

Knürr® DCL

Modular Rack Cooling from 6 kW to 60 kW



Emerson Network Power Business-Critical Continuity™ – so your success continues!

Core competencies

- AC Power
- Connectivity
- DC Power
- Embedded Computing
- Embedded Power
- Infrastructure Management & Monitoring
- Outside Plant
- Power Switching & Controls
- Thermal Management
- **Racks & Solutions**
- Services
- Surge Protection

No company, no matter how big or small, can afford business-critical system failures.

Over the years we at Emerson Network Power have acquired unique know-how. Our name represents reliable rack systems, power supply, precision cooling, connectivity and integrated solutions. We can therefore ensure that you gain the maximum benefits from your technology investments.

Thanks to Emerson Network Power's range of technology and extensive competencies, the entire bandwidth of company-wide solutions is supported for today's critical business requirements.

Customers all over the world rely on our support for future-proof investments – because they know that we offer specific innovations around the globe and optimized solutions from one single source – supported by reliable local service and support.

We can ensure the stable operation of your network infrastructure – regardless of whether voice, data or multimedia content is to be transmitted.

This is based on a time-proven, comprehensive portfolio of products, services and systems which supports a multitude of computing, telecommunications, health care and industrial applications. This creates a unique foundation of trust that is only possible by working together with Emerson Network Power.

Our task is to prepare you for the unknown and the unexpected. We will guide you through the dynamic changes occurring in your business environment.

We are also on hand to help you master the challenges this entails and take advantage of the greatest possible benefits of your technology investments. This is what we mean by Business-Critical Continuity.



Knürr® DCL

Modular Rack Cooling from 6 kW to 60 kW

Knürr® DCL is the water-cooled high-performance cooling unit for lateral attachment to server cabinets. The next generation of the legendary Knürr® CoolLoop - with optimized essential features

Modularity

- Two room-neutral architectures for medium to high heat-load density
- Easy to retrofit on site
- Multiple combinations of up to four server racks

Reliability

- N +1 fan redundancy
- Multi-level “fail-safe” controller
- Comprehensive alarm and monitoring functions
- Automatic emergency door opening

Energy efficiency

- Minimized power consumption through EC fans and dynamic fan control
- Long free-cooling times thanks to a generously dimensioned heat exchanger



Knürr® DCL with Knürr® DCM rack



Dynamic air supply through high-performance EC fans

Knürr® DCL-L Closed Loop Cooling Architecture Modular combination possibilities

- Fully contained air flow inside the cabinet or the cabinet row
- No heat load, no air flow in the room, high noise attenuation
- Complete separation of IT equipment from room, accurately controlled cooling air temperature
- No special requirements for the room - raised floor is not required.



Knürr® DCL-L with one Knürr® DCM

*30/34 kW per rack



Knürr® DCL30L frontview



High-density Server Rack cooled by two
Knürr® DCL-Ls

*60/68 kW per rack

Knürr® DCL	Cooling capacity	Height	Height units in Knürr® DCM
DCL 30	30 kW	2,000 mm	42 U
DCL 34	34 kW	2,200 mm	47 U

Knürr® DCL-L

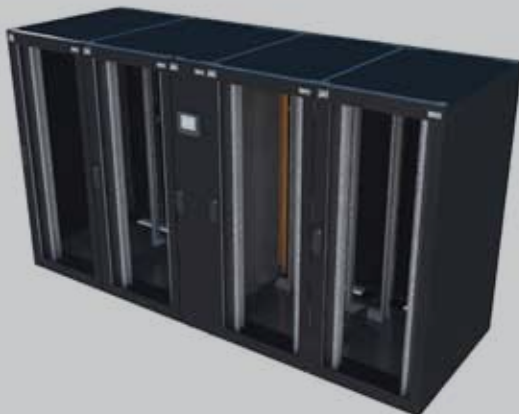


2-1 combination



*15/17 kW per rack

Knürr® DCL-L



4-1 combination



*6/7 kW per rack

* Top view cross-section: air flow pattern

Knürr® DCL-L Hybrid Cooling Architecture

Modular combination possibilities

- “Hybrid” configuration - air flow is contained in the cabinet or cabinet row and room.
- Cooling units and cabinets are open at the front and closed at the back.
- No heat load in the room, warm air remains inside cabinets.
- Distribution of cold air throughout the room, cold air reserve in case of cooling system failure
- Better alternative to hot aisle containment
- No raised floor required

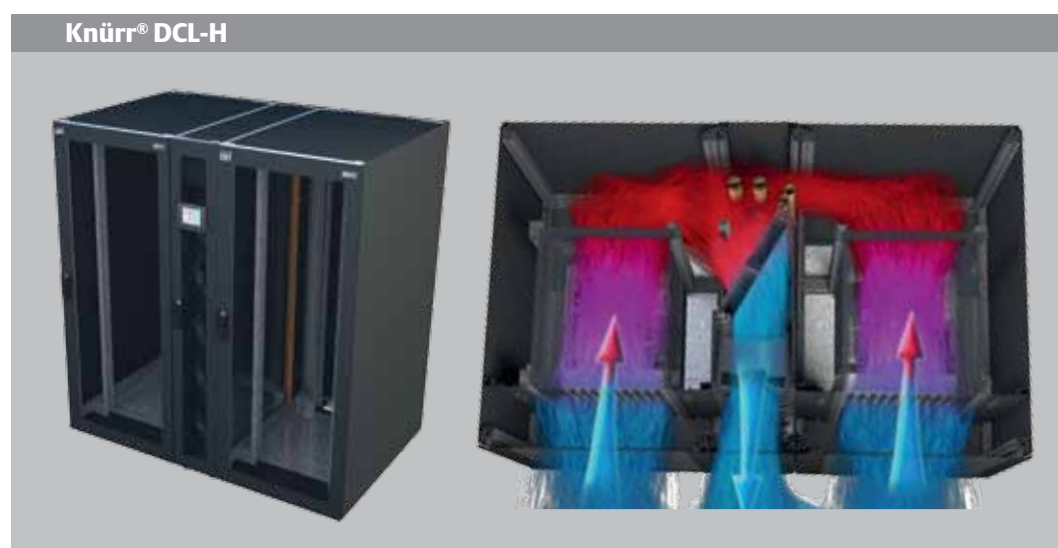


1-1 Knürr® DCL H application

* 30/34 kW per rack



Knürr® DCL- H front view



2-1 Knürr® DCL H application

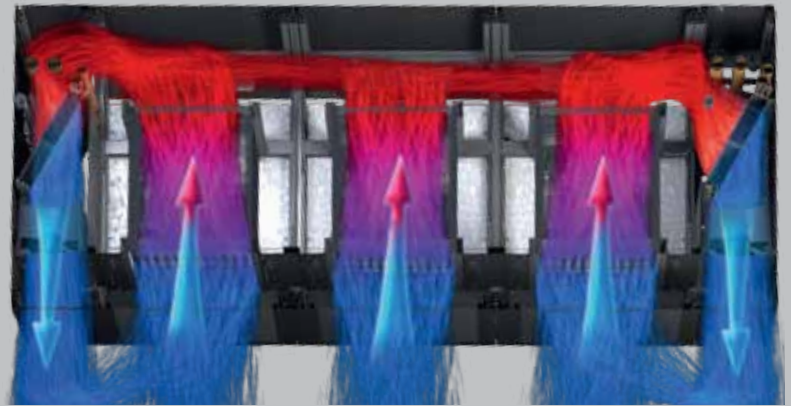
* 15/17 kW per rack

Knürr® DCL	Cooling capacity	Height	Height units in Knürr® DCM
DCL 30	30 kW	2,000 mm	42 U
DCL 34	34 kW	2,200 mm	47 U

Knürr® DCL-H



1-3-1 combination



*8/9 kW per rack for n+1 redundancy

Knürr® DCL-R

- Row cooling units for use in Smart Aisle cold aisle containments
- Alternative to Liebert CRV030/034 when the same controller as in Knürr® DCL-L or Knürr® DCL-H is required.
- Simple conversion to Knürr® DCL-L or Knürr® DCL-H through conversion of doors and replacement of sidepanels



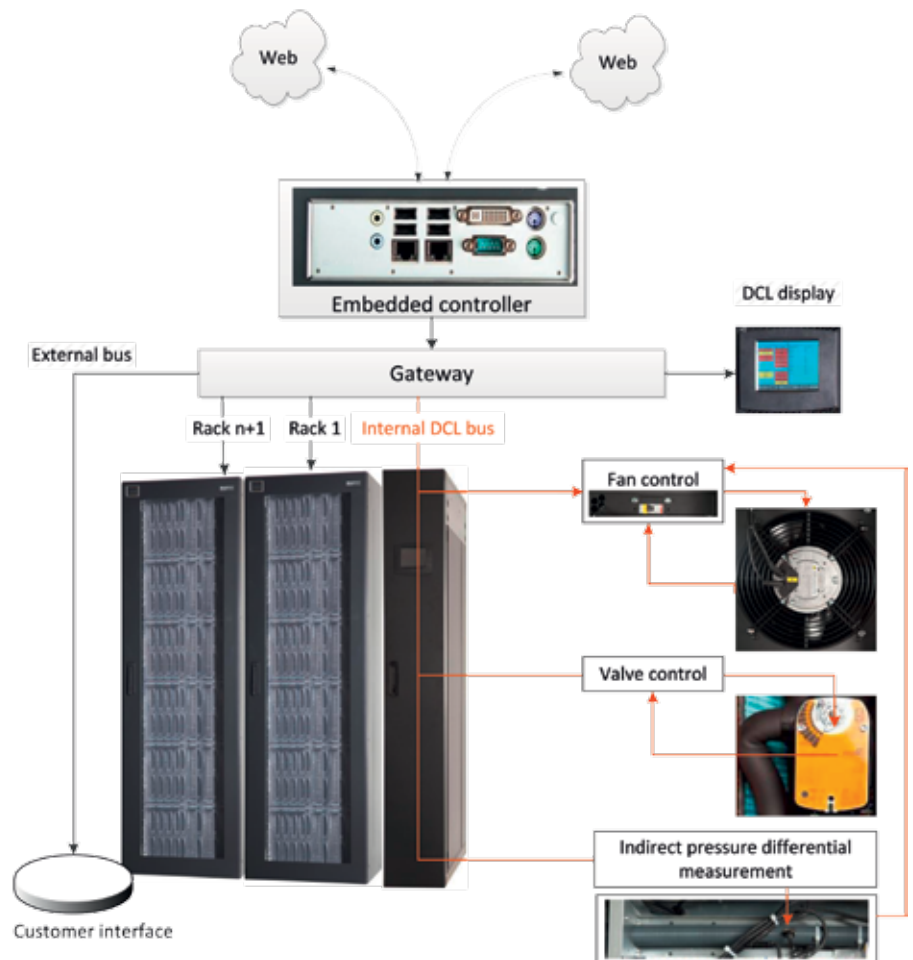
Knürr® DCL-R in row with Knürr® DCM

* Top view cross-section: air flow pattern

Knürr® DCL Availability

An essential requirement for data-center operators is ensuring uninterrupted availability. Knürr® DCL guarantees this by means of the following:

- "Fail-safe" functioning ("safe despite faults") of the control valve: in the event of a power failure or interruption to the control line, the control valve switches the full volume of the chilled water flow to heat exchangers and the fans to full speed.
- Rack cooling controller hardware guarantees autonomous continued operation in the event of a component failure. Components continue to operate in a controlled way in "fail-safe" mode.
- Access control and data security guaranteed by HTTPS and SNMP V3.
- Alarm management can be integrated into DCIM (Data Center Infrastructure Management).
- Rack cooling controller implements the patented concept of regulating fan speeds based on indirect differential pressure measurement.
- Rack cooling controller ensures that all changes made to settings are traceable by means of login and event recording.



Rack cooling controller architecture



Rack cooling controller



Rack cooling controller display output

- Precise control of cooling air temperature and air flow through patented concept
- Even air distribution to all internal IT components
- Even temperature profile in the air supply
- n+1 fan redundancy means that the remaining fans support the volume flow required for cooling in the event of a fan failure.
- In the event of :
 - planned downtime or maintenance
 - or unnecessary cooling power, non-return flaps ensure that hot air can flow from the hot aisle into the data center's cold zone.
- Redundant A/B power supply with automatic operation
- Dual-circuit heat exchanger option ensures redundancy of the water supply if two independent chilled water circuits are installed.
- Optional integration into Knürr® CoolVac systems guarantees leak proofing (patent pending).
- Automatic door opening provides additional overheating protection in case of cooling system failure.



Automatic emergency door opening option for server rack



Non-return flap open



Non-return flap closed

Emerson Network Power Efficiency



Simple fan change



Knürr® DCM server rack for cooling with Knürr® DCL, Liebert® power distribution modules and integrated cable management.

Considering today's competitive market, no data-center operator can ignore the issue of costs. Anyone who only thinks about the upfront costs or who wants to cut costs at the expense of reliability will be left dealing with unpleasant surprises later on. Clever decision-makers will consider Knürr's experience of ensuring low running costs with maximum availability.

- Greater power density in the data center results in better utilization of space and reduced building costs.
- Reduced running costs due to customized operation
- High chilled water supply temperature increases the proportion of free cooling during refrigeration and improves the energy efficiency rating (EER) of the chiller.
- The control valve adjusts cold water volume flow for the current operational situation.
- Low water-side pressure drop leads to reduced pump power consumption.
- Energy cost savings by adjusting the fan speed to the air flow level actually required using the embedded controller

- Low air pressure drop leads to the fans using less power.
- EC fans guarantee energy-efficient operation with maximum performance over the entire range of fan speeds.
- Operator support through the ability to display the "cooling power" efficiency value (ratio of electrical power consumption between servers and fans)
- Future-proof cooling solution: Knürr EC fans already comply with the energy efficiency requirements for CE approval applicable from 2015.
- Cooling power and energy efficiency (fan/pump power consumption for cold water connection) confirmed by independent institutions.

Adaptability



Fans in Knürr® DCL



2-way/3-way valve changeover

- Minimum possible investment for cooling components thanks to the option to use up to four server racks for each Knürr® DCL
- Facilitates data-center upgrade through gradual expansion of the data center with no need to invest further in different cooling infrastructure.
- Can be adapted to different shapes and spaces
 - Heights 2,000 mm and 2,200 mm
 - Depths in 100 mm increments from 1,000 mm to 1,300 mm.
- Same base unit can be used for aisle cooling concepts and rack cooling with minimum conversion cost.
- Simple switchover between 2-way and 3-way valve by means of a ball valve in the bypass line



Detail of Knürr® DCL Data-center Setup

Knürr® DCL

Basic specification, Order table

Knürr® DCL basic specification

Cooling performance/specifications		Knürr® DCL 30 KW	Knürr® DCL 34 KW	
Knürr® DCL for rack cooling		Knürr® DCL30L	Knürr® DCL34L	
Knürr® DCL for hybrid solution		Knürr® DCL30H	Knürr® DCL34H	
Knürr® DCL for aisle cooling		Knürr® DCL30R	Knürr® DCL34R	
Nominal cooling power*		30 kW	34 kW	
Air flow		5,000 m ³ /h	6,000 m ³ /h	
Water flow		4.5 m ³ /h	5.0 m ³ /h	
Max. water pressure		10 bar (145 PSI)	10 bar (145 PSI)	
Number of fans		5	6	
Fans' max. power consumption		5 x 170 W	6 x 170 W	
Dimensions	Height	2,000 mm	2,200 mm	
	Width	300 mm		
	Depth	DCL - L	1,200 mm - 1,300 mm	
		DCL - H	1,100 mm - 1,300 mm	
DCL - R		1,000 mm - 1,300 mm		

* Sensible cooling, at 16°C / 22°C (61°F / 72°F) water temperature, and 43°C (109°F) air inlet temperature



Knürr® DCL with Knürr® DCM

Knürr® DCL unit configuration number

Model number - Part 1/2										Model details											Part 2/2			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D	C	L	3	0	L																			
D	C	L	3	4	H																			
D	C	L	3	0	R																			

1.-3. DCL (data center rack cooling solution)

DCL – Data Center Loop

4.-5. Nominal cooling capacity

30 – 30 kW (2,000 mm / 42U)
34 – 34 kW (2,200 mm / 47U)

6. Type of application

L – closed loop architecture (without external panels)
H – hybrid architecture (without external panels)
R – in row cooling (with external panels)

7. Depth

1 – 1,000 mm (DCL-R version only)
R – 1,100 mm (not for DCL-L version)
2 – 1,200 mm
H – 1,300 mm

8. Mechanical options

0 – none (two units per pallet possible)
D – caster bracket (only one unit per pallet)

9. Electrical connection

2 – 230V AC 1-phase 50/60Hz CE
4 – 230V AC 1-phase 50/60Hz CE with A/B-transfer switch
A – 230V AC 1-phase 50/60Hz 2-pole CE
B – 230V AC 1-phase 50/60Hz 2-pole CE with A/B-transfer switch
P – 208 / 230V AC 2-pole 50/60Hz CSA
S – 208 / 230V AC 2-pole 50/60Hz CSA with A/B-transfer switch

10. Water connection / hex

Z – bottom
Y – top
9 – top and bottom
V – redundant bottom

11. Filter

N – no filter
A – MERV 1 (NA for 1,000 mm depth)
C – MERV 1, clog switch (NA for 1,000 mm depth)

12. Display

0 – none
Y – 5.7" display (14.5 cm)

13. Preparation for automatic door release system

0 – none
1 – prepared for one DCM server rack
2 – prepared for two DCM server racks
3 – prepared for three DCM server racks
4 – prepared for four DCM server racks

14. Chilled water monitoring

0 – none
T – temperature sensor inlet/outlet
4 – calorific meter
5 – condensate pump
6 – temperature sensor inlet/outlet + condensate pump
7 – calorific meter + condensate pump

15. Environment monitoring

0 – none
S – smoke detection
H – humidity monitoring
B – smoke detection and humidity monitoring

16. Color

1 – RAL 7021 (gray - black)
G – RAL 7035 (light gray)
2 – non standard color (SFA)

17. – 18. Free

19. Communication

0 – standard (HTTPS, SSH, MODBUS TCP, SNMP)
D – input/output customer
M – Modbus RTU
B – Bacnet
V – input/output customer + Modbus RTU
W – input/output customer + Bacnet

20. Server rack monitoring

0 – none
1 – door contacts 1 rack
2 – door contacts 2 racks
A – door contacts 3 racks
B – door contacts 4 racks
3 – 2 temperature sensors 1 rack
4 – 2 x 2 temperature sensors 2 racks
C – 3 x 2 temperature sensors 3 racks
D – 4 x 2 temperature sensors 4 racks
7 – door contacts + temperature sensors 1 rack
8 – door contacts + temperature sensors 2 racks
E – door contacts + temperature sensors 3 racks
F – door contacts + temperature sensors 4 racks

21. Packaging

P = land freight – short distance (pallet, shrink wrap, cardboard protection)
S = seaworthy (air freight) – long distance (wooden crate)

22. Special features

A = No SFAs, standard unit
X = SFA included

23. – 25. Factory configuration number

About Emerson Network Power

Emerson Network Power, a business of Emerson (NYSE:EMR), delivers software, hardware and services that maximize availability, capacity and efficiency for data centers, healthcare providers and industrial facilities. A trusted industry leader in smart infrastructure technologies, Emerson Network Power provides innovative data-center infrastructure management solutions that bridge the gap between IT and facility management and deliver efficiency and uncompromised availability regardless of capacity demands. Our solutions are supported around the world by local Emerson Network Power service technicians. Learn more about Emerson Network Power products and services at:

www.EmersonNetworkPower.eu

Emerson Network Power Global Headquarters

1050 Dearborn Drive
P.O. Box 29186
Columbus, OH 43229, USA
T +1 614 8880246

Emerson Network Power EMEA

Mariakirchener Straße 38
94424 Arnstorf, Germany
T +49 8723 27 0
F +49 8723 27 154
info@knuerr.com

Emerson Network Power United Kingdom

George Curl Way
Southampton
SO18 2RY, UK
T +44 (0)23 8061 0311
F +44(0)23 8061 0852
UK.Enquiries@Emerson.com

While every precaution has been taken to ensure accuracy and completeness of this literature, Emerson Network Power and/or its affiliates makes no representations or warranty about the accuracy, reliability, completeness, or timeliness of the materials and disclaims any and all liability for damages resulting from use of this information or for any errors or omissions.

©2013 Emerson Network Power. All rights reserved.
Specifications subject to change without notice.
MKA4LOUKDCL

Emerson, Business-Critical Continuity and Emerson Network Power are trademarks of Emerson Electric Co. or one of its affiliated companies. ©2013 Emerson Electric Co.