VERTIV

Product brochure

Vertiv™ CoolPhase Perimeter

DX Floor Mount, PAM010-140, R513A Indoor
floor mount with inverter-driven compressors for R513A.
Air- or water-cooled, with optional free cooling EconoPhase.

Vertiv™ CoolPhase Perimeter, PAM model range, is Vertiv indoor floor-mount unit range, equipped with onboard compressors and designed for precision air cooling in mission-critical applications through direct expansion.

The PAM model range is designed to operate with inverter-driven compressors and is optimized for the eco-friendly, non-flammable, and low-toxicity R513A refrigerant (A1, GWP = 633). It is available in both air-cooled versions with the optional Vertiv™ EconoPhase free cooling feature, and water-cooled configurations.

In today's connected world, fast, uninterrupted communication is crucial and even brief delays can cause financial or operational issues. To allow data systems run efficiently and cost-effectively, air conditioning must maintain optimal conditions for storage and processing.

In response to these demands, Vertiv™ CoolPhase Perimeter strives to provide comprehensive solutions that address the diverse needs of modern data centers. It is the right thermal management solution for rooms containing electronic equipment like small to medium datacenters, or for Edge applications and UPS and battery rooms.

Vertiv CoolPhase Perimeter is available with a wide range of configurations, options and accessories, making the unit easily adaptable to various installation needs. In conjunction with the Vertiv CoolPhase Perimeter units, a wide choice of Vertiv™ CoolPhase Condenser solutions is available for managing heat rejection to the outside, depending on specific system configurations.

The thermal management eco-friendly answer

A mindful approach to eco-conscious cooling represents the latest challenge in the realm of IT cooling and Thermal Management.

Vertiv™ CoolPhase Perimeter, PAM model range, allows owners to comply with the F-Gas Regulation (EU) 2024/573 and achieve their environmentally responsible goals.

PAM models are designed for use with R513A, a non-flammable refrigerant that allows approximately 70% reduction of the Global Warming Potential (GWP) when compared to the traditional R410A refrigerant, without any compromise from a safety and toxicity point of view. The choice of this refrigerant contributes, along with the other PAM models range distinctive features, to reduce installation costs (CAPEX) as no additional safety devices are required, as is the case of indoor units using flammable refrigerants.

Vertiv™ CoolPhase Perimeter

At Vertiv we believe that being mindful of product design, development, use, and disposal are important to the longevity of our industry.

Checkout these environmentally conscious features of the Vertiv™ CoolPhase Perimeter:

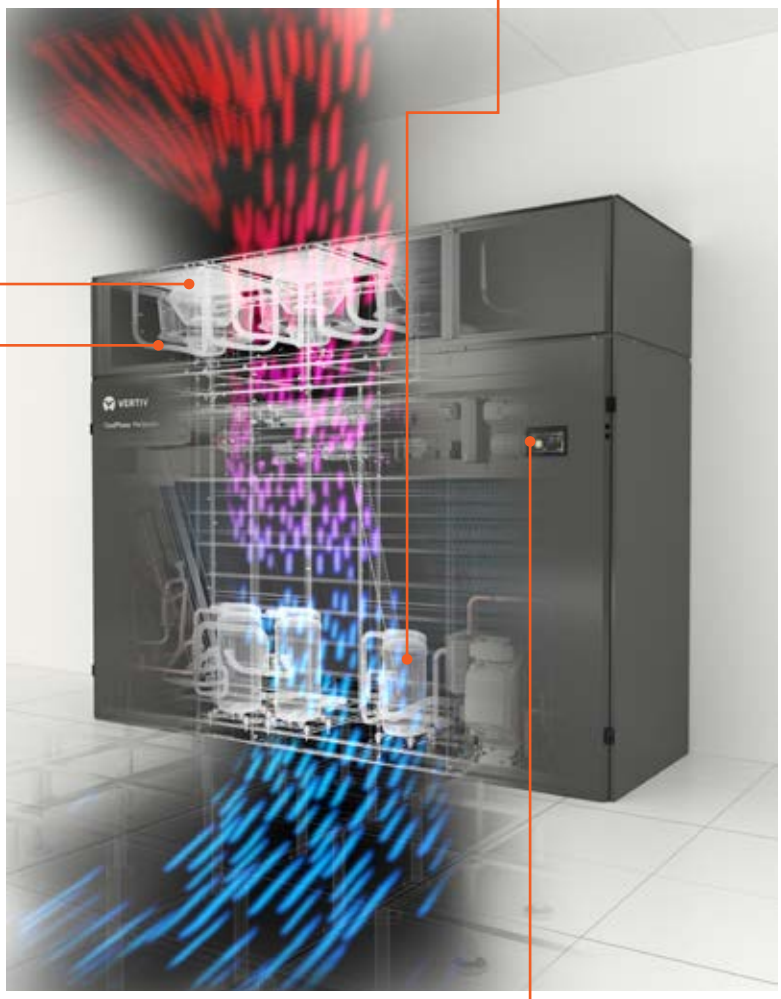
- R513A refrigerant is totally compliant to F-Gas Regulation (EU) 2024/573 and has a Low Global Warming Potential (GWP) of 631 as per IPCC AR4
- R513A is a non-flammable refrigerant, completely safe from fire injection and flame propagation risks, in case of leakage, with a lower toxicity compared to other refrigerants (class A1 as per ASHRAE 34 Standard)
- Inverter scroll compressor technology improves annual efficiency by up to 35% compared to a fixed speed compressor with further gains enabled by Vertiv™ EconoPhase free cooling technology
- Vertiv™ CoolPhase Condenser equipped with EC fans even further reduce power consumption and noise emissions

Higher overall efficiency

Vertiv™ CoolPhase Perimeter, PAM model range, enables continuous performance modulation, maximizing part-load efficiency and reducing operating costs. Enhanced by the patented Vertiv™ EconoPhase technology, it delivers a lower total cost of ownership through improved operational efficiency and the use of free cooling mode.

Eco-friendly without compromises

Vertiv™ CoolPhase Perimeter, PAM model range, is the ideal solution for the transition to a low carbon data center using a completely safe low-GWP refrigerant solution. The **absence of flammability risks** simplifies installation and limits costs increase.



Unique flexibility

Vertiv™ CoolPhase Perimeter, PAM models, offers a **wide range of airflow configurations** and delivery options that combined with easy and quickinstallation make it an extremely versatile unit that can satisfy any modern critical data center infrastructure.

Cooling continuity

Vertiv™ CoolPhase Perimeter, PAM models design and safety control logics allow to **maximize reliability and continuity of operations.** Each unit cooperates with the others (teamwork operation) but is completely independent from cooling continuity perspective.

Vertiv™ CoolPhase Perimeter at a glance

- Maximised cooling continuity, quiet operation and reliable continuous performance
- Low-GWP, non-flammable R513A refrigerant, to reduce carbon footprint
- Continuous modulation of the performance to achieve maximum efficiency in both full and part-load operations
- Unique free cooling option based on pumped refrigerant technology: Vertiv™ EconoPhase
- Optimised cooling density: maximum cooling capacity with a minimal footprint
- Compact design to facilitate transportation and installation
- Wide range of airflow and system configurations, providing maximum flexibility and ease of implementation
- Designed for a long service lifetime duration

The state of the art in room cooling

Thanks to an innovative design with best-in-class components and to a leading edge state of the art in HVAC industry technologies, Vertiv™ CoolPhase Perimeter, PAM models range, is designed to maximise the part load efficiency. The continuous modulation of the cooling performance significantly reduces the annual power consumption resulting in more cost effective solutions.

High-efficiency inverter technology

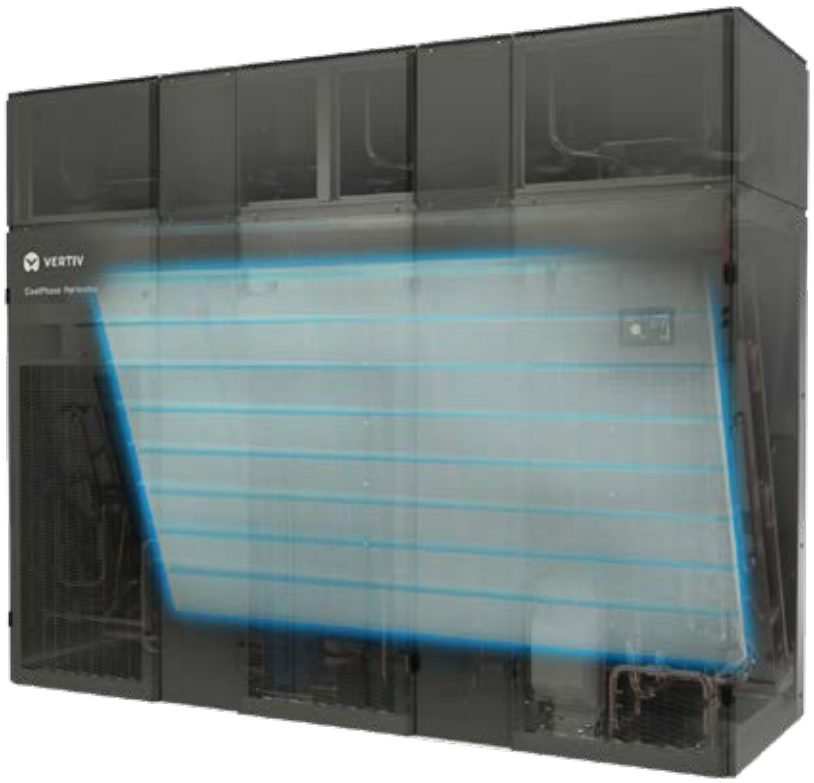
- Modulation down to 20% of full load
- Maximum energy efficiency at part-load conditions, where the unit operates most of the time
- Fewer on/off cycles for better power factor and reduced inrush current
- Brushless permanent magnet motor for higher speed, lower mechanical wear, and enhanced electrical efficiency

Electronic Expansion Valve

- Precise control of the evaporator feeding
- Increased evaporator efficiency thanks to an optimal superheat control.

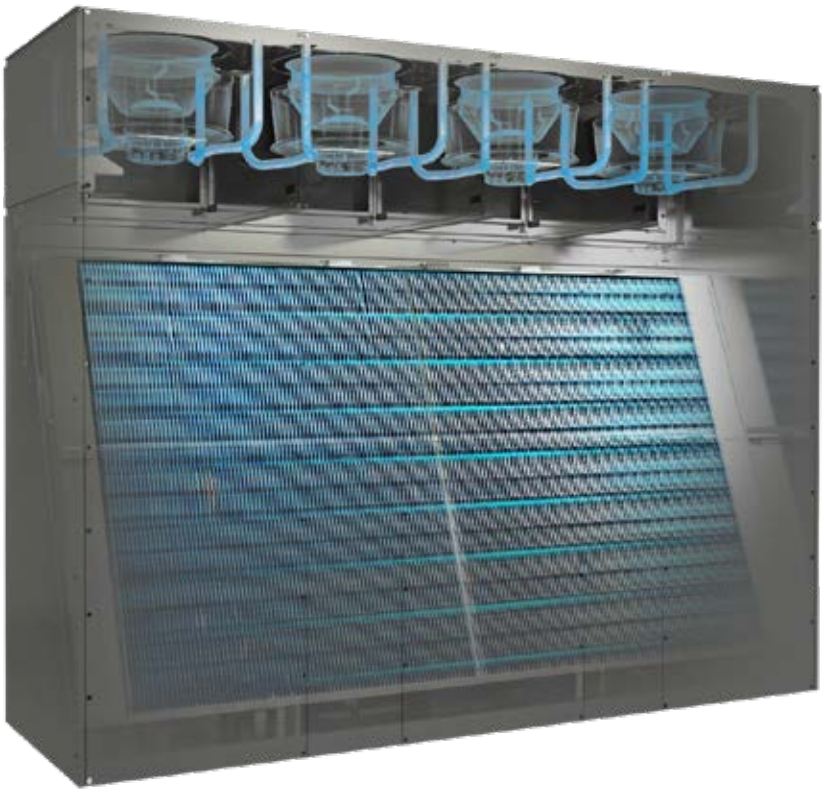
Staged coil and innovative patented filtration

- Filter class ISO 16890 ePM10 50%
- Extended filter surface allows for greater airflow, less air pressure drops and reduced fan consumption
- The innovative filter design significantly improve ease of maintenance



Last generation centrifugal EC fans

- Speed modulation down to 30% of maximum value
- Aerodynamically optimized vanes for minimum power consumption
- Perfectly balanced fan wheel and self-lubricatingbearings
- Low noise design



There is a system for your every need!

Vertiv™ CoolPhase Perimeter, PAM models range, units are available in different system configurations to best adapt to any specific installation needs.

The air cooled system

The air-cooled version dissipates heat from the room via the evaporator direct expansion coil, which is connected on-site to Vertiv™ CoolPhase Condensers, available in single or dual circuit configurations. This solution eliminates the need for water within the white space.

Low temperature version to operate also at low outdoor ambient temperatures (down to -20°C).

Two different coil treatments (epoxy & electrofin coating) are available for remote condensers making their installation possible also in critical environments.

Equivalent pipe length between the indoor unit and the remote condenser up to 100m.

Vertiv™ EconoPhase free cooling system

Vertiv™ CoolPhase Perimeter, PAM dual-circuit models are also available with the EconoPhase option. This innovative system enables free cooling operation in air-cooled configurations without the need for water (indirect free cooling) or unfiltered outside air (direct free cooling). When ambient conditions are favorable, the system automatically switches to a “pumped” mode: refrigerant pumps, integrated into the condenser, circulate the refrigerant without compression, consuming only a fraction of the energy required by compressors.

How it works

In cold temperatures, the Vertiv™ Liebert® iCOM™ control deactivates the compressors and engages the EconoPhase pumps circulate refrigerant using only a fraction of the energy.

During the hottest temperatures, compressors are activated, bypassing the economizer pumps.

In moderate temperatures, fall, spring or even during the night - Liebert® iCOM™ control may activate one compressor and one refrigerant pump to gain partial economization and energy savings.

Vertiv™ EconoPhase benefits at a glance

Maximum efficiency

- Refrigerant carries twice as much heat as water and 40 times as much heat as air
- Instant changeover to economizer mode, even for short periods, to maximize efficiency
- Better control and reliability than passive thermosyphon systems

Greater protection

- No outside air contamination
- No dampers or louvers to maintain
- Automatic failure diagnostics - pump unit serviceable without loss of cooling

Compact and flexible

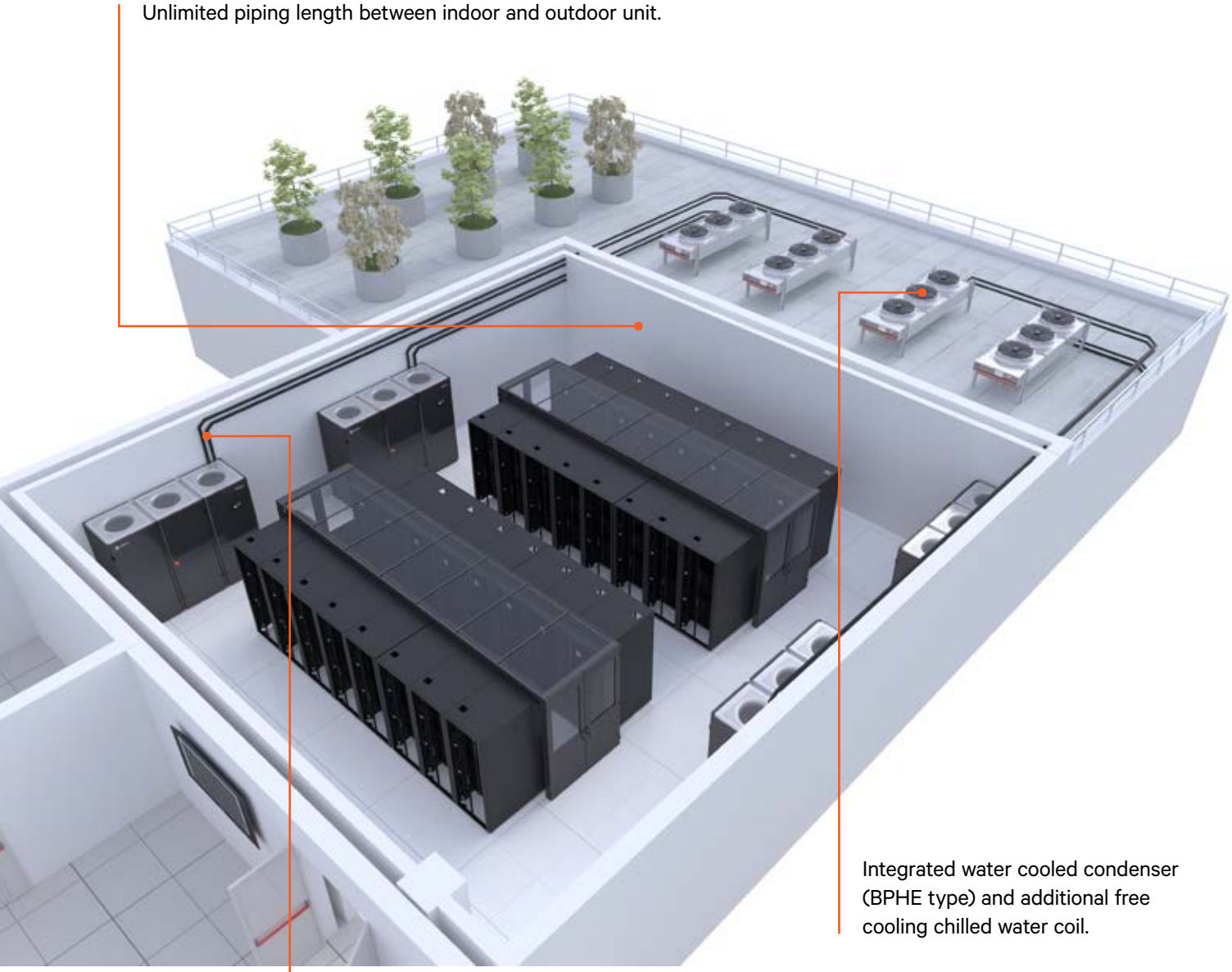
- Reduced footprint – the condenser includes the Vertiv™ EconoPhase system for pumped refrigerant operation
- Extended line lengths – up to 100 m, offering greater flexibility than passive thermosiphon systems
- Minimal maintenance – virtually maintenance-free, with only sealed pumps as moving parts

Vertiv™ EconoPhase system fully integrated into the Vertiv™ CoolPhase Condenser, OAV model

The water cooled system with and without indirect free cooling

In the Vertiv™ CoolPhase Perimeter, PAM water-cooled range, room air is cooled down through the evaporator direct expansion coil and the refrigerant condensation is managed through a water-cooled plate heat exchanger integrated in the indoor unit. The heat rejection takes place in the outdoor Vertiv™ Liebert® HPD dry cooler.

Vertiv CoolPhase Perimeter, PAM free cooling units use an additional chilled water coil to provide free cooling capacity whenever the outdoor ambient conditions allow for it. When air ambient temperature is low enough, the compressor is stopped and water is recirculated between the dry cooler and the indoor chilled water coil to work in indirect free cooling mode.



Unique flexibility

Vertiv™ CoolPhase Perimeter, PAM models range, is available with these air flow configurations.
For customized options, please reach out to Vertiv Technical Support.

Upflow

The unit is placed on the floor. Warm air goes inside the unit throught the front doors of the unit (red arrows) and cold air returns to the room (data center) from the top part of the unit, where the fan wheel is located (blue arrows).

Downflow frontal

The unit is placed on the floor. Warm air goes inside the unit through the top (red arrows) and cold air returns to the room (data center) through the front grid in the bottom part of the unit. Fan wheel is located at bottom part of the unit.

Downflow up

The unit is placed on the raised floor. Warm air goes inside the unit through the top (red arrows) and cold air returns to the room (data center) from the bottom grid through the raised floor. Fan wheel is located at the bottom part of the unit.

Main configurable features

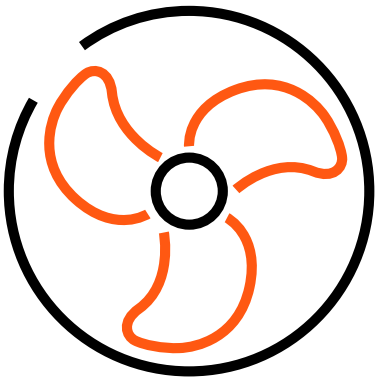
- Refrigerant post-heating
- Electrode humidifier
- Clogged filter detection, sensors and alarm
- Condensate pump
- Dual power feed with automatic switchover
- Harmonic filter

Main options & accessories

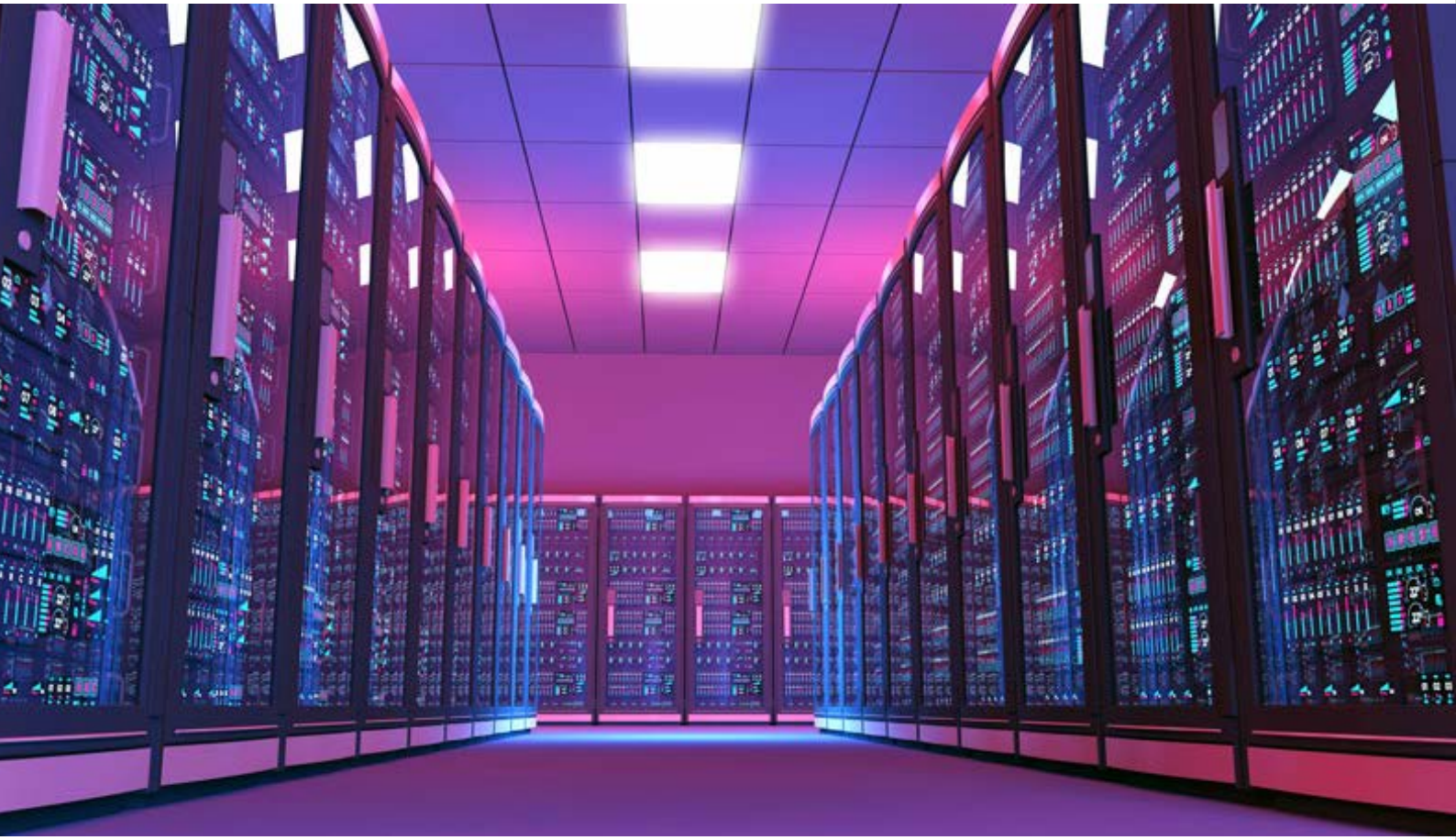
- Motorized damper
- Smoke and fire alarms
- Leak detectors
- Base frame
- Antivibration dampers with adjustable height
- Extension hood with different height

Cooling continuity

Vertiv™ CoolPhase Perimeter means enhanced availability of operations: downtime is minimized through prevention of alarms and failures and real-time optimization and adaptation of working parameters.



- **Dual power** feed option with automatic transfer switch option
- **Embedded UPS (Ultracap)** feeds the control board at least for 60 seconds in case of power outage, permitting system supervision and the fastest unit restart
- **Fast start logic:** The unit can recover from a power outage within 20-80s
- **Guaranteed airflow continuity:** Each fan is controlled and powered independently, both in the indoor and the outdoor unit
- **Tandem compressors** where applicable
- **Multiple sensor logic** allows the unit to automatically adapt to grant cooling and airflow to the servers when a sensor fails



Vertiv™ Liebert® iCOM™ smart control

Vertiv™ Liebert® iCOM™ smart control is the heart of the direct expansion cooling system, managing not only Vertiv™ CoolPhase Perimeter, PAM units, but also outdoor heat rejection components. The Liebert® iCOM™ software software embeds a comprehensive algorithm library developed and perfected over fifty years for perfectly adapting to the different requirements. The control set up can be done through a HD touch screen display which functions can be replicated even in a web browser (virtual display).

Ready for Teamwork of up to 32 Vertiv CoolPhase Perimeter, PAM units connected together in a common network, sharing information with each other and managing critical operating situations: advanced control functionalities allow a single display to be used as a 'team display', synchronizing the parameters of all the units from the same access point. The unit can communicate with the user's BMS system with extended parameter availability, and it can also be connected to Vertiv remote diagnostic and preventive monitoring Services.

- More than 10 different strategies to control temperature/humidity and airflow
- Auto-adaptive regulation PID algorithms
- Automatic working envelope control
- ESP Pressure monitoring and control
- Extended parameters availability to BMS through the widest range of protocols
- Outdoor unit safety logics: fan reversal mode for cleaning action, anti-freeze routines, etc.

Performance table, single circuit models

Single Circuit Units	PAM Model		PAM010	PAM020	PAM030	PAM040	PAM050
Max Airflow at input condition	Max Airflow	m3/h	7180	7750	7650	12390	21570
Max Cooling at input condition and Air indoor 33°C|35%RH	Total Cooling Capacity (NSHR =1)	kW	17.8	19.3	29.8	40	55.2
	Net Sensible EER Indoor / System	-	2,4 / 2,24	2,7 / 2,51	2,8 / 2,61	3,1 / 2,92	2,6 / 2,4
Performance at 90% modulation Air indoor 30°C|35%RH, DT12°C	Total Cooling Capacity (NSHR =1)	kW	14.8	16.2	25.8	38.1	52
	Net Sensible EER Indoor / System	-	2,9 / 2,66	3,3 / 3,01	3,1 / 2,79	3,2 / 2,97	3 / 2,78
Input conditions	Power supply	V | p | Hz	400/3/50				
	Refrigerant	Type	R513A				
	External Static Pressure / Filter	Pa | Class	0 Pa | ePM10 50%				
	Outdoor air temperature	°C	35°C				
	Condenser Match	Model	1xOAC033	1xOAC033	1xOAC042	1xOACH58	1xOACH87
	Unit Configuration	Airflow | Fans	Downflow frontal, High Efficiency Fans				
Design features	Refrigerating circuits	n°	1	1	1	1	1
	Variable Speed Compressors	n°	1	1	1	1	1
	Fixed Speed Compressors	n°	-	-	-	-	-
	EC Centrifugal Fan - Backward Curve Blower	n°	1	1	1	1	2
	Capacity Modulation	%	Continuous from 25 to 100%				
	Indoor Lenght [L]	mm	750	844	844	1200	1750
	Indoor Width [W]	mm	750	890	890	890	890
	Indoor Height [H]	mm	1970	1970	1970	1970	1970
	Indoor Weight	kg	285	354	363	550	730
System configurations	Air cooled	Availability	✓	✓	✓	✓	✓
	Air cooled with Freecooling EconoPhase		-	-	-	-	-
	Water cooled		ETO	ETO	ETO	ETO	ETO
	Water cooled with Indirect Freecooling		ETO	ETO	ETO	ETO	ETO
Airflow delivery available	DownFlow UP - Fans Over the Raised Floor	Availability	✓	✓	✓	✓	✓
	DownFlow UP - Frontal air delivery		✓	✓	✓	✓	✓
	UpFlow		✓	✓	✓	✓	✓

0-15 kW
Frame 0

15-30 kW
Frame 1

30-45 kW
Frame 2

45-60 kW
Frame 3

Performance table, dual circuit models

Dual Circuit Units	PAM Model		PAM060	PAM080	PAM100	PAM120	PAM140
Max Airflow at input condition	Max Airflow	m3/h	21150	34170	34330	52550	52550
Max Cooling at input condition and Air indoor 33°C|35%RH	Total Cooling Capacity (NSHR =1)	kW	60.9	76.4	116.2	139	158.4
	Net Sensible EER Indoor / System	-	2,81 / 2,6	2,66 / 2,5	2,55 / 2,31	2,63 / 2,41	3,07 / 2,63
Performance at 90% modulation Air indoor 30°C|35%RH, DT12°C	Total Cooling Capacity (NSHR =1)	kW	52	64.4	98.9	117.9	132.9
	Net Sensible EER Indoor / System	-	3,67 / 3,27	3,85 / 3,49	3,06 / 2,66	3,55 / 3,09	3,91 / 3,22
Input conditions	Power supply	V | p | Hz	400/3/50				
	Refrigerant	Type	R513A				
	External Static Pressure / Filter	Pa | Class	0 Pa | ePM10 50%				
	Outdoor air temperature	°C	35°C				
	Condenser Match	Model	2xOAC042	2xOAC058	1xOAV165	1xOAV165	1xOAV255
	Unit Configuration	Airflow | Fans	Downflow frontal, High Efficiency Fans				
Design features	Refrigerating circuits	n°	2	2	2	2	2
	Variable Speed Compressors	n°	1	1	1	1	1
	Fixed Speed Compressors	n°	1	2	2	2	2
	EC Centrifugal Fan - Backward Curve Blower	n°	2	3	3	4	4
	Capacity Modulation	%	Continuous from 25 to 100%				
	Indoor Lenght [L]	mm	1750	2550	2550	3200	3200
	Indoor Width [W]	mm	890	890	890	1050	1050
	Indoor Height [H]	mm	1970	1970	1970	2570	2570
	Indoor Weight	kg	730	937	1250	1600	1600
System configurations	Air cooled	Availability	✓	✓	✓	✓	✓
	Air cooled with Freecooling EconoPhase		ETO	ETO	✓	✓	✓
	Water cooled		✓	✓	ETO	ETO	ETO
	Water cooled with Indirect Freecooling		✓	✓	ETO	ETO	ETO
Airflow delivery available	DownFlow UP - Fans Over the Raised Floor	Availability	✓	✓	✓	✓	✓
	DownFlow UP - Frontal air delivery		✓	✓	✓	✓	✓
	UpFlow		✓	✓	✓	✓	✓

45-60 kW
Frame 3

60-100 kW
Frame 5

100-160 kW
Frame 10

Vertiv™ CoolPhase Condenser

Seamlessly matching with your air cooled units

Vertiv™ Coolphase Condenser delivers high performance, energy efficiency, and long-term reliability. Two families of Vertiv CoolPhase Condensers — OAC and OAV — are compatible with the Vertiv™ CoolPhase Perimeter, PAM models range, offering enhanced flexibility and integration.

- OAC models, single circuit condensers, features Fin & Tube plane shape coils and EC fans
- OAV models are natively dual-circuit heat rejection units, available with Fin & Tube or microchannel V shape coils, and equipped with high-performance EC fans
- OAV configurations are available in 2 versions: standard version, and the pumped refrigerant system version that enables free cooling operation through Vertiv's patented EconoPhase technology

Reduced footprint

Vertiv CoolPhase Condensers, OAV range is specifically designed to minimize outdoor footprint in dual circuit systems, making 1:1 configuration possible.

In EconoPhase versions, the pumped refrigerant system is fully integrated into the OAV condenser without need of additional devices.

Lower refrigerant charge

Microchannel technology significantly reduces refrigerant charge compared to traditional Fin & Tube coils, lowering both environmental impact and operating costs.

Performance table

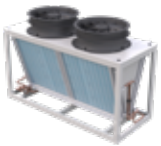
	OAV Model		OAV125	OAV165	OAV255	OAV315
Max Airflow and Heat Rejection Capacity at input condition	Max Airflow	m3/h	40300	40300	81300	81300
	Total Heat Rejection Capacity	kW	173	173	347	347
Input conditions*	Power supply	V/p/Hz	400/3/50 (+N)			
	Refrigerant	Type	R513A			
	Coil design	Type	Microchannel			
	Outdoor air temperature	°C	35			
	Condensing Temp | Desuperheating | Subcooling	°C / K / K	50 / 20 / 5			
	Unit Configuration	Fans	Standard Fans			
Design features	Refrigerating circuits	n°	2	2	2	2
	EC Axial Fan - Draw through	n°	2	2	4	4
	Capacity Modulation	%	Continuous from 20 to 100%			
	Outdoor Lenght [L]	mm	2609	2609	2609	2609
	Outdoor Width [W]	mm	1080	1080	2155	2155
	Outdoor Height Standard / EconoPhase [H]	mm	1730 / 2315	1730 / 2315	1730 / 2315	1730 / 2315
	Outdoor Weight Standard / EconoPhase	kg	420 / 460	420 / 460	780 / 820	780 / 820
System configurations	Air cooled	Availability	✓	✓	✓	✓
	Air cooled with Freecooling EconoPhase		✓	✓	✓	✓

Up to 33 kW
1 Fan

Up to 58 kW
2 Fans

Up to 95 kW
3 Fans

	OAC Model		OAC017	OAC033	OAC042	OAC*58	OAC*87	OAC095
Max Airflow and Heat Rejection Capacity at input condition	Max Airflow	m3/h	6330	7500	16700	16000	24000	22565
	Total Heat Rejection Capacity	kW	20	28.4	45.6	52.4	78.5	84.2
Input conditions*	Power supply	V/p/Hz	230/1/50 (+N)					
	Refrigerant	Type	R513A					
	Coil design	Type	Copper Pipe Aluminum Fin					
	Outdoor air temperature	°C	35					
	Condensing Temp | Desuperheating | Subcooling	°C / K / K	50 / 20 / 5					
	Unit Configuration	Fans	Standard Fans					
Design features	Refrigerating circuits	n°	1	1	1	1	1	1
	EC Axial Fan - Draw through	n°	1	1	2	2	3	3
	Capacity Modulation	%	Continuous from 20 to 100%					
	Outdoor Lenght [L]	mm	1054	1330	2330	2330	3330	3330
	Outdoor Width [W]	mm	950	936	936	936	936	936
	Outdoor Height Standard / EconoPhase [H]	mm	892	1113	1113	1113	1113	1113
	Outdoor Weight Standard / EconoPhase	kg	35	86	119	127	182	202
System configurations	Air cooled	Availability	✓	✓	✓	✓	✓	✓
	Air cooled with Freecooling EconoPhase		-	-	-	-	-	-



80-160 kW
Air Cooled version
2 Fans

160-300 kW EconoPhase
version with embedded PRE
2 Fans

160-300 kW Air Cooled version
2 Fans

160-300 kW EconoPhase
version with embedded PRE
4 Fans

Rely on integrated project and lifecycle thermal services for superior data center protection

Guarantee continuity to your business activities with a service partner who stands by you throughout your critical equipment lifecycle. From the project phase with start-up and testing, to lifecycle maintenance contracts and operational support, Vertiv ensures your solution performs optimally.

Global presence & local resources

With the broadest, most comprehensive service presence in the industry and more than 650 engineers dedicated to servicing Europe, Middle East and Africa, Vertiv ensures that your business is always protected, and that service is available whenever needed 24 hours a day.

Premium response

With Vertiv you can count on an extensive supply of critical parts plus crash-kits ready for deployment, and on service engineers that can respond to requests in record time. To do so, they can rely on a solid knowledge-base, and established escalation procedures valid across the entire region. In addition, they can also benefit from advanced incident management, and widespread presence of Service Centers all enabling them to deliver premium restoration capabilities.

Commissioning phase	Technical activities	Project management		
Pre-project activity		• Project charter / project initiation docs • Identify stakeholder		
Level 0 **Program and design**	• Commissioning spec & plan • Engineering • Design review • Schedule integration • Submittal review • Commissioning procedure • Commissioning kick-off	• Work breakdown structure (WBS) • Supply chain & procurement management plan • Project team creation • Create risk management plan • Create communication management plan	• Create change management plan • Create project schedule • Health & safety assessment • Kick-off meeting with customer	
Level 1 **Factory witness test**	• Factory witness test			
Level 2 **Delivery, qa/qc, installation assembly, field supervision**	• Site acceptance inspection • Delivery & assembly • Equipment installation			• Manage issues, changes & risks • Report project status • Contract, financial & quality review • Health & safety review
Level 3 **Start-up and site acceptance test**	• Installation & startup • Pre-functional equipment verification • Site acceptance test	• Supply chain & procurement management • Execute project plan • Schedule on-site resource management • Facilitate team meetings & distributes minutes • Health & safety management		
Level 4 **Functional performance testing**	• Functional performance test			
Level 5 **Integrated system test support**	• Integrated system test • Training & o&m verification			
Level 6 **Close out & turn-over**	• System manual • Seasonal testing • Warranty review & supplemental report • Commissioning report	• Customer acceptance • Handover to operation & maintenance • Lessons learned • Financial closure • Project closure		

Expertise & training

All service engineers are regularly certified according to country-specific regulations as well as wider European and international regulations and standards. Vertiv™ F-gas certifies all thermal service engineers. This enables them to operate with all refrigerants including the ones with low GWP (Global Warming Potential) such as R513A, used in Vertiv™ CoolPhase Perimeter low GWP.

Vertiv service engineers are trained, experienced professionals who undergo an average of one week of intensive training each quarter, totalling one month of full-time training per year. Training includes both technology and safety, to ensure competent and safe field operations, reinforced by established procedures to follow and central technical support in case of need.

Project services

From project planning and design, through to equipment procurement, installation, and commissioning, our project team offers comprehensive capabilities, ensuring speed of deployment and execution according to pre-defined and repeatable procedures. Low-GWP gases require the use of specific tooling. Vertiv engineers are endowed with the right tools and trained on how to use them, thus ensuring proper installation, start up, and maintenance of low-GWP units.

Supporting your business around the globe

Regular service of critical equipment supports maximum uptime and often reduces total cost of ownership. A service program ensures timely and proactive maintenance for avoiding unexpected, costly equipment downtime and enables optimal equipment operation. Vertiv service programs cover all technologies and can be tailored to suit individual business needs.

Preventing or minimizing refrigerant losses is key to every direct expansion circuit. Even more so with low-GWP refrigerants, where the aim is to use as least refrigerant as possible both in case of maintenance or repair. Advanced incident management procedures leveraging site data allow Vertiv to be extremely effective in fault management and root cause analysis should it happen. Vertiv extensive service offering includes installation, startup, commissioning, maintenance, replacements, 24x7 remote monitoring and diagnostics, and much more.

Warranty contracts

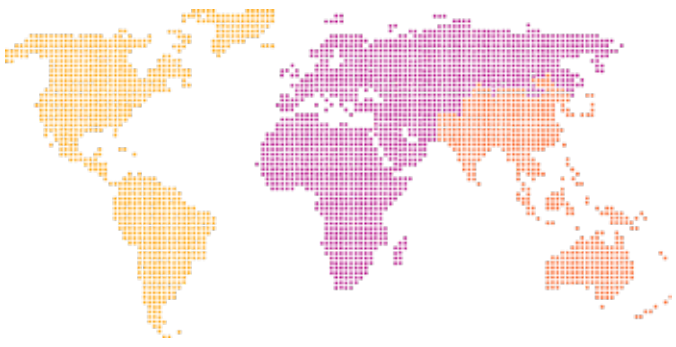
Preferred Warranty
Preventive maintenance
Response time

After warranty contracts

Basic	Essential	Preferred
Preventive maintenance	Preventive maintenance	Preventive maintenance
Response time	Response time	Response time
-	Labour included	Labour included
-	-	Parts included

Global presence, local expertise

Headquartered in Westerville, Ohio, USA, Vertiv does business in more than 130 countries.



Worldwide

Manuf. and Assembly Locations: **23**
Service Centers: **310+**
Service Field Engineers: **~4,000**
Technical Support/Response: **~300**
Customer Experience Centers/Labs: **27**

Americas

Manuf. and Assembly Locations: **9**
Service Centers: **170+**
Service Field Engineers: **~1,750**
Technical Support/Response: **~120**
Customer Experience Centers/Labs: **4**

Europe, Middle East, and Africa

Manuf. and Assembly Locations: **9**
Service Centers: **60+**
Service Field Engineers: **~650**
Technical Support/Response: **~130**
Customer Experience Centers/Labs: **12**

Asia Pacific

Manuf. and Assembly Locations: **5**
Service Centers: **80+**
Service Field Engineers: **~1,600**
Technical Support/Response: **~50**
Customer Experience Centers/Labs: **11**

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