

Translation **Double seat valve**

Operating manual **INOVA Typ 491**



Handtmann Worldwide - Technology for a Prosperous Future

The Handtmann Armaturenfabrik can look back over a long and successful tradition. Today it is part of the globally operating Handtmann Group of Companies.

The Handtmann Armaturenfabrik is one of the leading suppliers of armatures, valves and processing plants for the beverage industry, and increasingly for biotechnology and the chemical-pharmaceutical industry.

The success of the Handtmann Armaturenfabrik is based on long-term experience and processing expertise, practice-oriented consultation, comprehensive engineering work and state-of-the-art production

The ambitious goals can only be realised with highly qualified and motivated employees. This is why our employees are at the heart of what Handtmann does.

The Handtmann Armaturenfabrik is not looking for short-term success but rather the establishment of a long-term partnership with customers.

© 2023

Albert Handtmann Armaturenfabrik GmbH & Co. KG

Arthur-Handtmann-Straße 11

88400 Biberach an der Riss

Germany

Tel.: +49 7351 342-0

Fax: +49 7351 342-4480

service.af@handtmann.de

www.handtmann.de

Any copyrights regarding this technical documentation and any drawings submitted to the receiver in person shall remain at all times with

Albert Handtmann Armaturenfabrik GmbH & Co. KG,
Biberach, Germany.

They must not be copied nor reproduced without prior written authorisation.

0	Foreword	5
1	General	6
1.1	Manufacturer	6
1.2	Proper application	6
1.3	Improper application	6
1.4	Duties of operator.....	6
2	Safety Information.....	7
2.1	Symbols.....	7
2.2	Hazards and Safety Instructions	8
3	Notes	10
3.1	Notes on transport.....	10
3.2	Instructions for Delivery and Performance.....	11
3.3	Storage Instructions.....	11
4	Technical Description	12
4.1	Technical Data.....	12
4.2	Valve types.....	13
4.3	Valve structure.....	13
4.4	Dimensions	14
5	Operation	15
5.1	Functionality	15
5.1.1	Process integration, mechanical	16
5.1.2	Process integration, electrical	16
5.2	Valve control.....	17
5.3	Valve switching function	18
5.3.1	Production – valve CLOSED	18
5.3.2	CIP or production – valve OPEN	18
5.3.3	Cleaning of balancer (B)	19
5.3.4	Cleaning of leakage chamber (L)	19
5.4	Cleaning parameters.....	20
5.5	CIP cleaning.....	20
5.6	Leakage detection.....	21
6	Disassembly	22
6.1	Assembly and Disassembly Notices	22
6.2	Assembly tools.....	23
6.3	Preparing to dismantle the valve.....	24
7	Storing used valve inserts	25
8	Installation and Commissioning	26
8.1	Installation of valve housing	26
8.2	Preparing the new valve insert	27
8.3	Assembly of the valve insert	28
8.4	Commissioning valves.....	29

Foreword

9	Maintenance/Cleaning	30
9.1	Maintenance	30
9.2	Maintenance intervals	31
9.3	Seals	32
9.4	Seal replacement	33
9.5	Spare parts	34
10	Trouble shooting.....	35
11	Disposal	37
11.1	Disposal of Packaging.....	37

0 Foreword

These instructions contain instructions, notes and advice worth knowing, which are necessary for the installation and/or operation.

Read the instructions to ensure trouble-free operation.

The technical data, descriptions and design specifications correspond to the state at the time of printing. Intermediate design changes are possible in the interest of continuous further development.

Pictures and drawings shown are only complete to the extent that they are required for understanding.

The instructions serve to inform the operating personnel, the operator and, if applicable, trained qualified personnel. The instructions are part of the system delivery. Removing chapters from these instructions is prohibited. Missing instructions or missing pages thereof must be replaced immediately.

Any person who is instructed to set up, commission, operate, maintain and repair the system is required to read these instructions, specifically the safety notes, and have an understanding of its content and language.

If necessary, internal instructions under consideration of the technical qualification of the respective personnel must be provided.

To prevent operating errors and ensure the correct performance of necessary testing measures, the instructions must be accessible to operating personnel at all times.

Handtmann Armaturenfabrik GmbH & Co. KG is not liable for damages and malfunctions resulting from non-compliance with these instructions.

1 General

1.1 Manufacturer

Albert Handtmann Armaturenfabrik GmbH & Co. KG
Arthur-Handtmann-Str. 11; D-88400 Biberach
Tel.: +49(0) 73 51/3 42-0; Fax: +49(0) 73 51/ 3 42-44 80
E-Mail: sales.fittings@handtmann.de



1.2 Proper application

Double-seat valves are used in the food and beverage, pharmaceutical and chemical industries. They are used as individual valves or in a valve network (valve clusters).
Double-seat valves form the interface between two separate line systems with different media. Due to their mode of operation, they safely separate the media or transfer the media from one line system to the other.

1.3 Improper application

Unintended use applies if:

- operating conditions or uses other than those intended for the component/assembly/system apply,
- media other than those intended for the component/assembly/system are fed through them,
- unqualified personnel carries out the installation, operation and maintenance,
- unauthorized changes or modifications made on the component/assembly/system,
- Notes in the instructions are not observed.

Any improper use will void any warranties and statutory liability claims.

1.4 Duties of operator

The operator must ensure in particular that

- the component/assembly/plant is operated in accordance with its intended purpose and in correct functional condition.
- the legal requirements for operation and maintenance are observed.
- only sufficiently qualified authorised personnel performs maintenance on the component/assembly/plant.
- the personnel responsible for operation and maintenance is familiar with and observes the operating and assembly instructions and particularly the safety instructions contained in them.
- the attached safety and warning signs are not removed and remain legible.

2 Safety Information

2.1 Symbols



DANGER

Danger - endangerment caused by product-specific and process-specific conditions!

This symbol identifies an extremely dangerous situation that may result in severe bodily injury or even death if the relevant safety instructions are disregarded.



WARNING

Warning – general dangers!

This symbol identifies dangerous situations that may result in light to severe bodily injury if the relevant safety instructions are disregarded.



CAUTION

Caution – damage to components!

This symbol points out that special care must be taken during installation, operation or maintenance.

NOTICE



Note

This symbol refers to issues requiring special attention.

NOTICE



Note

This symbol identifies an environmentally friendly procedure or disposal method.

Safety Information

2.2 Hazards and Safety Instructions

Endangerment of operating personnel	
Explanations	Measures
The component/assembly weighs several kilograms. During transport, installation or repair work, crushing injuries may occur.	<ul style="list-style-type: none"> Protect the elements for installation, disassembly and maintenance work from sliding and falling. Wear required personal protective equipment in compliance with national regulations, such as protective gloves, safety shoes and, if necessary, safety helmet.
Danger at the connection points due to fluid, vapor or gas pressure.	<ul style="list-style-type: none"> Depressurize and/or drain the line system for installation and maintenance work. The line section must be disconnected from the remaining line system.
No tasks are required on the component/assembly/system in normal operation. Personnel who are accidentally present can be hit by emerging, pressurized, hot fluid or vapor if the process elements start to leak.	<ul style="list-style-type: none"> Inspect the floor under the component/assembly for unusual wetness and, if applicable, report same immediately to the appropriate department to correct the leaks. Wear safety clothing in the area of the component/assembly.
If the system is operated at a higher fluid temperature, the surface temperature of the component/assembly/system can reach this value as well.	<ul style="list-style-type: none"> Attach warning signs for hot surfaces. Flush the line system with cold water before performing maintenance work. Wear personal protective equipment when working on the assembly (cut-resistant, heat-resistant hand protection and foot protection).
The surfaces of the component/assembly/system can be blinding or throw unfavorable shadows with the corresponding incidence of light.	<ul style="list-style-type: none"> Ensure proper lighting recommended illuminance as defined in DIN EN 12464-1 of min. 500 lux.
In case of leakage in the component / assembly / system, CO ₂ can escape and lead to suffocation of persons.	<ul style="list-style-type: none"> The operator must take appropriate protective measures, such as CO₂ sensors or a ventilation system.
In case of leakage in the valve, hot medium (up to 140°C) can flow out and scald personnel.	<ul style="list-style-type: none"> The component/assembly/system must be subjected to a regular visual inspection for leaks.
General hazards during installation, maintenance and cleaning of the component/assembly/system	<ul style="list-style-type: none"> Install proper protections before working on the component/assembly/system <ul style="list-style-type: none"> ✓ Switch off the sections with the controls ✓ Activation of isolation equipment ✓ Close infeeds ✓ Switch off the system ✓ Attach/set up warning signs

Endangerment of operating personnel	
Explanations	Measures
<p>Flame cutting and welding work can cause hazards such as</p> <ul style="list-style-type: none"> • Fire, • Cutting injuries and • Burns. 	<ul style="list-style-type: none"> • Before starting welding work, a temporary permit must be obtained for working with open fire/welding. • Welding work must exclusively be performed by qualified personnel with the corresponding protective equipment. • All flammable parts must be removed from the area before welding work. • Flammable parts that cannot be removed must be covered. • Fire-extinguishing agents, such as powder extinguishers (see Fire Class) must be kept ready. • Organize fire guards who repeatedly check the work location for pockets of fire for 24 hours after completion of the work. • Wear heat-resistant protective gloves, suitable work clothing and safety goggles.
<p>Cleaning agent may emerge from the leakage drain during CIP cleaning. There is a danger of slipping and cleaning agent may get into the eyes.</p>	<ul style="list-style-type: none"> • Wear appropriate safety goggles in CIP operation. • If the CIP cleaning is activated, keep the hazardous area surrounding the leakage drain open and dry.
<p>For versions with swing bends (if installed):</p> <p>When changing the swing bend, the butterfly valve area of the pneumatic butterfly valve becomes freely accessible. A malfunction or pressure drop can cause unintended opening or closing of the butterfly valve. This results in a danger of crushing for fingers and hands.</p>	<ul style="list-style-type: none"> • Prior to maintenance work on a butterfly valve, disconnect it from the air supply. • Wear protective gloves • Attach warning signs for risk of crushing
Functional failure due to incorrect handling	
<p>The switching operation of the valves is impaired or jerky.</p>	<ul style="list-style-type: none"> • Remove residue or loosened small parts from the area of the valve seat • Follow the operating instructions of the respective components
<p>Installing or changing faulty or unspecified parts can disable or significantly impair the function.</p>	<ul style="list-style-type: none"> • Use only parts approved by the manufacturer

3 Notes

3.1 Notes on transport

 **DANGER**

Danger - Danger of injury to persons!

There is a risk of accident during transport due to the high weight.

- Do not walk or stand under suspended loads.
- When unloading the assembly, always use inspected and approved lifting gear (e.g., forklift truck, pallet truck, crane) and suitable aids with a sufficient load carrying capacity.
- Shackles, e.g., in accordance with DIN 82101
- Lashing chains, e.g., in accordance with DIN 5687 quality class 8
- Transport must be performed only by instructed personnel.

 **CAUTION**

Warning - General dangers

The danger areas must be cordoned off during transport and assembly (barrier tape).

ATTENTION

 **Note**

Observe the information signs for transport.



Fig. 1: Transport signs

3.2 Instructions for Delivery and Performance

- Check the delivery note data for factual correctness.
- Check the delivery for completeness. Later complaints will not be accepted.
- Perform visual inspection of the packaging system for external transport damage. These must be reported to the forwarder immediately.
- Claims due to transport damage not visible right away must be made within a week.

3.3 Storage Instructions

- The goods should remain in the delivered packaging systems until assembly.
- The goods must be stored in dry, closed rooms. Exposure to UV radiation and direct sunlight must be avoided. The maximum moisture must not exceed 60 %; the maximum storage temperature must not exceed 40 °C.
- It is vital to read the manual after unpacking the goods and before assembly.

4 Technical Description

4.1 Technical Data

Product area

Materials	Stainless steel 1.4307, 1.4404 (on request)
Seals	EPDM, FDA-compliant
Inner surface	≤ 0.8 µm
Outer surface	Metal blank, ≤ 1.6 µm
Nominal widths (DN)	50/65/80/100/125/150/200
Nominal widths (OD)	2" / 2 ½" / 3" / 4"

Other parts

Materials	Stainless steel 1.4307
Seals	EPDM
Surface	Metal blank, ≤ 1.6 µm

Production

Operating pressure	0 - 10 bar / 0 - 145 psi
Temperature	0 - 90 °C / 32°F - 194°F
Pressure shock resistance	40 - 50 bar tested / 500 – 700 psi
Control air	6 - 7 bar / 87 – 102 psi

Cleaning

CIP operating pressure	2 - 5 bar / 30 – 80 psi
Rinsing chamber pressure	< 0.5 bar / < 7 psi
Temperature	Hot water max. 85 °C / 185°F Steam 140 °C / 284°F Hot lye max. 85 °C / 185°F

Noise emissions

Workplace-related emission value	< 70 dB(A)
----------------------------------	------------

CAUTION



Note

The values given are standard values and refer to the EPDM sealing material.

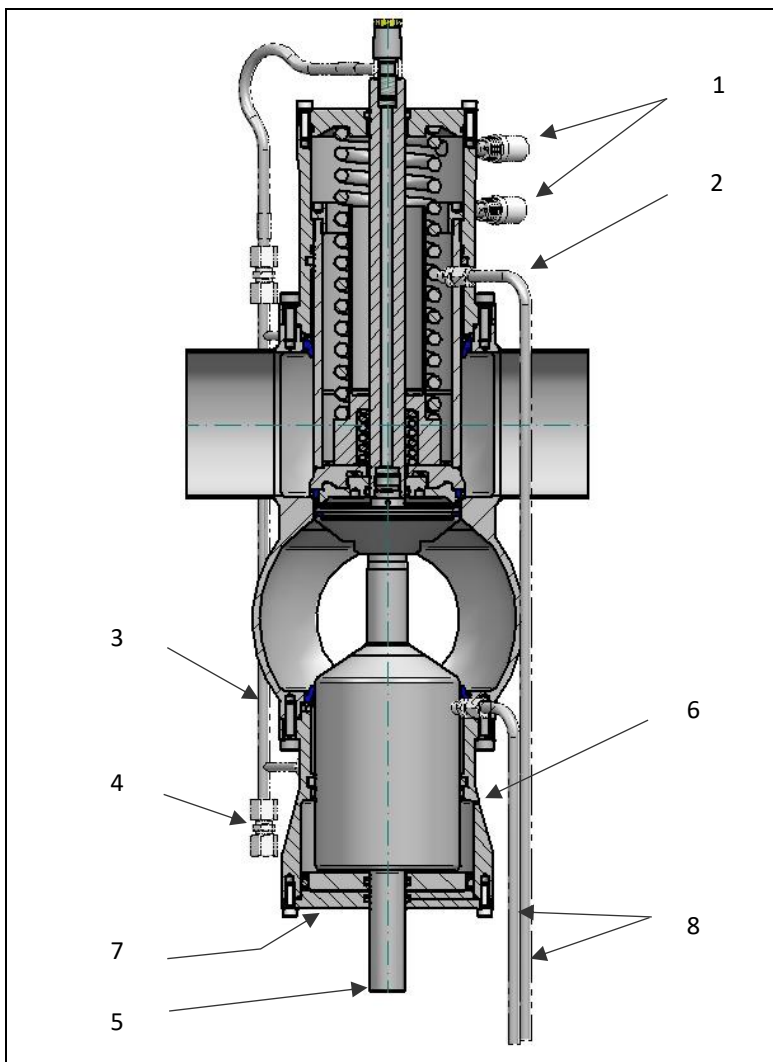
4.2 Valve types

Valve type 491 is identical to valve type 580 in the product range.

Although type 491 does not have seat lifting, it is equipped with a leakage chamber cleaning system and characterised by

- A split upper and lower valve plate (easier seal replacement)
- Upper and lower mould seals (EPDM) in the seat area
- A revised seat design with monitored cleaning gap and
- A one-piece housing guide (product chamber with hygienic design)

4.3 Valve structure

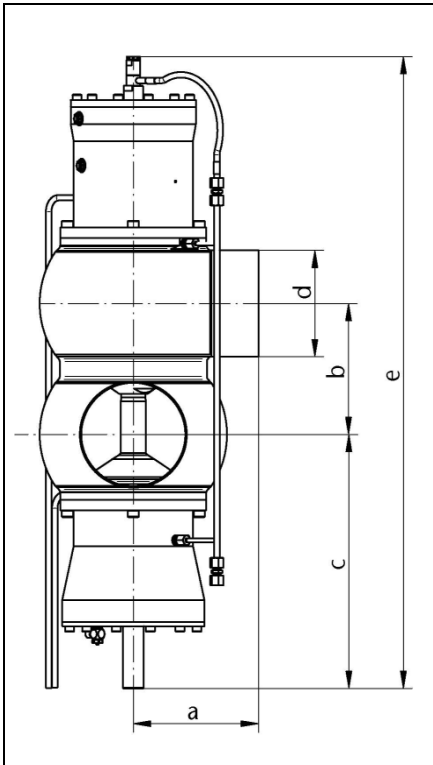


- | | |
|---|--|
| 1 | Electrical feedback |
| 2 | Upper venting hole (leakage display of quad ring) |
| 3 | CIP piping |
| 4 | Rinsing pipe connection (pipe \varnothing 8 mm) |
| 5 | Leakage chamber outlet (leakage display of seat seals) |
| 6 | Lower venting hole (leakage display of quad ring) |
| 7 | Air connection (PK 4 \varnothing 6/4 mm) |
| 8 | Rinsing chamber outlet (leakage display of lip seal) |

Fig. 2: Double-seat valve type 491

Technical Description

4.4 Dimensions



Dimensions [mm]							Weight [kg]
DN	OD	a	b	c	d	e	
50	2"	100	85	184	53	491	14.6
65	2 ½"	115	100	205	70	542	20.6
80	3"	130	116	251	85	643	29.8
100	4"	140	136	261	104	680	40.6
125	---	180	165	312	129	813	78
150	---	180	190	369	154	916	76

Kvs value [m³/h]				
DN	OD	Upper passage	Valve seat	Lower passage
50	2"	80	65	85
65	2 ½"	135	100	150
80	3"	200	150	230
100	4"	310	215	395
125	---	390	370	460
150	---	505	430	605

Fig. 3: Valve dimensions and Kvs values

5 Operation

CAUTION



Note – use in humid environments

The following must be observed during installation and operation in humid environments:

- Cables and pipes must be laid in such a way that no water (condensate, rain) or other liquid can run along the cable into the cable gland/M12 plug.
- The cable gland for M12 plugs must be screwed properly (tight fit).
- The housing must be screwed properly (tight fit).
- Under no circumstances may the position controller be sprayed or cleaned directly with a high-pressure cleaner.



WARNING



Warning – General hazards!

If the pressure system is exposed to a higher fluid temperature, the surface temperature of the assembly can reach this value as well.

- Attach warning signs for hot surfaces.



CAUTION

Caution - Damage to components!

If the valve is not checked and serviced at certain intervals, the function may be overridden or significantly disturbed.

- It is recommended to carry out regular checks.

5.1 Functionality

Double-seat valves are installed at critical junctions of two process lines. The different media flowing in the lines are sealed from each other two times (doubly) in the seat area of the valve by the upper and lower valve plates.

The leakage chamber is formed between the two valve plates. If a leak occurs at one of the two valve plates, the respective medium can flow out into the open via the leakage chamber.

A characteristic feature of the double-seat valve is leak-free switching operation:

- The lower valve plate moves in the sealing area of the valve seat against the upper valve plate. The leakage chamber is completely closed in the process.
- Now the adjacent valve plates move out of the upper valve seat area into the open valve position.
- During the closing process, the adjacent valve plates initially move to the upper valve seat area. The leakage chamber is still closed.
- The lower valve plates moves in the sealing area of the valve seat towards its end position and slowly opens the leakage chamber in the process.

Operation

Due to the piston-like valve rods, the double-seat valve is insensitive to pressure surges. The lower balance piston is also the drive piston, meaning the valve does not have a separate drive cylinder.

The upper and lower valve plates are integrated into the respective balancers (balancing pistons). During the switching process, the balancers move between the product chamber and the upper or lower rinsing chamber.

The seal between the product chamber and the rinsing chamber is made by a gap-free lip seal.

5.1.1 Process integration, mechanical

Four standard housing forms are available for integrating the double-seat valves into the line system. Other housing forms are available on request.

CAUTION



Note

With housing form X, the line levels are offset by 90°, for housing form II, they run parallel to one another. The wide line in the symbol illustration indicates the upper line level.



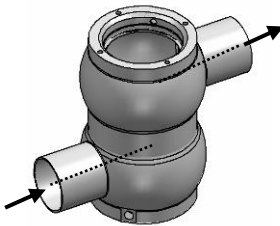
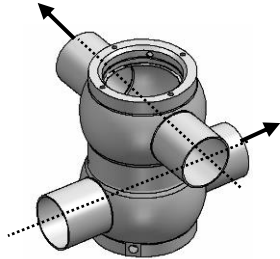






Order no. DN/OD	Form X	Order no. DN/OD	Form II		
		49101 / 49161			
49102 / 49162				E.g. Version 49101-II	E.g. Version 49104-X
49103 / 49163					
49104 / 49164					

Fig. 4: Form of version

5.1.2 Process integration, electrical

Various control units are available for integrating the double-seat valves into the automated CIP production process:

1. Proximity switch for open/closed end position sensing, external
2. Control head V.CON

5.2 Valve control

The double-seat valve is closed in home position.

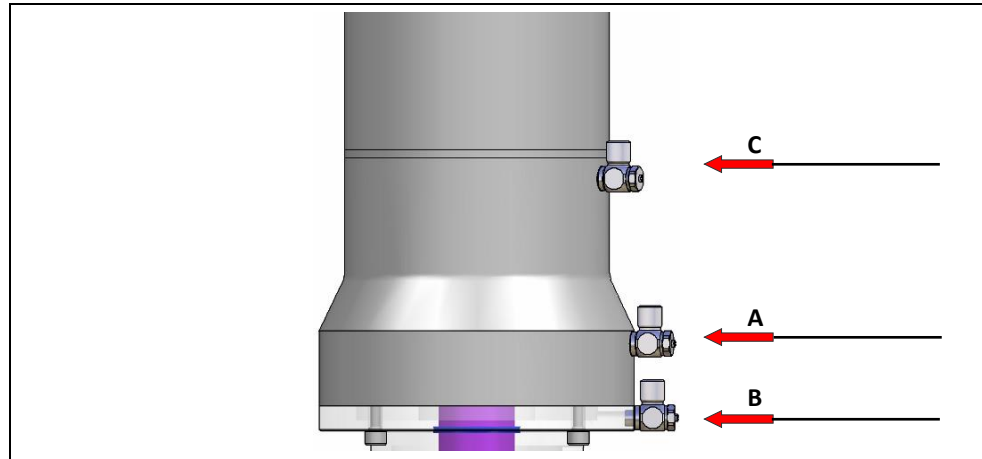


Fig. 5: Direct valve control

Direct control with compressed air activates one of the three switching functions:

- **A** activates the main function to open the valve
- **B** activates single seat lifting of the upper valve plate
- **C** activates single seat lifting of the lower valve plate

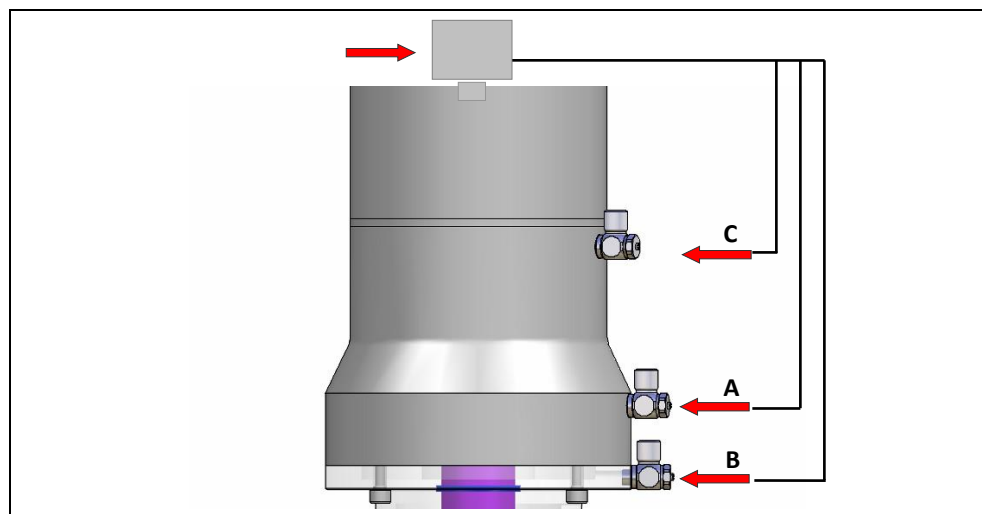


Fig. 6: Indirect valve control

Indirect control takes place via a built-on control unit. The various switching functions are activated by integrated pilot valves:

- **A** activates the main function to open the valve
- **B** activates single seat lifting of the upper valve plate
- **C** activates single seat lifting of the lower valve plate

5.3 Valve switching function

The function of the valve is characterised by the switching states described below.

5.3.1 Production – valve CLOSED

- The various process media flow through the upper and lower line system or valve housing.
- The two valve plates are in the end position in the seat area and seal the line systems against each other.
- The leakage chamber is formed between the two valve plates; this chamber is connected to the open surroundings.
- In the event of sealing problems in the seat area, the respective medium can flow out into the open via the leakage chamber and leakage drain.

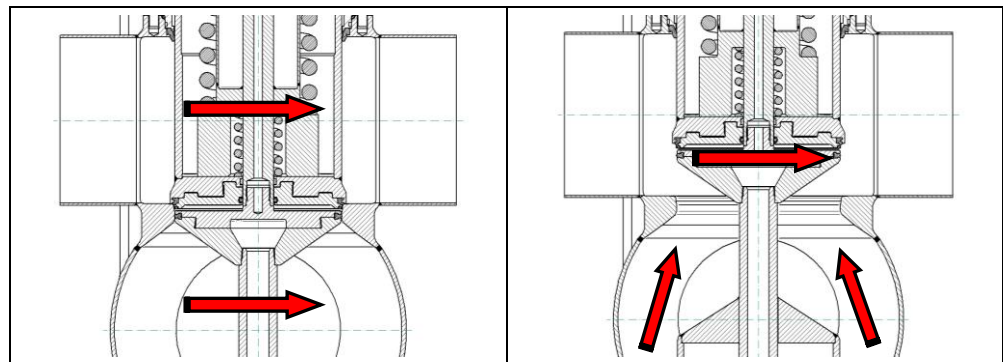


Fig. 7: Valve CLOSED

Valve OPEN

5.3.2 CIP or production – valve OPEN

- By applying compressed air to pos. A (Fig. Valve control), the lower valve plate moves from its end position against the upper valve plate. The seat seal is maintained in the process. The double-seat valve switches without leaks.
- The leakage chamber between the now adjacent valve plates is sealed by the leakage chamber seal. The valve plates move to the open valve position.
- When closing the valve, the valve plates first move against the upper valve seat.
- The lower plate moves to the end position while maintaining its seat seal, continuously opening the leakage chamber.

5.3.3 Cleaning of balancer (B)

For hygienically sensitive processes, we recommend connecting the rinsing chambers to the CIP circuit using controllable valves.

- During the valve switching process, the balancers (balancing pistons) move between the product chamber and the adjacent upper and lower rinsing chambers.
- The cleaning medium flows through the rinsing chambers via a stationary feed and drain line.
- This is how the upper and lower areas of the balancers that come into contact with the product are included in the cleaning process.

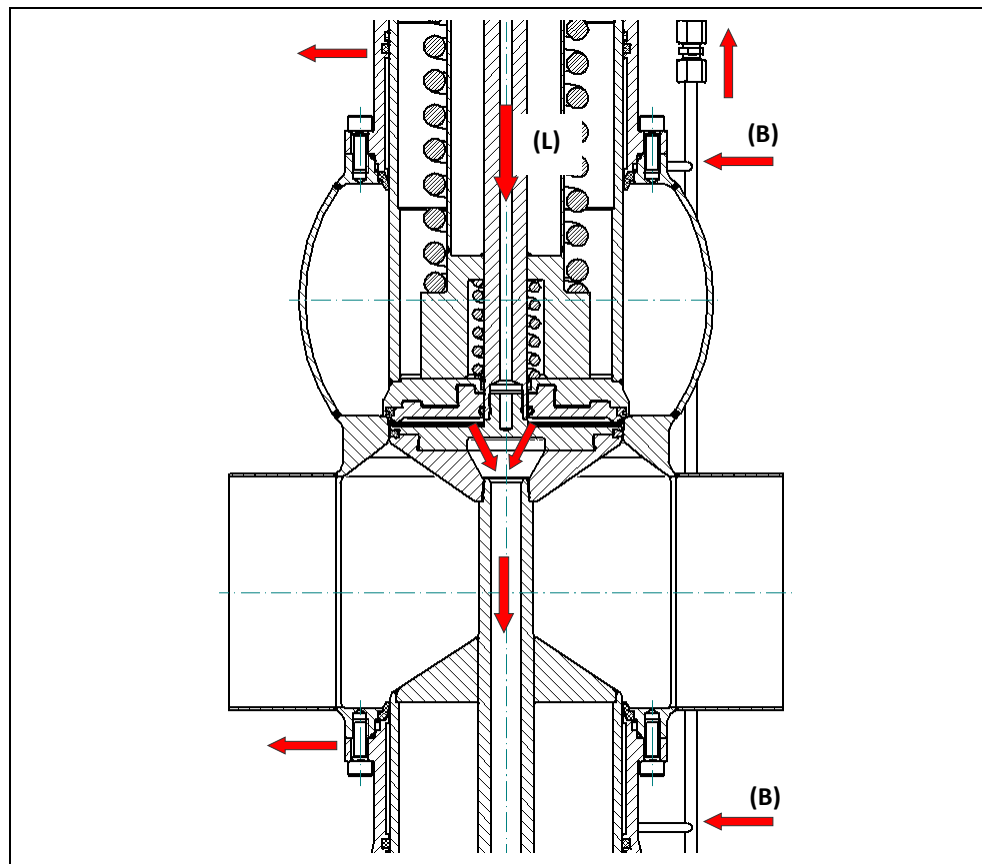


Fig. 8: Cleaning methods: Balancer and leakage chamber

5.3.4 Cleaning of leakage chamber (L)

- During supply and installation of the valve, the leakage chamber between the two valve plates is sealed off from the line system.
- Cleaning medium can be injected into the leakage chamber via a stationary feed line.
- The cleaning medium is discharged into the open through the leakage drain.

5.4 Cleaning parameters

The component and its sealing material in the area in contact with the product are designed for standard CIP operation.

Standard conditions are considered to be:

- CIP media based on commercially available lye-acid components with given resistance to EPDM sealing material. If the media composition deviates, consult the valve manufacturer.
- Cleaning additives in the 2-4% concentration range
- Cleaning cycles: 3 x 5 sec. with each cleaning medium for

Type 580	Type 491
<ul style="list-style-type: none"> - Balancer cleaning - Upper seat lifting - Lower seat lifting 	<ul style="list-style-type: none"> - Balancer cleaning - Leakage chamber cleaning

- See technical data for additional parameters

5.5 CIP cleaning

Double-seat valve type 491 does not feature single-seat lifting and can be cleaned separately in different areas, depending on which line section the cleaning medium is currently located.

Cleaning area	Type of cleaning
Valve passage and valve seat	The valve passage and valve seat are cleaned with the valve open through both line sections by moving the valve to the OPEN and CLOSED position at short intervals. This means the mutual separation of the two line sections is eliminated. There is CIP medium in both line sections.
Balancer and leakage chamber	Leakage chamber cleaning is best carried out with the valve closed. The CIP medium flows from above via the rinsing line into the leakage chamber between the two valve plates. The leakage chamber is sprayed out and the CIP medium is discharged into the open through the leakage drain. The balancers are always cleaned in the respective rinsing chamber together with leakage chamber cleaning via the common rinsing line. The balancers are rinsed from the bottom to the top with the rinsing chambers. The rinsing chambers are equipped with an overflow line at the outlet that is pulled downwards. The rinsing chamber always remains filled with CIP medium. In this case, a line section is in CIP operation.

5.6 Leakage detection

Protecting the moulded seals in the split valve plates from mechanical damage is essential during operation and maintenance.

Leakage in the area of the product and rinsing chamber can be detected as described below:

- If the moulded seal of a valve plate is defective, liquid escapes from the respective line section at the leakage outlet when the valve is in the closed position.
- If the leakage chamber seal is defective, liquid will escape at the leakage outlet when the valve is open.
- If the internal seal of the rinsing chambers (lip seals) is defective, liquid enters the upper or lower rinsing chamber. As this is normally filled with rinsing water from the last CIP cleaning, liquid immediately leaks out at the respective CIP outlet.
- If the outer seal of the rinsing chambers (quad ring) is defective, liquid will leak out at the upper or lower venting hole of the guide bushing.

6 Disassembly



WARNING

Warning – Welding hazards!

When dismantling valves or setting up a system, pipes must be welded. This can lead to a fire. The fire can seriously injure people.

During disassembly/assembly, sharp-edged pipe ends may be present. The staff can cut themselves at the sharp edges.

Welding or cutting pipes creates hot surfaces. These can lead to burns.

Therefore, please note the following before welding:

- Welding work may only be carried out by qualified personnel.
- Remove all flammable parts from the environment before welding.
- Cover combustible parts that cannot be removed.
- Prior to commencement of flame, welding, soldering and/or grinding operations, approval must be obtained from the plant manager for open fire/welding work.
- Work only with a release certificate.
- Have fire extinguishing agents, e.g. powder extinguishers ready.
- Organize fire stations.
- Check the workplace for fire nests several times up to 24 hours after completion of the work.
- Wear personal protective clothing during welding.
 - cut-resistant, heat-resistant hand protection
 - Foot protection
 - Head protection

6.1 Assembly and Disassembly Notices

Before starting work:

- Read the operating instructions and, in particular, the safety information.
- Check the current system status, e.g., pressure, temperature, medium, operating status.
- Clean, empty and/or depressurise the piping system.
- Disconnect pneumatic and electric connections from the actuator.

 **CAUTION**

Caution – damage to components!

Installation of faulty or non-specified parts or using the same as replacement parts may disable or disrupt functionality considerably.

- Only use parts and equipment approved by the manufacturer.
- After the work has been carried out, the function of the valve must be checked.

6.2 Assembly tools

CAUTION

 **Note**

The general assembly tools such as open-end spanners, ring spanners and hexagonal spanners must have a metric design.

CAUTION

 **Note**

Maintenance can only be carried out with Handtmann service tools for the respective component.

An assembly tool is strongly recommended for maintenance and disassembly of double-seat valves.

Assembly tool for type 491/580

Nominal width	Part no.	Part no.
DN 50	049101.77050R1	058001.77050R1
DN 65	049101.77065R1	058001.77065R1
DN 80	049101.77080R1	058001.77080R1
DN 100	049101.77100R1	058001.77100R1
DN 125/150	049101.77150R1	058001.77150R1

Guide bolt and eyebolt are included with the assembly tools.

6.3 Preparing to dismantle the valve



DANGER



Danger – danger due to electric current!

Unintentional opening and closing of the valve may occur during assembly.

- Before disassembly, disconnect the connections for auxiliary power and the supply lines (electrics, pneumatics, CIP) from the valve.



CAUTION

Caution – component damage!

The compression spring has slight pre-tension, so care should be taken when disassembling the drive.

- Use the auxiliary device for this purpose.

CAUTION



Note

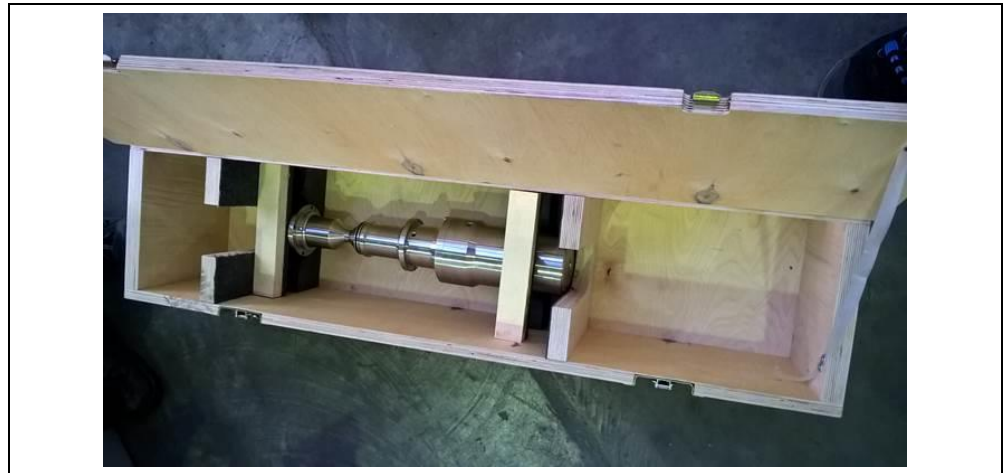
Disassembly of the valve or valve insert may only be carried out by Handtmann employees or trained specialists.

Disassembly of the valve or valve insert to exchange all seals is described in the associated service document. You will receive this with training.

Write to service.af@handtmann.de if you have any questions.

7 Storing used valve inserts

- The disassembled valve insert is placed in the supplied box. Make sure that a type designation is made, e.g. DSV 491 or 580 upper passage DNxx; lower passage DNxx
- Protecting the valve insert from dust with foil is recommended.



To be able to use the valve insert again, all seals in contact with the medium and/or on the drive side must be replaced.

The following options can be:

1. The valve insert is shipped to Handtmann in the box. This means that Handtmann uses its in-house service. All seals are replaced at the factory, the valve insert is serviced, its function is tested and it is returned to the customer.
2. Maintenance by the customer can only be carried out properly if training has been provided by Handtmann.

8 Installation and Commissioning

Before you start with the installation and commissioning:

- Check the current system status (pressure, temperature, medium) against the technical data.
- Check the valve for external and internal damage.
- Check the valve body in the area of the valve disc for dirt.

ATTENTION



Note

To avoid risks to life and health, be sure to read the general safety instructions.

The function of the valve must always be checked

- after the work has been carried out,
- before the system is put into operation for the first time, and
- after each disassembly and assembly of the valve.

8.1 Installation of valve housing

Preparations

- The valve insert, the lower bushing and the housing seals must be removed before the valve housing is welded into the line system.
- There must be sufficient free space above the installed valve for assembly / disassembly.
- The valve housing must be aligned in the line system so that the mounted valve is vertical and the leakage drain points downwards.

Requirements on the line system

- The feed and drain lines must be laid to favour flow.
- The line cross-section of the feed and drain lines should at least correspond to that of the valve inlet and outlet.
- Complete emptying of the valve housing must be ensured.
- Leakage should be discharged into appropriate drainage or collection equipment without pressure or danger as far as possible.

Installing valve housing

- The valve housing must be welded between the feed and drain lines without tension. This also applies when the lines are under thermal load.
- Check the valve housing for possible dirt residue.
- Check the surface condition of the valve seat area.
- Lightly grease the thread and seals.

8.2 Preparing the new valve insert



CAUTION

Caution – damage to components!

Installation of faulty or non-specified parts or using the same as replacement parts may disable or disrupt functionality considerably.

- Only use parts and equipment approved by the manufacturer.
- After the work has been carried out, the function of the valve must be checked.



CAUTION

Caution – component damage!

If non-specified greases are used during maintenance, the function may be overridden or significantly impaired.

- Do not use mineral oil-based greases under any circumstances!
- Only greases approved for use in foodstuffs may be used.

ATTENTION



Notice

The lip sealings and the O-rings must be coated with suitable grease prior to replacement.

O-rings must not be pressed into the CIP chamber (flushing chamber).

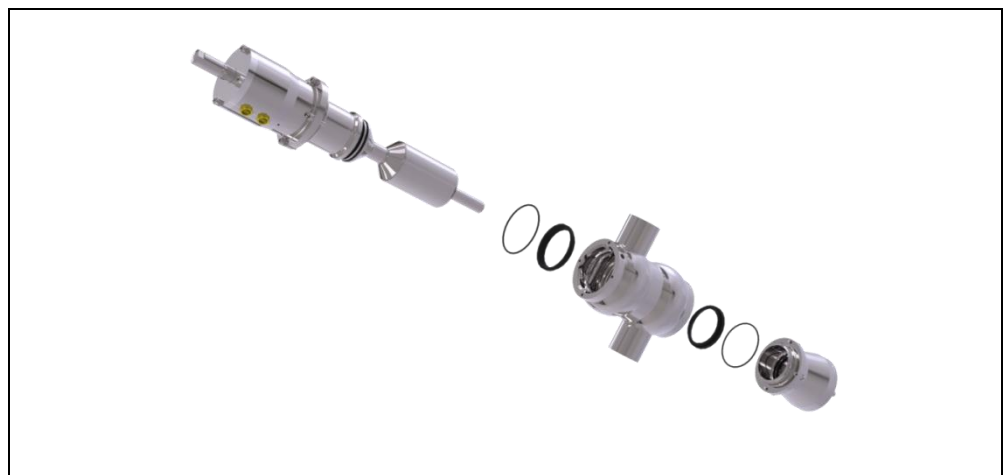


Fig. 9: Type 491

CAUTION



Note

Prior to installation, the valve inset has to be checked visually and lifted pneumatically.

8.3 Assembly of the valve insert

The valve insert is assembled in the reverse order from disassembly. Please refer to the training material and the following points:

- Quad rings are to be installed heavily greased.
- When tensioning the springs, ensure that the valve stem and the guide bore in the piston are aligned.
- Seals such as O-rings and lip seals should be lightly greased and tightened without twisting. Carefully and evenly press the seals into the existing grooves.
- Install the valve insert in the valve housing in a lifted state (if available) and screw tight.
- Finally, check the tightness of the valve.

When installing the valve insert in the housing, the following points must be taken into account. A detailed description is given in a training course including the respective training documents.

1. Insert the bushing at the bottom with the respective seals and screw it to the valve housing (see training documents, in reverse order from disassembly). Align the bushing with the connection nipple for the CIP manifold.
2. Insert the complete valve insert into the valve housing without tension. The leakage chamber is closed in this state. The position of the valve insert must be aligned with the connection for the CIP manifold.

Caution: Rotation only clockwise!

3. The valve insert is completely screwed to the valve housing.
4. Screw on manifold and overflow pipes, screw on external CIP feed pipe if required.
5. Attach electrical connections to the control unit.
6. Carry out a leakage and function test.
7. Attach direct or indirect control of the compressed air.
For type 580, note the three compressed air connections G1/8" for direct actuation of the three drive functions: Main stroke, upper lifting, lower lifting.

8.4 Commissioning valves

Before recommissioning, the connections of all valves must be checked.

- A leak check is carried out, with a test run with water. This is done either step-by-step via the individual valves or in the entire system.
- A pressure test is also carried out by a competent person.

After completion of all test runs, the valve or valve block can be put into operation.

Regular checks of the safety-relevant connections must be carried out. We therefore recommend that a maintenance schedule with maintenance intervals be drawn up by the operator.



WARNING



Warning – General dangers!

If valves need to be opened or changed for maintenance, cleaning, upkeep and repair tasks, liquid may escape under pressure and injure body openings.

- Before repair and maintenance tasks on the system, close all supply lines.
- Personal protective equipment must always be worn when working on the system.

9 Maintenance/Cleaning

9.1 Maintenance

Before you begin your work:

- Read the operating instructions and pay particular attention to the safety notes.
- Maintenance must only be performed by trained and qualified personnel.
- Use only original Handtmann spare parts for maintenance work.
- The line system must be cleaned, emptied and depressurized.
- Pneumatic and electrical connections must be disconnected from the drive.
- Use maintenance tools exclusively for maintaining the components described here.
- Wear proper protective equipment such as eye and hand protection while working.



DANGER

Danger – risk of persons being injured!

Never reach into the valve housing by hand when the compressed air supply is connected.

- That is why you must interrupt the compressed air supply directly at the valve by pulling off the supply hose.
- Switch off all voltage sources and secure against unintentional reconnection.
- Make sure that the line system is rinsed, depressurised and cooled down.



DANGER

Danger – risk of persons being injured!

The drive can be disassembled and contains preloaded compression springs, the main spring is chambered.

- We recommend having any necessary work carried out by the manufacturer.

ATTENTION



Note

- Welding work must be carried out exclusively by qualified personnel as defined in DIN 287-1. Forming gas must be used for welding at all times.



CAUTION

Caution – Damage to parts!

If the assembly instructions are not adhered to during disassembly or maintenance, the valve inset and housing may be damaged.

- After complete assembly of the valve inset, the inset has to be lifted pneumatically. Only then the lower piston inset can be entirely tightened.
- Failure to completely tighten the lower piston inset may result in abrasion on the lower piston, lower piston inset and the housing.

Lubricants

For the maintenance of Handtmann components, only use lubricants approved by Handtmann.

Otherwise a trouble-free operation of the components cannot be guaranteed.

For more information please contact our After Sales Service

service.af@handtmann.de

Additional Information on our products and services can be obtained via

<https://www.handtmann.de/en/process-technology/products-services/>

9.2 Maintenance intervals

The system or fittings and their safety devices should be inspected continuously for reasons of operational readiness and functional reliability.

The maintenance intervals are based on the operational conditions, such as switch frequency, media type, process temperature, temperature change, process pressure, etc. Therefore, the operator must specify the maintenance cycles in particular.

Visual inspections must still be carried out continuously every 1-2 weeks (if applicable):

- Check the valves and other components for function.
- Check the leakage drain and housing tightness (fluid leaks, etc.).
- Check the compressed air supply (e.g., compressed air hose, hose guide, hose bolting, filter).
- Check the electrical supply (e.g., line routing, line surface, cable bolting).

Manufacturer recommendation for checking the seals

Operating mode	Checking the seals
in general	annually
higher temperature load in production (> 60 °C)	semi-annually
frequent switch frequency (> 4000/year)	semi-annually

Upon completion of maintenance and repair work

- prepare a test report,
- install and secure removed protective devices,
- remove tools, foreign parts and operating materials and
- check the valves for function.

 **CAUTION**

Caution - Damage to components!
If the valve is not checked and serviced at certain intervals, the function may be overridden or significantly disturbed.

- It is recommended to carry out regular checks.

9.3 Seals

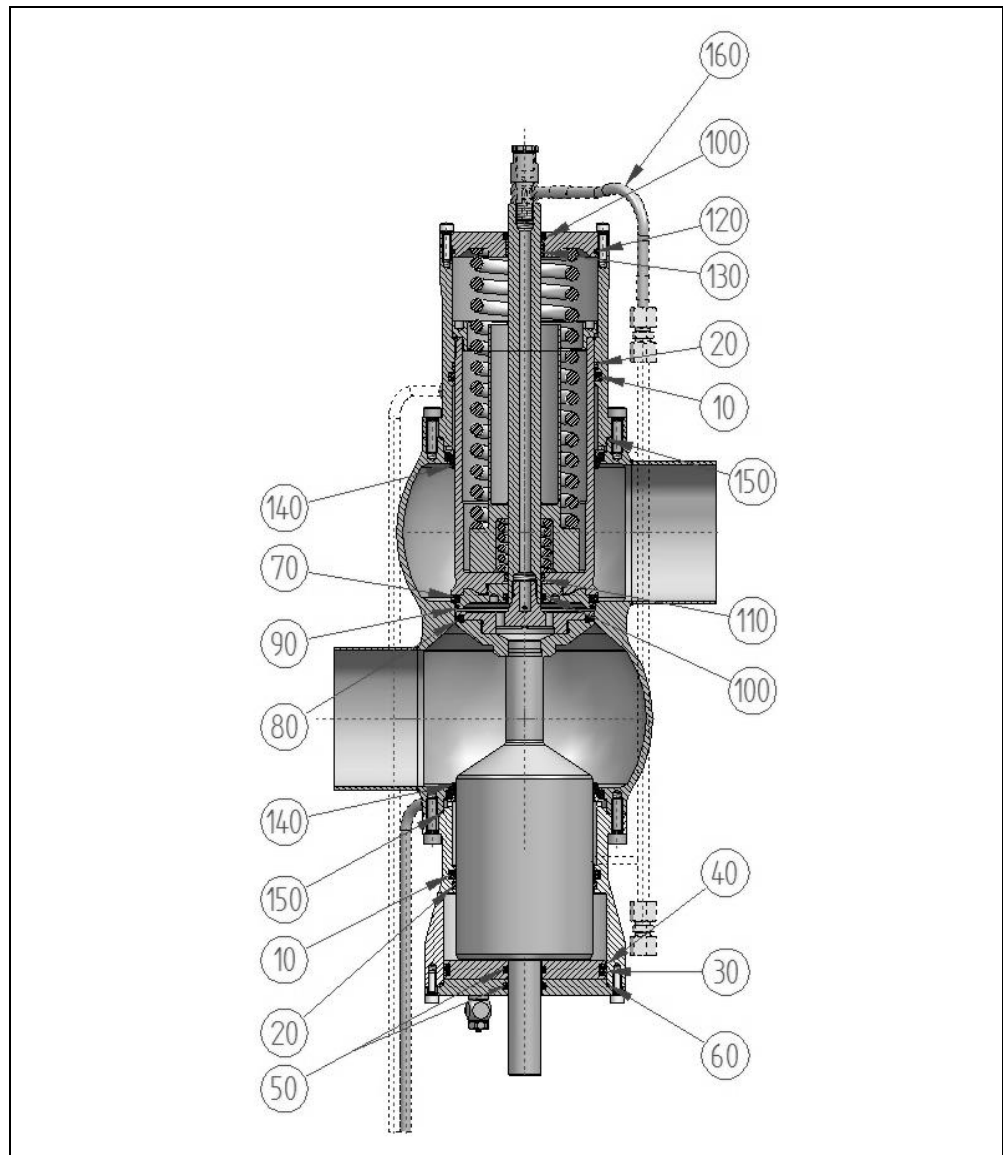


Fig. 10: Illustration of seals

10	Quad ring	90	O ring
20	Guide band	100	O ring
30	O ring	110	Guide band
40	Support ring	120	O ring
50	O ring	130	Guide band
60	O ring	140	Lip seal
70	Upper moulded seal	150	O ring
80	Lower moulded seal	160	Sealing ring

9.4 Seal replacement

Please note the following points:

- Use appropriate tools (e.g. lifting hooks) to remove the various seals. The lifting hooks are not necessary for the product chamber seals.
- Before inserting the new seals, thoroughly clean the seal grooves.
- The new seals are to be inserted lightly greased.
Only greases approved for use in foodstuffs may be used.



CAUTION

Caution – component damage!

If non-specified greases are used during maintenance, the function may be overridden or significantly impaired.

- Do not use mineral oil-based greases under any circumstances!
- Only greases approved for use in foodstuffs may be used.

Service interval

In order to guarantee the function and the process security of the INOVA double seat valves, a regular visual check has to be conducted.

Manufacturer recommendation

Temperature stressed areas >60°C (e.g. brew house):

- Medium-touched seal exchange every 1-2 years (M-Kit)
- Complete seal exchange every 6 years (C-Kit)

Temperature neutral areas (e.g. storage cellar/combi cellar):

- Medium-touched seal exchange every 3-4 years (M-Kit)
- Complete seal exchange every 6 years (C-Kit)

or

- Immediate seal exchange after more than 2000 switches (C-Kit)

The actual exchange rates can vary depending on the operating conditions.

9.5 Spare parts

ATTENTION



Note

Use only manufacturer-approved spare parts.

	DN 50	DN 65	DN 80	DN100	DN150
	NPS 2	NPS 2.5	NPS 3	NPS 4	NPS 5
49110	049110.0C050LE	049110.0C065LE	049110.0C080LE	049110.0C100LE	049110.0C150LE
49110	049110.0M050LE	049110.0M065LE	049110.0M080LE	049110.0M100LE	049110.0M150LE

C – complete (drive side and in contact with media)


M – medium (only in contact with media)


LE - EPDM

Valve insert for type	Designation	Nominal width	Part no.
491	Guide bolt complete	DN 50 - 65	1x 048101.81065 2x 100061
491	Guide bolt complete	DN 80 - 100	1x 048101.81100 2x 106298
491	Guide bolt complete	DN 125 - 150	1x 048101.81150 2x 100069
491	Eyebolt	DN 50 - 150	107738
580	Eyebolt	DN 50 - 150	107737
491/580	Air connections	DN 50 - 150	On request

10 Trouble shooting

- All faults must be checked and repaired immediately.
- The work required may only be carried out by qualified personnel in compliance with the safety instructions.

 **DANGER**



Danger - Dangers of electric current!

During assembly work, the power supply may malfunction.

- A regular inspection of the electrical components must be carried out by a qualified electrician.

Function fault		
Fault	Possible causes	Measures
Double-seat valve does not open.	<ul style="list-style-type: none"> • External compressed air supply is insufficient • Internal compressed air supply between solenoid valve and pneumatic drive is interrupted • Solenoid valve defective • Electrical control is faulty 	<ul style="list-style-type: none"> • Make sure that at least 5 bar of compressed air is applied to the valve. • Check compressed air hose • Exchange solenoid valve • Check cable routing and control head
Double-seat valve does not close.	<ul style="list-style-type: none"> • Solenoid valves are defective or electrical control is faulty or still active • A solid has settled between the sealing surfaces • Drive spring blocked or broken 	<ul style="list-style-type: none"> • Check solenoid valves and control • Clean valve body and seat • Exchange drive The defective drive must be repaired by the manufacturer.
Rinsing of the leakage chamber or the rinsing chambers is not sufficient.	<ul style="list-style-type: none"> • Volume or pressure of the rinsing liquid is not sufficient • Feed valve does not open. • Specified cycle times are not sufficient 	<ul style="list-style-type: none"> • Carry out the appropriate check and change the settings if necessary
Fault due to leakage		
Fault	Possible causes	Measures
Liquid leakage at the leakage outlet (valve closed and leakage CIP inactive).	<ul style="list-style-type: none"> • Moulded seal in the upper or lower seat area defective 	<ul style="list-style-type: none"> • Check the leaking liquid and assign it to the upper or lower line section. Check the respective seal seat or replace the moulded seal.

Trouble shooting

Liquid leakage at the leakage outlet (valve open and leakage CIP inactive).	<ul style="list-style-type: none"> O-ring in the leakage chamber defective 	<ul style="list-style-type: none"> Check the seal seat or replace the seal.
Liquid leakage at the overflow pipe of the upper or lower rinsing chamber	<ul style="list-style-type: none"> Upper or lower lip seal defective or not installed correctly 	<ul style="list-style-type: none"> Check the respective seal seat or replace the seal.
Liquid leakage at the upper or lower venting hole.	<ul style="list-style-type: none"> Upper or lower rinsing chamber seal defective 	<ul style="list-style-type: none"> Exchange quad ring.
No display of the valve position.	<ul style="list-style-type: none"> Plug defective Electrical power supply interrupted Solenoid valves are defective or electrical control is faulty or still active 	<ul style="list-style-type: none"> Check solenoid valves and control.

11 Disposal

ATTENTION



Note

Dispose of the component/assembly/system in an environmentally friendly manner according to country-specific specifications.

Find out how to dispose of the individual materials.

Dispose of all resulting parts in such a way that damage to health and the environment is excluded.

If necessary, ask your environmental officer.

11.1 Disposal of Packaging

ATTENTION



Note

Dispose of the packaging materials in an environmentally safe manner according to country-specific specifications.

Packaging can consist of the following materials:

Wood/polyethylene foil (PE foil)/paper and or cardboard/plastic/steel strips.



*Albert Handtmann Armaturenfabrik GmbH & Co. KG • Arthur-Handtmann-Straße 11 • 88400 Biberach an der Riss • Germany
Tel.: +49 7351 342-0 • Fax: +49 7351 342-4480 • sales.fittings@handtmann.de • www.handtmann.de*