

ECU-1800

Environmental Control Unit Compact air conditioners for transit case/electronics enclosures



Background

The ECU Series are ruggedized air conditioning systems for cooling electronics in austere and mobile applications. They maintain sealed electronics enclosures at or below ambient temperatures, enabling Commercial-Off-The-Shelf (COTS) electronics to be safely and effectively used for computing and communications in extremely hot or cold environments. These systems have been fully ruggedized for military use to MIL-STD-810.

ECU Series will continuously maintain a temperature of $\leq 125^{\circ}\text{F}$ (51.6°C) inside an electronics enclosure in a 125°F ambient environment removing 1,800 Watts of heat. The electronics remain sealed against all environmental contamination, improving reliability.

Application Example: WIN-T Program

The original ECU-550 was developed for US DOD (Warfighter Information Network-Tactical) WIN-T communications program. Since that time, more than 3,000 ECU's have served with great success in Afghanistan and Iraqi operations logging millions of hours of operation. With ten years of successful deployments supporting C4ISR systems, Aspen has been asked to develop a larger similar ECU based on our miniature vapor compression cooling technology.

System Highlights

- Enables COTS electronics
- Ruggedized for use in-theater
- Below ambient cooling
- 4-6 X the efficiency of thermoelectrics
- Ultra compact
- Extremely lightweight
- MIL-qualified/SWaP-C effective
- >90,000 hour MTBF



In response to these ongoing requests, Aspen launched the ECU-1800. Leveraging many of the same components as the ECU-550, the new system boasts - 1800 Watt cooling capacity, improved airflow distribution and increased SWAP efficiency.

Specifications

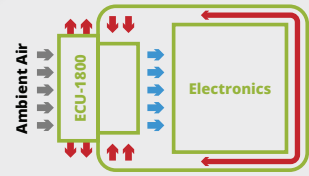
Preliminary Data*

In cooling applications, the vapor compression based ECU Series provides the highest efficiency and capacity, smaller size, low weight, minimal maintenance and low cost when compared to thermoelectric coolers (TEC).

Parameter

Cooling Capacity	1800 W	At rated operating conditions**
Heating Capacity	300 W (optional)	Resistive Heating
Operating Ambient Temp Range	-40°F to 140°F (-40°C to 60°C)	
Storage	-40°F to 160°F (-40°C to 71°C)	
Maximum Power Draw	900 W at 28 VDC	Actual power draw varies with operating condition
Voltage	28 VDC	22-32 VDC
Maximum Current	32 A at 28 VDC	
Altitude	15,000 ft (4.6 Km)	
Humidity Control	70% RH	
Orientation	±15°	On any axis from vertical
Military Standards	MIL-STD 810*, 461, 1275	Environmental, EMI Protection Power Supply
Weight	36.2 lbs (9.1 Kg)	16.5 Kg
Dimensions	15.5x18.5x11.5 in	39.4x47x29 cm

Airflow Schematic Top View



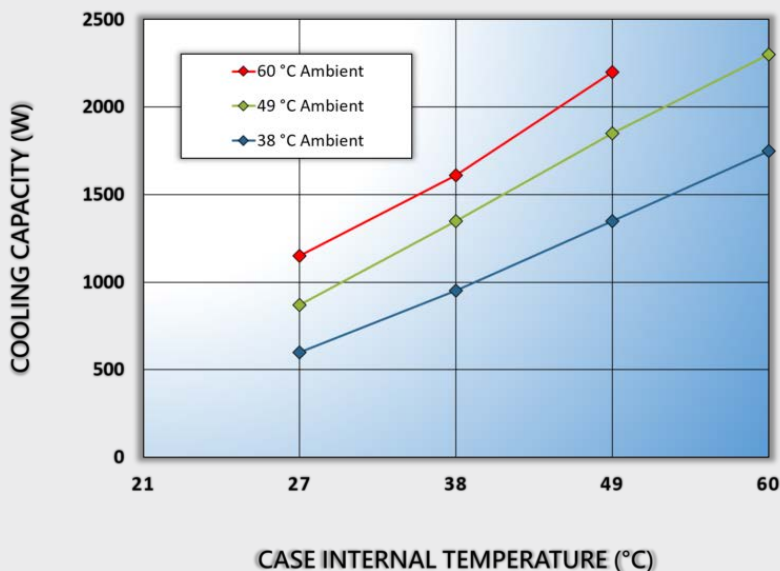
ECU-1800 Mounted in an Electronics Enclosure

- Sealed enclosure protects electronics.
- ECU-1800 does not allow mixing of inside and outside air.

ECU advantages

- 3 times smaller
- 4 times more efficient
- 5 times lighter
- >90,000 hour MTBF

Cooling Capacity Graph



Size-power-Weight Comparison of Thermoelectric and Vapor Compression

