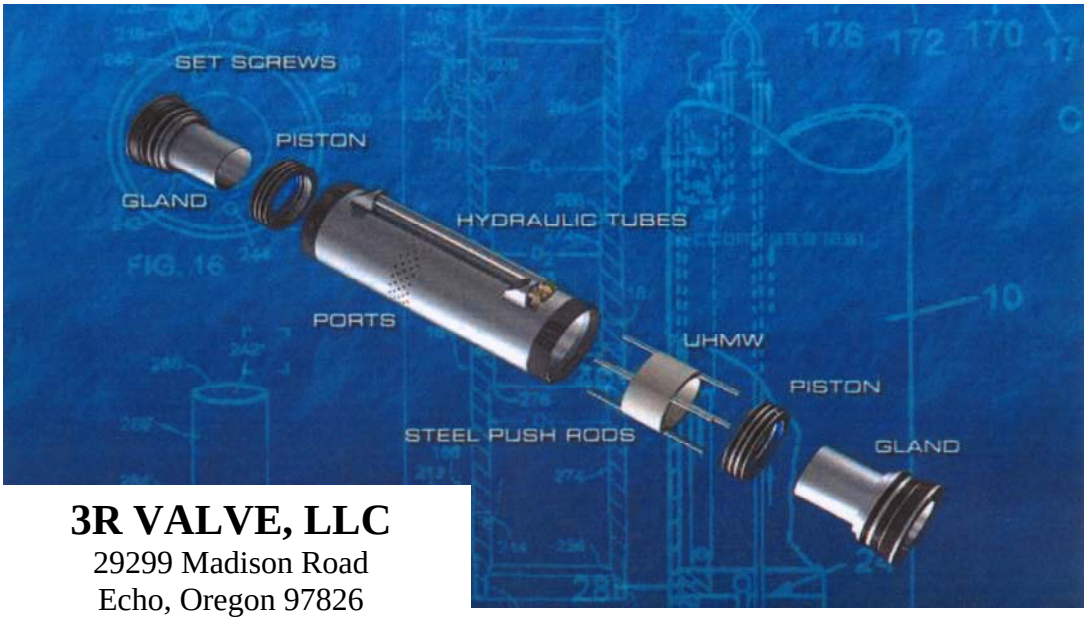
3R Valve



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ASR and the 3R Valve

"Aquifer Storage and Recovery" (ASR) is the storage of water from a separate source that meets drinking water standards in a suitable aquifer for later recovery and not having as one of its primary purposes the restoration of the aquifer. One way to accomplish ASR would be to have a separate "injection" well. Two problems with this approach would be the cost of a second well and uncertainty of recovering all of the injected water.

The common approach has been to utilize the production well as the injection well, pushing water down the pump column. This injected water cannot, however, be pushed backwards through a pump at sufficiently high rates. The solution to this problem has been the development of a valve that becomes part of the column. This valve allows water to be pumped from the aquifer up through the column in the closed position and pumped down the column into the aquifer in the open position. The newest such valve is the 3R Valve.

The 3R Valve works by using electrically-activated hydraulic pressure to move a cylinder which is inside a sleeve. Below are three views of the valve; an external view of the valve, an internal view of the valve closed, and an internal view of the valve open.

Three Views of the 3R Valve

External View of the Valve

Internal View of the Valve Closed

Internal View of the Valve Open

There are a number of advantages the 3R Valve has over alternative choices in ASR valve technology. These advantages include:

- The 3R Valve's solid tube construction is incapable of failure due to *torque transfer*, i.e. torque from the pump cannot unscrew the valve body, causing it to fail.
- The arrangement of smaller discharge ports allows the energy of the exiting water to dissipate in the surrounding water contained in the well bore, effectively reducing hydraulic mining of the well bore.
- If hydraulic pressure loss should occur in the control lines of the 3R Valve, the valve will maintain current discharge rate at the time of the hydraulic failure. However, the 3R Valve model AC incorporates an auto closing feature which automatically closes the valve in the event of a hydraulic pressure failure. This is in contrast to what can happen with the failure of competitors' valves in which uncontrollable water discharge rates can occur, possibly overwhelming the well bore's water infiltration rate, leading to an overflow of the well.
- All of the hydraulic components in the 3R Valve, including seal surfaces, are located inside the valve, eliminating the risk of foreign objects lodging in moving components, causing failure.
- Visual surface indicators allow the operator to visually and electronically "see" the current open or closed position of the valve.

New and Unique

The 3R Valve's technology brings a simpler design with increased reliability and reduced maintenance to the ASR field. The technology will reduce the risk of valve failure and thus reduce the likelihood of having to pull the valve and pump column. And once properly installed, the 3R Valve should be virtually maintenance free. If maintenance is required it would be comparable in simplicity to resealing a hydraulic cylinder.

After initial purchase, annual operation and maintenance costs are limited to the electricity needed to run the one horsepower pump. This usage will vary from user to user, depending on how often they cycle the valve.

The 3R Valve is comparably priced among its competitors, but the ASR technology eliminates the need of municipalities to build above ground storage facilities, saving construction costs and the uncertainty of public acceptance of construction of large, above ground storage facilities.

Major Components Supplied by 3R Valve LLC.

3R Valve

3R Valve, well column coupler, and section of well column (threaded). The length of the well column is such to make the overall length of the valve unit a specified length of 5 feet.

Hydraulic Pump and Motor

SPX Fluid power 1 HP 115/230 volt motor with a .5 GPM 3000 PSI pump.

Directional Control Valve

HYVAIR DO3S-2C-115A-35 Directional Control Valve

- Solenoid Actuator
- Double solenoid – 3 position spring centered
- Spool Function: A & B Blocked P to T
- Voltage: 115V
- AC Current/Connector

Tie-Rod Cylinders

Two (2) Bailey Chief TC3, 5 inch bore by 10 inch stoke, 3000 psi Tie-Rod Cylinders that serve as position indicators and an isolation between the hydraulic pump and the hydraulic hoses down the well.

Hydraulic Hose and Fittings

Two 600 foot or shorter rolls of Kleen Flo II SCT Series high pressure/temperature silicone covered Teflon hydraulic hose ¼ inch NSF Standard #4 Approved at 3000 PSI operating pressure and 12,000 psi burst pressure. Included are two sets of JIC male and female hydraulic fittings to connect the 3R Valve to the Chief solenoid and position indicators.

Electrical Control Panel

An electrical control panel with all the required components to operate the unit in hand or auto mode including:

- 25 Amp Circuit Breaker with Door Mounted Breaker Switch
- Full Voltage Starter (Contactors)
- Hand/Off/Auto and Open/Off/Closed Switches
- Limit Switches
- Timers

The following materials are used in the body and gland of the 3RValve

- Body, Glands and Steel Push Rods – Type 416 Stainless Steel – ASTM-A743
- Valve Sleeve – UHMW PE – Ultra-High-Molecular-Weight Polyethylene Molding ASTM-D4020
- Pistons – Aluminum Rod 6061-T6 ASTM-B221

Each Piston utilizes:

- G.F. PTFE / Nitrile Cat type seals
- Nylon, Glass reinforced Guide Elements
- Nitrile / Nylon T – type seal
- Urethane ST-XL Style Wiper ring

Glands are sealed with:

- Nitrile NBR7OA O-Rings
- Nitrile Backup ring
- Nylon, Glass reinforced Guide Elements

Contact information

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