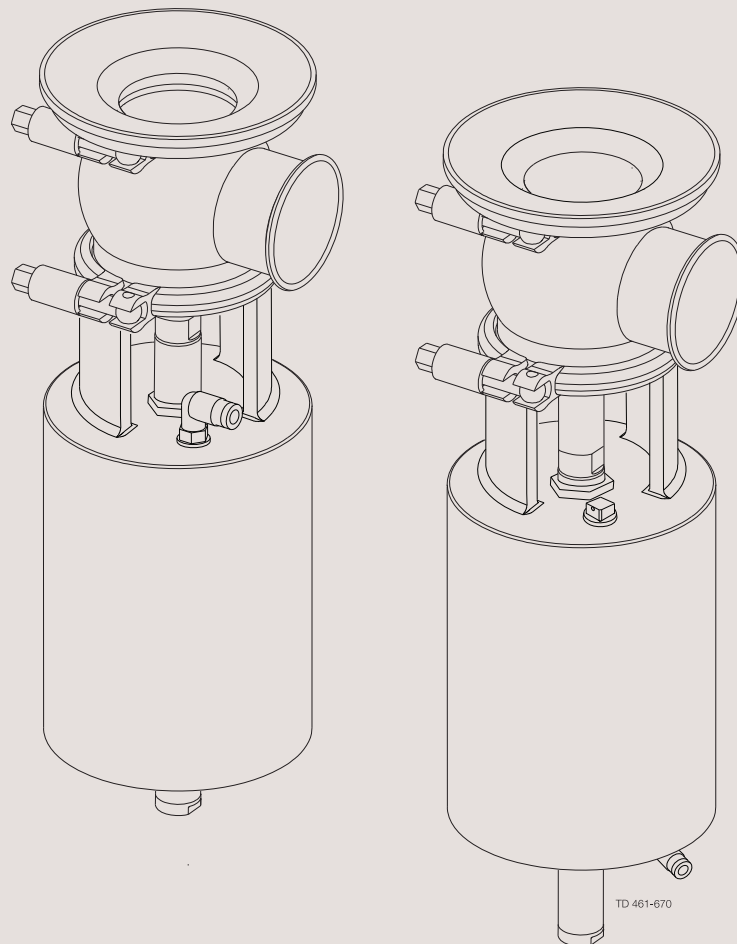




# Instruction Manual

## Unique 7000 Series Tank Outlet Valve



ESE02026-ENUS5

2014-12

Original manual



The information herein is correct at the time of issue but may be subject to change without prior notice

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# 1 EC Declaration of Conformity

Revision of Declaration of Conformity 2009-12-29

The Designated Company

Alfa Laval Kolding A/S

Company Name

Albuen 31, DK-6000 Kolding, Denmark

Address

+45 79 32 22 00

Phone No.

hereby declare that

Valve

Designation

Unique 7000 PN10

Type

From serial number 5099880 to 29999999999

is in conformity with the following directive with amendments:

- Machinery Directive 2006/42/EC
- Regulation (EC) No 1935/2004
- Pressure Equipment Directive 97/23/EC category 1 and subjected to assessment procedure Module A.

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

QHSE Manager, Quality, Health and safety & Environment

Title

Annie Dahl

Name

Kolding

Place

2013-12-03

Date

*Annie Dahl*

Signature



*Unsafe practices and other important information are emphasized in this manual.  
Warnings are emphasized by means of special signs.*

---

### 2.1 Important information

---

**Always read the manual before using the valve!**

**WARNING**

Indicates that special procedures must be followed to avoid serious personal injury.

**CAUTION**

Indicates that special procedures must be followed to avoid damage to the valve.

**NOTE**

Indicates important information to simplify or clarify procedures.

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### 2.2 Warning signs

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General warning:



Caustic agents:



## 2 Safety

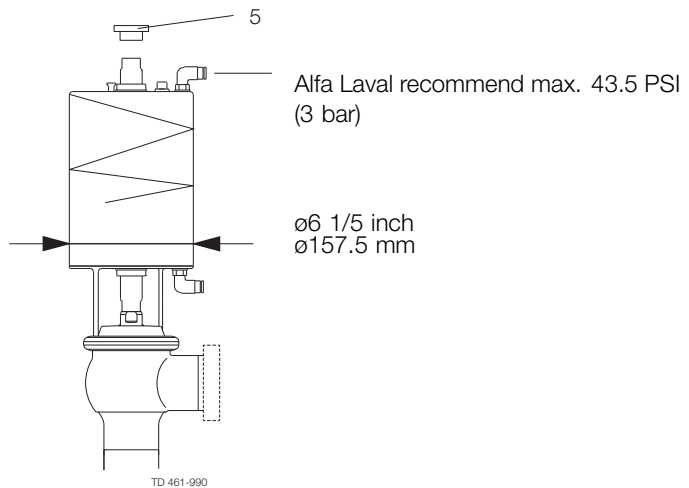
All warnings in the manual are summarized on this page.

Pay special attention to the instructions below so that severe personal injury and/or damage to the valve are avoided.

### 2.3 Safety precautions

#### Actuators marked with year 2012 (New actuator design):

Alfa Laval recommend only to use 43.5 PSI (3 bar) support air on the spring side in all the Unique 7000 actuators, to ensure 145 PSI (10 bar) product pressure without leakage. Plastic adapter (Pos. 5) is always used on the new design.



#### Actuators marked with year 2006-2011 (old actuator design):

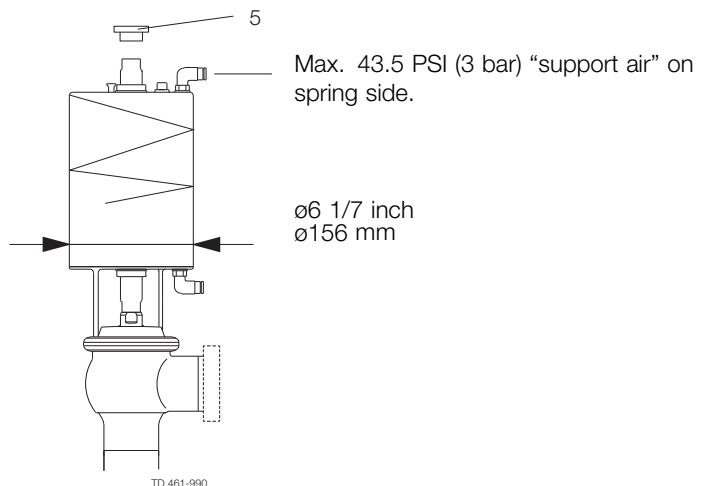


#### WARNING!

When using “support air” on spring side in all the Unique 7000 actuators, the pressure must **NOT** exceed 43.5 PSI (3 bar).

When using Unique 7000 actuators with OD156 mm with support air, **always** use the “steel adapter” (pos. 5). Tighten the “steel adapter” with torque of 21 lbf-ft (30 Nm) and use Loctite 243.

The actuator with OD156 mm is mainly used on valves ISO76/DN80 – ISO101/DN100. The outer actuator diameter = ø6 1/7 inch (156 mm).



---

*All warnings in the manual are summarized on this page.*

*Pay special attention to the instructions below so that severe personal injury and/or damage to the valve are avoided.*

---

### Installation:

**Always** read the technical data thoroughly (See chapter 6 Technical data)

**Always** release compressed air after use

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

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

**Never** dismantle the valve with valve and pipelines under pressure

**Never** dismantle the valve when it is hot



---

### Operation:

**Never** dismantle the valve with valve and pipelines under pressure

**Never** dismantle the valve when it is hot

**Always** read the technical data thoroughly (See chapter 6 Technical data)

**Always** release compressed air after use

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

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

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

**Always** handle lye and acid with great care



---

### Maintenance:

**Always** read the technical data thoroughly (See chapter 6 Technical data)

**Always** release compressed air after use

**Never** service the valve when it is hot

**Never** service the valve with valve and pipelines under pressure

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

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



### 3 Installation

The instruction manual is part of the delivery. Study the instructions carefully.

The items refer to parts list and service kits section.

The valve is supplied as separate parts as standard (for welding).

The valve is assembled before delivery, if it is supplied with fittings.

#### 3.1 Unpacking/delivery

##### Step 1

###### CAUTION

Alfa Laval cannot be held responsible for incorrect unpacking.

###### Check the delivery for:

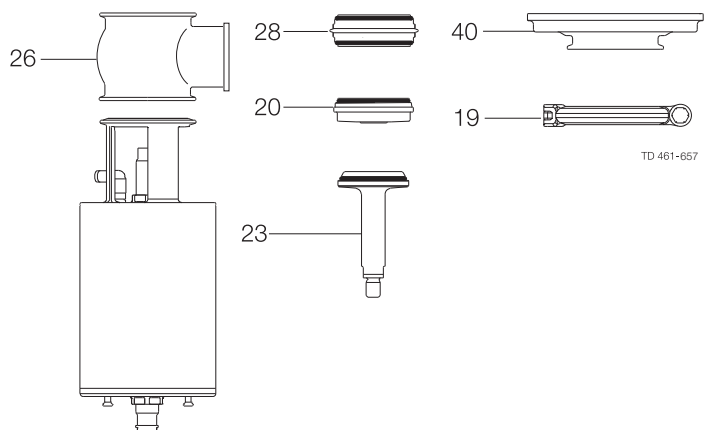
1. Complete valve, shut off valve (RA) or change-over valve (RA) (see steps 2a and 2b).
2. Delivery note.
3. Instruction manual.

##### Step 2

###### 2a

###### Standard:

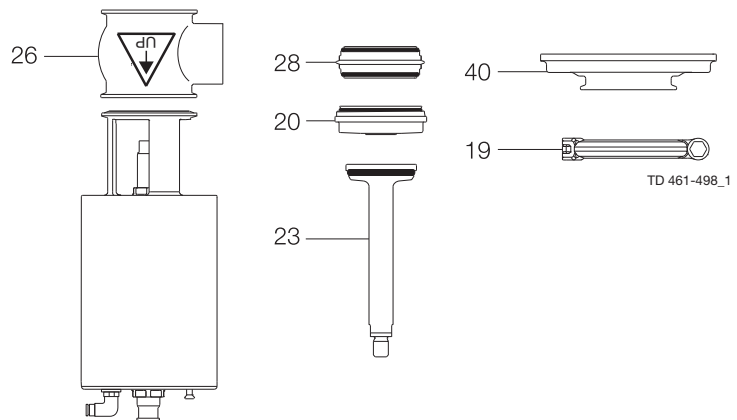
1. Complete actuator.
2. Bonnet (20).
3. 2 x clamp (19).
4. Valve plug (23).
5. Tank flange (40).
6. Valve seat (28).
7. Valve body (26).



###### 2b

###### Reverse Acting:

1. Complete actuator.
2. Bonnet (20).
3. 2 x clamp (19).
4. Valve plug (23).
5. Valve body (26).
6. Valve seat (28).
7. Tank flange (40).



##### Step 3

Remove possible packing materials from the valve/valve parts.

Inspect the valve/valve parts for visible transport damages.

Avoid damaging the valve/valve parts.



Study the instructions carefully and pay special attention to the warnings!  
The valve has welding ends as standard but can also be supplied with fittings.

### 3.2 General installation

#### Step 1



**Always** read the technical data thoroughly.  
See chapter 6 Technical data



**Always** release compressed air after use.

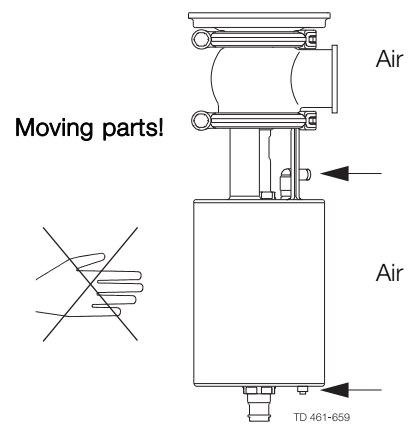
#### CAUTION

Alfa Laval cannot be held responsible for incorrect installation.

#### Step 2



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

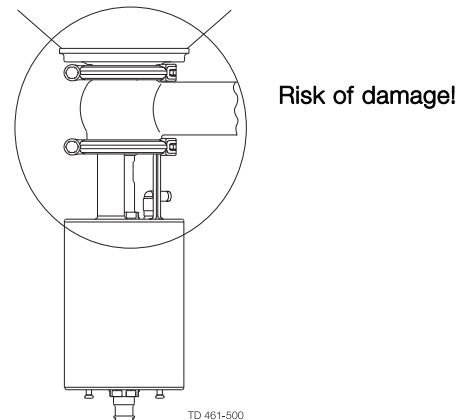


#### Step 3

Avoid stressing the valve.

#### Pay special attention to:

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



### 3 Installation

Study the instructions carefully.

The valve is supplied as separate parts to facilitate the welding.

The items refer to the parts list and service kits section.

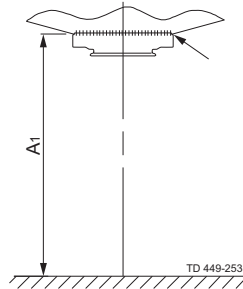
Check the valve for smooth operation after welding.

#### 3.3 Welding

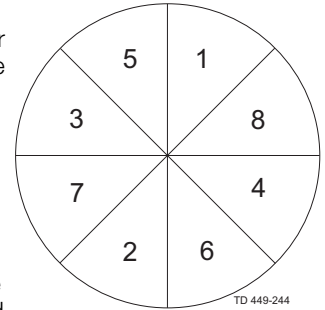
##### Step 1

Before welding the flange into the tank please note:

1. Maintain the minimum clearances "A" so that the actuator with the internal valve parts can be removed - please see later this section!



2. Only use pulsed arc welding and remember no gap between flange and tank plate. Tack weld always on the opposite side (8 segments with filler metal). Weld root if possible without filler metal. Welding of the final run must be done in 8 segments to avoid crack.



##### Min. dimension

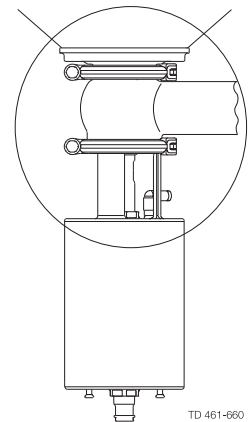
Size	DN/OD				DN			
	51	63.5	76.1	101.6	50	65	80	100
A <sub>1</sub>	16.8	17.3	18.9	19.8	16.9	17.5	19.2	19.9

A<sub>1</sub>\* Min. installation measure to allow that valve can be lifted out of the tank/valve body (if long stroke actuator or/and indication unit is mounted, height must be added).

##### Step 2

Assemble the valve in accordance with the steps on page 20.

**Pay special attention to the warnings!**

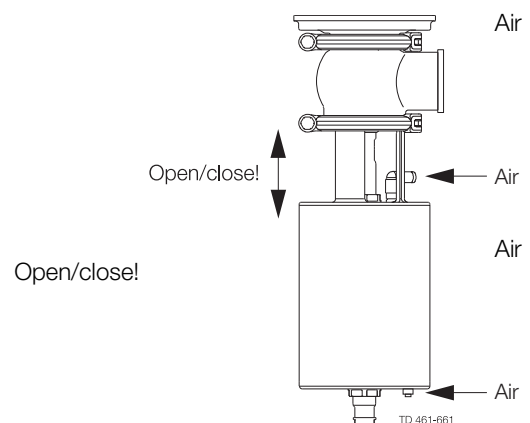


##### Step 3

###### Pre-use check:

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

**Pay special attention to the warnings!**



*Study the instructions carefully.*

*The valve is supplied as separate parts to facilitate the welding.*

*The items refer to the parts list and service kits section.*

*Check the valve for smooth operation after welding.*

---

### 3.4 Recycling information

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- **Unpacking**

- Packing material consists 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 and wear parts in the machine are replaced
- All metal parts should be sent for material recycling
- Worn out or defective electronic parts should be sent to a licensed handler for material recycling
- Oil and all non metal wear parts must be taken care of in agreement with local regulations

- **Scrapping**

- At end of use, the equipment shall be recycled according to relevant, local regulations. Beside 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 the local Alfa Laval sales company
-

## 4 Operation

Study the instructions carefully and pay special attention to the warnings!  
Ensure that the valve operates smoothly.  
The items refer to the parts list and service kits section.

### 4.1 Operation

#### Step 1



**Always** read the technical data thoroughly.  
See chapter 6 Technical data



**Always** release compressed air after use.

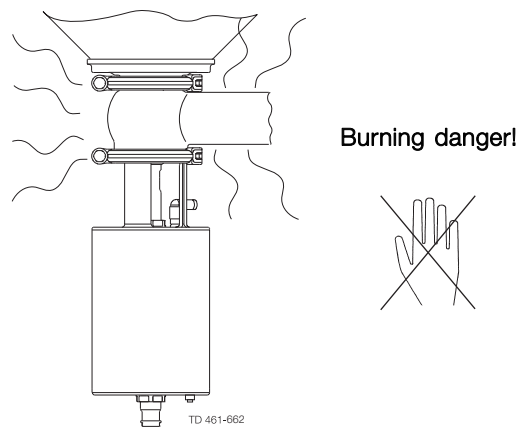
#### CAUTION

Alfa Laval cannot be held responsible for incorrect operation.

#### Step 2



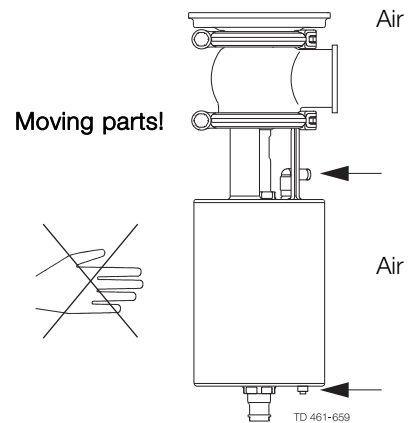
**Never** touch the valve or the pipelines when processing hot liquids or when sterilising.



#### Step 3



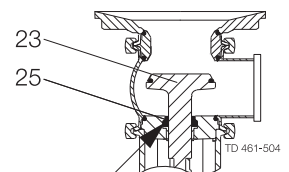
**Never** touch the moving parts if the actuator is supplied with compressed air.



#### Step 4

##### Lubrication of valves:

1. Ensure smooth movement between lip seal (25) and plug stem (23).
2. Lubricate with Klüber Paraliq GTE 703 if necessary (see section 4.1).



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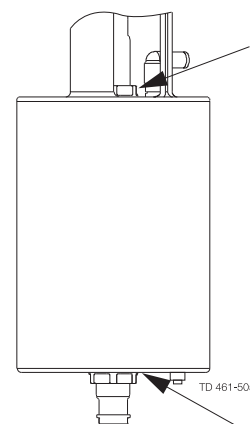
*Study the instructions carefully and pay special attention to the warnings!  
Ensure that the valve operates smoothly.  
The items refer to the parts list and service kits section.*

---

### Step 5

#### Lubrication of actuator

1. Ensure smooth movement of the actuator (the actuator is lubricated before delivery).
2. Lubricate with Molykote Longterm 2 plus if necessary.



## 4 Operation

Pay attention to possible faults. Study the instructions carefully.  
The items refer to the parts list and service kits section.

### 4.2 Troubleshooting

#### NOTE!

Study the maintenance instructions carefully before replacing worn parts. - See section 4.1!

Problem	Cause/result	Repair
External product leakage	Worn or product affected lip seal and/or O-ring	<ul style="list-style-type: none"><li>- Replace the seals</li><li>- Replace with seals of a different rubber grade</li></ul>
Internal product leakage	<ul style="list-style-type: none"><li>- Worn or product affected plug seal</li><li>- Product deposits on the seat and/or plug</li><li>- Product pressure exceeds actuator specification</li></ul>	<ul style="list-style-type: none"><li>- Replace the seal</li><li>- Replace with a seal of a different rubber grade</li><li>- Frequent cleaning</li><li>- Replace with a high pressure actuator</li><li>- Use auxiliary air on the spring side (do not exceed 3 bar)</li><li>- Reduce product pressure</li></ul>
Water hammer	The flow direction is the same as the closing direction	<ul style="list-style-type: none"><li>- The flow direction should be against the closing direction</li><li>- Throttle air release of solenoid in top unit</li></ul>
The valve does not open/close	Product pressure exceeds actuator specification	<ul style="list-style-type: none"><li>- Replace with a high pressure actuator</li><li>- Use auxiliary air on the spring side</li><li>- Reduce product pressure</li></ul>

The valve is designed for cleaning in place (CIP). CIP = Cleaning In Place.  
 Study the instructions carefully and pay special attention to the warnings!  
 NaOH = Caustic Soda.  
 HNO<sub>3</sub> = Nitric acid.

## 4.3 Recommended cleaning

### Step 1



**Always** handle lye and acid with great care.

**Caustic danger!**



**Always** use rubber gloves!

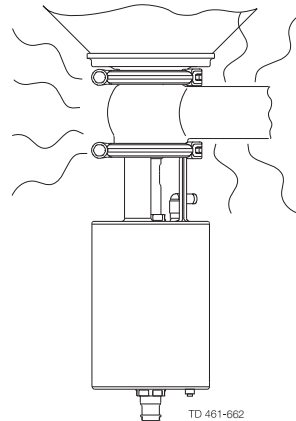


**Always** use protective goggles!

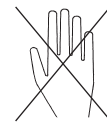
### Step 2



**Never** touch the valve or the pipelines when sterilising.

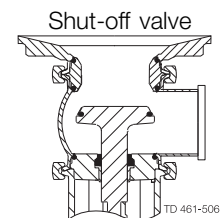


**Burning danger!**



### Step 3

Clean the plug and the seats correctly.  
**Pay special attention to the warnings!**  
 Lift and lower valve plug momentarily!



### Step 4

**Examples of cleaning agents:**

Use clean water, free from chlorides.

1. 1% by weight NaOH at 158° F

2.2 lb NaOH	+	26.4 gal water	=	Cleaning agent.
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0.6 gal 33% NaOH	+	26.4 gal water	=	Cleaning agent.
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2. 0.5% by weight HNO<sub>3</sub> at 158° F

0.2 gal 53% HNO <sub>3</sub>	+	26.4 gal water	=	Cleaning agent.
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## 4 Operation

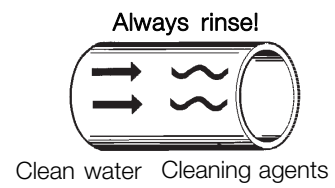
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The valve is designed for cleaning in place (CIP). CIP = Cleaning In Place.  
Study the instructions carefully and pay special attention to the warnings!  
NaOH = Caustic Soda.  
HNO<sub>3</sub> = Nitric acid.

---

### Step 5

1. Avoid excessive concentration of the cleaning agent.
2. Adjust the cleaning flow to the process.
3. **Always** rinse well with clean water after the cleaning.



### Step 6

#### NOTE

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

---



Maintain the valve regularly.  
Study the instructions carefully and pay special attention to the warnings!  
Always keep spare rubber seals and lip seals in stock.

## 5.1 General maintenance

### Step 1



**Always** read the technical data thoroughly.  
See chapter 5.



**Always** release compressed air after use.

### NOTE

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

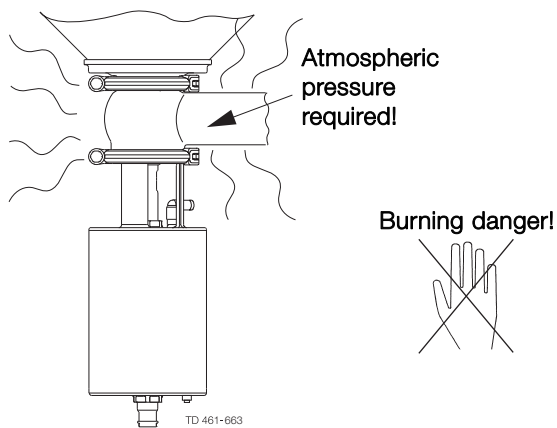
### Step 2



**Never** service the valve when it is hot.



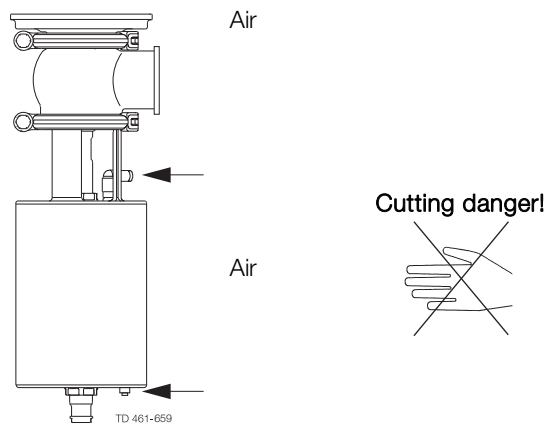
**Never** service the valve with valve and pipelines under pressure.



### Step 3



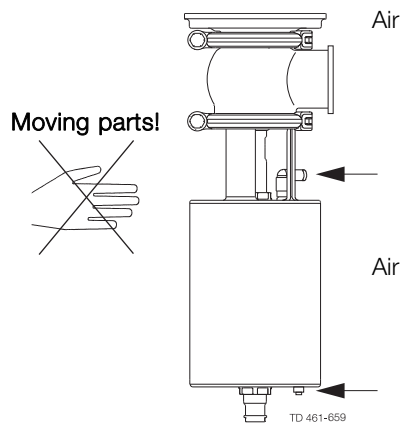
**Never** stick your fingers through the valve ports if the actuator is supplied with compressed air.



### Step 4



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



## 5 Maintenance

Maintain the valve regularly.

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

Always keep spare rubber seals and lip seals in stock.

Below are some guidelines for maintenance and lubrication intervals. Please note that the guidelines are for normal working conditions in one shift.

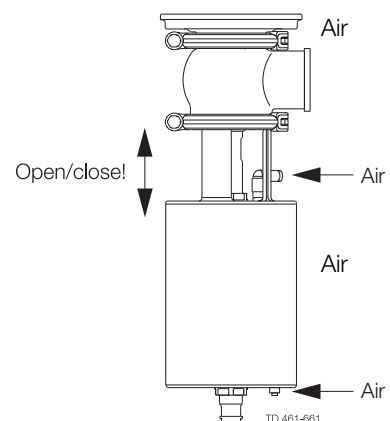
	Product wetted seals	Actuator bushings complete
Preventive maintenance	Replace after 12 months depending on working conditions	Replace after 5 years depending on working conditions
Maintenance after leakage (leakage normally starts slowly)	Replace at the end of the day	Replace when possible
Planned maintenance	<ul style="list-style-type: none"> <li>- Regular inspection for leakage and smooth operation</li> <li>- Keep a record of the valve</li> <li>- Use the statistics for planning of inspections</li> </ul> <b>Replace after leakage</b>	<ul style="list-style-type: none"> <li>- Regular inspection for leakage and smooth operation</li> <li>- Keep a record of the actuator</li> <li>- Use the statistics for planning of inspections</li> </ul> <b>Replace after leakage</b>
Lubrication	<b>Before fitting</b> Klüber Paraliq GTE 703 or similar USDA H1 approved oil/grease	<b>Before fitting</b> Molykote Longterm 2 plus

### Pre-use check:

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

**Pay special attention to the warnings!**

Open/close!



### Recommended spare parts

Service kits (see page )

Study the instructions carefully. The items refer to the parts list and service kits section. Handle scrap correctly.

NC = Normally closed.

NO = Normally open.

A/A = Air/air activated.

### 5.2 Dismantling the valve

#### Step 1

##### 1a

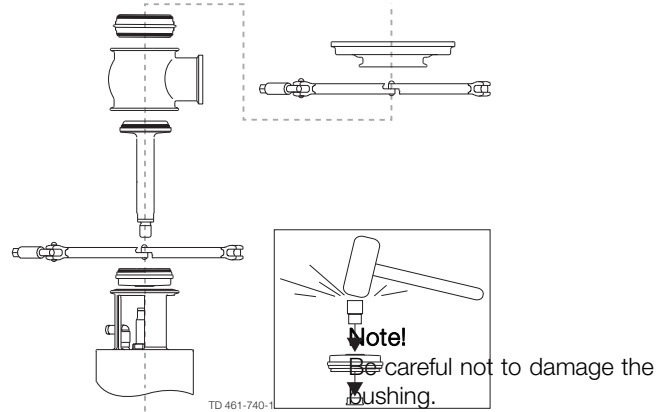
##### Standard:

1. Supply compressed air to the actuator (only NC).
2. Loosen and remove lower clamp.
3. Lift away the actuator.
4. Release compressed air (only NC).
5. Release compressed air (only NC).
6. Unscrew and remove valve plug.
7. Loosen and remove upper clamp.
8. Remove valve body.
9. Remove seat and O-ring.

**Note!** Be careful not to damage the bushing.

**Pay special attention to the warnings!**

**Note!** For plug seal replacement please see page 20.



##### 1b

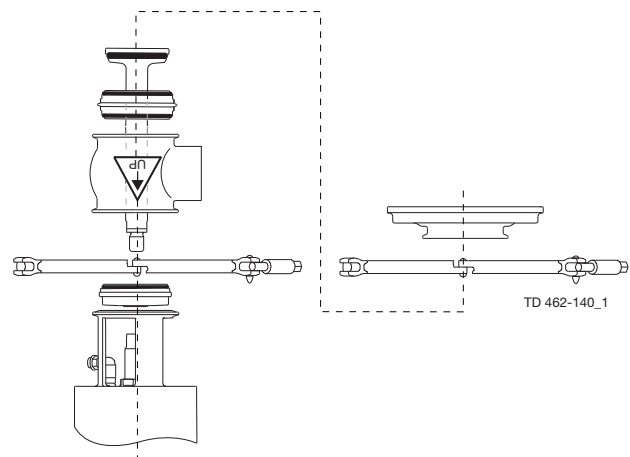
##### Reverse Acting:

1. Loosen and remove upper clamp.
2. Lift away the actuator and valve body.
3. Supply compressed air to the actuator (only NO).
4. Unscrew and remove valve plug.
5. Release compressed air (only NC).
6. Remove seat and O-rings.
7. Loosen and remove lower clamp.
8. Remove valve body.
9. Remove O-ring, lip seal and bushing in bonnet.  
(Use bushing tool and rubber mallet.  
See drawing, step 1a).

**Note!** Be careful not to damage the bushing.

**Pay special attention to the warnings!**

**Note!** For plug seal replacement please see page 20.



## 5 Maintenance

Study the instructions carefully.

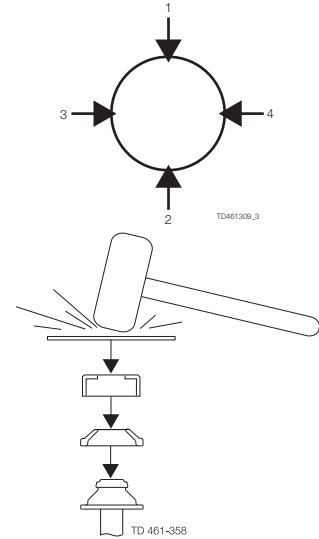
The items refer to the parts list and service kits section. Handle scrap correctly.

AVA = Air/air activated.

Service tool: See Spare Parts.

### 5.3 Elastomer seat ring replacement

1. Remove old seal ring using a knife, screwdriver or similar.  
Be careful not to damage metal parts.
  2. Pre-mount plug seal without pressing it into the groove.
  3. Squeeze plug seal into the groove using opposite pressure points.
  4. Release compressed air behind plug seal.
- 
1. Place the plug element on a firm support.
  2. Using a utility knife, partially AND CAREFULLY cut through the upper ring portion of the TR2 plug avoiding contact with stainless steel stem.
  3. Force apart both cut ends of the plug for removal from stem.
  4. TR2 plugs are installed by applying uniform pressure on all sides.  
(Pressure can be applied by using the seat assembly tool.)
  5. Using a piece of metal and a rubber mallet, place a precise tab to make the TR2 plug snap on to the stem. Reverse the tool and tab again to secure proper fit.
  6. Examine seat assembly to be sure the TR2 plug is properly mounted, holding the seat assembly in one hand - rotate the TR2 plug.  
(For proper CIP cleaning the TR2 plug should turn freely on the stem.)



For more explicit instructions, please refer to the maintenance video.

### 5.4 Assembly of valve

Reverse order of 5.2, Dismantling of valve.

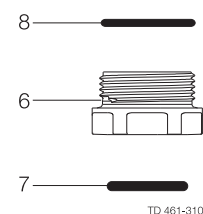
Lubricate O-ring (21) and lip seal (25) with Klüber Paraliq GTE 703.

Remember to tighten spindle and plug with a torque  $M = 23 \text{ lbf-ft}$  (30 Nm) (Use two 17 mm spanners)

If there are vibrations in the pipeline Alfa Laval recommend to use loctite nr. 243.

### 5.5 Actuator bushing replacement

1. Unscrew and remove top and bottom bushings with O-rings.
2. Lubricate O-rings with Molykote Longterm 2 plus before fitting.
3. Fit bushings and O-rings. Tighten brushing with a torque = 7 lbf-ft (10Nm).  
Be careful not to overtighten.



*It is important to observe the technical data during installation, operation and maintenance.  
Inform the personnel about the technical data.*

### 6.1 Technical data

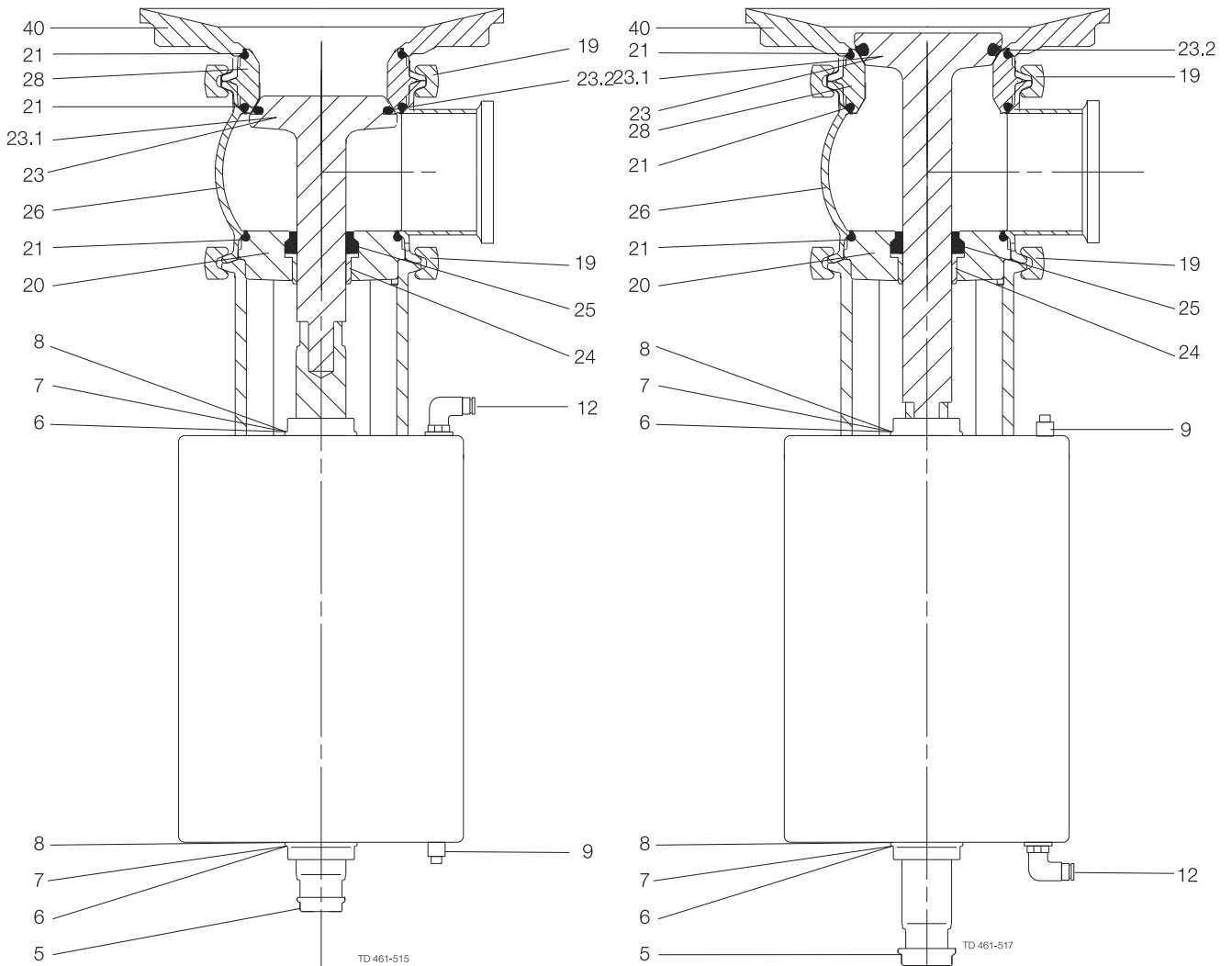
Data - valve/actuator	
Max. product pressure in pipeline (depends on valve specifications):	145 PSI (1000 kPa) (10 bar)
Max. product pressure in tank (depends on valve specifications and temperature):	145 PSI (1000 kPa) (10 bar) max. 68°F
	123 PSI (850 kPa) (8.5 bar) max. 212°F
	109 PSI (750 kPa) (7.5 bar) max. 302°F
Min. product pressure	Full vacuum
Temperature range	14° F to + 284° F (standard EPDM seal)
Air pressure, actuator	72.5 to 101.5 PSI (500 to 700 kPa) (5 to 7 bar)
Materials - valve/actuator	
Product wetted steel parts	AISI 316L (internal Ra < 32 μ inch)
Other steel parts	AISI 304
Plug seal	EPDM / PTFE (TR2)
Other product wetted seals	EPDM (standard)
Optional product wetted seals	HNBR and FPM
Other seals	NBR

#### Noise

One meter away from - and 1.6 meter above the exhaust the noise level of a valve actuator will be approximately 77db(A) without noise damper and approximately 72db(A) with damper - Measured at 7 bars air-pressure.

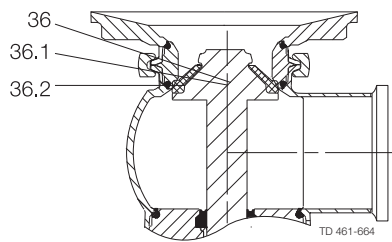
## 7 Unique 7000 Series Tank Outlet Valve

*It is important to observe the technical data during installation, operation and maintenance.  
Inform the personnel about the technical data.*

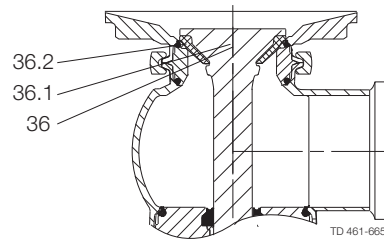


Standard

Reverse Acting



Standard (TR2)



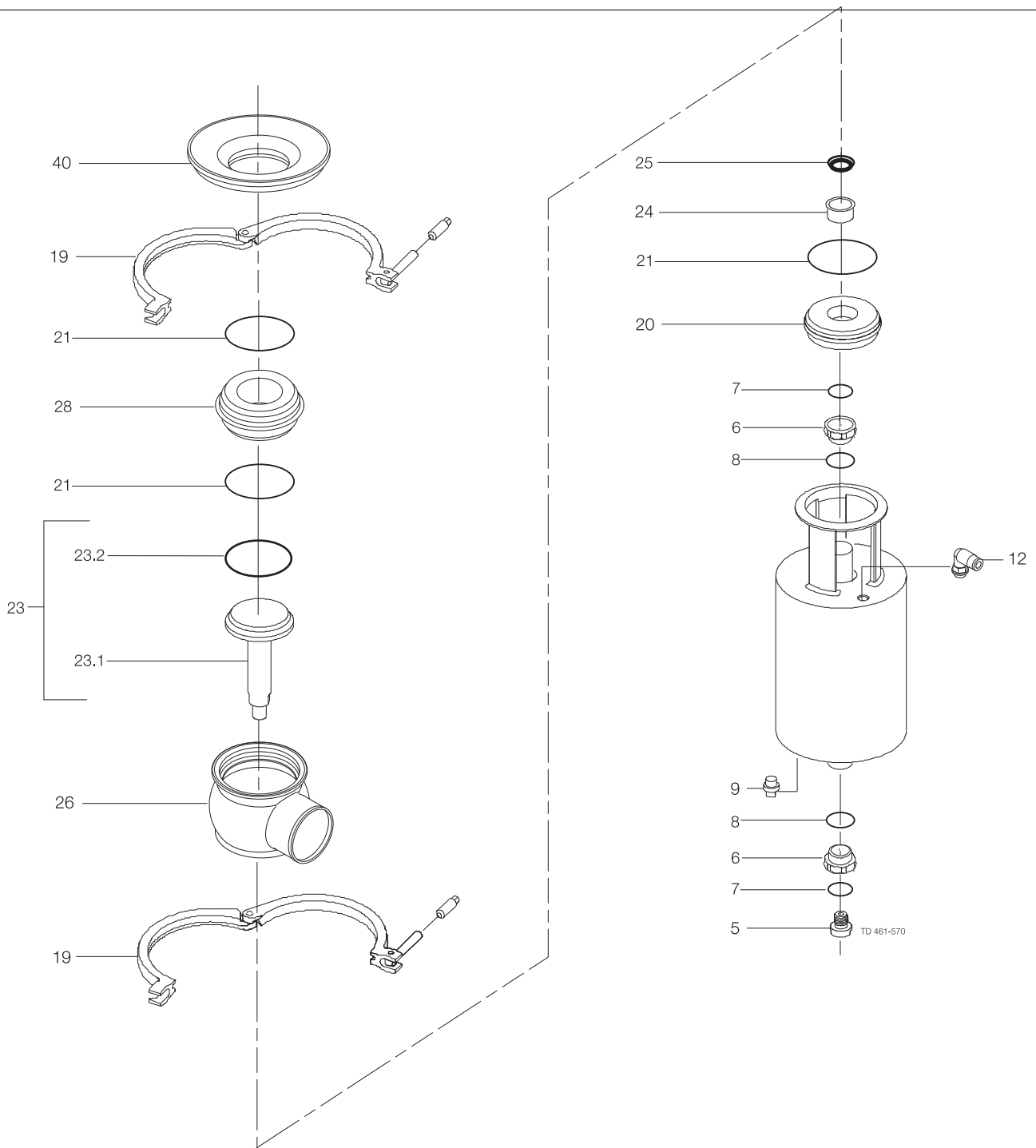
Reverse Acting (TR2)



## 7 Unique 7000 Series Tank Outlet Valve

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Inform the personnel about the technical data.*

### 7.1 Unique 7000 - Elastomer plug seal - Tank Outlet Valve





## 7 Unique 7000 Series Tank Outlet Valve

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Inform the personnel about the technical data.*

### Parts list

Pos.	Qty	Denomination
		Actuator
		Actuator
		Actuator
5	1	Adaptor
6 ●	2	Bushing
7 ●	2	O-ring
8 ●	2	O-ring
9	2	Plug
12	1(2)	Air fitting
19	1(2)	Clamp
20	1	Bonnet
21 ◆	3	O-ring
	3	O-ring
	3	O-ring
23	1	Plug, shut off, complete
	1	Plug, shut off, complete
	1	Plug, shut off, complete
23.1	1	Plug, shut off
23.2 ◆	1	Plug seal
	1	Plug seal
	1	Plug seal
24	1	Bushing
25 ◆	1	Lip seal
	1	Lip seal
	1	Lip seal
26	1	Valve body, upper
	1	Valve body, upper
	1	Valve body, upper
	1	Valve body, upper
28	1	Seal
40	1	Tank flange

### Service kits

Denomination	2"	2 ½"
	9611926500	9611926500
	9611926701	9611926702
	9611926705	9611926706
	9611926709	9611926710

Parts marked with — are included in the service kits (actuator)

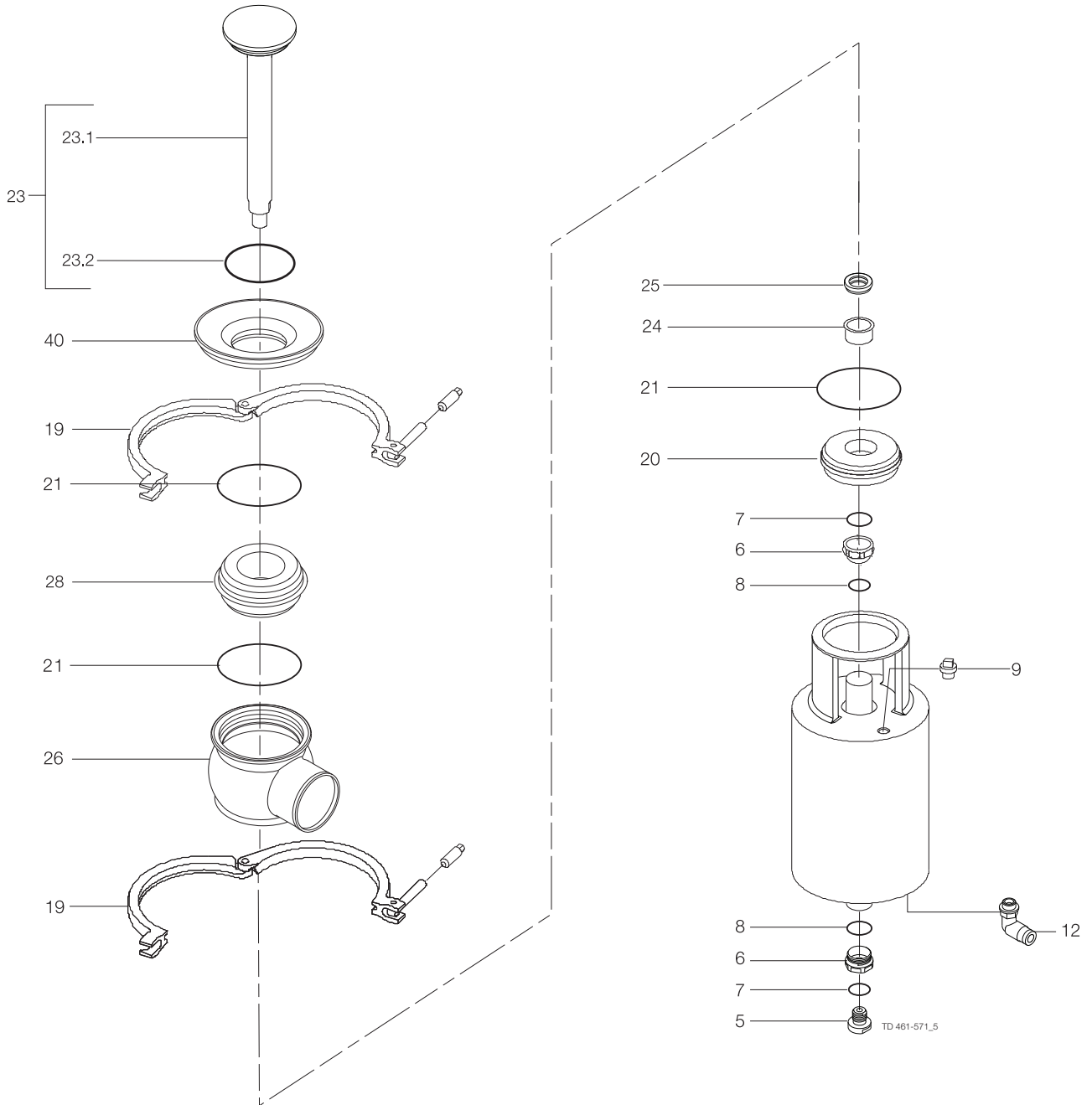
Parts marked with ◆ are included in the service kits (product wetted parts)

TD900397/1

## 7 Unique 7000 Series Tank Outlet Valve

*It is important to observe the technical data during installation, operation and maintenance.  
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### 7.2 Unique 7000 - Reverse Acting - Tank Outlet Valve



## 7 Unique 7000 Series Tank Outlet Valve

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### Parts list

Pos.	Qty	Denomination
		Actuator
		O-ring set (10 pcs.) EPDM
		O-ring set (10 pcs.) HNBR
		O-ring set (10 pcs.) FPM
		Lip seal set (10 pcs.) EPDM
		Lip seal set (10 pcs.) HNBR
		Lip seal set (10 pcs.) FPM
		Plug seal set (10 pcs.) EPDM
		Plug seal set (10 pcs.) HNBR
		Plug seal set (10 pcs.) FPM
5	1	Adapter
6 □	2	Bushing
7 □	2	O-ring
8 □	2	O-ring
9	1	Plug
12	1(2)	Air fitting
19	2	Clamp
20	1	Bonnet
21 ♦	3	O-ring
23	1	Plug
23.1	1	Plug
23.2 ♦	1	Plug seal
24	1	Bushing
25 ♦	1	Lip seal
26	1	Valve body
28	1	Seat
40	1	Tank flange

### Service kits

Denomination	2"	2 1/2"	3"	4"
<b>Service kit for Elastomer and TR2</b>				
□ Service kit .....	9611-92-6500	9611-92-6500	9611-92-6500	9611-92-6500
<b>Service kit for Product wetted parts (standard)</b>				
♦ Service kit, EPDM .....	9611-92-6701	9611-92-6702	9611-92-6703	9611-92-6704
♦ Service kit, HNBR .....	9611-92-6705	9611-92-6706	9611-92-6707	9611-92-6708
♦ Service kit, FPM .....	9611-92-6709	9611-92-6710	9611-92-6711	9611-92-6712

### Service kits

Denomination				
<b>Service kit for Product wetted parts, standard</b>				
♦ Service kit, EPDM .....	9611-92-6713	9611-92-6714	9611-92-6715	9611-92-6716
♦ Service kit, HNBR .....	9611-92-6717	9611-92-6718	9611-92-6719	9611-92-6720
♦ Service kit, FPM .....	9611-92-6721	9611-92-6722	9611-92-6723	9611-92-6724

## 7 Unique 7000 Series Tank Outlet Valve

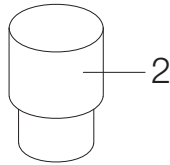
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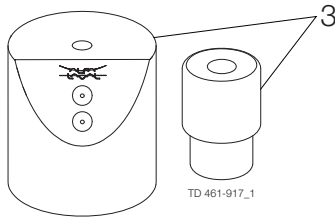
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### 7.3 Mounting Tool - Unique 7000 - Tank Outlet Valve

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TD 461-962\_1



TD 461-917\_1

## 7 Unique 7000 Series Tank Outlet Valve

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### Parts list

Pos.	Qty	Denomination
2	1	Tool for bushing (pos. 24)
3	1	Mounting tool for elastomer plug seals

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**How to contact Alfa Laval**

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

Please visit [www.alfalaval.com](http://www.alfalaval.com) to access the information directly.

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