IPE6 ENTHALPY PLATE EXCHANGER

MANUAL

innergy tech

setting the standard
for energy recovery

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HEAT PIPES • PLATES
WHEELS • CORES

V1.0

TABLE OF CONTENTS

ABOUT THIS MANUAL

This manual should be used as your main reference through the Installation, operation and maintenance of your new IPE6 enthalpy plate exchanger.

By following the instructions listed in this document, years of economical and satisfactory operation will be obtained. Please read this manual thoroughly. Several models are described in this publication. Some details of your model may be slightly different than the ones shown as the illustrations are typical ones.

Please take note that this manual uses the following symbols to emphasize particular information:

WARNING: Identifies an instruction which, if not followed, might cause serious personal injuries including possibility of death.

CAUTION: Denotes an instruction which, if not followed, may severely damage the unit and/or its components.

NOTE: Indicates supplementary information needed to fully complete an instruction.

If more information is needed, please contact your local Innergy tech Sales Representative or the Innergy tech Service Department.

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NOTE: Due to ongoing research and development, Innergy tech reserves the right to modify specifications and dimensions without prior notice.

WINNERGY PRO SELECTION SOFTWARE

The FREE Winnergy Pro selection software is a powerful tool developed by the Innergy tech sales and R&D teams.

Based on your entering conditions (airflow, temperatures and humidity), this easy to use and intuitive software gives you quick and complete results with just the click of a button.

Applied to our IPE6 Enthalpy plate exchanger, the Winnergy Pro selection software enables you to get instant performance and pressure drop results on all available dimensions and spacings. The program's unique feature also lets you switch instantly between our AHRI certified enthalpy or sensible plates or even enthalpy wheels or heat pipes for the best possible selection; every time.

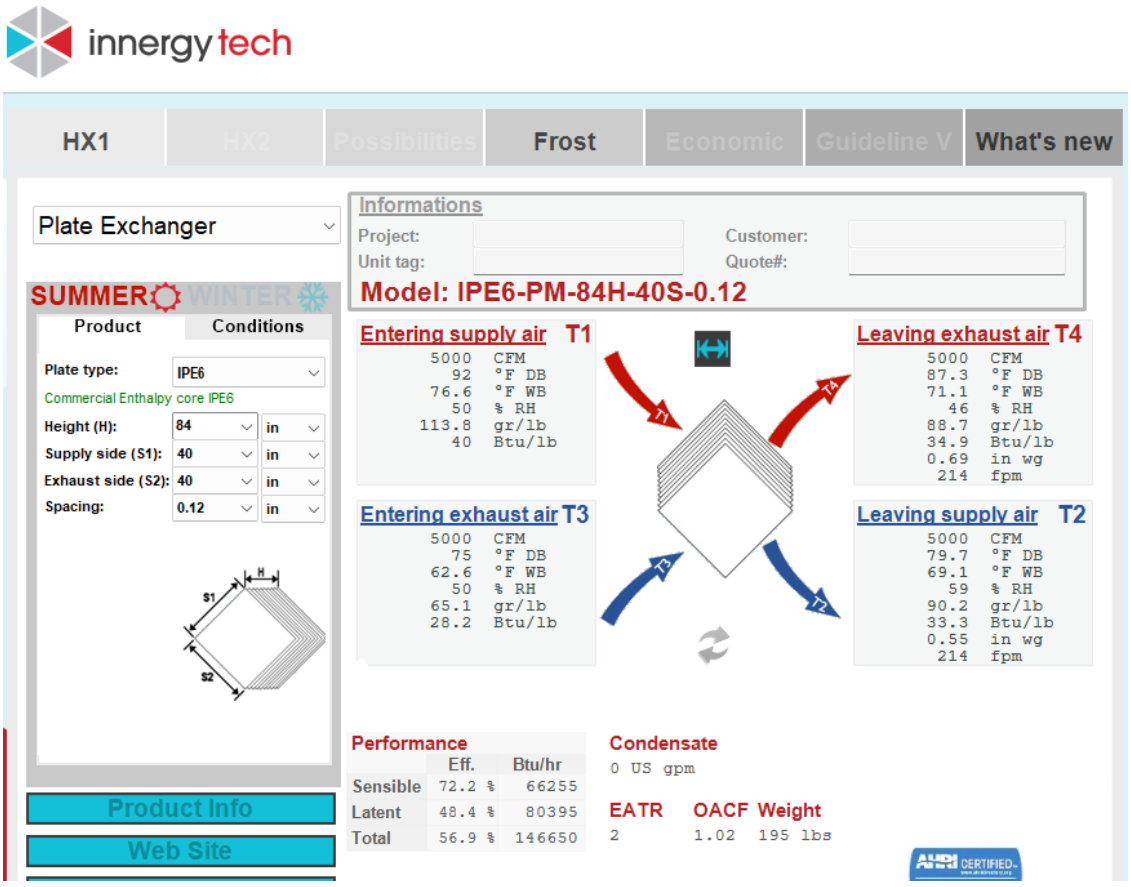


Figure 1
Winnergy Pro Selection Software

1. THE IPE6 ENTHALPY PLATE EXCHANGER

The IPE6 plate exchanger offers many improvements over our previous designs. Available with our next generation polymer hybrid membrane, the IPE6 offers the same great effectiveness numbers as the IPE5 with improved pressure differential resistance to help you reach ASHRAE 90.1 requirements easily. Furthermore, thanks to a completely redesigned assembly and fully automated production equipment, the pressure drops were reduced by up to 35%.

With a total of 8 square dimensions, 1 spacing per square, and adjustable width the IPE6 plate exchanger pushes the barrier even further for best pressure drop and design flexibility. Its robust construction now enables the manufacturing of plate exchangers 4″ up to 96″ (8 feet) long in just one section. Not only does this make the IPE6 the biggest enthalpy plate exchanger of the industry, but fewer sections also mean a simpler and faster installation in the ventilation unit.

Moreover, many of the IPE6 square dimensions are made to the exact same outer dimensions as our renowned Sensible plate exchanger line, making it possible for you to offer one AHU design for sensible only, or total energy recovery.

Now offering improved AHRI 1060 certified cores for guaranteed performances all for an unbeatable price, the IPE6 plate exchanger represents the very best the industry can offer when it comes to enthalpy plate exchangers.

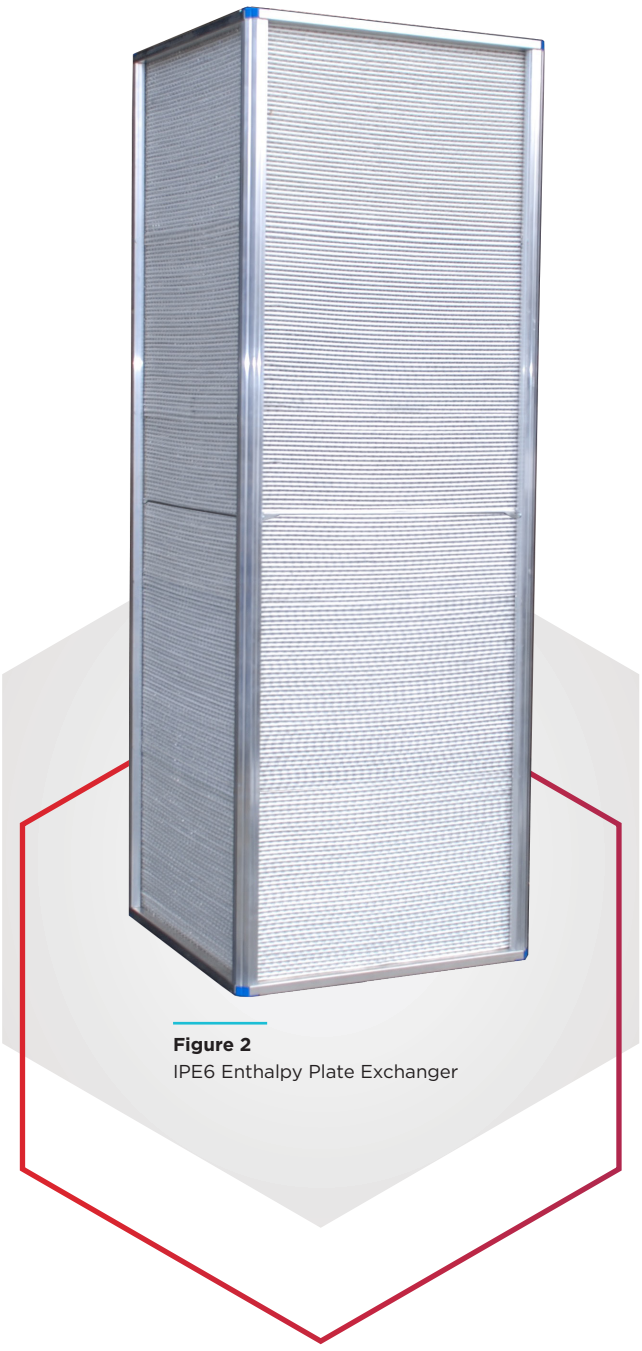


Figure 2
IPE6 Enthalpy Plate Exchanger

What's new

New alternate layers of corrugated spacer and liner material available with a polymer hybrid membrane.

Completely redesigned assembly and much improved production methods, the pressure drops reduced by up to 35%.

Robust construction for plate exchangers up to 96″ long in one section.

Now available in much larger sizes with single cores going up to 48″ square and modular up to 79″.

Water washable polymer hybrid membrane now available, making the plate exchanger easier than ever to clean.

Features

From 24″ to 79″ square dimensions available (total of 8 square dimensions).

Adjustable width at 4″ increments (up to 96″ in one section).

Pressure differential limit of 5″ W.C. for all models.

AHRI 1060 certified for guaranteed performances.

The enthalpy plate exchanger is UL Recognized to UL 1995 and UL 1812 requirements.

Membrane will not promote the growth of mold or bacteria (Successfully passed AATCC30-2013).

Standard 5 years warranty.

Square sizes that match perfectly with our Sensible plate exchangers' product line.

2. POLYMER HYBRID MEMBRANE (OPTIONAL)

A natural evolution, the polymer hybrid membrane pushes the barrier even further with our best sensible and total energy recovery to date. Using the best in class membrane, totally impermeable to air while highly permeable to water vapor.

It should be noted that the highly water selective polymer desiccant makes it impossible to transfer other harmful contaminants (only water vapor is absorbed and transferred). The membrane layer acts as a physical wall that separates the hot and humid airflow from the cold and dry one. Water (latent energy) transfer is based on the difference in vapor pressures of both airflows. The polymer hybrid membrane, constantly seeking to balance the pressures, absorbs water from the high pressure side and releases it on the low pressure side. Heat (sensible energy) transfer is made possible by the very small thickness (less than 0.005″) of the membrane as well as very good convection and conduction coefficients within the exchanger.

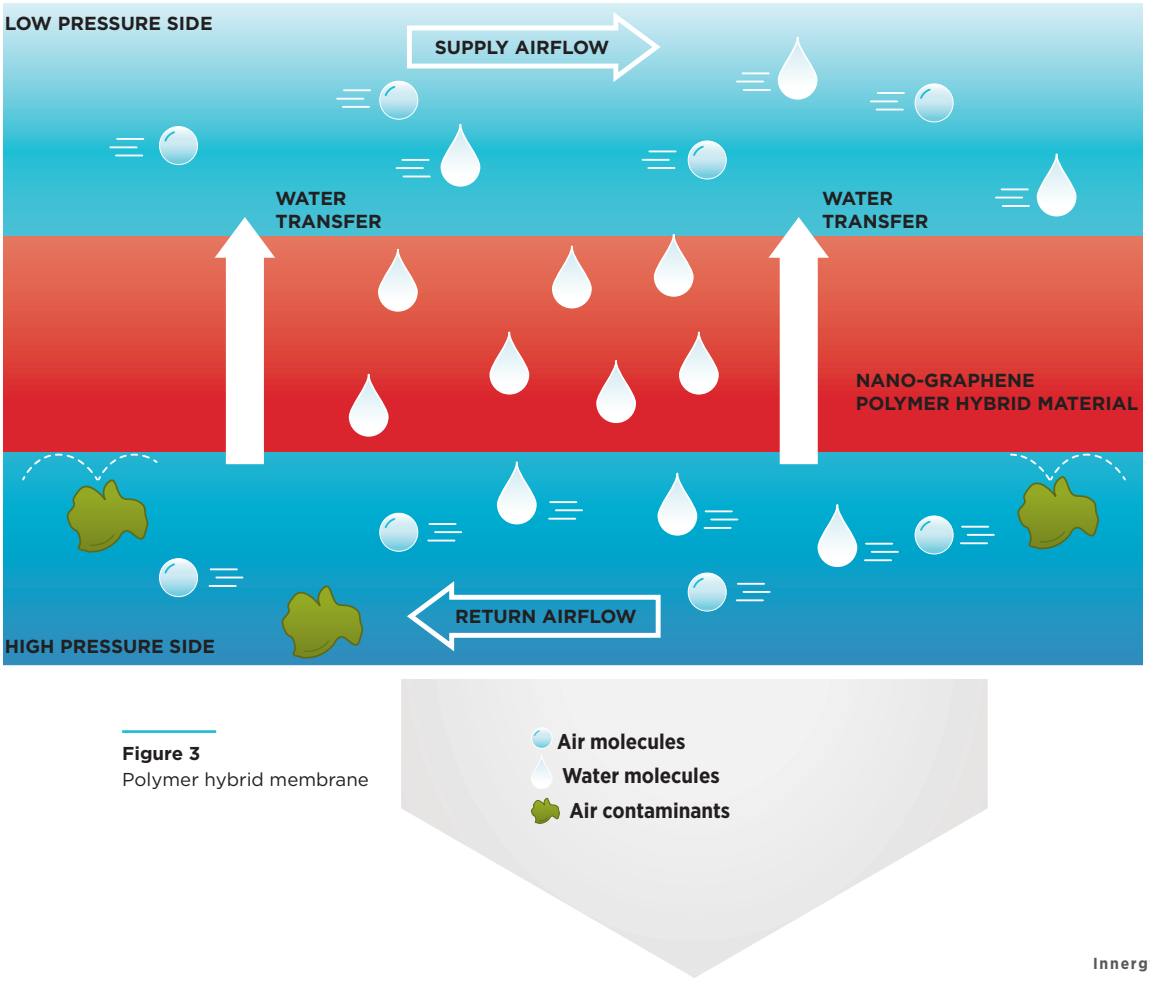


Figure 3
Polymer hybrid membrane

3. IPE6 CONSTRUCTION DETAILS

Our IPE6 Enthalpy plate exchangers are composed of the following main components

1.Membrane: The most important component of our enthalpy plate exchangers, the membrane is responsible for all energy transfer (please refer to section 2 for more details on the membrane).

2. Custom corner extrusions: Our special aluminum corner extrusions (figure 6) contribute to the plate exchanger overall rigidity. Its hollow section enables you to use screws for the plate exchanger's installation with no risk of creating unwanted cross leakage. Its 45° angled corner also facilitates installation and reduces the diagonal dimension.

3. Corner sealant: The silicone adhesive sealant results in a durable exchanger construction. Our manufacturing process allows for a perfectly shaped, even bead of adhesive along the length of the aluminum extrusions for a mess-free, and perfect corner seal every time.

4. Internal stiffener plates: IPE6 exchangers of specific length and square size will be equipped with an internal stiffener plate for greater rigidity of the assembly.

5. End plates: 7/8" wide G-90 galvanized steel end plates complete the assembly and should be used for lifting the plate exchanger, when applicable (for further instructions on handling, please refer to the section 9 of this manual)

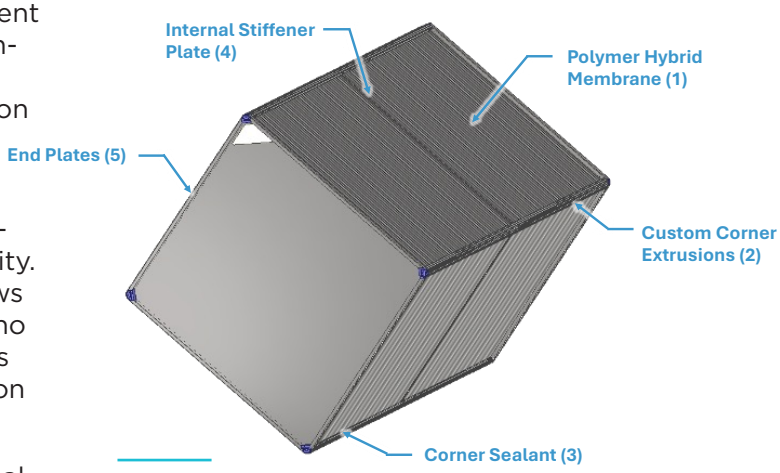


Figure 4
IPE6 main components

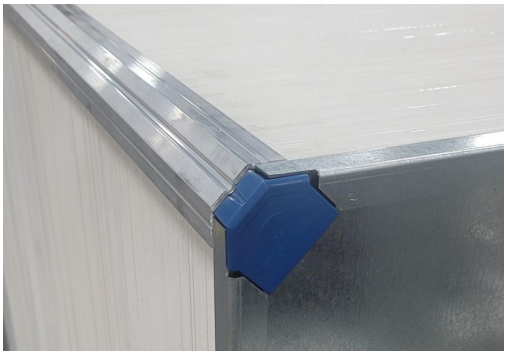


Figure 5
IPE6 construction detail

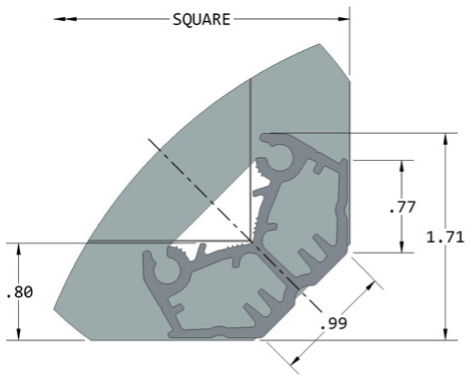


Figure 6
IPE6 aluminum corner extrusion

4. PERFORMANCE CONTROL

4.1. Frost control

4.1.1 THE COLD CORNER

The cross flow nature of a plate exchanger leads in an important variation of its leaving air temperature. Using computer calculations, it is possible to show this variation (figure 7). The coldest area of a plate exchanger (called the cold corner) is always at the junction of the entering outside air and leaving return air. Considering this cold corner effect, it is important to place your exhausts sensors in the center of the air duct, as far from the plate as possible but before the next in line component for a good average temperature reading. When space is an issue, average temperature sensors can be used or the sensor placed at the cold corner (6" (150mm) behind the exchanger and 6" (150mm) from the very corner) while using adjusted cold corner set points.

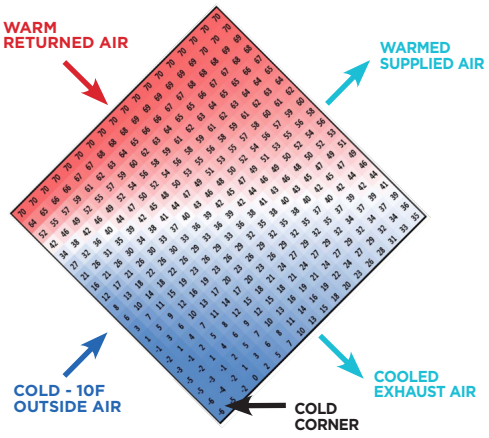


Figure 7
The cold corner

4.1.2 PREHEAT STRATEGY

The frost threshold (minimum outside air temperature) set point should be based on the return relative humidity as shown in table 1 below.

RH3	T1C	T1F
20%	-17.9	-0.22
25%	-14.4	6.08
30%	-12	10.4
35%	-10.3	13.46
40%	-9	15.8

Table 1: Pre-heat control: Frost threshold temperature (T1) depending on return air relative humidity (RH3), based on 2.5 mm (0.10") spacing

As shown above, the return relative humidity number is the most important factor when trying to optimise heating energy savings in winter. Without surprise, the lower the return RH, the lower the frost threshold of the exchanger will be. Quite interesting to note however is the fact that, since warmer air will hold more moisture for a given relative humidity, its frost threshold will be higher.

4.1.3 FACE AND BYPASS STRATEGY

The face and bypass dampers should be modulated based on a minimum exhaust air temperature (T4).

As shown in table 2, the exhaust set point will depend on the return air relative humidity and Outside Air temperature.

Important to note is that the set point temperatures shown are average exhaust air temperatures leaving the plate exchanger. For best results, the temperature sensor should be installed as far as the enthalpy plate as possible but before the next in-line item or an average temperature sensor should be used.

RH3 RH%	Outside Air Dry Bulb Temperature °F (°C)			
	-13 (-25)	-4 (-20)	5 (-15)	14 (-10)
20%	37(3)	25 (-5)	-	-
25%	51 (11)	39 (5)	27 (-4)	-
30%	58 (14)	50 (10)	37 (3)	-
35%	62 (17)	57 (14)	46 (9)	-
40%	64 (18)	59 (16)	52 (12)	34 (2)

Table 2 : Face & Bypass Control : Minimum Exhaust temperature (T4) depending on return air relative humidity (RH3) and Outside Air temperature (T1), based on 2.5 mm (0.10") spacing, sensible eff. = 75%

NOTE: Since the goal is to reduce the amount of cold air that enters the plate, face and bypass dampers on the return/exhaust air side are not necessary for frost control operations. While such an addition can help at optimizing the design by lowering the return side's pressure drop, it serves no control purpose.

4.1.3 SPECIAL FROST CONTROL CONSIDERATION FOR HORIZONTALLY INSTALLED EXCHANGERS

IPE6 plate exchangers used with side-by-side airflows per figure 20 (section 8.7) may only use the face and bypass frost control method for locations with ASHRAE heating dry bulb(99%) temperatures above the frost threshold given in table 1. For areas with expected colder temperatures than the IPE6 frost threshold, preheat should be used.

To ensure condensation evacuation, when the ventilation equipment is configured for side-by-side flows, a slight slope toward the leaving exhaust side is required.

4.2. Free cooling

Free cooling (or economizer) operations can be accomplished with our IPE6 exchangers by using a bypass area with face and bypass dampers on the outside/supply air side only. The outside air modulation can be done based on the outside air VS return air dry bulb or enthalpy comparison. See the following section 4.3 as well as figure 8 for more information.

NOTE: Just like frost control, face and bypass dampers on the return/exhaust air side are not necessary for free cooling operation.

4.3 Sequence of Operation

COOLING MODE: When outdoor air temperature is greater than the return air temperature, the IPE6 operates in cooling mode at its full effectiveness (bypass fully closed).

FROST CONTROL MODE: When the outdoor air (T1) or exhaust air (T4) temperature reaches the frost control setpoint (X1, see table 1 or 2 for recommended temperatures), the preheat coil or face and bypass is modulated in order to avoid ice formation within the exchanger's media.

FREE COOLING (ECONOMIZER) MODE: When outdoor air temperature (T1) is lower than the return air temperature (T3) but supplied air temperature (T2) reaches the free cooling setpoint (X2, defined by user), the face and bypass is modulated in order to prevent the supplied air (T2) from exceeding the free cooling setpoint (X2).

HEATING MODE: When outdoor air temperature(T1) is lower than the return air temperature (T3); when the outdoor air (T1) or exhaust air (T4) temperature is above the frost setpoint (X1, given in table 1 or 2) and supplied air temperature (T2) is below the free cooling setpoint (X2, defined by user), the IPE6 operates in heating mode at its full effectiveness (bypass fully closed).

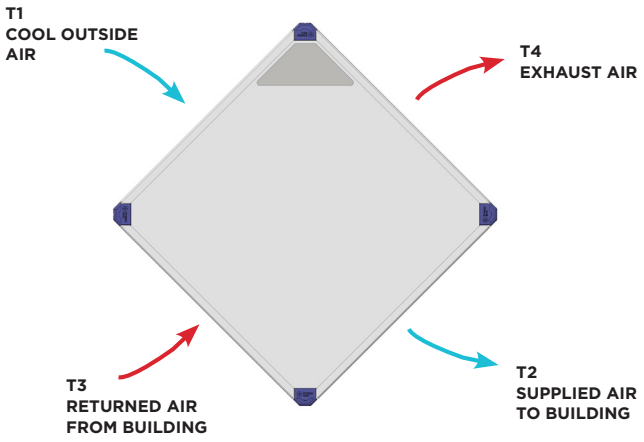
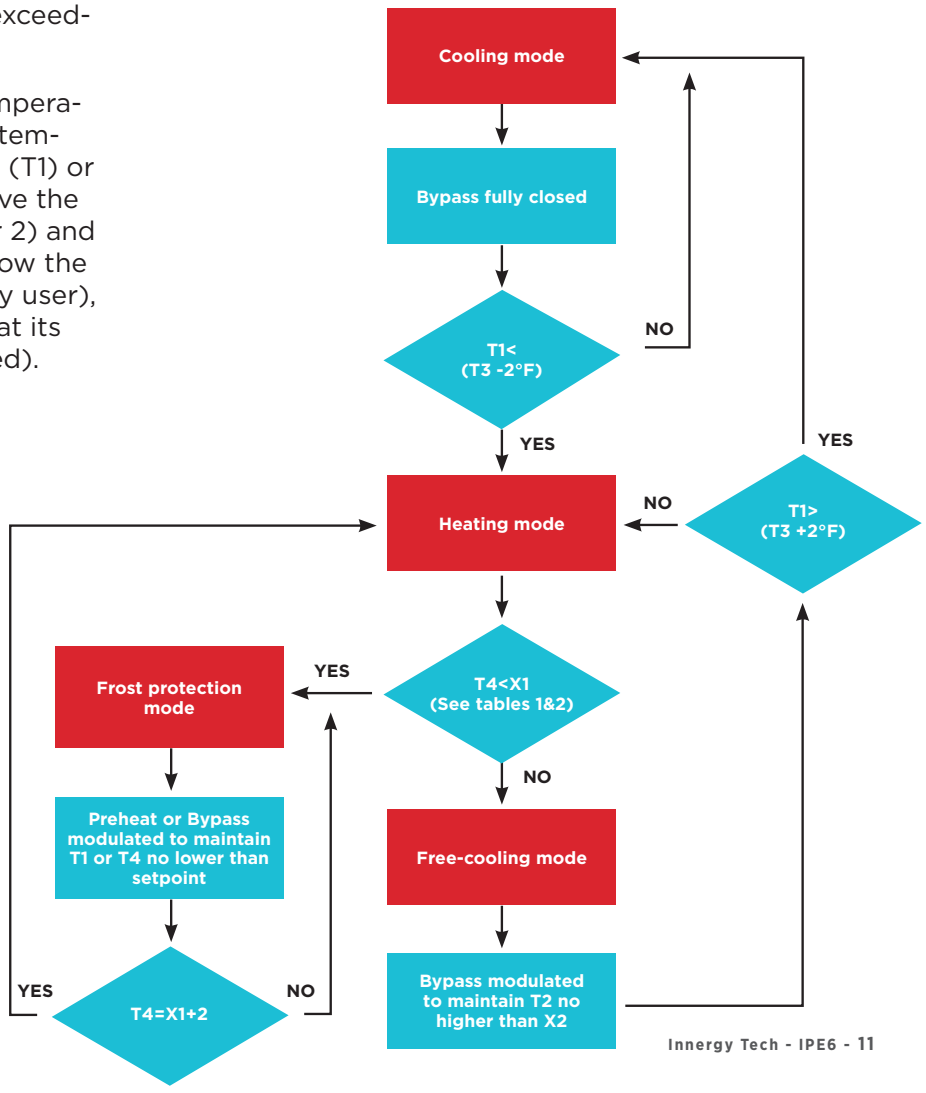


Figure 8
Free cooling diagram

IPE6 Plate Exchanger Flow Chart



Notes: Frost control setpoints (X1) are given in table 1 of section 4.2.1 for the preheat strategy or table 2 of section 4.2.2 for the face and bypass strategy.

The free cooling setpoint (X2) is defined by the engineer or end user based on the building heat gains.

This sequence of operation is based on dry bulb temperatures only for simplicity and greater reliability through time. As an alternate solution, outdoor air and return air enthalpy values can be used for advanced free cooling operations.

5. PRESSURE DIFFERENTIAL

5.1 What is the pressure differential

The pressure differential, directly affected by the fan locations, is defined as the difference in the static pressures the exchanger will see between the two air streams.

As shown on figure 9, the static pressure will vary before and after the plate exchanger for both air streams and therefore will be different for each of the four corner locations.

Note that the pressure differential should not be confused with the pressure drops, defined as the difference of the static pressures before and after the plate exchanger within the same airstream.

The maximum pressure differential is simply the highest value obtained when considering all four corners.

5.2 Pressure differential limits

While the IPE6 enthalpy plate exchanger offers a very good resistance to pressure differentials, caution must be taken during the AHU design stage to avoid exceeding the following limits:

Maximum Pressure Differential must not exceed 5" WC (1245 Pa).

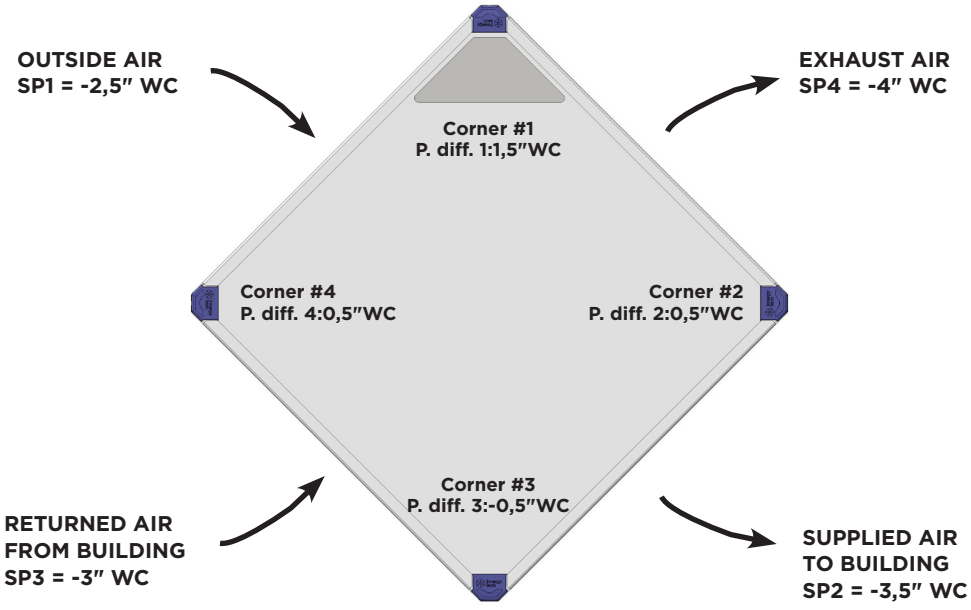


Figure 9
Pressure differential diagram

5.3 Pressure differential calculation example

If we use figure 9 values, we obtain the following:

Pressure differential at corner #1
Static Pressure 1 (SP1) - Static Pressure 4 (SP4) = P. diff.1
(- 2.5″WC) - (4″WC) = 1.5″ WC

Pressure differential at corner #2
Static Pressure 2 (SP2) - Static Pressure 4 (SP4) = P. diff.2
(-3.5″WC) - (-4″WC) = 0.5″WC

Pressure differential at corner #3
Static Pressure 2 (SP2) - Static Pressure 3 (SP3) = P. diff.3
(-3.5″WC) - (-3″WC) = -0.5″WC

Pressure differential at corner #4
Static Pressure 1 (SP1) - Static Pressure 3 (SP3) = P. diff.4
(-2.5″WC) - (-3″WC) = 0.5″WC

Since the highest value of the four pressure differentials is 1.5″WC, this is the value that should be considered for the core pressure differential limitation.

6. DIMENSIONS

6.1. Available dimensions

The IPE6 Enthalpy plate exchanger is available in eight (8) square sizes and one spacing per square. Single plate construction is used for up to 48″ (1200 mm) square size and modular construction, using four (4) smaller plates, for up to 79″ (2000 mm) square.

When the required exchanger exceeds 96″ (2440 mm) in stacked height (including its casing), more than one section will be provided, sections should be assembled together per section 8.4 (Joining sections).

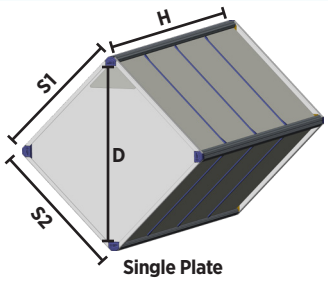
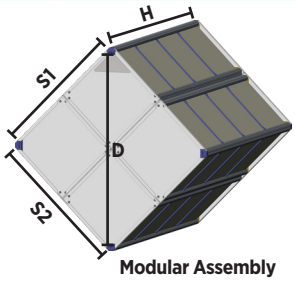
IPE6 Enthalpy Plate Exchanger Dimensions								
	SINGLE PLATE					MODULAR ASSEMBLY		
Square IPE6 Model	24	27	34	40**	48**	55	67	79
Square (S1, S2) (in/mm)	23.72 (600)	27.56 (700)	33.47 (850)	39.37 (1000)	47.24 (1200)	55.12 (1400)	66.93 (1700)	78.74 (2000)
Diagonal (D) (in/mm)	32.36 (822)	37.93 (963)	46.28 (1176)	54.63 (1388)	65.76 (1670)	76.9 (1953)	93.6 (2377)	110.3 (2802)
Height (H) (in)	Adjustable to 96″ in one section using 4″ increments							
Spacing (in/mm)	0.1 (2.5)	0.1 (2.5)	0.12 (3.1)	0.12 (3.1)	0.12 (3.1)	0.16 (4.0)	0.18 (4.5)	0.18 (4.5)
Construction	 Single Plate				 Modular Assembly			
* Exchangers longer than 96″ (2440mm) will be shipped in multiple sections. **Only available with IP membrane.								

Table 3
IPE6 Enthalpy Plate Exchanger Dimensions

6.2. IPE6 Enthalpy Plates VS Sensible Plates

For unitary or semi-custom air handling units, all the IPE6 enthalpy plate square sizes were selected to make sure they would match perfectly with our sensible only aluminum plate exchanger. This enables the AHU manufacturer to offer an enthalpy plate or sensible plate using just one unit design.

NOTE: The fit between the IPE6 enthalpy exchanger and its Sensible plate exchanger counterpart is based on the square dimensions. Due to its optimized extrusion design, the diagonal of the IPE6 will be slightly smaller in all cases.

7. INNERGY TECH IPE6 TERMINOLOGY

IPE6 IDENTIFIC CODE:

IPE6-PM-96H-24S-0.1

PM : Polymer hybrid membrane
IP : Energy recovery cellulose fiber membrane

96H : Adjustable per 4" (101.6mm) increments, up to 96" (2440mm) in a single section.

24S : Available squares are 24" (600mm), 27" (700mm), 34" (850mm), 40"(1000mm), 48" (1200mm), 55" (1400mm), 67" (1700mm) and 79" (2000mm).

0.1 : Available spacings are 0.1" (2.5mm), 0.12" (3.1mm), 0.16" (4mm) and 0.18" (4.5mm).

8. INSTALLING THE IPE6 ENTHALPY PLATE EXCHANGER

8.1. Planning for the IPE6 installation (fan locations)

For simplicity, all the diagrams of this section show the outside air coming from the top left and return air coming from the bottom left of the unit. Due to the crossflow nature of the IPE6 enthalpy plate exchanger, your entering air locations may differ from our diagram. The important factor always remains the fan location VS the plate exchanger and entering air location for each air stream.

DRAW THROUGH – DRAW THROUGH CONFIGURATION Our recommended arrangement. Will lower the air pressure drops through the AHU and lead to a low pressure differential at the plate exchanger. Ideally, the static pressures on the outside/supply air side should be higher compare to the return/exhaust air side.

BLOW THROUGH – BLOW THROUGH CONFIGURATION Will create a low pressure differential at the plate exchanger. Ideally, the static pressures on the outside/supply air side should be higher compare to the return/exhaust air side.

BLOW THROUGH – DRAW THROUGH CONFIGURATION Pressure differential at the plate exchanger can be high and should be verified (see section 5 for more information).

DRAW THROUGH – BLOW THROUGH CONFIGURATION Will always create an important negative pressure differential at the plate as well as inside the AHU and should be avoided. EATR (cross leakage) hazard.

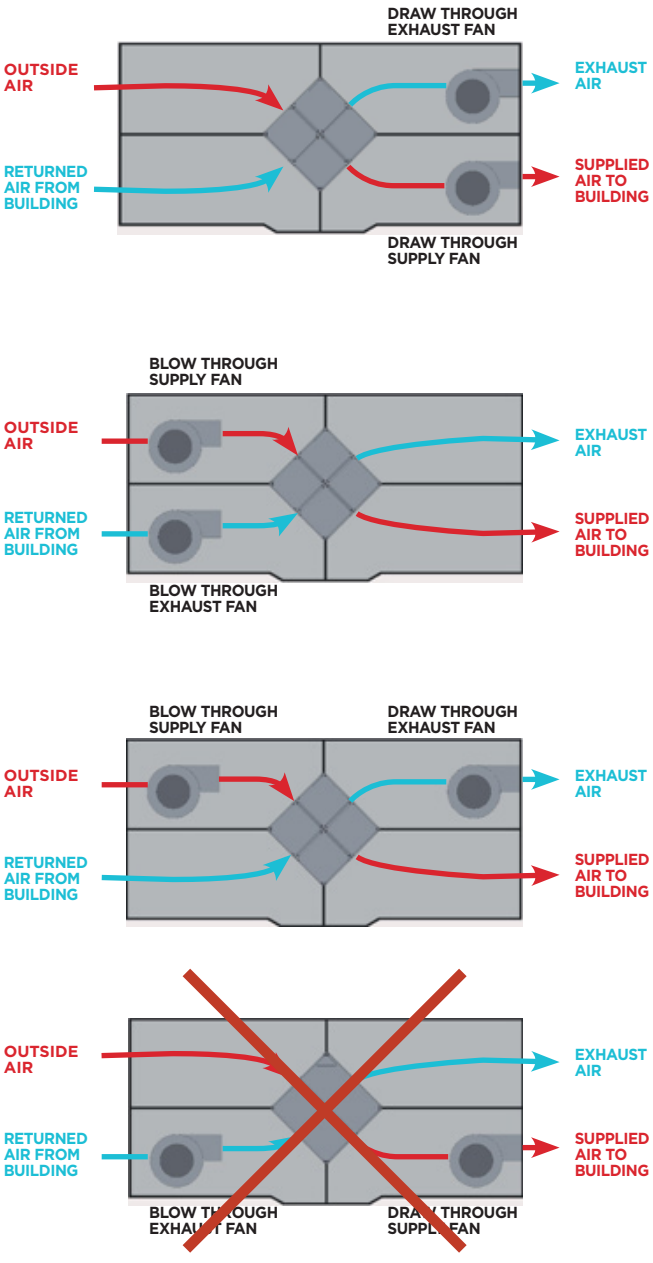


Figure 10
Fan configurations

8.2. Standard installation

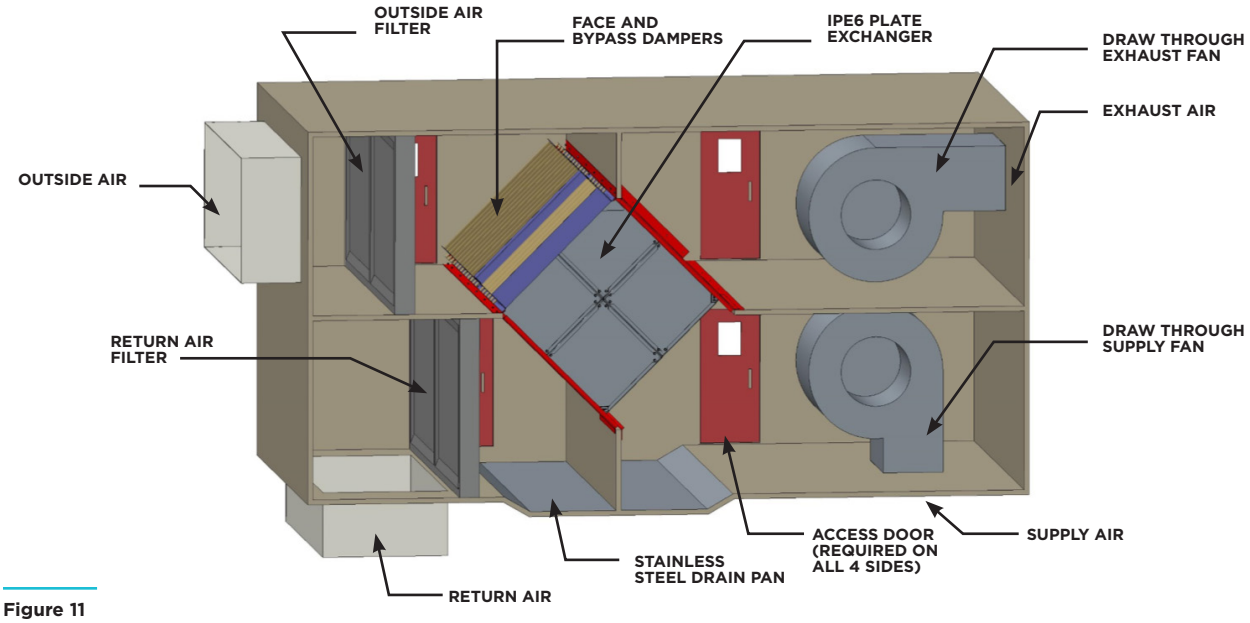


Figure 11
IPE6 standard installation

Figure 11 above shows a standard IPE6 installation in an AHU unit. Note the four access on each side of the plate exchanger, filters before the plate for both air streams, draw through fan locations (supply and exhaust), supply face and bypass dampers and stainless steel drain pan below the plate exchanger.

8.3. Installation details

Single plate installations should be done using caulk or foam to seal all corners and end plates as well as screws (for larger units) through the end plates or corner extrusions.

Install the first section and bolt it in place using the 7/8"wide end plates or aluminum extrusions (1/4" or #12 self-drilling screws recommended). (Figure 12)

CAUTION: The self-drilling screws used through the corner extrusions should not exceed 1/2" in length (plus the thickness of your part to be screwed onto the corner extrusion) to make sure they cannot penetrate the sealant and create a leak. (Figure 13)

When installing screws through the corner extrusions, make sure there is no gap between the extrusion and the AHU angle or plate (Figure 14). A gap could result in the screw pulling on the extrusion, damaging the corner seal and creating a leak.

Figure 12
Self-drilling screws through the corner extrusions

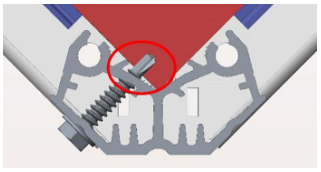


Figure 13
Screws if too long may create leaks!

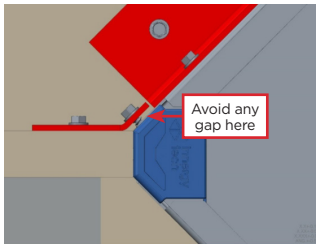


Figure 14
Gaps between the extrusions and the bracket

8.4. Joining sections

Since our maximum single section length is 96", wider plates will be sent in two (2) or more sections that will have to be assembled by following these simple steps:

Add caulk (1/4" bead along the red lines) on each meeting faces of the installed section and press the second section firmly before bolting it in place. (Figure 15 & 16)

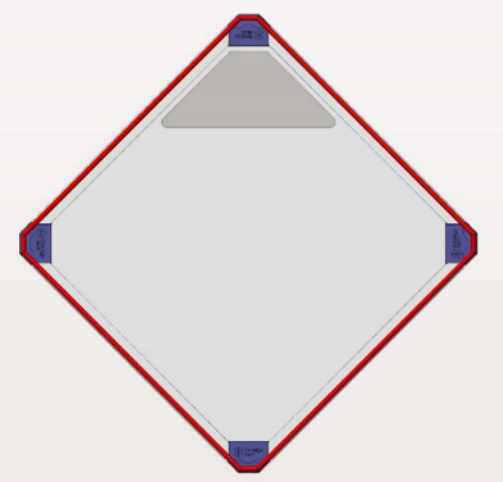


Figure 15
Joining sections (Single plate caulking path)

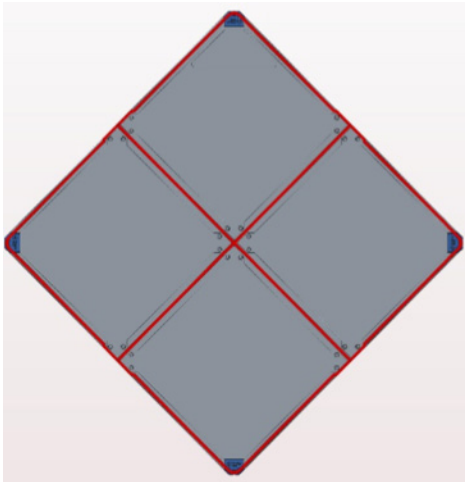


Figure 16
Joining sections (Modular assembly caulking path)

SPECIAL CORNER CONSIDERATION

As an added precaution and to avoid any possible cross leakage at the plastic corners, caulk should be added following the yellow path to all mating corners as shown on Figure 17.

To prevent any movement of the sections, Innergy tech recommends using 1.75" wide 16 GA aluminum plates (to be provided by the AHU manufacturer) to link the sections together with self-drilling screws (screwing through both end plates). (Figure 18)

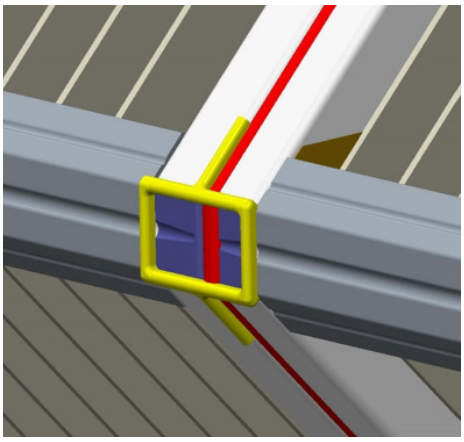


Figure 17
Joining sections (Special corner consideration)

WARNING: Note that linking the sections together should only be done once the sections are in the AHU and in their final location. You should never attempt to lift the exchangers following this step.

Repeat all steps for each additional section.

NOTE: Special attention should be given when joining the sections to avoid all unwanted plate bypass or cross leakage.

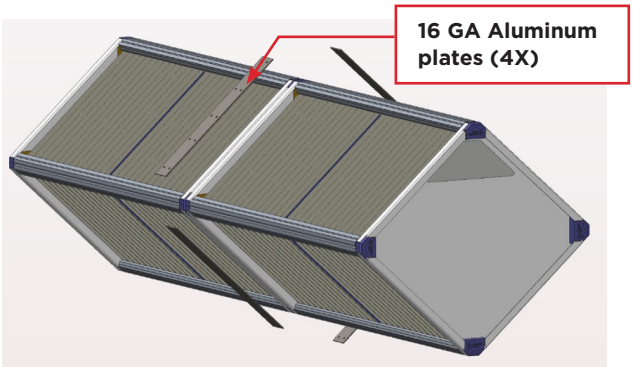


Figure 18
Joining sections (Completing the assembly)

8.5. Required filtration

As specified in ASHRAE 52.2, MERV 6 or higher type filters shall be used on both faces of the IPE6 enthalpy plate exchanger.

8.6. Drain pans

As conditions can vary greatly, Innergy tech recommends the use of stainless steel drain pans below its IPE6 exchangers (see section 8.2, figure 11 for a standard IPE6 installation with drain pans).

8.7. Vertical and horizontal installations

The IPE6 plate exchangers can be installed in the standard vertical orientation per figure 19 (for over/under airflows) or horizontal orientation per figure 20 (for side-by-side airflows).

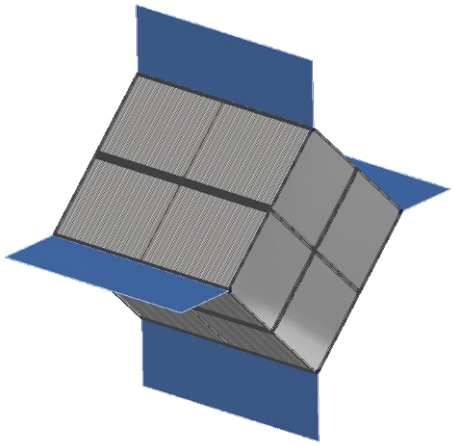


Figure 19
Standard vertical installation, over/under airflows

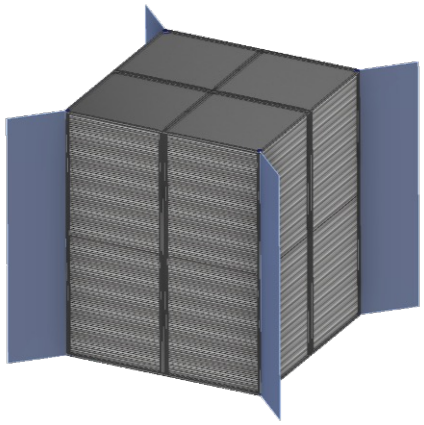


Figure 20
Horizontal installation, side-by-side airflows

CAUTION : While the best way to install a plate exchanger remains the standard vertical installation per figure 19 (reduced frost hazard), horizontal installations per figure 20 are possible pending special considerations are taken for the frost control mode (please see section 4.1.4 for more information).

8.8. Special double diamond considerations

Double diamond installations, where two plates are used in parallel as per figures 21 and 22, are possible and offer the advantage of enabling reduced width AHU designs for high airflow units. Low pressure drops, great effectiveness numbers and lower plate exchanger costs are other advantages that often come with this design.

As no design is perfect however, the double diamond approach asks for more complex plenums (made by the AHU manufacturer), can make the exchanger access more difficult and always requires caution through the design phase to avoid air distribution problems. In all cases, the Innergy tech sales team should be contacted for approval on the plenum design.

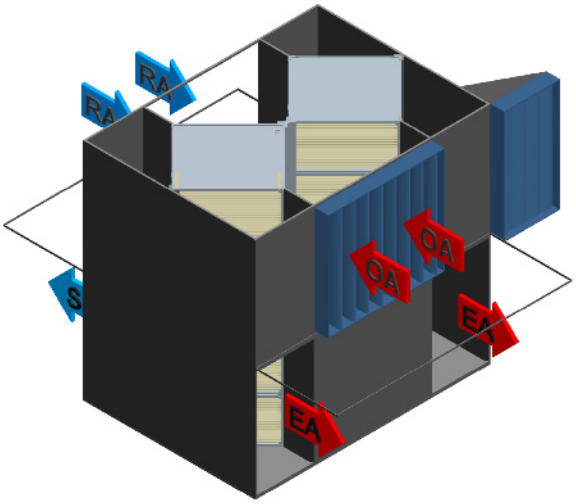


Figure 21
Double diamond top and bottom config.

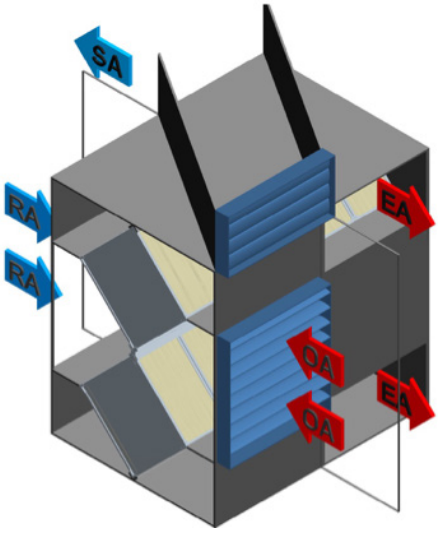


Figure 22
Double diamond side-by-side config.

DOUBLE DIAMOND DESIGN TIPS

Fan locations should be in draw through rather than blow through for reduced transitions' pressure drops and to keep pressure differentials low.

For better air distribution, avoid selecting plates with too low pressure drops (below 0.5"WC (125Pa)).

When possible, placing the filters against the face of the exchanger will help ensure better air distribution along the entire width of the plate sections. Access doors to all four sides of the plate exchangers for cleaning and inspection purpose remains very important with this design.

NOTE: As each installation is different, sending your plenum design to the Innergy tech sales team for review and approval on the minimum distances between the plates as well as before and after them is highly recommended.

Innergy tech only manufactures the exchangers and therefore cannot be held responsible for any airflow problems that may occur with double diamond air handling unit designs.

9. LIFTING AND HANDLING

9.1. Before starting

Before installing your new plate exchanger, the following should be checked:

Verify that the model number on the product corresponds to the model number ordered.

Verify that all dimensions and plate spacing corresponds with the official drawing of the product.

Verify all faces of the plate exchanger for any damage to the media or casing that may have occurred during freight.

CAUTION: Plates must always be in the vertical orientation for transport.

9.2 Lifting the IPE6 exchanger

As shown on figure 23, the IPE6 Enthalpy plate exchanger must be lifted from its side walls with a lifting bar so that the chains or slings are vertical.

WARNING: Suspending the exchanger from one point as shown on figure 24 is not recommended and may result in damage to the exchanger.

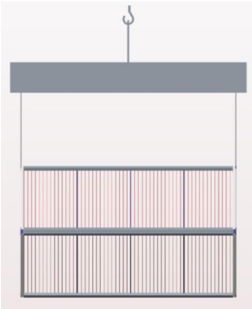


Figure 23
Lifting the IPE6 Exchanger
(Correct method)

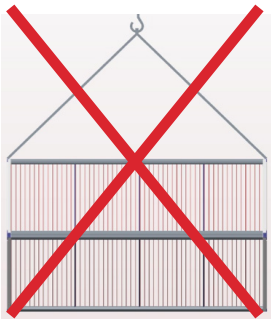


Figure 24
Lifting the IPE6 Exchanger
(Incorrect method)

9.3 Storage - important information

Rain, strong UV rays and extreme temperatures may damage the IPE6 plate exchanger and its media. It is recommended to store the IPE6 exchanger inside to protect it from the elements. If not possible, store the unit away from direct sunlight and rain when stored outdoors. When stored in dusty areas, the exchanger should be wrapped to prevent dust accumulation.

CAUTION: When wrapping the exchanger or attaching it to a skid with straps, care should be taken to NOT OVERTIGHTEN the straps as this may affect the integrity of the enthalpy plate exchanger.

9.3.1 CUSTOM ATTACHMENT

If using your own lifting device, attachments onto the plate exchanger can be made by simply bolting through the 7/8" (22mm) side walls. As shown on figure 25, the attachments should cover at least 3/4 of the side dimension.

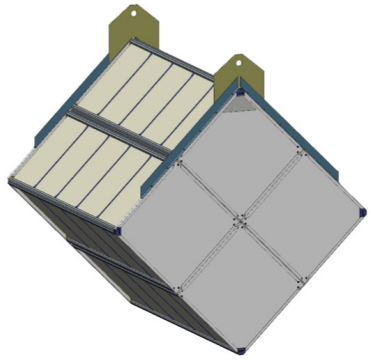


Figure 25
Lifting the IPE6 Plate Exchanger (Custom example)

WARNING: The IPE6 plate exchangers should never be lifted using their corner extrusions as it may potentially damage the corner seal and create cross-leakage.

When multiple sections are received, all the sections should be lifted and dropped into the AHU independently before joining them together. You should never attempt to lift two sections attached together.

10. MAINTENANCE & CLEANING

CAUTION: Extra care should be used during the entire cleaning process to prevent any damage to the polymer hybrid membrane.

Based on our long experience with enthalpy plate exchangers (over 20 years), dirt build-up inside the plate is not expected because of the inner laminar flow. Still, with time the entering faces of the exchanger can be affected by dust or dirt accumulations and to keep your plate exchanger at its maximum effectiveness, this cleaning procedure should be followed:

10.1 IPE6 Enthalpy plate exchanger cleaning procedure

1. For safety reasons, the entire HVAC system must be turned off before cleaning and prevented from being turned on unintentionally.

2. Open the lock of the compartment where the heat exchanger is installed and secure the working space so that the heat exchanger is fully visible.

If a filter is installed in front of the OA and RA of the heat exchanger, remove it and store it elsewhere.

3 It is recommended to use a vacuum cleaner with a soft brush to remove dust accumulated on the heat exchanger air inlet side once a year.

In most cases, you can remove almost all contaminants just by using a vacuum cleaner. (Figure 26). It is not advised to use compressed air, as it may blow dust on the outside surface further into the core. Vacuum clean wherever it is possible.

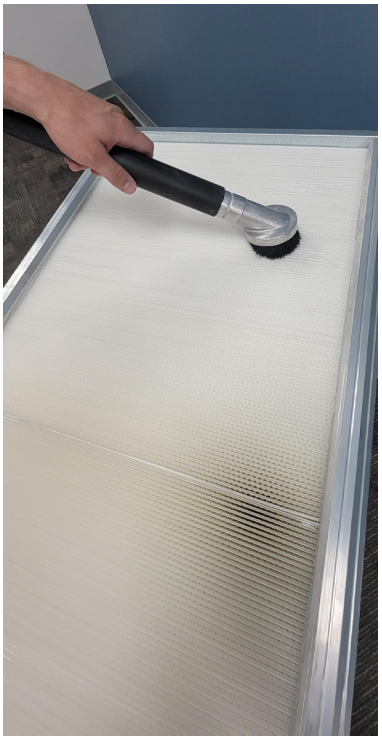


Figure 26
Using a vacuum cleaner

10.2 Hybrid polymer membrane washing instructions

1. If water cleaning is unavoidable, use clean water to clean. The recommended water pressure for the hose used at this time is 0.3~0.6 bar (0.03~0.06 MPa). **Never wash IP membrane with water!**

Since water flows from top to bottom inside the heat exchanger, if the OA or RA is located at the top, be extra careful to remove dust so that the remaining dust (contaminants) does not enter the core with the water. If the OA or RA is located at the bottom, there is no possibility of dust entering the heat exchanger due to water cleaning.

2.After removing moisture from the outside with a dry cloth, let it dry naturally for 24 to 48 hours in a well-ventilated area.

Use the drain hole to drain any water that has accumulated on the floor due to water cleaning and use a mop or similar to remove any moisture.2. .Thoroughly rinse with clean tap water if a soapy solution was used until no more bubbles appear in the exiting water.

If you have cleaned with water, check for any splashed water before turning on the power and remove it completely.

< Hose and water pressure >

Recommended hose size: 5/8-inch in diameter standard hose (Figure 29)

The purpose of the water is not to remove external dirt, but to wash away any particles that may be inside. Therefore, when washing with water, the water pressure in the hose should be low enough that no external pressure is applied to the heat exchanger. Do not use a high pressure hose.

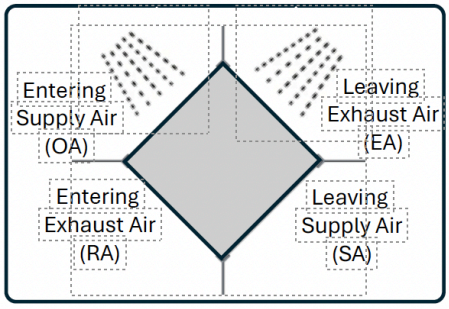


Figure 27
Cleaning with water

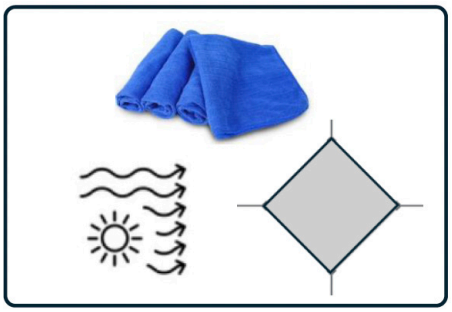


Figure 28
Drying the exchanger

Figure 29
Hose and water pressure

11. IPE6 SPECIFICATIONS

1. GENERAL SPECIFICATIONS

1.1 Furnish and install the IPE6 enthalpy plate exchanger.

1.2 The enthalpy plate exchanger shall transfer both sensible and latent energies between outgoing and incoming air streams in a cross flow arrangement.

1.3 The enthalpy plate exchanger must be manufactured in North America.

1.4 The enthalpy plate exchanger manufacturer must have at least ten (10) years of experience in the manufacturing of energy recovery components.

2. PRODUCT SPECIFICATIONS

2.1 The enthalpy plate exchanger media shall be a polymer hybrid material or coated with hydrophilic resin material.

2.2 The polymer material or coated with hydrophilic resin material shall exchange water by direct vapor transfer using molecular transport without the need of condensation.

2.3 The plate exchanger shall be constructed of alternating layers of corrugated polymer spacer and liner made from the polymer hybrid material or coated with hydrophilic resin material.

2.4 The enthalpy plate exchanger shall have a unique triangular flute design to provide optimal energy transfer.

2.5 The enthalpy plate exchanger shall be assembled into a strong, self-supporting frame made of aluminum corner extrusions and G90 galvanized steel end plates.

2.6 The corners of the enthalpy plate exchanger shall be sealed with silicone.

2.7 The aluminum corner extrusions shall be hollow to accept mounting screws and shall provide a 45° corner support angle.

2.8 The enthalpy plate exchanger shall operate at temperatures between -40 °F and 140 °F (-40 °C and 60 °C).

2.9 The enthalpy plate exchanger shall withstand, without more than 35 % increase of pressure drop, pressure differentials of at least 5″ w.g. It shall withstand pressure differential of 10″ WC without permanent deformation.

2.10 As specified in ASHRAE 52.2-2007, MERV 6 type filters shall be used on both faces of the enthalpy plate. Filters to be supplied by others.

3. QUALITY ASSURANCE SPECIFICATIONS

3.1 Performance: The enthalpy plate exchanger shall bear the AHRI 1060 Certified Product Seal. Sensible, latent and total effectiveness along with pressure drop, EATR and OACF rating shall be clearly documented with performance tests conducted in accordance with ASHRAE Standard 84-2020 and per the official AHRI laboratory. Exchangers that do not bear the AHRI 1060 certified seal shall be unacceptable.

3.2 Fire resistance: Following UL 1812 (Heating and Cooling Equipment) and UL 1995, the “Standard of Safety for Heating and Cooling Equipment”, the enthalpy plate exchanger shall be a UL Recognized Component and bear the UL Certification Mark.

3.3 Bacteria & mold resistance: The membrane shall not promote the growth of mold or bacteria and must have successfully passed AATCC30-2013 with no growth of Aspergillus Niger observed after 14 days.

3.4 Longevity test (frosting/defrosting cycles): The exchanger must have successfully passed 500 frosting/defrosting cycles with less than 5% change of its performance.

3.5 Warranty: The enthalpy plate exchanger shall come with a warranty of at least 5 years against manufacturing defects that could alter its function. Longer warranty periods shall be available upon request.

GLOSSARY

Following are terms used throughout this manual that you need to become familiar with. Note that many of these terms are covered in more details throughout the many sections of this manual.

BLOW-THROUGH CONFIGURATION: Refers to the arrangement that places the fan before the plate exchanger (see section 8 for more details).

CASING: Aluminum & galvanized steel assembly supporting the exchanger media.

CORNER ALUMINUM EXTRUSIONS: Part of the IPE6 exchanger casing that protects the four corners along the length of the plate exchanger (see section 3 for more details).

CORNER SEALANT: Silicon sealant that prevents any cross leakage at the plate exchanger corners (see section 3 for more details).

DOUBLE DIAMOND CONFIGURATION: Special configuration where two IPE6 plate exchangers are used in parallel (see section 8.8 for more details).

DRAW-THROUGH CONFIGURATION: Refers to the arrangement that places the fan after the plate exchanger (see section 8 for more details).

END PLATES: Part of the casing composed of galvanized steel plates on each end of the plate exchanger (see section 3 for more details).

ENTHALPY PLATE EXCHANGER: Device that exchanges sensible and latent energy through the surface of its special membrane.

EXHAUST AIR (EA): The return indoor air that has passed through the IPE6 plate exchanger. This air is being ducted outdoors.

FACE AND BYPASS STRATEGY: Frost control strategy that consists of reducing the amount of cold outdoor air going through the plate exchanger (see section 4.1.3 for details).

FREE COOLING: Performance control strategy that modulates the performances of the IPE6 exchanger to prevent overheating the building for cool outdoor air temperatures (see section 4.2 for more details).

MEMBRANE: Surface within the plate exchanger responsible for all the sensible and latent energy transfer (see section 2 for more details).

MODULAR PLATE CONSTRUCTION: Used for larger plate exchangers made with 4 single plate constructions assembled together.

OUTDOOR AIR (OA): Fresh air that is brought in from the outside. This air goes through the IPE6 plate exchanger and then is ducted into the building.

POLYMER SPACER: Corrugated polymer material that completes the IPE6 enthalpy plate exchanger media and ensures a consistent spacing.

PREHEAT STRATEGY: Frost control strategy that consists of preheating the outdoor air before it reaches the exchanger (see section 4.1.2 for details).

PRESSURE DIFFERENTIAL: Difference in static pressure between the Outdoor/Supply air stream and the Return/Exhaust air stream (see section 5 for more details).

PRESSURE DROP: Difference in static pressure before and after the plate exchanger within the same airstream.

RETURN AIR (RA): Stale air from the building that is being ducted to the IPE6 plate exchanger.

SENSIBLE PLATE EXCHANGER: Device that exchanges sensible only energy through the surface of its plates.

SINGLE PLATE CONSTRUCTION: Refers to IPE6 plate exchangers that only use one end plate to cover their entire square dimension (see section 6.1 for more details).

SPACING: Effective distance between two layers of exchanger membrane.

SQUARE: Square dimension of the IPE6 exchanger including its casing.

SUPPLY AIR (SA): Air that is brought in from the outside, has passed through the IPE6 plate exchanger and is ducted into the building.

WIDTH OR HEIGHT: Total stacked length of the plate exchanger including its casing.

LIST OF FIGURES

ABOUT INNERGY TECH

For more than 30 years, Innergy tech has been providing state-of-the-art, air-to-air heat and energy recovery products to the HVAC industry. With over 1 million residential and commercial products sold in more than 20 countries around the globe, Innergy tech is recognized as a world market leader in the heat and energy recovery industry. Our company is known for the quality of its products, its highly skilled technical services and for its ability to meet its commitments to its customers.

Innergy tech expertise

Research and development of new products at the leading edge of technology has always been our strength. It is the reason why we are now offering, and constantly improving, the most complete product line in the heat and energy recovery industry. If you are looking for Energy Recovery Wheels (Heat Wheels), Heat Pipes, Sensible or Enthalpy Plates Exchangers we can fill your needs.

Certified performance at Innergy tech

At Innergy tech, we strongly believe in third party certified performances as the only way to insure quality products that will perform as designed. Based on this belief, we have been part of the AHRI 1060 certification program from its very beginning as well as being an active AHRI (Air-Conditioning, Heating & Refrigeration Institute) member. This continuous effort resulted in a well-established industry certification program, which is now making the life of our customers far easier since they no longer have to accept self-certified products. This certification will give you peace of mind.

setting the standard
for **energy recovery**

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