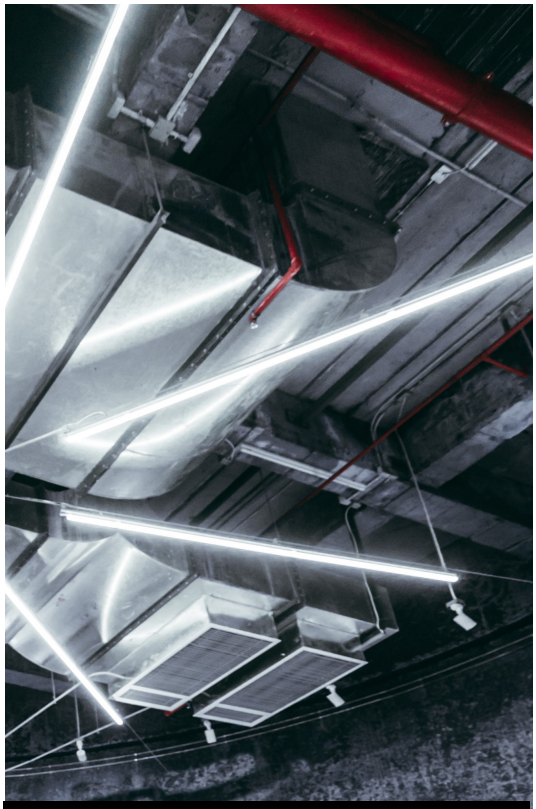


RH-Cube 18 Duct Configurations

Four RH-Cube 18 ducting topologies are discussed:

1) stand-alone
2) cascade
3) series
4) parallel

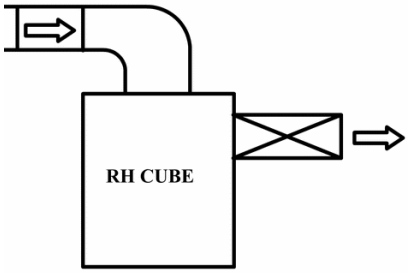
This app note presents four duct configurations for the RH-Cube 18:

1) Stand-alone
2) Cascade
3) Parallel
4) Series

Stand-alone is the least complicated since it is not directly connected to the rest of the HVAC system. Cascade provides the best performance and energy savings, and does not overload either the central unit supply or delivery air, which may occur with Series or Parallel configurations;

For more information on RH-Cube 18 supply and delivery duct attachment, clearances, and other details not found here, please refer to the installation manual.

1) Stand-Alone Configuration



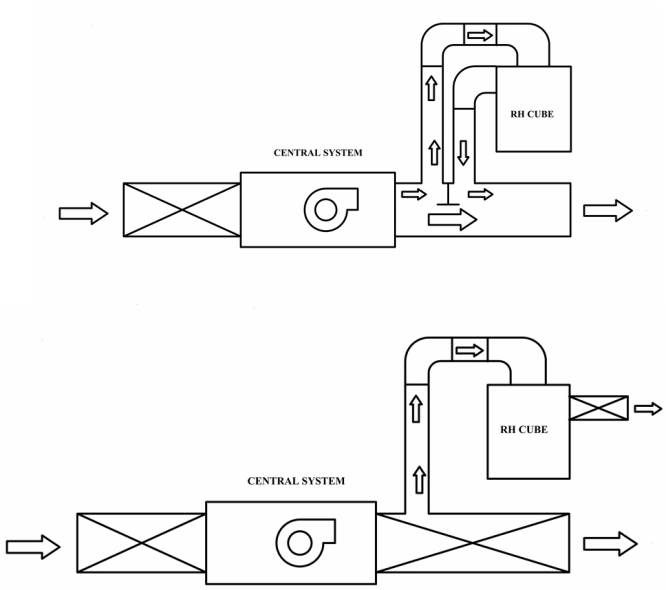
The Stand-Alone Configuration is the most basic architecture. and requires the least amount of ducting. Air is drawn from the immediate surroundings and a simple ducting system connects the delivery air to the living space.

This configuration can be used when installing an RH-Cube 18 in an attic, mechanical room, closet, basement, hotel ice machine room, etc. Even with minimal ducting, dehumidification will distribute rapidly due to the vapor pressure differential.

Stand-Alone Installation Details

- Controlled by a humidistat. No interlock to the central system is required.
- Static pressure must be kept below 4 inches.
- Typical delivery air dewpoint is between 44°F and 48°F.
- RETURN AIR:
  - For safety there should be at least three feet of ducting.
  - For noise reduction, 10 ft of insulated ducting with one elbow is recommended, or the use of a return air noise muffler.
- DELIVERY AIR:
  - The minimum duct length is 6 ft.
  - For noise reduction 10 ft of insulated ducting with one elbow is recommended.

2) Cascade Configuration (Patent Pending US 62974082)



In the Cascade Configuration, the RH-Cube 18's return air is taken directly from the delivery air of the central system. The RH-Cube 18's delivery air can either be ducted directly into the living space, or can be recombined with the central system's delivery air.

Benefits to Cascade Configuration

Cascade Configuration improves the efficiency (lbs/kw) of the RH-Cube 18 by up to an additional 40% and increases its dehumidification capacity

by up to 10% when compared to the stand-alone configuration. The boost in capacity and efficiency is due to the pre-cooling of the RH-Cube 18's air supply by the central system's air conditioner which reduces the amount of energy needed by the RH-Cube 18 to reach the dewpoint. And because the RH-Cube 18 contributes very little sensible cooling, the delivery air is not over cooled.

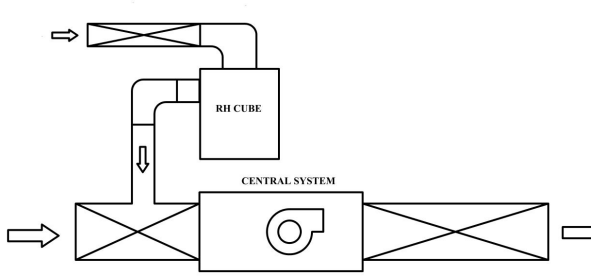
The Cascade Configuration provides even more opportunities to reduce operating costs, improve health and improve comfort.

- Because the RH-Cube 18 can supply 100% of the dehumidification needs, the air conditioner no longer needs to supply any latent cooling. As a result, the a/c's cooling coil can be tuned to operate at a higher temperature. This will save a significant amount of energy, extend the life of the air conditioner, and eliminate condensation in the ducting and its associated contaminant build-up.
- Because the RH-Cube 18 can deliver low RH at higher temperatures, for example, 77°F and 45% RH, the thermostat can be set higher, saving even more energy without compromising comfort.
- It has been shown that 77°F and 45% RH is a healthier environment than 72°F and 50% RH. It reduces or eliminates mold and dist mites, and is perceived as being more comfortable.

Cascade Installation Details

- Controlled by a humidistat
- Delivery air dewpoint is between 44°F and 48°F with air conditioner off and 36°F and 40°F with the air conditioner on.
- An interlock with central system's heater and fan is required.
- Central fan must be on while RH-Cube 18 is running if the delivery air of the RH-Cube 18 and central air are combined.

3) SERIES CONFIGURATION



In the Series Configuration the RH-Cube 18's delivery air joins the return air of the central system. Because this configuration lowers the dewpoint of the return air, it increases the likelihood of the central system's a/c to freeze up.

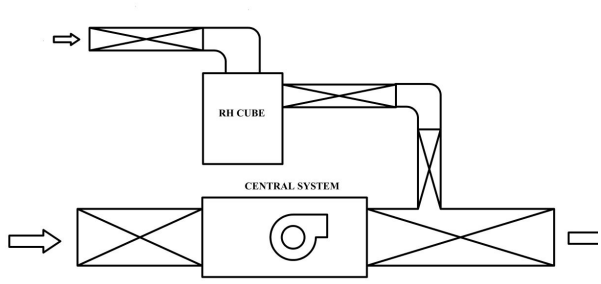
Several RH-Cube 18 can be added to a single central air system using this configuration; however, their combined contribution must not exceed 20% of the total return air.

Series Installation Details

- Controlled by a humidistat
- Static pressure must be kept below 4 inches.
- Typical delivery air dewpoint is between 44°F and 48°F.
- An interlock with central system's fan is required.
- RETURN AIR:
  - For safety there should be at least three feet of ducting.
  - For noise reduction, 10 ft of insulated ducting with one elbow is recommended, or the use of a return air noise muffler.

- DELIVERY AIR
  - The RH-Cube 18's air volume (600 cfm typical) must not exceed 20% of the central system's return air.
  - A baffle is required to direct b the air in the same direction of the central unit air flow.

4) Parallel Configuration



In the Parallel Configuration the RH-Cube 18's delivery air joins the delivery air of the central system.

Several RH-Cube 18 can be added to a single central air system delivery air using this configuration; however, their combined contribution must not exceed 20% of the total delivery air.

Parallel Installation Details

- Controlled by a humidistat
- Static pressure must be kept below 4 inches.
- Typical delivery air dewpoint is between 44°F and 48°F.
- An interlock with central system's fan is required.
- RETURN AIR:
  - For safety there should be at least three feet of ducting.
  - For noise reduction, 10 ft of insulated ducting with one elbow is recommended.
- DELIVERY AIR:
  - A baffle is required to direct the RH-Cube 18's delivery air in the same direction as the central system's air flow.
  - The RH-Cube 18's air volume (600 cfm typical) must not exceed 20% of the central system's return air.

SUMMARY TABLE

CONFIGURATION	INTER-LOCK	RETURN AIR	DELIVERY AIR	LEAVING DEW POINT
Stand Alone	N/A	Minimum ducting for noise reduction: 10 ft, insulated, one elbow, or use of muffler	- Minimum ducting: 6 ft - For noise reduction, insulate ducting and add one elbow.	44°F - 48°F
Parallel	N/A	Minimum ducting for noise reduction: 10 ft, insulated, one elbow, or use of muffler	- Minimum ducting: 6 ft - For noise reduction, insulate ducting and add one elbow. - baffle required direct to the air in the same direction of the central unit air flow	44°F - 48°F
Series	Central Fan	Minimum ducting for noise reduction: 10 ft, insulated, one elbow, or use of muffler	- Minimum ducting: 6 ft - For noise reduction, insulate ducting and add one elbow. - Baffle required to direct air in the same direction as central air system - Must not exceed 20% of central air system	44°F - 48°F
Cascade	Heater & Central Fan		- Baffle required to direct air in the same direction as central air system	44°F - 48°F A/C OFF 36°F - 40°F A/C ON