Powers™ Controls

908 Air Filter

Description

Powers Air Filters are designed to remove solids and petroleum-based oils from compressed air. Filtration efficiency can be as high as 99.9% per 0.5 micron particle, depending upon the contaminant. Combining oil absorption with mechanical separation methods makes such high effective filtration possible.

Features of the Powers Air Filters include a unique visible filtration element which changes color as oil is absorbed. A quick visual inspection tells when the filter element should be replaced.

Filters can be mounted permanently in any pipe run.

Part Number

908-033

Application

When using the Powers Air Filter, follow these guidelines:

- Flow. Do not exceed the maximum recommended flow rating for this filter. If the rating is exceeded, filter efficiency will be considerably reduced.

- Filter Location. Since Powers Air Filters must be serviced periodically, they should be located in a "conspicuous" area. If possible, avoid locating them above false ceilings, inside control panels, etc.

Use Figure 1 as a guide for air filter applications.

Specifications

<table>
<thead>
<tr>
<th>Operating</th>
<th>Maximum pressure</th>
<th>30 psi (206.85 kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum temperature</td>
<td>150°F (65.56°C)</td>
<td></td>
</tr>
<tr>
<td>Maximum flow</td>
<td>500 scim with 25 psi supply (1.37 cu.m/hr. with 172.38 kPa supply)</td>
<td></td>
</tr>
<tr>
<td>Maximum pressure drop at maximum flow</td>
<td>1 psi (6.895 kPa)</td>
<td></td>
</tr>
<tr>
<td>Filtration efficiency</td>
<td>99.9% for particles 0.5 micron and larger</td>
<td></td>
</tr>
</tbody>
</table>
Specifications, Continued

<table>
<thead>
<tr>
<th>Physical</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>Transparent Tube</td>
<td>Methyl Methacrylate</td>
</tr>
<tr>
<td>Shipping Weight</td>
<td>1/2 lb (0.2 kg)</td>
<td></td>
</tr>
</tbody>
</table>

Pipe Connections

| Air Lines              | 1/8-inch NPT male      |                      |

Operation

As air enters the filter element for final clean-up, it passes through a coalescing section of the construction. Here, the fine oil aerosol is captured on nonabsorbing surfaces, coalesced into larger droplets, and then allowed to pass to the oil absorbing section with the air.

The unique oil absorbing filter medium is an organic resin which has a high affinity for oil and is unaffected by water. This combination of properties is important because it allows the filter element to retain its full oil absorbing capacity despite any water present in the air stream.

This filter does not remove entrained water from the air and water removal, when necessary. Instead, it requires additional equipment such as a refrigerated air dryer.

The filter medium consists of individual particles which are relatively light and soft. Unlike hard inorganic granules, the filter medium does not tend to grind up or break up. The particles retain their original size and shape, assuring that they will be completely retained within the filter.

As the filter medium becomes saturated with oil, it turns from its original pink color to bright red. The red color gradually rises up the bed as the line of oil saturation progresses. This visible color indicates when the element should be replaced. As the element becomes saturated, there is no change in filtration efficiency – it remains at its original high value throughout the life of the element.

Note that filtration in the element is by impingement and impaction. The air passages are always large, relative to the size of droplets and particles being removed. Therefore, pressure drop through the filter remains low and there is no tendency to plug as in membrane or screen filtration.

After the oil vapor is removed, the compressed air passes through the felt pad at the top of the element, and then through screens that retain the filter element. Clean, oil-free air then exits from the filter.

Sizing

The instantaneous air consumption of a pneumatic system will vary. For example, air consumption is lowest when the supply valve in the instrument is closed or the pilot pressure (for a flapper nozzle instrument) is high. Conversely, air consumption is the highest when the supply valve in the instrument is open or the pilot pressure in the flapper nozzle is zero. Air usage figures shown in Technical Instruction AC-141-5 (155-002) are based on an average air consumption (somewhere between the highest and lowest indicated above).

Air filters must be able to handle the maximum instantaneous demand of a pneumatic system or controller. Air filters should be sized at twice the average air consumption. This value can be obtained by multiplying the air consumption figures in AC-141-5 by a factor of two. Example:

<table>
<thead>
<tr>
<th>Type of Equipment</th>
<th>Air Usage For Compressor Sizing (from AC-141)</th>
<th>Air Usage For Filters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powerstar Thermostat</td>
<td>20 SCIM</td>
<td>40 SCIM</td>
</tr>
</tbody>
</table>
Sizing, Continued

The Powers Air Filter should be operated within the pressure and airflow limits, as shown in Figure 2.

![Figure 2]

Maintenance

Element Life

Generally, filter element life is from four to five months. Very few filters last more than twelve months. Factors influencing filter life are high flow rates, high compressor rpm, high compressor operating temperature and worn compressor piston rings. These factors allow more oil to enter the air system and reduce the life of the filter.

Installation

The 908-033 is a pipe supported filter. A manual shutoff valve can be installed at the inlet to each filter to shut off the supply air while the filter element is being changed. If, during filter replacement, the loss of the air supply to the system is undesirable for about 5 minutes or so, a manual bypass should be installed around the filter.

![Figure 3]