



FACULTY  
OF MECHANICAL  
ENGINEERING

**Semestral Task**

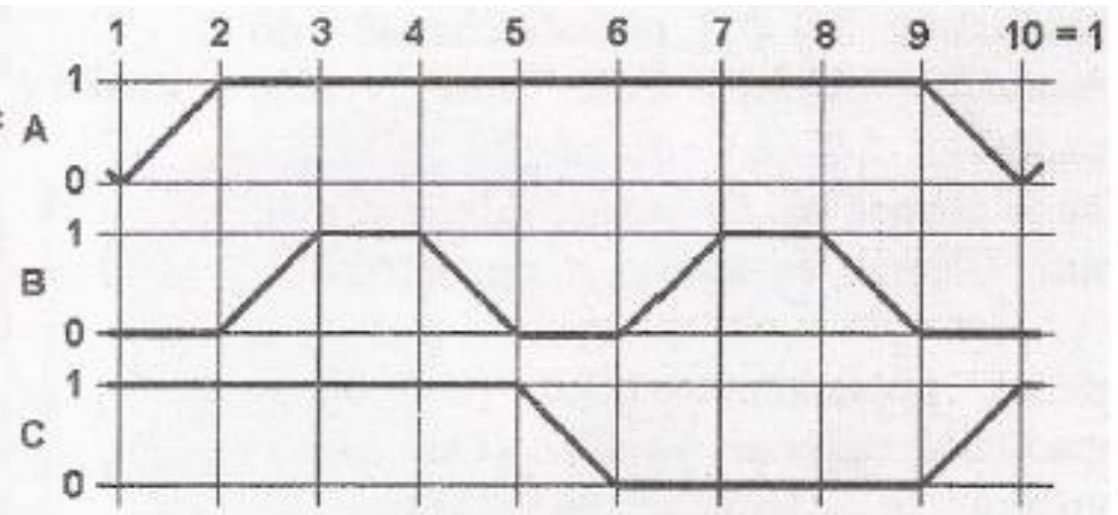
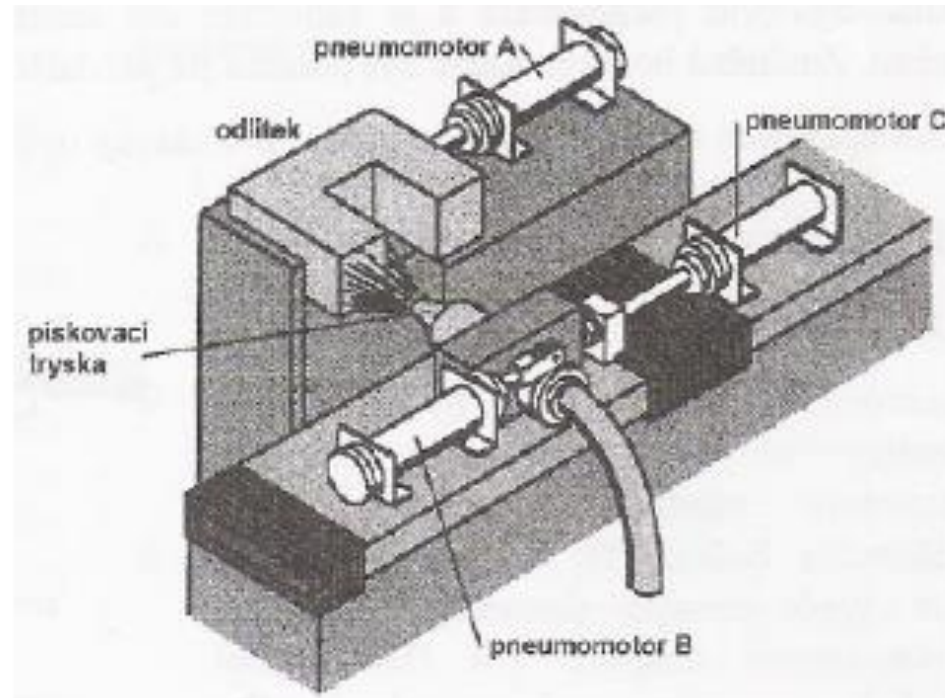
**Project A**

# Project Description

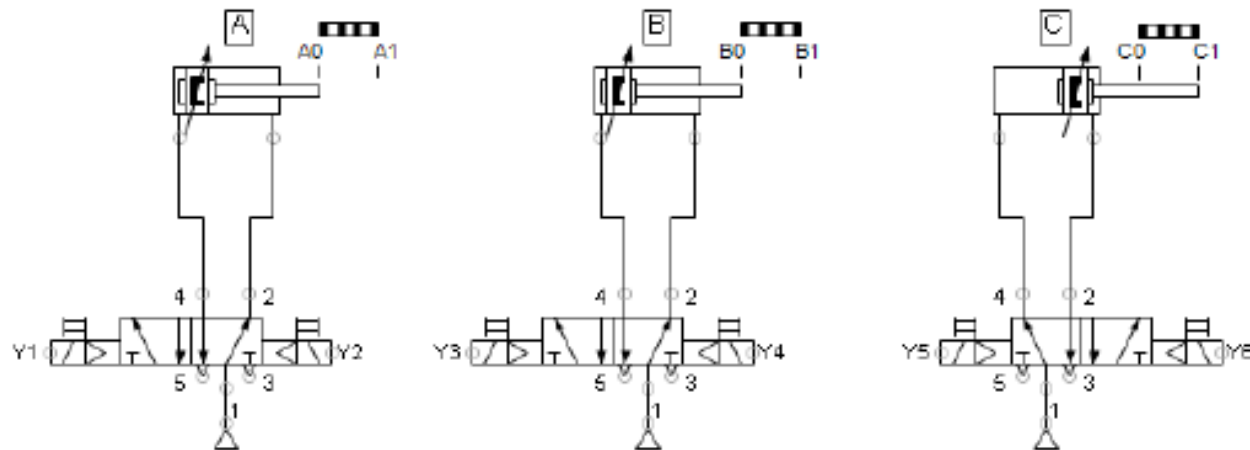
## Functionality Desired

There is a need to sand (cleanse) two arms of a U-shaped casting. The casting is put manually into the clamping facility. Then, via a START button, the command to begin the operation is relayed to the PLC. The casting is then clamped by the pneumatic motor A. Then, the pneumatic B opens the valve of the sanding nozzle and let it sand for the interval  $T_a$ . This interval of sanding is a parameter and it is possible to change it for each particular piece of casting from HMI facility (textual operator panel or PC with visualisation application). After completion of sanding of one arm of the casting, the pneumatic motor C moves the bed with the nozzle to second arm of the casting. The operation of sanding then repeats with the same interval. After completion of the second arm, the pneumatic motor C returns the bed of the sanding nozzle to the initial position. Then, the casting is released by the pneumatic motor A and it can be removed manually from the clamping bed.

# Situation and step diagram

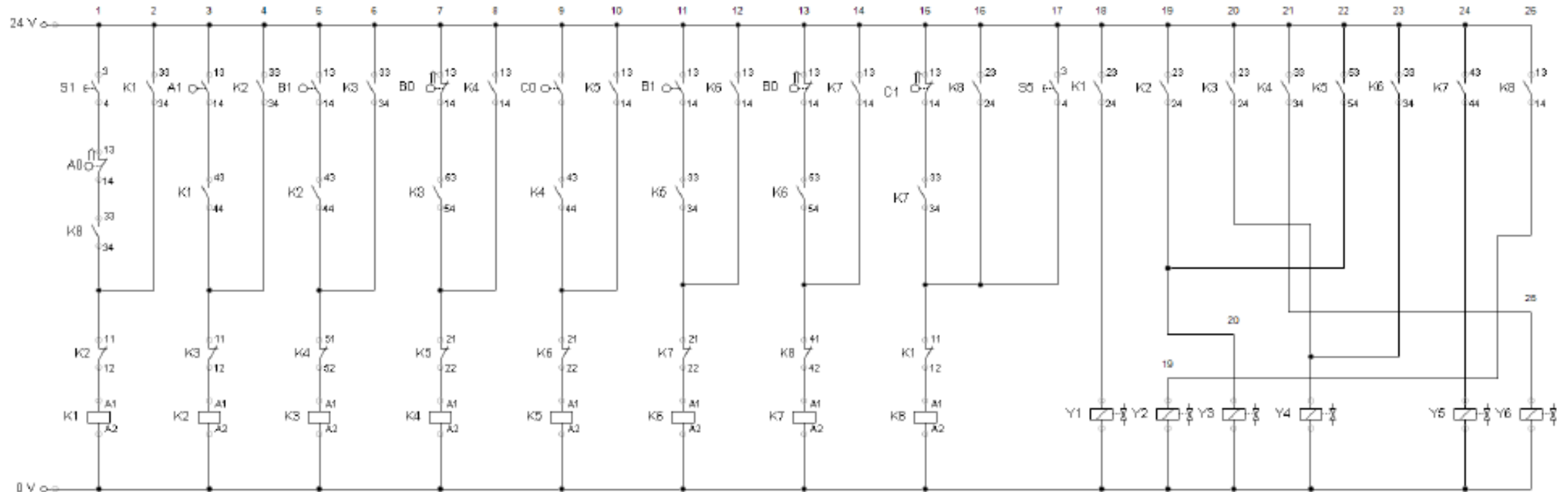


# Model created in FluidSIM



Identification	Quantity value	1	2	3	4	5	6	7	8	9	10
A	x [mm]	100	75	50	25	100	75	50	25	100	75
B	x [mm]	100	75	50	25	100	75	50	25	100	75
C	x [mm]	100	75	50	25	100	75	50	25	100	75

# Circuit created in FluidSIM



# List of INPUTS

S1	Start press button	To start running the program and initiate the sequences
S5	Set/reset press button	To reset the sequences or set them to be in standby mode
A0	End sensor A0	A0 = 1 indicates that motor A is in retracted position
A1	End sensor A1	A1 = 1 indicates that motor A is in extended position
B0	End sensor B0	B0 = 1 indicates that motor B is in retracted position
B1	End sensor B1	B1 = 1 indicates that motor B is in extended position
C0	End sensor C0	C0 = 1 indicates that motor C is in retracted position
C1	End sensor C1	C1 = 1 indicates that motor C is in extended position

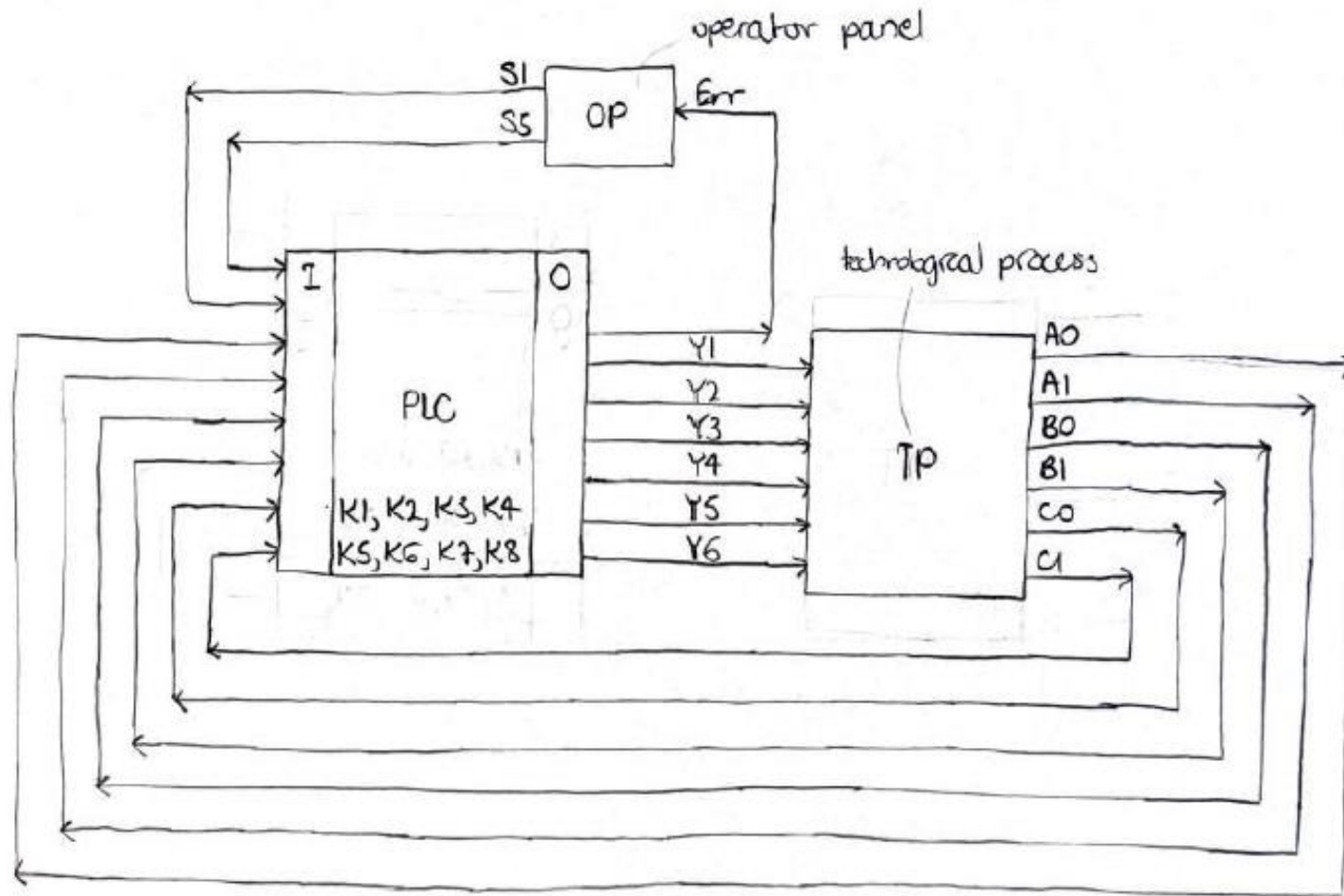
# List of OUTPUTS

Y1	Electric connector Y1	Y1 = 1 actuates the motor A to extend
Y2	Electric connector Y2	Y2 = 1 actuates the motor A to retract
Y3	Electric connector Y3	Y3 = 1 actuates the motor B to extend
Y4	Electric connector Y4	Y4 = 1 actuates the motor B to retract
Y5	Electric connector Y5	Y5 = 1 actuates the motor C to extend
Y6	Electric connector Y6	Y6 = 1 actuates the motor C to retract

# List of internal variables

K1	Memory block 1	K1 = 1 indicates that the first step of the sequence is taking place and resets the signal from previous step, also sets Y1 = 1
K2	Memory block 2	K2 = 1 indicates that the second step of the sequence is taking place and resets the signal from previous step, also sets Y3 = 1
K3	Memory block 3	K3 = 1 indicates that the third step of the sequence is taking place and resets the signal from previous step, also sets Y4 = 1
K4	Memory block 4	K4 = 1 indicates that the fourth step of the sequence is taking place and resets the signal from previous step, also sets Y6 = 1
K5	Memory block 5	K5 = 1 indicates that the fifth step of the sequence is taking place and resets the signal from previous step, also sets Y3 = 1
K6	Memory block 6	K6 = 1 indicates that the sixth step of the sequence is taking place and resets the signal from previous step, also sets Y4 = 1
K7	Memory block 7	K7 = 1 indicates that the seventh step of the sequence is taking place and resets the signal from previous step, also sets Y5 = 1
K8	Memory block 8	K8 = 1 indicates that the eighth step of the sequence is taking place and resets the signal from previous step, also sets Y2 = 1





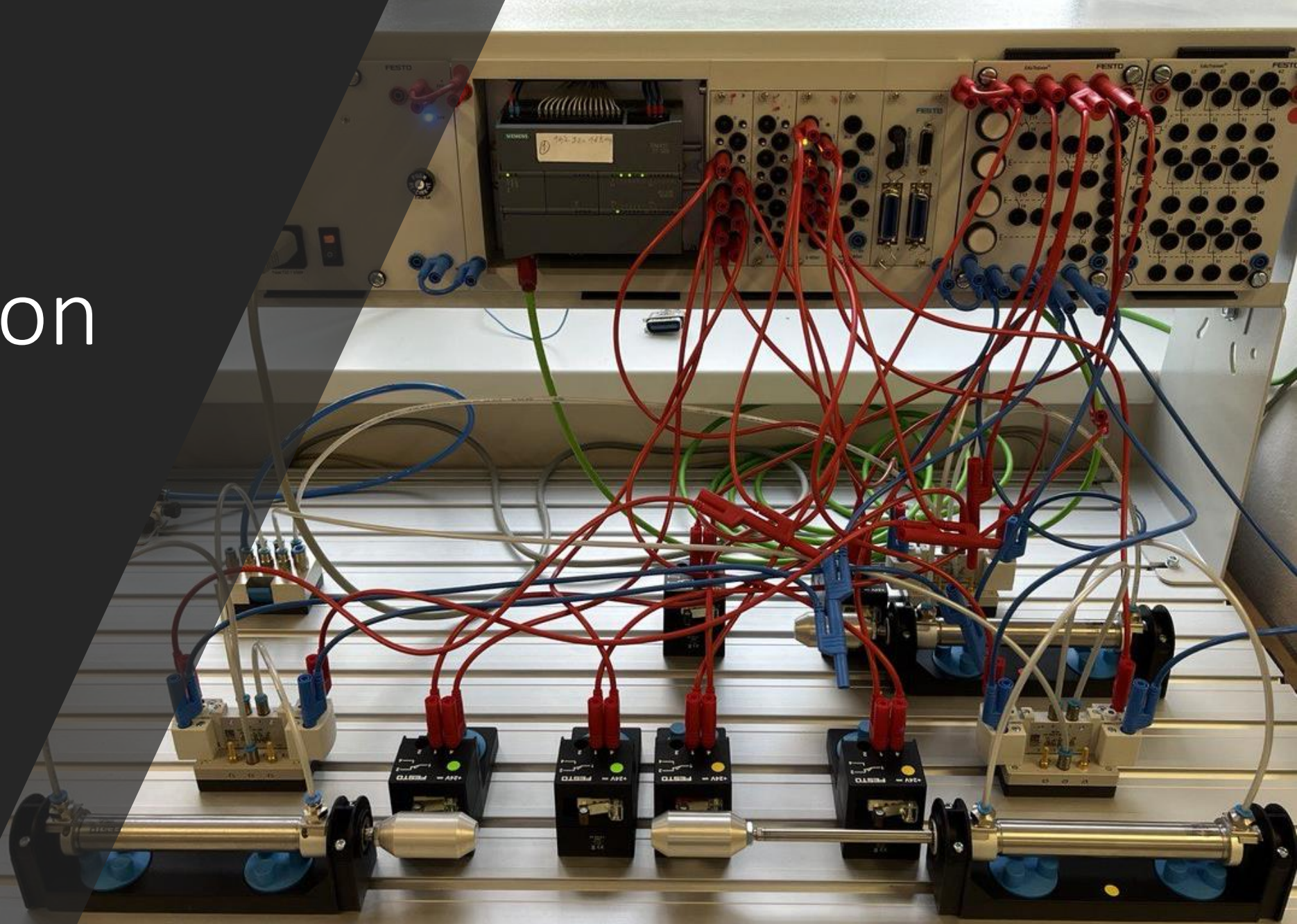
Block  
Diagram

# PLC used

- Siemens SIMATIC S7-1200



# Physical connection



Thank you for your  
attention!

