

D381X 涡轮沟槽信号蝶阀系列

D381X Turbine Grooved Signal Butterfly Valve Series

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书

Instruction Manual



开维喜阀门集团有限公司
Kaiweixi Valve Group Co., LTD.

D381X 涡轮沟槽信号蝶阀

D381X Turbine Grooved Signal Butterfly Valve

型号: D381X 规格: DN50-DN200
公称压力: PN10~PN16 适用介质: 水、泡沫混合液、油品、空气
适用温度: $\leq 80^{\circ}\text{C}$ 阀体材质: 铸铁、球铁、不锈钢
连接方式: 卡箍 驱动方式: 蜗轮
Model: D381X
Size: DN50-DN300
Nominal Pressure: PN10-PN16
Applicable Media: Water, foam concentrate mixture, oil, air
Applicable Temperature: $\leq 80^{\circ}\text{C}$
Body Material: Cast iron, ductile iron, stainless steel
Connection Type: Clamp
Drive Mode: Worm gear

概述

D381X 涡轮沟槽信号蝶阀是一种采用蜗轮蜗杆传动的沟槽连接信号阀门。其阀体为球墨铸铁，蝶板采用整体包覆橡胶设计，通过蜗轮减速机构驱动阀杆旋转 90° ，实现阀门的启闭。阀门上集成了微动开关式信号装置，当凸轮随蜗轮转动至预定位置时，会触动信号装置上的触头，从而输出“通”或“断”的电信号，以显示并反馈蝶阀的启闭状态。该阀门主要通过沟槽式卡箍与管路连接，安装时无需焊接，特别适用于消防喷淋系统等需要对阀门状态进行远程监控的场合。

Overview

The D381X turbine grooved signal butterfly valve is a grooved-connected signal valve that adopts worm gear transmission. Its body is made of ductile iron, and the disc features a fully rubber-covered design. The valve is opened and closed by the worm gear reduction mechanism driving the stem to rotate 90° . A micro-switch type signal device is integrated into the valve. When the cam rotates with the worm gear to a preset position, it trips the contacts on the signal device, thereby outputting an "ON" or "OFF" electrical signal to indicate and feed back the open/close status of the butterfly valve. The valve is mainly connected to pipelines by grooved clamps, requiring no welding during installation. It is particularly suitable for applications such as fire sprinkler systems where remote monitoring of valve status is required.



D381X 涡轮沟槽信号蝶阀产品图

Product Image of D381X Turbine Grooved Signal Butterfly Valve

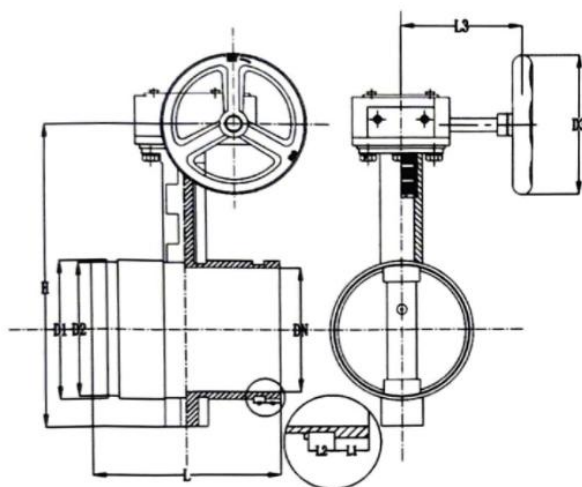
特点

1. 体积小，安装便捷：结构简单紧凑，体积小、重量轻，可在管道任意位置安装。采用沟槽卡箍连接，无需焊接和二次镀锌，安装速度比法兰连接快，综合安装成本可节省 30-50%。
2. 操作省力，启闭迅速：通过蜗轮蜗杆传动，操作扭矩小，仅需旋转 90° 即可快速完成阀门的启闭，省力轻巧。
3. 信号反馈，稳定可靠：内置微动开关式信号装置，可随阀门启闭输出稳定的“通/断”电信号，实现对阀门状态的远程监控。传感器寿命长，信号传输稳定。
4. 密封优良，寿命长久：采用高弹性 EPDM 橡胶阀座或蝶板整体包胶，密封可靠，可实现气体试验零泄漏。启闭试验次数可达数万次，使用寿命长。
5. 调节性好，双向流通：阀门流量特性趋于直线，具有良好的流量调节性能。安装时可不考虑管路介质流动方向，允许双向流动。
6. 适应性强，经久耐用：阀体采用球墨铸铁（QT450）材质，外覆粉末环氧树脂涂装，具有良好的抗腐蚀能力。适用于水、泡沫混合液等多种介质，适用温度范围为 0° C-80° C。

Features

- 1.Compact size and easy installation: Simple and compact structure, small volume, light weight, can be installed at any position on the pipeline. Adopting grooved clamp connection, no welding or secondary galvanizing required. Installation speed is faster than flange connection, and comprehensive installation cost can be saved by 30-50%.
- 2.Effortless operation and quick opening/closing: Through worm gear transmission, the operating torque is small. The valve can be quickly opened and closed by rotating 90° , which is labor-saving and light.
- 3.Stable and reliable signal feedback: Built-in micro-switch type signal device can output stable "ON/OFF" electrical signals as the valve opens and closes, enabling remote monitoring of valve status. The sensor has a long service life and stable signal transmission.
- 4.Excellent sealing and long service life: Adopting high-elasticity EPDM rubber seat or fully rubber-covered disc, the sealing is reliable and can achieve zero leakage in gas tests. The number of opening and closing tests can reach tens of thousands of times, providing a long service life.
- 5.Good adjustability and bidirectional flow: The valve flow characteristic tends to be linear, with good flow regulation performance. The direction of medium flow in the pipeline need not be considered during installation, allowing bidirectional flow.

6.Strong adaptability and durable: The valve body is made of ductile iron (QT450), coated with powder epoxy resin, providing good corrosion resistance. Suitable for various media such as water and foam mixture, with an applicable temperature range of 0° C to 80° C.



D381X 涡轮沟槽信号蝶阀结构图

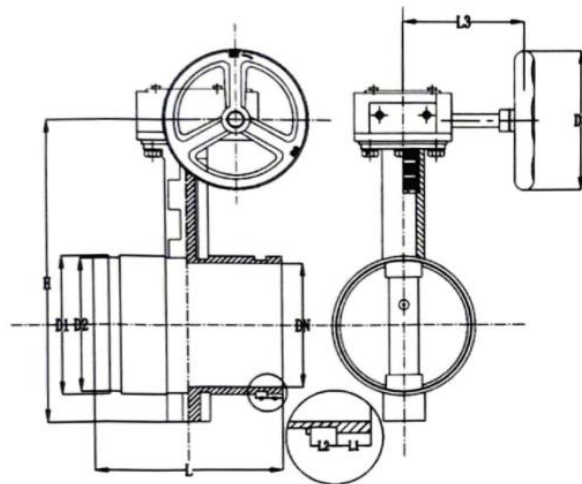
Structure Diagram of D381X Turbine Grooved Signal Butterfly Valve

零部件名称材料表 Parts Name And Material List

序号 No.	名称 Name	国家标准 National Standard	
1	阀体 Body	球铁 Ductile Iron	QT450-10
2	阀板 Disc	球铁 Ductile Iron	QT450-10
3	橡胶 Rubber	EPDM	
4	上轴 Top Shaft	不锈钢 Stainless Steel	1Cr13
5	下轴 Bottom Shaft	不锈钢 Stainless Steel	1Cr13
6	O 形圈 O-ring	丁腈 NBR (Nitrile Butadiene Rubber)	
7	定位齿盘 Positioning Ratchet Wheel	碳钢 Carbon Steel	45#
8	手柄 Handle	玛钢 Malleable Iron	
9	丝堵 Plug Screw	碳钢 Carbon Steel	45#

性能规范表 Performance Specification Table

性能规范表 Performance Specification Table		
公称压力 Nominal Pressure (PN)	1.0/1.6	MPa
强度试验压力 Strength Test Pressure	1.5/2.4	
密封试验压力 Seal Test Pressure	1.1/1.76	
适用温度 Suitable Temperature Range	≤80	℃



D381X 涡轮沟槽信号蝶阀外形尺寸图

Overall Dimension Drawing of D381X Turbine Grooved Signal Butterfly Valve

D381X 涡轮沟槽信号蝶阀外形尺寸表

Overall Dimension Table of D381X Turbine Grooved Signal Butterfly Valve

管道 公称 直径 DN	管道外径 Pipe outer diameter		管端至沟 槽边尺寸 Dimension from pipe end to groove edge	沟槽宽度 Groove width	沟径直径 C Groove diameter C		沟槽深 度 D Groove depth D	管壁最小 壁厚 T Minimum pipe wall thickness T
	实际尺 寸 Actual size	公差 Tolerance	A±0.76	B±0.76	实际尺 寸 Actual size	公差 Tolerance		

50	60.3	+0.61	-0.61	15.88	7.93	57.15	-0.38	1.58	3.6
65	73.0	+0.74	-0.74	15.88	7.93	69.09	-0.46	1.98	4.0
65	76.1	+0.76	-0.76	15.88	7.93	72.26	-0.46	1.98	4.0
80	88.9	+0.89	-0.79	15.88	7.93	84.94	-0.46	1.98	4.5
90	101.6	+1.02	-0.79	15.88	7.93	97.38	-0.51	2.11	5.0
100	108.0	+1.07	-0.79	15.88	9.53	103.73	-0.51	2.11	5.0
100	114.3	+1.14	-0.79	15.88	9.53	110.08	-0.51	2.11	5.0
125	133.0	+1.32	-0.79	15.88	9.53	129.13	-0.51	2.11	5.0
125	139.7	+1.40	-0.79	15.88	9.53	135.48	-0.51	2.11	5.0
125	141.3	+1.42	-0.79	15.88	9.53	137.03	-0.56	2.13	5.0
150	159.0	+1.60	-0.79	15.88	9.53	153.21	-0.56	2.16	5.4
150	165.1	+1.60	-0.79	15.88	9.53	160.90	-0.56	2.16	5.4
150	168.3	+1.60	-0.79	15.88	9.53	163.96	-0.56	2.16	5.4
200	219.1	+1.60	-0.79	19.05	11.10	214.40	-0.64	2.34	5.4

D381X 涡轮沟槽信号蝶阀 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、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。
- 检查并确认阀门符合现行国家标准《通用阀门标志》GB12220 的规定。
- 手动旋转蜗轮箱手轮，确认蝶板启闭灵活、无卡阻。安装前应将蝶板调整至微开状态（约 4° -5° ），以保护密封面。
- 检查信号装置是否完好，确保微动开关等电气元件无划痕、拉伤或破裂。

安装位置与方向：

- 阀门通常采用垂直安装，即阀杆处于垂直位置、手轮位于顶部。也可安装于水平管道上，但手柄不允许朝下。
- 安装位置应保证使用、维修和更换的方便。
- 本阀安装时可不考虑管路介质流动的方向，允许双向流动。
- 注意保护内腔密封面及信号装置，不得造成划伤或损坏。

管道对接要求：

- 阀门采用沟槽式（卡箍）连接，无需焊接，安装速度快捷。
- 安装时要求两边管段接口与阀门必须处于同心状态，如有偏差可能影响阀门的启闭功能。
- 阀门与管段连接稍有偏差时，沟槽结构可在一定角度范围内自动校正不同轴产生的误差。
- 连接配件时必须确保紧密牢固，安装位置与高度应符合设计要求。

搬运与存放:

- 传动结构、手轮以及手柄不能作为吊装点使用，搬运时请勿碰撞。
- 阀门安装前应存放在室内干燥处，阀板保持在微开状态。
- 重量较大的蝶阀，应设置牢固的基础。

驱动装置安装:

- 若配备电动或气动执行机构，应在阀门管道安装就位后再行安装。确保执行机构输出轴与阀杆对中，连接牢固可靠。
- 安装后应按执行机构说明书进行行程和扭矩的调试设定。
- 带有旁通阀的蝶阀，开启前应先打开旁通阀。

二、使用与操作说明

开启与关闭:

- 启闭阀门时不宜用力过大，否则可能损坏蜗轮轮齿或造成阀门损伤。
- 启闭手柄式阀门时必须夹紧手柄再作推移运动。
- 手动阀门全开后，应再回半圈或一圈，避免过紧损伤阀门。
- 不得使用大 F 扳手或加长套管帮助开启小口径手动阀门。
- 若阀门发现关闭不严时，可少开让介质流过阀门一会，将杂质冲刷掉，即可关闭严密。

首次使用:

- 建议在低压或介质未充满管道状态下，缓慢进行数次全开全关操作，以磨合密封面。
- 安装后、管道进行密封试压前，应将阀门蝶板完全打开，把管道内腔冲洗干净，否则将造成蝶阀关闭不严。
- 不可用蝶阀当调节门长期处于微小开度工作，以免引起冲刷磨损造成阀门不严密。

信号功能使用:

- 本阀通过蜗轮、蜗杆传动，凸轮随蜗轮转动到预定位置时，将信号装置上的触头放开或压下，相应输出“通”或“断”的电信号，显示阀门的启闭状态。
- 信号阀从全开到关闭过程中，输出“通”信号转换为“断”信号的转换点流量应大于等于全开流量的 80%。
- 定期检查信号装置的触点接触情况，确保信号输出正常。

开关操作注意事项:

- 讲解两个串联阀门，开启时要先全开一次门，后开二次门；关闭时要先关二次门，后关一次门。
- 正确使用小旁路门进行暖管和均衡压力。
- 运行中的阀门盘根有微小泄漏时应及时发现并通知有关人员处理。
- 电动阀门过力矩后，应通知热工及检修人员处理，不可强行打为手动进行启闭。

三、维护与保养说明

日常维护:

- 定期检查阀门外部及沟槽连接处有无泄漏。

- 保持阀杆及传动部件清洁，并按需对蜗轮传动机构等加注适量润滑脂。
- 检查信号装置及相关线路的运行状态是否正常。
- 经常检查疏水门，确保关闭严密。
- 阀门加关时不应过死，以防对阀门造成损伤。

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。
- 至少每月进行一次清洗和润滑（若经常使用）。
- 检查内容包括：密封面磨损情况、阀杆转动是否灵活、沟槽卡箍是否松动、O 型圈等密封件是否老化。
- 检查信号装置的触点接触电阻（应小于 0.01Ω ）和绝缘电阻（应大于 $2M\Omega$ ）。

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。

故障与处理：

- 泄漏：检查蝶板是否关到位；检查密封面是否损坏或有异物；检查沟槽卡箍是否均匀紧固。
- 操作扭矩过大：检查是否有内部卡阻或异物堆积；检查润滑是否充分；检查蜗轮机构是否损坏。
- 信号异常：检查微动开关是否损坏；检查凸轮位置是否偏移；检查线路连接是否正常。
- 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。

四、 安全注意事项

1. 严禁将手轮、手柄作为起吊点使用，搬运时应轻拿轻放，避免碰撞。
2. 安装时两端管段必须与阀门保持同心状态，否则会影响阀门正常启闭。
3. 手柄安装后不允许朝下，以免影响操作安全性。
4. 阀门在搬运及安装过程中应注意保护内腔密封面及微动开关，不得有划痕、拉伤、破裂等影响密封性能和电信号系统正常工作的损伤。
5. 安装后试压前必须彻底冲洗管道并将阀门完全打开，防止杂质损坏密封面。
6. 启闭阀门时力矩不宜过大，防止损坏蜗轮轮齿或阀门内部结构。
7. 运行中若发现电动阀门过力矩，禁止强行操作，应及时通知专业人员处理。

重要提示：

本说明为通用性技术指导，适用于常规工况（清水、消防泡沫混合液，工作温度 4°C - 75°C ）。若用于特殊介质（如强腐蚀性、易燃易爆、含固体颗粒等）、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。用于固体物料（如水泥、石粉等）时，应注意颗粒对密封面的磨损问题。

D381X Turbine Grooved Signal Butterfly Valve Installation and Maintenance Instructions

I. Installation Instructions

Pre-installation Check:

- Verify that the valve model, bore diameter, and pressure rating conform to the piping design requirements.
- Inspect the valve appearance to ensure no damage to the valve body, sealing surface, or disc during transport. Remove protective materials and debris from the valve cavity and disc sealing surface.
- Check and confirm that the valve complies with the current national standard "General Valve Marking" GB12220.
- Manually rotate the worm gear handwheel to confirm that the disc opens and closes flexibly without sticking. Before installation, adjust the disc to a slightly open position (approx. 4° - 5°) to protect the sealing surface.
- Check that the signal device is intact, ensuring that electrical components such as micro switches are free of scratches, tears, or cracks.

Installation Position and Direction:

- The valve is typically installed vertically, i.e., with the stem in a vertical position and the handwheel at the top. It can also be installed on horizontal pipelines, but the handle must not point downward.
- The installation position shall allow easy operation, maintenance, and replacement.
- This valve allows bidirectional flow; the direction of medium flow in the pipeline need not be considered during installation.
- Take care to protect the internal sealing surface and signal device from scratches or damage.

Pipeline Connection Requirements:

- The valve uses grooved (clamp) connection, requiring no welding and allowing fast installation.
- The connecting ends of both pipe sections must be concentric with the valve; any deviation may affect the valve's opening and closing function.
- If there is a slight misalignment between the valve and pipe sections, the grooved structure can automatically correct the error caused by misalignment within a certain angular range.
- Ensure that all connection fittings are tight and secure, and that the installation position and height meet design requirements.

Handling and Storage:

- Do not use the transmission structure, handwheel, or handle as lifting points. Avoid impact during handling.
- Before installation, store the valve indoors in a dry place, keeping the disc in a slightly open position.
- Heavier butterfly valves shall be installed on a firm foundation.

Actuator Installation:

- If equipped with an electric or pneumatic actuator, install it after the valve has been properly positioned on the pipeline. Ensure the actuator output shaft is aligned with the valve stem and that the connection is secure.

- After installation, perform stroke and torque adjustments according to the actuator manual.
- For butterfly valves with a bypass valve, open the bypass valve before opening the main valve.

II. Operation Instructions

Opening and Closing:

- Do not use excessive force when opening or closing the valve, as this may damage the worm gear teeth or the valve.
- When opening or closing a lever-operated valve, firmly grip the handle before moving it.
- After fully opening a manual valve, turn it back half a turn or one full turn to avoid over-tightening and damaging the valve.
- Do not use a large F-wrench or an extension sleeve to operate small-diameter manual valves.
- If the valve does not close tightly, open it slightly to allow the medium to flow through for a while to flush away debris, then close it again.

First Use:

- It is recommended to perform several slow full-open and full-close cycles under low pressure or with the pipeline not fully filled with medium to break in the sealing surfaces.
- After installation and before pressure testing the pipeline for leaks, fully open the valve disc and flush the pipeline interior thoroughly; otherwise, the butterfly valve may not close tightly.
- Do not use the butterfly valve as a control valve for extended periods at a very small opening, as this may cause erosion wear and lead to improper sealing.

Using the Signal Function:

- This valve uses worm gear transmission. When the cam rotates with the worm gear to a preset position, it releases or depresses the contacts on the signal device, correspondingly outputting an "ON" or "OFF" electrical signal to indicate the valve's open/close status.
- During the closing stroke from fully open to fully closed, the flow rate at which the signal valve's output switches from "ON" to "OFF" shall be not less than 80% of the fully open flow rate.
- Regularly check the contact condition of the signal device to ensure normal signal output.

Precautions for Switching Operation:

- For two valves in series: when opening, fully open the primary valve first, then open the secondary valve; when closing, close the secondary valve first, then close the primary valve.
- Use the small bypass valve correctly for pipe warming and pressure equalization.
- If a slight leak occurs at the valve gland during operation, detect it promptly and notify the appropriate personnel for handling.
- If an electric valve experiences an over-torque condition, notify the instrumentation and maintenance personnel for handling; do not forcibly switch to manual operation to open or close the valve.

III. Maintenance Instructions

Routine Maintenance:

- Regularly check the valve exterior and the grooved connections for leaks.
- Keep the stem and transmission components clean, and apply appropriate lubricant to the worm gear mechanism as needed.
- Inspect the operating status of the signal device and related wiring.
- Frequently check drain valves for tight shut-off.
- Do not force the valve closed beyond its normal limit to avoid damage.

Periodic Inspection:

- Depending on service frequency and operating conditions, a comprehensive inspection is recommended every 6 to 12 months.
- Perform cleaning and lubrication at least once a month (if used frequently).
- Inspection items include: wear condition of sealing surfaces, smoothness of stem rotation, looseness of grooved clamps, and aging of sealing components such as O-rings.
- Measure the contact resistance (should be less than 0.01Ω) and insulation resistance (should be greater than $2M\Omega$) of the signal device contacts.

Storage Requirements:

- When the valve is to be stored for an extended period, keep it in a slightly open position (to prevent the sealing surfaces from sticking due to prolonged pressure) and install protective covers on both ends.
- Store indoors in a dry, well-ventilated environment, avoiding direct sunlight, rain, and corrosive atmospheres.

Troubleshooting:

- Leakage: Check whether the disc is fully closed; check whether the sealing surface is damaged or has foreign matter; check whether the grooved clamps are evenly tightened.
- Excessive operating torque: Check for internal obstruction or debris buildup; check whether lubrication is adequate; check whether the worm gear mechanism is damaged.
- Signal abnormality: Check whether the micro switch is damaged; check whether the cam position has shifted; check whether the wiring connections are normal.
- If it is necessary to replace internal parts such as sealing rings or the stem, or if any trouble cannot be resolved, contact a professional or the manufacturer for assistance.

IV. Safety Precautions

1. Do not use the handwheel or handle as lifting points. Handle with care during transportation to avoid impact.
2. The two pipe sections must be concentric with the valve during installation; otherwise, normal opening and closing of the valve may be affected.
3. After installation, the handle must not point downward, as this may affect operational safety.
4. During handling and installation, take care to protect the internal sealing surface and micro switches. Do not cause scratches, tears, cracks, or other damage that could affect sealing performance or the proper functioning of the electrical signal system.

5. After installation and before pressure testing, thoroughly flush the pipeline and fully open the valve to prevent debris from damaging the sealing surface.
6. Do not apply excessive torque when opening or closing the valve to avoid damaging the worm gear teeth or internal valve structures.
7. If an over-torque condition is observed on an electric valve during operation, do not force operation; promptly notify professional personnel for handling.

Important Note:

These instructions are general technical guidance applicable to conventional operating conditions (clean water, fire-fighting foam mixture, operating temperature 4° C to 75° C). For special media (e.g., highly corrosive, flammable/explosive, containing solid particles), critical safety systems, or extreme parameter applications, operation and maintenance must strictly follow the relevant industry codes and the manufacturer's specific technical agreements. For service with solid materials (such as cement, stone powder, etc.), attention must be paid to the issue of particle-induced wear on the sealing surface.

非常感谢您的阅读！

Thank you very much for reading!

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