



Fig. 1 · Type 3323 Valve with mounted rod-type yoke (partial view)

## 1. Design and principle of operation

The Type 3323 Three-way Valve is based on the modular principle and can be combined with pneumatic as well as electric actuators.

- Type 3372-01xx Actuator attached to the V2001-PP Pneumatic Control Valve or
- Type 3372-03xx Actuator attached to the V2001-IP Electropneumatic Control Valve or
- Types 5824 or 5802 Actuators attached to the V2001-E1 and V2001-E2 Electric Control Valves.

The three-way valves operate either as mixing or diverting valve depending on the plug arrangement.

In mixing valves, the media to be mixed enter at ports A and B and the united flow leaves at port AB.

In diverting valves, the medium enters at port AB and the divided flows leave at ports A and B.

The flow across A or B to AB and vice versa is determined by the cross-sectional area between the seats and plugs.

The position of the plugs (3.1, 3.2) is changed by the signal pressure acting on the actuator.

The plug stem is sealed by means of a spring-loaded PTFE-ring packing (4.2) and connected to the actuator stem (8.1) via the stem connector (7).

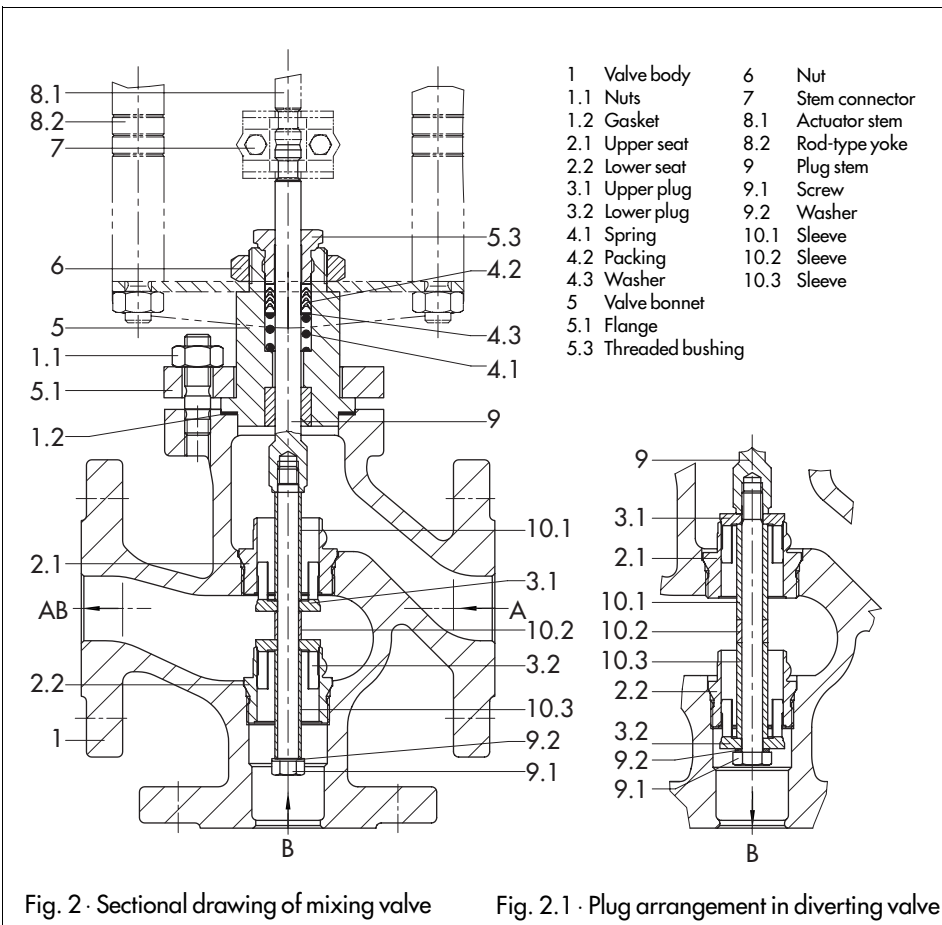


Fig. 2 · Sectional drawing of mixing valve

Fig. 2.1 · Plug arrangement in diverting valve

## 1.1 Technical data

<b>Valve</b>	Size	DN 15 to 50				NPS 1/2 to 2	
Material		Cast iron		Cast steel			
Nominal pressure		PN 16		PN 25, 40		Class 150, Class 300	
Type of connection	Flanges	DIN 2526 Form C				Raised Face	
Seat-plug sealing		Metal sealing					
Leakage class (DIN EN 1349)		Metal sealing: 1 (0.05 % K <sub>VS</sub> )					
Characteristic		Linear					
Rangeability		30:1 for DN 25 and lower			50 : 1 for DN 32 and larger		
Temperature range		-10 to 220 °C				15 to 430 °F	
	DN/NPS	15 / 1/2	20 / 3/4	25 / 1	32	40 / 1 1/2	50 / 2
K <sub>VS</sub> coefficients	m <sup>3</sup> /h	4	6.3	8	16	20	32
C <sub>V</sub> coefficients	USgal/min	5	7.5	9.5		23	37
Seat diameter	mm	24			40		
<b>Materials</b>							
Valve body		Cast iron GG-25 0.6025		Cast steel GP240 GH 1.0619		Carbon steel A216 WCB	
Valve bonnet		C22.8				A105	
Seat and plug		1.4305 / for seats in DN 32 and larger: 1.4104					
Guide bushing		1.4104					
Packing		PTFE V-ring packing with carbon; spring: 1.4310					
Body gasket		Graphite on metal core					



*Assembly, start-up and operation of the device may only be performed by trained and experienced personnel familiar with this product.*

*According to these mounting and operating instructions, trained personnel refers to persons who are able to judge the work they are assigned to and recognize possible dangers due to their specialized training, their knowledge and experience as well as their knowledge of the relevant standards.*

*Any hazards which could be caused by the process medium, the signal pressure and moving parts of the control valve are to be prevented by means of appropriate measures.*

*In addition, you are required to make sure that the control valve is only used in applications where operating pressure and temperatures do not exceed the operating values which are based on the valve sizing data submitted in the order.*

*Proper shipping and appropriate storage are assumed.*

## 2. Installation

### 2.1 Assembling the valve and actuator

The valve and the actuator are packed separately and must be assembled on site.

To do this, proceed as follows:

1. Remove the nut (6) from the valve bonnet.
2. Slightly retract the actuator stem (8.1) and place the actuator with its rod-type yoke on the valve bonnet. Secure with the nut (SW 36). Observe a tightening torque of min. 150 Nm.
3. Extend the actuator stem until it touches the plug stem.
4. Position the stem connector clamps and screw tight.

For further details, please refer to the mounting and operating instructions of the actuator used.

### 2.2 Mounting position

The valve can be mounted in any position. However, strictly observe the limitations resulting from the type of actuator used.

The valve must be installed free of stress. If necessary, support the pipelines near the connections.

**Do not install supports on the valve or on the actuator!**

Thoroughly flush the pipeline prior to installation of the valve!

### 2.3 Arrangement of the valve

According to the task to be performed the control valve must be installed at the points illustrated in Fig. 3.

Fail-safe action: the valve blocks the flow of the heating medium or releases the cooling medium.

The plug arrangement, i.e. either mixing or diverting valve, is indicated on a label fixed to the valve body.

### 2.4 Strainer, bypass

We recommend that you install a SAMSON Type 2 Strainer upstream of the valve, and with mixing valves, upstream of both ports.

We also recommend that you install a shut-off valve both upstream of the strainer and downstream of the valve as well as a bypass line so that the plant need not be shut down for maintenance routines.

## 3. Operation

Operating instructions refer only to the actuators and can be found in the mounting and operating instructions of the actuator used.

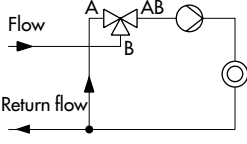
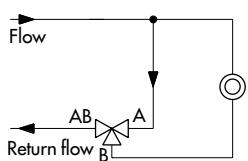
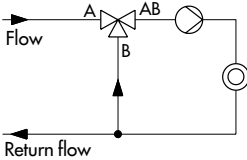
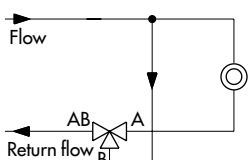
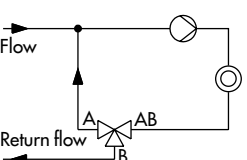
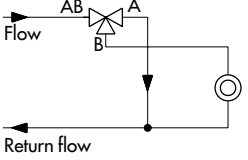
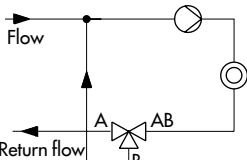
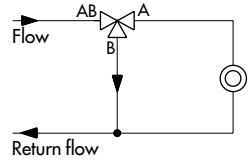
<p>Mixing service Temperature control <math>Q = \text{constant}</math></p>	<p>Diverting service Flow control <math>Q = 0 \text{ to } 100\%</math></p>	
<p><b>a</b></p> 	<p><b>b</b></p> 	<p><sup>1)</sup> FA = Actuator stem extends FE = Actuator stem retracts</p> <p>Heating using a mixing valve FA<sup>1)</sup> Cooling using a mixing valve FE<sup>1)</sup></p> <p>a) Installation in the flow pipe b) Installation in the return flow pipe</p>
<p><b>c</b></p> 	<p><b>d</b></p> 	<p>Heating using a mixing valve FA<sup>1)</sup> Cooling using a mixing valve FE<sup>1)</sup></p> <p>c) Installation in the flow pipe d) Installation in the return flow pipe</p>
<p><b>e</b></p> 	<p><b>f</b></p> 	<p>Heating using a diverting valve FA<sup>1)</sup> Cooling using a diverting valve FE<sup>1)</sup></p> <p>e) Installation in the return flow pipe f) Installation in the flow pipe</p>
<p><b>g</b></p> 	<p><b>h</b></p> 	<p>Heating using a diverting valve FA<sup>1)</sup> Cooling using a diverting valve FE<sup>1)</sup></p> <p>g) Installation in the return flow pipe h) Installation in the flow pipe</p>

Fig. 3 · Installation examples

## 4. Troubleshooting

### Important:

**Always separate the actuator and the valve prior to carrying out repairs!**

Separate the actuator from the valve by removing the stem connector clamps and the nut (6). Then lift the actuator off the valve.

If you notice external leakage, this could be caused by a damaged packing. If the valve does not shut off properly, dirt or other impurities could be caught between the seat and plug, preventing tight shut-off. Leakage may also be caused by damaged facings.

Disassemble the valve, clean the parts thoroughly and replace them, if required.



**When carrying out assembly work on the valve, relieve the corresponding section of the plant from pressure and drain it. Remove the valve.**

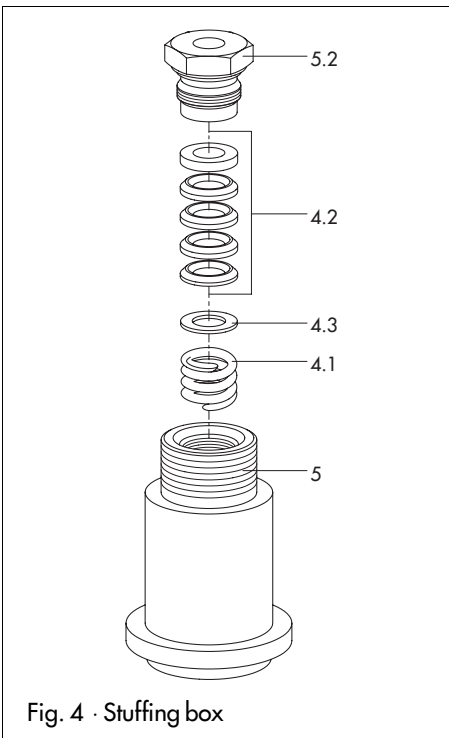


Fig. 4 · Stuffing box

### 4.1 Replacing the packing

If the valve leaks at the stuffing box, the packing (4.2) of the stuffing box needs to be exchanged as follows:

1. Screw out the threaded bushing (5.3).
2. Remove the nuts (1.1) and the flange (5.1).
3. Lift the valve bonnet (5) over the plug stem off the valve body.

Check the gasket (1.2) in the valve body for damage. We recommend that you replace the gasket.

4. Pull the damaged packing (4.2) out of the valve bonnet using an appropriate tool. Remove the washer (4.3) and spring (4.1) and clean the packing chamber.
5. Apply lubricant (order no. 8150-4000) to the individual parts of the new packing and the plug stem.
6. Place the valve bonnet with flange over the plug stem on the valve body and secure with nuts (1.1). Observe the tightening torques specified in the table.
7. Insert the spring (4.1) first and then the washer (4.3). Carefully slide the new packing (4.2) over the plug stem into the packing chamber.
8. Screw in the threaded bushing (5.2) and tighten.

### 4.2 Replacing the seat and/or plug

The mixing and the diverting valve differ as to the arrangement of their plugs and sleeves.

When replacing the seat and plug, we recommend that you also exchange the packing (4.2) and the gasket (1.2).

#### 4.2.1 Disassembly

1. Screw out the threaded bushing (5.3).
2. Remove the nuts (1.1) and the flange (5.1).
3. Lift the valve bonnet (5) over the plug stem off the valve body. Check the gasket (1.2) in the valve body for damages. We recommend that you replace the gasket.

**Mixing valve:**

4. Hold the plug stem from above in place using an appropriate tool on the hexagon head socket of the plug stem (9). Remove the screw (9.1) from below.  
Pull the screw and washer (9.2) as well as the sleeve (10.3) from below out of the body and the plug stem (9) from above. Remove the sleeve (10.2) from the side.
5. Screw out the upper seat (2.1) using a suitable seat wrench (see table).
6. Take both plugs (3.1 and 3.2) out of the valve body.
7. Use a seat wrench to screw out the lower seat (2.2).
7. Clean all the parts thoroughly and replace, if necessary.

**Diverting valve:**

4. Hold the plug stem from above in place using an appropriate tool on the hexagon head socket of the plug stem (9), then remove the screw (9.1) from below.  
Pull the screw and washer (9.2), the plug (3.2) as well as the sleeves (10.3, 10.2, 10.1) from below out of the body and the plug stem (9) as well as the plug (3.1) from above.
5. First, screw out the upper seat (2.1) and then the lower seat (2.2) using a suitable seat wrench (see table) .
6. Clean all the parts thoroughly and replace, if necessary.

**4.2 .2 Assembly**

Apply lubricant (order no. 8150-4010) to the thread and the sealing conus of the new or the old, reworked seats as well as to the end of the screw thread (9.1) .

**Mixing valve:**

1. Use a seat wrench to screw in the lower seat (2.2). Observe the tightening torque as indicated in the table on page 8.
2. Keep the following order to slide the serrated lock washer (9.2), sleeve (10.3), plug (3.2), sleeve (10.2) and the plug (3.1) on the screw (9.1). Loosely screw a hexagon head nut on the end of the thread.
3. Insert the screw with the sleeves and the plugs from below into the body so that the lower plug slides into its seat.
4. Screw the upper plug (3.1) firmly into the body, observing the tightening torques as indicated in the table below.
5. Press against the screw from below, remove the hexagon nut threaded onto it and screw on the plug stem instead.  
Hold the plug stem in place using an appropriate tool on the hexagon head socket of the plug stem and tighten all the parts with the screw (9.1).
6. Apply lubricant (order no. 8150-4000) to the plug stem and the individual parts of the packing.
7. Place the valve bonnet with flange over the plug stem on the valve body and secure with nuts (1.1). Observe the tightening torques specified in the table.
8. First, insert the spring (4.1) and then the washer (4.3). Carefully slide the parts of the packing (4.2) over the plug stem into the packing chamber.
9. Screw in the threaded bushing (5.3) and tighten.

## Diverting valve:

1. Use a seat wrench to screw in the lower seat (2.2) first and subsequently the upper seat (2.1). Observe the tightening torque specified in the table below.
2. Keep the following order to slide the serrated lock washer (9.2), the plug (3.2) and sleeves (10.3, 10.2, 10.1) on the screw (9.1). Insert all together into the seat from below and press in. Insert the upper plug from above and screw on the plug stem.
3. Hold the plug stem in place using an appropriate tool on the hexagon head socket of the plug stem and tighten all the parts with the screw (9.1).
4. Apply lubricant (order no. 8150-4000) to the plug stem and the individual parts of the packing.
5. Place the valve bonnet with flange over the plug stem on the valve body and secure with nuts (1.1). Observe the tightening torques as indicated in the table below.
6. First, insert the spring (4.1) and then the washer (4.3). Carefully slide the parts of the packing (4.2) over the plug stem into the packing chamber.
7. Screw in the threaded bushing (5.3) and tighten.

## SAMSON seat wrench:

More details and notes on the assembly procedure can be found in the SAMSON Special Tools EB 029 EN.

Seat wrenches / Tightening torques		
Valve size	DN 15 to 25 (NPS ½ to 1)	DN 32 to 50 (NPS 1½ to 2)
Seat wrench order no.	1280-3010	1280-3011
Seat thread mm Tight. torque ±10 %	M32 x 1.5 120 Nm	M58 x 1.5 500 Nm
Body nuts (1.1) Tight. torque +10 %	M10 20 Nm	M12 35 Nm

## 5. Description of nameplate

SAMSON		1	2	3		
4			POS	5	DN	6
PN	7	kvs	8	9	10	

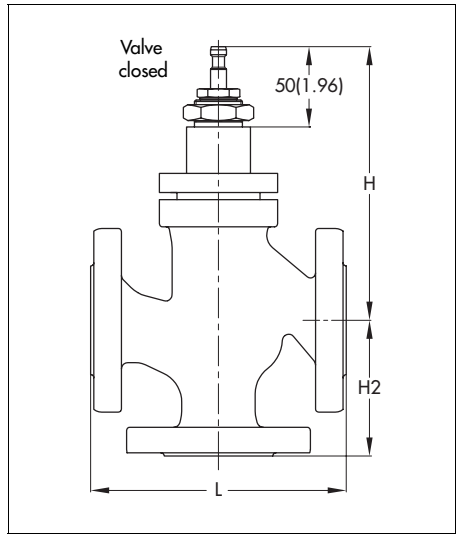
ANSI version

SAMSON					
				Size	
Cl	12	Cv	13		

- 1 Type
  - 2 Device index
  - 3 Material
  - 4 Device index and identification number  
Order number and modification index
  - 5 Order item
  - 6 Nominal size
  - 7 Pressure rating
  - 8 Kvs coefficient
  - 9 Characteristic:  
% – equal percentage
  - 10 Seal: ME – metal-sealing
- ANSI version:
- 12 ANSI Class (pressure rating)
  - 13 Cv coefficient (Kvs x 1.17)

## 6. Dimensions

DIN DN	L (mm)	H (mm)	H2 (mm)		
15	130	175	70		
20	150		80		
25	160		85		
32	180	180	100		
40	200		105		
50	230		120		
ANSI NPS					
	L (in) Class		H (in)	H2 (in) Class	
	150	300		150	300
1/2	7.25	7.50	6.9	3.62	3.76
3/4		7.62		3.82	
1		7.75	3.88		
1 1/2	8.75	9.25	7.1	4.37	4.63
2	10.00	10.50		5.00	5.26



## 7. Customer inquiries

Should you have any questions, please submit the following details:

- Type designation and order number (written on nameplate)
- Production number, nominal size and version of the valve
- Pressure and temperature of the process medium
- Flow rate in m<sup>3</sup>/h
- Bench range (signal pressure range) (e.g. 1.4 to 2.3 bar) in case of a pneumatic actuator
- Installation drawing



SAMSON AG · MESS- UND REGELTECHNIK  
Weismüllerstraße 3 · 60314 Frankfurt · Germany  
Phone: + 49 69 4009-0 · Fax: +49 69 4009-1507  
Internet: <http://www.samson.de>

**EB 8113/8114 EN**

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