37. MODBUS TCP/IP Gateway

This chapter explains how to use MODBUS TCP/IP Gateway and configure address mapping tables.

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37.1. Overview

To access the data of the PLC connected to HMI with SCADA software (Supervisory Control and Data Acquisition), the former way was to transfer PLC data to the HMI's local address first, and then use MODBUS TCP/IP protocol on PC to read HMI local address to get PLC data. Now by using MODBUS TCP/IP Gateway provided by EasyBuilder Pro, the mapping of MODBUS address to PLC address can be defined first, and then one can directly use MODBUS TCP/IP protocol to access PLC data.



37.2. Steps to Create an Address Mapping Table

To create an Address Mapping Table, please follow the steps:

- 1. In [System Parameter Settings] » [Device] tab, add the PLC device. (In the example FATEK FB Series is used).
- 2. Add MODBUS Server (Ethernet), select [Enable] check box under [MODBUS TCP/IP Gateway] as shown in the following figure.



Device Properties								
Name :	MODBUS Server							
	© HMI							
Location :	Local Settings							
PLC type :	MODBUS Server +							
	V.1.00, MODBUS_SERVER.e30							
PLC I/F :	Ethernet -							
IP : Local,Port=502(=HMI Port) Settings Use UDP (User Datagram Protocol)								
	Station no. : 1							
	Use broadcast command							
MODBUS TCP/IP Gate	way							
	Enable Address Mapping Tables							
	OK Cancel							

 Click [Address Mapping Tables] button and the following default tables will be displayed. Modify the tables if needed or add new tables.

A	Address Mapping Table								
	Table	Description	MODBUS Address		PLC Name	Mapped PLC Address	Table Size	Read/Write	
	1	0x <==> LB	0x-1		Local HMI	LB-0	12400 Bit(s)	Read/Write	
	2	1x <==> LB	1x-1	<==	Local HMI	LB-0	12400 Bit(s)	Read only	
	3	3x <==> LW	3x-1	<==	Local HMI	LW-0	9999 Word(s)	Read only	
	4	4x <==> LW	4x-1	<==>	Local HMI	LW-0	9999 Word(s)	Read/Write	
	5	3x <==> RW	3x-10000	<==	Local HMI	RW-0	55536 Word(s)	Read only	
	6	4x <==> RW	4x-10000	<==>	Local HMI	RW-0	55536 Word(s)	Read/Write	
	*Note: No cross-table reading/writing, i.e. accessing data from multiple tables in one command.								
	* LW-9288 indicates the last communication error : * Support the following function codes : 0 : normal 4 : read-only error 0x : 1, 5, 15 (15 used only to set LB) 1 : read/write undefined registers 5 : write-only error 1x : 2 2 : out of read/write range 6 : timeout 3x : 4 3 : bad command format 7 : invalid function code 4x : 3, 6, 16								
	Add Delete Settings OK Cancel								



4. For example, to access the data in the 50 consecutive registers of FATEK FB Series PLC starting from register D-0, configure the settings as shown in the following figure.

Table Settings				
Description (1) Device type	:			
	🔘 Bit	Word	ł	
(2) Mode				
Read	/Write	Read only	Write only	/
(3)				
MODBUS addres	s			
PLC name : M	ODBUS Server		-	
Address : 4	¢	▼ 1		
(4) Mapped PLC add	lress			
PLC name : F	ATEK FB Series			Setting
Address : D		▼ 0		
(5)			1	
Table size				
	50	Word(s)		
(6)				
Conversion				
	🕅 AB -> BA	AE	3CD -> CDAB	
			ОК	Cancel

- (1) Select the device type of the registers to be mapped, in the example select [Word].
- (2) Select the mode to access the data in the mapped register, in the example set to [Read/Write].
- (3) Set the start address of MODBUS, in the example set to "4x-1".
- (4) Set the start address of the mapped PLC, in the example set to "D-0".
- (5) Set the range size of address mapping, in the example set to "50".
- (6) If needed, select high/low byte swap (AB->BA) or high/low word swap (ABCD->CDAB).

Table	Description	MODBUS Address		PLC Name	Mapped PLC Address	Table Size	Read/Write
1	Access D0 ~ D49	4x-1	<==>	FATEK FB Series	D-0	50 Word(s)	Read/Write

The above figure shows that MODBUS Server $4x-1 \sim 4x-50$ registers are mapped to FATEK FB Series PLC D-0 \sim D-49 registers.

5. When finished, the data of FATEK FB Series PLC D-0 ~ D-49 registers are now accessible by using MODBUS TCP/IP protocol to send read / write command to 4x-1 ~ 4x-50 registers.



37.3. Notes about Configuring Address Mapping

- UDP is not supported when using the MODBUS TCP/IP Gateway feature.
- This feature is only supported by MODBUS Server (Ethernet) interface.
- System register LW-9288 is used to indicate if data transfer has been correctly executed.
 The following error codes represent:

Value	Definition					
0	Normal					
1	Read or write the register that is not defined in the					
	Address Mapping Table.					
2	Read or write a range of registers that is not within					
	the range defined in a single Address Mapping Table.					
	(Or, read / write a register that is defined in other					
	Address Mapping Table.)					
3	The command format does not follow MODBUS					
	TCP/IP protocol.					
4	Modify a read-only register.					
5	Read a write-only register.					
6	Cannot get the correct reply from PLC within the					
	specified time range.					
7	Use a function code that is not supported by					
	MODBUS Server.					

- The defined register range must not overlap between different mapping tables.
- If [MODBUS TCP/IP Gateway] is enabled, EasyBuilder Pro will cancel the original mapping between MODBUS Server and HMI register. That includes:
 - (1) 0x, 1x mapped to LB
 - (2) 3x, 4x mapped to LW, RW

Therefore, to access data in LB or LW register via 0x, 1x, 3x, 4x, configure the Address Mapping Table again. The following figure is an example.

Table	Description	MODBUS Address		PLC Name	Mapped PLC Address	Table Size	Read/Write
1	0x <==> LB	0x-1	<==>	Local HMI	LB-0	12400 Bit(s)	Read/Write
2	1x <==> LB	1x-1	<==	Local HMI	LB-0	12400 Bit(s)	Read only
3	3x <==> LW	3x-1	<==	Local HMI	LW-0	9999 Word(s)	Read only
4	4x <==> LW	4x-1	<==>	Local HMI	LW-0	9999 Word(s)	Read/Write
5	3x <==> RW	3x-10000	<==	Local HMI	RW-0	55536 Word(s)	Read only
6	4x <==> RW	4x-10000	<==>	Local HMI	RW-0	55536 Word(s)	Read/Write



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