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WATER HEAT EXCHANGERS, CONDENSERS AND EVAPORATORS SERIES P60, P3012, P30, P48, HEAT PIPES AND HEAT PUMPS:

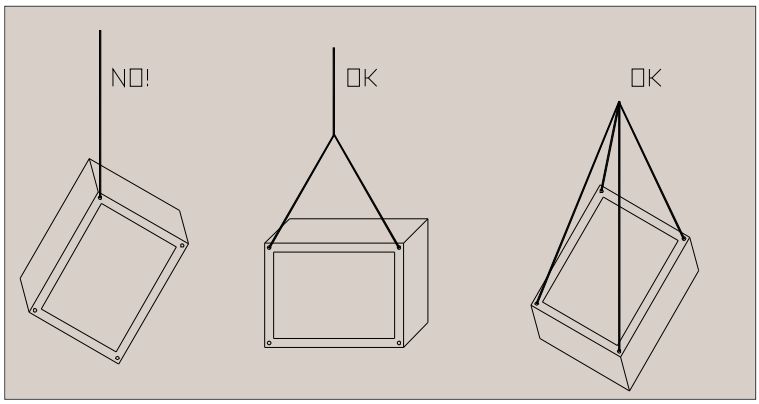
INSTRUCTIONS FOR INSTALLATION AND MAINTENANCE

INTRODUCTION AND GENERAL COMMENTS :

- Keep this installation and maintenance handbook in a dry place for future reference.
- Read this handbook and all other data sheets carefully before installing the heat exchanger.
- The manufacturer cannot accept any responsibility for damage caused to persons and/or equipment due to the disregarding of the recommendations contained in this hand-book, and all areas of good practice relevant to this product whether or not stated herein.

HANDLING :

- If the heat exchangers are contained in packaging, remove it with due care to avoid damage. Pay particular attention to fins, manifolds and distributors, which are easily damaged parts.
- All our heat exchangers are supplied with specific holes or hooks to facilitate moving and lifting. Use only these points for handling and bear in mind that these points are designed to support only the weight of the empty heat exchanger. Please note also that at least 2 holes or hooks should be used. Do not lift units by using only one of them.



- For moving and lifting the heat exchanger do not hook or lean on hairpin bends or on tubes and on no account use the manifolds and connections to move the heat exchangers. Any such action can cause the breakage of the welding/brazing between tubes and manifolds causing leaks.
- Lift the heat exchanger with suitably rated equipment in relation to its weight and dimensions. Consult the Manufacturer's instructions for further information.
- Pay attention to possible wind gusts, as the large side surface of the heat exchanger can cause considerable movement, making the installation difficult.
- Use suitable personal protection equipment (PPE) during installation (gloves, glasses, etc.).
- Pay attention to sharp corners and also to heat transfer fins as there is a risk of cutting.
- Do not stand and/or pass under the heat exchanger during handling operations.
- During positioning of the heat exchanger be sure that it is firmly fixed to the lifting equipment and that, when in position, there is no risk of tipping.

INSTALLATION:

a) General information

- Perform all installation operations wearing suitable PPE, such as safety gloves, etc.
- Some heat exchangers are normally supplied pressurised. Before starting installation reduce the pressure to atmospheric.
- During installation operations, high pressure or high temperature jets emissions may occur. Use suitable protection to avoid and to protect yourself from these risks.
- Allow sufficient space to allow access to the heat exchanger for possible maintenance or removal operations.
- Provide the external piping system with valves and a by-pass system to stop the primary fluid circulation for inspection or repairs.
- Provide special vents or outlet valves for air venting. Air may be found in the internal fluid circuit, particularly inside the heat exchanger. By releasing the air, air locks are prevented.
- Level and balance the heat exchanger, so that it may be easily connected to the pipe-work system without bending or stressing the headers.
- Do not bend or deform (with heat, hammers or other devices) the manifold connections and the manifolds themselves if they are not aligned with the pipe-work system. This automatically invalidates the warranty as often such operations result in the breakage of the welding/brazing joining the tubes to the headers.
- Avoid excessive vibrations caused by components with rotating parts, such as fans, compressors and automatic dampers, which could be transmitted to the heat exchanger, through pipes or other common supports.
- Do not tighten the bolts of the flanges, connections or casings of the heat exchanger, before aligning all gaskets and bolt holes.
- Ensure that the system is clean before being put into service and the piping is free from contamination (such as swarf, algae, sand, etc.) which might obstruct the heat exchanger tubes.
- Always stop the hot fluid flow when stopping the equipment.
- Do not use the heat exchanger under conditions exceeding those indicated in the 'Declaration of the Producer' and in the thermodynamic selection data (this states the minimum allowable temperature, the maximum allowable temperature, the maximum allowable pressure and the internal fluid). Do not use a different primary fluid to that specified.
- In the event that leaks appear between the flanges joining the manifolds to the piping, after the heat exchanger is put into service, tighten the flange bolts until the leakage disappears – if the leak persists it may be necessary to replace the gasket. Be aware of the pipe-work and heat exchanger surface temperature, especially in the case of hot oil and steam coils.
- During service, sudden emissions of gas, fluid or solid fragments may take place . Take all necessary precautionary measures to avoid damage to persons or equipment resulting from these events.
- Be sure that all pipe-work complies with all your national laws and regulations.

b) Procedure

- Carefully remove the heat exchanger from its package and, if necessary clean it
- Before operation, remove any caps and/or other protectors. Once removed do not expose the equipment to the weather to avoid water infiltration which may cause oxidation and breakage due to frost.
- Every heat exchanger is engineered and manufactured to work in a precise position which is always indicated on the label and in the order confirmation. This is necessary to permit perfect draining and venting and to maximize heat transfer. Please ensure that equipment is installed in accordance with this requirement.
- The pipe-work diameter should be of the same size as the heat exchanger connections
- Inlet and outlet connections should not be mounted rigidly; allowance must be made for a suitable means of expansion to avoid damage in service due to inevitable thermal expansions.
- Commission equipment gradually. Do not put hot fluid into the heat exchanger suddenly when it is empty and cold.
- Open the coil vents and allow the fluid to circulate inside the coil until it is completely filled. Close the vent valves and gradually bring the heat exchanger up to the working temperature.
- Gradually pressurise the heat exchanger, taking care to note the presence of any leaks or other problems. At the first sign of such stop the equipment immediately.

MAINTENANCE

Preliminary remarks :

Maintenance is essential to the correct service of the heat exchanger and to achieve a maximum working life. It is recommended that the equipment is inspected at least annually by qualified personnel. If conditions are particularly severe (e.g. too much dirt in the air, or internal fluid) more frequent checks are required.

- Carry out all maintenance operations wearing suitable PPE.
- Heat exchangers can be regarded as pressure vessels due to the fact that their internal working pressure is often higher than atmospheric (up to 21 Bar working pressure). It is absolutely forbidden to perform any operation that can affect the sealing or cause any structural damage which may cause leaks and emissions of the internal fluid which is often at high temperatures and pressures and can cause damages to persons and equipment. Carry out all maintenance operations with the equipment inactive. Having stopped the equipment it is essential that all the internal fluids are discharged and that no seals are loosened until the internal pressure is reduced to 1.5 Bar (absolute) and the component temperatures are not higher than 35°C.
- During these operations, fluid emissions at high pressures/temperatures can occur. Take necessary precautions for such events.
- Always ensure that all equipment connections are fitted with gaskets before restarting the system.
- Be sure that all the components of equipment are clean and in perfect working condition.
- Vent system periodically to avoid air build up in the circuit.
- When the heat exchanger is disassembled for any reason it is recommended that new gaskets are used. This avoids future possible leaks as the gasket, in time, becomes more fragile due to dehydration. Consult the technical details and suggestions on the use of gaskets for further information.

Risks and remarks regarding frost :

- Never leave the heat exchanger inactive and filled with fluid in the tubes if low external temperatures may occur, as it may cause irreparable damages to heat exchanger in the event of freezing. In these conditions drain the heat exchanger completely to avoid problems.
- Provide, and set with care, anti-frost thermostats.

CLEANING AND CARE OF FINS

Preliminay remarks :

Inevitably some dust and dirt of various kinds will reach the fins of the heat exchanger. Their effect on the external transfer surface causes a reduction of the heat exchanger capacity. Hence it is necessary to clean the finned pack regularly :

Cleaning methods :

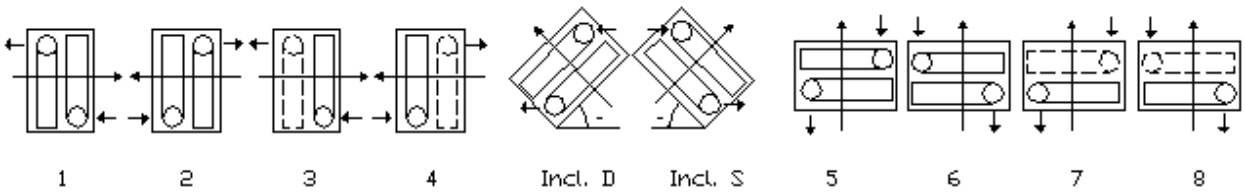
- Cleaning the external surface using compressed air. If the air pressure is extreme, damage could be caused to the fins due to bending.
- Cleaning with water with or without detergent. It is better to use cold water or room temperature water. The use of water with a temperature higher than 40°C is not recommended for evaporators and condensers, containing refrigerant and evaporable fluids.
- Cleaning with steam. Do NOT use steam for condensers and evaporators containing refrigerant / 2-phase fluids.

NOTICES AND PARTICULAR WARNINGS :

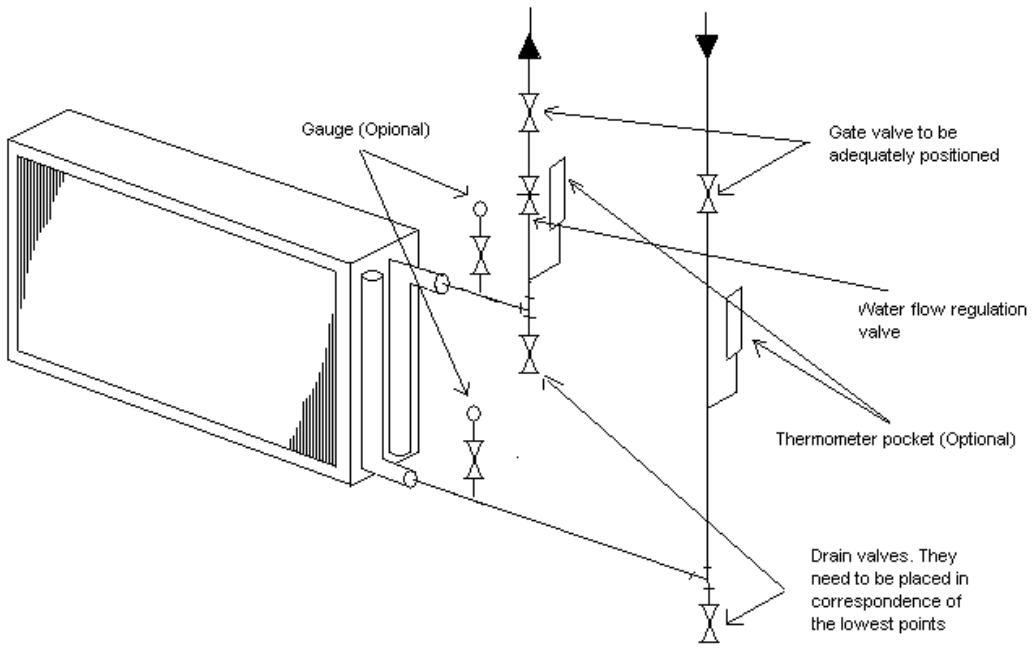
- Heat exchangers using an internal medium of steam, superheated water, hot water or hot oil may cause burns. Protect yourself suitably.

WORKING POSITIONS

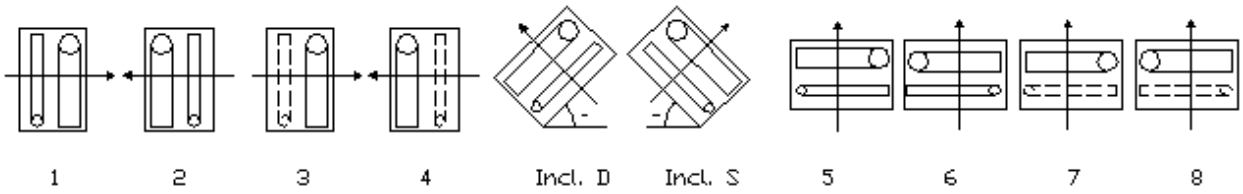
WATER / WATER + GLYCOL HEAT EXCHANGERS



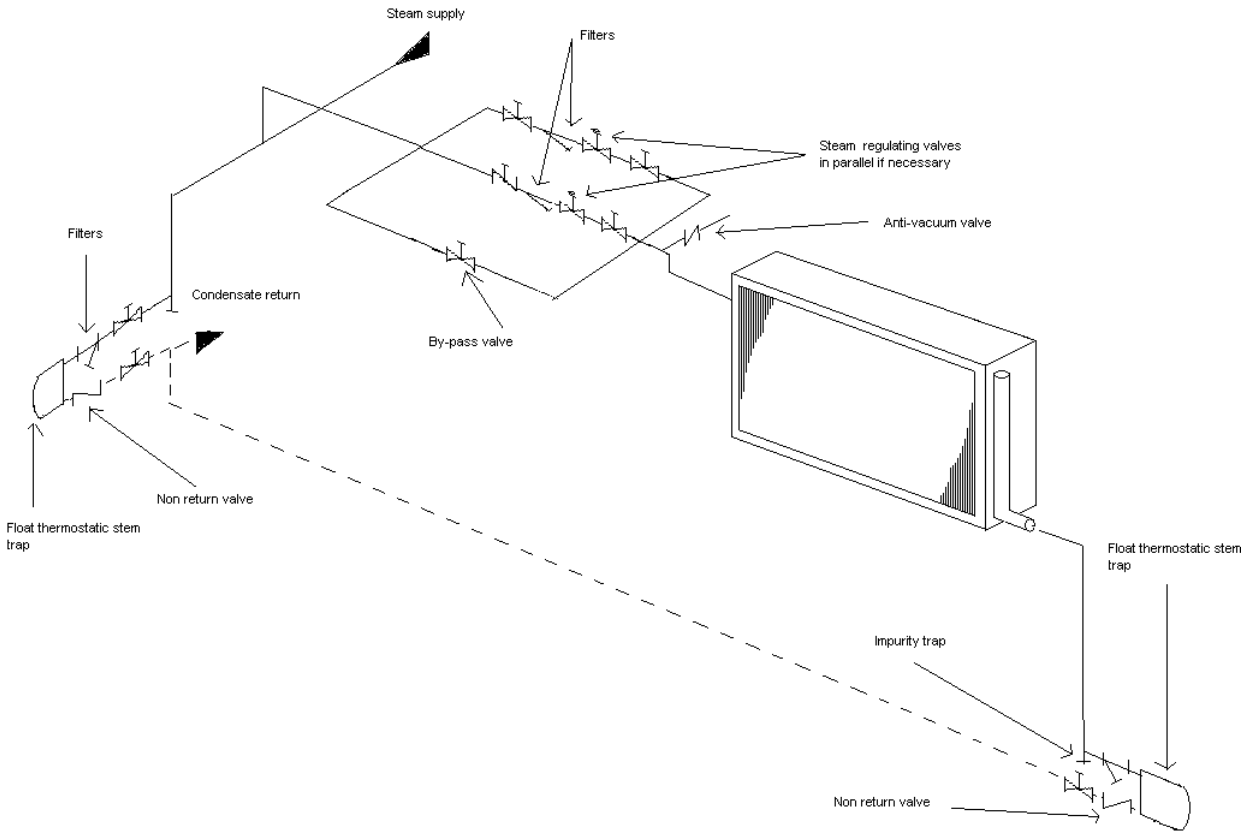
Typical installation scheme



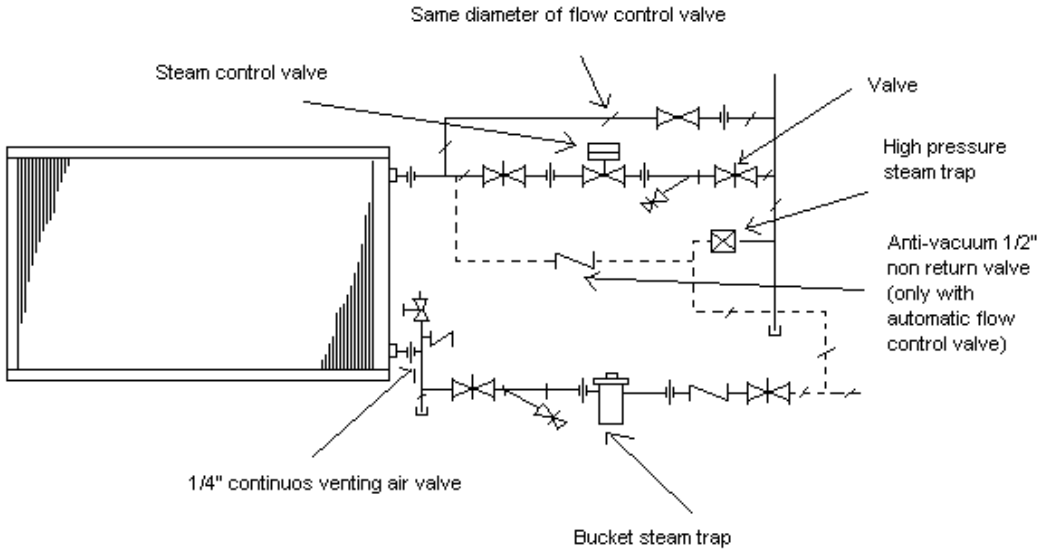
STEAM COILS



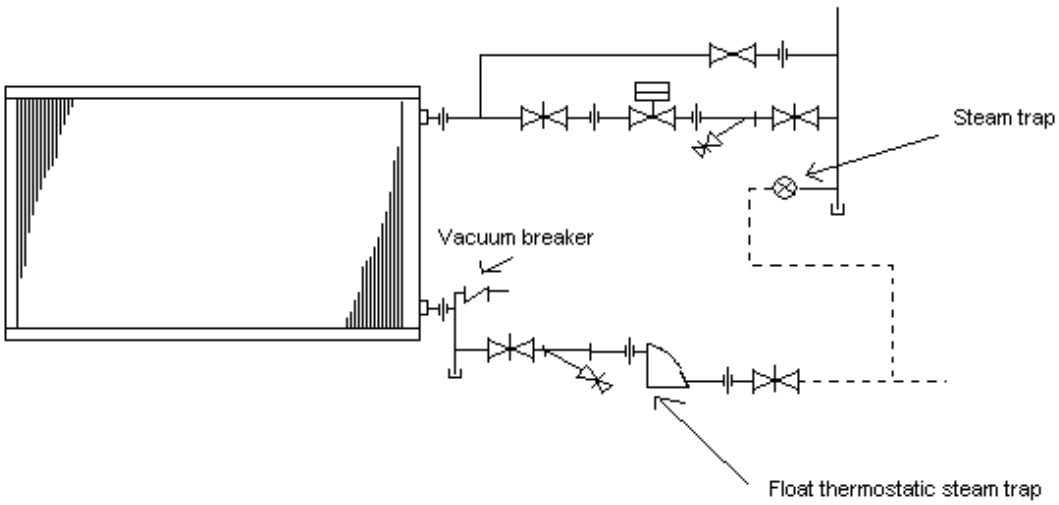
Typical installation scheme



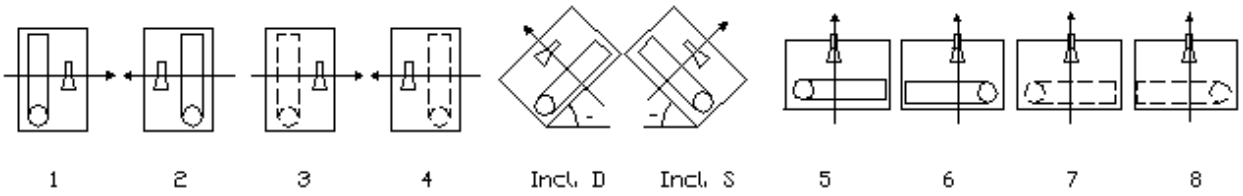
High-medium steam pressure installation scheme



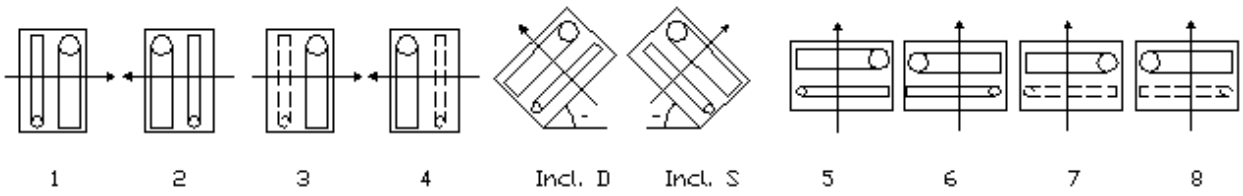
Low pressure steam installation scheme



DIRECT EXPANSION COILS (EVPORATORS)



CONDENSERS



NOTE:

All the schemes presented are not exhaustive as they are as general as possible. For further information please do not hesitate to contact your installer or our technical department .