

# PUMP UNIT TO DELIVER FRESH HOT DOMESTIC WATER (HDW) ModvFRESH 4

## List of features of main components

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

**(A) Controller**  
The flow, the temperatures and the instant power produced by the installation are immediately displayed on the controller.

**(H) VFS digital flow meter**  
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. Available measuring ranges: 1-20 l/min and 2-40 l/min.

**(G) High efficiency primary circulating pump**  
The special electronics modulates the speed of the high efficiency primary circulating pump, from a minimum of 10% up to 100%, to give always a precise user's temperature (f.i.45°C).

**(F) Connections**  
Connections with built-in check valve.

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

**(D) (DS) 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 15°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 of the insulation box.

**(E) Recycling**  
Recycling way (optional). The recycling circuit, provided with a special synchronone high efficiency circulating pump, allows to get an outlet flow already at the required temperature. It works "on demand" or on "time band". The circuit is provided with check valves. A special anti-legionnaire's disease function allows to sterilize all the secondary hydraulic circuit.

**(\*) It is present only in the models without recycling**

**DANGER: SCALDS**  
During the sterilization the safety level (60°C) is exceeded. Provide antiscald devices at the outlets.

**EPP insulation box**  
Measurements: 398 x 500 x 207 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.

**Return to the storage tank from 25°C to 15°C**  
(the temperature changes according to the value of the temperature and to the value of the flow)

**Hot domestic water 45°C**

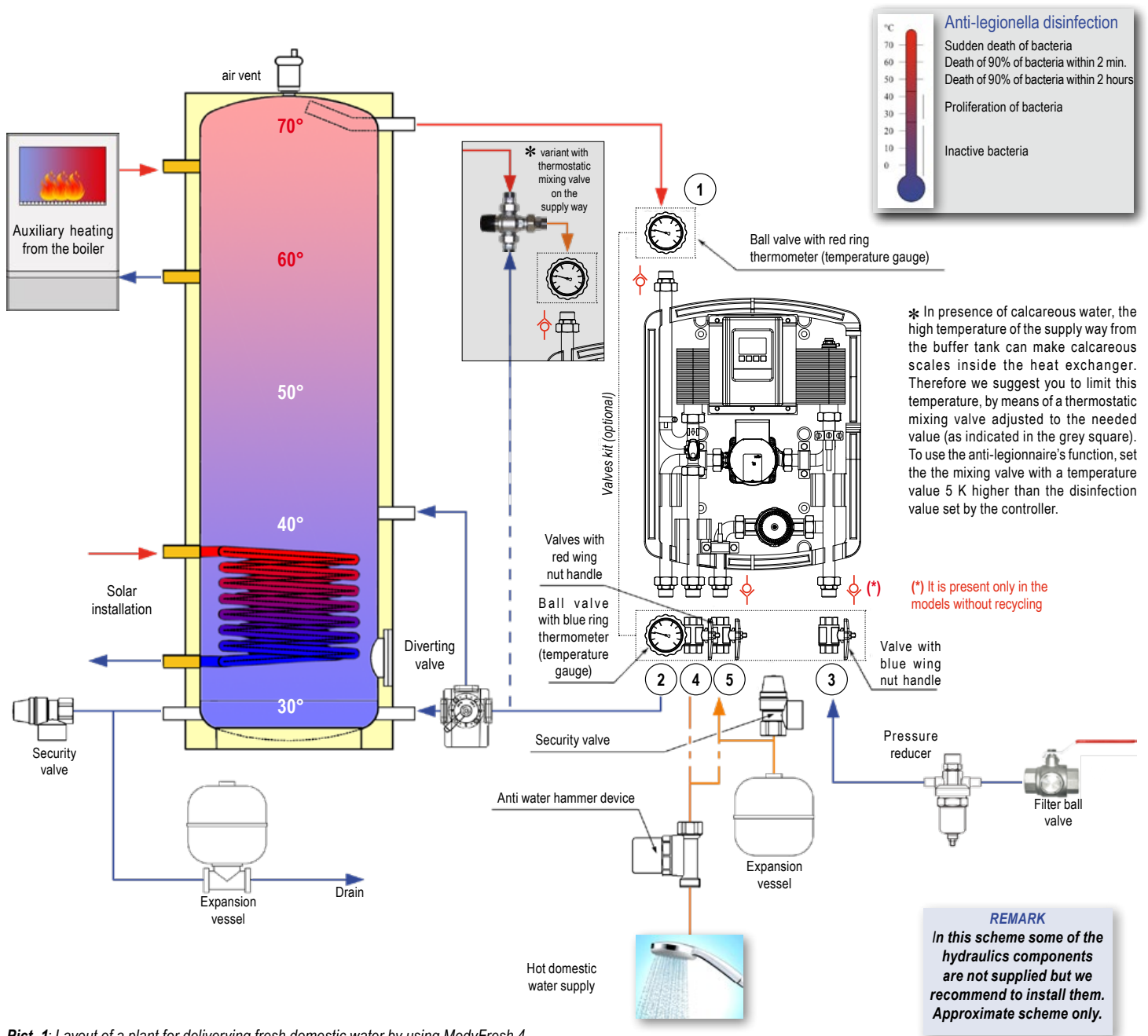
**Recycling 35°C**

**Water Supply 10°C**

**Supply from the storage tank 60°C**

**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.

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Pict. 1: Layout of a plant for delivering fresh domestic water by using ModvFresh 4

## Technical Features

Maximum allowed pressure (without water hammer):	<b>10 bar</b>
Working temperature:	<b>2 ÷ 95°C</b>
Headloss in the secondary circuit (at the flow of 20 l/min (50 kW model):	<b>4 mH<sub>2</sub>O</b>
Headloss in the secondary circuit (at the flow of 40 l/min (100 kW model):	<b>5 mH<sub>2</sub>O</b>
Headloss in the recycling circuit (at the flow of di 5 l/min):	<b>0,3 mH<sub>2</sub>O</b>

## Connections and links

### PRIMARY CIRCUIT

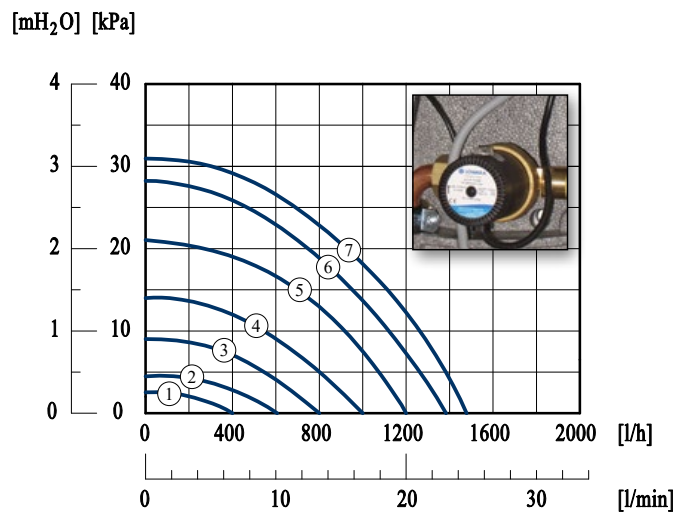
- 1 **Supply from the storage tank:** 3/4" ISO 228 male connection. Minimum diameter of the pipe DN20 (Cu 22x1). Maximum length: 3 m.
- 2 **Return to the storage tank:** 3/4" ISO 228 male connection. Minimum diameter of the pipe DN20 (Cu 22x1). Maximum length: 3 m.

### SECONDARY CIRCUIT

- 3 **Cold water supply:** 3/4" ISO 228 male connection with check valve (It is present only in the models without recycling). Minimum diameter of the pipe DN20 (Cu 22x1).
- 4 **Hot domestic water outlet:** 3/4" ISO 228 male connection. Minimum diameter of the pipe DN20 (Cu 22x1).
- 5 **Recycling (optional):** 3/4" ISO 228 male connection with check valve. Minimum diameter of the pipe DN15.

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## Peculiar diagram of the recycling circulating pump (if present)



**High efficiency synchronous circulating pump**  
 The speed control is always variable by means of the selector;  
 you can find the speeds corresponding to the 7 reference marks  
 along the selector scale.

## Materials

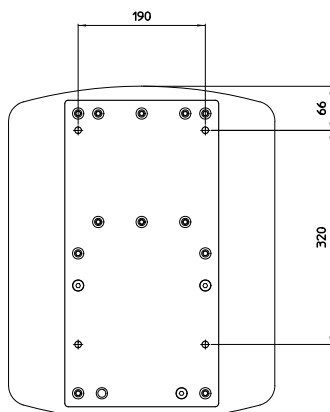
Pipe fittings	Piping	Insulation	Heat exchanger	Gaskets	Circulating pumps
Copper alloy CW617N	Copper	EPP	Stainless steel/AISI 316 L Copper	EPDM	Primary: body in composite material; Secondary: brass body

## Installation

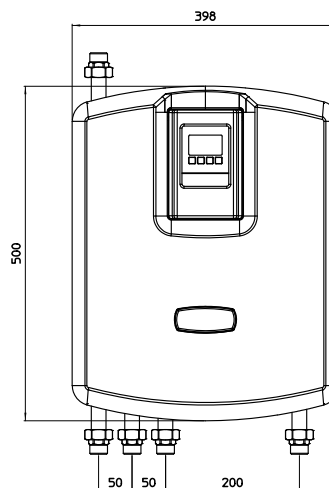
The pump unit can be mounted directly on the storage tank, if it is provided with the proper connections (see "Recommendations") or to the wall, near by.

For the wall mounting follow the directions:

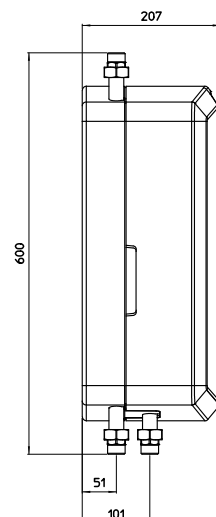
- ✓ Find the position of the 4 holes to be made into the wall according to the scheme *Pict. 2*;
- ✓ Bore and put the proper screw anchors;
- ✓ Remove the cover and fix the pump unit;
- ✓ Mount the connection valves set (optional) according to the *Pict. 1*;
- ✓ Connect the pipes in accordance to the connection scheme following 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*



# PUMP UNIT TO DELIVER FRESH HOT DOMESTIC WATER (HDW) MODvFRESH 4

## Wiring

The controller is supplied prewired. The power cable, also prewired, must be connected to the 230 VAC grid system only after having connected the temperature sensors, the diverting valve and the contact for the thermostat additional function (if present). For a quick and easy connection of the temperature sensors and valves/circulating pumps it is not necessary to operate on the controller, it is sufficient to put the cables into the automatic connectors of the sensor boxes.

**These operations must be done only by qualify staff.**

Please follow the following instructions during the installation:

**Anschlüsse / Connections:**

S4	rot/red
S5	orange
ground	weiss/white
ground	lila/purple

**Sensor-Box max 12V**

### ✓ Connect the sensors (all PT1000) to the pertinent sensor box

All the connections must be done by the clamps inside the "sensor box", in accordance with the scheme of *picture 2*. The sensor box must be fixed to the wall near the pump unit.

**S4:** Deep temperature sensor TT/S2 for the storage tank (in a medium-high position);

**S5:** Deep temperature sensor TT/S2 for the storage tank (in a medium position) (\*);

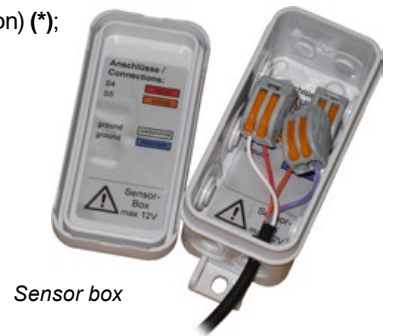
**ground:** Connect the second cable (white) of the sensor.

**ground:** Connect the second cable (violet) of the sensor.

(\* **If S6 < S5 → R3I = 230 V**

**If S6 > S5 → R3 = 230 V**

*Picture 2: Connection of the sensors to the sensor box*



Sensor box

**Anschlüsse / Connections:**

N =	blau/blue
PE =	grün/green gelb/yellow
R1 =	schwarz/black
R3 =	braun/brown
R3I =	grau/grey

**Netz-Mains-Box 230 VAC**

### ✓ Connect the relays to the pertinent relay box

All the connections must be done by the clamps inside the "relay box", in accordance with the scheme of *picture 3*. The relay box must be fixed to the wall near the pump unit.

**N:** Neutral wire;

**PE:** Ground;

**R1:** Thermostat function (output 230V) to start the energy source;

**R3:** 230 V output (NO) for diverting valve, exchange contact with R3I

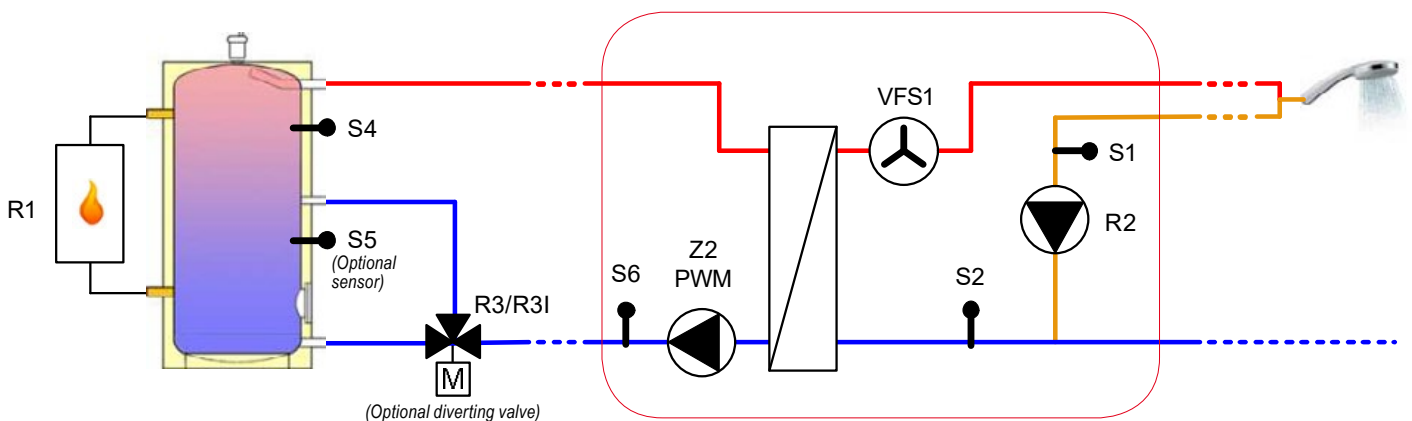
**R3I:** 230 V output (NC) for diverting valve, exchange contact with R3

*Picture 3: Connection of the relays to the relay box*



Relay box

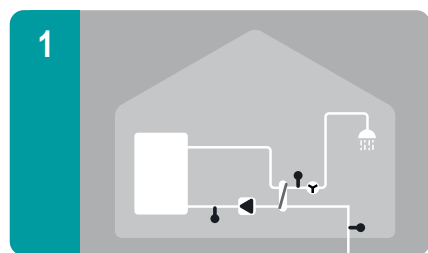
## Overall scheme



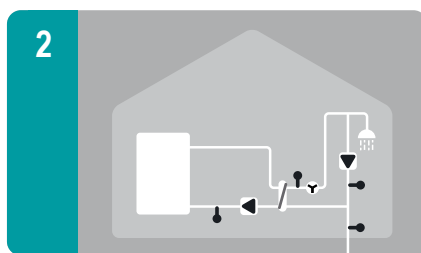


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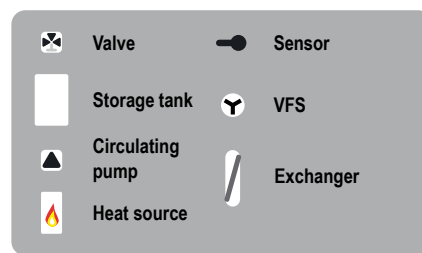
## Hydraulic schemes



Delivery of HDW

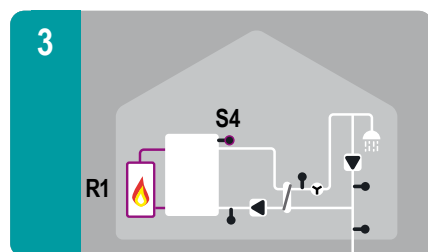


Delivery of HDW with recycling



## Hydraulic schemes with additional functions

Preset schemes of **ModvFresh 4** controller can be enriched in an easy and flexible way by two additional functions: additional heating with thermostat function and/or control of return temperature to storage tank by a diverting valve (optional). To make it easy, hereafter scheme shows the model with active recycling, however it is also possible to configurate the same scheme without recycling.

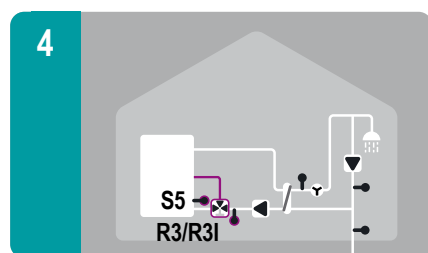


### ✓ Delivery of HDW with recycling and *additional thermostat function*

With this hydraulic scheme it is possible to manage an additional heat source.

S4: Deep temperature sensor TT/S2 for the storage tank (in a medium-high position).

R1: 230V voltage contact to start the heat source.

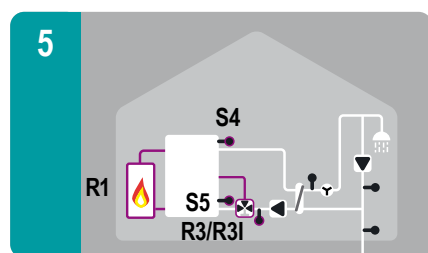


### ✓ Delivery of HDW with recycling and *control of return temperature*

With this hydraulic scheme it is possible to manage a motorized diverting valve on the return to control the stratification.

S5: deep temperature sensor TT/S2 for the storage tank (in a medium position).

R3/R3I: 230V voltage contact to control the diverting valve.



### ✓ Delivery of HDW with recycling, *additional thermostat function and control of return temperature*

With this hydraulic scheme it is possible to manage both an additional heat source and a motorized diverting valve on the return to control the stratification.

S4: deep temperature sensor TT/S2 for the storage tank (in a medium-high position).

R1: 230V voltage contact to start the heat source.

R3/R3I: 230V voltage contact to control the diverting valve.

*Please note: in scheme 5, the controller considers 25°C as fixed temperature inside the storage tank to manage the deviation. In case you would need to read the temperature and to process the value in the controller, it is necessary to order separately a TT/S2 sensor and to wire it to sensor box.*

S5: optional deep temperature sensor TT/S2 for the storage tank (in a medium position).

## 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.

### 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: 100W.**

# PUMP UNIT TO DELIVER FRESH HOT DOMESTIC WATER (HDW) ModvFRESH 4

## 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*), 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*);
- ✓ Open slowly the valve in the position 3 (*cold water supply*) and in case the valve in the position 5 (recycling);
- ✓ Purge the secondary circuit;
- ✓ 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.

## 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.**

## Recommendations

- ✓ Try to avoid pressure peaks during the working and the filling of the installation, to avoid to damage of the VFS sensor. Eventually put nearby an anti-water hammer device.
- ✓ The VFS sensor, depending upon models, begins to record the flow rate starting from 2 l/min. For a correct working a minimum flow rate of 3÷4 l/min is recommended.
- ✓ The VFS sensor records also the flow of the recycling circuit (if included): this function allows to avoid that the recycling pump starts during the standard working of the installation.. Please check the setups of this function on the controller manual.
- ✓ Be sure that the electric installation is provided with an efficient ground tap.

## Calculation of performances



It is also possible to download an excel file from the site [www.modvlvs.com](http://www.modvlvs.com) dedicated to the calculation of the performances of the **ModvFresh** units from where you can get: output power, time of delivery, the overall delivery capacity and recovery time of the temperature in the tank.

# PUMP UNIT TO DELIVER FRESH HOT DOMESTIC WATER (HDW) MODvFRESH 4

## Diagrams of the pump unit performances

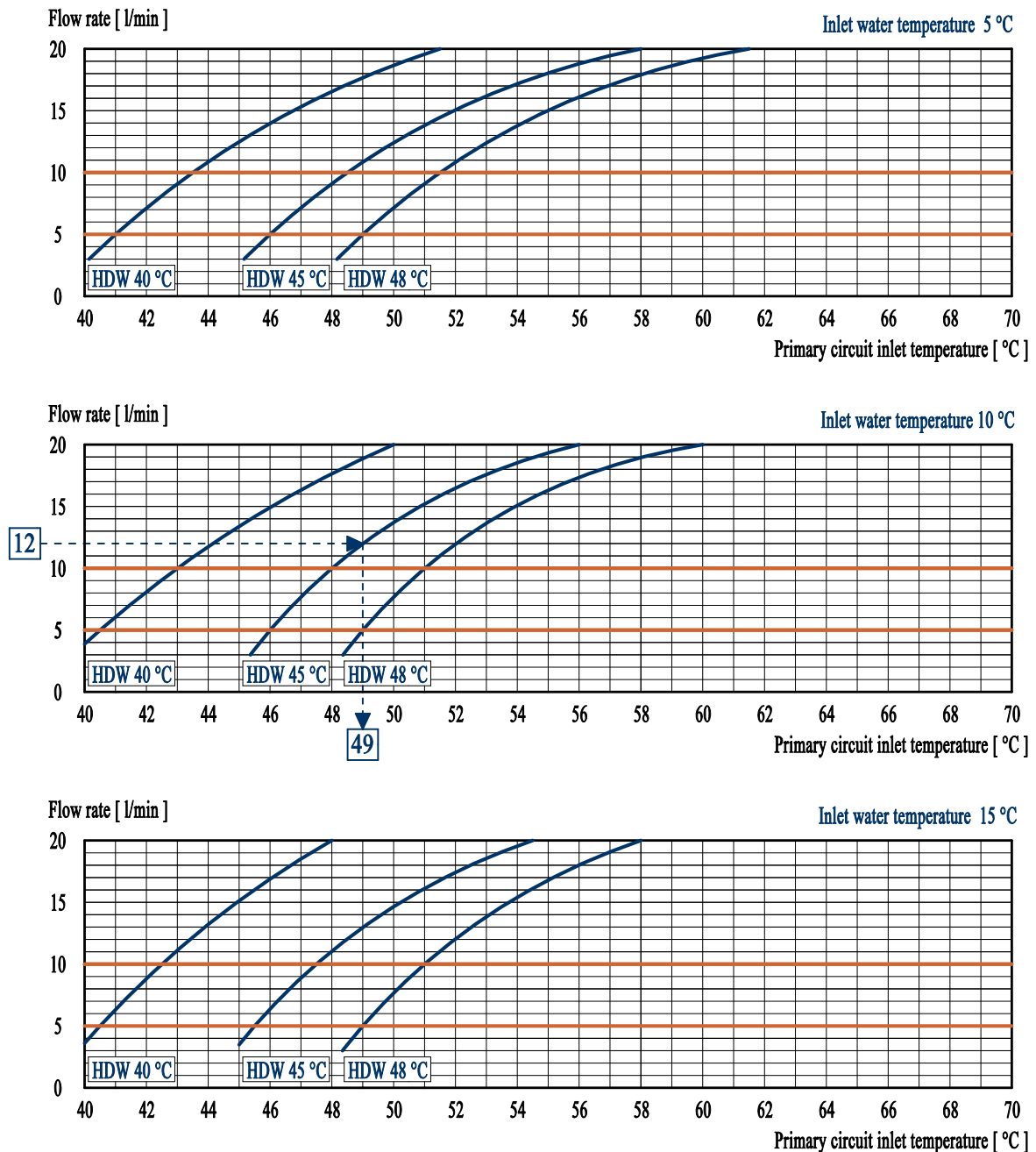
The following diagrams relate the user's flow rate and the supply temperature to the buffer storage tank, according to the requested temperature of HDW. This allows to identify the minimum supply temperature needed to supply HDW at a required temperature and flow. Vice versa it is also possible to fix 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 4 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 4 100 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 26,2 l/min.

HDW pump unit MODvFRESH 4 50 kW



# PUMP UNIT TO DELIVER FRESH HOT DOMESTIC WATER (HDW) MODvFRESH 4

## HDW pump unit MODvFRESH 4 100 kW

