



BMQC Series | Liquid Cooling Quick Disconnects

BACKGROUND

The rapid growth of Artificial Intelligence (AI) is pushing data center servers to new performance limits, generating heat levels that traditional air-cooling can no longer manage effectively. Liquid-cooling technology, with its superior heat-dissipation capabilities, is now the preferred solution for high-density server environments. To meet this demand, connectors must deliver high performance in a compact, reliable, and service-friendly design.

PROBLEM

Modern AI server designs are highly compact, leaving minimal space for liquid-cooling infrastructure. Connectors in these systems must be engineered with a reduced footprint while allowing high-volume coolant flow to efficiently remove heat. They must also maintain exceptional sealing performance to prevent leakage, as even minor coolant loss can result in costly equipment damage, downtime, and safety hazards. In addition, these connectors must withstand repeated mating cycles, variable pressures, vibration, and potential exposure to corrosive fluids while ensuring consistent thermal and mechanical performance over their service life.

AIO SOLUTION

Amphenol Industrial Operations has developed the Blind Mate Quick Connector (BMQC) series to meet these challenges. Designed in accordance with the Open Rack V3 Blind Mate Quick Connector Specification (BMQC) Revision 1.0, the BMQC is purpose-built for critical liquid cooling interfaces between data center rack servers and distribution manifolds. Its design accommodates ± 5 mm radial misalignment and $\pm 2.7^\circ$ angular misalignment, enabling smooth blind-mate engagement in high-density configurations. The internal geometry is optimized to maximize coolant throughput while minimizing pressure drop, ensuring efficient heat removal without compromising system performance. Every coupling is 100% helium-leak tested to verify zero-leakage integrity, and corrosion-resistant materials and surface treatments are employed to ensure long-term durability. The quick-connect, tool-free design simplifies installation and maintenance, reducing service times and improving system uptime.

The AIO BMQC is a proven, high-performance solution for modern data center cooling systems, delivering the reliability, serviceability, and thermal efficiency required to support the next generation of AI-optimized server deployments. For additional technical information, please contact Amphenol Industrial Operations.