Oil/water cooler - Type PHE

The oil/water coolers PHE are plate heat exchangers with soldered stainless steel plates.

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1 Technical data

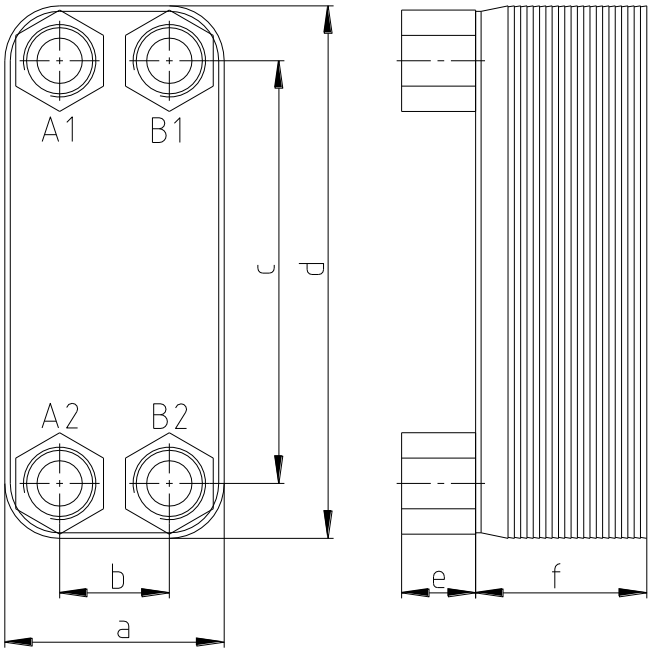

Illustration 1: Oil/water cooler - Type PHE

Table 1: Dimensions - Type PHE

Series	Type	Thread	Plates	Dimensions [mm]						Max. perm. operating pressure [bar]
				a	b	c	d	e	f	
PHE	100	4 x ¾“	20	73	40	154	191	24	52	10
	200	4 x 1“	20	116	72	243	286	24	55	30
			40						103	
			60						151	
	300		40	112	50	466	526	24	103	
			60						151	
			80						203	
	500	4 x 1 ½“	40	191	92	519	616	30	103	
			60						151	

2 Advice

2.1 General advice

Please read through these operating/assembly instructions carefully before you start up the oil/water cooler. Please pay special attention to the safety instructions!
The operating/assembly instructions are part of your product. Please store them carefully and close to the oil/water cooler. The copyright for these operating/assembly instructions remains with **KTR**.

2.2 Safety and advice symbols

	**Warning of personal injury**	This symbol indicates notes which may contribute to preventing bodily injuries or serious bodily injuries that may result in death.
	**Warning of product damages**	This symbol indicates notes which may contribute to preventing material or machine damage.
	**General advice**	This symbol indicates notes which may contribute to preventing adverse results or conditions.
	**Warning of hot surfaces**	This symbol indicates notes which may contribute to preventing burns with hot surfaces resulting in light to serious bodily injuries.

2.3 General hazard warnings

With assembly, operation and maintenance of the oil/water cooler it has to be made sure that the entire drive train is secured against accidental switch-on and the plant is unpressurized. You may be seriously hurt by hot or pressurized hydraulic oil or water. Please make absolutely sure to read through and observe the following safety indications.

- All operations on and with the oil/water cooler have to be performed taking into account "safety first".
- Please make sure to switch off the oil supply and water supply as well as the power pack before you perform your work on the oil/water cooler.
- Secure the power pack, oil and water supply against accidental switch-on, e. g. by providing warning signs at the place of switch-on or removing the fuse for current supply and lock the oil and water supply.
- Do not reach into the operation area of the machine as long as it is in operation.
- Secure the oil/water cooler against accidental contact (risk of burns). Please provide for the necessary protection devices and covers.

2 Advice

2.4 Intended use

You may only assemble, operate and maintain the oil/water cooler if you

- have carefully read through the operating/assembly instructions and understood them
- had technical training
- are authorized by your company

The oil/water cooler may only be used in accordance with the technical data (see chapter 1). Unauthorized modifications on the cooler are not admissible. We will not assume liability for any damage that may arise. In the interest of further development we reserve the right for technical modifications.
The **oil/water coolers PHE** described in here correspond to the technical status at the time of printing of these assembly/operating instructions.

3 Storage, transport and packaging

3.1 Storage

The oil/water coolers are supplied in preserved condition and with painting and can be stored at a dry and roofed place for 6 - 9 months.

The storage rooms must not include any ozone-generating devices like e. g. fluorescent light sources, mercury-vapour lamps or electrical high-voltage appliances.
Humid storage rooms are not suitable.
Please make sure that condensation is not generated. The best relative air humidity is less than 65 %.

3.2 Transport and packaging

In order to avoid any injuries and any kind of damage please always make use of proper transport and lifting equipment.

The oil/water coolers are packed differently each depending on size, quantity and kind of transport. Unless otherwise contractually agreed, packaging will follow the in-house packaging specifications of KTR.

4 Assembly

Operating temperature - 10 °C to + 200 °C
Oil/water cooler (plate heat exchanger) made of stainless steel 1.4401 soldered with copper.
Please observe boiling and freezing point.

4.1 Assembly / start-up

Please note that that there may be sharp metal edges on the oil/water cooler due to manufacturing.
Please wear safety gloves.

Please make sure that the lines are connected with zero potential. For that purpose refer to table 2 for the torques required for the connection.

Table 2: Torques of connection lines

Type	Thread	Torque [Nm]
100	4 x ¾“	115
200	4 x 1“	155
300		
500	4 x 1 ½“	350

With assembly of the lines make sure that

- a fluid generally flows within one letter code only
- the fluids are positioned in the opposite direction, for example:
  - Oil to be cooled:
    - Inlet A1
    - Exit A2
  - Cooling water:
    - Inlet B2
    - Exit B1
  - Side B is provided with one more drain on site which allows to fully enclose the hot medium. The cooling capacity is fully used in this way.
  - Side A is intended for connecting the medium with the highest temperature.

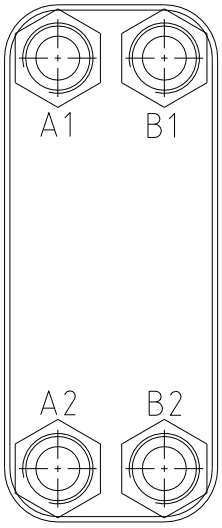

Illustration 2: Connection of lines

Please make sure that the medium used does not show any dirt. In order to avoid any blockages or damages on the oil/water cooler you have to make use of a filter.
A mesh size of filter of approx. 20 µm is usually sufficient.

Please note that the use of chlorous water, salt water, etc. is not suitable for oil/water coolers. Damages caused by corrosion cannot be excluded.

4 Assembly

4.2 Fastening device

For fastening the oil/water cooler we recommend to use a fastening device as per illustration 3.
From size 200 two fastening devices per oil/water cooler are recommended.

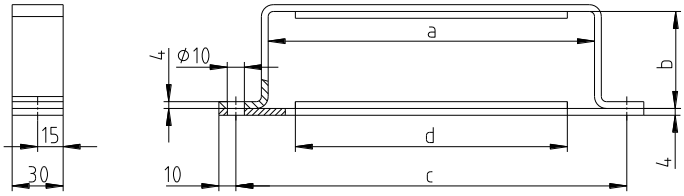

Illustration 3: Fastening device

Table 3: Dimensions - Fastening device

Type	Dimensions [mm]			
	a	b	c	d
BH100-20	80	56	114	75
BH200/300-20	120	59	150	118
BH200/300-40		107		
BH200/300-60		155		
BH200/300-80		207		
BH500-40	195	107	235	193
BH500-60		155		

4.3 Application

The oil/water cooler can be used for various coolants:

- Coolant
- Water
- Oil

Please note that the use of chlorous water, salt water etc. is not suitable for oil/water coolers. Damages caused by corrosion cannot be excluded.

4.4 Frost protection

Any generation of frost or ice will damage the oil/water cooler. Make use of a water-glycol mixture if the temperature is close to the freezing point or below. Please observe the operating temperature.

5 Disposal

In respect of environmental protection we would ask you to dispose of the packaging or products on termination of their service life in accordance with the legal regulations and standards that apply, respectively.

- **Metal**
  Any metal components have to be cleaned and disposed of by scrap metal.
- **Gaskets**
  Gaskets can be disposed of by residual waste.
- **Nylon materials**
  Nylon materials have to be collected and disposed of by a waste disposal company.

6 Cleaning

Before cleaning please make sure that the oil/water cooler has cooled down.
Touching the heated components causes burns.

Rinsing allows to remove most of the soft deposits/dirt blocking the interior space. A solution used for rinsing should be a soft acidity with a concentration of less than 5 %, e. g. phosphoric acid.
Rinse with 1.5 times the flow rate compared to regular operation, if possible, reverse the flow direction after 30 minutes.

Please note that the use of solutions being too acidic with rinsing is not suitable for oil/water coolers. Damages caused by corrosion cannot be excluded.

Before you start-up the system again, rinse the oil/water cooler with fresh water.
Clean the oil/water cooler regularly.

7 Maintenance

Preventive maintenance operations have to be performed by the user regularly.

The maintenance intervals mainly depend on the operating period and the water speed reached. In case of frequent standstill and low quantity of water short maintenance intervals are necessary.

- Inspect the oil/water cooler for leakages.
- Proper fastening of the oil/water cooler has to be assured.
- Inspect the oil/water cooler for damages.

Leakages have to be eliminated immediately.
Oil which has escaped has to be removed properly, since oil residues may vaporize on hot components and ignite.

8 Spares inventory, customer service addresses

A basic requirement to ensure the operational readiness of the oil/water cooler is a stock of the most important spare parts on site.

Contact addresses of the KTR partners for spare parts and orders can be obtained from the KTR homepage at www.ktr.com.

KTR does not assume any liability or warranty for the use of spare parts and accessories which are not provided by KTR and for the damages which may incur as a result.