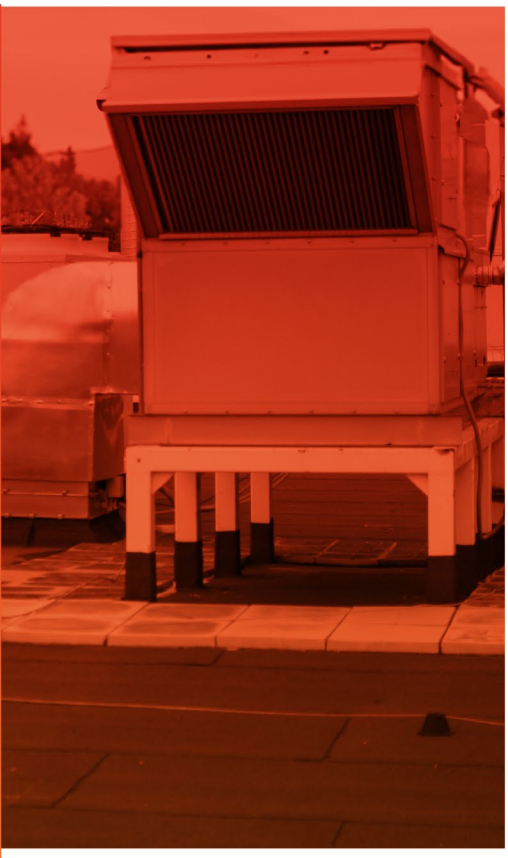
KMC CONTROLS

CASE STUDY: AIRFLOW MEASUREMENT SYSTEM (AFMS)

Creating consistent, balanced and measureable air quality for Denver Public Schools.



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EXECUTIVE SUMMARY

This case study explores the successful deployment of the KMC Airflow Measurement System (AFMS) in Denver Public Schools (DPS) by LONG Building Technologies in partnership with KMC Controls. The study highlights how the AFMS cost-effectively addresses Indoor Air Quality (IAQ) and equipment monitoring challenges by providing accurate airflow measurements, plus a comprehensive IAQ and Advanced Fault Detection and Diagnostics (AFDD) solution.

CUSTOMER PROFILE

Denver Public Schools (DPS) is committed to fostering optimal learning environments for their almost 90,000 students and 15,000 staff. As part of their commitment, DPS prioritized IAQ throughout their district of 207 schools, which led them to engage LONG Building Technologies—in partnership with KMC Controls—for a highly accurate, sustainable, and cost-effective solution.

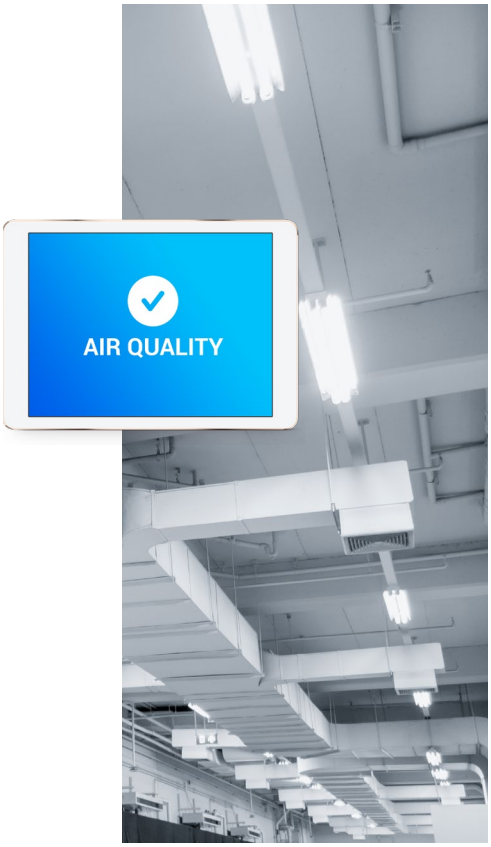
THE CHALLENGE

DPS's primary concern was optimizing IAQ, followed by comprehensive equipment monitoring. They aimed to implement advanced IAQ sequencing with CO2 sensors and ensure Air Changes per Hour were optimized for all classrooms. The challenge was to establish a cost-effective system that provided accurate and repeatable measurements while meeting ASHRAE standards.

ENGAGEMENT AND EXPERTISE

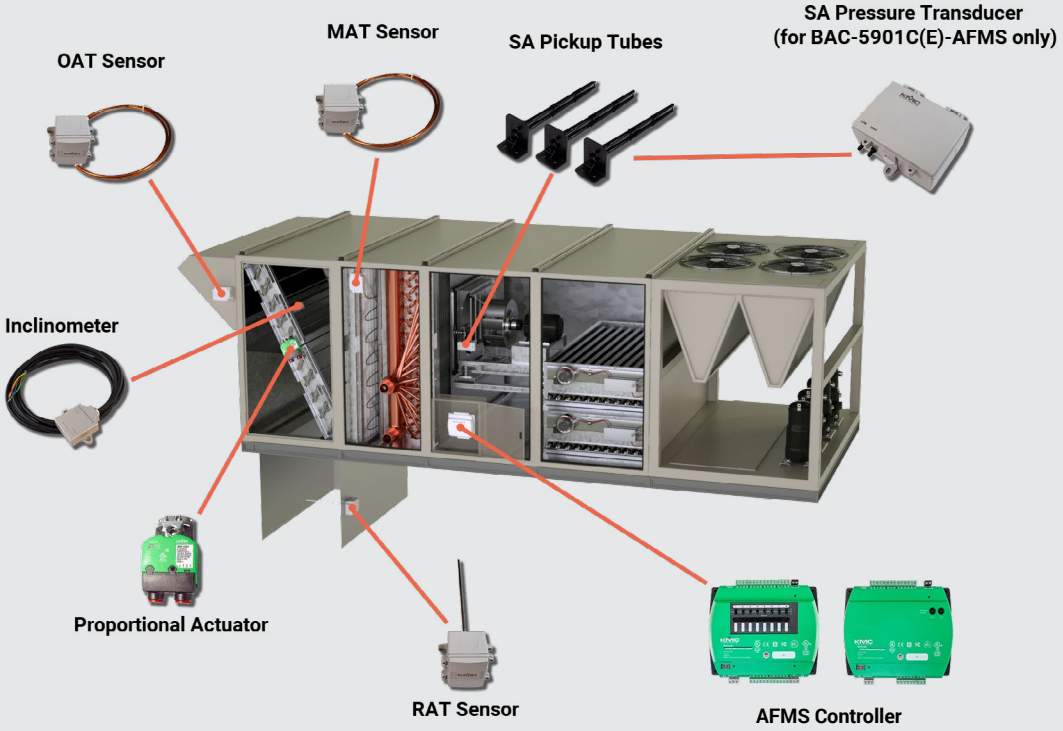
KMC Controls, chosen for its HVAC control expertise, collaborated with Harris, leveraging their 30-year partnership. The hospital, with over 1200 KMDigital controls, engaged KMC Controls to address the challenges as well as transition to an open protocol BAS.

THE SOLUTION



- **Sensor Selection and Placement:** Inclinometers were carefully placed on outdoor air dampers, and airflow measurement probes were placed on supply and exhaust fans to ensure accurate measurements.
- **Temperature Sensors:** New temperature sensors for Outside Air (OA), Return Air (RA), and Mixed Air (MA) were installed for the AFMS.
- **Communication Protocol:** The AFMS was configured to control the outdoor air damper actuator, communicating with the factory-mounted BACnet controller via BACnet MS/TP (RS-485).
- **Characterized Airflow Performance™:** Implementation of this automated calibration routine, completed in approximately two hours, ensured ongoing measurement accuracy.
- **Real-time Monitoring:** The integrated system allowed real-time monitoring of crucial metrics, facilitating effective balancing and pressurization management.
- **Timeline:** The implementation of the AFMS solution spanned multiple units within the DPS district, with varying timelines based on system complexity and scale.

Standard Rooftop Unit (RTU) Application



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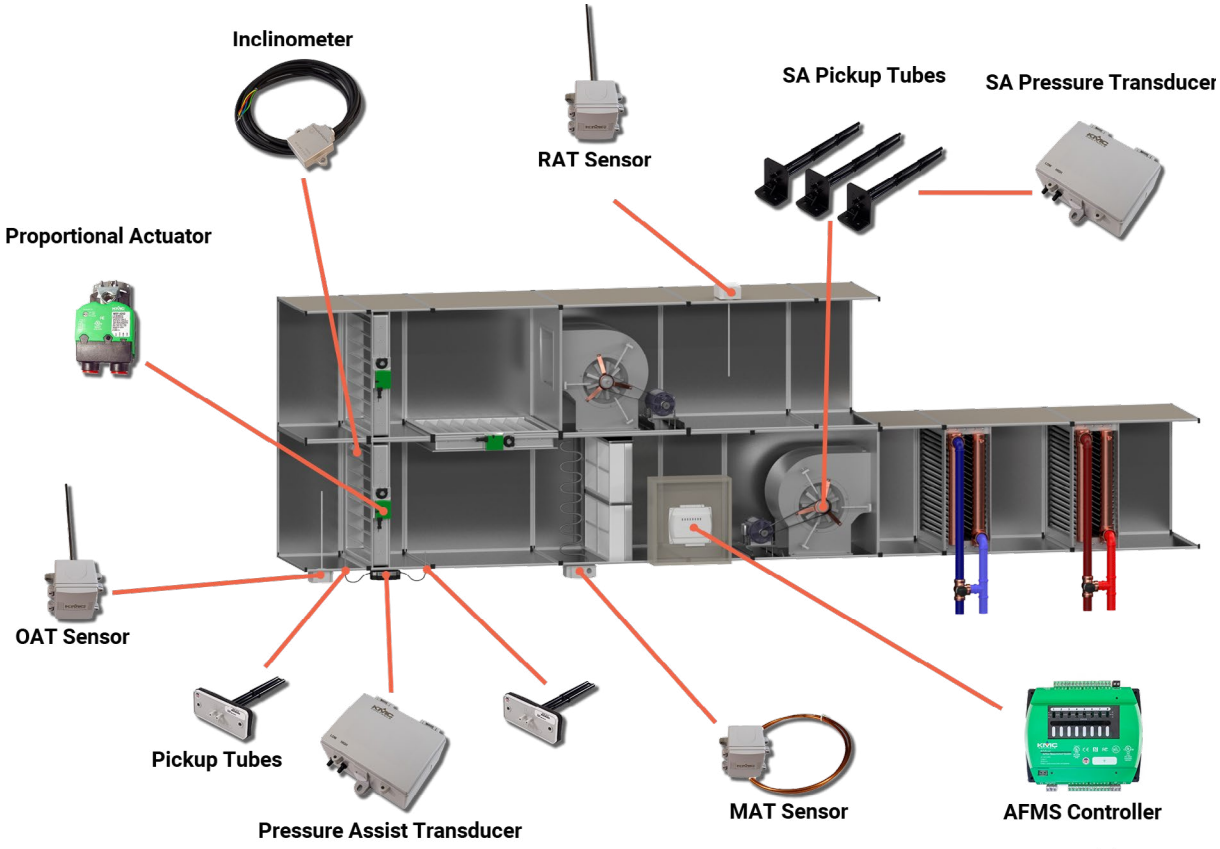
ACCURATE, REPEATABLE MEASUREMENTS FOR OPTIMAL PERFORMANCE

Built on ASHRAE standard measurement methods, the patented KMC Airflow Measurement System (AFMS) delivers accurate, repeatable measurements in nearly any equipment type.

Achieve precise and consistent supply, outside, and return air flow measurements across a wide range of equipment with the KMC AFMS.

From small, packaged rooftop units to large, built-up air handlers, this innovative solution ensures reliable and efficient HVAC operation for enhanced performance and maximum energy savings.

Air Handling Unit (AHU) Outside Air Damper (OAD) Pressure Assist



Characterized Airflow Performance™ provides accurate readings consistent with ASHRAE Standard 111 criteria.

IMMEDIATE RESULTS

The AFMS solution delivered significant outcomes:

- **Accurate Measurements:** The AFMS provides precise measurements of OA, RA, supply fan, and exhaust fan airflow rates, optimizing indoor air quality and system performance.
- **Cost-Efficiency:** The project's total cost was notably lower than other approaches, reducing the need for multiple airflow measurement devices and mechanical system modifications. A single AFMS controller does the work of the multiple devices needed for other approaches.
- **Automatic Recalibration:** The AFMS consistently monitors all measurements for accuracy drift—caused by the Air Handling Units' mechanical systems deteriorating or changing over time. It can re-establish the Characterized Airflow Performance™ curve on demand, meaning more uptime for the units and less time spent on maintenance or recalibration.
- **Proactive Maintenance:** Inclinometer feedback on damper position enables identification of damper blade deterioration and actuator linkage issues. The AFMS's Advanced Fault Detection and Diagnostics (AFDD) routines enable proactive troubleshooting, reducing downtime and maintenance costs.
- **Comprehensive Monitoring:** Air Changes per Hour data for each classroom and AFDD-based troubleshooting reports provide a holistic view of system performance.
- **Compliance Confidence:** Enhanced IAQ compliance fosters confidence among students, staff, and stakeholders.

CONCLUSION

The successful deployment of the KMC AFMS in Denver Public Schools showcases this advanced airflow measurement technology's capacity to enhance IAQ management and equipment monitoring. With Characterized Airflow Performance™ and its integrated AFDD functionalities, the AFMS delivered a reliable and sustainable solution, meeting the highest HVAC industry standards. The case study underscores the AFMS's capabilities in optimizing indoor environments, valuable for system integrators and facility managers in educational institutions and healthcare facilities.

LEARN MORE AT WWW.KMCCONTROLS.COM/AFMS/

KMC is a generational community of innovative people committed to delivering world-class technology. We stand for empowering positive impacts by supporting our people and our customers. Headquartered in New Paris, Indiana we have worked for more than 50 years in building automation including engineering, manufacturing, distribution and support. We are committed to open, secure, scalable systems and liberated data to help our customers achieve their goals.

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