

Compatible with
PR200.24.2
PR200.230.2

Sample Project: Press machine

PR200 Programmable Relay

- This is an example project for realizing of a simple press machine control with the PR200 programmable relay. This document describes devices used for this program and how the program is built.
- The machine has a press cylinder, which is located in a protection box, an on / off switch, two start buttons, an emergency stop switch, an LED for status and a sensor for monitoring the cylinder position. The press is only operated in two-hand operation and is only operable with the protection box closed. The sensor monitors these safety precautions.
- Parts should be formed with this pneumatic press machine. The cylinder doesn't move until the following conditions are met:
 - the protection box is closed
 - the emergency stop switch is not actuated
 - both start buttons are pushed (two-hand operation).
- The number of pressed parts is counted by the PR200. It is only counted when the press cylinder is fully extended.
- The counting function is performed with a universal counter function block (CTN). A reset button is used to reset the counter.
- Simple logic functions AND and OR are used in the program to evaluate the above conditions. After successful evaluation, the press cylinder is approached. This is done with the reset start trigger function block (RS). With this RS-trigger, the reset function has a higher priority.

1. Devices and Signal types

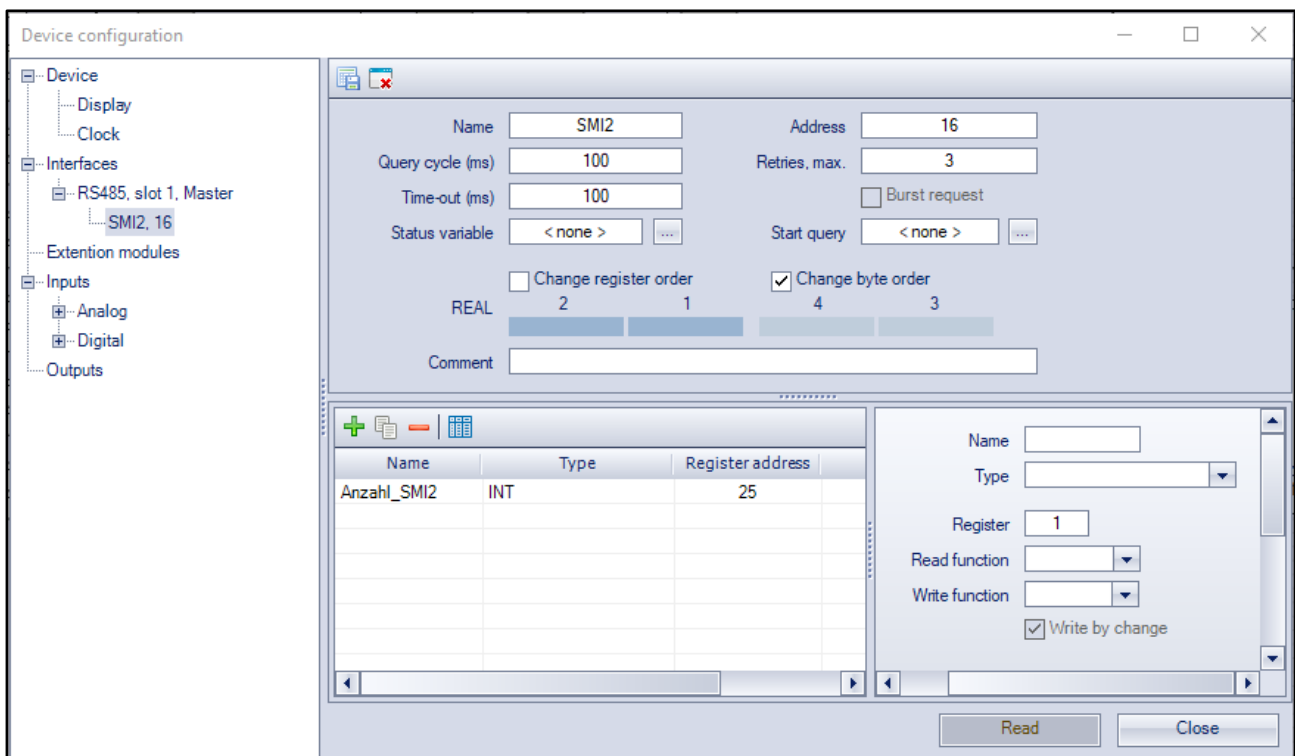
The table below lists which devices are used in this sample project and which signal types are processed by these devices.

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Devices	Signal types	PR200-Interfaces
Sensor to detect the end position of the cylinder	BOOL	DI1
Position sensor for the protection box	BOOL	DI2
Reset button for the counter	BOOL	DI3
Emergency stop switch	BOOL	DI4
On / off switch	BOOL	DI6
Start button 1	BOOL	DI7
Start button 2	BOOL	DI8
Output signal (Press cylinder)	BOOL	DO1
RS485 digital display SMI2	Modbus RTU	RS485 Slot 1

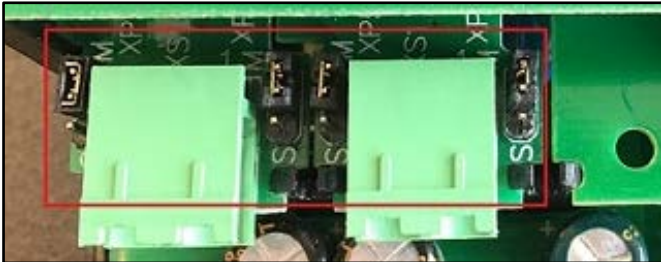
1.1. Device configuration

The RS485 digital display SMI2 is used to visually display the number of pressed parts. It should first be configured. The display is connected to the PR200 via the RS485 slot 1. In the akYtec ALP software, the connection is configured as shown in the figure below.



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The RS485 network interface is set to Slave by default. To use the interface as Master, the jumper positions must be set in accordance with Fig. 4.2a in the PR200 User guide page 10.

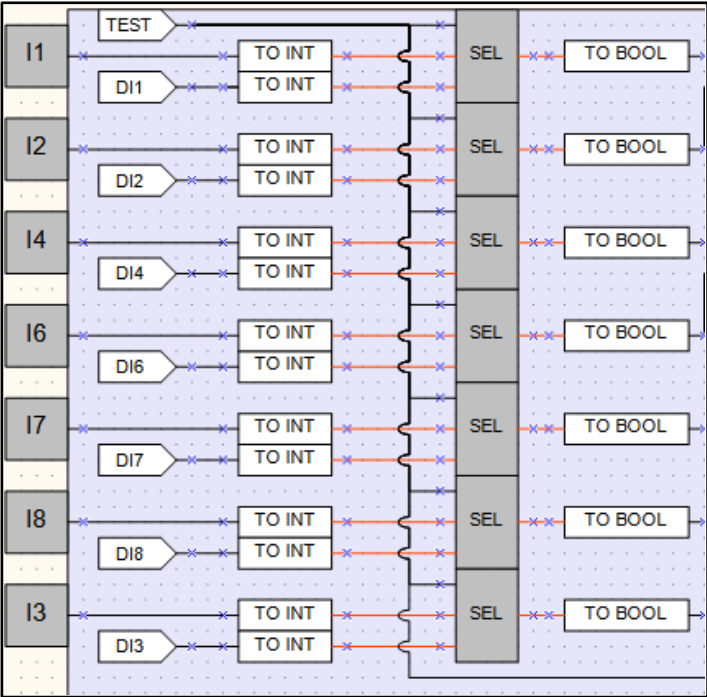


2. The program

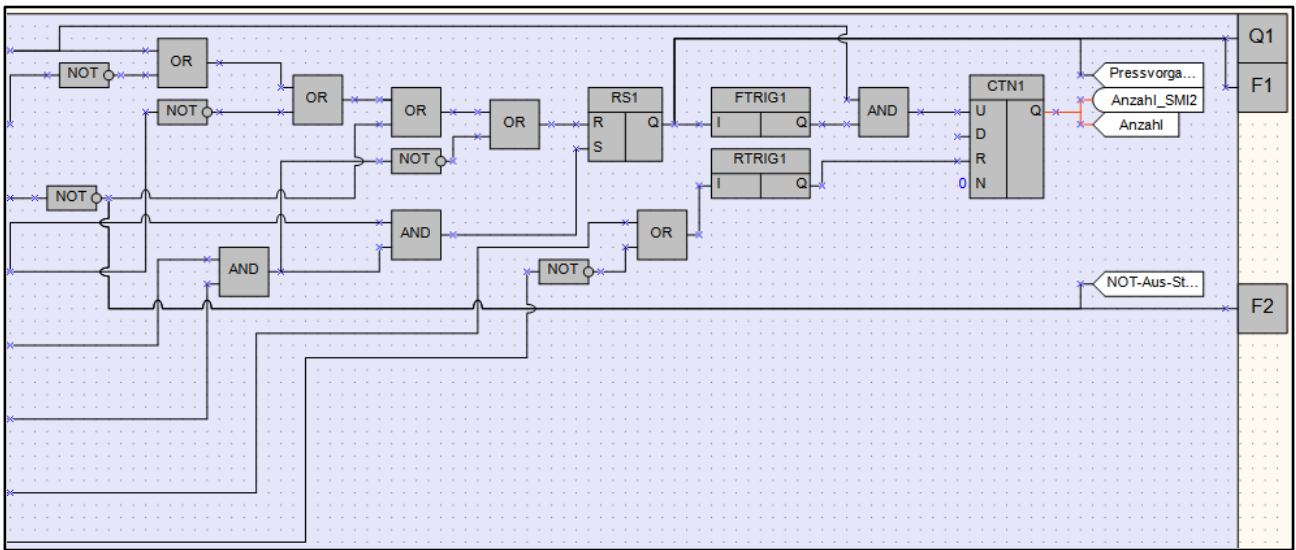
2.1. Program's layout

The program can be divided into two parts. The first part is used to receive input signals and to evaluate these on the basis of the conditions.

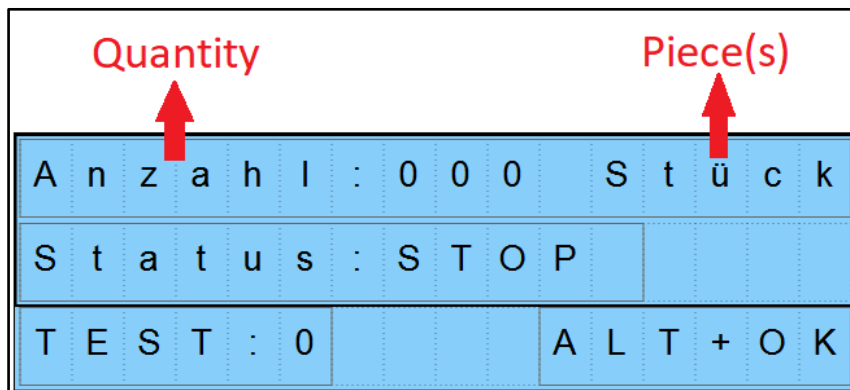
The second part serves to start or stop the press cylinder and to count the pressed parts.



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The number of pressed parts is displayed both on the PR200 screen and on the RS485 display SM12. The press status can also be seen on the PR200 screen.



2.2. Program testing with the PR200

In order to test the program more easily, the input / output signals are stored in several local variables. The variables then can be changed with the function keys on the PR200 and the pressing process can be simulated.

To perform the test, the variable TEST must be set to 1 and the ALT and OK function keys must be pressed together after the program has been successfully transferred to the PR200.

The screen then changes to the test mode (see figure below). In this mode, the individual input variables can be changed.

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I 1 = 0	I 2 = 0	I 3 = 0	I 4 = 0
I 6 = 0	I 7 = 0	I 8 = 0	0 0 0
T E S T : 0		A L T + O K	

To start the press cylinder, the input variables 2, 4, 6, 7 and 8 must be equal to one ($I_2 = I_4 = I_6 = I_7 = I_8 = 1$). The pressing process is indicated by a green LED F1. When the press cylinder is fully extended ($I_1 = 1$), the pressing operation is stopped and the counter is counted up (center-right).

When the emergency stop button is pressed, the pressing process is stopped and the red LED lights up.

If the reset button for the counter is set ($I_3 = 1$), the counter is reset.

To return to normal mode, the variable TEST must be set back to 0 and the ALT and OK function keys must be pressed.