太航德克森
TAIHANG DIRKSEN

DQO 系列

O 型球阀使用说明书

DQO Series O-type Ball Valve Mannual

太原太航德克森自控工程股份有限公司

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1、产品概述

DQO 系列 O 型切断球阀是在吸收几种不同结构球阀优点的基础上设计而成的新型球阀。采用唇缘式阀座结构，阀座磨损小，密封优良，使用寿命长。填料采用子母填料结构，极大地提高了填料函的密封性。采用全通径设计，全开时其流道和管路内径基本相同，流体压力损失小，流通能力大，因此适用于各种液体、气体等介质的切断控制。

1、Introduction

DQO series O-type ball valve is a new type ball valve designed on the basis of absorbing the advantages of several different structure ball valves. With lip seat structure, the wear is small, sealing is good and the valve has long service life. The packing adopts the piggyback structure, which greatly improves the sealing property of the packing box. The full diameter design is adopted, and the inner diameter of the flow channel and pipeline are basically the same when fully opened, the fluid pressure loss is small, and the flow capacity is large, so it is suitable for cutting off control of various liquids, gases and other media.

2、结构特点

2、Structure

2. 1 气动 O 型球阀

该系列球阀按气动执行机构的作用方式可分为单、双作用两大类，单作用 O 型球阀特点是动力源一旦发生故障，球阀将按控制系统要求自动地处于关闭或开启位置。双作用 O 型球阀将保持原位。

图 1　气动 O 型切断球阀

气动 O 型切断球阀与电磁阀、过滤减压阀等气动元件配套使用，可实现对石油、化工、制药、造纸、冶金、污水处理、油船、油罐等输送管道内介质的切断作用。

气动 O 型切断球阀除流通能力大、结构简单、维修方便的特点外，还具有如下特点：

1、密封阀座可采用软质材料，具有可靠的密封性。

2、适用于控制高粘度和含有细颗粒的流体。

3、当气动源故障时，单作用 O 型球阀能可靠地自行关闭或开启。

4、采用全封闭式结构，可防止污物和灰尘进入传动机构，动作可靠。

2.1 Pneumatic O-type ball valve

The series of ball valves can be divided into single and double acting two

categories according to the action mode of the pneumatic actuator. The single acting O-type ball valve is characterized by the fact that once the power source fails, the ball valve will automatically be in the closed or open position according to the requirements of the control system. Double-acting O-ball valves will remain in place.

Fig. 1 Pneumatic O-type ball valve

Pneumatic O-type cut-off ball valve and solenoid valve, filter pressure reducing valve and other pneumatic components used together, can achieve petroleum, chemical, pharmaceutical, paper making, metallurgy, sewage treatment, oil tanker, oil tank and other transmission pipeline medium cut off.

In addition to the characteristics of large flow capacity, simple structure and easy maintenance, the pneumatic O-type cut-off ball valve also has the following characteristics:

1、The sealing seat can be made of soft materials, with reliable sealing.

2、Suitable for controlling fluids with high viscosity and fine particles.

3、When the pneumatic source fails, the single-acting O-type ball valve can be reliably closed or opened by itself.

4、The use of fully enclosed structure, can prevent dirt and dust into the transmission mechanism, reliable action.

2. 2 手动 O 型球阀

O 型球阀可起调节和切断作用。阀芯为球型，开有圆柱形通孔。其最大特点是流路简单，全开时完全形成直骨通道，压力损失最小。

(1)、浮动球阀的极优双向密封设计

采用弹性唇缘式阀座密封，是一种具有弹性力的双重密封阀座结构，可达到任意方向的长久可靠密封；它能在使用中补偿由于压力、温度及磨损引起的变化，并可清除腔体内的积压。

(2)、手动浮动球阀的开、关指示

球阀、阀杆、手柄是阀门的运动部件，是一个装配单元，阀杆头部采用扁方结构，能从手柄所处位置很容易辩出阀门是处于开启位置或关闭位置。当手柄或阀杆扁方与管道轴线平行时，阀门处于开启位置；当手柄或阀杆扁方与管道轴线垂直时，阀门处于关闭位置。

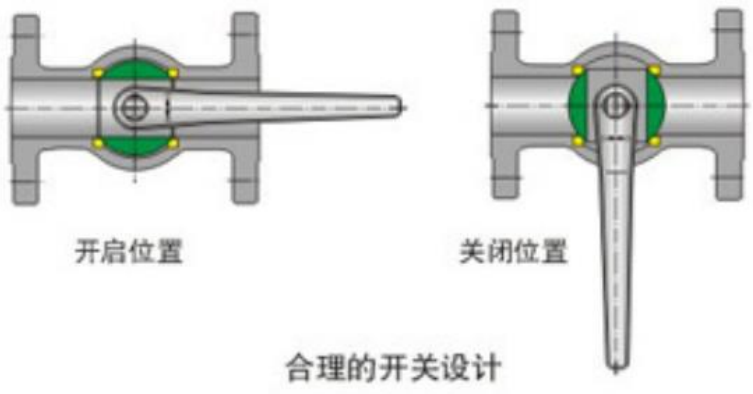
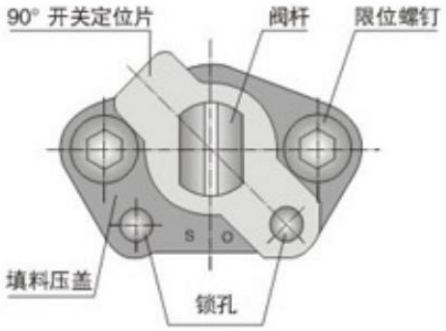


图 2 手动浮动球阀的开关

(3)、阀门锁定位置

为防止误操作阀门，在阀门的全开和全关位置可用锁锁定阀门，特别是安装在野外的阀门或当工艺流程不允许开或关阀门时，为防止其他人员错误操作阀门，将阀门位置锁定是很重要的。因此根据用户的需求在阀门设计时加装带锁孔定位片来满足用户的工艺要求。



90° 开关带锁孔定位片

图 3 锁定阀门

(4)、阀杆防飞出结构

当介质通过阀门时，阀体中腔的压力可能将阀杆推出（或在修阀门时，如果中腔有压力，在拆卸阀门时阀杆、介质容易飞出，误伤人员）。为防止这种情况发生，在阀杆下部设置一凸台结构，这样即使发生火灾时，填料、止推轴承被烧损或其它原因引起填料等损坏，阀体内的介质压力将使阀杆凸台与阀体上密封面紧密接触，防止介质大量从损坏的填料部位处泄漏。

(5)、防静电装置

当操作阀门时，由于球体和聚四氟乙烯等非金属材料阀座之间的摩擦，会产生静电电荷并聚积在球体上。为防止产生静电火花，特在阀体与阀杆之间、阀杆与球芯之间均设有导电弹簧，将积聚在球体上的电荷通过

静电通道导出，确保系统安全。

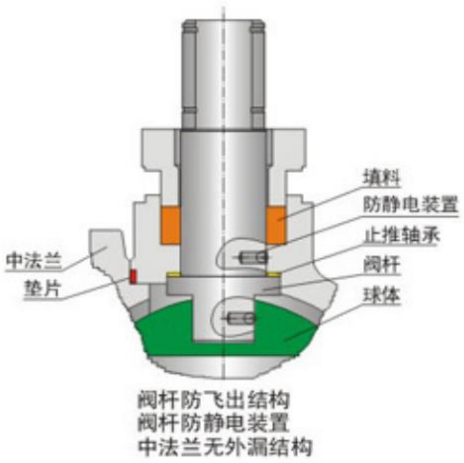


图 4 防静电装置

(6)、防火结构

当发生火灾时，填料、阀座等非金属（非防火材料）将被烧坏，大量泄漏的介质可能会更加促使火势蔓延、扩大，这时阀门的防火结构可阻挡介质大量泄漏。如果一旦阀座被烧损，球体将直接与阀体上的金属面接触，从而阻止介质大量从烧损的阀座处泄漏。

(7)、独特阀杆密封设计

采用子母填料结构设计，并加装星形圈及防尘软导向设计，保证填料密封无泄漏，阀杆采用下装式并设有密封垫片的结构，使轴向密封变为平面密封，随阀腔介质压力增加而增大密封力。

图 5 密封设计

(8)、超轻操作扭矩

采用唇缘式阀座结构、主副阀体之间硬接触限位结构，极大地减少了球芯与阀座之间的摩擦力，球芯表面经过精研磨处理，可达到镜面极光洁度，再加上高精度的加工尺寸配合，球体转动时，各相对运动部件摩擦力极小，转动灵活，操作扭矩超轻。

2.2 Manual O-type ball valve

The O-type ball valve can be adjusted and cut off. The spool is spherical and has a cylindrical through hole. Its biggest feature is that the flow path is simple, the straight bone channel is completely formed when it is fully opened, and the pressure loss is minimal.

(1)、Excellent bidirectional sealing design of floating ball valve

With elastic lip seat seal, it is a double sealing seat structure with elastic force, which can achieve long-term and reliable sealing in any direction; It can compensate for changes caused by pressure, temperature and wear during use, and can remove backlogs in the cavity.

(2)、Manual floating ball valve open and close instructions

Ball valve, stem, handle is the moving parts of the valve, is an assembly unit, stem head with flat square structure, can easily distinguish from the position of the handle is in the open position or closed position. When the handle or stem square is parallel to the pipe axis, the valve is in the open position; When the handle or stem square is perpendicular to the pipe axis, the valve is in the closed position.

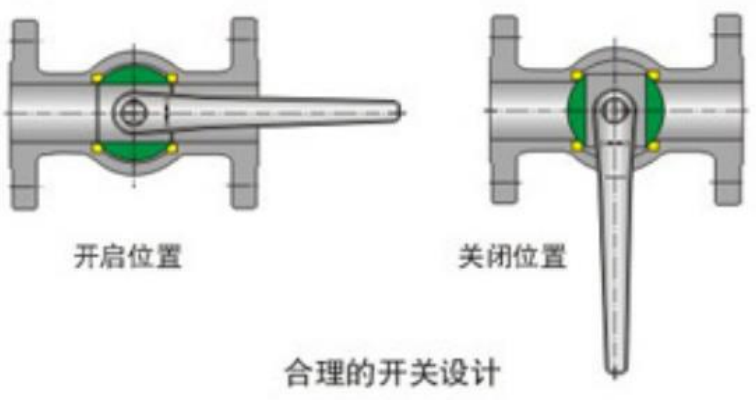
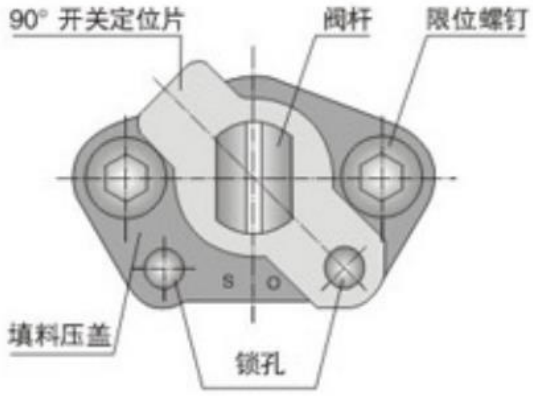


Fig. 2 Switch of manual floating ball valve

(3)、The valve lock position

In order to prevent misoperation of the valve, the valve can be locked at the fully open and fully closed positions of the valve, especially when the valve is installed in the field or when the process does not allow the valve to open or close, in order to prevent other personnel from operating the valve incorrectly, it is important to lock the valve position. Therefore, according to the needs of users, the valve design is equipped with lock-hole positioning pieces to meet the process requirements of users.



90° 开关带锁孔定位片

Fig. 3 Locking the valve

(4)、Valve stem anti-fly structure

When the medium passes through the valve, the pressure in the chamber of the valve body may push the stem out (or when repairing the valve, if there is pressure in the chamber, the stem and media are easy to fly out when removing the valve, injuring the personnel). In order to prevent this from happening, a boss structure is set in the lower part of the valve stem, so that even in the event of a fire, the packing and thrust bearings are burned or other causes of damage to the packing, the medium pressure in the valve body will make the valve stem boss and the sealing surface of the valve body close contact to prevent a large number of media from leaking from the damaged packing parts.

(5)、Eletrostatic protection device

When the valve is operated, electrostatic charges are generated and accumulate on the ball due to friction between the ball and non-metallic materials such as polytetrafluoroethylene. In order to prevent electrostatic

sparks, a conductive spring is arranged between the valve body and the valve stem, and between the valve stem and the ball core, and the charge accumulated on the ball is exported through the electrostatic channel to ensure the safety of the system.

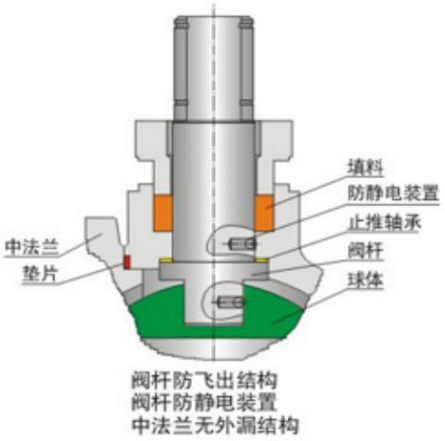


Fig. 4 Antistatic device

(6)、Fireproof structure

When a fire occurs, non-metal (non-fireproof materials) such as packing and seat will be burned out, and a large number of leaking media may further promote the spread and expansion of the fire, then the fire protection structure of the valve can block a large number of media leaks. Once the seat is burned, the ball will be in direct contact with the metal surface on the body, thus preventing a large amount of media from leaking from the burned seat.

(7)、Unique stem seal design

Adopt the structure design of the piggback structure packing, and install the star ring and dust soft guide design to ensure that the packing seal does not leak, the valve stem adopts the structure of the lower mounted and sealed gasket, so that the axial seal becomes a plane seal, and the sealing force

increases with the increase of the medium pressure of the valve chamber.

Fig. 5 Seal design

(8)、Ultra-light operating torque

The use of lip valve seat structure, the hard contact limit structure between the main and secondary valve bodies, greatly reducing the friction between the ball core and the seat, the surface of the ball core after fine grinding treatment, can reach the mirror extreme finish, coupled with high-precision processing size. When the ball rotates, the relative moving parts of the friction is very small, flexible rotation, operating torque ultra-light.

3、阀体组件结构及尺寸

3、Structure and size of body

3. 1 气动 O 型球阀

3.1 Pneumatic O-type ball valve

O 型球阀外型尺寸如下图所示。

The O-type ball valve dimensions are shown in the Fig. 6 below.

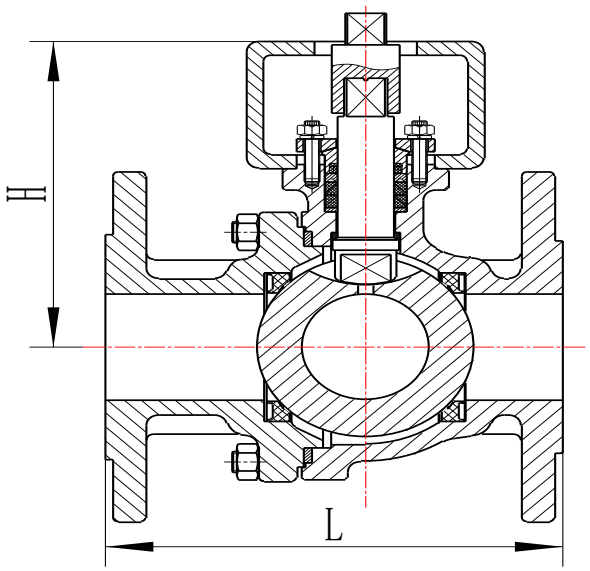


图 6 外型尺寸图

Fig. 6 External dimensions

表 1 外型尺寸表

Table1 Outline size table

150# RF

	L	H
DN15	108	95
DN20	117	95
DN25	127	100
DN32	140	120
DN40	165	133
DN50	178	145
DN65	190	165
DN80	203	212
DN100	229	245
DN125	356	290
DN150	394	320
DN200	457	370
DN250	533	420

300# RF

	L	H
DN15	140	95
DN20	152	95
DN25	165	100
DN32	178	120
DN40	190	133
DN50	216	145
DN65	241	165
DN80	282	212
DN100	305	250
DN125	381	290
DN150	403	320
DN200	502	370
DN250	568	420

400# RF

	L	H
DN15	140	95
DN20	190	95
DN25	216	100
DN32	229	120
DN40	241	133
DN50	292	145
DN65	330	165
DN80	356	212
DN100	405	250
DN125	457	300
DN150	495	360
DN200	597	380
DN250	673	420

600# RF

	L	H
DN15	165	95
DN20	190	95
DN25	216	100
DN32	229	120
DN40	241	133
DN50	292	145
DN65	330	165
DN80	356	212
DN100	432	250
DN125	508	300
DN150	559	360
DN200	660	445
DN250	787	450
DN300	838	550

O 型球阀阀体组件是由阀体、阀芯、密封阀座和其它零件组成的，如图 7 所示。

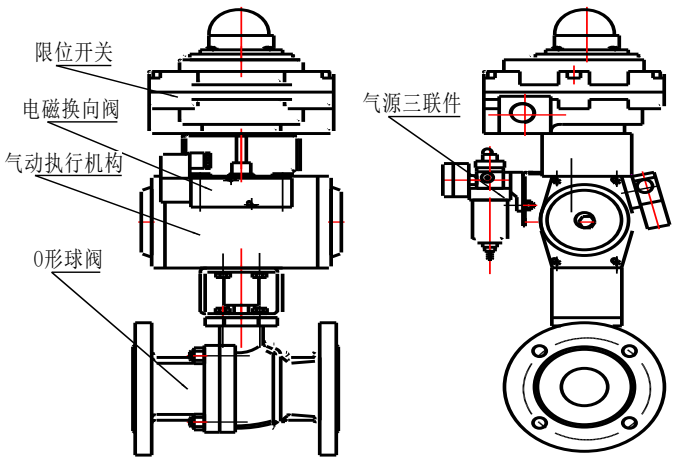


图 7 O 型球阀阀体

当驱动装置动作时，通过连轴套、阀杆和球芯转过 90°，使球阀由关

闭（开启）的位置转到开启（关闭）的位置控制管道内的介质流量。

双作用O型切断球阀和单作用O型切断球阀动作原理的区别在于后者执行机构气缸气压排空时，活塞在弹簧力作用下，球芯再转过90°，使球阀处于开启或关闭位置，而双作用O型球阀若要实现上述功能，AT执行机构需外加配带“气源保护装置”。

The O-type ball valve body assembly is composed of the valve body, spool, sealing seat and other parts, as shown in Fig 7.

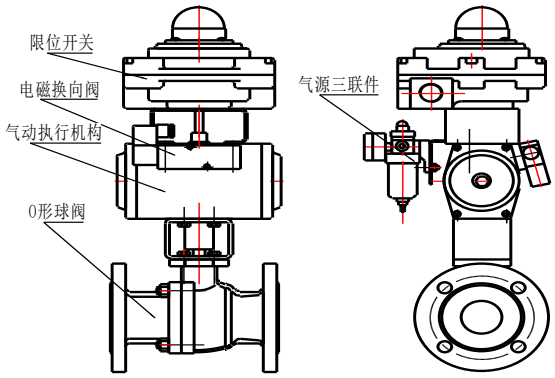


Fig. 7 O-type ball valve body

When the drive device is operating, the ball valve is turned 90° by connecting the sleeve, the valve stem and the ball core, so that the ball valve is turned from the closed (open) position to the open (closed) position to control the medium flow in the pipeline.

The difference between the action principle of double-acting O-type ball valve and single-acting O-type ball valve is that when the air pressure of the cylinder of the latter actuator is emptied, the piston under the action of the spring force, the ball core is turned 90°, so that the ball valve is in the open or

closed position, and if the double-acting O-type ball valve wants to achieve the above functions, the AT actuator needs to be equipped with an "air source protection device".

3.2 手动 O 型球阀

3.2.1 固定球阀

系列固定球阀主要适用于天然气、油品、化工、冶金、城建、环保、制药、食品等行业，其中抗硫系列产品适用于含硫化氢介质，杂质多，腐蚀严重的天然气长输管线。

(1)、独特的阀座密封结构

固定式球阀根据压力的大小、介质性质及密封要求的不同而选择球前密封结构、球后密封结构或球前球后密封结构。

球前密封结构：

阀座采用球前密封设计结构，此结构具有双向密封和中腔自动泄压功能。如图所示，镶嵌有合适的聚合材料的密封介质是浮动的，它由弹簧加载，在关闭位置时，密封面始终与球体保持紧密接触，确保阀门在高、低压差下均能达到无泄漏的密封。上游：阀座沿阀门轴向运动，施加于 A_2 面上的上游（进口）压力 P，在 A_1 面上产生一个方向力，由于 A_2 面大于 A_1,A_2-A_1=X,因此 X 面上的压力将阀座推向球体达到上游的紧密密封。下游：一旦阀腔内的压力 Pb 升高，作用在 A_3 面上的力大于 A_4 面上的力，

A_3- A_4=X_2,在X_2面上行成的压差就克服弹簧力使阀座与球体脱开，阀腔的压力向下游排放，之后在弹簧的作用下阀座重新与球体密合。

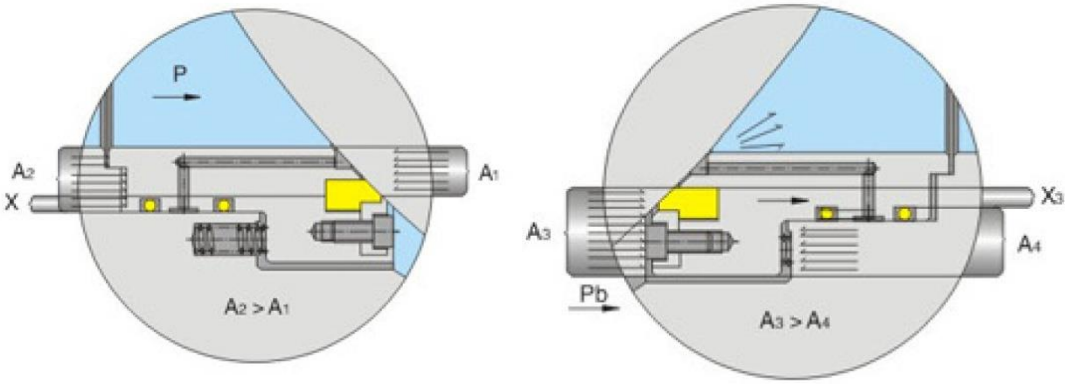


图 8 进口侧与出口侧

球后密封结构：

阀座由 d 和 dm 的面积差形成的活塞效应，在上游的介质作用下，使阀座密封圈与球体紧密接触面密封。出口侧，由 do 和 dm 的面积差行成的活塞效应，在阀体中腔的介质压力作用下，使阀座密封圈与球体紧密接触而密封。

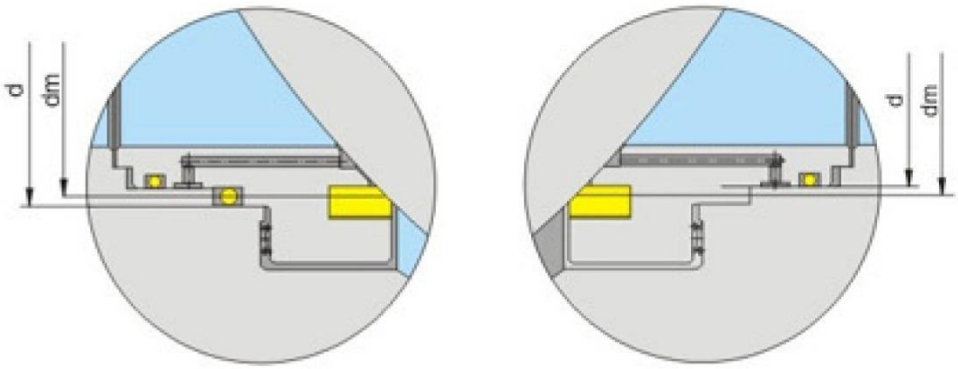


图 9 进口侧与出口侧

当中腔压力出现异常升高现象时，单密封结构的球阀具有自动泄压机能，而双密封结构的球阀则由阀体上的附加泄压装置进行泄压。

3.2 Manual O-type ball valve

3.2.1 Fixed ball valve

The fixed ball valve is mainly suitable for natural gas, oil products, chemical industry, metallurgy, urban construction, environmental protection, pharmaceutical, food and other industries, among which the anti-sulfur series products are suitable for hydrogen sulfide medium, impurities, serious corrosion of natural gas pipeline.

(1)、Unique seat sealing structure

Fixed ball valve according to the size of the pressure, the nature of the medium and the sealing requirements of the different and choose the ball before the sealing structure, the ball after the sealing structure or the ball before the ball after the sealing structure.

Sealing structure before ball:

The valve seat has a seal design before ball with bi-directional sealing and automatic pressure relief in the central cavity. As shown in the Fig. 8, the sealing medium inlaid with a suitable polymer material is floating, it is loaded by a spring, in the closed position, the sealing surface is always in close contact with the ball, to ensure that the valve can achieve a leak-free seal at high and low pressure differences. Upstream: The seat moves along the valve axially, the upstream (inlet) pressure P applied to the A2 surface creates a directional force on the A1 surface, because the A2 surface is greater than A1,A2-A1=X, so the

pressure on the X surface pushes the seat toward the ball to achieve a tight seal upstream. Downstream: Once the pressure Pb in the valve chamber rises, the force acting on the A3 surface is greater than the force on the A4 surface, A3-A4 =X_2, the pressure difference formed on the surface overcomes the spring force to detach the valve seat from the ball, and the pressure of the valve chamber is discharged downstream, and then the valve seat re-closes with the ball under the action of the spring.

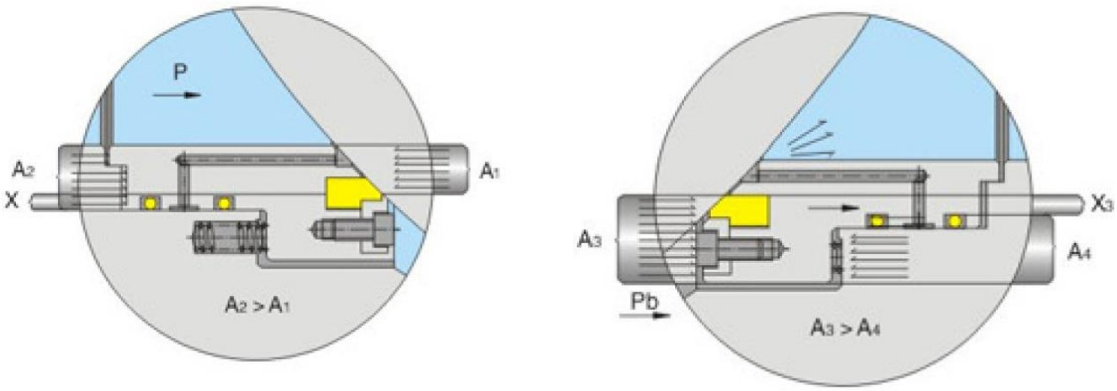


Fig. 8 Inlet side and outlet side

Sealing structure behind the ball:

The piston effect of the valve seat formed by the area difference between d and dm makes the valve seat seal sealed with the tight contact surface of the ball under the action of the upstream medium. On the outlet side, the piston effect caused by the area difference between do and dm makes the valve seat seal in close contact with the ball under the action of the medium pressure in the valve body cavity.

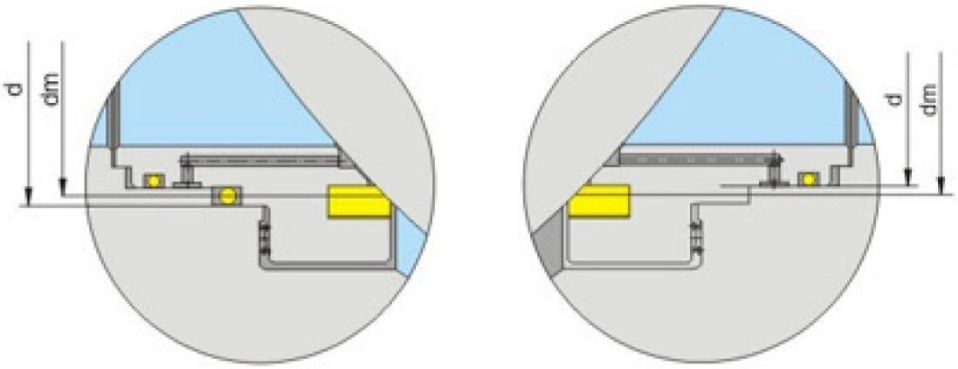


Fig. 9 Inlet side and outlet side

When the pressure of the middle cavity is abnormally increased, the ball valve with single seal structure has the function of automatic pressure relief, while the ball valve with double seal structure is relieved by the additional pressure relief device on the valve body.

(2)、密封的紧急救护

阀门设计有辅助的阀座紧急密封系统，一旦软密封受损，或出现紧急情况下而不能密封时，通过向辅助密封系统注射相应的密封剂即可进行紧急密封。紧急密封装置在必要时也可用来对阀座区域进行冲洗润滑，以保持其清洁。同样阀杆也可设计有辅助的紧急密封系统。

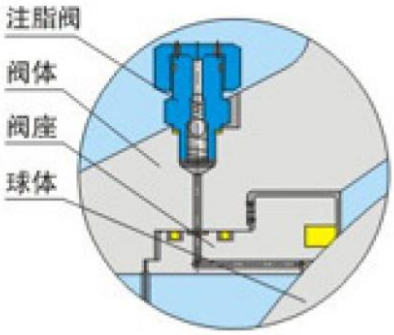


图 10 阀座辅助密封

1）、防火结构

根据工况及用户的需要，球阀可设计为防火结构。球阀的耐火设计执行 API607 及 JB/T6899 等标准的规定，一旦发生火灾而使软密封圈烧损时，球阀的防火结构可阻止介质的大量泄漏，防止火灾的进一步扩大。

2）、防静电结构

当操作阀门时，由于球体和阀座之间的摩擦，会产生静电电荷并聚集在球体上。为防止产生静电火花，特在阀门设置防静电装置，将积聚在球体上的电荷导出。

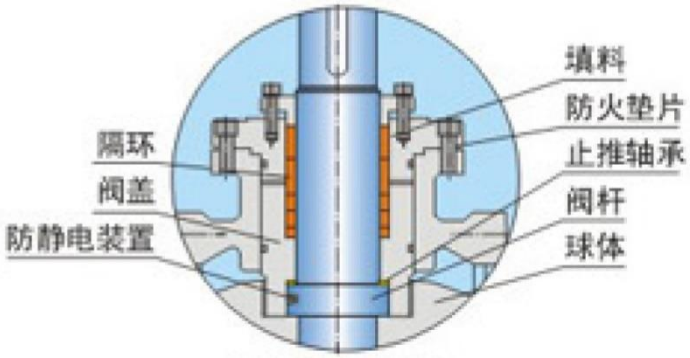


图 11 阀杆防飞出结构、阀杆防静电装置、阀杆无外漏结构

3）、锁定装置

在手动球阀的全开、全闭两点位置上设计可上锁的结构，这样，可防止误操作以及不可预知的线路振动而产生的不应有的开关现象，特别是在可燃性介质的石油类和化学药品的生产线，以及阀门在室外配管时，这种设计体现出的优点和实际效果特别好。

4）、全通径结构及缩径结构

为满足用户的不同需要，本公司球阀产品有全通径及缩径两种系列。全通径球阀的通道内径与管道内径一致，便于管道清扫，而缩径系列球阀

的重量相对较轻，但流体阻力仅为相同口径截止阀的 1/7 左右，故缩径系列球阀的应用前景较为广阔。

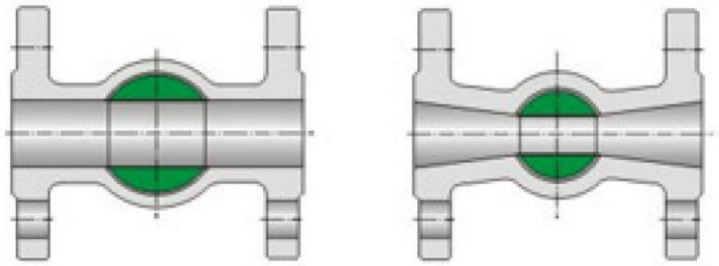


图 12 全径流道形式与缩径流道形式

(2)、Sealed emergency rescue

The valve is designed with an auxiliary seat emergency sealing system, which can be used for emergency sealing by injecting the appropriate sealant into the auxiliary sealing system if the soft seal is damaged or cannot be sealed in an emergency. Emergency seals can also be used to flush and lubricate the seat area if necessary to keep it clean. The stem can also be designed with an auxiliary emergency sealing system.

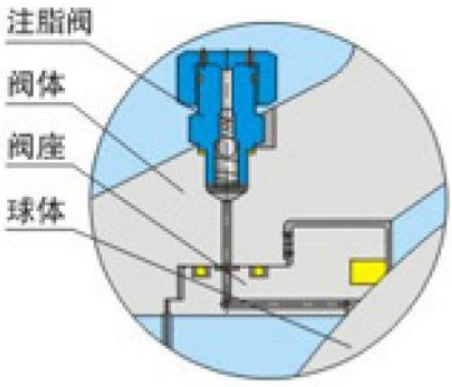


Fig. 10 Auxiliary valve seat seal

1)、Fireproof structure

According to the working conditions and the needs of users, the ball valve

can be designed as a fireproof structure. Ball valve fire design implementation of API607 and JB/T6899 and other standards, once a fire and the soft seal burning, ball valve fire structure can prevent a large number of media leakage, to prevent the further expansion of the fire.

2)、Electrostatic protection structure

When the valve is operated, electrostatic charges are generated and accumulate on the ball due to friction between the ball and the seat. In order to prevent electrostatic sparks, the valve is equipped with an anti-static device to export the charge accumulated on the sphere.

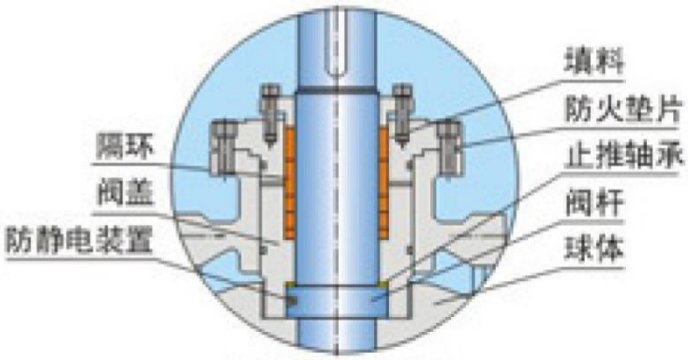


Fig. 11 Valve stem flight-proof structure, valve stem anti-static device, valve stem leak-free structure

3)、Locking device

The design of a lockable structure in the fully open and fully closed two-point position of the manual ball valve can prevent improper operation and unexpected line vibration caused by undue switching phenomenon, especially in the production line of petroleum and chemical drugs with flammable media, and when the valve is distributed outdoors, this design reflects the advantages and practical effects are particularly good.

4)、Full diameter structure and reduced diameter structure

In order to meet the different needs of users, the company's ball valve products have two series of full diameter and reduced diameter. The inner diameter of the full diameter ball valve is consistent with the inner diameter of the pipeline, which is convenient for pipeline cleaning, and the weight of the reduced diameter series ball valve is relatively light, but the fluid resistance is only about 1/7 of the same caliber globe valve, so the application prospect of the reduced diameter series ball valve is broad.

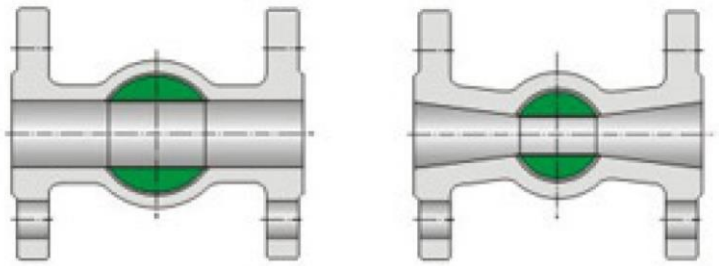


Fig. 12 Total runoff channel form and reduced runoff channel form

(3)、阀体的泄放装置

根据用户要求或装置系统要求，球阀的阀体上安装有排泄阀。一旦阀门的两端被封闭，阀腔内的积压可通过阀体的排泄阀进行排放，它具有双截止与泄放的功能。阀体的泄放阀的另一种功能是通过它可对阀体内的长期淤积物进行冲洗和排放。

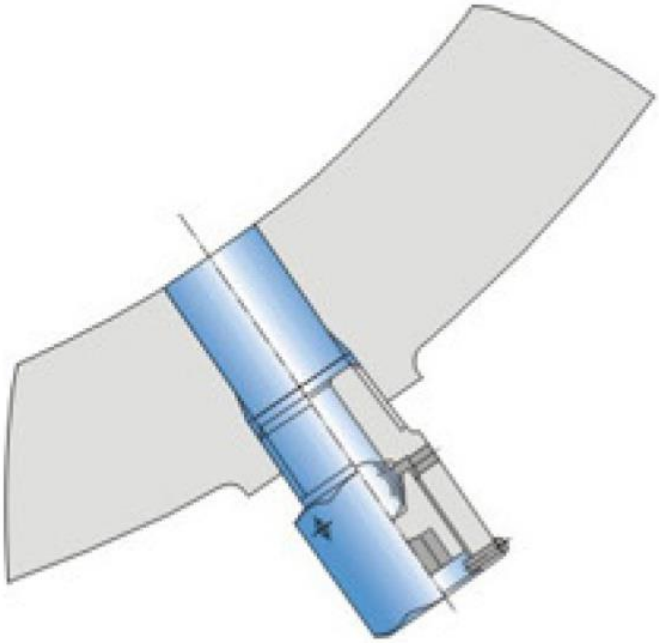


图 13 泄放装

阀体壁厚设计时留有一定的腐蚀余量，碳钢阀门阀杆、固定轴、球体、阀座及底盖均按 ASTM B733 和 B656 进行表面化学镀层。此外沿有多种防腐蚀材料供用户选择。阀门外使用的油漆，满足了各种环境条件的要求。

(3)、Valve body release device

According to user requirements or device system requirements, the valve body of the ball valve is installed with a discharge valve. Once the two ends of the valve are closed, the backlog in the valve chamber can be discharged through the discharge valve of the body, which has a double cut-off and discharge function. Another function of the valve body drain valve is to flush and discharge long-term sediment in the valve body.

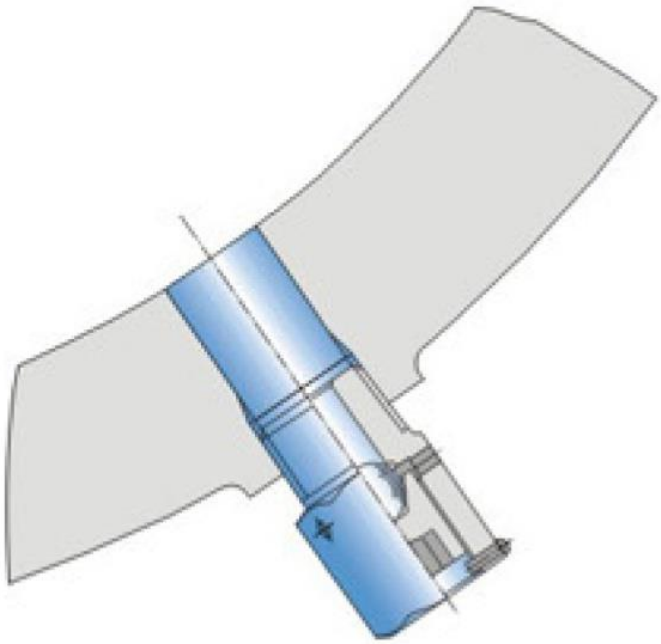


Fig. 13 Drain pack

The wall thickness of the valve body is designed with a certain corrosion allowance. The stem, fixed shaft, ball, seat and bottom cover of the carbon steel valve are chemically coated according to ASTM B733 and B656. In addition, there are a variety of anti-corrosion materials for users to choose. The paint used outside the valve meets the requirements of various environmental conditions.

(4)、抗硫化应力裂化

我公司生产系列抗硫球阀，阀门接触介质的材料（包含紧固件）都是按美国腐蚀工程师协会标准 NACE Mr0175 的要求进行选择，并在制造过程中作严格的质量控制和质量检测，以求完全符合标准的规定，并满足硫化环境工况的工艺要求。

(5)、加长杆装置

对于埋地球阀，可提供接长装置，接长装置包括阀杆、注油脂阀、排泄阀等的接长。用户应在订单中说明接长要求和长度（长度一般是指阀门通道中心至操作装置中心的距离）。

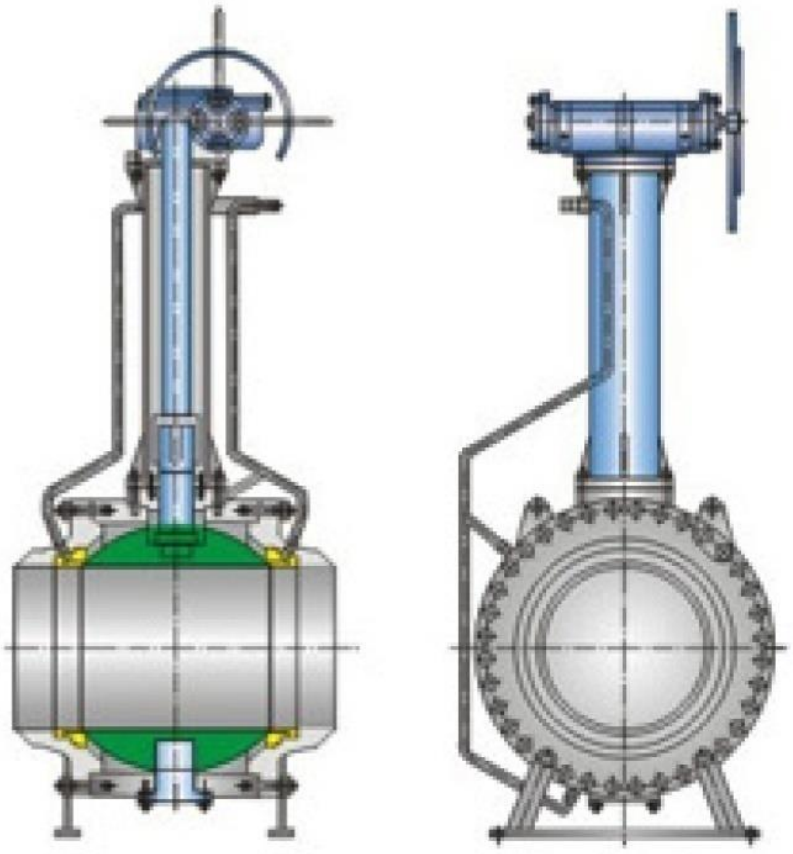


图 14 加长杆装置

(4)、Anti-vulcanization stress cracking

Our company produces a series of anti-sulfur ball valves, valve contact media materials (including fasteners) are selected according to the requirements of the American Institute of Corrosion Engineers standard NACE Mr0175, and in the manufacturing process for strict quality control and quality testing, in order to fully comply with the provisions of the standard, and meet the

vulcanization environmental conditions of the process requirements.

(5)、Lengthening stem device

For the buried ball valve, the length device can be provided, including the length of the valve stem, grease injection valve, discharge valve, etc. The user shall specify in the order length requirements and length (length generally refers to the distance from the center of the valve channel to the center of the operating device).

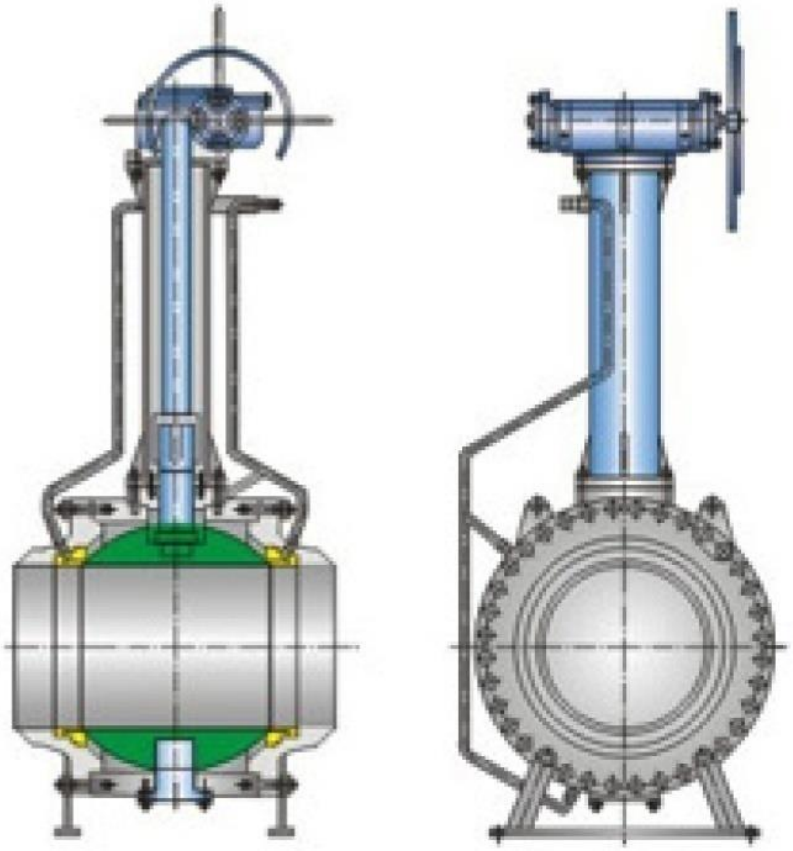


Fig. 14 Lengthening stem device

(6)、固定球结构示意图

(6)、Fixed ball structure diagram

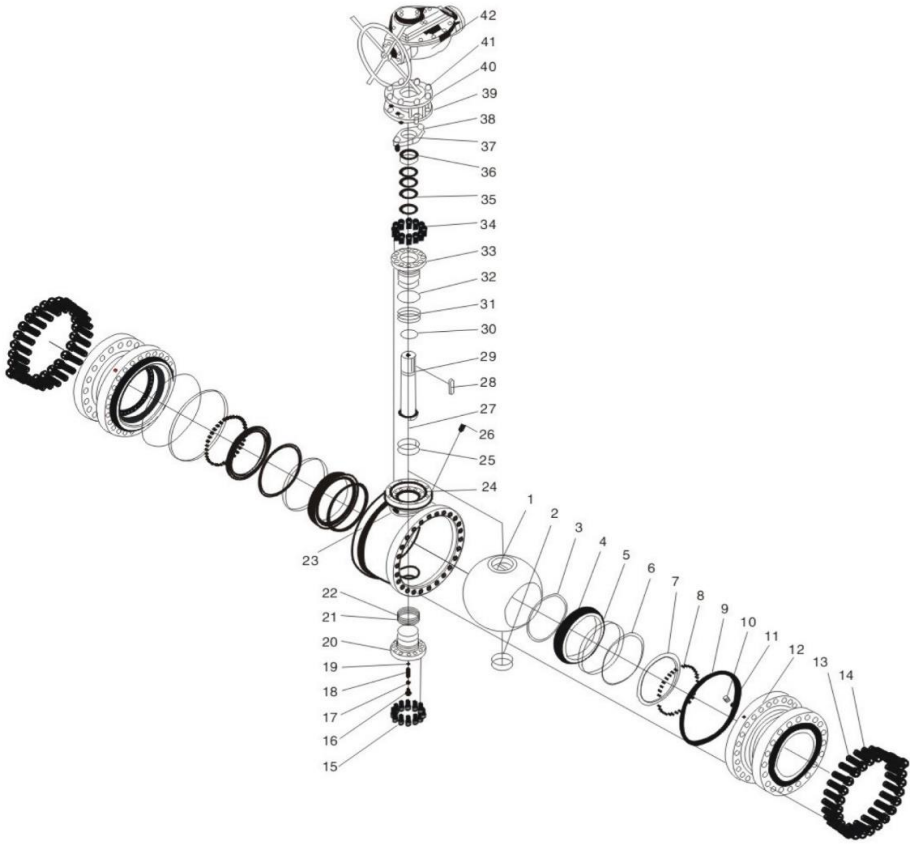


图 15 固定球结构

Fig. 15 Fixed ball structure

表 2 固定球阀主要零部件材料

Table 2 Materials for main parts of fixed ball valve

序号 No.	零件系列 Parts series	普通碳钢系列 Ordinary carbon steel series	不锈钢系列 Stainless steel series	低温钢系列 Low temperature steel series	抗硫系列 Sulfur resistant series	
					GB 标准	NACE 标准
1	球 The ball	A105+HCr/ENP	A351、CF8 、CF8M、	A352 LCB、LCC+ENP	A105+HCr/ENP	A351 CF8M+ENP

			CF3 、CF3M			
2	轴衬 Bush	金属衬 PTFE、烧结碳纤维 Sintered carbon fiber				
3	密封圈 Sealing ring	PTFE、RPTFE、烧结碳纤维、高分子聚合物 Sintered carbon fiber、High-molecular polymer				
4	阀座 Valve seat	A105+HCr/ENP	A182、F304 、316	A182、F6a	A105+HCr/ENP	A182、F316
5	O 型圈 O-ring	氟橡胶 Fluororubber				
6	防火垫 Fireproof mat	柔性石墨+不锈钢 Flexible graphite + stainless steel				
7	支撑圈 Support ring	A105+HCr/ENP	A182、F304 、316	A182、F6a	A105+HCr/ENP	A182、F316
8	弹簧 Spring			INCONEL 750		
9	O 型圈 O-ring	氟橡胶 Fluororubber				
10	注脂阀 Grease injection valve	同壳体材料（阀座注脂） Co-housing material (seat grease)				
11	垫片 Gasket	柔性石墨+不锈钢 Flexible graphite + stainless steel				

12	阀盖 Bonnet	A216 WCB	A351、CF8 、CF8M、CF3 、CF3M	A352 LCB、LCC	A216 WCB	A351 CF8M
13	螺柱 Stud	193 B7	A193 B8 、B8M	A320 L7	A193 B7M	A193 B7M
14	螺母 Nut	A194 2H	A194 8M	A194 4	A194 2HM	A194 2HM
15	螺钉 Screws	A193 B7	A193 B8 、B8M	A320 L7	A193 B7M	A193 B7M
16	螺塞 Plug screw	A105+HCr/ENP	A182、F304 、316	A182 F6a	A105+HCr/ENP	A182 F316
17	垫片 Gasket	—	RPTFE	RPTFE	紫铜 Red copper	RPTFE
18	螺钉 Screws	A193 B7	A193B8、B8M	A320L7	A193 B7M	A193 B7M
19	A182 F304					
20	底盖 Lower cap	A105+HCr/ENP	A182 、F304 、316	A182 F6a	A105+A182 F316 、HCr/ENP	
21	垫片 Gasket	柔性石墨+不锈钢 Flexible graphite + stainless steel				
22	O 型圈 O-ring	氟橡胶 Fluororubber				

23	注脂阀 Grease injection valve	同壳体材料（阀座注脂） Co-housing material (seat grease)				
24	阀体 Valve body	A216 WCB	A351、CF8 、CF8M、CF3 、CF3M	A352 LCB、LCC	GB/T12229 、 A216 WCB	A351 CF8M
25	轴衬 Bush	金属衬 PTFE、烧结碳纤维 Sintered carbon fiber				
26	排污阀 Blow-down valve	同壳体材料 Co-shell material				
27	弹簧 Spring	A182 F304				
28	键 key	GB/T 699 45				
29	阀杆 Valve stem	A182 F6a	A182 F304、316	A182 F6a	A182 F304	A182 F304
30	止推轴承 Thrust bearing	金属衬 PTFE、烧结碳纤维 Sintered carbon fiber				
31	O 型圈 O-ring	氟橡胶 Fluororubber				
32	垫片 Gasket	柔性石墨+不锈钢 Flexible graphite + stainless steel				

33	上阀座 Upper valve seat	A105+HCr/ENP	A182 F6a、316	A182 F6a	A105+HCr/ENP	A182 F316
34	螺钉 Screws	A193 B7	A193 B8、B8M	A320 L7	A193 B7M	A193 B7M
35	填料 Filler	柔性石墨、PTFE Flexible graphite				
36	填料压套 Packing bushing	A182 F6	A182 F304、316	A182 F6a	A105+HCr/ENP	A182 F316
37	压板 Clamp plate	A216 WCB	A351 CF8、CF8M	A351 CF8	A216 WCB	A351 CF8M
38	螺栓 Bolt	A193 B7	A193 B8、B8M	A320 L7	A193 B7M	A193 B7M
39	螺栓 Bolt	A193 B7	A193 B8、B8M	A320 L7	A193 B7M	A193 B7M
40	支架 Support	A216 WCB	A351 CF8	A352 LCB	A216 WCB	A351 CF8
41	螺栓 Bolt	A193 B7	A193 B8、B8M	A352 LCB	A216 WCB	A351 CF8
42	驱动形式 Driving form	蜗轮蜗杆、电动、气动、电液联动、气液联动 Worm gear, Electric, Pneumatic, Electro-hydraulic linkage, Gas-liquid linkage				

(7)、顶装式球阀

上装式球阀除了具有侧装式固定球阀的特点以外，还有以下几个特点：

整体式阀体设计，上装式耳轴固定支持法兰或对接焊结构。

因科镍波纹弹簧使密封的金属阀座向球移动，具有进口和出口双向密封功能。

采用独特的阀座可缩回技术，在线可更换球杆，阀杆密封圈金属阀座及波纹弹簧扭矩可减少到最小，便于阀门操作球杆与阀体有效接触，性能优越的防静电接地设备预置驱动装置平台及螺孔，随时可装配驱动装置防火功能。

便于维修，安装方便，使用寿命长。阀门无需从管线上拆下来，即可维修和更换内件，延长了使用寿命。

力矩小，密封可靠。球形结构的阀座与普通球阀不一样，可以自动调整密封位置。

预置驱动装置平台及螺孔，并符合 ISO5211 的要求。根据用户不同的要求，随时可装配驱动装置。

阀门具有 DBB 双阻塞泄放功能。

手动上装式球阀采用高强度整体式球杆结构，确保了球体的精确定位。

阀杆采用防吹出保护结构，提高阀门操作的安全性。

(7)、Top mounted ball valve

In addition to the characteristics of side-mounted fixed ball valves, there

are the following characteristics:

Integral body design, top mounted trunnons fixed support flange or butt welded structure.

Inco nickel corrugated spring makes the sealed metal seat move towards the ball, with an inlet and outlet two-way sealing function.

Unique valve seat retractable technology, online replaceable ball, valve stem seal ring metal seat and ripple spring torque can be reduced to a minimum, easy to valve operation ball and valve body effective contact, superior performance of anti-static grounding equipment preset drive device platform and screw holes, can be installed at any time drive device fire function.

Easy maintenance, easy installation, long service life. The valve can be serviced and replaced without being removed from the line, extending the service life.

Small torque, reliable sealing. The spherical structure of the valve seat is different from the ordinary ball valve, and the sealing position can be automatically adjusted.

Preset drive platform and screw holes in accordance with ISO5211 requirements. According to the different requirements of the user, the drive device can be assembled at any time.

Valve with DBB double block drain function.

The hand-mounted ball valve adopts a high-strength integrated ball rod structure to ensure the accurate positioning of the ball.

The valve stem adopts anti-blowout protection structure to improve the safety of valve operation.

表 3 球阀技术规范表

Table 3 Ball valve technical specification table

技术规范 Technical specification	API 系列 API series
设计规范 Design specification	API6D、API608、BS5351
压力温度等级 Pressure temperature rating	ASME B16.34
结构长度 Structural length	ASME B16.10
法兰连接 Flange connection	ASME B16.5、ASME B16.47
对焊端连接 Butt welded end connection	ASME B16.25
检验与试验 Inspection and test	API 598/API6D
防火试验 Fire test	API 6FA
铸钢件质量检验 Steel casting quality inspection	MSS-SP-55

下表所列的扭矩供选择驱动装置时参考，根据介质的特性，内件及阀门的开启频率尚需作额外因素考虑。如果用防腐内件，用于清洁润滑介质的阀门，扭矩可降低 20%。而对于苛刻介质，如料浆、颗粒性介质，以及用于氧气，扭矩可能要增加 50%。对于缩径阀门的操作扭矩按其缩口所对应的通径的阀门操作扭矩选用。（具体选择按实际为准）

The torques listed in the following table are for reference when selecting the drive device, and additional factors need to be taken into account according to the characteristics of the medium, the opening frequency of the internals and valves. If the anticorrosive internals are used to clean the valve of the lubricating medium, the torque can be reduced by 20%. For harsh media, such as slurry, granular media, and for oxygen, torque may increase by 50%. The operating torque of the reduced valve is selected according to the operating torque of the valve corresponding to the diameter of its reduced opening. (The specific selection is subject to actual conditions)

表 4 力矩表

Table 4 Torque table

通径		压力等级 Pressure rating						
DN	in	150	300	400	600	900	1500	2500
50x40	11/2	61	81	85	102	149	—	—
50	2	68	108	97	136	203	333	562
80x50	3x2	68	108	97	136	203	333	562
80	3	149	244	204	305	422	811	1460
100x80	4x3	149	244	204	305	422	811	1460
100	4	244	407	422	453	583	1505	1923
150x100	6x4	244	407	422	453	583	1505	1923
150	6	323	544	647	1006	1299	2940	5840
200x150	8x6	323	544	647	1006	1299	2940	5840
200	8	647	955	1157	2532	2766	6489	12181
250x200	10x8	647	955	1157	2532	2766	6489	12181
250	10	882	1822	2178	3941	5446	12181	15281
300x250	12x10	882	1822	2178	3941	5446	12181	15281

350x250	14x10	882	1822	2178	3941	5446	12181	15281
300	12	1577	2591	3064	6893	7909	15564	19834
350x300	14x12	1577	2591	3064	6893	7909	15564	—
400x300	16x12	1577	2591	3064	6893	7909	15564	—
350	14	1873	3224	3853	6205	10948	23512	—
400x350	16x14	1873	3224	3853	6205	10948	23512	—
400	16	3050	5447	6529	8817	13682	27039	—
450x400	18x16	3050	5447	6529	8817	13682	27039	—
500x400	20x16	3050	5447	6529	8817	13682	27039	—
450	18	3819	6197	7461	11231	17705	37085	—
500	20	4508	7830	9348	14919	29866	40309	—
550	22	5490	9453	11302	16058	39324	—	—
600x500	24x20	4508	7830	9348	15140	29866	40309	—
600	24	6723	11457	15535	21840	40810	64671	—
650	26	9289	15139	17869	24889	51322	—	—
700	28	11647	18067	21063	28767	53515	—	—
750x600	30x24	6723	11457	15535	21840	40810	—	—
750	30	13558	19207	24966	34398	57057	—	—
800	32	15224	24095	28235	38880	61123	—	—
850	34	17846	30249	33291	41789	70277	—	—
900x750	36x30	13558	19207	24966	34398	57057	—	—
900	36	22032	33331	36227	51521	81349	—	—
1000	40	25972	36490	45269	60368	—	—	—
1050	42	27034	40425	53515	70277	—	—	—
1200	48	42606	64985	79311	112293	—	—	—

表 5 供货范围表

Table 5 Scope of supply

规格	压力等级 Pressure rating

DN	in	150	300	600	900	1500	2500
50x40	2x21/2	●/△				☆/△	
50	2	●/△				☆/△	
80x50	3x2	●/△				☆/△	
80	3	☆/△				☆/△	
100x80	4x3	☆/△				☆/△	
100	4	☆/△				☆/△	
150x100	6x4	☆/△				☆/△	
150	6	●/☆/△/★		☆/△/★		☆/△/★	
200x150	8x6	☆/△/★		●/☆/△/★		☆/△/★	
200	8	☆/△/★		●/☆/△/★		☆/△/★	☆/△/★
250x200	10x8	☆/△/★				☆/△/★	☆/△/★
250	10	☆/△/★				☆/△/★	☆/△/★
300x250	12x10	☆/△/★				☆/△/★	☆/△/★
350x250	14x10	☆/△/★				☆/△/★	☆/△/★
300	12	☆/△/★				☆/△/★	☆/△/★
350x300	14x12	☆/△/★				☆/△/★	—
400x300	16x12	☆/△/★				☆/△/★	—
350	14	☆/△/★				☆/△/★	—
400x350	16x14	☆/△/★				☆/△/★	—
400	16	☆/△/★				☆/△/★	—
450x400	18x16	☆/△/★				☆/△/★	—
500x400	20x16	☆/△/★				☆/△/★	—
450	18	☆/△/★				☆/△/★	—
500	20	☆/△/★				☆/△/★	—
550	22	☆/△/★				☆/△/★	—
600x500	24x20	☆/△/★				☆/△/★	—
600	24	☆/△/★				☆/△/★	—
650	26	☆/△/★				—	

700	28	☆/△/★	—
750x600	30x24	☆/△/★	—
750	30	☆/△/★	—
800	32	☆/△/★	—
850	34	☆/★	—
900x750	36x30	☆/△/★	—
900	36	☆/★	—
1000	40	☆/★	—
1050	42	☆/★	—
1200	48	☆/★	—

注：●表示手动操作阀门，△表示气动操作阀门，☆表示齿轮齿箱操作阀门，★表示电动操作阀门，—表示没有此选项。

Note: ● Indicates manual operation valve, △ Indicates pneumatic operation valve, ☆ Indicates gear box operation valve, ★ Indicates electric operation valve, —Indicates that this option is not available.

表 6 产品性能规范表

Table 6 Product performance specification table

性能规范 Performance specification		压力等级 Pressure rating						
		150	300	400	600	900	1500	2500
试验压力	强度试验 Strength test	2.93	7.58	10.0	15.0	22.5	37.5	63.0
	密封试验 Seal test	2.07	5.52	7.31	11.03	16.5	27.5	46.2
	气压试验 Air pressure test	0.6						

适用温度 Applicable temperature	-196℃~550℃（注：不同工况温度，选用不同材质） -196℃~550℃ (Note: different working temperature, choose different materials)
适用介质 Applicable medium	水、蒸汽、石油、液化气、天然气等。Water, Steam,Oil, Liquefied gas, Natural gas, etc.
尺寸范围 Size range	DN50~1200(NP2”~45”),可根据客户要求制造 DN50~1200(NP2”~45”),Can be manufactured according to customer requirements
主体/内件材料 Body/interior material	碳钢、不锈钢、双相不锈钢、镍合金、钛材 Carbon steel, Stainless Steel, Duplex stainless steel, Nickel alloy, Titanium
端部连接 End connection	法兰连接、对接焊连接 Flange connection, Butt welding connection
驱动装置 Driving device	手动、蜗轮蜗杆传动、电动、气动 Manual, Worm gear drive, Electric, Pneumatic

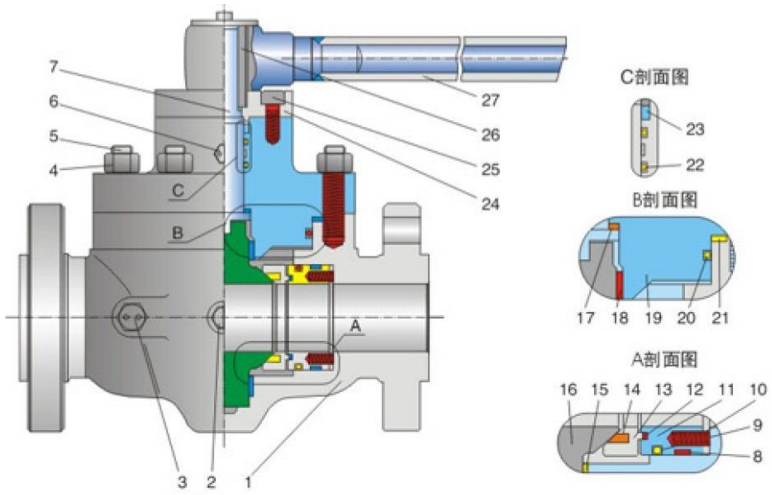


图 16 阀门结构示意图（手动上装式球阀）

Fig. 16 Schematic diagram of valve structure (Manual top type ball valve)

表 7 主要零部件材料表

Table 7 Material table of main parts

序号 NO.	零件名称 Name of parts	材料 Materials			序号 NO.	零件名称 Name of parts	材料 Materials		
		碳钢 Carbon steel	不锈钢 Stainless steel	低温钢 Low-temperature steel			碳钢 Carbon steel	不锈钢 Stainless steel	低温钢 Low-temperature steel
1	阀体 Valve body	A216 WCB	A351 CF8M	A352 LCC	15	下轴衬 Lower bush	PTFE +CS	PTFE+SS	PTFE+SS
2	排压阀 Pressure relief valve	A105+ ENP	A182 F316	A350 LF3	16	球体 Sphere	A105 +ENP	A182 F316	A350 LF3
3	注脂阀 Grease injection valve	A105+ ENP	A182 F316	A350 LF3	17	平面轴衬 Flat bush	PTFE +CS	PTFE+SS	PTFE+SS
4	螺母 Nut	A194 2H	A194 8	A194 7	18	上轴衬 Upper bush	PTFE +CS	PTFE+SS	PTFE+SS
5	螺柱 Stud	A193 B7	A193 B8	A320 L7	19	阀盖 Bonnet	A216 WCB	A351 CF8M	A352 LCC
6	注脂阀 Grease injection valve	A105+ ENP	A182 F316	A350 LF3	20	O 型圈 O-ring	氟橡胶 Fluororubber		
7	阀杆 Valve stem	A182 F6a	A182 F316	A182 F316	21	垫片 Gasket	柔性石墨+SS Flexible graphite		
8	防火垫 Fireproof mat	柔性石墨 Flexible graphite			22	O 型圈 O-ring	氟橡胶 Fluororubber		
9	O 型圈 O-ring	氟橡胶 Fluororubber			23	填料 Filler	柔性石墨 Flexible graphite		
10	弹簧 Spring	Incone1600			24	压盖 Gland	A105 +ENP	A182 F316	A350 LF3
11	支撑圈 Support ring	A105+ ENP	A182 F316	A350 LF3	25	螺钉 Screws	A193 B7	A193 B8	A320 L7
12	垫片 Gasket	柔性石墨 Flexible graphite			26	键 Key	ANSI 1045	ANSI	1045

13	阀座 Valve seat	A105+ENP A182 F316 A350 LF3	27	手柄 Controller	Q235A
14	密封圈 Seal ring	PTFE、NYLON、PEEK、PCTFE			

3.2.2 浮动球阀

3.2.2 Floating ball valve

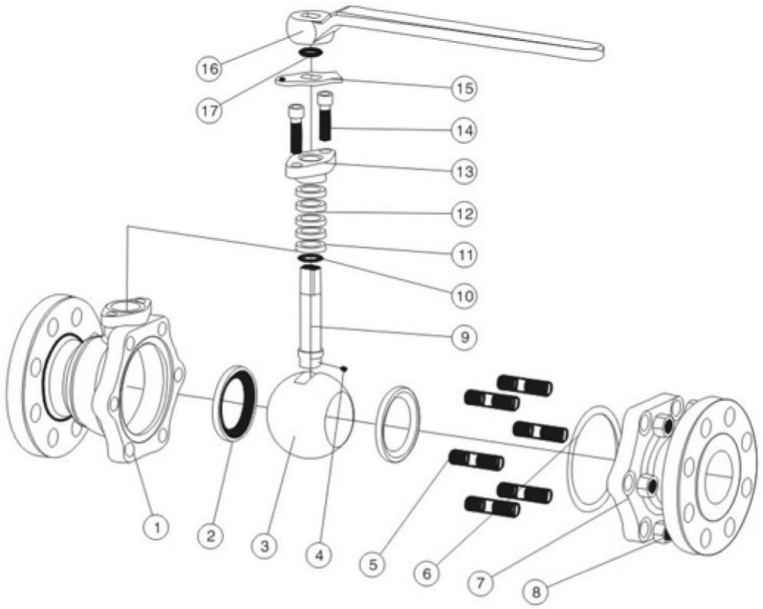


图 17 浮动球阀结构示意图

Fig. 17 Structure diagram of floating ball valve

表 8 主要零部件材料

Table 8 Main parts materials

序号 NO.	零件系列 Parts series	碳钢系列 Carbon steel series	不锈钢系列 Stainless steel series	低温钢系列 Low temperature steel series	抗硫系列 Sulfur resistant series	
					碳钢系列 Carbon steel series	不锈钢系列 Stainless steel series
1	阀体 Valve body	A216 WCB	A351、CF8、CF8M、CF3、CF3M	A352 LCB、LCC	GB/T12229、A216 WCB	A351 CF8M

2	阀座 Valve seat	PTFE、RPTFE、烧结碳纤维、金属+橡胶组件				
3	球体 Sphere	A105+HCr/ENP	A351、CF8、CF8M、CF3、CF3M	352、LCB LCC+ENP	A105+HCr/ENP	A351 CF8M+ENP
4	弹簧 Spring	INCONEL 750				
5	螺柱 Stud	A193 B7	A193 B8、B8M	A320 L7	A193 B7M	A193 B8M
6	垫片 Gasket	柔性石墨+不锈钢 Flexible graphite + stainless steel				
7	螺母 Nut	A194 2H	A194 8M	A194 4	A194 2HM	A194 8M
8	阀盖 Bonnet	A216 WCB	A351、CF8、CF8M、CF3、CF3M	A352 LCB、CC	GB/T 12229、A216 WCB	A351 CF8M
9	阀杆 Valve stem	A182 F6a	A182 F304、316	A182 F6a	A182 F304	A182 F316
10	轴衬 Bush	金属衬 PTFE;烧结碳纤维 Metal lined with PTFE; Sintered carbon fiber				
11	填料垫 Packing pad	A182 F6a		A182 F6a	A182 F6a	
12	填料 Filler	柔性石墨 Flexible graphite、PTFE				
13	螺钉 Screws	A216 WCB	A351 CF8、CF8M	A351 CF8	GB/T 12229、A216 WCB	A351 CF8M
14	填料压盖 Packing gland	A193 B7	A193 B8、B8M	A320 L7	A193 B7M	A193 B8M

15	定位片 Locating plate	GB/T 700 Q235A+Zn(Cr)
16	挡圈 Retainer	GB/T 1222 65Mn
17	手柄 Controller	A216　WCB

4 使用说明

4. 1 气动 O 型球阀

(1) 气动 O 型球阀应垂直安装于管道中，为便于检查、调整和维修、安装时应尽量靠近地面或有楼板的地方。

(2) 一般应设置旁通管路。

(3) 清洗管道时，球阀应处于全开位置避免损伤阀内件。

(4) 当配用阀门定位器后可实现比例调节。

球阀手操机构：

球阀的规格不同，它所需要的操作力矩也不同，有四种规格的手动机构可供选择。其结构如表 9 所示。

手动机构与 AT 执行机构的组配关系表：

表 9 手动机构与 AT 执行机构的组配关系表

手操机构	XLHJ26	XLHJ38	XLHJ54	XLHJ80A
执行机构	AT75\83	AT110/125/143/160	AT200/210	AT240 及以上

手动机构的用途：

(1) 如动力源发生故障或执行机构出现损坏的情况下，可切换成手动

操作，可使工艺过程照常进行。

(2) 可使球芯固定在任意开度上。

(3) 可作为限位装置。

手动操作时，应使手柄位于手动位置，便可进行手动操作，自动操作时，应将手柄置于自动位置。

4 Instructions for use

4.1 Pneumatic O-type ball valve

(1) Pneumatic O-type ball valve should be vertically installed in the pipeline, in order to facilitate inspection, adjustment and maintenance, installation should be as close to the ground or floor.

(2) Generally should be set up bypass pipeline.

(3) When cleaning the pipeline, the ball valve should be in a fully open position to avoid damaging the valve internals.

(4) Proportional adjustment can be achieved when the valve positioner is used.

Ball valve hand operation mechanism:

Ball valve specifications are different, it requires different operating torque, there are four specifications of manual mechanism to choose from. Its structure is shown in Table 9.

Combination relationship table of manual mechanism and AT actuator:

Table 9 Combination relationship between manual mechanism and AT actuator

手操机构 Manual	XLHJ26	XLHJ38	XLHJ54	XLHJ80A

mechanism				
执行机构 Executive mechanism	AT75\83	AT110/125/143/160	AT200/210	AT240 及以上

Uses of manual mechanism:

(1) If the power source fails or the actuator is damaged, it can be switched to manual operation, which can make the process proceed as usual.

(2) Can make the ball core fixed in any opening.

(3) Can be used as a limiting device.

For manual operation, the handle should be placed in the manual position to perform manual operation. For automatic operation, the handle should be placed in the automatic position.

4. 2 手动 O 型球阀

(1) 在使用球阀手动操作时，要注意保持手动装置清洁，以免进入杂物而导致破坏。

(2) 当球阀长期未使用时，要注意经常进行手动操作，以保证其灵活性和运转正常。

(3) 在操作球阀手动装置时，要注意安全，不能过力操作，以免产生意外事故。

以下是操球阀扭矩表。

4.2 Manual O-type ball valve

(1) When using the ball valve manual operation, pay attention to keep the manual device clean, so as not to enter the debris and cause damage.

(2) When the ball valve is not used for a long time, it is necessary to pay attention to frequent manual operation to ensure its flexibility and normal operation.

(3) In the operation of the ball valve manual device, pay attention to safety, can not over-force operation, so as to avoid accidents.

The following is the operating valve torque table.

表 10 扭矩表

Table 10 Torque table

通径（mm） DN / 压力 PN	15	20	25	40	50	65	80	100	125	150	200
PN1.6MPA	3	5	10	16	25	50	65	125	250	340	485
PN2.5MPA	3	5	11	18	30	60	80	140	300	400	680
PN4.0MPA	5	10	24	35	50	100	150	250	450	585	996
PN6.3MPA	15	30	50	80	100	200	300	400	—	—	—
PN10.0MPA	19	35	68	130	190	360	460	770	—	—	—

通径（mm） DN / 压力 PN	1/2	3/4	1	11/2	2	21/2	3	4	5	6	8
Class150	3	5	11	16	25	50	65	125	250	410	700
Class300	7	12	26	38	60	120	160	280	600	650	1560
Class400	15	30	50	90	140	240	350	540	—	—	—
Class600	19	35	68	130	190	360	460	770	—	—	—

表 11 手动球阀 Cv 值表

Table 11 Cv values of manual ball valves table

公称 in	1/2	3/4	1	11/4	11/2	2	21/2	3	4	5	6	8
通径 mm	15	20	25	32	40	50	65	80	100	125	150	200

缩径 Hole srinkage	9	19	45	—	125	165	270	350	550	670	765	1890
全径 Overall diameter	25	50	100	—	270	490	950	1160	2200	3800	5100	9300

5、工作原理

5.1 气动 O 型球阀

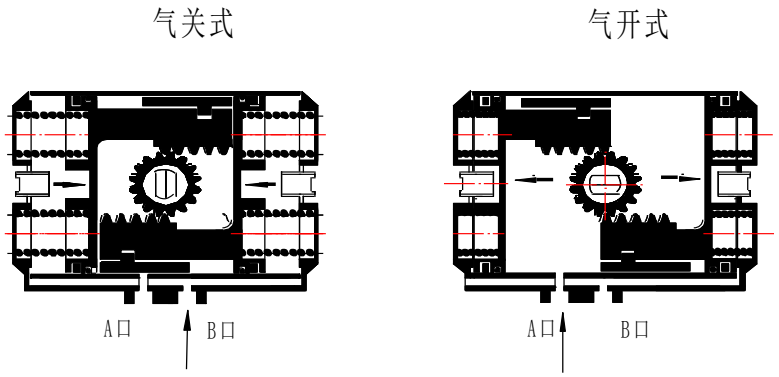


图 18 气关式与气开式

(1)气关式

外接气源通过气源三联件的进气口依次进入三联件出气端 ⟶ 电磁换向阀 ⟶ 气动执行机构气室中 A 口，当电磁阀通电，气动执行机构换向为 B 口进气，齿条式活塞推动齿轮轴通过连接轴带动阀门转动，关闭阀门，指示器为红色，并能给出开关接点信号。

(2)气开式

外接气源通过气源三联件的进气口依次进入三联件出气端 ⟶ 电磁换向阀 ⟶ 气动执行机构气室中 B 口，当电磁阀通电，气动执行机构 A 口进气，齿条式活塞推动齿轮轴通过连接轴带动阀门转动，打开阀门，指示器为黄色，并能给出开关接点信号。

5.2 手动 O 型球阀

当手动球阀的手柄旋转到一定角度时，手动球阀内部的浮球会与阀座脱离，导致介质的流道改变。这时，可以通过调整手动球阀的手柄角度，改变介质的流量。优点在于操作简便，易于维护，而且不需要使用气源或能源，因此适用于多种场合。

5 The working principle

5.1 Pneumatic O-type ball valve

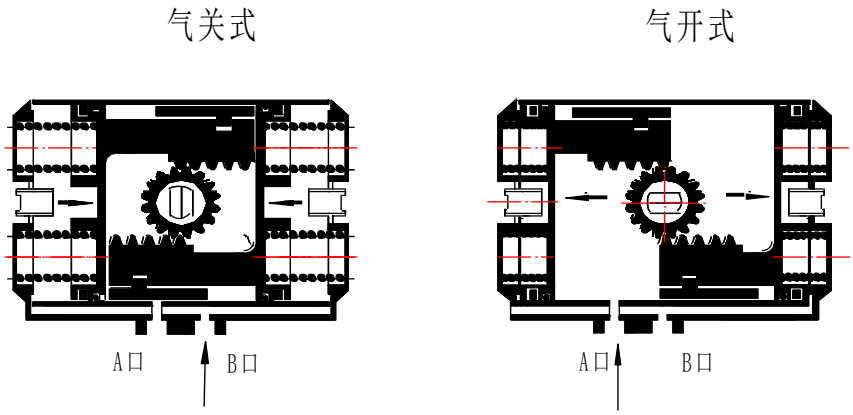


Fig. 18 Gas-closed and gas-open

(1) Air close type

The external air source enters port A in the air chamber of the electromagnetic reversing valve pneumatic actuator through the air intake port of the air source triplet in turn. When the solenoid valve is energized,

The pneumatic actuator is reversed for inlet B, and the rack piston drives the gear shaft through the connecting shaft to drive the valve to rotate and close the valve. The indicator is red and the switch contact signal can be given.

(2) Air open type

The external air source enters port B in the air chamber of the electromagnetic reversing valve pneumatic actuator through the air intake port of the air source triplet in turn. When the solenoid valve is energized,

Pneumatic actuator A inlet air, rack type piston drive the gear shaft through the connecting shaft to drive the valve rotation, open the valve, the indicator is yellow, and can give the switch contact signal.

5.2 Manual O-type ball valve

When the handle of the manual ball valve is rotated to a certain Angle, the float ball inside the manual ball valve will be detached from the seat, resulting in a change in the flow path of the medium. At this time, the flow rate of the medium can be changed by adjusting the handle Angle of the manual ball valve. The advantage is that it is simple to operate, easy to maintain, and does not require the use of air or energy, so it is suitable for a variety of occasions.

6、供货范围与产品性能

6、Scope of supply and product performance

表 12 供货范围表

Table 12 Scope of Supply

规格 Specification		公称压力 PN(MPa)					压力等级 Pressure rating			
DN	in	1.6	2.5	4.0	6.3	10.0	150	300	400	600
20x15	3/4x1/2	●/△					●/△			
20	3/4	●/△					●/△			
25x20	1x3/4	●/△					●/△			
25	1	●/△					●/△			

32	11/4	●/△		●/△	
40x32	11/2x11/4	—		—	
40	11/2	●/△		●/△	
50x40	2x11/2	●/△		●/△	
50	2	●/△		●/△	
65x50	21/2x2	●/△/★		●/△/★	
65	21/2	●/△/★		●/△/★	
80x65	3x21/2	●/△/★		●/△/★	
80	3	●/△/★		●/△/★	
100x80	4x3	●/△/★		●/△/★	
100	4	●/△/★		●/△/★	
125x100	5x4	●/△/★	—	●/△/★	—
125	5	●/△/★	—	●/△/★	—
150x100	6x4	●/△/★		●/△/★	
150	6	●/☆/△/★	—	●/☆/△/★	—
200x150	8x6	●/☆/△/★	—	●/☆/△/★	—
200	8	●/☆/△/★	—	●/☆/△/★	—

注：●表示手柄操作阀门

△表示气动操作阀门

☆表示齿轮箱操作阀门

★表示电动操作阀门

—表示未涉及的可按用户的要求制造

Note: ● Indicates a handle operated valve

△ Pneumatically operated valve

☆ Indicates gear box operating valve

★ Electrically operated valve

—Indicates that those not involved can be manufactured according to the user's requirements.

表 13 产品性能规范表

Table 13 Product performance specification table

性能规范 Performance specification		公称压力 Nominal pressure				压力等级 Pressure rating				
		1.6	2.5	4.0	6.3	10.0	150	300	400	600
试验压力 test ptrssure	强度试验 Strength test	2.4	3.75	6.0	9.6	15.0	2.93	7.58	10.0	15.0
	密封试验 Seal test	1.76	2.75	4.4	7.04	11.0	2.07	5.52	7.31	11.03
	气压试验 Air pressure test	0.6								
适用温度 Applicable temperature		-193℃~550℃（不同工况温度，选用不同的材质） -193 ℃ ~550 ℃ (different working conditions temperature, choose different materials)								
适用介质	普通型 Common type	水、蒸汽、石油、液化气、天然气等。 Water, steam, oil, liquefied gas, natural gas, etc.								
	抗硫型 Sulfur resistant type	含 H2、CO 的天然气、石油等。 Gas, oil, etc., containing H2 and CO.								

7、主要技术参数和性能

阀　　体：

型　　式　　直通两段式铸造球阀

公称通径　　15～400mm

公称压力　　PN1.6、2.5、4.0、6.4MPa

ANSI 150/300/600　JIS 10K/20K/40K

连接形式　　法兰连接 RF 法兰标准按 JB/T79.1-94 JB/T79.2-94、JIS 或 ANSI B16.5 规定及 DIN 标准。

材　　料　　ZG25I、ZG1Cr18Ni9 和 ZG0Cr17Ni12Mo2

介质温度　　-40～+180℃，180℃～425℃

填　　料　　V 型聚四氟乙烯，柔性石墨

阀内组件：

球芯型式　　圆柱形通孔球体

流量特性　　快开特性

球芯材料　　1Cr18Ni9、0Cr17Ni12Mo2 和 17-4PH

旋转轴材料　　0Cr17Ni12Mo2 和 17-4PH

阀座材料　　聚四氟乙烯，对位聚苯

球芯转角　　90°

其中气动 O 型球阀执行机构如下。

执行机构：

型　　式　　ATD(S)单作用（双作用）气缸活塞执行机构

气源接头　　RC1/8, RC1/4, RC1/2

环境温度　　-40～+80℃

供气压力　　0.4～0.7MPa

附　　件　　电磁阀、行程开关和过滤减压阀

侧装手轮机构和保护装置（只适用双作用执行机构）

7、Main technical parameters and performance

Valve body:

Type Straight：through two stage casting ball valve

Nominal diameter：　15 ~ 400mm

Nominal pressure：　PN1.6, 2.5, 4.0, 6.4MPa

ANSI 150/300/600　　JIS 10K/20K/40K

RF flanges are connected according to JB/T79.1-94 JB/T79.2-94, JIS or ANSI B16.5 and DIN standards.

Materials ：　ZG25I, ZG1Cr18Ni9 and ZG0Cr17Ni12Mo2

Medium temperature：　-40 ~ +180℃, 180 ~ 425℃

Filling V-type：　PTFE, flexible graphite

Valve internal components:

Spherical core type：　Cylindrical through hole sphere

Flow feature：　Fast opening feature

Ball core materials：　1Cr18Ni9, 0Cr17Ni12Mo2 and 17-4PH

Rotation axis material：　0Cr17Ni12Mo2 and 17-4PH

Seat materia：l polytetrafluoroethylene, para polystyrene

The ball core Angle is 90°

The pneumatic O-type ball valve actuator is as follows.

Executing agency:

ATD(S) Single acting (double acting) cylinder piston actuator

Air source connectors： RC1/8, RC1/4, RC1/2

Ambient temperature： -40 ~ +80℃

Gas supply pressure： 0.4 ~ 0.7MPa

Accessory： solenoid valve, travel switch and filter pressure reducing valve

Side-mounted hand wheel mechanisms and protection devices (for dual-acting actuators only)

8、安装、使用和调试

8. 1 气动 O 型球阀

(1) 气动 O 型切断球阀在安装前应先核对阀门铭牌上的位号、口径、公称压力、作用方式、所配附件等是否符合规定要求。

(2) 气动 O 型切断球阀可垂直和水平安装，但口径较大的阀门垂直安装时应对执行机构采取一定的支撑措施，以使阀门运行安全可靠。

(3) 气动 O 型切断球阀应安装在便于操作和维修的地方。

(4) 阀门安装前必须对管道进行清洗，除去管道中的异物，诸如焊渣、氧化皮石块等，安装后应使阀门处于全开位置，对管道和阀门进行清洗及检查阀门与管道连接处的密封性。

(5) 应根据工艺需要确定是否需要对 O 型气动切断阀设置旁通。

(6) 应定期对气动 O 型切断球阀进行检查、维修，检查重点为阀芯、阀座、执行机构中的活塞密封环等零件，如有损坏应及时修复或调换，确保阀门正常使用。

(7) 本气动执行机构的气路控制是由电磁阀控制的，电磁阀线圈为普通型及防爆型线圈，用户可根据需要选择，防爆线圈接线时应按照防爆操作规范对连接线头进行处理，确保连接可靠。

(8) 本气动 O 型切断阀的行程开关为普通型及防爆行程开关，在阀门开和关的位置能输出一对常开信号和一对常闭信号。电气接口为 2 个 1/2′接口，接线时请用合适的接头，以保证密封。

(9) 使用气源压力请勿超过 0.8Mpa。

8、Installation, use and commissioning

8.1 Pneumatic O-type ball valve

(1) Pneumatic O-type cut-off ball valve before installation should first check the valve nameplate on the number, caliber, nominal pressure, mode of action, accessories, etc. meet the requirements.

(2) Pneumatic O-type ball valve can be installed vertically and horizontally, but when the valve with a large diameter is installed vertically, certain support measures should be taken for the actuator to make the valve operate safely and reliably.

(3) Pneumatic O-type ball valve should be installed in a place that is easy to operate and maintain.

(4) The valve must be cleaned before installation to remove foreign matter in the pipeline, such as welding slag, oxide stone, etc. After installation, the valve should be in a fully open position to clean the pipeline and valve and check the tightness of the connection between the valve and the pipeline.

(5) According to the needs of the process, it should be determined whether the O-type pneumatic cut-off valve needs to be set by bypass.

(6) The pneumatic O-type ball valve should be inspected and repaired regularly, and the inspection focus is on the spool, seat, piston seal ring and other parts in the actuator. If there is damage, it should be repaired or replaced in time to ensure the normal use of the valve.

(7) The gas path control of the pneumatic actuator is controlled by the solenoid valve. The solenoid coil is a common type and explosion-proof type coil, which can be selected by the user according to the needs.

(8) The stroke switch of the pneumatic O-type cut-off valve is a common type and explosion-proof stroke switch, which can output a pair of normally open signals and a pair of normally closed signals at the position of the valve opening and closing. The electrical interface is 2 1/2 'interfaces. Please use appropriate connectors when wiring to ensure sealing.

(9) Do not use air source pressure exceeding 0.8Mpa.

8.2 手动 O 型球阀

(1) 取掉法兰端两边的保护盖，在阀完全打开的状态下进行冲洗清洁。

(2) 准备与管道连接前，需冲洗和清除干净管道中的残存的杂质。

(3) O 型调节球阀应安装在管道的水平方向或垂直方向。

(4) 安装点附近的管道不可有低垂或者承受外力的现象，可以用管道支架或者支撑物来消除管线的偏离。

(5) 与管道连接后，请用规定的扭矩交叉缩紧法兰连接螺栓。

(6) 如有阀体衬有防腐层，安装在管道上时，应采用耐腐蚀软垫，并注意不使阀体法兰密封面受损。

(7) 对填料压盖应定期检查，防止应渗漏腐蚀而损坏其他零件而造成事故。

8.2 Manual O-type ball valve

(1) Remove the protective cover on both sides of the flange end and rinse the valve when it is fully open.

(2) Before preparing to connect with the pipeline, it is necessary to wash and remove the remaining impurities in the clean pipeline.

(3) O-type ball valve should be installed in the horizontal direction or vertical direction of the pipeline.

(4) The pipeline near the installation point should not be low or bear external force, and the deviation of the pipeline can be eliminated by pipe brackets or supports.

(5) After connecting with the pipe, please use the specified torque to cross tighten the flange connection bolt.

(6) If the valve body is lined with anti-corrosion layer, installed on the pipeline, should use corrosion resistance cushion, and take care not to damage

the valve body flange sealing surface.

(7) The packing cover should be regularly checked to prevent leakage corrosion and damage to other parts caused by accidents.

9、维护和常见故障

(1)气源、信号压力一定，但阀门动作不稳定，其主要原因是：供气管线漏气，阀门摩擦力大，气缸漏气。因此，检查供气管线、气缸是否漏气。

(2)阀门动作迟钝，主要原因是：阀体内有泥浆或粘性过大的介质，出现堵塞或结焦现象，四氟阀座硬化变质。因此，如有上述现象发生，应及时清洗阀体或更换填料套。

(3)阀的泄漏量太大，主要原因是：密封阀座损坏，请更换密封阀座。

(4)密封填料部分渗漏，主要原因是：填料老化或擦伤、阀杆损坏。如有上述现象发生，应及时检查，更换填料或阀杆。

(5)阀体渗漏，主要原因是：主副阀体间紧固螺母松弛，密封垫或 O 型圈损坏，应紧固螺母或更换密封垫和 O 型圈。

9. Maintenance and common faults

(1) The air source, signal pressure is certain, but the valve action is unstable, the main reasons are: air supply pipeline leakage, valve friction, cylinder leakage. Therefore, check whether the gas supply line and cylinder leak.

(2) The valve action is slow, the main reason is: there is mud or viscous medium in the valve body, blockage or coking phenomenon, PTFE valve seat

hardening and deterioration. Therefore, if the above phenomenon occurs, the valve body should be cleaned or the packing sleeve replaced in time.

(3) The leakage of the valve is too large, the main reason is: the sealing seat is damaged, please replace the sealing seat.

(4) Sealing packing part leakage, the main reason is: packing aging or abrasion, valve stem damage. If the above phenomenon occurs, it should be checked in time to replace the packing or valve stem.

(5) Valve body leakage, the main reason is: the nut between the main and secondary valve bodies slack, gasket or O-ring damage, should tighten the nut or replace the gasket and O-ring.

10、运输和贮存

(1)储运前检查各种标志是否完整、齐全、正确、清晰，包装箱是否整齐、牢固、无破损伤裂，最后检查打箱、包装的可靠性及安全性。

(2)运输时应轻装、轻放，严禁抛滑和撞击，各类标志不得丢失、受潮及损坏机件。

(3)贮存在空气温度为 5～40℃，相对湿度不大于 90%，库房空气中应不含有腐蚀性有害物质。

(4)按包装箱表面标记放置，不得倒置。

(5)产品易锈部位涂防锈油脂，用防锈纸包敷，防锈期限不少于一年。

(6)包装箱内应有石油沥青纸或塑料薄膜作为防雨措施。

(7)产品包装自出厂发货之日起，保护有效期限为一年。

10. Transportation and storage

(1) Before storage and transportation, check whether all kinds of signs are complete, complete, correct and clear, whether the packing box is neat, firm, no damage or crack, and finally check the reliability and safety of the box and packaging.

(2) Transport should be light, light, strictly prohibited slipping and impact, all kinds of signs shall not be lost, damp and damaged parts.

(3) Stored in the air temperature of 5 ~ 40℃, the relative humidity is not more than 90%, the warehouse air should not contain corrosive harmful substances.

(4) Place according to the surface mark of the packing box, not upside down.

(5) Rust parts of the product coated with anti-rust grease, coated with anti-rust paper, anti-rust period of not less than one year.

(6) The packaging box should have petroleum asphalt paper or plastic film as rain prevention measures.

(7) Product packaging from the date of delivery, protection period is one year.

11、订货须知

订货时，请写明：

(1)、产品型号

(2)、公称通径

(3)、公称压力

(4)、执行机构（单/双作用指明）

(5)、介质温度

(6)、阀体和阀内件材料

(7)、附件

(8)、其它特殊要求

11. Instructions for ordering

When ordering, please state:

(1)、Product model

(2)、Nominal diameter

(3)、Nominal pressure

(4)、The executive mechanism (single/double role specified)

(5)、Medium temperature

(6)、Valve body and valve interior materials

(7)、Accessories

(8)、Other special requirements

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