

EXTRA 1 ½ HP
INSTRUCTIONS AND SERVICE MAINTENANCE

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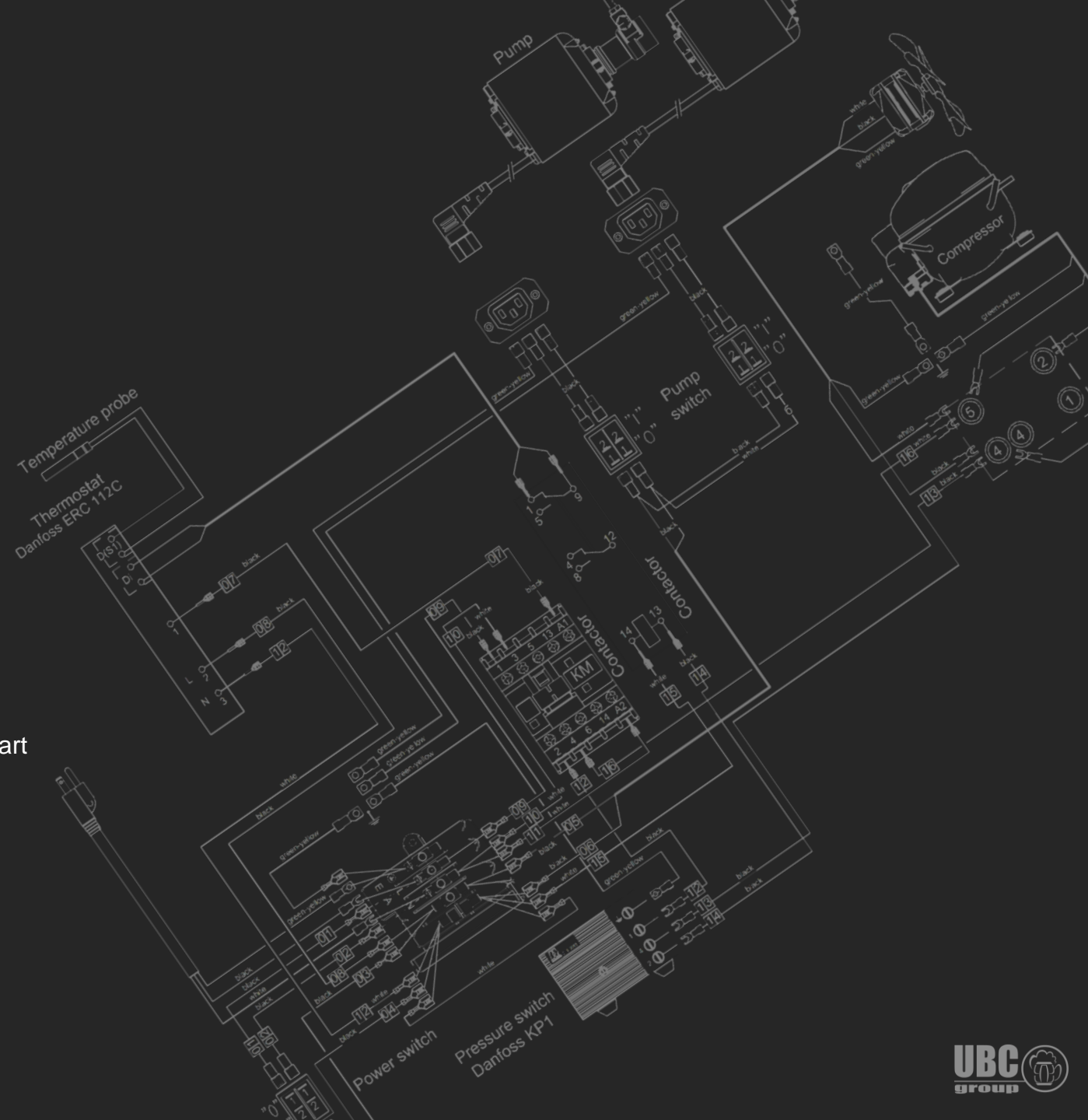
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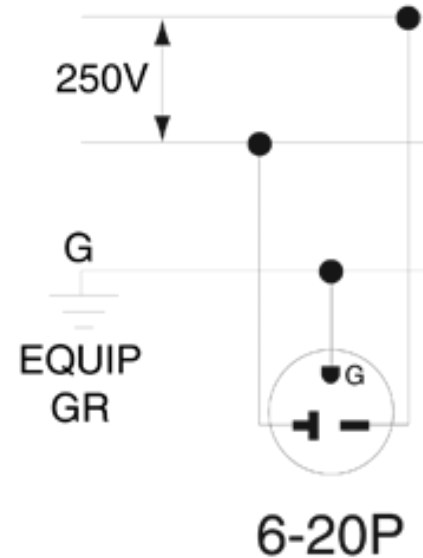
DESCRIPTION OF THE CONSTRUCTION

1.0 - DESCRIPTION

Glycol chiller Extra 1 ½ hp it was designed for cooling of the product pipeline (python). The chiller works from the electrical network with the parameters of 230V 60Hz and a line with a maximum current of 20A. Plug Type: NEMA 6-20P.

The chiller is available in versions with a NEMA 6-30P plug, and a Hardwire connection. In the standard version, the chiller is completed with two pumps, however, the design allows the installation of up to two additional pumps (subject to the expansion of the collector as shown in fig. 5.10). The evaporator in the refrigerator is a plate heat exchanger, this solution allows to significantly reduce weight of the chiller, the cost and refrigerant charge weight and also allows the chiller to work with a significant decrease in glycol in the bath, practically without loss of cooling capacity. However, the chiller requires at least one pump to be always on. The regulation device is thermal expansion valve (TXV). The chiller is charged with refrigerant R404A, the quantity needed is indicated on the supplier sticker.

The chiller is set up from the factory and does not require additional adjustment before starting or during operation. The aggregate part is designed in such a way that the electrical part is concentrated on one side, and, most of the soldering is on the opposite side. In this way, the maintenance of the chiller is simplified and the probability of electric damage during service soldering is reduced.



COOLER OPERATING PRINCIPLE

2.1 - REFRIGERATION UNIT

The main components of the chiller refrigeration machine are:

- Compressor
- Condenser
- Filter-dryer-receiver
- TXV, evaporator
- Refrigerant accumulator
- Condenser fan
- Pressure switch

The evaporator is a plate heat exchanger, this is because using a copper tube as an evaporator would significantly increase the weight of the chiller, would have to use a larger bath that would increase the dimensions of the chiller, its filling dose and the cost of the chiller.

The use of a plate heat exchanger requires the use of TXV and filter-dryer-receiver. This design provides a higher efficiency of the refrigeration machine over a wide range of ambient temperatures.

The low pressure switch is installed to prevent an accident, in case of: shutting down / breaking the pump, glycol leakage, and other situations when the pressure in the suction line is less than acceptable.

When the pressure switch is activated, the thermostat's display will light up on the screen of the thermostat indicating a warning message – dor.

Refrigerant accumulator is necessary to prevent the refrigerant from entering the liquid phase in the compressor.



COOLER OPERATING PRINCIPLE

2.2 - GLYCOL CIRCUIT

The two pumps suck the cooled glycol from the bath and send it to the cooled object, where it receives heat, after which the already hot glycol from the two circuits enters to the collector and returns to the evaporator, where it is cooled. In the case when not all pumps are working, to prevent leakages through other circuits, the check valves are installed in the manifold.

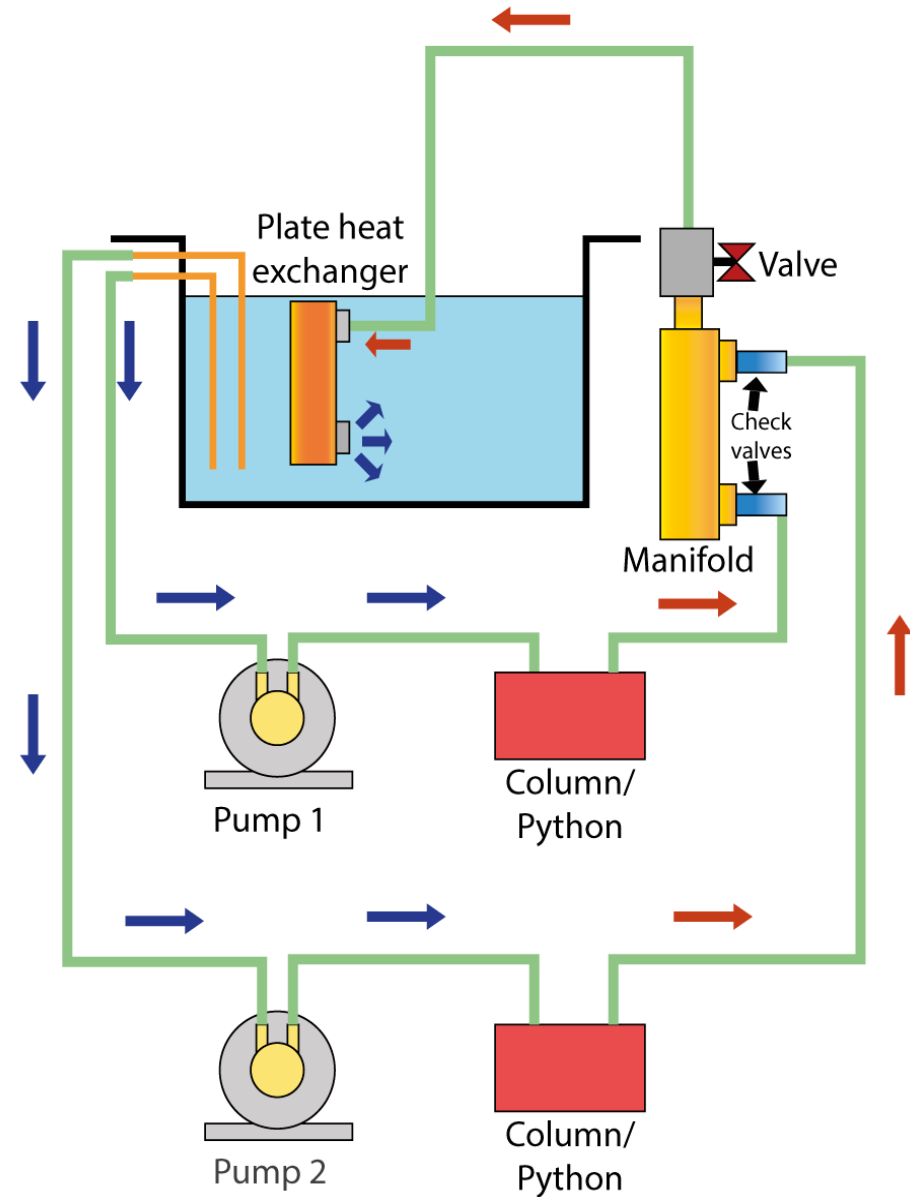


Fig. 2 - The scheme of operation and connection of the glycol circuit is shown in

COOLER OPERATING PRINCIPLE

CHILLER'S ELECTRICAL CIRCUIT

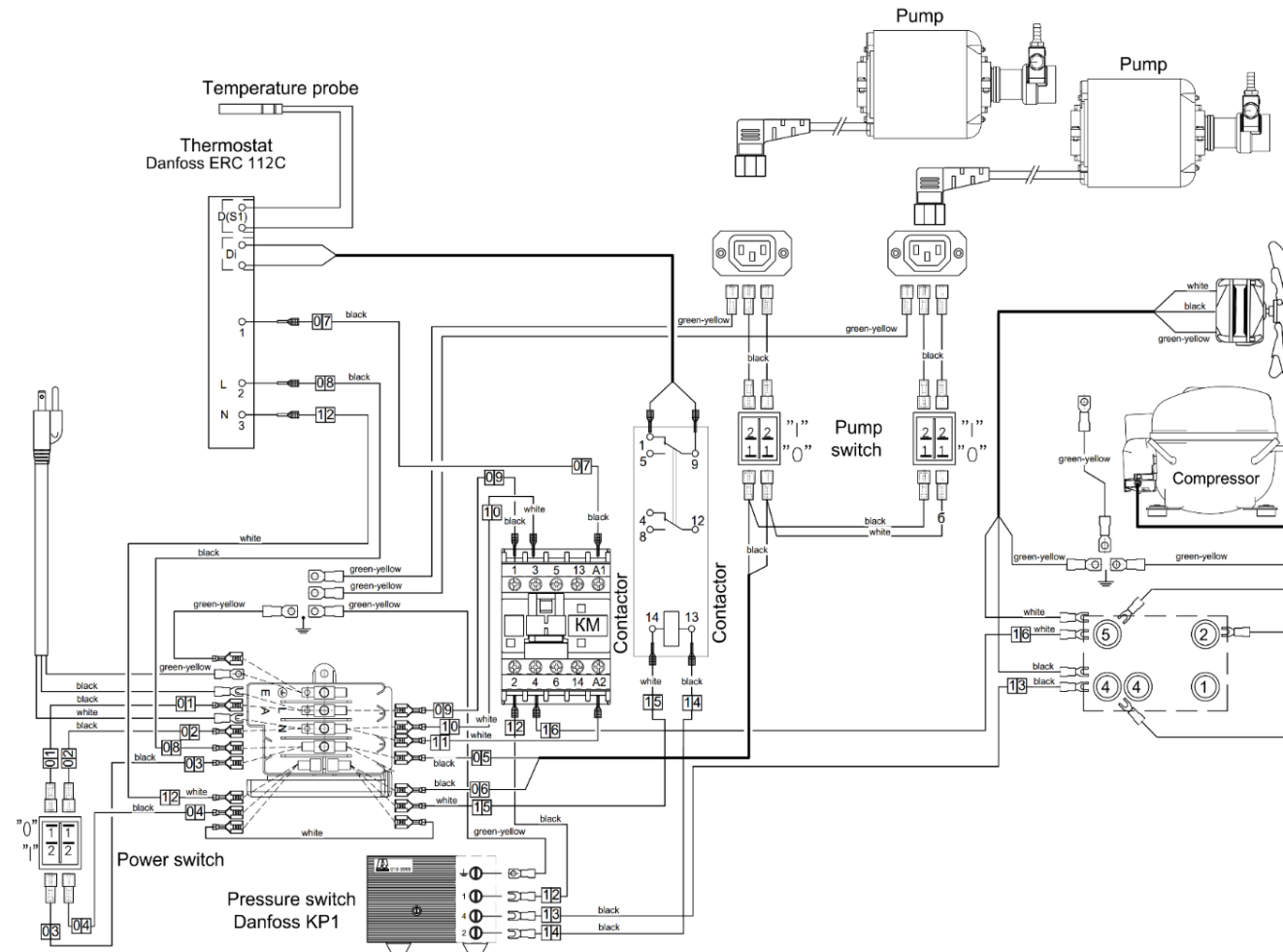


Fig.3 - The electrical circuit of the chiller

CHILLER PARAMETERS

3.0 - CHILLER PARAMETERS

This chiller was developed under the line of chillers Extra, the general dimensions in width and depth are the same, only the overall dimension in height has increased.

Maximum distance, ft	up to 750
Capacity, BTU/h, evap 20 °F	10800
Glycol tank capacity, gal	18
Dedicated circuit, amp	20
Compressor power, hp	1 1/2
Plug type (NEMA #)	6-20P
Voltage, V	230
Pump, GPH	80
Number of pre-installed pumps	2
Number of additional pumps*	2
Refrigerant	R404A
Width, in	29
Depth, in	23
Height, in	32/38 (on legs)
Weight gross/net, lb	205 / 193
Power cord length, ft	6
Inlet/Outlet barb, in	3/8
Operating ambient temperature, °F	60-90
Glycol mixture, vol%	40 % glycol and 60% water

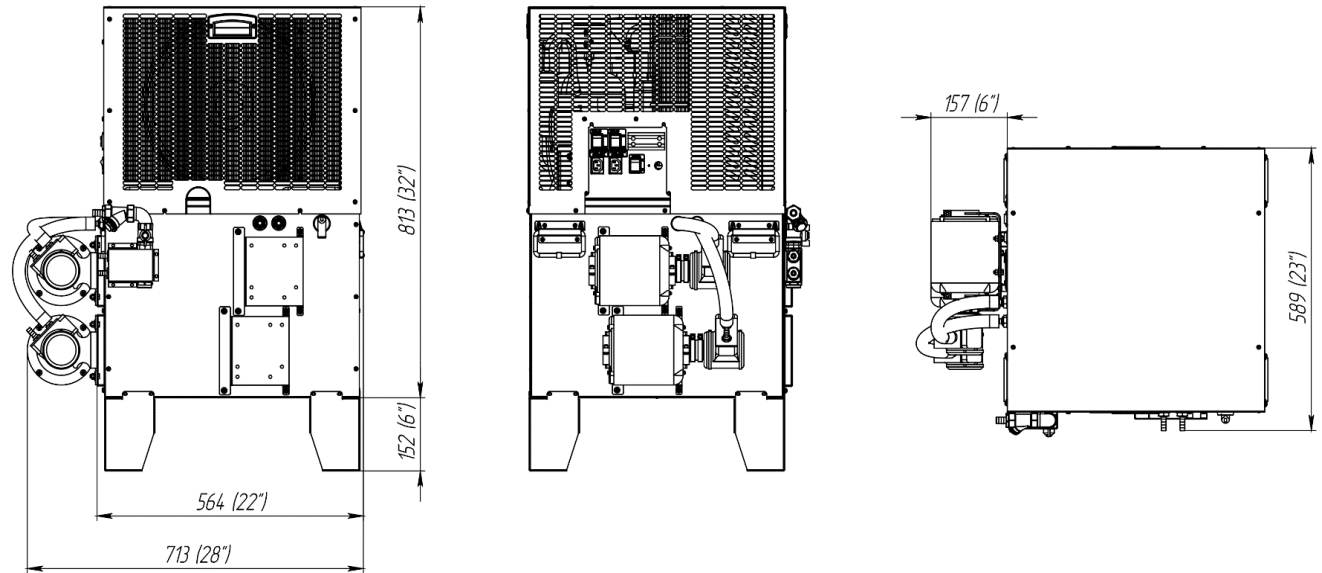


Fig. 4 - Overall dimensions

PREPARATION AND START-UP OF THE CHILLER

4.1 - PREPARATION OF THE CHILLER FOR THE FIRST START-UP

Before the first start-up, it is necessary to install the chiller according to the instructions, connect the pythons and fill the Propylene glycol / water solution with a concentration of 40% Propylene glycol and 60% water. To do this, remove the cover and by using the funnel, pour the glycolic solution until it does not overflow.

ATTENTION: the level of glycol in the bath may decrease after the start-up of the chiller, while it will fill the pythons of the cooling circuit, therefore, after the first start-up, it is necessary to make sure that the level of the liquid in the bath is correct, and if necessary, add some more.



PREPARATION AND START-UP OF THE CHILLER

4.2 - START UP OF THE CHILLER

Before each start-up, it is necessary to make sure that the chiller is in perfect condition, not contaminated, there are no obvious signs of leakage of glycol solution, the power cord has no mechanical damage, the body (shell) is securely fastened to the chiller.

Before installing the power cord in the outlet, make sure that all the buttons on the electrical panel are in the "off" position, and the cords of the pumps are installed in the corresponding outlet on the electrical panel.

The power cord should be installed in the appropriate outlet, with the parameters of the network 230V 60Hz. After installing the power cord, it is necessary on the electrical panel to turn the button of one of the pumps in the "on" position, and then turn the power button in the "on" position. The buttons will light up, the pump will start working, the display on the thermostat will light up, and after a few seconds the fan and compressor will turn on, as well. Turning on the other pumps is only allowed after cooling a Propylene glycol / water solution in the bath,



SERVICE MAINTENANCE

5.1 - REMOVING THE SHELL FOR CLEANING THE CONDENSER

1. Unscrew the eight screws.

Fig. 5 Screws that hold the shell

2. Carefully lift the shell up.

The condenser should be cleaned according to their cleaning and maintenance requirements.

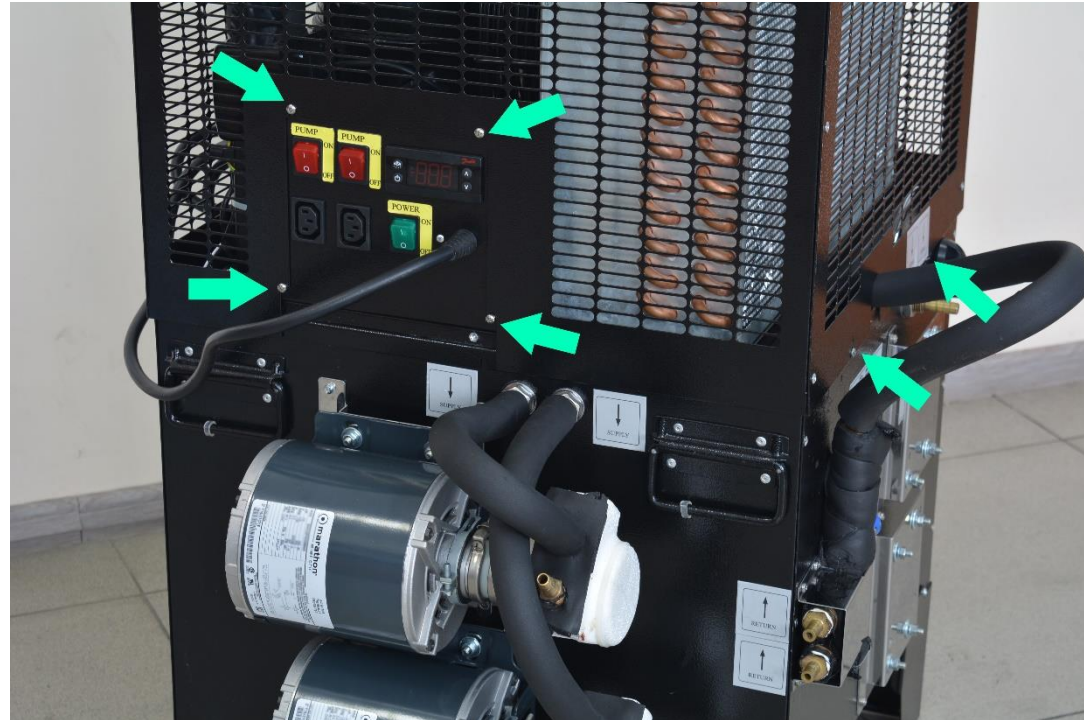


Fig. 5 – Screws that hold the shell

SERVICE MAINTENANCE

5.2 - GLYCOL RECHARGE

To fill the glycol, it is necessary to remove the cap as shown in fig. 6 and fill the Propylene glycol / water solution with a concentration of 40% Propylene glycol and 60% water using a funnel until it does not overflow.



Fig. 6 - Removing the cap to fill the glycol

SERVICE MAINTENANCE

5.3 - REMOVAL AND INSTALLATION OF THE AGGREGATE PART

The removal of the aggregate part of the cooler must be done by at least two people. For this you need:

1. Overlap the valve on the manifold assembly.
2. Remove the shell.
3. Unscrew the nut with a 32 mm wrench and disconnect the glycol return hose.

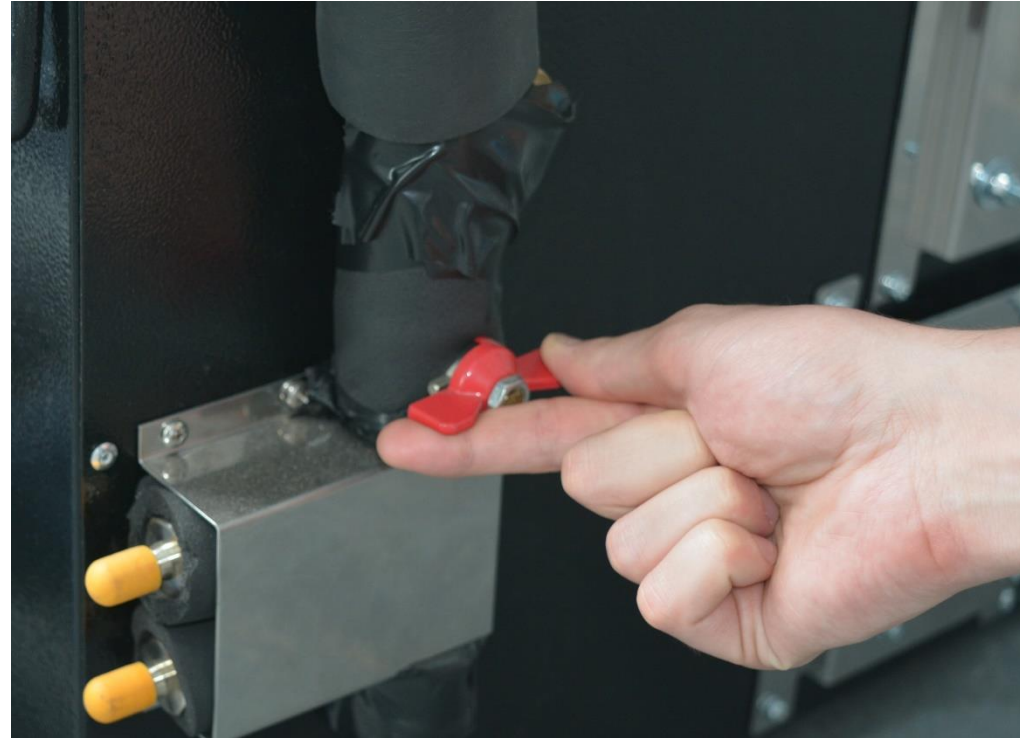


Fig. 7 - Valve overlap on the manifold assembly

SERVICE MAINTENANCE

5.3 - REMOVAL AND INSTALLATION OF THE AGGREGATE PART

4. Two people standing on the right and left remove the aggregate part.

The aggregate part has a very rigid stands.



Fig. 8 - Disconnecting the glycol return hose

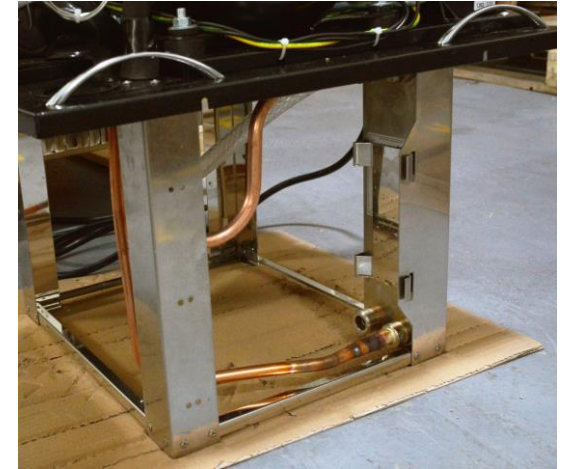


Fig. 8 – Stands of the aggregate part

SERVICE MAINTENANCE

5.3 - REMOVAL AND INSTALLATION OF THE AGGREGATE PART

The installation must be carried out in reverse order. Note that the condenser fins are on the front of the cooler (otherwise, the aggregate part will not be installed).

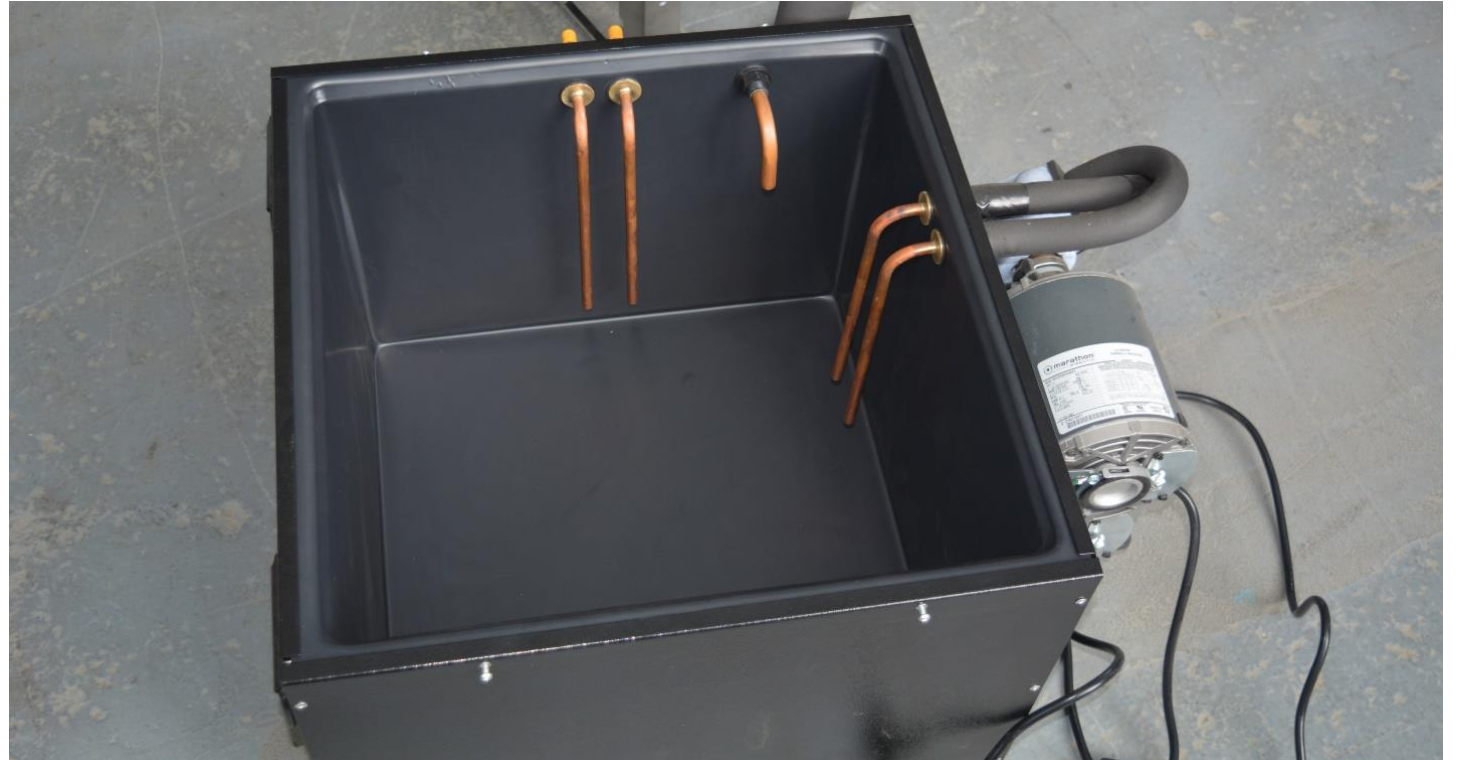


Fig. 10 - View of the cooler bath

SERVICE MAINTENANCE

5.4 - REPLACEMENT OF THE FAN

1. Unscrew 4 condenser bolts with a 13 mm wrench.
2. Move the condenser away from the compressor, Turning it slightly.

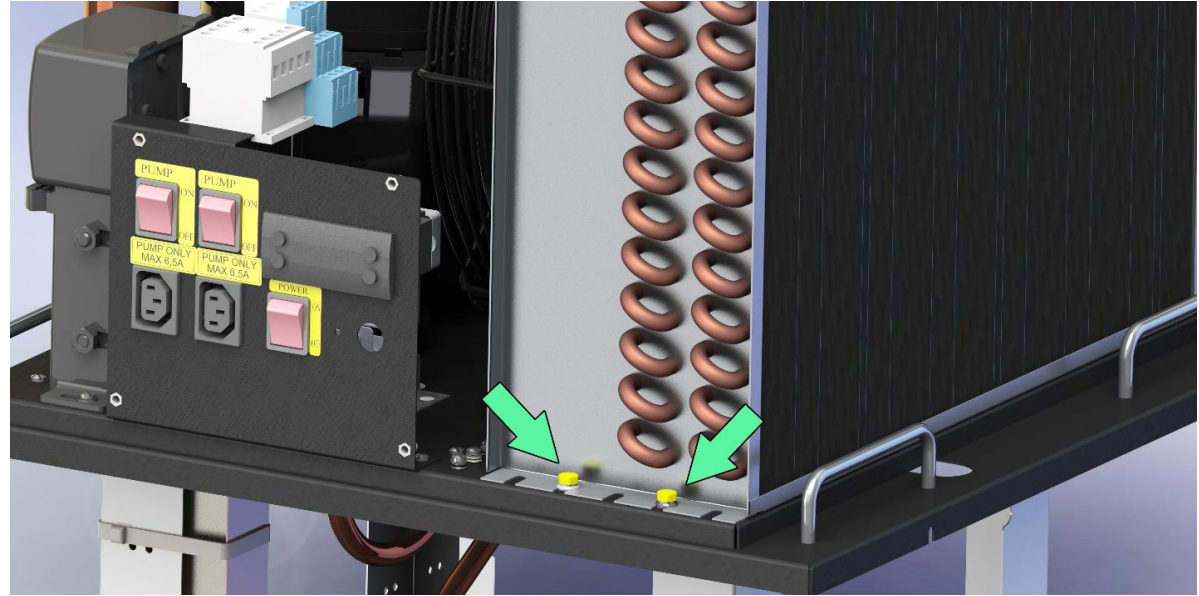


Fig. 11 - Bolts holding the condenser.



Fig. 12 - Retracted Condenser

SERVICE MAINTENANCE

5.4 - REPLACEMENT OF THE FAN

3. Unscrew 4 fan bolts with a 13 mm wrench.
4. Remove the fan assembly with the casing.
5. On the fan removed, unscrew the two screws and remove the cover.
6. Unscrew the cord terminals, loosen the cable clamp and pull out the cord.
7. Install the cord in the new fan and install the fan in the reverse order.



Fig. 13 - Bolts fastening the fan



Fig. 14 – Fan cover screws

SERVICE MAINTENANCE

5.5 - REPLACEMENT OF THE COMPRESSOR

Replacing the compressor is similar to the Extra $\frac{3}{4}$ hp and Extra $\frac{1}{2}$ hp chillers. To do this, it is necessary to release refrigerant, evaporate the discharge and suction tubes, disconnect the compressor from the electrical box, and, with a 13 mm wrench, unscrew the four nuts securing the compressor to the platform. Installation is performed in reverse order. Ensure tightness of the refrigerant circuit. The refrigerating machine is charged with refrigerant and weight indicated on the nameplate.



SERVICE MAINTENANCE

5.6 - REPLACEMENT OF THE EVAPORATOR

The evaporator is a plate heat exchanger, for its replacement, it is necessary:

1. Perform the removal of the aggregate part.
2. Unscrew the worm clamp from the evaporator and disconnect the hose.
3. Blow off freon and desolder the adapter from the evaporator, - taking it with pliers, move it away from the evaporator. The design of the tubes provides for their displacement without excessive deformation. Cleanup tubes from flux and solder.
4. unscrew the two screws, remove the holder and remove the evaporator.
5. Unscrew the fitting.
6. Before installing the new evaporator - install the fitting, pre-wound on the threads of the PTFE-tape, thereby ensuring the tightness of the connection. Install the new evaporator in reverse sequence. Pay attention to the fact that refrigerant outs are marked with orange circles (Q3-Q4). Solder with silver solder.

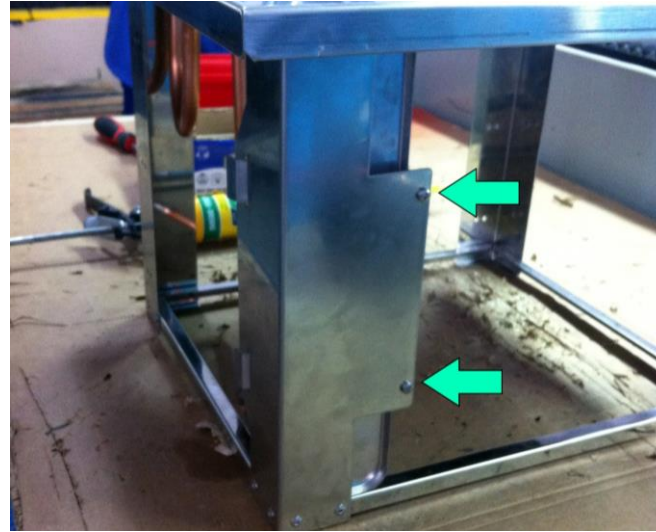


Fig. 16 - The screws holding the evaporator tack

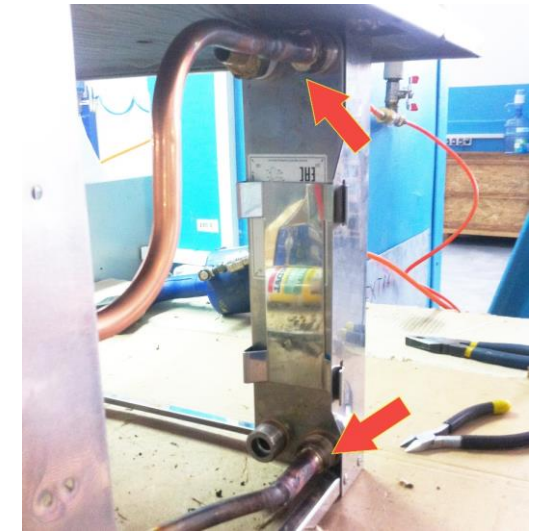


Fig. 15 - Soldering points for replacing the evaporator

SERVICE MAINTENANCE

5.7 - REPLACEMENT OF THE THERMAL EXPANSION VALVE

Replacing the TXV does not require special descriptions. The main requirements - when installing a new TXV, wrap the case with a wet cloth, solder with silver solder but do not allow it to overheat during soldering.

Install the bulb on the lower horizontal section of the refrigerant return tube, ensuring a tight fit to the tube. After installation, insulate thoroughly.

The replacement of the TXV can be done in two ways, - with the removal of the filter-dryer-receiver, and without. When removing and installing without a filter, - use the help of a mirror to make sure of the quality of the soldering. When removed with a filter, the soldering process is more convenient. For this you need:

1. Desolder the top filter tube.
2. Desolder the L-shaped tube out of the low-pressure tube.
3. Desolder the tube out of the TXV alignment line.
4. Cut off two ties that are holding filter-receiver.



Fig. 17 - Top receiver - filter tube

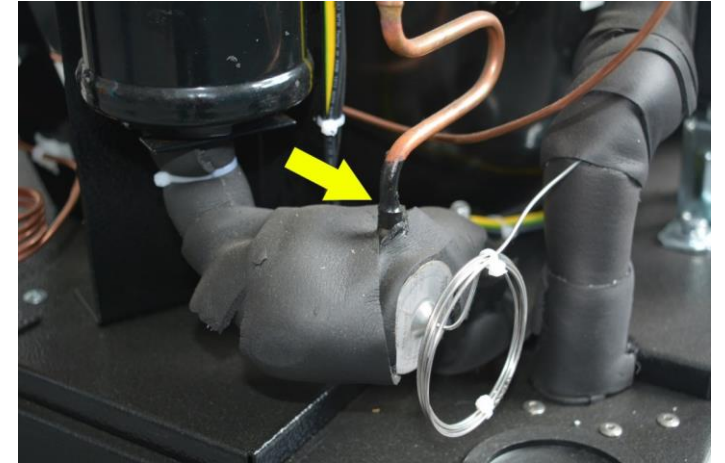


Fig. 18 – Alignment Tube

SERVICE MAINTENANCE

5.7 - REPLACEMENT OF THE THERMAL EXPANSION VALVE

5. remove the filter assembly from the TXV slightly raising the filter and pull the tube through the notch in the bracket
6. Desolder TXV from the filter tube and from the I-shaped tube.
7. Install a new TXV according to the diagram in fig. 20, having previously wound the body of the TXV into a wet cloth. All the outlets of the TXV are soldered with silver solder, and the outlets of the filter-dryer-receiver are made of copper-phosphorus.
8. Install the TXV together with the filter in the bracket, install all the mating tubes, solder it and then fix the filter with two clamps of at least 5x400 mm in size.
9. Set the TXV bulb to its original position.



Fig. 19 - Ties holding filter-receiver



Fig. 20 - Scheme of installation of TXV with filter-dryer-receiver

SERVICE MAINTENANCE

5.8 - REPLACEMENT OF THE THERMOSTAT AND OTHER ELEMENTS OF THE ELECTRICAL PART

After removing the cover, access to the electrical part of the cooler opens. If maintenance or access to a node is difficult, it is enough to unscrew the two screws that secure the electrical panel three turns and disengage it from the platform. In the removed position, access to all elements of the electrical part.

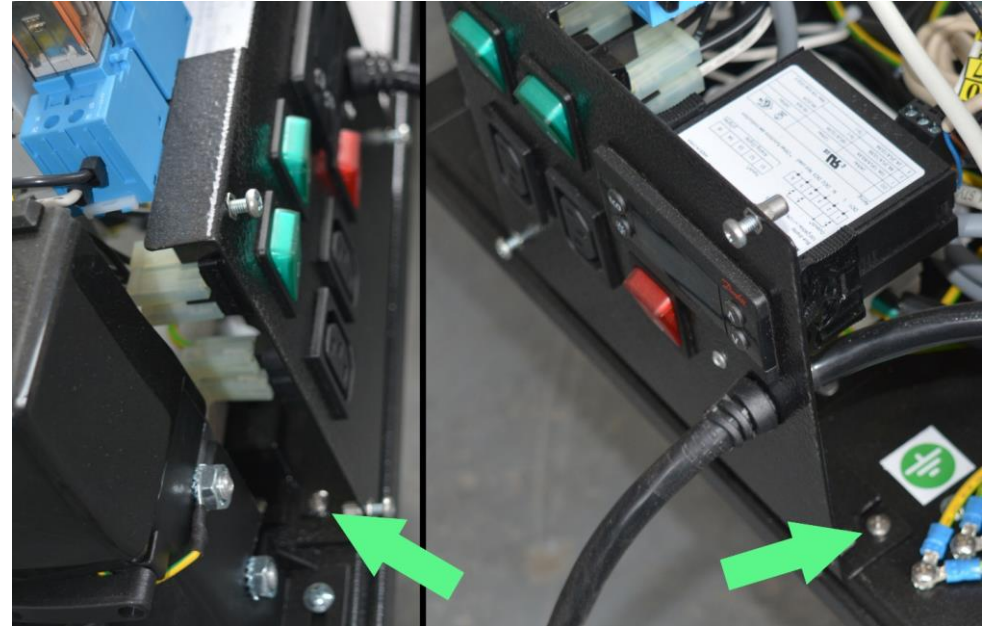


Fig. 21 - Electrical panel fixing screws

SERVICE MAINTENANCE

5.9 - ADDITIONAL EQUIPMENT OF THE COOLER – PUMPS

The cooler can be installed by the service master on its own. To do this, you must have at your disposal nozzles with an electric motor with a circulating pump and a skin pump installed, as well as an additional manifold with nozzles and check valves.

ATTENTION: the installation of the collector part should be carried out only when the glycol is completely drained from the circulation system (glycol may remain in the bathroom).

In the standard version of the cooler, with a 20-amp plug, electrical connection for two additional pumps is not provided, because they must be connected to separate sockets with the corresponding voltage.

To remove the collector assembly, it is necessary to unscrew the six screws securing the bracket.

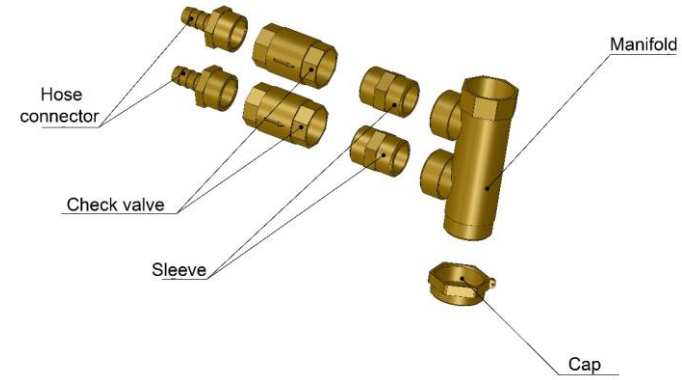


Fig. 22- Manifold to install additional pumps

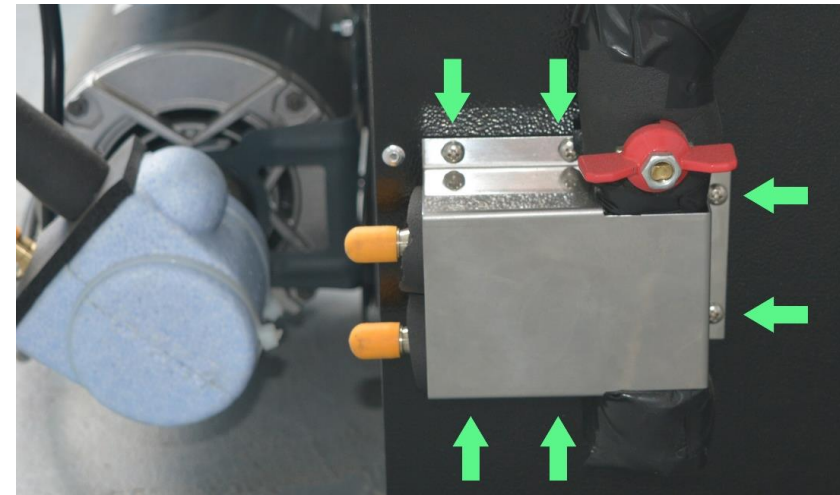


Fig. 23- Screws securing the collector bracket

SERVICE MAINTENANCE

5.9 - ADDITIONAL EQUIPMENT OF THE COOLER – PUMPS

Before connecting the additional collector part, it is necessary to remove the lower part of the insulation and unscrew the plug from the installed unit.

After coupling the collectors, it is necessary to make sure that the joints are tight, and then - to insulate them thoroughly. Installation to the body is made with a standard bracket, mounted to the upper manifold. It is recommended to stick "Return" stickers on the cooler case, denoting the return exits of glycol pythons.

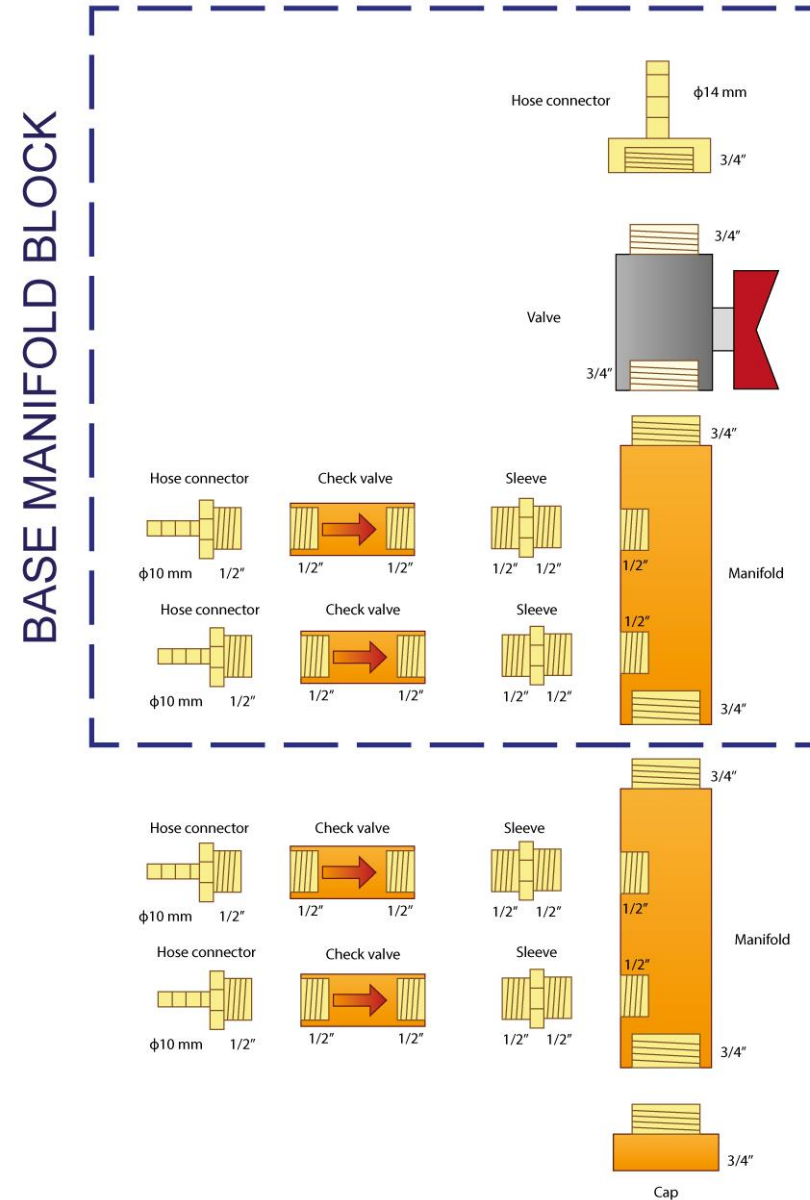


Fig. 24- Installation scheme additional collector unit