# Plug & Seat Valves (Short Stroke)

## Features

- Suitable for water or glycolic water
- DN15 to DN40
- PN16 rated
- Suitable for VT-AMV130, VT-AME130 actuators

## Specification

| | |
|---|---|
| Media | Hot & cold water with up to 50% Glycol |
| Media temperature | 2 to 120°C |
| Rangeability | Min. 50:1 |
| Nominal pressure | PN16 |
| Connections: | |
| VE-VRBZI | Internal threaded valve body |
| VE-VRBZE | External threaded body (couplings supplied with internal threads) |
| Materials: | |
| Body | Red bronze 2.1096.1 (RG5) |
| Valve seat | Red bronze 2.1096.1 (RG5) |
| Spindle | Stainless steel |
| Cone | Brass |
| Stuffing box | EPDM |
| Leakage: | |
| Port A-AB ≤ | 0.05% of $k_{vs}$ |
| Port B-AB ≤ | 2% of $k_{vs}$ |
| Stroke | 5.5mm |
| Country of origin | Slovenia |

## Product Codes

Internal thread:

**VE-VRBZI2-20-6.3**
2-Port Internal screwed valve PN16, $k_{vs}$ 6.3

**VE-VRBZI2-25-10**
2-Port Internal screwed valve PN16, $k_{vs}$ 10

**VE-VRBZI2-32-13**
2-Port Internal screwed valve PN16, $k_{vs}$ 13

**VE-VRBZI2-40-16**
2-Port Internal screwed valve PN16, $k_{vs}$ 16

**VE-VRBZI3-20-6.3**
3-Port Internal screwed valve PN16, $k_{vs}$ 6.3

**VE-VRBZI3-25-10**
3-Port Internal screwed valve PN16, $k_{vs}$ 10

**VE-VRBZI3-32-13**
3-Port Internal screwed valve PN16, $k_{vs}$ 13

**VE-VRBZI3-40-16**
3-Port Internal screwed valve PN16, $k_{vs}$ 16

External thread:

**VE-VRBZE2-20-6.3**
2-Port External screwed valve PN16, $k_{vs}$ 6.3

**VE-VRBZE2-25-10**
2-Port External screwed valve PN16, $k_{vs}$ 10

**VE-VRBZE2-32-13**
2-Port External screwed valve PN16, $k_{vs}$ 13

**VE-VRBZE2-40-16**
2-Port External screwed valve PN16, $k_{vs}$ 16

**VE-VRBZE3-20-6.3**
3-Port External screwed valve PN16, $k_{vs}$ 6.3

**VE-VRBZEI3-25-10**
3-Port External screwed valve PN16, $k_{vs}$ 10

**VE-VRBZE3-32-13**
3-Port External screwed valve PN16, $k_{vs}$ 13

**VE-VRBZE3-40-16**
3-Port External screwed valve PN16, $k_{vs}$ 16

Replacement Item:

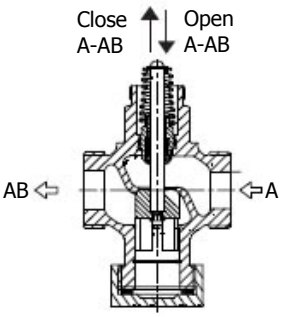
**VE-SB-1**
Stuffing box for DN20-40 valves

## Technical Overview

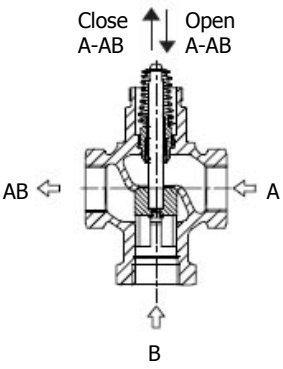
The VE-VRBZ range of 2 & 3 port valves provide a quality and cost effective solution for most water and chilled applications, and the 5.5mm stroke length gives good rangeability. They are available with internal and external thread.
These valve may be used with glycol concentrations of up to 50%.

## Operation

2-Port




3-Port




## Installation

**Hydraulic Connections**

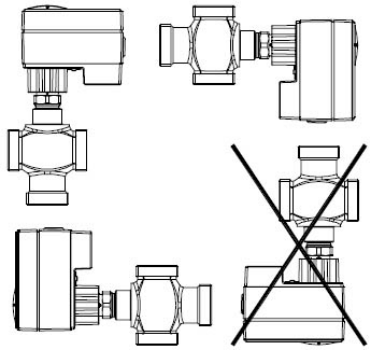
Mount according to flow direction as indicated on valve body, AB is always the outlet port; inlets are A (two port) or A and B (three port).

**Valve Mounting**

Before mounting the valve be sure that the pipes are clean and free from swarf. It is essential that all pipes are lined up squarely with the valve at each connection and that they are free from vibrations. Install the motorized control valves with the actuator in a vertical or horizontal position but not upside
down.
Leave sufficient clearance to facilitate the dismantling of the actuator from the valve body for maintenance purposes.
The valve must not be installed in an explosive atmosphere or at an ambient temperature higher than 50°C or lower than 2°C. It must not be subject to steam jets, water jets or dripping liquid.

## Installation (continued)

**Note** that the actuator may be rotated up to 360° with respect to the valve body by loosening the retaining fixture. After this operation retighten.



**Hydraulic diagrams for applications of 3-way mixing valves**

Note the valve **must** only be used as a mixing valve, and is not suitable for diverting (with one inlet and two outlet ports). Where this function is required, the valve should be mounted in the return line, as Fig. 2.

**Note that if the pump is installed before the A port of the below valve arrangement, then excessive valve hammering will occur thus causing an overload of the actuator.**

Fig.1 Mixing valve used in mixing application.

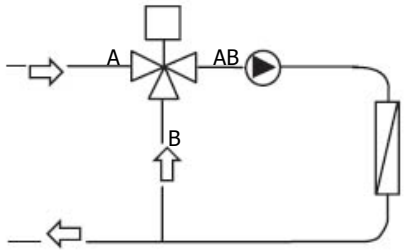
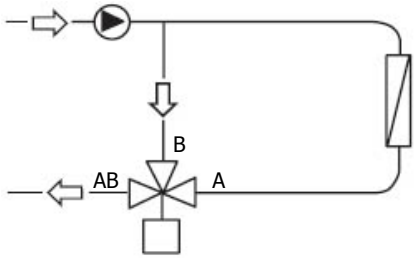



Fig.2 Mixing valve used in diverting application.



## Control Valve Sizing Diagram For Fluids

**Examples**

**1 For fluids with specific gravity of 1 (e.g. water)**

*Design data:*
*Flow rate: 6 m³/h*
*System pressure drop: 55 kPa*

Locate the horizontal line representing a flow rate of 6 m³/h (line A-A). The valve authority is given by the equation:

$$\text{Valve authority, } a = \frac{\Delta p1}{\Delta p1 + \Delta p2}$$

Where:

$\Delta p1$ = pressure drop across the fully open valve
$\Delta p2$ = pressure drop across the rest of the circuit with a full open valve

The ideal valve would give a pressure drop equal to the system pressure drop (i.e. an authority of 0.5):

If $\Delta p1 = \Delta p2$,
$a = \Delta p1/2*\Delta p1 = 0.5$

In this example an authority of 0.5 would be given by a valve having a pressure drop of 55 kPa at that flow rate (point B). The intersection of line A–A with a vertical line drawn from B lies *between* two diagonal lines; this means that no ideally-sized valve is available. The intersection of line A–A with the diagonal lines gives the pressure drops stated by real, rather than ideal, valves. In this case, a valve with $k_{vs}$ 6.3 would give a pressure drop of 90.7 kPa (point C):

$$\text{hence valve authority} = \frac{90.7}{90.7+55} = 0.395$$

The second largest valve, with $k_{vs}$ 10, would give a pressure drop of 36 kPa (point D):

$$\text{hence valve authority} = \frac{36}{36+55} = 0.62$$

Generally, for a 3 port application, the smaller valve would be selected (resulting in a valve authority higher than 0.5 and therefore improved controllability). However, this will increase the total pressure and should be checked by the system designer for compatibility with available pump heads,
etc. The ideal authority is 0.5 with a preferred range of between 0.4 and 0.7.

## Control Valve Sizing Diagram For Fluids

**2 For fluids with specific gravity different from 1 (e.g. water with glycol)**

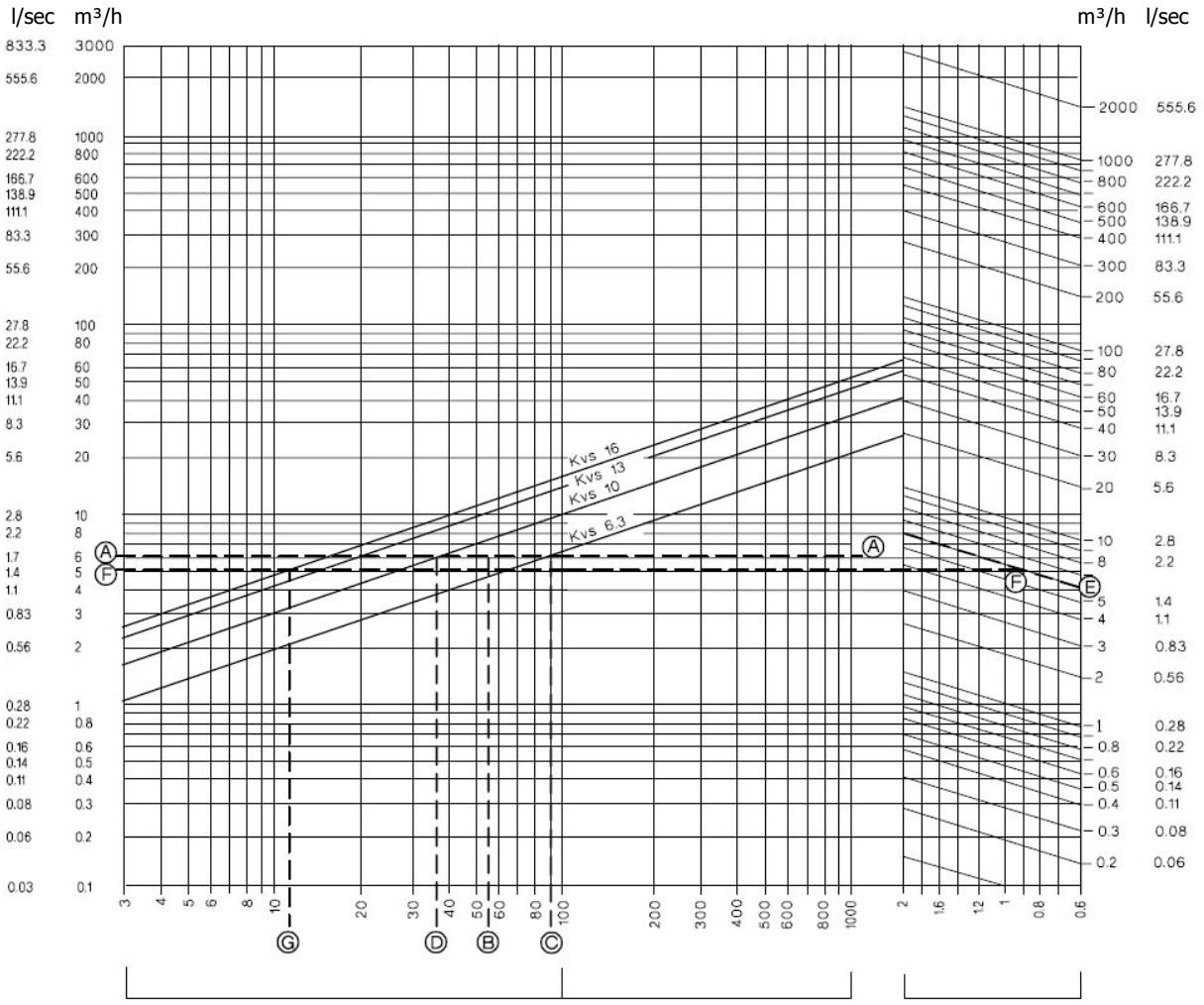
*Design data:*
*Flow rate: 6 m³/h of fluid, S.G. 0.9*
*System pressure drop: 10 kPa*

For this example, the left hand axis of the diagram must be ignored. Starting from the right hand axis, the flow rate of 6 m³/h is located (point E). The intersection of the diagonal line from point E with a vertical line from S.G. = 0.9 gives the starting point for the effective flow rate line F-F. The process then
continues as for Example 1, so 10 kPa intersects F-F nearest to the $k_{vs}$ 16 diagonal. The intersection of F-F with $k_{vs}$ 16 gives a valve pressure drop of 12.7 kPa (point G).

## Control Valve Sizing Diagram For Fluids

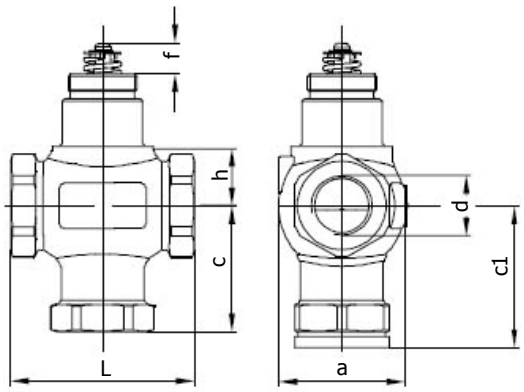
Flow liquid with specific gravity of 1

Flow liquid with specific gravity different to 1

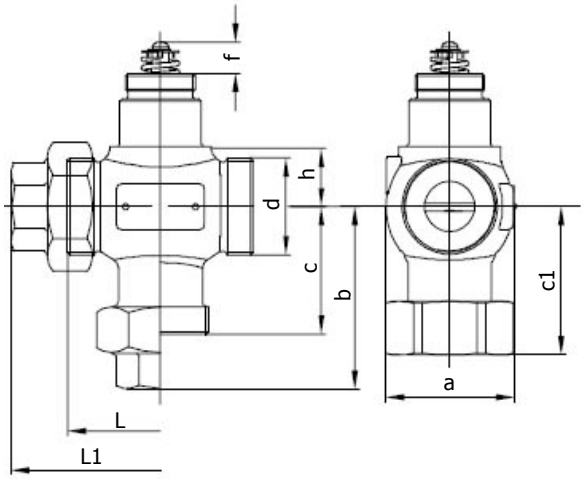


## Dimensions

**Internal Thread**




**External Thread**




| DN | Connection | L (mm) | c (mm) | c1 † (mm) | L1 (mm) | a (mm) | b (mm) | h (mm) | Weight (kg) 2-Port | 3-Port |
|---|---|---|---|---|---|---|---|---|---|---|
| 20 | *int. Rp ¾ | 80 | 55 | 2 | | 55 | | 57 | 1.2 | 1.1 |
| 25 | *int. Rp 1 | 95 | 60 | 67 | | 60 | | 57 | 1.6 | 1.4 |
| 32 | *int. Rp 1¼ | 112 | 66 | 75 | | 65 | | 63 | 2.3 | 2 |
| 40 | *int. Rp 1½ | 132 | 75 | 85 | | 71 | | 67 | 3.3 | 2.9 |
| 20 | **ext. G 1¼ | 80 | 55 | 62 | 128 | 55 | 79 | 57 | 1.4 | 1.2 |
| 25 | **ext. G 1½ | 95 | 60 | 67 | 151 | 60 | 88 | 57 | 1.7 | 1.4 |
| 32 | **ext. G 2 | 112 | 66 | 75 | 178 | 65 | 99 | 63 | 2.5 | 2.1 |
| 40 | **ext. G 2¼ | 132 | 75 | 85 | 201 | 71 | 110 | 67 | 3.3 | 2.9 |

† 2-Port only
* Internal thread, DIN 2999
** External thread, DIN ISO 228/1 (couplings supplied)