Advanced Innovative Engineering

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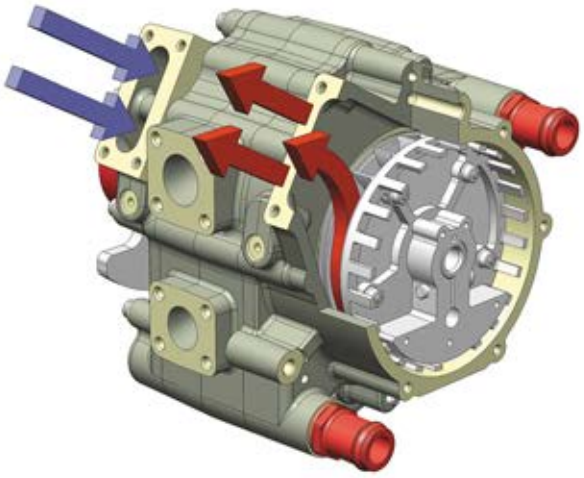
Technology: Patented, Liquid-Cooled **SPARCS***

Existing Wankel rotary engines available on the market typically use either closed-loop, oil-cooled or forced-air-cooled systems. AIE's innovative SPARCS* cooling system combines simplicity of design with the inherent high power-to-weight advantage of rotary engines, while practically eliminating the drawbacks these systems had in the past.

The SPARCS* cooling system for Wankel Rotary Engines utilises the self-pressurising blow by gases from the combustion process (which have escaped into the interior of the engine's core via the rotor's side seals) as a cooling medium. This pressurised air-gas mixture is recirculated in a completely closed loop circuit by an internal fan which is driven by the main shaft. As it recirculates, the air-gas mixture passes through the engine's rotor where it picks up heat before then being ducted through an external heat exchanger to reject the heat. The key to the system is that the high density of the pressurised air-gas mixture enables higher levels of heat removal from the engine's rotor than through standard air cooling methods.

As the SPARCS* system is completely sealed, the oil loss to atmosphere typical of air cooled rotary engines is completely eliminated. Oil supplied to the engine core is continually recirculated in the cooling gas mixture lubricating all moving surfaces, until eventually migrating past the seal pack (providing lubrication) before being burnt in the combustion process. As the lubrication oil in the engine core is recirculated many times, overall oil consumption is significantly reduced.



*Self-Pressurising-Air Rotor Cooling System

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