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PIPELINE VALVE®

Local Strategic FZV Partner

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PROVIDING COMPLETE CONTROL SOLUTIONS
FOR INDUSTRIAL PIPELINES

EMERGENCY SHUT-DOWN BALL VALVE

WWW.FZVGROUP.COM



FANGZHENG VALVE GROUP CO., LTD

INDUSTRIAL PIPELINE CONTROL EXPERT

FANGZHENG VALVE GROUP



We (FZV) commit ourselves to manufacturing excellent valves and achieving our customer satisfaction based on the principles of quality assurance and continual improvement.

We specialize in supplying a wide range of API 6D, API 609, API 600, API 594, API 6A, and API 16C products and wellhead equipment.

FZV was formally established in 1992, and so far, FZV has been approved by well-known international and domestic End-users and EPC companies.

FZV has set up three factories based in Shanghai and Wenzhou city with total area 76000 m² and maximum production capacity up to 32000 tons.

To enhance engineering designs and manufacture high-end products, FZV has in-house laboratory equipped with various facilities and test equipment to check and verify the product quality. The following tests are conducted in-house:

- Chemical analysis
- Mechanical test, Hardness, and impact test
- Non-destructive examination
- Salt spray test
- Fugitive emission test(ISO 15848-1 & 2)
- Deign validation testing (DVT) as per SHELL(MESC SPE 77/300)
- High temperature (Up to 550°C) and Cryogenic test (Up to -196°C)

FZV is certified by ISO 9001, ISO 14001, OHSAS 18001, API6D, API600, API609, API594, API607, API6A, API6A-PR2, API Spec.Q1, ABS, CCS, DNV, ATEX, and CE/PED, etc.

FZV Main Products Range:

Product types: Ball Valve, Gate Valve, Globe Valve, Check Valve, Butterfly Valve, Slab Gate Valve, Pipe Fitting, Cryogenic Valve, API6A Valve, Wellhead Equipment, Manifold & Christmas tree, etc.

Implemented Standards: ISO, API, BS, etc.

Casting material: WCB, LCB, WC6, WC9, C5, C12, CF3, CF3M, CF8, CF8M, C95500, 4A, 5A, Monel 400/500, Inconel 825/625, Titanium Alloy, etc.

Forging material: A105, LF2, F11, F12, F304, F321, F347, F316, 304L, 316L, C61900, F51, F53, F55, Inconel, Titanium Alloy, etc.

Nominal diameter: NPS 1/2"-68"(DN 15-DN 1,700)

Nominal pressure: API600 & API6D: CLASS 150~CLASS 2,500 (PN16~PN420) API 6A: 2,000PSI~15,000PSI

Temperature range: -196°C-550°C

Applications: Onshore oil and gas exploitation and transportation, offshore oil and gas platform and FPSO / FLNG / FSRU, natural gas purification and liquefaction unit, LNG receiving station and vaporization unit, refining, chemical industry and chemistry, coal to gas (oil) and coal chemical industry, air separation, power station, aerospace, military industry and new energy (solar power generation, hydrogen energy, etc.) etc.

The Business purpose of FZV: Providing Complete Control Solutions For Industrial Pipelines.

Our Advantages:

1. Strict quality management system to ensure excellent product quality;

2. Excellent production management system to ensure the shortest delivery;
3. Competitive price;

4. Responsive after-sales service.

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SUMMARY

An emergency shut down valve known as ESDV/ESD or safety shutoff valve includes both the valve body itself and an actuator which is the mechanism that allows the valve to quickly close in response to an emergency signal. Emergency shutdown (ESD) valves are used in high-risk industries to stop the flow of hazardous materials and prevent explosions, leaks, and environmental contamination. They are commonly used in the oil and gas, chemical processing, and offshore drilling industries.

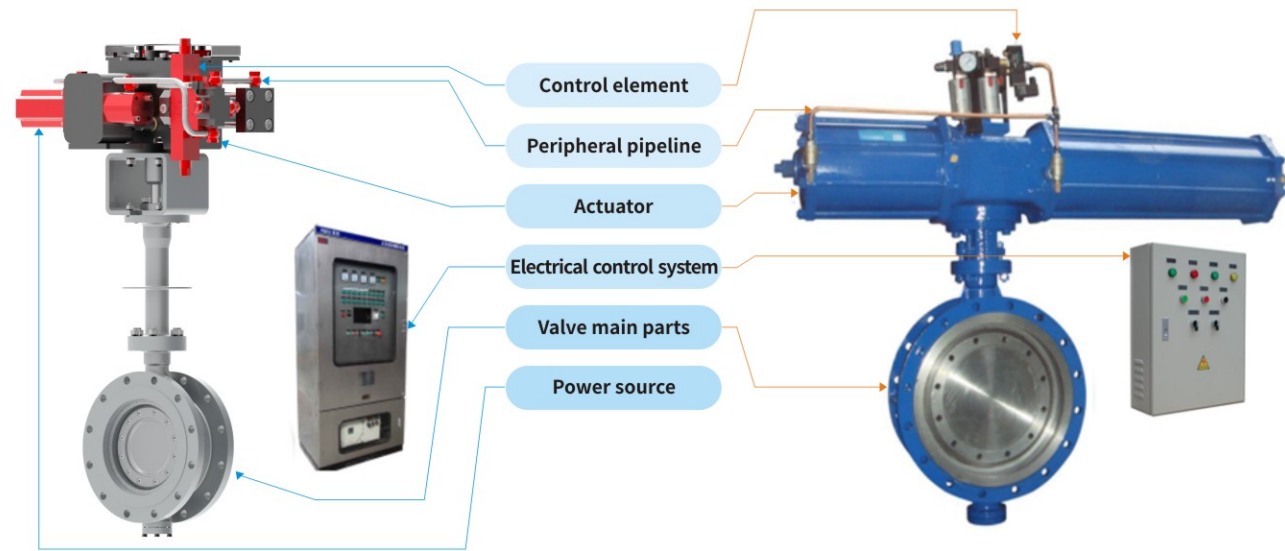


WORKING PRINCIPLE

Normally open type (FO): During normal operation, the valve remains in a fully open position allowing fluid to flow freely, and the solenoid valve coil is in a de-energized state, consuming no electrical power. In an emergency situation, such as the leakage of flammable gas, or the temperature or pressure within the equipment exceeding safe limits, the valve coil is instantaneously energized, triggering the valve to close quickly and enter a self-locking state. At the time of power outage, the valve remains in the self-locked closed state and will not automatically reopen.

Normally closed type (FC): During normal operation, the valve remains in a fully closed position blocking fluid flow until an external signal is applied to activate a mechanism like a solenoid coil, which then overcomes a spring force to open the valve and allow fluid to pass through. This type of emergency shut-off valve is commonly used in special applications, such as systems where safety requirements are extremely high and the valve is not allowed to remain open during a power outage.

Position retention (FL): During normal operation, the double-acting actuator controls the valve position by driving the piston movement with compressed air pressure, maintaining the valve at the set position. In the event of a failure, since the double-acting actuator does not have a spring return mechanism, the valve will not automatically open or close due to spring force when the energy supply fails. Instead, it relies on the internal mechanical structure and frictional forces within the actuator to temporarily hold the valve in the position where it was before the failure occurred.



TECHNICAL FEATURE

BALL VALVE PRODUCT DESIGN FEATURES

It is a quarter turn valve used widely for emergency shutdown applications. A stem connects to the ball, allowing it to be rotated to control flow. It has low fluid resistance, a simple structure, a relatively small volume, light weight, easy maintenance, good sealing performance, etc.

Emergency shut down ball valve design features

FZV ball valves are manufactured with critical design features which make them reliable to be used as an emergency shut down valve.

Low torque design

A low torque design typically achieved through features like low friction seals, and a well-aligned stem mechanism, refers to a design that minimizes the torque needed to rotate the ball and close reliably and quickly the valve in an emergency situation, and also reduces the cost of the actuator.

Improved lifetime

To extend valve lifespan by improving wear resistance, thermal spray coating is used to hard face the ball and seat sealing surfaces and also the connecting parts of the transmission chain by hard facing materials like tungsten carbide or chromium carbide.

Fire safe design

The metal-seated ball valve basically meets a fire safe feature as the sealing is provided by metal-to-metal contact area.

Soft-seated ball valve is designed with fire safe feature, when a fire occurs, soft seat is exposed to high temperature, it burns out and a metal to metal seal with the ball reduces the leakage to prevent a fire accident.

ISO5211 standard connection

The ball valves are designed with flange ISO5211 in the top of the valve which can be connected to all type of actuators including pneumatic, hydraulic, electric.

BUTTERFLY VALVE PRODUCT DESIGN FEATURES

A butterfly valve is a quarter-turn valve that regulates fluid flow by rotating a disc-shaped gate. The butterfly valve is known for its rapid and convenient operation, low fluid resistance, simple structure, relatively small size and weight, ease of maintenance, and good sealing performance.

Emergency shut down butterfly valve design features

FZV butterfly valves are manufactured with critical design features which make them reliable to be used as an emergency shut down valve.

Low torque design

A low torque design typically achieved through features like low friction seals, and a well-aligned stem mechanism, refers to a design that minimizes the torque needed to rotate the disc and close reliably and quickly the valve in an emergency situation, and also reduces the cost of the actuator.

Improved lifetime

To extend valve lifespan by improving wear resistance, the sealing surface of the disc and the seat is hard faced which helps to prevent scratches or deformation when the butterfly valve is quickly opened or closed.

Fire safe design

The metal-seated butterfly valve basically meets a fire safe feature as the sealing is provided by metal-to-metal contact area.

ISO5211 standard connection

The butterfly valves are designed with flange ISO5211 in the top of the valve which can be connected to all type of actuators including pneumatic, hydraulic, electric.

SAFETY INSTRUMENTED SYSTEM (SIS)

A safety instrumented system is composed of sensors, logic solvers, and final control elements whose purpose is to protect automatically a process from hazards. SISs are used in many industries, including oil, gas, and chemicals. The company's emergency shut down valve has drawn the strengths of each company, combined with the actual operation experience, and adopted a variety of analytical means to optimize the design and manufacturing. In the production process, it is strictly manufactured according to the mature process, seriously supervised according to the management system of efficient operation, strictly controlled according to the pilot operation specifications before the factory, eliminate hidden dangers, and ensure the reliable and stable performance of the valve itself.

The emergency shut down valve is controlled by the external system, and the external safety system is interlocked. When the relevant safety signals are received, the functional requirements are urgently realized to prevent the occurrence of dangers and the spread of accidents, so as to minimize the harm.

Safety Level (SIL)

SIL refers to a measure of the reliability and integrity of a safety function within a system, typically ranging from SIL1 (lowest) to SIL4 (highest). According to IEC 61508 and other relevant standards, the company's related products have obtained SIL 3 qualification.

Risk reduction formula

➔

Risk

=

Probability

×

Consequence

SIL is the basis for system performance measurement of expected failure rate (PFD)

Safety integrity level	Risk reduction factor	Expected failure rate	Make an impact
SIL 4 (>99.99%)	>10,000	0.0001	The devastating effects of multiple casualties
SIL 3 (99.9-99.99%)	1,000-10,000	0.001-0.0001	Causing multiple injuries and a risk of death; It has a serious impact on the environment for a long time
SIL 2 (99-99.9%)	100-1,000	0.01-0.001	Serious, irreparable harm to one or more persons; Potential threat to the environment or short-term serious impact
SIL 1 (90-99%)	10-100	0.1-0.01	Single injury (minor injury) or cause minor problems to the environment

HIGH INTEGRITY PRESSURE PROTECTION SYSTEM (HIPPS)

By accurately monitoring and judging the pressure value and status of the process flow, HIPPS can produce fast and reliable shutdown when these values exceed the safe operating limits to shut down logistics, prevent high-pressure logistics from entering low-voltage equipment, and play a role in protecting low-voltage equipment, ensuring personnel safety, and preventing environmental pollution. Mainly used in offshore platforms (WHP/FPSO), oil and gas fields, natural gas pipelines, high-risk chemical equipment, etc.

HIPPS is a completely independent operating system that does not interfere with the process control shutdown system (PSD), emergency shutdown system (ESD), and control system of the oilfield production facility. In general, the HIPPS system consists of two ESD valves, a 1oo2 mode logic solver, and three 2oo3 mode pressure transmitters. The specific modules are as follows:

- Pressure and flow rate sensors ----- available in 1oo2 or/and 2oo3 modes;
- The logic decoder ----- can process sensor data efficiently and is the decision basis of HIPPS system.
- The decision module that meets the SIL 3 standard ----- ensures the safe operation of the system and eliminates potential high pressure hazards.

Compared to conventional PSD and ESD systems, HIPPS standalone instrument systems have higher integrity, which is mainly used in offshore platforms (WHP/FPSO), oil and gas fields, natural gas pipelines, high-risk chemical plants and other places.

ACTUATOR

The actuator is a device specially used to drive the valve to complete the opening, closing or adjusting action, which acts as the connection between the automatic control system and the valve, receives the control signal from the control system, and converts the signal into the corresponding mechanical action on the valve. In this way, the flow, pressure and other parameters of the fluid medium (such as gas, liquid, etc.) in the pipeline are controlled to ensure that the fluid transportation and regulation in various application scenarios such as industrial production process and facility operation meet the actual needs.

WORKING PRINCIPLE AND CLASSIFICATION

Pneumatic actuator: Pneumatic actuator is usually composed of cylinder, piston, push rod, spring and other components. It uses compressed air as a power source, and uses the pressure generated after the compressed air enters the cylinder to promote the piston movement, and then drives the valve stem to produce a straight line or rotating action, and this displacement can be used to drive the valve and other controlled objects to open, close or adjust the action. It is widely used in petroleum, chemical industry and other industries that have high requirements for explosion-proof.

Electric actuator: Electric actuator is mainly composed of motor, reducer, position transmitter, control circuit and other parts. It receives the electrical signal from the control system (generally 4-20mA current signal or 0-10V voltage signal, etc.), and the control circuit drives the motor to rotate according to this signal, and the rotation of the motor is transformed into the appropriate speed and torque after the reducer is decelerated, and then drives the valve stem to produce a straight line or rotating action. The valve can be opened, closed and adjusted.

Hydraulic actuator: Hydraulic actuator is mainly composed of hydraulic cylinder, piston, hydraulic pump, control valve and other components. It uses hydraulic oil as the working medium, the hydraulic pump pressurizes the hydraulic oil and stores it in the hydraulic system. When the control signal is received, the hydraulic oil is controlled into different chambers of the hydraulic cylinder through the control valve, so that the piston produces a linear displacement in the hydraulic cylinder, and then drives the connected valve stem to produce a linear or rotating action to operate the controlled object. Its biggest advantage is that it can provide a large output force and torque, so it is particularly suitable for driving large, heavy duty valves that require a large operating force.

PNEUMATIC CONTROL EXECUTION SYSTEM MATCHING MANUFACTURERS OPTIONAL

Pneumatic control executive system can be selected according to customer requirements
Actuator optional: ROTORK, EMERSON, FLOWBUS, St Hans, Fostucco, HES, etc.
Component optional: FESTO, SMC, ASCO, bifold, AIRTAC, CKD, NORGREN, NPPC, etc.



HYDRAULIC CONTROL EXECUTION SYSTEM CAN BE SELECTED BY THE MANUFACTURER

Hydraulic control execution system can be selected according to customer requirements.
ROTORK actuators optional, EMERSON, atlas, Eaton fluid in a vickers, rexroth (changzhou), baoshan hydraulic oil cylinder and the Yangtze river and other manufacturers.
Components optional: REXROTH, ATOS, Parker, bifold, hydraulic pressure, hydraulic pressure, Shanghai Beijing huade dawn, etc.



ELECTRIC EXECUTIVE CONTROL SYSTEM MANUFACTURER OPTIONAL

Electric control executive system can be selected according to customer requirements.
ROTORK, AUMA, EMERSON, Chuanyi, Fuyin, Aoxiang, etc.



CONTROL SYSTEM

AIR-ACTUATED CONTROL SYSTEM

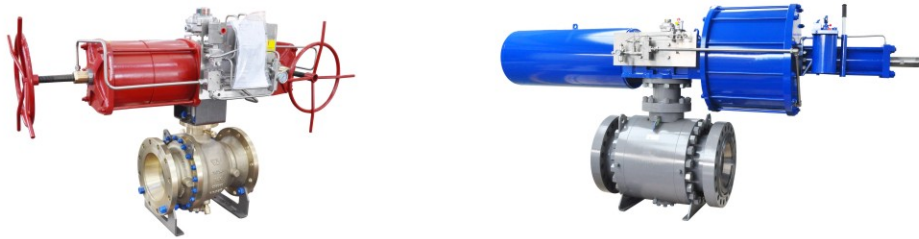
Simple construction: Pneumatic actuators are typically composed of basic components such as cylinders, pistons, and pushrods. Compared with some electric or hydraulic actuators, their mechanical structure is not complex. They do not have intricate electrical systems or complicated hydraulic circuits. Therefore, the overall construction is relatively intuitive and easy to understand. This makes them easier to operate during installation, maintenance, and repair.

Safety and Reliability: Pneumatic actuators use compressed air as the power source. Compressed air is inherently non-flammable and non-explosive. Compared to equipment that uses fuel or hydraulic oil as the power medium, the use of pneumatic actuators in many industrial environments with flammable and explosive risks (such as chemical plants and oil extraction sites) can significantly reduce safety hazards and ensure production safety.

High Output Force: By properly designing the size of the cylinder and the supply of air pressure, a relatively large output force can be achieved. This enables the actuator to easily drive large-diameter valves or control mechanisms that require a significant operating torque.

Strong Environmental Adaptability: Pneumatic actuators can operate normally under relatively harsh environmental conditions. They are capable of withstanding a variety of adverse factors such as high temperatures, humidity, dust, and corrosive gases.

Fast Response: Pneumatic actuators have a relatively fast response speed. When the air pressure signal changes, they can complete the action in a short period of time, enabling the opening, closing, or regulating operations of valves and other devices.



ELECTRIC CONTROL SYSTEM

High positioning accuracy: Electric actuators, equipped with high-precision motors and advanced control technologies—such as servo motors combined with encoder feedback systems—can accurately control the rotation angle or linear displacement of the output shaft. They can precisely position control elements like valves to the desired location, with positioning errors typically kept within a very small range.

Ease of automation: Electric actuators can be easily connected to various control systems, enabling remote control and automated operation through the reception of standard electrical signals. Operators can directly input commands from a central control room to precisely control the actions of the actuators, thereby managing the operating status of devices such as valves.

Compact structure and small size: Compared to some pneumatic and hydraulic actuators, electric actuators generally have a more compact overall structure and occupy less space. In particular, small electric actuators can be conveniently installed and arranged within devices with limited space.

Relatively high energy efficiency: Electric actuators directly convert electrical energy into mechanical energy, with relatively low energy losses during the conversion process. Some high-efficiency motors, in combination with optimized transmission mechanisms, can fully utilize electrical energy to achieve effective mechanical output, reducing unnecessary energy waste.

Relatively simple maintenance: Electric actuators typically do not have complex hydraulic or compressed air systems, eliminating issues such as oil leakage and air supply failures. Routine maintenance mainly focuses on the inspection and maintenance of the

motor, transmission components, and control circuits. As long as the basic conditions of normal motor operation, good electrical connections, and proper lubrication of the transmission components are ensured, the actuator can maintain good operating conditions.



HYDRAULIC CONTROL SYSTEM

High Output Force: In a closed hydraulic system, a large thrust is generated by applying a high-pressure source to the piston. Therefore, it can easily output significant force or torque, sufficient to drive various large-scale, heavy-duty valves and control mechanisms that require high operating forces.

High Positioning Accuracy: A hydraulic system can precisely control the flow and pressure of hydraulic oil through high-precision hydraulic control valves, thereby accurately regulating the movement speed and position of the actuator. With the assistance of corresponding sensor feedback systems, it can achieve relatively accurate positioning, meeting the requirements of applications that demand a certain level of control precision.

Fast Response Speed: Hydraulic oil is incompressible. When the hydraulic control valve receives a control signal to change the flow direction and volume of the hydraulic oil, the actuator can quickly respond and rapidly complete the corresponding action. It performs exceptionally well in applications that require rapid and frequent movements.

Strong Overload Resistance: A hydraulic system inherently has certain overload protection capabilities. When the actuator encounters a load exceeding its rated capacity, the hydraulic oil will flow through safety devices such as relief valves to release excess pressure, thereby protecting the actuator and all components of the hydraulic system from damage. It can effectively deal with potential overload issues in complex working conditions.

Suitability for Harsh Environments: The hydraulic oil in a hydraulic actuator circulates in a closed loop within the system. Dust, water vapor, and other impurities from the external environment are less likely to enter the hydraulic circuit and affect its normal operation. Therefore, it can adapt to harsh environmental conditions to a certain extent, such as high-temperature, humid, and dusty industrial sites.



CONTROL ELEMENT

Filter - pressure reducing valve and pneumatic two - piece unit or three - piece unit

The air filter regulator is an auxiliary device in a pneumatic actuator combination unit. After receiving compressed air at an input pressure of 0.3 to 1.0 MPa, it can supply a clean air source at 0.1 to 1.0 MPa to solenoid valves and valve positioners. The air filter regulator belongs to the pilot piston-type pressure-reducing valve category. By adjusting the spring pressure, the outlet pressure is set. The diaphragm senses changes in the outlet pressure, and the pilot valve controls the opening and closing to drive the piston, thereby regulating the flow area of the main valve's throttling section to achieve pressure reduction and stabilization. This product is primarily used in gas pipelines.

An oil mist lubricator is a special oil - injecting device. It atomizes the lubricating oil and injects it into the air flow. Then, along with the compressed air, the atomized oil flows into the parts that need lubrication, achieving the purpose of lubrication. The oil mist separator can separate the gaseous aerosol oil particles with a size of 0.3 - 5μm and rust particles and carbon particles larger than 0.3μm, which are difficult to be separated by the main line filter and the air filter.



INTRODUCTION OF SOLENOID VALVE

The solenoid valve is an electromagnetically controlled directional control valve, used to control the flow and direction of gases. It operates by controlling the movement of the valve core to block or expose different exhaust ports, while the intake port remains open. Compressed gas enters different exhaust pipes and then uses the air pressure from the solenoid valve to drive the piston of the cylinder. In this way, by controlling the current of the electromagnet in the pneumatic solenoid valve, the entire mechanical movement of the solenoid valve is controlled. The solenoid valve is a fundamental component for the automation of pneumatic valves.



INTRODUCTION OF LIMIT SWITCH

The limit switch is an important component of an actuator, mainly used to detect the position of the actuator's movement. When the actuator reaches the preset limit position, it will promptly send a signal to control the actuator to stop moving or trigger other related actions, ensuring that the actuator's movement stays within the specified range, thereby achieving precise control and safety protection.

Mechanical Contact Limit Switches: These switches have a simple structure and high reliability, operating through direct contact of mechanical parts to trigger the switch action. However, long-term use may cause wear that affects accuracy. They are suitable for applications where precision requirements are not extremely high and the working environment is relatively favorable.

Non-Contact Limit Switches: These switches offer the advantages of no wear, fast response, and high precision, detecting the position of the actuator using sensing technology. However, they are relatively expensive and may be affected by external electromagnetic interference. They are commonly used in automated control systems where high precision and reliability are required.



INTRODUCTION TO POSITIONER

A positioner is a control device used in conjunction with valves, typically mounted on control valves. It receives control signals from a controller and accurately controls the valve opening, enabling the valve to precisely regulate process parameters such as fluid flow rate, pressure, and temperature according to the system requirements.

Pneumatic Positioner: It accepts a 4-20mA current signal or other standard electrical signals from the controller, converting them into corresponding pneumatic signals that are output to the valve actuator. Based on the principle of force balance, the input current signal generates a magnetic field in the torque motor, which interacts with a permanent magnet to produce an electromagnetic force. This force actuates a lever or nozzle-flapper mechanism, altering the magnitude of the output pneumatic signal, thereby controlling the movement of the valve actuator and achieving the desired valve opening.

Smart Positioner of valve: In addition to the basic functions of an electro-pneumatic positioner, it is equipped with a microprocessor. The microprocessor calculates and processes the input signal and the actual valve position signal using advanced control algorithms. It then controls piezoelectric valves or other digital pneumatic control components via digital signals to precisely regulate the output pneumatic signal, achieving high-precision control of the valve. Moreover, it can communicate with a host computer or other devices through a communication interface, enabling remote parameter setting, diagnostics, and maintenance functions.



OTHER PNEUMATIC ACCESSORIES

Flow amplifier

When the output signal of the pneumatic control valve is transmitted far away or the capacity of the actuator is large, the use of the pneumatic accelerator can significantly improve the response speed of the actuator. The pneumatic accelerator is equipped with adjusting screws to overcome overshoot or oscillation.

Pneumatic control valve

Pneumatic components capable of rapid intake and exhaust. There are two threes, two fives, three fives.

Position maintaining valve

The position maintaining valve, also known as a pneumatic lock valve or a locking valve, can automatically shut down the passage between the control instrument and the actuator when a failure occurs in the air supply system. This ensures that the actuator's opening remains at the position it was in before the failure, thereby allowing the process to continue normally. Once the air supply failure is resolved, the valve can automatically restore the connection. Normal Operation. Therefore, the position-holding valve can serve as a safety protection device in the automatic control circuit.

Quick Exhaust Valve

A pneumatic component that can achieve rapid exhaust, used only for on-off valves.

Mechanical Valve

Manually or mechanically controlled air circuit.

Safety Valve

Overpressure protection.

Speed Controller

A pneumatic component used to regulate the intake speed.

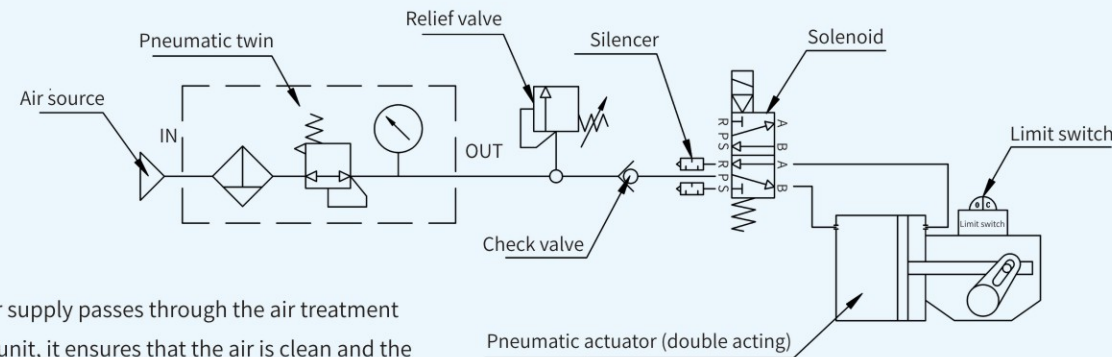
Junction Box

When the field wiring is relatively complex but the interface is small, a junction box is provided according to customer needs.

Fusible Plug

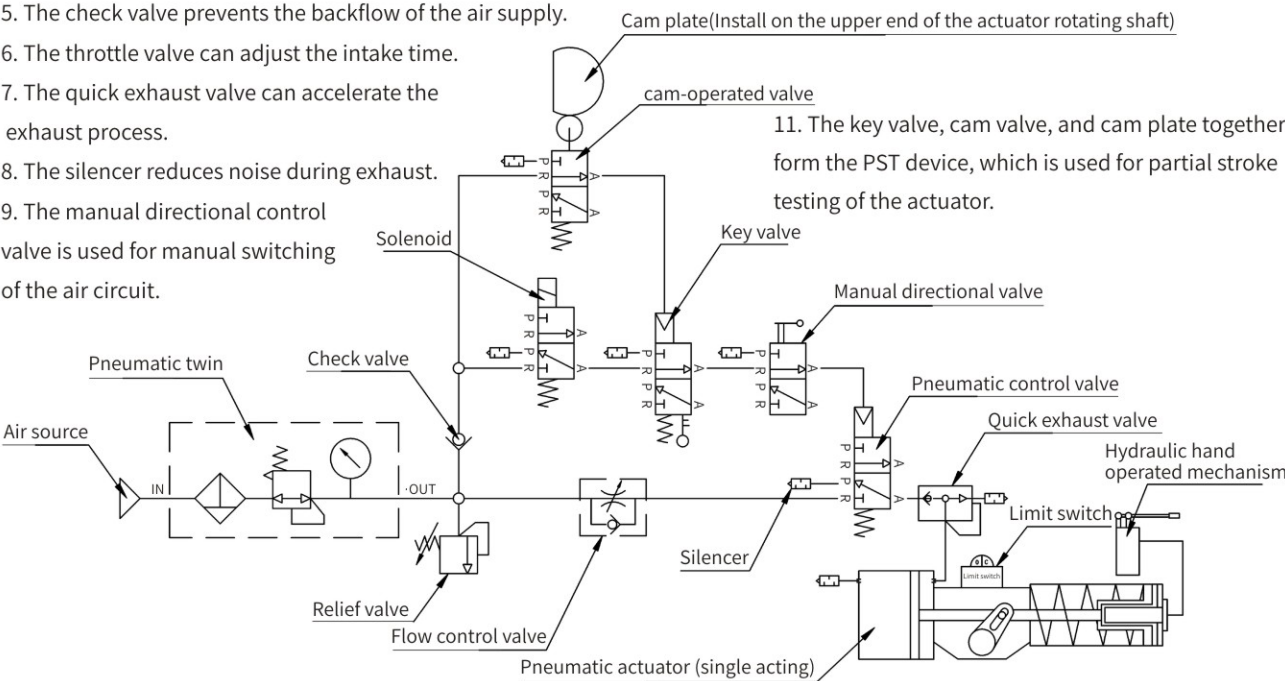
In case of high temperature or fire in the environment, the fusible plug melts to open the air circuit, allowing the actuator to achieve rapid exhaust and emergency reset of the actuator.

GAS PATH ANALYSIS



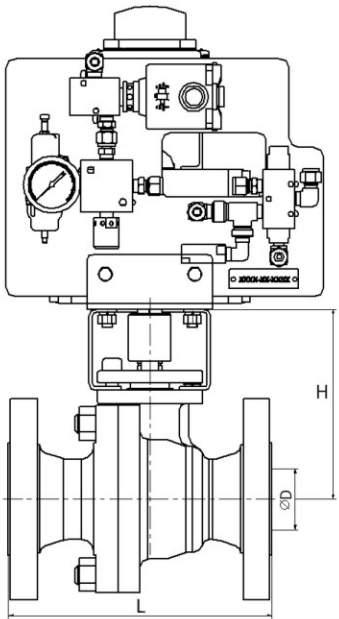
1. After the air supply passes through the air treatment combination unit, it ensures that the air is clean and the pressure is stable.
2. The solenoid valve controls the opening and closing of the pneumatic control valve, which receives air signals to control the operation of the pneumatic actuator.
3. The limit switch provides feedback on the position signals of the switch.
4. The pressure relief valve achieves overpressure protection.
5. The check valve prevents the backflow of the air supply.
6. The silencer reduces noise during exhaust.

1. After the air supply passes through the pneumatic two-piece combination, it ensures the air is clean and the pressure is stabilized.
2. The solenoid valve controls the opening and closing of the pilot valve, which receives air signals to control the operation of the pneumatic actuator.
3. The limit switch provides feedback on the position signals of the switch.
4. The pressure relief valve provides overpressure protection.
5. The check valve prevents the backflow of the air supply.
6. The throttle valve can adjust the intake time.
7. The quick exhaust valve can accelerate the exhaust process.
8. The silencer reduces noise during exhaust.
9. The manual directional control valve is used for manual switching of the air circuit.
10. The hydraulic manual mechanism can manually open and close the valve.
11. The key valve, cam valve, and cam plate together form the PST device, which is used for partial stroke testing of the actuator.



PRODUCT SIZE

CAST STEEL FLOAT

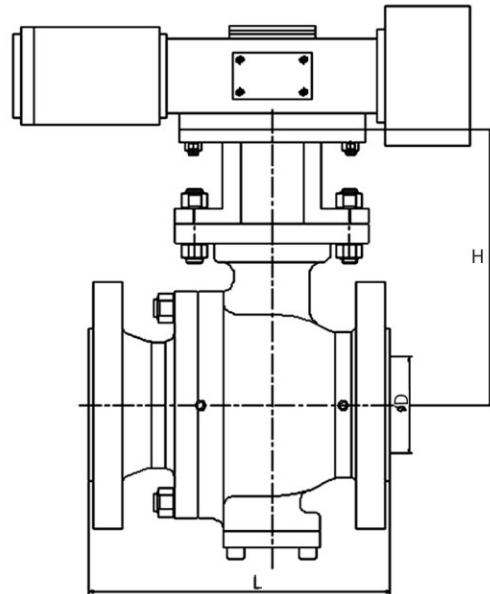


CLASS 150/PN20								CLASS 300/PN50							
NPS	DN	D mm	L mm	H mm	Cv Usgal/min	WT (Cast steel) Kg	ISO Coupling plate	NPS	DN	D mm	L mm	H mm	Cv Usgal/min	WT (Cast steel) Kg	ISO Coupling plate
1/2	15	13	108	89	46	2.5	F05	1/2	15	13	140	89	46	2.6	F05
3/4	20	19	117	90	97	3.2	F05	3/4	20	19	152	90	97	3.8	F05
1	25	25	127	101	168	5.6	F05	1	25	25	165	101	168	6	F05
1 1/2	40	38	165	145	389	7.2	F07	1 1/2	40	38	190	154.5	389	10.5	F07
2	50	50	178	156	647	9.8	F07	2	50	50	216	161	647	16	F07
3	80	76	203	215	2086	20	F10	3	80	76	283	216	2086	36	F10
4	100	100	229	221	2694	35.2	F10	4	100	100	305	221	2694	60	F10
6	150	150	394	300	6062	96	F14	6	150	150	403	301	6062	118	F14
8	200	202	457	360	10885	165	F14	8	200	202	502	360	10885	236	F16
10	250	252	533	410	17109	308	F16	10	250	252	568	410	17109	431	F25

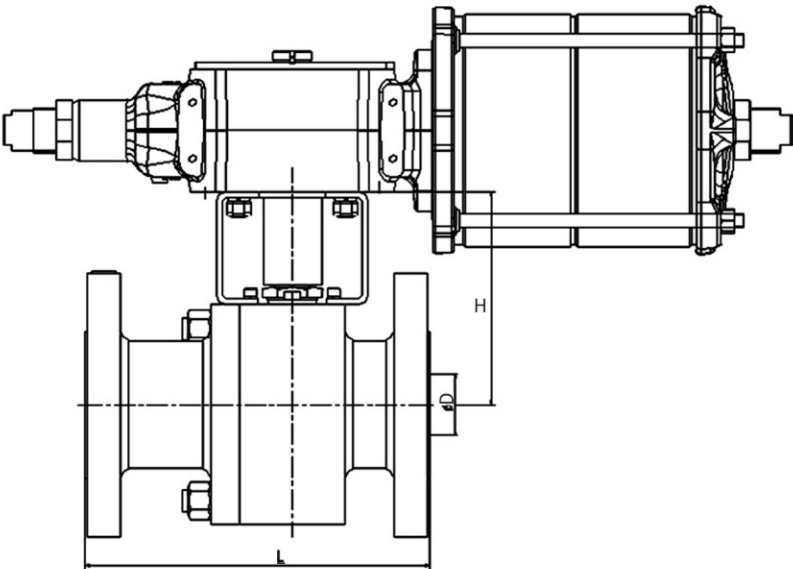
CLASS 600/PN100							
NPS	DN	D mm	L mm	H mm	Cv Usgal/min	WT(Cast steel) Kg	ISO Coupling plate
1/2	15	13	165	89	46	2.8	F05
3/4	20	19	190	90	97	5.3	F05
1	25	25	216	111	168	7	F07
1 1/2	40	38	241	156	389	13.6	F10
2	50	50	292	167	647	19	F10
3	80	76	356	220	2086	45	F14
4	100	100	432	261.5	2694	76	F16
6	150	151	559	320	6062	141	F16

The above H dimensions and ISO connection disk are for reference and can be adjusted according to the size of the actuator. The weight does not include the actuator.

CAST STEEL TRUNNION



FORGED STEEL FLOAT



CLASS 150/PN20							
NPS	DN	D mm	L mm	H mm	Cv Usgal/min	WT(Cast steel) Kg	ISO Coupling plate
2	50	50	178	210	46	19	F07
3	80	76	203	220	97	36	F10
4	100	100	229	246	168	53	F10
6	150	152	394	318	389	100	F10
8	200	201	457	368	647	172	F16
10	250	252	533	415	2086	284	F16
12	300	303	610	479	2694	494	F25
14	350	334	686	521	6062	592	F25
16	400	385	762	564	10885	805	F25
20	500	487	914	618	17109	1308	F25

CLASS 150/PN20							
NPS	DN	D mm	L mm	H mm	Cv Usgal/min	WT(Cast steel) Kg	ISO Coupling plate
1/2	15	13	108	89	46	2.7	F05
3/4	20	19	117	95	97	3.2	F05
1	25	25	127	104	168	6	F07
1 1/2	40	38	165	133	389	12	F07
2	50	50	178	142	647	15	F07
3	80	76	203	175	2086	22	F10
4	100	100	229	193	2694	46	F10
6	150	150	394	250	6062	110	F16
8	200	202	457	302	10885	175	F16
10	250	252	533	360	17109	320	F25

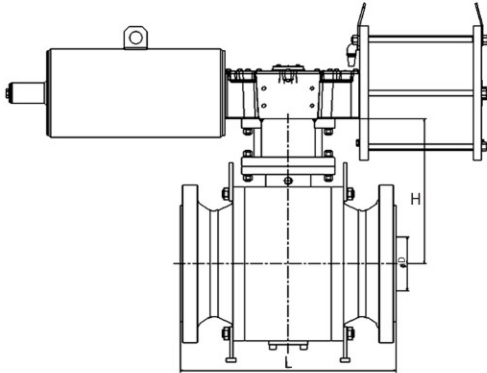
CLASS 300/PN50								CLASS 600/PN100							
NPS	DN	D mm	L mm	H mm	Cv Usgal/min	WT (Cast steel) Kg	ISO Coupling plate	NPS	DN	D mm	L mm	H mm	Cv Usgal/min	WT (Cast steel) Kg	ISO Coupling plate
2	50	50	216	220	46	25	F10	2	50	50	292	220	46	30	F12
3	80	76	283	250	97	42	F10	3	80	74	356	250	97	55	F12
4	100	100	305	279	168	95	F12	4	100	100	432	279	168	106	F12
6	150	151	403	323	389	200	F16	6	150	151	559	328	389	225	F16
8	200	202	502	375	647	246	F16	8	200	202	660	401	647	295	F25
10	250	252	533	425	2086	308	F25	10	250	252	787	475	2086	545	F25
12	300	303	648	481	2694	512	F25	12	300	303	838	557	2694	695	F30
14	350	334	762	528	6062	612	F25	14	350	334	889	580	6062	993	F30
16	400	385	838	585	10885	1018	F25	16	400	385	991	600	10885	1350	F30
20	500	487	991	662	17109	1352	F30	20	500	487	1194	685	17109	2264	F35

CLASS 300/PN50								CLASS 600/PN100							
NPS	DN	D mm	L mm	H mm	Cv Usgal/min	WT (Cast steel) Kg	ISO Coupling plate	NPS	DN	D mm	L mm	H mm	Cv Usgal/min	WT (Cast steel) Kg	ISO Coupling plate
1/2	15	13	140	89	46	3	F05	1/2	15	13	165	89	46	4.5	F05
3/4	20	19	152	95	97	3.6	F05	3/4	20	19	190	90	97	9.5	F05
1	25	25	165	124	168	10	F07	1	25	25	216	126	168	17	F07
1 1/2	40	38	190	148	389	18	F07	1 1/2	40	38	241	155	389	22	F10
2	50	50	216	152	647	22	F07	2	50	50	292	178	647	40	F12
3	80	76	283	173	2086	38	F10	3	80	76	356	205	2086	80	F14
4	100	100	305	220	2694	78	F12	4	100	100	432	250	2694	150	F16
6	150	150	403	258	6062	150	F14	6	150	151	559	316	6062	210	F16
8	200	202	502	335	10885	225	F16								
10	250	252	568	380	17109	368	F25								

The above H dimensions and ISO connection disk are for reference and can be adjusted according to the size of the actuator. The weight does not include the actuator.

The above H dimensions and ISO connection disk are for reference and can be adjusted according to the size of the actuator. The weight does not include the actuator.

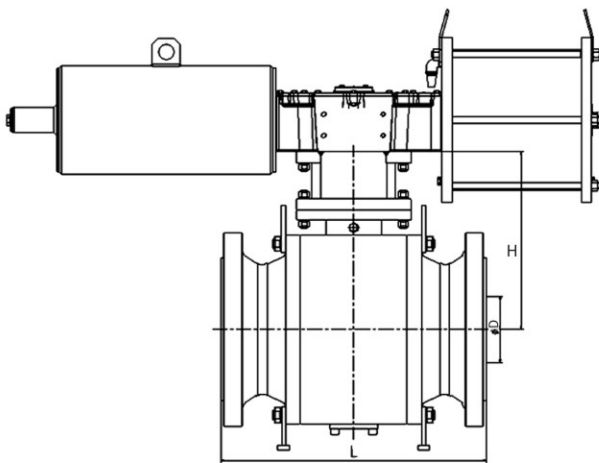
FORGED STEEL TRUNNION



CLASS 150/PN20							
NPS	DN	D mm	L mm	H mm	Cv Usgal/min	WT(Cast steel) Kg	ISO Coupling plate
2	50	49	178	180	647	20	F10
3	80	74	203	210	2086	42	F12
4	100	100	229	240	2694	55	F12
6	150	150	394	266	6062	154	F16
8	200	201	457	315	10885	270	F16
10	250	252	533	360	17109	462	F25
12	300	303	610	420	24734	646	F25
14	350	334	686	459	30055	958	F25
16	400	385	762	500	39934	1248	F25
20	500	487	914	549	63865	1440	F25
24	600	589	1067	681	96465	2810	F30
28	700	684	1245	750	125760	4045	F35
30	750	735	1295	790	145213	4850	F35
32	800	779	1372	870	163119	5490	F35
36	900	874	1524	1170	205330	8950	F35

CLASS 300/PN50								CLASS 600/PN100							
NPS	DN	D mm	L mm	H mm	Cv Usgal/min	WT (Cast steel) Kg	ISO Coupling plate	NPS	DN	D mm	L mm	H mm	Cv Usgal/min	WT (Cast steel) Kg	ISO Coupling plate
2	50	49	216	180	647	23	F10	2	50	49	292	190	647	33	F10
3	80	74	283	210	2086	50	F12	3	80	74	356	220	2086	58	F12
4	100	100	305	240	2694	72	F12	4	100	100	432	250	2694	122	F12
6	150	150	403	266	6062	175	F16	6	150	150	559	273	6062	260	F16
8	200	201	502	315	10885	327	F16	8	200	201	660	334	10885	465	F25
10	250	252	568	360	17109	408	F25	10	250	252	787	450	17109	750	F25
12	300	303	648	420	24734	735	F25	12	300	303	838	512	24734	1090	F25
14	350	334	762	459	30055	1162	F25	14	350	334	889	546	30055	1335	F30
16	400	385	838	500	39934	1492	F25	16	400	385	991	580	39934	1810	F30
20	500	487	991	600	63865	2695	F30	20	500	487	1194	664	63865	3000	F35
24	600	589	1143	705	96465	3210	F35	24	600	589	1397	800	96465	5000	F35
28	700	684	1346	820	125760	4975	F35	28	700	684	1549	850	125760	6100	F40
30	750	735	1397	870	145213	5590	F40	30	750	735	1651	910	145213	9050	F40
32	800	779	1524	930	163119	6240	F40	32	800	779	1778	970	163119	9940	F48
36	900	874	1727	1270	205330	10280	F40	36	900	874	2083	1315	205330	13530	F48

The above H dimensions and ISO connection disk are for reference and can be adjusted according to the size of the actuator. The weight does not include the actuator.

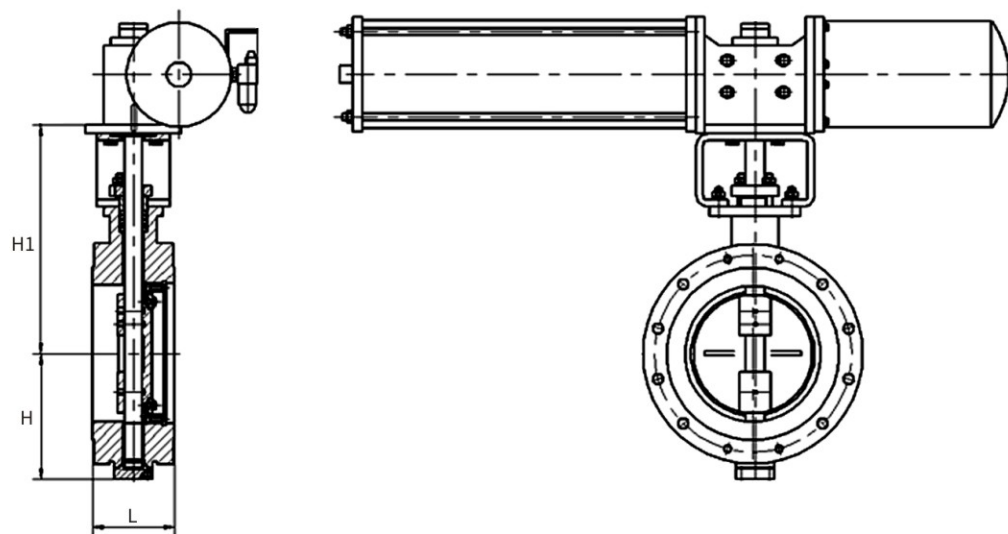


CLASS 900/PN150							
NPS	DN	D mm	L mm	H mm	Cv Usgal/min	WT(Cast steel) Kg	ISO Coupling plate
2	50	49	368	200	645	59	F12
3	80	74	381	220	1472	76	F12
4	100	100	457	250	2688	135	F14
6	150	150	610	283	6048	305	F25
8	200	201	737	420	10860	560	F25
10	250	252	838	500	17070	858	F25
12	300	303	965	530	24678	1343	F25
14	350	322	1029	545	27870	1610	F30
16	400	373	1130	573	37398	2525	F35
20	500	471	1321	710	59631	3480	F40
24	600	570	1549	850	87333	7030	F40
26	650	617	1651	880	102329	8270	F40
30	750	712	1880	980	136267	12440	F48
36	900	855	2286	1360	196500	19660	F48

CLASS 1500/PN250								CLASS 2500/PN420							
NPS	DN	D mm	L mm	H mm	Cv Usgal/min	WT (Cast steel) Kg	ISO Coupling plate	NPS	DN	D mm	L mm	H mm	Cv Usgal/min	WT (Cast steel) Kg	ISO Coupling plate
2	50	49	368	210	645	65	F12	2	50	42	451	290	474	226	F16
3	80	74	470	240	1472	150	F16	3	80	62	578	330	1033	482	F16
4	100	100	546	280	2688	220	F16	4	100	87	673	420	2035	721	F25
6	150	144	705	430	5574	461	F25	6	150	131	914	517	4613	1524	F30
8	200	192	832	450	9909	640	F25	8	200	179	1022	550	8613	1880	F30
10	250	239	991	481	15354	1210	F30	10	250	223	1270	616	13367	3140	F40
12	300	287	1130	563	22141	1592	F35	12	300	265	1422	685	18876	4260	F40
14	350	315	1257	645	26672	2260	F40								
16	400	360	1384	690	34836	3760	F40								
20	500	454	1664	820	55404	8060	F48								
24	600	534	2043	930	81219	14550	F48								

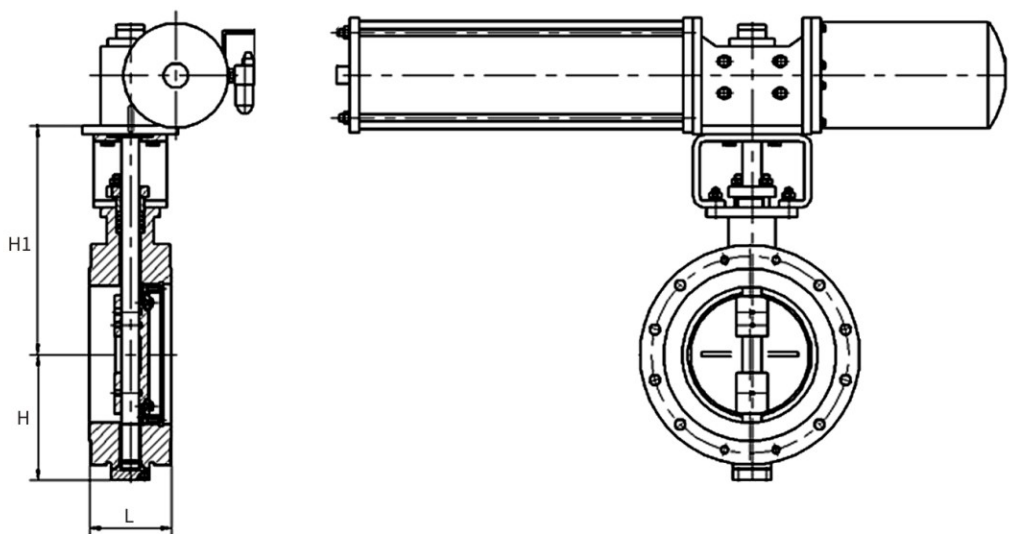
The above H dimensions and ISO connection disk are for reference and can be adjusted according to the size of the actuator. The weight does not include the actuator.

THREE-ECCENTRIC CENTER BUTTERFLY VALVE



CLASS 150/PN20						
NPS	L mm	H mm	H1 mm	Cv Usgal/min	WT(Cast steel) Kg	ISO Coupling plate
3	114	95	195	165	37	F07
4	127	115	205	318	54	F07
6	140	147	270	932	93	F10
8	152	185	310	1970	214	F12
10	165	215	355	2689	259	F14
12	178	250	395	3900	337	F14
14	190	290	440	5280	473	F16
16	216	320	490	7800	516	F25
18	222	345	510	9800	648	F25
20	229	375	535	12180	766	F25
24	267	440	605	19800	1086	F25
28	292	535	680	27600	1655	F30
32	318	625	760	35800	2285	F30
36	330	675	850	45600	2935	F35
40	410	725	905	56000	3510	F35
48	470	860	1020	83000	5530	F40

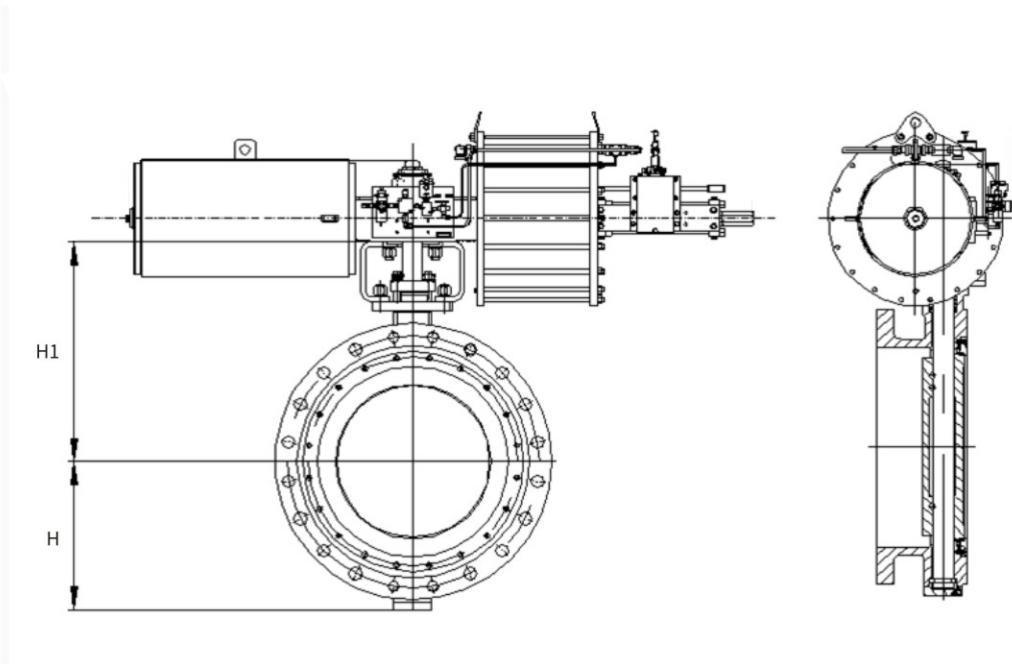
The above H~H2, L1~L3 dimensions and ISO connection disks are for reference, and can be adjusted according to specific conditions. The weight is for reference



CLASS 300/PN50						
NPS	L mm	H mm	H1 mm	Cv Usgal/min	WT(Cast steel) Kg	ISO Coupling plate
3	180	105	205	165	165	F07
4	190	128	225	318	318	F07
6	210	190	295	682	682	F12
8	230	230	345	1230	1230	F14
10	250	260	400	2370	2370	F16
12	270	300	440	3560	3560	F16
14	290	330	485	4780	4780	F25
16	310	365	510	6280	6280	F25
18	330	405	550	8000	8000	F25
20	350	440	600	10800	10800	F30
24	390	520	675	16200	16200	F30
28	430	685	775	22500	22500	F35
32	470	705	895	33100	33100	F40
36	510	760	950	42100	42100	F40
40	550	765	960	49000	49000	F40

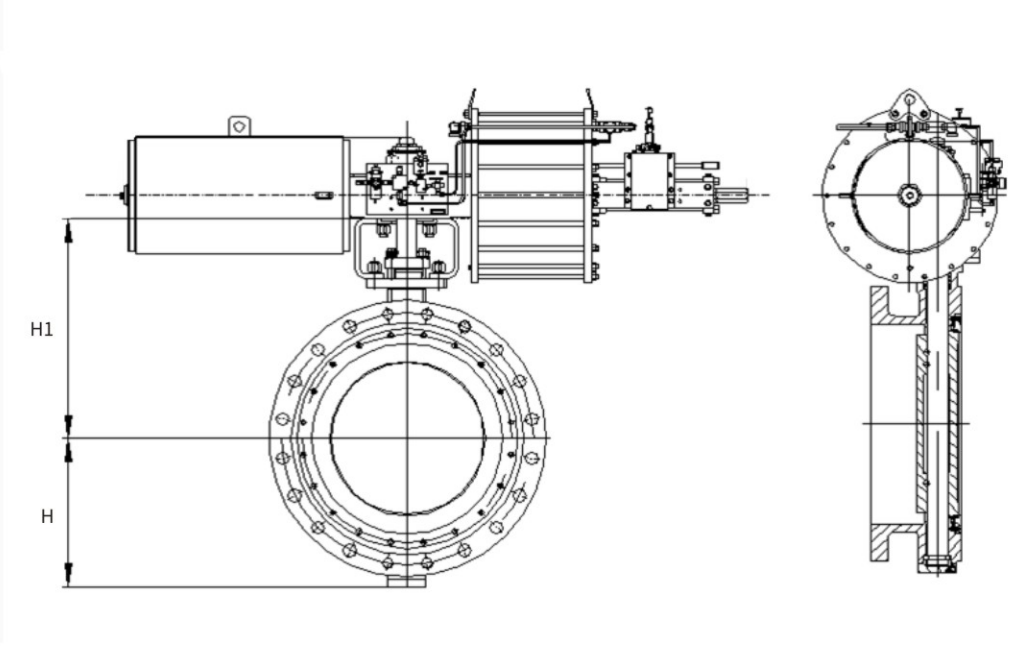
The above H~H2, L1~L3 dimensions and ISO connection disks are for reference, and can be adjusted according to specific conditions. The weight is for reference

DOUBLE ECCENTRIC BUTTERFLY VALVE



CLASS 150/PN20						
NPS	L mm	H mm	H1 mm	Cv Usgal/min	WT(Cast steel) Kg	ISO Coupling plate
3	114	95	195	165	37	F07
4	127	115	205	318	54	F07
6	140	147	270	932	93	F10
8	152	185	310	1970	213	F12
10	165	215	355	2689	256	F14
12	178	250	395	3900	332	F14
14	190	290	440	5280	468	F16
16	216	320	490	7800	510	F25
18	222	345	510	9800	640	F25
20	229	375	535	12180	760	F25
24	267	440	605	19800	1080	F25
28	292	535	680	27600	1630	F30
32	318	625	760	35800	2250	F30
36	330	675	850	45600	2900	F35
40	410	725	905	56000	3475	F35
48	470	860	1020	83000	5500	F40

The above H~H2, L1~L3 dimensions and ISO connection disks are for reference, and can be adjusted according to specific conditions. The weight is for reference



CLASS 300/PN50						
NPS	L mm	H mm	H1 mm	Cv Usgal/min	WT(Cast steel) Kg	ISO Coupling plate
3	180	105	205	50	50	F07
4	190	128	225	60	80	F07
6	210	190	295	80	195	F12
8	230	230	345	95	314	F14
10	250	260	400	105	421	F16
12	270	300	440	105	472	F16
14	290	330	485	130	662	F25
16	310	365	510	145	940	F25
18	330	405	550	8000	1010	F25
20	350	440	600	10800	1480	F30
24	390	520	675	16200	2160	F30
28	430	685	775	22500	3140	F35
32	470	705	895	33100	4212	F40
36	510	760	950	42100	5285	F40
40	550	765	960	49000	6090	F40

The above H~H2, L1~L3 dimensions and ISO connection disks are for reference, and can be adjusted according to specific conditions. The weight is for reference