



Series 1520 Thrust Stand Datasheet



Introduction

The Series 1520 Thrust Stand is an excellent tool for characterizing your drone’s propulsion system. This test stand is simple but accurate and reliable, a great way to obtain the critical data needed to enhance your flight performance.

Description

The Series 1520 can measure up to 5 kgf of thrust with a $\pm 0.5\%$ tolerance. It can handle current up to 40 A and voltage up to 35 V. The stand comes factory calibrated, but you can perform your own calibrations with your precision weight if desired.

The test stand connects to your computer via USB and is controlled with the RCbenchmark software. You can control the throttle manually or perform automated tests based on custom scripts.

Direct measurements

- Thrust
- Voltage
- Current
- RPM

Derived measurements

- Overall efficiency (g/W)

Applications

- Inrunner and outrunner brushless motor characterization
- Propeller characterization
- Servo testing and control
- Battery endurance testing

Technical Specifications

Table 1: Specifications for the Series 1520 Test Stand

Specification	Min.	Max.	Tolerance	Unit
Thrust	-5	5	0.5%	kgf
Voltage	0	35	0.5%	V
Current	0	40	1%	A
Angular speed*	0	190k	-	eRPM

*Electrical RPM, divide by the number of motor poles to obtain true mechanical RPM.

Sampling rate depends on the computer (up to 50 Hz) and is lower for the load cell (~8 Hz)

Hardware

The RCbenchmark Series 1520 thrust stand is designed to greatly reduce the time required for characterizing and testing brushless motors while obtaining precise and accurate results. See the manual for details on assembly. Figure 1 shows an overview of the important components of the tool.

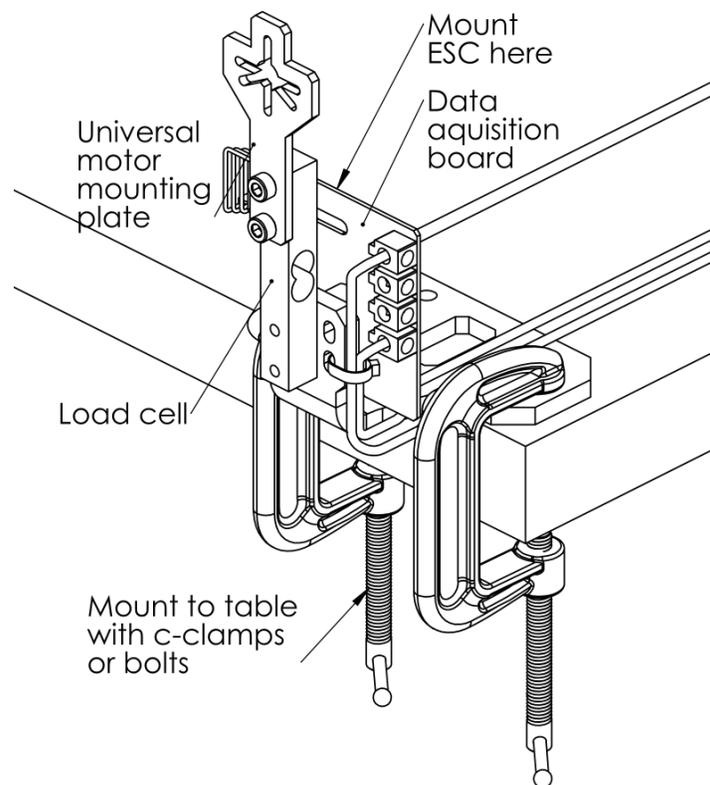


Fig. 1: Important components

Calibration

The load cell is factory calibrated. Users can optionally calibrate the load cell using their own test weight and the calibration wizard built-in the App.

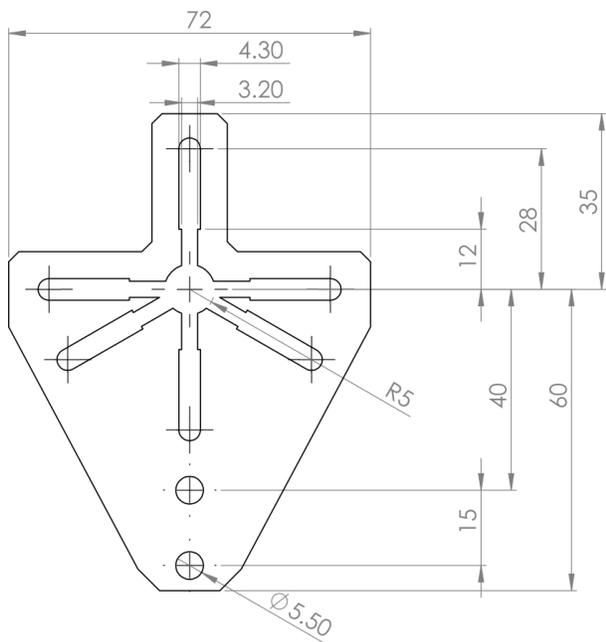


Fig. 2: Large motor mount dimensions

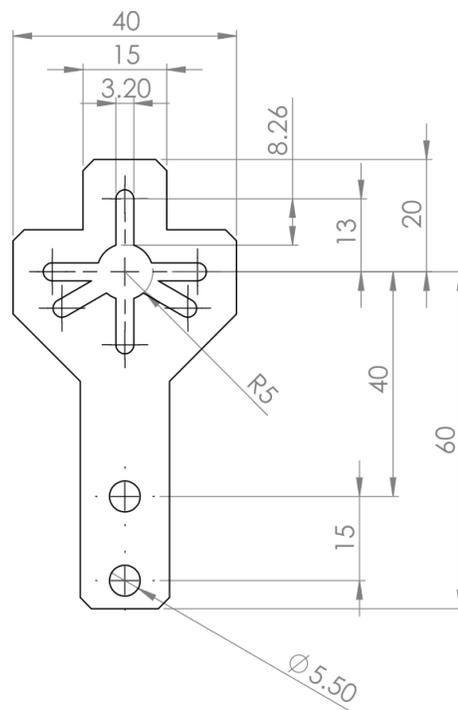


Fig. 3: Small motor mount dimensions

The test device is compatible with most inrunner and outrunner brushless motors with M2 to M4 screws and screw spacing of up to 56mm. Use the smaller motor mount if it will fit your motor.

Use the drawings in Figure 2 and 3 to check if you can install your motor on the device. The pattern fits almost all standard motors. Otherwise, you can make a wood adapter, or design your own motor mounting part using the dimensions in the drawings.

General dimensions of the test stand are shown in Figure 4.

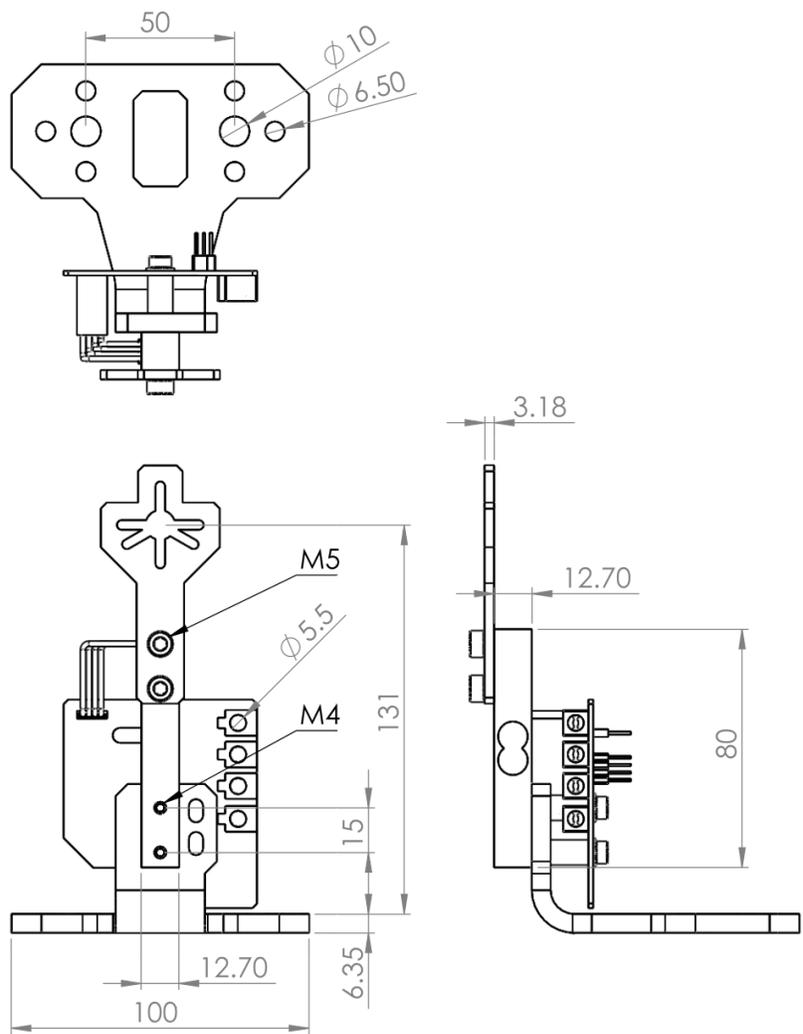


Fig. 4: General dimensions of the tool

Load cell dimensions are shown in Figure 5 and wiring information is shown in Table 2. The load cell can be read with an instrumentation amplifier.

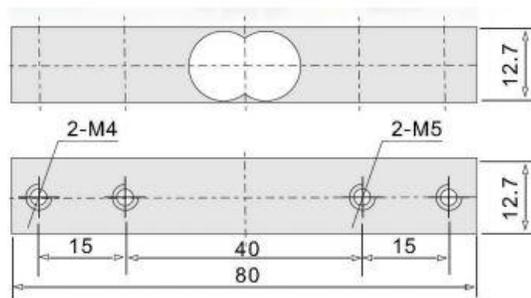


Fig. 5: General dimensions of the load cell

Software

Our open-source propulsion testing software is included with all test stands and allows you to control your propulsion system and record data easily.

The test stand can be controlled manually or automatically with Windows, Linux, Mac and Chrome OS. The interface displays sensor information in textual and graphical form, which can be recorded as single data points or continuous data. We provide pre-written test scripts, which you can then edit or you can write your own custom scripts.

Once the data is recorded, you can easily export it to a .CSV file, readable with most spreadsheet softwares. You can set-up your own working units, safety cut-offs and live plots to meet your needs. Your results will provide you with important information about propeller and motor efficiency as well as consumed power.

- Real time graphs
- Manual motor control
- Manual servo control (three channels)
- Calibration wizard
- Safety cutoffs based on any measured data
- CSV export
- Automated test
 - Ramps
 - Steps
 - Measure Kv
 - Measure number of poles
 - And more...
- User scripts with documentation

