

Environmental Control Unit

ECU-550 | Part # FP00027



System Overview

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. The ECU Series continuously maintains a temperature of $\leq 125^{\circ}\text{F}$ (51.6°C) inside an electronics enclosure in a 125°F ambient environment removing 550 Watts of heat. The electronics remain sealed against all environmental contamination, improving reliability.



Compact

22.8 x 47.0 x 17 cm
9.0 x 18.5 x 6.7 in
9.1 kg (20 lbs)



High-Capacity

Cools 550 Watts
Heats 300 Watts



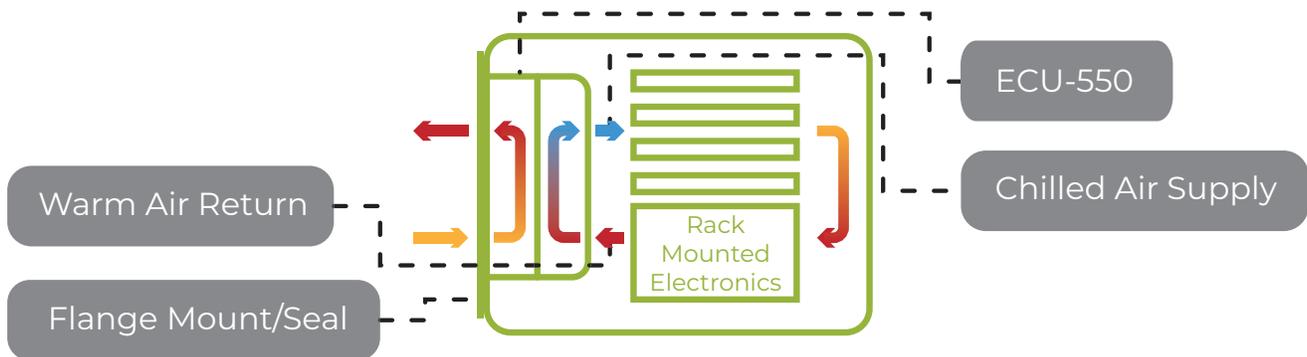
Low-Voltage

28V, 15 A
Highly Efficient



Military Grade

MIL-STD-810
MIL-STD-461
MIL-STD-1275



The ECU-550's enclosed design prevents dust, moisture, and airborne contaminants from affecting critical electronics. Its independent airflow paths ensure efficient heat removal while maintaining a clean and controlled internal environment, enhancing system durability and reliability.

Contact Us:  508-281-5322  info@aspensystems.com

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System Specifications

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Cooling Capacity	550 W at rated conditions
Heating Capacity	300 W At 40°F (4.4°C) or below
Maximum Current	16.4 A (at 32 VDC) / 15.0 A (at 28 VDC)
*Maximum Power Draw	420 W
Voltage	28 VDC
Operating Ambient Temperature	-40 to 140°F (-40 to 60°C) At $T_{\text{ambient}} < 125^{\circ}\text{F}$ (51.6°C)
Storage Temperature	-40 to 160°F (-40 to 71°C)
Military Standards	MIL-STD 810, 461, 1275
Altitude	15,000 ft (4.6 Km)
Humidity Control	70% RH
Orientation	±15° on any axis from vertical
Weight	20 lb (9.1 Kg)
Dimensions	9x18.5x6.7 in (22.8x47x17 cm)

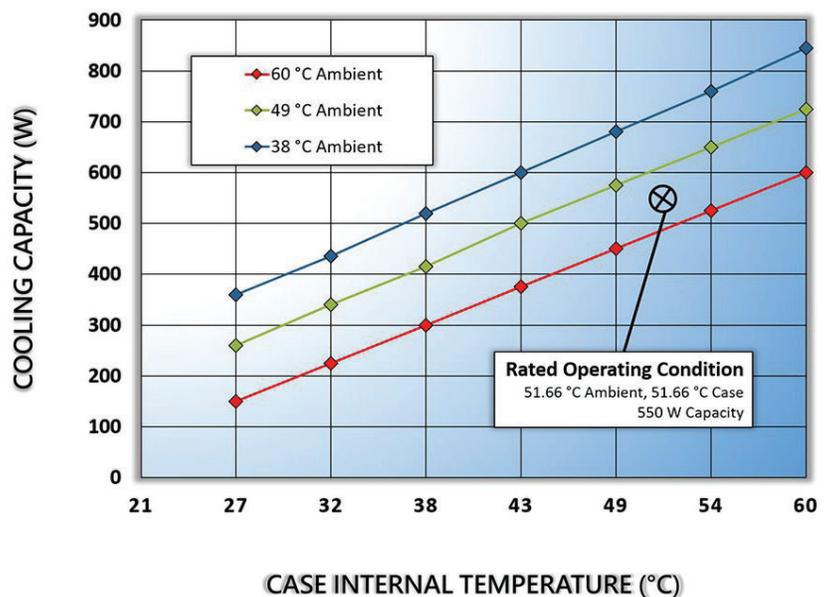
*Actual power draw will vary with ambient temperature, coolant temperature, and cooling load

Applications

The **ECU-550** is ideal for efficient and lightweight cooling solutions in a variety of demanding environments, including:

- Military communications Systems
- Electronics Transit Cases
- Sealed Electronics Enclosures
- Ground Vehicles
- Custom Equipment Enclosures
- Harsh Environmental Applications

Cooling Performance Chart



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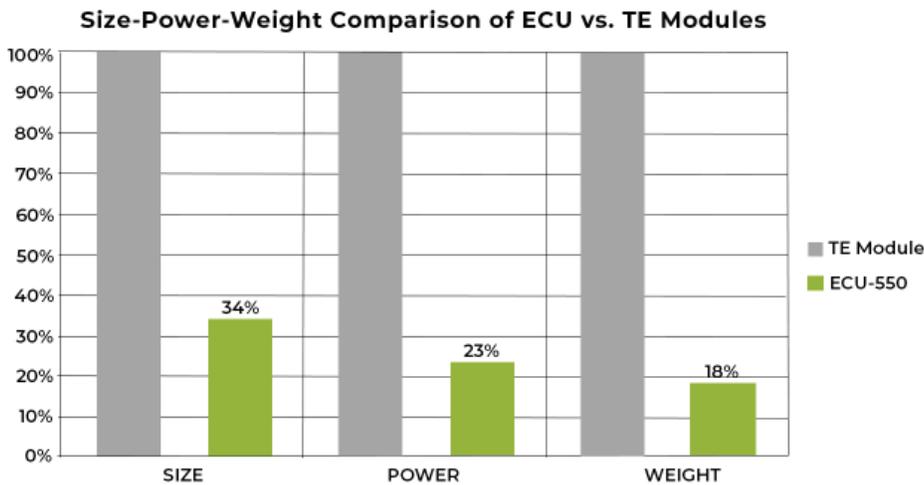
ECU Mini Compressor: A Superior Alternative to Thermoelectric Coolers

Thermoelectric cooling (TEC) was once the standard for sealed cases, but its inefficiency and weight made it impractical. TECs operate at only 10-15% of Carnot efficiency, consuming over four times the power of vapor compression systems and adding bulk and fragility.

In contrast, vapor compression systems offer superior performance, achieving efficient cooling at or below ambient temperatures with a lightweight, compact design.

Thermoelectric vs ECU Performance

Aspen's ECU-550 leverages vapor compression refrigeration to outperform thermoelectric and Peltier cooling in every key metric.



66%
Smaller

77%
Less Power
Consumption

82%
Lighter

Aspen Systems' innovative miniature compressor has redefined active cooling for military and portable applications, delivering unmatched reliability, efficiency, and manufacturability.

With nearly 10,000 systems deployed in Department of Defense programs, it outperforms outdated thermoelectric technology, combining advanced engineering with practical benefits to remain the preferred choice.



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About Aspen Systems

Aspen Systems' expertise lies in creating small, powerful, energy-efficient thermal management solutions deployed globally in industries including aerospace, automotive/EV, defense/military, life sciences, medical, electronics, semiconductor, and more.

Aspen's journey began in 1984 as an innovative technology organization and continued to grow with the development of miniature, variable-speed, DC compressors for military applications.

Today, we are a USA manufacturer committed to driving sustainability and delivering cutting-edge cooling solutions utilizing natural, low GWP refrigerants that are environmentally responsible and compliant with IATA safe air travel regulations.

Our manufacturing location operates under a Quality Management System (QMS) that is registered to the ISO 9001:2015 standard; which ensures that we consistently provide products that meet rigorous industry standards and all of our customer performance requirements.

Thermal Management Beyond ECUs: Comprehensive Cooling for Any Application

Liquid Chiller Modules

Aspen Systems' LCM Series provides compact, energy-efficient cooling for high-performance systems, using less space, weight, and power. Our Liquid Chiller Modules are a breakthrough in cooling technology for medical, lab, military, electric vehicle, laser, and electronics applications.

Direct Refrigerant Cooling

Eliminate the risks of fluid leaks, contamination, and maintenance with Direct Refrigerant Cooling from Aspen Systems. By eliminating traditional liquid-to-liquid heat exchangers, this method provides direct refrigerant cooling with higher efficiency, lower power consumption, and greater reliability, making it the ideal solution for mission-critical laser applications.

Custom Cooling Systems

Need a custom cooling solution that fits seamlessly into your technology? Aspen Systems collaborates with leading companies in aerospace, defense, medical, and industrial markets to develop integrated, high-efficiency cooling systems.

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