Simple PID controller with auto-tuning

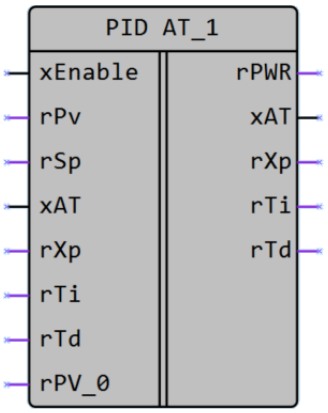


Figure 1 – Symbol

Inputs	Data type	Description	Range
xEnable	BOOL	Enable controller	0 – Controller OFF 1 – Controller ON
rPv	REAL	Current value of the process variable	
rSp	REAL	Setpoint value of the process variable	
xAT	BOOL	Auto-tuning management	0 – Auto-tuning OFF 1 – Auto-tuning ON
rXp	REAL	Proportional band, unit of measurement	0...9999
rTi	REAL	Integral time constant, s	0...4000
rTd	REAL	Differential time constant, s	0...4000
rPV_0	REAL	Process variable value at zero control output	
Outputs	**Data type**	**Description**	**Range**
rPWR	REAL	Output power of the controller	
xAT	BOOL	Auto-tuning management	0/1
rXp	REAL	Proportional band, unit of measurement	0...9999
rTi	REAL	Integral time constant, s	0...4000
rTd	REAL	Differential time constant, s	0...4000

Explanation of how macro works

The macro is intended for use with the PID_REG function block in power control mode together with auto-tuning.

ATTENTION: this macro is supported only by second-generation devices. It is not supported on first-generation devices (PR200, PR102, PR100).

Operating principle

A typical diagram of macro usage is shown in Figure 2.

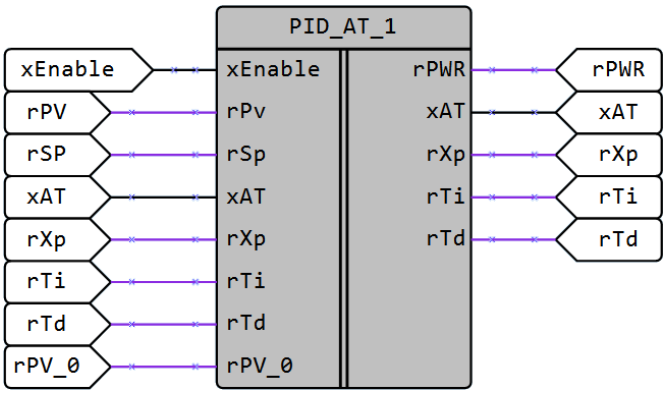
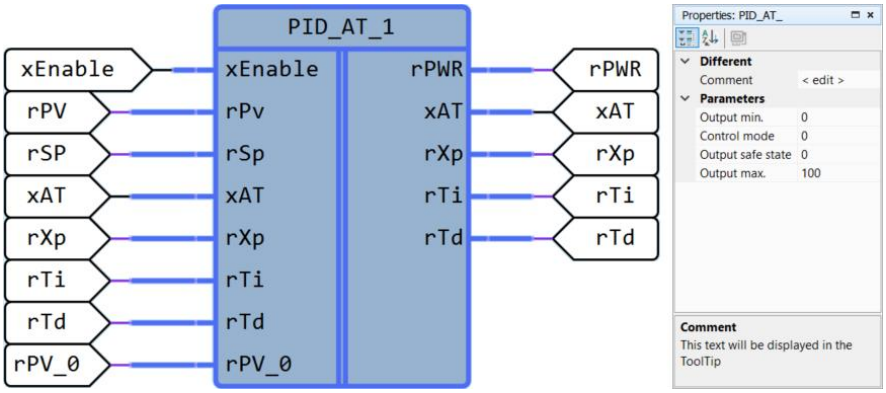


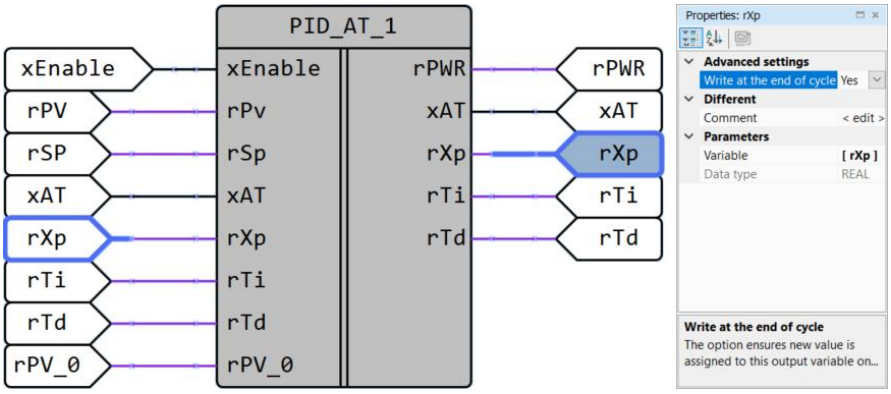
Figure 2 – Diagram

The PID controller coefficients are set on the inputs rXp, rTi, rTd. To perform auto-tuning, it is necessary to set the auto-tuning start flag (xAT) and specify the value of the process variable under zero output (rPV_0), that is, during the idle state. After its completion, the calculated coefficients will be written to the outputs rXp, rTi, rTd, and the auto-tuning flag will also be reset.

The block properties allow you to set the maximum, minimum, and off-state power levels, as well as the controller logic type (0 – heating, 1 – cooling):



When adding the block's output variables to the visualization, the 'Write at the end of cycle' property must be set to 'Yes':



Detailed information about the PID_REG function block can be found in the help menu.

Version	1.0
Last modification	22.04.2026.