

Matakuliah: **Teknik Otomasi**

Pengendalian Pneumatic dengan PLC

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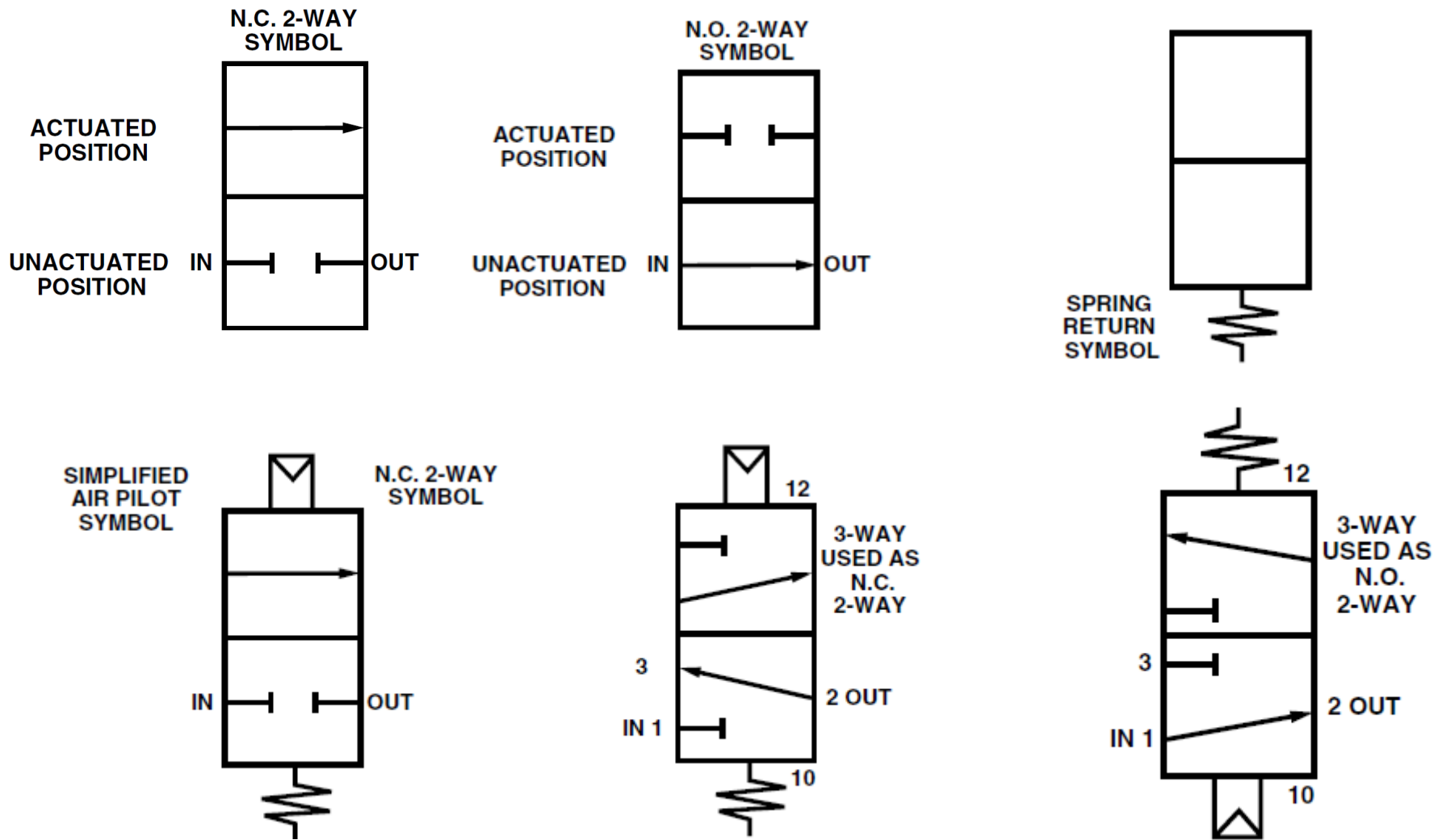
Tujuan

- **Mampu merancang program PLC dengan Ladder Diagram untuk Pengendalian Sistem Pneumatik.**

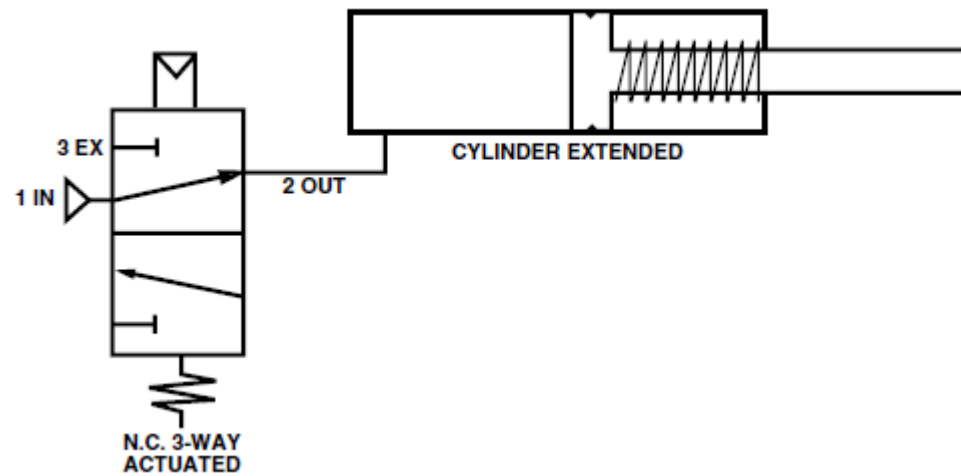
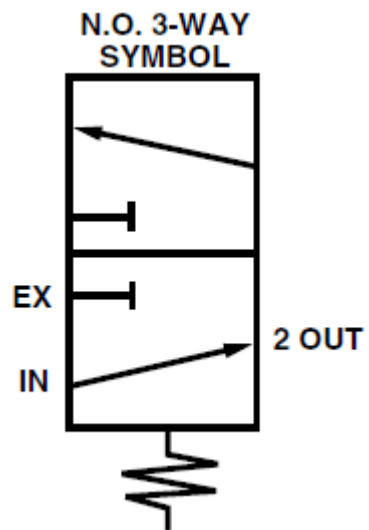
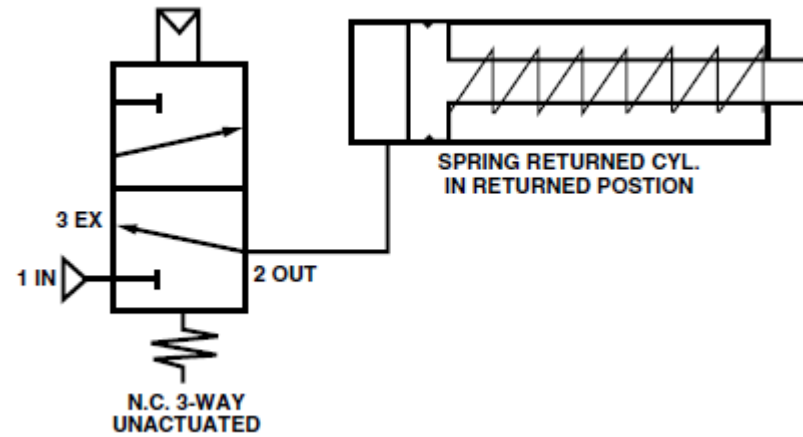
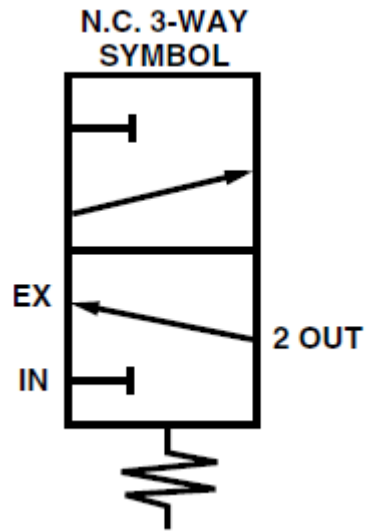
Topik:

- Pengendalian Dasar
 - Pengendalian Proses Squensial
 - Pneumatik dengan Timer/Counter
 - Pneumatik dengan Switching
 - Aplikasi Otomasi Industri
-

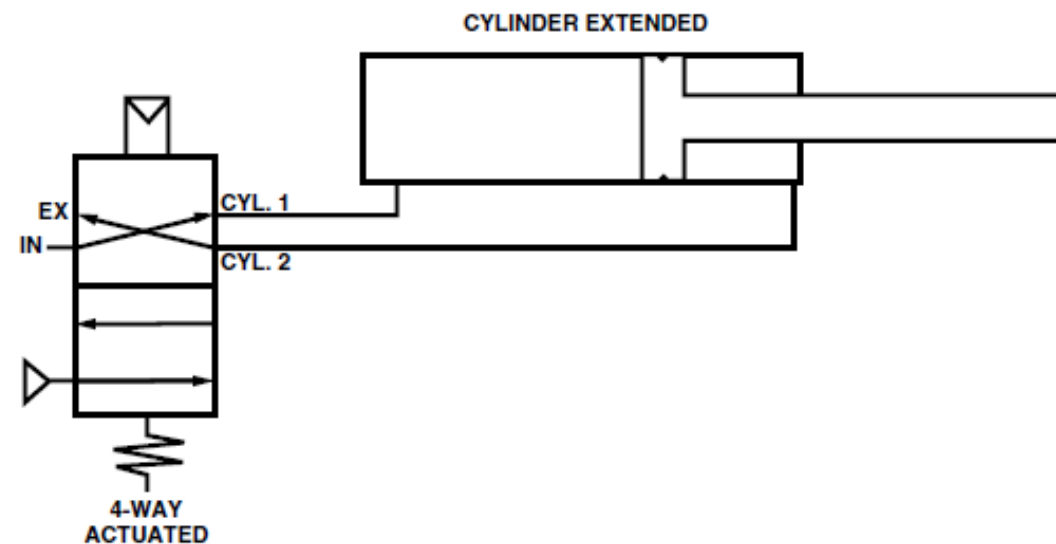
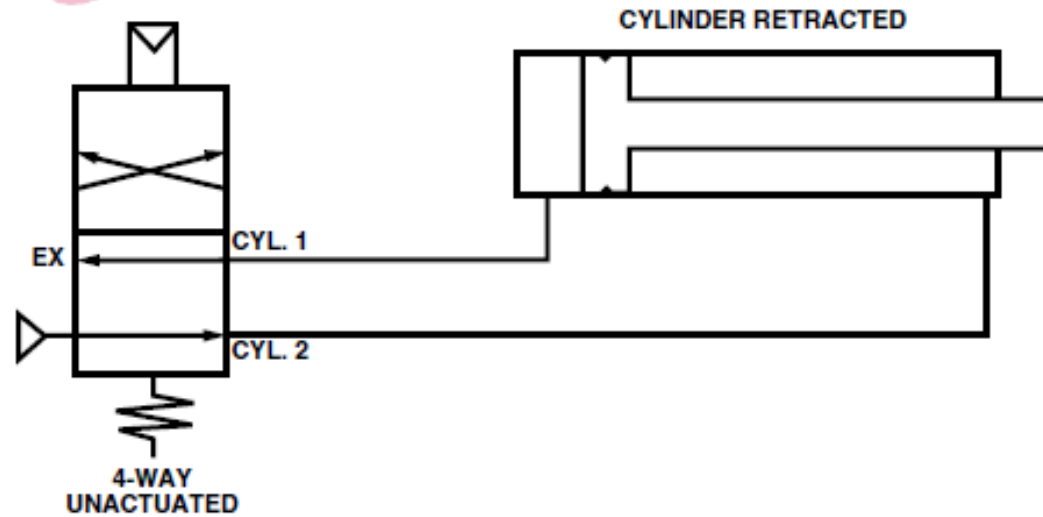
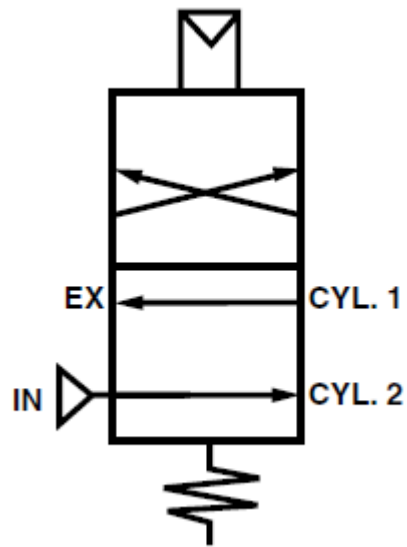
Symbol (2 way valves)



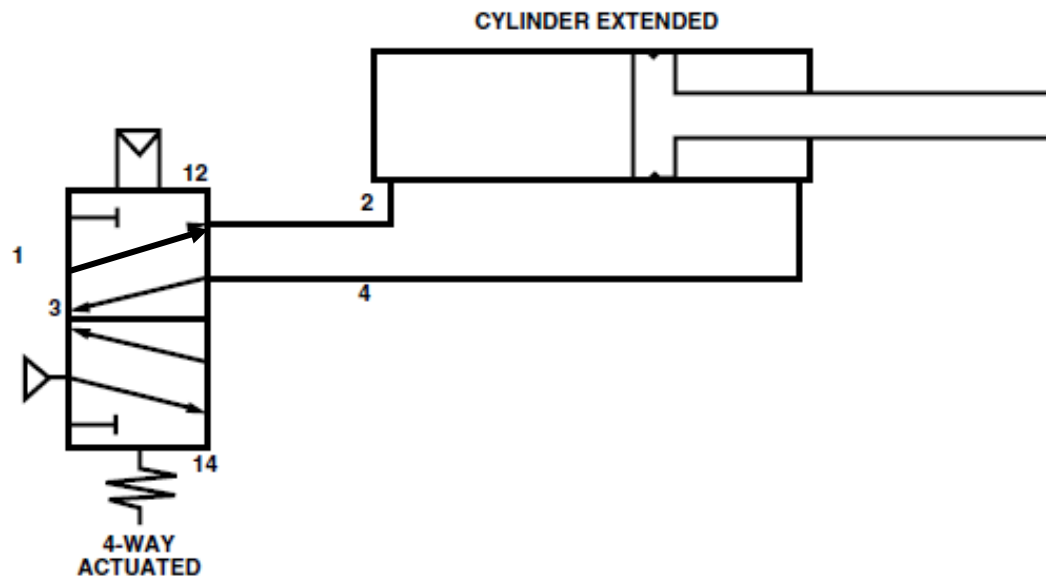
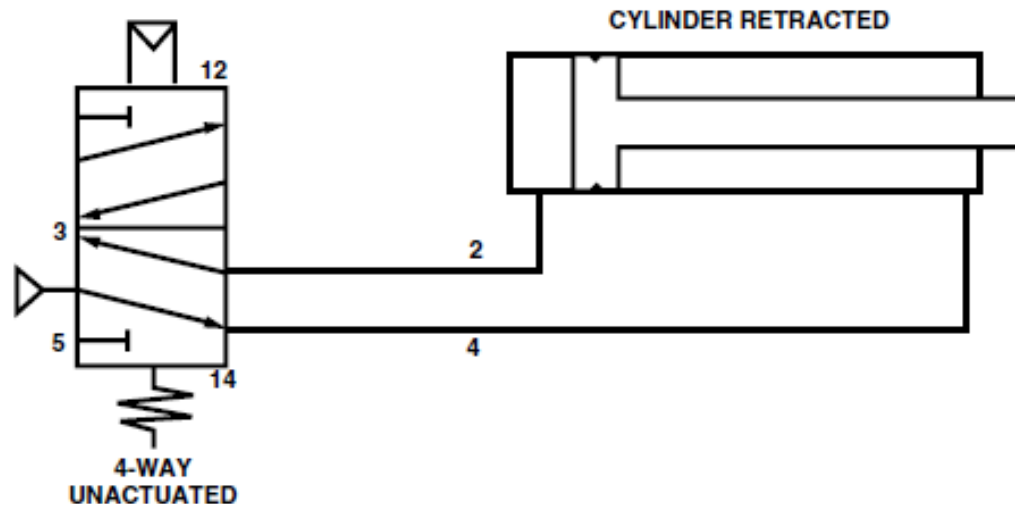
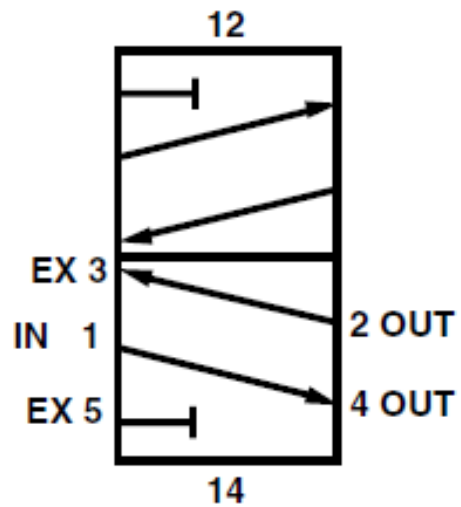
Symbol (3 way valves)



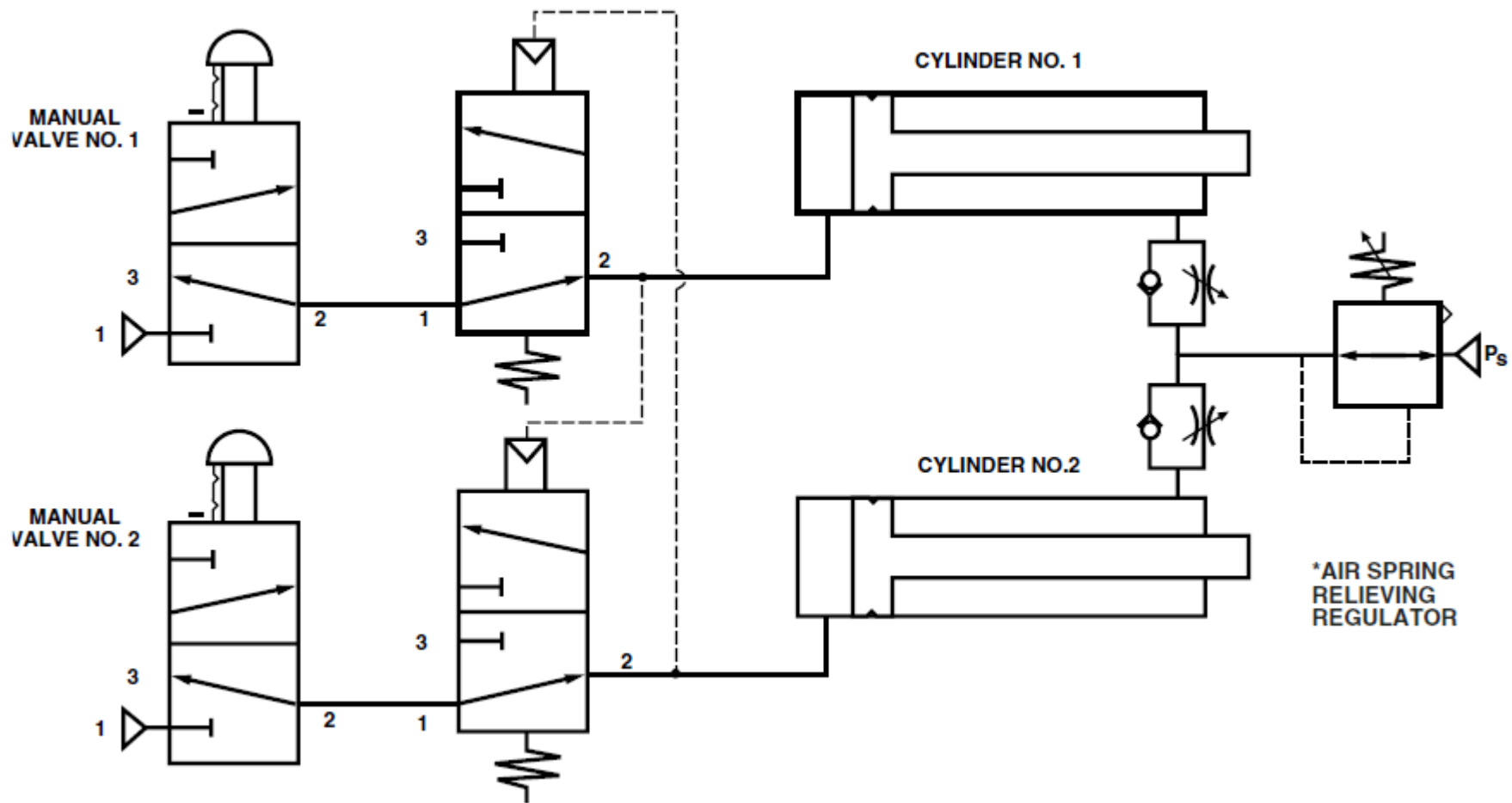
Symbol (4 way valves, 4 port)



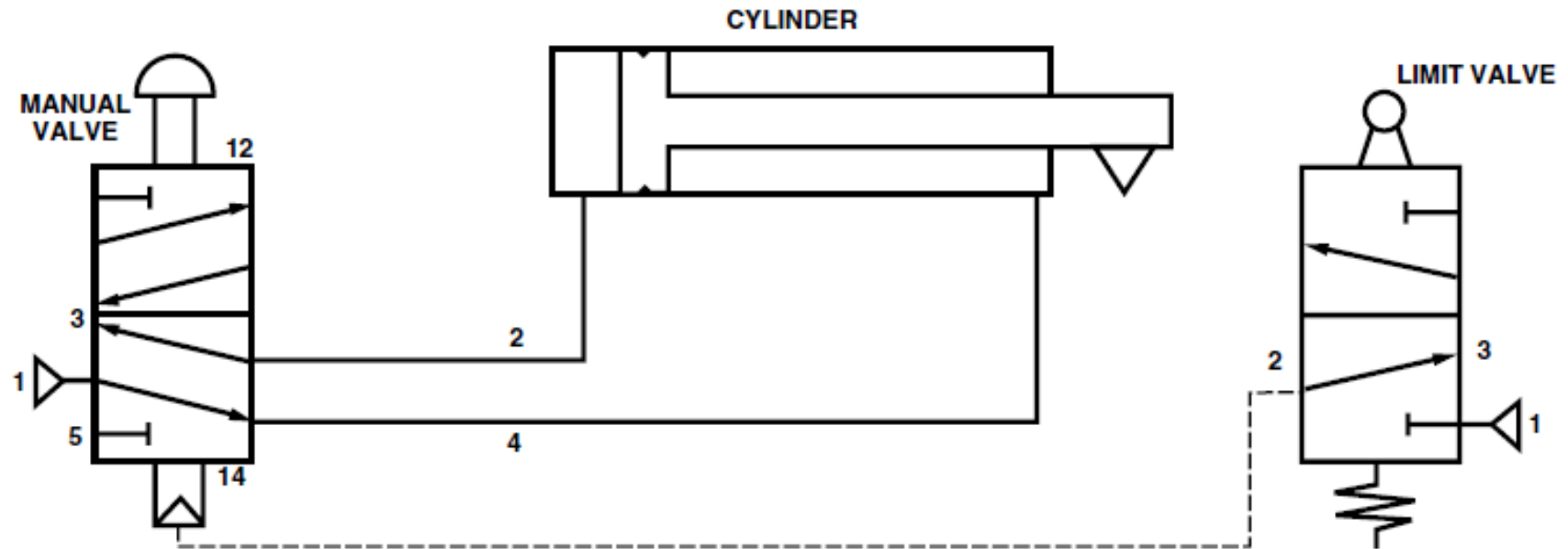
Symbol (4 way, 5 port)



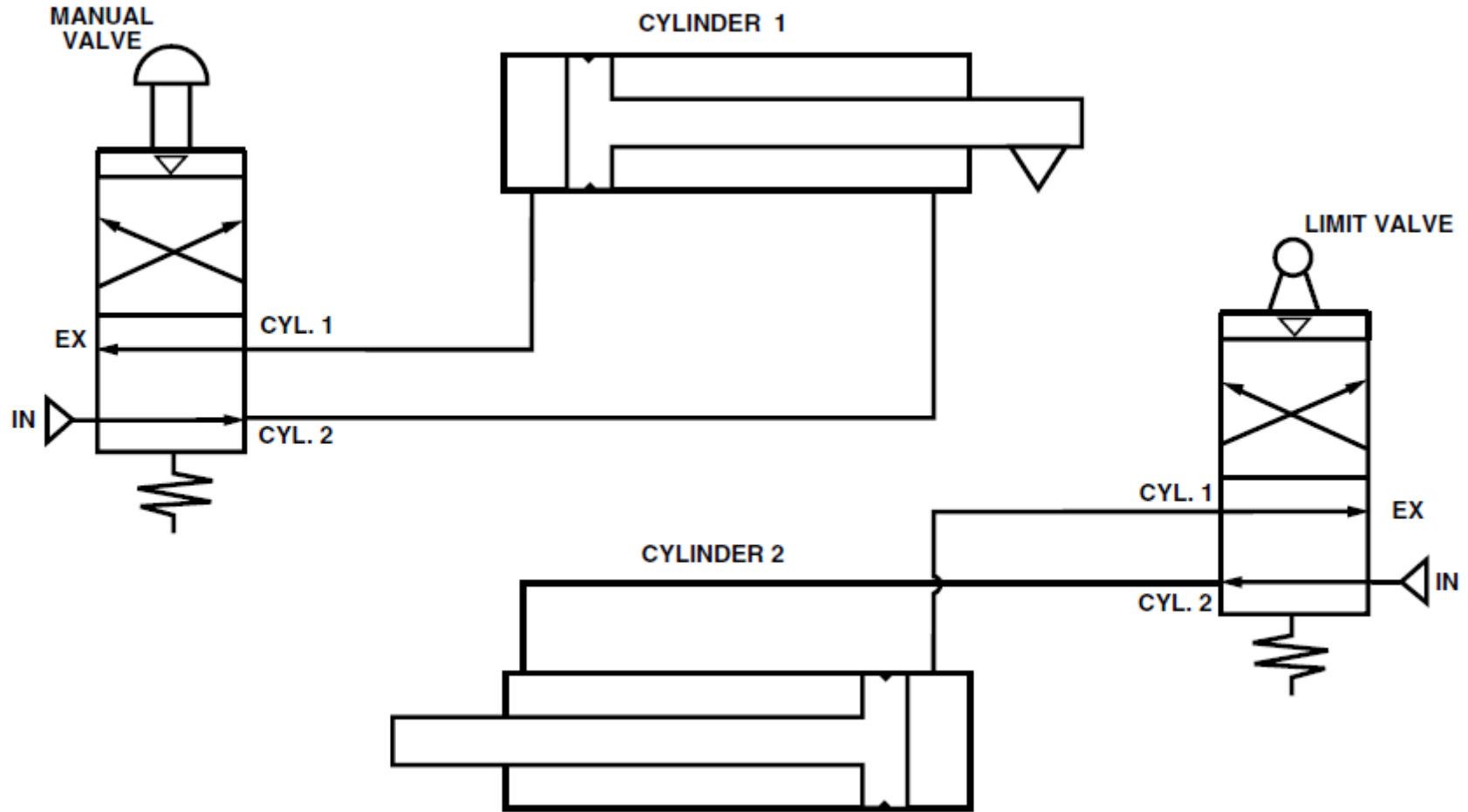
Rangkaian Interlock



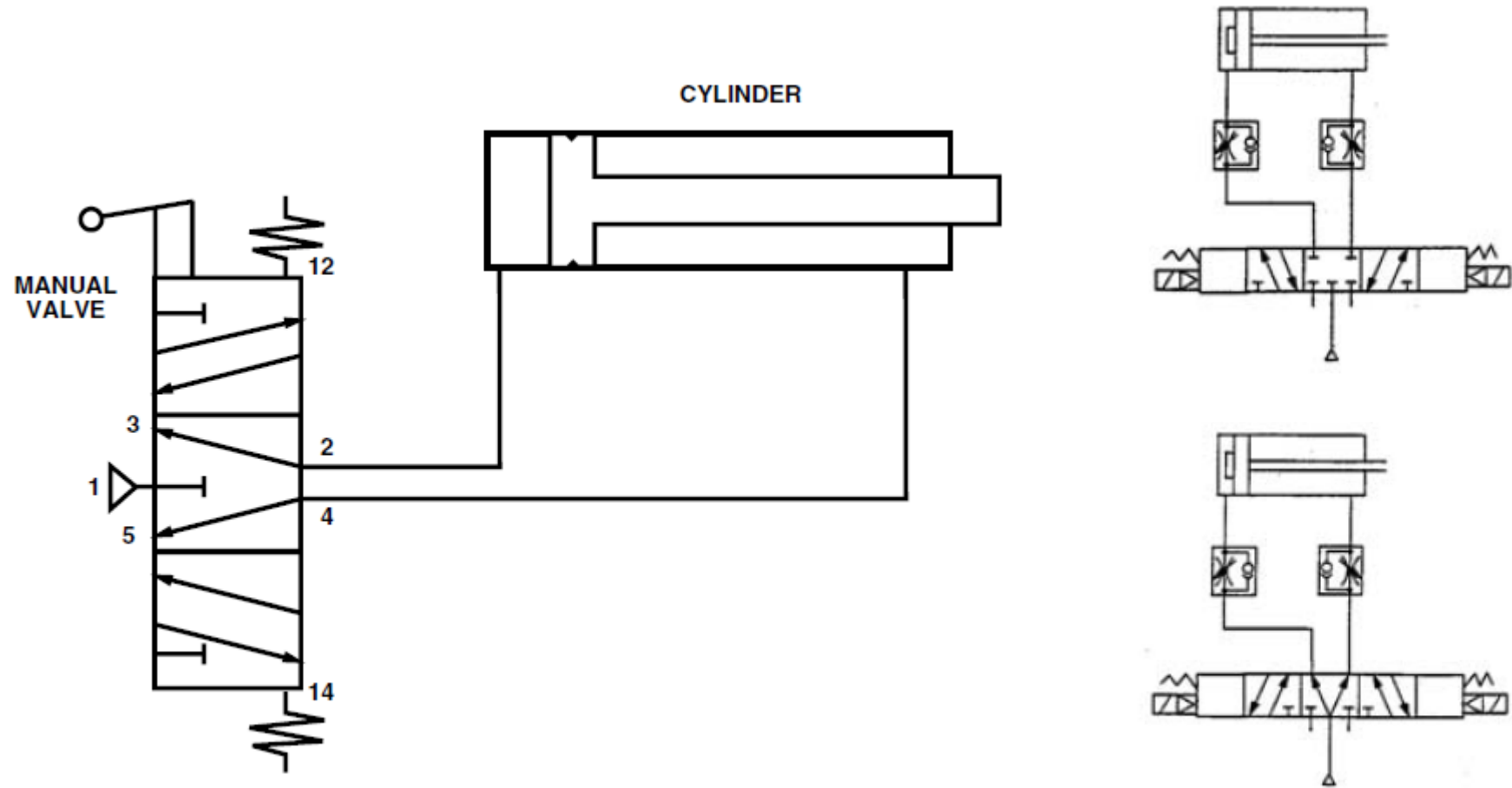
Cylinder Extends, Retracts Automatically



Event Based, Cylinders Extend in Succession



Cylinder Float



Penamaan Fungsi Pneumatic

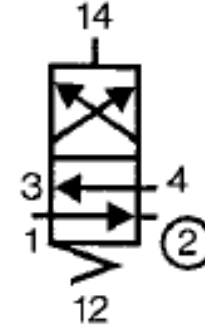
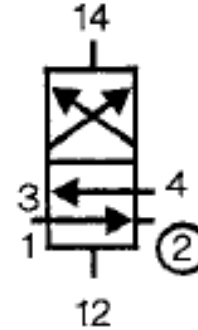
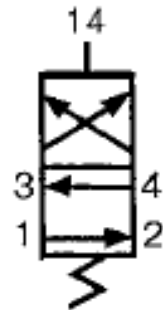
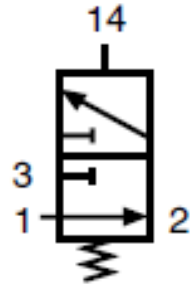
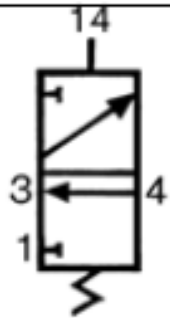
3/2 NC monostable

3/2 NO monostable

4/2 monostable

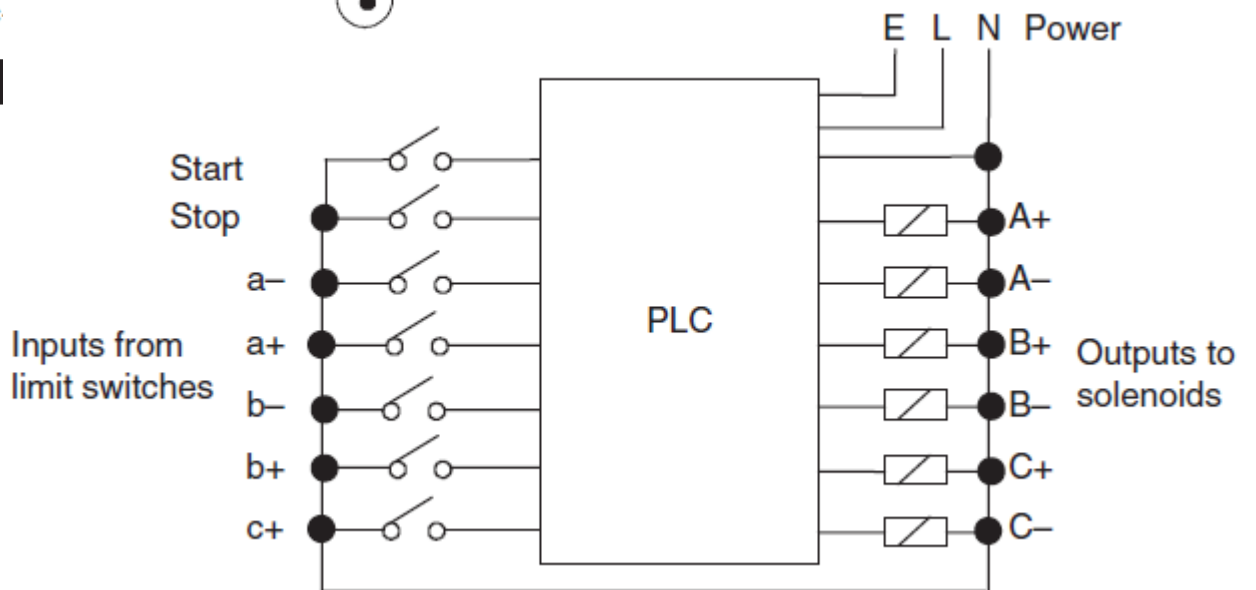
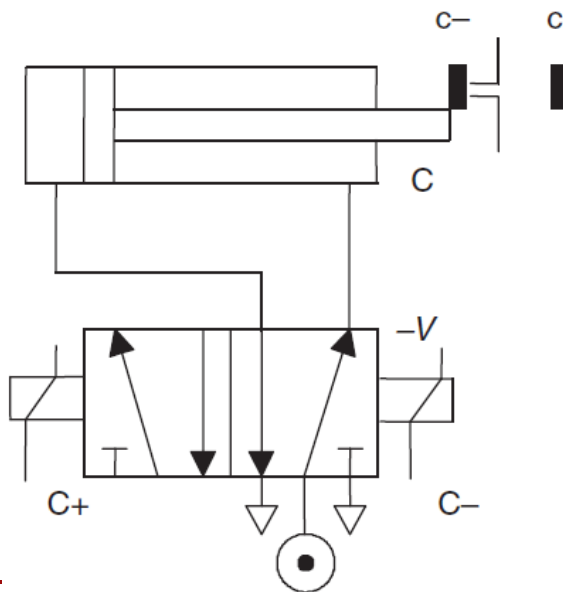
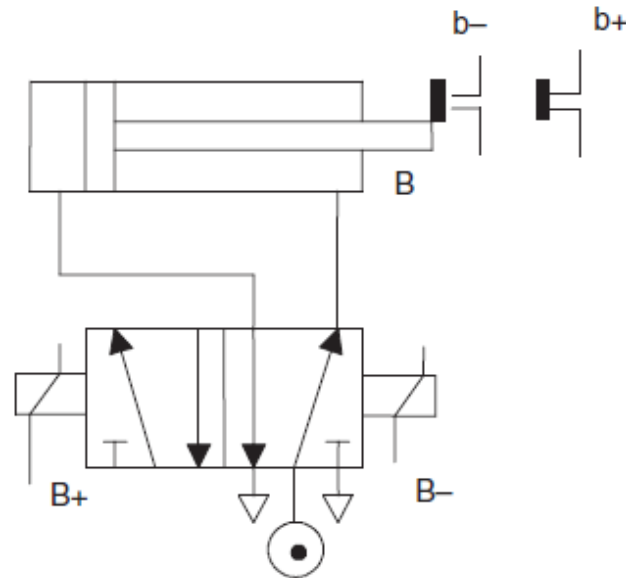
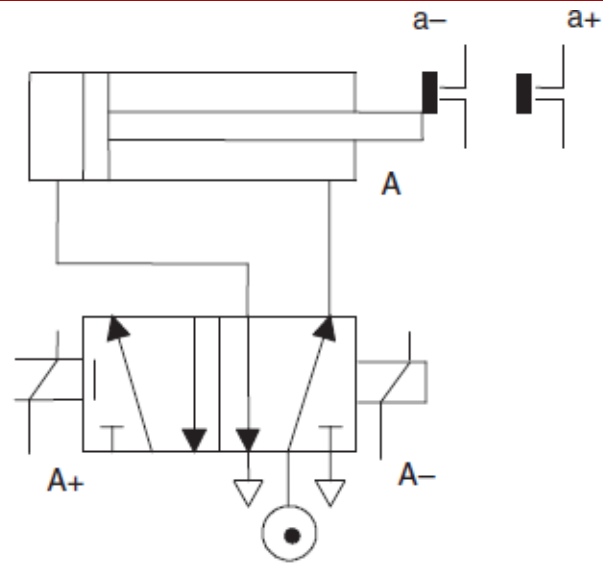
4/2 bistable

4/2 monostable

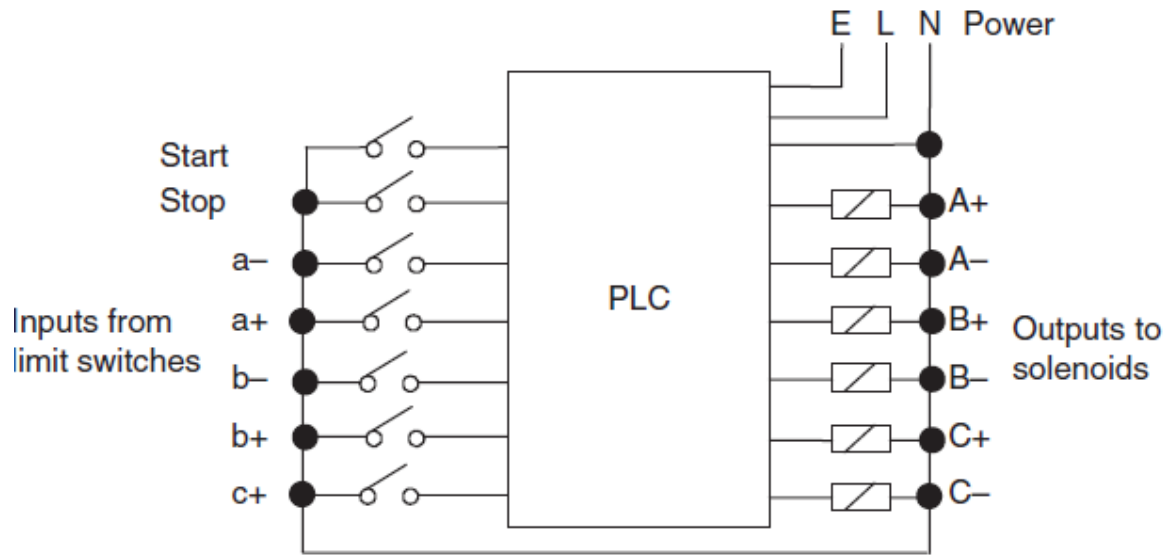


Contoh: Desain LD dengan Pneumatic

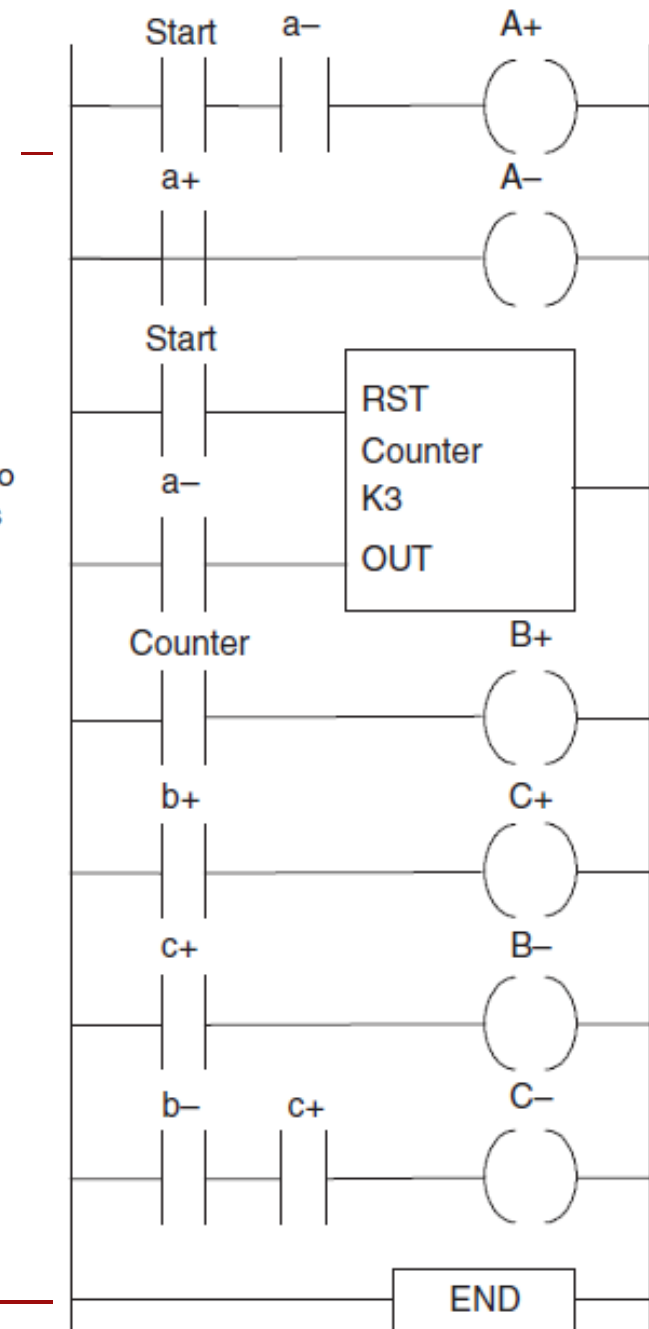
Pergerakan Piston: A+, A-, A+, A-, A+, A-, B+, C+, B-, C-



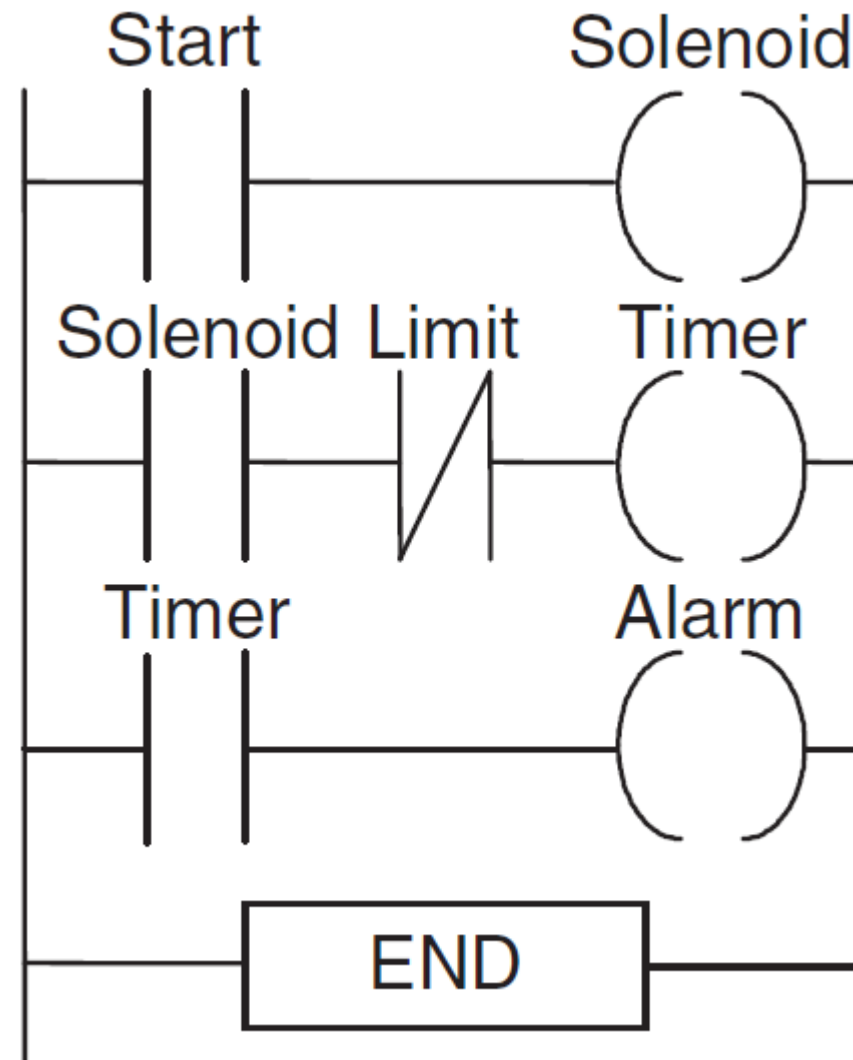
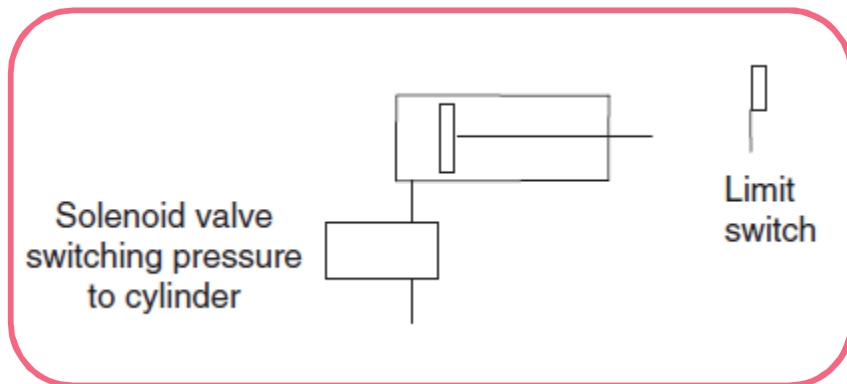
Perancangan Ladder Diagram



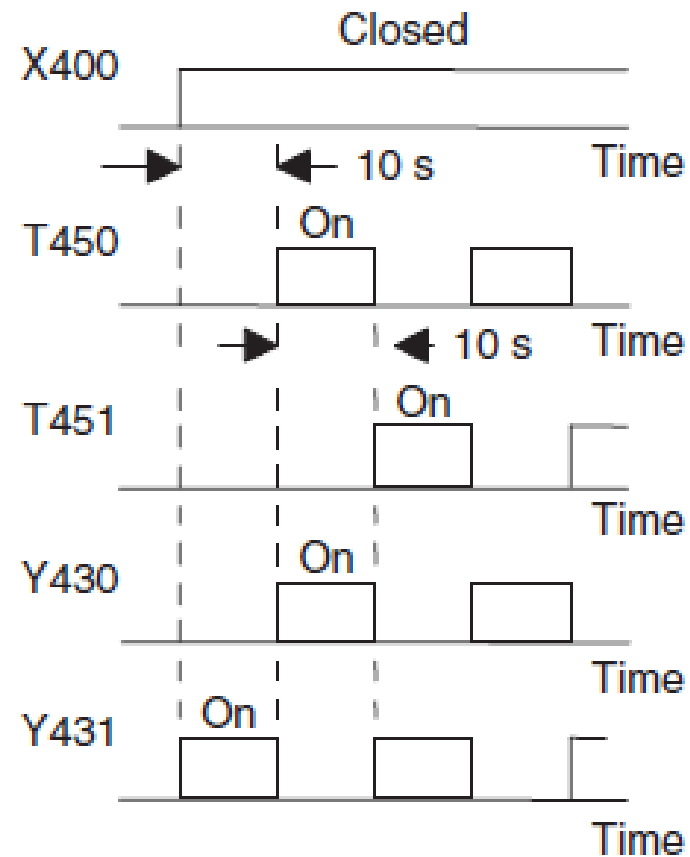
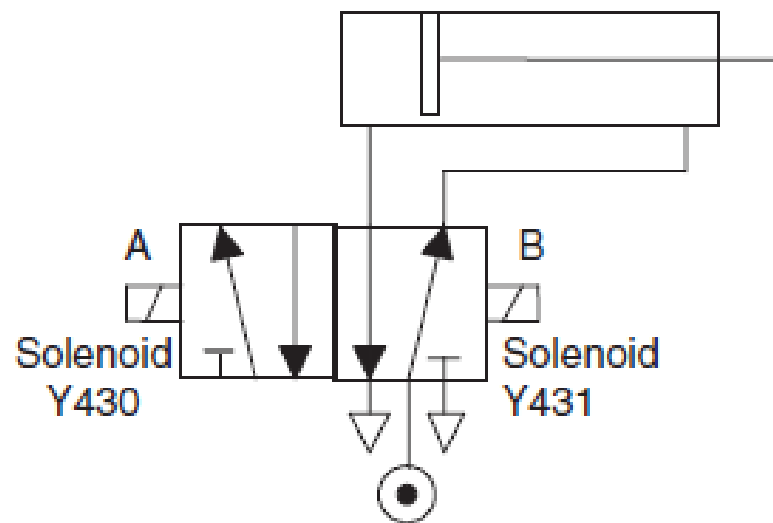
a-, a+, b-, b+, c-, c+ : input LS
 A-, A+, B-, B+, C-, C+: output
 Counter: 3 hitungan



Aplikasi Sederhana

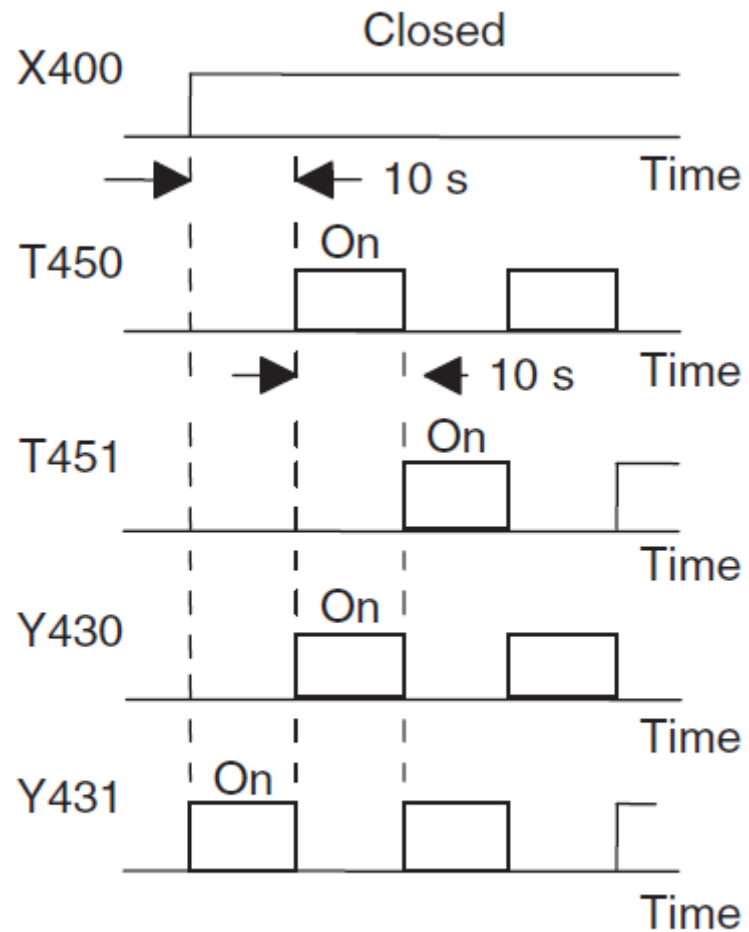


Siklus Piston

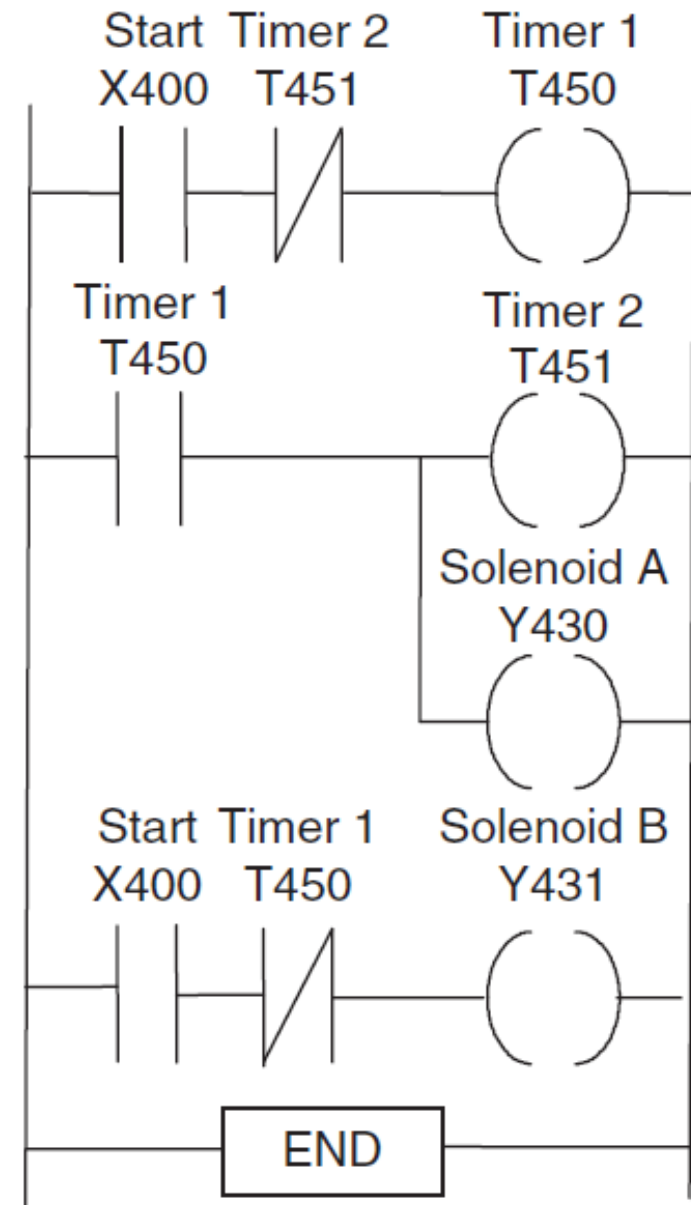


Timing diagram

Implementasi LD

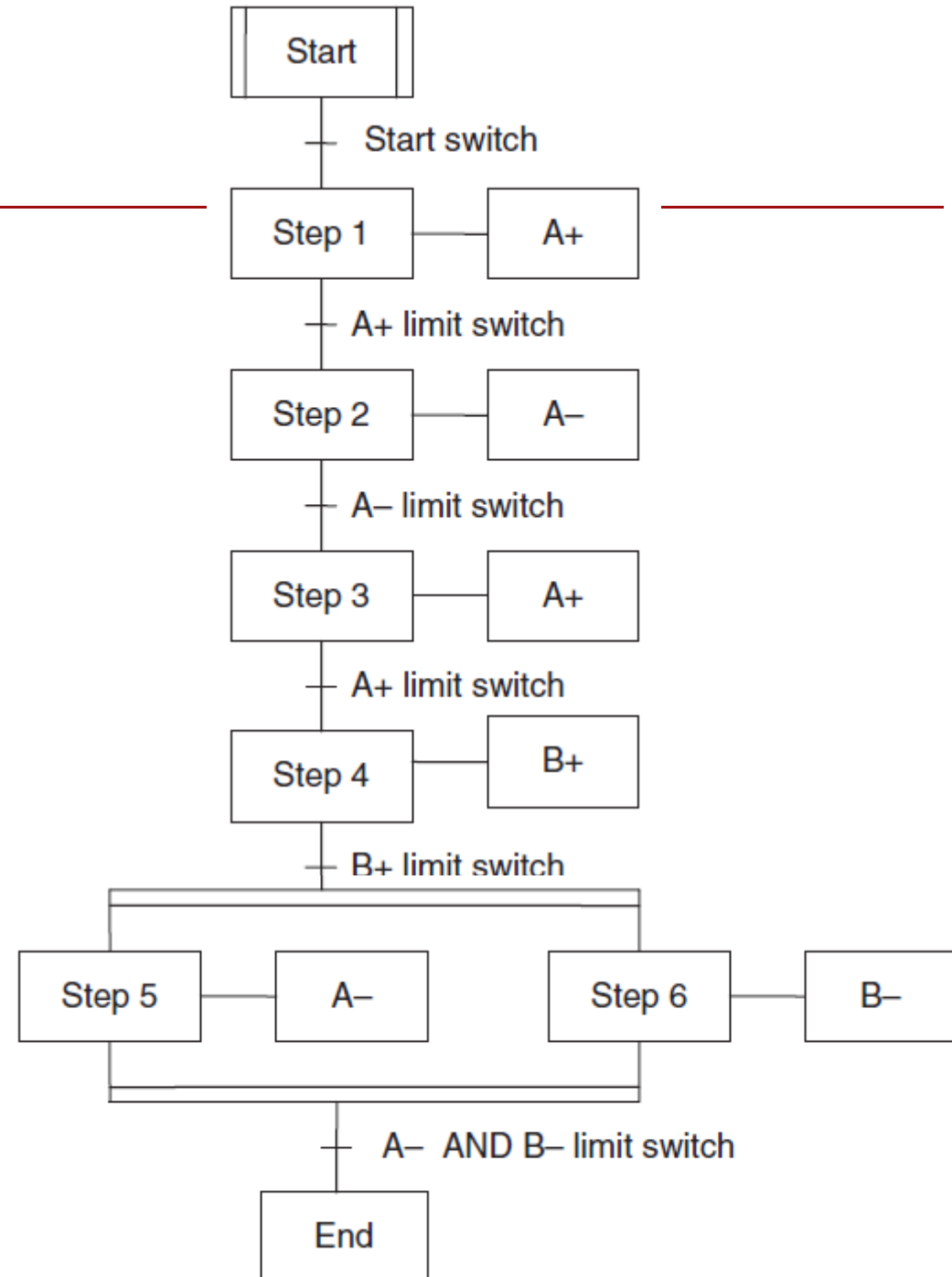
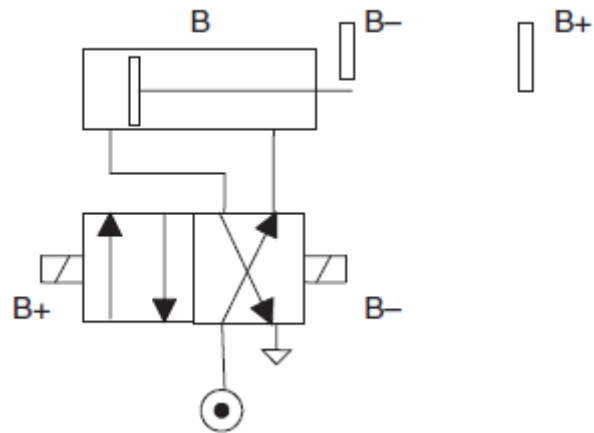
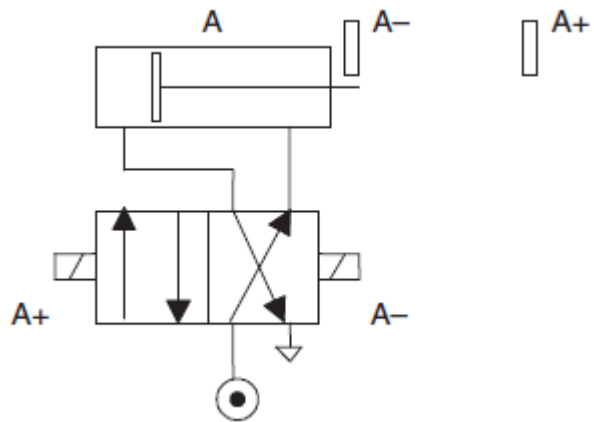


Timing diagram



Seq:

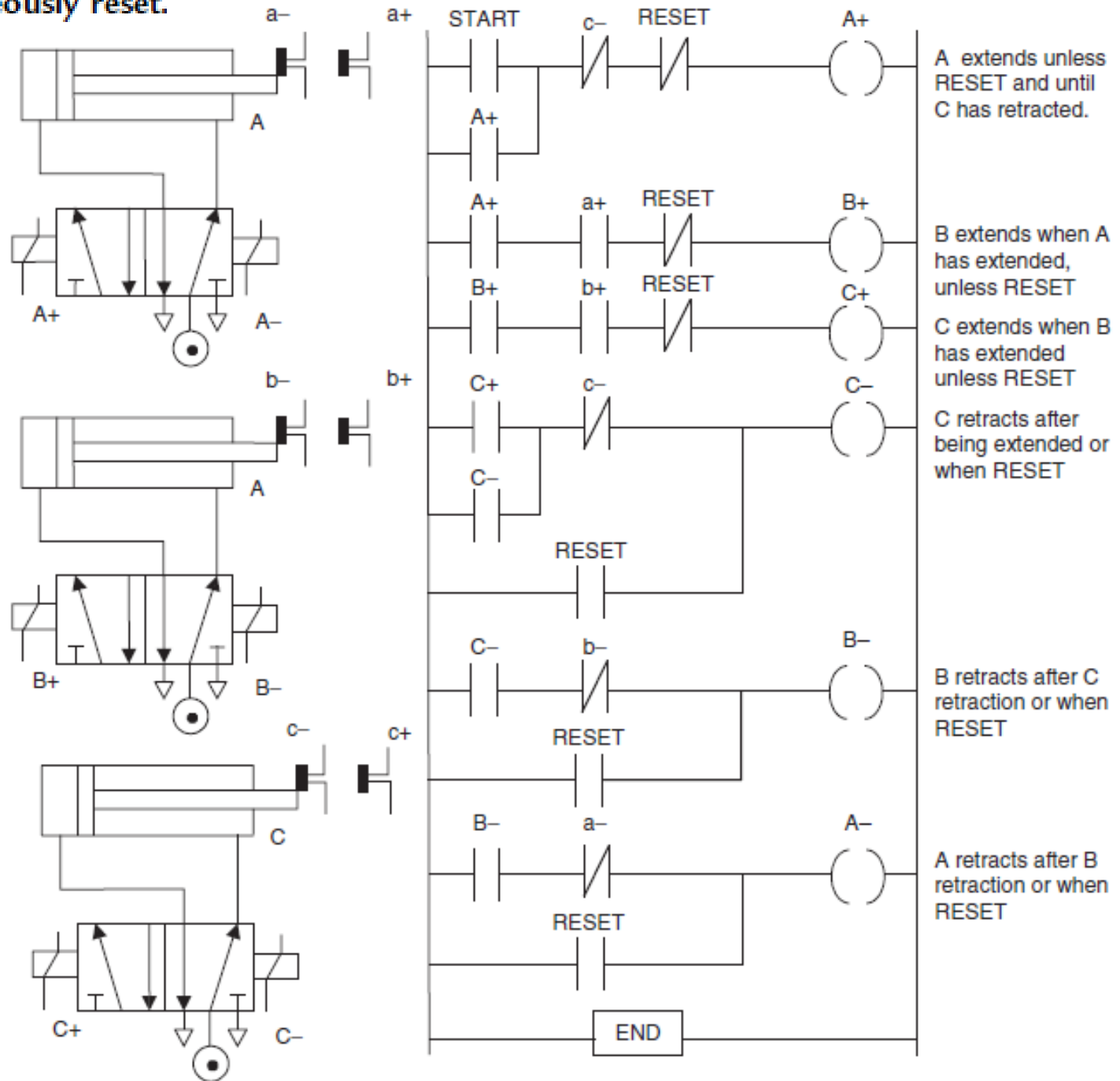
A+, A-, A+, B+, A-, B-



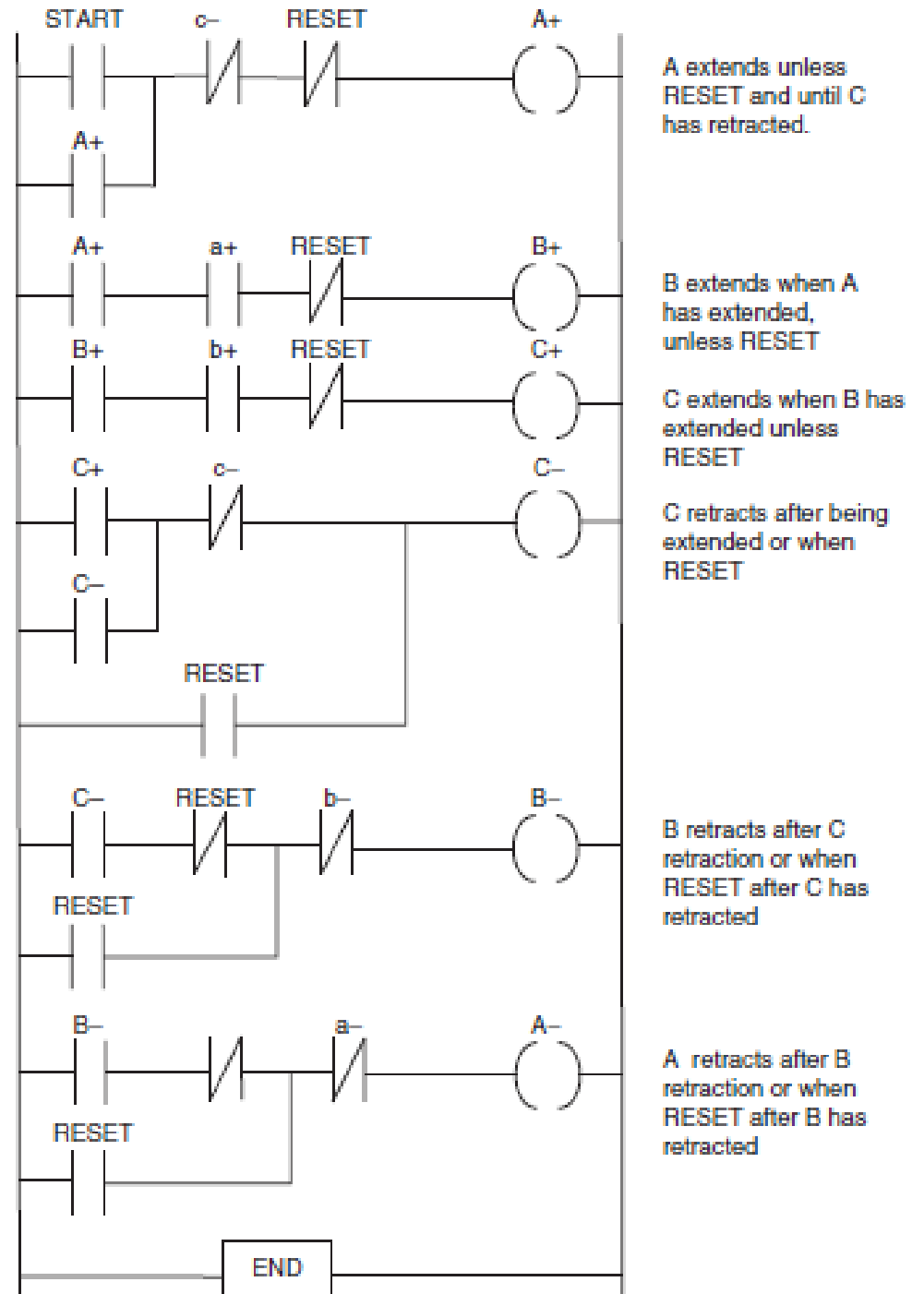
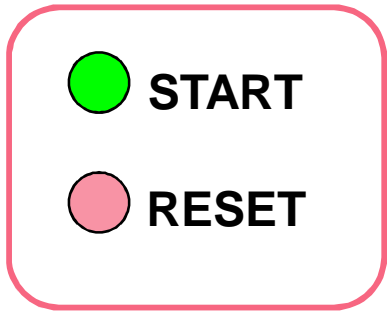
All cylinders simultaneously reset.

● START

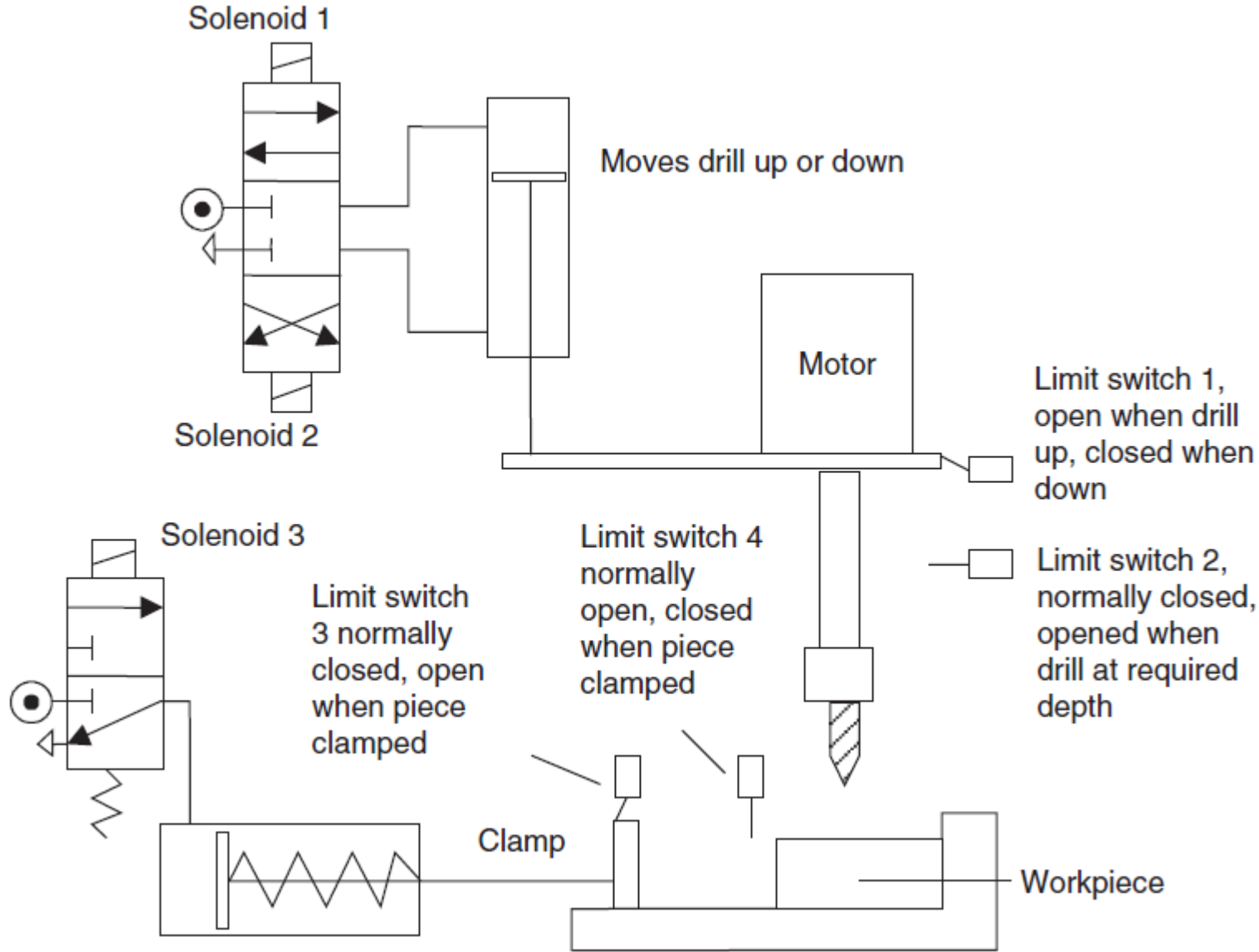
● RESET



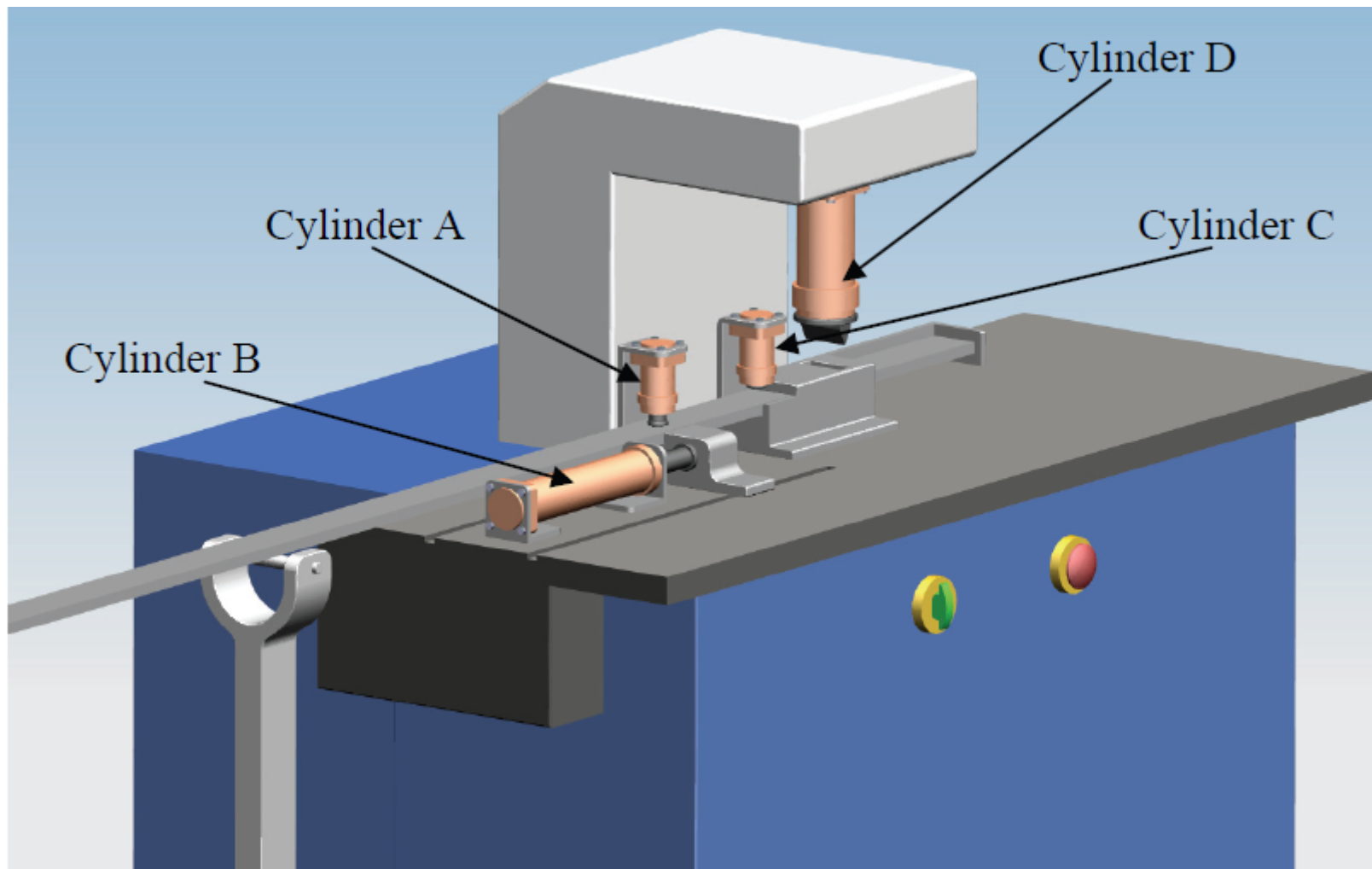
Reset in order C- B- A-



Drilling Device (Latihan #1)



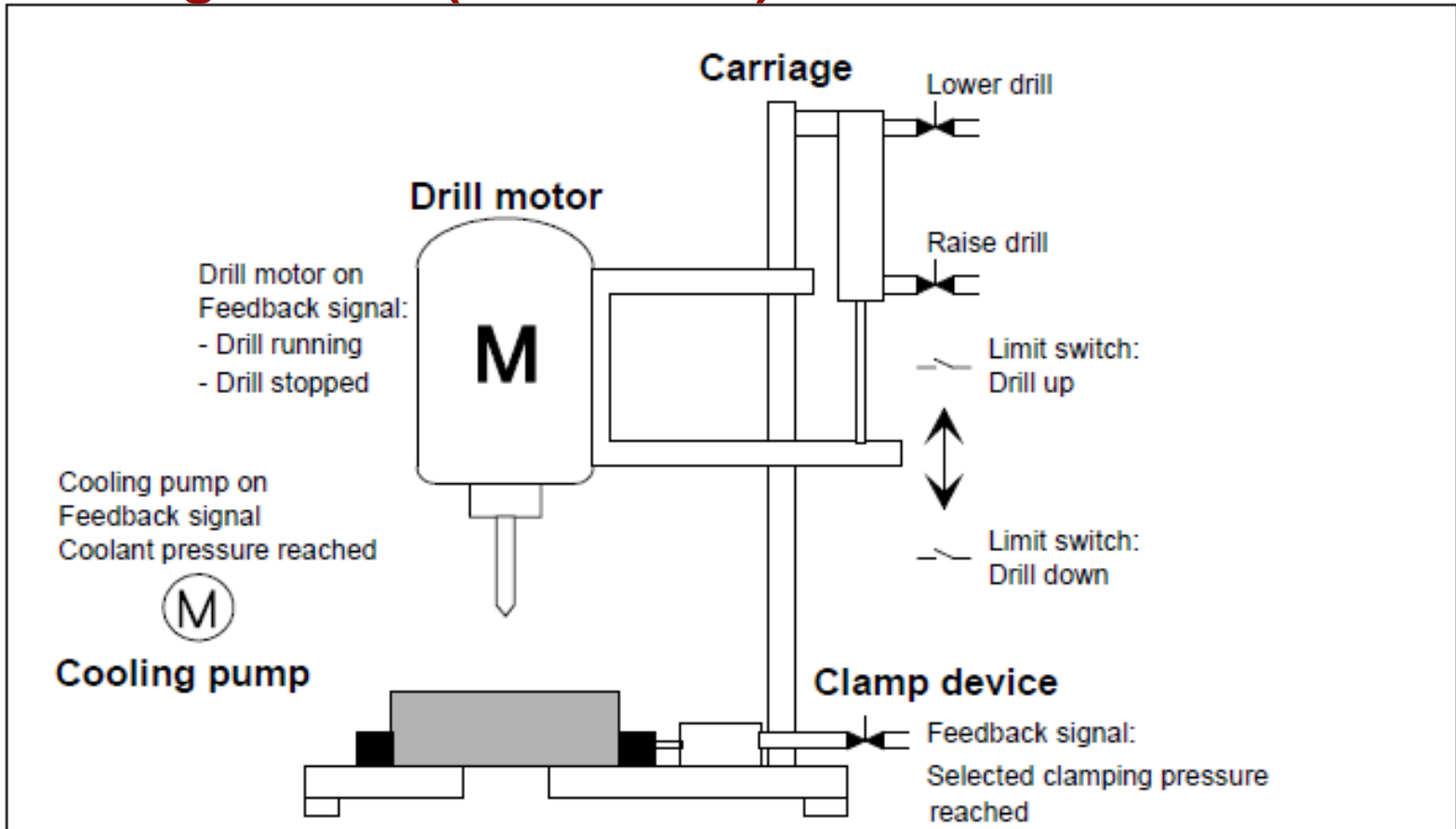
Cutting Device (Latihan #2)




I/O List

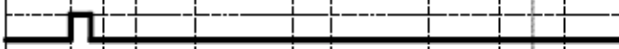


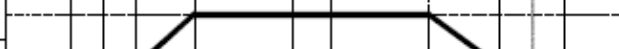
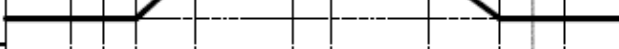


Symbol	Address	Data type	Comment
di_cyl-A_in	E 0.0	BOOL	pneumatic cylinder A in basic position
di_cyl-A_out	E 0.1	BOOL	pneumatic cylinder A in working position
di_cyl-B_in	E 0.2	BOOL	pneumatic cylinder B in basic position
di_cyl-B_out	E 0.3	BOOL	pneumatic cylinder B in working position
di_cyl-C_in	E 0.4	BOOL	pneumatic cylinder C in basic position
di_cyl-C_out	E 0.5	BOOL	pneumatic cylinder C in working position
di_cyl-D_in	E 0.6	BOOL	pneumatic cylinder D in basic position
di_cyl-D_out	E 0.7	BOOL	pneumatic cylinder D in working position
di_start	E 1.0	BOOL	start button
do_cyl-A_open	A 0.0	BOOL	set pneumatic cylinder A to work position
do_cyl-B_open	A 0.1	BOOL	set pneumatic cylinder B to work position
do_cyl-C_open	A 0.2	BOOL	set pneumatic cylinder C to work position
do_cyl-D_open	A 0.3	BOOL	set pneumatic cylinder D to work position

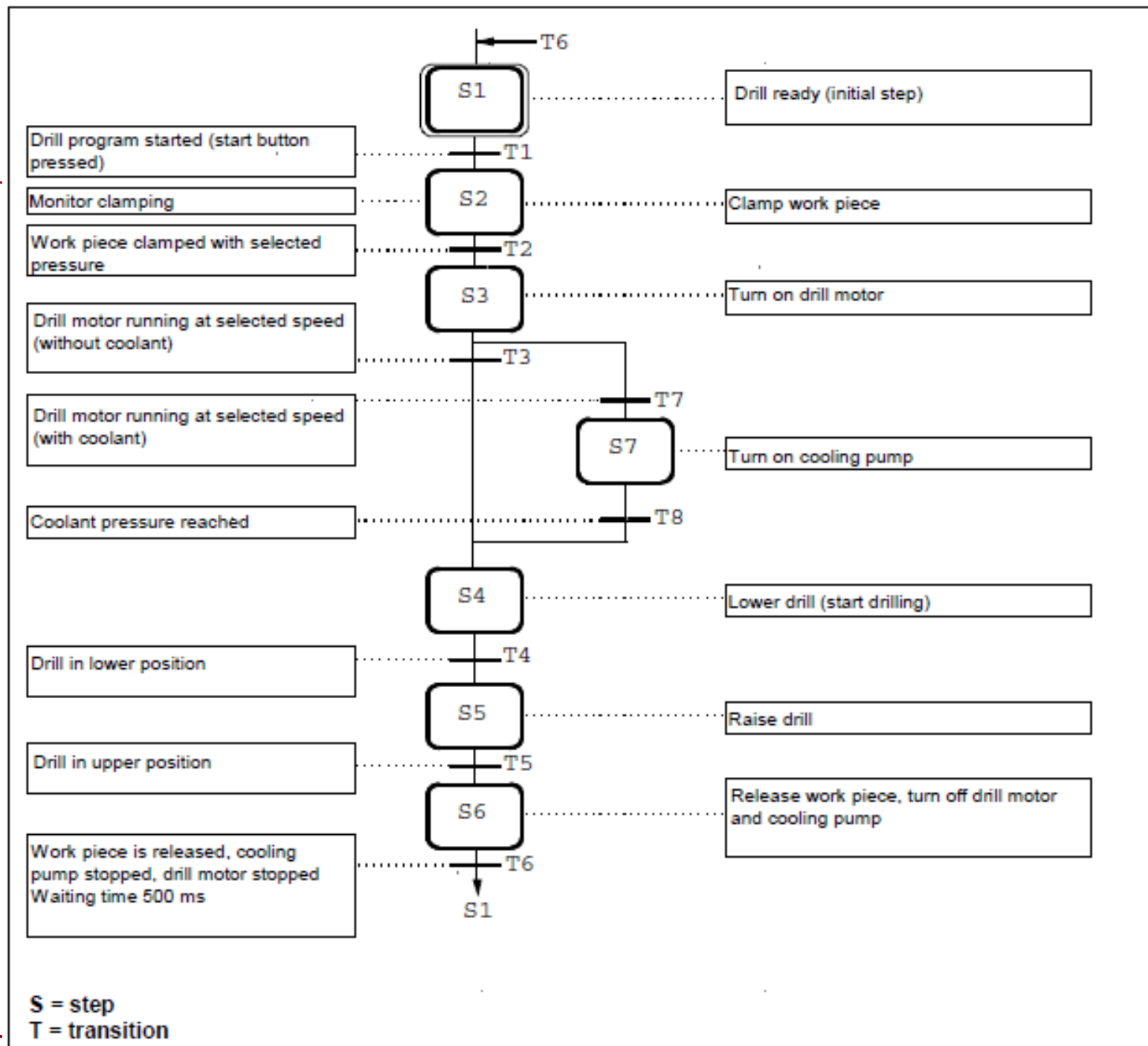
Drilling Device (Latihan #3)



 **Start button**

 **Coolant switch**

Element	State	
Start		
Clamping device	On	
	Off	
Motor	running	
	stopped	
Carriage	up	
	down	



Absolute Addresses	Symbolic addresses	Explanation
Inputs	in the program (I)	
I 0.0	Dr_mot_running	Feedback signal for drill running at selected speed
I 0.1	Dr_mot_stopped	Feedback signal for drill stopped
I 0.2	Drill_down	Limit switch for drill in lower position
I 0.3	Drill_up	Limit switch for drill in upper position
I 0.4	Cl_press_ok	Feedback signal for work piece clamping pressure reached
I 0.5	Coolant_sel	Selector for coolant (dependent on work piece)
I 0.6	Cool_press_ok	Feedback signal for coolant pressure reached
I 0.7	Start_button	Start button of the drill
Outputs	in the program (Q)	
Q 0.0	Dr_mot_on	Turn on drill motor
Q 0.1	Cool_pump_on	Turn on cooling pump (dependent on work piece)
Q 0.2	Lower_drill	Lower drill and carriage to bottom limit position
Q 0.3	Raise_drill	Raise drill and carriage to the upper limit position
Q 0.4	Clamp_workp	Clamp work piece at required pressure
