InRow Pumped Refrigerant Cooling

for Medium to Large Data Center Environments

InRow OA and Refrigerant Distribution Unit

The InRow OA is an overhead refrigerant based cooling system that provides up to 27kW of cooling directly to IT Equipment. This new offering is a zero white space solution that provides the option of mounting on the rack or suspend from the ceiling. Ideal for high density environments, the InRow OA integrates thermal containment for maximum energy efficiency.

The refrigerant used in this modular, pumped refrigerant system is R134a. R134a is a non-toxic refrigerant that poses no threat to IT equipment in the event of a leak, and has no Ozone depletion potential.

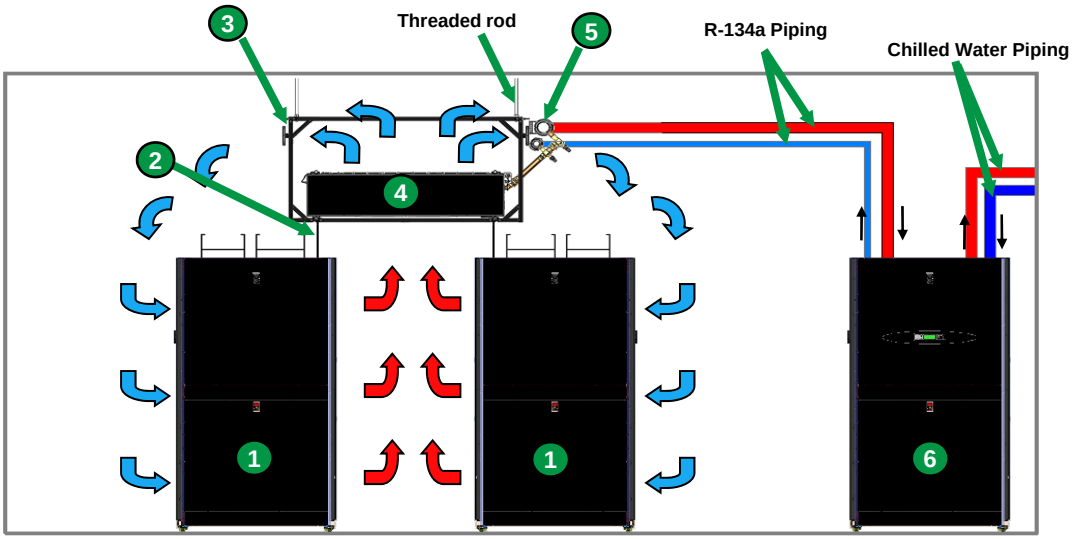
A Refrigerant Distribution Unit (RDU) is required with the deployment of an InRow OA. Each RDU can support multiple OA units, with a maximum capacity of 160kW. The RDU connects to a chilled water system and exchanges heat between the chilled water and R134a refrigerant. The RDU may be placed outside the datacenter, thus saving valuable data center floor space.

Target Applications & Environments

- 5 to 14kW/rack densities*
- Medium to Large Datacenters
- New and Existing Datacenters

Key Considerations

- Elimination of hot spots caused by high density deployments
- Flexibility to easily deploy and redeploy cooling
- Maximize available floor space for IT equipment
- Addresses fears of water in the data center in the most efficient manor.
- Eliminate the need to reconfigure floor layout to provide additional cooling to an existing zone
- Ensure stable inlet temperatures to IT equipment



1. IT Enclosures
2. Integrated Thermal Containment
3. InRow OA Mounting System
4. InRow OA
5. Modular Piping Headers
6. Refrigerant Distribution Unit (RDU)

* Capacities are based on single InRow OA operation, higher densities can be achieved when using with additional InRow floor mounted products

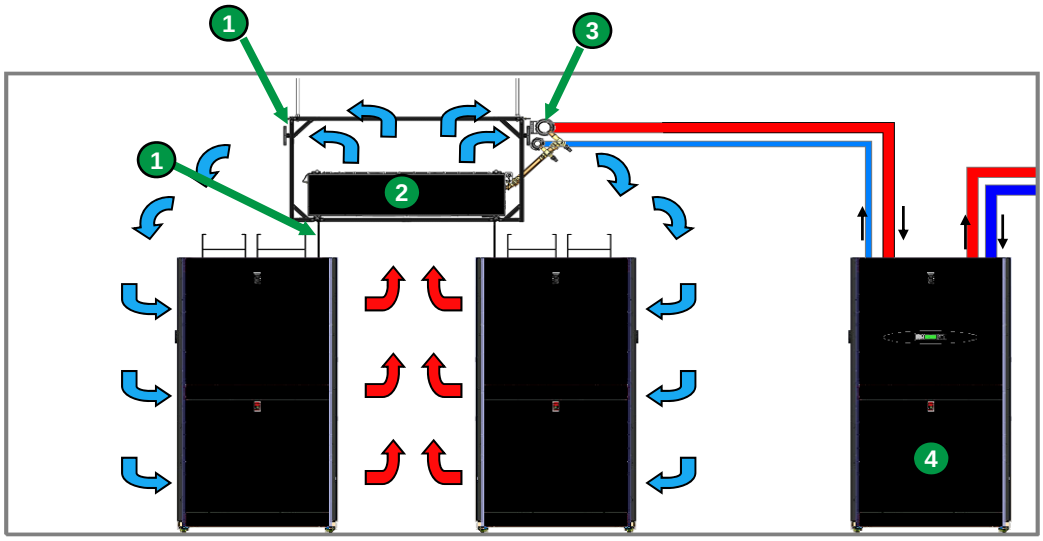
132 Fairgrounds Rd. West Kingston, RI 02892 USA • Call: 800-800-4APC • Fax: 401-789-3710 • e-mail: esupport@apc.com

APC by Schneider Electric

System Overview

The High Density Answer

Ideal for high density applications, the InRow OA captures up to 27kW of hot IT exhaust air at the source, neutralizes it and discharges cool air to the IT environment.



1 InRow OA Mounting System

- Integrated thermal containment which allows for cable access from the hot or the cold aisle
- Integrated piping support to reduce deployment time and initial costs
- The system is aisle width independent and offers the flexibility to be mounted on a rack or suspended from the ceiling.
- Maximizes available space for IT equipment

2 InRow OA w/ Active Response Controls

- Monitor and control temperature entering IT equipment ensuring proper operating environment.
- Active control of cooling capacity to right-size cooling to match IT heat load to maximize efficiency.

3 Modular Piping

- Preconfigured connections allows for site specific configurations and future expansion
- Provides isolation of individual cooling modules while providing a reliable leak free connection.

4 Refrigerant Distribution Unit

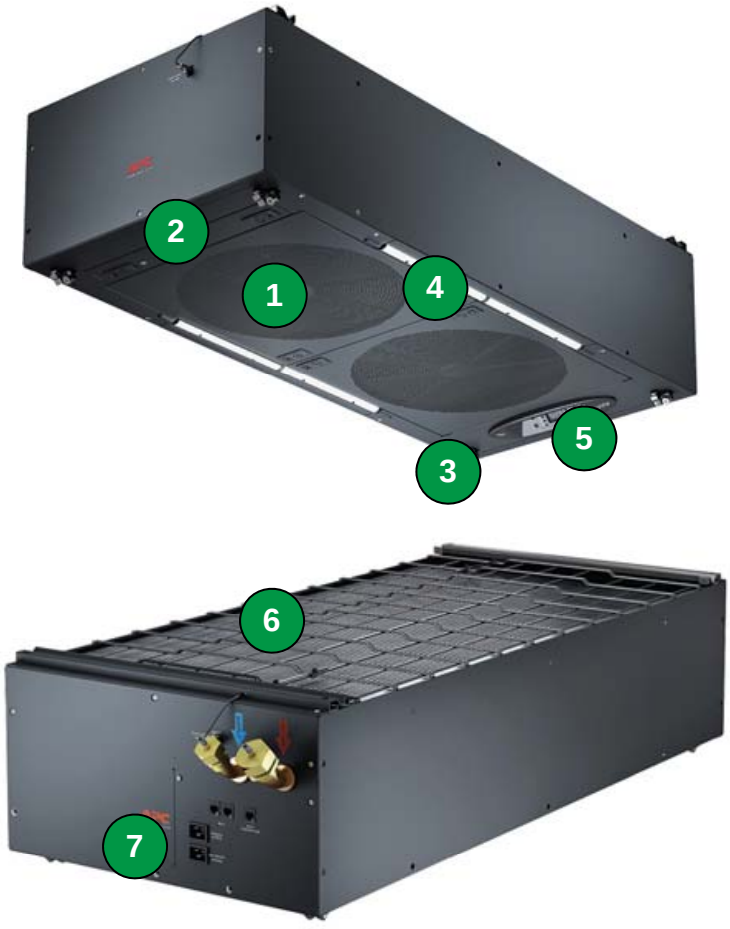
- Eliminates concerns of water next to or overhead of IT equipment racks
- Variable speed pumps to modulate capacity from 0-100%, with no minimum loading

APC by Schneider Electric

InRow OA

Close-coupled, pumped refrigerant cooling for medium to large datacenters

Up to 27kW



1. Tool-less, hot swappable fan modules reduce energy consumption through variable speed technology
2. Retractable electronics module for easy service access
3. Ease of installation and removal through the use of an integrated railway system
4. Motion activated, integrated LED lighting improves efficiency and replaces room lighting in hot aisle
5. Active Response Controls monitor rack inlets and controls cooling capacity to match IT heat load. Includes a user friendly interface for ease of operation
6. Micro Channel Heat Exchanger improves heat transfer and thermal performance
7. Dual A-B Power Inputs for power redundancy and protection

APC by Schneider Electric

Performance Specifications

Net Cooling Capacity @ 14.4ºC (58ºF) Evap Temperature		
SKU	**ACOA500***	**ACOA501****
Return Air Conditions ºC (ºF)	**Sensible Capacity kw (BTU/hr)**	**Sensible Capacity kw (BTU/hr)**
26.7 DB, 17.1 WB (80 DB, 62.8 WB)	13.2 (45,500)	13.6 (46,400)
29.4 DB, 18.1 WB (85 DB, 64.6 WB)	16.2 (55,300)	16.5 (56,300)
32.2 DB, 19.0 WB (90 DB, 66.2 WB)	19.0 (65,000)	19.4 (66,100)
35.0 DB, 19.9 WB (95 DB, 67.8 WB)	21.8 (74,400)	22.2 (75,700)
37.8 DB, 20.7 WB (100 DB, 69.3 WB)	24.5 (83,700)	25.0 (85,300)
40.6 DB, 21.6 WB (105 DB, 70.8 WB)	27.2 (92,800)	27.7 (94,500)

Note: * All values are accurate to +/- 1kW (3415 BTU/hr) and based on full airflow of 1463 l/s (3100 CFM)
Note: **All values are accurate to +/- 1kW (3415 BTU/hr) and based on full airflow of 1510 l/s (3200 CFM)
Note: Dewpoint must be 13.3ºC (56ºF) or lower to achieve conditions listed in table
Note: Sensible Heat Ratio = 1
Note: See InRow OA Technical Data Manual for more performance information

General Specifications

SKU	ACOA500	ACOA501
Maximum Airflow – l/s (CFM)	1463 (3100)*	1510 (3200)
Net Weight – kg (lbs) - empty	57 (125.7)	
Net Height – mm (in)**	352.4 13.9)	
Net Width – mm (in)	598 (23.5)	
Net Depth – mm (in)***	1312.5 (51.7)	
Refrigerant type	R134a	
Input Power	100-120V / 1Φ / 50/60Hz	200-240V / 1Φ / 50/60Hz
Power Consumption – Watts******	746	834
Plug Type	NEMA L5-20P	IEC-309 16/20A

Note: * Voltage Derate
Maximum Airflow at 120V = 1463 l/s (3100 CFM)
Maximum Airflow at 110V = 1372 l/s (2907 CFM)
Maximum Airflow at 100V = 1240 l/s (2628 CFM)
Note: ** Height includes track and rollers
Note: *** Depth does not include piping connections
Note: **** Power consumption includes 24 watts for integrated lighting

Accessories

- Mounting System – See InRow OA manuals for specifications
- Thermal Containment – See InRow OA manuals for specifications

APC by Schneider Electric

InRow Pumped Refrigerant Cooling

for Medium to Large Data Center Environments

InRow RA and Refrigerant Distribution Unit

The InRow RA is a floor mounted refrigerant based cooling system that provides up to 31kW of cooling directly to IT Equipment. The product design closely couples the cooling with the IT heat load. This design prevents hot air recirculation, while improving cooling predictability and allowing for a pay as you grow environment

The refrigerant used in this modular, pumped refrigerant system is R134a. R134a is a non-toxic refrigerant that poses no threat to IT equipment in the event of a leak, and has no Ozone depletion potential.

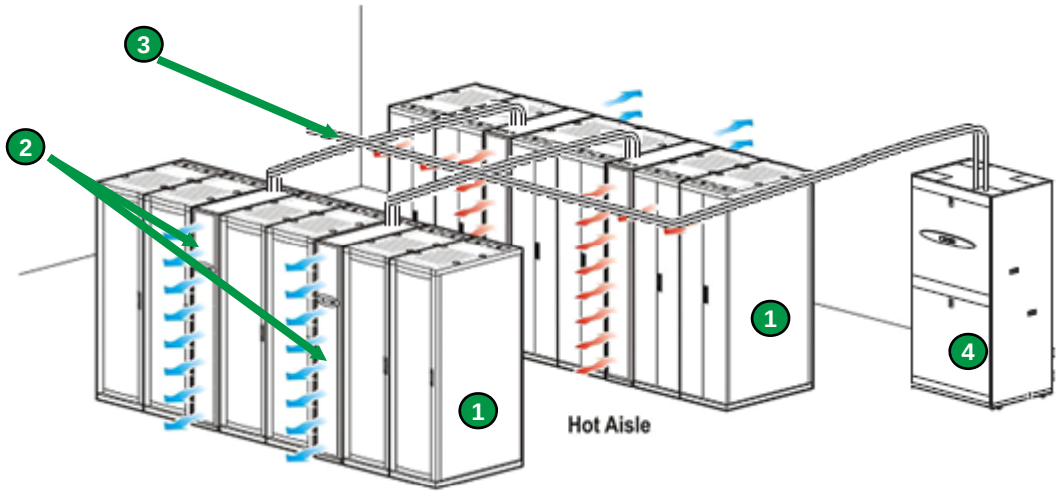
A Refrigerant Distribution Unit (RDU) is required with the deployment of an InRow RA. Each RDU can support multiple RA units, with a maximum capacity of 160kW. The RDU connects to a chilled water system and exchanges heat between the chilled water and R134a refrigerant. The RDU may be placed outside the datacenter, thus saving valuable data center floor space.

Target Applications & Environments

- 5 to 31kW/rack densities*
- Medium to Large Datacenters
- New and Existing Datacenters

Key Considerations

- Elimination of hot spots caused by high density deployments
- Flexibility to easily deploy and redeploy cooling
- Maximize available floor space for IT equipment
- Addresses fears of water in the data center in the most efficient manor.
- Ensure stable inlet temperatures to IT equipment



1 IT Enclosures
2 InRow RA
3 Modular Piping Headers
4 Refrigerant Distribution Unit (RDU)

* Capacities are based on single InRow RA operation, higher densities can be achieved when using with additional InRow overhead products

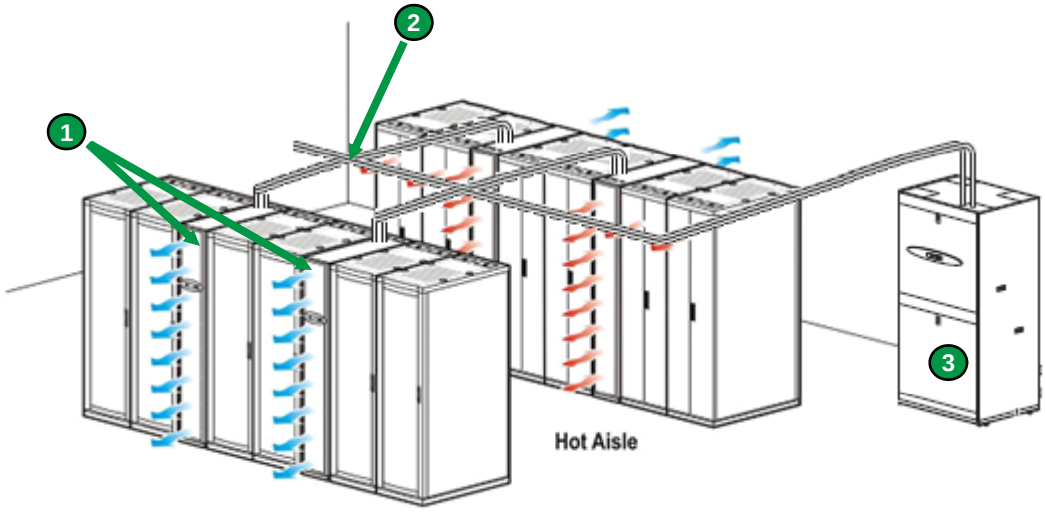
132 Fairgrounds Rd. West Kingston, RI 02892 USA • Call: 800-800-4APC • Fax: 401-789-3710 • e-mail: esupport@apc.com

APC by Schneider Electric

System Overview

The High Density Answer

Ideal for high density applications, the InRow RA captures up to 31kW of hot IT exhaust air at the source, neutralizes it and discharges cool air to the IT environment.



1 InRow RA w/ Active Response Controls

- Monitor and control temperature entering IT equipment ensuring proper operating environment.
- Active control of cooling capacity to right-size cooling to match IT heat load to maximize efficiency.

2 Modular Piping

- Preconfigured connections allows for site specific configurations and future expansion
- Provides isolation of individual cooling modules while providing a reliable leak free connection.

3 Refrigerant Distribution Unit

- Eliminates concerns of water next to or overhead of IT equipment racks
- Variable speed pumps to modulate capacity from 0-100%, with no minimum loading

APC by Schneider Electric

InRow RA

Close-coupled, pumped refrigerant cooling for medium to large datacenters

Up to 31kW

1. Top piping connections. Single supply / Single return to simplify piping and reduce deployment time
2. Top or bottom - primary / secondary power inputs for power redundancy and protection.
3. Variable speed, hot-swappable fans reduce energy consumption during off-peak hours and allow system to remain operational if a replacement is required.
4. Intelligent control offer network manageability, real time capacity monitoring, predictive failure notification and rack inlet temperature control.
5. Rear retractable electronics module allows for easy service access
6. Remote probe guarantees inlet temperature to IT equipment.
7. Casters allow for easy movement.

APC by Schneider Electric

Performance Specifications

Net Cooling Capacity @ 14.4ºC (58ºF) Evap Temperature		
SKU	**ACRA100***	**ACRA101****
Return Air Conditions ºC (ºF)	**Sensible Capacity kw (BTU/hr)**	**Sensible Capacity kw (BTU/hr)**
26.7 DB, 17.1 WB (80 DB, 62.8 WB)	15.2 (51,800)	15.0 (51,400)
29.4 DB, 18.1 WB (85 DB, 64.6 WB)	19.2 (65,600)	19.1 (64,100)
32.2 DB, 19.0 WB (90 DB, 66.2 WB)	22.6 (77,100)	22.4 (76,500)
35.0 DB, 19.9 WB (95 DB, 67.8 WB)	25.5 (87,200)	25.3 (86,500)
37.8 DB, 20.7 WB (100 DB, 69.3 WB)	28.9 (98,800)	28.7 (98,100)
40.6 DB, 21.6 WB (105 DB, 70.8 WB)	31.4 (107,200)	31.2 (106,400)

Note: * All values are accurate to +/- 1kW (3415 BTU/hr) and based on full airflow of 1520 l/s (3220 CFM) @ 120V/60Hz
Note: **All values are accurate to +/- 1kW (3415 BTU/hr) and based on full airflow of 1510 l/s (3200 CFM) @ 240V/60Hz
Note: Dewpoint must be 13.3ºC (56ºF) or lower to achieve conditions listed in table
Note: Sensible Heat Ratio = 1
Note: See InRow RA Technical Data Manual for more performance information

General Specifications

SKU	ACRA100	ACRA101
Maximum Airflow – l/s (CFM)	1520 (3220)*	1510 (3200)**
Net Weight – kg (lbs) - empty	152 (335)	160 (353)
Net Height – mm (in)	1991 (78.39)	
Net Width – mm (in)	300 (11.8)	
Net Depth – mm (in)	1070 (42.13)	
Refrigerant type	R134a	
Input Power	100-120V / 1Φ / 50/60Hz	200-240V / 1Φ / 50/60Hz
Power Consumption – Watts	833	770
Plug Type	NEMA L5-20P	IEC-309 16/20A

Note: * Voltage Derate
Maximum Airflow at 120V = 1520 l/s (3220 CFM)
Maximum Airflow at 110V = 1413 l/s (2994 CFM)
Maximum Airflow at 100V = 1298 l/s (2750 CFM)
Note: ** Voltage Derate
Maximum Airflow at 240V = 1510 l/s (3200 CFM)
Maximum Airflow at 230V = 1459 l/s (3090 CFM)
Maximum Airflow at 220V = 1402 l/s (2971 CFM)
Maximum Airflow at 208V = 1334 l/s (2827 CFM)
Maximum Airflow at 200V = 1287 l/s (2726 CFM)

APC by Schneider Electric

Refrigerant Distribution Unit (RDU)

Flexible pumped refrigerant distribution systems for InRow cooling

Up to 160kW

1. Redundant Variable speed pumps
   Allow for continuous operation in the event of a pump failure
2. Top or Bottom Piping Connections
   Allows for flexibility of installation
3. Casters allow for easy movement
4. Front Service / Installation Access
   Service clearance is only required in front of unit
5. Active Response Control monitors and controls refrigerant to vary cooling capacity and provide real time capacity monitoring. Communicates via SNMP and Modbus
6. Dual A-B Power Inputs
   Power redundancy and protection routed in top or bottom of unit.

APC by Schneider Electric

Performance Specifications

Entering Water Temperature: 7ºC (45ºF)			
SKU	**ACDA901**		
CW Delta T ºC (ºF)	**Total Net Capacity kW (BTU/hr)**	**CW Flow Rate l/s (GPM)**	**CW Pressure Drop kPa (psig)**
3.9 (7)	160 (545,900)	10.1 (160)	83 (12)

Note: All values are accurate to +/- 3kW (10,247 BTU/hr) rated with 20% PG
Note: Dewpoint must be 13.3ºC (56ºF) or lower to achieve conditions listed in table
Note: **No minimum loading requirements**
Note: See RDU Technical Data Manual for more performance information

General Specifications

SKU	ACDA901
Net Weight – kg (lbs) - empty	544 (1200)
Net Height – mm (in)	1991 (78.39)
Net Width – mm (in)	1070 (42.13)
Net Depth – mm (in)	750 (29.50)
Refrigerant type	R134a
Input Power	100-240V / 1Φ / 50/60Hz
Power Consumption – Watts	650
Plug Type	NEMA L5-20P IEC-309 16/20A

Accessories

- Modular Piping – See RDU manuals for specifications

APC by Schneider Electric