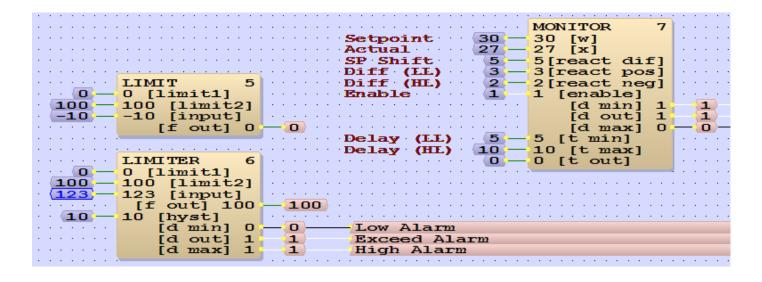


TT200202 - FUP - High and Low Limit Functions

Note	This Support Knowledge Base article KB is the result of a support request.
	It is not part of the official documentation of DEOS AG and does not claim to be complete.
	The article is intended to support the solution of a similar problem.
	If you have any questions, comments or additions, please contact DEOS AG Support.
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"

```
Contr_supplies

ANA_NORM

ANA_NORM
```

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

```
LIMIT 5
0 [limit1] 0 0 [limit2]
100 [limit2] 100 [limit2]
101 [input] -1 [input]
[f out] 100 -100
```

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

```
🚊 🗅 Contr_supplies
    ■ ANA_NORM
   -ÆP LIMIT
                                          LIMITER
                                                           6
   ■ ATTENUATOR
                                          \starlimit1
                                          *limit2
   ENTHALPY
                                          *input
   -₽ FILTER
                                                                D07
                                                       out
   TIM_LIN_XY
                                                   *d
                                                                D08
                                                                          Low Alarm
   ■ LIMITER
                                                   *d
                                                       out
                                                                          Exceed Alarm
High Alarm
    8
      ROTATOR
                                                       max
   ORDER
```

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.

```
LIMITER 6
0 [limit1]
100 [limit2]
95 [input]
[f out] 95 [f out] 89 [input]
[d min] 0 [d out] 1 [exceed Ala: [d max] 1 ] High Alarm

LIMITER 6
0 [limit1]
100 [limit2]
89 [input]
[f out] 89 [input]
[d min] 0 0 Low Alarm
[d min] 0 0 Exceed Ala: [d max] 0 0 High Alarm
```

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

```
MONITOR
                         25
25
                              [w]
Actual
                         5[react dif]
3[react pos]
   Shift
Diff (LL)
Diff (HL)
                         2[react
                                    neg]
                            [enable]
                              [d min]
                                                        Exceed Alarm
                            max

t min]

[t max

[t c
                                                        High Alarm
                                 max
Delay
                         10
                                 maxl
```

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

```
MONITOR
                                                                         MONITOR
Setpoint
                                                 Setpoint
                             [w]
                                                                              [w]
Actual
SP Shift
                        5[react dif
3[react pos
                                                 SP Shift
                                                                         5[react 3[react
Diff (LL)
                                                 Diff
                                                        (IL)
                                                                                    posl
                          [react
                                   neg]
                                                                                     neg]
                           [enable]
                                                                             [enable]
                                                 Enable
                                min]
                                                                              [d min]
[d out]
                           t max
[t min]
[t mar
                             Γđ
                                                                            max
t min]
[t mar
                                max]
                                                                              [d max]
                                                                         10
                        10
                                                 Delay
Delay
        (HL)
                                max1
                                                          (HL)
                                                                                 max]
```

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

```
MONITOR
                                                                            MONITOR
Setpoint
                             [w]
                                                  Setpoint
                                                                            25
23
                                                                                [w]
Actual
SP Shift
                         5[react
3[react
                                                                            5[react
3[react
                                                  SP Shift
Diff (LL)
Diff (HL)
                                    posi
                                                  Diff (LL)
Diff (HL)
                                                                                       posl
                         2 [react
                                    neg]
                                                                               react
                            [enable]
                                                  Enable
                                                                               [enable]
                              [d min]
[d out]
                                                                                 [d min]
                                                                                                  00
                            [d max]
                                                                                                  0
                                                                                            0
                                                                               [t min]
[t max]
[t out]
                                                                                 [d max]
Delay
                         10
                            [t
                                                                            10
                                                  Delay
```

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"

```
MONITOR
                                                                                       7
                                                          MONITOR
Setpoint
                        25
27
                             [w]
Actual
                        5[react dif]
3[react pos]
                                                          5[react dif]
3[react pos]
                                                                                   lif]
SP Shift
Diff
Diff
                                                          2 [react
                                                                      neg]
                                                                                    neg]
                           [enable]
Enable
                                                              [enable]
                                                                                   ∍]
                                                                                   2]
=]
[=]
                             Γđ
                                min]
                                                               [d min]
[d out]
                                                                                       10
                                outj
                           [d
                                max]
                                                                                0
                                                               ſα
Delay
        (LL)
                              min]
                                                                 minl
                        10
Delay
                                                                                    ٤]
                                                                  max]
```