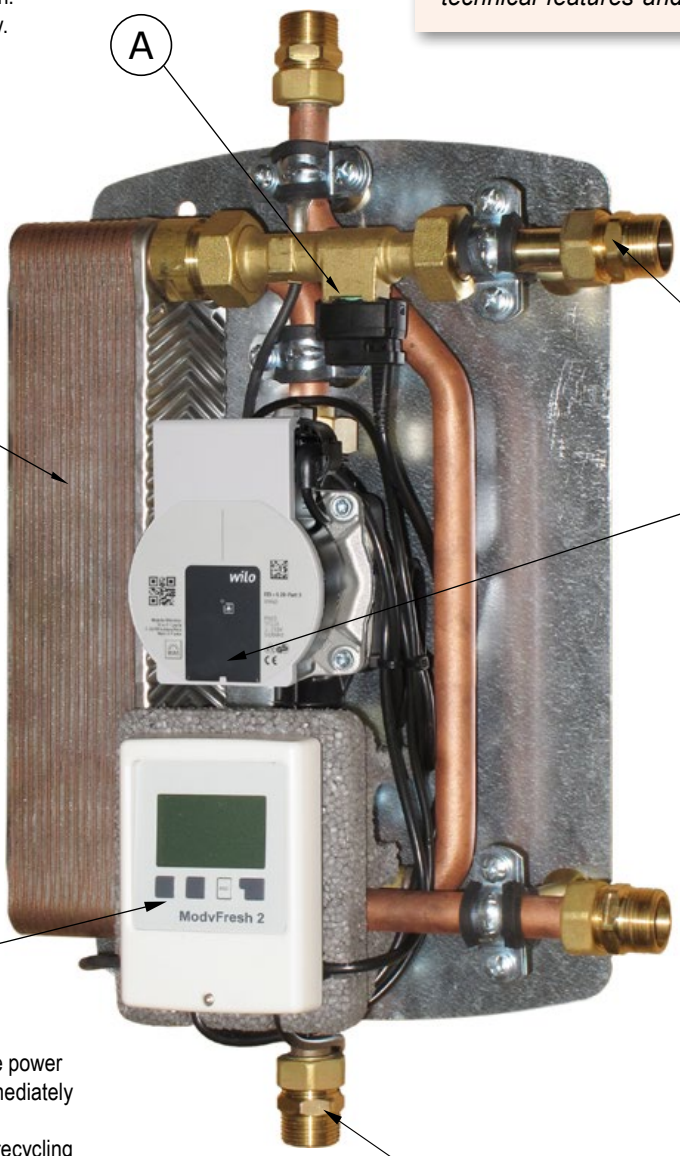
Directions for installation

List of features of main components

(A) VFS digital flow counter
Thanks to this special device the regulations and the settings of the pump unit are no longer required. The required variation of flow is immediately read by the digital sensor, therefore the controller adjusts the speed of the circulating pump to get the better performance of your installation. The flow appears on the LCD display.

SAFETY: *Please read carefully the mounting and the setting working instructions before starting the unit, in order to avoid accidents and failures caused by an incorrect use of the product. Please keep this manual for future consultations. Please also read the technical features and the instructions of the controller.*



(B) Check valve
Installed into the hot domestic water connection, prevents back flow of energy.

(F) Heat exchanger
Weld-braised plate heat exchanger made in stainless steel AISI 316. The large heat exchange surface assures a great heat exchange that allows the return of the water to the storage tank at a low temperature down to 25°C. This low temperature allows a perfect performance of the solar or of the heat pump supply. The heat exchanger can be easily removed for the service and/or the cleaning by means of the right-hand side opening od the insulation box.

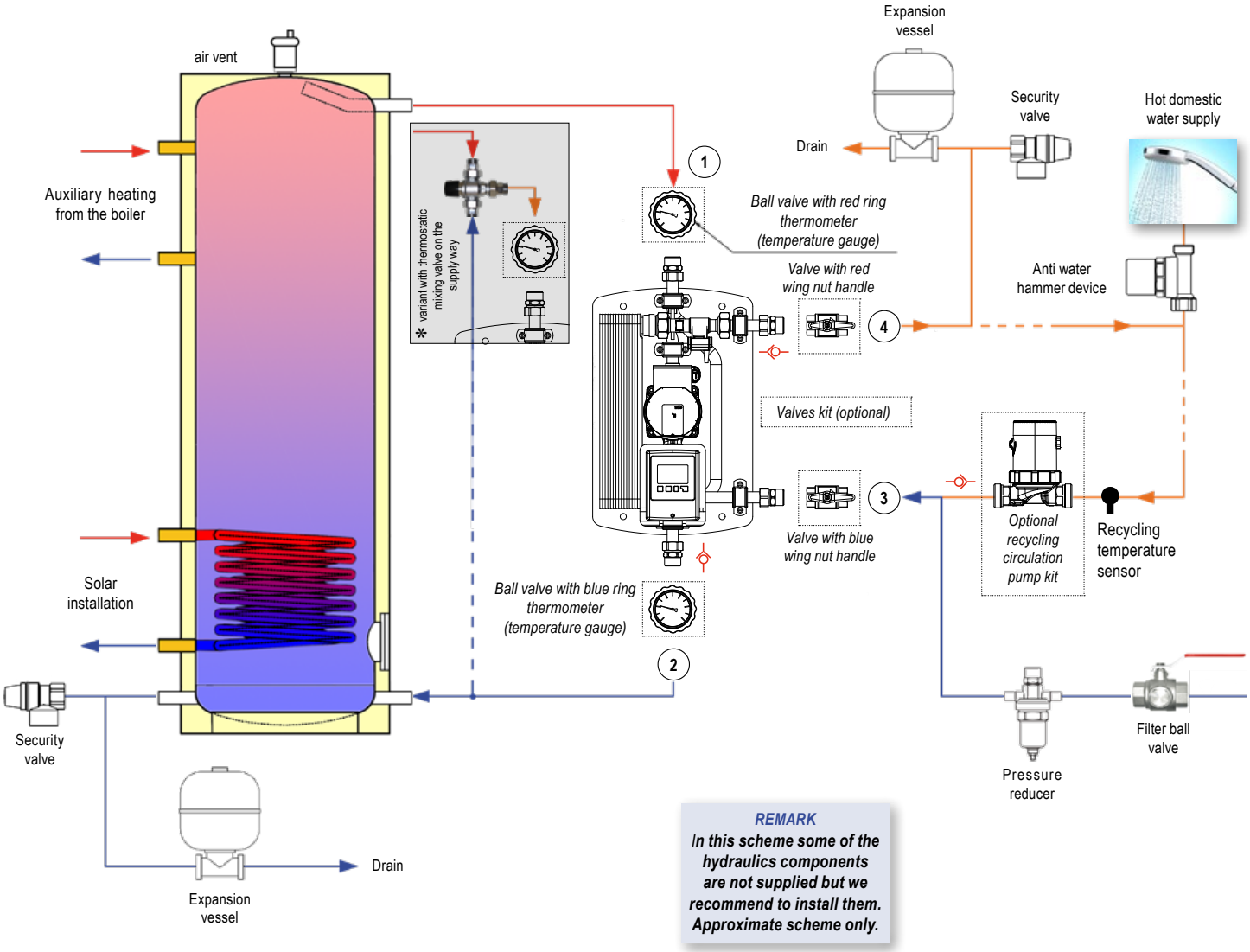
(C) High efficiency circulating pump
High efficiency circulating pump compliant with European Directive 2009/125/CE.
The special electronics adjusts the speed of the primary circulating pump, from a minimum speed of 10% up to the maximum selected speed, in order to assure always the selected temperature (f.i. 45°C).

(E) Controller
The flow, the temperatures and the power produced by the installation are immediately displayed on the controller.
The model with the handling of the recycling loop is equipped with an external connection box for the recycling circulating pump and with an additional sensor for the detection of the temperature of the recycling loop.

(D) Check valve
Installed into the return connection to the storage tank, prevents back flow of energy.

EPP insulation box
Measurements: 277 x 417 x 137 mm.
A special metal back plate fixes the unit to the insulation box and it allows a quick fitting to the wall or to the storage tank.

Hydraulic and connection scheme



***Pict. 1**: Layout of a plant for deliverying fresh domestic water by using ModvFresh 2*

Technical Features

Maximum allowed pressure (without water hammer):	***10 bar***
Working temperature:	***2 ÷ 95°C***
Headloss in the secondary circuit at the flow of 20 l/min *(50 kW model)*:	***3 mH_2O***
Headloss in the secondary circuit at the flow of 30 l/min *(70 kW model)*:	***6,5 mH_2O***

✻ In presence of calcareous water, the high temperature of the supply way from the buffer tank can make calcareous scales inside the heat exchanger. Therefore we suggest you to limit this temperature, by means of a thermostatic mixing valve adjusted to the needed value (as indicated in the grey square).

Connections and links

PRIMARY CIRCUIT

1. **Supply from the storage tank:** 3/4" ISO 228 male connection. Minimum diameter of the pipe DN20 (Cu 22x1). Maximum length: 3 m.
2. **Return to the storage tank:** 3/4" ISO 228 male connection with check valve. Minimum diameter of the pipe DN20 (Cu 22x1). Maximum length: 3 m.

SECONDARY CIRCUIT

3. **Cold water supply:** 3/4" ISO 228 male connection. Minimum diameter of the pipe DN20 (Cu 22x1).
4. **Hot domestic water outlet:** 3/4" ISO 228 male connection with check valve. Minimum diameter of the pipe DN20 (Cu 22x1).

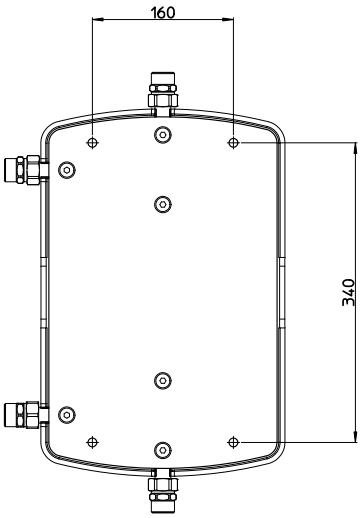
Materials

Pipe fittings	Piping	Insulation	Heat exchanger	Gaskets	Circulating pump
Copper alloy CW617N / CW614N	Copper	EPP	Stainless steel AISI 316 L Copper	EPDM	Composite material

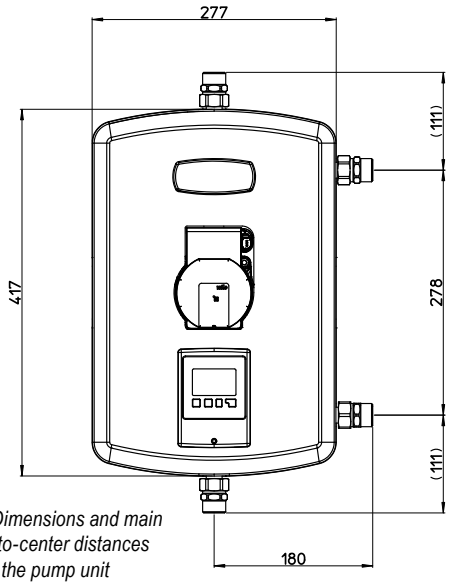
Installation

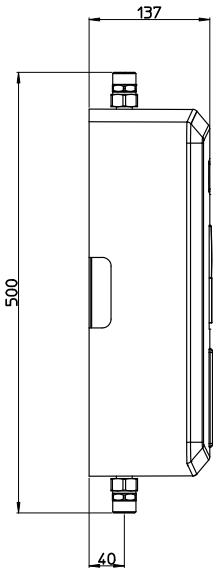
The pump unit can be mounted directly on the storage tank, if it is provided with the proper connections or to the wall, near by.
For the wall mounting follow the directions:

- ✓ Find the position of the 4 holes to be made into the wall according to the scheme *Pict.2*;
- ✓ Bore and put the proper screw anchors;
- ✓ Remove the cover and fix the pump unit;
- ✓ Mount the connection valves set (optional) according to the *Pict.1*;
- ✓ If the recycling kit (optional) is used: install the circulating pump and place the recycling temperature sensor according to what is indicated in the *illustration 1*;
- ✓ Connect the pipes in accordance to the connection scheme follwing the directions in *Pict.3*.



***Pict. 2**: Back plate for wall mounting*



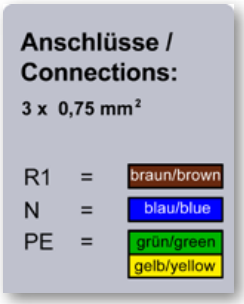


***Pict. 3**: Dimensions and main center-to-center distances of the pump unit*

Wiring of the optional recycling circulation pump

The controller is supplied already wired-up. The power supply cable, wired-up too, must be connected to the 230 VAC electric system only after having finished the connection of the recycling circulating pump, if present. For a quick and functional connection of the circulating pump it is not necessary to operate on the controller, it is enough to put the cable into the automatic connector of the connection box.

To do these operations, please use only qualified staff.



✓ **To connect the circulating pump to the connection box:**

The connection must be done following the scheme here at side. The connection box must be fixed near the pump unit.

N: Neutral;

PE: Ground;

R1: Phase of the circulating pump

Filling

The pump unit has been tested under pressure leaking in the factory. Anyway we recommend to check again the connections.

The storage tank must be put under pressure (about 2 bar).

- ✓ Open slowly the valve in the position 1 *(supply from the storage tank)*, purge the circuit, open slowly the valve in the position 2 *(return to the storage tank)*;
- ✓ Open slowly the valve in the position 3 *(cold water supply)*;
- ✓ If the optional recycling kit equipped with ball valve has been installed, open the valve very slowly.
- ✓ Open slowly the valve in the position 4 *(hot domestic water outlet)*;
- ✓ Open slowly one or more outlets for some minutes to let the air going out from the secondary circuit;
- ✓ Close the outlets;
- ✓ Breathe out the storage tank and in case restore the pressure.

Electrical connections

DANGER

The pump unit is pre-wired. A Shuko plug is necessary to connect it to the electric system. Voltage: 230 VAC ± 10%. Frequency: 50÷60 Hz. Maximum absorbed power: 50W.

Setting up

✓ Read carefully the instructions of the controller;
✓ Plug;
✓ Select the desired language, set the hour and the date as described in manual's pages.

Recommendations

✓ Try to avoid pressure peaks during the working and the filling of the installation, to avoid to damage the VFS sensor. Eventually put nearby an anti-water hammer device.
✓ The VFS sensor begins to record the flow rate starting from 2 l/min. For a correct working following is recommended a minimum flow rate: 3÷4 l/min.
✓ Be sure that the electric installation is provided with an efficient ground tap.

Suggestions / Remarks on the delivery capacity

The temperature into the storage tank must be almost 5K higher than the desired temperature of the domestic water. Higher differences of temperature allow to extend the delivery time of the hot water. In presence of calcareous water we recommend not to exceed the temperature of 70°C (supply from the storage tank) to avoid limescale into the secondary side of the plate exchanger, in case put a thermostatic valve (*Pict.1*).

DANGER: SCALDS

To avoid scalds to the user the supplied water must never be over 60°C. This temperature limit is preselected into the controller, anyway it can be reduced.

Minimum delivery capacity

To ensure a constant temperature of the HDW delivered, a minimum flow of delivery capacity is required. In the following table there is an example of delivery with a cold water temperature of 10°C on the supply: minimum deliveries are shown necessary to ensure stability at 45°C requested by the user, making various assumptions of water temperatures provided by the tank.

Water temperature on supply from the tank	*Minimum capacity for the model* ***ModvFresh 2 50 kW***	*Minimum capacity for the model* ***ModvFresh 2 70 kW***
55 °C	2 l/min	2,5 l/min
60 °C	2,5 l/min	3 l/min
65 °C	3 l/min	3 l/min
70 °C	3 l/min	3,5 l/min
75 °C	3,5 l/min	3,5 l/min
80 °C	4 l/min	4 l/min

Diagrams of the pump unit performances

The following diagrams relate the user's flow rate and the supply temperature to the buffer storage tank, according to the requested temperature of HDW. This allows to identify the minimum supply temperature needed to supply HDW at a required temperature and flow. Vice versa it is also possible to fix which is the maximum usable flow at the selected HDW temperature, at the available supply temperature. Performances are also due to the inlet temperature of the cold water from the water supply system; diagrams show three possibilities with inlet water at 5°C, 10°C and 15°C.

How to read the diagrams

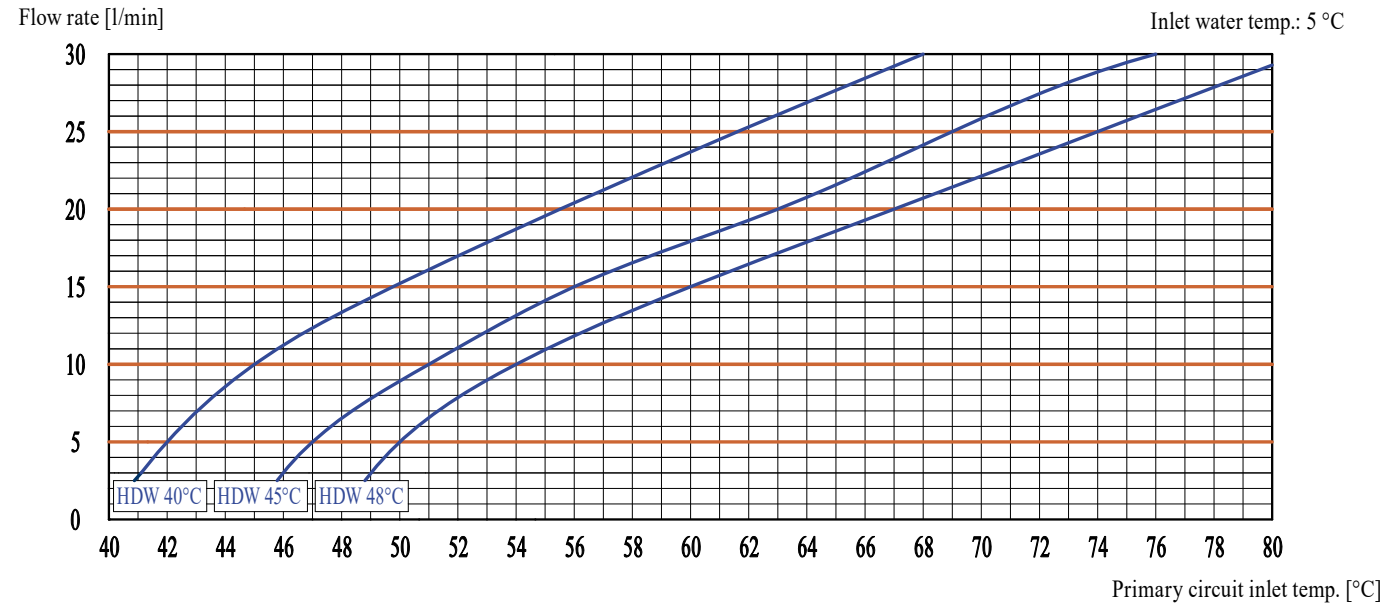
Example 1, shown in the next page (ModvFresh 2 50 kW, inlet at 10°C). In this case a HDW flow of 12 l/min at a temperature of 45°C is required. Crossing the desired HDW temperature curve, it follows that the supply from the buffer storage tank must be almost 51,7°C.

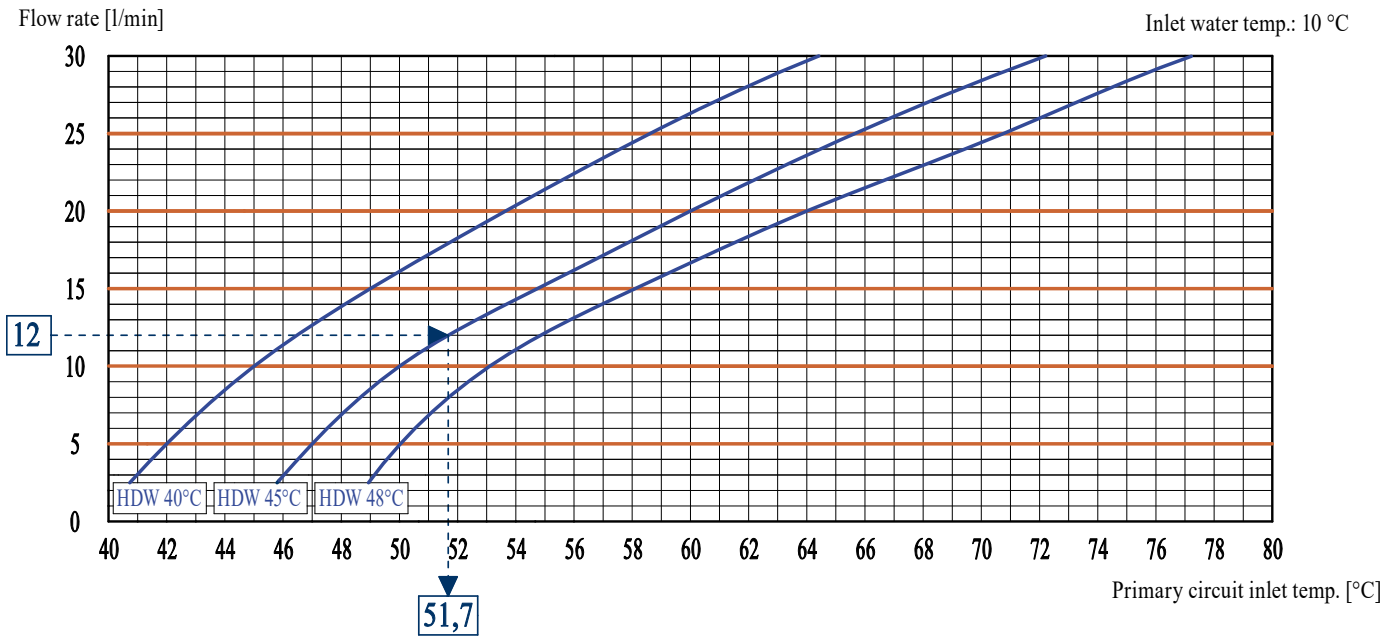
Example 2, shown in page 6 (ModvFresh 2 70 kW, inlet at 10°C). This is the case in which the supply from the buffer storage tank cannot go over 56°C and we want to see what can be the maximum suppliable temperature at the HDW of 45°C. Crossing the desired HDW temperature curve, it follows that the flow cannot be over 19,3 l/min.

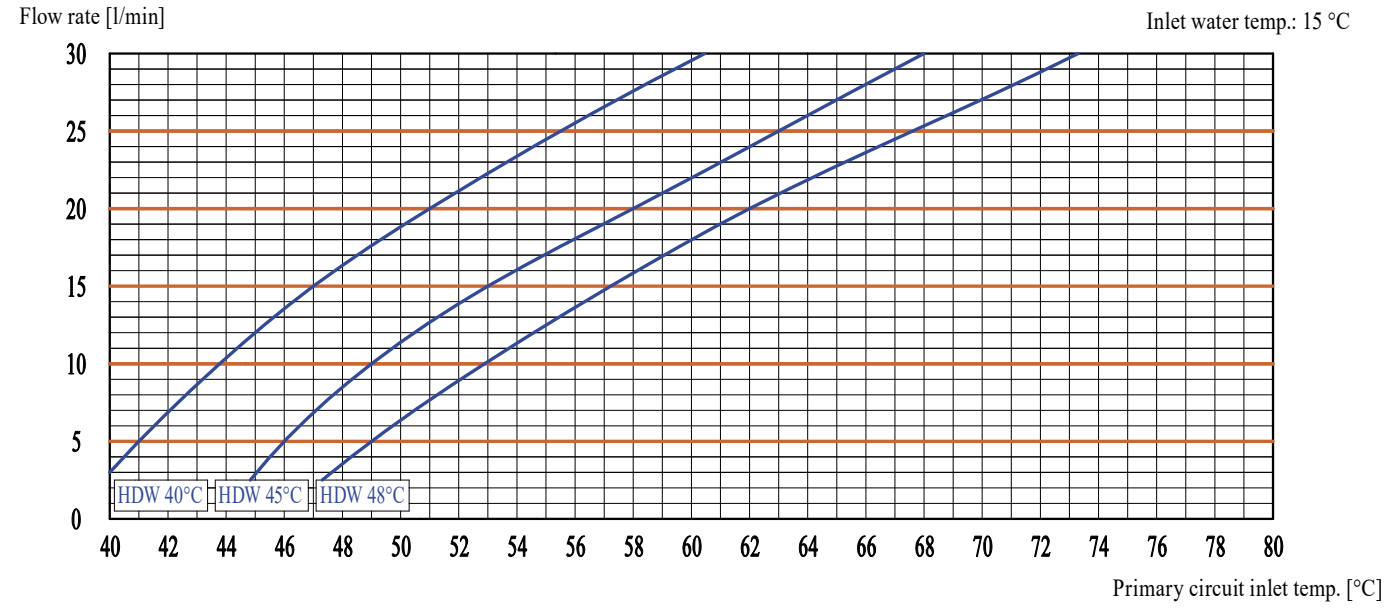
Calculation of performances

It is also possible to download an excel file from the site *www.modvlvs.com* dedicated to the calculation of the peformances of the ModvFresh 2 unit from where you cen get: output power, time of delivery, the overall delivery capacity and recovery time of the temperature in the tank.

HDW pump unit: *ModvFresh 2* - 50 kW







HDW pump unit: *ModvFresh 2* - 70 kW