ADVANCED COOLING TECHNOLOGIES

The Thermal Management Experts | www.1-ACT.com

ACT ENERGY RECOVERY SYSTEMS

Mark Stevens, South East Territory Manager, Mark.Stevens@1-ACT.com
Devin Pellicone, Lead Engineer Industrial Products Group, Devin.Pellicone@1-ACT.com

INFORMATION

Mark Stevens

Mark Stevens brings over 25 years of product management, product development and field application experience in the area of industrial controls & automation systems. Mark has been with ACT for nearly 10 years and was instrumental in the launch of the HVAC Energy Recovery Product in 2012 and the Sealed Enclosure Cooling Product line 2016. Mark supports our Manufacturers' Reps in the South East U.S. states.

Devin Pellicone

Devin is the Lead Engineer of the Industrial Products Group at Advanced Cooling Technologies. He has over 10 years of experience designing and building both passive and active two-phase cooling systems. Devin has been leading the development of ACT's pumped-passive HVAC energy recovery products, he holds numerous patents and has authored a score of journal publications.

Full bios are located in the handouts tab

This webinar is LIVE- we feel this provides the best viewing experience for our audience although this leaves room for technical error. If you experience technical difficulties please email Megan at megan.Ulrich@1-act.com. We will do our best to assist you!

Please note that the webinar will be recorded and sent out to all registrants.

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AHR EXPO INNOVATION AWARDS 2021 WINNER

YouTube

SELECTION TOOL

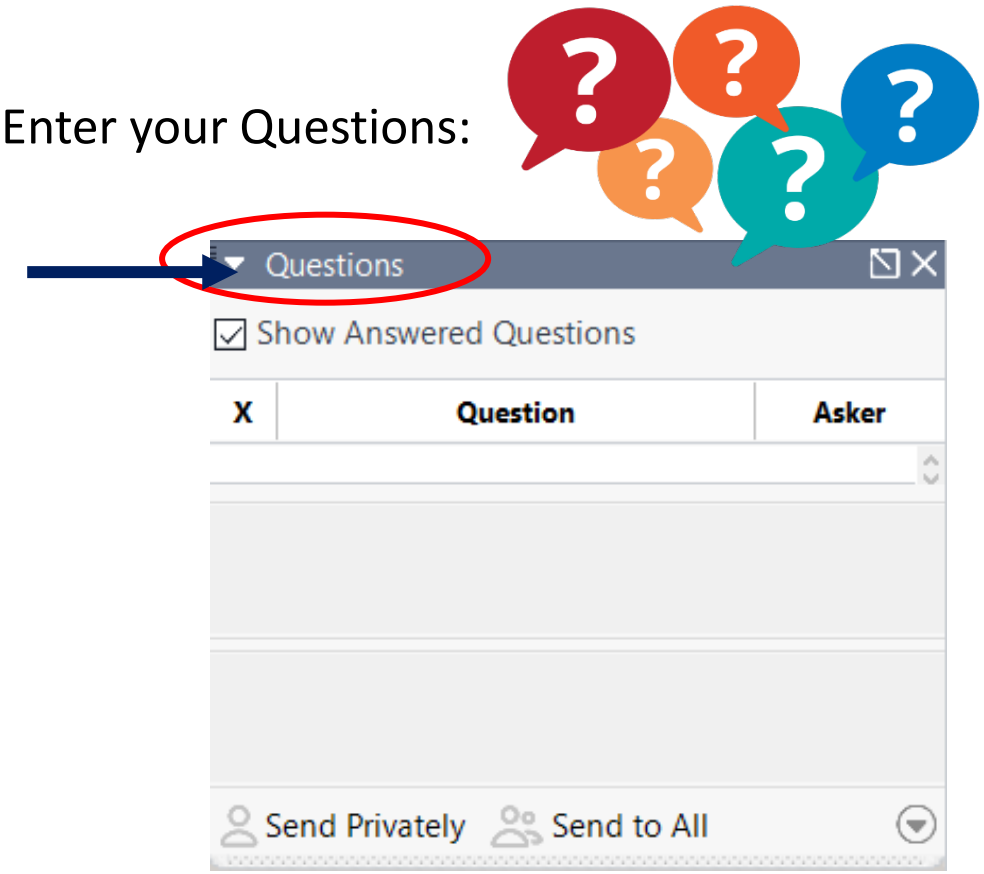
BROCHURES

HVAC HOME

AGENDA

- ACT overview
- Heat Pipes and HVAC Technology
- AAHX demo
- Case studies
- Pump Assisted Split Loop AAHX
- Q&A with Devin and Mark

Enter your Questions:



ADVANCED COOLING TECHNOLOGIES

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PROVIDING CUSTOM THERMAL MANAGEMENT SOLUTIONS

Founded in 2003

- Profitable and growing each year
- Over 155 Employees
- Over 83,000ft^2

Core Values

- Innovation
- Team Work
- Customer Care

Awards

- Mil/Aero 2020 Technology Innovators award
- AHR 2021 Product of the year award in Green Building category
- 2020 Central Penn Business Journal names ACT as #12 fastest growing company in central PA
- 2018 Supplier Excellence Award from L3 Technologies
- Tibbetts Award for SBIR Commercialization
- 2011 Outstanding Supplier Award, Aerospace Prime Contractor

ACT BUSINESS UNITS




DEFENSE & AEROSPACE

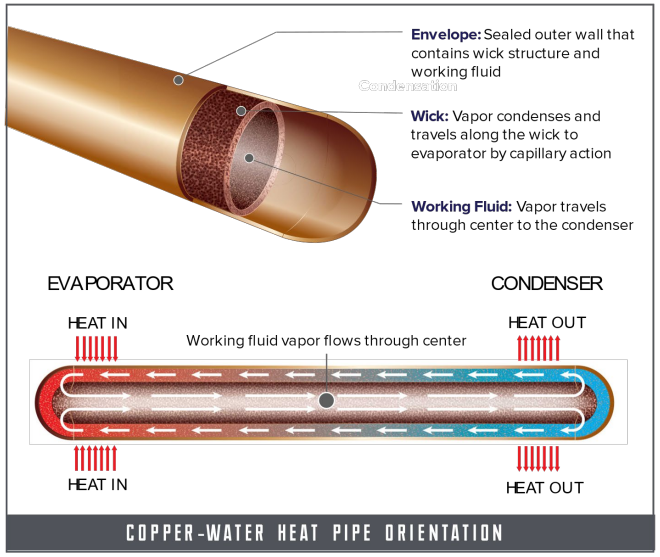
- Power Electronics Cooling
- Spacecraft Thermal Control
  50 Million Hours on Orbit
- Directed Energy Weapons
- Embedded Computing
- Sea, Land, Air and Space

INDUSTRIAL PRODUCTS

- Photonics Cooling
- Medical
- Transportation
- Energy
- Temperature Calibration
- HVAC Energy Recovery
- Electronics Enclosure Cooling

HEAT PIPES ARE THERMAL SUPER CONDUCTORS

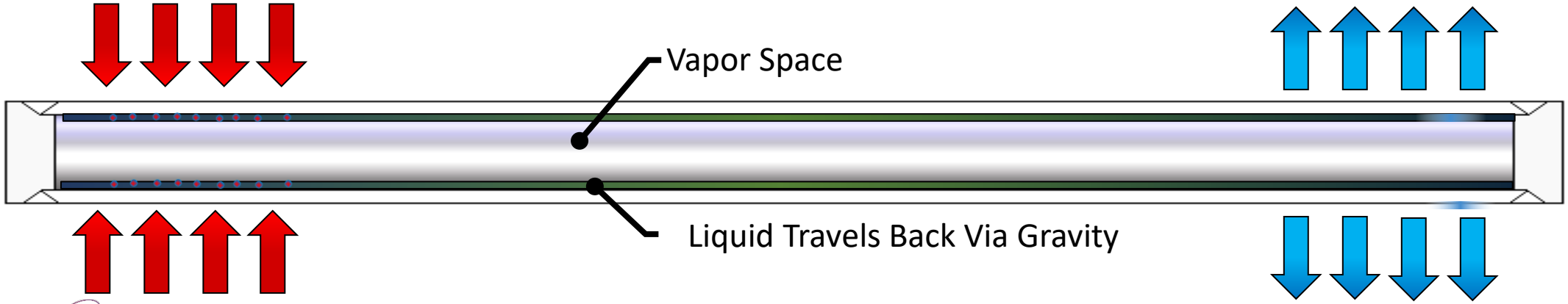
HVAC DEHUMIDIFICATION TECHNOLOGY



HEAT PIPE OPERATING PRINCIPLE:

Heat pipes function by absorbing heat at the evaporator end of the cylinder, boiling and converting the fluid to vapor. The vapor travels to the condenser end and condenses to liquid, the condensed liquid flows back to the evaporator, aided by gravity.

This phase change cycle continues as long as there is heat (warm outside air) at the evaporator end of the heat pipe. This process occurs passively (no external electrical energy required). A typical ACT-HP-WA HVAC system moves thousands of Watts of heat from warm outside air to the chilled dry air.



HEAT PIPES APPLIED TO HVAC SYSTEMS

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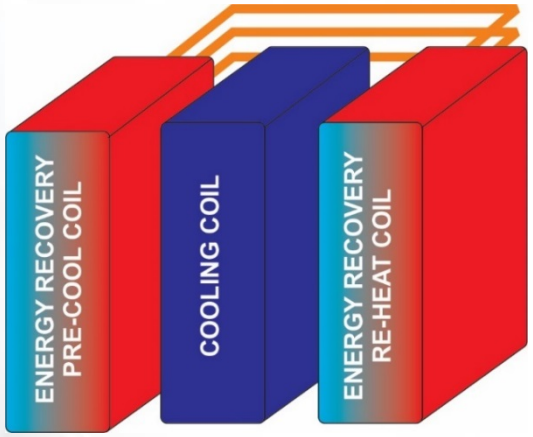
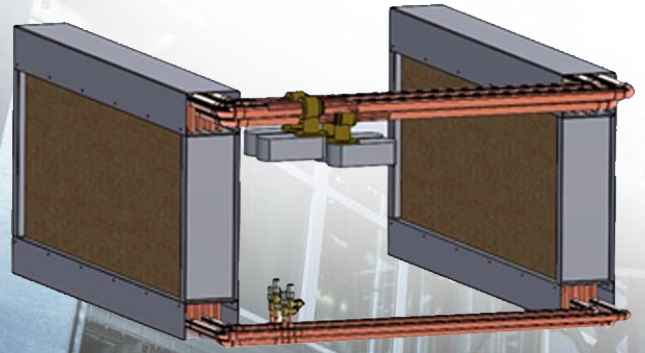
ACT ENERGY RECOVERY HVAC TECHNOLOGY TYPES

1 WRAP-AROUND SYSTEMS
(Enhanced Dehumidification)

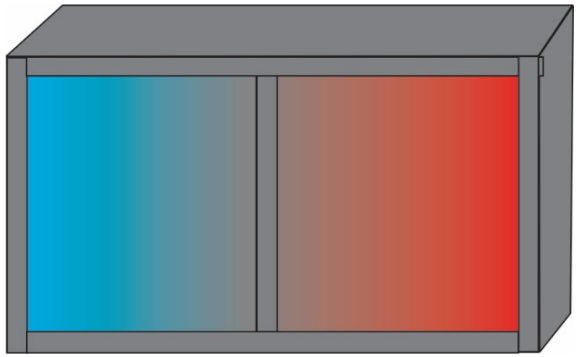


WAHX
PIPE-TO-PIPE

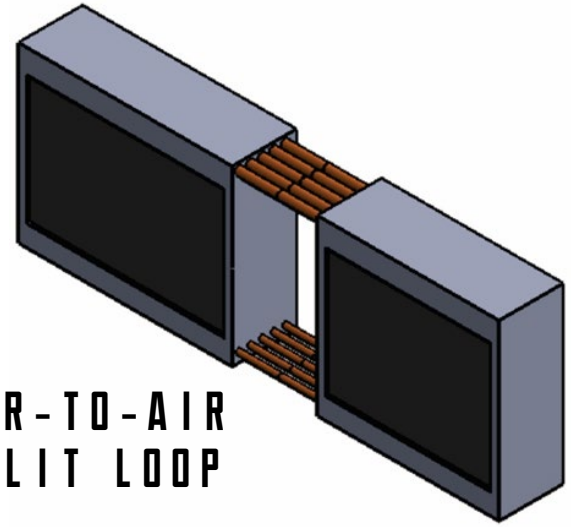


WAHX
SPLIT LOOP

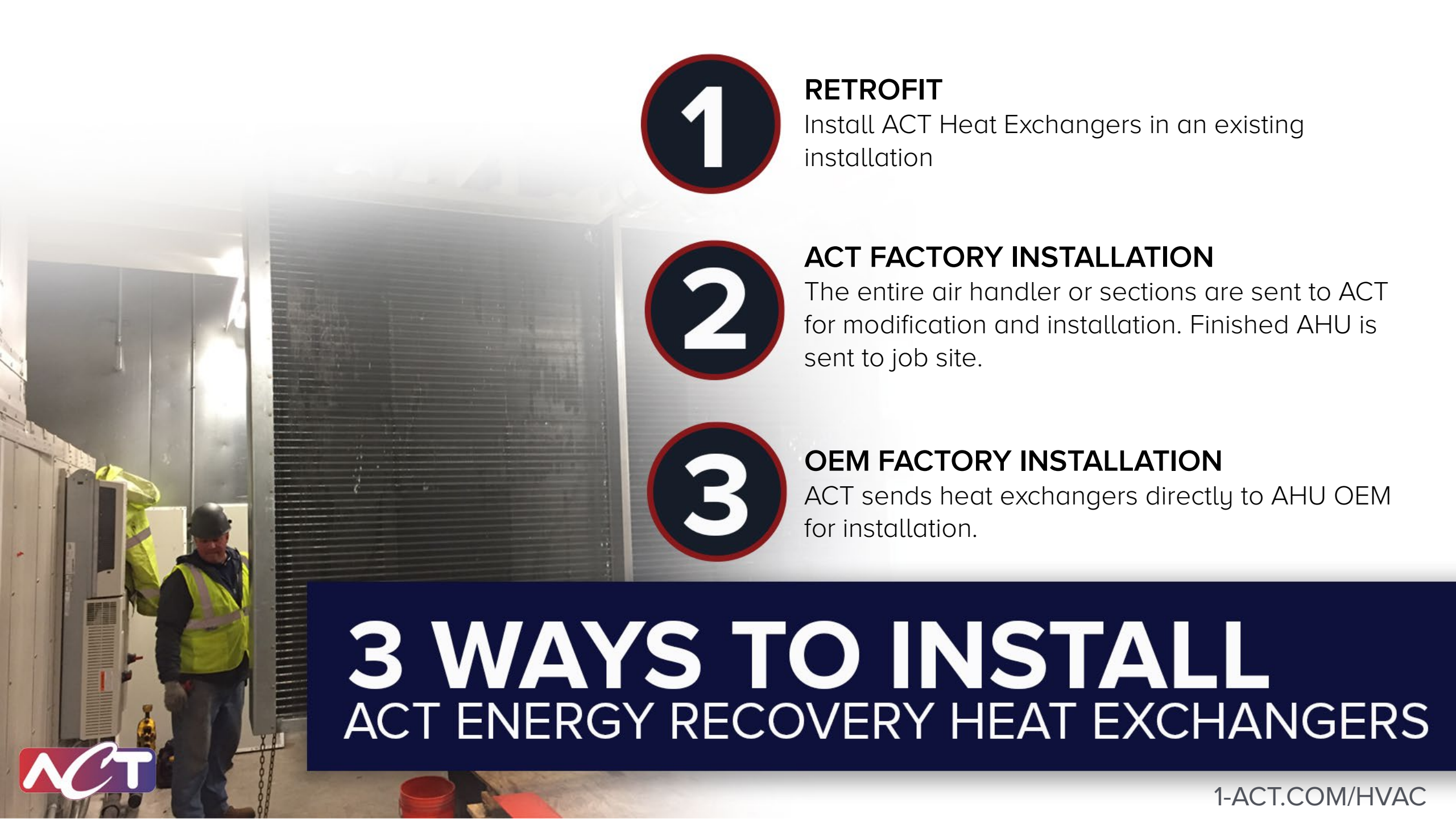
2 AIR-TO-AIR ENERGY RECOVERY SYSTEMS



AIR-TO-AIR
PIPE-TO-PIPE



AIR-TO-AIR
SPLIT LOOP



1

RETROFIT
Install ACT Heat Exchangers in an existing installation

2

ACT FACTORY INSTALLATION
The entire air handler or sections are sent to ACT for modification and installation. Finished AHU is sent to job site.

3

OEM FACTORY INSTALLATION
ACT sends heat exchangers directly to AHU OEM for installation.

3 WAYS TO INSTALL
ACT ENERGY RECOVERY HEAT EXCHANGERS

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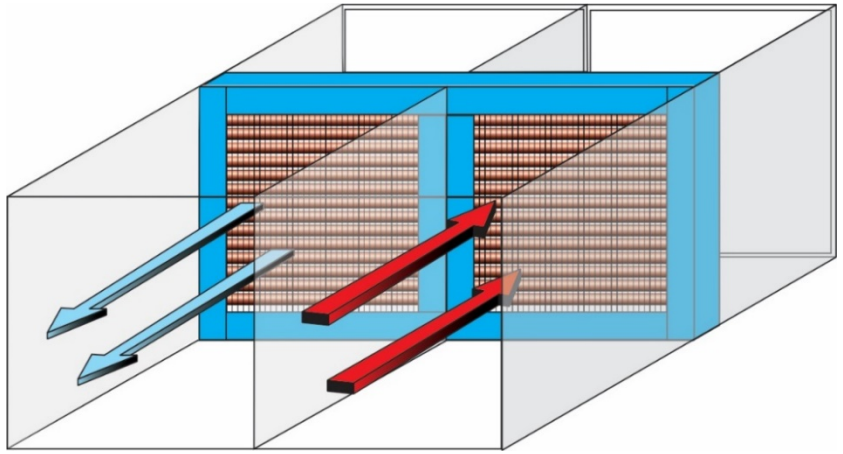
IS THIS A GREEN TECHNOLOGY?

YES- Here's why:

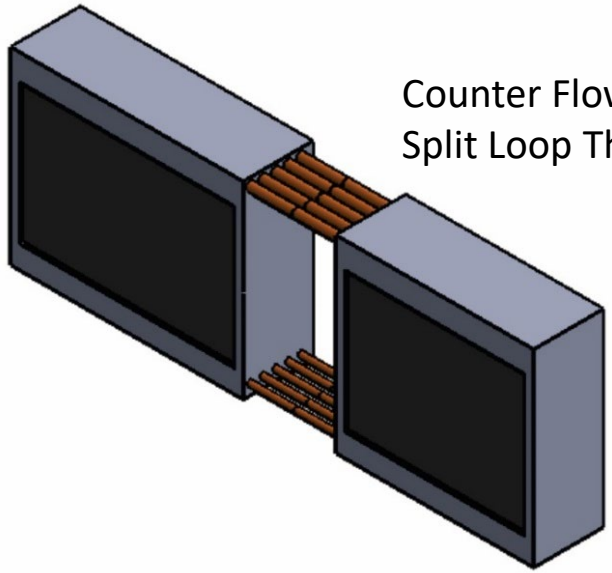
- Passive, environmentally friendly heat pipes
- Less energy consumption than energy wheels and other traditional HVAC technology
- Optimize energy recovery for increased number of air exchanges
- Heat pipes are generally passive…. or (when assisted with a pump, they are passive by the designed season)

ACT– HP-AAHX AIR-TO-AIR HEAT PIPE HEAT EXCHANGERS

- Captures Building's Energy for Pre-Cooling or Pre-Heating in a Counter Flow or Split Designs
- Sizes can match all existing coils
- Typical installations where duct work is side-by-side or Split
- No cross contamination of airstreams
- ASHRAE Standard 62-2010 ventilation for acceptable indoor air quality.

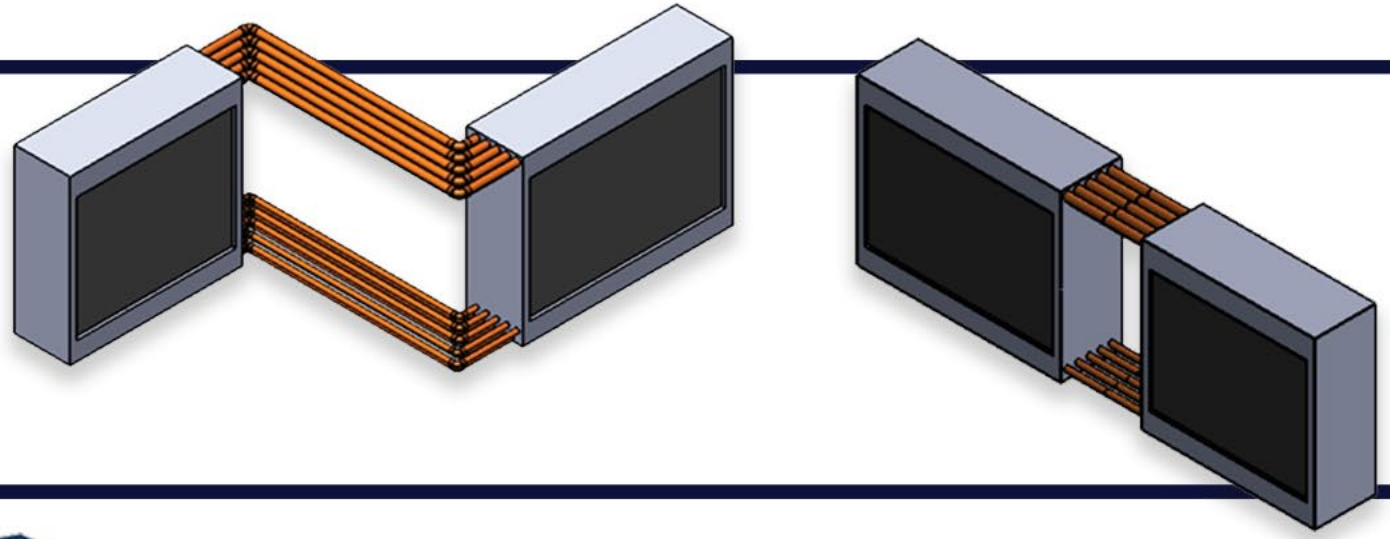


Counter Flow Side-by-Side AAHX

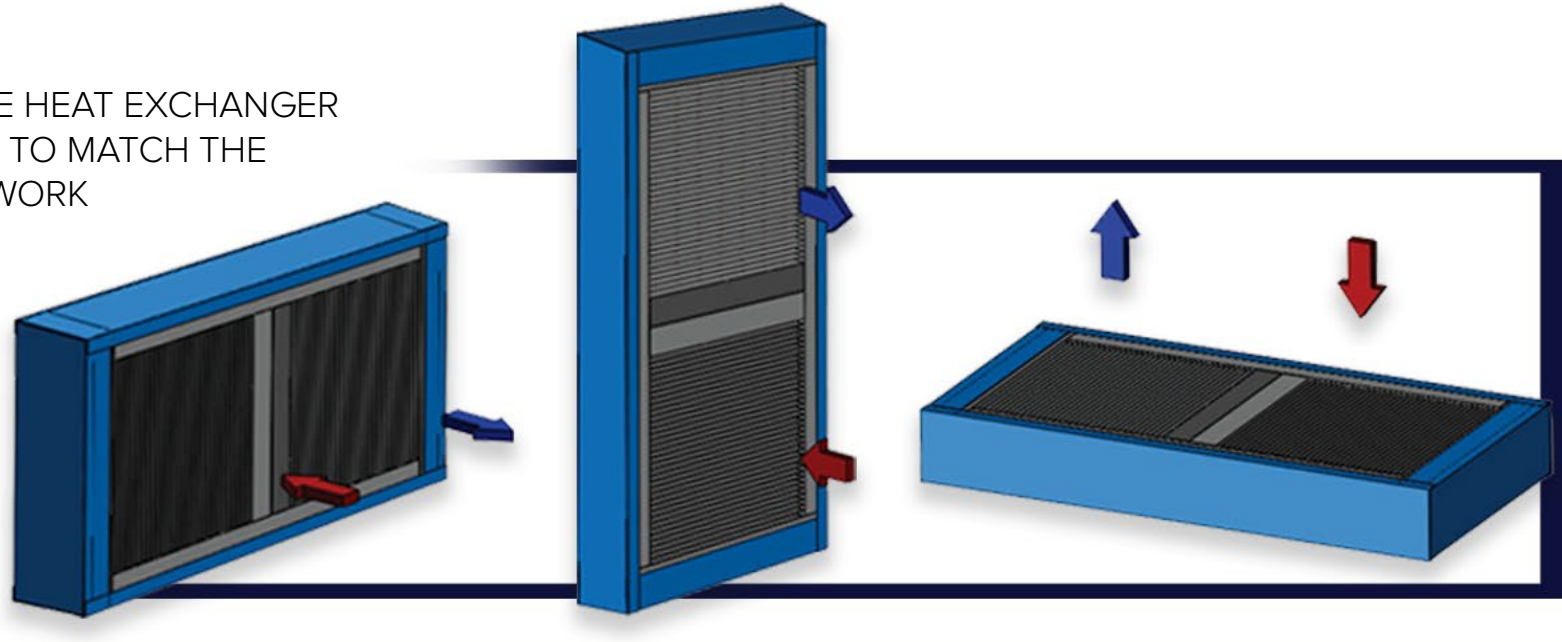


Counter Flow Side-by-Side Split Loop Thermosyphon

SPLIT LOOP THERMOSYPHON



THE ACT HEAT PIPE HEAT EXCHANGER CAN BE ORIENTED TO MATCH THE INSTALLED DUCT WORK



AIR-TO-AIR HEAT PIPE HEAT EXCHANGER

ACT AIR-TO-AIR HEAT PIPE HEAT EXCHANGERS

FLEXIBLE ASPECT RATIOS

WE CAN MATCH EXISTING DUCT PROFILES

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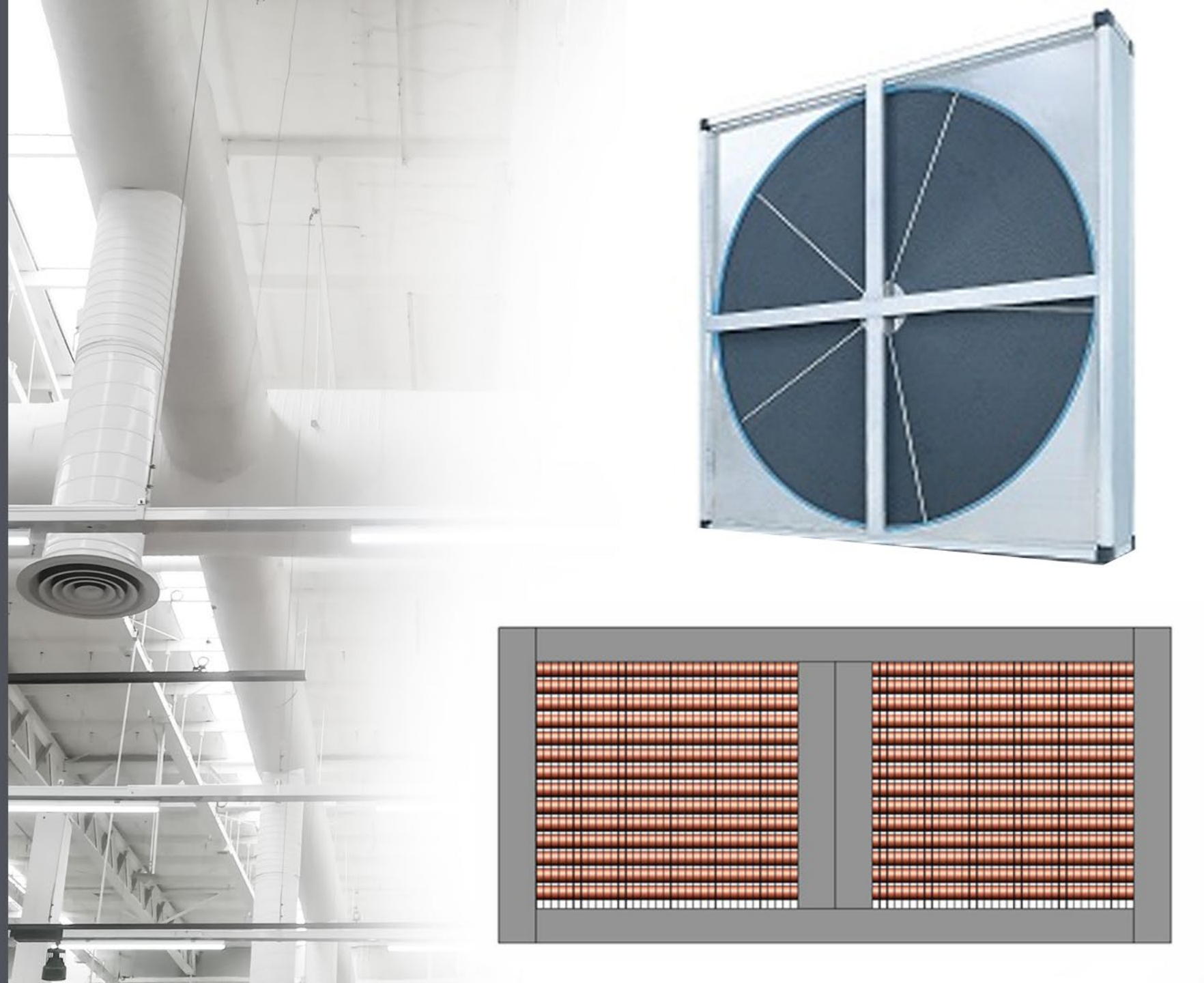


AAHX WITH FACE AND BYPASS DAMPERS

Project Details

- 45.0” Tall x 40.0” Long
- 6 Rows

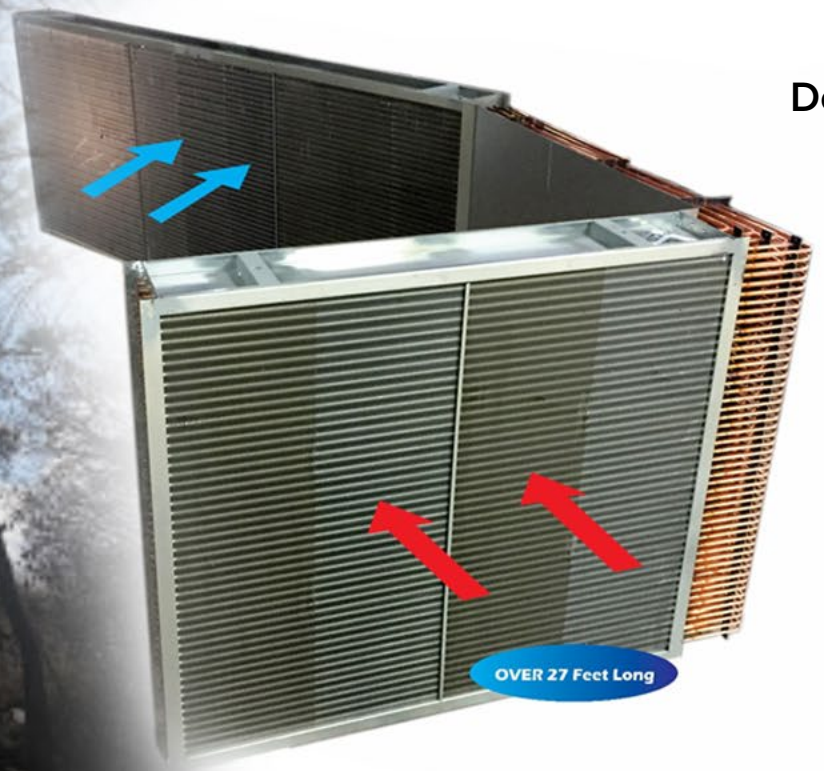
SAMSUNG MEDICAL CENTER SITE INSTALLATION

SAMSUNG MEDICAL CENTER

AIR-TO-AIR HEAT EXCHANGER

Project Description

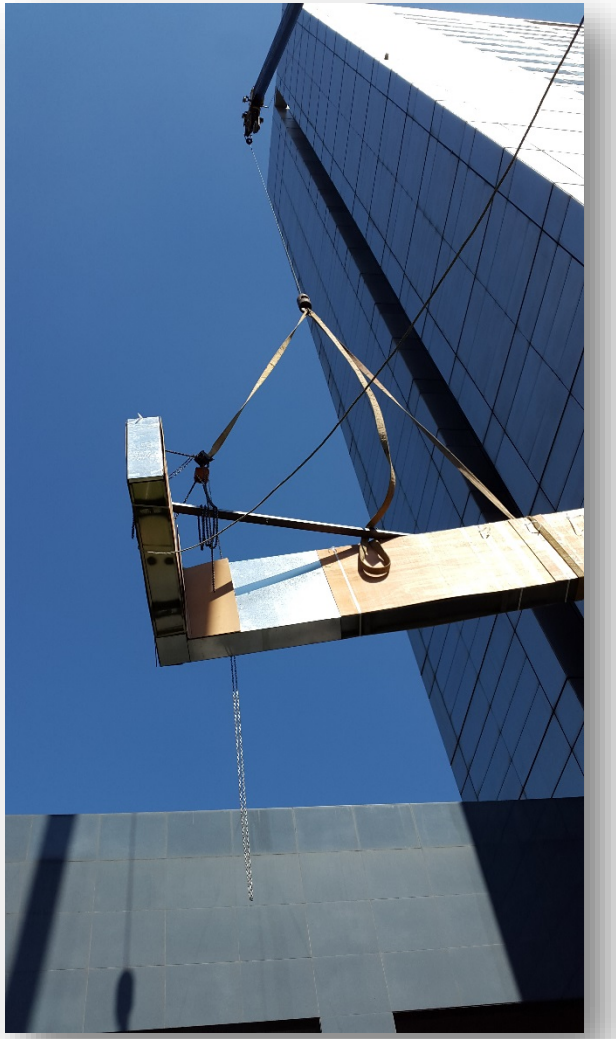
- Twenty (20) AAHX Units
  - 9 Standard AAHX
  - 10 Bended AAHX
- 1 - Three- Level Split Loop
  - AAHX Thermosyphon (built on site)

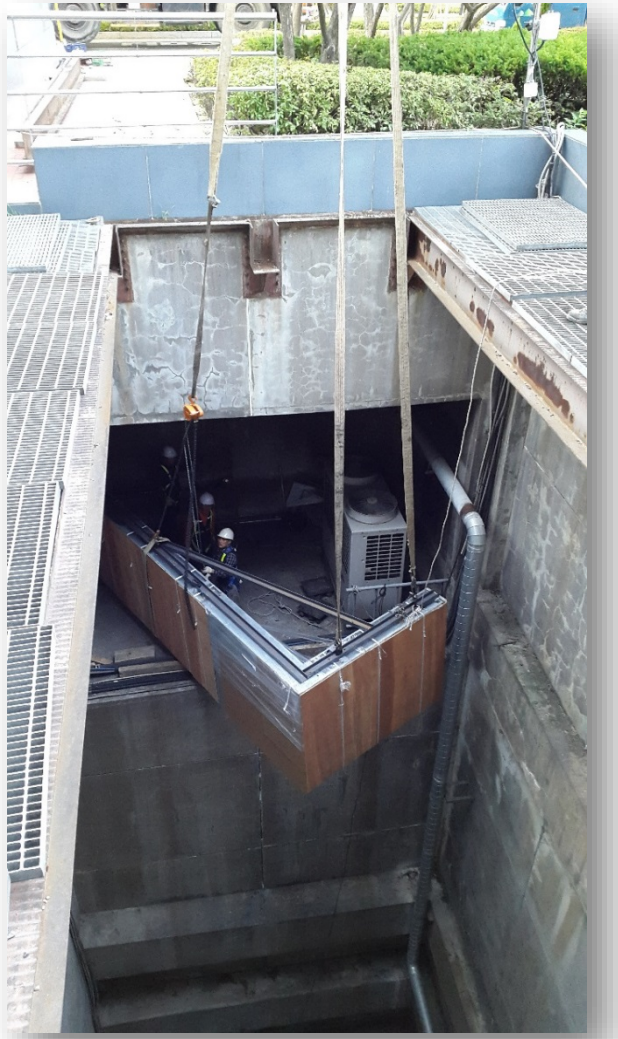


Description of the Units

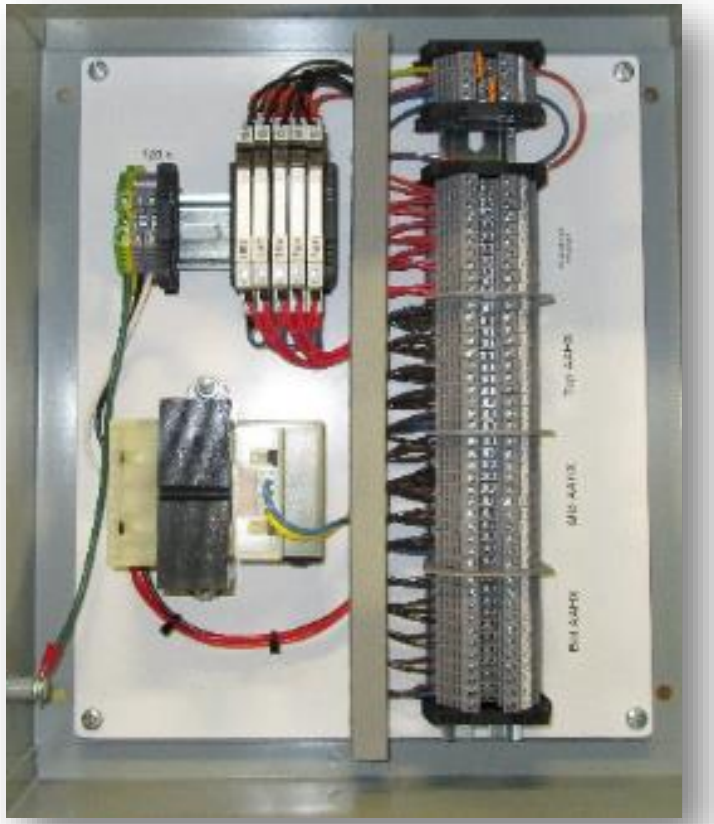
- 48” to 60” Tall
- 12 ft. to 27 ft. Long
- All Units10 Rows, 12 FPI

SAMSUNG MEDICAL CENTER SITE INSTALLATION





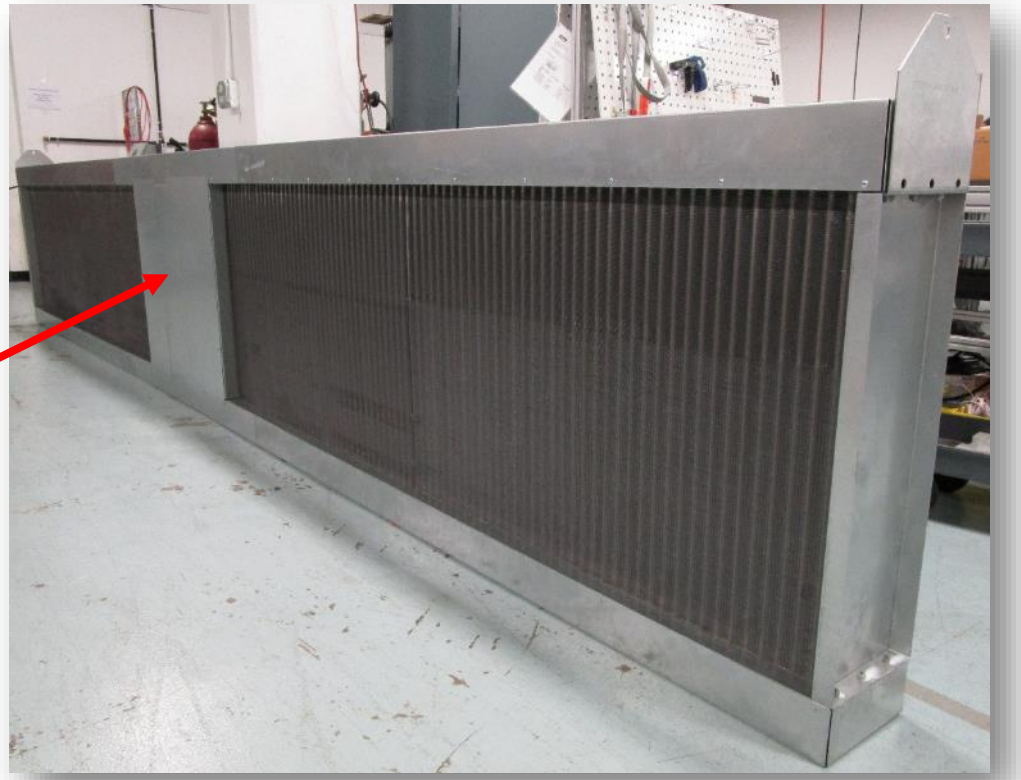
PASSIVE AIR-TO AIR SPLIT LOOP THERMOSYPHON WITH SUMMER/WINTER OPERATION & FROST CONTROL



Control Panel to turn reheat ON/OFF

Valve control located between air streams

Valves Control the Reheat in each of the 6 rows
On/Off for frost control



Counter Flow Heat Exchanger
Entering Air & Exhaust Air

AIR-TO-AIR PUMP-ASSISTED SPLIT LOOP ENERGY RECOVERY

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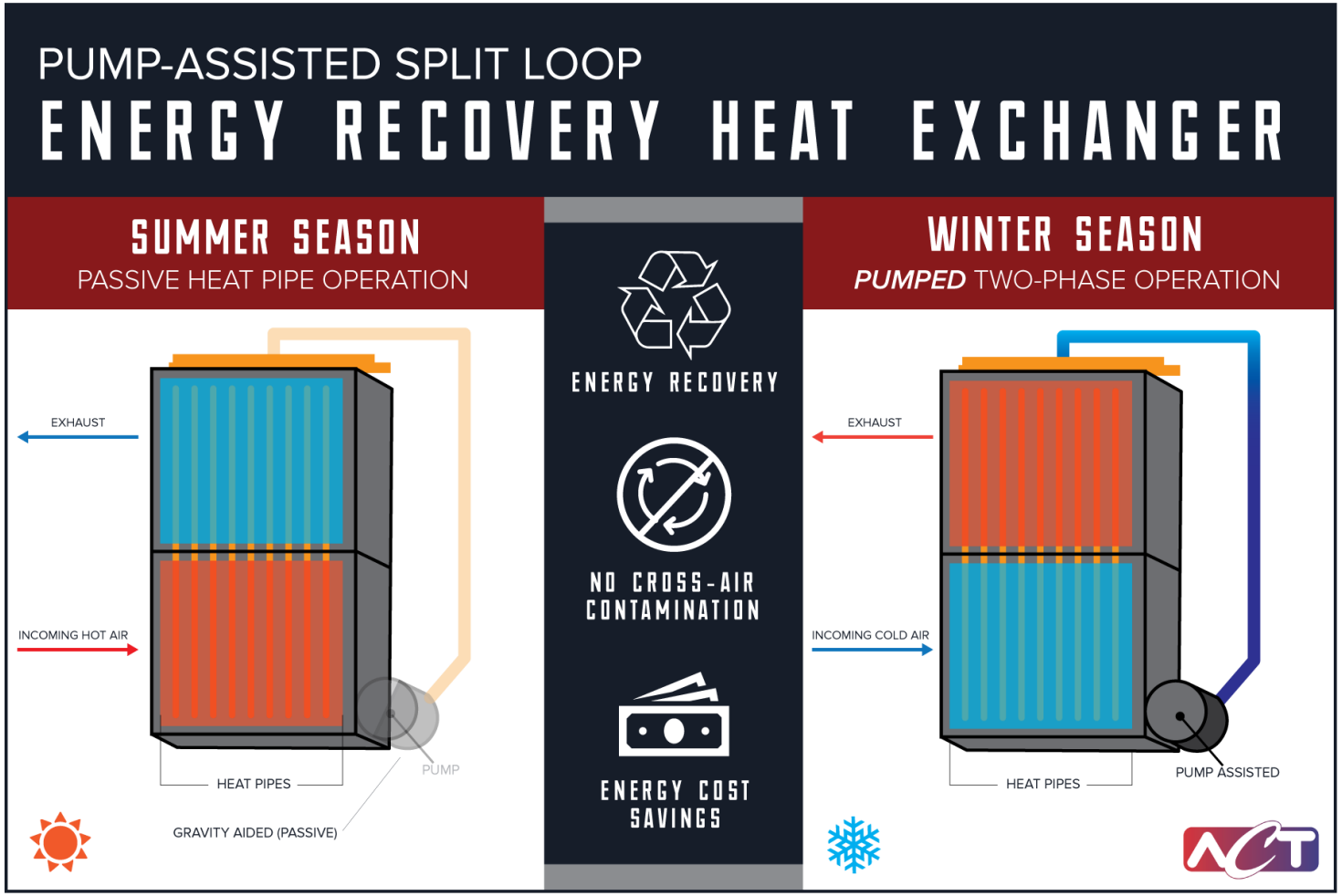
PUMP-ASSISTED ENERGY RECOVERY PRODUCTS

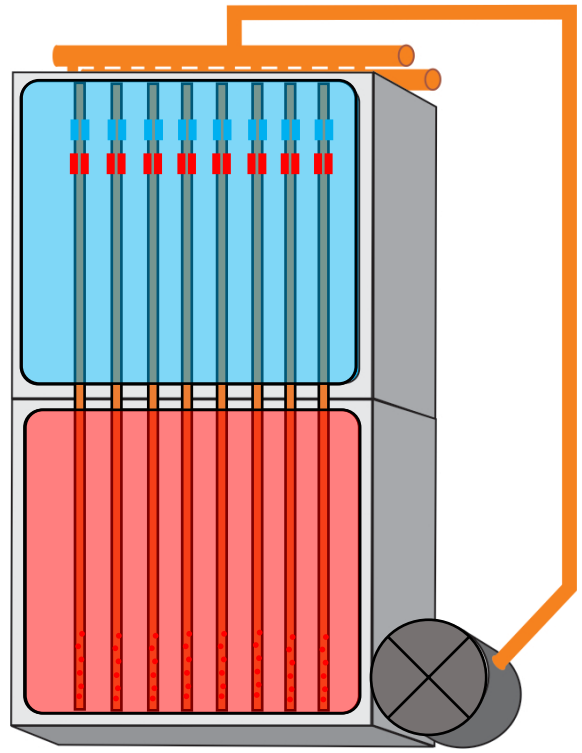
- All Season Energy Recovery
- Customizable coil geometries
- Ducts can be side-by-side horizontal, vertical or split
- Zero cross-contamination
- Low energy consumption by fractional horsepower pumps
- 3 Design Options:
  - Pumped-passive vertical
  - Pumped-passive split loop
  - Fully pumped split loop



PUMPED-PASSIVE VERTICAL ENERGY RECOVERY

- Ideal for applications with vertically stacked supply and exhaust AHUs
  - Direct replacement for energy wheel applications
- Highly customizable coil aspect ratios to fit most applications
- Operates half of the year with no energy input (passive mode)
  - Fractional horsepower pumps for active mode operation
- Payback periods as low as 2 years
- Sizes up to 25,000 CFM+

Hot Air Stream on the Top

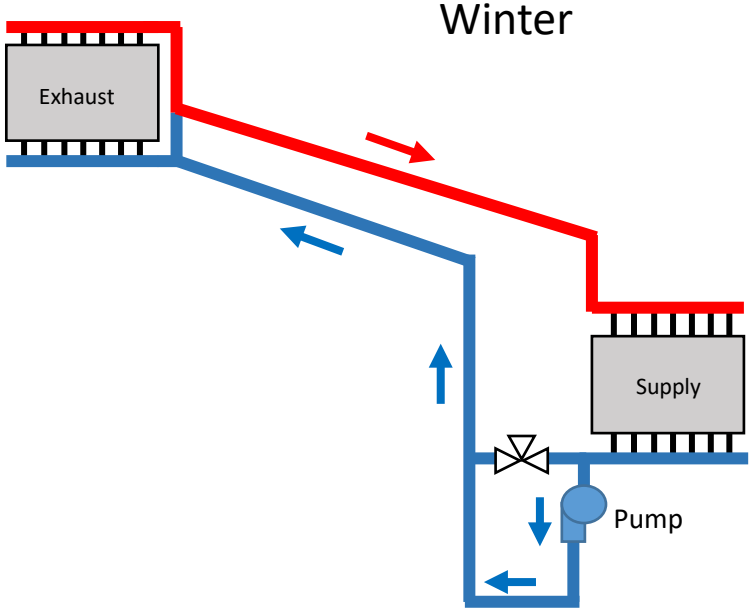


PUMPED-PASSIVE SPLIT LOOP ENERGY RECOVERY

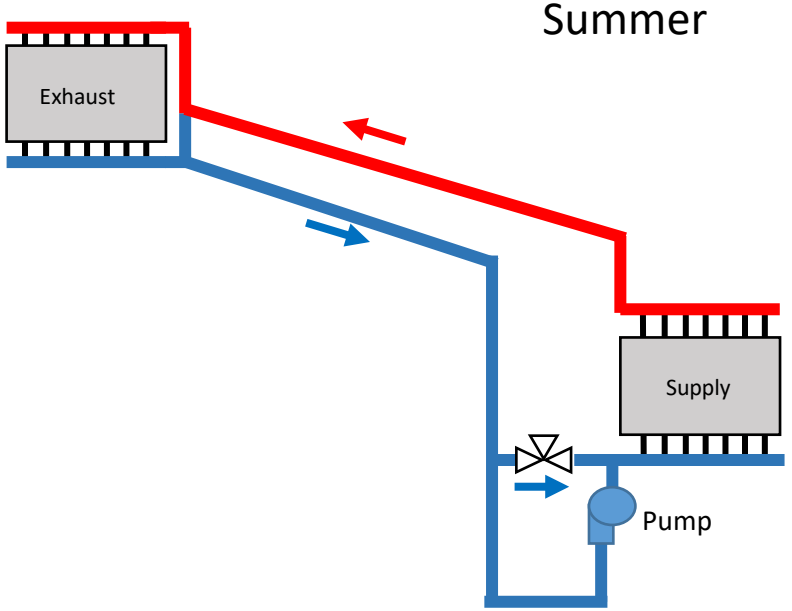
- Ideal for applications with supply and exhaust AHUs located long distances apart from each other
  - 100's of feet separation between coils is possible
- Split loop configuration
- Fin heights restricted to 36" for passive mode operation

- Highly customizable coil sizing to fit any application
  Supply and Exhaust coils can be different sizes if needed
- Operates half of the year with no energy input (passive mode)
  Fractional horsepower pumps for active mode operation

Winter



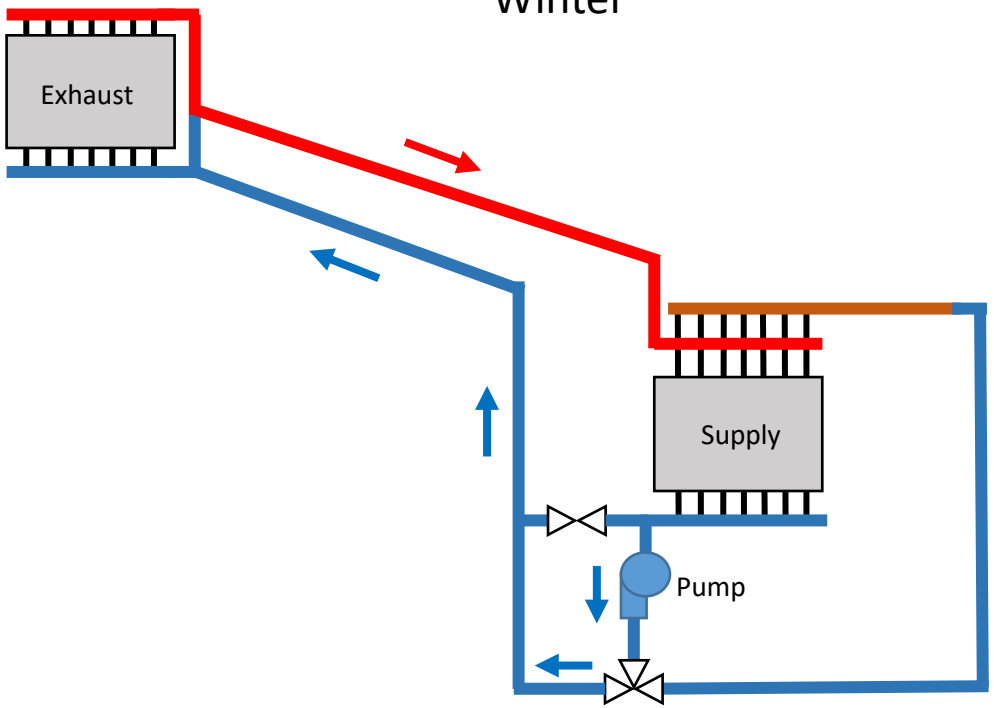
Summer



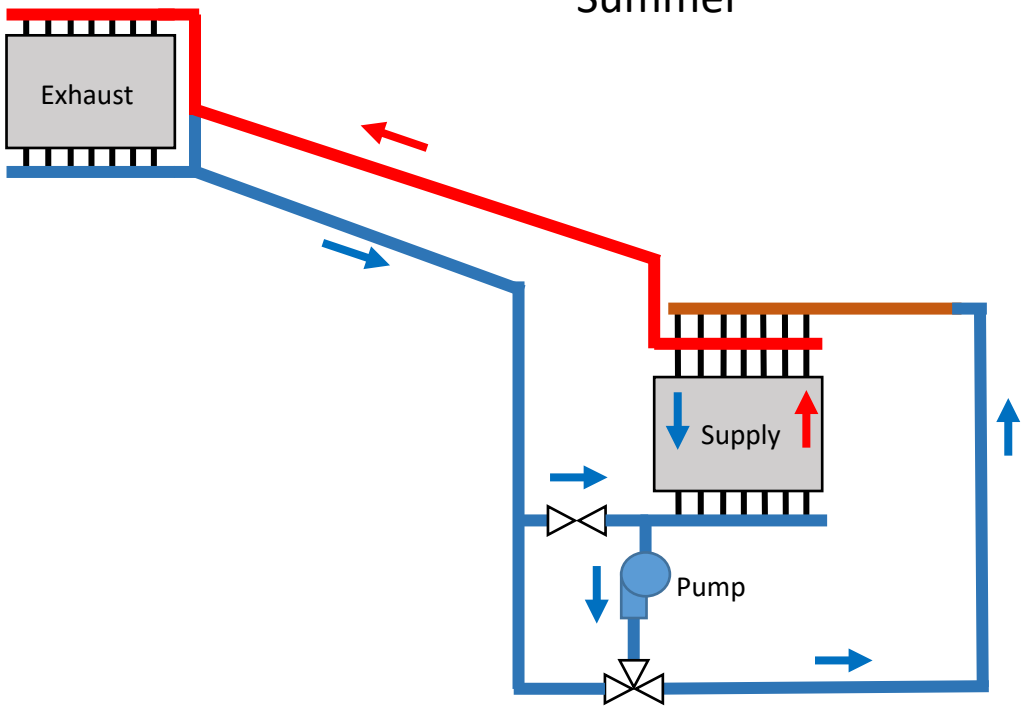
FULLY PUMPED SPLIT LOOP ENERGY RECOVERY

- Ideal for applications with supply and exhaust AHUs located long distances apart from each other
  - 100's of feet separation between coils is possible
- Split loop configuration
- Enables single coil heights greater than 36" by pumping in all seasons
- A fraction of the pumping power and pump size as compared to a glycol run-around loop

Winter

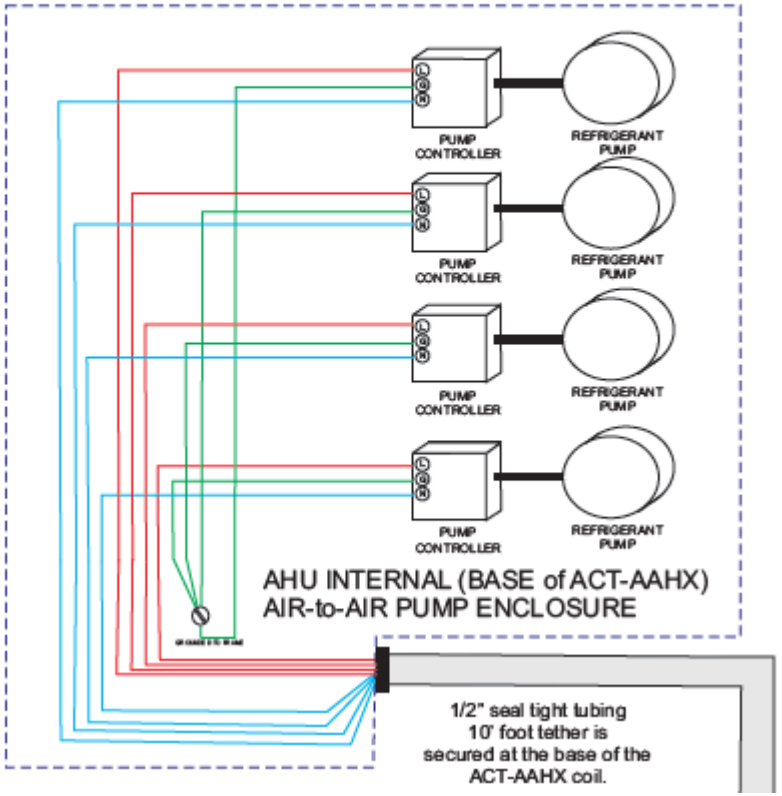


Summer



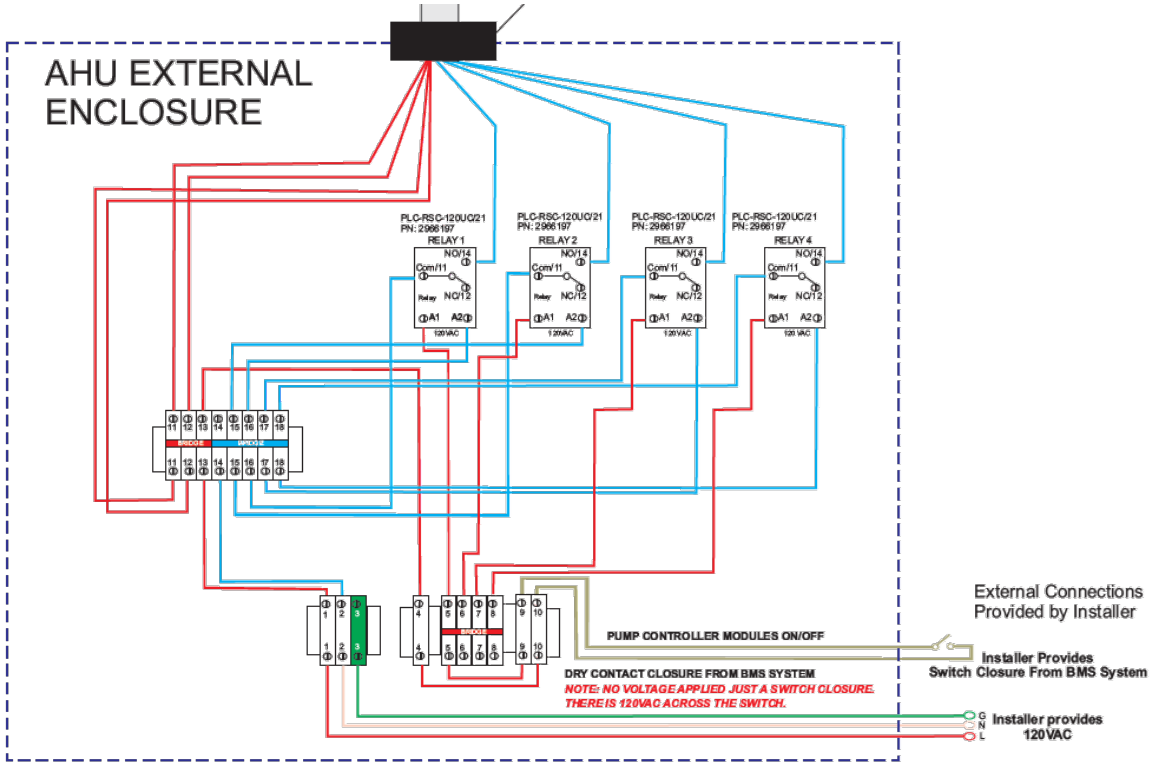
CONTROL SCHEMATIC EXAMPLE

ACT AIR-to-AIR PASSIVE/PUMPED ENERGY RECOVERY SYSTEM WITH FOUR PUMPS WIRING DIAGRAM



QUICK DISCONNECT INSTALLATION (BY INSTALLER)

Installer must disconnect wires so that the 1/2" seal tight tubing can fit easily through the wall of the AHU. Wires are marked from the factory to correspond to the quick disconnect's screw terminations. Reassemble the housing and snap to the enclosures mating locking flange.



Typical Enclosure Size:12"H x 12"L x 8"D

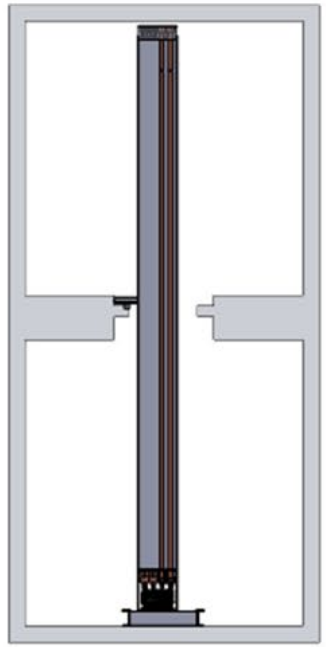
PROJECT: LEHIGH UNIVERSITY

PUMP-ASSISTED AAHX

READ THE CASE STUDY

PROJECT HIGHLIGHTS

- Retro-fit to replace energy wheel
- Payback estimated at 2 years
- Provided a low maintenance solution



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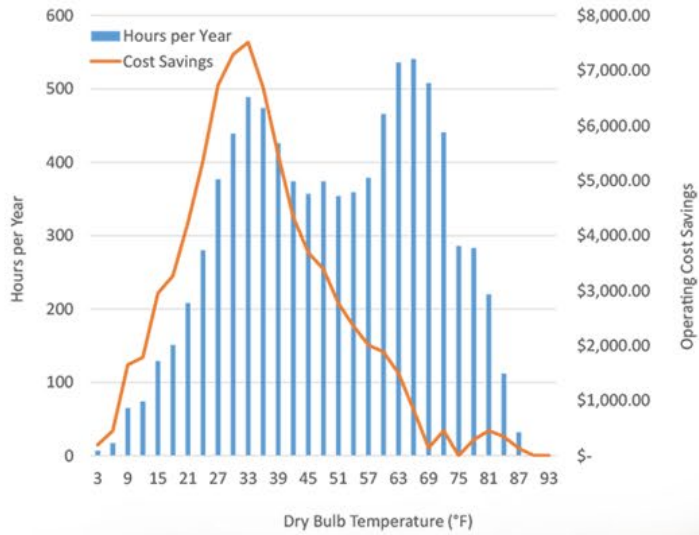
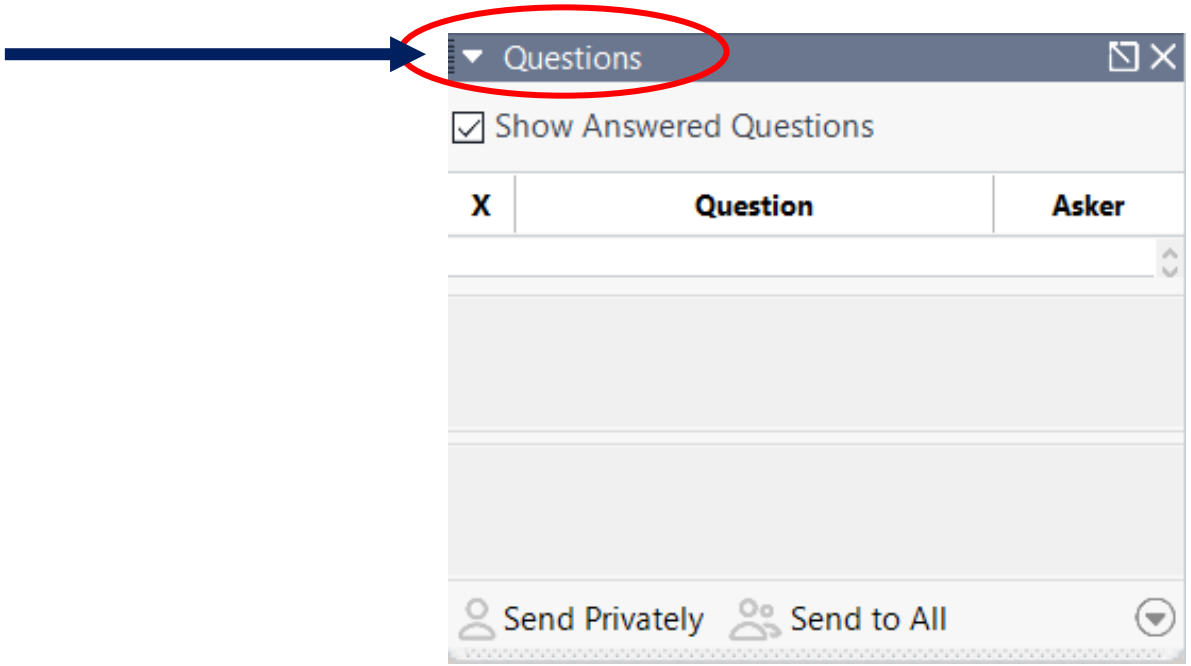
EXPECTED PAYBACK PERIOD

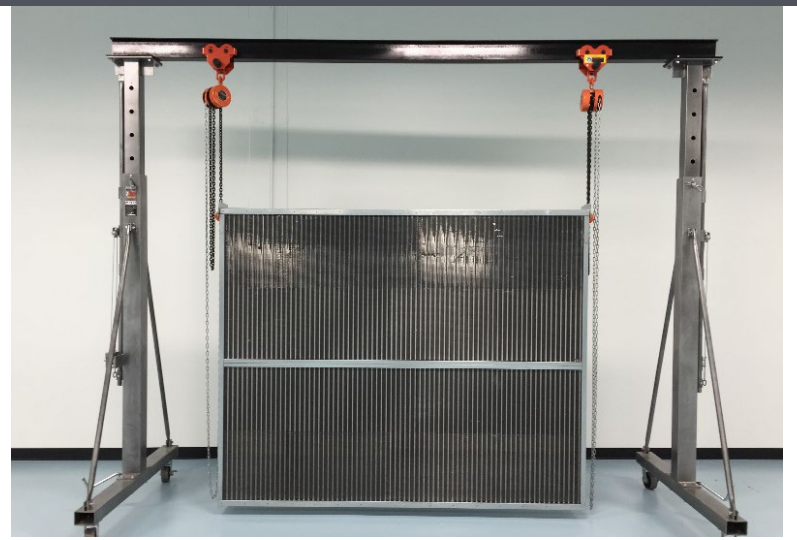


ASK QUESTIONS

- We want to hear from you! Ask questions by submitting them in the Gotowebinar question panel on the right and type your question.



THANK YOU



- The recording of this presentation will be sent to the email address you registered with
- Please contact us with any additional questions

Mark Stevens, South East Territory Manager, Mark.Stevens@1-ACT.com

Devin Pellicone, Lead Engineer Industrial Products Group, Devin.Pellicone@1-ACT.com