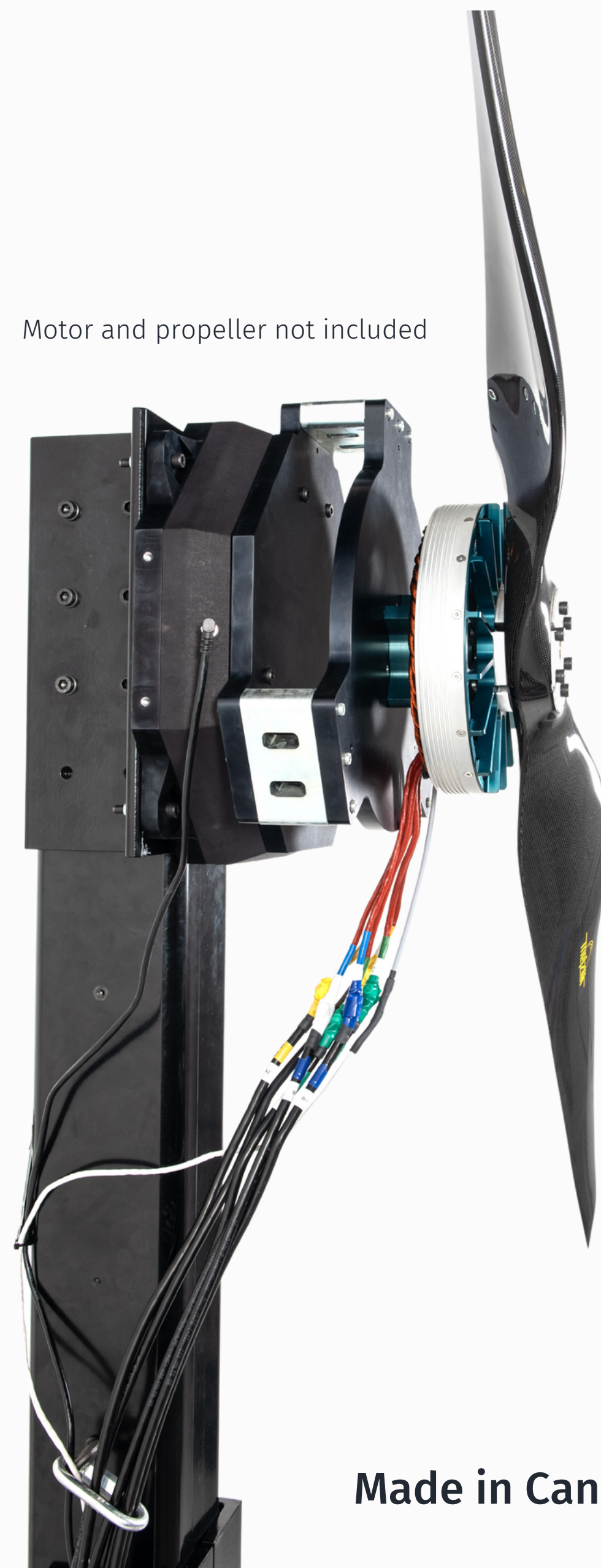


# Flight Stand 500

Professional thrust stand with powerful software for very large motors and propellers



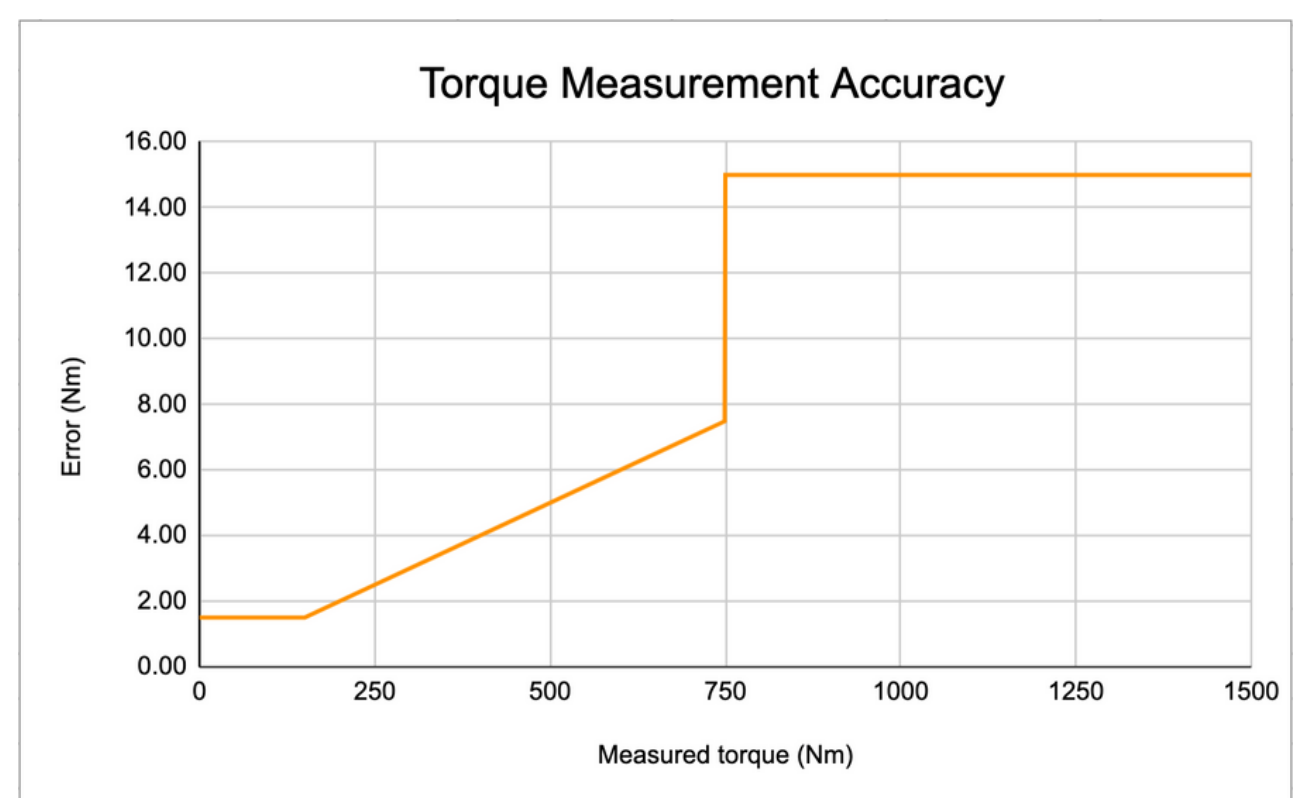
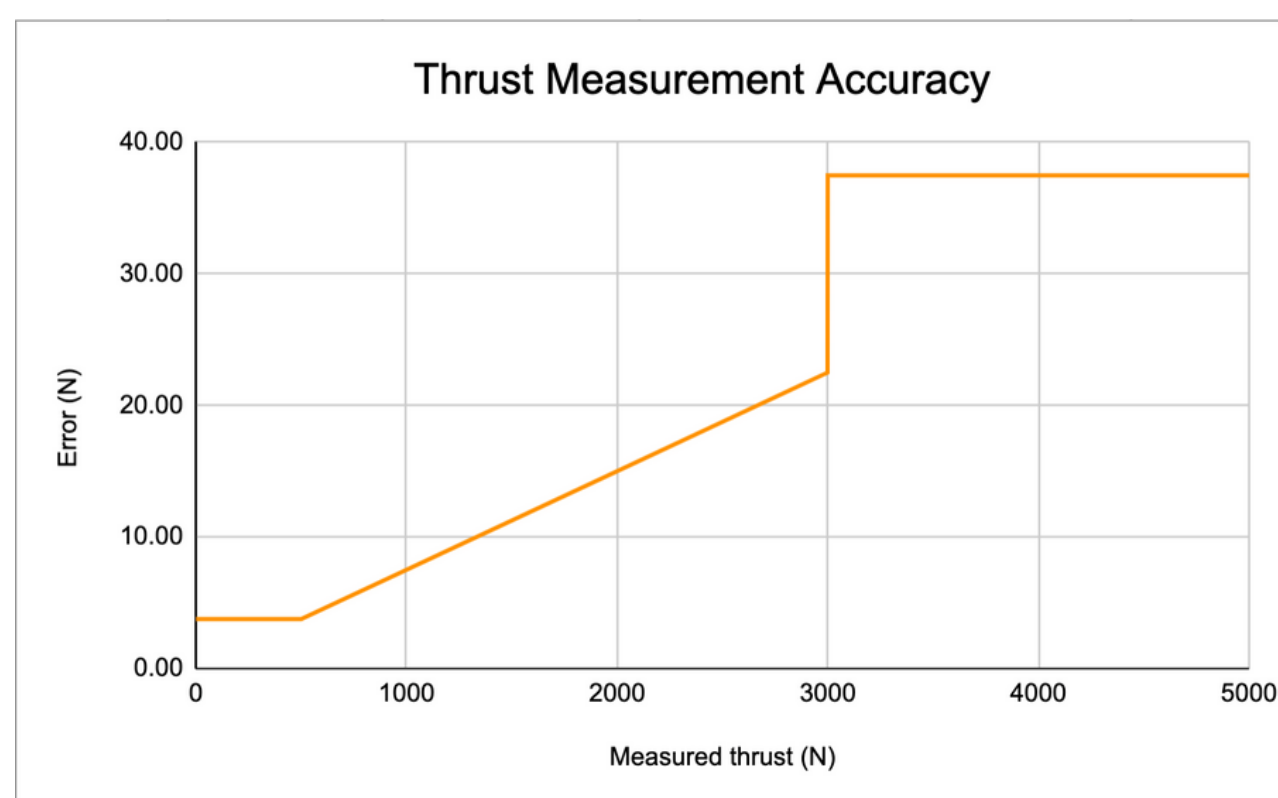
Motor and propeller not included



## Introduction

The Flight Stand 500 thrust stand allows you to precisely characterize and evaluate the performance of your motors and propellers by measuring thrust, torque, RPM, current, voltage, temperature, propeller efficiency and motor efficiency.

The force measurement system was designed with care to offer you frictionless, highly-accurate thrust and torque readings with minimal error:



## Important Features

These are some of the key features of the Flight Stand 500:

- **Real-time dynamic testing:** made possible by the 1,000 Hz sampling rate. Perform frequency and step input parameter identification.
- **Frictionless measurement:** our tools have a solid-state system for measuring thrust and torque, meaning there are no moving parts between the motor and load cells. This design significantly improves the accuracy of measurements and eliminates the need for bearings and hinges, which cause friction and are prone to misalignment.
- **ASTM Calibration:** our thrust stands are calibrated to ASTM standards to ensure maximum measurement precision. Thrust and torque are both calibrated with ASTM procedures.
- **CAN ESC Compatibility:** the stand can be controlled with CAN ESCs via the In/Out API.

## Technical Specifications

Note: these are preliminary values based on initial tests.

	Specification	Value
<b>Basic Information</b>	Storage temp & humidity	23°C, 20% - 80% suggested
	Operating temp & humidity	0°C to 40°C, 20% - 80% suggested
	Dimensions	70 x 270 x 100 cm
	Net weight	325 kg
	Input power / Output power	90 - 264 VAC, 1 A input adapts into 9 V, 2 A
<b>Measurement Information</b>	Sampling rate	1,000 Hz
	Thrust calibration	ASTM E74 standard (up to ±3,000 N)
	Torque calibration	ASTM E2428 standard (up to ±750 Nm)
	Angular speed	Up to 30,000 RPM
<b>Voltage and Current</b>	Voltage range	0.6 - 1,000 V
	Voltage resolution	0.001 V
	Voltage accuracy	1% between 7 V to 1,000 V
	Current range	100, 200, or 500 A
	Hall sensor linearity	1% from 25 - 500 A
	Current accuracy	±1% of measured value (between lower limit and full range)
<b>Thrust</b>	Range	±5,000 N
	Resolution	1.8 N
	Accuracy	0 - 500 N: constant error of ±3.75 N; 500 - 3000 N: ±0.75 % of measured value (±3.75 N to ±22.5 N); >3000 N: constant error of ±37.5 N
	Temperature effect	9 N per 10 degrees Celsius
<b>Torque</b>	Range	±1,500 Nm
	Resolution	0.175 Nm
	Accuracy	0 - 150 Nm: constant error of ±1.5 Nm; 150 - 750 Nm: ±1.0 % of measured value (±1.5 Nm to ±7.5 Nm); >750 Nm: constant error of ±15 Nm
	Temperature effect	2.6 Nm per 10 degrees Celsius
<b>RPM Sensor</b>	Range	Up to 30,000 RPM
	Operating environment	Indoor
	Resolution	0.1 RPM
	Accuracy	±1 RPM
<b>Temperature Sensor</b>	PT100	-30 °C to 100 °C, ±2 °C
<b>General analog inputs</b>	Range	2 inputs of ±10 V differential.
	Resolution	0.001 V
	Accuracy	±0.5% of measured value ±0.25 V
	Supply pin	5 V ± 0.1 V 30 mA max
<b>External Inputs and Outputs</b>	Connect CAN ESCs, sensors, wind tunnels, and more	Included

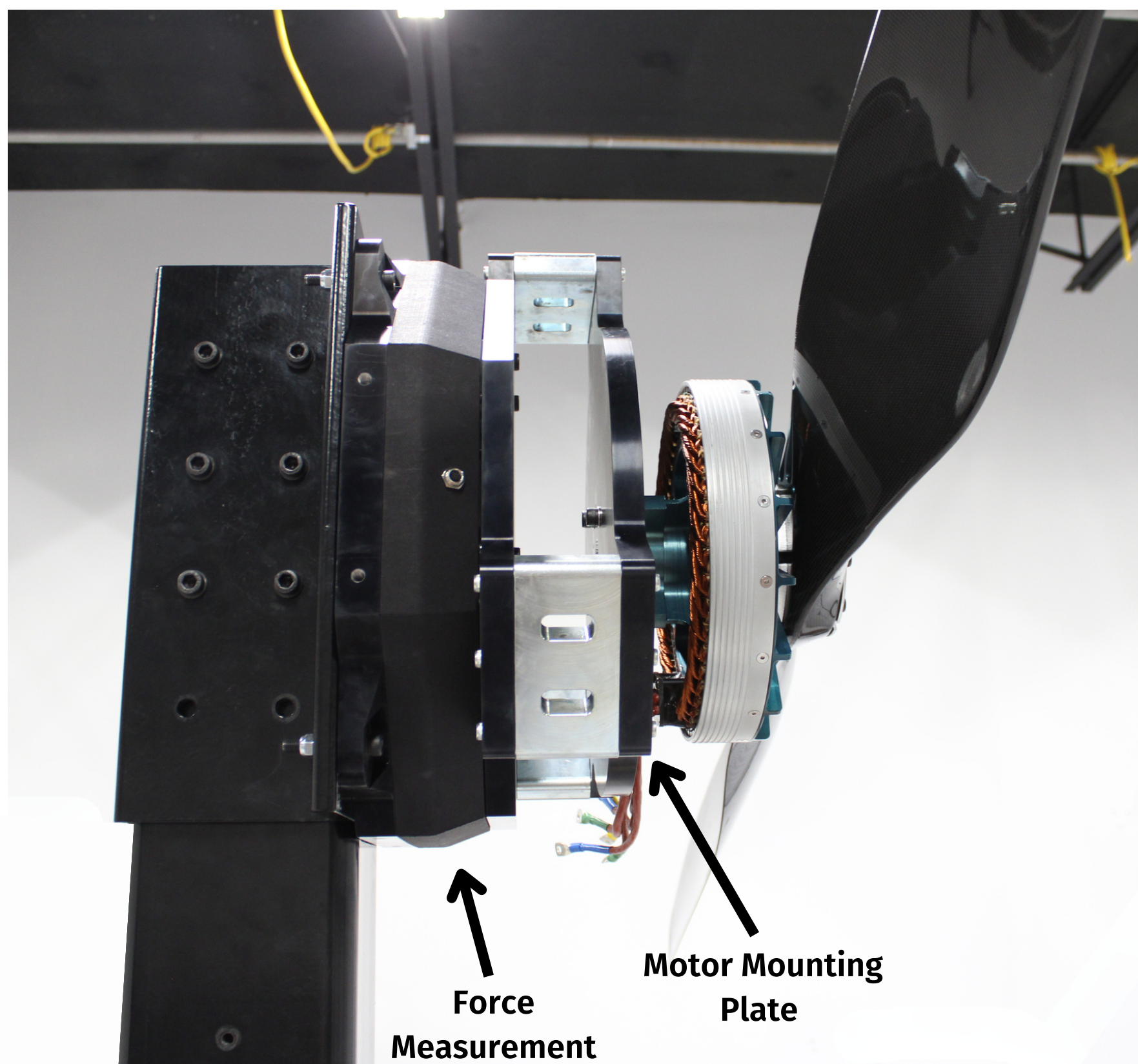


## What's Included

The Flight Stand 500 comes fully equipped with software, hardware and electronics. Here's what's included with your Flight Stand:

### Flight Stand 500:

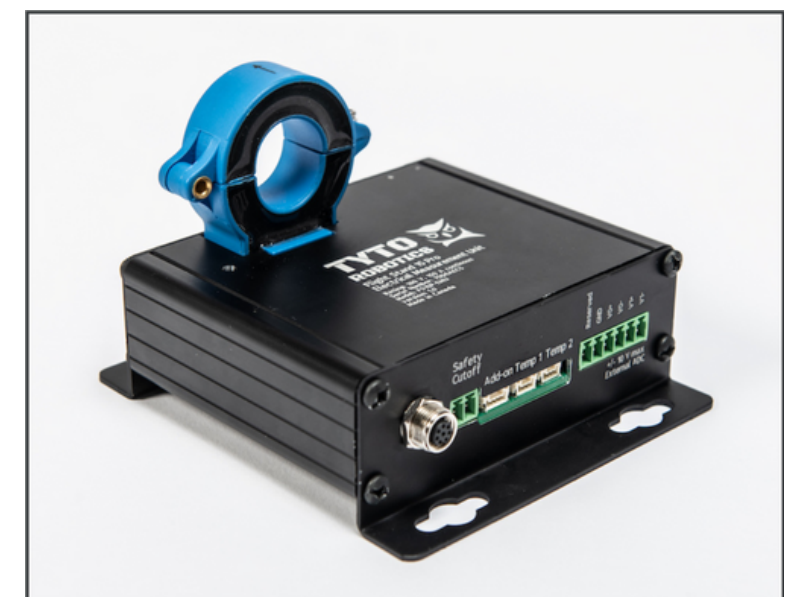
- Force Measurement Unit (500 kgf / 1,500 Nm) (1x): measures thrust and torque
- Electric Measurement Unit (1,000 V / 100 - 500 A) (1x): measures current and voltage
- Tubular structure (1x): supports the FMU and propulsion system, protects wiring
- Motor mounting plate: mounts the motor on the thrust stand
- Sync Hub (1x): connects the thrust stand to the software
- Temperature probes (2x): records the temperature at the desired location
- Optical RPM probe (1x): provides a precise measurement of the motor's rotation speed
- Flight Stand Software



↑  
Tubular Structure

↑  
Force  
Measurement  
Unit

↑  
Motor Mounting  
Plate



Electrical Measurement Unit



Sync Hub



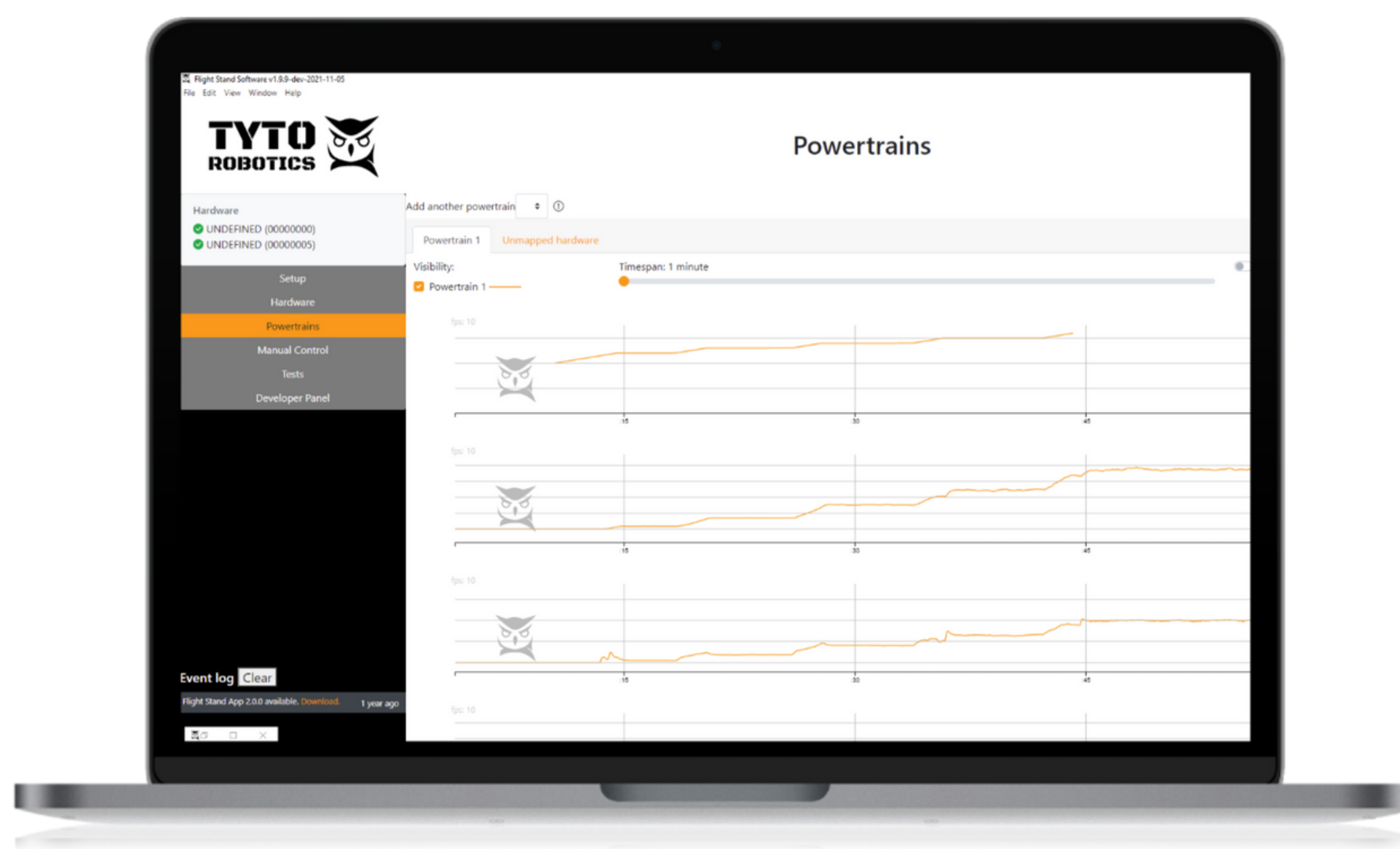
Optical RPM Probe

## Software Experience

The Flight Stand Software controls your thrust stand and records data. You can manually control tests with a throttle slider or automate tests using a table, data from a .CSV file, or the Python API.

### Key Features:

- **Input/ Output API:** users can connect and control third party sensors with the Flight Stand software. Examples include acoustic and vibration sensors, additional motors and flight controllers, wind tunnels, and more.
- **CAN ESC support:** there is a wide variety of CAN protocols available, which is why we've made it possible to control any CAN ESC as an external input.
- **Python Control API:** users who prefer to program tests in an external text editor can fully control their tests using the Python API. We've created several examples and test templates to help users setup the API and get started.
- **CSV data upload:** one way to automate tests is by uploading throttle values from a .CSV file. This includes throttle data from a recent flight with your UAV.
- **Detailed software tutorials:** we offer detailed articles and videos that explain and demonstrate how to use the Flight Stand software. They are easy to follow and will help you make use of all the features available.



## Applications

Below is a non-exhaustive list of possible applications for the Flight Stand 500:

- **Flight replay:** upload your flight controller data to the software and recreate your throttle pattern while your propulsion system is hooked up to the thrust stand.
- **Efficiency and power characterization:** measure the efficiency of your motor, propeller and overall system and compare electrical power input with mechanical power output.
- **Endurance and reliability testing:** study the endurance of your system's components using automated tests designed by you. Our user-friendly testing interface allows you to easily design and run step tests, ramp tests, flight replay tests, or any protocol you can come up with.

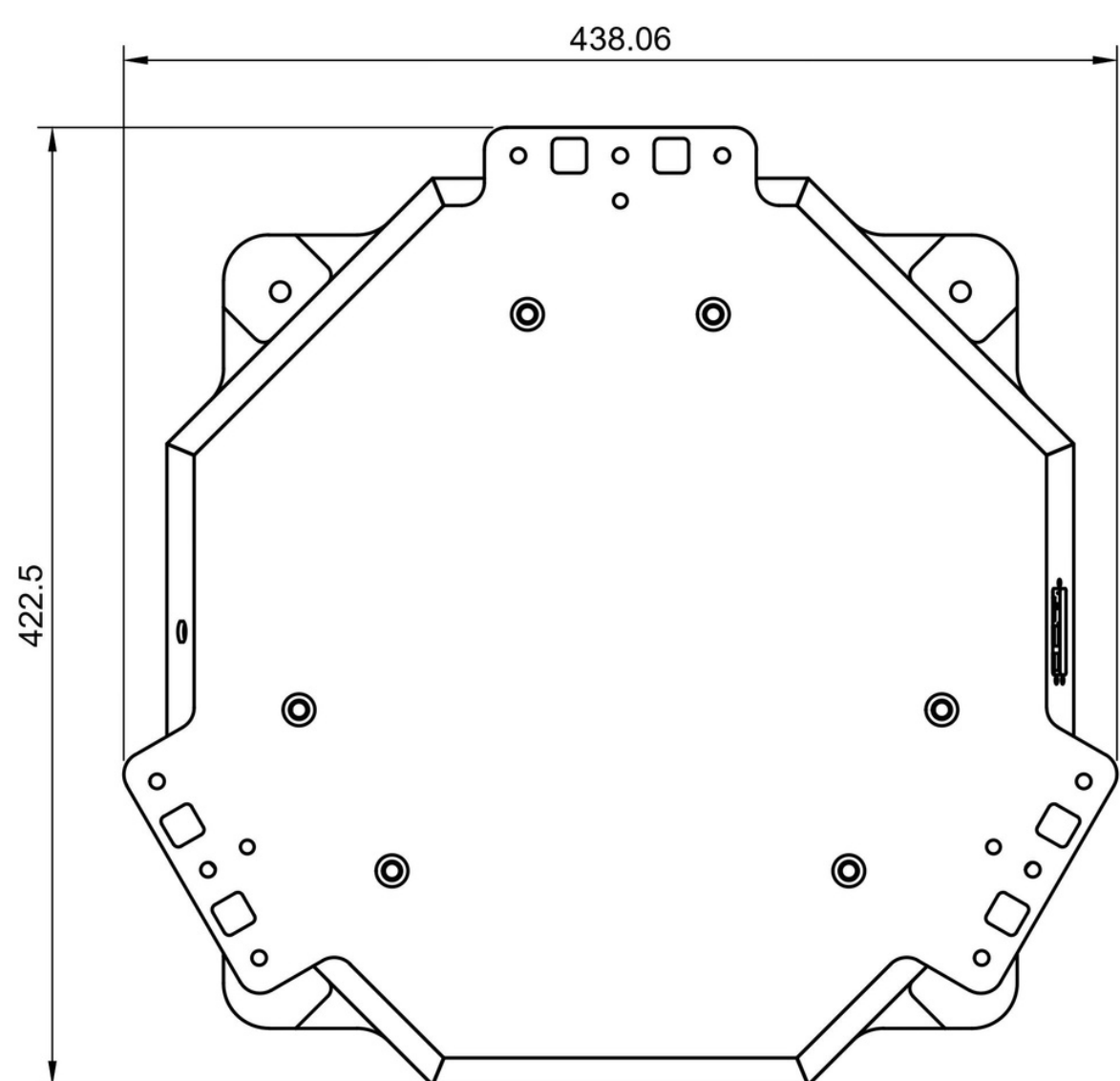


## Technical Drawings

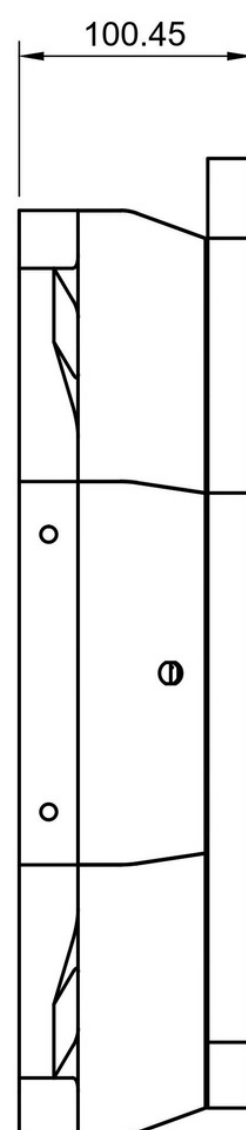
\*Note: Non-contractual dimensions; subject to slight changes.

### Force Measurement Unit:

#### Without Motor Mounting Plate

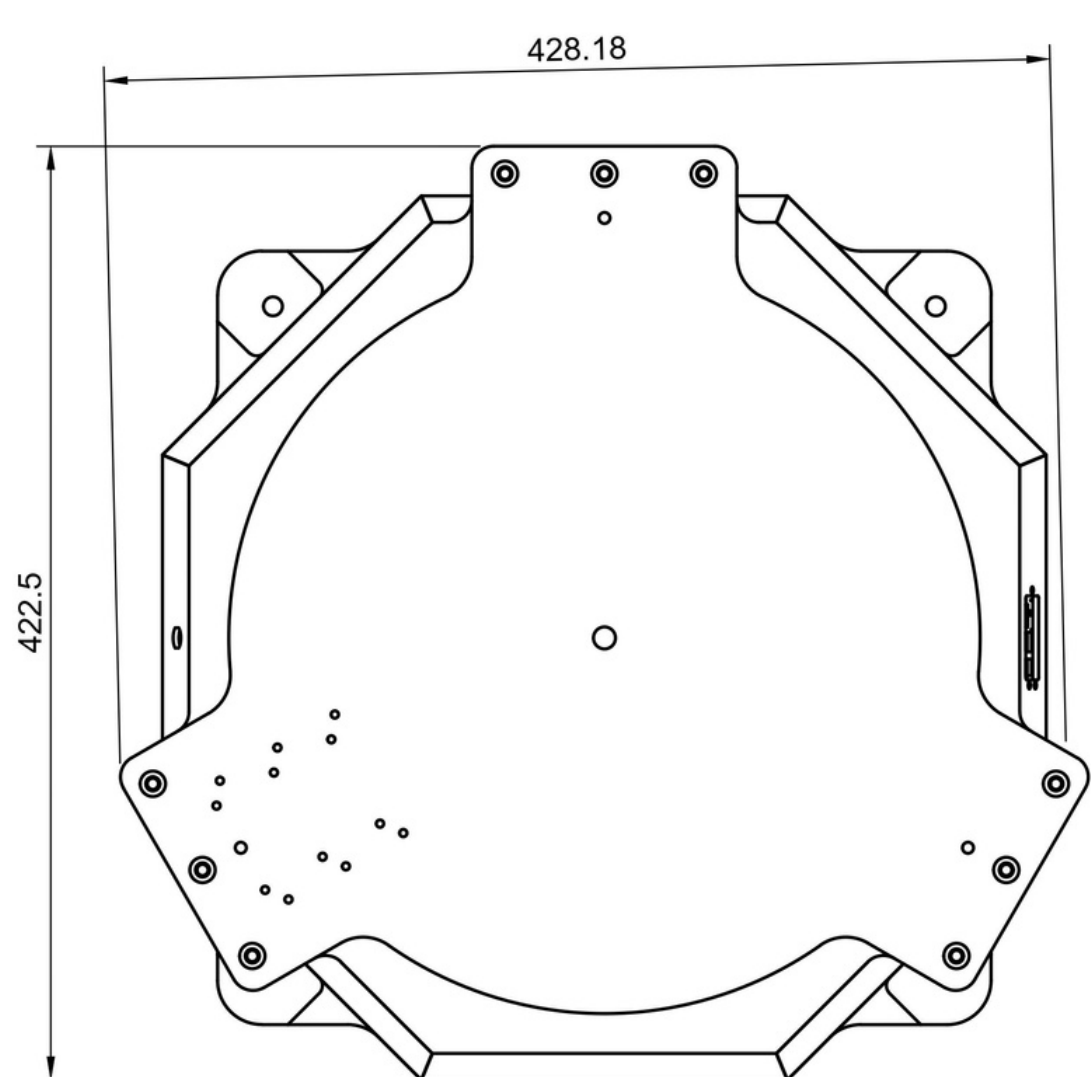


Front View

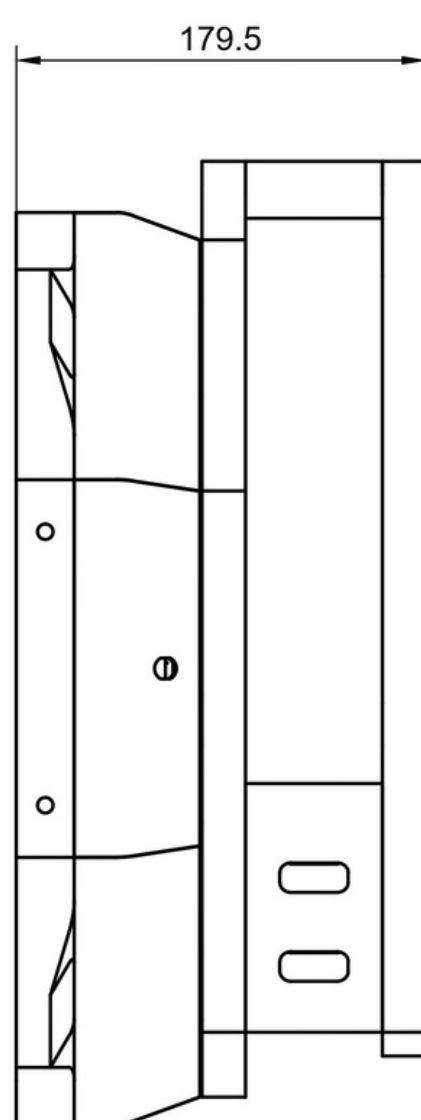


Side View

#### With Motor Mounting Plate



Front View



Side View

### Stand Structure Front View:

