

Installation, Operation and Maintenance Manual for Chesterton barrier fluid system type WSS

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1. Explanation of symbols

You will find the following symbols with all occupational safety warnings in these operating instructions, in which there is a risk to life and limb. Please adhere to these warnings and act with special care. Inform other users of these occupational safety warnings. In addition to the warnings in these operating instructions, the generally valid safety and accident prevention regulations must be taken into account.



Warning note:

A note on appropriate assembly and operation of the pressurised sealing system, non-adherence may result in malfunctions or damage to the sealing fluid system.



Danger warning:

Warnings which, when not adhered to, may result in damage or injury or the loss of the type approval permit.



Danger warning:

Electrical warnings which, when not adhered to, may result in damage or injury or the loss of the type approval permit.

These warnings are provided in parts of these operating instructions where special note should be taken to ensure that the directives, regulations, warnings and the correct work procedures are adhered to, so that damage or destruction of the machine and other system components can be prevented. These warnings are to be fully adhered to.

2. Safety instructions

These operating instructions contain basic information to be taken into account during set-up, operation and maintenance.

They must therefore be carefully read by the technician and other technical staff / operator before assembly and commissioning and should be made permanently available at the place of installation of the system.

Not only the general safety instructions listed in this chapter, but also the special safety warnings inserted under the main points must be taken into account. In addition, all safety warnings in the attached operating instructions for individual sub-systems must be adhered to.



- Read all instructions.
- Keep these operating instructions as a reference document.
- The sealing system and tank may only be removed or fitted when the machine to which it is connected is locked off, with careful adherence to the safety, accident and environmental regulations of the operator, as they apply to the relevant system component.
- The use of this system under conditions other than those specified on the type label and the technical data sheet is not permitted. The risk is borne by the operator.
- Any operation under different conditions is to be clarified with the manufacturer in advance.
- The tank is provided without the required safety equipment. Suitable equipment is to be fitted before commissioning the system.
- Before commissioning the system, the required tests are to be carried out on the equipped tank, in accordance with the usual regulations.
- The customer or operator must ensure that the persons entrusted with the handling, assembly and operation of the sealing system are also familiar with the design and function of the sealing system and the associated mechanical seal.
- It must be ensured that the seal and seal tank has been completely filled and bled. The mechanical seal must never be started up dry!!

3. Risk



Work in tanks may pose a risk of poisoning or asphyxiation. Work may only be carried out with the aid of suitable personal protective measures (e.g. breathing equipment, protective clothing, etc.).



There may be a risk of an explosive atmosphere being created in the tank. The corresponding steps to prevent the generation of sparks are to be taken. Work in this area may only be carried out by technical staff in accordance with the relevant safety directives.

Care must be taken that the power supply to the drive sub-systems is interrupted and secured to prevent unintentional switching on by third parties.

When handling sealing fluids, it is imperative to take note of the corresponding safety instructions.

4. Identification of the equipment


Tanks with CE labels are those that require a label in accordance with Directive 97/23/EC. The equipment has been designed in accordance with this directive.

Each tank is to be fitted with a factory label with a CE symbol, which will be given in the first line of the type label, together with the number of the designated institution.

Where not otherwise specified, the type label is attached to a welded label bracket near the top of the housing.

The type label will have the following information:

1. Tank type
2. Manufacturing number
3. Max/min design temperature for housing
4. Max. design pressure for housing
5. Material
6. Test pressure for housing
7. Content for pipe/housing, specified as volumetric unit
8. Drawing no.
9. Year of construction
10. Test date
11. CE symbol and number of the designated institution

			
Tank	<input type="text"/>	Type	<input type="text" value="1"/>
Factory No.	<input type="text" value="2"/>		
Drawing No.	<input type="text" value="8"/>		
Material	<input type="text" value="5"/>	Test date	<input type="text" value="10"/>
Year	<input type="text" value="9"/>	Product group	<input type="text"/>
Tank room		Cooling coil	
Max. filling volume	<input type="text" value="7"/>	Volume	<input type="text" value="7"/>
Max. pressure	<input type="text" value="4"/>	Max. pressure	<input type="text" value="4"/>
Max. temp	<input type="text" value="3"/>	Max. temp	<input type="text" value="3"/>
Test pressure	<input type="text" value="6"/>	Test pressure	<input type="text" value="6"/>

5. Use and application



The sealing liquid tank may only be used for tasks as specified in the "Technical Data Sheet". Any other use or use exceeding this limitation is not deemed appropriate. The manufacturer cannot be held responsible for any resulting damage. Appropriate use also includes adherence to all operating instructions and the inspection and maintenance intervals.

The operating and design data, other information, materials, corrosion allowance, additional and support loads may be taken from the data sheet or are listed in separate specifications..

General damage includes damage to the pressurised sealing system resulting from pressure peaks, frost, freezing of the media, corrosion or erosion due to short-term operating states or wrong operation of the system, which can no longer be verified; such damage is excluded from the warranty. See data sheet for any deviations from this rule.

6. Components, transport and storage



- The pressurised sealing system is to be transported and stored in its unopened original packaging.
- Only use suitable transport media or lifting devices to transport the components!
- The storage location must be dry and dust-free. Temperature and radiation influences are to be avoided.
- Weight specification are according to the attached technical data sheet.
- There are no long-term preservation measures for the sealing liquid tank.

Description of the pressurised sealing tank

The pressurised sealing tank has been constructed in accordance with the attached drawing. The tank has connections that can be used for inspection and cleaning. Auxillary connections are provided on the seal tank as detailed on the data sheet

Disassembly state

Pressurised sealing systems are delivered as complete units.

No sealing liquid has been added, nor does it form part of the consignment. Where possible, accessories have been pre-fitted.

Possible add-on systems

Depending on the customer's order, the sealing liquid tank may be fitted with connections for add-on systems. Other add-on systems can be fitted to some degree, following consultation with the manufacturer. (Add-on list)

Functional test

Inspection for damage

Seals to be checked after prolonged storage

Functional check of the additionally fitted monitoring units



7. Design and function

Design

All pressurised weld connections should be MAG/TIG welding, either welded through or counter-welded. Design, construction and manufacturing of the tank according to Pressure Equipment Directive 97/23/EC in association with the AD-2000 reference work and DIN EN ISO 3834-2 quality assurance.

Function

Sealing liquid tanks are used to supply mechanical seals. They are to be filled with a suitable sealing liquid. The liquid exchange at the mechanical seal takes place through natural circulation in accordance with the thermosyphon principle or through a forced circulation pump or a pumping screw.



Conditions for use

- Viscosity of the barrier liquid at an operating temperature of < 10cSt with natural circulation, <20cSt, with forced circulation during each operating phase (even during start-up).
- Only product-compatible, neutral, clean, well lubricating and harmless media may be used as barrier liquids. When using a forced circulation pump, the viscosity information provided by the pump manufacturer should be taken into account, but it should not be > the values provided above.
- The arrangement of the tanks in relation to the mechanical seal should be in accordance with the mode of operation (see 8.1 and 8.2) and should be agreed upon with the mechanical seal manufacturer.
- Where the sealing circuit contains stop valves (ball valves), they must be open and without narrowing or additional resistance.
- The liquid level in the tank must always remain above "MIN".
- The temperature of the sealing liquid should remain at least 40°C below boiling temperature.
- Where necessary, the sealing medium must be cooled or heated.
- Any overflow connections / ventilation connections are to be channelled into a suitable slop system under atmospheric pressure, without barriers or reduction in the cross-section of the pipe.



8. Assembly

This is based on the tank drawing. Assembly must take place in such a way that no major additional forces act on the tank, such as vibration or connection forces.



Assembly of the pressurised sealing system

The vessel may only be mounted on the bracket provided. Assembly must be such that no vibration acts on the pressurised sealing system. Where necessary, rubber mountings are to be used for assembly. No welding work may be carried out on the tank.



Electrical assembly

The assembly must be inspected by an expert before commissioning to ensure that the required electrical safety measures are in place. Grounding, nulling, isolating transformer, earth leakage or error voltage safety switches must meet the requirements of the relevant power plant.



The voltage stipulated in the technical data must be the same as the grid voltage available.

Please ensure that the electrical plug connections are above the flood lines and are protected from moisture. Power grid connection cables and sockets are to be checked for damage before use.

The end may not be immersed in water, as this may result in water penetrating into the motor connection zone.

Motor safety switches and switch boxes may never be set up in areas in which there is a risk of explosions.

The electrical connection must be in accordance with the local EVU or VDE regulations. The supply voltage and frequency are to be taken from the pump type label and the type label of the switch device. The voltage tolerance must be in the range from +6% to -10% of the grid voltage. Care must be taken that the data provided on the type labels are in accordance with the existing power supply.

- The switch device should be set up in the immediate vicinity of the pumping station. The maximum lengths of the power supply cables and level-measuring system cables are to be taken into account.
- The installation site may not be within the "EX" risk zone (even for "EX"-protected pumps).
- Provision of cable conduits.
- Provision of voltage supply.
- Pull the power supply cable and control lines through the cable pipe and connect the controls in accordance with the operating instructions and the terminal plan for the switch box.
- Carry out the required grounding work.
- In addition, the operating instructions for the pump and sensors apply.

Pipe assembly

The information in HP100R must be taken into account when assembling the pipe system.

- The pipe cross-section should be as large as possible. Pipes should be made of CrNi steel. Connections should be of the screw type, or clamped for sterile applications.
- Pipes should be ascending, without narrowing or kinks, from the mechanical seal to the tank. Where shut-off devices are required, ball valves should be used.
- Pipes should be fitted in arcs of at most 90° (45° to be preferred) and with a radius > 80 mm (> 100 mm to be preferred).
- The layout must take into account any changes in the length of the pipes caused by thermal expansion or vibrations.
- Pipes should be attached with clamps at regular intervals. Screw connections and fittings should not be subjected to mechanical load.
- The tank should be at least 1 m and at most 2 m above the mechanical seal to ensure that the thermosyphon effect can be initiated. Where a circulation pump is used, a short distance is possible.
- The return pipe from the mechanical seal must lead to the lateral connection of the tank.

- Overflow and bleeding connections must be connected according to 0.

Insulation

The pressurised sealing system is usually delivered by the manufacturer without any insulation. The operator should check whether insulation or other protection is necessary according to the statutory regulations. Insulation should be provided by the customer. When insulating the heat exchanger, care should be taken that the cleaning openings are provided with easily removable insulation caps.



Cleaning the supply systems

Pipes and screw connections should be cleaned before final assembly (e.g. with compressed air or suitable benzene or alcohol). The cleaning medium must be disposed of in accordance with the specifications.



9. Initial operation

A flushing process is required before commissioning, so that any remaining dirt is removed from the tank.

The pump should never be left to run dry (risk of overheating).

Any existing valves should be opened before commissioning the system.

Where additional three-phase current equipment is used, care must be taken that the correct flow direction has been set.

The cleaning medium must be compatible with the sealing liquid.

To ensure ongoing operation, the operator should carry out regular inspections with the aid of the monitoring devices. The intervals are to be defined by the operator. Where the system is being recommissioned after disassembly for maintenance or cleaning purposes, new seals must always be used.

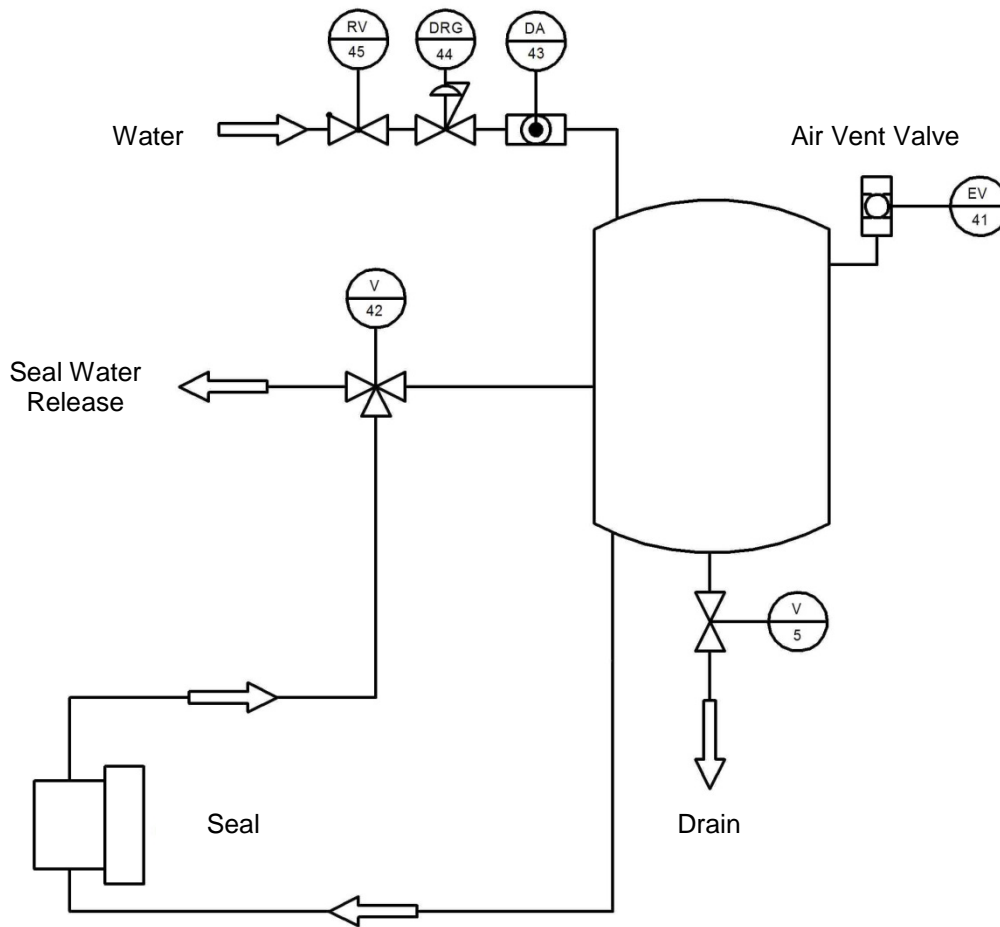
1. Install the system in a suitable location, free from vibrations and not more than 2m higher and 1m away from the mechanical seal.
2. Connect the tank using the supplied hose / -Return Hose from seal supply connection (50) to the mechanical seal and the mechanical seal at seal return connection (51). It is extremely important that the return line of the seal to seal the return connection (11) does not sag. More information on attaching the finned tube (22) can be found in Table 1 below.
3. Unplug the tank return pipe before filling (13) from the seal return connection (11) on the container. This allows the seal to be fully vented.
4. Connect a valve to the water supply in case of interrupted water supply at the check valve (45) before the pressure regulator (44) to (the pressure regulator has a max. Inlet pressure of 25 bar and a max. Discharge pressure of 10 bar).
5. Close the pressure regulator by turning the cap counterclockwise.
6. Open the water supply and turn the cap clockwise until water flows into the tank. Wait until the maximum level is reached. The tank is vented via the vent valve (41). Thereafter, set the desired pressure using a pressure regulator (44). Turning the cap clockwise to increase pressure, counterclockwise, the pressure is reduced. Upon reaching the desired pressure, push the cap to lock the regulator at the set pressure.
7. The water supply must remain connected to allow the system to self manage the system level and pressure.
8. Confirm the flow direction at the first commissioning of the system - ie, the tube is that warm. The warm pipe must lead to the return port of the tank, otherwise the thermosyphon may stall. If necessary swap the pipe connection at the seal tank.

Table 1: finned tube (optional)

1. Install the finned tube pieces included. Connect to a finned tube piece at Seal supply terminal (50) and the other at Seal return port on the container (N4) *.

- 2 The end user provides the pipe and excludes it from the seal to the finned tube (22).
* The finned tube can be bent for use.

WSS Installation Scheme Plan 53P



10. Switching off



Before switching off the circulation pump, care should be taken that supply of the tank is discontinued by switching off. Care should be taken that the stopping time of the pump is sufficiently long, as due to the hot wall materials used there may be some delayed heating, posing a risk of steam bubble formation and destruction of the equipment!



To prevent pressure peaks, stop valves should always be gradually opened and closed. **Only open the tank once it has cooled down and is not pressurised. This applies to all sealing elements to which the tank has been fitted.**



Note:

Depending on the medium used, there is a risk of freezing when temperatures drop below 5°C. In such cases the sealing liquid tank must be completely drained via the draining connections provided before being decommissioned. This is to prevent frost damage.



Note:

Drainage screws may only be removed in a depressurised state and when the medium has reached room temperature. An adequate cooling time must be ensured.

Open the drain valve and allow medium to drain via the drainage connection (5).
Collect the medium in accordance with current regulations and risk warnings and dispose of it in an appropriate way.
Completely empty the heat exchanger.



Attention:

When opening pressurised containers there is a risk that the lock screw may be ejected with force, as well as a risk of sustaining burns where temperatures are high.

11. Maintenance and disposal

Standards, norms and local regulations should be adhered to.
Correctly installed and operated sealing liquid systems require practically no maintenance. Only sealing or barrier liquid should always be available in adequate amounts.

Maintenance intervals

Daily

- Check and note the system pressure
- Look for signs of leaks from the seal, system and pipes.
- Check the sealing liquid filling level / temperature and adjust when required.
- Check the temperature and the flow rate of the cooling medium.
- Check all alarm signals.

Monthly

- All filters (where present), should be inspected and replaced when they are dirty or blocked.
- Any discolouration of the sealing liquid or filter contamination can be sign of a leak of the inner mechanical seal and should be investigated without delay.

After 5 years

- We also recommend that a complete internal and external inspection of the tank and all system components should be carried out at 5-yearly intervals.

Cleaning

The cleaning intervals of the sealing liquid system depend on the system location and the medium used.

Cleaning may take place

- Mechanically by brushing with a nylon brush.
- High-pressure cleaning of each individual pipe using special nozzles and water
- Chemical cleaning of the entire space on the pipe side. The liquid used must be chloride-free. It is recommended that chemical cleaning be carried out by a specialised company.

When rinsing the tank, the rinsing liquid must be duly disposed of. The rinsing medium must be compatible with the sealing medium. External cleaning is not absolutely necessary.

When using sealing liquid systems in sterile areas, the necessary sterilisation temperatures and times are to be adhered to. These are determined by the operator.



Note:

A nylon or stainless steel brush is to be used for cleaning stainless steel tanks and pipes. The use of a normal steel brush results in corrosion.

Breakdown

After any breakdown, the tank and the monitoring equipment should be checked. Faulty components and those that are no longer functional are to be repaired or replaced.

Repairs

Repairs may only be carried out by specialised staff. Original spares are to be used. Welding on the tank or heating of the tank for other reasons, as well as all work that could result in a decrease in wall thickness, is not permitted.



Disposal

The following procedure is to be used for proper disposal:

The sealing liquid system should be taken out of operation.

Liquids are to be drained from the tank, pipes and components and duly disposed of. The same applies to contaminated cleaning cloths and binders.

All cables and switch equipment is to be removed and disposed of as electronic waste.

All plastic parts are to be separately disposed of.

Separation of steel and aluminium. These materials are usually handed over to a disposal company.

12. Leaks

The following procedure is to be followed:

1. Mark the leak
2. Remove the system from operation as detailed in section 10.
3. Tighten the screws once the system has been depressurised. If the leak cannot be removed with the steps as detailed above, the seals should be replaced. Once the old seal has been removed, the sealing surfaces must be thoroughly cleaned. The sealing surfaces may not be damaged.
4. New seals should be placed dry onto the sealing surfaces and the screw connections tightened. Care should be taken that, where a connection has several screws, these are positioned crosswise and are evenly tightened.

13. ATEX

Before commissioning, the operator must check the components used for suitability regarding EX zone, ignition protection type and EPL.

Ensure that the ignition temperature of the sealing liquid or the transfer medium is at least 50°K above the maximum permitted surface temperature of the pump.

All conductive parts of a device must be connected in such a way that no dangerous differences in potential can occur between them. If there is a possibility that insulated metal components could be charged and thus act as a source of ignition, grounding connections must be provided. The grounding resistance may not exceed 10^6 Ohm.



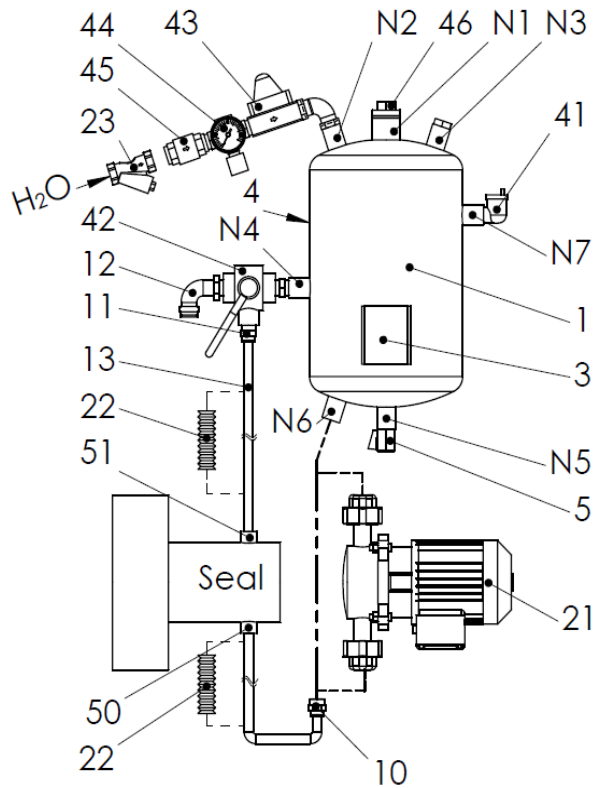
14. Component list

POS	Description	Water Save MSS	Item Number
1	Seal Tank	X	
2	---		
3	Nameplate	X	
4	Mounting Bracket	X	
5	Drain Valve 1/2"	X	STS-100047
10	R 1/2" Straight Fitting 12mm Push In Tube	X	
11	R 1/2" Straight Fitting 12mm Push In Tube	X	
12	R 1/2" Elbow 12mm Push In Tube	X	
13	Polyamide Pipe. Dia.12mm	X	
22	Finned Tube Kit	O	STS-100148
23	Inline Water Filter	O	STS-100096
41	Vent Valve	X	STS-100016
42	3 Way Ball Valve – L Type	X	
43	Flow Indicator	X	STS-100039
44	Water Supply Regulator With Gauge	X	STS-100099
45	Check Valve	X	STS-100102
46	Plug R 1"	X	
50	NPT Straight 12mm Push In Tube	X	
51	NPT Straight 12mm Push In Tube	X	

X = Standard / O = Optional

15. Item Overview

Water Savings System



Pos. / Beschreibung

- 1 Behälter
- 2 ---
- 3 Typenschild
- 4 Befestigungskonsole
- 5 Entleerungsventil Rp 1/2"

- 10 Dichtungs-Versorgungsanschluss 12mm
- 11 Dichtungs- Rücklaufanschluss 12mm
- 12 Dichtungsspülauslauf 12mm
- 13 PA-Schlauch Dia. 12mm

- 22 Rippenrohr Kit (opt.)
- 23 Filter Einheit (opt.)

- 41 Entlüftungsventil
- 42 3 Wege-Kugelhahn
- 43 Durchflussanzeiger
- 44 Druckregler Wasser mit Manometer
- 45 Rückschlagventil Wasser Rp1/2"
- 46 Verschluss R1"

- 50 Dichtungs-Versorgungsanschluss 12mm
- 51 Dichtungs-Rücklaufanschluss 12mm

- N1 Anschluss G1" mit Verschluss
- N2 Füllen Wasser Rp 1/2"
- N3 Anschluss Rp 1/2" m. Verschl.
- N4 Sperrflüssigkeit Rücklauf Rp 1/2"
- N5 Entleerung Rp 1/2"
- N6 Sperrflüssigkeit Versorgung Rp 1/2"
- N7 Entlüftung Rp 1/2"

Pos. / Description

- 1 Seal Tank
- 2 ---
- 3 Name Plate
- 4 Fixture
- 5 Drain Valve Rp 1/2"

- 10 Seal Supply Connection Dia. 12mm
- 11 Seal Return Connection Dia. 12mm
- 12 Seal Water Release Dia. 12mm
- 13 PA-Hose Dia. 12mm

- 22 Finned Tube Kit (opt.)
- 23 Filter unit (opt.)

- 41 Air Vent valve
- 42 3 Way L-Port Valve
- 43 Flow Indicator
- 44 Water Supply Regulator with Pressure Gauge
- 45 Check Valve Water Rp 1/2"
- 46 Plug R1"

- 50 Seal Supply Connection Dia. 12mm
- 51 Seal Return Connection Dia. 12mm

- N1 Nozzle G1" with Plug
- N2 Fill Water Rp 1/2"
- N3 Connection Rp 1/2" with Plug
- N4 Seal Return Connection Rp 1/2"
- N5 Drain Rp 1/2"
- N6 Seal Supply Connection Rp 1/2"
- N7 Vent Rp 1/2"