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RA_PID User Defined Function Block

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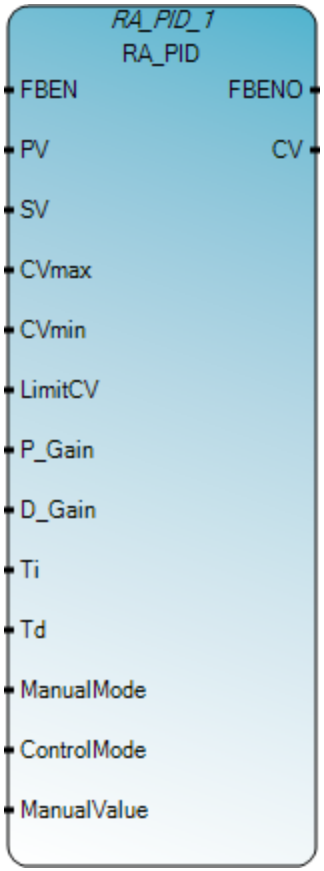
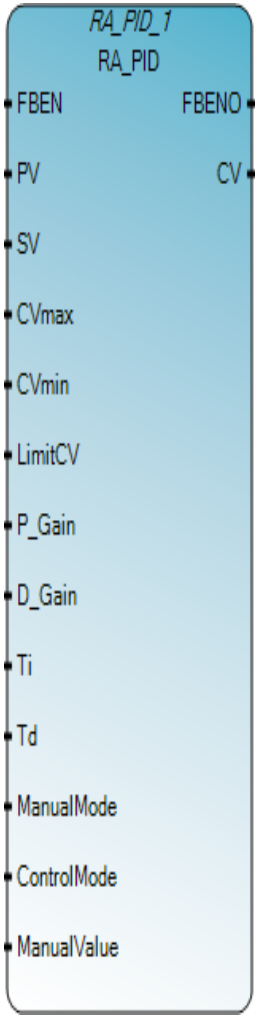
Disclaimer



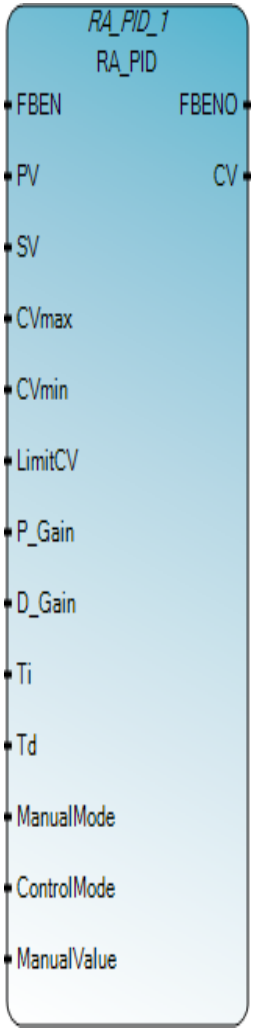
- RA_PID UDFB provide a easy to use interface for user to use Micro800 PID function. For full functionality, Please use IPIDCONTROLLER instruction instead
- This UDFB was created using CCW 2.0, it requires CCW 2.0 to work
- The Control value could limited to a specified range

Parameters



Parameter	Data Type	Description
FBEN	BOOL	Function block enable.
FBENO	BOOL	Function block enable output
PV	REAL	Process value, the value we measured. For example heating chamber temperature, water tank water level
SV	REAL	Set point value
CVmax	REAL	Maximum limit for Control value
CVmin	REAL	Minimum limit for Control value
LimitCV	BOOL	If we want to limit the CV value within the range of CVmin to CVmax, then set LimitCV = True otherwise set it to false
ManualMode	BOOL	If we want to manually specify the CV value, we could set ManualMode = TRUE
ControlMode	BOOL	ControlMode is the term we use in Micrologix PID for the “acting”. When True, Direct acting (output moves same direction as error). That is, the actual process value is greater than the SetPoint and the appropriate controller action is to increase the output (For example: Chilling). When False, reverse acting (output moves opposite direction as error). That is, the actual process value is greater than the SetPoint and the appropriate controller action is to decrease the output (For example: Heating).
CV	REAL	Control value

Parameters



Parameter	Data Type	Recommend initial value	Description
P_Gain	REAL	0.0001	A higher proportional gain will cause a larger change in the CV output based upon the difference between the PV (measured process value) and SV (set point value). The higher the gain, the faster the error will be decreased but this may result in instability such as oscillations. The lower the gain, the slower the error will be decreased but the system will be more stable and less sensitive to large errors. The P Gain usually is the most important gain to adjust and consequently the first gain to adjust while tuning.
D_Gian	REAL	0.0001	A higher derivative gain will cause a larger change in the CV output based upon the rate of change of the difference between the PV and SV. A higher gain will make a system more responsive to sudden changes in error but increases the chances of instability such as oscillations. A lower gain will make a system less responsive to sudden changes in error and will make the system less susceptible to noise and step changes in the PV.
Ti	REAL	0	A smaller integral time constant will cause a faster change in the CV output based upon the difference between the PV and SV integrated over this time. A smaller integral time constant will decrease the steady state error (i.e. error when SV is not being changed) but increases the chances of instability such as oscillations. A larger integral time constant will slow down the response of the system and make it more stable, but PV will approach the SV at a slower rate.
Td	REAL	0	A smaller derivative time constant will cause a faster change in the CV output based upon the rate of change of the difference between PV and SV. A smaller derivative time constant will make a system more responsive to sudden changes in error (e.g. SV is changed) but increases the chances of instability such as oscillations. A larger time constant will make a system less responsive to sudden changes in error and will make the system less susceptible to noise and step changes in PV. Td is related to the derivative gain but allows the derivative contribution to PID to be tuned using time so the sample time must be taken into consideration.

Sample Code