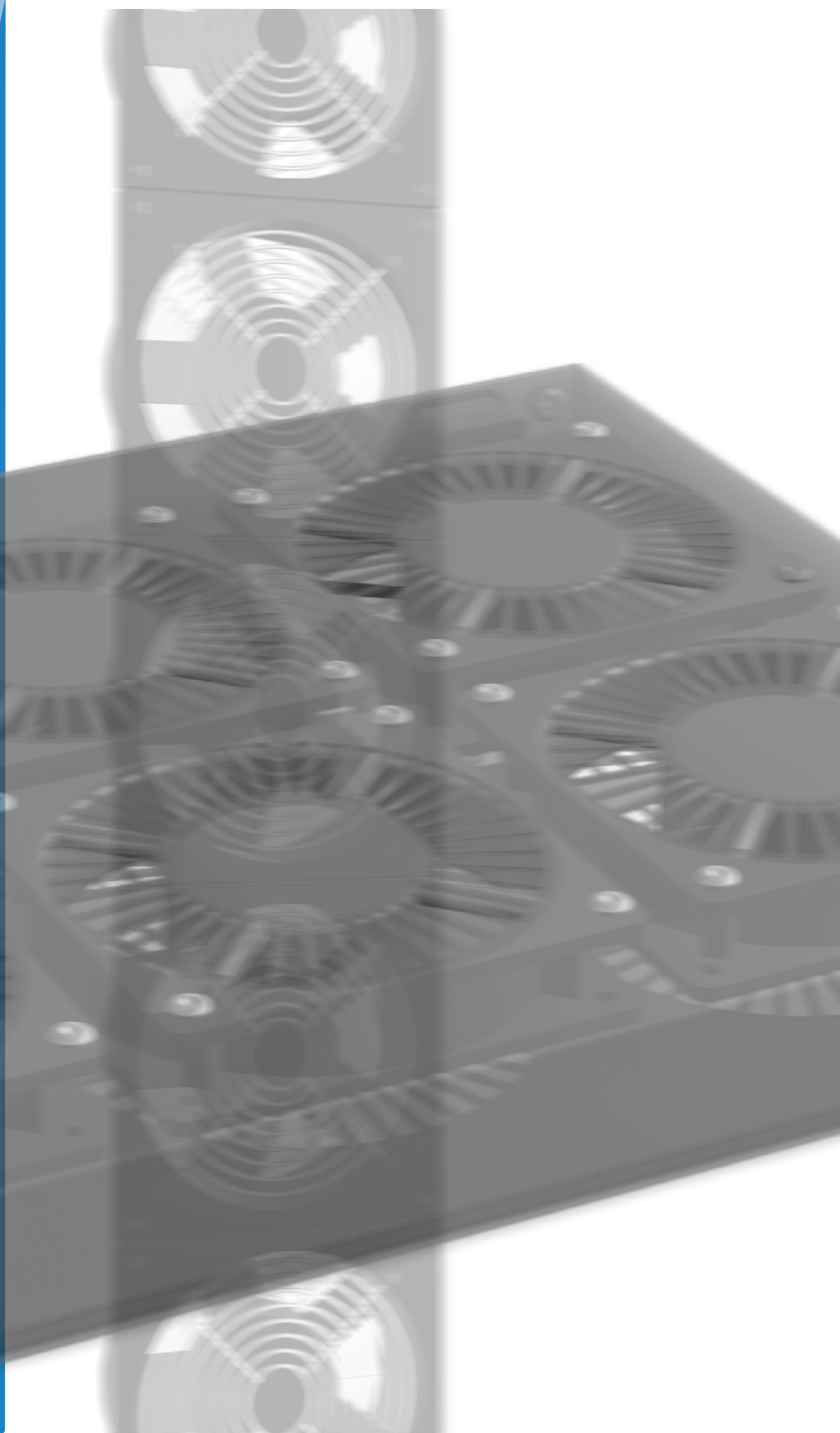


4. TARGETED COOLING & AIRFLOW MANAGEMENT

4. TARGETED COOLING & AIRFLOW MANAGEMENT

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TARGETED COOLING

It stands to reason that the cooling of a facility does not need to be uniform as a concentration of blade servers will produce a far greater heat load than more traditional form factor servers or Storage Area Arrays and we don't often see a computer room featuring only one type of equipment. CONTEG Targeted Cooling gives the facility planner the flexibility to design different power zones within the data-center eliminating the need for a "blanket" approach which could lead to over-cooling of the facility in low density areas and high operational costs associated with too much cooling.

CONTEG Targeted Cooling Solutions are available in four main types: **Side Mount** (see page 76), **Rear Mount** (see page 79), **Top Mount** and **Wall Mount** (see page 80, 81). The name represents the side of rack used for connection with the A/C or cooling unit.

Rear and Side Mount solutions are designed to address the very high density heat loads typically found in today's data center or equipment room. Rear Mount solution represents a unique additional cooling system, while the side mount solutions can be applied as the main cooling system in various types of data centers.

Open and Closed air loop architectures give a high degree of design flexibility to ensure that the cooling needs of the equipment can be met, whatever the design criteria may be. The highly efficient cooling units are available with capacities up to 36kW in a 300mm wide footprint to ensure that even the most demanding computing equipment environment can be kept at the optimum temperature.

Chilled Water system uses chilled water to absorb heat from the air and sends it via a piping system to a chiller. A chiller transfers the waste heat to the atmosphere and is normally located outside. The required equipment includes chillers, cooling tower (or dry cooler), pumps and electrical control equipment. In **Direct Expansion** system, the evaporator is in direct contact with the air. The hot air from the IT equipment is directed over an indoor finned coil which transfers the heat to the liquid refrigerant. The heat is rejected in an other heat exchanger or outdoor condenser. The term "direct" refers to the position of the evaporator with respect to the air loop. The term "expansion" refers to the method used to transform the refrigerant (R410A) in the finning coil.

Top and Wall Mount solutions have been developed for deployment in areas where there is insufficient cooling available to properly serve the needs of the equipment, for example in Telecommunications Closets or where insufficient capacity exists within the central air-conditioning system to cope with the heat load generated by extra equipment.



TARGETED COOLING UNITS COMPATIBILITY

The principles of installation and operation of all offered cooling systems are different. Due to this we have prepared an easy-to-read table with the compatibility information between chosen rack series and the Targeted Cooling systems.

PREMIUM RACK SERIES

PREMIUM rack series is the most suitable one to be used together with the complete range of Targeted Cooling solutions. All below presented PREMIUM rack series (RDF, RHF, RSF) are fully compatible with all solutions except rear mount cooling units in closed architecture, where only RDF racks are recommended to be used. Please note, that only 800mm wide racks can be used for rear mount cooling solutions.

OPTIMAL RACK SERIES

The ROF rack series is traditional, through years of proven rack series, which has been redesigned to maximize the compatibility with all data center solutions including Targeted Cooling products. Thanks to this, the ROF racks can be used in various projects using side open architecture cooling systems and can also be used together with rear mount cooling units in closed architecture and with wall mount A/C units.

Targeted Cooling solutions	Rack series compatibility			
	RHF	RDF	RSF	ROF
Side Mount - Open Architecture	Yes	Yes	Yes	Yes
Side Mount - Closed Architecture	Yes	Yes	Yes	Use RHF, RDF, RSF
Rear Mount - Open Architecture ¹	Yes	Yes	Yes	Yes
Rear Mount - Closed Architecture ¹	No	Yes ²	No	Yes ²
Top Mount	Yes	Yes	Yes	Use RHF, RDF, RSF
Wall Mount	Yes	Yes	Yes	Yes

¹ 800mm wide racks only

² When applied, the load rating of 1200mm deep racks is limited to 500kg

More information on the racks presented here can be found on following pages of this catalog:

RHF - page 20

RDF - page 24

RSF - page 28

ROF - page 37

Information on compatibility of other free standing rack series upon request.

4.1 SIDE MOUNT COOLING UNITS

CONTEG Side Mount Targeted Cooling is available in both closed and open air loop configurations. The Open Architecture units can be deployed in the cabinet row to deliver cooling directly to the cold aisle. Closed Architecture units provide the ultimate in available cooling with capacities up to 36kW.

OPEN AIR LOOP ARCHITECTURE is ideally suited for use in hot/cold and contained cold aisle deployments and can be used to supplement the existing cooling system within a facility to add capacity on a zone by zone basis. Warm air is sucked directly from the hot aisle, cooled and humidified by the side mounted cooling units before being delivered back into the cold aisle for use by the equipment. The range of available capacities means that it is now easy to meet zone cooling requirements in a hot/cold aisle deployment without over-cooling the entire facility. Furthermore, side cooling can be combined with the CONTEG contained cold or hot aisle solution to further promote efficient use of chilled air leading to reduced facility operational costs.

CLOSED AIR LOOP ARCHITECTURE is ideally suited for very high heat density racks where traditionally delivered cooling air may not provide sufficient capacity for the very high thermal loads generated by equipment placed in the racks. Additionally, the side mount closed architecture ensures that heat generated within the cabinet is removed at the point of production and not released into the data center environment, thereby minimizing the chances of localized hot-spots forming in the high density zones.

Other cooling capacity up to 80kW upon request.
Contact us for more information on this cooling solution.

DESCRIPTION

- Cooling capacities: up to 36kW; even the most demanding computing equipment can be kept at the optimum temperature
- Height: 42, 45 or 48U
- Width: 300mm
- Depth: 1000 or 1200mm (1000mm not applicable for closed loop)
- Welded frame construction from 1.5 & 2mm sheet steel
- Available in Direct Expansion (DX) and Chilled Water (CW) variants
- Electronic Control Board - cooling and chilled air throughput are

- controlled with microprocessors to ensure optimum cooling levels are maintained at all times
- Plumbed to either outdoor micro-condensers or the central chilled water systems. Pipes are laid below raised floor and routed to the chilled water or micro-condenser installations
- EC fans available upon request
- Top connection (bottom as standard) of pipes with coolant available (only chilled water variant) upon request



Side mount cooling units

CHILLED WATER SIDE MOUNT COOLING UNITS ¹

OPEN ARCHITECTURE	12.5 kW	16.2 kW	19.3 kW
H x W x D: 42U x 300mm x 1000mm ²	AC-SO-CW/A2-42-30/100	AC-SO-CW/A8-42-30/100	AC-SO-CW/B4-42-30/100
H x W x D: 42U x 300mm x 1200mm ²	AC-SO-CW/A2-42-30/120	AC-SO-CW/A8-42-30/120	AC-SO-CW/B4-42-30/120
CLOSED ARCHITECTURE	21.6 kW	29.5 kW	36 kW
H x W x D: 42U x 300mm x 1000mm ²	AC-SM-CW/A4-42-30/100	AC-SM-CW/B2-42-30/100	AC-SM-CW/C4-42-30/100
H x W x D: 42U x 300mm x 1200mm ²	AC-SM-CW/A4-42-30/120	AC-SM-CW/B2-42-30/120	AC-SM-CW/C4-42-30/120

Add -T in the end of the cooling unit's code for top connection of water piping (bottom connection as standard); drain pump is standard part of delivery ³

Add -EC in the end of the cooling unit's code for having EC (enhanced) fans in your cooling unit ³

¹ Presented nominal cooling capacity is valid under nominal conditions only open architecture: water temperature 7/12 °C, air inlet temperature 30 °C; closed architecture: water temperature 7/12 °C, air inlet temperature 45 °C; refrigerant: water without additives

² Cooling units in 45 and 48U also available - simply replace 42 in cooling unit's code for 45 or 48 (example: AC-SO-CW/A2-48-30/100)

³ Example: AC-SO-CW/A8-45-30/120-TEC = side mount cooling unit, open architecture, chilled water, 16,2kW, (H/W/D) 45U/300mm/1200mm, top connection of piping, EC fans

DIRECT EXPANSION SIDE MOUNT COOLING UNITS

OPEN ARCHITECTURE	12 kW	20 kW
H x W x D: 42U x 300mm x 1000mm ¹	AC-SO-DX/A2-42-30/100	AC-SO-DX/A8-42-30/100
H x W x D: 42U x 300mm x 1200mm ¹	AC-SO-DX/A2-42-30/120	AC-SO-DX/A8-42-30/120
CLOSED ARCHITECTURE	12 kW	20 kW
H x W x D: 42U x 300mm x 1000mm ¹	AC-SM-DX/A2-42-30/100	AC-SM-DX/A8-42-30/100
H x W x D: 42U x 300mm x 1200mm ¹	AC-SM-DX/A2-42-30/120	AC-SM-DX/A8-42-30/120

¹ Cooling units in 45 and 48U also available - simply replace 42 in cooling unit's code for 45 or 48 (example: AC-SO-DX/A2-48-30/100)

TECHNICAL DATA - CHILLED WATER SIDE MOUNT COOLING UNITS

	Unit	AC-SO-CW/A2	AC-SO-CW/A8	AC-SO-CW/B4	AC-SM-CW/A4	AC-SM-CW/B2	AC-SM-CW/C4
Total cooling capacity ¹	kW	12.5	16.2	19.3	21.6	29.5	36.0
Sensible cooling capacity ¹	kW	12.5	16.2	19.3	21.6	29.5	36.0
Architecture	type	open	open	open	closed	closed	closed
Power supply	V/ph/Hz	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50
Air flow ²	m³/h	2500	3600	3600	2600	4000	4000
AC FAN VERSION (delivered as standard)							
Number of fans	pcs	3	5	5	3	5	5
Fan motor max. (each)	W/A	160/0.7	160/0.7	160/0.7	160/0.7	160/0.7	160/0.7
EC FAN VERSION (optionally)							
Number of fans	pcs	3	5	5	3	5	5
Fan motor max. (each)	W/A	178/1.4	178/1.4	178/1.4	178/1.4	178/1.4	178/1.4
AIR-TO-WATER HEAT EXCHANGER							
Type		COPPER TUBE/ALUMINUM FIN			COPPER TUBE/ALUMINUM FIN		
Air face velocity	m/s	2.3	2.8	2.8	2.3	2.8	2.8
WATER CIRCUIT							
Water flow	l/h	2150	2790	3330	3700	5070	6200
Water pressure drop (total) ³	kPa	62	91	75	81	122	142
Water valve		3-way modulating valve			3-way modulating valve		
WASHABLE FILTER (delivered as standard)							
Quantity and shape	pcs/type	3/zigzag	3/zigzag	3/zigzag	x	x	x
Size	mm	600x180	600x180	600x180	x	x	x
Depth	mm	100	100	100	x	x	x
Efficiency		EU3	EU3	EU3	x	x	x
COOLING MODULE							
Height	mm	1978 (42U), 2111 (45U), 2245 (48U)			1978 (42U), 2111 (45U), 2245 (48U)		
Width	mm	300	300	300	300	300	300
Depth	mm	1000 or 1200	1000 or 1200	1000 or 1200	1200	1200	1200
Weight - depth 1000mm, height 42/45/48U ⁴	kg	169/174/179	173/178/183	173/178/183	x	x	x
Weight - depth 1200mm, height 42/45/48U ⁴	kg	179/185/191	183/189/195	183/189/195	179/185/191	183/189/195	183/189/195
WATER CONNECTION SIZES							
Supply pipe diameter and type	in	1" female	1" female	1" female	1" female	1" female	1" female
Return pipe diameter and type	in	1" female	1" female	1" female	1" female	1" female	1" female

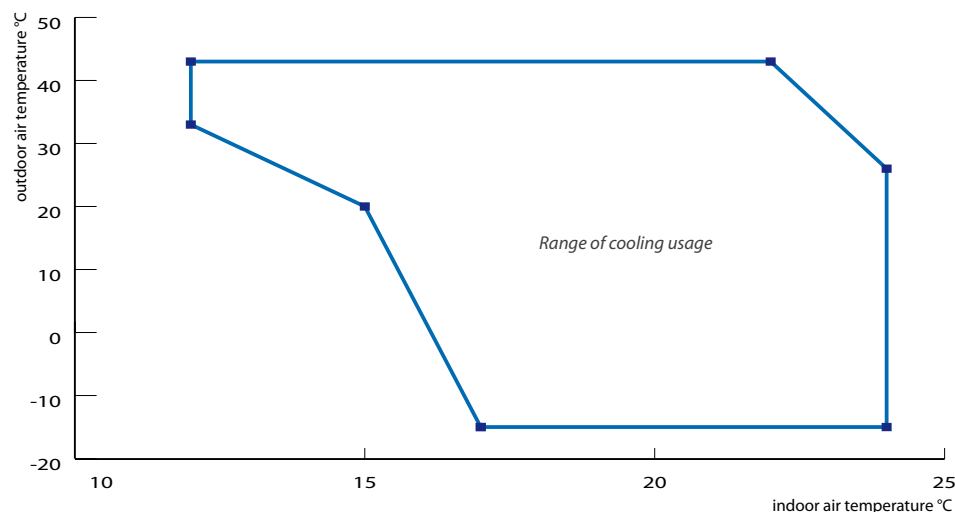
¹ Cooling capacity is valid under nominal conditions only (open architecture: water temperature 7/12 °C, air inlet temperature 30 °C; closed architecture: water temperature 7/12 °C, air inlet temperature 45 °C; refrigerant: water without additives)

² Air flow in closed architecture models refers to the unit not installed in the rack

³ Total pressure losses through the water circuit inside the unit

TECHNICAL DATA - DIRECT EXPANSION SIDE MOUNT COOLING UNITS

Information on technical details of direct expansion side mount cooling units upon request. Please contact our product managers. Contact details can be found on www.conteg.com.



TECHNICAL DATA - DIRECT EXPANSION OUTDOOR UNITS

	Unit	AC-DX-FDC125VN	AC-DX-FDC200VS
Nominal cooling capacity	kW	12.5 (5.0 - 14.0)	20.0 (7.0 - 22.4)
Phase		1 phase	3 phase
Power source		220-240V 50Hz / 220V 60Hz	380-415V 50Hz / 380V 60Hz
Cooling power consumption	kW	4.05/4.05	6.58/6.58
Running current	A	17.6/18.6	9.9/10.6
Power factor	%	99/99	96/94
Inrush current (L.R.A.), max. running current	A/A	5, 24	5, 24
Noise level	dB(A)	50	57
Exterior dimensions	H/W/D in mm	845/970/370	1300/970/370
Net weight	kg	74	122
COMPRESSOR			
Type		RMT5126MDE2	GTC515ND70K
Starting method		direct line start	direct line start
Type of control		electronic expansion valve	electronic expansion valve
REFRIGERANT			
Type		R410A	R410A
Quantity	kg	3.8 (pre-charged up to piping length of 30m)	5.4 (pre-charged up to the piping length of 30m)
AIR HANDLING EQUIPMENT			
Fan	type/qty	propeler fan/1	propeler fan/1
Motor	W/qty	86/1	86/2
Air flow	CMM	75	150
INSTALLATION DATA			
Refrigerant piping size	mm	Liquid pipe: Ø 9.52 Gas pipe: Ø 15.88	Liquid pipe: Ø 9.52 Gas pipe: Ø 22.22
Connecting method		flare piping	brazing piping (outdoor liquid piping: flare)
Drain hose		holes size Ø20 x 3pcs	holes size Ø20 x 3pcs
Insulation for piping		necessary (both liquid & gas piping)	necessary (both liquid & gas piping)
OTHERS			
Refrigerant oil		0.9 (M-MA68)	1.45 (M-MA32R)
Defrost method		microcomputer controlled de-icer	microcomputer controlled de-icer
Shock & vibration absorber		rubber sleeve (for compressor)	rubber sleeve (for compressor)
Operation control		controlled by indoor unit	controlled by indoor unit
Safety equipment		internal thermostat for fan motor, anomalous discharge temperature protection	internal thermostat for fan motor, anomalous discharge temperature protection
Energy class		A	A



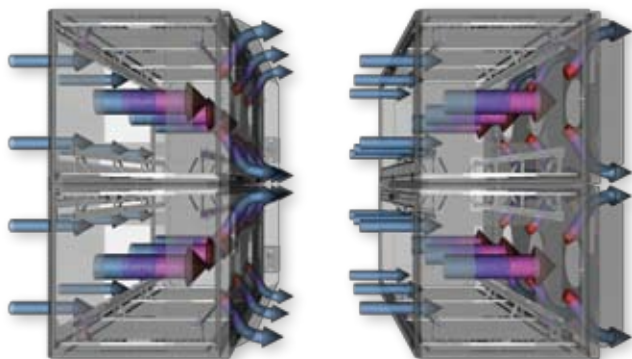
AC-DX-FDC125VN



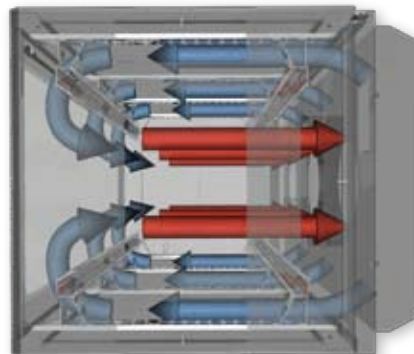
AC-DX-FDC200VS

4.2 REAR MOUNT COOLING UNITS

The rear mount cooling units are designed for cooling of very high thermal loads that are typical for modern data centers and server rooms. The range includes cooling units with cooling output up to 18 kW. The cooling units' architecture offers two versions - a closed air circuit and an open air circuit.



Top view - air flow detail - open air-loop architecture



Top view - air flow detail - closed air-loop architecture

Architecture with an open air circuit

The rear mount cooling unit with open circuit is suitable for application in data centres with traditional arrangement, i.e. with identical orientation of all racks in a data center. After passing through a rack, the air is cooled and it passes to another corridor where it is sucked by the next rack row.

Architecture with a closed air circuit

The rear mount cooling units with a closed circuit are ideal for cooling of hot spots - extremely hot local points in the rack vicinity. Therefore, they can be used not only in newly established data centers, but in older centers as well, where increased output of the equipment installed results in a problem concerning sufficient cooling of hot spots.



ROF 80x80 42U
with rear mount
cooling

DESCRIPTION

- Cooling capacity: 8, 12 or 18kW; even the most demanding blade computing environment can be kept at the optimum temperature
- Height: 42U
- Width: 800mm
- Heavy duty frame and rear door contain the chiller unit to deliver the chilled air directly to equipment
- Available in both Direct Expansion (DX) and Chilled Water (CW) variants
- DX includes frame, door and plumbing connections, CW includes frame, door and plumbing connections
- Electronic Control Board - cooling and chilled air throughput are controlled with microprocessors to ensure optimum cooling levels are maintained at all times
- Plumbed to either outdoor micro-condensers or the central chilled water systems. Pipes are laid below raised floor and routed to the chilled water or micro-condenser installations



Compatible Rack Part No.	Required Cooling and Part Numbers		
OPEN ARCHITECTURE - DIRECT EXPANSION	8kW	12kW	18kW
RHF/RDF/RSF/ROF-42-80/xxx	AC-RO-DX/08-42	AC-RO-DX/A2-42	AC-RO-DX/A8-42
OPEN ARCHITECTURE - CHILLED WATER	8kW	12kW	18kW
RHF/RDF/RSF/ROF-42-80/xxx	AC-RO-CW/08-42	AC-RO-CW/A2-42	AC-RO-DX/A8-42
CLOSED ARCHITECTURE - DIRECT EXPANSION	8kW	12kW	18kW
RDF/ROF-42-80/xxx	AC-RC-DX/08-42	AC-RC-DX/A2-42	AC-RC-DX/A8-42
CLOSED ARCHITECTURE - CHILLED WATER	8kW	12kW	18kW
RDF/ROF-42-80/xxx	AC-RC-CW/08-42	AC-RC-CW/A2-42	AC-RC-CW/A8-42

4.3 TOP MOUNT A/C UNITS

CONTEG Top Mount solutions deliver exceptional cooling capacity without adding to the floor-area required for the rack. The Top Mount cooling solution is available in capacities ranging from 900 Watts to 6000 Watts (approx 17.750 BTU/Hr) to give the correct required cooling without over-cooling. These cooling units are compatible with the free standing racks, series RHF, RDF, RSF.

The Top Mount solution is a stand-alone direct expansion (DX) solution which means that no additional plumbing or piping is required. Condensate is eliminated thanks to a Condensate Dissipater (1.4 kW version and above) and triple condensate protection system. This means that the condensate normally associated with air-conditioning systems is eliminated, giving total flexibility for deployment.

The Top Mount solutions all feature electronic control boards as standard which give superior control of the air conditioner over standard electromechanical types. The Electronic Control Board ensures that the Top Mount units are running at optimal efficiency and not overcooling the cabinet.

When installing these units into closed areas always make sure that the room has sufficient clearance and adequate ventilation so that environmental operating conditions (up to 55°C) are not exceeded.

DESCRIPTION

- Cooling output of cooling units 0.9 - 6 kW
- Compact design - coolant piping distribution systems are not necessary
- Condensate evaporation system (standard on units of 1.4 kW and above) eliminates the need for condensate drainage
- The triple protection system ensures condensate cannot enter rack
- The heat exchanger surface has been treated specially to provide the highest possible resistance against clogging, therefore the unit is able to operate with full output even when the ambient temperature reaches 55 °C
- The cooling system was designed for operation without filters reducing ongoing maintenance requirements
- The cooling units have easy to use electronic control boards for accurate and easy setting of the required temperature in the rack



Air flow through the rack - top mount cooling



In the case of a high temperature within the cabinet, alarm contacts will operate. This means that the Top Mount solution can be tied into existing monitoring systems or CONTEG's Rack & Environment Monitoring System to alert remotely if the temperature exceeds user defined thresholds.

TOP MOUNT A/C UNITS ¹		Required Cooling and Part Numbers (Includes Top Mounting Collar)				
Compatible Rack Full Part No.	0.9 kW	1.4 kW	2 kW	2.8 kW	4.1 kW	6 kW
RSF-42-60/80T-GWSWA-ACA-B	AC-TM-09-60/80	AC-TM-14-60/80	AC-TM-20-60/80	AC-TM-28-60/80	AC-TM-41-60/80	
RSF-42-60/10T-GWSWA-ACA-B				AC-TM-28-60/100	AC-TM-41-60/100	AC-TM-60-60/100
RSF-42-60/12T-GWSWA-ACA-B				AC-TM-28-60/120	AC-TM-41-60/120	AC-TM-60-60/120
RSF-42-80/80U-GWSWA-ACA-B ²	AC-TM-09-80/80	AC-TM-14-80/80	AC-TM-20-80/80	AC-TM-28-80/80	AC-TM-41-80/80	
RSF-42-80/10U-GWSWA-ACA-B ²				AC-TM-28-80/100	AC-TM-41-80/100	AC-TM-60-80/100
RSF-42-80/12U-GWSWA-ACA-B ²				AC-TM-28-80/120	AC-TM-41-80/120	AC-TM-60-80/120
RHF-42-60/10L-GWSWA-ACF-B				AC-TM-28-60/100	AC-TM-41-60/100	AC-TM-60-60/100
RHF-42-80/10P-GWSWA-ACF-B				AC-TM-28-80/100	AC-TM-41-80/100	AC-TM-60-80/100

¹ Part numbers presented in configuration with standard extrusions, other types also available; racks in light gray (RAL 7035), for black (RAL 9005) write H instead of B in the end of rack's code

² For RDF racks simply write RDF instead of RSF in the rack's code; please note, that RDF load rating is limited to 500kg

4.4 WALL MOUNT A/C UNITS

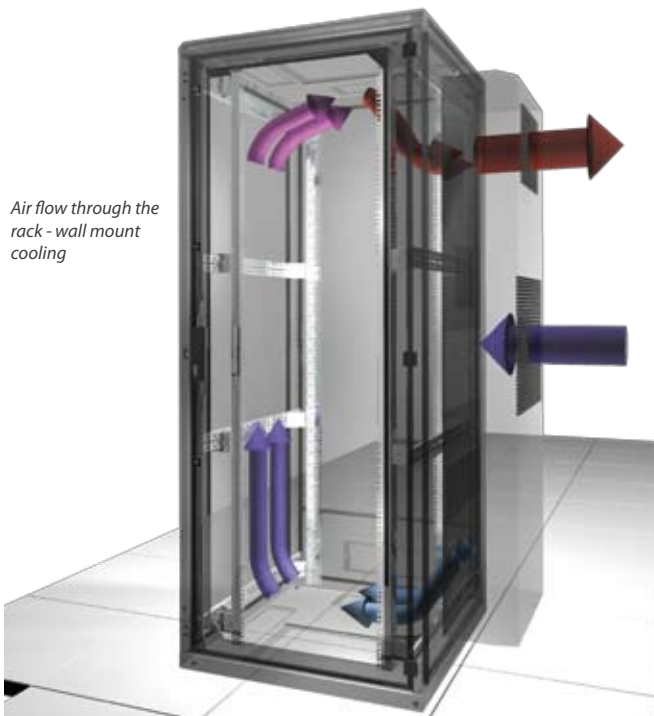
The wall-mount A/C units are installed instead of one of the rack side panels. Since it is mounted instead of the rack side panel, there is no limitation by the overhead clearance. These cooling units are compatible with the free standing racks, series RHF, RDF, RSF, ROF and RMF.

The Wall Mount units are ideally suited to spaces where insufficient clearance exists to install a roof mount solution. CONTEG wall mount solutions are available with capacities ranging from 1.1 to 3.0 kW per cooling unit. Up to two CONTEG Wall Mount cooling units can be fitted to a rack with control of the units via an optional control box for redundancy with duty cycle balancing.

When installing these units into closed areas always make sure that the room has sufficient clearances and adequate ventilation so that environmental operating conditions (up to 55°C) are not exceeded.

DESCRIPTION

- Cooling output of cooling units 1.1 - 3 kW
- Compact design - coolant piping distribution systems are not necessary
- Condensate evaporation system (available in output units of 1.4 kW and more) eliminates the need of condensate drainage
- The heat exchanger surface was treated specially to provide the highest possible resistance against clogging, therefore the unit is able to operate with full output even when the ambient temperature reaches 55 °C
- The cooling system was designed for operation without filters - reducing maintenance costs
- The cooling unit has simple control as well as easy setting of the required temperature in the rack
- The electronic control panel ensures accurate control of the cooling unit in order to achieve the required climate inside the rack
- This cooling type can be installed easily even into already installed ROF racks (retrofit installation possible) - the side panel will be replaced by air-conditioning at installation; blanking panels will be installed, too. It is necessary to fulfil the condition of IP rating 54.



Air flow through the rack - wall mount cooling



Wall Mount air-conditioning units retain the same cooling technology (Direct Expansion) as the Top Mount solutions. The revolutionary design means that filters are not required leading to reduced maintenance. All Wall Mount air conditioning units are equipped with electronic control boards as standard to ensure that the required temperature is accurately maintained. Wall Mount cooling units are easily integrated with RAMOS to provide remote notification should the temperature inside the rack exceed user defined thresholds.

WALL MOUNT A/C UNITS		Required Cooling and Part Numbers (Includes Replacement Side Panel)			
Compatible Rack Part No.	1.1 kW	1.4 kW	2 kW	2.5 kW	3 kW
ROF/RMF-42-xx/60	AC-WM-11-42/60	AC-WM-14-42/60	AC-WM-20-42/60		
RDF/RSF/ROF/RMF-42-xx/80	AC-WM-11-42/80	AC-WM-14-42/80	AC-WM-20-42/80	AC-WM-25-42/80	AC-WM-30-42/80
RHF/RDF/RSF/ROF/RMF-42-xx/100				AC-WM-25-42/100	AC-WM-30-42/100

4.5 AIRFLOW MANAGEMENT PRODUCTS

TURNING VANE

The Turning Vane is designed to enhance the natural draw effect of the chimney and is designed to allow passage of cabling and power as well as effectively direct the airflow. Constructed from 1 and 2mm powder coated sheet steel, the clever design of the turning vane ensures optimum airflow for the hot exhaust. The turning vane requires a minimum of 200mm off-set on the rear extrusions.



Turning vane

Code	Description
DP-HPR-60/120-B	Kit consists of top plate, chimney, turning vane; designed for RSF-xx-60/120; color light grey (RAL 7035)
DP-HPR-60/120-H	Kit consists of top plate, chimney, turning vane; designed for RSF-xx-60/120; color black (RAL 9005)
DP-HPR-80/120-B	Kit consists of top plate, chimney, turning vane; designed for RDF/RSF-xx-80/120; color light grey (RAL 7035)
DP-HPR-80/120-H	Kit consists of top plate, chimney, turning vane; designed for RDF/RSF-xx-80/120; color black (RAL 9005)

CHIMNEY

The Chimney is designed to form a duct for the hot exhaust between the rack and the hot plenum. The chimney is constructed from 1mm powder coated sheet steel and comes complete with gasket kits to ensure optimum sealing between the rack and the hot plenum. The chimney height is adjustable from 750 to 1360mm according to your site requirements.



Chimney

AIR FLOW DEFLECTOR

The deflector is located in the bottom part of the rack and is used to lead the cold air directly to the cold zone in front part of a rack. Deflector is produced in 600 or 800mm width and can be installed into all ROF family racks of all depths - from 600 to 1200mm. Deflector can be equipped with louvre which helps to control air-flow rates or shut air supply off if no equipment is fitted into the rack. Information on compatibility of the air flow deflector with the PREMIUM rack series upon request.



Air flow deflector with louvre

AIR SEPARATION FRAME

The Air Separation Frame is used for minimizing by-pass airflow between the rack columns and extrusions. Using an Air Separation Frame in a Room Feed with Plenum Return deployment forms a "cool zone" inside the rack between the front door and the equipment mounted on the 19" profiles. Cool zone depth is recommended as 150mm.



Air separation frame

Code	Requires H in U	Applicable for ROF/RDF	
		D in mm	W in mm
DP-AFD-ROF-60/80/20	2	800, 1200	600
DP-AFD-ROF-60/100/20	2	1000	600
DP-AFD-ROF-80/80/20	2	800, 1200	800
DP-AFD-ROF-80/100/20	2	1000	800
DP-AFD-VF-60	Variable Flow Rate Louvre - 600		
DP-AFD-VF-80	Variable Flow Rate Louvre - 800		

Code	Depth of cold zone in mm	Applicable for ROF/RHF/RSF	
		H in U	W in mm
DP-ROF-CW-42/60/15 ³	150	42	600
DP-ROF-CW-42/80/15 ^{1,2,3}	150	42	800
DP-RHF-CW-42/60/15	150	42	600
DP-RHF-CW-42/80/15 ²	150	42	800
DP-RSF-CW-42/60/15 ³	150	42	600
DP-RSF-CW-42/80/15 ^{2,3}	150	42	800

¹ can be used for RDF racks

² necessary to use extrusions type C or P (with blank panels)

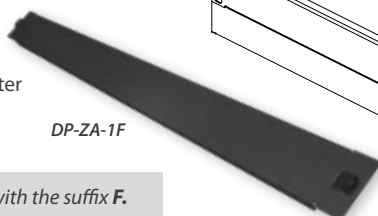
³ Height 42U can be replaced by 45 or 48U

19" BLANK AND FAST BLANK PANELS

Used to cover empty positions in rack to minimize by-pass airflow and enhance aesthetic appearance.

DESCRIPTION:

- Height 1, 2, 3, and 5U
- Color powder coated RAL (standard RAL 9005)
- Tool-less solution uses quarter turn fasteners



DP-ZA-1F

DP-ZA-1U

Code	Height	Width
DP-ZA-1U	1U	19"
DP-ZA-2U	2U	19"
DP-ZA-3U	3U	19"
DP-ZA-5U	5U	19"
DP-ZA-1F	1U	19"
DP-ZA-2F	2U	19"
DP-ZA-3F	3U	19"
DP-ZA-5F	5U	19"

For tool-less design use code with the suffix F.

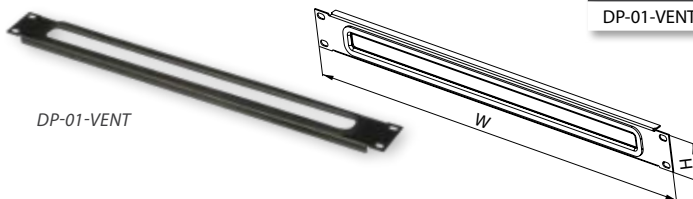
19" VENTED PANEL

Enables front to rear cable passage through empty positions in rack.

DESCRIPTION:

- Height 1U
- Width 19"
- Color powder coated RAL (standard RAL 9005)

DP-01-VENT



Code	Height	Width
DP-01-VENT	1U	19"

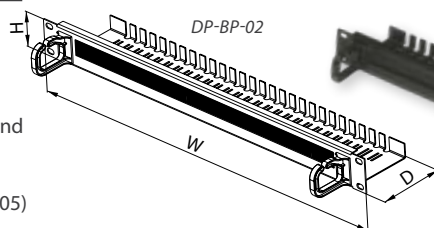
19" VENTED PANEL WITH BRUSH

Enables front to rear cable passage through empty positions in rack whilst helping to minimize by-pass airflow.

DESCRIPTION:

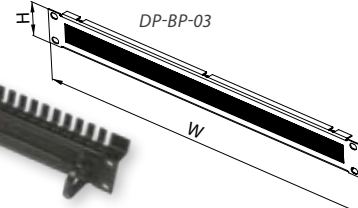
- Types:
 - a) with brush
 - b) with brush and cable management
- Vented panel with brush and cable management has cable management bar on back and two cable brackets 40x50mm on sides
- Height 1U
- Color powder coated RAL (standard RAL 9005)

DP-BP-02



Code	Height	Width	Depth in mm
DP-BP-02	1U	19"	85
DP-BP-03	1U	19"	--

DP-BP-03



VENTILATION UNITS

Used to force airflow through a rack to assist with cooling

DESCRIPTION:

- Two to nine fans
- Possible to install:
 - a) in 19" extrusions - horizontally
 - b) in top or bottom frame of free-standing rack
- Connecting kit for ventilation unit is needed when installing in top or bottom frame
- Temperature range -10°C to 55°C
- Thermostat in the range 0°C - 60°C included; optionally no thermostat
- Voltage range 230V/50Hz (optionally 48V DC)
- Protection category to EN 60 529 IP 20
- Color powder coated RAL (standard RAL 9005)
- Enhanced option DP-VEN-xx-E

DP-VEN-03

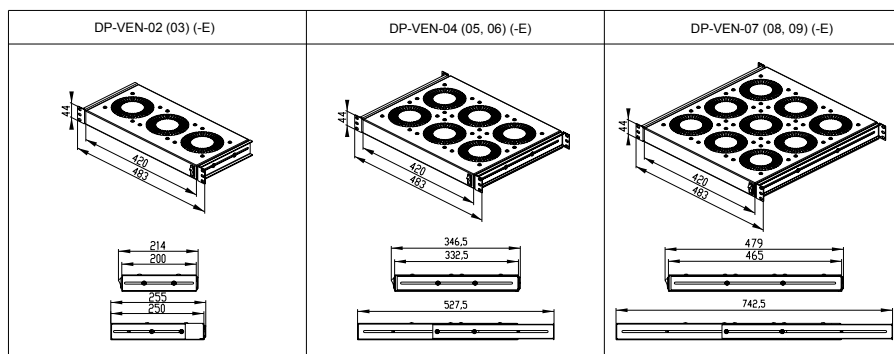
DP-VEN-06

DP-VEN-09



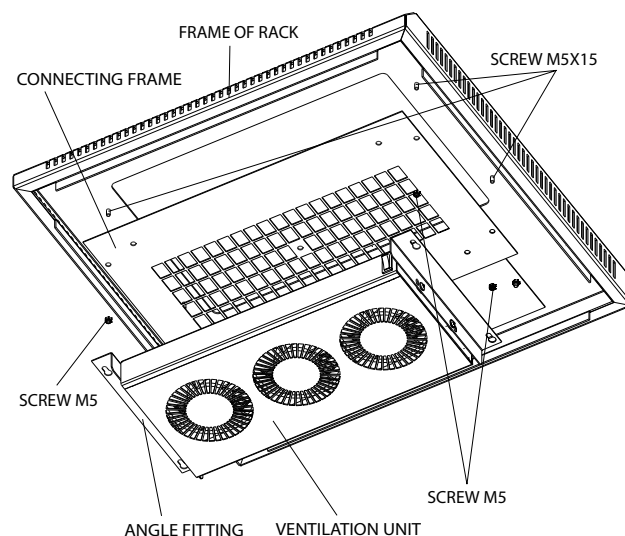
19" mounting ventilation unit	Connecting kit for installation in top or bottom frame of free standing racks depth 600, 800 or 1200mm	Connecting kit for installation in top or bottom frame of free standing racks depth 1000mm
DP-VEN-02(-E) 	DP-VER-03 	DP-VER-031
DP-VEN-03(-E) 	DP-VER-03F 	DP-VER-031F
DP-VEN-04(-E) 	DP-VER-06 	DP-VER-061
DP-VEN-05(-E) 	DP-VER-06F 	DP-VER-061F
DP-VEN-06(-E) 		
DP-VEN-07(-E) 		DP-VER-091
DP-VEN-08(-E) 		DP-VER-091F
DP-VEN-09(-E) 		

Information on installation options (into top or bottom frame of ROR rack series) on request



Code	Air through put (m3.h-1)	Rated current max. (A)	Power (W)	Noise level* (dB)
DP-VEN-02	210	0,18	38	48,0
DP-VEN-03	315	0,27	57	49,8
DP-VEN-04	420	0,36	76	51,0
DP-VEN-05	525	0,45	95	52,0
DP-VEN-06	630	0,54	114	52,8
DP-VEN-07	735	0,63	133	53,5
DP-VEN-08	840	0,72	152	54,0
DP-VEN-09	945	0,81	171	54,5
DP-VEN-02-E	330	0,28	44	53,0
DP-VEN-03-E	495	0,42	66	54,8
DP-VEN-04-E	660	0,56	88	56,0
DP-VEN-05-E	825	0,70	110	57,0
DP-VEN-06-E	990	0,84	132	57,8
DP-VEN-07-E	1155	0,98	154	58,5
DP-VEN-08-E	1320	1,12	176	59,0
DP-VEN-09-E	1485	1,26	198	59,6

* Approximate value. Real noise level depends on conditions at installation site.



FANS

Used to force airflow through a rack where ventilation unit is not used.

DESCRIPTION:

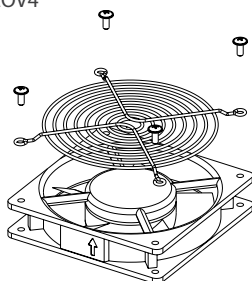
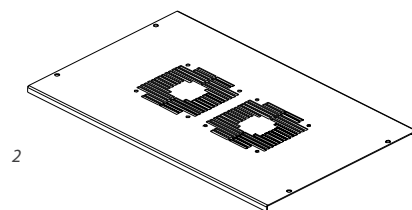
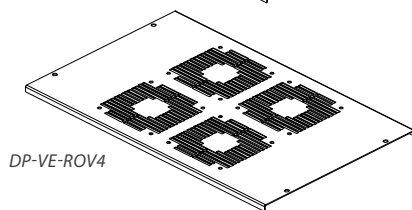
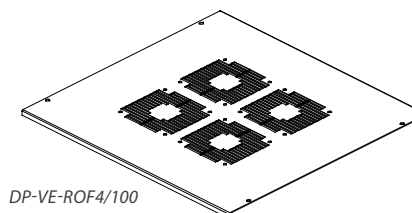
- Possible to install:
 - a) on side or top of wall-mounting rack - special perforation needed (ordering code of the wall mounting rack to be extended: -VH for 2x side perforation or -TH for 2x top cover perforation)
 - b) in top or bottom frame of distribution rack
 - requires perforated gland plate DP-VE-ROV2 or DP-VE-ROV4
- Mounting kit included
- Code: DP-VE-01



Side panel installation



Special perforation



ACTIVE DOOR

The active door is designed for mounting of up to 3 ventilation units, each with 6 fans (for racks of 600mm width) and 9 fans (for racks of 800mm width). Front mounted active door ensures effective air delivery in to the rack. The rear mounted active door removes heated air from the rack. Active doors can be where higher density heat loads are required by augmenting the delivery or extraction of air for cooling purposes.

- Perforated sheet metal or vented door
- Preparation for mounting of 3 ventilation units, each with 6 fans
- Multipoint swivel handle lock
- Universal keys
- Colour design - powdered paint RAL 7035 or RAL 9005

Apply the appropriate codes in positions describing door type/door lock type in the rack ordering matrix:

- JW for sheet steel perforated door, ready for up to 3 x 6 (3 x 9)-position ventilation unit, multipoint swivel handle lock, universal key
- KW for vented door, ready for up to 3 x 6 (3 x 9)-position ventilation unit, multipoint swivel handle lock, universal key



AUTOMATIC DOOR HANDLE

For easy and secure automated access to the Contained Cold Aisle we have developed the Automatic Door Handle. Using the Automatic Door Handle the Contained Cold Aisle doors can be controlled and opened/closed either locally via push buttons or integrated with your access control system. The ADH can also be integrated with RAMOS to provide alarms and further increase the flexibility of the system.



Code	Description
CA-DS-ADH	Automatic door handle system for CA-DS-42-45/120, including engines, control buttons and needed accessories

CONTAINED AISLE - DOOR

The contained aisle door assembly comprises a metal frame equipped with dual leaf opening doors (2212 x 620mm) to allow access into the contained cold aisle. The door frame is easily assembled on site and attached to the end of the row of racks, after installation of the sealing strip, the doors can be easily hung to provide air separation, security and comfortable access. The doors feature a large glass window for clear vision into the cold aisle. Doors are supplied with handle and locking mechanisms as standard, options for automatic door handling systems are available.



Code	Description
CA-DS-42-45/120	Double door and doorframe; width 1200mm ¹ , height 2212/2245mm (door/doorframe), color powder coated RAL 7045/7040, compatible with all ROF family racks; applicable in contained cold aisle design with height 42 and 45U

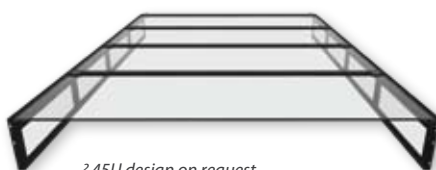
¹ 1800mm wide door on request

Flexible Contained Aisle system is available upon request. This system is the ideal solution when a row of racks with different heights or even with gaps because of missing racks is required to be contained. System is based on self-supporting construction with clear polycarbonate panels on the top of the roof. Vertical side sections of the roof feature PVC foil strips, which can be easily cut to the required length. Flexible Contained Aisle can work with standard aisle door (see above) or with PVC foil strips instead of standard door. Contact us for more information.



CONTAINED AISLE - ROOF

The modular roof sections are bolted onto the top of racks to prevent mixing of cooled air and warm exhaust. The assembly is made from 1.5mm powder coated steel and is available in widths of 600, 800, 900 & 1100mm to suit all deployment options. The vertical sections feature a glass insert panel to allow easy access to the top of installed racks whilst allowing maximum light into the cold aisle. The roof panel is made from 6mm clear polycarbonate to allow easy integration of fire suppression systems into the cold aisle.



² 45U design on request

Code	Description
CA-RS-42/60-H	Top cover and vertical side panels, for 600mm wide/42U high ² rack design, sheet steel parts in RAL 9005
CA-RS-42/80-H	Top cover and vertical side panels, for 800mm wide/42U high ² rack design, sheet steel parts in RAL 9005
CA-RS-42/90-H	Top cover and vertical side panels, for 600+300mm (covers neighbouring section) wide/42U high ² rack design, sheet steel parts in RAL 9005
CA-RS-42/110-H	Top cover and vertical side panels, for 800+300mm (covers neighbouring section) wide/42U high ² rack design, sheet steel parts in RAL 9005