Custom Coriolis Cart Reduces Calibration Time

The Problem

A commercial air conditioning unit manufacturer in North Carolina operates multiple refrigerant charging stations throughout their facility. Each station is responsible for charging AC units with specific types of refrigerant. For this process, high accuracy is a necessity. Over or undercharging a unit can lead to over-pressurization, ruptured lines, and other safety risks. Further, consistently overcharging units (even by small amounts) can lead to substantial financial losses from wasted refrigerant. So the charging process needed to be precise, repeatable, and verifiable.

The manufacturer already had Coriolis meters installed on each charge skid to measure flow, but still needed a reliable means of verifying the accuracy of the meters. Their existing process involved stopping production, using a forklift to move a large scale into place, charge refrigerant into the tank on the scale, then manually compare the weight reading to the data provided by the station's meter. This proved to be a major source of inefficiency and potentially introduced errors or wasted product.

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These costs quickly stacked, factoring in the wasted refrigerant, the operator's time, and the immense cost of halted production. The custom came to Cross Company with a defined problem: they were wasting too much time and money on this calibration and verification process and needed a better way.

THINGS WE DID

1 **Designed a Portable Verification System**

We engineered a custom mobile cart that could be easily moved between the customer's multiple refrigerant charging stations, eliminating the need for fixed, dedicated calibration equipment at each one.

2 **Enabled In-Process Calibration**

The cart was designed with quick-connect fittings to loop directly into the live charging process, allowing for meter verification without ever having to shut down the production line.

3 **Integrated High-Accuracy Metering**

We selected and integrated a high-precision AW Lake TRICOR Coriolis meter onto the cart to serve as a reliable and accurate standard for verifying the existing station meters.

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The Solution

After understanding the core issues with the existing process, Cross was able to develop a unique, custom solution in the form of a portable Coriolis cart. The cart was designed to be a verification system that could be easily moved between the various refrigerant stations in the plant, verifying the flow of refrigerant while the tanks were charging.

The ability to verify during recharging was a key innovation in this project. Using the cart, the manufacturer was able to virtually eliminate the previous downtime. Instead of having to shut down the whole line, the cart utilized quick-connect fittings to loop directly into the refrigerant lines during the normal charging process. That means as an AC unit is being charged, the cart's own high-accuracy flow meters are able to measure the flow in parallel with the station's existing meter.

At the end of the charging cycle, the cart's integrated HMI automatically compares the total flow from both meters. It then provides a simple "Pass" or "Fail" result based on the customer's required tolerances. Now, an operator only has to roll the cart to the station, connect it, run a normal charge, and check the results. What once took hours of manual work and calculation is now a simple and fast verification step.

For this custom cart, Cross selected the AW Lake TRICOR Coriolis meter. This allowed us to provide a solution able to meet the customer's accuracy specifications at an affordable price point. All backed by the excellent support of a trusted partner.

While this specific cart was designed for a refrigerant application, its principle is widely applicable. This solution from Cross Company's Process Solutions group can be adapted for any process that involves charging tanks or equipment with a fluid or gas. This includes automotive (oil, coolant, hydraulic fluid changing), aerospace, generator manufacturing, and any other process involving the metered dispensing of nitrogen, water, chemicals, and more.

This project is a prime example of Cross Company's commitment to developing innovative, custom solutions that solve our customers' most difficult challenges.