

FREEVAVE

Freevalve: Achieving Emission and CO2 reduction with fully variable valvetrain technology with the help of ATI

Contrary to popular belief, the rumors of the death of the internal combustion engine (ICE) has been greatly exaggerated. The Freevalve fully variable valvetrain technology allows for a reduction of CO2 and other emissions without the sacrifice of performance and efficiency. This opens the door for potentially allowing combustion engine operation on pure renewable liquid fuels, thus saving the world from huge amounts of CO2. The fully variable Freevalve valvetrain operation further allows for several engine operating modes such switching between different combustion cycles, number of strokes, or engine braking. This technology can be used in any kind of Internal Combustion Engine (ICE) and is independent of fuel type. With assistance from Accurate Technologies' (ATI's) measurement and calibration tool (VISION), the full potential of this implementation can be realized.

About Freevalve

Freevalve is a technology company that has set a new standard for valve train operation. Many manufacturers have attempted to achieve more efficient valve control with little success. For example, there are cases of multiple cam lobes being used to offer two different options for lift and duration. Other cases include electronically controlled cam angles being used to allow for the adjustment of the of the valve overlap throughout the RPM range.

Freevalve's camless engines allow for complete control by the calibrator by using pneumatic actuators to control the valves. That means lift, duration and overlap are completely calibratable parameters with each valve being independent from the rest. This provides limitless options to optimize the engines combustion efficiency as well at creates immense potential for compact engines to deliver big performance. The increased combustion efficiency translates into lower emissions as well as fuel savings for the consumer.







How ATI products helped Freevalve meet the development challenges

Two years ago, Freevalve made the switch to ATI's VISION Calibration and Data Acquisition software and they were able to seamlessly incorporate VISION with its existing control interfaces. The camless design utilizes a dedicated control unit required for calibrating the valve timing. Robin Gärdin, a control system engineer for Freevalve says, "VISION has helped us a lot with doing conditions and logging of the various parameters during running and testing." Robin goes on to state that previously the software being used had less features and was unable to capture the number of parameters necessary during testing and development. "Our current application is logging some 200 parameters, that makes the multi graph views in the same stripchart recorder handy."

A prime example of this innovative technology being put to real world use is the new Koenigsegg Gemera which boasts a mind blowing 600bhp out of a 2-liter, 3-cylinder, twin turbo compact engine. They achieve these impressive numbers by taking advantage of the independently controlled valves. In order to offer this feature, each valve requires its own position sensor to control the actuator. That one feature alone has increased the demand in data acquisition required to develop and calibrate this system.





VISION provides a complete DAQ solution with powerful yet convenient features for data analysis, data collection and connection to devices acquiring data. VISION's Project Manager is used to simplify test setup in a tree structure format that easily allows the addition, removal, and configuration of measurement devices. VISION recorders or screens provide a customizable method to collect, manage, and analyze data in the manner and format that best fits individual needs.

TECHNOLOGIES

Robin goes on to say, "VISION's floating windows has helped greatly in development by allowing the use of multiple screens when logging and viewing data." To provide greater user interface flexibility many of the commonly viewed VISION windows (Screen, REC, VST, CAL, and KAM), easily convert to 'floating' windows which allows them to move to other external monitors (i.e. HDMI, Display Port, USB, etc.) separate from the main VISION window. The number of floating windows that can be created is only limited to the number of screens available.

Using VISION's Universal ECU Interfacing tool kits provides a means to flash and update control units with new software. Robin says "In parallel with the logging we have some 100 parameters in data lists where we both read and adjust parameters when our system is running. That is a necessity for us to develop the system. Adjusting parameters include changing operating modes and tuning various controllers."







Future Plans

Future plans for Freevalve include utilizing ATI's VISION for its calibration needs. VISION has proven an invaluable tool in its data acquisition which has led to them exploring the powerful calibration tools ATI has to offer.



For further information on Freevalve or ATI visit their respective websites: www.freevalve.com/www.freevalve.com/www.accuratetechnologies.com

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