



## Instruction for the manufacture of cabinets of the Laboratory Assignments in Control Systems

NOTE: voltage work, i.e. switching when the switchboard is live, is always prohibited at the educational institution.

### Controlling the forward/reverse motor starter with PLC

Connect Beckhoff's CX8190 logic as shown in the circuit diagrams so that the motor can be reversed via logic control. Connect the buttons to the logic inputs and control the motor contactors with logic outputs and relays.

Note that the logic I/O uses a voltage of 24 VDC and the motor contactors have a control voltage of 24 VAC.

**Make three different logic programs that control motors:**

#### Program 1

The motor starts clockwise (viewed from the end of the axle) from the pushbutton -SJ1, stops from the pushbutton -SJ3, starts counterclockwise from the pushbutton -SJ2. There must be sufficient time between changes of direction to allow the engine to stop.

#### Program 2

The motor starts clockwise from -SJ1, runs for 5 seconds, stops for 3 seconds and runs counterclockwise for 4 seconds and stops again for 3 seconds.

The cycle continues until the stop button -SJ3 is pressed.

#### Program 3

The motor starts clockwise from the -SJ1 button and changes direction counterclockwise when the inductive sensor BG1 (PNP) is activated. When the inductive sensor BG2 (PNP) is activated, the direction changes clockwise. There must be sufficient time between changes of direction to allow the motor to stop. Stopping is done from the button -SJ3.

The program is made using the TwinCat software. When the program is ready to be tested, the program is uploaded to logic.