FLOWSERVE

# TECHNICAL BULLETIN

## *Valtek SelfAct*

*Pressure Reducing Valve*

*Type 5801*

*DN 15 - 200, PN 10 - 40*

*FCD VLEETB5801A4 02/21*

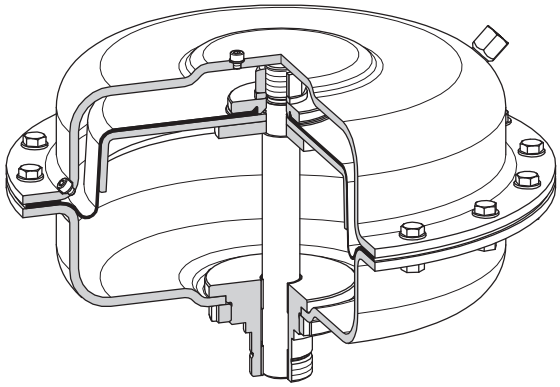

*Experience In Motion*

# 5801 SelfAct - Pressure Reducing Valve

## Application

Self-actuating Pressure Reducing Valves are used to provide a constant pressure **downstream** of its built-in position. Suitable for steam, non inflammable vapors and gases and neutral liquids.

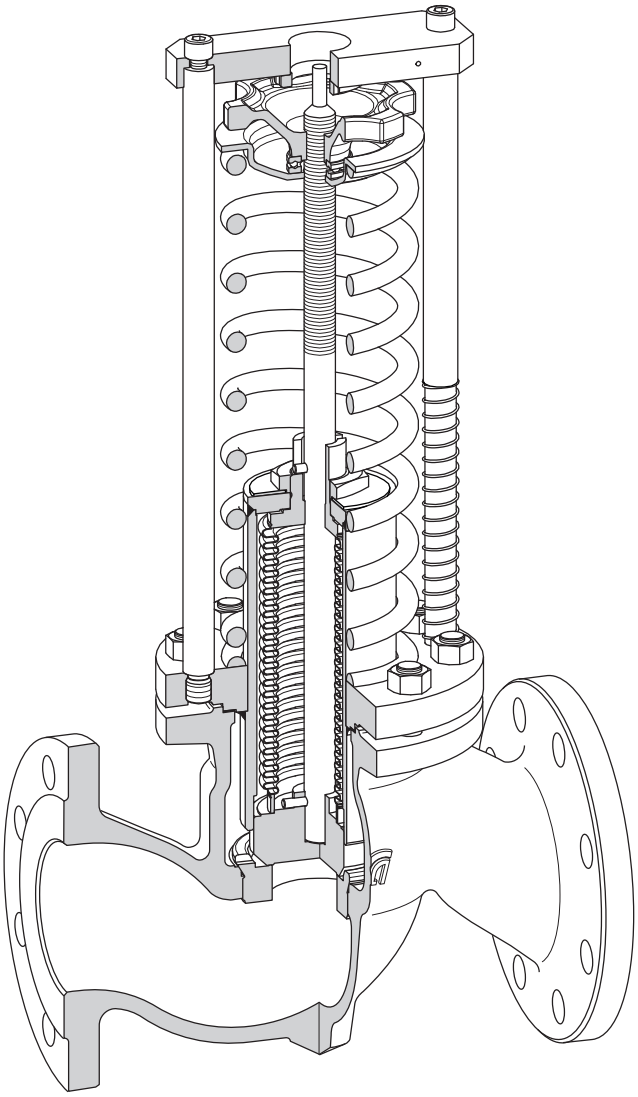
Attention - the shut-off function is not part of the intended use of a pressure reducing valve, use an additional shut-off valve for such an application.



## Product features

**Body shape gives optimum flow characteristic**

- Excellent flow dynamics when correctly selected
- Heavy top guided plug
- Largest possible kvs-values
- High degree of accuracy in the outlet pressure by carefully selected springs



**Long service life and operational reliability**

- Maintenance free
- Strong guide, giving minimum vibration and wear
- The valve stem is sealed by a CrNi-steel bellows which is also used to pressure balance the valve

**Replaceable trim**

- Simple maintenance as the valve body remains in the piping when trim is replaced
- Screwed seat

**Wide range of application**

- Up to 6 adjustment ranges are available per size
- Easy control point setting by the handwheel at any time

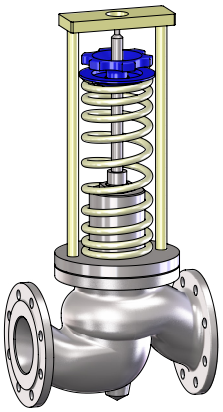
## Quick delivery

SelfAct Valves can be delivered within one week

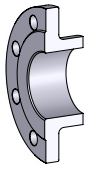
**Quality assurance system certificated acc. ISO 9001 : 2015 and ISO 14001 : 2015.**

**Flowserve minimal Valve Standards acc. to the Pressure Equipment Directive 97/23/EU Modul H**

# Body Design - „Three Flange“

| Body Design | Type ( Body ) / Size | | Body Material | Bonnet Design | Packing Design | Trim Design |
|---|---|---|---|---|---|---|
| **3-Flange** | **D** . . . .<br>Flanged<br><br>PN 10<br>16<br>25<br>40<br><br>DN 15<br>20<br>25<br>32<br>40<br>50<br>65<br>80<br>100<br>125<br>150<br>200 |  | 0.7043<br>for sizes<br>DN 200<br><br>1.0619<br>for sizes<br>DN 15 - 150<br><br>1.4581<br>for sizes<br>DN 15 - 100 | Standard Bonnet | Metal Bellows | Disk Plug |

# Body Connecting Design - „Detail“

| Body Design | Type ( Body ) | | Design | |
|---|---|---|---|---|
| 3-Flange | . **K** . . . |  | according to<br>**EN 1092-1** | **Form B1** |

# Body Pressure - Temperature Ratings

| PN | Body Material | Service Temperature in °C | -10 | 0 | 120 | 200 | 250 | 300 | 350 | 400 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 1.0619 | Maximum Allowable Working Pressure in bar | 10 | 10 | 10 | 8 | 7 | 5 | 4 | 3 |
| | 1.4581 | | 10 | 10 | 8,4 | 7,3 | 6,9 | 6,5 | 6,1 | 5,7 |
| 16 | 0.7043 | | 16 | 16 | 15 | 13 | 12 | 11 | 10 | |
| | 1.0619 | | 16 | 16 | 16 | 14 | 13 | 11 | 10 | 8 |
| | 1.4581 | | 16 | 16 | 13 | 12 | 11 | 10 | 10 | 9 |
| 25 | 0.7043 | | 25 | 25 | 24 | 20 | 19 | 17 | 16 | |
| | 1.0619 | | 25 | 25 | 25 | 22 | 20 | 17 | 16 | 13 |
| | 1.4581 | | 25 | 25 | 21 | 18 | 17 | 16 | 15 | 14 |
| 40 | 1.0619 | | 40 | 40 | 40 | 35 | 32 | 28 | 24 | 21 |
| | 1.4581 | | 40 | 40 | 34 | 29 | 28 | 26 | 24 | 23 |

# Disk Plug

**Characteristic: linear**

| kvs (m³/h) | Port Size (mm) | Stroke (mm) | Material / Design | Possible seat diameter depends on nominal size DN | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1.4571 | 15 | 20 | 25 | 32 | 40 | 50 | 65 | 80 | 100 | 125 | 150 | 200 |
| 1,8 | 12 | 4 | • | • | • | • | | | | | | | | | |
| 3,0 | 20 | 5 | • | • | | | | | | | | | | | |
| 5,0 | 20 | 5 | • | | • | | | | | | | | | | |
| 8,0 | 20 | 5 | • | | | • | | | | | | | | | |
| 10 | 20 | 6 | • | | | | • | | | | | | | | |
| 15 | 25 | 6 | • | | | | | • | | | | | | | |
| 25 | 32 | 8 | • | | | | | | • | | | | | | |
| 38 | 40 | 9 | • | | | | | | | • | | | | | |
| 59 | 50 | 11 | • | | | | | | | | • | | | | |
| 87 | 65 | 12 | • | | | | | | | | | • | | | |
| 150 | 86 | 16 | • | | | | | | | | | | • | | |
| 204 | 105 | 17 | • | | | | | | | | | | | • | |
| 255 | 120 | 18 | • | | | | | | | | | | | | • |

# Rangeability

| Rangeability | |
|---|---|
| Standard | 1 : 10 |

# Leakage-class acc. to DIN 3230

| acc. Standard | Plug design | Leakage Class acc. DIN 3230 - BO | Test Medium | Test Pressure | max. Seat Leakage in % of kvs |
|---|---|---|---|---|---|
| standard | metal to metal seated, reseated | Class 1 - tight | Air | Working Pressure, max. 6 bar | 0,0 - tight |

# Actuator Selection

**Incorporable Actuator Size depends on Adjustment Range and Nominal Size:**

| Adjusment Range (bar g) | Nominal Size DN | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15 | 20 | 25 | 32 | 40 | 50 | 65 | 80 | 100 | 125 | 150 | 200 |
| 8 - 20 | B11 | | | | | | | A11 | B2 | | | |
| 8 - 16,5 | | | | | | | | | | A11 | | |
| 3,2 - 10 | | | | | | | | A2 | | | | |
| 2,4 - 10 | | | | | | A11 | | | | | | |
| 1,1 - 10 | A11 | | | | | | | | | | | |
| 1,8 - 4,5 | | | | | | | | | | A3 | | |
| 1,2 - 4,0 | | | | | | | | A3 | | | | |
| 0,8 - 3,0 | | | | | | A3 | | | | | | |
| 0,8 - 2,2 | | | | | | | | | | A4 | | |
| 0,4 - 1,5 | | | | | | | | A4 | | | | |
| 0,4 - 1,1 | | | | | | | | | | A51 | | |
| 0,1 - 1,4 | A4 | | | | | | | | | | | |
| 0,1 - 1,0 | | | | | | A4 | | | | | | |
| 0,1 - 0,6 | | | | | | | | A51 | | A6 | | |

# Operating Medium Temperature > 100 °C

**If the medium temperature is > 100 °C the use of a Seal Tank is essential otherwise the diaphragm of the actuator will be destroyed!**

| Seal Tank | Nominal Size DN | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15 | 20 | 25 | 32 | 40 | 50 | 65 | 80 | 100 | 125 | 150 | 200 |
| 1 | G1 | | | | | | | | | | | |
| 2 | | | | | | | | G2 | | | | |
| 3 | | | | | | | | | | G3 | | |

## Installation recommendation

The successful employment of the Pressure Reducing Valve depends directly on a suitable design of the mounting arrangement. As the function of the Pressure Reducing Valve depends greatly on the consideration of the physical possibilities, it is recommended to observe the stated standard values. Deviations may lead to considerable fluctuations in the control loop for which the Pressure Reducing Valve manufacturer rejects any liability whatsoever. In borderline cases, an expensive conversion of the piping should be expected. Even though the physical processes may in individual cases justify a deviation from the standard values, however, this requires a comprehensive system knowledge and the express approval of the manufacturer.

## Physical requirements

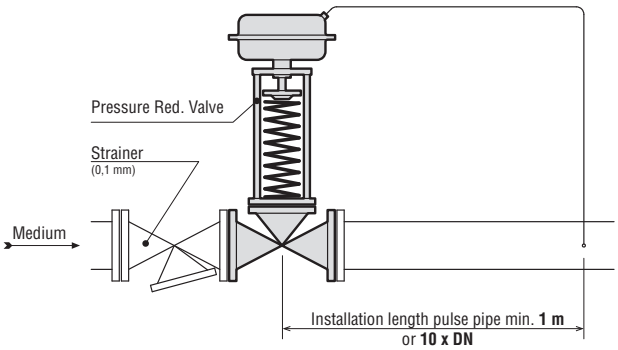
- Pressure Reducing Valves are used primarily for **steam, non inflammable vapors** and **gases.** It also has limited use for **neutral liquids,** because the close direction of the plug is in the flow direction of the medium and that can produce vibrations (hammer) at a utilisation for less than 20%.
- Realistic **rangeability 1 : 10!**
- At service conditions of **more** than **100 °C** it is necessary to protect the diaphragm against overheating by using a **seal tank!**
- Ensure that the outlet velocity for
  - **vapors** and **gases** is less than **70 m/s** and
  - **liquids** and **wet steam** is less than **8 m/s,**

  otherwise the standards for friction loss, wearing, pressure shock and noise of flow will be increase distinctly.
- The safe load **relative differential pressure** depends on nominal size and is for
  DN 15 - 50 max. **24 bar**
  DN 65 - 100 max. **20 bar**
  DN 150 - 200 max. **15 bar**

  otherwise the trim can be overloaded.

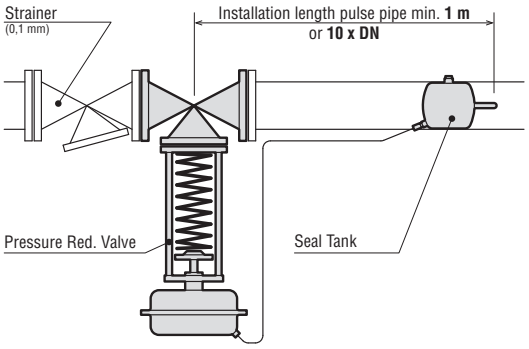
## System requirements

- System drawings with design recommendation. Experience shows that deviations result in considerable problems.




Installation at service condition **< 100 °C**

Installation at service conditions **> 100 °C**

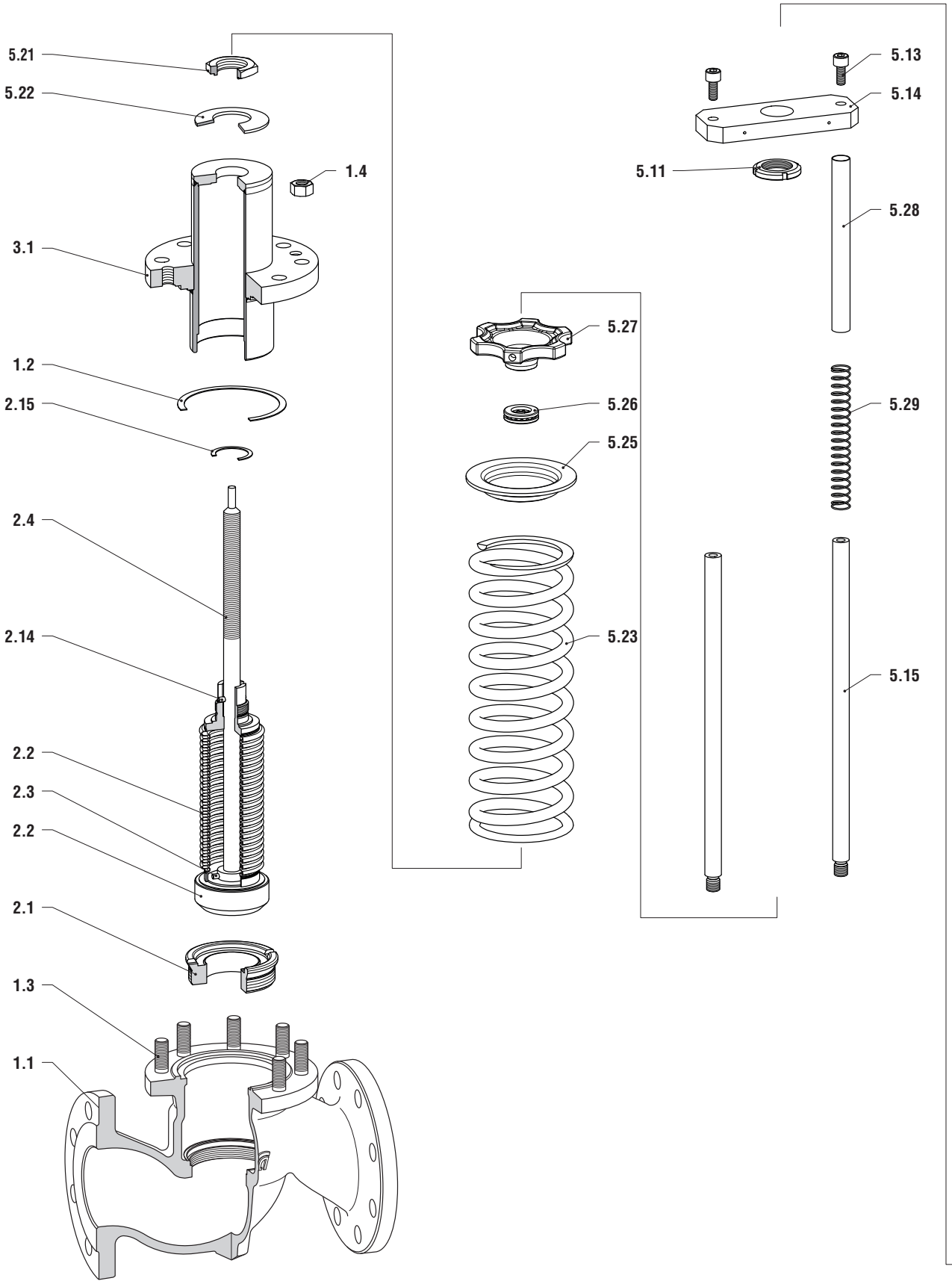


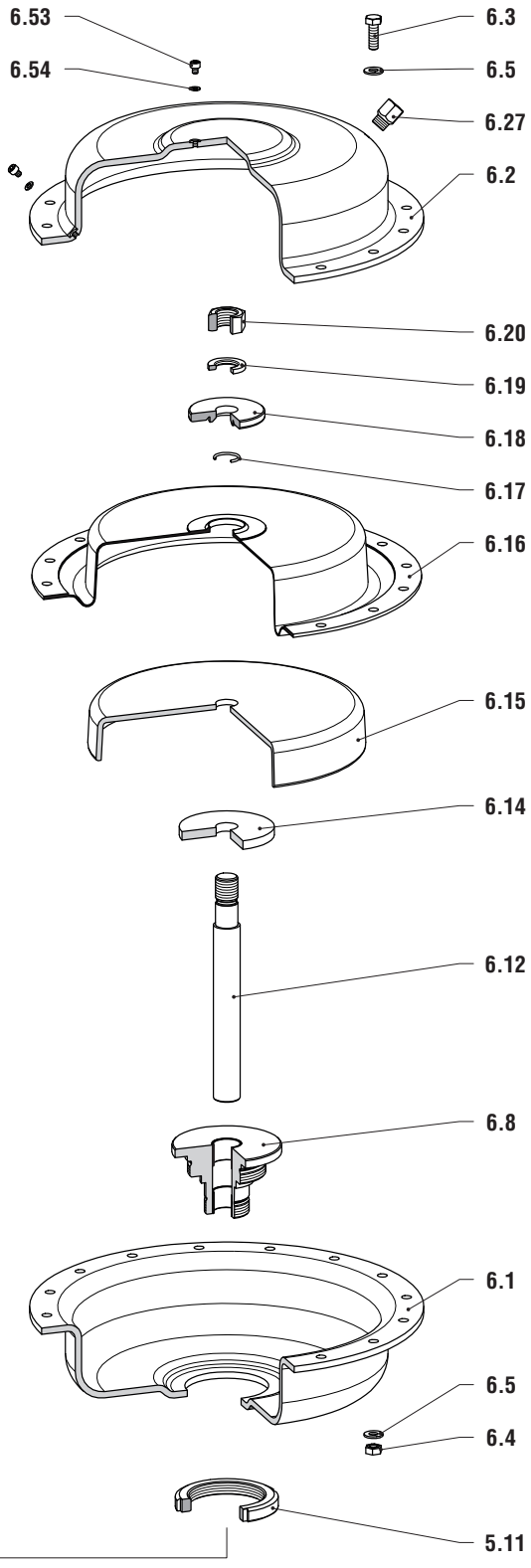

For installing a water seal tank be carefully to place it higher up than the valve actuator !

## Installation

- At service conditions **more** than **100 °C** pour water into the filler socket of the seal tank until it emerges from the vent without bubbles. Now close the vent screw and continue filling until the water reaches a height of 35 mm below the top level of the filler socket. After closing the filler socket, the pressure reducing valve is ready to work.
- At service conditions **less** than **100 °C** and gaseous the pressure reducing valve is ready to work. In case of liquid, the actuator must be filled completely with liquid by using its upper vent screw.

# Parts List

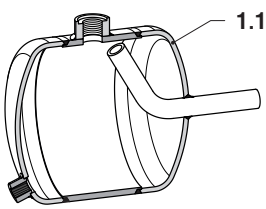

5.21
5.22
1.4
3.1
1.2
2.15
2.4
2.14
2.2
2.3
2.2
2.1
1.3
1.1
5.27
5.26
5.25
5.23
5.13
5.14
5.11
5.28
5.29
5.15




| Designation | Part | Materials | | | Spare Parts |
|---|---|---|---|---|---|
| Body | 1.1 | 0.7043 | 1.0619 | 1.4581 | |
| Bonnet Gasket | 1.2 | Pure Graphite on Support Plate from 1.4571 | | | D |
| Stud Bold | 1.3 | YK | | A2-70 | |
| Hex Nut | 1.4 | YK | | A2-70 | |
| Screwed Seat | 2.1 | 1.4571 | | | S |
| Plug / Bellows Unit | 2.2 | 1.4571 | | | K |
| Straight Pin | 2.3 | 1.4021 | | | |
| Stem | 2.4 | 1.4021 | | | |
| Spring Pin | 2.14 | 1.1231 | | | |
| Gasket | 2.15 | Pure Graphite on Support Plate from 1.4571 | | | D |
| Bonnet | 3.1 | 1.0460 | | 1.4571 | |
| Lock Nut, Actuator | 5.11 | Steel, chromatized | | | |
| Cylinder Head Stud | 5.13 | 8.8, chromatized | | | |
| Plate | 5.14 | 1.1191, chromatized | | | |
| Column | 5.15 | 1.0736, chromatized | | | |
| Hex Nut | 5.21 | 1.0501 | | | |
| Belleville Spring | 5.22 | 1.8159 | | | |
| Compression Spring | 5.23 | 1.7103, chromatized | | | |
| Lower Spring Plate | 5.24 | Sheet Steel, painted [1] | | | |
| Upper Spring Plate | 5.25 | Sheet Steel, painted | | | |
| Ball Bearing | 5.26 | chrome Steel | | | |
| Hand Wheel | 5.27 | 0.6025, painted | | | |
| Setting Scale | 5.28 | 1.0308 | | | |
| Spring | 5.29 | 1.1191, chromatized | | | |

| | | | |
|---|---|---|---|
| Lock Nut, Actuator | 5.11 | Steel, Chromatized | |
| Lower Casing | 6.1 | 1.0332, powder coated | |
| Upper Casing | 6.2 | 1.0332, powder coated | |
| Hex Screw | 6.3 | A2-70 | |
| Hex Nut | 6.4 | A2-70 | |
| Washer | 6.5 | A2 | |
| Distance Ring | 6.7 | 1.0460, chromatized [2] | |
| Guide Bush | 6.8 | 1.0460, chromatized / Bronze, Steel | |
| Actuator Stem | 6.12 | 1.4122 | |
| Washer | 6.14 | 1.0736, chromatized | |
| Diaphragm Plate | 6.15 | 1.0332, chromatized | |
| Diaphragm | 6.16 | NBR | M |
| O - Ring | 6.17 | NBR | |
| Pressure Washer | 6.18 | 1.4305 | |
| Lock Washer | 6.19 | A2 | |
| Hex Nut | 6.20 | A2-70 | |
| Diaphragm Plate Ring | 6.52 | 1.0460 [2] | |
| Lock Screw | 6.53 | A2-70 | |
| Gasket | 6.54 | Aramide fibre attached to NBR | |
| Cylinder Head Stud | 6.55 | A2-70 [2] [3] | |
| Gasket | 6.56 | Aramide fibre attached to NBR [2] [3] | |

| | | | | |
|---|---|---|---|---|
| Seal Tank | 1.12 | 1.0308 | 1.4571 | |




1) Lower Spring Plate not used by DN 65 and DN 100
2) Only used by Actuator Size B1, B2
3) only used by Actuator Size A1, A2, A3

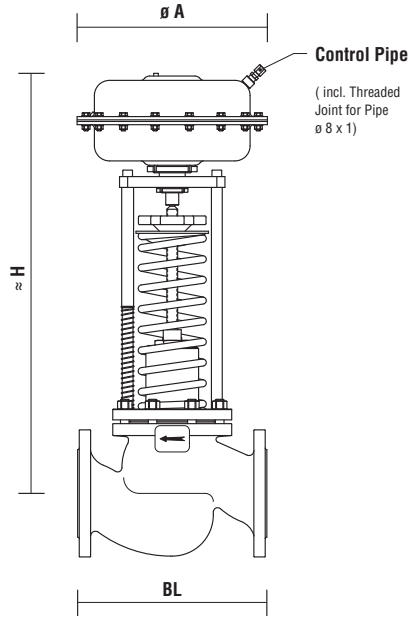
K Trim
S Screwed Seat
D Gasket Set

M Diaphragm

# Dimensions and Weights

## Pressure Reducing Valve

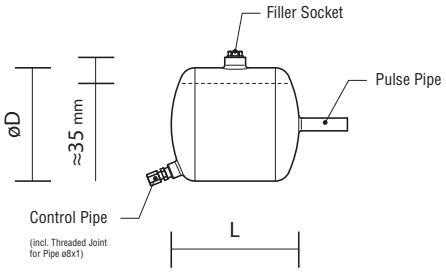
( Values in Millimeter → mm respectively Kilogram → kg )




| Designation | | | øA | Nominal Size DN | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 15 | 20 | 25 | 32 | 40 | 50 | 65 | 80 | 100 | 125 | 150 | 200 |
| BL | Face to Face Dimensions acc. to EN 558-1 Basic Line 1 | | | 130 | 150 | 160 | 180 | 200 | 230 | 290 | 310 | 350 | 400 | 480 | 600 |
| ≈ Height | H | with Actuator B11 | 150 | 490 | 490 | 490 | 510 | 525 | 600 | 605 | - | - | - | - | - |
| | H | with Actuator B2 | 160 | - | - | - | - | - | - | - | - | 700 | - | - | - |
| | H | with Actuator A11 | 150 | 490 | 490 | 490 | 510 | 525 | 600 | 605 | 690 | - | 805 | 825 | 860 |
| | H | with Actuator A2 | 160 | - | - | - | - | - | - | - | 690 | 690 | 805 | 825 | 860 |
| | H | with Actuator A3 | 195 | - | - | - | - | - | 600 | 605 | 690 | 690 | 805 | 825 | 860 |
| | H | with Actuator A4 | 270 | 510 | 510 | 510 | 530 | 545 | 620 | 625 | 710 | 710 | 825 | 845 | 880 |
| | H | with Actuator A51 | 355 | - | - | - | - | - | - | - | 775 | 775 | 890 | 910 | 945 |
| | H | with Actuator A6 | 510 | - | - | - | - | - | - | - | - | - | 925 | 945 | 980 |
| ≈ Weight | | with Actuator B11 | | 10 | 11 | 12 | 15 | 17 | 22 | 30 | - | - | - | - | - |
| | | with Actuator B2 | | - | - | - | - | - | - | - | - | 60 | - | - | - |
| | | with Actuator A11 | | 10 | 11 | 12 | 15 | 17 | 22 | 30 | 43 | - | 85 | 118 | 179 |
| | | with Actuator A2 | | - | - | - | - | - | - | - | 45 | 59 | 87 | 120 | 181 |
| | | with Actuator A3 | | - | - | - | - | - | 25 | 33 | 46 | 60 | 88 | 121 | 182 |
| | | with Actuator A4 | | 12 | 13 | 14 | 17 | 19 | 24 | 32 | 45 | 59 | 87 | 120 | 181 |
| | | with Actuator A51 | | - | - | - | - | - | - | - | 58 | 72 | 100 | 133 | 194 |
| | | with Actuator A6 | | - | - | - | - | - | - | - | - | - | 110 | 143 | 204 |
| Flanges drilled and dimensioned acc. to | | | | EN 1092-1, Form B1 | | | | | | | | | | | |

# Seal Tank

( Values in Millimeter → mm respectively Kilogram → kg )




| Designation | Seal Tank Dimensions | | |
|---|---|---|---|
| | G1 Suitable for DN 15-65 | G2 Suitable for DN 80-100 | G3 Suitable for DN 125-200 |
| L Length | 206 | 172 | 250 |
| øD | 88,9 | 152,4 | 152,4 |
| Pulse Pipe | ø 17,2 x 2,6 | | |
| ≈ Weight | 1,7 | 3,5 | 4,9 |

# Pressure Reducing Valve - order code

| SelfAct | | Type | | | DN | PN | Body / Cert. | | | Plug | Seat | kvs | Trim | Actuator | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5801 | D | K | 50 | 40 | 1.0619 | O | O | T | 32 | 25 | 1.4571 | A3 | G1 |
| Body design | globe, flanged end | | **D** | | | | | | | | | | | | |
| Flange connection | Integral Flange acc. to EN 1092-1 Form B1 | | | **K** | | | | | | | | | | | |
| | Option: DN 65 / PN 16 - 4 hole flange | | | **1** | | | | | | | | | | | |
| Nominal Size | 15 - 20 - 25 - 32 - 40 - 50 - 65 - 80 - 100 - 150 - 200 | | | | **15 - 200** | | | | | | | | | | |
| Nominal pressure | 10 - 16 - 25 - 40 | | | | | **10 - 40** | | | | | | | | | |
| Body material | for DN 200 only | | | | | | **0.7043** | | | | | | | | |
| | for DN 15 - 150 only | | | | | | **1.0619** | | | | | | | | |
| | for DN 15 - 100 only | | | | | | **1.4581** | | | | | | | | |
| Material certificate | without | | | | | | | **O** | | | | | | | |
| | DGRL 97/23/EC Cat. II | 2.2 | | | | | | **Z** | | | | | | | |
| | | 3.1 with copy of certificates ( CMTR of body & bonnet ) | | | | | | **B** | | | | | | | |
| | | 3.1 with copy of certificates ( CMTR of body & bonnet & bolting ) | | | | | | **D** | | | | | | | |
| Final test certificate | without | | | | | | | | **O** | | | | | | |
| | DGRL 97/23/EC Cat. II | 2.2 | | | | | | | **Z** | | | | | | |
| | | 3.1 | | | | | | | **B** | | | | | | |
| | | 3.2 | | | | | | | **A** | | | | | | |
| Plug type | Disk plug | | | | | | | | | **T** | | | | | |
| Seat diameter | (mm) | | | | | | | | | | **12 - 120** | | | | |
| kvs - value | ( $m^3/h$ ) | | | | | | | | | | | **1,8 - 255** | | | |
| Trim material | 410 SS | | | | | | | | | | | | **1.4571** | | |
| Actuator | B11 - B2 - A11 - A2 - A3 - A4 - A51 - A6 | | | | | | | | | | | | | **B11 - A6** | |
| Vessel | G1 - G2 - G3 | | | | | | | | | | | | | | **G1 - G3** |

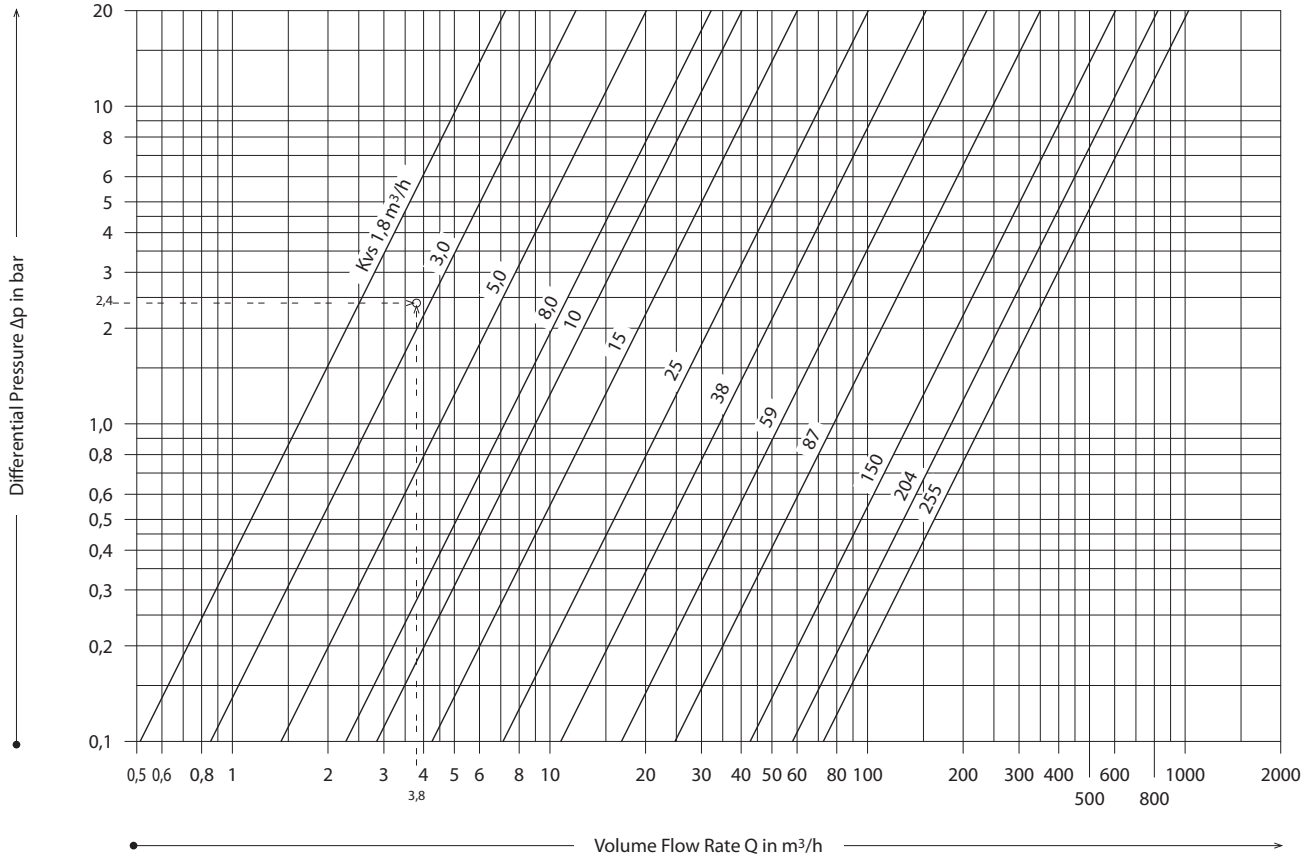
# Diagram to select the Kvs - value for water

- Example - **water:**

  Differential Pressure Δp 2,4 bar
  Volume Flow Rate Q 3,8 m³/h

- Solution > Kvs-value **3,0 m³/h**

The operational data are registered in the diagram below for the example. The intersecting point shows the kvs-value as a result from differential pressure and volume flow rate. In case of an intersecting point between two kvs-lines the bigger one has to be chosen.




# Diagram to select the Kvs - value for steam

- Example - **saturated steam**:

  Upstream Pressure $p_1$ 11,5 bar (g)
  Differential Pressure Δp 2 bar
  Mass Flow Rate W 1200 kg/h

- Solution > Kvs-value **15 m³/h**

The operational data are registered in the diagram below for the example. The intersecting point shows the kvs-value as a result from upstream pressure, differential pressure and mass flow rate. In case of an intersecting point between two kvs-lines the bigger one has to be chosen.

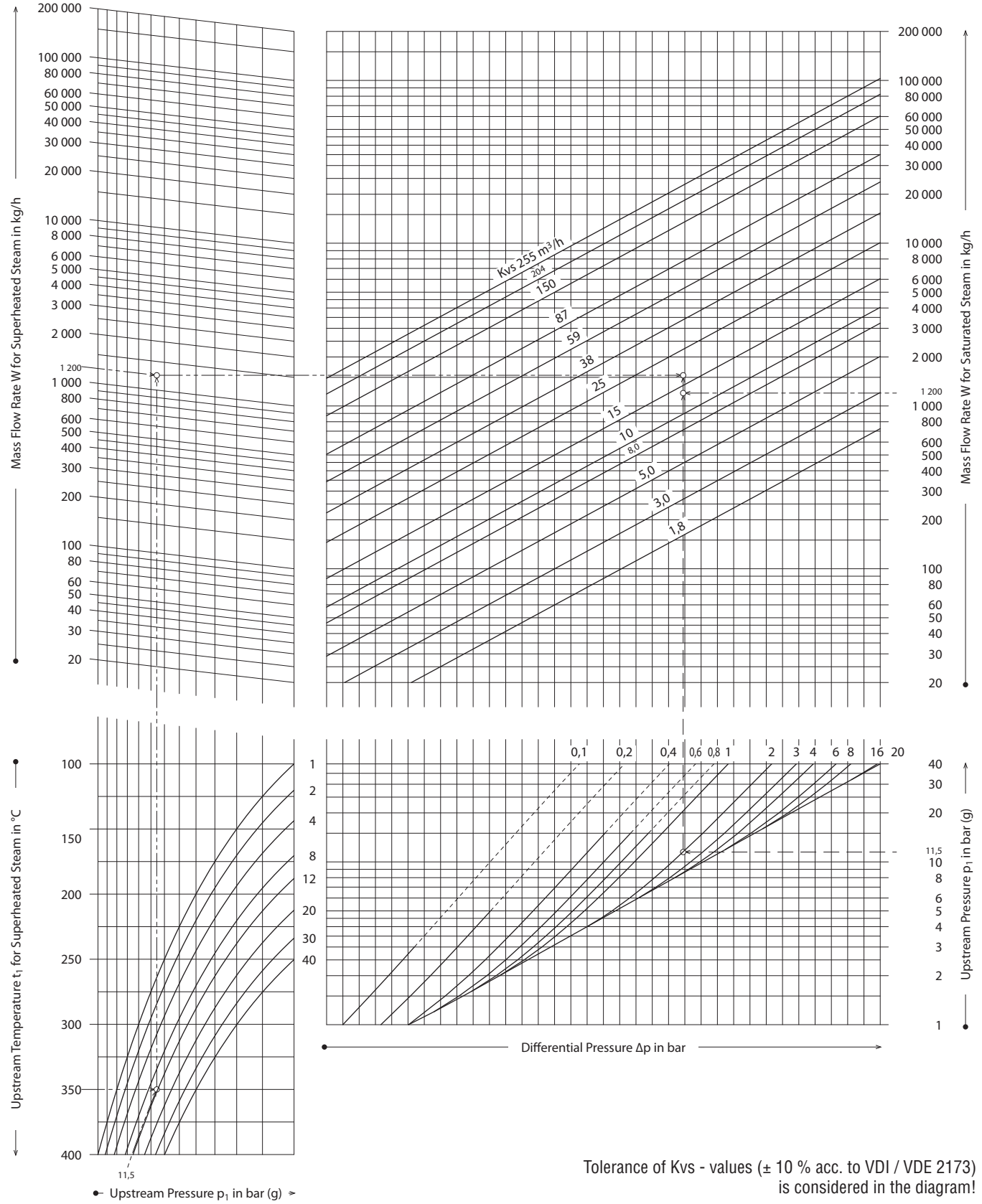
- Example - **superheated steam:**

  Upstream Pressure $p_1$ 11,5 bar (g)
  Differential Pressure Δp 2 bar
  Upstream Temperature $t_1$ 350 °C
  Mass Flow Rate W 1200 kg/h

- Solution > Kvs-value **25 m³/h**

The operational data are registered in the diagram below for the example. The intersecting point shows the kvs-value as a result from upstream pressure, differential pressure and mass flow rate. In case of an intersecting point between two kvs-lines the bigger one has to be chosen.

CAUTION: The physical conditions (liquid, saturated steam, superheated steam) are a result from the service condition and is shown in the literature on the subject (steam table) !




Tolerance of Kvs - values (± 10 % acc. to VDI / VDE 2173) is considered in the diagram!

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Fax: 91 80 28410286

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Co., Ltd.
Makkah Road, Phase 4
Plot 10 & 12, 2nd Industrial City
Damman
KINGDOM of SAUDI ARABIA
Phone: +966-3-857 3150
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