



ADVANCED

TEST & AUTOMATION

Systems and Software for a Complex World in Motion



Project Overview



Throttle Body

Performance Test Stand



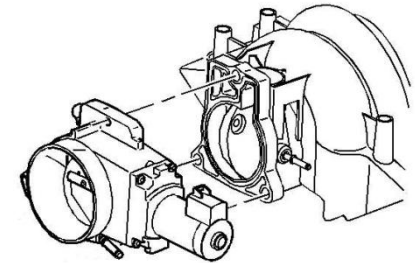
Who We Worked With

- ATA was approached by a new client with a need to benchmark the performance of various models of throttle bodies



- The client was among the leading Tier 2 suppliers for intake manifold and engine manufacturers across North America

- The client was after a flexible and reliable test system capable of assessing the performance of various different models of throttle bodies

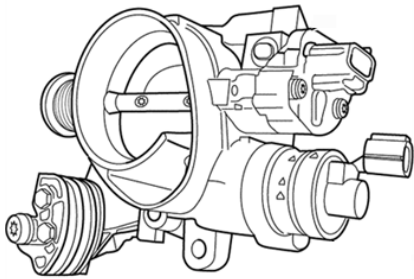


- The client did not have any existing tools for accurately testing the performance of their throttle body assemblies, and was looking to establish standardized procedures and tests specifications



Tailored To Specific Needs

- A detailed study of the client's trademark product allowed ATA to develop a highly modular and automated system, capable of supporting many different products with short test cycle times



- The client's main criteria included minimizing the overall dimensional footprint of the test stand, along with increasing the machine mobility for easy maneuvering in the test lab
- Considerations had to be made to ensure that the test bench was configurable in terms of added functionality, since it had to support testing of the entire line of client's products, present and future
- ATA was able to propose an architecture to accomplish client's need for a performance test bench, with test procedures conforming to custom OEM specifications



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:



- selection of drive motor based on maximum torque
- 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 for excellent mobility around the test lab



- 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 interface and test products based on completely different technologies, for example:
 - analog-driven vs. PWM-controlled throttle bodies
 - development testing on lower voltage models ($<14V_{DC}$)
- In addition to providing the functionality requested by the client, provisions were made in anticipation of future upgrades, such as a variety of spare analog and digital I/O channels
- 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
 - additional automatic safety aspects of the machine allowed the operator for more unsupervised control



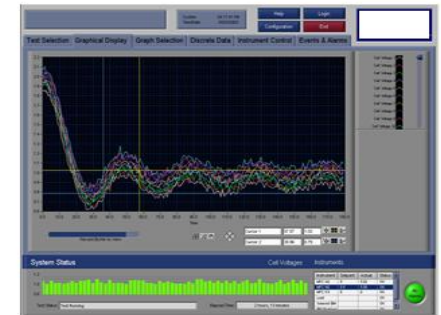
Superior Efficiency



- Built in features would let the operator switch over from open-loop software control to closed-loop management from a dedicated external controller used in the field
- Automatic test execution, data collection and final report generation, in addition to powerful graphing elements, provided complete feedback to the user without much need for data post-processing
- Added flexibility was given to the test engineers by being able to create specific test conditions in manual mode
 - tests could be combined with vibration (shaker table) and temperature (thermal chamber) testing
- The test stand was designed both as a high-accuracy and a low maintenance item by using reliable technology and off-the-shelf components, and balancing it with cost

Making Sense Of The Data

- Through the use of ATA's software platform, the execution and analysis of tests results was greatly automated, such as:
 - external angle sensor measurement for internal calibration
 - calibration of end-stop limits and the limp home command
 - response time and rate of movement measurement based on applied input voltage signal profile
 - fine increment of input angles plotted versus time
- The client was also able to run end-of-line testing of units, with engineering-level analysis and real-time feedback through a 15-step sequence
- Integrated ability to generate new test reports which would provide additional information about pass/fail tests, such as actual readings, min & max limits, standard deviations, etc.



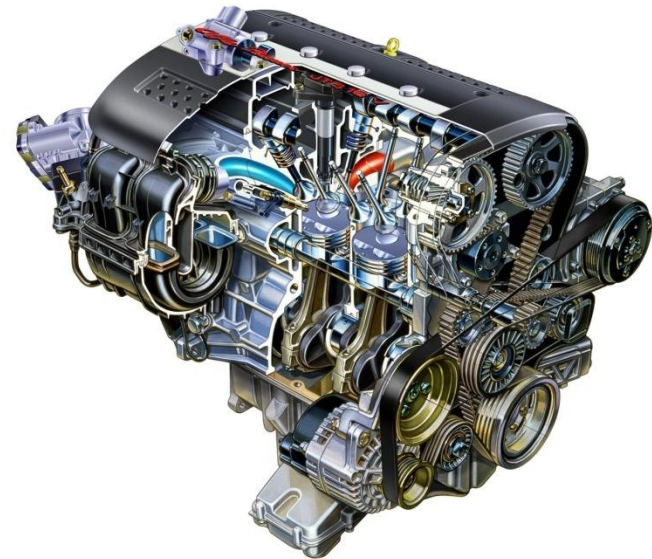
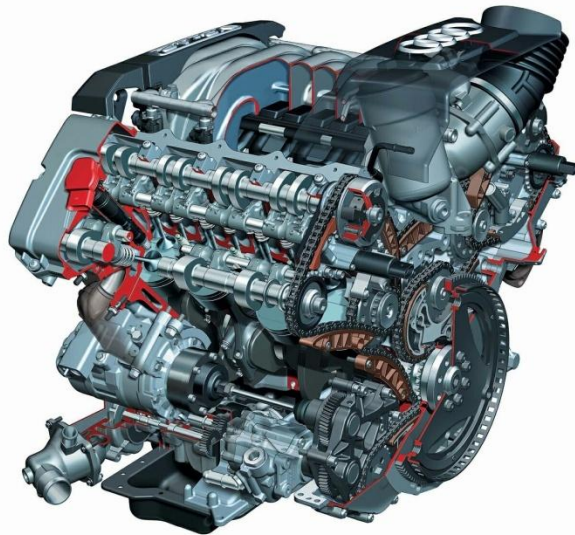
Project Milestones

- 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: 4 weeks
- Design to approval time: 2 weeks
- Build & commissioning time: 6 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

For further information please contact:

Anthony Khoraych, P.Eng.
Advanced Test & Automation Inc.

641 Main Street East
MILTON ON L9T 3J2
Canada

Tel: +1 (647) 477-6247, Ext. 32

Fax: +1 (647) 477-2180

Anthony.Khoraych@advancedta.com

“ Systems and Software for a Complex World in Motion”

www.advancedta.com