Alfa Laval Controlled Rotating Retractor and Controlled Rotating Retractor UltraPure

Wall mounted cleaning nozzles

Lit. Code 200020000-1-EN-GB

Instruction manual

BRITISH ENGLISH

Published by
Alfa Laval Kolding A/S
Albuen 31
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The original instructions are in English

Contents

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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

Wall Mounted Cleaning Device

Designation

Controlled Rotating Retractor, Controlled Rotating Retractor UltraPure

Type

Serial number from 2023-0001 to 2030-99999

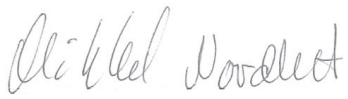
Serial number

is in conformity with the following directives with amendments:

- Machinery Directive 2006/42/EC

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

Vice President Business Unit Hygienic Fluid Handling and Heat Transfer Technologies, Head of Product Management	Mikkel Nordkvist
Title	Name
Kolding, Denmark	1 June 2026
Place	Date (YYYY-MM-DD)



Signature

DoC Revison_ 01_062026

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

Wall Mounted Cleaning Device

Designation

Controlled Rotating Retractor, Controlled Rotating Retractor UltraPure

Type

Serial number from 2023-0001 to 2030-99999

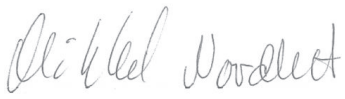
Serial number

is in conformity with the following directives with amendments:

- The Supply of Machinery (Safety) Regulations 2008

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

Vice President Business Unit Hygienic Fluid Handling and Heat Transfer Technologies, Head of Product Management	Mikkel Nordkvist
Title	Name
Kolding, Denmark	1 June 2026
Place	Date (YYYY-MM-DD)



Signature

DoC Revison_ 01_062026

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.
	Corrosive substance.
	Hot surface and burning danger.
	Cutting danger.
	Heavy object lifting.

	Transportation with forklift truck or other industrial vehicles if heavy.
	Electricity.
	Danger of injury (lasermarked on the actuator). Do **not** attempt to disassemble the actuator due to spring under load danger! (The lock wire opening is blocked).
	Danger of injury (lasermarked on the actuator). Do **not** attempt to cut open actuator due to spring under load danger! (The lock wire opening is blocked).
	Danger of injury (laser marked on actuator). Do **not** attempt to cut the actuator open due to spring under load (the lock wire opening is blocked).

2.2 Safety precautions

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

Transportation and lifting

	**Always** ensure that personnel must have experience with lifting operations. **Always** ensure that the personnel use the correct protective equipment.
	**Always** ensure that compressed air is released.
	**Always** ensure that all connections are disconnected before attempting to remove the machine from the installation.
 	**Always** use predesigned lifting points if defined. Ensure that the lifting equipment is suitable for the machine. **Always** ensure the lifting point to be in line with centre of gravity. Adjust lifting point if necessary. **Always** use appropriate lifting equipment for heavy parts when relevant. Use lifting logs when available.
	**Always** keep an eye on the load and stay clear during the lifting operation.
	**Always** drain liquid out of the machine before transportation.
	**Always** ensure sufficient fixing of the machine during transportation - if specially designed packaging material is available, it must be used.
	**Always** use original packaging or similar during transportation.

Installation

	**Always** follow this Instruction manual thoroughly. Before installing the machine and setting it into operation carefully read *Safety* on page 9, *General installation* on page 29 and *Operation* on page 37.
	**Ensure** that the machine is compatible with the product and CIP media.
	**Never** dismantle or touch the machine or pipelines when processing hot fluids or when sterilising.
	**Ensure** that the tank being cleaned does not contain a combustible liquid or vapor having a risk of ignition or explosion. Any tank cleaning machine can develop a static electricity charge while in operation.
	**Always** ensure all pipelines (product, air, and water) are depressurized and emptied before installation, inspection, assembling and disassembling. **Always** assemble the machine completely before start and make sure everything is in place and properly tightened.
	**Ensure** that the tank cleaning device is properly grounded if the tank being cleaned contains a combustible liquid or vapor having a risk of ignition or explosion. Any tank cleaning device can develop a static electricity charge while in operation.
	**Always** release compressed air after use.
	**Never** work on the machine or touch moving parts if the actuator is supplied with compressed air.
	Do **NOT** attempt to disassemble the actuator due to spring under load danger! Do **NOT** attempt to cut the actuator open due to spring under load.

Operation

	**Always** follow this Instruction manual thoroughly. Before installing the machine and setting it into operation carefully read *Safety* on page 9, *General installation* on page 29 and *Operation* on page 37.
	**Ensure** that the machine is compatible with the product and CIP media. **Always** take necessary precautions if leakage occurs as this can lead to hazardous situations. If the liquid or vapor is hot, corrosive, or toxic, a leak would present a serious hazard to any personnel in the immediate vicinity or to any exposed electrical equipment. **Always** rinse well with clean water after cleaning. **Always** handle lye and acid with great care. **Always** follow the instructions in the safety data sheets from the suppliers of cleaning agents, detergents, oils etc.
	**Never** operate the machine unless it is properly mounted or installed.
	**Never** dismantle or touch the machine or pipelines when processing hot fluids or when sterilising.
	**Ensure** every tank opening is covered before operating the tank cleaning device. These covers should be sealed well enough to withstand the full force of the liquid hitting the covers.
	**Always** release compressed air after use.
	**Never** work on the machine or touch moving parts if the actuator is supplied with compressed air.
	**CAUTION** Do **not** operate actuator with cleaning media pressure on.

Maintenance

	**Always** follow this Instruction manual thoroughly. Before maintaining the machine, carefully read *Maintenance* on page 41.
	**Always** rinse well with clean water prior to maintenance.

	**Always** ensure all pipelines (product, air, and water) are depressurized and emptied before installation, inspection, assembling and disassembling. **Always** assemble the machine completely before start and make sure everything is in place and properly tightened.
	**Never** dismantle or touch the machine or pipelines when processing hot liquids or when sterilising.
	**Always** release compressed air after use.
	**Never** work on the machine or touch moving parts if the actuator is supplied with compressed air.
	Do **NOT** attempt to disassemble the actuator due to spring under load danger! Do **NOT** attempt to cut the actuator open due to spring under load.

Storage

	Alfa Laval recommends: • Store the supplied Alfa Laval product as supplied in original packaging • Port opening(s) should be protected against 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) • Rinse the supplied Alfa Laval product with clean water before storage

Noise

	One meter from and 1.6 meter above the exhaust, the noise level of an actuator is approximately 77 dB(A) without noise damper and approximately 72 dB(A) with damper – measured at 7 bar air-pressure.

Hazards

 	**Burn Hazard** Various surfaces of the supplied Alfa Laval product and CIP supply line can be hot and cause burns. Wear protective gloves.

Corrosive Hazard

Always handle cleaning liquids (e.g., lye and acid) with great care and in accordance with separate instructions for those fluids.

Always follow the general rules and recommendations regarding ventilation, personnel protection etc. when using chemical cleaning agents and lubricants.

Cut Hazard

- Sharp edges, especially on the spray orifice, can cause cuts. Wear protective gloves
- 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.

DANGER

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

WARNING

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

CAUTION

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

NOTE

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

DANGER

If the actuator is marked with one of the below warnings, do NOT attempt to disassemble it.

The spring inside is under load — any type of breakage or attempt to open the actuator can lead to severe injury or even death!

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.

2.6 How to contact Alfa Laval

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

Please visit *http://www.alfalaval.com* to access the information directly.

3 Introduction

Alfa Laval Controlled Rotating Retractor

The Alfa Laval Controlled Rotating Retractor is a high-performance, resource-efficient CIP cleaning device that uses up to 55% less water and delivers up to 100x higher cleaning efficiency than static spray balls. Its extended reach, adjustable rotation speed, low maintenance, and real-time monitoring help reduce installation and operating costs. It also maximizes uptime, ensuring thorough cleaning of hard-to-access areas – even where devices cannot remain in place during operation.

Alfa Laval Controlled Rotating Retractor UltraPure

The Alfa Laval Controlled Rotating Retractor UltraPure is a hygienic rotating retractor for cleaning-in-place (CIP) of hard-to-access processing areas. This retractable CIP device uses up to 55% less water and delivers up to 100x higher cleaning efficiency than static spray balls. Its extended cleaning reach, adjustable rotation speed, low maintenance, and real-time monitoring help reduce installation and operating costs. It also maximizes uptime, ensuring thorough cleaning of hard-to-access areas– even where devices cannot remain in place during operation.

3.1 General description

This Instruction manual has been prepared as a guide for installing, operating, and maintaining the supplied Alfa Laval product. Should you require further assistance, Alfa Laval Technical Sales Support department and worldwide network of sales offices are pleased to help you. Please quote the type, article, and serial numbers with all your enquiries; this helps us to help you.

Refer to *Marking* on page 26 for placement of type and serial number.

Preventive maintenance gives the best and most economical performance from the supplied Alfa Laval product. For maintenance recommendation see *Maintenance* on page 41.

NOTE

If the supplied Alfa Laval product stops working unintentionally within the warranty period, please contact Alfa Laval Technical Sales Support department or worldwide network of sales offices. Please do not try to fix any mechanical problems on your own.

The drawing indicates the main components of the supplied Alfa Laval product.

A: Air supply inlet

B: Actuator

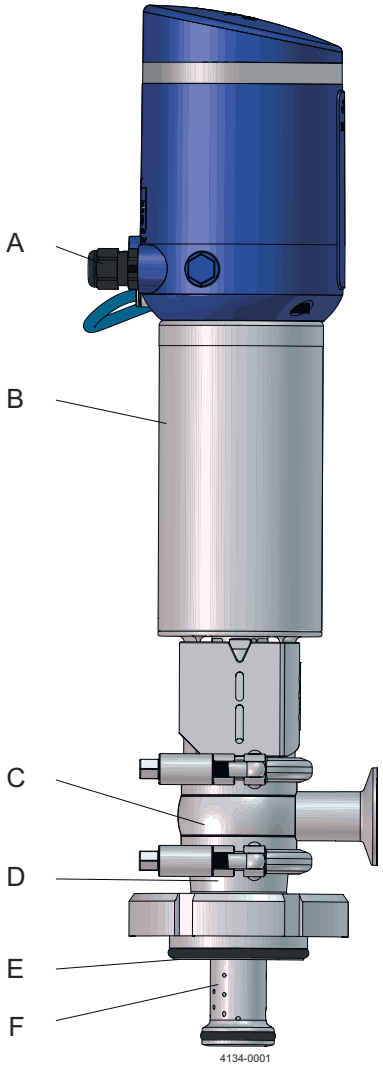
C: Inlet house

D: Process adaptor

E: Process connection

F: Spray part

G: ThinkTop V70



3.1.1 Intended use

For the purpose of this Instruction manual, tanks are defined as any compartment e.g., vessels, containers, semi-closed equipment ducts.

The end-user should verify:

- that the tank cleaning device is in conformity with respect to tank size in which it is used
- that the construction materials (both metallic and nonmetallic) are compatibility with product, flushing media, cleaning media, temperatures, and pressure under the intended use

The tank cleaning device is intended for use in closed tanks. If used in open environment see instructions in *Safety* on page 9 and *General installation* on page 29.

The wetted parts of the machine (see) can be used in explosive hazard zones , provided it is installed according to safety instructions in local regulations.

The Alfa Laval Controlled Rotating Retractor is designed for closed tanks and process equipment with moving internals, and processes where permanently

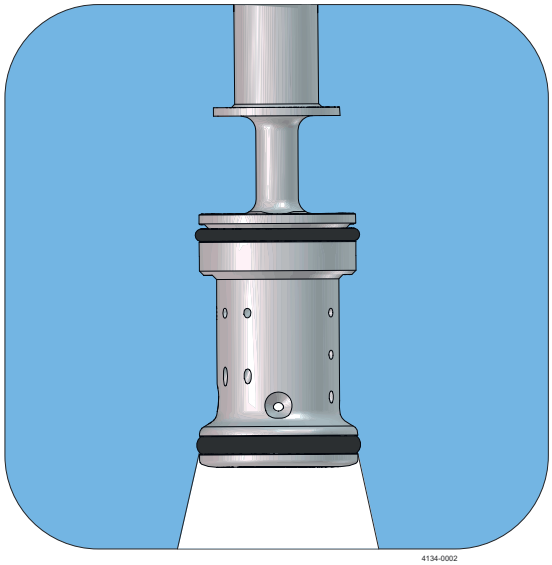
installed tank cleaning devices may have an undesired influence on the process or product. For larger tanks, multiple Alfa Laval Controlled Rotating Retractors may be applied.

3.1.2 Working principle

The Alfa Laval tank cleaning device is pneumatic driven and media lubricated.

The Alfa Laval Controlled Rotating Retractor functions as a pneumatic open and a spring close seat valve. Applying air to the primary plug in the actuator extended the spray part out of the Inlet house.

The Alfa Laval Controlled Rotating Retractor is a sanitary tank cleaning device of the rotating spray type for permanent installation. In the closed position, the installation forms a flush design with the tank wall and the spray part is out of the product. It provides a 345 degrees cleaning pattern.



Spray pattern 345°

The cleaning media is directed through the 1” tri-clamp inlet connection into the inlet house. Adaptors for other inlet connections are available (see *Inlet connection adaptors* on page 69). The liquid passes through openings in the spray part and out through the orifices.

Applying air to alternating sides of the secondary plug in the actuator converts a linear movement to a reciprocal radial movement. The rotation speed can be adjusted by the throttle valves (see *Unpacking/delivery* on page 27). The axial position of the spray part is monitored by the ThinkTop. The axial movement of the secondary plug (and thereby the rotation of the spray part) is monitored by the ThinkTop.

Alternating air in the actuator is controlled by the ThinkTop build in software or, alternatively programmed in the PLC by the end user (see *Appendix B - ThinkTop setup* on page 83 for detailed information).

The spray part is retracted by spring action to its closed position when diverting the air pressure away from the actuator.

The actuator can remain extended during a draining or purging phase. For purging recommentations see 3-A accepted practices "604-5 Supplying Air

Under Pressure in Contact With Milk, Milk Products and Product Contact Surfaces."

Application assistance and optimal position recommendation is available by contacting Alfa Laval Technical Sales Support department or worldwide network of sales offices.

3.1.3 Design principle

The supplied Alfa Laval product is designed in accordance with the 3-A Sanitary Standards No. 78-04 as well as the guidelines of the European Hygienic Design Group (EHEDG) wherever feasible and thus complies with requirements to design, materials, surface finish and documentation.

The machine is completely self-cleaning except for the part of the plug facing towards the product. This surface is normally cleaned by a second tank cleaning device. When properly installed the machine is self-draining, see *Draining* on page 31.

- All permanent assemblies are fully welded
- No threads have been used in the product and cleaning media contact area
- Gaskets and seals are exposed to cleaning liquid

The product contact surface materials are (for specific information see *Technical Data* on page 61):

- Metals: AISI 316 stainless steel (or better corrosion-wise)
- Elastomers: complies with relevant food contact legislation (e.g., FDA, EU regulation) and pharma standards (e.g., USP 87, USP 88 Class VI, ISO 10993). For further details see Alfa Laval Anytime for specific Parts IDs
- Polymers: complies with relevant food legislation (e.g., FDA, EU 10/2011) and pharma standards (e.g., USP 87, USP 88 Class VI, ISO 10993). For further details see Alfa Laval Anytime for specific Parts IDs

The tank cleaning device is lubricated by the cleaning media. No oil, grease or other lubricants are used in the product contact area.

3.2 Patents and trademarks

This Instruction Manual is published by Alfa Laval Kolding A/S without any warranty. Improvements and changes may at any time be made by Alfa Laval Kolding A/S without prior notice. Such changes are incorporated in new editions.

The Alfa Laval logotype is a trademark or a registered trademark of Alfa Laval Corporate AB.

Other products or company names mentioned herein may be the trademarks of their respective owners. Any rights not expressly granted herein are reserved.

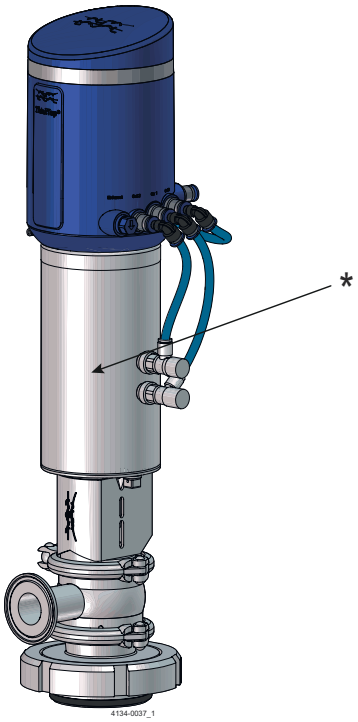
3.3 Quality system

The supplied Alfa Laval product is produced according to Alfa Laval Kolding´s ISO 9001 international standard certified quality system.

3.4 Marking

Alfa Laval tank cleaning devices are marked to allow for recognition of machine designation, machine type, serial number and manufacturing address.

The marking is placed on the tank cleaning device as shown below.



* Marking area

Serial number explanation

Machines supplied with standard documentation:

yyyy-xxxxx: serial number

yyyy: year

xxxxx: 5 digit sequential number

4 Installation

Every machine is operationally tested before shipment and is ready to run after unpacking. No assembly is required prior to use. Any change to the operating conditions provided in this Instruction manual affects the performance of the machine.

4.1 Unpacking/delivery

WARNING **Air supply**

Always connect air supply hose to push-in fitting. Make sure that the air supply hose is fitted properly. To reduce risk of whiplash, fasten air supply hose to other supply lines as close to the push-in fitting as practically possible.

NOTE

Alfa Laval cannot be held responsible for incorrect unpacking.

Always read *Safety precautions* on page 12.

Always read *Technical Data* on page 61.

Unpacking and initial inspection

- Check delivery note
- Remove packing material from the machine
- Inspect the machine for visible transport damage
- Avoid damaging the machine

During handling and installation, handle the machine with care to not damage the surface finish of the machine.

The machine has been tested at the factory before shipping in accordance with the Test Specifications.

Upon arrival, check that the machine is in operating condition using one the two options below.

For both options start with the following:

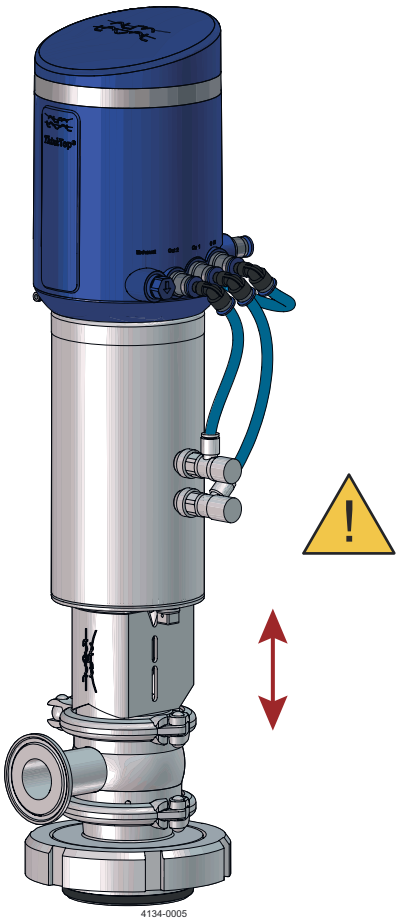
1. Attach the ThinkTop (17) to the top of the actuator.
2. Attach air hoses (19, 20 and 21) as shown in .
3. Attach air supply to the ThinkTop (17).
4. Supply compressed air to the ThinkTop (17).

Automate set-up

1. Perform Start-up and Auto-setup as shown in *Appendix B - ThinkTop setup* on page 83.
2. Check is complete.

Manual check

1. Open and close the valve several times to ensure it operates smoothly by manually operating the solenoide valves on the ThinkTop (see ThinkTop Instruction manual for more information).
2. Activate solenoide valve 3 - wait for the spray part to extended completely - keep valve 3 activated.
3. Activate solenoide valve 1 for 2 sec - no or very little rotation takes place - then deactivate.
4. Activate solenoide valve 2 until the spray part is done rotating clockwise direction (10 to 15 sec) (seen from the end of the spray part) - then deactivate.
5. Activate solenoide valve 1 until the spray part is done rotating counter clockwise direction (seen from the end of the spray part) - then deactivate.
6. Deactivate solenoide valve 3.
7. Check is complete.



If the spray part (3) does not extend or the spray part (3) does not turn freely, contact Alfa Laval Technical Sales Support department or worldwide network of sales offices.

4.2 General installation

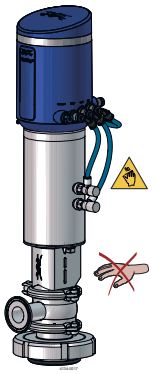
DANGER

If the actuator is marked with one of the below warnings, do NOT attempt to disassemble it.

The spring inside is under load — any type of breakage of the actuator can lead to severe injury or even death!

WARNING

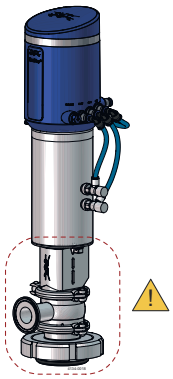
Never touch moving parts if the actuator is supplied with compressed air.



CAUTION **Avoid stressing the valve**

Pay special attention to:

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



WARNING **Air supply**

Always connect air supply hose to push-in fitting. Make sure that the air supply hose is fitted properly. To reduce risk of whiplash, fasten air supply hose to other supply lines as close to the push-in fitting as practically possible.

WARNING **Prevent startup**

Precaution shall be made to prevent starting the cleaning operation, while personnel are inside the tank or otherwise can be hit by water jets from the cleaner head.

NOTE

Alfa Laval cannot be held responsible for incorrect installation.

Always read *Safety precautions* on page 12.

Always read *Technical Data* on page 61.

Always release compressed air after use.

Always thoroughly flush all supply lines and machines before installation to remove remains from welding, grinding, scale and other foreign matter.

Always install the machine in accordance with national regulations for safety and other relevant regulations and standards. In EU-countries the complete system must fulfil the EU-Machinery Directive and depending on application, the EU-Pressure Equipment Directive and other relevant Directives, and shall be CE-marked before it is set into operation.

4.2.1 Installation orientation

To be operational, the supplied Alfa Laval product should be installed in the recommended orientation, as provided below. If required, the installation shall be made so that self-draining properties (see *Draining* on page 31) of the machine is ensured.

NOTE **Recommended installation orientation**

Any orientation.

4.2.2 Process setup recommendation

To separate the CIP system from the process it is recommended to install a shutoff valve close to the machine inlet.

CAUTION

It is recommended that the liquid valve fitted is of a type that prevents hydraulic shocks. Hydraulic shocks may cause severe damage to the machine and/or the entire installation. Ideally, use a frequency controlled pump with a ramp function for start-up to supply the cleaning liquid.

4.2.3 Strainer recommendations

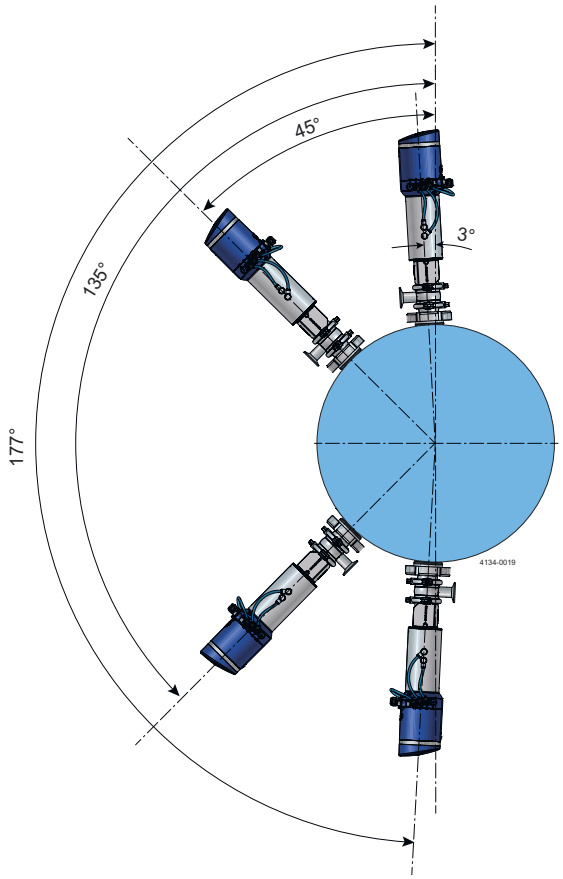
Larger particles may get trapped by the spray orifice, while smaller particles (e.g., fine sand) may be trapped by the smaller clearances of the machine and increase wear. Magnitude of the issues relies on the particle shape and properties (e.g., soft vs. hard). Experience shows that Alfa Laval tank cleaning devices may operate with strainer sizes larger than recommended below. Contact Alfa Laval Technical Sales Support department or worldwide network of sales offices.

For low amounts of particles in the recirculating CIP liquid larger particles should be avoided and in this case a 0.250 mm strainer may be sufficient for a reliable operation. However, particles up to 0.8 mm can pass the spray orifice in the rotor.

For high amounts of particles in the recirculating CIP liquid, it is recommended to install a strainer according to the smallest clearance in the machines. For the Alfa Laval Controlled Rotating Retractor, a strainer of 0.9 mm is recommended.

4.2.4 Draining

The supplied Alfa Laval product is drainable by gravity when positioned from 3 degrees to 45 degrees and from 135 degrees to 177 degrees to vertical upwards. From 45 degrees to 135 degrees up to 2.0 ml may be retained (the volume depends on the stop position of the spray part and the process connection).



4.2.4.1 2 inch clamp connection

Closing process performed and a 30 sec cleaning process (without liquid) will results in:

3 - 45 degrees:	Drainable
45 - 135 degrees:	Max. 2.0 ml
135 - 177 degrees:	Drainable

WARNING **Improved draining**

Operation for improved draining for orientation between 0 degrees and 45 degrees:

If dried in open position before closing the Alfa Laval Controlled rotating retractor, liquid may get trapped within the Alfa Laval Controlled rotating retractor.

Closing and opening the retractor and let it rotate for 30 sec before drying is highly recommended.

Contact Alfa Laval for further information.

4.2.4.2 3 inch RJT, DN80 clamp and 3 inch clamp

Closing process performed and a 30 sec cleaning process (without liquid) will results in:

3 - 45 degrees:	Drainable
45 - 135 degrees:	Max. 0.045 ml
135 - 177 degrees:	Drainable

WARNING **Improved draining**

Operation for improved draining for orientation between 0 degrees and 45 degrees:

If dried in open position before closing the Alfa Laval Controlled rotating retractor, liquid may get trapped within the Alfa Laval Controlled rotating retractor.

Closing and opening the retractor and let it rotate for 30 sec before drying is highly recommended.

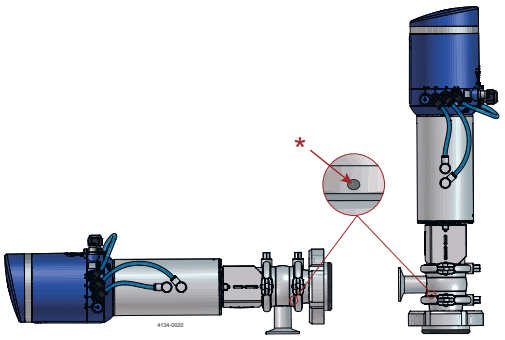
Contact Alfa Laval for further information.

Leak detection hole on inlet house

Make sure that the leak detection hole in the inlet house:

1. is visible, when mounting the retractor vertically.
2. is pointing downwards to allow leaking liquid do drain by gravity, when mounting the retractor horizontally.

* = Indicates leakage detection hole



4.2.5 Welding recommendation

> **NOTE**
>
> For installation of weld plate see *Appendix A - Weld plate installation* on page 81.

4.2.6 Attachment to supply line

> **NOTE**
>
> It is recommended to have a separate CIP supply line for each machine. If installed on a common CIP supply line, make sure that either:
>
> 1. each machine has the correct pressure at the inlet to each machine, or
> 2. only one of the machines runs at a time with the correct inlet pressure.

The machine is attached to the CIP supply line using the inlet connection.

For rigid supply lines, the inlet connection should align with the CIP supply line. Alternatively, flexible supply lines can be used.

4.2.7 Installation of externally mounted tank cleaning devices

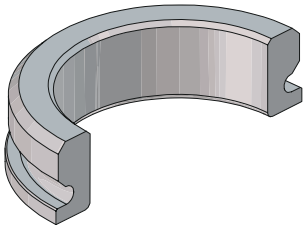
The machine shall be mounted into or onto the designate welded process connection (see *Weld plates* on page 68) using appropriate fasteners.

> **NOTE**
>
> For full functionality the installation should be made so the end of the wall mounted cleaning device is flush (L/D ~ 0) with the tank wall.

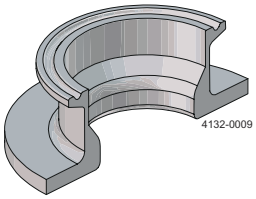
Alfa Laval Controlled Rotating Retractor fits into several types of weld plates. See *Weld plates* on page 68.

In principle, there are two different types of weld plates:

Insertion type



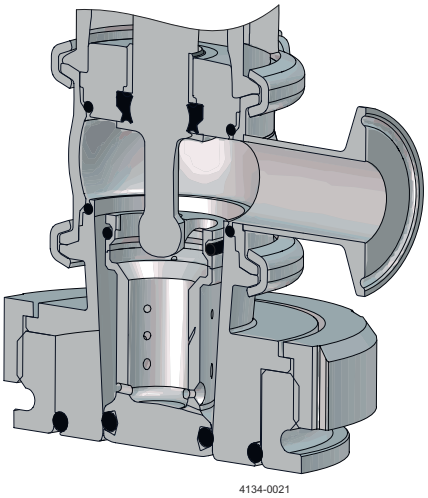
Attachment type

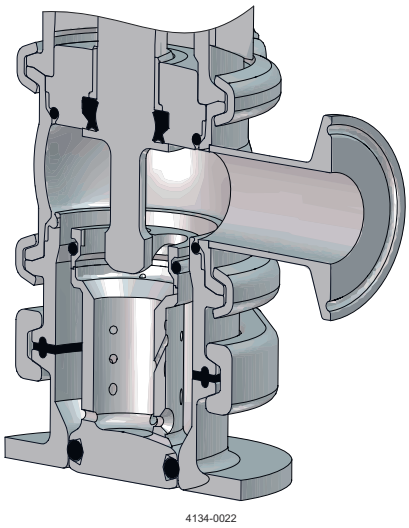


NOTE

For installation of weld plate please refer to *Weld plates* on page 68.

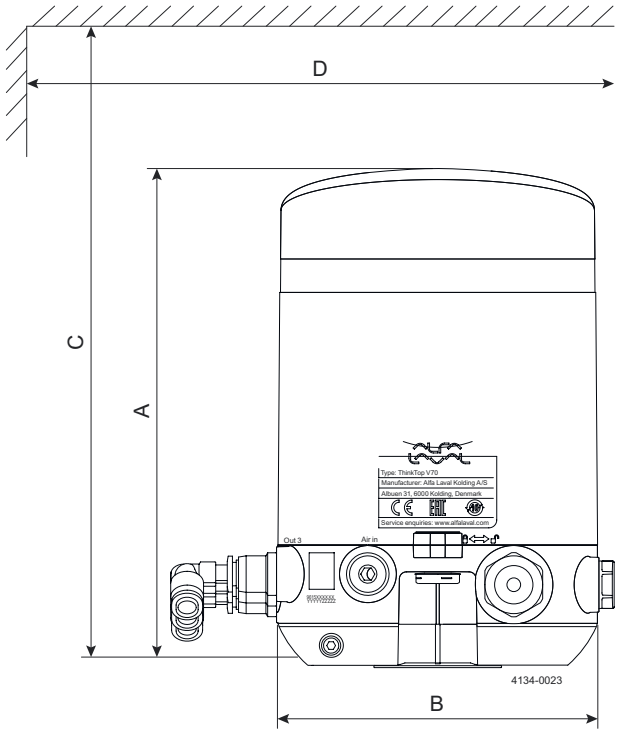
For the insertion type, the machine comes with a fully integrated home chamber (process adapter attached to the inlet house) that is inserted into the weld plate and attached by either a nut or a clamp connection. This nut or clamp is neither in product- nor cleaning media-contact. Before insertion, wet the O-ring going into the weld flange.





For the attachment type, the machine and the weld adaptor create the home chamber when the process adapter is attached to the weld plate. Attachment is done by a clamp connection. The gasket in this connection is in cleaning media-contact.

Dimensions mm	
A	164.0 mm
B	105.0 mm
C	250.0 mm
D	170.0 mm



4.2.8 Recommended installation (spacing)

Reserved for future content.

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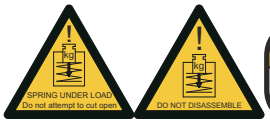
5 Operation

DANGER

If the actuator is marked with one of the below warnings, do NOT attempt to disassemble it.

The spring inside is under load — any type of breakage or attempt to open the actuator can lead to severe injury or even death!

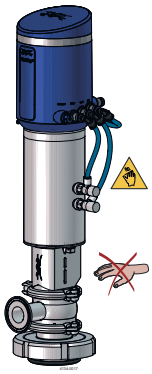


WARNING **Prevent startup**

Precaution shall be made to prevent starting the cleaning operation, while personnel are inside the tank or otherwise can be hit by water jets from the cleaner head.

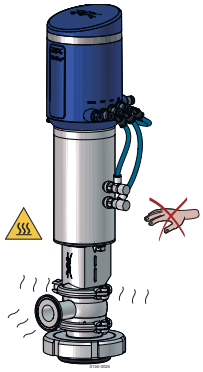
WARNING

During operation, **never** touch moving parts if the actuator is supplied with compressed air.



WARNING

Never touch the supplied Alfa Laval product and the pipelines when processing hot fluids or when sterilising.



CAUTION

Always handle CIP and SIP chemicals with great care.

Always use rubber gloves!

Always use protective goggles!

Always rinse with clean water after using a cleaning agent.

NOTE

Alfa Laval cannot be held responsible for incorrect operation.

Always read *Safety precautions* on page 12.

Always read *Technical Data* on page 61.

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

NOTE

Always store/dispose cleaning agents in accordance with current regulations/ directives.

5.1 Normal operation

WARNING **Air supply**

Always connect air supply hose to push-in fitting. Make sure that the air supply hose is fitted properly. To reduce risk of whiplash, fasten air supply hose to other supply lines as close to the push-in fitting as practically possible.

NOTE **Media**

Only use media compatible with materials shown in chapter *Technical Data* on page 61.

Never use aggressive chemicals, excessive concentrations of chemicals at elevated temperatures, as well as certain solvents hydrochlorides. If you are in doubt, contact your local Alfa Laval sales office.

PEEK is not resistant to concentrated sulfuric acid. Normal detergents, moderate solutions of acids and alkalis are acceptable.

EPDM exposed to fatty materials may swell significantly. For milk fat specifically, the fat content shall not exceed 8% for the EPDM used in the machine.

NOTE **Temperature**

Never exceed 95°C (203°F) when flowing cleaning media through the machine. However, the machine withstands surrounding temperatures of up to 150°C (302°F).

NOTE **Pressure**

Always check that the CIP process connections are correctly mounted.

Always apply media pressure gradually to avoid hydraulic shocks. Hydraulic shocks might stress mechanical parts.

Always see *Technical Data* on page 61 for recommended and maximum operating parameters.

NOTE **Vessel drainage**

Ensure the tank bottom is drained during cleaning.

Ensure tank bottom is pitched toward an opening large enough to avoid liquid buildup or puddling.

Always use a scavenger or suction pump if gravity is insufficient to avoid liquid buildup.

5.2 Recommended cleaning

The internal surfaces of the tank cleaning device are cleaned by the cleaning liquid passing through the tank cleaning device. The external surfaces of the spray part are cleaned by cleaning liquid expelled from the tank cleaning device itself, either as targeted cleaning or free falling film cleaning. The surfaces of the tank cleaning device exposed to the inside of the tank not targeted by cleaning liquid from the tank cleaning device itself are cleaned by the cleaning liquid sprayed on the surfaces from a second tank cleaning device.

- After use, flush the machine with fresh water
- Cleaning media should never be allowed to dry or remain in the system due to possible "salting out" or "scaling" of the cleaning media. If cleaning media contains volatile chloride solvents, it is recommended not to flush with water after use, as this might create hydrochloric acid
- Hot chemical may be used for cleaning and sterilization. If steaming is needed, contact you local Alfa Laval office for recommendation
- Protect against scalding and burning

5.3 Troubleshooting

NOTE

Study the maintenance instructions carefully before replacing worn parts – see *Maintenance* on page 41.

DANGER

If the actuator is marked with one of the below warnings, do NOT attempt to disassemble it.

The spring inside is under load — any type of breakage of the actuator can lead to severe injury or even death!

Problem	Possible causes	Action
Leakage at piston	• Worn or damaged lipseal	• Replace lipseal
Leakage at clamp connections	• Worn or damaged O-rings	• Replace O-ring
Leakage at seal towards product zone	• Worn or product affected plug seal • Product deposit on seal and or seat	• Replace seal • More frequent cleaning
Piston is not restoring to original position	• Damaged actuator • Foreign objects in inlet house	• Replace actuator • Inspect inlet house and remove foreign objects
Poor cleaning performance	• Insufficient flow/pressure	• Refer to the pressure-flow graph to reconfirm the recommended operating conditions at the device • Reconfirm minimum flow rate recommended for size of surface being cleaned (e.g., based on ASME BPE recommendations)
	• Incorrect cleaning media	• Verify temperature and concentration of the cleaning media
	• Insufficient time	• Verify cleaning time
	• Debris in the orifice	• Inspect orifice and remove debris
	• Poor drainage of tank	• Ensure the tank drains cleaning liquid at a rate equal to or higher than the flow rate of all tank cleaning devices.

6 Maintenance

DANGER

If the actuator is marked with one of the below warnings, do NOT attempt to disassemble it.

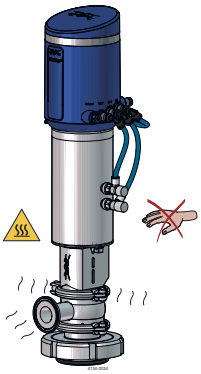
The spring inside is under load – any attempt to open the actuator can lead to severe injury or even death!

WARNING

Never touch moving parts if the actuator is supplied with compressed air.

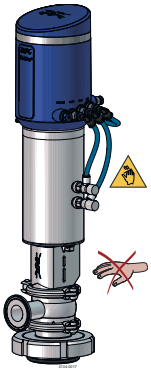
WARNING

Never touch the supplied Alfa Laval product and pipelines when processing hot liquids or when sterilising.



CAUTION

During maintenance, caution is needed when the actuator is supplied with compressed air. Only touch moving parts with tools.



NOTE

Alfa Laval cannot be held responsible for incorrect maintenance.

Always read *Safety precautions* on page 12.

Always read *Technical Data* on page 61.

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

Alfa Laval recommend keeping service kits in stock to optimise uptime of your equipment.

6.1 Preventive maintenance

NOTE

Always handle the machine with care. Take proper action to protect fine surfaces from being damaged.

Use only proper tools (e.g., the Alfa Laval standard tool kit). **Never** force or hammer components together or apart. **Always** perform all assembly/ disassembly steps in the order described in this Instruction manual.

Never assemble components without previous cleaning. This is especially important at all mating surfaces.

Work in a clear well-lighted work area.

Always use Alfa Laval genuine spare parts.

To optimise the operation of the machine and to minimize the downtime due to repair activities, the maintenance should consist of:

- **Inspection and maintenance:** 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 shall be replaced or repaired
- **Stock of Alfa Laval genuine spare parts:** Alfa Laval recommends keeping a stock of genuine spare parts facilitating preventive maintenance and reducing down time in case of unplanned breakdowns

NOTE

According to “Regulation (EC) No 1935/2004 - Article 17” effective from 27th of October 2006, producers of food shall ensure traceability of the materials and articles intended to come into contact with foodstuffs. It is recommended that a traceability system is setup for replacement of wear parts and spare parts. This makes it possible to identify into which machine a given wear part or spare part has been inserted.

The recommended preventive maintenance program provided in *Recommended service intervals* on page 43 is based on tank cleaning devices working in average conditions. However, a tank cleaning device,

exposed to heavy soiling and recirculation CIP liquid containing abrasives and/or particulates needs more frequent attention than one exposed to light/no soiling and recirculation with ordinary CIP liquid. Alfa Laval Kolding A/S recommends that you adjust the maintenance program to suit the cleaning task in hand. Contact your local Alfa Laval sales office for discussion.

For further information regarding Alfa Laval Service Kits and service intervals, see *Recommended service intervals* on page 43.

Maintenance and lubrication intervals

Below are some guidelines for maintenance and lubrication intervals.

NOTE

Please note that the guidelines are for normal working conditions in one shift.

	Product wetted seals	Actuator bushings complete
Preventive maintenance	Replace after 12 months depending on working conditions. When opening and closing the retractor in dry conditions, plug shall be replaced after 60 CIPs.	Replace after 5 years depending on working conditions.
Maintenance after leakage (leakage normally starts slowly)	Replace at the end of the day.	Replace when possible.
Planned maintenance	• Regular inspection for leakage and smooth operation • Keep a record of the machine • Use the statistics for inspection planning **Replace after leakage**	• Regular inspection for leakage and smooth operation • Keep a record of the machine • Use the statistics for inspection planning **Replace after leakage**
Lubrication	**Before fitting:** Wet O-rings with water or, if accepted by end user, Alfa Laval Silicon based Food-grade Lubricant USDA H1 approved grease.	**Before fitting:** Molykote Longterm 2 plus

6.2 Recommended service intervals

It is recommended that the wear parts are checked every 500 working hours (after 2000 working hours: inspection every 200 working hours) for machine working under normal conditions.

Recommended spare parts and service kits: See Spare part manual availabe in *Alfa Laval product catalogue Anytime* or in the *Close at hand spare part catalogue*.

NOTE

(#) refers to position numbers, see *Parts lists and exploded views* on page 73.

WARNING

Use only pure water at normal temperature for safety reasons.

Use goggles when checking rotation.

An inspection consists of:

1. At a pressure of 0.3 bar (4.4 psi) open a hatch in the tank to verify rotation and liquid is expelled from all orifices. If needed proceed to next step.
2. Un-install the machine as described in *Uninstall for maintenance* on page 46.
3. Visual inspection for foreign objects. Remove any objects and clean before rotation verification.
4. Rotation verification as described in *Unpacking/delivery* on page 27.
5. Disassemble the machine as described in *Dismantling* on page 44.
   a. Check lip seal (7) for visible wear.
   b. Check plug seal (5) for visible wear.
   c. Check O-ring (4) for visible wear.
6. Reassemble the machine as described in *Assembly* on page 59.
7. Rotation verification as described in *Unpacking/delivery* on page 27.
8. Reinstall machine as the reverse of *Uninstall for maintenance* on page 46.
9. Fill in service log

6.3 Dismantling

DANGER

If the actuator is marked with one of the below warnings, do NOT attempt to disassemble it.

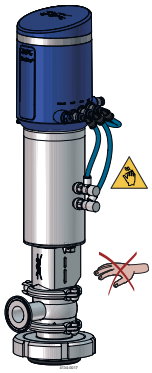
The spring inside is under load – any type of breakage of the actuator can lead to severe injury or even death!

WARNING **Air supply**

Always connect air supply hose to push-in fitting. Make sure that the air supply hose is fitted properly. To reduce risk of whiplash, fasten air supply hose to other supply lines as close to the push-in fitting as practically possible.

CAUTION

During maintenance, caution is needed when the actuator is supplied with compressed air. Only touch moving parts with tools.



NOTE

Handle scrap correctly – see *Recycling information* on page 19.

NOTE

Alfa Laval Kolding A/S do not recommend or support disassembly of the actuator in the field due to spring under load danger. Please return the actuator to us for disassembly and repair. Replacement of bushings (21) and O-rings (20) (22) on the actuator is possible without opening the actuator (see *Actuator bushing replacement (non-maintainable actuator)* on page 56).

6.3.1 Uninstall for maintenance

The uniqe design of the Alfa Laval Controlled Rotatating Retractor allows for 2 different options for dismantling:

- **Option 1:** Remove only actuator and spray part from the retractor to inspect wear parts. The CIP supply line does not need to be disconnected.
- **Option 2:** Remove the entire retractable device from the process connection and then dismantel the retractor. The CIP supply line shall be disconnected by loosening the cleaning media inlet connection (clamp or nut) and remove the gasket.

Both options are explained in details below.

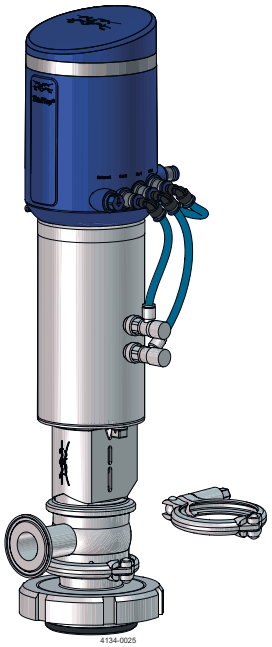
Clean material build-up and deposits from external parts with water or suitable chemical cleaner, possibly Scotch-brite, S-Ultrafine.

NOTE

(#) refers to position numbers, see *Parts lists and exploded views* on page 73.

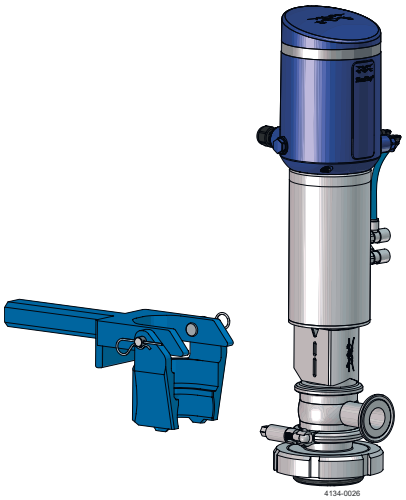
1 **Option 1 – remove only actuator and spray part**

The design of the Alfa Laval retractable allows the user to only remove the actuator (B, see *General description* on page 21) and the spray part assembly in an easy operation to inspect the actuator (16), the spray part (3) and the plug seal (5). The inlet house (10) and process adaptor (13) then remain attached to the process connection (E, see *General description* on page 21). This significantly reduces the weight of the removed parts and save time as the supply line does not need to be removed for maintenance.



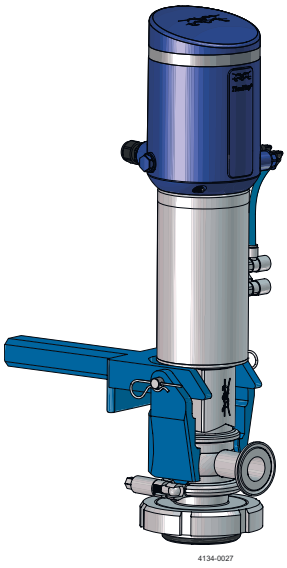
a) Loosen and remove upper clamp (11) on inlet house (10).

b) Insert tool (8010056638) around the yoke of the actuator (16). This can be done one-handed. When in place, the tool will fit tightly around the yoke so it can be operated one-handed.



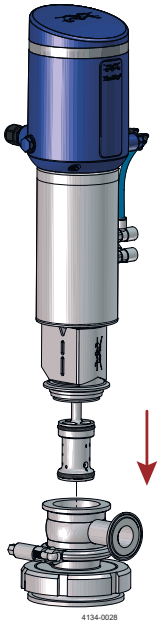
c) Push down on the handle of the tool to release the plug seal (5) from the plug seal seat.

d) Remove the tool from the yoke.



e) Withdraw the actuator (16) including spray part (3) from the inlet house (10).

f) If the lip seal does not require inspection go to *Plug seal replacement* on page 54.

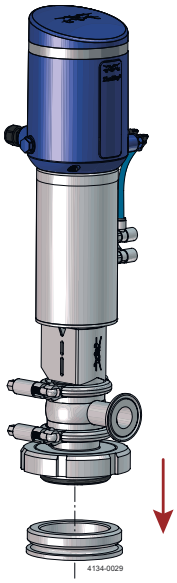


2 **Option 2 – remove the entire retractable device from the process connection**

The design of the Alfa Laval Controlled Rotating Retractor allows the user to remove the entire retractor to inspect all parts.

a) Dismount the connection (15) from the process connection (E, see *General description* on page 21) on the processing equipment.

b) Withdraw the machine from the process connection (E, see *General description* on page 21).



6.3.2 Disassembly

CAUTION

During disassembly and assembly, the threads can gall. If any resistance is felt when screwing/unscrewing parts, proceed with caution.

NOTE

Before disassembly, **always** thoroughly read the disassembly instructions and the Spare Part manual available on *anytime.alfalaval.com/alweb/*.

Always replace all parts included in the Service Kit.

Always clean all tools and fixtures prior to assembly/disassembly to ensure that scratches and marks and trace of soil/corrosion from tools are avoided.

Never scratch or damage the surfaces of the machine.

Always place components on soft material.

Always check surfaces for product residues and clean all parts before assembly.

Always assemble the machine as described on the following pages.

6.3.2.1 Uninstalled using option 1 (only parts with moving parts are removed from process line)

NOTE

If option 2 was performed for removing the Alfa Laval retractor go to *Uninstalled using option 2 (entire retractor removed from the process line)* on page 51.

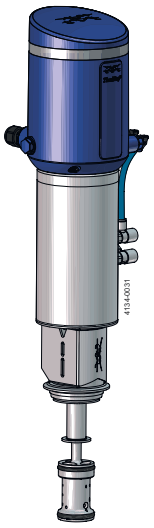
NOTE

(#) refers to position numbers, see *Parts lists and exploded views* on page 73.

1

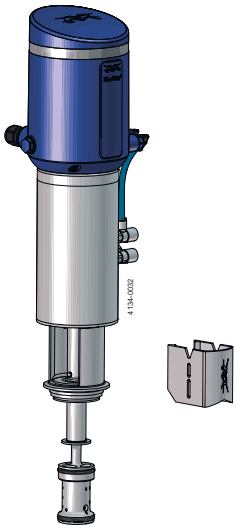
a) Connect an air supply directly to the air fitting at the top of the actuator (located in the cavity in the ThinkTop).

b) Apply pressurised air to move the spray part into the open position.



2

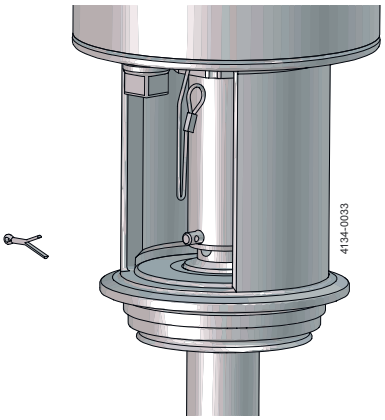
a) Remove the shield (12) from the yoke.



3

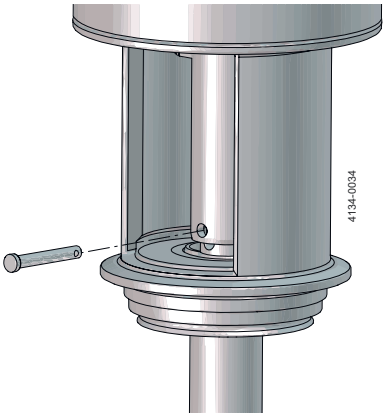
a) Use a plier to unbend the cottor pin (2).

b) Withdraw the cotter pin (2) from the pin (1).



4

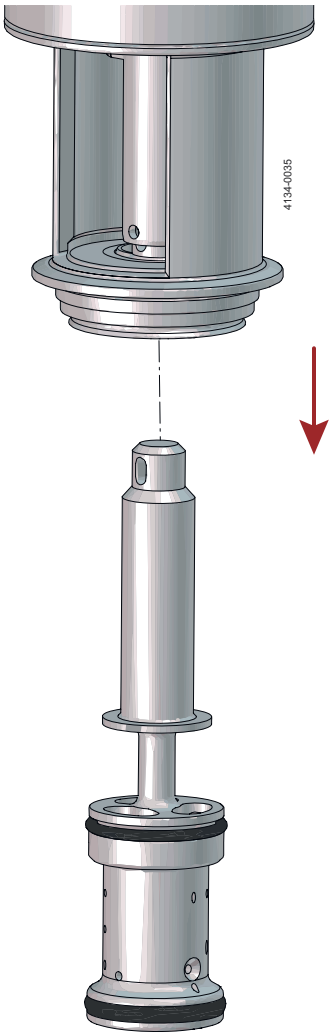
a) Use a plier to push and/or withdraw the pin (1) from the connection between the output shaft of the actuator (16) and the spray part (3).



5

a) Withdraw the spray part (3) from the output shaft of the actuator (16) and out through the lip seal (7).

   This allows for inspection of the lip seal (7), the floating o-ring (4) and the plug seal (5).



6.3.2.2 Uninstalled using option 2 (entire retractor removed from the process line)

NOTE

If option 2 was performed for removing the Alfa Laval retractor, perform either option 1 using the Alfa Laval tool 8010056638 for removing the actuator and spray assembly from the valve body and then the instruction in *Uninstalled using option 1 (only parts with moving parts are removed from process line)* on page 49.

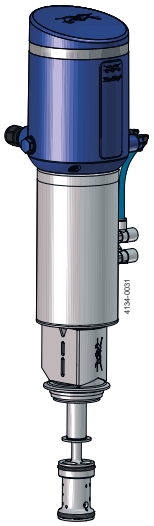
NOTE

(#) refers to position numbers, see *Parts lists and exploded views* on page 73.

1

a) Connect an air supply direclty to the air fitting at the top of the actuator (16), located in the cavity in the ThinkTop (17).

b) Apply pressurised air to move the spray part (3) into the open position.



2

a) Wet plug seal (5) with water.

b) Remove the pressurized air to move the spray part (3) into the closed position.

3

a) Loosen and remove the upper clamp (11) on the inlet house (10).

4

a) Push on the end of the spray part (3) to push the plug seal (5) past the process adaptor (13).

NOTE

For some adaptors some force is needed to press the plug seal (5) past the valve seat in the process adaptor (13).

b) Withdraw the actuator (16) and spray part assembly (3) from the inlet house (10).

Further disassembly is done according to *Uninstalled using option 1 (only parts with moving parts are removed from process line)* on page 49.

6.4 Lipseal replacement and bushing replacement

NOTE

(#) refers to position numbers, see *Parts lists and exploded views* on page 73.

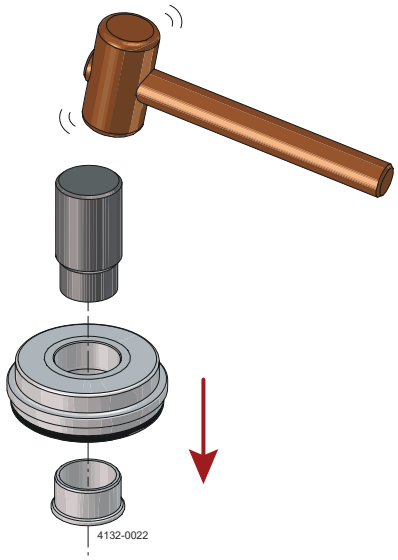
6.4.1 Removal of lipseal and bushing

1. Remove lip seal (7) from sealing element (8) using a small flat headed screw driver.

2. Remove bushing (6) from sealing element (8) using bushing tool (9613160901) and rubber mallet.

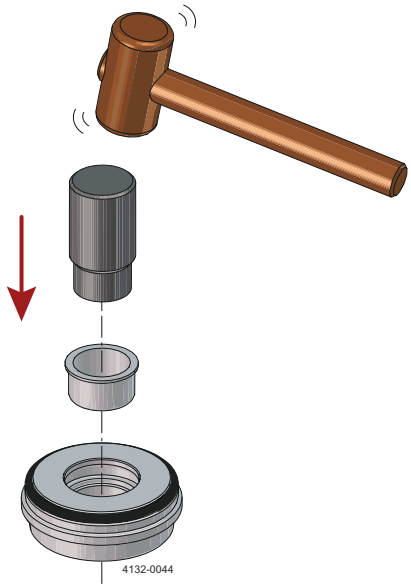
   NOTE

   Be careful not to damage the bushing.



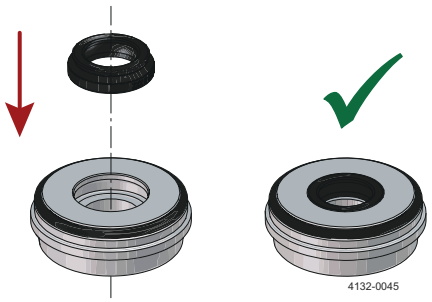
6.4.2 Mounting bushing

1. Orientated the bushing (6) as shown. Press it slightly into the sealing element (8). Insert busing tool (9613160901) into the bushing (6) and hammer the bushing (6) in place using the rubber mallet.



6.4.3 Mouting lipseal

1. Orientate the lip seal (7) as shown. Squeeze the lip seal (7) to fit the cylindrical part of the lip seal (7) into the lip seal groove in the sealing element (8).



6.5 Static O-ring replacement

NOTE

(#) refers to position numbers, see *Parts lists and exploded views* on page 73.

1. Remove static O-rings (9) from sealing element (8) and process adaptor (13) and static O-ring (14) from process adaptor (13).

2. Insert static O-rings (9) on sealing element (8) and process adaptor (13) and static O-ring (14) on process adaptor (13). Make sure the O-rings are completely mounted in the O-ring grooves.

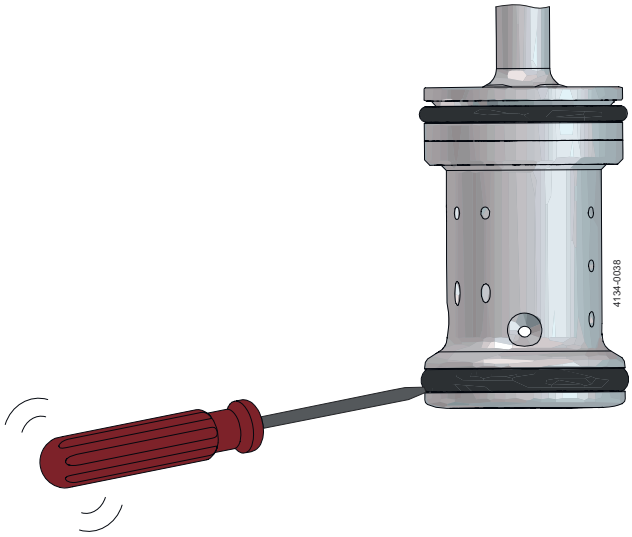
6.6 Plug seal replacement

NOTE

(#) refers to position numbers, see *Parts lists and exploded views* on page 73.

6.6.1 Removal of plug seal

1. Remove old plug seal (5) using a knife, a small flat headed screwdriver or similar. Be careful not to damage the spray part (3) surface.



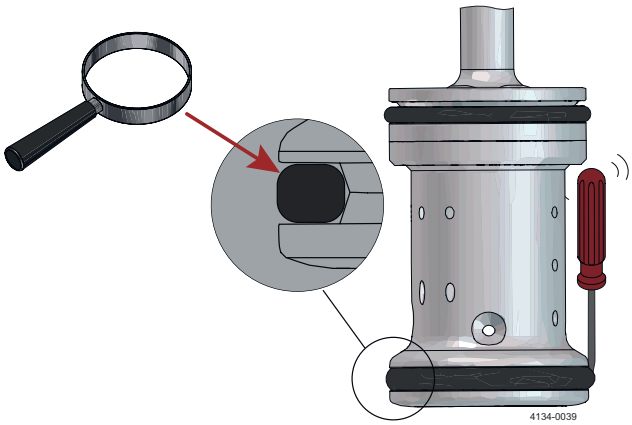
6.6.2 Mounting plug seal

1

Fit the plug seal (5) on the spray part (3) without pressing into the groove.

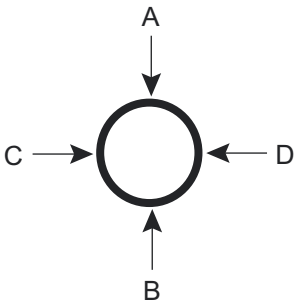
Be careful not to twist the plug seal (5).

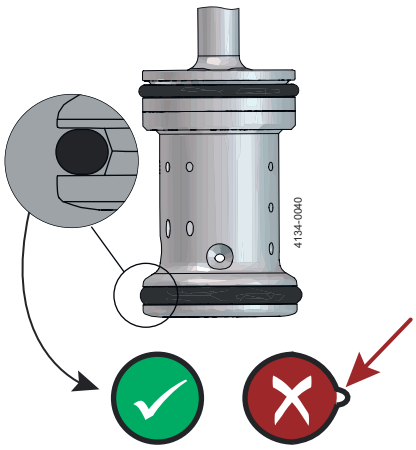
Use a small flat headed screwdriver (two turns) to fit the plug seal (5) properly and ensure it is not twisted.



2

1. Wet plug seal (5) with a little water.
2. To ensure correct mounting, press with your thumb on the plug seal (5), which must be done approximately 10 times and always with the opposite pressure points, from A to B and C to D.
   - **a.** The rest of the plug seal (5) can now be pressed into the groove so the whole plug seal (5) is mounted. Check that there are NO “bulge”.
   - **b.** If there is little bulge – then use the screwdriver to eliminate the bulge.
   - **c.** Again, press with the thumb on the plug seal (5) and keep the pressure while rotating 360°.
   - **d.** Alternatively, press the plug seal and spray part into the plugseat of the process connector.





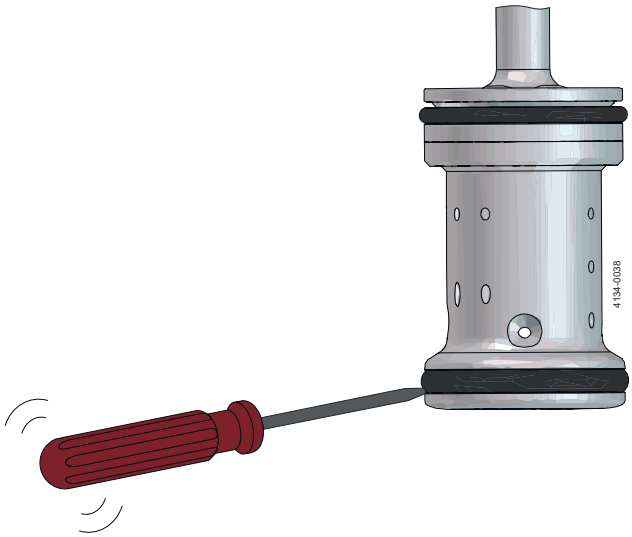
3

It is important to release compressed air behind the plug seal (5).

This is done with a small flat headed screwdriver.

It must be done in one or two different points on the circumference.

Be careful not to make marks on the surface of the spray part (3) and plug seals (5).



6.7 Actuator bushing replacement (non-maintainable actuator)

DANGER

If the actuator is marked with one of the below warnings, do NOT attempt to disassemble it.

The spring inside is under load — any type of breakage of the actuator can lead to severe injury or even death!

NOTE

(#) refers to position numbers, see *Parts lists and exploded views* on page 73.

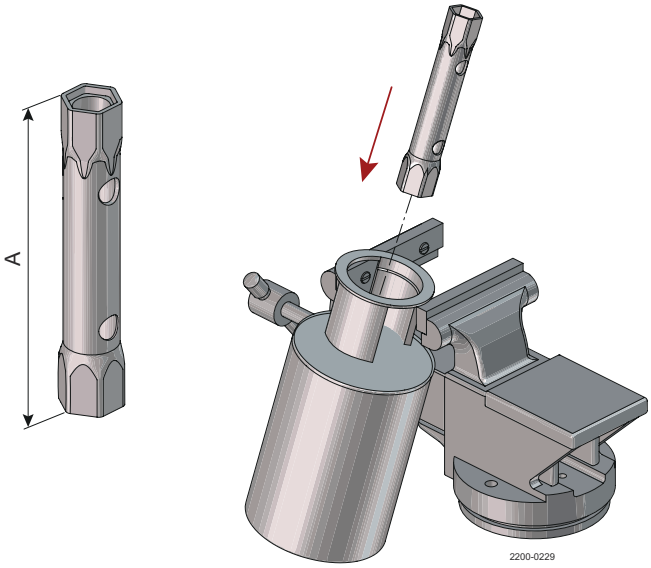
Tools needed for replacement:

1)

Use a 27 mm (1 1/16") tubular box wrench to unscrew and fasten the bushings (23).

This tool allows the actuator stem to fit inside and provide good access to the bushing (23) placed in the actuator yoke end.

The tubular box wrench can be bought from Alfa Laval as part of 9614198401.



2)

The actuator spindle can in some cases be forced off-center by the internal spring (see drawing).

If misaligned the spindle can be aligned with the bushing (23) thread using an aligning spindle and the thread adaptor.

The aligning spindle and thread adaptor can be bought from Alfa Laval as part of 9614198401. This also include the 27 mm (1 1/16") tubular box wrench with bushing inserted for the aligning spindle.

The aligning spindle can also be manufactured locally using below dimensions.

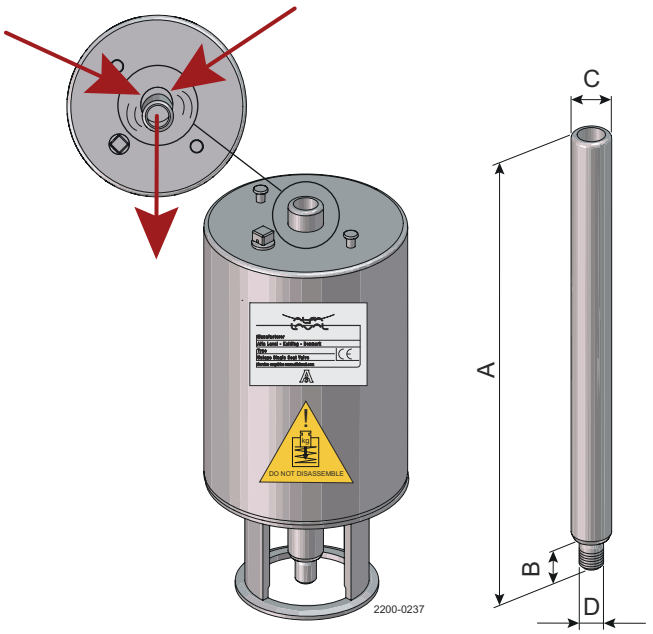
Dimensions

A = 280 mm (11")

B = 6 mm (0.63")

C = Rod Ø20 mm (0.79")

D = M6x1



Spindle forced off centre by spring inside actuator

1

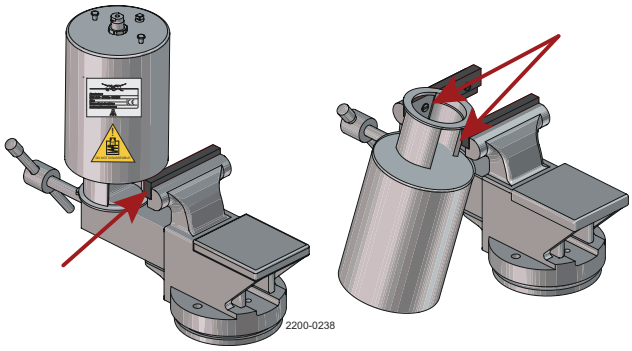
The actuator service kit contains two bushings (23) and four O-rings (22) (24).

Mount the thick O-ring (22) inside and the thin O-ring (24) outside the bushing (23).

2

The actuator must be fixed in a vise. Alfa Laval recommend use of soft jaws.

Be careful not to damage the yoke by over tightening and only fix carefully on the yoke “leg” (see drawing).



3

Unscrew and remove the bushing (23) with the two O-rings (22) (24).

4

Lubricate the stem and O-rings (22) (24) with “Muolykote Longterm 2 Plus” or an equivalent grease before sliding the new bushings (23) onto the actuator stem.

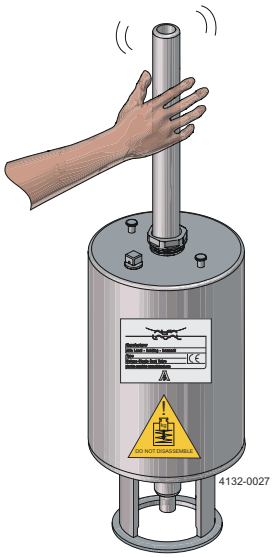
Slide the lubricated bushing (23) with the two O-rings (22) (24) onto the acatuator stem.

5

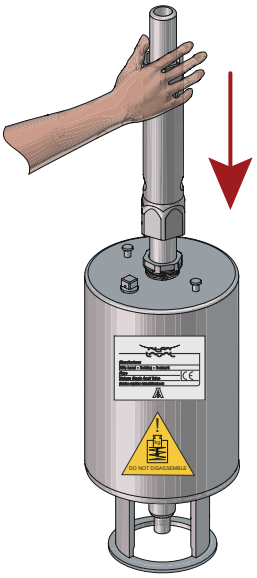
Fit the aligning spindle to the actuator stem and slide the tubular box wrench onto the aligning spindle.

Move the tubular box wrench so the thread on the bushing aligns with the thread in the actuator.

When aligned, initial fasten the bushing using the fingers. Ensure the thread engages easily.



Aligning spindle

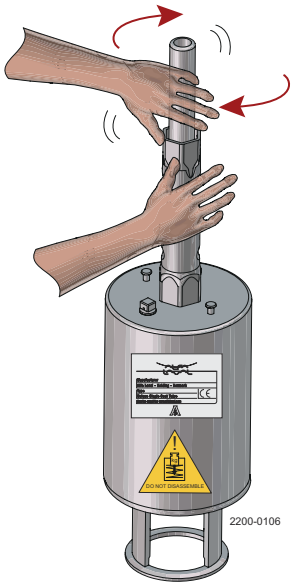

Tubular box wrench

6

Lower the tubular box wrench onto the bushing.

Fasten the bushing (23).

Recommended torque is 10 Nm (7 lb-ft) which is achievable by hand tightening only.



6.8 Assembly

NOTE

All parts must be cleaned thoroughly before reassembling.

Any deposits remaining on the parts can cause difficulty disassembling again.

Reverse order of *Disassembly* on page 48.

NOTE

(#) refers to position numbers, see *Parts lists and exploded views* on page 73.

Lubricate lip seal (7) and plug seal (5) with water.

The clamp (11) threads must be lubricated before tightening – max. torque for the clamps is 10-12 Nm (8-9 lbf – ft).

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 Alfa Laval Controlled Rotating Retractor

For additional information regarding the ThinkTop, please refer to the ThinkTop instruction manual, available on *Anytime* or at *www.alfalaval.com*.

7.1.1 Technical data

Temperature/pressure – process contact	
Temperature range – liquid service:	-10°C to 95°C / 14°F to 203°F
Temperature max. – steam/gas service:	Max. 121°C / 250° F
Temperature max. – ambient:	Max. 150°C / 304°F
Pressure range – liquid service:	1–3 bar / 14.5–43.5 psi
Pressure max. – liquid service:	5 bar / 72.5 psi
Pressure max. – steam/gas:	2 bar / 29 psi
Pressure min. – vessel:	Full Vacuum

Temperature/pressure – actuator	
Temperature range:	-10°C to 60°C / 14°F to 140°F
Pressure range - supply:	5–7 bar / 72.5-101.5 psi

Misc.	
Wetting radius:	See performance data
Cleaning radius:	See performance data
Lubrication – product contact:	Cleaning media
Air supply connection:	6 mm / ¼ inch adaptor included in the box

7.1.2 Physical data

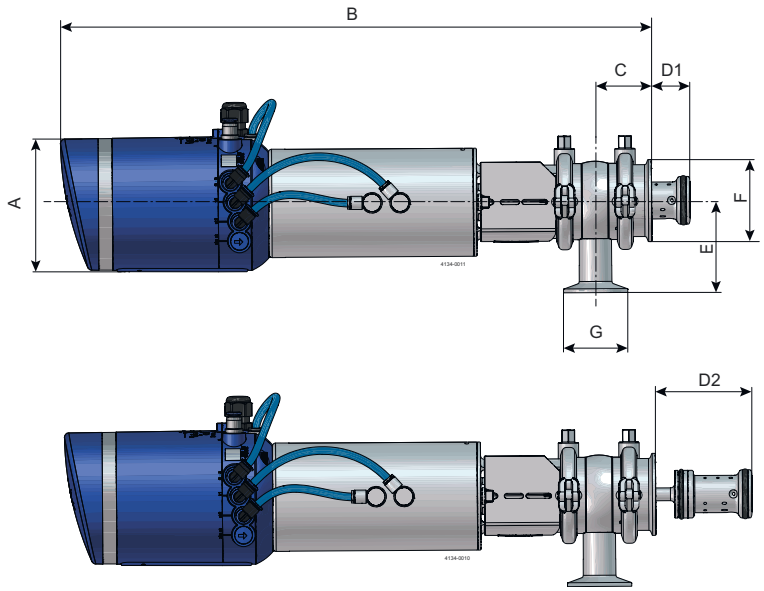
Materials	
Steel parts – product wetted:	AISI 316/316L
Steel parts – non-product wetted:	AISI 304, AISI 304L, AISI 302, Chemically nickel-plated brass
Seal parts – product wetted:	EPDM
Seal parts – non-product wetted exposed:	NBR, FPM
Polymer parts - product wetted:	PTFE
Polymer parts – non-product wetted exposed:	Igildur, PP

Surface roughness	
External surface finish:	Bead blasted
Internal surface finish - cleaning media:	Ra 0.8 µm / Ra 32 µi
Internal surface finish - product:	Ra 0.8 µm / Ra 32 µi Ra 0.38 µm EP / Ra 15 µi EP

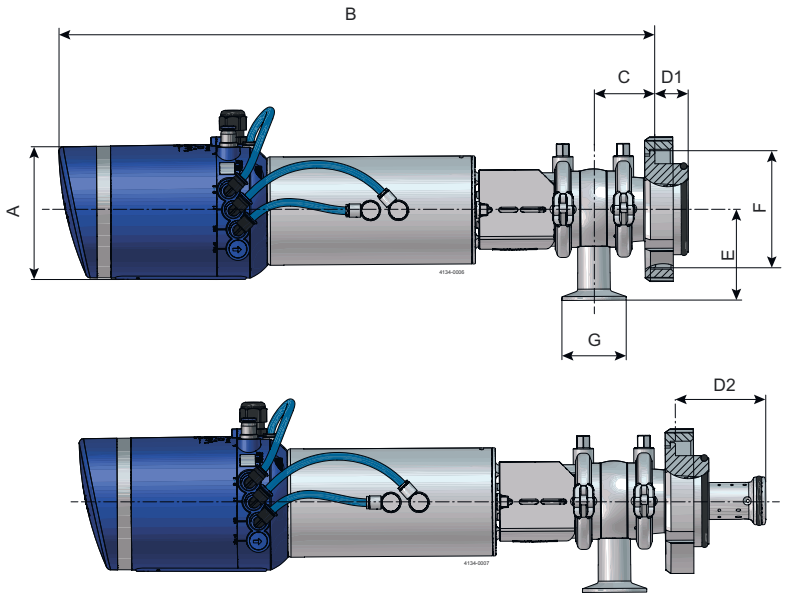
Communication
Digital PNP
AS-Interface v2.1, 31 node
AS-Interface v3.0, 62 node
IO-Link

Automation
Updated V70 ThinkTop with auto setup

7.1.3 Dimensions



Tank connection	Inlet connection	Dimension (mm / inch)						Weight
F	G	A	B	C	D1	D2	E	Kg / lb
2 inch clamp	1 inch clamp	105 / 4.1	463.4 / 18.2	44 / 1.7	30.1 / 1.9	71.1 / 2.8	71.5 / 2.8	4.5 / 9.9

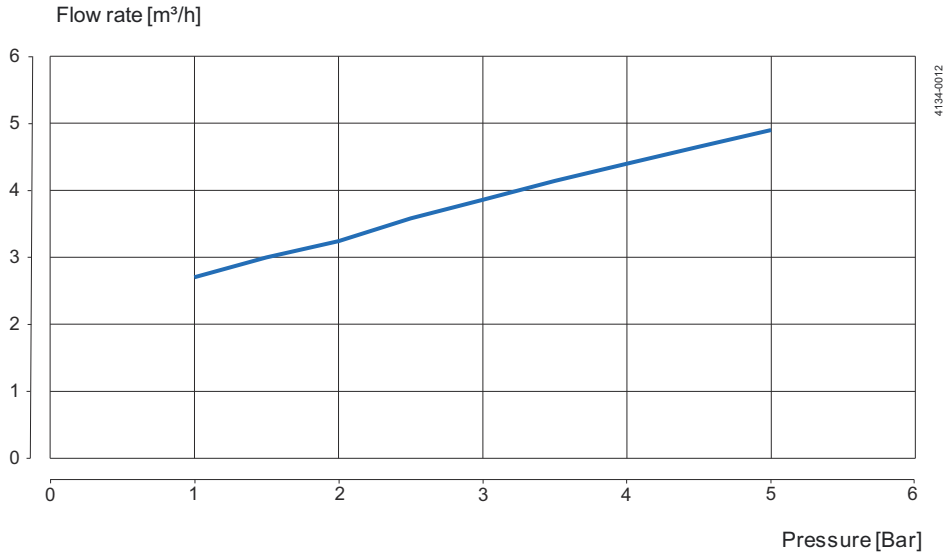


Tank connection	Inlet connection	Dimension (mm / inch)						Weight
F	G	A	B	C	D1	D2	E	Kg / lb
3 inch RJT	1 inch clamp	105 / 4.1	467.8 / 18.4	48.4 / 1.9	26.0 / 1.0	66.7 / 2.6	71.5 / 2.8	5.9 / 13.0
DN80			464.3 / 18.3	44.9 / 1.8	29.5 / 1.2	70.2 / 2.8		5.3 / 11.9
3 inch clamp			470.8 / 18.5	51.4 / 2.0	23.0 / 0.9	63.7 / 2.5		5.1 / 11.2

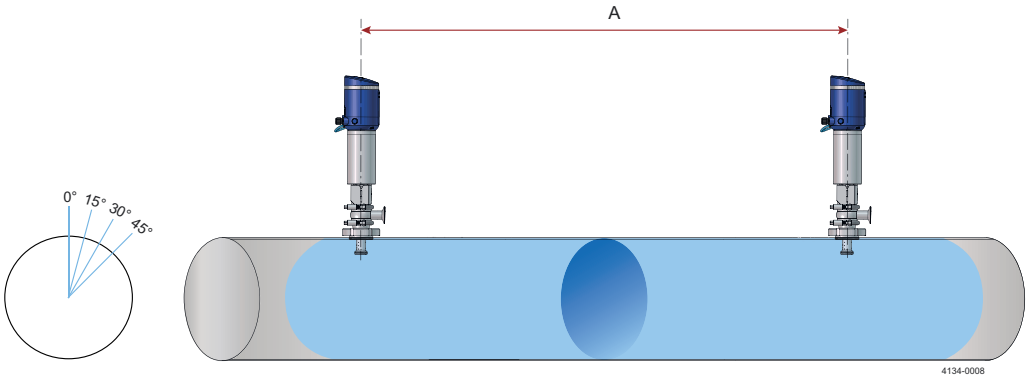
7.1.4 Performance data

> **NOTE**
>
> The inlet pressure has been taken immediately before the machine inlet. To achieve the performance indicated in the curves, the pressure drop in the supply lines between pump and machine must be taken into consideration.

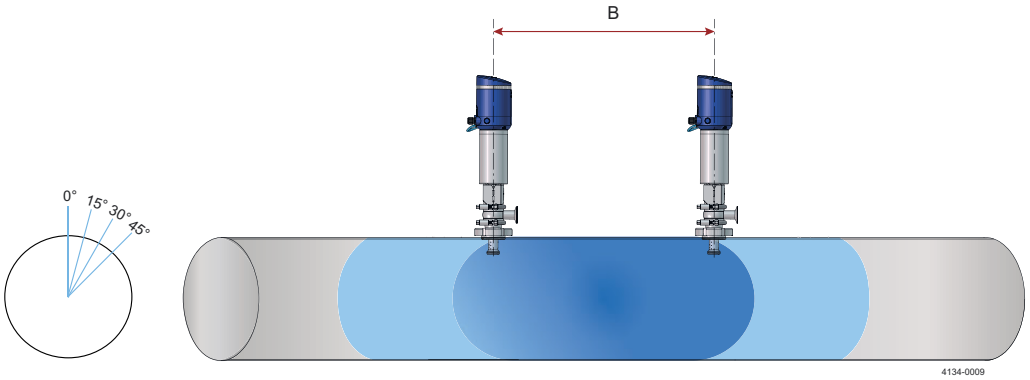
7.1.4.1 Flow rate



7.1.4.2 Cleaning distance



A (mm / feet) Overlapping cleaning distance at 2 bar / 29 psi			
0°	**15°**	**30°**	**45°**
2200 / 7.2	2400 / 7.9	3200 / 10.5	3700 / 12.1



B (mm / feet) Distance to reach next cleaning retractor at 2 bar / 29 psi			
0°	**15°**	**30°**	**45°**
1000 / 3.3	1600 / 5.2	2000 / 7.2	2600 / 8.5

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8 Product programme

Please go to *https://hygienicfluidhandling-catalogue.alfalaval.com* for possible configurations and item numbers.

8.1 Qualification documentation

Documentation specification

Standard version

Q-doc

Equipment Documentation includes:

- EN 1935/2004 DoC
- EN 10204 type 3.1 Certificate and DoC
- FDA DoC
- GMP EC 2023/2006 DoC
- EU 10/2011 DoC
- ADI DoC
- QC DoC
- China GB-4806 DoC
- Japan Article 18(3) DoC
- EU national rubber regulation

UltraPure version

Q-doc

Equipment Documentation includes:

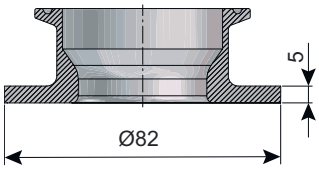
- EN 1935/2004 DoC
- EN 10204 type 3.1 Certificate and DoC
- FDA DoC
- GMP EC 2023/2006 DoC
- EU 10/2011 DoC
- ADI DoC
- QC DoC
- China GB-4806 DoC
- Japan Article 18(3) DoC
- USP 87 or 88 Class VI (or the equivalent ISO 10993)
- EU national rubber regulation

8.2 Accessories

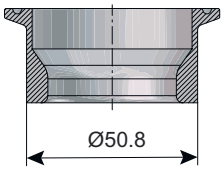
8.2.1 Weld plates

Process connections

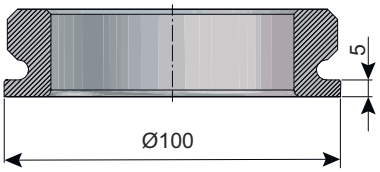
Item no:	Denomination
8010013956	2 inch Clamp weld adaptor
8010056895	2 inch Clamp weld adaptor (small ducts)
8010019832	3 inch RJT weld adaptor, for hole in duct
8010019833	3 inch RJT weld adaptor, for pull out on duct
8010058560	2 inch Clamp weld adaptor - Q-doc
8010058563	2 inch Clamp weld adaptor (small ducts) - Q-doc
8010058561	3 inch RJT weld adaptor, for hole in duct - Q-doc
8010058562	3 inch RJT weld adaptor, for pull out on duct - Q-doc



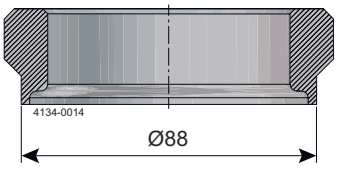
8010013956
8010058560



8010056895
8010058563



8010019832
8010058561

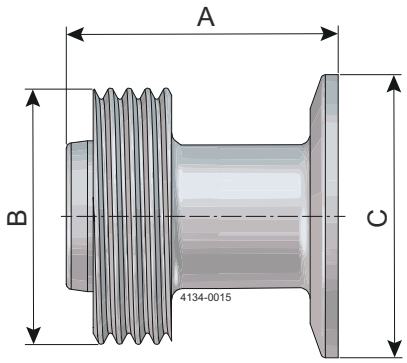


8010019833
8010058562

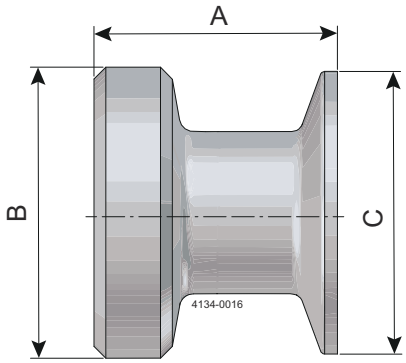
8.2.2 Inlet connection adaptors

Item number	A mm	B male part	C
8010019834	48	1" RJT	1" clamp[1]
8010027772	43.5	DN25 DIN 11851 (thread 52)	1" clamp[1]

[1] ISO 2852



8010019834



8010027772

8.2.3 Tools and installation material

Tools available for assembly and disassembly

Item no.	Denomination
9614198401	Actuator tool for mounting of bushing
9613160901	Sealing element tool for mounting bushing
8010056638	Retractor service tool
Commodity	Rubber Mallet
Commodity	M10 fork/ring key or similar
Commodity	Nose-pliers
Commodity	Small flat headed screwdriver

Installation material for connecting Alfa Laval machine to the process

Item no.	Denomination
9611991358	Gasket for 1" Clamp ISO 2852
211053	Clamp or 1"-1½" ISO 2852
290043	Gasket for 2" Clamp ISO 2852
211054	Clamp for 2" ISO 2852
9611992017	Gasket for DN80 Clamp DIN11866
9611994459	Clamp for DN80 DIN11866
9611991362	Gasket for 3" Clamp ISO 2852
211056	Clamp for 3" ISO 2852
9611992821	Gasket for 1" RJT
9611991269	Gasket for DN25 DIN11851

Installation kits

Item no.	Denomination
8010055618	CIP inlet, 1" Clamp ISO 2852
8010055619	CIP inlet, 1" RJT
8010055620	CIP inlet, DN25 Clamp DIN11851
8010055621	Process connection, 2" Clamp ISO 2852
8010055622	Process connection, 3" Clamp ISO 2852
8010055623	Process connection, DN80 Clamp DIN11866

9 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.

9.1 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

9.2 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.

9.3 Warranty - Definition

WARNING

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.

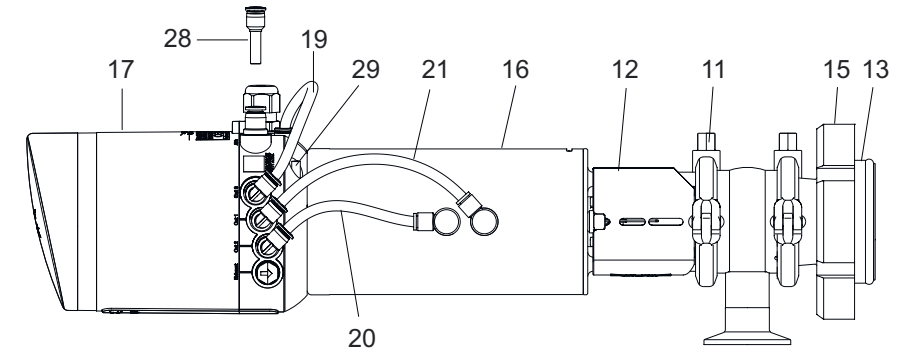
Liability and warranty are excluded:

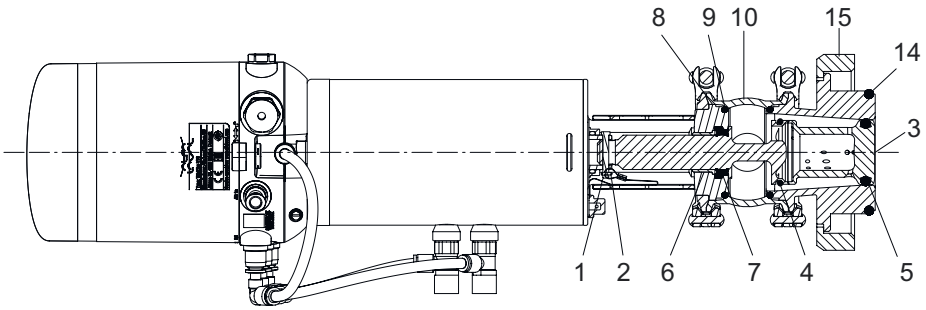
- If advice and instruction of operating instructions are ignored
- For incorrect operation or for insufficient maintenance of the supplied Alfa Laval product
- For any kind of change of function of the supplied Alfa Laval product without prior written agreement by Alfa Laval Kolding A/S
- If supplied 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 9)
- 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)

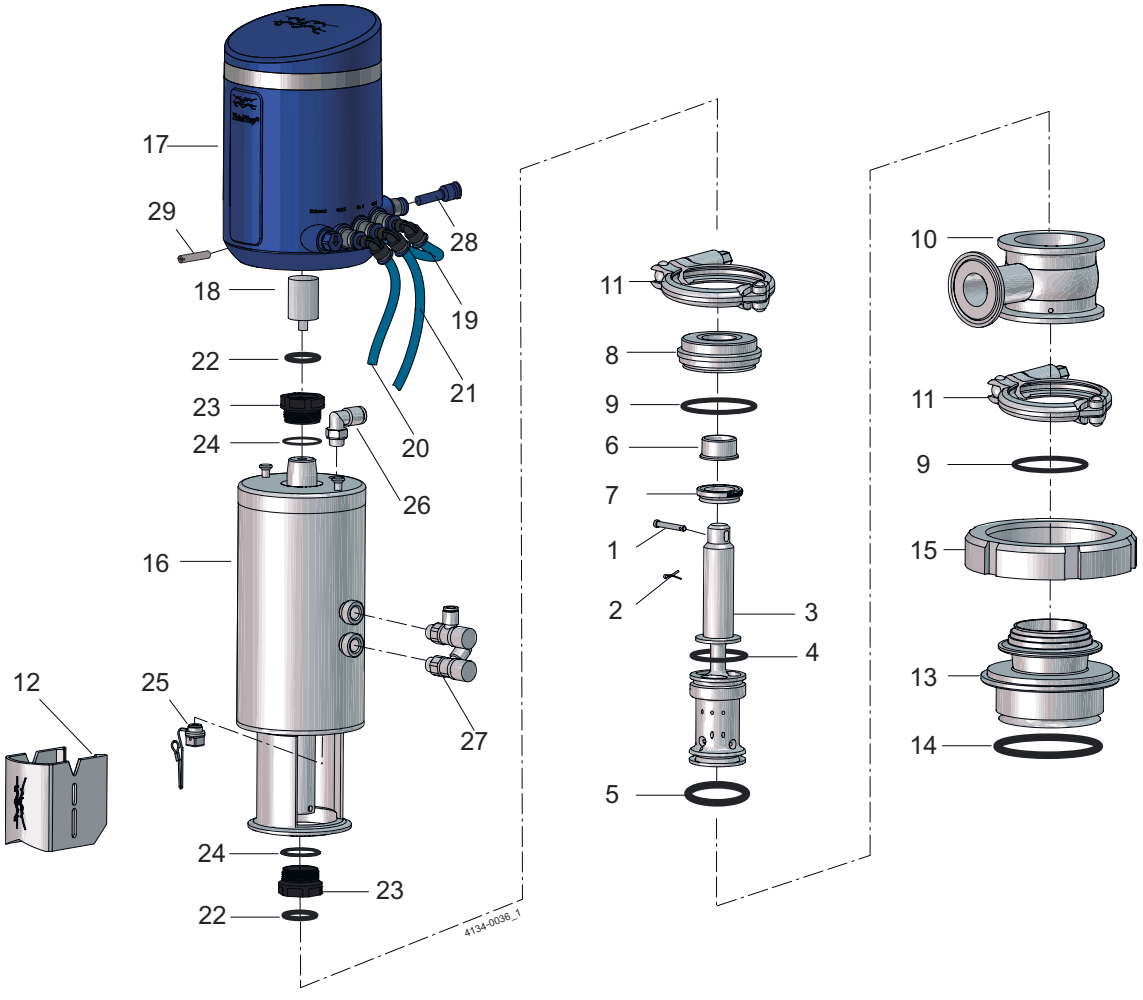
When exchanging parts, only original replacement parts, released from the manufacturer, must be used.

10 Parts lists and exploded views

10.1 Standard version - RJT connection







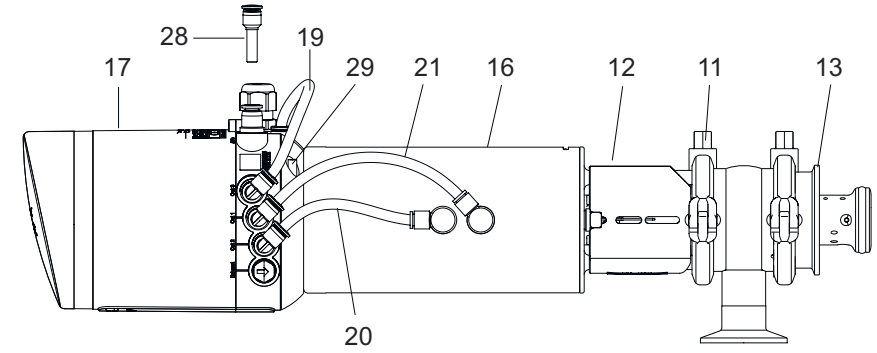
Pos.	Qty.	Denomination
1	1	Clip-on part
2	1	Pin
3	1	Spray part
4	1	O-ring
5	1	Plug seal
6	1	Bushing
7	1	Lip seal
8	1	Sealing element
9	2	O-ring
10	1	Inlet house
11	2	Clamp
12	1	Shield
13	1	Process adaptor
14	1	O-ring
15	1	Nut

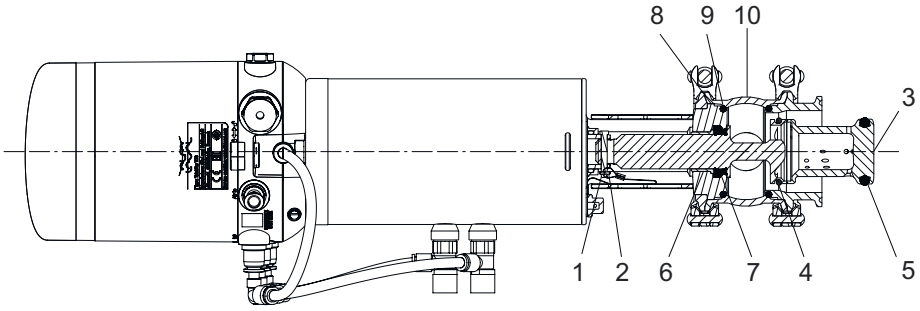
Pos.	Qty.	Denomination
16	1	Actuator complete
17	1	ThinkTop
18	1	ThinkTop target
19	1	Air hose
20	1	Air hose
21	1	Air hose
22	2	O-ring
23	2	Bushing
24	2	O-ring
25	1	Plug with grounding wire
26	1	Air fitting
27	2	Air fitting
28	1	Air fitting
29	2	Screw for ThinkTop mounting

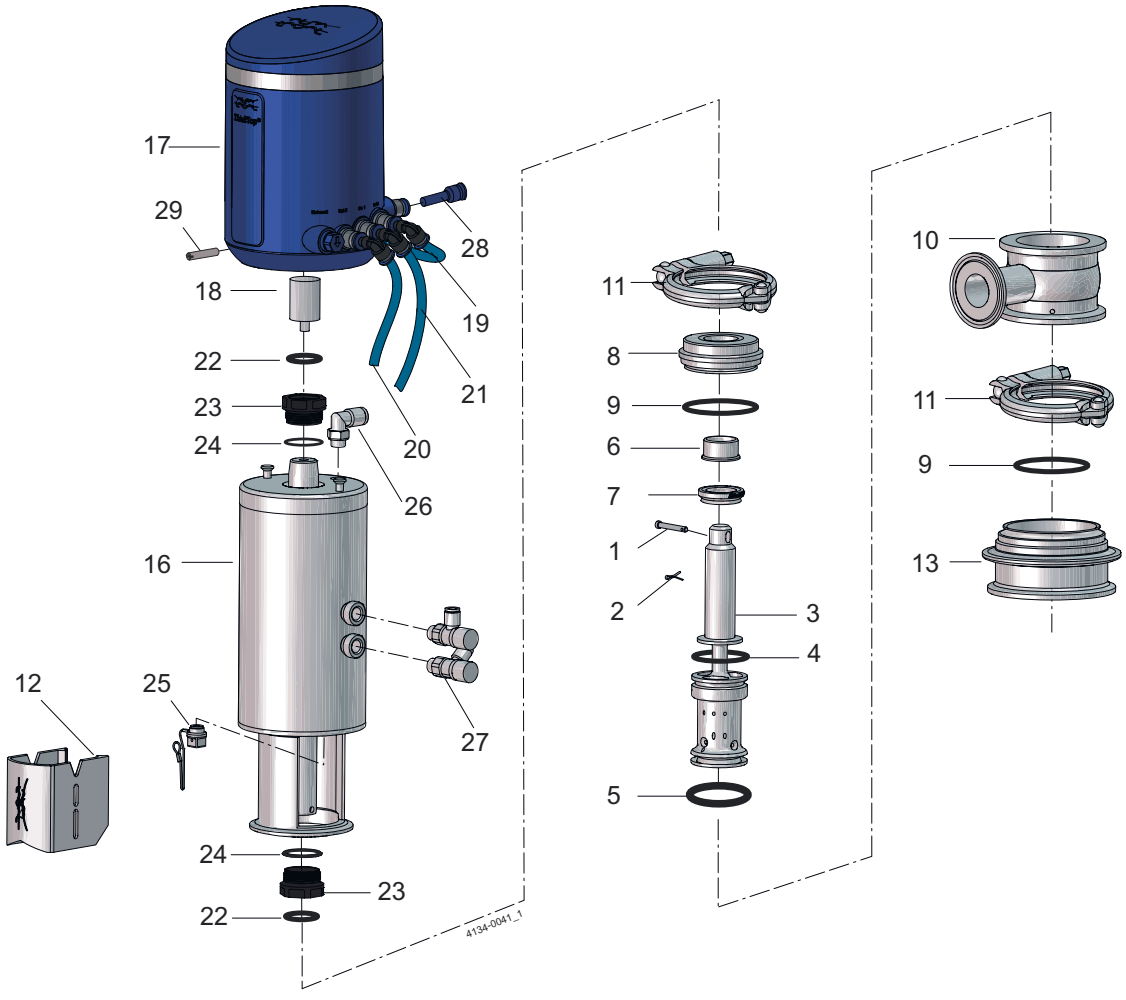
NOTE

Find unique item numbers and item numbers for Spare part and Service kits in the Spare part manual available from the on-line *Alfa Laval product catalogue Anytime* or in the *Close at hand spare part catalogue*.

10.2 Standard version - 2 inch clamp connection







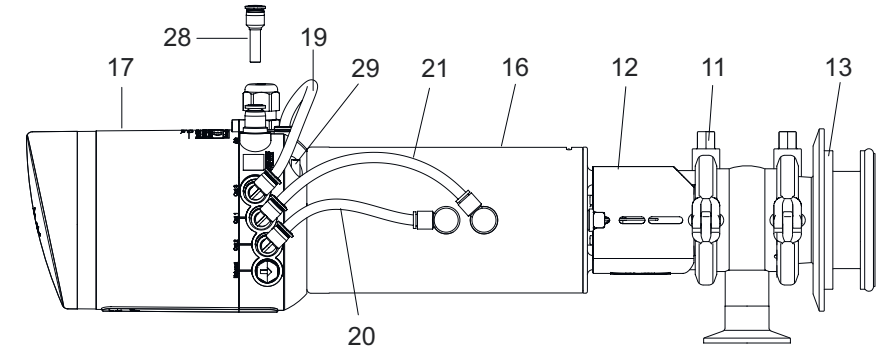
Pos.	Qty.	Denomination
1	1	Clip-on part
2	1	Pin
3	1	Spray part
4	1	O-ring
5	1	Plug seal
6	1	Bushing
7	1	Lip seal
8	1	Sealing element
9	2	O-ring
10	1	Inlet house
11	2	Clamp
12	1	Shield
13	1	Process adaptor
16	1	Actuator complete

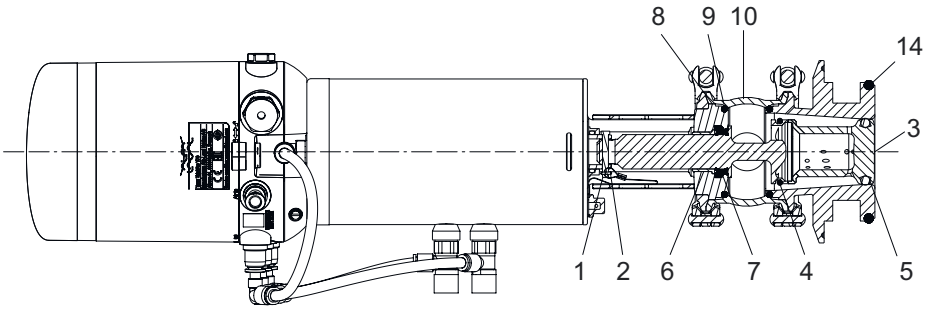
Pos.	Qty.	Denomination
17	1	ThinkTop
18	1	ThinkTop target
19	1	Air hose
20	1	Air hose
21	1	Air hose
22	2	O-ring
23	2	Bushing
24	2	O-ring
25	1	Plug with grounding wire
26	1	Air fitting
27	2	Air fitting
28	1	Air fitting
29	2	Screw for ThinkTop mounting

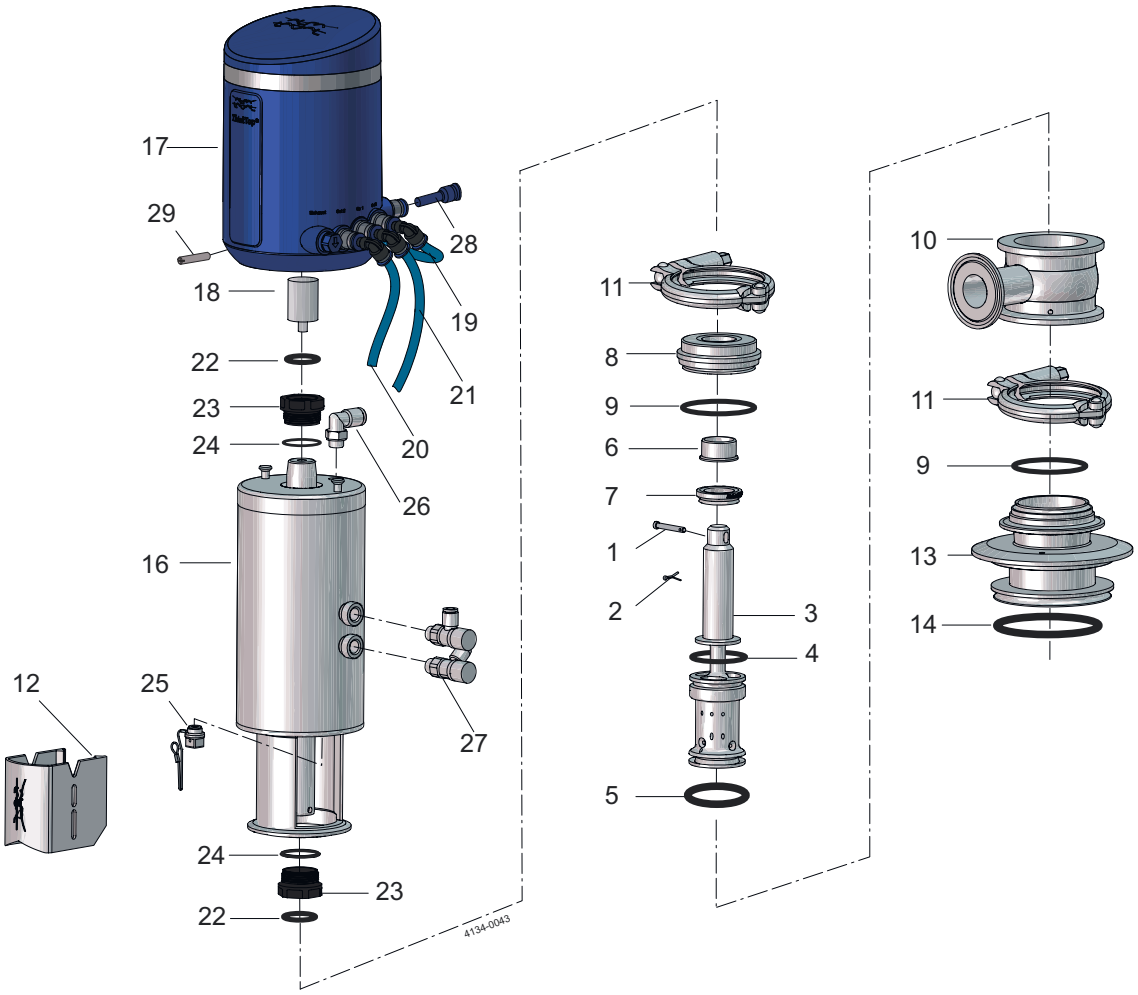
NOTE

Find unique item numbers and item numbers for Spare part and Service kits in the Spare part manual available from the on-line *Alfa Laval product catalogue Anytime* or in the *Close at hand spare part catalogue*.

10.3 Standard version - DN80 clamp connection







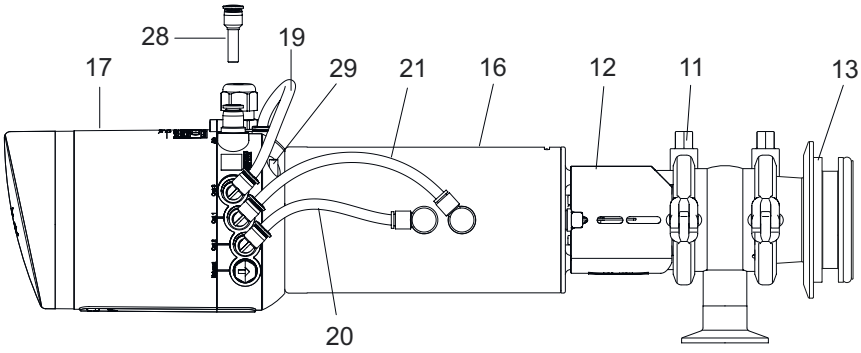
Pos.	Qty.	Denomination
1	1	Clip-on part
2	1	Pin
3	1	Spray part
4	1	O-ring
5	1	Plug seal
6	1	Bushing
7	1	Lip seal
8	1	Sealing element
9	2	O-ring
10	1	Inlet house
11	2	Clamp
12	1	Shield
13	1	Process adaptor
14	1	O-ring

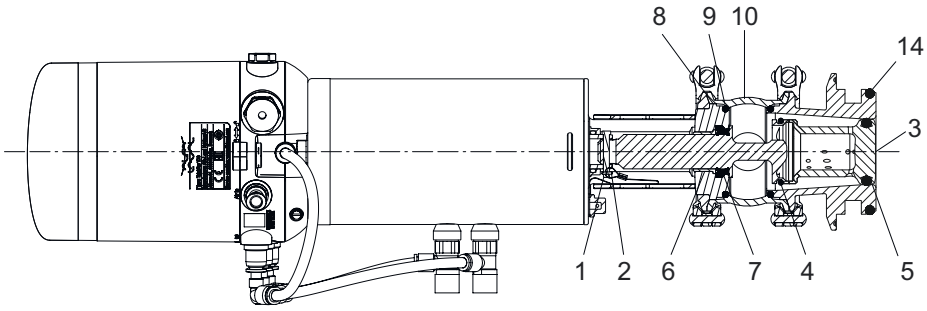
Pos.	Qty.	Denomination
16	1	Actuator complete
17	1	ThinkTop
18	1	ThinkTop target
19	1	Air hose
20	1	Air hose
21	1	Air hose
22	2	O-ring
23	2	Bushing
24	2	O-ring
25	1	Plug with grounding wire
26	1	Air fitting
27	2	Air fitting
28	1	Air fitting
29	2	Screw for ThinkTop mounting

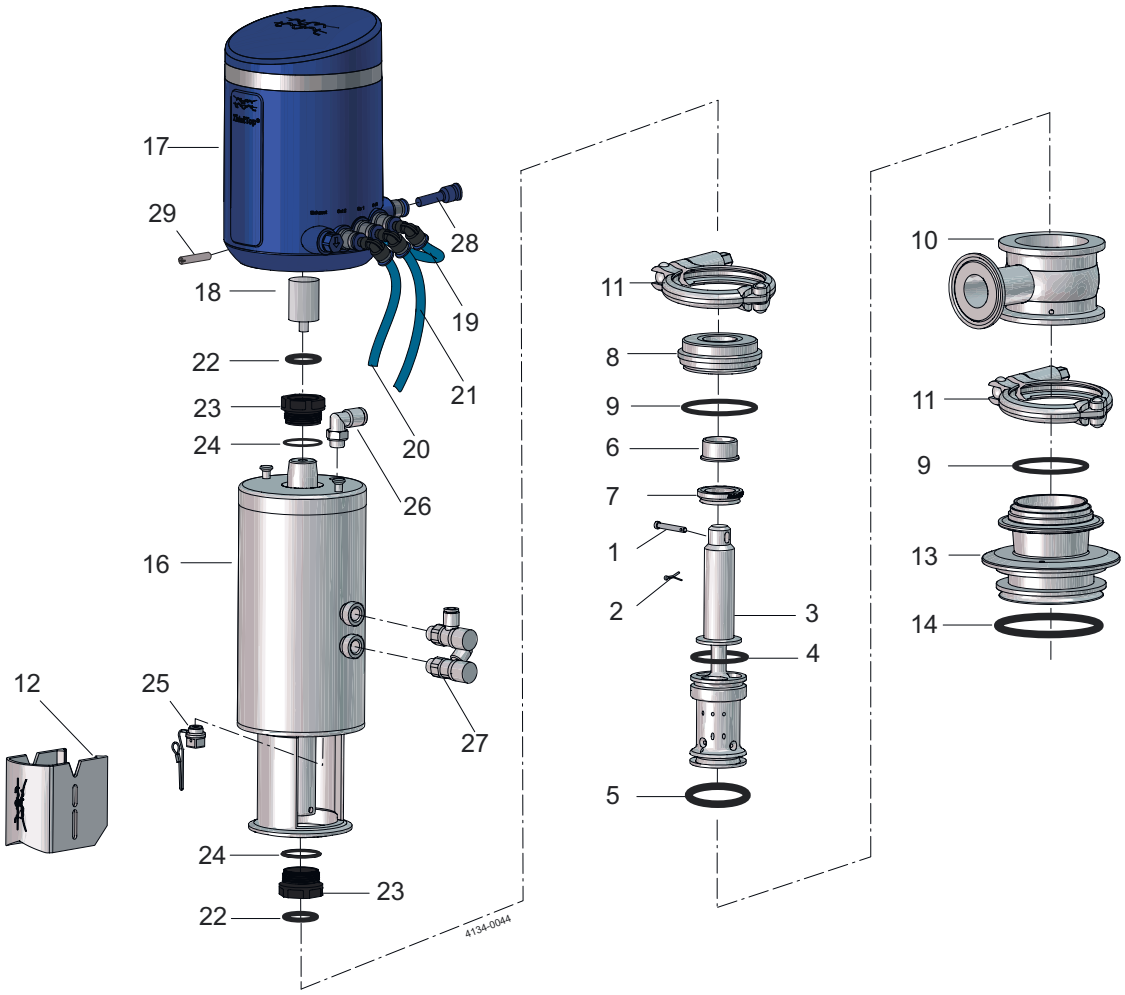
NOTE

Find unique item numbers and item numbers for Spare part and Service kits in the Spare part manual available from the on-line *Alfa Laval product catalogue Anytime* or in the *Close at hand spare part catalogue*.

10.4 Standard version - 3 inch clamp connection







Pos.	Qty.	Denomination
1	1	Clip-on part
2	1	Pin
3	1	Spray part
4	1	O-ring
5	1	Plug seal
6	1	Bushing
7	1	Lip seal
8	1	Sealing element
9	2	O-ring
10	1	Inlet house
11	2	Clamp
12	1	Shield
13	1	Process adaptor
14	1	O-ring

Pos.	Qty.	Denomination
16	1	Actuator complete
17	1	ThinkTop
18	1	ThinkTop target
19	1	Air hose
20	1	Air hose
21	1	Air hose
22	2	O-ring
23	2	Bushing
24	2	O-ring
25	1	Plug with grounding wire
26	1	Air fitting
27	2	Air fitting
28	1	Air fitting
29	2	Screw for ThinkTop mounting

NOTE

Find unique item numbers and item numbers for Spare part and Service kits in the Spare part manual available from the on-line *Alfa Laval product catalogue Anytime* or in the *Close at hand spare part catalogue*.

11 Appendix

11.1 Appendix A - Weld plate installation

WARNING

Always pay special attention to the instructions below so that severe personal injury and/or damage to the weld plate and device is avoided.

Always read this Instruction manual thoroughly.

Only install the device when the tank is depressurized and cooled down.

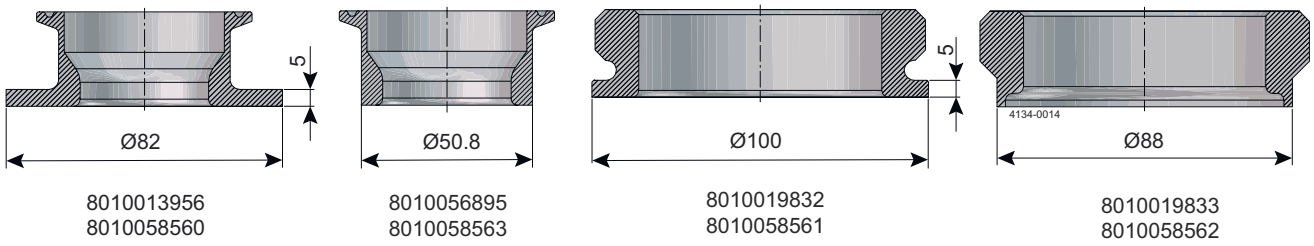
Only use qualified technical personnel to install the weld plate. They shall have read and understood the Instruction manual!

NOTE

To ensure a hygienic weld (avoid or remove discoloration) it is recommended to use either shielding gas or post-treatment of the welding zone.

Incorrect welding procedures may deform and warp the weld plate - therefore, it is recommended to use a heat sink during welding to dissipate heat from the welding area.

Dimensional information



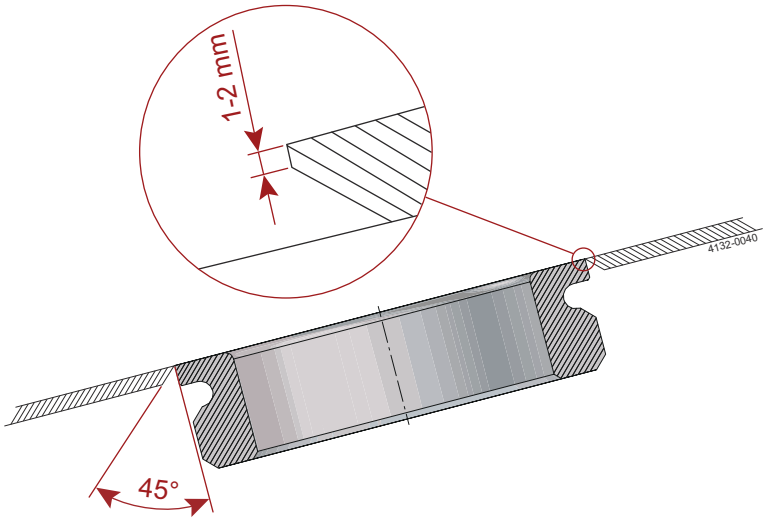
8010013956
8010058560

8010056895
8010058563

8010019832
8010058561

8010019833
8010058562

1. Cut a hole in the tank sized to the diameter of the weld plate (the gap between the hole and weld plate must be as small as possible).
2. Chamfer the outer edges by 45 degrees, leaving a 1-2 mm (0.039"-0.078") opening with the original diameter toward the inside of the tank.



3. Align the inside of the weld plate with the inside of the tank surface.

4. Using appropriate filler, tack weld the weld plate to the tank in positions 1 and 2 from inside of the tank if possible as shown (Image 1). Ensure the weld plate is level; adjust if needed, and then tack weld it at positions 3 and 4. Ensure the weld zone is cooled down with compressed air between each point.
5. Continue tack welding the weld plate at positions 5 through 8, preferable from the inside of the tank if possible as shown (Image 2).
6. Allow the weld plate and welded areas to cool, using compressed air to speed the process as needed. Do not quench with water, as this may cause warping due to material shrinkage.
7. Weld between positions 3 and 4 from the outside, and then cool the welded section using compressed air. Continue welding between the tack weld points 3 and 4 in opposite direction. Ensure that the welded sections are cooled down with compressed air after each welding.
8. Allow the region to cool, then repeat step 7 from inside of the tank, if possible.
9. Once the welding is complete, allow the weld plate to cool completely to room temperature. Do not quench the area with water, as this may cause warping of due to material shrinkage.
10. For installations to be 3-A compliant, the welding should be treated to Ra 0.8 and should not provide imperfections to the surfaces.
11. If grinding and polishing is performed, the area should be allowed to cool between grinding and polishing.

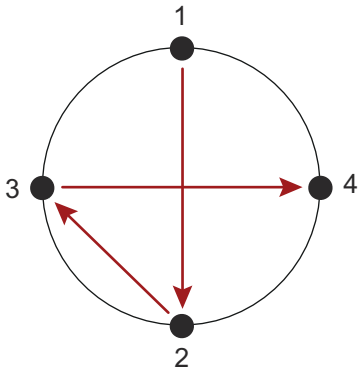


Image 1

From inside the tank if possible

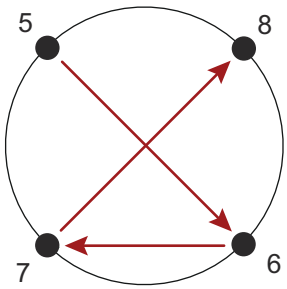


Image 2

From inside the tank if possible

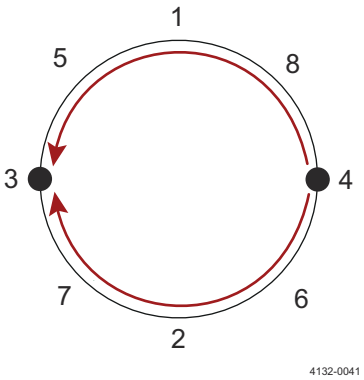
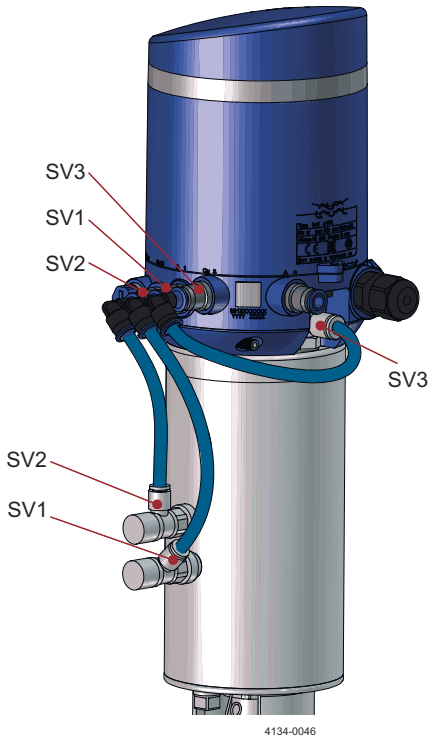


Image 3

First from outside the tank if possible

11.2 Appendix B - ThinkTop setup

The ThinkTop V70 must be mounted correctly and all air hoses connected to the proper air fittings on the CRR.



Solenoid valves

Valve name and definition	Function
Solenoid valve 1: **SV1**	Rotate spray part in counterclockwise (CCW) direction
Solenoid valve 2: **SV2**	Rotate spray part in clockwise (CW) direction
Solenoid valve 3: **SV3**	Open and close retractor

Ensure that the correct version of the Thinktop is used:

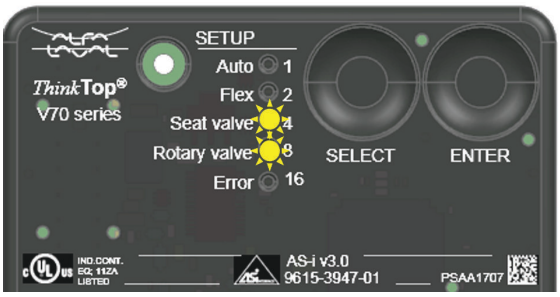
- AS-i v 3.0
- AS-i v 2.11
- Digital 24VDC
- IO-link

11.2.1 Start-up

1 The Controlled Rotating Retractor (CRR) is delivered with the ThinkTop preprogrammed with auto setup. And will be ready to use from the box.

The following can be done to check that all is in order or if modifications are required.

1. Check that the Controlled Rotating Retractor module is active on the ThinkTop.
   a. If the correct module is active, the light indicators on the ThinkTop will look like this:
   b. If not set to retractor mode, this can be done by pressing the “ENTER” 6 times, followed by “SELECT”.



11.2.2 Auto setup

1 Once the Retractor mode is selected the auto setup can be utilized.

This will automatically set the target positions.

Press “ENTER” and then “SELECT” to initiate “Auto”.

> **NOTE**
>
> The throttle valves must be set properly for the auto setup to work as intended. If the throttle valves are set at too low a setting it may result in faulty positioning.

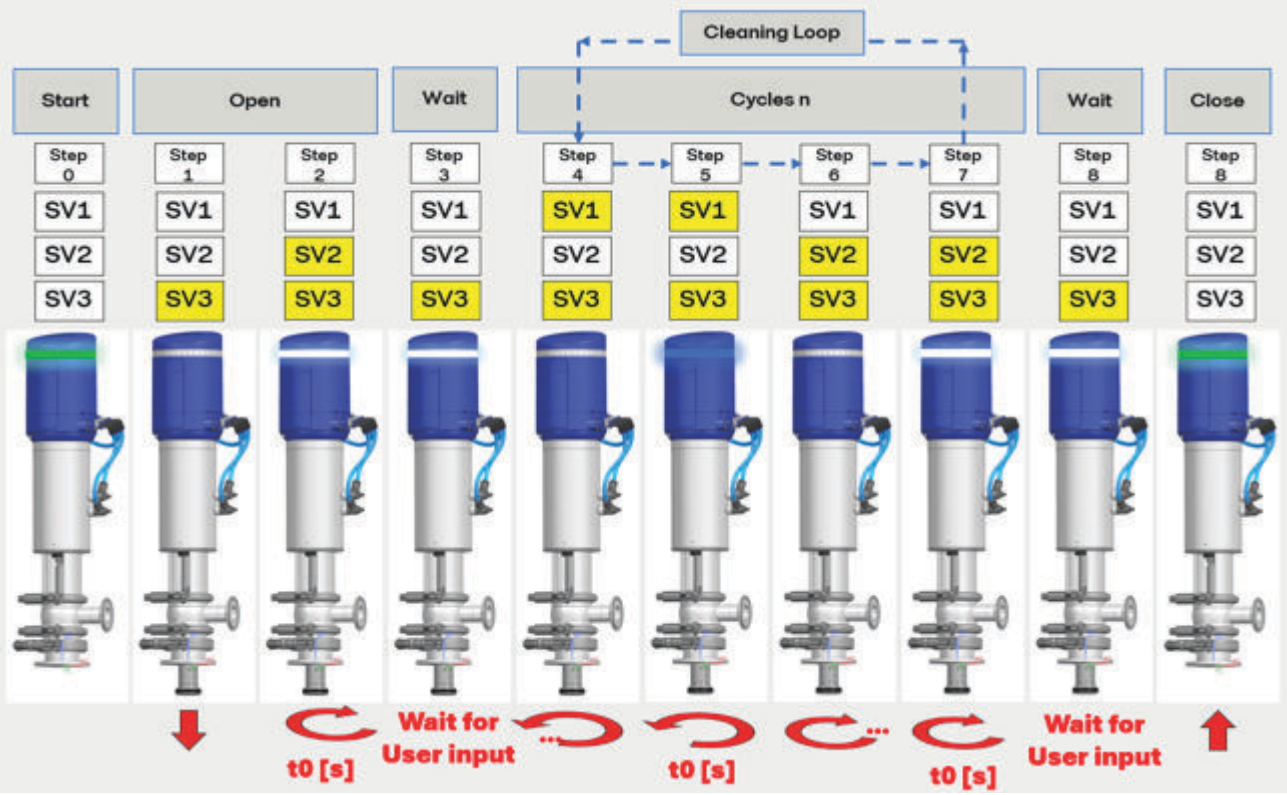
If all settings are correct and the air hoses properly connected the retractor will open and then rotate clockwise and counterclockwise. And then return to the closed position.

11.2.3 Flex setup

1 It is possible to use the controlled rotating retractor using the flex setup outside of the CRR module.

1. To exit the retractor module and enter the main module of the Thinktop press “ENTER” until no lights are active and then press “SELECT”.

Using flex setup will require PLC programming, which will not be part of this document. However, the following diagram will state the recommended logic.



11.2.4 Troubleshooting

1 If the unit is unresponsive.

- Remove the cap from the thinktop.
- Manually activate SV3 and SV1 using a flathead screwdriver until the white light is active on the Thinktop.
- Deactivate all solenoid valves.

  The unit should indicate green light.
- Execute autosetup.

This will make the unit operational again.

If nothing happens when toggling the solenoid valves it could be because the throttle valves are set too low.

11.2.5 Use

To operate the CRR, only two commands are required:

A. Open/close retractor

B. Start/stop cleaning cycle