Operating and maintenance instruction

Pneumatic Valve 2.0 (4‘150 bar / 60‘000 psi)
Normally closed and normally open

Operating and maintenance instruction

ALLFI AG - Riedenmatt 1 – CH-6370 Stans

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Scope of application

The present operating and maintenance instruction is valid for all pneumatic valves 2.0 (4‘150 bar / 60‘000 psi).

- 901070
- 901080
- 901770
- 901780
- 910070
- 910080
- 910170
- 910180
- 910270
- 910280
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- 910380
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- 901070-I
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- 910970-I
- 910980-I
- 911170-I
- 911180-I
- IT-910280-I
- IT-910480
- IT-911180-I
- UH-910480

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Appendix A – Technical drawing and parts list (shipped with the product)

Appendix B – general chart of design and article numbers normally open

Appendix C – general chart of design and article numbers normally closed

1 General

1.1 Information on use of the operation and maintenance instruction

This operation and maintenance instruction is a key part of the product. The information in this manual is mandatory and must be read and understood by all the persons before operating with the pneumatic valve 2.0. The manual must be stored in distance as well as always accessible to the persons, working with the pneumatic valve 2.0.

Should you have any questions regarding the content of the manual, please contact the manufacturer directly.

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1.2 Scope of delivery

The individual parts contained in the shipment can be gathered from the set list in the appendix A (technical drawing and part list). Upon receipt, the shipment has to be checked of integrity. Possible detected defectives must be reported immediately to the manufacturer.

1.3 Warranty claim

The ALLFI AG grants warranty for the shipped parts as followed:

- Material and manufacturer faults of 12 months from date of delivery or
- Defects within the first 2'000 hours of operation

Following spare parts are excluded from the warranty:

- Seal Kit
- Pneumatic Cylinder (must be replaced after 100'00 cycles)
- Pressure Plate
- Valve Body

1.4 Disclaimer

ALLFI AG refuses any claims of liability (material damages, physical injury, as well as disruption of operation), that are a result of disregarding this operating and maintenance instruction.

For example, the damage because of:

- Inadmissible application of the valve
- Defective maintenance
- The disregard of operation instructions
- Chemical and electrolytical influences
- Use of parts, spare parts or accessory from a third-party manufacturer
- Arbitrary modifications
- Not or insufficiently trained staff

The disregard of all these instructions happens on exclusive risk and exclusive responsibility of the client. The ALLFI AG is not liable for any production downtimes.

2 Security

2.1 Declaration of symbols

This operating and maintenance instruction manual contains important notes and symbols, which are to be considered and followed. These include:

DANGER

Danger emphasizes operating and service procedures that if not avoided, may lead to death or serious personal injuries.

WARNING

Warnings emphasize operating or service procedures, or conditions that can result in serious personal injury or death.

CAUTION

Cautions emphasize operating or service procedures, or conditions that can result in equipment damage or impairment of system operation. If not avoided, light or medium body injuries could be the consequence.

NOTE

Notes provide additional information that can expedite or improve operating or service procedures.

Danger symbol without key word: Additional notes

2.2 General warning notes

Using of the pneumatic valve 2.0, the following warnings are to be considered.

The specified warnings are not only restricted to the operation with the maximal permissible operating pressure of 4’150 bar / 60’000 psi. They are also valid on work with reduced operation pressures!

DANGER

Danger of cutting of extremities on contact with waterjet

The contact with the high kinetic energy performing waterjet can have the consequence of cutting of extremities or lead to other injuries.

Therefore:

- Operate the machine only when nobody stands in the danger zone of the waterjet.
- Never touch the waterjet, not even with personal protective equipment.

Any injuries in connection with the waterjet, alarm the emergency doctor immediately.

CAUTION

Danger of breathing difficulties and irritation of the skin and eyes by released solid particles or dust.

During machining of certain material, solid particles and dust may float in the air, which could cause breathing difficulties and irritations to the skin and eyes.

Therefore:

- Ensure the proper ventilation of the room surrounding the machinery.
- Ensure to wear the personal protective equipment (protection glasses, breathing mask, gloves, …)

Additionally, the rules and regulations of the working place are to be followed to prevent injuries!

2.3 Intended use

The intended use consists in:

- operate the pneumatic valve 2.0 with air pressure
- block the water with a pressure of max. 4’150 bar / 60’000 psi (static applications)
- the fixed installation (no hand guidance) of the pneumatic valve 2.0 on the machine
- if provisions against flying fragments or a leaking liquid with high pressure are made
- if water is used exclusively as working fluid
- if the technical limit values are respected

2.4 Inadmissible usage

Inadmissible usage of the pneumatic valve 2.0 includes:

- The usage of all other fluids other than water
- The addition of other substances to the water
- Closure of the pressure relief holes
- Excessive application of the valve e.g. large fluctuations in pressure
- Exceeding permitted limits
- Operating the valve with demounted or disabled technical protection
- Use the pneumatic valve as a cutting head

Likewise, all other uses of the valve deviating from the intended use are not permitted. All questions should be addressed directly to the manufacturer.

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2.5 Residual risks

The manufacturer and/or operator of the machine where the pneumatic valve 2.0 is built in, has taken every precautionary measure possible to reduce residual risks, as far as possible reasonably practicably.

Operation phase	Damage	Danger	Reason	(possible) measures
Operation	Physical injuries	Liquids leaking under high pressure (e.g. at pressure relief holes)	Ignoring the torque	Follow the torque
			Damaged sealing surfaces	Regular supervision
			Busted/Cracked connections and high-pressure components as a result of defects	Protective wall as a technical protective measure
		Flying fragments	Ignoring the torque	Follow the torque
			Damaged sealing surfaces	Regular supervision
			Busted/Cracked connections and high-pressure components as a result of defects	Protective wall as a technical protective measure

2.6 Safety installations

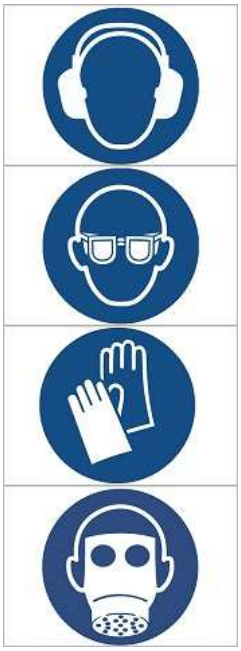
The manufacturer or the operator of the full machine, which the pneumatic valve 2.0 is built in, has ensured the following safety arrangements:

- Safety devices to prevent flying fragments or liquids leaking under high pressure.
- Emergency stoppage to immediately shut down the operating machine. This emergency stoppage is an integral part of the system that automatically activates in case of the failure of high pressure components or massive operating errors, alternatively it may be manually activated by the operator.

Danger for the operator will arise if safety protections are not functionally, not followed or evaded anytime. The operator has to ensure the functionality of the safety protections anytime.

2.7 Personal protection equipment

The operator must offer his staff following protection equipment while he's working:



Ear protector against:
- Noise emissions

Wear protection glasses against:
- Fluids and dust particles
- Flying fragments

Hand guards against:
- Sharp edges of components
- Intrusion of micro particles into the skin

Inhalation protection against:
- Dust particles, micro particles and spray mist

2.8 Qualification of the staff

The pneumatic valve 2.0 may only be operated and maintained by certified, trained staff.

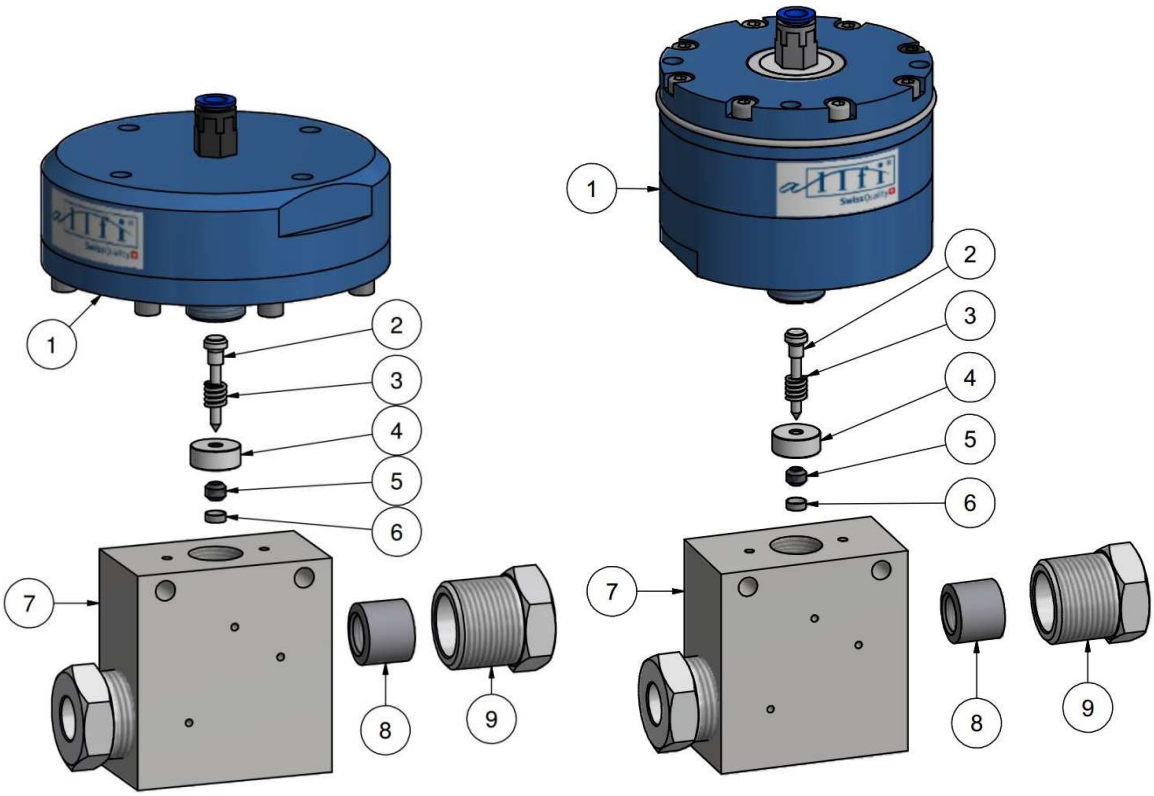
3 Structure and function

3.1 Structure

The pneumatic valve 2.0 is available for 1/4”, 3/8” and 9/16” tubes, as straight, angle, 3-way and 2-stem valve and the pneumatic cylinder as normally open and normally closed.

The valve is also as a manual hand valve available (check additional operation and maintenance instruction and article in the web shop.

The explosion views of the pneumatic valve 2.0 normally open and normally closed are shown below.



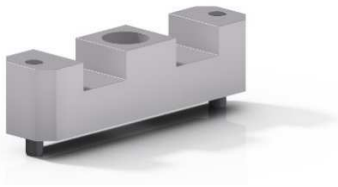
Legend:

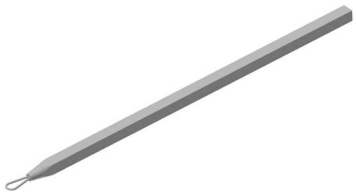
1. Pneumatic Cylinder NO	1. Pneumatic Cylinder NC
2. Needle complete	2. Needle complete
3. Spring	3. Spring
4. Pressure Plate	4. Pressure Plate
5. HP Seal	5. HP Seal
6. Conical Disc	6. Conical Disc
7. Valve Body	7. Valve Body
8. Collar	8. Collar
9. Gland Nut	9. Gland Nut

3.2 Function

The pneumatic valve 2.0 is a needle valve. The valve needle is moved by pneumatic pressure and spring force. The seal kit is replaceable by removing the pneumatic cylinder. The maximal permissible operating water pressure is 4’150 bar / 60’000 psi. The operation pneumatic pressure must be 6 -7 bar / 87 -100 psi anytime.

3.3 Accessories

			
Article:	Torque wrench	Spanner	Assembling Tool
Article no:	000468	AF 17 – 000339 only for 1/4" AF 22 – 000272 only for 3/8" AF 24 – 000280 AF 32 – 000503 only for 9/16"	912198
Function:	Tightens screws with a specific torque		Tightens pneumatic cylinder with torque wrench AF24

			
Article:	Disassembly Tool	Molykote DX Paste	Mounting tool for O-ring
Article no:	910078	051055	040011
Function:	Disassembly HP Seal from Valve Body	Greasing screw connections and metallic contact areas	Dissassembly of Conical Disc

4 General technical data

Maximal working pressure:	4‘150 bar / 60,000 psi
Connection tube diameter:	HP Tube 1/4“, 3/8“, 9/16“
Pneumatic pressure:	6 – 7 bar / 87 – 100 psi
Minimum valve diameter:	2.2 mm
Design:	Check appendix B and C
Maximal working temperature:	50 °C
Maximal stocking temperature:	60 °C

Technical data as dimensions can be found in the technical drawing in appendix A.

Requested water quality:

Water parameter	Unit	Value
Electrical Conductivity	µS / cm	100 – 450
PH-value	-	7.0 - 8.5
Total hardness	°dH	2.0 - 10.0
Carbonate hardness (acid capacity pH 4.3)	°dH	2.0 - 10.0
Degree of alkalinity pH 8.2	mmol / l	0 - 0.25
Chloride	mg / l	≤ 50
Iron	mg / l	≤ 0.2
Manganese	mg / l	≤ 0.05
Copper	mg / l	≤ 2.0
Silicate	mg / l	≤ 5.0
(Filtrate-) solid content	mg / l	≤ 350

5 Installation and commissioning

General installation tip:

- Absolute cleanliness of the pipes is important before connection.
- Follow the steps below for installation.
- Before startup and after inspection or maintenance, check the water tightness of the pneumatic valve.
- Use of a pneumatic oiler is forbidden.
- Compressed air filter with water separator must be installed. Compressed air must be dry.

NOTE

Material damage as a result of pitting

Not or insufficient greased threads or contact areas can pit.

Therefore:

Always grease threads and metallic contact areas with DX-Paste (Article no. 051055). Check appendix A for additional information.

NOTE

Material damage or leakage as a result of fouling

Fouling components, especially at threads, can lead to leakages and damage.

Therefore:

Pay attention to the cleanliness of the components while maintaining.

NOTE

Material damage as a result of leakages

Constant leakage may damage the product.

Therefore:

Immediately eliminate leakages (see chapter 8 „Faults and Troubleshooting").

⚠ WARNING

Risk of injury: It is forbidden to close the pressure relief holes.

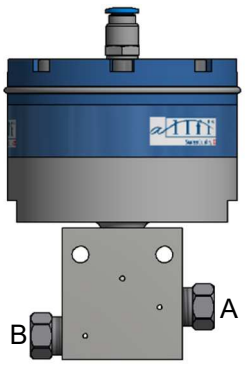
By closing the pressure relief holes, the pneumatic valve or parts of it may explode.

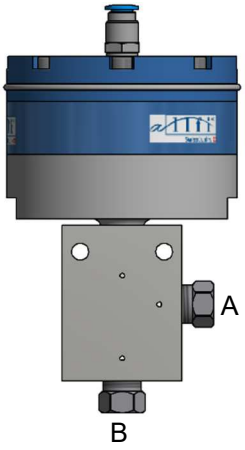
Therefore: Never close or cover any pressure relief hole.

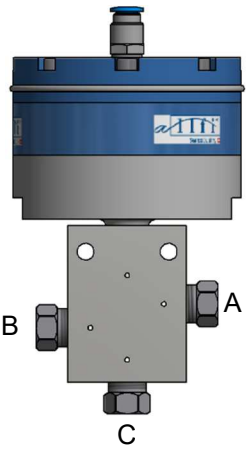
➢ **Positions of the pressure relief holes:**

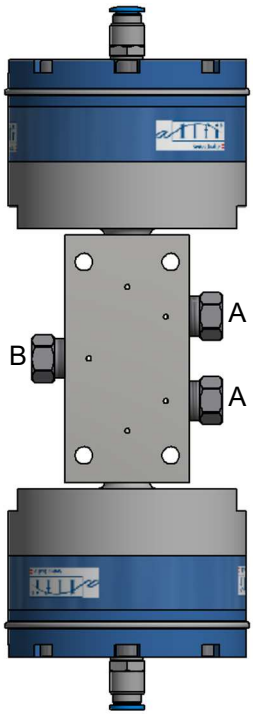
5.1 Flow direction

The flow direction depends primarily on the pressure conditions in the connected high-pressure pipes. To achieve long service lives, port A should be subjected to as few pressure fluctuations as possible.









With frequent switching (more than one switching cycle per 5 operating hours on average), port A should be under pressure when the valve is closed. As a result, the HP seal and the valve body are subjected to static stress. The B/C connection is subjected to dynamic stress.

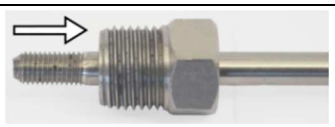
In the case of occasional switching (less than one switching cycle per 5 operating hours on average), the situation is the opposite since the switching cycles are less important than the pressure fluctuations in the line network. When the valve is closed, port B/C should be under pressure. The HP seal and the sealing area of the valve body are therefore not exposed to pressure fluctuations.

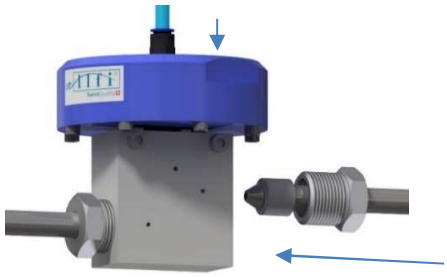
The above information on the switching cycles are rough guide values. In case of doubt, it is recommended to contact the supplier. The same also applies to applications where both A and B/C may be under pressure when the valve is closed.

5.2 Installation

During installation, ensure that none of the pressure relief holes are closed!

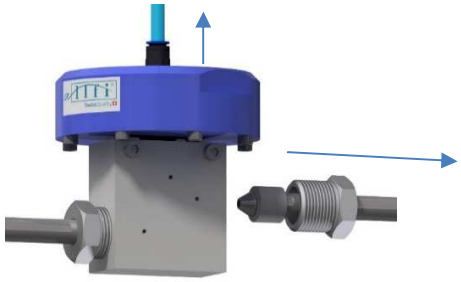
Consider flow direction → see chapter 5.1

	Slide the gland nut over the HP tube.
	Screw the collar on the HP tube (left handed thread). There must be 1 or 2 convolutions visible between the conus and the pressure ring.

	Fix pneumatic valve 2.0 with two/four screws M6 (M5 for imperial 1/4“ and imperial 3/8“) on the machine. Connect the high-pressure line to the pneumatic valve 2.0 (torque see appendix A). Connect pneumatic hose.

6 Deinstallation

Before uninstalling the pneumatic valve 2.0, release pressure from the HP tubes to avoid unexpected re-pressurizing.

	Remove pneumatic hose and HP tube. Remove the pneumatic valve 2.0 from the machine.

7 Maintenance, Service and Repair

It’s not necessarily to unmount the pneumatic valve 2.0 from the machine. Usually the maintenance is easier if the HP tubes are removed and the pneumatic valve 2.0 is unmounted from the machine.

The pneumatic valve 2.0 requires little maintenance expenditure. The lifetime of the sealing, the needle and the valve body depend on the actuation frequency, the pressure and the pressure fluctuations. Preventive maintenance is not possible.

The springs of the pneumatic cylinder must be replaced every 5 years or after 1'000'000 cycles, which occurs earlier.

Once a year, all parts of the pneumatic cylinder must be checked for rust. In case of rust, replace the pneumatic cylinder.

NOTE
Material damage or leakage as a result of fouling Dirty components, especially considering the threads, may lead to leakages and damage of the pneumatic valve 2.0. **Therefore:** Ensure a proper cleaning of the components.

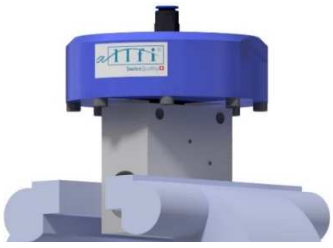
NOTE
Possible damage as a result of direct transfer of the torque to the HP-tubes Loosening or tightening the pneumatic cylinder (pos. 1 on page 10) make sure that the torque is not transmitted to the HP-tubes, as these can be damaged.

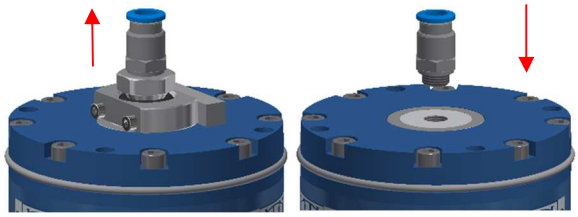
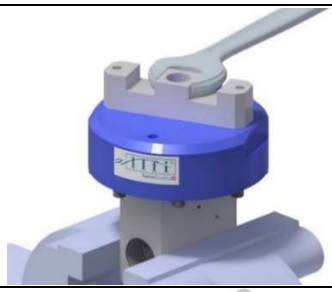
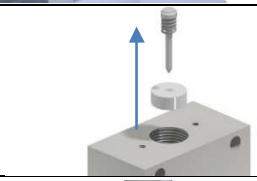
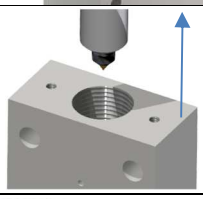
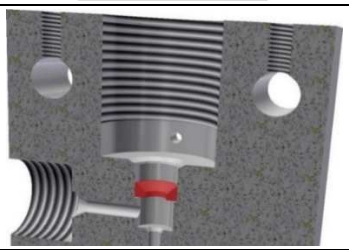
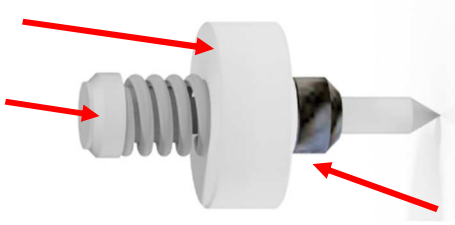
NOTE
Property damage as a result of pitting Threads that are not greased or insufficiently greased may pit. **Therefore:** Always grease threads and metallic contact areas with DX-Paste (Article no. 051055). Check appendix A for additional information.

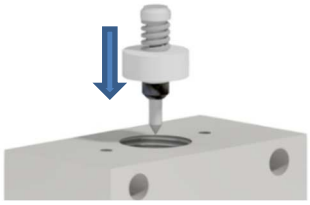
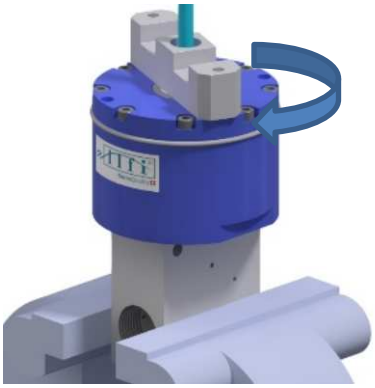
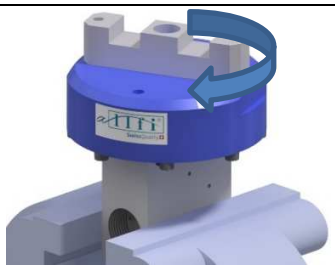
The following instructions are described using the pneumatic valve 2.0 straight normally open. The procedure is the same for all other types of pneumatic valves 2.0, unless otherwise noted.

7.1 Replace HP Seal

Release pressure of the HP tubes before opening to protect against re-pressurization.

1		Disconnect pneumatic hose and HP Tubes. Remove the pneumatic valve 2.0 from the machine.
2		Fix it in bench vice. **Attention!** Use protective jaws.

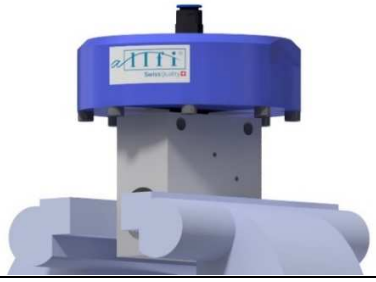
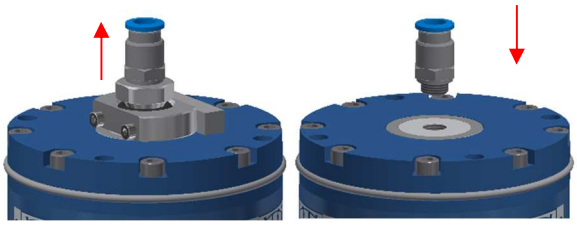
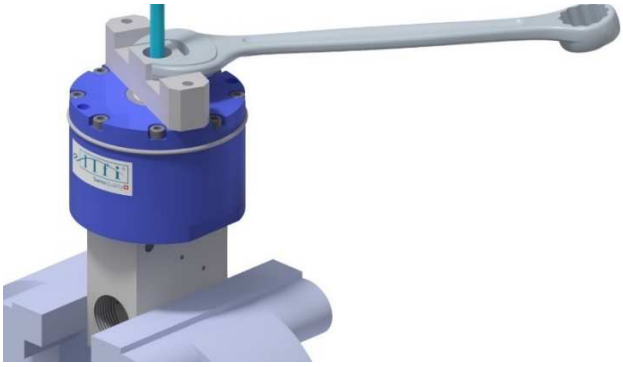
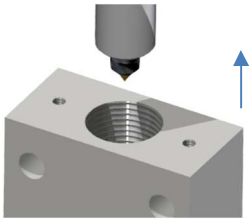
2.1		If the option sensor valve is used, unscrew it and screw on the push-in fitting.
3a		**For pneumatic cylinder NC** Pressurize pneumatic cylinder with compressed air (6-7 bar). The pneumatic valve 2.0 is now open and the valve seat will not be damaged. Loosen pneumatic cylinder with the assembling tool 912198 and an open-end wrench AF24 and remove it. Release compressed air and remove air hose.
3b		**For pneumatic cylinder NO** Loosen pneumatic cylinder with the assembling tool 912198 and an open-end wrench AF24. Remove pneumatic cylinder.
4		Remove needle, spring and pressure plate with a plier.
5		Remove HP seal with disassembly tool 910078.
6		Check if the conical disk is in the right position (marked red in picture).
7		Assemble seal kit with a new HP seal. Grease the pressure plate and needle on the red marked surfaces with DX-Paste 051055.

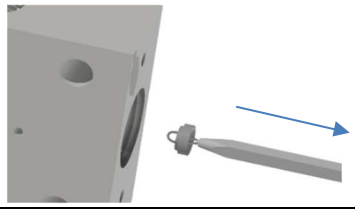
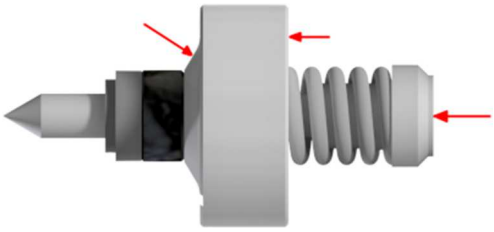
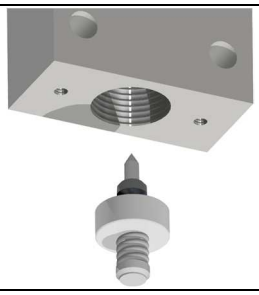
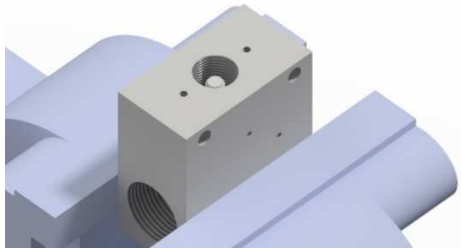
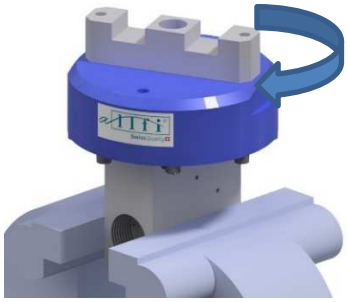
8		Press the new seal kit into the valve body.
9a		**For pneumatic cylinder NC** Pressurize pneumatic cylinder with compressed air (6-7 bar). The pneumatic valve 2.0 is now open and the valve seat will not be damaged. Tighten the pneumatic cylinder with the assembling tool 912198 and a torque wrench (moment of force according appendix A). Remove the pneumatic hose. If the option sensor valve is used, unscrew push-in fitting and screw on the option sensor valve.
9b		**For pneumatic cylinder NO** Tighten the pneumatic cylinder with the assembling tool 912198 and a torque wrench (moment of force according appendix A).
10		Fix pneumatic valve 2.0 on the machine. Connect the high-pressure line to the pneumatic valve 2.0 (torque see appendix A). Connect pneumatic hose.

7.2 Replace Sealing kit

Release pressure of the HP tubes before opening to protect against re-pressurization.

1		Disconnect pneumatic hose and HP Tubes. Remove the pneumatic valve 2.0 from the machine.

2		Fix it in bench vice. **Attention!** Use protective jaws.
2.1		If the option sensor valve is used, unscrew it and screw on the push-in fitting.
3a		**For pneumatic cylinder NC** Pressurize pneumatic cylinder with compressed air (6-7 bar). The pneumatic valve 2.0 is now open and the valve seat will not be damaged. Loosen pneumatic cylinder with the assembling tool 912198 and an open-end wrench AF24 and remove it. Release compressed air and remove air hose.
3b		**For pneumatic cylinder NO** Loosen pneumatic cylinder with the assembling tool 912198 and an open-end wrench AF24. Remove pneumatic cylinder.
4		Remove needle, spring and pressure plate with a plier.
5		Remove HP seal with disassembly tool 910078.

6		Remove valve body from bench vice Remove conical disk with Mounting tool
7		Assemble new seal kit with a new needle complete, a new spring, a new pressure plate, a new HP seal and a new conical disk. Grease the pressure plate and needle on the red marked surfaces with DX-Paste 051055.
8		Screw spindle into valve body from below.
9		Fix valve body in bench vice again.
10a		**For pneumatic cylinder NC** Pressurize pneumatic cylinder with compressed air (6-7 bar). The pneumatic valve 2.0 is now open and the valve seat will not be damaged. Tighten the pneumatic cylinder with the assembling tool 912198 and a torque wrench (moment of force according appendix A). Remove the pneumatic hose. If the option sensor valve is used, unscrew push-in fitting and screw on the option sensor valve.
10b		**For pneumatic cylinder NO** Tighten the pneumatic cylinder with the assembling tool 912198 and a torque wrench (moment of force according appendix A).

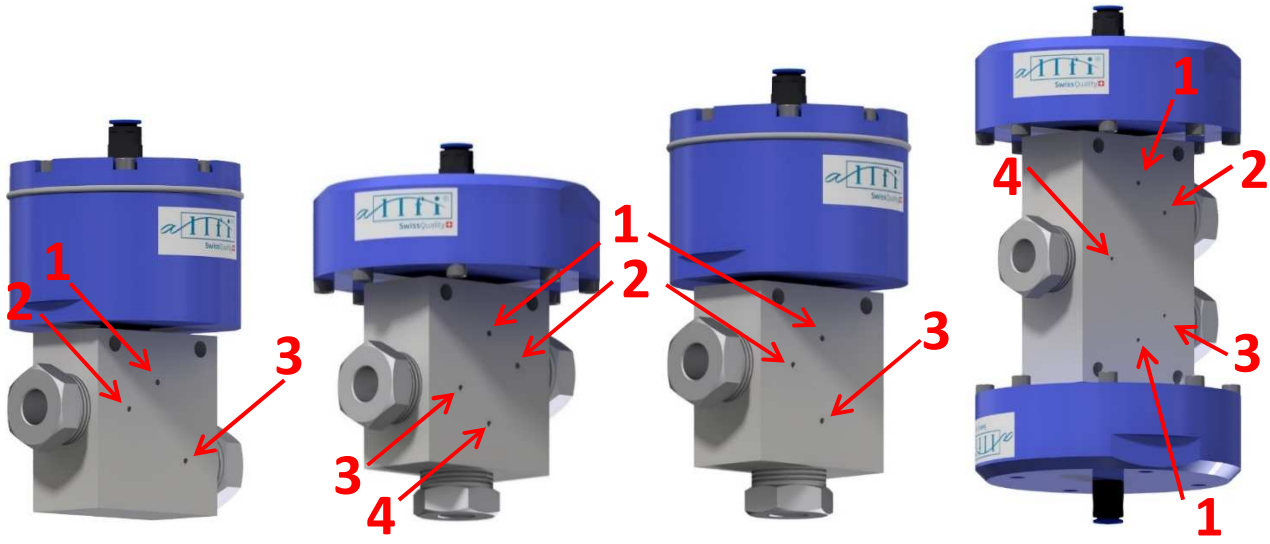
11		Fix pneumatic valve 2.0 on the machine. Connect the high-pressure line to the pneumatic valve 2.0 (torque see appendix A). Connect pneumatic hose.

8 Faults and Troubleshooting

Before uninstalling the pneumatic valve 2.0, release pressure from the HP tubes and protect against an unexpected re-pressurizing.

Warning! After any troubleshooting, check the water tightness of the pneumatic valve 2.0.

8.1 Leakage of the pneumatic valve 2.0



Pos.	Cause of the lockage	Action	Chapter
1	HP Seal untight	Check moment of force	7.1
		Replace HP Seal	7.1
2,3,4	Screw connection high pressure tube not tight	Tighten Screw	5.1

8.2 Pneumatic valve 2.0 normally open NO

Error	Cause	Action	Chapter
Pneumatic valve 2.0 doesn't close properly / completely	Pneumatic pressure to low	Check pneumatic pressure	
	Debris in valve seat	Clean pneumatic valve 2.0, use HP filter	7.1
	Valve seat and/or needle cone damaged	Replace seal kit and/or replace valve body	7.2

	Pneumatic cylinder malfunction	Pneumatic cylinder repair by manufacturer	
Pneumatic valve 2.0 doesn't open	Spring malfunction	Replace seal kit	7.2
	Needle stucked in pressure plate	Clean and/or replace seal kit	7.2
	Pneumatic cylinder malfunction	Pneumatic cylinder repair by manufacturer	

8.3 Pneumatic valve 2.0 normally closed

Error	Cause	Action	Chapter
Pneumatic valve 2.0 doesn't close properly / completely	Spring in pneumatic cylinder malfunction	Pneumatic cylinder repair by manufacturer	
	Debris in valve sea	Clean pneumatic valve 2.0, use HP filter	7.1
	Valve seat and/or needle cone damaged	Replace seal kit and/or replace valve body	7.2
	Pneumatic cylinder malfunction	Pneumatic cylinder repair by manufacturer	
Pneumatic valve 2.0 doesn't open	Pneumatic pressure to low	Check pneumatic pressure	
	Spring malfunction	Replace seal kit	7.2
	Needle stucked in pressure plate	Clean and/or replace seal kit	7.2
	Pneumatic cylinder malfunction	Pneumatic cylinder repair by manufacturer	

9 Recycling

The pneumatic valve 2.0 is made of metal and plastic. All the metal parts can be recycled. The plastic parts are to be professionally recycled as per local specifications.

10 Appendix B

Ventile pneum. NO 2.0 / Pneum. Valves NO 2.0 / 91xx80

Metrisch / Metric

Artikel-Nr.	Typ	Type	A	B	C	D	E	F	G	H	I	J	K	L	M	N
910080	durchgang	Straight	50	55	33	45	25	SW/AF 17	7	35	114	28	11	12	-	M16 x 1.5
910380	eck	Angle	50	65	33	-	25	SW/AF 17	7	35	124	-	11	21	-	M16 x 1.5
910680	3-Weg	3-way	50	66	33	43	25	SW/AF 17	7	35	125	28	11	10	12	M16 x 1.5
910980	doppelventil	2-stem	50	100	33	50	25	SW/AF 17	7	35	218	28	11	17	-	M16 x 1.5
910180	durchgang	Straight	50	60	33	45	25	SW/AF 22	7	35	119	20	11	12	-	M20 x 1.5
910480	eck	Angle	50	68	33	-	25	SW/AF 22	7	35	127	-	11	20	-	M20 x 1.5
910780	3-Weg	3-way	50	69	33	43	25	SW/AF 22	7	35	128	20	11	10	11	M20 x 1.5
911080	doppelventil	2-stem	70	100	33	50	25	SW/AF 22	7	35	218	20	11	17	-	M20 x 1.5
910280	durchgang	Straight	70	75	33	53	38	SW/AF 32	7	50	134	30	6	20	-	M30 x 2
910580	eck	Angle	70	73	33	-	38	SW/AF 32	7	50	132	-	6	20	-	M30 x 2
910880	3-Weg	3-way	70	77	33	45	38	SW/AF 32	7	50	136	30	6	12	12	M30 x 2
911180	doppelventil	2-stem	70	112	33	56	38	SW/AF 32	7	50	230	30	6	23	-	M30 x 2

Imperial

9/16"	Artikel-Nr.	Typ	Type	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	910080-I	durchgang	straight	50	55	33	45	25	SW/AF 17	5.5	35	114	27	10	12	-	9/16" - 18 UNF
	910380-I	eck	angle	50	60	33	-	25	SW/AF 17	5.5	35	119	-	10	15.5	-	9/16" - 18 UNF
1/4"	910680-I	3-Weg	3-way	50	66	33	43	25	SW/AF 17	5.5	35	125	27	10	10	11.5	9/16" - 18 UNF
	910980-I	doppelventil	2-stem	50	87	33	43.5	25	SW/AF 17	5.5	35	205	27	10	10.5	-	9/16" - 18 UNF
	910180-I	durchgang	straight	50	57	33	43	25	SW/AF 22	5.5	35	116	18	10	10	-	3/4" - 16 UNF
	910480-I	eck	angle	50	66	33	-	25	SW/AF 22	5.5	35	125	-	10	17	-	3/4" - 16 UNF
3/8"	910780-I	3-Weg	3-way	50	69	33	43	25	SW/AF 22	5.5	35	128	18	10	10	10	3/4" - 16 UNF
	911080-I	doppelventil	2-stem	50	95	33	47.5	25	SW/AF 22	5.5	35	213	18	10	14.5	-	3/4" - 16 UNF
	910280-I	durchgang	straight	66	64	33	45	38	SW/AF 32	7	35	123	26	10	12	-	1/8" - 12 UNF
	910580-I	eck	angle	66	71	33	-	38	SW/AF 32	7	35	130	-	10	18	-	1/8" - 12 UNF
	910880-I	3-Weg	3-way	66	79	33	45	38	SW/AF 32	7	35	138	26	10	12	14	1/8" - 12 UNF
	911180-I	doppelventil	2-stem	66	105	33	52.5	38	SW/AF 32	7	35	223	26	10	19.5	-	1/8" - 12 UNF

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11 Appendix C

Ventile pneum. NC 2.0 / Pneum. Valves NC 2.0 / 91xx70

Metrisch / Metric

Artikel-Nr.	Typ	Type	A	B	C	D	E	F	G	H	I	J	K	L	M	N
910070	durchgang	Straight	50	55	33	45	25	SW/AF 17	7	35	144	28	11	12	-	M16 x 1.5
910370	eck	Angle	50	65	33	-	25	SW/AF 17	7	35	154	-	11	21	-	M16 x 1.5
910670	3-Weg	3-way	50	66	33	43	25	SW/AF 17	7	35	155	28	11	10	12	M16 x 1.5
910970																M16 x 1.5
910170	durchgang	Straight	50	60	33	45	25	SW/AF 22	7	35	149	20	11	12	-	M20 x 1.5
910470	eck	Angle	50	68	33	-	25	SW/AF 22	7	35	157	-	11	20	-	M20 x 1.5
910770	3-Weg	3-way	50	69	33	43	25	SW/AF 22	7	35	158	20	11	10	11	M20 x 1.5
911070																M20 x 1.5
910270	durchgang	Straight	70	75	33	53	38	SW/AF 32	7	50	164	30	6	20	-	M30 x 2
910570	eck	Angle	70	73	33	-	38	SW/AF 32	7	50	162	-	6	20	-	M30 x 2
910870	3-Weg	3-way	70	77	33	45	38	SW/AF 32	7	50	166	30	6	12	12	M30 x 2
911170																M30 x 2

Imperial

Artikel-Nr.	Typ	Type	A	B	C	D	E	F	G	H	I	J	K	L	M	N
910070-I	durchgang	Straight	50	55	33	45	25	SW/AF 17	5.5	35	144	27	10	12	-	9/16" - 18 UNF
910370-I	eck	Angle	50	60	33	-	25	SW/AF 17	5.5	35	149	-	10	15.5	-	9/16" - 18 UNF
910670-I	3-Weg	3-way	50	66	33	43	25	SW/AF 17	5.5	35	155	27	10	10	11.5	9/16" - 18 UNF
910970-I																9/16" - 18 UNF
910170-I	durchgang	Straight	50	57	33	43	25	SW/AF 22	5.5	35	146	18	10	10	-	3/4" - 16 UNF
910470-I	eck	Angle	50	66	33	-	25	SW/AF 22	5.5	35	155	-	10	17	-	3/4" - 16 UNF
910770-I	3-Weg	3-way	50	69	33	43	25	SW/AF 22	5.5	35	158	18	10	10	10	3/4" - 16 UNF
911070-I																3/4" - 16 UNF
910270-I	durchgang	Straight	66	64	33	45	38	SW/AF 32	7	35	153	26	10	12	-	1/8" - 12 UNF
910570-I	eck	Angle	66	71	33	-	38	SW/AF 32	7	35	160	-	10	18	-	1/8" - 12 UNF
910870-I	3-Weg	3-way	66	79	33	45	38	SW/AF 32	7	35	168	26	10	12	14	1/8" - 12 UNF
911170-I																1/8" - 12 UNF

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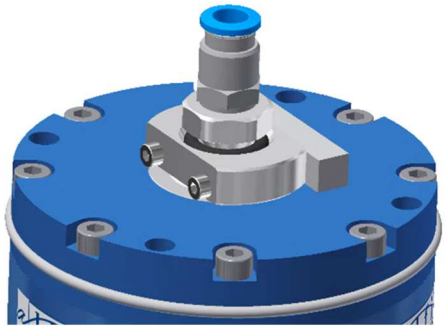
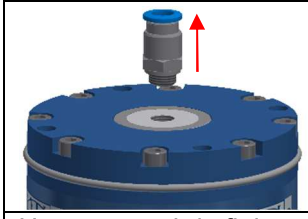
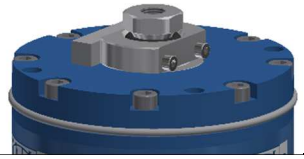
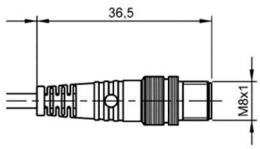
12 Option Sensor Valves NC

Part number: 912170



Assembly: See also drawing 912170 (enclosures of sensor option)

			
Unscrew push-in fitting	Screw on sensor option valves NC	Screw push-in fitting onto sensor option valves NC	Connect sensor plug

Disassembly in reverse order.

Sensor:

Basic features

Approval/Conformity	cULus CE EAC WEEE
Basic standard	IEC 60947-5-2

Display/Operation

Function indicator	yes
Power indicator	no

Electrical connection

Cable diameter D	3.00 mm
Cable length L	0.5 m
Connection	M8x1-Male, 3-pin
Connection type	Cable with connector, 0.50 m, PUR
Polarity reversal protected	yes
Protection against device mix-ups	yes
Short-circuit protection	yes

Electrical data

Load capacitance max. at Ue	0.5 µF
Min. operating current Im	0 mA
No-load current Io max., damped	12 mA
No-load current Io max., undamped	4 mA
Operating voltage Ub	10...30 VDC
Output resistance Ra	33.0 kOhm + D
Rated insulation voltage Ui	75 V DC
Rated operating current Ie	200 mA
Rated operating voltage Ue DC	24 V
Rated short circuit current	100 A
Ready delay tv max.	10 ms
Residual current Ir max.	80 µA
Ripple max. (% of Ue)	15 %
Switching frequency	3000 Hz
Utilization category	DC -13
Voltage drop static max.	2.5 V

Environmental conditions

Ambient temperature	-25...70 °C
Contamination scale	3
EN 60068-2-27, Shock	Half-sinus, 30 g_n, 11 ms
EN 60068-2-6, Vibration	55 Hz, amplitude 1 mm, 3x30 min
IP rating	IP67

Functional safety

MTTF (40 °C)	830 a

Interface

Switching output	PNP normally open (NO)

Material

Housing material	Zinc, Die casting
Material jacket	PUR
Material sensing surface	PBT

Mechanical data

Dimension	40 x 8 x 8 mm
Installation	for flush mounting
Size	8x8

Range/Distance

Assured operating distance Sa	1.6 mm
Hysteresis H max. (% of Sr)	15.0 %
Rated operating distance Sn	2 mm
Real switching distance sr	2 mm
Repeat accuracy max. (% of Sr)	5.0 %
Switching distance marking	■■
Temperature drift max. (% of Sr)	10 %
Tolerance Sr	±10 %

Remarks

The sensor is functional again after the overload has been eliminated.

For more information about MTTF and B10d see MTTF / B10d Certificate

Indication of the MTTF- / B10d value does not represent a binding composition and/or life expectancy assurance; these are simply experiential values with no warranty implications. These declared values also do not extend the expiration period for defect claims or affect it in any way.

Connector Drawings

Wiring Diagrams