

INSTALLATION, OPERATION & MAINTENANCE GUIDE



PLAN 52 & PLAN 53A SEAL SUPPORT SYSTEMS



Various Configurations:

- Single or Dual Level Switches
- Customizable Valve & Instrumentation Options
- With or Without Cooling Coil
- Single or Ambidextrous Supply & Return Ports

INSTALLATION & START-UP

- 1 Install the mechanical seal on the pump. Refer to the seal OEM installation instructions for details.
- 2 Mount buffer/barrier fluid reservoir within a 36 in. [1m] radius of the seal location and such that the normal liquid level (NLL. Midpoint of the level gauge sight glass) is 36-72 in. [1-2m] above the center line of the seal gland (Figure 3). The reservoir should be as close as possible to the mechanical seal while allowing enough room for operation and maintenance of all equipment.

NOTE: *Circulation of buffer/barrier fluid through the system is dependent on thermal siphoning and/or a pumping ring inside the seal. For best performance, head loss and friction should be minimized as much as possible by maintaining short connection distances between reservoir and seal.*

- 3 Remove plastic shipping plugs
- 4 If installed, connect reservoir cooling coil connections to cooling water supply lines.
- 5 Correctly make connections between the buffer/barrier fluid reservoir and the mechanical seal according to the connection labels on the design sheet.
 - * The **SEAL SUPPLY** connection (lower port) on the reservoir must connect to the buffer/barrier fluid in (BFI) connection on the seal gland;
 - * The **SEAL RETURN** connection (upper port) on the reservoir must connect to the buffer/barrier fluid out (BFO) connection on the seal gland (Figure 3)

NOTE: *Piping should slope continuously upwards (1/2 in./ft. [40 mm/m]) with no relative high points that would result in air trappage in the tubing.*

NOTE: *For shafts smaller than 2 1/2 in. [64 mm] use at least 1/2 in. diameter tubing and at least 3/4 in. tubing for larger shaft units.*

NOTE: *Use smooth, long radius bends in the piping, minimize 90 ° elbows and use 45 ° bends wherever possible*

IMPORTANT

DO NOT USE thread tape. Use thread sealant instead. Thread tape has been known to break apart and enter the buffer/barrier fluid stream, resulting in damage to and premature failure of the mechanical seal.

IMPORTANT

Ensure ALL tubing/piping is free of pipe strain/tension which could adversely affect the seal

- 6 Insulate high temperature (hot) lines as necessary for safety.
- 7 Ensure ALL unused ports and connections adequately plugged and sealed.

CAUTION

DO NOT RUN SYSTEM DRY! Do not operate the pump without buffer/barrier fluid in the seal system and SEAL SUPPLY & RETURN tubing/piping open with buffer/barrier fluid being supplied to the seal.

DANGER

Using Oxygen or air to pressurize the system can be dangerous. THIS COULD CAUSE AN EXPLOSION! Use dry Nitrogen or other recommended inert gasses and always understand the risks associated with pressurized gasses.

- 8 Properly connect wiring for ALL electrical instruments (switches, transmitters or other instrumentation). Refer to wiring diagrams and detailed setup information in instrument specification documents. Consult the instrument OEM manual supplied with the system.

- 9 Use the **FILL** port to fill the reservoir with a suitable buffer/barrier fluid to the midpoint of the level gauge sight glass.

NOTE: Check system for leaks

- 10 For Plan 52 configurations (Figure 1), connect the reservoir **VENT** connection to the plant vapor management (VRU/Flare) system.
- 11 For Plan 53A configurations (Figure 2), connect plant or inert gas (Nitrogen) system to the reservoir **VENT** connection.

NOTE: *It is recommended that the system be purged of air/oxygen as much as possible. This can be accomplished by pressurizing the reservoir to 30 psig [2.1 barg], venting the pressure down to 2-5 psig [0.1-0.3 barg], and repeating at least 8 times or as many times as deemed necessary.*

- 12 Slowly pressurize the system to the recommended set pressure or normal operating pressure. Allow at least 15 minutes for gas pressure and temperature to stabilize.
 - * For Plan 53A systems, the barrier/fluid pressure should be 20-30 psig [1.4-2.1 barg] higher than the highest pressure expected in the seal chamber.
 - * A pressure regulator and a check valve are recommended to maintain the minimum set pressure and ensure safety. A self-relieving pressure regulator is not recommended; the release of volatile leakage and other gasses may pose a health and safety hazard.
 - * Check for leaks in the tubing, connections and at the seal.

- 13 Flood the pump, vent ALL air from the seal chamber, and again check seal for leakage. Ensure the product is not leaking into the reservoir by noting changes in liquid level and buffer/barrier fluid pressure.

- 14 Start the pump per pump manufacturer's recommendations, observe for proper operation, and check for excessive heat at the seal gland.



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OPERATION

Monitor the buffer/barrier fluid pressure, liquid level and temperature in the first few hours after start-up. Look for fluctuating readings of fluid level, pressure and temperature. System should reach a steady operational state and provide consistent readings. After start-up, monitor the system over 2-3 days confirming stable operation and system readings. Note any rapid, significant or fluctuating readings of the system as this may be a sign of a future system failure. Consult pump, seal or support system manufacturer if problems persist.

Mechanical Seals are designed to leak and leak minimally during normal operation. Continuously check and refill the buffer/barrier fluid reservoir.

PLAN 52 (Unpressurized) systems may be refilled periodically without needing to shutdown the pump and depressurize the system.

PLAN 53A (Pressurized) systems will require a pump (foot or hand pump) to refill without first shutting down the process pump and depressurizing the sealing

MAINTENANCE

Buffer/barrier fluids will breakdown over time or become contaminated with process leakage. Fluids should be drained from the system as often as possible or during scheduled pump shutdowns. The reservoir as well as the tubing/piping should be flushed and refilled with new, clean buffer/barrier fluid. It is important to keep the seal support system clean and free of debris and obstruction to ensure proper operation and seal lubrication. The cleaning fluid and procedure will depend on the contamination in the reservoir.

AFTER A SEAL FAILURE: Clean the seal support system by draining the reservoir and flushing all piping and tubing

NEVER RE-USE BUFFER/BARRIER FLUID AFTER A SEAL FAILURE

For systems with a weld-pad style level gauge, it is recommended that the bolts be checked and re-torqued to 20 ft-lb [27 N-m] (starting with a middle bolt and working outwards in

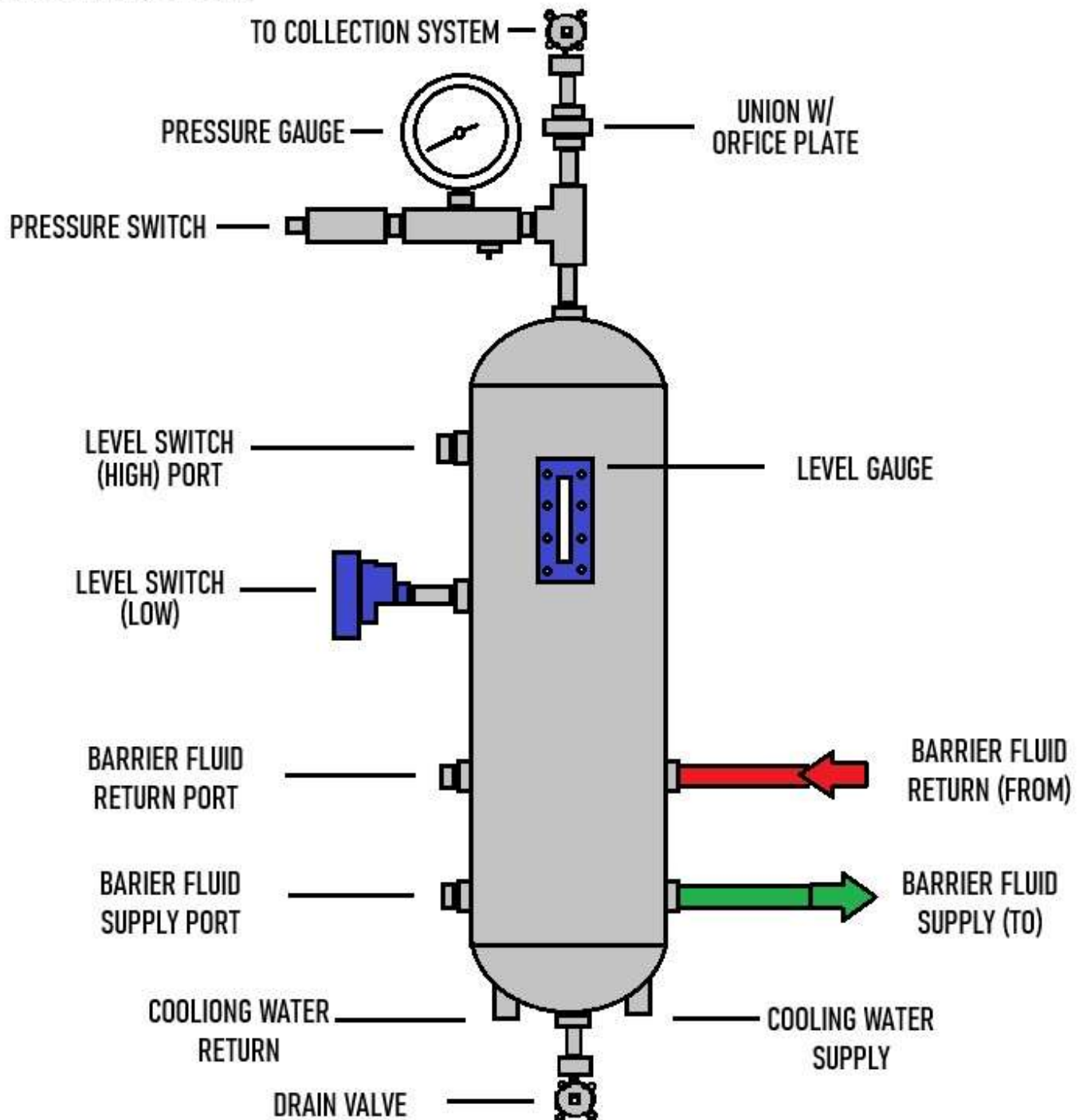
PLAN 52 ARRANGEMENT

Figure 1: External reservoir providing buffer liquid to outer seal

PLAN 53A ARRANGEMENT

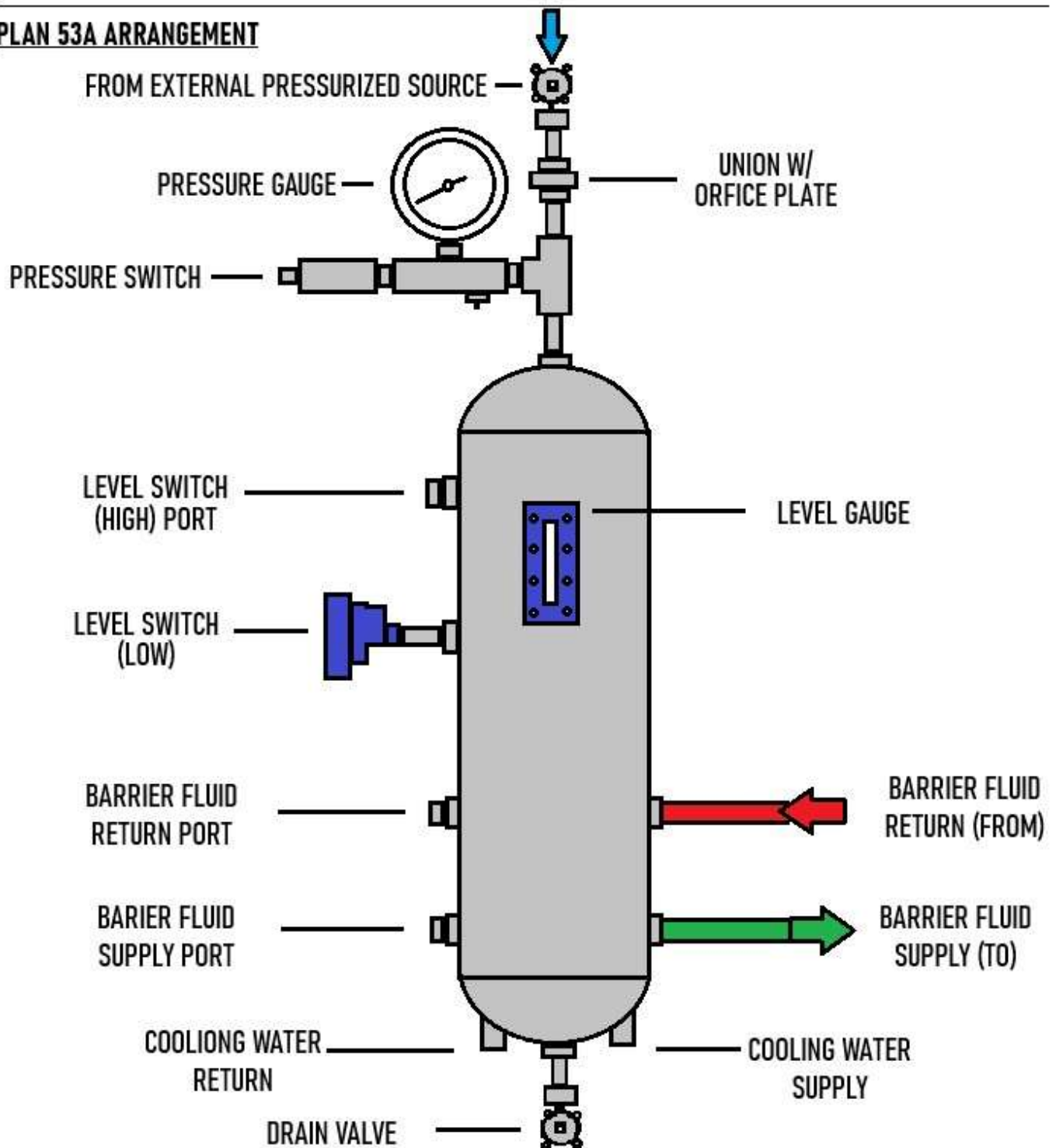


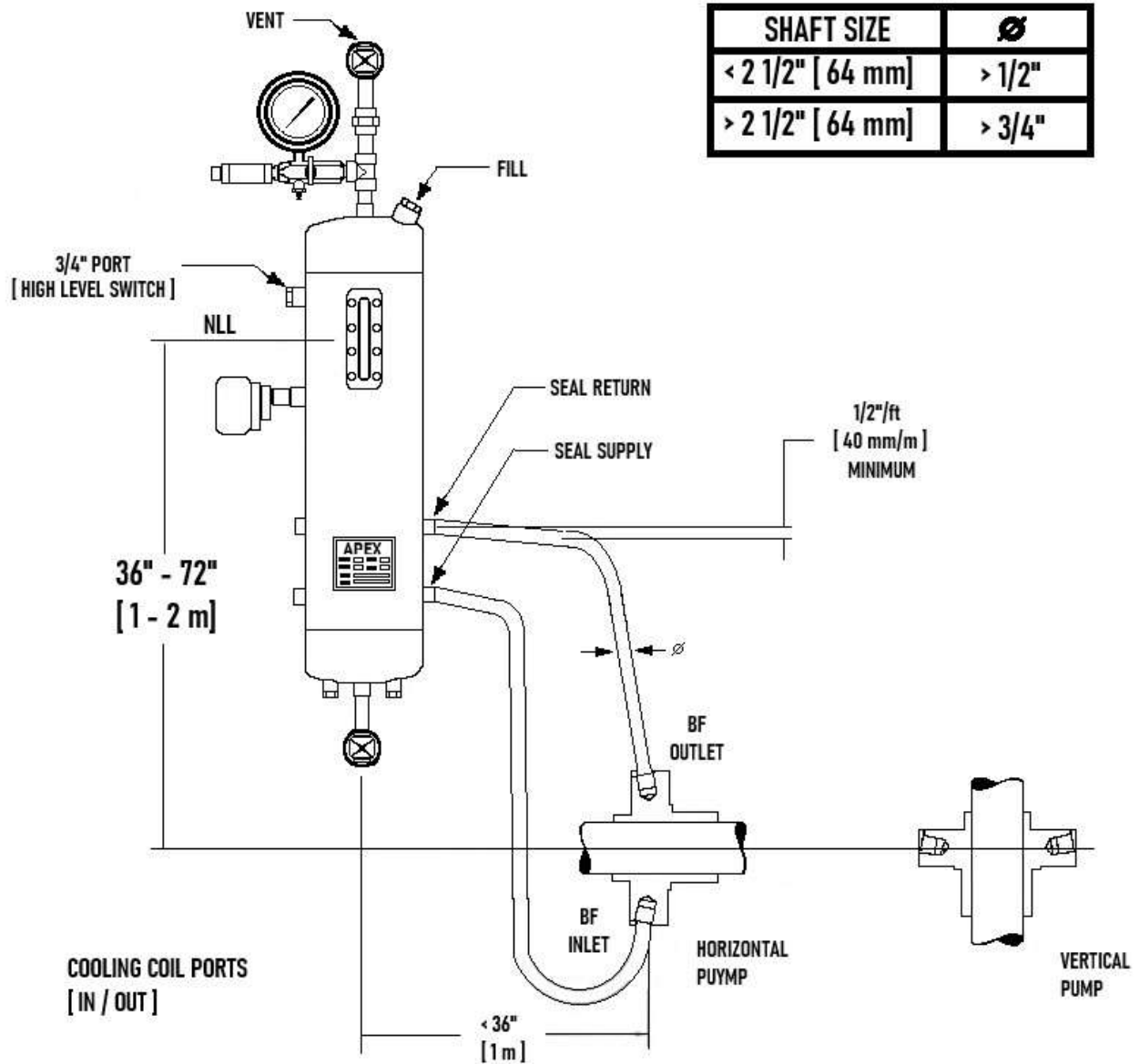
Figure 2: Pressurized external reservoir providing barrier fluid to inner and outer seals



APEX

SEAL POTS

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COMMON INSTALLATION OF BUFFER/BARRIER FLUID RESERVOIR