



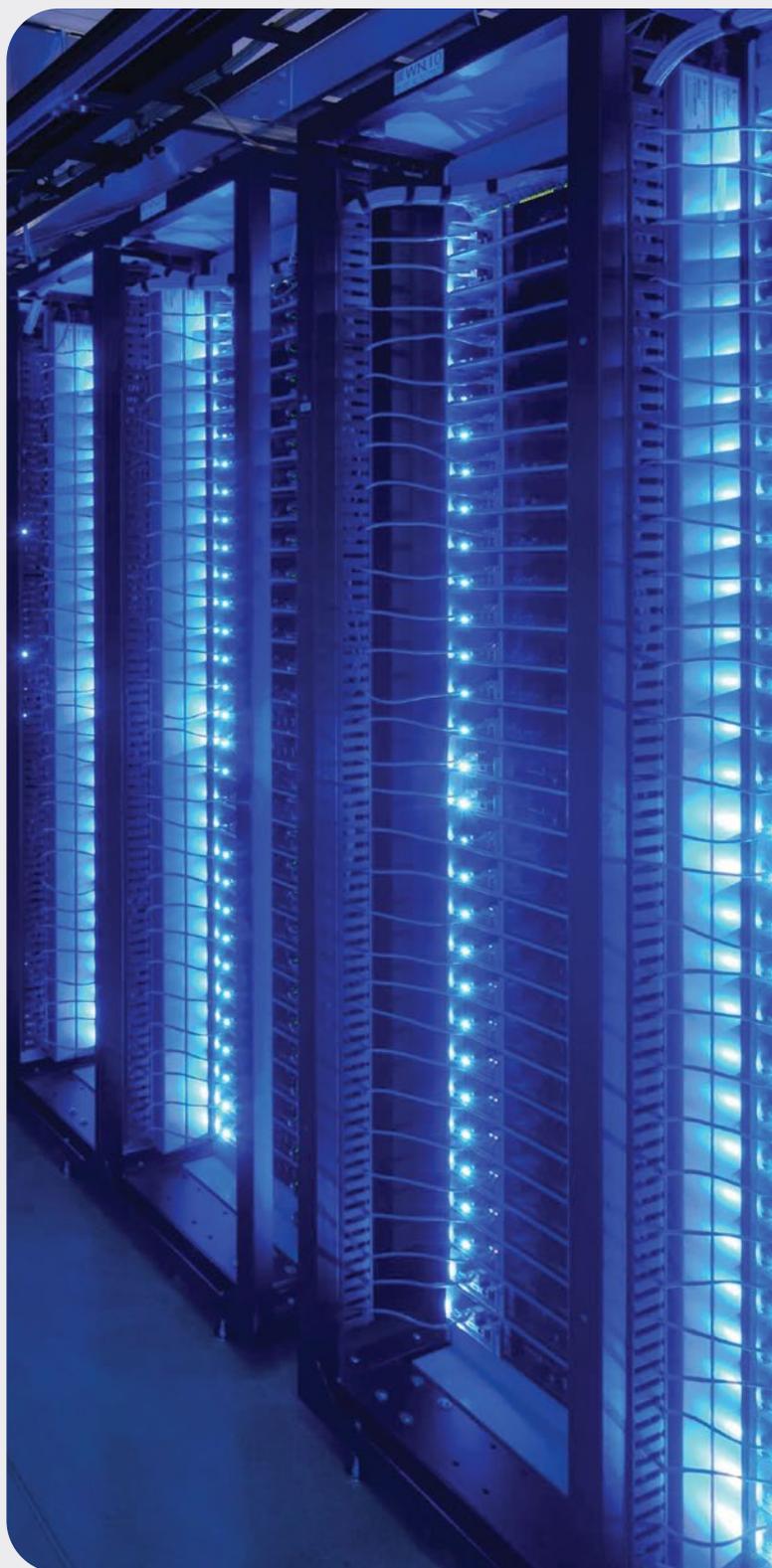
# Data center liquid cooling

Liquid cooling solutions, designed specifically to meet the growing demands of today's data center.



## 30 years

Danfoss has been setting the standard in liquid cooling for over 30 years.



# Why liquid cooling?

For increased performance, energy efficiency and cost savings, there is simply no substitute for direct-to-chip liquid cooling. No other system unlocks the full potential of your data center while simplifying installation and maintenance like Danfoss fluid conveyance solutions.

## Energy sustained

Danfoss' direct-to-chip liquid cooling improves data center Power Usage Effectiveness (PUE) by efficiently and cost-effectively removing heat emitted by a server processor.

## Performance unleashed

The thermal efficiency and reduced space requirements of liquid cooling enables increased chip density, unlocking your data center's full potential. Danfoss' hoses and connectors route coolant from the source to the chip, keeping your high-performing processors running smoothly, even during peak loads. That means consistent computing power and increased performance when you need it most.

## The power of Water

It's better at  
**cooling**

**1,000x**  
more cooling capacity

**25x**  
better heat transfer

**10x**  
less energy use

It's better for your  
**business**

**40%**  
energy use reduction

**Greater**  
chip density, with fewer racks

**Easier**  
to maintain than immersion  
cooling

It's better for the  
**environment**

**Smaller**  
carbon footprint

**Minimal**  
water use

**Reduced**  
refrigeration

# The Danfoss way

For decades, our fluid conveyance experts have helped shape and evolve the direct-to-chip liquid cooling market, delivering high-performance source line and rack cooling solutions, while keeping ease of installation and service a priority.





# 40%

Up to 40% energy use reduction with water cooling

### One partner, every solution

Danfoss has a comprehensive portfolio of premium fluid conveyance products to meet your thermal management system needs. With products designed to work in concert, we'll deliver everything you need for a high-performing source-to-rack cooling solution.

### Creative design solutions are our specialty

With optional configurations, Danfoss' fluid conveyance solutions offer the flexibility you need to design the ultimate data center. Our products are designed to work in tight spaces to simplify installation and maintenance, ensuring your cooling system operates efficiently.

### Making cutting-edge simple

Peace of mind and resiliency — that's what Danfoss liquid cooling systems bring to your data center design. Whether it's hoses with the highest-level flame rating available (UL94 V0), or individually leak-tested dry-break couplings, Danfoss delivers market-leading technology optimized for performance and reliability.

### Experts everywhere

We are your liquid cooling experts. We pioneered leak-free, quick disconnect technology with IBM decades ago and remain at the forefront of the industry today. And with a global team embedded in all major regions of the world, our extensive knowledge ensures each customer has what they need to be successful.



**OPEN**  
Compute Project  
SOLUTION PROVIDER®

## A member of OCP

Danfoss is a Solution Provider of the Open Compute Project (OCP), a collaborative, community-focused organization working to standardize the design and performance of all hardware for small- to hyper-scale data centers. We're not just meeting the industry standard; we're helping set it, both today and into the future.

Data center liquid cooling: Source line solutions

# Making connections you can count on

From main supply lines to single point connections, Danfoss provides the hardware to make your software work.



Danfoss Hansen®  
FD83 Series  
Full-flow dual-interlock  
coupling

An industry standard, our stainless steel FD83 has been supporting data center liquid cooling reliably for decades.



Danfoss FF4514 and FF4521  
90° Swivel Adapter Families  
Specifically developed for  
liquid cooling hose assembly  
connection.



↕ To data center  
Cooling  
Distribution  
Unit (CDU)



Boston by Danfoss  
Royal™ EHW194 EPDM hose  
Engineered for durability and  
ease of use, EHW194 hoses  
feature industry-leading safety  
ratings, superior kink resistance  
and long-lasting performance.



Fluid compatibility



Full flow



Ease of use



Reliability

# Source line solutions

Every data center has different requirements. Our range of fluid conveyance solutions enable you to engineer the safest and most efficient thermal management system for your data center.

Couplings			
<ul style="list-style-type: none"> <li>• Leak-free and corrosion resistant.</li> <li>• 100% helium-leak tested.</li> <li>• FD83 patented locking mechanism ensures parts cannot be disconnected while liquid is flowing.</li> <li>• FD83 offers unlimited configuration options, eliminating extra clamps or additional components.</li> </ul>			
FD83 series Full-flow dual-interlock coupling Stainless steel		<ul style="list-style-type: none"> <li>• 303 Stainless steel or engineered plastic</li> <li>• Standard seal material: EPDM</li> <li>• "Patented" locking pin design and lever handle</li> <li>• Identical coupling halves</li> </ul>	<ul style="list-style-type: none"> <li>• Highest flow and low spillage</li> <li>• 100% helium leak tested</li> <li>• Size: 1" and 2"</li> <li>• Port Connections: 3/4", 1" and 2"</li> </ul> Pairs with: • EHW194

Hoses			
<ul style="list-style-type: none"> <li>• Full, unrestricted flow and excellent kink resistance.</li> <li>• Multiple size and specification options to meet your requirements.</li> <li>• Hoses with UL94 V0 rating — leads the industry.</li> <li>• Tested with wide range of industry standard coolant solutions to ensure compatibility with corrosion inhibitors, eliminating contamination and ensuring long life.</li> </ul>			
Boston Royal EHW194 Rubber hose		<ul style="list-style-type: none"> <li>• EPDM tube and cover, two-ply textile reinforcement</li> <li>• UL 94 V-0 rated</li> <li>• Smooth, kink resistant hose with tight bend radius for routing</li> <li>• Qualified with push-on &amp; crimp fitting options</li> </ul>	<ul style="list-style-type: none"> <li>• Multiple color options</li> <li>• Operating temperature: -40°C to +140°C (-40°F to 284°F)</li> <li>• Sizes -4 through -32 (except -5)</li> <li>• 16 bar (232 psi)</li> <li>• Available with thin-wall: smaller diameter for improved flexibility and lower bending radius</li> </ul>

Assembly solutions			
Socketless Fittings		<ul style="list-style-type: none"> <li>• Brass or stainless steel</li> <li>• Configurable end connections available</li> <li>• No tools needed</li> <li>• No clamps required</li> </ul>	<ul style="list-style-type: none"> <li>• Qualified with EHW194 hoses</li> </ul>
Sanitary Crimp Fittings		<ul style="list-style-type: none"> <li>• Stainless Steel</li> <li>• Sizes: -16 to -32</li> <li>• No clamps required</li> </ul>	<ul style="list-style-type: none"> <li>• Qualified with EHW194 hoses</li> </ul>

Adapters			
90° Swivel Adapters		<ul style="list-style-type: none"> <li>• Swivelling functionality for easy and fast connection</li> <li>• Available for different hose sizes and port threads</li> <li>• 304 stainless steel material provides broad fluid compatibility</li> </ul>	<ul style="list-style-type: none"> <li>• Standard seal material: EPDM, additional material available on request</li> <li>• Operation temperature range: -3°C min (26.6°F), 60°C max (140°F)</li> <li>• 100% of production parts are helium leakage tested</li> <li>• Production related QR code for easy traceability</li> </ul>

Data center liquid cooling: Inner rack solutions

# Solutions to your liquid cooling challenges



**Danfoss Hansen OCP UQD (Universal Quick Disconnect)**  
Designed for high flow rate and no spillage, the UQD coupling is perfect for in-rack applications with smaller hose lines.

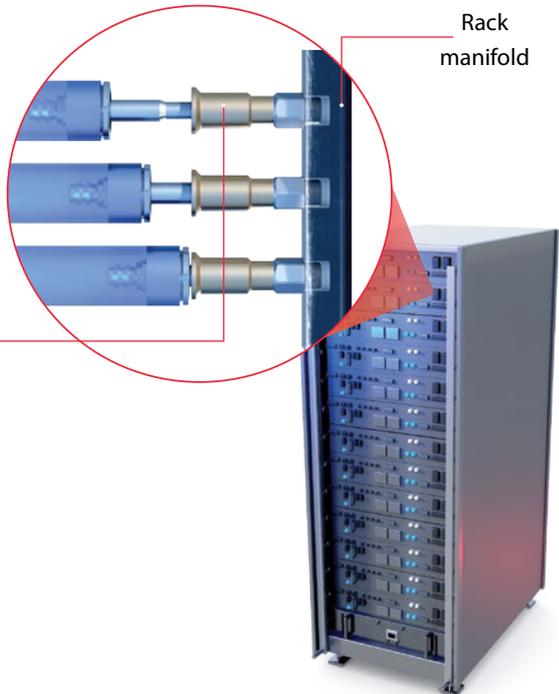


**Boston by Danfoss Royal™ EHW194 EPDM hose**  
Engineered for durability and ease of use, EHW194 hoses feature industry-leading safety ratings, superior kink resistance and long-lasting performance.

**Danfoss Hansen OCP ORV3 BMQC**  
The Blind-Mate's self-centering design offers misalignment compensation, ensuring simple and secure connection between the blade and rack manifold.



**Danfoss Hansen OCP UQD Blind-Mate**  
Offers a self-alignment feature to help connect in location with limited access or visibility and guarantees 100% helium-leak testing on every coupling.



# Rack and server solutions

Danfoss' direct-to-chip cooling solutions extend into the racks through efficient routing of flexible, kink-free hoses, and leak-free, helium-tested couplings.

Couplings				
<ul style="list-style-type: none"> <li>No-leak, no-drip designs.</li> <li>Corrosion-resistant anodized aluminum, stainless steel or composite plastic options.</li> <li>Deliver high flow and low pressure drop.</li> </ul>				
OCP ORV3 BMQC Hands-free self-centering quick disconnect coupling		<ul style="list-style-type: none"> <li>303 stainless steel</li> <li>EPDM seal</li> <li>Self-centering design with radial, angular and axial misalignment compensation</li> <li>Designed for hands-free connection</li> </ul>	<ul style="list-style-type: none"> <li>Interchange meets OCP standard</li> <li>100% helium-leak tested</li> <li>Sizes: 3mm</li> </ul>	Pairs with: • EHW194
UQD Universal quick disconnect coupling		<ul style="list-style-type: none"> <li>303 and 304 stainless steel</li> <li>EPDM seal</li> <li>Push-to-connect design</li> <li>Meets OCP performance specifications</li> </ul>	<ul style="list-style-type: none"> <li>High flow and no spillage</li> <li>100% helium leak tested</li> <li>Sizes: UQD02, UQD04, UQD06, UQD08</li> </ul>	
UQDB Universal quick disconnect blind-mate		<ul style="list-style-type: none"> <li>303 stainless steel</li> <li>EPDM seal</li> <li>Meets OCP performance specifications</li> </ul>	<ul style="list-style-type: none"> <li>Blind-connection thanks to self-alignment feature with radial compensation of 1 mm</li> <li>Sizes: UQDB02, UQDB04, UQDB06, UQDB08.</li> </ul>	
MQD & MQDB		<ul style="list-style-type: none"> <li>Stainless Steel 304 material and EPDM seals</li> <li>Designed for data center server cooling application</li> <li>Color identification (red and blue) for hand mate MQD</li> </ul>	<ul style="list-style-type: none"> <li>Available in 3 different sizes (MQD02, MQD03, MQD04)</li> <li>All parts are 100 % helium-leak tested</li> <li>Operating temperature: -40° C to +150 ° C (-40°F to 302°F)</li> </ul>	

Hoses				
<ul style="list-style-type: none"> <li>Hoses with UL94 V0 rating — leads the industry.</li> <li>Best-in-class rubber hoses and thermoplastic tubing form into shape for easier routing and perfect fit, while maintaining flexibility during installation.</li> </ul>				
Boston Royal EHW194 Rubber hose		<ul style="list-style-type: none"> <li>EPDM tube and cover, two-ply textile reinforcement</li> <li>UL 94 V-0 rated</li> <li>Smooth, kink resistant hose with tight bend radius for routing</li> <li>Qualified with push-on &amp; crimp fitting options</li> </ul>	<ul style="list-style-type: none"> <li>Multiple color options</li> <li>Operating temperature: -40°C to +140°C (-40°F to 284°F)</li> <li>Sizes -4 through -32 (except -5)</li> <li>16 bar (232 psi)</li> <li>Available with thin-wall: smaller diameter for improved flexibility and lower bending radius</li> </ul>	

# Refrigerant solutions

Always innovating and evolving to deliver the latest in liquid cooling technology, Danfoss' refrigerant solutions meet the needs of the next generation of data center.

Hoses			
GH001 & EZ Clip Fittings		<ul style="list-style-type: none"> <li>• Thermoplastic veneer lining with elastomeric tube, synthetic elastomer cover, textile reinforcement</li> <li>• Lowest permeation assembly on the market</li> <li>• Maximum kink resistance and qualified at full vacuum</li> </ul>	<ul style="list-style-type: none"> <li>• R134a, R1234yf, R407C, R404A, R12, 1234ze, 1233zd and other refrigerants</li> <li>• Sizes: -4, -6, -8, -10, -12, -16</li> </ul>
EverCool EC007 hose		<ul style="list-style-type: none"> <li>• Ultra-low permeation</li> <li>• Qualified with the newest industry refrigerants</li> <li>• Greater fracture and kink resistance</li> </ul>	<ul style="list-style-type: none"> <li>• Standards and certifications: Exceeds SAE J3062 (Type G) and SAE J2064</li> <li>• Sizes: -6 to -14</li> <li>• Pressure: 35 bar (500 psi)</li> <li>• Operating temperatures: -40 °C to 135 °C (-4 °F to 275 °F)</li> </ul>
EverCool GH055 hose		<ul style="list-style-type: none"> <li>• UL94 -V0 performance for flame resistance</li> <li>• Crimp and clip fitting options for ease of installation and maintenance</li> <li>• Thermoformability for custom routing</li> </ul>	<ul style="list-style-type: none"> <li>• Standards and certifications: Exceeds SAE J3062 and J2064 Type G</li> <li>• Sizes: -6 &amp; -8</li> <li>• Pressure: 26 bar (375 psi)</li> <li>• Operating temperatures: -30°C to 90°C (-22°F to 194°F)</li> </ul>

Couplings			
5400 quick disconnect coupling		<ul style="list-style-type: none"> <li>• Thread together design allows connection and disconnection under pressure</li> <li>• Lock washer and jam nut standard for optional bulkhead mounting</li> <li>• Standard seal material: Neoprene</li> <li>• Dura-Kote™ plating for excellent corrosion resistance</li> </ul>	<ul style="list-style-type: none"> <li>• Sizes: -4, -8, -12</li> </ul>
Dual phase high pressure quick disconnect coupling		<ul style="list-style-type: none"> <li>• Hex flats on larger size (-12)</li> <li>• Bulkhead mounting feature</li> <li>• Available in both brass and stainless-steel versions</li> <li>• Compatible with R1234yf and R515B refrigerants</li> </ul>	<ul style="list-style-type: none"> <li>• Sizes: -4, -8, -12</li> </ul>



# Fluid conveyance solutions for liquid cooling data centers

Efficient • Reliable • Sustainable

## Count on Danfoss' data center experience to help lead the future of data center liquid cooling

Delivering industry-leading solutions with decades of proven performance, Danfoss' global team of fluid conveyance experts continually advance liquid cooling technology to enable the data center of tomorrow.

Danfoss can accept no responsibility for possible errors in catalogues, brochures and other printed material. Danfoss reserves the right to alter its products without notice. This also applies to products already on order provided that such alterations can be made without subsequential changes being necessary in specifications already agreed.

All trademarks in this material are property of the respective companies. Danfoss and the Danfoss logotype are trademarks of Danfoss A/S.

All rights reserved.

**Danfoss A/S**  
Nordborgvej 81  
6430 Nordborg  
Denmark  
[danfoss@danfoss.com](mailto:danfoss@danfoss.com)  
CVR reg. no. 20165715