; Click"Stop" to stop testing immediately.

User can set different throttle and keep time as shown in Fig. 14:

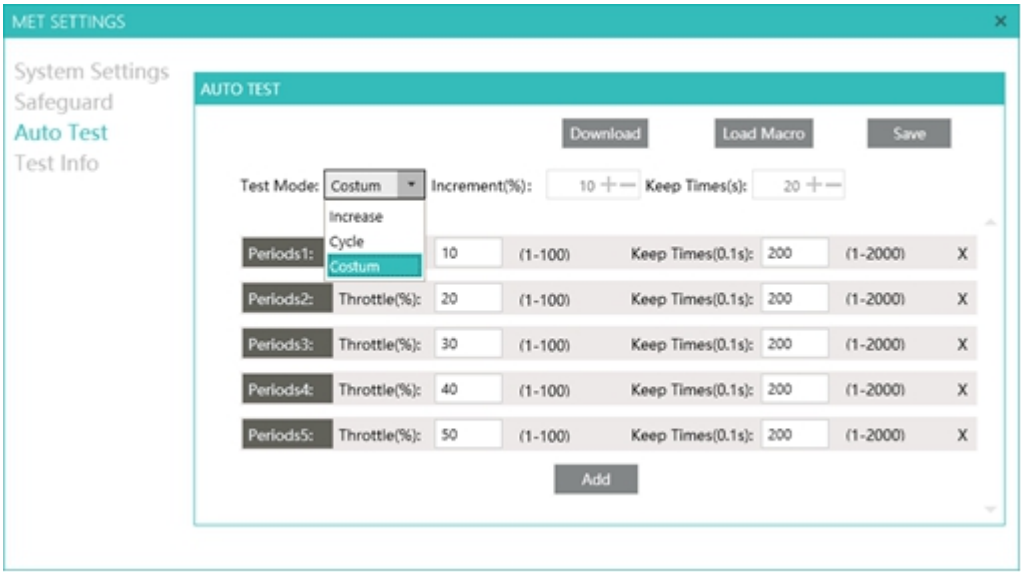

Fig. 14 Automatic Testing Interface

Test modes: increase, cycle and custom modes.

Increase mode: stop testing when throttle range reaches 100%.

Cycle mode: hold up the "Keep time" when throttle reaches 100%, and then decrease to 0% and stop testing.

Custom mode: " Increment" and "Keep Time" are invalid. User can set the throttle and keep time of each period. Additionally, use can define the settings in custom mode.

6. Data Analysis

The log(CSV file) will be saved in "My computer/Document/MET Chart/Log" after test finished and the tool unlocked.

(1) Data Analysis (Chart):

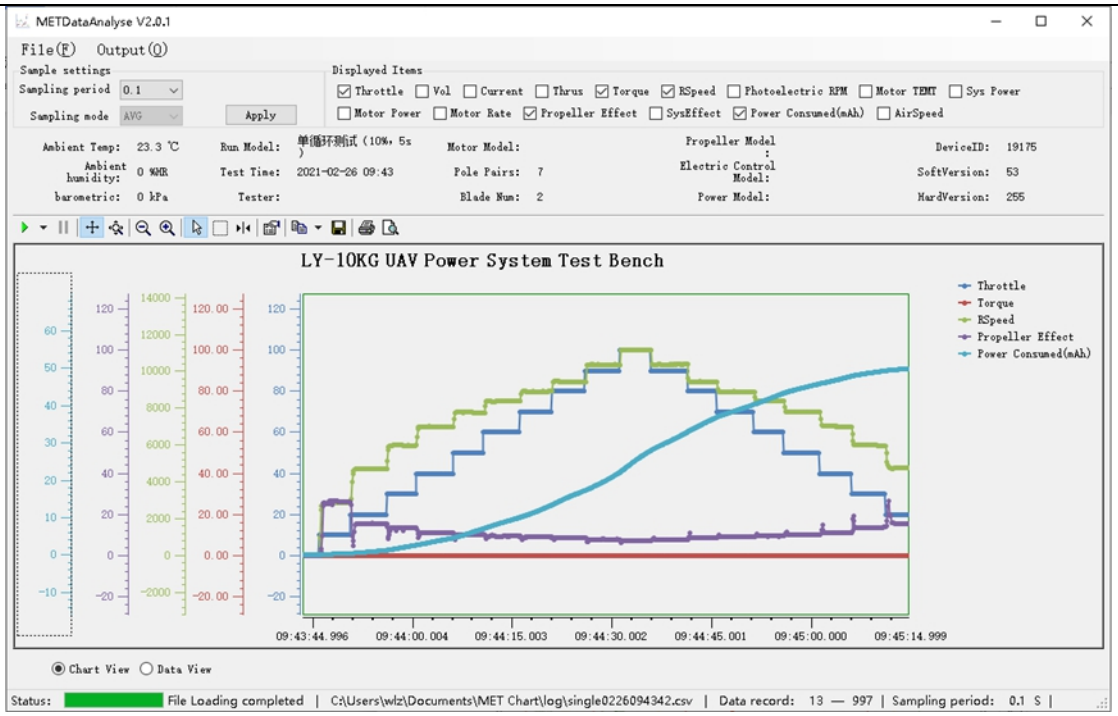

Fig.15 Data Analysis (chart view) Interface

The system will automatically open and load the last record after running the program.

Data Analysis displays in Chart.

User can drag the graph by pressing your Mouse. Press “Ctrl”+ Mouse to zoom in and out the curves.

User will see the detailed parameters of a specific point when move your mouse there.

Click “ data view “ to view the specific test data, as shown in Fig. 16 below:

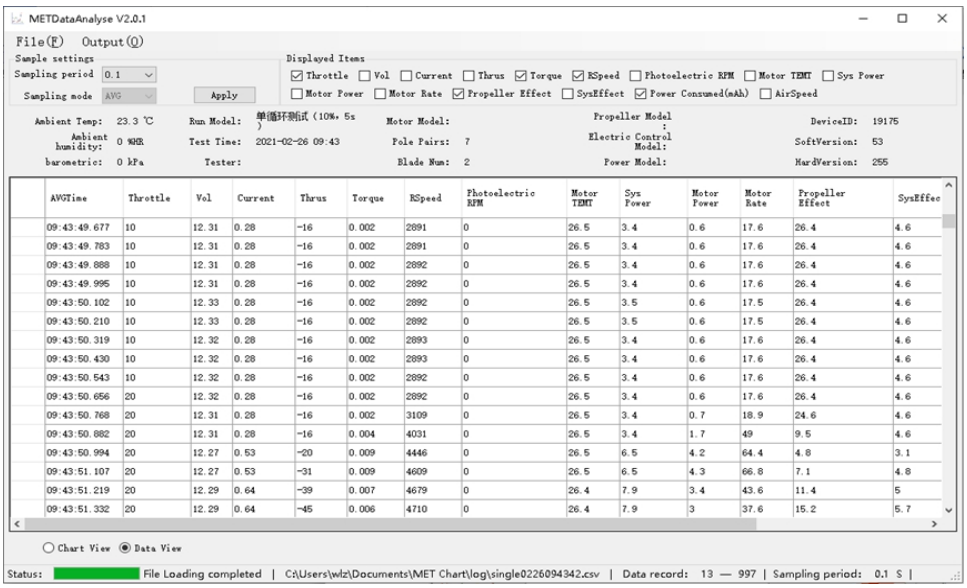

Fig. 16 Data Analysis (data view)

Click “File” and select a log, it will be displayed in data sheet or chart.

(3) Throttle Average

The software records the test data and eliminates unstable data by Filter setting. It calculates the average of each throttle and forms a file.

Click “Throttle AVG”, the throttle average can be saved in Excel, as shown in Fig. 17.

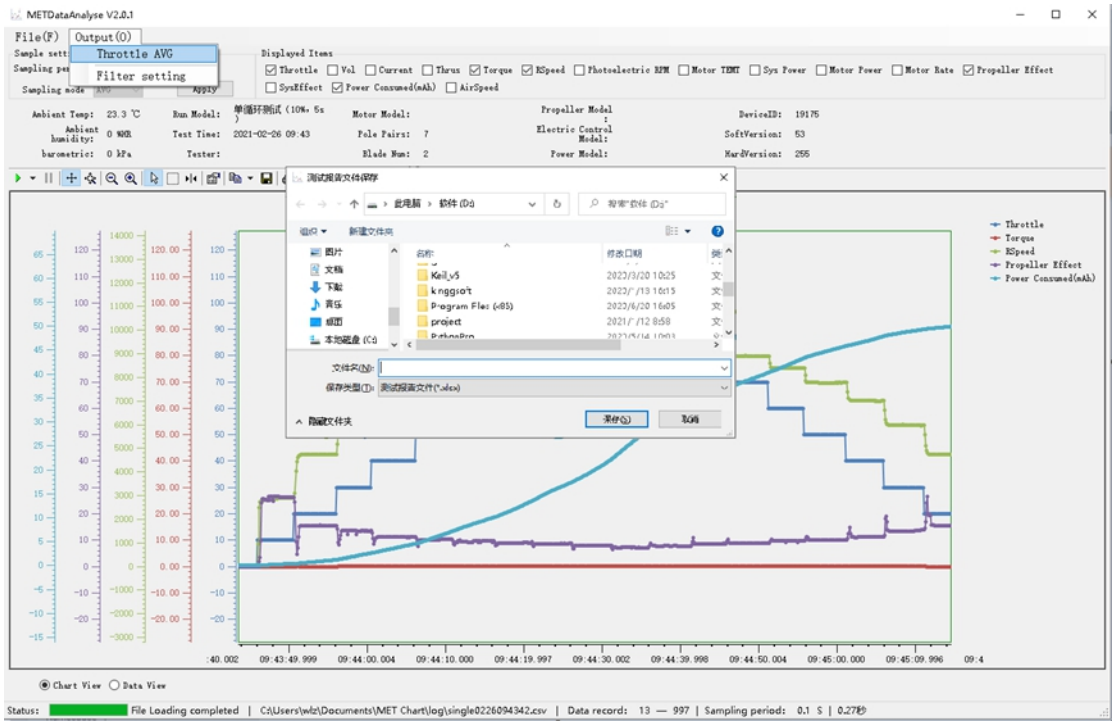

Fig.17 Throttle Average

Note: user can adjust the filter setting according his own propulsion system to optimize the test data.

7. Other Settings

“System Setting” contains the software and test bench configuration.

“Safeguard”, it will alarm and throttle off when reaches the limits, as shown in Fig. 10 below:

For safety, the software will monitor some main parameters such as voltage, current, temperature, speed and power consumption. The software will alarm or shut off the throttle when these parameters exceed their limits, as shown in Fig. 18 below:

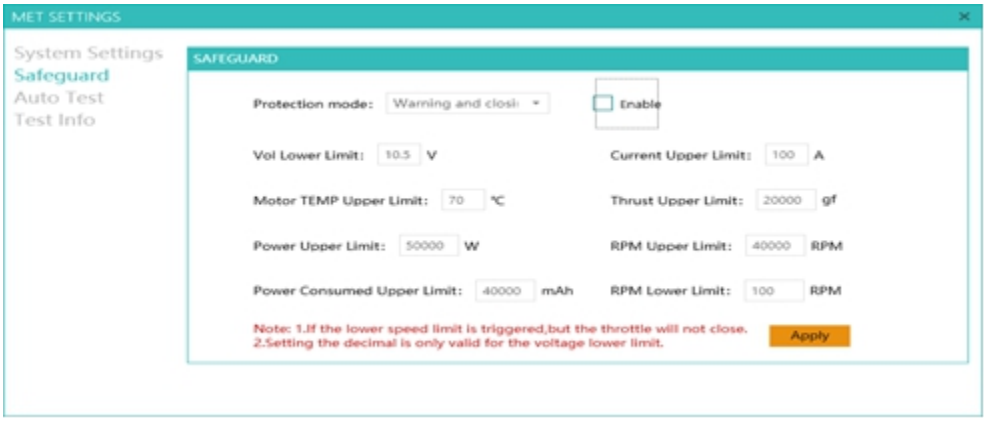

Fig. 18 Safeguard Settings

"Test Information", set the information of the motor, propeller,etc so that the system can generate the test report automatically.

