CNZPV
ZHIPENG AUTOMATIC CONTROL VALVE
智鹏控制阀

Installation And Operation Instruction

Metal Control Valve

-ZPL210 Series

智鹏阀门集团有限公司
ZHIPENG VALVE GROUP CO., LTD

◆Products Introduction

With the development of industrial automation, control valves play a pivotal role in the automation process. They possess both static and dynamic characteristics. The static characteristic refers to the flow characteristic of the valve, which is influenced by factors such as valve's size, valve core & seat structure and the actuator type, valve positioner, inlet pressure & outlet pressure, as well as fluid properties. On the other hand, the dynamic characteristic is controlled by the actuator and positioner. Regulating valve belong to the control valve series and primarily serve to regulate medium(fluid) pressure, flow rate, and temperature.

●Classification Of Control Valves

○By Motion Mode:

①Linear Motion: Single-seat valves, double-seat valves, sleeved valves, angled valves, three-way valves, diaphragm valves

②Rotary Motion: Butterfly valves, ball valves, eccentric rotary valves, and full-function ultra-lightweight control valves.

○By Drive Mode:

① Pneumatic control valve: compressed air as the source

② Electric control valve: electricity power as the source

③ Hydraulic control valve: liquid medium (such as oil, etc.)as the source

○By Adjustment Mode:

① Regulating type

② ON/OFF(Shut-Off) type

③ Regulating + Shut-off type

○By Flow Characteristic Mode:

① Linear type

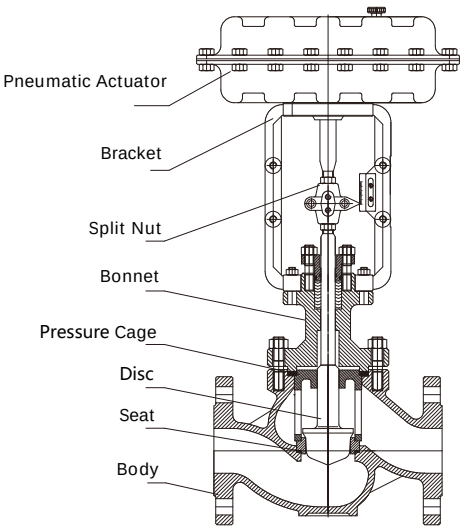
② Equal percentage type(EQ%)

③ Parabolic type

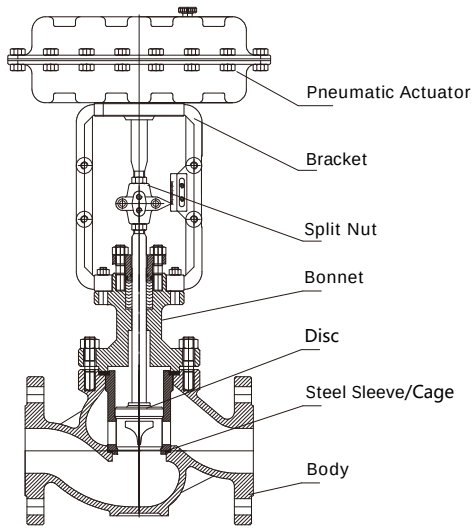
④ Quick Opening type

★Users can select based on the operating conditions (pressure differential, temperature, medium state, medium flow direction, installation method) and the required leakage rate.

◆ZPL200 Structures(Straight-Through Type)



Straight-Through Single seat Control Valve
(ZPL210Y)



Straight-Through Sleeve Guided Control Valve
(ZPL220Y)

◆Application And Characteristics

ZPL210(straight-through single seat), **ZPL410**(Angle-through single seat) series single-seat valve is an **unbalanced** regulating valve, There only have one disc and one seat in valve's body, the advantage is less leakage, easy to close, or even completely shut off, so based on the structure have regulating type and shut-off type. The shortcoming is that the medium has a strong thrust force on the disc, that is, the unbalanced force is strong, especially for the high pressure and large diameter valve are more serious.So, it is suitable for the condition requiring small leakage and small differential pressure. Therefore, the single-seat regulating valve is generally a low-pressure-drop valve within the diameter of DN15 to DN100. Single-seat regulating valves are widely used in industrial such as electric utility, metallurgy, chemical, petroleum, textiles, pharmaceuticals, papermaking for the automation of production processes.

ZPL220(straight-through sleeve-guided valve), **ZPL420**(Angle-through sleeved valve) series valve is a **balanced** type of regulating valve,the disc's guiding area is wide, can improve the oscillation caused by vortex and impact, have good shock-resistance, allowed pressure difference, stable operation, It can reduce noise by about 10dB compared to a regular single-seat control valve. The application of these valves is widespread in industries that demand reliability and exceptional shut-off performance, particularly in low-temperature and high-pressure process pipelines. With their extensive range of materials and diverse design forms, these valves find versatile applications across various industrial.

The ZPL310 (three-way diverging) and **ZPL320** (three-way converging) series valves are designed to change the direction of fluid flow. They consist of three ports connected to pipelines, equivalently combining two single-seat valves into one unit.
These valves can be classified as diverging valves (with one inlet and two outlets) or converging valves (with two inlets and one outlet).
When it's working, one port is fully open while the other remains completely closed, resulting in a force similar to a single-seat valve with significant unbalanced force. The valve core of the three-way valve is identical to that of a sleeve valve, featuring two types of throttling areas: a large window opening and small hole drilling (jet type). The latter serves the purpose of reducing noise levels and minimizing resonance effects. This series exhibits characteristics such as compact structure, lightweight design, responsive action, precise flow control capabilities, direct compatibility with control instruments input signals (4-20mA DC, 0-10mA DC or 1-5V DC), as well as single-phase power for operational control purposes. It enables automatic regulation and control over fluid mediums within process pipelines while accurately managing parameters like pressure, flow rate temperature, liquid level for gas liquids and steam mediums by maintaining them at desired set values.
Additionally suitable for dividing fluids into multiple outlets or merging multiple fluids into a singular stream through its three-way configuration.
These products find extensive application in industrial production processes across various sectors including chemical manufacturing petroleum refining metallurgy power generation light industry papermaking pharmaceuticals.

The Advantages Of Our Matal Regulating Valves

1.The Snap-in structure of the seat eliminates the drawbacks of threaded insertion, and ensures automatic alignment of the valve cage, valve core,and seat upon tightening of the upper cover. And it's easy to Installation and removal. even in severe corrosion conditions, facilitating easy removal of the seat for maintenance and repair purposes.

2.The single-seat with double-sealing design makes valve have longer service life while also addressing issues related to seat corrosion and erosion without requiring part replacement.

3.A one-piece forged valve cover guarantees good sealing effect that is better suited for use under diverse operating conditions.

4.One-piece construction of both the valve core and stem avoids latch-type structural defects to ensure stability even under high pressure differentials.

5.The balanced type valve cage delivers superior sealing performance throughout flow/characteristic ranges while withstanding significant pressure differentials.

6.Special treatment (polishing/nitriding/Stellite alloy cladding) extends valve's service life while enhancing reliability.

7.The utilization of high-grade non-asbestos seals or bellows pipe seals, along with the distinctive structure of the packing cover, effectively resolves the issue of external leakage from the packing cover.

◆Materials For Main Parts

Body/Upper Bonnet Material	WCB、LCB、WC6、WC9、304、316、316L
Disc Material	410、304、316、316L
Seat Material	304、316、316L (+PTFE/PPL)
Stem Material	17-4PH 304、316、316L
Sleeve/Cage Material	WCB、304、316、316L
Bellows Material	304、316、316L
Valve Type	Straight-through type, Angle-through type Three-way Type,Jacket insulation type
Bonnet Type	Standard type, Extended type, Low-temperature type, Bellows type
Temp. Range	-45℃—425℃

Leakage Level	Soft Seal: GradeVI,Sleeved/Metal Seal:III Single-seat/Metal Seal:GradeIV
Flow Characteristic	Linear, EQ%,ON/OFF,Shut-off
Ends	Flang(RF/FM/RJ)、Welded
Adjustable Scale	30:1 50:1
Flange Connection Standard	HG20592-2009、ANSI B16.5
Available Actuators	Pneumatic Diaphragm Type(ZP6100)
	Pneumatic Piston Type(ZP6200)
	Electric Type

☆The selection of valve disc and valve seat materials that are less susceptible to temperature and pressure changes is recommended when operating in high-temperature and high-pressure environments with significant fluctuations. Additionally, it is advisable to incorporate a heat exchanger when the temperature reaches ≥250°C.

☆The phenomena of cavitation erosion exclusive to liquid media. In practical production processes, these occurrences can lead to vibrations and noise, ultimately reducing the service life of valves. Therefore, it is advisable to prevent their onset when selecting appropriate valves.

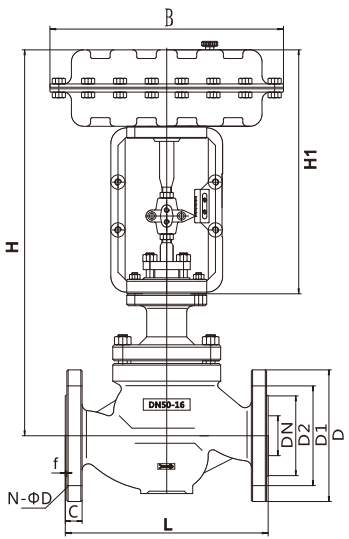
◆Parameters & Indicators

- Rated CV Value & Travel-Length

Nominal Diameter	Seat Size	Rated CV Value		Travel-Length
		EQ%	Linear	
20	6	0.4	—	16
	8	1.0	---	16
	10	1.6	---	16
	15	4.0	---	16
	20	6.3	10	16
25	6	0.4	---	16
	8	1.0	---	16
	10	1.6	---	16
	15	4.0	---	16
	20	6.3	10	16
	25	10	16	16

Nominal Diameter	Seat Size	Rated CV Value		Travel-Length
		EQ%	Linear	
32	32	17	25	25
40	40	24	35	25
50	50	44	55	25
65	65	68	85	40
80	80	99	135	40
100	100	175	210	40
125	125	275	345	60
150	150	360	466	60
200	200	640	735	60
250	250	960	1000	100
300	300	1300	1500	100

◆Outer Size Of ZPL200 Series
(Standard Bonnet Type)



Outer Size

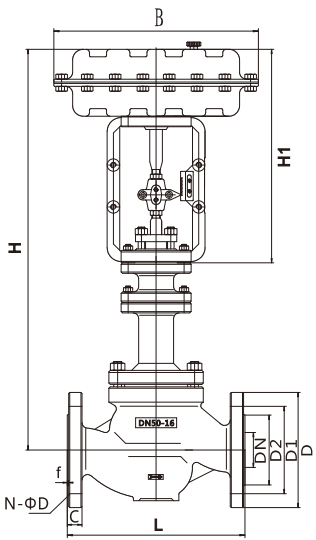
Nominal Diameter	L(CV3000)	L (pint-sized)	H (Standard)	H1	B	Stroke
DN20	181	150	420	295	290	16
DN25	184	160	425			
DN32	200	180	475	325	290	25
DN40	222	200	490			
DN50	254	230	500			
DN65	276	290	595	380	365	40
DN80	298	310	605			
DN100	352	350	620			
DN125	403	400	790	495	475	60
DN150	451	480	820			
DN200	543	600	880			
DN250	673	730	1210	790	605	100
DN300	850	850	1260			
DN350	980	980	1305			

Flange Connecting Size(PN16)

Nominal Diameter	D	D1	D2	C	f	N-ΦD
DN20	105	75	55	18	2	4-Φ14
DN25	115	85	65	18	2	4-Φ14
DN32	140	100	75	18	2	4-Φ18
DN40	150	110	85	18	2	4-Φ18
DN50	165	125	100	18	2	4-Φ18
DN65	185	145	120	18	2	8-Φ18
DN80	200	160	135	20	2	8-Φ18
DN100	220	180	155	20	2	8-Φ18
DN125	250	210	185	22	2	8-Φ18
DN150	285	240	210	22	2	8-Φ22
DN200	340	295	265	24	2	12-Φ22
DN250	405	355	320	26	2	12-Φ26
DN300	460	410	375	28	2	12-Φ26
DN350	520	470	435	30	2	16-Φ26

（The size of the product is subject to the physical object）

◆Outer Size Of ZPL200 Series
(Bellows Bonnet Type)



Outer Size

Nominal Diameter	L(CV3000)	L (pint-sized)	H (Bellows)	H1	B	Stroke
DN20	181	150	520	295	290	16
DN25	184	160	525			
DN32	200	180	630	325	290	25
DN40	222	200	635			
DN50	254	230	645			
DN65	276	290	810	380	365	40
DN80	298	310	820			
DN100	352	350	835			
DN125	403	400	1095	495	475	60
DN150	451	480	1115			
DN200	543	600	1160			
DN250	673	730	1210	790	605	100
DN300	850	850	1260			
DN350	980	980	1305			

Flange Connecting Size(PN16)

Nominal Diameter	D	D1	D2	C	f	N-ΦD
DN20	105	75	55	18	2	4-Φ14
DN25	115	85	65	18	2	4-Φ14
DN32	140	100	75	18	2	4-Φ18
DN40	150	110	85	18	2	4-Φ18
DN50	165	125	100	18	2	4-Φ18
DN65	185	145	120	18	2	8-Φ18
DN80	200	160	135	20	2	8-Φ18
DN100	220	180	155	20	2	8-Φ18
DN125	250	210	185	22	2	8-Φ18
DN150	285	240	210	22	2	8-Φ22
DN200	340	295	265	24	2	12-Φ22
DN250	405	355	320	26	2	12-Φ26
DN300	460	410	375	28	2	12-Φ26
DN350	520	470	435	30	2	16-Φ26

（The size of the product is subject to the physical object）

◆Installation Notice

1.After carefully inspecting the valve (Tag No. , type, nominal diameter, nominal pressure, material, etc.) prior to installation, ensure that it complies with the required specifications and that the flow direction indication on the valve's body with the fluid flow direction in the pipeline.
2.The valves should be installed vertically on horizontal pipelines with the actuator positioned above, and Inclined installation should be avoided. Vertical installation is strictly prohibited for valves with a diameter of 65mm or above (including 65mm).
3.The installation of a bypass can guarantee uninterrupted production in the event of product maintenance or failure.The product is meticulously designed and manufactured in strict accordance with the specified parameters outlined in the technical specifications. In case of any changes to the usage parameters, please promptly contact our company (special requirements should be communicated prior to placing an order).
5.The product has undergone thorough inspection and calibration prior to delivery. If feasible, it is recommended to perform an additional examination of the sealing and external leakage before installation.
6.The product's accessories have been carefully adjusted to the optimal position prior to delivery, therefore it is advised not to make any random adjustments.
7.The pipeline must undergo blowing and testing both before and after installation. In this particular scenario, it is essential for the valve to be fully open.

◆ Repair & Maintenance

◇ Repair：

①When there is a leakage in the seal, it is recommended to deactivate the signal source in order to facilitate automatic closure of the valve. If the seal no longer leaks, this indicates signal drift and necessitates adjustment the signal accordingly. In case the leakage persists, it is advisable to shut down the pipeline and inspect for potential damage on the sealing part. If no damage is detected, proceed with cleaning impurities and reinstalling the seal. However, if damage is observed on the sealing part, machining and grinding are required; severe damage may require replace it.

②When the product is used for media that are prone to crystallization, sedimentation, or contain solid particles, frequent blockages may occur at the seat and guide of the jacketed cage. In such cases, an external air or steam device can be connected at the bottom of the valve cover. Opening the external device when the valve becomes blocked or stuck allows for flushing without having to disassemble the regulating valve, thereby enabling normal operation of the valve.

③For the small-diameter, particularly ultra-low flow regulating valves, the throttling gap is narrow, and it is imperative that there are no impurities in the medium for the regulating valve. It is highly recommended to install a filter on the pipeline prior to the valve installation.

④The flow of media through the valve body generates an imbalanced force that impacts the sealing effectiveness of the single-seat valve. If you are dissatisfied with the sealing performance, you have the option to select a double-seat control valve or replace the hard-sealed valve seat with a soft-sealed one to solve any leakage issues.

⑤When there is a leakage in the packing part, it is typically resolved by tightening the cover nut (3 to 5 rounds is enough). If the leak persists,replace the packing material . It is strictly prohibited to replace the packing under pressured pipelines containing toxic, flammable, explosive, or highly corrosive media.

⑥Before installation, it must be confirmed that the technical parameters of the valve are consistent with the specifications, otherwise the valve will vibrate. The vibration can also be solved by changing the flow direction (high inlet and low outlet). If it still cannot be solved, please contact us to redesign the production. It is strictly prohibited to continue use to prevent vibration-induced valve stem fracture.

◇ Maintenance

①CLEANING:
The valves should be thoroughly cleaned upon removal from the process line to eliminate any contaminants that may have come into contact with the valve components, thereby preventing potential damage to personnel and equipment caused by corrosive or hazardous fluids. Additionally, it is essential to remove any surface corrosion present on exposed parts.

②DISASSEMBLY:
The valves need to be disassembled in order to thoroughly inspect all components and determine the extent of repair and replacement required. Firstly, it is essential to completely dismantle both the actuator and valve. During disassembly, utmost care should be taken to safeguard delicate parts such as valve cores, valve seats, valve stems, push rods, and shaft sleeves, as well as all precision-machined surfaces of every component in order to prevent any damage and minimize repair costs.
Special tools must be used for disassembling the valve seats.

③MAIN COMPONENT INSPECTION AND MAINTENANCE:
There may exhibit minor rust spots and wear on the orifice surface of the valve core and the sealing surface. Maybe can rectified using conventional mechanical processing and polishing techniques. In case of severe damage, it is imperative to replace the affected components with a new one. During repair, it is essential to ensure the alignment of the valve core and valve seat. If there is any damage to the sealing surface of the stem, only new parts should be used for replacement. The guiding and sealing surfaces of a reverse action actuator's push rod must be replaced with new parts if damaged; however, appropriate repairs can be made for a positive action actuator. Should any defects affecting strength, such as cracks, be detected during inspection of the compression spring, immediate replacement with a new one is necessary.

④REPLACEMENT OF WEARING PARTS:
During each inspection, the wearable components must be replaced based on their specific condition. The main wearable parts of the valve include:packing, O-shape sealing ring, gaskets, and diaphragms. Upon removing the diaphragm, it should undergo a thorough examination for cracks and wears. The decision to replace it should be made in accordance with its specific condition.
Normally, replacement is recommended every 2 to 3 years.

⑤ASSEMBLY AND TESTING:
When assembling, it is necessary to apply appropriate lubricating oil to the positioning parts, guiding parts, and threaded connection parts of the components, in order to facilitate disassembly during subsequent inspections. Special attention should also be given to ensuring coaxiality between the push rod, valve core, and valve seats throughout the entire machine. After assembly and adjustment are completed, the product must undergo an test specified in the standard before it can be installed and further used.

Fault analysis & Troubleshooting

Fault Analysis		Cause Analysis	Troubleshooting
Valve does not work	Positioner has air source but no output force	The constant - orifice of the amplifier in the positioner is blocked	Press the cleaning element button for cleaning
		The vapour accumulates in the slide valve of the amplifier	Move the slide valve for times & add a Air-fliter
	There is a signal but still no working	The valve disc and the valve seat are stuck	Disassemble and reinstall
		The valve stem is distorted or broken	Replace the valve stem
		The actuator is faulty	Check the connecting pipe & air source
The working of the valve is unstable	There is a stable air source/signal, but the control valve is not stable	The positioner has a faulty	Reinstall the positioner
		There is a leak in the output line	Fasten the pipeline joint
		The actuator's opening rate is too small, Pressure changes in the pipe cause insufficient thrust	Increase the air-source pressure
		The valve friction is heavy	Adjust the valve seat
Valve with vibration or noise	Vibration while control valve nearly full close	The size choice of valve is too big and always used at a small opening	Re - select the valve size
		The direction of medium flow is the same as the valve closing direction	Reinstall the valve in a different direction
	Vibration of the control valve at any position	The support frame of the valve is unstable	Reinforce the support frame
		There is a vibration source nearby the valve	Take vibration-damping/elimination measures
		There have wear clearance at connection	Adjust and eliminate the wear clearance
The valve moves slowly	The stem moves slowly when moving in both direction	Blockage or coking phenomena in valve's body with sticky substance	Clean the valve's inner body
		The packing seal material is hardened and deteriorated	Replace the packing material
	The valve stem moves slowly in one direction	The diaphragm in the actuator is damaged	Replace the diaphragm
		There is air leakage in the actuator	Tighten the actuator's each bolts
Leakage in the control valve	Excessive leakage when fully closed	The sealing gasket under the sleeve is damaged	Replace the gasket
	The valve can't reach to the fully-close position	Excessive pressure difference, and lack output force of the actuator	Increase the air - source pressure
		There is impurities in the valve body	Clean the valve's inner parts
Leakage at the packing and connection	Packing leakage	The packing gland is not tightened enough	Tighten the connecting bolts
		The packing is aged	Replace the packing
		The valve stem is damaged	Replace the valve stem
	Leakage between the valve body & bonnet	The fastening bolts are loose	Fasten the connecting bolts
		The sealing gasket is damaged	Replace the sealing gasket