TT200202 – FUP - High and Low Limit Functions

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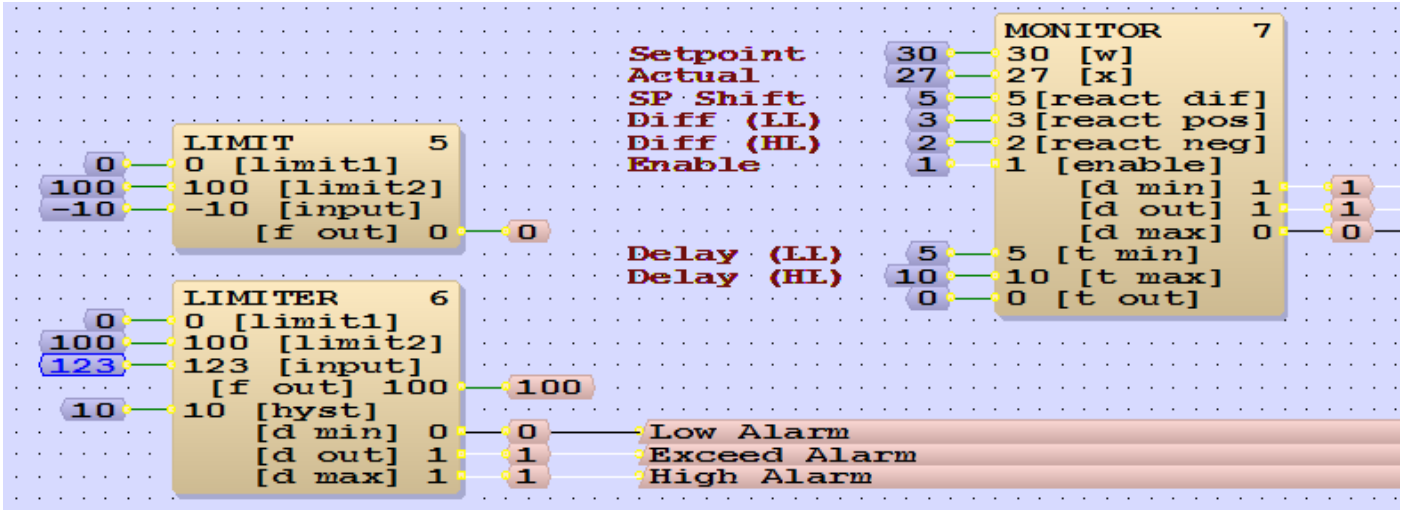
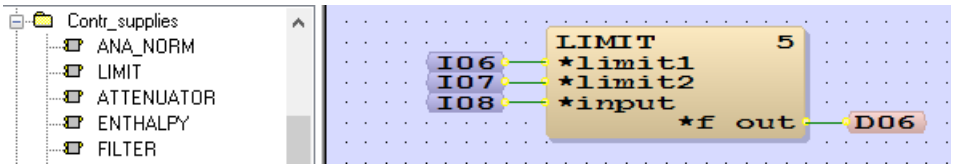
Title	High and Low Limit Functions (TT200202)
Object	FUP
Reference version	2
Date	02.2020
Author	EK
Goal	To explain the usage of the High and Low Limit Function Blocks

Content:

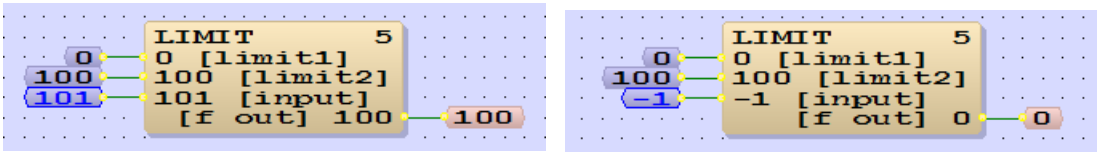


TT200202 – FUP - High and Low Limit Functions

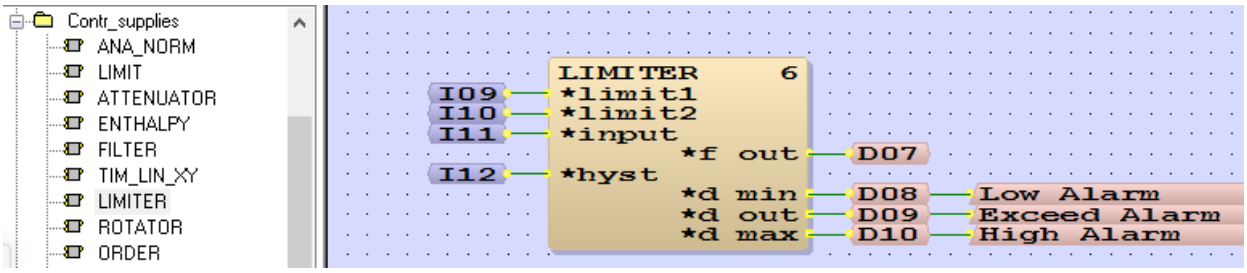
1. We can easily limit the output value using the “LIMIT” module under “Cntr_supplies”



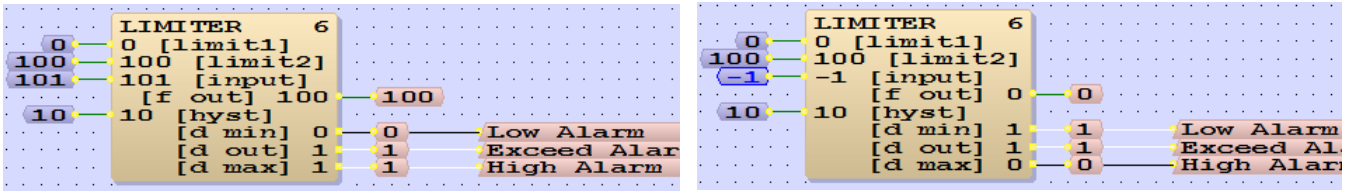
2. The example below will limit the output from 0-100, therefore Input 101 becomes 100, and Input -1 become 0



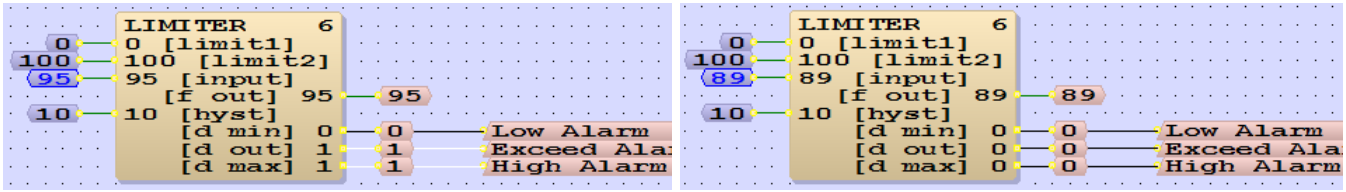
3. To have alarm function when the Input reaches the limits, we can use the “LIMITER” module



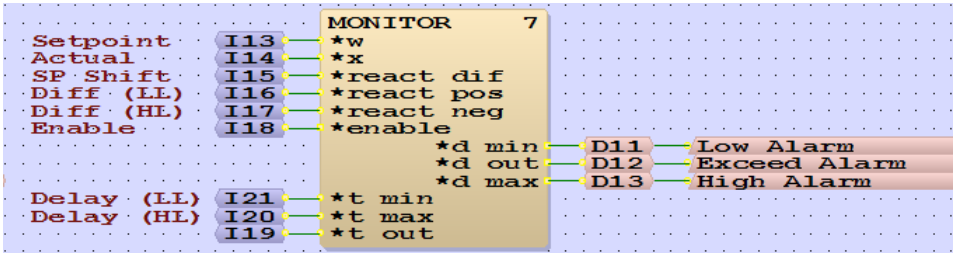
4. In additional to the limit function, this module also set 3 outputs based on the comparison of the input and the limits, then we can link the output to the “Text Message” for alarm generation



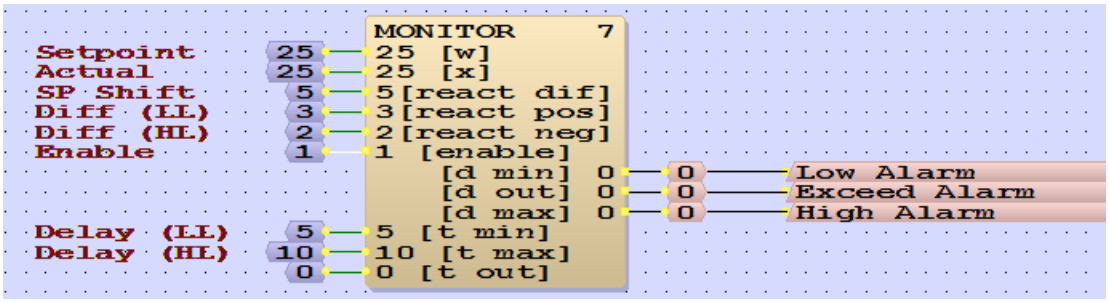
5. The module also provides the “deadband” function (Input “hyst”), where the output will only reset to 0 when the Input fall within the “limit1+hyst” and “limit2-hyst” after the output is set to 1. In this example, the output remains at 1 when the Input falls from 101 to 95, and it will reset to 0 when it falls under 100-10=90.



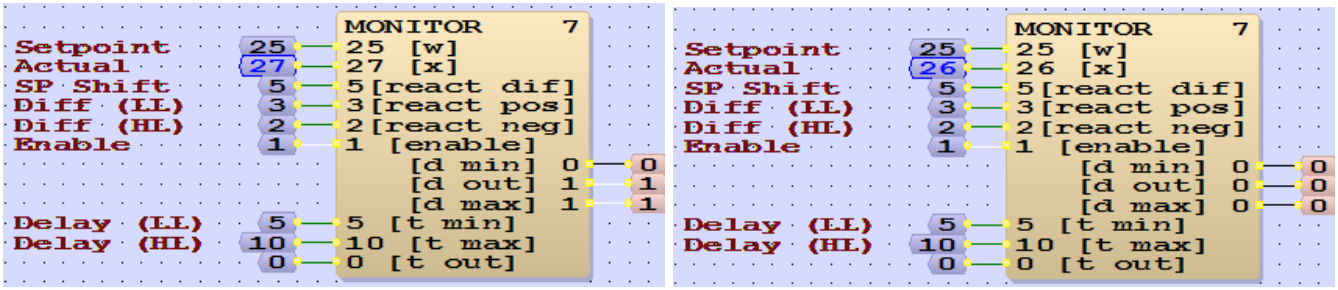
6. We’ve a 3rd module called “MONITOR” that compare the different between the actual value and the setpoint and provides some more functions



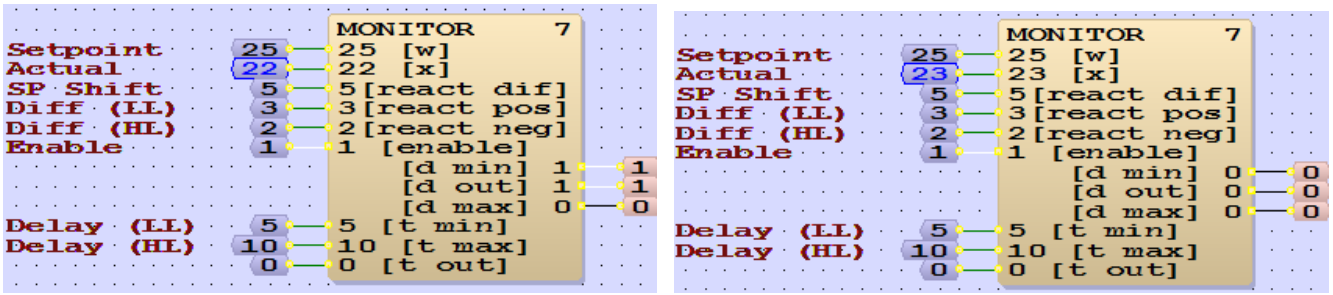
7. This module is useful when you have a PID loop (e.g. temperature), and want to alert the user when the room temperature is higher and/or lower than the setpoint by a specific amount. In this example,
    a. Input “w” is the setpoint
    b. Input “x” is the room temperature
    c. Input “react diff” (SP Shift) is the value that the SP changed so that the alarm is reset
    d. Input “react pos” (Diff LL) is the low alarm limit = SP – react pos
    e. Input “react neg” (Diff HL) is the high alarm limit = SP + react neg
    f. Input “enable” is to use to enable the alarm, e.g. when the room is occupied
    g. Input “t min” (Delay LL) is the delay time for the low limit alarm
    h. Input “t max” (Delay HL) is the delay time for the high limit alarm
8. Let’s try by simulation. First set the “Enable” to 1



9. Set “x” to 27 and after 10s, the “d out” and “d max” will set to 1. Set “x” to 26 to clear the output



10. Set “x” to 22 and after 5s, the “d out” and “d min” will set to 1. Set “x” to 23 to clear the output



11. Now set “x” to 27 and wait for the alarm. Set “w” to 30 and the alarm is reset, delay start again for 10s. If the different is still too big, it will alarm again. This allows time for the PID loop to reach the desire temperature, when the user change the setpoint >= the “SP Shift”