

# Vertiv™

## Rack Cooling Solutions

All issues and arguments to date can be summarized under three main criteria for assessing data center infrastructure.

### 1. Availability

The key issue for all data centers is availability. Maximum computing power, rapid access or lowest costs, are of little use if availability is jeopardized by uncertainties, failures or even lengthy downtimes.

Data center services users, whether it be in-house or a customer that outsources its computing power, will only remunerate the finest computing technology (including cloud computing) if they can rely one hundred percent on the availability of the data they need.

With Vertiv™ data center infrastructure, you are always in a position to achieve the degree of availability that matches your scope of work.

### 2. Efficiency

A customer who can rely on the availability will still be dissatisfied if this availability is achieved at the expense of efficiency. Efficiency must be seen as a multi-purpose term. Efficiency covers:

The functionality of technical processes, e.g. expressed in the efficiency of the cooling or power supply.

Cost effectiveness in terms of both investment and running costs. When we talk about investment, it is not just the pure equipment investment that matters;

other important factors are:

- Building costs
- Consequential costs for recirculation facilities
- Consequential costs for power supply facilities
- Efficiency of the cooling and power supply facilities
- Consumption values and costs for operating equipment
- Monitoring, service and repair costs.

Timely efficiency in relation to processing speed and the period from data provision to data output.

### 3. Adaptability

Availability and efficiency are only sufficient if planning, project management and implementation is short term rather than sustainable.

Future-proofing and adaptability for Vertiv are also crucial factors in the development and delivery of data center infrastructure.

Future-proofing redners data center infrastrucutre operational even:

- there is a demand for increased computing capacity
- the heat loads caused by new server types – or changes to the proportions of different server types – are increased or redistributed
- current flow and speed, volume flow or the pressure ratios are changed.

Products from Vertiv are future-proof and provide an appropriate and efficient response.

Adaptability delivers highly efficient results even during planning and project management and is, naturally, also part of future-proofing.



## Vertiv™ Knürr® DCD

### Cooling Door for Maximum Energy Efficiency

Vertiv™ Knürr® DCD is an air-water heat exchanger that is integrated in the rear door of a server rack. The heat exchanger is designed to absorb heat loads of up to 35 kW from server racks.

- Compact solution for new and existing data centers.
- Highest possible energy efficiency with shortage of fans.
- Supports cold-room concept.
- Permanent water circulation piping can be routed through water-carrying hinges.



Opened Vertiv Knürr DCD



Special water-bearing hinge



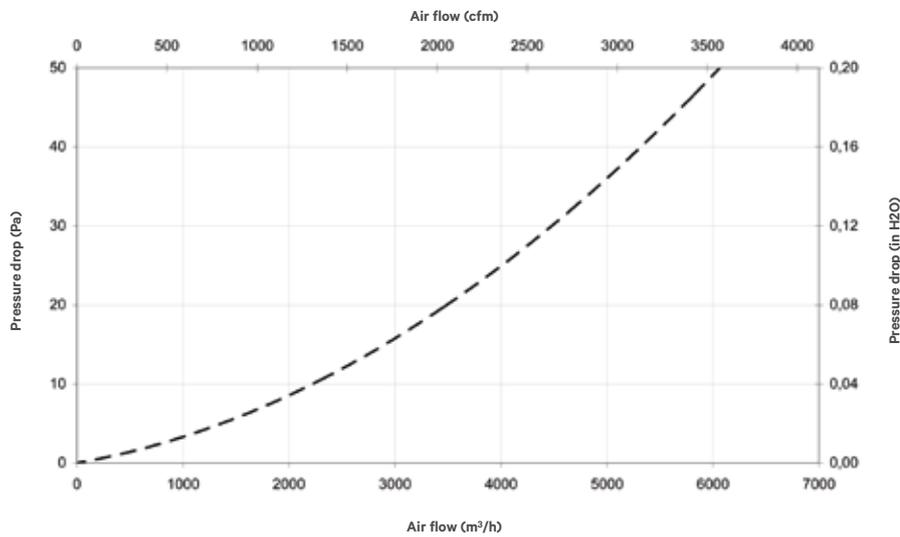
Water-connection fitting for the top



Condensation-water discharge fittings



Condensate pan



35Pa can be handled in servers with typical fans

### Vertiv™ Knürr® DCD Benefits

#### ■ Availability

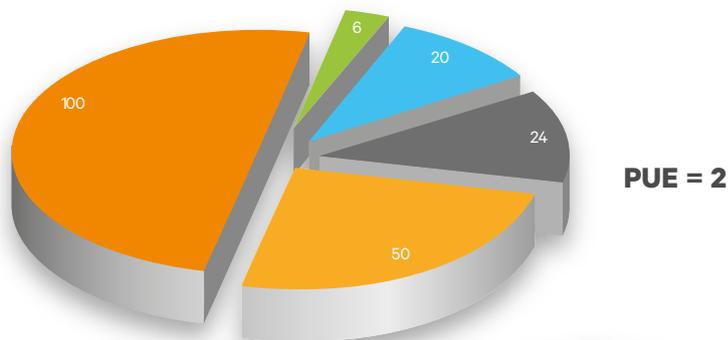
- No additional fans are required for cooling; fan failure is no longer an issue.
- System is highly reliable.
- Fewer sources of failure.
- No additional fans needed; thus no heat is wasted.
- Guaranteed 35 kW cooling.
- Minimal air pressure drop for cooling air.
- Conduit and collector for condensate water in the event of the temperature dropping below dew point. Condensate water is discharged via a flexible 5/8" hose attached to a male coupling.

#### ■ Efficiency

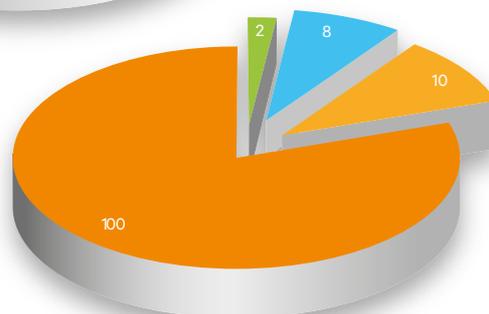
- Optimal space utilization through ultra compact design and hence very low room costs.
- Lowest possible pressure loss in water cooling circulation: only 54 kPa minimizes energy consumption of pumps.
- Minimal pressure loss in cooling air flow through optimized heat exchanger structure and linear air paths without bends: no energy costs incurred by additional fan for cooling unit.

#### ■ Adaptability

- Standard heights for 2000 and 2200 mm (42 / 47U).
- Standard widths 600, 700 and 800 mm.
- Top or bottom cold-water connection (field can be adjusted).
- Using a special adapter frame, the Vertiv Knürr DCD cooling door is compatible with server racks from other manufacturers.



PUE = 1,2



- Lighting
- Electrical losses
- Air circulation
- Cooling
- IT equipment

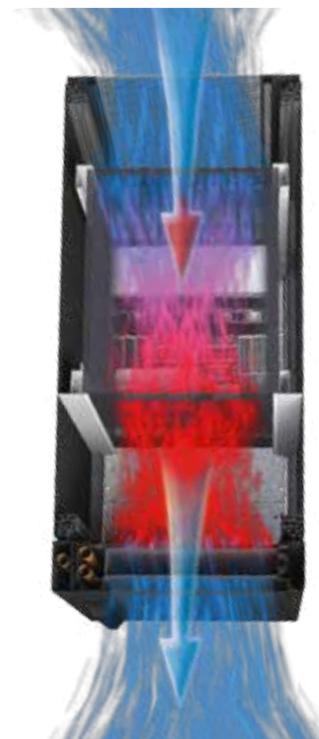
## Vertiv™ Knürr® DCD Configurations



Vertiv™ Knürr® DCD open without trim



Server rack cooling components with Vertiv Knürr DCD cooling door



Server rack air flow with Vertiv Knürr DCL (cross-section)

## Vertiv™ Knürr® DCD / DCM Basic Specifications

### Cooling-air side

|  |  |
|--|--|
| Housing material                       | Sheet steel (powder-coated)  |
| Operating ambient temperature          | 10 °C ÷ 35 °C (50 °F - 95 °F) (other temperatures available upon on request) |
| Max. absolute humidity on site         | 8 g/kg   |
| Air outlet temperature (as per ASHARE) | 18 °C ÷ 27 °C (64.4 °F - 80.6 °F)  |
| Air temperature difference - OFF       | 15 K ÷ 20 K  |

### Cold-water side

|                               |  |
|-------------------------------|--|
| Cooling power                 | 35 kW  |
| Cold water inlet temperature  | 12 °C ÷ 18 °C (53.6 °F - 64.4 °F) (other temperatures available upon on request) |
| Cold water outlet temperature | 18 °C ÷ 24 °C (64.4 °F - 75.2 °F) (other temperatures available upon on request) |
| Max. operating pressure       | 10 bar (145 psi)   |
| Pipe connection IN / OUT      | 1" female (on frame) (DIN ISO 228-1)   |

Vertiv™ Knürr® DCD  
Configuration number

| Model number – Part 1/2 |   |   |   |   |   |   |   |   |    | Detail of model |    |    |    |    |    |    |    |    |    | 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 | D | 3 | 5 |   |   |   |   |    |                 |    |    |    |    |    |    |    |    |    |          |    |    |    |    |  |

**1. – 5. Basic unit**  
Vertiv Knürr DCD is an air-water exchanger that is integrated into the rear door of a server rack. The heat exchanger serves to absorb heat loads from server racks up to 35kW. Thereby, it can be configured in such way that no thermal loads are released to the installation area.

**6. Rack height**  
A – 2000 mm  
B – 2100 mm  
C – 2200 mm

**7. Rack width**  
6 – 600 mm  
7 – 700 mm  
8 – 800 mm

**8. Rack type**  
0 – No rack  
3 – 3rd party rack adapter  
A – Predisposition for DCM rack

**9. CW connection – hinge position**  
1 – top left  
2 – top right  
3 – bottom left  
4 – bottom right

**10. Rack depth**  
0 – No rack  
E – 1000 mm  
F – 1100 mm  
G – 1200 mm

**11. Front Door**  
0 – No rack  
C – One wing perforated right  
G – Double wing perforated  
L – One wing perforated left  
X – Rack without front door

**12. 19" rails front**  
0 – No rack  
A – Symmetric with air separation and additional vertical U slots (Width 800 mm)  
B – Symmetric with air separation (Width 600 mm)  
L – Asymmetric with air separation and additional vertical U slots (Width 700/800 mm)

**13. 19" rails back side**  
0 – No rack  
A – Symmetric with air separation and additional vertical U slots (Width 800 mm)  
B – Symmetric with air separation (Width 600 mm)  
L – Asymmetric with air separation and additional vertical U slots (Width 700/800 mm)  
S – Symmetric without air separation (Width 600 mm)  
Y – Asymmetric without air separation (Width 700/800 mm)

**14. Bottom Plate**  
0 – No rack  
L – Cable entry for levelling feet  
R – Cable entry for castors

**15. Plinth**  
0 – No rack  
A – Plinth H100 mm  
B – Plinth H200 mm  
F – Levelling feet  
R – with castors (no plinth available)

**16. Color**  
1 – RAL 7035 (light-grey)  
G – RAL 7021 (black-grey)

**17. Rack side panels**  
0 – No rack, without side panels  
B – With both side panels

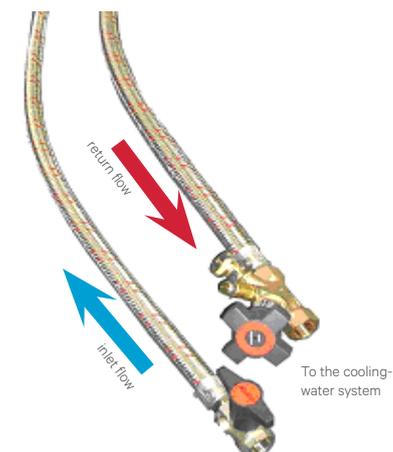
**18. 19" front side jumpering depth**  
0 – None  
A – 80 mm  
D – 123 mm

**19. – 20. Free**

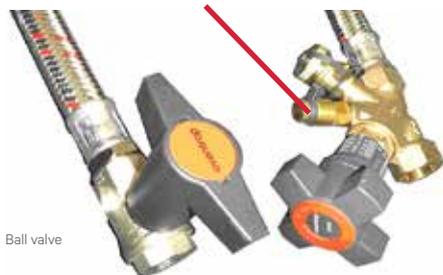
**21. Packaging**  
P – Short distance (pallet, shrink wrap)  
S – Long distance (Wooden box)

**22. SFA – special features**  
A – No SFA  
X – SFAs included

**23. – 25. Free**



Draining and purging valve with nipple for measurement device connection (3/4", female) (for measuring water flow rate)



Ball valve

Shut-off and control valves (to set the volumetric flow rate)

To DCD - R1" To building chilled water connection - variable



Example of Connecting kit adapter

## Vertiv™ Knürr® Chilled Water Connecting Kit

### Application

- Simple connection to water circulation, simple start-up.

### Consists of

- Two flexible armored tubes, stainless steel plated, water-resistant and frost-resistant EPDM. Nickel-plated pipe connections.

### Temperature range

- 0 - 110° C.

### Operating pressure

- Max. 10 bar.

### Inner diameter

- 31 mm.

### Connections

- Threaded connection, 1 1/4" (or 1"), flat sealing.

### Length

- 1500 mm.

### Ball valve connections

- 1 1/4" (or 1").

Shut-off and control valves with 3/4" draining and purging connection and a nipple for measuring pressure and temperature.

Connections: 1 1/4" (or 1").

| Description                    | Order No. |
|--------------------------------|-----------|
| Cold-water connection kit 5/4" | 080090910 |
| Cold-water connection kit 1"   | 080090660 |

## Connecting adapter kit

### Consists of:

- Two flexible pipes respectively for supply and return feed to increase the distance between the chilled water supply and return connection to the building and adapt its interface type.

### Length

- 300 mm.

| Description                  | Order No. |
|------------------------------|-----------|
| Pipe DN25 L300 R1" x 1" NPT  | 400005321 |
| Pipe DN25 L300 R1" x Rp 1"   | 400005325 |
| Pipe DN25 L300 R1" x Rp 5/4" | 400005326 |