

# Almost Everything You Need to Know About Pneumatic and Hydraulic Systems

Basic laws of fluids, fluid properties and vacuum, plumbing, symbols and typical fluid power systems set the stage for the study of components, symbols and basic circuits.

Following chapters go through Reservoir, Filters, Pumps, Relief and Unloading valves, Directional Control Valves, Slip-in Cartridge valves, Infinitely Variable Directional Control Valves, Flow Controls and Flow dividers, Pressure Control valves, Actuators, Accumulators, Air-Oil Systems and Intensifiers, Miscellaneous Fluid Power Components and Air Logic Controls.

Each chapter shows generic cutaways of a part and gives an explanation of how it functions. In most cases there is a circuit showing how this component fits in a typical system. There is a natural flow from the power source to output devices that allows the student to see how the different parts work together.

Multiple choice questions at the end of each chapter test the students retention of pertinent information on the parts discussed.

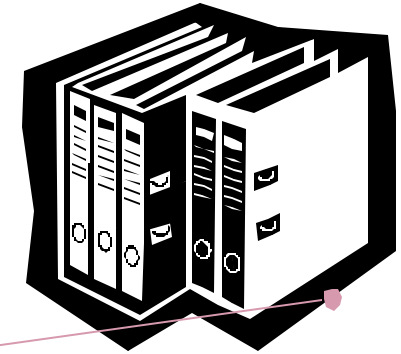
A section on circuit reading, Brain Teasers and Formula makeup the rest of the training experience.

Each student now has a ready reference for future reading and refreshing on most Fluid Power components.

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**INTRODUCES**



## Industrial Fluid Power Basics

**A generic training book  
for Maintenance  
Mechanics and  
Technicians That Work on  
Fluid Power Systems**

**Available Now**

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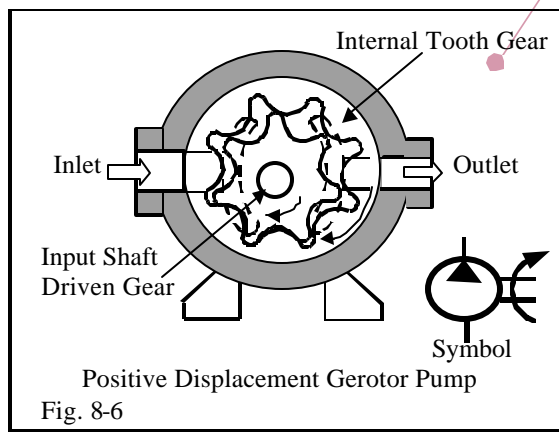
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## Typical Pump Cutaway



## Explanation of Function

### Fixed Displacement Pumps Gerotor

The newest design of a gear pump is called a Gerotor (Generated Rotor). A cutaway and symbol is shown in **Fig. 8-6**. This pump design is not common in the market place. At present there is only one or two manufacturers that offer this type. As a fluid motor it is one of the most common designs and is offered by over fifteen different companies.

A Gerotor pump uses a driven gear of say seven teeth inside an internal tooth gear and they both turn the same direction. Because of the machined shapes the driven gear always makes contact with the internal tooth gear at different points as they rotate. As the example shows this allows cavities to form and close as the gears turn.

In the example in **Fig. 8-6** as the driven gear turns clockwise the internal tooth gear turns the same way at one tooth per revolution slower. This action causes cavities to form on the left hand that start reducing pressure in this area. This reduced pressure (vacuum) causes atmospheric pressure to push fluid in and fill the forming cavities. Kidney shaped cavities in this sector, both sides of the teeth, allows fluid to fill the cavities for 180° around the **Inlet** side.

As the gears continue turning the cavities formed on the left side start closing on the right hand side. This forces fluid through the kidney shaped openings and to the **Outlet** port.

Like the other gear pumps a Gerotor pump is un-balanced and has no way to overcome clearances due to wear. Though a Gerotor pump starts out 85-90% efficient it deteriorates as it runs and constantly loses volume.

Gerotor pumps can have more than one pumping section in a common housing. This allows for different flows or pressures to some circuits for speed and force changes

Another point on the aforementioned pumps is they are not capable of variable volume except by physical or speed change. The next two types of pumps are capable of changing volume while running the same speed. These pumps can also reduce flow on a pressure build-up signal and almost eliminate the need for a relief valve.

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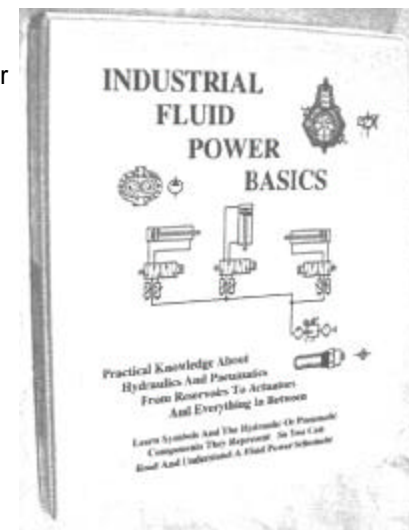
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