

Portable Refrigeration Circuit with Software Monitoring



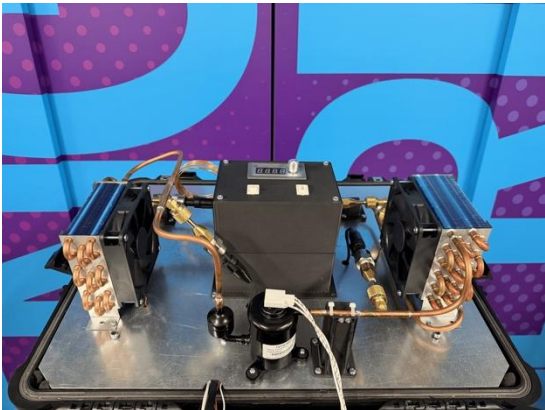
From left to right: Nico Beck, Thomas Gagnon, Evan Kamish, and Zach Johnson

PROJECT BACKGROUND & DESIGN GOAL:

Trane Technologies is a global leader in climate control and HVAC systems and needs effective hands-on training and client demonstration tools. Most refrigeration implementations are impractical to transport between job sites, training facilities, and client meetings. The goal of this project is to design and fabricate a portable refrigeration learning tool that presents a fully functional refrigeration circuit with clearly visible internal components, a graphical display of live pressures and temperatures, and the ability to adjust the temperature setpoint both through the circuit controls and the graphical interface.

DESIGN OUTCOMES:

The completed unit will deliver a portable, self-contained refrigeration demonstration platform that allows a single operator to transport, set up, and run a live refrigeration circuit for any audience. The system will provide visibility into component operation and live pressure and temperature readings through an integrated graphical interface. The interface will allow the user to adjust the temperature setpoint on demand. The result is a professional, durable training and demonstration tool that bridges the gap between classroom instruction and the real-world behavior of refrigeration systems.



The Refrigeration Circuit



TEAM 6

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DESIGN CONSTRAINTS:

- **Cooling Performance**
The circuit shall produce 50 °F of lift between the condenser and evaporator.
- **Portability**
The system shall be designed for single-person portability.
- **Electronic Sensors**
The circuit shall be controlled and monitored by an electronic control system and software.
- **Website Responsiveness**
The website and sensors shall communicate with less than 2 seconds of latency.



Website Display of Temperatures and Pressures