



VVF53..  
VVF53..K

VXF53..

ACVATIX™

## 2- and 3-port valves with flanged connections, PN 25 VVF53.. VXF53..

From the large-stroke valve line

- High-performance valves for medium temperatures from -20...220 °C
- Valve body of nodular cast iron EN-GJS-400-18-LT
- DN 15...150
- $k_{vs}$  0.16...400 m<sup>3</sup>/h
- Flange type 21, flange design B
- VVF53..K with pressure compensation to handle high differential pressure
- Equipable with electro-motoric actuators SAX.. or electro-hydraulic actuators SKD.., SKB.., SKC..

### Use

In boiler, district heating and refrigeration plants, cooling towers, heating groups, and in air handling units as control or shutoff valves.

For use in closed or open hydraulic circuits (observe cavitation).


Архангельск (8182)63-90-72  
Астана +7(7172)727-132  
Белгород (4722)40-23-64  
Брянск (4832)59-03-52  
Владивосток (423)249-28-31  
Волгоград (844)278-03-48  
Вологда (8172)26-41-59  
Воронеж (473)204-51-73  
Екатеринбург (343)384-55-89  
Иваново (4932)77-34-06  
Ижевск (3412)26-03-58  
Казань (843)206-01-48

Калининград (4012)72-03-81  
Калуга (4842)92-23-67  
Кемерово (3842)65-04-62  
Киров (8332)68-02-04  
Краснодар (861)203-40-90  
Красноярск (391)204-63-61  
Курск (4712)77-13-04  
Липецк (4742)52-20-81  
Магнитогорск (3519)55-03-13  
Москва (495)268-04-70  
Мурманск (8152)59-64-93  
Набережные Челны (8552)20-53-41

Нижний Новгород (831)429-08-12  
Новокузнецк (3843)20-46-81  
Новосибирск (383)227-86-73  
Орел (4862)44-53-42  
Оренбург (3532)37-68-04  
Пенза (8412)22-31-16  
Пермь (342)205-81-47  
Ростов-на-Дону (863)308-18-15  
Рязань (4912)46-61-64  
Самара (846)206-03-16  
Санкт-Петербург (812)309-46-40  
Саратов (845)249-38-78

Смоленск (4812)29-41-54  
Сочи (862)225-72-31  
Ставрополь (8652)20-65-13  
Тверь (4822)63-31-35  
Томск (3822)98-41-53  
Тула (4872)74-02-29  
Тюмень (3452)66-21-18  
Ульяновск (8422)24-23-59  
Уфа (347)229-48-12  
Челябинск (351)202-03-61  
Череповец (8202)49-02-64  
Ярославль (4852)69-52-93

## Type summary

| Valves  | Actuators                    |             |  |                | SAX.. <sup>4)</sup> |                   | SKD.. <sup>2)</sup> |                   | SKB..           |                   | SKC..           |                   |   |
|---|------------------------------|-------------|--|----------------|---------------------|-------------------|---------------------|-------------------|-----------------|-------------------|-----------------|-------------------|---|
|   | Stroke                       |             |  |                | 20 mm               |                   | 20 mm               |                   |                 |                   | 40 mm           |                   |   |
|   | Positioning force            |             |  |                | 800 N               |                   | 1000 N              |                   | 2800 N          |                   | 2800 N          |                   |   |
| PN 25<br>PN 16 <sup>1)</sup>  | Data sheet                   |             |  |                | N4501               |                   | N4561               |                   | N4664           |                   | N4566           |                   |   |
|    | Stock no.                    | DN          | k <sub>vs</sub><br>[m <sup>3</sup> /h] | S <sub>v</sub> | Δp <sub>s</sub>     | Δp <sub>max</sub> | Δp <sub>s</sub>     | Δp <sub>max</sub> | Δp <sub>s</sub> | Δp <sub>max</sub> | Δp <sub>s</sub> | Δp <sub>max</sub> |   |
| [kPa]   |                              |             |  |                |                     |                   |                     |                   |                 |                   |                 |                   |   |
| <b>Fluids</b><br>Preferred flow direction A-AB with fluids for low noise operation and high k <sub>vs</sub> -values with all actuator types | VVF53.15-0.16                | S55208-V100 | 15                                     | 0.16           | > 50                | 2500              | 1200                | 2500              | 1200            | 2500              | -               | -                 |   |
|   | VVF53.15-0.2                 | S55208-V101 | 15                                     | 0.2            |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.15-0.25                | S55208-V102 | 15                                     | 0.25           |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.15-0.32                | S55208-V103 | 15                                     | 0.32           |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.15-0.4                 | S55208-V104 | 15                                     | 0.4            |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.15-0.5                 | S55208-V105 | 15                                     | 0.5            |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.15-0.63                | S55208-V106 | 15                                     | 0.63           |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.15-0.8                 | S55208-V107 | 15                                     | 0.8            |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.15-1                   | S55208-V108 | 15                                     | 1              |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.15-1.25                | S55208-V109 | 15                                     | 1.25           |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.15-1.6                 | S55208-V110 | 15                                     | 1.6            |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.15-2                   | S55208-V111 | 15                                     | 2              |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.15-2.5                 | S55208-V112 | 15                                     | 2.5            |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.15-3.2                 | S55208-V113 | 15                                     | 3.2            |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.15-4                   | S55208-V114 | 15                                     | 4              |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.20-6.3                 | S55208-V116 | 20                                     | 6.3            | > 100               | 1600              | 750                 | 2100              | 1100            | 2000              | 1150            | -                 | - |
|   | VVF53.25-5                   | S55208-V117 | 25                                     | 5              |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.25-6.3                 | S55208-V118 | 25                                     | 6.3            |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.25-8                   | S55208-V119 | 25                                     | 8              |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.25-10                  | S55208-V120 | 25                                     | 10             |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.32-16                  | S55208-V122 | 32                                     | 16             |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.40-12.5                | S55208-V123 | 40                                     | 12.5           |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.40-16                  | S55208-V124 | 40                                     | 16             |                     |                   |                     |                   |                 |                   |                 |                   |   |
| VVF53.40-20   | S55208-V125                  | 40          | 20                                     |                |                     |                   |                     |                   |                 |                   |                 |                   |   |
| VVF53.40-25   | S55208-V126                  | 40          | 25                                     |                |                     |                   |                     |                   |                 |                   |                 |                   |   |
| VVF53.50-31.5   | S55208-V127                  | 50          | 31.5                                   |                |                     |                   |                     |                   |                 |                   |                 |                   |   |
| VVF53.50-40   | S55208-V128                  | 50          | 40                                     |                |                     |                   |                     |                   |                 |                   |                 |                   |   |
| VVF53.65-63 <sup>3)</sup>   | S55208-V129                  | 65          | 63                                     |                |                     |                   |                     |                   |                 |                   |                 |                   |   |
| VVF53.80-100 <sup>3)</sup>  | S55208-V130                  | 80          | 100                                    |                |                     |                   |                     |                   |                 |                   |                 |                   |   |
| VVF53.100-160 <sup>3)</sup>   | S55208-V131                  | 100         | 160                                    |                |                     |                   |                     |                   |                 |                   |                 |                   |   |
| VVF53.125-250 <sup>3)</sup>   | S55208-V132                  | 125         | 250                                    |                |                     |                   |                     |                   |                 |                   |                 |                   |   |
| VVF53.150-400   | S55208-V133                  | 150         | 400                                    |                |                     |                   |                     |                   |                 |                   |                 |                   |   |
| <b>Fluids and Steam</b><br>Compensated valves are optimized for a single flow direction AB-A for fluids and steam.                          | VVF53.50-40K <sup>3)</sup>   | S55208-V134 | 50                                     | 40             | > 100               | -                 | -                   | 2500              | 1250            | 2500              | 1250            | -                 | - |
|   | VVF53.65-63K <sup>3)</sup>   | S55208-V135 | 65                                     | 63             |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.80-100K <sup>3)</sup>  | S55208-V136 | 80                                     | 100            |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.100-150K <sup>3)</sup> | S55208-V158 | 100                                    | 150            |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.125-220K <sup>3)</sup> | S55208-V159 | 125                                    | 220            |                     |                   |                     |                   |                 |                   |                 |                   |   |
|   | VVF53.150-315K               | S55208-V160 | 150                                    | 315            |                     |                   |                     |                   |                 |                   |                 |                   |   |

<sup>1)</sup> DN 15...50: Flange dimensions for PN 16 and PN 25

DN 65...150: Flange dimensions only for PN 25

<sup>2)</sup> Usable up to a max. medium temperature of 150 °C

<sup>3)</sup> Valve characteristic for k<sub>vs</sub> value 63 m<sup>3</sup>/h from 90 % stroke, k<sub>vs</sub> value 100, 160 and 250 m<sup>3</sup>/h from 80 % stroke is optimized for maximum volumetric flow

VVF53..K: Valve characteristic for k<sub>vs</sub> value 63 m<sup>3</sup>/h from 90 % stroke, k<sub>vs</sub> value 40, 100, 150 and 220 m<sup>3</sup>/h from 80 % stroke is optimized for maximum volumetric flow

<sup>4)</sup> Usable up to a max. medium temperature of 130 °C


DN = Nominal size


k<sub>vs</sub> = Flow nominal value of cold water (5...30 °C) through the fully opened valve (H<sub>100</sub>) at a differential pressure of 100 kPa (1 bar)

S<sub>v</sub> = Rangeability

Δp<sub>s</sub> = Maximum permissible differential pressure at which the motorized valve still closes securely against the pressure

Δp<sub>max</sub> = Maximum permissible differential pressure across the valve's throughport for the entire positioning range of the motorized valve

| Valves   | Actuators                  |             |  |                | SAX.. <sup>6)</sup> |                   | SKD.. <sup>2)</sup> |                   | SKB..           |                   | SKC..           |                   |
|--|----------------------------|-------------|--|----------------|---------------------|-------------------|---------------------|-------------------|-----------------|-------------------|-----------------|-------------------|
|  | Stroke                     |             |  |                | 20 mm               |                   | 20 mm               |                   |                 |                   | 40 mm           |                   |
|  | Positioning force          |             |  |                | 800 N               |                   | 1000 N              |                   | 2800 N          |                   | 2800 N          |                   |
| PN 25<br>PN 16 <sup>1)</sup>   | Data sheet                 |             |  |                | N4501               |                   | N4561               |                   | N4664           |                   | N4566           |                   |
|   | Stock no.                  | DN          | k <sub>vs</sub><br>[m <sup>3</sup> /h] | S <sub>v</sub> | Δp <sub>s</sub>     | Δp <sub>max</sub> | Δp <sub>s</sub>     | Δp <sub>max</sub> | Δp <sub>s</sub> | Δp <sub>max</sub> | Δp <sub>s</sub> | Δp <sub>max</sub> |
|  |                            |             |  |                | [kPa]               |                   |                     |                   |                 |                   |                 |                   |
| <b>Steam</b> <sup>4)</sup><br>Exclusive flow direction AB-A for steam. Also useful for maximum close-off pressure Δp <sub>s</sub> and maximum differential pressure in operation (Δp <sub>max</sub> ) with fluids. Use with electro-hydraulic actuators only | VVF53.15-0.16              | S55208-V100 | 15                                     | 0.16           | > 50                |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.15-0.2               | S55208-V101 | 15                                     | 0.2            |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.15-0.25              | S55208-V102 | 15                                     | 0.25           |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.15-0.32              | S55208-V103 | 15                                     | 0.32           |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.15-0.4               | S55208-V104 | 15                                     | 0.4            |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.15-0.5               | S55208-V105 | 15                                     | 0.5            |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.15-0.63              | S55208-V106 | 15                                     | 0.63           |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.15-0.8               | S55208-V107 | 15                                     | 0.8            |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.15-1                 | S55208-V108 | 15                                     | 1              |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.15-1.25              | S55208-V109 | 15                                     | 1.25           |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.15-1.6               | S55208-V110 | 15                                     | 1.6            |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.15-2                 | S55208-V111 | 15                                     | 2              |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.15-2.5               | S55208-V112 | 15                                     | 2.5            |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.15-3.2               | S55208-V113 | 15                                     | 3.2            |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.15-4 <sup>5)</sup>   | S55208-V114 | 15                                     | 3.6            |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.20-6.3 <sup>5)</sup> | S55208-V116 | 20                                     | 5              |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.25-5                 | S55208-V117 | 25                                     | 5              |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.25-6.3               | S55208-V118 | 25                                     | 6.3            |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.25-8                 | S55208-V119 | 25                                     | 8              |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.25-10 <sup>5)</sup>  | S55208-V120 | 25                                     | 8              |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.32-16 <sup>5)</sup>  | S55208-V122 | 32                                     | 15             |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.40-12.5              | S55208-V123 | 40                                     | 12.5           |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.40-16                | S55208-V124 | 40                                     | 16             |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.40-20                | S55208-V125 | 40                                     | 20             |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.40-25 <sup>5)</sup>  | S55208-V126 | 40                                     | 23             |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.50-31.5              | S55208-V127 | 50                                     | 31.5           |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.50-40                | S55208-V128 | 50                                     | 40             |                     |                   |                     |                   |                 |                   |                 |                   |
|  | VVF53.65-63                | S55208-V129 | 65                                     | 63             |                     |                   |                     |                   |                 |                   |                 |                   |
| VVF53.80-100   | S55208-V130                | 80          | 100                                    |                |                     |                   |                     |                   |                 |                   |                 |                   |
| VVF53.100-160 <sup>5)</sup>  | S55208-V131                | 100         | 150                                    |                |                     |                   |                     |                   |                 |                   |                 |                   |
| VVF53.125-250 <sup>5)</sup>  | S55208-V132                | 125         | 220                                    |                |                     |                   |                     |                   |                 |                   |                 |                   |
| VVF53.150-400 <sup>5)</sup>  | S55208-V133                | 150         | 360                                    |                |                     |                   |                     |                   |                 |                   |                 |                   |

| Valves  | Actuators                   |             |  |                | Δp <sub>max</sub> |      |     |      |     |      |     |      |   |
|---|-----------------------------|-------------|--|----------------|-------------------|------|-----|------|-----|------|-----|------|---|
|   | Stroke                      |             |  |                | [kPa]             |      |     |      |     |      |     |      |   |
|   | Positioning force           |             |  |                | A→B               | AB→A | A→B | AB→A | A→B | AB→A | A→B | AB→A |   |
| PN 25<br>PN 16 <sup>1)</sup>  | Data sheet                  |             |  |                |                   |      |     |      |     |      |     |      |   |
|  | Stock no.                   | DN          | k <sub>vs</sub><br>[m <sup>3</sup> /h] | S <sub>v</sub> |                   |      |     |      |     |      |     |      |   |
| <b>Fluids</b>   | VXF53.15-1.6                | S55208-V140 | 15                                     | 1.6            | > 100             | 1200 | 200 | 1200 | 200 | 1200 | 200 | -    | - |
|   | VXF53.15-2.5                | S55208-V141 | 15                                     | 2.5            |                   |      |     |      |     |      |     |      |   |
|   | VXF53.15-4                  | S55208-V142 | 15                                     | 4              |                   |      |     |      |     |      |     |      |   |
|   | VXF53.20-6.3                | S55208-V144 | 20                                     | 6.3            |                   |      |     |      |     |      |     |      |   |
|   | VXF53.25-6.3                | S55208-V145 | 25                                     | 6.3            |                   |      |     |      |     |      |     |      |   |
|   | VXF53.25-10                 | S55208-V146 | 25                                     | 10             |                   |      |     |      |     |      |     |      |   |
|   | VXF53.32-16                 | S55208-V148 | 32                                     | 16             |                   |      |     |      |     |      |     |      |   |
|   | VXF53.40-16                 | S55208-V149 | 40                                     | 16             |                   |      |     |      |     |      |     |      |   |
|   | VXF53.40-25                 | S55208-V150 | 40                                     | 25             |                   |      |     |      |     |      |     |      |   |
|   | VXF53.50-40                 | S55208-V152 | 50                                     | 40             |                   |      |     |      |     |      |     |      |   |
|   | VXF53.65-63 <sup>3)</sup>   | S55208-V153 | 65                                     | 63             |                   |      |     |      |     |      |     |      |   |
|   | VXF53.80-100 <sup>3)</sup>  | S55208-V154 | 80                                     | 100            |                   |      |     |      |     |      |     |      |   |
|   | VXF53.100-160 <sup>3)</sup> | S55208-V155 | 100                                    | 160            |                   |      |     |      |     |      |     |      |   |
|   | VXF53.125-250 <sup>3)</sup> | S55208-V156 | 125                                    | 250            |                   |      |     |      |     |      |     |      |   |
|   | VXF53.150-400               | S55208-V157 | 150                                    | 400            |                   |      |     |      |     |      |     |      |   |

- 1) DN 15...50: Flange dimensions for PN 16 and PN 25  
DN 65...150: Flange dimensions only for PN 25
- 2) Usable up to a max. medium temperature of 150 °C
- 3) Valve characteristic for k<sub>vs</sub> value 63 m<sup>3</sup>/h from 90 % stroke, k<sub>vs</sub> value 100, 160 and 250 m<sup>3</sup>/h from 80 % stroke is optimized for maximum volumetric flow
- 4) Operate with opposite flow direction with steam
- 5) Reduced k<sub>vs</sub> value
- 6) Usable up to a max. medium temperature of 130 °C

**Note**

When using a stem heating element with a medium temperature of below  $-5\text{ }^{\circ}\text{C}$ , the stem sealing gland must be replaced. In this case, the sealing gland must be ordered separately (Stock number: 4 284 8806 0).

**Ordering****Example**

| Product number | Stock number | Description                     |
|----------------|--------------|---------------------------------|
| VXF53.25-6.3   | S55208-V145  | 3-port valve with flange, PN 25 |
| SAX31.03       | S55150-A106  | Electro-hydraulic actuator      |

**Delivery**

Valves, actuators and accessories are packed and delivered as separate items.

**Note**

Counter-flanges, bolts and gaskets must be provided on site.

**Spare parts, Rev.-Nr.**

See page 15

**Equipment combinations**

| Product number | Description      | Stroke  | Positioning force | Operating voltage | Positioning signal                  | Spring return time | Positioning time                    | LED   | Manual adjuster                 | Auxiliary functions |                              |    |
|----------------|------------------|---------|-------------------|-------------------|-------------------------------------|--------------------|-------------------------------------|-------|---------------------------------|---------------------|------------------------------|----|
| SAX31.00       | S55150-A105      | 20 mm   | 800 N             | AC 230 V          | 3-position                          | -                  | 120 s                               | -     | Push and fix                    | 1)                  |                              |    |
| SAX31.03       | S55150-A106      |         |                   |                   |                                     |                    | 30 s                                |       |                                 |                     |                              |    |
| SAX61.03       | S55150-A100      |         |                   | AC/DC 24 V        | 3-position                          | -                  | 0...10 V<br>4...20 mA<br>0...1000 Ω | 120 s | -                               | Push and fix        | 1)                           |    |
| SAX61.03U      | S55150-A100-A100 |         |                   |                   |                                     |                    |                                     | 30 s  |                                 |                     |                              |    |
| SAX81.00       | S55150-A102      |         |                   |                   |                                     |                    |                                     | 120 s |                                 |                     |                              |    |
| SAX81.03       | S55150-A103      |         |                   |                   |                                     |                    |                                     | 30 s  |                                 |                     |                              |    |
| SAX81.03U      | S55150-A103-A100 |         |                   |                   |                                     |                    |                                     |       |                                 |                     |                              |    |
| SKD32.21       | SKD32.21         | 20 mm   | 1000 N            | AC 230 V          | 3-position                          | 8 s                | Opening: 30 s<br>Closing: 10 s      | -     |                                 | 1)                  |                              |    |
| SKD32.50       | SKD32.50         |         |                   |                   |                                     | -                  | 120 s                               |       |                                 |                     |                              |    |
| SKD32.51       | SKD32.51         |         |                   |                   |                                     | 8 s                |                                     |       |                                 |                     |                              |    |
| SKD60          | SKD60            |         |                   | AC 24 V           | 3-position                          | -                  | 0...10 V<br>4...20 mA<br>0...1000 Ω | 15 s  | Opening: 30 s<br>Closing: 15 s  | ✓                   | Turn, Position is maintained | 2) |
| SKD62          | SKD62            |         |                   |                   |                                     |                    |                                     | -     | 120 s                           |                     |                              |    |
| SKD62U         | SKD62U           |         |                   |                   |                                     |                    |                                     |       |                                 |                     |                              |    |
| SKD62UA        | SKD62UA          |         |                   |                   |                                     |                    |                                     | 8 s   |                                 |                     |                              |    |
| SKD82.50       | SKD82.50         |         |                   | 20 mm             | 2800 N                              | AC 230 V           | 3-position                          | -     | Opening: 120 s<br>Closing: 10 s | -                   |                              | 1) |
| SKD82.50U      | SKD82.50U        |         |                   |                   |                                     |                    |                                     | 10 s  |                                 |                     |                              |    |
| SKD82.51       | SKD82.51         |         |                   |                   |                                     |                    |                                     | 10 s  |                                 |                     |                              |    |
| SKD82.51U      | SKD82.51U        | 10 s    |                   |                   |                                     |                    |                                     |       |                                 |                     |                              |    |
| SKB32.50       | SKB32.50         | 20 mm   | 2800 N            |                   |                                     | AC 24 V            | 3-position                          | -     | 120 s                           | -                   |                              | 1) |
| SKB32.51       | SKB32.51         |         |                   |                   |                                     |                    |                                     | 10 s  |                                 |                     |                              |    |
| SKB60          | SKB60            |         |                   | 10 s              |                                     |                    |                                     |       |                                 |                     |                              |    |
| SKB62          | SKB62            |         |                   | -                 | 120 s                               |                    |                                     |       |                                 |                     |                              |    |
| SKB62U         | SKB62U           |         |                   |                   |                                     | 10 s               |                                     |       |                                 |                     |                              |    |
| SKB62UA        | SKB62UA          |         |                   |                   |                                     | 10 s               |                                     |       |                                 |                     |                              |    |
| SKB82.50       | SKB82.50         | 40 mm   | 2800 N            | AC 230 V          | 3-position                          | -                  | Opening: 120 s<br>Closing: 20 s     | -     |                                 | 1)                  |                              |    |
| SKB82.50U      | SKB82.50U        |         |                   |                   |                                     | 18 s               |                                     |       |                                 |                     |                              |    |
| SKB82.51       | SKB82.51         |         |                   |                   |                                     | 20 s               |                                     |       |                                 |                     |                              |    |
| SKB82.51U      | SKB82.51U        |         |                   | 20 s              |                                     |                    |                                     |       |                                 |                     |                              |    |
| SKC32.60       | SKC32.60         |         |                   | 40 mm             | 2800 N                              | AC 24 V            | 3-position                          | -     | 120 s                           | -                   |                              | 1) |
| SKC32.61       | SKC32.61         |         |                   |                   |                                     |                    |                                     | 18 s  |                                 |                     |                              |    |
| SKC60          | SKC60            | 20 s    |                   |                   |                                     |                    |                                     |       |                                 |                     |                              |    |
| SKC62          | SKC62            | -       | 120 s             |                   |                                     |                    |                                     |       |                                 |                     |                              |    |
| SKC62U         | SKC62U           |         |                   |                   |                                     | 20 s               |                                     |       |                                 |                     |                              |    |
| SKC62UA        | SKC62UA          |         |                   |                   |                                     | 20 s               |                                     |       |                                 |                     |                              |    |
| SKC82.60       | SKC82.60         | AC 24 V | 3-position        | -                 | 0...10 V<br>4...20 mA<br>0...1000 Ω | 20 s               | Opening: 120 s<br>Closing: 20 s     | ✓     | Turn, Position is maintained    | 2)                  |                              |    |
| SKC82.60U      | SKC82.60U        |         |                   |                   |                                     | 20 s               |                                     |       |                                 |                     |                              |    |
| SKC82.61       | SKC82.61         |         |                   |                   |                                     | 18 s               |                                     |       |                                 |                     |                              |    |
| SKC82.61U      | SKC82.61U        | 18 s    |                   |                   |                                     |                    |                                     |       |                                 |                     |                              |    |

1) Auxiliary switch, potentiometer

2) Position feedback, forced control, selection of valve characteristic

3) Optional: Sequence control, selection of acting direction

4) Plus sequence control, stroke limitation, and selection of acting direction





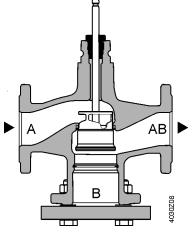
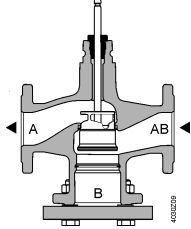
**Product documentation**

- Mounting Instructions M4030 74 319 0749 0
- Basic documentation P4030 Contains background information and technical basic knowledge of valves

**Technical and mechanical design**



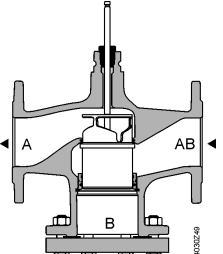
The illustrations below show the basic design of the valves. Constructional features, such as the shape of plugs, may differ.

**2-port valves**

|  |   |
|--|---|
|  <b>Fluids</b>  |  <b>Steam ( Fluids possible )</b>                                      |
|  Closing against the pressure                           |  Closing with the pressure   |
|  <p><b>A → AB</b></p> <p>For use with all actuators</p> |  <p><b>A ← AB</b></p> <p>Use with electro-hydraulic actuators only</p> |

**2-port valves pressure compensated**

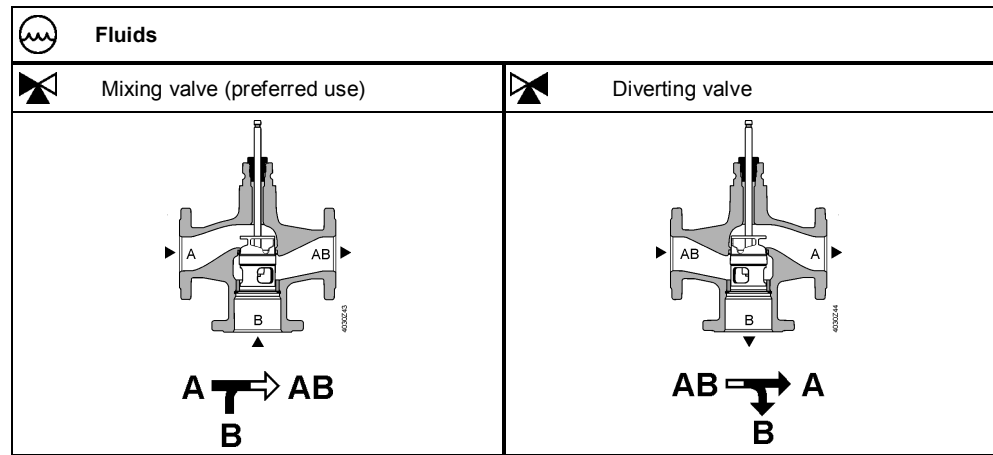
The VVF53..K valves use a pressure-compensated plug. This enables the same type of actuators to be used for the control of volumetric flow at higher differential pressures.

|   |
|---|
|  <b>Fluids and Steam</b>   |
|  Closing with the pressure   |
|  <p><b>A ← AB</b></p> <p>Use with electro-hydraulic actuators only</p> |



Note


**2-port valves do not become 3-port valves by removing the blank flange!**

### 3-port valves



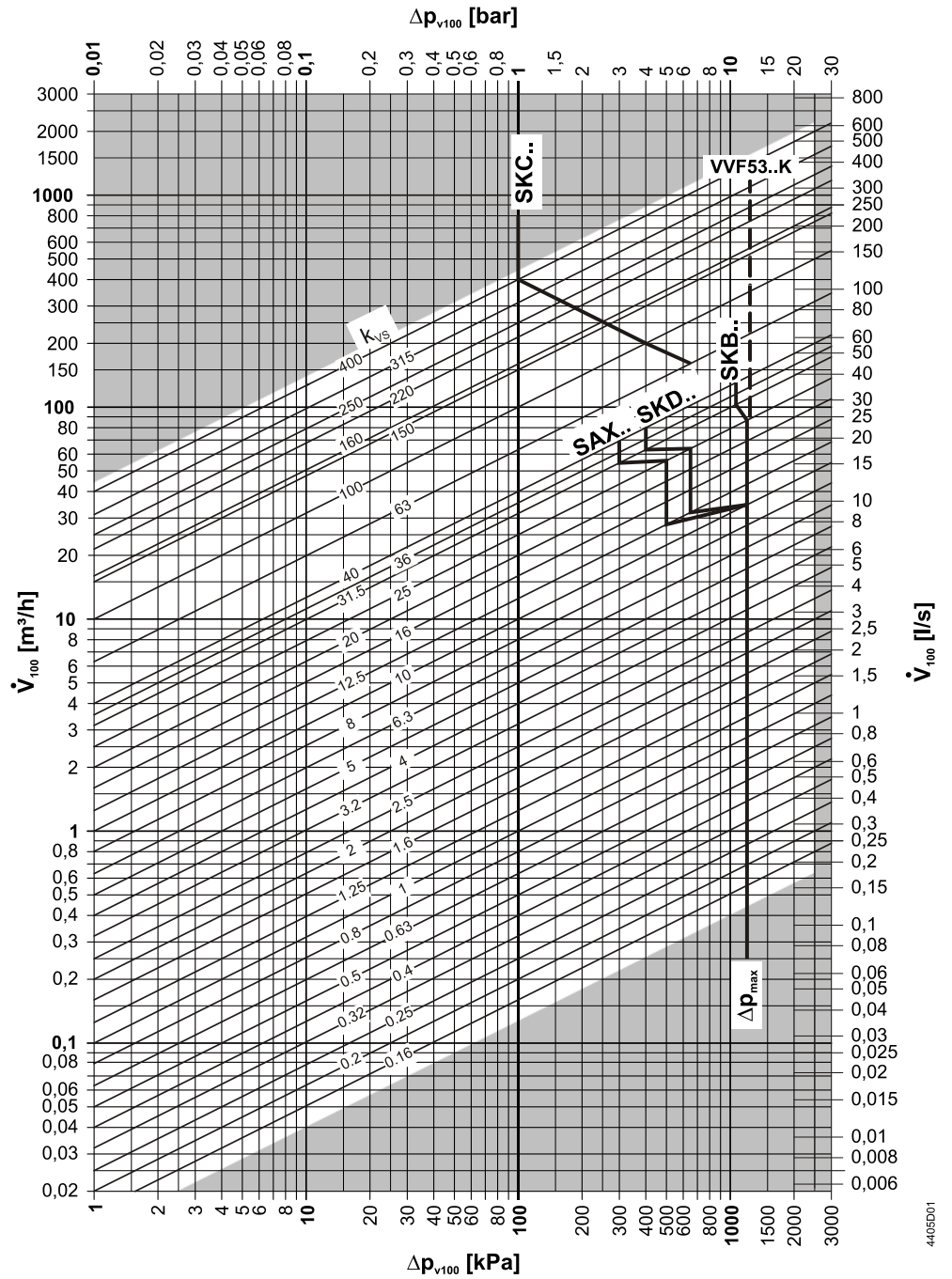
### Accessories

| Product number | Stock number | Description          | Note  |  |
|----------------|--------------|----------------------|---|--|
| ASZ6.6         | S55845-Z108  | Stem heating element | Required for medium temperatures < 0 °C   |   |
| -              | 428488060    | Stem sealing gland   | When using valves of the V..F53.. lines with a stem heating element and a medium temperature below -5 °C, the stem sealing gland must be replaced. With the gland 428488060 the valve can be used with water, water with antifreeze and brines between -20 °C and 150 °C. |  |

| Adapter type | Stock number | Bolts included | Description  | VXF41.. |   |
|--------------|--------------|----------------|--|---------|---|
| ALF41B15     | S55845-Z110  | 4x M12x90mm    | Adapter for replacing 3-port valves VXF41.. by VXF53.. <ul style="list-style-type: none"> <li>• Due to different dimensions of the bypass flange</li> <li>• Every valve to be replaced requires an adapter</li> <li>• Adapter is supplied with the required number and size of bolts and nuts as well as two suitable flat sealings</li> </ul> Replace 3-port valves VXF41.., DN 65...150 by 3-port valves VXF43.. (data sheet N4404). | DN 15   |  |
| ALF41B25     | S55845-Z111  | 4x M12x90mm    |  | DN 25   |   |
| ALF41B40     | S55845-Z112  | 4x M16x90mm    |  | DN 40   |   |
| ALF41B50     | S55845-Z113  | 4x M16x90mm    |  | DN 50   |   |

# Sizing

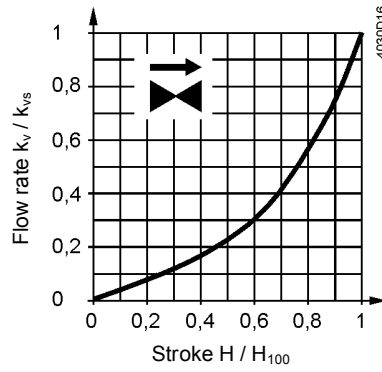
## Flow chart



$\Delta p_{max}$  values apply for the mixing function.  $\Delta p_{max}$  values for the diverting function see table "Type summary", page 2

$\Delta p_{max}$  values for  $k_{vs}$  value 16, DN 32, see table "Type summary", page 2

**Valve characteristics**  
**2-port valves**

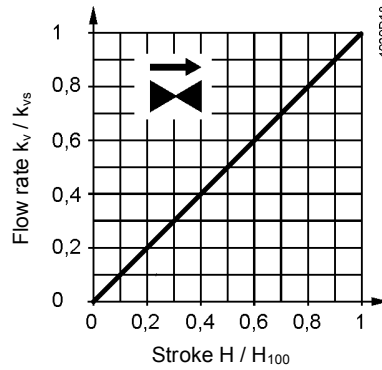


0...30 %: Linear  
30...100 %: Equal percentage  
 $n_{gl} = 3$  to VDI / VDE 2173

For high  $k_{vs}$  values the valve characteristic is optimized for maximum volumetric flow  $k_{V100}$ .

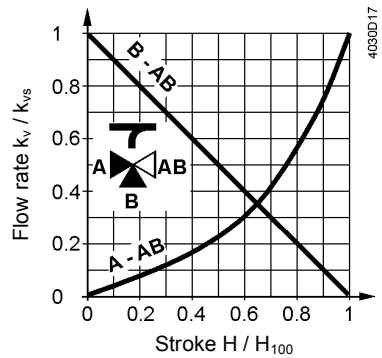
For product lines:

- VVF53.125-200
- VVF53.125-250
- VVF53.125-220K
- VVF53.150-315
- VVF53.150-400
- VVF53.150-315K



0...100 %: Linear

**3-port valves**



**Throughport A-AB**

0...30 %: Linear  
30...100 %: Equal percentage  
 $n_{gl} = 3$  to VDI / VDE 2173

For high  $k_{vs}$  values the valve characteristic is optimized for maximum volumetric flow  $k_{V100}$ .

**Bypass B-AB**

0...100 %: Linear

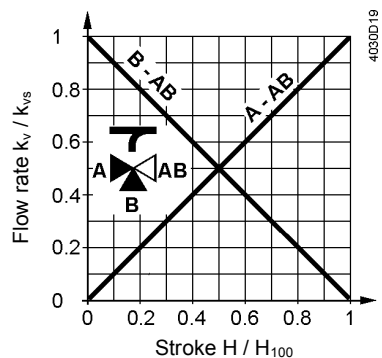
- Port AB = constant volumetric flow
- Port A = variable volumetric flow
- Port B = Bypass (variable volumetric flow)

**Mixing:** Volumetric flow from port A and port B to port AB

**Diverting:** Volumetric flow from port AB to port A and port B

For product lines:

- VXF53.125-250
- VXF53.150-400



**Throughport A-AB**

0...100 %: Linear

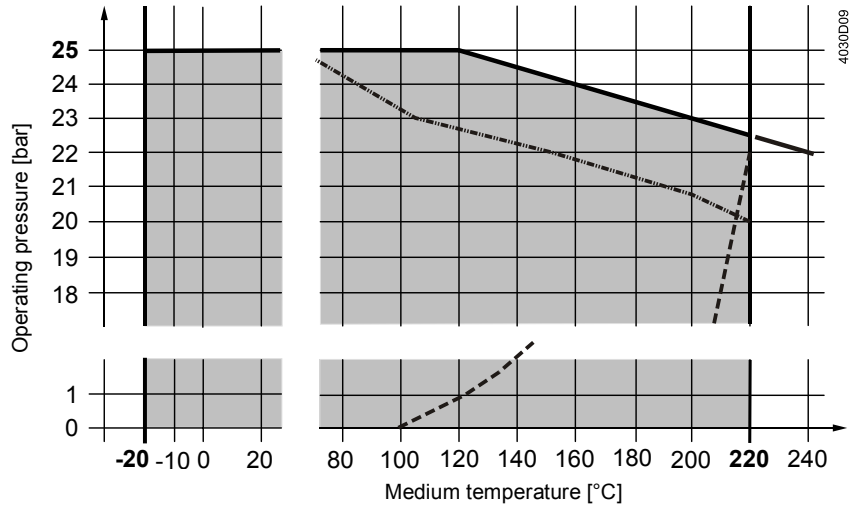
**Bypass B-AB**

0...100 %: Linear



**Operating pressure and medium temperature**

**Fluids**  
with V..F53..



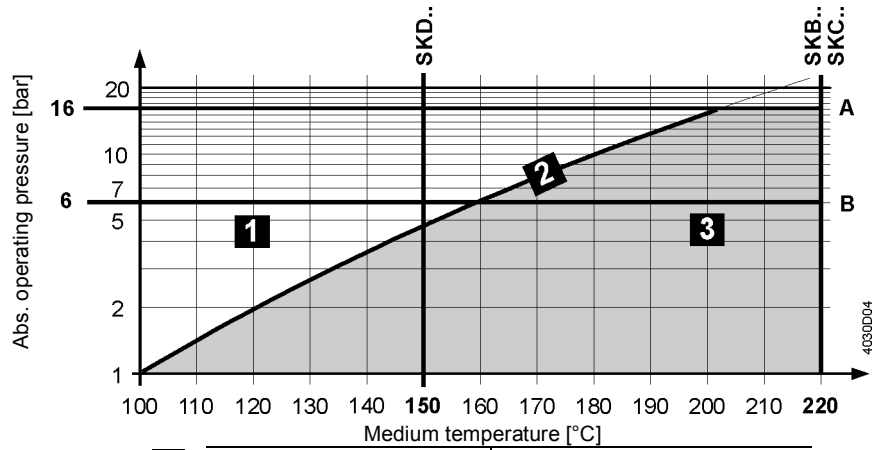
- Curve for saturated steam; steam forms below this line
- - - Operating pressure according to EN 1092, valid for 2-port valves with blank flange

**Operating pressure and operating temperatures according to ISO 7005, EN 1092 and EN 12284**

Notes

All relevant local directives must be observed

**Saturated steam**  
**Superheated steam**  
with VVF53..



|          |                                      |                             |
|----------|--------------------------------------|-----------------------------|
| <b>1</b> | Water                                | -                           |
| <b>2</b> | Wet steam                            | To be avoided               |
| <b>3</b> | Saturated steam<br>Superheated steam | Permissible operating range |
| A        | Subcritical pressure ratio           |                             |
| B        | Supercritical pressure ratio         |                             |

**Medium compatibility and temperature ranges**

| Medium  | Temperature range     |                       | Valve   |                 |         | Note   |
|---|-----------------------|-----------------------|---------|-----------------|---------|--|
|   | T <sub>min</sub> [°C] | T <sub>max</sub> [°C] | VVF53.. | VVF53..K        | VXF53.. |  |
| Cold water                                      | 1                     | 25                    | ■       | ■               | ■       | -  |
| Low-temperature hot water                       | 1                     | 130                   | ■       | ■               | ■       | -  |
| High-temperature hot water <sup>1)</sup>        | 130                   | 150                   | ■       | ■               | ■       | -  |
|   | 150                   | 180                   | ■       | ■               | ■       | -  |
|   | 180                   | 220                   | ■       | ■               | ■       | -  |
| Water with antifreeze                           | -5                    | 150                   | ■       | ■               | ■       | V..F53: With a medium temperature of below -5 °C, the stem sealing gland must be replaced by the gland 428488060 |
|   | -10                   | 150                   | ■       | - <sup>4)</sup> | ■       |  |
|   | -20                   | 150                   | ■       | - <sup>4)</sup> | ■       |  |
| Cooling water <sup>2)</sup>                     | 1                     | 25                    | ■       | ■               | ■       | -  |
| Brines  | -5                    | 150                   | ■       | ■               | ■       | V..F53: With a medium temperature of below -5 °C, the stem sealing gland must be replaced by the gland 428488060 |
|   | -10                   | 150                   | ■       | - <sup>4)</sup> | ■       |  |
|   | -20                   | 150                   | ■       | - <sup>4)</sup> | ■       |  |
| Saturated steam <sup>3)</sup>                   | 100                   | 150                   | ■       | ■               | -       | -  |
|   | 100                   | 220                   | ■       | ■               | -       | -  |
| Superheated steam                               | 120                   | 150                   | ■       | ■               | -       | -  |
|   | 120                   | 220                   | ■       | ■               | -       | -  |
| Heat transfer oils                              | 20                    | 220                   | ■       | ■               | ■       | On the basis of mineral oil  |
| Super-clean water (demineralized and deionized) | 1                     | 150                   | -       | -               | -       |  |

<sup>1)</sup> Differentiation due to saturated steam curve

<sup>2)</sup> Open circuits

<sup>3)</sup> Operate with inverted flow direction with steam

<sup>4)</sup> VVF53..K can't be used with media below -5 °C due to the compensation sealing material

**Fields of use**

| Fields of use       |                              | Valve   |         |
|---------------------|------------------------------|---------|---------|
|                     |                              | VVF53.. | VXF53.. |
| <b>Generation</b>   | Boiler plants                | ■       | ■       |
|                     | District heating plants      | ■       | -       |
|                     | Refrigeration plants         | ■       | ■       |
|                     | Cooling towers <sup>1)</sup> | ■       | ■       |
| <b>Distribution</b> | Heating groups               | ■       | ■       |
|                     | Air handling units           | ■       | ■       |

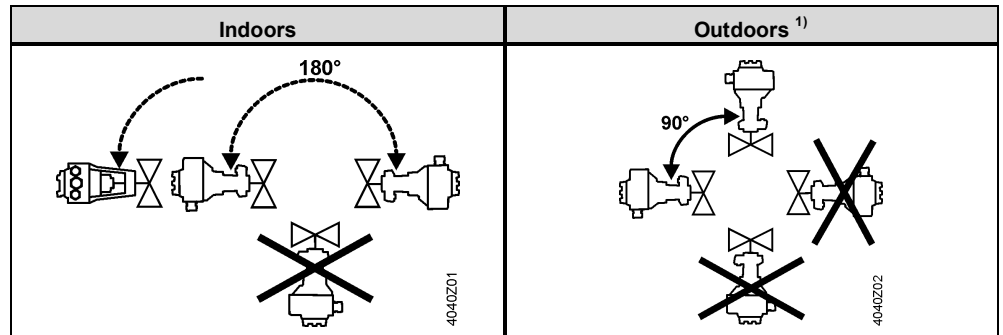
<sup>1)</sup> Open circuits

**Engineering notes**

- Mounting location** Preferably mount the valves at the return, as the temperature is lower there and the strain on the stem sealing gland is lower.
- Operate valves of the product lines VVF53.. with inverted flow direction for steam.
- Dirt trap** Mount a dirt filter or dirt trap before the valve to ensure proper functioning, and a long service life of the valve.
- Remove dirt, welding beads, etc. from the valves and pipes.
- Cavitation** Cavitation can be avoided by limiting the pressure differential across the valve depending on the medium temperature and the prepressure.

## Mounting notes

Mounting position



<sup>1)</sup> Only in combination with weather shield ASK39.1 and actuators SAX..

Mounting positions apply to both 2- and 3-port valves.

## Commissioning notes



**The valve may be put into operation only if actuator and valve are correctly assembled.**

Note

Ensure that actuator stem and valve stem are rigidly connected in all positions.

Function check

| Valve               | Throughport A→AB | Bypass B→AB |
|---------------------|------------------|-------------|
| Valve stem extends  | Closes           | Opens       |
| Valve stem retracts | Opens            | Closes      |

## Maintenance notes

The valves are maintenance-free.



When servicing valves or actuators:

- Deactivate the pump and turn off the power supply
- Close the shutoff valves
- Fully reduce the pressure in the piping system and allow pipes to completely cool down

If necessary, disconnect the electrical wires.

Due to the different types of material used, the valve must be disassembled prior to disposal. Special handling of certain valve components may be required by law or may be sensible from an ecological point of view.

**Local and currently valid legislation must be observed.**

Disposal



## Warranty

Application-related technical data are guaranteed only when the valves are used in connection with the Siemens actuators listed under "Equipment combinations", page 3.

When used with actuators of other manufacture, any warranty by Siemens becomes void.

## Technical Data

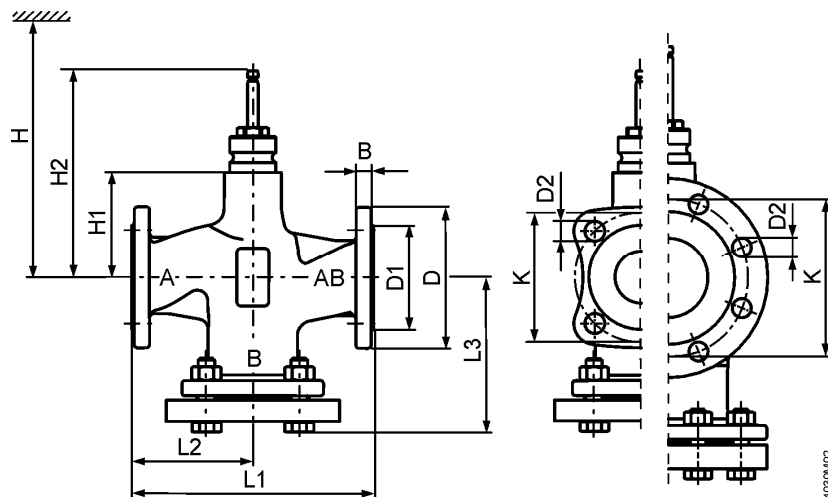
|                  |  |  |   |
|------------------|--|--|---|
| Functional data  | PN class   | PN 25  |   |
|                  | Connection   | Flange   |   |
|                  | Operating pressure   | See Section "Operating pressure and medium temperature" page 9   |   |
|                  | Valve characteristics <sup>1)</sup>  | See section "Valve characteristics", page 8                      |   |
|                  | Leakage rate   | Throughport  | 0...0.01 % of $k_{vs}$ value (Class IV)   |
|                  |  | Bypass   | 0.5...2 % of $k_{vs}$ value with SKD..., SKB..., SKC..<br>0.05 % of $k_{vs}$ value with SAX.. |
|                  | Permissible media  | See table "Medium compatibility and temperature ranges", page 10 |   |
|                  | Medium temperature   |  | -20...220 °C <sup>2)</sup>  |
|                  |  |  | VVF53..K: 1...220 °C  |
|                  | Rangeability   |  | DN 15, $k_{vs} \leq 1.25 \text{ m}^3/\text{h}$ : >50  |
|                  |  | DN 15...150: >100  |   |
| Nominal stroke   |  | Up to DN 50: 20 mm<br>From DN 65: 40 mm                          |   |
| Materials        | Valve body   | EN-GJS-400-18-LT   |   |
|                  | Blank flange   | VVF.. P265GH   |   |
|                  | Valve stem, seat, plug   | Stainless steel  |   |
|                  | Stem sealing gland   |  | Stainless steel   |
|                  |  |  | FEPM (silicone-free)  |
|                  | Compensation sealing   |  | Stainless steel   |
|                  |  |  | FEPM (silicone-free)  |
| Adapter ALF41B.. | Steel S235JRG2   |  |   |
| Standards        | Pressure Equipment Directive   | PED 97/23/EC   |   |
|                  | Pressure-carrying accessories  | According to article 1, section 2.1.4                            |   |
|                  | Fluid group 2  | PN 25  |   |
|                  | without CE certification according to article 3, section 3 (good engineering practice) | $\leq \text{DN } 40$   |   |
|                  | Category I, with CE certification  | DN 50...100  |   |
|                  | Category II, with CE certification, notified body identification number 0036           | DN 125...150   |   |
|                  | PN class   | ISO 7268   |   |
|                  | Operating pressure   | ISO 7005, DIN EN 12284   |   |
|                  | Flanges  | ISO 7005   |   |
|                  | Length of flanged valves   | DIN EN 558-1, line 1   |   |
|                  | Valve characteristic   | VDI 2173   |   |
|                  | Leakage rate   | Throughport, Bypass according to EN 60534-4 / EN 1349            |   |
|                  | Water treatment  | VDI 2035   |   |

|                             |   |                           |
|-----------------------------|---|---------------------------|
| Environmental conditions    |   |                           |
| Storage: IEC 60721-3-1      | Class   | 1K3                       |
|                             | Temperature   | -15...55 °C               |
|                             | Rel. humidity   | 5...95 % r.h.             |
| Transport: IEC 60721-3-2    | Class   | 2K3, 2M2                  |
|                             | Temperature   | -30...65 °C               |
|                             | Rel. humidity   | < 95 % r.H.               |
| Operation: IEC 60721-3-3    | Class   | 3K5, 3Z11                 |
|                             | Temperature   | -15...55 °C               |
|                             | Rel. humidity   | 5...95 % r.h.             |
| Environmental compatibility | ISO 14001 (environment)<br>ISO 9001 (quality)<br>SN 36350 (environmentally compatible products)<br>RL 2002/95/EG (RoHS) |                           |
| Dimensions / Weight         | Dimensions  | See „Dimensions“, page 14 |
|                             | Weight  | See „Dimensions“, page 14 |

- <sup>1)</sup> For certain valve lines and high  $k_{vs}$  values, the valve characteristic is optimized for maximum volumetric flow  $k_{V100}$
- <sup>2)</sup> For medium temperatures < -5 °C, the stem sealing gland must be replaced. The sealing gland must be ordered separately (Stock number: 4 284 8806 0).

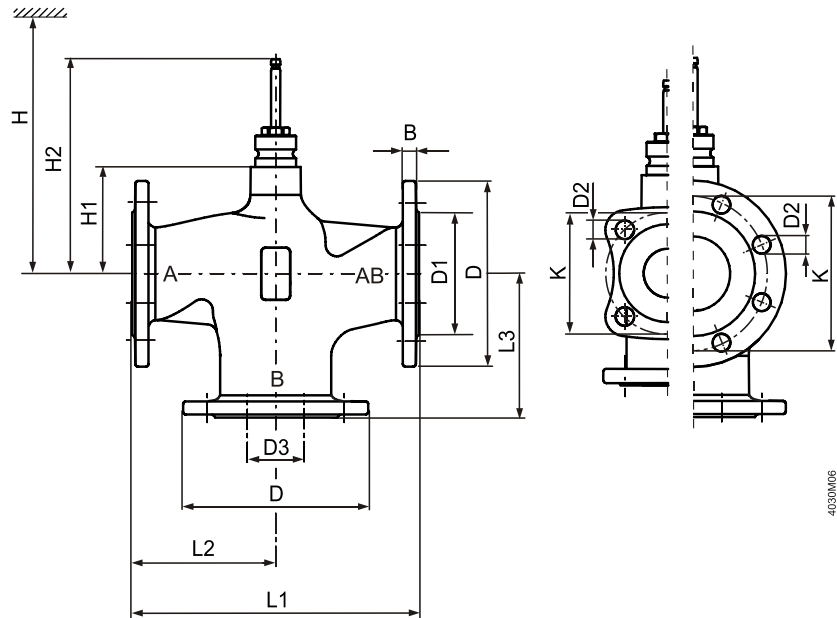
## Dimensions

VVF53..



| Product number | DN   | kg   | B   | Ø D | Ø D1    | Ø D2    | L1  | L2  | L3    | Ø K   | H1  | H2    | H     |       |       |       |
|----------------|------|------|-----|-----|---------|---------|-----|-----|-------|-------|-----|-------|-------|-------|-------|-------|
|                |      |      |     |     |         |         |     |     |       |       |     |       | SAX.. | SKD.. | SKB.. | SKC.. |
| VVF53..        | 15   | 4.2  | 14  | 95  | 46      | 14 (4x) | 130 | 65  | 87.5  | 65    | 63  | 159.5 | 505   | 563   | 638   | -     |
|                | 20   | 5.3  | 16  | 105 | 56      | 14 (4x) | 150 | 75  | 99.5  | 75    | 63  | 144.4 | 505   | 563   | 638   | -     |
|                | 25   | 6.1  | 15  | 115 | 65      | 14 (4x) | 160 | 80  | 104.5 | 85    | 63  | 159.5 | 505   | 563   | 638   | -     |
|                | 32   | 8.7  | 17  | 140 | 76      | 19 (4x) | 180 | 90  | 119   | 100   | 60  | 156.5 | 502   | 560   | 635   | -     |
|                | 40   | 10.1 | 16  | 150 | 84      | 19 (4x) | 200 | 100 | 129   | 110   | 60  | 156.5 | 502   | 560   | 635   | -     |
|                | 50   | 13.5 | 16  | 165 | 99      | 19 (4x) | 230 | 115 | 146   | 125   | 100 | 196.5 | 542   | 600   | 675   | -     |
|                | 65   | 22.2 | 17  | 185 | 118     | 19 (8x) | 290 | 145 | 178   | 145   | 115 | 231.5 | -     | -     | -     | 690   |
|                | 80   | 27.7 | 17  | 200 | 132     | 19 (8x) | 310 | 155 | 190   | 160   | 115 | 231.5 | -     | -     | -     | 690   |
|                | 100  | 38.6 | 17  | 235 | 156     | 23 (8x) | 350 | 175 | 212.5 | 190   | 146 | 262.5 | -     | -     | -     | 721   |
|                | 125  | 54.4 | 17  | 270 | 184     | 28 (8x) | 400 | 200 | 242   | 220   | 159 | 275.5 | -     | -     | -     | 734   |
| 150            | 74.3 | 17   | 297 | 211 | 28 (8x) | 480     | 240 | 284 | 250   | 186.5 | 303 | -     | -     | -     | 762   |       |
| VVF53..K       | 50   | 13.6 | 16  | 165 | 99      | 19 (4x) | 230 | 115 | 146   | 125   | 100 | 196.5 | 542   | 600   | 675   | -     |
|                | 65   | 22.3 | 17  | 185 | 118     | 19 (8x) | 290 | 145 | 178   | 145   | 115 | 231.5 | -     | -     | -     | 690   |
|                | 80   | 27.9 | 17  | 200 | 132     | 19 (8x) | 310 | 155 | 190   | 160   | 115 | 231.5 | -     | -     | -     | 690   |
|                | 100  | 39.0 | 17  | 235 | 156     | 23 (8x) | 350 | 175 | 212.5 | 190   | 146 | 262.5 | -     | -     | -     | 721   |
|                | 125  | 57.5 | 17  | 270 | 184     | 28 (8x) | 400 | 200 | 242   | 220   | 159 | 275.5 | -     | -     | -     | 734   |
| 150            | 75.8 | 17   | 297 | 211 | 28 (8x) | 480     | 240 | 284 | 250   | 186.5 | 303 | -     | -     | -     | 762   |       |

VXF53..




4030M06

| Product number | DN  | kg   | B  | Ø D | Ø D1 | Ø D2    | Ø D3 | L1  | L2  | L3  | Ø K | H1    | H2    | H     |       |       |       |
|----------------|-----|------|----|-----|------|---------|------|-----|-----|-----|-----|-------|-------|-------|-------|-------|-------|
|                |     |      |    |     |      |         |      |     |     |     |     |       |       | SAX.. | SKD.. | SKB.. | SKC.. |
| VXF53..        | 15  | 3.2  | 14 | 95  | 46   | 14 (4x) | 25   | 130 | 65  | 65  | 65  | 63    | 159.5 | 505   | 563   | 638   | -     |
|                | 20  | 4.0  | 16 | 105 | 56   | 14 (4x) | 35   | 150 | 75  | 75  | 75  | 63    | 159.5 | 505   | 563   | 638   | -     |
|                | 25  | 4.6  | 15 | 115 | 65   | 14 (4x) | 38   | 160 | 80  | 80  | 85  | 63    | 159.5 | 505   | 563   | 638   | -     |
|                | 32  | 6.1  | 17 | 140 | 76   | 19 (4x) | 46   | 180 | 90  | 90  | 100 | 60    | 156.5 | 502   | 560   | 635   | -     |
|                | 40  | 7.2  | 16 | 150 | 84   | 19 (4x) | 57   | 200 | 100 | 100 | 110 | 60    | 156.5 | 502   | 560   | 635   | -     |
|                | 50  | 9.7  | 16 | 165 | 99   | 19 (4x) | 69   | 230 | 115 | 115 | 125 | 100   | 196.5 | 542   | 600   | 675   | -     |
|                | 65  | 16.6 | 17 | 185 | 118  | 19 (8x) | 86   | 290 | 145 | 145 | 145 | 115   | 231.5 | -     | -     | -     | 690   |
|                | 80  | 20.9 | 17 | 200 | 132  | 19 (8x) | 100  | 310 | 155 | 155 | 160 | 115   | 231.5 | -     | -     | -     | 690   |
|                | 100 | 28.5 | 17 | 235 | 156  | 23 (8x) | 123  | 350 | 175 | 175 | 190 | 146   | 262.5 | -     | -     | -     | 721   |
|                | 125 | 42.2 | 17 | 270 | 184  | 28 (8x) | 149  | 400 | 200 | 200 | 220 | 159   | 275.5 | -     | -     | -     | 734   |
|                | 150 | 55.9 | 17 | 297 | 211  | 28 (8x) | 174  | 480 | 240 | 240 | 250 | 186.5 | 303   | -     | -     | -     | 762   |

Spare parts

Stem sealing gland

| Product number     | DN          | Stock number  | Comments   |   |
|--------------------|-------------|---------------|--|---|
| VVF53..<br>VXF53.. | DN 15...150 | 74 284 0061 0 | Standard version with FEPM-O-ring for medium temperatures between -5 °C and 220 °C.  |  |
|                    |             | 4 284 8806 0  | When operating with medium temperatures below -5 °C . With the gland 428488060 the valve can be used with water, water with antifreeze and brines between -20 °C and 150 °C. |   |

## Revision numbers

| Product number | Valid from rev. no. | Product number | Valid from rev. no. | Product number | Valid from rev. no. |
|----------------|---------------------|----------------|---------------------|----------------|---------------------|
| VVF53.15-0.16  | ..A                 | VVF53.50-40K   | ..B                 | VXF53.15-1.6   | ..A                 |
| VVF53.15-0.2   | ..A                 | VVF53.65-63K   | ..B                 | VXF53.15-2.5   | ..A                 |
| VVF53.15-0.25  | ..A                 | VVF53.80-100K  | ..B                 | VXF53.15-4     | ..A                 |
| VVF53.15-0.32  | ..A                 | VVF53.100-150K | ..B                 | VXF53.20-6.3   | ..A                 |
| VVF53.15-0.4   | ..A                 | VVF53.125-220K | ..B                 | VXF53.25-6.3   | ..A                 |
| VVF53.15-0.5   | ..A                 | VVF53.150-315K | ..B                 | VXF53.25-10    | ..A                 |
| VVF53.15-0.63  | ..A                 |                |                     | VXF53.32-16    | ..A                 |
| VVF53.15-0.8   | ..A                 |                |                     | VXF53.40-16    | ..A                 |
| VVF53.15-1     | ..A                 |                |                     | VXF53.40-25    | ..A                 |
| VVF53.15-1.25  | ..A                 |                |                     | VXF53.50-40    | ..A                 |
| VVF53.15-1.6   | ..A                 |                |                     | VXF53.65-63    | ..A                 |
| VVF53.15-2     | ..A                 |                |                     | VXF53.80-100   | ..A                 |
| VVF53.15-2.5   | ..A                 |                |                     | VXF53.100-160  | ..A                 |
| VVF53.15-3.2   | ..A                 |                |                     | VXF53.125-250  | ..A                 |
| VVF53.15-4     | ..A                 |                |                     | VXF53.150-400  | ..A                 |
| VVF53.20-6.3   | ..A                 |                |                     |                |                     |
| VVF53.25-5     | ..A                 |                |                     |                |                     |
| VVF53.25-6.3   | ..A                 |                |                     |                |                     |
| VVF53.25-8     | ..A                 |                |                     |                |                     |
| VVF53.25-10    | ..A                 |                |                     |                |                     |
| VVF53.32-16    | ..A                 |                |                     |                |                     |
| VVF53.40-12.5  | ..A                 |                |                     |                |                     |
| VVF53.40-16    | ..A                 |                |                     |                |                     |
| VVF53.40-20    | ..A                 |                |                     |                |                     |
| VVF53.40-25    | ..A                 |                |                     |                |                     |
| VVF53.50-31.5  | ..A                 |                |                     |                |                     |
| VVF53.50-40    | ..A                 |                |                     |                |                     |
| VVF53.65-63    | ..C                 |                |                     |                |                     |
| VVF53.80-100   | ..C                 |                |                     |                |                     |
| VVF53.100-160  | ..C                 |                |                     |                |                     |
| VVF53.125-250  | ..C                 |                |                     |                |                     |
| VVF53.150-400  | ..C                 |                |                     |                |                     |

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