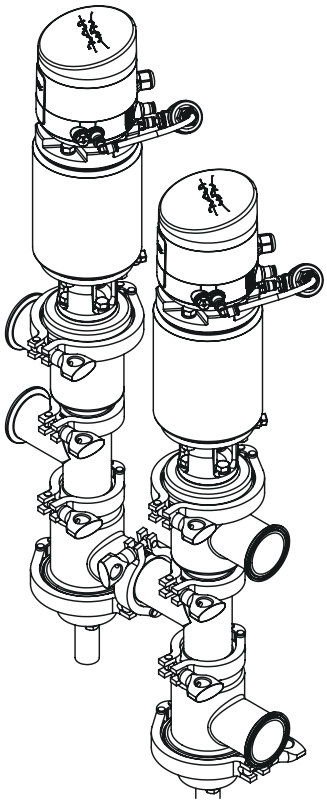
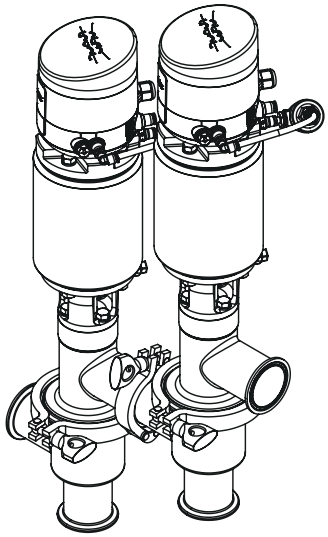
700 Series Flo-Diversion

Single Seat Valves





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Instruction Manual

AMERICAN ENGLISH

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The original instructions are in English

Contents

1 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.

1.1 Safety Signs

Mandatory Action Signs

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

Warning Signs

	General warning.
	Transportation with forklift truck or other industrial vehicles if heavy.
	Hot surface and burning danger.
	Cutting danger.
	Corrosive substance.
	Crushing of hands.
	Danger of injury (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 (label marked on actuator). Do **not** attempt to cut the actuator open due to spring under load (the lock wire opening is locked).

1.2 Safety Precautions

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

General

	To prevent unexpected start and contact with electrical live and moving parts. **Always** disconnect the power supply and air supply safely: • The power supply disconnecting device and air supply must be disconnected (in off position) and locked.

Transportation and Lifting

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

Installation

	If the local safety regulations prescribe that the installation has to be inspected and approved by responsible authorities before the valve is put into service, consult with such authorities before installing the equipment and have the projected installation approved by them. **Always** release compressed air after use. **Always** assemble the valve completely before startup and make sure everything is in place and correctly tightened.
  	**Never** work on the valve or touch moving parts if the actuator is supplied with compressed air. **Never** touch the clip assembly or the actuator piston rod if the actuator is supplied with compressed air. **Never** touch the coupling between the valve body and the actuator if compressed air is supplied to the actuator. **Always** ensure that the valve and pipelines are depressurized, emptied, and cooled down to ambient temperature before installation, inspection, assembly, or dismantling of the valve. **Never** touch the valve or the pipelines when processing hot liquids or when sterilising. **Never** stick your fingers through the valve ports if the actuator is supplied with compressed air.
    	Do **NOT** attempt to disassemble or by other means open the actuator due to spring under load danger!

Operation

	Always read ***Technical Data*** thoroughly. **Never** operate the valve unless a correct installation has been verified. **Never** dismantle the valve during operation or when pressurized. **Necessary** precautions must be taken if leakage occurs as this can lead to hazardous situations. **Never** cover or in any way restrict the valve, the valve must be able to work unobstructed at all time. **Never** throttle the outlet of the detecting valve. **Always** keep the cleaning pressure lower than the product pressure. **Never** dismantle or touch the actuator for force opening if supplied with compressed air.
	**Never** touch the valve or pipelines when hot. **Never** touch the valve or the pipelines when processing hot liquids or when sterilising.
	**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** touch moving parts of the valve during operation. **Always** release compressed air after use. **Never** touch the clip assembly or the actuator piston rod if the actuator is supplied with compressed air. **Never** touch the coupling between the valve body and the actuator if compressed air is supplied to the actuator. **Never** touch the moving parts if the actuator is supplied with compressed air.

Maintenance

In order to optimise the operation of the supplied Alfa Laval product and to minimize the down time due repair activities, the maintenance includes:

- Inspection and maintenance of the supplied Alfa Laval product: strictly follow the technical documentation
- **Preventive maintenance:** visual inspection of the supplied Alfa Laval product followed by necessary adjustments and planned periodic replacement of wear and tear parts
- **Repairs:** unscheduled break down of a component, often causing the system to stop. Damaged components must be replaced
- **Stock of Alfa Laval genuine spare parts:** Alfa Laval recommend keeping a stock of genuine spare parts facilitating preventive maintenance and reducing downtime in case of unplanned break downs

Never touch the coupling between the valve body and the actuator if compressed air is supplied to the actuator.

The actuator springs are not caged (ø85 mm, NC/NO).

Never use compressed air for removing the end caps of the actuator.

Always fit the end cap with the “mushrooms” turned outwards and position it correctly before supplying compressed air to the actuator.

Always use Alfa Laval genuine spare parts.

Always release compressed air after use.

Always ensure that the valve and pipelines are depressurized, emptied, and cooled down to ambient temperature before dismantling the valve.

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

Never work on the valve or touch moving parts if the actuator is supplied with compressed air.

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

Never put your fingers between the valve and actuator for force opening.

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

Never service the valve when it is hot.

Do **NOT** attempt to disassemble or by other means open the actuator due to spring under load danger!

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

Never service the valve with valve and pipelines under pressure **unless specifically prescribed.**

Storage

Alfa Laval recommend:

- Store the supplied Alfa Laval product as supplied in original packaging
- Port opening(s) should be protected against any ingress
- Bare steel (not stainless) should be lightly oiled/greased
- Store in a clean, dry place without direct sunlight or UV light
- Temperature range -5 °C to +40 °C (23 °F - 104 °F)
- Relative humidity less than 60%
- No exposure to corrosive substances (including contained air)

Noise

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

Hazards

Burn Hazard

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

Corrosive Hazard

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

Cut Hazard

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

Crushing Hazard

- Avoid placing hands into valve orifice pinch points

Health Hazard

Danger of injury: (an extra yellow label marked on the actuator from June 2016). Do **NOT** attempt to cut the actuator open due to spring under load. (The lock wire opening is locked).

Danger of injury (laser marked on the actuator). Do **NOT** attempt to disassemble the actuator due to spring under load danger! (The lock wire opening is locked).

Danger of injury (label marked on actuator). Do **NOT** attempt to cut the actuator open due to spring under load. (The lock wire opening is locked).

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

1.3 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.

1.4 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.

1.5 Recycling Information

WARNING

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!

Unpacking

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

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

Maintenance

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

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

Scrapping

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

How to contact Alfa Laval

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

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

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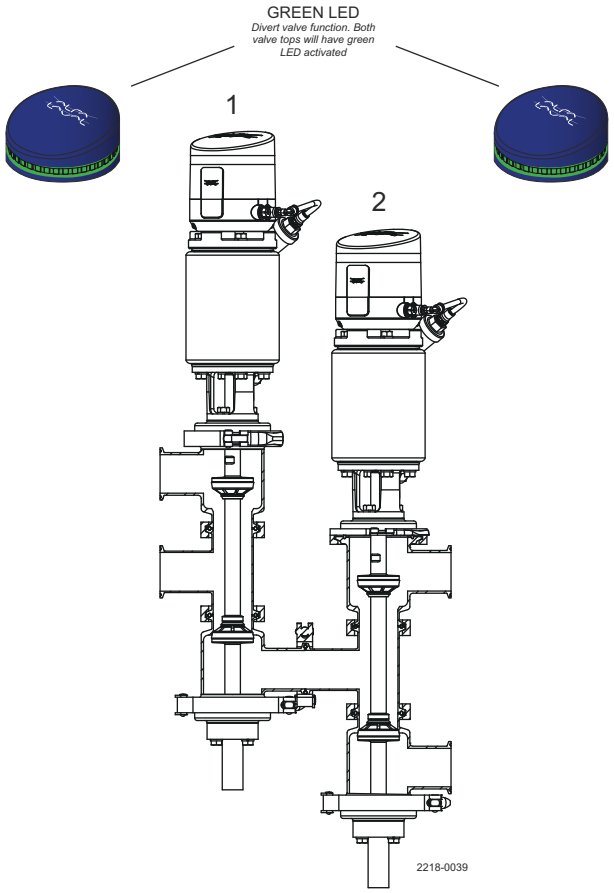
2 Introduction

2.1 Valve Assembly Nomenclature

Valve Assembly Nomenclature

Models:		762-227 and 762-227MRAL (optional reverse-acting tangential)
Sizes:	Std. valve	1½", 2", 2½", 3"
	RA	2", 2½", 3", 4"
Features:		Design based on 700 Series valve. Available with either TR, TR2 or elastomer seat rings. Non-maintainable Actuator.



2.2 Performance

762 Individual Flo-Diversion Valve

Valve Model/Size	Max. Operating Pressure (psi)	Max. Capacity (GPM)	Air Supply Pressure Required (psi)
762-227-1½"	100	60	80
762-227-2"	100	95	80
762-227-2½"	100	175	80
762-227-3"	50	215	80
762-227-3H	100	215	80

762 Reverse Acting Flo-Diversion Valve

Valve Model/Size	Max. Operating Pressure (psi)	Max. Capacity (GPM)	Air Supply Pressure Required (psi)
762-227MRAL-2"	100	200	80
762-227MRAL-2½"	80	350	80
762-227MRAL-3"	70	500	80
762-227MRAL-4"	40	950	90

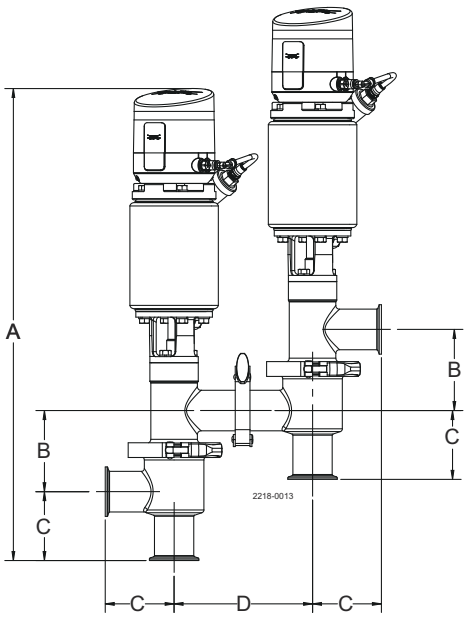
Product pressure can be increased with reduction of capacity. If higher holding pressures are required contact Alfa Laval.

2.5" HP - 110 psi

3" HP - 100 psi

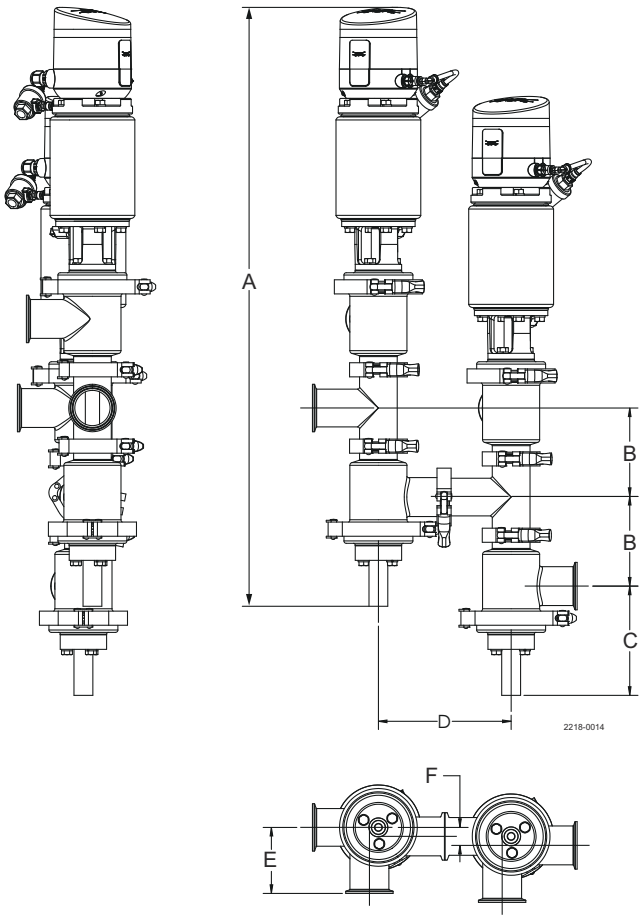
2.3 Dimensions

762 Individual Flo Diversion Valves



Valve Size	1½"	2"	2½"	3"
A	22¼"	22¾"	23⅜"	24⅜"
B	4⅝"	4⅛"	4½"	5"
C	2¾"	3½"	3½"	3¾"
D	5 9/16"	7 1/16"	7 1/16"	7 9/16"
Stroke	1 5/16"	15/16"	1 5/16"	15/16"

762 Reverse Acting Flo-Diversion Valve



Valve Size	2"	2½"	3"	4"
A	$30^{13}/_{32}$"	$32^{7}/_{16}$"	$36^{7}/_{16}$"	$45^{23}/_{32}$"
B	$4^{23}/_{32}$"	$4^{1}/_{4}$"	$5^{3}/_{4}$"	$7^{5}/_{64}$"
C	$5^{51}/_{64}$"	$6^{1}/_{32}$"	$6^{9}/_{32}$"	$9^{19}/_{64}$"
D	$7^{1}/_{16}$"	$7^{1}/_{16}$"	$7^{9}/_{16}$"	$8^{9}/_{64}$"
E	$3^{1}/_{2}$"	$3^{1}/_{2}$"	$3^{3}/_{4}$"	$4^{1}/_{64}$"
F	$^{1}/_{2}$"	$^{16}/_{16}$"	$^{13}/_{16}$"	$^{1}/_{2}$"

3 Installation

3.1 Unpacking

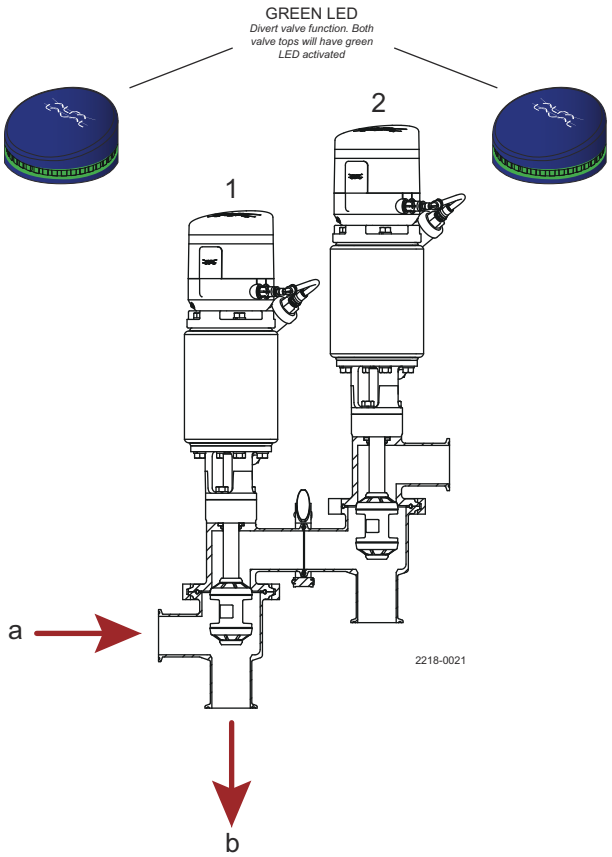
The Flo-Diversion Valve should be unpacked immediately upon receipt from the factory and carefully inspected for damage that may have occurred during shipping. The equipment should also be checked against the bill of lading to make sure there are no shortages. Any damage or shortage should be immediately reported to the carrier.

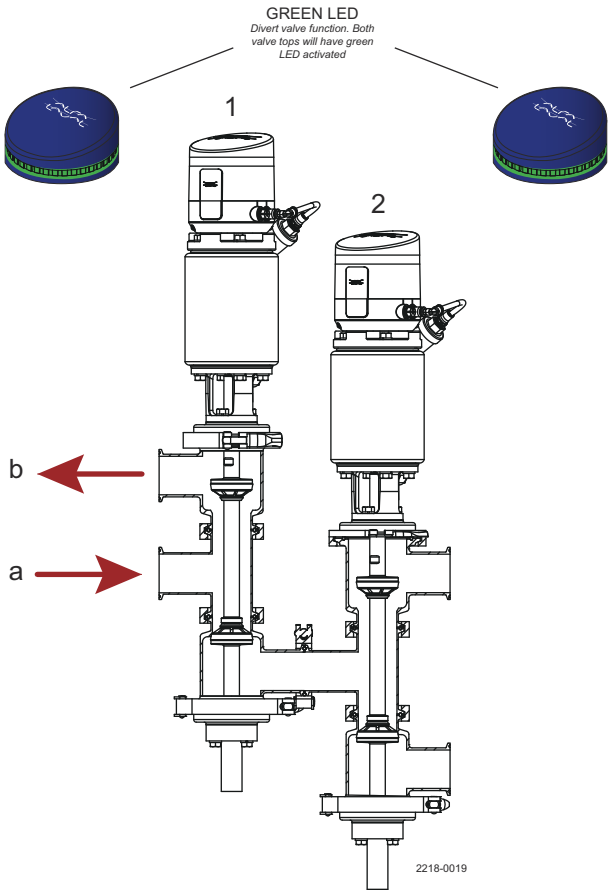
Location of Equipment

The valves are mounted at the end of the holding tube. Care should be taken, however, to locate the valves in a place where they are easily reached for maintenance and disassembly.

The control panel should be located near the valves, and positioned so it can be easily reached for changing the selector switch position,manual diversion, and when necessary, and for service of the electrical components if malfunctions should occur.

Easy access to the valve and panel is necessary for operator and regulatory agency testing. If valves are not accessible from the floor, and appropriate fixed platform may be required by state and federal regulators.





3.2 Installation

Secure the valves to an adequate support, and connect the valves to the product piping. The valves are furnished with Tri-Clamp® fittings for simplified connections. Make sure the piping is self-supporting and that the joints at the valves are properly aligned to prevent strain on the valves.

Remove ThinkTops from their boxes and install on the valve actuators per installation instruction in ThinkTop manual section. ThinkTops have been programmed at the factory prior to shipment. Confirm set up with test procedures described in this manual.

3.2.1 Air Supply

Connect a clean dry air supply. All air connections should be made with ¼ OD poly-flo tubing or equivalent. Black or galvanized pipe is not recommended. Before making final connections blow out all air lines to remove scale, metal fillings or other extraneous particles.

Make sure that the air lines are connected to the proper valves. Quick couplers are not acceptable as air connection joints.

See air connections (*Pneumatic Connections* on page 25) for valves with the solenoids in the ThinkTops. For valves with the solenoids at the panel, the air lines will connect directly to the quick exhaust valve.

3.2.2 Electrical installation, Digital-I0 24V

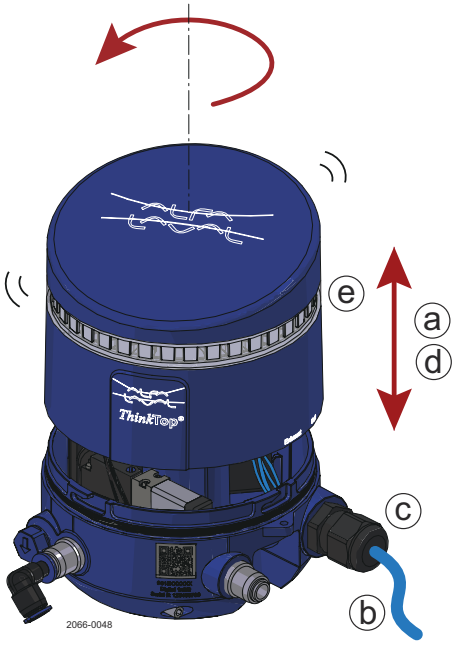
a Remove the top cover by turning it counter clockwise and then lifting it upwards.

b Connect the cable to the ThinkTop, and then connect the wires to the terminals according to the wiring diagram.

c Tighten the cable gland using a 19 mm wrench (3 Nm). Or tighten the M12 connector using a 14 mm wrench (0.6. 1.5 Nm).

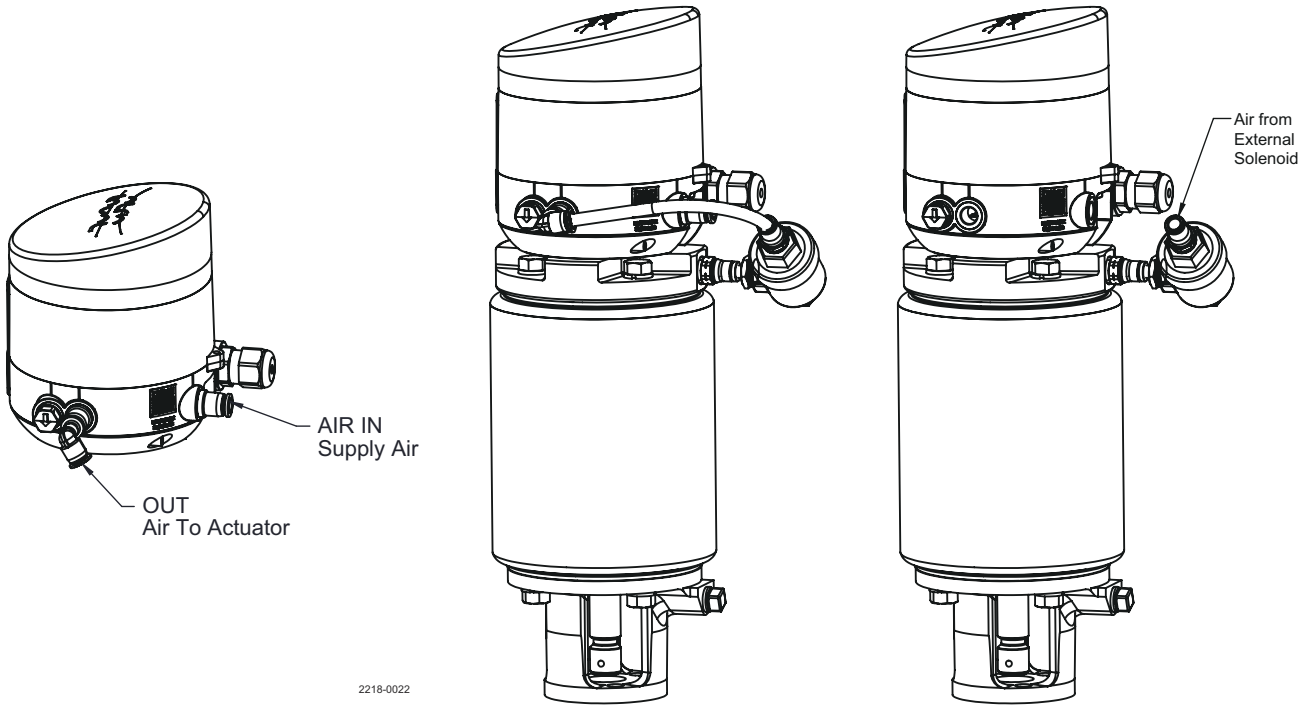
d Put the top cover back in place.

e Turn on the power supply. If installed correctly, the light guide flashes green.



TerminalsV50 Digital-IO 24V			
1	Powersupply	24V	(brown)
2	Powersupply	GND	(blue)
3	out(PLC in)	StatusOK	(white)
4	out	Valvede-energised (DE-EN)	(black)
5	out	Mainvalve energised (EN)	(grey)
6	in	Solenoidvalve 1 for main valve (SV1)	(pink)

3.2.3 Pneumatic Connections



3.3 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!

3.4 Operation Modes

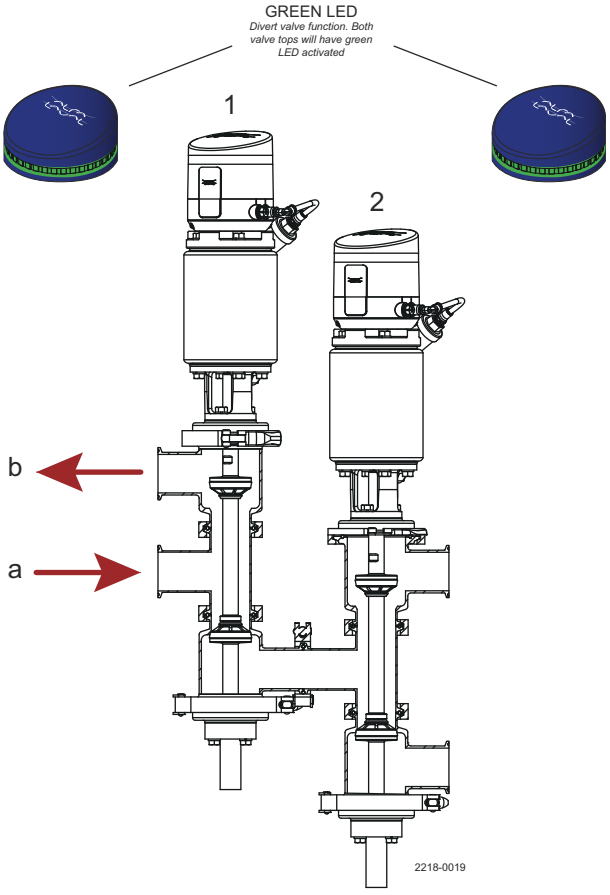
The Flow Diversion device consists of two (2) valves. Each is a two-position, three-port valve connected by a common body. This common body is the upper body of the Divert Valve and the middle body of the Leak Detect Valve. The air-to-raise actuators of the two valves are connected to independent air supplies which cycle the valves to the three operating modes; Divert, Flush and Forward Flow. A description of the three modes follows:

Divert Mode

Divert is the first mode of operation assumed by the Flow Diversion Valve in the start-up procedure. Until a legal product temperature is reached and normal system operation is established, the product is diverted to the Balance Tank. Stem position can be seen by checking the valve stem in the open yoke portion of the valve.

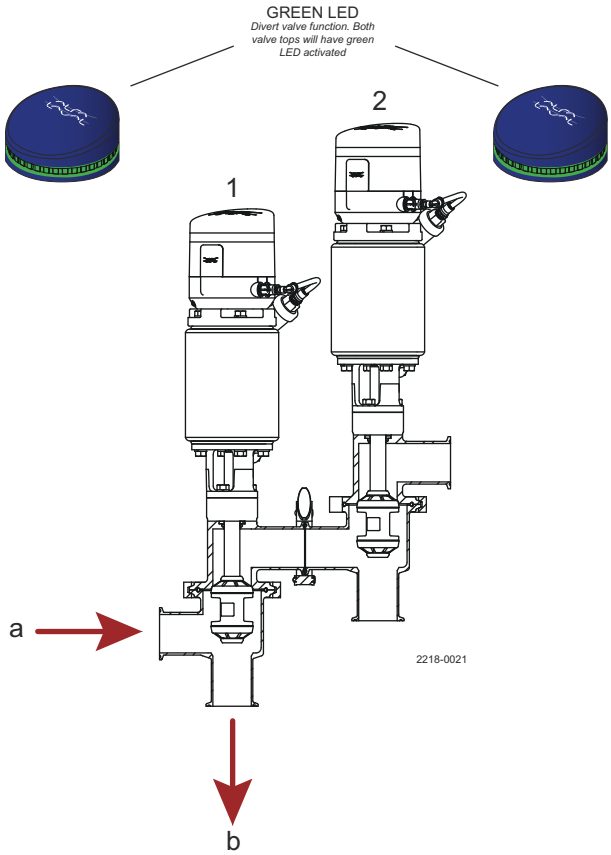
The Divert Valve should be in the divert position when:

1. The control panel selector switch is in the Divert Position
2. The control panel selector switch is in the "off" position.
3. The power supply is interrupted.
4. The air supply is interrupted.
5. If meter base timing system (MBTS) equals non legal flow condition
6. If temperature is below the STLR cut out set point



Reverse-Acting

1. Divert Valve
2. Leak Detect Valve
   - **a.** Product Inlet
   - **b.** To Balance Tank



Standard Valve

1. Divert Valve
2. Leak Detect Valve
   - **a.** Product Inlet
   - **b.** To Balance Tank

Flush Mode

In this mode, correctly pasteurized product flushes and clears the common body between the Divert Valve and the Leak Detect Valve,by opening the divert valve for a set amount of time.

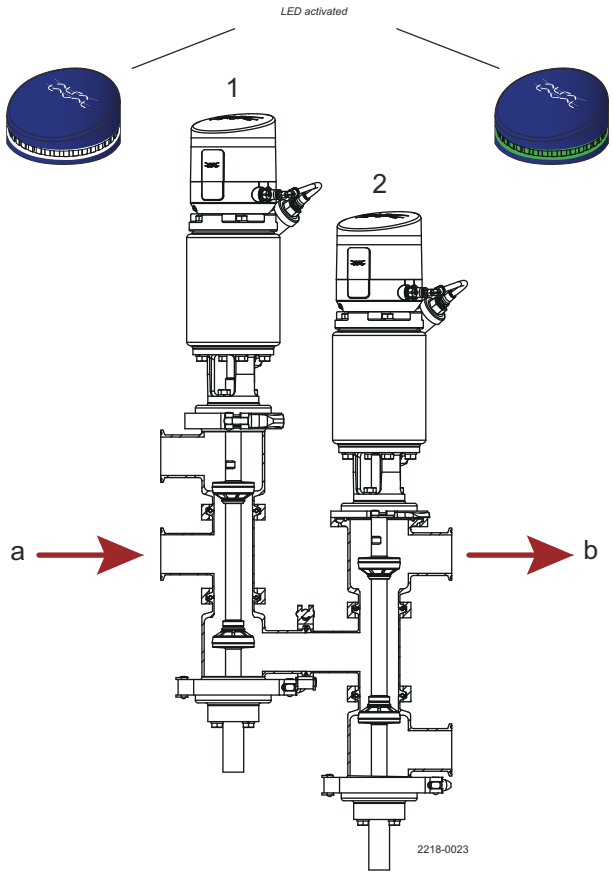
The legal flush delay timer is controlled by a Flow Divert Valve controller. This control system is separate from the Divert and Leak DetectValves, but works in conjunction with them. The control system can be from several sources and of several designs but must be approved by the FDA prior to use.

Product that flows through the valves in the Flush mode is returned to the Balance Tank through the Leak Detect Valve and the ReturnLine. This line must be separate from the Divert Product Return Line, but both of these lines return the product to the Balance Tank.

The valve stems will be in the position as shown in below. Note: ThinkTop LED activated.

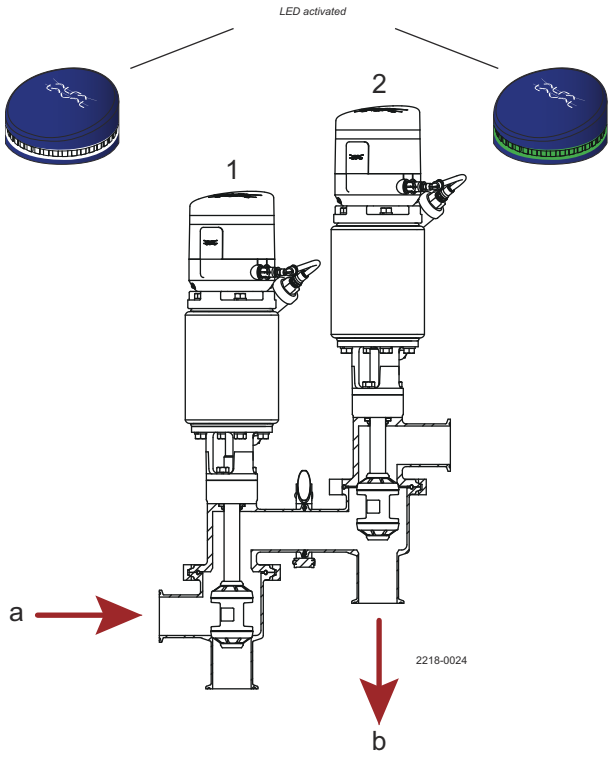
NOTE

The Divert and Leak Detect valves are not considered self draining, so the "FLUSH MODE" position must be held for not less than 1 second, no more than 5 seconds per PMO, before the valves are placed in the full forward flow position.



Reverse-Acting

1. Divert Valve
2. Leak Detect Valve
   a. Product Inlet
   b. To Balance Tank



Standard Valve

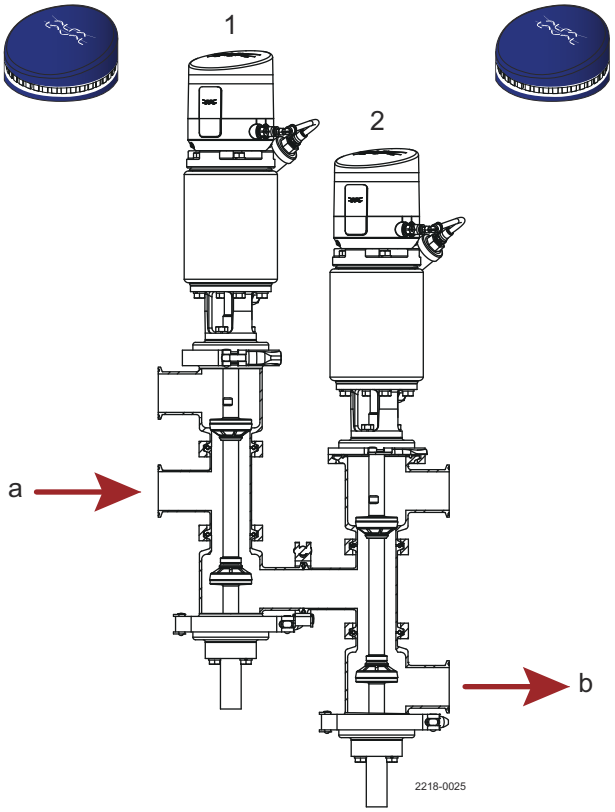
1. Divert Valve
2. Leak Detect Valve
   a. Product Inlet
   b. To Balance Tank

Forward Flow Mode

Forward Flow is the final operating mode of the Flow Diversion Valve. Product flows through both valves to the cooling sections of the pasteurization system.

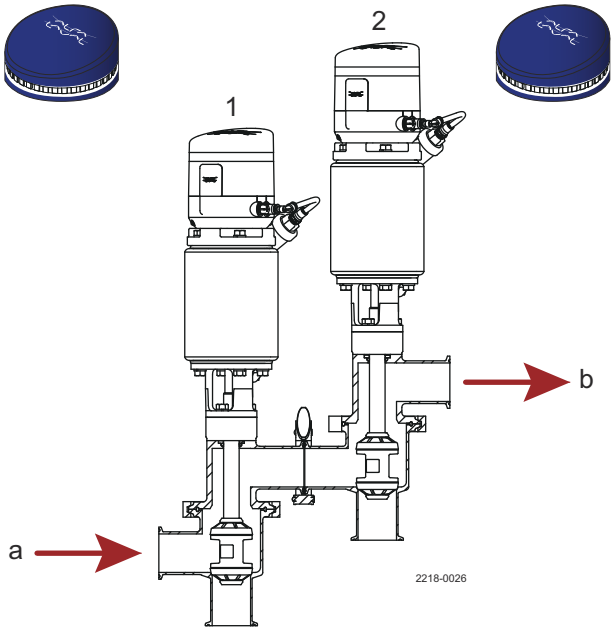
For the Forward Flow mode to be maintained:

1. The legal set temperature is above the legal divert set point.
2. The power supply and air supply must be maintained.
3. If meter base timing system (MBTS) is maintaining legal flow condition.



Reverse-Acting

1. Divert Valve
2. Leak Detect Valve
   - **a.** Product Inlet
   - **b.** Forward Flow



Standard Valve

1. Divert Valve
2. Leak Detect Valve
   - **a.** Product Inlet
   - **b.** Forward Flow

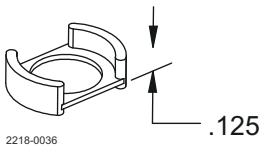
4 Operation

4.1 Auto Setup

ThinkTop Indication Specifications

ThinkTops use micro chip sensor technology which provides a more accurate position sensing than mechanical switches. The micro chips in the sensor, utilizing a principle called the Hall Effect, calculate the position of the indicating target to a very high degree of accuracy. This enables the sensor to detect even the slightest change in stem position.

The ThinkTop provides a sensor band width of 1.5 mm (0.059") accurate to 0.004". In contrast, a micro-switch roller can travel more than 1.6 mm (0.063") without an indication signal change.



Further, the ThinkTop sensor has no moving parts to contacts to wear or break, so there is very little maintenance required.

The ThinkTop also provides visual indication lights to show valve position.

Auto Setup activates all relevant solenoid valves and automatically completes the setup.

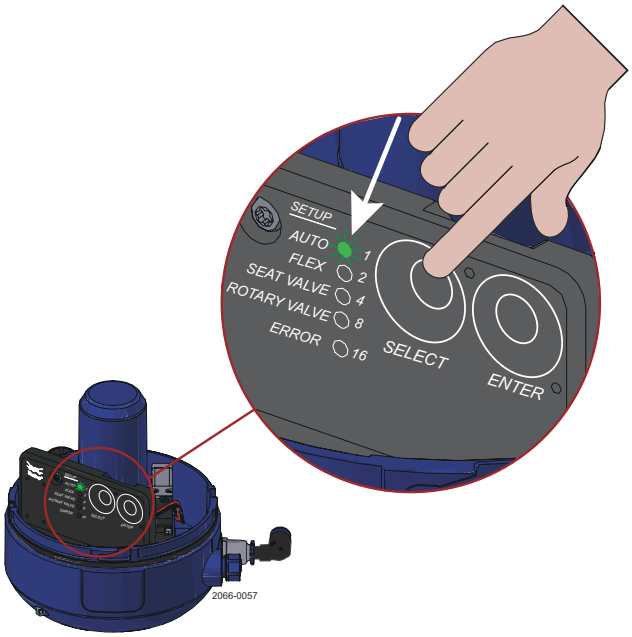
Perform Auto Setup

1. Remove the top cover by turning it counter clockwise and then lifting it upwards.

2. Press the SELECT button and then the ENTER button to initiate the Auto Setup functionality.

   When Auto Setup has completed successfully, the following happens:

   - The light guide lights steady green.
   - The control unit is now in operation mode, and the following features are activated:
     - Solenoid valve interlock
     - Surveillance mode
     - Logical signal adaption



3. Put the top cover back in place.

4. Run an IO test to verify that the system returns the correct feedbacks.

Auto setup issues

- If Auto Setup returns an error, read the troubleshooting section for more information
- If the IO test does not work as expected after completing Auto Setup, consider using Flex Setup for seat valve
- If using external solenoids refer to the ThinkTop manual to preform Flex Setup

Canceling Auto Setup

Press the SELECT button, to cancel Auto Setup.

4.2 Valve Assembly Test and Sealing Instructions

The ThinkTop sensors on these valves are safety devices. They are adjusted so that the flow promoting device will not run, at sub-legal pasteurization temperatures, unless the valves are completely and properly assembled.

To test the sensor adjustment:

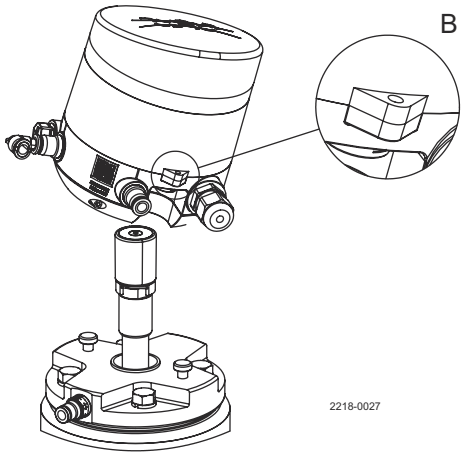
Test can be preformed witout breaking 'seal wire' if ThinkTop does not need to be reprogrammed. If ThinkTop needs to be reprogrammed refer to *Auto Setup* on page 29.

1. Make certain the valves are properly assembled, paying particular attention to the actuator mounting, yoke bonnet and body clamps, and the valve stem to actuator stem connection.

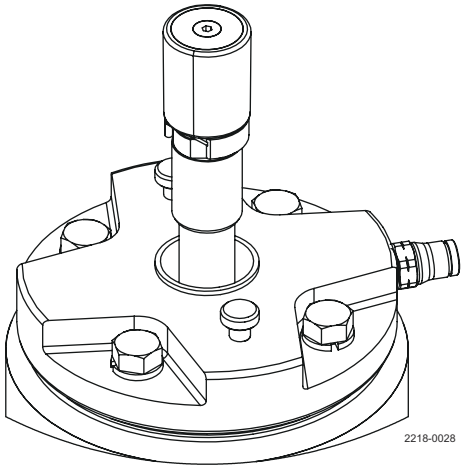
2. Make sure the temperature sensing element of the Safety Thermal Limit Recorder Controller is below legal pasteurization temperature.

3. Momentarily turn on the flow promoting device (timing pump) to make sure it is operating properly, and then turn it off.

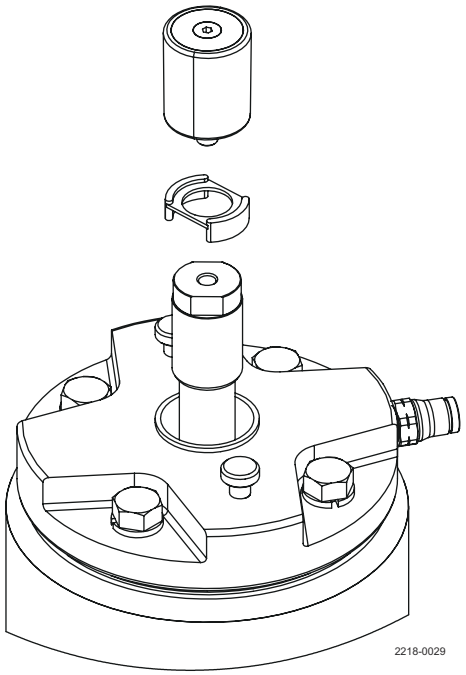
4. Unscrew 2 Allen screws (2.5mm) and remove ThinkTop.

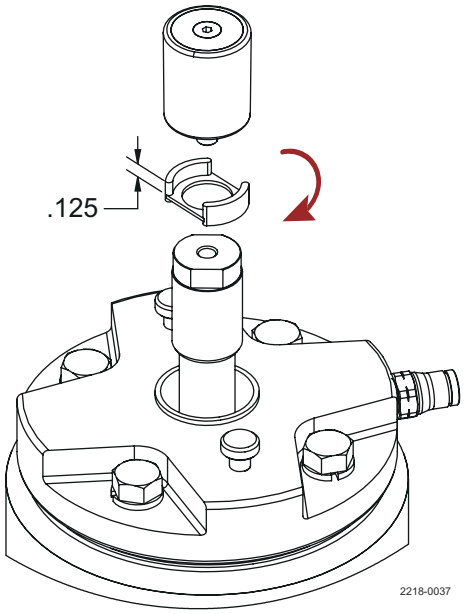


5. Test spacer is installed beneath the magnet in operation mode.

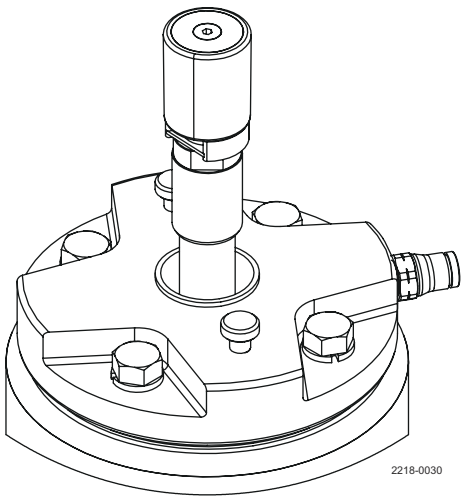


6 Unscrew sensor target and flip test spacer 180° between the stem and magnet. This will simulate the stem being out of position by 0.125".





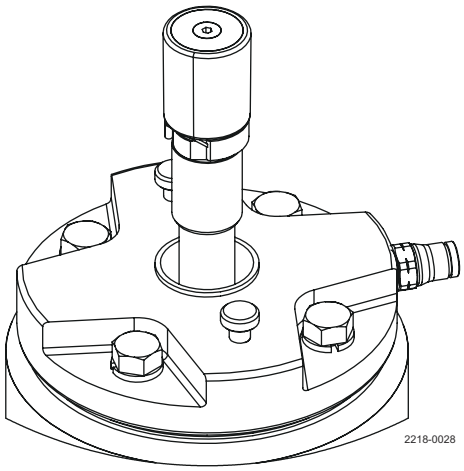
7 Assemble sensor target and test spacer for Test Mode. Reassemble ThinkTop to top of actuator and screw in the 2 Allen screws (2.5 mm).



8. Turn the selector switch to the “Product” position and the flow promoting device (timing pump) should not start.

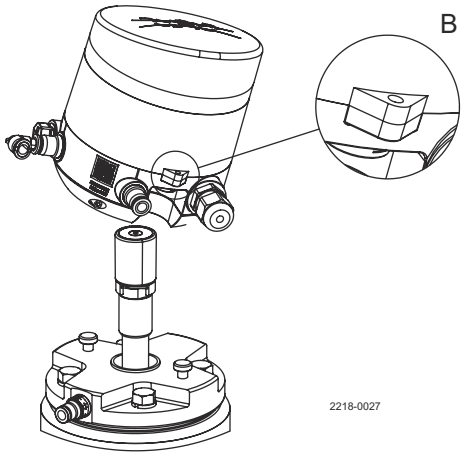
9. If test was successful, remove ThinkTop.

10. Flip the spacer 180° and reassemble the valve in Operation Mode. Ensure valve is properly and completely assembled.



11. Repeat steps 4-10 with the leak detect valve.

12. When positive test results are obtained, if necessary attach new seal wire Through the hole on ThinkTop cover as noted in Detail B.



CORRECTIVE ACTION: If the flow promoting device (timing pump) fails to respond as indicated in the above described procedure, an immediate check of the Flow Diversion Valve assembly, ThinkTop adjustment and wiring is required to locate and correct the cause.

4.3 Troubleshooting

Problem	Probable Cause	Remedy
Response time above one second.	1. Faulty Quick Exhaust. 2. Defective solenoid valve. 3. Broken diaphragm on quick exhaust valve. 4. Actuator not functioning properly	1. Inspect air lines for leaks or obstructions and take necessary corrective action. 2. Test Filter-Regulator and repair or replace if defective. 3. Test solenoids. Replace if necessary. 4. Replace diaphragm. 5. Check for excessive back pressure. 6. Service actuator.
Valves will not assume forward flow position at any selection switch setting.	1. Inadequate air supply to actuator. 2. The pressure thermo switch capillary tube or controller has failed or leaking. 3. Electrical difficulties. 4. Actuator not functioning properly	1. Check air system as described above. 2. Replace switch, refer to controller manual. 3. Refer to electrical troubleshooting chart and take corrective action. 4. Service actuator
Valve will not assume divert position.	1. Quick exhaust valve is not functioning properly. 2. Obstruction in divert or leak detector valve.	1. Inspect quick exhaust valve and remove obstruction or replace valve. 2. Disassemble valve and remove obstruction.
Timing pump will not start.	1. Timing pump switch is not on. 2. One or both valve plug assemblies are not properly connected to actuator stem.	1. Turn on switch. 2. Assemble valve stems to actuator stems correctly. 3. Check for proper adjustment of ThinkTop.
Valves slamming or banging	1. Hydraulic shock caused by high differential pressure. 2. Pressure or flow rate exceeds valves published maximum limits.	1. Review system pressure before and after valves. 2. Lower process flow rate and pressure. 3. Convert to Reverse Acting FDV. 4. ContactAlfa Laval tech. support to review options.

4.4 Recommended Cleaning

WARNING **Risk of burns!**

Never touch the supplied product or the pipelines when sterilizing.

CAUTION

Always handle lye and acid with great care.

NOTE

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

NaOH = Caustic soda.

HNO_3 = Nitric acid.

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

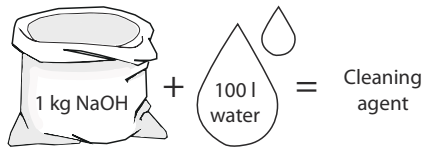
Examples of cleaning agents

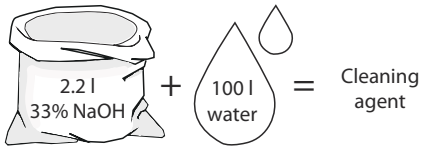
NOTE

Use clean water free from chlorides.

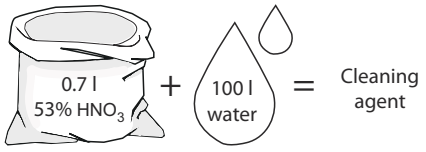
Metric System

1. 1% by weight NaOH at 70°C



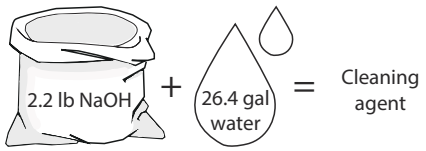


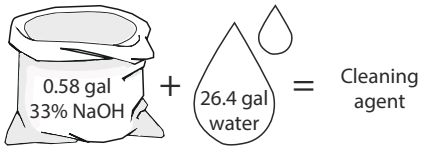
2. 0.5% by weight HNO_3 at 70°C



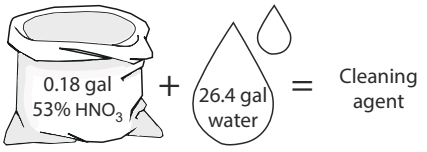
Imperial System

1. 1% by weight NaOH at 158°F





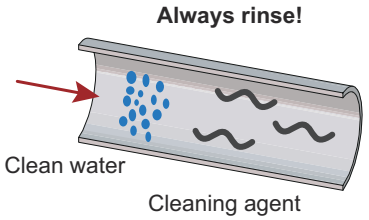
2. 0.5% by weight HNO_3 at 158°F



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

⚠ CAUTION

Always rinse well with clean water after the cleaning.



5 Maintenance

5.1 General Maintenance

NOTE

Maintain the valve regularly.

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

Always read the technical data thoroughly.

Always keep spare rubber seals and lip seals in stock.

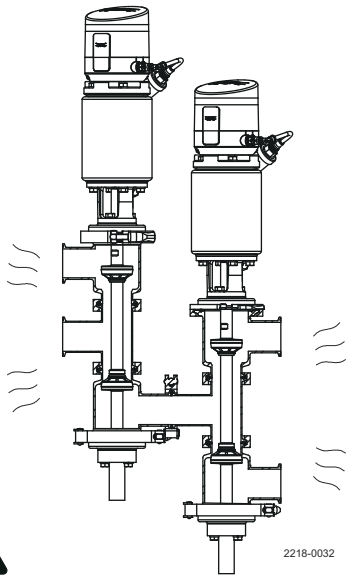
All scrap must be stored/disposed of in accordance with current rules/directives.

CAUTION

Always release the compressed air after use.

WARNING **Burn Risk!**

Never service the valve when it is hot.



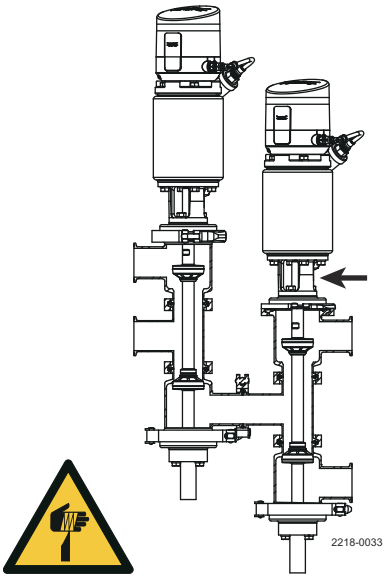
WARNING

Never service the valve with valve and pipelines under pressure.

Atmospheric pressure required!

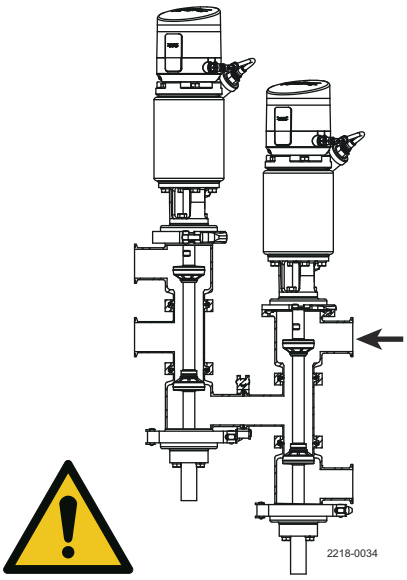
WARNING **Cutting danger!**

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



WARNING **Moving parts!**

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



5.2 Maintenance Schedule

	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 slowing)	Replace immediately	Replace when possible
Planned maintenance	• Regular inspection for leakage and smooth operation • Keep a record of the value • Use the statistics for planning of inspections Replace after leakage	• Regular inspection for leakage and smooth operation • Keep a record of the actuator • Use the statistics for planning of inspections Replace after leakage
Lubrication	**Before fitting:** USDA H1 approved oil/grease	**Before fitting:** Molykote longterm 2 plus

5.3 Disassembly

This section describes complete disassembly of the valves, actuators and the control unit. Although completedisassembly is covered, it is only intended as a guide. The valves, actuators and control unit should be disassembled to the extent necessary for inspection or needed repair.

5.3.1 Disassembly- Standard Flow Diversion Valve

1. Besure the timing pump is turned off. Remove the lower body line clamps on the divert valve and the upper body outlet line clamp from the leak detect valve.
2. Remove divert valve body clamp and separate the lower body from the upper body.
3. Remove leak detect body clamp and separate the upper valve assembly from the lower valve body.
4. Move selector switch on the control unit to the “inspect” position to extend valve stems for removal.
5. After the valves have assumed the inspect position unscrew the valve stems from the actuator stems.
6. Disconnect electrical power to the control housing and shut off air supply to the valves.
7. Separate upper valve body from yoke by removing three bolts. Remove split bushing, sleeve and o- ring from upper body.
8. Separate yoke from actuator by removing four bolts. Remove green bushing retainer and o-ring between yoke and actuator.

5.3.2 Disassembly - Reverse-Acting Valve

1. Besure the timing pump is turned off. Remove the four tri-clamps that connect the valve to the process system. To separate the Flo-Diversion Valve into two valves remove the tri-clamp that connects the valves together.
2. Remove Tri-clamp and separate the bonnet / end cap assembly from the valve body. Remove the four screws and washers to separate the bonnet from the end cap. Pull the clear plastic stem guard out of the end cap.
3. Remove o-ring from the end cap and the o-ring and bushing from the bonnet.
4. Apply air to actuator for stem removal. Unscrew the stem nut and remove the stem and o-ring.
5. Remove air to the actuator.
6. Remove the clamp that connects the actuator, bonnet, yoke and stem assembly to the valve body.
7. Unscrew the stem from the actuator shaft.
8. Separate bonnet from yoke by removing three bolts. Remove bushing and o-ring from valve bonnet.
9. Separate yoke from actuator by removing four bolts. Remove green bushing retainer and o-ring between yoke and actuator.
10. Remove the two clamps and gaskets to separate the remaining valve body assembly.

5.4 Actuator Bushing / Packing Replacement

WARNING

To prevent personal injury, do not attempt to cut actuator open.

The actuator spring is compressed and under load.

Bushings guide the actuator stem while packings provide sealing around the stem. The bushing and packing should both be replaced if one or the other fails. Even if only one end fails both ends of the actuator should be serviced. Disconnect and remove actuator completely from valve before proceeding with the steps below, see *Disassembly* on page 40.

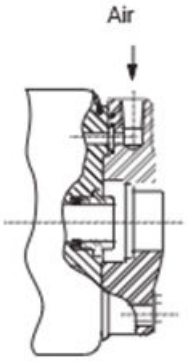
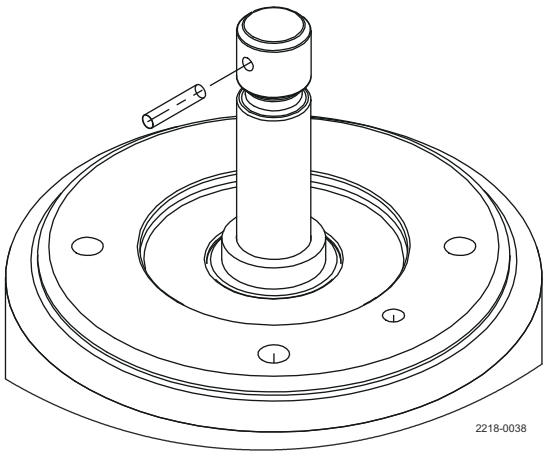


Figure 7

1. Attach the indicating nut to the actuator stem with the retaining rings on the Control Top end and screw on a $^{5}/_{8}$ nut to the actuator stem threaded end.
2. Apply 60 PSIG to the unthreaded air holes in the actuator end caps to blow out the packings and bushings. The nuts on the actuator stem will prevent the bushing form flying off the end of the actuator stem.
3. Remove air supply once the bushing and packing are forced out.
4. Wipe stem clean. Lubricate new packing with Tri- clover C137 lubricant.
5. Slide new packing over the stem with the “V” side facing the actuator. Partially insert packing into smallest counter bore using a flat tool to assist the outer lip.
   DO NOT DAMAGE OF ROLL THE PACKING LIP DURING INSTALLATION.
6. Place bushing on top of the packing. Push on the bushing until outer flange is flush with actuator.

5.5 Actuator stem nylon lock repacement



1 The Nylon Locking Pin located in the middle of the stem thread keeps the valve stem from becoming loose due to vibrations. After every disassembly, the nylon locking pin must be replaced. Punch out the old nylon pin with a ⅛" (3mm) or smaller diameter punch. Insert a new nylon locking pin.

5.6 Actuator lubrication

1 For optimum performance, lubricate once annually. Inject 5cc of STP * into the unthreaded thru hole in each end of the actuator. Roll actuator on a flat surface repeatedly to obtain uniform coverage of lubricant. Do not over lubricate. This is not a remedy for actuator failure.

5.7 Valve Assembly

WARNING

To prevent personal injury, keep hands and tools out of and away from valve bodies and stems when applying or releasing air to an actuator. The actuator stem assembly moves with extreme force and suddenness.

NOTE IMPORTANT

Replace all worn or damaged components as required. Spray stem and o-ring with Tri- Clover L-1011 Sanitary Lubricant. Make sure all valve bodies are mated properly before securing with clamps. Tighten all clamps securely to assure proper alignment. When disassembling and assembling valve, bench area should be clean to prevent marking and nicking of seats.

Replace nylon lock before threading valve stem onto actuator stem, see *Actuator stem nylon lock repacement* on page 43.

5.7.1 762-227 VALVE ASSEMBLY

1. Place o-ring into counter bore above air port on yoke.
2. Place green bearing retainer into bottom of actuator.
3. Place actuator onto yoke with threaded shaft end into the yoke. Align yoke air port with unthreaded thru hole in actuator end cap.
4. Fasten with four bolts and lock washers.
5. Lubricate o-ring with Suitable lubricant. Insert o-ring into body, place washer on top of o-ring, place split bushing on top of washer. Fasten upper body to yoke with three bolts and lock washers.
6. Apply 60 psig air to actuator.
7. Push valve stem through bonnet until it meets the actuator stem. Partially thread valve stem onto actuator stem by hand until nylon lock resistance is felt. Apply an open end wrench over the valve stem flats, turn clock wise and tighten until valve stem meets actuator stem shoulder.
8. Remove air to actuator.
9. Place gasket in body groove and clamp together. Cycle valve at least 6 times. Operate valves after assembly to be sure they are operating correctly. Inspect all air line connections for leaks.

5.7.2 762-227MRAL VALVE ASSEMBLY

1. Place o-ring into counter bore above air port on yoke.
2. Place green bearing retainer into bottom of actuator.
3. Place actuator onto yoke with short shaft end into the yoke. Align yoke air port with unthreaded thru hole in actuator end cap.
4. Fasten with four bolts and lock washers.
5. Insert the o-rings and bushings into the valve bonnets.
6. Attach the bonnet to the yoke with four screws and washers.
7. Slide the valve stem thru the bonnet and yoke, then screw the stem onto the actuator shaft.
8. Place the body gasket into the groove of the bonnet
9. Assembly the two valve bodies and tee with two gaskets and two clamps to make up the valve body assembly. Each valve that makes up the Flo-Diversion Valve consists of one right hand tangential body and one left hand tangential valve body. The valve must be assembled to accomodate the process system as well as the capability to drain.
10. Insert the stem that is attached to the actuator into the proper end of the valve body assembly. Clamp the valve body to the bonnet.
11. Apply air to the actuator to allow for stem assembly.
12. Slide the o-ring and the hollow stem onto the stem attached to the actuator. Install the stem nut to hold the stems together and to compress the o-ring seal.
13. Remove air from the actuator.
14. Assembly the end cap to the bonnet with three screws and lock washers.
15. Push the grooved end of the clear plastic stem guard into the end cap.
16. Install the valve body gasket into the groove of the valve body.
17. Slide the end cap / bonnet assembly onto the valve stem then clamp to the valve body. Operate valves after assembly to be sure they are operating correctly. Inspect air line connections for leaks.

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6 Technical Data

NOTE

Technical data must be observed during installation, operation and maintenance.

All personnel should be informed about the technical data.

6.1 Physical Data

Materials	
Productwetted metal:	316L stainless steel
Other steel parts:	304 stainless steel
Finish:	32Ra
Product wetted seals:	Buna bonded or “TR”/"TR2" PTFE replaceable
Elastomers:	BUNA, EPDM, SFY (Fluorelastomer), “TR”/"TR2" PTFE replaceable

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7 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.

7.1 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

7.2 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.

7.3 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.

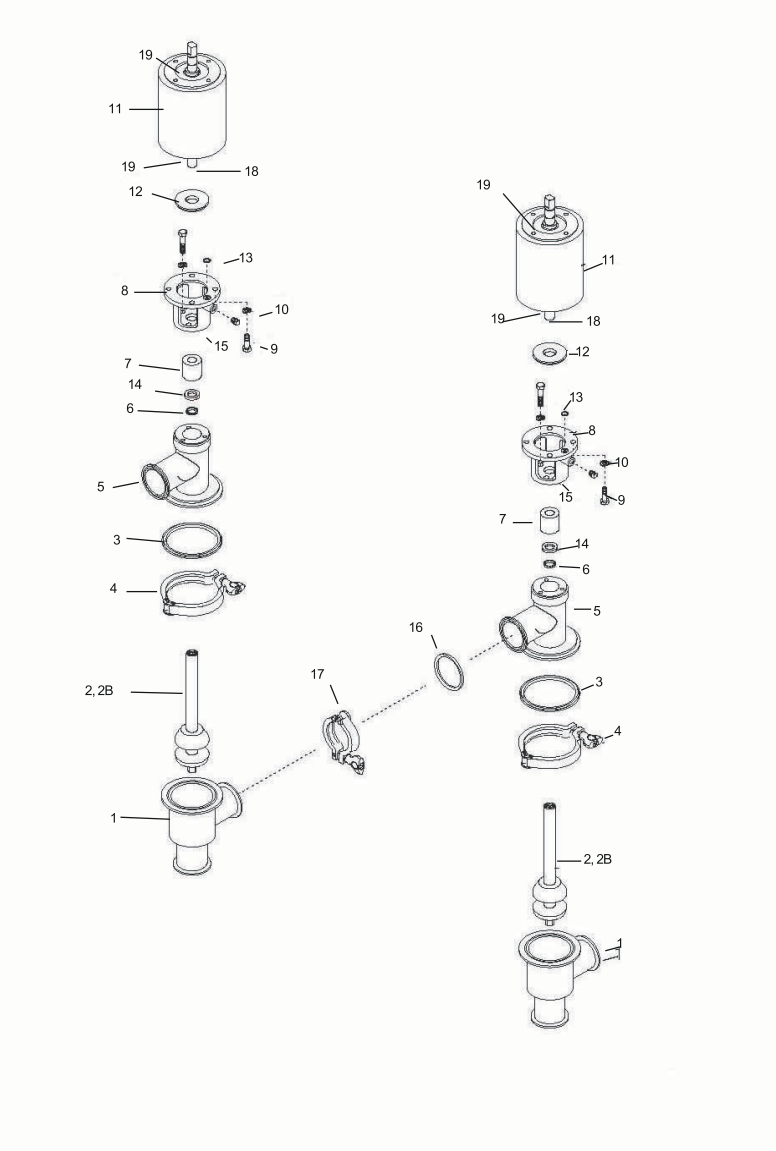
Liability and warranty are excluded:

- 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 5)
- 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.

8 Parts Lists and Exploded Views

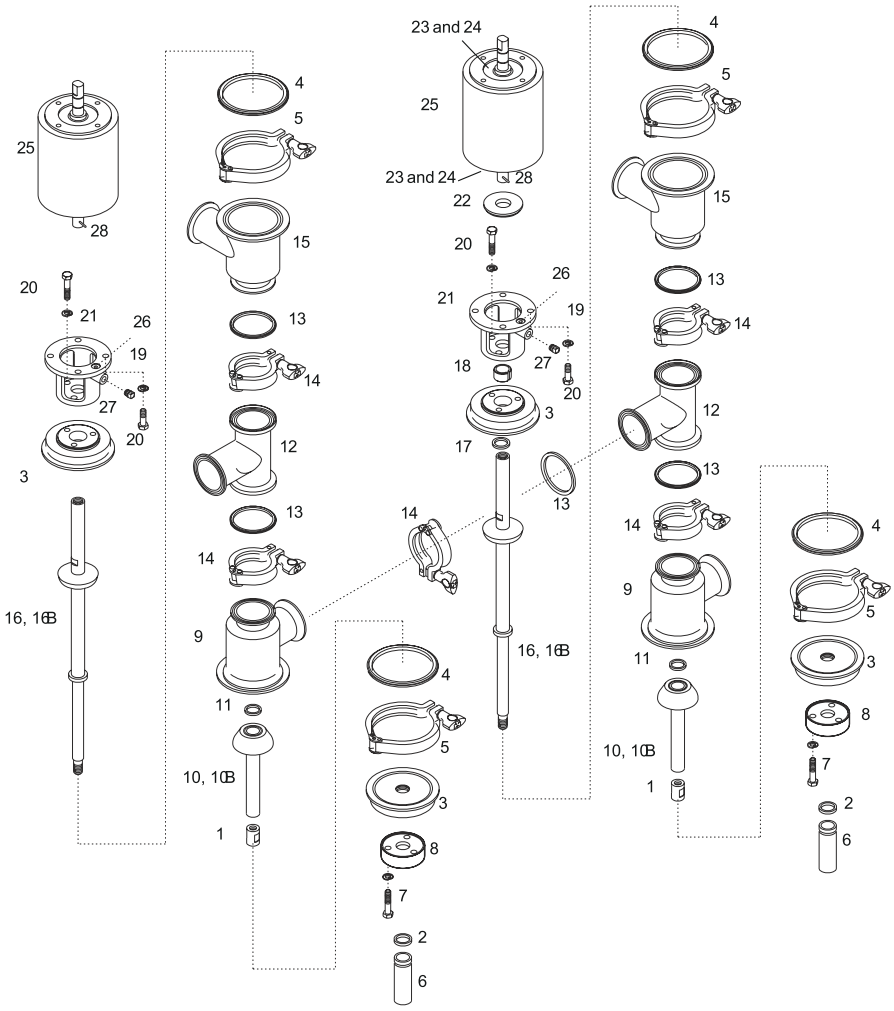
8.1 762-227M



Pos.	Qty.	Denomination
1	2	Lower body
2	2	Stem, LP, BUNA
	2	Stem, LP, EPDM
	2	Stem, LP, SFY
	2	TR valve plug
	2	TR2 valve plug
2B	1	TR seat upper
	1	TR seat lower
	1	TR2 seat upper
	1	TR2 seat lower
3	1	Body gasket BUNA
	1	Body gasket EPDM
	1	Body gasket SFY
4	2	Clamp
5	2	Upper body
6	1	O-ring stem BUNA
	1	O-ring stem EPDM
	1	O-ring stem SFY

Pos.	Qty.	Denomination
7	1	Bushing
8	2	Yoke
9	14	Screw
10	14	Lockwasher
11	2	Actuator
	2	Actuator, HP Option
12	1	Packing retainer
13	1	O-ring
14	2	Seal washer
15	1	Vented plug
16	1	Gasket BUNA
	1	Gasket EPDM
	1	Gasket SFY
17	1	Clamp
18	1	Pin
19	2	Packing

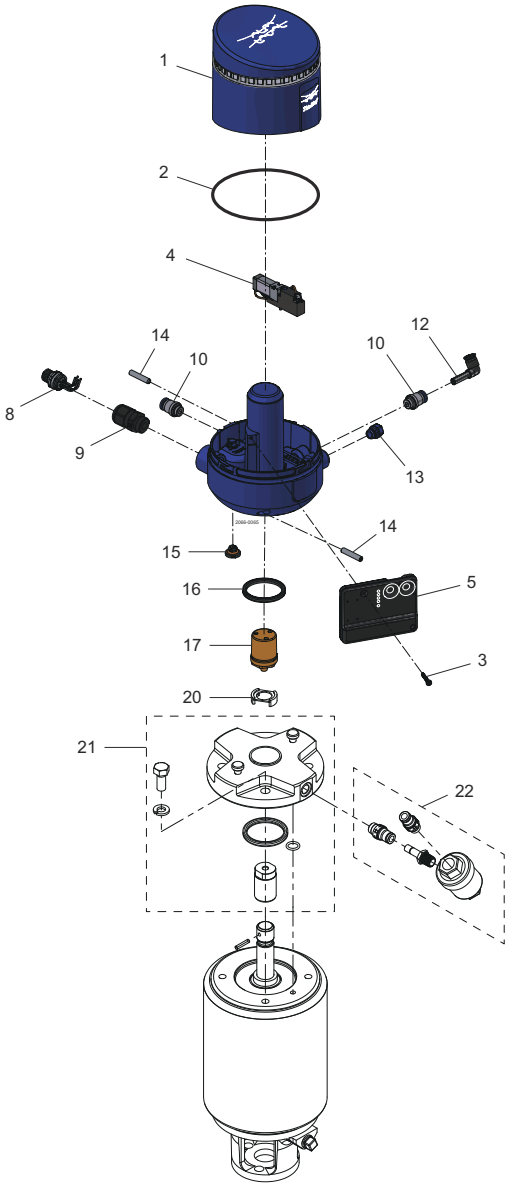
8.2 762-227MRAL



Pos.	Qty.	Denomination
1	2	Nut
2	2	O-ring BUNA
	2	O-ring EPDM
	2	O-ring SFY
3	4	Bonnet
4	2	Body gasket BUNA
	2	Body gasket EPDM
	2	Body gasket SFY
5	1	Clamp
6	2	Stem guard
7	6	Screw
8	2	End cap
9	2	R.H. body
10	2	Lower stem BUNA
	2	Lower Stem, LP, BUNA
	2	Lower Stem, LP, EPDM
	2	Lower Stem, LP (SFY)
	2	TR lower stem
	2	TR2 lower stem
10B	2	TR stem seat lower
	2	TR2 stem seat lower
11	2	O-ring BUNA
	2	O-ring EPDM
	2	O-ring SFY
12	2	Body
13	5	Gasket BUNA
	5	Gasket EPDM
	5	Gasket SFY

Pos.	Qty.	Denomination
14	5	Clamp
15	2	L.H. body
16	2	Stem BUNA
	2	Stem, LP, BUNA
	2	Stem, LP, EPDM
	2	Stem, LP, SFY
	2	TR stem
	2	TR2 stem
16B	2	TR stem seat
	2	TR2 stem seat
17	4	O-ring BUNA
	4	O-ring EPDM
	4	O-ring SFY
18	4	Bushing
19	20	Lockwasher
20	14	Screw
21	2	Yoke
22	4	Packing retainer
23	4	Packing
24	4	Seal retainer
25	2	Actuator
	2	Actuator, HP Options
26	2	O-ring
27	2	Vent plug
28	4	Pin

8.3 ThinkTop V50



Pos.	Qty.	Denomination
1	1	Cover
2	1	V-ring
3	1	Screw
4	1	Solenoid valve 1x3/2
5	1	Control board, 24V Digital
6	1	Spacer
7	4	Base screw
8	1	M12 plug, 8 pins
9	1	Cable gland, main entry, Ø4-10 mm
10	2	Air fitting, straight, ¼"

Pos.	Qty.	Denomination
11	3	Blind plug air
12	1	Air fitting, elbow, ¼"
13	1	Exhaust plug
14	2	Set screw
15	1	Gore vent
16	1	X-ring
17	1	Sensor target
19	1	Base
20	1	Test spacer
21	1	Adaptor kit
22	1	Quick exhaust kit