List of features of main components

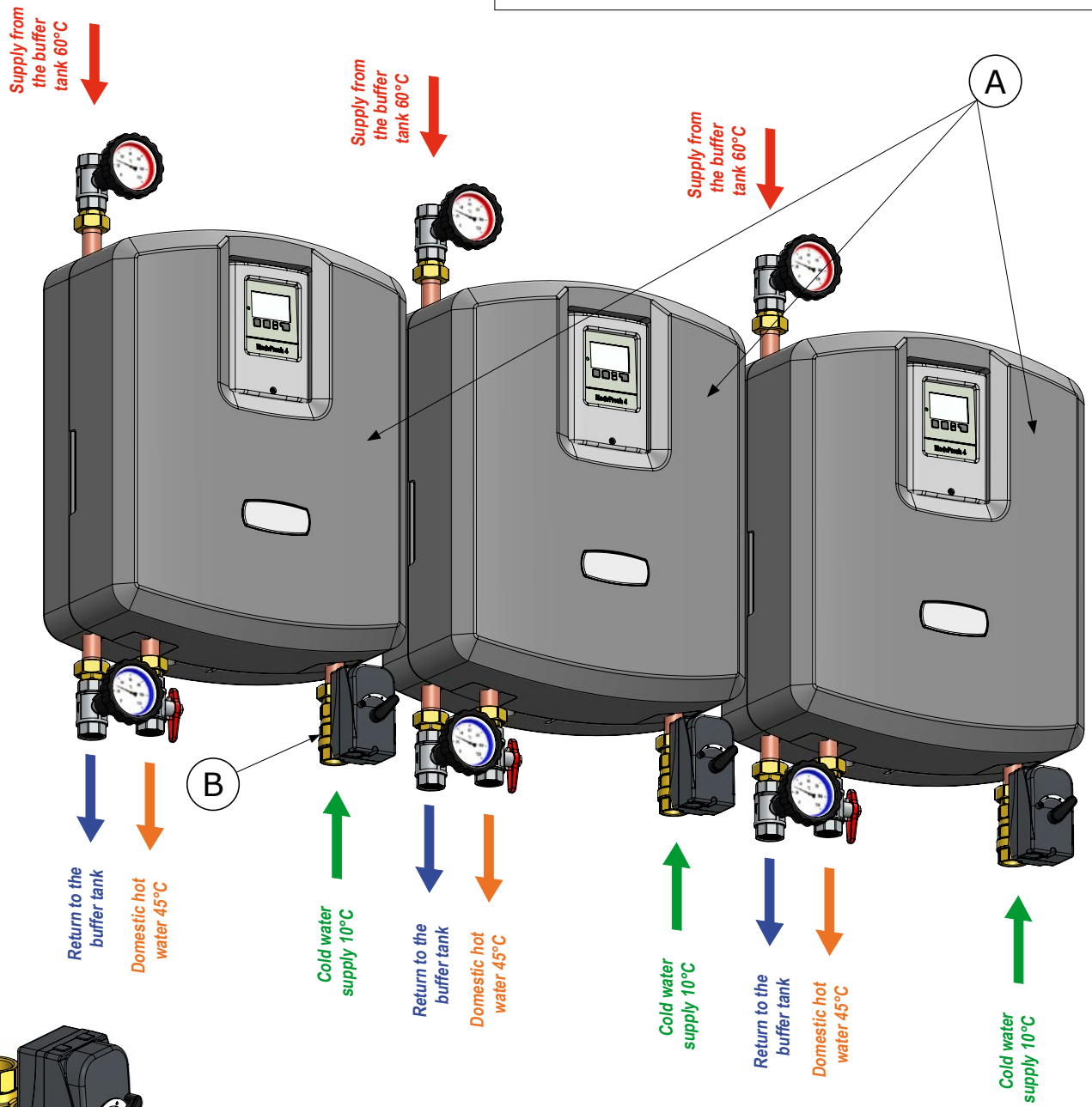
SAFETY: ***These instructions contain the basic information for the correct installation and commissioning of the ModvFresh modules making up the Kascata system; they are therefore to be considered an integration of the instruction sheets attached to the individual pump units.*** *We therefore recommend, before operating the system, to read carefully the mounting and commissioning instructions for the system and the individual components, in order to avoid accidents and breakdowns caused by improper use of the products. Keep this manual for future reference.*

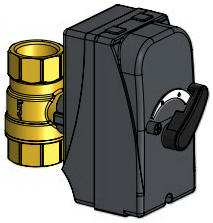
(A) ModvFresh hydraulic modules

Position the modules making up the Kascata system next to the buffer tank. **If the design of the system requires a recirculation line, it is recommended to install a unit with recirculation, as the last element of the cascade, to to achieve a significant plant simplification.**

Shut-off valve kit - OPTIONAL

The images show ModvFresh 4 units with the optional ball valve kit installed (it can be ordered separately). The installation of this valve kit is recommended in order to carry out maintenance of the various modules if necessary.





(B) Ball valve with servomotor

F/F Full flow ball valve equipped with two points on/off servomotor, 5 Nm, 20".
The valve is installed on the cold water supply inlet. The servomotor is completely managed by the ModvFresh 4 control unit.

Hydraulic connection diagram

Install the modules as described in the instruction manual of the ModvFresh 4 modules. Respect the distances amongst the pump units and from the buffer tank as shown in Figure 1. If a recirculation line is also provided in the cascade system, it must be made during the installation of the components, by positioning the only ModvFresh module equipped with recirculation as the last element.

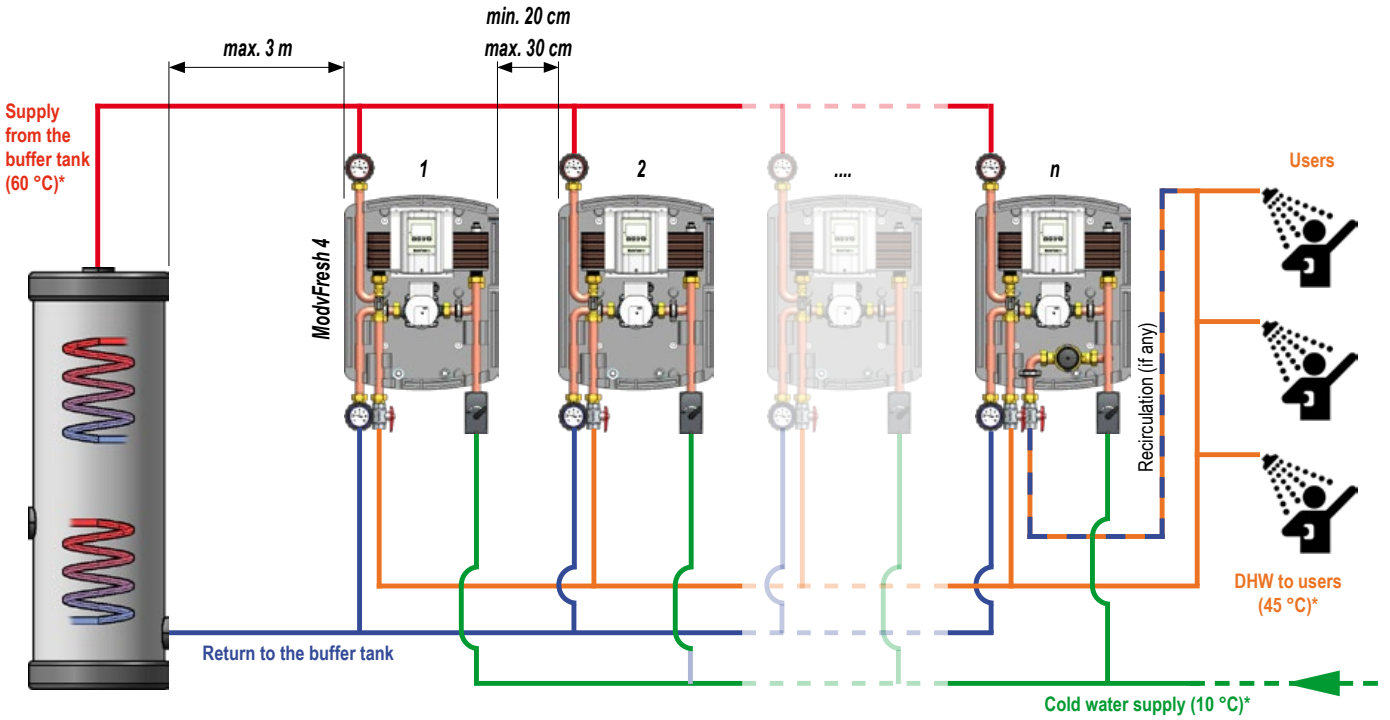


***Figure 1**: Schematic of a plant for the production of domestic hot water managed by the ModvFresh Kascata control system.*

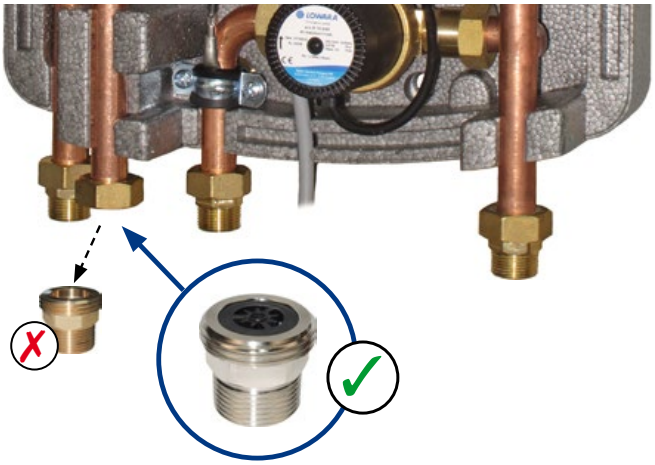
***NOTE: Approximate schematic only.** Temperature values marked with an asterisk (*) have to be considered as nominal. For more information, please refer to the section "field of utilization".*

FIELD OF UTILIZATION:
Nominal supply temperature of the buffer tank: 60°C.
Nominal temperature of the cold water supply: 10°C.
Nominal temperature of DHW production: 45°C, adjustable from 30°C to 70°C.
Recirculation line temperature: adjustable from 10°C up to 40°C.

Minimum diameter of the pipes		
N. of 100 kW ModvFresh modules	*Pipes of the plant [mm]*	*Recirculation line pipes (if any)*
2 units	*DN25*	*Minimum pipe DN20 (do not use corrugated pipe)*
3 units	*DN32*	
4 units	*DN32*	
5 units	*DN40*	
6 units	*DN40*	

Flow rate limitation fitting

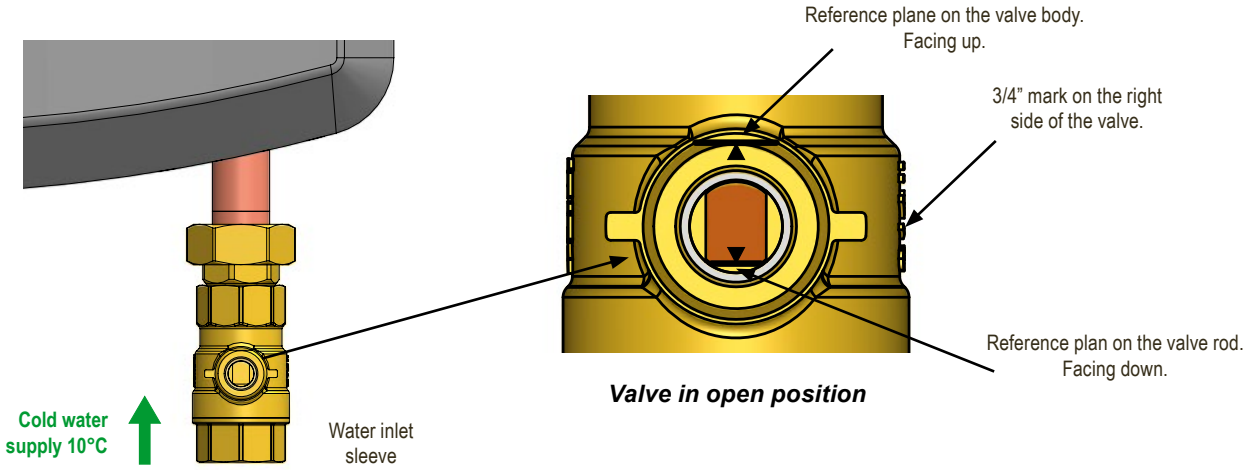
1" x 3/4" male fitting equipped with flow limiter 38 L/min. The device, mounted on the DHW output of the ModvFresh 4 100 kW units (flow rate 2-40 L/min), prevents excessive flow rates to go through the VFS meter, event that could damage it. **The fitting must be installed on the DHW outlet of each ModvFresh 4 module, replacing the standard fitting supplied with the product.**



Head loss table					
[L/min]	28,75	33,11	37,08	39,89	40,11
Head loss [bar]	**0,5**	**0,7**	**1,0**	**1,5**	**2,0**

Installation of the cold water inlet valve

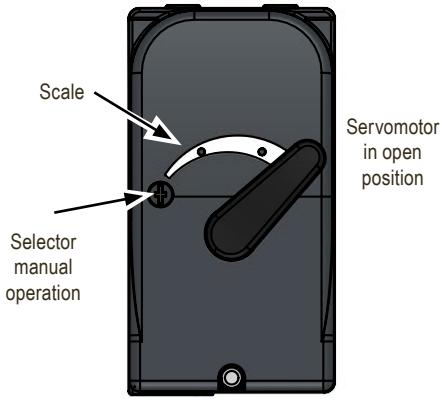
Install the shut-off valves on the cold water inlet pipe of each ModvFresh 4 module. The valve must be in an open and oriented position as in the image (the sleeve facing the water inlet). Also check the position and the orientation of the rod: **the valve is thus ready to receive the servomotor.**

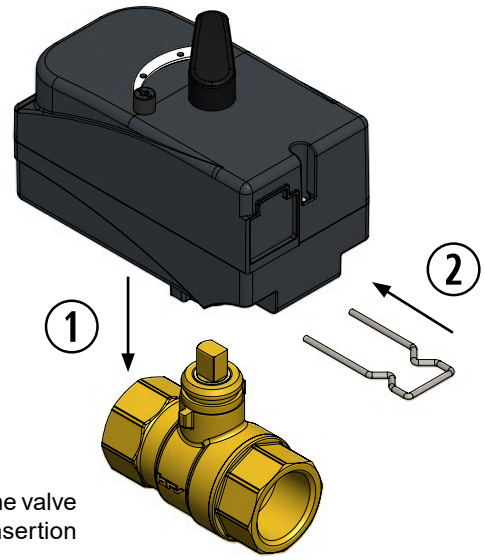


Valve in open position

Assembly of the servomotor on the valve

Make sure the servomotor is in open position, like shown. If not, position it using the function of manual rotation; then return the selector to the automatic operation position. Position the insert of the scale oriented as shown in the figure.

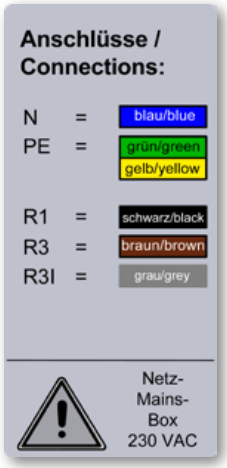




Insert the servomotor on the valve rod, then lock it with the insertion of the appropriate clip.

***WARNING:* Any assembly other than that specified is not allowed.**

Servomotor connection



All the connections must be done by the clamps inside the "sensor box". The sensor box must be fixed to the wall near the pump unit.

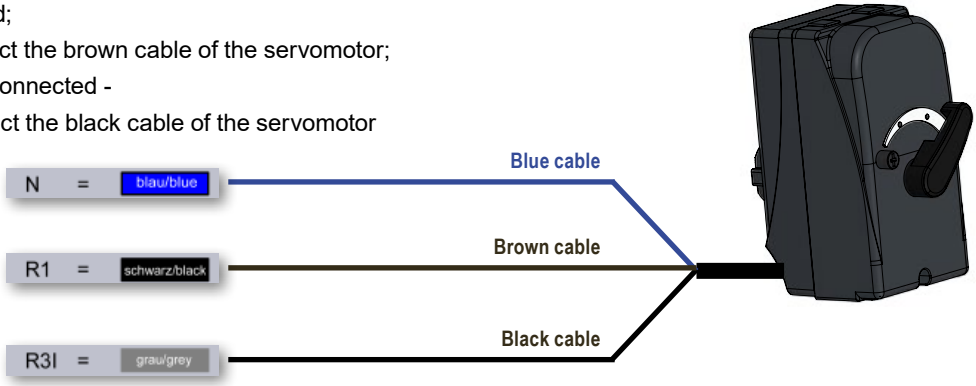
N: Neutral; connect the blue cable of the servomotor;

PE: Ground;

R1: Connect the brown cable of the servomotor;

R3: - Not connected -

R3I: Connect the black cable of the servomotor



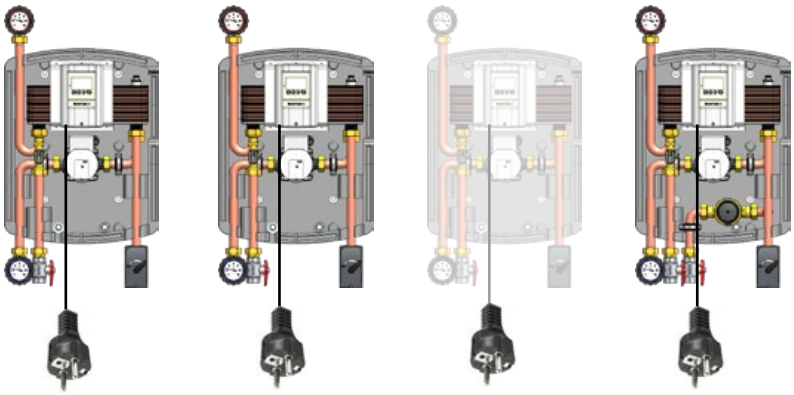
Electrical connection diagram for power supply

The power supply of the ModvFresh modules must be taken via Shuko wall outlets. *Do not cut or extend the power cord supplied with the units.*

Electrical connections

DANGER

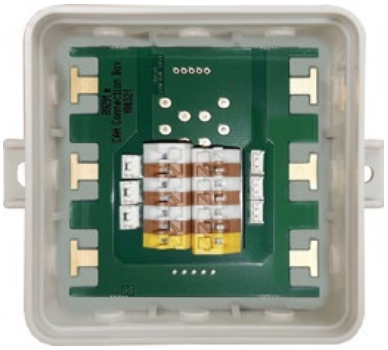
The pump units are pre-wired. Shuko plugs are necessary to connect them to the electric system. Voltage: 230 VAC ± 10%. Frequency: 50÷60 Hz. Maximum absorbed power of each unit: 200W.

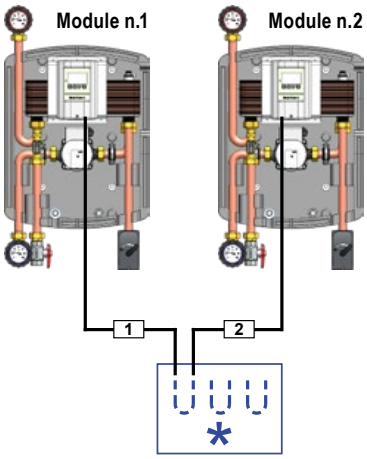


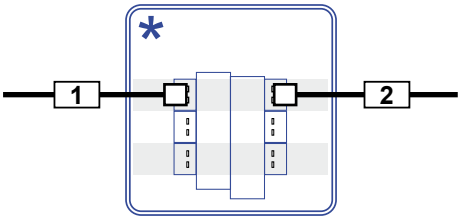
***Picture 2**: Schematic of the connection to the electric system.*

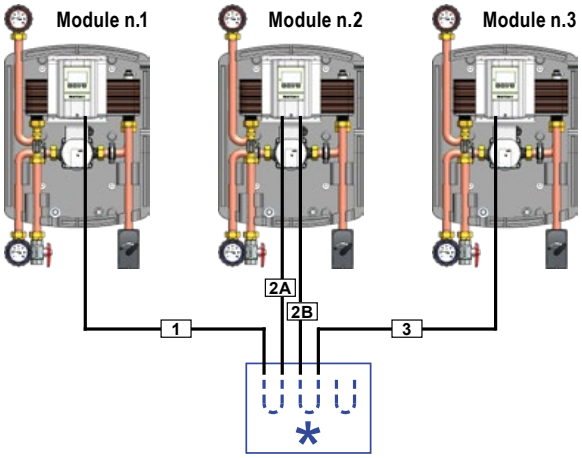
CAN-Bus line connection diagrams

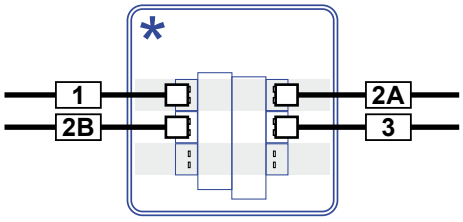
ModvFresh 4 control units are connected via the specific wiring as indicated in the following diagrams. The CAN-Bus cables are already pre-wired inside the ModvFresh 4 control unit: simply connect the cables in the appropriate connection box as indicated by the examples below. The two control units with a single cable are configured for CAN-Bus termination and are therefore positioned at the beginning and end of the series.



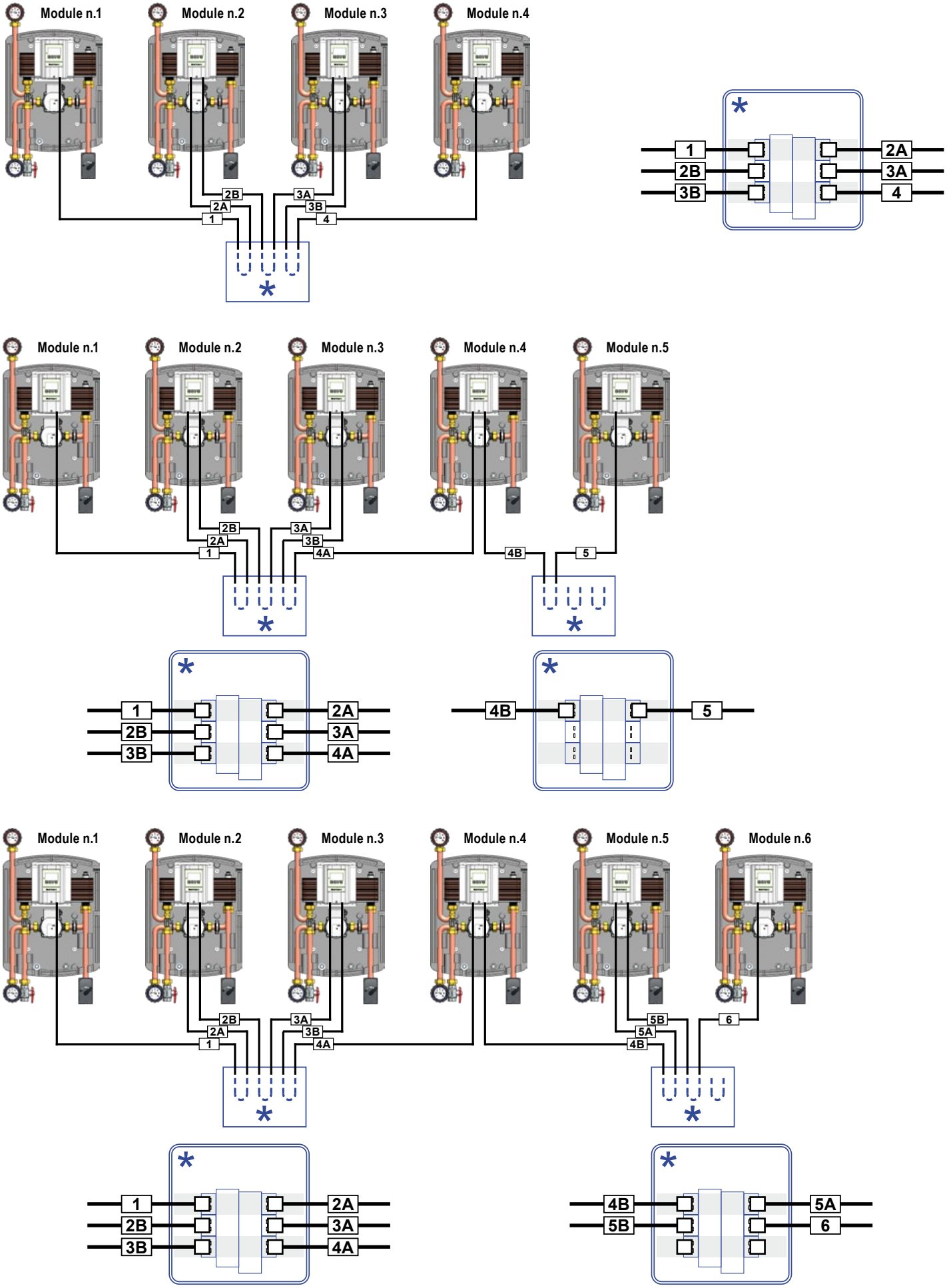






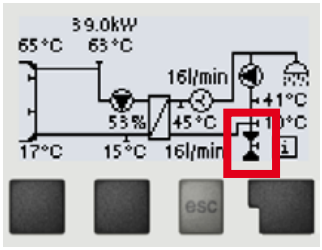


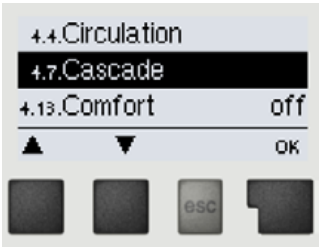
MODVFRESH KASCATA: SYSTEM FOR THE CASCADE CONNECTION OF SEVERAL DHW MODULES



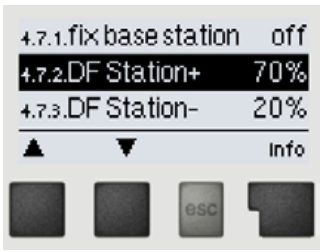
Working parameters

The ModvFresh 4 control unit is already configured in the factory with the Cascade functions active and the default settings. Further configurations are not necessary. Based on the project data, it is possible to vary the activation and deactivation thresholds of the next module which are expressed as % with respect to the range of the single VFS (40 L/min). These settings are found in menu 4.7 Cascade and in corresponding submenus.

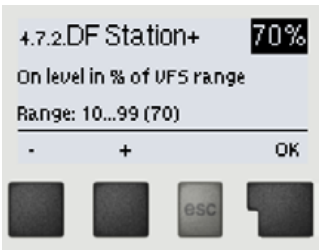


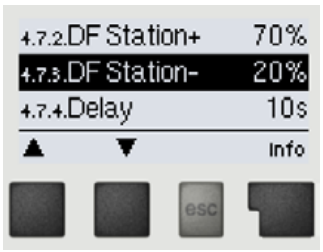


In the hydraulic diagram on the control unit display, the highlighted icon indicates the presence of the Cascade functions. Next to the icon is shown the total flow rate delivered by the system.

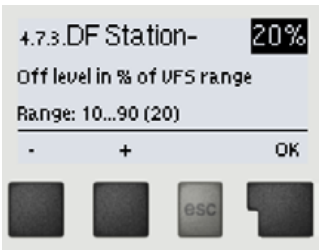


→ [Info] →





→ [Info] →



Recommended settings

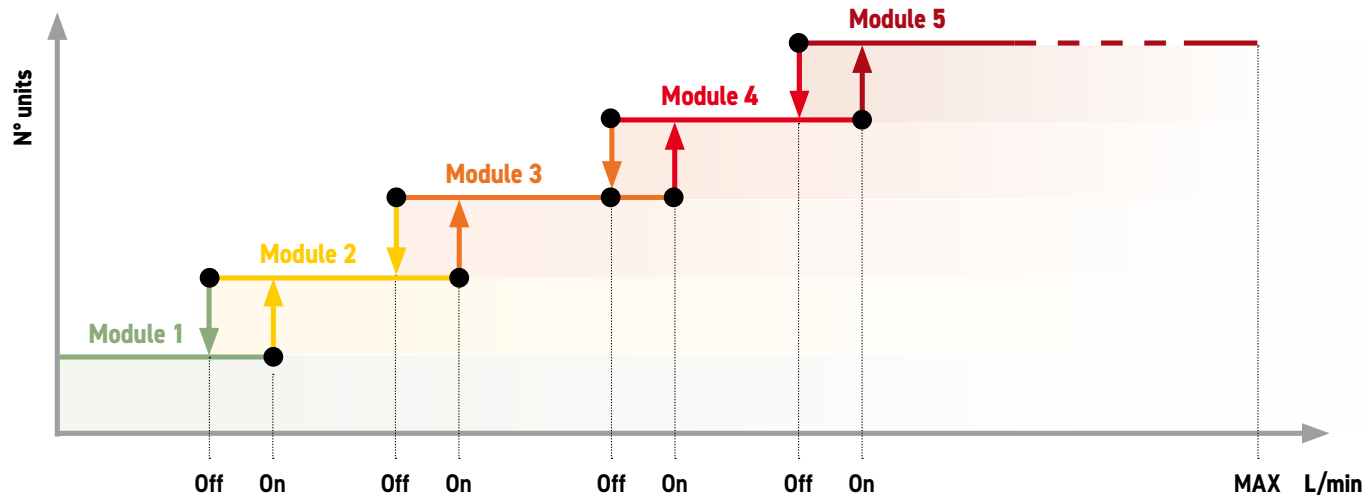
Default:
DF Station+
(Flow rate unit on):
70%
DF Station-
(Flow rate unit off):
20%

Alternatively:
DF Station+
(Flow rate unit on):
60%
DF Station-
(Flow rate unit off):
15%

Warning: *to ensure balanced operation, the percentage value entered in "**DF Station -**" must correspond to a flow rate less than half of the flow rate corresponding to the percentage entered in "**DF Station +**".*

Example: *since the percentages are related to the VFS range (40 L/min), the default values correspond to: 70% at 28 L/min and 20% at 8 L/min. So the above recommendation is verified, as 8 L/min is less than half of 28 L/min.*

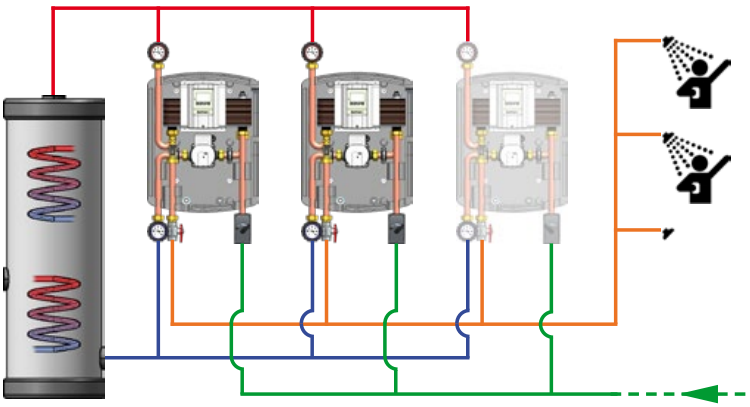
Example for an operating logic with 5 units, pre-defined thresholds 70%-20%:



Main operating methodologies of the plant

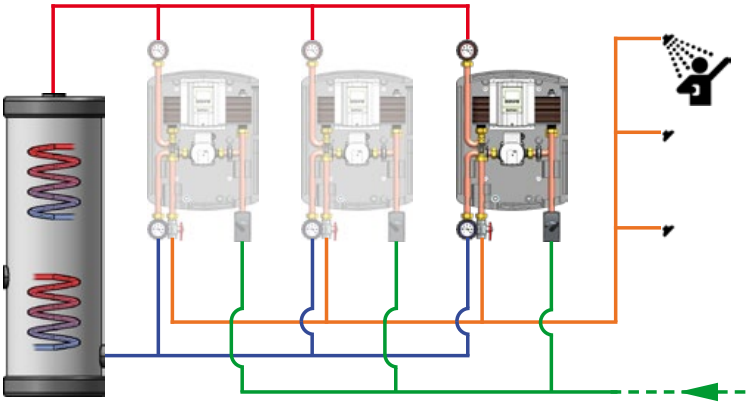
ModvFresh Kascata has different operating modes, based on the user's request (for simplification it is schematized a system with 3 modules).

System start-up and selective activation of the modules



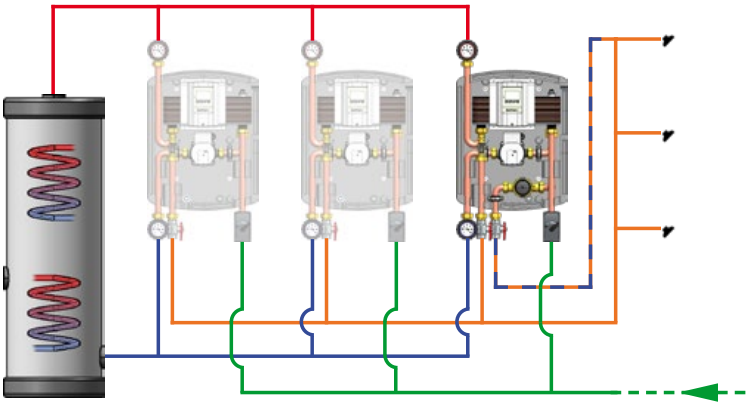
In the starting configuration, without any user's request, the first **ModvFresh** is in a condition of operation (more precisely in stand-by) as the shut-off valve managed by the **Kascata** system is usually open.
Following the request from a first user, the first **ModvFresh** module is activated and consequently it starts to produce domestic hot water.
Then, as the users increase and therefore the requested flow, VFS sensors register progressively this growth and the **Kascata** system, which controls the opening of the shut-off valves located on the water inlet of each module, activates the needed modules accordingly to guarantee the required flow (in schematics on the side, modules 1 and 2 generate the desired flow). Therefore, according to this operating mode, when the demand for domestic hot water changes, the individual modules are activated or deactivated.

System stop and routine function



Once the user's request stops, the **Kascata** system operates the closing of all the shut-off valves except the one of the priority unit. It is important to say that it does not coincide necessarily with the unit number 1, because it is the routine function that determines, time by time and according to the worked time of every unit, which one has to be kept in stand-by. When a new user's request is coming, the unit which, in that particular moment, is considered primary will start up delivering again the flow and, if necessary, the **Kascata** system will operate on the shut-off valves of other units, bringing the system back to the previously described operating conditions.
The importance of the routine function is fundamental, in fact it allows a balanced load on all the units of the system.

Recirculation line



If the design of the system requires a recirculation line, it is possible to manage this function by installing, as the last element of the cascade (to simplify the hydraulic connections), a **ModvFresh** unit with recirculation.
The starting time bands and the recirculation line temperature can be set directly on the built-in controller of the special unit.

Components list

Components list		Complete system code, without recirculation line	MFK-200	MFK-300	MFK-400	MFK-500	MFK-600
		Complete system code, with recirculation line	MFK-R-200	MFK-R-300	MFK-R-400	MFK-R-500	MFK-R-600
		Components codes	Quantity				
	ModvFresh 4 pump units (*) **Already provided of Can-Bus wiring and activated Kascata functionality**	031400-100-40 031415-100-40 (*)	2 pcs	3 pcs	4 pcs	5 pcs	6 pcs
	Zone valve	031610	2 pcs	3 pcs	4 pcs	5 pcs	6 pcs
	Servomotor for zone valve	M11	2 pcs	3 pcs	4 pcs	5 pcs	6 pcs
	Flow rate limitation fitting	DBOJ031000-38/S	2 pcs	3 pcs	4 pcs	5 pcs	6 pcs
	CAN-Bus connection box	BOX-CANM	1 pc	1 pc	1 pc	2 pcs	2 pcs

(*) If the system has a recirculation line, one of the ModvFresh basic modules is supplied in the version equipped with recirculation. In order to simplify installation, it is recommended to install this module always as the last element.