

COORDINATED MOTION CONTROL

In majority of the pneumatic applications more than one cylinder is used . The movement of these cylinders are coordinated as per the required sequence

- The activation of limit switches of different cylinders will provide set or reset signal to the final control valves for further controlling the movement of various cylinders
- The limit switches have to be arranged in the proper location with the help of motion diagram

Motion Diagram Step Displacement Diagram

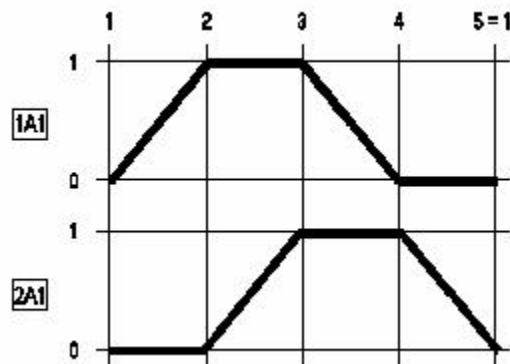


Figure 6.1 Motion Diagram –Displacement Step Diagram

- In order to develop control circuitry for multi cylinder applications, it is necessary to draw the motion diagram to understand the sequence of actuation of various signal input switches-limit switches and sensors
- Motion diagram represents status of cylinder position -whether extended or retracted in a particular step

Example: Coordinated Motion Control for a Stamping Application

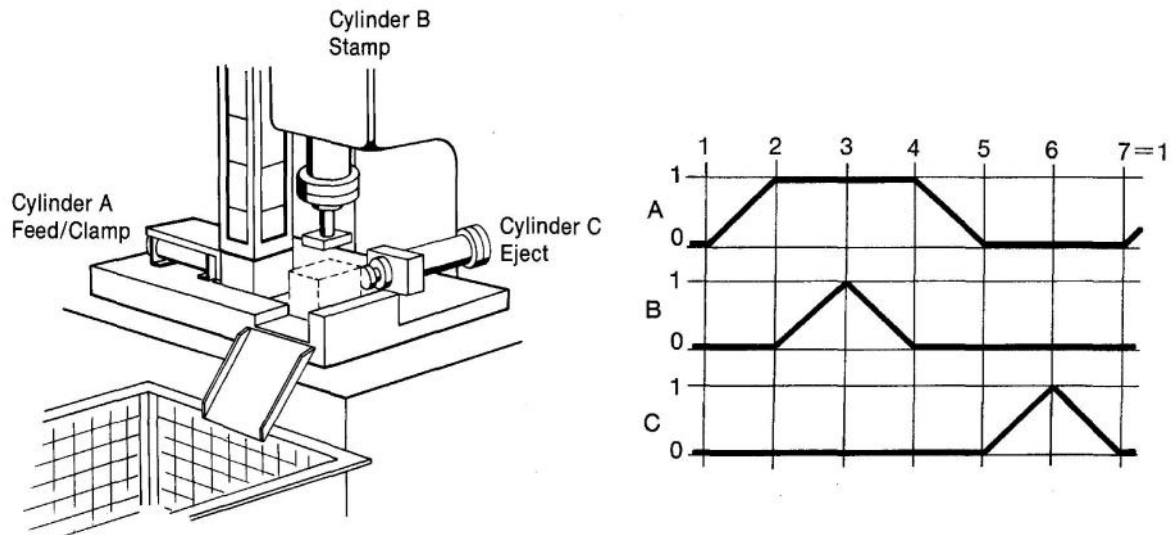


Figure 6.2: Clamping, Stamping and Ejection Application

Multi Cylinder Application with Two Cylinders A and B

Input Signals

- Cylinder A – Limit switch at home position a_0
- Limit switch at home position a_1
- Cylinder B - Limit switch at home position b_0
- Limit switch at home position b_1

Out put Signals

- Cylinder A advancing step is designated as A^+
- Cylinder A retracting step is designated as A^-
- Cylinder B advancing step is designated as B^+
- Cylinder B retracting step is designated as B^-

Designation of Signals

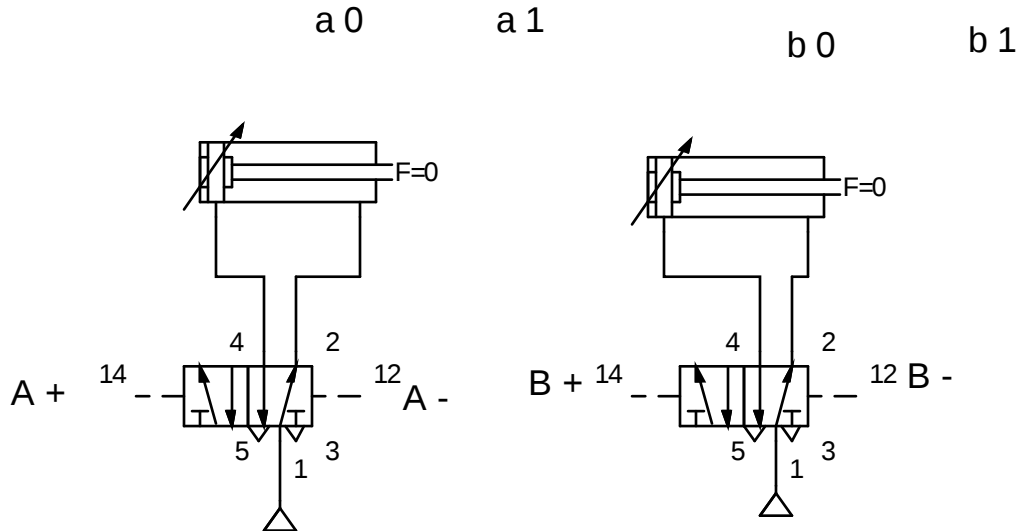


Figure 6.3 Designation of Signals

Sequential Motion of Cylinders

It is possible to have the following sequence of operation with **two** cylinders

<u>Sequence</u>	<u>Example of Application</u>
A+, B+, A-, B-	Lifting & Shifting / shifting of parts in two directions ,
A+, B+, B-, A-	Clamping & Stamping/Riveting
A+, A-, B+, B-	Feeding and Ejection of parts

Example 1: Lifting and Shifting

- Products are required to be transferred from lower level conveyor to higher level conveyor using two Pneumatic Cylinders
- Lifting Cylinder A lifts the product on receiving it at lower level
- Shifting Cylinder B shifts the product from the platform to the higher level conveyor

- Lifting cylinder retracts
- Shifting cylinder retracts

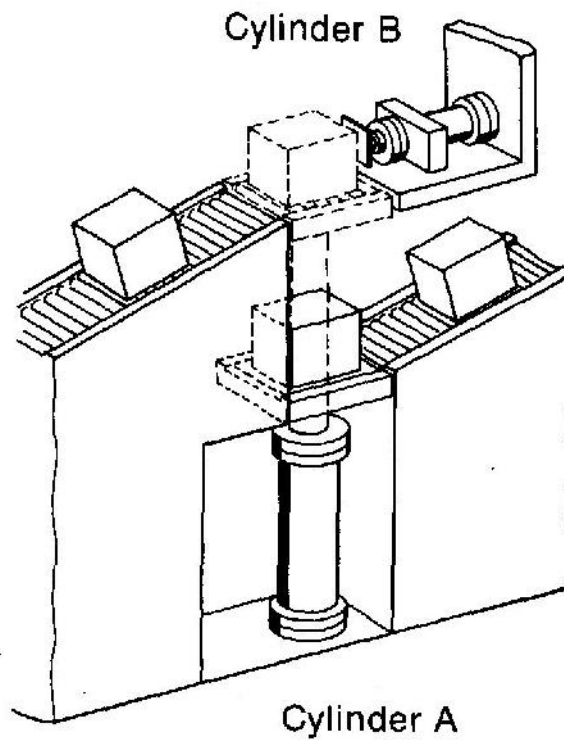


Figure 6.4 : Schematic of Lifting and Shifting Application

Source : <http://elearningatria.files.wordpress.com/2013/10/hydraulics-and-pneumatics.pdf>