APR Technologies

Rheion® Pumped Loop 1PL-100

Control and transport of heat over distances

The Rheion® Pumped Loop 1PL-100 allows for the transport and spreading of heat over distances on spacecraft, as well as precise, active control of temperatures in a changing environment. Dielectric fluid is circulated to pick up heat from multiple components in series or parallel and reject it at the radiator, making it possible to cool high-power equipment located far from the radiator. The Pumped Loop uses non-conductive, fire-proof, dielectric fluid, has no moving parts and operates with virtually no vibrations, thereby giving it a long operational lifetime, unlike systems using mechanical pumps.

Benefits

Precise temperature control

In a typical system, sensor and payload temperatures can be maintained within ±5K or better across a wide range of power dissipation and environmental conditions.

Long-distance heat transport

Transports and spreads heat over long distances on spacecraft, picking up heat from multiple components in series or parallel and rejecting it at the radiator, enabling cooling of high-power equipment located far from the radiator.

Long operational lifetime

Driven by an electrohydrodynamic pump with no moving parts, the loop is free of vibration and mechanical wear.

Immediate ON/OFF capability

Instant pump response, with typical loop response time of 5 to 30 seconds depending on loop length.

Ground-testable

Limited influence from gravity enables validation testing on the ground before flight.

Customisable design

Available in various sizes, with heat exchanger size, tube routing, pressure tolerance and flow generation tailored to each application.

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Applications

The Rheion® Pumped Loop 1PL-100 is suited for a range of thermal challenges on spacecraft and surface vehicles.

Thermal control

Provides precise thermal control of sensitive equipment located anywhere in the satellite and cooling of high-power equipment located far from the radiator.

Thermal system

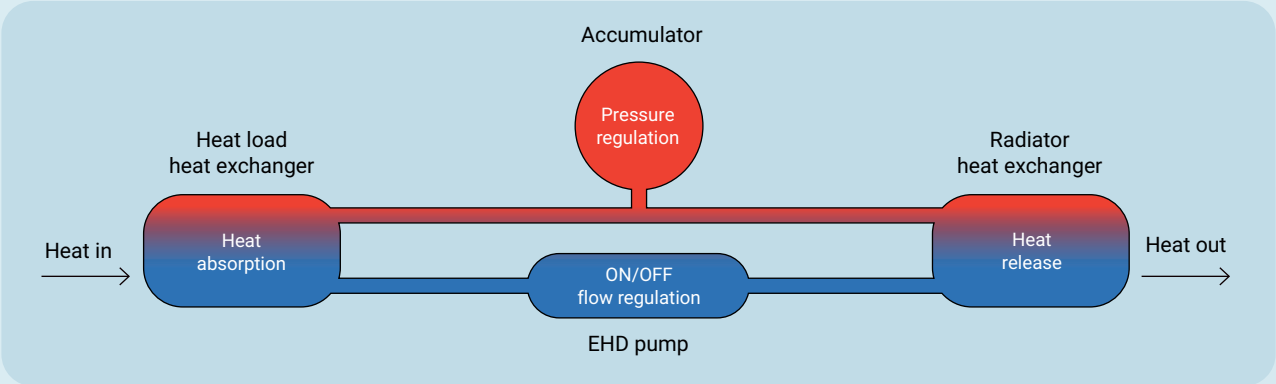
Can serve as a complete thermal system for a smaller satellite, picking up heat from several heat loads and rejecting it at the radiator.

Thermal isolation

Provides thermal isolation of equipment on surface vehicles during cold conditions, reducing the need for heaters.

Technical Data

Heat removal at 40 K ΔT (W)	>200
On-conductance (W/K)	>5
Off-conductance at RT (W/K)	<0.1
Power consumption in ON (W)	< 6
Operating temperature (°C)	-50 to +70
Weight (g)	<3 kg



About APR

APR Technologies is a Swedish deep tech company, developing and producing high-performance liquid cooling solutions for applications in chip cooling, batteries, space and defence. The technology directs cooling liquid flow directly to the heat source using no moving parts and is protected by more than 70 granted patents in 22 countries.
APR Technolgoies is headquartered in Enköping, Sweden.

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