

Alfa Laval LKAP

Single seat valves



Lit. Code

200007925-1-EN-GB

Instruction Manual

Published by
Alfa Laval Kolding A/S
Albuen 31
DK-6000 Kolding, Denmark
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The original instructions are in English

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1 Declarations of Conformity

1.1 EU Declaration of Conformity

The designated company

Alfa Laval Kolding A/S, Albuen 31, DK-6000 Kolding, Denmark, +45 79 32 22 00

Company name, address and phone number

Hereby declare that

Valve

Designation

LKAP

Type

is in conformity with the following directives with amendments:

- Machinery Directive 2006/42/EC
- Pressure Equipment Directive (PED) 2014/68/EU *category 1 and subjected to assessment procedure Module A.*

The person authorised to compile the technical file is the signer of this document.

Vice President BU Hygienic Fluid Handling

Head of Product Management

Title

Mikkel Nordkvist

Name

Kolding, Denmark

Place

2025-05-01

Date (YYYY-MM-DD)



Signature

DoC Revison_ 01_052025 / This Declaration of Conformity replaces Declaration of Conformity dated 2022-10-01



1.2 UK Declaration of Conformity

The designated company

Alfa Laval Kolding A/S, Albuen 31, DK-6000 Kolding, Denmark, +45 79 32 22 00

Company name, address and phone number

Hereby declare that

Valve

Designation

LKAP

Type

is in conformity with the following directives with amendments:

- The Supply of Machinery (Safety) Regulations 2008
- The Pressure Equipment (Safety) Regulations 2016 *category 1 and subjected to assessment procedure Module A.*

Signed on behalf of: Alfa Laval Kolding A/S.

Vice President BU Hygienic Fluid Handling
Head of Product Management

Title

Mikkel Nordkvist

Name

Kolding, Denmark

Place

2025-05-01

Date (YYYY-MM-DD)



Signature

DoC Revison_ 02_052025



2 Safety

Read this first



This Instruction Manual is designed for operators and service engineers working with the supplied Alfa Laval product.

Operators must read and understand the **Safety, Installation and Operating** instructions of the supplied Alfa Laval product before carrying out any work or before you put the supplied Alfa Laval product into service!

Not following the instructions can result in serious accidents.

This documentation describes the authorized way to use the supplied Alfa Laval product. Alfa Laval will take no responsibility for injury or damage if the equipment is used in any other way.

This Instruction Manual is designed to provide the user with the information to perform tasks safely for all phases in the lifetime of the supplied Alfa Laval product.

The operator shall always read the chapter **Safety** first. Hereafter the operator can skip to the relevant section for the task to be carried out or for the information needed.

Always read the chapter **Technical Data** thoroughly.

This is the complete Instruction Manual for the supplied Alfa Laval product.


NOTE

The illustrations and specifications in this Instruction Manual were effective at the date of printing. However, as continuous improvements are our policy, we reserve the right to alter or modify the Instruction Manual without prior notice or any obligation.







The English version of the Instruction Manual is the original manual. Alfa Laval cannot be held responsible for incorrect translations. In case of doubt, the English version applies.

2.1 Safety Signs

Mandatory Action Signs

	General mandatory action sign.
	Refer to instruction manual.
	Use eye protection - safety glasses.
	Use protective hand wear - safety gloves.
	Wear protective equipment - safety helmet.
	Use ear protection in noisy environments - noise protector.
	Wear protective equipment - safety shoes.

Warning Signs

	General warning.
	Transportation with forklift truck or other industrial vehicles if heavy.
	Hot surface and burning danger.
	Cutting danger.
	Corrosive substance.
	Crushing of hands.

2.2 Safety Precautions

All warnings in the Instruction Manual are summarised on these pages. Pay special attention to the instructions below so that severe personal injury and/or damage to the supplied Alfa Laval product is avoided.






General

	<p>To prevent unexpected start and contact with electrical live and moving parts.</p> <p>Always disconnect the power supply and air supply safely:</p> <ul style="list-style-type: none"> • The power supply disconnecting device and air supply must be disconnected (in off position) and locked.
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Transportation and Lifting

 	<p>Never lift or elevate in any way other than described in this manual.</p> <p>Always use the original packaging or similar during transportation.</p> <p>Always ensure that personnel must have experience with lifting operations.</p> <p>Always ensure that all connections are disconnected before attempting to remove the valve from the installation.</p> <p>Always ensure that no leakage of lubricants can occur.</p> <p>Always drain liquid out of the valves before transportation.</p> <p>Always ensure sufficient fixing of the valve during transportation - if specially designed packaging material is available, it must be used.</p> <p>Always ensure that compressed air is released.</p>
 	<p>Always use designated lifting points if defined. Ensure that the lifting equipment is suitable for the supplied Alfa Laval product.</p> <p>Always ensure that the unit is securely fixed during transportation.</p> <p>Always ensure the lifting point to be in line with center of gravity. Adjust lifting point if necessary.</p> <p>Always use suitable transport device ie. forklift or pallet lifter.</p> <p>Always use appropriate lifting equipment for heavy parts when relevant. Use lifting logs when available.</p> <p>Always keep an eye on the load and stay clear during the lifting operation.</p>





Installation

	<p>If the local safety regulations prescribe that the installation has to be inspected and approved by responsible authorities before the valve is put into service, consult with such authorities before installing the equipment and have the projected installation approved by them.</p> <p>Always release compressed air after use.</p> <p>Always assemble the valve completely before startup and make sure everything is in place and correctly tightened.</p>
  	<p>Never touch the clip assembly or the actuator piston rod if the actuator is supplied with compressed air.</p> <p>Always ensure that the valve and pipelines are depressurized, emptied, and cooled down to ambient temperature before installation, inspection, assembly, or dismantling of the valve.</p> <p>Never touch the valve or the pipelines when processing hot liquids or when sterilising.</p>
	<p>Never work on the valve or touch moving parts if the actuator is supplied with compressed air.</p>


Operation

	<p>Never operate the valve unless a correct installation has been verified.</p> <p>Never dismantle the valve during operation or when pressurized.</p>
	<p>Never touch the valve or pipelines when hot.</p>
	<p>Always rinse well with clean water after cleaning.</p> <p>Always handle lye and acid with great care.</p> <p>Always follow the instructions in the safety data sheets from the suppliers of cleaning agents, detergents, oils etc.</p>
	<p>Never touch moving parts of the valve during operation.</p> <p>Always release compressed air after use.</p>


Maintenance

	<p>In order to optimise the operation of the supplied Alfa Laval product and to minimize the down time due repair activities, the maintenance includes:</p> <ul style="list-style-type: none"> • Inspection and maintenance of the supplied Alfa Laval product: strictly follow the technical documentation • Preventive maintenance: visual inspection of the supplied Alfa Laval product followed by necessary adjustments and planned periodic replacement of wear and tear parts • Repairs: unscheduled break down of a component, often causing the system to stop. Damaged components must be replaced • Stock of Alfa Laval genuine spare parts: Alfa Laval recommend keeping a stock of genuine spare parts facilitating preventive maintenance and reducing downtime in case of unplanned break downs
 	<p>Always release compressed air after use.</p> <p>Always ensure that the valve and pipelines are depressurized, emptied, and cooled down to ambient temperature before dismantling the valve.</p>
	<p>Never work on the valve or touch moving parts if the actuator is supplied with compressed air.</p> <p>Never pressurize the valve/actuator when the valve is serviced unless specifically prescribed.</p>

Storage

	<p>Alfa Laval recommend:</p> <ul style="list-style-type: none"> • Store the supplied Alfa Laval product as supplied in original packaging • Port opening(s) should be protected against any ingress • Bare steel (not stainless) should be lightly oiled/greased • Store in a clean, dry place without direct sunlight or UV light • Temperature range -5 °C to +40 °C (23 °F - 104 °F) • Relative humidity less than 60% • No exposure to corrosive substances (including contained air)
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Noise

	<p>Under certain operating conditions, the supplied Alfa Laval product and/or the systems in which they are installed can produce high sound pressure levels. Appropriate noise protection measures should be taken when necessary and in accordance with local legislation.</p>
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Hazards



Burn Hazard

- Lubrication oil, machine parts and various machine surfaces can be hot and cause burns. Wear protective gloves



Corrosive Hazard

- Always handle cleaning liquids, lye and acid with great care and in accordance with separate instructions for those fluids
- When using chemical cleaning agents and lubricants, make sure you follow the general rules and suppliers recommendation regarding ventilation, personnel protection etc.



Cut Hazard

- Sharp edges, especially on bowl discs and threads, can cause cuts. Wear protective gloves



Crushing Hazard

- Avoid placing hands into valve orifice pinch points

Safety check



A visual inspection of any protective device (shield, guard, cover or other) on the supplied Alfa Laval product shall be carried out at least every 12 months. If the protective device is lost or damaged, especially when this leads to deterioration of safety performance, it shall be replaced. The fixing of the protective device should only be replaced with fixings of the same or an equivalent type.

Inspection acceptance criteria:

- It should not be possible to reach moving parts originally protected by a protective device
- The protective device must be securely mounted
- Ensure that screws for the protective device are securely tightened

Procedure in case of non-acceptance:

- Fix and/or replace the protective device

2.3 Warning Signs in Text

Pay attention to the safety instructions in this Instruction Manual.

Below are definitions of the four grades of warning signs used in the text where there is a risk for injury to personnel or damage to the supplied Alfa Laval product.



Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate damage to the supplied Alfa Laval product.



Indicates important information to simplify or clarify procedures.

2.4 Requirements of Personnel

Operators

The operators shall read and understand this Instruction Manual.

Maintenance personnel

The maintenance personnel shall read and understand this Instruction Manual. The maintenance personnel or technicians shall be skilled within the field required to carry out the maintenance work safely.

Trainees

Trainees can perform tasks under the supervision of an experienced employee.

People in general

The public shall not have access to the supplied Alfa Laval product.

In some cases, specially skilled personnel may need to be hired (i.e. electricians, welders). In some cases the personnel has to be certified according to local regulations with experience of similar types of work.

2.5 Recycling Information

Unpacking

Packing material may consist of wood, plastics, cardboard boxes and in some cases metal straps.



- Wood and cardboard boxes can be reused, recycled or used for energy recovery
- Plastics should be recycled or burnt at a licensed waste incineration plant
- Metal straps should be sent for material recycling

Maintenance

During maintenance, oil (if used) and wear parts in the supplied Alfa Laval product should be replaced.

- Oil and all non-metal wear parts must be disposed of in accordance with local regulations
- Rubber and plastics should be burnt at a licensed waste incineration plant. If not available they should be disposed of in accordance with local regulations
- Bearings and other metal parts should be sent to a licensed handler for material recycling
- Seal rings and friction linings should be disposed of to a licensed land fill site. Check your local regulations
- All metal parts should be sent for material recycling
- Worn out or defected electronic parts should be sent to a licensed handler for material recycling

Scrapping

At end of use, the equipment must be recycled in accordance with the relevant local regulations. Besides the equipment itself, any hazardous residues from the process liquid must be considered and dealt with in a proper manner. When in doubt, or in the absence of local regulations, please contact your local Alfa Laval sales company.

How to contact Alfa Laval

Contact details for all countries are continually updated on our website.

Please visit www.alfalaval.com to access the information directly.

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3 Introduction

The Alfa Laval LKAP is a pneumatic single seat valve with a single contact surface between the plug and the seat to minimize the risk of contamination. Compact and straightforward, it is designed for use as a remote-controlled shut-off valve for small flows and for dosing applications.

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4 Installation

4.1 Unpacking/Delivery

! NOTE

This Instruction Manual is part of the delivery.

Study the instructions carefully.

LKAP-V: Valve body with two valve ports.

LKAP-T: Valve body with three valve ports.

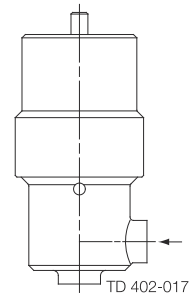
Alfa Laval cannot be held responsible for incorrect unpacking.

Check the delivery for:

1. Complete valve, LKAP-V or LKAP-T.
2. Delivery note.
3. Instruction manual.

1

- a) Clean the valve for possible packing materials.
- b) Inspect the valve for visible transport damage.
- c) Avoid damaging the valve.



4.2 General Installation

NOTE

Always read *Technical Data* on page 39 thoroughly.

Study the instructions carefully and pay special attention to the warnings!

Alfa Laval cannot be held responsible for incorrect installation.

Always release compressed air after use.

The valve has welding ends as standard but can also be supplied with fittings.

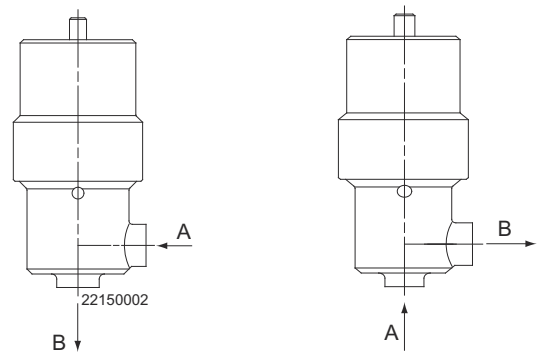
NO = Normally open.

NC = Normally closed.

1 Flow direction:

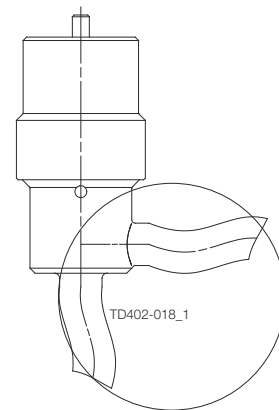
To avoid pressure shocks it is recommended to install the valve with inlet through the bottom connection.

- A: Inlet
- B: Outlet



2 Avoid stressing the valve.

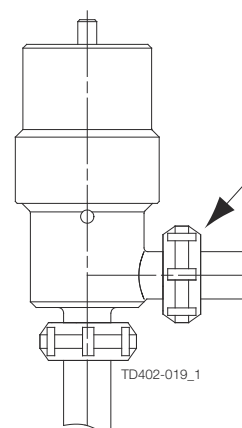
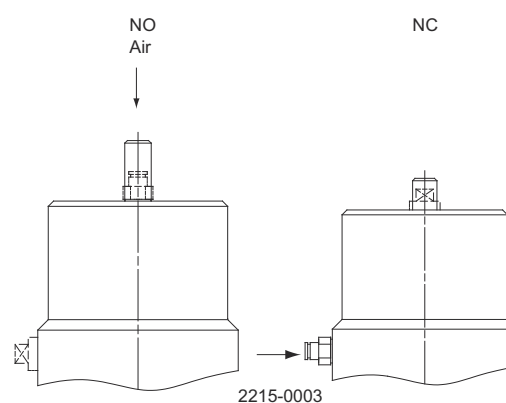
- Vibrations
- Thermal expansion of the tubes
- Excessive welding
- Overloading of the pipelines



Risk of damage!

3 Fittings:

Ensure that the connections are tight (remember seal rings).

**4 Air connection: R 1/8" (BSP).**

4.3 Welding

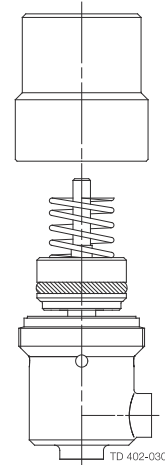
NOTE

Study the instructions carefully.

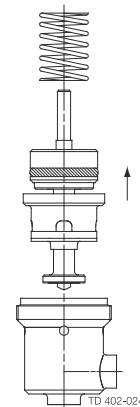
The items refer to the drawings and the parts list in section *Parts Lists and Exploded Views* on page 43.

Check the valve for smooth operation after welding.

- 1
 - a) Turn air cylinder (2) anticlockwise by hand with a strap wrench or with a spanner.
 - b) Remove the air cylinder from valve body (15).

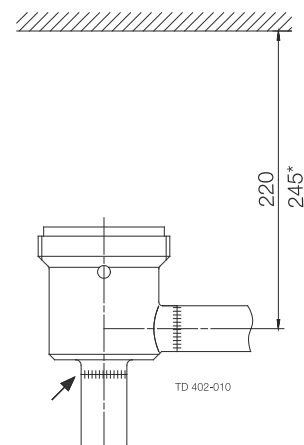


- 2
 - a) Remove spring (5) and the rest of the internal valve parts from valve body (15).



- 3
 - a) Weld valve body (15) into the pipelines
 - b) Maintain the minimum clearance so that the internal valve parts can be removed.

* = incl. induction

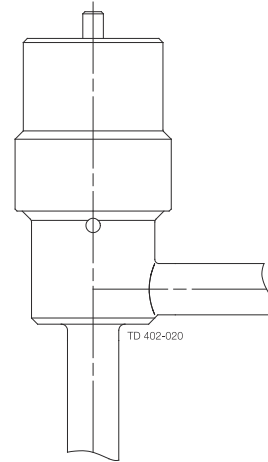


Weld carefully

-
- 4 Assemble the valve in accordance with the instructions in section [Assembly](#) on page 35.
-

- 5 **Pre-use check:**
- a) Supply compressed air to the valve.
 - b) Open and close the valve several times to ensure that it operates smoothly.

Pay special attention to the warnings!



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5 Operation

5.1 General Operation

NOTE

Study the instructions carefully and pay special attention to the warnings!

Ensure that the valve operates smoothly.

Pay attention to possible faults.

Always read *Technical Data* on page 39 thoroughly.

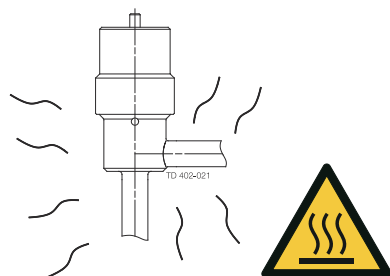
Alfa Laval cannot be held responsible for incorrect operation.



WARNING Burning danger!

Always release compressed air after use.

Never touch the valve or the pipelines when processing hot liquids or when sterilising.



5.2 Troubleshooting

NOTE

Study the maintenance instructions carefully before replacing worn parts - see [Maintenance](#) on page 31.

The items refer to the drawings and the parts list in [Parts Lists and Exploded Views](#) on page 43.

Problem	Cause/result	Repair
Product leakage through the drain holes.	Worn/product affected lip seal (11).	Replace the lip seal. Select a different rubber grade.
Leakage at the valve plug.	Worn/product affected O-ring (13).	Replace the O-ring. Select a different rubber grade.
Air leakage through the drain holes.	Worn actuator O-rings.	Replace the O-rings.
Air leakage between air cylinder (2) and valve body (15), (threaded connection).	Worn O-ring (9). Loose air cylinder (2).	Replace the O-ring. Tighten the air cylinder.

5.3 Recommended Cleaning

WARNING Risk of burns!

Never touch the supplied product or the pipelines when sterilizing.



CAUTION

Always handle lye and acid with great care.



NOTE

The supplied product is designed for cleaning in place (CIP).

NaOH = Caustic soda.

HNO₃ = Nitric acid.

The cleaning agents must be stored/disposed of in accordance with current regulations/directives.

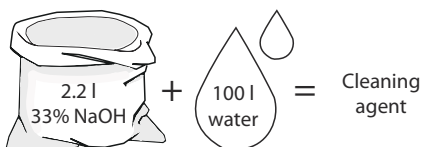
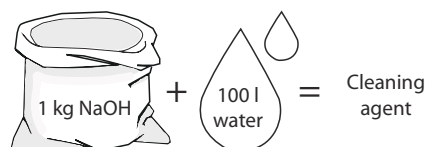
Examples of cleaning agents

NOTE

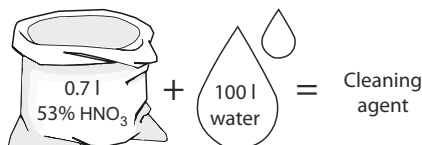
Use clean water free from chlorides.

Metric System

1. 1% by weight NaOH at 70°C

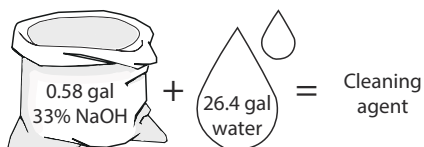
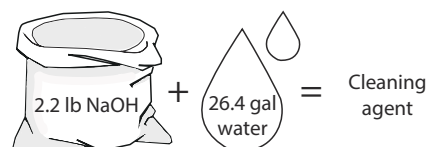


2. 0.5% by weight HNO₃ at 70°C

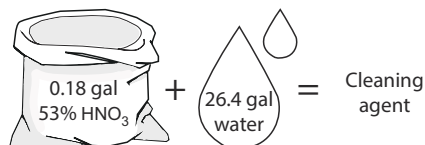


Imperial System

1. 1% by weight NaOH at 158°F



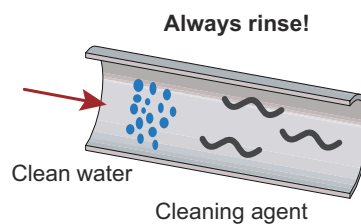
2. 0.5% by weight HNO₃ at 158°F



1. Avoid excessive concentration of the cleaning agent ⇒ **Dose gradually!**
2. Adjust the cleaning flow to the process
Milk sterilization/viscous liquids ⇒ Increase the cleaning flow!



Always rinse well with clean water after the cleaning.



6 Maintenance

6.1 General Maintenance

NOTE

Always read *Technical Data* on page 39 thoroughly.

Alfa Laval cannot be held responsible for incorrect maintenance.

Maintain the valve and the actuator carefully.

Study the instructions carefully and pay special attention to the warnings!

Always keep service kits in stock.

Check the valve for smooth operation after servicing.

All scrap must be stored/discharged in accordance with current rules/directives.

Always use Alfa Laval genuine spare parts.

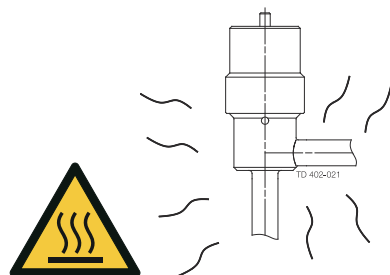
WARNING

Danger of burns!

Always release compressed air after use.

Never service the valve when it is hot.

Never service the valve with valve and pipelines under pressure.



Guidelines for maintenance and lubrication

	Valve lip seal	Valve O-rings	Actuators O-rings
Preventive maintenance	Replace after 12 months	Replace when replacing the lip seal	Replace after 5 years
Maintenance after leakage (leakage normally starts slowly)	Replace at the end of the day	Replace when replacing the lip seal	Replace when necessary

	Valve lip seal	Valve O-rings	Actuators O-rings
Planned maintenance	<ul style="list-style-type: none"> • Regular inspection for leakage and smooth operation • Keep a record of the valve • Use the statistics for planning of inspections • Replace after leakage 	<ul style="list-style-type: none"> • Replacing when replacing the lip seal 	<ul style="list-style-type: none"> • Regular inspection for leakage and smooth operation • Keep a record of the valve • Use the statistics for planning of inspections • Replace after air leakage
Lubrication	Before fitting <ul style="list-style-type: none"> • Silicone grease or silicone oil 	None	Before fitting <ul style="list-style-type: none"> • Grease or oil

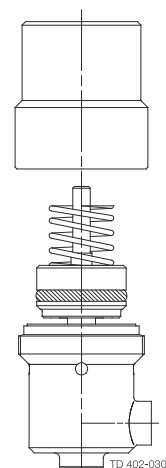
6.2 Dismantling

NOTE

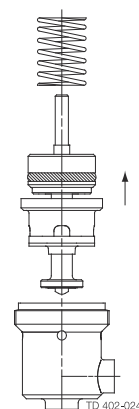
Study the instructions carefully.

The items refer to the drawings and the parts list in *Parts Lists and Exploded Views* on page 43

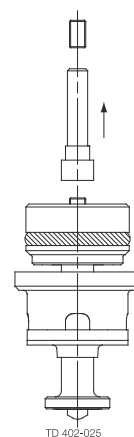
- 1
 - a) Turn air cylinder (2) anticlockwise by hand with a strap wrench or with a spanner.
 - b) Remove the air cylinder from valve body (15).
 - c) Pull out O-ring (3) from the air cylinder.



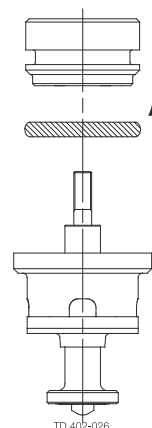
- 2
 - a) Remove spring (5) and the rest of the internal parts from valve body (15).



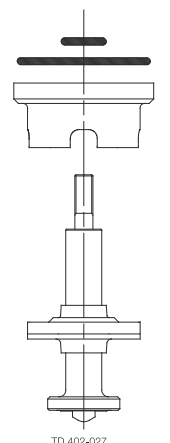
- 3
 - a) Turn nut (4) anticlockwise and remove it from valve plug unit (12, 14).
 - b) Remove screw (1) from the nut.



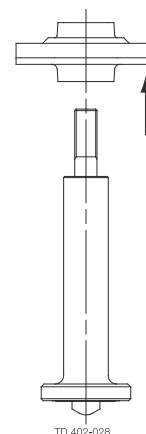
- 4**
- a) Separate piston (6) from valve plug unit (12, 14).
 - b) Pull off O-ring (7) from the piston.



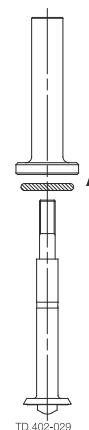
- 5**
- a) Slide off bottom piece (10) from valve plug unit (12, 14).
 - b) Remove O-rings (8, 9) from the bottom piece.



- 6**
- a) Pull off lip seal (11) from valve plug unit (12, 14).



- 7**
- a) Remove hollow spindle (12) from valve spindle (14).
 - b) Pull out O-ring (13) from the hollow spindle.



6.3 Assembly

NOTE

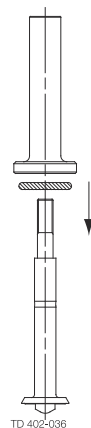
Study the instructions carefully.

The items refer to the drawings and the parts list in *Parts Lists and Exploded Views* on page 43.

Lubricate the rubber seals before fitting them.

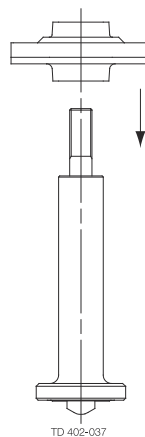
1

- a) Fit O-ring (13) in hollow spindle (12).
- b) Slide the hollow spindle onto valve spindle (14).



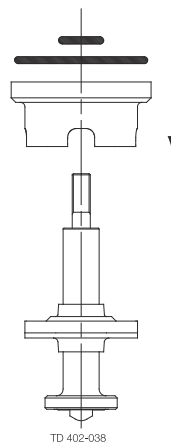
2

- Fit lip seal (11) on valve plug unit (12, 14).



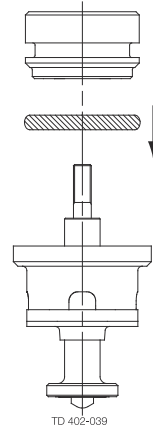
3

- a) Fit O-rings (8, 9) into the grooves of bottom piece (10).
- b) Slide the bottom piece onto valve plug unit (12, 14).



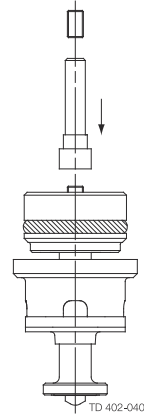
4

- Fit O-ring (7) on piston (6).
- Guide the piston onto valve plug unit (12, 14).



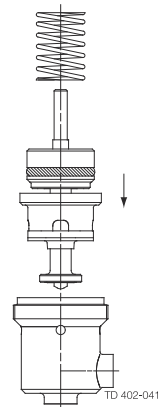
5

- Fit screw (1) in indication nut (4).
- Guide the indication nut onto valve plug unit (12, 14), turn it clockwise and tighten.



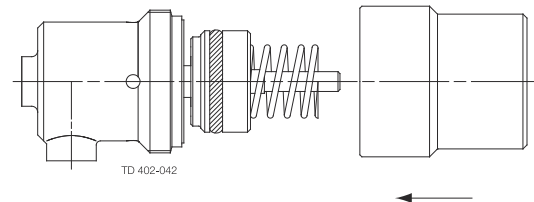
6

- Position spring (5) in the groove of piston (6).
- Fit valve plug unit (12, 14) with the internal parts into valve body (15).



7

- Slide O-ring (3) into the groove of air cylinder (2).
- Fit the air cylinder on valve body (15), turn it clockwise and tighten by hand with a strap wrench or with a spanner.



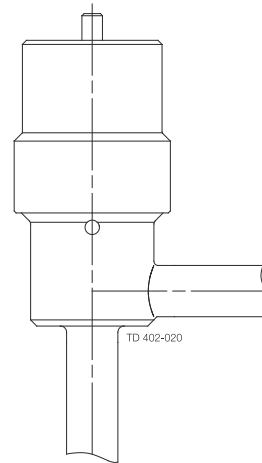
! NOTE

Fix bottom piece (10) by means of two $\varnothing 6\text{mm}$ mandrels so that a free discharge from the drain holes is maintained.

8 Pre-use check:

- a) Supply compressed air to the valve
- b) Open and close the valve several times to ensure that it operates smoothly

Pay special attention to the warnings!



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7 Technical Data

NOTE

Technical data must be observed during installation, operation and maintenance.
All personnel should be informed about the technical data.

7.1 Technical Data

Temperature

Max. temperature:	140 °C (EPDM)
Min. temperature:	-10 °C

Pressure

Flow Kv ($\Delta p = 1 \text{ bar}$):	9 m ³ /h
Max. recommended pressure under the plug (NC):	600 kPa (6 bar)
Min. air pressure:	500 kPa (5 bar)
Max. prod. pressure:	1000 kPa (10 bar)

ATEX

Classification:	II 2 G D ¹
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¹ This equipment is outside the scope of the directive 2014/34/EU and must not carry a separate CE marking according to the directive as the equipment has no own ignition source.

7.2 Physical Data

Materials

Product wetted steel parts:	1.4404 (316L)
Other steel parts:	1.4301 (304)
Surface finish inside:	Ra ≤ 1.6 µm
Other seals:	NBR
Finish:	Semi bright
Product wetted parts:	Nitrile (NBR), (standard)
Other seals:	Nitrile (NBR)
Alternative product wetted seals:	EPDM and Fluorinated rubber (FPM)

Proportions

Size:	25 mm
Weight:	2.5 kg

7.3 Noise



One metre / 3 ft away from and 1.6 metres / 5 ft above the exhaust, the noise level of a valve actuator will be approximately 77 dB(A) without noise damper and approximately 72 dB(A) with damper - measured at 7 bar air-pressure.

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8 Spare Parts

For every delivered Alfa Laval Product, a spare part list is available.

This spare part list contains a range of the most common wear parts for the machinery. If any component not mentioned is required, please contact your local Alfa Laval representative for availability.

You can find our spare part catalogue at <https://hygienicfluidhandling-catalogue.alfalaval.com>.

Always use Alfa Laval genuine spare parts. The warranty of Alfa Laval products is dependent on use of Alfa Laval genuine spare parts.

8.1 Ordering Spare Parts

When ordering spare parts, please always state:

1. Serial number (if available)
2. Item number/spare part number (if available)
3. Capacity or other relevant identification

8.2 Alfa Laval Service

Alfa Laval is represented in all larger countries of the world.

Do not hesitate to contact your local Alfa Laval representative, with any questions or requirement of spare parts for Alfa Laval equipment.

8.3 Warranty - Definition



The rules of Intended use are absolute. Use of the supplied Alfa Laval product is allowed only when in compliance with the technical data supplied with the Intended use.

Differing utilisation, other than agreed with Alfa Laval Kolding A/S, exclude any liability and warranty.

No modification or alteration of the supplied Alfa Laval product is allowed, unless explicit permission is granted by Alfa Laval Kolding A/S.



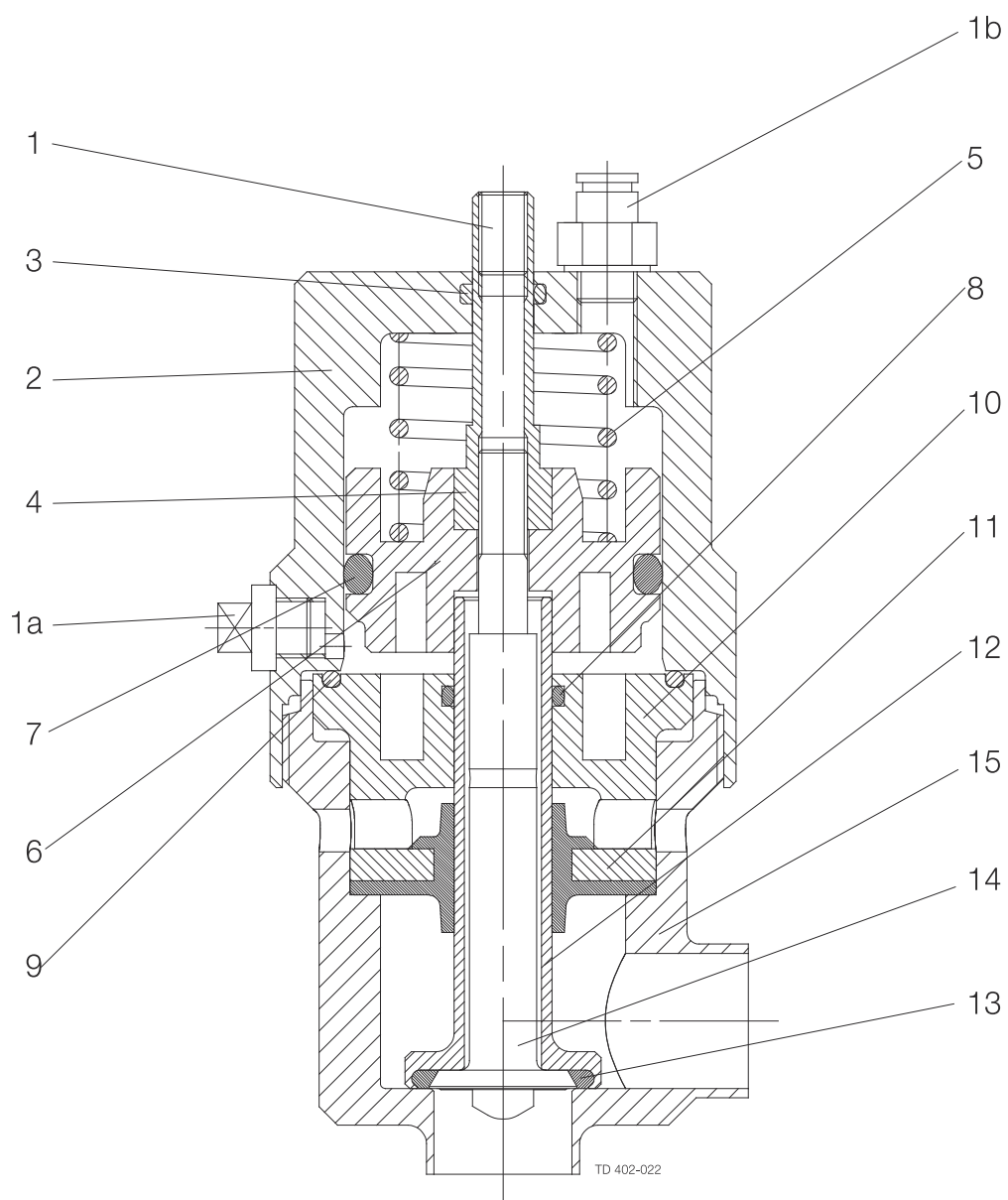
Liability and warranty are excluded:

- If advice and instruction of operating instructions are ignored
- For incorrect operation or for insufficient maintenance of the supplied Alfa Laval product
- For any kind of change of function of the supplied Alfa Laval product without prior written agreement by Alfa Laval Kolding A/S
- If supplied Alfa Laval product is modified by non-authorised persons
- If using the supplied Alfa Laval product without attention of appropriate safety regulations, (see [Safety](#) on page 7)
- If protection equipment is not used and vessel process / ancillary equipment is not brought to a standstill
- If the supplied Alfa Laval product and ancillary parts are not properly maintained (to be executed in intervals and including fitting of prescribed replacement parts)

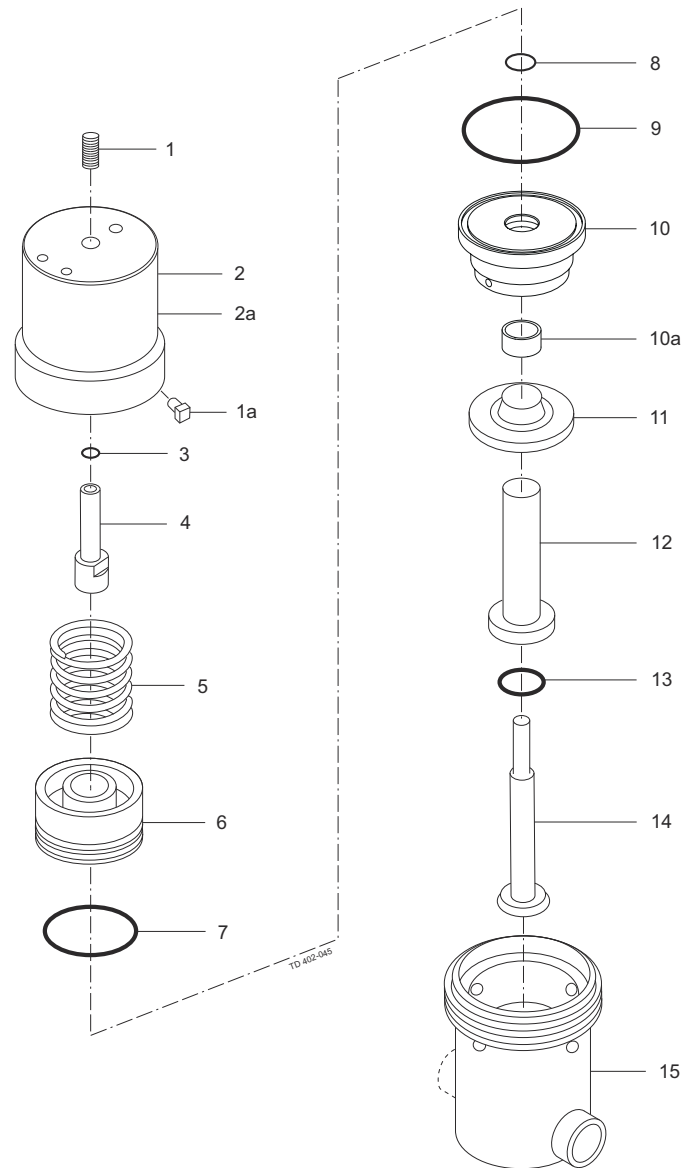
When exchanging parts, only original replacement parts, released from the manufacturer, must be used.

9 Parts Lists and Exploded Views

9.1 Exploded View



9.2 LKAP-V and LKAP-T Air-operated Valves with Welding Ends



Pos.	Qty.	Denomination
1a	1	Plug
1	1	Pointed screw
2a	1	Air cylinder
2	1	Air cylinder
3	1	O-ring
4	1	Nut
5	1	Spring
6	1	Piston

Pos.	Qty.	Denomination
10	1	Bottom piece
10a	1	Guide ring
11	1	Lip seal
12	1	Hollow spindle
13	1	O-ring
14	1	Valve spindle
15	1	L-Valve house