

BASIC PNEUMATIC CIRCUITS

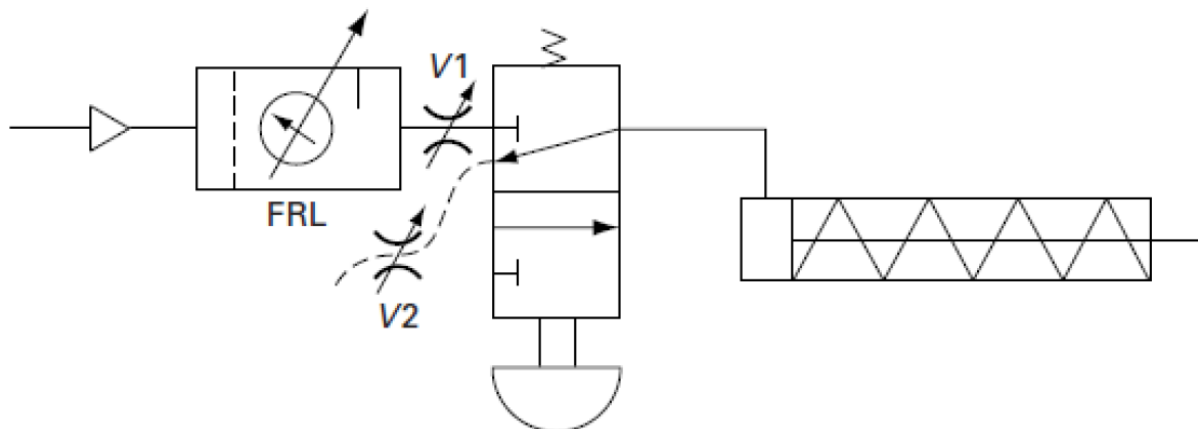
Introduction

In this section we present a number of basic pneumatic circuits using pneumatic components that have been previously discussed. Pneumatic circuits are similar to their hydraulic counterparts. One difference is that no return lines are used in pneumatic circuits because the exhausted air is released directly into the atmosphere.

This is depicted by a short dashed line leading from the exhaust port of each valve. Also, no input device (such as a pump in a hydraulic circuit) is shown, because most pneumatic circuits use a centralized compressor as their source of energy. The input to the circuit is located at some conveniently located manifold, which leads directly into the filter-regulator-lubricator (FRL) unit.

Operation of Single-Acting Cylinder

Figure shows a simple pneumatic circuit, which consists of a three-way valve controlling a single-acting cylinder. The return stroke is accomplished by a compression spring located at the rod end of the cylinder. When the push-button valve is actuated, the cylinder extends. It retracts when the valve is deactivated. Needle valves $V1$ and $V2$ permit speed control of the cylinder extension and retraction strokes, respectively.



Operation of Double-Acting Cylinder

Figure shows the directional control of a double-acting cylinder using a four-way valve. Control of a double-acting cylinder requires a DCV with four different functioning ports (each of the two exhaust ports perform the same function). Thus, a four-way valve has four different functioning ports. In contrast, the control of a single-acting, spring-return cylinder requires a DCV with only three ports. Hence a

three-way valve has only three ports, as shown in the previous Figure. Actuation of the push-button valve extends the cylinder. The spring-offset mode causes the cylinder to retract under air power.

