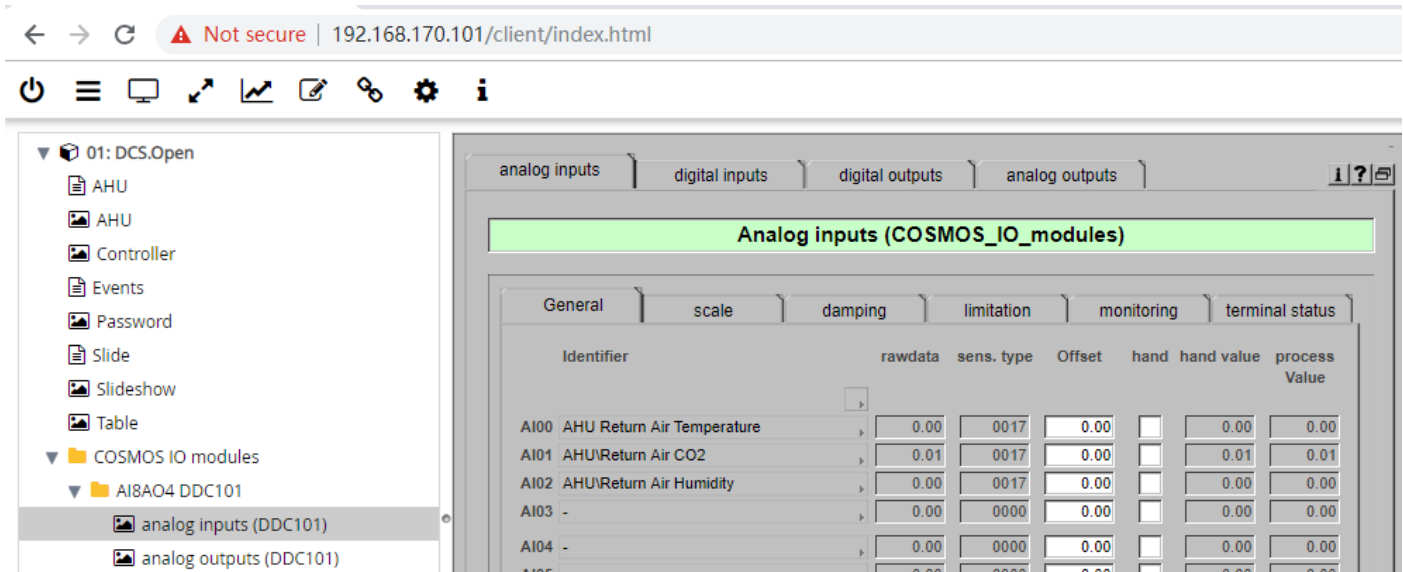## TT190505 – Troubleshoot - IO Point Values

1. To check the I/O point values, we can use the I/O module graphic page. Let's take a look at the analog input (AI) first.

2. Check the "Raw Data" first. If the value is 0, then maybe the "Sensor Type" is wrong, or the wiring connection is wrong. Below are the common sensor types, normally we use 17 for voltage input (or 177 for 0-100%) and 98 for PT1000 input.

type	ident. num	sensor	range
AS_Status_00	0	input deactivated	
AS_V_10V_2	17	voltage input	0..10V
AS_T_10mV_K_2	34	M-sensor (LM235Z)	-50°C..130°C
AS_T_Ni1000_2	50	Ni-1000 (DIN)	-50°C..650°C (2)
AS_T_Ni1000L_2	82	Ni-1000 (Tk5000)	-50°C..650°C (2)
AS_T_Pt1000_2	98	Pt-1000	-50°C..650°C (2)
AS_R_8000_2	162	resistance in ohm	0,5..10 kOhm
AS_V_percent	177	voltage input	0..100% = 0..10V

3. So, for the AI00 (AHU Return Air Temp), the type we set in FUP is 17 (voltage input), but if actually the sensor connected is PT1000, therefore the reading is 0. We can test it by manually changing it here to 98. Click on the "Sensor Type" value for AI00, and change to 98, and press "Enter". You should now see the correct reading. Type 0 to clear the manual setting.

4. If the temperature reading is a bit different from the actual temperature, you can use the "Offset" to adjust it. See below, the "Process Value" is the temperature reading you will see in your FUP page, and in the graphic. Now it has an "Offset" of 0.5 from the "Raw Data" reading

5. Next, we check AI01 (Return Air CO2). Mostly it is a 0-10V sensor, so the type 17 should be correct. Please check the wiring according to the OPEN 600 datasheet, and the I/O module datasheet for correct wiring. After you fixed the wiring issue, you should see the voltage we get from AI01 terminal

Identifier		rawdata	sens. type	Offset
	▸			
AI00 AHU Return Air Temperature	▸	25.77	0098	0.50
AI01 AHU\Return Air CO2	▸	4.65	0017	0.00
AI02 AHU\Return Air Humidity	▸	0.00	0017	0.00

6. For 0-10V sensor, you need to set the correct sensor range according to your sensor specification. For example, if the CO2 sensor range is 0-2000 ppm, then you can set the sensor range in the "Scale" tab. Now change the "Sensor Value (Max Value)" to 2000, and you should see the correct reading in "Value (Scaled)"

General	scale	damping	limitation	monitoring	terminal status

Identifier	input Value = ---- (MIN-value) ----	sensor Value	input Value = ---- (MAX-value) ----	sensor Value	MIN limit	MAX limit	Value (scaled)
▸							
AI00 AHU Return Air Temperat ▸	0.00	0.00	10.00	10.00	-9999.00	99999.00	26.27
AI01 AHU\Return Air CO2 ▸	0.00	0.00	10.00	2000.00	-9999.00	99999.00	930.25

7. For some 0-10V temperature sensor, the range is -50 to 150 degree, then you need to set both the "Min Value" and "Max Value" for "Sensor Value"
8. Sometimes you may see all the settings in the I/O module are 0, or many strange values. It is because you forget to do a "Preset" when you upload a completely new program or it's a new controller. Please refer to TT19504 on how to "Preset" the controller
9. If you're testing your program, and you don't have the sensor connected, or the sensor is faulty, you can "fixed" the sensor value temporary so that we can test your program logic. Tick the "Hand" checkbox, and type the value you want in the "Hand Value" input

General	scale	damping	limitation	monitoring	terminal status

Identifier		rawdata	sens. type	Offset	hand	hand value	process Value
▸							
AI00 AHU Return Air Temperature	▸	25.77	0098	0.50	☐	26.27	26.27
AI01 AHU\Return Air CO2	▸	4.65	0017	0.00	☑	1000.00	1000.00

10. Now, we will check the digital input (DI).

digital inputs (ddc101)

General	terminal status

| Identifier		rawdata	rev. terminal	rev. LED	LED-color GREEN/RED	hand	hand Value	process Value
▸								
DI00 AHU\Supply Fan Status	▸	☐	☐	☐	☑	☐	☐	☐
DI01 AHU\Supply Fan Trip	▸	☐	☐	☐	☑	☐	☐	☐
DI02 AHU\External Clock - Sim	▸	☐	☐	☐	☑	☐	☐	☐

11. Checking DI is easy as we have status LED on the top of the OPEN 600 and DI module. The LED should be light up if the wiring is correct and the DI contact is closed

Identifier		rawdata	rev. terminal	rev. LED	LED-color GREEN/RED	hand	hand Value	process Value
▸								
DI00 AHU\Supply Fan Status	▸	☑	☐	☐	☑	☐	☑	☑

12. Next, we will check digital output (DO). After you turn on the AHU in your graphic, you should see the LED (DO00) light up in your controller, and the DO module graphic should look like this
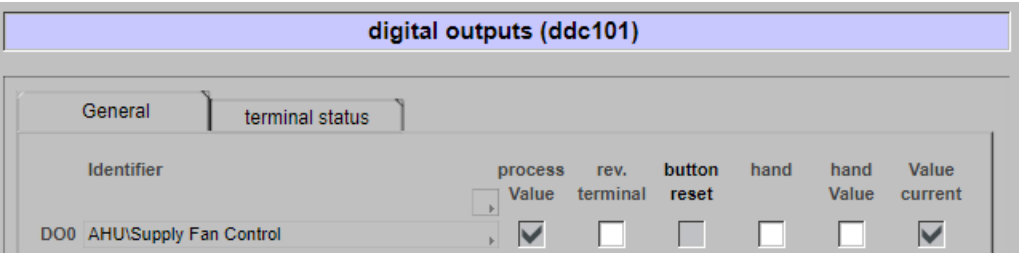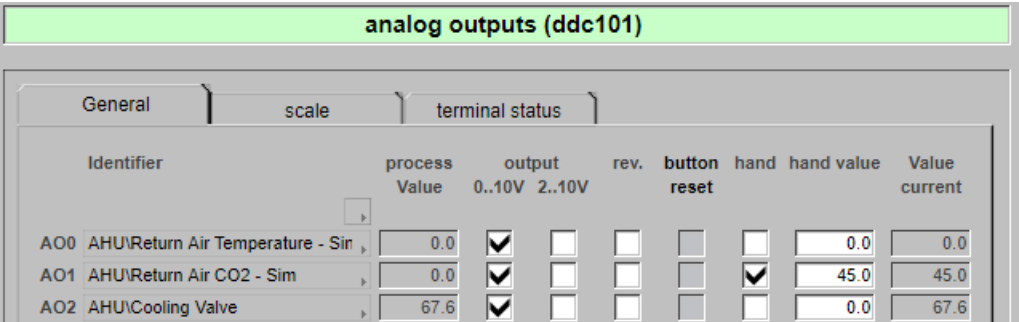

13. If it is not, then maybe you've forgot to link the output "Reference" in your FUP page to "Cross Reference" in your I/O module macro. Please refer to TT180802 for details.
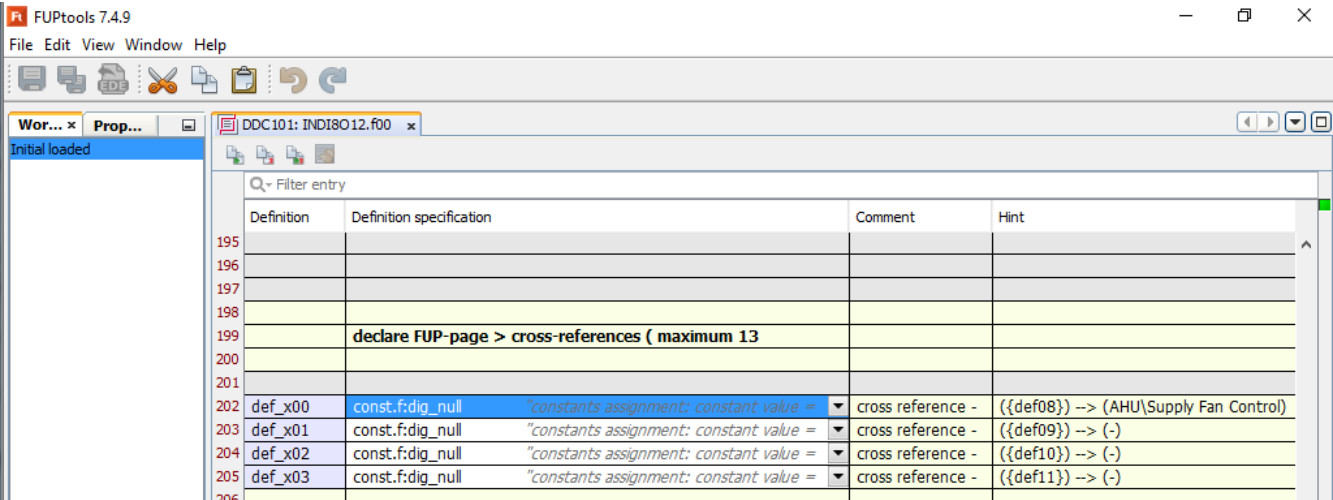
14. If the DO LED is light up, but there is no voltage output to the DO terminal, or the AHU is not turned on, then you need to check the wiring connection. You can also use the "Hand" and "Hand Value" to test the DO point manually, but please remember to untick it after testing

15. Finally, we will check the Analog Output (AO). Similar to DO, we also have LED for AO. If the AO LED is not flashing, or the value is always 0 in the I/O module graphic, then you may forget linking the "Cross Reference" again

16. Below is the meaning of the AO LED flashing

Analog outputs AO0 ... AO4

LED	Function
Pulses (yellow)	The number of pulses (flashing status) returns the value of the output. Each pulse corresponds to about 10% (1 volt) of the voltage range. If an output is in the **automatic mode** a brief pause takes place before each state-flashing. In **the hand-operation** a series of **very short flash pulses** take place before any state-flashing.