

ELECTRIC VEHICLE SOLUTIONS



**MORE INNOVATIVE.
MORE RUGGED.
MORE ELECTRIC.**





- Innovative power and cooling products for military and industrial vehicle electrification
- Rugged military and industrial solutions for the toughest missions
- Flexible designs meeting high density power, voltage and packaging needs
- Ongoing investment in electrification power technologies

OUR HISTORY

Crane Aerospace & Electronics is a leader of innovative and reliable electrical power, fluid management and sensing solutions equipped to persevere in the most rugged environments. On the battlefield, in space or in flight, our product solutions excel.

Military and heavy industrial vehicles are electrifying their fleets, and as platforms transition into hybrid or fully electric systems, we are ready now to provide innovative solutions thanks to our rich legacy expertise and strategic technology investment.

ELECTRICAL POWER CAPABILITIES

Crane A&E offers versatile electrical power solutions. From milliwatts to megawatts, we deliver efficient packaging, environmental durability and superior size, weight, power and cost for mission-critical systems.

Key Capabilities

- Onsite high-power R&D lab (1.5 MW)
- Power subsystems up to 500 kW
 - Modular and flexible
- Power conversion 4 kW – 30 kW solutions
 - 600-900 VDC/28 VDC
 - See product matrix for additional product offerings
- High efficiency and density
- Digital interfaces and control
- Communication interfaces: CAN, RS 485, ethernet
- EMC verified
- Rugged mechanical design (military) shock/vibration
- Customizable performance and packaging to meet customer needs

FLUID MANAGEMENT CAPABILITIES

Crane A&E delivers custom fluid solutions for a wide range of thermal management and fluid needs from conventional to next-generation applications. This includes environmental control systems, power generators, hydraulic, fuel, and all-electric/hybrid-electric power architectures. Since 1904, our Lear Romec heritage brand has provided reliable fluid products to the aerospace & defense industry. Today, our Fluid Management group supplies fuel, water and coolant pumps, flow measurement and thermal management for complex fluid systems in the harshest applications.

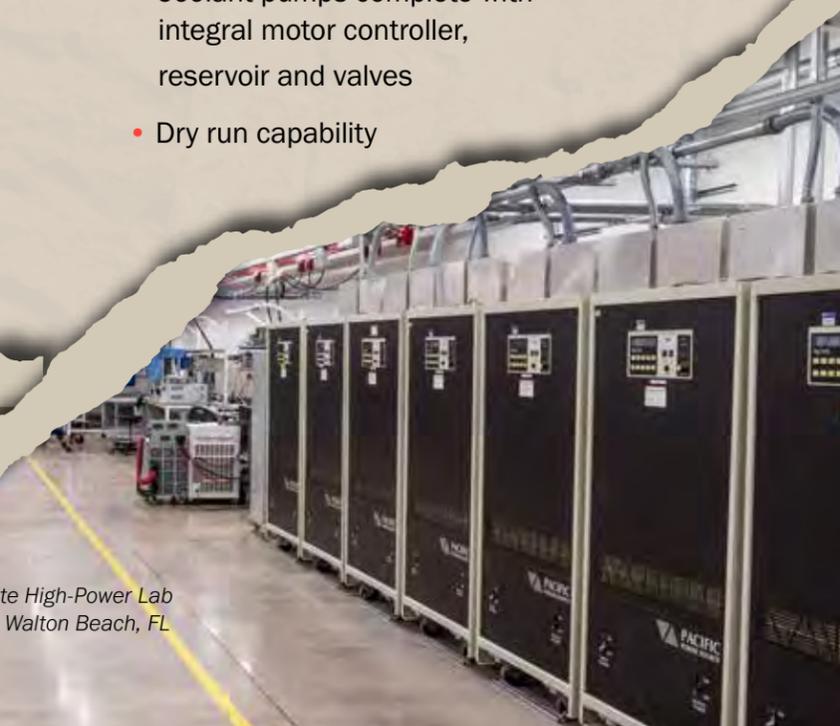
Key Capabilities

- Pumps featuring up to 250 psi and 200 GPM per pumping element
- Explosion-proof electric motors
- Coolant pumps complete with integral motor controller, reservoir and valves
- Dry run capability

THE **P**OWER **H**OUSE

AT FORT WALTON BEACH
HIGH POWER. HIGH CAPABILITY

Onsite High-Power Lab
Fort Walton Beach, FL



[MILITARY SOLUTIONS]

Engineered to operate in harsh battlefield conditions, Crane A&E delivers unmatched, custom and reliable mission-critical electric power system solutions for the coming generation of military hybrid and all-electric tactical and combat vehicles.

- High power conversion
 - 600 VDC - 28 VDC
 - 4 kW - 30 kW
 - High temperature operation
 - Meets MIL-STD environment
 - CAN bus interface
- Thermal management system solutions



[HEAVY INDUSTRIAL SOLUTIONS]

Built to power the toughest jobs, Crane A&E's suite of custom and off-the-shelf electric power system products offer solutions for next-generation hybrid and all-electric heavy industrial vehicles.

- Innovative power and cooling products for heavy industrial vehicle electrification

- Rugged commercial solutions equipped to tackle the toughest jobs
- Flexible designs meeting high density power, voltage and packaging needs
- Advanced development, continuous investment in electrification power technologies



The appearance of U.S. Department of Defense (DoD) visual information does not imply or constitute DoD endorsement.

[PRODUCT SPOTLIGHT]

BI-DIRECTIONAL POWER CONVERSION

Our new 15 kW to 120 kW bi-directional converters are engineered for use in hybrid and all-electric vehicle powertrains and are essential for in-vehicle power distribution.

- Permits charging and use of energy storage including Li-Ion batteries
- Supports cross-tie between vehicle power busses



MOTOR CONTROL

Our custom high-performance, scalable motor control solution is engineered to optimize motor-driven pump performance.

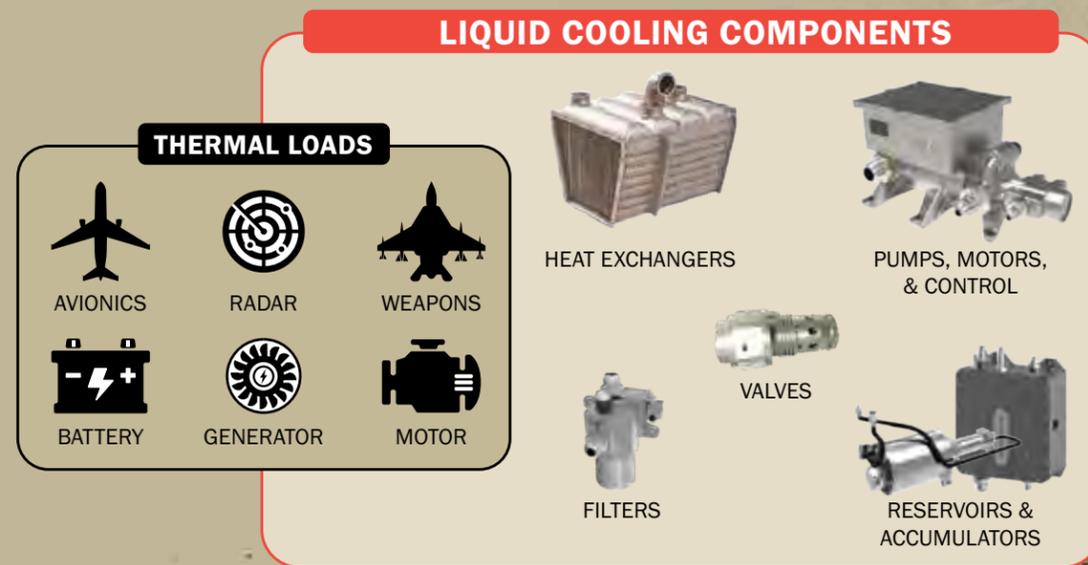
- Wide range of input voltages (28 VDC - 540 VDC)
- Power levels up to 5,000 W
- Optional health monitoring



THERMAL MANAGEMENT SYSTEMS

We've leveraged our rich history in fluid management to deliver innovative cooling products to satisfy elevated levels and new sources of thermal loads introduced by electric vehicle power systems.

- Broad offering of liquid cooling pump, motor and controller technologies
- Additional component offerings: reservoirs, accumulators, heat exchangers, valves and filtration
- High heat removal for harsh electronic environments



[PRODUCT SOLUTION MATRIX]

FLUID MANAGEMENT

- Fuel, Water, Cooling and Lubrication Pumps
- Thermal Management Systems
- Tanks / Reservoirs
- Accumulators
- Filter Assemblies
- Heat Exchangers
- Valves

SENSING

- Proximity Sensing Components
- Pressure Sensors
- Wireless Sensing - Tire Pressure Sensing
- Fuel Gauging Components / Systems

ELECTRICAL POWER

Bi-Directional Power Conversion

600 VDC - 28 VDC, 15 kW

600 VDC to Variable (250 VDC to HV input), up to 120 kW*

30 - 100 kW Import/Export (600 VDC - 115/208 VAC) converter*

Up to 500 kW Motor Drive Inverter (600 VDC input)*

* Under development

High Voltage DC-DC Converter (4 kW)

900 VDC - 28 VDC

270 VDC - 28 VDC

900 VDC - 270 VDC

High Power Conversion

High & Low Voltage Power Supplies

Integrated Starter Generator Controller (ISGC)

Integrated Power Assemblies w/ Self Contained Cooling

Motor Control

Battery Charging System (Custom)

Power Supply



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