Regulus

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CSE2 MIX F R8 1F

Installation and Operation Manual
CSE2 MIX F R8 1F PUMP STATION

EN

CSE2 MIX F R8 1F

Contents

1. INTRODUCTION

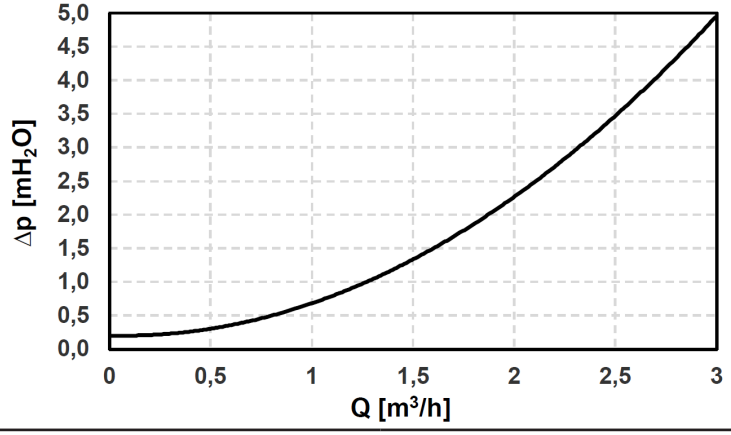
CSE2 MIX F R8 1F twin-line pump station is designed for mixed heating circuits. It provides flow through the heating system, mixes to the outlet temperature using a motorized mixing valve (controlled by an external controller). The pump station includes a filter with magnet, so it is also suitable for older steel pipe systems. It can be easily mounted on a wall or on a manifold for multiple heating circuits.

2. PUMP STATION DESCRIPTION AND DATA

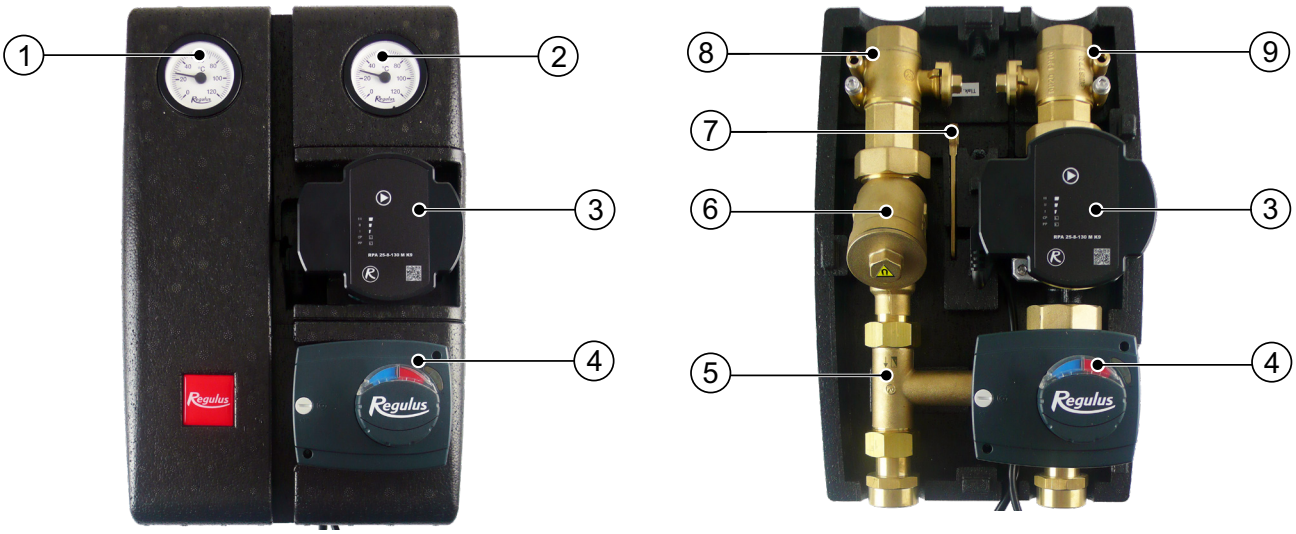
Main Features	
Description	**The pump station consists of:** ● RPA 25-8 pump ● 2 ball valves w. sensor sheath ● check valve ● filter with strainer&magnet ● LK 840 actuated mixing valve ● thermometers, insulation
Working fluid	Water, water-glycol mixture (max. 1:1) - pH 6.5-8.5.
Installation	vertically on a wall or manifold (125 mm pitch)
Connections	4 x G 1“ F
Code	**21126**

Data for CSE2 MIX F R8 1F Pump Station	
Fluid working temperature	5 - 95 °C
Max. working pressure	10 bar
Min. working pressure	0.5 bar
Ambient temperature	5 - 40 °C
Max. relative humidity	80%, non condensing
Pump power supply	1 ~ 230 V, 50 - 60 Hz
Pump station max. power input	67 W
Mixing valve Kvs	6.3 m^3/h
Max. pressure difference	5 mH_2O (at mixing valve inlets)
Leak rate	< 1 % Kv_s at 5 m H_2O pressure difference (at mixing valve inlets)
Mixing valve power supply	230 V, 50 Hz; from external controller w. 3-point control
Valve shift time	120 s
Insulation material	EPP RG 60 g/l
Overall dimensions	360 x 133 x 245 mm
Total weight	6.7 kg
Connections	4 x G 1“ F

Pump Station Pressure Drop Graph



3. PUMP STATION COMPONENTS



1 – Thermometer at the heating circuit return line
2 – Thermometer at the heating circuit inlet
3 – RPA 25-8 circulation pump
4 – mixing valve w. actuator
5 – T-piece w. check valve
6 – Dirt filter with magnet
7 – Lever for ball valves
8 – Ball valve w. sheath for temperature sensor (heating circuit return line)
9 – Ball valve w. sheath for temperature sensor (heating circuit inlet)

3.1. RPA 25-8 PUMP

3.1.1. General Information

The high efficiency circulation pumps of the RPA series are used exclusively for the circulation of liquids in hot water heating systems. Operating the pump in other systems or in systems containing too little water, air bubbles or not pressurized can lead to its rapid destruction.

3.1.2. Pump Description

High efficiency wet-running ON/OFF circulation pump designed for circulation of fluids in heating systems; the pump is equipped with an anti-blocking motor and integrated electronic performance control; LED indication of operation for an easy check; choice between constant speed mode I, II, III, PP mode for variable differential pressure or CP mode for constant differential pressure.

3.1.3. Pump Wiring

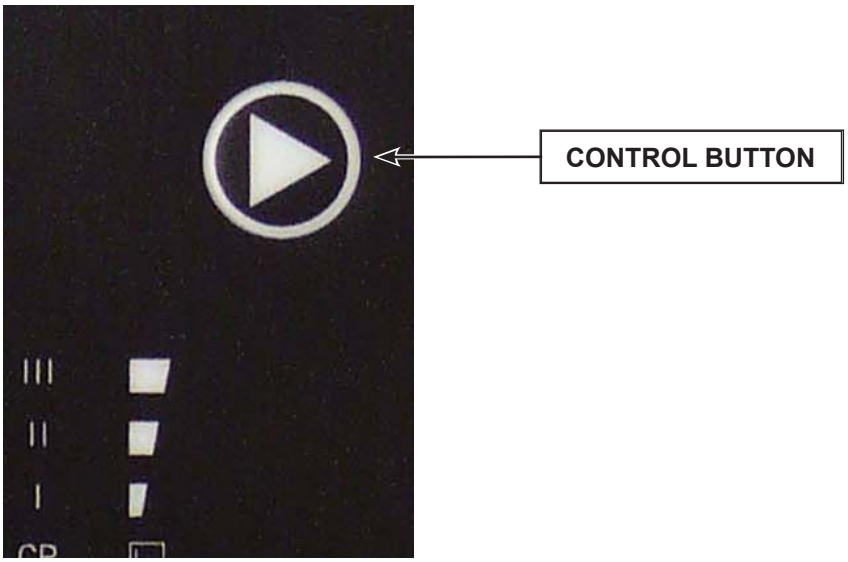
Connecting/disconnecting the pump must be done by a professionally qualified person!

Insert the power cable into the connector on the pump. Connect the wires at the other end of the cable to the corresponding terminals in the terminal block.

3.1.4. Pump Control

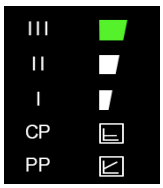
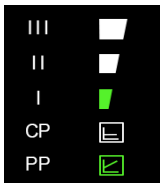
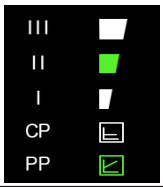
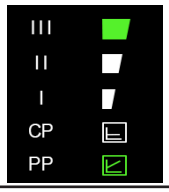
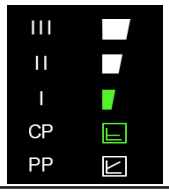
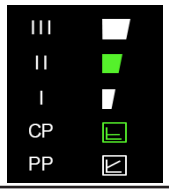
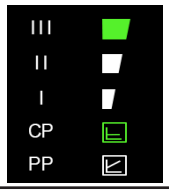
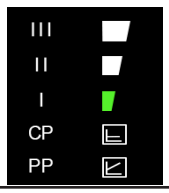
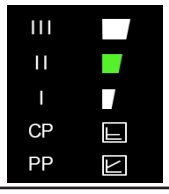
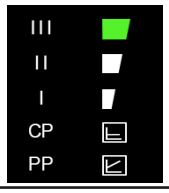
In the factory settings of the RPA 25-8 pump, the Constant Speed (CS) operating mode and the pump performance curve III are preset. After switching on, the pump runs at the factory setting or at the last setting.

The settings can be changed using the control button, see below.



By briefly pressing the control button:

You select the **operating mode** of the pump: constant speed (CS), proportional pressure (PP) or constant pressure (CP) and the pump **performance curve** (I, II, III). The LED lights show the pump settings (operating mode and performance curve).

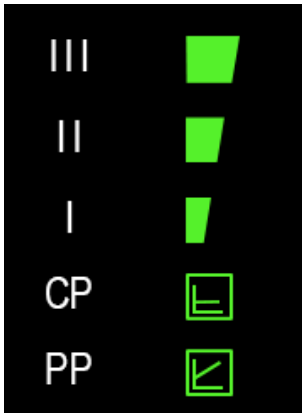
NUMBER OF PRESSES	OPERATING MODE		LED INDICATORS
0	CS III (factory setting)	constant speed III	
1	PP I	proportional pressure I	
2	PP II	proportional pressure II	
3	PP III	proportional pressure III	
4	CP I	constant pressure I	
5	CP II	constant pressure II	
6	CP III	constant pressure III	
7	CS I	constant speed I	
8	CS II	constant speed II	
9	CS III	constant speed III	

PUMP AIR VENTING

If the pump is aerated:

Activate the vent function by pressing and holding the control button for 5 seconds. Venting is indicated by five flashing LED lights - see picture.

The pump alternately switches on and off during venting. Venting lasts for 5 minutes, after which the pump switches to normal mode.

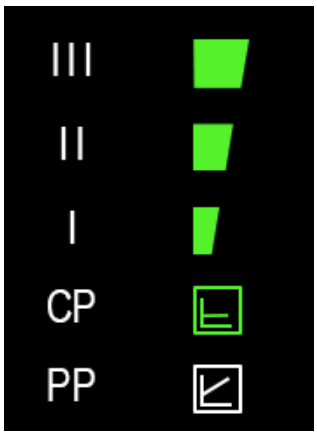


MANUAL RESTART

In case the pump has been stopped for a long time or is blocked, activate the manual restart by holding the control button for 8 seconds. A manual restart is signalled by four flashing LED lights - see the pic., and during it the pump alternately switches on and off.

Manual restart lasts for 5 minutes, after which the pump switches to normal mode.

If the pump is not unblocked, contact a specialist technician.



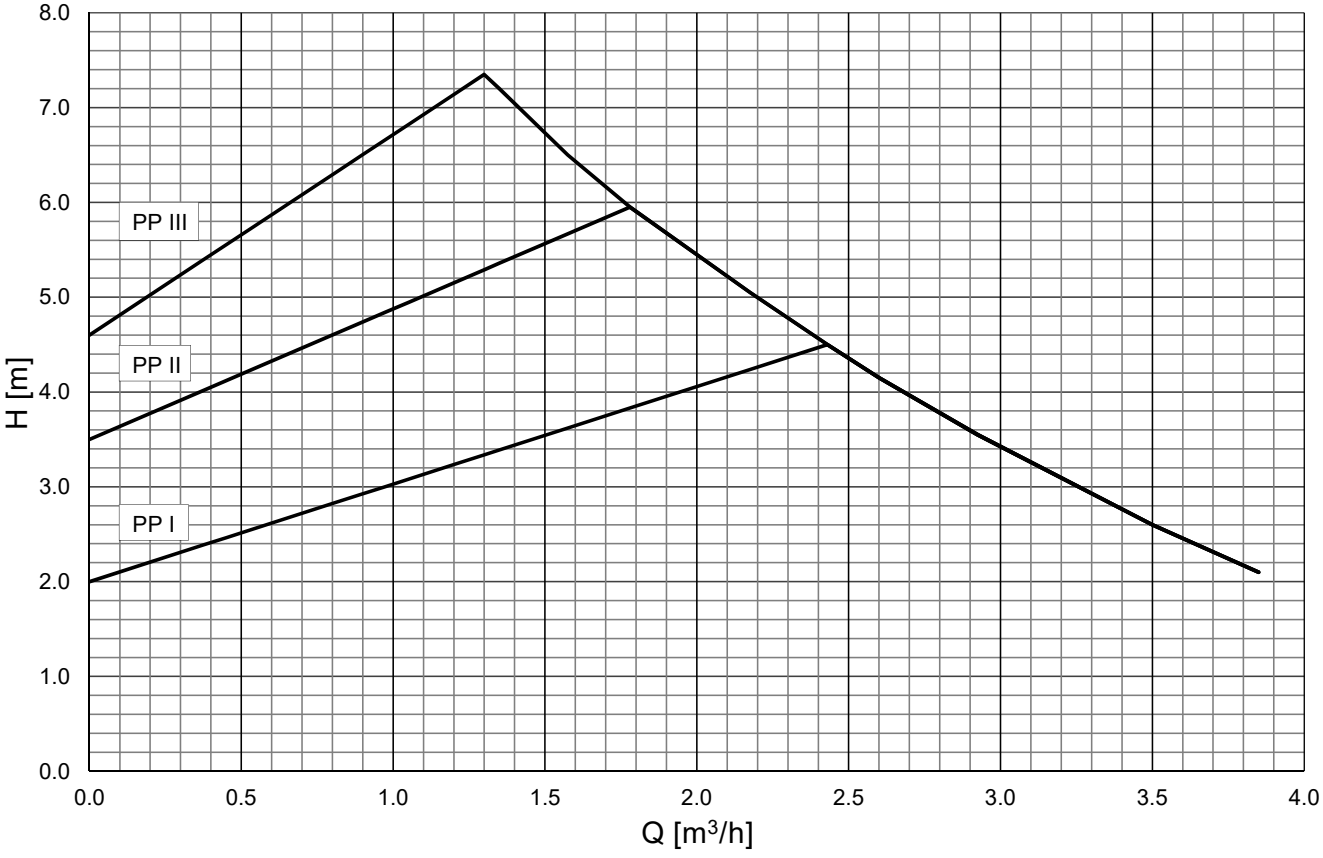
PUMP OPERATING MODES

Proportional pressure PP

The operating mode "proportional pressure" is recommended in systems where it is appropriate to reduce the pump discharge pressure together with the decrease of the required flow rate. A typical example is a heating circuit with radiators equipped with thermostatic valves, when choosing this operating mode can reduce the noise of the thermostatic valves, which is usually caused by closing of a larger number of radiators in the system. **This mode, on the other hand, is unsuitable for circuits of heat sources where a decrease in head together with flow rate can even cause that these sources stop working.**

As the pump also reduces the head when reducing the flow rate, there is a substantial reduction in the pump power consumption and thus also the operating costs. For larger heating circuits and for circuits where there are significant differences in the heating performance requirements in separate heating zones, this mode can temporarily cause underheating. For these systems, it may be more appropriate to switch the pump to constant pressure mode CP.

Performance curves

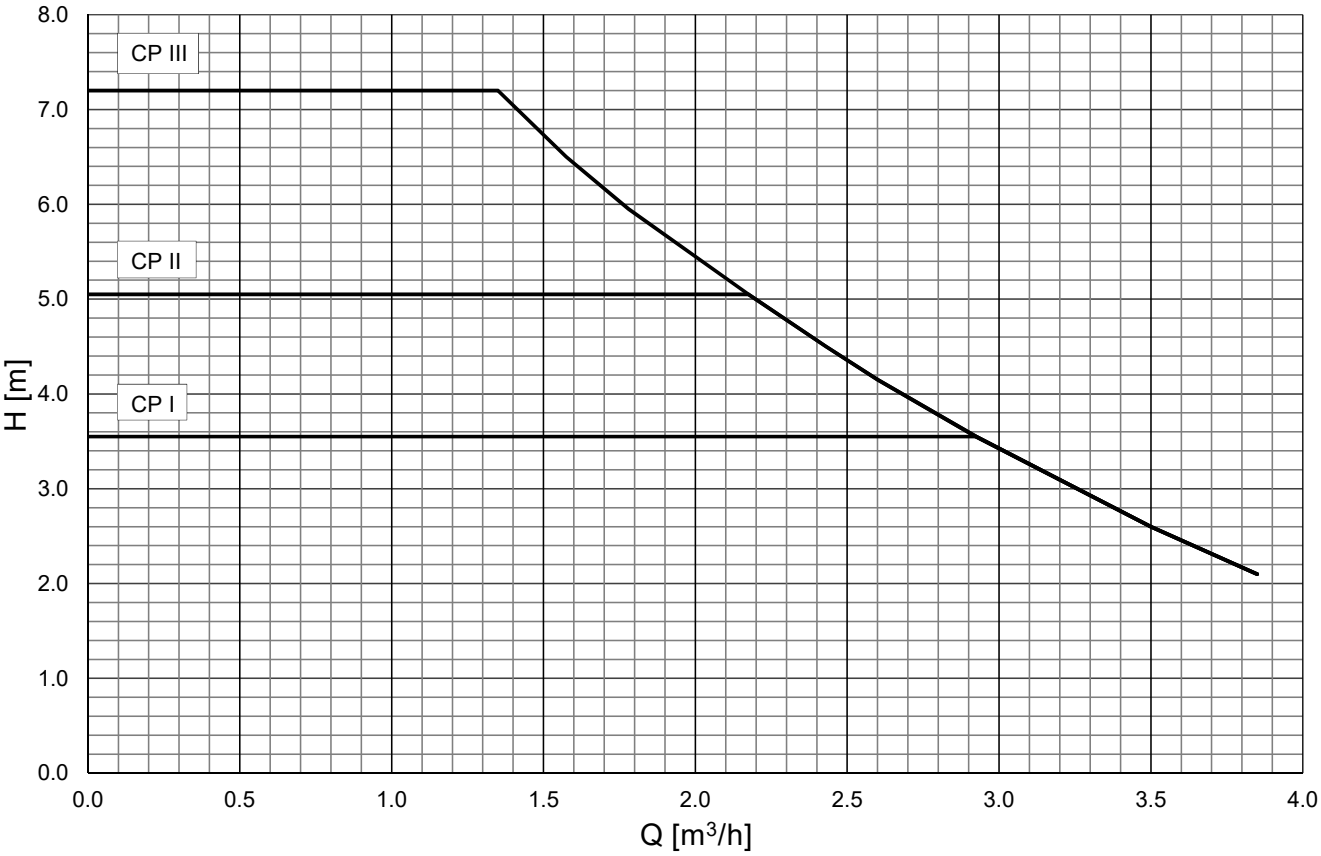


Constant pressure CP

The operating mode "constant pressure" (constant head) is suitable for hydraulic circuits of heat sources (boilers, heat pumps, solar thermal systems, etc.), hot water tanks, hot water heaters, floor heating systems and extensive heating circuits where the previous PP mode could cause underheating by reducing the head.

By reducing the required flow, the pump maintains a constant head, so the reduction of pump performance is more gradual than in the PP mode.

Performance curves

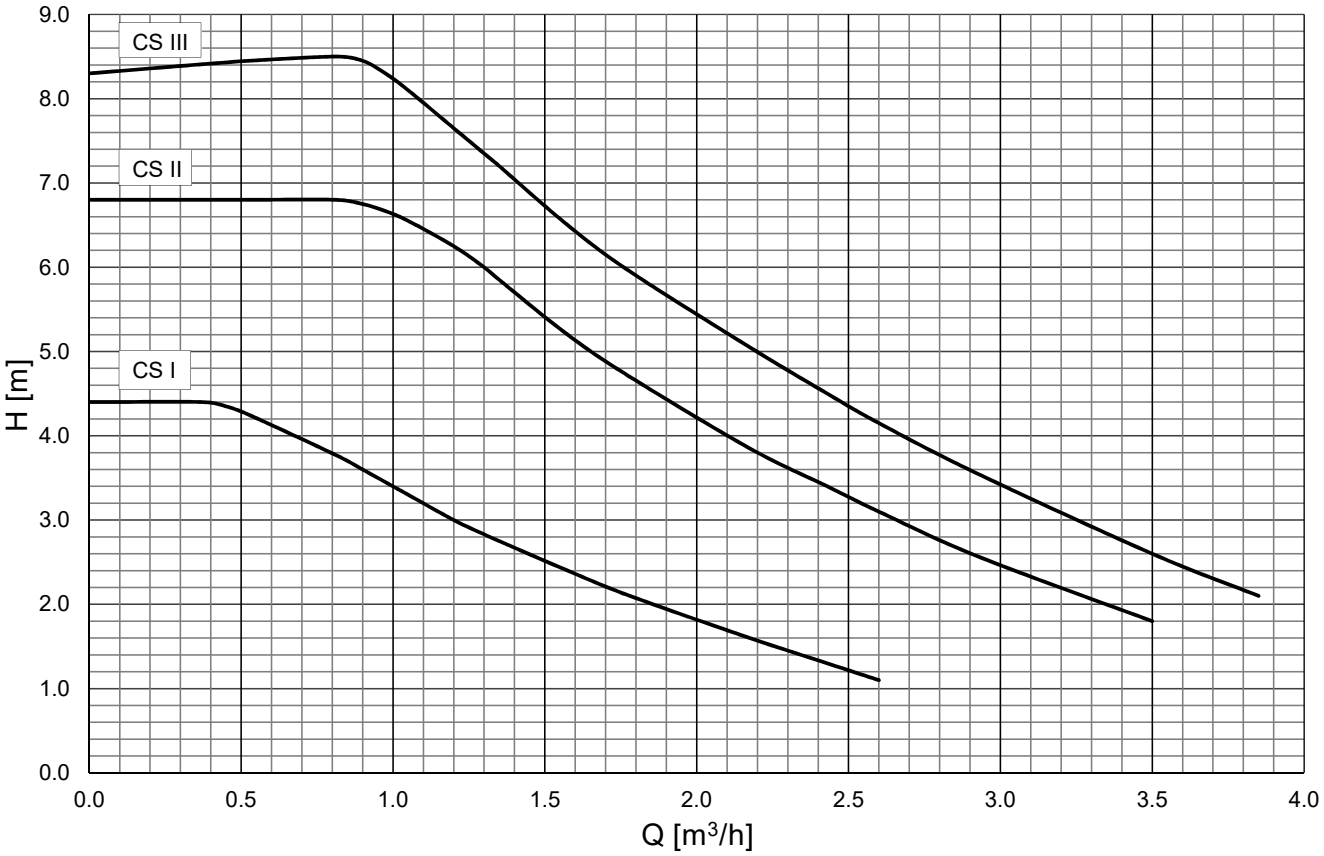


Constant speed CS

The operating mode "constant speed" means that the pump does not adjust its speed in any way depending on the flow rate or head of the hydraulic circuit. The flow rate and head of the pump is therefore completely dependent on the set speed level (I, II, III) and on the setting of the hydraulic circuit. This mode is used where the more economical CP mode is not suitable. This is the same mode that older types of classic circulation pumps had, where the speed mode I, II, III was selected with a switch.

The mode may be suitable e.g. for older types of circuits where the flow rate is regulated by a throttle and the requirement is to maintain it. Furthermore, it can be suitable for solid fuel boilers that are equipped with older types of TSV valves with balancing by means of a manual throttle valve, or in other similar specific cases of a requirement for a constant pumping performance of the pump.

Performance curves



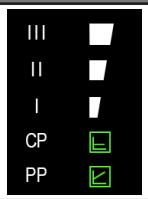
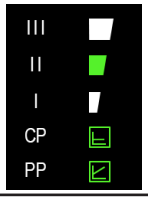
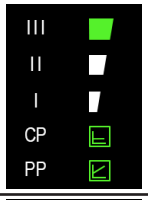
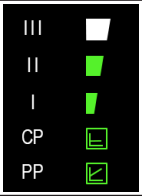
3.1.5. Technical Data

Electric Data	
Power supply	1~230 V, 50/60 Hz
Max. power consumption	65 W
Max. current	0.65 A
IP rating	IP 44
Insulation class	F
Motor protection	not needed (block resistant)

3.1.6. FAULTS, THEIR CAUSE AND TROUBLESHOOTING

FAULT	PROBABLE CAUSE	TROUBLESHOOTING
Pump not running	Loose cable or power interruption	Check the power supply and power cable connection
	Damaged pump control electronics	Replace the pump
	Blocked pump impeller	Disconnect the actuator and clean the pump
Noise in heating system / pump	Low pump suction pressure	Increase the pressure above the min. working pressure value - see chap. 2
	Air in the system or pump	Vent the system and the pump
Pump is running but no fluid circulation through system	Closed valve in system	Check that valves are open
	Air in the system	Vent the system

Some types of faults are signaled on the pump with LED lights:

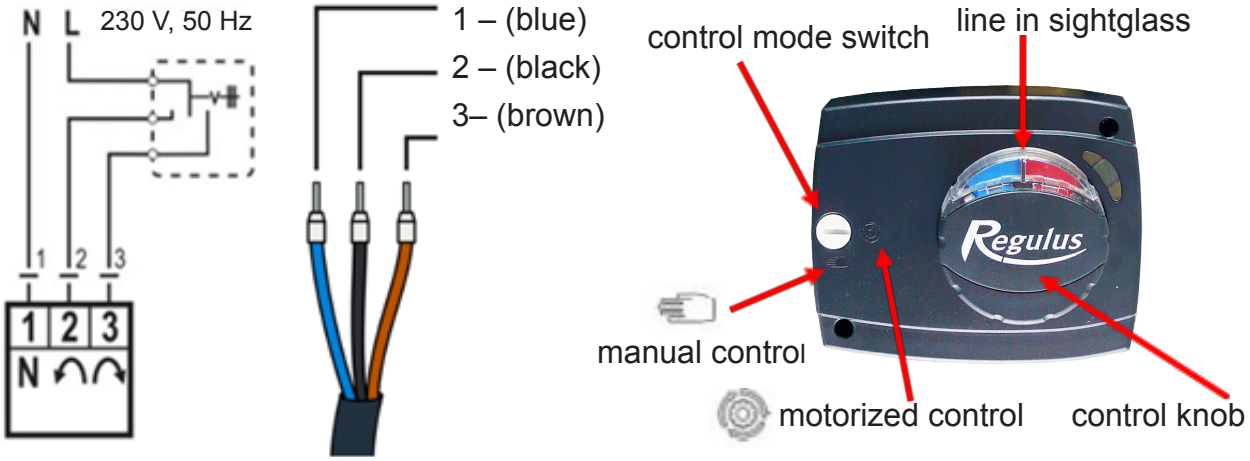
FAULT	SIGNAL	PROBABLE CAUSE	TROUBLESHOOTING
Blocked pump impeller		Impurities in the pump	Remove the actuator and clean the pump
Overvoltage or undervoltage		The mains voltage is too high or too low	Check that the power cable is correctly attached and that the mains voltage is correct
Power phase interruption inside the pump		Broken motor winding or other interruption of the power phase inside the pump	Replace the pump
Electrical short circuit inside the pump		Damaged motor winding or other electrical short inside the pump	Replace the pump

If the fault cannot be rectified, contact a specialist technician.

3.2. MIXING VALVE W. ACTUATOR

LK 840 mixing valve is controlled by an AVC actuator with three-point control. The current position of the valve member can be read from the sight glass on the actuator housing. The control mode switch is used to set automatic or manual control. If manual control is set, the actuator is controlled by turning the control knob.

ACTUATOR ELECTRICAL WIRING



The actuator is factory set to motorized control and ready for operation. Should it be inevitable to remove it or replace, please follow the instructions in the appendix.

3.3. CHECK VALVE

The check valve downstream of the filter prevents natural circulation in the heating circuit.

3.4. FILTER WITH MAGNET

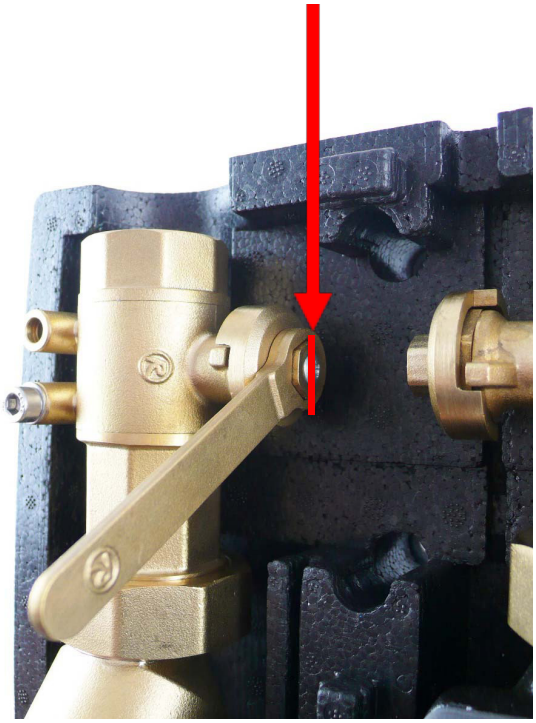
The filter located in the return line of the pump station is designed to collect particles from heating water. It consists of a brass housing, removable stainless-steel strainer collecting coarse dirt, and a brass lid with a magnet that attracts magnetic particles.
The filter needs to be checked regularly, and cleaned when needed. Turn off the circulation pump, close the ball valve upstream of the filter. Water inlet downstream of the magnet is closed by the check valve. Unscrew the filter lid, remove the stainless steel strainer and flush thoroughly. Wipe the impurities on the magnet and re-assemble the filter by inserting the strainer, screwing in and tightening the lid.

3.5. BALL VALVES

Ball valves are intended to isolate the pump station from the heating circuit. Then it is not necessary to drain the heating circuit for servicing (incl. cleaning the filter). In order to have a more solid hydraulic section of the pump station, they are fixed to the rear mounting plate.

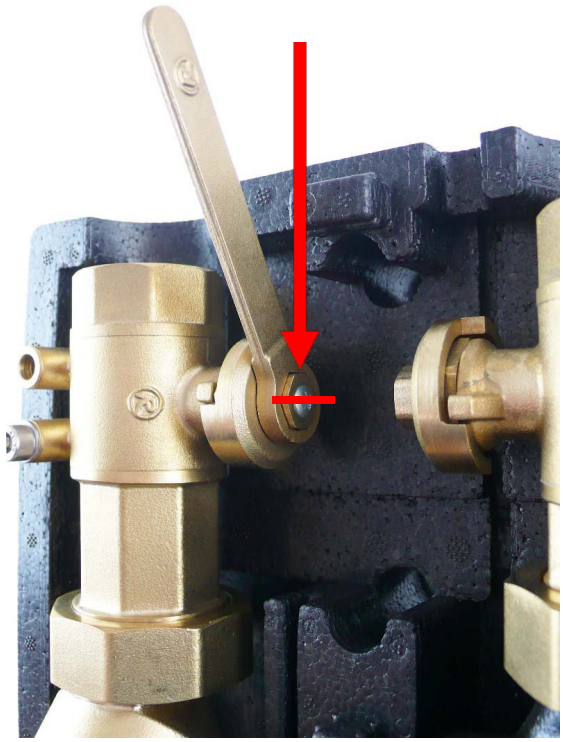
The ball valves are controlled by a lever that is placed inside the pump station insulation. The valve is closed or opened by turning the lever by 90°. The state of the valve is indicated by the groove on the control hexagon of the valve. The ball valve can be accesses only after the front section of the insulation is removed. As a result, unintentional closure of the system by n unauthorized person is not possible.

OPEN



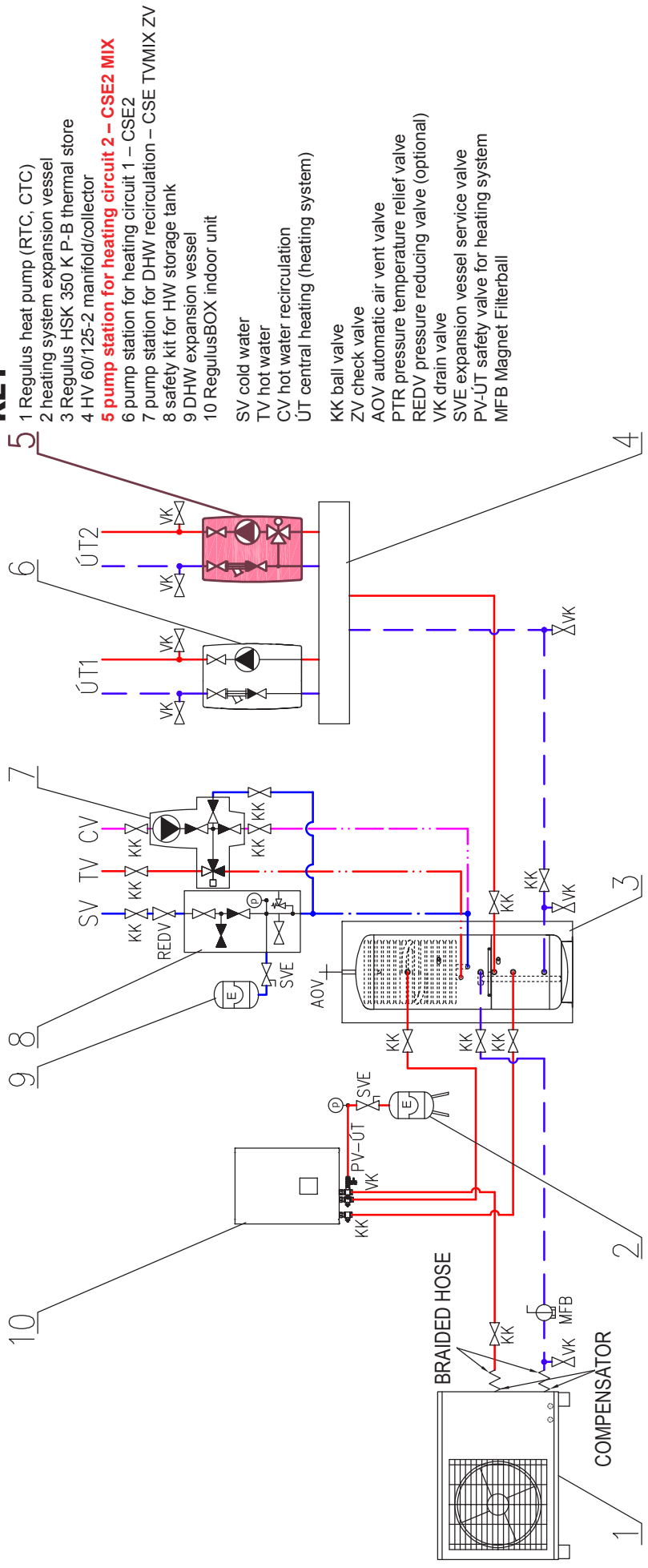
groove in the flow direction

CLOSED

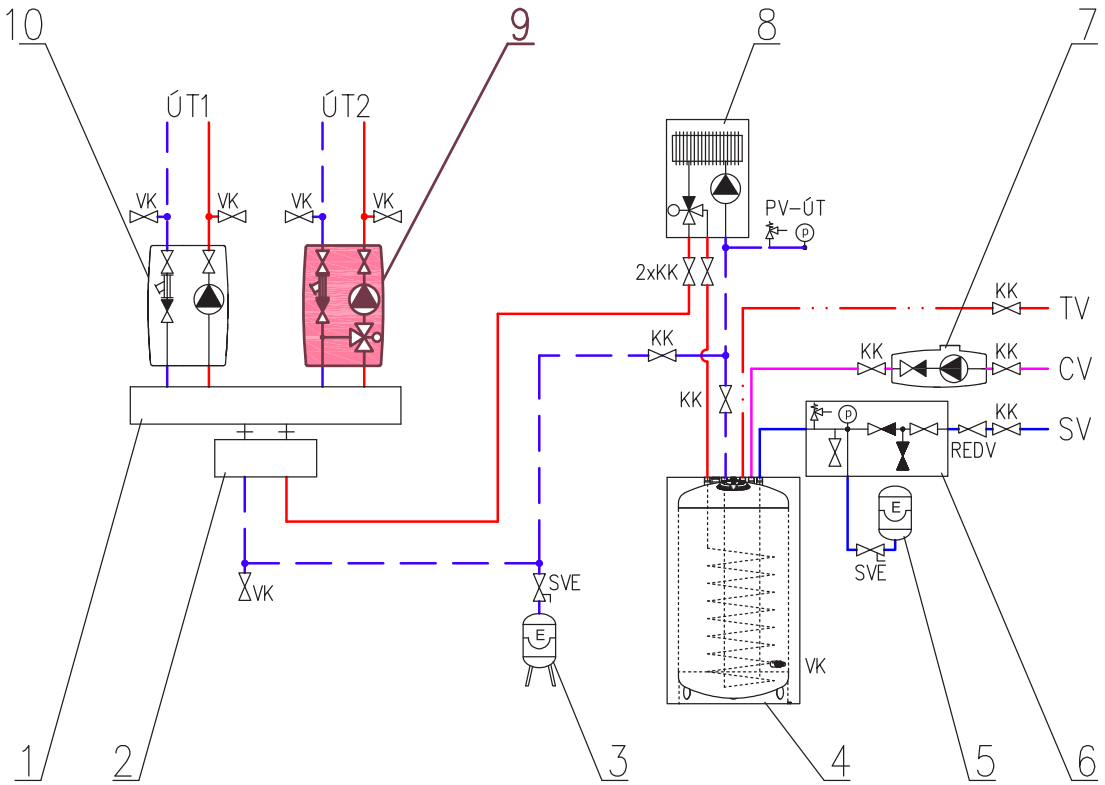


groove perpendicular to the flow direction

4. PUMP STATION CONNECTION EXAMPLES



CSE2 MIX



KEY

1 HV 60/125-2 manifold/collector
2 hydraulic pressure balancer
3 heating system expansion vessel
4 hot water storage tank (e.g. NBC 170 HP)
5 DHW expansion vessel
6 safety kit for HW storage tank
7 pump station for DHW recirculation – CSE TV ZV
8 boiler (natural gas, electric…)
9 pump station for heating circuit 2 – CSE2 MIX
10 pump station for heating circuit 1 – CSE2

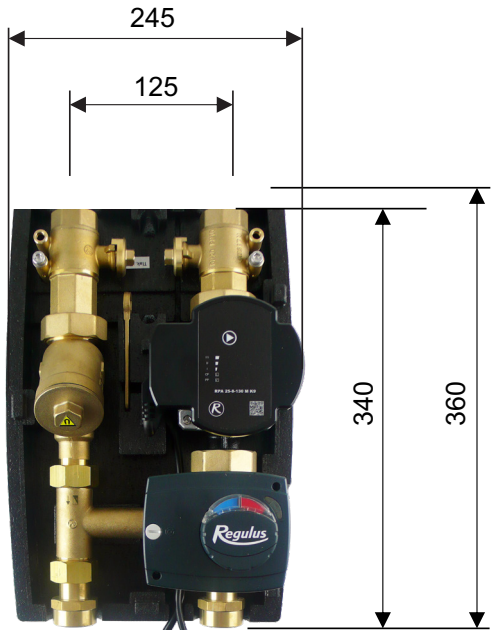
SV cold water
TV hot water
CV hot water recirculation
ÚT central heating (heating system)

KK ball valve
ZV check valve
AOV automatic air vent valve
PTR pressure temperature relief valve
REDV pressure reducing valve (optional)
VK drain valve
SVE expansion vessel service valve
PV-ÚT safety valve for heating system
MFB Magnet Filterball

5. PUMP STATION INSTALLATION

The pump station is designed to be mounted on a wall or a manifold with 125 mm connection pitch. In the rear section of the insulation there are two mounting holes for fixing the metal plate to the wall. Mounting holes pitch is 80 mm.

Installation dimensions are shown in the figure below.



The package includes a mounting kit that is used to fix the pump station to the intended place.
The mounting kit includes:

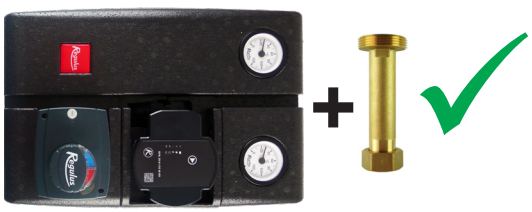
Screw 5x50, round head	2 pcs
6.4 stainless steel washer, DIN 9021/A2	2 pcs
Wall plug 8mm TX	2 pcs

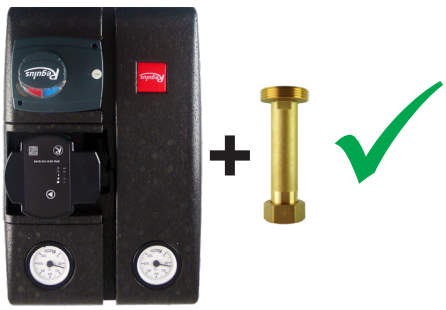
Permissible and prohibited positions of the pump station

Permissible positions

Conditionally permissible positions

(may be used when a filter is replaced by the filter replacement section, code 19017)

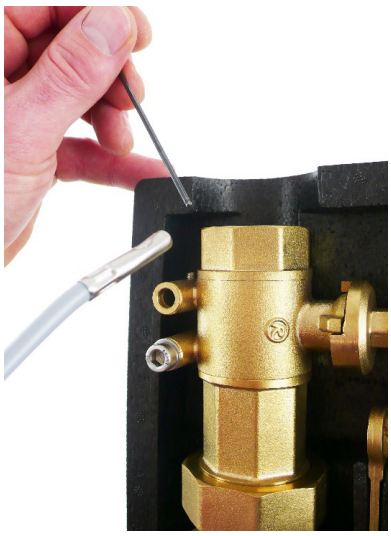
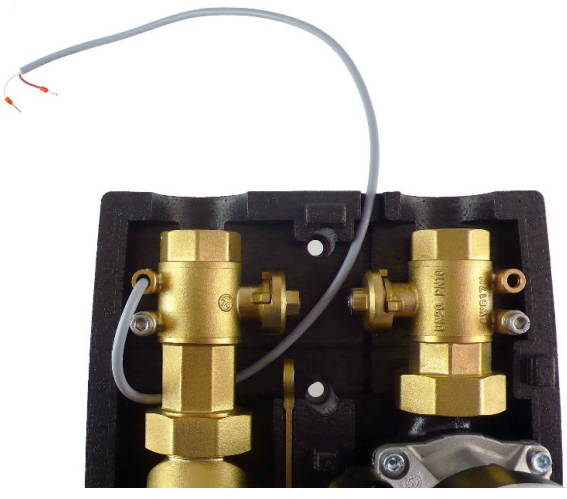


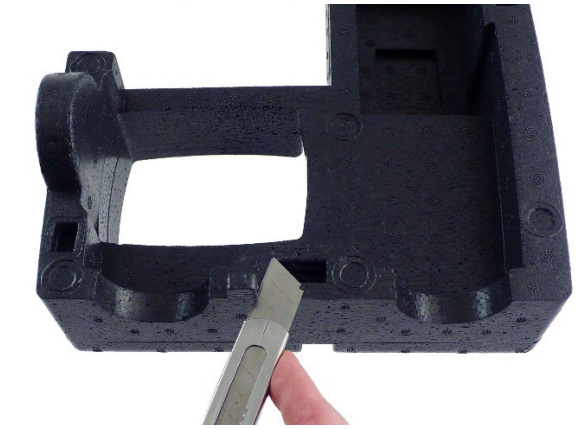


Prohibited positions

6. TEMPERATURE SENSOR INSTALLATION

The ball valve housings are equipped with a sheath for the temperature sensor, where the sensor can be inserted and secured by a fixing screw against being pulled out. In the top and bottom section of the insulation there are passages to run the cables through, then it is necessary to cut the appropriate part of the passage lock from the front part of the insulation with a knife, so that the exiting cables are firmly wrapped around by the lock.

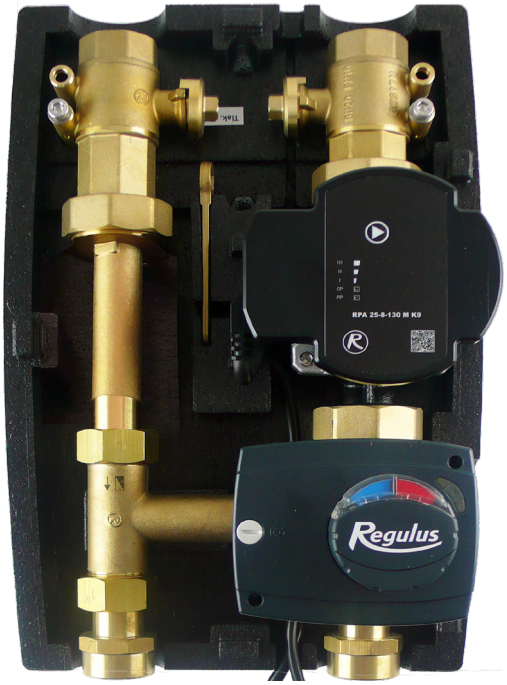
1. Temperature sensor placement	
2. Securing the temperature sensor with the screw	
3. Running the sensor cable through the recess in the insulation	

4. Trimming the cable passage lock	
5. Installed sensors	

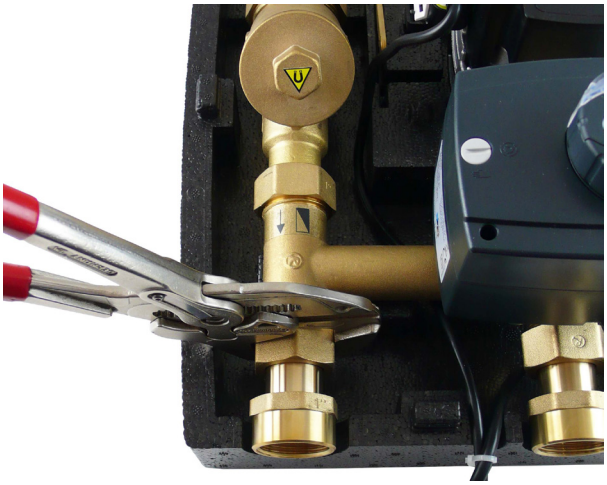
7. OPTIONAL ACCESSORIES

The following optional accessories are available for the pump station:

A – Filter replacement section for CSE2
Code 19017

Loosen the union nut above and under the filter. 	Remove the filter and mount the filter replacement section (code 19017) in its place. 

B – Ball Valve w. drain valve, 1“ Fu/F
Code 17415
and Union 1“ Fu/M incl. gasket
Code 15695

Remove both the connecting fittings. 	Install the union 15695 in their place, then attach the ball valve w. drain valve (17415) to the union. 

C – Union, 1“ Fu/M, extended, with check valve, incl. gasket
(for return line of CSE2 pump stations)
Code 18653
and **Union, 1“ Fu/M, extended, incl. gasket**
(for flow line of CSE2 pump stations)
Code 18797

Remove both the connecting fittings.

Install the extended union with check valve (18653) to the return line.

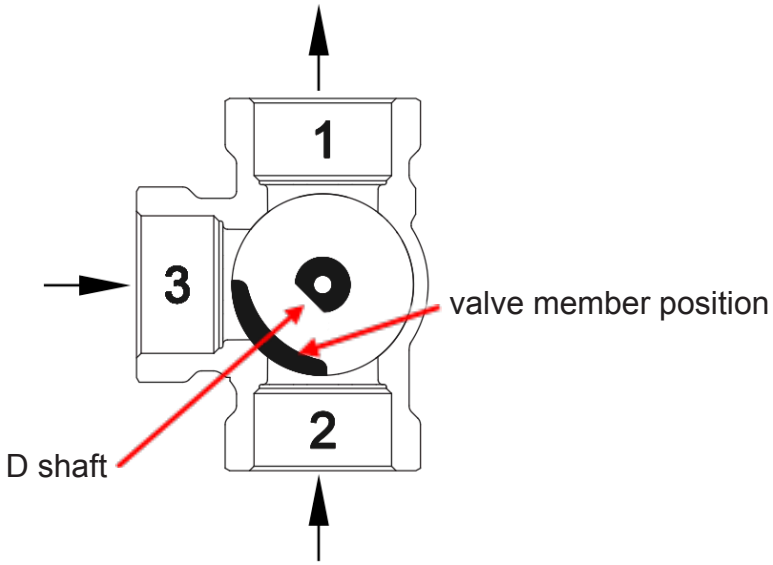
Install the extended union (18797) to the flow line.

D – Union to connect CSE2 to 5/4” manifold - 1“x5/4“ Fu/F
Code 17920

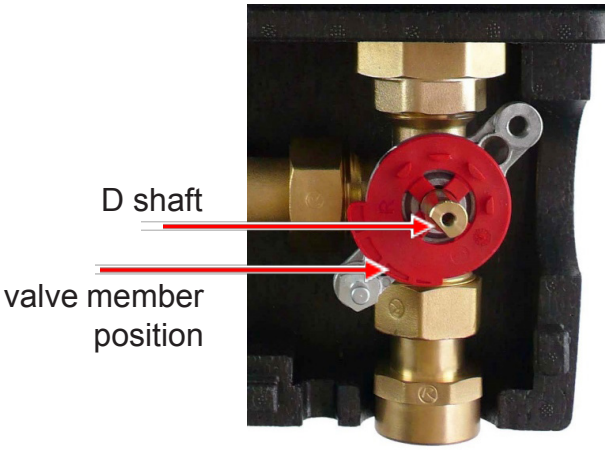
Remove both the connecting fittings. 	Replace them with the union 17920 intended for connection to a manifold. 

APPENDIX – AVC ACTUATOR ADJUSTMENT

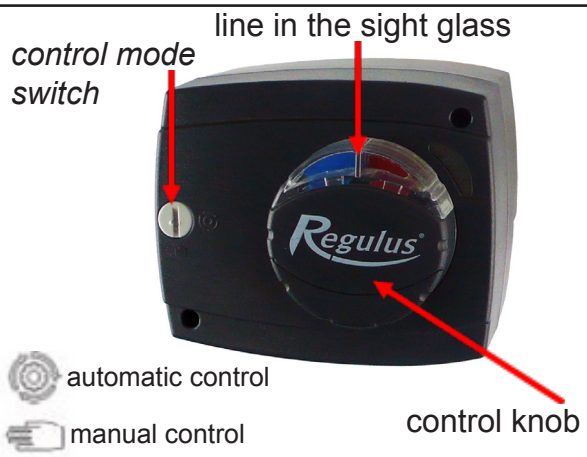
– The actuator is set and ready for operation from the production
– The instructions apply only if the actuator had to be removed e.g. to be replaced



1.
When fitting the actuator, turn the D-shaft in such a manner that the valve member is between inlets 2 and 3 at an angle of 45.



2.
Fit the plastic adapter on the shaft. The flat edge of the shaft and the arrow on the plastic adapter are located on the same side as the valve member.

3. Prior to fitting the actuator on the plastic adapter, switch it to manual control, set the control knob exactly to the middle of its movement range.	
4. Fit the actuator onto the plastic adapter. Check its turning: the control knob shall be able to turn freely both to left and right by 45° (when turned to the right by 45° the path 3 is closed, and when turned to the left by 45° the path 2 is closed). Having performed the check, tighten the fastening screw and switch back to automatic control.	
5. The actuator shall be installed in the same manner as in the figure.	

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