



ADVANCED COOLING TECHNOLOGIES

AAHX

# AIR-TO-AIR HEAT PIPE HEAT EXCHANGERS

**Simple Design. Powerful Results.  
Up to 70% Sensible Effectiveness and  
Often <2-Year ROI in High-Ventilation Systems.**

ACT's Air-to-Air Heat Pipe Heat Exchangers (AAHXs) recover energy from exhaust air to preheat or precool incoming make-up air, reducing heating and cooling loads before they reach the building's HVAC systems. With a sealed, passive design, AAHXs transfer sensible heat between two isolated airstreams with no moving parts, cross-contamination risk, or mechanical maintenance. The result is reliable, high-performance energy recovery that lowers carbon emissions and utility costs while simplifying system operation.

**CLEAN, PASSIVE,  
SENSIBLE ENERGY RECOVERY**



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# THE ACT AAHX ADVANTAGE



## Zero Moving Parts

Maximizes reliability and delivers the lowest lifecycle cost



## Simple Maintenance

Coil-like cleaning; no media, seals, or moving parts to service



## Sealed Airstreams

Fully isolated supply and exhaust support clean IAQ and pressure-critical environments



## Compact & Flexible

Fits where energy wheels cannot, with more AHU and duct layout options



## High Sensible Effectiveness

Typically up to 70%, application dependent

# HOW IT WORKS



## Evaporation

Warm outside air entering the lower section transfers heat to the working fluid (refrigerant) inside the vertical heat pipes, causing it to vaporize and cool the incoming supply air.



## Transport

The vapor, driven by a pressure differential under vacuum, rises to the condenser section in the upper exhaust area, where it encounters the cooler exhaust airstream.

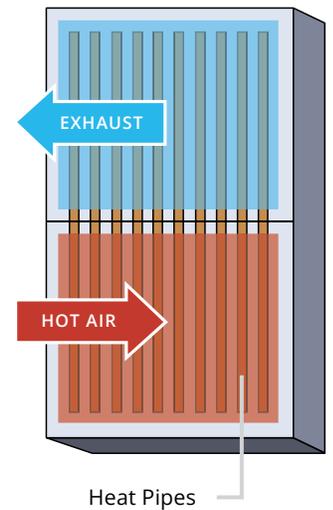


## Condensation & Return

There, the vapor condenses, releasing heat into the exhaust air, and the cooled liquid returns by gravity to the lower section to repeat the cycle and cool the incoming supply air.

### GRAVITY-AIDED PASSIVE MODE

Pre-cooling vertical installation shown



# IDEAL APPLICATIONS

According to ASHRAE 90.1, many high-ventilation building types now require or strongly benefit from energy recovery, making AAHXs a smart choice for:



Healthcare & Laboratories



Education



Hospitality, Aquatics & High-Humidity Facilities



Commercial & Institutional Buildings



Correctional Facilities

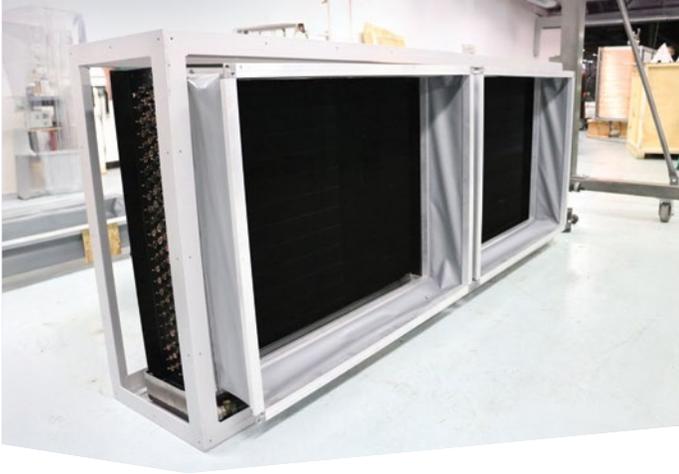


Retrofit & Energy-Efficiency Upgrades

# CONFIGURATIONS & ORIENTATION

## Configurations for Any Layout

From compact, adjacent coils to long-separation split-loop systems, ACT AAHXs adapt to your AHU or duct geometry without sacrificing performance. Multiple configurations allow designers to meet separation, orientation, and control requirements while maintaining sealed, sensible only energy recovery.



### Pipe-to-Pipe AAHX | GRAVITY-AIDED PASSIVE

Best for applications where supply and exhaust coils can be mounted adjacent within the same AHU or duct section (horizontal or vertical). Transfers sensible heat passively with no pumps, valves, or external power and supports one- or two-season operation depending on climate and control strategy.

### Split-Loop AAHX | PASSIVE OR PUMP-ASSISTED

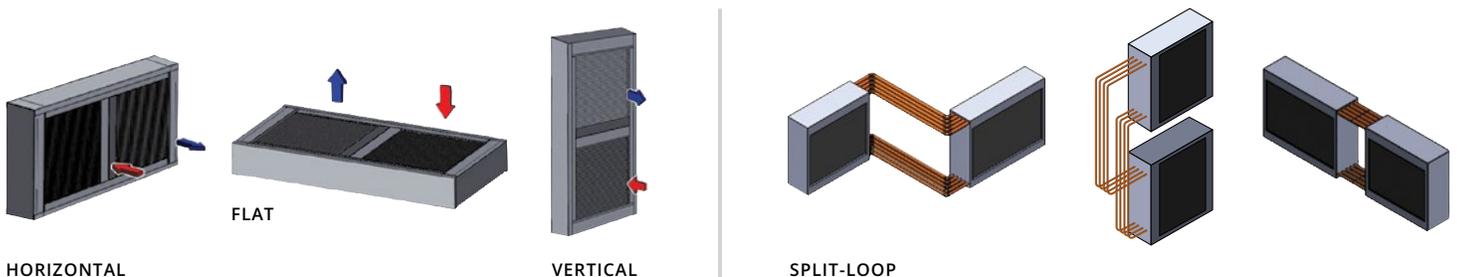
For layouts with separated supply and exhaust sections or when vertical offset is required, split-loop thermosyphon configurations allow extended coil separation while maintaining sealed, isolated airstreams. Use pump-assisted split-loop AAHXs when system layout, elevation change, or long piping runs exceed the limits of passive heat pipe operation and added control flexibility is desired.

	PIPE-TO-PIPE AAHX	SPLIT-LOOP AAHX (PASSIVE OR PUMP-ASSISTED)
<b>Airstream Relationship</b>	Adjacent	Separated (with or without vertical offset)
<b>Operation Options</b>	Passive, 1- or 2-season	Passive or pump-assisted*; 1- or 2-season
<b>Typical Separation</b>	Up to ~12 ft	Up to ~30 ft (greater with pump-assisted configurations)
<b>Best Fit</b>	Compact AHUs and retrofits with collated airflows	Large AHUs, remote exhaust, or complex mechanical rooms with space constraints

\*Pump-assisted split-loop configurations are used only when system layout, coil separation, or elevation change exceeds the limits of passive heat pipe operation.

## Unit Orientation

AAHX units can be oriented to match the AHU or duct aspect ratio while maintaining performance and fully isolated airstreams.



# SPECIFICATIONS

## PERFORMANCE

Function	Sensible-only energy recovery for building ventilation or dual tunnel AHU applications
Technology	Passive two-phase heat transfer with fully isolated airstreams
Effectiveness	Up to 70%, application dependent
Pressure Drop	Low; optimized per airflow and geometry
Thermal Resistance	Very low due to phase-change heat transfer
Cross-Contamination	None—sealed system with no shared media
Maintenance	Simple coil cleaning; no moving or wearing components
ROI	Often under 2 years in high-ventilation or energy-intensive systems
System Refrigerant Type	R-513A (others can be evaluated upon request)
Pumped System Operating Voltage	120VAC or 230VAC

DESIGN & INTEGRATION	Range/Option	Notes
Evaporator-Condenser Separation	Up to ~12 ft for standard AAHX	Greater distances with split-loop and pump-assisted designs
Airflow Range	Up to >100,000 CFM (coil dependent)	Sized per application
Pressure Drop	Low, custom-optimized	Maintains fan efficiency
Installation Options	Flat-slab, split, or stacked	Configurable for air ducts and AHUs
Corrosion Protection	Heresite® or E-Coat	Recommended for coastal, humid, or corrosive environments
MECHANICAL & OPERATIONAL	Options/Values	Typical Use Case
Tube Materials	Copper or aluminum	Standard HVAC duty and most commercial applications
Fin Materials	Copper or aluminum	Multiple fin geometries available
Coatings	Heresite, E-Coat, or bare-fin	Matches corrosion and budget requirements
Configurations	Pipe-to-pipe, split-loop thermosyphon, or pump-assisted	Integration or distance-based flexibility
Operating Mode	Sensible heat transfer only	No humidity exchange
System Scale	Small DOAS units to large AHUs	Application dependent
Temperature Range	Typical HVAC supply/exhaust ranges	Suitable for most commercial systems
Frost Control	Optional reheat capacity control	Used for frost control in cold climates

**Recover energy. Reduce complexity.  
Deliver results.**

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1046 New Holland Avenue, Lancaster, PA 17601, USA | 717.295.6061

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