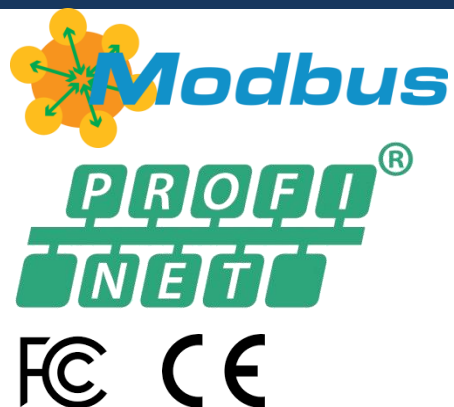


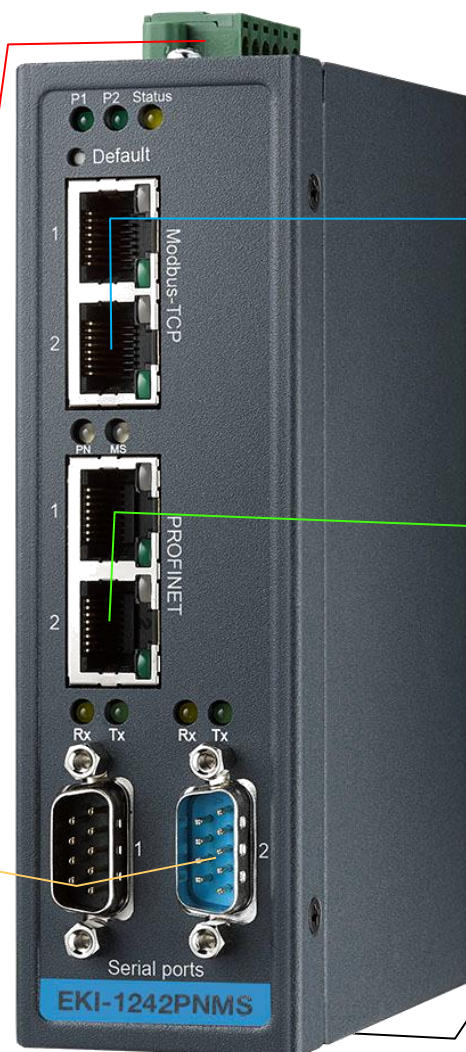
# **EKI-1242PNMS\_Example of Configure Modbus TCP or RTU to ProfiNet Protocol Gateway**

# Fieldbus Gateway Product Portfolio -EKI-1242PNMS



- Operating temperature range: -10~60°C
- 12~48 VDC wide range dual power input

- 2 Ports of MODBUS RTU
  - ✓ Baud Rate 50bps - 921.6k bps
  - ✓ Support Flow Control
  - ✓ Support RS232/RS485/RS422



- MODBUS TCP Master
  - ✓ Max. Number of 64 Modbus connections
  - ✓ MODBUS Functions support 1,2,3,4,5,6,15,16,23

- PROFINET I/O Conformance Class B (RT)
  - ✓ Support 8 ms cyclic time
  - ✓ Support max. 64 slots
  - ✓ Support MRP Client
  - ✓ GSDML V2.32

- Easy backup & restore configuration via microSD card

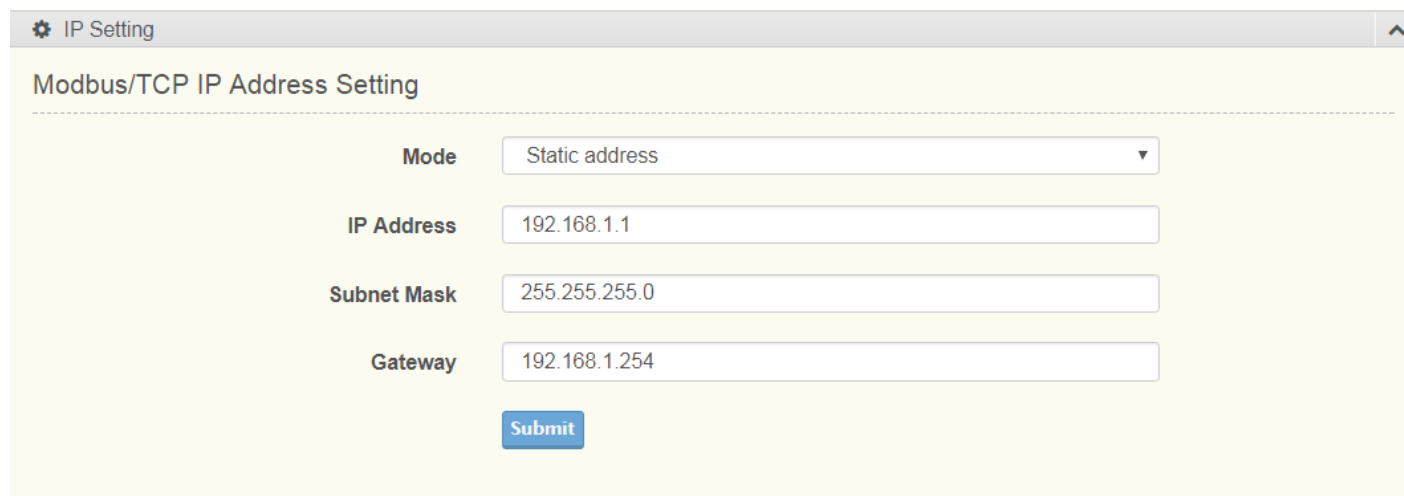
The IP Settings menu allows you to select a static address or DHCP network configuration. The Static address displays the configurable settings for the static option.

Network Setting > IP Setting

Default IP Address: 192.168.1.1

User name in GUI: admin

Password in GUI: admin



The screenshot displays the 'IP Setting' configuration window. At the top, there is a title bar with a gear icon and the text 'IP Setting'. Below this, the main heading is 'Modbus/TCP IP Address Setting'. The configuration area contains four labeled input fields: 'Mode' (a dropdown menu set to 'Static address'), 'IP Address' (a text box containing '192.168.1.1'), 'Subnet Mask' (a text box containing '255.255.255.0'), and 'Gateway' (a text box containing '192.168.1.254'). A blue 'Submit' button is located at the bottom center of the form.

## 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
Type	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> .
Baud Rate	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
Parity	Click the drop-down menu to select the parity: None, Odd, Even, Mark or Space
Data Bits	Click the drop-down menu to select the data bits: 5, 6, 7, or 8.
Stop Bits	Click the drop-down menu to select the stop bits: 1, 1.5 or 2.
Flow Control	Click the drop-down menu to select the flow control mode: None, XOn/XOff, RTS/CTS.

### 3 Protocol Setting

On the PROFINET network, the gateway transmits mapped data to PROFINET master though 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 > PROFINET Setting

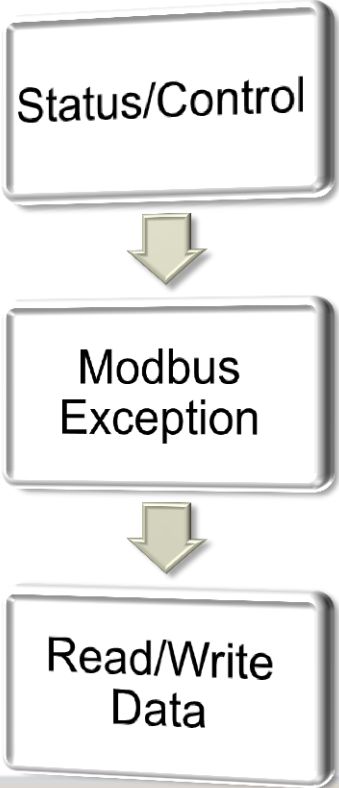
PROFINET Setting

Device Status/Control Word in Slot ☐ Enabled ☒ Disabled

Exception Code in Slot ☐ Enabled ☒ Disabled

Read Only Community

Read / Write Community



*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

## 3.1 Protocol Setting

On the PROFINET network, the gateway transmits mapped data to PROFINET master though 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 > PROFINET Setting



The screenshot shows a web interface titled "PROFINET Setting" with a gear icon. It contains four configuration options, each with a radio button for "Enabled" and "Disabled":

- Device Status/Control Word in Slot**: The "Disabled" radio button is selected.
- Exception Code in Slot**: The "Disabled" radio button is selected.
- Read Only Community**: A text input field containing the value "public".
- Read / Write Community**: A text input field containing the value "private".

A blue "Submit" button is located at the bottom of the form.

### *SNMP Community:*

The SNMP Community provides configuration options for the community. The Community supported Read Only and Read-Write Community settings.

## 3.2 Modbus Setting

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

↔ Network Setting

↔ Serial Setting

📄 Protocol Setting

PROFINET Setting

**Modbus Setting**

Mapping Overview

🔧 System Management

🔧 Tools

⚙️ Modbus Setting

Start-up Mode Running

When Modbus error Freeze Data

Submit

⚙️ Modbus Commands

Allocated input size: 54 bytes   output size: 33 bytes

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		

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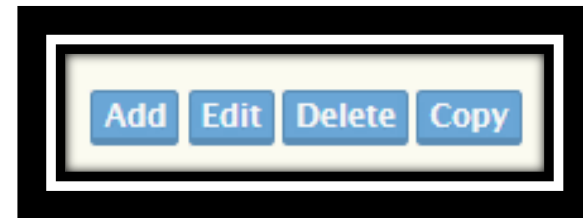
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## 3.2 Modbus Setting

- 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.

 Modbus Command Setting

Name	<input type="text" value="Name"/>	
Mode	<input type="text" value="TCP"/>	▼
Slave IP Address	<input type="text" value="IP Address"/>	
Port	<input type="text" value="Port"/>	( 1 - 65535 )
Slave ID	<input type="text" value="Slave ID"/>	( 1 - 247 )
Function Code	<input type="text" value="06 - Write single register"/>	▼
Trigger	<input type="text" value="Cyclic"/>	▼
Poll Interval	<input type="text" value="Poll Interval"/>	( 500 - 1200000 ms)
Data Swap	<input type="text" value="None"/>	▼
Write Starting Address	<input type="text" value="Write Starting Address"/>	( 1 - 65535 )
Write Quantity	<input type="text" value="Write Quantity"/>	( 1 - 1 )
Response Timeout	<input type="text" value="Response Timeout"/>	( 10 - 12000 ms)
When EtherCAT doesn't exchange I/O	<input type="text" value="Freeze Data"/>	▼
Safe Value	<input type="text" 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 PROFINET network.
  - Status word (optional)
  - Exception code (optional)
  - Input data
- Output data: Data from the PROFINET network to the Modbus TCP/RTU network.
  - Control word (optional)
  - Output data
- Process Data Objects (PDO) List
  - Name of the PDO
  - Index of the PDO
  - Size of the PDO in bytes
  - The read/write capability of the PDO

PROFINET I/O

Slot	Transaction Name	In Slot Range(bytes)	Input Word	Output Word
1	command1	0 - 3	2	-
2	command2	0 - 3	-	2
3	command3	0 - 0	-	1

# he PDO

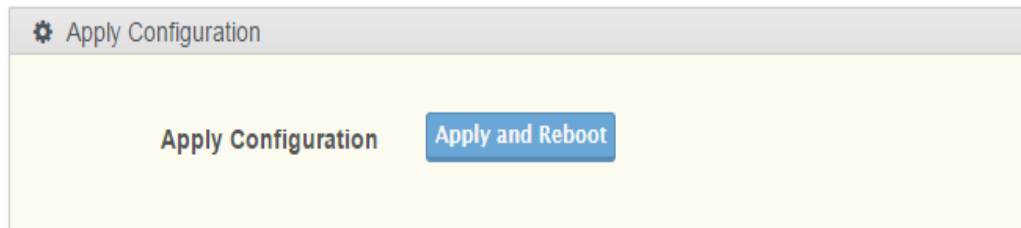
Modbus Client

Name	FC	Data Swap	Scan Time	Response Timeout	UID	Read/Write Starting Address	Quantity	When PROFINET doesn't exchange I/O
command1	3	None	1000	1000	1	110	2	
command2	16	None	1000	1000	1	120	2	Freeze Data
command3	5	None	1000	1000	1	130	1	Freeze Data

## 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.

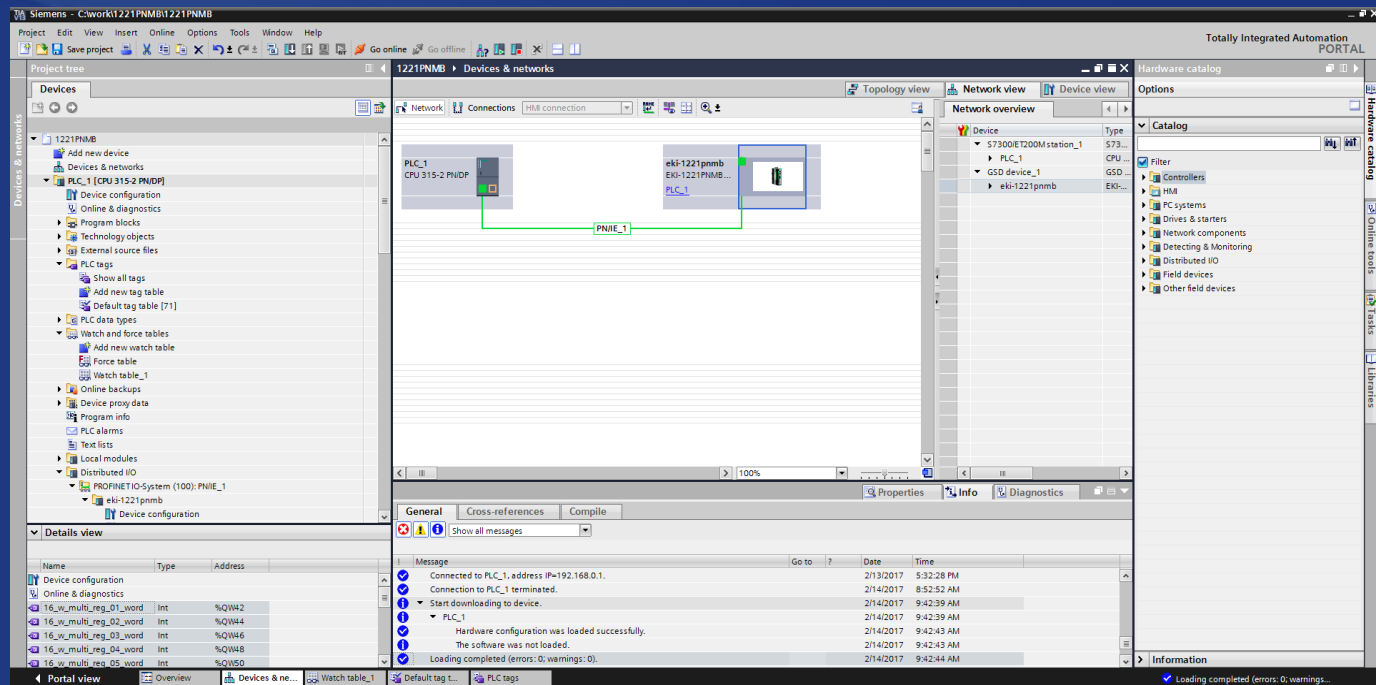


Please note that changes made to the configuration will not be saved and used by the gateway until they have been applied and system reboot. Remember to apply the configuration in order for changes to take effect. As soon as you have submitted data to the configuration but not yet applied it, you will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

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

# DEMO-

## Read/Write EKI-1242PNMS Modbus Data via TIA Portal Step 7



# TIA Portal Step7 – EKI-1242 GSD File Description

Naming: GSD (General Station Description) file

Language: XML

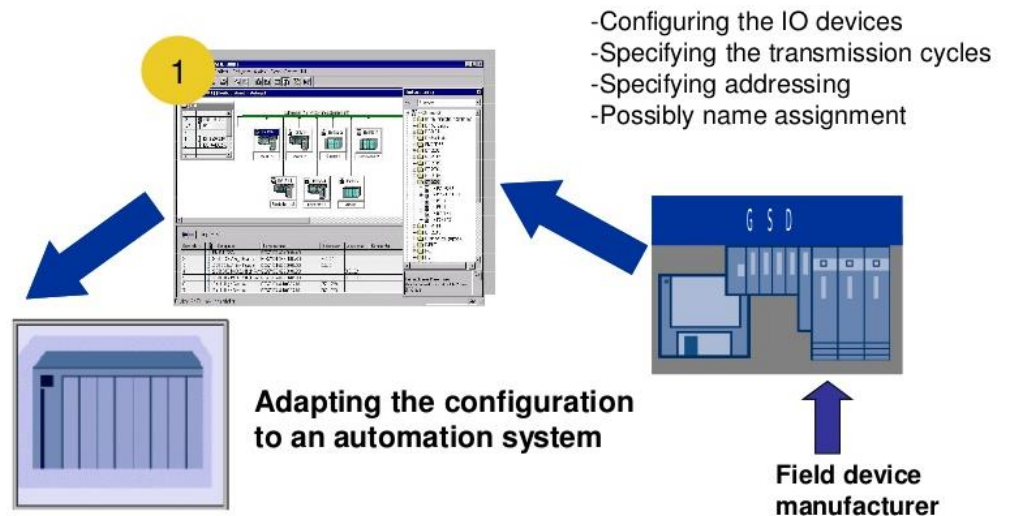
Keywords: GSDML

## [Content of the GSD files](#)

- Administration of the IO-Devices
- Modules (Number and Type)
- Configuration data of modules (e.g. Analog input)
- Parameter of modules
- Diagnostic information (e.g. cable break)

# Configure for PROFINET IO Data Access

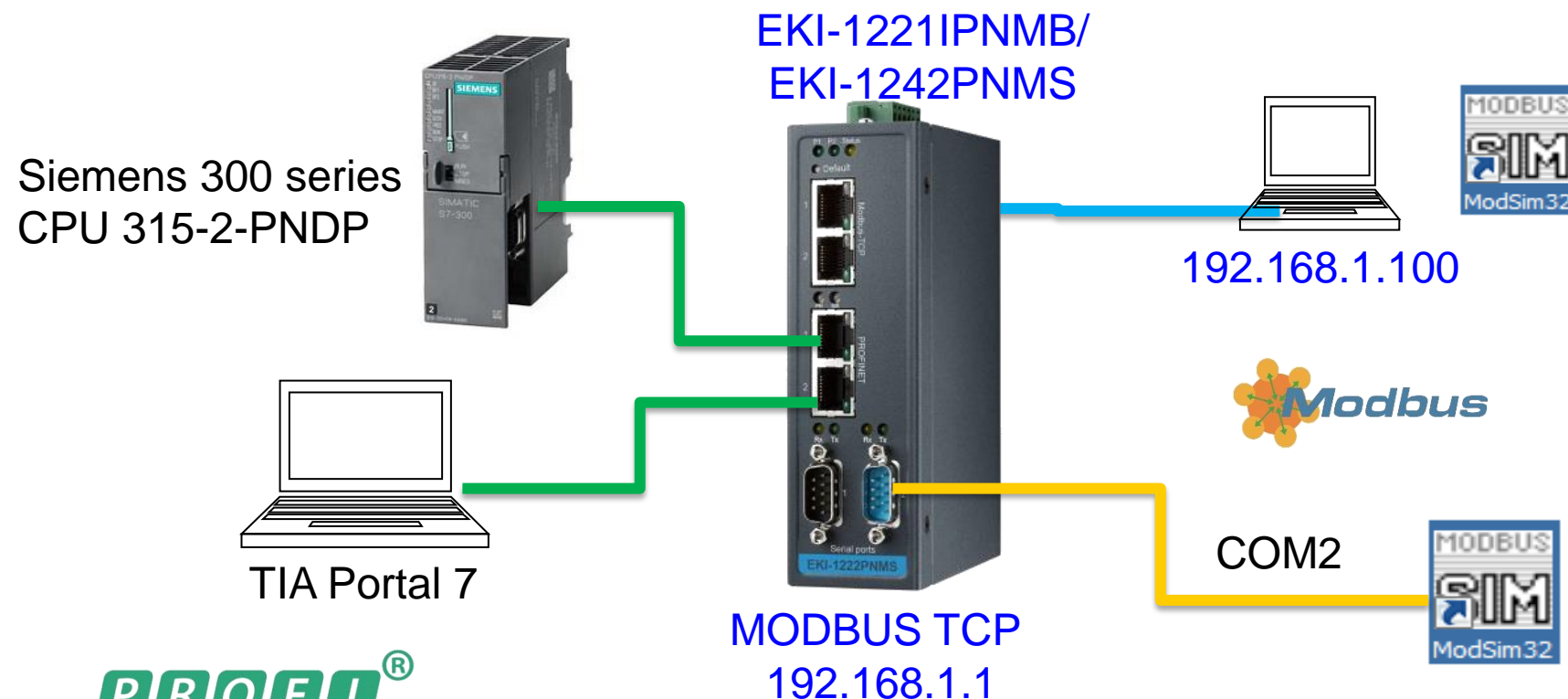
- Step 1: Import *EKI-1242 GSD file* in TIA Portal Step7.  
The IO Devices is configured based on the content in the GSD file
- Step2: Completion of IO Controller and IO Device Network/Topology Setting  
and create EKI-1242 PROFINET IO Slot Data in Data view
- Step3: The IO Controller takes over the data exchange with the IO Device  
automatically and can easily use watch table to monitor



# Video –Network Topology



- ◆ We provide video to show-up “How to read data Modbus RTU/TCP data after configuration of EKI-1221IPNMB/EKI-1242PNMS and Read/Write ProfiNet data from TIA Portal 7. Network topology as below







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