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Modbus Configuration

What is a Modbus Mapping?

A Modbus map is simply a list for a slave device that defines
- what the data is (eg. pressure or temperature readings)
- where the data is stored (which tables and data addresses)
- how the data is stored (data types, byte and word ordering)

COM

RS485 setting

- BAUDRATE-9600/19200/38400/57600/115200
- PARITY-EVEN/ODD/NONE
- STOPBIT-1/2
- DATALENGTH-8/7

Modbus RTU Master

- Send delay (ms)-0 (default) - Valid Range 0 to 65535
- Minimum interface (char)-3.5 (default) up to 100 with 0.5 difference

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Modbus Type in configuration file

1. Modbus RTU Master (Modbus Type code:0x01)

Modbus mapping file for RTU will have columns as follows;

Modbus Type	Slave Device ID	Communication timeout (ms) (Default-3000)	No. of retries (default-2)	Polling (ms)	Variable	Function Code	Address	Length

- Communication timeout (ms) – 0 to 65535
- No. of retries – 0 to 9
- Polling (ms) – 3600000

2. Modbus TCP

a. Modbus TCP Client (Modbus Type code:0x02)

Modbus mapping file for TCP client will have columns as follows;

Modbus Type	Polling (ms)	Slave IP Address	TCP Port	Slave Device ID	Variable	Function Code	Address	Length

b. Modbus TCP Server (Modbus Type code:0x03)

Modbus mapping file for TCP Server will have columns as follows;

Modbus Type	TCP Port	Variable	Function Code	Address	Length

Device ID

Each slave in a network is assigned a unique unit address from 1 to 255. When the master requests data, the first byte it sends is the Slave address. This way each slave knows after the first byte whether or not to ignore the message.

Function Code

The second byte sent by the Master is the Function code. This number tells the slave which table to access and whether to read from or write to the table.

Function Code	Action	Table Name
01 (01 hex)	Read	Discrete Output Coils
05 (05 hex)	Write single	Discrete Output Coil
15 (0F hex)	Write multiple	Discrete Output Coils
02 (02 hex)	Read	Discrete Input Contacts

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04 (04 hex)	Read	Analog Input Registers
03 (03 hex)	Read	Analog Output Holding Registers
06 (06 hex)	Write single	Analog Output Holding Register
16 (10 hex)	Write multiple	Analog Output Holding Registers

Function code supported by Data addresses

Data Addresses	Function Code		
	Read	Write Single	Write Multiple
Discrete Output Coils 0xxxx	0x01	0x05	0x15
Discrete Input Contacts 1xxxx	0x02	NA	NA
Analog Input Registers 3xxxx	0x04	NA	NA
Analog Output Holding Registers 4xxxx	0x03	0x06	0x16

Modbus Data Address

Information is stored in the Slave device in four different tables. Two tables store on/off discrete values (coils) and two store numerical values (registers). The coils and registers each have a read-only table and read-write table.

- Each table has 9999 values.
- Each coil or contact is 1 bit and assigned a data address between 0000 and 9998.
- Each register is 1 word = 16 bits = 2 bytes and also has data address between 0000 and 9998.

Coil/Register Numbers	Data Addresses	Type	Table Name
1-9999	0000 to 9998	Read-Write	Discrete Output Coils
10001-19999	0000 to 9998	Read-Only	Discrete Input Contacts
30001-39999	0000 to 9998	Read-Only	Analog Input Registers
40001-49999	0000 to 9998	Read-Write	Analog Output Holding Registers

Coil/Register Numbers can be thought of as location names since they do not appear in the actual messages. The Data Addresses are used in the messages.

For example, the first Holding Register, number 40001, has the Data Address 0000.
The difference between these two values is the **offset**.
Each table has a different offset. 1, 10001, 30001 and 40001.

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