



ADVANCED

TEST & AUTOMATION

Systems and Software for a Complex World in Motion



Project Overview



Throttle Body

Durability Test Stand

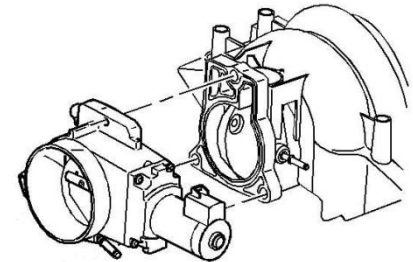


Who We Worked With

- ATA was approached by an existing client with a need to deliver a durability test stand for checking the endurance of throttle bodies, in addition to the performance test stand delivered earlier



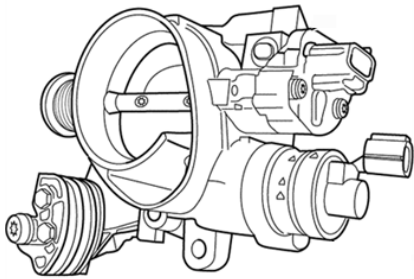
- The client was among the leading Tier 2 suppliers for intake manifold and engine manufacturers across North America
- The client was after a scalable and reliable test system capable of performing durability testing on numerous units simultaneously, with test durations in excess of 500 hours
- The client did not have any existing test benches that were dedicated for endurance testing of their throttle body assemblies





Tailored To Specific Needs

- The client's main criteria included having a layout capable of testing multiple units in parallel, where the units could be different models, and also could be controlled individually



- A careful study of the client's product lineup allowed ATA to develop a highly modular system, capable of supporting many different products with minimal setup times
- Considerations had to be made to ensure that the test bench was configurable in terms of added functionality, since it had to support newly developed products as well
- ATA was able to propose an architecture capable of testing 36 different units simultaneously, with the ability to load predefined or custom test procedures

Key Design Elements

- The first step of the design process was sizing all major test bench components specifically to client's product requirements, such as:



- encoder matching for specified accuracy of feedback
- high-frequency torque measurement of driveshaft
- mounting fixture design for different models
- electrical connector layout for different models

- Test stand frame was built entirely of anodized aluminum extrusion profiles, fitted with polycarbonate plastic covers for operator safety



- For technical info regarding the test bench, contact ATA Inc.



Productivity & Expandability

- The test stand was developed as a highly flexible architecture, allowing the client to connect and test models with an array of different setup configurations, based on:
 - electric motor size (voltage rating & current consumption)
 - electric motor control method (analog voltage, PWM)
 - throttle position sensor feedback type and quantity
 - idle air control valve configuration and control method
 - throttle plate mechanical interface
- In addition to being able to connect a unit to the test stand and configure it through ATA's software, provisions were made so that durability testing could also be done using actual throttle body controllers used in the field
- The test bench had the capability to start/stop the execution on different test heads individually, without interrupting ongoing scripts



Superior Efficiency



- Easy scripting features and the ability to combine multiple test sequences into a single master test, required less operator involvement and resulted in a higher degree of automation
- Automatic test execution, data collection and final report generation, in addition to powerful graphing elements, provided complete feedback to the user based on the requested level of detail
- Custom alarming could be set up to initiate on analog signal limits that would abort the test execution, without affecting other test heads
- The test stand was designed as a low maintenance item by using proven and reliable technology, and maximizing the use of off-the-shelf components



Making Sense Of The Data

- Through the use of ATA's software platform, the execution and analysis of tests results was fully automated:
 - confirming proper throttle position sensor calibration
 - confirming proper end-stop limit calibration
 - execution of limp home command
 - desired response time and rate of change based on analog signal
- Client was able to receive engineering-level statistical analysis in real-time, so that failure rates could be determined and reported in a timely manner



- Ability to generate test reports which would provide additional information about pass/fail calculations, such as actual readings, min & max limits, standard deviations, etc.



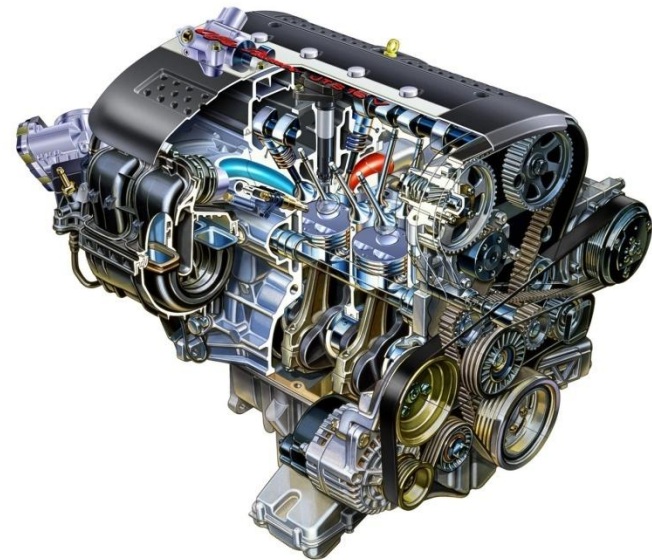
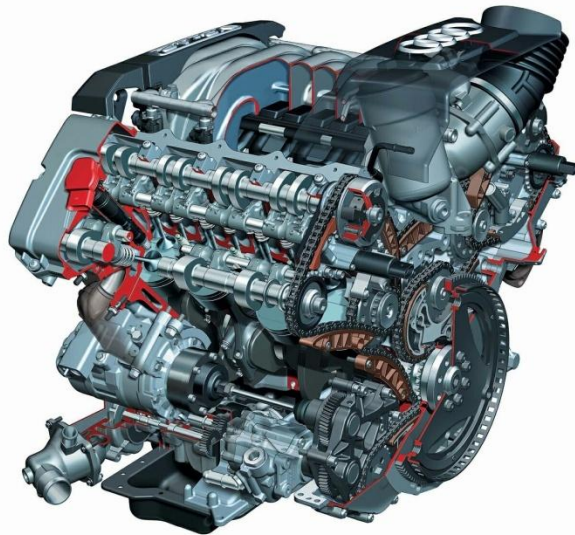
Project Milestones

- The project was delivered on-time and on-budget, with ATA continuing to support the client during test stand operation and results analysis, especially during the early stages of adaptation
- Upon project completion, all documentation needed for maintenance of the test stand was released:
 - electrical, hydraulic and pneumatic drawings
 - mechanical drawings of custom & spare parts
 - detailed test stand and software manuals
- Proposal to full design time: 3 weeks
- Design to approval time: 1.5 weeks
- Build & commissioning time: 5 weeks
- On-site setup time: 1 week



Facts About ATA Inc.

- Certified Engineering Firm
- Specialized in Complex Rotating Components
- Formalized Project Management & Delivery Process
- Internal Design, Integration and Commissioning Team



ATA Inc.

Your Partner in Test

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