

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

List of features of main components



SAFETY: These instructions contain the basic information to install and to put in working correctly ModvFresh pump units that form the Kascata system; therefore you must consider them as a supplement of the instruction sheets enclosed to each pump unit. Therefore, before starting the installation, we suggest to read carefully the mounting and the setting working instructions, in order to avoid accidents and failures caused by an incorrect use of the product. Please keep this manual for future consultations.

(B) Ball valve



ON-OFF 2-way ball valve for drinking water, with bronze body. Equipped with housing system to install ModvMaster and ModvSlave servomotors.

(A) ModvFresh pump units

That can be installed on cascade in a number variable from 2 up to 5. Place the pump units of the Kascata system near by the buffer tank.

If the cascade system requires a recycling line, to make the installation easier we suggest to set up the recycling unit as the last element of the cascade.



(E) VFS sensor

Flow sensor VFS 10-200 l/min. It is installed on the supply water network (before the installation) and connected to the special signal converter, that sends the flow information to ModvMaster.

B

C

(C) ModvMaster

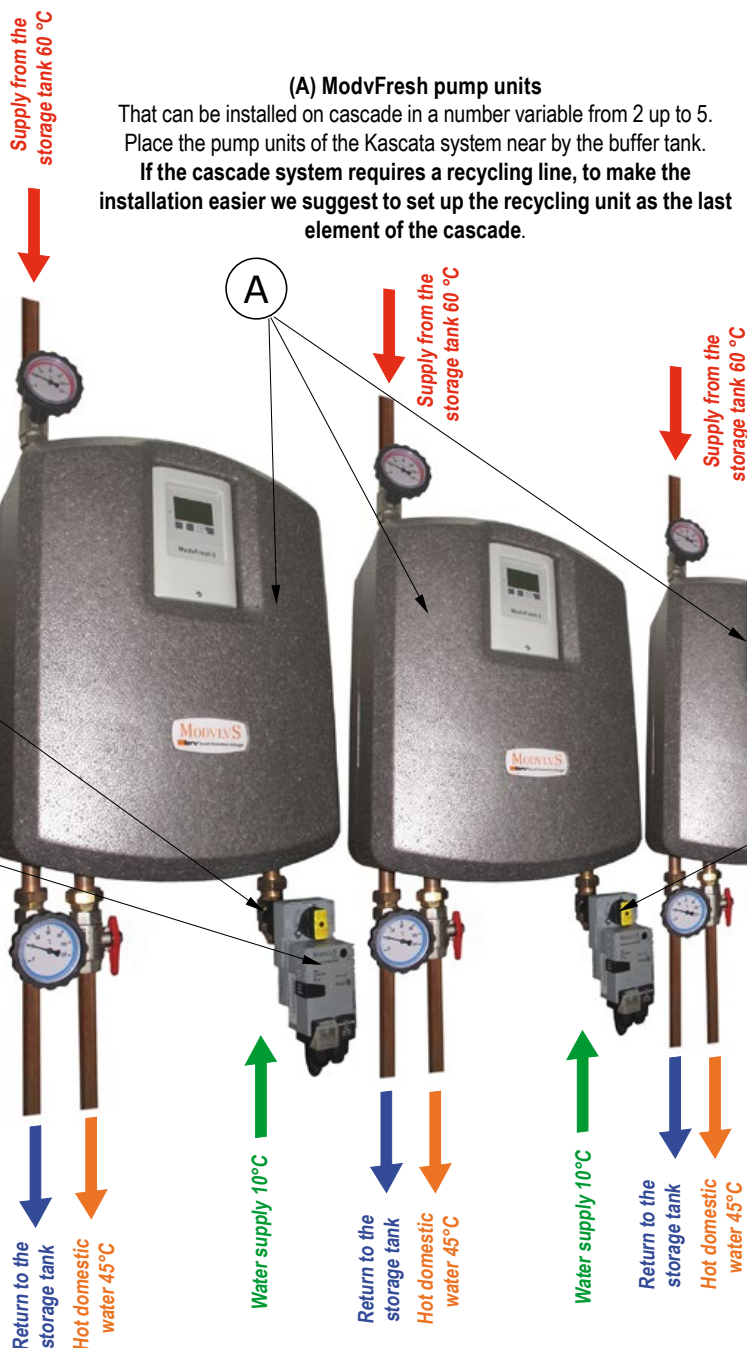
Primary servomotor (master) 24 volt AC/DC, 35 seconds working time. It contains the control software of the whole system and, by getting the information sent by VFS sensor, it controls the ModvSlave servomotors. ModvMaster is placed on the cold water inlet ball valve and the pump unit on which is placed is identified with the number 1.

D

(D) ModvSlave Secondary servomotors (slaves)

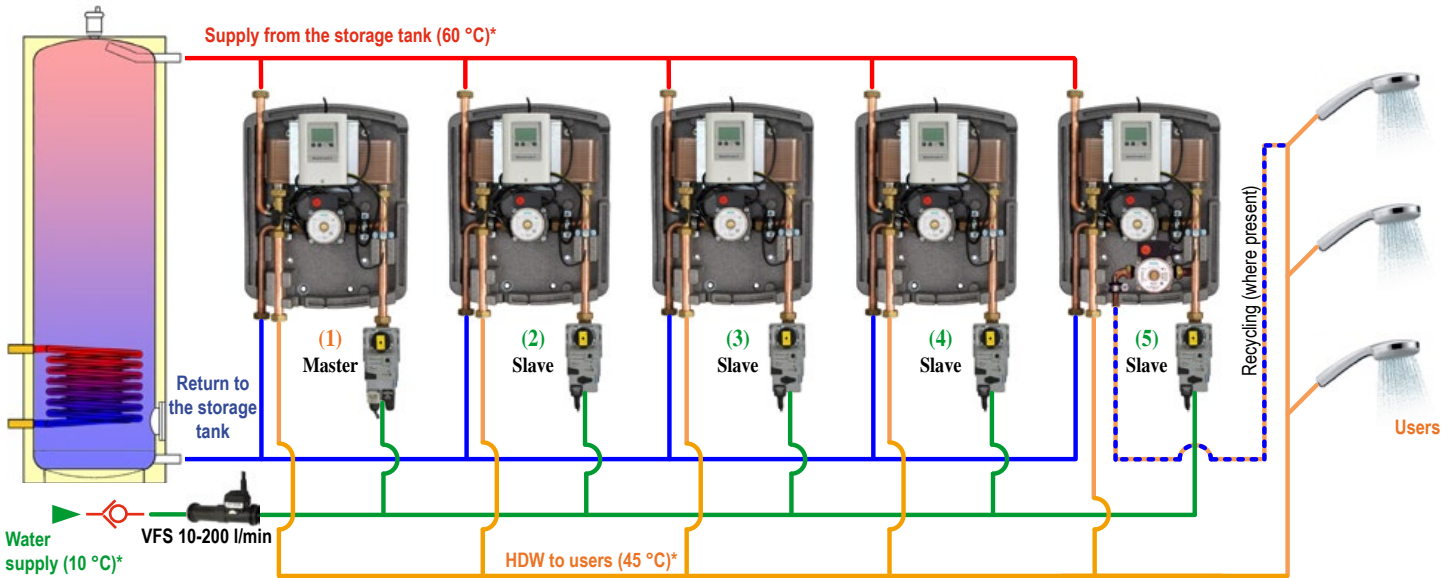
24 volt AC/DC with fast actuation time of 5 seconds. They get the control signals from ModvMaster and consequently start up or stop the pump units on which they are installed.

ModvSlave servomotors must be placed on the cold water inlet ball valve of all ModvFresh pump units except the number 1; you can find more precise installation directions in the sections "hydraulic connection scheme" and "electric connection scheme".



TAKE CARE: The numbers that identify the pump units and by means of which it is possible to manage the working of the system, are given at random to ModvMaster servomotors (always number 1) and Modvslave (from 2 up to 5, according to the number of pump units of the installation) linked to them. The servomotors programming is made directly at the factory, therefore any further operation on the components during the installation is not necessary, except the electric wiring and the hydraulic connection.

Hydraulic connection scheme



Picture 1: Schematization of an installation to supply hot domestic water (HDW), managed by ModvFresh Kascata control system.

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

Do the hydraulic connections following the scheme of picture 1. We underline that the scheme here represented is to be considered as not compulsory but, as a rule, it is the most suitable feasible solution from the plant simplification point of view.

Go on with the carrying out of the installation by preparing each pump unit to be connected to the common pipings, by placing on the pump units the special valve for the housing of ModvMaster and ModvSlave servomotors; **this valve, as it is not symmetric, must be connected in accordance with the flow direction** (please take as a reference the arrow on the body of the valve).



TAKE CARE!

To install the ball valves suitable to fit the servomotors you must remove the connection on the feeding way of the supply water network to go on to remove of the pipe union connection, as shown in the picture at side; this operation also requires the elimination of the built in check valve. As the logic of the system requires that almost one isolating valve is always open, to prevent the emptying of the installation, we recommend to install, before the VFS sensor, a check valve with a size fit to the piping of the common supply line of the pump units.



Then, always with reference to the picture 1, do the connection to the check valve and the VFS sensor on the supply watering line, and place them at the bottom of the connecting derivations of each pump unit. Finally connect the pump units to the common lines; to select the right size of the pipes fit to the dimension of the installation, see the chart at side.

Directions concerning the system equipped with recycling line:

If in the cascade system is foreseen the recycling line too, it has to be made, during the installation of the components, placing the only ModvFresh with recycling as last unit.

For instance, if we want to make a 4 pump units cascade system (400 nominal kW – 160 l/min) with recycling line, it would be better to foresee the installation of three ModvFresh, standard model so placed:

- ✓ the first linked to ModvMaster, identified with number 1;
- ✓ the second end the third, respectively linked to ModvSlaves, number 2 and 3;

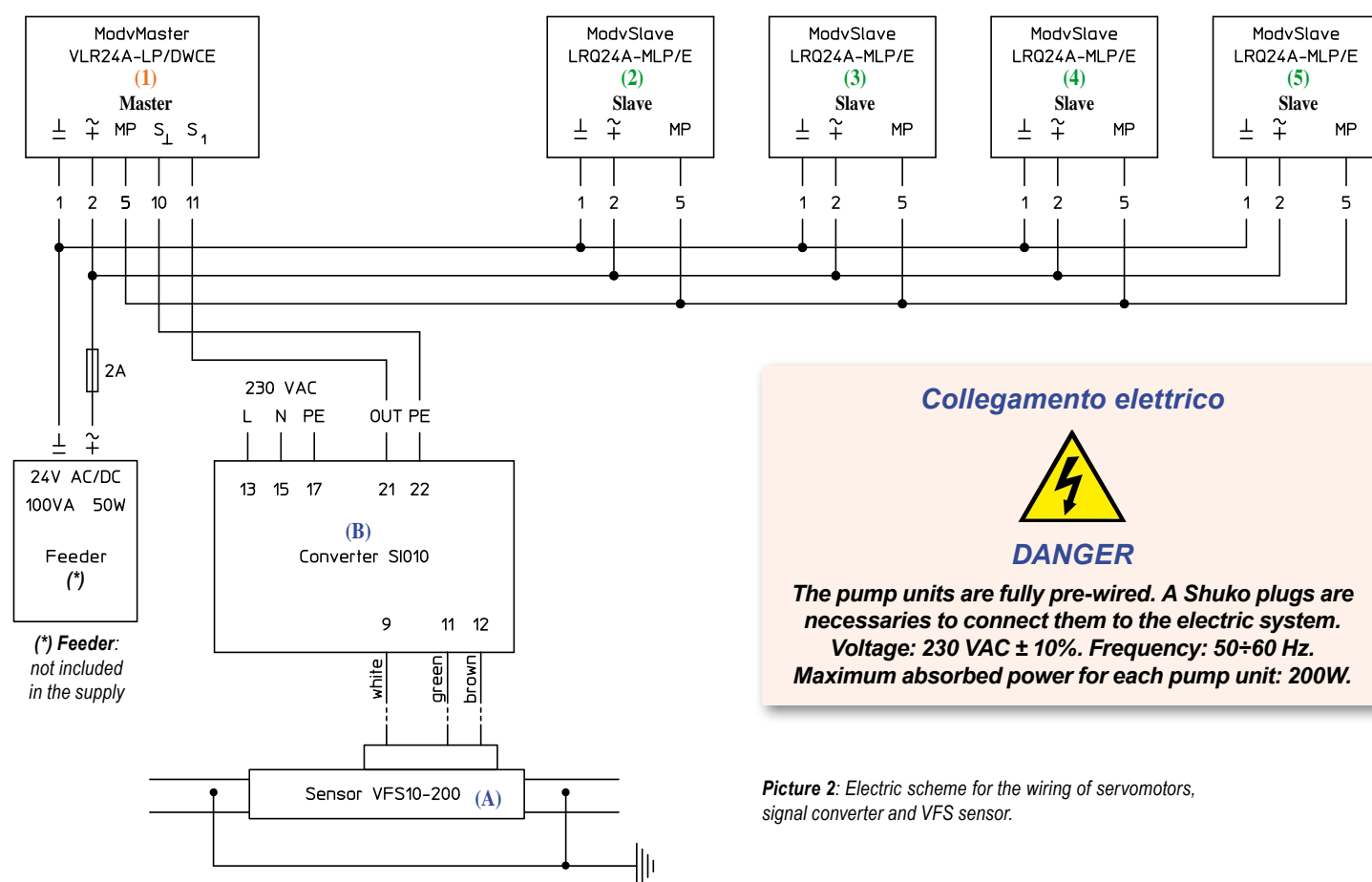
To finish the system the fourth pump unit, equipped with recycling and linked to ModvSlave number 4.

Minimum pipings diameters		
No. of MODVFRESH pump units, 100 kW	Installation pipings [mm]	Recycling line pipings (if present)
2 pcs	DN25 (Cu 28x1,5)	DN15
3 pcs	DN32 (Cu 35x1,5)	DN15
4 pcs	DN32 (Cu 35x1,5)	DN20
5 pcs	DN40 (Cu 42x1,5)	DN20

FIELD OF UTILIZATION:

For a maximum nominal power of 500 kW and flow up to 200 l/min.
Nominal supply temperature of the storage tank: 60°C.
Nominal temperature of the water supply: 10°C.
Nominal temperature of HDW production: 45°C, adjustable from 30°C to 70°C.
Recycling line temperature adjustable from 10°C up to 40°C.

Electrical connection scheme



Picture 2: Electric scheme for the wiring of servomotors, signal converter and VFS sensor.

Do the electric wirings following carefully the scheme of *picture 2*, that concerns exclusively to the wiring of VFS sensor (A), of signal converter (B) and of ModvMaster (1) and ModvSlave (respectively 2, 3, 4, 5) servomotors; **moreover it is not necessary to do the electric wirings inside each ModvFresh that, as already prewired at factory, must be only connected to the electric system by means of the special plug.**

The connection of the components of the Kascata system must be done as follows:

- ✓ Connect the cables brown and green (power supply), white (signal) of the VFS sensor to the signal converter, respectively to the clamps 12, 11 and 9;
- ✓ Connect the signal converter to the power supply 230 VAC by means of the clamps number 13, 15, 17;
- ✓ Make the the line to tanfer the flow informations between the converter and ModvMaster, by connecting respectively the clamps number 21 and 22 of the first one to the numbers 11 and 10 of the second one.
- ✓ Supply power to all the servomotors of the system by means of the clamps number 1 and 2 of each servomotor; supply an electric power suitable to the working of components (100 VA - 50 W) and foresee the installation of a 2 A fuse to protect the system.
The feeder is not included in the equipment.
- ✓ Make the bus line by wiring together all the servomotors: connect each **ModvSlave** servomotor (by means of the their clamps number 5) to the common line coming from the clamp 5 of **ModvMaster**.

General informations concerning the working parameters of the system

HDW system MODVFRESH KASCATA: delivered flow				
Requested flow [l/min]	N° moduli ModvFresh attivi	Hot water selected temperature [°C]	Needed supply temperature from the storage tank [°C]	Supplied power [kW]
40	1	50	70	112
80	2	50	70	224
120	3	50	70	336
160	4	50	70	448
200	5	50	70	560

Assembling of the servomotor on the ball valve



MASTER servomotor



SLAVE Servomotor

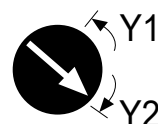


Ball valve

Controls and indicators



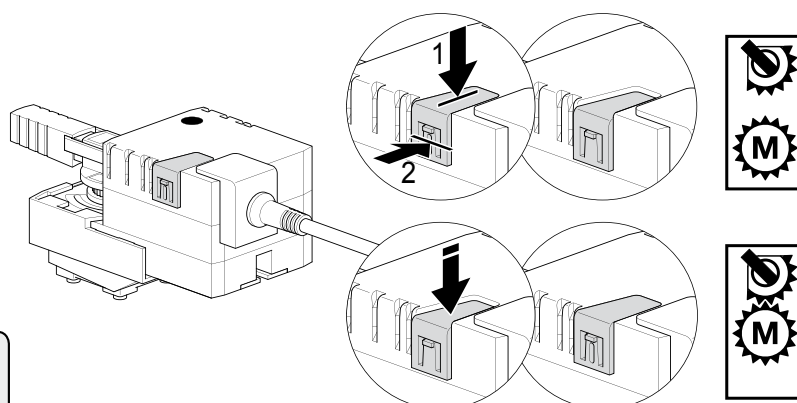
- ① **Direction of rotation switch**
Switching over: Change of direction of rotation
Used selection: Y2



- ② **Push-button with green LED**
Off: No voltage supply or fault
On: In operation
Pressed button: Switches on angle of rotation adaption followed by standard operation

- ③ **Push-button with yellow LED**
Off: Standard operation
On: Adaption or synchronising process active
Pressed button: No function

- ④ **Push-button for disengagement switch**
Pressed button: Neutral drive, the motor stops, it is possible to work the controls by hand on opening and closing
Released button: the drive is engaged, the synchronization starts, then the working mode will be standard



Coding at side:

Master	1
Slave	2 3 4 5

- ① **Servomotor and ball valve must be coupled while both are in fully open position (counter-clockwise rotation).** Make sure that they are in this position, or if necessary, intervene manually to position them as shown:

Servomotor



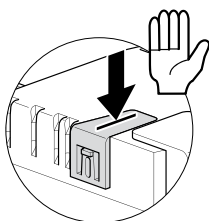
Picture A: position of the end of stroke insert



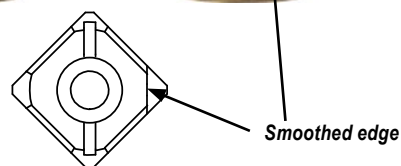
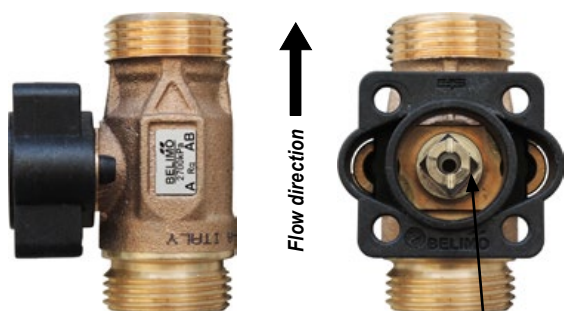
Picture B: correct position of insertion of the knob

Servomotor. Fully open position: make sure that the end of stroke insert is positioned as in picture A and that the knob is consequently inserted as in Picture B.

If the position is not the one indicated above, it is necessary to turn manually the motor control by holding down the appropriate button.

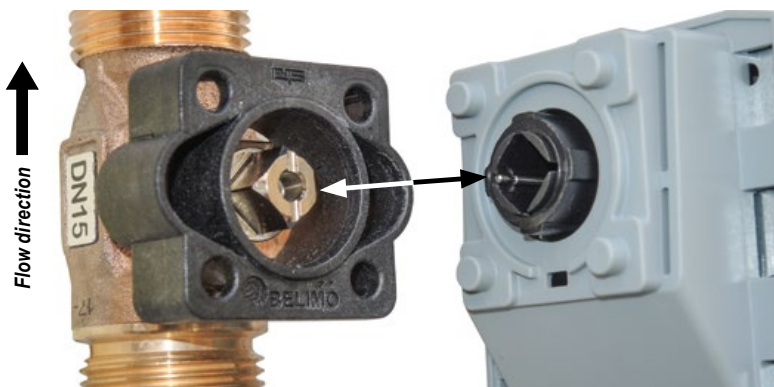


Ball valve



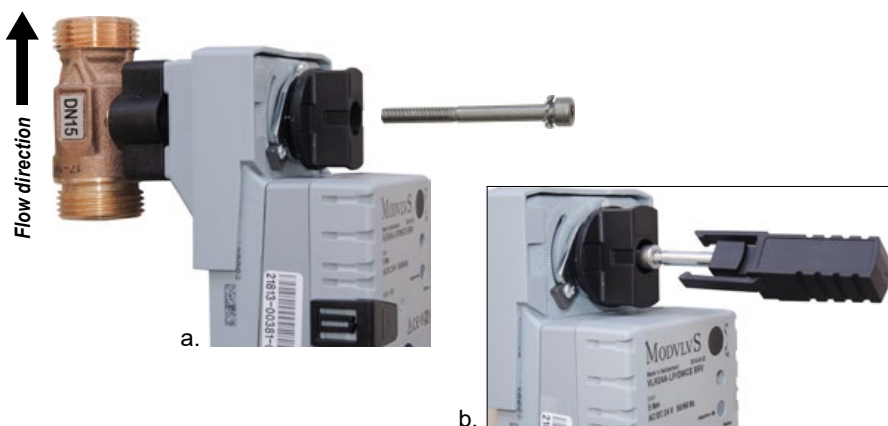
Ball valve: check the position of the control rod Flow direction

②



Mount the servomotor on the ball valve paying attention to the orientation. The knob and the rod, both already in position as described in point ①, refer to the metal insert in the framework of the rod. The insert must be matched with the smoothed edge of the control rod.

③



Once the servomotor is positioned, tighten the fixing screw with the appropriate key supplied.

④



The key can then be inserted into the knob to facilitate manual movements and clearly indicate the position.

⑤

Keeping pressed the button test the closing working (clockwise rotation) and the opening working (anticlockwise rotation). The full rotation must be of 90°. Put in the open position and release the unlocking button. **Starting of the installation: At the first power supply the servomotors will do some opening and closing movements. During this step, that will last about 3 minutes, please do not interfere. When these operations are finished, only one servomotor must be in the open position.**

Main working methods of the installation

ModvFresh Kascata has several working methods, according to the user's requirements (for example a 3 units installation is schematized).

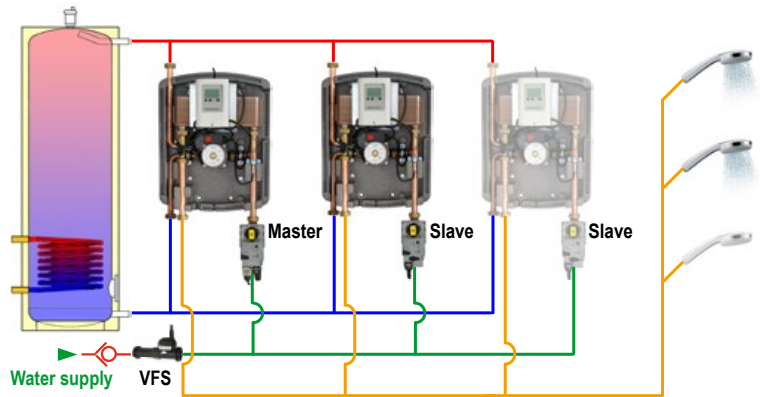
Starting of the installation and selective activation of the units

In the starting configuration, without any user's requirement, the first **ModvFresh** (*master*) is in effectiveness condition (to be more precise it is in stand-by) because the isolating valve managed by **ModvMaster** is usually open.

After the request of the first user, the **ModvFresh** number 1 is activated and it starts to produce hot domestic sanitary water.

Then, according to the increase of users and, consequently, of the requested flow, the VFS sensor progressively registers this increase and sends this input to **ModvMaster** that controls the opening of the isolating valves placed on the cold water inlet of every unit and, consequently, the starting of the slave units necessary to allow the requested mixed water flow (in the scheme at side the requested flow is given by units 1 and 2).

Therefore, in this working mode, every individual unit is activated or deactivated according to the variation of the request of hot water.

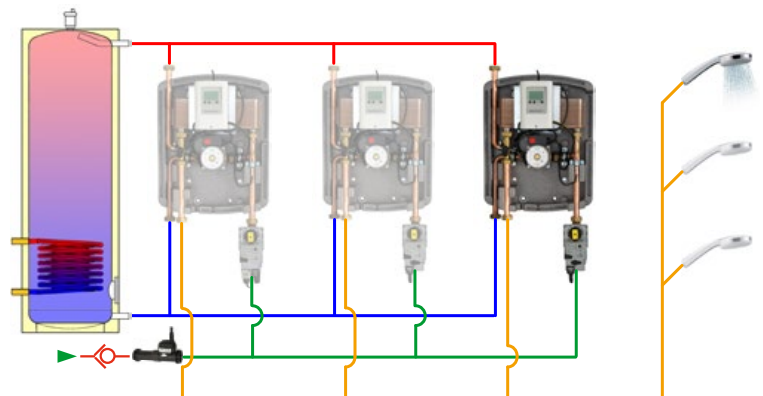


Stop of the installation and routine function

Once the user's request stops, **ModvMaster** operates the closing of all the isolating valves except the one of the priority unit. It is important to say that it does not coincide necessarily with the unit number 1 (on which **ModvMaster** is placed), because it is the routine function that determines, time by time and according to the worked hours 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 giving again the flow and, if necessary, **ModvMaster** will operate on the insulating valves of other units, bringing back the system into the condition of scheme 1.

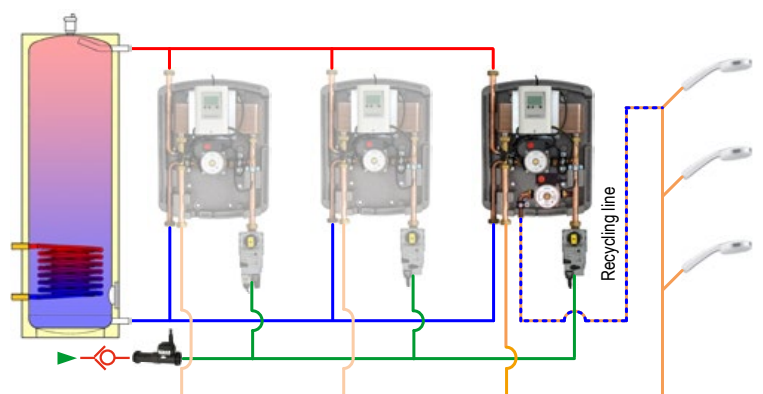
The importance of the routine function is fundamental, in fact it allows a balanced load on all the units of the system.



Recycling line

If the planning of the installation requires a recycling 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 recycling.

The starting time bands and the recycling line temperature can be set directly on the built-in controller of the special unit.



RACCORDO LIMITATORE DI PORTATA 38 L/MIN

38 L/MIN FLOW RATE LIMITATION FITTING



Raccordo limitatore di portata

IT

Flow rate limitation fitting

EN

1. Campo d'impiego

Raccordo 1" x 3/4" Maschio provvisto di limitatore di flusso 38 L/min. Il dispositivo, montato sull'uscita ACS dei gruppi ModvFresh 4 100 kW (portata 2-40 L/min), assicura che il misuratore VFS non venga attraversato da portate eccessive che potrebbero danneggiarlo. Particolarmente indicato per sistemi Kascata.

1. Field of utilization

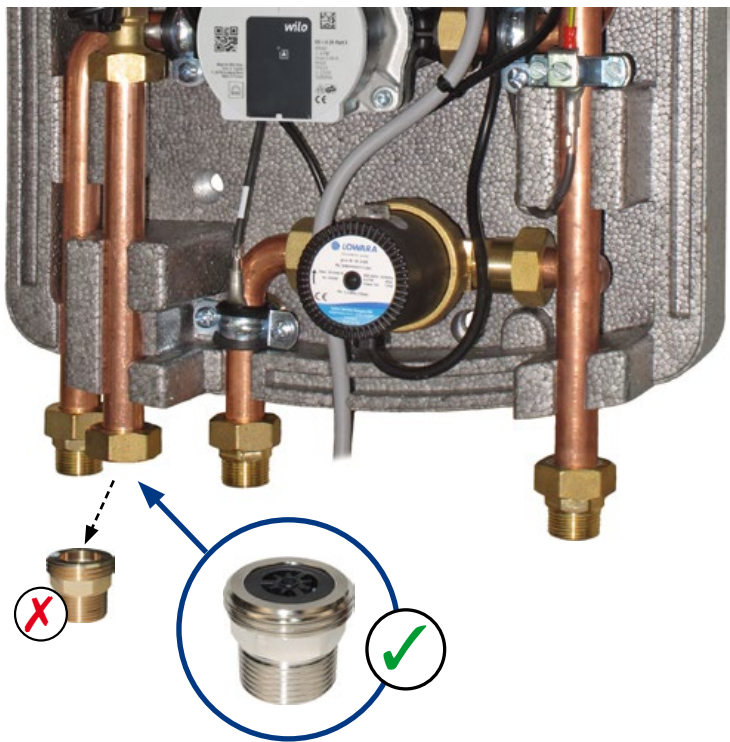
1" x 3/4" male fitting equipped with flow limiter 38 L/Min. The device, mounted on the DHW output of the ModvFresh 4 100 kW units (flow rate 2-40 L/min), prevents excessive flow rates to go through the VFS meter, event that could damage it. Particularly suitable for the Kascata systems.

2. Istruzioni di montaggio

Il raccordo deve essere installato sull'uscita ACS del gruppo ModvFresh 4, sostituendo il raccordo fornito con il prodotto standard.

2. Installation directions

The fitting must be inserted on the DHW outlet of the ModvFresh 4 unit, replacing the fitting supplied with the standard product.



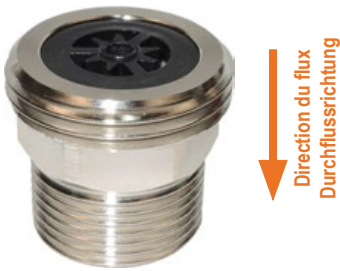
3. Caratteristiche tecniche

3. Technical features

Tabella perdite di carico - Load losses table					
[L/min]	28,75	33,11	37,08	39,89	40,11
Perdita di carico Load losses [bar]	0,5	0,7	1,0	1,5	2,0

RACCORD LIMITEUR DE DÉBIT 38 L/MIN

DURCHFLUSSBEGRENZER 38 L/MIN



Raccord limiteur de débit

FR

Durchflussbegrenzer

DE

1. Champ d'utilisation

Raccord mâle de 1" x 3/4" équipé d'un limiteur de débit 38 L/Min. L'appareil, monté sur la sortie ECS des unités ModvFresh 4 100 kW (débit 2-40 L/min), garantit que le débitmètre VFS n'est pas soumis à des débits excessifs qui pourraient l'endommager. Particulièrement adapté aux systèmes Kascata.

1. Einsatzbereich

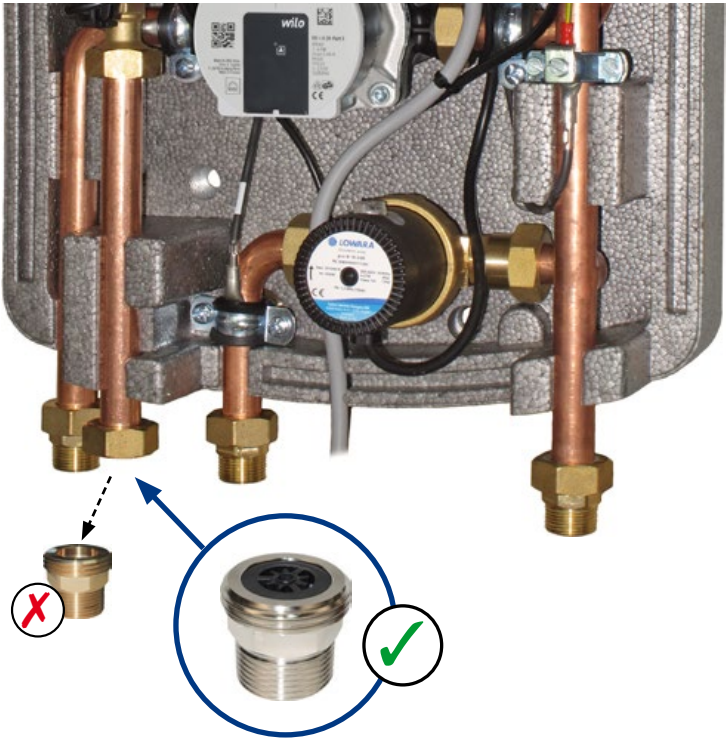
1" x 3/4" Verbindung mit Durchflussbegrenzer 38 L/min. Das Gerät, das am ACS-Ausgang der ModvFresh 4 100-kW-Einheiten (Durchflussrate 2-40 L/min) montiert ist, stellt sicher, dass das VFS-Messgerät nicht von exzessiven Durchflussraten durchflossen wird, die es beschädigen könnten. Besonders geeignet für Kascata-Systeme.

2. Notice de montage

Le raccord doit être installé sur la sortie d'eau chaude sanitaire de l'unité ModvFresh 4, en remplacement du raccord fourni avec le produit standard.

2. Montageanleitung

Die Armatur muss am ACS-Ausgang der ModvFresh 4-Einheit installiert werden und ersetzt die mit dem Standardprodukt gelieferte Armatur.



3. Données techniques

3. Technische Merkmale

Tableau des pertes de charge - Differenzdruckdiagramm					
[L/min]	28,75	33,11	37,08	39,89	40,11
Pertes de charge Differenzdruck [bar]	0,5	0,7	1,0	1,5	2,0