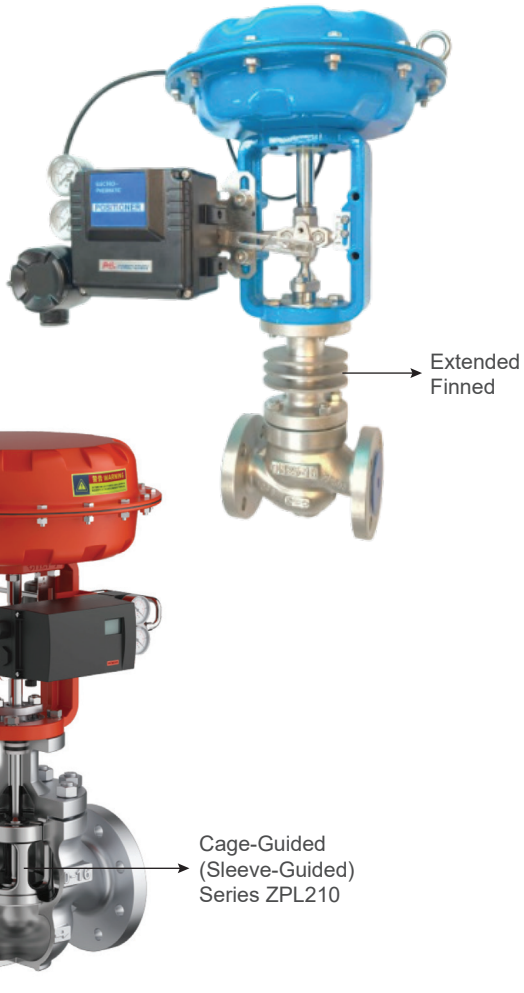
FELLBACH®

# ZPL210 Series

## Pneumatic Sleeve-Guided Single-Seat Control Valve

### DIN-Version
### Flange Dimension and Drilling to DIN-2501

- DN-15 (P10/16/40), PCD 65mm
- DN-20 (P10/16/40), PCD 75mm
- DN-25 (P10/16/40), PCD 85mm
- DN-32 (P10/16/40), PCD 100mm
- DN-40 (P10/16/40), PCD 110mm
- DN-50 (P10/16/40), PCD 125mm
- DN-65 (P10/16/40), PCD 145mm
- DN-80 (P10/16/40), PCD 160mm
- DN-100 (P10/16), PCD 180mm




### TECHNICAL DATA

**ZP6100 Diaphragm Type:**

ZP6102 Diaphragm Type, Stk16mm Ø290
ZP6103 Diaphragm Type, Stk25mm Ø290
ZP6104 Diaphragm Type, Stk40mm Ø365
ZP6105 Diaphragm Type, Stk60mm Ø475
ZP6106 Diaphragm Type, Stk100mm Ø580

### MATERIAL

- **Body** : Stainless Steel CF8 (SS304)
- **Valve Plug (Cage-Guided)** : Stainless Steel CF8 (SS304)
- **Material Seat** : F304
- **Stem** : 17-4PH 304
- **Trim** : 304 + STL
- **Packing** : Graphite + PTFE
- **Maximum Temperature** : +230°C
- **Color of Actuator** : Blue

### PRESSURE RATING

PN10 to 16
**Working Pressure (medium)**
Max.16 bar

### PARAMETERS

| DN | Model No. | Cv | Stoke (mm) | Actuator Type | Air Pressure | Max.Temp |
|---|---|---|---|---|---|---|
| 15 | ZPL210-200 | 4 | 16 | ZP6102 | Max. 4 bar | +230°C |
| 20 | ZPL210-300 | 6.3 | 16 | ZP6102 | Max. 4 bar | +230°C |
| 25 | ZPL210-400 | 10 | 16 | ZP6102 | Max. 4 bar | +230°C |
| 32 | ZPL210-500 | 17 | 25 | ZP6103 | Max. 4 bar | +230°C |
| 40 | ZPL210-600 | 24 | 25 | ZP6103 | Max. 4 bar | +230°C |
| 50 | ZPL210-700 | 44 | 40 | ZP6104 | Max. 4 bar | +230°C |
| 65 | ZPL210-800 | 68 | 40 | ZP6104 | Max. 4 bar | +230°C |
| 100 | ZPL210-900 | 99 | 40 | ZP6104 | Max. 4 bar | +230°C |
| 125 | ZPL210-1000 | 175 | 60 | ZP6105 | Max. 4 bar | +230°C |
| 150 | ZPL210-2000 | 275 | 60 | ZP6105 | Max. 4 bar | +230°C |
| 200 | ZPL210-3000 | 360 | 60 | ZP6105 | Max. 4 bar | +230°C |

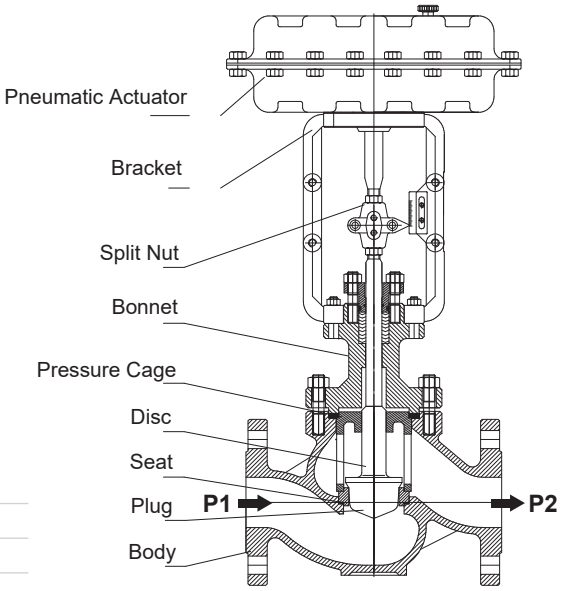
Noted: ZPL210-201 for normally open.
Cv = Kv x 1.15

# Pneumatic Sleeve-Guided Single-Seat Control Valve

## PRODUCT OVERVIEW

The **ZPL210 Series** cage-guided single-seat control valve adopts a **top-guided single-seat sealing structure with a cage and plug.** The valve body features an S-shaped flow path and an anti-swirl flow design, ensuring smooth fluid movement, high flow capacity, wide adjustable range, precise flow characteristic curves, and low seat leakage. Additionally, its soft-sealing structure provides both regulating and shut-off functions, making it a control & isolation valve that can also serve as a shut-off valve.

Due to its unique structural characteristics **(high fluid thrust on the plug, requiring significant unbalance force), this valve is not suitable for high-pressure differentials or large diameters.** It is designed for applications demanding low leakage and small pressure drops. Thus, cage-type single-seat control valves are generally recommended for: Small-bore, high-pressure differential conditions or Large-bore, low-pressure differential conditions. These single-seat control valves are widely used in industrial automation control across sectors such as: Power generation, Metallurgy, Chemical processing, Petroleum, Textiles, Pharmaceuticals, Paper manufacturing, etc.



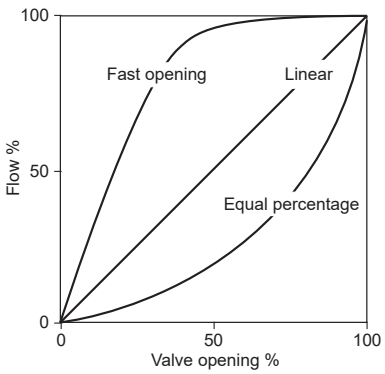

Cage-Guided Single Seat Regulating Globe Valve

| | | |
|---|---|---|
| **Body Type** | Straight-Through Type | |
| **Size** | DN15 ~ DN200 | |
| **D&M Std.** | GB/T4213 | |
| **F2F Std.** | DIN EN 558, Series 1 / ANSI ISA 75.08.01 | |
| **PT&I Std.** | GB/T4213, ANSI FCI 70-2-2006 | |
| **Conn. Std.** | Flange Std. | RF Type, FM/M Type, T/G Type, FF Type |
| | HG/T20592-2009 | PN10, PN16, PN25, PN40 (Standard Stock) |
| | ASME B16.5 | 150LB, 300LB (On Request) |
| | JIS B2210 | 10K, 16K, 20K (On Request) |
| **Sealing Type** | Seat Sealing Type | Metal+STL Seated; Soft Seated |
| | Stem Sealing Type | Packing Sealing, Bellows Sealing |
| **Materials** | Body/Bonnet Material | SS304 |
| | Plug Material | F304, F316L, etc. |
| | Stem Material | 17-4PH, F304, F316L, etc. |
| | Seat Material | F304 + STL |
| | Bellows Material | SS316L |
| | Packing Material | V-Ring PTFE; Graphite + PTFE |
| **Bonnet Type** | Standard Type | -17°C ~ +230°C |
| | Extended (Finned) Type | 230°C |
| | Cryogenic Type | -196°C ~ -17°C |
| | Bellows Type | Toxic, Volatile, or Hazardous media |
| **Technical Parameters** | Flow Characteristic | Equal percentage (E) / Linear (L) / Quick opening (F) |
| | Leakage Level | Metal Seated: ANSI B16.104 Class IV; Soft Seated: ANSI Actuator B16.104 Class VI |
| | Rangeability | 50:1 |

### ZPL210 Valve Characteristic - Options:

| | |
|---|---|
| **ZPL210-E** | **Equal Percentage (E) as Standard**<br>• Suitable for most modulating process control applications providing good control at all flowrates. |
| **ZPL210-F** | **Fast Opening (F) on Request**<br>• For on / off applications only. |
| **ZPL210-L** | **Linear (L) on Request**<br>• Primarily for liquid flow control where the differential pressures across the valve is constant. |

### Typical flow characteristic curves



# Pneumatic Sleeve-Guided Single-Seat Control Valve

## Principle of Operation

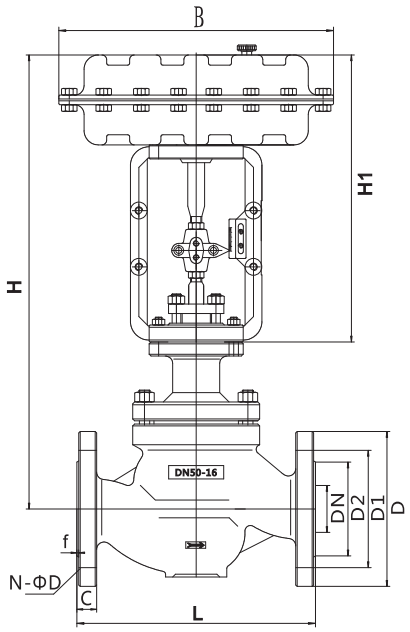
The medium flows through the valve in the direction indicated by the arrow. The valve plug position determines the cross-sectional area between the seat and plug.

## Fail-safe Position

Depending on how the springs are arranged in the pneumatic actuator, the valve has two diffrerent fail-safe position effective upon air supply failure.

- **Actuator Stem Extends (fail-close)**
  The valve closes when the supply air fails.
- **Actuator Stem Retracts (fail-open)**
  The valve open when the supply air fails.

Outer Size of ZPL210 Series
(Standard Bonnet Type)



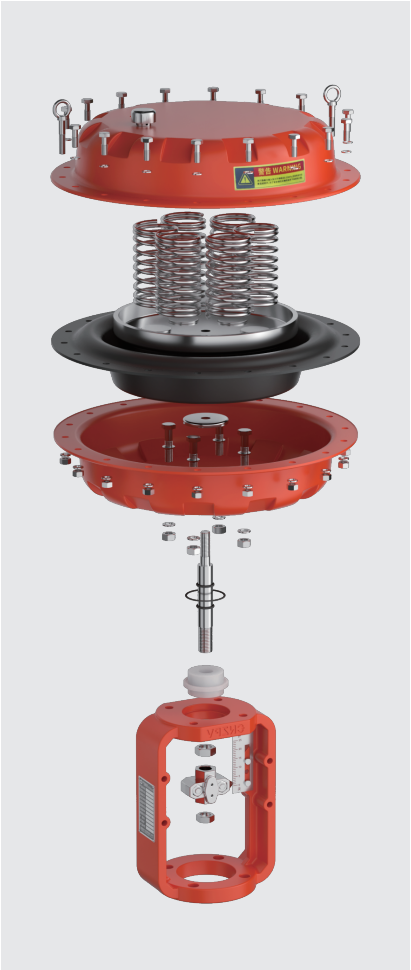

## DIMENSION:

| Nominal Diameter | L (class 150) | L (PN16/40) | H (Standard) | H1 | B | Stroke (mm) |
|---|---|---|---|---|---|---|
| DN15 | 184 | 130 | 420 | 295 | 290 | 16 |
| DN20 | 184 | 150 | 420 | 295 | 290 | 16 |
| DN25 | 184 | 160 | 425 | 295 | 290 | 16 |
| DN32 | 200 | 180 | 475 | 325 | 290 | 25 |
| DN40 | 222 | 200 | 490 | 325 | 290 | 25 |
| DN50 | 254 | 230 | 500 | 325 | 290 | 25 |
| DN65 | 276 | 290 | 595 | 380 | 365 | 40 |
| DN80 | 298 | 310 | 605 | 380 | 365 | 40 |
| DN100 | 352 | 350 | 620 | 380 | 365 | 40 |
| DN125 | 403 | 400 | 790 | 495 | 475 | 60 |
| DN150 | 451 | 480 | 820 | 495 | 475 | 60 |
| DN200 | 543 | 600 | 880 | 495 | 475 | 60 |
| DN250 | 673 | 730 | 1210 | 790 | 605 | 100 |
| DN300 | 850 | 850 | 1260 | 790 | 605 | 100 |
| DN350 | 980 | 980 | 1305 | 790 | 605 | 100 |

## FLANGE CONNECTING SIZE (PN16)

| Nominal Diameter | D | D1 | D2 | C | f | N-ØD |
|---|---|---|---|---|---|---|
| DN15 | 105 | 75 | 55 | 18 | 2 | 4-Ø14 |
| DN20 | 105 | 75 | 55 | 18 | 2 | 4-Ø14 |
| DN25 | 115 | 85 | 65 | 18 | 2 | 4-Ø14 |
| DN32 | 140 | 100 | 75 | 18 | 2 | 4-Ø18 |
| DN40 | 150 | 110 | 85 | 18 | 2 | 4-Ø18 |
| DN50 | 165 | 125 | 100 | 18 | 2 | 4-Ø18 |
| DN65 | 185 | 145 | 120 | 18 | 2 | 8-Ø18 |
| DN80 | 200 | 160 | 135 | 20 | 2 | 8-Ø18 |
| DN100 | 220 | 180 | 155 | 20 | 2 | 8-Ø18 |
| DN125 | 250 | 210 | 185 | 22 | 2 | 8-Ø18 |
| DN150 | 285 | 240 | 210 | 22 | 2 | 8-Ø18 |
| DN200 | 340 | 295 | 265 | 24 | 2 | 12-Ø22 |
| DN250 | 405 | 355 | 320 | 26 | 2 | 12-Ø26 |
| DN300 | 460 | 410 | 375 | 28 | 2 | 12-Ø26 |
| DN350 | 520 | 470 | 435 | 30 | 2 | 16-Ø26 |

# Pneumatic Multi-Spring Diaphragm Actuator ZP6100



## Overview

The ZP6100 series pneumatic actuator adopts a multi-spring diaphragm structure, making it a lightweight, compact, high-performance linear travel actuator with high output force. It is primarily composed of key components such as the diaphragm, compression spring, tray, push rod, bracket, bushing, and diaphragm cover.

Its working principle: The electrical or pneumatic signal from the regulating instrument is converted into air pressure by the positioner and input into the diaphragm air chamber. This causes the elastic diaphragm to transform the input pressure into thrust on the push rod, which in turn moves the valve spool accordingly, thereby changing the valve's opening. It typically accepts a standard pressure signal of 02×10° ~10×10 Pa and converts it into thrust. When the signal pressure is introduced into the diaphragm air chamber, this pressure multiplied by the effective area of the diaphragm produces thrust, moving the push rod and compressing the spring until the reaction force generated by the spring balances the thrust on the diaphragm. The greater the signal pressure, the greater the thrust, and the larger the displacement of the push rod, i.e., the compression of the spring. As the push rod moves from zero to full travel, the valve transitions from fully open (or fully closed) to fully closed (or fully open).

## Main Parts & Material

| Item | Material | Item | Material |
|---|---|---|---|
| Cover | Carbon steel, stainless steel | Sleeve | Wear-Resistant Nylon(MC)、2Cr13 |
| Yoke | Carbon steel, stainless steel | Diaphragm | EPDM/Nylon、NBR/Nylon |
| Push Rod | 1Cr18Ni9、2Cr13 | Spring | 60Si2MnA |

## Action Type

Direct-acting (D): When the signal pressure increases, the push rod moves downward.

Reverse-acting (R): When the signal pressure increases, the push rod moves upward.

## Performance（GB/T4213-2008）

| Project | w.Positioner | w/o Positioner |
|---|---|---|
| Basic Error (%) | ≤±1.5 | ±8%（Percentage of Stroke） |
| Hysteresis (%) | ≤1.5 | - |
| Dead Band (%) | ≤0.6 | 6%（percentage of pressure span） |
| Rated Travel Deviation (%) | ±2.5 | ±2.5 |
| Start/End Dev. (%) | ±2.5 | ±2.5 |
| FC Start | ±2.5 | ±2.5 |
| FO Start | ±2.5 | ±2.5 |
| Cycle Life | 100,000 Times | |
| Spring Range | 20-100、40-200、80-240、140-300KPa | |
| Oper. Temp. | -30 ~ +70℃ | |
| Air Port | NPT1/4”、3/8” | |

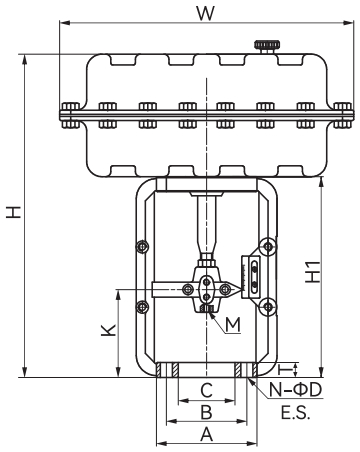
## Air Consumption

| Model No. | Air Chamber Volume (Liters) | Air Consumption (Liters) |
|---|---|---|
| ZP6102 | 1.58 | 5.34 |
| ZP6103 | 1.82 | 6.13 |
| ZP6104 | 4.63 | 15.6 |
| ZP6105 | 10.89 | 36.7 |
| ZP6106 | 37.06 | 124.89 |

P.S.:The air consumption data is measured at an air supply pressure of 2.5 Bar and 1 cycle per minute.

# Pneumatic Multi-Spring Diaphragm Actuator ZP6100

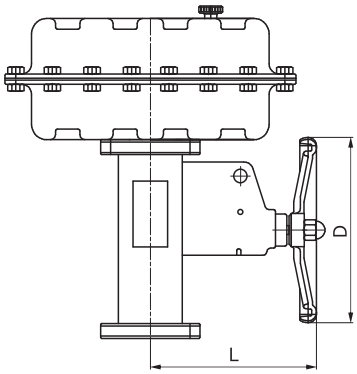
## STANDARD TYPE




### Dimensions: Unit:mm

| ACTUATOR | | ZP6102D/R | ZP6103D/R | ZP6104D/R | ZP6105D/R | ZP6106D/R |
|---|---|---|---|---|---|---|
| Travel(mm) | | 16 | 25 | 40 | 60 | 100 |
| K | FC(D) | 115 | 120 | 175 | 195 | 270 |
| | FO(R) | 95 | 95 | 135 | 135 | 170 |
| Area($cm^2$) | | 350 | 350 | 600 | 900 | 1500 |
| Thrust (N) | FC(D) | 2500 | 2500 | 3900 | 6800 | 10000 |
| | FO(R) | | | | | |
| W | | 290 | 290 | 365 | 475 | 580 |
| H | | 307 | 333 | 404 | 514 | 690 |
| H1 | | 210 | 210 | 260 | 310 | 400 |
| A | | 100 | 100 | 130 | 145 | 170 |
| B | | 80 | 80 | 105 | 118 | 135 |
| C | | 60 | 60 | 80 | 95 | 100 |
| T | | 18 | 18 | 20 | 22 | 26 |
| N-φD | | 4-φ11 | 4-φ11 | 4-φ13 | 4-φ15 | 4-φ17 |
| M | | M12x1.25 | M12x1.25 | M16x1.5 | M20x1.5 | M24x1.5 |

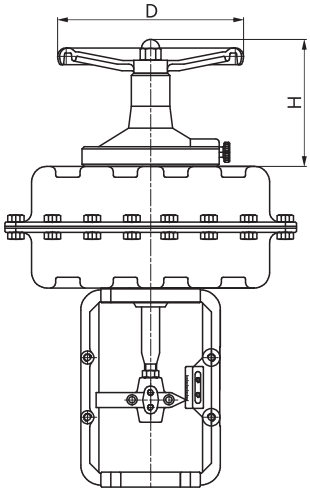
## OPTIONAL




### Side-mounted Manual Mechanism Overall Dimensions: Unit:mm

| ACTUATOR | TRAVEL(mm) | Dimensions | | Force(N) |
|---|---|---|---|---|
| | | D | L | |
| ZP6102D/R | 16 | 220 | 210 | 190 |
| ZP6103D/R | 25 | 220 | 210 | |
| ZP6104D/R | 40 | 280 | 305 | 290 |
| ZP6105D/R | 60 | 400 | 450 | 460 |
| ZP6106D/R | 100 | 550 | 500 | 580 |

## OPTIONAL




### Top-mounted Manual Mechanism Overall Dimensions: Unit:mm

| ACTUATOR | TRAVEL(mm) | Dimensions | | Force(N) |
|---|---|---|---|---|
| | | D | L | |
| ZP6102D/R | 16 | 90 | 125 | 190 |
| ZP6103D/R | 25 | 90 | 130 | |
| ZP6104D/R | 40 | 250 | 180 | 260 |
| ZP6105D/R | 60 | 300 | 225 | 410 |