Phoenix – Basic Description & Operation

There are three Phoenix models available, pneumatic and electric.

The pneumatic model uses a pneumatic actuator indexing a pair of dog clutches to operate the backwash sequence and its controls are contained in a wall mounted NEMA 4 enclosure for hazardous, wet, and hot applications.

The electro-pneumatic and electric models use a 24 VDC motor/gearbox assembly for rotating the diverting valve during backwash and its controls are contained inside the Phoenix filter for compactness.

For controlling the backwash sequence, the electro-pneumatic and electric Phoenix's use a printed circuit board whereas the pneumatic model uses a Siemens LOGO! logic module.

The pneumatic and electro-pneumatic models utilize a pneumatically actuated ball valve for backwash. Whereas, the electric model uses a 24 VDC electrically actuated, coax valve for backwash.

Below is a basic description of operation for the Phoenix. The "basic" operation for all three Phoenix models is similar. However, as stated above the drive mechanism for the indexing and the controls differ.

The filter contains six (6) pods in a radial design around an inlet chamber with a filter element in each pod. Liquid enters the Phoenix via a 3" inlet on the bottom of the filter and is then diverted to enter each of the six pods/filter elements. The entry to each pod is tangential which produces a centrifugal action within each pod allowing the heavier particles to remain in suspension while the filter elements remove the finer particles. This allows the filter to accommodate heavier particle loading than would otherwise be possible. In filter mode, the fluid flow is from outside the element to the inside. The filtered liquid from each pod / filter is then joined in a common doughnut shaped chamber situated on the top of the Phoenix filter and exits via the 3" flange on the side of the filter.

A pressure transducer is fitted on the inlet and on the outlet of the Phoenix. The inlet and outlet pressure are continuously monitored. The Phoenix will initiate an automatic backwash sequence once the differential pressure reaches the predetermined set point established by the user.

From initiation to completion, the Phoenix's internal diverting valve rotates through the 360°, 7-position backwash cycle. (The filter has 6 filter element positions and 1 home position). A small, internal proximity switch located in the top of the filter provides a signal to the control system once the backwash cycle has been completed and stops any further advancing of the indexer. Fitted on the backwash outlet is a pneumatically (or electrically) actuated ¾" backwash valve. This valve opens and closes six times throughout the backwash process, once for each element, thereby allowing uninterrupted flow during the backwash process.

Upon backwash initiation, the internal diverting valve advances 51º (360/7) so that the 'shoe' is positioned over the inlet to pod 1, thereby shutting off its inlet. After a pause of 0.5 seconds, the pneumatic backwash valve opens. By opening the backwash valve to atmosphere, a portion of clean filtered liquid is allowed to travel in a reverse direction from the inside to the outside of the filter element. This reverse supply of clean liquid will cause the filter element to open along its entire length while 'shimmering' at the same time. The combination of the filter element opening and 'shimmering' allows for a very quick and efficient backwash.

In this way, all debris is removed from the outside of the filter element, even debris that may be lodged on the surface of the filter element. The result is a very efficient backwash with very little fluid required. The backwash sequence to clean each pod is normally 3-4 seconds (adjustable depending on system pressure and contaminant). When one pod has been backwashed, the internal diverting valves advances another 51º (360/7) so that the 'shoe' is positioned over the inlet to pod 2, thereby shutting off its inlet.   After a pause of 0.5 seconds, the pneumatic backwash valve opens. This cycle continues until all six pods have been backwashed. Once the backwash has been completed, the filter will return to its clean differential pressure every time.

Simplicity, consistency, reliability, and lowest cost of ownership make the Phoenix an ideal answer for many filtration applications!