5.0   Pneumatic Applications

The pneumatic components are available in the PDA (Pneumatic) version of HyPneu. With these components users can design a system which comprises only pneumatic components. In addition, if the user also has the HDA (Hydraulic) version, the user can use the pneumatic components in building any system which also has hydraulic or mechanical components. HyPneu allows the user complete flexibility in building a system consisting of a variety of types of components. This way HyPneu more accurately reflects the types of systems actually built in real-life. The following example shows how HyPneu was used to design a 100% pneumatic system.

5.1   Example of Pneumatic System Analysis

Most designers are totally absorbed by the logic of a pneumatic control system. However, the highly compressible air can seriously influence the performance of such systems even though the logic is correct. In order to move a given load for a given distance, the pressure must first build up to the level which will begin to move the load. The time required for this pressure build-up will depend upon the volume of the system and the size of the air pump (compressor). Therefore, to gain the optimum for production the dynamic pressure and flow must be an integral part of the design process.

HyPneu is capable of analyzing and simulating a pneumatic control system. For example, consider the simple system shown which consists of a compressor, a valve, and a load—in this example the load in a simple orifice. The pressure response and the flow response are given in the graph. In this example, if it is assumed that it requires 40 psi air pressure to move the load, it will not begin to move until the 0.05 second point. Furthermore, it can be seen that maximum velocity will not be reached until maximum flow is reached, which is approximately one half second.
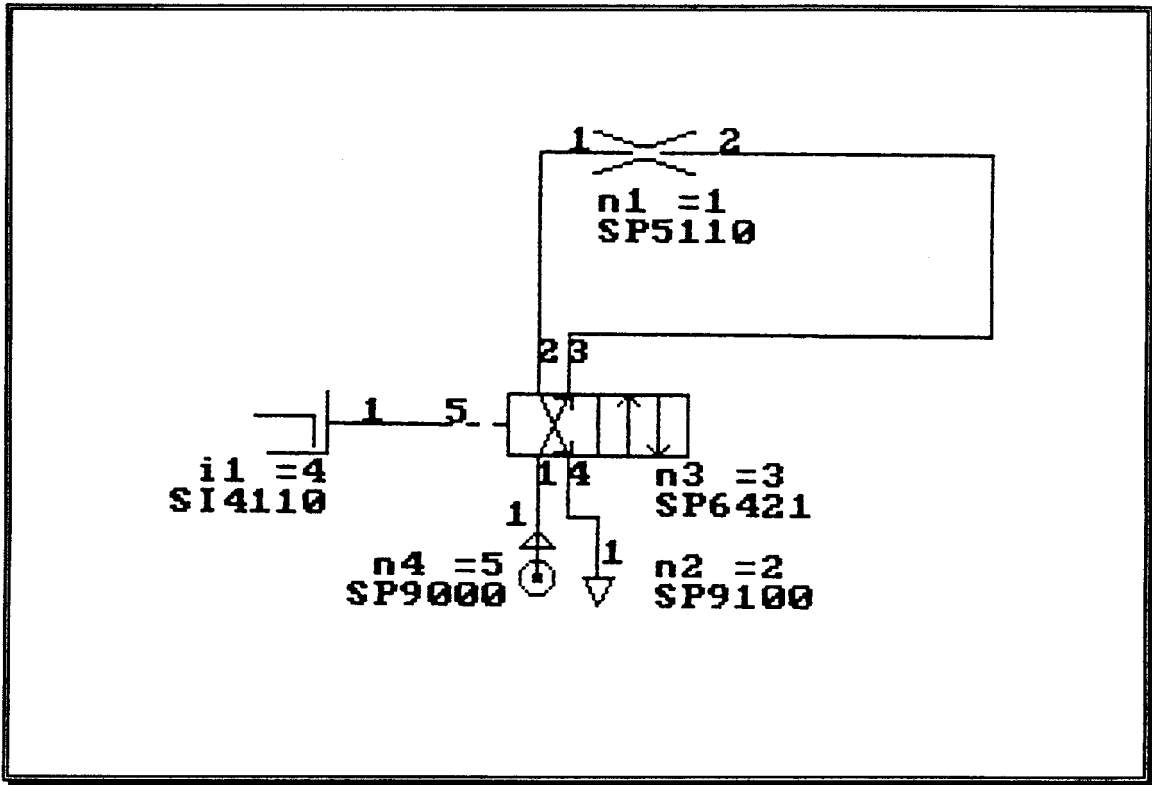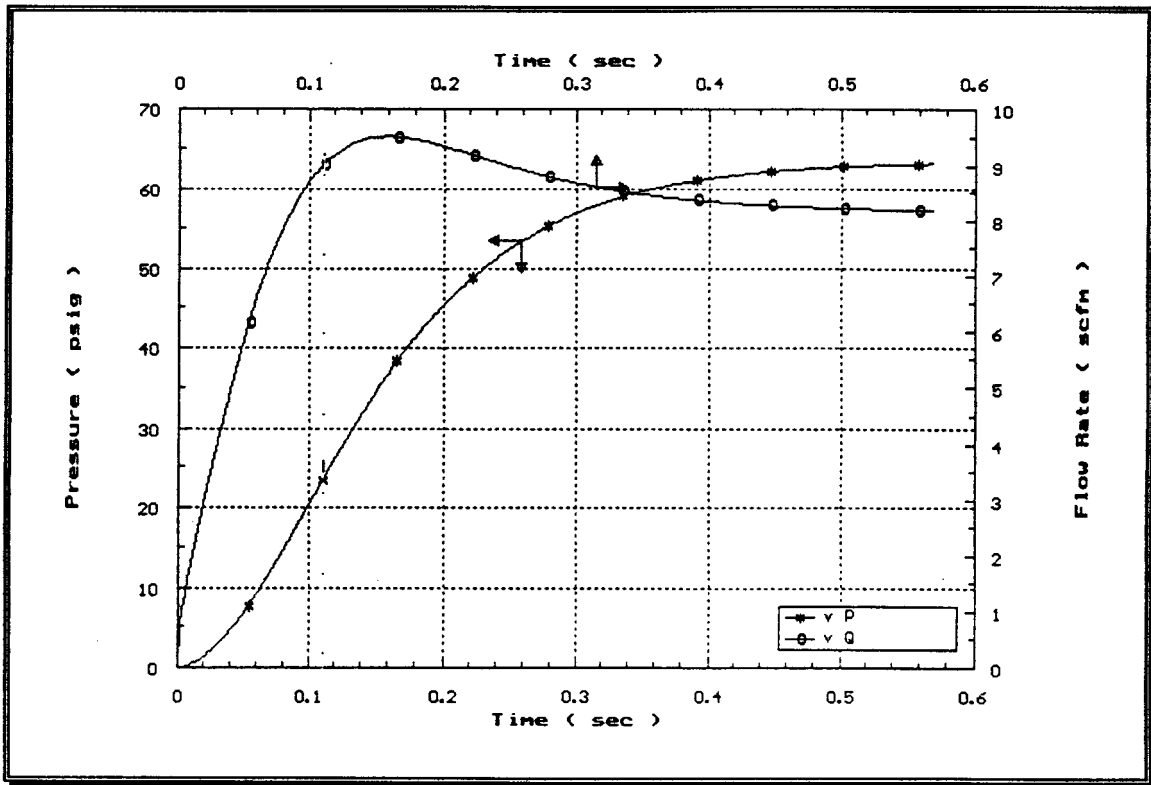
Figure 5.1a. Pneumatic System Analysis Schematic.

Figure 5.1b. Pneumatic System Analysis.