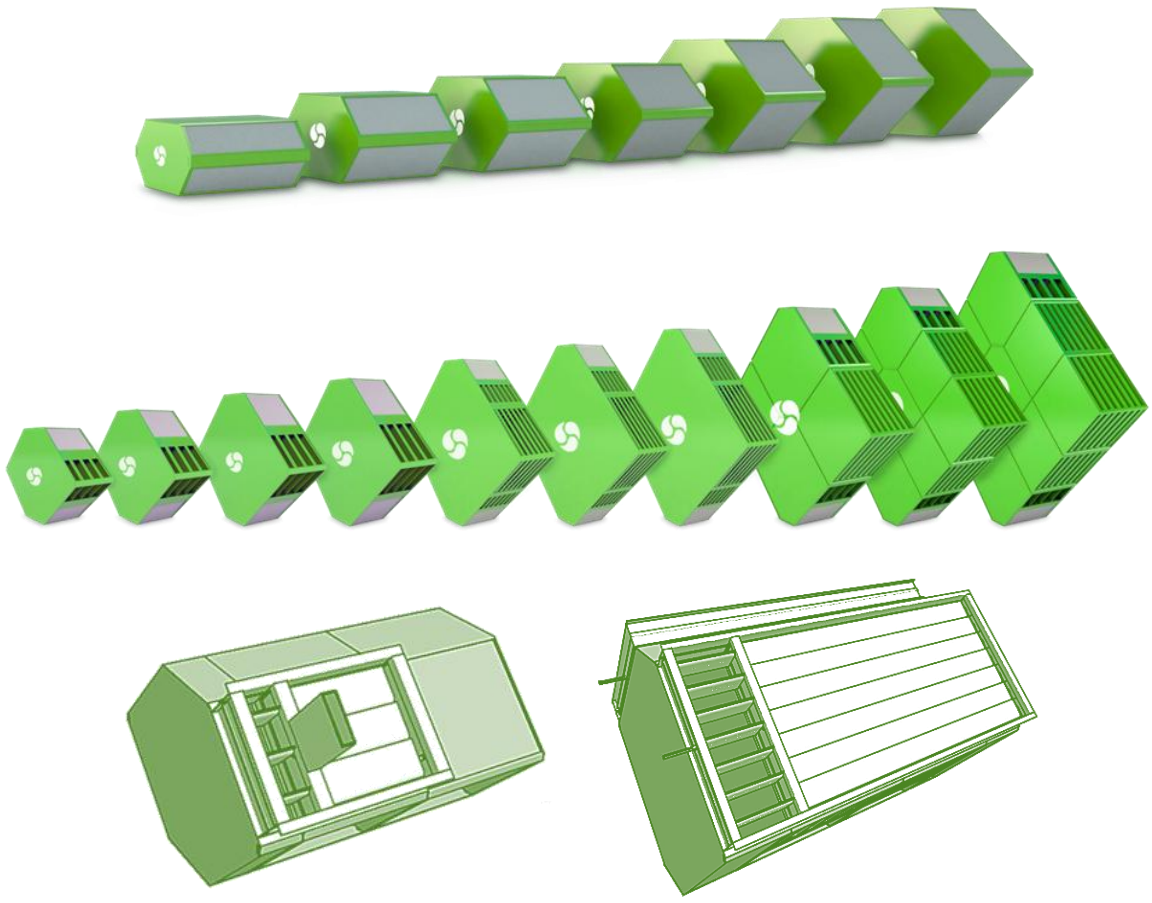
ERI CORPORATION
ENERGY RECOVERY AND VENTILATION COMPONENTS

COUNTER FLOW PLATE HEAT EXCHANGERS

PCF

INSTALLATION, OPERATION AND MAINTENANCE MANUAL



Version 1.3, 30/10/2025

EUROVENT CERTIFIED PERFORMANCE

TÜV SÜD

ErP 2016-2018 COMPLIANT

CONTENTS

1. INTRODUCTION

This manual contains important instructions for the safe handling, installation, and operation of our counter flow plate heat exchanger (PCF) products. Before proceeding with the installation process please read the instructions in this manual attentively.

Prior to Installation, Operation and Maintenance as part of the customers design process ERI Corporation expect all recommendations contained in the product Design Handbook, communication from ERI, recommendations of ERI and good engineering practice to be taken into account.

PCFs are bespoke products manufactured to customers' requirements; therefore this document must always be read in conjunction with the individual product technical datasheet and any relevant specifications for each project.

This manual is a part of the product, please store it safely for future reference.

ERI Corporation is a **member of Eurovent** and our products are certified under the **Eurovent Association product programmes. ERI is regularly audited** to assess the quality of the products and processes in our facilities. Being certified requires **regular testing of the products** and **validation of the selection software** for accuracy and consistency. Selection software distributed to customers and partners is updated following approval by the Eurovent Certification Company (ECC). The new version is made available on the ERI Corporation website and communicated to relevant users within a maximum of one month from the official ECC approval date. The **Eurovent Certified Performance is a mark of excellence and quality** which assures customers of our continued efforts to deliver state-of-the-art heat recovery products.

PLEASE NOTE: Energy Recovery Industries (ERI) Corporation strives to continuously improve and develop its products and therefore reserves the right to make changes to the design and technical documentation without prior notice.

2. QUALIFIED PERSONNEL

The installation and maintenance of the product should be carried out only by qualified personnel.

Qualified personnel are defined as those who have been trained to carry out the relevant work, are knowledgeable about the applicable safety regulations, capable of identifying potential hazards and can therefore carry out the work in a safe and professional manner.

It is the responsibility of the product user to provide adequate training to the personnel responsible for the installation, operation, and maintenance of this product.

3. GENERAL SAFETY WARNINGS

☛ Please note the following warnings displayed throughout this document:

PLEASE NOTE

Denotes important information relevant to the product that otherwise does not represent an immediate danger to the user or the proper operation of the equipment.

WARNING

Denotes important information relevant to the product that, if ignored, might cause damage or impair the proper operation of the equipment.

DANGER

Denotes important information relevant to the product that, if ignored, might cause harm and injury.

☛ It is important to pay attention to safety warnings displayed in this manual, on the product and on packaging. Failing to comply with such warnings might cause personal injury and/or damage to the product and its surroundings.

☛ Ensure that any applicable safety regulations and standards are complied with during the installation, operation and maintenance of this product.

☛ The product can only be used within the operating limits and according to the instructions described in this manual. ERI Corporation is not liable for any damage resulting from improper use or failure to follow the recommended instructions.

4. DELIVERY

4.1. CHECKING THE GOODS

- All ERI Corporation products are tested and inspected prior to leaving the factory.
- Immediately upon receiving the goods and before removal from the delivery vehicle inspect the visible packaging, photograph any damage before removal from the vehicle, note the damage on the delivery note provided by the driver.
- Immediately upon receiving the goods following removal from the delivery vehicle make a visual inspection of the packaging. In case of visible damage, do not unpack the product, note the damage on the delivery note provided by the driver, make a photographic record and inform ERI Corporation immediately.

PLEASE NOTE: ERI Corporation will not accept claims for damage sustained during or after offloading and positioning the product on site at the delivery destination.

- Consult the product label present in the packaging of each product.

Counter flow plate heat exchanger packing label and part label

- Check whether the delivered model and quantity of the products matches the order and confirm that any ordered spare items are included with the delivery. In case of shortage inform ERI Corporation immediately.

PLEASE NOTE: All claims for damage or missing goods must be reported to ERI Corporation by email within 24 hours of delivery and must include the order number, copy of the signed delivery documentation and photographic record of the issue.

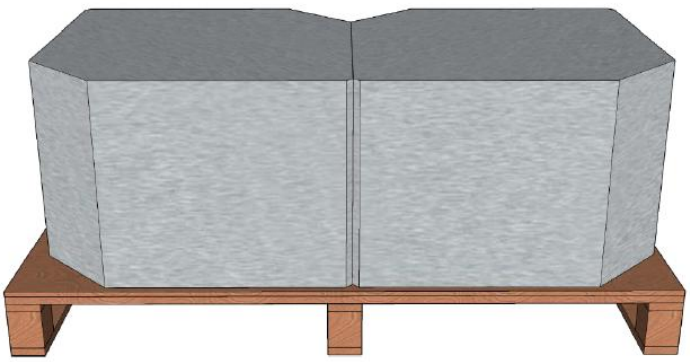
PLEASE NOTE: Items such as dampers, seals, etc might be delivered in a separate crate or together with the main package.

4.2. UNPACKING THE GOODS

☛ The method of packing is for the products to be loaded on wooden pallets. Cardboard packaging and plastic straps are added to protect from superficial damage and minor water and dust ingress.

IMPORTANT: Packaging is not suitable for storage outdoors.

Counter flow plate heat exchanger packaging



Unpacking PCF

☛ How to open the box with PCF.

1. Cut and remove plastic straps carefully
2. Remove top cover
3. Remove side covers one by one

☛ You will end up with PCF heat exchangers on wooden pallet basis.

☛ After unpacking the product check whether the unit and any separate parts have been supplied in good condition. If damage is present inform ERI Corporation immediately.

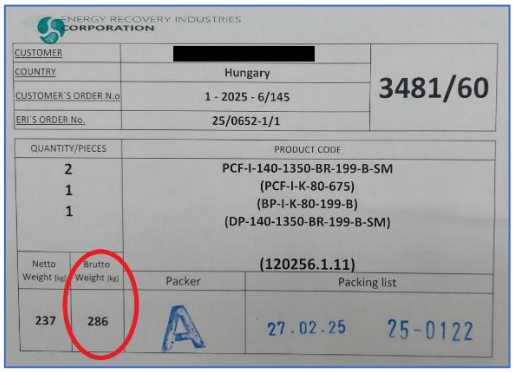
PLEASE NOTE: Items such as dampers, seals, etc might be delivered in a separate crate or together with the main package. Do not dispose of the packaging before verifying all items have been removed from it.

PLEASE NOTE: Minor aesthetic dents and scratches might be the result of the manufacturing process and will not affect the operation and performance of the product. ERI Corporation will not accept any claims related to minor aesthetic issues.

PLEASE NOTE: All claims for damage or missing goods must be reported to ERI Corporation by email within 24 hours of delivery and must include the order number, copy of the signed delivery documentation and photographic record of the issue.

4.3. HANDLING THE GOODS

- All transport and handling shall be carried out only by qualified personnel.
- Before attempting to off-load the goods, please ensure that a suitable means of transporting/lifting to accommodate the weight and size of the equipment is available.
- The weight of the equipment is displayed on the manufacturing label fitted on the outside of the packaging and on the documentation provided at the time of order confirmation. Please check the weight of the product before attempting to handle it.


ENERGY RECOVERY INDUSTRIES CORPORATION

CUSTOMER	[redacted]	3481/60
COUNTRY	Hungary	
CUSTOMER'S ORDER No.	1 - 2025 - 6/145	
ERI'S ORDER No.	25/0652-1/1	

QUANTITY/PIECES	PRODUCT CODE
2 1 1	PCF-I-140-1350-BR-199-B-SM (PCF-I-K-80-675) (BP-I-K-80-199-B) (DP-140-1350-BR-199-B-SM)
	(120256.1.11)

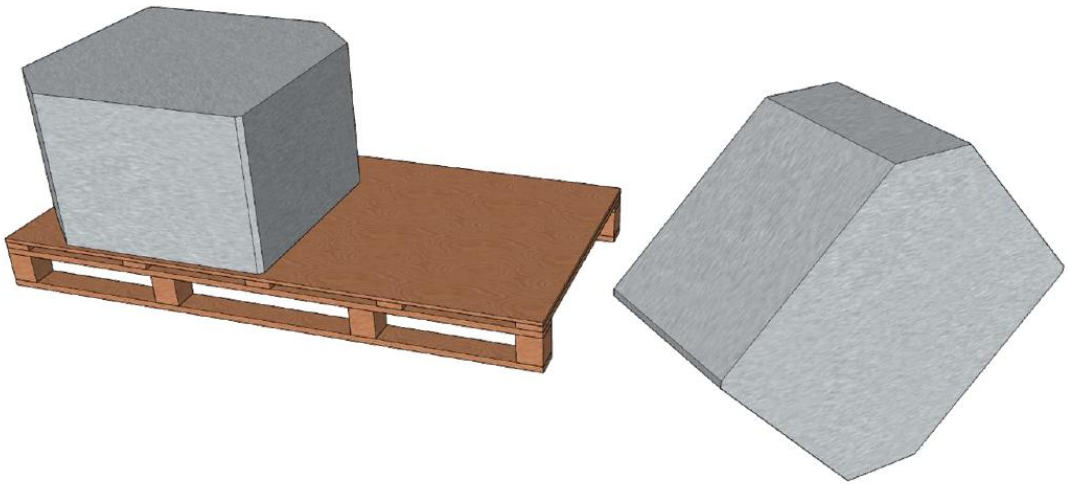
Netto Weight [kg]	Brutto Weight [kg]	Packer	Packing list
237	286	A	27.02.25 25-0122

Delivery label (located on the outside of packaging)

- While in its original packaging always use the provided wooden pallet to handle and transport the product. The use of a fork-lift or pallet truck is recommended.
- The handler shall be liable for securing the product against tipping and falling.
- The forks must be inserted at least 70% of the package depth to ensure it does not slip or break.
- Manual lifting between floor and shoulder level is acceptable only up to a maximum weight of 25kg (89/391/CEE).

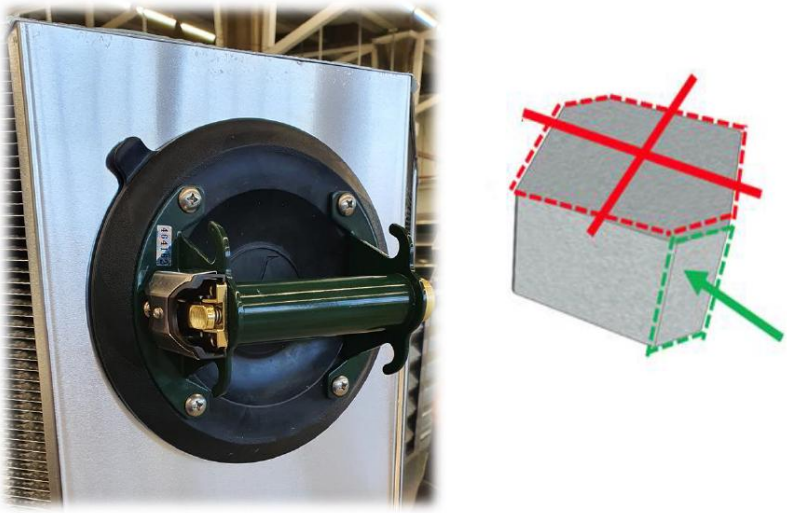
Handling with forklift

- Many options exist for handling the exchangers and manoeuvring to the installed position. Methods used should be suitable for the handling tools available and managed by qualified personnel experiences in these operations.
- Examples of handling are suggested below however it is the responsibility of the receiver of the goods to handle and install in a safe manner that does not damage the equipment. ERI will not be responsible for damage dure to handling issues.
- Smaller exchangers are delivered in a horizontal position and can be manoeuvred into the correct orientation for installation by hand.



Rotation of exchanger to normal installation orientation

- If used vacuum grippers should only be applied to the side covers as shown below and are recommended for use on models no larger than 124.

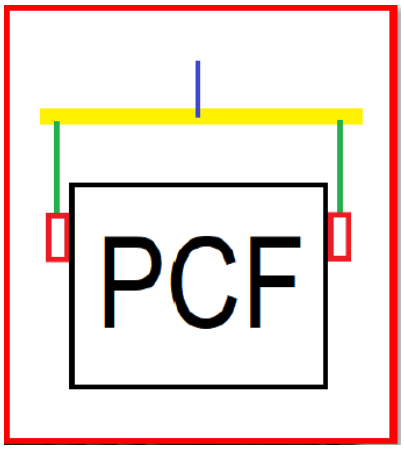


Use of vacuum grippers

- Larger exchangers may need to be rotated on the pallet to allow lifting from below exchanger.
- Lifting frames can be used for rotation of exchangers to vertical, however all surfaces of the exchanger must be protected as shown in example below.

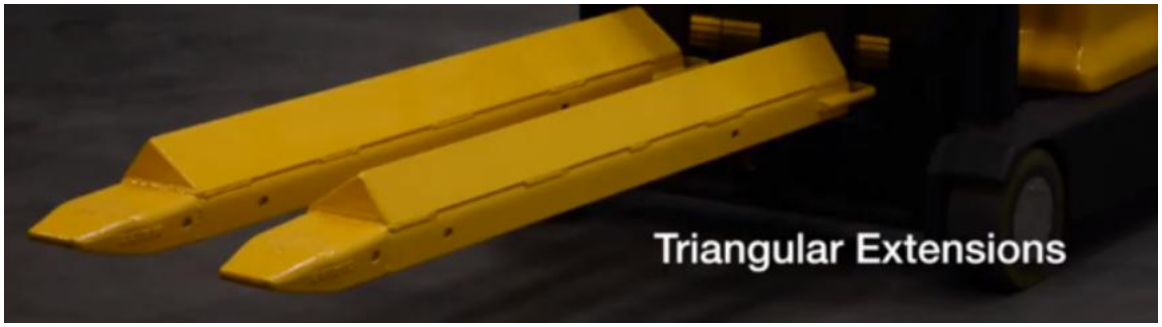
Example of use of lifting frame

- Slings can be used to lift exchanger form below, they must be used in conjunction with a spreader bar to prevent damage to the exchanger by the slings (as below). Also the exchanger must be protected (1) against supporting steelwork (2).



Spreader bar and slings in conjunction with packing and supporting steelwork

- Forklift truck can also be used either with or without triangular forklift extensions with suitable protection between the forks and the exchanger.



Triangular forklift extensions

5. STORAGE

Should it be required to store the products for any period of time prior to installation they should be stored:

- In a dry and appropriately ventilated internal location.
- With an ambient temperature between 0°C and +40°C and ambient relative humidity of 20% to 80%.
- Protected from impact, moisture, direct sunlight, dust, and corrosive substances.
- In a horizontal and even surface, in their original packaging or with a suitable cover.
- Secured in the shipped position and original packaging to prevent possible damage or injury.

Storage warning labels

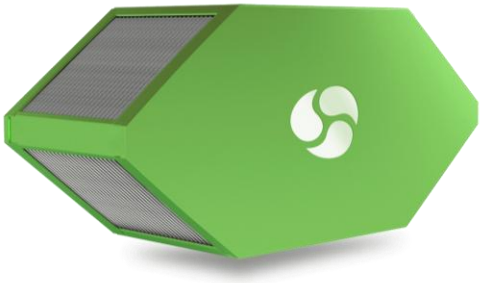
- During storage the equipment must be inspected on a regular basis and its packaging repaired if damaged.
- The products should never be stacked on top of each other even while in their original packaging.
- Loose items delivered with the product shall be stored safely from unauthorized access, damage and the weather.

> **!** **IMPORTANT:** Plate heat exchangers stored for long periods of time might suffer from surface discoloration caused by condensation formed within the packaging. ERI Corporation will not be liable for such defects. To avoid formation of condensation in the packaging inspect the products regularly and, if necessary, open the packaging sufficiently so that condensation can dry.

6. PRODUCT OVERVIEW

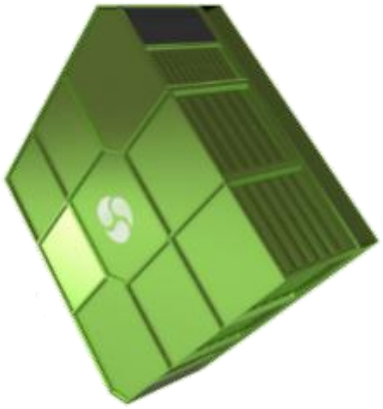
☛ Counter flow plate heat exchangers are available in 3 basic configurations:

- PCF residential and commercial applications
- PCF-I commercial and industrial applications with options for dampers
- PCF-N commercial and industrial applications with options for dampers and modular construction



PCF counter flow plate heat exchanger product

PCF-I counter flow plate heat exchanger product



PCF-N counter flow plate heat exchanger product

6.1. INTENDED USE AND OPERATING LIMITS

- PCFs manufactured by ERI Corporation are intended for installation in ventilation units or HVAC duct systems for comfort and process applications.
- Suitability of the product for any application must be considered for each project.
- The recommended operating limits for the product are as follows:

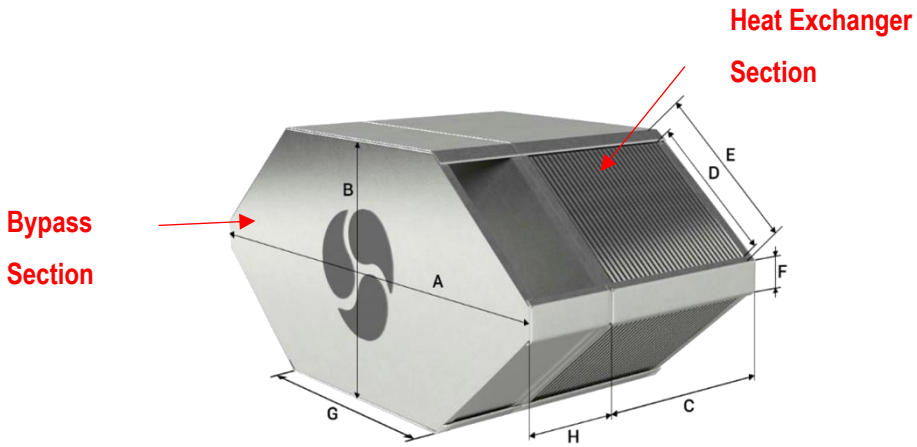
Ambient air temperature range (storage)	0˚C to +40˚C
Ambient air humidity range (storage)	20% to 80%
Inlet air operating temperature range	-40˚C to +90˚C
Frost protection may be required when outdoor temperature falls below approximately -4^{0}C or 2^{0}C on side where condensation occurs	
Additional sealing is recommended where high levels of condensation are expected (typically where extract air condition exceeds 13g/kg)	
Maximum operating pressure drop	400 Pa
Maximum operating pressure differential	1700 Pa

PLEASE NOTE: PCF's are bespoke products manufactured to the customers' specification. Operating limits might deviate from the values above. Always consult the product datasheet and project specification along with this manual.

6.2. COMPONENTS

6.2.1. EXCHANGER

The exchanger comprises a 'stack' of interlocked aluminium plates or lamella which form the heat exchange surface. The interlocking and assembly process separates the 2 air streams. The stack is encased in an aluminium casing. Casing and lamella can be coated in corrosion resistant coating or other types of coating to enhance performance.



Counter flow heat exchanger

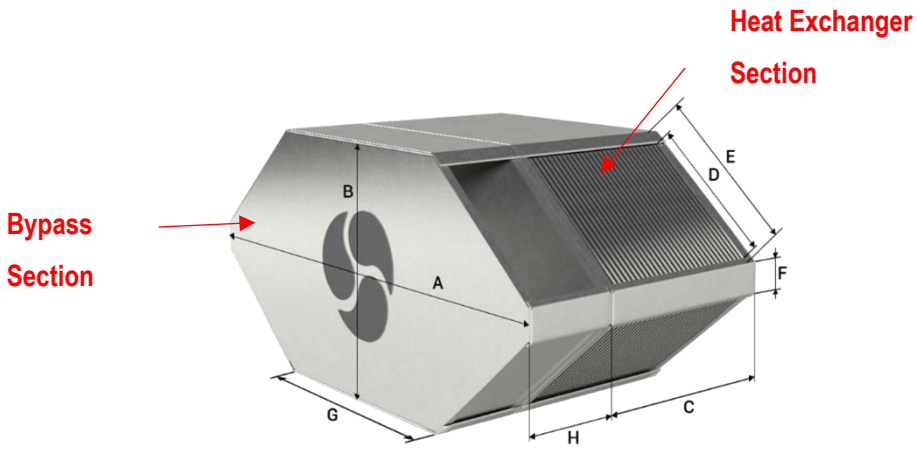
6.2.2. DIVIDER

For larger air volume flow rates 2 or more Exchangers can be joined together. Aluminium dividers are used to separate and guide the air into each exchanger. Dividers lamella can be coated in corrosion resistant coating

Counter flow heat exchanger with divider

6.2.3. BYPASS

To allow control of the heat exchanger an aluminium bypass maybe be fitted. This provides an alternative air path for one of the air streams to prevent or reduce heat recovery.



PCF counter flow heat exchanger with bypass

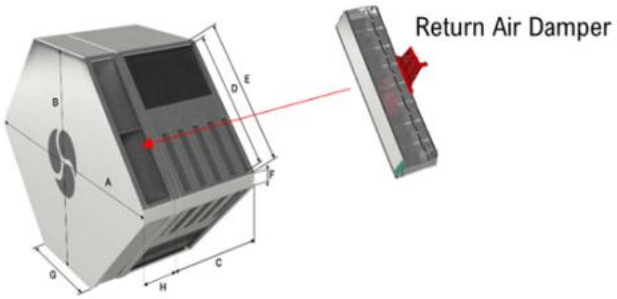
6.2.4. FACE AND BYPASS DAMPER

To control the proportion of air that passes through the heat exchanger and the bypass, aluminium face and bypass dampers can be fitted. Face and bypass dampers are formed from 2 or more joined damper sections with the blades for exchanger and bypass in opposite positions.

PCF-I counter flow heat exchanger with face and bypass damper

6.2.5. RECIRCULATION OR RETURN AIR DAMPER

For AHU designs where extract air could be recirculated directly back into the supply air stream an additional aluminium recirculation damper could be fitted.

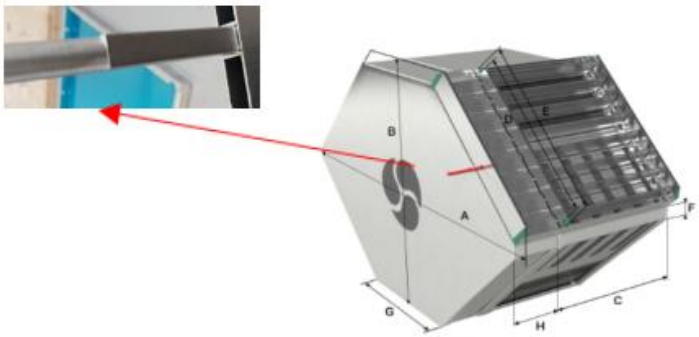


PCF-I counter flow heat exchanger with recirculation damper

6.2.6. DAMPER DRIVE SYSTEM

SHAFT OPTIONS

Face and bypass and recirculation dampers are equipped with one of various types of drive connection. Either a square or round drive shaft can be provided to the side of the damper.

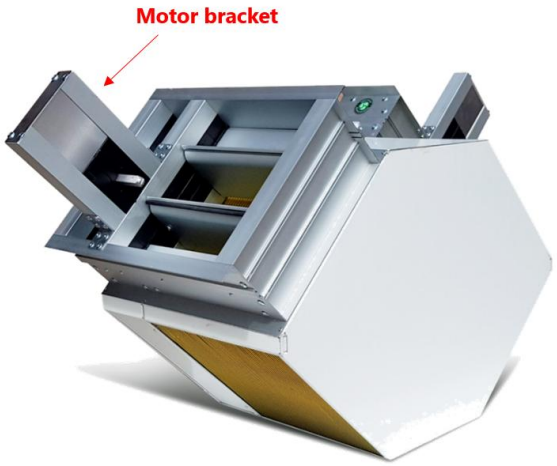


Round damper drive shaft options

Square damper drive shaft options

MOTOR BRACKET OPTIONS

An alternative to the side drive is to fit a face mounted motor / actuator bracket.



Type of motor bracket drive

6.2.7. PERFORMANCE TOLERANCE

Stated testing tolerances are based on the **Eurovent AAHE certification programme** when tested under the procedures, conditions and requirements of **standard EN308**

Test Criteria	Tolerance
Influence of pressure difference on pressure drop	+10% or at least 15Pa
Dry pressure drop at standard conditions	+10% or at least 15Pa
Temperature efficiency dry	-3%
Temperature efficiency wet	-5%
Air leakage	Max. 0.5% @ 250Pa

Testing tolerances for PCF heat exchangers

Note

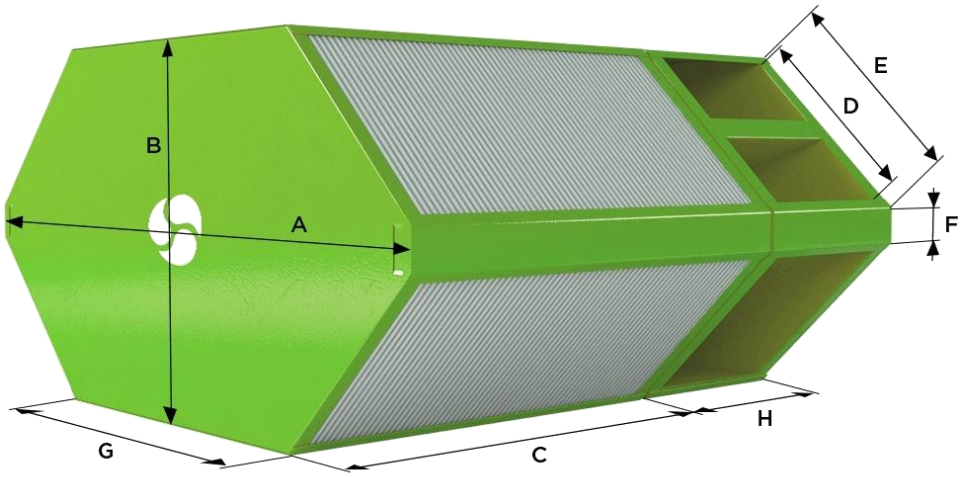
Any testing carried out under conditions deviating from those stated in EN308 are likely to yield results with larger tolerances than those stated above.

EN13053 states " it should be noted that the characteristics of a component or section when tested as a part of a complete air handling unit can be significantly different from those of the same component or section tested in ideal conditions as a stand-alone component"

7. TECHNICAL DATA

7.1. DIMENSIONAL DATA

The main dimensions that define a PCF heat exchanger model are illustrated below.



PCF heat exchanger dimensions

- Dimensions **A, B, D, E, F, G** are fixed and defined by the selected **model size.**
- **Dimension C** indicates the **width of the heat exchanger** and **Dimension H** the **width of bypass section**.
- Only **these two dimensions (C and H)** are variable and can be **specified manually in 1mm increments**.

The following table shows the overall dimensions for all available PCF models without dampers.

PLEASE NOTE: For overall dimensions including dampers please refer to our selection software or request detail drawings from your sales representative.

MODEL SIZE	A [mm]	B [mm]	D [mm]	E [mm]	F [mm]	G [mm]
18	397	172	90	106	22	248
25	454	230	131	147	22	248
30	496	271	160	176	22	248
35	537	312	189	205	22	248
45	619	394	247	263	22	248
55	700	477	305	321	22	248
62	758	534	346	362	22	248
65	774	550	352	368	30	254
80	899	674	440	456	30	254
95	1040	815	540	556	30	254
110	1182	959	641	657	30	254
124	1314	1089	734	750	30	254
140	PCF-I = 1600 PCF-N = 1607	PCF-I = 1376 PCF-N = 1352	PCF-I = 936 PCF-N = 939	PCF-I = 952 PCF-N = 955	30 0	254
180	PCF-I= 1887 PCF-N = 1886	PCF-I = 1662 PCF-N = 1632	PCF-I = 1139 PCF-N = 1137	PCF-I = 1155 PCF-N = 1153	30 0	254
220	PCF-I = 2165 PCF-N = 2170	PCF-I = 1945 PCF-N = 1920	PCF-I = 1337 PCF-N = 1341	PCF-I = 1353 PCF-N = 1357	30 0	254
248	2435	2180	1516	1540	0	254
270	2702	2448	1714	1730	0	254
330	3130	2880	2020	2036	0	254
372	3525	3270	2296	2312	0	254

PCF model dimensions

7.2. DAMPER TORQUE RATINGS

Use the following table for sizing of damper actuators (widths are up to, round to higher width).

MODEL	Overall Width in mm and Damper Surface Area (m^2)									
	250	500	750	1000	1200	1500	1750	2000	2250	2500
45	0,07	0,14	0,20	0,27	0,33	0,40	0,47	0,53	0,60	0,66
	5 Nm									
55	0,09	0,17	0,25	0,33	0,41	0,49	0,57	0,65	0,73	0,81
	5 Nm									
62	0,1	0,19	0,28	0,37	0,46	0,55	0,64	0,73	0,82	0,91
	5 Nm									
80	0,12	0,23	0,35	0,46	0,57	0,69	0,8	0,92	1,03	1,14
	5 Nm								10 Nm	
95	0,14	0,28	0,42	0,56	0,7	0,84	0,98	1,12	1,26	1,39
	5 Nm							10 Nm		
110	0,17	0,33	0,5	0,66	0,83	0,99	1,15	1,32	1,48	1,65
	5 Nm						10 Nm			
124	0,19	0,38	0,57	0,75	0,94	1,13	1,32	1,5	1,69	1,88
	5 Nm					10 Nm				
140	0,24	0,48	0,72	0,96	1,19	1,43	1,67	1,91	2,15	2,38
	5 Nm				10 Nm				20 Nm	
180	0,29	0,58	0,87	1,16	1,45	1,74	2,03	2,31	2,6	2,89
	5 Nm			10 Nm			20 Nm			
220	0,34	0,68	1,02	1,36	1,7	2,03	2,37	2,71	3,05	3,39
	5 Nm		10 Nm				20 Nm			
248	0,39	0,78	1,16	1,55	1,93	2,32	2,7	3,09	3,47	3,86
	5 Nm		10 Nm			20 Nm				
270	0,44	0,87	1,3	1,74	2,17	2,6	3,03	3,47	3,9	4,33
	2 x 5 Nm		2 x 5 Nm		2 x 10 Nm					2x20 Nm
330	0,51	1,02	1,53	2,04	2,55	3,06	3,57	4,07	4,58	5,09
	1 x 5 Nm & 1 x 10 Nm						1 x 10 Nm & 1 x 20 Nm			
372	0,58	1,16	1,74	2,32	2,89	3,47	4,05	4,63	5,21	5,78
	1 x 5 Nm & 1 x 10 Nm					1 x 10 Nm & 1 x 20 Nm				

Required actuator torque in function of Model Size and Overall Width (C+H)

8. ORDER CODE

CODE: PCF	I	3	140	750	GE	T	BP	140	C	CM	W	RM	DM3	HO

PRODUCT
Plate Counterflow Heat Exchanger

CONSTRUCTION TYPE
"Blank" - Standard (default)
I - Light Industrial
N - Heavy Industrial
R - Reverse
C - Customized

PLATE SPACING
2.1 - H=2.1 mm (default)
3 - H=3.0 mm
2.2A - H=2.2mm (Cust. Airmaster DK)

MODEL SIZE
Base: 18, 25, 30, 35, 45, 55, 62
Kombi: 65, 80, 95, 110, 124, 140, 180, 220, 248, 270, 330, 372

EXCHANGER WIDTH, mm
Min.: 18-62 = 50; **45-220 (I)** = 200; **140-220 (N)** = 250
Max.: 5000

MATERIAL OPTIONS
AL - Plain Aluminum Lamellas and Casing (default)
AC - Plain Aluminum Lamellas, Coated AL Casing
GE - Gold Epoxy AL Lamellas, Plain Aluminium Casing
GP - Gold Epoxy AL Lamellas, Coated AL Casing
GC - Gold Epoxy AL Lamellas, Coated AL Casing, Fully Protected
HB - Hydrophilic AL Lamellas, Plain Aluminium Casing, Adiabatic Cooling
HC - Antimicrobial AL Lamellas, Coated AL Casing, Fully Protected, Hygienic

GENERAL OPTIONS
T - Extra Inner Sealing, Leakage < 0,25% NAF@250Pa
P - Plastic Handle

BYPASS TYPE
BP - Fixed bypass (fixed to exchanger, cannot be removed)
BR - Loose bypass (separate part)

BYPASS WIDTH, mm
Min.: 18-62 (S) = 50; **45-220 (I)** = 110; **140-220 (N)** = 160
Max.: 1000

BYPASS POSITION
A - Bypass on the side is open on top-right
B - Bypass on the side is open on top-left
C - Bypass in the middle of the exchangers

BYPASS DAMPER (I AND N CONSTRUCTION ONLY)
SL - Damper w/ Side Shaft Left (BP A or BP B - Side)
SR - Damper w/ Side Shaft Right (BP A or BP B - Side)
SM - Damper w/ Actuator Mounting Bracket (BP A or BP B - Side)
CL - Damper w/ Side Shaft Left (BP C - Middle)
CR - Damper w/ Side Shaft Right (BP C - Middle)
CM - Damper w/ Actuator Mounting Bracket (BP C - Middle)

BYPASS DAMPER SHAFT/BRACKET OPTIONS (I AND N CONSTRUCTION ONLY)
N - Shaft square (default) SL/SR/CL/CR
R - Shaft round (optional) SL/SR/CL/CR
V - Damper Actuator Mounting Bracket, Regular, Square Shaft 12x12x90mm, L=55mm H=180mm, SM/CM [DP-01] (default if missing)
H - Damper Actuator Mounting Bracket, Compact, Square Shaft 12x12x90mm, L=55mm, H=100mm, SM/CM [DP-02]
W - Damper Actuator Mounting Bracket, Heavy, Weger, Square Shaft 12x12x135mm, L=100mm, H=100mm, SM/CM [DP-03]
D - Damper Actuator Mounting Bracket, Regular, Daikin, Square Shaft 12x12x145mm, L=110mm, H=180mm, SM/CM

RETURN AIR DAMPER (I AND N CONSTRUCTION ONLY)
RN - Return Air Damper w/ Side Shaft
RM - Return Air Damper w/ Actuator Bracket

DAMPER OPTIONS (I AND N CONSTRUCTION ONLY)
DM3 - Deicing damper 3 individual sections (1 bypass section, Position C) - with Motor Brackets
DS3 - Deicing damper 3 individual sections (1 bypass section, Position C) - with Side Shaft
DL3 - Deicing damper 3 individual sections (1 bypass section, Position C) - with Linkage System
DM5 - Deicing damper 5 individual sections (1 bypass section, Position C) - with Motor Brackets
DM5 - Deicing damper 5 individual sections (1 bypass section, Position C) - with Side Shaft
DL5 - Deicing damper 5 individual sections (1 bypass section, Position C) - with Linkage System
MET - All metal damper (without any plastic parts)
DC3 - Damper class 3 tightness (with spec.plastic parts) - Only for standard damper (NOT FOR ALL METAL)
OX - Damper anodized profiles (NOT FOR ALL METAL)

ASSEMBLY AND DELIVERY OPTIONS
HO - Horizontal assembly, Horizontal lamella orientation
UO - Delivery unassembled, in individual parts (Modular Style, PCF N Only)

9. MECHANICAL INSTALLATION

9.1. LOCATION

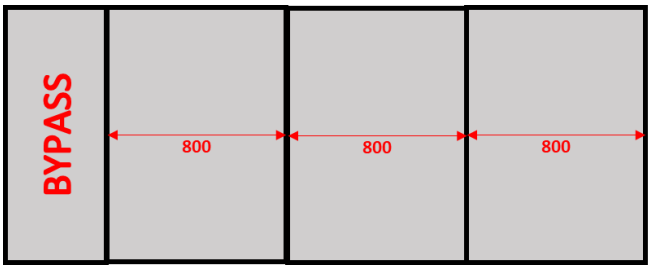
- The product is designed for installation into an appropriate AHU casing or ductwork system.
- The AHU casing internal dimensions should allow sufficient space for the installation of the product and maintenance access to each face of the exchanger.
- The product is suitable for handling clean filtered air.
- The suitability of the product for locations having a high level of pollutants and corrosive elements should be assessed for each project.
- We recommend easily removable access panels are installed on to all inlet and outlet faces.
- To facilitate major maintenance activities and future replacement, we recommend sufficient space is allowed to fully remove the plate heat exchanger from the side of the air handling unit. Typically, the AHU external width + 100mm should suffice but this should be adapted in accordance with the individual design of the AHU and the dimensions of the plate heat exchanger and the installation location. Where exchangers are supplied in smaller modules this removal space can be significantly reduced.
- Adequate illumination in the installation location should be provided by the end user to ensure maintenance can be carried out safely.
- For installations with potentially high levels of condensation (such as swimming pools) we recommend drain trays under both sides of the heat exchanger.
- For installations with heat exchange plates in horizontal orientation (parallel to the AHU floor) we recommend a drain pan on all sides of the exchanger where possible. If the exchanger includes dividers these should be open at the bottom of the exchanger where condensation is most likely

9.2. POSITIONING AND SUPPORT

- However installed the base of the exchanger should be fully supported.
- Larger exchangers are delivered in separate blocks to be installed in parallel by the customer. If any dampers and bypass sections are required those will also be delivered separately.

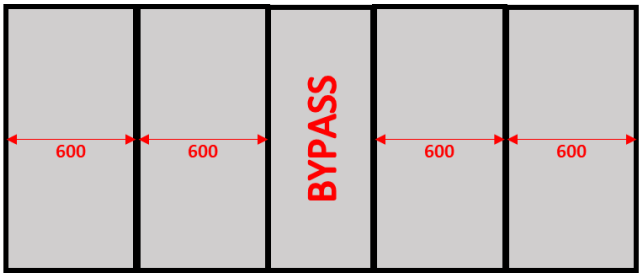
Exchangers delivered in multiple blocks

- Each block including any bypass or dampers must be sealed about its perimeter using sealant or sealing tape to prevent bypass and passage of moisture.
- For example a casing construction type Light Industrial (PCF-I) model with exchanger width dimension (C) of 2400mm, if the bypass is located on the side the exchanger will be divided into 3 blocks of 800mm.



- ***C = 2400mm, Side Bypass, 3 Blocks x 800mm***

- However, if the bypass is located in the middle/centre then the exchanger will be divided into 4 blocks of 600mm.



- ***2400mm, Central Bypass, 4 Blocks x 600mm***

☛ Recommended installation is with vertical plates to assist the removal of condensate.

Vertical installation

Horizontal installation

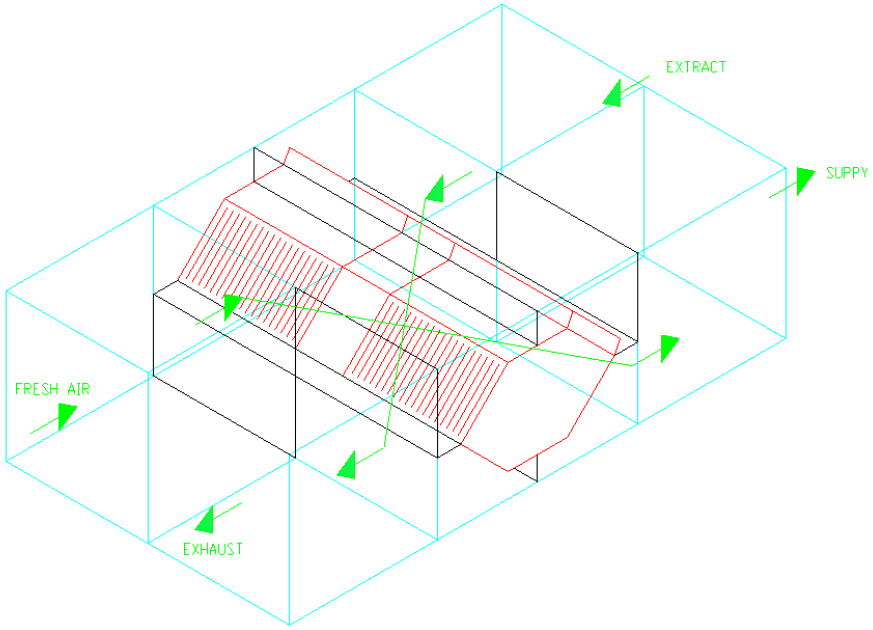
☛ Installing the heat exchanger with a horizontal lamella orientation (lamellas parallel to the floor of the AHU or ductwork) can lead to condensate being retained in the heat exchanger. This can increase pressure drop, the risk or freezing and the risk of water transfer between airflows.

☛ To avoid issues with horizontal installation please follow these recommendations:

- The maximum overall height (excluding bypass, flanges, etc; Dimension C only) must not exceed 2000mm for PCF-I and 3150mm for PCF-N.
- Any bypass section must be always on the top of the exchanger. Bypass in middle/central or the bottom position is not allowed.
- Where the exchanger includes dividers the bottom divider must be open at the cooled air outlet position to allow the flow of condensate (an AHU drawing should be provided to the ERI Engineering team prior to manufacture to ensure this).
- It is recommended the exchanger is installed in with a minimum inclination of 3 degrees in the direction of exhaust air outlet (condensation to drain by gravity towards exhaust air side).
- It is recommended a drain tray is installed under the complete exchanger or at all entry / exit points.
- Horizontal units should be produced with extra sealing option to provide a more rigid lamella construction and reduce potential for transfer of condensate between air flows.
- Maximum recommended size for horizontal installation is model 248.

- Dampers will be mounted as standard with vertical blades.

☛ An alternative installation solution for side-by-side air handling units with vertical plate orientation is shown below. This is a good option to assist condensation evacuation from the centre of the exchanger.



Installation of PCF counter flow plate heat exchanger in side by side AHU sections showing air flow and air dividing bulkheads

☛ Establish the weight of the product and make sure that the surface of installation (ceilings, walls, floors, etc..) will be adequate to support it.

! **IMPORTANT:** The PCF casing is designed to support the weight of the exchanger only. Do not support the weight of other items in the AHU or ductwork system on the PCF casing or dampers if installed.

9.3. MODULAR INSTALLATION

- Installation Option Modular (UO) means the exchanger will be delivered unassembled in individual parts (Heat exchanger modules + Dividers) ready for assembly by the customer.
- A separate guide is available offering further details of modular / unassembled installation.
- This is available only for exchangers of Casing Construction type Heavy Industrial (PCF-N).
- The exchangers are delivered in the following number of pieces.

Model Size	Number Kombi Modules	Number Divider Modules
140	2	2
180	2	2
220	2	2
248	2	2
270	3	6
330	3	6
372	3	6

Modular Installation number of pieces per Model Size

Modular Installation (UO) option

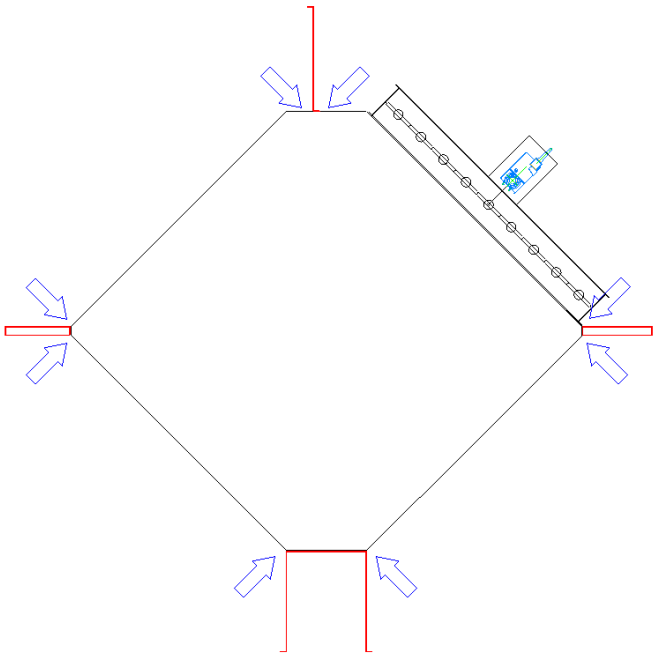
9.4. CONDENSATION AND FREEZING

- Due to the high efficiency of counterflow plate heat exchangers high amounts of moisture condensation can occur during operation. When the outside temperature is low enough, the exhaust air can be cooled significantly below its dew point and moisture will condensate in significant amounts.
- If the outside air is cold enough, the exhaust air can be cooled close or below the freezing point. This can also happen if the cold air volume is far in excess of the hot air volume (unbalanced airflow operation).
- If this happens for long periods, a frost layer will form on the exchanger lamellas which will lead to increased pressure drop. Left unattended this can ultimately lead to the failure of the exchanger, fans or the air handling unit casing.
- System designers should consider the requirements for defrost prior to manufacture and installation.
- For applications where significant levels or condensation are possible (such as swimming pools) drain trays are recommended on both sides of the heat exchanger.

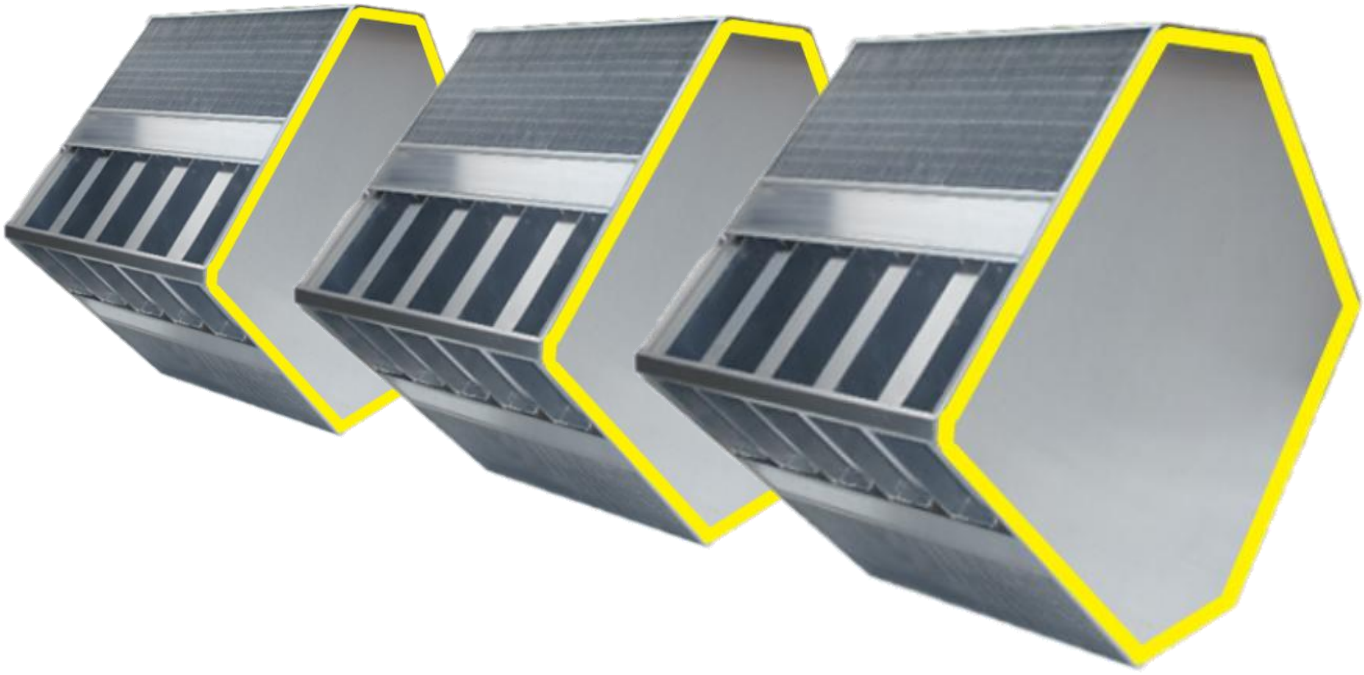
9.5. SEALING

- Exchangers up to 1000mm wide (for PCF and PCF-I) and 1050mm (for PCF-N) plus bypass can be supplied fully assembled with dampers already in place. This is determined during design stage of any project. These exchangers can be installed in the AHU in 1 piece and then sealed in place.
- The Plate Heat Exchanger and Bypass casing must be appropriately sealed against the AHU casing in order to avoid leakage.
- The recommended method is to seal the top, bottom, inlet and outlet Plate Heat Exchanger support framework against the exchanger using an appropriate sealant (e.g. silicone, sealing tape, sealing gasket).

! **DANGER:** Failing to appropriately seal the Plate Heat Exchanger Casing against the AHU can lead to significant amounts of air leakage between airflows which might be detrimental to IAQ and potentially dangerous in certain environments.



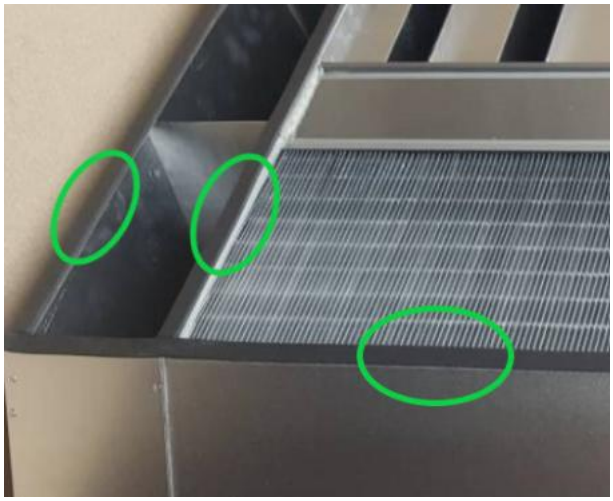
Suggested air seal locations in blue



Showing seal locations in yellow between heat exchanger sections, bypass sections and AHU front and rear face

9.6. FITTING OF DAMPERS

- The drive shaft for the damper is supplied not fitted (taped to the damper casing). The temporary shaft in the drive shaft location should be removed whilst holding the blade in position. The drive shaft can be inserted into the hole and damper blade (approximately 50mm) fixed in position with a self-tapping screw
- Plate heat exchanger and bypass casing is complete with 8mm, 15mm or 20mm flange dependant on the size of the exchanger. This frame is suitable for mounting the dampers.
- Damper over all frame size is manufactured to match the over all width and height of the assembled heat exchanger.
- It is recommended dampers are installed after installing the heat exchanger in the AHU.
- Sealing and installation material are not provided for standard heat exchanger installation. Materials required by the installer are standard parts such as self drilling screws, sealing tape (for example 3mm x x10mm) and sealant / glue (for example hybrid polymer Tekaflex MS40).



Sealing tape applied to exchanger and bypass

- Following application of the sealing tape to the exchanger frame the damper can be positioned on the exchanger. Prior to fixing it should be checked that the exchanger is fitted with equal diagonal and the blades rotate freely.
- A minimum number of self tapping screws should be used to hold the exchanger in place. One screw at each corner of the bypass and exchanger drilled into the edge of the exchanger frame outer corners is sufficient as shown below.

Self tapping screws in each corner of exchanger and bypass

Possible location of external brackets to hold damper in place

☛ If access to the exchanger corners is difficult it is acceptable to hold the damper in position against the exchanger face with external brackets fixed to AHU casing (for example in positions above).

9.7. FILTRATION

- EN13053 recommends minimum ISO ePM10 ⩾ 50% on fresh air side, ISO ePM2,5 ⩾ 50% on extract air side.
- ERI recommends minimum ISO Coarse ⩾ 60% to protect rotor from heavy dust.

10. FIRST USE

10.1. BEFORE STARTING THE AHU

Check:

- Whether damper rotates freely by turning the drive shaft using a suitable tool (before connection of damper actuators).
- Whether adequate and sufficient service access is available.
- Whether the PCF is properly secured to its supporting structure (air handling unit framework).
- Whether the PCF is properly sealed to the AHU casing.
- Whether adequate condensation collection and disposal devices are in place.
- Whether any tools or other objects such as packaging have been left inside or adjacent to the product and might obstruct its free movement or passage of air.
- Whether appropriate filtration is in place.

11. MAINTENANCE

11.1. MAINTENANCE SCHEDULE

- The recommended maintenance schedule is detailed below. These maintenance intervals should be adapted based on operating conditions and observations from regular inspection

Item	Maintenance Interval	Recommended Maintenance
Casing	6 months	Check for cleanliness and corrosion. Clean and remove corrosion as necessary (see 11.2)
Exchanger	6 months	Check for cleanliness and damage. Clean as necessary, minor impact damage may be repaired (see 11.2)
Damper	6 months	Check for cleanliness and rotation. Check for wear on cogs and plastic fittings Clean as necessary, if rotation is impaired or excessive wear observed damper should be repaired or replaced

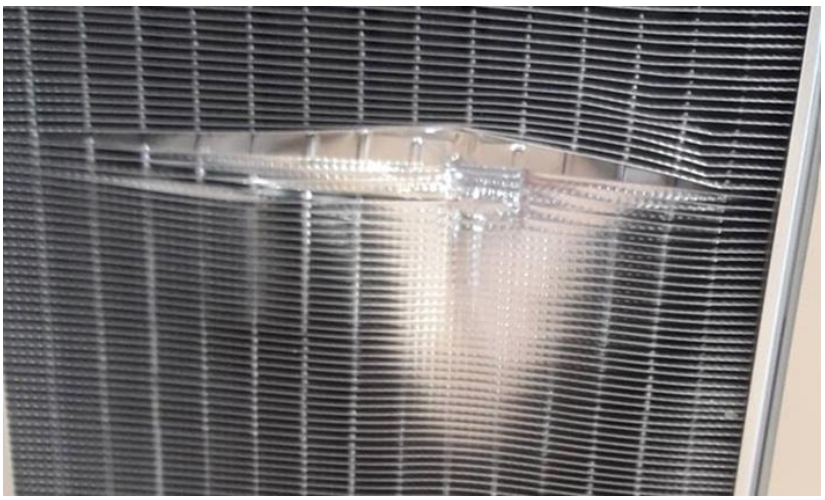
11.2. MAINTENANCE OF THE PCF

CLEANING

- A high level of filtration will prevent deposits of dust on the heat exchanger surfaces.
- All exchanger surfaces can be cleaned with a mild liquid soap solution which should be rinsed off with clean water.
- Do not direct high pressure jet spray directly on heat exchanger surface as this can cause damage.

MINOR REPAIR TO EXCHANGER PLATES / LAMELLA

- Any impact damage to the heat exchanger surface such as shown below could create additional air leakage between the air streams. ERI recommend the replacement of the exchanger should this occur.



Impact damage to heat exchanger surface

☛ It may be possible to make a cosmetic repair using wide jaw pliers. Repairs should be gradual, using pliers to carefully re shape the damage.

Wide nose pliers for cosmetic repair (replacement exchanger recommended)

DANGER: Before and during maintenance and/or repairs, the AHU must be disconnected from the power supply. Do not perform repairs if you aren't sure of the exact procedure.

12. TROUBLESHOOTING

- Plate heat exchangers are largely maintenance free and are unlikely to offer performance issues during their working life.
- Increase in pressure drop through the device could be as a result of a blockage, turbulent air flow upstream of the device or due to high static pressure in the AHU at the plate heat exchanger location which can cause deformation to the heat exchanger plates.
- No commercial ventilation plate heat exchanger is 100% air sealed, therefore a small amount of condensation leakage across the plates is possible. The exchanger should be installed with a slope to assist in the evacuation of moisture and air flow direction should be arranged to further help remove moisture. If this is not the case or high levels of condensation exist then installing drain trays to collect moisture at both sides of the exchanger will be necessary.

PLEASE NOTE: To facilitate the troubleshooting procedure please have the following data handy before contacting ERI Corporation:

- Detailed description of problem experienced
- Project reference
- Equipment type and model
- Serial number of the equipment (can be found on the manufacturing label)
- A description or schematic of the mechanical and electrical installation or AHU drawing accompanied by a photographic record if possible
- A detailed description of the fault and procedures attempted to solve it
- Commissioning report for the system showing flow rates and static pressured at the heat exchanger location

13. LIFE EXPECTANCY

- The estimated average plate heat exchanger lifetime is 15 years when maintained in accordance with the instructions in this manual.
- Life expectancy of the product is provided as a guideline and applicable only where the product is maintained in accordance with the instructions in this manual. Actual life expectancy is subject to the conditions of installation, regular maintenance and the environmental conditions on site

14. SPARES

- Spare parts are not supplied with the product unless ordered.
- There are no spare parts associated with the heat exchanger itself, spares for dampers are also generally not required.

PLEASE NOTE: The use of spare or replacement parts not approved by ERI Corporation might result in the warranty being invalidated.

15. DISPOSAL

- Please ensure the equipment is turned off before beginning the disposal procedure.
- The equipment is manufactured from aluminium which is widely recycled. There is a small amount of sealant and glue inside the exchanger and plastic parts within the dampers which can be sent with the for recycling and removed during fragmentation if necessary
- All materials must be disposed of in accordance with applicable local regulations.

16. WARRANTY

- Basic troubleshooting shall be carried out by the customer before attempting to make a warranty claim. Proof of the attempted troubleshooting procedures shall be provided when submitting the claim.
- Any claim for warranty must be complete with records of installation, commissioning, and maintenance.
- When the customer is unable to provide such records or it is deemed that the product was incorrectly installed, operated, maintained or otherwise misused or modified without prior agreement, ERI Corporation reserves the right to invalidate the warranty.

APPENDIX I – PERIODIC MAINTENANCE RECORD

PLATE HEAT EXCHANGER
PERIODIC MAINTENANCE RECORD

Engineer(s): _____ **Site:** _____

Company: _____ **AHU ID:** _____

Date: _____ **PCF ID:** _____

Item	Interval	Recommended maintenance	Date(s)/Signature
Casing	6 months	Check for cleanliness. Clean as necessary and remove any soap deposits	
Exchanger	6 months	Check for cleanliness. Clean as necessary and remove any soap deposits	
Damper	6 months	Check for cleanliness. Clean as necessary and remove any soap deposits. Check for wear on cogs and plastic fittings	

Notes

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