

SP592型指挥器操作自力式微压调节阀（以下简称调压阀）

SP592 Pilot Type Self-Operated Micro-Pressure Regulating Valve(hereafter called as pressure regulating valve)

注意 Caution

安装，操作，维护由非专业人员进行可能会对设备，人员造成损坏，所以必须由专业人员进行调压阀的安装，调试及维护。

Due to the installation, operation or maintenance performed by non-professional persons may cause equipment damages or injuries. The work must be performed by professional persons.

产品概述 Product Overview

SP592型调压阀是一种指挥器操作微压调节阀，可广泛应用于各类气体的微压控制和储罐微压氮封系统。可将中压气体一次节流减压稳压至极低压力，最低控制压力0.15KPa，最高控制压力12KPa，最低使用温度-48℃，最高使用温度120℃。

SP592 pressure regulating valve is a micro-pressure regulating valve for pilot type and extensively applied for the micro-pressure control of different gas and micro-pressure nitrogen blanketing. It can regulate the middle-pressure gas to reduce and stabilize the pressure to minimal pressure in a regulation. The minimal control pressure is 0.15 KPa. The maximum control pressure is 12KPa. The minimal operation temperature is -48℃. The maximum operation temperature is 120℃.

产品特点 Product Feature

- 优秀的微压控制性能---调压阀采取了许多措施以适应精确稳定的微压控制。

Excellent Micro-Pressure Control Performance---The pressure regulating valve takes many measures to adapt to precise and stable micro-pressure control.

杠杆力放大---指挥器操作机构为杠杆放大拉力机构，微压控制因其在膜片上产生的推力极其微小，而单纯的增大膜片面积又会使阀门体积过于庞大，通过杠杆机构可在不增加阀门体积的情况下放大6倍推力以适应控制需要。

Amplify Lever Force---The pilot operation mechanism is amplify the pull force of the lever. The micro-pressure control should generate micro push on the diaphragm. The pure expanded diaphragm area will lead to too huge valve volume. The lever can amplify the push to 6 time for control without the need of increasing the valve volume.

喷嘴式先导阀---指挥器的控制性能决定了整个调压系统的控制能力，对于微压控制来讲任何摩擦力和阻力都会严重影响其控制效果，指挥器阀芯采用喷嘴挡板式结构，无任何滑动摩擦，灵敏度高。

Nozzle Pilot Valve---The control performance of the pilot-valve determines the control capability of the whole pressure regulating valve system. For the micro-pressure control, any friction and resistance will severely affect the control effect. The pilot-valve plug is designed as the nozzle retaining plate structure without any sliding friction, so it is very high in control sensitivity.

背压式控制---对于气动系统来讲，背压控制是最稳定的，调压阀采用双膜室同时进气，背侧膜室通过指挥器喷嘴调节释放气流的控制方式来达到稳定精确控制。

Back-Pressure Control---For the pneumatic system, the back-pressure control is the most stable. The gas be input to the bilateral diaphragm case of the main-valve. The back diaphragm case can adjust the released gas flow via the pilot valve nozzle for stable and precise control.

内置减压阀---指挥器调压阀的动力气源来自于阀前，而阀前压力往往较高且是一变化的压力。指



指挥器内置减压阀可将阀前较高压力减压至较低且稳定的气压来供给调压阀的控制系统。

Embedded Pressure Reducing Valve---The power gas of the pressure regulating valve of the pilot valve is from the gas ahead of the upstream. Generally the upstream pressure is higher and changes. The embedded pressure reducing valve inside the pilot valve can reduce to the low and stable pressure from the higher pressure of the upstream and it to the control system of the pressure regulating valve.

过滤器---指挥器是很精密的气动仪器，需要洁净的控制气源，调压阀阀前导压管上自带过滤器以保证输送给指挥器洁净的气源。

Filter---It is the precise pneumatic instrument of the pilot valve and requires clean control gas. The pilot pressure tube of the pressure regulating valve includes includes a filter to guarantee clean gas to the pilot valve.

- 低启动压力---主阀也为杠杆式驱动，所以调压阀只要15KPa的阀前压力就可以正常启动调节。

Low Start Pressure---The main valve is drive by lever, so the pressure regulating valve can normally start and adjust the pressure regulating valve by using 15KPa upstream pressure.

- 耐压差---平衡式主阀阀芯使调压阀具有很高的耐压差性能。

Withstand Pressure Difference---The balance main valve plug can make the pressure regulating valve withstand higher pressure difference.

- 软密封---阀芯为软密封结构，在阀芯关闭时能轻松切断流体。

Soft Sealing Seal---The valve plug is designed as software sealing structure and can easily cut off the flow.

- 无填料---在微压控制时任何摩擦阻力都会影响调压阀的控制精度，SP592型调压阀无填料结构使整个调节机构有很好的灵敏度，同时又减少了外泄漏点。

No Packing---Any friction resistance will affect the control precision of the pressure regulating valve at the micro-pressure control. SP592 pressure regulating valve without packing makes the regulating mechanism have highly sensitive and reduces leakage point.

- 高精度---高灵敏度指挥器控制主阀使调压阀有很高的控制精度。

High Precision---The high-sensitivity pilot valve provides a high control precision of the pressure regulating valve.

- 低超调---在任何控制系统中总希望超调量越小越好，SP592型调压阀为一次节流，减压比极大，极易产生超调，指挥器喷嘴又是一快退阀芯，当产生超压时，喷嘴阀芯会迅速开启平衡主阀两膜室使主阀快速关小，使超调量减至最小。

Low Over Control---The less over control is expected for any control system. SP592 pressure regulating valve is a once regulate the flow and the reduction ratio is extremely, so it easil generate over control. The nozzle of the pilot valve is a rewind valve plug. When the pressure is over, the nozzle valve plug will quickly open two diaphragm case make the pressure to balance and quickly reduce the flow to minimze over control.

- 安全过载---为最大限度减少零件重量对控制压力的影响，调压阀的整个调节机构按尽可能轻小，精细的原则设计，在正常工作时，下游压力极低，调节机构受力很小，但在实际使用过程中过载是难免的，下游压力完全有可能在非正常状态下达到阀前压力，这时膜片组件产生的推力对调节机构来说绝对是破坏性的，调压阀的过载保护机构能有效卸载其过载力，使调节机构不会损坏，也就是说调压阀在大多数工况中执行器膜室可完全承受阀前最高使用压力而不会损坏。

Overload Safety---To reduce the influence of the parts gravity for control pressure. The whole regulating device of the pressure regulating valve should be designed as light and precise as far as possible. The downstream pressure is very low during normal operation. The force on the regulating device is very small. The overload is unavoidable in actual operation. The downstream pressure can reach the upstream pressure at abnormal state. At this time, the push force generated by the diaphragm assembly is very destructive to the regulation device. The overload device of the pressure regulating valve can effectively uninstall the overload force and avoid damage

to the regulation device. Namely when the pressure regulating valve is operating. In most case, the diaphragm case of the actuator can fully withstand the maximum operation pressure of upstream and it will not be damaged.

● 调压方便---螺杆式调节机构使调压更轻松，方便，迅速。

Easy Pressure Regulation---The screw regulation device can realize easy, convenient and quick pressure regulation.

● 不锈钢执行器---执行器作为调压阀的重要部件，采用不锈钢板成形，有很高的耐压强度和使用寿命。

Stainless Actuator---As an important part of the regulator, the actuator is made of stainless plate to ensure its high pressure-strength and long service life.

● 维护方便---SP592型调压阀每一结构的确定原则是在保证性能指标的前提下达到最方便的安装维护。顶置压入式安装不需拆下阀体就可以进行内部的检查维护，且不需任何专用工具。

采用阀盖中心定位原则，省去所有不必要的重复配合，内件留有足够的间隙，使内件能轻松取出或放入。

Easy Maintenance---The selection criteria of the every structure of the SP592 regulator is to make sure the most convenient installation and maintenance while ensuring the performance requirements are met.

The top-mounted push-down installation method allows you to inspect and maintain the internal parts without any special tools before disassembling the regulator.

The bonnet central alignment method is adopted to avoid all unnecessary repeat matching operation. The internal part has sufficient clearance to make sure itself can be easily taken out or put in.

● 系列通用---SP592型调压阀与本公司所产的整个自力式系列产品有极高的零部件通用性，可减少项目备件数量。

Universal Parts---SP592 regulator has extremely high parts universality with the whole self-operated products series manufactured by our company, it helps to reduce the inventory of spare parts.

规格系列，性能参数 Specification Series and Performance Indicator

● 阀体尺寸（阀体为法兰式连接）

Body Size(Flanged connection)

DN15(1/2"), DN20(3/4"), DN25(1"), DN40(1 1/2"), DN50(2")
DN65(2 1/2"), DN80(3"), DN100(4")

● 压力等级

PN16, 40, 64 ANSI 150LB, 300LB, 600LB

也可以定制 Can also be customized

● 流量系数 Flow Factor

阀门口径 Diameter of Valve	DN15, DN20, DN25, DN40, DN50							
KV	0.3	0.6	1	1.6	2.5	4.5	6.5	9

注：DN15最大KV为4.5, DN20最大KV为6.5, 其余口径不限。
Remak: maximum 4.5 KV is allow for DN15, maximum 6.5 KV is for DN20, the diameter is not limited for other types.

阀门口径 Diameter of Valve	40	50	65	80	100
KV	22	36	58	90	145

注：以上为标准口径，阀门也可按缩径尺寸加工。

Note: Diameters listed in above table are standard diameters, the valves can also be made with Reduced diameters.

● 反馈接口 Feedback Interface

ZG1/4" 出厂配好10mm卡套接头。

ZG1/4" 10mm card set of connector is provided in the plant.

● 取压方式 Pressure Measuring Method

阀外取压，用于储罐氮封应罐顶取压

Measured at outside.

Applied to the tank nitrogen blanketing, measuring from top of tank.

● 流量特性 Flow Characteristics

L (标准 Normal)

EQ%(特殊加工 Secical processing)

● 调压范围分段 Division of Regulation Pressure range

0.2-0.4KPa, 0.25-0.65KPa, 0.4-1.2KPa, 0.9-2.7KPa,
1.5-5KPa, 3-9KPa, 4-12KPa

● 阀前压力范围 Upstream Pressure Scope

最低阀前启动压力：15KPa

Minimal upstream state pressure: 15KPa

最低保证阀芯全开压力：30KPa

Minimal pressure for full valve opening: 30KPa

最高阀前压力：1200KPa

Maximum upstream pressure: 1200KPa

● 使用温度 Operation Temperature

调压阀为软密封，使用温度主要取决于密封件与膜片材质。

This is soft-sealing valves, the temperature depends on the material of the sealing part and diaphragm.

NBR -29-82°C

FKM -8-120°C

SR -48-85°C

EPDM -38-115°C

● 泄漏等级 Leakage Class

软密封 VI级

Soft-sealing VI

● 控制性能 Control Performance

动态控制精度：2%

Dynamic control precision: 2%

静态关断精度：< 0.25Kpa

Static cut-off precision: < 0.25Kpa

● 过载压力: 800KPa

Overload Pressure: 800KPa

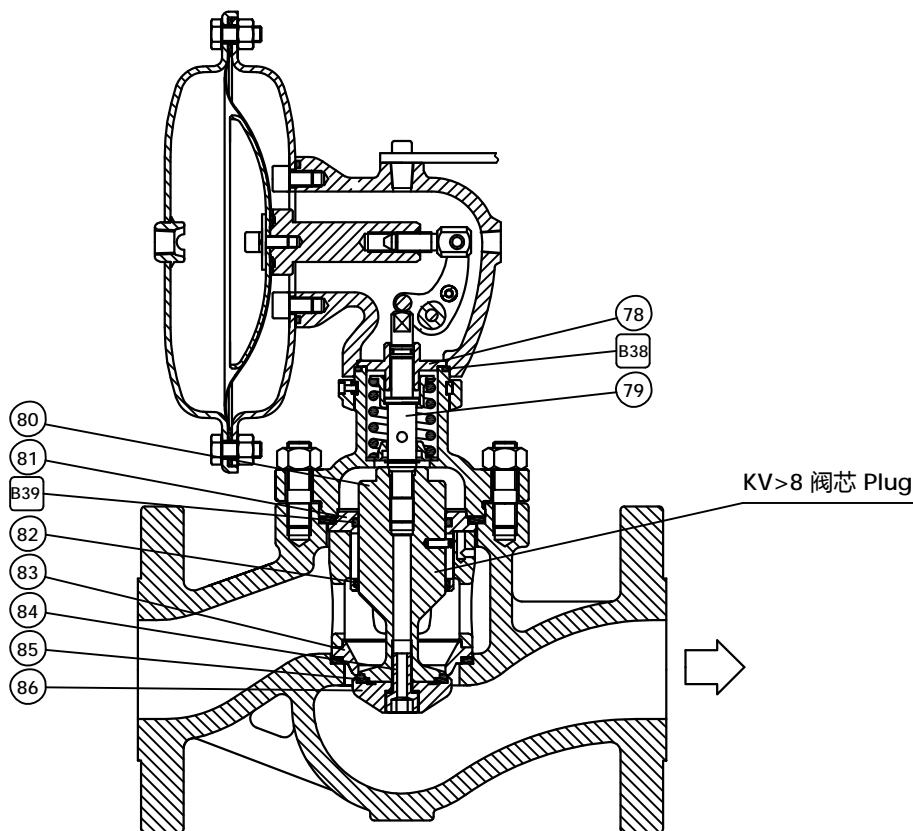
● 附件 Annex

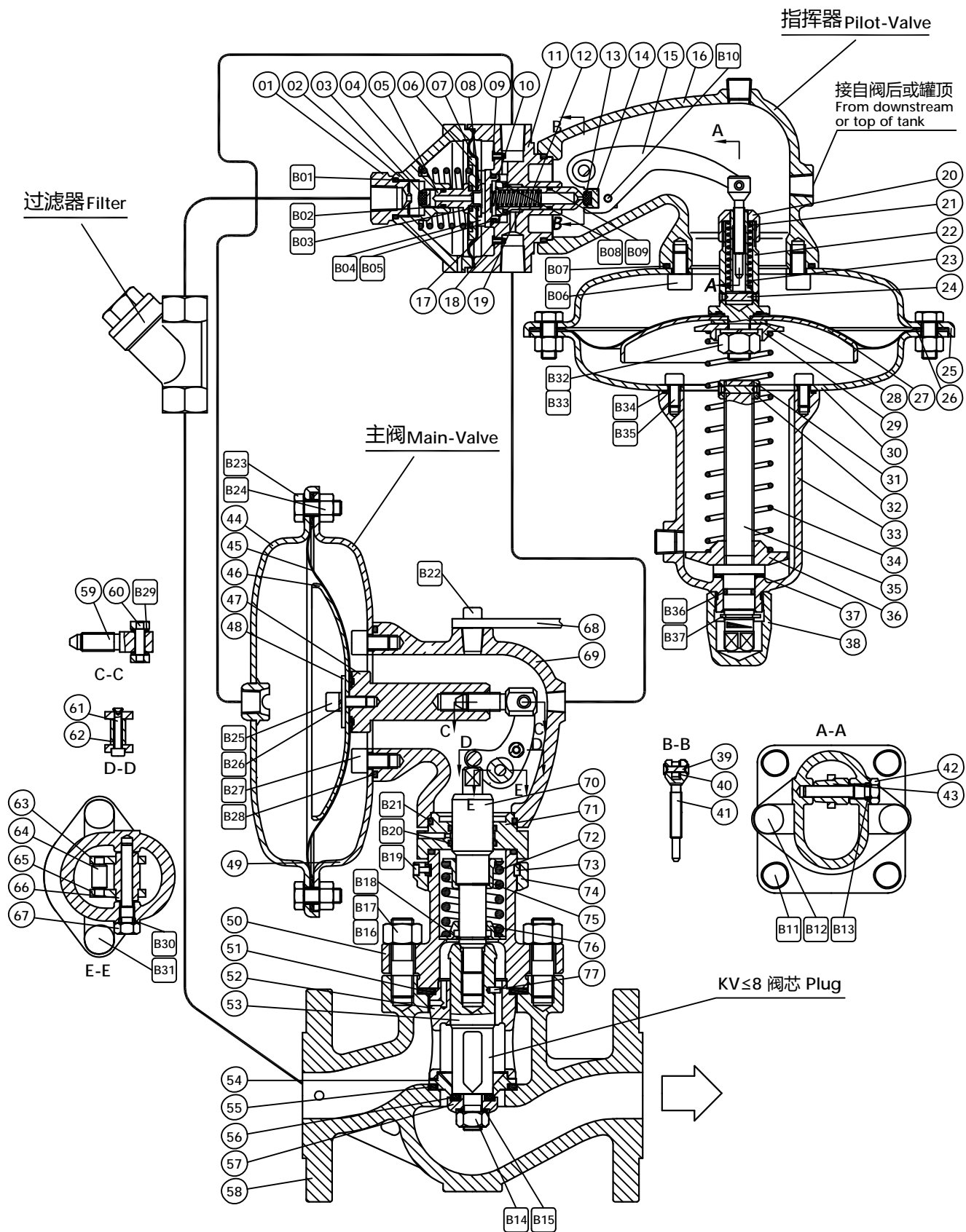
取压接头，压力表，取压球阀

Pressure collection connector, Pressure gauge,

Pressure collection ball valve

结构、零件清单、零件材质 Structure、Parts List and Material

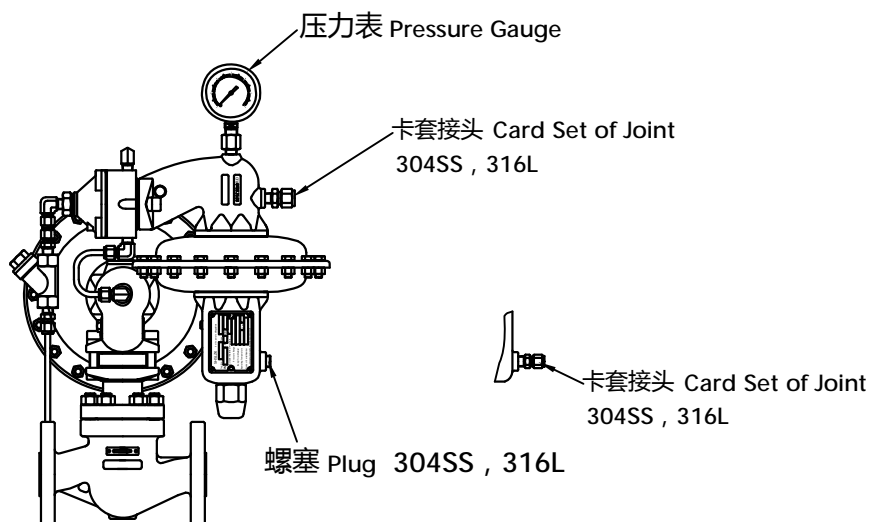




序号	零件名称	材质	序号	零件名称	材质
SN	Name of Part	Material	SN	Name of Part	Material
01	接头 Connect	304SS , 316L	40	垫圈 Washer	PTFE
02	指挥器左阀体 Left Pilot Valve Body	CF8 , CF3M	41	连接螺栓 Connecting Bolt	304SS , 316L
03	阀垫 Valve Cushion	NBR;FKM;SR;PTFE	42	下销 Bottom Pin	304SS , 316L
04	弹簧 Spring	304SS , 316L	43	轴套 Shaft Set	304SS , 316L
05	阀芯 Plug	304SS , 316L	44	膜盖 Diaphragm Case	304SS , 316L
06	盘 Diaphragm Plate	304SS , 316L	45	膜片 Diaphragm	NBR,FKM,SR
07	膜片 Diaphragm	NBR,FKM,SR	46	盘 Diaphragm Plate	304SS , 316L
08	垫圈 Washer	304SS , 316L	47	连杆 Connecting Rod	304SS , 316L
09	恒节流件 Constant Throttle	H62	48	垫圈 Washer	304SS , 316L
10	盖 Cover	304SS , 316L	49	膜盖 Diaphragm Case	304SS , 316L
11	指挥器右阀体 Right Pilot Valve Body	CF8 , CF3M	50	阀盖 Bonnet	WCB,CF8,CF3M
12	弹簧 Spring	304SS , 316L	51	阀盖垫圈 Sealing Ring of Bonnet	316SS+Graphite 316L+Graphite
13	阀垫 Valve Cushion	NBR;FKM;SR;PTFE			316L+PTFE
14	挡板 Baffle	304SS , 316L	52	套筒 Cage	CF8,CF3M,304SS,316L
15	杠杆 Lever	304SS , 316L	53	阀芯 Plug	304SS , 316L
16	端盖 End Cover	CF8 , CF3M	54	阀座 Valve Seat	304SS , 316L
17	压圈 Press Ring	304SS , 316L	55	阀座垫圈 Sealing Ring of Valva Seat	316SS+Graphite 316L+Graphite
18	恒节流件 Constant Throttle	H62			316L+PTFE
19	喷嘴 Nozzle	304SS , 316L	56	阀垫 Valve Cushion	NBR;FKM;SR;PTFE
20	螺套 Screw Set	304SS , 316L	57	压圈 Press Ring	304SS , 316L
21	弹簧 Spring	304SS , 316L	58	阀体 Body	WCB,CF8,CF3M
22	连接套 Connecting Set	304SS , 316L	59	连接螺栓 Connecting Bolt	304SS , 316L
23	连杆 Connecting Rod	304SS , 316L	60	销 Pin	304SS , 316L
24	销 Pin	304SS , 316L	61	螺钉 Screw	304SS , 316L
25	膜盖 Diaphragm Case	304SS , 316L	62	套管 Casing	304SS , 316L
26	膜片 Diaphragm	NBR,FKM,SR	63	左杠杆 Left Lever	304SS , 316L
27	盘 Diaphragm Plate	LY12	64	滚轮 Roller	304SS , 316L
28	垫圈 Washer	304SS , 316L	65	右杠杆 Right Lever	304SS , 316L
29	弹簧座 Spring Seat	304SS	66	轴套 Shaft Set	304SS , 316L
30	膜盖 Diaphragm Case	304SS , 316L	67	下销 Bottom Pin	304SS , 316L
31	挡圈 Block Ring	304SS	68	安装板 Connecting Plate	304SS , 316L
32	销 Pin	304SS	69	端盖 End Cover	CF8,CF3M
33	弹簧罩 Spring Cover	CF8	70	阀杆 Valve Stem	304SS , 316L
34	设定弹簧 Setting Spring	304SS	71	平衡圈 Balance Ring	304SS , 316L
35	螺杆 Screw	304SS	72	弹簧 Spring	304SS , 316L
36	螺母 Nut	Hpb59-1	73	挡环 Baffle Ring	304SS
37	垫圈 Washer	PTFE	74	法兰 Flange	CF8
38	保护罩 Protective Cover	304SS	75	弹簧座 Spring Seat	304SS , 316L
39	销 Pin	304SS , 316L	76	弹簧座 Spring Seat	304SS , 316L

序号	零件名称	材质	序号	零件名称	材质
SN	Name of Part	Material	SN	Name of Part	Material
77	下销 Bottom Pin	304SS , 316L	82	导套 Guide Bush	PTFE
78	导套 Guide Bush	304SS , 316L	83	阀座 Valve Seat	304SS , 316L
79	阀杆 Valve Stem	304SS , 316L	84	螺钉 Screw	304SS , 316L
80	阀芯 Plug	304SS , 316L	85	阀垫 Valve Cushion	NBR;FKM;SR;PTFE
81	平衡圈 Balance Ring	304SS , 316L	86	压圈 Press Ring	304SS , 316L
B01	O型圈 O-ring	NBR;FKM;SR	B21	O型圈 O-ring	NBR;FKM;SR
B02	O型圈 O-ring	NBR;FKM;SR	B22	内六角螺钉 Socket Head Screw	304SS
B03	O型圈 O-ring	NBR;FKM;SR	B23	六角螺栓 Hex Bolts	304SS
B04	内六角螺钉 Socket Head Screw	304SS , 316L	B24	六角螺母 Hex Nut	304SS
B05	O型圈 O-ring	NBR;FKM;SR	B25	内六角螺钉 Socket Head Screw	304SS,316L
B06	内六角螺钉 Socket Head Screw	304SS , 316L	B26	弹簧垫圈 Spring Washer	304SS,316L
B07	O型圈 O-ring	NBR;FKM;SR	B27	内六角螺钉 Socket Head Screw	304SS,316L
B08	O型圈 O-ring	NBR;FKM;SR	B28	O型圈 O-ring	NBR;FKM;SR
B09	O型圈 O-ring	NBR;FKM;SR	B29	O型圈 O-ring	NBR;FKM;SR
B10	内六角螺钉 Socket Head Screw	304SS , 316L	B30	O型圈 O-ring	NBR;FKM;SR
B11	内六角螺钉 Socket Head Screw	304SS	B31	内六角螺钉 Socket Head Screw	304SS
B12	内六角螺钉 Socket Head Screw	304SS	B32	六角螺母 Hex Nut	304SS
B13	O型圈 O-ring	NBR;FKM;SR	B33	弹簧垫圈 Spring Washer	304SS,316L
B14	六角螺母 Hex Nut	304SS	B34	O型圈 O-ring	NBR;FKM;SR
B15	齿型垫 Tooth Cushion	304SS;316L	B35	内六角螺钉 Socket Head Screw	304SS
B16	双头螺柱 Stud	45#;304SS	B36	O型圈 O-ring	NBR
B17	六角螺母 Hex Nut	45#;304SS	B37	弹性挡圈 Circlip	304SS
B18	弹性挡圈 Circlip	304SS	B38	O型圈 O-ring	NBR;FKM;SR
B19	内六角螺钉 Socket Head Screw	304SS	B39	O型圈 O-ring	NBR;FKM;SR
B20	O型圈 O-ring	NBR;FKM;SR			

附件 Annex



操作原理 Operational Principle

调压阀主要由主阀，过滤器，指挥器组成。主阀接受指挥器的控制信号来控制其阀芯开度调节流量，从而控制所需的工艺压力。过滤器保证给精密的指挥器洁净的气源，指挥器会感应阀后压力并将引入的阀前动力压转换成气动信号来控制主阀的开度。

The pressure regulating valve composed of the main valve, filter and pilot valve. The main valve receives the control signals of the pilot valve to control the openness of the valve plug, so it can control the required process pressure. The filter can supply clean gas to the precise pilot valve. The pilot valve will sense the downstream pressure, transform the introduced upstream power pressure to the pneumatic signals and control openness of the main valve.

主阀为常闭阀，指挥器为常开阀。

The main valve is the constantly closed valve. The pilot valve is the constantly open valve.

气体引入阀体，阀前压力气源经过滤器引入指挥器，指挥器内置减压阀会将高压气体减压稳压至较低压力，该压力经恒节流件同时输入主阀膜室两侧，当指挥器喷嘴关闭时，主阀膜室两侧压力相等，主阀阀芯在复位弹簧的推力下处于关闭。旋动指挥器调节螺钉，指挥器给定弹簧被压缩，推动膜片组件带动杠杆机构打开喷嘴挡板，因恒节流件的存在，主阀左侧膜室的压力被释放，膜室两侧产生压力差，膜片组件会拉动主阀调节机构开启阀芯，气体会进入阀后系统，阀后压力又会经导压管反馈至膜片组件产生推力并与给定弹簧推力比较，当推力大于弹簧力，喷嘴挡板会关小开度，反之会增大开度，而喷嘴挡板开度的变化直接会改变主阀左膜室的压力，也就相应会控制主阀开度的大小。对于整个调压系统来讲就是阀后压力减小，主阀开度增大，阀后压力增大，主阀开度减小。当阀后压力在指挥器膜片上产生的推力正好与给定弹簧推力平衡时，喷嘴挡板就会稳定在这一开度上，主阀也会稳定在这一开度上，整个系统的压力及调压阀调节机构的开度均达到平衡状态，而此时的阀后压力即为设定压力。当阀前压力变化或阀后流量变化引起阀后压力变化时，原有的平衡就被打破，指挥器膜片会带动喷嘴挡板做出相应调节改变给主阀的气动信号，使主阀阀芯作出相应调节使压力恢复至设定值，系统重新恢复平衡。当阀后流量降为“0”时，阀后压力会逐渐累积升高，因喷嘴口径很小，且又有杠杆增力机构，压力略有升高，喷嘴就会关闭，主阀膜室两端压力平衡，主阀也相应关闭，系统处于保压状态。

The gas is supplied into the valve. The upstream pressure gas is supplied into the pilot valve via the filter. The embedded pressure-reducing valve of the pilot valve will reduce the pressure. This pressure is supplied into two sides of the main valve diaphragm case via the constant throttling part. When the pilot-valve's nozzle is closed, the pressure on both sides of the main valve diaphragm case is equal. The main valve plug is closed under push of the restore spring. To rotate the regulation screw of the pilot valve, the pilot valve spring is compressed to drive the diaphragm component and drive the lever to open the nozzle retaining plate. The pressure will be released in the left diaphragm case of the main valve due to the constant throttling part. The pressure is different on both sides of the diaphragm case. The diaphragm component will drive the adjustment device of the main valve to open the valve plug. The gas will be supplied into the downstream system. The downstream pressure will feed back to the pilot valve diaphragm via the pressure conduit to generate push and compare it with the given spring push. When the push is higher than the spring force, the nozzle retaining plate will reduce openness. On the contrary, it will increase the openness. Change of the nozzle retaining plate openness will directly change the pressure of the left diaphragm case of the main valve and will also control the openness of the main valve. For the whole pressure regulation system, the downstream pressure reduces and the main valve openness increase. The downstream pressure increase and the main valve openness reduces. When the push generated by downstream pressure on the pilot valve diaphragm is equal to the given spring push, the nozzle retaining plate will keep under this openness. The pressure of the whole system and openness of the pressure regulating valve will be equal. At this time, the downstream pressure is the set pressure. When the upstream pressure change or downstream flow change leads to downstream pressure change, the old balance will be changed. The pilot valve diaphragm will make the nozzle retaining plate adjust and

make the pressure restore to the setting. The system will quickly restore to the balance state. When the downstream flow reduces to "0", the downstream pressure will gradually increase. The nozzle diameter is very small, the pressure will increase little and the nozzle will close under action of the lever pressurizing device. The pressure balance main valve at two ends of the main valve diaphragm case will also close. The system is under holding state.

阀后输出压力的大小就取决于指挥器给定弹簧推力的大小，所以只要旋动调节螺钉就可以对阀后压力进行调整设定，顺时针为升压，逆时针为降压。

The downstream output pressure depends on the given spring push of the pilot valve, to rotate the regulating screw, you can adjust and set the downstream pressure. To clockwise rotate, the pressure will increase, to rotate anticlockwise, the pressure will decrease.

指挥器膜片组件及其相连的喷嘴挡板感应机构有很高的灵敏度，阀后压力稍有变化，就会被感应放大成气动信号去控制主阀，整个调压系统有很高的调节精度。

The diaphragm component of the pilot valve and nozzle retaining plate sensing device are very sensitive. If the downstream pressure changes little, they will sense the signals and amplify them as the pneumatic signals to control the main valve. The whole pressure regulation system has a very high regulation precision.

喷嘴本身就是一控制主阀通道的阀芯，由于调压阀是极高减压比系统，当有系统快速扰动时极易产生超调（主要是正向超调），为尽可能减小超调，喷嘴在弹簧作用下将主阀两膜室关断，当有快速扰动影响时，阀后压力略有超压，指挥器膜片就会带动挡板推动喷嘴立即打开主阀两膜室通道强制平衡其两端压力，使主阀阀芯迅速关小。

The nozzle is a valve plug which controls the left and right diaphragm case channel of the main valve. The pressure regulating valve can reduce the pressure much, when the system is affected by quick disturbance, it can easily lead to over control (mainly forward over pressure). To reduce the over control as much as possible, the nozzle close two diaphragm case under action of the spring. When affected by quick disturbance, the downstream pressure will increase little. The pilot valve diaphragm will drive the retaining plate to push the nozzle and instantly open two diaphragm case channels of the main valve to forcefully balance the pressure at two ends and quickly reduce the openness of the main valve plug.

指挥器膜片组件内安装有超载弹簧，超载弹簧的推力是经计算并预设的，其预压缩力能保证调压阀正常工作，当压力超过过载压力时，调节机构已到位固定，膜片组件可克服超载弹簧的预紧力继续移动直至贴紧膜盖，使过载力作用至膜盖，从而保护调节机构不会损坏，当系统恢复正常后又可正常运行。

The diaphragm component of the pilot valve is installed with the over-load spring. The push of the over-load spring is computed and preset. The pre-compression force can guarantee normal operation of the pressure regulating valve. When the pressure is excessive, the regulation device is fixed in place. The diaphragm component can overcome pre-tightening force of the overload spring to continue movement till touching the diaphragm case, so the over load will be imposed to the diaphragm case and prevent the regulation device from damage. After the system restores to the normal state, it can normal operate.

安装 Install

● 调压阀安装时介质流向一定要与阀体上的箭头一致，调压阀尽量水平安装于管道，因调压阀为极低压力控制，指挥器膜片的重力方向也会影响其输出压力，如需采取其他安装方向，可能要重新整定压力，DN>50时应水平安装，否则会影响其使用寿命。

The medium flow direction should be consistent with the arrow direction when installing the pressure regulating valve. The pressure regulating valve should be installed on the tube as horizontal as possible. The pressure regulating valve can control under very low pressure, the gravity direction of the pilot valve will affect the output pressure. If needed, other installation direction is considered. The pressure may be set again. For DN>50, the valve should be installed horizontally. Otherwise, it may affect the use life.

● 调压阀前后应安装截止阀，以便检修和维护，在重要的场合应安装旁路阀，以便应急使用。

Shut-off valves should be installed either at the upstream and downstream of the regulator for inpection and maintenance. The by-pass valve should be installed for emergency in important applications.

● 调压阀前后应装上压力表或其他检测仪表，以

便进行压力调整。

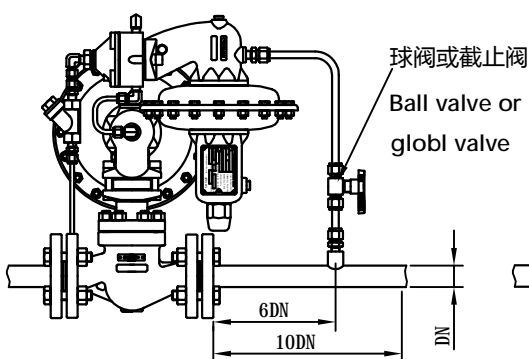
The pressure gauge or other pressure detection instrument should be installed before and after the pressure regulating valve for pressure adjustment.

● 可选择调压阀上自带压力表，此压力表显示的即为阀后控制压力。

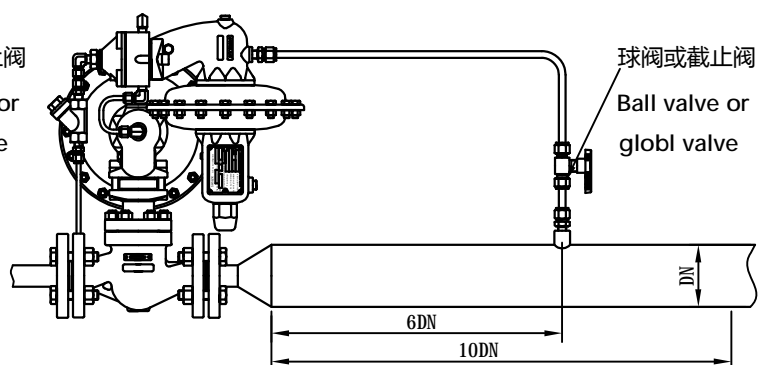
The pressure regulating valve can include a pressure guage. This pressure guage dispys the downstream control pressure.

● 调压阀为阀外取压，管道上应取压安装导压。导压管上应装上球阀或截止阀，阀后应有10DN的直管段，取压点在6DN处，阀后有扩径管的应以扩径后的管径为准。

The pressure regulating valve is external measured pressure. The pipe should be installed with the pressure guide pipe. The pressure guide pipe should be installed with of the ball valve or globe valve. The 10DN straight pipe should be installed after the valve. The pressure measured point should be located at 6DN. If the diameter expansion pipe is behing the valve, refer to the diameter of the expanded pipe.



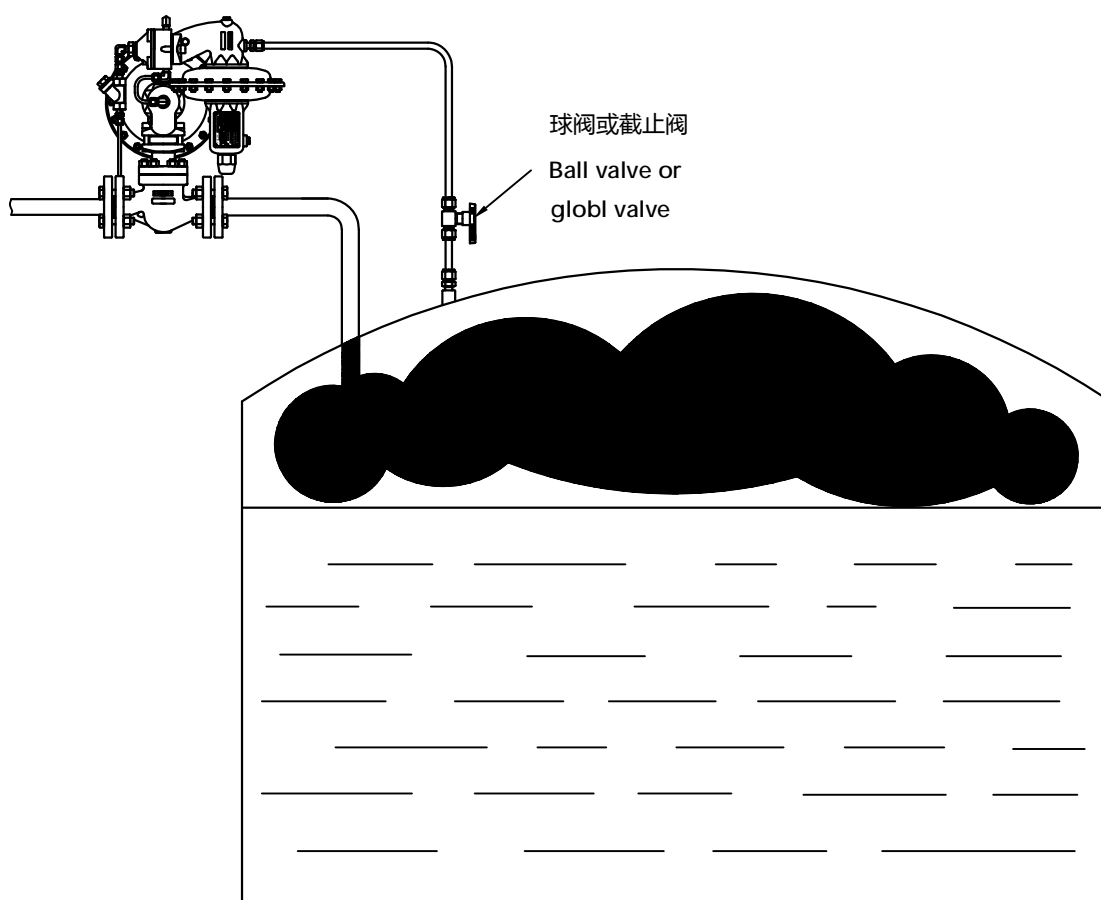
等口径
Equal Diameter



阀后有扩径管
Downstream expanding

● 对于应用于储罐氮封的调压阀取压点应直接取自于罐顶，这样才能充分发挥调压阀的输出流量来满足氮封流量的需求，使罐顶保持相对于大气压的微正压。储罐上一般安装呼吸阀与调压阀配套使用，在正常使用时储罐靠调压阀吸气，靠呼吸阀排气，当调压阀故障或氮气中断时，呼吸阀可吸气保护储罐不致吸瘪。

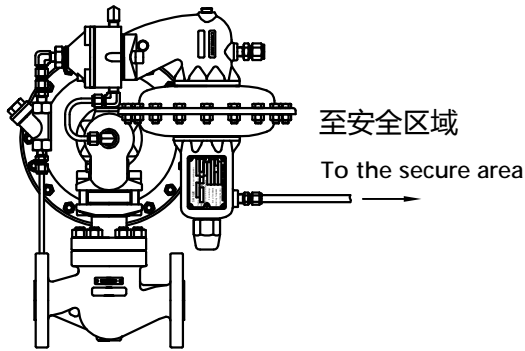
For the nitrogen blanketing tank, the measured point of the pressure regulating valve is collected at the top of the tank, so it can fully meet the flow requirement of the nitrogen blanketing via the output flow of the pressure regulating valve and keep the tank top micro positive pressure to the atmospheric pressure. Generally, the tank is installed with breathing valve and pressure regulating valve. The tank sucks the gas by pressure regulating valve during normal operation and discharge gas via the breathing valve. When the pressure regulating valve fails or the nitrogen breaks, the breathing valve can suck the gas to avoid the tank shrinkage.



用于储罐氮封 For Tank Nitrogen Blanketing

- 调压阀膜片损坏时会引起介质的泄漏，对于现场不允许介质泄漏的，可在调压阀执行器上安装引流管引致安全区域。

When the pressure regulating valve diaphragm is damaged, it will lead to medium leakage. If the medium leakage is forbidden at the field, the flow guide pipe can be installed on the actuator of the pressure regulating valve to guide the flow to the secure area.



安装引流管
Installation Of Guide Pipe

- 调压阀安装前管道应已进行清洗或吹扫，不应留有颗粒，焊渣等杂物。

The piping should be flushed or purged before the installation of the regulator to remove any particulates or welding slag.

运行使用 Operation

- 投入运行前应先检查各部安装是否正确。

To make sure the components of the regulator are correctly installed before the regulator is put into operation.

- 开启导压管上的球阀或截止阀，有旁路的应先关闭旁路阀，应保证阀后系统有一定流量，缓慢打开阀前截止阀，并观察压力表示值，如无异常现象可全开阀前截止阀，调压阀即进入运行状态。如需改变其输出压力，只要打开执行器上的保护罩，旋动调节螺杆即可，顺时针压力升高，反之压力减小。

To open the ball valve or globe valve on the pressure on the guide pipe. First close the bypass valve(if provided)

- 调压阀安装完以后如需进行管道试压，应将导压管上的球阀或截止阀关闭。

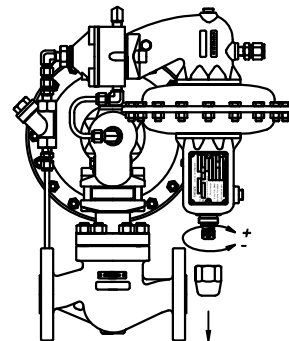
When the piping will be pressure tested after the installation of the regulator, the globe valve or ball valve on the pressure introduction pipe should be closed.

警告 Warning

- 调压阀到了现场如要对其进行试压，必须认识到调压阀完全不同于普通调节阀，调压阀严禁进行水压，一旦有水进入指挥器系统将严重影响调压阀的使用。如要进行试压检漏，可用洁净的空气或氮气，然后用泡沫检查。检漏的压力不应超过阀门的允许使用压力。

After the pressure regulating valve is delivered to the site, its pressure should be tested. The pressure regulating valve is different from the common valve. The water pressure test is forbidden for the pressure regulating valve. Once the water flows into the pilot valve system, it will severely affect the operation of the pressure regulating valve. For pressure test and leakage detection, first use clean air or nitrogen and then use the foam. The leakage detection pressure should not be over the permitted operation pressure of the valve.

and open the downstream globe valve, guarantee that downstream system has certain flow, slowly open the upstream globe valve and watch the pressure gauge, if no exception, you can fully open the upstream globe valve, the pressure regulating valve enters operation state. To change the output pressure, you should open the protection cover on the actuator and rotate the adjusting screw. To rotate clockwise, the pressure will increase. On the contrary, the pressure will reduce.



- 对于阀上自带压力表的调压阀在开启阀前截止阀时应尽可能缓慢平稳，以免冲坏膜盒微压表。

If the pressure regulating valve includes a pressure

gauge, you should open the upstream globe valve as slowly and stably as possible to avoid damage to the micro-pressure gauge of the diaphragm box.

检修要点 Repair Points

- 调压阀的指挥器，过滤器，主阀为独立组件，可单独进行检修。

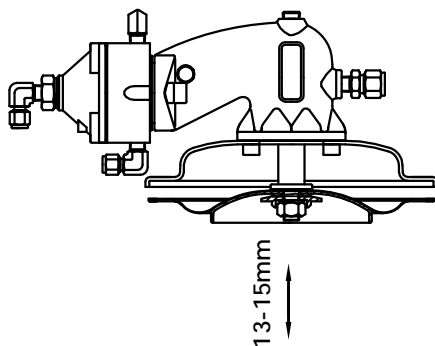
The pilot valve, filter and main valve of the pressure regulating valve are independent components and can be separately repaired.

- 指挥器主要检查减压阀膜片，指挥器膜片，减压阀阀垫，挡板阀垫是否损坏失效，当然其他密封圈也应检查，指挥器内部应重点检查恒节流件是否堵塞，内部是否洁净，如有污染堵塞，应加以清洗。

For the pilot valve, you mainly check whether the pressure reducing valve diaphragm, pilot valve diaphragm, pressure reducing valve cushion and retaining valve cushion are damaged and are invalid, also check the sealing ring. For internal components, you should mainly check whether the constant flow component is blocked and is clean inside. If it is blocked by the waste, you should clean it.

- 指挥器膜片组件重新装入时应保证其行程在13-15mm左右。

When the diaphragm component of the pilot valve is installed again, its stroke should be about 13-15mm.



膜片组件与连接螺栓连接后向内旋入，将膜片组件向内压到底，然后向外拉出，感觉挡板刚好关闭，这时膜片组件的行程应为13-15mm。

After the diaphragm component is connected with the connection bolt, you should rotate it inward to press the diaphragm component till the bottom and push out.

you should feel that the retaining plate is just closed. At this time, the stroke of the diaphragm component should be about 13-15 mm.

- 过滤器的滤网可取出清洗。

Take out the filtering mesh of the filter and clean it.

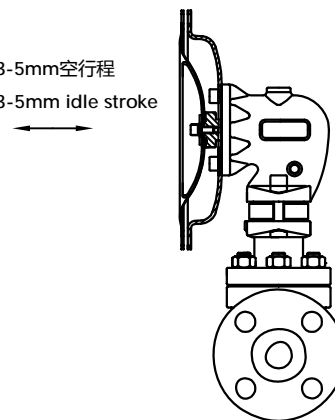
- 主阀主要检查膜片，阀芯密封垫等橡胶材质零件是否有老化失效，如有损坏应及时更换。

For the main valve, you mainly check whether the rubber parts such as diaphragm and valve plug sealing cushion are aging and invalid. If they are damaged, you should replace them in time.

- 主阀膜片旋入后拉动膜片组件应保证其留有3-5mm的空行程，这样即可保证主阀阀芯关闭，又可保证阀芯有足够的全启行程。

After the diaphragm of the main valve is roated in, to pull the diaphragm component back, you should reserve 3-5mm idle stroke, so it can guarantee that the main valve plug is fully closed and the valve plug has enough full state stroke.

3-5mm空行程
3-5mm idle stroke



型号编制 Mode Establishment

SP 592

DN:

15-DN15(1/2")

20-DN20(3/4")

25-DN25(1")

40-DN40(1 1/2")

50-DN50(2")

65-DN65(2 1/2")

80-DN80(3")

100-DN100(4")

PN:

16-PN16

40-PN40

64-PN64

150-150LB

300-300LB

600-600LB

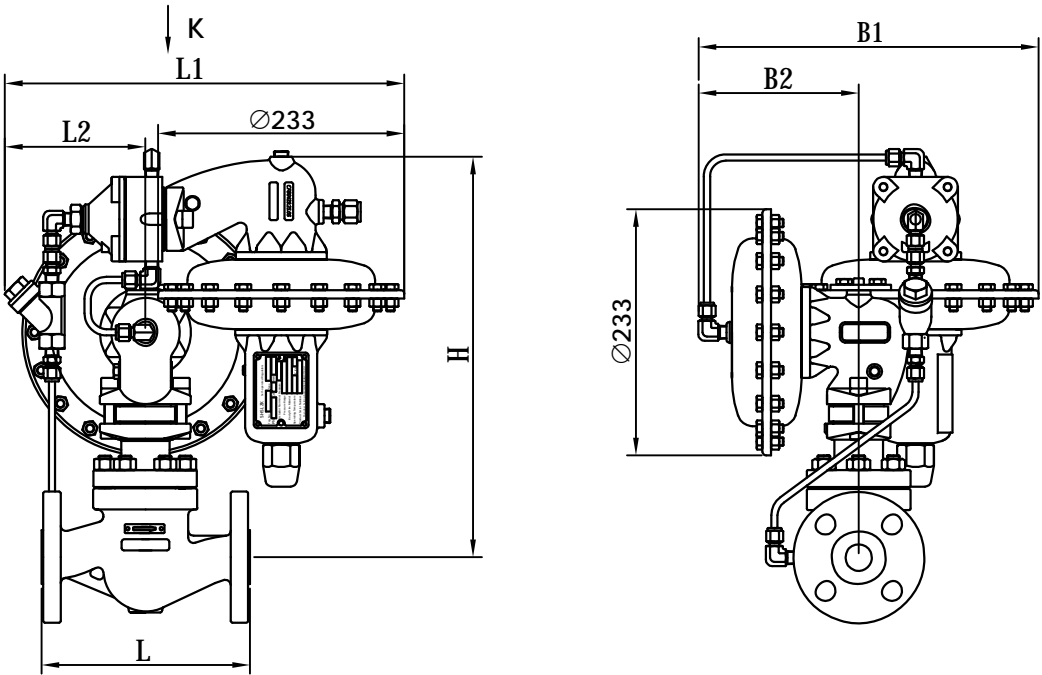
铭牌内容 Description on The Nameplate

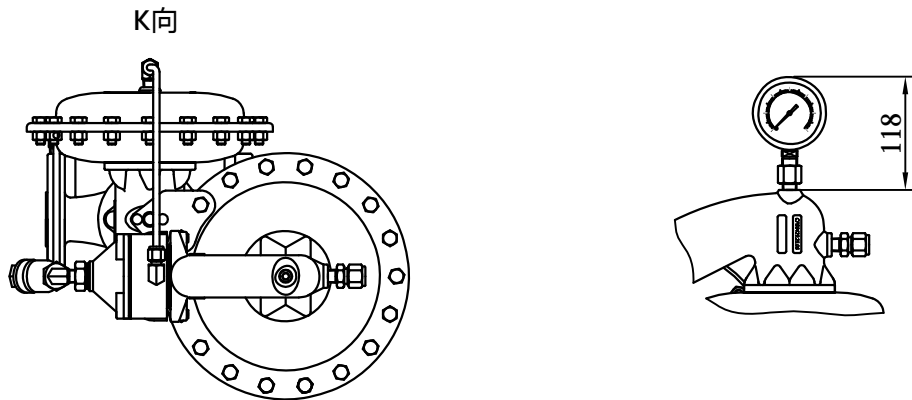
- | | |
|---|--|
| ● 产品型号 Type | ● 执行器最高耐压 Maximun Pressure of Actuator |
| ● 公称通径 Nominal Diameter | ● KV值 Kv Value |
| ● 公称压力 Nominal Pressure | ● 使用温度 Operating Temperature |
| ● 阀体/内件材质 Material of Body/Internal Parts | ● 法兰标准 Flange Standard |
| ● 膜片材质 Material of Diaphragm | ● 生产编号 Serial Number |
| ● 调压范围 Regulation Range | |

选型条件 Selection Criteria

- | | |
|---|--|
| ● 管线尺寸 Pipeline Dimensions | ● 取压方式 Pressure Measuring Method |
| ● 介质种类 Medium | ● 设定压力 Setting Point |
| ● 介质温度、环境温度
Medium Temperature、Ambient Temperature | ● 法兰标准 Flange Standard |
| ● 介质密度 Medium Density | ● 本体及内件材质要求
Requirements on Material of The Body and Internal parts |
| ● 阀前压力、阀后压力
Upstream Pressure、Downstream Pressure | ● 其他特殊要求 Other Special Requirements |
| ● 流量 Flowrate | |

外型尺寸 Dimension





公称通径 Nominal Diameter		15	20	25	40	50	65	80	100
PN16(150LB)	L	181	181	184	222	254	276	298	352
PN40(300LB)		181	194	197	235	267	292	317	368
PN64(600LB)		206	206	210	251	286	311	337	337
L1	377						425		
L2	132						164		
H	375		375	385	400	406	485	490	505
B1	322						386		
B2	152						225		
PN16(150LB)	重量 Kg Weight	20	22	23	28	31	45	58	71
PN40(300LB)		20	22	23	28	31	45	60	75
PN64(600LB)		22	25	27	33	36	53	65	83

注：重量由于配置不同会有所不同，这里的重量为较平均的重量。

Remark: The weight will be different due to different configurations, the weight indicates average weight

经验分享 Experience Sharing

● 阀后安全装置

对于微压控制调压阀必须认真评估阀后设备的安全性，阀后最高压力在非正常状态下可能达到阀前压力，在这种情况下如会对下游设备造成损坏和不安全，下游一定要安装安全阀或其他安全释放设备，安全阀起跳压力一定要高于设定值一定范围，一般应高于该调压阀控制压力的50%以上。安全阀的排量应充分考虑调压阀的全开排量，有必要的话旁路阀的最大排量也应考虑。

Dowstream Safety Device

As for micro-pressure regulating valve, the safety of the downstream equipment must be seriously evaluated, the maximum downstream pressure may equal to the upstream pressure in this abnormal condition. The downstream safety valve or other safety-release devices must be installed, the tripping pressure of the safety valve should be higher than the setting pressure with a certain range, this range normally should be about 50%. The discharge capacity of the safety valve should be selected based on the full-opened discharge capacity of the regulator, the maximum flow of the by-pass valve should also be considered whenever necessary.

● 储罐氮封应用

调压阀应用于储罐氮封一般会与呼吸阀配套使用，呼吸阀的排气压力应比调压阀的设定压力至少高50%，这样不宜控制干扰，同时也可以节约氮气。呼吸阀的排量应满足储罐在进料及升温时的排气量和调压阀最大进气量和旁路阀（如有旁路的话）的最大进气量的总和。

调压阀应用于储罐氮封其取压口应直接取自于罐顶，不要以为取自于阀后管线也一样，在没有流量的时候，阀后为封闭系统，各点的压力是一样的，但在阀门开启充氮时，管线的压力和罐顶的压力在动态下存在极大的偏差，甚至阀后管线压力控制正常而罐顶已出现负压。对于流量很小的系统可以管线取压，不过应仔细计算阀后管线在减压后的微压状态下的流量是否满足储罐氮封的要求。如果阀后管线作足够的扩径，也可以进行管线取压，不过同样应仔细核算微压状态下的管线流量。

Generally the pressure regulating valve is used for tank blanketing with breathing valve. The exhaust pressure of the breathing valve should be at least 50% higher than the set pressure of the pressure regulating valve, so it is not easy to control disturbance. The nitrogen can be saved. The drainage of the breathing valve should be sum of the drainage capacity of the tank in feeding and temperature increase, maximum gas supply capacity of the pressure regulating valve and maximum gas supply capacity of the bypass(if the bypass is provided).

When the pressure regulating valve is used for tank blanketing, the measured point should be directly collected at the top and should not be collected from downstream pipeline. When no flow is available, the downstream system is an enclosed system. The pressure of different points are same. When the valve starts to charge the nitrogen, the pressure of the pipeline and tank top includes high deviation under dynamic condition. Even if the pressure control of the downstream pipeline is normal, the tank top has a negative pressure. For the system with a small flow, the pressure can be collected from pipeline, but you should carefully compute whether the flow of the downstream pipeline under pressure-relieved micro-pressure state meets the requirement of tank nitrogen blanketing. If the downstream pipeline has enough expanded diameter, the measured point can be collected from the pipeline, you should also compute the pipeline flow under micro-pressure state.

● 流量系数的计算及KV值的选择

流量系数的计算与普通调节阀一样，这里不再详述，KV值选择时注意阀门的开度不应超过70%，比较理想的开度范围为10-60%。

对于储罐氮封流量的确定我们要考虑出料泵的最大排量，同时还要考虑罐体在降温时引起的罐顶气体收缩量。即调压阀在任何情况下应有足够的输出流量来维持罐顶的微正压。

The Calculation of The Flow Coefficient and Selection KV Value.

The detailed calculation of the flow coefficient will not be described here because the method is the same with normal valve, it should be noticed that the maximum openness of the valve should be not higher than 70% when the KV value is selected, the suitable range of the openness should be 10-60%.

To identify the flow of the tank nitrogen blanketing, we should consider the maximum drainage capacity of the feed out pump and top gas shrinkage when the tank temperature reduce. Namely the pressure regulating valve has enough output flow to keep the micro positive pressure of the tank top in any case.

● 调压范围的选择

所选的调压范围必须涵盖所需的工艺设定值。同一设定值会有多个调压范围适用，但应使设定值尽量处于调压范围的中间或中间偏上的位置，因为对于每一对弹簧和执行器的配置其理论偏差是固定的，设定值越靠近调压范围上限值相对偏差就越小。一般设定值处于调压范围40-85%的范围是比较合适的。

Selection of Regulation Range

The regulation range selected must cover the process setting required. There will be a number of regulation

ranges can be used for the same setting value. The ranges should be selected to make the setting value is at the middle or upper middle of the range, it is because that the theoretical deviation of every combination of spring and actuator is fixed, the deviation will be smaller when the setting value is closer to the upper limit of the regulation range. Generally, it is suitable to make the setting valve is in the 40-85% of the regulation range.

- 流量特性

调压阀可选择 L 或 EQ% 特性，L 特性响应迅速，但在小流量控制时可能不稳定，EQ%可在极小流量时稳定控制，但在小流量控制时响应相对较慢。储罐应用时可用 L 特性，作为管线取压调压应用时可选EQ%特性。

Flow Characteristics

The "L" or "EQ%" characteristics can be selected for the pressure regulating valve. "L" characteristics response should be quickly, but it may be unstable under small flow control. "EQ%" can be stably controlled in case of small flow, but the response is relatively slow in the small flow control. When the tank is used and the pressure is collected from the tank top, "L" characteristics can be used. For pressure collection and regulation of the pipe, "EQ%" characteristics is used.

- 执行器的选择

必须认识到调压阀不同于普通调节阀，介质会进入执行器，介质会直接接触膜片，所以我们首先应考虑介质是否会腐蚀膜片，介质温度是否超过膜片允许温度，从而选择合适的膜片材质。

Selection of Actuator

It must be noticed that the regulator is different with conventional valve. The medium will enter the actuator and make direct contact with the diaphragm. Therefore, we should consider that whether there is any corrosion to the diaphragm will be caused by the medium or whether the temperature of the medium is higher than the allowed temperature of the diaphragm when we select the suitable material of the diaphragm.

- 启动压差

指挥器操作调压阀是以调压阀前后压差为动力源，调压阀前后压差应不小于30KPa才能驱动阀门正常工作。

Start Pressure Different

The pilot valve operates the pressure regulating valve via the pressure difference before and after the pressure regulation valve. To drive normal operation of the valve, the pressure difference must not be less than 30KPa.