CASCADING METHOD OF SIGNAL ELIMINATION

Reversing Valves [Double piloted 5/2 way or 4/2 way] These are signal processing valves which are used to change over from one signal to next signal Depending on the presence of set or reset signal at the reversing valves, output change over takes place from port 4 to port 2 of the valve There is no need to examine exact step where signal overlap occur in the circuit

Reversing Valves

When an input limit switch signal, S1 is generated, it is used to activate a Final Control valve. This results in activation of a corresponding cylinder which is followed by activation of a limit switch S2. This limit switch signal cancels the first input signal S1 using a reversing valve and the same process continues

Conditions for Cascading

• Number of signal inputs [from limit switches] must be equal to number of output signals [pilot signals to final control valves]
• Each input signal is assigned to a particular output signal
• It should be possible to store an output signal even when the corresponding input signal is no longer present
• Only one output signal may exist at any one point or it must be possible to eliminate any specific output signal
• The input signal should be effective in the same required sequence
• No. of reversing valves required are (n-1), where n is total number signals from limit switches or signal groups

Designation of Signals

![Diagram of signals from limit switches]

Figure 8.1. Designation of Signals From Limit Switches
Cascading Stages

Figure 8.2: Cascading Stages

Development of Cascade Stages

I 
II 
III 
IV 
V

Reset Signal from Signal line S5
Reset signal from Signal line S3
Reset Signal from Signal line S2
I Input from Last signal + Start Switch

Ist Out of Cascade to Signal Line S1
II Out put of Cascade to Signal line S2
II Input from Limit Switch e2
Out put from II Cascade to Signal line S3
III rd Input from limit switch e3
IV Out put of Cascade to Signal line S4
IV Input from Limit Switch e4
V Out put from cascade to Signal line S5
Last Input Signal from Limit Switch e5

Figure 8.3 Input Signals to Cascade Stages
Figure 8.4: Arrangement of Cascading Reversing Valves and Input Signals

Two Cylinder Co-Ordinated Motion Control [A+,B+,B-,A-]

- Sequence of operation
  A+,B+,B-,A-
- Signal Groups
  [ a1][b1][b0][a0]
- Last signal (a0) + Start signal is used to initiate the motion. This will be input signal to the last stage of cascade.

Grouping of Signals

- Total number of cascade stages can further be reduced by grouping of signals.
- While grouping of signals, care should be taken not to include more than one output signal from the same cylinder.
- Total number of cascade stages will be one less than the number of signal groups.

Example 8.1 Clamping and Stamping: Application

Required Sequence:  A+,B+,B-,A-

Cylinder Sequence  [ A+ , B+]  [B-, A-]

Signal Sequence  [ a1, b1 ]  [bo, ao]

Signal Groups  S1  S2
Circuit for Sequential Motion  A+,B+,B-,A-.

Figure 8.5 : Circuit Diagram for Sequence A+,B+, B-, A+

Example 2

Required Sequence: A+,A-,B+,B-

Cylinder Sequence  [ A+ ],[ A-,B+], [B-]

Signal Sequence  [ a1 ], [ao ,b1],[ bo]

Signal Groups    S1    S2    S3
Circuit for Sequence Motion  A+,A-,B+,B-  

Figure 8.6: Circuit Diagram for Sequence  A+, A-, B+, B-  