Three-way and four-way sector mixing valves Series V3GB and Series V4GB

Main features

- Three-way V3GB valve available as mixing and diverting valve.
- Four-way V4GB mixing valve.
- Threaded connections female from 1/2“ to 2”.
- Brass body and rotor.
- Power supply 230Vac with 2 m length cable.
- Control signal 3-point.
- Rotation angle 90°C in 140 seconds.
- Automatic and manual operating.
- Suitable for heating cooling systems (max. glycol 50%).

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Description

The three-way sector mixing valves **Series V3GB** and four-way **Series V4GB**, equipped with the 3-point electronic actuator **Series M60W**, are **control valves** for **heating systems, cooling systems** and the **domestic hot water systems** installed to optimize the use of the available energy.

V3GB

Three-way sector mixing valve equipped with 3-point electronic bidirectional modulating actuator.
Max working pressure 10 bar. Working temperature 0°C ÷ 110°C.
Brass body and rotor, EPDM gaskets. Threaded female connections from 1/2“ to 2”.
Rotation angle of 90° in 140 seconds.
Power supply 230 V, 50 Hz; power consumption 3 VA.
Complete of 2 meters length removable electrical cable with connector with safety latch.
Working also as diverting valve. Suitable for water with max. glycol 50%.

Type	Part no.	Dn	Kvs	Weight [kg]
V3GB	V3GB0015M60230	1/2” F	2,5	1,07
V3GB	V3GB0204M60230	3/4” F	4	1,14
V3GB	V3GB0206M60230	3/4” F	6	1,13
V3GB	V3GB2508M60230	1” F	8	1,29
V3GB	V3GB2512M60230	1” F	12	1,27
V3GB	V3GB3215M60230	1 1/4” F	15	1,66
V3GB	V3GB3218M60230	1 1/4” F	18	1,63
V3GB	V3GB4026M60230	1 1/2” F	26	2,67
V3GB	V3GB5040M60230	2” F	40	2,92

V4GB

Four-way sector mixing valve equipped with 3-point electronic bidirectional modulating actuator.
Max working pressure 10 bar. Working temperature 0°C ÷ 110°C.
Brass body and rotor, EPDM gaskets. Threaded female connections from 1/2“ to 2”.
Rotation angle of 90° in 140 seconds.
Power supply 230 V, 50 Hz; power consumption 3 VA.
Complete of 2 meters length removable electrical cable with connector with safety latch.
Suitable for water with max. glycol 50%.

Type	Part no.	Dn	Kvs	Weight [kg]
V4GB	V4GB0015M60230	1/2” F	2,5	1,12
V4GB	V4GB0204M60230	3/4” F	4	1,20
V4GB	V4GB0206M60230	3/4” F	6	1,20
V4GB	V4GB2508M60230	1” F	8	1,46
V4GB	V4GB2512M60230	1” F	12	1,43
V4GB	V4GB3215M60230	1 1/4” F	15	1,76
V4GB	V4GB3218M60230	1 1/4” F	18	1,64
V4GB	V4GB4026M60230	1 1/2” F	26	2,87
V4GB	V4GB5040M60230	2” F	40	3,00

Operation and application

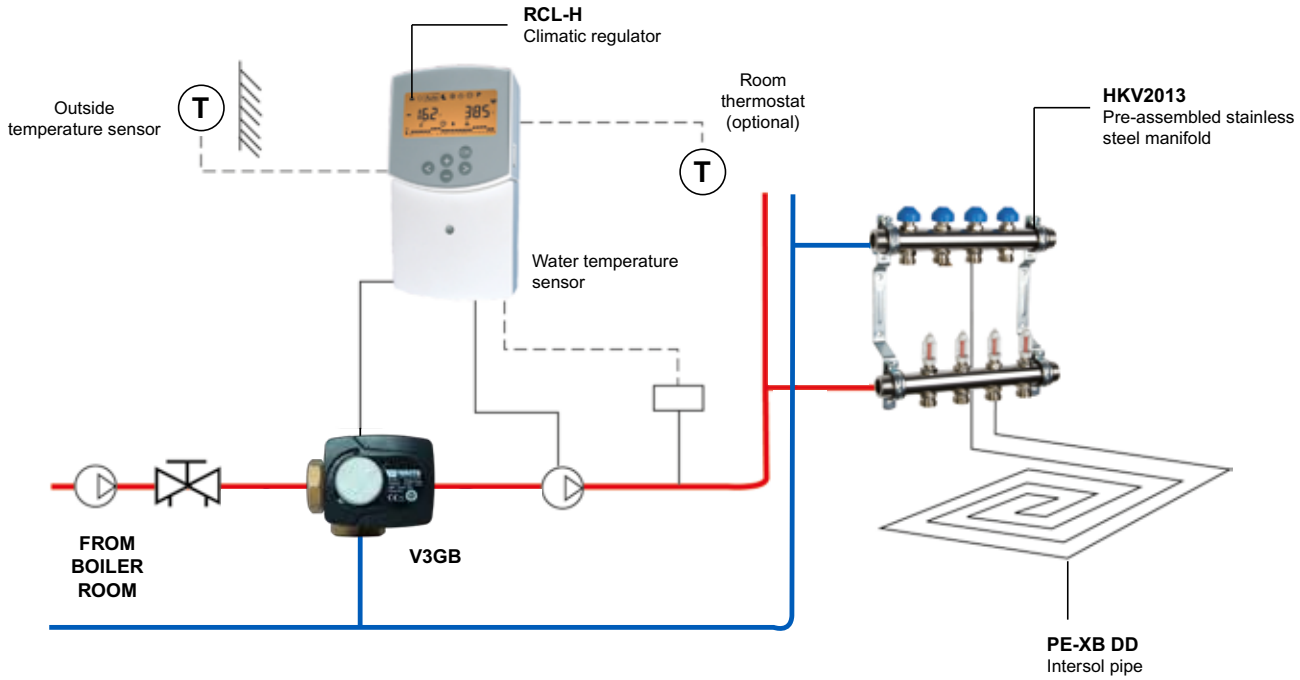
The three-way and four-way mixing valves are control devices with the function to regulate the mix of two fluids with different temperatures (typically hot and cold water). The scope is to obtain a fluid downstream of the valve with the temperature required from the system.

The mix of the two inlet fluids is across the shaped brass rotor that by rotating changes section ports of the fluids. The mixed fluid flow rates are proportional to the rotation angle of the rotor.

These valves can be used in any application where is required to regulate the temperature of a fluid.
Some typical application are:

- Delivery temperature regulation of centralized heating/cooling systems.
- Temperature regulation in function of the outside temperature of heating systems with the climatic regulation (see the following graphic).
- Temperature regulation of the domestic hot water for systems with traditional boiler, solar boiler or with heat exchanger.

In this graphic is represented a sample of application with the **modulating climatic regulation** to control the radiant panel water temperature in function of the outside temperature obtained with the climatic regulator **Series RCL-H** and the three-way mixing valve **Series V3GB**.



Depending on the three-way valves **Series V3GB** are connected can work both as mixing valves and as diverting valves.

V3GB as diverting valve (figure 1)
The inlet flow rate (2) is divided in two (1 and 3) in function of the angular position of the rotor.
Running the actuator will **regulate the flow rates** (1 and 3) downstream the valve.

V3GB as mixing valve (figure 2)
The outlet flow rate (2) is the sum of the inlet flow rates (1 and 3) that are mixed in function of the angular position of the rotor. Running the actuator will **regulate the temperature** of the fluid (2) downstream the valve.

V4GB as mixing valve (figure 3)
The flow rate outgoing from the way marked with the pump symbol (▲), the system delivery, is the mix of the flow rates coming from the boiler (1) and the return of the system (2); the flow rate (3) is the return to the boiler. Since the angular position of the rotor determines the mixing rate of all the fluids, this valve can be used to **regulate the** delivery **temperature** to the system (▲) or to regulate the temperature of the boiler inlet (as anti-condensing valve for solid fuel fired boiler).
The four-way valve **Series V4GB** functions also as hydraulic switch between primary and secondary circuits.

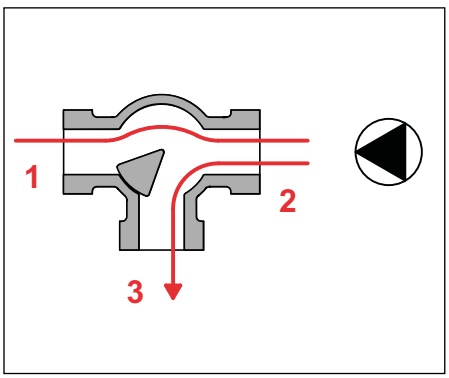


Fig.1 - 3-way diverting valve

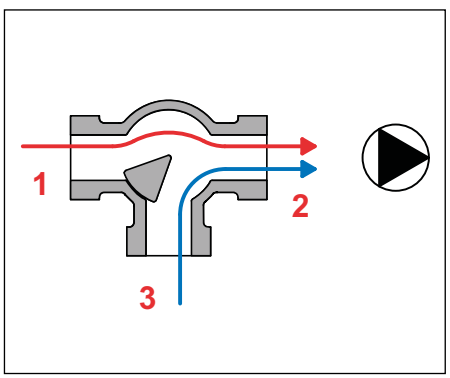


Fig.2 - 3-way mixing valve

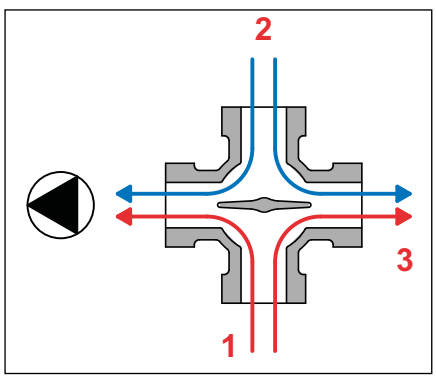
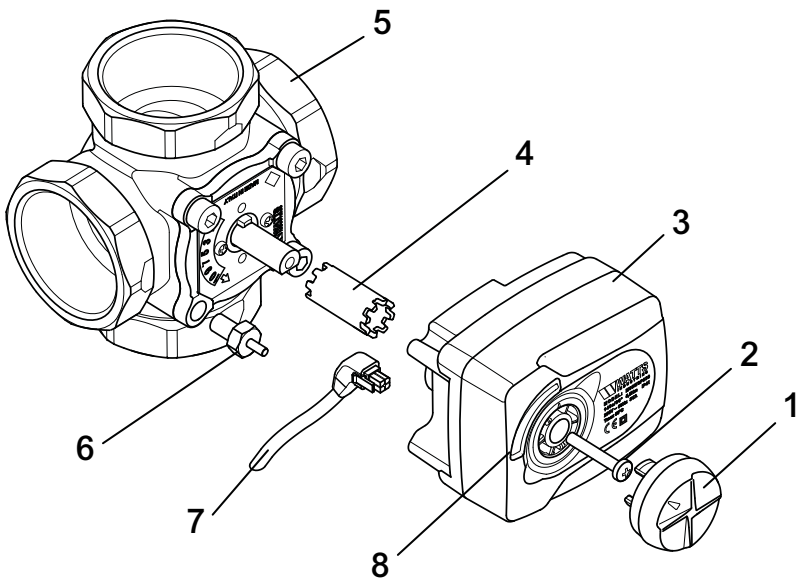


Fig.3 - 4-way mixing valve

The three-way valves **Series V3GB** and the four-way valves **Series V4GB** are equipped with the three-point modulating electronic actuator **Series M60W** that it can both automatically or manually operate.

Automatic operating
When the voltage is applied between grey and brown cable, th eactuator shaft rotates clockwise and it automatically stops at the end of the stroke (Fig.1 = 100% of the inlet flow rate 2 is diverted to 3).
When the voltage is applied between grey and black cable, the actuator shaft rotates counterclockwise and it automatically stops at the end of the stroke (Fig.1 = 100% of the inlet flw rate 2 is diverted to 1).
When the voltage is not applied, the actuator remains in its position.

Manual operating
By extracting one step the knob, the gearbox is by-passed and the actuator (valve) shaft can be directly moved rotating the knob by hand.



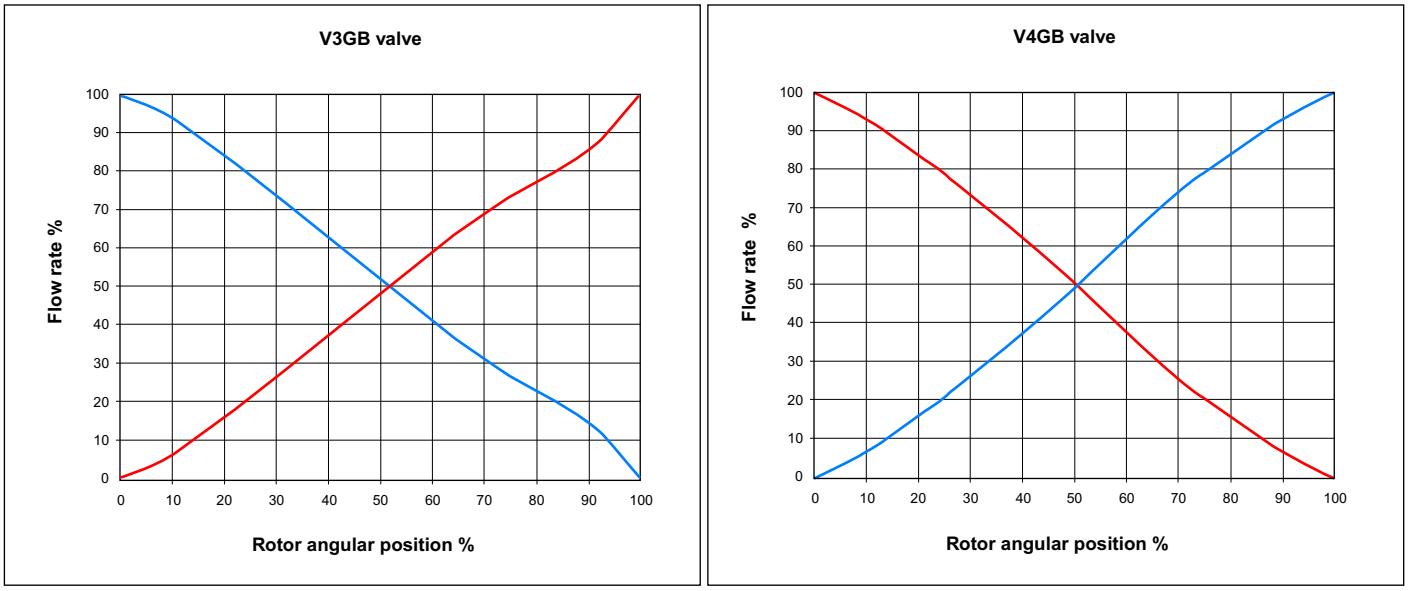
1 - Knob
2 - Fixing screw
3 - Actuator M60W
4 - Coupling
5 - Mixing valve V4BG
6 - Rotation locking device
7 - Supply cable
8 - Scale

Technical characteristics

Technical features	
Max. operating pressure	10 bar
Max. operating temperature - valve	0 ÷ 110 °C (rarely -20 ÷ 130 °C)
Max. operating temperature - actuator	-5 ÷ 55 °C
Compatible fluids	water, water with max. glycol 50%
Rotor lekeage	< 0,1%
Actuator action	modulating 3-point
Rotating angle	90°
Running time	140 seconds ± 5%
Nominal torque	5,5 Nm
Power supply	230 V a.c. ±10%
Frequency	50 Hz
Power consumption	3 VA
Protection class	IP 41
Electrical Protection class	class II

Design features	
Valve body	from 1/2" to 1.1/4" - CW617N Brass from 1.1/2" to 2" - CB753S Brass
Rotor	CW617N Brass
Gaskets	EPDM
Plastic case	ABS
Other plastic components	plastic reinforceed with fiber glass
Connections	threaded female EN 10226-1

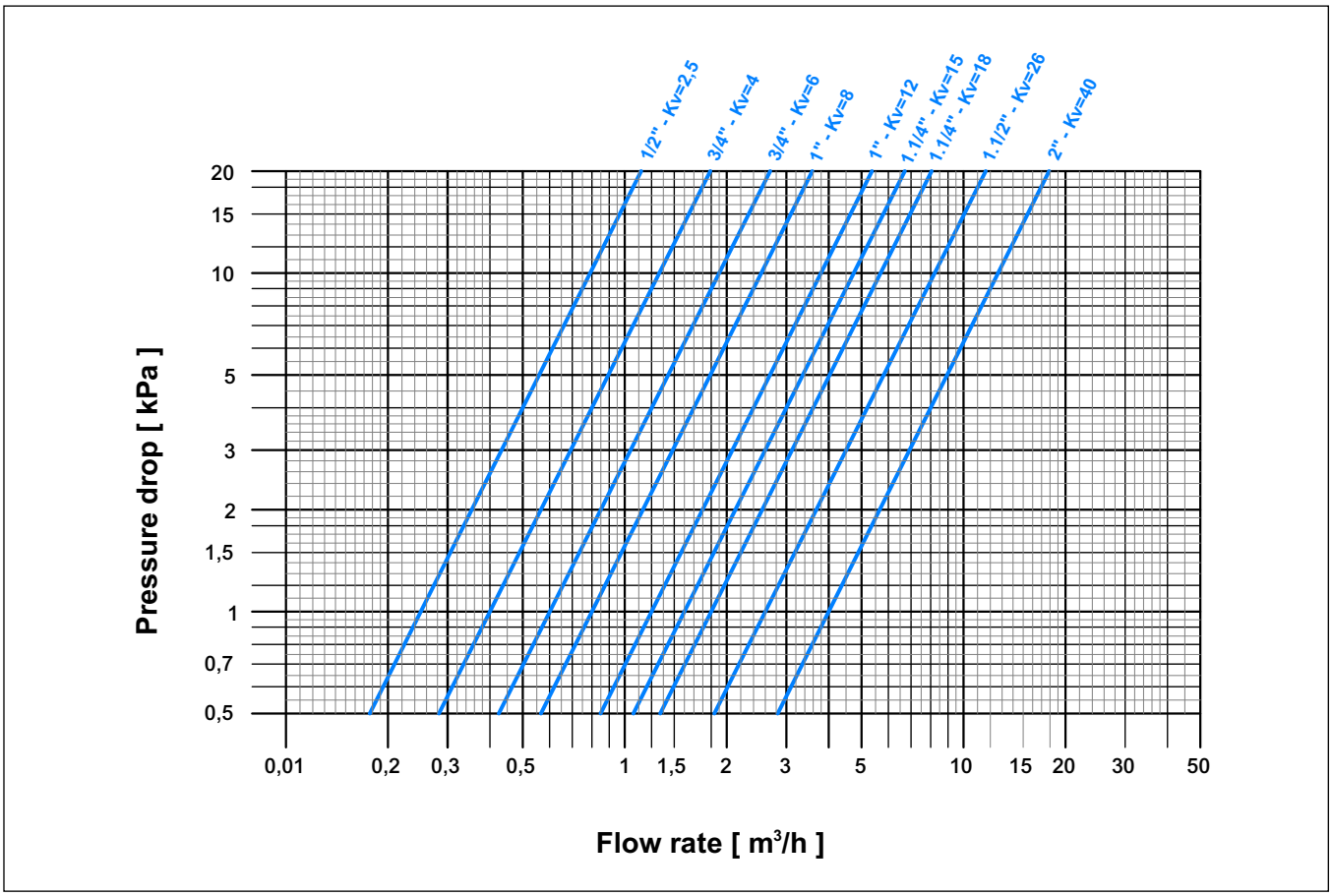
Regulation chart



Sizing

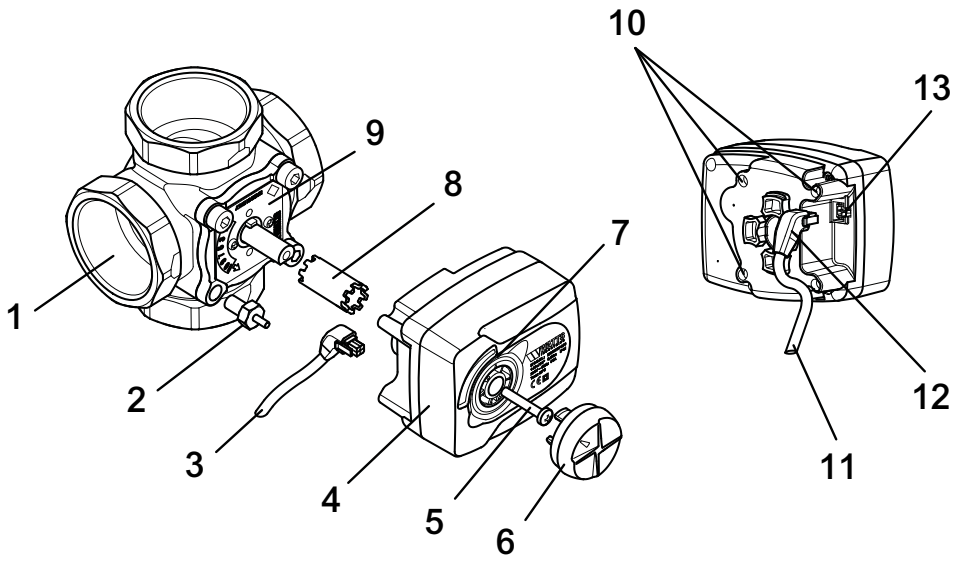
To size the mixing valve use the flow rate / pressure drops nomograph.
To obtain a good valve authority and low pressure drops, it is suggest to consider a valve pressure drop of about the 10% of the downstream circuit. The intersection point between this value and the flow rate corresponds to the optimal regulation of the circuit. Therefore select the valve with the curve closer to this point.

Flow rate-Pressure drop



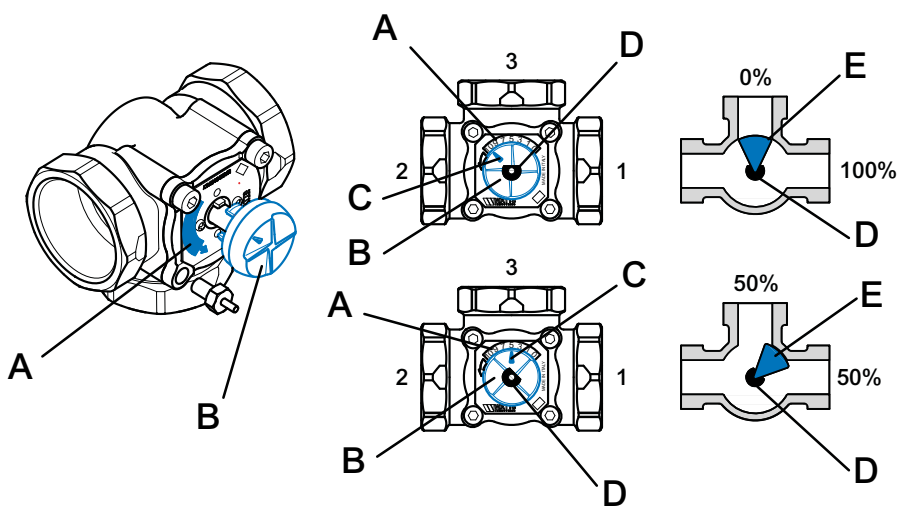
Installation

Referring to following picture:
- Remove the knob (6).
- Screw the rotation locking device (2) with a key of 13 mm (torque 15 Nm).
- Place the coupling (8) between the valve shaft and the actuator shaft.
- Mount the actuator ensuring that the actuator fixing hole (10) and the rotation locking device (2) match.
- Verify the alignment among the knob arrow (6), the valve shaft milling ant the two scales (7) and (9).
- Fix the screw (5) (torque 1÷1,5 Nm) and mount again the knob.
- Insert the plug (12) into the socket (13). To take it out, pull it keeping pressed the safety latch.



1 - Mixing valve
2 - Rotation locking device
3 - Power cable
4 - Actuator M60W
5 - Fixing screw
6 - Knob
7 - Scale
8 - Coupling
9 - Label with Kv
10 - Fixing holes
11 - Cable
12 - Connector
13 - Socket

By changing the rotor position respect to the valve it is possible to obtain several valve configuration. Therefore, at the first installation, it is important make the correct alignment among the valve marks and the actuator ones.
Referring to following picture consider these references.
- Use the actuator knob (B) to operate the valve shaft.
- The knob arrow (C) shows the mixing percentage onto the valve scale (A).
- The rotor position (E) inside the valve is indicated by the shaft milling (D).

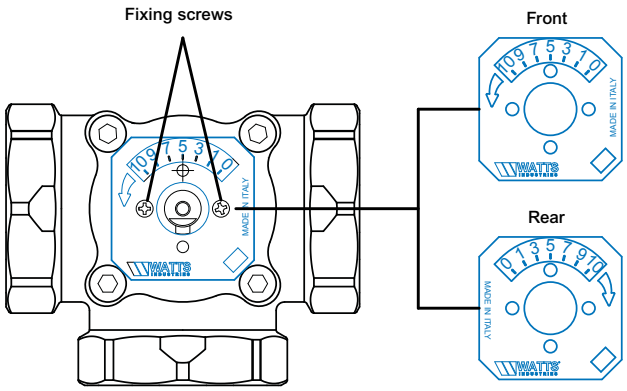


The way 1 is open and the way 3 is closed.
The flow rate in 2 is the 100% of the flow rate 1.
The knob arrow indicates 10

The ways 1 and 3 are open.
The flow rate in 2 is the mix of 50% of 1 and 3.
The knob arrow indicates 5

A. Scale
B. Actuator knob
C. Knob arrow
D. Milling reference
E. Rotor

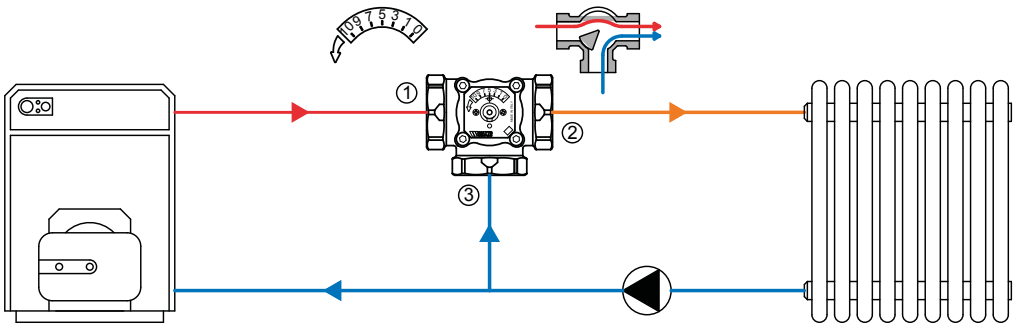
The aluminum label of the valve is printed in both of sides. In the front side there is the scale for the counterclockwise rotation and in the rear side there is the scale for the clockwise rotation.
To change the scale unscrew the fixing screws, overturn the label and fix it again.



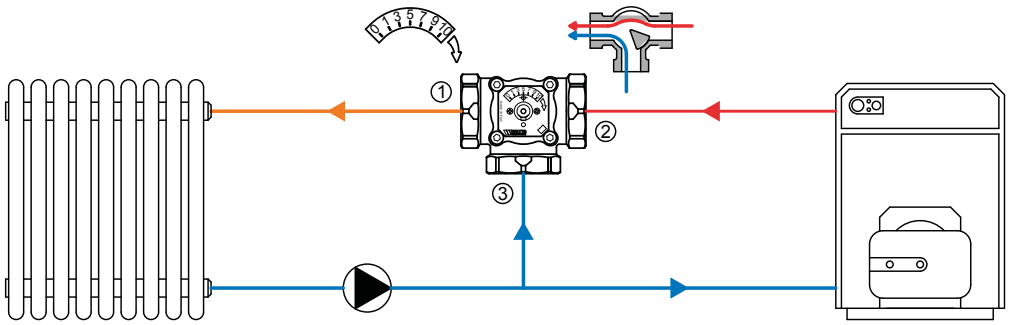
To make easy the installation all the ways of the valves are marked as following:
Series V3GB with the numbers 1, 2 e 3
Series V4GB with the numbers 1, 2, 3 and the symbol ▲

Here following some samples of installation

V3GB used as mixing valve

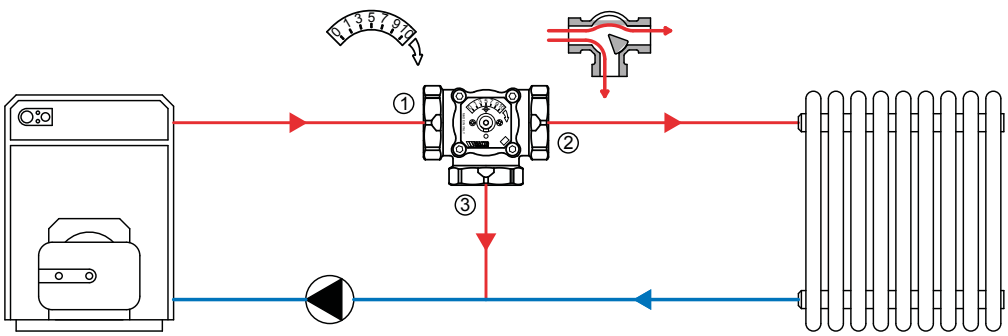


Boiler in the left – counterclockwise rotation (Factory set)



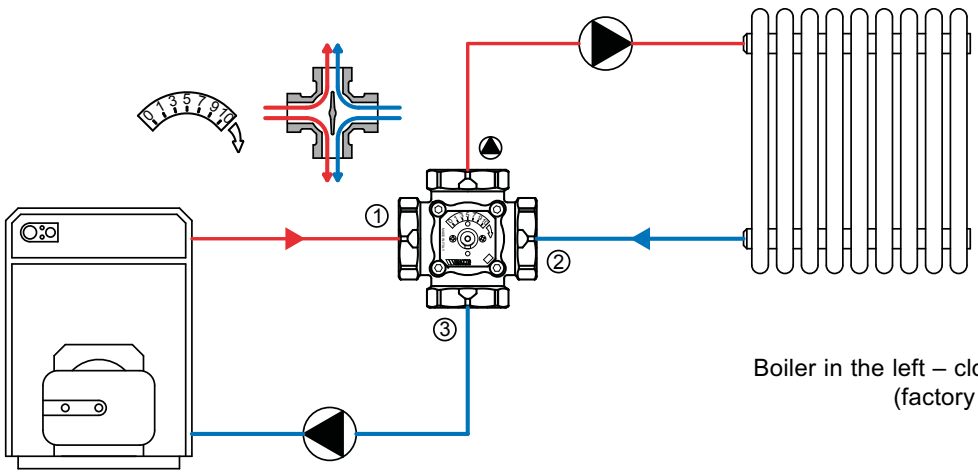
Boiler in the right – clockwise rotation

V3GB used as diverting valve

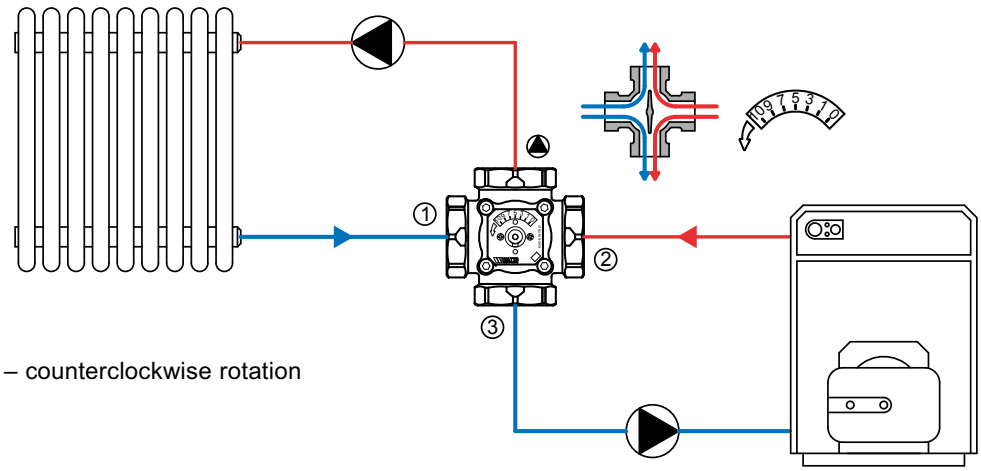


Boiler in the left – clockwise rotation

V4GB used as mixing valve

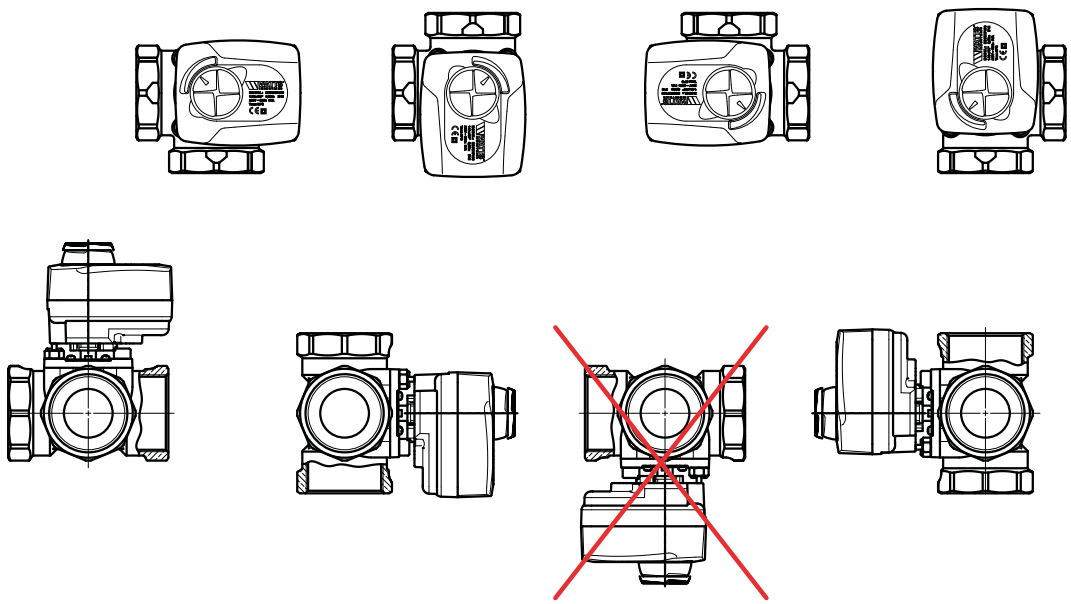


Boiler in the left – clockwise rotation
(factory set)

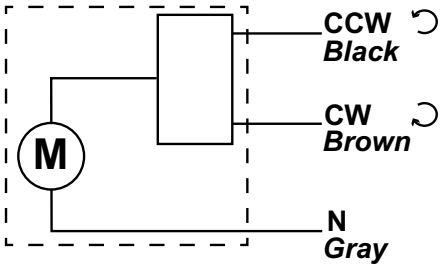


Boiler in the right – counterclockwise rotation

The mixing valve **Series V3GB** and **Series V4GB** can be installed in any orientation respect to the pipe except upside-down as showed in the following picture.
Install the valve leaving enough space to manually operate the actuator and to make the electrical connections.

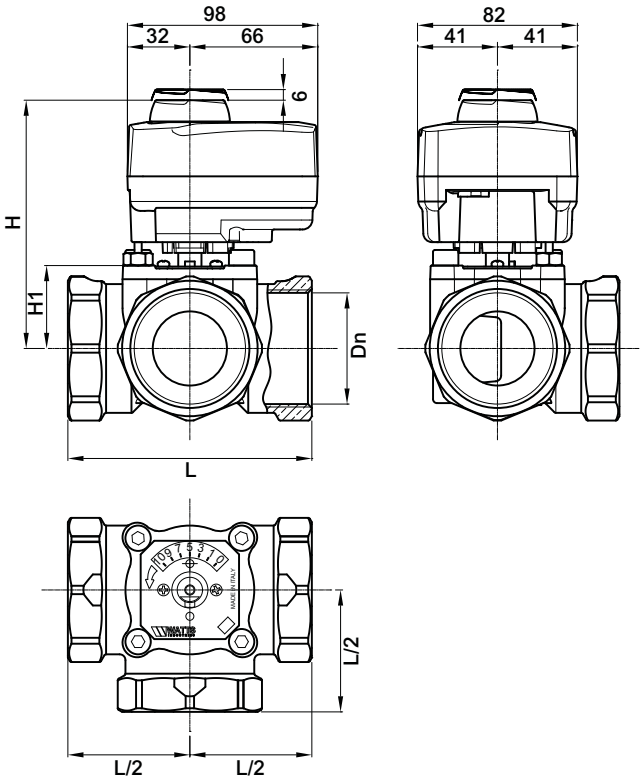


Electric diagram

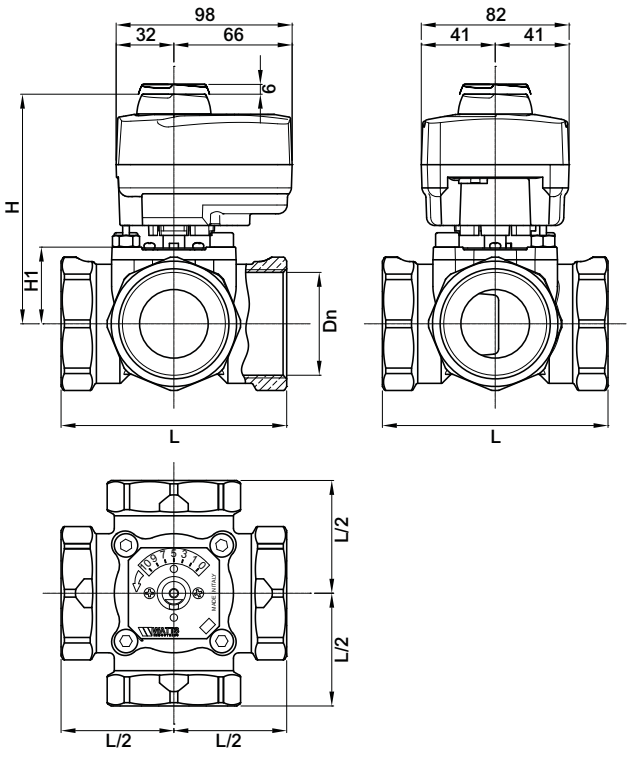


Overall Dimensions (mm)

V3GB



V4GB



Type	Part no.	Dn	Kvs	L	H	H1
V3GB	V3GB0015M60230	1/2" F	2,5	80	119	35
V3GB	V3GB0204M60230	3/4" F	4	80	119	35
V3GB	V3GB0206M60230	3/4" F	6	80	119	35
V3GB	V3GB2508M60230	1" F	8	82	119	35
V3GB	V3GB2512M60230	1" F	12	82	119	35
V3GB	V3GB3215M60230	1 1/4"F	15	85	121	37
V3GB	V3GB3218M60230	1 1/4"F	18	85	121	37
V3GB	V3GB4026M60230	1 1/2"F	26	116	126	42
V3GB	V3GB5040M60230	2" F	40	125	127	43

Type	Part no.	Dn	Kvs	L	H	H1
V4GB	V4GB0015M60230	1/2" F	2,5	80	119	35
V4GB	V4GB0204M60230	3/4" F	4	80	119	35
V4GB	V4GB0206M60230	3/4" F	6	80	119	35
V4GB	V4GB2508M60230	1" F	8	82	119	35
V4GB	V4GB2512M60230	1" F	12	82	119	35
V4GB	V4GB3215M60230	1 1/4"F	15	85	121	37
V4GB	V4GB3218M60230	1 1/4"F	18	85	121	37
V4GB	V4GB4026M60230	1 1/2"F	26	116	126	42
V4GB	V4GB5040M60230	2" F	40	125	127	43

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