

T 8055 EN

Type 3253-1 and Type 3253-7 Pneumatic Control Valves

Type 3253 Three-way Valve · DIN version



Application

Mixing or diverting valve for process engineering applications with high industrial requirements

| | |
|-------------------------|------------------------|
| Nominal size | DN 15 to 500 |
| Nominal pressure | PN 10 to 400 |
| Temperatures | -196 to +550 °C |

Type 3253 Three-way Valve with

- Type 3271 Pneumatic Actuator (Type 3253-1 Control Valve)
- Type 3277 Pneumatic Actuator (Type 3253-7 Control Valve) for integral positioner attachment

Valve body made of

- Cast iron
- Cast steel
- Cast stainless steel, high-temperature cast steel or cast cold-resisting steel

Two spring-loaded PTFE V-ring packings or two adjustable high-temperature packings

On request with a test connection between the two packings.

Conversion between mixing and diverting services by **reversing** the seat-guided valve plug

The control valves, designed according to the modular assembly principle, can be equipped with various accessories: Positioners, limit switches, solenoid valves and other accessories according to IEC 60534-6 and NAMUR recommendation. Refer to Information Sheet ▶ T 8350 for more details.

Versions

Standard version with PTFE packing for temperatures from -10 to +220 °C or with adjustable high-temperature packing for -10 to +350 °C

- **Type 3253-1** (Fig. 1) · Type 3253 Valve and Type 3271 Actuator with 350 to 2800 cm² actuator area (see Data Sheets ▶ T 8310-1, ▶ T 8310-2 and ▶ T 8310-3)
- **Type 3253-7** · Type 3253 Valve and Type 3277 Pneumatic Actuator with 350 to 700 cm² actuator area, for integral positioner attachment (see Data Sheet ▶ T 8310-1)

Further versions

- **Insulating section or bellows seal** · See Technical data
- **Additional handwheel** · See Data Sheets ▶ T 8310-1, ▶ T 8310-2 and ▶ T 8310-3



Fig. 1: Type 3253-1 Pneumatic Control Valve with Type 3271 Actuator

- **ANSI version** · NPS ½ to 20, Class 300 to 2500 · See Data Sheet ▶ T 8056
- **Type 3244** · DN 15 to 150, PN 10 to 40; NPS ½ to 6, Class 150 to 300 · See Data Sheet ▶ T 8026
- **Type 3253-2 Electric Control Valve** · Details on request
- **Type 3253-3 Manually Operated Valve** with Type 3273 Hand-operated Actuator · See Data Sheet ▶ T 8312

Principle of operation

Depending on the plug arrangement, the three-way valve can be used either as a mixing or diverting valve.

In mixing valves, the process media to be mixed enter at valve ports A and B. The combined flow exits the valve at port AB (Fig. 2 and Fig. 3). The flow rate from ports A or B to AB depends on the cross-sectional area of flow between the seats and plugs.

In diverting valves, the process medium enters at the valve port AB and the partial flows exit at ports A and B (Fig. 4).

Fail-safe position

Depending on how the springs are arranged in the pneumatic actuator (see Data Sheets ► T 8310-1, ► T 8310-2, and ► T 8310-3), the valve has two different fail-safe positions effective upon air supply failure.

- **Actuator stem extends:** when the supply air fails, port B is closed in mixing valves and port A is closed in diverting valves.
- **Actuator stem retracts:** when the supply air fails, port A is closed in mixing valves and port B is closed in diverting valves.

Fig. 2 to Fig. 4 show configuration examples.

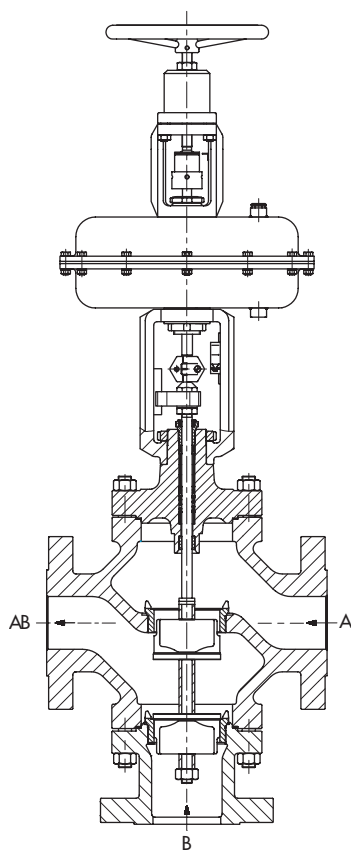


Fig. 2: Type 3253-1 Control Valve with Type 3271 Pneumatic Actuator and additional handwheel, body version for DN 50 to 500, plug arrangement for mixing service (anti-rotation fixture for DN 50 and higher)

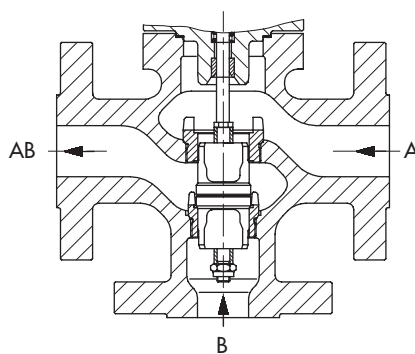


Fig. 3: Type 3253 Three-way Valve, body version for DN 15 to 40, plug arrangement for mixing service
plug arrangement for diverting service DN 15 to 25

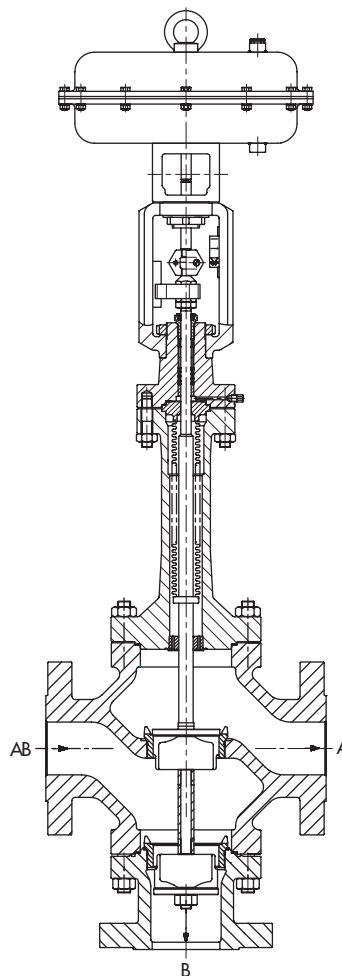


Fig. 4: Type 3253-7 Control Valve with Type 3277 Pneumatic Actuator (only up to DN 100), body version for DN 40 to 500, plug arrangement for diverting service (anti-rotation fixture for DN 50 and higher)

Table 1: Technical data for Type 3253

| Material | | Cast iron EN-JL1040 | | Cast steel 1.0619 | | Cast steel 1.7357 | Cast stainless steel 1.4408 | |
|--|------------|--|------------|----------------------|------------|----------------------|--------------------------------|--------------|
| Nominal size ¹⁾ | DN | 150 to 200 | 250 to 500 | 15 to 100 | 150 to 300 | 15 to 300 | 15 to 100 | 150 to 300 |
| Nominal pressure ¹⁾ | PN | 16 | 10 | 16 to 160 | 16 to 160 | 16 to 160 | 16 to 160 | 16 to 160 |
| Type of connection | Flanges | All DIN EN versions | | | | | | |
| Seat-plug seal | | Metal seal | | | | | | |
| Characteristic | | Linear | | | | | | |
| Rangeability | | 50:1 | | | | | | |
| Temperature ranges in °C · Permissible operating pressures acc. to pressure-temperature diagrams (see Information Sheet ► T 8000-2) | | | | | | | | |
| Body without insulating section | | -10 to +220 °C · Up to +350 °C with high-temperature packing | | | | | | |
| Body with insulating section or bellows seal | | -10 to +300 | | -10 to +400 | | -10 to +500 | | -196 to +550 |
| Valve plug | Metal seal | -196 to +550 | | | | | | |
| Leakage class according to IEC 60534-4 | | ≤ 0.05 % of K _{VS} coefficient | | | | | | |
| Compliance | | CE · EAC | | | | | | |

¹⁾ Up to PN 400 on request · DN 400: PN 16 to 40 · DN 500: PN 16 to 40

Table 2: Materials (EN material number)

| Standard version Body | Cast iron EN-JL1040 | Cast steel 1.0619 | Cast steel 1.7357 | Cast stainless steel 1.4408 |
|-----------------------------|------------------------|---|----------------------|--------------------------------|
| Valve bonnet | | 1.0460/1.0619 | | 1.4408/1.4401 |
| Seat and plug ¹⁾ | | 1.4006/1.4008 | | 1.4409/1.4404 |
| Guide bushings | | 1.4112 | | 2.4610 |
| Packing ²⁾ | | V-ring packing: PTFE with carbon; spring: 1.4310 · High-temperature packing | | |
| Body gaskets | | Graphite seal on metal core | | |
| Insulating section | | 1.0460/1.0619 | | 1.4408/1.4401 |
| Metal bellows seal | | | | |
| Intermediate piece | | 1.0460/1.0619 | | 1.4408/1.4401 |
| Metal bellows | | 1.4571 ³⁾ | | |

¹⁾ All seats and plugs also available with Stellite® facing

²⁾ Other packings on request (► T 8000-1)

³⁾ Other bellows material on request

Table 3: Available K_{VS} coefficients

Terms for control valve sizing according to IEC 60534, Parts 2-1 and 2-2: $F_L = 0.95$, $X_T = 0.75$

| K _{VS} | 4 | 8 | 25 | 40 | 100 | 160 | 360 | 630 | 800 | 1500 | 2500 | 3600 |
|-------------------|----|---|----|----|-----|-----|-----|-----|-----|------|------|------|
| Seat Ø | 24 | | 38 | 50 | 80 | 100 | 150 | 200 | 250 | 300 | 400 | 500 |
| Rated travel | 15 | | 30 | | | 60 | | | 120 | | | |
| DN | | | | | | | | | | | | |
| 15 | • | | | | | | | | | | | |
| 25 | | • | | | | | | | | | | |
| 40 | | | • | | | | | | | | | |
| 50 | | | | • | | | | | | | | |
| 80 | | | | | • | | | | | | | |
| 100 | | | | | | • | | | | | | |
| 150 | | | | | | | • | | | | | |
| 200 | | | | | | | | • | | | | |
| 250 ¹⁾ | | | | | | | | | • | | | |
| 300 | | | | | | | | | | • | | |
| 400 | | | | | | | | | | | • | |
| 500 | | | | | | | | | | | | • |

¹⁾ Special version K_{VS} 1000 only for DN 250 as mixing valve with 120 mm travel

Notes on the differential pressure tables

- Bench ranges highlighted in gray apply to standard operation ($p_2 = 0$), i.e. at rated travel · Bench ranges not highlighted apply to the maximum pretensioned springs
- Bench ranges not highlighted apply to the maximum pretensioned springs.
- Differential pressures in parentheses refer to the values for half travel in parentheses in the bench range row
- The springs in actuators with fail-safe action "actuator stem retracts" cannot be preloaded.

Table 4: Differential pressures

Table 4.1: Permissible differential pressures Δp for valves with and without bellows seal · Fail-safe position "actuator stem extends" · Pressures in bar

| Bench range [bar] with actuator area [cm ²] | | | | | 350 | 700 | 1400 | 2800 | 2 x 2800 |
|---|-----------------|-------------|----------------|-----------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|
| | | | | | 0.2 to 1.0 (0.8 to 1.2) | 0.4 to 2.0 (1.6 to 2.4) | 1.4 to 2.3 (1.85 to 2.3) | 2.1 to 3.3 (2.7 to 3.3) | - |
| | | | | | | | 0.5 to 2.5 (2 to 3) | 1.1 to 2.4 (2.05 to 2.7) | 1.3 to 2.8 (2.45 to 3.2) |
| | | | | | - | - | 1.1 to 2.3 (2.0 to 2.6) | 1.3 to 3.3 | |
| | | | | | Required supply pressure | | | | |
| DN | K _{VS} | Travel [mm] | Seat bore [mm] | Actuator [cm ²] | Δp in bar | | | | |
| 15 | 4 | 15 | 24 | 350 | 8 | 22 | 90 | 140 | - |
| | | | | 700 | (105) | (215) | (250) | (370) | - |
| 25 | 8 | 15 | 24 | 350 | 8 | 22 | 90 | 140 | - |
| | | | | 700 | (105) | (215) | (250) | (370) | - |
| 40 | 25 | 15 | 38 | 350 | - | 8 | 35 | 55 | - |
| | | | | 700 | (140) | (85) | (100) | (145) | - |
| 50 | 40 | 30 | 50 | 700 | 4 | 10 | 42 | 65 | - |
| | | | | 1400 | (49) | (100) | (126) | (129) | (155) |
| 80 | 100 | 30 | 80 | 700 | - | - | (16) | 25 | - |
| | | | | 1400 | (18) | (38) | (49) | (50) | (60) |
| 100 | 160 | 30 | 100 | 700 | - | - | 10 | 15 | - |
| | | | | 1400 | (11) | (24) | (31) | (32) | (38) |
| 150 | 360 | 60 | 150 | 1400 | - | 2 | 3 | 7 | 8.5 |
| | | | | 2800 | - | (22) | (28) | (28) | - |
| 200 | 630 | 60 | 200 | 1400 | - | - | - | 4 | 4.5 |
| | | | | 2800 | - | (12) | (15.5) | (15.5) | - |
| | | | | 2x2800 | - | (25) | (32) | (32) | - |
| 250 | 800 | 60 | 250 | 2800 | - | - | - | (10) | - |
| | | | | 2x2800 | - | - | - | (20) | - |
| 300 | 1500 | 120 | 300 | 2800 | - | - | - | 3.5 | - |
| | | | | 2x2800 | - | - | - | 7.5 | - |
| 400 | 2500 | 120 | 400 | 2800 | - | - | - | - | 2.3 |
| | | | | 2x2800 | - | - | - | - | 5 |
| 500 | 3600 | 120 | 500 | 2x2800 | - | - | - | - | 3 |

Table 4.2: Permissible differential pressures Δp for valves with and without bellows seal · Fail-safe position "actuator stem retracts"
· Pressures in bar

| Bench range [bar] with actuator area [cm ²] | | | | | 350 | 0.2 to 1.0 (0.2 to 0.6) | 0.4 to 2.0 (0.4 to 1.2) | 1.4 to 2.3 (1.4 to 1.85) | 2.1 to 3.3 (2.1 to 2.7) | - |
|---|-----------------|-------------|----------------|--------------------------|-------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|
| | | | | | 700 | | | 0.5 to 2.5 (0.5 to 1.5) | 1.1 to 2.4 (1.1 to 1.75) | 1.3 to 2.8 (1.3 to 2.05) |
| Required supply pressure | | | | | 1400 | - | | 0.5 to 2.5 (0.5 to 1.5) | 1.1 to 2.4 (1.1 to 1.75) | 1.3 to 2.8 (1.3 to 2.05) |
| | | | | | 2800 | | | | 1.1 to 2.3 (1.1 to 1.7) | 1.3 to 3.3 (1.3 to 2.3) |
| Lower spring range value + Upper spring range value | | | | | | | | | | |
| DN | K _{V5} | Travel [mm] | Seat bore [mm] | Actuator cm ² | Δp in bar | | | | | |
| 15 | 4 | 15 | 24 | 350 | 8.5 | 22.5 | 92 | 141 | - | |
| | | | | 700 | (22.5) | (50) | (189) | (287) | - | |
| 25 | 8 | 15 | 24 | 350 | 8.5 | 22.5 | 92 | 141 | - | |
| | | | | 700 | (22.5) | (50) | (189) | (287) | - | |
| 40 | 25 | 15 | 38 | 350 | - | 8 | 36 | 55 | - | |
| | | | | 700 | (8.5) | (19) | (75) | (114) | - | |
| 50 | 40 | 30 | 50 | 700 | 4 | 10.5 | 42.5 | 65 | - | |
| | | | | 1400 | (10.5) | (23.5) | (30) | (68) | (80) | |
| 80 | 100 | 30 | 80 | 700 | - | - | 16 | 25 | - | |
| | | | | 1400 | (3.5) | (9) | (11.5) | (26) | (31.5) | |
| 100 | 160 | 30 | 100 | 700 | - | - | 10.5 | 16 | - | |
| | | | | 1400 | - | (5.5) | (7) | (16.5) | (20) | |
| 150 | 360 | 60 | 150 | 1400 | - | - | - | 7 | 8.5 | |
| | | | | 2800 | - | (5) | (6.5) | (15) | - | |
| 200 | 630 | 60 | 200 | 1400 | - | - | - | 4 | 4.5 | |
| | | | | 2800 | - | - | - | (8) | - | |
| | | | | 2x2800 | - | (5.5) | (7) | (17) | - | |
| 250 | 800 | 60 | 250 | 2800 | - | - | - | (5) | (13) | |
| | | | | 2x2800 | - | - | (4.5) | (10) | - | |
| 300 | 1500 | 120 | 300 | 2800 | - | - | - | - | - | |
| | | | | 2x2800 | - | - | - | 7.5 | 9 | |
| 400 | 2500 | 120 | 400 | 2800 | - | - | - | - | - | |
| | | | | 2x2800 | - | - | - | - | 5 | |
| 500 | 3600 | 120 | 500 | 2x2800 | - | - | - | - | 3 | |

Table 5: Dimensions in mm for standard versions of Type 3253-1 and Type 3253-7**Table 5.1:** Type 3253 Three-way Valve

| Valve | DN | 15 | 25 | 40 | 50 | 80 | 100 | 150 | 200 | 250 | 300 | 400 | 500 | |
|-------------------------|--|------------|------------|-----|-----|-----|-----|-----|------------|-----|-------------------|--------------------|--------------------|-----|
| Length L | PN 10 to 40 | 130 | 160 | 200 | 230 | 310 | 350 | 480 | 600 | 730 | 850 | 1100 | 1250 | |
| | PN 63 to 160 | 210 | 230 | 260 | 300 | 380 | 430 | 550 | 650 | 775 | 900 | 1150 ¹⁾ | 1400 ²⁾ | |
| Height H4 | PN 10 to 40 | 152 | 152 | 164 | 217 | 222 | 242 | 315 | 389 | 441 | 637 | 637 | 735 | |
| | 518 | | | | | | | | | - | | | | |
| | PN 250 to 400 | 186 | 186 | 195 | 251 | 288 | 348 | 445 | 544 | 699 | 811 | - | - | |
| H8 for actua- tor | 350 cm ² | 240 | 240 | 240 | 240 | 240 | 240 | - | | | | | | |
| | 700 cm ² | 240 | 240 | 240 | 240 | 240 | 240 | 418 | 418 | 418 | - | | | |
| | 1400-60 cm ² | - | | | | 295 | 295 | 295 | 418 | 418 | 418 | 503 | 503 | 503 |
| | 1400-120 cm ² 2800 cm ² | | | | | 480 | 480 | 480 | 503 | 503 | 503 ³⁾ | 650 | 650 | 650 |
| H2 (ap- prox.) | PN 10 to 40 | 115 | 115 | 130 | 230 | 275 | 305 | 480 | 520 | 595 | 740 | 830 | 982 | |
| | PN 63 to 160 | 115 | 115 | 130 | 275 | 310 | 370 | 535 | 590 | 730 | 790 | - | | |
| | PN 250 to 320 | 140 | On request | | | | | 587 | On request | | | | | |
| | PN 400 | On request | | | | | 457 | 626 | On request | | | | | |

1) DN 400, up to PN 63

2) DN 500, up to PN 40

3) H8 = 650 mm with 250 mm seat bore

Table 5.2: Types 3271 and 3277 Pneumatic Actuators

| Actuator area | cm ² | 350 | 700 | 1400-60 | 1400-120 | 2800 | 2 x 2800 |
|------------------|-----------------|-----|-----------------|-----------------|-----------------|-------------|-------------|
| Diaphragm ØD | mm | 280 | 390 | 530 | 534 | 770 | 770 |
| H ¹⁾ | mm | 82 | 199 | 337 | 598 | 713 | 1213 |
| H3 ²⁾ | mm | 110 | 190 | 610 | 650 | 650 | 650 |
| H5 | Type 3277 | mm | 101 | 101 | - | - | - |
| | Type 3271 | | M30 x 1.5 | 0 | 0 | M60 x 1.5 | 0 |
| | Type 3277 | | M30 x 1.5 | 0 | 0 | - | - |
| α | Type 3271 | | G 3/8 (3/8 NPT) | G 3/8 (3/8 NPT) | G 3/4 (3/4 NPT) | G 1 (1 NPT) | G 1 (1 NPT) |
| α2 | Type 3277 | | G 3/8 | G 3/8 | - | - | - |

1) Height including lifting eyelet or female thread and eyebolt according to DIN 580. Height of the swivel lifting hook may differ. Actuators up to 355v2 cm² without lifting eyelet or female thread

2) Minimum clearance required to remove the actuator

Table 6: Weights for Type 3253-1 and Type 3253-7 in standard version**Table 6.1:** Type 3253 Three-way Valve

| Valve | DN | 15 | 25 | 40 | 50 | 80 | 100 | 150 | 200 | 250 | 300 | 400 | 500 |
|---|--------------|------------|----|----|----|-----|-----|-----|------------|-----|-----|-----|-----|
| Valve without actuator (approx. kg) ¹⁾ | PN 10 to 40 | On request | | | | | | | | | | | |
| | PN 63 to 160 | 32 | 37 | 50 | 93 | 129 | 165 | 365 | On request | | | - | - |

1) Weights in kg for Type 3253 in PN 250 to 400 on request

Table 6.2: Types 3271 and 3277 Pneumatic Actuators

| Actuator | cm ² | 350 | 700 | 1400-60 | 1400-120 | 2800 | 2 x 2800 |
|---------------------------|-------------------|-----|-----|---------|--------------------------------------|--------------------------------------|------------|
| Type 3271 (approx. kg) | Without handwheel | 8 | 22 | 70 | 175 | 450 | 950 |
| | With handwheel | 13 | 27 | 175 | 300 ¹⁾ /425 ²⁾ | 575 ¹⁾ /700 ²⁾ | On request |
| Type 3277 (approx. kg) | Without handwheel | 12 | 26 | - | | | |
| | With handwheel | 17 | 31 | | | | |

1) Side-mounted handwheel up to 80 mm travel

2) Side-mounted handwheel above 80 mm travel

Table 7: Dimensions in mm and weights in kg for Type 3253 Valve with insulating section · Without actuator

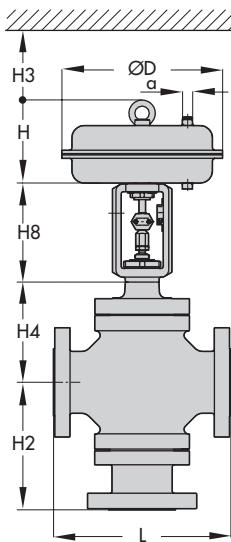
| Valve size | DN | 15 | 25 | 40 | 50 | 80 | 100 | 150 | 200 | 250 | 300 | 400 | 500 |
|-----------------------------------|---------------|------------|-----|-----|-----|-----|-----|-----|------------|------------|------|------|------|
| Height H4 | PN 10 to 160 | 353 | 353 | 365 | 487 | 492 | 512 | 665 | 944 | 1064 | 1135 | 1136 | 1200 |
| | PN 250 to 400 | 382 | 382 | 391 | 516 | 546 | 598 | 789 | 1068 | On request | | | |
| Weight without actuator (approx.) | PN 10 to 40 | On request | | | | | | | | | | | |
| | PN 63 to 160 | 36 | 41 | 53 | 99 | 135 | 171 | 401 | On request | | | - | |

Table 8: Dimensions in mm and weights in kg for Type 3253 with bellows seal · Without actuator

| Valve size | DN | 15 | 25 | 40 | 50 | 80 | 100 | 150 | 200 | 250 | 300 | 400 | 500 |
|-----------------------------------|----------------------------------|------------|-----|-----|-----|-----|------------|-----|------------|---------|------|------|-----|
| Height H4 | 15-120 mm travel PN 10 to 40 | 350 | 350 | 362 | 596 | 601 | 601 | 722 | 1038 | 1493 | 1505 | 1507 | - |
| | 15-60 mm travel PN 63 to 160 | 350 | 350 | 362 | 596 | 601 | 601 | 856 | 1438 | On req. | - | | |
| | 15-60 mm travel PN 250 to 320 | 621 | 621 | 623 | 840 | 842 | On request | | | | - | | |
| | 15-60 mm travel PN 400 | On request | | | | | | | | | - | | |
| Weight without actuator (approx.) | PN 10 to 40 | On request | | | | | | | | | | | |
| | PN 63 to 160 | 37 | 42 | 54 | 100 | 136 | 172 | 406 | On request | | | - | - |

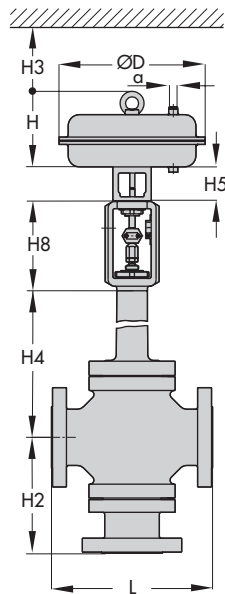
Dimensional drawings

Type 3271 Pneumatic Actuator

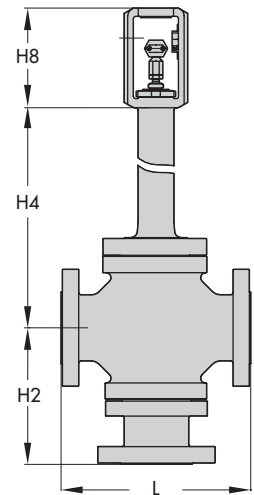


Type 3253-1

Type 3277 Pneumatic Actuator



Type 3253-7



Type 3253 with bellows seal or insulating section

Selection and sizing of the control valve

1. Calculate K_v coefficient according to IEC 60534-6
2. Select nominal size DN and K_{vS} coefficient from Table 3 and Table 4
3. Determine the permissible differential pressure Δp from Table 4
4. Select the valve body material from Table 1 and Table 2 as well as from the pressure-temperature diagrams in Information Sheet ► T 8000-2
5. Select accessories from Table 1 and Table 2.

Order specifications:

| | |
|--------------------|---|
| Nominal size | DN |
| Nominal pressure | PN |
| Body material | According to Table 2 |
| Bonnet | Standard bonnet, insulating section or bellows seal |
| Type of connection | Flanges |
| Actuator | Type 3271 or Type 3277 (see Data Sheets ► T 8310-1, ► T 8310-2 and ► T 8310-3) |
| Fail-safe position | Actuator stem extends/retracts |
| Process medium | Density in kg/m^3 and temperature in $^{\circ}\text{C}$ |
| Flow rate | kg/h or m^3/h in standard or operating state |
| Pressure | p_1 and p_2 in bar (absolute pressure p_{abs}) (with minimum, normal and maximum flow rate) |
| Valve accessories | Positioner and/or limit switch |