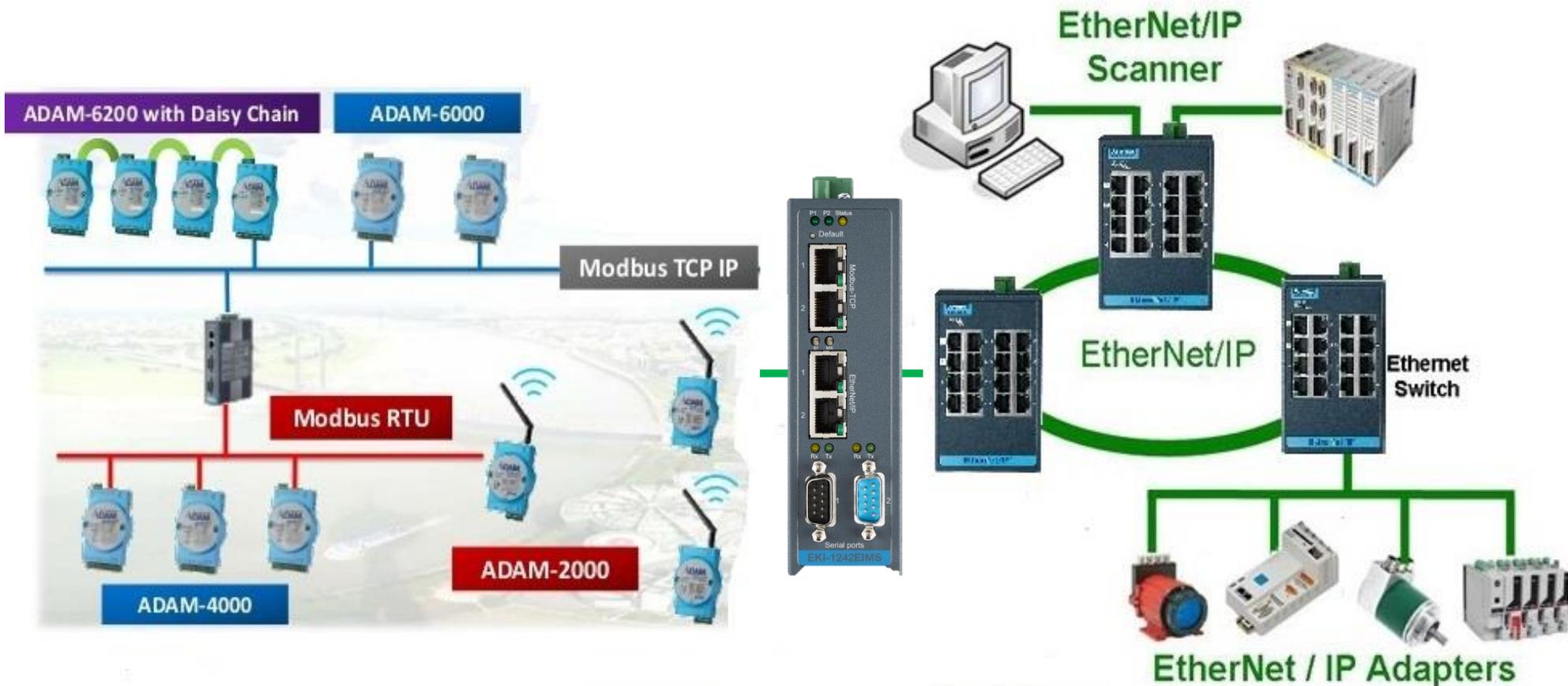


# Modbus TCP/RTU to Ethernet/IP Protocol Gateway

- EKI-1242EIMS Configuration

# EKI-1242EIMS Architecture



# 1 Network Setting

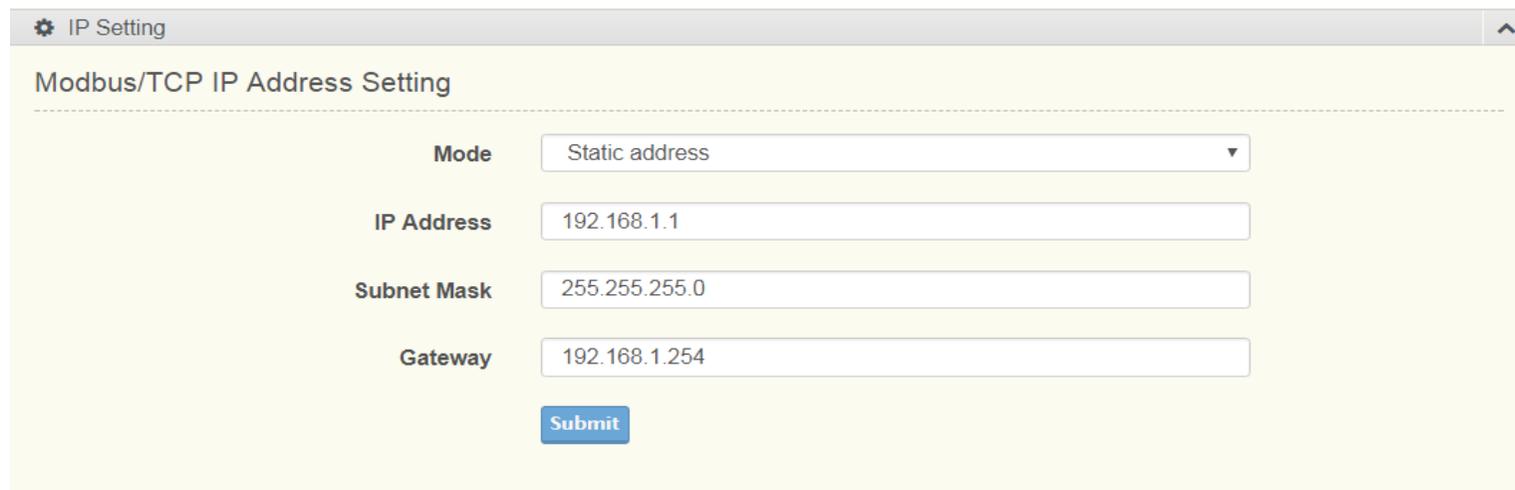
The IP Settings menu allows you to select a static address or DHCP network configuration. The Static address displays the configurable settings for the static option.

Network Setting > IP Setting

Default IP Address: 192.168.1.1

User name in GUI: admin

Password in GUI: admin



The screenshot shows a web interface for configuring IP settings. At the top, there is a header bar with a gear icon and the text "IP Setting". Below this, the main content area is titled "Modbus/TCP IP Address Setting". The configuration is presented as a form with the following fields:

- Mode:** A dropdown menu currently set to "Static address".
- IP Address:** A text input field containing "192.168.1.1".
- Subnet Mask:** A text input field containing "255.255.255.0".
- Gateway:** A text input field containing "192.168.1.254".

At the bottom of the form, there is a blue "Submit" button.

# 1 Network Setting

## There are two options of IP Setting

- a. Ethernet/IP and Modbus TCP are in the different subnet
- b. Ethernet/IP and Modbus TCP are in the same subnet.

In this bridge mode, the two interfaces use identical IP address.

Mode: Static address

IP Address: 192.168.1.1

Subnet Mask: 255.255.255.0

Gateway: 192.168.1.254

Modbus/TCP and EtherNet/IP interface use the same IP address setting

Mode: Static address

IP Address: 192.168.1.1

Subnet Mask: 255.255.255.0

Gateway: Gateway

Submit

System	
Information Name	Information Value
Model	EKI-1221EIMB
Firmware Version	1.00.05
Uptime	0h 6m 9s

Modbus/TCP	
Information Name	Information Value
MAC Address	74:FE:48:2D:0C:EC
Mode	Static
IP Address	192.168.1.1
Subnet Mask	255.255.255.0
Gateway	192.168.1.254

EtherNet/IP	
Information Name	Information Value
MAC Address	74:FE:48:2D:0C:EC
Mode	Static
IP Address	192.168.1.1
Subnet Mask	255.255.255.0
Gateway	192.168.1.254

## 2 Serial Setting

The Serial Setting allows for the configuration of the serial interface type, baud rate, parity, data/stop bits, and flow control for port configuration.

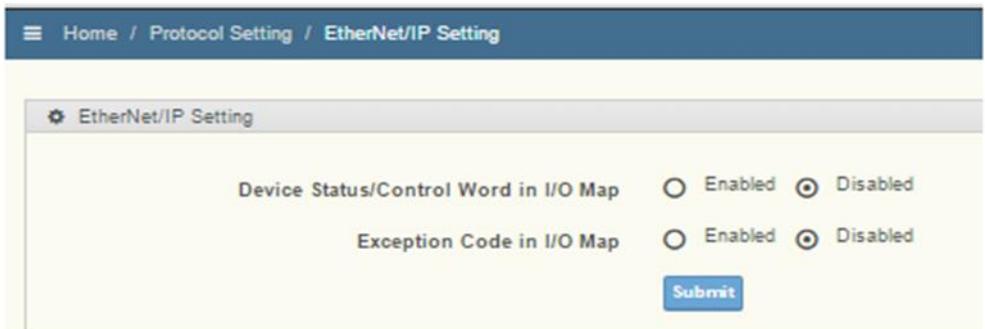
### Serial Setting > Port

Parameter	Description
<b>Type</b>	Click the drop-down menu to select a serial interface: <a href="#">RS-232</a> <a href="#">RS-422</a> or <a href="#">RS-485</a> .
<b>Baud Rate</b>	Enter a value to specify the baud rate. The value should conform to the current transmission speeds of connected devices when setting the baud rate
<b>Parity</b>	Click the drop-down menu to select the parity: None, Odd, Even, Mark or Space
<b>Data Bits</b>	Click the drop-down menu to select the data bits: 5, 6, 7, or 8.
<b>Stop Bits</b>	Click the drop-down menu to select the stop bits: 1, 1.5 or 2.
<b>Flow Control</b>	Click the drop-down menu to select the flow control mode: None, XOn/XOff, RTS/CTS.

# 3 Protocol Setting

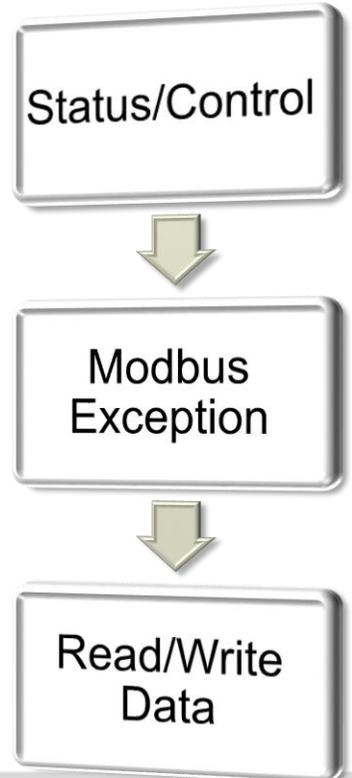
On the Ethernet/IP network, the gateway transmits mapped as Ethernet/IP adaptor I/O data. The first *two I/O mapped bytes* in either direction can be dedicated for *status/control* information, and *another 64 bytes* of data coming from the Modbus TCP/RTU can feature the *Modbus exception codes*.

To access this page, click Protocol Setting > Ethernet/IP Setting



*status/control :*

Bit	Value	Description
0-1 (Least significant bit)	01b	Puts the gateway in idle state.
	10b	Puts the gateway in running state.
2-15	(reserved)	Unused



## 3.2 Modbus Setting

On the Modbus TCP/RTU network side, the gateway will act as a Modbus TCP/RTU master.

The screenshot displays the Modbus Setting interface. On the left is a navigation menu with options: Overview, Network Setting, Protocol Setting, EtherNet/IP Setting, **Modbus/TCP Setting** (highlighted), Mapping Overview, System Management, and Tools. The main content area is divided into two sections: 'Modbus Setting' and 'Modbus Commands'.

**Modbus Setting** section:

- Start-up Mode: Running
- When Modbus error: Freeze Data
- Submit button

**Modbus Commands** section:

Allocated input size: 54 bytes    output size: 33 bytes

Buttons: Add, Edit, Delete, Copy

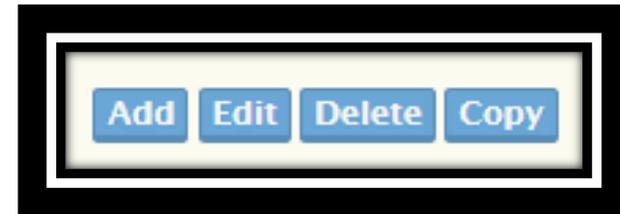
Index	Name	Mode	Slave ID	FC	Address/Quantity	Trigger	Scan Interval	Data Swap	Response Timeout	I/O Disconnect	Safe Value
1	Command 1	RTU Serial Port: 1	1	3	Read Address 100, Quantity 2	Cyclic	1000	None	1000		
2	Command 2	TCP Slave IP Address: 192.168.1.100 Port: 502	2	16	Write Address 1000, Quantity 10	Cyclic	1000	Word	1000	Freeze Data	
3	Command 3	TCP Slave IP Address: 192.168.1.50 Port: 502	1	15	Write Address 2000, Quantity 8	Data change	1000	None	1000	Safe Value	1
4	Command 4	RTU Serial Port: 2	4	23	Read Address 3000, Quantity 14 Write Address 4000, Quantity 6	Cyclic	2000	DoubleWord	1000	Freeze Data	
5	Command 5	TCP Slave IP Address: 192.168.1.40 Port: 502	5	4	Read Address 5000, Quantity 11	Cyclic	500	None	800		

## 3.2 Modbus Setting

- Start-up Mode Operation Mode

Value	Description
Running	The Modbus TCP/RTU master starts to exchange data with the slaves as soon as possible after start-up.
Idle	The Modbus TCP/RTU master does not exchange any data with the slaves and waits for instructions via the control word.

- Modbus Commands Table



**Add button:** Click Add and then Modbus command page will appear.

**Edit button:** select the specific command *click Edit button* and then Modbus command page will appear.

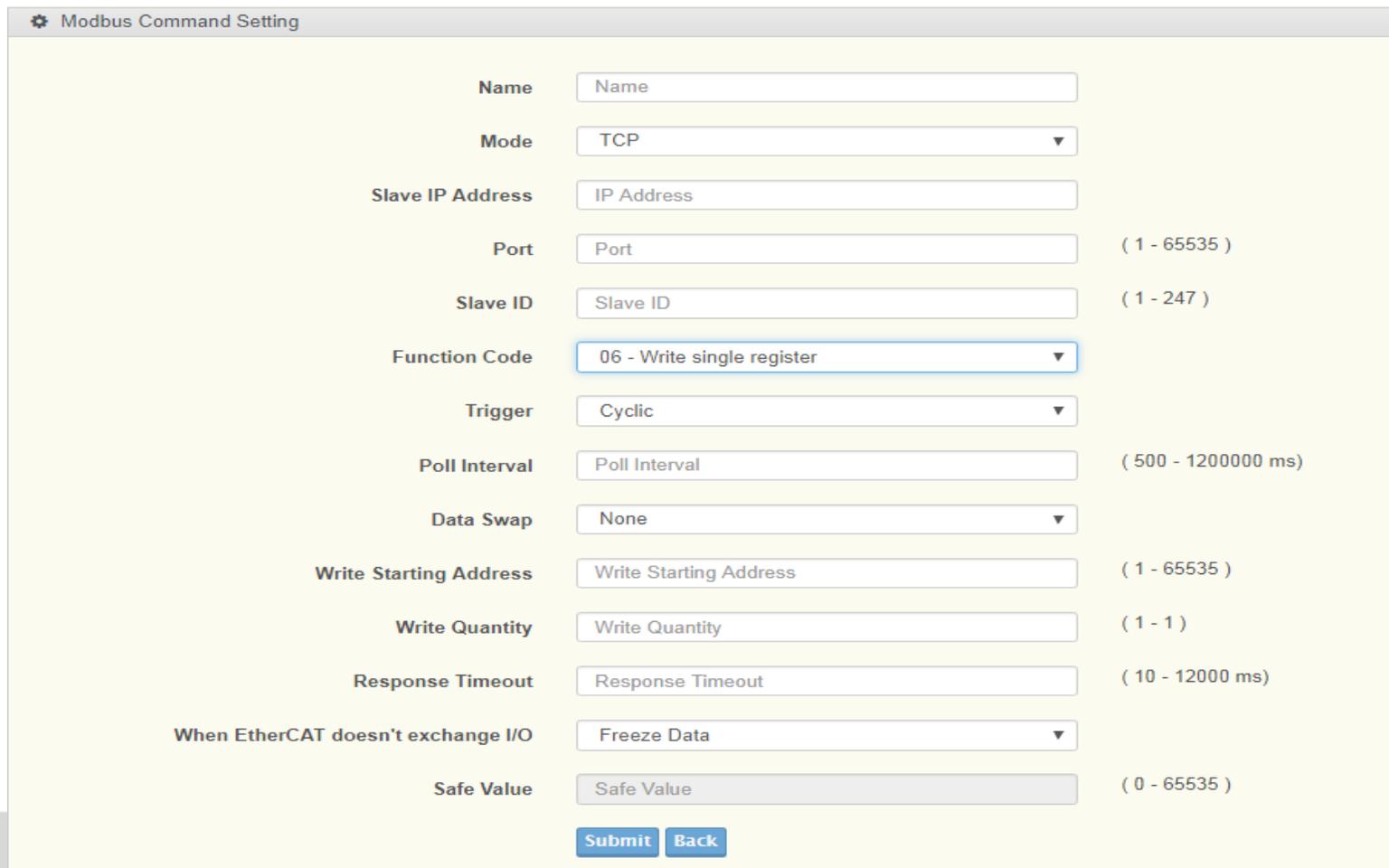
**Delete button:** select the specific command and then *click the Delete button*

**Copy button:** select specific command and then click the **Copy** button.

Note: The gateway needs to be restarted before any changes will take effect.

## 3.2 Modbus Command Creation

To communicate with remote Modbus TCP/RTU slave devices, specify the Modbus command for each slave device. Each slave device may need more than one command for communication, so you need to input all the commands manually.



The screenshot displays the 'Modbus Command Setting' configuration window. It features a series of input fields and dropdown menus for configuring a Modbus command. The 'Function Code' dropdown is currently set to '06 - Write single register'. The 'Trigger' dropdown is set to 'Cyclic'. The 'When EtherCAT doesn't exchange I/O' dropdown is set to 'Freeze Data'. At the bottom, there are 'Submit' and 'Back' buttons.

Field Name	Value	Range / Notes
Name	Name	
Mode	TCP	
Slave IP Address	IP Address	
Port	Port	( 1 - 65535 )
Slave ID	Slave ID	( 1 - 247 )
Function Code	06 - Write single register	
Trigger	Cyclic	
Poll Interval	Poll Interval	( 500 - 1200000 ms)
Data Swap	None	
Write Starting Address	Write Starting Address	( 1 - 65535 )
Write Quantity	Write Quantity	( 1 - 1 )
Response Timeout	Response Timeout	( 10 - 12000 ms)
When EtherCAT doesn't exchange I/O	Freeze Data	
Safe Value	Safe Value	( 0 - 65535 )

Parameter	Description
<b>Name</b>	A name to help identify the command.
<b>Mode</b>	The mode of Modbus protocol, TCP or RTU. TCP: Modbus TCP communication over TCP/IP networking. RTU: Modbus RTU communication via serial port.
<b>Slave IP Address</b>	The IP address of remote slave device. The field is available only in TCP mode.
<b>Serial Port</b>	The physical interface to to connect with remote Modbus RTU devices. The field is available only in RTU mode.
<b>Port</b>	The TCP port number of remote slave devices. The range is from 0 to 65535.
<b>Slave ID</b>	The Modbus slave id that this slave module will accept. The range is from 1 to 255.
<b>Function Code</b>	When a message is sent from a Master to a Slave device the function code field tells the slave what kind of action to perform. Below are the supported function codes: 01: Read coils 02: Read discrete inputs 03: Read holding registers 04: Read input register 05: Write single coil 06: Write single register 15: Write multiple coils 16: Write multiple registers 23: Read/Write multiple registers
<b>Trigger</b>	Cyclic: The read/write command is sent cyclically at the interval specified in the "Poll Interval" parameter. Data change: The data area is polled for changes at the time interval defined by Poll Interval. A write command is issued when a change in data is detected. The field is available only in Write function code.
<b>Poll Interval</b>	The polling interval defines how often the Modbus command shall be resent, e.g. the time cycle of a repeating command. The range is from 500 to 1,200,000 ms.
<b>Data Swap</b>	Decides in what order the different bytes of the received/transmitted data shall be sent on the network. None: Don't need to swap Word: 0x01, 0x02 becomes 0x02, 0x01 Double Word: 0x01, 0x02, 0x03, 0x04 becomes 0x04, 0x03, 0x02, 0x01 Note: 1) When function code is 1, 2, 5, or 15, None is the only option. 2) When function code is 6, only None and Word are the options. 3) When function code is 3, 4, 16, or 23, the number of Quantity must be even.
<b>Read/Write Starting Address</b>	The starting Modbus register or bit to read from/write to. The range is from 1 to 65535.
<b>Read/Write Quantity</b>	Specifying how many quantities to read/write. The range is from 1 to 2000.
<b>Response Timeout</b>	The time span within which the remote Modbus device must return a response to the transaction.
<b>When PROFINET doesn't exchange I/O</b>	In I/O mapped write transaction, when PROFINET does not exchange I/O: Clear data to Modbus server: Transmits only zeros. Freeze data to Modbus server: Repeat the last stored data. Write safe value: The value to transmit for each element. Stop: The transmission of any and all data to the Modbus server is halted.
<b>Safe Value</b>	The value to transmit for each Modbus server when PROFINET doesn't exchange I/O.

# 3.3 Mapping Overview

The I/O mapped data will follow priority order:

- Input Data: Data from the Modbus TCP/RTU network to the Ethernet/IP network.
  - Status word (optional)
  - Exception code (optional)
  - Input data
- Output data: Data from the Ethernet/IP network to the Modbus TCP/RTU network.
  - Control word (optional)
  - Output data

- Overview
- Network Setting
- Protocol Setting
  - EtherNet/IP Setting
  - Modbus/TCP Setting
  - Mapping Overview**
- System Management
- Tools

Home / Protocol Settings / Mapping Overview

Total input data buffer:496byte

Input Mapping Overview

Input Data Byte buffer view

Address	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0000h																
0010h																
0020h																
0030h																
0040h																
0050h																
0060h																

Modbus/TCP - Master

Name	Function Code	Data Size(Byte)	Byte range
Device Status		2	0 - 1
Exception code		64	2 - 65
EIPRead	3	20	66 - 85

Output Mapping Overview

Output Data Byte buffer view

Address	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0000h																
0010h																
0020h																
0030h																

EtherNet/IP - Adapter

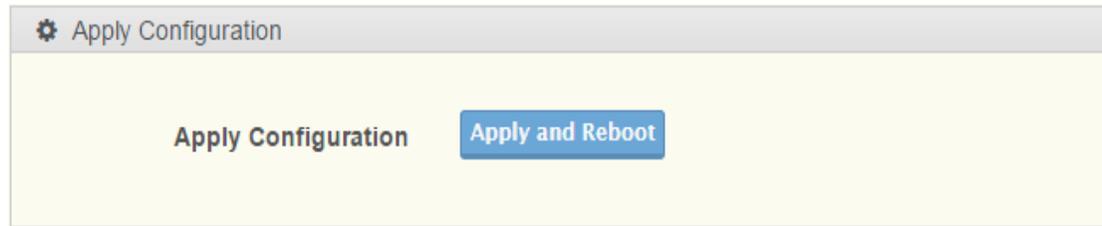
Name	Function Code	Data Size(Byte)	Byte range
Device Control		2	0 - 1
EIPWrite	16	4	2 - 5

Total output data buffer:496byte

## 4 Apply Configuration – Save and Reboot

Click Apply and Reboot button to have configuration changes you have made to be saved across a system reboot.

To access this page, click System Management > Apply Configuration.



Please note that changes made to the configuration will not be saved and used by the gateway until they have been applied and system reboot. Remember to apply the configuration in order for changes to take effect. As soon as you have submitted data to the configuration but not yet applied it, you will see the box below at the top of the web pages:

Go to [Apply](#) page to apply configuration and reboot device

# Data View – Ethernet/IP Read Part Data view

- When you set up Modbus/TCP session and use I/O Mapping, you can see the Ethernet/IP I/O Data in Data View page

Go to [Apply](#) page to apply configuration and reboot device

Home / Overview / Data View

Auto Refresh

Address	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0000h	3B	DF	21	CD	04	D2	0B	D8	00	00	00	00	00	00	00	00
0010h	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0020h	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0030h	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0040h	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0050h	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0060h	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0070h	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0080h	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

Name	FC	Data Size (Byte)	Byte Range
EIPRead	3	20	0 - 19

ModSim32 - ModSim1

File Connection Display Window Help

ModSim1

Device Id: 1

Address: 0001

Length: 20

MODBUS Point Type: 03: HOLDING REGISTER

40001: <3BDFH>	40011: <0000H>
40002: <21CDH>	40012: <0000H>
40003: <04D2H>	40013: <0000H>
40004: <0BD8H>	40014: <0000H>
40005: <0000H>	40015: <0000H>
40006: <0000H>	40016: <0000H>
40007: <0000H>	40017: <0000H>
40008: <0000H>	40018: <0000H>
40009: <0000H>	40019: <0000H>
40010: <0000H>	40020: <0000H>

# Tool – Modbus RTU/TCP Protocol Traffic Monitor

- EKI-1242EIMS support Modbus RTU/TCP Protocol Traffic Monitor function for easy troubleshooting.
- When communication issues happen it may be caused by incorrect software parameters, such as wrong slave IDs or wrong register addresses even it could be incorrect command configuration. With Traffic Monitoring, you can check data and easily identify root cause Just in Time.

The screenshot displays the Modbus Traffic Catcher tool interface. On the left, a navigation menu includes Overview, Network Setting, Serial Setting, Protocol Setting, System Management, and Tools. The 'Tools' section is highlighted, and 'Modbus Traffic Catcher' is selected. The main window shows the tool's status as 'Capturing...' with 'Start', 'Stop', and 'Export' buttons. The 'Export' button is highlighted with a red box. A CSV file icon labeled '1,2,3' is shown above the table. The table below lists captured traffic data with columns for No., Time, Trans ID, Name, Send / Recv, Slave ID, FC, Length, and Data.

No.	Time	Trans ID	Name	Send / Recv	Slave ID	FC	Length	Data
1	0h:0m:0s.000	3	Read_MS_2	Send	6	3	8	06 03 00 05 00 01 95 BC
2	0h:0m:0s.130	3	Read_MS_2	Receive	6	3	7	06 03 02 00 7B 4D A7
3	0h:0m:0s.450	3	Read_MS_2	Send	6	3	8	06 03 00 05 00 01 95 BC
4	0h:0m:0s.582	3	Read_MS_2	Receive	6	3	7	06 03 02 00 7B 4D A7
5	0h:0m:0s.770	1	Read_MP	Send	1	3	12	77 9F 00 00 00 06 01 03 00 00 00 01
6	0h:0m:0s.772	1	Read_MP	Receive	1	3	11	77 9F 00 00 00 05 01 03 02 53 A3
7	0h:0m:0s.950	3	Read_MS_2	Send	6	3	8	06 03 00 05 00 01 95 BC
8	0h:0m:1s.085	3	Read_MS_2	Receive	6	3	7	06 03 02 00 7B 4D A7







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