

Compatible with
PR200.24.2.1/ PR200.24.2.2
PR200.230.2.1/ PR200.230.2.2

Sample Project: Pump control

PR200 Programmable Relays

- This is an example project for processing analog and digital signals. The aim of this program is to control two pumps with an emergency stop switch. This document describes how the program is built and how the control works.
- The incoming analog temperature values from a temperature sensor PT100 via temperature transmitter NPT1 are evaluated. The pumps are then switched on depending on the evaluation result.
- The PR200 is connected to a SCADA via Modbus RTU. This SCADA can control the process of this program (enter setpoints and set the emergency stop signal).
- Simple logical functions NOT, OR, AND as well compare function blocks REAL-Greater-Than (fGT) are used in this program. They are used to analyze incoming signals and measurement.

1. Input and output signals

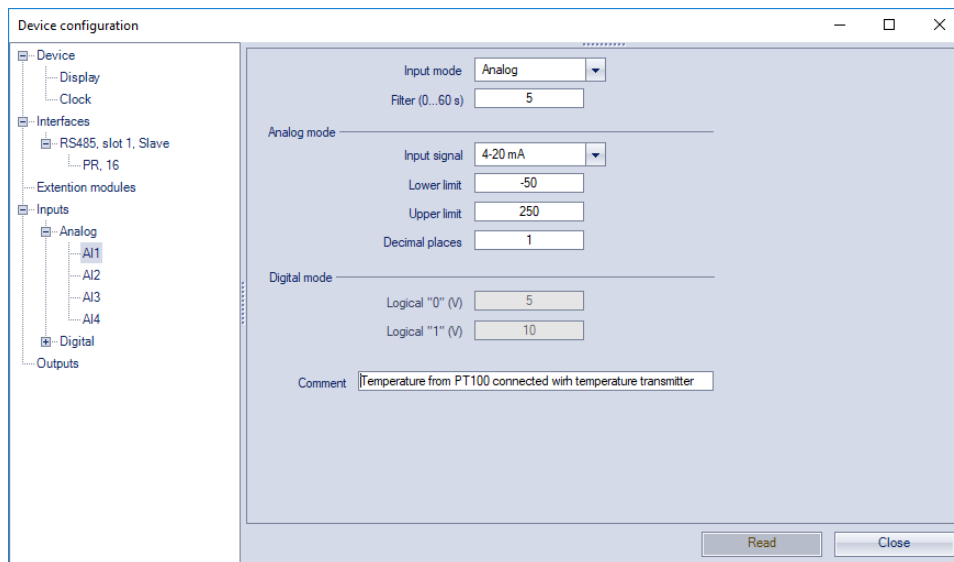
The table below lists which types of signals are processed by the PR200 and the interfaces to which these signals are connected to PR200.

Signal type	PR200-Interface	Description
Analog input (4...20 mA)	AI1	Analog input 4-20 mA from Temperature Transmitter connected with PT100 (-50...+250°C)
Digital input	DI1	Emergency stop button (normally closed N/C)
Digital output	DO1	Pump no. 1
Digital output	DO2	Pump no. 2
Digital output	DO3	LED-light for emergency status-controlling (light on= System stop, light off= system running)
Modbus RTU	RS-485 Slot 1	SCADA as Master

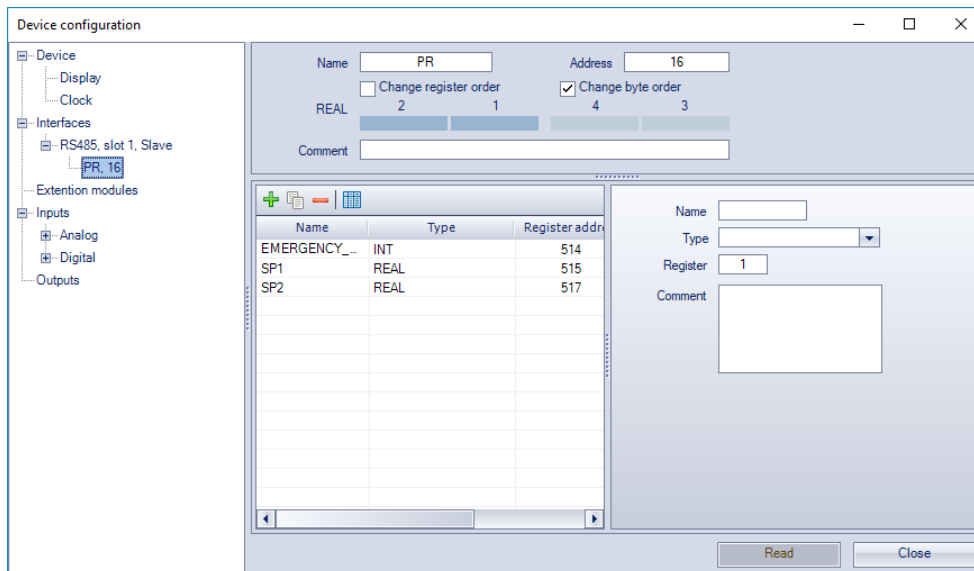
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1.1. Device configuration

The analog input AI1 for the temperature sensor via the transmitter NPT1 is first configured in the akYtec ALP software (see figure below).



The SCADA is connected to the PR200 via the RS485 slot 1. The PR200 serves as a slave and the SCADA as a master. In the akYtec ALP software, the connection is configured as shown in the figure below.



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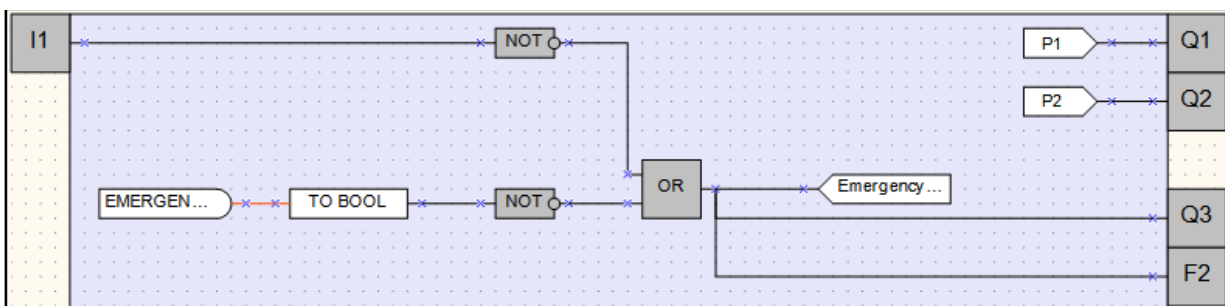
2. The Program

2.1. Variable table

Variable	Data type	Function
SP1	REAL	Set-point 1 (via Modbus, Register-Address=515)
SP2	REAL	Set-point 1 (via Modbus, Register-Address=517)
EMERGENCY_STOP	INT	Emergency-stop signal (normally closed N/C) from Master (via Modbus, Register-Address=514)
P1	BOOL	Pump no. 1
P2	BOOL	Pump no. 2
Emergency_STATUS	BOOL	Emergency-stop status check (0= System running, 1= Stop)

2.2. Functions and structure of the program

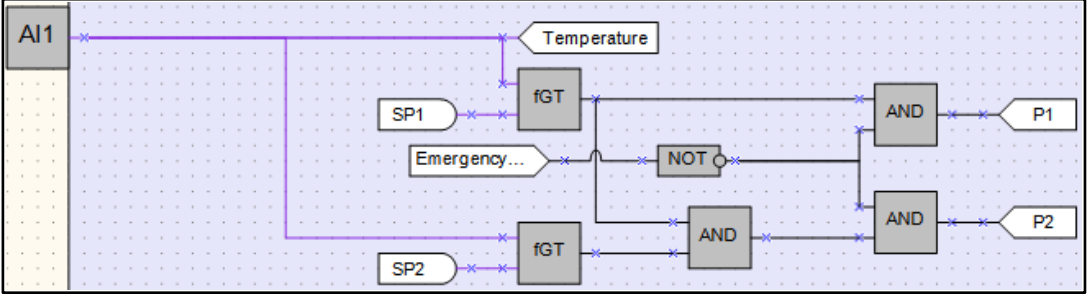
The emergency stop switch DI1 (N/C contact) and the emergency stop signal from the SCADA are checked and the status is stored in the Emergency_STATUS flag. When one of the two emergency-off signals is switched, the status flag is set to 1 and the LED Q3 and F2 are switched on.



The temperature value (AI1) is compared with the setpoints entered by the SCADA. If the temperature value is greater than the setpoint 1, pump 1 will start (P1 = 1). If the temperature value is higher than setpoint 2, pump 2 will start (P2 = 1).

If the flag from the Emergency STATUS is 1 (emergency stop button is pressed), the pump will not start.

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The temperature measurement and the status of the pumps are shown on the PR200 display.

T e m p : + 0 0 . 0 C	P 1 : 0
S t a t u s : R u n	P 2 : 0