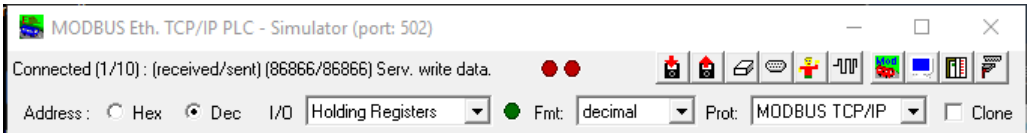
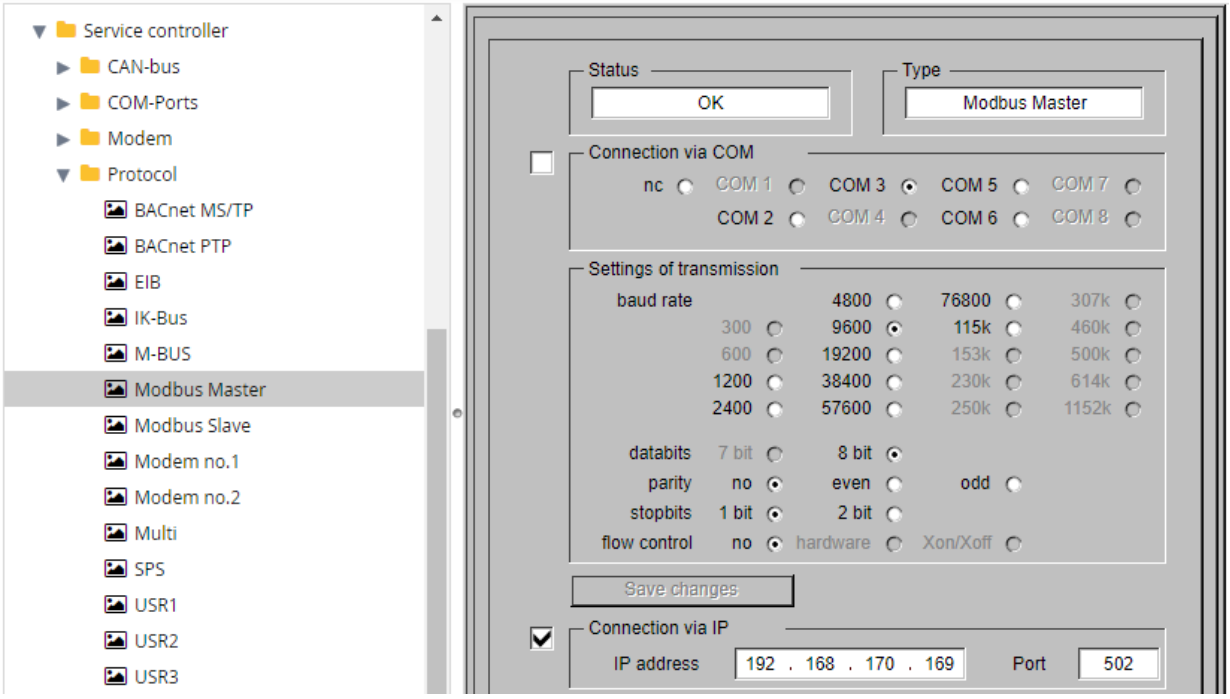
TT190802 – FUP - Modbus TCP Integration

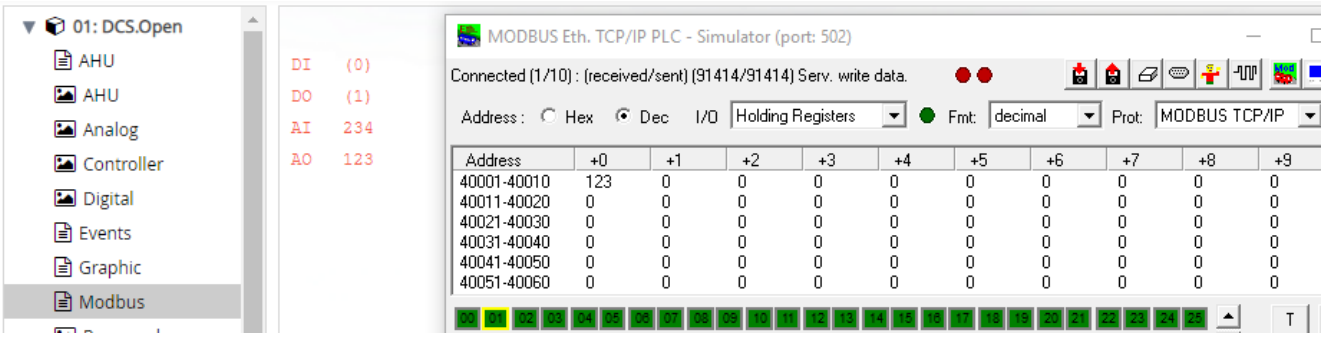
1. Now we will show you how to integrate Modbus TCP device. Please refer to “TT190801” for basic Modbus (RTU, RS-485) integration setup and configuration
2. Start the Modbus simulation software, set the “Port” to “Modbus TCP/IP”



3. Start browser and connect to the controller. Select “Service Controller”, “Protocol” and “Modbus Master”. Disable the “Connection via COM” and enable the “Connection via IP”, and set the IP address to your PC’s IP address (which running the simulation software) like below



4. You can now test it in the software. Some firewall/antivirus software may block the TCP port 502 for Modbus communication, so if there is no communication, please try to disable them

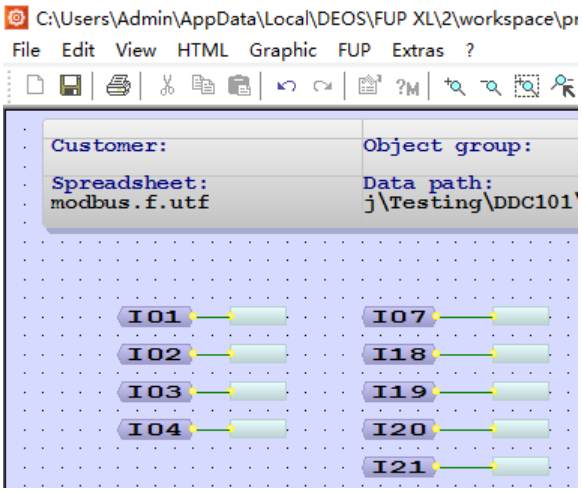


5. OK, now we will try to integrate a real Modbus device (Pilot SPM91 Single Phase Power Meter) which connect to OPEN 600 through a Modbus RTU to TCP convertor.

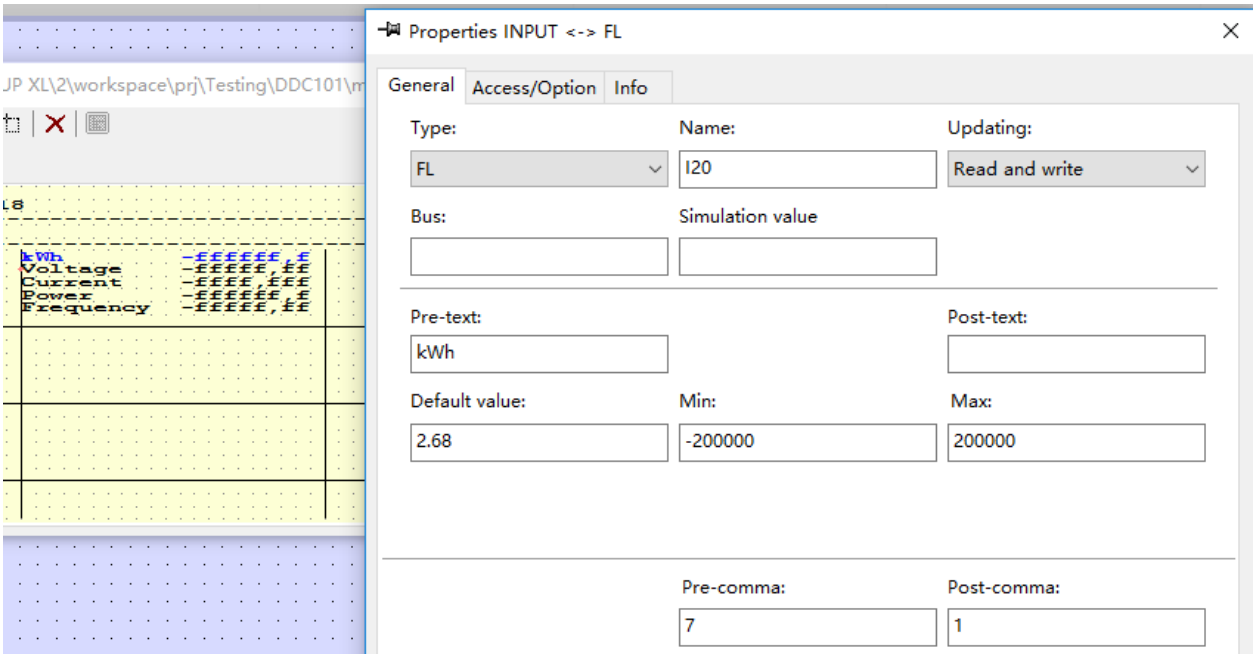
6. This is the Modbus register table of the power meter

Register No.	Definition	Remarks
Real-time data registers(0x03 RO)		
40001	Active energy (low)	× 0.1, unit: kWh Low byte in the back, high byte in the former. Range: 0-999999.9
40002	Active energy (high)	
40003	Voltage	× 0.01, unit: V
40004	Current (low)	× 0.001, unit: A Low byte in the back, high byte in the former.
40005	Current (high)	
40006	Active power (low)	× 0.1, unit: W The highest byte is the sign byte.
40007	Active power (high)	
40008-40011	Reserved	
40012	Frequency	× 0.01, unit: Hz

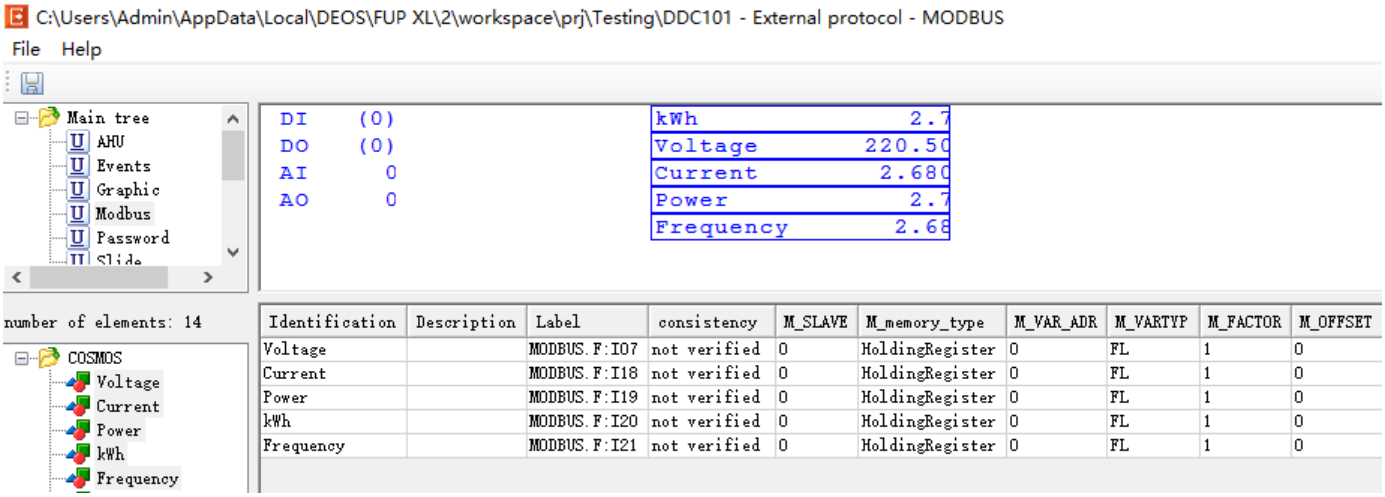
7. Open the “modbus.f” FUP page, add 5 more “Inputs” like this



8. Open the HTML page, change all the point type to “FL”, type in the “Pre-text” and change the “Pre-comma” and “Post-comma” (digits and decimal places) like this



9. Save and close the FUP page. Click the controller, right click, select “System Integration”, “Modbus”. Click on the “Modbus” HTML page, drag and drop the 5 points to the below table



Identification	Description	Label	consistency	M_SLAVE	M_memory_type	M_VAR_ADR	M_VARTYP	M_FACTOR	M_OFFSET
Voltage		MODBUS.F:I07	not verified	0	HoldingRegister	0	FL	1	0
Current		MODBUS.F:I18	not verified	0	HoldingRegister	0	FL	1	0
Power		MODBUS.F:I19	not verified	0	HoldingRegister	0	FL	1	0
kWh		MODBUS.F:I20	not verified	0	HoldingRegister	0	FL	1	0
Frequency		MODBUS.F:I21	not verified	0	HoldingRegister	0	FL	1	0

10. The power meter was set to Modbus ID 41, and the Modbus TCP convertor has IP address set to 192.168.170.253. So, in the “M_SLAVE” column, we can input “41:192.168.170.253:502” where 502 is the Modbus TCP port number

Identification	Description	Label	consistency	M_SLAVE
kWh		MODBUS.F:I20	not verified	41:192.168.170.253:502
Voltage		MODBUS.F:I07	not verified	41:192.168.170.253:502
Current		MODBUS.F:I18	not verified	41:192.168.170.253:502
Power		MODBUS.F:I19	not verified	41:192.168.170.253:502
Frequency		MODBUS.F:I21	not verified	41:192.168.170.253:502

11. In (6), it mentioned “Real-time data registers(0x03 RO)”, so we know that it is using Modbus function “03” which is “Read Holding Registers”, so in the “M_memory_type” column, we select “HoldingRegister”

Identification	Des	Label	consistency	M_SLAVE	M_memory_type
kWh		MODBUS.F:I20	not verified	41:192.168.170.253:502	HoldingRegister
Voltage		MODBUS.F:I07	not verified	41:192.168.170.253:502	HoldingRegister
Current		MODBUS.F:I18	not verified	41:192.168.170.253:502	HoldingRegister
Power		MODBUS.F:I19	not verified	41:192.168.170.253:502	HoldingRegister
Frequency		MODBUS.F:I21	not verified	41:192.168.170.253:502	HoldingRegister

12. In (6), we see the “Register No.” for the points are 40001, 40003, 40004, etc. In Modbus, the Holding Register number start from 40001, which means address is 1. But in our controller the Modbus address start from 0, so in this case the “M_VAR_ADR” is set to 0, 2, 3, etc.

Identification	Des	Label	consistency	M_SLAVE	M_memory_type	M_VAR_ADR
kWh		MODBUS.F:I20	not verified	41:192.168.170.253:502	HoldingRegister	0
Voltage		MODBUS.F:I07	not verified	41:192.168.170.253:502	HoldingRegister	2
Current		MODBUS.F:I18	not verified	41:192.168.170.253:502	HoldingRegister	3
Power		MODBUS.F:I19	not verified	41:192.168.170.253:502	HoldingRegister	5
Frequency		MODBUS.F:I21	not verified	41:192.168.170.253:502	HoldingRegister	11

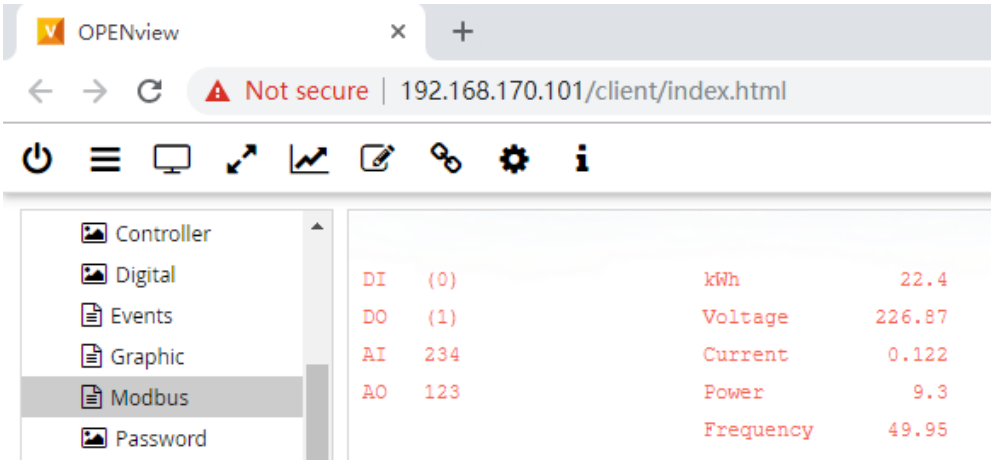
13. There is no mention of point type in (6), so normally we can use “UI” for points with 1 address (e.g. Voltage, 40003), and “ULI” or “ULI_TYPE2” for points with 2 address (e.g. Energy, 40001 and 40002)

Identification	Des	Label	consistency	M_SLAVE	M_memory_type	M_VAR_ADR	M_VARTYP
kWh		MODBUS.F:I20	not verified	41:192.168.170.253:502	HoldingRegister	0	ULI_TYPE2
Voltage		MODBUS.F:I07	not verified	41:192.168.170.253:502	HoldingRegister	2	UI
Current		MODBUS.F:I18	not verified	41:192.168.170.253:502	HoldingRegister	3	ULI_TYPE2
Power		MODBUS.F:I19	not verified	41:192.168.170.253:502	HoldingRegister	5	ULI_TYPE2
Frequency		MODBUS.F:I21	not verified	41:192.168.170.253:502	HoldingRegister	11	UI

14. Finally, in the “Remarks”, it mentioned the scale of 0.1. 0.01, etc. So, we input them in to “M_FACTOR” column accordingly. This is also why we set the “Type” to “FL” in the FUP page, to show the decimal points

Identification	Des	Label	consistency	M_SLAVE	M_memory_type	M_VAR_ADR	M_VARTYP	M_FACTOR
kWh		MODBUS.F:I20	not verified	41:192.168.170.253:502	HoldingRegister	0	ULI_TYPE2	0.1
Voltage		MODBUS.F:I07	not verified	41:192.168.170.253:502	HoldingRegister	2	UI	0.01
Current		MODBUS.F:I18	not verified	41:192.168.170.253:502	HoldingRegister	3	ULI_TYPE2	0.001
Power		MODBUS.F:I19	not verified	41:192.168.170.253:502	HoldingRegister	5	ULI_TYPE2	0.1
Frequency		MODBUS.F:I21	not verified	41:192.168.170.253:502	HoldingRegister	11	UI	0.01

15. Compile and upload the new program to the controller. Now, you can see both Modbus TCP devices (the simulation software and the power meter via the Modbus TCP convertor) can successfully integrated into our OPEN 600



16. Please note that Modbus RTU (RS-485) and Modbus TCP cannot work at the same time. This means if you need to integrate both of them in one OPEN 600, you need to use the Modbus TCP convertor to convert the Modbus RTU devices to Modbus TCP.