



INSTRUCTION MANUAL

SPC-1 SANITARY PROPORTIONAL-CONTROLLED VALVE WITH POSITIONER



ALFA LAVAL RESERVES THE RIGHT TO MINOR CHANGES IN DESIGN AND FUNCTION

Introduction

Thank you for purchasing an Alfa Laval product.

This manual has been provided to instruct you how to operate and service this product correctly and safely. Be sure to follow all directions and instructions; failure to do so could result in personal injury or equipment damage.

This manual should be considered part of this product and should remain with it at all times for reference. (If you sell it, please be sure to include this manual with it).

Warranty is provided as part of Alfa Laval's commitment to our customers who operate and maintain their equipment as this manual dictates. Failure to do so may result in loss of warranty.

Where defects appear on the product during the warranty period, Alfa Laval will back the product and correct the problem. Should the equipment be modified or not kept in the manner prescribed within this manual, the warranty will become null and void.

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Safety

Throughout each of G&H Product Corp's instruction manuals, certain safety signal words and symbols will appear. These are in the form of, warning, caution or note.

WARNING!

CAUTION!

NOTE!

- Indicates that special procedures **must** be followed to avoid severe personal injury.
- : Indicates that special procedures **must** be followed to avoid damage to the equipment.
 - Denotes actions or procedures to follow for optimum, safe use of equipment.

Follow Safety Directions

Read this manual thoroughly before working on equipment.

Leave all safety stickers on equipment and keep them maintained in legible condition. In the event that stickers damaged or are missing, contact G&H Products Corp. for replacements.

Maintain equipment in good working condition.

Do Not Make Machine Modifications

G&H Products Corp. offers a full range of products to suit all of your needs. Therefore, product modification is never necessary.

Keep Maintenance Safe

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Read this manual thoroughly before working on equipment.

Replace damaged or worn parts immediately. Never allow old product, debris, or any lubricants to build up on equipment. Never operate unless equipment is in proper working order.

Before attempting to service the machine, disconnect all power and compressed air. Allow machine to come to a complete stop. Never service a machine while it is operating. Keep all limbs away from moving equipment. Be sure that product pressure has been relieved before beginning maintenance.

2. Warning signs



: General warning.



- : Caustic agents.

Safety

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All warnings in the manual are summarized on this page.

3. Safety Precautions

Installation:



Operation:







Maintenance:





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

- **Always** read the technical data carefully (see page 14).
- Always release compressed air after use.
- **Always** read the technical data carefully (see page 14).
- Always release compressed air after use.
- **Never** touch the valve or the pipelines when processing hot liquids or when sterilizing.
- Always handle caustic and acid with great care.

- **Always** read the technical data carefully (see page 14).
 - Always release compressed air after use.
- Never service the valve when it is hot.
 - **Never** pressurize the valve and the pipelines during service.



Installation

The instruction manual is part of the delivery.

Study the instructions carefully. NC: Normally closed. NO: Normally open.

1. Unpacking/Delivery

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CAUTION!

We cannot be held responsible for incorrect unpacking.

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Check the delivery for:

- 1. Complete valve, NC or NO version.
- 2. Delivery note.
- 3. Positioner instructions.
- 4. Instruction manual. 央



Inspect the valve for visible transport damage.

Inspection!

3 → Remove packing materials!

Remove possible packing materials from the valve ports.



Avoid damaging the air connection and the valve ports.



Installation

Risk of damage!

Study the instructions carefully and pay attention to the warnings!

The valve body has ends for welding as standard but can also be supplied with fittings. NC: Normally closed. NO: Normally open.

2. Installation



Always read the technical data carefully (see page 14).

- Always release compressed air after use.

CAUTION!

We cannot be held responsible for incorrect installation.



Remember seal rings!

Outlet



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



Weld carefully!

Outlet

Inlet

Welding:

- 1. Remove the internal valve parts in accordance with instruction 1 on page 10.
- 2. Weld the valve into the pipelines (see 5).
- 3. Assemble the valve in accordance with instruction 4-5 on page 11.

CAUTION!

Α

Ensure that the flow direction is correct.



- 1. Use clean 1/4" air tube.
- 2. Connect the supply air tube (max. 95.7 psi) and the signal air tube (3-15 psi) to the correct ports on the positioner.
- 3. Seal the air tubes carefully.
- 4. Use clean, dry and oil-free compressed air.
- 5. Read the technical data carefully (see page 14). (See the positioner instructions).



Inlet

Fittings: Check that the connections are tight.

CAUTION!

Ensure that the flow direction is correct.



Dimension	A (Inches)
1.5"/38mm	24.5
2"/51mm	24.4
2.5"/63.5mm	25.0
3"/76mm	27.6
4"/101.6mm	28.6

Welding:

Maintain the minimum clearance (A) so that the actuator/positioner can be removed.



Operation

The valve is adjusted and tested before delivery. The adjustment instructions are only to be used if further adjustment is required! Study the instructions carefully and pay attention to the warnings!

1. Operation / Adjustment



1

Always read the technical data carefully (see page 14).

- Always release compressed air after use.

CAUTION!

We cannot be held responsible for incorrect operation.







Lubrication of valve:

- 1. Ensure smooth movement between lip seal (17) and plug stem (18).
- 2. Lubricate with silicone oil/grease if necessary.



Lubrication of actuator:

- Ensure smooth movement of the actuator (the actuator is lubricated before delivery).
- 2. Lubricate with oil/grease if necessary.



Zero adjustment of positioner:

- 1. Remove the top cover of the positioner.
- 2. Set supply air pressure of 72-87 psi (max. 100 psi).
- 3. Set min. instrument air pressure (0.2 bar (3 psi)).
- 4. Turn the zero adjustment screw so that the
- valve plug is closed against the seat. 5. A slight increase of the instrument air pres-
- A slight increase of the instrument air pressure should now move the valve plug. (See the positioner instructions).

Split range operation:

- 1. Change from full range to split range operation by changing the positioner spring.
- Zero adjust the positioner (see 5). (See the positioner instructions).





Pay attention to possible faults.

Study the instructions carefully. The items refer to the drawings and the parts list on page 17.

2. Troubleshooting

NOTE!

Study the maintenance instructions carefully before replacing worn parts. - See page 9!

Problem	Cause/Result	Repair
The valve plug jerks	The sealings seize	Lubricate: - O-ring (6) and the inside of cylinder (7) - Lip seal (17)
Product leakage at stem and/or clamp	Worn/product-affected lip seal (17) and/or seal (18b)	 Replace the seals Replace by seals of a different rubber grade
Product leakage (closed valve)	 Worn/product-affected seal ring Loose plug parts (vibrations) Product deposits on the seat and/or plug 	 Replace the seal ring Replace by a seal of a different rubber grade Tighten the loose parts Frequent cleaning
Product leakage (too high pressure or too small actuator)	 Worn actuator O-rings Too small actuator or actuator spring 	 Replace the O-rings Replace by a larger actuator (for valve sizes 38 - 63.5 mm (1½" - 2½")) Fit a stronger spring
Water hammer	The flow direction is the same as the closing direction	- The flow direction should be against the closing direction
The valve does not open/close	 Faulty clip complete (11) The pressure on the plug is too high 	 Replace the clip assembly Reduce the pressure Fit stronger spring/larger actuator
Deviation in the flow regulation	Mechanical parts have come loose (vibrations)	Tighten and adjust
Actuator does not regulate	Actuator errors	Return the actuator to the supplier





Operation

The valve is designed for cleaning in place (CIP).

Study the instructions carefully and pay attention to the warnings! NaOH = Caustic Soda. HNO₃ = Nitric acid.

3. Recommended Cleaning



2 Scalding danger!

Never touch the valve or the pipelines when sterilizing.

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1. Avoid excessive concentration of the cleaning agent

- \Rightarrow Dose gradually!
- 2. Adjust the cleaning flow to the process
 - \Rightarrow Milk sterilization/viscous liquids
 - \Rightarrow Increase the cleaning flow!
- 6

NOTE!

The cleaning agents should be stored/disposed of in accordance with current regulatory guidelines.

Always rinse well with clean water after the cleaning.

Cleaning agents

Clean water



Maintenance

Maintain the valve regularly.

Study the instructions carefully and pay attention to the warnings!

Always keep spare lip seals and rubber seals in stock. Check the valve for smooth operation after service.

1. General Maintenance



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- Always read the technical data carefully
 (see page 14).
- Always release compressed air after use.

NOTE!

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



Ordering spare parts

- Contact the Sales Department.
- Order from the Spare Parts List.

Recommended spare parts: Service kits (see Spare Parts List).

	Valve lip seal	Actuator rubber seals	Actuator air release filter
Preventive maintenance	Replace after 12 months	Replace after 5 years	
Maintenance after leakage (leakage nor- mally starts slowly)	Replace by the end of the day	Replace when possible	
Planned maintenance	 Regular inspection for leakage and smooth operation Keep a record of the valve Use the statistics for planning of inspec- tions Replace after leakage 	 Regular inspection for leakage and smooth operation Keep a record of the valve Use the statistics for planning of inspec- tions Replace after air leakage 	Yearly inspection is recommanded - Clean the filters - Replace if worn (2 filters)
Lubrication	Before fitting Silicone grease or silicone oil	Before fitting Grease	



Maintenance

Study the instructions carefully.

10

The items refer to the drawings and the parts list on the pages 16-17.

Handle scrap correctly. NO = Normally open. NC = Normally closed.



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Maintenance

Study the instructions carefully. The items refer to the drawings and the parts list on the pages 16-17. Lubricate the lip seal before fitting it. NO = Normally open. NC = Normally closed.

3. Assembly of Valve





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- 1. Assemble the complete valve plug.
- 2. Fix screw (18e) by using Loctite 243 or similar.

Press lip seal (17) onto plug assembly (18).



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Air

- 1. Insert the plastic ring of clip complete (11) in the actuator piston rod.
- 2. Connect valve plug assembly (18) to piston (9) using clip complete (11).

Pay attention to the warnings!



Operate!

- Supply compressed air to the actuator (NC version).
 Position the actuator in valve body (20).
- 3. Fit and tighten clamp (19).
- 4. Release compressed air (NC version).
- Pay attention to the warnings!

- 1. Connect supply air and signal air to the positioner.
- 2. Operate the valve by means of signal air.
- 3. Adjust the positioner (see 5, page 6).
- 4. Operate the valve several times to ensure that it runs smoothly.

Pay attention to the warnings!



Maintenance

Study the instructions carefully.

The items refer to the drawings and the parts list on the pages 16-17.

Handle scrap correctly. NO = Normally open. NC = Normally closed.

4. Disassembly of Actuator



- 2. Pull off O-ring (8) from the piston.
- 3. Pull out O-ring (6) from the cylinder.

Replace the rubber seals.



- 1. Remove the positioner spring and extract spring support (4) from cylinder top (7).
- 2. Pull off O-ring (5) from the spring support.



 Lift off cylinder (7) from bonnet (14). (NO-version: remove spring assembly (12) from the bonnet).
 Pull off O-rings (6, 13) from the bonnet.

Maintenance

Study the instructions carefully. The items refer to the drawings and the parts list on the pages 16-17. Lubricate the rubber seals before fitting them. NO = Normally open. NC = Normally closed.

5. Assembly of Actuator



- 1. Insert lock wire (10) through the slot in cylinder (7) into the hole in bonnet (14).
- 2. Turn the cylinder 360° clockwise.



- 1. Fit upper spring support and gasket.
- 2. Fit the positioner and the screws on cylinder (7) and tighten.
- Position the air hose connection on the top and bottom air fittings and press gently (see 6) (NC-version).

If necessary, turn cylinder (7) with positioner further in relation to bonnet (14) so that the top and bottom air connections are fixed on the same side.



- 1. Place O-rings (6, 13) in bonnet (14). (NO-version: fit spring assembly (12) in the bonnet).
- 2. Position cylinder (7) on the bonnet.

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- 1. Slide O-ring (5) onto spring support (4).
- 2. Push the spring support carefully in piston top (9). Make sure it fits properly.
- 3. Fit positioner spring on the spring support in the cylinder.



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Technical Data

It is important to read the technical data carefully before installation, operation and maintenance. Inform the personnel about the technical data. See the positioner instructions.

1. Technical Data

Data - valve/actuator

Max. product pressure	145 psi (10 bar)
Min. product pressure	Full vacuum
Temperature range	14°F to 284°F (EPDM)
Air pressure, actuator	72.5-95.7 psi (5 to 6.6 bar)

Materials - valve/actuator

Product wetted steel parts	AISI 316L
Other steel parts	AISI 304
Plug stem	AISI 316 with hard chrome plated stem surface
Product wetted seals	EPDM (standard)
Other seals	Nitrile (NBR)
Alternative product wetted seals	Nitrile (NBR) and Flouropolymer (FPM)
Finish	Polished

Data - positioner

Instrument input Pressure range	0.2-1 bar (3-15 psi)
Instrument input Pressure	Maximum 1 bar (15 psi)
Supply pressure	5.0-6.6 bar (75-100 psi)
Air consumption	0.6 SCFM (in balance condition with 1.3 bar (20 psi) supply and 0.6 bar (9 psi) dead ended output)
Spring travel	1" (25 mm)
Response level	0.25% of scale
Ambient temperature	-40° C to +82° C (-40° F to +180° F)

Data - air

Max. particle size	3 microns
Max. oil contant	1ppm
Dew point	18°F below ambient temp. or lower, min. 36°F.





Technical Data

It is important to read the technical data carefully before installation, operation and maintenance.

Inform possible personnel about the technical data. NO = Normally open. NC = Normally closed.

2. Pressure Drop / Capacity Diagram

For $\Delta p = 14.5 \text{ psi} (1 \text{ bar})$.

SRC-P PRESSURE DROP DIAGRAMS



Pressure Drop Calculation

The Cv designation is the flow rate in GPM at a pressure drop of 1 psi when the valve is fully open (water at 68° F or similar liquids). The Cv value at other pressure drops is calculated according to the following formular:

$$Cv = \frac{Q}{\sqrt{\Delta p}}$$

Where: $Cv = Flow \text{ coefficient (GPM at } \Delta p = 1 \text{ psi).}$ Q = Flow rate (GPM).

 Δp = Pressure drop over valve (psi).

Note! For the diagram the following applies: Medium: Water (68° F). Measurement: In accordance with VDI 2173.



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PCS

Exploded Drawing

This page shows an exploded view of SPC-1.

The drawing includes all items of the valve. They are identical with the items in the Spare Parts List.

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SPC-1





Drawing/Parts List

The drawing below shows SPC-1, NO and NC version.

The items refer to the parts list on the opposite part of

The drawing and the parts list include all items. NO = Normally open. NC = Normally closed. The items are identical with the items in the Spare Parts List. Please use this list when ordering.

Parts List

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Qty.	Description

			Actuator complete
1		1	Valve positioner
2		1	Air fitting
3		2	Air fitting
4		1	Spring support
5	Δ	1	O-ring
6	Δ	2	O-ring
7		1	Cylinder
8	Δ	1	O-ring
9		1	Piston
10	Δ	1	Lock wire
11	Δ	1	Clip complete
12		1	Spring assembly

	5
	6
	8
	9
	(15)
	180
8	TO 439-001
Ν	10 20

Item	Qty.	Denomination
13 Δ	1	O-ring
14	1	Bonnet
15	1	Plug
16	1	Air fitting
17 ²⁾²	1	Lip seal
18	1	Plug complete
18a	1	Plug
18b 2)2	1	Seal
18c	1	Plug head
18d 2)2	1	O-ring
18e	1	Bolt
19	1	Clamp complete
20	1	Valve body
Δ : Service kit for actuator		
²⁾²¹ : Service kit - EPDM, NBR, FPM		

the page.

3) 2) (4) (1)100 Ē 6 (7)(12) 9 8 (13) (10) (6) (16) (11) (14) (19) (17) (180) (18b) -20 (180) (180) 10 439-026 (18e) NC

Information

This page may be used for notes concerning the normal handling of the valve. The best way to produce user-friendly manuals is through feedback from the user. - Please see below.

1. Notes

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2. User feedback

Our goal is to produce instruction manuals that meet your needs.

If you have any comments which may help us in our efforts to improve this manual, please do not hesitate to send them to us.

Alfa Laval Inc. Tel. (800) 558-4060 Fax. (800) 781-2777 Questions? Please contact:

Alfa Laval, Inc. 9560 - 58th Place, Suite 300 Kenosha, WI 53144

www.alfalaval.us

Thank you!

