

Ameridex Plate Exchangers

P.O. Box 237
145 County Road 309
Bryant, Alabama 35958
(256) 597-3360 (Voice)
(256) 597-3358 (Fax)

Operation & Maintenance Manual

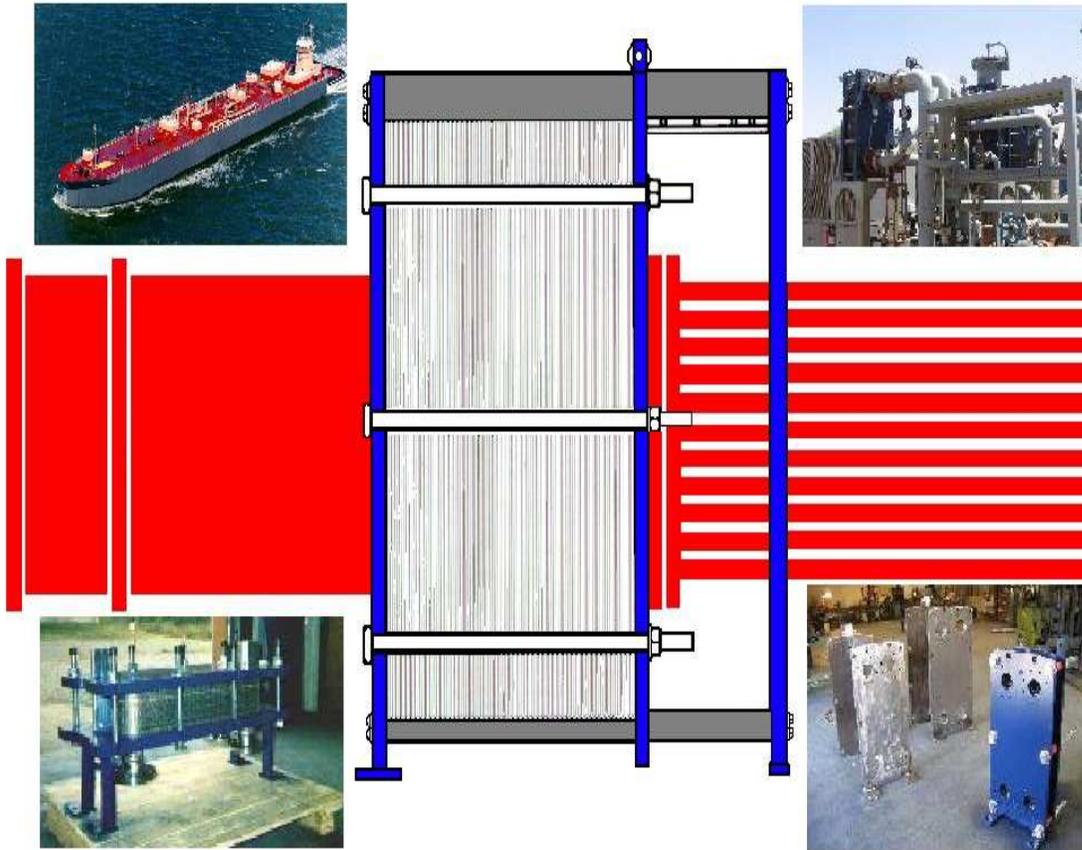


TABLE OF CONTENTS

EXCHANGER TYPE and LOG	2	START-UP and OPERATION	10
FOREWARD	3	Working Pressure.....	10
INTRODUCTION	3	Pump Activation.....	10
SAFETY NOTIFICATIONS	3	Pressure Pulsations and Vibrations.....	10
CONSTRUCTION and FUNCTION	4	Leakage During Start-Up.....	10
Design and Function of Ameridex Plate Heat Exchangers.....	4	Airing.....	10
The Plate Pack.....	4	Pressure Rise and Change of Temperature.....	11
Intermediate Frames.....	4	Leakage During Operation.....	11
The Plates.....	5	OPENING and ASSEMBLING	11
Heat Transfer Plate Portholes.....	5	Drained.....	11
Changing Plates.....	5	Without Pressure and Cooled.....	11
DRAWING, DIAGRAM & NAME PLATE	6	Opening and Dismounting.....	11
Assembly Drawing.....	6	Mounting and Assembling.....	12
Placing of Connections.....	6	CLEANING	12
Name Plate.....	6	Manual Cleaning.....	12
GASKETS	7	CIP Cleaning.....	13
Construction.....	7	Cleaning Materials.....	13
Adhesive.....	8	Reasons for Insufficient Cleaning.....	13
Detergent.....	8	FAULT LOCATIONS	14
Applying Adhesive.....	8	Reduced Capacity.....	14
Adhesive Drying Time Table.....	8	External Leakage.....	14
INSTALLATION of PLATE EXCHANGER	9	Internal Leakage.....	14
Space Requirements.....	9	REBUILDING and SPARE PARTS	15
Pipe Installation.....	9	PARTS & SERVICE	15
Tightening.....	9	RECEIPT OF PHE	16
		UNPACKAGING THE PHE.....	16
		STANDING UNIT UP.....	17
		MULTIPLE UNITS PACKAGED TOGETHER.....	17
		PHE STORAGE.....	18
		NOTES.....	19

EXCHANGER TYPE & LOG

MODEL	SERIAL #	# OF PLATES	PLATE MATERIAL	MISC.

*In the chart provided above, please input all pertinent information in regards to you Plate Heat Exchanger (Referred to as **PHE** form here on)*

Please refer to the *Drawing and Serial # Name Plate* section for information on where to obtain this information.

Please have this information available when contacting Ameridex Plate Exchangers in regard to your PHE unit(s).

FOREWORD

Thank you for your purchase of an Ameridex Plate Exchangers Plate & Frame type heat exchangers.

This manual will cover the operation and maintenance of your Ameridex Plate Exchanger supplied Plate Heat Exchanger (PHE). Ameridex recommends that all responsible for the installation, use and maintenance of the PHE carefully read the manual before working with the product.

INTRODUCTION

The contents of this manual are applicable to all PHE manufactured and sold by Ameridex Plate Exchangers.

- All Ameridex plate and frame type heat exchangers are designed and built in accordance with the operating specifications supplied by the customer. These specifications include, but are not limited to, the following:
 - Capacity
 - Temperatures
 - Fluid Types
 - Pressures
- Any operation of the exchanger outside of the designed specifications can damage the exchanger.
- Special care must be taken during start-up and shut-down of system to prevent extreme pressure spikes that can damage the exchanger.

SAFETY NOTIFICATIONS

Proper care and safety precautions must be observed at all times when installing, operating or performing maintenance on the exchanger. Please note incidents of the following symbol when it appears in this manual. It denotes what precaution and safety measures must be taken when interacting with the exchanger.



Please note that Ameridex can not be held responsible for damage due to the improper installation, operation or maintenance of the exchanger. Furthermore, Ameridex can not be held liable for injury from same and/or not following the proper safety and safety equipment guidelines.

CONSTRUCTION AND FUNCTION

DESIGN AND FUNCTION OF AMERIDEX PLATE HEAT EXCHANGERS

As the name indicates, your plate and frame heat exchanger utilizes a frame to hold and compress a varying number of heat transfer plates. The individual parts of the frame are as follows: (Fig. 1)

- Front Cover
- Rear Cover
- Stanchion
- Carry Bar
- Guide Bar
- Clamping Bolts

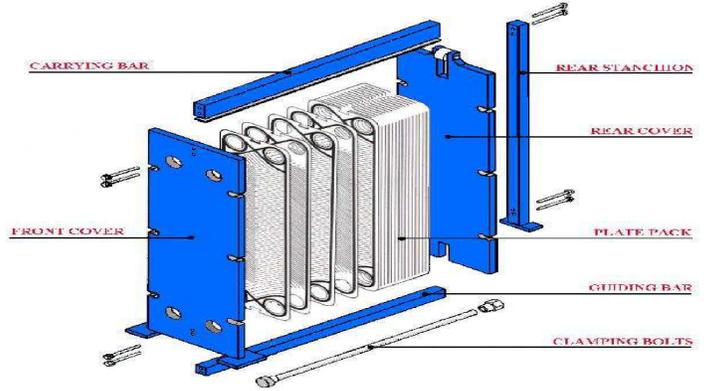


Fig. 1

Each heat transfer plate is supplied with a gasket affixed, so that the plates form a closed system of parallel flow channels. It is through these channels which the medias flow alternating at every second interval.

The gaskets are attached to the plate either through the utilization of adhesive or the “Ameri-Snap” snap in gasket system. These gaskets provide the isolation of the medias from the atmosphere. In order to separate the medias, the plates are double gasketed around the interior of the inlet portholes with intermediate drain areas designed into the gaskets.

Every second plate in the pack must be turned 180 Deg. So that the plates form a closed system of parallel flow channels through which the medias flow alternately at every second interval. (Fig. 2)

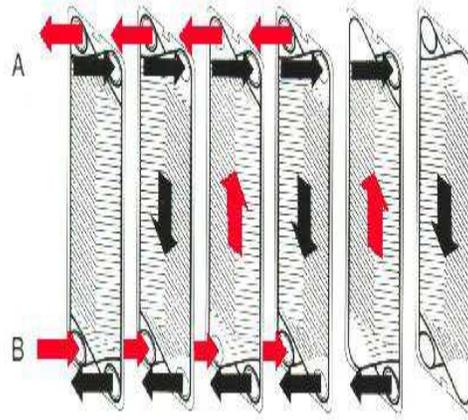


Fig. 2

INTERMEDIATE FRAMES

If the PHE works with several medias at the same time, it can be necessary to insert intermediate frames. The intermediate frames are equipped with corner blocks which form connections between the different sections. Two connections can be placed in the same corner block which will connect to two different sections in the PHE. (Fig. 3)

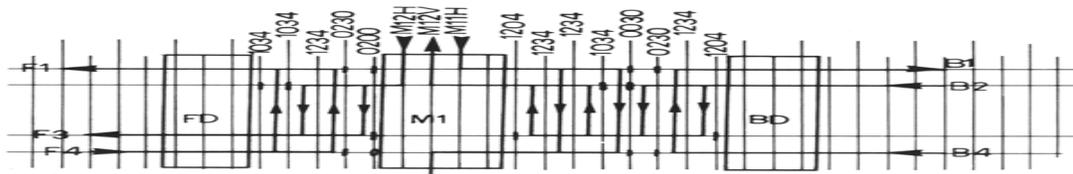


Fig. 3

THE PLATES

Ameridex heat transfer plates are designed so that they may be utilized as either right or left plates simply by turning the plate 180 Degrees.

On a right plate, the flow runs from porthole #2 to porthole #3 or the reverse - porthole #3 to porthole #2. On a left hand plate, the flow runs from porthole #1 to porthole #4 or the reverse - porthole #4 to porthole #1. (Fig. 4)

HEAT TRANSFER PORTHOLES

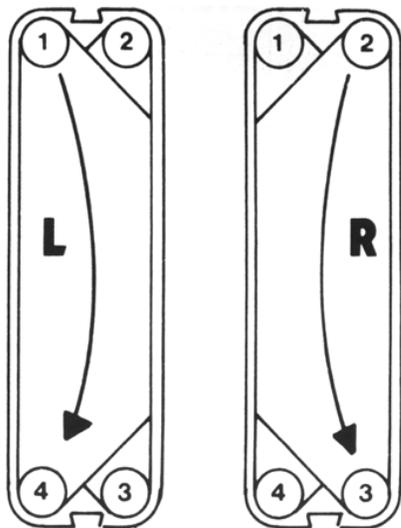


Fig. 4

Depending upon the desired liquid flow within the PHE, the four corner portholes must be open. These portholes are numbered 1-4 beginning with the upper left hand side of the plate and run in clockwise order as seen on the gasketed side of the plate. (Fig. 4)

As can be seen in the diagram drawing, the portholes are open and demonstrates the liquid flow in the PHE. (Fig. 3)

Code is used to describe which portholes are open and which are closed. For example, code 1234 denotes that all portholes are open while code 0204 denotes that only porthole 2 and porthole 4 are open, while porthole 1 and porthole 3 are closed.

CHANGING PLATES *

The changing and mounting of new plates may be done after disconnection of the PHE from the media source(s) and removal of the clamping bolts. Before mounting spare plates be sure to check the plates are identical to those which you want changed. A reduction of the number of plates can be made, but note that plates must be removed two (2) by two (2) so that the plate pack, after reduction, is still mounted by plates which turn right and left. The plates which are removed must have all four (4) ports open. It is necessary to correct the minimum tightening dimension after either an increase or a reduction in the number of plates. **

** Note : Please refer to the Opening & Assembly section of this manual for instructions and precautions necessary when changing plates.*

*** Note : A reduction in the number of plates means the transmission area of the PHE is reduced corresponding to the plates being removed. A removal of plates will cause a rise in the pressure drop over the PHE.*



When handling plates, protective gloves must always be worn. All plates, independent of thickness and material, have extremely sharp edges.

Always handle plates from the sides and with two hands. Never grab a plate through the portholes or the top angular edges. This will protect the individual working with the plate(s) as well as insure no damage to the plate(s) and/or gasket(s).

DRAWINGS, DIAGRAMS & NAME PLATE

The assembly drawing indicates various dimensions of the PHE. This includes, but is not limited to, height, width, length and connections. (Fig. 5) (Please note that the connection types are indicated on the upper right hand side of the drawing and may differ from the connection type specifically shown on the illustration.)

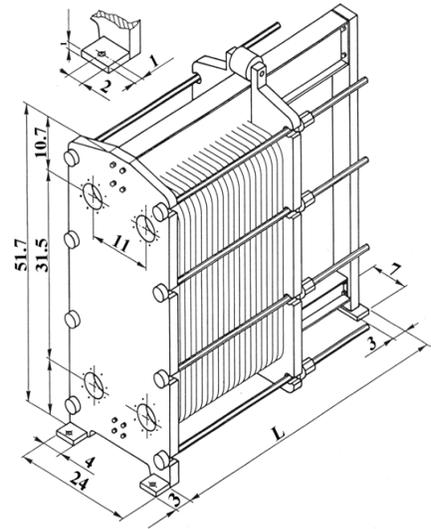


Fig. 5

PLACING OF CONNECTIONS

On the symmetrical drawing under the flow diagram, the placing of the connections is shown. (Fig. 6) The dot and dash intermediate frames are drawn according to the number of intermediate frames in the PHE. The connections are marked with a code consisting of letters and numbers.

Example:

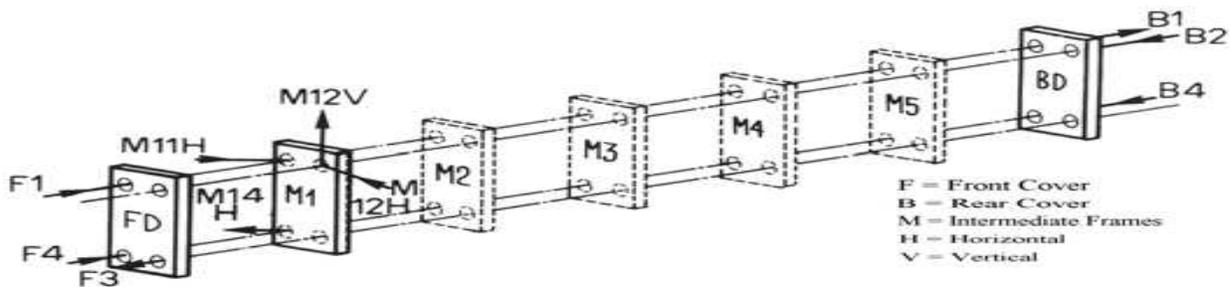
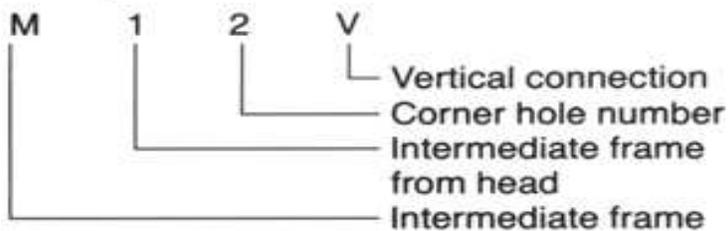


Fig. 6

NAME PLATE

Located on the front cover of the PHE is a name plate, which is stamped with important information concerning the PHE. (Fig. 7) (Actual name plate on unit may vary from the included example.)

Certain model PHE feature smaller name plates which show only the unit serial number. For these units, it is important to contact Ameridex directly for tightening information, etc.

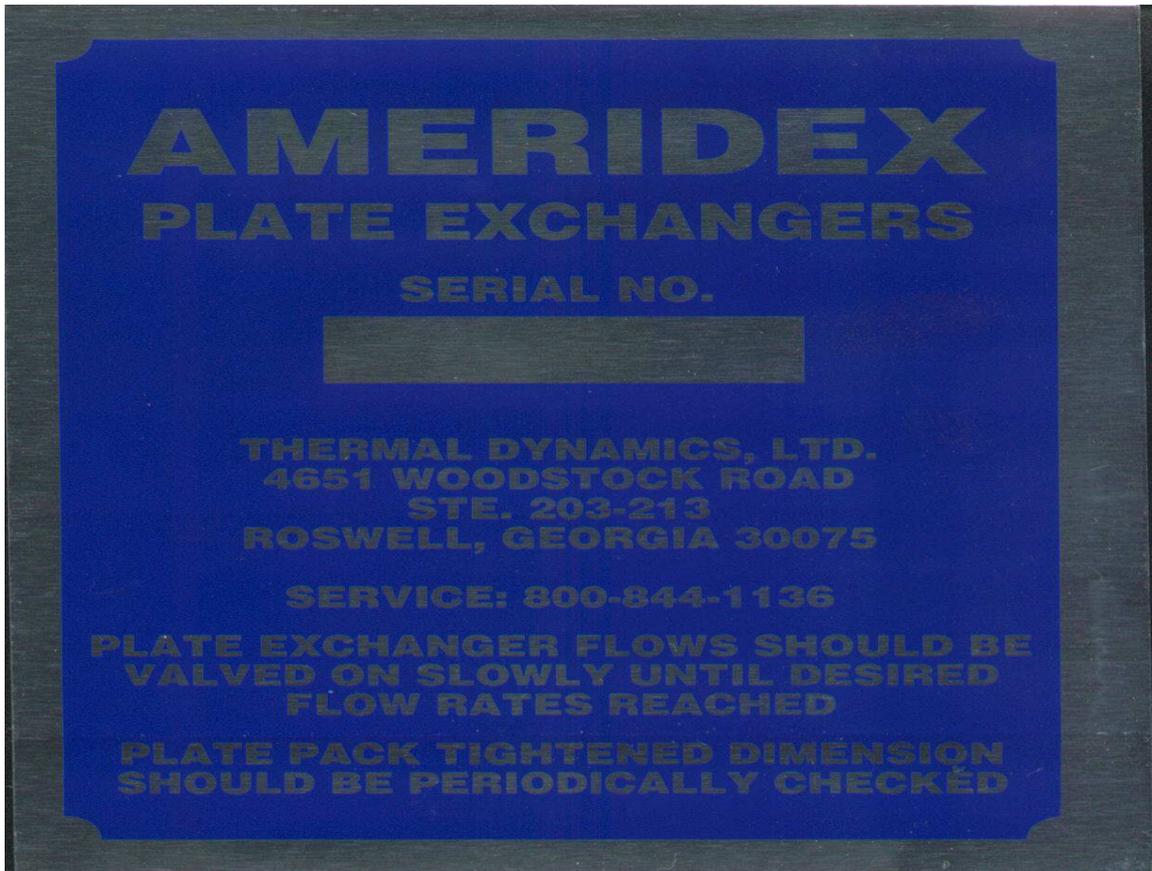


Fig. 7 **

*** Note : Actual name plate may vary from example shown above*

GASKETS

CONSTRUCTION

The PHE contains two (2) types of gaskets. (Fig. 8) The plate which immediately follows the front cover (and the intermediate cover, if applicable) is called a “start plate” and contains a “start gasket”. All other plates in the PHE contain a “flow gasket”. A start gasket is made by combining two (2) port ringed gaskets. Therefore, should re-gasketing become necessary for a PHE, notation of the gasket lay-out must be made before removing nit for replacement.

The above holds true independent of the type of gaskets you PHE is equipped with.

Ameri-Snap : Hanging type gaskets.

Adhesive : Gaskets are held in place by industrial adhesive.

FLOW START



Fig. 8

ADHESIVE

Scotch grip 1099 blastomeric is a nitrile rubber adhesive on a soluble basis (25% solid materials). It is partly thermoplastic to allow the old gasket to be removed from the plates by heating them in boiling them in hot water.



Adhesives can be toxic. Please follow all safety guidelines supplied by the products manufacturer. Wear all safety equipment necessary to avoid ingestion of adhesive, as well as contact with adhesive on skin or in eyes.

DETERGENT

ACETONE should be used for the cleaning and degreasing of new gaskets and the gasket groves on the plates to which the gaskets will be applied. It is very important that all detergents have evaporated before applying the adhesive.



Solvents can be dangerous if inhaled. Make sure to take all necessary precautions and follow all safety guidelines supplied by the products manufacturer.

APPLYING ADHESIVE

For best results, a flat, solid and level surface large enough to support the total area of the plates being gasketed should be repaired. A table or workbench should suffice. Make sure it is clean and free of any obstructions.

The first step in applying adhesive is to prepare the surface to which it will be applied. The area must be free of fingerprints, debris, etc. Wipe both the gasket and the gasket groove with a cloth which has been saturated with an approved industrial degreaser. A small brush should be used to apply a thin coating of adhesive to the back of each gasket. Place the gaskets flat, adhesive side up, in a clean moisture free area to allow drying to occur.

Next, apply a thin uniform coating of adhesive in the gasket groove on the plate. The adhesive should first be applied to the curved edges of the gasket groove and then continue along the straight edges. Take care to insure excessive amounts of adhesive are not present. When gasket is seated, no adhesive should be visible around the edges. In instances where excess is present, solvent may be used to wipe away excess after the adhesive has had the proper time to cure.

After applying adhesive in the gasket groove, seat the gasket in the groove and apply equal amounts of pressure along the whole area of the gasket. Once the gaskets are properly pressed into place, the plates should be carefully stacked, assuring that the pressure is equally distributed across the area of each plate. Allow adequate time for the adhesive to dry. (Chart 1)

Upon completion, the plates are once again hung into the frame and the PHE closed. (Please refer to Opening and Assembly section of this manual)

Temperature Range	Drying Time
194-212 Deg. F (80-100 Deg. C)	2 Hours
100-190 Deg. F (40-50 Deg. C)	24 Hours
Normal Room Temperature	48 Hours

CHART 1

INSTALLATION OF THE PLATE AND FRAME EXCHANGER

There are three important factors to consider when planning the installation of a PHE.

SPACE REQUIREMENTS

The plate exchanger requires enough space so that it may be opened for inspection and repairs without problem. (Fig. 9) It is necessary for the plates and the clamping bolts to have enough space so that they may be opened and closed without problem. The rear cover must be pulled back to the stanchion before opening for service can be easily completed. (Fig. 10)

PIPE INSTALLATION

In order to make the PHE yield the specific duty, the pipe installation must be mounted according to the included diagram. The pipe installation must be configured so that the rubber liners, if used in the studded ports, may be removed.

Also, the connection must be mounted in such a manner as to prevent the PHE from being overloaded as well as being flexible enough as to allow extra tightening of the unit to be possible.

TIGHTENING

Your PHE should be checked for loosening of the clamping bolts before being put into operation. Slight loosening of the bolts can occur during shipping as the plates and gaskets take a set position.

All bolts must be securely in place before initial operation of the PHE and that the unit is routinely checked for any loosening of the bolts during the initial month of operation.



Severe harm and/or injury can result from operation of PHE not secured to the proper tightening dimension.



To prevent harm and/or injury during working on PHE, use only correctly sized tools and equipment. Proper safety equipment must also be used

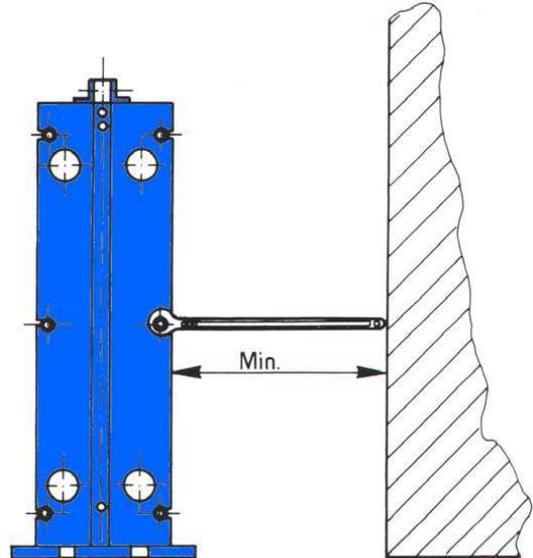


Fig.9

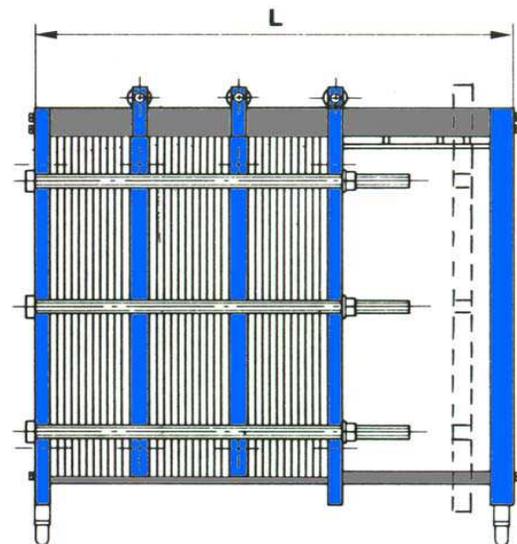


Fig. 10

START-UP & OPERATION

When starting up your PHE the following key points must be observed :

- Working Pressure
- Pump Activation
- Pressure Pulsation and Vibration
- Leakage During Start-Up
- Airing
- Pressure Rise and Change Of Temperature
- Leakage During Operation
- Longer Working Pauses

WORKING PRESSURE

The maximum working pressure of you PHE is included in the design parameter data sheet. It will also be indicated on the name plate included on the front of the unit. (Fig. 7) Operating the unit in excess of this pressure can result in severe damage to the unit.

PUMP ACTIVATION

When starting the pumps, the valves to the PHE must be closed. After the pump has been started, opening of the valves must be carefully monitored in order to avoid liquid and/or pressure shock from pressures in excess of the unit's tolerance.

PRESSURE PULSATIONS AND VIBRATIONS

No pressure pulsations or vibrations are to be transferred from the pumps or other equipment to the PHE. Transfer of said can result in fatigue fractures in the plates located within the unit. **

*** Note : Ameridex manufactured PHE carrying OSHPD Certification are built with greater tolerance against vibration but are can still suffer fracturing from constant and/or excessive conditions. Please refer to the unit's certification for exact tolerances.*

LEAKAGE DURING START-UP

Leakage during start-up of PHE can arise. This stops when both the gaskets and the plates have obtained running temperature and when pressure has been equalized throughout the entire unit.

If leakage does not cease under these conditions, please check for correct tightening dimension and possible plate damage resulting from shipping.

Please refer to Un-packaging and Inspection section of this manual for specifics on inspection of unit upon receipt.

AIRING

Air in the PHE reduces the heat transmission and increases the pressure drop. Therefore, the PHE must be vented to remove all excess air.

PRESSURE RISE AND CHANGE OF TEMPERATURE

During operation, pressure and temperature across the PHE must be controlled continuously. A rising pressure drop and/or a falling heat transmission indicates that some scaling has deposited on the plates. This scaling must be removed.

Please refer to the Cleaning section for explanation of removal of scaling.

LEAKAGE DURING OPERATION

Refer to Fault Location section

OPENING AND ASSEMBLY

- The unit must be drained
- There must be no pressure and the PHE must be allowed to cool
- Opening and Dismounting
- Mounting and Assembly

When opening and assembling the PHE it is important to carefully observe the following items :

DRAINED

The PHE must be drained of all media before opening. Small amounts of media residue may remain in the unit, unless the unit is flushed and pumped out, which will result in some media spillage underneath the unit when opened.



Make sure to take all necessary safety precautions based on the medias used within the PHE. The correct safety equipment and media containers must be used, prepared and in place before opening the unit to protect personnel, facilities and equipment.

WITHOUT PRESSURE AND COOLED

Before opening the PHE be sure that there is no pressure in it and the temperature has cooled to a minimum of 90 Degrees F (35 Deg. C). If the unit is opened with a temperature greater than 90 Degrees F, the gaskets may come loose from the plates.



Attempting to open a PHE while under pressure can result in severe harm and/or injury.

Scalding and/or burns can result from media temperature in excess of 140 Deg. F.

OPENING AND DISMOUNTING

When opening your PHE, all clamping bolts must be loosened equally and the rear cover pulled back towards the back cover. (Fig. 10)



For PHE units mounted in ships, the rear cover must be fastened to the rear stanchion to ensure it does not move forward suddenly due to the rocking of the vessel. Failure to do so can result in severe harm and/or injury.

MOUNTING AND ASSEMBLY

All plates and gaskets must be inspected carefully before being mounted in the PHE. Plates should be clean and free of any and all debris. Gaskets must also be clean and free of debris and excess adhesive. A particle as small as a grain of sand has the potential to cause leakage during unit operation and can result in damage to plates and/or gaskets.

Plates should be replaced in the exact opposite sequence from removal, beginning with the start plate. For a standard pass PHE, the gaskets must always face towards the front cover of the unit. (For dual section model exchangers, please refer to the Parts and Service Contact section to contact Ameridex for assistance before proceeding).

Please note that for new PHE units or units with new gaskets, the unit is assembled according to the measure stated on the name plate ± 0.1 mm per plate.

During assembly, the front and rear covers must be parallel. It is therefore necessary to measure the assembling dimensions on both side of the PHE at the top, middle and bottom to assure this occurrence.

(Fig. 12)

CLEANING

Both the capacity and the corrosion resistance of the PHE are greatly influence by the cleanliness of the unit. To combat factors that can hinder the performance of the PHE, certain measures can be taken :

- Manual Cleaning
- Cleaning in Place (CIP Cleaning)
- Cleaning Materials
- Control of cleaning



Regardless of the method used to clean the PHE, always use proper safety equipment to prevent injury and/or harm.

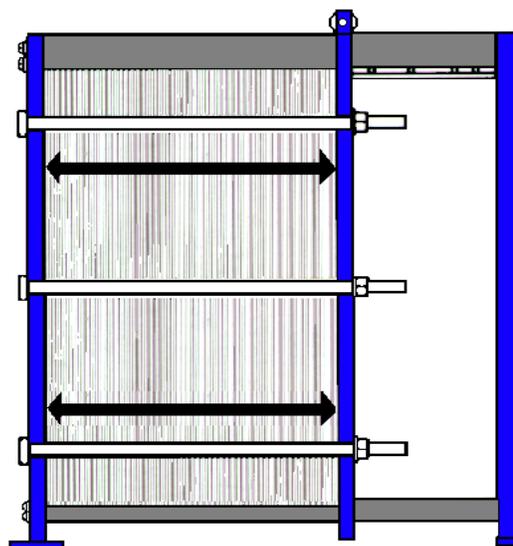


Fig. 12

MANUAL CLEANING

Open the PHE as outlined in the “Opening & Assembly” section of this manual. Carefully separate the plates and remove them from the exchanger. Use a soft bristled brush and cleaner safe for material type of your plates.

Never use the following to clean the PHE plates:

Wire Brush

Sandpaper

Metal scraper

Plates or gaskets (regardless of material make-up) can be severely damaged or destroyed if cleaned improperly.

High pressure cleaning of the plates may be utilized after the gaskets have been removed to prevent damage and abrasives are not added.

CIP CLEANING

If the scaling on plates is soluble and all materials in the circulation system of the PHE and the equipment it is part of are resistant to the cleaning base, the method of Cleaning In Place (CIP) can be used.

This method can also be employed even without circulation within the system. To accomplish, simply fill a drained, but tightened unit, with an approved and safe cleaning base. After allowing suitable amount of time to allow the scaling to be dissolved, the PHE is drained and flushed with clean water.

An example of CIP cleaning :

- *Cooling and heating liquids are drawn out while the PHE is at rest*
- *Rinse with cold or tepid water*
- *Circulate warm cleaning base through both circuits of the PHE*
- *Rinse again with cold or tepid water*
- *Rinse with combination of water and cleaning base*
- *Rinse with cold or tepid water one final time*

CLEANING MATERIALS

A qualified cleaning material is one which removes scaling on the plates without damaging the plates or gaskets. Stainless steel has a passivated (protecting) film. This film must not be destroyed as it assists in preserving the resistance of the stainless steel.

Suitable Cleaning Materials

- Oil and grease are removed with a water emulsifying oil solvent, I.e. BP system cleaner.
- Organic and grease fouling are removed with sodium hydroxide (NaOH) solution:
 - Concentration = 5.00 liters 30% NaOH per 100 liters water (H₂O) Maximum temperature = 180 Deg. F
- Carbonates and limestone are removed with nitric acid (HNO₃) solution**:
- Concentration = 2.4 liters 62% (HNO₃) per 100 liters water (H₂O) Maximum Temperature = 140 Deg. F

*** Note : Nitric acid will result in build-up of the passivation film of stainless steel.*



All cleaning materials have the potential to be harmful if ingested, inhaled or by coming in contact with exposed skin or eyes. Use all necessary safety equipment and precautions as outlined by the cleaning materials' manufacturer.

REASONS FOR INSUFFICIENT CLEANING

- Low circulation quality
- Improper (short) cleaning period
- Improper mix of cleaning chemicals for the amount of scaling (fouling) on the plates
- Lack of cleaning control (frequency of cleaning)

FAULT LOCATIONS

- Reduced capacity
- External leakage
- Internal leakage

REDUCED CAPACITY

If a reduction of heat transmission and/or a rising pressure drop is maintained, the PHE requires cleaning.

EXTERNAL LEAKAGE

There are a number of different possibilities to explain why external leakage may occur :

- The PHE is working at a higher operating pressure than the unit is designed for. (See *Drawings & Name Plate*) If this is the case, the pressure must be reduced to be matched to the designed operating pressure the PHE was designed for.
- The PHE is not tightened to the minimum measure. (See *Drawings & Name Plate*) The unit must be tightened to the correct dimension. (Fig. 9)
- The PHE is suffering from scaling or fouling on internal components. The unit will need to be opened (See *Opening & Assembly*) and the plates inspected. All plates must be free of scaling and without deformity. The gaskets must also be inspected for cleanliness, elasticity and deformity. All parts must be clean and free of all debris to insure proper operation and prevent leakage.

If all of the above have been checked and leakage continues, the gaskets may require replacing. If a leakage occurs through the weepholes of the gaskets, check for defective gasket(s) and/or plate corrosion in the area of the drainage zone.

INTERNAL LEAKAGE

Internal leakage leads to mixing of the fluids inside the PHE. Leakage of this type may only be repaired by changing the defective plates. Inspect for suspected internal leakage in the following manners :

- Remove one of the lower pipe connections and build the opposite circuit under pressure. After pressure has stabilized, no fluid should be coming from the removed pipe connection. If leakage does occur, then there is a leak in one or more plates. The PHE must be opened and each plate inspected carefully as the leak may be as small as a pinhole
- Open the PHE and remove all plates. Allow the plates to dry completely and then hang plates back in the frame in the same order as they were removed. Re-assemble the unit back to the correct tightened dimension and circulate fluid on only one side, or every second interval. After a short period, drain and open the PHE carefully so that no fluid is allowed into the dry uncalculated interval. Exam the plates carefully for any fluid on the dry side of the plate. Detecting water on the dry side of the plate will allow you to pinpoint the leak and find the hole in the plate through which the fluid is leaking.

REBUILDING PHE

The PHE is composed of separate modules and this is very flexible in regard to being able to handle both increases and reductions in capacity. This in turn allows for a vast array of possibilities when a change in capacity is being planned. Ameridex keeps detailed files with all pertinent information on every delivers PHE. We will gladly forward suggestions and/or quotations concerning a rebuild of an existing PHE. In order to accommodate such inquiries, Ameridex will need the Serial Number of the unit (See : *Drawings & Name Plate*) as well as detailed information on the desired modifications.

Once modifications have been finalized, Ameridex delivers a complete description of procedures to rebuild the PHE along with all necessary spare parts if required. Ameridex will also update all files relating to the project and keep available for future reference.

SPARE PARTS

When ordering spare parts, please reference the PHE Type and Serial Number as listed on page 2 in the *Exchanger Type & Log*. This is to insure delivery of proper and necessary parts and guidelines for installation.

Other factors to pay attention to when ordering :

- When ordering plates it is important to note the correct pattern code and if plates are left or right turning.
- When ordering a complete set of new gaskets, glue and cleaning fluid the Serial Number of the PHE must be indicated.
- When ordering clamping bolts it is necessary to measure the bolts being replaced to ensure delivery of proper size replacements. This is especially important if any alterations have been made on-site to allow proper placement of unit. *Please refer to Installation of Plate Heat Exchanger section*

PARTS & SERVICE

Mark R. Hilkman - VP
Ameridex Plate Exchangers
P.O. Box 237
145 County Rd 309
Bryant, Alabama 35958

Telephone : (256) 597-3360
Fax: (256) 597-3358
E-mail : ameridexplateexchangers@ameridex.net



RECEIPT OF PLATE AND FRAME HEAT EXCHANGER

Upon receipt of you PHE unit(s), please use the following guidelines to un-packaging, inspect and (if necessary) stand the unit(s) up.

UN-PACKAGING THE PHE

All PHE units are package to insure not only the safety of the unit as it is transported, but also the safety of the individuals that come in contact with the unit as it is shipped from out facility, in transit and when it arrives on-site or at your designated destination.

PHE units are package in one of the following configurations:

- Standing upright
- On its face
- On its side

The following factors determine the configuration in which the unit(s) will ship:

- Dimensions
- Weight
- Center of gravity
- Number of units being shipped to location
- Method being used to transport product

Unless specific circumstances or it is requested by the customer, all Ameridex PHE units ship fully crated. That means, the unit is secured on a pallet that has complete sides, top and bracing to hold the unit steady during transport. The unit is also shrink-wrapped (Fig.13).

Regardless of the configuration in which the PHE is shipped, the following steps should be taken when un-packaging the unit:

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Inspect crate(s) for any signs of damage during shipping * • Remove crate lid • Remove any packing materials and bracing securing the unit during shipping • Remove sides of crate • Inspect unit for any visible damage ** | <ul style="list-style-type: none"> • Stand unit up (if necessary) • Remove Bolts anchoring unit to shipping pallet (if unit is standing) • Remove unit from pallet • Remove shrink-wrap • Place unit in prepared final destination |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

** If any damage is found notify Ameridex immediately as well as freight company that delivered the product*

*** If any damage is found notify Ameridex immediately.*



Fig. 13

While all of the above is self-explanatory, please use the following guidelines for specific situations :

STANDING UNIT UP

- Remove all crating and bracing/bolting materials securing the unit.
- Place hoisting straps around one bolt on each side of the top of the unit. (Fig. 14)
- Lift the PHE from the pallet.
- Lower the PHE to standing on a horizontal surface.
- Adjust straps to follow the unit to be hoisted and moved in a level orientation.
- Place the PHE in the prepared area (*See Installation of Plate Exchanger section*) and bolt in place (if applicable).



To prevent injury and/or damage to the unit, always used appropriate hoisting equipment. Keep the area underneath the unit clean when either lifting or moving the PHE.

Some PHE units are designed with lifting eyes on the front cover as well as the rear cover and/or stanchion. These may be used to lift and/or move the unit. (Fig. 15)



Fig. 15

MULTIPLE UNITS PACKAGED TOGETHER

Orders for multiple PHE units shipping to the same location will often be packaged together on the same pallet. In these instances please follow the un-packaging guidelines as listed above, removing the units from the pallet one PHE at a time.

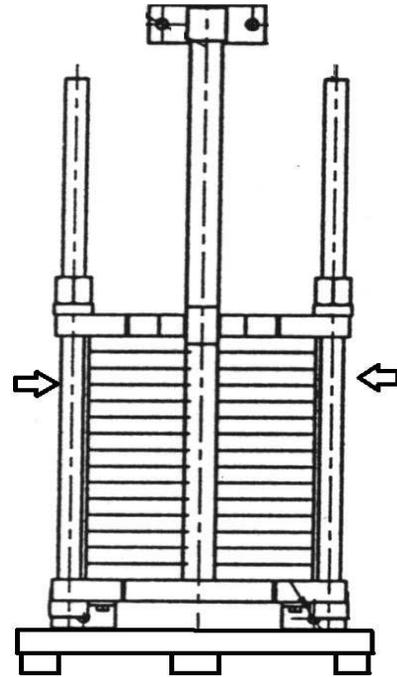


Fig. 14

To prevent damage to the PHE never :

- Lift by the connections
- Lift by portholes
- Lift with studs surround ports
- Lift by the rear stanchion, carry or Guide bars

When a PHE is shipped on its side, the same steps may be used to stand the unit.

MAINTENACE RECOMMENDATIONS

Your Ameridex PHE arrives from the factory completely devoid of fouling and ready to work. However, in order to keep you PHE operating at peak capacity in the most efficient manner possible the following steps should be taken:

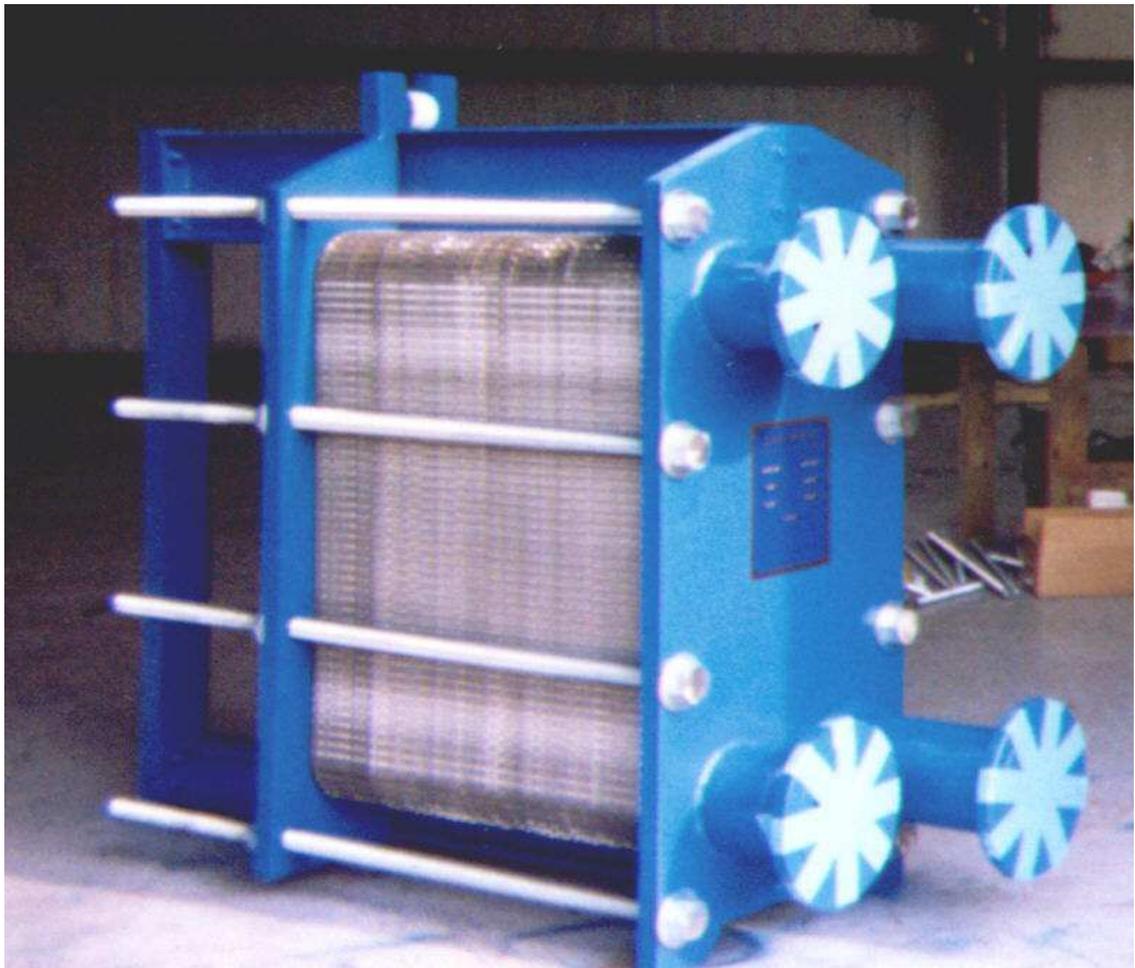
- When installing the PHE, be sure that proper monitoring instrumentation is installed as well. Installing temperature and pressure gauges will for monitoring of exact PHE performance at any given time.
- Installation of filters on fluid inlets can not be overstated. Installing proper filtration is the most effective step to avoid fouling buildup within the PHE.
- The tightening bolts on the PHE are subject to vibration and can loosen slightly overtime. Ameridex recommends slight bolt tightening (or “snugging) on a monthly basis.
- Periodic cleaning of the PHE is highly recommended. The timetable required for cleaning of the PHE will vary and greatly depends on the into which the PHE is placed. Ameridex recommends undertaking cleaning of the PHE when instrumentation indicates that pressure drops are 30% higher than listed on the design requirements. This condition is a strong indicator that fouling has built up to a point wherein it needs to be addressed.
- The lifespan of the gaskets utilized in the PHE will dependent upon many factors, including (but not limited to) the fluids in contact with, temperature and atmospheric contact. Ameridex recommends that 10% of the total number of gaskets within the unit be kept in stock in for emergency re-gasketing in the event of leakage occurring.
- Ameridex recommends the re-gasketing of all plates within a PHE every 3-5 years in response to normal wear and expansion from pressure and temperature exposure.

PHE STORAGE

When your PHE unit(s) are required to be stored for an extended period - six months or longer - please use the following procedures :

- For units that have been in service please refer to the *Opening and Assembly* section on procedures to empty and cool the PHE
- If the unit show signs of scaling or fouling please refer to the *Cleaning* section on procedures to correct before placing in storage
- Seal all ports. Blind flanges with gaskets may be used on portholes or flanged connections. Caps should be used on NPTs.
- Coat all unpainted carbon steel surfaces with a rust inhibitor. Light grease or oil is acceptable
- Grease all bolt threads
- Unit(s) should be stored indoors if possible to protect against moisture and temperature extremes*
- Unit(s) may be shrink-wrapped to guard against sun-damage and possible corrosion from the elements

** Never store units in an area of 32 Degrees F (0 Deg. C) or lower.*



GLOSSARY

Ameri-Clip: An SEC Plate Exchanger gasket system by which the gasket is attached to the heat transfer plate utilizing clips that attach around the edge of the plate.

Ameri-Snap: An SEC Plate Exchanger gasket system by which the gasket is attached to the heat transfer plate utilizing tabs that snap through small punches in the plates.

Carry Bar: The upper bar of the PHE frame. It is from this bar that the heat transfer plates with ears hang from.

Clamping Bolts: It is through the equalized movement of these bolts that the PHE is closed down to the correct tightening dimension. May also be referred to as tightening bolts.

Feet: The mechanism which allows the PHE to be bolted in place. On standard PHE units, there are top feet located on the base of the front cover (Referred to as the Front Feet), and one at the base of the stanchion (Referred to as the Rear Foot). May also be referred to as mounting feet.

Frame: The structure in which heat transfer plates are hung and compressed to create a PHE.

Front Cover: This is the steel plate that acts as the front of the PHE. On standard PHE units, this is where the portholes are located for piping and the means through which they flow into and out of the PHE. The front cover has openings drilled for the clamping bolts to pass through.

Guide Bar: The lower bar of the PHE frame. It's primary function is to act as a guide for the heat transfer plate when opening or closing the PHE. It also helps to insure that the heat transfer plate line up correctly.

Portholes: The circular cut-outs visible at the corner of the heat transfer plate.

Rear Cover: The steel plate that acts as the back of the PHE unit. It comes equipped with a hanging mechanism that allows it to move forward and back along the carry bar so that the unit may be opened and closed. The rear cover has openings drilled for the clamping bolts to pass through.

Stanchion: The rear bar vertical bar which acts as the back support of the PHE frame. In most instances the rear mounting foot is located at the base of this support and a lifting hole at the top

Tightening Dimension: This is the measurement that the thermal heat transfer plate pack must be compressed to for the PHE to operated correctly. It is measured from the inside of the front cover to the inside of the back cover.

NOTES