

# 衬氟自控蝶阀 Lined Control Butterfly Valve

## 结构与工作原理 Structure and Working Principle

衬氟蝶阀是由阀体、蝶板、阀座、阀杆、执行机构等组成(如图1所示)。蝶板以阀杆为轴线旋转,由执行机构驱动,把电、气输入信号转换成阀杆的转动,带动蝶板在阀体内转动,即蝶板转动到与输入信号相对应的位置,实现全开—全闭的动作。

Lined control butterfly valve consists of body, disc, seat, stem and actuator etc. The rotation of disc pivots on the shaft. Rotation angle of disc is drove by actuator, converting the input message of electricity and air into rotation of stem, rotating the disc in the body. It can realize full open or full close action.

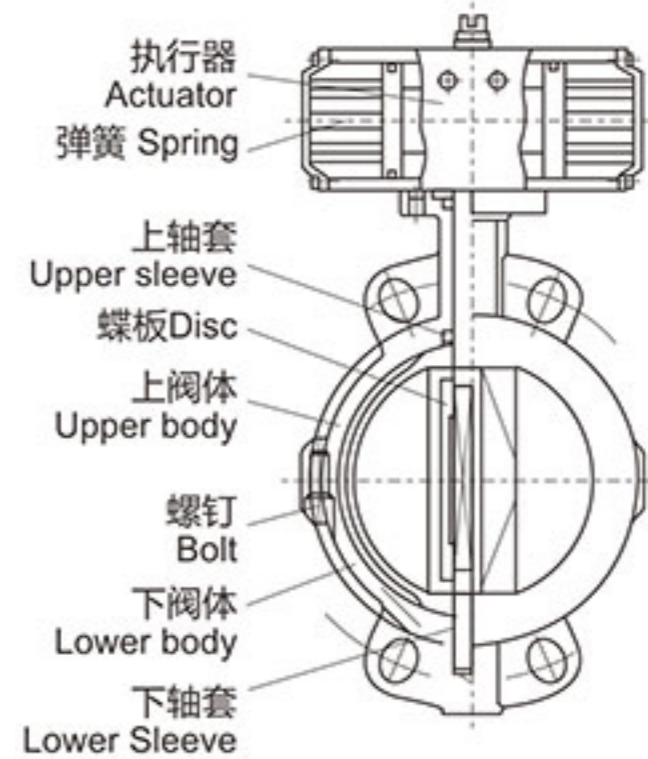


图1 Photo 1

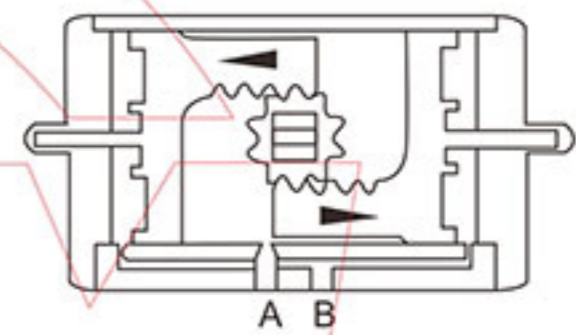
气动衬氟蝶阀采用新型系列ACT型气动执行器,大口径阀门采用系列AW型气动执行器拔叉式传动,结构合理,输出扭矩大,有双作用式和单作用式(弹簧复位)。

双作用气缸(图2)的工作原理:当压缩空气从A口进入两活塞之间腔时,使左右活塞方向相反运动,输出轴逆时针方向转动,两活塞侧面空气由B口排出;反之,当压缩空气从B口进入,使左右活塞向中心运动,输出轴顺时针方向转动,空气由A口排出。

Pneumatic lined butterfly control valve adopts new type ACT pneumatic actuator, and AW type pneumatic actuator for big size valve, with advantage of reasonable structure, output torque, with double acting and single acting (spring return).

Double acting pneumatic actuator (photo 2) operation principle: when compressed air comes from A port to cavity of two pistons, making the left and right piston move in the opposite direction and the output shaft rotate in counterclockwise direction, Then the air at the sides of two piston will be exhausted from B port. Conversely, the compressed air comes from B port, making the left and right piston move in the center and output shaft rotate in the clockwise direction, then the air will be exhausted from A port.

逆时针方向转动  
Rotation in the counterclockwise direction



顺时针方向转动  
Rotation the clockwise direction

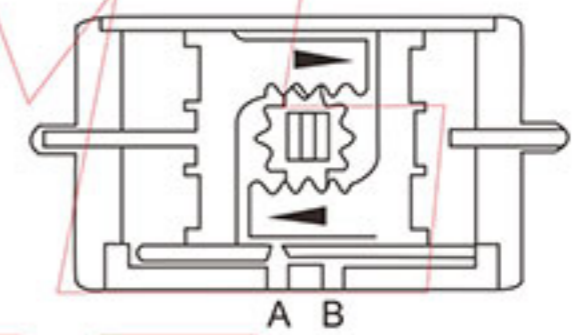
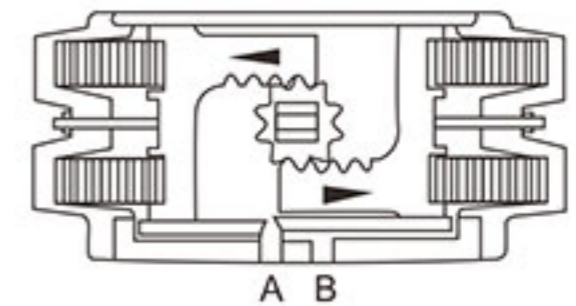


图2 Photo 2

单作用气缸(图3)的工作原理:当需要逆时针方向转动时,压缩空气从A口输入,使左右活塞向相反方向运动,输出轴逆时针方向转动,两活塞侧面空气由B口排出;失气或失电时,由于弹簧的作用使两活塞向中心移动,输出轴顺时针方向转动,空气由A口排出。

Single acting pneumatic actuator operation principle (photo 3): when required the rotation in the counterclockwise direction, compressed air comes from A port to realize the left-right piston move in the opposite direction. When output axis rotates in the counterclockwise direction, the air at the sides of two pistons will be exhausted from B port. When out of air or electricity, the two pistons move to the center because of the action of the spring, and then the output axis rotates in the clockwise direction to output the air from A port.

逆时针方向转动  
Rotation in the counterclockwise direction



顺时针方向转动  
Rotation the clockwise direction

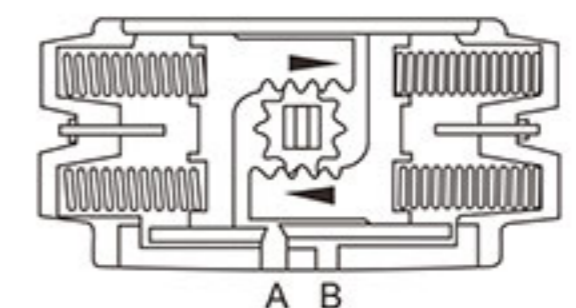


图3 Photo 3

主要零件材料 Material Specification

零件名称 Name	材料 Material
阀体、蝶板 Body, Disc	WCB/CF8+衬里材料 Lining material
阀杆 Stem	2Cr13, SS410, SS420, 17-4PH
阀座 Seat	PFA, PTFE, FEP, GXPO
填料 Packing	PTFE
衬垫 Pad	硅橡胶 Silicon rubber
气缸 Cylinder	挤压铝(氧化) Pressing aluminum (oxidized)
活塞 Piston	压铸铝(镀镍) Cast aluminum (nickel plated)

Kv值-流量系数 Kv Flow Coefficient

公称通径 DN	50	65	80	100	125	150	200	250	300
流量系数 Kv	110	211	318	660	836	1244	2523	3064	4588
公称通径 DN	350	400	450	500	600	700	800	900	1000
流量系数 Kv	6024	7300	9828	12148	17754	30887	39789	49778	54100

主要技术参数 Technical Specification

设计标准 Design & Manufacture Standard	HG/T3704, API 608
结构长度标准 Face-to-face Dimension	HG/T3704, GB/T12221, ASME B16.10
法兰标准 Flange Connection	HG/T20592, GB/T9119, ASME/ANSI 16.5, JIS B2220
检测与试验标准 Inspection & Test Standard	GB/T4213, GB/T13927, GB/T26144, API598
密封面形式 Sealing surface	HG/T 20592 RF, ASME B16.5 RF
实际压力 Working Pressure	最大1.0 MPa(1.6 MPa特制) Maximum 1.0 MPa(1.6 MPa customized)
公称压力 Nominal Pressure	0.6MPa, 1.0MPa, 1.6MPa; 150LB; JIS 10K
工作温度 Working Temperature	-29°C ~200°C
全行程时间 Full Travel Time	全开或全关所用时间为4~35秒 4~35 seconds when fully open or fully close
流量特性 Flow Characteristic	近似等百分比 Approximate equal percentage
执行机构 Actuator	配用ACT系列或者AW系列活塞式执行机构 Equipped with ACT series or AW series piston actuator
供气压力 Pressure Supply	气源压力 Air pressure: 0.5 MPa
气源接头 Air Supply Connection	Rc1/4
误差 Basic Error	带定位器,基本误差±2%; 回差: < 1.5%; 死区: 0.8%; 始终点误差为±1.5%; With positioned: ±2%, backlash < 1.5%; dead zone: 0.8%; End point deviation: ±1.5%
泄漏量 Leakage Rate	不超过阀门额定Cv值的10 <sup>-5</sup> No more than 10 <sup>-5</sup> of rated CV
选购附件 Optional Accessories	定位器、空气过滤压器、电磁阀、限位开关等等(按订货要求配套提供) positioner, air set, solenoid valve, limit switch etc. (according to the order)

# 衬氟自控蝶阀 Lined Control Butterfly Valve

## 流量特性曲线 Flow Characteristic Curve

注：流量特性曲线表示阀门开启程度和流量间的关系，一般蝶阀适合用于流量控制，当阀门开启角度在30度以下时，不推荐用于控制流量。

Note: Flow characteristic curve defines the relation of the valve open degree and flow. Generally butterfly valve is good for flow control. However when the open degree is less than 30° it is not recommended to used butterfly valve to control flow rate.

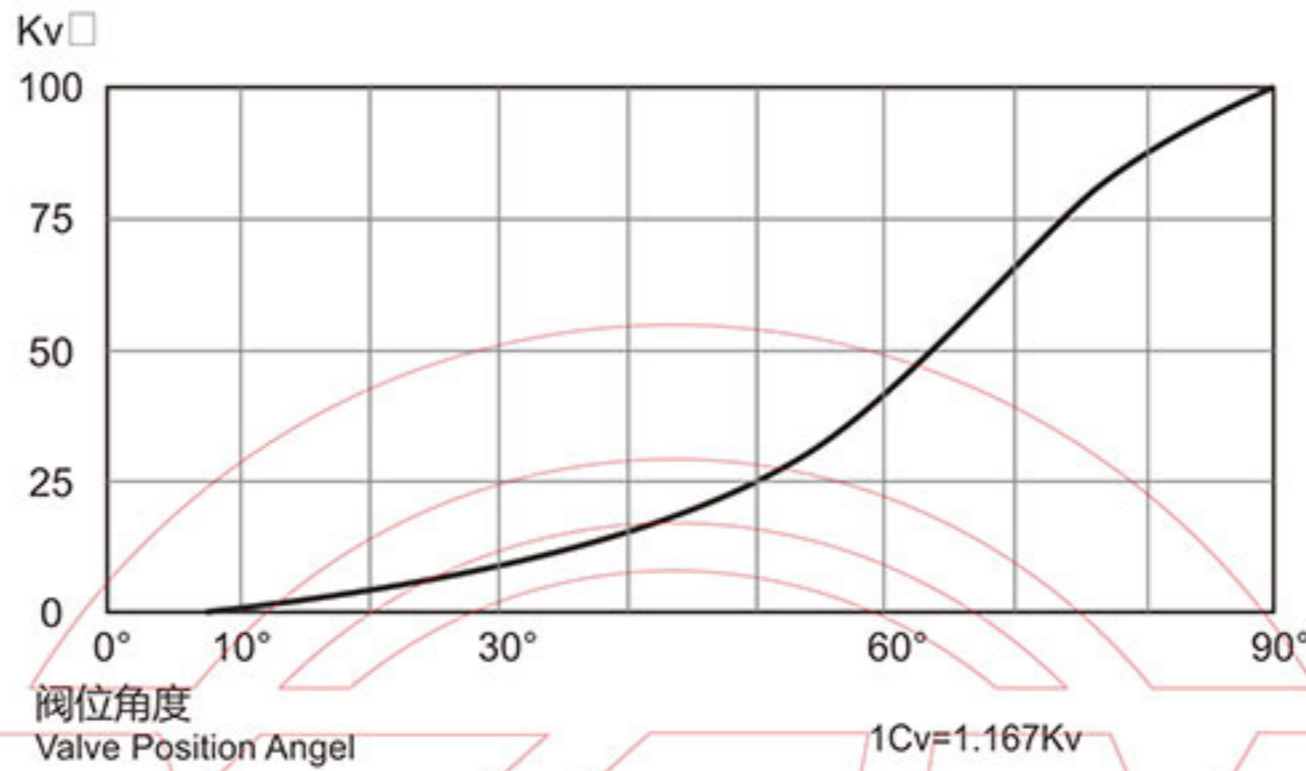


图4 Photo 4

**Kv值的定义：**Kv值是表示气体流量特性的一个参数和表示方法。  
**Kv值的测定：**当阀门全开时，阀门两端压差 $\Delta p=0.1\text{MPa}$ ，流体密度 $\rho=1\text{g/cm}^3$ 时；通过阀门的流量为 $q_v(\text{m}^3/\text{h})$ ，则流通能力Kv值为：

**KV definition:** it is the parameter and notation of air flow characteristic  
**KV measurement:** When the valve fully opened, two end of differential pressure  $\Delta p=0.1\text{MPa}$ , flow density:  $\rho=1\text{g/cm}^3$  Valve flow rate:  $q_v (\text{m}^3/\text{h})$  :

$$Kv \text{ 值的计算: } Kv = q_v \cdot \sqrt{\frac{\rho}{\Delta p}}$$

式中：Kv：流通能力， $\text{m}^3/\text{h}$ ； $\rho$ ：实测流体密度， $\text{g/cm}^3$ ； $\Delta p=p_1-p_2$   
 $p_1$ 和 $p_2$ 是被测元件上下游的压力差。  
 Kv值与Cv值之间的关系： $Cv=1.167Kv$

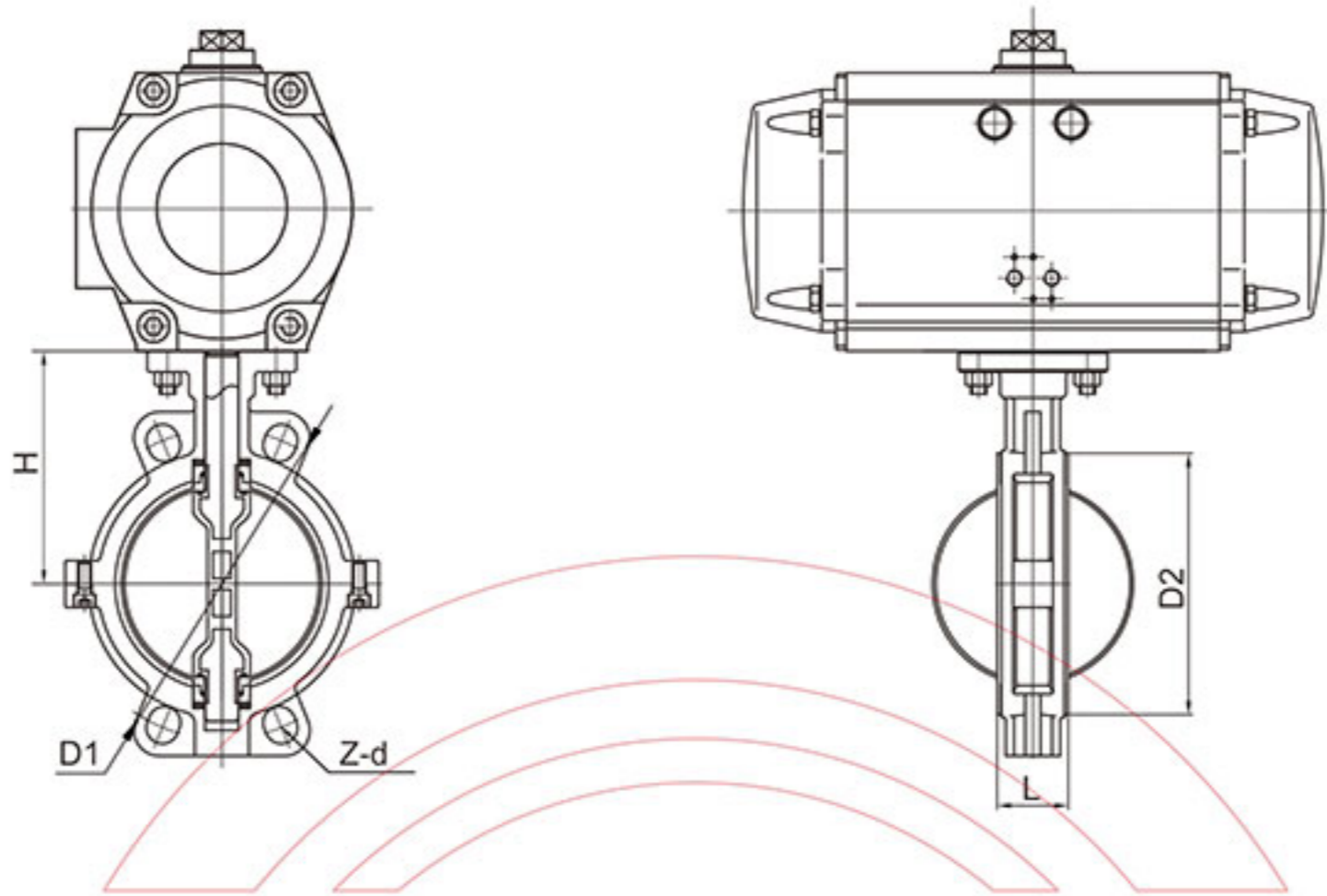
KV: flow capacity,  $\text{m}^3/\text{h}$ ;  $\rho$ : actual flow density,  $\text{g/cm}^3$ ,  $\Delta p=p_1-p_2$   
 $CV=1.167KV$

## 安装与维修

- 产品使用的环境温度为 $-29^\circ\text{C} \sim 70^\circ\text{C}$ 。因为活塞的橡胶零件，在过低温度下易硬化变脆，高温时会加速老化。
- 产品最好正立安装。如安装位置不允许，也可与垂直线成一角度。倾斜安装时，应考虑加设支撑架。
- 手轮机构使用后，必须将手动/自动操作杆置于自动位置，否则会影响自动控制。
- 衬氟蝶阀安装在管道上之前，应彻底清洗管道系统的杂质和污物，以免阀门运行部件卡死，或损坏阀座密封面、蝶板密封面等重要零件。
- 衬氟蝶阀安装时，密封如有泄漏现象，需要将上下阀体螺钉重新紧固，直至无泄漏为止。

## Installation and Maintenance

- The applicable temperature for lined control butterfly valve is  $-29^\circ\text{C} \sim 70^\circ\text{C}$ . Since the piston is rubber parts, it is easily hardening and brittle under extreme low temperature, and aging accelerates under high temperature.
- This valve is better for vertical installation; if not allowed, consider adding the support bracket for slanting installation.
- After hand wheel actuator used, the telescopic pipe should be returned to top end, or will affect automatic control.
- It should clean the impurities and dirt on pipeline before the lined butterfly valve before installed, to avoid the running parts stuck, or damage the important parts of seat and disc sealing face.
- When the lined butterfly valve installed and there is leakage, it should tighten the bolts between upper and lower bodies until no leakage.



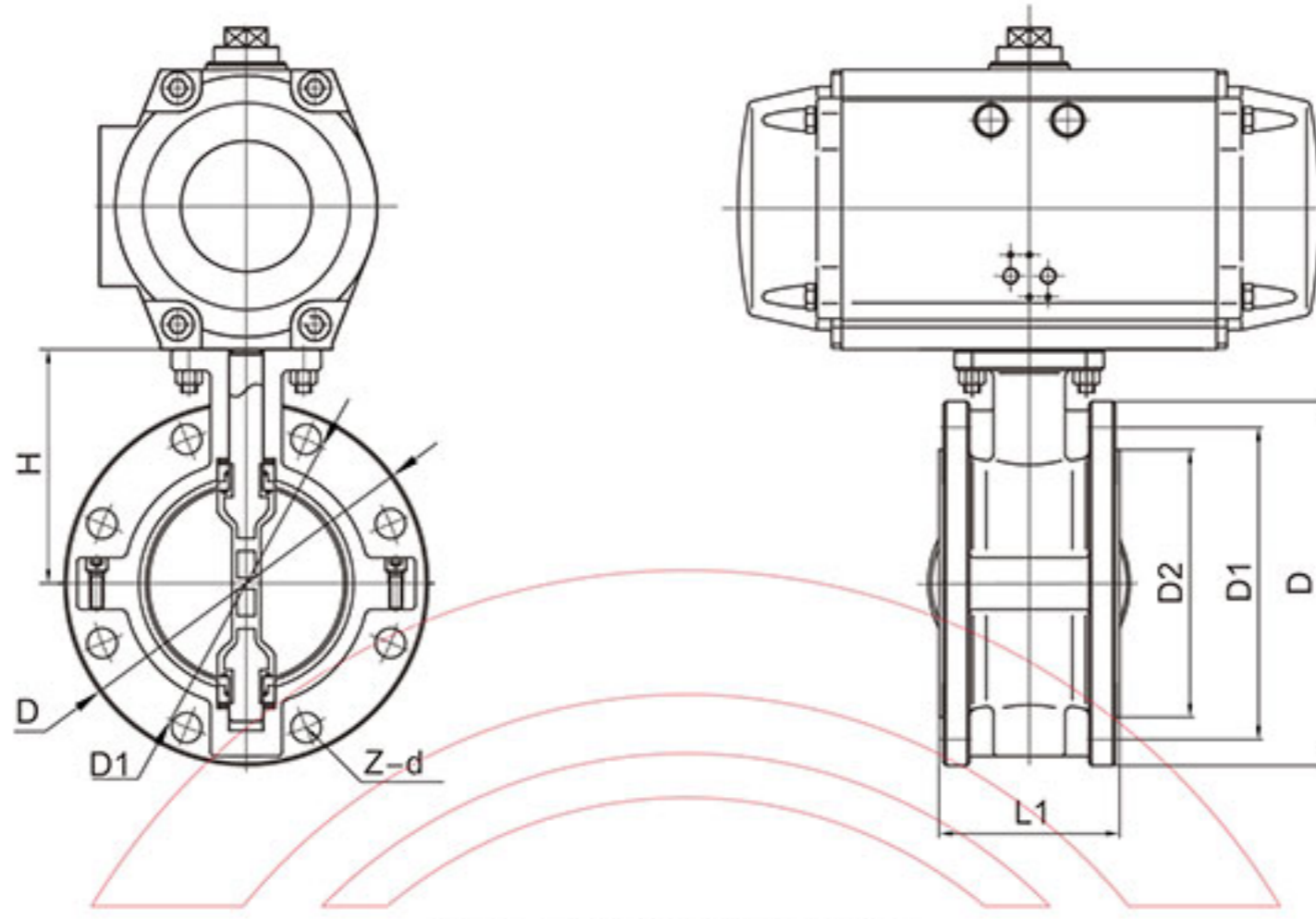
YFM-D671PFA/F4/F46/GXPO

HG/T 20592

单位Unit:mm

DN	结构长度 face to face		PN10				PN16				H	执行器型号		
	对夹式 wafer L	法兰式 flange L1	D	D1	D2	Z-d	D	D1	D2	Z-d		双作用 Double acting	单作用 Single acting	扭矩 Torque N·m
50	43	108	160	125	90	4-18	160	125	90	4-18	112	ACT75D	ACT75S	25
65	46	112	180	145	110	4-18	180	145	110	4-18	125	ACT75D	ACT90S	40
80	46	114	195	160	130	8-18	195	160	130	8-18	135	ACT90D	ACT100S	50
100	52	127	215	180	148	8-18	215	180	148	8-18	142	ACT115D	ACT125S	100
125	56	140	245	210	180	8-18	245	210	180	8-18	165	ACT125D	ACT145S	120
150	56	140	285	240	202	8-22	285	240	202	8-22	180	ACT145D	ACT160S	160
200	60	152	340	295	263	8-22	340	295	263	12-22	228	ACT160D	ACT190S	210
250	68	165	395	350	313	12-22	405	355	313	12-26	278	ACT160D	ACT190S	440
300	78	178	445	400	368	12-22	460	410	368	12-26	295	ACT190D	ACT210S	950
350	78	190	505	460	415	16-22	520	470	415	16-26	341	AW17	AW20S	1850
400	102	216	565	515	484	16-26	580	525	484	16-30	390	AW17	AW20S	1950
450	114	222	615	565	519	20-26	640	585	519	20-30	442	AW20a	AW20S	2680
500	127	229	670	620	590	20-26	715	650	590	20-33	470	AW20	AW25S	3630
600	154	267	780	725	688	20-30	840	770	688	20-36	520	AW25	AW28S	5120

注: 1. 所选执行机构型号仅供参考 (气源压力大于0.5MPa)  
2. 扭矩值为阀门空载时的扭矩, 不含安全系数。



YFM-D641PFA/F4/F46/GXPO

ASME B16.5 / JIS B2220

单位Unit:mm

NPS	结构长度 face to face		ASME 150LB				JIS 10K				H	执行器型号		
	对夹式 wafer L	法兰式 flange L1	D	D1	D2	Z-d	D	D1	D2	Z-d		双作用 Double acting	单作用 Single acting	扭矩 Torque N·m
2	43	108	152	120.5	90	4-19	155	120	90	4-19	112	ACT75D	ACT75S	25
2½	46	112	178	139.5	110	4-19	175	140	110	4-19	125	ACT75D	ACT90S	40
3	46	114	190	152.5	130	4-19	185	150	130	8-19	135	ACT90D	ACT100S	50
4	52	127	230	190.5	148	8-19	210	175	148	8-19	142	ACT115D	ACT125S	100
5	56	140	255	216.0	180	8-22	250	210	180	8-23	165	ACT125D	ACT145S	120
6	56	140	280	241.5	202	8-22	280	240	202	8-23	180	ACT145D	ACT160S	160
8	60	152	343	298.5	263	8-22	330	290	263	12-23	228	ACT160D	ACT190S	210
10	68	165	406	362.5	313	12-25	400	355	313	12-25	278	ACT160D	ACT190S	440
12	78	178	485	432.0	368	12-25	445	400	368	16-25	295	ACT190D	ACT210S	950
14	78	190	535	476.0	415	12-29	490	445	415	16-25	341	AW17	AW20S	1850
16	102	216	597	539.5	484	16-29	560	510	484	16-27	390	AW17	AW20S	1950
18	114	222	635	578.0	519	16-32	620	565	519	20-27	442	AW20a	AW20S	2680
20	127	229	698	635.0	590	20-32	675	620	590	20-27	470	AW20	AW25S	3630
24	154	267	813	749.5	688	20-35	795	730	688	24-33	520	AW25	AW28S	5120

Note: 1 Selected actuator models are for reference only (gas source pressure is greater than 0.5MPa)

2 Torque value of the valve is with no loading and without safety factor.