

SP100H型内设定自力式压力调节阀（以下简称调压阀）

SP100H Internal-Setting Self-Operated Pressure Regulating Valve(hereafter called as pressure regulating valve)

注意 Caution

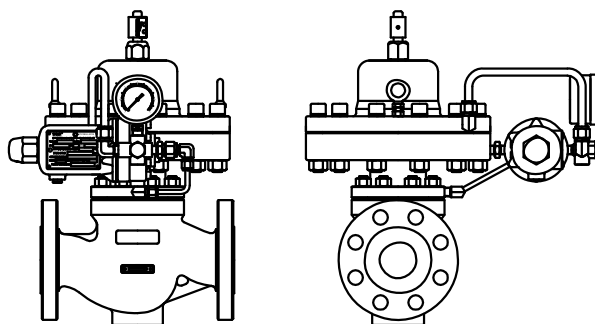
安装，操作，维护由非专业人员进行可能会对设备，人员造成损坏，所以必须由专业人员进行调压阀的安装，调试及维护。

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

SP100H型调压阀是一种内部设定直接作用调压阀。可广泛应用于各类低腐蚀气体。最低控制压力300KPa，最高控制压力8000KPa，最低使用温度为-48℃，最高使用温度为120℃。仅用于阀后压力控制，适用于中高压工况。

SP100H Self-operated Pressure Regulator is a Internal-setting direct-operated pressure regulator. It can be use for downstream pressure control. The lowest control pressure is 500 KPa and the highest control pressure is 8000 KPa. The lowest operating temperature is -48℃ and the highest operating temperature is 120℃.

**产品特点 Product Feature**

- 结构紧凑---内置弹簧结构使调压阀结构更紧凑，同时具有更好的防护性。
Compact Structure---The embedded spring structure makes the pressure regulating valve more compact and well protected.
- 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.
- 精度高---SP100H调压阀适用于高压控制，弹簧作用产生的固定净差相对于控制压力来讲很小，使调压阀有很高的控制精度。
High Precision---SP100H pressure regulating valve applicalbe to the high pressure control, fixed net difference spring action to produce the equivalent of the control pressure is very small. The pressure regulating valve has high control precision.
- 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.
- 稳定控制---设定减压阀与主控制阀相互独立控制，互不干扰，使控制更稳定。
Stability Control---The setting regulator and main control valve are mutually independent control, do not

interfere with each other, to make the control more stable.

● **安全过载**---在任何情况下安全永远是最重要的，自力式调节阀因其介质会直接进入执行器，当系统超压时，往往会严重损坏阀门。SP100H型调压阀的过载保护设计会安全承载高于调压范围上限值几倍甚至几十倍的过载压力，在有些配置中可完全达到公称压力。

Overload Safety---The safety shall be ensured under any circumstances. The self-operated regulator allows medium to enter the actuator, so the overload of the system usually badly damaged the regulator. The overload design mechanism of SP100H regulator can safely bear the overload pressure one or few dozens times higher than the upper limit pressure of the regulation range. The overload pressure can reach the nominal pressure of the valve in most configurations.

● **带压力表**---压力表为本调压阀的标准配置，使现场安装调试更方便。

With Pressure Gauge---The pressure gauge is standard configuration of the pressure regulating valve. It make the installation and commissioning more convenient.

● **维护方便**---SP100H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 SP100H 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 parts has sufficient clearance to make sure itself can be easily taken out or put in.

● **系列通用**---SP100H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---SP100H 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 (阀体为法兰连接)**

Body Size(Flanged connection)

DN20(3/4"),DN40(1 1/2"),DN50(2"),DN65(2 1/2")

DN80(3"),DN100(4"),DN150(6"),DN200(8")

● **压力等级 Pressure Rating**

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

也可以定制 Can also be customized

● **反馈接口 Feedback Interface**

ZG1/4" 出厂配好10mm卡套接头，控制压力大于4.0MPa时配10mm焊接接头。

ZG1/4" 10mm card set of connector is provided in the plant, 10mm weld-end connector will be provided if the control pressure is over 4.0MPa.

● **流量系数 Flow Factor**

阀门口径 Valve size	20	25	40	50	65	80	100	150	200
KV	6	8	22	35	58	90	140	350	450

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.

● **取压方式 Pressure Measuring Method**

阀外取压或阀体法兰取压

Measured at outside of the valve or valve flange.

● **泄漏等级 Leakage Class**

软密封 VI级 Soft-sealing VI

- 关闭等级 Closing Class
<6%的调压范围上限值
<6% of upper limit of regulation range
- 流量特性 Flow Characteristics
L (标准 Normal)
EQ%(特殊加工 Special processing)
- P1MAX: 9.0MPa
P2MAX: 8.0MPa

- 使用温度 Operation Temperature
对于软密封阀门来讲，温度主要取决于密封件及膜片材质。
For the soft sealing valve, the temperature depends on the material of the sealing part and diaphragm.
NBR -29-82℃
FKM -8-120℃
SR -48-85℃
EPDM -38-115℃

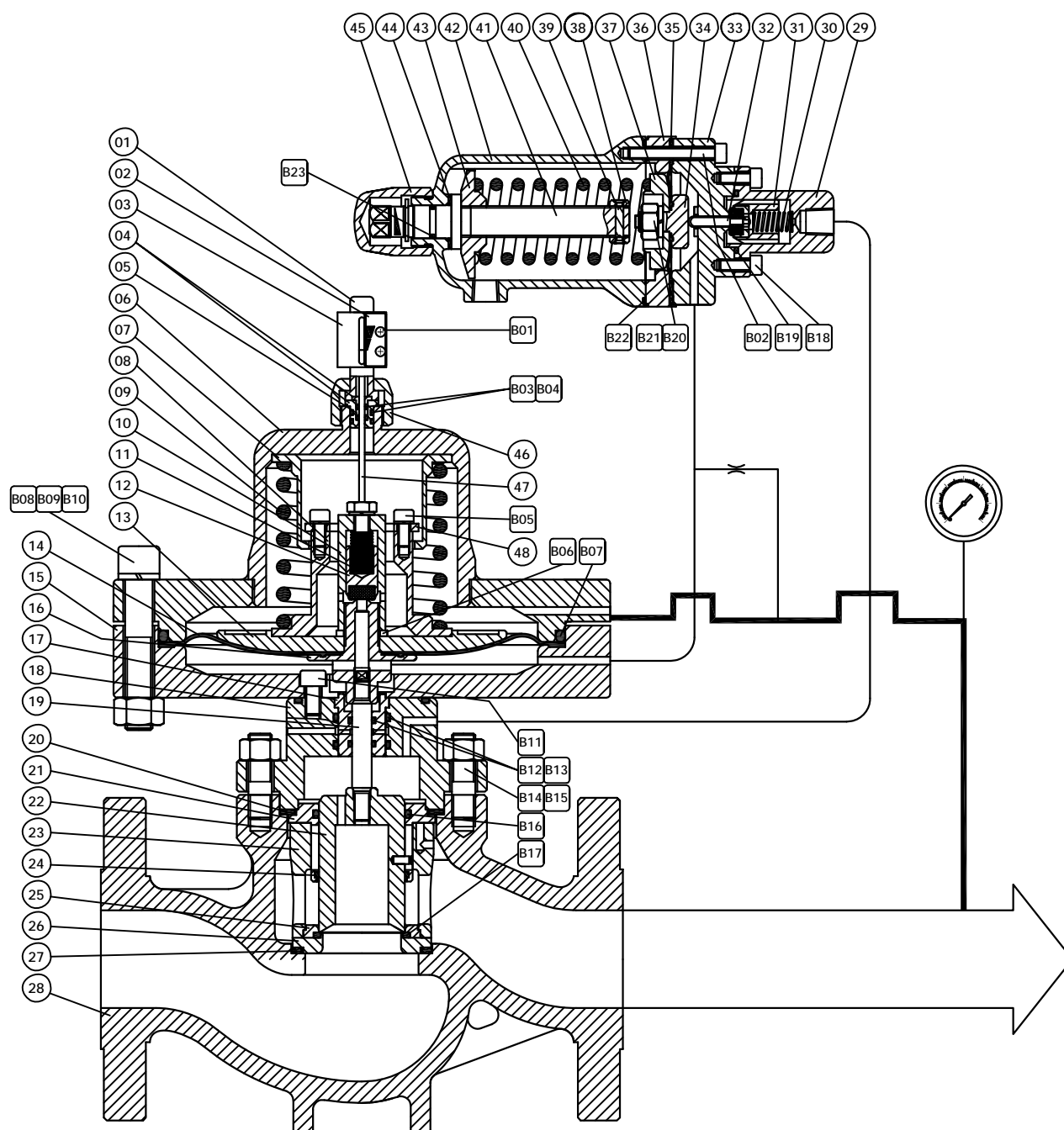
调压范围、执行器组配、压差、精度

Spring Range、The Actuator Configuration、Difference Pressure and Precision

执行器号 Actuator number	驱动压差	调压范围 Spring range	理论偏差 Theoretical Precision	许用压差 Difference Pressure MPa									执行器耐压 Max actuator pressure
				阀门口径 Valve Size									
				20	25	40	50	65	80	100	150	200	
Z08.01.00	50KPa	300-1200KPa	5%	5.0	5.0	5.0	5.0						8.5MPa
		1000-3600KPa	4%	5.0	5.0	5.0	5.0						
		2500-8000KPa	3%	5.0	5.0	5.0	5.0						
	100KPa	300-1200KPa	5%	8.0	8.0	8.0	8.0						
		1000-3600KPa	4%	8.0	8.0	8.0	8.0						
		2500-8000KPa	3%	8.0	8.0	8.0	8.0						
Z08.02.00	50KPa	300-1200KPa	5%					5.0	5.0	5.0			
		1000-3600KPa	4%					5.0	5.0	5.0			
		2500-8000KPa	3%					5.0	5.0	5.0			
	100KPa	300-1200KPa	5%					8.0	8.0	8.0			
		1000-3600KPa	4%					8.0	8.0	8.0			
		2500-8000KPa	3%					8.0	8.0	8.0			
Z08.03.00	50KPa	300-1200KPa	5%								4.8	4.8	
		1000-3600KPa	4%								4.8	4.8	
		2500-8000KPa	3%								4.8	4.8	
	100KPa	300-1200KPa	5%								8.0	8.0	
		1000-3600KPa	4%								8.0	8.0	
		2500-8000KPa	3%								8.0	8.0	
行程 Travel mm				12			22			32			

调压阀组件结构、零件清单、零件材质

Component Structure, Parts List and Parts Material of Pressure-Regulating Valve



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	端盖 End Cover	304SS	35	膜片 Diaphragm	NBR,FKM,SR , EPDM
02	标尺 Scale	304SS	36	压圈 Press Ring	304SS , 316L
03	标尺座 Scale Seat	304SS	37	盘 Diaphragm Plate	304SS
04	导套 Guide Bush	H62	38	挡圈 Block Ring	304SS
05	导套 Guide Bush	PTFE	39	销 Pin	304SS
06	膜盖 Diaphragm Case	304SS,316L	40	弹簧 Spring	304SS , 60Si2MnA
07	弹簧座 Spring Seat	20#,304SS,316L	41	螺杆 Screw	304SS
08	弹簧座 Spring Seat	20#,304SS,316L	42	弹簧罩 Spring Cover	CF8
09	弹簧 Spring	60Si2MnA,304SS	43	螺母 Nut	Hpb59-1
10	螺母 Nut	304SS , 316L	44	垫圈 Washer	PTFE
11	弹簧 Spring	304SS	45	保护罩 Protective Cover	304SS
12	阀芯 Plug	304SS , 316L	46	螺母 Nut	304SS
13	盘 Diaphragm Plate	20#,304SS,316L	47	指针 Poniter	304SS,316L
14	膜片 Diaphragm	NBR,FKM,SR , EPDM	48	压圈 Press Ring	304SS , 316L
15	膜盖 Diaphragm Case	304SS,316L			
16	连接套 Connecting Set	304SS , 316L			
17	导套 Guide Bush	H62			
18	阀盖 Bonnet	WCB,CF8,CF3M			
19	阀杆 Valve Stem	304SS , 316L			
20	阀盖垫圈 Sealing Ring of Bonnet	316SS+Graphite	B01	螺钉 Screw	304SS
21	导套 Guide Bush	304SS , 316L	B02	内六角螺钉 Socket Head Screw	304SS
22	阀芯 Plug	304SS , 316L	B03	O型圈 O-ring	NBR;FKM;SR
23	套筒 Cage	CF8,CF3M,304SS,316L	B04	O型圈 O-ring	NBR;FKM;SR
24	导套 Guide Bush	PTFE	B05	内六角螺钉 Socket Head Screw	304SS , 316L
25	压圈 Press Ring	304SS , 316L	B06	弹簧垫圈 Spring Washer	304SS
26	阀座 Valve Seat	304SS , 316L	B07	O型圈 O-ring	NBR;FKM;SR
27	阀座垫圈 Sealing Ring of Seat	316SS+Graphite	B08	六角螺母 Hex Nut	304SS
28	阀体 Body	WCB,CF8,CF3M	B09	弹簧垫圈 Spring Washer	304SS
29	端盖 End Cover	304SS,316L	B10	内六角螺钉 Socket Head Screw	304SS
30	弹簧 Spring	304SS	B11	内六角螺钉 Socket Head Screw	304SS
31	阀芯 Plug	304SS , 316L	B12	O型圈 O-ring	NBR;FKM;SR
32	推杆 Push Rod	304SS , 316L	B13	O型圈 O-ring	NBR;FKM;SR
33	阀体 Body	304SS , 316L	B14	双头螺柱 Stud	45#;304SS
34		304SS , 316L	B15	六角螺母 Hex Nut	45#;304SS

序号	零件名称	材质
SN	Name of Part	Material
B16	O型圈 O-ring	NBR;FKM;SR
B17	O型圈 O-ring	NBR;FKM;SR
B18	内六角螺钉 Socket Head Screw	304SS
B19	O型圈 O-ring	NBR;FKM;SR
B20	六角螺母 Hex Nut	304SS
B21	弹簧垫圈 Spring Washer	304SS
B22	O型圈 O-ring	NBR
B23	O型圈 O-ring	NBR

操作原理 Operational Principle

气体进入主控阀，阀前压力被引入设定减压阀，设定减压阀将阀前高压减压并稳压后输入主控阀下膜室产生推力克服弹簧力打开主控阀阀芯，气体流入阀后，同时阀后压力又被引入主控阀上膜室，直到此压力产生的推力加上弹簧力与下膜室推力平衡，主控阀阀芯就稳定在与阀后流量及压力对应的开度上。当阀后流量或阀前压力变化引起阀后压力变化时，主控阀上下膜室间的平衡就被打破，阀后压力降低，阀芯会随之开大，反之，阀后压力升高，阀芯关小，总之，不管工况如何变化，阀后压力始终被控制在一定范围内。

节流孔是在动态调节时保证主控阀上下膜室间保证一定的控制压差，使阀芯能开启或关闭。当阀后处于关断时，阀后流量变为“0”，节流孔也就失去作用，上下膜室间的压力会趋于相等，在弹簧力的作用下，主控阀阀芯会逐渐关闭，最后当压力继续略升以后，减压阀也随之关闭，阀后就处于保压状态。

设定压力的大小就来自于设定减压阀的输出压力，而减压阀输出压力的大小来自于弹簧的压缩力，所以只要改变设定减压阀的弹簧推力就可以控制整个调压系统的输出压力，因此只要旋转设定减压阀上调节螺杆就可以轻松调节调压阀的输出压力了。

All fluid input the Main Control Valve, the pressure before the valve be guide to setting Regulator, stable and regulate the pressure before the valve by the setting Regulator, then input to the Main Control Valve's bottom diaphragm cavity, Generate thrust with the force of the spring balance remove the plug of the Main Control Valve. Air fluid output to the Main Control Valve, meanwhile the pressure be guide to top diaphragm cavity, until the thrust (with the force of the spring) be balanced with the thrust of the bottom diaphragm cavity, then the plug of the Main Control Valve stabled on the correct position of the setting flow or pressure. When the setting flow or pressure has be changed, then the top & bottom diaphragm cavity thrusts balance breakdown, below the valve's reduced, plug opening, before the valve's pressure increase, the plug closing. So, the below the valve's pressure still be controlled in the setting extent, whatever the process condition changed.

Throttle hold the difference pressure of the top & bottom diaphragm cavity in the dynamics, to control the plug remove. When the piping shutoff below the valve, flow is zero, the throttle defuunct, two diaphragm cavity's pressure tends to be equal, plug will be closed by the spring thrust, at last, when the pressure be hold, regulator closed, the pressure will be hold below the valve.

Setting pressure according to the setting regulator, setting regulator's output pressure according the spring thrust. So adjust the setting regulator's spring thrust control the output pressure of the whole regulate system. Rotate the adjustment screw of the setting regulator, easy to adjust pressure of the control valve.

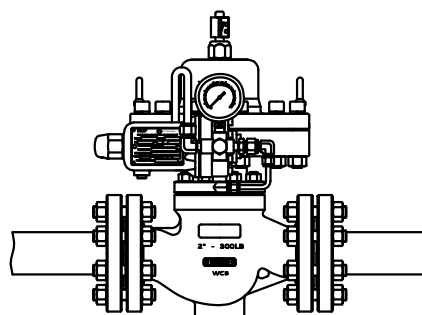
安装 Install

- 调压阀安装时介质流向一定要与阀体上的箭头一致，调压阀应水平安装于管道。

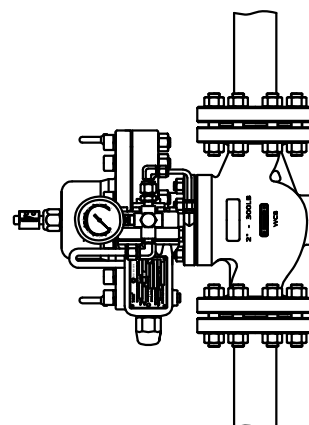
The medium flow direction should be consistent with the arrow direction when installing the pressure relief valve. The relief valve should be installed on the tube as horizontal.

- 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 global valve or ball valve on the pressure introduction pipe should be closed.



正确 Right



错误 Error

- 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。

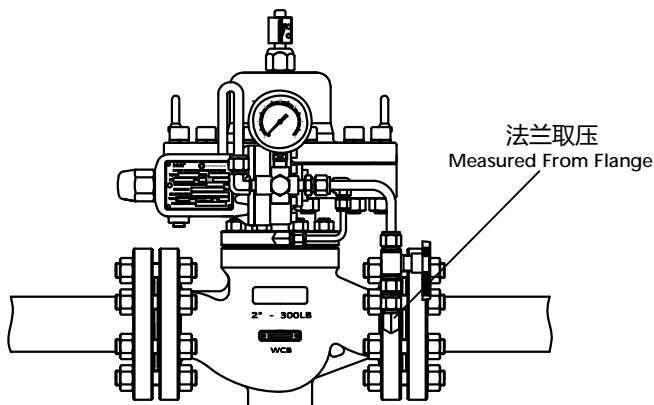
Shut-off valves should be installed either at the upstream and downstream of the regulator for inspection and maintenance. The by-pass valve should be installed for emergency in important applications.

- 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.

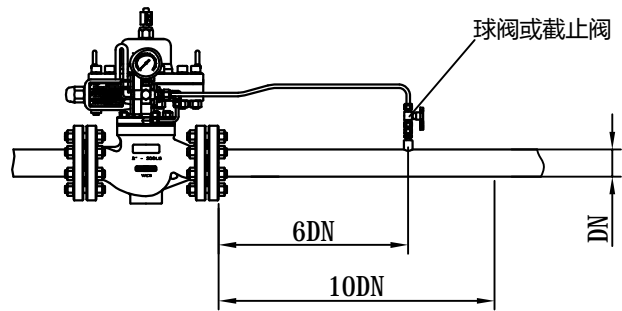
- 对于阀体法兰取压的调压阀只需直接将阀门安装于管道上即可。

The regulator with pressure measured from the valve flange can be directly installed on the piping.

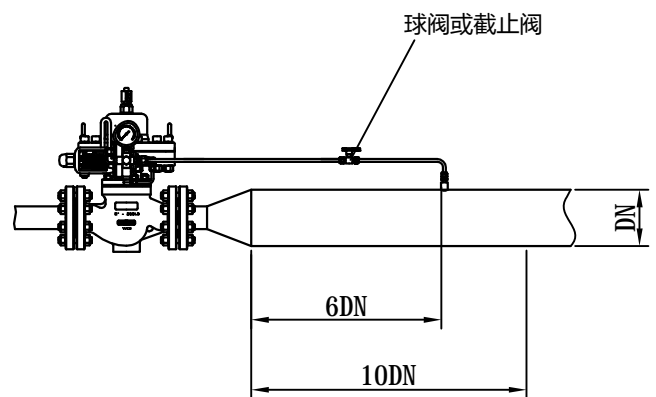


- 调压阀为阀外取压，管道上应取压安装导压管。导压管上应装上球阀或截止阀，阀后应有10DN的直管段，取压点在6DN处，阀后有扩径管的应以扩径后的管径为准。

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 behind the valve, refer to the diameter of the expanded pipe.



等口径
Equal Diameter



阀后有扩径管
Downstream expanding

警告 Warning

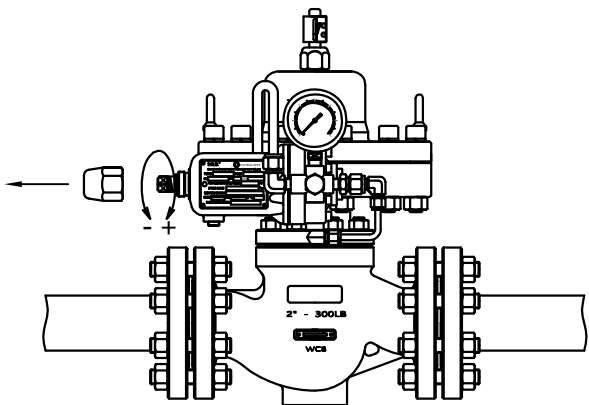
- 调压阀到了现场如要对其进行试压，必须认识到调压阀不同于普通调节阀，调压阀严禁进行水压，一旦有水进入到控制系统将严重影响调压阀的使用。如要进行试压检漏，可用洁净的空气或氮气，然后用泡沫检查。检漏的压力不应超过阀门的允许使用压力。

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 control 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.

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) and open the downstream globe valve, guarantee that downstream system has certain flow, slowly open the upstream globe valva 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 contray, the pressure will reduce.



型号编制 Mode Establishment

SP 100H	—	□	—	□
		DN:	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

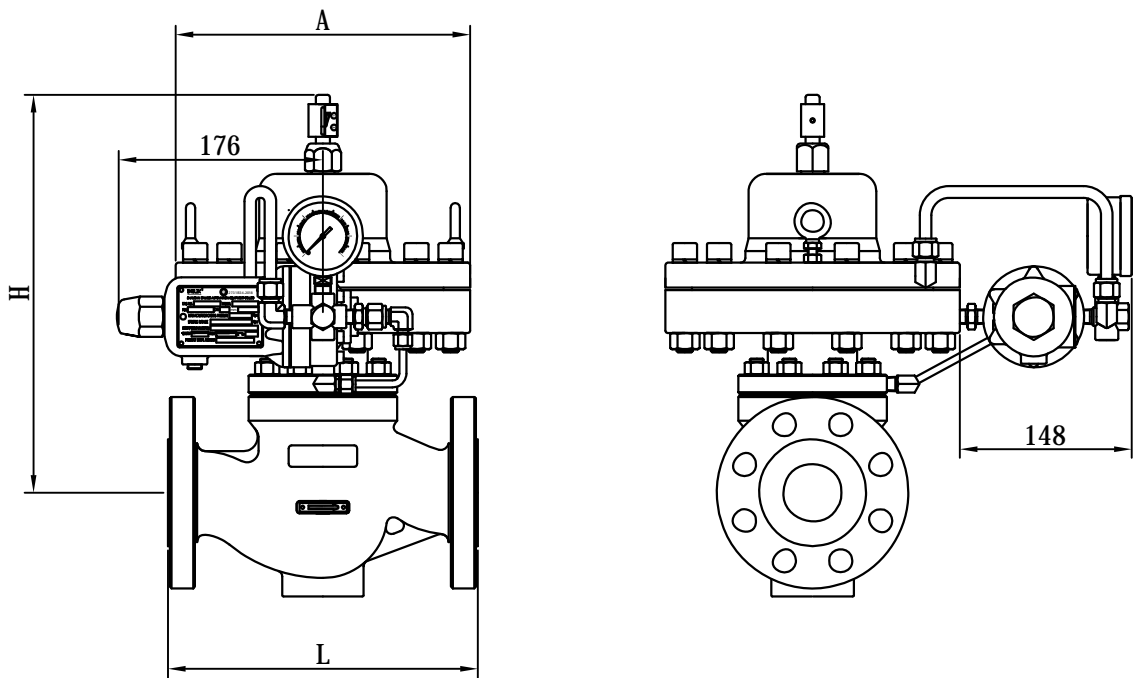
铭牌内容 Description on The Nameplate

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

外型尺寸 Dimension



阀门口径 Valve Size		20	25	40	50	65	80	100	150	200
L	PN16(150lb)	181	184	222	254	276	298	352	451	543
	PN40(300lb)	194	197	235	267	292	317	368	473	600
	PN64(600lb)	206	210	251	286	311	337	394	508	610
H		306	315	340	350	390	412	430	580	606
A	Z08.01.00	246								
	Z08.02.00	302								
	Z08.03.00	396								

经验分享 Experience Sharing

● 阀后安全装置

对于阀后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30%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。

Dowerstream Safety Device

As for dowerstream 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 30%. 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.

● 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%。

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%.

● 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 uper middle of the range, it is because that the theorretical 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。

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.

● 取压方式的选择

取压方式有现场管线取压和阀体法兰取压，现场取压精度高，阀体法兰取压安装方便。对于阀前控制影响不大，但阀后控制阀由于存在介质膨胀，取压方式的选择应更慎重，但有一原则，如阀门口径与阀后管线同口径，可选择阀体法兰取压，如阀后管线口径大于阀门口径，宜选择现场管线取压。

Selection of Pressure Measuring Method

The pressure measuring methods include field piping measurement and regulator flange measure. The field measurement has a higher accuracy. The flange measurement is easy for installation. Pressure measuring method has small effect on the upstream control regulator. The expansion of the medium should be considered carefully for the measuring method of the downstream control regulator. When the diameter of the regulator is the same with the downstream pipeline, the flange measuring method should be selected. When the diameter of the downstream pipeline is larger than the regulator's, the field pipeline measuring method should be selected.

● 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.
