Environmentally Controlled Testing Chamber

FAMU-FSU Engineering

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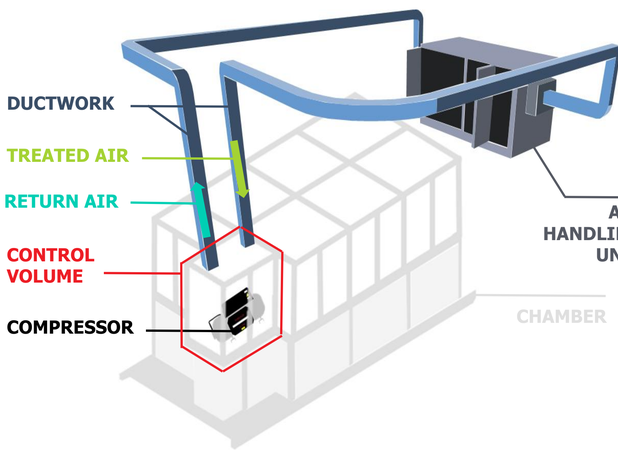
Danfoss

Initial Design



The **objective** of this project is to validate the existing design and deliver an assembly that regulates temperature and humidity for use in a laboratory environment

Assumptions

- The test rig will rest on a flat level surface
- Conductive heat from the compressor is negligible
- The size of the compressor is unchanging
- The existing support has adequate load capacity

Targets

Support:
- No deformation
- Support 5 lbs of weight

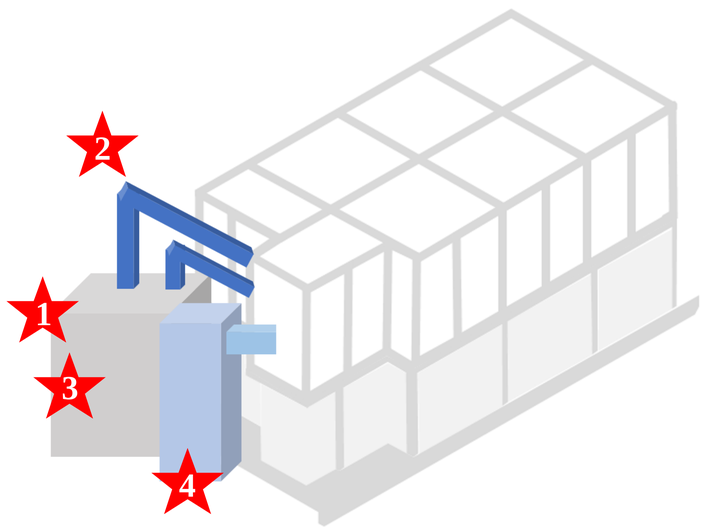
Control:
- Measure temperature and humidity within 1%
- $10°C \leq T \leq 50°C$
- $0\% \leq RH \leq 95\%$
- At least 3 sensors
- 1 m^3/min air flow

Accessibility:
- Access from 3 sides
- Compressor exchange within 15 min
- 30 cm overhead clearance
- Display information
- No human interaction

Design Changes

1. **Floor-Mounted AHU**
2. **Detachable Side Ducts**
3. **29,000 BTU A/C**
4. **Industrial Humidifier**

Final Design



Future Work

Order Materials:
- BOM sent to Danfoss
- Danfoss will review and order over the break

Prototyping:
- Plastic bin with AHU, sensors and controls attached
- Will save time when completing the installation

Oversee Installation:
- Danfoss Turbocor Lab Facility in Innovation Park

Tune Controls:
- Adjust gains with Arduino controller
- Test extensively to ensure performance and accuracy