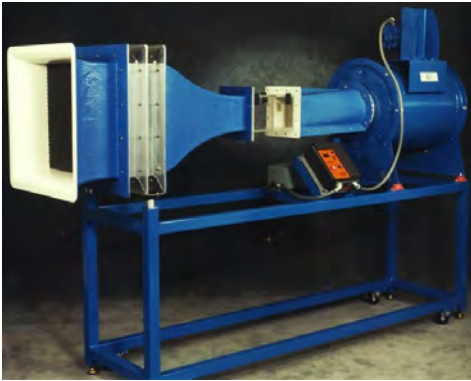


# Wind Tunnel



Machine:	Wind Tunnel
Make/Model:	ELDS Model 402
Revised:	7 / 14 / 2023
Author:	Trevor Marks
Location:	Building 570, rm 1101
Department:	Mechanical Engineering

**DO NOT use this machine unless you have been trained in its safe use and operation!**

## Personal Protective Equipment



Safety Glasses  
Required



Hearing  
Protection



Protective  
Clothing

## Potential Hazards

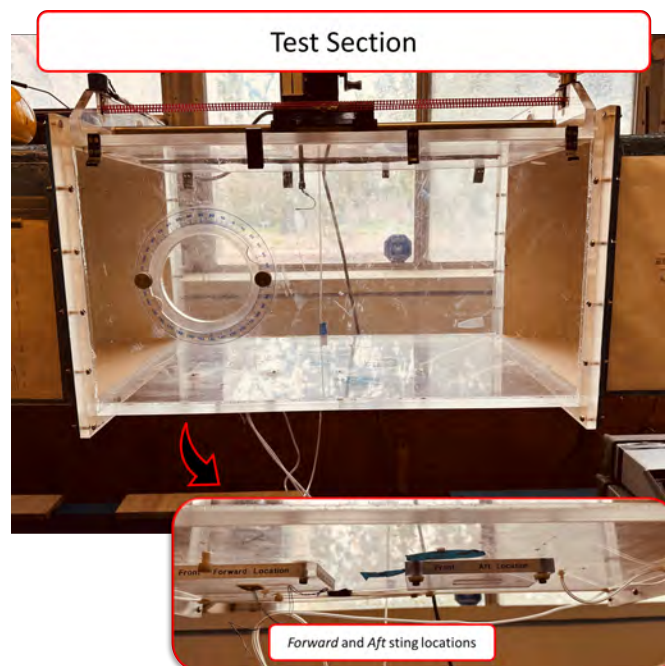
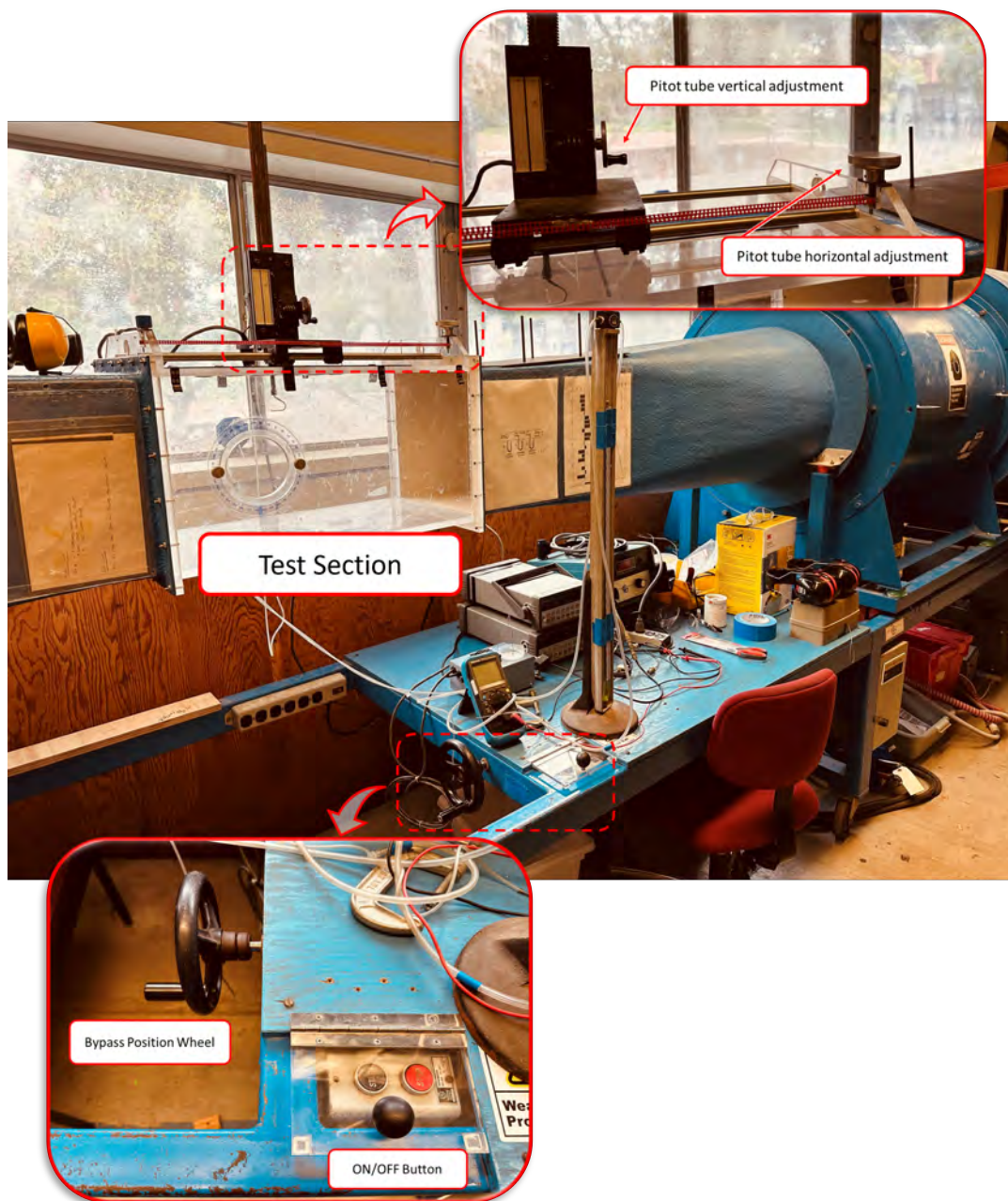
- Hearing loss
  - Wear proper hearing protection.

## Typical Operations

- Lift, drag, air speed measurements

## Select Specifications

- Open circuit Eiffel style
- Test section: 12" x 12" x 24"
- Air velocity range: 10 - 160 fps



## Procedure Checklist

### PRE-Operation:

1. If using the dynamometer
  - Calibrate as described in the `Dynamometer Calibration` section.
  - After calibration, mount test device **securely** to dynamometer sting.
2. If using the dynamometer or other sting set up, install sting mount in either the *forward* or *aft* location.
3. Ensure all mounts are securely installed and that no parts are loose or able to become detached from the test apparatus. You may lift the test section top plate to gain access to the test section, but do not remove the top plate as the pitot tube may become damaged.
4. Verify the test section top plate is fastened in place.
5. Verify the pitot tube can be moved to required test positions without contacting the test device.
6. Use the `bypass position wheel` to open the bypass section, this will result in starting with minimum air speed.
7. Identify ON/OFF switch.

### Operation:

1. Press the `START` button and allow the wind tunnel fan to come up to speed.

The motor start-up pulls a large amount of current causing the motor heating up but the motor temperature will drop to the operating temperature after it is running. However, restarting the motor before it has a chance to cool down can lead to excessive heating of the motor resulting in damage.

2. Use the `bypass position wheel` to close the bypass section until the desired air speed is reached.
3. Perform desired measurement(s).
4. At the conclusion of the test run press the `STOP` button.

**Caution do not restart the wind tunnel again until 10 minutes have elapsed!**

### POST-Operation:

- Remove all fixtures.
- Leave the machine and work area in a safe, clean state.
- Ensure the lights are off and the door is closed when you leave.
- Return the key to staff.

## Dynamometer Calibration and Use

### [Dyno Use and Calibration \[YouTube Link\]](#)

#### Drag Axis Calibration:

1. Detach and orient dyno assembly in blue vise to calibrate the drag axis
2. Attach signal conditioner cable to dyno
3. Verify output connections (BNC cables, connectors, meters)
4. Power ON signal conditioner box and meters
5. Install weight pan
6. Zero DRAG using DRAG thumbwheel (to within  $\pm 0.005$  V)
7. Add calibration weight (s) and record output (in volts) [400 g maximum]
8. Remove weight pan

#### Lift Axis Calibration:

1. Orient dyno assembly to calibrate the lift axis using the C-clamp
2. Install weight pan
3. Zero LIFT using LIFT thumbwheel (to within  $\pm 0.005$  V)
4. Add calibration weight (s) and record output (in volts) [400 g maximum]
5. Remove weight pan and uninstall dyno assembly from calibration fixture

#### Installation of Dynamometer and Model:

1. Remove blanking plate from wind tunnel test section
2. Install dyno assembly onto test section noting air flow direction
3. Do not overtighten screws
4. Remove upper cover of test section
5. Rest the lid on the lid support plate taking extreme care not to disturb pitot tube
6. Install model on dyno sting
7. Don't apply excessive loads while attaching model
8. Don't overtighten set screw(s)
9. Remount upper cover being careful of the pitot tube
10. Re-Zero LIFT and DRAG before turning on fan