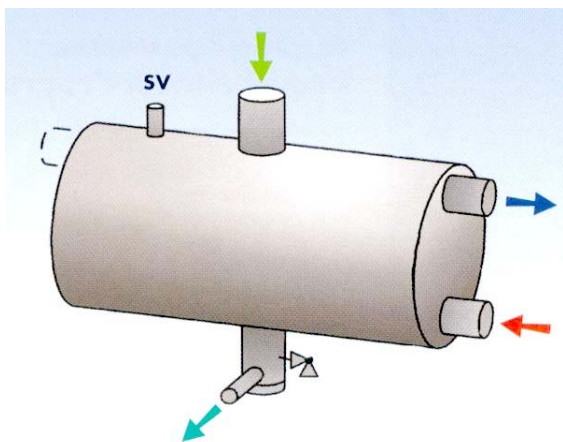


**Please read this manual carefully before installing, commissioning or operating the plate-type condenser PK.**



## 1. INTENDED USE

The plate-type condenser is solely designed for use in refrigeration systems to condensate refrigerant against a cooling fluid.

## 2. SAFETY REQUIREMENTS

Any work with refrigeration systems must be carried out by trained personnel. All safety regulations and codes of practice concerning prevention of accidents or the safe use of refrigerants must be adhered to.

Under no circumstances are the indicated temperature- and pressure limitations on the data plate to be exceeded!



An safety valve or overflow valve must be installed to prevent unacceptable pressure increase.

Fire prevention should be considered to avoid unacceptable overheating of the plate evaporator.

Before commissioning make sure all safety equipment has been checked and works properly. Any safety equipment must be retested after disassembly or activation.

## 3. TERMS OF WARRANTY

To prevent accidents and for the safe operation of the refrigerant plant no modifications or alterations may be carried out to the plate-type condenser PK without written approval by TH. WITT Kältemaschinenfabrik GmbH.

All information for the safe operation and maintenance of this plate type condenser is based on our experience and is to the best of our knowledge.

### Our liability or warranty is excluded, if:

- The instructions in this manual are not adhered to
- The plate-type condenser and its equipment was operated incorrectly or the handling was not in accordance with the mentioned procedures
- The plate-type condenser is used for purposes other than that for which it was intended to
- Safety devices were not used or disconnected
- There have been modifications made without written approval
- During installation or operation the safety requirements were not adhered to

## 4. SCOPE OF DELIVERY

The scope of delivery is specified in the order confirmation and technical drawings that belong to the order.

### Standard scope of delivery

- Pressure vessel with built-in plate stack assembled as plate-type condenser with all required connections for refrigerant and cooling fluid.
- Oil sump with drain valve
- Welded-on feet

### Optional

- Stop valves
- quick acting oil drain valve



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### 5. DESCRIPTION OF OPERATION

The plate-type condenser consists of a visible pressure vessel that contains a round, fully welded, stainless steel plate stack made by Vahterus, Finland.

The plates are welded in pairs. At one side the cooling liquid will flow through whereas refrigerant is condensed at the other side of the plates. Refrigerant gas enters from the top connection of the vessel and will flow to the bottom connection while getting condensed.

The cooling fluid is fed through the connections in the front plate. Larger volume flows may require 2 connections for inlet and outlet. It is common to use the bottom connection as an inlet and the top connection as an outlet for the cooling fluid, however, the connections may be switched if necessary.

When plate-type condensers are arranged in parallel the pressure drop of each unit should be about the same.

### 6. SHIPPING AND STORAGE

All openings (connections, etc.) are covered with yellow protection caps to prevent the intake of moisture or dirt. If storage is required for more than two months or shipping overseas, the oil drain vessel shall be filled with an inert gas charge to prevent corrosion.



Use only the intended mounting brackets to lift up the pressure vessel.

### 7. INSTALLATION

Allow sufficient space for inspection and servicing.

The welded-on feet should be placed on an even surface and the vessel aligned horizontally.



Make sure all interconnecting pipework is stress free when installation the unit. Do not allow vibrations to stress any connections.



To avoid any air may collect inside the condenser it is recommended to use the top connection as the outlet. The connecting piping system should be designed accordingly, to avoid any gas collection as well.

If the condenser is installed outside a freezing protection must be provided.

### 8. COMMISSIONING

Commissioning and start up of the plate-type condenser is not permitted until a safety analysis of the entire refrigeration installation has been carried out.

On completing installation of the plate-type condenser PK, the refrigerant plant must be pressure tested and documentation relating to the testing kept in a safe place.

Make sure the system is sufficient dry. A vacuum test at below 270 Pa for at least 30 minutes should pass successfully. Thereupon you should break the vacuum with nitrogen. The next vacuum test of the system should hold the pressure below 270 Pa for at least 6 hours.

#### Please make sure that

- All piping has been connected according to the drawings
- The required safety devices are installed and tested
- The quality of the cooling fluid is properly. Only clean circulating water without chlorine or lime should be used (if required with corrosion inhibitor) according to VDI3803/DIN 38402.

#### Liquid Charge

Since the condensed refrigerant will flow off constantly, the pressure vessel is considered without liquid charge during normal operation.

Upon filling of the system the pressure should be increased slowly to the operating pressure. During this time the



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cooling fluid side should degassed carefully.

## 9. OPERATION

Upon start-up you should attend the system until the operation has come to a stable condition. Then you can put the unit into permanent operation.

### Important:



Even with fully welded plate stacks there remains the possibility that a leak may occur. Particularly with ammonia the operator should check the cooling fluid within the first weeks of operation. Later a periodical check (e.g. once a year) is sufficient.

## 10. SERVICING AND INSPECTION



A visual inspection of the plate-type condenser shall be carried out at regular intervals, e.g. according to EN 378-2 or other appropriate regulations. (This includes visual testing with regard to corrosion)



An oil layer on the plate surfaces will cause a dramatic decrease of the heat transfer. When using ammonia as refrigerant it is recommended to drain the oil frequently, if no automatic oil return has been installed.



Any contamination must be avoided, because this could block the narrow channels within the plate stack.

There are two options to clean the unit, if the cooling fluid side becomes contaminated:

- Back flush with cooling fluid at high velocity
- Cleaning with chemicals

Please contact us prior to cleaning the apparatus to receive further information regarding this subject.



Never use hydrochloric acid to clean the stainless steel plates, not even in low concentration!!

## 11. TROUBLE SHOOTING WHEN THE HEAT TRANSFER IS REDUCED

### 1. To be checked at the cooling fluid side:

Is the flow reduced or blocked?

⇒ If not check the refrigerant side.

#### 1.1 Is the apparatus contaminated?

⇒ Search for the cause and eliminate it. Clean the cooling fluid side.

#### 1.2 Is it possible that air has collected inside the heat exchanger? (This is possible if the unit is operated in part load or with a bad-piping system.)

⇒ Increase the velocity of the cooling fluid flow to flush out any gas bubbles.

### 2. To be checked at the refrigerant side

#### 2.1 Proper functioning of automatic and adjustable valves.

⇒ Make sure the required refrigerant flow is provided

#### 2.2 Is it possible that oil contaminates the plate surfaces?

⇒ Drain the oil carefully considering regulation and codes of practice.