

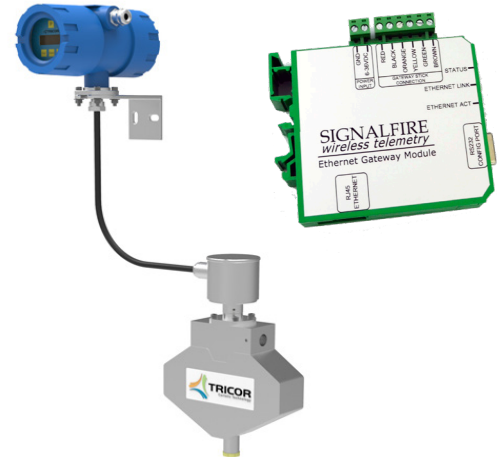


APPLICATION SPOTLIGHT

Coriolis Mass Meters Provide Early Warning for Paint Operations at Aviation Manufacturing Facility



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APPLICATION:

ABB Robotics, along with the OEM airframe manufacturer, have developed an automated painting process to coat airplane wings. Uncoated wings are lowered by overhead cranes into two very long spray booths, orientated end-to-end with a service booth in the middle. The two ABB six-axis robots are themselves mounted on three axis-gangways that travel along the wings on either side. They also move the robot up or down, and have a large arm with the robots mounted at the end that can swing out over the wing to provide complete access to all wing surfaces. The wing is mounted to elevators that raise or lower the wing so that the robots can paint the bottom or top of the wing. Primer, color coats, and topcoat paint are then applied while the other wing is being prepped in the second booth.

PRODUCT SUPPLIED:

- TRICOR TCM 0325 Coriolis Mass Flow Meters
- SignalFire Ethernet Interface Module

CHALLENGES:

ABB was tasked to add additional colors and a method to detect air in the paint supply lines which is a precursor to running out of paint. If this occurs it can lead to extreme expense in downtime to rework the wing. There are methods to detect the presence of air in a paint line, but none were compatible with Class I, Division 1, EX environments. That's when engineers at ABB reached out to AW-Lake for help.

SOLUTION:

AW-Lake flow engineers proposed using our TRICOR Coriolis metering technology to detect the presence of air bubbles by monitoring the specific gravity of the paint. A downward spike in specific gravity output occurs as air is introduced into the paint stream when the paint in the pressure vessel begins to run empty. This serves as an early detection method for over-agitation and out-of-paint conditions.

In addition, the meter provides high accuracy flow verification when used in conjunction with the servo driven paint gear pumps. This eliminates a manual flow calibration procedure, saving both paint and time. The system can now also track paint usage by paint type and color for VOC compliance.

One last innovation was the integration of SignalFire's Modbus to Ethernet converter module so that the five flow meters associated with each robot could be interfaced to a high-speed wireless telemetry system. This eliminated thousands of feet of Ethernet wiring in the C1D1 EX area. With the wireless solution in place, full communication and meter configuration is possible from the overlooking control room.



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RESULTS:

AW-Lake's involvement in this project allowed ABB to fulfill one aspect of their contract that no other solution offered. That is, the ability to detect paint defects from air bubbles in paint due to over agitation and from running out of paint to improve system quality and uptime. The ROI is estimated to easily be less than one year when costs from rework, paint pump calibration time, and process validation are all considered.

