

## PNEUMATIC COMMAND ADAPTING FOR MANUFACTURING TECHNOLOGIC GAUGES

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**Abstract:** The machine offers a good solution for the pneumatic efficiency increasement of some manufacturing operations. First of all, it's about the flexibility insurance, regarding the manufactured probe 's geometry, but also the costs and times reducing necessary for this process. The paper presents a representative example, consisting in the pneumatic command of a different forms and length folding profile machine.

**Key words:** automatisation, pneumatics, modular logic sequency (MLS)

### 1. Advantages of the pneumatic command systems

The use of the pneumatic command and ordering systems presents a lot of advantages, as:

- homogenization of the manufacturing machines functioning, by the point of view of energy;
- flexibility increasement regarding the manufactured probes;
- easy repairing and conservation;
- robustness in functioning;
- relative low costs

The pneumatic command and ordering systems were successfully used to a very large series of manufacturing and processing machines and technologic gauges.

### 2. The adapting of the pneumatic command systems for the profiles folding machines

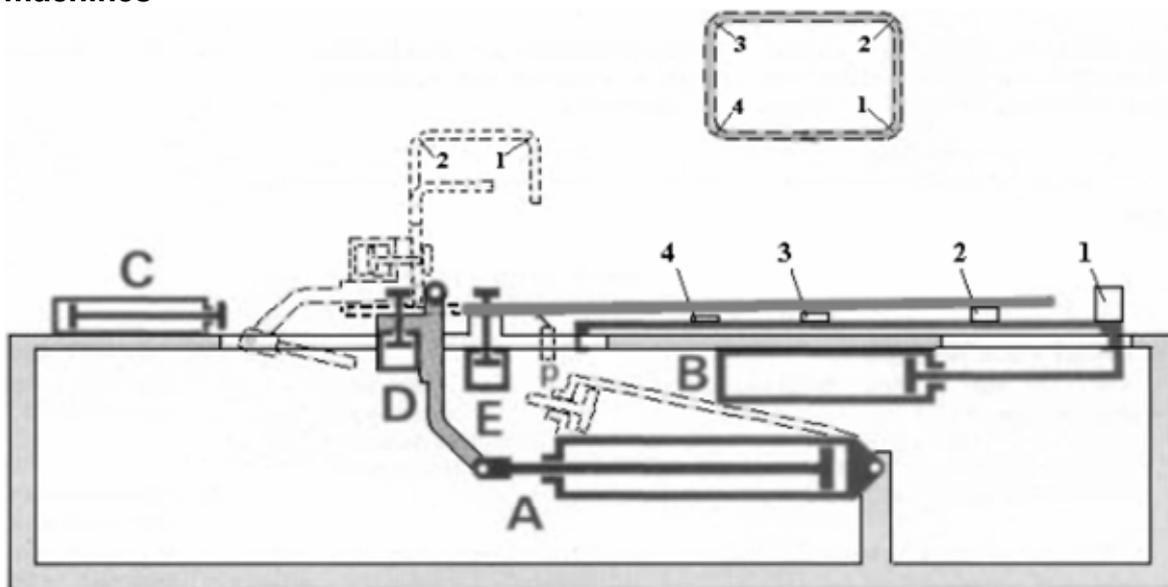


Fig. 1 – The functioning principle of a profile folding machine [1]

In the paper there is described an example in which to a profile folding machine was successfully adapted a pneumatic command and ordering system. The machine's functioning principle equipped with integrated pneumatic command is presented in fig. 1. The machine serves to the folding of some iron cores or sheet profiles in four successive points, resulting an enclosed frame.

The pneumatic ordering system who equips the machine is composed by five pneumatic cylinders: A, B, C, D and E, with double action, having the following destination:

- A serves to the sheet profile folding;
- B realize the table advance , by the piston retracting;
- C – used as stopper to the advance of the folding supposed sheet profile;
- D and E – used for the sheet profile fixing.

The advance / retracting command of the cylinders is made with 3/2, 4/2 or 5/2 pneumatic distributors [2].

In the first phase was projected a pneumatic ordering system, with automatic functioning mode, for the running of a frame manufacturing cycle. In order to project the system two steps were followed: first of all, a logical events diagram necessary to pass through a manufacturing cycle, was draw up. (Fig. 2) and the second step consisted in the pneumatic logical command scheme projecting.

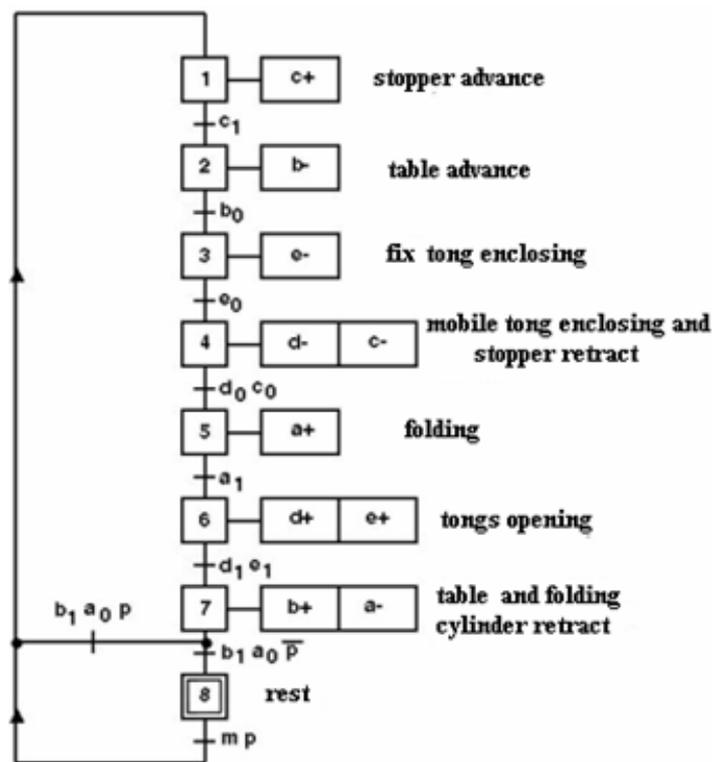


Fig. 2 - Logic events diagram for a folding cycle pass through

The cycle taking again must be made four times for each folding point, being conditioned by the probe presence perception by the sensor "p".

To base on the event diagram the command scheme was drawn up (Fig. 3), using a modular logic sequences (MLS). The sequences number coincides with the logic events number, specified in the diagram.

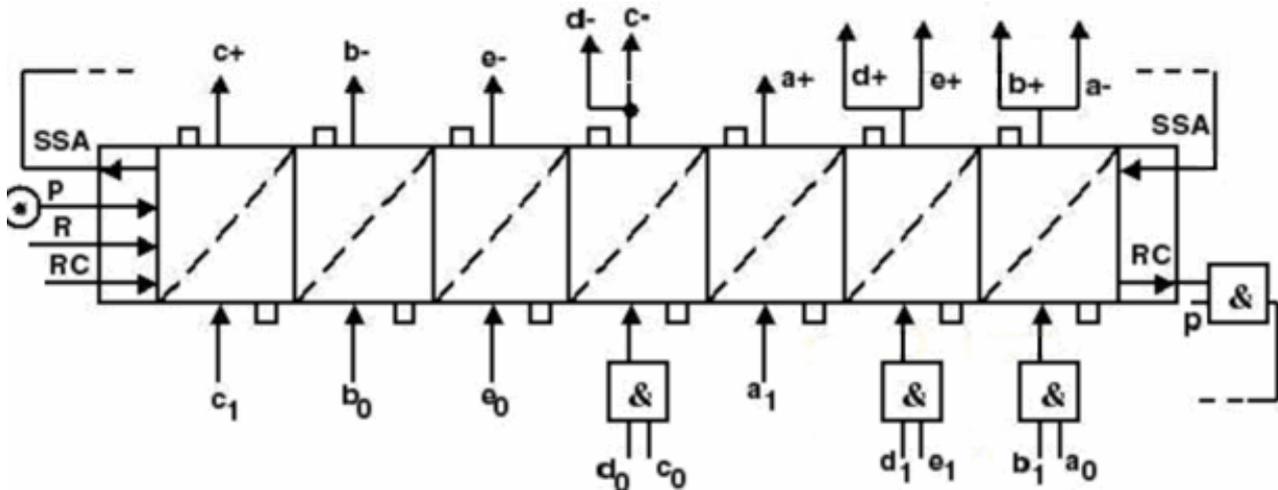


Fig. 3 – Pneumatic command scheme for a probe folding cycle

In practice, very frequently is necessary to establish also some special functioning modes, like: adjustment running modes, manual starts / stops, security stops and so on. In this case, there was took the problem to project some pneumatic command systems for the cycle starts and stops insurance, in order to establish some adjustment modes, through phase by phase running way, or through some specific phases action. For the adjustment mode insurance is necessary, first of all, a security starting, who, at their turn, invokes a cycle initialization. This involves the following sub-cycle retracting phases: **C-**; **D+**, **E+**; **B+**, **A-**.

By the point of view of the logic event diagram projecting, it means a parallel defining of a sub-diagram corresponding to the cycle initialization (Fig. 4).

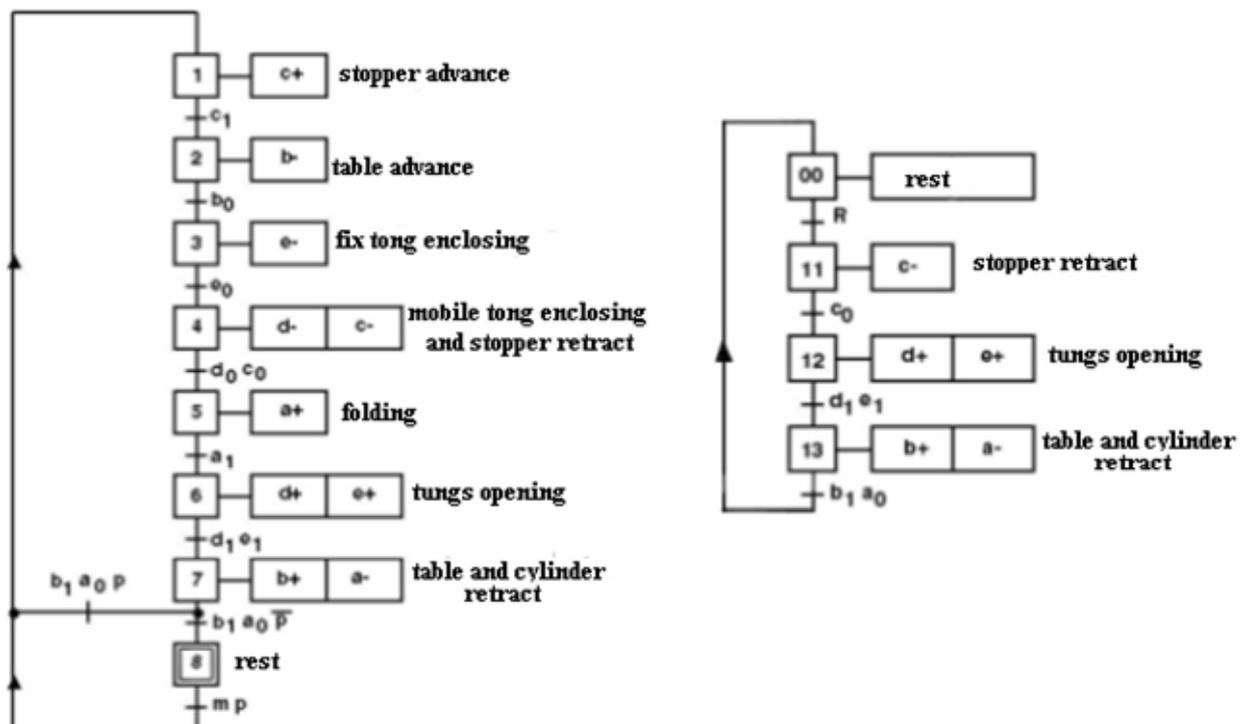


Fig. 4 – Logic necessary events diagram for the pass through a folding cycle for automatic and adjustment mode

By the point of view of the pneumatic command scheme, besides the main MLS, composed by the seven cycle corresponding sequences, in automatic mode, a second MLS is necessary, composed by the four cycle corresponding retract sequences for the initialization (Fig. 5) [3].

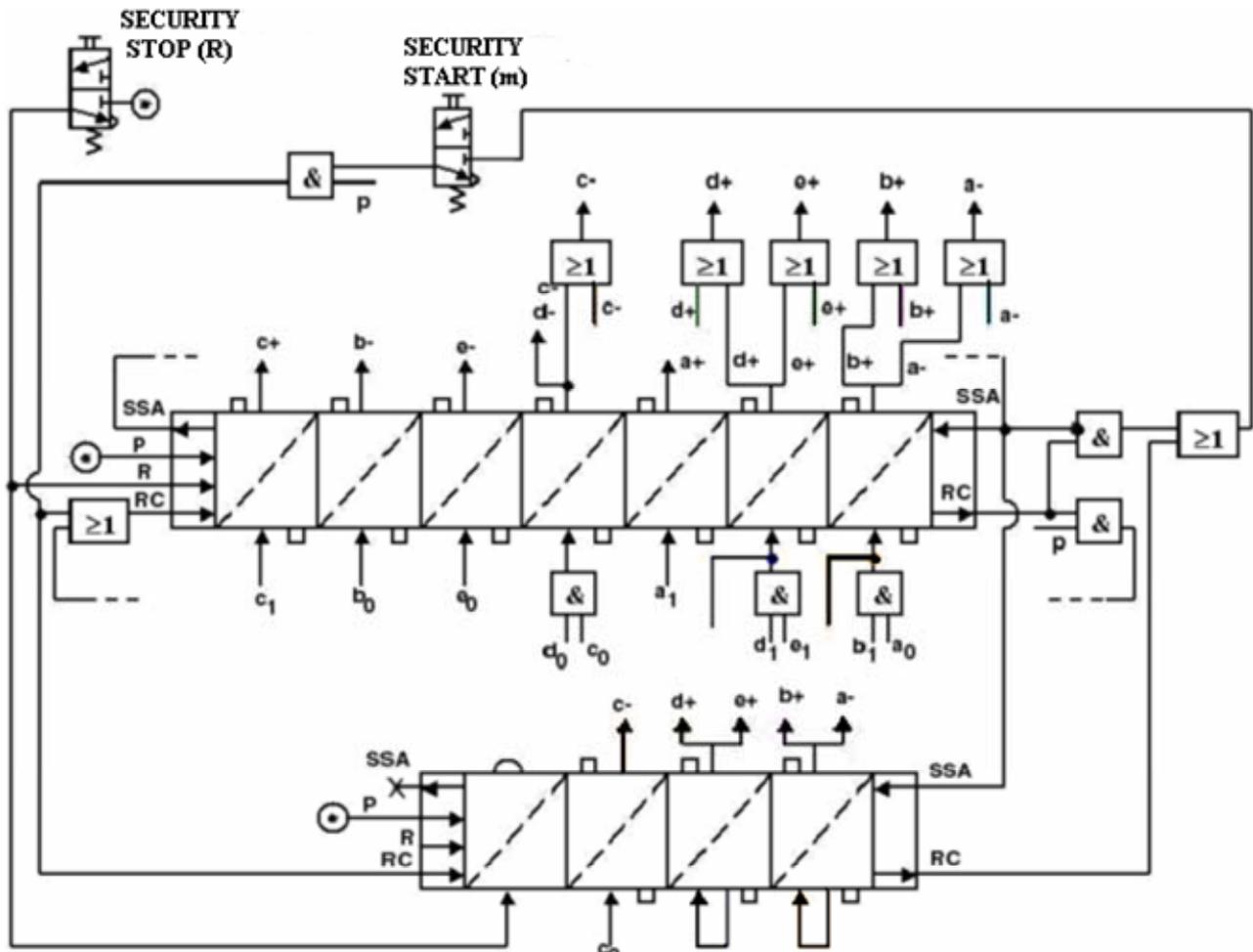


Fig. 5 – The MLS for the pneumatic command of the profile folding cycle, in automatic and adjustment mode [3]

#### References

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