NMT - NIOSH Simulation Rig

Located in MSEC 236

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Table of Contents

Powering On

Assuming the Simulation Rig was correctly shut down and powered off, this procedure is used to turn everything back on.

1. Plug the surge protector ("power strip") into the wall

2. Flip the surge protector's switch to "reset" (or ON)
   At this point, the cooling fan for the silver power supply should begin spinning

3. Power on the Raspberry Pi by pressing the button on its external power switch (shown below)

4. Move the mouse around as the Raspberry Pi powers on until the desktop appears

5. From the start menu in the bottom left corner of the desktop, mouse over "other programs", and select the top PyCharm program option

6. If the "V4_serial_reader.py" program is not already open, double click on its name in the box on the left side of the screen to open it

7. Ensure the drop-down menu next to the green triangle play button at the top of the screen says "Current File"

8. Click the green play button to start the program.
   After completing its start-up procedure, the program will create and update a spreadsheet with all of the data it collects

9. Once finished with the program, click the red square stop button at the top of the screen to end the data collection

10. Enter anything except for "del" into the terminal at the bottom of the screen and press enter to close the program. Or enter "del" to delete the data

Powering Off

Proper shut-down procedure is necessary to prevent damage to the software and electronics.

1. Close the PyCharm program with the X in the top right corner

2. From the start menu in the bottom left corner of the desktop, select "power off".

3. After the screen goes black, wait for 20 seconds.

4. Press the power button on the Raspberry Pi's external power switch (as shown in step 3 of the Powering On instructions)

5. Turn off the smoke machine (see instructions in the **Smoke Machine** section)

6. Flip the switch on the surge protector ("power strip") to "OFF"
   All fans will stop spinning.

7. Unplug the surge protector
   For storage, the surge protector can be plugged into itself.

Intake Fan Control

The fan speed control box controls the rpm speed of both stages of the 2-stage intake fan. It is plugged into the surge protector for power, and it connects to the yellow + green control wires of the fan as well as the black + brown ground wires.

1. Turning a knob clockwise increases the speed of the fan stage

2. Turning a knob counterclockwise decreases the speed of the fan stage

3. The knobs are labeled "FRONT FAN" and "REAR FAN", and control the front ('first stage') and rear ('second stage') of the fan accordingly

4. Generally, the first stage moves more air, and the second stage works best when the first stage is at an equal or greater speed setting

Smoke Machine

The smoke machine generates lots of fog relative to the size of the simulation rig. Ensure the system is sealed properly before turning anything on. The smoke machine is not known to trigger the room's smoke detector, but avoid filling the entire room with smoke.

Caution: The smoke machine becomes hot during use, be careful not to burn yourself.

1. After turning on the rest of the simulation rig, ensure the pink extension cord is plugged in and use the red switch on the back of the smoke machine to begin its preheating process

2. While the machine is heating, an LED illuminating the smoke fluid tank will glow red

3. Once the LED illuminating the smoke fluid tank turns blue, the machine is up to temperature

4. If the red or blue LEDs begin flashing, stop using the machine, power it off, and refill the tank with water based fog fluid. We are using ***FogWorx Extreme High Density*** fluid

5. Using the remote control, set the desired flow rate and press the red "Manual" button once to release smoke. If no smoke was produced, try increasing the flow rate. Depending on the ambient temperature, settings below 6 may not produce smoke

   Avoid using the "Timer" and "Continuous" buttons, since they can easily overwhelm the intake fan, especially when it is running at low speed

6. When finished, use the switch on the back of the fog machine to power it off separately from the rest of the simulation rig and unplug the pink extension cord from the wall

Smoke Machine LED Codes

Red:
 Machine is heating. Wait for the red LED to go out before using.

Flashing Red:
 Machine is heating and **requires smoke fluid refill**.

Blue:
 Machine is at or near full temperature, ready to use.

Flashing Blue:
 Machine is at or near full temperature but **requires smoke fluid refill**.