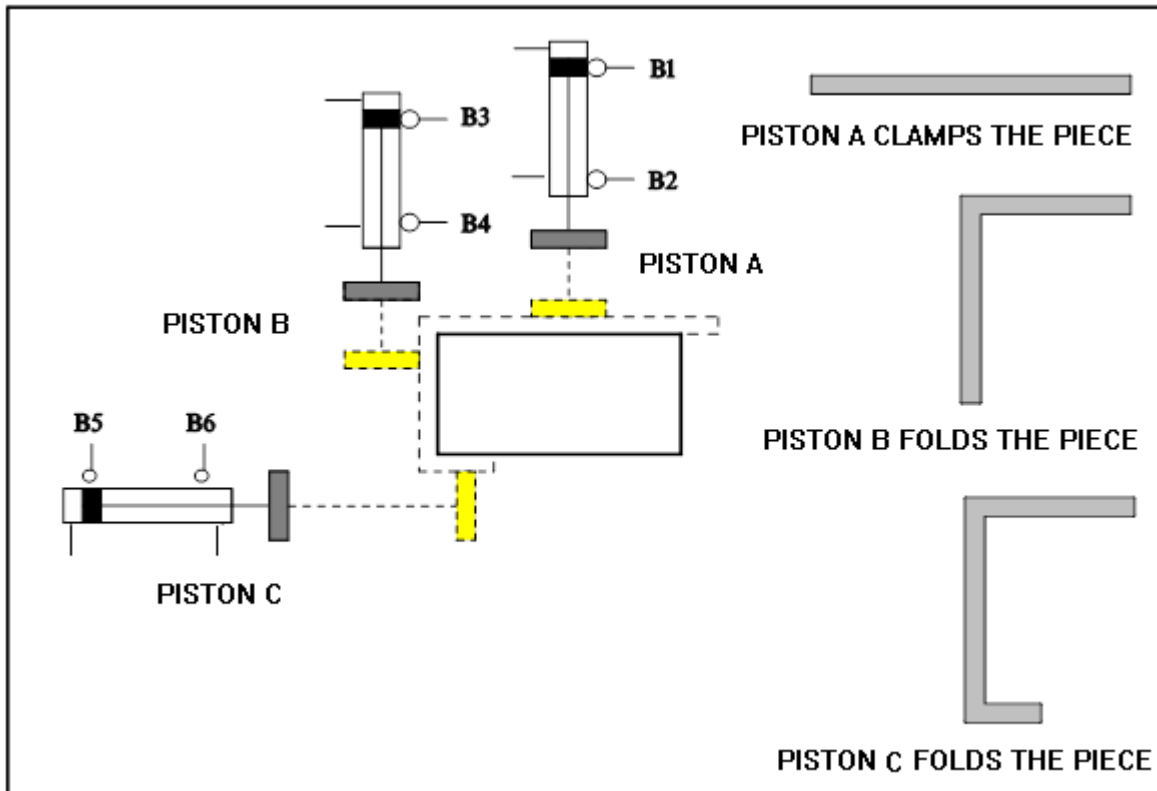




# Pneumatic bending machine



The application is controlled by a PLC S7-200 and contains three double-acting cylinders.

On each of these cylinders, there are two magnetic sensors for detecting the position of the cylinder piston. The cylinders are controlled by a 5/3 way solenoid valve, with pneumatic spring return.

## Operation:

- Cylinder A advances after a start-pushbutton is actuated. The advance-state is detected by B2.
- If cylinder A is advanced, cylinder B advances. The advance-state is detected by B4. Cylinder A stays advanced.
- If cylinder A and B advanced, cylinder C advances. The advance-state is detected by B6. Cylinder A and B advance.
- Is B6 detected, cylinder C retracts. This is detected by B5.






- Is B5 detected, cylinder B retracts. This is detected by B3.
- Is B3 detected, cylinder A retracts. This is detected by B1.
- All cylinders are now in begin position and the process can start again after a start pushbutton is actuated.
- We can bring back all cylinders in retract position with a stop pushbutton.








Design an electropneumatic circuit diagram for the components you selected and test its function. Draw this circuit diagram in E-PLAN.  
Connect the solenoid valves, sensors and compressed air lines.  
Draw a pneumatic circuit in FluidSim (optional).  
Draw an action plan in Grafcet Editor.  
Create a PLC circuit and transfer the solution to MicroWin.  
Test your circuit via PLC S7-200.

## Components of the bendingsimulation



The following table lists the most important components of the bending station.

	Double-acting cilinder
	Electrically control valve 5/2
	Solenoid 24VDC



	One way flow control valve
	Compressed air regulator
	Magnetic proximity sensor/switch with 3 pole cable 24VDC
	Mounting for proximity sensor
	Quick star fitting
	Silencer
	Distribution block



	Hoses
	SIEMENS PLC S7-200 (relay)

### ***Assembly and wiring***

The application is almost completely made up.

Pneumatic: the compressed air lines must be connected to cylinders and valves.

Electrical: wiring push buttons, sensors and valves must be connected to the inputs and outputs of the PLC.

### ***Preparation***

Adjust speed control of the cylinders in advanced position.

Checking the correct connection of the three-wire sensors and valves.

Simulation of the bending process.

After generating these connections, we will check them by steering all cylinders, sensors and relays via the PLC.

### ***Aids***

Grafset Editor, MicroWin, bending simulation panel.

### ***Learning objectives***

Upon completing this exercise, you should

- be able to select the components of an electropneumatic circuit.
- be able to design electropneumatic circuits.
- be able to control a double-acting cylinder using MicroWin.
- be familiar with the function of magnetic proximity sensors.
- be able to realize control circuits using sensors.
- be able to create simple sequences.
- be able to design a ladder diagram in MicroWin.