PUMP UNIT TO DELIVER HOT DOMESTIC WATER (HDW) MODVFRESH 1

List and base technical features of the main components

SAFETY: *Please read carefully the mounting and working directions before starting the unit, in order to prevent accidents and failures of the installation caused by improper use of the product. Keep this manual for further consultations.*

(A) Electric shunt box
It holds the wiring of the electric devices. The power supply cable of the pump unit can be connected to the electric system 230V without any other connection. Modvfresh 1 is ready to be installed.

(B) Check valve
Built-in the connection of "Supply from storage tank", it avoids undesirable circulations.

(C) Air vent valve
Automatic air vent: it helps to vent the system from the air microbubbles present in the circuit.

(D) Heat exchanger
Weld-braised plate heat exchanger in stainless steel AISI 316. The heat exchanger can be easily removed for service and/or cleaning through the right side slit of the insulation box.

(E) Primary high efficiency circulating pump
The circulating pump starts when there is a request from the user. It is possible to set the speed in accordance with the conditions of use, so optimizing the energy consumption (*see the paragraph "Return temperature to the storage tank"*).

(F) Union
Connection union with built-in check valve.

(G) Manostat
Is function is to read the pressure difference between the cold water supply and the hot domestic water and to start up consequently the circulating pump. The starting happens since small flows of 1 l/min.

(H) Thermostatic mixing valve
The thermostatic mixing valve allows to set the requested temperature from 35°C up to 60°C. Please rotate clockwise to reduce and anticlockwise to increase the temperature, the requested value (*) must clash to the reference on the valve body.

Usually it is appropriate to assure that the supply temperature from the storage tank is almost 10 K more than the requested temperature.

TAKE CARE
In this application, the circulator must be set in ***constant speed*** *mode. Declared performances are reached by selecting curve III.*

PPE insulation box
Measurements: 398 x 500 x 207 mm.
A special back steel plate fixes the unit to the insulation box and it allows a quick fitting to the wall or to the storage tank.

(*) Knob corresponding temperature							
T°	**MIN**	**1**	**2**	**3**	**4**	**5**	**MAX**
35-60°C	*34*	*39*	*45*	*50*	*55*	*60*	*62*

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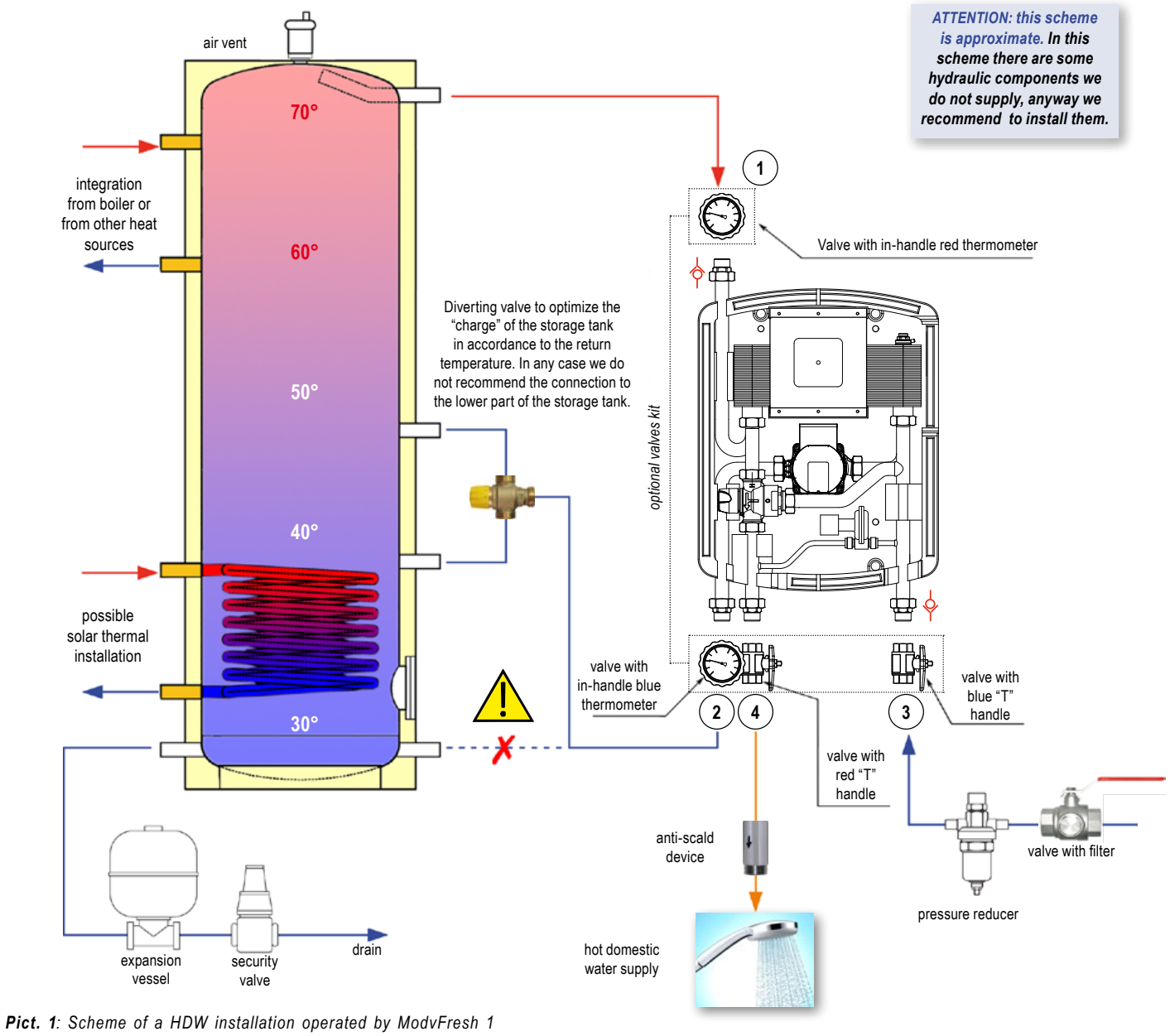
Connection hydraulic scheme

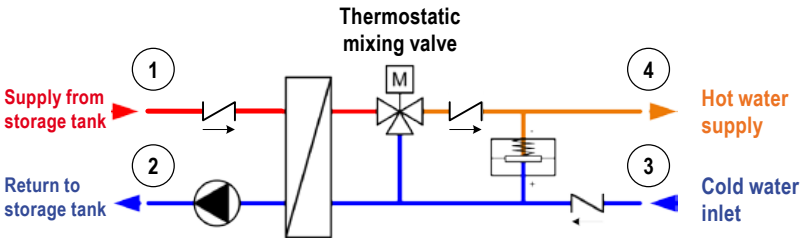


Pict. 1: Scheme of a HDW installation operated by ModvFresh 1

Technical features

Maximum pressure allowed (without water hammer):	***10 bar***
Working temperature:	***2 ÷ 95°C***
Setting accuracy of Multimix mixing valve:	***±2°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 40 l/min *(100 kW model)*:	***9 mH_2O***

Connection hydraulic scheme



Connections and links

PRIMARY CIRCUIT

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

SECONDARY CIRCUIT

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

Materials used

Fittings	Piping	Insulation	Heat exchanger	Gaskets	Circulating pump
Copper alloy CW617N	Copper	EPP	Stainless steel AISI 316 L Copper	EPDM	Body in composite material

Recommendations

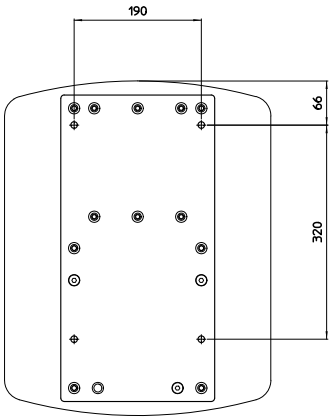
✓ Be sure that the electric installation is provided with an efficient ground tap.

✓ When the product is installed in an open circuit where the circulating water is “fairly hard” (from 12 °f to 18 °f) we recommend installing an ion exchange water softener on the cold water inlet to prevent limescale deposits from affecting the good operation of the thermostatic cartridge.

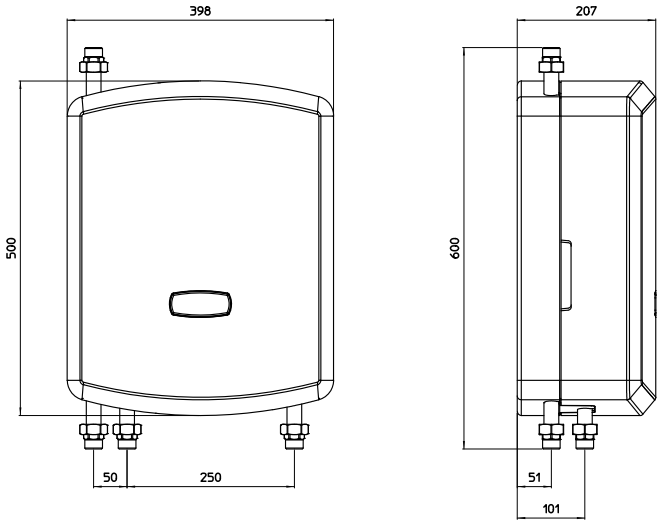
Mounting

The pump unit can be fixed directly to the storage tank, if there are the relevant connections (see “Recommendations”) or to the wall nearby. To install it to the wall please follow the directions:

✓ Locate and determine the position of the 4 holes to be made on the wall according to the scheme in *Pict. 2*;
✓ Drill and put into the holes the screw anchors suitable to type of masonry;
✓ Remove the cover and fix the pump unit;
✓ Mount the valves kit (opzional) following as shown in *Pict. 1*;
✓ Connect the pipes following the connection scheme, see directions of *Pict. 3*.



***Pict. 2**: back plate to fix the unit to the wall*



***Pict. 3**: dimensions and significant centre distances of the pump unit*

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 under pressure (approx. 2 bar).

✓ Open slowly the valve in the position 1 *(supply from the storage tank)*, if necessary, purge the primary circuit by acting on the air vent valve located on the heat exchanger; open slowly the valve in the position 2 *(return to the storage tank)*;
✓ Slowly open the valve in position 3 *(cold water inlet)*;
✓ Slowly open the valve in position 4 *(hot domestic water outlet)*;
✓ Slowly open one or several water supplies for some minutes to let the air going out from the secondary circuit;
✓ Close the outlets;
✓ Breathe out the storage tank and in case re-establish the pressure.

Electrical connection

DANGER

The pump unit is fully pre-wired. Use a Shuko plug to connect it to the electric system. Voltage: 230 VAC ± 10%. Frequency: 50÷60 Hz. Maximum absorbed power: 80W.

Setting up

✓ Insert the plug in a 230 V socket;
✓ Adjust the thermostatic mixing valve setting the requested temperature;
✓ Do some flow tests, with the storage tank in running conditions, to check the return temperature. Repeat the test at the minimum and maximum flow of the installation and in case adjust the calibration of the diverting valve (if present) to optimize the stratification into the storage tank.

Suggestions / Remarks on the flow capacity

The temperature into the storage tank must be almost 10 K more than the required HDW temperature. Higher temperature differences allow to extend the water flow time. We recommend not to exceed the temperature of 70°C (supply from storage tank) to avoid problems of limescale deposit into the secondary side of the plate exchanger; in case put a thermostatic mixer (*Pict.1*). The return to storage tank can be diverted putting one or several thermic valves differently calibrated to get an effective stratification (*Pict.1*). *In the following tables the main working parameters of the two models of pump units are indicated (data have been obtained with an inlet cold water temperature of 10°C):*

DANGER: SCALDS

Setting temperatures of the thermostatic mixing valve higher than 55°C may cause scalds in a very short time, mostly to the childrens. Therefore we recommend to install a security anti-scald device in the crucial outlets.

Pump units to deliver fresh HDW MODVFRESH 1 50 kW: supplied power			
Requested power [l/min]	Hot water set temperature [°C]	Required supply temperature (storage tank) [°C]	Supplied power [kW]
10	50	53	28
20	50	60	56

Pump units to deliver fresh HDW MODVFRESH 1 100 kW: supplied power			
Requested power [l/min]	Hot water set temperature [°C]	Required supply temperature (storage tank) [°C]	Supplied power [kW]
20	50	56	56
30	50	63	84
40	50	70	112

Return temperature to storage tank

ModvFresh 1 does not control the return temperature to the storage tank. As the speed of the pump is fixed on the set value, in case of low flows you'll have quite high return temperatures directly proportional to the supply temperature from storage tank. And instead, at high flows, you'll have quite low return temperatures, always proportional to the supply temperature.

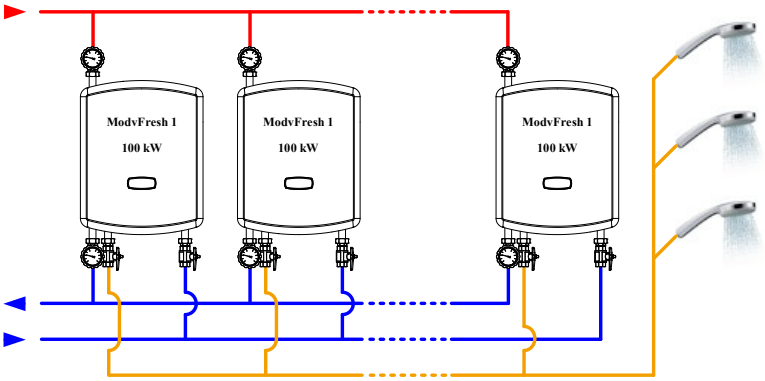
Therefore, in order to avoid to spoil the stratification into the storage tank, especially in presence of thermic contributions coming from systems such as heat pumps, solar thermal, etc., we recommend to connect the return pipe to the storage tank at a right level, as higher as high is the foreseen return temperature. To optimize the loading of the storage tank it would be better to put a diverting valve as indicated in the *Pict. 1*, getting several loading points at different levels (temperatures).

Anyway it is possible to adjust the installation to get the lower possible return temperature. To do it, you have to reduce the speed of the primary circulating pump to the minimum (by using the special selector), the set HDW temperature permitting. If this temperature is not reached at high flows, Increase the circulating pump speed up to a running level that allows the expected performances.

ModvFresh 1 on parallel

In case of high powers and high flows it is possible to connect up to 5 **ModvFresh 1** in parallel (model 100 kW) to deliver up to 200 l/min and a power of 500 kW without putting other devices such as electronic controllers, motorized valves, flow sensors etc.

The connecting scheme is particularly suitable for installations where the request of flow from the user is nearly constant, this to optimize the power consumption of the circulating pumps that are all activated at a very small flow; the control of the temperature is anyway assured during the whole use of the flow.



Diagrams of the pump unit performances

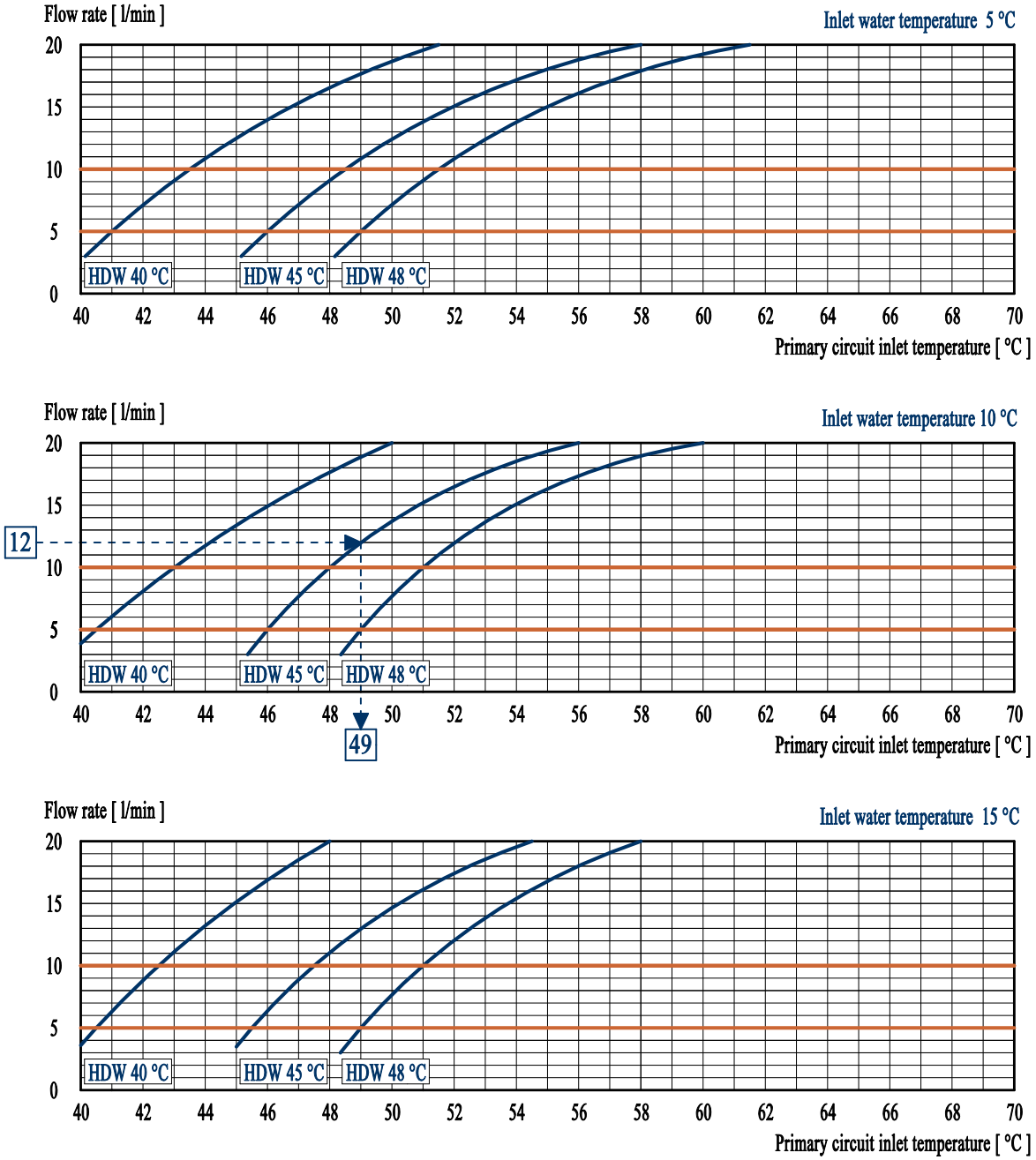
The following diagrams relate the user's flow rate and the supply temperature to the buffer storage tank, according to the requested temperature of HDW. This allows to identify the minimum supply temperature needed to supply HDW at a required temperature and flow. Vice versa it is also possible to fix 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

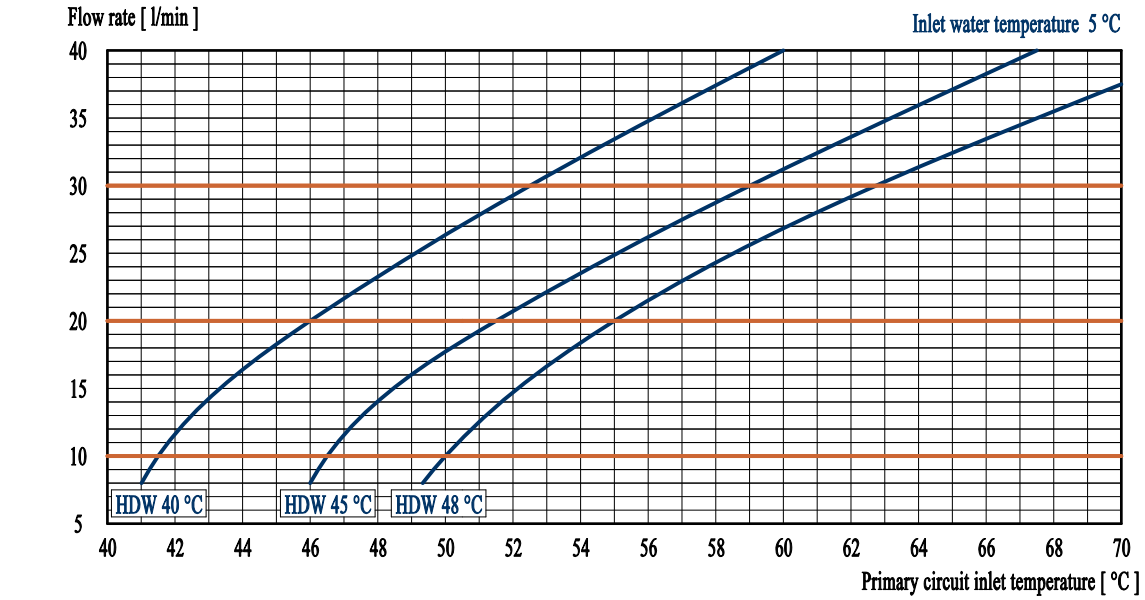
Example 1, shown in the below diagram (ModvFresh 1 50 kW, inlet at 10°C). In this case a HDW flow of 12 l/min at a temperature of 45°C is required. Crossing the desired HDW temperature curve, it follows that the supply from the buffer storage tank must be almost 49°C.

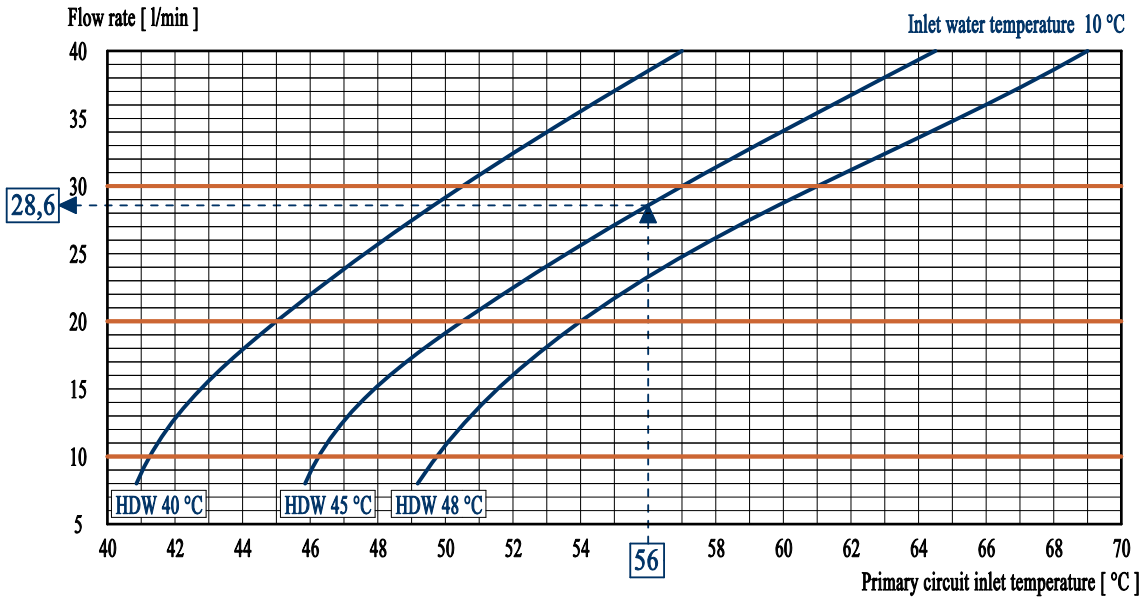
Example 2, shown in the next page (ModvFresh 1 100 kW, inlet at 10°C). This is the case in which the supply from the buffer storage tank cannot go over 56°C and we want to see what can be the maximum suppliable temperature at the HDW of 45°C. Crossing the desired HDW temperature curve, it follows that the flow cannot be over 28,6 l/min.

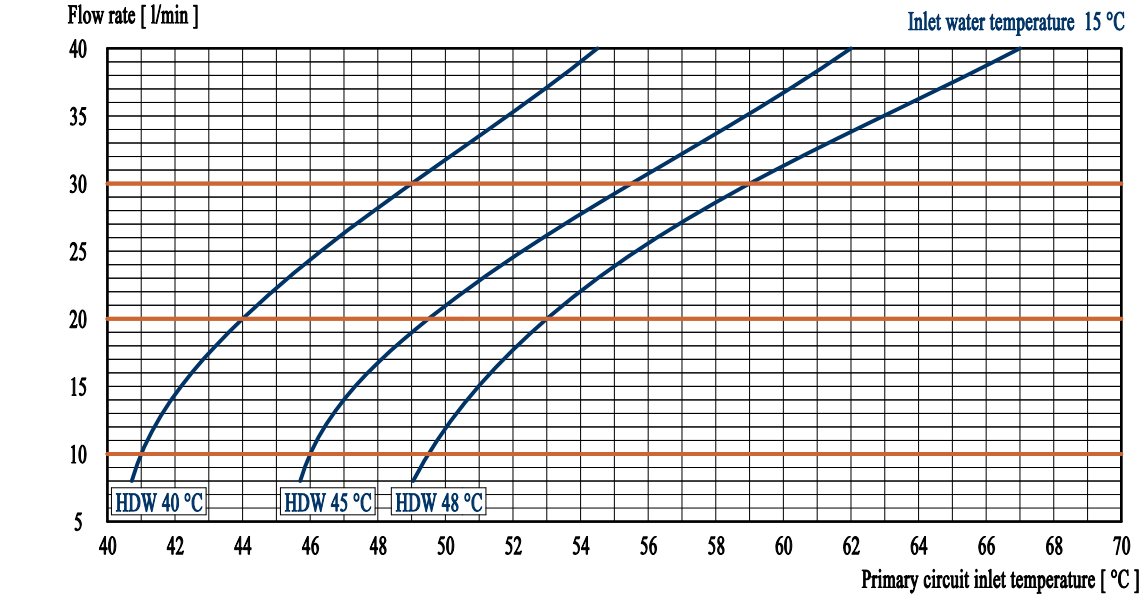
HDW pump unit* MODVFRESH 1 *50 kW



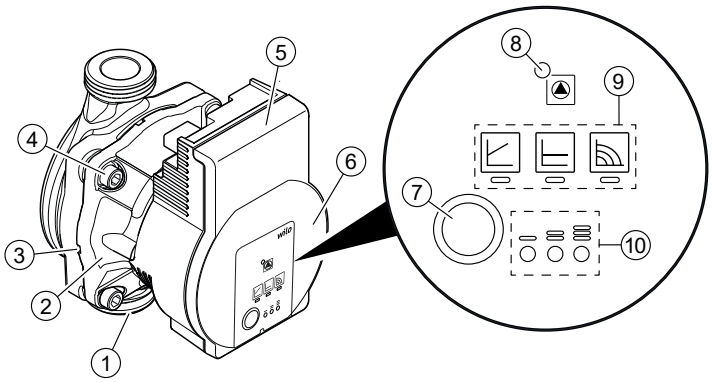
HDW pump unit MODVFRESH 1 *100 kW*







Synchrone high efficiency circulating pump Wilo Para SC



1. Pump housing with screwed connections
2. Glandless motor
3. Condensate drain openings (4x around circumference)
4. Housing screws
5. Control module
6. Rating plate
7. Operating button for pump adjustment
8. Run/fault signal LED
9. Display of selected control mode
10. Display of selected pump curve (I, II, III)

Indicator lights (LEDs)

- Signal display
- LED is lit up in green in normal operation
- LED lights up/flashes in case of fault

- Display of selected control mode Δp-v, Δp-c and constant speed
- Display of selected pump curve (I, II, III) within the control mode
- LED indicator combinations during pump venting function, manual restart and key lock

Operating button

Press
- Select control mode
- Select pump curve (I, II, III) within the control mode

Press and hold
- Activate the pump venting function (press for 3 seconds)
- Activate manual restart (press for 5 seconds)
- Lock/unlock button (press for 8 seconds)

Funzioni

Venting
The pump venting function is activated by pressing and holding the operating button (for 3 seconds) and automatically vents the pump.
The top and bottom LED rows flash in turn at 1 second intervals. To cancel, press and hold the operating button for 3 seconds.
The heating system is not vented.

Manual restart
A manual restart is initiated by pressing and holding the operating button (for 5 second) and unblocks the pump if required
(e.g. after long standstill period in summer).

Lock/unlock the button
The key lock is activated by pressing and holding the operating button (for 8 seconds) and locks the pump's current settings. It protects against undesired or unauthorised adjustment of the pump.

TAKE CARE

RECOMMENDED ADJUSTMENT MODE

NOT RECOMMENDED ADJUSTMENT MODE

Control modes

- The LED selection of control modes and corresponding pump curves takes place in clockwise succession.
- Press the operating button briefly (approx. 1 second).
- LEDs display the set control mode and pump curve.

	LED display	Control mode	Pump curve
1	✓	Constant speed	II
2	✓	Constant speed	I
3	✗	Variable differential pressure Δp-v	III
4	✗	Variable differential pressure Δp-v	II
5	✗	Variable differential pressure Δp-v	I
6	✗	Constant differential pressure Δp-c	III
7	✗	Constant differential pressure Δp-c	II
8	✗	Constant differential pressure Δp-c	I
9	✓	Constant speed	III