TT230503 – OFXL - Modbus Module Regin RCF-230C

1. In this document, we will show you how to integrate the Regin RCF-230CTD-EC room controller as an example using the new Modbus module in OPEN FXL 4. Note: please refer to the last few TT for details on how to configure and operate the new Modbus module.

2. The Regin RCF room controller has many features and has many configuration settings, please read the RCF manual for details. For Modbus integration, you need to set at least the following correctly.
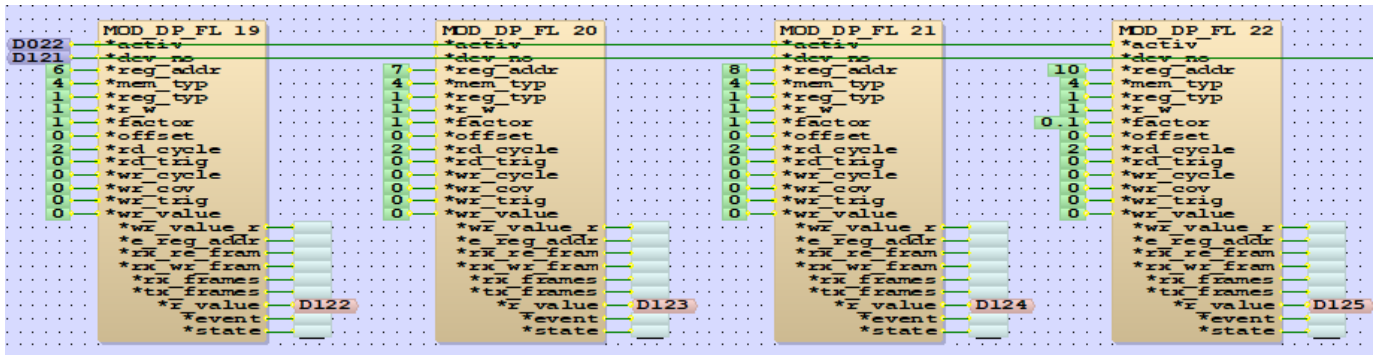
Number of parameter	Description	Factory setting (FS)
53	Modbus address	254
54	Parity and stop bits for Modbus communication: 0 = 8N2 1 = 8O1 2 = 8E1 3 = 8N1	2
55	Modbus timeout for characters (t1.5), in ms. Should be 3.5 times a character, ie. at least 2 ms.	2
56	Response lag Modbus (t3.5), in ms. Should be 3.5 times a character, ie. at least 5 ms.	5
57	Communication protocol: 0 = Automatic EXOline or Modbus 1 = BACnet MS/TP	0
62	Speed for communication protocol: 0 = 9600 bps 1 = 19200 bps 2 = 38400 bps 3 = 76800 bps	0

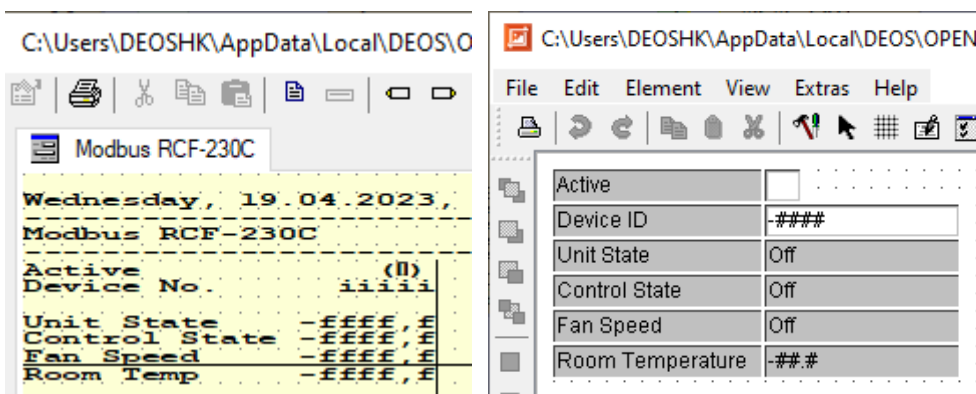3. First, we want to read the following "Input Register".

Input register

Name of signal	Type	Modbus address	Description
RC_Actual_X.RegioUnitState	X,4	7	Current running mode: 0 = Off 1 = Economy/Standby 2 = Not used 3 = Not used 4 = Comfort
RC_Actual_X.RegioControllerState	X,4	8	Current control: 0 = Off 1 = Heating 2 = Cooling
RC_Actual_X.RegioFanSpeed	X,4	9	Current fan speed: 0 = Off 1 = Fan speed 1 active 2 = Fan speed 2 active 3 = Fan speed 3 active
RC_Actual_R.RegioRoomTemp	R,4	11	Room temperature

4. We use 4 "MOD_DP_FL" modules. Since most of the settings are the same and not changed, we can use "Constant" to make it easier. Set the "mem_type" to 4 for "input register". Set the "reg_addr" according (reg_addr = Modbus address – 1). Set the "factor" to 0.1 for room temperature.

Parameter	MOD_DP_FL 19	MOD_DP_FL 20	MOD_DP_FL 21	MOD_DP_FL 22
inputs	D022, D121			
*reg_addr	6	7	8	10
*mem_typ	4	4	4	4
*reg_typ	1	1	1	1
*r_w	1	1	1	1
*factor	1	1	1	0.1
*offset	0	0	0	0
*rd_cycle	2	2	2	2
*rd_trig	0	0	0	0
*wr_cycle	0	0	0	0
*wr_cov	0	0	0	0
*wr_trig	0	0	0	0
*wr_value	0	0	0	0
*r_value	D122	D123	D124	D125

5. Set the HTML page and graphic page accordingly.

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Modbus RCF-230C

Wednesday, 19.04.2023,
Modbus RCF-230C

Active   (I)
Device No.   iiiii

Unit State   -ffff,f
Control State -ffff,f
Fan Speed   -ffff,f
Room Temp   -ffff,f

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File   Edit   Element   View   Extras   Help

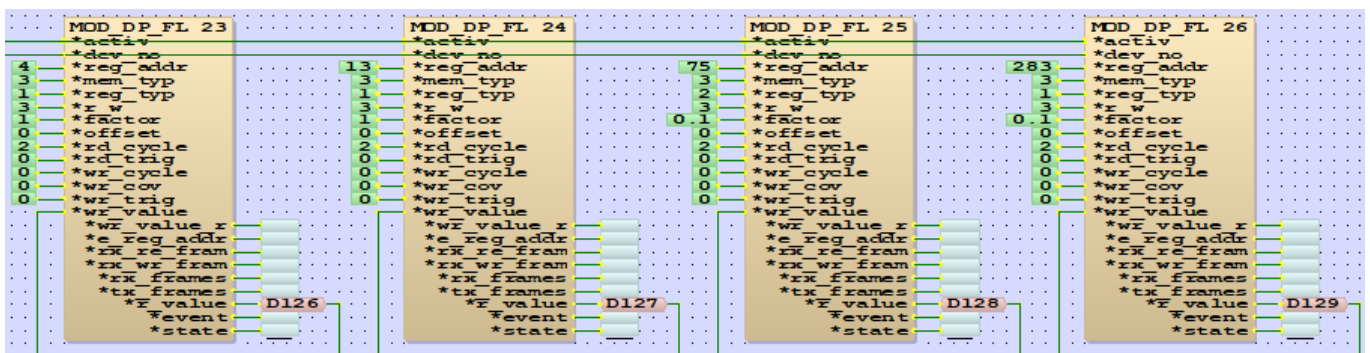|	
Active	
Device ID	-####
Unit State	Off
Control State	Off
Fan Speed	Off
Room Temperature	-##.#

6. Next, we want to read/write the following "Holding Register".

Holding register

| Name of signal	Type	Modbus address	Default setting	Description
RC_Setp_X.RegioFanSelect	X,3	5	4	Select fan mode: 0 = Off 1 = Manual speed 1 2 = Manual speed 2 3 = Manual speed 3 4 = Auto
RC_Setp_X.RegioRemoteState	X,3	14	5	Used for remote control: 0 = Off 1 = Economy/Standby 2 = Not used 3 = Not used 4 = Comfort 5 = No remote control
RC_Setp_R.RegioSetPOffset	R,3	76	0	Setpoint displacement
RC_SetpExt_R.RegioRCFSetPoint	R,3	284	22°C	Basic setpoint

7. Again, we use 4 "MOD_DP_FL" modules. Set the "mem_type" to 3 for "holding register". Set the "reg_addr" according (reg_addr = Modbus address – 1). Set "r_w" to 3.

| Parameter	MOD_DP_FL 23	MOD_DP_FL 24	MOD_DP_FL 25	MOD_DP_FL 26
*reg_addr	4	13	75	283
*mem_typ	3	3	3	3
*reg_typ	1	1	2	1
*r_w	3	3	3	3
*factor	1	1	0.1	0.1
*offset	0	0	0	0
*rd_cycle	2	2	2	2
*rd_trig	0	0	0	0
*wr_cycle	0	0	0	0
*wr_cov	0	0	0	0
*wr_trig	0	0	0	0
*wr_value	0	0	0	0
*r_value	D126	D127	D128	D129

8. For Modbus address 75, which is the "Setpoint Offset", it is a signed integer so that you can input negative integer (e.g. -3). In this case, you need to change the "reg_type" to 2 (i.e. SI). Also, same as temperature and setpoint, you need to set "factor" to 0.1.
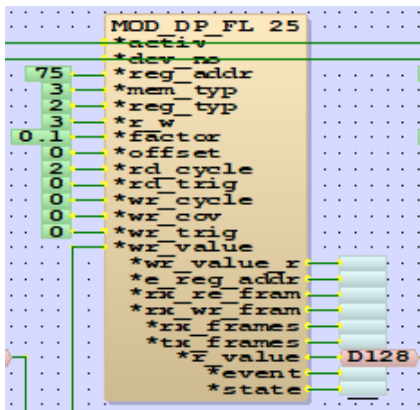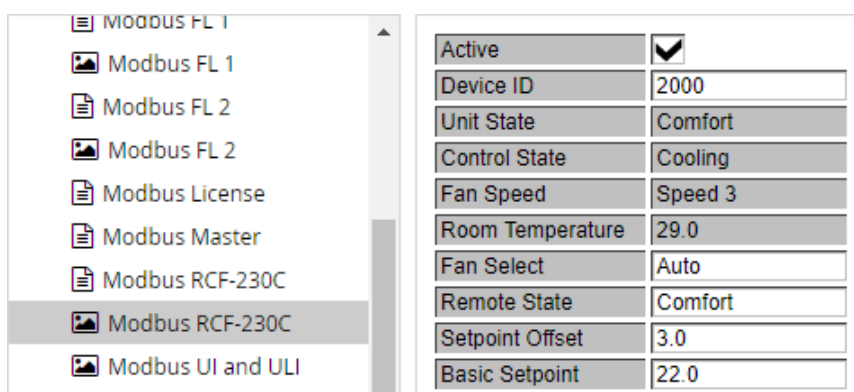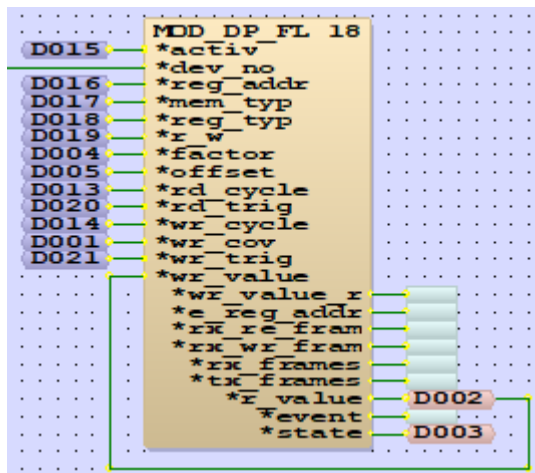

9. Create a new graphic page like below.
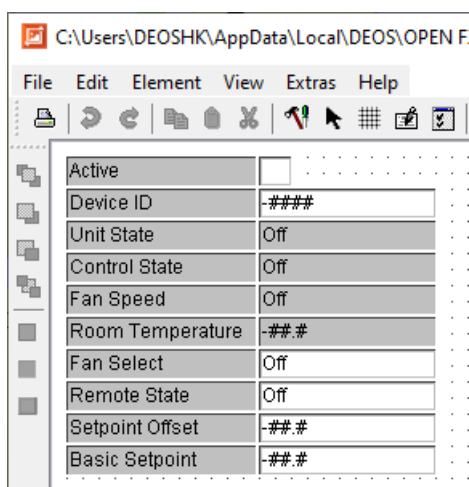
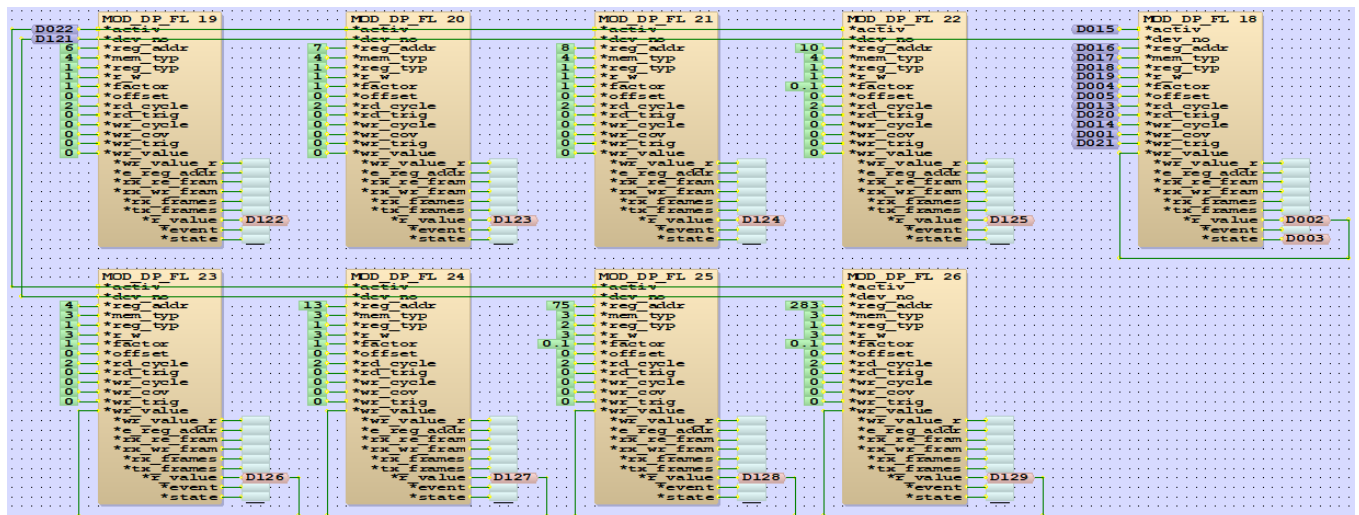10. Load the program to the controller for testing. By default, the points are disabled.
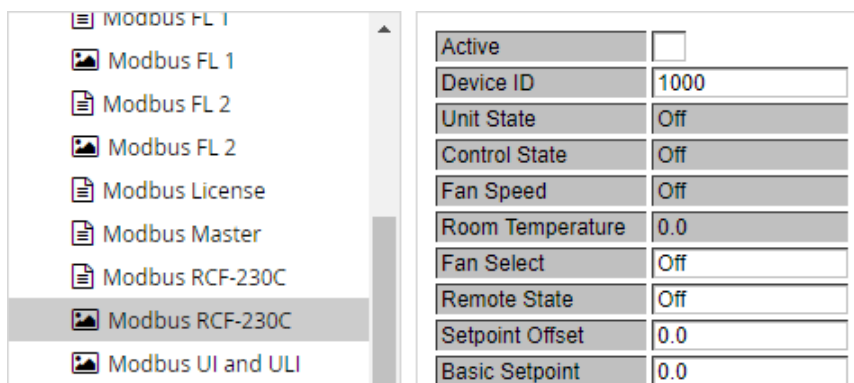
11. Input the correct "Device No." and set it to "Active". Now you should see all the points.

12. Please remember to set the correct Modbus master and device settings, e.g. COM port settings, and Modbus address.
13. Since there are so many Modbus points in the room controller, it is not realistic to build all of them in OFXL. But sometimes (e.g. during commissioning) you may want to read/write some of them, so we build an additional "MOD_DP_FL" module for this purpose.

14. Here is the complete program.

15. Add the graphic for the additional point.

16. Now we have a program that read/write all the frequently used Modbus points in the room controller, and an additional point that are freely configurable online to read/write any of the Modbus point.

Active	☑
Device ID	2000
Unit State	Comfort
Control State	Cooling
Fan Speed	Speed 3
Room Temperature	29.4
Fan Select	Auto
Remote State	Comfort
Setpoint Offset	3.0
Basic Setpoint	22.0

Active	☐
Address	0
Point Type	Holding Register
Data Type	UI
Read/Write	Read
Factor	1.00
Offset	0.00
Read Cycle	2
Read Trigger	☐
Write Cycle	0
Write COV	0.10
Write Trigger	☐
Value	0.00

Status	Modbus data point inactive

▼ 📦 01: DCS.Open
   📄 AHU
   🖼 AHU
   📄 Events
   📄 Modbus Device
   📄 Modbus FL 1
   🖼 Modbus FL 1
   📄 Modbus FL 2
   🖼 Modbus FL 2
   📄 Modbus License
   📄 Modbus Master
   📄 Modbus RCF-230C
   🖼 Modbus RCF-230C

17. For example, you want to read the controller setpoint, which is in the "Input Register".

RC_Actual_R.RegioPIDSetP	R_4	20	Controller setpoint

18. Enter the correct settings and set the point to "Active" to read the point.

Active	☑
Device ID	2000
Unit State	Comfort
Control State	Cooling
Fan Speed	Speed 3
Room Temperature	29.4
Fan Select	Auto
Remote State	Comfort
Setpoint Offset	3.0
Basic Setpoint	22.0

Active	☑
Address	19
Point Type	Input Register
Data Type	UI
Read/Write	Read
Factor	0.10
Offset	0.00
Read Cycle	2
Read Trigger	☐
Write Cycle	0
Write COV	0.10
Write Trigger	☐
Value	25.00

Status	OK

19. Another example is to set the PI settings, which is in the "Holding Register".

RC_Setp_R.RegioPIDPGain	R_3	77	10°C	Room controller P-band
RC_Setp_R.RegioPIDITime	R_3	78	300 sec	Room controller I time

20. Like below. Note: Suggest to set it to inactive, change the settings, and then set it active again.

Active	☑
Address	76
Point Type	Holding Register
Data Type	UI
Read/Write	Read/Write
Factor	1.00
Offset	0.00
Read Cycle	2
Read Trigger	☐
Write Cycle	0
Write COV	0.10
Write Trigger	☐
Value	10.00