Vertiv™ SmartAisle™ Containment

Energy-efficient Data Center Cooling

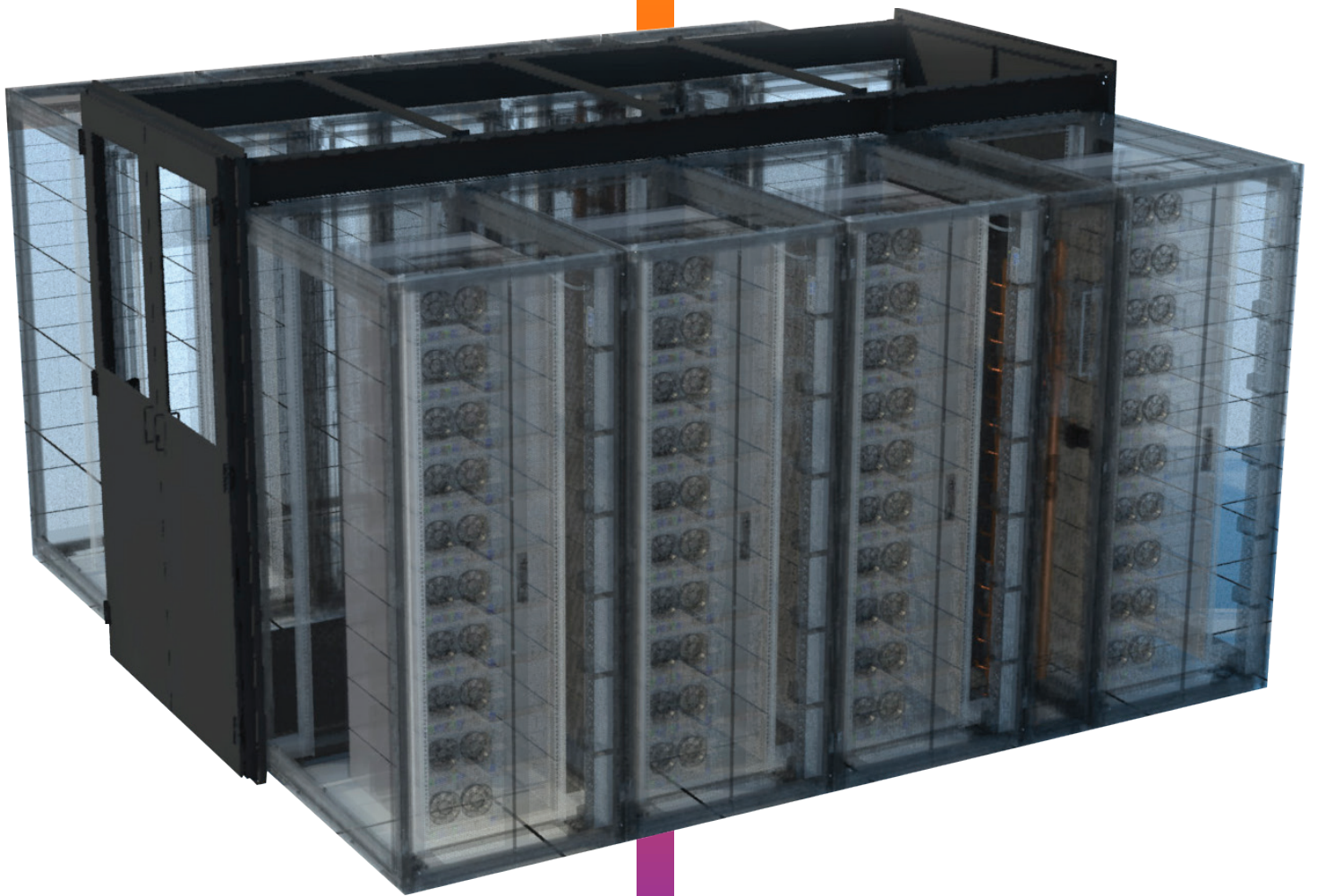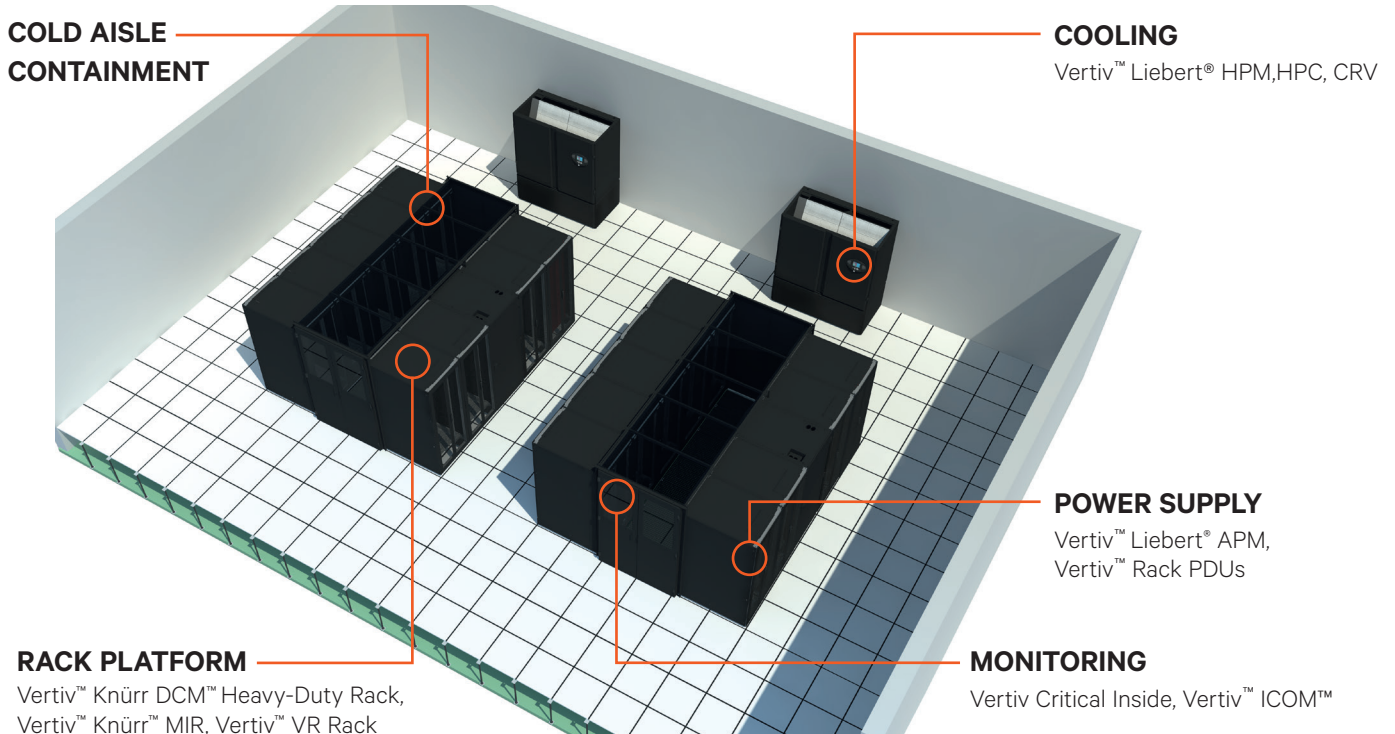# Vertiv™ SmartAisle™ Containment

Vertiv

Vertiv designs, builds and services mission critical technologies that enable the vital applications for data centers, communication networks, and commercial and industrial environments. We support today's growing mobile and cloud computing markets with our portfolio of power, thermal, infrastructure management products, software and solutions, all complemented by our global service network. Bringing together global reach and local knowledge, and our decades-long heritage including brands like Liebert® and NetSure™, our team of experts is ready to take on your most complex challenges, creating solutions that keep your systems running — and your business moving. Together, we're building the future of a world where critical technologies always work.

Your vision, Our passion.
Vertiv.com

Vertiv™ SmartAisle™ Containment

Vertiv™ SmartAisle™ – the comprehensive data-center solution

COLD AISLE CONTAINMENT

COOLING
Vertiv™ Liebert® HPM,HPC, CRV

POWER SUPPLY
Vertiv™ Liebert® APM,
Vertiv™ Rack PDUs

RACK PLATFORM
Vertiv™ Knürr DCM™ Heavy-Duty Rack,
Vertiv™ Knürr™ MIR, Vertiv™ VR Rack

MONITORING
Vertiv Critical Inside, Vertiv™ ICOM™

ITs most important response is the increasing independence of applications from within the IT infrastructure. Virtualization and cloud computing are today's buzzwords. Energy-efficient IT components and their dynamic control according to the applications' current needs form the hardware basis for this.

In terms of physical infrastructure the answer lies in the Vertiv SmartAisle from Vertiv. In the data-center, the SmartAisle™ forms the room, the power supply and the cooling system for servers, storage and the network. Choosing a comprehensive range of components that are tailored to one another in every respect enables the physical infrastructure to be adapted to any need imaginable, since no data-center is like any other and no data-center remains unchanged for long.

The Vertiv SmartAisle solution ensures optimal availability, efficiency and future-proofing.

Features

- Best failsafe capacity
- Ideal temperature for IT; no hot spots
- Minimum power consumption
- Easy to plan and run.

Complete solution

- Racks
- Rack PDUs
- Power distribution
- UPS
- Cooling with Vertiv ICOM control
- Enclosure
- Cable management
- Monitoring: cabinet and aisle
- Vertiv critical inside
- Commissioning and maintenance
- Other services.

All active components have interfaces to a top-level infrastructure management system which facilitates integrated monitoring, management and automation of the physical infrastructure.

Vertiv™ SmartAisle™ – A form of containment proven to lead to substantial savings in energy costs

Achieved energy savings through patented, controlled cold aisle containment in many projects (banks, insurance companies, industry etc.).

the green grid

Green IT

- Reduction in CO_2 emissions through optimum energy efficiency.
- Improved energy efficiency by reduced cooling air demand.
- Compliance with the EU Code of Conduct.

Vertiv™ SmartAisle™ Containment

Vertiv™ SmartAisle™ – the comprehensive data-center solution

Control from Vertiv

Due to rising power costs and increased environmental awareness, almost every operator's current objective is to operate their data-center as energy efficiently as possible.
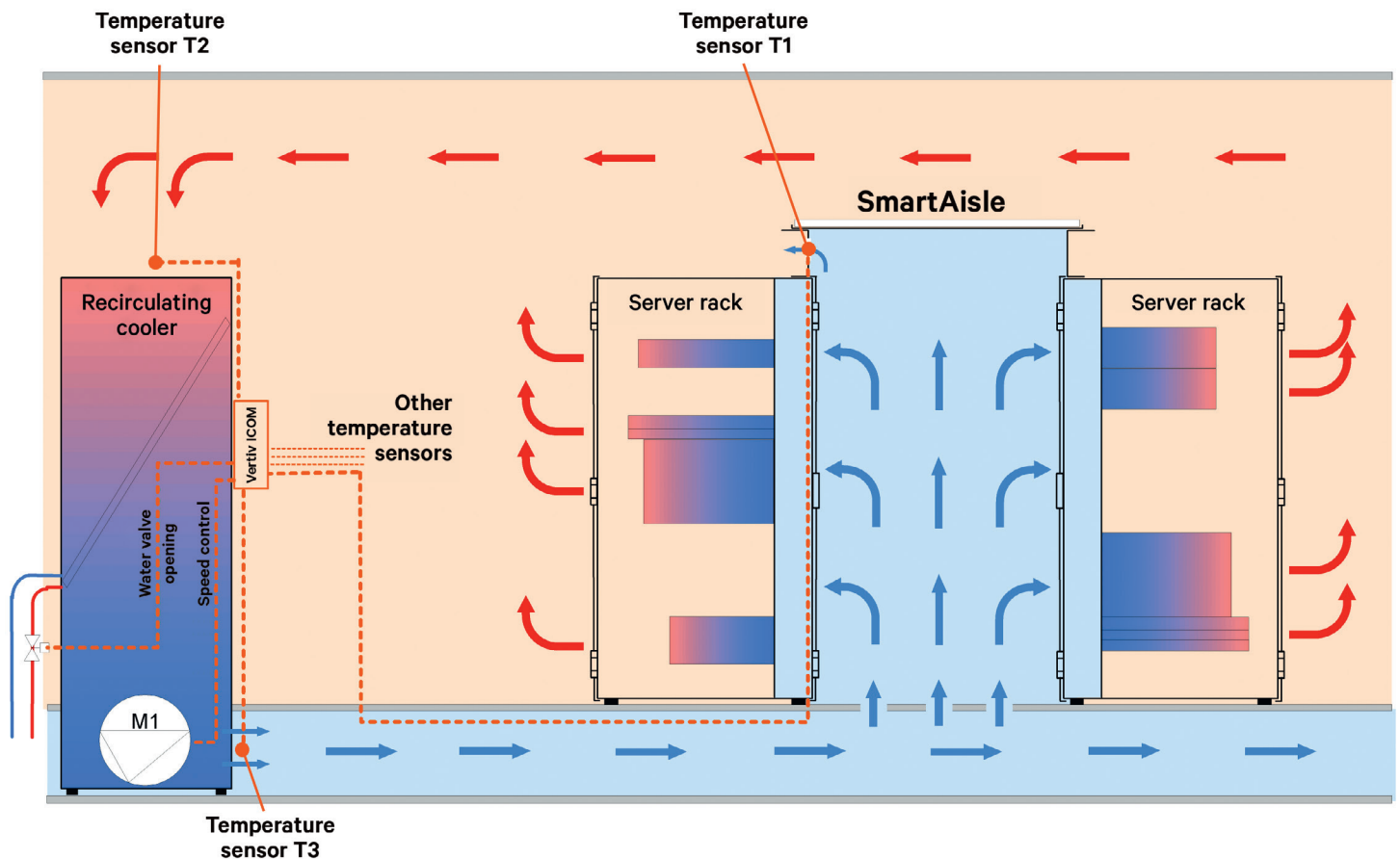
Many already ensure the basic separation of cold air from warm air with dummy (blanking) panels, bushings for cable entry, cold aisle containment, etc. The data-center can be further optimized by adjusting the fan speed of the recirculated air devices. This is an essential and important factor for an energy-efficient data-center. The operator can save enormous power costs by choosing the most appropriate type of regulation.

The right choice can also increase availability. The failure of a device serving to recirculate air is compensated by increasing the speed of the other devices. In terms of control, there are two main principles in use – pressure control and control via the cold aisle temperature.

With the Vertiv SmartAisle control principle, the cold aisle temperature, i.e. the temperature of the air supply to the servers, is used to control the fans which regulate the temperature in the room (see figure). This control principle is patented.

PATENTED

The principle of the Vertiv™ SmartAisle™ control

Temperature sensor T2

Temperature sensor T1

SmartAisle

Recirculating cooler

Vertiv ICOM

Water valve opening

Speed control

Other temperature sensors

Server rack

Server rack

M1

Temperature sensor T3

Vertiv™ SmartAisle™ containment – systematically separating cold from warm air forms the basis of an energy-efficient data-center
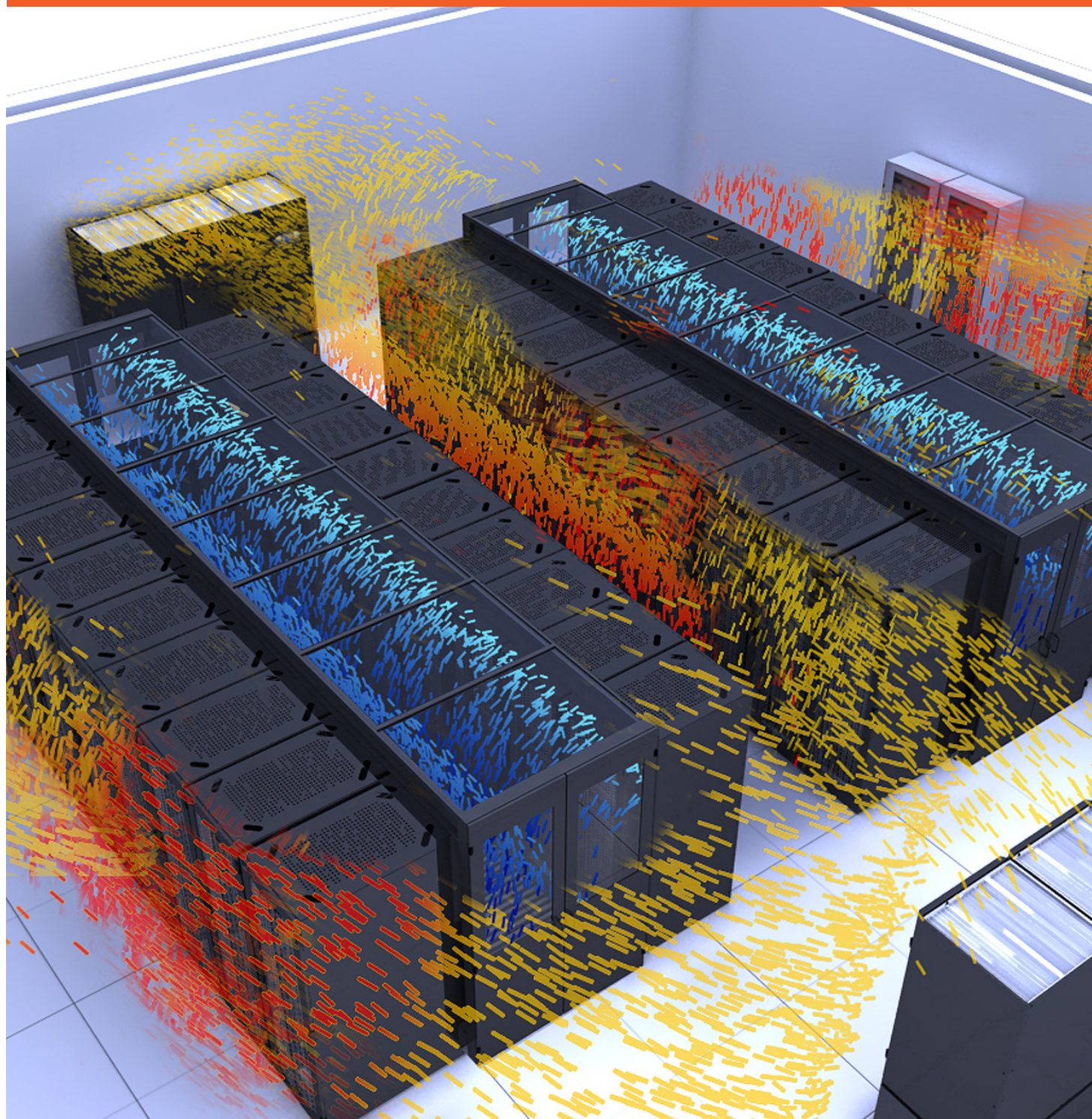
Vertiv™ SmartAisle™ – the comprehensive data-center solution

Overview of Vertiv SmartAisle Containments

STANDARD

Standard product range:
- Aisle width 1200 and 1800 mm
- Rack height 2000 and 2200 mm.

Features:
- Ideal for new data-centers and for retrofitting homogeneous cabinet aisles
- Industrial prefabrication makes for a highly economic solution
- Quick and easy to assemble on site.

CUSTOMIZED

Features:

- Precisely fitted to cabinets and cabinet positions
- Suitable for retrofitting non-homogenous data-centers
- Combination with Vertiv SmartAisle standard.

SWITCHAIR

Features:

- No hot spots
- Adequate airflow
- Can be use d in energy-efficient data-center.

Vertiv™ SmartAisle™

Containment Solution from Vertiv

The Vertiv SmartAisle standard product range consists of flexible, adaptable and user-friendly components.

The individual components equate the tolerances of the racks, which are not usually installed with millimeter precision. The system fits not only onto Vertiv™ Knürr™ racks but also onto most commercially available racks. The racks do not need to be installed in pairs. The top panels are transparent to allow use of the available room lighting.

The standard top elements are ready for the patented Vertiv SmartAisle controller.

Different door systems are available – hinged doors and sliding doors. Hinged or swing doors are better in terms of safety and emergency exits. On the other hand, sliding doors take up less space.

Standard product range

- Aisle width 1200 and 1800 mm.
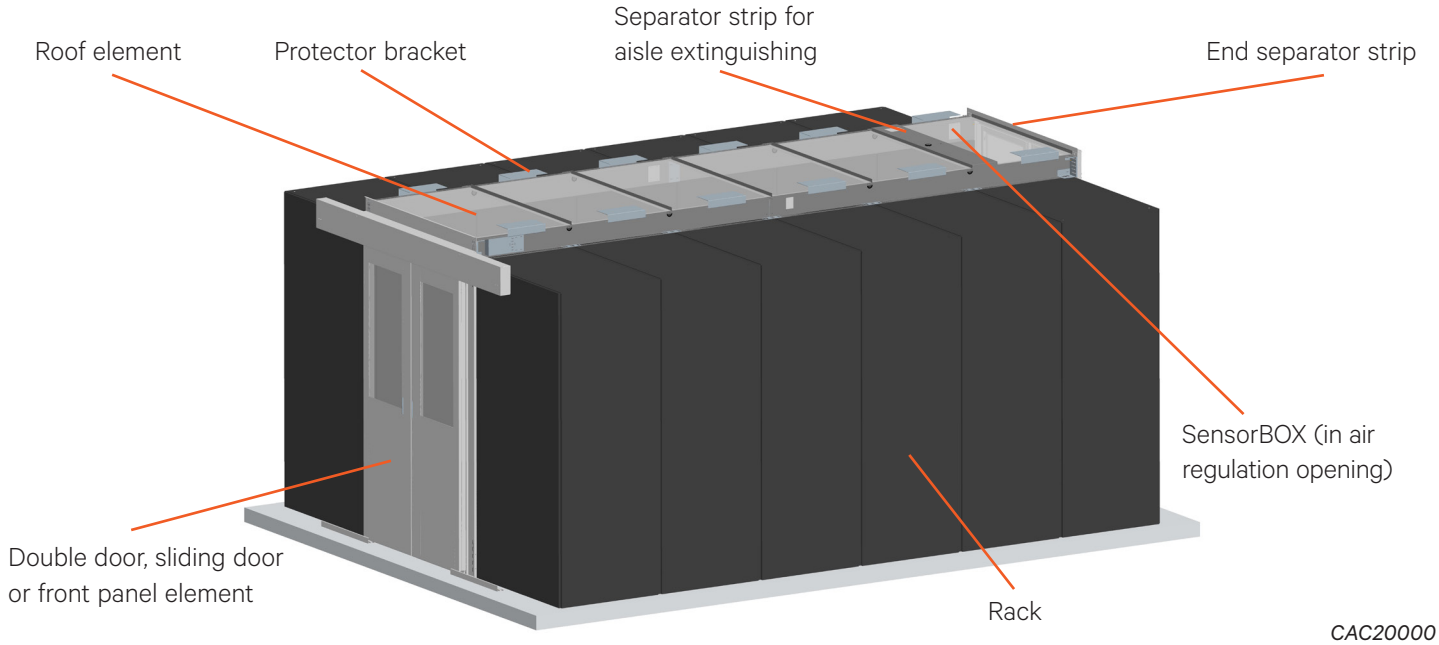- Rack height 2000 and 2200 mm.

Features

- Ideal for new data-centers and for retrofitting homogeneous cabinet aisles
- Industrial prefabrication makes for a highly economic solution
- Quick and easy to assemble on site.

Vertiv™ SmartAisle™ Containment Standard ideal for homogeneous layout in the data-center

Vertiv™ SmartAisle™ Containment

Vertiv™ SmartAisle™ Containment Standard

Configuration assistance

Roof element   Protector bracket   Separator strip for aisle extinguishing   End separator strip

SensorBOX (in air regulation opening)

Double door, sliding door or front panel element

Rack

CAC20000

Necessary items for the cold aisle	EXAMPLE
Aisle width (standard dimensions 1200 and 1800 mm +/- 50 mm)	Aisle width (AW) = 1200 mm
Rack height (standard dimensions 2000 and 2200 mm)	Rack height (H) = 2000 mm
Aisle length	Aisle length (L) = 4800 mm
Rack type	Vertiv Knürr DCM® W800
Color (light gray RAL 7035 or dark gray RAL 7021)	Dark gray RAL 7021

OPTIONS	EXAMPLE	ARTICLE	
Front door element (sliding door, double door, front panel)	Sliding door	**1 piece**	03.029.026.8
Front door closer (mechanical, electric)	Electric door closer	**1 piece**	03.029.046.8
Rear door element (sliding door, double door, front panel)	Double door	**1 piece**	03.029.031.8
Rear door closer (mechanical, electric)	Mechanical door closer	*(integrated in double door)*	
Roof element	Roof element L2400	**2 set**	03.029.129.8
End separator strip	End separator strip AW 1200	**1 pair**	03.029.010.8
SensorBOX	Yes	**2 pcs**	03.029.132.8
Protector bracket	Yes	**6 sets**	03.029.041.8
Vertiv™ Knurr DCM™ balancing sheet metal	Yes	**8 sets**	03.029.137.8
Filler panel	No		
Height panel	No		
Sealing set	Yes (per rack)	**2 sets**	03.029.040.9
Raised floor air barrier for cable entry	Yes	**22 pcs**	03.028.211.9
Grate	Yes	**28 pcs**	03.029.090.8
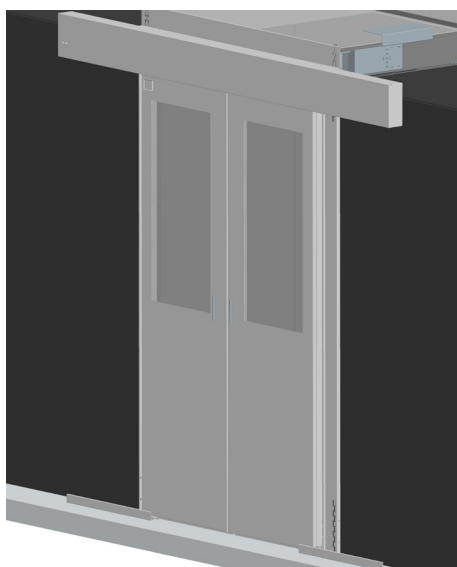
CAC20001

Vertiv™ SmartAisle™ Sliding Door prepared for automatic door closers

- For cold aisle containment for aisle widths: 1200 / 1800 mm (+/- 50 mm)
- Quick and easy mounting
- Suitable for Vertiv™ Knürr™ MIR and Vertiv™ Knurr DCM™ racks and most racks of other manufacturers.

Clear door opening
- Width: at least 950 mm
- Height: 2080 mm.

Material
- Door elements: sheet steel
- Windows: single safety glass panel
- Brush strips: polyamide (UL9 HF-1).

Finish
- Final digit of order number .1: Powder-coated texture, RAL 7035, light gray
- Final digit of order number .8: Powder-coated texture, RAL 7021 dark gray.

Scope of delivery
- 1 frame structure
- 2 doors
- 2 floor guides
- Covers
- Sealing material
- Mounting material.

Supplied as
- Flat-packed kit.

Please note
- The required closers (electric or mechanical) should be ordered for this!

W/L	AW	Order no.	UP
2000	1200	03.029.026.X	1 set
2200	1200	03.029.027.X	1 set
2000	1800	03.029.066.X	1 set
2200	1800	03.029.067.X	1 set
2400	1200	On request	1 set
2400	1800	On request	1 set
2600	1200	On request	1 set
2600	1800	On request	1 set

CAC20004

CAC20005

Dimensions in mm:

W	width	U	standard height unit
H	height	1U	44.45 mm
D	depth	UP	unit of packaging
L	length	kg	weight
AW	aisle width		

Conversion:

1mm	0.03937 inch	1kg	2.2046 pounds
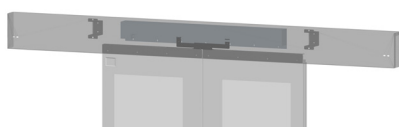
Electric Closing mechanism for Sliding Door

- Suitable for Vertiv SmartAisle sliding door
- Increases energy efficiency as doors are closed automatically
- Opens with "push & go"
- Closes with "push & go" or automatically (0 to 30 seconds)
- Opener/closer contact for control (e.g. fire alarm system).

Material
- Sheet steel

Finish
- Final digit of order number .1: Powder-coated texture, RAL 7035, light gray
- Final digit of order number .8: Powder-coated texture, RAL 7021 dark gray.

Scope of delivery
- 1 electric drive
- 1 cover
- Various mounting brackets
- Mounting material.

Technical data
- Power supply: 230 V / 50-60 Hz
- Opening speed: 0.4 m/s
- Closing speed: 0.2 m/s
- Automatic closing time setting: 0 to 30 s
- Force: 30 N.

Supplied as
- 1 unit.

Order no.	UP
03.029.046.X	1 set

Vertiv™ SmartAisle™ Containment
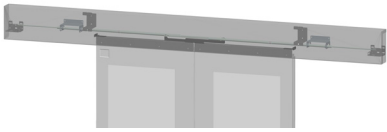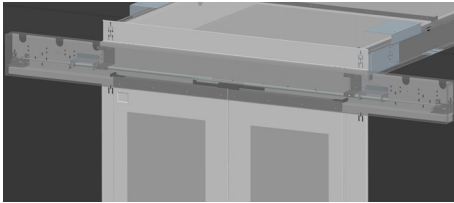
CAC20006

CAC20007

Mechanical Closing mechanism for Sliding Door

- Suitable for Vertiv™ SmartAisle™ sliding door
- Increases energy efficiency as doors are closed automatically
- Retaining function for open door.

Material
- Sheet steel.

Finish
- Final digit of order number .1: Powder-coated texture, RAL 7035, light gray
- Final digit of order number .8: Powder-coated texture, RAL 7021 dark gray.

Scope of delivery
- 2 sets of gas pressure springs
- 1 cover
- Various mounting brackets
- Mounting material.

Technical data
- Force: 20 N.

Supplied as
- 1 Unit.

Order no.	UP
03.029.047.X	1 set
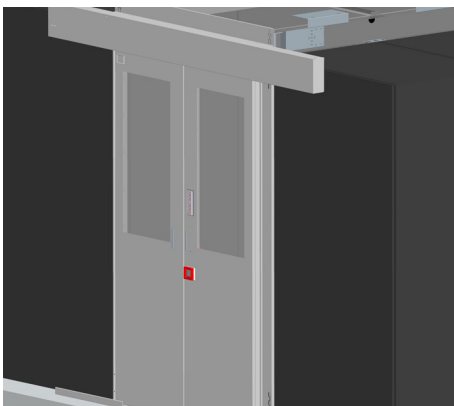
CAC20002

CAC20003

Vertiv™ SmartAisle™ Sliding Door with access control

- For cold aisle containment for aisle widths: 1200 / 1800 mm (+/- 50 mm)
- Quick and easy mounting
- Suitable for Vertiv™ Knürr™ MIR and Vertiv™ Knürr DCM™ racks and most racks of other manufacturers
- Safe closing through magnets; the door can be opened manually with little effort if there is a power failure
- Access control with keypad as standard (other systems possible in the respective project)
- Button inside for normal exit
- VdS-approved emergency switch inside for in case of emergency; height of the switch is under 1 meter
- VdS-approved emergency switch outside for rescue
- Door contact switch for monitoring door open – door closed".

Clear door opening
- Width: at least 950 mm
- Height: 2080 mm.

Material
- Door elements: sheet steel
- Windows: single safety glass panel
- Brush strips: polyamide (UL94 HF-1).

Finish
- Final digit of order number .1: Powder-coated texture, RAL 7035, light gray
- Final digit of order number .8: Powder-coated texture, RAL 7021 dark gray.

Scope of delivery
- 1 frame structure
- 2 doors
- 2 floor guides
- 1 Rack Monitoring System
- Electric closing
- Covers
- Sealing material
- Mounting material.
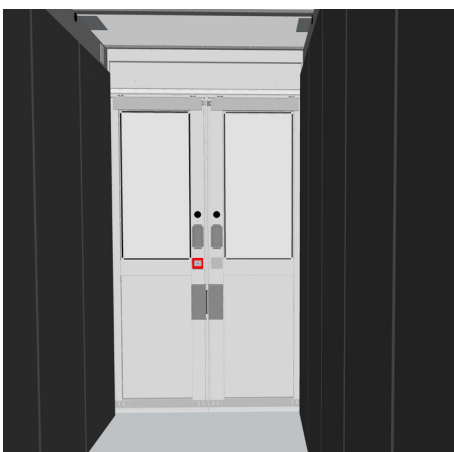
Supplied as
- Flat-packed kit.

Dimensions in mm:

W	width	U	standard height unit
H	height	1U	44.45 mm
D	depth	UP	unit of packaging
L	length	kg	weight
AW	aisle width		

Conversion:

1mm	0.03937 inch	1kg	2.2046 pounds

W/L	H	D	AW	For rack type	Order no.	UP
	2000		1200		03.029.029.X	1 set
	2200		1200		03.029.029.X	1 set

CAC20008

Vertiv™ SmartAisle™ Double Door with automatic door closer

- For cold aisle containment for aisle widths: 1200 / 1800 mm (+/- 50 mm)
- Quick and easy mounting
- Suitable for Vertiv™ VR, Vertiv™ Knürr™ MIR and Vertiv™ Knürr DCM™ racks and most racks of other manufacturers
- Integrated automatic mechanical door closer (opening angle 180°, mounting bracket approx. 120°, from approx. 100° automatic closing).

Door width clearance

- Width: 1200 mm
- Height:
  - 2100 mm (for rack height 2000 mm)
  - 2300 mm (for rack height 2200 mm)

Material

- Door frame: aluminum
- Door elements: sheet steel
- Windows: single safety glass panel
- Brush strips: polyamide (UL94 HF-1).

Finish

- Final digit of order number .1:
  Powder-coated texture,
  RAL 7035, light gray

- Final digit of order number .8:
 Powder-coated texture,
  RAL 7021 dark gray.

Scope of delivery

- 1 door frame
- 2 doors
- 3 design covers
- 2 door closers
- Mounting material.

Supplied as

- Flat-packed kit.

W/L	H	D	AW	For rack type	Order no.	UP
	2000		1200		**03.028.021.X**	1 set
	2200		1200		**03.028.022.X**	1 set
	2000		1800		**03.028.046.X**	1 set
	2200		1800		**03.028.047.X**	1 set
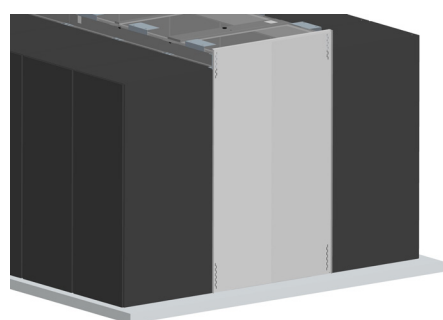
CAC20009

Vertiv™ SmartAisle™ Front Panel

- For cold aisle containment for aisle widths: 1200 / 1800 mm (+/- 50 mm)
- Alternative to a cold aisle door
- Quick and easy mounting
- Suitable for Vertiv™ Knürr™ MIR and Vertiv™ Knürr DCM™ racks and most racks of other manufacturers.

Material

- Sheet steel.

Finish

- Final digit of order number .1:
  Powder-coated texture,
  RAL 7035, light gray

- Final digit of order number .8:
  Powder-coated texture,
  RAL 7021 dark gray.

Scope of delivery

- 1 bracing bracket
- 2 to 4 panel elements
- Mounting material.

Supplied as

- Flat-packed kit.

W/L	H	D	AW	For rack type	Order no.	UP
	2000		1200		**03.029.031.X**	1 set
	2200		1200		**03.029.032.X**	1 set
	2000		1800		**03.029.037.X**	1 set
	2200		1800		**03.029.038.X**	1 set

Vertiv™ SmartAisle™ Containment
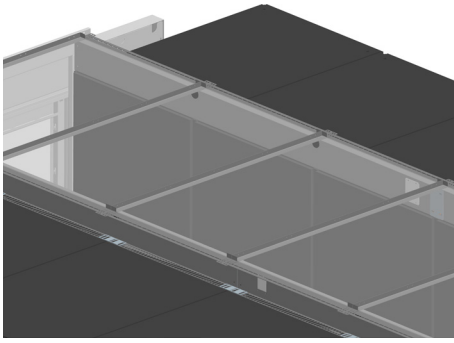
CAC20010

Vertiv™ SmartAisle™ Roof Element

- For cold aisle containment for aisle widths: 1200 / 1800 mm (+/- 50 mm)
- Quick and easy mounting
- Suitable for Vertiv™ Knürr™ MIR and Vertiv™ Knürr DCM™ racks and most racks of other manufacturers
- With rubber sleeves for cable routing
- Roof panel with low fire load and low smoke generation (optionally with compound safety glass)
- Roof panels can be quickly and easily removed
- Prepared for SensorBox for energy-efficient operation of the recirculated-air cooling devices and for preventing hot spots.

Clear aisle height
- Rack height 2000 mm: 2150 mm
- Rack height 2200 mm: 2350 mm.

Material
- Angular extrusion, cross brace: sheet steel
- Roof panel: Polycarbonate, UL 94-VO/DIN 4102 B1.

Finish
- Final digit of order number .1: Powder-coated texture, RAL 7035, light gray
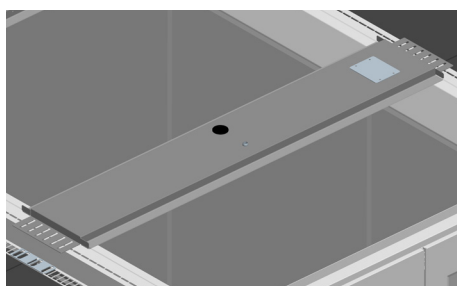- Final digit of order number .8: Powder-coated texture, RAL 7021, dark gray.

Scope of delivery
- 2 angular extrusions with air regulation opening
- 1 separator strip at W300/600/800
- 3 separator strips at L2400
- 1 roof panel at W300/600/800
- 3 roof panels at L2400
- 2 angular extrusion plates
- Mounting material.

Supplied as
- Flat-packed kit.

IMPORTANT
- When used with Vertiv™ Knürr DCM™ Heavy-Duty Rack, please also order suitable balancing sheet metals!

Please note
- The appropriate number of SensorBOXes to regulate the recirculating coolers should also be ordered!

W/L	H	D	AW	For rack type	Order no.	UP
	300		1200		**03.029.120.X**	1 set
	600		1200		**03.029.123.X**	1 set
	800		1200		**03.029.126.X**	1 set
	2400		1200		**03.029.129.X**	1 set
	300		1800		**03.029.122.X**	1 set
	600		1800		**03.029.125.X**	1 set
	800		1800		**03.029.128.X**	1 set
	2400		1800		**03.029.131.X**	1 set
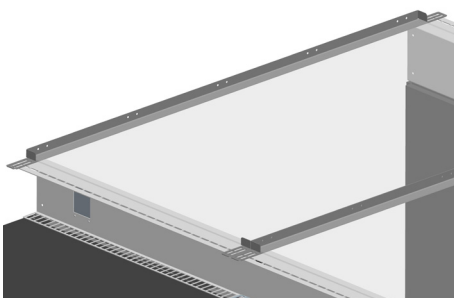
CAC20011

Vertiv™ SmartAisle™ End Separator Strip

- For cold aisle containment for aisle widths: 1200 / 1800 mm (+/- 50 mm)
- Quick and easy mounting
- To connecting to the door element or front panel element.

Material
- Sheet steel

Finish
- Final digit of order number .1: Powder-coated texture, RAL 7035, light gray
- Final digit of order number .8: Powder-coated texture, RAL 7021, dark gray.

Scope of delivery
- 2 end separator strips Mounting material

Supplied as
- 1 Unit

AW	For rack type	Order no.	UP
1200		**03.029.010.X**	1 pair
1800		**03.029.012.X**	1 pair

CAC20012

Vertiv™ SmartAisle™ Separator Strip for Aisle Extinguishing
for Vertiv™ SmartAisle™ roof element

- For gas extinguishing in the cold aisle
- With rubber sleeve for inserting the piping or the nozzles into the cold aisle
- Possibility to screw in the fastening for the piping on the cold aisle containment
- Prepared for SensorBox for the energy-efficient operation of the recirculated-air cooling devices and for preventing hot spots.

Material
- Sheet steel.

Finish
- Final digit of order number .1: Powder-coated texture, RAL 7035, light gray
- Final digit of order number .8: Powder-coated texture, RAL 7021, dark gray.

Scope of delivery
- 1 separator strip for aisle extinguishing
- Mounting material.

Supplied as
- Flat-packed kit.

W/L	H	D	AW	For rack type	Order no.	UP
200			1200		**03.029.115.X**	1 set
200			1800		**03.029.117.X**	1 set

CAC00NEU

Vertiv™ SmartAisle™ Sliding-door Wall-mount
Prepared for Automatic Door Closers

Description
- For a cold aisle containment between rack row and wall.
- For an aisle width of 900 to 1200 mm (± 50 mm).
- Quick and easy mounting.
- Suitable for Vertiv™ Knürr™ MIR and Vertiv™ Knürr DCM™ racks and most other brands.

Clear door opening
- Width: 860 mm (mechanical door closer); 820 mm (electrical door closer).
- Height: 2080 mm.

Material
- Door components: sheet steel.
- Observation window: single safety-glass panel.
- Brush strips: polyamide (UL94 HF-1).

Finish
- Final digit of order number .1: powder-coated, RAL 7035 light-grey.
- Final digit of order number .8: powder-coated, RAL 7021 dark-grey.

Scope of delivery
- 1 x frame.
- 2 x doors.
- 2 x floor guides.
- 1 x Covers.
- 1 x Sealing material.
- 1 x Mounting kit.

How supplied
- Flat-packed kit.

Note
- Please order the requisite closers (electric or mechanical).

H	AW		Order no.	UP
2000-2200	900-1200		**03.029.190.X**	1 set

Dimensions in mm:

W	width	U	standard height unit
H	height	1U	44.45 mm
D	depth	UP	unit of packaging
L	length	kg	weight
AW	aisle width		

Conversion:

1mm	0.03937 inch	1kg	2.2046 pounds
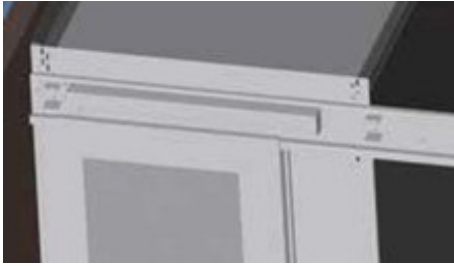
CAC00NEU

Electric Sliding-door Closer Wall-mount

- Compatible with Vertiv SmartAisle™ sliding door wall- mount.
- Increases energy efficiency as doors closes automatically.
- Opens with "push & go".
- Closes with "push & go" or automatically (0 to 30 seconds).
- Opener/closer contact for control (e.g. fire alarm system).

Material
- Sheet steel.

Finish
- Final digit of order number .1: powder-coated, RAL 7035 light-grey.
- Final digit of order number .8: powder-coated, RAL 7021 dark-grey.

Scope of delivery
- 1 x electric drive.
- 1 x cover.
- 1 x Mounting brackets.
- 1 x Mounting kit.

Technical data
- Power supply: 230 V / 50 - 60 Hz.
- Opening speed: 0,4 m/s.
- Closing speed: 0,2 m/s.
- Automatic closing time, adjustable: 0 to 30 s.
- Force: 30 N.

How supplied
- Flat-packed kit.

Order no.	UP
03.029.192.X	1 set

CAC00NEU

Mechanical Sliding-door Closer Wall-mount

- Suitable for Vertiv SmartAisle™ sliding door wall- mount.
- Increases energy efficiency as doors open and close automatically.
- Stop function when open.

Material
- Sheet steel.

Finish
- Final digit of order number .1: powder-coated, RAL 7035 light-grey.
- Final digit of order number .8: powder-coated, RAL 7021 dark-grey

Scope of delivery
- 2 x sets of gas pressure springs.
- 1 x cover.
- 1 x Mounting brackets.
- 1 x Mounting kit.

Technical data
- Force: 20 N.

How supplied
- Flat-packed kit.

Order no.	UP
03.029.193.X	1 set

CAC00NEU

Vertiv™ SmartAisle™ Top Cover Plate Wall-mount

- Used in cold aisle containment for aisle width 1200 mm (± 50 mm).
- Quick and easy mounting.
- Suitable for MIR® and DCM® racks and most other brands.
- With rubber sleeves for cable routing.
- Top cover plate with low fire load and smoke generation (optionally with compound safety glass).
- Top cover plate(s) can be removed quickly and easily.
- Equipped with SensorBOX for energy-efficient operation of the recirculated air cooling devices and for preventing hot spots.

Clear aisle height
- Rack height 2000 mm: 2150 mm.
- Rack height 2200 mm: 2350 mm.

Material
- Angular extrusion, cross brace: sheet steel.
- Top cover plate: polycarbonate, UL94 V-0/DIN 4102 B1.

Finish
- Final digit of order number .1: powder-coated, RAL 7035 light-grey.
- Final digit of order number .8: powder-coated, RAL 7021 dark-grey.

Scope of delivery
- 2 x angular extrusions with air regulation opening.
- 1 x separator strip for W 300/600/800, 3 x separator strips for L 2400.
- 1 x top cover plate for W 300/600/800, 3 x top cover plates for L 2400.
- 2 x angular extrusion plates.
- 1 x Mounting kit.

How supplied
- In sets.

Important Note
- When using Knürr DCM® or MIR® 2 racks, please also order corresponding adjustment plates.

Note
- Please also order correct number of Sensor-BOXes for the recirculated air cooling devices control system.

L	AW	Order no.	UP
300	1200	**03.029.195.X**	1 set
600	1200	**03.029.196.X**	1 set
800	1200	**03.029.197.X**	1 set
2400	1200	**03.029.198.X**	1 set
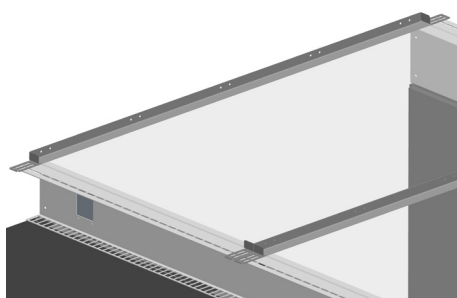
CAC20011

Vertiv™ SmartAisle™ End Separator Strip Wall-mount

- Used in cold aisle containment for aisle widths: 1200 mm (± 50 mm). To the wall.
- Other aisle widths are available on request.
- Quick and easy mounting.
- For connecting the door component or front panel.

Material
- Sheet steel.

Finish
- Final digit of order number .1: powder-coated, RAL 7035 light-grey.
- Final digit of order number .8: powder-coated, RAL 7021 dark-grey.

Scope of delivery
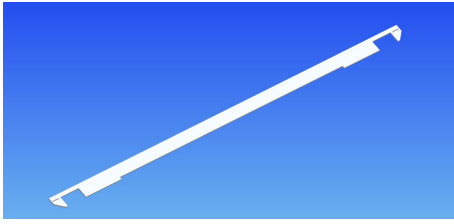- 2 x end separator strips.
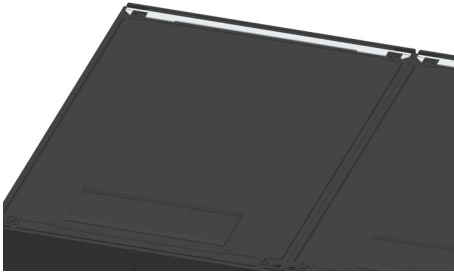- 1 x Mounting kit.

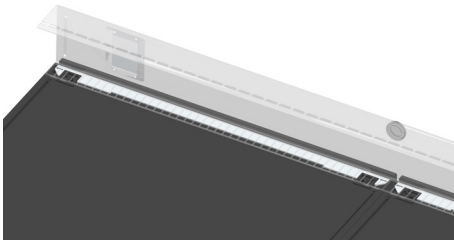**Technical data**
- Force: 20 N.

How supplied
- 1 set.

AW	Order No.	UP
1200	03.029.199.X	1 pair

CAC20013

CAC20014

CAC20015

Vertiv™ SmartAisle™, Vertiv™ Knürr DCM™ Balancing Sheet Metal
for use with Vertiv™ Knürr DCM™ Heavy-Duty Rack

- For equalizing the height between Vertiv™ Knürr DCM™ Heavy-Duty Rack and cold aisle containment.

Material
- Sheet steel.

Finish
- Final digit of order number .1:
  Powder-coated texture,
  RAL 7035, light gray
- Final digit of order number .8:
 Powder-coated texture,
  RAL 7021 dark gray.

Scope of delivery
- 1 balancing sheet metal.

Supplied as
- Flat-packed kit.

W/L	H	D	AW	For rack type	Order no.	UP
300				Vertiv™ Knürr DCM™*	**03.029.134.X**	1 set
600				Vertiv™ Knürr DCM™*	**03.029.135.X**	1 set
800				Vertiv™ Knürr DCM™*	**03.029.137.X**	1 set
1000				Vertiv™ Knürr DCM™*	**03.029.139.X**	1 set

CAC20016

CAC20017

Vertiv™ SmartAisle™ SensorBOX
for Vertiv™ SmartAisle™ roof element

- Suitable for air- regulation opening of the roof elements
- Conforms to a patented regulation principle for the energy-efficient operation of cooling systems
- Ready for Vertiv™ Liebert® temperature sensor
- Can be used for different sensors.

Material
- Sheet steel.

Finish
- Final digit of order number .1:
  Powder-coated texture,
  RAL 7035, light gray
- Final digit of order number .8:
  Powder-coated texture,
  RAL 7021, dark gray.

Scope of delivery
- 1 SensorBOX Mounting material.

Supplied as
- Flat-packed kit.

Order no.	UP
03.029.132.X	1 set
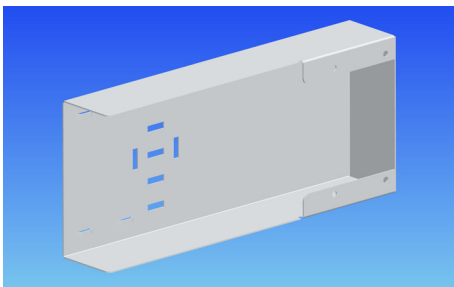
CAC20018
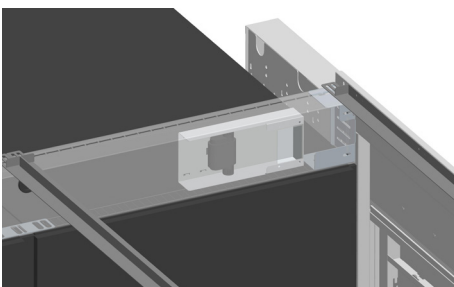
CAC20019

Vertiv™ SmartAisle™ Filler Panel

for separating areas in the aisle without racks

- For separating areas in the aisle without racks
- Quick and easy mounting
- Height-variable; applicable for "gross" rack heights from 1990 to 2220 mm
- More filler panels can be mounted side by side.

Material
- Sheet steel.

Finish
- Final digit of order number .1: Powder-coated texture, RAL 7035, light gray
- Final digit of order number .8: Powder-coated texture, RAL 7021, dark gray.

Scope of delivery
- 1 filler panel (two-piece) Mounting material.

Supplied as
- Flat-packed kit.

W/L	H	Order no.	UP
300	2000 / 2700	03.029.058.X-001	1 set
600	2000 / 2700	03.029.058.X-004	1 set
800	2000 / 2700	03.029.058.X-006	1 set
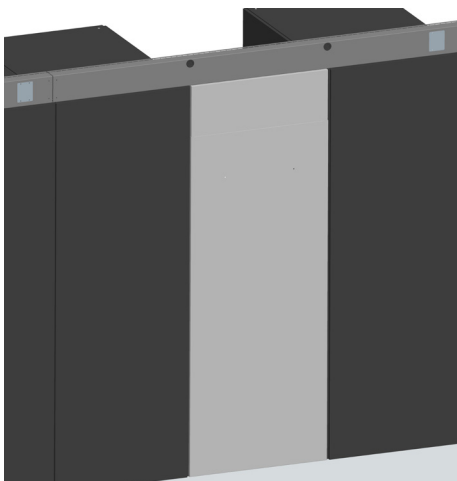
Dimensions in mm:			
W	width	U	standard height unit
H	height	1U	44.45 mm
D	depth	UP	unit of packaging
L	length	kg	weight
AW	aisle width		
Conversion:			
1mm	0.03937 inch	1kg	2.2046 pounds

DCM20057

LUF20328
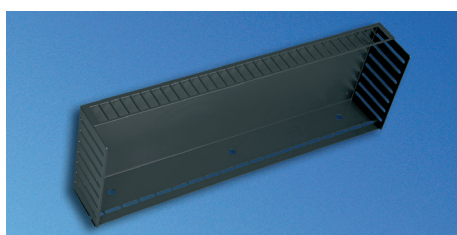
Vertiv™ SmartAisle™ Height Panel

- For balancing the separation of the cold and hot areas in smaller racks.

Material
- Sheet steel.

Finish
- Final digit of order number .1: Powder-coated texture, RAL 7035, light gray
- Final digit of order number .8: Powder-coated texture, RAL 7021, dark gray.

**Scope of delivery**
- 1 height panel Mounting material.

Supplied as
- Flat-packed kit.

Please note
- For several height panels positioned beside one another, please ask for the appropriate angular extrusion plates.

W/L	H	D	AW	For rack type	Order no.	UP
300	221			Vertiv™ Knürr DCM™*	03.029.140.X	1 set
600	221			Vertiv™ Knürr DCM™*	03.029.141.X	1 set
600	200			Vertiv™ Knürr™ MIR	03.029.051.X	1 set
800	221			Vertiv™ Knürr DCM™*	03.029.143.X	1set
800	200			Vertiv™ Knürr™ MIR	03.029.052.X	1 set
1000	221			Vertiv™ Knürr DCM™*	03.029.145.X	1 set

DCM20045

LUF20327

Vertiv™ SmartAisle™ Protector Bracket for Roof Element

- Prevents plexiglas panels from lifting up with excess pressure
- Enables safe pressure balance in the event of a fault or if a fire is being extinguished.

Material
- Sheet steel.

Finish
- Final digit of order number .1:
  Powder-coated texture,
  RAL 7035, light gray
- Final digit of order number .8:
  Powder-coated texture,
  RAL 7021, dark gray.

Scope of delivery
- 1 pair of protector brackets
- Mounting material.

Supplied as
- Flat-packed kit.

W/L	H	D	AW	For rack type	Order no.	UP
					03.029.041.X	1 set
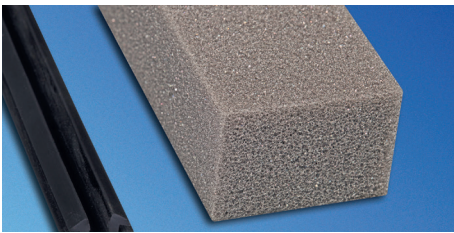
LUF20336

Vertiv™ SmartAisle™ Sealing Set
for 4.8 meter aisle length

- Suitable for installation in Vertiv™ Knürr™ MIR rack
- For sealing the leveling area between the floor and rack
- For sealing Vertiv™ Knürr™ MIR rack aisles without side panels.

Material
- Foam: PUR-Ether UL94 HF-1, black
- Cover extrusion: PVC extruder, black

Scope of delivery
- 10 meters of foam 40 x 25 mm
- 31 meter cover extrusion.

Supplied as
- Flat-packed kit.

W/L	H	D	AW	For rack type	Order no.	UP
4800				Vertiv™ Knürr™ MIR	03.029.040.9	1 set

DCM20047

Vertiv™ SmartAisle™ Sealing Material

- Suitable for sealing openings (e.g. leveling areas between floor and rack, between racks, etc.).

Material / color
- PUR-Ether UL94 HF-1, black.

Scope of delivery
- 5 x 2 meters of foam.

Supplied as
- Flat-packed kit.

W/L	H	D	AW	SIZE	Order no.	UP
				40 x 40 (glued surface) mm	03.029.042.9	1 set
				20 x 20 (glued surface) mm	03.029.043.9	1 set
				5 x 10 (glued surface) mm	03.029.044.9	1 set
				25 x 40 (glued surface) mm	03.029.045.9	1set
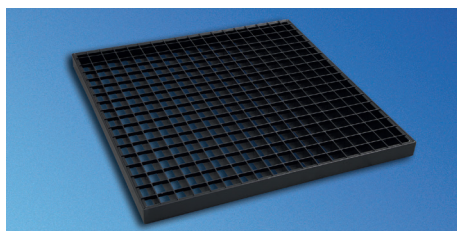
LUF20331

Vertiv™ SmartAisle™ Protector Bracket for Roof Element

- For use on raised floors
- Can be used with high heat loads and high requirements for cooling air per rack
- For energy-efficient operation of the recirculated air devices.
- Mesh spacing 33 x 16mm

Dimensions in mm:

W	width	U	standard height unit
H	height	1U	44.45 mm
D	depth	UP	unit of packaging
L	length	kg	weight
AW	aisle width		
Conversion:			
1mm	0.03937 inch	1kg	2.2046 pounds

Material

- Zinc-passivated steel.

Finish

- Final digit of order number .1:
  Powder-coated texture,
  RAL 7035, light gray
- Final digit of order number .8:
  Powder-coated texture,
  RAL 7021, dark gray.

Standards

- Produced in acc. with RAL-GZ 638
  Load capacity according to DIN EN 12825

  - on supports: deflection class 1A (2 kN) and 2C (3kN);

  - measurement plate center on supports and profiles: deflection class 2A (3kN).

Scope of delivery

- 1 raised floor grate.

Technical data

- Size 598 x 598 x 40 mm (WxLxH)
- Free cross-section 88%
- Max. surface load 50.000 N/m2 with even distribution
- Max. point load (on 200 x 200 mm area) 4.500 N.

Supplied as

- 1 Unit.

Please note

- Suitable for raised floors with 40 mm thick panels!

Order no.	UP
03.029.090.X	1 set
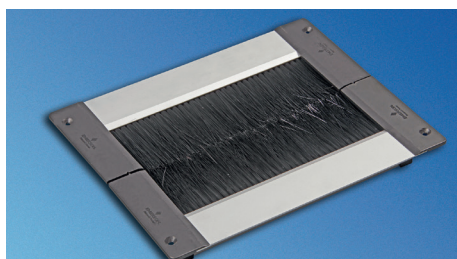
LUF20334

LUF20301

LUF20302

Vertiv™ SmartAisle™ Raised Floor Air Barrier for cable entry

- For cable entry from the raised floor
- Sunk in to the raised floor, or can be used as superstructure
- Two-row tight brushes for pressure-resistant cold-hot separation
- For new breakouts; as superstructure for existing breakouts
- Two-piece – option to easily extend and upgrade.
- The length can be easily shortened onsite (metal saw)
- Also suitable for cabling on the rack wall (U-shape, two-piece)
- Slot-in connection – additional threaded connection.
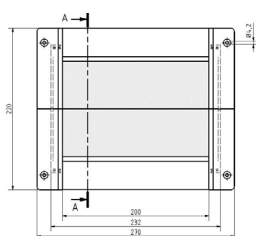
Dimensions

- 03.028.211.9:
  - External dimensions (270 mm x 220 mm)
  - Usable cable entry (200 mm x 126 mm)
  - Raised floor breakout (240 mm x 180 mm)
- 03.028.212.9:
  - External dimensions (600 mm x 220 mm)
  - Usable cable entry (530 mm x 126 mm)
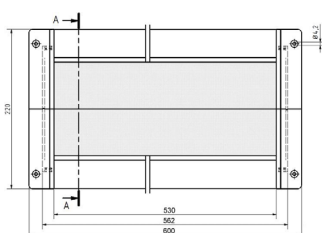 - Raised floor breakout (570 mm x 180 mm).

Scope of delivery

- 1 pair of raised floor air barriers Mounting material.

Supplied as

- Flat-packed kit.

W	H	D	U	D (max) kg	MODEL	Order no.	UP
270	220				Length 270 mm	**03.028.211.9**	1 set
600	220				Length 600 mm	**03.028.212.9**	1 set

Vertiv™ SmartAisle™ Containment Customized

Customized – Retrofitting Solution from Vertiv

On Request

Data Centers are often the result of a structure that has developed over the course of many years.

Cabinets have different dimensions and are not always positioned in a line. Knürr offers this customized solution based on a profile construction that can be made on site to accommodate the data-center precisely.

With this solution, the dimensions are recorded on site and the profiles and panels for the enclosure are cut and assembled according to your requirements. The panels are normally cut away from the data-center in a designated area.

If possible, the customized elements are combined with standard components. The standard sliding or hinged doors are generally used. The standard top element is also sometimes used as the customized elements are only used for the gaps between the cabinets.

Features

- Precisely fitted to cabinets and cabinet positions

- Suitable for retrofitting non-homogenous data-centers

- Can be combined with Vertiv SmartAisle standard.

Vertiv™ SmartAisle™ Containment Customized adapts to specific conditions in the data-center

Vertiv™ Containment SwitchTubes

SwitchTubes – Switch Cooling from Vertiv

Cooling of switches

Servers draw in cold air for cooling from the front and blow out the heated air at the back. In contrast, switches generally suck in cold air from the side and blow the air out at the side or from the back. This leads to cooling problems in racks which have a consistent separation of warm and cold air. Special air-conduction systems are needed for switch applications in order to ensure a safe, energy-efficient solution.

The Vertiv SmartAisle SwitchTube is a safe and flexible supplement to the entire SmartAisle range. Different standard products are available depending on the switch type.

Switches have special requirements.

Cooling / ventilation:

- Usually side-to-side airflow (right to left, left to right, left and right to back, and combinations of different directions)
- Switches suck in hot air!
- Often high cooling capacity required (up to 10 kW per switch).

Maximum supply-air temperature:

- Maximum supply-air temperature is approx. 37- 40°C
- Problems in environments with energy-efficient cold / hot air separation
- Increased energy demand for cooling.

Cabling:

- Large number of cables
- The fan unit is not blocked by cables, which enables repairs to be carried out during operation
- Airflow should not be obstructed by cables.

Mechanics:

- Different heights (1U to approx. 24U)
- Different depths with different intake areas
- Vertiv offers a wide range of SwitchTubes for the most common switches on the market.

Features

- No hot spots
- Adequate airflow
- Allows use in energy-efficient data center.

SwitchTubes – Controlled Cooling for Switches

Servers are usually cooled from front to back. This fits into the concept of a modern, energy-efficient data center. However, the cooling direction of switches is mostly side-to-side. In this application, switches tend to suck in cold air from a warm area.

The SwitchTube enables the switch to receive air from the cold aisle, while hot air is guided into the hot aisle.
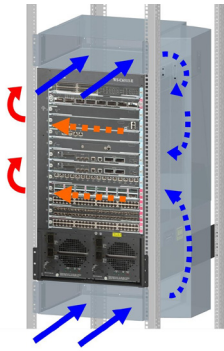
Vertiv™ SmartAisle™ Containment
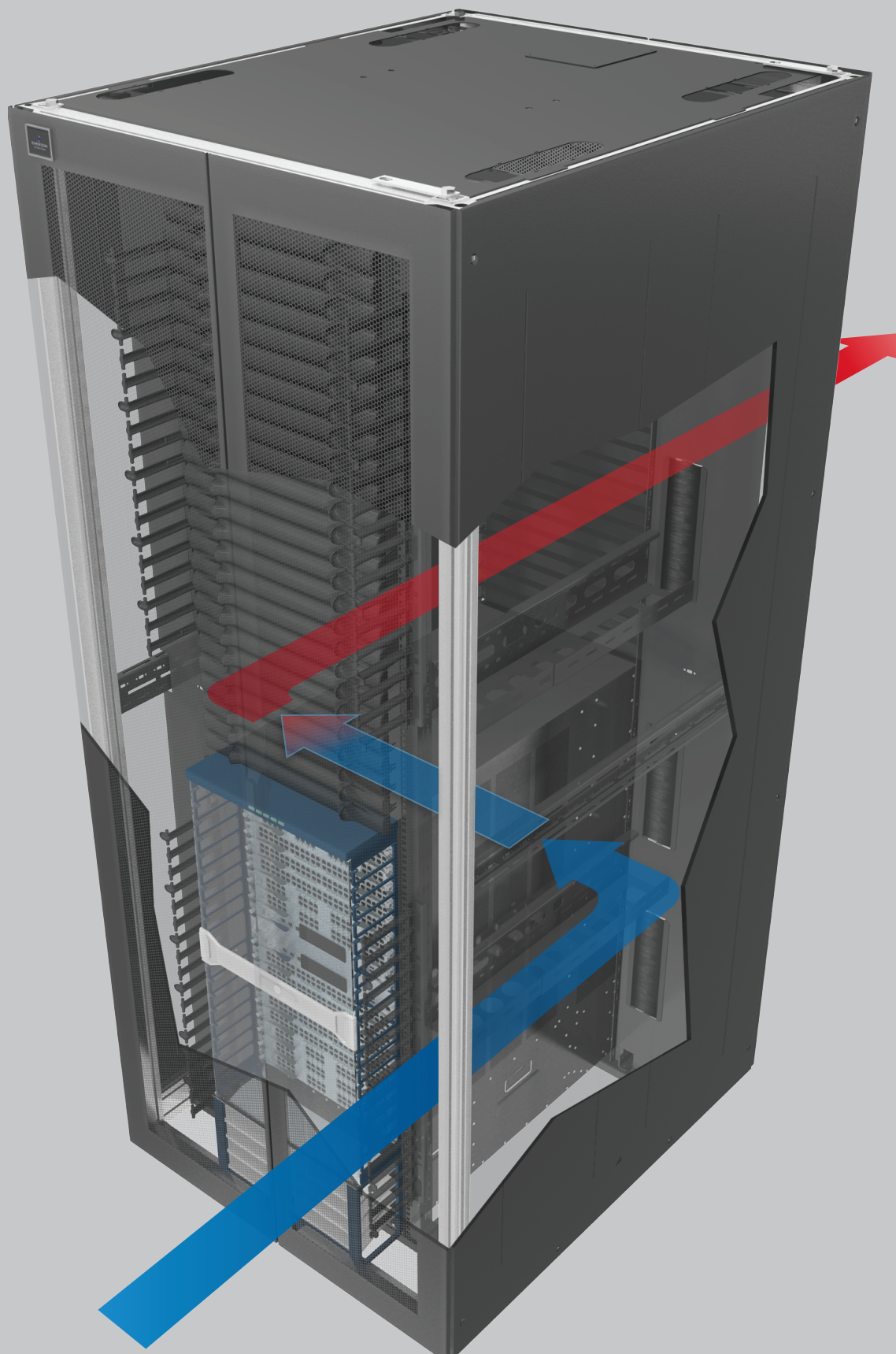
Vertiv™ SmartAisle™ Containment SwitchTubes
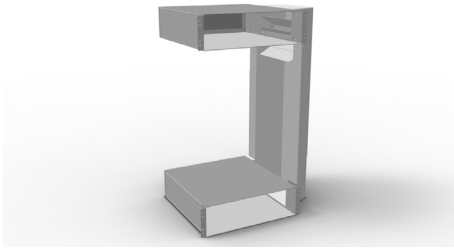
LUF20360
03.029.217.X

LUF20379
03.029.217.X

Vertiv™ SmartAisle™ Switch 19"-Tube
for cooling a core switch from the cold aisle

- For applications with and without raised floors
- Applicable to switches with side-to-side cooling for energy-efficient cooling
- Air inlet from the cold aisle (ideally with containment)
- Suitable for Vertiv™ Knürr™ MIR and Vertiv™ Knürr DCM™ rack; rack width 800 mm
- Requires 3 or 6U of the 19" installation space
- Applicable to different switch heights
- Height variable installation in the rack possible
- INFO: cold-warm separation necessary in rack.

Material

- Tube: sheet steel
- Sealing foam: PUR-Ether UL94 HF-1.

Finish

- Final digit of order number .1: Powder-coated texture, RAL 7035, light gray
- Final digit of order number .8: Powder-coated texture, RAL 7021, dark gray.

Scope of delivery

- 2 intake drawers (for type 12-21U)
- 1 intake drawer (for type 7-12U / 4-6U)
- 1 height-adjustable air tube
- Sealing foam
- Mounting material.

Supplied as

- Flat-packed kit.

IMPORTANT

- Suitable for cooling a maximum of 2-7 kW heat load (at $\Delta T = 13$ K) per SwitchTube.
- If there are many switches installed in the rack, one part of the front inlet perforated section is covered (since they are often very close to the front behind the front 19" extrusions).
- May not be suitable for switches with different cooling directions.

Please note

- Additional installations may be difficult due to existing cabling and accessory components.

W	Application	For rack type	Order no.	UP
800	Core switch 12-21U	MIR®, DCM®	**03.029.217.X**	1 set
800	Core switch 12-21U	MIR®, DCM®	**03.029.218.X**	1 set
800	Core switch 7-12U	MIR®, DCM®	**03.029.213.X**	1 set
800	Core switch 7-12U	MIR®, DCM®	**03.029.215.X**	1 set
800	Core switch 4-6U	MIR®, DCM®	**03.029.214.X**	1 set
800	Core switch 7-12U	MIR®, DCM®	**03.029.219.X**	1 set

Dimensions in mm:

W	width	U	standard height unit
H	height	1U	44.45 mm
D	depth	UP	unit of packaging
L	length	kg	weight
AW	aisle width		

Conversion:

1mm	0.03937 inch	1kg	2.2046 pounds
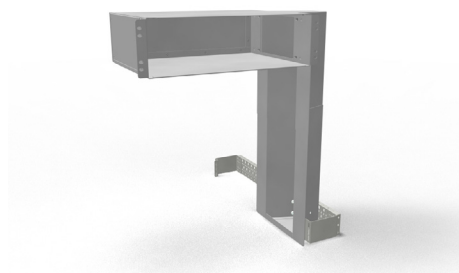
LUF203 · *03.029.213.X*
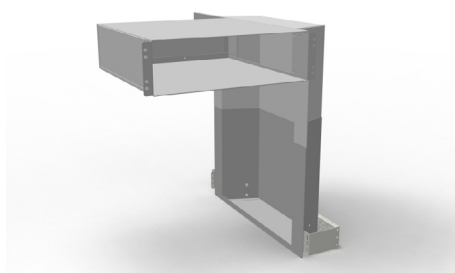
LUF20377 · *03.029.215.X*
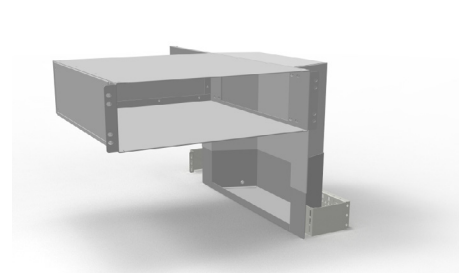
LUF20359 · *03.029.214.X*
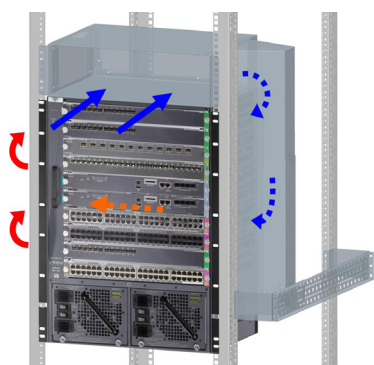
LUF20375 · *03.029.213.X*
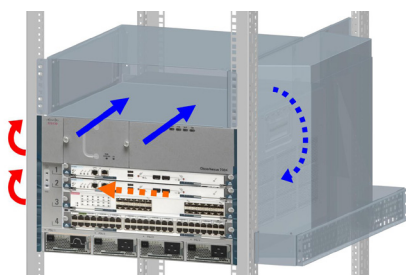
LUF20378 · *03.029.215.X*
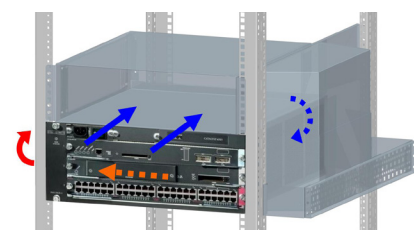
*LUF20376* · *03.029.214.X*
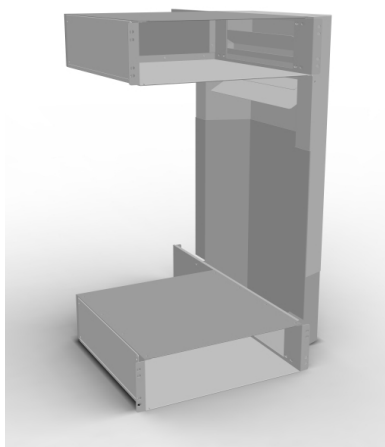
LUF20354 · *03.029.218.X*

LUF20380 · *03.029.218.X*

Intake area

Item number	Switch height	Max.	Max. air-intake area depth in mm (Distance to 19")	Compatible
03.029.217.X	12-21	approx. 7 kW (ΔT = 13 K) per switch tube	460	CISCO Catalyst 6506(-E). 6509(-E), 6513, MDS 9509 Director
03.029.218.X	12-21	approx. 7 kW (ΔT = 13 K) per switch tube	600	CISCO NEXUS 7009
03.029.213.X	7-12	approx. 2 kW (ΔT = 13 K) per switch tube	320	CISCO Catalyst 4503, 4506, 4507R, 4510R
03.029.215.X	7-12	approx. 4 kW (ΔT = 13 K) per switch tube	600	CISCO Nexus 7004
03.029.214.X	4-6	approx. 4 kW (ΔT = 13 K) per switch tube	550	CISCO Catalyst 6503(-E), 6504(-E)
03.029.219.X	7-12	approx. 4 kW (ΔT = 13K) per switch tube	460	CISCO Catalyst 6807-XL, Enterasys S4

Vertiv™ SmartAisle™ Containment
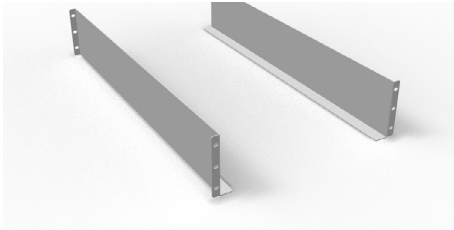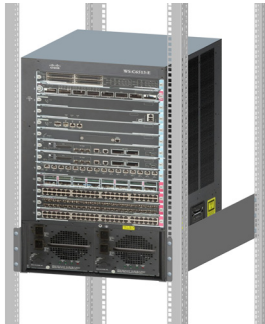
LUF20364

LUF20365

Chassis Runner Tube D740

to support switches when installed in the rack

- Supports the weight of the switch during installation and securing in the rack
- Can be used with Vertiv™ SmartAisle™ Switch 19" Tubes 12-21U
- Suitable for insertion depth 740 mm
- Suitable for all 19" extrusions
- Suitable e.g. for: CISCO Catalyst 6506(-E), MDS 9509 Director.

Material / finish

- Sheet steel 2,0 mm, zinc-passivated.

Scope of delivery

- 2 chassis runners
- Mounting material.

Supplied as

- In pairs.

W/L	U	D	For insertion depth	Order no.	UP
130	3	from 900	740	**03.029.230.7**	1 pairs

Vertiv™ SmartAisle™ SwitchTube 1U back-to-front

for 1U high switches

- For 1U switches with "back-to-front" cooling
- Can be applied flexibly for different switch depths
- Suitable for different insertion depths
- Suitable for Vertiv™ Knürr™ MIR and Vertiv™ Knürr DCM™ rack
- Suitable e.g. for Enterasys SSA 180.

Material / finish

- Tube: sheet steel
- Sealing foam: PUR-Ether UL94 HF-1.

Finish

- Final digit of order number .1: Powder-coated texture, RAL 7035, light gray
- Final digit of order number .8: Powder-coated texture, RAL 7021, dark gray.

LUF20366

Scope of delivery

- 1 intake drawer
- 2 rear support brackets
- Sealing foam
- Edge protection
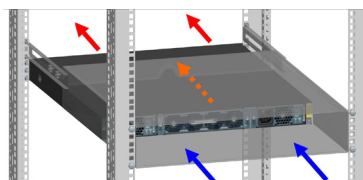- Mounting material.

Supplied as

- Flat-packed kit.

Please note

- Additional installations may be difficult due to existing cabling and accessory components.
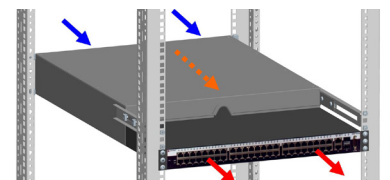
W	H	U	For insertion depth	For rack type	Order no.	UP
450	87,5	2	600–750	for Switches with 1U height	**03.029.212.X**	1 unit
450	132	3	600–750	for Switches with 2U height	**03.029.207.X**	1 unit
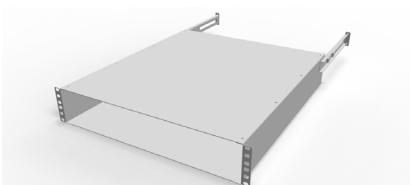
LUF20372

LUF20373

LUF20374

LUF20356   *03.029.210.X*

LUF20368   *03.029.210.X*

LUF20369   *03.029.210.X*

Vertiv™ SmartAisle™ SwitchTube

for 1U / 2U / 3U high switches

- For 1U, 2U or 3U switches with side-to-side cooling
- Can be used in racks with "back-to-front" cooling
- Can be applied flexibly for different switch depths
- Front or rear mounting possible
- Suitable for different cooling directions (left to right, right to left or right and left to back)
- Suitable for different insertion depths from 560 to 755 mm
- Suitable for Vertiv™ Knürr™, Vertiv™ Knürr™ MIR and Vertiv™ Knürr DCM™ server extrusion
- Suitable for rack widths 600, 700, 800 and 1000
- Suitable e.g. for CISCO Catalyst 3750, Juniper EX3200, Juniper EX4200.

Material / finish

- Tube: sheet steel
- Sealing foam: PUR-Ether UL94 HF-1.

Finish

- Final digit of order number .1:
  Powder-coated texture,
  RAL 7035, light gray
- Final digit of order number .8:
  Powder-coated texture,
  RAL 7021, dark gray.

Scope of delivery

- 1 intake drawer
- 2 side air ducts
- 1 side cover
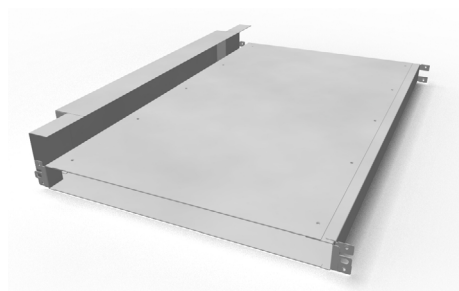- Sealing foam
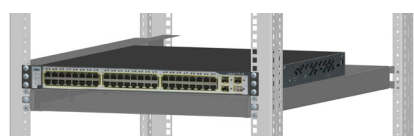- Mounting material

Supplied as

- Flat-packed kit.

Please note

- Additional installations may be difficult due to existing cabling and accessory components.

W	H	U	For insertion depth	Model	Order no.	UP
440	88,1	1	560 - 755	for 1 U switch	**03.029.210.X**	1 unit
440	132,5	2	560 - 755	for 2 U switch	**03.029.211.X**	1 unit
440	177	3	560 - 755	for 3 U switch	**03.029.208.X**	1 unit

LUF20357   *03.029.211.X*

LUF20370   *03.029.211.X*
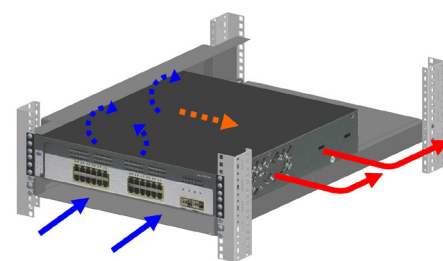
LUF20371   *03.029.211.X*

Dimensions in mm:

W	width	U	standard height unit
H	height	1U	44.45 mm
D	depth	UP	unit of packaging
L	length	kg	weight
AW	aisle width		

Conversion:

1mm	0.03937 inch	1kg	2.2046 pounds
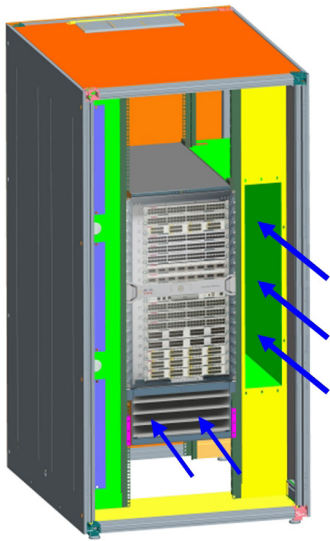
LUF20362
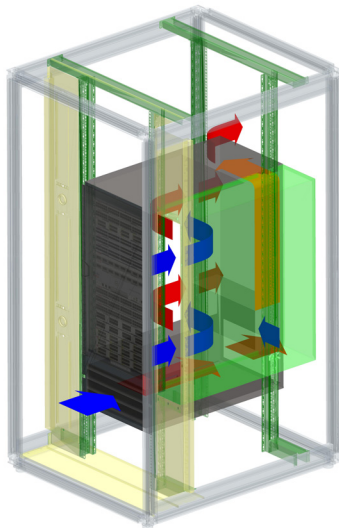
Vertiv™ SmartAisle™ SwitchRack

for CISCO Nexus 7018

- For assembling a CISCO Nexus 7018 at a height of 7U to 31U
- Base Vertiv™ Knürr DCM™ rack
- Rack width of 1000 mm according to the CISCO specification for adequate cold air
- Avoids hot spots (recirculation of air)
- Front area depth of 200 mm for orderly cabling
- Panels for separating cold and warm air for an energy-efficient operation
- Cold air intake from the cold aisle.

Material / finish

- Basic frame: extruded aluminium, polished
- Corner piece: die-cast aluminium, polished
- Doors: sheet steel, powder-coated texture
- Covers: zinc-passivated sheet steel, powder-coated texture
- Foam: PUR-Ether UL94 HF-1.

Color

- Final digit of order number .1: Visible surface of covers RAL 7035, light gray
- Final digit of order number .8: Visible surface of covers, RAL 7021, dark gray.

Scope of delivery

- 1 basic frame
- 4 19" server extrusions, sheet steel incl. U marking
- 2 side panels with quick-release fasteners
- 1 top cover with cable entry (three-piece sliding plates, can also be opened completely)
- 1 front door, double, perforated, sheet steel, with handle and mounting for cylinder lock
- 1 rear door, double, perforated, sheet steel, with handle and mounting for cylinder lock
- 1 complete air separation (on the left: cover with 3x 2U 19" cutouts, right side with air tube)
- 4 leveling feet
- 1 complete earthing set (VDE 0100).

Supplied as

- Assembled.

Please note

- Mounting adapters for 19" server extrusion should also be ordered for mounting Knürr accessories (01.147.640.9).

LUF20363

Dimensions in mm:

W	width	U	standard height unit
H	height	1U	44.45 mm
D	depth	UP	unit of packaging
L	length	kg	weight
AW	aisle width		

Conversion:

1mm	0.03937 inch	1kg	2.2046 pounds

W	H	D	U	Front depth	Insertion depth	Rack type	Order no.	UP
1000	2000	1200	42	200	740	DCM	**03.029.222.X**	1 unit

LUF20355

Vertiv™ SmartAisle™ SwitchTube Raised Floor

for cooling a core switch from a raised floor

- Suitable for switches with side-to-side cooling for energy-efficient cooling
- Air inlet from the raised floor
- Suitable for Knürr Vertiv™ Knürr™ MIR rack; rack width 800 mm (NOT for DCM rack)
- Suitable for different switch heights
- Height-variable assembly possible in the rack; tool-free blanking panels to cover the areas outside switches
- Base area tube: 420 cm²
- Cut-out in the raised floor (min./max.): 355/410 x 127/162 mm
- INFO: cold-warm separation necessary in rack
- INFO: for max. switch intake depth of 460 mm (distance from the 19" area)
- Suitable e.g. for CISCO Catalyst 6509(-E), Catalyst 6513, Catalyst 6506(-E), MDS 9509 Director, HP ProCurve 8212.

LUF20367

Material / finish

- Tube: sheet steel
- Sealing foam: PUR-Ether UL94 HF-1.

Finish

- Final digit of order number .1: Powder-coated texture, RAL 7035, light gray
- Final digit of order number .8: Powder-coated texture, RAL 7021, dark gray.

Scope of delivery

- 1 tube with blanking panels (1U, 3U)
- 1 bottom plate
- Sealing material
- Mounting material.

Supplied as

- Flat-packed kit.

IMPORTANT

- Suitable for cooling a maximum 4 kW heat load (at ΔT = 13 K) per SwitchTube.
- The tube covers one part of the front inlet perforation section when many switches are installed in the rack (as they are often close to the front behind the front 19" extrusions).
- May not be suitable for switches with different cooling directions.
- The highest 3U in the rack cannot be used for cooling.

Please note

- Additional installations may be difficult due to existing cabling and accessory components.
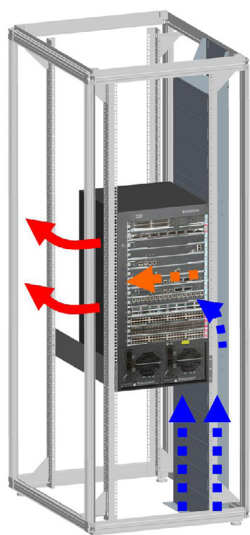
W/L	U	D	ITEM	For rack type	Order no.	UP
800	2000		Tube	Vertiv™ Knürr™ MIR	**03.029.200.X**	1 set
800	2200		Tube	Vertiv™ Knürr™ MIR	**03.029.202.X**	1 set

Vertiv.com | **Vertiv Infrastructure Limited,** George Curl Way, Southampton, SO18 2RY, VAT Number: GB188146827

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