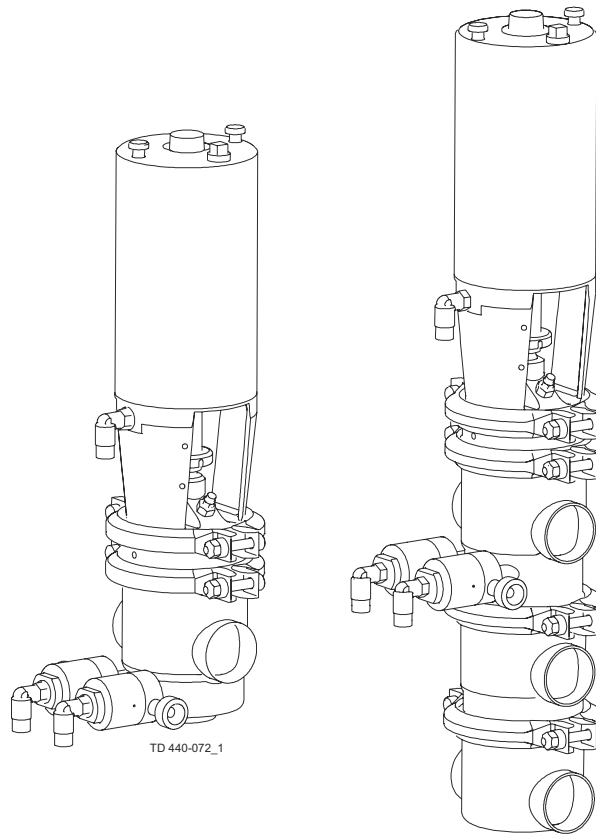


Alfa Laval SMP-BCA

Double seal valves



Lit. Code

200007943-1-EN-GB

Instruction Manual

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

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

Sanitary Mixproof Valve

Designation

SMP-BC PN10

Type

is in conformity with the following directives with amendments:

- Machinery Directive 2006/42/EC
- Pressure Equipment Directive 2014/68/EC and was subjected to the following 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

2025-01-21

Date (YYYY-MM-DD)



Signature

DoC Revison_ 01_012025 / 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

Sanitary Mixproof Valve

Designation

SMP-BC PN10

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

2025-01-21

Date (YYYY-MM-DD)



Signature

DoC Revison_ 02_012025



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.
	Danger of injury Do not attempt to disassemble the actuator due to spring under load danger!






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 safely:</p> <ul style="list-style-type: none"> • The power supply disconnecting device must be disconnected (in off position) and locked.
---	---





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>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> <p>Do NOT attempt to disassemble or by other means open the actuator due to spring under load danger!</p>


Operation

	<p>Always read Technical Data thoroughly.</p> <p>Never operate the valve unless a correct installation has been verified.</p> <p>Necessary precautions must be taken if leakage occurs as this can lead to hazardous situations.</p>
	<p>Never touch the valve or pipelines when hot.</p> <p>Never touch the valve or the pipelines when processing hot liquids or when sterilising.</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>Never dismantle the valve during operation or when pressurized.</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 use Alfa Laval genuine spare parts.</p> <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>Do NOT attempt to disassemble or by other means open the actuator due to spring under load danger!</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

	<p>Burn Hazard</p> <ul style="list-style-type: none">• Lubrication oil, machine parts and various machine surfaces can be hot and cause burns. Wear protective gloves
	<p>Corrosive Hazard</p> <ul style="list-style-type: none">• 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.
	<p>Cut Hazard</p> <ul style="list-style-type: none">• Sharp edges, especially on bowl discs and threads, can cause cuts. Wear protective gloves
	<p>Crushing Hazard</p> <ul style="list-style-type: none">• 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.

	<ul style="list-style-type: none"> • 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.

3 Introduction

The Alfa Laval SMP-BCA Mixproof Valve with PTFE Diaphragm is an aseptic double-seal valve designed for use under aseptic conditions and sterilization involving high temperatures. Based on the Alfa Laval SMP-BC, the SMP-BCA features a straightforward design that keeps liquids separated using two seals on the same plug with a leakage chamber in between. With its PTFE face and reinforced EPDM rubber backing, the diaphragm follows the plug movement of the upper valve body and ensures no increase in the concentration of microorganisms in the product during processing.

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4 Installation

4.1 Unpacking/Delivery

NOTE

The Instruction Manual is part of the delivery.

Study the instructions carefully.

Stop valve: With one valve body.

Change-over valve: With three valve bodies.

CIP = Cleaning In Place (see *Recommended Cleaning* on page 27).

Alfa Laval cannot be held responsible for incorrect unpacking.

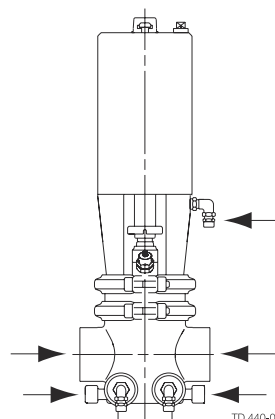
Check the delivery for:

1. Complete valve, standard or three-bodied valve
2. Delivery note
3. Instruction Manual

- 1 Remove possible packing materials from the valve ports.

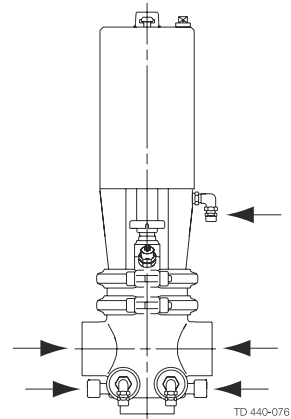
CAUTION

Avoid damaging the air connection and the valve ports, the detecting valve and the CIP valve.



Remove packing materials!

- 2 Inspect the valve for visible transport damage.



Inspection!

4.2 General Installation

NOTE

Study the instructions carefully and pay special attention to the warnings!
The valve has welding ends as standard but can also be supplied with fittings.
CIP = Cleaning In Place (see [Recommended Cleaning](#) on page 27).

CAUTION

Always read [Technical Data](#) on page 45 thoroughly.
Always release compressed air after use.
Alfa Laval cannot be held responsible for incorrect installation.

WARNING

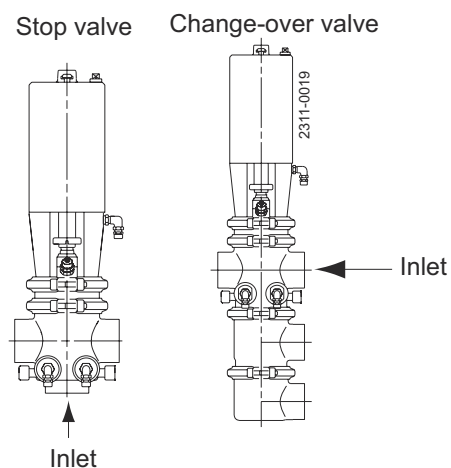
Never touch the clip assembly or the actuator piston rod if the actuator is supplied with compressed air.



1

Install the valve so that:

- The actuator is turned to the uppermost point
- The detecting valve is self-draining
- The flow is against the closing direction to avoid water hammer

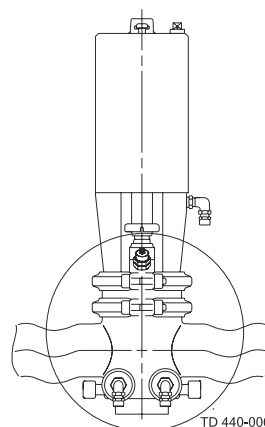


Avoid water hammer!

2

Avoid stressing the valve. Pay special attention to:

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

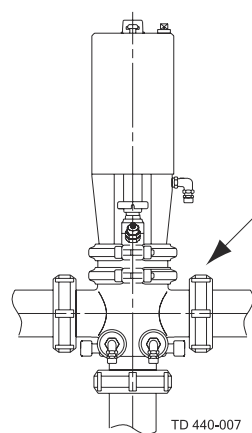


Risk of damage!

3

Fittings

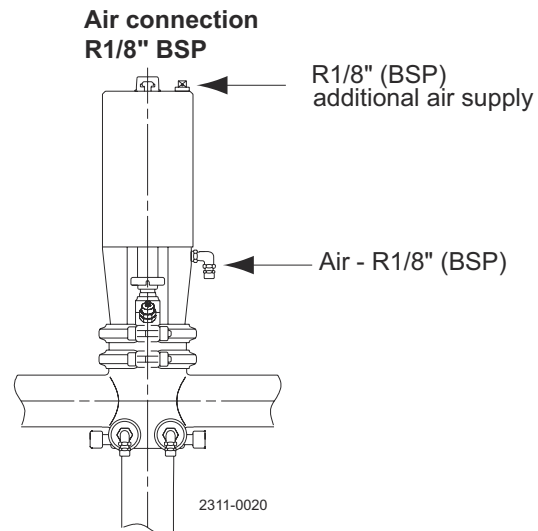
Ensure that the connections are tight.



Remember seal rings!

4 Drain connection

The drain hose on the bonnet should always be connected to a tube so that no personal injury can occur in case of a leakage.



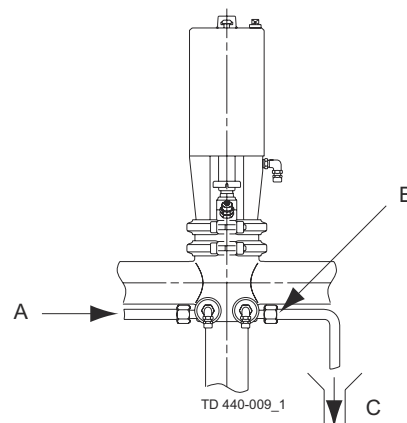
5 CIP/Steam connection

1. See the description of cleaning and optional extras in [Recommended Cleaning](#) on page 27.
2. Connect CIP correctly.
3. Internal steam pressure must not exceed 120 °C / 200 kPa (2 bar).

A = CIP/Steam in

B = R3/8" (BSP), external thread

C = CIP/Steam out or leakage drain



4.3 Welding

NOTE

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

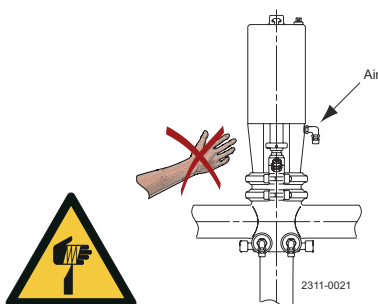
The valve has welding ends as standard.

Weld carefully.

Check the valve for smooth operation after welding.

WARNING Cut hazard!

Never stick your fingers through the valve ports if the actuator is supplied with compressed air.



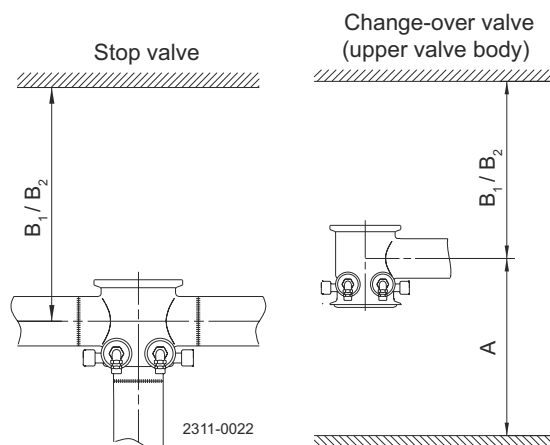
- 1 Dismantle the valve in accordance with 1- 3 in section *Dismantling of Valve* on page 33.

Pay special attention to the warnings!

NOTE

Always weld the valve body into the pipelines so that the valve body seal rings can be replaced (change-over valve). Maintain the minimum clearances (A and B) so that the lower valve plug (change-over valve) and the actuator with the internal parts can be removed.

Valve size	A	B1	B2 (incl. top unit)
	mm/inch		
DN40/38 mm	280/11	580/22.8	760/30
DN50/51 mm	305/12	580/22.8	760/30
DN65/63.5 mm	360/14	580/22.8	760/30
DN80/76 mm	410/16	630/24.8	810/31.9
DN100/101.6 mm	470/19	630/24.8	860/33.9



- 3 Assemble the valve in accordance with 4 - 9 in section *Assembly of Valve* on page 34.

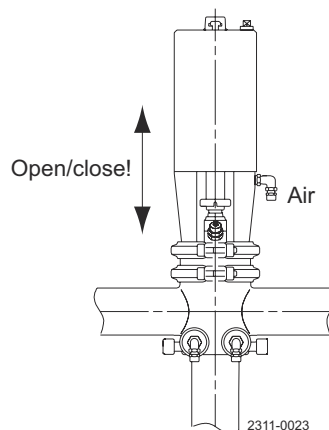
Pay special attention to the warnings!

4 Pre-use check

1. Supply compressed air to the actuator.
2. Open and close the valve a few times to ensure that it operates smoothly.

Pay special attention to the warnings!

If actuator is supported by air on spring side;
max allowable pressure is 300 kPa (3 bar)



5 Operation

5.1 General Operation

NOTE

The valve is adjusted and tested before delivery.

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

Pay attention to possible faults.

The items refer to the drawings and parts - see [Parts Lists and Exploded Views](#) on page 49

CIP = Cleaning In Place (see [Recommended Cleaning](#) on page 27).

Always read [Technical Data](#) on page 45 thoroughly.

CAUTION

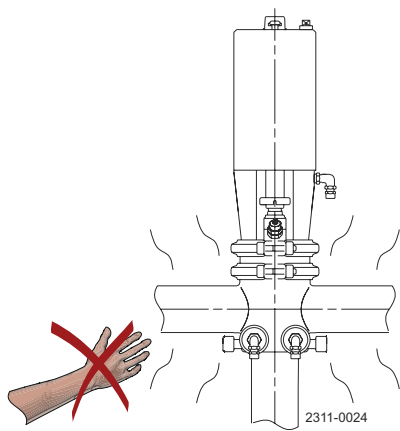
Always release compressed air after use.

Alfa Laval cannot be held responsible for incorrect operation.

WARNING Burn hazard!

Never touch the clip assembly or the actuator piston rod when the actuator is supplied with compressed air.

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



5.2 Troubleshooting

NOTE

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

Problem	Cause/result	Possible solution
Product leakage through the detecting valve (closed valve)	<ul style="list-style-type: none"> Worn seal rings The two seal rings affected by different products Incorrect fitting of seal rings Product deposits on the seat and/or plug 	<ul style="list-style-type: none"> Replace the seal rings Select a different rubber grade Frequent cleaning
Product leakage through the detecting valve (open valve)	<ul style="list-style-type: none"> Worn O-ring (26a) Worn spindle (26d) Product deposits on the seat and/or plug 	<ul style="list-style-type: none"> Replace the O-ring Replace the spindle Frequent cleaning
Product leakage at drain tube and/or clamp	Worn/product affected diaphragm set (22) and/or seal rings (17)	<ul style="list-style-type: none"> Replace the seal rings or diaphragm set Select a different rubber grade
Product leakage through middle or lower valve body (closed lower plug)	<ul style="list-style-type: none"> Worn/product affected plug seal ring Loose parts (vibrations) Product deposits on the seat and/ or plug 	<ul style="list-style-type: none"> Replace the seal ring Select a different rubber grade Tighten the loose parts Frequent cleaning
<ul style="list-style-type: none"> Air leakage through the CIP and detecting valve Air leakage at the actuator 	Worn seal rings	Replace the seal rings

5.3 Recommended Cleaning

NOTE

The valve is designed for Cleaning In Place (CIP).

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

NaOH = Caustic soda.

HNO₃ = Nitric acid.

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

WARNING Corrosive hazard!

Always handle lye and acid with great care.

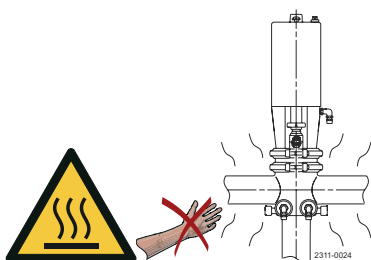
Always use rubber gloves!

Always use protective goggles!



CAUTION Burn hazard!

Never touch the valve or the pipelines when sterilizing.



CAUTION

Always keep the cleaning pressure lower than the product pressure.

Never throttle the outlet of the detecting valve (risk of mixing because of overpressure).

Sterile barrier chamber:

Max. CIP press. 60-100 kPa (0.6-1 bar)

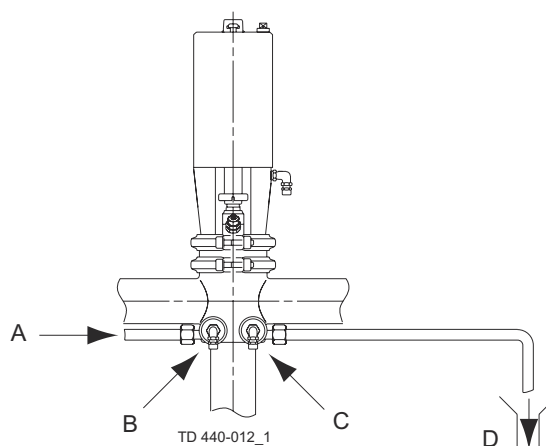
Max. steam press. 200 kPa (2 bar)/
120 °C

A = CIP/steam in

B = CIP/steam valve

C = Detecting valve

D = CIP out

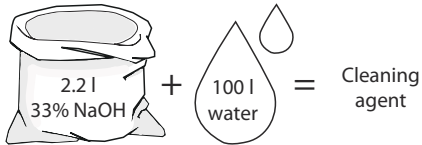
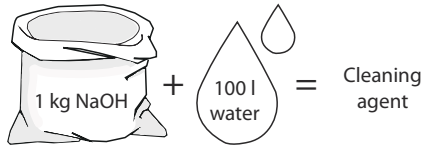


Examples of cleaning agents

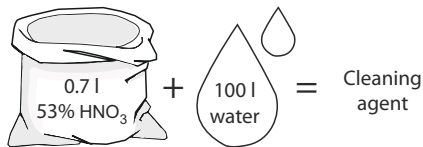
Use clean water free from chlorides

Metric System

1. 1% by weight NaOH at 70°C

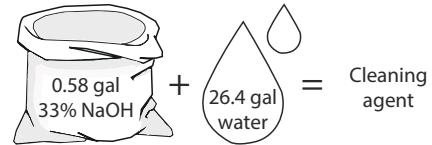
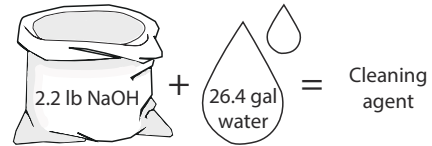


2. 0.5% by weight HNO₃ at 70°C

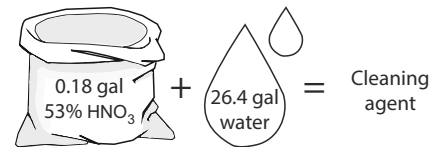


Imperial System

1. 1% by weight NaOH at 158°F



2. 0.5% by weight HNO₃ at 158°F



Recommended cleaning periods

Cleaning periods of 10-15 seconds for the leakage chamber.

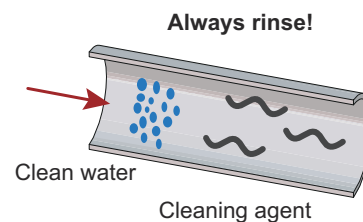
Product	Periods
Milk	1-2
Yoghurt	3-5
Beer	2-5
Cold wort	5-10

Recommended cleaning flow rates

(For special processes, see list items 1- 3 below).

Leakage chamber: 12-15 l/min (3.2 - 4.0 gpm).

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
3. **Always** rinse well with clean water after the cleaning.



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

Cleaning cycle

NOTE Pay special attention to the warnings!

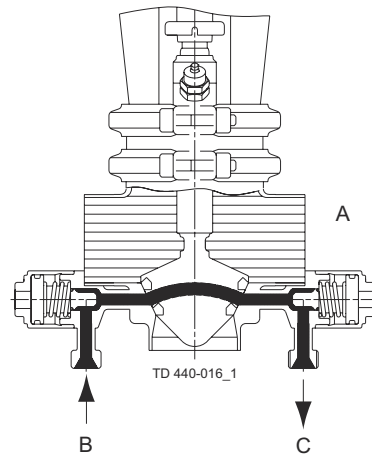
Closed stop valve:

Cleaning of sterile barrier chamber:

A = Product

B = CIP/steam in

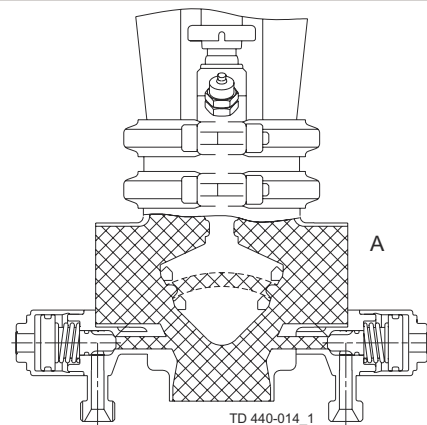
C = CIP/steam out



Open stop valve:

Cleaning of the valve body and the leakage chamber:

A = CIP

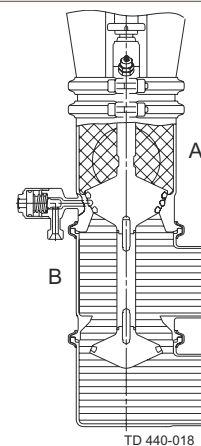


Change-over valve:

Cleaning of the upper valve body:

A = CIP

B = Product



5.4 Cleaning and Sterilization Equipment (Optional Extra)

NOTE

The installations kits are for cleaning/sterilizing of the leakage chamber when the valve is closed.

The stainless steel tubes must be cut and welded during installation.

CIP = Cleaning In Place.

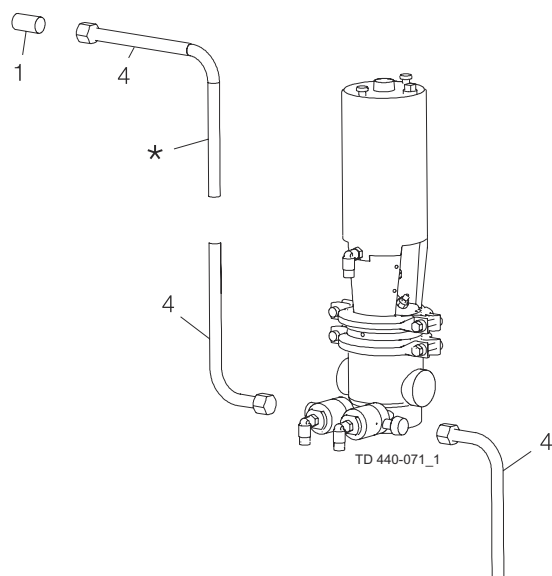
Installation kit C for CIP/steam and leakage connection of a single valve (stainless steel tubes)

Contents:

Pos. 1 Welding male part

Pos. 4 CIP leakage tube AISI 316

* Adjust and weld during installation.



To ensure aseptic processing and mixproof function certain rules must be followed:

- After the valve is closed the leakage chamber must be cleaned and sterilized.
- The leakage chamber must be kept sterile until the valve is opened again.

6 Maintenance

6.1 General Maintenance

NOTE

Maintain the valve regularly.

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

CIP = Cleaning In Place.

Always keep spare rubber seals, lip seals and guide rings in stock.

Always read *Technical Data* on page 45 thoroughly.

CAUTION

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

Always release compressed air after use.

Always remove the CIP connections before service.

CIP = Cleaning in Place.

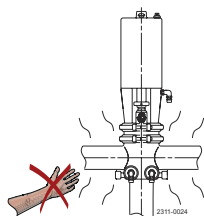
Never pressurize the valve/actuator when the valve is serviced **unless specifically prescribed**.

WARNING Burn hazard!

Never service the valve when it is hot.

Never service the valve with valve and pipelines under pressure.

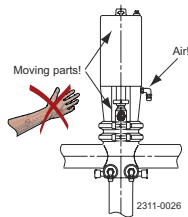
Atmospheric pressure required!



WARNING Cut hazard!

Never stick your fingers through the valve ports if the actuator is supplied with compressed air.

Never touch the clip assembly or the actuator piston rod if the actuator is supplied with compressed air.



The valve is designed so that single internal leakages do not result in the products becoming mixed.

Internal leakage in the valve is externally visible.

Check the valve for smooth operation after service.

Ordering spare parts: Contact the Sales Department

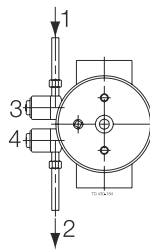
	Valve diaphragm unit	Valve rubber seals	Actuator rubber seals	Bonnet guide ring and O-rings
Preventive maintenance	Replace after 12 month (depending on working conditions)	Replace when replacing the diaphragms	Replace after 5 years	Replace when replacing the actuator rubber seals ¹
Maintenance after leakage (leakage normally starts slowly)	Replace by the end of the day	Replace when replacing the diaphragms	Replace when possible	
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	Replace when replacing the diaphragms	<ul style="list-style-type: none"> Regular inspection for leakage and smooth operation Keep a record of the actuator Use the statistics for planning of inspections Replace after air leakage	Replace when replacing the actuator rubber seals ¹
Lubrication (US-DAH1 approved oil/grease)	Before fitting: Silicone oil or silicone grease	Before fitting: Silicone oil or silicone grease	Before fitting: Silicone oil or silicone grease	Lubricate O-rings before fitting. Silicone oil or silicone grease

¹ IMPORTANT! Check that the guide ring is fitted if replacing the bonnet

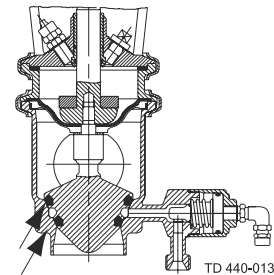
Pre-use check

Water: 3-4 bar

1. Ensure that the valve plug seals against the seat.
Pay special attention to the warnings!
2. Pressurise the sterile barrier chamber by means of water.
3. Check that the plug seals are tight (no water leakage through the valve ports).
4. Supply compressed air to the actuator
5. Open and close the valve a few times to ensure that it operates smoothly.
Pay special attention to the warnings!



- 1 = In
- 2 = Out
- 3 = CIP valve
- 4 = Detecting valve



Inspection

6.2 Dismantling of Valve

NOTE

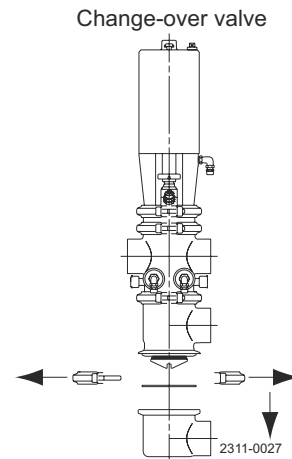
Study the instructions carefully.

The items refer to the drawings and the parts list in *Parts Lists and Exploded Views* on page 49.

Lubricate the rubber seals and the diaphragms before fitting them.

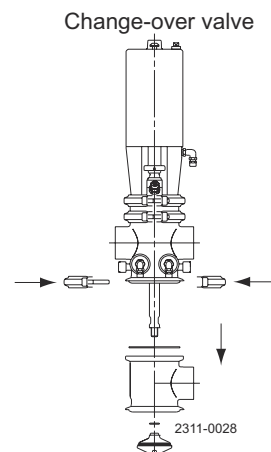
1

1. Loosen and remove lower clamp (19).
2. Take away lower valve body (31).
3. Pull out seal ring (17).



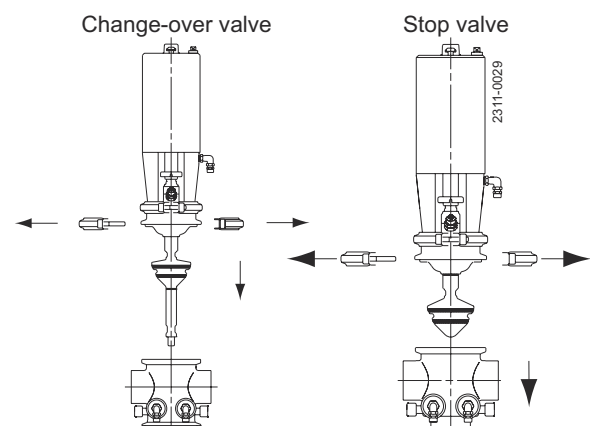
2

1. Unscrew lower plug (30).
2. Pull off seal ring (30a) (see special instruction in section *Replacement of Plug Seals* on page 40).
3. Loosen and remove upper clamp (19).
4. Take away middle valve body (27).
5. Pull off O-ring (28) and seal ring (17).



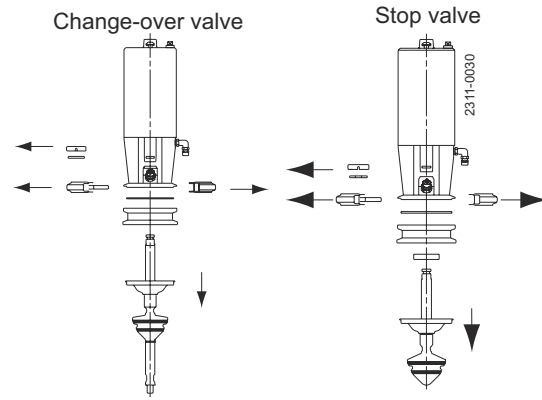
3

1. Loosen and remove lower diaphragm clamp (19).
2. Take away upper valve body (25).



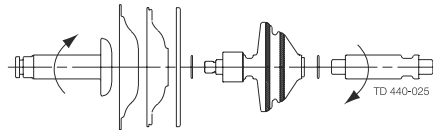
4

1. Remove clip assembly (9).
2. Remove upper plug with complete diaphragm/stem unit.
3. Remove washer (20) (stop valves only).
4. Loosen and remove upper diaphragm clamp (19).
5. Take away intermediate piece (18).
6. Remove seal ring (17) from the intermediate piece.



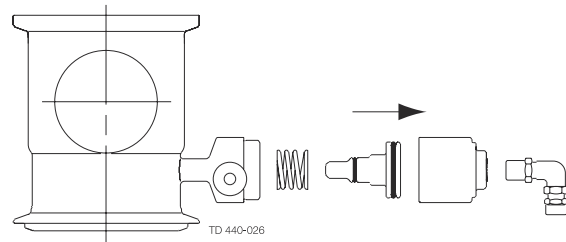
5

1. In sequence, turn lower and upper stem (29, 21) anticlockwise (for stop valve: only upper stem) to separate them from upper plug (24) (counterhold with a spanner).
2. Remove diaphragms (22a, 22b), L-seal (22c) and stem seal (22d) from the upper plug.
3. Remove diaphragm ring (23) and seal ring (17) from upper valve plug (25) (only for valve sizes 76-101.6 mm/ DN80-100).



6

1. Remove air fitting (26g).
2. Unscrew CIP valve housing (26f).
3. Pull out CIP valve plug (26d).
4. Remove CIP valve spring (26b).



6.3 Assembly of Valve

NOTE

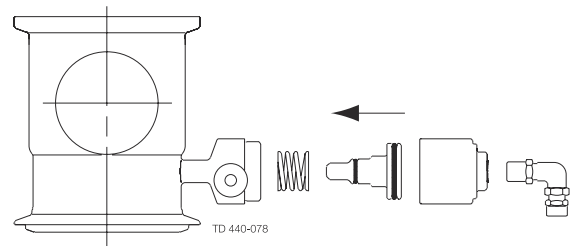
Study the instructions carefully.

The items refer to the drawings and the parts list in section *Parts Lists and Exploded Views* on page 49.

Lubricate the rubber seals and the diaphragms before fitting them.

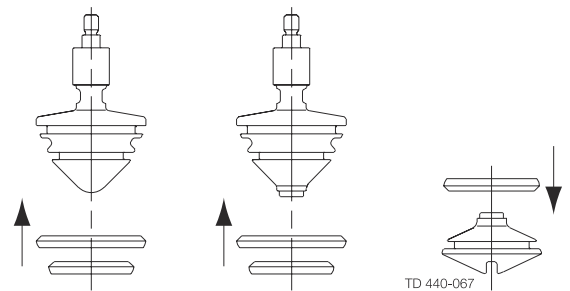
1

1. Fit CIP valve spring (26b) on CIP valve plug (26d).
2. Insert the CIP valve plug with spring in the CIP valve body.
3. Screw CIP valve housing (26f) onto the CIP valve body.
4. Screw air fitting (26g) into the CIP valve housing.



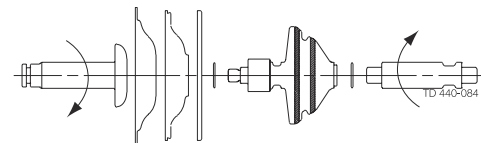
2

- Fit seal rings (24b, 24c) and seal ring (30a) on plugs (see special instructions in section [Replacement of Plug Seals](#) on page 40).



3

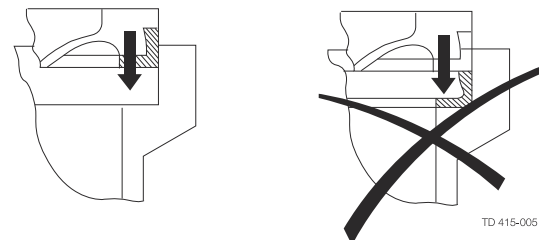
1. Fit stem seal (22d), L-seal (22c) and diaphragms (22a, 22b) on upper plug (24). (For L-seal: see step 4 on page 35).
2. Fit diaphragm ring (23) between upper stem (21) and the upper plug (only for valve sizes 76-101.6 mm/ DN80-100).
3. In sequence, screw the upper and lower stem (29) clockwise (for stop valve: only upper stem onto upper plug). Counterhold with a spanner. (Use loctite on threads of stems).



4

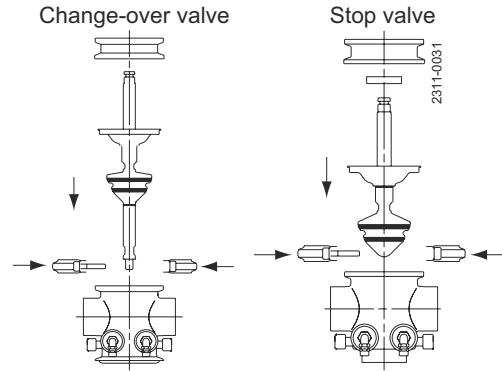
CAUTION

Ensure that L-seal (22c) is fitted on diaphragm (22a) before placing the diaphragm unit in upper valve body (25).



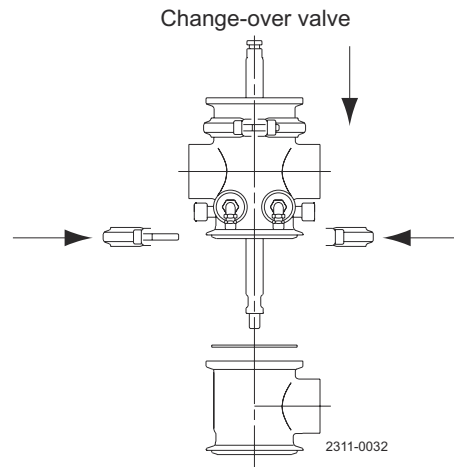
5

1. Slide seal ring (17) into upper valve body (25) (only valve sizes 76-101.6 mm/ DN80-100).
2. Fit diaphragm/stem unit in the upper valve body.
3. Position intermediate piece (18) on the upper valve body.
4. Fit and tighten lower diaphragm clamp.
5. Position washer (20) on upper stem (stop valve only).



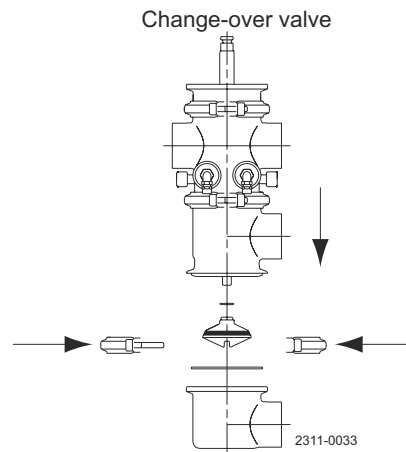
6

1. Slide seal ring (17) into middle valve body (27).
2. Position the middle valve body on upper valve body (25).
3. Fit and tighten upper clamp (19).



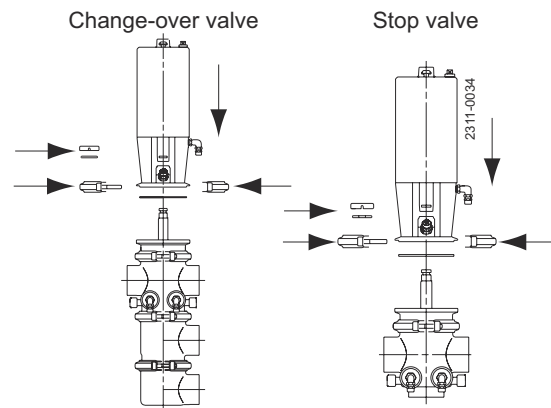
7

1. Slide O-ring (28) onto lower plug (30).
2. Screw the lower plug onto lower stem (29). (Use loctite).
3. Slide seal ring (17) into lower valve body (31).
4. Position the lower valve body on middle valve body (27).
5. Fit and tighten lower clamp (19).



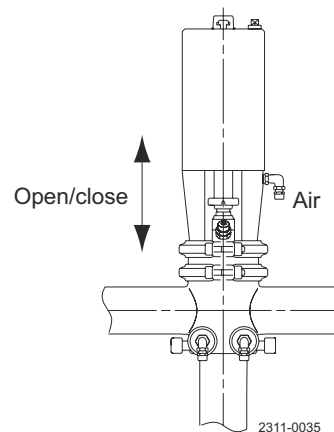
8

1. Slide seal ring (17) into intermediate piece.
2. Supply compressed air to the actuator.
3. Lift actuator onto mounted intermediate piece (18).
4. Reassemble clip assembly (9).
5. Release compressed air.
6. Fit and tighten upper diaphragm clamp (19).



9

1. Supply compressed air to the actuator.
2. Operate the valve a few times to ensure that it runs smoothly.
Pay special attention to the warnings.



6.4 Dismantling of Actuator

NOTE

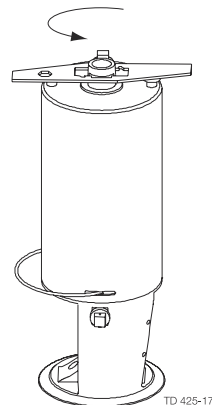
Study the instructions carefully.

The items refer to the drawings and the parts list in section [Parts Lists and Exploded Views](#) on page 49.

Handle scrap correctly.

1

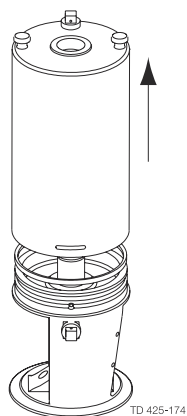
1. Rotate cylinder (4) to unhook lock wire (10).
2. Remove the lock wire.



Rotate with the service tool!

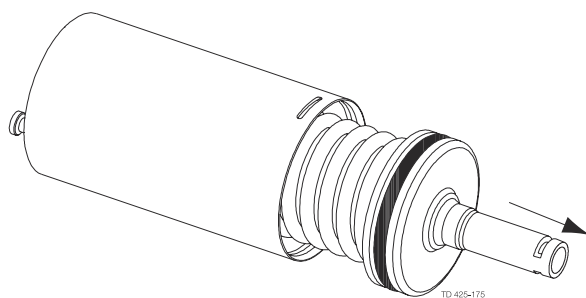
2

1. Disconnect cylinder (4) from bonnet (11).
2. Pull off O-rings (2,10) from the bonnet.



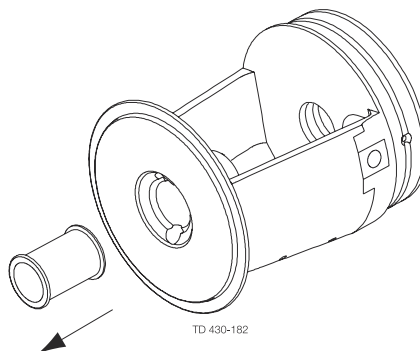
3

1. Pull out piston (8) and spring assembly (5).
2. Pull off O-ring (7) from the piston.



4

1. Remove guide ring (15) from bonnet (11).
2. Remove O-rings (14,16) from guide ring (15).



6.5 Assembly of Actuator

NOTE

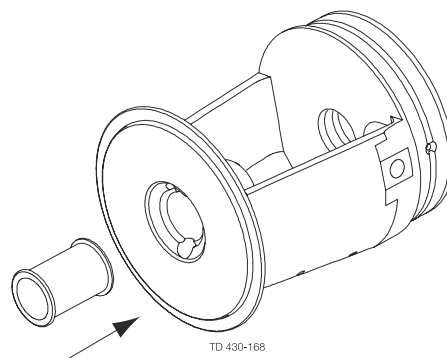
Study the instructions carefully.

The items refer to the drawings and the parts list in section *Parts Lists and Exploded Views* on page 49.

Lubricate the rubber seals before fitting them.

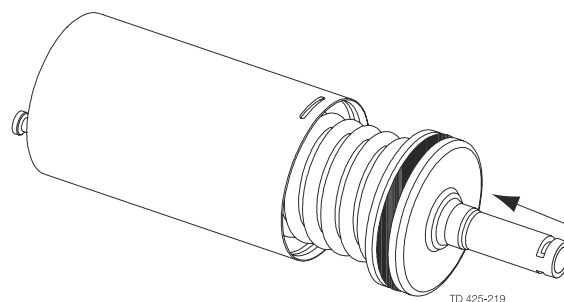
1

1. Fit O-rings (14, 16) on guide ring (15).
2. Fit guide ring (15) in bonnet (11).



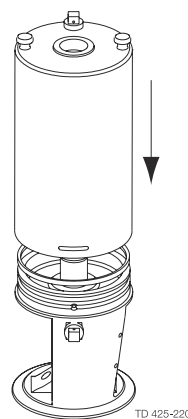
2

1. Fit O-ring (7) on the piston.
2. Push the piston and spring packet (5) into cylinder (4).



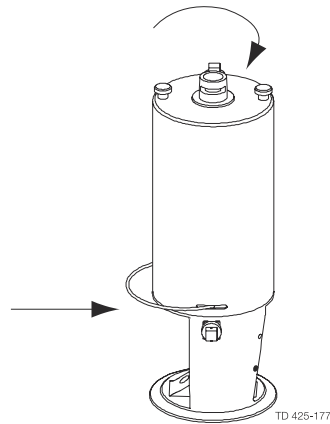
3

1. Slide O-rings (2,10) onto bonnet (11).
2. Fit cylinder (4) on the bonnet.



4

1. Rehook lock wire (10) through the slot in cylinder (4) in the hole in bonnet (11).
2. Rotate the cylinder 360° (see illustration above).

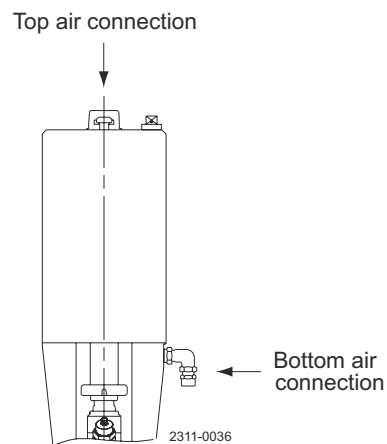


Rotate with the service tool!

5

NOTE

Rotate cylinder (4) further 180° in relation to bonnet (11) so that the top and bottom air connections are fixed on the same side



6.6 Replacement of Plug Seals

NOTE

Study the instructions carefully.

The items refer to the drawings and the parts list in section [Parts Lists and Exploded Views](#) on page 49.

Handle scrap correctly.

Do **not** lubricate the rubber seals or the tool parts before fitting the seals.

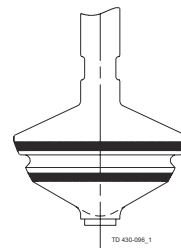
1 Removing the seal rings

Remove the old seal rings by cutting them through and pulling them out of the grooves.

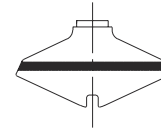
IMPORTANT! Before reading the following steps, please see [Tool for Plug Seals](#) on page 55.



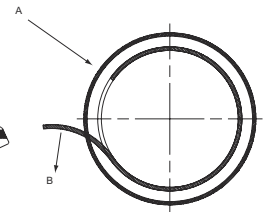
Do not damage the seal ring grooves.



Upper valve plug



Lower valve plug



A = Cut through!

B = Pull

2 Fitting the seal rings

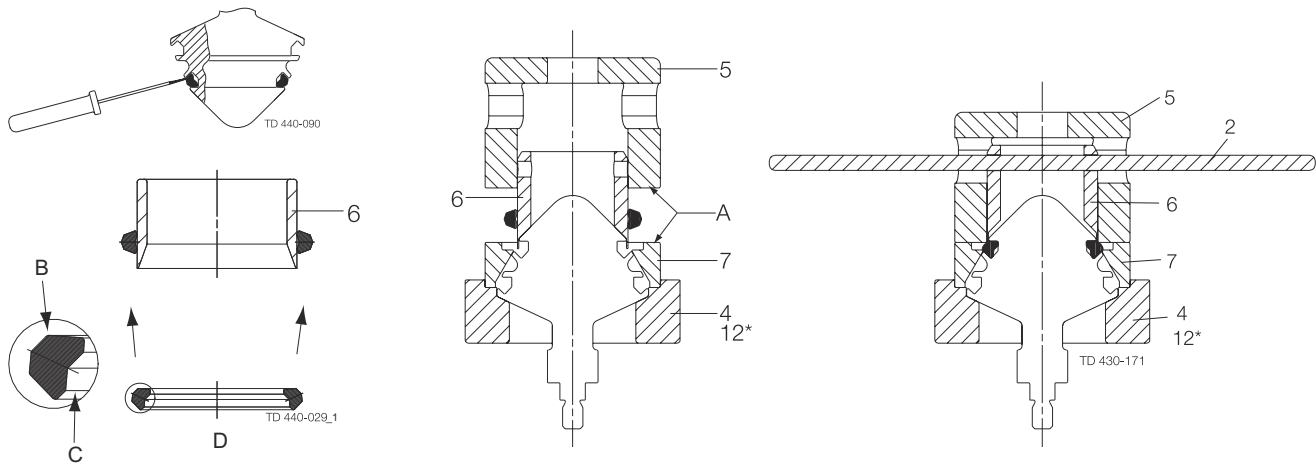
For stop and change-over valves.

Lower (small) seal ring.

1. Carefully grease the seal with Klüber Paraliq GTE 703 (USDA H1) - do **NOT** grease on back of seal!
2. Fit the small seal on the inner guide ring (6). Remember to mount the flat side of seal upwards as shown on figure.
3. Fit support part (7) for smaller seal.
4. Lubricate the ends (A) of the support part (7) and the outer guide ring (5) with Klüber Paraliq GTE 703 (USDA H1) and assemble the tool.
5. In a hydraulic press, the outer guide ring (5) is pressed downwards so that the seal is fitted in the groove of the valve plug.
IMPORTANT! The outer guide ring (5) must be closed quickly until metal contact with the support part (7). Normally, the inner guide ring (6) is moved upwards during closing; otherwise lift the pin (2) while fixture is still closed.
6. If the seal is not fitted correctly in the groove this can be fixed with a screwdriver.
7. Always remember to release air behind the seal after fitting.

Upper valve plug:

(Stop valve and change-over valve)



B = Grease

C = No grease

D = **NOTE!** Flat side up!

A = Lubricate ends

* = Only for 38-51 mm/DN40-50 upper change-over plug

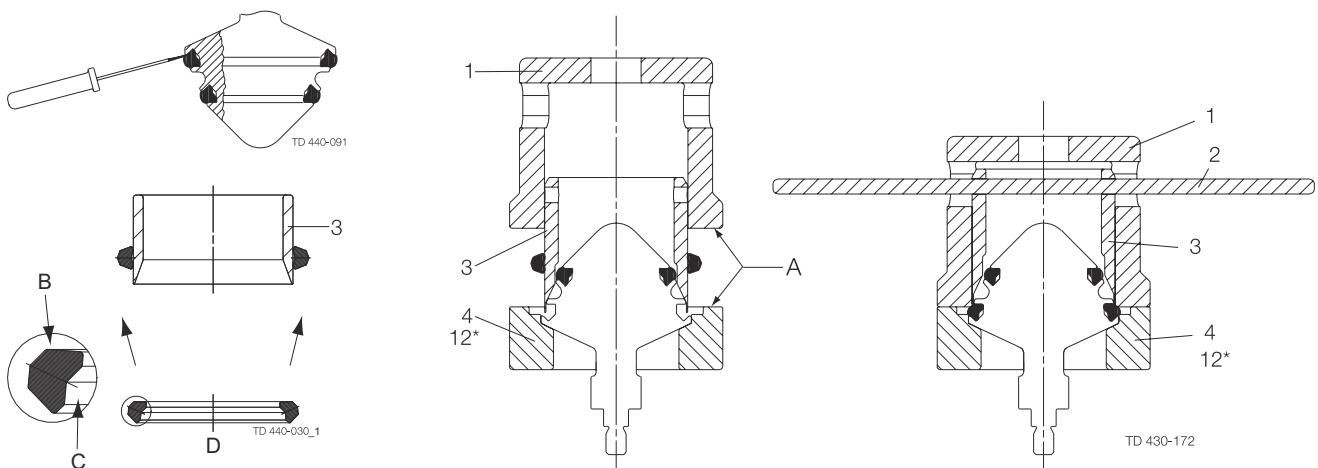
For stop and change-over valves:

Upper (large) seal ring

1. Carefully grease the seal with Klüber Paraliq GTE 703 (USDA H1) - Do NOT grease on back of seal!
2. Fit the large seal on the inner guide ring (3). Remember to mount the flat side of seal upwards as shown on figure.
3. Lubricate the ends (A) of the tool housing (4) and the outer guide ring (1) with Klüber Paraliq GTE 703 (USDA H1) and assemble the tool.
4. In a hydraulic press, the outer guide ring (1) is pressed downwards so that the seal is fitted in the groove of the valve plug.
IMPORTANT! The outer guide ring (1) must be closed quickly until metal contact with the tool housing (4). Normally, the inner guide ring (3) is moved upwards during closing; otherwise lift the pin (2) while fixture is still closed.
5. If the seal is not fitted correctly in the groove this can be fixed with a screwdriver.
6. Always remember to release air behind the seal after fitting.

Upper valve plug

(Stop valve and change-over valve)



B = Grease

C = No grease

D = **NOTE!** Flat side up!

A = Lubricate ends

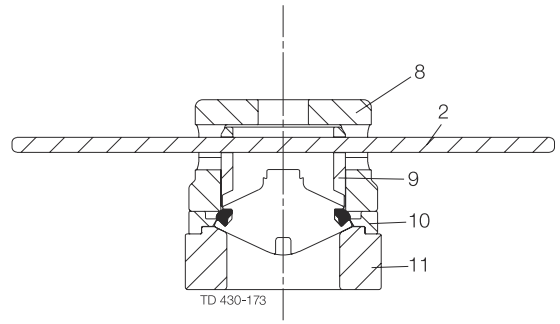
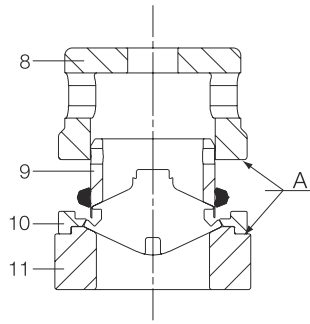
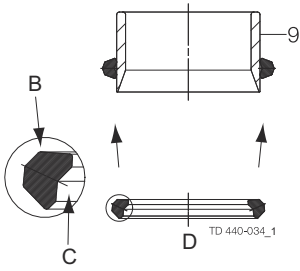
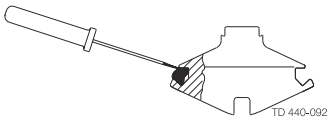
* = Only for 38-51 mm/DN40-50 upper change-over plug

For change-over valves

1. Carefully grease the seal with Klüber Paraliq GTE 703 (USDA H1) - Do NOT grease on back of seal!
2. Fit the seal on the inner guide ring (9). Remember to mount the flat side of seal upwards as shown on figure.
3. Fit support part (10)
4. Lubricate the ends of the support part (10) and the outer guide ring (8) with Klüber Paraliq GTE 703 (USDA H1) and assemble the tool.
5. In a hydraulic press, the outer guide ring (8) is pressed downwards so that the seal is fitted in the groove of the valve plug.
IMPORTANT! The outer guide ring (8) must be closed quickly until metal contact with the support part (10). Normally, the inner guide ring (9) is moved upwards during closing; otherwise lift the pin (2) while fixture is still closed
6. If the seal is not fitted correctly in the groove this can be fixed with a screwdriver.
7. Always remember to release air behind the seal after fitting.

Lower valve plug

(Change-over valve)



B = Grease

C = No grease

D = **NOTE!** Flat side up!

A = Lubricate ends

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

Temperature range:	-10 °C to 140 °C / 14 °F to 284 °F (EPDM)
Max. sterilization temperature (steam - short time)	150 °C - 380 kPa (3.8 bar) / 302 °F - 55 psi (3.8 bar)

Pressure

Pressure range:	0-800 kPa (0-8 bar) / 0-116 psi (0-8 bar)
Optimum process conditions:	>50 kPa (0.5 bar), > 20 °C / >7.25 psi (0.5 bar), > 68 °F
Air pressure:	500-800 kPa (5-8 bar) / 72.5-116 psi (5-8 bar)

Air consumption (litres free air)

38mm, 51mm, DN40, DN50	0.2 x air pressure in bar
63.5mm, 76mm, 101.6mm, DN65, DN 80, DN100	0.7 x air pressure in bar

NOTE

Vacuum is not recommended in aseptic applications.

**Expected lifetime of diaphragm unit under normal conditions:
(no pressure shocks or cavitation)**

Size/type	Stop valve activations	Change-over valve activations
38 mm/DN40	12,000	10,000
51 mm/DN510	12,000	10,000
63.5 mm/DN65	12,000	5,000
76.1 mm/DN80	5,000	5,000
101 mm/DN100	5,000	5,000

NOTE

Activating the valve without internal product pressure reduces life time of diaphragm unit.

7.2 Physical Data

Material	
Product wetted steel parts:	1.4404 (316L)
External surface finish:	Semi-bright (blasted)
Internal surface finish:	Ra ≤ 1.6 μm / Ra < 64 μinch
Optional:	Bright (polished) Ra ≤ 0.8 μm / Ra ≤ 32 μinch
Other steel parts:	1.4301 (304)
Product wetted seals:	EPDM and PTFE
Optional:	NBR and PTFE, FPM and PTFE
Other seals:	NBR, EPDM

Weight (kg)										
Size	38 mm	51 mm	63.5 mm	76.1 mm	101.6 mm	40DN	50DN	65DN	80DN	100DN
Weight - Stop valve	6.5	6.8	13.3	14.9	18.2	6.5	6.8	13.3	15.6	18.2
Weight - Divert valve	8.2	8.6	15.5	18.6	24.6	8.2	8.6	15.5	19.6	24.6

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:

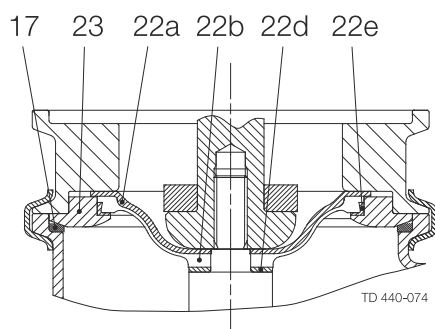
- If advice and instruction of operating instructions are ignored
- For incorrect operation or for insufficient maintenance of the supplied Alfa Laval product
- For any kind of change of function of the supplied Alfa Laval product without prior written agreement by Alfa Laval Kolding A/S
- If supplied Alfa Laval product is modified by non-authorized 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.

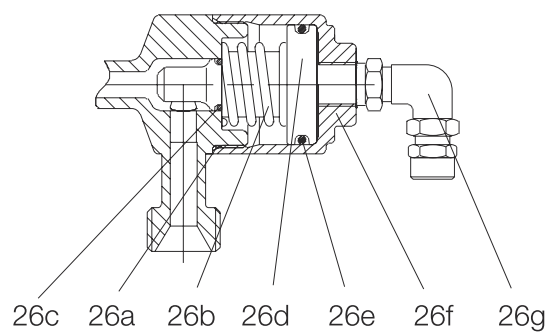
9 Parts Lists and Exploded Views

9.1 Drawings

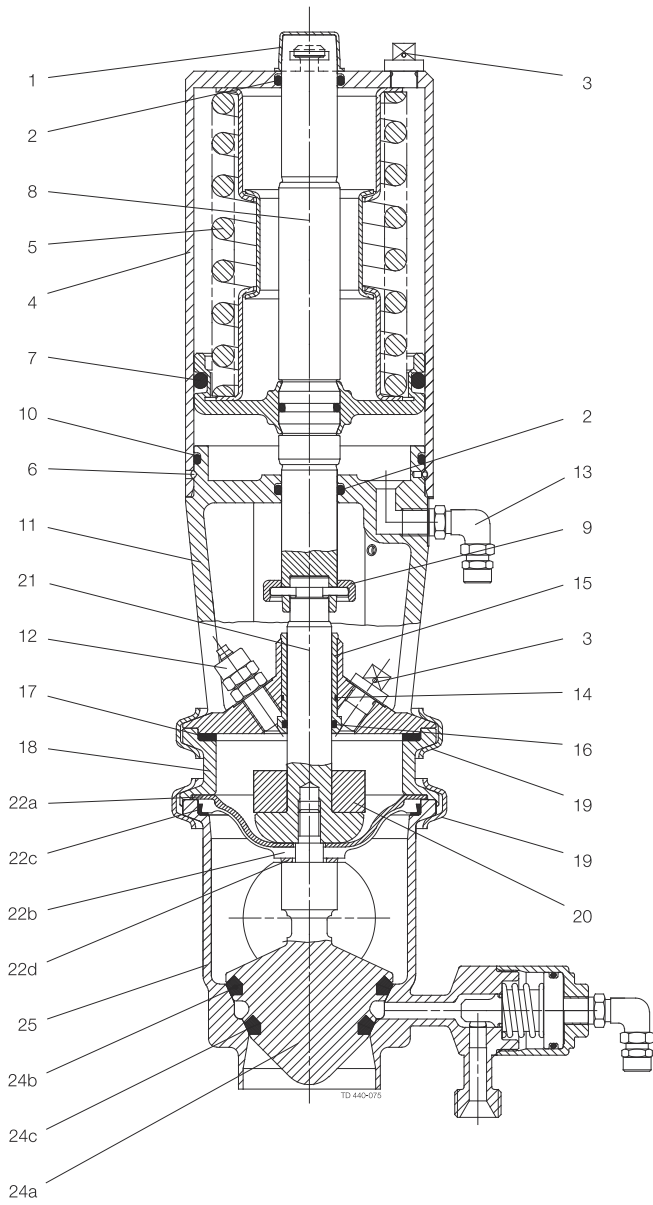
(76-101.6mm/DN80-100)



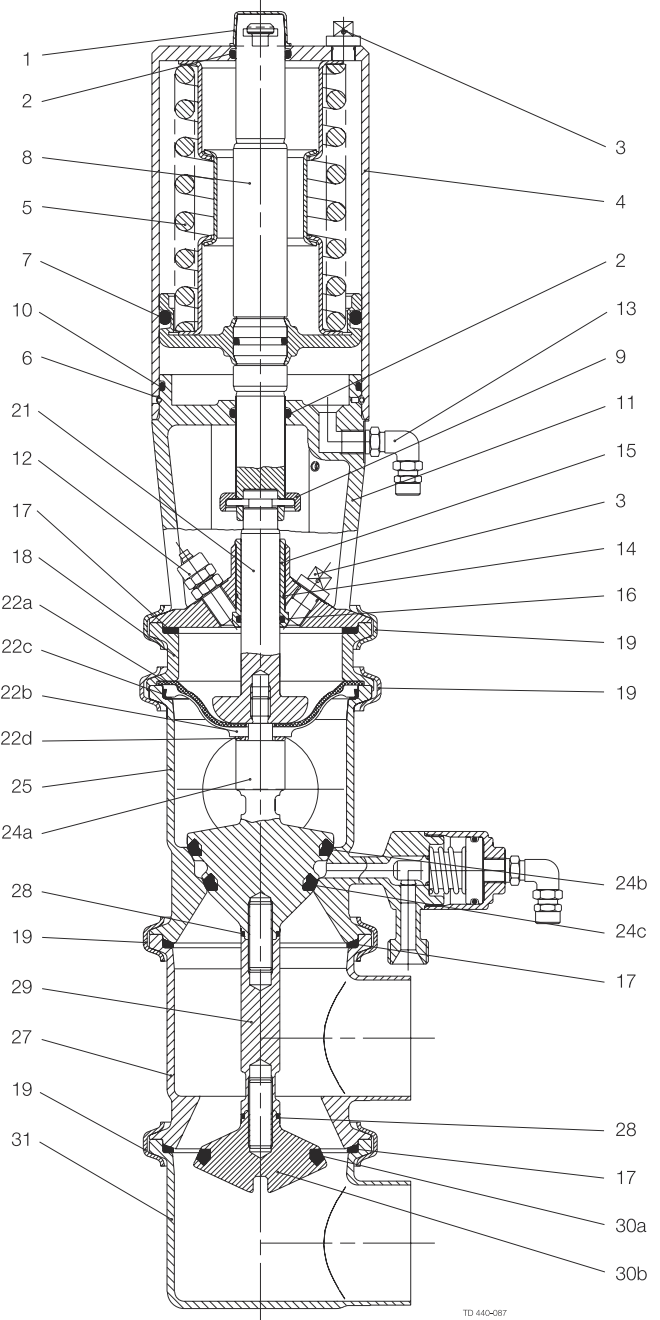
CIP/detecting valve



Stop valve



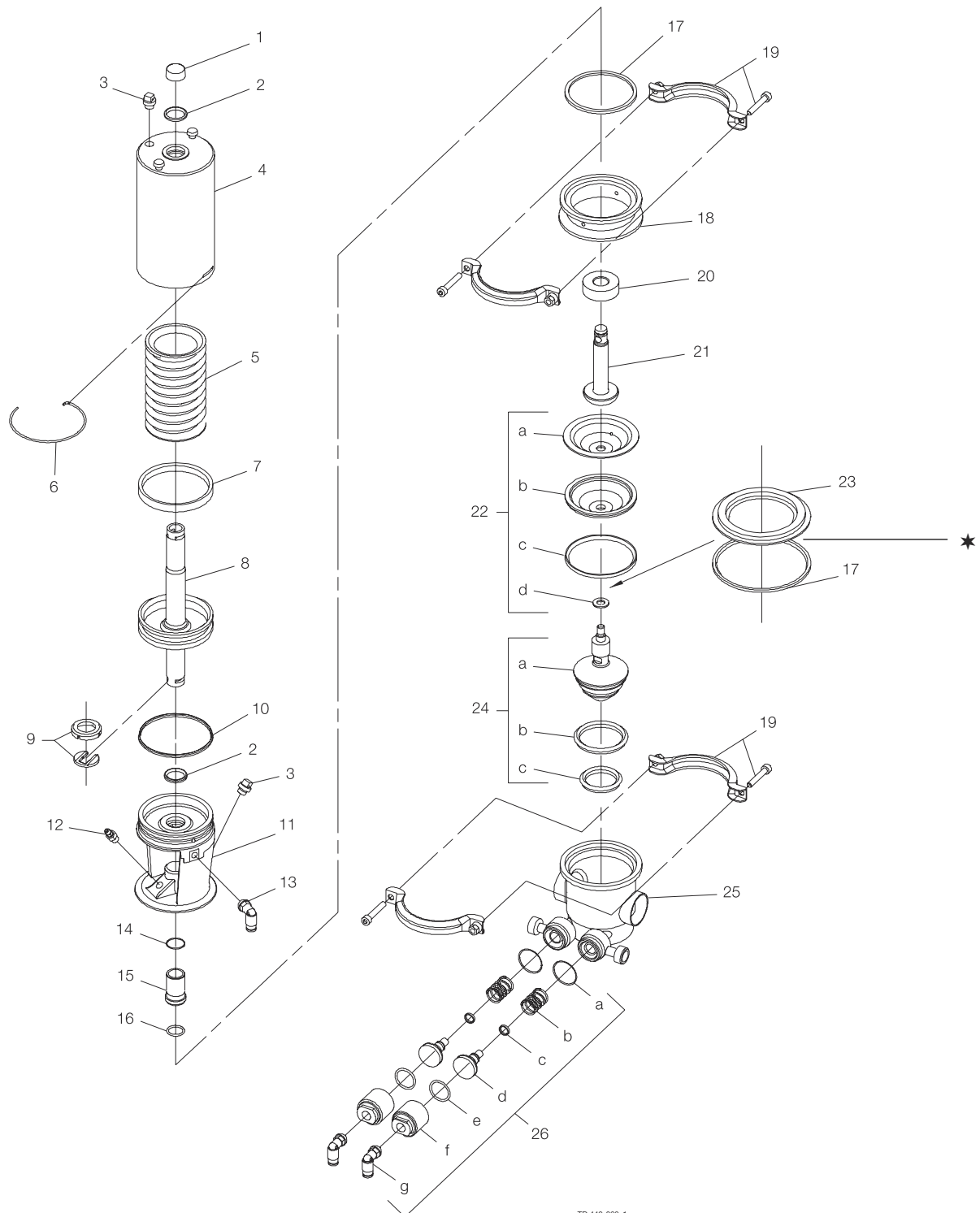
Change-over valve



9.2 Stop Valve

9.2.1 Parts Drawing

* Sizes 76-101.6 mm/DN80-100



TD 440-069_1

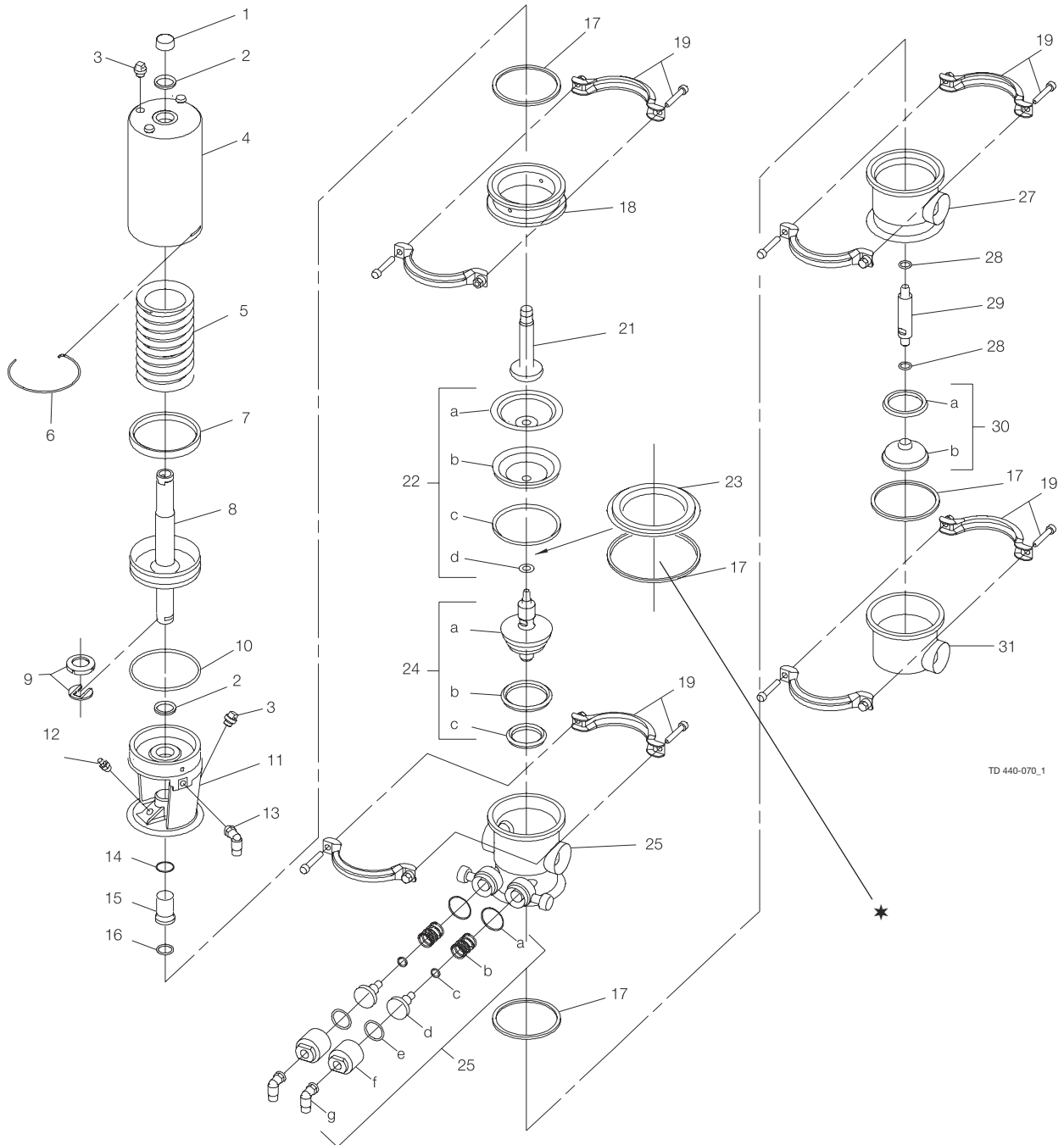
9.2.2 Parts List

Pos.	Qty	Denomination	Pos.	Qty	Denomination
		Actuator complete	21	1	Stem upper
1	1	Cap	22	1	Diaphragm set
2	2	O-ring	22a	1	Diaphragm support, EPDM
3	2	Plug	22b	1	Diaphragm, PTFE
4	1	Cylinder	22c	1	L-seal
5	1	Spring assembly	22d	1	Stem seal
6	1	Lock wire	23	1	Diaphragm ring
7	1	O-ring	24	1	Plug complete
8	1	Piston	24a	1	Plug
9	1	Clip, complete	24b	1	Seal ring
10	1	O-ring	24c	1	Seal ring
11	1	Bonnet	25	1	Valve body
12	1	Drain tube	26		Internal parts
13	1	Air fitting, swivel bend	26a	2	O-ring, NBR
14	1	O-ring bonnet	26b	2	Spring
15	1	Guide ring	26c	2	O-ring
16	1	O-ring stem	26d	2	Spindle
17	1	Seal ring	26e	2	O-ring, HNBR
18	1	Intermediate piece	26f	2	Plug
19	2	Clamp and screws	26g	2	Air fitting, swivel bend
20	1	Washer			

9.3 Change-over Valve

9.3.1 Parts Drawing

* Sizes 76-101.6 mm/DN80-100



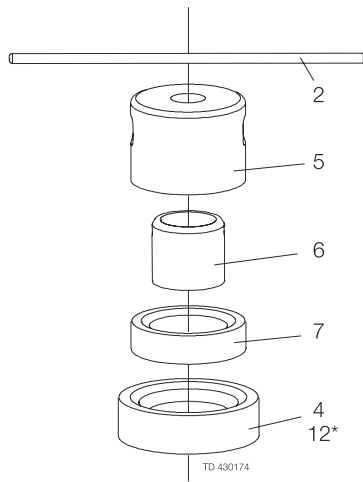
TD 440-070_1

9.3.2 Parts List

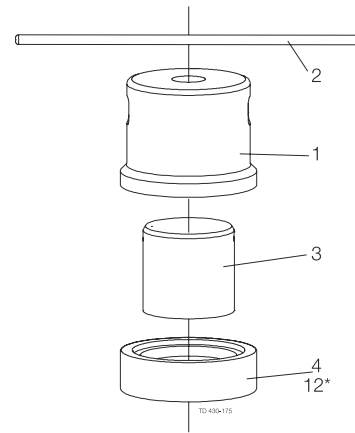
Pos.	Qty	Denomination	Pos.	Qty	Denomination
		Actuator complete	22c	1	L-seal
1	1	Cap	22d	1	Stem seal
2	2	O-ring	23	1	Diaphragm ring
3	2	Plug	24	1	Plug upper complete
4	1	Cylinder	24a	1	Plug upper
5	1	Spring assembly	24b	1	Seal ring
6	1	Lock wire	24c	1	Seal ring
7	1	O-ring	25	1	Valve body
8	1	Piston	26	1	Internal parts
9	1	Clip, complete	26a	2	O-ring, NBR
10	1	O-ring	26b	2	Spring
11	1	Bonnet	26c	2	O-ring
12	1	Drain tube	26d	2	Spindle
13	1	Air fitting, swivel bend	26e	2	O-ring HNBR
14	1	O-ring bonnet	26f	2	Plug
15	1	Guide ring	26g	2	Air fitting, swivel bend
16	1	O-ring stem	27	1	Valve body
17	3	Seal ring	28	2	O-ring
18	1	Intermediate piece	29	1	Stem lower
19	4	Clamp and screws	30	1	Plug lower complete
21	1	Stem upper	30a	1	Seal ring
22	1	Diaphragm set	30b	1	Plug lower
22a	1	Diaphragm support, EPDM	31	1	Valve body
22b	1	Diaphragm, PTFE			

9.4 Tool for Plug Seals

Tool for shut-off valve and change-over valve (upper plug)



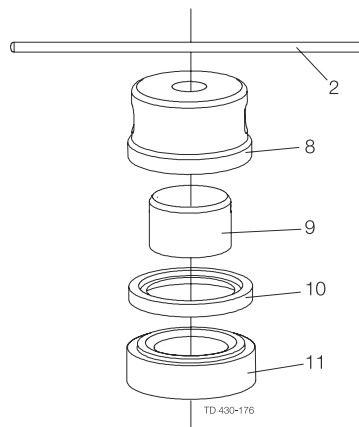
Small seal ring



Large seal ring

* Only for 38-51 mm/DN40-50 upper change-over plug (marking C8)

Tool for change-over valve (lower plug)



Lower valve plug

Parts list

Pos.	Qty	Denomination	Pos.	Qty	Denomination
1	1	Outer guide ring for large seal	7	1	Support part, upper plug
2	1	Pin for tool	8	1	Outer guide ring, lower plug
3	1	Inner guide ring for large seal	9	1	Inner guide ring, lower plug
4	1	Tool housing, upper plug	10	1	Support part, lower plug
5	1	Outer guide ring for small seal	11	1	Tool housing, lower plug
6	1	Inner guide ring for small seal	12	1	Tool housing, ch/o upper plug