ThermOmegaTech®

Aerospace & Defense Division



- **Thermostatic Cartridges**
- **Thermostatic Valves**
- **Thermal Actuators**
- **PCB Assembly**

Contact For More Info
(877) 379-8258
www.TOT-AD.com

AS9100D CERTIFIED
ISO 9001

ThermOmegaTech®

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COMPANY OVERVIEW

Who We Are

ThermOmegaTech® is a trusted leader in thermostatic temperature control solutions, specializing in **phase-change technology and thermal actuator design**. Since 1983, we have designed and manufactured self-actuating thermal control products for dozens of applications, ensuring reliable performance.

Operating from a **60,000+ sq. ft. facility in Warminster, PA**, we bring engineering, manufacturing, assembly, testing, and quality control together under one roof for seamless communication and rapid development.



Our state-of-the-art facility is equipped with advanced CNC machining, automation, environmental testing, calibration test baths, and precision measurement systems, allowing us to deliver high-quality, customized thermal solutions for Aerospace and Defense applications such as thermal bypass, fluid temperature regulation, electronics cooling, airflow control, freeze protection, scald prevention and more.

We also offer Electronics Contract Manufacturing services through our **Electronics Division**.

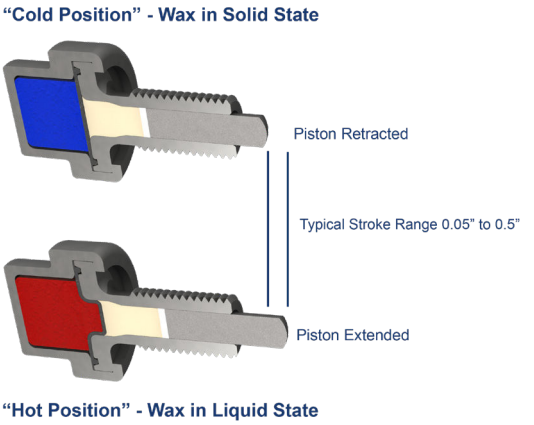
Our Technology

At the heart of our thermostatic valves is a thermal actuator filled with our proprietary Thermoloid® paraffin wax blend. This wax actuator expands and contracts in response to temperature changes, translating to a known stroke response within a narrow range of temperature variation.

Cold Position: The wax remains solid, keeping the piston retracted.

Hot Position: As temperature rises, the wax melts and expands, generating controlled motion that actuates a valve stem, lever, or mechanical device.

This **reliable and repeatable motion** enables precise thermal control, with activation temperatures customizable within a narrow range (typically 10-20°F). Due to its **high-density, incompressible nature**, our actuator generates **significant force** while maintaining a compact design—making it ideal for many Aerospace and Defense applications.



Capabilities

In addition to our standard thermal control products, we provide custom-engineered solutions tailored to specific requirements. Our in-house engineering team supports every stage of development - from concept to production – ensuring efficiency and performance. With stringent quality control and full part and lot traceability, we deliver reliable, high-performance solutions.

Certifications & Compliance

We adhere to the highest industry standards with **AS9100D certification**, ensuring **rigorous quality management** across all operations. Our products comply with **RoHS, REACH, DFARS, and ITAR regulations**, and we can provide **First Article Inspection Reports (FAIRs)** for full compliance with Aerospace and Defense protocols.

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Thermal Actuators

A thermal actuator, or wax motor, is a compact, self-powered device that converts thermal energy into mechanical motion using the phase change properties of paraffin wax. As the wax transitions between solid and liquid states, it expands and contracts, extending or retracting a piston to generate force.



These actuators deliver precise, repeatable motion, with stroke lengths typically ranging from 0.05 to 0.5 inches and force outputs between 20 and 150 lbs. They are also maintenance-free and require no external power, making them ideal for harsh or remote environments.

Benefits

- Self-Operating — No external power to function
- Maintenance-Free — No periodic calibration is needed
- Low SWaP (Size, Weight, and Power) — Compact and efficient
- Fewer Components — Minimizes failure points



Standard Specifications

- Materials: 303 Stainless Steel, 316 Stainless Steel, and Brass
- Alternative Materials: Duplex 2205 and 2507 Stainless Steel – *others available upon request*
- Start to Stroke Temperature Range: 15°F to 300°F (-9.4°C to 149°C)
- Max. Stroke Activation Range: 10°F to 20°F (5.5°C to 11.1°C)
- Chemical Treatments: Passivation, Electropolishing, NACE Annealing, Chemfilm, and Anodizing



Applications

- Military Aircraft: Fuel/oil cooler assemblies
- Military Vehicles: Hydraulic cold-start systems
- Unmanned Aerial Vehicles (UAVs): Vent door control

High Output Paraffin Actuators (HOPA)

For applications requiring higher force or displacement, we design High Output Paraffin Actuators (HOPAs) that can deliver over 1,000 lbs. of force. For situations requiring these higher force outputs or longer stroke lengths, custom actuators may need to be designed to meet those specific needs.

Key Features

- Designed for high-force applications in compact spaces
- Operate under pressure or vacuum conditions and in liquid or gas
- Negligible outgassing
- Can be activated via an external heat source, such as an electric resistor
- Provide a non-explosive alternative to traditional explosive bolts, enhancing safety



Applications

- Space & Deep-Sea Exploration: One-time release operations in spacecraft, satellites, and underwater vehicles

ThermOmegaTech®

Aerospace & Defense Division

Mixing & Diverting Valves and Cartridges

ThermOmegaTech's thermostatic mixing and diverting (M&D) valves are engineered to maintain optimal fluid temperature within systems, enhancing performance and safeguarding critical components from overheating. They reduce warm-up times, protect sensitive electrical components, and can be integrated into existing systems. Whether used in mixing or diverting mode, our valves ensure that systems operate at peak efficiency.

Mixing Mode: Proportions hot and cold inlet feeds to maintain a consistent output temperature.
Diverting Mode: Directs flow through a heat exchanger or bypasses it based on the fluid temperature.

Benefits



- Self-Operating — No external power source required
- Thermostatically Controlled — Automatically adjusts based on temperature fluctuations
- Reliable & Low-Maintenance — Durable design with minimal moving parts
- Compact & Lightweight — Fits seamlessly into new or existing system designs
- Pressure Independent — Operates effectively regardless of system pressure variations

Standard Specifications



- Sizes: ½", 1" or 2"
- Materials: 303 Stainless Steel, 316 Stainless Steel, and Brass
- Set-Point Temperature Range: 35°F to 210°F (1.7°C to 98.9°C)
- Seal Materials: Buna-N, EPDM, Viton, or Fluorsilicone
- Maximum Operating Pressure: 350 PSIG (24 BAR)
- Maximum Operating Temperature: 250°F (121°C)

Applications

ThermOmegaTech's thermostatic valves are ideal for critical systems across a range of military and aerospace sectors, including:

- Avionics Cooling – Regulating liquid cooling in military aircraft
- Hydraulic Cold-Start Bypass – Optimizing military vehicle performance
- Fuel Cell Thermal Control – Managing coolant temperature in space & underwater systems
- Environmental Control – Regulating temperature in spacecraft
- Radar & Missile Systems – Liquid cooling for critical electronics & sensors
- Aircraft Ground Support – Managing nitrogen-generation cart temperatures







Valves or Cartridges to Fit Your Designs

ThermOmegaTech® offers commercial off-the-shelf (COTS) M&D valves and cartridges to meet your design needs. Our cartridges incorporate the same thermal actuator technology as our standard valves, without the housing, making it easier to integrate into preexisting systems with their unique designs and strict space requirements.

If our standard products don't meet your needs, our engineers can develop custom solutions, including modifications to valve size, port configuration, body material, O-ring material, temperature settings, stroke, length, thread type, and more.

ThermOmegaTech®

Aerospace & Defense Division

FREEZE PROTECTION & SCALD PROTECTION

Freeze Protection

ThermOmegaTech's **Freeze Protection Valve** prevents frozen water lines. When temperatures drop below 35°F (1.7°C), the valve automatically opens to bleed out the cold water. When warmer water from the resupply increases the water temperature back above 40°F (4.4°C), the valve closes to conserve water. This power-free system ensures reliable freeze protection without human intervention, minimizing the risk of error, water waste, and energy inefficiency.

Benefits



- Self-Actuating — Requires no electricity or manual intervention
- Prevents Pipe Bursts — Eliminates risks of freezing and costly damage
- Minimizes Water Waste — Automatically shuts off when temperatures are safe
- Reliable & Maintenance-Free — Long-lasting, fail-safe operation
- Cost Savings — Reduces energy costs through water conservation

Standard Specifications



- Sizes: ½" and ¾"
- Maximum Operating Pressure: 300 PSIG (20.7 BAR)
- Maximum Temperature for ½": 185°F (85°C)
- Maximum Temperature for ¾": 155°F (68.3°C)

Applications

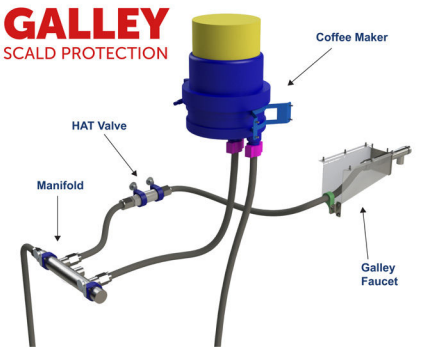
- Naval Shipyards – Protects potable water lines from freezing while in port or dry-dock
- Military Bases & Infrastructure – Prevents freeze damage to critical water systems

Scald Protection

Our **Scald Protection Valve** prevents injuries by automatically shutting off water flow when temperatures exceed safe limits. On aircraft galleys, it protects personnel and passengers by stopping overheated water from reaching faucets. Once the temperature returns to a safe level, the valve automatically reopens, ensuring reliable, hands-free operation.

ThermOmegaTech® valves protect personnel in hundreds of commercial aircraft, including the Airbus 380, A330, & A350, Boeing B747 & B777, and the Boeing KC-46A Refueling Tanker.

Benefits



- Self-Actuating — No external power is required
- Fast Response Time — Quickly reacts to temperature spikes
- Prevents Burns & Injuries — Ensures safe water temperatures
- ANSI Z358.1 Compliant — Meets safety standards for emergency application

Standard Specifications

- Sizes: ½" and ¾"
- Maximum Operating Pressure: 200 PSIG (13.8 BAR)
- Maximum Operating Temperature: 150°F (83.3°C) over set-point with a limit of 300°F (149°C)

Applications

- Aircraft Galley Safety – Prevents boiling fluids from beverage systems from backflowing into faucets

ThermOmegaTech®
Electronics Division

ELECTRONICS CONTRACT MANUFACTURING

Electronics Contract Manufacturing Services - PCB Assembly

ThermOmegaTech's Electronics Division provides high-quality Printed Circuit Board (PCB) assembly services for the aerospace and defense markets. With advanced technology, extensive expertise, and rigorous quality control, we provide military-grade PCB assemblies that meet the demands of **mission-critical applications.**

We manufacture PCB assemblies for high-level applications in aircraft such as the C-130 Hercules, CH-47 Chinook, KC-46 Pegasus, Bell 407 Helicopter, Boeing 757, Boeing 767, Bombardier Global Express, Kratos SSAT, and Korean T-50 Golden Eagle.



Assembly Services

- Turnkey — We source and order all necessary PCBs and components.
- Consignment — Provide us with your PCBs and/or parts for assembly, offering flexibility to meet your needs

Key Capabilities

- **PCB Types:** Rigid, Flex, Rigid/Flex
- **Assembly Techniques:** Surface Mount, Thru-Hole, and Mixed-Technology Processing
- **Processing:** Lead & Lead-Free
- **Fine Pitch:** Down to 0.3mm (BGA, QFN, QFP)
- **Configurations:** Single or Double-Sided
- **Materials:** FR4, Rogers, Copper, Ceramic, Duroid, Aluminum, High-Temperature Laminates
- **Substrates:** Metal Core Insulated, Copper Substrates
- **Connectors:** High-Speed Backplane, Rack-and-Panel, I/O, Fiber Optics, Micro/Miniature Connectors
- **Relays & Circuit Breakers:** Signal-Level, Solid-State
- **PCB Layers:** Single or Multi-Layer

Our Facility

ThermOmegaTech's state-of-the-art facility, with its automated technology, meets the strictest production requirements. Equipped with precision pick-and-place machines, multi-zone reflow ovens, and 3D optical inspection systems, our facility ensures consistent quality and high-performance assembly.



We maintain robust environmental controls, including ESD flooring and a humidification system for optimal assembly conditions.

Applications

- Trim actuators for Military Helicopters and Aircraft
- Stabilizing Trim Transducers for Commercial Aircraft
- Yaw Damper Control for Commercial and Military Aircraft
- Ground-based Radar Motion Control for Military Vehicles
- Automatic Flight Control Systems for Military Aircraft

Certifications

AS9100D CERTIFIED ISO 9001 | IPC J-STD-001 | IPC IPC-A-610 | RoHS compliant

A&D BROCHURE
REV: 2/20/2025