

Dimensional Comparison & Performance Testing of Air Door Actuators

Enventure provided engineering support to execute the validation of Abutment Dimensions and Performance Characteristics before clearing the production runs of ADAs.



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About the Client

The Client is one of the world's leading supplier of Automotive and off-highway vehicle replacement parts.

The company has been serving customer since a century and their products are known for its quality and engineering excellence. Innovation is the client's competitive advantage, in many cases they make improvements upon the original design and believe in re-engineering the part to make it better, stronger, and more efficient.



The Product and Business Need

The client is well-known for high-quality Air Door Actuators (ADAs) used in the automobiles. The ADAs are essentially small electric motors fitted with attachments to move the vent doors facilitating mixing of hot & cold air achieve the desired cabin temperature. ADAs also control the position of the vents to check the airflow into the vehicle's passenger area. It is critical for the ADA to function flawlessly to deliver the perfect air conditioning for the passengers.

The two parameters vital for the optimum performance of ADAs are - **Abutment Dimensions** and **Performance Characteristics**.

The business requirement was to execute the validation of the aforesaid parameters before clearing the production runs of ADAs.



Solution

Enventure assigned a team of engineers, who worked on the entire process from conceptualization to testing, Analysis and reporting.

The tasks were executed on two phases - **Dimensional Comparison** and **Performance Testing**.



• Dimension Comparison: Critical dimensions were captured by using a variety of calibrated tools and equipment ranging from Coordinate Measuring Machines (CMM) to Calipers, Micrometers and Height master.

Form, Fit and Function validation vis-à-vis specifications and field conditions were performed to ensure interchangeability.

- Performance Testing: After the Air Door Actuators are validated for Form, Fit and Function and found suitable to be mounted on the Fixture (simulating mounting conditions of actuators in the vehicle). Performance testing was conducted to assess:
 - Actuator position
 - o at nominal / normal operating voltages and current
 - o at peak voltages and current
 - Sensitivity of actuation with respect to different voltage levels
 - Several other co-relatable electro-mechanical functions

Items/Tools used: Power supplies (Dual Channel), Electronic measuring instruments, Harness, Precision Angle measuring devices and dedicated fixtures to simulate mounting of actuators in the vehicle. Tests were performed to find correlation between controlled reference voltage and corresponding error in desired actuator position.

Technology adaptation

The team of expert engineers adopted rational sampling technique to reduce the Dimensional validation time and devised a simple fixture for the performance testing of ADA's.

Concurrent running of the two validations with due identification and traceability helped to reduce the scheduled times by 50% of the estimated time lines.





Why Enventure?

- Ability to develop complex test setups, with quick turnaround time and competitive pricing
- Resources knowledgeable in automotive instrumentation and testing domain
- Enjoys status of privileged customer for state of the art test facilities





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