



BY JASON THOMPSON

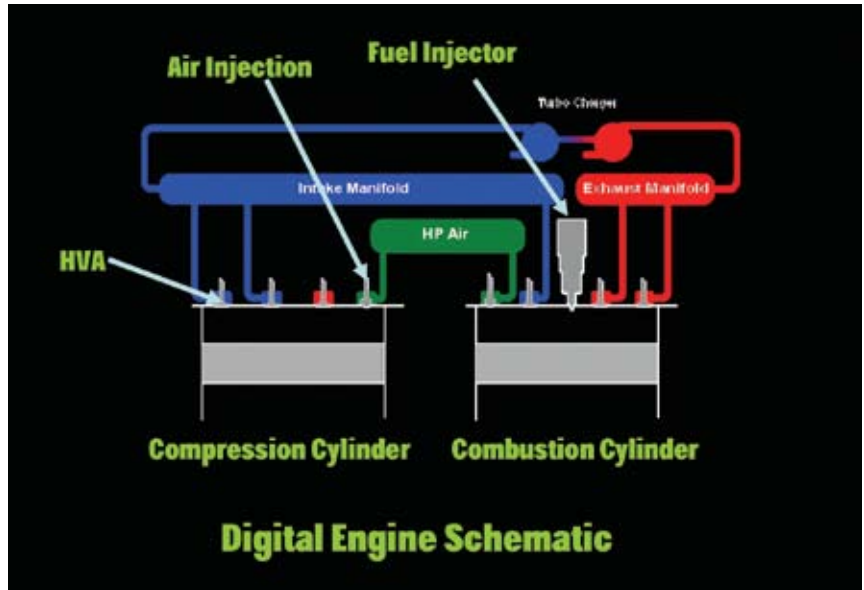
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STURMAN INDUSTRIES REVISITED

Back in the April '11 issue of *Diesel Power*, we introduced you to Sturman Industries' engine technology. In that issue, we published an article discussing how digitally controlling airflow into an engine with hydraulic valve actuation (HVA) could increase performance and efficiency while decreasing emissions. There was so much to discuss, we didn't have room to explain Sturman's combustion cycle or its hybrid capability. I wish we had space to include the rotary diesel engine it's been working on, too. It's time for me to rectify that oversight.

STURMAN COMBUSTION CYCLE

As the piston comes down from the power stroke, the exhaust valves are quickly opened and closed to allow some of the exhaust to be left in the cylinder. As the piston starts to go back up, fuel is injected into the hot inert environment and is atomized completely. This eliminates the need for extremely high injection pressures and aftertreatment systems.



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Then the intake valves open and close quickly, allowing enough air for compression ignition, which begins just before top dead center. Right after top dead center, the intake valve is opened and closed once again, this time letting in more air as the piston goes down on

another power stroke. With this engine, air (instead of fuel) manages the timing. Then the process starts all over again, because the engine is now a two-stroke. At any given time, the engine can be programmed to operate as a 2-, 4-, 6-, 8-...even up to a 12-stroke if it makes sense. The results of this controlled combustion process are said to equal a 20 percent increase in thermal efficiency, offer more power, and provide the ability to adjust to changing fuel types on the fly.

AIR HYBRID

Back in 2007, Sturman Industries, the University of California Los Angeles (UCLA), and Volvo Powertrain worked together on a truck that used braking energy from the wheels to compress air into a storage tank. The compressed air could then be pumped into the engine cylinders (when needed) to provide additional cylinder pressure to push down on the engine's pistons. This technology was intended to demonstrate that braking energy could be recovered and used to help propel a vehicle—without the need for expensive batteries or electric wheel motors. [MP](#)

