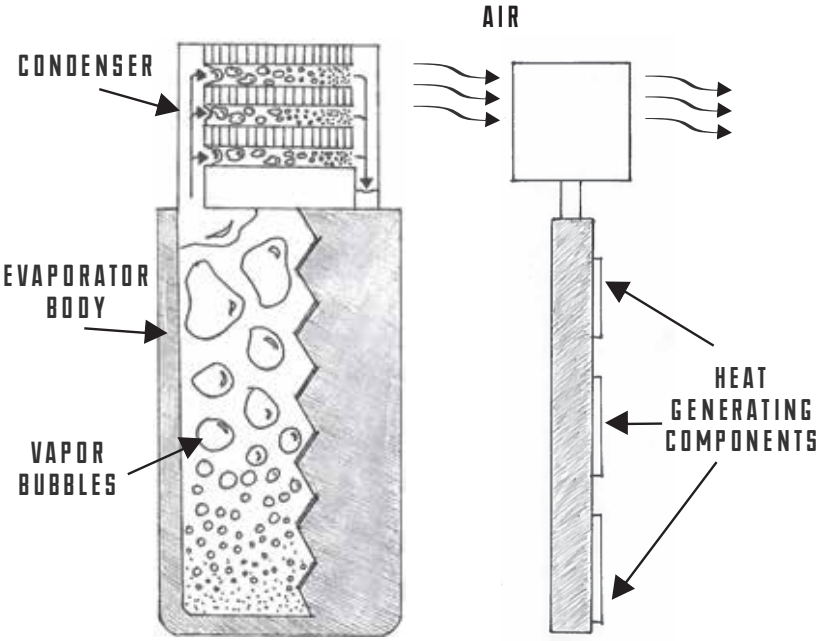
HIGH PERFORMANCE POWER ELECTRONICS COOLERS

How It Works

ACT's power electronics coolers use the thermosyphon effect to move large amounts of waste heat at low thermal resistances. Heat generated by power electronics causes liquid within the attached cold plates to evaporate. The expansion of this fluid as it changes phase from liquid to vapor creates a stirring motion that increases convection and subsequently, heat transfer efficiency. This same expansion of vapor in the evaporator, combined with the condensation of liquid in the condenser, generates a gravitational pressure imbalance that naturally maintains fluid circulation between the condenser and evaporator. A substantial amount of waste heat is transferred using this natural circulation since the latent heat of evaporation of the working fluid is large. The result? An extremely high performance cold plate that requires no moving parts!

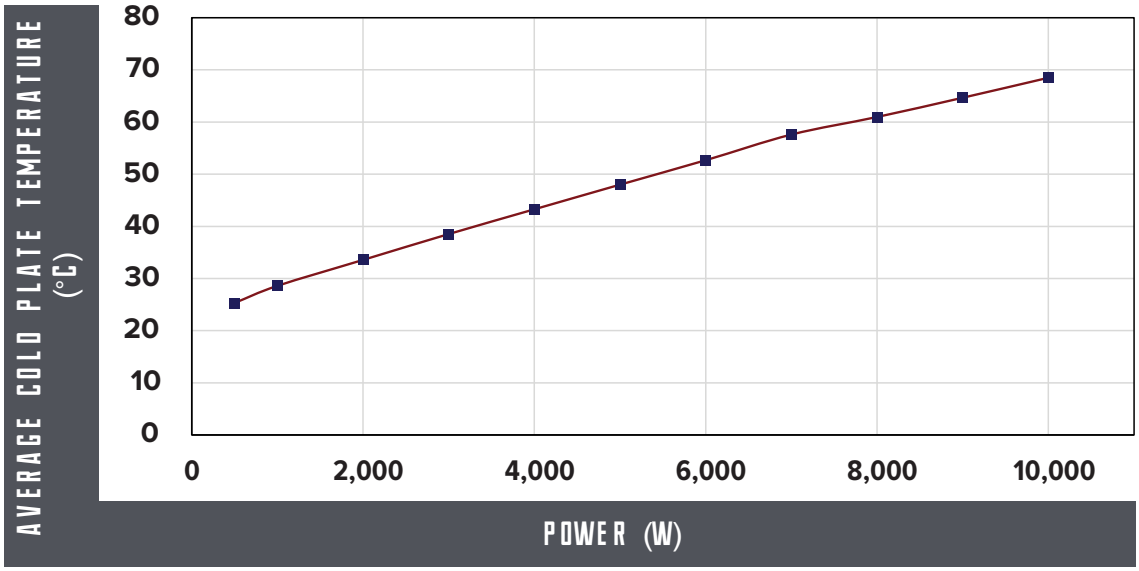


A schematic representation of the principles of operation are shown (left) along with an image of a complete unit (right)

SPECIFICATIONS

- Power Capability: Greater than 11 kW
- Thermal resistance: Less than 0.005 °C/W
- Operating environment temperature range: -55°C to +50°C
- Storage temperature range: -55°C to +80°C
- No moving parts
- Dielectric working fluid
- Greater than 10 year lifetime

Performance Data



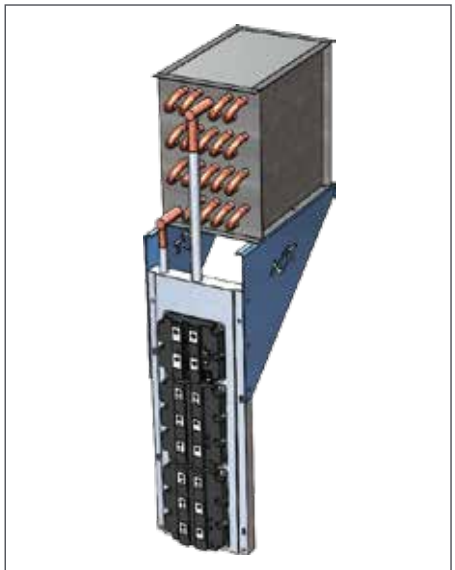
Typical performance for a high performance power electronics cooler operating with vertical airflow and an ambient air temperature of 22°C.

Packaging Options

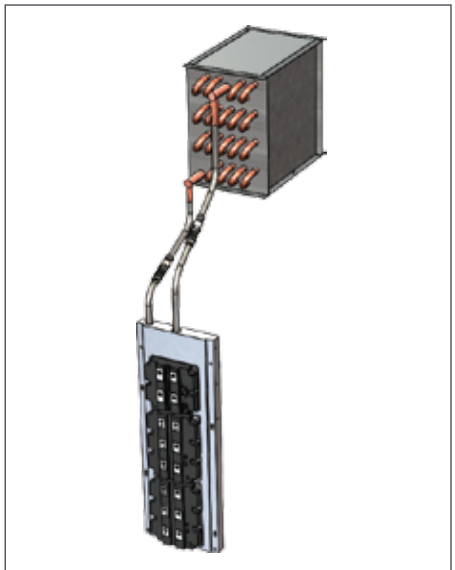
Condenser layout options can vary as required by the application. Three main options are available to provide maximum flexibility for system integrators.

- Horizontal Air Flow
- Vertical Air Flow
- Remote Condenser
    - Available with or without quick disconnects for ease of installation/removal

HORIZONTAL AIR FLOW



VERTICAL AIR FLOW



REMOTE CONDENSER
(WITH QUICK DISCONNECTS)

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