

## T 8222-1 EN

### Type 3310 Segmented Ball Valve

DIN and ANSI versions



#### Application

Rotary valve for throttling or on/off service in industrial applications with high flow rates

**Nominal size** DN 25 to 300 · NPS 1 to 12

**Pressure rating** PN 10 to 40 · Class 150 to 300

**Temperatures** -46 to +450 °C · -51 to +842 °F

#### Special features

Type 3310 Segmented Ball Valve with

- Single-acting AIR TORQUE Type SRP Pneumatic Rotary Actuator
- Double-acting AIR TORQUE Type DAP Pneumatic Rotary Actuator
- Single-acting SAMSON Type 3278 Pneumatic Rotary Actuator ► T 8321
- Electric actuator

Valve body made of

- Cast steel
- Cast stainless steel

Segmented ball

- Soft seal
- Metal seal

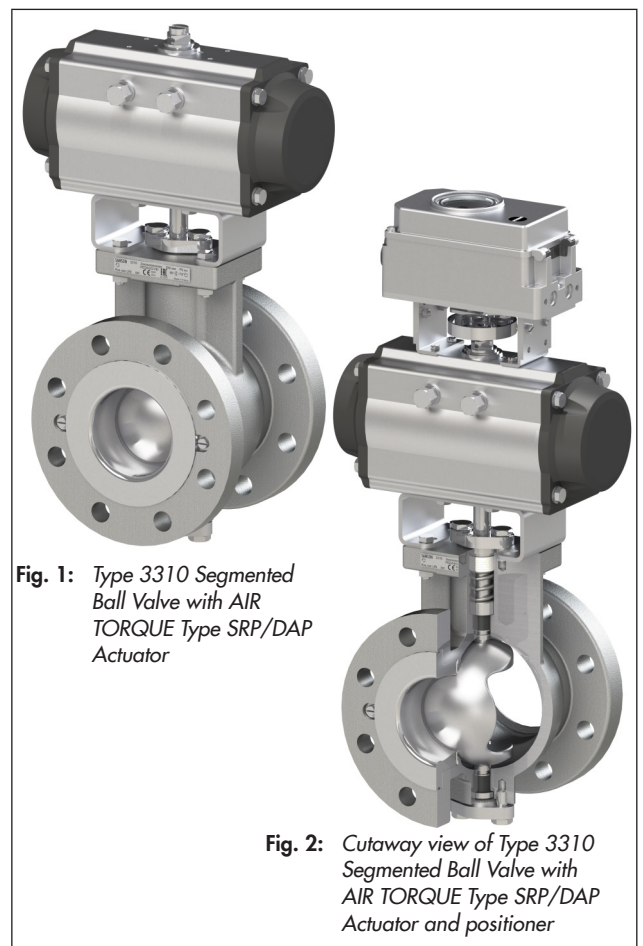
The control valves can be equipped with various accessories: Positioners, solenoid valves and other accessories according to VDI/VDE 3845 on AIR TORQUE Type SRP or Type DAP Rotary Actuators and Type 3278 Rotary Actuator. Direct attachment of SAMSON valve accessories to Type 3278 Rotary Actuator.

#### Versions

**Standard version** for temperatures ranging from -29 to +220 °C/-20 to +428 °F, DN 25 to 300/NPS 1 to 12

Further versions:

- With packing certified according to DIN EN ISO 15848-1
- With double packing, with or without leak monitoring
- With insulating section for a wider temperature range
- With flanges with special faces
- With pneumatic rotary actuator and additional handwheel
- With manual override
- With heating jacket (on request)



**Fig. 1:** Type 3310 Segmented Ball Valve with AIR TORQUE Type SRP/DAP Actuator

**Fig. 2:** Cutaway view of Type 3310 Segmented Ball Valve with AIR TORQUE Type SRP/DAP Actuator and positioner

- With additional seals for protection of the bearing
- Version for oxygen service (GOX) up to 13.8 bar
- Version according to NACE ISO 15156 or MR0103-2007/ISO 17495-1 (on request)
- Two versions for the food and beverage industry and for the pharmaceuticals and biotechnology sector:

- Valve with gaskets and packings that comply with the EU Regulation (EC) No. 1935/2004 and the US Regulation FDA 21 CFR Section 177.1550.
- Valve for cleanroom environments: materials (gaskets, packings, body), manufacture of parts as well as assembly conditions in accordance with the EU Regulation (EC) No. 1935/2004 and the US Regulation FDA 21 CFR Section 177.1550.

### Principle of operation

In the segmented ball valve, the medium flows through the retainer located on the convex side of the ball. When the valve is closed, the pressure acts on the convex side of the ball. The flow coefficient is determined by the opening angle of the ball.

To reduce the wear on the body when controlling abrasive media, the direction of flow <sup>1)</sup> can be reversed.

### Fail-safe position

With the Type SRP and Type 3278 Rotary Actuator the control valve has two fail-safe positions which become effective when the pressure acting on the piston or diaphragm is reduced as well as when the supply air fails:

- **Fail-close valve:** The actuator springs cause the segmented ball valve to close when the supply air fails.
- **Fail-open valve:** The actuator springs cause the segmented ball valve to open when the supply air fails.

The Type DAP Rotary Actuator has no springs. The control valve must be fitted with special accessories to enable the valve to move to a defined end position upon supply air failure.

### Valve characteristic selection

The design of the segmented ball allows the same valve to be used with two different types of flow characteristic:

- **Equal percentage (standard)**
- **Linear**

The actuator turns clockwise to close the valve (looking from the actuator toward the valve).

<sup>1)</sup> Standard direction of flow = FTO, reverse direction = FTC

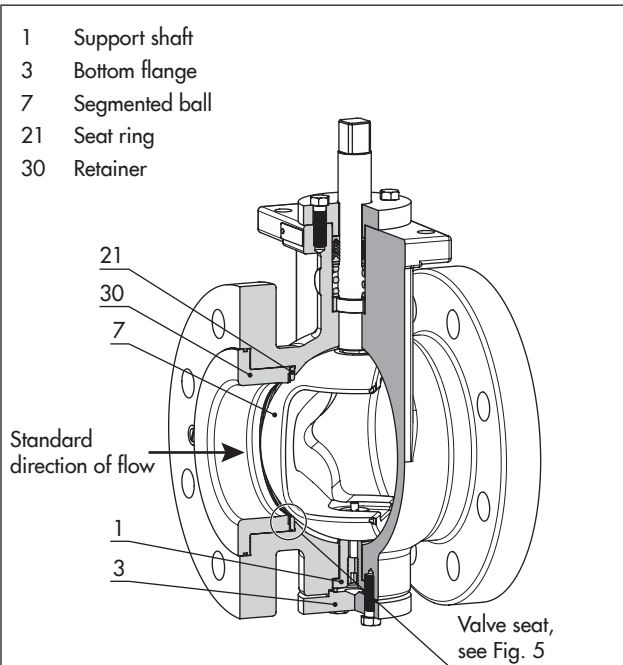


Fig. 3: Type 3310 Segmented Ball Valve

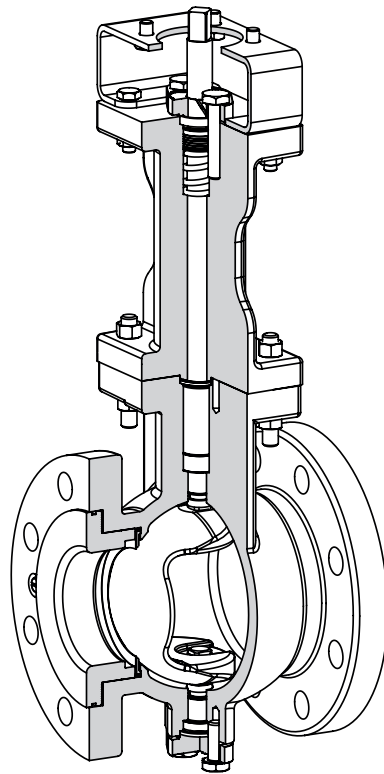


Fig. 4: Insulating section for Type 3310 Segmented Ball Valve

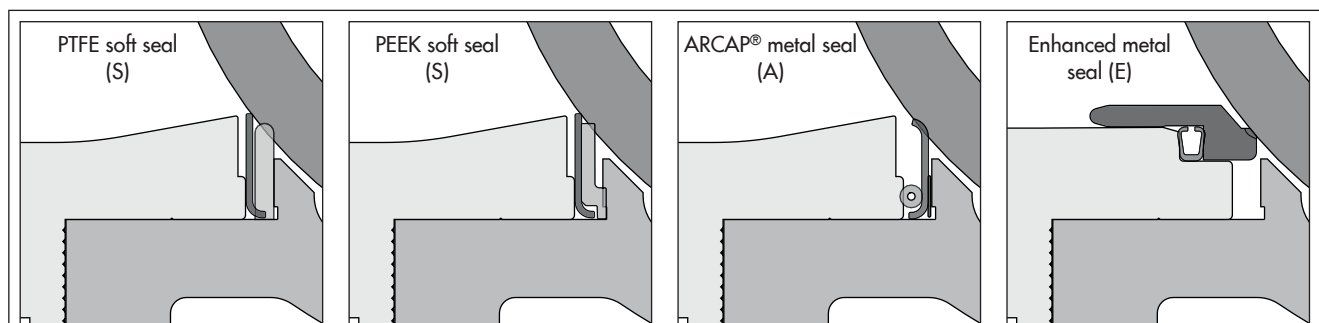


Fig. 5: Valve seats

**Table 1: Technical data**

| Valve seat                               | Type                                  |              | Soft seal<br>S                                   |                                 | Metal seal                      |                                                              |
|------------------------------------------|---------------------------------------|--------------|--------------------------------------------------|---------------------------------|---------------------------------|--------------------------------------------------------------|
|                                          | Version                               |              | PTFE                                             | PEEK                            | A                               | E                                                            |
|                                          | Material                              |              | PTFE                                             | PEEK                            | ARCAP®                          | Enhanced                                                     |
| Pressure rating                          |                                       |              | PN 10 · 16 · 25 · 40<br>Class 150/300            |                                 |                                 |                                                              |
| Type of connection                       | Flanges                               |              | DIN EN 1092<br>ANSI B16.5                        |                                 |                                 |                                                              |
| Leakage class according to ANSI/FCI 70-2 |                                       |              | VI                                               | VI                              | IV                              | IV                                                           |
| Max. opening angle                       |                                       |              | 90°                                              |                                 |                                 |                                                              |
| Temperature range                        | Standard version                      | DIN          | 1.0619                                           | -10 to +220 °C (14 to 428 °F)   |                                 |                                                              |
|                                          |                                       |              | 1.4408                                           | -29 to +220 °C (-20 to +428 °F) |                                 |                                                              |
|                                          |                                       | ANSI         | A216 WCC                                         | -29 to +220 °C (-20 to +428 °F) |                                 |                                                              |
|                                          |                                       |              | A351 CF8M                                        | -29 to +220 °C (-20 to +428 °F) |                                 |                                                              |
|                                          | Version with short insulating section | DIN          | 1.0619                                           | -10 to +220 °C (14 to 428 °F)   | -10 to +220 °C (14 to 428 °F)   | -10 to +400 °C <sup>1)</sup> (14 to 752 °F <sup>1)</sup> )   |
|                                          |                                       | ANSI         | A216 WCC                                         | -29 to +220 °C (-20 to +428 °F) | -29 to +220 °C (-20 to +428 °F) | -29 to +427 °C <sup>1)</sup> (-20 to +800 °F <sup>1)</sup> ) |
|                                          |                                       | DIN and ANSI | 1.4408                                           | -46 to +220 °C (-51 to +428 °F) | -40 to +220 °C (-40 to +428 °F) | -46 to +450 °C <sup>1)</sup> (-51 to +842 °F <sup>1)</sup> ) |
|                                          |                                       |              | A351 CF8M                                        |                                 |                                 | -46 to +315 °C <sup>1)</sup> (-51 to +599 °F <sup>1)</sup> ) |
| Characteristic                           |                                       |              | Linear or equal percentage                       |                                 |                                 |                                                              |
| Rangeability                             |                                       |              | Equal percentage: R > 400:1<br>Linear: R > 100:1 |                                 |                                 |                                                              |
| Face-to-face dimensions                  |                                       |              | DIN EN 558-2 Series 36<br>ISA 75.08.02           |                                 |                                 |                                                              |
| Conformity                               |                                       |              | CE · UK · ENEC                                   |                                 |                                 |                                                              |

<sup>1)</sup> Only for high-temperature versions (T<sub>max</sub> = 220 °C (428 °F) with standard short insulating section)

**Table 2: Materials for standard version**

| Valve body                   | 1.0619                                                     |              | 1.4408                                           |              | A216 WCC                                         |              | A351 CF8M                                        |              |
|------------------------------|------------------------------------------------------------|--------------|--------------------------------------------------|--------------|--------------------------------------------------|--------------|--------------------------------------------------|--------------|
| Nominal size                 | DN 25                                                      | DN 40 to 300 | DN 25                                            | DN 40 to 300 | NPS 1                                            | NPS 1½ to 12 | NPS 1                                            | NPS 1½ to 12 |
| Segmented ball <sup>1)</sup> | 1.4404                                                     | 1.4409       | 1.4404                                           | 1.4409       | 316L                                             | CF3M         | 316L                                             | CF3M         |
| Shaft                        | DN 150 and NPS 6: AISI 630 · All other nominal sizes: 316L |              |                                                  |              |                                                  |              |                                                  |              |
| Bearing bushing              | ACTEON® (570)/N26055                                       |              |                                                  |              |                                                  |              |                                                  |              |
| Packing                      | V-ring packing: PTFE with carbon · Spring: Stainless steel |              |                                                  |              |                                                  |              |                                                  |              |
| Bottom flange                | Up to DN 80: 1.4409<br>DN 100 and larger: 1.0460           |              | Up to DN 80: 1.4409<br>DN 100 and larger: 1.4404 |              | Up to NPS 3: A351 CF3M<br>NPS 4 and larger: A105 |              | Up to NPS 3: A351 CF3M<br>NPS 4 and larger: 316L |              |

<sup>1)</sup> The segmented ball is chrome plated as standard.

**Table 3: Opening angle and associated C<sub>v</sub> and K<sub>VS</sub> coefficients**
**Table 3.1: C<sub>v</sub> coefficients for modified linear characteristic**

| Nominal size |     | Opening angle |     |      |     |      |      |      |      |      |      |
|--------------|-----|---------------|-----|------|-----|------|------|------|------|------|------|
| NPS          | DN  | 5°            | 10° | 20°  | 30° | 40°  | 50°  | 60°  | 70°  | 80°  | 90°  |
| 1            | 25  | 0.35          | 1   | 3.4  | 7   | 11.5 | 17.3 | 24.5 | 32.3 | 38   | 40   |
| 1½           | 40  | 1             | 3   | 10   | 21  | 35   | 52   | 74   | 97   | 114  | 120  |
| 2            | 50  | 1.4           | 4   | 13.6 | 28  | 46   | 69   | 98   | 129  | 152  | 160  |
| 3            | 80  | 3.6           | 10  | 34   | 70  | 115  | 173  | 245  | 323  | 381  | 400  |
| 4            | 100 | 6.3           | 18  | 60   | 123 | 201  | 302  | 429  | 565  | 666  | 700  |
| 6            | 150 | 13            | 35  | 119  | 245 | 402  | 605  | 858  | 1130 | 1333 | 1400 |
| 8            | 200 | 18            | 50  | 170  | 350 | 574  | 864  | 1226 | 1614 | 1904 | 2000 |
| 10           | 250 | 28            | 78  | 264  | 543 | 890  | 1339 | 1900 | 2502 | 2951 | 3100 |
| 12           | 300 | 28            | 78  | 264  | 543 | 890  | 1339 | 1900 | 2502 | 2951 | 3100 |

**Table 3.2:**  $K_{VS}$  coefficients for modified linear characteristic

| Nominal size |     | Opening angle |      |       |     |     |      |      |      |      |      |
|--------------|-----|---------------|------|-------|-----|-----|------|------|------|------|------|
| NPS          | DN  | 5°            | 10°  | 20°   | 30° | 40° | 50°  | 60°  | 70°  | 80°  | 90°  |
| 1            | 25  | 0.3           | 0.85 | 3     | 6   | 10  | 14.7 | 20.8 | 27.4 | 32.3 | 34   |
| 1½           | 40  | 0.85          | 2.5  | 8.5   | 18  | 30  | 44   | 63   | 82.4 | 97   | 102  |
| 2            | 50  | 1.2           | 3.4  | 11.68 | 24  | 40  | 59   | 84   | 110  | 130  | 140  |
| 3            | 80  | 3             | 8.5  | 29    | 60  | 98  | 148  | 210  | 276  | 325  | 340  |
| 4            | 100 | 5.4           | 15   | 51    | 105 | 172 | 260  | 367  | 482  | 570  | 600  |
| 6            | 150 | 11            | 30   | 102   | 210 | 344 | 517  | 733  | 965  | 1140 | 1200 |
| 8            | 200 | 15.4          | 43   | 145   | 300 | 490 | 738  | 1048 | 1380 | 1630 | 1700 |
| 10           | 250 | 24            | 66   | 225   | 464 | 760 | 1145 | 1624 | 2140 | 2520 | 2650 |
| 12           | 300 | 24            | 66   | 225   | 464 | 760 | 1145 | 1624 | 2140 | 2520 | 2650 |

**Table 3.3:**  $C_V$  coefficients for modified equal percentage characteristic (standard)

| Nominal size |     | Opening angle |      |     |     |     |      |      |      |      |      |
|--------------|-----|---------------|------|-----|-----|-----|------|------|------|------|------|
| NPS          | DN  | 5°            | 10°  | 20° | 30° | 40° | 50°  | 60°  | 70°  | 80°  | 90°  |
| 1            | 25  | 0.08          | 0.16 | 1.3 | 3.3 | 6.3 | 10.7 | 16.3 | 23   | 32   | 40   |
| 1½           | 40  | 0.25          | 0.5  | 4   | 10  | 19  | 32   | 49   | 69   | 95   | 120  |
| 2            | 50  | 0.3           | 0.6  | 5   | 13  | 25  | 42   | 65   | 92   | 126  | 160  |
| 3            | 80  | 0.8           | 1.6  | 12  | 32  | 62  | 106  | 162  | 231  | 316  | 400  |
| 4            | 100 | 1.4           | 2.8  | 22  | 56  | 109 | 186  | 284  | 405  | 553  | 700  |
| 6            | 150 | 2.8           | 5.6  | 43  | 112 | 218 | 371  | 567  | 809  | 1106 | 1400 |
| 8            | 200 | 4.0           | 8    | 62  | 160 | 312 | 530  | 810  | 1156 | 1580 | 2000 |
| 10           | 250 | 6.2           | 12   | 96  | 248 | 484 | 822  | 1256 | 1792 | 2449 | 3100 |
| 12           | 300 | 6.2           | 12   | 96  | 248 | 484 | 822  | 1256 | 1792 | 2449 | 3100 |

**Table 3.4:**  $K_{VS}$  coefficients for modified equal percentage characteristic (standard)

| Nominal size |     | Opening angle |      |     |     |     |     |      |      |      |      |
|--------------|-----|---------------|------|-----|-----|-----|-----|------|------|------|------|
| NPS          | DN  | 5°            | 10°  | 20° | 30° | 40° | 50° | 60°  | 70°  | 80°  | 90°  |
| 1            | 25  | 0.07          | 0.13 | 1.1 | 2.8 | 5.3 | 9   | 14   | 20   | 27   | 34   |
| 1½           | 40  | 0.21          | 0.4  | 3.4 | 8.5 | 16  | 27  | 42   | 59   | 81   | 102  |
| 2            | 50  | 0.25          | 0.5  | 4   | 11  | 21  | 36  | 56   | 79   | 108  | 140  |
| 3            | 80  | 0.7           | 1.4  | 10  | 27  | 53  | 91  | 138  | 197  | 270  | 340  |
| 4            | 100 | 1.2           | 2.4  | 19  | 48  | 93  | 159 | 243  | 346  | 473  | 600  |
| 6            | 150 | 2.4           | 4.8  | 37  | 96  | 186 | 317 | 485  | 691  | 945  | 1200 |
| 8            | 200 | 3.4           | 6.8  | 53  | 137 | 267 | 453 | 692  | 990  | 1350 | 1700 |
| 10           | 250 | 5.3           | 10   | 82  | 212 | 414 | 702 | 1074 | 1531 | 2093 | 2650 |
| 12           | 300 | 5.3           | 10   | 82  | 212 | 414 | 702 | 1074 | 1531 | 2093 | 2650 |

**Table 4:** Terms for control valve sizing and noise level calculation**Table 4.1:** Modified linear characteristic

|       | Opening angle |      |      |      |      |      |      |      |      |      |
|-------|---------------|------|------|------|------|------|------|------|------|------|
|       | 5°            | 10°  | 20°  | 30°  | 40°  | 50°  | 60°  | 70°  | 80°  | 90°  |
| $F_L$ | 0.95          | 0.95 | 0.95 | 0.94 | 0.87 | 0.81 | 0.73 | 0.65 | 0.59 | 0.57 |
| $X_T$ | 0.78          | 0.78 | 0.78 | 0.76 | 0.65 | 0.56 | 0.46 | 0.36 | 0.30 | 0.27 |
| $Z$   | 0.39          | 0.35 | 0.28 | 0.23 | 0.2  | 0.17 | 0.14 | 0.12 | 0.10 | 0.09 |

**Table 4.2:** Modified equal percentage characteristic

|       | Opening angle |      |      |      |      |      |      |      |      |      |
|-------|---------------|------|------|------|------|------|------|------|------|------|
|       | 5°            | 10°  | 20°  | 30°  | 40°  | 50°  | 60°  | 70°  | 80°  | 90°  |
| $F_L$ | 0.95          | 0.95 | 0.95 | 0.95 | 0.95 | 0.90 | 0.82 | 0.75 | 0.66 | 0.57 |
| $X_T$ | 0.78          | 0.78 | 0.78 | 0.78 | 0.78 | 0.69 | 0.58 | 0.49 | 0.38 | 0.27 |
| $Z$   | 0.44          | 0.39 | 0.33 | 0.29 | 0.24 | 0.21 | 0.18 | 0.15 | 0.12 | 0.09 |

**Table 5:** Permissible differential pressures for Type 3310 Segmented Ball Valve · All pressures stated in bar

**Table 5.1:** Permissible differential pressures for valve CLOSED · For both fail-safe positions · With AIR TORQUE Type SRP Rotary Actuator

| Nominal size |     | C <sub>v</sub> coefficient | Shaft Ø in mm | Type SRP ... Actuator | No. of springs | Required supply pressure | Max. supply pressure at |                 |                               | Δp with soft or metal seal      |                                |
|--------------|-----|----------------------------|---------------|-----------------------|----------------|--------------------------|-------------------------|-----------------|-------------------------------|---------------------------------|--------------------------------|
| NPS          | DN  |                            |               |                       |                |                          | 20 °C (71 °F)           | 220 °C (428 °F) | 450 °C <sup>1)</sup> (842 °F) | With standard direction of flow | With reverse direction of flow |
| 1            | 25  | 40                         | 16            | 60                    | 2/3            | 2.5                      | 6.9                     | 5.5             | 4                             | 15                              | 10                             |
|              |     |                            |               |                       | 4              | 4                        | 7.5                     | 6.1             | 4.5                           | 20                              | 20                             |
|              |     |                            |               | 30                    | 5/6            | 5.5                      | 8                       | 8               | 8                             | 17                              | 12                             |
| 1½           | 40  | 120                        | 16            | 100                   | 2/3            | 2.5                      | 4.8                     | 3.9             | 2.9                           | 20                              | 17                             |
|              |     |                            |               | 60                    | 4              | 4                        | 7.5                     | 6.1             | 4.5                           | 20                              | 19                             |
|              |     |                            |               |                       | 5/6            | 5.5                      | 8                       | 6.7             | –                             | 20                              | 20                             |
| 2            | 50  | 160                        | 16            | 150                   | 2/3            | 2.5                      | 5.6                     | 5               | 4.4                           | 20                              | 20                             |
|              |     |                            |               | 100                   | 4              | 4                        | 8                       | 7.6             | 6.6                           | 20                              | 20                             |
|              |     |                            |               | 60                    | 5/6            | 5.5                      | 8                       | 8               | 8                             | 20                              | 20                             |
| 3            | 80  | 400                        | 16            | 220                   | 2/3            | 2.5                      | 3.8                     | 3.5             | 3.1                           | 20                              | 20                             |
|              |     |                            |               | 150                   | 4              | 4                        | 6.2                     | 5.6             | 5                             | 20                              | 20                             |
|              |     |                            |               | 100                   | 5/6            | 5.5                      | 8                       | 8               | 7.2                           | 20                              | 18                             |
| 4            | 100 | 700                        | 25            | 450                   | 2/3            | 2.5                      | 6.6                     | 6               | 5.2                           | 18                              | 15                             |
|              |     |                            |               | 300                   | 4              | 4                        | 8                       | 8               | 8                             | 18                              | 16                             |
|              |     |                            |               | 220                   | 5/6            | 5.5                      | 8                       | 8               | 8                             | 20                              | 19                             |
| 6            | 150 | 1400                       | 25            | 600                   | 3              | 3                        | 5.5                     | 5               | 4.4                           | 11                              | 8                              |
|              |     |                            |               |                       | 4              | 4                        | 5.9                     | 5.4             | 4.8                           | 20                              | 20                             |
|              |     |                            |               | 450                   | 5/6            | 5.5                      | 7.8                     | 7.1             | 6.3                           | 20                              | 20                             |
|              |     |                            |               | 300                   | 5/6            | 5.5                      | 8                       | 8               | 8                             | 6                               | 3                              |
| 8            | 200 | 2000                       | 36            | 1200                  | 2/3            | 2.5                      | 5                       | 4.5             | 3.9                           | 9                               | 6                              |
|              |     |                            |               |                       | 4              | 4                        | 5.6                     | 5.1             | 4.5                           | 20                              | 20                             |
|              |     |                            |               | 900                   | 5/6            | 5.5                      | 7.8                     | 7.1             | 6.3                           | 20                              | 20                             |
| 10           | 250 | 3100                       | 36            | 1200                  | 4              | 4                        | 5.6                     | 5.1             | 4.5                           | 9                               | 6                              |
|              |     |                            |               |                       | 5/6            | 5.5                      | 6.2                     | 5.7             | –                             | 19                              | 16                             |
|              |     |                            |               | 900                   | 5/6            | 5.5                      | 7.8                     | 7.1             | 6.3                           | 7                               | 5                              |
| 12           | 300 | 3100                       | 36            | 1200                  | 4              | 4                        | 5.6                     | 5.1             | 4.5                           | 9                               | 6                              |
|              |     |                            |               |                       | 5/6            | 5.5                      | 6.2                     | 5.7             | –                             | 19                              | 16                             |
|              |     |                            |               | 900                   | 5/6            | 5.5                      | 7.8                     | 7.1             | 6.3                           | 7                               | 5                              |

<sup>1)</sup> Version with insulating section

**Table 5.2:** Permissible differential pressures for valve CLOSED · For both fail-safe positions · With Type 3278 Rotary Actuator

| Nominal size |     | C <sub>v</sub> coefficient | Shaft Ø in mm | Actuator area in cm <sup>2</sup> | Bench range <sup>1)</sup> | Required supply pressure | Max. supply pressure at |                 | Δp with soft or metal seal      |                                |
|--------------|-----|----------------------------|---------------|----------------------------------|---------------------------|--------------------------|-------------------------|-----------------|---------------------------------|--------------------------------|
| NPS          | DN  |                            |               |                                  |                           |                          | 20 °C (71 °F)           | 220 °C (428 °F) | With standard direction of flow | With reverse direction of flow |
| 1            | 25  | 40                         | 16            | 160                              | 0.5 to 1.0                | 1.5                      | 2.5                     | 2               | 17                              | 12                             |
|              |     |                            |               |                                  | 0.8 to 1.6                | 2.4                      | 3                       | 2.6             | 20                              | 20                             |
| 1½           | 40  | 120                        | 16            | 160                              | 0.5 to 1.0                | 1.5                      | 2.5                     | 2               | 10                              | –                              |
|              |     |                            |               |                                  | 0.8 to 1.6                | 2.4                      | 3                       | 2.6             | 20                              | 20                             |
| 2            | 50  | 160                        | 16            | 160                              | 0.8 to 1.6                | 2.5                      | 4.5                     | 4.1             | 20                              | 20                             |
| 3            | 80  | 400                        | 16            | 160                              | 1.2 to 2.4                | 3.7                      | 5.2                     | 4.7             | 7                               | –                              |
|              |     |                            |               |                                  | 1.7 to 3.4                | 5.1                      | 5.8                     | 5.4             | 20                              | 20                             |
| 4            | 100 | 700                        | 25            | 320                              | 0.8 to 1.6                | 2.4                      | 4.8                     | 4.4             | 9                               | 4                              |
|              |     |                            |               |                                  | 1.2 to 2.4                | 3.6                      | 5.4                     | 5               | 20                              | 20                             |
| 6            | 150 | 1400                       | 25            | 320                              | 1.7 to 3.4                | 5.1                      | 6                       | 5.6             | 12                              | 10                             |

<sup>1)</sup> Only applies to standard direction of flow

**Table 6:** Permissible shaft and opening torques

| Nominal size |     | Shaft end                 | Perm. shaft torque [Nm] at |                 | Valve seat type | Opening torque in Nm at room temperature |        |        |        |                                 |        |        |        |
|--------------|-----|---------------------------|----------------------------|-----------------|-----------------|------------------------------------------|--------|--------|--------|---------------------------------|--------|--------|--------|
| NPS          | DN  |                           | 20 °C (71 °F)              | 220 °C (428 °F) |                 | Standard direction of flow at Δp         |        |        |        | Reverse direction of flow at Δp |        |        |        |
|              |     |                           |                            |                 |                 | 5 bar                                    | 10 bar | 15 bar | 20 bar | 5 bar                           | 10 bar | 15 bar | 20 bar |
| 1            | 25  | Key drive or square drive | 70                         | 54              | S               | 9                                        | 9      | 11     | 13     | 10                              | 11     | 13     | 15     |
|              |     |                           |                            |                 | A/E             | 8                                        | 9      | 10     | 12     | 9                               | 10     | 11     | 13     |
| 1½           | 40  | Key drive or square drive | 70                         | 54              | S               | 12                                       | 12     | 14     | 16     | 13                              | 14     | 16     | 18     |
|              |     |                           |                            |                 | A/E             | 10                                       | 11     | 12     | 14     | 11                              | 12     | 13     | 15     |
| 2            | 50  | Key drive or square drive | 125                        | 110             | S               | 14                                       | 14     | 16     | 18     | 15                              | 16     | 18     | 20     |
|              |     |                           |                            |                 | A/E             | 11                                       | 12     | 13     | 15     | 12                              | 13     | 14     | 16     |
| 3            | 80  | Key drive or square drive | 125                        | 110             | S               | 24                                       | 26     | 28     | 30     | 27                              | 29     | 31     | 33     |
|              |     |                           |                            |                 | A/E             | 19                                       | 21     | 24     | 27     | 21                              | 23     | 26     | 29     |
| 4            | 100 | Key drive or square drive | 500                        | 440             | S               | 50                                       | 60     | 70     | 80     | 55                              | 65     | 75     | 85     |
|              |     |                           |                            |                 | A/E             | 40                                       | 45     | 55     | 65     | 45                              | 50     | 60     | 70     |
| 6            | 150 | Key drive or square drive | 500                        | 440             | S               | 100                                      | 110    | 120    | 130    | 110                             | 120    | 130    | 140    |
|              |     |                           |                            |                 | A/E             | 70                                       | 80     | 100    | 120    | 80                              | 90     | 110    | 130    |
| 8            | 200 | Square drive              | 860                        | 750             | S               | 170                                      | 190    | 225    | 285    | 190                             | 210    | 245    | 305    |
|              |     |                           |                            |                 | A/E             | 100                                      | 145    | 190    | 230    | 110                             | 155    | 200    | 240    |
| 10           | 250 | Square drive              | 860                        | 750             | S               | 260                                      | 300    | 350    | 410    | 290                             | 330    | 380    | 440    |
|              |     |                           |                            |                 | A/E             | 155                                      | 230    | 305    | 375    | 170                             | 245    | 320    | 390    |
| 12           | 300 | Square drive              | 860                        | 750             | S               | 260                                      | 300    | 350    | 410    | 290                             | 330    | 380    | 440    |
|              |     |                           |                            |                 | A/E             | 155                                      | 230    | 305    | 375    | 170                             | 245    | 320    | 390    |

**Table 7:** Dimensions and weights of Type 3310 Valves · Dimensions in mm · Weights in kg

| Nominal size                                                               |                                         | NPS                    | 1    | 1½   | 2    | 3     | 4     | 6     | 8     | 10    | 12    |
|----------------------------------------------------------------------------|-----------------------------------------|------------------------|------|------|------|-------|-------|-------|-------|-------|-------|
|                                                                            |                                         | DN                     | 25   | 40   | 50   | 80    | 100   | 150   | 200   | 250   | 300   |
| Face-to-face dimension according to DIN EN 558-2 Series 36 or ISA 75.08.02 | Standard – Form B1 – Raised face (DIN)  | L<br>(Type 21)         | 102  | 114  | 124  | 165   | 194   | 229   | 243   | 297   | 338   |
|                                                                            | DEM – Form C – Tongue (DIN)             |                        |      |      |      |       |       |       |       |       |       |
|                                                                            | DEF – Form D – Groove (DIN)             |                        |      |      |      |       |       |       |       |       |       |
|                                                                            | SEM – Form E – Male face (DIN)          |                        |      |      |      |       |       |       |       |       |       |
|                                                                            | SEF – Form F – female face (DIN)        |                        |      |      |      |       |       |       |       |       |       |
|                                                                            | RF – Raised Face (ASME)                 |                        |      |      |      |       |       |       |       |       |       |
|                                                                            | LFF – Large Female Face (ASME)          | L                      | 112  | 124  | 134  | 175   | 204   | 239   | 253   | 307   | 348   |
|                                                                            | SFF – Small Female Face (ASME)          |                        |      |      |      |       |       |       |       |       |       |
|                                                                            | LGF – Large Groove Face (ASME)          |                        |      |      |      |       |       |       |       |       |       |
|                                                                            | SGF – Small Groove Face (ASME)          | L                      | 116  | 128  | 138  | 179   | 208   | 243   | 257   | 311   | 352   |
|                                                                            | LMF – Large Male Face (ASME)            |                        |      |      |      |       |       |       |       |       |       |
|                                                                            | SMF – Small Male Face (ASME)            |                        |      |      |      |       |       |       |       |       |       |
|                                                                            | LTF – Large Tongue Face (ASME)          |                        |      |      |      |       |       |       |       |       |       |
|                                                                            | STF – Small Tongue Face (ASME)          |                        |      |      |      |       |       |       |       |       |       |
| Shaft end diameter                                                         | Ø d                                     |                        | 16   | 16   | 16   | 16    | 25    | 25    | 36    | 36    | 36    |
| Dimensions of square drive on shaft end                                    | SW <sup>1)</sup>                        |                        | 12   | 12   | 12   | 12    | 19    | 19    | 27    | 27    | 27    |
| Flange connection according to DIN EN ISO 5211                             | Type SRP/DAP (AIR TORQUE)               | F05 VK14 <sup>2)</sup> | •    | •    | •    | –     | –     | –     | –     | –     | –     |
|                                                                            |                                         | F07 VK17 <sup>2)</sup> | •    | •    | •    | •     | –     | –     | –     | –     | –     |
|                                                                            |                                         | F10 VK22 <sup>2)</sup> | –    | –    | •    | •     | •     | •     | –     | –     | –     |
|                                                                            |                                         | F12 VK27 <sup>2)</sup> | –    | –    | –    | –     | •     | •     | •     | •     | •     |
|                                                                            |                                         | F14 VK36 <sup>2)</sup> | –    | –    | –    | –     | •     | •     | •     | •     | •     |
|                                                                            |                                         | F16 VK46 <sup>2)</sup> | –    | –    | –    | –     | –     | –     | •     | •     | •     |
|                                                                            | Type 3278                               | F05 Ø 16               | •    | •    | •    | –     | –     | –     | –     | –     | –     |
|                                                                            |                                         | F07 Ø 16               | •    | •    | •    | •     | –     | –     | –     | –     | –     |
|                                                                            |                                         | F10 Ø 25               | –    | –    | –    | –     | •     | •     | –     | –     | –     |
|                                                                            |                                         | F12 Ø 25               | –    | –    | –    | –     | •     | •     | –     | –     | –     |
| Other dimensions                                                           |                                         | A                      | 107  | 117  | 126  | 145   | 170   | 206   | 254   | 281   | 281   |
|                                                                            |                                         | B                      | 72.2 | 82.2 | 91.2 | 110.2 | 135.2 | 171.2 | 198.7 | 227.2 | 227.2 |
|                                                                            |                                         | C                      | 50   | 50   | 50   | 50    | 55    | 55    | 80    | 80    | 80    |
|                                                                            | Type SRP/DAP (AIR TORQUE)               | E                      | 15   | 15   | 15   | 18    | 23    | 23    | 35    | 35    | 35    |
|                                                                            | Type 3278                               |                        | 31   | 31   | 31   | 34.3  | 49.2  | 49.2  | –     | –     | –     |
|                                                                            | Insulating section                      | F                      | 170  | 170  | 170  | 170   | 253   | 253   | 253   | 253   | 253   |
|                                                                            |                                         | G                      | 100  | 100  | 84   | 84    | 130   | 130   | 150   | 150   | 150   |
|                                                                            |                                         | H                      | –    | –    | 34   | 55    | 58    | 58    | 84    | 84    | 84    |
|                                                                            |                                         | Ø I                    | 14   | 14   | 10.5 | 10.5  | 13    | 13    | 17    | 17    | 17    |
|                                                                            |                                         | Ø J                    | 63   | 63   | 63   | 63    | 78    | 78    | 100   | 100   | 100   |
| Weights                                                                    | Valve                                   | PN 16 B1               | 6.6  | 9.5  | 11.6 | 18.3  | 29.6  | 46.7  | 73    | 98    | 136   |
|                                                                            |                                         | PN 40 B1               | 6.6  | 9.5  | 12.9 | 20.9  | 32.8  | 52.2  | 91    | 129   | 178   |
|                                                                            |                                         | Class 150 RF           | 6    | 7.5  | 10.4 | 20.5  | 31.8  | 47.2  | 81.8  | 107   | 153   |
|                                                                            |                                         | Class 300 RF           | 7    | 10   | 13.4 | 23.6  | 39.1  | 62.1  | 102   | 143   | 201   |
|                                                                            | Additional weight of insulating section |                        | 3.7  | 3.7  | 4.4  | 6.9   | 16.2  | 16.2  | 23.2  | 23.2  | 23.2  |

<sup>1)</sup> SW = Width across flats<sup>2)</sup> VK = Square drive

**Table 8:** Dimensions and weights of AIR TORQUE Type SRP/DAP Pneumatic Rotary Actuator · Dimensions in mm · Weights in kg

| Actuator                                          |          | 30          | 60          | 100         | 150         | 220         | 300         | 450         | 600         | 900   | 1200  | 2000  |
|---------------------------------------------------|----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------|-------|-------|
| M1                                                |          | 153.5       | 203.5       | 241         | 259         | 304         | 333         | 394.5       | 422.5       | 474   | 528   | 605   |
| M2                                                |          | 85          | 102         | 115         | 127         | 145         | 157         | 177         | 196         | 220.5 | 245   | 298.5 |
| M3                                                |          | 84.5        | 93          | 106         | 118.5       | 136         | 146.5       | 166         | 181         | 200   | 221.5 | 262   |
| M4                                                |          | 20          | 20          | 20          | 20          | 30          | 30          | 30          | 30          | 50    | 50    | 50    |
| Flange connection according to<br>DIN EN ISO 5211 |          | F05/<br>F07 | F05/<br>F07 | F05/<br>F07 | F07/<br>F10 | F07/<br>F10 | F07/<br>F10 | F10/<br>F12 | F10/<br>F12 | F14   | F14   | F16   |
| Weight                                            | Type SRP | 1.7         | 3.1         | 4.3         | 6.1         | 9.3         | 12          | 17          | 22          | 33    | 42    | 67    |
|                                                   | Type DAP | 1.6         | 2.7         | 3.7         | 5.2         | 8           | 9.8         | 14          | 18          | 24    | 34    | 53    |

**Table 9:** Dimensions and weights of handwheel ILG-D · Dimensions in mm · Weights in kg

| Handwheel                                 | 200                       | 600   | 900  | 1500  | 2400 | 5000  |
|-------------------------------------------|---------------------------|-------|------|-------|------|-------|
| N1                                        | 122                       | 145   | 160  | 175   | 194  | 209   |
| N2                                        | 42                        | 51    | 56.5 | 55    | 62   | 72    |
| N3                                        | 186                       | 217.5 | 286  | 349   | 356  | 387.5 |
| N4                                        | 53.2                      | 64.5  | 84.5 | 107.5 | 127  | 155   |
| N5                                        | 100                       | 200   | 400  | 500   | 600  | 800   |
| Flange connection acc. to DIN EN ISO 5211 | See valve data in Table 7 |       |      |       |      |       |
| Weight                                    | 7.3                       | 17    | 21   | 34    | 54   | 80    |

**Table 10:** Dimensions and weights of handwheel ILG-S · Dimensions in mm · Weights in kg

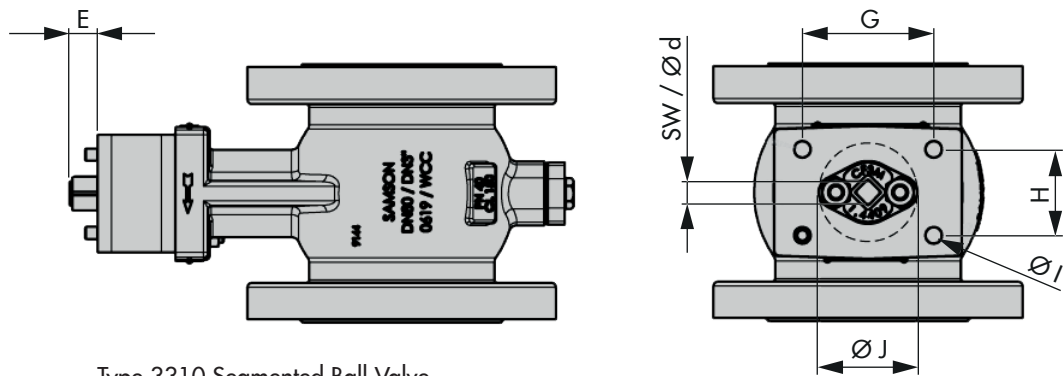
| Handwheel                                 | 210                       | 550  | 880 | 1250   |
|-------------------------------------------|---------------------------|------|-----|--------|
| N1                                        | 84.5                      | 119  | 131 | 149    |
| N2                                        | 29.6                      | 40.5 | 42  | 48     |
| N3                                        | 188                       | 230  | 270 | 311    |
| N4                                        | 52                        | 71   | 86  | 104 ,5 |
| N5                                        | 100                       | 200  | 200 | 300    |
| Flange connection acc. to DIN EN ISO 5211 | See valve data in Table 7 |      |     |        |
| Weight                                    | 5                         | 10   | 14  | 22     |

**Table 11:** Dimensions and weights of handwheel AB · Dimensions in mm · Weights in kg

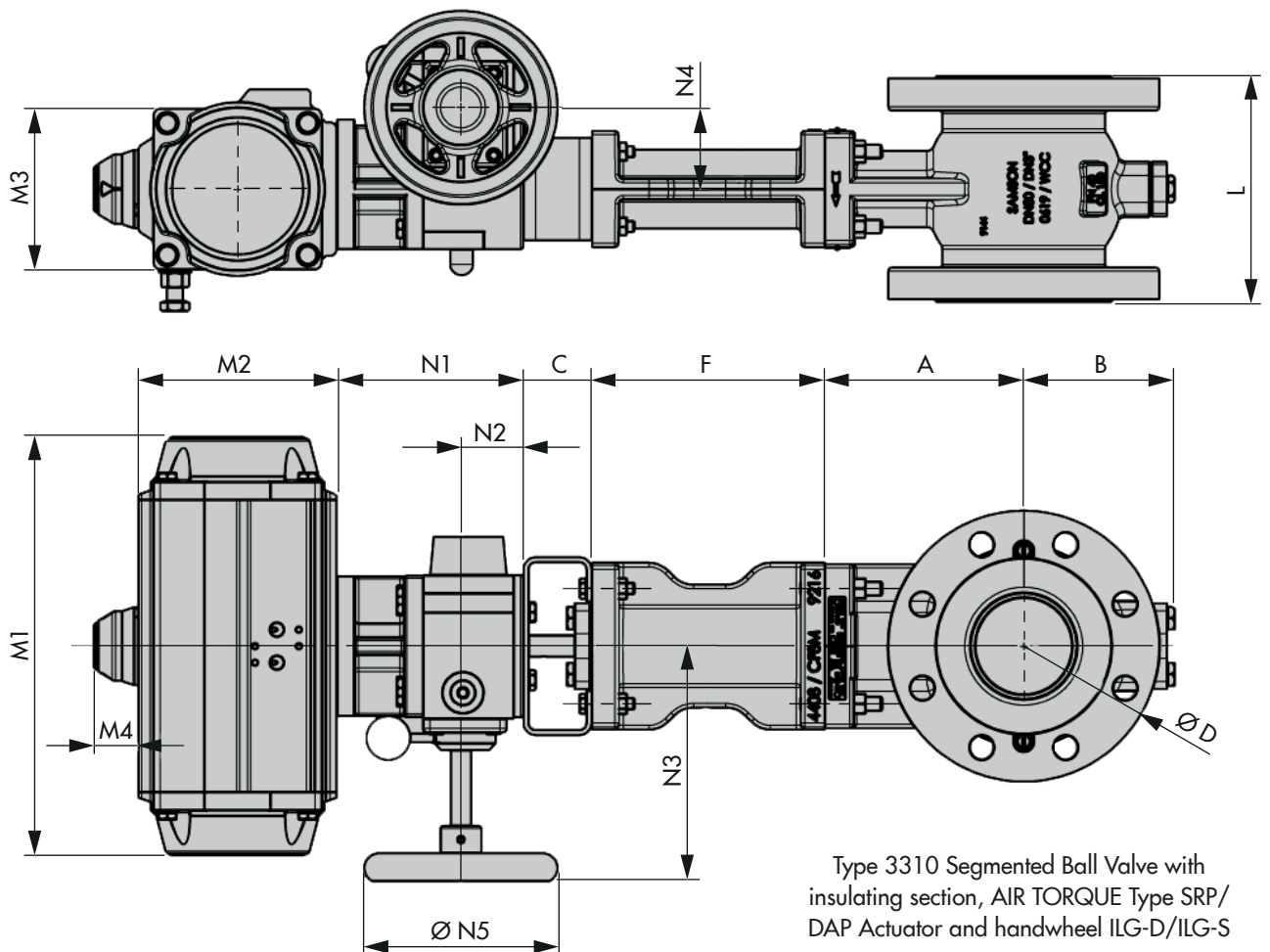
| Nominal size NPS                          | 1 to 2                    | 3     | 4 to 6 | 8 to 12 |
|-------------------------------------------|---------------------------|-------|--------|---------|
| Handwheel                                 | 150                       | 210   | 550    | 550     |
| R1                                        | 124                       | 127.5 | 174    | 174     |
| R2                                        | 80                        | 102   | 138    | 138     |
| R3                                        | 48.5                      | 54    | 79     | 79      |
| R4                                        | 42.5                      | 52    | 71     | 71      |
| R5                                        | 100                       | 200   | 200    | 300     |
| R6                                        | 115.5                     | 187   | 230    | 283     |
| Flange connection acc. to DIN EN ISO 5211 | See valve data in Table 7 |       |        |         |
| Weight                                    | 2.2                       | 3.5   | 8.5    | 8.5     |

**Table 12:** Dimensions and weights of Type 3278 Pneumatic Rotary Actuator · Dimensions in mm · Weights in kg

| Actuator                                  | 160 cm <sup>2</sup> | 320 cm <sup>2</sup> |
|-------------------------------------------|---------------------|---------------------|
| Ø O1                                      | 225                 | 295                 |
| O2                                        | 260                 | 421                 |
| O3                                        | 332                 | 516                 |
| O4                                        | 132                 | 183                 |
| Ø O5                                      | 250                 | 385                 |
| O6                                        | 120                 | 150                 |
| O7                                        | 118                 | 162                 |
| Flange connection acc. to DIN EN ISO 5211 | F07                 | F12                 |
| Weight                                    | 16                  | 50                  |



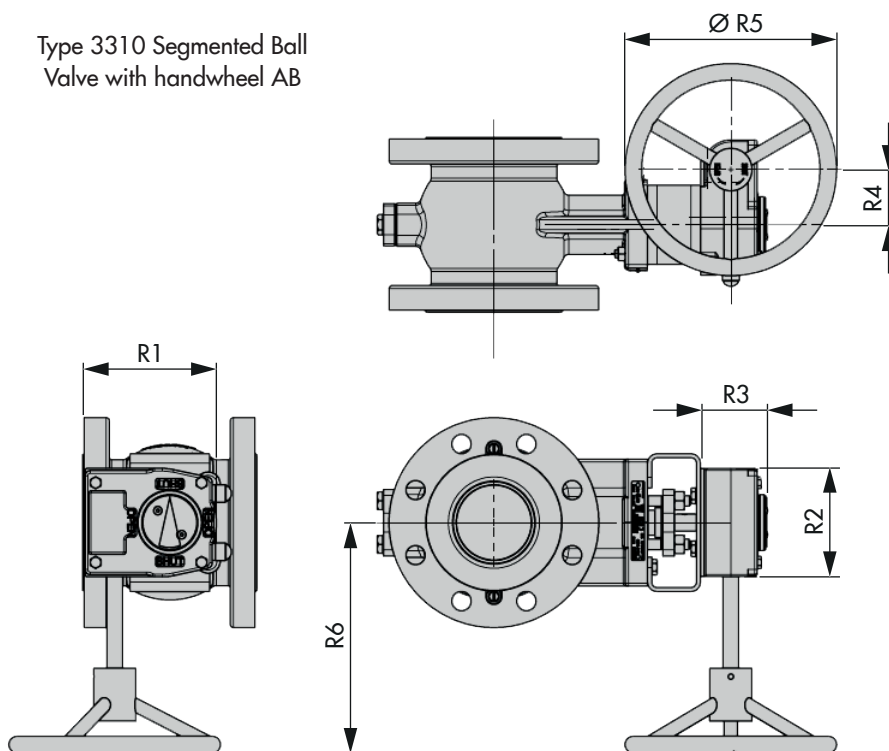
Type 3310 Segmented Ball Valve



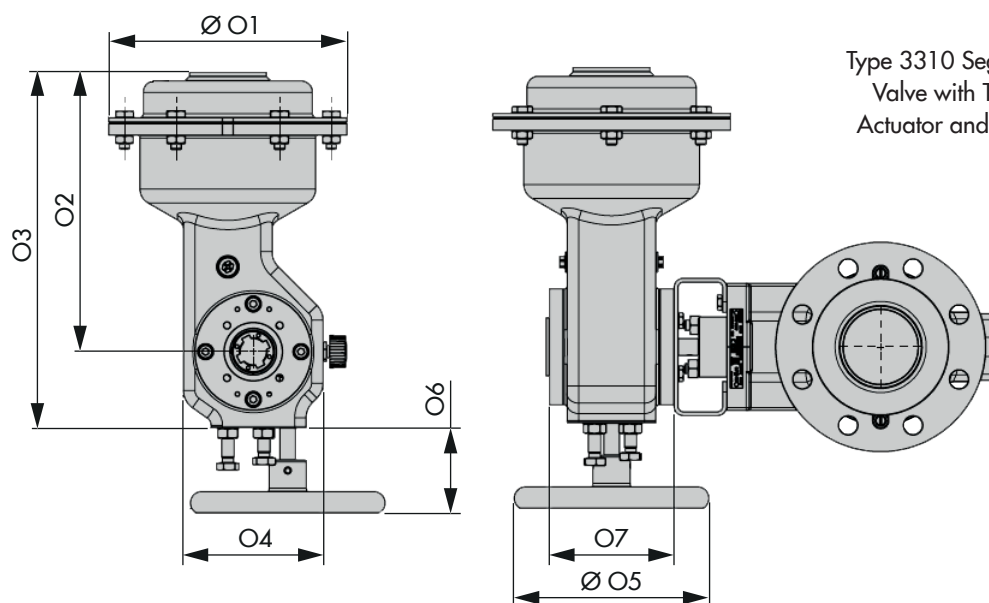
Type 3310 Segmented Ball Valve with  
insulating section, AIR TORQUE Type SRP/  
DAP Actuator and handwheel ILG-D/ILG-S

## Dimensional drawings

Type 3310 Segmented Ball  
Valve with handwheel AB



Type 3310 Segmented Ball  
Valve with Type 3278  
Actuator and handwheel



## Order numbers

|                   |                            |                    |                                                           |
|-------------------|----------------------------|--------------------|-----------------------------------------------------------|
| Nominal size      | DN .../NPS ...             | Rotary actuator    | Type SRP (AIR TORQUE), Type DAP (AIR TORQUE) or Type 3278 |
| Pressure rating   | PN .../Class ...           | Fail-safe position | Fail-close or fail-open                                   |
| Body material     | Refer to Table 2           | Supply air         | ... bar                                                   |
| Gasket            | Metal or soft seal         | Operating range    | Number of springs or bench range                          |
| Characteristic    | Equal percentage or linear | Valve accessories  | Positioner and/or limit switch                            |
| Direction of flow | Standard or reverse        |                    |                                                           |