



众源自控
Zhongyuan Automatic Control

卓而不凡 智造未来

国产精品进口替代

Extraordinary, intelligent to create the future

Domestic boutique import
substitution



因为耶和华你神领你进入美地，那地有河，有泉，有源，从山谷中流出水来。

Because the God Jehovah led you into the nice land, where there are rivers, springs and sources, and water flows from the valleys.

(申命记 8:7)

(Deuteronomy 8:7)





®

众源自控

Zhongyuan Automatic Control

®





企业简介 Company profile

浙江众源自控设备有限公司是一家融合科研、设计、开发、生产与销售于一体的现代化企业。

“众源自控”专注于 PLC 及 DCS 流体控制阀的产品运用与研发。公司秉持严格把控每一个环节、每一道工序的原则，从设计研发到生产作业的各个阶段，全方位落实质量控制，对每一处细微之处力求精益求精。让用户在使用产品的同时，深切体悟到我们追求高品质的产品理念，畅享愉悦的使用体验。

公司的主导产品涵盖高品质气动薄膜调节阀、电动调节阀、抗生素截止阀、球阀、卫生级蝶阀、隔膜阀等控制阀门，以及控制阀的驱动生产与研发。其中，齿轮齿条气动执行器、拔叉式气动执行器、电动执行器等产品备受用户赞誉。

公司严格遵循国标 (GB、JB、HG 等)、美标 (ANSI、ASME、API 等)、德标 (DIN)、日标 (JIS)、英标 (BS)、国际标准 (ISO) 等标准进行生产，还可根据用户需求进行非标定制。

“众源自控”的控制阀系列专为蒸汽及工业流体精心设计，我们提供灵活多样的控制阀解决方案。产品广泛应用于啤酒饮料、制药及医疗设备、食品加工、生物发酵、乳制品、水处理、精细化工、化工等诸多领域。

中国制造乃固国之根基，“众源自控”以专心、专注、专业的不懈努力，致力于打造品质卓越、性能非凡、使用稳定的产品，智造未来，迈向世界舞台。

三木成森，三人为众；齐心协力，万众一心，有山有水有谷是生命的繁衍之源。

“众源”，这里是美地，那地有河，有泉，有源.....

Zhejiang Zhongyuan Automation Equipment Co., Ltd. is a modern enterprise that integrates scientific research, design, development, production, and sales.

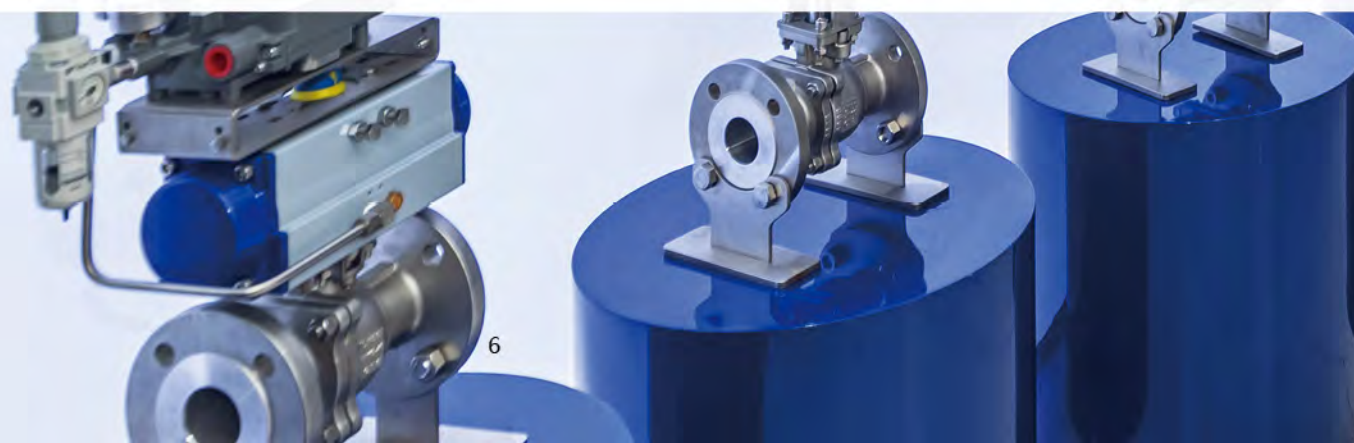
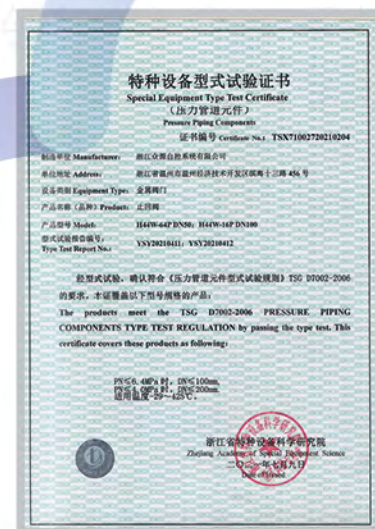
Zhongyuan Automation "focuses on the application and research and development of PLC and DCS fluid control valves. The company adheres to the principle of strictly controlling every link and process, implementing quality control in all stages from design and development to production operations, and striving for excellence in every detail. Enable users to deeply understand our pursuit of high-quality product philosophy and enjoy a pleasant user experience while using the product.

The company's leading products include high-quality pneumatic diaphragm control valves, electric control valves, antibiotic shut-off valves, ball valves, sanitary butterfly valves, diaphragm valves and other control valves, as well as the production and research and development of control valve drives. Among them, gear rack pneumatic actuators, fork type pneumatic actuators, electric actuators and other products have been highly praised by users. The company strictly follows national standards (GB, JB, HG, etc.), American standards (ANSI, ASME, API, etc.), German standards (DIN), Japanese standards (JIS), British standards (BS), international standards (ISO), etc. for production, and can also customize non-standard products according to user needs.

The control valve series of "Zhongyuan Automation" is carefully designed for steam and industrial fluids, and we provide flexible and diverse control valve solutions. The product is widely used in various fields such as beer and beverage, pharmaceutical and medical equipment, food processing, biological fermentation, dairy products, water treatment, fine chemicals, and chemical engineering.

Sanmi Chengsen, three people in a group; Working together, united as one, mountains, waters, and valleys are the source of life's reproduction.

Zhongyuan, this is Meidi, where there are rivers, springs, and active sources



铝制横式 -单作用 / 双作用气动执行器

Aluminum horizontal-single-acting/double-acting pneumatic actuator



1 产品概述 product description

该系列新型齿轮齿条式气动执行器综合了国内外最新技术，通过 CAD 三维模型创优化设计，外形美观紧凑、现代化；并采用实用新型材料、新工艺，使产品的质量、性能更加可靠；多规格选型更经济实惠；产品全面符合最新国际标准技术规范，满足现在和未来的需求。

This series of new rack-and-pinion pneumatic actuators integrate the latest domestic and foreign technology, through the CAD three-dimensional model to create an optimized design, beautiful, compact and modern appearance; and use new practical materials and new technology to make the product quality and performance more reliable; The specification selection is more economical; the products fully comply with the latest international standard technical specifications to meet current and future needs.



2

特点 Features

- 齿轮齿条双活塞对称结构设计，动作快速平稳，精度高，输出功率大，通过简单的改变活塞装配位置可得到反方向旋转。
- 挤压的优质铝合金缸体，经精密加工的内孔和外部表面进行硬质阳极氧化处理（特殊情况下阳极氧化 + 特氟隆涂层），使寿命更长，摩擦系数低。
- 一体式设计，所有的双作用和单作用执行器型号，都具有相同的缸体和端盖，很方便通过加装弹簧来改变作用方式。
- 组合式预压安全弹簧组，不论在装配过程或使用现场中，都能方便而安全的安装或增减弹簧数量。
- 外部侧面两个单独的调节螺钉对于已安装在阀门上的执行器更是精确方便，调节阀开和阀关位置，如需全程调节时则另外 2 个端盖处配置较长调螺钉。
- 多功能位置指示器，现场可视化指示，符合 VDI/VDE3845、NAMUR 标准槽，能安装并输出所有附件，如限位开关盒、电气定位器、位置传感器。
- 气源接口符合 NAMUR 标准，可直接安装 NAMUR 标准电磁阀。
- 活塞背面的复合材料轴瓦和导向环以及输出轴的轴承等，可防止金属对金属的摩擦，并且增加润滑，使其低摩擦、长寿命。
- 所有的紧固件均采用不锈钢材料，长期抗腐蚀。
- 连接部分符合国际标准规范 ISO5211, IN3337 (F03-F25) 使产品安装具有互换性、通用性。
- The rack-and-pinion double piston symmetrical structure design features fast and stable action, high precision, and large output power. The reverse rotation can be obtained by simply changing the piston assembly position.
- The extruded high-quality aluminum alloy cylinder body is hard anodized (anodized + Teflon coating in special cases) on the precision-machined inner hole and outer surface, which makes the life longer and has a low friction coefficient.
- One-piece design. All double-acting and single-acting actuator models have the same cylinder body and end cover, which makes it easy to change the mode of action by adding springs.
- The combined preloading safety spring set can be conveniently and safely installed or the number of springs can be increased or decreased during assembly or on-site use.
- Two separate adjustment screws on the external side are more precise and convenient for actuators already installed on the valve, adjusting the valve opening and closing positions. If full stroke adjustment is required, longer adjustment screws are configured at the other two end caps.
- Multifunctional position indicator, on-site visual indication, conforms to VDI/VDE3845, NAMUR standard slot, can install and output all accessories, such as limit switch box, electric positioner, position sensor.
- The air source interface complies with NAMUR standards and can be directly installed with NAMUR standard solenoid valves.
- The composite material bearings and guide rings on the back of the piston, as well as the bearings on the output shaft, can prevent metal to metal friction and increase lubrication, resulting in low friction and long life.
- All fasteners are made of stainless steel, long-term corrosion resistance.
- The connection part complies with the international standards ISO5211, DIN3337 (F03-F25), which makes the product installation interchangeable and universal.

型号编制

Flange connection standard

ZY-160 S-K10 F10/12 P27-90-B-A

⑨. 防腐等级: A、B

⑧. 环境温度: 标准型 -B, 低温型 -D, 高温型 -G

⑦. 开关角度: $0^{\circ} \sim 90^{\circ}$, $0^{\circ} \sim 120^{\circ}$, $0^{\circ} \sim 180^{\circ}$, 3P, $0^{\circ} \sim 45^{\circ} \sim 90^{\circ}$

⑥. 轴孔代号: P- 八角孔, H- 平行对边孔, W- 两个键槽孔

⑤. 连接尺寸: ISO5211 标准: 法兰尺寸, F03~F16; 八角孔尺寸, 9~46

④. 弹簧数量: K5/K6/K7/K8/K9/K10/K11/K12, 双作用无此参数



③. 作用形式: D- 双作用, S- 单作用

②. 执行器缸径: 40~300

①. ZY 系列气动执行器 常规

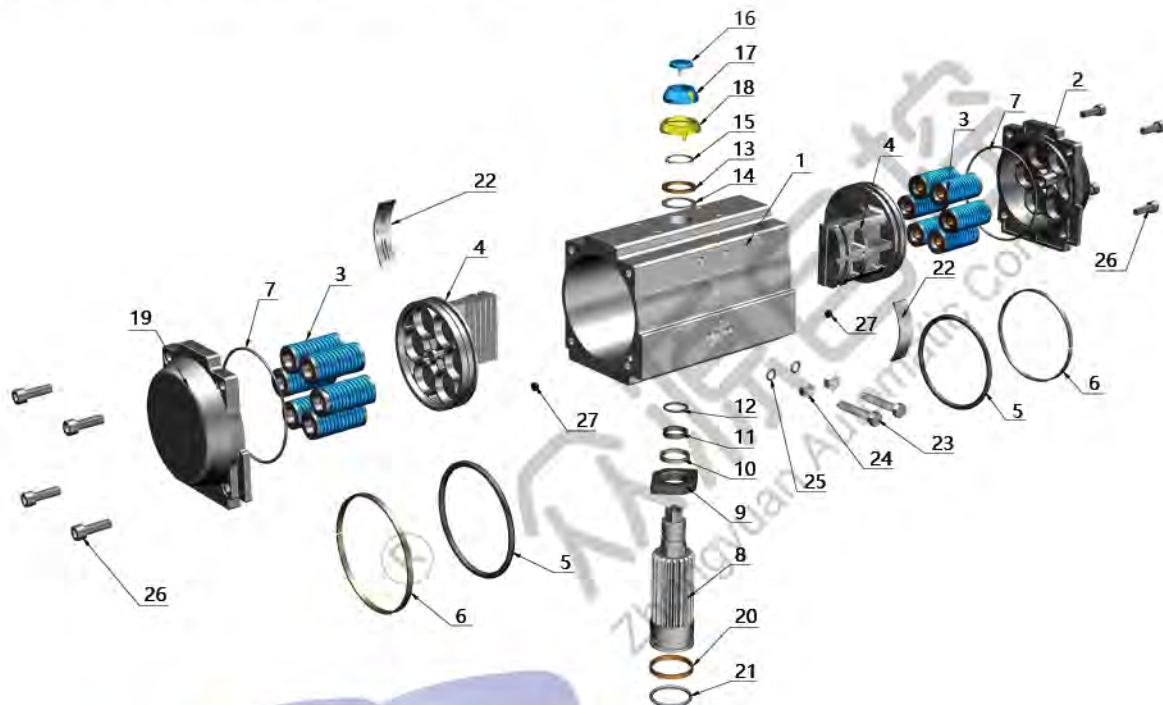
②. ZY-C 加长

③. ZY-SD 三段式

4

零部件及材料、防腐

Parts and materials, anti-corrosion



推荐维修用的零部件，包括在备件包中的零件。

Recommended repair parts, including parts in the spare parts kit.

序号	数量	名称	材质
1	1	缸体	铝合金
2	1	右端盖	铸铝合金
3	6-12	弹簧组	合金弹簧钢
4	2	活塞	铸铝合金
5	2	O 型圈 (活塞)	NBR
6	2	活塞环	复合材料
7	2	O 型圈 (端盖)	NBR
8	1	齿轮轴	304/ 碳钢镀镍
9	1	调整凸轮	20# 镀锌
10	1	推力垫片 (齿轮轴)	尼龙 46
11	1	耐磨套 (齿轮轴顶部)	尼龙 45
12	1	O 型圈 (齿轮轴顶部)	NBR
13	1	推力垫片 (齿轮轴顶部)	尼龙 46
14	1	薄平垫	304
15	1	轴用弹性挡圈	304
16	1	塑料螺钉	304+ 塑料
17	1	指示盖	塑料
18	1	角度环	塑料
19	1	左端盖	铸铝合金
20	1	耐磨套 (齿轮轴底部)	尼龙 45
21	1	O 型圈 (齿轮轴底部)	NBR
22	1	导向轴瓦 (活塞靠背)	复合材料
23	2	调节螺栓	304
24	2	调节螺母	304
25	2	O 型圈 (调节螺丝)	NBR
26	8	内六角螺栓	304
27	2	堵头	NBR

指示盖



反馈



阀门位置指示器 ALS-200 系列产品获得: CSA、NEMA 4、NEMA 4x、IP67 认证

CT6 隔爆型阀门位置指示器 ALS-400 获得 ATEX、Exd、DIPA20 TA、T6 粉尘防爆认证

ALS-200D 马蹄型磁感阀门回讯器

定位器



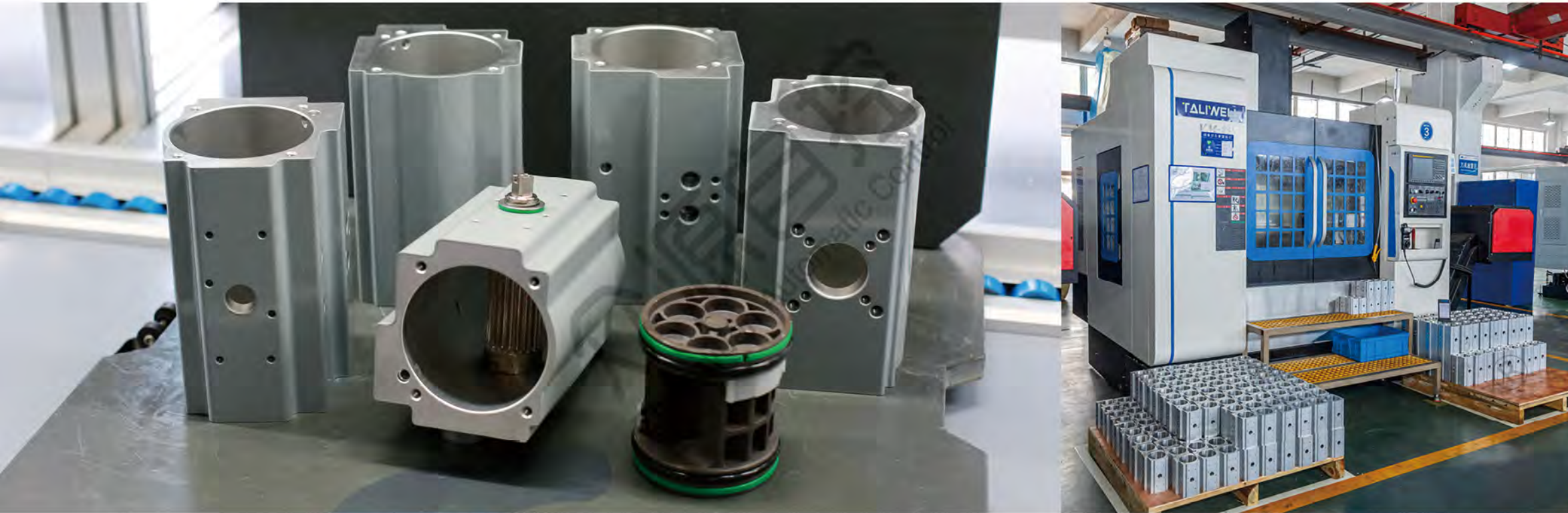
气缸



阀门



5 执行器关键生产技术节点 Key production technology nodes of actuators



执行器型材

- 铝合金 6005-T5 是一种中等强度的铝合金，主要合金元素为镁和硅。这种组合赋予了铝材出色的耐腐蚀性、焊接性和可加工性。
- 在机械性能方面，6005-T5 铝合金具有较高的抗拉强度 ($\geq 160\text{MPa}$) 和屈服强度 ($\geq 110\text{MPa}$)，以及良好的硬度，断裂伸长率也在合理范围内。这些性能使得 6005-T5 铝合金在承受较大压力和负荷时，能够保持良好的稳定性和安全性。此外，其冲击韧性高，能够有效抵抗外界冲击和振动。
- 优质的 6005-T5 型材经过加工中心加工后内表面粗糙度能达到 $Ra \leq 0.4\mu\text{m}$ ，缸体经氧化后表面硬度达到 HV500，椭圆度小于 5 丝以内，过硬的加工技术，保证了气缸的寿命能达到 30 万次以上，性能卓越的浙江众源自控设备有限公司生产的 AT 气缸，综合品质优于国外品牌。

- Aluminum alloy 6005-T5 is a medium strength aluminum alloy, with magnesium and silicon as the main alloying elements. This combination endows aluminum with excellent corrosion resistance, weldability, and processability.
- In terms of mechanical properties, 6005-T5 aluminum alloy has high tensile strength ($\geq 160\text{MPa}$) and yield strength ($\geq 110\text{MPa}$), as well as good hardness, and the elongation at break is also within a reasonable range. These properties enable 6005-T5 aluminum alloy to maintain good stability and safety under high pressure and load. In addition, it has high impact toughness and can effectively resist external impacts and vibrations.
- The high-quality 6005-T5 profile can achieve an inner surface roughness of $Ra \leq 0.4\mu\text{m}$ after being processed by a machining center. The surface hardness of the cylinder body after oxidation reaches HV500, and the ellipticity is less than 5 threads. The excellent processing technology ensures that the life of the cylinder can reach more than 300000 times. The AT cylinder produced by Zhejiang Zhongyuan Self Control Equipment Co., Ltd., which has excellent performance, has better comprehensive quality than foreign brands.

数控加工中心

- 公司积极引进先进的 CNC 加工中心，能够切实确保气缸缸体的加工精度与质量；并配备自有研发的刀具，从而为产品质量提供了坚实有力的保障。
- 高品质的产品既离不开良好的管理、先进的理念以及优秀的人才，更需要精良的设备作为支撑。浙江众源自控设备有限公司拥有相对完善的生产和检验能力，有力地保证了产品的卓越品质。
- The company actively introduces advanced CNC machining centers, which can effectively ensure the machining precision and quality of cylinder blocks; And equipped with self-developed cutting tools, providing a solid and powerful guarantee for product quality.
- High quality products not only rely on good management, advanced concepts, and excellent talents, but also require sophisticated equipment as support. Zhejiang Zhongyuan Automation Equipment Co., Ltd. has relatively complete production and inspection capabilities, effectively ensuring the excellent quality of its products.

椭圆度公差测量

- 首先，椭圆度直接影响气缸的密封性能。若椭圆度过大，气缸在工作时容易出现密封不严的情况，导致气体泄漏，从而降低系统的工作效率，甚至可能引发安全隐患。其次，良好的椭圆度能够确保气缸在运行过程中扭矩达到最佳水平，避免出现不顺畅现象，保障系统的稳定运行。
- 公司通过对生产技术的严格把控，将气缸小于 125 缸径的椭圆度控制在 3 丝以内，125 - 240 缸径的椭圆度控制在 5 丝以内。
- Firstly, ovality directly affects the sealing performance of the cylinder. If the ellipse is too large, the cylinder is prone to poor sealing during operation, leading to gas leakage and reducing the efficiency of the system, and may even cause safety hazards. Secondly, good ellipticity can ensure that the torque of the cylinder reaches the optimal level during operation, avoiding any roughness and ensuring the stable operation of the system.
- The company strictly controls its production technology, keeping the ellipticity of cylinders with a diameter less than 125 within 3 threads and 125-240 within 5 threads.



缸体/活塞氧化

- 氧化铝主要成分是矾土，化学性质稳定。铝型材氧化后可防止被腐蚀，因压缩空气带水进入气缸，水中有氯离子且酸性高，若铝型材和活塞不氧化处理会快速被腐蚀致气缸损坏。氧化膜非常坚硬，耐磨性强。铝本身柔软易加工变形，表面硬度低。而氧化铝坚硬，铝阳极氧化后表面硬度可提高到 HV200 - 600 左右，膜厚超 20μm 的硬质铝阳极氧化材硬度超 HV400，可超过不锈钢，能用于轴类等滑动部件。
- The main component of alumina is bauxite, which has stable chemical properties. Oxidation of aluminum profiles can prevent corrosion, as compressed air carries water into the cylinder, which contains chloride ions and is highly acidic. If the aluminum profiles and pistons are not oxidized, they will quickly corrode and cause damage to the cylinder. The oxide film is very hard and has strong wear resistance. Aluminum itself is soft and easily deformed during processing, with low surface hardness. Aluminum oxide is hard, and the surface hardness of aluminum anodized can be increased to around HV200-600. Hard aluminum anodized materials with a film thickness of over 20 μm have a hardness of over HV400, which can exceed stainless steel and can be used for sliding parts such as shafts.

粗糙度检测

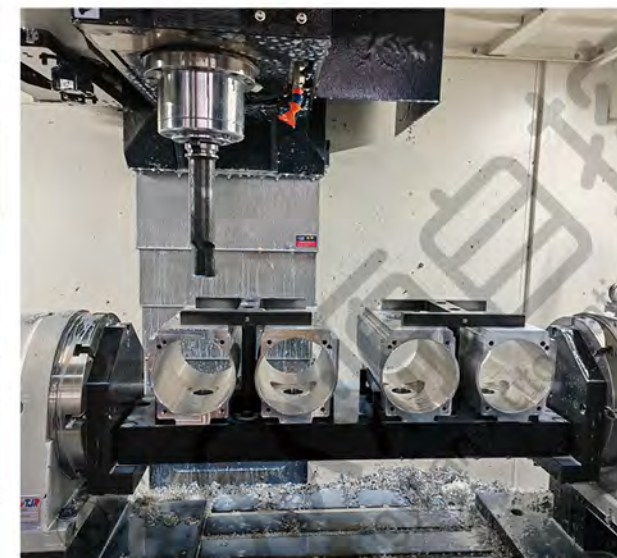
- 气缸面粗糙度要求用于衡量气缸表面平滑程度，对密封性、低摩擦性、润滑性和磨损程度有重要影响。一般气缸使用时 Ra 值在 0.2μm 至 0.63μm 之间，粗糙度应尽可能小以保证表面光滑、降低摩擦、提高密封性能。气缸内侧表面要求较高粗糙度以增加润滑膜形成、减少摩擦磨损。在制造过程中控制粗糙度可保证气缸正常运行、延长使用寿命。
- The roughness requirement of the cylinder surface is used to measure the smoothness of the cylinder surface, which has a significant impact on sealing, low friction, lubrication, and wear degree. When using a general cylinder, the Ra value should be between 0.2 μm and 0.63 μm, and the roughness should be minimized to ensure a smooth surface, reduce friction, and improve sealing performance. The inner surface of the cylinder requires high roughness to increase the formation of lubricating film and reduce friction and wear. Controlling roughness during the manufacturing process can ensure the normal operation of the cylinder and extend its service life.

气密性测试

- 气动执行器气密性检测的重要性
- 在于确保其正常运行和安全性，具体内容如下：
确保正常运行：气动执行器的气密性是其正常运行的关键。如果气动执行器存在气密性问题，可能会导致气压不稳定，从而影响其正常工作。通过气密性检测，可以及时发现并修复气动执行器的气密性问题，确保其安全稳定运行。
- 公司为了气动执行器全检每一只产品，自主研发连续式气动检测平台，全自动控制，并且进行 -5 度到 95 度精准调试，确保产品出厂前是合格稳定高性能的产品。

- The importance of air tightness testing for pneumatic actuators
- To ensure its normal operation and safety, the specific contents are as follows:
Ensure normal operation: The airtightness of pneumatic actuators is the key to their normal operation. If there is an air tightness issue with the pneumatic actuator, it may cause unstable air pressure, thereby affecting its normal operation. Through air tightness testing, air tightness issues of pneumatic actuators can be detected and repaired in a timely manner, ensuring their safe and stable operation.
- The company has independently developed a continuous pneumatic testing platform with fully automatic control and precise debugging from -5 degrees to 95 degrees for the full inspection of each pneumatic actuator product, ensuring that the product is qualified, stable, and high-performance before leaving the factory.

6 执行器生产设备 Actuator production equipment



高精尖的生产设备，确实是生产环节中不可或缺的重要组成部分，见证了我们品质的执着追求，先进的加工中心、精密的数控机床，以微米级的精度雕琢着产品的每一个细节，让复杂的零件加工变得轻而易举。

我们深知，只有通过严格的生产检测，才能为客户提供放心、可靠的产品。我们致力于打造高品质的产品，让每一位用户都能感受到我们的用心与诚意。

High precision and cutting-edge production equipment is indeed an indispensable part of the production process, witnessing our persistent pursuit of quality. Advanced machining centers and precision CNC machines carve every detail of the product with micrometer level precision, making complex part processing easy.

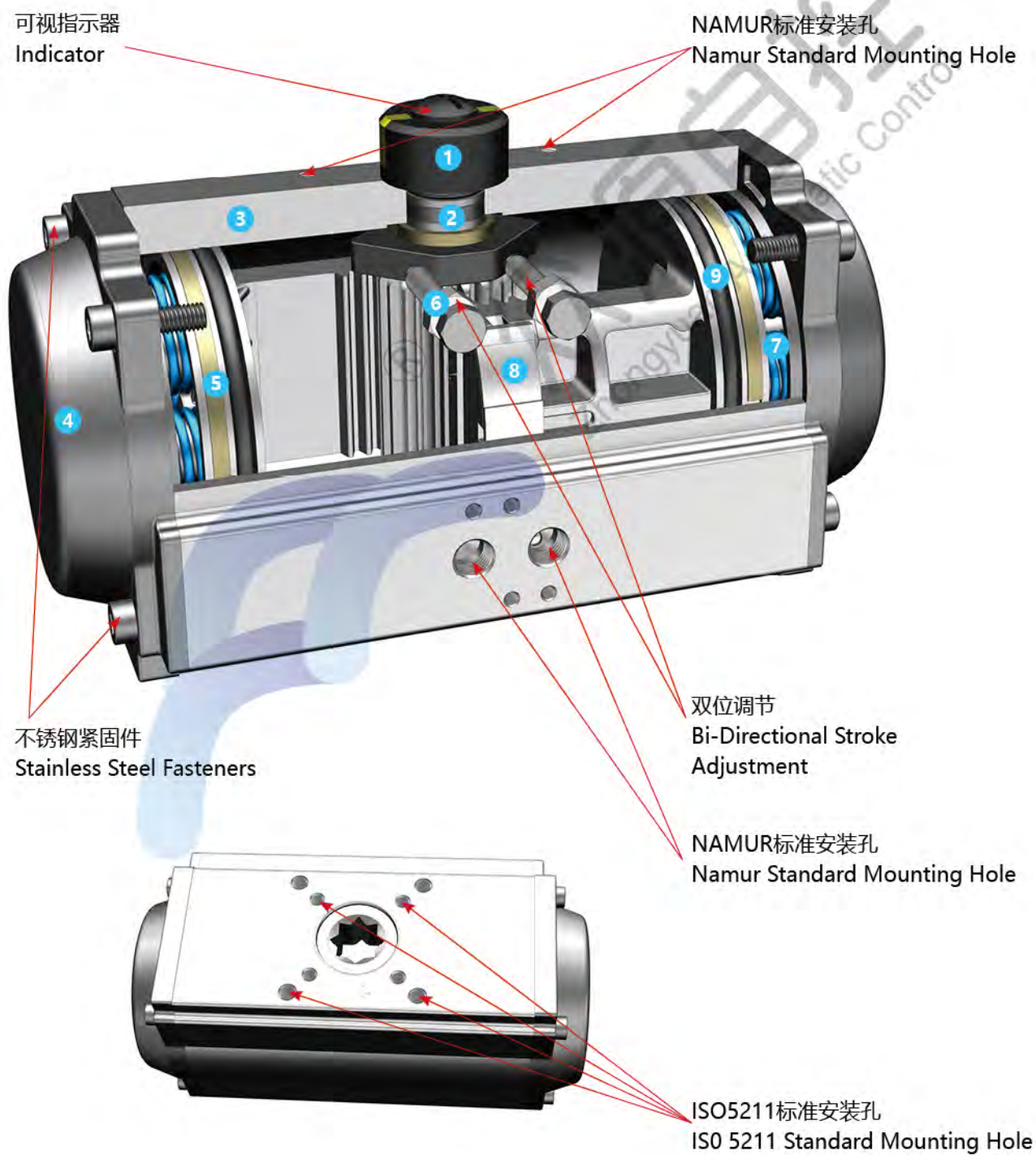
We are well aware that only through strict production testing can we provide customers with reliable and trustworthy products. We are committed to creating high-quality products, so that every user can feel our dedication and sincerity.



7

结构特点

Structure Features



1、指示器 Indicator

NAMUR 标准指示器便于安装位置开关、定位器等附件。
Position indicator with NAMUR is convenient for mounting accessories such as Limit switch, Positioner and so on.

2、输出轴 Pinion

镀镍合金钢、高精密一体式输出轴同时符合 NAMUR、ISO5211、DIN3337 标准。可根据客户要求定制尺寸和不锈钢材料。

The pinion is high-precision and integrative, made from nickel-plated alloy steel, full conform to the latest standards of ISO5211, DIN3337, NAMUR. The dimensions can be customized and the stainless steel is available.

3、缸体 Actuator Body

ASTM6005 压铸铝合金缸体可以采用硬质氧化、环氧树脂喷涂 (根据要求喷涂蓝色、橙色、黄色等)、PTFE 涂层或镀镍满足不同要求。

According to the different requirements, the Die-casting ASTM6005 Body can be treated with hard anodized, powder polyester painted (different colours is available such as blue, orange, yellow etc.), PTFE Or Nickel plated.

4、端盖 End Caps

压铸铝合金表面金属粉末喷涂各种颜色、PTFE 涂层或镀镍处理。

Die-casting aluminum powder polyester painted in different colours, PTFE or Nickel plated.

5、活塞 Pistons

双活塞齿条、采用铸铝硬质氧化或者铸钢镀锌处理, 安装位置对称、运作迅速、使用寿命长, 简单的颠倒活塞可以改变旋转方向。

The twin rack pistons are made from Die-casting aluminum treated with Hard anodized or made from Cast steel with galvanization. Symmetric mounting position, long cycle life and fast operation, reversing rotation by simply inverting the pistons.

6、行程调节 Travel adjustment

两个独立的行程调节螺钉可以进行方便、精确 $\pm 5^\circ$ 的调节开关位置。

The two independent external travel stop adjustment bolts can adjust $\pm 5^\circ$ at both open and close direction easily and precisely.

7、高性能弹簧 High performance springs

采用优质材料、涂层处理, 预压装配。具有较强的抗腐蚀性和使用寿命。能够安全、简单的拆卸单作用执行器, 通过改变弹簧数量满足不同的力矩输出范围。

Preloaded coating springs are made from the high quality material for resistant to corrosion and longer service life, which can be demounted safely and conveniently to satisfy different requirements of torque by changing quantity of springs.

8、轴承、导板 Bearings & Guides

采用低摩擦、长寿命复合材料, 避免了金属与金属的直接接触, 维修更换简单方便。

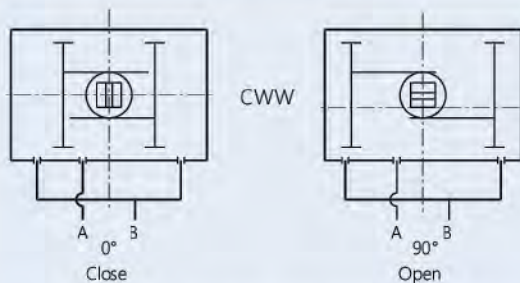
Made from low friction, long-life compound material, to avoid the direct contact between metals. The maintenance and replacement are easy and convenient.

9、O-rings 密封

在常温工作条件下使用丁腈橡胶, 在高温或低温时采用氟化丁腈橡胶或硅橡胶。

NBR rubber O-rings provide trouble-free operation at standard temperature ranges. For high and low temperature applications HNBR or Silicone.

工作原理 working principle

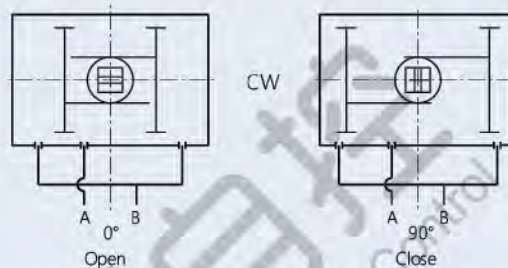


A 口进气, 压缩空气推动活塞向外运动, 使执行器输出轴逆时针旋转 ($0^\circ \rightarrow 90^\circ$), B 口排气。

B 口进气, 压缩空气推动活塞向内运动, 使执行器输出轴顺时针旋转 ($90^\circ \rightarrow 0^\circ$), A 口排气。

A port intake, compressed air pushes the piston outward, causing the actuator output shaft to rotate counterclockwise ($0^\circ \rightarrow 90^\circ$), and B port exhaust.

B port intake, compressed air pushes the piston inward, causing the actuator output shaft to rotate clockwise ($90^\circ \rightarrow 0^\circ$), and A port exhausts.

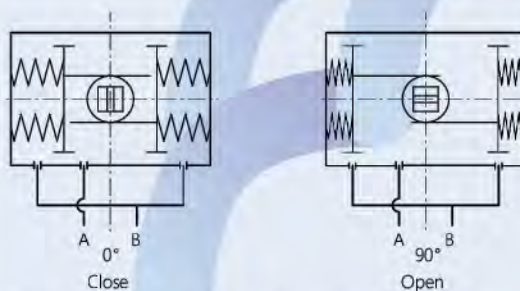


A 口进气, 压缩空气推动活塞向外运动, 使执行器输出轴顺时针旋转 ($90^\circ \rightarrow 0^\circ$), B 口排气。

B 口进气, 压缩空气推动活塞向内运动, 使执行器输出轴逆时针旋转 ($0^\circ \rightarrow 90^\circ$), A 口排气。

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B port intake, compressed air pushes the piston inward, causing the actuator output shaft to rotate counterclockwise ($0^\circ \rightarrow 90^\circ$), and A port exhausts.

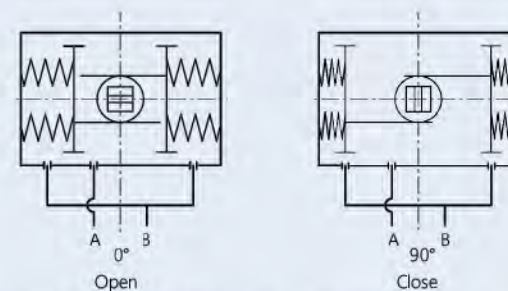


A 口进气, 压缩空气克服弹簧力, 推动活塞向外运动, 执行器输出轴逆时针转动 ($0^\circ \rightarrow 90^\circ$), B 口排气;

执行器失气, 活塞在弹簧力的作用下向内运动, 执行器输出轴顺时针转动 ($90^\circ \rightarrow 0^\circ$), A 口排气。

A port intake, compressed air overcomes the spring force, pushes the piston outward, the actuator output shaft rotates counterclockwise ($0^\circ \rightarrow 90^\circ$), and B port exhausts;

The actuator loses air, and the piston moves inward under the action of spring force. The output shaft of the actuator rotates clockwise ($90^\circ \rightarrow 0^\circ$), and A port exhausts.



A 口进气, 压缩空气克服弹簧力, 推动活塞向外运动, 执行器输出轴顺时针转动 ($90^\circ \rightarrow 0^\circ$), B 口排气;

执行器失气, 活塞在弹簧力的作用下向内运动, 执行器输出轴逆时针转动 ($0^\circ \rightarrow 90^\circ$), A 口排气。

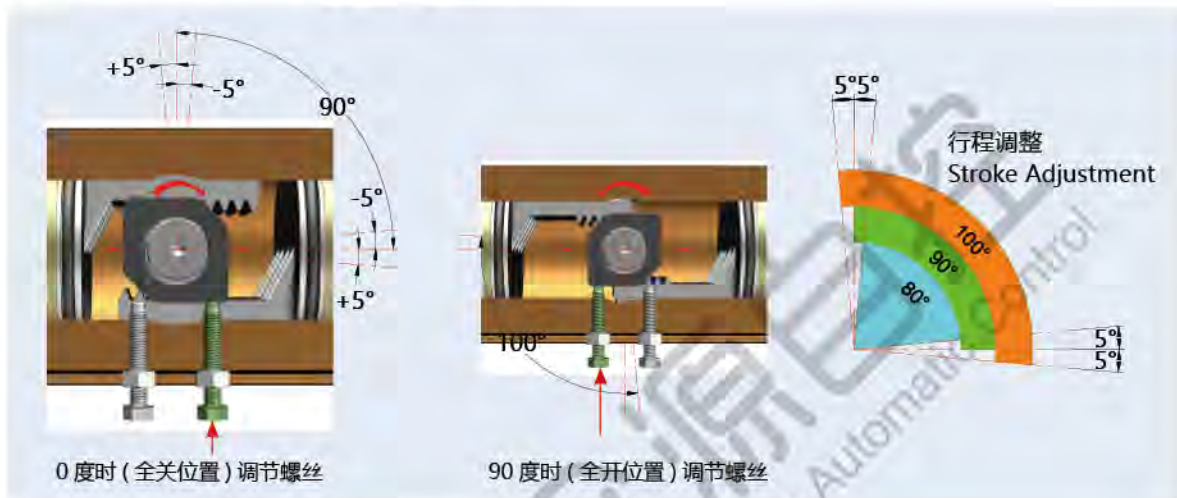
A port intake, compressed air overcomes the spring force, pushes the piston outward, the actuator output shaft rotates clockwise ($90^\circ \rightarrow 0^\circ$), and B port exhausts;

The actuator loses air, and the piston moves inward under the action of spring force. The output shaft of the actuator rotates counterclockwise ($0^\circ \rightarrow 90^\circ$), and A port exhausts.

9

行程及调节范围

A Route and an Adjusting Scale



执行器在 0 度时,

可通过调节螺丝调节里面的限位块, 对输出轴进行正负 5 度的调节, 以保证阀门处于全关位置。

When the actuator is at 0 degrees, the limit block inside can be adjusted by adjusting the screw to adjust the output shaft by plus or minus 5 degrees to ensure that the valve is in the fully closed position.

执行器在 90 度时,

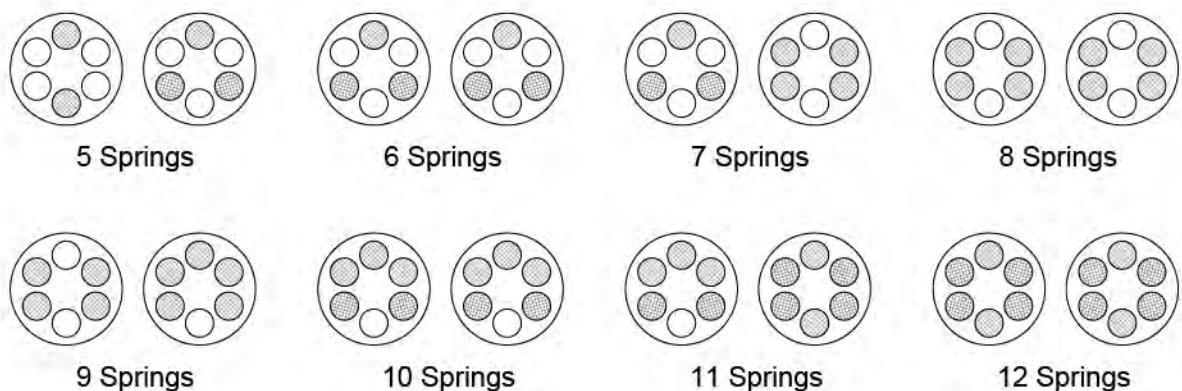
可通过调节螺丝调节里面的限位块, 对输出轴进行正负 5 度的调节, 以保证阀门处于全开位置。

When the actuator is at 90 degrees, The limit block inside can be adjusted by adjusting the screw to adjust the output shaft by plus or minus 5 degrees to ensure that the valve is in the fully open position.

10

单作用执行器弹簧安装形式

Spring mounting form for spring return actuators



重量表 Weight Table (Net Weight)

型号 Model	AT007	AT012	AT020	AT035	AT050	AT075	AT110	AT160	AT225
缸径 (mm)	ZY32	ZY40	ZY52	ZY63	ZY75	ZY83	ZY92	ZY105	ZY125
重量 / 双作用 (DA)	0.9KG	1.1KG	1.2KG	2KG	2.4KG	3.2KG	4.4KG	6.2KG	8.8KG
重量 / 单作用 (RS)	1.1KG	1.25KG	1.4KG	2.2KG	2.8KG	3.4KG	5KG	6.4KG	9.8KG

型号 Model	AT435	AT665	AT1000	AT1200	AT1800	AT2700	AT3800	AT5700	AT8000
缸径 (mm)	ZY140	ZY160	ZY190	ZY210	ZY240	ZY270	ZY300	ZY350	ZY400
重量 / 双作用 (DA)	12.4KG	18.4KG	31.2KG	37.1KG	54.7KG	76KG	100.KG	186.KG	243.KG
重量 / 单作用 (RS)	14.6KG	21.4KG	35.2KG	42.8KG	59.8KG	95.2KG	128.2KG	216.KG	279.KG

注: 表中 SR 单作用弹簧数量为 10 根, 缸径 270-400 的是 12 根。

Note: The number of SR single acting springs in the table is 10. There are 12 cylinders with a diameter of 270-400.

耗气量 Air Consumption

开向体积和关向体积 Air Volume Opening & Closing

型号 Model	Air volume opening 开向体积 (升)	Air volume closing 关向体积 (升)
AT007	0.04	0.05
AT012	0.08	0.11
AT020	0.12	0.16
AT035	0.21	0.23
AT050	0.3	0.34
AT075	0.43	0.47
AT110	0.64	0.73
AT160	0.95	0.88
AT255	1.6	1.4

型号 Model	Air volume opening 开向体积 (升)	Air volume closing 关向体积 (升)
AT435	2.5	2.2
AT665	3.7	3.2
AT1000	5.9	5.4
AT1200	7.5	7.5
AT1800	11	9
AT2700	17	14
AT3800	23.8	29.7
AT5700	35.1	46.3
AT8000	52.6	56

耗气量取决于供气压力、开关行程、体积及动作次数。计算如下:

$$\text{升/分} = \text{气缸体积 (开向体积 + 关向体积)} \times \left[\frac{\text{供气压力 (Kpa)} + 101.3}{101.3} \right] \times \text{X 次数 / 分钟}$$

Air consumption rest with Air Supply, Air volume and Action cycle times, expressions:

$$L/MAin = \text{Air volume (Air volume opening + Air volume closing)} \times \left[\frac{\text{Air Supply (Kpa)} + 101.3}{101.3} \right] \times \text{X Action cycle times (/min)}$$

动作时间表 Operation Time

Size	AT007		AT012		AT020		AT035		AT050		AT075		AT110		AT160		AT255	
	DA	SR	DA	SR	DA	SR	DA	SR	DA	SR	DA	SR	DA	SR	DA	SR	DA	SR
0° - 90°	0.2	-	0.2	0.8	0.3	0.9	0.3	0.9	0.3	1	0.4	1.2	0.5	1.2	0.7	1.4	0.8	1.5
90° - 0°	0.2	-	0.2	0.5	0.2	0.5	0.25	0.5	0.3	0.6	0.4	0.6	0.5	0.6	0.7	0.8	0.9	1
Size	AT435		AT665		AT1000		AT1200		AT1800		AT2700		AT3800		AT5700		AT8000	
	DA	SR	DA	SR	DA	SR	DA	SR	DA	SR	DA	SR	DA	SR	DA	SR	DA	SR
0° - 90°	1.3	2.5	2.2	2.6	2.8		2.8	3.6	3	4	3.5	5	4	6	5	8	8	12
90° - 0°	1.5	1.4	2.4	1.5	3.5	3.41.8	3.3	2.5	3.3	2.8	3.8	3	4.5	4	5.5	5	8.5	8

以上执行器动作时间数据, 由实验室测出, 以下是实验室测试条件:

- (1)AT007-AT1000, 洁净气源, 气源压力 5Bar, 常温, 执行器不带负载, 行程 90°, 测试电磁阀:2W512-10, 气源管:8mm
- (2)AT1200-AT8000, 洁净气源, 气源压力 5Bar, 常温, 执行器不带负载, 行程 90°, 测试电磁阀:2W512-15, 气源管:16mm
- (3)单作用 SR 按照 FC, 10根弹簧测试;F0的时间是 FC位置 0°-90°和 90°-0°的数据互换;



11

工作技术条件 Working technical conditions

1. 工作介质 /Working medium

干燥或润滑的空气或无腐蚀性气体介质中杂质微粒小于 30 μ m

The impurity particles in dry or lubricated air or non-corrosive gas medium are less than 30 μ m

2. 气源压力 /Air pressure

最小气源压力 2.5 巴，最大气源压力 8 巴。

The minimum air pressure is 2.5 bar and the maximum air pressure is 8 bar.

3. 介质环境温度 /Medium ambient temperature

标准: -20 $^{\circ}$ C ~ + 80 $^{\circ}$ C

Standard: -20 $^{\circ}$ C ~ +80 $^{\circ}$ C

低温: -35 $^{\circ}$ C ~ + 80 $^{\circ}$ C

Low temperature: -35 $^{\circ}$ C ~ +80 $^{\circ}$ C

高温: -15 $^{\circ}$ C ~ + 150 $^{\circ}$ C

High temperature: -15 $^{\circ}$ C ~ +150 $^{\circ}$ C

4. 行程调节 /Stroke adjustment

0 $^{\circ}$ -90 $^{\circ}$ 两个位置有 $\pm 5^{\circ}$ 的调节范围

0 $^{\circ}$ -90 $^{\circ}$ Two positions with $\pm 5^{\circ}$ adjustment range

5. 应用 /application

室内或户外

Indoor or outdoor

选型与订购 Selection and ordering

例如:

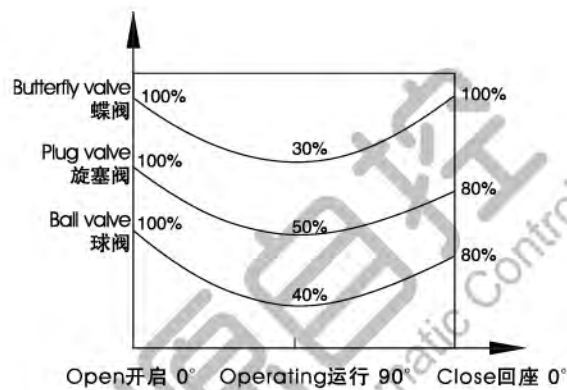
- 蝶阀原最大扭矩 = 80N·m
- 打开后扭矩 $80 \times 30\% = 24\text{N} \cdot \text{m}$
- 气源压力 = 6Bar
- 我们可以选择 AT-125S
- 空气行程 $0^\circ = 199\text{N} \cdot \text{m} > 80\text{N} \cdot \text{m}$
- 空气行程 $90^\circ = 122\text{N} \cdot \text{m} > 24\text{N} \cdot \text{m}$
- 弹簧行程 $90^\circ = 157\text{N} \cdot \text{m} > 24\text{N} \cdot \text{m}$
- 弹簧行程 $0^\circ = 105\text{N} \cdot \text{m} > 80\text{N} \cdot \text{m}$

以上数据显示可以满足该蝶阀的正常开启

E.g:

- The original maximum torque of butterfly valve = 80N·m
- Torque after opening $80 \times 30\% = 24\text{N} \cdot \text{m}$
- Air pressure = 6Bar
- We can choose AT-125S
- Air stroke $0^\circ = 199\text{N} \cdot \text{m} > 80\text{N} \cdot \text{m}$
- Air stroke $90^\circ = 122\text{N} \cdot \text{m} > 24\text{N} \cdot \text{m}$
- Spring stroke $90^\circ = 157\text{N} \cdot \text{m} > 24\text{N} \cdot \text{m}$
- Spring stroke $0^\circ = 105\text{N} \cdot \text{m} > 80\text{N} \cdot \text{m}$

The above data shows that the normal opening of the butterfly valve can be satisfied



双作用配阀门安全系数要求 Safety factor requirements for double acting valves

双作用执行器的选型 Selection of double-acting actuators

在正常工作条件下，双作用执行器考虑的安全系数为 20%-30%。

例如：

- 阀门力矩 = 100 N·m
- 安全力矩 = $100 \times (1 + 30\%) = 130 \text{ N} \cdot \text{m}$
- 气源压力 = 5 Bar

Under normal working conditions, the safety factor considered for double-acting actuators is 20%-30%.

E.g:

- Valve torque = 100 N·m
- Safety torque = $100 \times (1 + 30\%) = 130 \text{ N} \cdot \text{m}$
- Air pressure = 5 Bar

单作用配阀门安全系数要求 Safety factor requirements for single acting valves

单作用执行器的选型 Selection of single acting actuator

在正常工作条件下，单作用执行器考虑的安全系数为 30%-50%。

例如：

- 阀门需要力矩 = 100 N·m
- 安全力矩 = $(1 + 30\%) = 130 \text{ N} \cdot \text{m}$

对照单作用执行器输出力矩表，我们可以查 ZY-140S 输出力矩为

- 空气行程 $0^\circ = 238.4 \text{ N} \cdot \text{m}$
- 空气行程 $90^\circ = 132.4 \text{ N} \cdot \text{m}$
- 弹簧行程 $0^\circ = 172 \text{ N} \cdot \text{m}$
- 弹簧行程 $90^\circ = 258 \text{ N} \cdot \text{m}$
- 所有输出力矩均大于我的需求

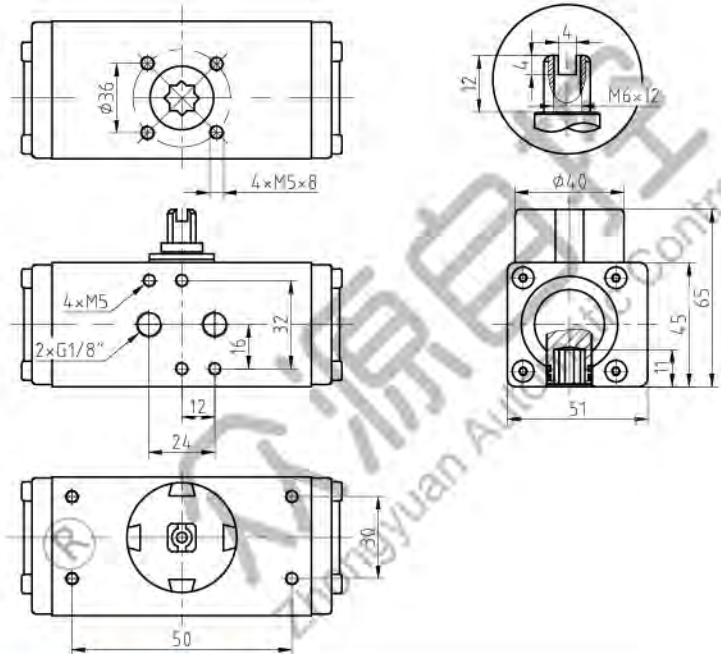
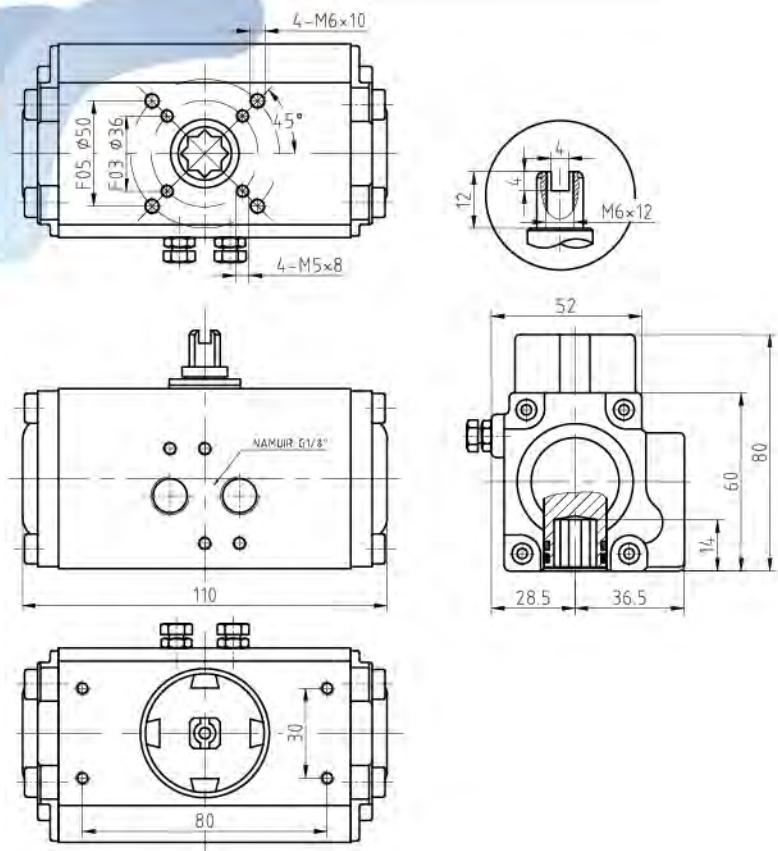
Under normal working conditions, the safety factor considered for single acting actuators is 30% -50%.

For example:

- The valve requires a torque of $100 \text{ N} \cdot \text{m}$
- Safe torque = $(1 + 30\%) = 130 \text{ N} \cdot \text{m}$

By comparing the output torque table of the single acting actuator, we can check that the output torque of ZY-140S is

- Air execution range $0^\circ = 238.4 \text{ N} \cdot \text{m}$
- Air execution range $90^\circ = 132.4 \text{ N} \cdot \text{m}$
- Spring stroke $0^\circ = 172 \text{ N} \cdot \text{m}$
- Spring stroke $90^\circ = 258 \text{ N} \cdot \text{m}$
- All output torques are greater than my requirements

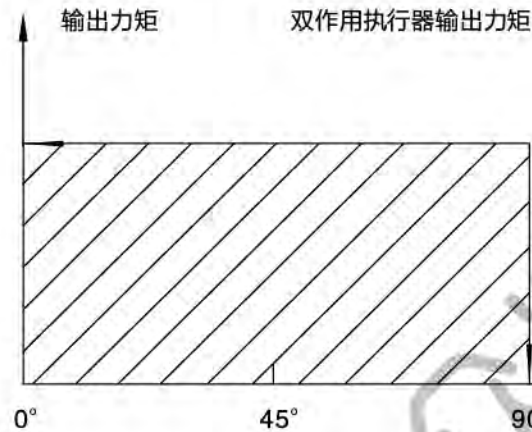
RT007DA
(Ø32)RT012DA
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14

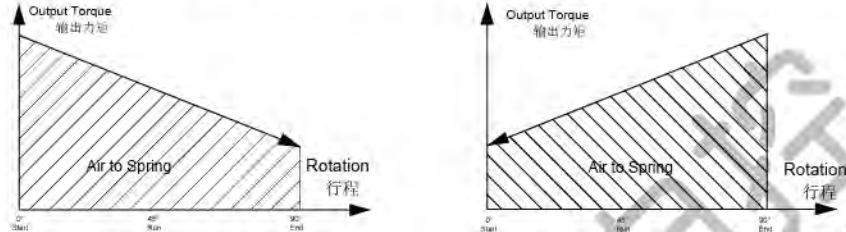
G1/2" NAMUR标准

双作用执行器输出扭矩表

Dual acting actuator output torque table



型号 Model	Cylinder Dia.	气源压力 Air supply pressure (Unit: bar)									
		2	2.5	3	4	4.5	5	5.5	6	7	8
AT007DA	ZY32D	3	4	5	6	7	8	8	9	11	12
AT012DA	ZY40D	5	6	7	10	11	12	13	14	17	19
AT020DA	ZY52D	8	10	12	16	18	20	22	24	28	32
AT035DA	ZY63D	15	18	22	29	33	36	40	44	51	58
AT050DA	ZY75D	20	25	30	40	45	50	55	60	70	80
AT075DA	ZY83D	31	39	47	63	70	78	86	94	110	125
AT110DA	ZY92D	45	56	68	90	102	113	124	135	158	181
AT160DA	ZY105D	66	83	99	132	149	165	182	198	231	264
AT225DA	ZY125D	100	125	150	200	226	251	276	301	351	401
AT435DA	ZY140D	171	214	256	342	385	427	470	513	598	684
AT665DA	ZY160D	266	332	399	532	598	665	731	798	931	1064
AT1000DA	ZY190D	426	532	638	851	958	1064	1170	1277	1490	1702
AT1200DA	ZY210D	532	665	798	1064	1197	1330	1463	1596	1862	2128
AT1800DA	ZY240D	769	962	1154	1539	1731	1924	2116	2308	2693	3078
AT2700DA	ZY270D	1170	1462	1754	2339	2632	2924	3216	3509	4094	4679
AT3800DA	ZY300D	1526	1908	2289	3052	3434	3815	4197	4578	5341	6104
AT5700DA	ZY350D	2285	2856	3427	4570	5141	5712	6283	6854	7997	9139
AT8000DA	ZY400D	3256	4070	4884	6512	7326	8140	8954	9768	11396	13024

单作用执行器输出扭矩表 (N·m)
Single-acting actuator output torque table (N·m)


			输出扭矩 Output torque of air to springs (Nm)														Springs' output	
气压 Air Pressure		2.5bar		3.0bar		4.0bar		5bar		6.0bar		7.0bar		8.0bar				
型号 model	Cylinder Dia.	Spring Qty	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End
AT020SR	ZY52S	K5	5.7	3.8	7.6	5.7											6.2	4.3
		K6	4.9	2.5	6.9	4.5	10.9	8.5									7.4	5.0
		K7	4.0	1.3	6.0	3.3	9.8	7.3	14.0	10.4							8.6	5.9
		K8			5.2	2.0	9.2	6.0	13.2	9.1	17.2	14.1					9.9	6.7
		K9			4.3	0.8	8.3	4.8	12.3	7.9	16.3	12.8	20.3	16.8			11.1	7.6
		K10					7.4	3.6	11.5	6.7	15.5	11.6	19.5	15.6			12.4	8.5
		K11					6.6	2.3	10.6	5.4	14.6	10.4	18.6	14.3	22.6	18.3	13.6	9.3
								9.7	4.2	13.8	9.1	17.8	12.2	21.8	17.1	14.8	10.2	
AT035SR	ZY63S	K5	11.4	7.7	15.0	11.4	22.3	18.7									10.4	6.8
		K6	10.1	5.7	13.6	9.3	20.9	16.6	28.3	23.9							12.5	8.2
		K7	8.6	3.6	12.5	7.2	19.5	14.5	26.8	21.9							14.6	9.6
		K8			10.9	5.1	18.2	12.4	25.5	19.8	32.8	27.0	40.1	34.3			16.7	10.9
		K9					16.8	10.4	24.1	17.7	31.4	24.9	38.7	32.2			18.8	12.3
		K10					14	8.2	22.8	15.6	30.0	22.8	37.3	30.1	44.7	37.4	20.9	13.7
		K11							21.5	13.5	28.7	20.7	36.0	28.0	43.3	35.3	22.9	15.0
								20.0	11.4	27.3	18.6	34.6	25.9	41.9	33.3	25.0	16.4	
AT050SR	ZY75S	K5	14.5	10.6	19.4	15.5	29.5	25.7									14.5	10.5
		K6	12.4	7.6	17.3	12.6	27.4	22.7	37.5	32.8							17.4	12.7
		K7	10.4	4.8	15.2	9.7	25.3	19.9	35.4	29.9							20.3	14.8
		K8			13.1	6.8	23.1	16.9	33.3	27.0	43.2	37.0	53.3	47.0			23.2	16.9
		K9					21.0	14.1	31.2	24.1	41.1	34.1	51.2	44.2			26.1	19.0
		K10					19.0	11.1	28.8	21.2	39.0	31.2	49.1	41.2	59.1	51.2	29.0	21.1
		K11							27.0	18.3	37.0	28.3	47.0	38.4	57.0	48.4	31.9	23.2
								24.9	15.4	34.9	25.4	44.9	35.4	54.9	45.4	34.7	25.3	
AT075SR	ZY83S	K5	23.3	16.1	31.1	24.0	46.8	39.7									23.0	15.8
		K6	20.1	11.5	28.0	19.3	43.7	35.1	59.4	50.7							37.6	19.0
		K7	17.0	6.9	24.8	14.8	40.5	30.5	56.2	46.2							32.3	22.1
		K8			21.7	10.1	37.4	25.8	53.1	41.5	68.6	57.2	84.5	72.9			36.8	25.3
		K9					34.2	21.3	49.9	37.0	65.6	52.6	81.2	63.8			41.4	28.5
		K10					31.0	16.6	46.7	32.3	62.4	48.0	78.1	63.7	93.8	79.3	46.0	31.6
		K11							43.6	27.7	59.3	43.4	75.0	59.1	90.6	74.8	50.6	34.8
								40.4	23.2	56.1	38.9	71.7	54.5	87.4	70.2	55.2	38.0	
AT110SR	ZY92S	K5	33.1	22.0	44.2	33.2	66.8	55.9									34.4	23.2
		K6	28.4	15.2	39.6	26.4	62.2	49.0	84.8	71.6							41.2	28.0
		K7	23.8	8.2	34.9	19.4	57.5	42.1	80.2	64.7							48.1	32.7
		K8			31.3	12.6	52.9	35.2	75.5	57.9	98.1	80.5	120.7	103.0			55.0	37.3
		K9					48.2	28.4	70.9	51.0	93.5	73.6	116.0	96.1			61.9	42.0
		K10					43.6	21.5	66.2	44.1	88.8	66.7	111.3	89.2	134.0	111.8	68.7	46.7
		K11							61.5	37.2	84.1	59.9	106.6	82.4	129.2	105.0	75.6	51.4
								56.8	30.4	79.4	53.0	101.9	75.5	124.5	98.1	82.5	56.0	
AT160SR	ZY105S	K5	51.0	33.4	67.5	49.9	100.6	83.0									49.2	31.6
		K6	44.7	23.5	61.1	40.0	94.2	73.2	127.3	106.2							59.1	38.0
		K7	38.4	13.7	54.9	30.3	87.9	63.4	121.0	96.4							68.9	44.3
		K8			48.5	20.4	81.6	53.5	114.7	86.5	147.7	119.6	180.8	152.7			78.7	50.6
		K9					75.3	43.7	108.4	76.8	141.5	109.8	174.5	142.9			88.6	56.9
		K10					68.9	33.4	102.0	66.5	135.1	99.6	168.2	132.6	201.2	165.7	98.4	63.3
		K11							95.7	57.0	128.7	90.1	161.8	123.1	194.8	156.2	108.3	69.6
								89.4	47.5	122.5	80.6	155.5	113.6	188.6	146.7	118.1	75.9	
AT255SR	ZY125S	K5	73	47	98	72	148	122									79	52
		K6	63	31	88	56	138	107	188	157							94	63
		K7	52	15	77	40	127	90	178	141							110	73
		K8			67	25	117	75	167	125	217	176	268	226			125	84
		K9					107	59	157	109	207	159	257	210			141	94
		K10					96	44	146	94	196	144	247	194	297	245	157	105
		K11							136	78	186	128	236	178	286	228	173	115
								125	63	176	113	226	163	276	213	188	125	

			输出扭矩 Output torque of air to springs (Nm)																Springs' output	
气压 Air Pressure			2.5bar		3.0bar		4.0bar		5bar		6.0bar		7.0bar		8.0bar					
型号 model	Cylinder Dia.	Spring Qty	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End		
AT435SR	ZY140S	K5	128	85	171	127	256	213									129	86		
		K6	111	59	154	102	239	187	325	273							155	103		
		K7	94	33	137	76	222	162	308	247							181	120		
		K8			120	50	205	136	291	221	376	307	462	392			206	137		
		K9					187	110	273	196	358	281	444	367			232	155		
		K10					170	84	256	169	341	255	427	340	512	426	258	172		
		K11							238	143	324	229	409	314	495	400	284	189		
								221	118	307	203	392	289	478	374	310	206			
AT665SR	ZY160S	K5	193	124	259	191	392	324									208	140		
		K6	165	83	232	149	365	282	498	415							250	168		
		K7	137	41	203	107	336	240	469	373							292	196		
		K8			176	66	309	199	442	237	575	465	708	598			333	223		
		K9					280	157	413	290	546	423	679	556			375	251		
		K10					253	115	386	248	519	381	652	514	785	647	417	279		
		K11							358	207	491	340	624	473	757	606	458	307		
								330	165	463	298	596	431	729	564	500	335			
AT1000SR	ZY190S	K5	332	222	438	329	651	542									309	200		
		K6	292	161	398	267	611	480	824	693							371	240		
		K7	252	99	358	205	571	418	784	631							433	280		
		K8			318	143	531	356	744	569	957	782	1169	995			495	320		
		K9					491	295	704	507	917	720	1130	933			557	360		
		K10					451	233	664	446	877	658	1090	871	1302	1084	618	400		
		K11							624	384	837	597	1050	809	1263	1022	680	440		
								584	322	797	535	1010	748	1223	960	742	480			
AT1200SR	ZY210S	K5	390	285	523	418	789	684									380	275		
		K6	335	209	468	342	734	608	1000	874							456	330		
		K7	280	133	413	266	679	532	945	798							532	385		
		K8			358	190	624	456	890	722	1156	988	1422	1254			608	440		
		K9					569	380	835	646	1101	912	1367	1178			684	495		
		K10					514	304	780	570	1046	836	1312	1102	1578	1368	760	550		
		K11							725	494	991	760	1257	1026	1523	1292	836	605		
								670	418	936	684	1202	950	1468	1216	912	660			
AT1800SR	ZY240S	K5	552	409	744	600	1129	985									554	410		
		K6	470	297	662	489	1047	874	1432	1259							665	492		
		K7	388	187	580	379	964	764	1349	1149							775	575		
		K8			498	268	883	653	1267	1037	1652	1422	2037	1807			886	656		
		K9					800	542	1185	926	1569	1311	1954	1696			998	739		
		K10					178	431	1103	816	1488	1201	1872	1586	2257	1970	1108	821		
		K11							1021	705	1406	1090	1791	1474	2176	1859	1219	903		
								939	594	1323	979	1708	1363	2093	1748	1330	985			
AT2700SR	ZY270S	K5	903	675	1195	968	1779	1552									787	560		
		K6	790	519	1083	811	1667	1396	2252	1981							943	672		
		K7	679	361	972	654	1556	1238	2141	1823							1101	783		
		K8			860	497	1444	1081	2029	1666	2614	2252	3199	2836			1258	895		
		K9					1332	923	1917	1509	2502	2094	3087	2678			1416	1007		
		K10					1220	767	1805	1352	2390	1937	2974	2521	3560	3107	1572	1119		
		K11							1693	1194	2278	1779	2862	2364	3448	2949	1730	1231		
							1582	1037	2167	1623	2751	2207	3336	2792	1887	1342				
AT3800SR	ZY300S	K5	1097	729													1061	730		
		K6	935	494	1316	875											1273	876		
		K7	772	258	1153	639	1916	1402									1485	1022		
		K8			991	403	1754	1166	2517	1929							1697	1168		
		K9					1592	930	2355	1693	3118	2456					1909	1314		
		K10					1430	695	2193	1458	2956	2221	3719	2984	4482	3747	2122	1460		
		K11							2030	1222	2793	1985	3556	2748	4319	3511	2334	1606		
							1868	986	2631	1749	3394	2512	4157	3275	2546	1752				
AT5700SR	ZY350S	K5	1553	964													1702	1173		
		K6	1292	586	1863	1157											2043	1408		
		K7	1031	208	1602	779	2745	1922									2383	1642		
		K8			1341	401	2484	1544	3626	2686							2724	1877		
		K9					2224	1165	3336	2307	4508	3449					3064	2112		
		K10					1963	787	3105	1929	4247	3071	5390	4214	6532	5356	3405	2346		
		K11							2844	1551	3986	2693	5129	3836	6271	4978	3745	2581		
							2584	1172	3726	2314	4869	3457	6011	4599	4086	2816				
AT8000SR	ZY400S	K7	2028	869													2880	1837		
		K8	1736	411	2550	1225											3292	2100		
		K9			2259	768	3887	2396									3703	2362		
		K10			1967	311	3595	1939	5223	3567							4115	2624		
		K11					3303	1482	4931	3110	6559	4738					4526	2887		
		K12					3012	1025	4640	2653	6268	4281	7895	5908	9523	7536	4938	3149		
		K13							4348	2195	5976	3823	7603	5450	9231	7078	5349	3412		
		K14							4057	1738	5685	3366	7312	4993	8940	6621	5761	3674		
		K15							3765	1281	5393	2909	7020	4536	8648	6164	6172	3937		
									5101	2452	6728	4079	8356	5707	6584	4199				

Shape and connection dimensions of 120° /180° stroke actuator (double acting)



- 120°/180° stroke ATC double acting pneumatic actuator size table**

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三位置气动执行器

Three-position pneumatic actuator



三位置气动执行器有二种型号 0° - 45° - 90° 和 0° - 90° - 180° ，在气口“2”进气后活塞向两端运动被两端设计有辅助活塞产生机械限制来实现中间位置的，可直接利用外面两端调节螺栓很容易调节中间位置角度，如 20° 、 30° 、 50° 、 75° 和 95° 、 120° 、 130° 、 150° 、 175° 等。

There are two types of three-position pneumatic actuators: 0° - 45° - 90° and 0° - 90° - 180° . The movement of the piston to both ends is mechanically restricted by the design of auxiliary pistons at both ends after air intake at port "2". To achieve the middle position, you can directly use the outer ends to adjust the pin bolt to easily adjust the middle position angle, such as 20° , 30° , 50° , 75° and 95° , 120° , 130° , 150° , 175° , etc.

- 驱动方式：有双作用式和单作用式（弹簧复位）。
- 技术特点：扭矩：15Nm - 4000Nm。
- 安装法兰：DIN/ISO 5211 DIN 3337/ F03 - F04 - F05 - F07 - F10 - F12 - F14 - F16。
- 控制阀连接：NAMUR 标准。
- 转角： 90° 135° 180° 三段式
- 扭矩：复位扭矩取决于弹簧作用，与供气压力无关。可提供 4 种不同规格弹簧尺寸。字母 DA 或 SR 后的数字代码表示在 5.6bar 气源压力下的扭矩。
- 工作温度： 0°C ~ 80°C ， -20°C ~ 80°C （干燥空气）（特殊型号：高温 -20°C ~ 150°C ，低温 -50°C ~ 60°C ）。
- 气源：4bar~8bar。
- 控制气源：经过滤的压缩空气，无需润滑。在润滑空气的情况下，不得使用洗涤剂油或与 NBR 相溶的润滑油。

- Drive mode: There are double acting and single acting (spring reset).
- Technical features: Torque: 15Nm - 4000Nm.
- Installation flange: DIN/ISO 5211 DIN 3337/F03-F04-F05-F07-F10-F12-F14-F16.
- Control valve connection: NAMUR standard.
- Corner: 90° 135° 180° three-stage design
- Torque: The reset torque depends on the action of the spring and is independent of the supply pressure. Four different specifications of spring sizes are available. The numerical code after the letters DA or SR represents the torque at a source pressure of 5.6 bar.
- Working temperature: 0°C ~ 80°C , -20°C ~ 80°C (dry air) (special models: high temperature -20°C ~ 150°C , low temperature -50°C ~ 60°C).
- Gas source: 4 bar~8 bar.
- Control air source: filtered compressed air, no lubrication required. Do not use detergent oil or lubricating oil that is soluble in NBR while lubricating air.

工作原理

Working principle

三位置气动执行器的操作需要设计一套电磁阀控制回路系统来完成操作，其控制原理如下：

The operation of the three-position pneumatic actuator requires the design of a solenoid valve control loop system to complete the operation. The control principle is as follows:

位置 1 (中间位置)

Position 1 (middle position)

气源压力同时进入 2 口和 D 口，空气从 4 口和 C 口排出，2 口作为内部活塞移动，D 口是通过辅助活塞推杆限制内部活塞定位在预定的中间位置，

The air source pressure enters port 2 and port D at the same time, and the air is discharged from port 4 and port C. Port 2 acts as an internal piston to move. Port D restricts the internal piston to a predetermined intermediate position through an auxiliary piston push rod.

位 S2 (全开位 S)

Position S2 (Fully open position S)

气源压力同时进入 2 口和 c 口，空气从 4 口和 D 口排出，2 口的内部活塞继续移动，C 口为解除辅助活塞推杆限制定位，使内部活塞顺利到达全开位置。

The air source pressure enters port 2 and port c at the same time, and air is discharged from port 4 and port D. The internal piston of port 2 continues to move. Port C is to release the auxiliary piston push rod for positioning and make the internal piston reach the fully open position smoothly.

位置 3 (全关位置)

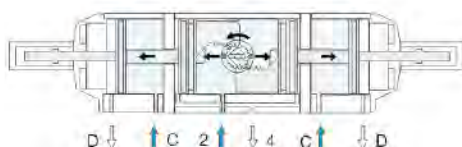
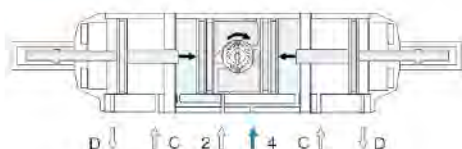
Position 3 (fully closed position)

气源压力进入 4 口，空气从 2 口排出的，内部活塞向中间方向中间移动到达全关位置。

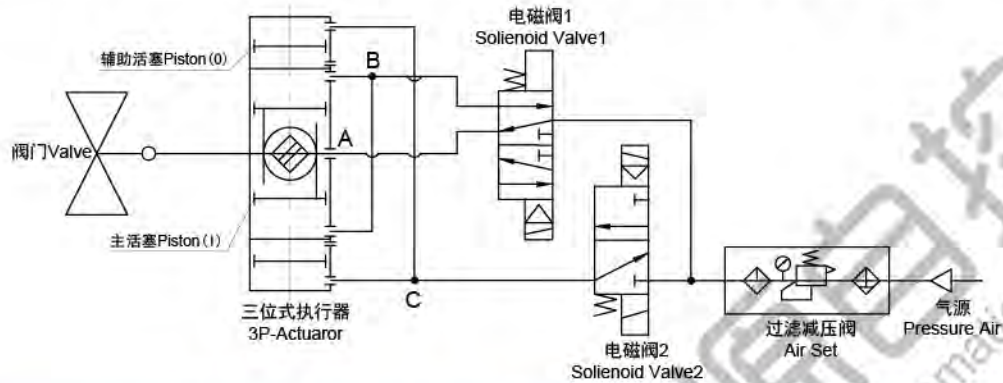
Air source pressure enters port 4, air is discharged from port 2, and the inner piston moves to the middle direction to reach the fully closed position.

可提供 0° - 45° - 90° 弹簧回位型号规格，在断气断电时（或气源故障），通过弹簧迫使内部活塞回位到全关位置。

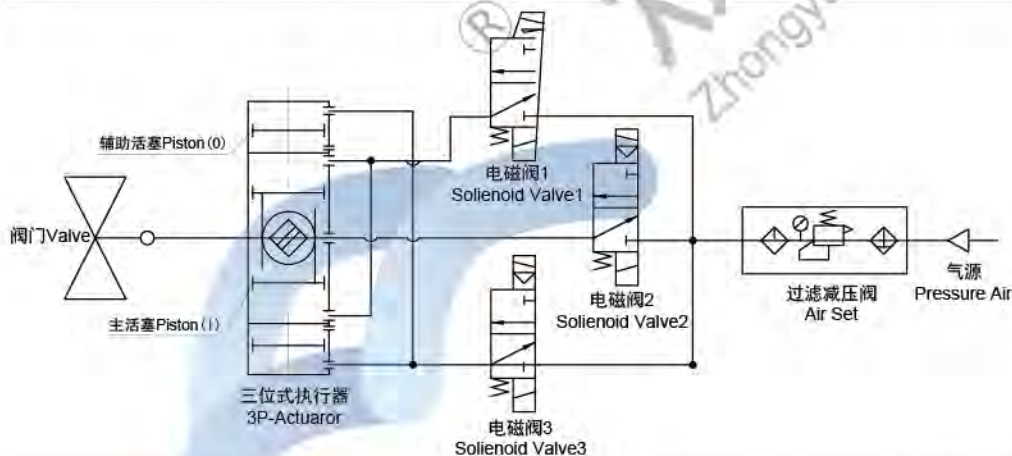
0° - 45° - 90° spring return models and specifications are available. When the air is cut off (or the air source fails), the internal piston is forced to return to the fully closed position by the spring.



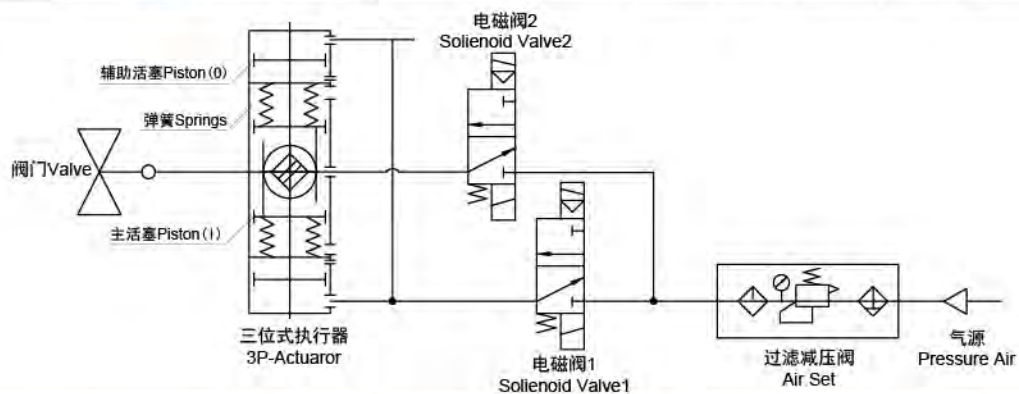
Three Position Pneumatic Actuator Schematic Diagram



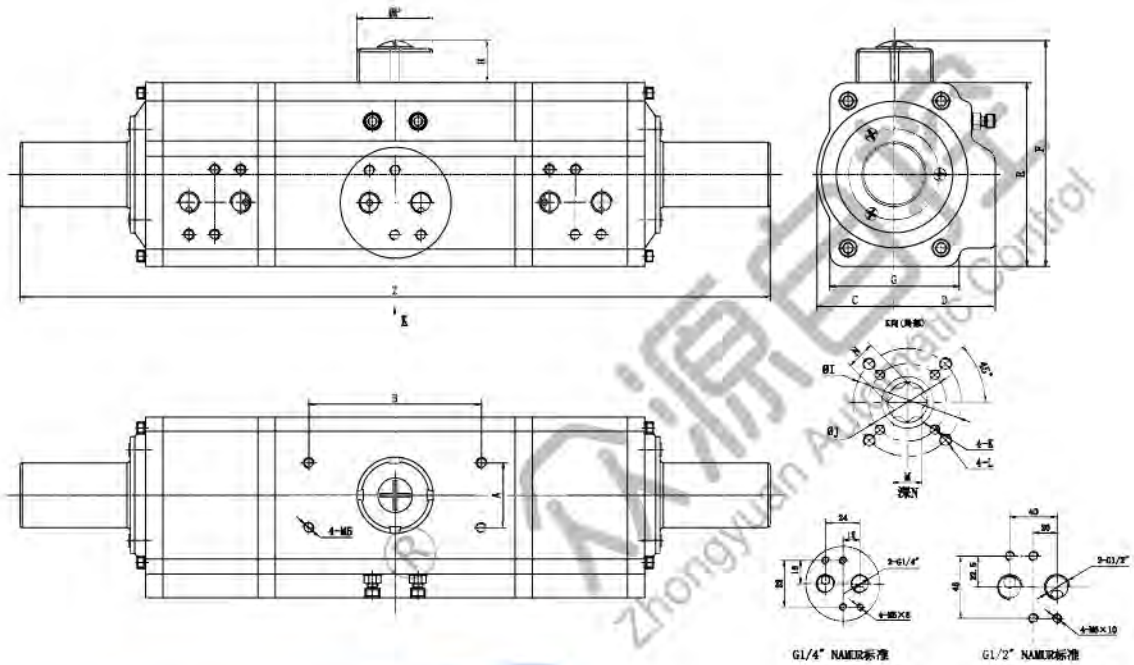
	0°	90°	30°	0°
电磁阀 1 Solenoid Valve1	OFF	ON	OFF	OFF
电磁阀 2 Solenoid Valve2	OFF	OFF	ON	OFF



	0°	90°	90°	30°	0°
电磁阀 1 Solenoid Valve1	OFF	OFF	ON	OFF	OFF
电磁阀 2 Solenoid Valve2	ON	OFF	OFF	ON	ON
电磁阀 2 Solenoid Valve2	OFF	OFF	ON	ON	OFF



	0°	90°	90°	30°	90°
电磁阀 1 Solenoid Valve1	OFF	ON	OFF	ON	OFF
电磁阀 2 Solenoid Valve2	OFF	ON	ON	ON	OFF



外形及连接尺寸
Shape and connection size

Model		A	B	C	D	E	F	G	H	I	1-1	J	J-1	K	L	M	N	P	Z	Air
AT012DA	ZY40D	30	80	24	29	60	88	43	28	36	F03	50	F05	M5×8	M6×10	11	14	40	280	1/8"
AT020DA	ZY52D	30	80	30	42.5	72.4	80.4	50.5	28	36	F03	50	F05	M5×8	M6×10	11	14	40	312	1/4"
AT035DA	ZY63D	30	80	36	47	88.5	116.5	69.5	28	50	F05	70	F07	M6×10	M8×13	14	18	40	347	1/4"
AT050DA	ZY75D	30	80	42.5	53	100	128	78	28	50	F05	70	F07	M6×10	M8×13	14	18	40	412	1/4"
AT075DA	ZY83D	30	80	46.5	57	109.5	137.5	86	28	50	F05	70	F07	M6×10	M8×13	17	21	40	583	1/4"
AT110DA	ZY92D	30	80	50	58	117	145	90	28	50	F05	70	F07	M6×10	M8×13	17	21	40	625	1/4"
AT160DA	ZY105D	30	80	57.5	64	135	163	104.5	28	70	F07	102	F10	M8×13	M10×16	22	27	55	658	1/4"
AT225DA	ZY125D	30	80	67.5	74.5	157	185	120.5	28	70	F07	102	F10	M8×13	M10×16	22	27	55	715	1/4"
AT435DA	ZY140D	30	80	75.5	75.5	174	202	125	28	102	F10	125	F12	M10×16	M12×20	27	32	55	760	1/4"
AT665DA	ZY160D	30	130	87	87	198	246	143	38	102	F10	125	F12	M10×16	M12×20	27	32	62	804	1/4"
AT1000DA	ZY190D	30	130	103	103	232	260	172	38	125	F12	140	F14	M12×20	M16×25	36	40	80	852	1/4"
AT1200DA	ZY210D	30	130	113	113	257	295	194	38			140	F14		M16×25	36	40	80	942	1/4"
AT1800DA	ZY240D	30	130	130	130	292	340	230	38			165	F16		M20×30	46	50	80	1140	1/4"
AT2700DA	ZY270D	30	130	147	147	331	369	253	38			165	F16		M20×30	46	50	80	1250	1/2"
AT3800DA	ZY300D	30	130	161	168	354	392	290	38	165	F16	215	F20	M20×30	M20×30	46	50	80	1320	1/2"

CT 0° -45° -90° 型单作用式输出扭矩 (弹簧复位) (NM)
CT 0° -45° -90° type single-acting output torque (spring return) (NM)

气压		气源压力 (Bar)																				弹簧的输出扭矩		
型号	弹簧数量	2.5bar		3.0bar		3.5bar		4.0bar		4.5bar		5bar		5.5bar		6.0bar		7.0bar		8.0bar		0° Start	90° End	
		0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End			
AT035DA	ZY63S	5	9.1	62	12	9.1	15	12	17.9	15	20.8	17.9	23.7	20.8									8.5	5.5
		6	8	4.5	10.9	7.4	13.8	10.3	16.8	13.3	19.7	16.2	22.6	19.1	25.6	22.1							10.2	6.7
		7			9.8	5.7	12.7	8.7	15.7	11.6	18.6	14.5	21.5	17.4	24.5	20.4	27.4	23.3					11.8	7.8
		8					11.6	7	14.6	9.9	17.5	12.8	20.4	15.8	23.3	18.7	26.3	21.6	32.1	27.5			13.5	8.9
		9							13.4	8.2	16.4	11.1	19.3	14.1	22.2	17	25.2	19.9	31	25.8	36.9	31.6	15.2	10
		10									15.3	9.4	18.2	12.4	21.1	15.3	24.1	18.2	29.9	24.1	35.8	29.9	16.9	11.1
		11											17.1	10.7	20	13.6	22.9	16.5	28.8	22.4	34.7	28.2	18.6	12.2
		12														18.9	11.9	21.8	14.8	27.7	20.7	33.5	26.6	20.3
AT050DA	ZY75S	5	18	11.7	23.8	17.6	29.6	23.4	35.4	29.2	41.2	35	47.1	40.8									17.3	11.1
		6	15.8	8.3	21.6	14.1	27.4	19.9	33.2	25.7	38	31.5	44.8	37.3	50.7	43.2							20.8	13.3
		7			19.4	10.6	25.2	16.4	31	22.3	36.8	28.1	42.6	33.9	48.4	39.7	54.3	46.5					24.2	15.5
		8					23	13	28.8	18.8	34.6	24.6	40.4	30.4	46.2	36.2	52	42	63.7	53.7			27.7	17.7
		9							26.6	15.3	32.4	21.1	38.2	27	44	32.8	49.8	38.6	61.5	50.2	73.1	61.8	31.1	19.9
		10									30.2	17.7	36	23.5	41.8	29.3	47.6	35.1	59.2	46.7	70.9	58.4	34.6	22.1
		11											33.8	20	39.6	25.8	45.4	31.7	57	43.3	68.7	54.9	38.1	24.3
		12														37.4	22.4	43.2	28.2	54.8	39.8	66.4	51.4	41.5
AT075DA	ZY83S	5	41.1	27	54.4	40.3	67.7	53.6	81	66.8	94.2	80.1	108	93.4									39.4	25.3
		6	36.1	19.1	49.3	32.4	62.6	45.7	75.9	58.9	89.2	72.2	103	85.5	116	98.8							47.3	30.4
		7			44.3	24.5	57.6	37.8	70.8	51.1	84.1	64.3	97.4	77.6	111	90.9	124	104					55.2	35.4
		8					52.5	29.9	65.8	43.2	79.1	56.5	92.3	69.7	106	83	119	96.6	146	123			63.1	40.5
		9							60.7	35.3	74	48.6	87.3	61.9	101	75.1	114	88.4	140	115	167	142	71	46.5
		10									68.9	40.7	82.2	54	95.5	67.3	109	80.5	135	107	162	134	78.8	50.6
		11											77.2	46.1	90.5	59.4	104	72.7	130	99	157	136	86.7	55.6
		12														85.4	51.5	98.7	64.8	125	92	152	118	94.6
AT110DA	ZY92S	5	85.9	55.9	114	84	141	111	169	139	197	167	224	194									82.5	52.5
		6	75.4	39.4	103	67	131	95	158	122	186	150	214	178	241	205							98.9	62.9
		7			92.6	50.6	120	78	148	106	176	134	203	161	231	189	259	17					115	73.4
		8					110	62	137	89.4	165	117	193	146	221	173	248	200	304	256			132	83.9
		9							127	72.9	155	101	182	128	210	156	238	184	293	239	348	294	^A8	94.4
		10									144	84	172	112	200	140	227	167	283	223	338	278	165	105
		11											161	95.3	189	123	217	151	272	206	327	261	181	115
		12														179	107	206	134	262	190	317	245	198
AT160DA	ZY105S	5	171	117	228	174	285	231	341	287	398	344	455	401									166	112
		6	149	84	206	141	262	197	319	254	376	311	432	367	489	424							199	135
		7			183	108	240	164	296	221	353	278	410	334	466	391	523	448					233	157
		8					217	131	274	188	331	244	387	301	444	358	501	414	614	528			266	179
		9							252	154	308	211	365	268	422	324	478	381	592	494	705	608	299	202
		10									286	178	343	235	399	291	456	348	569	461	683	575	332	224
		11											320	201	377	258	433	315	547	428	660	541	365	247
		12														354	225	411	281	524	395	638	508	399
AT225DA	ZY125S	5	319	216	425	323	532	429	638	535	744	641	850	748									315	212
		6	277	153	383	260	489	366	595	472	702	578	808	685	914	791							378	255
		7			340	197	447	303	553	409	659	515	765	622	872	728	978	834					441	297
		8					404	240	510	346	617	452	723	559	829	665	935	771	1148	984			504	340
		9							468	283	574	389	680	496	787	602	893	708	1105	921	1318	1133	567	382
		10									532	326	638	433	744	539	850	645	1063	858	1275	1070	630	325
		11											595	370	702	476	808	582	1020	795	1233	1007	693	487
		12														659	413	766	519	978	732	1191	944	756

常见故障及检查、排除方法

Common faults and inspection and troubleshooting methods

故障现象 Fault phenomenon	检查项目 Inspection items	解决方法 Resolvent
气动阀门不能动作 Pneumatic valve cannot operate	1、电磁阀是否正常，线圈是否烧坏，电磁阀芯是否被脏物卡死 Is the solenoid valve normal, is the coil burnt out, and is the solenoid valve core stuck by dirt	更换电磁阀、更换线圈、清除脏物。 Replace the solenoid valve, replace the coil, and remove any debris.
	2、对气动执行器单独供气试验，检查密封圈及气缸是否是损坏。 Conduct a separate air supply test on the pneumatic actuator to check if the sealing ring and cylinder are damaged.	更换已坏密封圈及气缸。 Replace the damaged sealing ring and cylinder.
	3、阀内有杂质将阀芯卡住。 Impurities inside the valve are causing the valve core to get stuck.	清除杂质，更换已损件。 Remove impurities and replace damaged parts.
	4、手动机动的手柄处在手动位置。 The handle for manual maneuvering is in the manual position.	将手柄转到气动位置 Turn the handle to the pneumatic position
动作迟缓、爬行 Slow movements and crawling	1、气源压力不够。 The gas source pressure is insufficient.	增加气源压力 (0.4-0.7Mpa) Increase the gas source pressure (0.4-0.7Mpa)
	2、气动执行器输出扭矩过小。 The output torque of the pneumatic actuator is too low.	增大气动执行器的型号规格。 Increase the model specifications of pneumatic actuators.
	3、阀门阀芯或其他阀件装配太紧。 The valve core or other valve components are assembled too tightly.	重新装配调整。 Reinstall and adjust.
	4、气源管路堵塞，流量过小。 The gas source pipeline is blocked and the flow rate is too low.	排除堵塞，更换过滤器滤芯。 Remove the blockage and replace the filter element.
回讯器没有信号 The cam position device has no signal	1、电源线路短路或断路。 Short circuit or open circuit in the power supply line.	检修电源线路。 Repair the power supply circuit.
	2、回讯器内凸轮位置不准确。 The cam position inside the feedback device is inaccurate.	调整凸轮至正确位置。 Adjust the cam to the correct position.
	3、微动开关损坏。 The micro switch is damaged.	更换微动开关。 Replace the micro switch.