

DATA CENTER COOLING

AIR-COOLED CHILLER

MECH-iC

COMPACT AIR-COOLED MAGNETIC-BEARING CHILLER
PLATFORM DESIGNED FOR MODERN DATA CENTER
COOLING ENVIRONMENTS



THE AIR-COOLED MAGNETIC BEARING CHILLER

A New Standard for Reliable, Efficient, & Compact Data Center Cooling

Modern data centers are becoming increasingly dense, requiring more cooling capacity within tighter site footprints and more demanding operating conditions. As a result, air-cooled chiller systems must maintain reliable, efficient performance across a wide range of load and ambient conditions.

Mitsubishi Electric's MECH-iC is a mission-critical, air-cooled chiller platform designed for modern data center applications. The system combines oil-free magnetic-bearing compressors, high-efficiency heat exchangers, and fast-restart controls to deliver reliable performance, low maintenance, and predictable operation within a compact footprint.

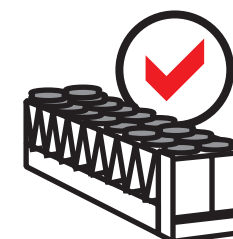
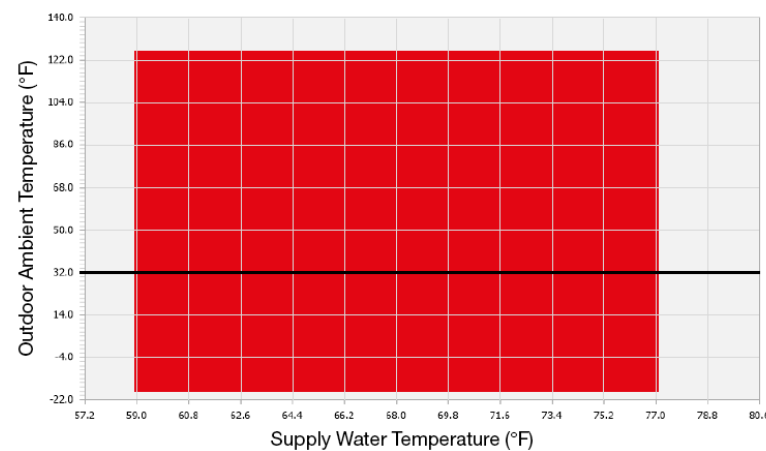
Available in 350 (1.2 MW) and 500-ton (1.75 MW) nominal capacity models, MECH-iC chillers are optimized for 65–75°F chilled-water supply temperatures typical of today's hybrid air- and liquid-cooling environments. It's non-flammable R-515B refrigerant (next gen, A1, low-GWP) simplifies code compliance and supports compact, mission-critical chiller design.



Wide Operating Range

While optimized for 65–75°F supply water temperatures, the MECH-iC covers supply temperatures ranging from ~59–77°F to serve most IT equipment.

Wide ambient temperature operation from -20–125°F means MECH-iC can reliably serve data centers throughout the North American climate.



Fits in a 40' HC Container



Small Footprint

The MECH-iC platform fits more capacity into less space, minimizing hot-air recirculation and improving real-world performance.

The small footprint reduces shipping, crane, rigging, steel, and pad requirements.



25% smaller (10' shorter) than conventional air-cooled chillers

A PURPOSE-BUILT CHILLER SYSTEM FOR THE MODERN DATA CENTER

Resilient & Adaptable Chillers for a Wider Range of IT Cooling Demands & Operating Conditions

Engineered for uptime & operational resilience

- **Oil-free compressor technology** removes the need for oil management
- **Fast restart** function enables rapid cooling recovery following power interruptions
- **Independent heat-tracing freeze protection** protects piping during shutdown, maintenance, and idle conditions
- **Controller backup options** maintain control operation during power interruption
- **Built-in diagnostics and multi-level alarm management**
- **Stable operation** across varying load and ambient conditions
- **Mitsubishi Electric preventative maintenance** available for additional uptime and service continuity



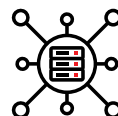
Minimum consumption, maximum performance

- **Series flooded evaporators** improve temperature matching and reduce compressor lift
- **The R.E.D. Cooler's dedicated subcooling solution** lowers energy use across varying load levels and ambient temperatures, leaving more facility power for IT equipment
- **V-block microchannel coils and Ø36" EC fans** deliver high heat rejection and low power demand to reduce generator and electrical infrastructure requirements
- **Smart current limiting** minimizes startup electrical demand
- **Harmonic mitigation** improves power quality
- **Oil-free magnetic bearing compression** enables efficient and stable operation at warm evaporating temperatures with precise capacity modulation



Simplified planning, configuration, & integration

- **Open protocol integration** for connection to facility control and monitoring systems
- **Energy monitoring** for system visibility and optimization
- **Different acoustic layouts** for data centers near population-dense areas
- **Compact footprint** and shorter length than chillers of similar capacities for constrained site layouts, reducing pad, steel, and crane requirements
- **Accessible V-block layout** simplifies inspection and coil cleaning
- **Coil protection treatments** to withstand harsh environmental conditions
- **Completely customizable**



More Cooling Capacity in Less Space

The patented R.E.D. Cooler separates subcooling from the main condenser, creating a dedicated second stage for heat rejection. This frees up the main condenser to focus on converting refrigerant to liquid while lowering condensing pressures to reduce system workload.

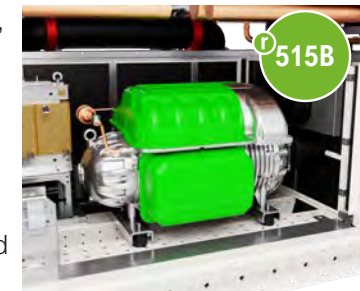
With each coil optimized for its specific function, the technology allows for smaller compressors without sacrificing cooling capacity.

R.E.D. Cooler
Reduced Exergy Depletion



Oil-Free Efficiency and Sustainability

- **Synchronous motor**—direct drive, eliminates gearbox losses
- **Magnetic bearings**—frictionless, oil-free operation, longer life
- **2-stage centrifugal compressor**—high efficiency, compact design, large capacity
- **Inlet guide vanes (IGV)**—optimized part-load performance



- **Soft start**—low inrush current, smooth ramp up, grid friendly
- **Low GWP R515B refrigerant**—supports evolving environmental requirements without sacrificing cooling performance
- **Non-flammable A1 refrigerant**—classification simplifies handling and site integration

Series Evaporators for Warm-Water Systems



The MECH-iC evaporators are run in series, splitting the temperature drop into two stages to improve temperature matching between water and refrigerant.

This maintains a higher average evaporating temperature and low approach temperature across the heat exchanger, reducing compressor lift and energy consumption, while delivering greater efficiency in warm-water, high ΔT cooling architectures.

CORE TECHNOLOGIES

FAN SECTION

- Highly efficient **Ø36 inch EC fans** provide high airflow and heat rejection
- Sound emissions can be improved with fan diffusers and fan plenum



MICROCHANNEL COIL

- Maximize heat exchange surface in a compact package with **microchannel coil** technology
- Reduced refrigerant charge requirements
- **R.E.D. cooler patented solution** improves the thermodynamic cycle increasing both efficiency and cooling capacity



R.E.D. Cooler
Reduced Exergy Depletion

ELECTRICAL COMPONENT DESIGN

- Separated control and power compartments for simplified service access
- Trunk-style door helps protect technicians in outdoor service conditions
- Ventilated compartment design supports reliable operation in demanding environments



Drawing on decades of cooling expertise, MECH-iC is engineered to maintain efficient and stable operation under today's demanding data center conditions.

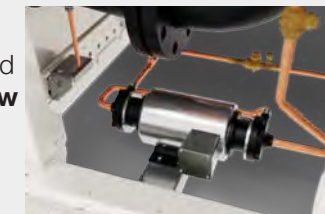
V-BLOCK COIL LAYOUT

- Optimized layout delivers more cooling in less space
- **Removable side shields** make cleaning and maintenance easy



LOW LIFT PUMP

- Maintains refrigerant flow at very low lift
- Ideal for high leaving water temperatures since it **extends the compressor operating envelope**
- Improved operating stability and reduced nuisance trips **in low ambient and high**

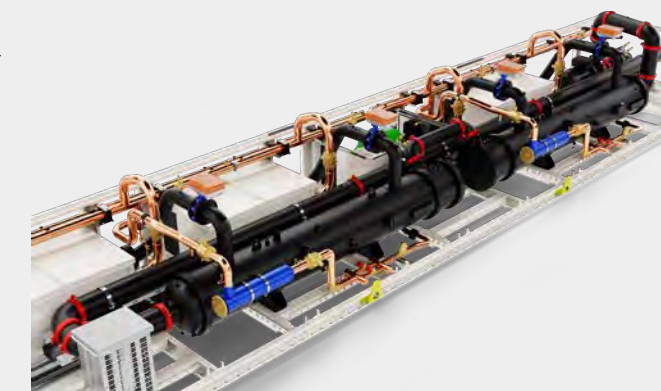


SERIES EVAPORATORS

- State of the art flooded evaporators, in series, **maximize cooling efficiency**
- Improved temperature matching and **reduced compressor energy consumption**
- Optimized for modern data center operating conditions

OIL-FREE CENTRIFUGAL COMPRESSORS

- Low vibration, direct-drive design **reduces mechanical complexity and wear**, improving long-term reliability
- **Integrated variable speed drive** provides smooth start-up with reduced inrush current
- Oil-free magnetic bearings eliminate oil maintenance and performance degradation
- Multi-circuit, multi-compressor architecture supports fault isolation and improved turndown through staged capacity control



MECH-iC TECHNICAL DATA

mitsubishicritical.com/data-center-cooling-solutions/chillers/#technical-documents

COMPREHENSIVE CONTROL & FULL SYSTEM OPTIMIZATION

Technology without coordination leaves efficiency on the table. MECH-iC was developed as a complete package, with all components working in concert, to optimally match today's data center conditions.

MECH-iC's intuitive onboard control system allows operators to set parameters that align with IT equipment needs, site goals for water and power use, and individual unit or grouped optimization to efficiently address cooling demands.

With open BMS protocol integration (Modbus, BACnet, MS/TP & IP, SNMP, etc.), the chiller pairs perfectly with other hybrid-air or liquid-cooled equipment in the data center's cooling system and connects to the central management software of your choosing.



Interface Functions

- **Automatic capacity and small-step temperature adjustments**
- **Built in protection** logic for safe operation under all conditions
- **Real-time visibility** of temperature, pressure, and system status
- **Alarm and event logs, system diagnostics, and performance trending**

Multi-Chiller Group Control

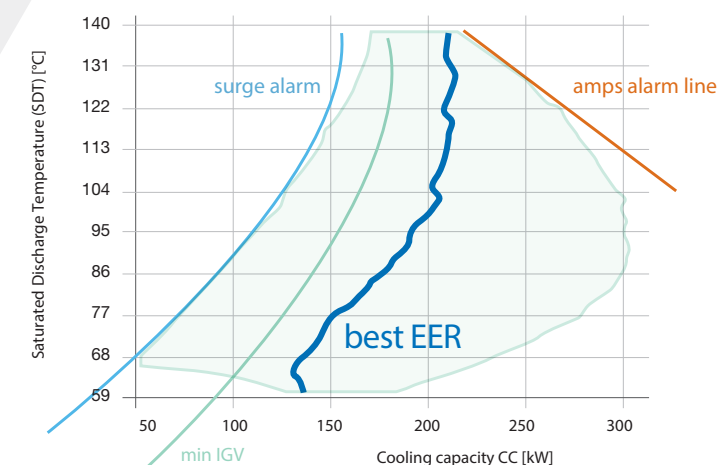
- **Embedded group control logic** for seamless connection between chillers (up to eight)
- **Automatic or manual staging and sequencing** with dynamic master selection
- **Smart load distribution** balances loads and runtime across all units
- **Staggered compressor startups** prevent current peaks
- **Supports N+1 and N+2 redundancy** with no single point of failure



PAIR WITH MEWALL THERMAL WALL UNITS

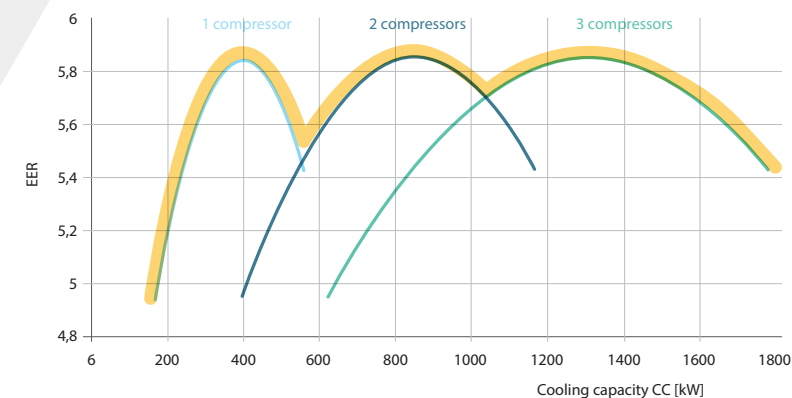
mitsubishicritical.com/data-center-cooling-solutions/thermal-wall-cooling/

MECH-iC can be paired with state-of-the-art MEWALL thermal wall units as part of a modern chilled water cooling approach for high-density data center environments.



Stable Performance Throughout the Operating Envelope

Control logic continuously manages compressor operation across varying load and ambient conditions to maintain stable performance and help avoid surge and overcurrent conditions during startup, operation, and shutdown—**always working** within the limits of “surge” and “amp” alarms.



Maintaining High Efficiency Across Load Conditions

Intelligent compressor staging helps maintain high operating efficiency across varying cooling loads by keeping compressors operating within their most efficient range during part-load conditions.

CUSTOMIZATION & ADD-ONS

Hydronic Pump Options: Factory-integrated pump kit with native Variable Primary Flow (VPF) control logic designed to maintain stable flow, reduce pump energy, and simplify deployment

- External Pump Control
- Integrated Pump Kit – Low Head or High Head



Dual Power Supply with Automatic Transfer Switch (ATS): Automatic transfer switch between utility and generator ensuring continuous operation during power interruptions

Control Power Backup Options: Maintain controller power during outages and ride through short disturbances, preventing unnecessary restarts and minimizing reboot time

- Internal battery backup (≈20–30 minutes) or UltraCap® stored energy (≈7–8 minutes)



Energy Monitoring Options: Gain visibility into cooling output and electrical consumption for performance optimization and BMS integration

- Electrical Energy Meter with Modbus RS-485 Output or integrated with Unit Controller
- Cooling Energy Meter (BTU) or Flow Meter



Active Harmonic Filters: Improves power factor, reduces electrical distortion to near zero, and enhances reliability and grid compliance

Condenser Fan Options: Fan Discharge Diffusers (field-installed) reduce outlet swirl, recirculation losses, and sound levels



Evaporator Options: Marine Water Box allows evaporator cleaning without disconnecting water or refrigerant piping, reduces service time and complexity, improves long-term reliability



Condensing Coil Construction & Protection Options:

- E-coated Microchannel Coil (MCHX)
- Copper Tube/Aluminum Fin Coil or with Pre-Painted Aluminum Fin Coil
- Blygold Corrosion Protection Coating

TECHNICAL DATA

		350T	500T
COOLING CAPACITY ^{1 2}			
Gross Cooling Capacity	kW (RT)	1,207 (343)	1,768 (503)
EFFICIENCY ¹			
Total Power Input	kW	305	456
Coefficient of Performance	kW/kW	3.95	3.88
kW/RT Ratio	kW/RT	0.89	0.907
SERIES EVAPORATOR			
Type		Flooded	Flooded
Quantity		2	2
Water Flow Rate ¹	GPM	516	757
Evaporator Water Volume	GAL	57	91
Minimum Required System Volume	GAL	1,321	1,321
Connection Size	in	5"	6"
CONDENSER FANS			
Type	in	36" Axial EC	36" Axial EC
Number of Fans		16	20
COMPRESSORS			
Type		Centrifugal	Centrifugal
Number of Compressors		2	4
Refrigerant Circuits		2	4
Refrigerant		R515B	R515B
Factory Refrigerant Charge	lbs	1,499	1,896
SOUND ³			
Sound Power Level (LwA)	dB(A)	108	107
Sound Pressure Level (LpA)	dB(A)	75	74
ELECTRICAL			
Power Supply	V / Ph / Hz	460V / 3Ph / 60Hz	460V / 3Ph / 60Hz
Full Load Amps ¹	A	537	1,018
PHYSICAL			
Dimensions	ft	31.2' x 7.41' x 8.20'	31.2' x 7.41' x 8.20'
Operating Weight	lbs	23,589	30,865

¹ Performance based on 66°F/82°F (18.9°C/27.8°C entering/leaving water temperature and 108°F (42°C) ambient temperature using 100% water.

² AHRI 550/590 Certified.

³ Sound data based on ISO 9614.

CONTACT US TO SEE MECH-iC CONFIGURED FOR YOUR APPLICATION

mitsubishicritical.com/data-center-cooling-solutions/chillers/#contact



CRITICAL POWER SOLUTIONS

547 Keystone Drive Suite 300, Warrendale, PA 15086

Phone: 800-887-7830 **Email:** cpssales@meppi.com

MitsubishiCritical.com

