Nexus Seals

Working With People to Engineer Solutions

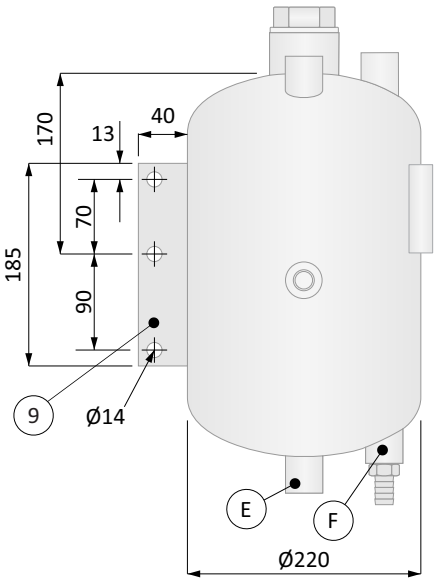
SWMS

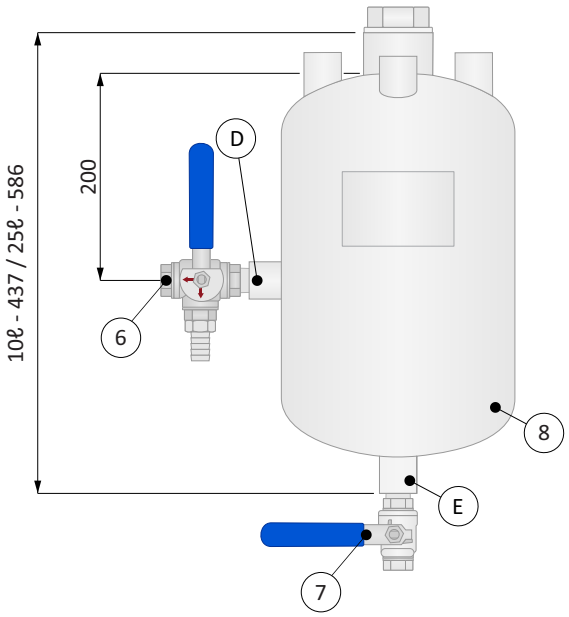
Modified Plan 52/53A
Water Management System

Pressure
Max Set Pressure: 20 bar g
Max Design Pressure: 30 bar g

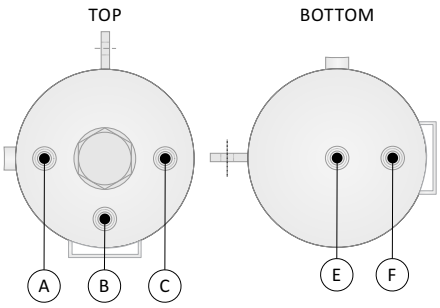
Temperature
Max Temperature: 100°C
Min Temperature: 0°C

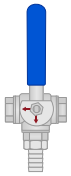
Volume
10ℓ
25ℓ





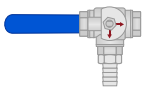
Port	Function
A	Filling Water (Option)
B	Filling Water (Option)
C	Filling Water (Option)
D	Seal Water Return
E	Drain
F	Seal Water Supply





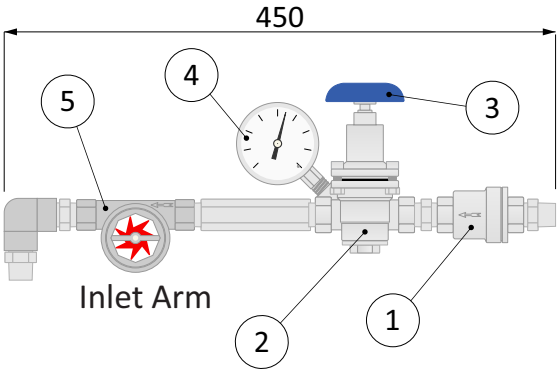
Position 1

Vent mechanical seal cavity of air
(Seal water return hose to atmosphere)



Position 2

Normal working position
(Seal water return hose to pressure vessel)



Item	Description	Function
1	Non - return valve	Protects plant water supply from potential contamination from the seal and assists with protection against pressure fluctuations.
2	Pressure regulator	Enables the desired system pressure to be set and allows the automatic replenishing of water in the pressure vessel if required.
3	Pressure regulator handle	Adjust for desired pressure.
4	Pressure regulator gauge	Provides a visiual indication of buffer/barrier fluid pressure display in the pressure vessel.
5	Flow indicator	Provides a visual indication of a mechanical seal upset by turning as the water flows through.
6	3 - Way Valve	Inlet for buffer/barrier return from mechanical seal, allows fpr mechanical seal flushing and venting.
7	2 - Way Valve	Outlet to drain or flush the pressure vessel.
8	Pressure Vessel	304 stainless steel water storage vessel.
9	Mounting Flange	Used to mount the pressure vessel onto a support structure or stand.
10	Stand	System stand - *Optional (See Page 3)

Double seals have often been avoided despite being the best solution for the application. The reason for this is that historically buffer / barrier Fluid Systems have relied on a Nitrogen blanket with or without a “bladder” system. Maintenance engineers have opted to use double seals only when absolutely necessary, however, this has been detrimental to the integrity of the equipment.

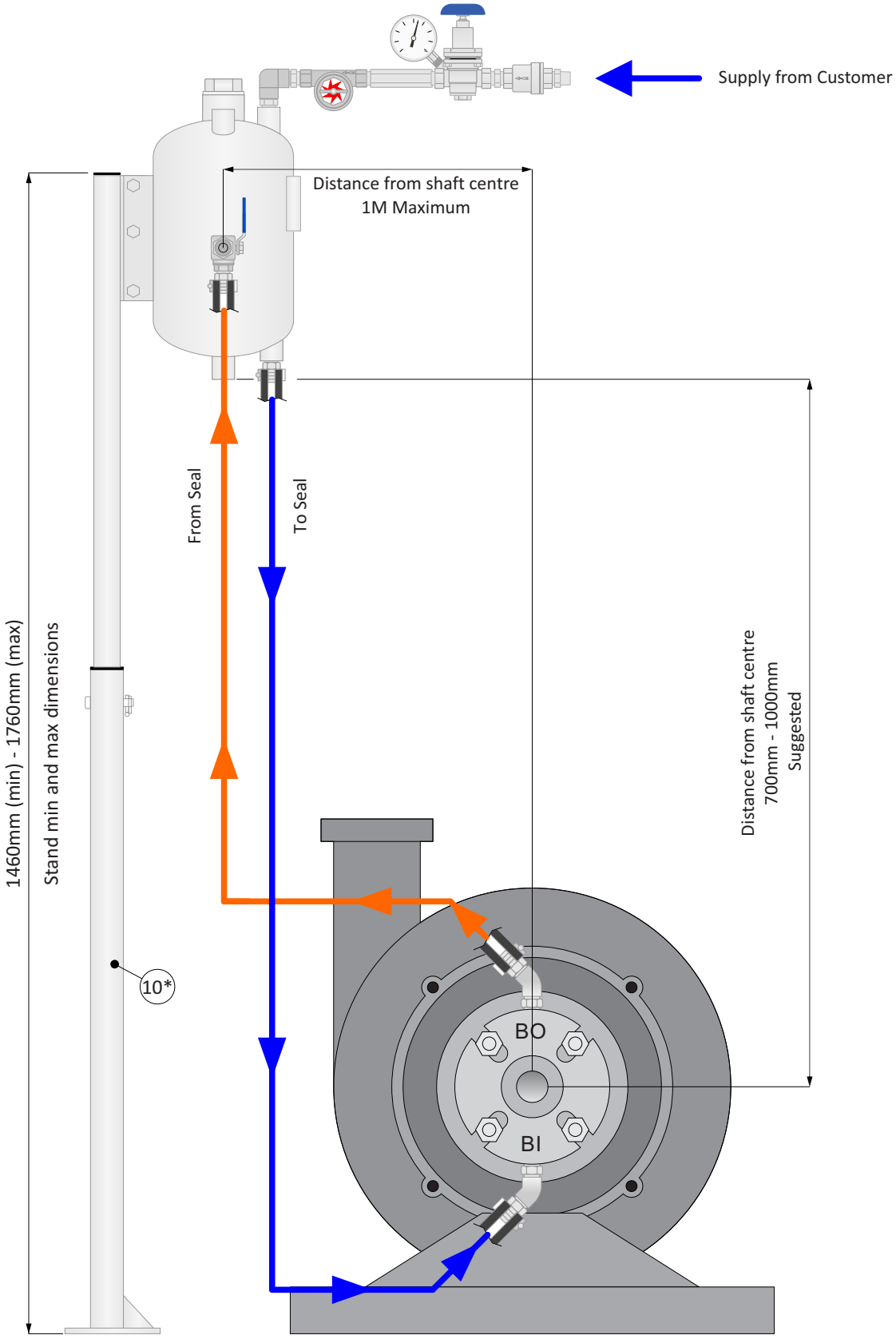
The SWMS (Custom Plan 52 / 53A Water Management System) buffer / barrier fluid system connects directly to the plant water line. Through the Pressure Regulator the plant water line pressure is set to the desired pressure based on the required configuration).

Configuration Options :
SWMS Custom plan 52 – System pressure to be less than the stuffing box pressure and less than 2.8 bar. If the stuffing box pressure is less than 2.8 bar, then the system pressure is set between 0.5 bar and 2.8 bar and must always be less than the stuffing box pressure.

SWMS Custom Plan 53A – System pressure to be set between 1.5 – 2.0 bar higher than the stuffing box pressure.

By viewing the flow indicator any mechanical seal failure can be detected, optionally an electronic flow switch can be provided to set off an alarm. The buffer / barrier Fluid is circulated in the system through thermosiphon effect or with the assistance of a pumping device.

The pressure regulator will allow plant water to flow into the tank and re - establish the desired buffer / barrier fluid pressure automatically. The technician will notice the flow indicator turning and either notice water leakage to atmosphere to indicate outboard seal face leakage, or if no water is present, the cause of the water flow is due to inboard seal face leakage.


Supply from Customer
Distance from shaft centre
1M Maximum
From Seal
To Seal
1460mm (min) - 1760mm (max)
Stand min and max dimensions
Distance from shaft centre
700mm - 1000mm
Suggested
10*
BO
BI

Installation & Commissioning

1. Install the **SNORKEL ADAPTER** to **PORT A**, **B** or **C** that is to be used as the filling water inlet.
2. Connect the **INLET ARM** to the **SNORKEL ADAPTER**.
3. Install the system in a suitable location, which is free from vibration, and no more than 2 meters above and 1 meter from the side of the mechanical seal.
4. Isolate the plant water supply.
5. Connect the seal water supply hose to **PORT (F)** at the bottom of the **PRESSURE VESSEL (8)** then to the barrier IN **(BI)** port on the mechanical seal, using the hose, clamps and adaptors provided.
6. Connect the seal water return hose to the barrier OUT **(BO)** port on the mechanical seal to **PORT (D)** at the **THREE-WAY VALVE (6)** using the hose, clamps and adaptors provided.
7. Rotate the **PRESSURE REGULATOR HANDLE (3)** on the **PRESSURE REGULATOR (2)** counterclockwise to the zero position to prevent any water from flowing into the **PRESSURE VESSEL (8)**.
8. Connect the plant water supply to the **NON-RETURN VALVE (1)** on the **INLET ARM** and open the plant water supply line. There should be no flow as the **PRESSURE REGULATOR (2)** is set to zero.
9. Set the **THREE-WAY VALVE (6)** at **PORT (D)** to **position 1**, this will allow the seal water return hose to drain to atmosphere. (Refer to reference image).
10. Open the **PRESSURE REGULATOR (2)** slightly by rotating the **PRESSURE REGULATOR HANDLE (3)** clockwise to allow a slow stream of water to enter the pressure vessel and ultimately the mechanical seal.
11. The **THREE-WAY VALVE (6) at PORT (D)** will vent the air from the mechanical seal, once water begins to flow out of the **THREE-WAY VALVE (6)** at **PORT (D)** set the valve to **position 2** so the water from the seal water return hose begins to flow into the **PRESSURE VESSEL (8)** at **PORT (D).** (Refer to reference image)**.**
12. Adjust the **PRESSURE REGULATOR HANDLE (3)** clockwise to allow the plant water supply to flow freely into the **PRESSURE VESSEL (8)**. **FLOW INDICATOR (5)** will rotating as the water flows.
13. Observe the **PRESSURE REGULATOR GAUGE (4)** and adjust the **PRESSURE REGULATOR (2)** to achieve the desired buffer/barrier fluid pressure. (**See notes below**).
14. After commissioning, ensure that the plant water supply is always maintained.
15. During normal operation the **FLOW INDICATOR (5)** will only rotate if there is a problem with the mechanical seal. The flow indicator wheel should not be rotating during normal operation.
16. When the system is first run, check the direction of flow – i.e. which hose gets hot. The warmer hose should be the one coming from the Barrier Out port of the mechanical seal to **PORT (D)** at the **THREE-WAY VALVE (6)**. Call the technician if this is not so.

Notes:

- If the system is required to run as a **BUFFER FLUID (Custom Plan 52)** then the system pressure is to be less than the stuffing box pressure and less than 2.8 bar. If the stuffing box pressure is less than 2.8 bar, then the system pressure is set between 0.5 bar and 2.8 bar and must always be less than the stuffing box pressure.
- If the system is required to run as a **BARRIER FLUID (Custom Plan 53A)** then the system pressure must be between 1.5 - 2.0 bar higher than the stuffing box pressure.
- It is of utmost importance that there is no sagging of the hose. If the hose sags, cut the hose shorter. The idea is to have some slack in the hose, but not any sagging.
- Carefully follow the installation and commissioning instructions to ensure that there is a sufficient air pocket at the top of the pressure vessel which is required for the system to operate.

HEALTH AND SAFETY WARNING

- This system has been designed for use only as a buffer/barrier fluid system for mechanical seals using a suitable non-hazardous buffer/barrier fluid, typically water.
- The SWMS does not have pressure relief valves supplied.
- Do not over-pressurise the system beyond the maximum design pressure. If there is any possibility of over-pressurisation the system must be fitted with a suitable protection device.
- Do not exceed the operating limits of the system. It is not designed for cyclic loading.
- The system may get hot in operation with risk of burn injury. Suitable engineering controls or guarding should be adopted where necessary.
- Ensure the system is completely leak free before full operation.
- If the barrier fluid becomes contaminated it is recommended that the barrier fluid is replaced taking necessary precautions.
- Isolate the process and power on installation, maintenance and decommissioning (and ensure that the system pressure has been relieved before undertaking maintenance)

Environment

- At end of life, the barrier fluid and system should be disposed of in accordance with local regulations and with due regard to the environment.

Maintenance

- The system should be maintained in accordance with site standards.

After 5 years

- We also recommend that after 5 years a complete internal and external inspection is conducted of the pressure vessel, and all the system's components.