

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

easyE4

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 ≤ 4 Mixing tank is empty
A02	I07 ≤ 258 (2.5 V) Level 1
A03	I07 ≤ 630 (6.0 V) Level 2