

# VSxC-2/-3/-4

## SMALL LINEAR VALVES PN16 FOR MODULATING AND ON/OFF-CONTROL

### PRODUCT DATA



**VSxC-2**

**VSxC-3**

**VSxC-4**

### GENERAL

These small linear valves are used in combination with small electric linear valve actuators and thermoelectric actuators for the control of hot and/or chilled water for fan coil units and small reheaters/recoolers in electric/electronic temperature control systems.

### FEATURES

- **Small size allows installation where space is limited**
- **Long stroke results in a high quality characteristic**
- **Soft seat provides low leakage rate and high rangeability**
- **High close-off pressure**
- **Wide standardized range of  $k_{vs}$  values**
- **Reduced  $k_{vs}$  values in the bypass to facilitate hydronic balancing**
- **Range of fittings available for different connections (compression, soldered, threaded)**
- **Compatible with two-piece Conex compression fittings**
- **Dezincification-resistant yellow brass**

### SPECIFICATIONS

|   |  |
|---|--|
| <b>Models</b>                               | Two-way VSxC-2<br>Three-way VSxC-3<br>Three-way with bypass VSxC-4 |
| <b>Operation</b>                            | All models stem up to close, port A to B / AB                      |
| <b>Nominal pressure rating</b>              | PN16   |
| <b>Capacity index (<math>k_{vs}</math>)</b> | see tables on page 2 and 3   |
| <b>Close-off pressures</b>                  | see tables on page 2 and 3   |
| <b>Leakage rate</b>                         | $\leq 0.02\%$ of $k_{vs}$  |
| <b>Port connection</b>                      | conical sealing connections in standard sizes                      |

#### Valve body

|                 |   |
|-----------------|---|
| <b>Material</b> | Brass                                   |
| <b>Size</b>     | DN15 (1/2"), DN20 (3/4"), DN25 (1-1/4") |

#### Trim

|                               |                             |
|-------------------------------|-----------------------------|
| <b>Stem</b>                   | Stainless steel             |
| <b>Plug</b>                   | Brass / EPDM                |
| <b>Suitable medium</b>        | Water, with max. 50% glycol |
| <b>Controlled water temp.</b> | 2...120 °C                  |

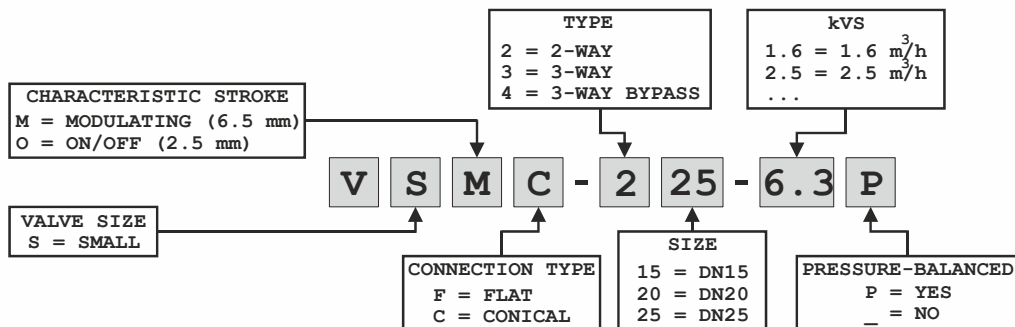
#### Modulating valves

|                       |   |
|-----------------------|---|
| <b>VSMC-xxx</b>       |   |
| <b>Stroke</b>         | 6.5 mm  |
| <b>Dimensions</b>     | see Fig. 4, Fig. 5, and Fig. 6 on page 6 and Fig. 7, Fig. 8, and Fig. 9 on page 7 |
| <b>Characteristic</b> | 2-way: modified equal %<br>3-way: A-AB modified equal %;<br>B-AB linear           |

#### ON/OFF valves

|                   |   |
|-------------------|---|
| <b>VSOC-xxx</b>   |   |
| <b>Stroke</b>     | 2.5 mm  |
| <b>Dimensions</b> | see Fig. 4, Fig. 5, and Fig. 6 on page 6 and Fig. 7, Fig. 8, and Fig. 9 on page 7 |

## NAMING KEY



## FLOW CAPACITIES AND CLOSE-OFF PRESSURE RATINGS

### VSxC-2 Two-Way Valves with Conical Sealing

| DN | K <sub>vs</sub><br>A-B | type   | stroke | order no.     | close-off pressure            |                            |                       |
|----|------------------------|--------|--------|---------------|-------------------------------|----------------------------|-----------------------|
|    |                        |        |        |               | M6410C,L; M7410C,E<br>(180 N) | MT8; M5410C1, L1<br>(90 N) | MT4; M7410A<br>(90 N) |
| 15 | 0.16                   | MOD    | 6.5    | VSMC-215-0.16 | 600 kPa                       | 600 kPa                    | --                    |
| 15 | 0.25                   | MOD    | 6.5    | VSMC-215-0.25 | 600 kPa                       | 600 kPa                    | --                    |
| 15 | 0.40                   | MOD    | 6.5    | VSMC-215-0.4  | 600 kPa                       | 600 kPa                    | --                    |
| 15 | 0.63                   | MOD    | 6.5    | VSMC-215-0.63 | 600 kPa                       | 600 kPa                    | --                    |
| 15 | 1.0                    | MOD    | 6.5    | VSMC-215-1.0  | 600 kPa                       | 600 kPa                    | --                    |
| 15 | 1.6                    | MOD    | 6.5    | VSMC-215-1.6  | 300 kPa                       | 300 kPa                    | --                    |
| 15 | 2.5                    | MOD    | 6.5    | VSMC-215-2.5  | 100 kPa                       | 100 kPa                    | --                    |
| 20 | 2.5                    | MOD    | 6.5    | VSMC-220-2.5  | 150 kPa                       | 150 kPa                    | --                    |
| 20 | 4.0                    | MOD    | 6.5    | VSMC-220-4.0  | 50 kPa                        | 50 kPa                     | --                    |
| 25 | 6.3                    | MOD    | 6.5    | VSMC-225-6.3P | 250 kPa                       | 250 kPa                    | --                    |
| 25 | 8.0                    | MOD    | 6.5    | VSMC-225-8.0P | 250 kPa                       | 250 kPa                    | --                    |
| 15 | 1.0                    | ON-OFF | 2.5    | VSOC-215-1.0  | 600 kPa                       | 600 kPa                    | 600 kPa               |
| 15 | 1.6                    | ON-OFF | 2.5    | VSOC-215-1.6  | 300 kPa                       | 300 kPa                    | 300 kPa               |
| 15 | 2.5                    | ON-OFF | 2.5    | VSOC-215-2.5  | 150 kPa                       | 150 kPa                    | 150 kPa               |
| 20 | 2.5                    | ON-OFF | 2.5    | VSOC-220-2.5  | 200 kPa                       | 200 kPa                    | 200 kPa               |
| 20 | 4.0                    | ON-OFF | 2.5    | VSOC-220-4.0  | 100 kPa                       | 100 kPa                    | 100 kPa               |
| 25 | 4.0                    | ON-OFF | 2.5    | VSOC-225-4.0P | 200 kPa                       | 200 kPa                    | 200 kPa               |
| 25 | 5.5                    | ON-OFF | 2.5    | VSOC-225-5.5P | 200 kPa                       | 200 kPa                    | 200 kPa               |

**VSxC-3 Three-Way Valves with Conical Sealing**

| DN | Kvs  |      | type   | order no.     | appli-<br>cation | stroke | close-off pressure            |                            |                       |
|----|------|------|--------|---------------|------------------|--------|-------------------------------|----------------------------|-----------------------|
|    | A-AB | B-AB |        |               |                  |        | M6410C,L;<br>M7410C,E (180 N) | MT8; M5410C1, L1<br>(90 N) | MT4; M7410A<br>(90 N) |
| 15 | 0.25 | 0.16 | MOD    | VSMC-315-0.25 | MIX              | 6.5    | 600 kPa                       | 600 kPa                    | --                    |
| 15 | 0.40 | 0.25 | MOD    | VSMC-315-0.4  | MIX              | 6.5    | 600 kPa                       | 600 kPa                    | --                    |
| 15 | 0.63 | 0.4  | MOD    | VSMC-315-0.63 | MIX              | 6.5    | 600 kPa                       | 600 kPa                    | --                    |
| 15 | 1.0  | 0.63 | MOD    | VSMC-315-1.0  | MIX              | 6.5    | 600 kPa                       | 600 kPa                    | --                    |
| 15 | 1.6  | 1.0  | MOD    | VSMC-315-1.6  | MIX              | 6.5    | 300 kPa                       | 300 kPa                    | --                    |
| 15 | 2.5  | 1.6  | MOD    | VSMC-315-2.5  | MIX              | 6.5    | 100 kPa                       | 100 kPa                    | --                    |
| 20 | 2.5  | 1.6  | MOD    | VSMC-320-2.5  | MIX              | 6.5    | 150 kPa                       | 150 kPa                    | --                    |
| 20 | 4.0  | 2.5  | MOD    | VSMC-320-4.0  | MIX              | 6.5    | 50 kPa                        | 50 kPa                     | --                    |
| 25 | 6.3  | 4.0  | MOD    | VSMC-325-6.3P | MIX              | 6.5    | 250 kPa                       | 250 kPa                    | --                    |
| 25 | 8.0  | 5.5  | MOD    | VSMC-325-8.0P | MIX              | 2.5    | 250 kPa                       | 250 kPa                    | --                    |
| 15 | 1.0  | 0.63 | ON-OFF | VSOC-315-1.0  | MIX/DIV          | 2.5    | 600 / 200 kPa                 | 600 / 200 kPa              | 600 / 200 kPa         |
| 15 | 1.6  | 1.0  | ON-OFF | VSOC-315-1.6  | MIX/DIV          | 2.5    | 300 / 200 kPa                 | 300 / 200 kPa              | 300 / 200 kPa         |
| 15 | 2.5  | 1.6  | ON-OFF | VSOC-315-2.5  | MIX              | 2.5    | 150 kPa                       | 150 kPa                    | 150 kPa               |
| 20 | 2.5  | 1.6  | ON-OFF | VSOC-320-2.5  | MIX              | 2.5    | 200 kPa                       | 200 kPa                    | 200 kPa               |
| 20 | 4.0  | 2.5  | ON-OFF | VSOC-320-4.0  | MIX              | 2.5    | 100 kPa                       | 100 kPa                    | 100 kPa               |
| 25 | 4.0  | 2.5  | ON-OFF | VSOC-325-4.0P | MIX              | 6.5    | 200 kPa                       | 200 kPa                    | 200 kPa               |
| 25 | 5.5  | 4.0  | ON-OFF | VSOC-325-5.5P | MIX              | 6.5    | 200 kPa                       | 200 kPa                    | 200 kPa               |

**VSxC-4 Four-Way Valves with Conical Sealing**

| DN | Kvs  |      | type   | order no.     | appli-<br>cation | stroke | close-off pressure            |                            |                       |
|----|------|------|--------|---------------|------------------|--------|-------------------------------|----------------------------|-----------------------|
|    | A-AB | B-AB |        |               |                  |        | M6410C,L;<br>M7410C,E (180 N) | MT8; M5410C1, L1<br>(90 N) | MT4; M7410A<br>(90 N) |
| 15 | 0.25 | 0.16 | MOD    | VSMC-415-0.25 | MIX              | 6.5    | 600 kPa                       | 600 kPa                    | --                    |
| 15 | 0.40 | 0.25 | MOD    | VSMC-415-0.4  | MIX              | 6.5    | 600 kPa                       | 600 kPa                    | --                    |
| 15 | 0.63 | 0.4  | MOD    | VSMC-415-0.63 | MIX              | 6.5    | 600 kPa                       | 600 kPa                    | --                    |
| 15 | 1.0  | 0.63 | MOD    | VSMC-415-1.0  | MIX              | 6.5    | 600 kPa                       | 600 kPa                    | --                    |
| 15 | 1.6  | 1.0  | MOD    | VSMC-415-1.6  | MIX              | 6.5    | 300 kPa                       | 300 kPa                    | --                    |
| 15 | 2.5  | 1.6  | MOD    | VSMC-415-2.5  | MIX              | 6.5    | 100 kPa                       | 100 kPa                    | --                    |
| 20 | 2.5  | 1.6  | MOD    | VSMC-420-2.5  | MIX              | 6.5    | 150 kPa                       | 150 kPa                    | --                    |
| 20 | 4.0  | 2.5  | MOD    | VSMC-420-4.0  | MIX              | 6.5    | 50 kPa                        | 50 kPa                     | --                    |
| 25 | 6.3  | 4.0  | MOD    | VSMC-425-6.3P | MIX              | 6.5    | 250 kPa                       | 250 kPa                    | --                    |
| 25 | 8.0  | 5.5  | MOD    | VSMC-425-8.0P | MIX              | 2.5    | 250 kPa                       | 250 kPa                    | --                    |
| 15 | 1.0  | 0.63 | ON-OFF | VSOC-415-1.0  | MIX/DIV          | 2.5    | 600 / 200 kPa                 | 600 / 200 kPa              | 600 / 200 kPa         |
| 15 | 1.6  | 1.0  | ON-OFF | VSOC-415-1.6  | MIX/DIV          | 2.5    | 300 / 200 kPa                 | 300 / 200 kPa              | 300 / 200 kPa         |
| 15 | 2.5  | 1.6  | ON-OFF | VSOC-415-2.5  | MIX              | 2.5    | 150 kPa                       | 150 kPa                    | 150 kPa               |
| 20 | 2.5  | 1.6  | ON-OFF | VSOC-420-2.5  | MIX              | 2.5    | 200 kPa                       | 200 kPa                    | 200 kPa               |
| 20 | 4.0  | 2.5  | ON-OFF | VSOC-420-4.0  | MIX              | 2.5    | 100 kPa                       | 100 kPa                    | 100 kPa               |
| 25 | 4.0  | 2.5  | ON-OFF | VSOC-425-4.0P | MIX              | 6.5    | 200 kPa                       | 200 kPa                    | 200 kPa               |
| 25 | 5.5  | 4.0  | ON-OFF | VSOC-425-5.5P | MIX              | 6.5    | 200 kPa                       | 200 kPa                    | 200 kPa               |

## OPERATION

In the case of the two-way valve, the three-way valve, and the three-way valve with bypass, the built-in spring produces a closing force on the A-B / A-AB ports.

The valves are supplied with a screwed-on adjustment cap for manual operation and for protection of the stem. At modulating valves with 6.5mm stroke the adjustment cap allows A-B / A-AB to be fully closed and A-B / A-AB to be opened by ~50% (B-port closed by 50%). This allows the stem to be set up for filling or initial heating/cooling during the building construction phase without the use of a controller or actuator.

The small electric valve actuators as well as the thermo-electric actuators provide automatic control over the opening and closing movement of the valve stem.

### Typical Operation

All types of valves should be mounted in the return flow. If the  $\Delta p$ -values exceed 300 kPa, attention should be paid to the development of noise.

### Two-Way Valves

Direction of flow always from port A to port B  
 Port B: Outlet

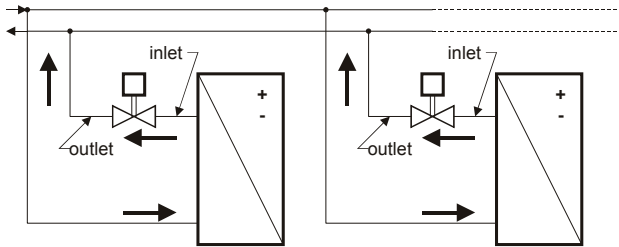


Fig. 1. Two-way valve operation

### Three-Way Valves

These valves are preferably used as mixing valves, this means:

Port AB: Total flow outlet  
 Port A: Controlled flow inlet  
 Port B: Bypass inlet

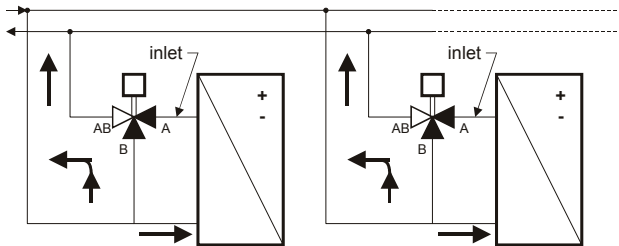


Fig. 2. Three-way valve operation

### Three-Way Valves with Bypass

These valves simplify the installation, which is depending on the layout of the pipework, as the bypass pipe is part of the valve. The information for the normal three-way valves is also valid for this type.

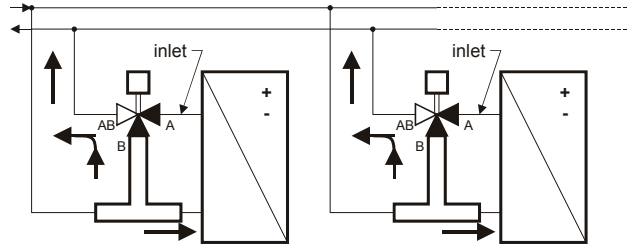


Fig. 3. Three-way valve with bypass

## MOUNTING

When installing the valve care must be taken that the flow direction is correct (see section "Typical Operation"). The valve must not be mounted with the stem pointing downward. The adjustment cap must be removed from the valve only when the actuator is fitted. The valve should be installed as stress-free as possible with a tightening torque of 25 to 30 Nm.

The valve is supplied complete with mounting instructions. The water quality must meet VDI 2035 requirements.

**NOTE:** Mount the actuator by hand, only. Do not use a tool, as this could result in damage.

## MAINTENANCE / SPARE PARTS

The valves do not require any maintenance.

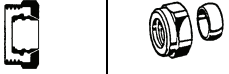
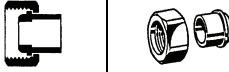


In case of failure or leakage, the valve must be replaced. No spare parts for the valve or sealing are available.

## DISPOSAL

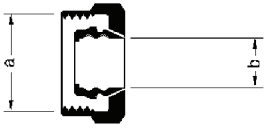
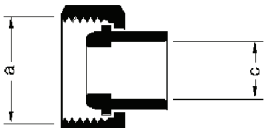

Statutory regulations and/or environmental protection considerations may require special handling in disposing of the valves.

## ACCESSORIES

Valves VSxC-2 need two connection sets, valves VSxC-3 need three connection sets, and valves VSxC-4 need four connection sets.

| connection          | pipe size             | DN             | order number                  | connection set   |  | description                                 |
|---------------------|-----------------------|----------------|-------------------------------|--|--|---|
| compression         | 15 mm<br>22 mm        | 15<br>20       | ACN-15C<br>ACN-20C            |  |  | Consisting of 1 union nut and 1 ferrule     |
| soldering           | 12 mm<br>15 mm        | 15<br>20       | ACN-15S<br>ACN-20S            |  |  | Consisting of 1 union nut and 1 solder bush |
| external thread     | R3/8"<br>R1/2"<br>R1" | 15<br>20<br>25 | ACN-15T<br>ACN-20T<br>ACN-25T |  |  | Consisting of 1 union nut and 1 tailpiece   |
| compression (Conex) | 15 mm<br>22 mm        | 15<br>20       | 63*<br>65*                    |  |  | Capnut and compression ring                 |

\*Cannot be purchased from Honeywell

| dimensions of connection sets   |                                       |                |                |                       | order number                  |
|---|---------------------------------------|----------------|----------------|-----------------------|-------------------------------|
|   | a                                     | b              | c              | d                     |                               |
|    | G1/2"<br>1-1/8" x 14 BS 84            | 15 mm<br>22 mm | --             | --                    | ACN-15C<br>ACN-20C            |
|   | G1/2"<br>1-1/8" x 14 BS 84            | --             | 12 mm<br>15 mm | --                    | ACN-15S<br>ACN-20S            |
|  | G1/2"<br>1-1/8" x 14 BS 84<br>G1-1/4" | --             | --             | R3/8"<br>R1/2"<br>R1" | ACN-15T<br>ACN-20T<br>ACN-25T |

## DIMENSIONS

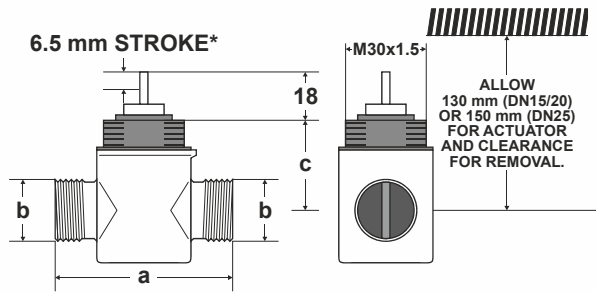


Fig. 4. Two-way valves, dimensions (mm)

\*NOTE: In the case of modulating valves, the stroke amounts to 6.5 mm, and the closure distance to 18 mm. In the case of ON/OFF valves, the stroke amounts to 2.5 mm, and the closure distance to 14 mm.

Table 1. Two-way valves, dimensions (mm)

|      | A  | B               | D  |
|------|----|-----------------|----|
| DN15 | 56 | G ½ A           | 32 |
| DN20 | 66 | 1-1/8 x 14 BS84 | 34 |
| DN25 | 76 | G 1 ¼ A         | 48 |

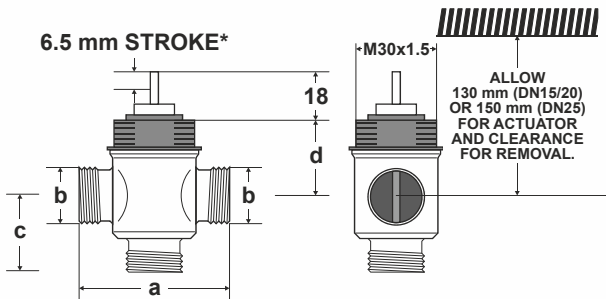


Fig. 5. Three-way valves, dimensions (mm)

\*NOTE: In the case of modulating valves, the stroke amounts to 6.5 mm, and the closure distance to 18 mm. In the case of ON/OFF valves, the stroke amounts to 2.5 mm, and the closure distance to 14 mm.

Table 2. Three-way valves, dimensions (mm)

|      | A  | B               | C    | D  |
|------|----|-----------------|------|----|
| DN15 | 56 | G ½ A           | 24.5 | 32 |
| DN20 | 66 | 1-1/8 x 14 BS84 | 33   | 34 |
| DN25 | 76 | G 1 ¼ A         | 38   | 48 |

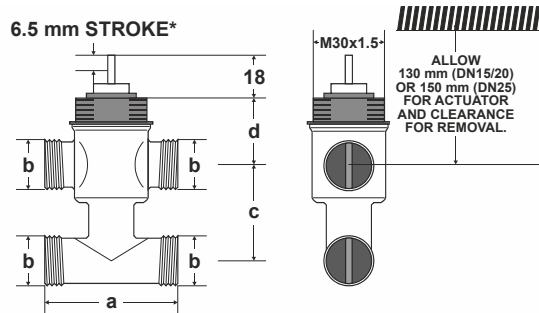


Fig. 6. Three-way valves with bypass, dimensions (mm)

\*NOTE: In the case of modulating valves, the stroke amounts to 6.5 mm, and the closure distance to 18 mm. In the case of ON/OFF valves, the stroke amounts to 2.5 mm, and the closure distance to 14 mm.

Table 3. Three-way valves with bypass, dimensions (mm)

|      | A  | B               | C    | D  |
|------|----|-----------------|------|----|
| DN15 | 56 | G ½ A           | 40   | 32 |
| DN20 | 66 | 1-1/8 x 14 BS84 | 40   | 34 |
| DN25 | 76 | G 1 ¼ A         | 62.5 | 48 |

## DIMENSIONS WITH SNAP-ON

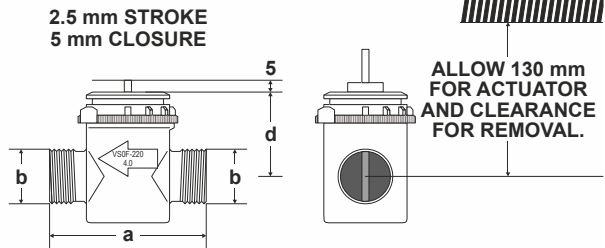


Fig. 7. Two-way valves with snap-on, dimensions (mm)

Table 4. Two-way valves with snap-on, dimensions (mm)

|      | A  | B               | D    |
|------|----|-----------------|------|
| DN15 | 56 | G ½ A           | 34.5 |
| DN20 | 66 | 1-1/8 x 14 BS84 | 36.6 |

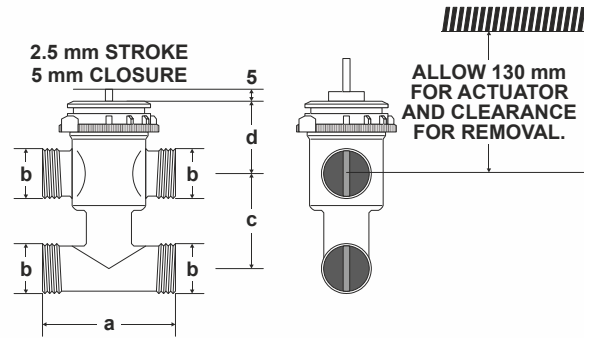


Fig. 9. Three-way valves with bypass and snap-on, dimensions (mm)

Table 6. Three-way valves with bypass, dimensions (mm)

|      | A  | B               | C  | D    |
|------|----|-----------------|----|------|
| DN15 | 56 | G ½ A           | 40 | 34.5 |
| DN20 | 66 | 1-1/8 x 14 BS84 | 40 | 36.6 |

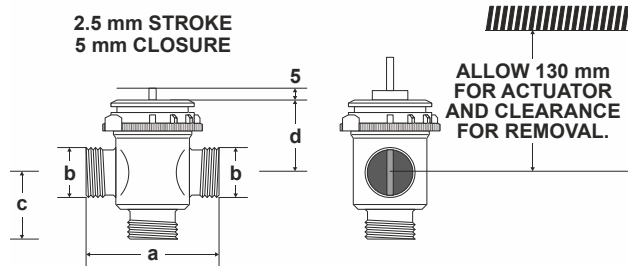


Fig. 8. Three-way valves with snap-on, dimensions (mm)

Table 5. Three-way valves with snap-on, dimensions (mm)

|      | A  | B               | C    | D    |
|------|----|-----------------|------|------|
| DN15 | 56 | G ½ A           | 24.5 | 34.5 |
| DN20 | 66 | 1-1/8 x 14 BS84 | 33   | 36.6 |

## VALVE ACTION WITH MT-SERIES SMART-T THERMAL ACTUATORS

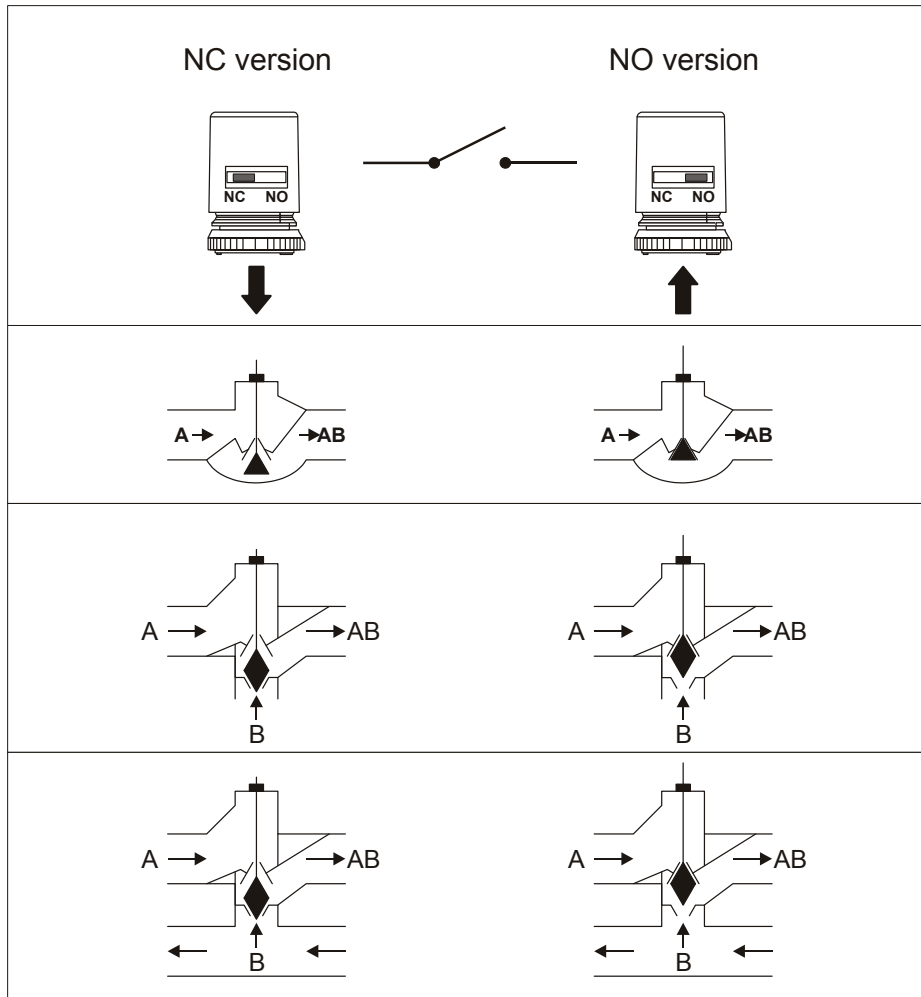


Fig. 10. Valve action with MT-series Smart-T Thermal Actuators

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