

InfraStruXure[™] InRow SC

Air-Cooled Self-Contained- 50/60Hz



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Overview

The InRow SC offers efficient, effective and economical cooling for a variety of wiring closets and server room spaces.

- Computer rooms
- Telecommunication facilities
- Clean rooms
- Power equipment
- Medical equipment rooms
- Archives
- LAN/WAN environments

A worldwide network of APC representatives is fully qualified to provide engineering, sales, installation and service for our products.

APC warrants all parts for 12 months from shipment. Extended warranties are available.

Capacity

The InRow SC self contained configuration is available in a capacity of up to 7kw.

Configuration

- Self Contained Air-cooled

In-row Advantages

The In-row solution improves energy efficiency and cooling ability in a number of ways. First, the room air is pulled in through a filter at the rear of the unit, is cooled, and is then distributed out the front of the unit to cool the space. At the same time, air from outside the room is utilized for capturing and removing heat. Removing the heat from the hot aisle is a better return air path than placing the air conditioner along the perimeter. The cold air is then supplied to the area in front of the racks, exactly where it is needed.

Regulatory Approvals

- CE Compliant
- UL Listed
- IEC Certified
- BSMI
- EN 55022 Class A
- FCC Part 15 Class A
- ICES-003
- VCCI
- VDE

Standard Features

- Direct Drive Tubeaxial Fans
- Insulated Side Panels
- Evaporator Coil
- Condenser Coil
- Compressor
- Condensate Pump
- Condensate Pan
- Hot Gas Bypass Valve
- Single Power Cord Supply
- Microprocessor Controller
- Network Management Card
- High Head Pressure Protection
- Rack Inlet Temperature Control
- Remote Shutdown
- Power Supply
- Input/Output Contacts- Alarms
- Washable Filters
- Ducting Kit
- SX Baying Kit

Optional Features

- Rope Water Detector
- Cable Support Bridge Trough
- VX Baying Kit



InRow SC System Overview

Self Contained System

A Self Contained system requires no refrigerant lines or heat exchangers to be installed. The InRow SC plug and play modular design allows for rapid installation.



- No specialized skills or trades required for installation
- Rapidly deployable solution for supplementing cooling when new equipment is added

Application Guidelines

The InRow SC is designed to be placed in-row, between equipment racks for a cooling-only air conditioning application. In order for the InRow SC to operate at optimum performance capabilities, the following requirements must be met on a 24hr/7week basis:

- Connection to a building cooling system return plenum
- Plenum must provide at least 850 CFM (1440 m³/hr) airflow to the condenser inlet and be able to remove this much airflow from the condenser discharge
- Condenser temperature draws from the plenum must be between 32-105F (0-40C)
- Heat rejection must be treated by the building cooling system or exhausted to the outside ambient air

Standard Features

Direct Drive Tubeaxial Fans

Each unit is equipped with six 200mm mixed flow, direct drive, tubeaxial DC fans. Three of the fans blow air across the condenser coil to provide heat rejection from the refrigerant system. In order to provide uniform airflow across the evaporator coil, the remaining three fans draw air through the evaporator section. The evaporator fans are hot-swappable and can be easily replaced while the unit is in operation. All fans are variable speed, allowing them to assist in modulating unit cooling capacity and maintaining refrigerant head pressure.



Insulated Side Panels



The frame is constructed of 16 gauge formed

steel for maximum strength. All exterior panels and corner posts on the frame are powder coated for durability and an attractive finish. Front and rear exterior panels are constructed of 18 gauge perforated steel with 69.5% open free area. Insulation is 5 lb/ft³ (80.1 kg/m) density and complies with ASTM E84 rating of 25/50.

Condensate Pump

Removes moisture from the system to ensure continuous operation. The factory installed and wired condensate pump is capable of 15.2m (50ft) of total run, of that 4.9m (16ft) can be vertical lift.

Condensate Pan

Condensate Pan is V-0 thermal formed, antifungal, non-ferrous material for higher indoor air quality.

Hot Gas Bypass

An electronically controlled actuator directs hot discharge gas from the compressor back to the expansion valve and into the coil. During lightly loaded conditions, this reduces compressor cycling and prevents the evaporator coil from freezing. Hot gas bypass also assists in the management of the refrigerant head pressure.

Single Power Cord Supply

The 60hz unit utilize a NEMA L6-20 plug, the 50hz unit uses an IEC 309 16A plug. The power cord can be connected to the power connector at the top or bottom of the unit.

Microprocessor Controller

The easy-to-use display allows the operator to select options from the device's menu-driven interface to control and monitor the connected air conditioning system.

Network Management Card

Permits multi-level access to monitoring, control, and event notification features over the user's network. Also allows the InRow SC to be integrated into APC's InfraStruXure Manager device.

High Head Pressure Protection

The condenser fans modulate to maintain a nominal refrigerant discharge of 425psi. If the condenser inlet air is restricted or too warm, the refrigerant discharge pressure will rise until the unit shuts down even with condenser fans at 100%. To prevent a total loss of cooling, the unit will slow evaporator fan

speed and open the hot gas bypass valve to reduce unit capacity and discharge pressure.

Rack Inlet Temperature Control

To control the unit based on rack inlet temperature, a remote sensor is provided. This sensor is factory wired for a remote placement in the field on adjacent IT racks.

Remote Shutdown/IO Contacts

The unit provides one field connection input for remote shutdown. I/O contacts allow for remote annunciation of any alarm condition or critical only alarms.

Power Supply

The unit includes 2 power supplies, each capable of running the fans at 80% capacity in the event of a single power supply failure.

Washable Filters

The filtration of conditioned air is extremely vital to maintaining the clean, particle-free environment required by electrical equipment. Filters are <20% (ASHRAE 52.1) and MERV 1 (ASHRAE 52.2) rated that meets HF-1 standards for electronics.

Ducting Kit w/Ceiling Adapter

60Hz units have a 24"x24" adapter, 50Hz units have a 600mmx600mm adapter. Each duct tube is 6 ft. (1.8m) long and 10" (254mm) in diameter.

SX Baying Kit

Baying kit enables the cooling system to be bayed to the APC Netshelter SX enclosures. Kit is made of 16 gauge metal.

Optional Features

Rope Water Detector



The solid-state spot water detector activates an audible alarm on the controller when moisture is detected. A maximum of one detector can be installed.

Cable Support Bridge Trough



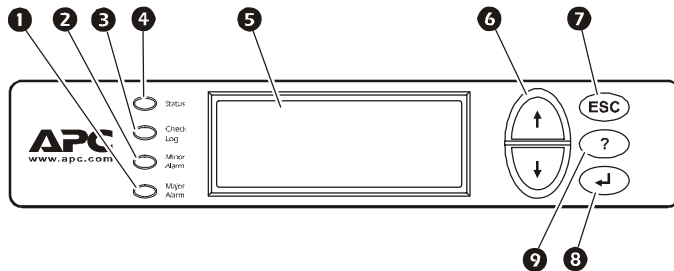
Organizes cables over the top of the unit without interfering with the duct tubes. The bridge trough is mounted to the racks, which allows the InRow SC to be moved without having to disconnect any of the overhead cabling. Up to 100 CAT5 cables can fit inside the bridge trough.

VX Baying Kit



Baying kit enables the cooling system to be bayed to the APC Netshelter VX enclosures. Kit is made of 16 gauge metal.

Microprocessor Controller



1	Critical Alarm LED
2	Warning Alarm LED
3	Check Log LED
4	Status LED
5	Liquid Crystal Display (LCD)
6	Up and Down Arrow Keys
7	ESC key
8	Enter key
9	Help key

Microprocessor Controller

The microprocessor controller is standard on each system. The controller provides precision control for the demanding requirements of:

- Data centers
- Control rooms
- Clean rooms
- Switch rooms
- UPS rooms

Open Architecture

The NetworkAIR SC protocol is open for integration with all building management systems. Communication interface on the system is MODBUS RS485.

Control Type

Controller utilizes proportional and integral derivative (PID), a time proven precision environmental control method. This allows for custom tuning of control variables to achieve desired system response.

Control

The backlit, four-line by twenty character display is password configurable.

Functions

- Supply and Return Air Conditions
- Operational Mode Control
- Event Logging
- Alarms
- Fan Speed Adjustment
- Input/Output Module Programming

Logging

The microprocessor displays the 30 most recent alarms. Each alarm log contains a time/date stamp as well as operating conditions at the time of occurrence. The controller also displays run time, in hours, for major components (Air Filter, Condenser Fans, Evaporator Fans, Compressor, Condensate Pump, Fan Power Supplies).

Factory Default Set Points:

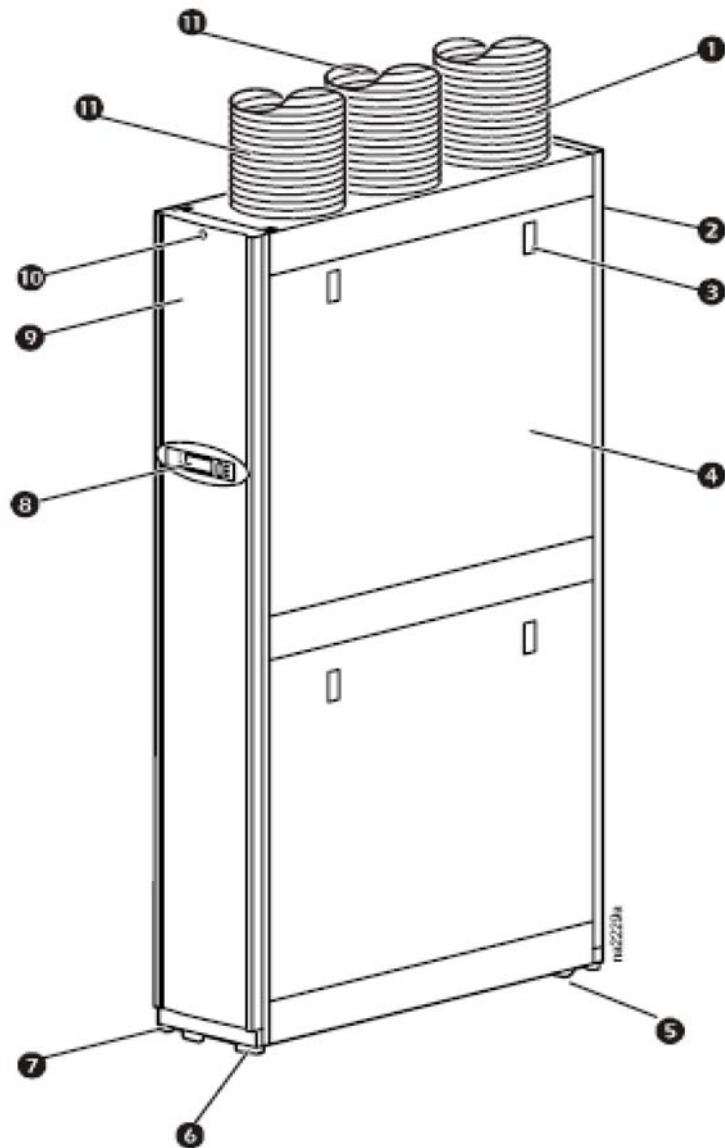
- Cool: 72.0° F (22.2° C)
- Deadband: 1.8° F (1.0° C)
- Supply Air InRow: 64.0° F (17.8° C)
- Supply Air RACS: 68.0° F (20.0° C)
- Supply Air Spot: 57.0° F (13.9° C)
(applies to Proportional mode only)

Alarms

- Air Containment High Pressure Fault
- Air Filter Clogged
- Air Filter Run Hours Violation
- A-Link Isolation Relay Fault
- Condensate Pump Full Fault
- Condenser Fan #n Fault
- Cooling Failure
- Persistent High Discharge/Low Suction Pressure Alarm
- Rack Inlet High Temperature Violation/Fault
- Suction Pressure Sensor/ Temperature Fault
- Supply Air High Temperature Violation
- Upper Return/Supply Air Sensor Fault
- Water Detection Fault
- Discharge Pressure Sensor Fault
- Evaporator Fan #n Fault
- External Communication Fault
- Fan Power Supply Left/Right Fault
- Filter Sensor Fault
- High Discharge Pressure Alarm
- Internal Communication Fault
- Lower Return/Supply Air Sensor Fault
- Low Suction Pressure Alarm
- On Standby: Input Contact Fault

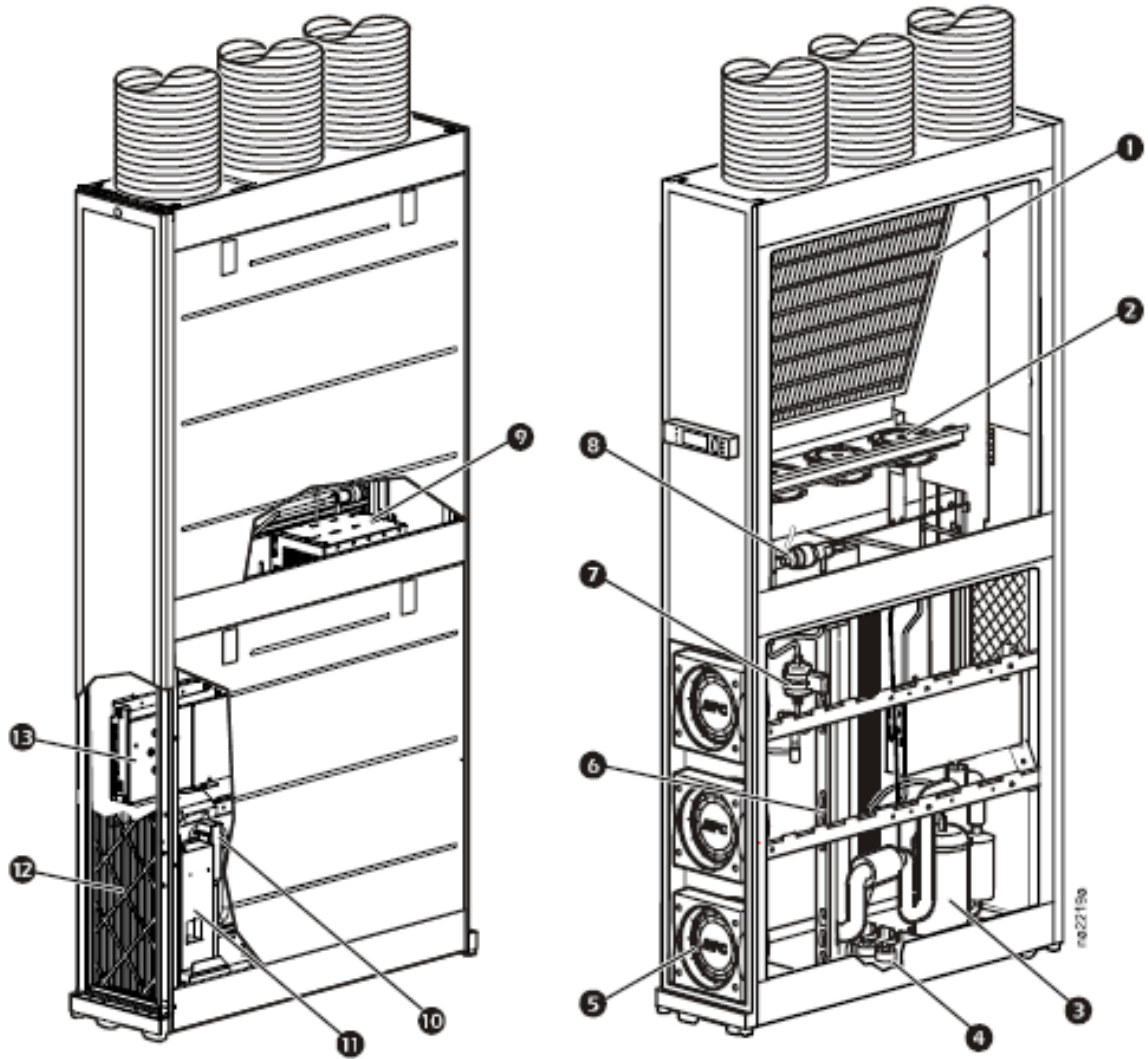
Components

External View



- | | | | |
|---|------------------------------|---|-------------------------------------|
| ① | Intake Air Duct | ⑦ | Adjustable Leveling Foot (4 Places) |
| ② | Removable Rear Door | ⑧ | Display Interface |
| ③ | Side Panel Latch/Lock | ⑨ | Removable Front Door |
| ④ | Removable Side Panel | ⑩ | Door Lock |
| ⑤ | Rear Casters (Non-Swiveling) | ⑪ | Exhaust Air Duct |
| ⑥ | Front Casters (Swiveling) | | |

Internal View



- ① Condenser Coil
- ② Condenser Fans
- ③ Compressor
- ④ Condensate Pan Floats
- ⑤ Evaporator Fans
- ⑥ Evaporator Coil
- ⑦ Refrigeration Filter Drier
- ⑧ Hot Gas Bypass Valve
- ⑨ Power Supply
- ⑩ Condensate Pump
- ⑪ High Voltage Box
- ⑫ Standard Washable 1/2in Air Filter
- ⑬ User Interface Panel

Air-cooled Performance Specifications

NET COOLING CAPACITY		
Model	ACSC100	ACSC101
70°F DB, 58.5°F WB (21.1°C DB, 14.7°C WB)		
Total - BTU/hr (kW)	16300 (4770)	15100 (4410)
Sensible - BTU/hr (kW)	15100 (4440)	14300 (4200)
72°F DB, 60.0°F WB (22.2°C DB, 15.6°C WB)		
Total - BTU/hr (kW)	17000 (4980)	15400 (4510)
Sensible - BTU/hr (kW)	15500 (4530)	14400 (4230)
75°F DB, 61.0°F WB (23.9°C DB, 16.1°C WB)		
Total - BTU/hr (kW)	16700 (4890)	16200 (4740)
Sensible - BTU/hr (kW)	16200 (4740)	15900 (4650)
80°F DB, 67.0°F WB (26.7°C DB, 19.4°C WB)		
Total - BTU/hr (kW)	18100 (5310)	18000 (5250)
Sensible - BTU/hr (kW)	15500 (4560)	16000 (4680)
80°F DB, 62.5°F WB (26.7°C DB, 16.9°C WB)		
Total - BTU/hr (kW)	17200 (5040)	16700 (4890)
Sensible - BTU/hr (kW)	17200 (5040)	16700 (4890)
85°F DB, 65.0°F WB (29.4°C DB, 18.3°C WB)*		
Total - BTU/hr (kW)	18000 (5250)	16700 (4890)
Sensible - BTU/hr (kW)	18000 (5250)	16700 (4890)
95°F DB, 82.7°F WB (35.0°C DB, 28.2°C WB)**		
Total - BTU/hr (kW)	22000 (6450)	21300 (6240)
Sensible - BTU/hr (kW)	11300 (3300)	11300 (3300)

Note: All values are accurate to +/- 5% and based on full fan speed with standard filters and 95 deg F (35C) Condenser entering air

All except * or ** tests were performed at 100% evaporator fan speed. Net cooling data is published above



*Airflow reduced to 1000SCFM (1700 m³/hr) at this condition to maintain appropriate suction temperature

**Airflow reduced to 600SCFM (1020 m³/hr) at this condition to maintain appropriate suction temperature

General Technical Specifications

MODEL	ACSC100	ACSC101
ELECTRICAL INPUT	200-240V, 1ph, 60Hz	200-240V, 1ph, 50Hz
AIR SYSTEM - Direct Drive Tubeaxial Fans		
Max Evaporator Airflow	1200 CFM (2038 m ³ /hr)	
Max Condenser Airflow	850 CFM (1440m ³ /hr)	
EVAPORATOR COIL - COPPER TUBE/ALUMINUM FIN		
Face Area - ft ² (m ²)	2.5 (0.23)	
Rows Deep	2	
Face Velocity - FPM (m/s)	380 (2.44)	
FILTERS		
Quantity	1	
Size - in (mm)	9.375 X 36.75 (238 X 933)	
Depth - in (mm)	1/2 (13)	
Efficiency (%)	<20% MERV 1	
PHYSICAL DATA		
Weight - lbs (kg)	365 (165.9)	
Height - in (mm)	78.4 (1991)	
Width - in (mm)	11.8 (300)	
Depth - in (mm)	42.1 (1069)	
REFRIGERANT		
R-410A - oz/kg	52 (1.47)	

Electrical Data

SKU	Voltage	Phase	Frequency	Rated Current (Amps)	InRush Current (Amps)	Power (W)	Plug Type
ACSC100	200-240V	1ph	60Hz	16.0	56.0	2940	NEMA L6-20P 
ACSC101	200-240V	1ph	50Hz	14.4	65.0	2390	IEC 309 16A 

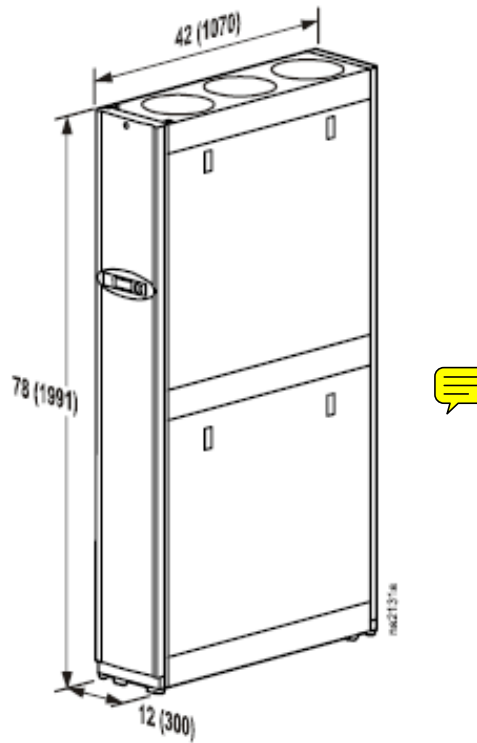
Sound Performance Data

Air-cooled Tested Sound Data										
Evap Fan Speed%	Condenser Fan Speed	Octave Band Hz, Sound Power dB re 10 ⁻¹² W Data obtained from Reverberation Sound Tests at ETL							Lp Sound Pressure dB re: 20 microPa*	
		125	250	500	1000	2000	4000	8000		dB
										dB
										dB
100%	100%	77.5	86.5	86.5	83.0	78.0	75.5	70.5		82.2
90%	100%	77.5	86.5	85.5	81.0	76.0	73.5	68.0		81.0
80%	100%	82.0	86.5	85.5	79.5	75.5	70.5	65.5		80.5
60%	80%	74.5	87.0	79.5	78.5	73.0	66.5	62.5		78.1

*Weighted Sound Pressure dBA in a 10'x10'x10' room at 5 ft distance

Dimensional Data

InRow SC Assembled Module



Dimensions are inches (millimeters)

Mechanical Connections

InRow SC Condensate Line



InRow SC Power Connections

Guidelines for Installation

The InRow SC provides reliable, self-contained cooling that maximizes availability within small IT rooms and wiring closets. The unit incorporates the latest system design innovations to provide you with optimum efficiency, reliability and rapid installation.

For more detailed information, see the InRow SC Installation manual (990-2796).

Room preparation

During the design of the data center, consider ease of entry for the equipment, floor loading factors, and accessibility to ducting and wiring.

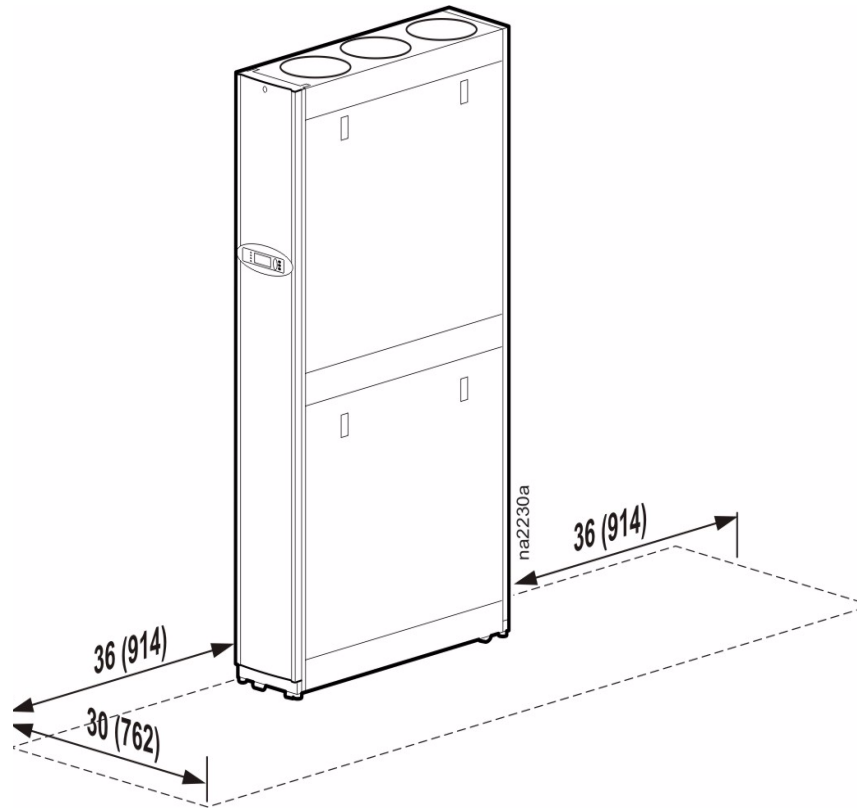
Ensure the room is insulated to minimize the influence of exterior heat loads. Use the minimum required amount of fresh air for make up to comply with local and national codes and regulations.

Receiving the unit

Your InRow SC unit has been completely tested and inspected prior to shipment. To ensure that you have received the unit in excellent condition, perform a careful inspection of the crating and the unit immediately upon receipt. Verify that all parts ordered were received as specified. Report any damage discovered to the freight carrier. If necessary, contact the APC field service department for help in repairing or replacing damaged parts. While APC is not responsible for damage incurred in transit, we want to make sure that you have no undue delays in your system start-up.

Rigging

The unit is manufactured with a formed steel frame for maximum strength and unit integrity. However, as with all electrical and mechanical equipment, you must take care with proper rigging of your unit. The equipment is easily tipped over. Use extreme caution when unpacking and moving. When using a forklift to move the unit, make sure to lift only from the bottom of the unit. When moving the equipment on a ramp, always point the narrow width in the direction of travel. Do not place the equipment on its side. If the equipment has been tipped, place it upright on a flat, solid surface and keep in this position for at least 24 hours before operating.



Service Access

Routine service and basic repair activities can be accomplished with front and rear access only. APC recommends 36" (914mm) of clear floor space in front and back of the unit for this purpose. For major repair activities needing side access, 30" (762mm) of clear space should be provided as needed. At least 42" (1070mm) of clear space is required to free the unit from the row of rack enclosures.

Guide Specifications

Standard Components

A. CABINET CONSTRUCTION

1. Exterior panels shall be 18 gauge metal with 5 lb/ft³ (80 kg/m³) density foam insulation. Insulation complies with UL94-5VA ASTM E84 flame spread and smoke developed rating of 25/50. Front and rear exterior panels shall be 18 gauge perforated steel with 69.5% open free area, and equipped with a keyed lock to provide a means of securing access to the internal components of the unit.
2. The frame shall be constructed of 16 gauge formed steel welded for maximum strength. All units shall provide full service from the front and rear, allowing units to be placed within a row of racks.
3. All exterior panels and frame shall be powder coated for durability and attractive finish. Exterior frame and panel color shall have color values: L = 74.50, a = -.53, b = +8.20.
4. Units shall include casters and leveling feet to allow ease of installation in the row and provide a means to level the equipment with adjacent IT racks.

B. VARIABLE SPEED DIRECT DRIVE MIXED FLOW DC FAN ASSEMBLY

1. Fan: The unit shall be configured for draw-through air pattern to provide uniform air flow over the entire face of the coil. Each unit shall include six 200 mm mixed flow direct drive DC axial fans. Three fan assemblies shall be designed to provide 400 CFM (680 m³/hr) each across the evaporator coil for total unit airflow of 1200 CFM (2039 m³/hr). Three fan assemblies shall be designed to provide 283 CFM (480 m³/hr) each across the evaporator coil for total unit airflow of 850CFM (1440 m³/hr).
2. Variable Speed Fans: Fans shall be variable speed capable of modulating from 30-100%. Fans shall soft start to minimize in-rush current when starting.
3. Fan Protection: Each fan assembly shall consist of a plastic injection molded bezel with integral fan discharge finger guard. Inlet of the fan should include a cage type finger guard.
4. Operation and Service: The unit should be capable of operation in the event of a fan failure. Fans shall be replaceable while the unit is in operation.

C. POWER SUPPLY

1. Input Power Feed: Single power input should be a locking NEMA or IEC plug connection suitable for the input power selected. Unit power consumption is not to exceed 2950 watts during normal operation.
2. Power Supplies: Dual power supplies are capable of running the unit fans at 80% capacity in the event of a power supply failure. Power supplies shall be hot-swappable.

D. MICROPROCESSOR CONTROLLER

1. Monitoring and Configuration: The master display shall allow monitoring and configuration of the air conditioning unit through a menu-based control. Functions include status reporting, set-up, and temperature set points. Four LEDs report the operational status of the connected air conditioning unit.
2. Controls: The microprocessor controller shall come equipped with control keys to allow the user to navigate between menus, select items, and input alpha numeric information.
3. Alarms: The microprocessor controller shall activate a visible and audible alarm in the occurrence of the following events:
 - a. Air Containment High Pressure Fault
 - b. Air Containment Pressure Sensor Fault
 - c. Air Filter Clogged
 - d. Air Filter Run Hours Violation
 - e. A-Link Isolation Relay Fault
 - f. Condensate Pan Full Fault
 - g. Condensate Pump Fault
 - h. Condenser Fan #n Fault
 - i. Cooling Failure
 - j. Discharge Pressure Sensor Fault
 - k. Evaporator Fan #n Fault
 - l. External Communication Fault
 - m. Fan Power Supply Left Fault
 - n. Fan Power Supply Right Fault
 - o. Filter Sensor Fault
 - p. High Discharge Pressure Alarm
 - q. Internal Communication Fault
 - r. Lower Return Air Sensor Fault
 - s. Lower Supply Air Sensor Fault
 - t. Low Suction Pressure Alarm
 - u. On Standby: Input Contact Fault
 - v. Persistent High Discharge Pressure Alarm
 - w. Persistent Low Suction Pressure Alarm
 - x. Rack Inlet High Temperature Violation
 - y. Rack Inlet Temperature Sensor Fault
 - z. Return Air High Temperature Violation
 - aa. Suction Pressure Sensor Fault
 - ab. Suction Temperature Sensor Fault
 - ac. Supply Air High Temperature Violation
 - ad. Upper Return Air Sensor Fault
 - ae. Upper Supply Air Sensor Fault
 - af. Water Detection Fault

4. Logging: The microprocessor controller shall log and display all available events. Each alarm log shall contain time/date stamp as well as operating conditions at the time of occurrence. Controller shall display the run time hours for major components.

E. NETWORK MANAGEMENT CARD

The unit shall include a network management card to provide management through a computer network through TCP/IP. Management through the network should include the ability to change set points as well as view and clear alarms.

F. EVAPORATOR AND CONDENSER COIL

Coil shall use raised lance with rippled edge type aluminum fin and 0.375"OD rifled copper tube coils with 0.012" wall thickness. Coil end supports shall be a minimum 18 gauge galvanized steel.

G. CONDENSATE PAN

The unit shall consist of a primary and secondary drain pan. Secondary drain pan shall be piped to primary pan for removal of condensate. Primary drain pan shall include a condensate pump and dual floats for control and overflow protection. Condensate pans are V-0 thermal formed, anti-fungal, non-ferrous material for higher indoor air quality.

H. CONDENSATE PUMP

Factory installed and wired condensate pump shall pump 1.3 gal/h (4.9 liters/hour) at 16 ft (4.9 m) of vertical lift and a 50 ft (15.2 m) horizontal run.

I. FILTERS

Standard Air filter: <20% efficient per ASHRAE 52.1, MERV 1 per ASHRAE 52.2, 1/2" washable mesh filter

J. REMOTE TEMPERATURE SENSOR

Remote temperature sensor shall ship factory wired to the unit for placement in the field to provide control input based on rack inlet temperature.

K. HOT GAS BYPASS

The unit shall use an electronic stepper valve for hot gas bypass operation. The actuator will have 1596 steps from fully open to fully closed. The discharge gas will be piped to the unit thermostatic expansion valve.

L. DUCTING KIT

Ducting kit with ceiling tile adapter is included with the unit. Duct tubes shall be 10" (254mm) in diameter and 6' (1.8m) long and constructed from UL 181 Class I material.

Ceiling tile adapter shall be suitable for either 24"x24" or 600mm x 600mm suspended ceiling grids and constructed of powder coated metal.

M. CABLE WATER DETECTOR (OPTIONAL)

1. A leak detection sensing cable shall be shipped loose with the unit. If water or other conductive liquids contact the cable anywhere along its length, the main controller visually and audibly annunciates an alarm.
2. The detector shall be provided with a 20ft (6.1m) of cable. Additional cable may be cascaded up to 80ft (24.4m) total length.

N. CABLE SUPPORT BRIDGE TROUGH (OPTIONAL)

Overhead cable distribution bridge shall connect to adjacent racks and allow for removal of the unit without disrupting the cable connections. The trough shall be made of 16 gauge metal with powder coat finish. Trough shall be capable of carrying no less than 80 CAT5 cables.



APC Worldwide Customer Support

Customer support for this or any other APC product is available at no charge in any of the following ways:

- Visit the APC Web site to find answers to frequently asked questions (FAQs), to access documents in the APC Knowledge Base, and to submit customer support requests.
 - **www.apc.com** (Corporate Headquarters)
Connect to localized APC Web sites for specific countries, each of which provides customer support information.
 - **www.apc.com/support/**
Global support with FAQs, knowledge base, and e-support.
- Contact an APC Customer Support center by telephone or e-mail.
 - Regional centers:

APC headquarters U.S., Canada	(1)(800)800-4272 (toll free)
Latin America	(1)(401)789-5735 (USA)
Europe, Middle East, Africa	(353)(91)702020 (Ireland)
Asia Pacific	(61) 2 9955 9366 (Australia)

- Local, country-specific centers: go to **www.apc.com/support/contact** for contact information.

Contact the APC representative or other distributor from whom you purchased your APC product for information on how to obtain local customer support.

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