

# FDU™ Auto Top Up

## Installation Operations & Maintenance Instructions



ENVIRONMENTAL TECHNOLOGY

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## Health and Safety

- This system has been designed for use only as a barrier fluid system for mechanical seals using a suitable non-hazardous barrier fluid.
- Isolate the process and power on installation, maintenance and decommissioning and ensure that the system pressure has been relieved before undertaking maintenance.
- The system should only be installed by competent engineering personnel
- Electrical connections must be made in compliance with applicable legislation and / or local requirements by a competent / qualified electrician.
- If there is any risk of FIRE the system must be fitted with a suitable pressure relief device to prevent over-pressurisation.
- Pipe relief valves discharge to safe area (when fitted).
- Pressure test the complete system assembly at 1.1x maximum working pressure (duration 5 minutes) and ensure the system is completely leak free before full operation.
- 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. Not designed for cyclic loading.
- The system may get hot in operation with risk of burn injury, and suitable engineering controls or guarding should be adopted where necessary. The risk from Legionella bacteria should be assessed with water barrier fluids at temperatures between 20°C to 45°C (68°F to 115°F).
- If the barrier fluid becomes contaminated it is recommended that the barrier fluid is replaced taking necessary precautions. If the contamination is potentially corrosive or damaging to the system remove from service and contact AESSEAL for technical advice.



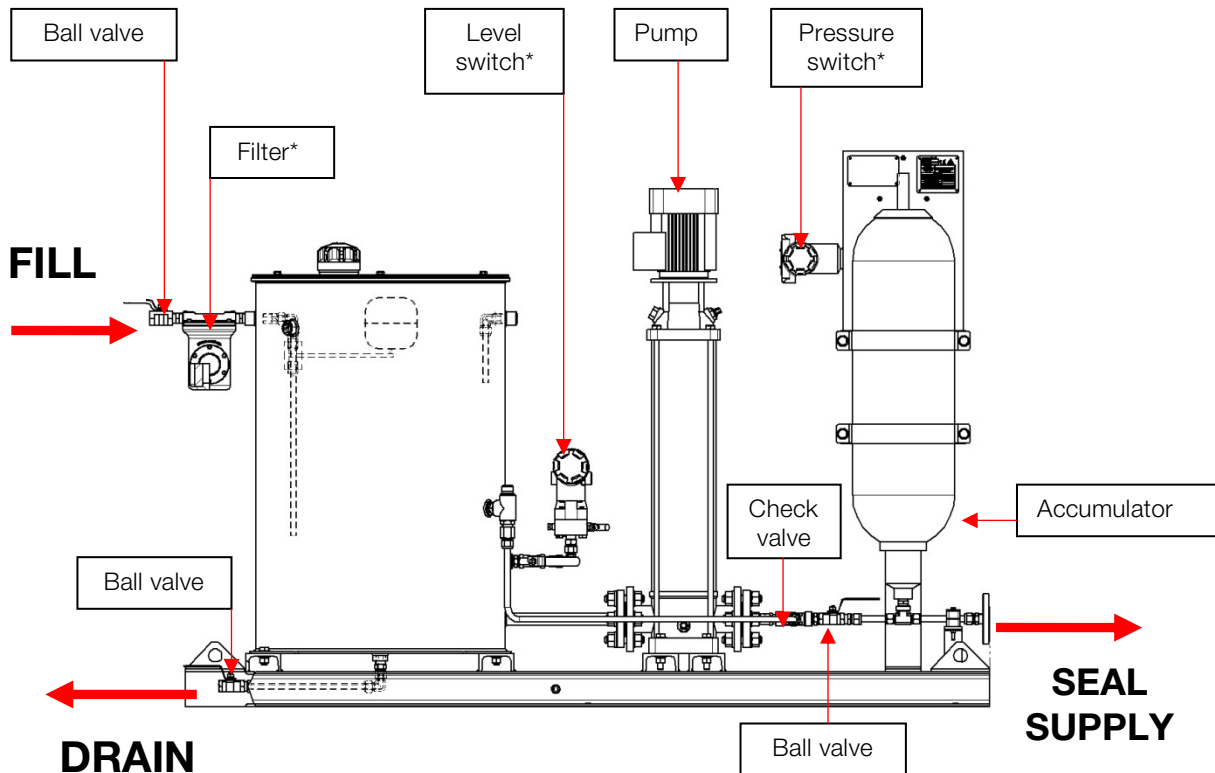
## Environment

Once the barrier fluid and system have reached the end of its life, it should be disposed of in accordance with local regulations and with due regard to the environment.

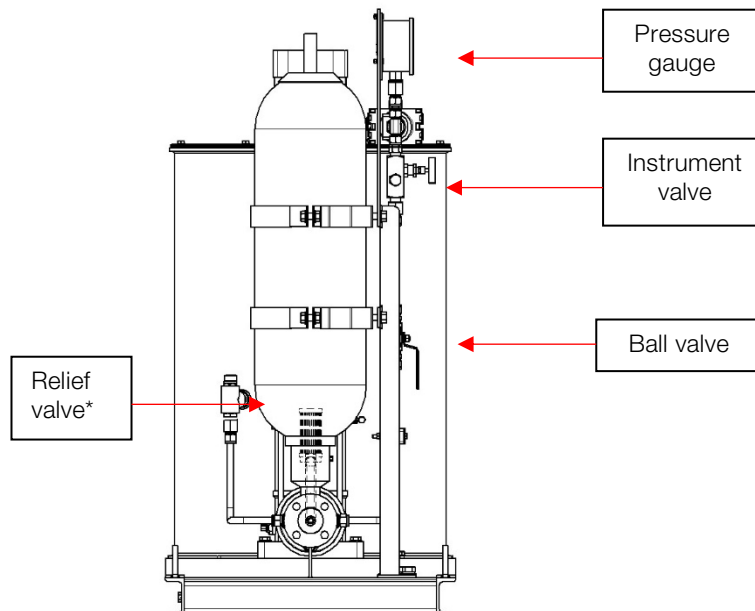
**For further information please contact **AESSEAL®****

## Installing & Commissioning

### Typical FDU Auto Top Up with Options



**Fig.1a Typical layout**



**Fig.1b Typical layout**

\* Optional Extras

**Please also refer to the drawing contained in the document pack whilst reading these instructions!**

Fig. 2 Typical P&amp;ID Configurations

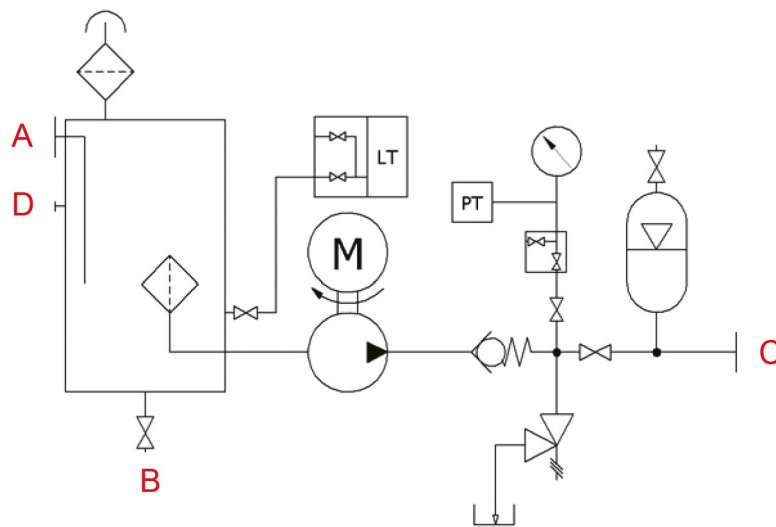


Fig.2

## Installing & Commissioning

### Connections

**Ensure all connections are made:**

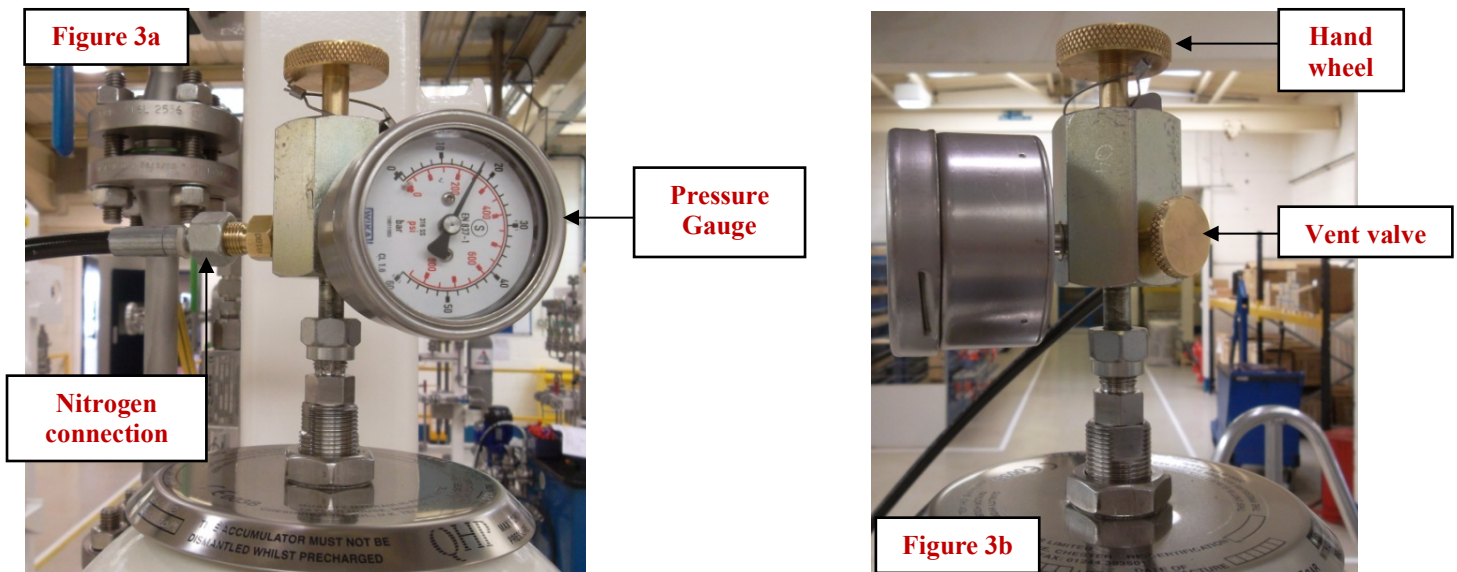
- A Water supply
- B Tank drain
- C Supply
- D Overflow

- The FDU can be situated on any convenient flat and level surface (such as a concrete floor or plinth), within close proximity of the seals and support systems.
- Ensure the system is securely affixed to the floor using correct sized bolts inserted through the holes in the FDU mounting skid.
- Pipe runs may be in hard pipe or suitable flexible hoses, 1" or greater pipe bore is recommended.
- The pipe run should be suitably supported and secured, avoiding potential hazards, such as steam pipes, walkways etc.
- Check that the pipe runs are connected from inlet and outlet connections to and from the seal support systems. Ensure that all threaded and compression fittings are tightened. Ensure that all seal supply lines are fully vented.
- Check that the pipe run is connected to the tank water supply.
- Ensure electrical connections are made to the centrifugal pump/motor set, and ensure correct direction.
- Ensure that any isolation valves between the seal system and the seal (if fitted) are open, and all vents and drains are closed.
- Ensure any isolation valves fitted to the pressure gauge are open.
- Fill the tank with fresh clean barrier fluid via the filler breather or via inlet fill ball valve to 50mm / 2" below the overflow and pay careful attention to the level of the fluid when priming the circuit to ensure the pump does not run dry. N.B. It may be necessary to stop/start the pump to prime the system fully.

- Consult Grundfoss pump/motor manual for instructions on how to prime the pump; once the pump has been primed it may now be started.  
**Nb.** DO NOT start the pump until it has been filled with liquid and vented. Check rotation of motor by means of the motor fan and label on top of the fan cover.
- Once a reading has been detected on the pressure gauge, turn the pump/motor off, and pre-charge the accumulator bladder with nitrogen using the supplied charging kit following the F.C.H. accumulator charging procedures attached below. Note.(The inside of the accumulator must be wet before bladder inflation can commence)
- Adjust the pressure by adjusting the selected systems pressure control valve, or other, until desired working settings are reached.
- Ensure the desired pressure is reached by checking the pressure gauge/switch read out.
- Consult Grundfoss instruction manual for any pump/motor technical information.
- *For 304 SS Systems, when used with a water based barrier/buffer the Chloride content shall not exceed 100ppm*

## Pre-charging the system

**Please also refer to the accumulator charging procedures contained in the document pack before charging the accumulator**



- Confirm the charging kit is compatible with the accumulator, and attach the charging kit to the accumulator as shown in Figures 3a and 3b
- Connect the charging kit to the nitrogen bottle regulator using the flexible hose.

**To attain accurate pressure and avoid damaging the bladder, the following principles need to be observed, failure to so may result in accumulator operation malfunction.**

- The bladder must be inflated slowly in several stages, controlling the pressure by screwing in the nitrogen bottle regulator knob clockwise, and observing the pressure gauge reading on the charging kit.

### The pre-charging stages are as follows:

1. Slowly inflate the bladder in 5 to 10 BAR (approx) stages with Nitrogen.
2. After each stage, allow 5 to 10 minutes to enable the bladder to cool down and settle.
3. Charge the accumulator bladder to 90% of the Pre-commissioning leak test pressure (i.e. 1.1x system working pressure) See steps 6 and 7, and then close the nitrogen regulator
4. Wait 30 minutes to allow full stabilisation and cooling of the bladder.
5. Screw the charge kit hand wheel down to open the accumulator valve to determine the true pressure inside the bladder.
6. Deflate / inflate the bladder as required to 90% of pre-commissioning leak test pressure (ie 1.1x system working pressure).
7. Following pre-commissioning leak test deflate the bladder as required to 90% of system operating pressure or as detailed on system drawing and / or name plate.
8. The system can now be pressurised with the correct barrier fluid to full system working pressure.

### Operation

- The system is designed as a pressurizing system used to feed water management systems in a closed circuit.
- The system does not run continuously, operating to pressurize the water being supplied to the water management system. Once the desired pressure in the circuit has been reached the pump unit will switch off.
- The pressure switch will detect if the pressure in the circuit falls below the necessary operating level and will turn the pump on, until the desired pressure is reached.
- The 180 litre FDU arrangement requires little attention in operation, however the following should be observed:
- The condition of the barrier fluid and suction filter must be checked after one week following commissioning or any major maintenance such as a seal change. If satisfactory, further checks should be carried out at monthly intervals.
- The fill point of the system is connection **A** on Fig. 2 via the ball valve and filter fitted at the top of the tank. The drain point is connection **B** on Fig. 2 which is also via a ball valve fitted at the base of the tank.
- For potentially explosive atmospheres an ATEX FDU is available.

**NOTE: System specifications vary depending on components fitted, refer to system nameplate or AESSEAL for system specific details**

### Noise Emission Declaration

- In accordance with BS EN ISO 20361:2009 (Grade 2) and BS EN ISO 3744 the A-weighted emission sound pressure level, LpA, does not exceed 70 dB(A). The noise measurements were taken at a distance of 1 metre from the surface of the system at a height of 1.6 metres from the floor and measurement uncertainty is 2.5 dBA.

## Maintenance

The system should be maintained in accordance with site standards, or local regulations.

### Daily

- Check and record the system pressure reading, any change may be a sign of a developing problem, such as a blockage/advanced seal leakage.
- Check for signs of leakage from seal, system, and pipe work.
- Check water level, water supply and temperature.
- Check any alarms on the pressure and level switches or transmitters if fitted.

### Monthly

- Any filters (If fitted), should be inspected every month and changed if contaminated/blocked.
- Any discolouration of the barrier fluid or contamination of the filter may be an indication of leakage of the inboard mechanical seal, and should be investigated immediately.

### 5 Years

- It is recommended that after 5 years a complete internal and external inspection is conducted of the vessel, and all systems component parts.

### 10 Years

- The system / vessel should be subjected to a complete and thorough examination, including the undertaking of a full system hydrostatic proof pressure integrity test by a suitably qualified and competent person\*. AESSEAL recommends this should form part of the written scheme of examination as per the PSSR 2000 regulations.

*\* AESSEAL offers a full examination, integrity testing and refurbishment service (or, where necessary, a replacement system / vessel), to ensure continued optimum and safe system performance.*

## Optional Extras

### Twin Pumps

- The secondary pump/motor combination can be used as a back-up if first pump/motor failure occurs, or to perform any maintenance or servicing.

### Freeze Fuse Settings

- The Freeze Fuse has a rotating dial which adjusts the temperature at which a valve opens to allow colder water to be relieved to a suitable drain point. The standard temperature range is between 0 and 30 degrees C. Adjust the rotating dial to the desired temperature.

### External Filter

- Visually inspect the filter through the viewing window to determine any contaminant build up, and replace filter cartridge if deemed necessary.



### Pressure & Level Transmitters

- Adjust the pressure and level transmitter until desired working settings are reached, consult manufacturers operating manuals for any technical information.

### Float Valve

- Adjust until required level is reached, consult manufacturers operating manual for any technical information.
- If you have purchased other optional extras, please refer to the installation instructions supplied by the manufacturer