TT200205 – FUP - Comparator Functions

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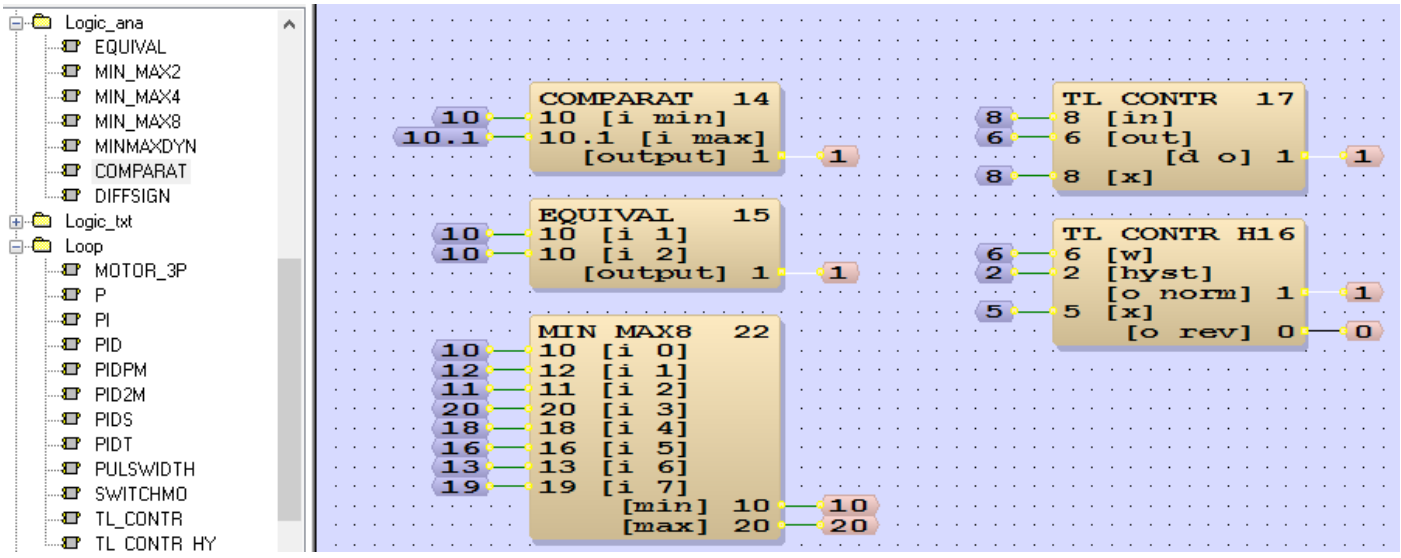
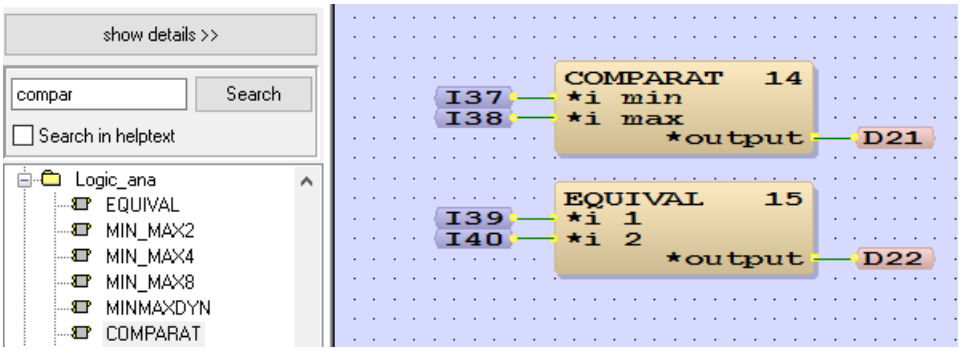
Title	Comparator Functions (TT200205)
Object	FUP
Reference version	2
Date	02.2020
Author	EK
Goal	To explain the usage of the Comparator Function Blocks

Content:

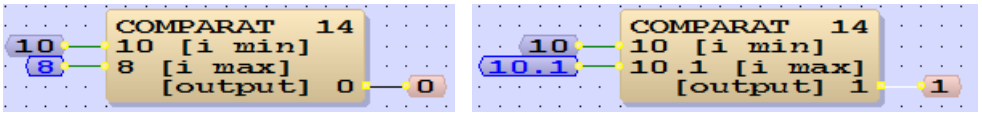


TT200205 – FUP - Comparator Functions

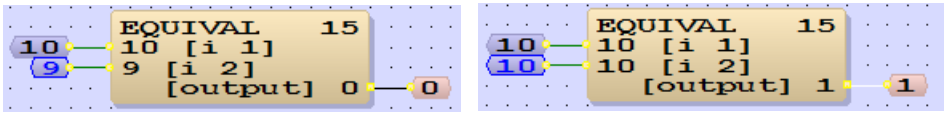
1. If we want to compare the inputs, we can use the “COMPARAT” or the “EQUIVAL” modules, under “Logic_ana”



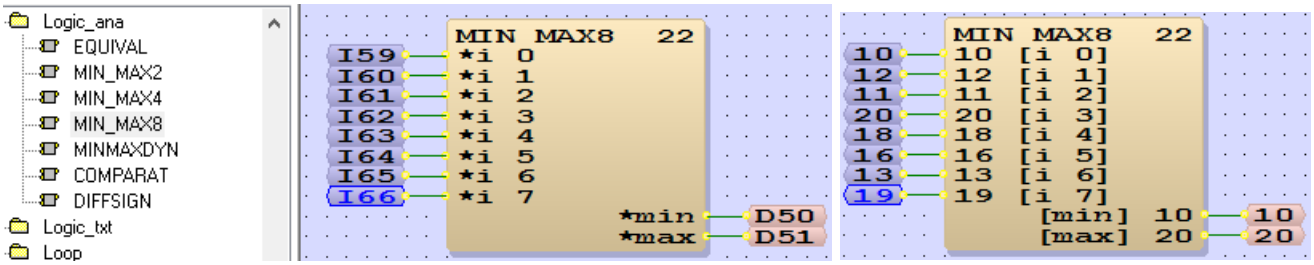
2. The “COMPARAT” module compare “i_min” and “i_max”, and if “i_max” > “i_min”, output will be set to 1



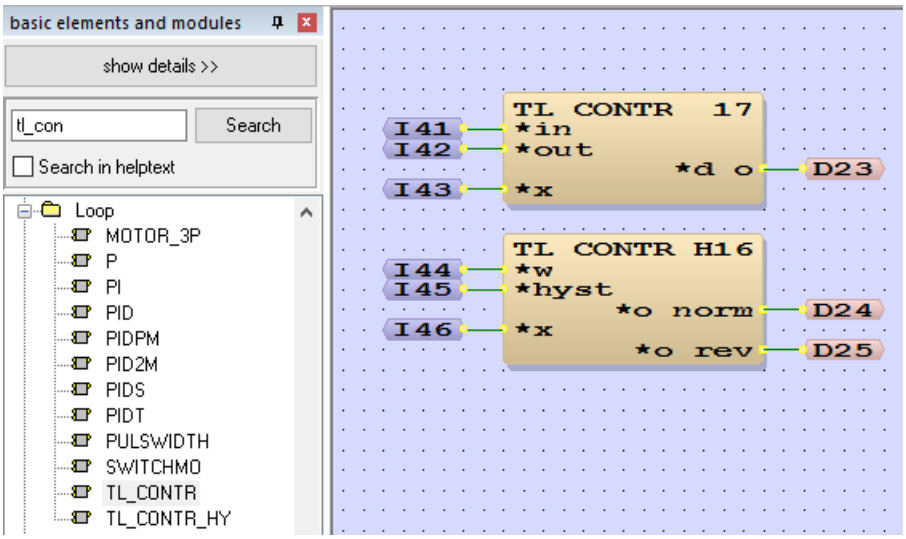
3. The “EQUIVAL” module compare “i_1” and “i_2”, and if “i_1” = “i_2”, output will be set to 1

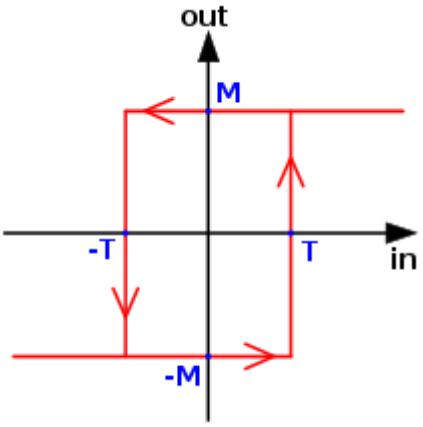


4. We also have the “MIN_MAX” modules that compare up to 8 inputs and provide the minimum and maximum values



5. Sometimes we need a “deadband” (or hysteresis) between the setting of the output from 0-1 and 1-0. We can use the following modules



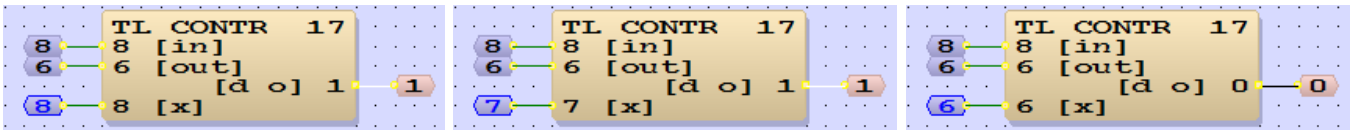


6. The “TL_CONTR” module will set the output like this

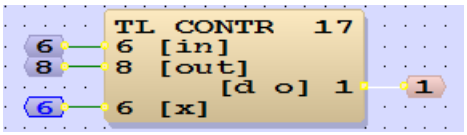
   If the value of "in" > "out", the output "d_o" will be set as follows:

x >= in	-> d_o = 1
x < in and x > out	-> d_o will not be changed
x <= in	-> d_o = 0

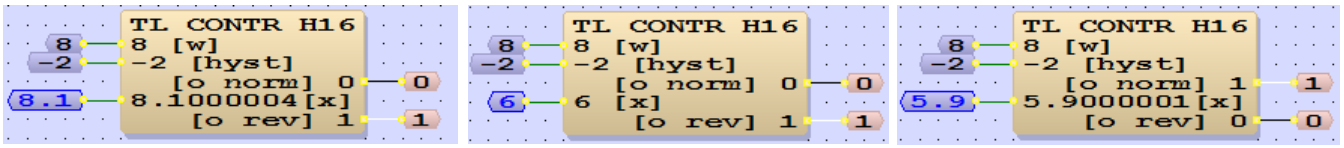
7. For example, if we want to turn on the chiller when chilled water temperature reaches 8 °C and turn it off when it falls to 6 °C, we can set like below. Output is 1 when x goes up to 8, it will remain at 1 when x goes down to 7, and will change to 0 when x goes down to 6



8. For heating application, i.e. turn on the heater when the temperature falls to 6°C, we can set the “in” and “out” in the reverse direction, like below



9. The “TL_CONTR_HY” is similar to “TL_CONTR”, but instead of “in” and “out”, it uses “w” as setpoint and “hyst” as deadband. For the chiller example, we can set like below, setpoint=8, deadband=2 (i.e. hyst = -2). The output is “o_rev”



10. You may notice that it’s different from “TL_CONTR” that the output “o_rev” is 1 when the input is higher than the setpoint, not >=. So, the logic is like this

    If input "hyst" < 0

x > w	-> o_rev = 1
x <= x and >= w + hyst	-> o_rev will not be changed
x < w + hyst	-> o_rev = 0

11. For heating application, i.e. turn on the heater when the temperature falls below 6°C, and then turn if off when temperature rise above 8°C, we can set like below. This time the output is “o_norm”