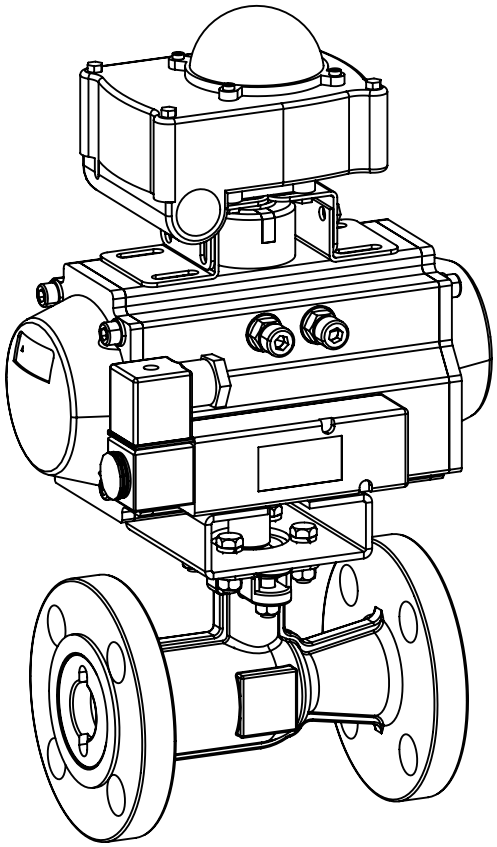
Intermittent Blowdown Control Valve

DN 25, 32, 40, 50

Installation, Operating and Maintenance Instructions



Local regulations may restrict the use of this product to below the conditions quoted.
In the interests of development and improvement of the product, we reserve the right to change the specification without notice.

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1. Safety Notes

Tools

Before starting work, make sure that you have suitable tools and consumables available. Use only genuine Vira replacement parts.

Temperature

After isolation, let the temperature to cool down to avoid danger of burns.

Freezing

Required precautions must be taken to protect products in environments where they may be exposed to temperatures below freezing point.

Pressure

Ensure that any pressure is isolated and safely vented to atmospheric pressure. Do not assume that the system has depressurized even when the pressure gauge indicates zero. exposed to temperatures below freezing point.

Access

Ensure safe access and if necessary a safe working platform (suitably guarded) before attempting to work on the product. Arrange suitable lifting gear if required.

Residual Hazards

The external surface of the product may be very hot. Take essential care when removing the product from an installation.

Hazardous Environment

Plant rooms are explosion-risk areas. There may be a lack of oxygen, dangerous gases, extremes of temperature, hot surfaces, fire hazards excessive noise, and moving machinery.

Protective Clothing

In order to be protected against the hazards of chemicals, high temperature, radiation, noise, falling objects, and dangers to eyes and face, anyone around requires protective clothing suitable in the plant room.

Supervision

All work must be carried out or supervised by a suitably competent person. Installation and operating personnel should be trained in the correct use of the product according to the Installation and Operation Instructions.

Disposal

Unless otherwise stated in the Installation and Operation Instructions, this product is recyclable and no ecological hazard is anticipated with its disposal providing due care is taken.

Returing Products

When returning products to “Vira Isı ve Endüstriyel Ürünler A.Ş” the customers must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk.

2. General Information and Application

Vira BKV pneumatic actuated blowdown valves are monoblock, reduced bore ball valves. The valve is fitted with a 90° rotary spring return pneumatic actuator; limit switch box and a solenoid valve for air inlet. The BKV series pneumatic actuated blowdown valves are used with a Vira bottom blowdown controller to provide timed control of bottom blowdown.

The BKV series pneumatic actuated blowdown valves, working in conjunction with bottom blowdown controller ensures that the boiler blowdown cycles occur with minimum heat loss. The valve is suitable for a maximum pressure of 23 bar g @ 200 °C.

2.1 Standards and Certification

This product fully comply with the requirements of the EU Pressure Equipment Directive. This product is available with material certification to EN 10204 3.1.

Note: All certification/inspection requirements must be stated at the time of order placement.

2.2 Actuator

Air supply connection is designed in accordance with NAMUR standard to install solenoid valves.

The namur drive pinion and the namur top mounting connection permit direct installation of accessories like switch box.

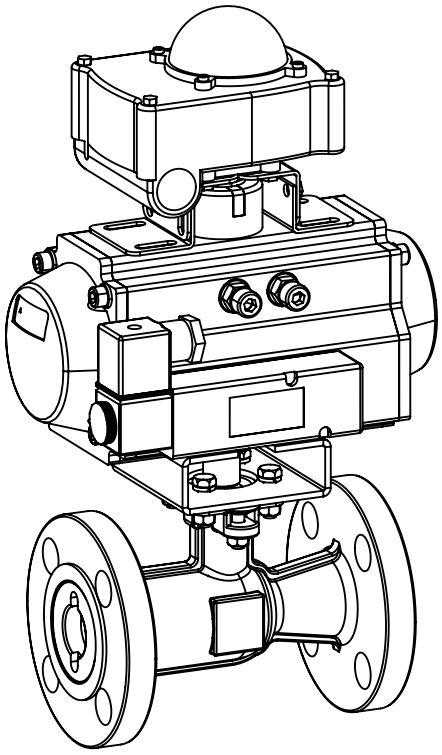


Figure 1 : BKV Blowdown Control Valve

2.3 Switch Box (APL 210-N)

Limit switch box is a device that indicates the valve closed or open position. It also provides a position verification signal.

2.4 Namur Solenoid Valve (4M310-08)

The function of a Namur solenoid valve is to control the flow of media (mostly air). The valve itself is controlled by a solenoid that opens or closes the valve by controlling the air flow through a pilot to the pneumatic actuator.

3. Technical Data

3.1 Actuator

Operating Temperature	-20 ~ +80°
Minimum Air Supply Pressure	2.5 Bar
Maximum Air Supply Pressure	8 Bar
Operating Media	Dry or Lubricated Air
Maximum Particle Diameter	< 30 µm
Cover Material	Aluminum Die Casting
Body Material	Aluminum Die Casting
Bearings	POM
O-Rings	NBR
Cam Adjustment	Stainless Steel
Output Shaft	Carbon Steel
Gasket	Stainless Steel
Cover Bolts	Stainless Steel

Table 1 : Actuator Data

3.2 Valve

Body Design Condition	PN 40
PMA Maximum Allowable Pressure	150 °C @ 34 Bar g
TMA Maximum Allowable Temperature	240 °C @ 0 bar g
Minimum Allowable Temperature	-10 °C
PMO Maximum Operating Pressure For satured steam service	220 °C @ 21.7 Bar g
TMO Minimum Operating Temperature	-10 °C

Table 2 : Working Limits

Note : Designed for a maximum cold hydraulic test pressure of : 1.5 x PMA

3.3 Namur Solenoid Valve

Protection Class	IP 65
Body Material	Extruded Aluminum
Seal	NBR
Working Temp.	-10 ~ +80 C
Working Pressure	6-8 Bar
Working Medium	(<=40µm) dry and lubricated air
Cable Plung	M20 * 1,5 1/2" BSPP
Insulation Grade	H Class Coil
Voltage	220V AC

Table 3 : Namur Solenoid Valve Data

3.4 Limit Switch Box

Type	Rotary Stroke
Protection Class	IP 67
Cable Connection	G1/2" M20/NPT
Wiring Terminal	8
Indicator Cover	0-90 ° OPEN Yellow / CLOSED Red
Cover Material	Aluminum Alloy
Body	Aluminum Alloy
Shaft	SS 304
Indicator Cover	Polycarbonate

Table 4 : Limit Switch Box Data

4. Installation and Dimensions

Before installing a valve, check to ensure that size, pressure rating, materials of construction, end connections, etc. are suitable for the service conditions of the particular application.

The actuator should not be exposed to excessive heat.

Additional protection is recommended for outdoor installation.

Valves should be installed where there is sufficient space available so that they may be conveniently maintained.

An extra care is needed to ensure that all dirt which may accumulated in the valve during storage is removed before installation.

Not to cause any damage to the valve seat and operating mechanism during operation, pipeline strainers should be fitted upstream of the valves.

Install the valve with the actuator at the top. The preferred position is with the stem vertical.

The air supply to the solenoid valve/actuator must be to in 10 mm minimum diameter.

The air inlet connection is 1/4".

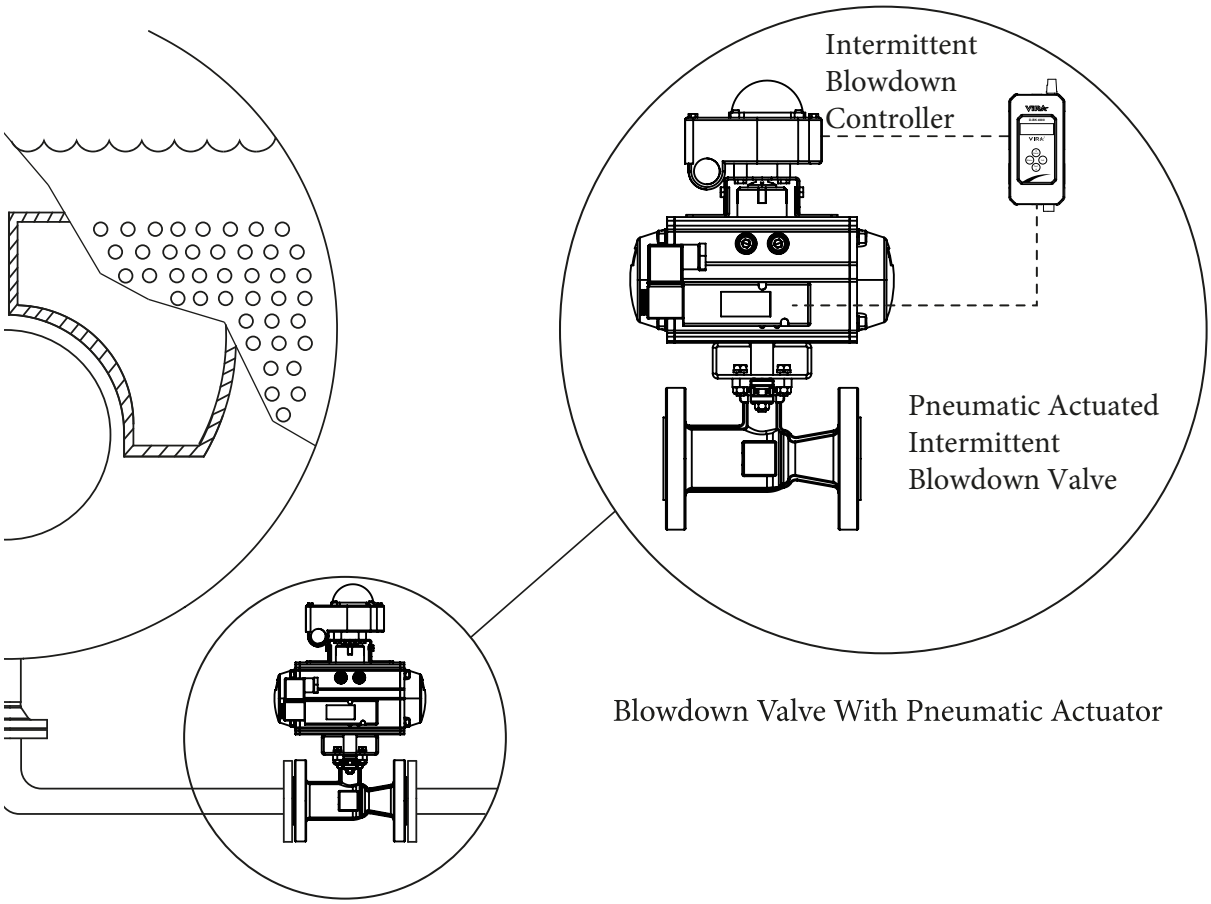


Figure 2 : Installation Example of BKV 4040 Blowdown Valve.

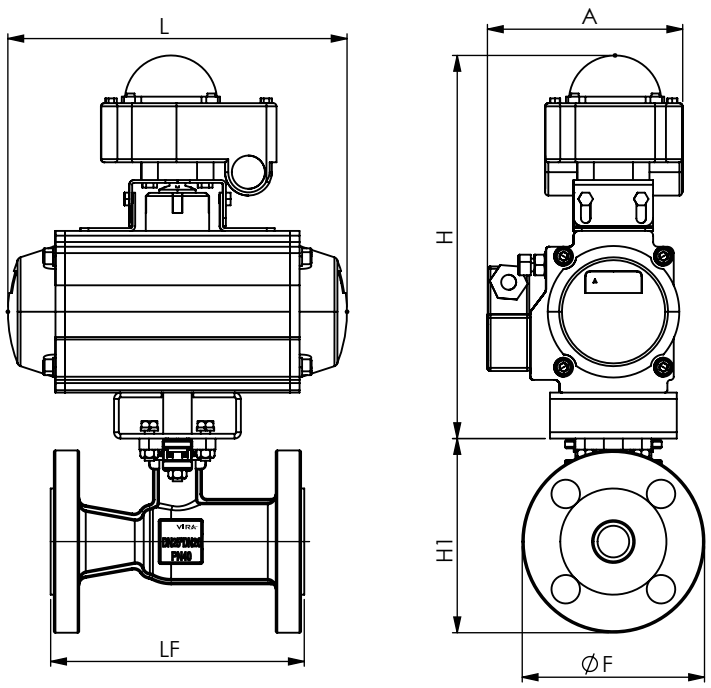


Figure 3 : BKV 4000 Dimensions

SIZE	L	LF	A	H	H1	F
DN 25	214	160	124	242	122,5	115
DN 32	252	180	127	255	135	140
DN 40	252	200	127	256	140	150
DN 50	270	230	148	267	165	165

Table 5 : BKV 4000 Dimensions

5. VAT Single Acting Actuator with Spring Return

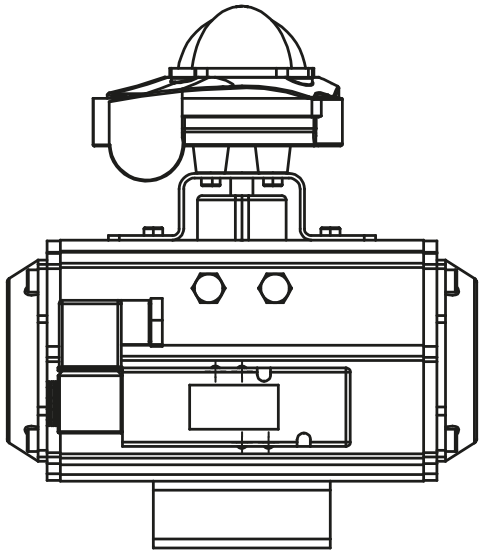


Figure 4 : VAT Actuator

5.1 Actuator Technical Data

5.1.1 Selection of Spring Return Actuator

- Under normal operating conditions, a single actuator to consider the role of the safety factor of 30%-50%.

Note: Single action during the spring return actuators, actuators B hole ventilation does not affect actuator output torque. Instead it's helpful of spring retum

For Example:
Valve required torque: 35 N.m.
Safety Torque= 35x(1+30%)= 45,5 N.m

- The air pressure torque values at 0° and 90°, as well as the spring return torque values at 0° and 90°, must all be higher than the calculated safe torque value. The selection from the table is made accordingly.
- We took the row containing 10 springs as reference and used 5.5bar as the reference pressure
- According to single acting actuator output torque table, we can find AT-100S

Implementation process 0°= 87,1 N.m.
Implementation process 90°= 50N.m.
Spring Torque 0°= 58,9 N.m.
Spring Torque 90°= 96 N.m.

Single Acting Actuator Output Torque (Nm)

Suitable	Air Pressure		2.5 bar		3 bar		3.5 bar		4 bar		4.5 bar		5 bar		5.5 bar		6 bar		7 bar		8 bar		Spring Torque	
Valve Size	Model	Spring Q.ty	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°
DN 25	VAT-75S	5 6 7 8 9 10 11 12	16.1 13.5	8 3.8	22.1 19.5 17	14 9.8 5.8	27.8 25.2 22.7 20.1	19.7 15.5 11.3 7.1	33.6 31 28.5 25.9 23.3	25.5 21.3 17.1 12.9 8.7	39.4 36.8 34.3 31.7 29.1 26.5	31.3 27.1 22.9 18.7 14.5 10.3	45.2 42.6 40.1 37.5 34.9 32.3 29.8	37.1 32.9 28.7 24.5 20.3 16.1 11.9	48.5 46 43.4 40.8 38.2 35.7 33.1	38.8 34.6 30.4 26.2 22 17.8 13.6	51.7 49.1 46.5 43.9 41.4 38.8	40.3 36.1 31.9 27.7 23.5 19.3	60.8 58.2 55.6 53.1 50.5	47.8 43.6 39.4 35.2 31	69.8 67.2 64.7 62.1	55.2 51 46.8 42.6	21 25.2 29.4 33.6 37.8 42 46.2 50.4	12.9 15.5 18 20.6 23.2 25.8 28.3 30.9

Suitable	Air Pressure		2.5 bar		3 bar		3.5 bar		4 bar		4.5 bar		5 bar		5.5 bar		6 bar		7 bar		8 bar		Spring Torque	
Valve Size	Model	Spring Q.ty	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°
DN 32 DN 40	VAT-88S	5 6 7 8 9 10 11 12	25.5 21.4	12.7 6.1	34.8 30.7 26.7	22 15.4 8.7	43.8 39.7 35.7 31.6	31 24.4 17.7 11.1	53 48.9 44.9 40.8 36.8	40.2 33.6 26.9 20.3 13.7	62.1 58 54 49.9 45.9 41.8	49.3 42.7 36 29.4 22.8 16.3	71.2 67.1 63.1 59 55 50.9 46.9	58.4 51.8 45.1 38.5 31.9 25.4 18.7	76.7 72.7 68.6 64.6 60.5 56.5 52.4	61.4 54.7 48.1 41.5 35 28.3 21.7	81.7 77.6 73.6 69.5 65.5 61.4	63.7 57.1 50.5 44 37.3 30.7	95.6 91.6 87.5 83.5 79.4	75.1 68.5 62 55.3 48.7	110 106 102 97.4	86.5 80 73.3 66.7	33 39.6 46.3 52.9 59.5 66 72.7 79.3	20.2 24.3 28.3 32.4 36.4 40.5 44.5 48.6

Suitable	Air Pressure		2.5 bar		3 bar		3.5 bar		4 bar		4.5 bar		5 bar		5.5 bar		6 bar		7 bar		8 bar		Spring Torque	
Valve Size	Model	Spring Q.ty	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°
DN 50	VAT-100S	5 6 7 8 9 10 11 12	37 31..	18.4 8.7	50.3 44.4 38.5	31.7 22 12.4	63.6 57.7 51.8 46	45 35.3 25.7 16.1	76.6 70.7 64.8 59 53	58 48.3 38.7 29.1 19.5	90.6 84.7 78.8 73 67 61.1	72 62.3 52.7 43.1 33.5 24	103.6 97.7 91.8 86 80 74.1 68.3	85 75.3 65.7 56.1 46.5 37 27	111 105 99 93 87.1 81.3 75.4	88.3 78.7 69.1 59.5 50 40 31	118 112 106 100 94.3 88.4	91.7 82.1 72.5 63 53 44	139 133 127 121 115	109 99.5 90 80 71	160 154 148 142	127 117 107 98	48 57.7 67.3 76.9 86.5 96 106 115	29.4 35.3 41.2 47 53 58.9 64.7 70.6

5.2 Namur Solenoid Valve Assembly to the Actuator

Carefully place the solenoid valve onto the NAMUR surface of the actuator. Make sure the air ports are properly aligned. Insert the screws and tighten them diagonally. The recommended tightening torque is generally 4–6 Nm. Connect the compressed air supply line to the “P” pressure inlet port of the valve. Exhaust ports should be directed to free air or fitted with silencers. Make the electrical connection with a 24VDC or 220VAC depending on the configuration of power supply.

5.3 Solenoid Valve Wiring

5.3.1 Solenoid Valve Wiring with BK 4000 Controller

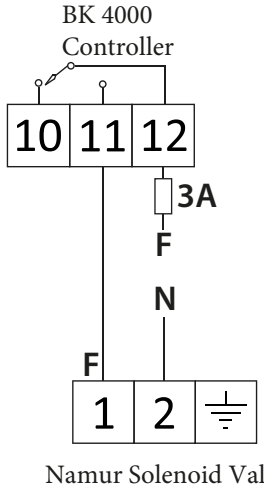


Figure 5 : Switch Box Wiring with BK 4000 and Namur Solenoid Valve

5.3.2 Solenoid Valve Wiring with D-BK 4000 Controller

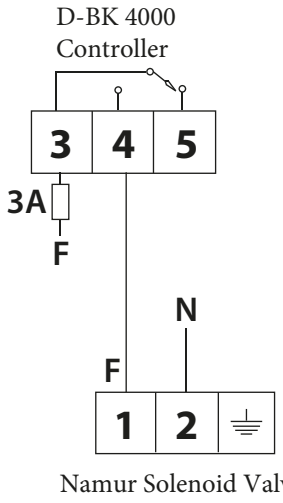


Figure 6 : Switch Box Wiring with D-BK 4000 and Namur Solenoid Valve

5.4 Switch Box Wiring

5.4.1 Switch Box Wiring with BK 4000 Controller

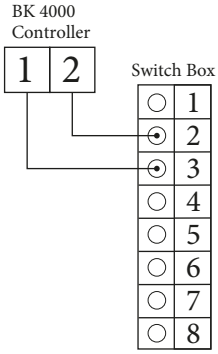


Figure 7 : Switch Box Wiring with BK 4000 Controller

5.4.2 Switch Box Wiring with D-BK 4000 Controller

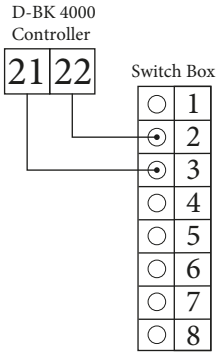


Figure 8 : Switch Box Wiring with D-BK 4000 Controller

6. Operation

The NAMUR solenoid valve controls the operation of a pneumatic actuator by directing the air supply to the actuator chambers. When the solenoid coil is energized (24VDC or 220VAC), the internal spool shifts, allowing compressed air to flow from the pressure port (P) to one of the actuator ports (A or B), causing the actuator to rotate or move to the open position. When the solenoid is de-energized, the spool returns to its initial position (either by spring return or air pressure), reversing the air flow and moving the actuator to the closed position. The exhaust air is released through the exhaust ports (R and S), which can be equipped with silencers.

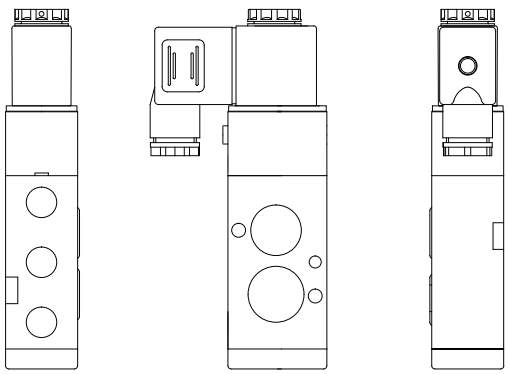


Figure 9 : Solenoid Valve

7. Maintenance

7.1 Actuator Maintenance

Periodically check that all fasteners remain tight. No routine maintenance is required, as the actuator is supplied with sufficient lubrication for a normal working life. Depending on the severity of actuator operating conditions, periodic replacement of the 'O' rings may be required.

7.1.1 Preventitive Maintenance

- We recommend a periodic inspection to check the actuator function.
- Actuators must be operated at least once every six months.
- Replace the 'O' rings, guides and washers if necessary.

7.1.2 General Information and Preventive Maintenance

- Regularly check that all connection elements remain tight at specific intervals. The actuator does not require periodic lubrication. However, depending on the operating conditions, periodic leak inspections should be performed, and sealing elements may need to be replaced.
- Operate the actuator at least once every 6 months. It is recommended to perform function tests at regular intervals, including checking for air leaks and ensuring the smoothness of the opening and closing movements.

7.1.3 Actuator Assembly – Disassembly

Mechanical disassembly and cleaning should only be performed by personnel trained in maintenance, according to the manufacturer's recommendations.

1. Separate the actuator from the valve (remove the ISO 5211 connection flange).
2. Carefully remove the side covers (if spring type, be cautious: the spring is under tension).
3. Remove the internal parts:
  - Rack pistons
  - Pinion shaft
  - O-ring seals and bearings

4. Wipe all parts with a clean cloth.
  - Remove dirt, particles, or oil residues.
  - Use isopropyl alcohol or solvent if necessary.

5. Replace O-rings, piston seals, and shaft bearings if they are cracked, hardened, or worn.
6. Completely dry all parts.

7.1.4 Lubrication and Assembly

- Apply a thin layer of high-temperature resistant grease on the rack and gear surfaces.
  - Lightly lubricate the O-rings with silicone-based grease
  - Carefully reassemble all parts:
- Align the piston with the shaft.
- Tighten the side covers according to the manufacturer's torque specifications.

The shaft sealing gasket must seat properly without being pinched.

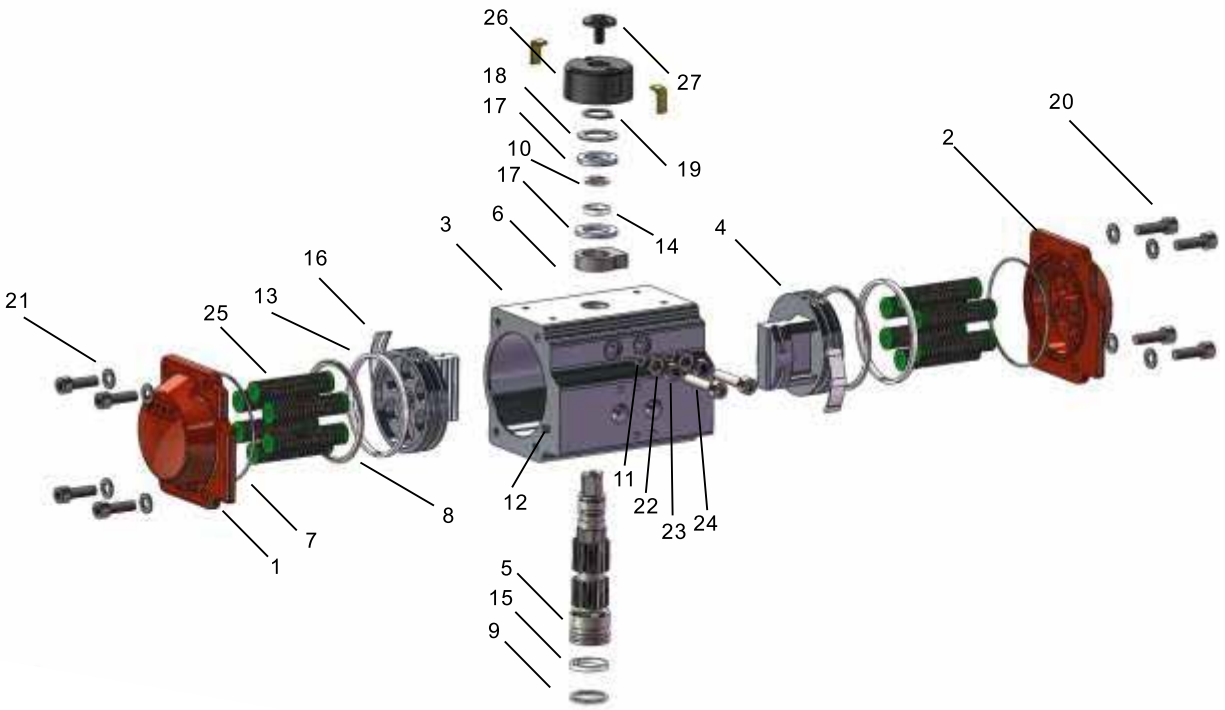


Figure 10 : Pneumatic Actuator Exploded View

No	Each Number	Part Name	Materials	Selected Materials
1	1	Left Cover	Aluminum Die Casting	Stainless Steel
2	1	Right Cover	Aluminum Die Casting	Stainless Steel
3	1	Body	Aluminum Extrusion	Stainless Steel
4	2	Piston	Aluminum Die Casting	.....
5	1	Output Shaft		Stainless Steel
6	1	Cam Adjustment	Stainless Steel	.....
7	2	O-ring (cover)	NBR	Fluorine or silicone rubber
8	2	O-ring (Piston)	NBR	Fluorine or silicone rubber
9	1	O-ring (output shaft bottom)	NBR	Fluorine or silicone rubber
10	1	O-ring (output shaft at the top)	NBR	Fluorine or silicone rubber
11	2	O-ring (adjusting screw)	NBR	Fluorine or silicone rubber
12	2	Plug (Cylinder)	NBR	Fluorine or silicone rubber
13	2	Bearing (Piston)	POM	.....
14	1	Bearing (Output shaft at the top)	POM	.....
15	1	Bearing (Output shaft bottom)	POM	.....
16	1	Guide with Bearing (Piston back)	POM	.....
17	2	Thrust Bearing (output shaft)	POM	.....
18	2	Gasket (output shaft)	Stainless Steel	.....
19	1	Flexible file ring	Aluminum Die Casting	.....
20	8	Cover bolt	Stainless Steel	.....
21	8	Cover Gasket	Stainless Steel	.....
22	2	Gasket	Stainless Steel	.....
23	2	Nut	Stainless Steel	.....
24	2	Adjustment bolt	Stainless Steel	.....
25	5-16	Spring Components	Alloy spring steel	.....
26	1	Position indicator	POM	.....
27	1	Screw of indicator	POM	.....

Table 6 : Actuator Bill of Material Table

7.2 Solenoid Valve Maintenance Instructions

Adjust the maintenance period of the solenoid valve according to its usage condition.

- Before maintenance, completely release the system pressure and disconnect the electrical connection of the valve.

- Inspect the valve's outer surface, connection points, and cables. If there are any cracks, wear, rust, or dirt, clean or replace them.

- Ensure that the pneumatic connections are tight and leak-free. Check the electrical connections and fix any loose or oxidized parts.

- Energize the valve and observe the opening-closing movements. Make sure the movement is smooth and fast.

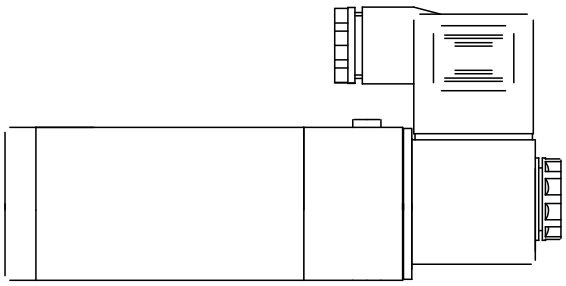


Figure 11 : Solenoid Valve

7.3 Intermittent Blowdown Valve

The Bottom Blowdown Valve is a type of valve used in boilers, pipelines, or equipment to discharge accumulated sludge, sediment, and impurities.
Bottom blowdown valve is a single-piece, reduced-bore design engineered specifically for sludge and sediment removal applications in steam boilers. Its robust construction ensures reliable operation under high temperature and pressure conditions, while the quick-acting mechanism enables efficient discharge and helps maintain boiler water quality. Compact, durable, and easy to maintain, it provides a long service life and stable performance in demanding industrial environments.
Due to contamination, it requires periodic maintenance for cleaning and ensuring tightness. Timely maintenance increases the efficiency of both the valve and the system.

7.3.1 Safety Precautions

- The line must be completely depressurized.
- The pipelines before and after the valve must be closed and blinded.
- Maintenance should not begin until the temperature of the line and valve has dropped to a safe working level.

7.3.2 Disassembly

1. Loosen the flange connection bolts in a diagonal sequence.
2. After removing the bolts, carefully remove the valve from its position.
3. Remove the bolts pos. 12 on the bracket pos. 15 that connects the actuator and the valve.
4. Remove the bolts pos. 9, then disassemble the parts in order to perform maintenance and replacement of the packings pos. 8
5. For valve gasket pos. 6 replacement and cleaning, remove the top cover pos. 2 using the special tool.

Note: For the spare parts list, refer to Table 8, For pose numbers see figure 10, Page 15.

7.3.3 Assembly

Perform the assembly by following the reverse order of the disassembly steps.

Warning!

To avoid problems during assembly, it is recommended to label the parts with their corresponding pos numbers during disassembly and reassemble them in the same order.

7.3.4 Maintenance

- Check the body and internal parts for corrosion, cracks, or deformation. If such conditions are found, the valve should be completely replaced.
- Clean the valve body, disc, stem, and bearings.
- Inspect the sealing surfaces and flanges for damage; if any damage is found, replace the sealing elements.
- Lightly lubricate moving parts with suitable grease or oil.

7.3.5 Test Procedure (Hydrostatic Test)

Perform seat tightness and body hydrostatic tests properly and in accordance with relevant procedures.

Product Description

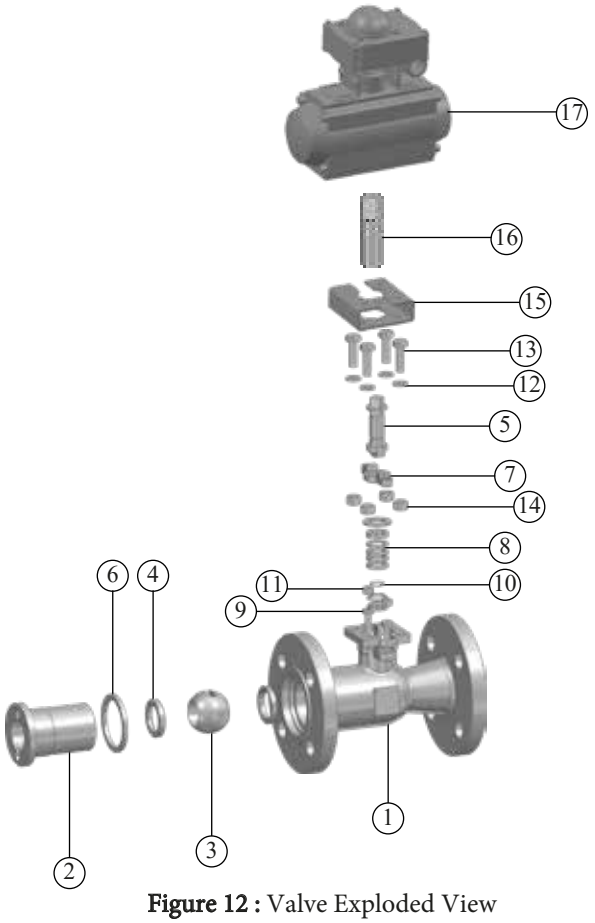


Figure 12 : Valve Exploded View

NO.	Name	Material
1	Body	ASTM A216 WCB
2	Bonnet	ASTM A216 WCB
3	Ball	ASTM A182 F316
4	Seat	Material of Construction
5	Stem	ASTM A182 F316
6	Seal Gasket	AISI 316+Graphite
7	Packing Gland	ASTM A216 WCB
8	Packing	Flexible graphite
9	Hexhead bolt	ASTM A193 Grade B7
10	Nut	ASTM A194 Grade 2H
11	Thrust pad	AISI 316
12	Hexhead bolt	ASTM A193 Grade B7
13	Spring washer	GB/T 1222 65Mn
14	Nut	ASTM A194 Grade 2H
15	Bracket	Galvanized ST-37
16	Connection	GB/T 699
17	Actuator	-

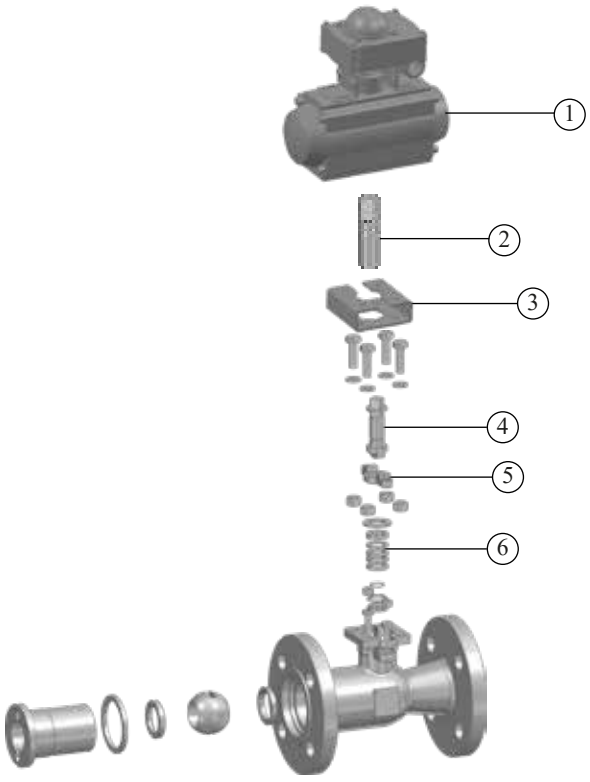
Table 7 : Product Parts List

Common Faults, Inspection and Troubleshooting

	Inspection Items	Solution
Pneumatic valve can not move	**1.** When solenoid valve is normal, coil is burned or not, or whether solenoid valve core is blocked by foreign matter.	Replace solenoid valve and coils and Remove foreign matter
	2. Test the pneumatic actuator seperately with air supply, check whether sealing ring and cylinder is damaged.	Replace the damaged sealing ring and cylinder
	3. Impurities in the valve blocks the valve core.	Remove impurities and replace damaged parts
Slow motion, crawling	**1.** Air supply pressure is not enough.	Increase air supply pressure (0.4-0.7Mpa)
	2. Output torque of pneumatic actuator is too small.	Choose a larger pneumatic actuator model
	3. Valve coil or other valve components are too tight.	Reassemble and readjustments
	4. Air supply pipe is pluged and flow is too small.	Clear the plug and replace the filter
Reply devices without signal	**1.** A power outage or electricity interruption occurs.	Inspect and repair power circuit
	2. Cam position inside the switch box is not accurate.	Adjust the cam to correct position
	3. Micro switches is damaged.	Replace micro switches

Table 8 : Fault Finding

8. Spare Parts



NO.	Name	Material
1	Actuator	-
2	Connection	GB/T 699
3	Bracket	Galvanized ST-37
4	Stem	ASTM A182 F316
5	Packing Gland	ASTM A216 WCB
6	Packing	Flexible graphite

Table 9 : Spare Part list

Figure 13 : Valve Exploded View

9. Technical Assistance

For technical assistance or service requests, please directly contact Vira service center by making a phone call or sending an e-mail to **servis@viraisi.com.**

Return faulty or service items to Vira itself or authorized agency in your area. Ensure all items are suitably packed for transit (preferably in the original cartons).

Please provide the following information with any equipment being returned:

- Your name, company name, address and telephone number, order number and invoice and return delivery address.
- Description and the serial number of equipment.
- Full description of the fault or repair required.
- If the equipment is being returned under warranty, please indicate the date of purchase.

The manufacturer reserves the right to make change without prior notification.

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