



# Introducing ThermoCube II

# ThermoCube II

## The next generation of our legendary chiller

- Designed to be configurable to meet the needs of your specific application
- Built upon the learning from over 34,000 ThermoCube systems shipped to date
- The same popular options as the original ThermoCube plus many new options
- Software configurable operating parameters
- Power subsystem redesigned for even longer life (In warranty failure rate < 1.5%)
- Quieter variable speed fan and auto restart are now standard
- Plug and play replacement for any existing ThermoCube I



# ThermoCube II Specifications

**Specifications match ThermoCube I with added functionality and new options**



SPECIFICATIONS	
Operating Range	5°C to 50°C (extendable to -5°C to 65°C with -LT and -HT)
Ambient Temperature	10°C to 40°C non-condensing
Stability / Repeatability	± 0.05°C at constant load (even near ambient)
Cooling Capacity	200 to 500 watts @ 20°C (20°C ambient)
Noise (at 1 meter)	< 50 dBA (with 50% load), < 63 dBA (with full load)
Coolant / Process Fluid	Koolance (27% propylene glycol / water mix) or 27-50% ethylene glycol / water mix. Options available for Fluorinert / Galden or alternate fluids
Process Fluid Fittings	John Guest, CPC, APC, swage or FNPT
Pumps	Diaphragm, Centrifugal or Gear pump
Tank Volume	300 ml with level sensor (or 900 ml stainless tank)
Wetted Materials	Available with aluminum, copper or stainless steel cold plate to ensure wetted metal compatibility
Size (L x W x H)	13" x 11.0" x 13" (32.x 28 x 32 cm)
Weight	28 lbs (12.7 kg) with basic options
Power Input	Universal: 100-240 VAC, 50/60 Hz, 7-5 A max
Communications	Keypad, RS232, RS485, Ethernet or TTL
Alarms	Temperature, fluid level, system or component failure
Standards	TUV listed to UL, CAN/CSA and EN 61010-1, CE 61010-1

# ThermoCube II 650 watt chiller

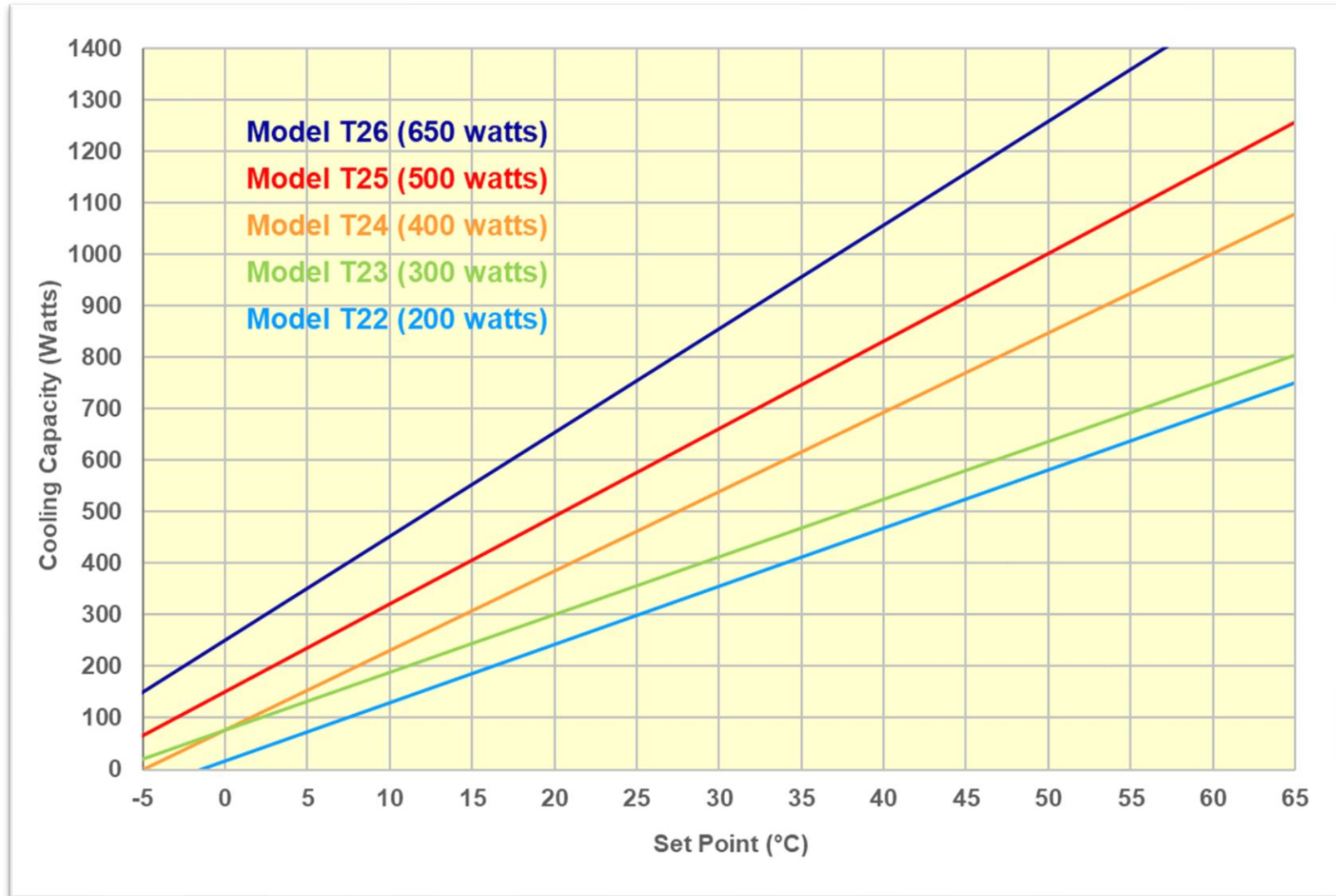
**30% more cooling capacity than the previous highest capacity model**



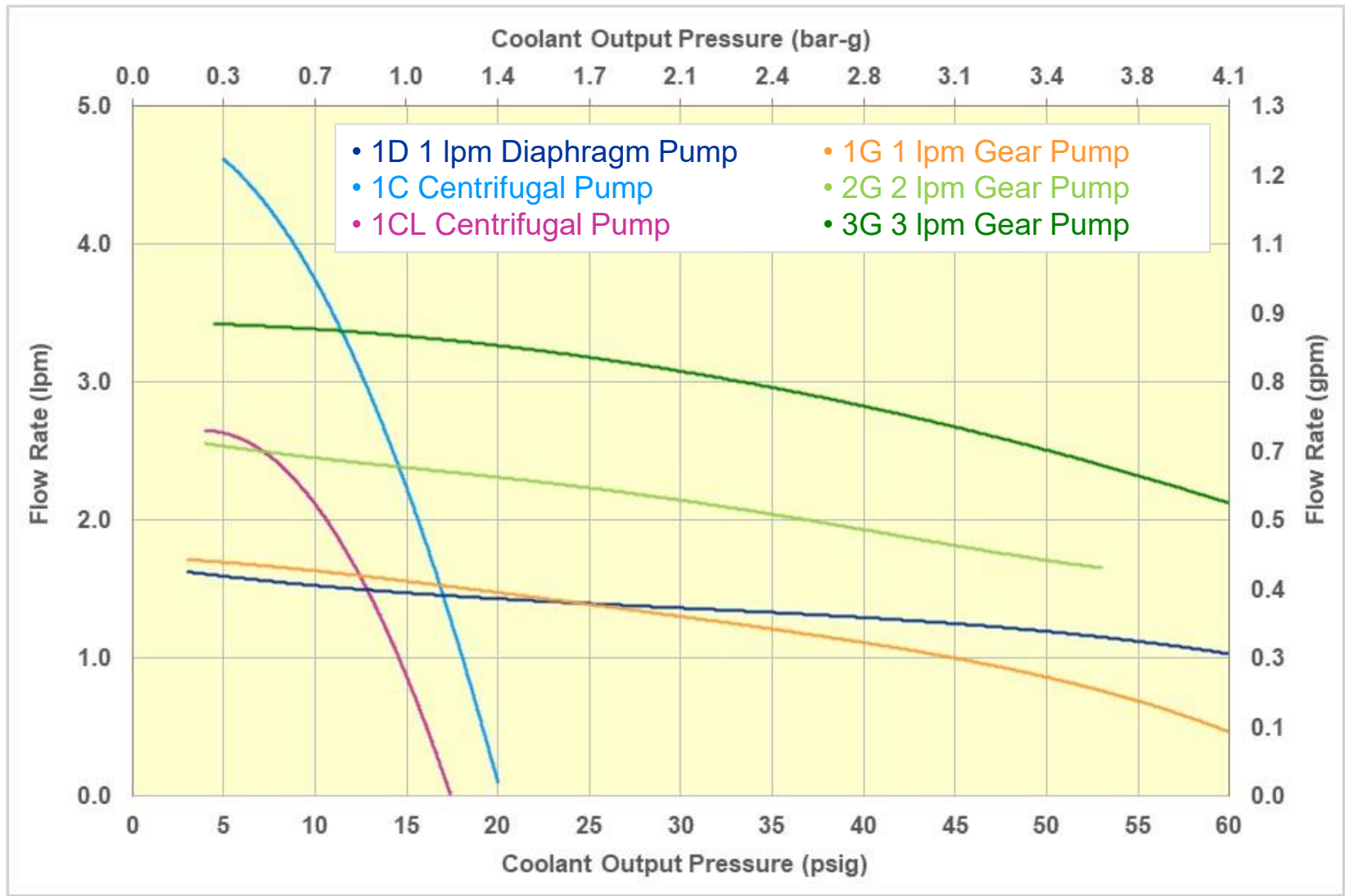
## SPECIFICATIONS

Operating Range	5°C to 50°C (extendable to -5°C to 65°C with -LT and -HT)
Ambient Temperature	10°C to 40°C non-condensing
Stability / Repeatability	± 0.05°C at constant load (even near ambient)
Cooling Capacity	650 watts @ 20°C (20°C ambient)
Noise (at 1 meter)	< 50 dBA (with 50% load), < 63 dBA (with full load)
Coolant / Process Fluid	Koolance (27% propylene glycol / water mix) or 27-50% ethylene glycol / water mix. Options available for Fluorinert / Galden or alternate fluids
Process Fluid Fittings	John Guest, CPC, APC, swage or FNPT
Pumps	Centrifugal or Gear pump
Tank Volume	300 ml with level sensor (or 900 ml stainless tank)
Wetted Materials	Aluminum cold plate (stainless steel cold plate planned)
Size (L x W x H)	14.5" x 11.0" x 13" (36.x 28 x 33 cm)
Weight	33 lbs (15 kg) with basic options
Power Input	Universal: 100-240 VAC, 50/60 Hz, 7-5 A max
Communications	Keypad, RS232, RS485, Ethernet or TTL
Alarms	Temperature, fluid level, system or component failure
Standards	TUV listed to UL, CAN/CSA and EN 61010-1, CE 61010-1

# Cooling Capacity Curves



# Pump Curves



# Detailed Comparison – Specifications

	Original ThermoCube	ThermoCube II
Available cooling capacities	200, 300, 400 and 500 watts	200, 300, 400, 500, 650 watts
Stability / Repeatability	± 0.05°C	± 0.02°C to 0.05°C (Selectable display precision)
Acoustic Noise	Quieter variable speed fan is a selectable option	Variable speed fan is now standard on all models with software adjustable speed
Process fitting options	JG, CPC, swage, FNPT	JG, CPC, APC, swage, FNPT
Pump options	Diaphragm, Centrifugal or Gear pumps	Diaphragm, Centrifugal or Gear pumps, new 5 lpm pump
Input Power	100-240 VAC, 50/60 Hz Some loss of cooling capacity at 100 VAC	100-240 VAC, 50/60 Hz No degradation of cooling capacity
Dimensions and weight	13" x 11" x 13" / 28 lbs	Same (except for 650 w mod.)
Communications Interface	RS232 (Hex)	RS232 (Hex or ASCII), RS485, Ethernet or TTL
RoHS compliance	Only for custom models	100% RoHS compliant

# Detailed Comparison – System Design

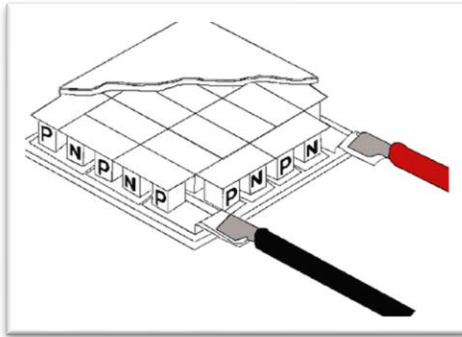
	Original ThermoCube	ThermoCube II
Thermoelectric module configuration	Modules in series, so if one module fails, the chiller fails	Parallel strings of modules, so if a module fails the chiller still runs with reduced capacity
Thermoelectric power	High variable voltage up to 144 VDC	Runs on more standard 24 VDC power
Power Efficiency	variable voltage for improved power efficiency	Still variable voltage
Electrical filtering	Required special inductors and electric filters for both AC and DC power	No unique electrical filtering required
Improved temperature control	12 bit Analog to Digital converter controls to $\pm 0.05^{\circ}\text{C}$	More accurate 22 bit Analog to Digital converter actually controls to $\pm 0.02^{\circ}\text{C}$
Display	LED with no backlight	Blue, with backlit display
Risk of parts obsolescence	Uses many parts selected ~20 years ago. Many parts are end-of-life or obsolete	Utilizes newer, more widely available components to reduce supply chain risk



# Detailed Comparison – Features

	<b>Original ThermoCube</b>	<b>ThermoCube II</b>
Pump speed control	No ability to adjust speed without customization	Max pump speed is configurable
Fan speed control	No ability to adjust	Max fan speed is configurable
Pump off during standby	Requires custom design	Configurable setting
Remote communications mode on display	Not shown on display	Remote mode indicator
Communication commands	Only basic commands available: Set temp, request temp or request alarms	Many more commands added including configuration commands
Communications speed	9,600 baud rate	Configurable as either 9,600 or 57,600 baud rate
Communications protocol	Hex	Configurable as either Hex or ASCII
Audio alarm	No audio alarm	Optional audio alarm
Integrated flow meter	No flow meter option	New flow meter option

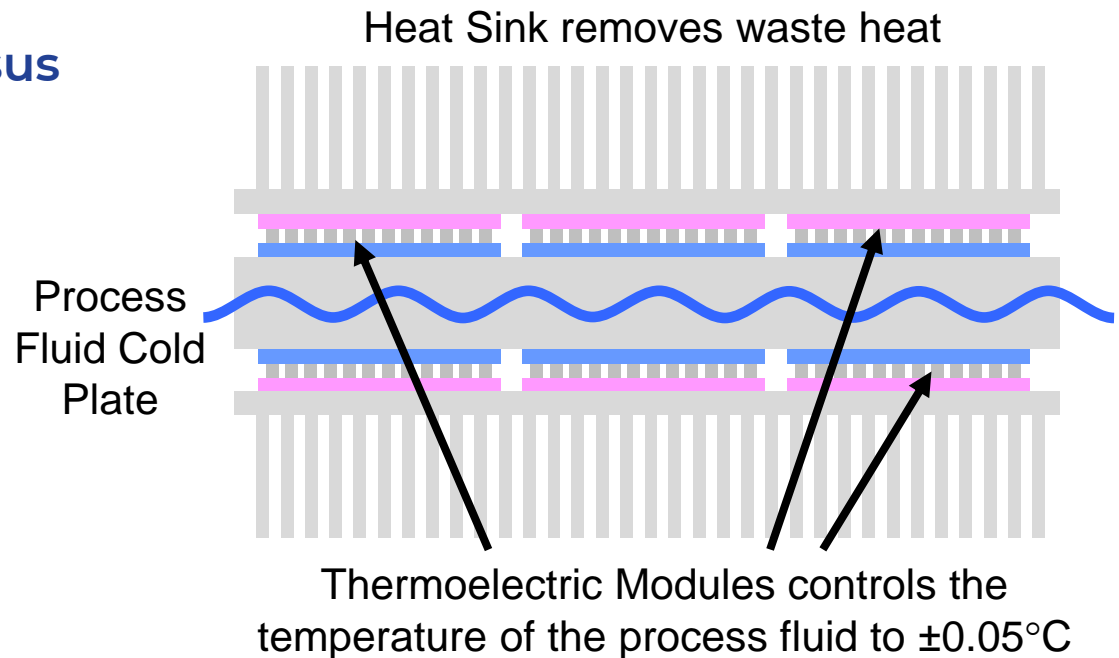
# Why thermoelectric technology?



By utilizing thermoelectric technology, we offer an environmentally friendly alternative to compressor-based chillers. Our chillers are up to 80% more energy efficient and do not use Freon, PFAS chemicals or other forever chemicals.

## Thermoelectric chillers versus compressor based chillers

- ✓ Inherently more reliable
- ✓ No compressor and fewer moving parts
- ✓ More compact
- ✓ Green technology – no harmful refrigerants
- ✓ More energy efficient
- ✓ Quieter operation
- ✓ No maintenance



# Advantages over traditional chillers

	Compressor Chiller	Thermoelectric Chiller
Cooling Engine	Gas compressor	Solid State thermoelectric modules (electrons)
Heating Engine	Heater	Solid State thermoelectric modules (electrons)
Power	Electric motor	Variable output DC power supply
Control Method	Hot gas bypass or pulse on heater (fighting on/off compressor)	Fully adjustable, precise voltage control
Moving Parts	Compressor Hot gas bypass valve Pump Fan	Pump Fan
Gas	HCFC or HFC refrigerants	No refrigerants
Typical Stability	±0.1°C	±0.05°C
Cooling Capacity	Medium to High	Low to Medium
Size / Typical Weight	Large / 75 lbs	Compact / 28 lbs