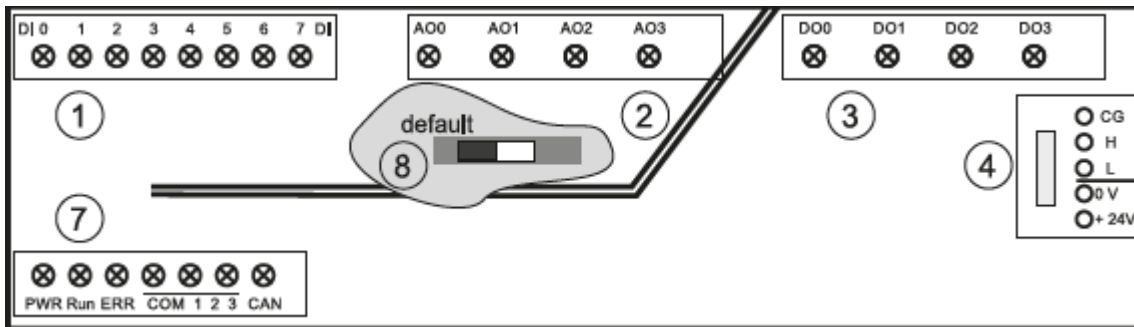
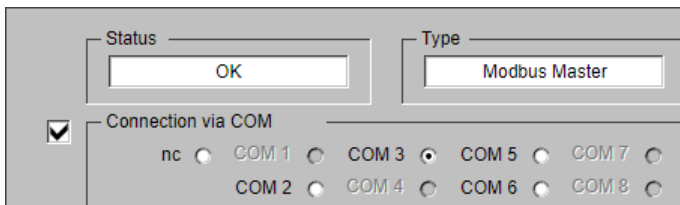


## TT190804 – Troubleshoot - Modbus Communication

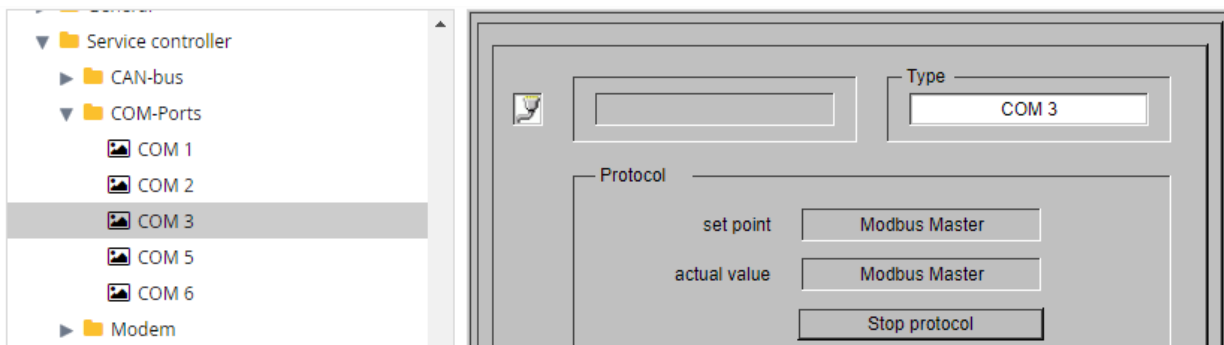
1. You can check the communication with the COM3 LED



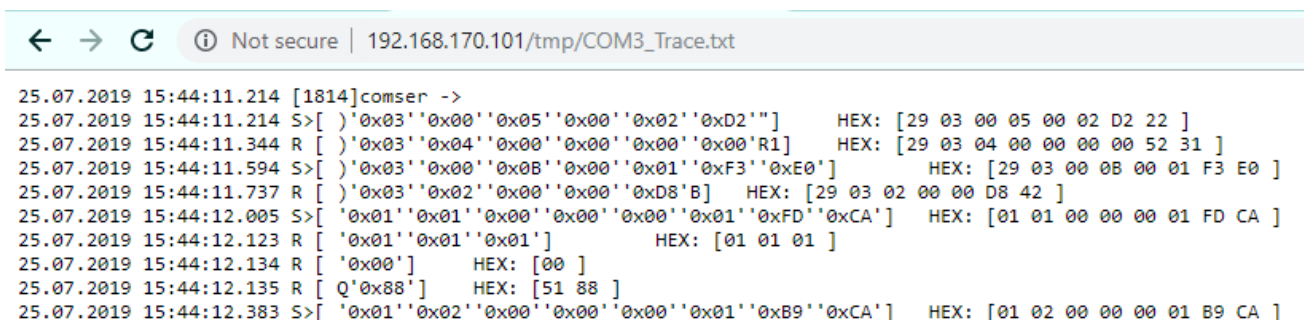
2. Normally COM3 should be flashing green all the time
3. If COM3 is always off, then maybe you've not configured the Modbus points in FUP, or you've not enabled the Modbus connection, or you don't have Modbus option license



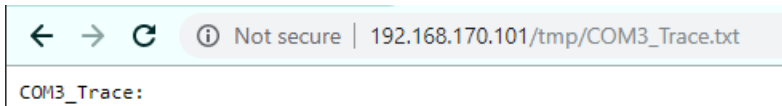
4. If COM3 is flashing green for a few seconds, and then off for 2 minutes, and flash, and off for 2 mins..., then maybe
  - a. RS-485 cable is disconnected, or not connect correctly
  - b. you've set the COM3 settings incorrectly, e.g. baud rate, parity
  - c. many of the Modbus devices are offline, e.g. power off
  - d. you may need to install the 120Ω resistor (EOL resistor) at both ends of the RS-485 cable
5. Check the settings at "Service Controller", "COM Ports", "COM3". If the setting is not correct (e.g. not Modbus Master), click "Stop Protocol", and set it again in step 10



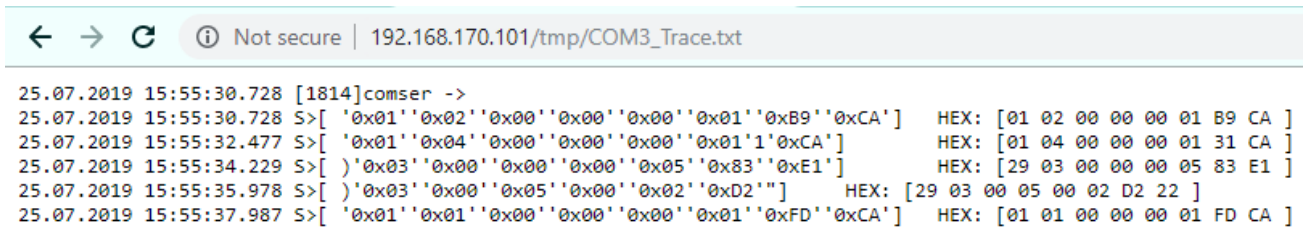
6. To check the Modbus communication in detail, we can use the "Trace" function. Type "http://192.168.170.101/tmp/COM3\_Trace.txt" in the browser



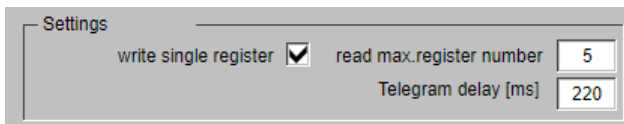
7. If you see no message, then it could be the reasons in (3)



8. If you see only send message “S>”, but no receive “R”, then it could be the reasons in (4)



9. Please note that you need to click the “refresh” button in your browser to update the trace log. If you checked all the items in (4) but still can’t solve the problem, then we have to look at the Modbus configuration in FUP and in the controller
10. First, check the settings for Modbus communication in the “Modbus Master” page



11. “Write Single Register” is for Modbus device that does not support Modbus function 15 and 16 (Write Multiple). Most Modbus devices do not support this, so tick this option for all projects
12. “Read Max. Register Number” is that maximum number of points that OPEN 600 can read in 1 Modbus command. Some Modbus devices have limit on this, so you can try to reduce it for a smaller number (e.g. 1 or 2) for testing if cannot read
13. “Telegram Delay (ms)” is the time to wait before sending the next Modbus command in OPEN 600. “100” here means 0.1 second. You can change it to a smaller number if you want faster communication, but some devices maybe cannot response too fast
14. Second, we check the FUP program, “System Integration”, “Modbus”

number of elements: 9	Identification	Description	Label	consistency	M_SLAVE	M_memory_type	M_VAR_ADR	M_VARTYP	M_FACTOR
COSMOS	kWh		MODBUS.F:I20	not verified	41	HoldingRegister	0	ULI_TYPE2	0.1
Voltage			MODBUS.F:I07	not verified	41	HoldingRegister	2	UI	0.01
Current			MODBUS.F:I18	not verified	41	HoldingRegister	3	ULI_TYPE2	0.001
Power			MODBUS.F:I19	not verified	41	HoldingRegister	5	ULI_TYPE2	0.1
Frequency			MODBUS.F:I21	not verified	41	HoldingRegister	11	UI	0.01
DI			MODBUS.F:I01	not verified	1	Discrete_Input	0	BIT	1
DO			MODBUS.F:I02	not verified	1	Coil	0	BIT	1
AI			MODBUS.F:I03	not verified	1	Input_Register	0	UI	1
AO			MODBUS.F:I04	not verified	1	HoldingRegister	0	UI	1

15. Make sure the settings here are the same as the device Modbus datasheet
- Check the device ID “M\_SLAVE”, register type, point address “M\_VAR\_ADR”, and point type “M\_VARTYP”, based on the device’s Modbus register table
  - Our controller’s Modbus address start from 0, but many Modbus devices address start from 1, so try to change the address to (address – 1), e.g. from 1 to 0
  - Try to make “M\_VAR\_ADR” for each slave device in ascending order, by dragging the point up/down in the left panel
  - Make a backup of the FUP project, and try one Modbus device and a few points first (UI is easier) by deleting all other points in “System Integration”, “Modbus”
16. We can use the “Debug” field on the right-hand side of the table to check the communication

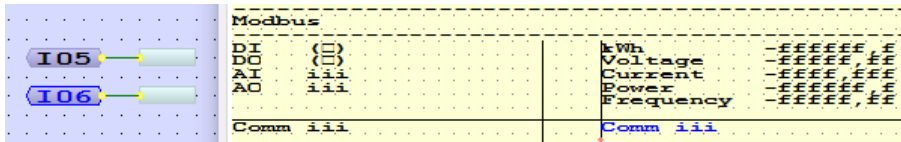
number of elements: 9	Identifi	Des	Label	c	M_SLAVE	M_memory_type	M_VAR_ADR	M_VARTYP	M_FACTOR	M_OFFSET	Read/Wr	Write	Write	Debug
COSMOS	kWh		MODBUS.F:I20	no	41:192.168.170.253:502	HoldingRegister	0	ULI_TYPE2	0.1	0	R	0	0.1	
Voltage			MODBUS.F:I07	no	41:192.168.170.253:502	HoldingRegister	2	UI	0.01	0	R	0	0.1	

#### Debug:

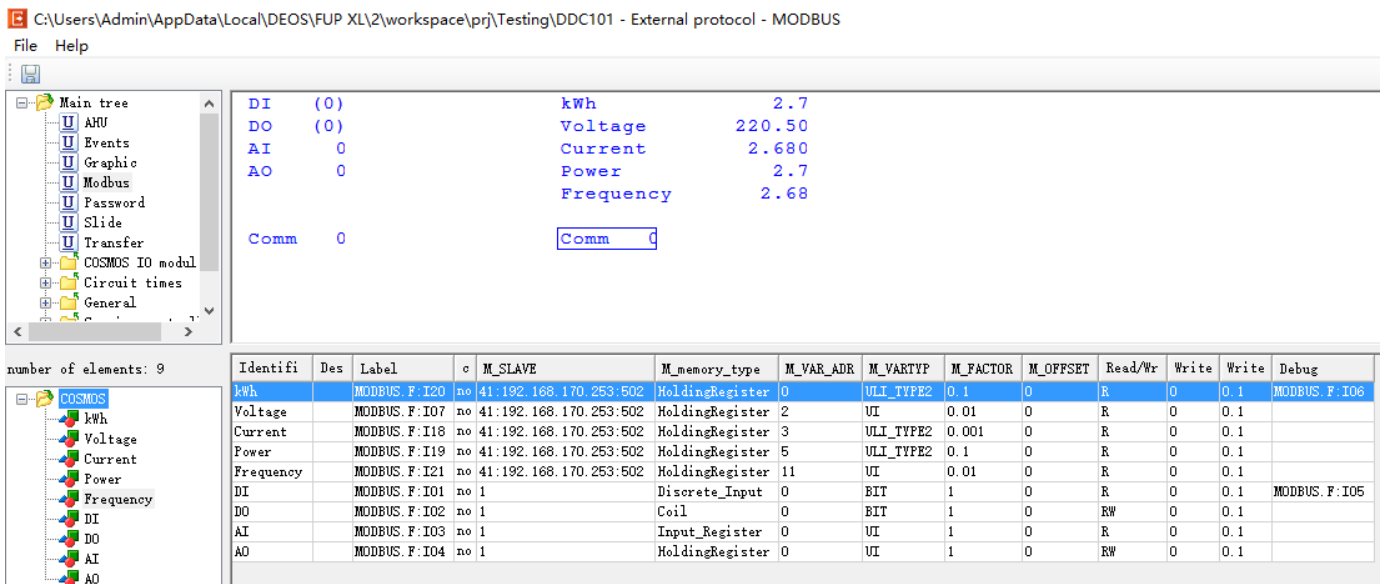
To check a Modbus connection during runtime, a different label on which information about the status is written can be entered for each data point. The label must represent a type UI data point. The information is encoded as follows:

- 0:  
Communication is OK
- 1:  
Data point is configured for reading, but the reading operation was not successful
- 2:  
Data point is configured for writing, but the writing operation was not successful
- 3:  
Data point is configured as reading/writing and at least one action failed

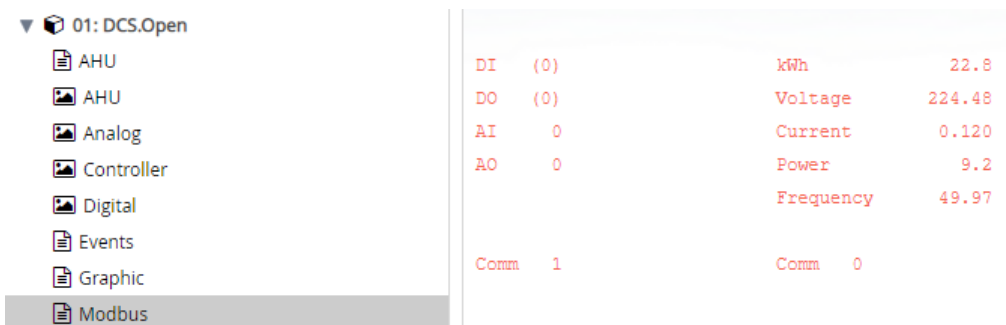
17. Now, we create 2 “Input” as type “UI” in the FUP page, one for each Modbus device



18. In the Modbus integration, drag and drop the 2 “Input” to the “Debug” column of any one of the registers in each Modbus device



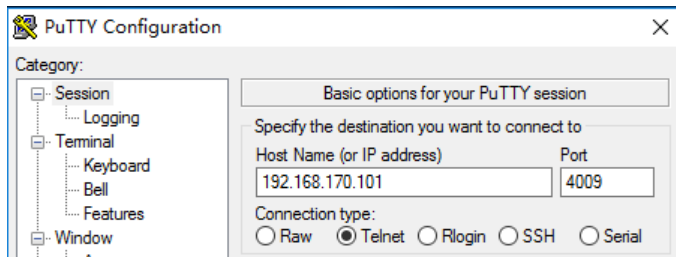
19. You can now see the device communication in your FUP page. It is 0 when communication is OK, otherwise there is problem in the communication



20. Please note that if the device is offline (e.g. power off) and the online again, you may need to wait for up to 2 minutes before the OPEN 600 start to read it again. To make it faster, you can disable and enable the Modbus communication in the controller manually



21. To view the Modbus TCP communication, you can use PuTTY or Telnet to connect to the controller at port “4009”



22. Click “Open” and you should see the Modbus TCP communication trace log file

