

**VOLUME IX:
QUARTER TURN
VALVE
AUTOMATION**

**Industrial Technical
Manual Series**

FIFTH EDITION

IPEX QUARTER TURN AUTOMATION

- PNEUMATIC ACTUATION
- ELECTRIC ACTUATION
- ACCESSORIES



IPEX
by aliaxis

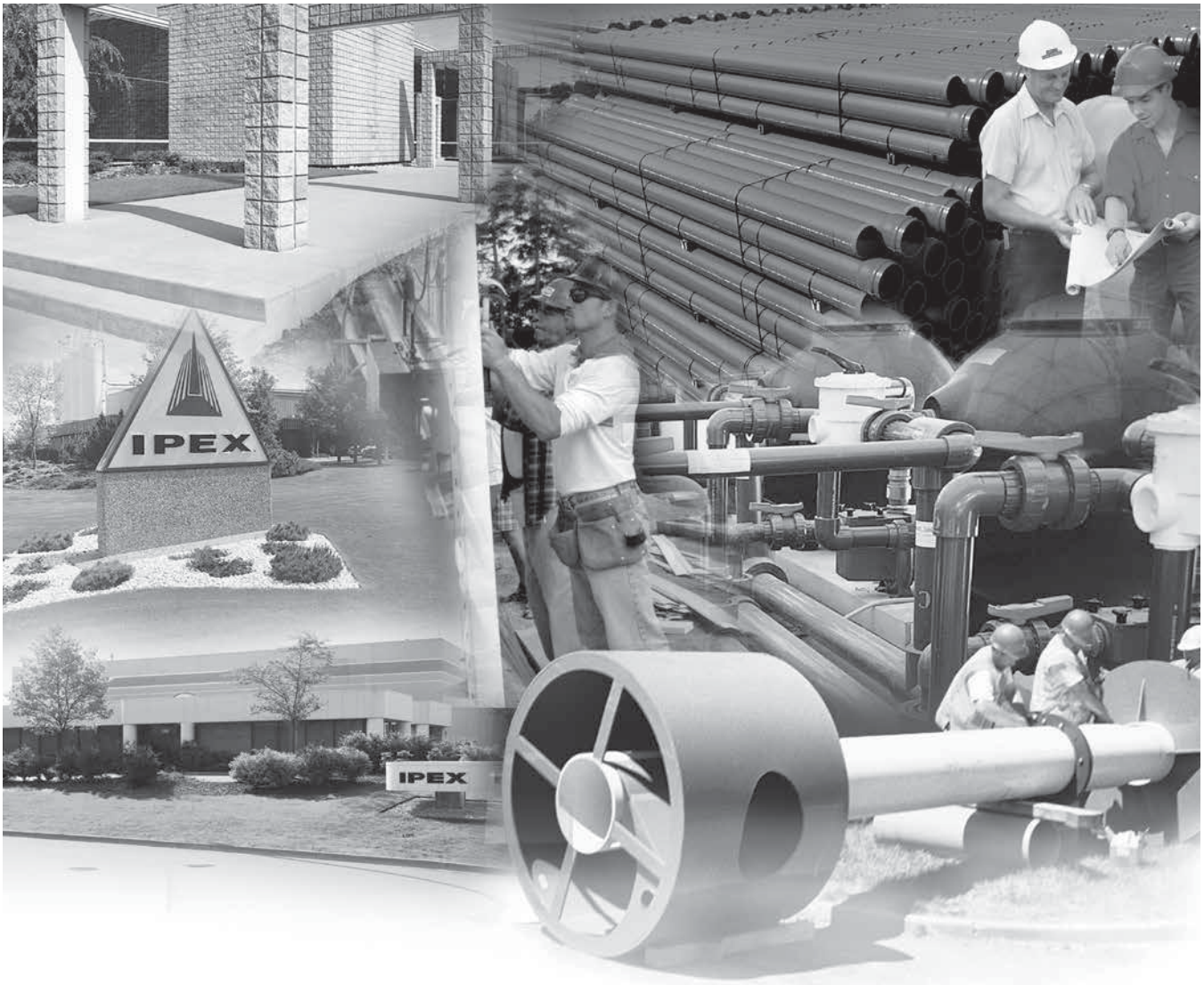
Quarter Turn Automation

Industrial Technical Manual Series

Vol. IX, 5th Edition

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ABOUT IPEX

At IPEX, we have been manufacturing non-metallic pipe and fittings since 1951. We formulate our own compounds and maintain strict quality control during production. Our products are made available for customers thanks to a network of regional stocking locations throughout North America. We offer a wide variety of systems including complete lines of piping, fittings, valves and custom-fabricated items.

More importantly, we are committed to meeting our customers' needs. As a leader in the plastic piping industry, IPEX continually develops new products, modernizes manufacturing facilities and acquires innovative process technology. In addition, our staff take pride in their work, making available to customers their extensive thermoplastic knowledge and field experience. IPEX personnel are committed to improving the safety, reliability and performance of thermoplastic materials. We are involved in several standards committees and are members of and/or comply with the organizations listed on this page.

For specific details about any IPEX product, contact our customer service department.

Safety Alerts

Engineered thermoplastics are safe inert materials that do not pose any significant safety or environmental hazards during handling or installation. However, improper installation or use can result in personal injury and/or property damage. It is important to be aware of and recognize safety alert messages as they appear in this manual.

The types of safety alert messages are described below.



This safety alert symbol indicates important safety messages in this manual. When you see this symbol be alert to the possibility of personal injury and carefully read and fully understand the message that follows.

WARNING

"WARNING" identifies hazards or unsafe practices that can result in severe personal injury or death if instructions, including recommended precautions, are not followed.

CAUTION

"CAUTION" identifies hazards or unsafe practices that can result in minor personal injury or product or property damage if instructions, including recommended precautions, are not followed.

Note: The use of the word "NOTE" signifies special instructions which are important but are not related to hazards.

For the materials described in this manual, the following warning applies.

WARNING

- NEVER use compressed air or gas in PVC/CPVC/PP/PVDF pipe and fittings.
- NEVER test PVC/CPVC/PP/PVDF pipe and fittings with compressed air or gas, or air-over-water boosters.
- ONLY use PVC/CPVC/PP/PVDF pipe for water and approved chemicals.



Use of compressed air or gas in PVC/CPVC/PP/PVDF pipe and fittings can result in explosive failures and cause severe injury or death.

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CONTENTS

	Quarter Turn Automation Manual	
	About IPEX	
	Safety Alerts	<i>i</i>
Section One:	Introduction to Quarter Turn Automation	
	General Information	1
Section Two:	Pneumatic Actuators	
	Overview	3
	Features	4
	Operation Guide	5
Section Three:	Electric Actuators	
	Overview	7
	Features	8
Section Four:	Quarter Turn Valve Automation Submittal	9
Section Five:	Automated Ball Valves	
	VKD Series Automated Ball Valves	11
	TKD Series 3-Way Automated Ball Valves	28
Section Six:	Automated Butterfly Valve	
	FK Series Automated Butterfly Valves	53
	FE Series Automated Butterfly Valves	65
Section Seven:	Accessories	
	Solenoid	81
	Speed Control	82
	Exhaust Filter	82
	Limit Switch Box	82
	SPDT Mechanical Switches	83
	Inductive Proximity Sensors	83
	Positioners	84
	Accessories – Pneumatic Actuator	86
	Accessories – Mounting	87
Section Eight:	Standards	
	Overview	89

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SECTION ONE: INTRODUCTION TO QUARTER TURN AUTOMATION

General Information

More and more industrial processes are turning to automation both as a way of reducing cost and increasing capabilities. Automation allows an operator to control a near infinite number of valves/functions with speed and precision, from a centralized remote location. With increased software sophistication, entire systems can be operated and monitored by a central management system. The popularity of valve automation continues to increase; therefore, focus and understanding of these products is essential to our industry. From simple 'on/off' to complex 'metering' functions, the choices are almost limitless.

A quarter turn valve is any kind of valve that will travel from the fully open to the fully closed position in a 90° motion. Ball, butterfly and certain diverting/multi-port valves fall under this description. Ball and butterfly valves are two of the most commonly used valves in pipelines and feature large flow rates and quick on/off operation.

Without a power source the actuator itself is inadequate. Something needs to 'drive' the actuator so that it can cycle the valve. Two inexpensive, readily available, and easy to transport power options are compressed air (or hydraulic fluid), or electricity. The decision of which to use is determined by the cost of the unit (actuated valve), cost (or availability) of the power supply system, the system layout, performance requirements and operating conditions.

The three basic control functions available through quarter turn automation are:

Double Acting

This requires external power for each stroke. For example, power to open the valve, then power to close the valve.

Normally Open

Also referred to as 'fail safe open', the default position is open and the actuator requires power to close the valve.

Normally Closed

Also referred to as 'fail safe closed', the default position is closed and the actuator requires power to open the valve.

NOTES

SECTION TWO: PNEUMATIC ACTUATORS

Overview

Pneumatic actuators are the most common choice for quarter turn plastic valves in process applications. Compressed air systems are readily available in any plant, and the cost of the actuator itself is generally lower than that of an electric unit with a comparable torque output. Typical quarter turn automation seldom requires positioning (something achieved more easily with an electric actuator), therefore the cycle life of a pneumatic unit will be substantially greater, and will be intrinsically safer than an electric actuator in volatile environments.

While there are many different kinds of pneumatic actuators, a rack and pinion style is the preferred choice within the plastic piping industry. This type of actuator is quite tough and rugged, and has a high cycle life. They generally have a compact, simple construction, and certain models can be quite light in weight. The design also allows the same basic actuator to be used as a double acting or (with minor additions) a spring return unit.

Spring Return (Air to Spring)

A spring return pneumatic actuator which requires an air stroke to either close or open the valve and contains a spring that forces the valve back to the opposite (default) position.

Normally Closed (Fail Safe Closed)

A spring return actuator mounted on the valve in such a way that at the end of the spring stroke the valve is closed. Air is required to open the valve. This will be the preferred choice if the valve is mostly in the closed position or if, in case of an emergency where the power to the actuator fails, the valve needs to close for safety reasons.

Normally Open (Fail Safe Open)

A spring return actuator mounted on the valve in such a way that at the end of the spring stroke the valve is open. Air is required to close the valve. This will be the preferred choice if the valve is mostly in the open position or if, in case on an emergency where the power to the actuator fails, the valve needs to open for safety reasons.

Double Acting (Air to Air)

A pneumatic actuator with no spring stroke. Air is required to both open and close the valve. In the absence of new input (compressed air) the unit will remain in the previous position (either open or closed).

Control Media

Most pneumatic actuators will also work with a clean, non-clogging hydraulic fluid; however compressed air is generally more readily available. As such, both the cleanliness of the supply air, and corrosion resistance of the internal components will contribute to a long, maintenance free actuator life. Ambient air will also be in contact with many components of an actuator, so selection of suitable corrosion resistant materials (e.g. high strength polymers and stainless/epoxy coated metals) may be necessary.

Features

Depending on size and application, IPEX utilizes the UT Technopolymer or MT Aluminum Housing pneumatic actuators.

Compact Design

Our rack & pinion pneumatic actuator produces linear torque output in a compact design utilizing the same body and end caps for double acting and spring return units.

Corrosion Resistance

Double-Acting or Spring-Return housing are manufactured from a polyamide base material or an anodized aluminum utilizing high cycle life spring cartridges made with non-metallic materials (springs are epoxy coated).

Pre-Loaded Spring Cartridges

Epoxy coated special steel springs are pre-loaded with non-metallic materials. The stainless steel end cap fasteners are extra long to allow for spring relaxation. All parts are corrosion resistant.

Stainless Steel Pinions and Fasteners

All manufactured from high quality stainless steel.

Namur Mounting

Namur VDI/VDE 3845 and ISO 5211 dimensions on all sizes. No special blocks are required to mount solenoid valves, limit switches or positioners.

Blowout Proof Protection

Mechanically held in with our exclusive patent-pending flange design, pinions are 100% blowout proof ensuring safe and effective operation.

ISO 5211 Output Drive

Standard on all pneumatic actuators, the lower pinion comes standard as a double-square female output drive according to the ISO 5211 standard. Optional double-d shafts are available upon request.

Rugged Tooth Design

The pinion teeth are engaged the full length and stroke of the piston. The pinion height allows manual override without disturbing the indicated positions.

Solenoid Connection

Solenoid valve connection according to VDI/VDE 3845 made with an insert in alloy UNI 5076 (ASTM B179) coated with high corrosive resistance material; air connections are 1/4" NPT.

Versatile Operating Media

Air (lubricated if possible), Hydraulic oil or water, minimum of 40psi pressure (1 bar) and maximum of 120psi pressure (8 bar).

Working Temperature

Standard working temperature range of -4°F to 176°F (-20°C to 80°C).

Available:

Low temperature Silicone seals -55°F (-48°C)

High temperature Viton seals to 250°F (121°C) continuous; 300°F (149°C) cyclic

Degree of Travel

The standard angle of rotation is 90°. Additional travel rotations of 120°, 135°, 150° and 180° are available. MT aluminum housing actuators feature dual travel stops that provide for ± 10° stroke registration on both the opening and closing phases of the actuator stroke.

Honed Bore for High Cycle Life

Extruded aluminum body is internally machined and lapped to exact specifications. Honing prevents dry spots from forming within the actuator bore and therefore eliminates premature seal failure – a critical aspect to long cycle life. All internal and external surfaces are hard anodized for corrosion resistance, with all units permanently lubricated at the factory with non-silicone grease.

High Cycle Bearings

Shaft bearings isolate the pinion gear from the housing and support the shaft for high cycle applications.

High Visibility Position Indication

External open/close indicator is standard, available for all the rotations.

Traceability

All units are serial number stamped for traceability back to the manufacturing date, time, and personnel.

Quality Assurance

All units are seal tested throughout the cycle of the actuator on highly sensitive electronic equipment.

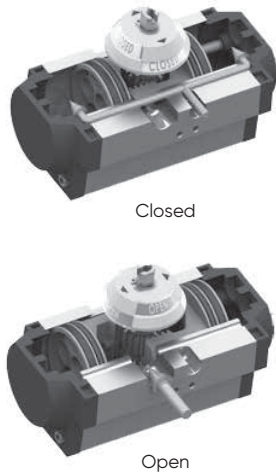
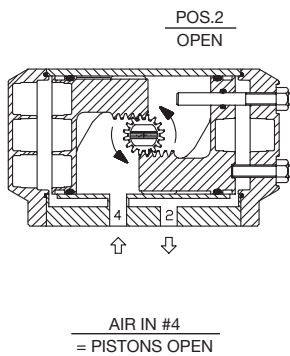
Operation Guide

Double Acting Actuators

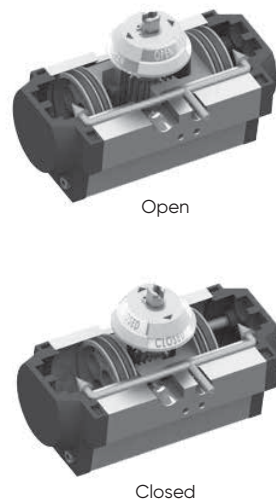
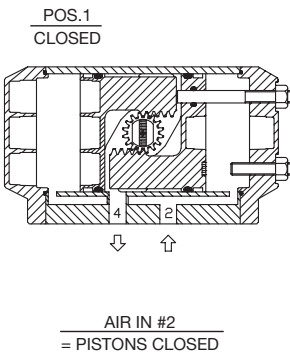
IPEX actuators have a standard angle of rotation of 90°. Additional travel rotations of 120°, 135°, 150°, and 180° are available. MT models feature dual travel stops that provide for +10° stroke registration on both the opening and closing phases of the actuator stroke.

Double Acting

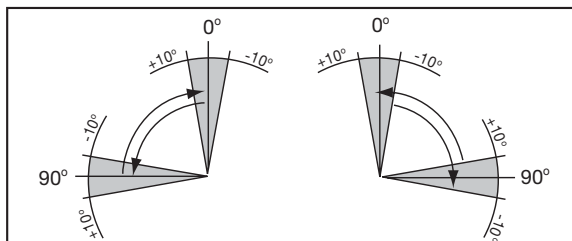
Opening Phase



Closing Phase



↑ = AIR IN ↓ = AIR OUT



Spring Return Actuator Terminology

1. Air Stroke

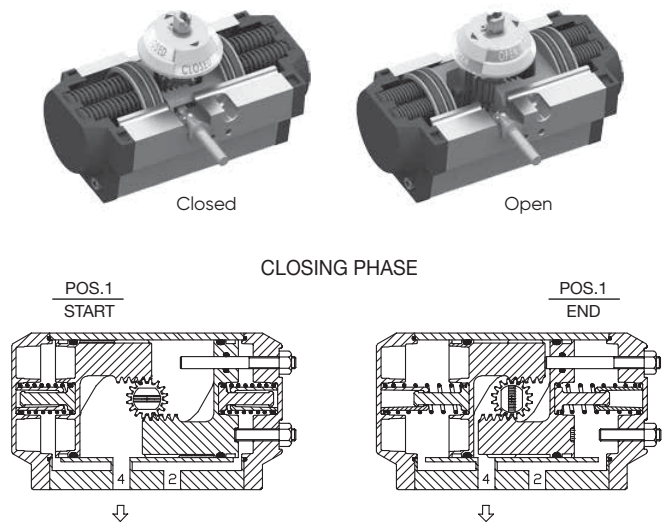
When air is supplied to the actuator, the pistons compress the springs. The greater the spring compression, the less torque output the actuator can supply.

2. Spring Stroke

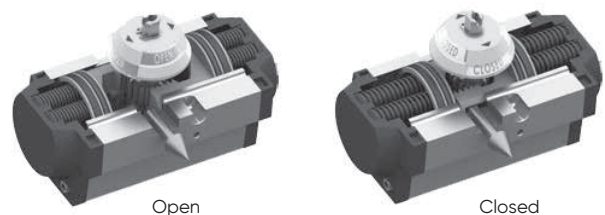
When air is removed from the actuator, the stored energy in the springs forces the pistons inward. At full compression, the spring is at its maximum torque output. This is the Spring Start. When springs are uncompressed, this is the Spring End.

3. Fail Position

IPEX actuators can be preset for fail closed or fail open operation.



AIR FIGURE = PISTONS CLOSE (SPRING RELEASE)



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SECTION THREE: ELECTRIC ACTUATORS

Overview

Although slightly more expensive than pneumatics, electric actuators have certain desirable benefits. They are the preferred choice when cycle time is an issue, as a quick closing pneumatically actuated valve could cause a damaging pressure surge condition (water hammer). The use of an electric actuator may also be preferred when the distance from the power source is considerable. The friction losses in long runs of compressed air line may result in reduced efficiency and/or additional compressor stations.

In addition, electric actuators are the preferred (if not the only) choice when a quarter turn valve like a multi-port is used. In this case, it is possible that the travel required is not just 0° to 90° but 0° to 90° to 180°. A rack and pinion actuator would need four separate pistons and a multiplicity of related air chambers, whereas this is easily accomplished with an electric unit.

Most electric actuators have a cam/limit switch arrangement which allows the unit to be set up for a variety of rotations. The two standard limit switches can be used to provide a remote location with an open or closed signal. A multitude of voltages both for AC and DC current are also typically available.

IP Rating

IP stands for 'Ingress Protection'. An IP number is used to specify the environmental protection of enclosures around electronic equipment. These ratings are determined by specific tests. The IP number is composed of two numbers, the first referring to the protection against solid objects and the second against liquids. The higher the number, the better the protection.

Nema Rating

Electric actuators are often supplied with a NEMA 4 or equivalent rated enclosure. This allows the use of the actuated valve in outdoor applications. More demanding environments may require a greater rating (e.g. 4X for corrosion proof, 7 for explosion proof, etc.)

Declutchable Manual Override

Most electric units will have a way to manually rotate the actuator's shaft (thus opening or closing the valve). Depending on the size of the actuator, this may be a very difficult if not impossible operation. A declutchable override will allow the manual operation of the valve without having to fight the resistance of the actuator's winding.

Reversible

A reversible actuator will travel in one direction (e.g. clockwise) to open (or close), and then will reverse its direction of travel to reach the opposite function. Although more expensive than unidirectional units, reversible actuators are preferable. Reversing the travel will wear the valve seat in an even way resulting in much greater cycle life of the actuated valve.

Cycle Time

The travel time that an electric actuator employs from beginning to end of a 90° rotation.

Duty Cycle

The percentage of time that an electric actuator can be energized versus the time it needs to be de-energized. Exceeding the actuator cycle time will result in the failure of the unit due to over-heating. Many units have a standard duty cycle of 25% while others may be as great as 75%.

Features

Standard Features

Enclosure

Enclosures are made of a V0 self-extinguishing class corrosion-resistant techno-polymer and are NEMA 4X rated*.

Position Indicator

Actuators have external visual position indicators.

Permanent Lubrication

Bushings are self-lubricated, reducing the need for maintenance.

Heavy Duty Gears

Steel and techno-polymer gear wheels with hardened steel pinions help withstand stall conditions and reduce down time due to gear failure.

Universal Mounting

Actuators can be mounted and operated in any position with ISO 5211 double star mounting.

Adjustability

Actuators automatically adjust motor speed and output torque, depending on process variations, to keep cycle times consistent.

Optional Features

Electronic Positioner

For precise control applications that use analog signals (4-20mA, 0-10VDC).

Heater

The heater is activated once the actuator is powered and when the temperature inside the housing falls below 77°F.

Limit Switches

2 SPDT limit switches allow for independent fine tuning of the open and closed positions. 2 auxiliary limit switches are standard.

Declutchable Manual Override

Allows the valve to be cycled 'on' or 'off' during a power failure, without having to overcome the resistance of the actuator's winding.

Holding Power

Actuators are able to hold 150% of the rated torque, in either direction, while power is removed from the control.

Duty Cycle

Actuators have a 75% duty cycle (50% for VB015), allowing for high cycle applications.

Torque Limiter

Will shut the actuator off in stall conditions to protect the motor.

Battery Back Up

Cycles valve to a fail-safe position if a power failure occurs.

* Type 4X Enclosure Indoor Use Only

* **Note:** All electric actuators (except the VB015) are CSA approved for indoor applications.

SECTION FOUR: QUARTER TURN VALVE AUTOMATION SUBMITTAL

Job Information (please print clearly)

Customer		Contact Name	Date
City/State	Phone	E-mail	
Job Name		Job Location	
End-User	Engineer	Contractor	

Application Information (please print clearly)

Application Description

Type of Fluid	Flow Rate GPM	Pressure PSI	Temperature °F
---------------	------------------	-----------------	-------------------

Valve Information

Valve Operation: On/Off Flow Regulation

Valve Type

<input type="checkbox"/> Ball Valve	Size	Body Material	Seals		End Connections
		<input type="checkbox"/> PVC <input type="checkbox"/> PP <input type="checkbox"/> CPVC <input type="checkbox"/> PP-n <input type="checkbox"/> ABS <input type="checkbox"/> PVDF	<input type="checkbox"/> EPDM <input type="checkbox"/> FPM		<input type="checkbox"/> Socket (IPS) <input type="checkbox"/> Threaded (FNPT) <input type="checkbox"/> Flanged (ANSI 150)
<input type="checkbox"/> Butterfly Valve	Size	Disc Material	Seals		End Connections
		<input type="checkbox"/> PP <input type="checkbox"/> ABS <input type="checkbox"/> PVC <input type="checkbox"/> PVDF <input type="checkbox"/> CPVC	<input type="checkbox"/> EPDM <input type="checkbox"/> FPM <input type="checkbox"/> NBR		<input type="checkbox"/> Wafer <input type="checkbox"/> SS Lugs (ANSI 150 Flanged)
<input type="checkbox"/> 3-Way Ball Valve	Size	Body Material	Seals	Port	End Connections
		<input type="checkbox"/> PVC <input type="checkbox"/> CPVC <input type="checkbox"/> PP	<input type="checkbox"/> EPDM <input type="checkbox"/> FPM	<input type="checkbox"/> T <input type="checkbox"/> L	<input type="checkbox"/> Socket (IPS) <input type="checkbox"/> Threaded (FNPT) <input type="checkbox"/> Flanged (ANSI 150)

Actuator Type

<input type="checkbox"/> Pneumatic	Air Supply Pressure		Type			
	<input type="checkbox"/> 80 psi <input type="checkbox"/> Other: _____		<input type="checkbox"/> Double Acting <input type="checkbox"/> Spring Return, Fail Close <input type="checkbox"/> Spring Return, Fail Open			
	Pilot Solenoid					
	Type		Voltage		Protection Rating	
	<input type="checkbox"/> 3-Way <input type="checkbox"/> 4-Way		<input type="checkbox"/> 120V AC <input type="checkbox"/> 24V DC <input type="checkbox"/> Other: _____		<input type="checkbox"/> 4/4x <input type="checkbox"/> 7/9 <input type="checkbox"/> Other: _____	
	Limit Switches					
Type			Protection Rating			
<input type="checkbox"/> SPDT-Mechanical <input type="checkbox"/> SPDT-Proximity <input type="checkbox"/> Other: _____			<input type="checkbox"/> 4/4x <input type="checkbox"/> 7/9 <input type="checkbox"/> Other: _____			
Positioner						
Input Signal			Options			
<input type="checkbox"/> 3-15 psi <input type="checkbox"/> 4-20 mA <input type="checkbox"/> Other: _____			<input type="checkbox"/> Limit Switch (LS) <input type="checkbox"/> Position Transmitter (PT) <input type="checkbox"/> LS and PT <input type="checkbox"/> Intrinsically Safe			
Other Options						
<input type="checkbox"/> Declutchable Manual Override <input type="checkbox"/> Muffler – Brass/Bronze <input type="checkbox"/> Speed Control – Brass/Bronze <input type="checkbox"/> L-Port Actuator Beacon Kit <input type="checkbox"/> T-Port Actuator Beacon Kit						
<input type="checkbox"/> Electric	Voltage		Protection Rating		Rotation	
	<input type="checkbox"/> 100-240V AC <input type="checkbox"/> 24V AC/DC <input type="checkbox"/> 12V AC/DC <input type="checkbox"/> Other: _____		<input type="checkbox"/> 4/4x <input type="checkbox"/> 7/9 <input type="checkbox"/> Other: _____		<input type="checkbox"/> 90° (Standard) <input type="checkbox"/> 180° <input type="checkbox"/> 270° <input type="checkbox"/> Other: _____	
	Positioner				More Options	
	Input Signal <input type="checkbox"/> 4-20 mA <input type="checkbox"/> 0-10V DC <input type="checkbox"/> Other: _____				<input type="checkbox"/> Battery Backup <input type="checkbox"/> Other: _____	

SECTION FIVE: AUTOMATED BALL VALVES

VKD Series Automated Ball Valves



IPEX VKD Series Automated Ball Valves offer a variety of advanced features such as the patented seat stop carrier, a high quality stem and ball support system, and the new DUAL BLOCK® system which locks the union nuts, preventing back-off due to vibration or thermal cycling. Deep grooves, thick o-rings, and cushioned Teflon® seats contribute to strong seals at pressures up to 232psi while an integral mounting flange and support bracketing combine for simple adaptation for actuation and anchoring. VKD Series Automated Ball Valves are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

Valve Availability

Body Material:	PVC, CPVC, PP
Size Range:	1/2" through 4"
Pressure:	232psi, 150psi (PP)
Seats:	Teflon® (PTFE)
Seals:	EPDM or FPM
End Connections:	Socket (IPS), Threaded (FNPT), Socket (Metric)
Actuator Control:	Double Acting Pneumatic, Spring Return Pneumatic, Electric

Note: PVDF valves available on request.



ASTM D1784
ASTM D2464
ASTM D2466
ASTM D2467
ASTM D4101
ASTM F1498
ASTM F437
ASTM F439



ANSI B1.20.1



ISO 11922-1

VKD Series Automated Ball Valves

Samples Specificaiton

1.0 Ball Valves – VKD

1.1 Material

- The valve body, stem, ball and unions shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.
- or The valve body, stem, ball and unions shall be made of Corzan® CPVC compound which shall meet or exceed the requirements of 23447 according to ASTM D1784.
- or The valve body, stem, ball and unions shall be made of stabilized PP homopolymer compound, also containing a RAL 7032 pigment, which shall meet or exceed the requirements of Type I Polypropylene according to ASTM D4101.

1.2 Seats

- The ball seats shall be made of Teflon® (PTFE).

1.3 Seals

- The o-ring seals shall be made of EPDM.
- or The o-ring seals shall be made of FPM.

2.0 Connections

2.1 Socket style

- The IPS socket PVC end connectors shall conform to the dimensional standards ASTM D2466 and ASTM D2467.
- or The IPS socket CPVC end connectors shall conform to the dimensional standard ASTM F439.
- or The Metric socket PP end connectors shall conform to the dimensional standard ISO 11922-1.

2.2 Threaded style

- The female NPT threaded PVC end connectors shall conform to the dimensional standards ASTM D2464, ASTM F1498, and ANSI B1.20.1.
- or The female NPT threaded CPVC end connectors shall conform to the dimensional standards ASTM F437, ASTM F1498, and ANSI B1.20.1.
- or The female NPT threaded PP end connectors shall conform to the dimensional standards ASTM F1498, and ANSI B1.20.1.

3.0 Design Features

- The valve shall be double blocking with union ends.
- All valves shall be full port.
- All valves shall allow for bi-directional flow.
- The valve body shall be single end entry with a threaded carrier (ball seat support).
- The threaded carrier shall be adjustable with the valve installed.
- The valve body shall have an expansion and contraction compensating groove on the molded end.
- The valve body, union nuts and carrier shall have deep square style threads for increased strength.
- The ball and stem shall be machined smooth to minimize wear on valve seats and seals.
- All valve seats shall have o-ring backing cushions to compensate for wear and prevent seizure of the ball.
- The stem design shall feature double o-ring seals as well as a safety shear point above the o-rings.
- All valves shall have integrally molded mounting features for actuation.
- All valves shall have integrally molded support bracketing for anchoring.
- The valve shall include the Dual Block® union nut locking mechanism.

3.1 Pressure Testing

- All valves shall have been pressure tested in both the open and closed positions by the manufacturer.

3.2 Pressure Rating

- All PVC and CPVC valves shall be rated at 232psi at 73°F.
- All PP valves shall be rated at 150psi at 73°F.

3.3 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.4 Color Coding

- All PVC valves shall be color-coded dark gray.
- or All CPVC valves shall be color-coded light gray.
- or All PP valves shall be color coded beige gray.

VKD Series Automated Ball Valves

- 4.0 All valves shall be Xirtec® PVC, Xirtec® CPVC or SFPP by IPEX or approved equal.

5.0 Actuators

- All Actuators shall be factory installed by IPEX

Pneumatic Actuator:

- Shall be sized for 80 psi control air pressure
- Shall be dual piston rack and pinion design with linear torque output.
- Body shall be Technopolymer UT series or Anodized Aluminum MT series with standard position indicator and NAMUR VDI/VDE 3845 and ISO 5211 mounting dimensions.
- All models shall be operable using air, water, nitrogen or compatible hydraulic fluids from 40 – 120psi.
- Aluminum body models shall feature dual travel stops that provide +/- 10° stroke rotation on both the opening and closing phases.
- All external fasteners shall be stainless steel.

Electric Actuator:

- Shall have 100VAC – 240VAC reversing motors with torque limiters, thermal protection, auxiliary limit switches, NEMA 4X enclosure*, manual override, and position indicator as standard.
- or Shall have 24VDC reversing motors with torque limiters, thermal protection, auxiliary limit switches, NEMA 4X enclosure*, manual override, and position indicator as standard.
- 4–20mA positioner, battery backup, and 180° rotation models shall be available in 100 – 240VAC and 24VDC
- All models shall have ISO 5211 mounting dimensions

* Type 4X Indoor Use Only Enclosure

VKD Series Automated Ball Valves

Valve Selection

Size (inches)	Body Material	Seal Material	IPEX Part Number							
			Pneumatic Double Acting		Pneumatic Spring Return, Normally Closed		Pneumatic Spring Return, Normally Open		Electric Double Acting, 100-240 VAC	
			IPS Socket	FNPT Threaded	IPS Socket	FNPT Threaded	IPS Socket	FNPT Threaded	IPS Socket	FNPT Threaded
1/2	PVC	EPDM	253296		253332		253368		253404	
		FPM	253305		253341		253377		253413	
	CPVC	EPDM	253314		253350		253386		253422	
		FPM	253323		253359		253395		253431	
3/4	PVC	EPDM	253297		253333		253369		253405	
		FPM	253306		253342		253378		253414	
	CPVC	EPDM	253315		253351		253387		253423	
		FPM	253324		253360		253396		253432	
1	PVC	EPDM	253298		253334		253370		253406	
		FPM	253307		253343		253379		2534715	
	CPVC	EPDM	253316		253352		253388		253424	
		FPM	253325		253361		253397		253433	
1-1/4	PVC	EPDM	253299		253335		253371		253407	
		FPM	253308		253344		253380		253416	
	CPVC	EPDM	253317		253353		253389		253425	
		FPM	253326		253362		253398		253434	
1-1/2	PVC	EPDM	253300		253336		253372		253408	
		FPM	253309		253345		253381		253417	
	CPVC	EPDM	253318		253354		253390		253426	
		FPM	253327		253363		253399		253435	
2	PVC	EPDM	253301		253337		253353		253409	
		FPM	253310		253346		253382		253418	
	CPVC	EPDM	253319		253355		253391		253427	
		FPM	253328		253364		253400		253436	
2-1/2	PVC	EPDM	253302	-	253338	-	253374	-	253410	-
		FPM	253311	-	253347	-	253383	-	253419	-
	CPVC	EPDM	253320	-	253356	-	253392	-	253428	-
		FPM	253329	-	253365	-	253401	-	253437	-
3	PVC	EPDM	253303	-	253339	-	253375	-	253411	-
		FPM	253312	-	253348	-	253384	-	253420	-
	CPVC	EPDM	253321	-	253357	-	253393	-	253429	-
		FPM	253330	-	253366	-	253402	-	253438	-
4	PVC	EPDM	253304	-	253340	-	253376	-	253412	-
		FPM	253313	-	253349	-	253385	-	253421	-
	CPVC	EPDM	253322	-	253358	-	253394	-	253430	-
		FPM	253331	-	253367	-	253403	-	253439	-

FOR CUSTOM CONFIGURATIONS, PLEASE CONTACT IPEX.

PP valves available on request.

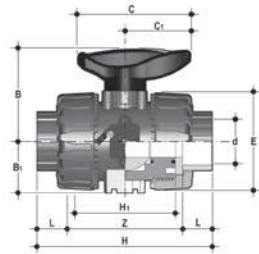
Flanged valves available on request.

VKD Series Automated Ball Valves

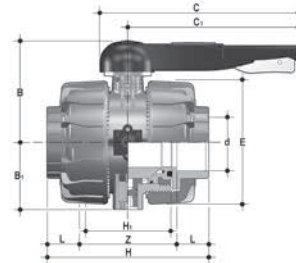
Dimensions

IPS Socket Connections

Sizes: 1/2" – 2"



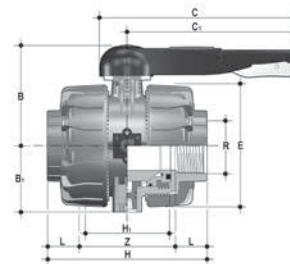
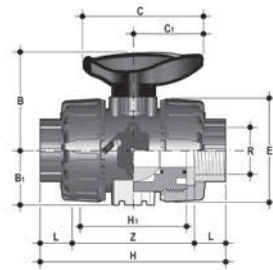
Sizes: 2-1/2" – 4"



Dimensions (inches)

Size	d	L	Z	H	H1	E	B1	B	C1	C
1/2	0.84	0.89	2.83	4.61	2.56	2.13	1.14	2.13	1.57	2.64
3/4	1.05	1.00	3.07	5.08	2.76	2.56	1.36	2.56	1.93	3.35
1	1.32	1.13	3.33	5.59	3.07	2.87	1.54	2.74	1.93	3.35
1-1/4	1.66	1.26	3.86	6.38	3.46	3.39	1.81	3.25	2.52	4.25
1-1/2	1.90	1.38	4.02	6.77	3.66	3.86	2.05	3.50	2.52	4.25
2	2.38	1.50	4.83	7.83	4.37	4.80	2.44	4.25	2.99	5.28
2-1/2	2.88	1.75	5.75	9.25	5.24	6.46	3.43	6.46	6.89	8.86
3	3.50	1.89	6.85	10.63	5.87	7.99	4.13	6.97	10.71	12.87
4	4.50	2.26	7.60	12.13	6.57	9.37	5.08	7.80	12.99	15.16

Female NPT Threaded Connections

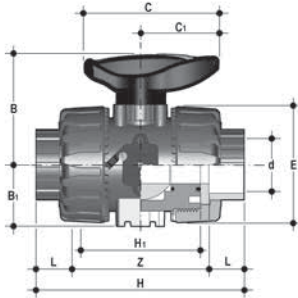


Dimension (inches)

Size	R	H	L	Z	H1	E	B1	B	C1	C
3/8	3/8-UPT	4.06	0.54	2.98	2.56	2.13	1.14	2.13	1.57	2.69
1/2	1/2-NPT	4.37	0.70	2.97	2.56	2.13	1.14	2.13	1.57	2.64
3/4	3/4-NPT	4.61	0.71	3.19	2.76	2.56	1.36	2.56	1.93	3.35
1	1-NPT	5.31	0.89	3.54	3.07	2.87	1.54	2.74	1.93	3.35
1-1/4	1-1/4-NPT	6.02	0.99	4.05	3.46	3.39	1.81	3.25	2.52	4.25
1-1/2	1-1/2-NPT	6.14	0.97	4.20	3.66	3.86	2.05	3.50	2.52	4.25
2	2-NPT	7.32	1.17	4.99	4.37	4.80	2.44	4.25	2.99	5.28
2-1/2	2-1/2-NPT	9.25	1.31	6.64	5.24	6.46	3.43	6.46	6.89	8.86
3	3-NPT	10.63	1.40	7.83	5.87	7.99	4.13	6.97	10.71	12.87
4	4-NPT	12.13	1.48	9.17	6.57	9.37	5.08	7.68	12.99	15.16

VKD Series Automated Ball Valves

Metric Socket Connections

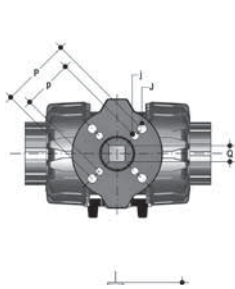


Dimension (inches)

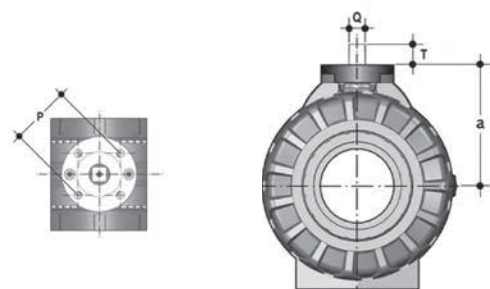
Size	d	H	L	Z	H1	E	B1	B	C1	C
20mm	0.79	4.02	0.57	2.87	2.56	2.13	1.14	2.13	1.57	2.64
25mm	0.98	4.49	0.63	3.23	2.76	2.56	1.36	2.56	1.93	3.35
32mm	1.26	4.96	0.71	3.54	3.07	2.87	1.54	2.74	1.93	3.35
40mm	1.57	5.55	0.81	3.94	3.35	3.39	1.81	3.25	2.52	4.25
50mm	1.97	6.46	0.93	4.61	3.66	3.86	2.05	3.50	2.52	4.25
63mm	2.48	7.83	1.08	5.67	4.37	4.80	2.44	4.25	2.99	5.28

Automation Pad

Sizes: 1/2" – 2"



Sizes: 2-1/2" – 4"

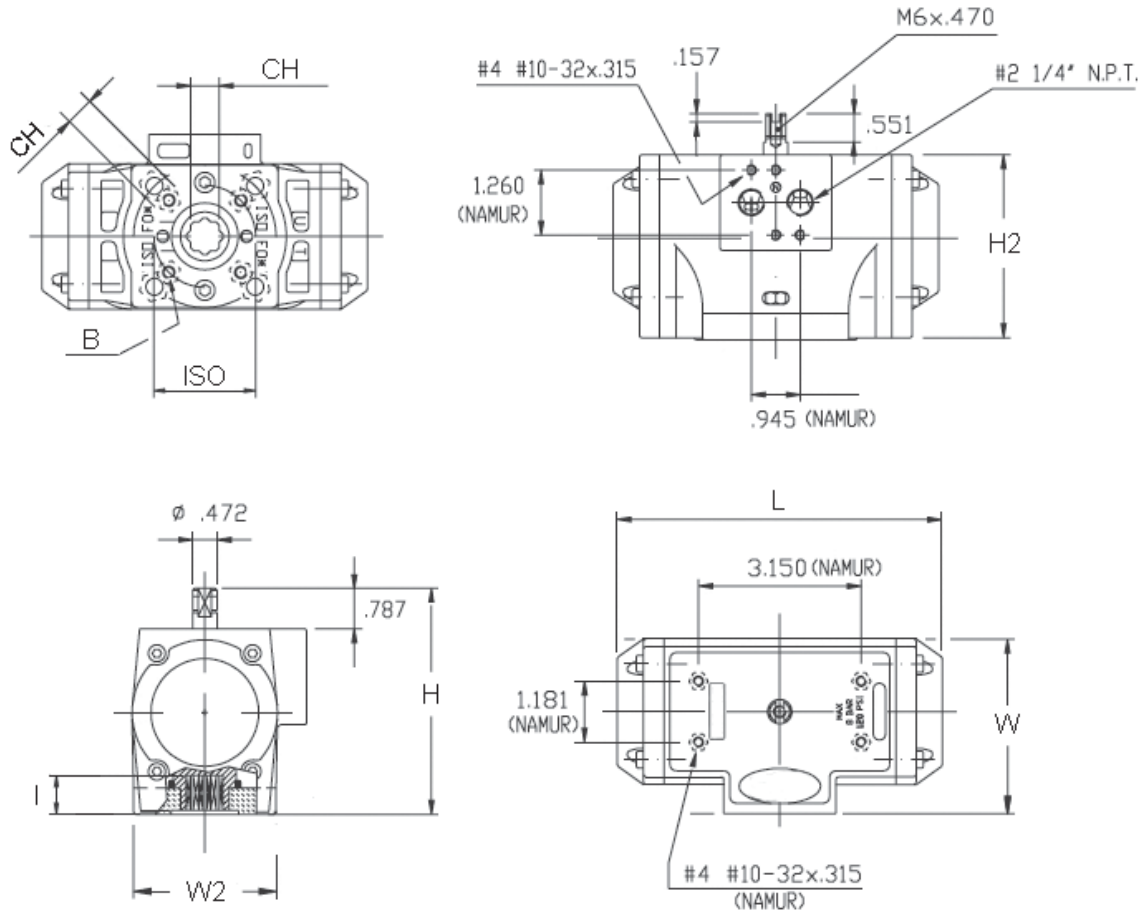


Dimensions (inches)

Size	a	T	Q	p / P	j / J
1/2	2.28	0.47	0.43	F03 / F04	0.22
3/4	2.89	0.47	0.43	F03 / F05 or F04	0.22 / 0.26 or 0.22
1	2.91	0.47	0.43	F03 / F05 or F04	0.22 / 0.26 or 0.22
1-1/4	3.82	0.63	0.43 or 0.55	F05	0.26
1-1/2	4.09	0.63	0.43 or 0.55	F05	0.26
2	4.49	0.63	0.43 or 0.55	F05 / F07	0.26 / 0.33
2-1/2	4.69	0.63	0.55	F07	-
3	5.20	0.63	0.55	F07	-
4	5.91	0.75	0.67	F07	-

VKD Series Automated Ball Valves

Models UT11, UT14, UT19



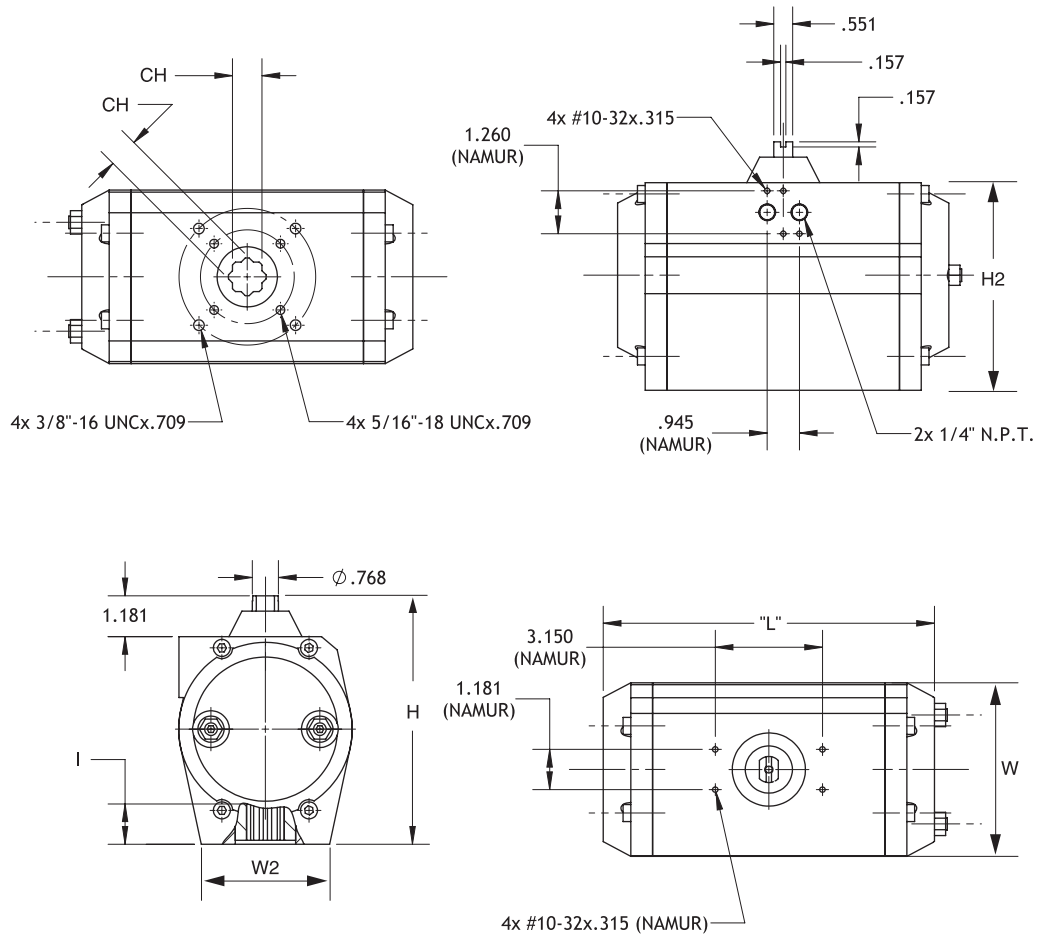
Dimensions (inches)

Valve Size	Double Acting Model	ISO	CH	L	W	W2	H	H2	I	B
1/2	UT11DA	F04	0.43	4.69	2.64	2.09	3.58	2.76	0.49	10-32 UNF x 0.40
3/4	UT11DA	F04	0.43	4.69	2.64	2.09	3.58	2.76	0.49	10-32 UNF x 0.40
1	UT11DA	F04	0.43	4.69	2.64	2.09	3.58	2.76	0.49	10-32 UNF x 0.40
1-1/4	UT14DA	F05 / F07	0.55	6.30	3.39	2.76	4.37	3.54	0.75	1/4-20 UNC x 0.51
1-1/2	UT14DA	F05 / F07	0.55	6.30	3.39	2.76	4.37	3.54	0.75	1/4-20 UNC x 0.51
2	UT14DA	F05 / F07	0.55	6.30	3.39	2.76	4.37	3.54	0.75	1/4-20 UNC x 0.51
2-1/2	UT19DA	F05 / F07	0.67	6.89	3.98	2.76	5.22	4.39	0.91	5/16-18 UNC x 0.51
3	UT19DA	F05 / F07	0.67	6.89	3.98	2.76	5.22	4.39	0.91	5/16-18 UNC x 0.51
4	MT26DA	F05 / F07	0.67	9.41	3.78	3.01	5.04	3.86	0.75	5/16-18 UNC x 0.51

BALL VALVES

VKD Series Automated Ball Valves

Models UT26, UT31, UT36

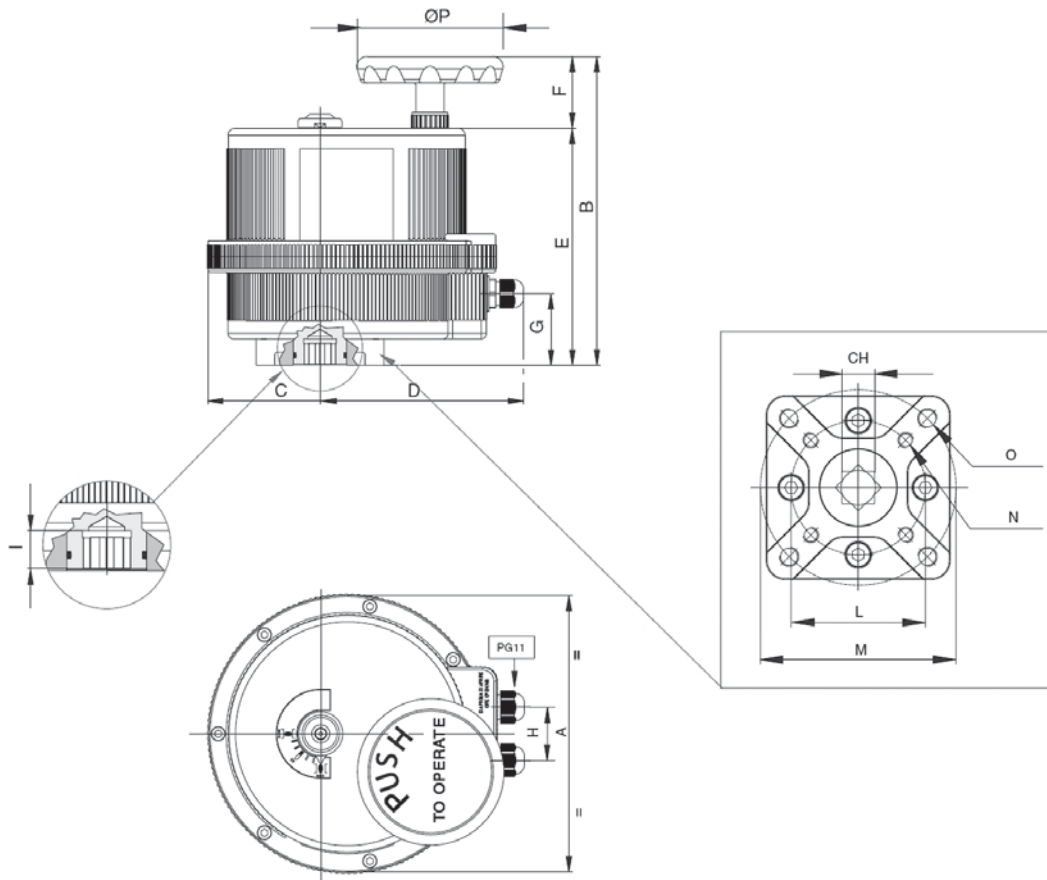


Dimensions (inches)

Valve Size	Spring Return Model	ISO	CH	L	W	W2	H	H2	I	B
1/2	UT11S2	F04	0.43	4.69	2.64	2.09	3.58	2.76	0.49	10-32 UNF x 0.40
3/4	UT11S2	F04	0.43	4.69	2.64	2.09	3.58	2.76	0.49	10-32 UNF x 0.40
1	UT11S2	F04	0.43	4.69	2.64	2.09	3.58	2.76	0.49	10-32 UNF x 0.40
1-1/4	UT14S4	F05 / F07	0.55	6.30	3.39	2.76	4.37	3.54	0.75	1/4-20 UNC x 0.51
1-1/2	UT19S5	F05 / F07	0.67	6.89	3.98	2.76	5.22	4.39	0.91	5/16-18 UNC x 0.51
2	UT19S5	F05 / F07	0.67	6.89	3.98	2.76	5.22	4.39	0.91	5/16-18 UNC x 0.51
2-1/2	MT31S4	F05 / F07	0.67	9.06	4.49	3.56	5.79	4.62	0.91	5/16-18 UNC x 0.51
3	MT31S4	F05 / F07	0.67	9.06	4.49	3.56	5.79	4.62	0.91	5/16-18 UNC x 0.51
4	MT36S4	F05 / F07	0.87	9.69	5.10	3.76	7.24	6.06	1.18	3/8-16 UNC x 0.71

VKD Series Automated Ball Valves

Electric Actuator Dimensions



Dimensions (inches)

Valve Size	Actuator Model	ISO	CH	A	B	C	D	E	F	G	H	I	L	M	N	O	ØP
1/2	VB015	F03/F05	0.43	4.84	5.57	1.67	4.74	4.96	0.61	4.06	1.26	0.55	1.42	1.97	10-24 UNC 2BX0.47	1/4-20 UNC 2BX0.55	2.68
3/4	VB015	F03/F05	0.43	4.84	5.57	1.67	4.74	4.96	0.61	4.06	1.26	0.55	1.42	1.97	10-24 UNC 2BX0.47	1/4-20 UNC 2BX0.55	2.68
1	VB015	F03/F05	0.43	4.84	5.57	1.67	4.74	4.96	0.61	4.06	1.26	0.55	1.42	1.97	10-24 UNC 2BX0.47	1/4-20 UNC 2BX0.55	2.68
1-1/4	VB015	F03/F05	0.43	4.84	5.57	1.67	4.74	4.96	0.61	4.06	1.26	0.55	1.42	1.97	10-24 UNC 2BX0.47	1/4-20 UNC 2BX0.55	2.68
1-1/2	VB015	F03/F05	0.43	4.84	5.57	1.67	4.74	4.96	0.61	4.06	1.26	0.55	1.42	1.97	10-24 UNC 2BX0.47	1/4-20 UNC 2BX0.55	2.68
2	VB030	F03/F05	0.43	6.18	7.40	2.38	5.12	5.75	1.64	1.30	1.42	0.47	1.42	1.97	10-24 UNC 2BX0.47	1/4-20 UNC 2BX0.55	2.56
2-1/2	VB060	F05/F07	0.55	7.28	8.46	2.66	5.77	6.81	1.65	2.01	1.42	0.63	1.97	2.76	1/4-20 UNC 2BX0.59	5/16-18 UNC 2BX0.67	2.56
3	VB060	F05/F07	0.55	7.28	8.46	2.66	5.77	6.81	1.65	2.01	1.42	0.63	1.97	2.76	1/4-20 UNC 2BX0.59	5/16-18 UNC 2BX0.67	2.56
4	VB110	F07/F10	0.67	8.31	9.14	3.31	6.02	7.01	2.13	2.13	1.58	0.75	2.76	4.02	5/16-18 UNC 2BX0.79	3/8-16 UNC 2BX0.79	4.33

VKD Series Automated Ball Valves



Note: Pneumatic actuator performance is based on 80 psi available control air pressure.

Actuator Technical Data

Valve Size (inches)	Double Acting Pneumatic	Actuator Model Spring Return Pneumatic	Electric
1/2	UT11DA	UT11S2	VB015
3/4	UT11DA	UT11S2	VB015
1	UT11DA	UT11S2	VB015
1-1/4	UT14DA	UT14S4	VB015
1-1/2	UT14DA	UT19S5	VB030
2	UT14DA	UT19S5	VB030
2-1/2	UT19DA	MT31S4	VB060
3	UT19DA	MT31S4	VB060
4	MT26DA	MT36S4	VB110

Pneumatic Actuator Torque Data

Valve Size (inches)	Double Acting		Spring Set (standard)	Spring Torque (in-lbs)		Air Torque (in-lbs)		
	Model	Torque (in-lbs)		Model	Start	End	Start	End
1/2	UT11DA	125	UT11S2	S2	66	44	81	59
3/4	UT11DA	125	UT11S2	S2	66	44	81	59
1	UT11DA	125	UT11S2	S2	66	44	81	59
1-1/4	UT14DA	275	UT14S4	S4	150	107	168	125
1-1/2	UT14DA	275	UT19S5	S5	307	230	270	193
2	UT14DA	275	UT19S5	S5	307	230	270	193
2-1/2	UT19DA	500	MT31S4	S4	502	374	626	498
3	UT19DA	500	MT31S4	S4	502	374	626	498
4	MT26DA	750	MT36S4	S4	824	614	986	776

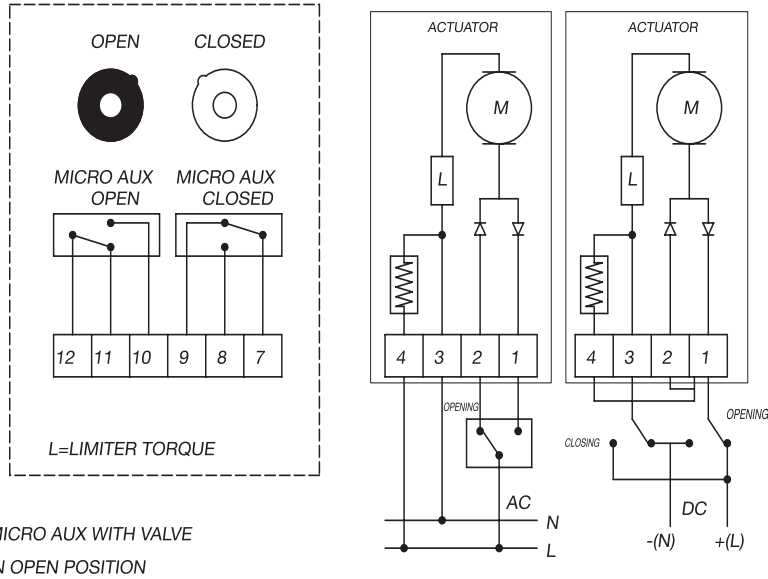
Pneumatic Actuator Weights and Air Consumption

Valve Size (inches)	Double Acting			Spring Return		
	Model	Weight (lbs)	Air Cons. (in ³)	Model	Weight (lbs)	Air Cons. (in ³)
1/2	UT11DA	1.26	13.5	UT11S2	1.44	8.0
3/4	UT11DA	1.26	13.5	UT11S2	1.44	8.0
1	UT11DA	1.26	13.5	UT11S2	1.44	8.0
1-1/4	UT14DA	2.62	22.0	UT14S4	3.06	10.8
1-1/2	UT14DA	2.62	22.0	UT19S5	5.16	17.5
2	UT14DA	2.62	22.0	UT19S5	5.16	17.5
2-1/2	UT19DA	4.34	40.6	MT31S4	10.7	40.6
3	UT19DA	4.34	40.6	MT31S4	10.7	40.6
4	MT26DA	7.15	68.7	MT36S4	17.8	75.0

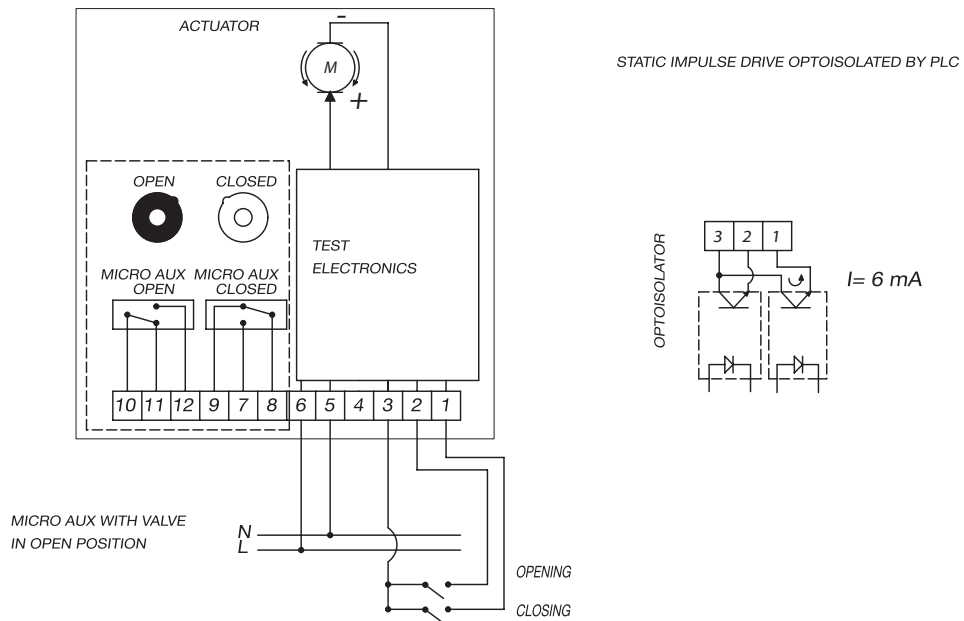
VKD Series Automated Ball Valves

Electrical Actuator

Model VB015 24V AC/DC

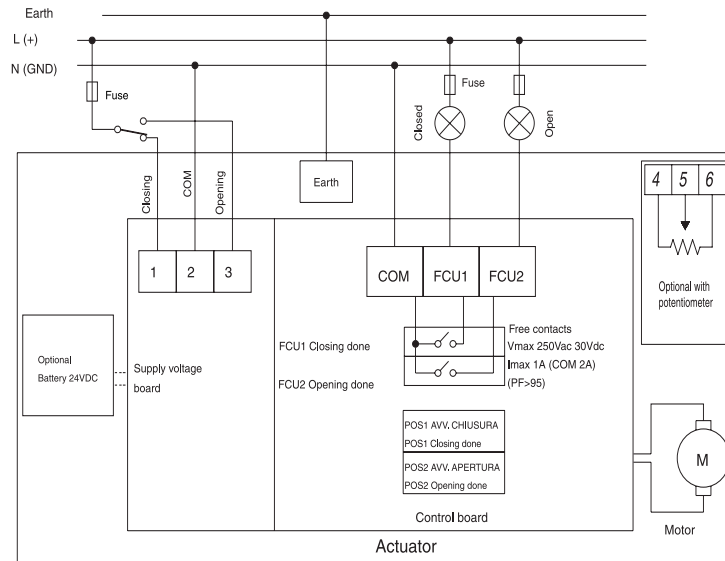


Model VB015 100V – 240V AC

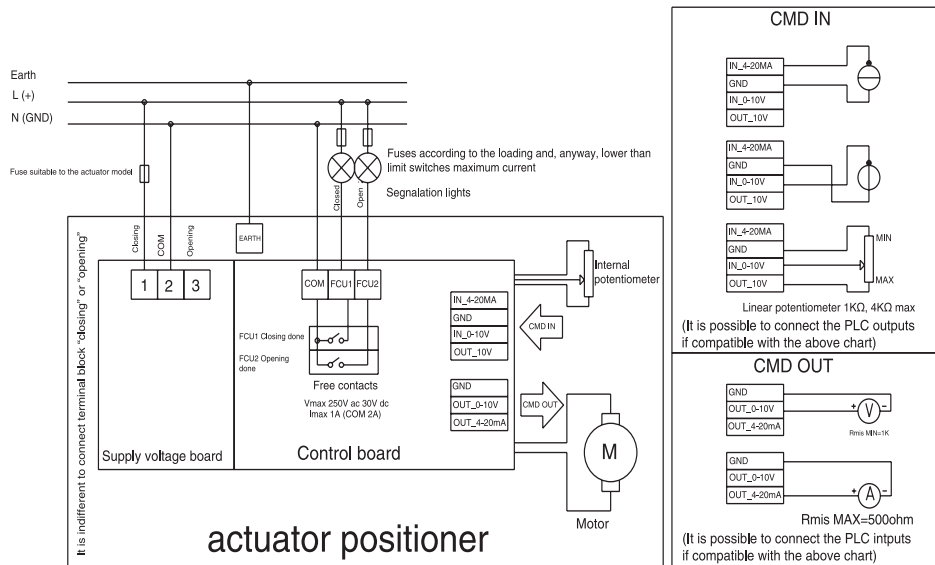


VKD Series Automated Ball Valves

Model VB030 to VB350 24V AC/DC, 110 – 240V AC



VB030 to VB350 24V AC/DC, 110 – 240V AC with Positioner



VKD Series Automated Ball Valves

Model		VB015	VB030	VB060	VB110
Max Working Torque (in-Lbs)		133	266	530	975
Voltage (V)	Low Voltage	12V AC/DC	12V DC	12V DC	12V DC
		24V AC/DC	24V AC/DC	24V AC/DC	24V AC/DC
	High Voltage Multitension	100-240V AC	100-240V AC	100-240V AC	100-240V AC
Working Time (sec)		10	8	9	27
Torque Limiter		STD	STD	STD	STD
Duty Rating		50%	75%	75%	75%
Protection		IP65 ** NEMA 4X*	IP65-67 NEMA 4X*	IP65-67 NEMA 4X*	IP65-67 NEMA 4X*
Rotation		90°	90°	90°	90°
Upon Request		180°	180° or 70°	80° or 70°	80° or 70°
Manual Intervention		STD	STD	STD	STD
Position Indicator		STD	STD	STD	STD
Working Temperature		-4F +131F	-4F +131F	-4F +131F	-4F +131F
Heater		STD	STD	STD	STD
Additional Free Limit Switches		2 STD	2 STD	2 STD	2 STD
Drilling ISO 5211 PAD		F03 – F05	F03 – F05	F05 – F07	F07 – F10
Square Drive		0.43	0.43	0.55	0.67
Square Upon Request		0.35	0.35 – 0.55	0.43 – 0.67	0.55 – 0.87
Positioner (4~20mA or 0~10 VDC)		Not Available	Upon Request	Upon Request	Upon Request
Electrical Connections		PG11	PG11	PG11	PG11
Weight (LBS)		3.09	5.07	7.28	10.80

* Type 4X Indoor Use Only Enclosure
** UL pending

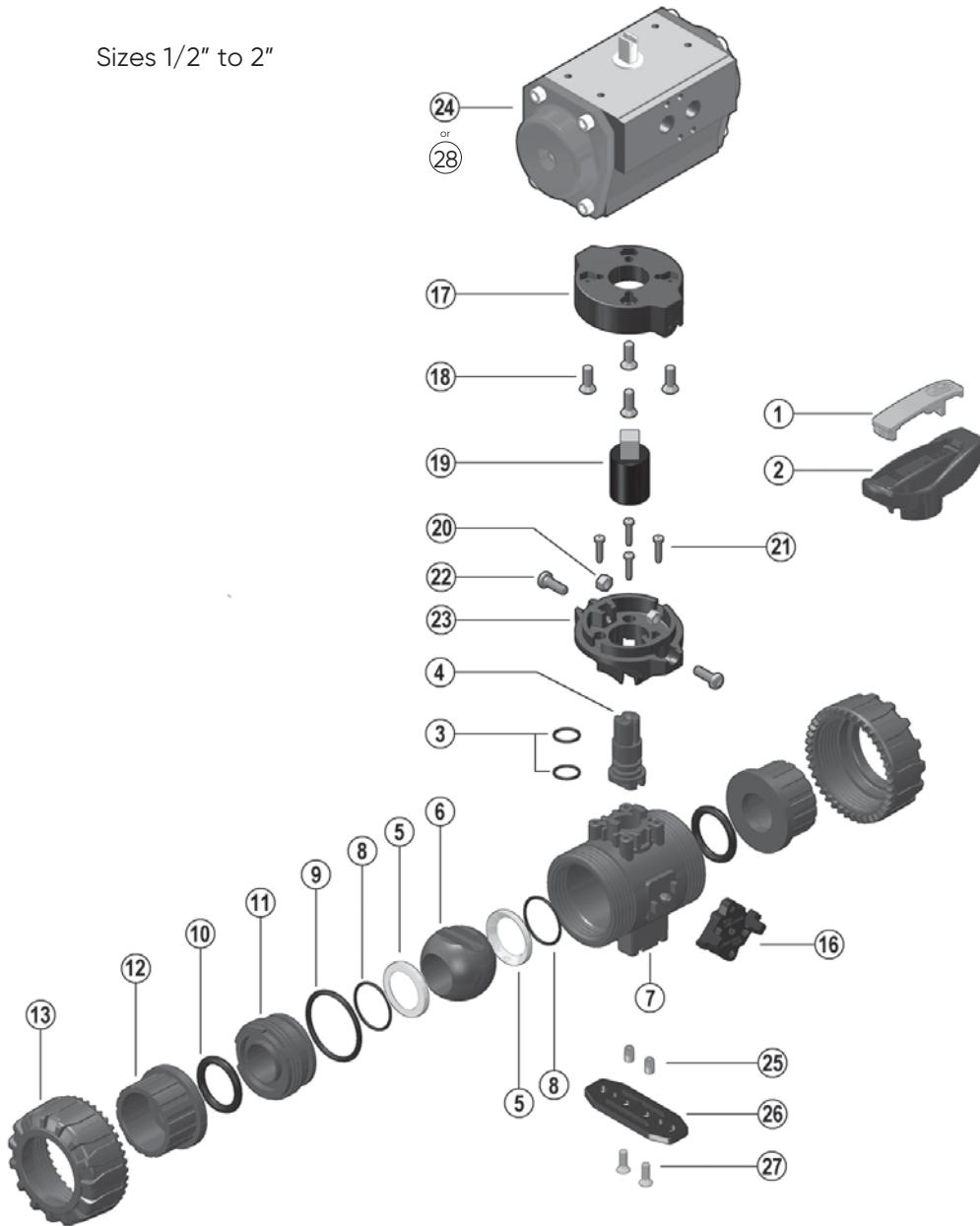
Electric Actuator Power Consumption

MODEL		VB015		VB030		VB060		VB110	
VERSION H	Nominal Voltage	100V AC	240V AC	100 – 240V AC					
	Absorbed Current	75mA	25mA	0.3 – 0.2A		0.6 – 0.3A			
	Absorbed Power	6.6 VA	6 VA	30 – 48VA		60 – 72 VA			
VERSION L	Nominal Voltage	24V AC/DC		24V AC/DC		24V AC/DC		24V AC/DC	
	Absorbed Current	1.2A	0.6A	2.0A	1.0A	3.6A	1.8A	2.0A	1.0A
	Absorbed Power	15 VA		24 VA		44 VA		24 VA	
Frequency		50/60 HZ							

VKD Series Automated Ball Valves

Components

Sizes 1/2" to 2"



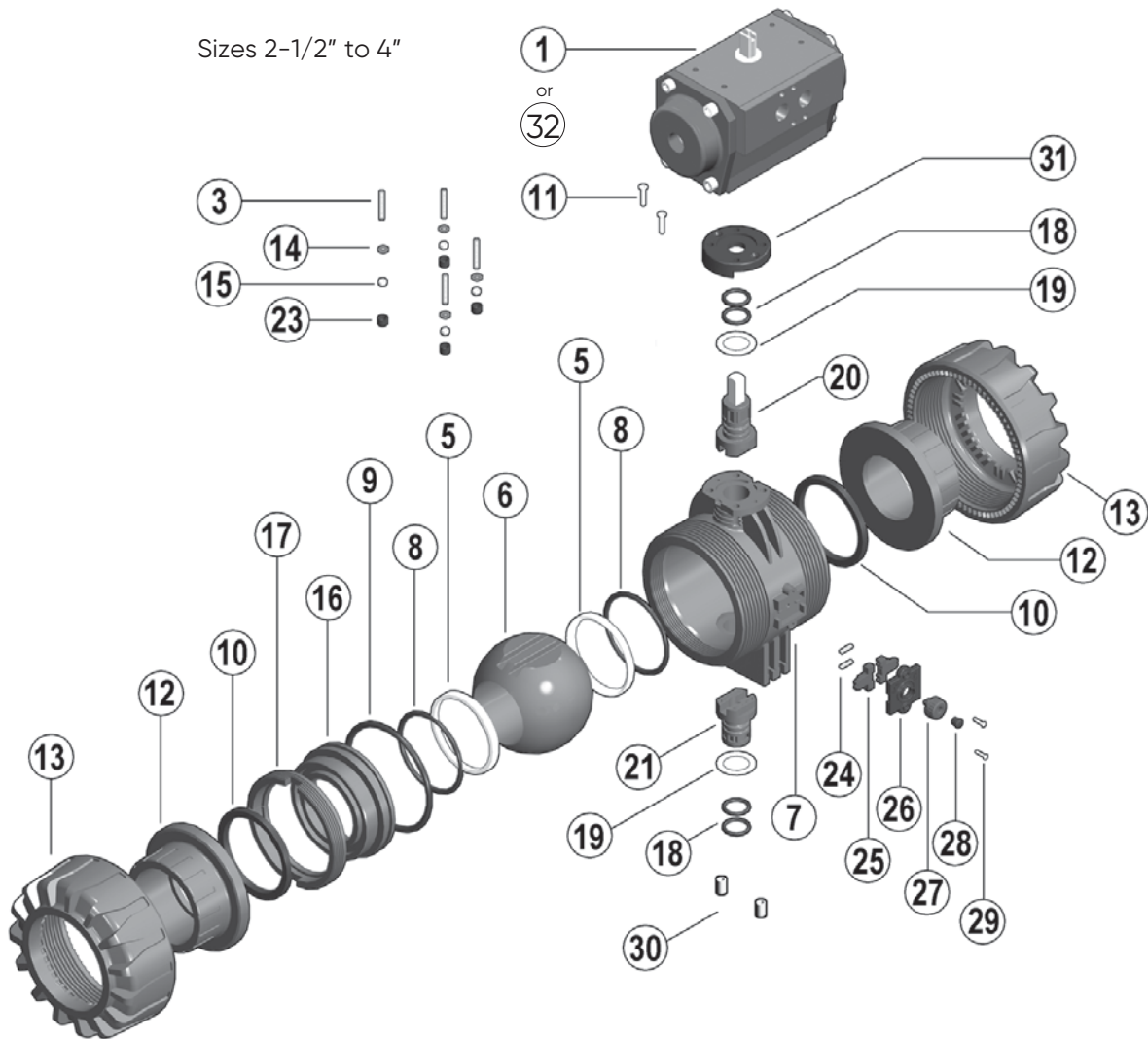
#	Component
1	Insert
2	Handle
3	Stem O-Ring
4	Stem
5	Ball Seat
6	Ball
7	Body
8	Support O-Ring for Ball Seat
9	Radial Seal O-Ring
10	Socket Seal O-Ring
11	Support for Ball Seat
12	End Connector
13	Union Nut

#	Component
16	Dual Block
17	Upper Plate
18	Screw
19	Coupling Spindle
20	Nut
21	Screw
22	Screw
23	Lower Plate
24	Pneumatic Actuator
25	Bracketing Bush
26	Distance Plate
27	Screw
28	Electric Actuator (not shown)

VKD Series Automated Ball Valves

Components

Sizes 2-1/2" to 4"



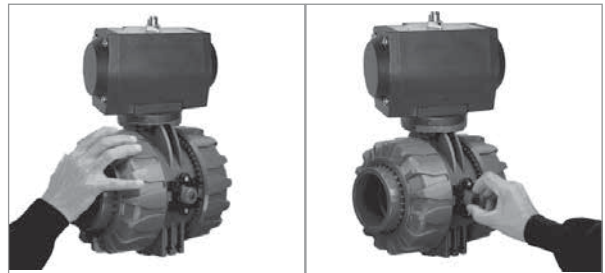
#	Component
1	Pneumatic Actuator
3	Screw
5	Ball Seat
6	Ball
7	Body
8	Support O-ring for Ball Seat
9	Radial Seal O-ring
10	Special Socket Seal
11	Screw
12	End Connector
13	Union Nut
14	Washer
15	Nut
16	Support for Ball Seat
17	Stop Ring

#	Component
18	Stem O-Ring
19	Friction Reducing Bush
20	Upper Stem
21	Lower Stem
22	Pad
23	Protection Cap
24	Spring
25	Nut Block
26	Cover
27	Nut Block Button
28	Protection Cap
29	Screw
30	Bracketing Bush
31	Actuation Adapter
32	Electric Actuator (not shown)

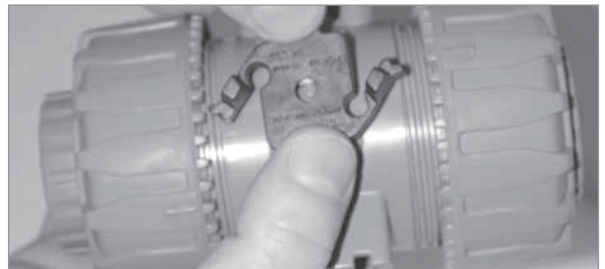
VKD Series Automated Ball Valves

Installation Procedures

1. Remove the union nuts (part #13 on previous page) and slide them onto the pipe.
2. Please refer to the appropriate connection style sub-section:
 - a. For socket style, solvent cement or fuse the end connectors (12) onto the pipe ends. For correct solvent cementing procedure, please refer to the section entitled, "Joining Methods – Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". Be sure to allow sufficient cure time before continuing with the valve installation.
 - b. For threaded style, thread the end connectors (12) onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
3. All quarter turn automated valves are tested for proper operation before leaving the factory. Adjustment of the seat stop carrier should not be necessary. However, if adjustment is required, ensure that the valve is in the closed position then remove the insert tool (1) from the handle (2), supplied loose. For sizes 2-1/2" to 4", use the tool that accompanies the valve. Line up the moldings on the tool with the slots in the carrier. Tighten or loosen to the desired position then replace the tool on the handle.
4. Ensure that the valve is in the closed position, and that the socket o-rings (10) are properly fitted in their grooves. If anchoring is required, insert the bracket bushings (25) into the bottom of the valve (sizes 1/2" to 2" only). Carefully place the valve in the system between the two end connections and fix if necessary.
5. Tighten the union nut on the side opposite to that which is marked "ADJUST". Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. Over-tightening may damage the threads on the valve body and/or the union nut, and may even cause the union nut to crack.
6. Tighten the union nut on the side marked "ADJUST". Tightening the union nuts in this order results in the best possible valve performance due to optimum positioning and sealing of the ball and seat support system.
7. Connect pneumatic or electric connections according to provided diagrams.
8. Cycle the valve open and close to ensure that the cycling performance is adequate. If adjustment is required, place the valve in the closed position, loosen the union nuts, remove the valve from the system, and then continue from Step 3.
9. Engage the Dual Block® system by affixing the molded piece (16, sizes 1/2" to 2") to the side of the valve body or by turning the red knob (27, sizes 2-1/2" to 4") to the locked position. This feature will prevent back-off of the union nuts during operation.



2-1/2" - 4" Dual Block® Mechanism



1/2" - 2" Dual Block® Mechanism

VKD Series Automated Ball Valves

Valves Maintenance

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the line. Be sure to depressurize and drain the valve and isolated branch. It is recommended that all actuators be de-activated before servicing the valve to avoid injury.
2. If necessary, remove actuator connections and detach the valve from the support structure by disassembling the connections to the bracket on the optional bottom of the valve body (7).
3. Unlock the Dual Block® system by compressing the two ends of the molded piece (16, sizes 1/2" to 2") or by turning the red knob (27, sizes 2-1/2" to 4") to the unlocked position. Loosen both union nuts (13) and drop the valve out of the line. If retaining the socket o-rings (10), take care that they are not lost when removing the valve from the line.
4. Remove the actuator, if necessary, from the valve by removing the screws (22) located horizontally across from each other (sizes 1/2" to 2"). On sizes 2-1/2" to 4", remove the actuator by loosening and removing the bolts (3), washers (14), nuts (15), and caps (23).
5. Ensure the valve is in the closed position. If it is not, rotate the ball using the exposed stem or stem extension, making sure not to damage. Line up the moldings on the wrench tool (1, sizes 1/2" to 2") with the slots in the carrier (found on the side marked "ADJUST"). Loosen and remove the carrier (11 or 16).
6. Carefully press the ball (6) out of the valve body, taking care not to score or damage the outer surface.
7. Press the stem (4 or 20) into the valve body from above. On sizes 2-1/2" to 4", remove the lower stem (21) by pushing it into the valve body from below.
8. The stem o-rings (3 or 18), body o-ring (9), ball seats (5), ball seat o-rings (8), and bushings (19, sizes 2-1/2" to 4") can now be removed and/or replaced.

Note: It is not typically necessary to disassemble the Dual Block® components (sizes 2-1/2" to 4"). It is not necessary to remove the actuator from the valve unless the stem requires servicing or replacement. If possible, leave actuator attached to valve during servicing.



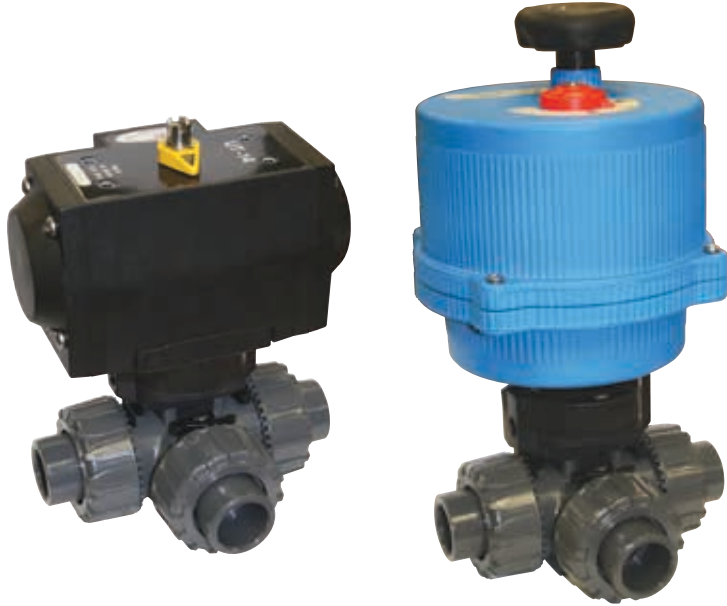
Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities.

1. Replace the stem o-rings (3 or 18), body o-ring (9), ball seat o-rings (8), ball seats (5), and bushings (19, sizes 2-1/2" to 4") in their proper positions.
2. Insert the stem (4 or 20) into position from inside the valve body (7). On sizes 2-1/2" to 4", insert the lower stem (21) as well.
3. On sizes 2-1/2" to 4", replace the actuation adapter plate and affix in position using the bolts (11), washers (14), and nuts (15). Replace the caps (23) over the nuts.
4. Replace the stem extension, if applicable.
5. Carefully insert the ball (6) into the valve body, taking care not to score or damage the outer surface. Ensure that the actuator and ball position correspond to the same operating position.
6. Insert the threaded carrier (11 or 16) and tighten into the valve body. Use the wrench tool to sufficiently tighten.
7. Replace the actuator, if removed, and affix in position using screws (22) installed horizontally (1/2" to 2") or bolts (3), washers (14), nuts (15), and caps (23) (2-1/2" to 4").
7. Place the end connectors (12) into the union nuts (13), then thread onto the valve body taking care that the socket o-rings remain properly fitted in their grooves.
8. Engage the Dual Block® system by affixing the molded piece (16, sizes 1/2" to 2") to the side of the valve body or by turning the red knob (27, sizes 2-1/2" to 4") to the locked position.



TKD Series 3-Way Automated Ball Valves



IPEX TKD Series 3-Way Automated Ball Valves can be used for flow diverting, mixing, or on/off isolation. They offer a variety of advanced features such as the patented seat stop carrier, a high quality stem and ball support system, and the new DUAL BLOCK® system which locks the union nuts preventing back-off due to vibration or thermal cycling. Deep grooves, thick o-rings, and cushioned Teflon® seats contribute to strong seals at pressures up to 232psi while an integral mounting flange and support bracketing combine for simple adaptation for actuation and anchoring. Actuators can be configured for 90° or 180° operation. TKD Series 3-Way Automated Ball Valves are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

VALVE AVAILABILITY

Body Material: PVC, CPVC

Size Range: 1/2" through 2"

Pressure: 232psi

Seats: Teflon® (PTFE)

Seals: EPDM or FPM

End Connections: Socket (IPS), Threaded (FNPT)

Actuator Control: Double Acting Pneumatic, Spring Return Pneumatic, Electric



ASTM D1784
ASTM D2464
ASTM D2466
ASTM D2467
ASTM F1498
ASTM F437
ASTM F439



ANSI B1.20.1

TKD Series 3-Way Automated Ball Valves

Samples Specifications

1.0 Ball Valves – TKD

1.1 Material

- The valve body, stem, ball, end connectors, and unions shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.
- The valve body, stem, ball and unions shall be made of Corzan® CPVC compound which shall meet or exceed the requirements of 23447 according to ASTM D1784.
- These compounds shall be listed with NSF to Standard 61 for potable water.

1.2 Seats

- The ball seats shall be made of Teflon® (PTFE).

1.3 Seals

- The o-ring seals shall be made of EPDM.
- or The o-ring seals shall be made of FPM.

2.0 Connections

2.1 Socket style

- The IPS socket PVC end connectors shall conform to the dimensional standards ASTM D2466 and ASTM D2467.

2.2 Threaded style

- The female NPT threaded PVC end connectors shall conform to the dimensional standards ASTM D2464, ASTM F1498, and ANSI B1.20.1.

3.0 Design Features

- All valves shall be true union at all three ports.
- All valves shall be full port.
- Valve design shall permit positive shutoff of any of the three ports.
- Balls shall be of T-port or L-port design (specifier must select one).
- The valve shall have blocking seat supports at all three ports.
- The threaded carrier (ball seat support) shall be adjustable with the valve installed.
- The valve body, union nuts and carrier shall have deep square style threads for increased strength.
- The ball shall be machined smooth to minimize wear on valve seats.
- All valve seats shall have o-ring backing cushions to compensate for wear and prevent seizure of the ball.
- The thickness of the valve body shall be the same at all three ports.
- The valve shall include the Dual Block® union nut locking mechanism.
- The stem design shall feature a shear point above the o-ring to maintain system integrity in the unlikely event of a stem breakage.
- All valves shall have integrally molded mounting flanges for support and actuation.

3.1 Pressure Rating

- All valves shall be rated at 232psi at 73°F (23°C).

3.2 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.3 Color Coding

- All PVC valves shall be color-coded dark gray.

4.0 All valves shall be Xirtec® PVC by IPEX or approved equal.

5.0 Actuators

- All Actuators shall be factory installed by IPEX

TKD Series 3-Way Automated Ball Valves

Pneumatic Actuator:

- Shall be sized for 80 psi control air pressure
- Shall be dual piston rack and pinion design with linear torque output.
- Body shall be Technopolymer UT series or Anodized Aluminum MT series with standard position indicator and NAMUR VDI/VDE 3845 and ISO 5211 mounting dimensions.
- All models shall be operable using air, water, nitrogen or compatible hydraulic fluids from 40 – 120psi.
- Aluminum body models shall feature dual travel stops that provide +/- 10° stroke rotation on both the opening and closing phases.
- All external fasteners shall be stainless steel.

Electric Actuator:

- Shall have 100VAC – 240VAC reversing motors with torque limiters, thermal protection, auxiliary limit switches, NEMA 4X enclosure*, manual override, and position indicator as standard.
- or Shall have 24VDC reversing motors with torque limiters, thermal protection, auxiliary limit switches, NEMA 4X enclosure*, manual override, and position indicator as standard.
- 4–20mA positioner, battery backup, and 180° rotation models shall be available in 100 – 240VAC and 24VDC
- All models shall have ISO 5211 mounting dimensions

* Type 4X Indoor Use Only Enclosure

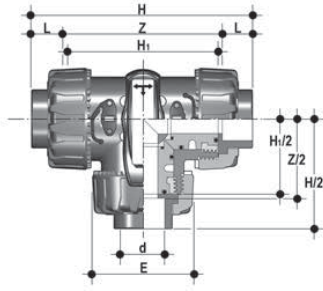
TKD Series 3-Way Automated Ball Valves

Size (inches)	Body Material	Seal Material	IPEX Part Number							
			Pneumatic Double Acting		Pneumatic Spring Return, Normally Closed		Pneumatic Spring Return, Normally Open		Electric Double Acting, 100-240 VAC	
			IPS Socket	FNPT Threaded	IPS Socket	FNPT Threaded	IPS Socket	FNPT Threaded	IPS Socket	FNPT Threaded
1/2	PVC	EPDM	253791		253767			253744		253720
	L-Port	FPM	253797		253773			253750		253726
	PVC	EPDM	253803		253779			253756		253732
	T-Port	FPM	253809		253785			253762		253738
	CPVC	EPDM	254071		254061			253828		253840
	L-Port	FPM	254001		254013			254025		254037
3/4	PVC	EPDM	254055		254067			253834		253995
	T-Port	FPM	254007		254019			254031		254044
	PVC	EPDM	253792		253768			253745		253721
	L-Port	FPM	253798		253774			253751		253727
	PVC	EPDM	253804		253780			253757		253733
	T-Port	FPM	253810		253786			253763		253739
1	CPVC	EPDM	254049		254062			253829		253841
	L-Port	FPM	254002		254014			254026		254038
	CPVC	EPDM	254056		254068			253835		253996
	T-Port	FPM	254008		254020			254032		254045
	PVC	EPDM	253793		253769			253746		253722
	L-Port	FPM	253799		253775			253752		253728
1-1/4	PVC	EPDM	253805		253781			253758		253734
	T-Port	FPM	253811		253787			253764		253740
	CPVC	EPDM	254051		254063			253830		253991
	L-Port	FPM	254003		254015			254027		254039
	CPVC	EPDM	254057		254069			253836		253997
	T-Port	FPM	254009		254021			254033		254046
1-1/2	PVC	EPDM	253794		253770			253747		253723
	L-Port	FPM	253800		253776			253753		253729
	PVC	EPDM	253806		253782			253759		253735
	T-Port	FPM	253812		253788			253765		253741
	CPVC	EPDM	254052		254064			253831		253992
	L-Port	FPM	254004		254016			254028		254040
2	CPVC	EPDM	254058		254070			253837		253998
	T-Port	FPM	254010		254022			254034		254047
	PVC	EPDM	253795		253771			253748		253724
	L-Port	FPM	253801		253777			253754		253730
	PVC	EPDM	253807		253783			253760		253736
	T-Port	FPM	253813		253789			253766		253742
2	CPVC	EPDM	254053		254065			253832		253993
	L-Port	FPM	254005		254017			254029		254041
	CPVC	EPDM	254059		254050			253838		253999
	T-Port	FPM	254011		254023			254035		254048
	PVC	EPDM	253796		253772			253749		253725
	L-Port	FPM	253802		253778			253755		253731
2	PVC	EPDM	253808		253784			253761		253737
	T-Port	FPM	253814		253790			253815		253743
	CPVC	EPDM	254060		254066			253833		
	L-Port	FPM	254006		254018			254030		254043
	CPVC	EPDM	254054		254072			253839		254000
	T-Port	FPM	254012		254024			254036		254042

BALL VALVES

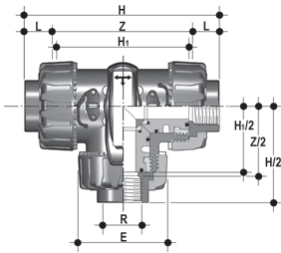
TKD Series 3-Way Automated Ball Valves

Dimensions



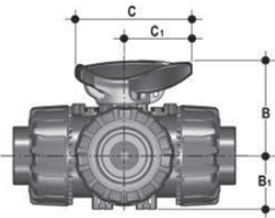
IPS Socket Connections – Dimension (inches)

Size (d)	E	H	H ₁	L	Z
1/2	2.13	5.20	3.15	0.91	3.43
3/4	2.56	6.27	3.94	1.00	4.26
1	2.87	6.85	4.33	1.13	4.59
1-1/4	3.39	8.07	5.16	1.26	5.55
1-1/2	3.86	8.96	5.83	1.38	6.20
2	4.80	10.51	7.05	1.50	7.50



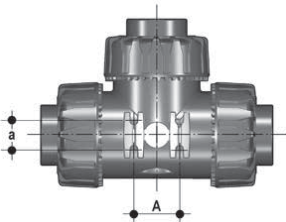
Female NPT Threaded Connections – Dimension (inches)

Size (R)	E	H	H ₁	L	Z
1/2	2.13	4.96	3.15	0.71	3.56
3/4	2.56	5.76	3.94	0.71	4.35
1	2.87	6.56	4.33	0.89	4.78
1-1/4	3.39	7.71	5.16	0.99	5.73
1-1/2	3.86	8.32	5.83	0.97	6.38
2	4.80	9.99	7.05	1.17	7.66



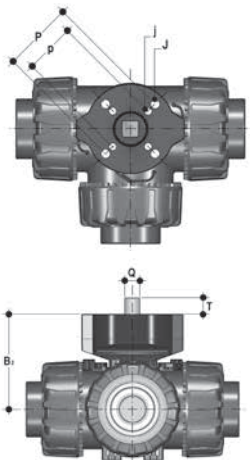
IPS Socket & Female NPT Threaded – Dimension (inches)

Size (R)	B	B ₁	C	C ₁
1/2	2.13	1.14	2.64	1.58
3/4	2.56	1.36	3.35	1.93
1	2.74	1.54	3.35	1.93
1-1/4	3.25	1.81	4.25	2.52
1-1/2	3.50	2.05	4.25	2.52
2	4.25	2.44	5.28	2.99



Mounting Flanges – Dimension (inches)

Size	A
1/2	1.22
3/4	1.22
1	1.22
1-1/4	1.97
1-1/2	1.97
2	1.97



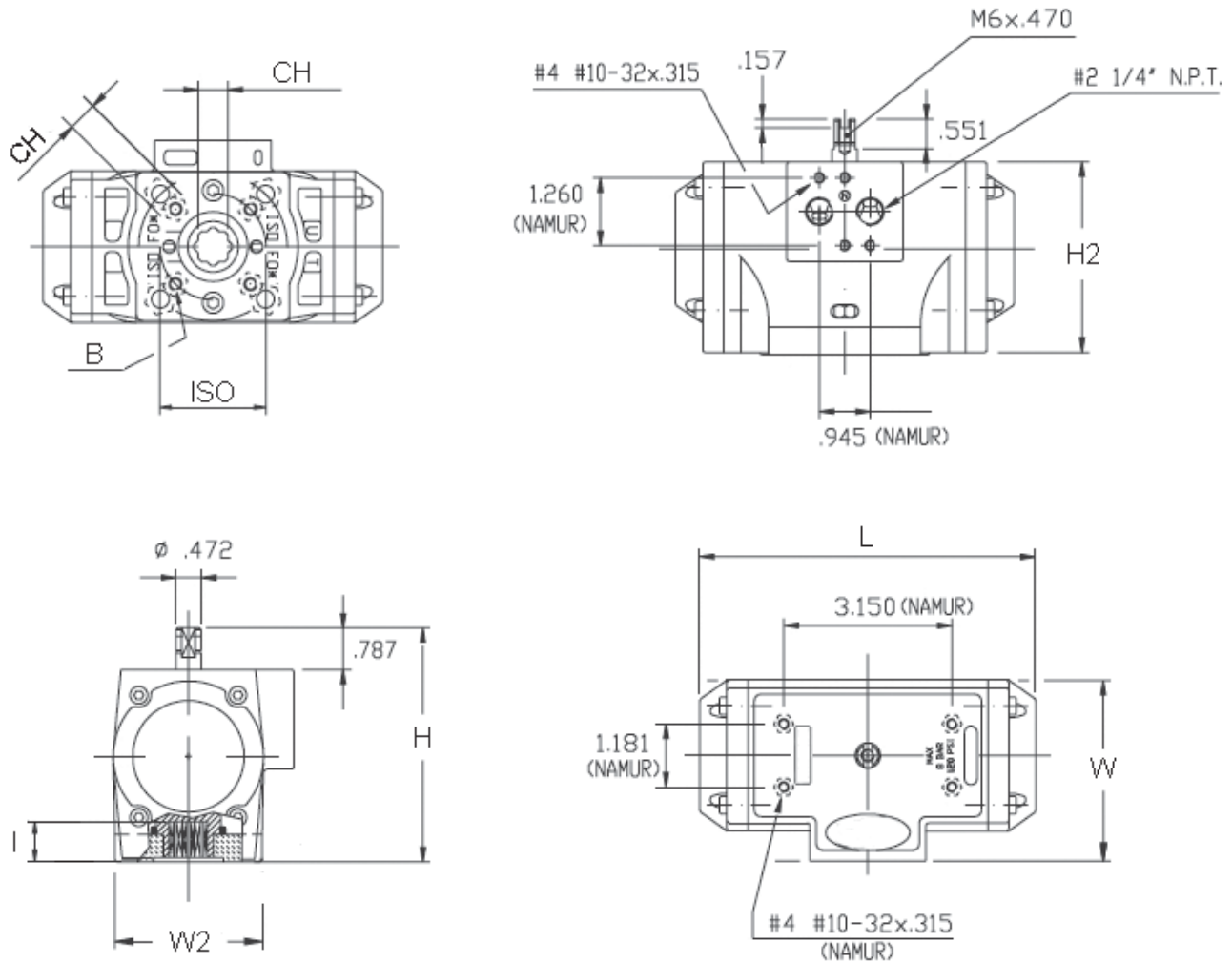
Mounting Kit – Dimensions (inches)

Size	B ₂	T	Q	p / P	j / J
1/2	2.28	0.47	0.43	F03 / F04	0.22
3/4	2.89	0.47	0.43	F03 / F05 or F04	0.22 / 0.26 or 0.22
1	2.91	0.47	0.43	F03 / F05 or F04	0.22 / 0.26 or 0.22
1-1/4	3.82	0.63	0.43 or 0.55	F05	0.26
1-1/2	4.09	0.63	0.43 or 0.55	F05	0.26
2	4.49	0.63	0.43 or 0.55	F05 / F07	0.26 / 0.33

TKD Series 3-Way Automated Ball Valves

Pneumatic Actuator Dimensions

Models UT11, UT14, UT19



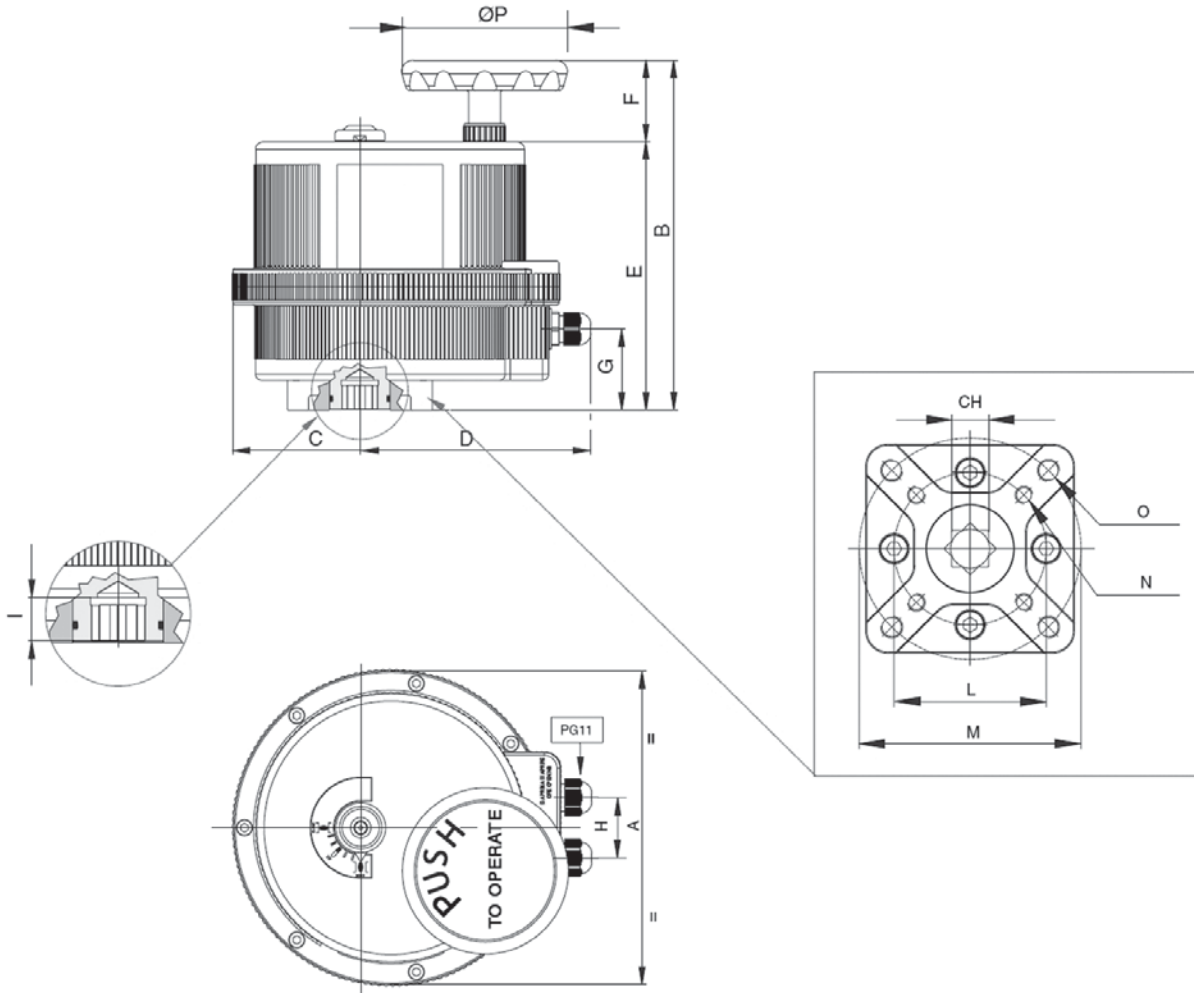
Dimensions (inches)

Valve Size	Double Acting Model	ISO	CH	L	W	W2	H	H2	I	B
1/2	UT11DA	F04	0.43	4.69	2.64	2.09	3.58	2.76	0.49	10-32 UNF x 0.40
3/4	UT14DA	F05 / F07	0.55	6.30	3.39	2.76	4.37	3.54	0.75	1/4-20 UNC x 0.51
1	UT14DA	F05 / F07	0.55	6.30	3.39	2.76	4.37	3.54	0.75	1/4-20 UNC x 0.51
1-1/4	UT14DA	F05 / F07	0.55	6.30	3.39	2.76	4.37	3.54	0.75	1/4-20 UNC x 0.51
1-1/2	UT14DA	F05 / F07	0.55	6.30	3.39	2.76	4.37	3.54	0.75	1/4-20 UNC x 0.51
2	UT14DA	F05 / F07	0.55	6.30	3.39	2.76	4.37	3.54	0.75	1/4-20 UNC x 0.51

BALL VALVES

TKD Series 3-Way Automated Ball Valves

Electric Actuator Dimensions

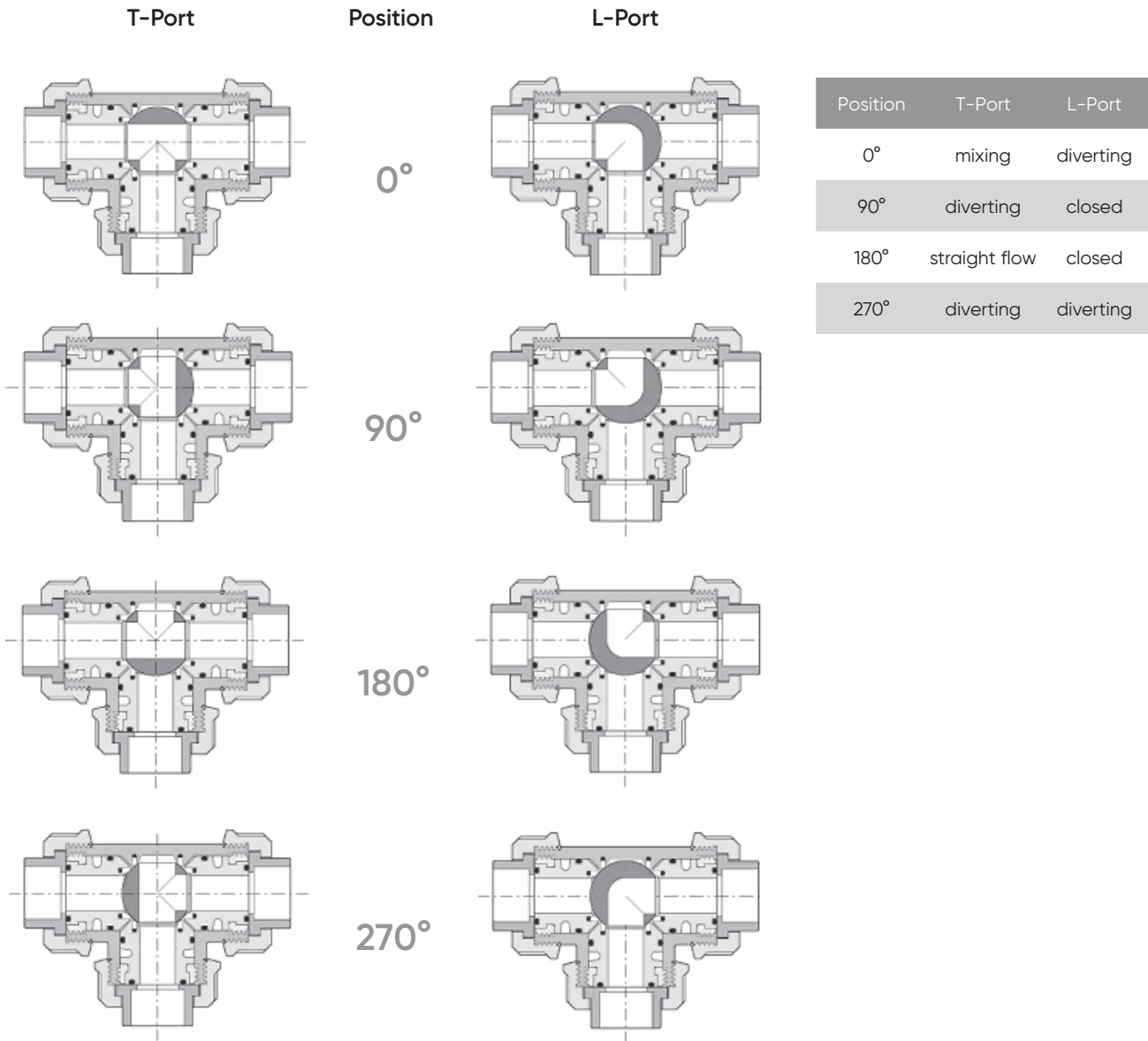


Dimensions (inches)

Valve Actuator Size	Model	ISO	CH	A	B	C	D	E	F	G	H	I	L	M	N	O
1/2	VB015	F03 / F05	0.43	4.84	6.28	1.67	4.78	5.67	0.61	4.35	1.26	0.47	1.42	1.97	10-24 UNC x 0.55	1/4-20 UNC x 0.55
3/4	VB015	F03 / F05	0.43	4.84	6.28	1.67	4.78	5.67	0.61	4.35	1.26	0.47	1.42	1.97	10-24 UNC x 0.55	1/4-20 UNC x 0.55
1	VB015	F03 / F05	0.43	4.84	6.28	1.67	4.78	5.67	0.61	4.35	1.26	0.47	1.42	1.97	10-24 UNC x 0.55	1/4-20 UNC x 0.55
1-1/4	VB015	F03 / F05	0.43	4.84	6.28	1.67	4.78	5.67	0.61	4.35	1.26	0.47	1.42	1.97	10-24 UNC x 0.55	1/4-20 UNC x 0.55
1-1/2	VB030	F03 / F05	0.43	6.18	7.39	2.38	5.01	5.75	1.64	1.30	1.42	0.47	1.42	1.97	10-24 UNC x 0.55	1/4-20 UNC x 0.55
2	VB030	F03 / F05	0.43	6.18	7.39	2.38	5.01	5.75	1.64	1.30	1.42	0.47	1.42	1.97	10-24 UNC x 0.55	1/4-20 UNC x 0.55

TKD Series 3-Way Automated Ball Valves

Operating Positions – Please specify 'open' and 'closed' positions



Note: Electric actuators can be configured for either 90° or 180° operation.

TKD Series 3-Way Automated Ball Valves



Note: Pneumatic actuator performance is based on 80psi available control air pressure.

Actuator Technical Data

Valve Size (inches)	Double Acting Pneumatic	Actuator Model Spring Return Pneumatic	Electric
1/2	UT11DA	UT11S2	VB015
3/4	UT14DA	UT14S4	VB015
1	UT14DA	UT14S4	VB015
1-1/4	UT14DA	UT19S5	VB015
1-1/2	UT14DA	UT19S5	VB030
2	UT14DA	UT26S4	VB030

Pneumatic Actuator Torque Data

Valve Size (inches)	DOUBLE ACTING		SPRING RETURN					
	Model	Torque (in-lbs)	Model	Spring Set (standard)	Spring Torque (in-lbs)		Air Torque (in-lbs)	
					Start	End	Start	End
1/2	UT11DA	125	UT11S2	S2	66	44	81	59
3/4	UT14DA	275	UT14S4	S4	150	107	168	125
1	UT14DA	275	UT14S4	S4	150	107	168	125
1-1/4	UT14DA	275	UT19S5	S5	307	230	270	193
1-1/2	UT14DA	275	UT19S5	S5	307	230	270	193
2	UT14DA	275	UT26S4	S4	392	247	503	358

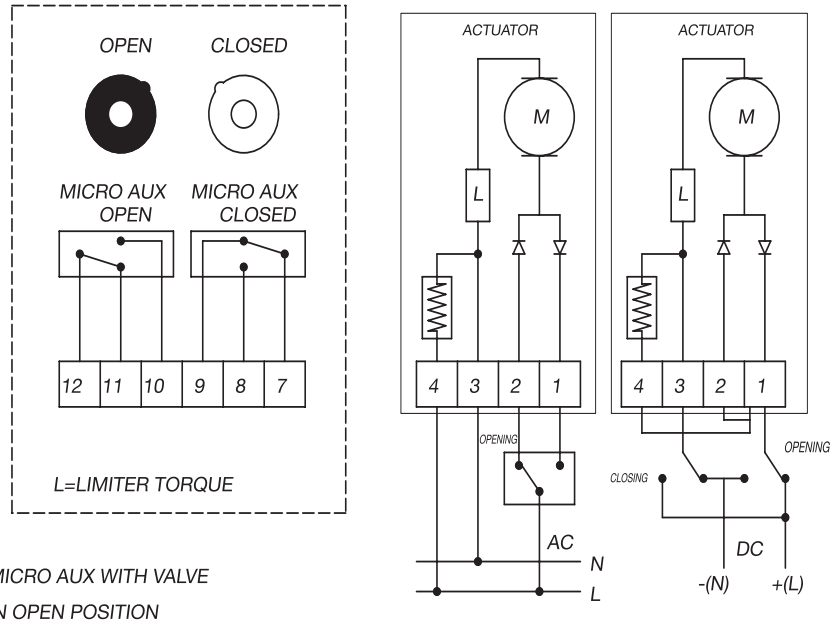
Pneumatic Actuator Weights and Air Consumption

Valve Size (inches)	DOUBLE ACTING			SPRING RETURN		
	Model	Weight (lbs)	Air Cons. (in ³)	Model	Weight (lbs)	Air Cons. (in ³)
1/2	UT11DA	1.26	13.5	UT11S2	1.44	8.0
3/4	UT14DA	2.62	22.0	UT14S4	3.06	10.8
1	UT14DA	2.62	22.0	UT14S4	3.06	10.8
1-1/4	UT14DA	2.62	22.0	UT19S5	5.16	17.5
1-1/2	UT14DA	2.62	22.0	UT19S5	5.16	17.5
2	UT14DA	2.62	22.0	UT26S4	9.88	30.0

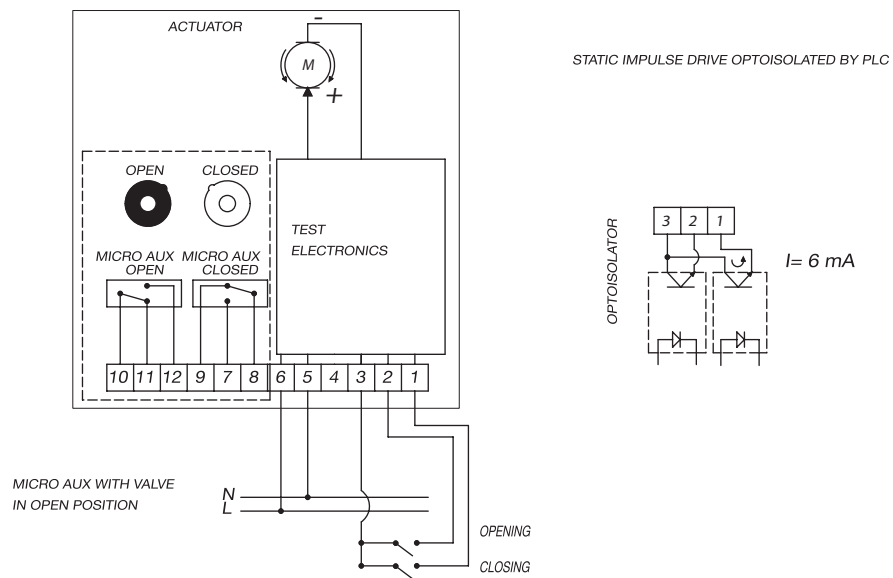
TKD Series 3-Way Automated Ball Valves

Electrical Actuator

Model VB015 24V AC/DC



Model VB015 100V – 240V AC

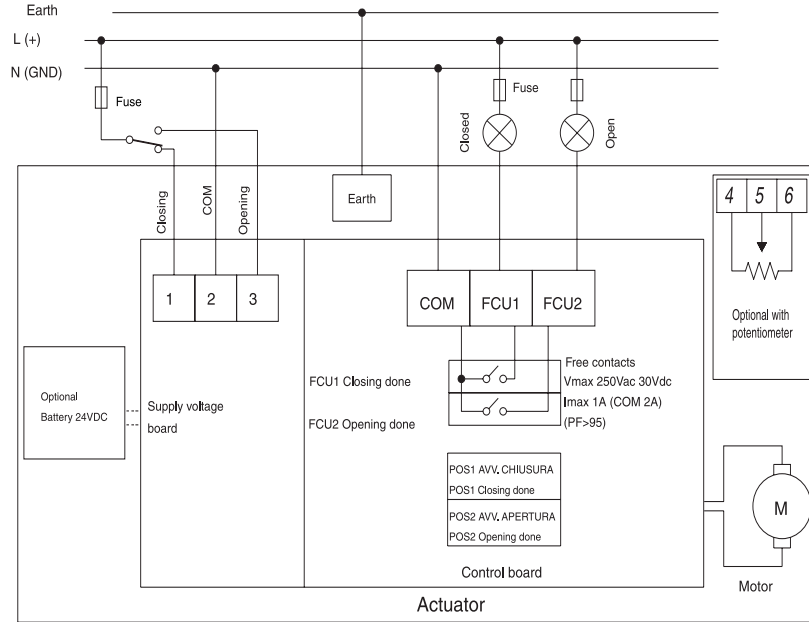


BALL VALVES

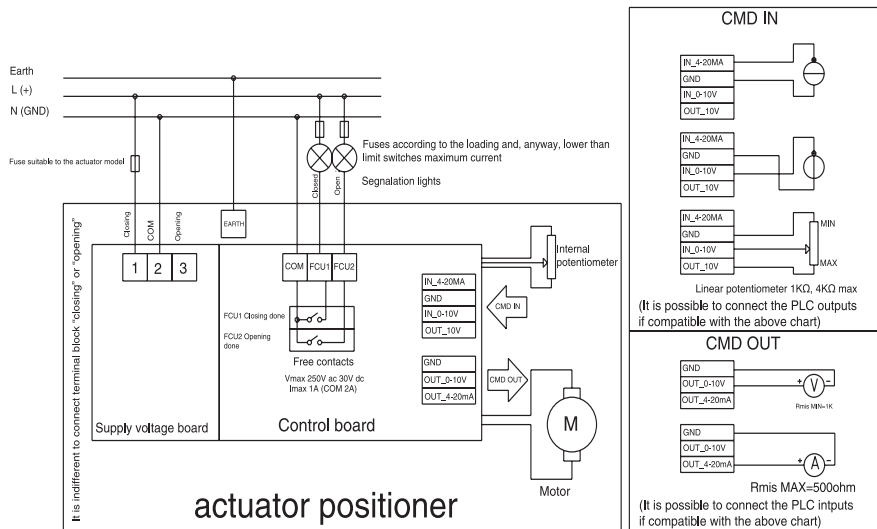
TKD Series 3-Way Automated Ball Valves

Electrical Actuator

Model VB30 to VB350, 24V AC/DC, 110 – 240V AC



VB30 to VB350 24V AC/DC, 110 – 240V AC with Positioner



TKD Series 3-Way Automated Ball Valves

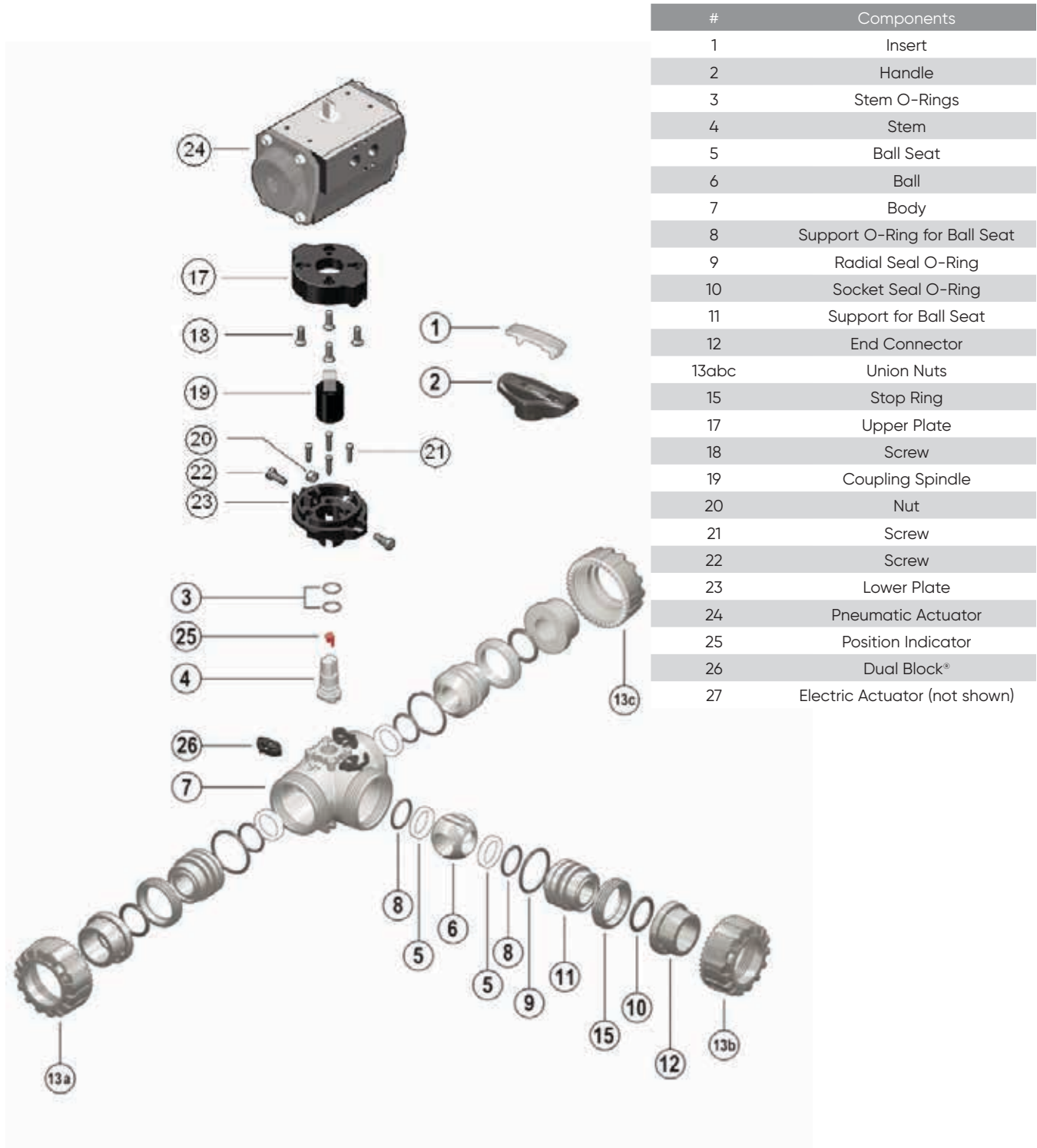
Model		VB015	VB030
Max Working Torque (in-Lbs)		133	266
Voltage (V)	Low Voltage	12V AC/DC	12V DC
		24V AC/DC	24V AC/DC
	High Voltage Multitension	100-240V AC	100-240V AC
Working Time (sec)		10	8
Torque Limiter		STD	STD
Duty Rating		50%	75%
Protection		IP65 ** NEMA 4X*	IP65-67 NEMA 4X*
Rotation		90°	90°
Upon Request		180°	180° or 70°
Manual Intervention		STD	STD
Position Indicator		STD	STD
Working Temperature		-4F +131F	-4F +131F
Heater		STD	STD
Additional Free Limit Switches		2 STD	2 STD
Drilling ISO 5211 PAD		F03 – F05	F03 – F05
Square Drive		0.43	0.43
Square Upon Request		0.35	0.35 – 0.55
Positioner (4~20mA or 0~10 VDC)		Not Available	Upon Request
Electrical Connections		PG11	PG11
Weight (LBS)		3.09	5.07

Electric Actuator Power Consumption

MODEL		VB015		VB030
VERSION H	Nominal Voltage	100V AC	240V AC	100 – 240V AC
	Absorbed Current	75mA	25mA	0.3 – 0.2A
	Absorbed Power	6.6 VA	6 VA	30 – 48VA
VERSION L	Nominal Voltage	24V AC/DC		24V AC/DC
	Absorbed Current	1.2A	0.6A	2.0A 1.0A
	Absorbed Power	15 VA		24 VA
Frequency		50/60 HZ		

TKD Series 3-Way Automated Ball Valves

Components



TKD Series 3-Way Automated Ball Valves

Installation Procedures

1. For socket and threaded style connections, remove the union nuts (part #13 on previous page) and slide them onto the pipe. For flanged connections, remove the union nut / flange assemblies from the valve (Figure 1).
2. Please refer to the appropriate connection style subsection:
 - a. For socket style, solvent cement the end connectors (12) onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". Be sure to allow sufficient cure time before continuing with the valve installation.
 - b. For threaded style, thread the end connectors (12) onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" (Figure 2).
3. All quarter turn automated valves are tested for proper operation before leaving the factory. Adjustment of the seat stop carrier should not be necessary. However, if adjustment is required, remove the insert tool (1) from the handle (2) provided. Line up the moldings on the tool with the slots in the seat supports. Tighten or loosen to the desired position then replace the tool on the handle. For correct alignment of the ball and seat support system, adjustment should begin with the center port.
4. Ensure that the socket o-rings (10) are properly fitted in their grooves then carefully place the valve in the system between the end connections. If anchoring is required, fix the valve to the supporting structure via the integral mounting flange on the bottom of the valve body (7).
5. Tighten the three union nuts. Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. Over-tightening may damage the threads on the valve body and/or the union nut, and may even cause the union nut to crack (Figure 2).
6. Check the installation of the dedicated lock nut device DUAL BLOCK® (26) on the valve body (Figure 3).
7. Connect pneumatic or electric connections according to provided diagrams.
8. Cycle the valve open and close to ensure that the cycling performance is adequate. If adjustment is required, loosen the union nuts, remove the valve from the system, and then continue from Step 3.



Figure 1



Figure 2



Figure 3

TKD Series 3-Way Ball Valves

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the system. Be sure to depressurize and drain the isolated branch and valve before continuing.
2. If necessary, remove actuator connections and detach the valve from the support structure
3. Unlock the Dual Block® system (Figure 3) by compressing the lever (26). Loosen the three union nuts (13) and drop the valve out of the line. If retaining the socket o-rings (10), take care that they are not lost when removing the valve from the line.
4. Remove the actuator, if necessary, from the valve by removing the screws (22) located horizontally across from each other fastening the upper and lower portions of the actuation pad.
5. To disassemble, rotate the ball to the appropriate position using the provided handle (2).
4. Remove the insert tool (1) from the handle provided, then line up the moldings on the tool with the slots in the seat supports (11). Loosen and remove all three seat supports from the valve body (7).
5. Remove the ball (6) from the valve body while taking care not to score or damage the outer surface.
6. To remove the stem, push it into the valve body from above.
7. Remove the seats (5), backing o-rings (8), and body o-rings (9) from the seat supports.
8. Remove the seat and backing o-ring from the inside of the valve body.
9. Remove the stem o-rings (3).
10. The valve components can now be checked for problems and/or replaced.

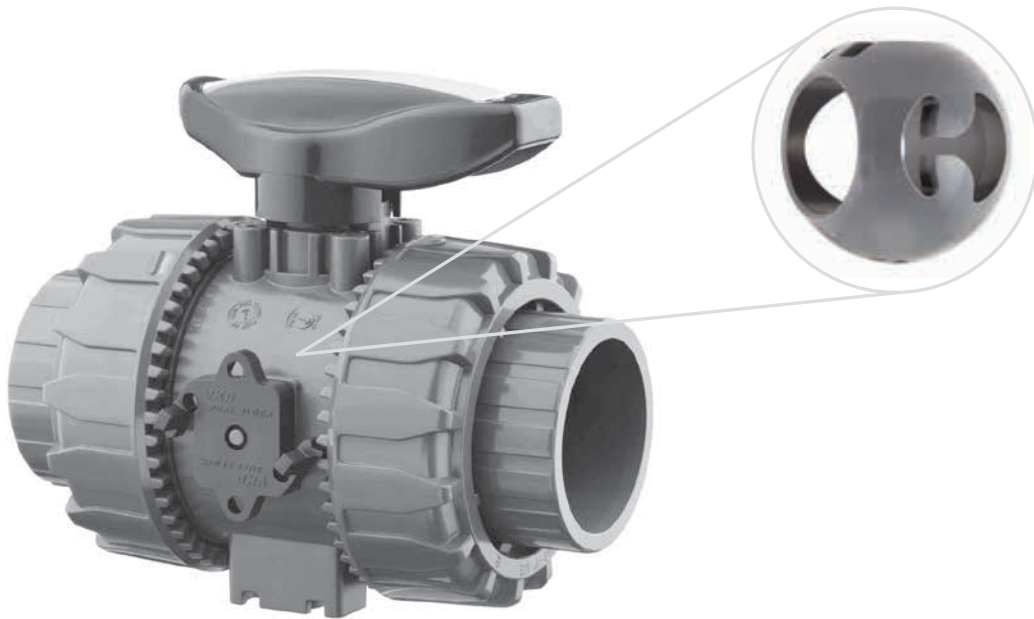
Note: It is not necessary to remove the actuator from the valve unless the stem requires servicing or replacement. If possible, leave actuator attached to valve during servicing.

Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities.

1. Properly fit the stem o-rings (3) in the grooves on the stem (4), then insert the stem from the inside of the valve body (7).
2. Line up the markings on the stem with the ports in the valve body.
3. Replace the backing o-ring (8) and seat (5) at the back of the valve body.
4. Insert the ball (6) into the valve body while ensuring that the ports line up with the markings on the stem. Ensure that the actuator and ball position correspond to the same operating position
5. Ensure that all body o-rings (9), backing o-rings, and seats are properly fitted on the three seat supports (11). Starting with the center port, tighten each support into the valve body using the insert tool (1).
6. Replace the actuator, if removed, and affix in position using screws (22) located horizontally across from each other.
7. Properly fit the socket o-rings (10) in their respective grooves.
8. Place the end connectors (12) into the union nuts (13), then thread onto the valve body taking care that the socket o-rings remain properly fitted in their grooves.

VKR Series Regulating Ball Valves



Designed to meet the requirements of the most severe industrial applications, IPEX VKR Series Regulating Ball Valves combine the reliability and safety features of IPEX VKD ball valves with a newly designed profiled ball. The patented ball design provides linear flow regulation throughout its full range of operation even when the valve is open just a few degrees. Like a traditional shut-off ball valve, the VKR has a 90° operating angle which allows the use of a standard quarter-turn actuator, ensuring perfect alignment and reducing the torque required for actuation. The patented Dual Block® mechanism locks the union nuts in place preventing back-off during severe service conditions.

VALVE AVAILABILITY

Body Material	PVC, PP, PVDF
Size Range	1/2" through 2"
Pressure	up to 232 psi
Seats	Teflon® (PTFE)
Seals	EPDM or Fluoropolymer (FPM)
End Connections	Socket (IPS), Threaded (FNPT) Socket (Metric), Flanged (ANSI 150)
Actuator Control	Electric with Positioner



ASTM D1784
ASTM D2464
ASTM D2466
ASTM D2467
ASTM D4101
ASTM D3222
ASTM F1498



ANSI B1.20.1

VKR Series Regulating Ball Valves

Samples Specifications

1.0 Ball Valves – VKR

1.1 Material

- The valve body, stem, ball and unions shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.
- or The valve body, stem, ball and unions shall be made of stabilized polypropylene (PP) homopolymer compound, also containing a RAL 7032 pigment, which shall meet or exceed the requirements of Type PP according to ASTM D4101.
- or The valve body, including end connectors and unions shall be made of virgin, non-regrind polyvinylidene fluoride (PVDF) compound which shall meet or exceed the requirements of Table 1 according to ASTM D3222.

1.2 Seats

- The ball seats shall be made of Teflon® (PTFE).

1.3 Seals

- The o-ring seals shall be made of EPDM.
- or The o-ring seals shall be made of Fluoropolymer (FPM).

2.0 Connections

2.1 Socket style

- The IPS socket PVC end connectors shall conform to the dimensional standards ASTM D2466 and ASTM D2467.
- or The Metric socket PP end connectors shall conform to the dimensional standard ISO 11922-1.
- or The Metric socket PVDF end connectors shall conform to the dimensional standard ISO 10931.

2.2 Threaded style

- The female NPT threaded PVC end connectors shall conform to the dimensional standards ASTM D2464, ASTM F1498 and ANSI B1.20.1.
- or The female NPT threaded PP end connectors shall conform to the dimensional standards ASTM F1498 and ANSI B1.20.1.

3.0 Design Features

- The valve shall be double blocking with union ends.
- All valves shall have a flow indication arrow on the side of the body.
- The valve body shall be single end entry with a threaded carrier (ball seat support).
- The threaded carrier shall be adjustable with the valve installed.
- The valve body shall have an expansion and contraction compensating groove on the molded end.
- The valve body, union nuts, and carrier shall have deep square style threads for increased strength.
- The ball design shall allow flow regulation starting at a 6° angle of opening.
- The ball and stem shall be machined smooth to minimize wear on valve seats and seals.
- The stem design shall feature double o-ring seals as well as a safety shear point above the o-rings.
- All valve seats shall have o-ring backing cushions to compensate for wear and prevent seizure of the ball.
- All valves shall have integrally molded mounting features for actuation.
- All valves shall have integrally molded support bracketing for anchoring.

3.1 Pressure Tested

- All valves shall have been pressure tested in both the open and closed positions by the manufacturer.

3.2 Pressure Rating

- All PVC and PVDF valves shall be rated at 232 PSI at 73°F.
- All PP valves shall be rated at 150 PSI at 73°F.
- All flanged valves shall be rated at 150 PSI at 73°F.

3.3 Markings

- All valves shall be marked to indicate size, material designation and manufacturers name or trade mark.

3.4 Color Coding

- All PVC valves shall be color-coded dark gray.
- or All PP valves shall be color-coded beige gray.
- or All PVDF valves shall not be color-coded and be white (unpigmented) in appearance.

- 4.0 All valves shall be Xirtec® PVC, PP or PVDF by IPEX or approved equal.

VKR Series Regulating Ball Valves

5.0 Actuators

- All Actuators shall be factory installed by IPEX

Pneumatic Actuator:

- Shall be sized for 80 psi control air pressure
- Shall be dual piston rack and pinion design with linear torque output.
- Body shall be Technopolymer UT series or Anodized Aluminum MT series with standard position indicator and NAMUR VDI/VDE 3845 and ISO 5211 mounting dimensions.
- All models shall be operable using air, water, nitrogen or compatible hydraulic fluids from 40 – 120psi.
- Aluminum body models shall feature dual travel stops that provide +/- 10° stroke rotation on both the opening and closing phases.
- All external fasteners shall be stainless steel.

Electric Actuator:

- Shall have 100VAC – 240VAC reversing motors with torque limiters, thermal protection, auxiliary limit switches, NEMA 4X enclosure*, manual override, and position indicator as standard.
- or Shall have 24VDC reversing motors with torque limiters, thermal protection, auxiliary limit switches, NEMA 4X enclosure*, manual override, and position indicator as standard.
- 4–20mA positioner, battery backup, and 180° rotation models shall be available in 100 – 240VAC and 24VDC
- All models shall have ISO 5211 mounting dimensions

* Type 4X Indoor Use Only Enclosure

VKR Series Regulating Ball Valves

Valve Selection

Valve Size (inches)	Body Material	Seal Material	IPEX Part Number Electric Double Acting, 100-240 VAC	
			IPS Socket	FNPT Threaded
1/2	PVC	EPDM	353684	253185
		FPM	353675	235189
3/4	PVC	EPDM	353683	235186
		FPM	353676	235190
1	PVC	EPDM	353682	235187
		FPM	353678	235191
1-1/4	PVC	EPDM	353681	235186
		FPM	353685	235192
1-1/2	PVC	EPDM	353680	253187
		FPM	353686	235193
2	PVC	EPDM	353679	235188
		FPM	353677	235194

For custom configurations, please contact IPEX.
For pneumatically actuated valves, please contact IPEX.
PP and PVDF valves available on request.
Flanged valves available on request.

Body Material:

- PVC PP
 PVDF

Size (inches):

- 1/2 1-1/4
 3/4 1-1/2
 1 2

Seals:

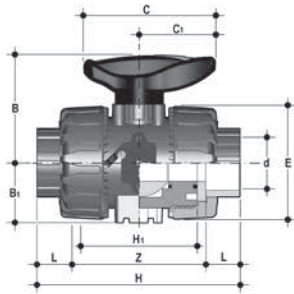
- FPM

End Connections:

- Socket (IPS)
 Threaded (FNPT)
 Flanged (ANSI 150)

IPEX Part Number:

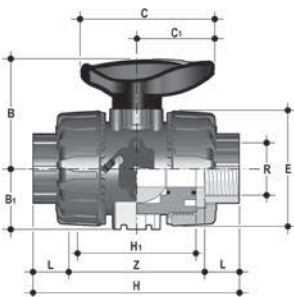
Dimensions



IPS Socket Connections

Dimension (inches)

Size	d	H	L	Z	H1	E	B1	B	C1	C
1/2	0.84	4.61	0.89	2.83	2.56	2.13	1.14	2.13	1.57	2.64
3/4	1.05	5.08	1.00	3.07	2.76	2.56	1.36	2.56	1.93	3.35
1	1.32	5.59	1.13	3.33	3.07	2.87	1.54	2.74	1.93	3.35
1-1/4	1.66	6.38	1.26	3.86	3.46	3.39	1.81	3.25	2.52	4.25
1-1/2	1.90	6.77	1.38	4.02	3.66	3.86	2.05	3.50	2.52	4.25
2	2.38	7.83	1.50	4.83	4.37	4.80	2.44	4.25	2.99	5.28



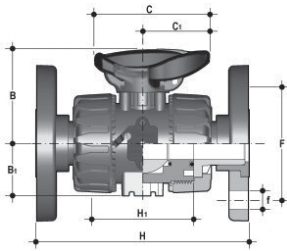
Female NPT Threaded Connections

Dimension (inches)

Size	R	H	L	Z	H1	E	B1	B	C1	C
1/2	1/2-NPT	4.37	0.70	2.97	2.56	2.13	1.14	2.13	1.57	2.64
3/4	3/4-NPT	4.61	0.71	3.19	2.76	2.56	1.36	2.56	1.93	3.35
1	1-NPT	5.31	0.89	3.54	3.07	2.87	1.54	2.74	1.93	3.35
1-1/4	1-1/4-NPT	6.02	0.99	4.05	3.46	3.39	1.81	3.25	2.52	4.25
1-1/2	1-1/2-NPT	6.14	0.97	4.20	3.66	3.86	2.05	3.50	2.52	4.25
2	2-NPT	7.32	1.17	4.99	4.37	4.80	2.44	4.25	2.99	5.28

VKR Series Regulating Ball Valves

Dimensions



VKD Flanged Connections

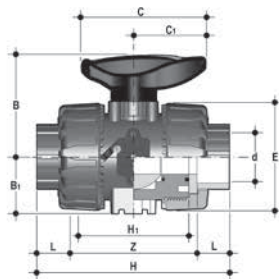
Dimension (inches)

Size	H	H1	B	B1	C	C1	F	f	U
1/2"	5.63	2.56	2.13	1.14	2.64	1.58	2.37	0.63	0.16
3/4"	6.77	2.76	2.56	1.36	3.35	1.93	2.75	0.63	0.16
1"	7.36	3.07	2.74	1.54	3.35	1.93	3.13	0.63	0.16
1 1/4"	7.48	3.47	3.25	1.81	4.25	2.52	3.5	0.63	0.16
1 1/2"	8.35	3.66	3.5	2.05	4.25	2.52	3.87	0.63	0.16
2"	9.21	4.37	4.25	2.44	5.28	2.99	4.75	0.75	0.16

Note: Dimensions based on VKD ANSI 150 Flanging Kit

Metric Socket Connections

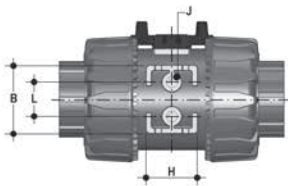
Dimension (inches)



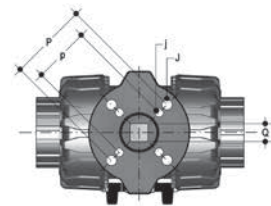
Size	d	H	L	Z	H1	E	B1	B	C1	C
20mm	0.79	4.02	0.57	2.87	2.56	2.13	1.14	2.13	1.57	2.64
25mm	0.98	4.49	0.63	3.23	2.76	2.56	1.36	2.56	1.93	3.35
32mm	1.26	4.96	0.71	3.54	3.07	2.87	1.54	2.74	1.93	3.35
40mm	1.57	5.55	0.81	3.94	3.35	3.39	1.81	3.25	2.52	4.25
50mm	1.97	6.46	0.93	4.61	3.66	3.86	2.05	3.50	2.52	4.25
63mm	2.48	7.83	1.08	5.67	4.37	4.80	2.44	4.25	2.99	5.28

Support Bracket

Dimension (inches)



Size	J	B	L	H
1/2	M4	1.24	0.79	1.06
3/4	M4	1.57	0.79	1.18
1	M4	1.57	0.79	1.18
1-1/4	M6	1.97	1.18	1.38
1-1/2	M6	1.97	1.18	1.38
2	M6	2.36	1.18	1.57

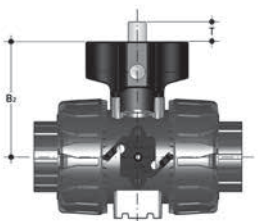


Actuation Pad

Dimension (inches)

Size	B2	p	P	j	J	T	Q
1/2	2.28	F03	F04	0.22	0.22	0.47	0.43
3/4	2.89	F03	F05	0.22	0.26	0.47	0.43
*3/4	2.89		F04		0.22	0.47	0.43
1	2.91	F03	F05	0.22	0.26	0.47	0.43
*1	2.91		F04		0.22	0.43	0.43
1-1/4	3.82	F05	F07	0.26	0.33	0.63	0.55
1-1/2	4.09	F05	F07	0.26	0.33	0.63	0.55
2	4.49	F05	F07	0.26	0.33	0.63	0.55

* Available upon request

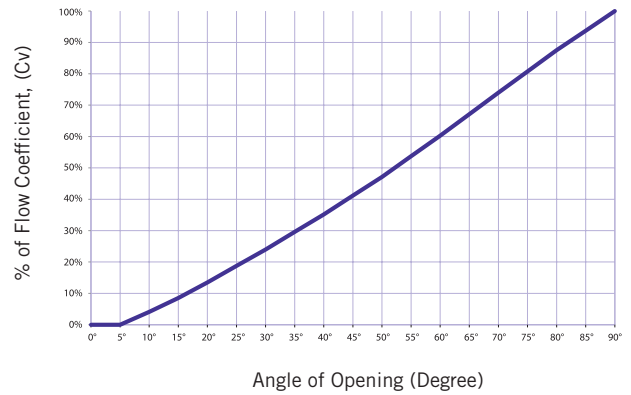


VKR Series Regulating Ball Valves

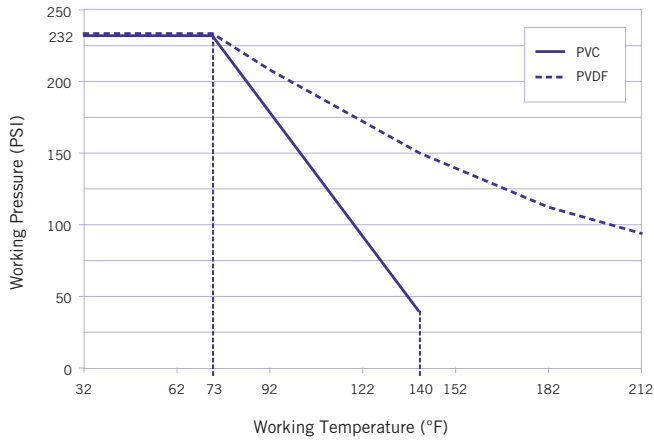
Weights

Size (inches)	Approximate Weight (lbs)			Approximate Weight (lbs)		
	IPS	Metric	PVC	PP	PVDF	FNPT Threaded
1/2	20mm	0.47	0.32	0.60	0.46	0.31
3/4	25mm	0.76	0.48	0.98	0.74	0.50
1	32mm	0.99	0.66	1.29	0.99	0.67
1-1/4	40mm	1.58	1.06	2.07	1.49	1.01
1-1/2	50mm	2.15	1.50	2.74	2.11	1.43
2	63mm	3.77	2.57	4.82	3.68	2.50

Flow Performance Curve

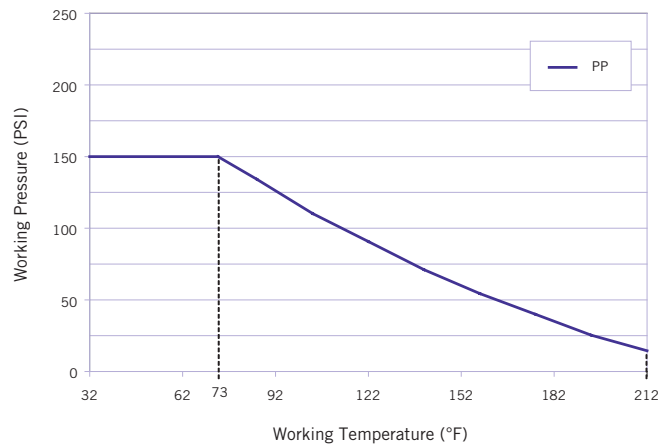


Pressure – Temperature Ratings

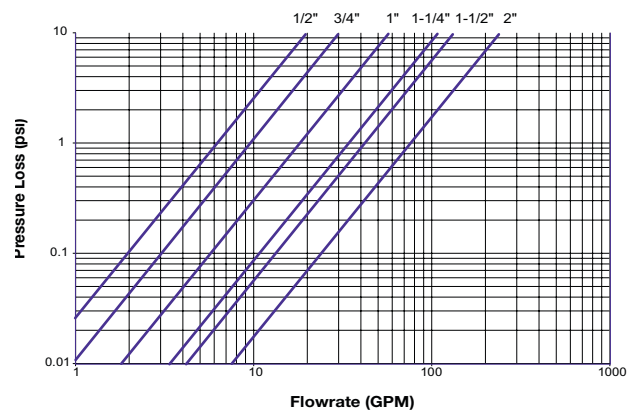


Flow Coefficients

Size (in)	CV
1/2	6.1
3/4	9.4
1	17.8
1-1/4	33.2
1-1/2	41.1
2	74.1

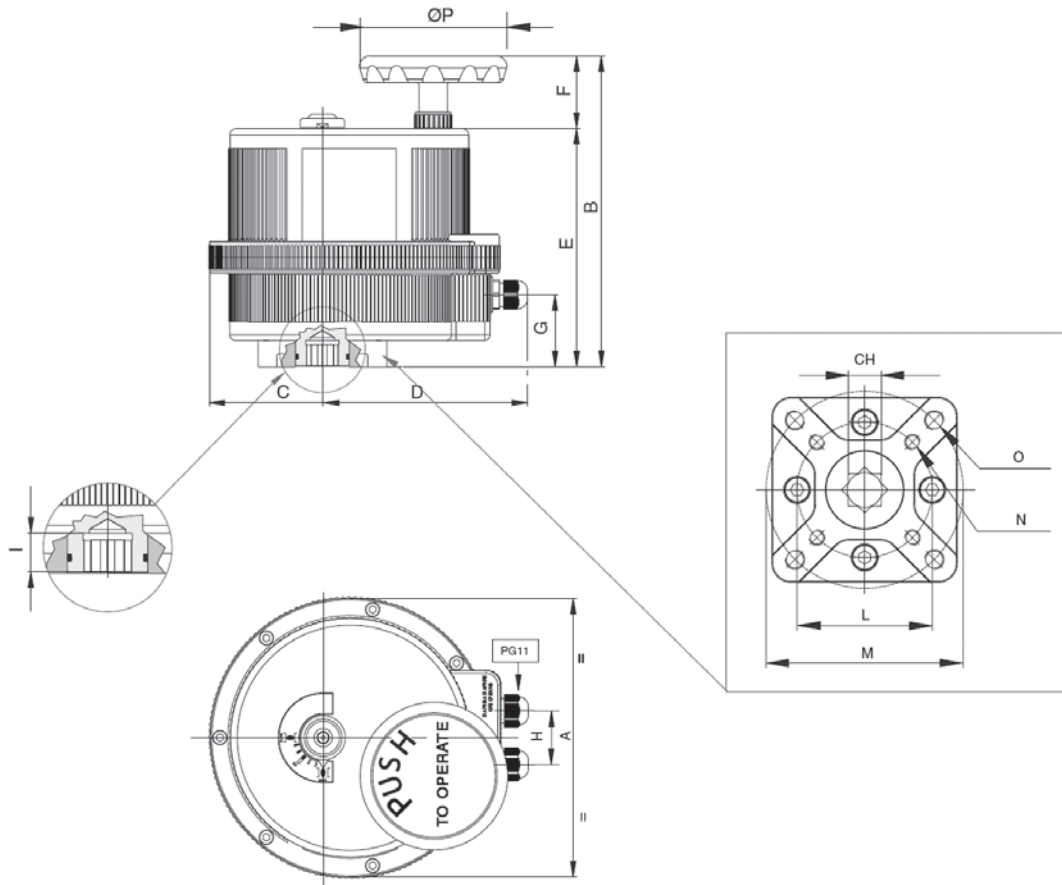


Pressure Loss Chart



VKR Series Regulating Ball Valves

Electric Actuator Dimensions

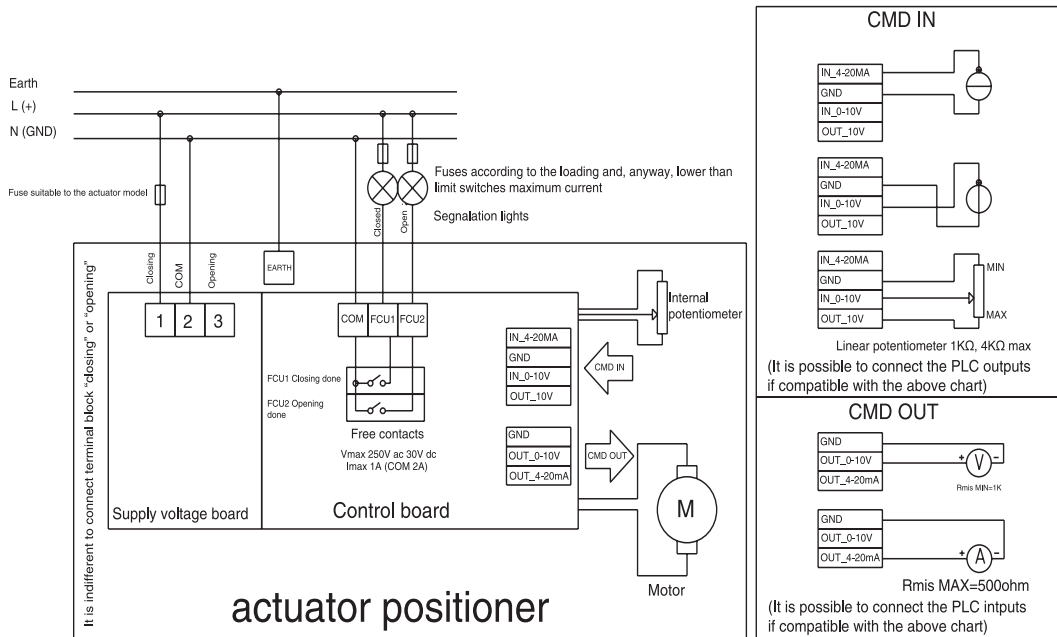


Dimensions (inches)

Valve Size	Actuator Model	ISO	CH	A	B	C	D	E	F	G	H	I	L	M	N	O	ØP
1/2	VB015	F03/F05	0.43	4.84	5.57	1.67	4.74	4.96	0.61	4.06	1.26	0.55	1.42	1.97	10-24 UNC 2BX0.47	1/4-20 UNC 2BX0.55	2.68
3/4	VB030	F03/F05	0.43	4.84	5.57	1.67	4.74	4.96	0.61	4.06	1.26	0.55	1.42	1.97	10-24 UNC 2BX0.47	1/4-20 UNC 2BX0.55	2.68
1	VB030	F03/F05	0.43	4.84	5.57	1.67	4.74	4.96	0.61	4.06	1.26	0.55	1.42	1.97	10-24 UNC 2BX0.47	1/4-20 UNC 2BX0.55	2.68
1-1/4	VB030	F03/F05	0.43	4.84	5.57	1.67	4.74	4.96	0.61	4.06	1.26	0.55	1.42	1.97	10-24 UNC 2BX0.47	1/4-20 UNC 2BX0.55	2.68
1-1/2	VB030	F03/F05	0.43	4.84	5.57	1.67	4.74	4.96	0.61	4.06	1.26	0.55	1.42	1.97	10-24 UNC 2BX0.47	1/4-20 UNC 2BX0.55	2.68
2	VB030	F03/F05	0.43	6.18	7.40	2.38	5.12	5.75	1.65	1.30	1.42	0.47	1.42	1.97	10-24 UNC 2BX0.47	1/4-20 UNC 2BX0.55	2.56

VKR Series Regulating Ball Valves

VB030 to VB350 24V AC/DC, 110 – 240V AC with Positioner



VKR Series Regulating Ball Valves

Electrical Actuator

Model		VB030
Max Working Torque (in-Lbs)		266
Voltage (V)	Low Voltage	24V AC/DC
	High Voltage Multitension	100-240V AC
Working Time (sec)		8
Torque Limiter		STD
Duty Rating		75%
Protection		IP65-67 NEMA 4X*
Rotation		90°
Upon Request		180° or 270°
Manual Intervention		STD
Position Indicator		STD
Working Temperature		-4F +131F
Heater		STD
Additional Free Limit Switches		2 STD
Drilling ISO 5211 PAD		F03 – F05
Square Drive		0.43
Positioner (4~20mA or 0~10 VDC)		Yes
Electrical Connections		PG11
Weight (LBS)		5.07

* Type 4X Indoor Use Only Enclosure

** UL pending

Electric Actuator Power Consumption

MODEL		VB030
VERSION H	Nominal Voltage	100 – 240V AC
	Absorbed Current	0.3 – 0.2A
	Absorbed Power	30 – 48VA
VERSION L	Nominal Voltage	24V AC/DC
	Absorbed Current	1.0A
	Absorbed Power	24 VA
Frequency		50/60 Hz

NOTES

SECTION SIX: AUTOMATED BUTTERFLY VALVES

FK Series Automated Butterfly Valves



IPEX FK Series Automated Butterfly Valves offer superior strength and chemical resistance in highly corrosive environments and process flow conditions. This versatile industrial valve features double self-lubricating seals, and a special shaped liner and body cavity guaranteeing a bubble tight seal while keeping break-away torque at an absolute minimum. An integral stainless steel lug version provides for full bi-directional operation allowing disassembly of the downstream flange connection without weakening the integrity of the upstream connection to the pressurized line. FK Series Automated Butterfly Valves are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

VALVE AVAILABILITY

Body Material:	Glass reinforced PP (GRPP)
Disc Material:	CPVC, also offered in PP, PVC, ABS, and PVDF
Size Range:	1-1/2" through 12"
Pressure:	See Sample Specifications
Seats:	EPDM or FKM
Seals:	EPDM or FKM
Body Style:	Wafer or Lugged
End Connections:	Flanged (ANSI 150)
Actuator Control:	Double Acting Pneumatic, Spring Return Pneumatic, Electric



ASTM D4101
ASTM D1784
ASTM D3222



ANSI B16.5

FK Series Automated Butterfly Valves

Sample Specificaiton

1.0 Butterfly Valves - FK

1.1 Material

- The valve body shall be made of glass reinforced polypropylene (GRPP) obtained from homopolymer polypropylene (PPH).
- The valve disc shall be made of Corzan® CPVC compound which shall meet or exceed the requirements of cell classification 23447 according to ASTM D1784.
- or The valve disc shall be made of stabilized PP homopolymer compound, also containing a RAL 7032 pigment, which shall meet or exceed the requirements of Type I Polypropylene according to ASTM D4101.
- or The valve disc shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.
- or The valve disc shall be made of virgin, non-regrind PVDF compound which shall meet or exceed the requirements of Table 1 according to ASTM D3222.
- The valve shaft shall be made of 316 or 420 stainless steel.

1.2 Seats

- The disc liner shall be made of EPDM.
- The disc liner shall be made of FKM.

1.3 Seals

- The o-ring seals shall be made of EPDM.
- The o-ring seals shall be made of FKM.

2.0 Connections

2.1 Flanged style

- The ANSI 150 flanged connections shall conform to the dimensional standard ANSI B16.5.

3.0 Design Features

- The valve shall be of either wafer or lugged design (specifier must select one).
- The lugged style shall feature permanently integrated stainless steel lugs. No field inserted lugs allowed.
- The shaft shall have standard ISO square dimensions for direct mounting of actuators.
- The disc seat shall be a trapezoidal elastomeric liner and provide a bubble tight seal.
- The liner shall completely isolate the valve body from the process flow.
- The liner shall function as a flange gasket on both sides of the valve.
- The body cavity shall feature special channeling to prevent liner slippage and compression.
- The disc, seats, and seals shall be the only wetted parts.
- Teflon® seated o-ring seals shall prevent the stainless steel shaft from becoming wetted.

FK Series Automated Butterfly Valves

3.1 Pressure Rating

CPVC Disc, Wafer Style

- 1-1/2" and 2" shall be rated at 232 psi at 73°F
- 2-1/2" to 10" shall be rated at 150 psi at 73°F
- 12" shall be rated at 120 psi at 73°F

PP Disc, Wafer Style

- 1-1/2" to 10" shall be rated at 150 psi at 73°F
- 12" shall be rated at 120 psi at 73°F
- 14" shall be rated at 100 psi at 73°F
- 16" shall be rated at 85 psi at 73°F

PVC Disc, Wafer Style

- 14" shall be rated at 100 psi at 73°F
- 16" shall be rated at 85 psi at 73°F

PVDF Disc, Wafer Style

- 1-1/2" and 2" shall be rated at 232 psi at 73°F
- 2-1/2" to 10" shall be rated at 150 psi at 73°F
- 12" shall be rated at 120 psi at 73°F

CPVC Disc, Lugged Style

- 2-1/2" to 8" shall be rated at 150 psi at 73°F
- 12" shall be rated at 85 psi at 73°F

PP Disc, Lugged Style

- 2-1/2" to 8" shall be rated at 150 psi at 73°F
- 10" and 12" shall be rated at 85 psi at 73°F

PVDF Disc, Lugged Style

- 2-1/2" to 8" shall be rated at 150 psi at 73°F
- 12" shall be rated at 85 psi at 73°F

3.2 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.3 Color Coding

- All valve bodies shall be color-coded beige gray.
- CPVC valve discs shall be color-coded light gray
- PP valve discs shall be color-coded beige gray
- PVC valve discs shall be color-coded dark gray
- PVDF valve discs shall not be color-coded and be white in appearance

4.0 All valves shall be by IPEX or approved equal.

5.0 Actuators

- All Actuators shall be factory installed by IPEX

Pneumatic Actuator:

- Shall be sized for 80 psi control air pressure
- Shall be dual piston rack and pinion design with linear torque output.
- Body shall be Technopolymer UT series or Anodized Aluminum MT series with standard position indicator and NAMUR VDI/VDE 3845 and ISO 5211 mounting dimensions.
- All models shall be operable using air, water, nitrogen or compatible hydraulic fluids from 40 – 120psi.
- Aluminum body models shall feature dual travel stops that provide +/- 10° stroke rotation on both the opening and closing phases.
- All external fasteners shall be stainless steel.

Electric Actuator:

- Shall have 100VAC – 240VAC reversing motors with torque limiters, thermal protection, auxiliary limit switches, NEMA 4X enclosure*, manual override, and position indicator as standard.
- or Shall have 24VDC reversing motors with torque limiters, thermal protection, auxiliary limit switches, NEMA 4X enclosure*, manual override, and position indicator as standard.
- 4-20mA positioner, battery backup, and 180° rotation models shall be available in 100 – 240VAC and 24VDC
- All models shall have ISO 5211 mounting dimensions

* Type 4X Indoor Use Only Enclosure, contact IPEX.

FK Series Automated Butterfly Valves

Valve Selection

Size (inches)	Disc Material	Seal Material	IPEX Part Number							
			Pneumatic Double Acting		Pneumatic Spring Return, Normally Closed		Pneumatic Spring Return, Normally Open		Electric Double Acting 100-240 VAC	
			Wafer	SS Lugs	Wafer	SS Lugs	Wafer	SS Lugs	Wafer	SS Lugs
1-1/2	CPVC	EPDM	154600	-	154618	-	154636	-	154654	-
		FKM	154668	-	154686	-	154704	-	154722	-
2	CPVC	EPDM	154601	-	154619	-	154637	-	154655	-
		FKM	154669	-	154687	-	154705	-	154723	-
2-1/2	CPVC	EPDM	154602	154610	154620	154628	154638	154646	154656	154662
		FKM	154670	154678	154688	154696	154706	154714	154724	154730
3	CPVC	EPDM	154603	154611	154621	154629	154639	154647	154657	154663
		FKM	154671	154679	154689	154697	154707	154715	154725	154731
4	CPVC	EPDM	154604	154612	154622	154630	154640	154648	154658	154664
		FKM	154672	154680	154690	154698	154708	154716	154726	154732
5	CPVC	EPDM	154605	154613	154623	154631	154641	154649	154659	154665
		FKM	154673	154681	154691	154699	154709	154717	154727	154733
6	CPVC	EPDM	154606	154614	154624	154632	154642	154650	154660	154666
		FKM	154674	154682	154692	154700	154710	154718	154728	154734
8	CPVC	EPDM	154607	154615	154625	154633	154643	154651	154661	154667
		FKM	154675	154683	154693	154701	154711	154719	154729	154735
10	CPVC	EPDM	154608	154616	154626	154634	154644	154652	-	-
		FKM	154676	154684	154694	154702	154712	154720	-	-
12	CPVC	EPDM	154609	154617	154627	154635	154645	154653	-	-
		FKM	154677	154685	154695	154703	154713	154721	-	-

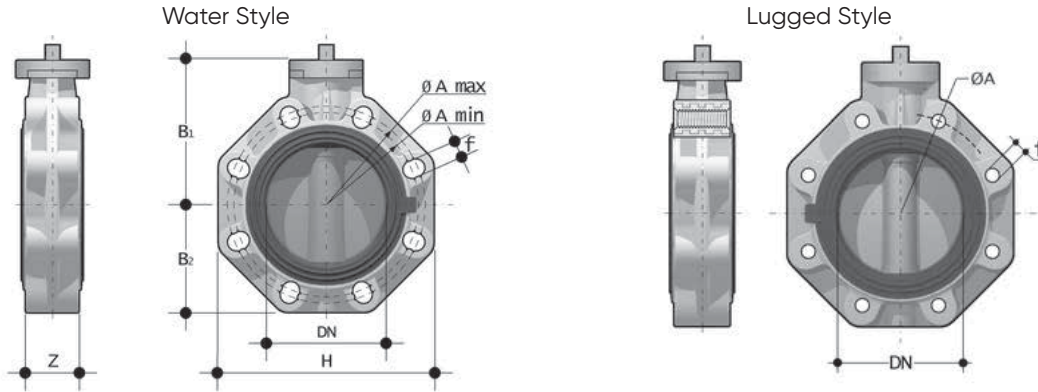
FOR CUSTOM CONFIGURATIONS, PLEASE CONTACT IPEX.

PP, PVC, ABS, and PVDF disc valves available on request.

For 10" and 12" electrically actuated valves, please contact IPEX. For 14" and 24" actuated valves, please contact IPEX

FK Series Automated Butterfly Valves

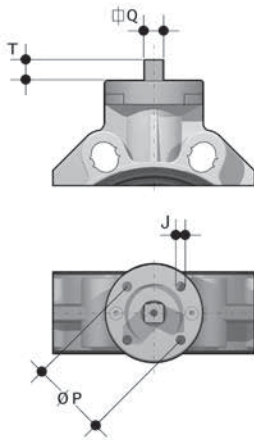
Dimensions



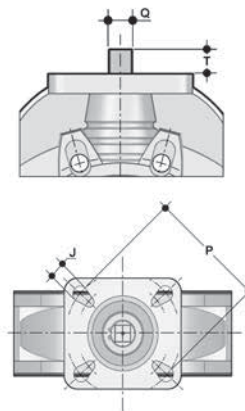
Dimensions (inches)

Size	DN	Z	B ₁	B ₂	H	A _{min}	A _{max}	f	Alug	flug	# holes
1-1/2	1.57	1.30	4.17	2.36	5.20	3.90	4.29	0.75	3.87	1/2-UNC	4
2	1.97	1.69	4.41	2.76	5.79	4.53	4.94	0.75	4.75	5/8-UNC	4
2-1/2	2.56	1.81	4.69	3.15	6.50	5.04	5.67	0.75	5.50	5/8-UNC	4
3	3.15	1.93	5.24	3.66	7.28	5.71	6.30	0.75	6.00	5/8-UNC	8
4	3.94	2.20	5.79	4.21	8.31	6.50	7.48	0.75	7.50	5/8-UNC	8
5	4.92	2.52	6.57	4.72	9.45	8.03	8.46	0.91	8.50	3/4-UNC	8
6	5.91	2.76	7.09	5.28	10.55	9.06	9.53	0.91	9.50	3/4-UNC	8
8	7.87	2.80	8.94	6.34	12.72	11.02	11.73	0.91	11.75	3/4-UNC	8
10	9.84	4.49	9.76	8.27	15.94	13.19	14.25	1.00	14.25	7/8-UNC	12
12	11.81	4.49	12.01	9.65	18.70	15.35	17.01	1.14	17.00	7/8-UNC	12

Sizes 1-1/2" to 8"



Sizes 10" to 12"



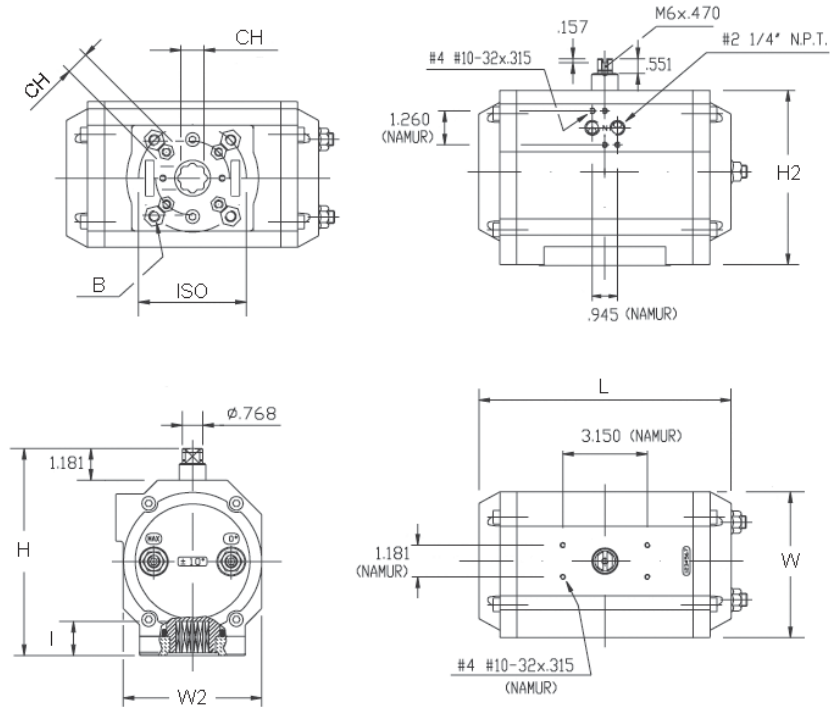
Dimensions (inches)

Size	T	Q	ISO	P	J
1-1/2	0.47	0.43	F05	1.97	0.28
2	0.47	0.43	F05	1.97	0.28
2-1/2	0.47	0.43	F05 / F07	1.97 / 2.76	0.28 / 0.35
3	0.63	0.55	F07	2.76	0.35
4	0.63	0.55	F07	2.76	0.35
5	0.75	0.67	F07	2.76	0.35
6	0.75	0.67	F07	2.76	0.35
8	0.94	0.87	F10	4.02	0.43
10	1.14	1.06	F10 / F12 / F14	4.02 / 4.92 / 5.51	0.43 / 0.51 / 0.67
12	1.14	1.06	F10 / F12 / F14	4.02 / 4.92 / 5.51	0.43 / 0.51 / 0.67

FK Series Automated Butterfly Valves

Pneumatic Actuator Dimensions

Models UT16, UT21, UT26, UT31, UT36, UT41, UT46, UT51, UT61



Dimensions (inches)

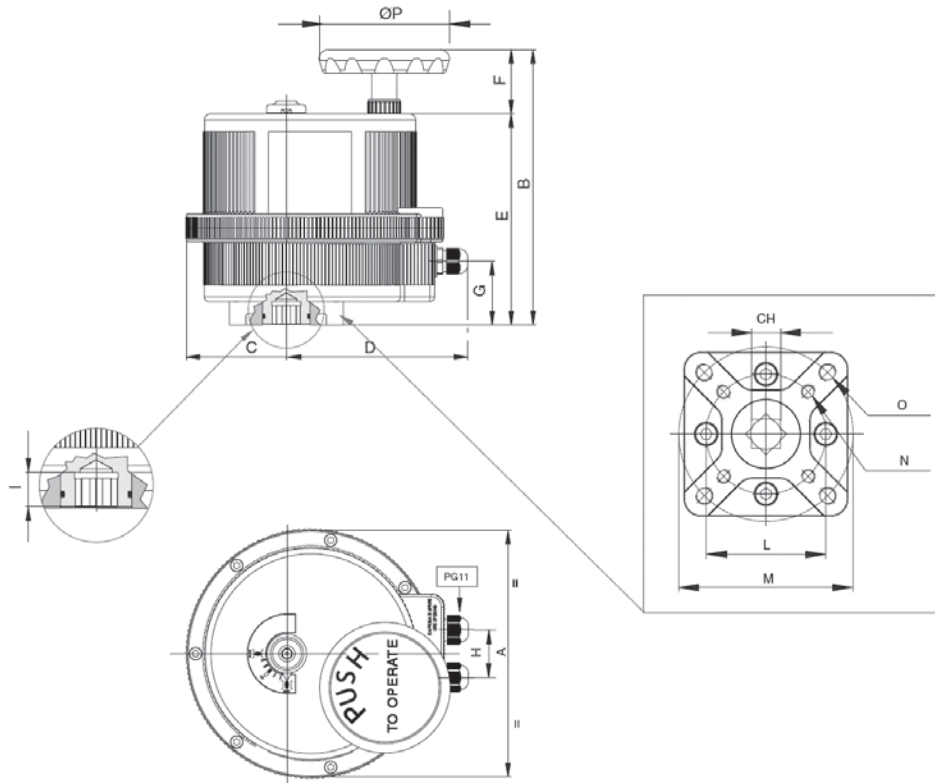
Valve Size	Double Acting Model	ISO	CH	L	W	W2	H	H2	I	B
1-1/2	MT16DA	F05 / F07	0.55	6.50	3.19	2.44	4.37	3.19	0.75	1/4-20 UNC x 0.51
2	MT16DA	F05 / F07	0.55	6.50	3.19	2.44	4.37	3.19	0.75	1/4-20 UNC x 0.51
2-1/2	MT16DA	F05 / F07	0.55	6.50	3.19	2.44	4.37	3.19	0.75	1/4-20 UNC x 0.51
3	MT21DA	F05 / F07	0.67	6.97	3.78	3.01	5.04	3.86	0.75	5/16-18 UNC x 0.51
4	MT21DA	F05 / F07	0.67	6.97	3.78	3.01	5.04	3.86	0.75	5/16-18 UNC x 0.51
5	MT26DA	F05 / F07	0.67	9.41	3.78	3.01	5.04	3.86	0.75	5/16-18 UNC x 0.51
6	MT31DA	F05 / F07	0.67	9.06	4.49	3.56	5.79	4.61	0.91	5/16-18 UNC x 0.51
8	MT36DA	F07 / F10	0.87	9.69	5.10	3.76	7.24	6.06	1.18	3/8-16 UNC x 0.71
10	MT51DA	F10 / F12	1.06	14.21	7.13	4.33	9.13	7.95	1.57	1/2-13 UNC x 0.79
12	MT51DA	F10 / F12	1.06	14.21	7.13	4.33	9.13	7.95	1.57	1/2-13 UNC x 0.79

Dimensions (inches)

Valve Size	Spring Return Model	ISO	CH	L	W	W2	H	H2	I	B
1-1/2	MT21S5	F05 / F07	0.67	6.97	3.78	3.01	5.04	3.86	0.75	5/16-18 UNC x 0.51
2	MT26S4	F05 / F07	0.67	9.41	3.78	3.01	5.04	3.86	0.75	5/16-18 UNC x 0.51
2-1/2	MT26S4	F05 / F07	0.67	9.41	3.78	3.01	5.04	3.86	0.75	5/16-18 UNC x 0.51
3	MT31S4	F05 / F07	0.67	9.06	4.49	3.56	5.79	4.61	0.91	5/16-18 UNC x 0.51
4	MT36S4	F07 / F10	0.87	9.69	5.10	3.76	7.24	6.06	1.18	3/8-16 UNC x 0.71
5	MT41S4	F07 / F10	0.87	11.42	5.16	3.76	7.24	6.06	1.18	3/8-16 UNC x 0.71
6	MT46S4	F07 / F10	0.87	13.82	5.71	3.88	7.81	6.63	1.18	3/8-16 UNC x 0.71
8	MT51S4	F10 / F12	1.06	14.21	7.13	4.33	9.13	7.95	1.57	1/2-13 UNC x 0.79
10	MT61S5	F14	1.42	17.48	9.13	6.32	11.30	10.12	1.97	5/8-11 UNC x 0.98
12	MT61S5	F14	1.42	17.48	9.13	6.32	11.30	10.12	1.97	5/8-11 UNC x 0.98

FK Series Automated Butterfly Valves

Electric Actuator Dimensions



Valve Actuator Size	Model	ISO	CH	A	B	C	D	E	F	G	H	I	L	M	N	O	ØP
1-1/2	VB015	F03/F05	0.43	4.84	5.57	1.67	4.74	4.96	0.61	4.06	1.26	0.55	1.42	1.97	10-24 UNC 2BX0.47	1/4-20 UNC 2BX0.55	2.68
2	VB030	F03/F05	0.43	6.18	7.40	2.38	5.12	5.75	1.65	1.30	1.42	0.47	1.42	1.97	10-24 UNC 2BX0.47	1/4-20 UNC 2BX0.55	2.56
2-1/2	VB030	F03/F05	0.43	6.18	7.40	2.38	5.12	5.75	1.65	1.30	1.42	0.47	1.42	1.97	10-24 UNC 2BX0.47	1/4-20 UNC 2BX0.55	2.56
3	VB060	F05/F07	0.55	7.28	8.46	2.66	5.77	6.81	1.65	2.01	1.42	0.63	1.97	2.76	1/4-20 UNC 2BX0.59	5/16-18 UNC 2BX0.67	2.56
4	VB060	F05/F07	0.67	7.28	8.46	2.66	5.77	6.81	1.65	2.01	1.42	0.63	1.97	2.76	1/4-20 UNC 2BX0.59	5/16-18 UNC 2BX0.67	2.56
5	VB110	F07/F10	0.67	8.31	9.14	3.31	6.02	7.01	2.13	2.13	1.58	0.75	2.76	4.02	5/16-18 UNC 2BX0.79	3/8-16 UNC 2BX0.79	4.33
6	VB110	F07/F10	0.67	8.31	9.14	3.31	6.02	7.01	2.13	2.13	1.58	0.75	2.76	4.02	5/16-18 UNC 2BX0.79	3/8-16 UNC 2BX0.79	4.33
8	VB270	F07/F10	0.87	8.74	9.19	3.03	6.69	7.17	2.03	2.13	1.58	0.95	2.76	4.02	5/16-18 UNC 2BX0.79	3/8-16 UNC 2BX0.79	4.33

FK Series Automated Butterfly Valves



Note: Pneumatic actuator performance is based on 80psi available control air pressure.

Actuator Technical Data

Valve Size (inches)	Double Acting Pneumatic	Spring Return Pneumatic	Electric
1-1/2	UT16DA	UT21S5	VB015
2	UT16DA	UT26S4	VB030
2-1/2	UT16DA	UT26S4	VB030
3	UT21DA	UT31S4	VB060
4	UT21DA	UT36S4	VB060
5	UT26DA	UT41S4	VB110
6	UT31DA	UT46S4	VB110
8	UT36DA	UT51S4	VB190
10	UT51DA	UT61S5	-
12	UT51DA	UT61S5	-

Pneumatic Actuator Torque Data

Valve Size (inches)	DOUBLE ACTING		SPRING RETURN					
	Model	Torque (in-lbs)	Model	Spring Set (standard)	Spring Torque (in-lbs) Start	Spring Torque (in-lbs) End	Air Torque (in-lbs) Start	Air Torque (in-lbs) End
1-1/2	UT16DA	275	UT21S5	S5	307	230	270	193
2	UT16DA	275	UT26S4	S4	392	247	503	358
2-1/2	UT16DA	275	UT26S4	S4	392	247	503	358
3	UT21DA	500	UT31S4	S4	502	374	626	498
4	UT21DA	500	UT36S4	S4	824	614	986	776
5	UT26DA	750	UT41S4	S4	1011	741	1259	989
6	UT31DA	1000	UT46S4	S4	1779	1120	2005	1346
8	UT36DA	1600	UT51S4	S4	2203	1738	2762	2297
10	UT51DA	4500	UT61S5	S5	5366	4277	4823	3734
12	UT51DA	4500	UT61S5	S5	5366	4277	4823	3734

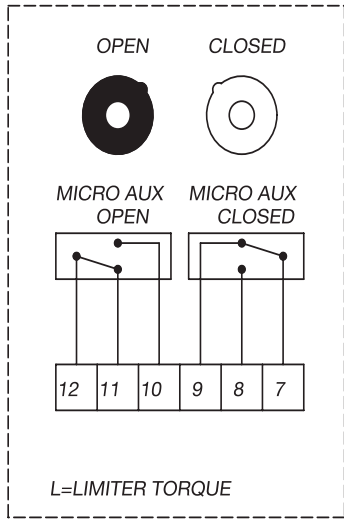
Pneumatic Actuator Weights and Air Consumption

Valve Size (inches)	DOUBLE ACTING			SPRING RETURN		
	Model	Weight (lbs)	Air Cons. (in3)	Model	Weight (lbs)	Air Cons. (in3)
1-1/2	UT16DA	4.03	25.6	UT21S5	7.16	18.1
2	UT16DA	4.03	25.6	UT26S4	9.88	30.0
2-1/2	UT16DA	4.03	25.6	UT26S4	9.88	30.0
3	UT21DA	6.33	44.4	UT31S4	12.28	40.6
4	UT21DA	6.33	44.4	UT36S4	19.88	75.0
5	UT26DA	8.82	68.7	UT41S4	23.61	100.0
6	UT31DA	10.67	88.9	UT46S4	33.11	115.6
8	UT36DA	16.71	153.1	UT51S4	49.89	181.3
10	UT51DA	39.24	425.0	UT61S5	101.19	343.8
12	UT51DA	39.24	425.0	UT61S5	101.19	343.8

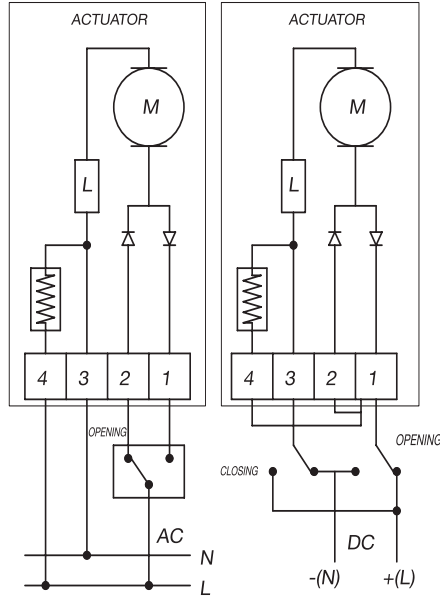
FK Series Automated Butterfly Valves

Electrical Actuator

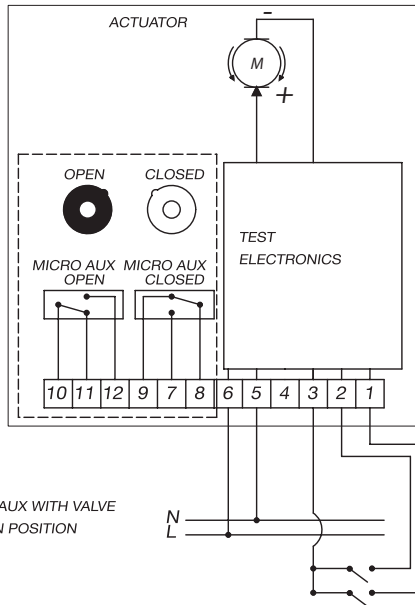
Model VB015 24V AC/DC



MICRO AUX WITH VALVE
IN OPEN POSITION

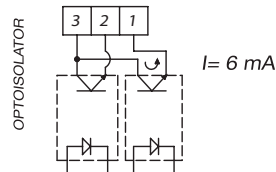


Model VB015 100V – 240V AC



MICRO AUX WITH VALVE
IN OPEN POSITION

STATIC IMPULSE DRIVE OPTOISOLATED BY PLC

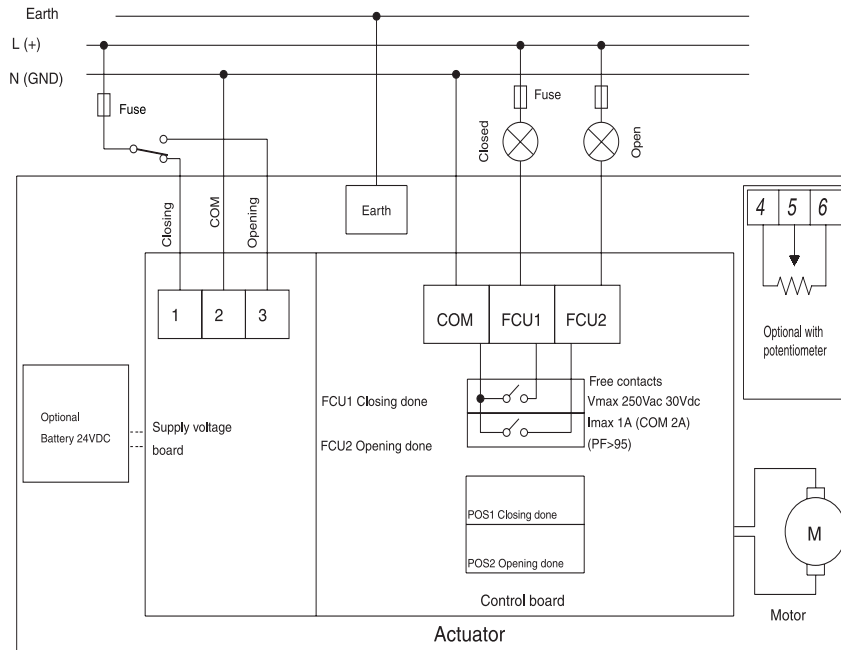


BUTTERFLY
VALVES

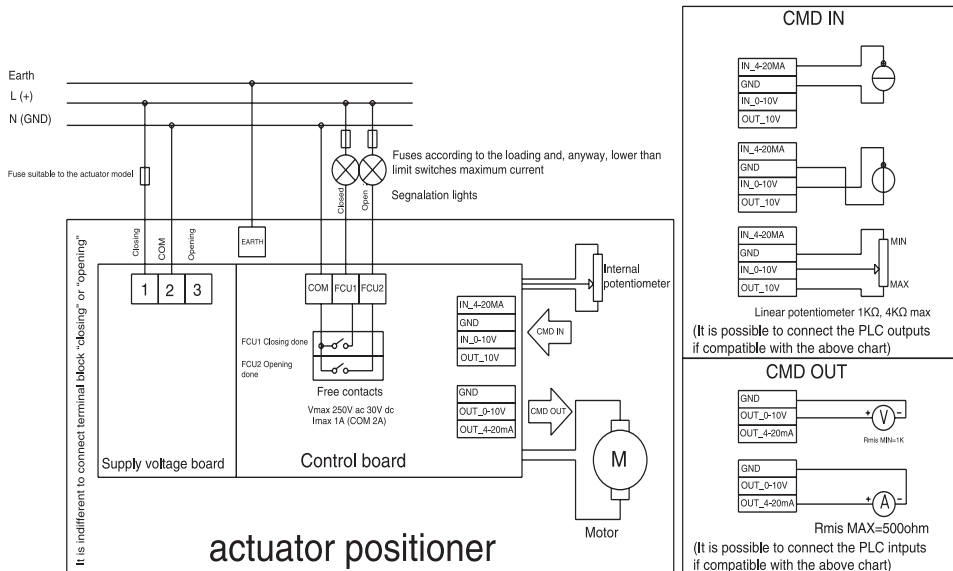
FK Series Automated Butterfly Valves

Electrical Actuator

Model VB030 to VB350 24V AC/DC, 110 – 240V AC



VB030 to VB350 24V AC/DC, 110 – 240V AC with Positioner



FK Series Automated Butterfly Valves

Model		VB015	VB030	VB060	VB110	VB270
Max Working Torque (in-Lbs)		133	266	530	975	2390
Voltage (V)	Low Voltage	24V AC/DC	24V AC/DC	24V AC/DC	24V AC/DC	24V AC/DC
	High Voltage Multitension	100-240V AC	100-240V AC	100-240V AC	100-240V AC	100-240V AC
Working Time (sec)		10	8	9	27	50
Torque Limiter		STD	STD	STD	STD	STD
Duty Rating		50%	75%	75%	75%	75%
Protection		IP65 ** NEMA 4X*	IP65-67 NEMA 4X*	IP65-67 NEMA 4X*	IP65-67 NEMA 4X*	IP65-67 NEMA 4X*
Rotation		90°	90°	90°	90°	90°
Upon Request		180°	180° or 270°	180° or 270°	180° or 270°	180° or 270°
Manual Intervention		STD	STD	STD	STD	STD
Position Indicator		STD	STD	STD	STD	STD
Working Temperature		-4F +131F	-4F +131F	-4F +131F	-4F +131F	-4F +131F
Heater		STD	STD	STD	STD	STD
Additional Free Limit Switches		2 STD	2 STD	2 STD	2 STD	2 STD
Drilling ISO 5211 PAD		F03 – F05	F03 – F05	F05 – F07	F07 – F10	F07 – F10
Square Drive		0.43	0.43	0.55	0.67	0.87
Positioner (4~20mA or 0~10 VDC)		Not Available	Upon Request	Upon Request	Upon Request	Upon Request
Electrical Connections		PG11	PG11	PG11	PG11	PG 11
Weight (LBS)		3.09	5.07	7.28	10.80	13.23

* Type 4X Indoor Use Only Enclosure

** UL Pending

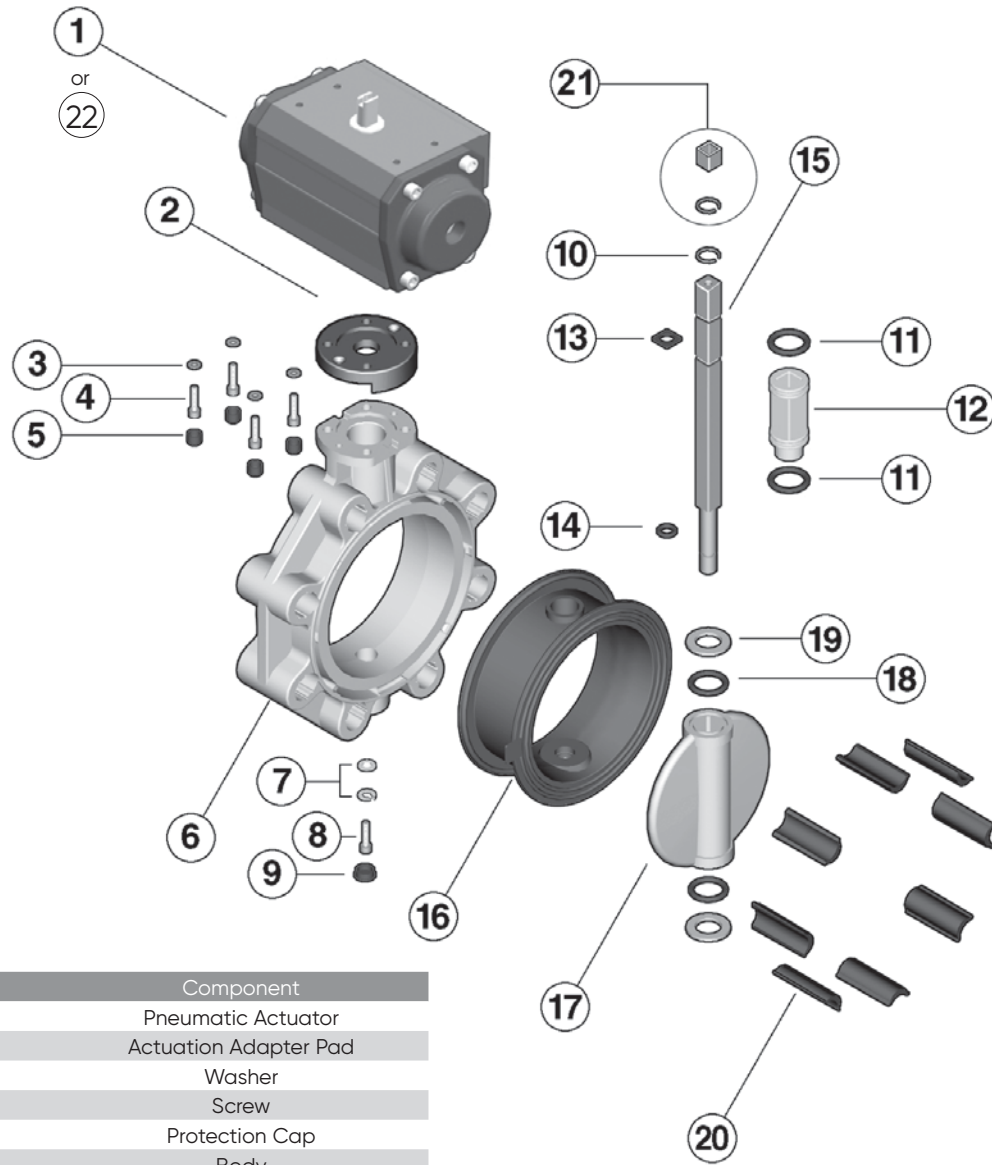
Electric Actuator Power Consumption

MODEL		VB015		VB030	VB060	VB110	VB270
VERSION H	Nominal Voltage	100V AC	240V AC	100 – 240V AC			
	Absorbed Current	75mA	25mA	0.3 – 0.2A	0.6 – 0.3A		
	Absorbed Power	6.6 VA	6 VA	30 – 48VA	60 – 72 VA		
VERSION L	Nominal Voltage	24V AC/DC		24V AC/DC	24V AC/DC	24V AC/DC	24V AC/DC
	Absorbed Current	0.6A		1.0A	1.8A	1.0A	1.8A
	Absorbed Power	15 VA		24 VA	44 VA	24 VA	44 VA
Frequency		50/60 HZ					

FK Series Automated Butterfly Valves

Components

Sizes 1-1/2" to 8"

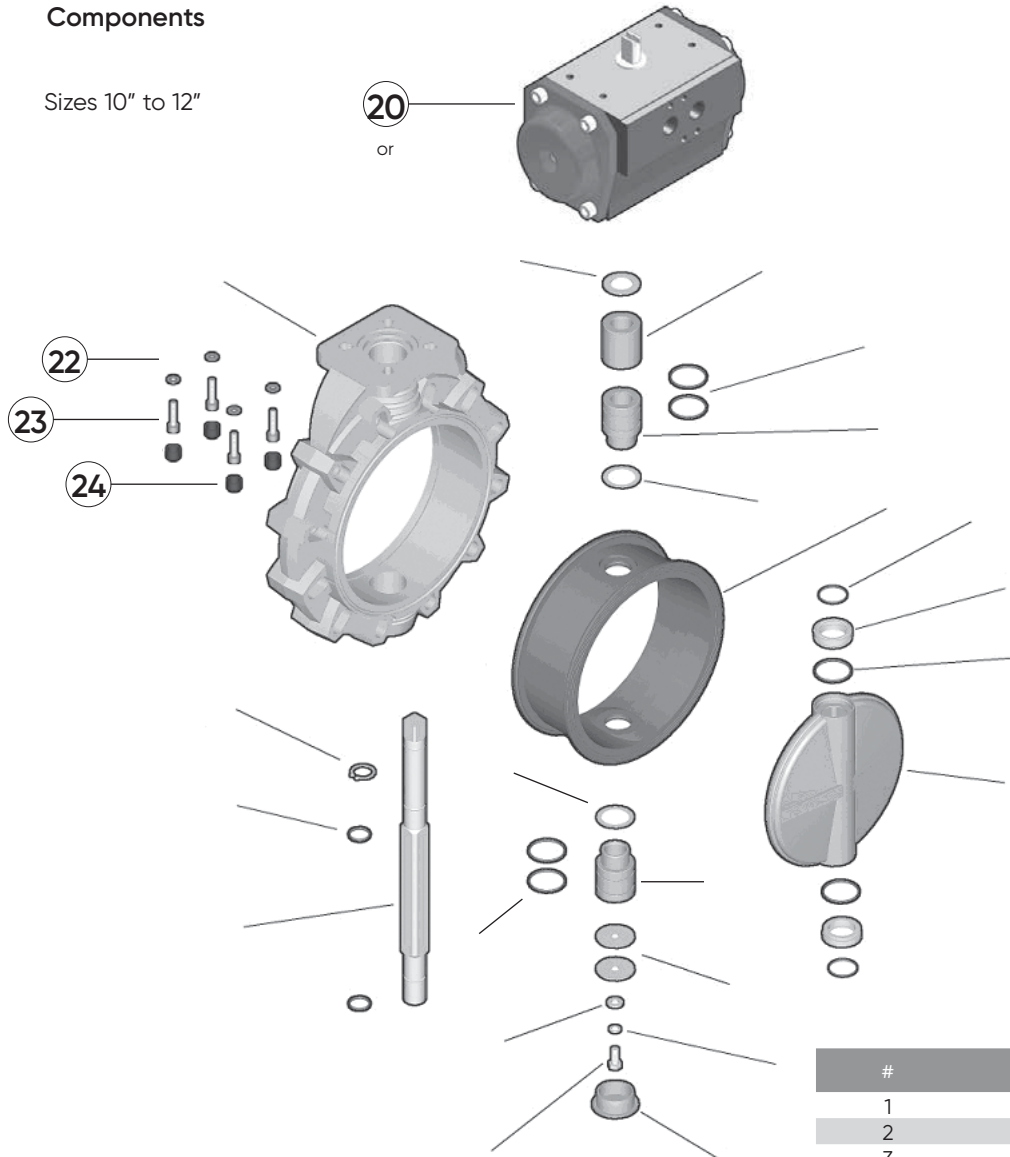


#	Component
1	Pneumatic Actuator
2	Actuation Adapter Pad
3	Washer
4	Screw
5	Protection Cap
6	Body
7	Washer
8	Screw
9	Protection Cap
10	Seeger Ring
11	Bush O-Ring
12	Bush
13	Shaft O-Ring
14	Shaft O-Ring
15	Shaft
16	Primary Liner
17	Disc
18	Disc O-Ring
19	Anti-Friction Ring
20	Centering Inserts
21	Reduction Sleeve
22	Electric Actuator (not shown)

FK Series Automated Butterfly Valves

Components

Sizes 10" to 12"

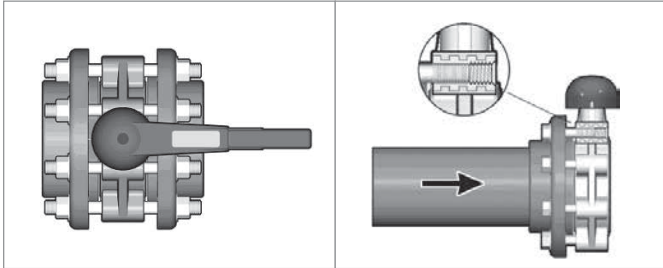


#	Component
1	Body
2	Washer
3	Bushing
4	Bushing O-Ring
3	Bushing for O-Ring
6	Washer
7	Primary Liner
8	Anti-Friction Ring
9	Disc O-Ring
10	Disc
11	Washer
12	Washer
13	Cap
14	Screw
15	Washer
16	Shaft
17	Shaft O-Ring
18	Retaining Ring
19	O-Ring
20	Pneumatic Actuator
21	Electric Actuator (not shown)
22	Washer
23	Screw
24	Protection Cap

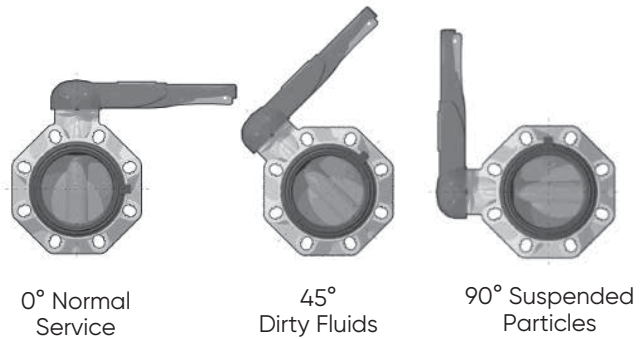
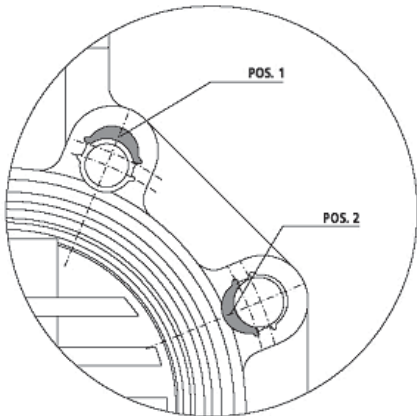
FK Series Automated Butterfly Valves

Installation

- For non-lugged style sizes 1-1/2" through 8", push the inserts (27) into the body holes according to the position chart below.
- Ensure that the length of the bolts is sufficient for the size of valve being installed. Due to the varying designs of plastic flanges, there is no recommended minimum length. However, a length that results in at least 5 exposed threads on each side should be sufficient.



- Please refer to the appropriate application sub-section:
 - For typical inline installation, ensure that the disc is in the partially closed position then carefully insert the valve into the piping system between the two flanges. Insert the bolts, washers, and nuts (if necessary), then hand tighten. Take care to properly line up the valve and flanges as any misalignment may cause leakage.
 - For lugged version end of line installation, ensure that the disc is in the partially closed position then carefully position the valve on the flange. Insert the bolts, and washers, then hand tighten. Take care to properly line up the valve and flange as any misalignment may cause leakage.



- Connect pneumatic or electric connections according to provided diagrams.

Size (inches)	ANSI 150 Insert Position	Nominal Bolt Torque (ft-lbs)
1-1/2	POS 1	7
2	-	9
2-1/2	POS 2	11
3	POS 2	13
4	POS 2	15
5	POS 2	26
6	POS 2	30
8	POS 2	41
10	-	52
12	-	52

- To avoid damage to the primary gasket, cycle the valve to the open position before tightening the bolts. For correct joining procedure, please refer to the section entitled, "Joining Methods – Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". The bolts should be tightened in an even pattern to the nominal torque in the table below. These torque ratings are sufficient to maintain a watertight seal at the maximum rated operating pressure.

Note: If the process media is dirty or contains suspended particles, it is advisable to install the valve in an orientation in which the shaft is not vertical (see diagrams). Over time, particles may collect at the bottom of the valve posing a threat to the seal between the disc, liner, and shaft.

Note: All quarter turn automated valves are tested for proper operation before leaving the factory.

FK Series Automated Butterfly Valves

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the system. Be sure to depressurize and drain the isolated branch before continuing. It is recommended that all actuators be de-activated before servicing the valve to avoid injury.
2. Cycle the valve to a partially open position then loosen each bolt holding the valve to the pipe flange(s). Please refer to the section entitled, "Joining Methods – Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" for a recommended bolt tightening pattern diagram. Follow the same pattern when disassembling the flanged joint(s) then carefully remove the valve from the line.

Sizes 1-1/2" to 8":

3. Loosen and remove the bolts, washers and protection caps fixed to the actuator (3, 4, & 5). Carefully remove the actuator and the pad (2) from the valve taking care not to damage the stem.
4. Remove the cap (9) then loosen and remove the screw (8) and washer (7) from the base of the valve body.
5. Carefully pull the shaft (15) out of the valve body then remove the disc (17).
6. Remove the primary liner (16) from the valve body.
7. Remove the nylon bushing (12) and o-rings (11) from the valve body (sizes 2-1/2" to 8").
8. Remove the disc anti-friction rings (19), and o-rings (18, sizes 2-1/2" to 8").
9. Remove the retaining ring (10, sizes 2-1/2" to 8") and o-rings (13, 14) from the shaft.
10. The valve components can now be checked for problems and/or replaced.

Sizes 10" to 12":

3. Loosen and remove the bolts, washers and protection caps fixed to the actuator (22, 23 & 24). Carefully remove the actuator from the valve taking care not to damage the stem.
4. Remove the cap (13) then loosen and remove the screw (14) and washers (11, 12 & 15) from the base of the valve body (1).
5. Carefully pull the shaft (16) out of the valve body then remove the disc (10).
6. Remove the primary liner (7) from the valve body.
7. Remove the upper and lower bushings (3, 5), washers (2, 6), and o-rings (4) from the valve body.
8. Remove the disc anti-friction rings (8) and o-rings (9, 19).
9. Remove the retaining ring (18) and o-rings (17) from the shaft.
10. The valve components can now be checked for problems and/or replaced.

FK Series Automated Butterfly Valves

Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities.

Sizes 1-1/2" to 8":

1. Insert the primary liner (16) into the valve body (6). Ensure that the proper holes line up with those on the body.
2. Properly fit the o-rings (11) on the nylon bushing (12) (sizes 2-1/2" to 8") then insert the Teflon washer and bushing into the valve body from above.
3. Properly fit the disc o-rings (18, sizes 2-1/2" to 8") and anti-friction rings (19) on the disc (17), then insert into the valve liner taking care to center the holes.
4. Properly fit the o-rings (13, 14) and retaining ring (10, sizes 2-1/2" to 8") in their grooves on the shaft (15), then carefully insert into the valve body from above.
5. Fasten the shaft at the base of the valve body using the screw (8) and washer (7). Affix the cap (9) over the bolt.
6. Place the spacer pad (2) on the valve body.
7. Carefully place the actuator on the stem, lining up the holes. Fasten using the necessary bolts, washers and protection caps (3, 4 & 5). Ensure that the actuator and disk position correspond to the same operating position.

Sizes 10" to 12":

1. Insert the primary liner (7) into the valve body (1). Ensure that the proper holes line up with those on the body.
2. Properly fit the o-rings (4) on the upper and lower bushings (3, 5) then insert into the valve body from above and below along with the washers (2, 6).
3. Properly fit the disc o-rings (9, 19) and anti-friction rings (8) on the disc (10), then insert into the valve liner taking care to center the holes.
4. Properly fit the o-rings (17) and retaining ring (18) in their grooves on the shaft (16), then carefully insert into the valve body from above.
5. Fasten the shaft at the base of the valve body using the screw (14) and washers (11, 12, and 15). Affix the cap (13) over the bolt.
6. Carefully place the actuator on the stem, lining up the holes. Fasten using the necessary bolts, washers and protection cap (22, 23 & 24). Ensure that the actuator and disk position correspond to the same operating position.

FE Series Automated Butterfly Valves



IPEX FE Series Automated Butterfly Valves incorporate many features of our industrial FK valve, yet the all PVC construction and EPDM liner make this valve the perfect choice for water and light industrial applications. This versatile valve features double self-lubricating seals, and a special shaped liner and body cavity guaranteeing a bubble tight seal while keeping break-away torque at an absolute minimum. Inserting stainless steel lugs into special molded features in the body allows for end of line installation. FE Series Automated Butterfly Valves are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

VALVE AVAILABILITY

Body Material:	PVC
Disc Material:	PVC
Size Range:	1-1/2" through 12"
Pressure:	232psi (1-1/2" to 2") 150psi (2-1/2" to 8") 75psi (10" to 12")
Seats:	EPDM
Seals:	EPDM
Body Style:	Wafer
End Connections:	Flanged (ANSI 150)
Actuator Control:	Double Acting Pneumatic, Spring Return Pneumatic, Electric



ASTM D1784



ANSI B16.5

FE Series Automated Butterfly Valves

Sample Specification

1.0 Butterfly Valves – FE

1.1 Material

- The valve body and disc shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.
- The valve shaft shall be made of zinc plated steel (sizes 1-1/2" to 8").
- The valve shaft shall be made of 420 stainless steel (sizes 10" and 12").

1.2 Seats

- The disc liner shall be made of EPDM

1.3 Seals

- The o-ring seals shall be made of EPDM.

2.0 Connections

2.1 Flanged Style

- The ANSI 150 flanged connections shall conform to the dimensional standard ANSI B16.5.

3.0 Design Features

- The valve shall be of wafer design.
- The shaft shall have standard ISO square dimensions for direct mounting of actuators.
- The disc seat shall be a trapezoidal elastomeric liner and provide a bubble tight seal.
- The liner shall completely isolate the valve body from the process flow.
- The liner shall function as a flange gasket on both sides of the valve.
- The body cavity shall feature special channeling to prevent liner slippage and compression.
- The disc, seats, and seals shall be the only wetted parts.
- Teflon® seated o-ring seals shall prevent the shaft from becoming wetted.

3.1 Pressure Rating

- All valves sizes 2-1/2" through 8" shall be rated at 150psi at 73°F.
- All valves sizes 10" through 12" shall be rated at 75psi at 73°F.

3.2 Markings

- All valves shall be marked to indicate size, material designation, and manufacturer's name or trade mark.

3.3 Color Coding

- All valves shall be color-coded dark gray.

4.0 All valves shall be Xirtec® PVC by IPEX or approved equal.

5.0 Actuators

- All Actuators shall be factory installed by IPEX

Pneumatic Actuator:

- Shall be sized for 80 psi control air pressure
- Shall be dual piston rack and pinion design with linear torque output.
- Body shall be Technopolymer UT series or Anodized Aluminum MT series with standard position indicator and NAMUR VDI/VDE 3845 and ISO 5211 mounting dimensions.
- All models shall be operable using air, water, nitrogen or compatible hydraulic fluids from 40 – 120psi.
- Aluminum body models shall feature dual travel stops that provide +/- 10° stroke rotation on both the opening and closing phases.
- All external fasteners shall be stainless steel.

Electric Actuator:

- Shall have 100VAC – 240VAC reversing motors with torque limiters, thermal protection, auxiliary limit switches, NEMA 4X enclosure*, manual override, and position indicator as standard.
- or Shall have 24VDC reversing motors with torque limiters, thermal protection, auxiliary limit switches, NEMA 4X enclosure*, manual override, and position indicator as standard.
- 4-20mA positioner, battery backup, and 180° rotation models shall be available in 100 – 240VAC and 24VDC
- All models shall have ISO 5211 mounting dimensions

* Type 4X Indoor Use Only Enclosure

FE Series Automated Butterfly Valves

Valve Selection

Size (inches)	Disc Material	Seal Material	IPEX Part Number			
			Pneumatic Double Acting Wafer	Pneumatic Spring Return, Normally Closed Wafer	Pneumatic Spring Return, Normally Open Wafer	Electric Double Acting, 100-240 VAC Wafer
1-1/2	PVC	EPDM	253680	253690	253700	253710
2	PVC	EPDM	253681	253691	253701	253711
2-1/2	PVC	EPDM	253682	253692	253702	253712
3	PVC	EPDM	253683	253693	253703	253713
4	PVC	EPDM	253684	253694	253704	253714
5	PVC	EPDM	253685	253695	253705	253715
6	PVC	EPDM	253686	253696	253706	253716
8	PVC	EPDM	253687	253697	253707	253717
10	PVC	EPDM	253688	253698	253708	–
12	PVC	EPDM	253689	253699	253709	–

FOR CUSTOM CONFIGURATIONS, PLEASE CONTACT IPEX.

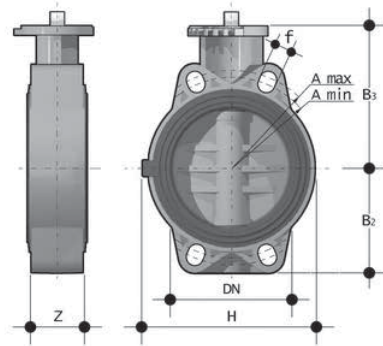
PP, CPVC and PVDF disc valves available on request.

For 10" and 12" electrically actuated valves, please contact IPEX.

For 14" and 24" actuated valves, please contact IPEX.

FE Series Automated Butterfly Valves

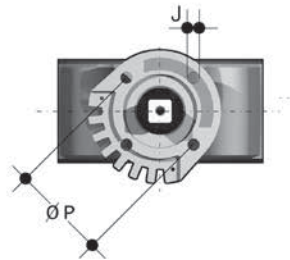
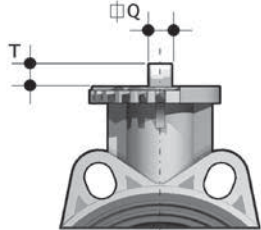
Dimensions



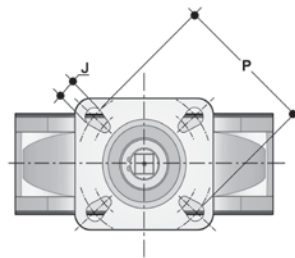
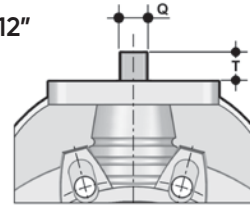
Dimensions (inches)

Size	DN	Z	B2	B3	H	Amin	Amax	f	# holes	Pattern
1-1/2	1.57	1.30	2.36	4.17	5.20	3.68	4.29	0.75	4	square
2	1.97	1.69	2.76	4.45	5.79	4.25	4.88	0.75	4	square
2-1/2	2.56	1.81	3.15	4.84	6.50	5.04	5.67	0.75	4	square
3	3.15	1.93	3.54	5.59	5.12	5.71	6.26	0.75	4	rectangular
4	3.94	2.20	4.13	5.98	5.91	6.50	7.48	0.75	4	rectangular
5	4.92	2.52	4.76	6.93	7.28	8.03	8.46	0.91	4	rectangular
6	5.91	2.76	5.20	7.44	8.27	9.06	9.53	0.91	4	rectangular
8	7.87	2.80	6.34	8.46	12.80	11.02	11.73	0.91	8	square
10	9.84	4.49	8.27	9.76	15.94	14.25	14.25	1.00	12	square
12	11.81	4.49	9.65	12.01	18.70	17.00	17.00	1.00	12	square

Sizes 1-1/2" to 8"



Sizes 10" and 12"



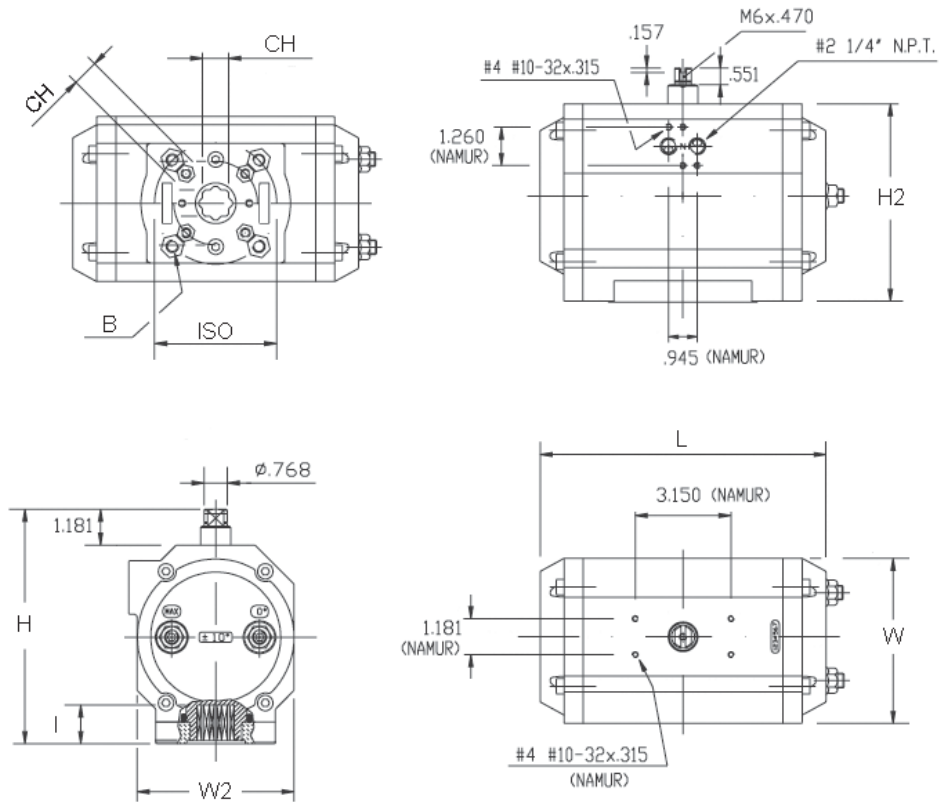
Dimensions (inches)

Size	T	Q	ISO	P	J
1-1/2	0.47	0.43	F05	1.97	0.28
2	0.47	0.43	F05	1.97	0.28
2-1/2	0.47	0.43	F05 / F07	1.97 / 2.76	0.28 / 0.35
3	0.63	0.55	F07	2.76	0.35
4	0.63	0.55	F07	2.76	0.35
5	0.75	0.67	F07	2.76	0.35
6	0.75	0.67	F07	2.76	0.35
8	0.94	0.87	F10	4.02	0.43
10	0.94	0.87	F10 / F12 / F14	4.02 / 4.92 / 5.51	0.43 / 0.51 / 0.67
12	0.94	0.87	F10 / F12 / F14	4.02 / 4.92 / 5.51	0.43 / 0.51 / 0.67

FE Series Butterfly Valves

Pneumatic Actuator Dimensions

Models UT16, UT21, UT26, UT31, UT36, UT41, UT46, UT51, UT61



Dimensions (inches)

Valve Size	Double Acting Model	ISO	CH	L	W	W2	H	H2	I	B
1-1/2	UT16DA	F05 / F07	0.55	6.50	3.19	2.44	4.37	3.19	0.75	1/4-20 UNC x 0.51
2	UT16DA	F05 / F07	0.55	6.50	3.19	2.44	4.37	3.19	0.75	1/4-20 UNC x 0.51
2-1/2	UT16DA	F05 / F07	0.55	6.50	3.19	2.44	4.37	3.19	0.75	1/4-20 UNC x 0.51
3	UT21DA	F05 / F07	0.67	6.97	3.78	3.01	5.04	3.86	0.75	5/16-18 UNC x 0.51
4	UT21DA	F05 / F07	0.67	6.97	3.78	3.01	5.04	3.86	0.75	5/16-18 UNC x 0.51
5	UT26DA	F05 / F07	0.67	9.41	3.78	3.01	5.04	3.86	0.75	5/16-18 UNC x 0.51
6	UT31DA	F05 / F07	0.67	9.06	4.49	3.56	5.79	4.61	0.91	5/16-18 UNC x 0.51
8	UT36DA	F07 / F10	0.87	9.69	5.10	3.76	7.24	6.06	1.18	3/8-16 UNC x 0.71
10	UT51DA	F10 / F12	1.06	14.21	7.13	4.33	9.13	7.95	1.57	1/2-13 UNC x 0.79
12	UT51DA	F10 / F12	1.06	14.21	7.13	4.33	9.13	7.95	1.57	1/2-13 UNC x 0.79

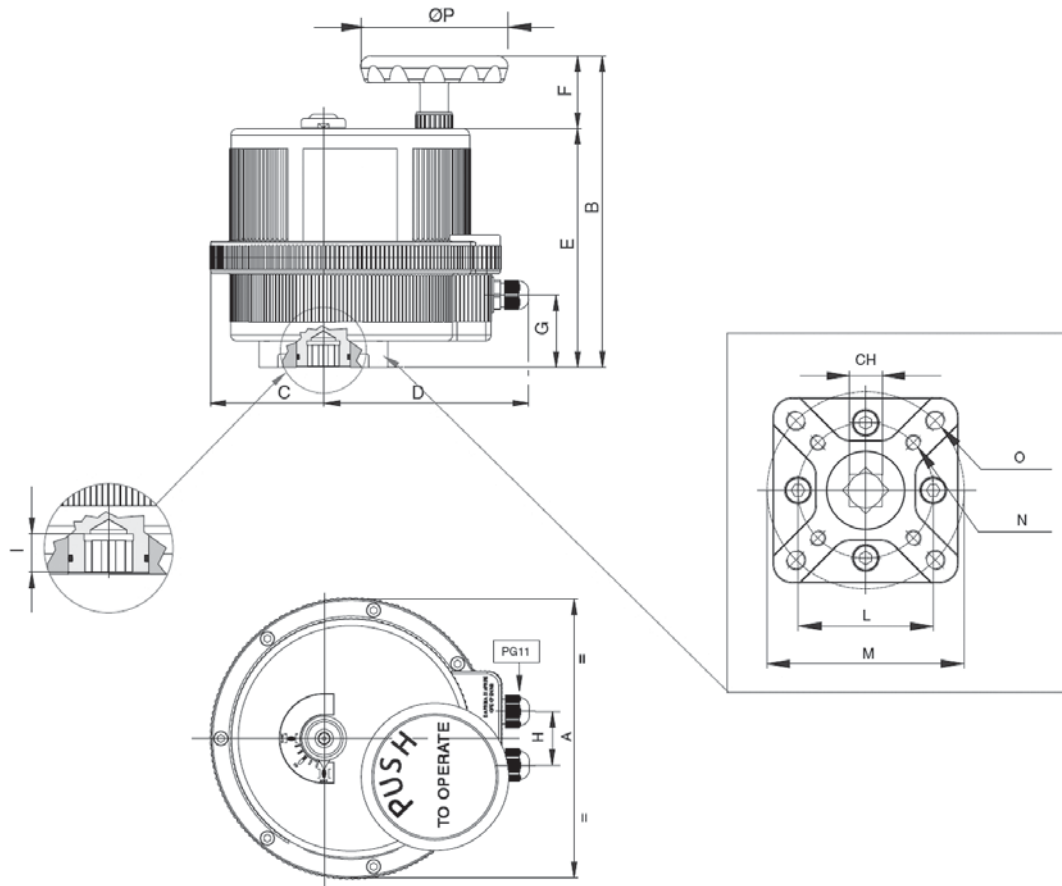
Dimensions (inches)

Valve Size	Spring Return Model	ISO	CH	L	W	W2	H	H2	I	B
1-1/2	MT21S5	F05 / F07	0.67	6.97	3.78	3.01	5.04	3.86	0.75	5/16-18 UNC x 0.51
2	MT26S4	F05 / F07	0.67	9.41	3.78	3.01	5.04	3.86	0.75	5/16-18 UNC x 0.51
2-1/2	MT26S4	F05 / F07	0.67	9.41	3.78	3.01	5.04	3.86	0.75	5/16-18 UNC x 0.51
3	MT31S4	F05 / F07	0.67	9.06	4.49	3.56	5.79	4.61	0.91	5/16-18 UNC x 0.51
4	MT36S4	F07 / F10	0.87	9.69	5.10	3.76	7.24	6.06	1.18	3/8-16 UNC x 0.71
5	MT41S4	F07 / F10	0.87	11.42	5.16	3.76	7.24	6.06	1.18	3/8-16 UNC x 0.71
6	MT46S4	F07 / F10	0.87	13.82	5.71	3.88	7.81	6.63	1.18	3/8-16 UNC x 0.71
8	MT51S4	F10 / F12	1.06	14.21	7.13	4.33	9.13	7.95	1.57	1/2-13 UNC x 0.79
10	MT61S5	F14	1.42	17.48	9.13	6.32	11.30	10.12	1.97	5/8-11 UNC x 0.98
12	MT61S5	F14	1.42	17.48	9.13	6.32	11.30	10.12	1.97	5/8-11 UNC x 0.98

BUTTERFLY VALVES

FE Series Automated Butterfly Valves

Electric Actuator Dimensions



Dimensions (inches)

Valve Actuator Size	Model	ISO	CH	A	B	C	D	E	F	G	H	I	L	M	N	O	ØP
1-1/2	VB015	F03 / F05	0.43	4.84	5.57	1.67	4.74	4.96	0.61	4.06	1.26	0.55	1.42	1.97	10-24 UNC 2BX0.47	1/4-20 UNC 2BX0.55	2.68
2	VB030	F03 / F05	0.43	6.18	7.40	2.38	5.12	5.75	1.65	1.30	1.42	0.47	1.42	1.97	10-24 UNC 2BX0.47	1/4-20 UNC 2BX0.55	2.56
2-1/2	VB030	F03 / F05	0.43	6.18	7.40	2.38	5.12	5.75	1.65	1.30	1.42	0.47	1.42	1.97	10-24 UNC 2BX0.47	1/4-20 UNC 2BX0.55	2.56
3	VB060	F05 / F07	0.55	7.28	8.46	2.66	5.77	6.81	1.65	2.01	1.42	0.63	1.97	2.76	1/4-20 UNC 2BX0.59	5/16-18 UNC 2BX0.67	2.56
4	VB060	F05 / F07	0.67	7.28	8.46	2.66	5.77	6.81	1.65	2.01	1.42	0.63	1.97	2.76	1/4-20 UNC 2BX0.59	5/16-18 UNC 2BX0.67	2.56
5	VB110	F07 / F10	0.67	8.31	9.14	3.31	6.02	7.01	2.13	2.13	1.58	0.75	2.76	4.02	5/16-18 UNC 2BX0.79	3/8-16 UNC 2BX0.79	4.33
6	VB110	F07 / F10	0.67	8.31	9.14	3.31	6.02	7.01	2.13	2.13	1.58	0.75	2.76	4.02	5/16-18 UNC 2BX0.79	3/8-16 UNC 2BX0.79	4.33
8	VB270	F07 / F10	0.87	8.74	9.19	3.03	6.69	7.17	2.03	2.13	1.58	0.95	2.76	4.02	5/16-18 UNC 2BX0.79	3/8-16 UNC 2BX0.79	4.33

FE Series Automated Butterfly Valves

Electric Actuator Dimensions



Note: Pneumatic actuator performance is based on 80psi available control air pressure.

Actuator Technical Data

Valve Size (inches)	Double Acting Pneumatic	Spring Return Pneumatic	Electric
1-1/2	UT16DA	UT21S5	VB015
2	UT16DA	UT26S4	VB030
2-1/2	UT16DA	UT26S4	VB030
3	UT21DA	UT31S4	VB060
4	UT21DA	UT36S4	VB060
5	UT26DA	UT41S4	VB110
6	UT31DA	UT46S4	VB110
8	UT36DA	UT51S4	VB190
10	UT51DA	UT61S5	-
12	UT51DA	UT61S5	-

Pneumatic Actuator Torque Data

Valve Size (inches)	DOUBLE ACTING		SPRING RETURN					
	Model	Torque (in-lbs)	Model	Spring Set (standard)	Spring Torque (in-lbs)		Air Torque (in-lbs)	
					Start	End	Start	End
1-1/2	UT16DA	275	UT21S5	S5	307	230	270	193
2	UT16DA	275	UT26S4	S4	392	247	503	358
2-1/2	UT16DA	275	UT26S4	S4	392	247	503	358
3	UT21DA	500	UT31S4	S4	502	374	626	498
4	UT21DA	500	UT36S4	S4	824	614	986	776
5	UT26DA	750	UT41S4	S4	1011	741	1259	989
6	UT31DA	1000	UT46S4	S4	1779	1120	2005	1346
8	UT36DA	1600	UT51S4	S4	2203	1738	2762	2297
10	UT51DA	4500	UT61S5	S5	5366	4277	4823	3734
12	UT51DA	4500	UT61S5	S5	5366	4277	4823	3734

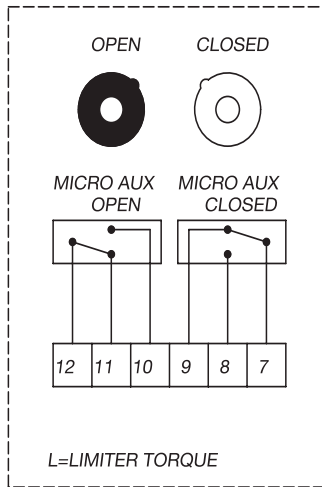
Pneumatic Actuator Weights and Air Consumption

Valve Size (inches)	DOUBLE ACTING			SPRING RETURN		
	Model	Weight (lbs)	Air Cons. (in ³)	Model	Weight (lbs)	Air Cons. (in ³)
1-1/2	UT16DA	4.03	25.6	UT21S5	7.16	18.1
2	UT16DA	4.03	25.6	UT26S4	9.88	30.0
2-1/2	UT16DA	4.03	25.6	UT26S4	9.88	30.0
3	UT21DA	6.33	44.4	UT31S4	12.28	40.6
4	UT21DA	6.33	44.4	UT36S4	19.88	75.0
5	UT26DA	8.82	68.7	UT41S4	23.61	100.0
6	UT31DA	10.67	88.9	UT46S4	33.11	115.6
8	UT36DA	16.71	153.1	UT51S4	49.89	181.3
10	UT51DA	39.24	425.0	UT61S5	101.19	343.8
12	UT51DA	39.24	425.0	UT61S5	101.19	343.8

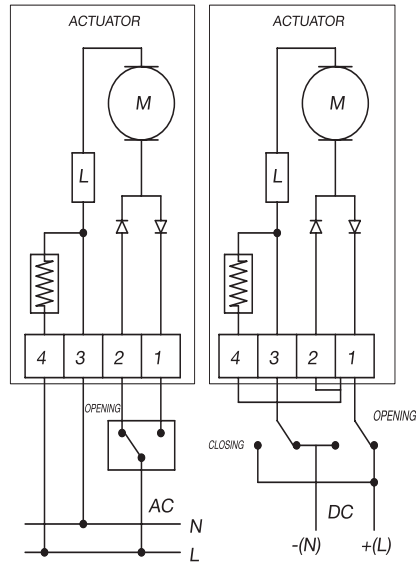
FE Series Automated Butterfly Valves

Electrical Actuator

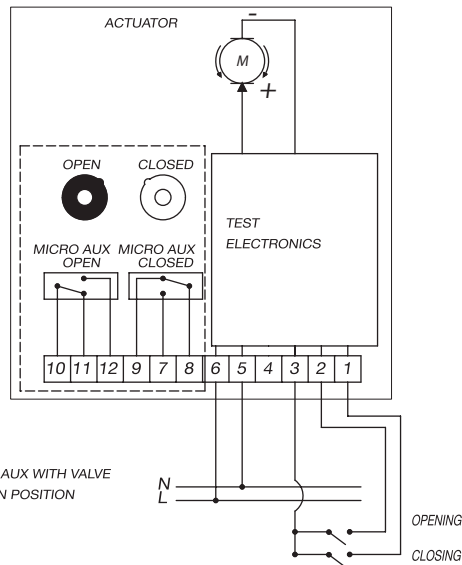
Model VB015 24V AC/DC



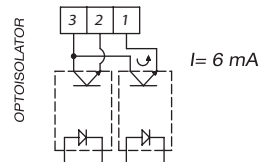
MICRO AUX WITH VALVE
IN OPEN POSITION



Model VB015 100V – 240V AC



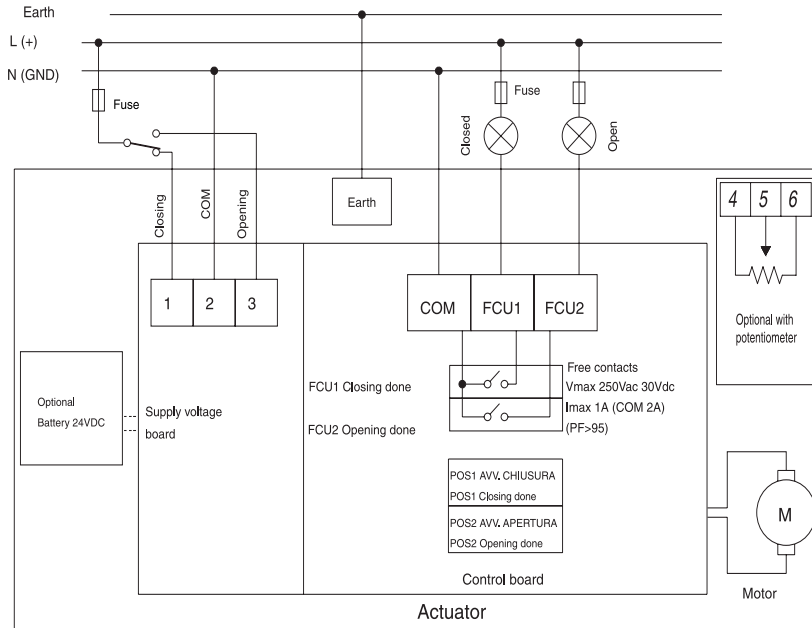
STATIC IMPULSE DRIVE OPTOISOLATED BY PLC



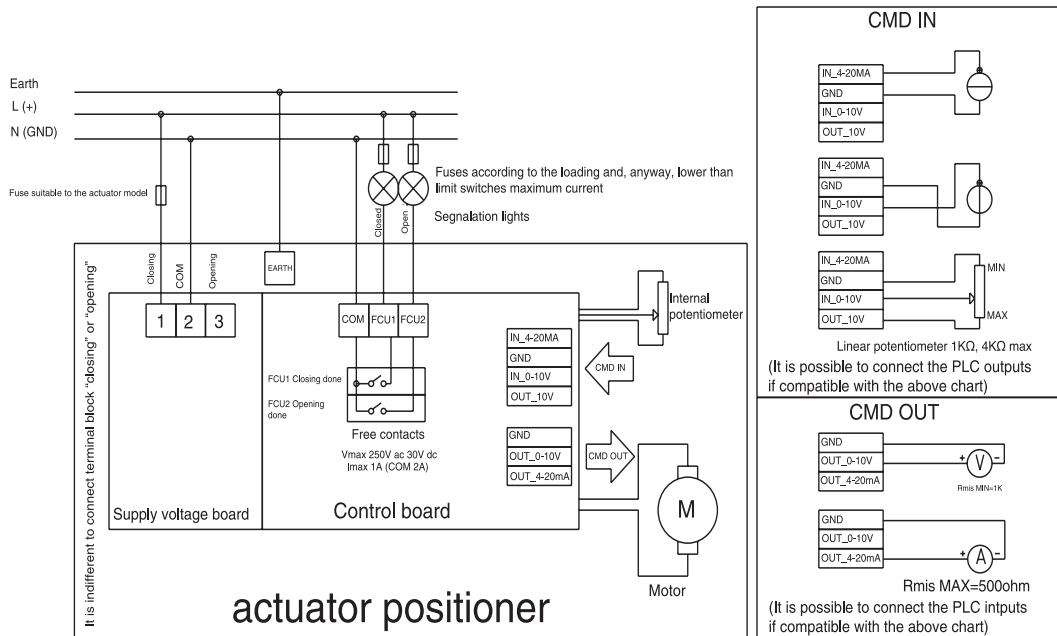
FE Series Automated Butterfly Valves

Electrical Actuator

Model VB030 to VB350 24V AC/DC, 110 – 240V AC



VB030 to VB350 24V AC/DC, 110 – 240V AC with Positioner



BUTTERFLY VALVES

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters

FE Series Automated Butterfly Valves

Model	VB015	VB030	VB060	VB110	VB270	
Max Working Torque (in-Lbs)	133	266	530	975	2390	
Voltage (V)	Low Voltage	24V AC/DC	24V AC/DC	24V AC/DC	24V AC/DC	24V AC/DC
	High Voltage Multitension	100-240V AC	100-240V AC	100-240V AC	100-240V AC	100-240V AC
Working Time (sec)	10	8	9	27	50	
Torque Limiter	STD	STD	STD	STD	STD	
Duty Rating	50%	75%	75%	75%	75%	
Protection	IP65 ** NEMA 4X*	IP65-67 NEMA 4X*	IP65-67 NEMA 4X*	IP65-67 NEMA 4X*	IP65-67 NEMA 4X*	
Rotation	90°	90°	90°	90°	90°	
Upon Request	180°	180° or 270°	180° or 270°	180° or 270°	180° or 270°	
Manual Intervention	STD	STD	STD	STD	STD	
Position Indicator	STD	STD	STD	STD	STD	
Working Temperature	-4F +131F	-4F +131F	-4F +131F	-4F +131F	-4F +131F	
Heater	STD	STD	STD	STD	STD	
Additional Free Limit Switches	2 STD	2 STD	2 STD	2 STD	2 STD	
Drilling ISO 5211 PAD	F03 – F05	F03 – F05	F05 – F07	F07 – F10	F07 – F10	
Square Drive	0.43	0.43	0.55	0.67	0.87	
Positioner (4~20mA or 0~10 VDC)	Not Available	Upon Request	Upon Request	Upon Request	Upon Request	
Electrical Connections	PG11	PG11	PG11	PG11	PG 11	
Weight (LBS)	3.09	5.07	7.28	10.80	13.23	

* Type 4X Indoor Use Only Enclosure
** UL pending

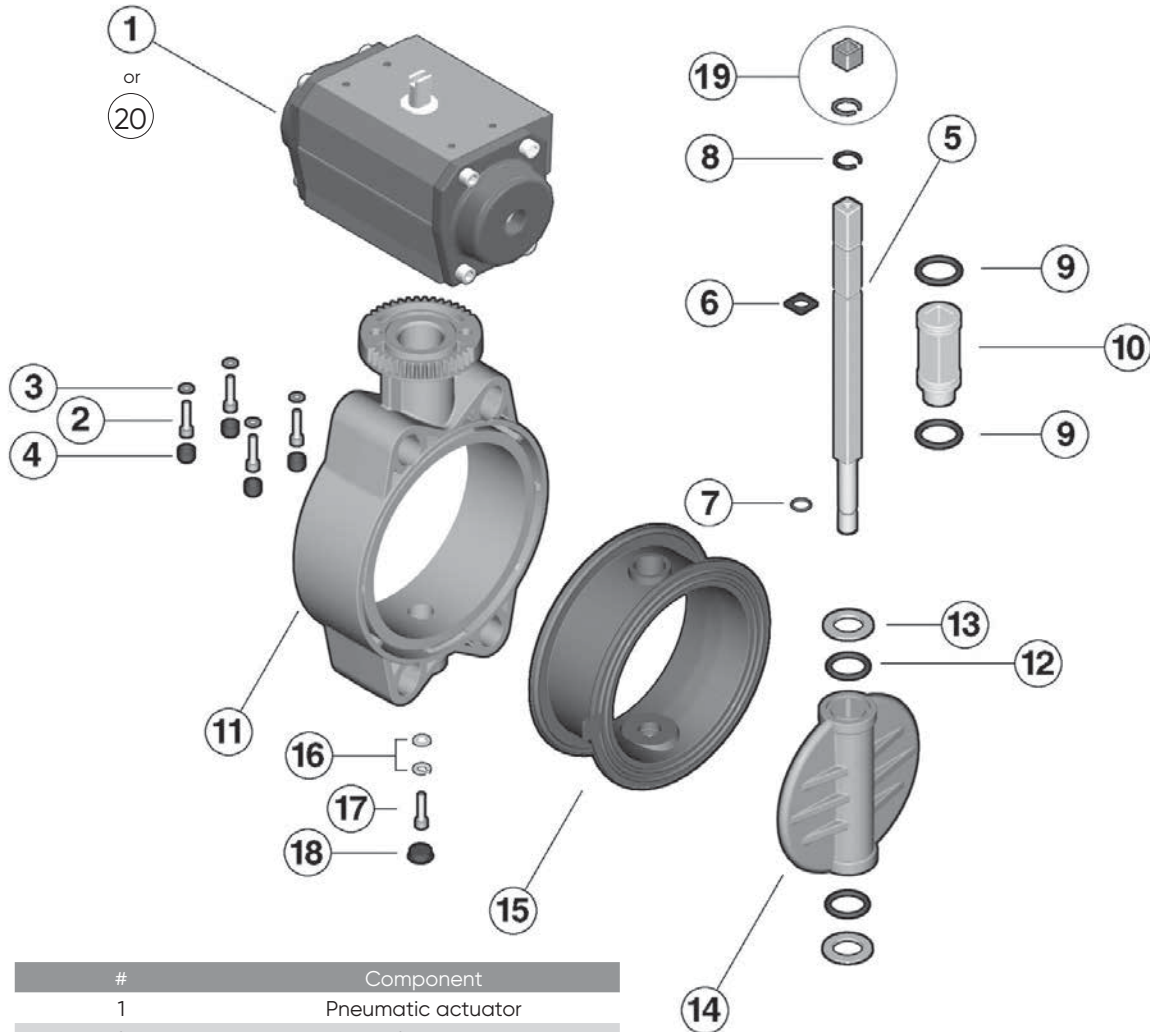
Electric Actuator Power Consumption

MODEL		VB015	VB030	VB060	VB110	VB270
VERSION H	Nominal Voltage	100V AC 240V AC	100 – 240V AC			
	Absorbed Current	75mA 25mA	0.3 – 0.2A	0.6 – 0.3A		
	Absorbed Power	6.6 VA 6 VA	30 – 48VA	60 – 72 VA		
VERSION L	Nominal Voltage	24V AC/DC	24V AC/DC	24V AC/DC	24V AC/DC	24V AC/DC
	Absorbed Current	0.6A	1.0A	1.8A	1.0A	1.8A
	Absorbed Power	15 VA	24 VA	44 VA	24 VA	44 VA
Frequency		50/60 HZ				

FE Series Automated Butterfly Valves

Components

Sizes 1-1/2" to 8"

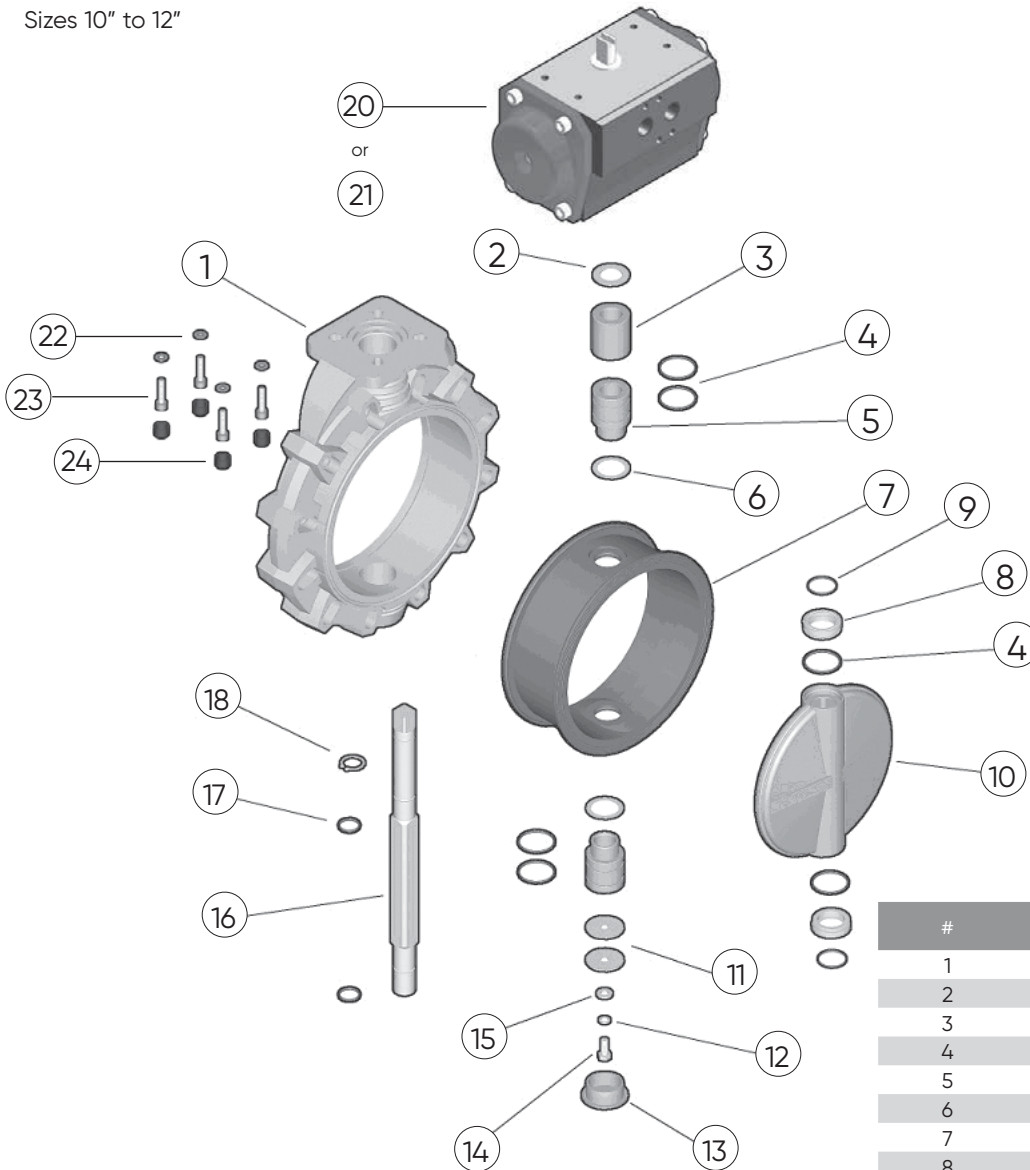


#	Component
1	Pneumatic actuator
2	Screw
3	Washer
4	Protection cap
5	Shaft
6	Shaft O-ring
7	Shaft O-ring
8	Seeger ring
9	Bush O-ring
10	Bush
11	Body
12	Disc O-ring
13	Anti-friction ring
14	Disc
15	Primary liner
16	Washer
17	Screw
18	Protection cap
19	Reduction sleeve
20	Electric Actuator (not shown)

FE Series Automated Butterfly Valves

Components (cont'd)

Sizes 10" to 12"

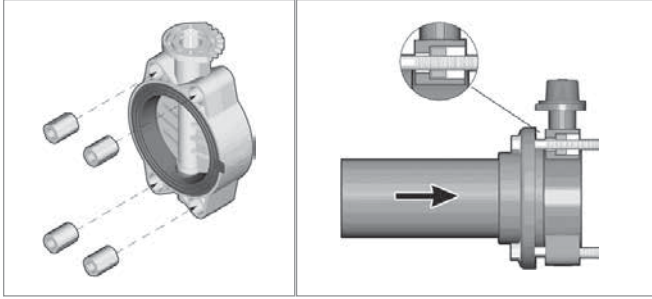


#	Component
1	Body
2	Washer
3	Bushing
4	Bushing O-Ring
5	Bushing for O-Ring
6	Washer
7	Primary Liner
8	Anti-Friction Ring
9	Disc O-Ring
10	Disc
11	Washer
12	Washer
13	Cap
14	Screw
15	Washer
16	Shaft
17	Shaft O-Ring
18	Retaining Ring
19	O-Ring
20	Pneumatic Actuator
21	Electric Actuator (not shown)
22	Washer
23	Screws
24	Protection Cap

FE Series Automated Butterfly Valves

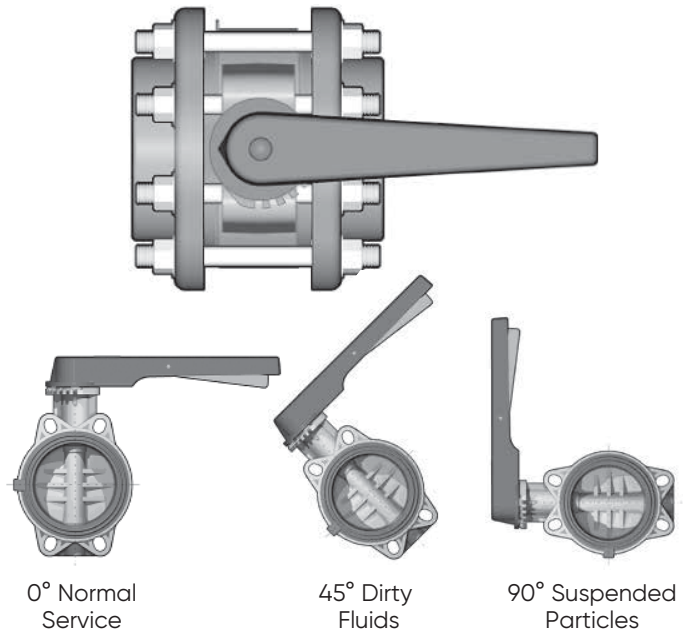
Installation Procedures

1. Ensure that the length of the bolts is sufficient for the size of valve being installed. Due to the varying designs of plastic flanges, there is no recommended minimum length. However, a length that results in at least 5 exposed threads on each side should be sufficient.



2. Please refer to the appropriate application sub-section:
 - a. For typical inline installation, ensure that the disc is in the partially closed position then carefully insert the valve into the piping system between the two flanges. Insert the bolts, washers, and nuts (if necessary), then hand tighten. Take care to properly line up the valve and flanges as any misalignment may cause leakage.
 - b. For lugged version end of line installation, insert the necessary steel lugs into the valve body. Ensure that the disc is in the partially closed position then carefully position the valve on the flange. Insert the bolts, and washers, then hand tighten. Take care to properly line up the valve and flange as any misalignment may cause leakage.
3. Connect pneumatic or electric connections according to provided diagrams.
4. To avoid damage to the primary gasket, cycle the valve to the open position before tightening the bolts. For correct joining procedure, please refer to the section entitled, "Joining Methods – Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". The bolts should be tightened in an even pattern to the nominal torque in the table below. These torque ratings are sufficient to maintain a watertight seal at the maximum rated operating pressure.

Note: End of line installation will cause the maximum rated pressure to be reduced to the values listed in the table below. If the process media is dirty or contains suspended particles, it is advisable to install the valve in an orientation in which the shaft is not vertical (see diagrams). Over time, particles may collect at the bottom of the valve posing a threat to the seal between the disc, liner, and shaft. 0° normal service 45° dirty fluids 90° suspended particles



Size (inches)	Nominal Bolt Torque (ft-lbs)	Lugged Pmax (psi)
1-1/2	7	90
2	9	90
2-1/2	11	90
3	13	90
4	15	90
5	26	90
6	30	60
8	41	60
10	52	-
12	52	-

FE Series Automated Butterfly Valves

Valve Maintenance

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the system. Be sure to depressurize and drain the isolated branch before continuing. It is recommended that all actuators be de-activated before servicing the valve to avoid injury
2. Cycle the valve to a partially open position then loosen each bolt holding the valve to the pipe flange(s).
Please refer to the section entitled, "Joining Methods – Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" for a recommended bolt tightening pattern diagram. Follow the same pattern when disassembling the flanged joint(s) then carefully remove the valve from the line.

Sizes 1-1/2" to 8":

4. Loosen and remove the bolts, washers and protection caps fixed to the actuator (2, 3 & 4). Carefully remove the actuator from the valve taking care not to damage the stem.
5. Remove the cap (18) then loosen and remove the screw (17) and washer(s) (16) from the base of the valve body.
6. Carefully pull the shaft (5) out of the valve body then remove the disc (14).
7. Remove the primary liner (15) from the valve body.
8. Remove the nylon bushing (10) and o-rings (9) from the valve body (sizes 2-1/2" to 8").
9. Remove the disc anti-friction rings (13), and o-rings (12, sizes 2-1/2" to 8").
10. Remove the retaining ring (8, sizes 2-1/2" to 8") and orings (6, 7) from the shaft.
11. The valve components can now be checked for problems and/or replaced.

Sizes 10" to 12":

3. Loosen and remove the bolts, washers and protection caps fixed to the actuator (22, 23 & 24). Carefully remove the actuator from the valve taking care not to damage the stem.
4. Remove the cap (13) then loosen and remove the screw (14) and washers (11, 12, and 15) from the base of the valve body (1).
5. Carefully pull the shaft (16) out of the valve body then remove the disc (10).
6. Remove the primary liner (7) from the valve body
7. Remove the upper and lower bushings (3, 5), washers (2, 6), and o-rings (4) from the valve body.
8. Remove the disc anti-friction rings (8) and o-rings (4, 9).
9. Remove the retaining ring (18) and o-rings (17) from the shaft.
10. The valve components can now be checked for problems and/or replaced.

FE Series Automated Butterfly Valves

Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities.

Sizes 1-1/2" to 8":

1. Insert the primary liner (15) into the valve body (11). Ensure that the proper holes line up with those on the body.
2. Properly fit the o-rings (9) on the nylon bushing (10) (sizes 2-1/2" to 8") then insert into the valve body from above.
3. Properly fit the disc o-rings (12, sizes 2-1/2" to 8") and anti-friction rings (13) on the disc (14), then insert into the valve liner taking care to center the holes.
4. Properly fit the o-rings (6, 7) and retaining ring (8, sizes 2-1/2" to 8") in their grooves on the shaft (6), then carefully insert into the valve body from above.
5. Fasten the shaft at the base of the valve body using the screw (17) and washer (16). Affix the cap (18) over the bolt.
6. For 8" sizes, affix the spacer pad (20) to the valve body using the screws (19), washers (21), and nuts (22).
7. Carefully place the actuator on the stem, lining up the holes. Fasten using the necessary bolts, washers and protective caps (2, 3 & 4). Ensure that the actuator and disk position correspond to the same operating position.

Sizes 10" to 12":

1. Insert the primary liner (7) into the valve body (1). Ensure that the proper holes line up with those on the body.
2. Properly fit the o-rings (4) on the upper and lower bushings (3, 5) then insert into the valve body from above and below along with the washers (2, 6).
3. Properly fit the disc o-rings (4, 9) and anti-friction rings (8) on the disc (10), then insert into the valve liner taking care to center the holes.
4. Properly fit the o-rings (17) and retaining ring (18) in their grooves on the shaft (16), then carefully insert into the valve body from above.
5. Fasten the shaft at the base of the valve body using the screw (14) and washers (11, 12, and 15). Affix the cap (13) over the bolt.
6. Carefully place the actuator on the stem, lining up the holes. Fasten using the necessary bolts, washers and protection caps (22, 23 & 24). Ensure that the actuator and disk position correspond to the same operating position.

NOTES

SECTION SIX: ACCESSORIES

Overview

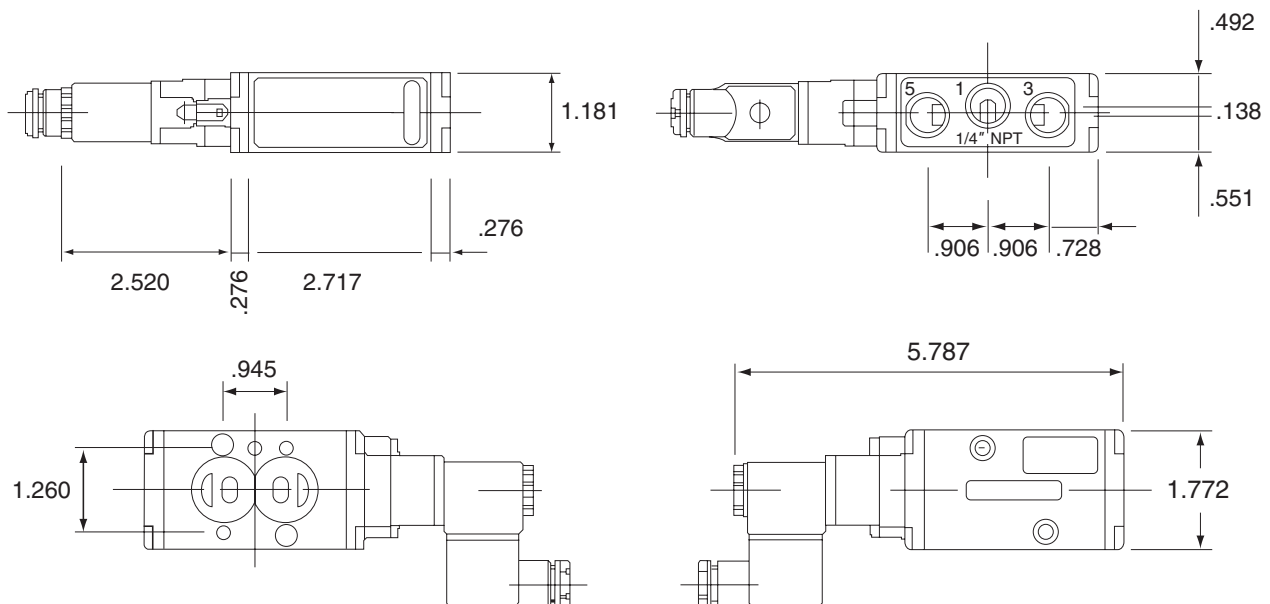
All modern pneumatic actuators offer an array of accessories such as position indicators, manual over rides, limit switch boxes (with or without indicators), speed controls and pneumatic or electronic positioners. These items are described in details in the following section.

Solenoid

- Universal Application 3-way or 4-way selectable with a simple field interchangeable insert
- Inlet and Exhaust port sizes are 1/4" NPT
- Manual Override Standard
- NEMA 4 Class H Coil Standard on each unit
- Additional protection classes available; Intrinsically Safe and Explosion Proof (NEMA 7/9)
- All units are stamped with a progressive traceable serial number



Standard Voltage	24 – 110 – 220V; 50/60 Hz; 12 – 24V DC
Duty Cycle	100%
Protection Class	NEMA 4, 4x with connector assembled
Air Supply Connection	1/4" NPT
Operating Pressure	30psi – 145psi
Din Connector	1/2" NPT
Flow Factor	Cv 0.5
Operating Temperature	-4F to 158F
Weight	1.08lb



Speed Control

Provide infinite variation of control of air flow at an acceptable sound level on the exhaust ports of air valves with complete safety. An external adjustment screw accurately varies orifice opening from closed to full flow as required. The final position is then locked into place by a lock nut mechanism. Objectionable exhaust air noise is eliminated by the surrounding sleeve of sintered bronze.

Exhaust Filter



Utilize porous sintered bronze filter element secured to Brass pipe fittings. They are used to diffuse air and muffle noise from the exhaust ports of air valves to an acceptable level within OSHA noise requirements. These mufflers can also be used as filters, preventing corrosive atmosphere from entering the actuator thus extending the actuators working life.

Limit Switch Box

Manufactured completely in techno-polymer with stainless steel fasteners and Nema 4, 4x rating, these products are corrosion resistant and suitable for the most corrosive environments.

The operating position of the switches can be easily changed by adjusting the high resolution spline cams manually and independently with the need for additional tools. The cams are spring backed and will not be affected by normal vibration.

Each box is equipped with two (2) standard 1/2" NPT conduit entries and one (1) terminal strip with 8 contact points.

Comes standard with a high visibility beacon, offering clear location of the current valve position.

The switchbox also comes standard with stainless steel captive cover bolts; an added feature to ensure long life of the switchbox.



SPDT Mechanical Switches

With 8 Point Terminal Strip on a printed circuit board



Technical Data

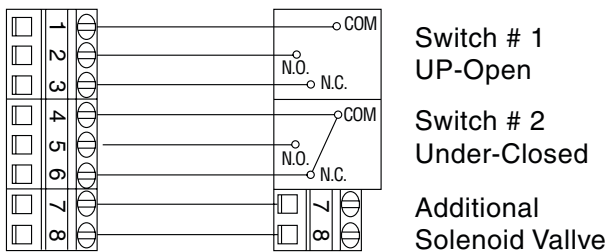
Operating Force	0.135 lbf (0.60 N)
Release Force	0.014 lbf (0.06 N)
Differential Travel	0.189 in (4.8 mm)
Over-travel	0.032 in (0.8 mm)

Electrical Rating

Contact Arrangement: SPDT (Form C)

Rated Voltage	Resistive Load	Inductive Load
125 VAC	5 Amp	3 Amp
250 VAC	3 Amp	2 Amp
8 VDC	5Amp	5 Amp
14 VDC	5 Amp	4 Amp
30 VDC	4 Amp	3 Amp
125 VDC	0.4 Amp	0.4 Amp
250 VDC	0.2 Amp	0.2 Amp

Wiring Diagram



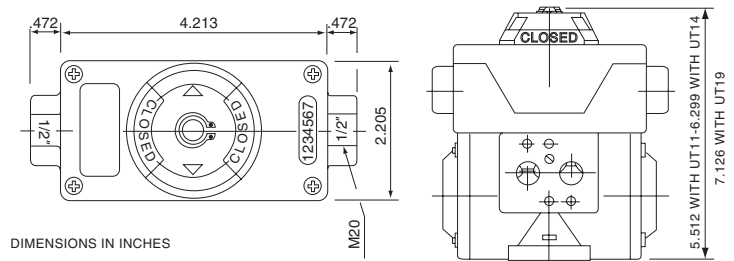
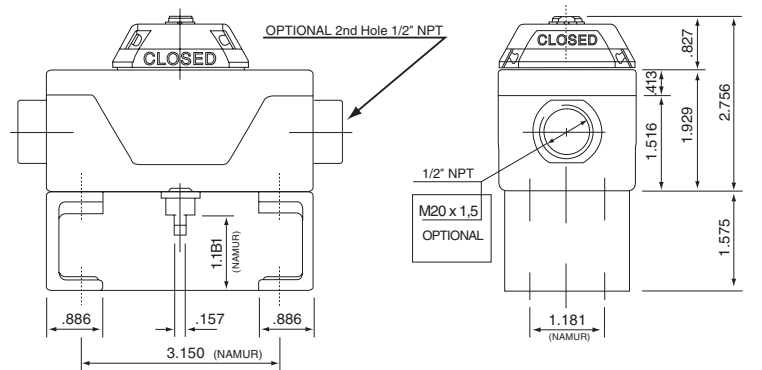
Materials

Box	Technopolymer
Brackets	Technopolymer
Position Indicator	Technopolymer
Fasteners	Stainless Steel
Seals	Buna-N
Operating Shafts	Technopolymer
Cams	Technopolymer
Microswitches	Technopolymer
Electrical Board with Clamps	Polyamide

Inductive Proximity Sensors



Nominal voltage	8V
Current consumption	
Sensing face covered	1mA
Sensing face free	3mA
Switching frequency	1000Hz
Self inductance	50mH
Self capacitance	35nF
Protection	IP67
Operating Temperature	-25 to 100°C



Positioners

Electro-Pneumatic General Information

The electro-pneumatic positioner is used for rotary operation of pneumatic rotary valve actuators by means of an electrical controller or control system with an analog output signal of 4 to 20 mA or split ranges.

Features

- No resonance in the range of 5~200Hz.
- 1/2 Split Control without any other substitutes.
- Easy to adjust zero and span.
- Easy to convert from Reverse Action to Direct Action or vice versa.
- Easy Feedback Connection.
- Fast and accurate response.
- Low air consumption.
- Easy to protect from hunting effect by using output orifice for small size actuators.
- Designed as a block build structure for maintenance and repair.

Input Signal	4 to 20mA DC
Impedance	250 + 15
Supply Pressure	0.14 to 0.7 Mpa
Stroke	0° to 90°
Air connection	1/4" NPT
Gauge Connection	1/8" NPT
Degree of Protection	IP66
Operating Temperature	4F to 150F (-20C to 70C)
Linearity	+ 2%
Sensitivity	0.50%
Repeatability	0.50%
Air Consumption	0.18 CFM
Flow Capacity	2.83 CFM
Material	Die-cast Aluminum
Weight	2.8Kg with junction box



Specifications

Options

- Electro-pneumatic positioner with limit switch and beacon.
- Electro-pneumatic positioner with position transmitter.
- Electro-pneumatic positioner with limit switch, beacon and position transmitter (shown above).

Positioners

Pneumatic General Information

The pneumatic positioner is used for rotary operation of pneumatic rotary valve actuators by means of a pneumatic controller or control system with an output signal of 3-15psi.

Input Signal	0.2 – 1.0 kgf/cm ² (3 – 15 psi)
Supply Pressure	1.4 – 7.0 kgf/cm ² (20 – 100 psi)
Stroke	0° to 90°
Connection	PT 1/4" (Gauge PT 1/8) NPT 1/4" (Gauge NPT 1/8)
Pressure Gauge	0-28psi, 0-57psi, 0-140psi
Ambient Temperature	-22°F to 185°F
Linearity	± 2% F.S
Hysteresis	± 1% F.S
Sensitivity	± 0.5% F.S
Repeatability	± 0.5% F.S
Air Consumption	0.11 CFM, (Sup. = 20psi)
Max. Flow Capacity	2.8 CFM, (Sup. = 20psi)
Weight	1.7kg (3.7lb)
Material	Aluminum Diecasting



Specifications

Options

- Pneumatic positioner with limit switch and beacon.
- Pneumatic positioner with position transmitter.
- Pneumatic positioner with limit switch, beacon and position transmitter.

Accessories – Pneumatic Actuator



Pilot Solenoids – 110 VAC, 3/4-Way

Component Style	Significant Number	Product Code
NEMA 4/4X	SV61CSA110VAC	253055
NEMA 7/9	SV91	253056

Pilot Solenoids – 24 VDC, 3/4-Way

Component Style	Significant Number	Product Code
NEMA 4/4X	SV61CSA24VDC	253088

Pilot solenoids meet NAMUR mounting specifications.



Limit Switches – NEMA 4/4X

Component Style	Significant Number	Product Code
Mechanical	MS41-2	253057
Proximity	PS41-2AL	253058

Limit switches include universal mounting brackets (ISO 5211)



Positioners

Component Style	Significant Number	Product Code
3 – 15 psi	PNY01	253061
4 – 20 mA	PEY01	253059
4 – 20 mA, w/ limit switch (LS)	PEY02	253816
4 – 20 mA, w/ position transmitter (PT)	PEY03	253817
4 – 20 mA, w/ LS & PT	PEY04	253818
4 – 20 mA, I-safe	PEI01	253062

All positioners include universal mounting brackets (ISO 5211) and gages.

Several other positioners available, including Intrinsically Safe, Explosion proof, Smart, Stainless Steel and High Vibration models, with limit switch and position transmitter options. Please contact IPEX for more information.



Manual Override

Component Style	Significant Number	Product Code
Sandwich Declutch. Gearbox ISO 5211	PV01-GOJ26	253819

Declutchable gearbox has MAXIMUM torque rating of 2600 in-lbs.

For higher torque values, please contact IPEX for larger size gearbox models.



Other

Component Style	Significant Number	Product Code
Muffer – Brass/Bronze	MUFF-NPT	253065
Speed Control – Brass/ Bronze	SPEED-NPT	253066
L-Port Actuator Beacon Kit	BEACON-3W-L	253089
T-Port Actuator Beacon Kit	BEACON-3W-T	253090

Customer must specify at time of order if accessories are to be factory assembled

Accessories – Mounting



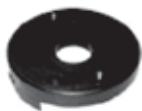
VKD & TKD Series Ball Valve Mounting Kit

Size (inches)	Mounting Detail	Significant Number	Product Code
1/2	F03 / F04 / 11mm	2KTPQCPEF	154048
3/4	F04 / 11mm	2KTPQCPGGF04	154049
3/4	F03 / F05 / 11mm	2KTPQCPGG	154050
1	F04 / 11mm	2KTPQCPHHF04	154051
1	F03 / F05 / 11mm	2KTPQCPHH	154052
1-1/4	F05 / F07 / 11mm	2KTPQCPH11	154182
1-1/4	F05 / F07 / 14mm	2KTPQCPH11	154053
1-1/2	F05 / F07 / 11mm	2KTPQCPJ11	154183
1-1/2	F05 / F07 / 14mm	2KTPQCPJ11	154054
2	F05 / F07 / 11mm	2KTPQPLL11	154174
2	F05 / F07 / 14mm	2KTPQPLL	154055
2-1/2 - 4 (VKD)	F05 / F07	1PIA08TM	153001



TK Series 3-Way Ball Valve Mounting Kit

Size (inches)	Mounting Detail	Significant Number	Product Code
1/2	F03 / F04 / 11mm	2KT00200	154056
3/4	F04 / 11mm	2KT0020111	154175
3/4	F03 / F05 / 11mm	2KT00201	154057
1	F04 / 11mm	2KT0020211	154176
1	F03 / F05 / 11mm	2KT00202	154058
1-1/4	F05 / F07 / 11mm	2KTF5F7I11	154177
1-1/4	F05 / F07 / 14mm	2KT5F11	154059
1-1/2	F05 / F07 / 11mm	2KTF5F7J11	154178
1-1/2	F05 / F07 / 14mm	2KTF5F7J11	154060
2	F05 / F07 / 11mm	2KTF5F7LL11	154179
2	F05 / F07 / 14mm	2KTF5F7LL	154061



Spacer Plate for FK Series Butterfly Valves

Size (inches)	Mounting Detail	Significant Number	Product Code
1-1/2 - 6	F05 / F07	1PIA08TM	153001
8	F10	1PIA08VM	153002



Square Stem Adapter

Size (inches)	Mounting Detail	Significant Number	Product Code
0.43 x 0.35	11mm x 9mm	11X9SSA	253048
0.55 x 0.43	14mm x 11mm	14X11SSA	253049
0.67 x 0.43	17mm x 11mm	17X11SSA	253050
0.67 x 0.55	17mm x 14mm	17X14SSA	253051
0.87 x 0.67	22mm x 17mm	22X17SSA	253052
1.06 x 0.87	27mm x 22mm	27X22SSA	253053
1.42 x 1.06	36mm x 27mm	36X27SSA	253054

NOTES

SECTION EIGHT: STANDARDS

Overview

Standards exist to ensure that thermoplastic piping systems meet the required level of performance for a particular application. IPEX engineers and technical staff actively participate in thermoplastic standards development throughout North America. These activities result in new standards and improvements to existing standards for thermoplastic piping.

Standards Organizations

IPEX products comply with standards developed by several standards organizations. Additional information on standards and compliance can be obtained by contacting the following organizations.

ASTM International, www.astm.org
100 Barr Harbor Drive, West Conshohocken, Pennsylvania USA 19428-2959

ANSI, www.ansi.org
1819 L Street, NW., Suite 600, Washington DC USA 20036

ISO, www.iso.org
1 rue de Varembé, Case postale 56, CH-1211 Geneva 20, Switzerland

NSF International, www.nsf.org
P.O. Box 130140, 789 N. Dixboro Rd, Ann Arbor, Michigan USA 48113-0140

Applicable Standards

The following is a list of applicable standards for IPEX thermoplastic valves and related piping systems. This list is up-to-date at the time of printing.

ASTM

D1784	Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
D1785	Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
D2464	Standard Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
D2466	Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
D2467	Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
D3222	Standard Specification for Unmodified Poly(Vinylidene Fluoride) (PVDF) Molding Extrusion and Coating Materials
D4101	Standard Specification for Polypropylene Injection and Extrusion Materials
F437	Standard Specification for Threaded Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80
F439	Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80
F441/F441M	Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80
F1498	Standard Specification for Taper Pipe Threads 60° for Thermoplastic Pipe and Fittings

ANSI

- | | |
|---------|-----------------------------------|
| B1.20.1 | Pipe Threads, General Purpose |
| B16.5 | Pipe Flanges and Flanged Fittings |

ISO

- | | |
|---------|---|
| 10931 | Plastics piping systems for industrial applications – Poly(vinylidene fluoride) (PVDF) – Specifications for components and the system |
| 11922-1 | Thermoplastics pipes for the conveyance of fluids
Dimensions and tolerances – Part 1: Metric series |

NSF

- | | |
|--------|--|
| NSF 14 | Plastic Piping System Components and Related Materials |
| NSF 61 | Drinking Water System Components – Health Effects |

SALES AND CUSTOMER SERVICE

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ipexna.com

About IPEX by Aliaxis

As leading suppliers of thermoplastic piping systems, IPEX by Aliaxis provides our customers with some of the largest and most comprehensive product lines. All IPEX by Aliaxis products are backed by more than 50 years of experience. With state-of-the-art manufacturing facilities and distribution centers across North America, we have established a reputation for product innovation, quality, end-user focus and performance.

Markets served by IPEX by Aliaxis products are:

- Electrical systems
- Telecommunications and utility piping systems
- PVC, CPVC, ABS, PE, PEX, PVCO, PP and PVDF pipe and fittings (1/2" to 60")
- Industrial process piping systems
- Municipal pressure and gravity piping systems
- Plumbing and mechanical piping systems
- PE Electrofusion systems for gas and water
- Industrial, plumbing and electrical cements
- Irrigation systems

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A policy of ongoing product improvement is maintained. This may result in modifications of features and/or specifications without notice.

