AW-LAKE
PROCESS FLOW MEASUREMENT

APPLICATION SPOTLIGHT

HVAC Equipment Manufacturing – Precision Refrigerant Charging with Coriolis Mass Flow Measurement

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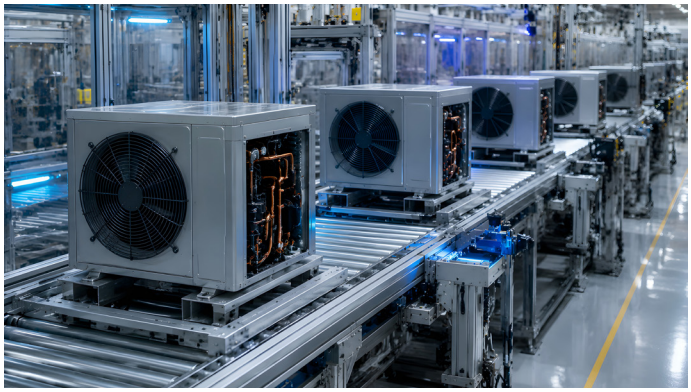

APPLICATION:

Vacuum Technology Inc.'s Smart Refrigerant Charging System is designed to evacuate, verify dehydration, and charge condensing units and heat pumps at production rates of up to five ounces of refrigerant per second.

At these speeds, the system must deliver the specified refrigerant charge accurately and repeatably. It must also provide operators with real-time process data for monitoring, traceability, and troubleshooting.

PRODUCT SUPPLIED:

- **TCM 0650 Coriolis Mass Flow Meters**

CHALLENGE:

Refrigerant density can change with process temperature and other operating conditions. When charge quantity is determined primarily from volumetric flow, the calculated mass depends on using the correct density value for the refrigerant's actual condition.

This creates added complexity in a high-speed charging process. The system must confirm how much refrigerant mass entered each product—not simply how much volume passed through the line.

Vacuum Technology also needed measurement data that could integrate with the charging station's controls and operator interface. In addition to delivered mass, operators required visibility into flow rate, density, temperature, accumulated totals, meter status, and alarms.

SOLUTION:

Vacuum Technology integrated a TRICOR Coriolis meter into its Smart Refrigerant Charging System to measure instantaneous mass flow and total refrigerant mass delivered to each unit.

Because the meter measures mass directly, the system does not have to infer the delivered charge from a temperature-dependent volume measurement. The accumulated mass value allows the controls to determine when the specified charge has been reached and initiate the appropriate valve-closing sequence.

The TRICOR meter also measures density and process temperature while providing calculated volumetric flow and accumulated totals. These additional variables give operators a broader view of changing process conditions and support system diagnostics.

Measurement data is communicated to the charging station's control system and incorporated into the operator interface. Depending on the selected transmitter and configuration, available outputs can include analog, pulse, and status signals, along with industrial communication options such as Modbus, HART, and fieldbus protocols.

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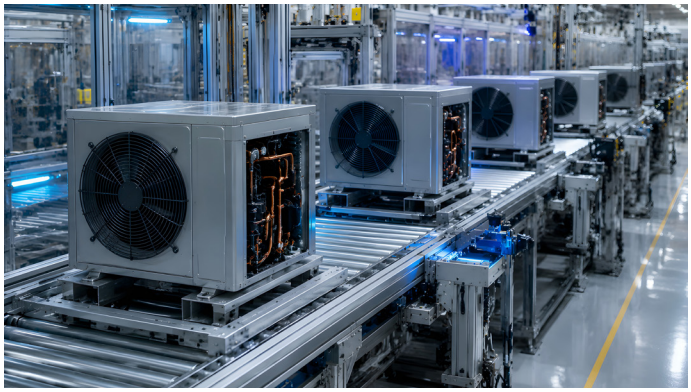

The system can display current mass flow, total refrigerant delivered, density, temperature, volumetric flow, meter status, alarms, and charge-cycle data. This information can also be communicated to customer control systems, production equipment, and databases.

Together, the Vacuum Technology charging platform and TRICOR Coriolis meter combine production speed with accurate refrigerant delivery and real-time process visibility. Manufacturers gain tighter charging control, improved traceability, and more information for monitoring and troubleshooting each cycle.