

X44 系列三通法兰旋塞阀

X44 Series Three-Way Flanged Plug Valve

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

X44 系列三通法兰旋塞阀

型号: X44W-1.0T X44T-1.0 X44W-1.0 X44W-1.0 P/R/C

规格: DN25-DN300

公称压力: PN1.0

适用介质: 水、蒸汽、油品、硝酸类、煤气

适用温度: $\leq 250^{\circ}\text{C}$

阀体材质: 铸铜、铸铁、铬镍钛不锈钢、铬镍钼钛不锈钢、铸钢

连接方式: 法兰

驱动方式: 手动、气动、电动

Model: X44W-1.0T, X44T-1.0, X44W-1.0, X44W-1.0 P/R/C

Specification: DN25-DN300

Nominal pressure: PN1.0

Applicable medium: Water, steam, oil, nitric acid type, gas

Applicable temperature: $\leq 250^{\circ}\text{C}$

Valve body material: Cast copper, cast iron, CrNiTi stainless steel, CrNiMoTi stainless steel, cast steel

Connection method: flange

drive method: Manual, pneumatic, electric



X44 系列三通法兰旋塞阀产品图

X44 Series Three-Way Flanged Plug Valve Product Diagram

概述

X44 系列三通法兰旋塞阀是一种通过锥形或圆柱形旋塞（塞体）的旋转运动来实现流体通道的切换、分配或开启、关闭的阀门。该阀为三通式结构，旋塞上设有 L 形或 T 形介质流道，通过旋转旋塞 90 度或 180 度，使流道与阀体不同通道对齐或错位，从而实现介质的换向、合流或分流。其阀杆与旋塞为一体式或固定连接设计，操作时阀杆与旋塞同步旋转，无升降动作，填料密封位于阀杆与阀体之间，确保外密封可靠。阀体两端及侧口均采用法兰连接方式，通过螺栓与管道法兰紧固，密封可靠，拆卸方便，适用于中大口径及较高压力的管道系统。该阀门依靠旋塞与阀体密封面之间的精密配合及润滑或弹性密封材料实现密封，操作扭矩小，密封性能稳定，广泛应用于石油、化工、冶金、电力等行业的管路系统中，作为介质流向切换或分配之用。

Overview

The X44 series three-way flanged plug valve is a type of valve that switches, distributes, opens, or closes fluid passages through the rotary motion of a tapered or cylindrical plug. The valve

adopts a three-way structure, with L-shaped or T-shaped medium flow ports provided on the plug. By rotating the plug 90 or 180 degrees, the flow ports align with or become offset from different passages of the valve body, thereby achieving flow direction change, merging, or diverting. The valve stem is integrally or fixedly connected to the plug. During operation, the stem and plug rotate synchronously without any lifting motion. Packing sealing is provided between the stem and the valve body to ensure reliable external sealing. Both ends and the side port of the valve body adopt flanged connections, which are fastened to the pipeline flanges by bolts, providing reliable sealing and convenient disassembly, suitable for medium and large-diameter pipeline systems under higher pressure. The valve relies on precise fit and lubrication or resilient sealing materials between the plug and the valve body sealing surfaces to achieve sealing, offering low operating torque and stable sealing performance. It is widely used in pipeline systems of petroleum, chemical, metallurgical, power and other industries for flow direction switching or distribution purposes.

特点

1. 法兰连接, 可靠便捷: 阀体两端及侧口均采用法兰连接方式, 通过螺栓与管道法兰紧固, 密封可靠, 拆卸方便, 适用于中大口径及较高压力的管道系统。
2. 三通切换, 流道灵活: 旋塞上设有 L 形或 T 形流道, 旋转 90 度或 180 度即可完成介质的换向、合流或分流, 操作迅速。可根据工况需求实现多种流向控制。
3. 密封性能可靠: 旋塞与阀体密封面可进行精密研磨, 或采用聚四氟乙烯 (PTFE) 等弹性材料衬套, 实现良好的密封效果, 且具有自润滑性, 操作轻便。
4. 耐腐蚀与耐磨: 阀体及旋塞可根据介质选用碳钢、不锈钢、合金钢等材质, 密封面可进行硬化处理 (如堆焊硬质合金、渗氮等), 耐磨损、抗冲刷, 使用寿命长。
5. 无升降结构, 安装空间小: 阀杆与旋塞一体旋转, 无轴向位移, 整体高度较低, 适用于安装空间受限的管道系统。
6. 双向密封无流向限制: 阀门设计为双向密封, 无严格介质流向要求, 安装适应性更强。
7. 适用范围广泛: 法兰连接强度高, 适用于石油、化工、冶金、电力等行业的管路系统, 作为介质流向切换或分配之用。

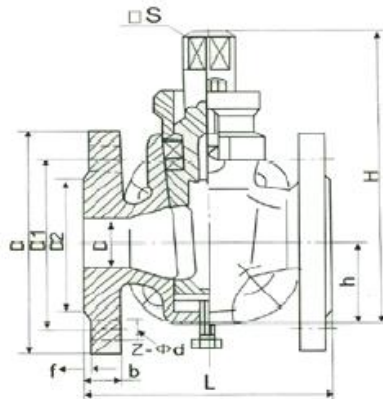
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1. Flanged Connection, Reliable and Convenient: Both ends and the side port of the valve body adopt flanged connections, which are fastened to the pipeline flanges by bolts, providing reliable sealing and convenient disassembly, suitable for medium and large-diameter pipeline systems under higher pressure.
2. Three-Way Switching with Flexible Flow Path: L-shaped or T-shaped flow ports are provided on the plug. A 90-degree or 180-degree rotation of the plug completes flow direction change, merging, or diverting, providing rapid operation. Various flow control modes can be achieved according to process requirements.
3. Reliable Sealing Performance: The sealing surfaces of the plug and valve body can be precision-lapped or lined with resilient materials such as PTFE, achieving excellent sealing effect with self-lubricating properties and smooth operation.
4. Corrosion and Wear Resistance: The valve body and plug can be made of carbon steel, stainless steel, alloy steel, or other materials depending on the medium. Sealing surfaces can be hardened (e.g., hardfacing with cemented carbide, nitriding, etc.), providing wear resistance, erosion resistance, and long service life.

5. Non-Rising Stem Design, Compact Installation Height: The stem and plug rotate as one unit without axial movement, resulting in a low overall height, suitable for pipeline systems with limited installation space.

6. Bidirectional Sealing, No Flow Direction Restriction: The valve is designed for bidirectional sealing with no strict requirement on flow direction, offering greater installation flexibility.

7. Wide Range of Applications: The flanged connection offers high strength, suitable for pipeline systems in petroleum, chemical, metallurgical, power and other industries for flow direction switching or distribution purposes.



X44 系列三通法兰旋塞阀结构图

X44 Series Three-Way Flanged Plug Valve Structural diagram

零部件名称材料表 List of Component Names and Materials

序号/No.	名称/name	材料/material
1	阀体/valve bod	铸铜、铸铁、铬镍钛不锈钢、铬镍钼钛不锈钢、铸钢/Cast copper, cast iron, CrNiTi stainless steel, CrNiMoTi stainless steel, cast steel
2	塞子/Plug	铸铜、铸铁、铬镍钛不锈钢、铬镍钼钛不锈钢、铸钢/Cast copper, cast iron, CrNiTi stainless steel, CrNiMoTi stainless steel, cast steel
3	填料/Packing	油浸石棉盘根、柔性石墨/Oil-impregnated asbestos packing, flexible graphite
4	填料压盖/packing gland	铸铜、铸铁、铬镍钛不锈钢、铬镍钼钛不锈钢、铸钢/Cast copper, cast iron, CrNiTi stainless steel, CrNiMoTi stainless steel, cast steel

性能规范表 Performance Specification Sheet

性能规范表 Performance Specification Sheet		
公称压力 Nominal Pressure	1.0	MPa
强度试验压力 Strength test pressure	1.5	
密封试验压力 Sealing test pressure	1.1	
适用温度 Applicable Temperature	≤250	℃

外形尺寸标准要求

- 1、阀门的结构长度按 GB/T12221 的标准
- 2、连接法兰按 GB/T17241.6 的标准

Standard requirements for external dimensions

1. The structural length of the valve shall comply with the standard of GB/T12221
2. Connecting flanges according to GB/T17241.6 standard

外形尺寸表 Outline dimension table

X44W-1.0T X44T-1.0 X44W-1.0

公称压力 Nominal pressure PN (MPa)	公称通径 Nominal diameter DN (mm)	尺 寸 Measurements (mm)							
		L	D	D1	D2	z-φd	□s	h	H
1.0	25	145	115	85	56	4×φ14	17	38	133
	32	170	135	100	78	4×φ18	18	45	152
	40	180	145	110	85	4×φ18	24	55	212
	50	200	160	125	100	4×φ18	28	74	260
	65	220	180	145	120	4×φ18	32	82	295
	80	250	195	160	135	4×φ18	40	95	327
	100	300	215	180	155	8×φ23	45	135	425
	125	350	245	210	185	8×φ23	54	154	482
	150	400	280	240	210	8×φ23	62	172	512
	200	450	335	295	265	8×φ23	75	195	605
	250	530	390	350	320	8×φ23	85	230	660
	300	580	440	400	368	8×φ23	100	263	760

X44W-1.0 P/R/C

公称 压力 Nominal pressure PN (Mpa)	公称通径 Nominal diameter DN (mm)	尺寸 measurements (mm)							
		L	D	D1	D2	Z-φd	□s	h	H
1.0	25	145	115	85	56	4×φ14	17	38	133
	32	170	135	100	78	4×φ18	18	45	152
	40	180	145	110	85	4×φ18	24	55	212
	50	200	160	125	100	4×φ18	28	74	260
	65	220	180	145	120	4×φ18	32	82	295
	80	250	195	160	135	4×φ18	40	95	327
	100	300	215	180	155	8×φ23	45	135	425
	125	350	245	210	185	8×φ23	54	154	482
	150	400	280	240	210	8×φ23	62	172	512
	200	450	335	295	265	8×φ23	75	195	605
	250	530	390	350	320	8×φ23	85	230	660
	300	580	440	400	368	8×φ23	100	263	760

第一部分：安装须知**一、 安装前准备**

核对阀门：核对设备铭牌，确认公称压力、口径及壳体材质（通常为铸钢、不锈钢或合金钢）符合设计要求。检查旋塞与阀体密封面有无划伤或锈蚀，并确认 L 形或 T 形流道与工艺要求一致。清点法兰密封垫片及法兰连接件。

管道准备：安装前必须对管道系统进行彻底吹扫或冲洗，清除管道内残留的焊渣、铁锈、油污及杂物，防止杂质进入阀腔损伤旋塞与阀体密封面。

方向与姿势：X44 阀门为三通结构，安装前应确认所需的流向切换或分配方式（L 形用于换向，T 形用于合流或分流）。为便于操作和维护，推荐水平安装并使阀杆处于垂直向上位置，手轮或执行机构应朝向便于操作的方向。法兰连接时应确保各法兰面平行对中。

Part 1: Installation Instructions**1、 Preparation before installation**

Verification: Check the valve nameplate to confirm that the nominal pressure, nominal diameter, and body material (typically cast steel, stainless steel, or alloy steel) meet the design requirements. Inspect the sealing surfaces of the plug and valve body for scratches or corrosion. Confirm that the L-shaped or T-shaped flow port matches the process requirements. Count the flange gaskets and flange fasteners.

Pipeline Preparation: Before installation, the pipeline system must be thoroughly purged or flushed to remove weld slag, rust, oil, and other debris, preventing foreign matter from entering the valve cavity and damaging the sealing surfaces between the plug and valve body.

Orientation and Position: The X44 valve has a three-way structure. Before installation, confirm the required flow direction change or distribution mode (L-shaped for diverting, T-shaped for merging or splitting). For ease of operation and maintenance, horizontal installation is recommended with the valve stem in a vertical upward position. The handwheel or actuator should face a direction convenient for operation. During flange connection, ensure that all flange faces are parallel and aligned.

二、 安装过程

吊装与对中：平稳吊装阀门，确保阀体各法兰与管道法兰自然对中，严禁强行撬动对孔。禁止以阀杆、手轮作为承力点。

位置选择：建议安装在需要改变介质流向、合流或分流的管段位置，如设备进出口、分支管路或循环系统。安装位置应留有足够的空间用于操作和检修。

支撑与仪表：大口径或重型旋塞阀需有管道独立支撑，避免阀体承受额外弯矩。为监控运行状态，建议在阀门各进出口管道上安装压力表，用于判断阀门密封性能及切换准确性。法兰连接时应使用合适的密封垫片，按对角线顺序均匀紧固螺栓。

2、 Installation process

Lifting and Alignment: Lift the valve smoothly and ensure natural alignment between each valve body flange and the corresponding pipeline flange. Forced alignment by prying is prohibited. Do not use the valve stem or handwheel as lifting or load-bearing points.

Location Selection: The valve should be installed at pipeline sections where flow direction change, merging, or diverting is required, such as equipment inlets/outlets, branch pipelines, or circulation systems. Sufficient space shall be reserved for operation and maintenance.

Supports and Instruments: Large-diameter or heavy plug valves require independent pipeline supports to prevent additional bending moments on the valve body. To monitor operating status, it is recommended to install pressure gauges on each inlet and outlet pipeline of the valve to evaluate valve sealing

performance and switching accuracy. For flange connections, use appropriate sealing gaskets and tighten bolts evenly in a diagonal sequence.

第二部分：操作与使用须知

一、初始投运：

排气与充液：缓慢开启系统介质进口阀，打开阀门高点的排气阀（如有），待介质连续稳定流出后关闭，排尽阀腔内空气。

检漏与观察：升压至工作压力后，检查阀体与管道法兰连接处、阀杆填料处有无渗漏。记录初始状态下的操作扭矩，作为运行基准值。观察并确认阀门在各切换位置下均无内漏。

二、运行监控与操作：

操作扭矩监测（科学维护依据）：定期记录阀门启闭及切换时的操作扭矩。当扭矩明显增大时，表明密封面可能发生粘连、异物卡滞或填料过紧，应及时检查处理。严禁强行操作。

切换操作：启闭或切换阀门时应缓慢转动手轮或执行机构。X44 系列三通旋塞阀通过旋转旋塞 90 度或 180 度实现介质的换向、合流或分流，各切换位置应有明显限位感。到位后勿过度施力。长期处于固定位置的阀门，建议每月进行一次全行程切换操作，防止旋塞与阀体密封面粘连或结垢。

定期检查：对于间歇使用的阀门，建议定期进行切换操作，确认阀门灵活可靠，各通道切换准确。

Part 2: Instructions for Operation and Use

I. Initial Commissioning

Venting and Filling: Slowly open the system medium inlet valve. Open the vent valve at the high point of the valve (if available) and close it after a continuous and stable flow of medium emerges, ensuring that air in the valve cavity is completely expelled.

Leak Check and Observation: Raise the pressure to the working pressure and check for leakage at the valve-body flange connections and valve stem packing. Record the initial operating torque as a baseline value. Observe and confirm that there is no internal leakage at each switching position.

II. Operation Monitoring and Handling

Torque Monitoring (Basis for Scientific Maintenance): Regularly record the operating torque when opening, closing, or switching the valve. A significant increase in torque indicates possible sticking, foreign matter obstruction, or over-tightened packing on the sealing surfaces, which should be inspected and addressed promptly. Forced operation is prohibited.

Switching Operation: Rotate the handwheel or actuator slowly when opening, closing, or switching the valve. The X44 series three-way plug valve achieves flow direction change, merging, or diverting by rotating the plug 90 or 180 degrees. A distinct limit feel should be present at each switching position. Do not over-torque when reaching the end position. For valves remaining in a fixed position for extended periods, a full-stroke switching operation is recommended once per month to prevent sticking or scaling between the plug and valve body sealing surfaces.

Periodic Inspection: For valves used intermittently, regular switching operations are recommended to confirm that the valve is flexible and reliable, and that each channel switches accurately.

第三部分：维护与保养须知

一、日常维护

外观与泄漏检查：定期巡检，检查阀体、法兰连接处、阀杆填料压盖有无锈蚀、裂纹或泄漏。如有微量外漏可适当均匀拧紧填料螺栓。检查各法兰螺栓有无松动。

仪表维护：确保各进出口压力表读数准确、灵敏。

操作灵活性检查：定期（如每月）对阀门进行全行程切换操作，确认转动灵活、无卡滞现象，各通道切换准确。

二、旋塞密封维护

安全隔离与泄压：关闭阀门各进出口的截止阀。缓慢打开下游泄放阀或系统放空口，确认阀腔压力降至零且无介质流出后，方可进行后续操作。对于高温介质，须待阀体温度降至常温后再作业。

拆卸填料压盖或阀盖：使用合适工具，均匀对角松开并卸下填料压盖螺栓或阀盖螺栓。注意保护密封面，避免划伤。

取出与检查旋塞：小心取出旋塞（如为可拆式结构）。检查旋塞与阀体密封面有无划伤、腐蚀坑点、剥落或异物粘连。检查 L 形或 T 形流道是否畅通。检查填料是否老化、变硬或失去弹性。

清洁密封面：使用软布和清洁剂擦拭密封面，清除结垢、锈蚀或粘连物。对于轻微磨损，可使用专用研磨工具进行研磨修复。严禁用硬物刮擦密封面。流道应用高压水或压缩空气吹扫干净。

检查与更换密封件：必须更换所有旧填料和密封垫片。对于衬 PTFE 等软密封结构的阀门，应检查衬套有无变形或破损，必要时更换。

回装与调试：将旋塞准确复位，确保密封面清洁并涂抹适量润滑脂（如有要求）。注意旋塞流道方向与阀体各通道的对应关系。均匀对称紧固填料压盖螺栓或阀盖螺栓。操作旋塞应转动灵活、无卡滞，各切换位置限位准确。回装后进行密封性试验，确认无内外泄漏。

Part Three: Maintenance and Care Instructions

I. Routine and Periodic Maintenance

Visual and Leak Inspection: Perform regular inspections to check for rust, cracks, or leakage at the valve body, flange connections, and valve stem packing gland. If slight external leakage occurs, evenly tighten the packing bolts as appropriate. Check for loosened flange bolts on each connection.

Instrument Maintenance: Ensure that pressure gauges on each inlet and outlet are accurate and responsive.

Operational Flexibility Check: Regularly (e.g., monthly) perform a full-stroke switching operation of the valve to confirm smooth rotation, no sticking, and accurate channel switching.

II. Plug Seal Maintenance (Core Procedure)

Safety Isolation and Depressurization: Close the shutoff valves on all inlet and outlet ports of the valve. Slowly open the downstream drain valve or system vent. Ensure that the valve cavity pressure drops to zero and no medium flows out before proceeding with subsequent operations. For high-temperature media, allow the valve body temperature to cool to ambient temperature before working.

Disassembly of Packing Gland or Valve Cover: Use appropriate tools to evenly and diagonally loosen and remove the packing gland bolts or valve cover bolts. Protect the sealing surfaces from scratches.

Removal and Inspection of Plug: Carefully remove the plug (if of a removable design). Inspect the plug and valve body sealing surfaces for scratches, corrosion pits, spalling, or foreign matter adhesion. Check whether the L-shaped or T-shaped flow ports are unobstructed. Check whether the packing has aged, hardened, or lost elasticity.

Cleaning of Sealing Surfaces: Wipe the sealing surfaces with a soft cloth and cleaning agent to remove scale, rust, or adhered matter. For minor wear, use specialized lapping tools for restoration. Do not strike or scratch the sealing surfaces with hard tools. The flow ports should be blown clean with high-pressure water or compressed air.

Inspection and Replacement of Sealing Components: All old packing and gaskets must be replaced. For soft-sealed valves with PTFE or similar liners, check whether the liner is deformed or damaged and replace if necessary.

Reassembly and Testing: Properly reposition the plug, ensuring that the sealing surfaces are clean and that an appropriate amount of lubricant (if required) is applied. Pay attention to the alignment between the plug flow port and the valve body passages. Evenly and symmetrically tighten the packing gland bolts or

valve cover bolts. The plug shall rotate smoothly without sticking, and each switching position shall have accurate limit feel. After reassembly, perform a sealing test to confirm no internal or external leakage.

三、常见故障与处理

故障现象/Fault Phenomenon	可能原因/Possible Causes	处理方法/Corrective Actions
阀门无法完全关闭，内漏严重/Valve fails to close completely; severe internal leakage	1. 旋塞与阀体密封面磨损或划伤。 2. 软密封衬套（如 PTFE）变形或破损。 3. 密封面有异物卡滞。/1. Wear or scratching of plug and valve body sealing surfaces. 2. Deformation or damage of soft seal liner (e.g., PTFE). 3. Foreign matter stuck between sealing surfaces.	1. 拆解检查密封面，进行研磨修复或更换旋塞。 2. 更换密封衬套。 3. 清洗密封面，清除异物。/1. Disassemble and inspect sealing surfaces; perform lapping or replace the plug. 2. Replace the seal liner. 3. Clean sealing surfaces to remove foreign matter.
阀杆填料处外漏/External leakage at valve stem packing	1. 填料螺栓松动。 2. 填料老化或磨损。 3. 阀杆表面划伤或腐蚀。/1. Packing bolts loose. 2. Packing aged or worn. 3. Valve stem surface scratched or corroded.	1. 均匀拧紧填料螺栓。 2. 泄压后更换新填料。 3. 修复或更换阀杆。/1. Evenly tighten packing bolts. 2. Depressurize and replace packing. 3. Repair or replace the valve stem.
操作扭矩过大，转动困难/Excessive operating torque; difficult rotation	1. 长期未操作或未及时切换，密封面粘连或结垢。 2. 填料压得过紧。 3. 阀体或旋塞变形（如过热、过压）。/1. Long period without operation or switching; sealing surfaces stuck or scaled. 2. Packing compressed too tightly. 3. Valve body or plug deformed (e.g., due to overheating or overpressure).	1. 注入润滑剂或清洗密封面，反复转动直至灵活。 2. 适当松解填料压盖。 3. 检查工况是否超限，必要时更换阀门。/1. Inject lubricant or clean sealing surfaces; rotate repeatedly until smooth. 2. Slightly loosen the packing gland. 3. Check if operating conditions exceed limits; replace valve if necessary.
流向切换不准确（三通功能异常）/Inaccurate flow switching (three-way function abnormal)	1. 旋塞未旋转到规定位置（90° 或 180°）。 2. 旋塞流道与阀体通道对位偏差。 3. 定位限位装置松动或磨损。/1. Plug not rotated to specified position (90° or 180°). 2. Misalignment between plug flow port and valve body passages. 3. Positioning stop device loose or worn.	1. 确认旋塞旋转到位。 2. 拆解检查并重新调整对位。 3. 调整或更换限位装置。/1. Confirm plug rotation is fully in position. 2. Disassemble, inspect, and realign. 3. Adjust or replace the stop device.

四、长期停用与存放

长期停用的阀门，应将其置于半开状态（约 15° ~30° 开启位）或按制造商建议的位置，避免密封面长期受压粘连。关闭系统各进出口阀门，排除阀腔内积液和压力。

对阀杆外露表面、法兰密封面等加工表面进行防锈处理（如涂防锈脂）。

阀门各进出口应用盲板或塑料盖封住，防止灰尘和异物进入阀腔。

存放在干燥、通风的室内，不得露天堆放，避免受潮和机械损伤。

3、 Long term disuse and storage

For valves taken out of service for extended periods, place them in a partially open position (approximately 15° to 30° open) or as recommended by the manufacturer to prevent long-term compression sticking of the sealing surfaces. Close all inlet and outlet valves of the system, and drain any trapped pressure and liquid from the valve cavity.

Apply rust preventive treatment (e.g., anti-rust grease) to exposed valve stem surfaces, flange sealing surfaces, and other machined surfaces.

Cover all inlet and outlet ports of the valve with blind flanges or plastic caps to prevent dust and foreign matter from entering the valve cavity.

Store in a dry, well-ventilated indoor location. Outdoor storage is not permitted. Protect from moisture and mechanical damage.

非常感谢您的阅读！

Thank you very much for reading!

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