CCO kit

Compact Change Over - 6-way changeover valve with motor

QUICK FACTS

- Enables heating & cooling in products with only one heat exchanger circuit
- Precise flow regulation
- For a 4-pipe cooling/heating system
- Valve PN10, DN10
- Kvs 0.9 m^3/h
- Separate Kv-value settings for cooling/heating
- Motor 24 V 2-10 V
- Maximum cooling and heating capacities when the entire heat exchanger is used.
- One actuator and one valve instead of the traditional double setup

Technical description

Use

Changeover valve for regulating the heating and cooling water flow in products such as climate beams and comfort modules and radiation panels.

The valve supplies the above product with heated or chilled water which means that the whole product's heat exchanger can be utilised and only one actuator with valve is required.

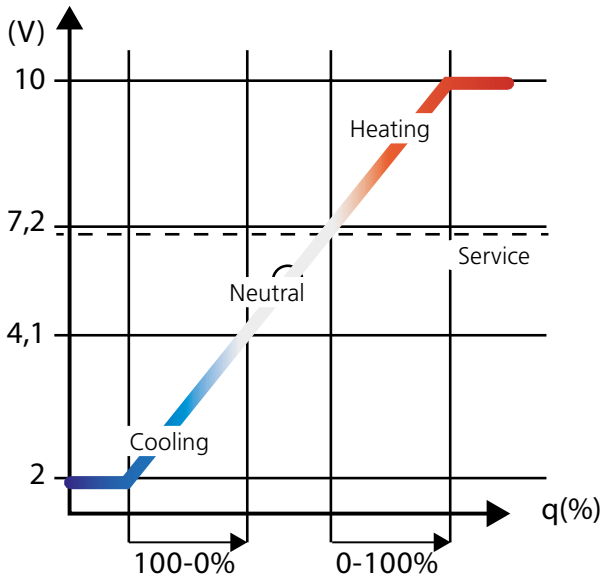
Function

The valve can be regulated using a 2-10 V motor, which turns it through 90°.

- At 2 V, the valve is at one of its end stops and fully open for cooling.
- When the cooling requirement is less, the voltage signal is increased to close the valve completely at 4.1 V.
- In the range between 4.1 and 7.2 V, the valve is in the neutral mode (also see neutral mode below).
- At 7.0 V, the valve is closed in service mode.
- At 7.2 V, it begins to open for heating, and at 10 V is fully open for the flow of hot water.

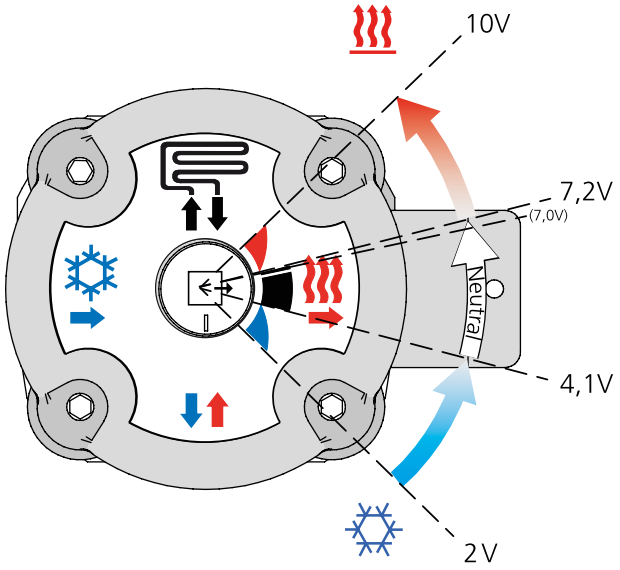
Neutral mode

The valve is equipped with a pressure equalisation channel. This prevents pressure differences occurring between the product and system.



2-10 V modulating:

- 2-4.1 Cooling
- 4.1-7.2 Neutral mode
- 7.0 Service mode
- 7.2-10 Heating



❄	⟸	Cooling in
	⇑	Return pipe, chilled water
♨	⇓	Supply pipe, heated water
	⟸	Return pipe, heated water
	⇑	Return pipe from coil
	⇓	Supply pipe to coil
		From max. to min. heating
		Narrow left position = closed for service Wide right position = neutral
		From min. to max. cooling

Water quality

Swegon recommends water quality according to VDI 2035-2 for both the heating and cooling system. It is recommended to install a vacuum degasser to be able to keep the oxygen content in the water below the levels (<0.1 mg/l) prescribed in VDI 2035-2, especially in the cooling system where it is harder to remove loose gas. It is also important that the pre-pressure in the expansion vessel is dimensioned according to EN-12828 for both the heating and cooling system and that regular checks of the pre-pressure are made. The cooling and heating systems are to be deigned to prevent oxygen from entering the system, this is particularly important to consider when it comes to the selection of flex hoses, pipes and expansion vessels. When the system is filled with fresh water, it has an oxygen content of approximately 8 mg/l, however, this oxygen is consumed quickly within a few days through corrosion processes. It is then important to avoid filling the system unnecessarily with new fresh water. Automatic air vents are usually installed to facilitate the filling of the system, it is, however, recommended that automatic air vents are switched off when the system is fully vented to avoid these sucking air into the system if the pre-pressure in the expansion vessel drops.

Technical/mechanical design

Characteristics & advantages

The flow sound from the valve is very low, lower than for traditional valves of the same dimension.

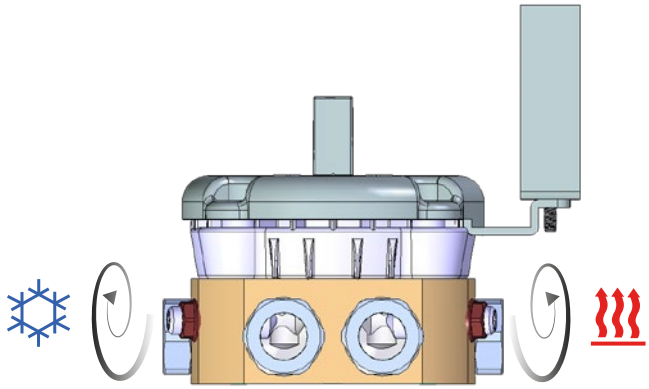
The design means that heating and cooling can never be run simultaneously, but both circuits will be in contact with one another which means that a very minute volume of heated water and chilled water will be exchanged when the valve switches between heating and cooling.

It is important that systems are designed to be able to handle the system liquid moving between the cold and hot system.

Adjustment of the Kv-value

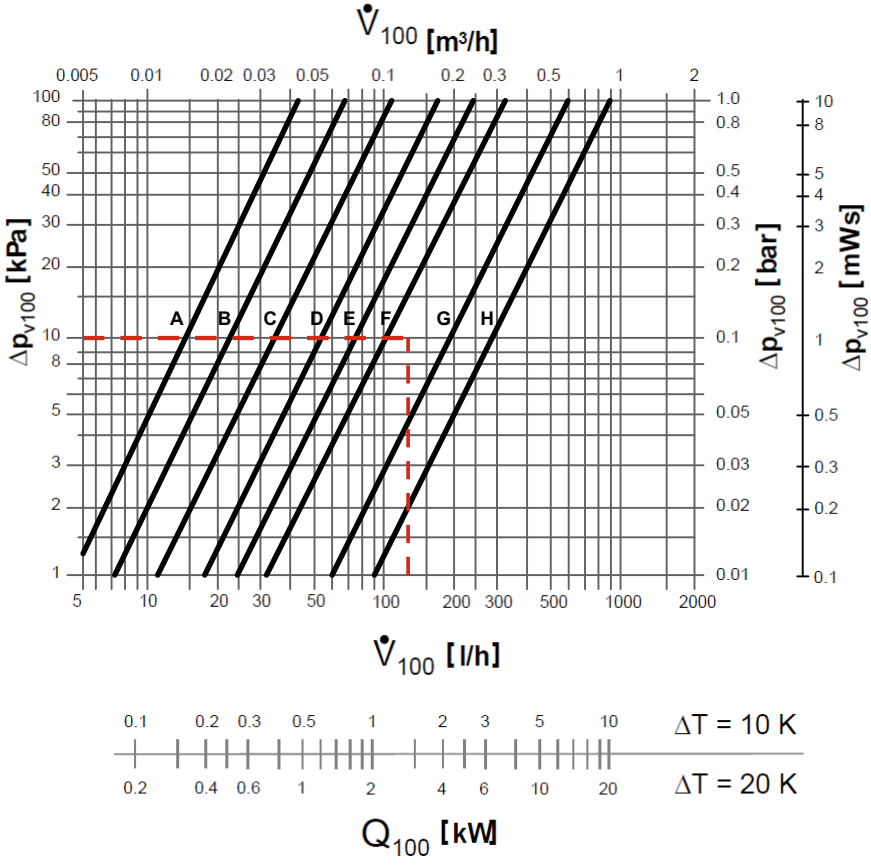
Kv-values can be set for cooling and heating using separate adjustment screws.

Turn the screw clockwise to its stop position, then open it a number of turns in order to achieve a specific Kv-value



Kv-value

Number of turns that the adjustment screw is open								
	A	B	C	D	E	F	G	H
Turns	0.5 turn	0.75 turn	1 turn	1.25 turn	1.5 turn	2 turns	3 turns	4 turns
Kvs m³/h	0.042	0.072	0.116	0.171	0.24	0.327	0.6	0.9



Example:

In a typical case, a flow of 144 l/h is required to obtain correct capacity in the cooling case, and a pressure drop of 10 kPa across the valve is desirable to obtain good regulation.

In the diagram (see red marking), you can see that this is achieved at the preset Kv-value between F and G, i.e. the screw should be opened approx. 2.5 turns, see Table above.

Technical data

Dimensions, valve

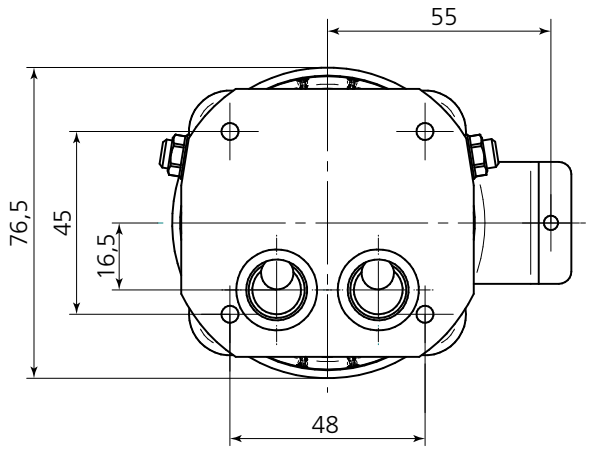


Figure 1. Dimensions, valve, viewed from bottom

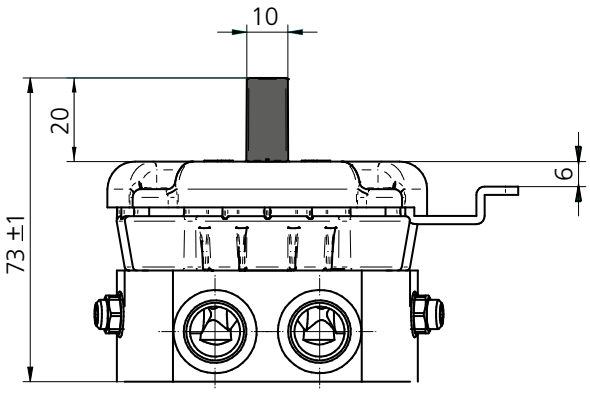


Figure 2. Dimensions, valve, viewed from the side.

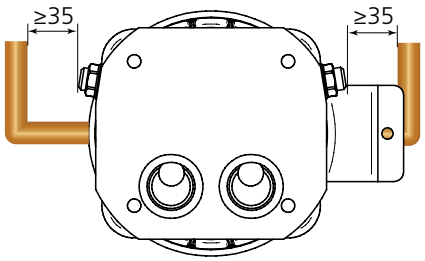


Figure 3. Install the pipe at least 35 mm from the adjustment screw.

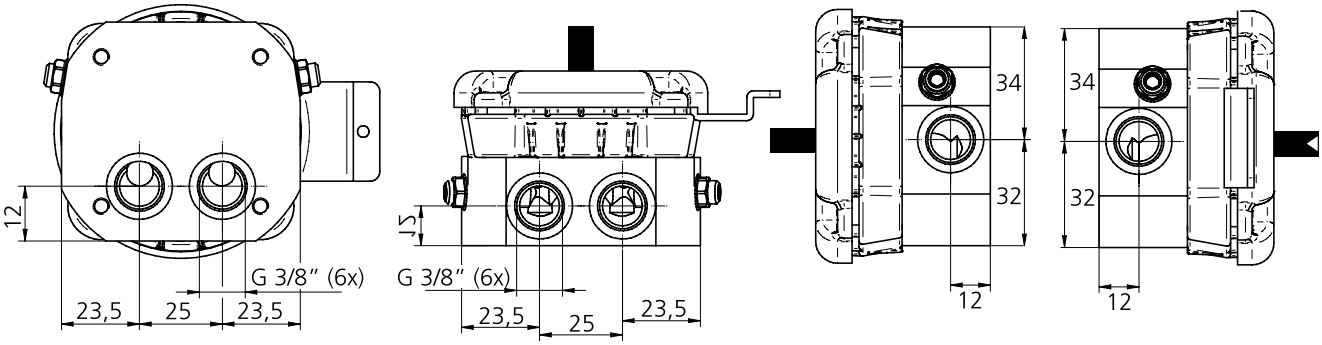


Figure 4. Connections: Six 3/8" connections. Supplied with mounted clamp-ring couplings for Ø 12 mm pipes.

Valve

Pressure class	PN10
Media temperature	2-80 °C
Permissible media	Water with max. 45% ethylene glycol.
	Water treatment to VDI 2035
Differential pressure, max.	1 bar
Kv-value, min.	0.028
Kv-value, max.	0.9
Connections	G 3/8" internal/Ø 12 mm clamp-ring coupling
Material	
valve casing	Brass
enclosure	Plastic
reinforcing enclosure	Galvanised sheet steel
spindle	Plastic
o-rings	EPDM
cover	Plastic
Flow distributor	Ceramic
Weight of valve	0.9 kg

Motor

Electrical data		
Rated voltage	24 VAC {50/60Hz), 24 VDC	
Rated voltage range	19...29 VAC/DC	
Power consumption	(operation) Standby (end position)	1.5 W 1.0 W
Cable sizing	3.0VA	
Control	Continuous	
	2...10 VDC/Ri > 100 kΩ	
	4...20 mA/Rext. = 500 Ω	
Re-feed position	2...10VDC, max. 5 mA	
Functional data		
Torque	4 Nm	
Synchronised speed	± 5%	
Direction of rotation	Optional depending on installation configuration	
Disengagement of gearbox	By turns, self-resetting	
Actuating time, motor	150 s / 90°	
Sound power level	<35 dB(A)	
Connection to damper/valve	10 mm (4E10)	
Position indicator	Mechanical with indicator	
Service/useful life	>60'000 cycles (0° - 95° - 0°)	
Safety		
Degree of protection	III (extra-low voltage)	
Enclosure class	IP54	
EMC	CE (2004/108/EC)	

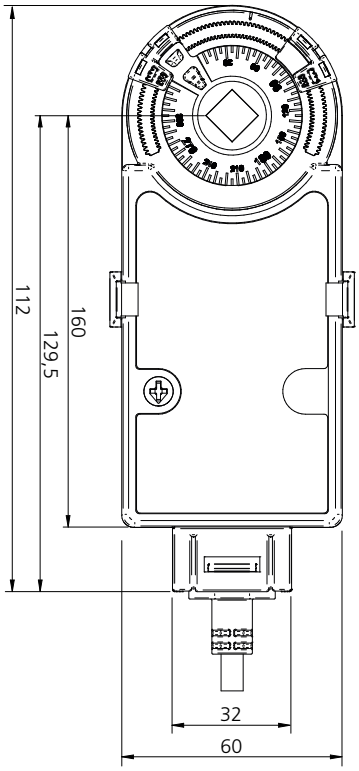


Figure 5. Dimensions, motor, viewed from above.

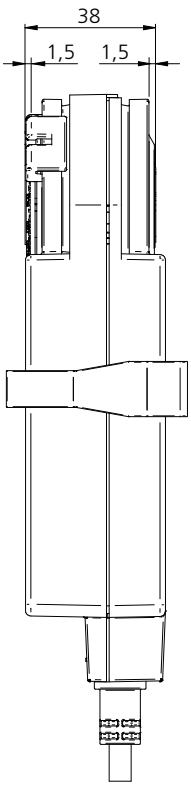
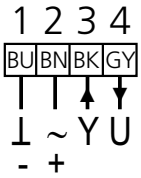


Figure 6. Dimensions, motor, viewed from the side.

Connections



Dimensions and weights

Motor weight	0.3 Kg

Dimensions, valve with mounted motor

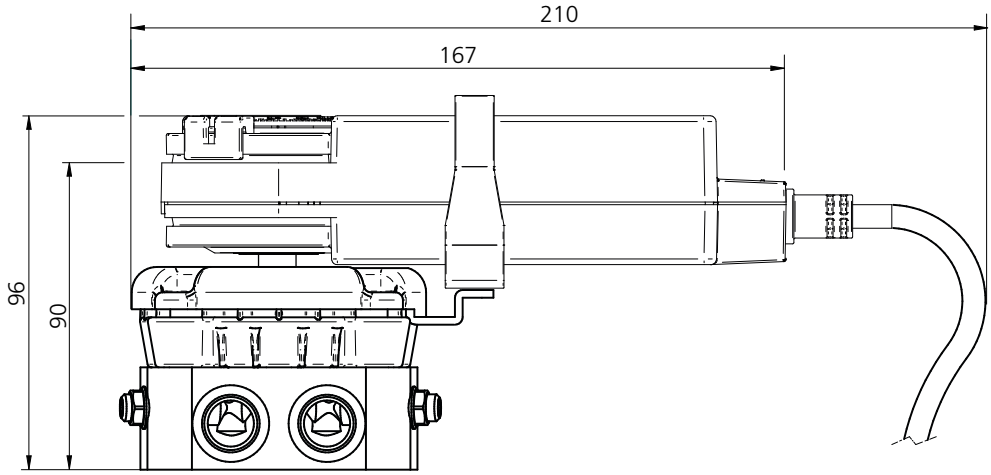


Figure 7. Dimensions, valve with motor, viewed from side

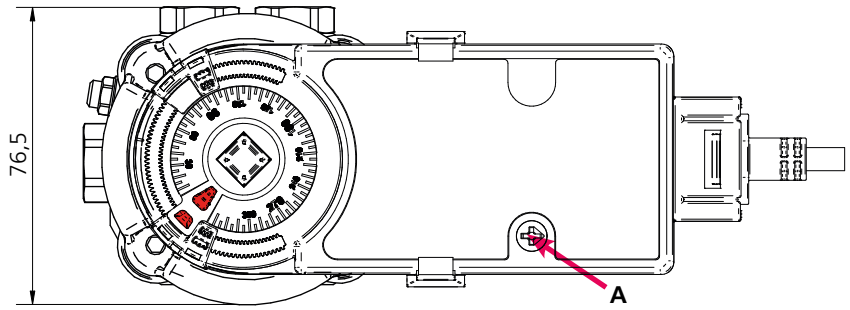


Figure 8. Dimensions, valve with motor, viewed from above.
(A, release of the motor's gearbox)

Maintenance

The valve and motor do not require any maintenance at all.