

D643Y 硬密封气动蝶阀系列

D643Y Hard Seal Pneumatic Butterfly Valve Series

使
用
说
明
书

User Manual



开 维 喜 阀 门 集 团 有 限 公 司
Kaiweixi Valve Group Co., LTD.

D643Y 硬密封气动蝶阀

D643Y Hard Seal Pneumatic Butterfly Valve

型号: D643Y 规格: DN50-DN1200
公称压力: PN10~PN25 适用介质: 水、油品及类似液体、气体
适用温度: $\leq 550^{\circ}\text{C}$ 阀体材质: 铸钢、不锈钢、双相不锈钢
连接方式: 法兰 驱动方式: 气动
Model: D643Y
Size: DN50-DN1200
Nominal Pressure: PN10-PN25
Applicable Medium: Water, oil, similar liquids, and gas
Applicable Temperature: $\leq 550^{\circ}\text{C}$
Body Material: Cast steel, stainless steel, duplex stainless steel
Connection Type: Flange
Actuation Type: Pneumatic

概述

D643Y 气动法兰式硬密封蝶阀是一种通过高强度合金钢板焊接而成的蝶板，绕其圆形阀杆旋转 90° 以实现流体的开启、关闭和流量调节的阀门。其阀杆轴线位于管道中心线位置，属于中线型结构，密封副由金属材料对金属材料构成。阀门采用法兰式连接，即阀体两端带有与管道法兰标准相匹配的连接法兰，通过螺栓螺母与管道法兰直接紧固连接。密封结构采用多层次金属硬密封技术，利用多层不锈钢片与石墨等材料复合而成的密封圈，在弹性力与介质压力的作用下实现可靠密封，具备耐高温、耐磨损、抗腐蚀等特点。该阀门通过气动装置驱动阀杆旋转 90° ，可实现对管道流体的快速切断与精确调节，并可选配电磁阀、限位开关等附件，实现远程自动化控制。

Overview

The D643Y Pneumatic Flanged Hard Seal Butterfly Valve is a valve in which the disc, fabricated from high-strength alloy steel plates through welding, rotates 90° around its circular shaft to achieve fluid opening, closing, and flow regulation. Its shaft axis is located at the centerline of the pipeline, classifying it as a concentric (centerline) type structure, with the sealing pair consisting of metal-to-metal materials. The valve features a flanged connection, meaning both ends of the valve body are equipped with connecting flanges that match the pipeline flange standards, allowing direct fastening to the pipeline flanges using bolts and nuts. The sealing structure employs multi-layer metal hard seal technology, utilizing a seal ring composed of multiple layers of stainless steel sheets compounded with materials like graphite to achieve reliable sealing under the action of elastic force and medium pressure, offering characteristics such as high-temperature resistance, wear resistance, and corrosion resistance. This valve is operated by a pneumatic actuator that rotates the shaft 90° , enabling rapid shut-off and precise regulation of the pipeline fluid. Accessories such as solenoid valves and limit switches can be optionally configured for remote automated control.



D643Y 硬密封气动蝶阀产品图

Product Image of D643Y Hard-Sealing Pneumatic Butterfly Valve

特点

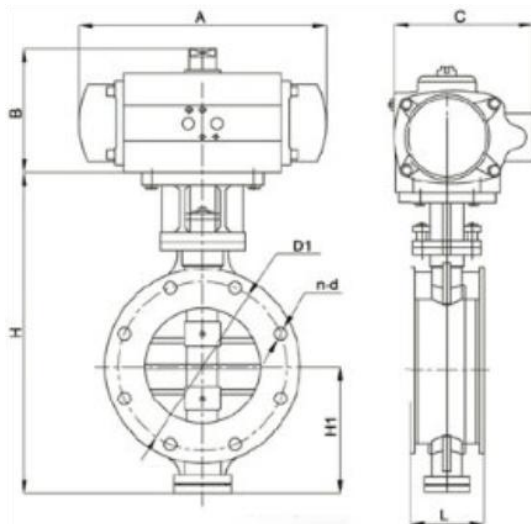
- 1、结构紧凑，承压能力强：采用法兰式连接结构，阀体刚性强，能够承受较高的管道应力和介质压力，适用于中高压工况。整体设计紧凑，重量相对较轻。
- 2、启闭迅速，操作扭矩小：采用 90° 回转启闭方式，开关迅速流畅。由于采用金属密封副，且通过多层次密封结构设计，使蝶板与阀座之间的摩擦减小，有效降低操作扭矩。
- 3、流体阻力小，节能效果显著：当阀门全开时，蝶板厚度方向与介质流向平行，对流体的阻挡极小，压力损失接近于零，具有良好的节能效果。
- 4、密封性能可靠，耐高温磨损：采用多层次金属硬密封结构，密封副由不锈钢与耐温合金材料组成，通过弹性变形实现零泄漏密封。该结构耐高温、耐磨损、抗冲刷，使用寿命长。
- 5、维护方便，检修成本低：阀体采用整体式或对分式设计，便于内部密封件的检查和更换。密封圈采用可更换结构，无需整体拆卸阀门即可进行现场维护，有效降低检修成本。
- 6、适用工况广泛：阀体可选用碳钢、不锈钢等材质，密封面可堆焊硬质合金或喷涂耐磨材料，能够适用于高温、高压、腐蚀性等苛刻工况，广泛应用于石油、化工、冶金、电力等行业的管道系统。

Features

- 1、Compact Structure, High Pressure Resistance: Featuring a flanged connection structure, the valve body possesses high rigidity, enabling it to withstand significant pipeline stress and medium pressure, making it suitable for medium to high-pressure conditions. The overall design is compact and relatively lightweight.
- 2、Quick Opening and Closing, Low Operating Torque: Employing a 90° rotary operation, the valve opens and closes rapidly and smoothly. The metal sealing pair, enhanced by a multi-layer sealing structure design, reduces friction between the disc and the seat, effectively lowering the operating torque.
- 3、Low Fluid Resistance, Significant Energy Saving: When the valve is fully open, the thickness direction of the disc aligns parallel to the flow direction of the medium, creating minimal obstruction to the fluid. The pressure loss approaches zero, offering excellent energy-saving benefits.
- 4、Reliable Sealing Performance, High Temperature and Wear Resistance: Utilizing a multi-layer metal hard seal structure, the sealing pair consists of stainless steel and temperature-resistant alloy materials. Zero-leakage sealing is achieved through elastic deformation. This structure is resistant to high temperatures, wear, and erosion, ensuring a long service life.

5、Easy Maintenance, Low Inspection and Repair Costs: The valve body features an integral or split design, facilitating easy inspection and replacement of internal sealing components. The seal ring is designed to be replaceable, allowing for on-site maintenance without needing to disassemble the entire valve, effectively reducing maintenance costs.

6、Wide Applicability: The valve body can be made from materials like carbon steel or stainless steel. The sealing surface can be overlaid with hard alloy or sprayed with wear-resistant materials. This allows the valve to be suitable for demanding conditions involving high temperatures, high pressures, and corrosive media. It is widely used in pipeline systems across industries such as petroleum, chemical, metallurgy, and power.



D643Y 硬密封气动蝶阀结构图

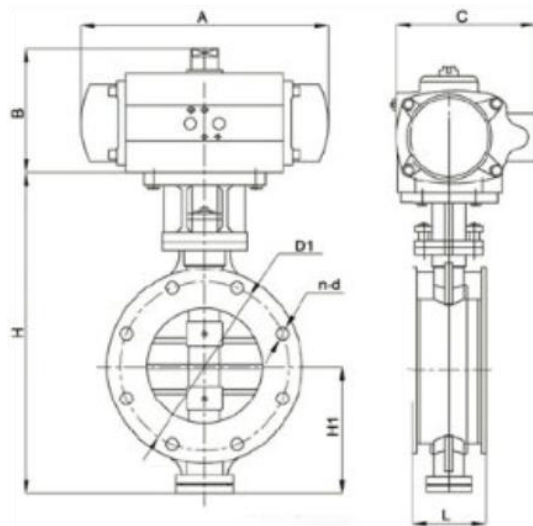
Structural Diagram of D643Y Hard-Sealing Pneumatic Butterfly Valve

零部件名称材料表 Part Name

名称 name	材料 Materials
阀体 body	铸钢、不锈钢、双相不锈钢 Cast steel, stainless steel, duplex stainless steel
蝶板 disc	WCB 碳钢 / 合金钢 / 不锈钢 WCB Carbon Steel / Alloy Steel / Stainless Steel
阀杆 stem	2Cr13 不锈钢 / 合金钢 2Cr13 Stainless Steel / Alloy Steel
密封圈 Sealing Ring	不锈钢圈 Stainless Steel Ring
填料 packing	柔性石墨 Flexible Graphite
螺栓 Bolt	碳钢 Carbon Steel
气动执行器 Pneumatic actuator	铝合金+ 碳钢 Aluminum Alloy + Carbon Steel

性能规范表 Performance Specification Table

性能规范表 Performance Specification Table		
公称压力 Nominal Pressure	1.0/1.6/2.5	MPa
强度试验压力 Strength Test Pressure	1.5/2.4/3.75	
密封试验压力 Seal Test Pressure	1.1/1.76/2.75	
适用温度 Applicable Temperature	≤550	℃



D643Y 硬密封气动蝶阀外形尺寸图

D643Y Hard Seal Pneumatic Butterfly Valve Overall Dimension Drawing

D643Y 硬密封气动蝶阀外形尺寸表

D643Y Hard Seal Pneumatic Butterfly Valve overall dimension table

公称通径 Nominal Diameter (DN)	主 要 尺 寸 Main Dimensions			法兰尺寸和螺栓规格 Flange Dimensions and Bolt Specifications								
				1.0 MPa			1.6 MPa			2.5 MPa		
	L	H1	H	D	D1	n-Φd	D	D1	n-Φd	D	D1	n-Φd
50	108	350	112	165	125	4-18	165	125	4-18	165	125	4-18
65	112	370	115	185	145	4-18	185	145	4-18	185	145	8-18
80	114	380	120	200	160	4-18	200	160	8-18	200	160	8-18
100	127	420	138	220	180	8-18	220	180	8-18	235	190	8-22
125	140	460	164	250	210	8-18	250	210	8-18	270	220	8-26
150	140	555	175	285	240	8-22	285	240	8-22	300	250	8-26

200	152	760	200	340	295	8-22	340	295	12-22	360	310	12-26
250	165	830	243	395	350	12-22	405	355	12-26	425	370	12-30
300	178	895	250	445	400	12-22	460	410	12-26	485	430	16-30
350	190	950	280	505	460	16-22	520	470	16-26	555	490	16-33
400	216	1190	305	565	515	16-26	580	525	16-30	620	550	16-36
450	222	1255	350	615	565	20-26	640	585	20-30	670	600	20-36
500	229	1305	380	670	620	20-26	715	650	20-33	730	660	20-36
600	267	1340	445	780	725	20-30	840	770	20-36	845	770	20-39
700	292	1520	480	895	840	24-30	910	840	24-36	960	875	24-42
800	318	1710	530	1015	950	24-33	1025	950	24-39	1085	990	24-48
900	330	1810	580	1115	1050	28-33	1125	1050	28-39	1185	1090	28-48
1000	410	1960	650	1230	1160	28-36	1255	1170	24-42	1320	1210	28-58
1200	470	2250	760	1455	1380	32-39	1485	1390	32-48	1530	1420	32-56

D643Y 硬密封气动蝶阀安装与维护须知

一、 安装说明

安装前检查：

核对阀门型号、口径、压力等级及介质流向是否与管路设计要求一致。

检查阀门外观，确保运输过程中阀体、法兰密封面及蝶板无损伤。清除阀腔内及蝶板密封面的保护物和杂物。

手动操作蜗轮机构或驱动方榫，确认蝶板启闭灵活、无卡阻。安装前建议将蝶板调整至微开状态（约 10%-15% 开度）。

检查气动执行机构及附件（电磁阀、限位开关、过滤减压阀等）是否完好，气源压力是否符合要求。

安装位置与方向：

阀门可安装于水平或垂直管道上，安装位置应便于观察、操作和维护。

注意阀体或法兰上的箭头指示方向，确保其与介质设计流向一致。硬密封蝶阀通常设计为双向密封，但最佳密封效果与流向有关，应遵循产品标识。

管道对接要求：

阀门采用法兰式连接，需使用标准管道法兰进行安装。安装前应确保管道法兰端面平行、对中，严禁通过强行拧紧螺栓校正管道法兰间的错位或间隙，以免阀体变形导致密封失效。

安装时，将阀门置于两片法兰之间，放入法兰垫片（如需），插入连接螺栓后，采用对角、分步、均匀的方式拧紧螺母，确保阀门受力均匀。

气动执行机构安装与调试：

阀门出厂时通常已将执行机构安装完毕。如需现场拆装，应在阀门管道安装就位后进行。确保执行机构输出轴与阀杆对中，连接牢固可靠。

接通气源前，应将手动操作装置（如手动机构）切换至空挡或释放位置。

依据执行机构说明书进行供气压力和行程的调试设定。通过调整限位螺栓，确保阀门能够达到全开和全关位置。

安装电磁阀、定位器等控制附件，并进行动作测试，验证开关信号与阀门位置对应正确。

二、使用与操作说明

开启与关闭：

首次使用或长期停用后重新启用时，建议在低压或无介质状态下，缓慢进行数次全开全关操作，以磨合密封面并确认动作正常。

正常操作时应平稳启闭，避免冲击。使用气动执行机构时，应确保气源压力稳定，控制信号准确。

开度调节：

若配备定位器，本阀门可用于调节流量，通过控制气源信号实现蝶板旋转角度的精确控制，实现流量调节。若长期处于部分开启的调节状态，建议定期进行全行程开关操作，以防密封面局部磨损或介质沉积结垢影响密封与操作。

注意事项：

用于高温工况时，冷态安装并首次通入热介质后，需对法兰螺栓进行热态再紧固，防止因热膨胀差异引起泄漏。

如介质中含有固体颗粒或纤维，应采取过滤措施或评估其对密封面的磨损风险。

严禁在带压状态下拆卸阀门或执行机构。

三、维护与保养说明

日常维护：

定期检查阀门外部及法兰连接处有无泄漏。

保持阀杆及传动部件清洁，并按需对阀杆密封处、执行机构传动部件等加注适量润滑脂。

检查气源处理系统（过滤减压阀）是否正常工作，定期排放过滤器积水。

检查各气动接头及管路有无漏气现象。

定期检查：

根据使用频率与工况条件，建议每 6-12 个月进行一次全面检查。

检查内容包括：密封面磨损情况、阀杆转动是否灵活、法兰螺栓是否松动、阀杆填料密封处是否泄漏、O 型圈等密封件是否老化。

检查执行机构运行状态：开关动作是否到位、动作是否平稳、有无异常声响。

存放要求：

阀门长期存放时，应处于微开状态（避免密封面长期受压粘连），并装好两端法兰保护盖。

存放于干燥、通风的室内环境中，避免阳光直射、雨淋及腐蚀性气氛。

气动执行机构接口应用封堵盖保护，防止灰尘、异物进入。

故障与处理：

泄漏：

阀座密封面泄漏：检查蝶板是否关到位；检查密封面是否损坏或有异物；检查执行机构行程限位是否调整正确。

阀杆处泄漏：检查填料压盖是否松动；检查填料是否磨损或老化；需均匀压紧压盖或更换填料。

法兰连接处泄漏：检查法兰螺栓是否均匀紧固；检查法兰垫片是否损坏。

操作故障:

阀门不动作: 检查气源压力是否正常; 检查电磁阀是否得电或工作正常; 检查是否有机卡阻。

动作不到位: 检查执行机构行程调整是否正确; 检查气源压力是否充足; 检查是否有内部异物卡阻。

动作迟缓: 检查过滤减压阀是否堵塞; 检查气源管路是否通畅; 检查执行机构内部是否漏气。

扭矩过大或有异响: 检查是否有内部卡阻或异物堆积; 检查润滑是否充分; 检查轴承或阀杆是否损坏。

如需更换密封圈、阀杆等内部零件, 或遇到无法排除的故障, 建议联系专业人员或生产厂家处理。

重要提示:

本说明为通用性技术指导, 适用于常规工况。若用于特殊介质(如强腐蚀、易燃易爆、超低温等)、关键安全系统或极端参数场合, 必须严格遵循相关行业规范及制造商的专项技术协议进行操作与维护。

D643Y Hard Seal Pneumatic Butterfly Valve Installation and Maintenance Instructions**I. Installation Instructions****Pre-Installation Inspection:**

Verify that the valve model, nominal diameter, pressure rating, and flow direction markings match the pipeline design requirements.

Inspect the valve exterior to ensure no damage occurred to the body, flange sealing surfaces, or disc during transport. Remove any protective coatings and debris from the valve interior and disc sealing surfaces.

Manually operate the worm gear mechanism or drive square to confirm the disc opens and closes smoothly without binding. It is recommended to position the disc slightly open (approx. 10-15% opening) before installation.

Check that the pneumatic actuator and accessories (solenoid valve, limit switches, filter regulator, etc.) are intact and that the air supply pressure meets the requirements.

Installation Position and Orientation:

The valve can be installed in horizontal or vertical pipelines. The installation location should facilitate inspection, operation, and maintenance.

Pay attention to the direction arrow indicated on the valve body or flange, ensuring it aligns with the intended medium flow direction. Hard seal butterfly valves are often designed for bidirectional sealing, but optimal sealing performance may relate to flow direction; always follow the product labeling.

Pipeline Connection Requirements:

This valve features a flanged connection and must be installed using standard pipeline flanges. Before installation, ensure the pipeline flange faces are parallel and aligned. Do not attempt

to correct misalignment or gaps between pipeline flanges by over-tightening bolts, as this can deform the valve body and cause seal failure.

During installation, position the valve between the two flanges, insert the flange gasket (if required), insert the connecting bolts, and tighten the nuts evenly in a diagonal, step-by-step pattern to ensure uniform stress on the valve.

Pneumatic Actuator Installation and Commissioning:

The actuator is typically factory-installed. If field assembly is required, it should be done after the valve is installed in the pipeline. Ensure the actuator output shaft is properly aligned and securely connected to the valve stem.

Before connecting the air supply, disengage or release any manual override devices (e.g., handwheel mechanism).

Adjust and set the supply pressure and stroke limits according to the actuator manual. Adjust the travel stop bolts to ensure the valve reaches its fully open and fully closed positions.

Install control accessories like solenoid valves or positioners, and perform function tests to verify that the open/close signals correctly correspond to the valve position.

II. Operation Instructions

Opening and Closing:

For initial use or after prolonged shutdown, it is recommended to perform several slow full-stroke operations under low or no pressure conditions to seat the sealing surfaces and confirm normal operation.

During normal operation, open and close the valve smoothly to avoid sudden impacts. When using the pneumatic actuator, ensure a stable air supply pressure and accurate control signals.

Opening Adjustment:

If equipped with a positioner, the valve can be used for flow regulation. Precise control of the disc rotation angle, and hence flow rate, is achieved by modulating the air signal.

If the valve operates in a partially open regulating state for extended periods, periodic full-stroke operation is recommended to prevent localized wear on the sealing surfaces or buildup of deposits that could affect sealing and operation.

Precautions:

For high-temperature service, after cold installation and initial introduction of hot media, re-tighten the flange bolts while hot to compensate for thermal expansion differences and prevent leaks.

If the medium contains solid particles or fibers, consider implementing filtration measures or assess the risk of abrasion to the sealing surfaces.

Never disassemble the valve or actuator while the system is under pressure.

III. Maintenance Instructions

Routine Maintenance:

Regularly inspect the valve exterior and flange connections for leaks.

Keep the valve stem and transmission components clean. Apply appropriate lubricant to the stem seal area and actuator transmission parts as needed.

Check the air preparation unit (filter regulator) for proper function and drain any accumulated water regularly.

Inspect all pneumatic fittings and tubing for air leaks.

Periodic Inspection:

Depending on service frequency and operating conditions, a comprehensive inspection is recommended every 6-12 months.

Inspection items include: Wear condition of sealing surfaces; Smoothness of stem rotation; Tightness of flange bolts; Leakage at the stem packing; Condition (aging/cracking) of seals like O-rings.

Check actuator performance: Proper stroke completion (full open/close); Smooth operation; Unusual noises.

Storage Requirements:

For long-term storage, the valve should be kept in a slightly open position (to prevent long-term compression and sticking of sealing surfaces) with protective covers installed on both flange ends.

Store in a dry, well-ventilated indoor environment, away from direct sunlight, rain, and corrosive atmospheres.

Protect pneumatic actuator ports with caps to prevent dust and foreign objects from entering.

Troubleshooting and Handling:

Leakage:

Leakage at Seat Seal: Check if the disc is fully closed; Inspect sealing surfaces for damage or debris; Verify actuator stroke limit adjustment is correct.

Leakage at Stem: Check if the packing gland is loose; Inspect packing for wear or aging; Tighten the gland evenly or replace the packing.

Leakage at Flange Connection: Check if flange bolts are uniformly tightened; Inspect the flange gasket for damage.

Operational Faults:

Valve Does Not Operate: Check air supply pressure; Verify solenoid valve is powered and functional; Check for mechanical binding.

Valve Does Not Stroke Fully: Check actuator stroke adjustment; Ensure sufficient air supply pressure; Check for internal obstructions.

Slow Operation: Check if the filter regulator is clogged; Ensure air supply lines are clear; Check actuator for internal air leaks.

Excessive Torque or Unusual Noise: Check for internal binding or debris buildup; Verify adequate lubrication; Inspect bearings or stem for damage.

For replacement of internal parts like seal rings or stems, or for faults that cannot be resolved, contact qualified personnel or the manufacturer.

Important Note:

These instructions provide general technical guidance applicable to standard conditions. For special media (e.g., highly corrosive, flammable, cryogenic), critical safety systems, or extreme parameters, operation and maintenance must strictly comply with relevant industry standards and the manufacturer's specific technical agreements.

非常感谢您的阅读！

Thank you very much for reading!



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