

- Indirect actuation of a double-acting cylinder with a bi-stable valve
- Operating a pressure regulator to limit the piston force
- Use of a pressure sequence valve
- Realisation of a control system with single cycle and continuous cycle by means of a valve with selector switch

Training aims

- Drawing the displacement-step diagram (with signal lines)
- Designing and drawing the circuit diagram
- Comparing one's own solution to the one proposed
- Constructing the circuit
- Function check
- Adjusting the time delay valve
- Adjusting the one-way flow control valve
- Adjusting the pressure regulator and the pressure sequence valve
- Dismantling and orderly replacement of components

Problem

Problem description An electrically heated welding rail is pressed onto a rotatable cold drum by a double-acting cylinder (1A) and welds a continuous plastic sheet into pieces of tubing. The forward stroke is triggered by means of a push button. The maximum cylinder force is set at 4 bar (= 400 kPa) via a pressure regulator with pressure gauge. (This prevents the welding rail damaging the metal drum.) The return stroke is not initiated until the forward end position has been acknowledged and the pressure in the piston area has reached 3 bar (= 300 kPa).

The supply air is restricted for the movement of the cylinder. The flow control should be adjusted so that the pressure increase to $p = 3$ bar (= 300 kPa) only takes place after $t_1 = 3$ seconds, after the cylinder has reached the forward end position (the foil edges which are overlapped are welded by the heated welding rail as increased pressure is applied).

Restarting is only possible when the retracted end position has been reached and a time of $t_2 = 2$ seconds has elapsed. Reversing a 5/2-way valve with selector switch causes the control to be switched to continuous cycle.

Fig. 8/1: Positional sketch



