



Right-angle Valves DN250 ISO-K to DN1000 ISO- F and ANSI 10" to 35" with electropneumatic drive

Operating instructions 300950715_002_C1

Part numbers

504137V003

504138V003

504139V003

504140V003

504141V003

504142V003

504143V003

504138V103

504140V103

504141V103

504142V103

504143V103



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You must use this product as described in this manual. Read the manual before you install, operate, or maintain the product. For manual enquiries, email documentation@leybold.com.

Contents

1 Safety and compliance.	7
1.1 Definition of Warnings and Cautions.	7
1.2 Trained personnel	7
1.3 Safety symbols.	8
2 Important safety information.	10
2.1 Mechanical hazards.	10
2.2 Electrical hazards.	10
2.3 Hazards caused by materials and substances.	10
3 Description.	11
3.1 Introduction.	11
3.2 Design and function.	11
3.3 Conforming utilisation.	11
3.4 Supplied equipment.	11
4 Technical data.	12
4.1 Right-angle valve with ISO flanges.	12
4.2 Right-angle valve with ANSI flanges.	13
4.3 Dimensions.	14
5 Transportation.	17
6 Installation.	18
6.1 Vacuum connection.	18
6.2 Compressed air connection.	18
6.3 Electrical connections.	19
7 Operation.	21
7.1 Commissioning.	21
7.2 Operation.	21
7.3 Operating temperatures and degassing temperatures.	21
7.4 Converting the valve to the "normally open type".	21
7.5 Manual opening and closing of the valve.	21
8 Maintenance.	23
8.1 Maintenance safety.	23
8.2 Maintenance interval.	23
8.3 Maintenance kits.	23

Contents

- 8.4 Maintenance for right-angle valve. 28
 - 8.4.1 Valve top flange or Valve disc leakage seal kits replacement 28
 - 8.4.2 Valve bellow seal kits replacement. 29
 - 8.4.3 Valve bellow replacement kits. 29
 - 8.4.4 Pilot Valve kits replacement. 30
 - 8.4.5 Position indicators replacement 30
- 8.5 Return the equipment or components for service 31
- 9 Fault finding. 33**
- 10 Disposal. 34**
- 11 Legal declarations. 35**

List of Figures

Figure 1. Right-angle valve with ISO flanges. 14

Figure 2. Right-angle valve with ANSI flanges. 15

Figure 3. Valve control. 19

Figure 4. Exploded view. 24

Figure 5. Position indicators. 31

List of Tables

Table 1: Right-angle valve with ISO flanges.	12
Table 2: Right-angle valve with ANSI flanges.	13
Table 3: Socket screw description.	24
Table 4: Maintenance kits for DN250 ISO-K/F.	25
Table 5: Maintenance kits for DN320 ISO-K/F and 10" ANSI.	25
Table 6: Maintenance kits for DN400 ISO-K/F.	25
Table 7: Maintenance kits for DN500 ISO-K/F and 16" ANSI.	26
Table 8: Maintenance kits for DN630 ISO-K/F and 20" ANSI.	26
Table 9: Maintenance kits for DN800 ISO-K/F and 32" ANSI.	27
Table 10: Maintenance kits for DN1000 ISO-K/F and 35" ANSI.	27
Table 11: Pilot valve replacement kits.	28
Table 12: Position indicator replacement kits.	28

Safety and compliance

1 Safety and compliance

For safe operation from the start, read these instructions carefully before you install or commission the equipment and keep them safe for future use. Read all the safety instructions in this section and the rest of this manual carefully and make sure that you obey these instructions.

The instruction manual is an important safety document that we often deliver digitally. It is your responsibility to keep the instruction manual available and visible while working with the equipment. Please download the digital version of the instruction manual for use on your device or print it if a device will not be available.

1.1 Definition of Warnings and Cautions

Important safety information is highlighted as warning and caution instructions which are defined as follows. Different symbols are used according to the type of hazard.

WARNING:

If you do not obey a warning, there is a risk of injury or death.

CAUTION:

If you do not obey a caution, there is a risk of minor injury, damage to equipment, related equipment or process.

NOTICE:

Information about properties or instructions for an action which, if ignored, will cause damage to the equipment.

We reserve the right to change the design and the stated data. The illustrations are not binding.

1.2 Trained personnel

For the operation of this equipment “trained personnel” are:

- skilled workers with knowledge in the fields of mechanics, electrical engineering, pollution abatement and vacuum technology and
- personnel specially trained for the operation of vacuum pumps

Safety and compliance

1.3 Safety symbols

The safety symbols on the products show the areas where care and attention is necessary.

The safety symbols that we use on the product or in the product documentation have the following meanings:

	Warning/Caution Risk of injury and/or damage to equipment. An appropriate safety instruction must be followed or a potential hazard exists.
	Warning - Corrosive substances Risk of injury or damage to equipment. Identifies the presence of corrosive gases, liquids or materials.
	Warning - Dangerous voltage Risk of injury. Identifies possible sources of hazardous electrical shock.
	Warning - Flammable material Risk of fire. Identifies possible sources of flammable gases, liquids or materials.
	Warning - Hot surfaces Risk of injury. Identifies a surface capable of inflicting burns through contact.
	Warning - Maximum angle of paired slings Risk of damage to equipment. Specifies a maximum angle that must be maintained to ensure safe lifting of equipment.
	Warning - Moving parts present Risk of injury. Identifies moving parts that may cause injury or damage to equipment.
	Warning - Pressurised Risk of injury or damage to equipment. Identifies equipment containing pressurised gases or liquids.
	Warning - Risk of explosion Risk of injury or damage to equipment. Identifies a situation that could result in an explosion.
	Warning - Toxic material Risk of injury or damage to the environment. Identifies a source of toxic gases, liquid or material.

Safety and compliance

	Mandatory - Read the manual Failure to comply with this action may result in injury or damage to equipment.
	Warning - Use protective equipment Risk of injury. Use appropriate Personal Protective Equipment (PPE) when performing the task.

Important safety information

2 Important safety information

2.1 Mechanical hazards



CAUTION: SAFE CONNECTION

Risk of explosion. The vacuum and compressed air connections must only be done by trained personnel or personnel suitably trained by the operator.



CAUTION: MOVING THE VALVE DISC

Risk of injury. During operation, there is the risk that the valve disc may trap and injure parts of the body. Through suitable measures (a mesh guard, for example) it is possible to make sure that the inside section of valve is not accessible.

2.2 Electrical hazards



CAUTION: ELECTRICAL SAFETY

Risk of electric shock. The electrical connections must only be done by a trained electrician as specified, for example, by the regulations EN 50110-1. All local regulations must be followed.

2.3 Hazards caused by materials and substances



CAUTION: HAZARDOUS SUBSTANCES

Risk of injury and damage to equipment. If the valve has previously handled hazardous gases, implement proper precautionary measures before the valve is opened.



CAUTION: SAFE WORKING ENVIRONMENT

Risk of injury. If necessary use gloves, a respirator and/or protective clothing and work under an exhaust hood.

3 Description

3.1 Introduction

The DN250 to DN1000 and ANSI 10" to 35" are right-angle valves with an electropneumatic drive.

The double-acting piston transfers the pneumatic through the piston rod to the valve disc.

The pneumatic drive of the piston is controlled by a 5/2 way pilot valve. Refer to [Figure: Valve control](#).

3.2 Design and function

The bellow sealed valves operate free of hydrocarbons as the piston rod is sealed off completely against the atmosphere by bellow in the direction of the vacuum process. A groove provided at the pneumatic drive equalises the pressure in the bellow. It also acts as a sniffer bore for helium leak testing.

The valve may be easily disassembled by removing the bonnet plate from the body which will provide easy access to the bellow and the poppet.

3.3 Conforming utilisation

The DN250 to DN1000 and ANSI 10" to 35" valves are isolating valves for use in vacuum systems.

The valve seals have been designed with bellow and are rated for pressures $< 1 \times 10^{-7}$ mbar.

If there is a possibility for the valves to be exposed to radioactive radiation, contact us for advice.



WARNING: CORROSIVE MATERIAL

Risk of damage to equipment. All inner sections of the valve which come into contact with the medium flowing through the valve need to be protected against aggressive or corrosive gases and condensate.



WARNING: EXPLOSIVE MATERIAL

Risk of explosion. The maximum permissible operating pressure of 1 atmosphere must not be exceeded. The entire system must be protected against explosions and detonations.

3.4 Supplied equipment

- The complete right-angle valve with pilot valve, including solenoid coil
- All flanges (housing and bypass flanges) are provided with protection caps or EPE cover
- Operating instructions

Technical data

4 Technical data

4.1 Right-angle valve with ISO flanges

Table 1 Right-angle valve with ISO flanges

Parameter	DN250	DN320	DN400	DN500	DN630	DN800	DN1000
Installation orientation	Vertical / pneumatic cylinder at the top						
Conductance (l/s)	2500	4100	6300	10500	16500	29400	46900
Weight (Kg)	40	74	108	164	269	480	783
Drive pneumatic (opening and closing)							
▪ Maximum pressure difference when opening (mbar)	300	50	50	50	50	50	50
▪ Opening time # (s)	≤3	≤5	≤5	≤5	≤5	≤8	≤8
▪ Closing time # (s)	≤3	≤5	≤5	≤5	≤5	≤8	≤8
Service life (actuations)	10 ⁵ cycles						
Helium leak rate (mbar·l/s)	1×10 ⁻⁹						
Pressure range (mbar to atmospheric pressure)	1×10 ⁻⁸	5×10 ⁻⁸					
Maximum operation temperature (°C)	60						
Connection flange **	DN250 ISO-K - K	DN320 ISO-K - F	DN400 ISO-K - F	DN500 ISO-K - F	DN630 ISO-K - F	DN800 ISO-F	DN1000 ISO-F
Bypass flange	DN63 ISO-K	DN63 ISO-K	DN63 ISO-K	DN100 ISO-K	DN160 ISO-K	DN250 ISO-K	DN250 ISO-K
Spare flange*	NW16	NW16	NW25	NW25	NW25	NW25	NW25
	NW40	NW40	NW40	NW40	NW40	NW40	NW40
Materials							
▪ Housing and disc	Stainless steel 1.4301						
▪ Seals	FKM						
▪ Sealing bellow	Stainless steel 1.4404						
Pilot valve							
▪ Nominal voltage (V d.c.)	24						
▪ Nominal power consumption (W)	0.45						
▪ Duty ratio	100%						
End position switch (maximum contact ratings)							
▪ Nominal voltage	5 V d.c. / 240 V a.c.						
▪ Current (mA)	100						
▪ Power consumption (W)	10						
Compressed air supply							
▪ Air connection	1/8" quick connector	1/8" quick connector with 8 mm tube					1/4" quick connector

Technical data

Parameter	DN250	DN320	DN400	DN500	DN630	DN800	DN1000
	with 6 mm tube						with 8 mm tube
▪ Pressure range (bar)	5 - 7						

Under vacuum, differential pressure $\Delta p = 0$ and compressed air = 6 bar

* For gauge or leak detection

** DN320 to DN630 have a clamp flange

4.2 Right-angle valve with ANSI flanges

Table 2 Right-angle valve with ANSI flanges

Parameter	10" ANSI	16" ANSI	20" ANSI	32" ANSI	35" ANSI
Installation orientation	Vertical / pneumatic cylinder at the top				
Conductance (l/s)	3800	8600	10600	29300	34500
Weight (Kg)	76	188	308	500	842
Drive pneumatic (opening and closing)					
▪ Maximum pressure difference when opening (kPa)	5				
▪ Opening time # (s)	≤5	≤5	≤5	≤8	≤8
▪ Closing time # (s)	≤5	≤5	≤5	≤8	≤8
Service life (actuations)	10 ⁵ cycles				
Helium leak rate (mbar·l/s)	1×10 ⁻⁹				
Pressure range	5×10 ⁻⁸ mbar to atmospheric pressure				
Maximum operation temperature (°C)	60				
Connection flange	10" ANSI	16" ANSI	20" ANSI	32" ANSI	35" ANSI
Bypass flange	3" ANSI	4" ANSI	6" ANSI	8" ANSI	8" ANSI
Spare flanges*	NW16	NW25	NW25	NW25	NW25
	NW40	NW40	NW40	NW40	NW40
Materials					
▪ Housing and disc	Stainless steel 1.4301				
▪ Seals	FKM				
▪ Sealing bellow	Stainless steel 1.4404				
Pilot valve					
▪ Nominal voltage (V d.c.)	24				
▪ Nominal power consumption (W)	0.45				
▪ Duty ratio	100%				
End position switch (maximum contact ratings)					
▪ Nominal voltage	5 V d.c. / 240 V a.c.				
▪ Current (mA)	100				
▪ Power consumption (W)	10				
Compressed air supply					

Technical data

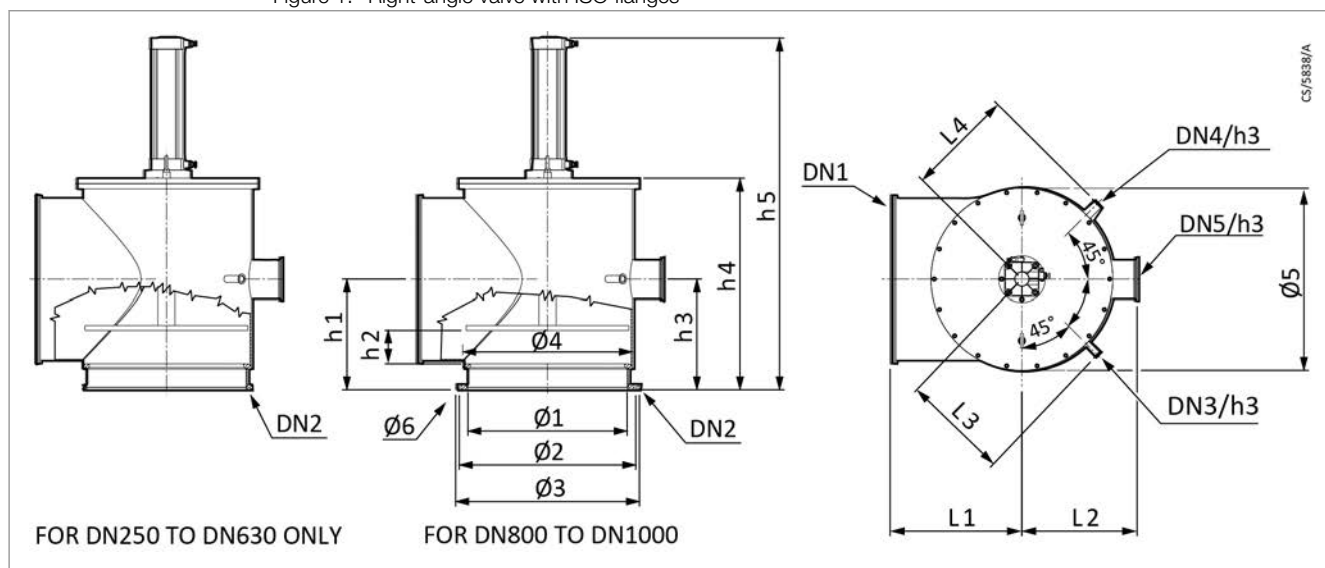
Parameter	10" ANSI	16" ANSI	20" ANSI	32" ANSI	35" ANSI
▪ Air connection	1/8" quick connector with 6 mm tube (DN250) 1/8" quick connector with 8 mm tube (DN320-DN800) 1/4" quick connector with 8 mm tube (DN1000)				
▪ Pressure range (bar)	5 - 7				

Under vacuum, differential pressure $\Delta p = 0$ and compressed air = 6 bar

* For gauge or leak detection

4.3 Dimensions

Figure 1. Right-angle valve with ISO flanges

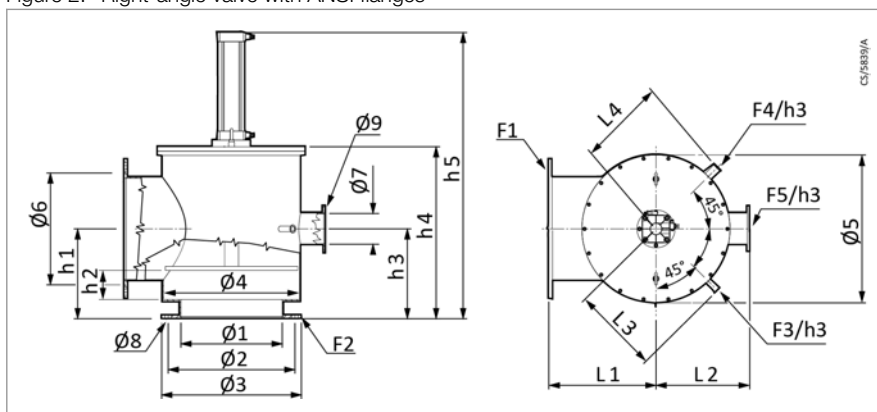


PN	504137V003	504138V003	504139V003	504140V003	504141V003	504142V003	504143V003
DN1	DN250 ISO-K	DN320 ISO-K	DN400 ISO-K	DN500 ISO-K	DN630 ISO-K	DN800 ISO-F	DN1000 ISO-F
DN2	DN250 ISO-K	DN320 ISO-K	DN400 ISO-K	DN500 ISO-K	DN630 ISO-K	DN800 ISO-F	DN1000 ISO-F
DN3	16 KF	16 KF	25 KF	25 KF	25 KF	25 KF	25 KF
DN4	40 KF	40 KF	40 KF	40 KF	40 KF	40 KF	40 KF
DN5	DN63 ISO-K	DN63 ISO-K	DN63 ISO-K	DN100 ISO-K	DN160 ISO-K	DN250 ISO-K	DN250 ISO-K
h1	211	250	330	360	450	560	650
h2	145	190	240	286	330	285	340
h3	211	208	220	330	355	440	542
h4	398	516	624	701	858	1054	1227
h5	629	856	1084	1210.7	1405	1596	1792
Ø1	261.2	318	400	501	651	800	1000
Ø2	-	395	480	580	720	890	1090
Ø3	290	425	510	610	750	920	1120
Ø4	306	400	510	616	700	920	1120
Ø5	310	400	510	616	760	920	1120
Ø6	-	12 x Ø14	16 x Ø14	16 x Ø14	20 x Ø14	24 x Ø14	32 x Ø14
L1	208	279	350	406	537	595	700

Technical data

L2	206	279	325	406	470	533	635
L3	206	258	300	370	436	505	603
L4	206	258	300	370	436	505	603

Figure 2. Right-angle valve with ANSI flanges



PN	504138V103	504140V103	504141V103	504142V103	504143V103
F1	10" ANSI	16" ANSI	20" ANSI	32" ANSI	35" ANSI
F2	10" ANSI	16" ANSI	20" ANSI	32" ANSI	35" ANSI
F3	16 KF	25 KF	25 KF	25 KF	25 KF
F4	40 KF	40 KF	40 KF	40 KF	40 KF
F5	3" ANSI	4" ANSI	6" ANSI	8" ANSI	8" ANSI
h1	250	360	450	560	650
h2	190	286	330	285	340
h3	208	330	355	440	542
h4	516	701	858	1054	1227
h5	856	1210.7	1405	1596	1792
Ø1	310	463	508	816	900
Ø2	362	540	635	921	987
Ø3	407	597	700	965	1060
Ø4	400	616	700	920	1120
Ø5	400	616	760	920	1120
Ø6	317	473	560	826	920
Ø7	87	117.5	154	205	205
Ø8	12 x Ø25	16 x Ø28	20 x Ø32	16 x Ø23	23 x Ø28
Ø9	4 x Ø19	4 x Ø19	8 x Ø19	8 x Ø21	8 x Ø21
L1	279	406	537	595	700
L2	279	406	470	533	635

Technical data

L3	258	370	436	505	603
L4	258	370	436	505	603

5 Transportation

Do the following when you move or store the valve:

- Make sure that the protection caps or top flanges are installed when the valve is moved or stored.
- Lift the valve at the lifting eyes. It can be set down on the lower flange only when the protective caps are in place.
- Use lifting devices with sufficient carrying capacity. Never stand below the lifted valve while it is being moved.
- For prolonged storage seal the valve airtight and insert several desiccant packs.

Installation

6 Installation

6.1 Vacuum connection



CAUTION: SAFE CONNECTION

Risk of explosion. The vacuum and compressed air connections must only be done by trained personnel or personnel suitably trained by the operator.



CAUTION: MOVING THE VALVE DISC

Risk of injury. During operation, there is the risk that the valve disc may trap and injure parts of the body. Through suitable measures (a mesh guard, for example) it is possible to make sure that the inside section of the valve is not accessible.

When you do the vacuum connection, note the following:

- Touching the inner sections of the valve will increase the desorption rate. Wear clean, lint-free gloves and use clean tools.
- Contamination and damage will impair the operation of the vacuum components. All the rules regarding cleanliness, contamination and protection against damage must be observed.
- Remove the protection caps before you install the valve.
- The vacuum connection is provided by a screwed flange connection, a clamped flange connection and a small flange connection.
- The installation orientation is vertical with the pneumatic cylinder at the top.
- The sealing surfaces and the centring rings can be cleaned with a solvent (acetone / alcohol). Aggressive cleaning agents must not be used.

6.2 Compressed air connection

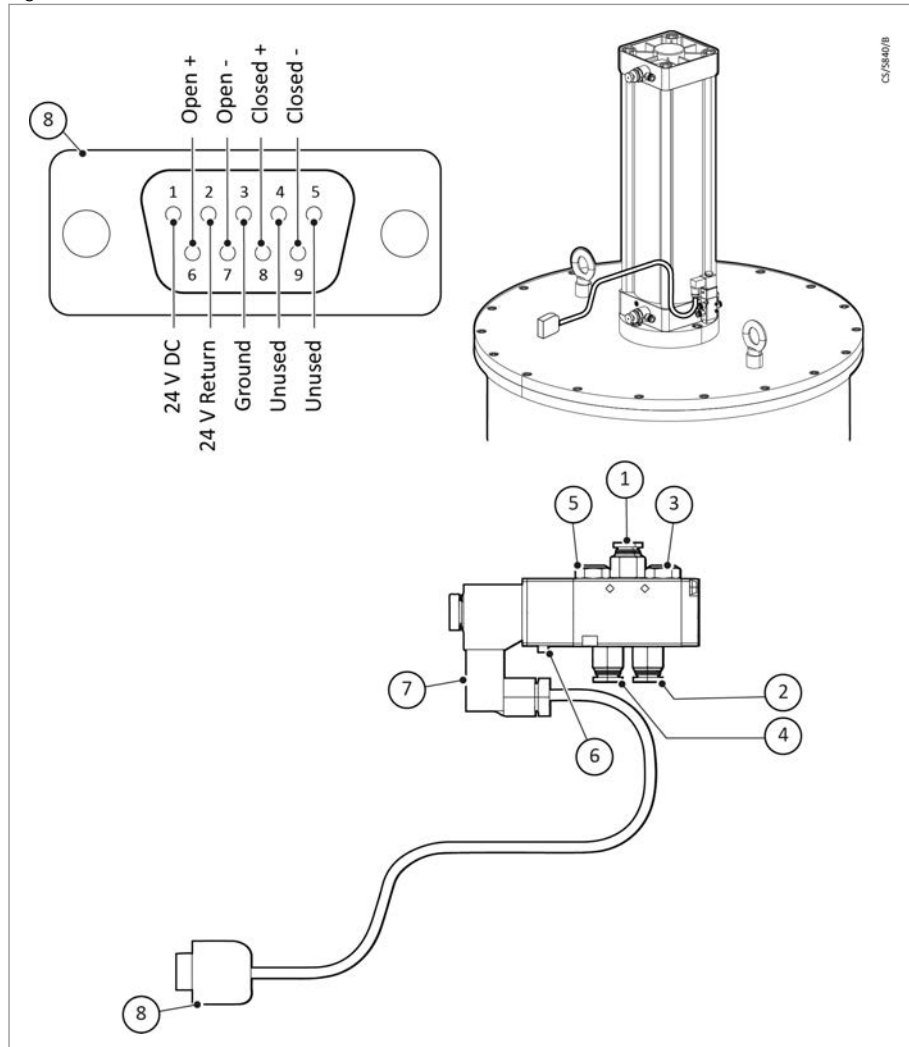
When you do the compressed air connection, note the following:

- The maximum permissible operating pressure must not be exceeded.
- The compressed air hose must be rated for at least 10 bar and needs to be fitted professionally.
- We recommend not to use oil containing compressed air. Oil will get deposited in the pilot valve and air cylinder. In the case of oil containing compressed air, the exhaust air (compressed air discharge) needs to be led away and disposed of in line with the regulations for such media.
- The operating pressure range for the compressed air is between 5 and 7 bar.
- The compressed air connection is 1/8 quick connector.
- The compressed air should be dry and must not contain any particles greater than 50 µm.
- The compressed air connections from the pilot valve to the right-angle valve has already been fitted.
- Refer to [Figure: Valve control](#). Attach the compressed air to the port (1) at the pilot valve. When you supply compressed air to the connection (4) then the right-angle valve is opened. When you supply compressed air to the connection (2), then the right-angle is closed.

Installation

- The compressed air hoses can be pressurised and must be protected against any kind of mechanical damage.
- If required, the leak tightness of the fitting can be tested with soap solution (pressure test).

Figure 3. Valve control



- | | |
|--|---|
| 1. Connection for compressed air (customer side) | 2. Compressed air for pneumatic cylinder |
| 3. Silencer | 4. Compressed air for pneumatic cylinder |
| 5. Silencer | 6. Manual actuator for pilot valve |
| 7. Plug for pilot valve | 8. 9-pin D sub connector for electrical connections |

6.3 Electrical connections

When you do the compressed air connection, note the following:

- During all connection work make sure that the mains lines have been reliably disconnected.
- The electrical connections must only be provided by a trained electrician as specified by EN 50110-1. Observe all local regulations.
- An incorrect nominal voltage can destroy the control valve.

Installation

Connecting the Solenoid coil

- The connection is provided with the SUB-D plug. Refer to [Figure: Valve control](#).
- Tighten the SUB-D connecting cables to the plug and then connect according to the wiring diagram.

Connecting the End position switches

- The electrical switching signals from the end position switches can be tapped for further processing at the SUB-D plug. Refer to [Figure: Valve control](#).
- The contacts are floating.
- The maximum contact ratings are as follows:
 - Voltage: 5 V a.c. / 240 V d.c.
 - Current: 100 mA
 - Power: 10 W

After the valve is installed, the end position switches need to indicate in the open respectively closed position of the valves and the corresponding signals. The indicating light (LED on) is active when the cylinder is at the respective end position. If required, the end position switches will have to be readjusted by moving them to the end positions until the proper signal is obtained.

The sensor must always be located close to the cylinder.

7 Operation

7.1 Commissioning

Do the steps that follow to commission the valve.

- Check whether the supply voltage which is available matches that which was provided on the valve.
- Make sure that the supply voltage is present at the valve.
- Check the voltage with the solenoid label.
- Open the compressed air supply.
- Open the valve through the emergency override on the pilot valve or through a central system controller.

7.2 Operation



CAUTION: CRUSH INJURY

Risk of injury. During operation of the valve, when the valve is operated at the end of a line (open) make sure that no parts of the human body can enter into the valve.

Upon delivery, the valves are in the closed state, that is, the valve disc is resting against the valve seat.

In case the supply voltage fails, the valve closes automatically and is designated as being of the "normally closed" type. The valve needs compressed air to close.

7.3 Operating temperatures and degassing temperatures

The temperature range for the complete valve is -5 °C to +40 °C.

The valve without the pilot valve and the solenoid coil can be heated up to a temperature of 60 °C.

The temperature for the compressed air must be within -5 °C to +40 °C.

7.4 Converting the valve to the "normally open type"

The normal version of the right-angle valve will close automatically when the operating voltage for the compressed air supply fails.

There is a possibility of converting the valve to the "normally open" type.

To convert the valve, do the steps that follow:

1. Switch off the mains voltage and the compressed air supply.
2. Protect the mains voltage and compressed air supply against being switched on again.
3. Interchange the two compressed air hoses (2 and 4) which supply the piston at the pilot valve. Refer to [Figure: Valve control](#).
4. Leak test using soap solution after you do any changes to the hose plumbing.

7.5 Manual opening and closing of the valve

The pilot valve is equipped with a knob for the manual auxiliary operation of the valve. Use a screwdriver to manually actuate the valve, when the compressed air is present at the valve.

Operation

There are two switch positions:

- Position 0 = Normal position, in this position the valve is closed (for solenoid operation).
- Position 1 = the valve is open.

8 Maintenance

8.1 Maintenance safety

CAUTION: MAINTENANCE SAFETY

Risk of loss of warranty. Make sure that you use only genuine parts supplied by us for all maintenance activities. Use of any other part can lead to loss of warranty.



All work must be done by suitably trained personnel. Maintenance or repairs carried out incorrectly will affect the life and performance of the pump and may cause problems when filing warranty claims.

Make sure not to reuse the used seals. Always use the new seals after maintenance.

Make sure not to open the air cylinder. This must be done by suitably trained personnel.

8.2 Maintenance interval

The valves are maintenance-free within the MTBF time. All moving parts have been lubricated with special grease. Each time the drive has been disassembled, you must re-lubricate the valve.

When the product reaches the first maintenance period (the number of work cycles reach 100000, or the calendar life reaches 10 years), the maintenance kits must be replaced.

If the product fails to reach the first maintenance period, the corresponding parts in kits must be replaced.

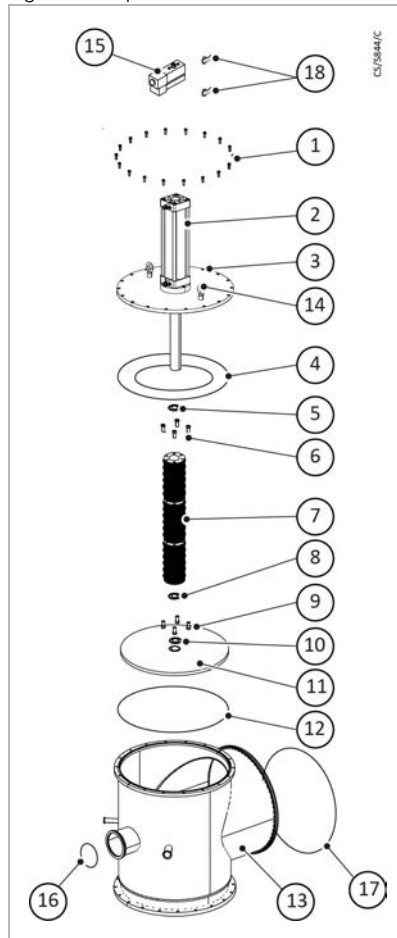
8.3 Maintenance kits

The following maintenance kits are provided:

1. Valve top flange or valve disc seal kits
2. Valve bellow seal kits
3. Valve bellow replacement kits
4. Flange seal kits (only for ANSI version)
5. Pilot valve kits

Maintenance

Figure 4. Exploded view



- | | |
|------------------------------------|------------------------------------|
| 1. Socket screw | 2. Air cylinder |
| 3. Valve top flange | 4. O-ring |
| 5. O-ring | 6. Socket screw |
| 7. Bellow | 8. Retainer ring |
| 9. Socket screw | 10. O-ring |
| 11. Valve disc | 12. O-ring |
| 13. Valve housing | 14. Lifting ring |
| 15. Pilot valve | 16. O-ring (only for ANSI version) |
| 17. O-ring (only for ANSI version) | 18. Position indicator |

Table 3 Socket screw description

	Position 1	Position 6	Position 9
DN250	12 x M8 x 12	6 x M6 x 16	6 x M6 x 16
DN320 and 10"	12 x M8 x 15	6 x M5 x 15	6 x M5 x 10
DN400	16 x M10 x 20	6 x M6 x 16	6 x M6 x 16
DN500 and 16"	16 x M10 x 20	6 x M6 x 16	6 x M6 x 16
DN630 and 20"	20 x M10 x 20	6 x M6 x 16	6 x M6 x 16
DN800 and 32"	24 x M12 x 25	6 x M8 x 20	6 x M8 x 20
DN1000 and 35"	24 x M10 x 25	6 x M8 x 20	6 x M8 x 20

Maintenance

Table 4 Maintenance kits for DN250 ISO-K/F

Maintenance Kit	Qty.	Description	Position
GK3002614120		Top flange/disc seal kit, Angle valve 250	
	1	O-ring 265×3.55	4
	1	O-ring 250×5.3	12
GK3002614121		Bellow seal kit, Angle valve 250	
	2	O-ring 48.7×3.55	5,10
	1	O-ring 265×3.55	4
	1	O-ring 250×5.3	12
GK3002614122		Bellow replacement kit, Angle valve 250	
	2	O-ring 48.7×3.55	5,10
	1	O-ring 265×3.55	4
	1	O-ring 250×5.3	12
	1	Valve bellow DN250	7

Table 5 Maintenance kits for DN320 ISO-K/F and 10" ANSI

Maintenance Kit	Qty.	Description	Position
GK3002614123		Top flange/disc seal kit, Angle valve 320 and 10"	
	1	O-ring 350×5.3	4
	1	O-ring 325×7	12
GK3002614124		Bellow seal kit, Angle valve 320 and 10"	
	1	O-ring 61.5×3.55	5
	1	O-ring 47.5×3.55	10
	1	O-ring 350×5.3	4
	1	O-ring 325×7	12
GK3002614125		Bellow replacement kit, Angle valve 320 and 10"	
	1	O-ring 61.5×3.55	5
	1	O-ring 47.5×3.55	10
	1	O-ring 350×5.3	4
	1	O-ring 325×7	12
	1	Valve bellow DN320 / 10"	7
Additional flange seal kit for 10" ANSI			
GK3002614141		Flange seal kit, Angle valve 10"	
	1	O-ring 78×3	16
	1	O-ring 315×5	17

Table 6 Maintenance kits for DN400 ISO-K/F

Maintenance Kit	Qty.	Description	Position
GK3002614126		Top flange/disc seal kit, Angle valve 400	
	1	O-ring 437×7	4
	1	O-ring 412×7	12

Maintenance

Maintenance Kit	Qty.	Description	Position
GK3002614127		Bellow seal kit, Angle valve 400	
	2	O-ring 47.5×3.55	5,10
	1	O-ring 437×7	4
	1	O-ring 412×7	12
GK3002614128		Bellow replacement kit, Angle valve 400	
	2	O-ring 47.5×3.55	5,10
	1	O-ring 437×7	4
	1	O-ring 412×7	12
	1	Valve bellow DN400	7

Table 7 Maintenance kits for DN500 ISO-K/F and 16" ANSI

Maintenance Kit	Qty.	Description	Position
GK3002614129		Top flange/disc seal kit, Angle valve 500 and 16"	
	1	O-ring 545×7	4
	1	O-ring 508×7	12
GK3002614130		Bellow seal kit, Angle valve 500 and 16"	
	2	O-ring 47.5×3.55	5,10
	1	O-ring 545×7	4
	1	O-ring 508×7	12
GK3002614131		Bellow replacement kit, Angle valve 500 and 16"	
	2	O-ring 47.5×3.55	5,10
	1	O-ring 545×7	4
	1	O-ring 508×7	12
	1	Valve bellow DN500 / 16"	7
Additional flange seal kit for 16" ANSI			
GK3002614142		Flange seal kit, Angle valve 16"	
	1	O-ring 102×3	16
	1	O-ring 475×8	17

Table 8 Maintenance kits for DN630 ISO-K/F and 20" ANSI

Maintenance Kit	Qty.	Description	Position
GK3002614132		Top flange/disc seal kit, Angle valve 630 and 20"	
	1	O-ring 695×7	4
	1	O-ring 633.48×6.99	12
GK3002614133		Bellow seal kit, Angle valve 630 and 20"	
	2	O-ring 47.5×3.55	5,10
	1	O-ring 695×7	4
	1	O-ring 633.48×6.99	12
GK3002614134		Bellow replacement kit, Angle valve 630 and 20"	
	2	O-ring 47.5×3.55	5,10
	1	O-ring 695×7	4
	1	O-ring 633.48×6.99	12
	1	Valve bellow DN630 / 20"	7

Maintenance

Maintenance Kit	Qty.	Description	Position
Additional flange seal kit for 20" ANSI			
GK3002614143		Flange seal kit, Angle valve 20"	
	1	O-ring 150x3	16
	1	O-ring 820x8	17

Table 9 Maintenance kits for DN800 ISO-K/F and 32" ANSI

Maintenance Kit	Qty.	Description	Position
GK3002614135		Top flange/disc seal kit, Angle valve 800 and 32"	
	1	O-ring 843x7	4
	1	O-ring 815x7	12
GK3002614136		Bellow seal kit, Angle valve 800 and 32"	
	2	O-ring 66.27x3.53	5,10
	1	O-ring 843x7	4
	1	O-ring 815x7	12
GK3002614137		Bellow replacement kit, Angle valve 800 and 32"	
	2	O-ring 66.27x3.53	5,10
	1	O-ring 843x7	4
	1	O-ring 815x7	12
	1	Valve bellow DN800 / 32"	7
Additional flange seal kit for 32" ANSI			
GK3002614144		Flange seal kit, Angle valve 32"	
	1	O-ring 200x3	16
	1	O-ring 315x5	17

Table 10 Maintenance kits for DN1000 ISO-K/F and 35" ANSI

Maintenance Kit	Qty.	Description	Position
GK3002614138		Top flange/disc seal kit, Angle valve 1000 and 35"	
	1	O-ring 1050x7	4
	1	O-ring 1000x10	12
GK3002614139		Bellow seal kit, Angle valve 1000 and 35"	
	1	O-ring 82.14x3.53	5
	1	O-ring 53.57x3.53	10
	1	O-ring 1050x7	4
	1	O-ring 1000x10	12
GK3002614140		Bellow replacement kit, Angle valve 1000 and 35"	
	1	O-ring 82.14x3.53	5
	1	O-ring 53.57x3.53	10
	1	O-ring 1050x7	4
	1	O-ring 1000x10	12
	1	Valve bellow DN1000 / 35"	7
Additional flange seal kit for 35" ANSI			

Maintenance

Maintenance Kit	Qty.	Description	Position
GK3002614145		Flange seal kit, Angle valve 35"	
	1	O-ring 200x3	16
	1	O-ring 910x8	17

Table 11 Pilot valve replacement kits

Maintenance kit	Qty.	Description	Position
G3002614146	1	Pilot valve DN250	15
G3002614167	1	Pilot valve DN320 - 800 / 10"-32"	15
G3002614147	1	Pilot valve DN1000 / 35"	15

Table 12 Position indicator replacement kits

Maintenance Kit	Qty.	Description	Position
GK3002614148	1	Position indicator DN250	18
GK3002614149	1	Position indicator DN320-1000 / 10"-35"	18

8.4 Maintenance for right-angle valve



CAUTION: UNSAFE ACTIVITY

Risk of injury or damage to equipment. Follow the safety information explained in this manual. Disconnect the compressed air connection and all electric cables before you open the valve. Remove the screws holding the bonnet plate to the bonnet flange.



CAUTION: HEAVY OBJECT

Risk of damage to equipment. Use a suitable lifting facility and the provided crane eyes (for size $\geq$ DN320 or DN10") to lift the valve cover with the air cylinder and the complete inner section.



CAUTION: TORSION TO VALVE DISC

Risk of damage to bellow. Make sure that the valve disc is not subjected to any torsion during assembly and disassembly. All sealing surfaces, the bellow and the piston rod must be protected against damage.



CAUTION: CLEANING THE VALVE

Risk of damage to equipment. Use only commercially available cleaning agents to clean the inside chamber. Mechanical cleaning of the bellow must be avoided. Replacement of sealing rings in the compressed air cylinder must be done by a suitably trained personnel.

8.4.1 Valve top flange or Valve disc leakage seal kits replacement

Accessories required to maintain valve top flange or valve disc leakage:

- Top flange or disc seal kit, angle valve
- Allen key tool
- High vacuum silicone grease

To maintain valve top flange or valve disc leakage: Refer to [Figure: Exploded view](#)

1. Use the Allen key to remove the socket screw (1).
2. Use the lifting device to pull the valve top flange (the cylinder and the valve top flange are connected as a whole) from the valve housing together with the valve disc through the lifting ring (14).



Note:

For DN250 there is no lifting ring and no need for a lifting device.

3. Replace the O-ring (1) on the valve top flange and the O-ring (12) on the valve disc.
4. Grease the outside of the O-ring (12) of the valve disc.
5. Lift the valve top flange and put the valve disc back into the valve housing.
6. Use the Allen key to tighten the socket screws (1).

8.4.2 Valve bellow seal kits replacement

Accessories required to maintain valve bellow leakage:

- Bellow seal kit, angle valve
- Allen key
- High vacuum silicone grease

To fix the valve bellow leakage:

1. Use the Allen key to remove the socket screw (1).
2. Use the lifting device to pull the valve top flange (the cylinder and the valve top flange are connected as a whole) from the valve housing together with the valve disc through the lifting ring (14).



Note:

For DN250 there is no lifting ring and no need for a lifting device.

3. Check the connection of the valve bellow.
 - If there is air leakage at the connection of the upper end of the valve bellow (7), use the Allen key to remove the socket screw (6) at the upper valve core connection and directly replace the upper O-ring (5).
 - If the air leakage occurs at the lower end, use the Allen key to remove the socket screw (9) at the connection and then the lower end O-ring (10) can be replaced directly.
4. After the O-ring (5 and 10) at the valve bellow is replaced, use the Allen key to tighten the socket screw (6 and 9).
5. Replace the O-ring (4) on the valve top flange and the O-ring (12) on the valve disc.
6. Grease the outside of the O-ring (12) of the valve disc.
7. Lift the valve top flange and put the valve disc back into the valve housing.
8. Use the Allen key to tighten the socket screw (1).

8.4.3 Valve bellow replacement kits

Accessories required to maintain valve bellow:

- Bellow replacement kit, angle valve

Maintenance

- Allen key
- High vacuum silicone grease

To fix the valve bellow leakage:

1. Use the Allen key to remove the socket screw (1).
2. Use the lifting device to pull the valve top flange (the cylinder and the valve top flange are connected as a whole) from the valve housing together with the valve disc through the lifting ring (14).

 Note:

For DN250 there is no lifting ring and no need for a lifting device.

3. Remove the socket screw (6 and 9) at the upper and lower ends of the valve bellow joint with the Allen key.
4. Remove the retainer ring with retaining ring pliers and replace the whole valve bellow, then re-assemble the retainer ring (8).
5. Replace O-rings (5 and 10) on both ends of the valve bellow then use the Allen key to tighten the socket screw (6 and 9).
6. Replace the O-ring (4) on the valve top flange and the O-ring (12) on the valve disc.
7. Grease the outside of the O-ring of the valve disc.
8. Lift the valve top flange and put the valve disc back into the valve housing.
9. Use the Allen key to tighten the socket screw (1).

8.4.4 Pilot Valve kits replacement

The pilot valves are maintenance-free.

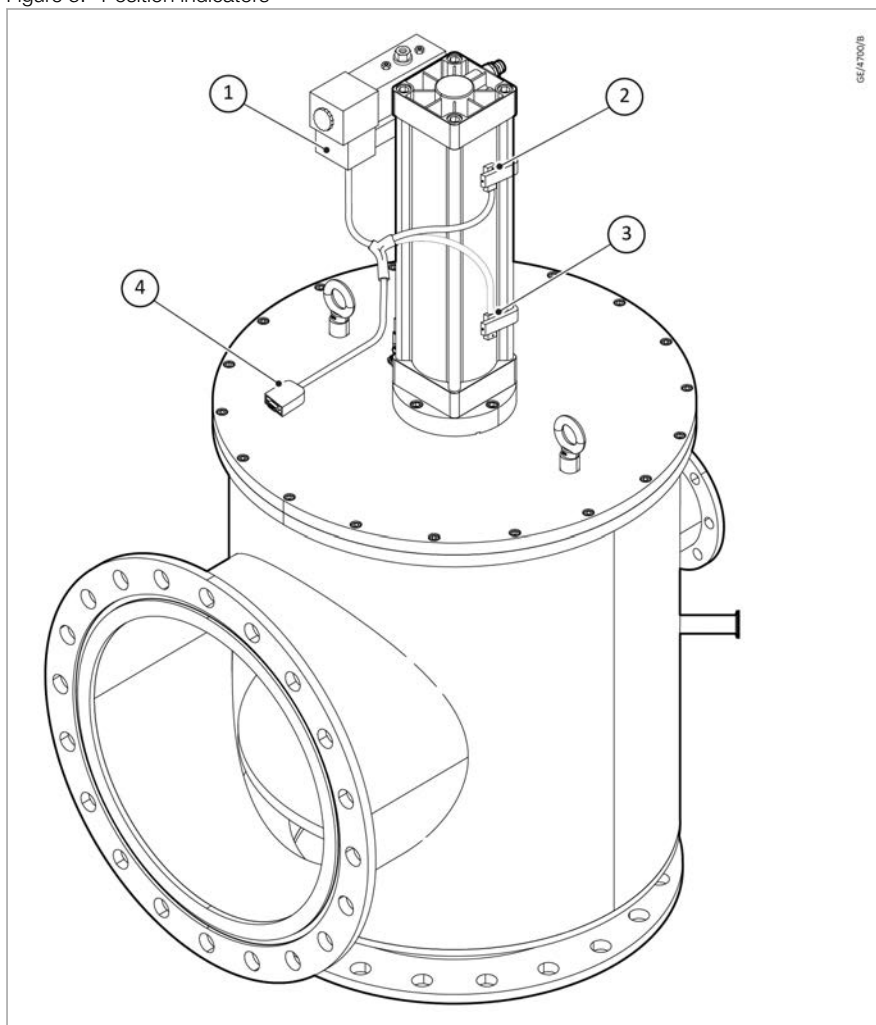
During the regular maintenance work, seating of the connection plug must be checked.

8.4.5 Position indicators replacement

To replace the position indicators, refer to [Figure: Position indicators](#) and do the steps that follows:

1. Remove the position indicators and pilot valve SUB-D9 cable (4) from power supply.
2. Remove the position indicators (2,3) and take off from the air cylinder.
3. Loosen the pilot valve cable (1) from the pilot valve and remove the wires.
4. Tighten the new position indicators to the air cylinder.
5. Tighten the pilot valve cable to pilot valve.
6. Connect the SUB-D9 cable to power supply.
7. Switch on the compressed air supply and move the upper indicator (2) to find the valve disc upper location. The light on the position indicator will lighten when the valve disc is detected.
8. Tighten the screw on the upper position indicator.
9. Switch off the compressed air supply and move the lower position indicator (3) to find the valve disc lower location. The light on the position indicator will lighten when the valve disc is detected.
10. Tighten the screw on the lower position indicator.

Figure 5. Position indicators



- | | |
|-----------------------|-----------------------|
| 1. Pilot valve | 2. Position indicator |
| 3. Position indicator | 4. Sub-D9 cable |

8.5 Return the equipment or components for service

Before you send your equipment to us for service or for any other reason, you must complete a Declaration of Contamination Form. The form tells us if any substances found in the equipment are hazardous, which is important for the safety of our employees and all other people involved in the service of your equipment. The hazard information also lets us select the correct procedures to service your equipment.

If you are returning equipment note the following:

- If the equipment is configured to suit the application, make a record of the configuration before returning it. All replacement equipment will be supplied with default factory settings.
- Do not return equipment with accessories fitted. Remove all accessories and retain them for future use.
- The instruction in the returns procedure to drain all fluids does not apply to the lubricant in pump oil reservoirs.

Download the latest documents from leybold.com/en/downloads/download-documents/declaration-of-contamination/, follow the

Maintenance

procedure in HS1, fill in the electronic HS2 form, print it, sign it, and return the signed copy to us.



NOTICE:

If we do not receive a completed form, your equipment cannot be serviced.

9 Fault finding

Fault	The valve does not work after first power on
Cause	The voltage does not match the voltage requirement
Remedy	Change the power supply voltage
Fault	The pilot valve does not work
Cause	Gas supply pressure is not between 0.4 - 0.6 MPa or the pilot valve is faulty
Remedy	Check the gas supply pressure or replace the pilot valve
Fault	The valve does not work when power on and charged with compressed air
Cause	The pressure difference between inlet port and outlet port is over limit
Remedy	Adjust the pressure difference according to Technical data on page 12
Fault	The valve is functional but there is no signal from the position indicators
Cause	Indicators position is offset or indicators are faulty
Remedy	Adjust the indicator location or replace the indicators. Refer to Position indicators replacement on page 30
Fault	Air leakage from connections of pilot valve or air cylinder
Cause	Pilot valve connectors are broken or air cylinder is faulty
Remedy	Replace the connectors or valve
Fault	Gas leak from inlet port to outlet port when valve is switch off
Cause	The valve disc O-ring is faulty or the valve is installed in wrong direction
Remedy	Check the sealing surface and replace the defective O-ring if required. Refer to Valve top flange or Valve disc leakage seal kits replacement on page 28 Install the valve in vertical direction. Refer to Technical data on page 12
Fault	Poor vacuum when the valve disc is open but vacuum becomes better after the valve disc is closed
Cause	Leakage at bellow sealing O-rings or the bellow is broken
Remedy	Replace the bellow sealing O-rings. Refer to Valve bellow seal kits replacement on page 29 Replace the bellow. Refer to Valve bellow replacement kits on page 29

10 Disposal



WARNING: CONTAMINATION HAZARD

Risk of toxic exposure. Contaminated parts can be detrimental to health and the environment. Before beginning with any work, first find out whether any parts are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.

The equipment may have been contaminated by the process or by environmental influences. In this case, the equipment must be decontaminated in accordance with the relevant regulations. We offer this service at fixed prices. Further details are available on request.

Separate clean components according to their materials, and dispose of these accordingly. We offer this service. Further details are available on request.

When sending any equipment to us, observe the regulations given in [Return the equipment or components for service](#) on page 31.

EU Declaration of Conformity



Leybold GmbH
Bonner Strasse 498
D-50968 Köln
Germany

Documentation Officer
T: +49(0) 221 347 0
documentation@leybold.com

The product specified and listed below

Product designation: Right angle valve with pneumatic drive
Type designation: BAV DN250 ISO-K, BAV DN320 ISO-K/F, BAV DN400 ISO-K/F, BAV DN500 ISO-K/F
BAV DN630 ISO-K/F, BAV DN10" ANSI, BAV DN16" ANSI, BAV DN20" ANSI,
Part number: 504137V003, 504138V003, 504139V003, 504140V003, 504141V003, 504138V103,
504140V103, 504141V103

Is in conformity with the relevant requirements of European CE legislation:

2006/42/EC	Machinery directive <i>Note: The safety objectives of the Low Voltage Directive 2014/35/EU were complied with in accordance with Annex 1 No. 1.5.1 of this directive.</i>
2014/30/EU	Electromagnetic compatibility (EMC) directive
2011/65/EU	Restriction of certain hazardous substances (RoHS) directive as amended by Delegated Directive (EU) 2015/863

Based on the relevant requirements of harmonised standards:

EN ISO 12100:2010	Safety of machinery. General principles for design. Risk assessment and risk reduction
EN 60204-1: 2018	Safety of machinery. Electrical equipment of machines. General requirements
EN 61000-6-2:2005	Electromagnetic Compatibility (EMC) - Part 6-2: Generic Industrial Immunity Standard
EN 61000-6-4:2007	Electromagnetic Compatibility (EMC) - Part 6-4: Generic Industrial Emission Standard

You must retain the signed legal declaration for future reference
This declaration becomes invalid if modifications are made to the product without prior agreement.

Cologne, August 5th, 2021

Tianjin, August 5th, 2021



Andries De Bock
VP Engineering
Industrial Vacuum Division



Raymond Liang
GM of Leybold Tianjin
Industrial Vacuum Division

Declaration of Conformity

Leybold GmbH
Bonner Strasse 498
D-50968 Koln
Germany

Documentation Officer
Innovation Drive
Burgess Hill
West Sussex
RH15 9TW
documentation@leybold.com

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Product designation: Right angle valve with pneumatic drive
Type designation: BAV DN250 ISO-K, BAV DN320 ISO-K/F, BAV DN400 ISO-K/F, BAV DN500 ISO-K/F, BAV DN630 ISO-K/F, BAV DN10" ANSI, BAV DN16" ANSI, BAV DN20" ANSI,
Part number: 504137V003, 504138V003, 504139V003, 504140V003, 504141V003, 504138V103, 504140V103, 504141V103

The object of the declaration described above is in conformity with relevant statutory requirements:

Supply of Machinery (Safety) Regulations 2008

The objectives of the Electrical Equipment (Safety) Regulations 2016 are governed by Annex 1 1.5.1 of this regulation.

Electromagnetic Compatibility Regulations 2016

Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

Relevant designated standards or technical specifications are as follows:

EN ISO 12100:2010	Safety of machinery. General principles for design. Risk assessment and risk reduction
EN 60204-1: 2018	Safety of machinery. Electrical equipment of machines. General requirements
EN 61000-6-2:2005	Electromagnetic Compatibility (EMC) - Part 6-2: Generic Industrial Immunity Standard
EN 61000-6-4:2007	Electromagnetic Compatibility (EMC) - Part 6-4: Generic Industrial Emission Standard

You must retain the signed legal declaration for future reference

This declaration becomes invalid if modifications are made to the product without prior agreement.

Signed for and on behalf of Leybold GmbH

Cologne, August 5th, 2021

Tianjin, August 5th, 2021



Andries De Bock
VP Engineering
Industrial Vacuum Division



Raymond Liang
GM of Leybold Tianjin
Industrial Vacuum Division

ADDITIONAL LEGISLATION AND COMPLIANCE INFORMATION

EMC (EU, UK):

Caution: This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

RoHS (EU, UK): Material Exemption Information

This product is compliant with the following Exemptions

Annex III:

- 6(c) Copper alloy containing up to 4% **lead** by weight

REACH (EU, UK)

This product is a complex article which is not designed for intentional substance release. To the best of our knowledge the materials used comply with the requirements of REACH. The product manual provides information and instruction to ensure the safe storage, use, maintenance and disposal of the product including any substance based requirements.

Article 33.1 Declaration (EU, UK)

This product contains Candidate List Substances of Very High Concern above 0.1%ww by article as clarified under the 2015 European Court of Justice ruling in case C-106/14.

- Lead (Pb)
This substance is present in certain brass components.

WASTE FRAMEWORK DIRECTIVE (EU)

SCIP Number: b645d041-832f-485c-8d44-d4ee3e2a23b0

Additional Applicable Requirements

The product is in scope for and complies with the requirements of the following:

2012/19/EU

Directive on waste electrical and electronic equipment (WEEE)

材料成分声明

China Material Content Declaration

部件名称 Part name 	有害物质 Hazardous Substances					
	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr VI)	多溴联苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
铜接头 Brass connectors	X	O	O	O	O	O
消音器 Brass silencer	X	O	O	O	O	O
电子元件和控件 Electronics and Controls (brass components)	X	O	O	O	O	O
O: 表示该有害物质在该部件的所有均质材料中的含量低于 GB/T 26572 标准规定的限量要求。 O: Indicates that the hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572. X: 表示该有害物质在该部件的至少一种均质材料中的含量超出 GB/T26572 标准规定的限量要求。 X: Indicates that the hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T26572.						



Pioneering products. Passionately applied.

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