

Mixing plant

Task definition

The plant consists of two tanks, a mixing tank, a stirrer and an ultrasonic sensor that monitors the filling level in the mixing tank. The plant can be run in Manual and Automatic mode.

Manual mode (S2 switched off)

All valves and the stirrer can be switched on and off independently.

Automatic mode (S2 switched on)

In Automatic mode, the ultrasonic sensor checks whether the mixing tank is empty. Only when the measured value at I07 is less than 4 does the plant switch to Automatic mode. The plant starts up as follows if the tank is empty:

After a delay of 2 seconds (T01), the valve for tank 1 (Y1) opens until the first level (2.5 V) of the sensor is measured. The stirrer then switches on for 10 seconds. There is a pause of 5 seconds after stirring. Only then does the valve Y2 of the second tank open. Once the second level is reached, the stirrer switches on for 20 seconds.

In order to mix both components sufficiently, there is an additional stirring phase of 20 seconds after a pause of 8 seconds. Once this stirring period has elapsed, the drain valve opens Y3.

The stirrer stays switched on while the mixture runs out until level 1 is reached. Only when the ultrasonic sensor detects the empty state of the tank can the process be restarted after 2 seconds.

This is repeated until the main switch S1 is switched on and no manual operation is selected.

Device class used

easy500

Wiring

Inputs

I01 = S1 Main switch (ON/OFF)
I02 = S2 Main/Automatic selector
I03 = S3 Button for valve Y1, tank 1
I04 = S4 Button for valve Y2, tank 2
I05 = S5 Button for valve Y3, mixing tank
I06 = S6 Button for stirrer motor
I07 = Analog input for level monitoring via the measuring sensor

Outputs

Q01 = Y1 Valve for tank 1
Q02 = Y2 Valve for tank 2
Q03 = Y3 Valve for mixing tank
Q04 = M1 Motor for the stirrer

Parameters

T01 = On-delay for open Y1
T02 = Stirrer time 1, 10s
T03 = Pause time 1, 5s
T04 = Stirrer time 2, 20s
T05 = Pause time 2, 8s
T06 = Stirrer time 3, 20s
A01 = $I07 \leq 4$ Mixing tank is empty
A02 = $I07 \leq 258$ (2.5 V) Level 1
A03 = $I07 \leq 630$ (6.0 V) Level 2