

EURO HEAT – manufacturer of plate heat exchangers

OPERATION MANUAL

- D 033, D 100, D 500, D 600, D 800 –



EURO HEAT

P H E

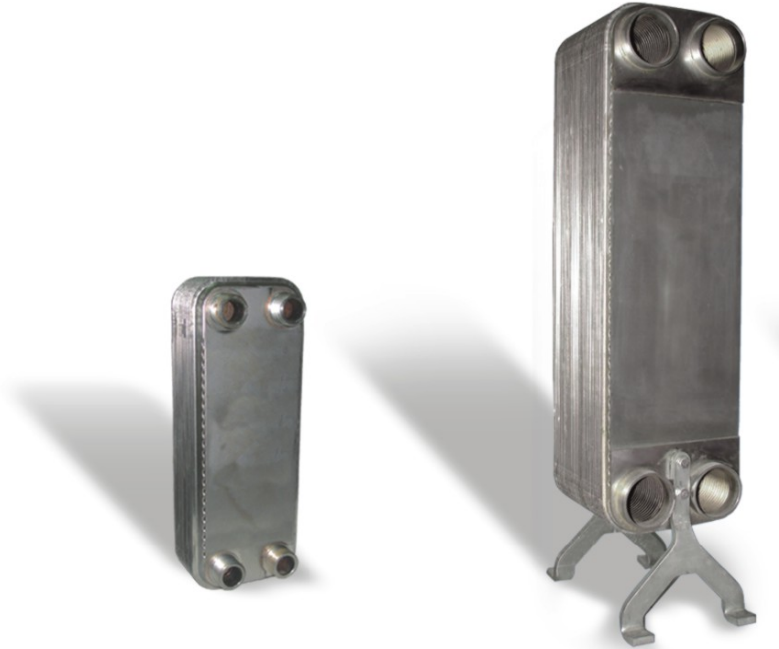


TABLE OF CONTENTS

1.0	GENERAL	2
1.1	USER INFORMATION	2
1.2	APPLICATION OF BRAZED HEAT EXCHANGERS	2
1.3	IDENTIFICATION / NAME PLATE	3
1.4	BASIC SAFETY INSTRUCTIONS	3
1.5	EXCHANGER SPECIFICATIONS	4
2.0	HOW DOES BRAZED HEAT EXCHANGES WORK	5
3.0	ADVANTAGES OF BRAZED HEAT EXCHANGERS	6
4.0	INSTALATION GUIDE	6
4.1	GENERAL INFORMATION	6
4.2	CONECTING TO THE SYSTEM	6
4.3	REFRIGERATION DETAILS - CONDENSERS	7
4.4	REFRIGERATION DETAILS – EVAPERATORS	8
5.0	START-UP PROCEDURES	8
6.0	SHUT-DOWN PROCEDURES	9
7.0	CLEANING OF BRAZED HEAT EXCHANGER	9

1.0 GENERAL

MANUFACTURER INFORMATION



EURO HEAT
P H E

- MANUFACTURER OF PLEAT HEAT EXCHANGERS

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1.1 USER INFORMATION

Information in this manual refer to the standard products of EURO HEAT PHE.

Please always follow the indications given in this manual.

Only authorized and qualified personal is allowed to perform tasks of setting up, putting into operation and maintenance of brazed heat exchanger.

Users are obliged to fulfill requirements of all national (international) regulations and standards regarding the equipment under pressure, storage and transportation of hazardous liquids and gases (if such are use in the heat exchanger).

Explanations and instructions that must be met in order to avoid damage to the system and injuries of working personel are marked with red triangles



Explanations and instructions that must be met to ensure the correct and undisturbed work of heat exchangers are marked with yellow triangle



If you need to make any modifications to the installation that heat exchanger is associated with, do it according to this guide. In case that the guide notes are not related to specific modifications or if explanation is not enough, contact the manufacturer, EURO HEAT PHE, before the starting any modifications.

1.2 APLICATION OF BRAZED HEAT EXCHANGERS

EURO HEAT brazed heat exchanger are designed to meet specific requirements (operating temperature, operating pressure, volumetric flow) set by the customer. Exchanger are made in accordance with the European standard EC-PED 97/23.

EURO HEAT brazed heat exchanger have an excellent price / quality ratio, high efficiency, and are easy to set or replace.

The most frequent application of the brazed heat exchangers are:

Industrial application:

- cooling hydraulic oil in a variety of machines
- heat recovery in the various processes
- pasteurization of various liquids in the food industry

Heating :

- exchange of heat in district heating systems
- central preparation of sanitary hot water
- heat pumps


Refrigeration :

- condensers
- evaporators
- economizers
- heat pumps

In the case of any changes in the operating conditions that deviate from the conditions specified when ordering heat exchanger, it is necessary to contact EURO HEAT and get written approval that heat exchanger can be used in the changed working conditions.

1.3 IDENTIFICATION / NAME PLATE

Each heat exchanger from EURO HEAT is supplied with the identification tablet positioned on front of the exchanger. On the tablet are basic information about heat exchanger. Take care that tablet is always accessible and that data on tablet can always be read.

	PROIZVODNJA PLOCASTIH IZMENJIVACA I PASTERIZATORA Kragujevac, Atinska 101, 034 345 055 www.euroheatphe.com – office@euroheat.co.rs
Type	<input type="text"/>
Serial no.	<input type="text"/>
Year of manufacture	<input type="text"/>
Capacity	<input type="text"/>
Primary temperature	<input type="text"/>
Secondary temperature	<input type="text"/>
Working pressure	<input type="text"/>
Testing pressure	<input type="text"/>

1.4 BASIC SAFETY INSTRUCTIONS

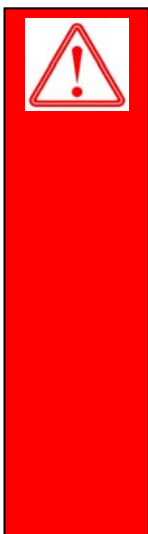


Plate heat exchanger are devices that operates under relatively high pressure and therefore must set up, put into operation and maintained by qualified personal.

National and international regulations (eg the European standard EC PED 97/23/EG) that are related to the pressure equipment, transport and use of hazardous liquids and gases as well as regulations concerning safety must be respected.

Do not take any modifications or reparations of the heat exchanger when the heat exchanger is under pressure and the temperature of the heat exchanger is not under 40°C.

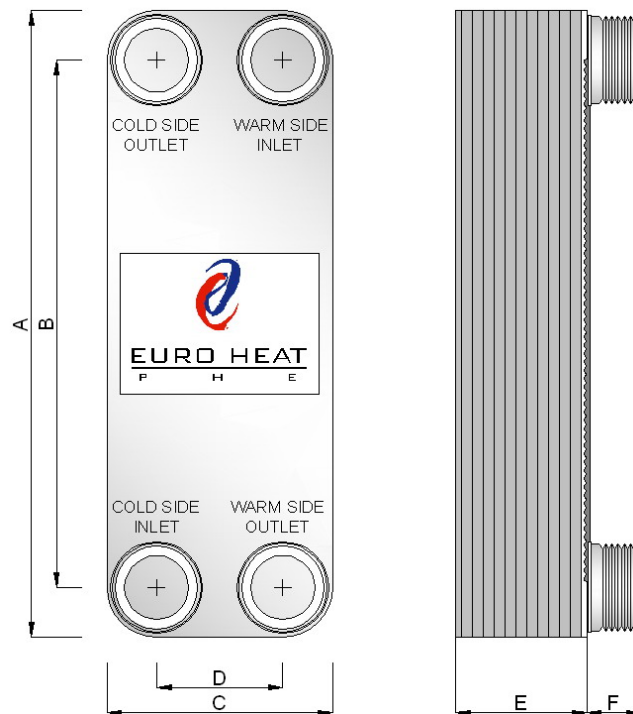
If the working temperature of heat exchanger exceeds 90° C it is necessary to provide some sort of protection (not supplied with the heat exchanger), so that contact with the hot surface can be avoided and possible injuries of working staff prevented.

Due to the existence of high pressure it is recommended to use a safety valves (not supplied with the heat exchanger) so that heat exchanger can be protected from unplanned increase of working pressure.

1.5 EXCHANGER SPECIFICATIONS

TYPE	A	B	C	D	E	F	connection size	weight of exchanger
D 033	181	145	82	46	$10 + 2.5 \times n$	11	1/2 "	$0.12 + 0.06 \times n$
D 100	276	224	105	53	$10 + 2.7 \times n$	20	3/4 "	$0.4 + 0.15 \times n$
D 500	520	450	144	72	$10 + 2.7 \times n$	30	6/4 "	$3.4 + 0.27 \times n$
D 600	584	472	234	122	$10 + 2.7 \times n$	40	NO 65	$6.5 + 0.46 \times n$
D 800	814	692	242	120	$10 + 2.8 \times n$	66	NO 80	$9.1 + 0.63 \times n$

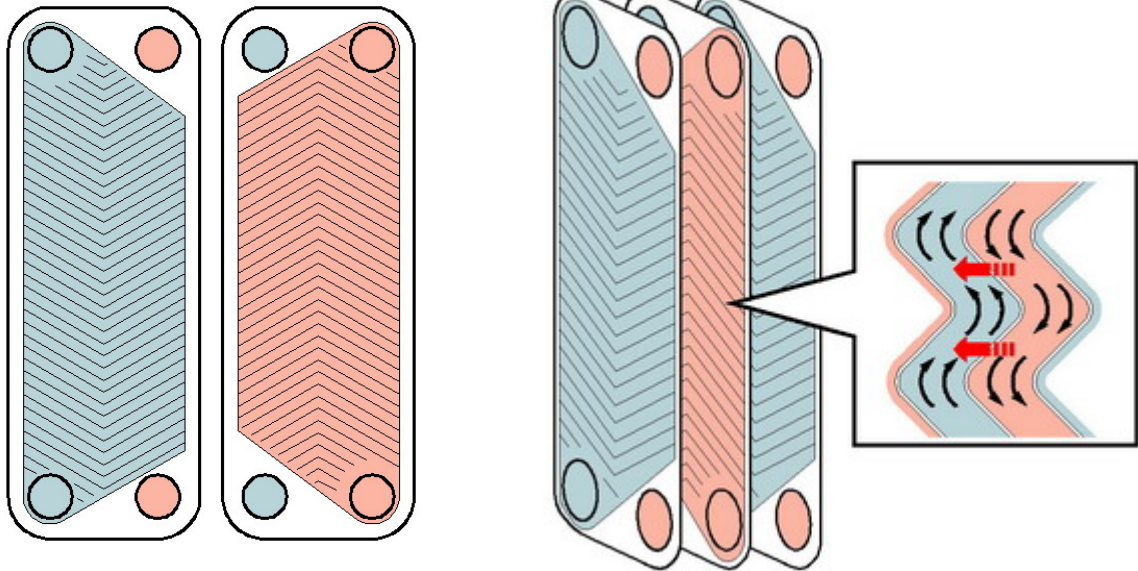
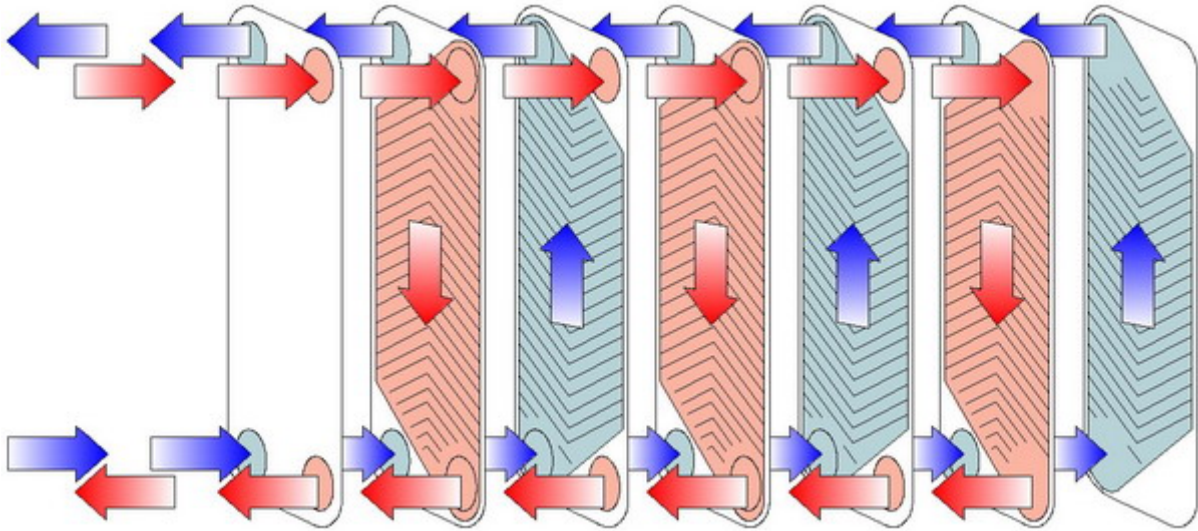
(n represents the number of internal plates
length measures are in mm
weight measures are in kg)



BASIC DATA	
minimal working temperature	- 180 °C
maximum working temperature	+ 225 °C
nominal pressure	NP32, NP24, NP16
test pressure	45 bar
materials	Č 4580 (AISI 304) Č 4576 (AISI 316) bakar

2.0 HOW DOES BRAZED HEAT EXCHANGES WORK

Brazed plate heat exchanger consists of a number of embossed metal plates with portholes for passage of the two fluids between which heat exchange is performed. Adjoining plates are reversed so as to form a lattice of contact points from the ridges of the plates. With the plates vacuum-brazed together, a compact, pressure-resistant and very efficient heat exchanger is created which is able to withstand significant operating pressures (up to 40 bar). Embossing is done in such way that after brazing it provides absolute sealing so there is no possibility of mixing the working fluids. Embossing of plates also helps in the creation of vigorous turbulence that helps heat transfer.



A

B

"A plate" is a plate hanging with the chevron pointing downwards

"B plate" is a plate hanging with the chevron pointing upwards

3.0 ADVANTAGES OF BRAZED HEAT EXCHANGERS

- ❖ *Close Temperature Approach* – A small difference in the temperatures of the exchange media (for instance, between condensing and cooling water) can result in substantially higher efficiency to the overall system.
- ❖ *High Working Pressures* – EURO HEAT brazed heat exchangers are rated to pressures of 40 bar, making them well suited to high-pressure applications including the condensing side of refrigeration systems.
- ❖ *Freeze Resistance* – Because of the high turbulence in the channels, any tendency toward freezing of cooling water is minimized. As such, temperatures at the water side can be lower than in any other kind of heat exchanger. Should a system failure cause freezing in the unit, EURO HEAT brazed heat exchangers will recover better than other types of heat exchangers.
- ❖ *Compactness* – EURO HEAT brazed heat exchangers occupy very small area compering other types of exchangers which represents a tremendous advantage in many applications, especially prefabricated systems.
- ❖ *Modularity* – When systems are built in modules, EURO HEAT brazed heat exchangers can easily be arranged in sequently or parallel order.
- ❖ *Economy* – Considering the advantages of brazed heat exchangers – low purchase price, fast and easy installation, low shipping cost, simple tubing installation, smaller cabinets and so on – EURO HEAT brazed heat exchangers are often considerably more economical than alternatives.

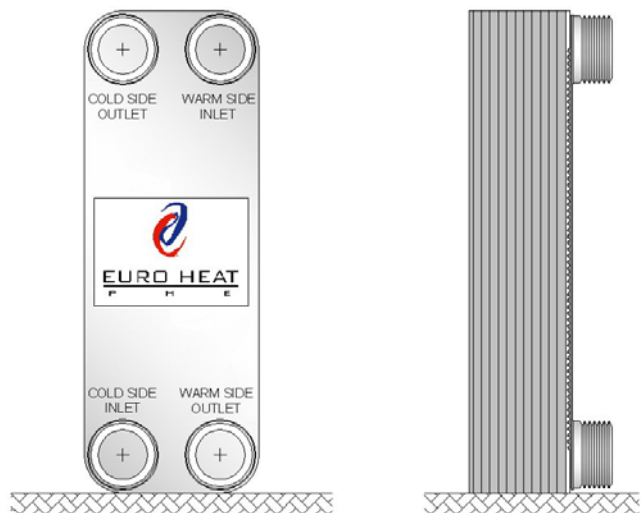
4.0 INSTALATION GUIDE

4.1 GENERAL INFORMATION

Whenever it is possible, the brazed heat exchanger should be placed in the upright position.



When working with brazed heat exchanger it is recommended usage of protective gloves in order to avoided possible injuries of working staff.



4.2 CONECTING TO THE SYSTEM

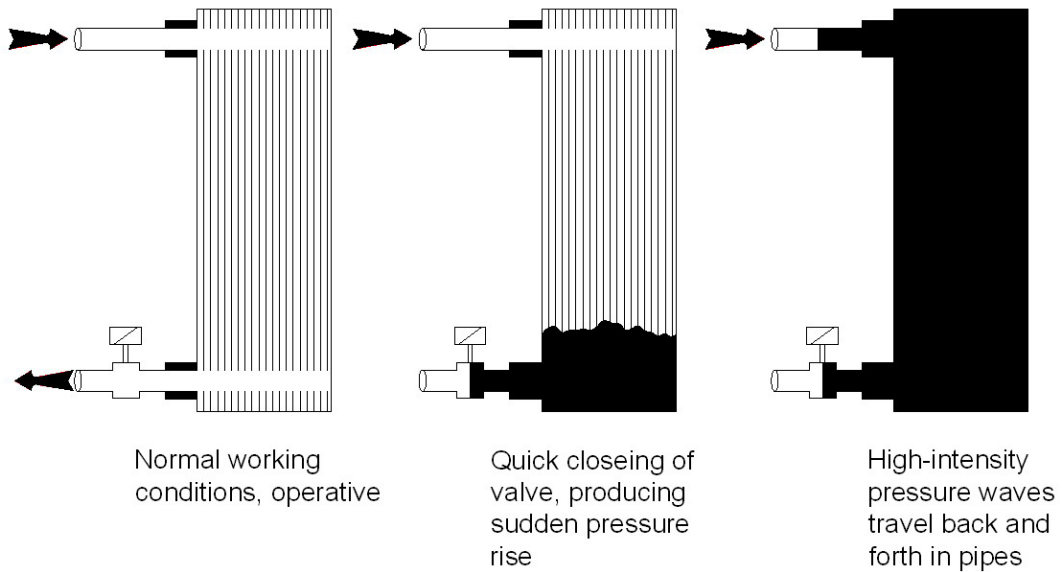
It is recommended usage of flexible connections, to avoid the transfer of vibrations from the pipes and control valves on the brazed heat exchanger.

Don't overtighten female unions onto the threaded connections; excessive force will shear the connection braze

Seal unions with O-rings or round gaskets at the end of the connection. Tape may also be used to seal the threads.



Setting the flow should be done slowly to avoid the risk of the occurrence of water hammer. Sudden changes in velocity of noncompressible fluid (like water) can cause the appearance of water hammer, the occurrence of which could seriously damage the pipes, valves, heat exchanger and other system components. The most common cause of water hammer is quick closing of the valves. Sudden interruption of fluid flow leads to a multiple increase in pressure in relation to the normal operating pressure. Wave of very high pressure moves through the pipes back and forth between the closure and relief points. At a relief point of the system velocities pressure wave can reach speeds approximate to the speed of sound.



Shock wave created in this way can create significant damage because it causes alternately expands and contracts pipe lines. In brazed heat exchanger, water hammer can deform front and back plate into a bulb shape with resulting internal or external leakage.

An air chamber or water hammer arrestor can avoid or eliminate these problems. Valves with controlled closing time can also be used to avoid danger of water hammer.

4.3 REFRIGERATION DETAILS – CONDENSERS

Refrigerant gas flows in at the top left.

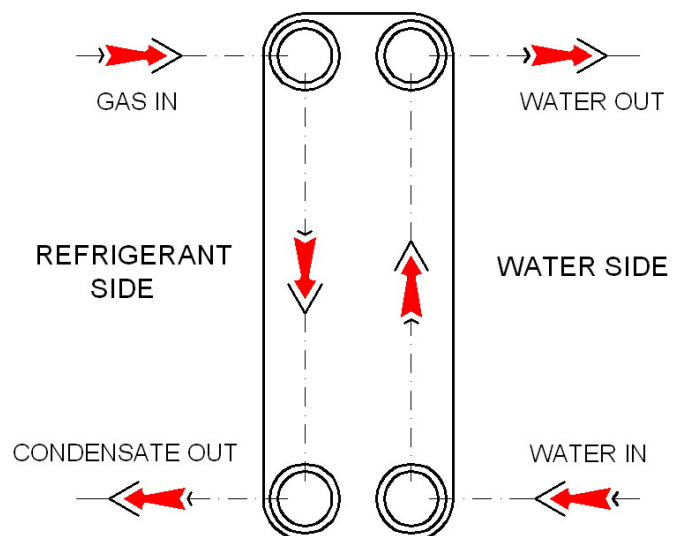
Condensate liquid flows out at bottom left.

Water inlet is at the bottom right and water outlet at the top right.

Connect water and refrigerant for countercurrent flow in most cases.

Solder connections to the refrigerant side when using EURO HEAT brazed heat exchangers as condensers.

FLOW PATTERN FOR CONDENSOR



4.4 REFRIGERATION DETAILS – EVAPERATORS

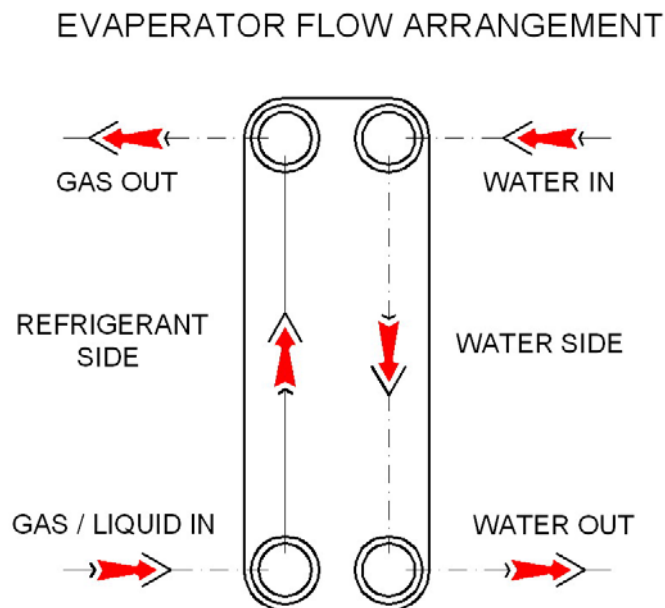
The mixture of liquid and refrigerant gas flows in at bottom left.

Gas flows out at top left.

Water inlet is at the top right and water outlet at bottom right.

Connect water and refrigerant for countercurrent flow in most cases.

Solder connections to the refrigerant side when using EURO HEAT brazed heat exchangers as evaporator.



5.0 START-UP PROCEDURES



If there are more than one pump in the system, check which pump should be put to work first.

- 1 Verify if the valve between pump and exchanger, which regulates the flow, is closed
- 2 Verify that the air valve (not supplied with the exchanger) is fully open
- 3 Open the air valve and start pump
- 4 Slowly open the valve between the pump and exchanger
- 5 When all the air is out from of the exchanger close the air valve
- 6 repeat steps from 1 to 5 on the secondary side of exchanger

6.0 SHUT-DOWN PROCEDURES



If there are more than one pump in the system, check which pump should be turned off first.

- 1 turn off the pump
- 2 slowly close valve between pump and the exchanger
- 3 repeat steps from 1 to 2 on the secondary side of exchanger

7.0 CLEANING OF BRAZED HEAT EXCHANGER

When the likelihood of fouling is high (for instance, when hard water is used), clean the exchanger by circulating a cleaning liquid through it.

Use a tank with a weak acid for this clean-in-place (CIP) process. A five-percent solution of phosphoric H_3PO_4 acid is a safe and effective choice for most units.

If the exchanger is cleaned frequently, use a five-percent solution of oxalic acid, $H_2C_2O_4$.

For best results, the cleaning solution flow rate should be at least 1.5 times the normal flow rate, preferably in backflush mode.

Before restarting, flush the unit with plenty of fresh water to purge any remaining acid.

Clean at regular intervals.

CLEANING IN PLACE

