

# MGate 5105-MB-EIP User's Manual

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# MGate 5105-MB-EIP User's Manual

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# Introduction

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Welcome to the MGate 5105-MB-EIP line of Modbus-to-EtherNet/IP gateways. All models perform easy protocol conversions between Modbus RTU/ASCII, Modbus TCP, and EtherNet/IP protocols.

This chapter is an introduction to the MGate 5105-MB-EIP and includes the following sections:

- **Overview**
- **Package Checklist**
- **Power Input and Relay Output Pinouts**
- **LED Indicators**
- **Dimensions**
- **Pin Assignments**
  - Modbus (Modbus RTU/ASCII) Pin Assignment
  - Console (RS-232) Pin Assignment
- **Mounting the Unit**
- **Specifications**
- **Reset Button**
- **Pull-high, Pull-low, and Terminator for RS-485**
- **microSD**
- **Configuration Methods**

# Overview

The MGate 5105-MB-EIP is a line of protocol gateways that provides users with the following features:

- Gateway function to transfer data between Modbus RTU/ASCII, Modbus TCP and EtherNet/IP
- Support for both EtherNet/IP adapter and scanner
- Effortless configuration via web or Windows utility
- Complete packet analysis and diagnosis information for maintenance
- Redundant dual DC power inputs
- Built-in Ethernet cascading for easy wiring
- Power-off warning by relay output
- MicroSD card supported for configuration backup
- Web-based GUI for I/O data visualization
- -40 to 75°C wide operating temperature range models available

# Package Checklist

All models of the MGate 5105-MB-EIP Series are shipped with the following items:

**Standard Accessories:**

- 1 MGate 5105-MB-EIP Modbus-to-EtherNet/IP Gateway
- Documentation & software CD
- Quick installation guide (printed)
- Warranty card

**Optional Accessories:**

- DR-4524: 45W/2A DIN-rail 24 VDC power supply with universal 85 to 264 VAC input
- DR-75-24: 75W/3.2A DIN-rail 24 VDC power supply with universal 85 to 264 VAC input
- DR-120-24: 120W/5A DIN-rail 24 VDC power supply with 88 to 132 VAC/176 to 264 VAC input by switch
- WK-36-01: wall-mounting kit

**NOTE** Notify your sales representative if any of the above items is missing or damaged.

# Power Input and Relay Output Pinouts

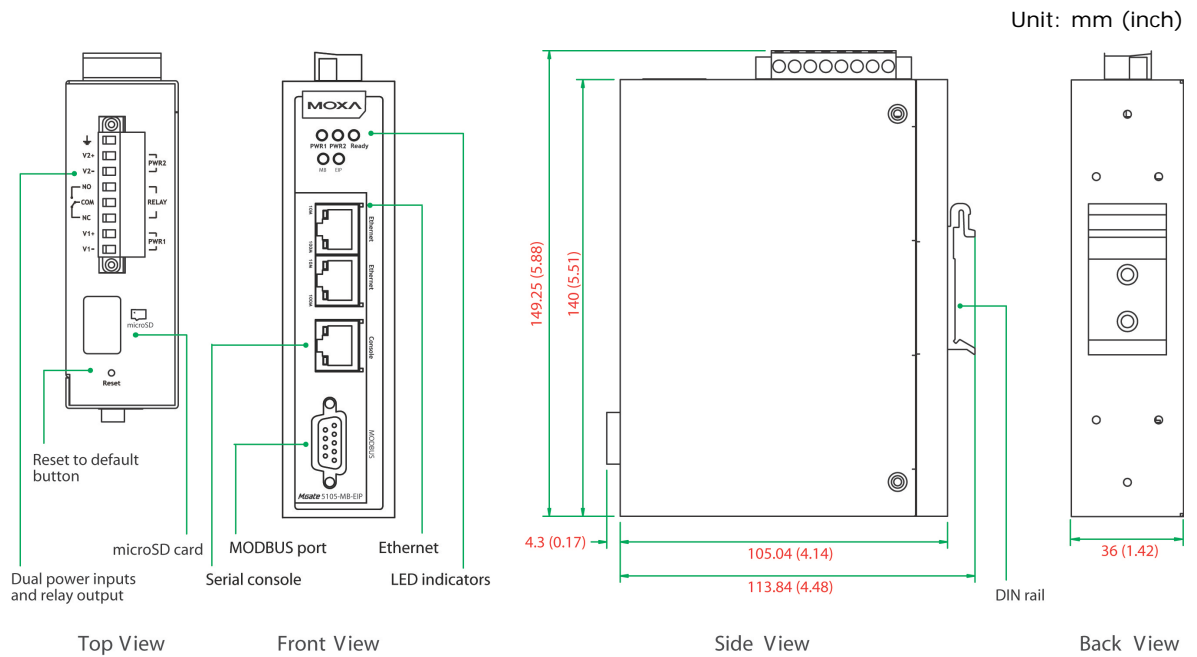


	V2+	V2-				V1+	V1-
Shielded Ground	DC Power Input 2	DC Power Input 2	N.O.	Common	N.C.	DC Power Input 1	DC Power Input 1

# LED Indicators

LED	Color	Description
<b>PWR 1, PWR 2</b>	Green	Power is on
	Off	Power is off
<b>Ready</b>	Off	Power is off or a fault condition exists
	Green	Steady: Power is on, and the MGate is functioning normally
		Blinking: The MGate has been located by MGate Manager's Location function
	Red	Steady: Power is on, and the MGate is booting up
		Blinking slowly: Indicates an IP conflict, or the DHCP or BOOTP server is not responding properly
Flashing quickly: microSD card failed		
<b>EIP (Scanner)</b>	Off	No I/O data is exchanged
	Green	Steady: I/O data is exchanged with all devices
		Blinking: I/O data is exchanged with at least one device (not all configured devices can communicate with a gateway)
<b>EIP (Adapter)</b>	Off	No I/O data is exchanged
	Green	Steady: I/O data is exchanged with all devices
		Blinking: I/O data is exchanged with at least one device (not all configured devices can communicate with a gateway)
<b>MB</b>	Off	No communication with Modbus RTU/ASCII device
	Green	Modbus RTU/ASCII communication progress
	Red	Communication error
		When MGate 5105 acts as RTU/ASCII Master: <ol style="list-style-type: none"> <li>1. Slave device returned an error (exception)</li> <li>2. Received frame error (parity error, checksum error)</li> <li>3. Timeout (slave device no response)</li> </ol> When MGate 5105 acts as RTU/ASCII Slave: <ol style="list-style-type: none"> <li>1. Received invalid function code</li> <li>2. Master accessed invalid register address or coil addresses</li> <li>3. Received frame error (parity error, checksum error)</li> </ol>

# Dimensions

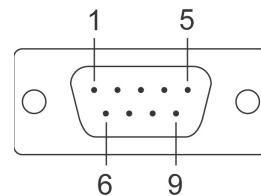


# Pin Assignments

## Modbus (Modbus RTU/ASCII) Pin Assignment

The MGate 5105-MB-EIP Series uses a DB9 serial port to connect to Modbus RTU/ASCII devices.

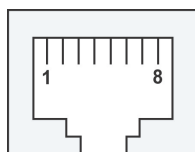
Pin	RS-232	RS-422, RS-485-4W	RS-485-2W
1	DCD	TxD-	-
2	RxD	TxD+	-
3	TXD	RxD+	Data+
4	DTR	RxD-	Data-
5	GND	GND	GND
6	DSR	-	-
7	RTS	-	-
8	CTS	-	-
9	-	-	-



## Console (RS-232) Pin Assignment

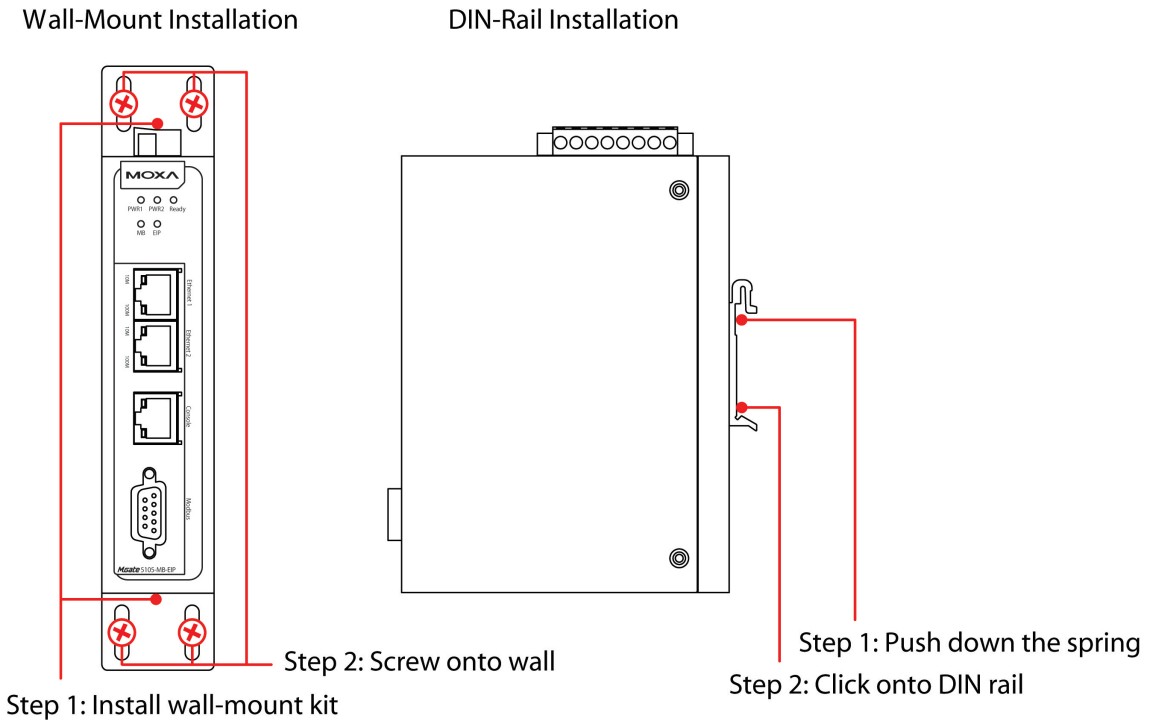
The MGate 5105-MB-EIP Series uses an RJ45 connector to connect to a PC for device configuration.

Pin	RS-232
1	DSR
2	RTS
3	GND
4	TXD
5	RXD
6	DCD
7	CTS
8	DTR



# Mounting the Unit

1. Connect the power adapter. Connect the 12–48 VDC power line or DIN-rail power supply to the MGate 5105-MB-EIP device's terminal block.
2. Use a Modbus serial cable to connect the MGate to a Modbus slave device.
3. Use an Ethernet cable to connect the MGate to the EtherNet/IP controller.
4. The MGate 5105-MB-EIP is designed to be attached to a DIN rail or mounted on a wall. For DIN-rail mounting, push down the spring and properly attach it to the DIN rail until it “snaps” into place. For wall mounting, install the wall-mount kit (optional) first, and then screw the device onto the wall. The following figure illustrates the two mounting options:



# Specifications

## Ethernet Interface

**Protocol:** EtherNet/IP, Modbus TCP

**Number of Ports:** 2 (Ethernet cascade)

**Speed:** 10/100 Mbps, Auto MDI/MDIX

**Connector:** 8-pin RJ45

**Magnetic Isolation Protection:** 1.5 kV (built-in)

## EtherNet/IP

**Class:** Adapter, Scanner

**CIP Objects Supported:** Identity, Message Router, Assembly, Connection Manager, TCP/IP interface, Ethernet link, Port

### Max. Number of Connections:

MGate as Adapter: 16 connections for read-only, 1 connection for read/write

MGate as Scanner: 100 connections

### Max. Total I/O Data Size:

Input: 2048 bytes (496 bytes per connection)

Output: 2048 bytes (496 bytes per connection)



## Modbus

**Functions Supported:** 1, 2, 3, 4, 5, 6, 15, 16, 23

**Max. Number of Commands:** 100

**Max. Number of Connections:**

MGate as Modbus TCP Client: 32 connections

MGate as Modbus TCP Server: 16 connections

**Max. Total I/O Data Size:**

Input: 2048 bytes

Output: 2048 bytes

## Modbus Serial Interface

**Protocol:** Modbus RTU/ASCII

**Number of Ports:** 1

**Serial Standards:** RS-232/422/485, software selectable

**Connectors:** DB9 male

**Isolation:** 2 kV (built-in)

**RS-485 Data Direction Control:** ADDC® (automatic data direction control)

**Pull High/Low Resistor for RS-485:** 1 K $\Omega$ , 150 K $\Omega$

**Terminator for RS-485:** 120  $\Omega$

**Data Bits:** 5, 6, 7, 8

**Stop Bits:** 1, 1.5, 2

**Parity:** None, Even, Odd, Space, Mark

**Flow Control:** RTS/CTS, RTS Toggle

**Baudrate:** 50 bps to 921.6 Kbps

## External Storage Drive

**Interface:** microSD

**Standard:** SDHC v2.0

## Serial Signals

**RS-232:** TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

**RS-422:** Tx+, Tx-, Rx+, Rx-, GND

**RS-485-4w:** Tx+, Tx-, Rx+, Rx-, GND

**RS-485-2w:** Data+, Data-, GND

## Software

**Operation Modes:** EtherNet/IP Adapter/Scanner, Modbus RTU/ASCII/TCP Client/Server

**Configuration Options:** Web console, Windows utility, serial console

**Utilities:** MGate Manager for Windows 2000 (x86/x64), Windows XP (x86/x64), Windows 2003 (x86/x64), Windows Vista (x86/x64), Windows Server 2008 (x86/x64), Windows Server 2008 R2, Windows 7 (x86/x64), Windows 8 (x86/x64), Windows 8.1 (x86/x64), Windows Server 2012, Windows Server 2012 R2, Windows 10 (x86/x64)

## Physical Characteristics

**Housing:** Metal (IP30)

**Weight:** 507 g (1.12 lb)

**Dimensions:** 36 x 105 x 140 mm (1.42 x 4.13 x 5.51 in)

**Storage Card Slot:** 1 microSD (SDHC) card slot supports up to 32 GB

**Relay Alarm Circuit:** 3-pin circuit with current-carrying capacity of 2 A @ 30 VDC

## Environmental Limits

**Operating Temperature:**

Standard Models: 0 to 60°C (32 to 140°F)

Wide Temp. Models: -40 to 75°C (-40 to 167°F)

**Storage Temperature:** -40 to 85°C (-40 to 185°F)

**Ambient Relative Humidity:** 5 to 95% (non-condensing)

**Altitude:** Up to 2000 m

**Note:** Please contact Moxa if you require products guaranteed to function properly at higher altitudes.

## Power Requirements

**Input Voltage:** 12 to 48 VDC  
**Power Connector:** Terminal block  
**Power Consumption:**  
 455 mA @ 12 VDC, 125 mA @ 48 VDC

**Standards and Certifications**

**Safety:** UL 508, EN 60950-1  
**Hazardous Location:** Class 1 Division 2, ATEX, IECEx  
**EMC:** EN 55032/24  
**EMI:** CISPR 32, FCC Part 15B Class B

**EMS:**

IEC 61000-4-2 ESD: Contact: 8 kV; Air: 15 kV  
 IEC 61000-4-3 RS: 80 MHz to 1 GHz: 10 V/m  
 IEC 61000-4-4 EFT: Power: 4 kV; Signal: 2 kV  
 IEC 61000-4-5 Surge: Power: 2 kV; Signal: 2 kV  
 IEC 61000-4-6 CS: 150 kHz to 80 MHz: 10 V/m  
 IEC 61000-4-8 PFMF

**Shock:** IEC 60068-2-27  
**Freefall:** IEC 60068-2-32  
**Vibration:** IEC 60068-2-6, IEC 60068-2-64

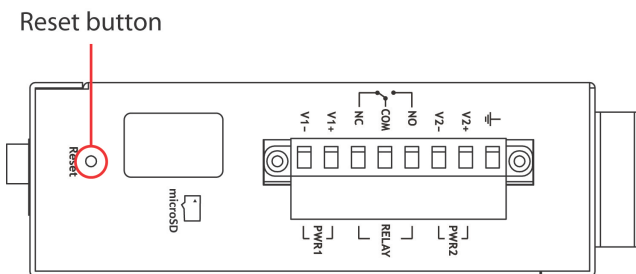
**Reliability**

**MTBF (mean time between failures):** 859,422 hrs.  
**Standard:** Telcordia SR332

**Warranty**

**Warranty Period:** 5 years  
**Details:** See [www.moxa.com/warranty](http://www.moxa.com/warranty)

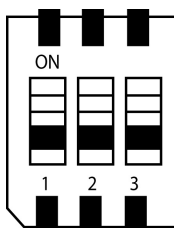
## Reset Button



Restore the MGate to factory default settings by using a pointed object (such as a straightened paper clip) to hold the reset button down until the Ready LED stops blinking (approx. 5 seconds).

## Pull-high, Pull-low, and Terminator for RS-485

Remove the MGate 5105-MB-EIP's top cover and you will find DIP switches to adjust each serial port's pull-high resistor, pull-low resistor, and terminator.



SW	1	2	3
	Pull-high resistor	Pull-low resistor	Terminator
ON	1 kΩ	1 kΩ	120 Ω
OFF	150 kΩ*	150 kΩ*	—*

\*Default

# microSD

The MGate 5105-MG-EIP provides users with an easy way to backup, copy, replace, or deploy. The MGate is equipped with a microSD card slot. Users can plug in a microSD card to backup data, including the system configuration setting, GSD files, and system data log.

## First time using the MGate gateway with a new microSD card

1. Format the microSD card as FAT file system through a PC.
2. Power off the MGate and insert the microSD card (ensure that the microSD card is empty).
3. Power on the MGate. The default settings will be copied to the microSD card.
4. Manually configure the MGate via MGate Manager or web console, and all the stored changes will copy to the microSD card for synchronization.

## First time using the MGate with a microSD card containing a configuration file

1. Power off the MGate and insert the microSD card.
2. Power on the MGate.
3. The configuration file stored in the microSD card will automatically copy to the MGate.

## Duplicating current configurations to another MGate gateway

1. Power off the MGate and insert a new microSD card.
2. Power on the MGate.
3. The configuration will be copied from MGate to microSD card.
4. Power off the MGate and insert the microSD card to the other MGate.
5. Power on the second MGate.
6. The configuration file stored in the microSD card will automatically copy to the MGate.

## Malfunctioning MGate replacement

1. Replace the malfunctioning MGate with a new MGate.
2. Insert the microSD card into the new MGate.
3. Power on the MGate.
4. The configuration file stored on the microSD card will automatically copy to the MGate.

## microSD card writing failure

The following circumstances may cause the microSD card to experience a writing failure:

1. The microSD card has less than 20 Mbytes of free space remaining.
2. The microSD card is write-protected.
3. The file system is corrupted.
4. The microSD card is damage.

The MGate will stop for the above events, accompanied by a flashing Ready LED and beeping alarm. When you replace the MGate gateway's microSD card, the microSD card will synchronize the configurations stored on the MGate gateway. Note that the replacement microSD card should not contain any configuration files on it; otherwise, the out-of-date configuration will copy to the MGate device.

# Configuration Methods

MGate 5105-MB-EIP provides three ways to configure an MGate.

1. **MGate Manager (Windows utility)**

Use MGate Manager to configure the MGate through Ethernet, or check the MGate status. Refer to **Chapter 3** for details.

2. **Web console**

Use the web console to configure the MGate, or verify the MGate's status, by Ethernet. Use a web browser such as Microsoft Internet Explorer or Google Chrome to connect to the MGate, using HTTP/HTTPS protocol. In this case, the MGate IP address must be configured correctly. Refer to **Chapter 4** for details.

3. **Serial console**

Use the serial console to configure the MGate, or verify the MGate's status, through an RS-232 null modem (crossover) cable. Use a serial terminal emulation tool such as Moxa PComm Terminal Emulator or PuTTY to log in to the MGate serial console. Note that the serial console doesn't provide the interface for all parameters. Some parameters must be configured through MGate Manager or the web console. You must use a DP9-to-RJ45 cable to connect the serial console port on the MGate gateway's front panel to the serial port on the host. The serial console parameters are 115.2 kbps; parity: none; 8 data bits; and one stop bit.

## Quick Configuration Guide

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This chapter provides a quick overview of how to configure the MGate 5105-MB-EIP by web console. For more detailed information on how to configure the MGate 5105-MB-EIP, refer to Chapters 3 and 4.

The following topics are covered in this chapter:

- ❑ **Cable Connection**
- ❑ **Log in to the Web Console**
- ❑ **Quick Setup**
  - System Setup
  - Select Protocols
  - Role 1 and Role 2 of MGate 5105-MB-EIP
  - Finish
- ❑ **Basic Settings**
- ❑ **Network Settings**
- ❑ **Serial Settings**
- ❑ **Protocol Conversion**
- ❑ **EtherNet/IP Configuration**
- ❑ **Modbus RTU/ASCII Configuration**
- ❑ **Modbus TCP Configuration**
- ❑ **I/O Data Mapping**
- ❑ **Communication Analysis**
- ❑ **I/O Data View**

# Cable Connection

The MGate gateway supports Modbus RTU/ASCII, Modbus TCP, and EtherNet/IP protocol. If the MGate gateway needs to communicate with Modbus RTU/ASCII devices, connect your Modbus device to the MGate gateway's Modbus port. Regardless, at least one of your devices should be Modbus TCP or EtherNet/IP interface. Connect your Modbus TCP or EtherNet/IP device to the MGate gateway's 10/100M Ethernet port as well. The MGate gateway will indicate a valid Ethernet connection in the following ways:

- The Ethernet LED will maintain a solid green color when connected to a 100 Mbps Ethernet network.
- The Ethernet LED will maintain a solid orange color when connected to a 10 Mbps Ethernet network.
- The Ethernet LED will flash when Ethernet packets are being transmitted or received

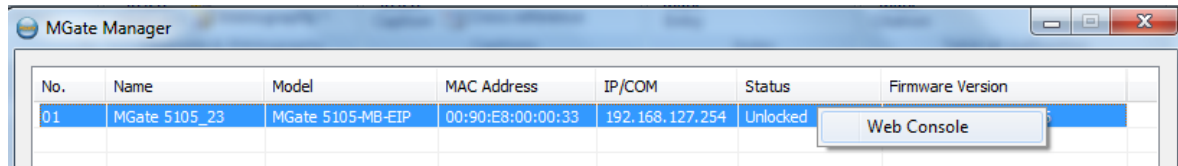
The gateway can be powered by connecting a power source to the terminal block by following the steps below:

1. Loosen or remove the screws on the terminal block.
2. Connect the 12–48 VDC power line to the terminal block. Confirm that the power source is off already.
3. Tighten the connections using the screws on the terminal block.
4. Turn on the power source.

**NOTE** Note that the gateway does not have an on/off switch. It automatically turns on when it receives power. The PWR LED on the top panel will glow to indicate that the unit is receiving power.

# Log in to the Web Console

If you do not know the MGate gateway's IP address when setting it up for the first time (default IP is 192.168.127.254), use an Ethernet cable to connect the host PC and MGate gateway directly. If the gateway and host PC are connected through the same Ethernet switch, make sure that there is no router between them. Then use MGate Manager to detect the MGate gateways on your network. When the MGate gateway appears on the MGate Manager device list, right-click on the selected MGate and configure it by web console.



On the first page of the web console, enter the **admin** for the default Account name and **moxa** for the default Password.

Account

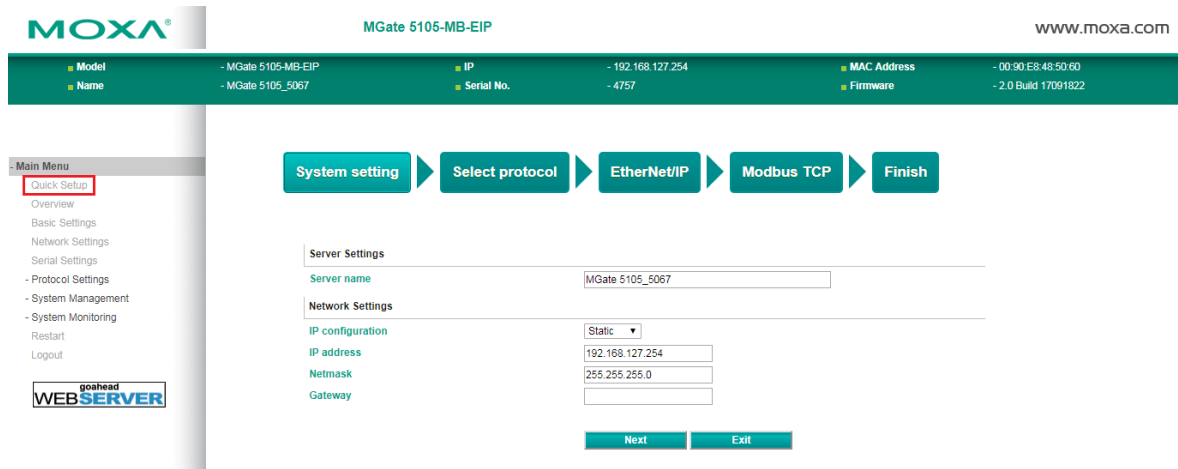
Password

# Quick Setup

In most cases, users find it difficult to complete the MGate's configuration. Therefore, the MGate Series now provides Quick Setup, an illustrated guide especially designed to make configuration easy. When you press Quick Setup, you will access the mode and start to configure. Only a few steps are needed. For a detailed parameter description, please refer to Chapter 3 and Chapter 4.

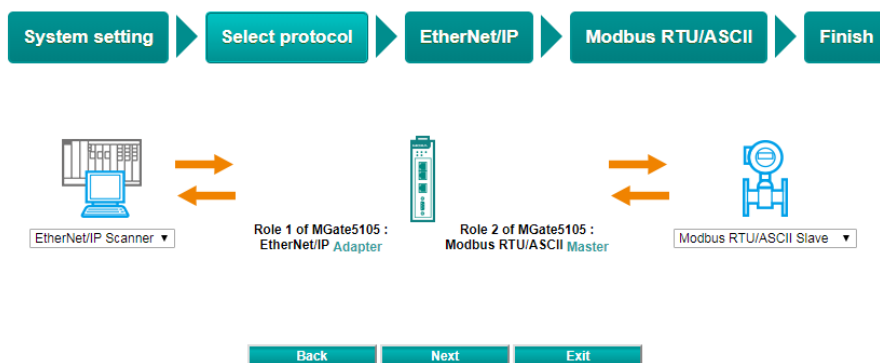
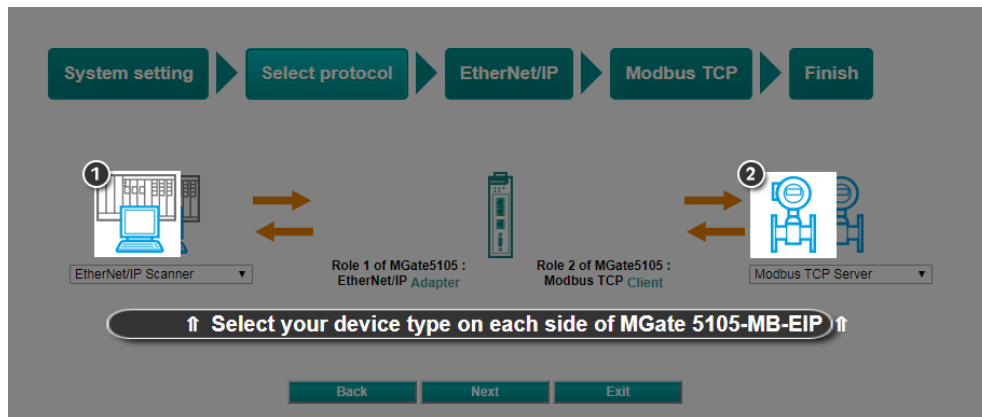
# System Setup

First, configure the Server Settings to identify the units and Network Settings of the MGate.



## Select Protocols

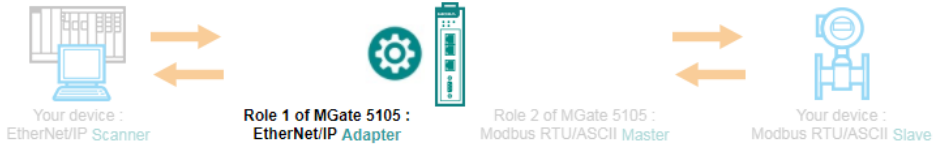
Then, you should select your devices' protocols on each side. After the protocols have been selected, the MGate will change its role to the correct one. For example, if the device is set as an EtherNet/IP Scanner, the MGate will then automatically configure as an EtherNet/IP Adapter by itself.



## Role 1 and Role 2 of MGate 5105-MB-EIP

After finishing the Protocol Selection, Role 1 and Role 2 of the MGate have been confirmed. You will need to configure the roles on each side by the following steps.

Here is an example of Role 1 as an EtherNet/IP Adapter and Role 2 as a Modbus RTU/ASCII Master. To configure a Modbus command, please refer to Modbus RTU/ASCII Settings:



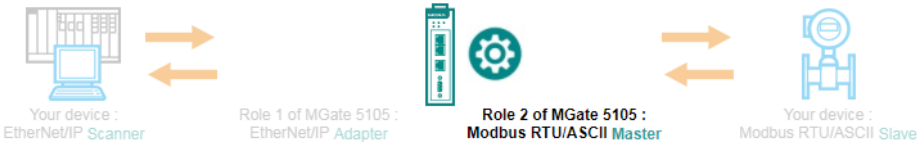
**O → T Parameters**

Instance	100
O → T (Output) data size	Auto (auto calculate according to the other protocol)

**T → O Parameters**

Instance	110
T → O (Input) data size	Auto (auto calculate according to the other protocol)

Back Next Exit



**Modbus Mode**

Mode selection: Modbus RTU ▼

**Serial Parameter Settings**

Baud rate	Parity	Data bit	Stop bit	Flow control	Interface	RTS on delay	RTS off delay
115200 ▼	None ▼	8 ▼	1 ▼	None ▼	RS-232 ▼	0	0

**Modbus Commands**

\*press ctrl key to multi-select!

+ Add ✎ Edit 📄 Clone 🗑 Delete ↕ Move

Index	Name	Slave ID	Function	Address / Quantity
1	Command1	1	3	Read address 0, Quantity 1
2	Command2	1	6	Write address 100, Quantity 1
3	Command3	1	16	Write address 200, Quantity 5

Back Next Exit



## Finish

Once all the configurations are done, you can check if all the parameters are correct on this page. Moreover, if you want to determine the data mapping status, you can click **View I/O data mapping** to know more details. If all of them are correct, press **Save** to turn the parameters on.

System setting
▶
Select protocol
▶
EtherNet/IP
▶
Modbus RTU/ASCII
▶
Finish

MGate name      MGate 5105\_5067

MGate IP config    192.168.127.254

Netmask            255.255.255.0

Gateway            --

Your device :  
EtherNet/IP Scanner
Role 1 of MGate 5105-MB-EIP :  
EtherNet/IP Adapter
Role 2 of MGate 5105-MB-EIP :  
Modbus RTU/ASCII Master
Your device :  
Modbus RTU/ASCII Slave

<b>MGate Protocol1 Settings</b>	<b>MGate Protocol2 Settings</b>
<b>Protocol type</b>	EtherNet/IP adapter
<b>O ⇒ T (Output) Parameters</b>	Instnace : 100, data size : 12
<b>T ⇒ O (Input) Parameters</b>	Instnace : 110, data size : 2
<b>Protocol type</b>	Modbus serial master
<b>Mode</b>	Modbus RTU
<b>Serial parameter</b>	115200 None,8,1 RS-232
<b>Total commands</b>	3

Back
Save
Exit

## Basic Settings

On this webpage, you can change the name of the device and time zone settings.

### Basic Settings

**Server Settings**

Server name

Server location

**Time Settings**

Time zone

Local time
 / 
  / 
 
 : 
  :

Time server

Submit

# Network Settings

First, configure the **IP address** and **Netmask**. Contact your network administrator for the appropriate IP settings information.

## Network Settings

### Network Settings

<p><b>IP configuration</b></p> <p><b>IP address</b></p> <p><b>Netmask</b></p> <p><b>Gateway</b></p> <p><b>DNS server 1</b></p> <p><b>DNS server 2</b></p>	<p>Static ▼</p> <p>192.168.127.254</p> <p>255.255.255.0</p> <p></p> <p></p> <p></p>
---	---

submit

# Serial Settings

Second, refer to the datasheet of your Modbus RTU/ASCII devices to configure **Serial parameters** for Modbus RTU/ASCII devices.

## Serial Settings

Port	Baud rate	Parity	Data bit	Stop bit	Flow control	FIFO	Interface	RTS on delay	RTS off delay
1	115200 ▼	None ▼	8 ▼	1 ▼	None ▼	Enable ▼	RS-232 ▼	0	0

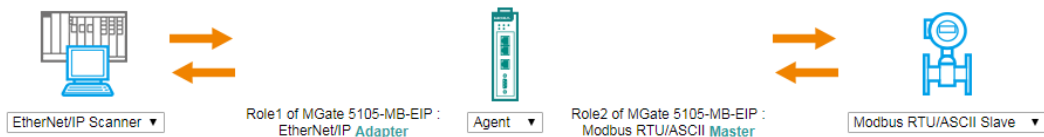
Submit

# Protocol Conversion

The MGate 5105-MB-EIP supports Modbus RTU/ASCII, Modbus TCP, and EtherNet/IP protocols. The MGate fulfills a different role on each of its sides. Each role is determined by your devices' settings. Therefore, set the role of each of your devices correctly.

EtherNet/IP Scanner/Adapter, Modbus TCP Client/Server, and Modbus RTU/ASCII Master/Slave can be selected.

## Protocol Conversion

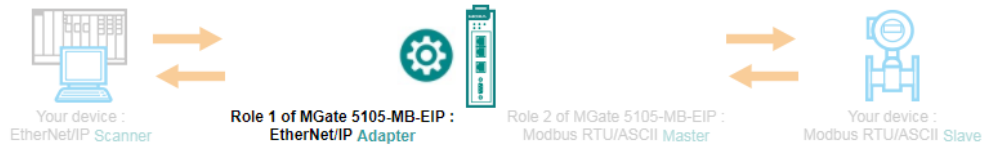


Submit

# EtherNet/IP Configuration

If you select EtherNet/IP Scanner as your device, MGate 5105-MB-EIP will be configured as Ethernet/IP Adapter. In Adapter mode, you can choose **Automatic** configuration to automatically map O→T (Originator to Target) and T→O (Target to Originator) data sizes to Modbus data.

## ••EtherNet/IP



Mode selection Adapter

EIP encapsulation inactivity timeout  (0 - 3600 sec, 0 for disable)

---

Connection1 Adapter Settings

O → T instance 100

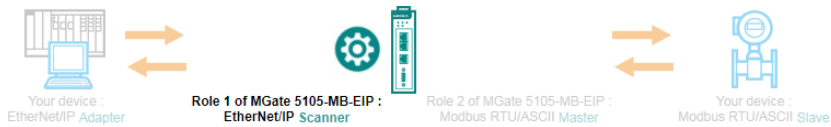
T → O instance 110

I/O data size configuration Automatic ▾

**Submit**

If you select EtherNet/IP Adapter as your device, the MGate 5105-MB-EIP will be configured as Ethernet/IP Scanner. In Scanner mode, you must designate the parameters for each connection. Refer to your EtherNet/IP adapter’s datasheet to fill out O→T and T→O parameters.

## ••EtherNet/IP



Mode selection Scanner

EIP encapsulation inactivity timeout  (0 - 3600 sec, 0 for disable)

---

Remote EtherNet/IP Device

+ Add   
 Edit   
 Clone   
 Delete   
 Move

Index	Name	Connection	Adapter IP Address	O → T (Output) Parameters	T → O (Input) Parameters
<b>Submit</b>					

Click **Add** to add EtherNet/IP commands.

**Connection Settings**

Name

Connection

Adapter IP address  Port

---

**O → T (Output) Parameters**

Instance

Data size  (0 - 496 bytes)

Real time format

Packet rate  (0 - 3000 ms)

Fault protection

Fault timeout  (100 - 65535 ms)

---

**T → O (Input) Parameters**

Instance

Data size  (0 - 496 bytes)

Real time format

Packet rate  (0 - 3000 ms)

Connection type

Timeout multiplier

---

**Configuration Instance**

Instance

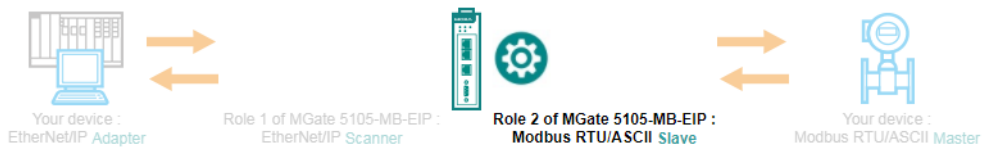
**NOTE** A PLC may use Output and Input instead of O→T and T→O.

# Modbus RTU/ASCII Configuration

As with the Modbus RTU/ASCII setup, you should start by checking if you already have configured the serial parameters on **Serial Settings** page.

In RTU/ASCII Slave mode, the MGate gateway works as a Modbus slave device and waits for the incoming query from the Modbus master device. You only need to identify the Modbus Slave ID when in Slave mode.

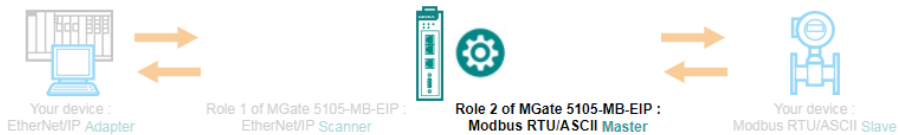
## ⚙️ Modbus RTU/ASCII Settings



**Role** Slave  
**Mode** RTU ▼  
**Slave Settings**  
**Slave ID**  (1 - 255)

In RTU/ASCII Master mode, the MGate works as a Modbus master device and will send the Modbus request to the Modbus network actively.

## ⚙️ Modbus RTU/ASCII Settings



**Role** Master  
**Mode** RTU ▼  
**Master Settings**  
**Initial delay**  (0 - 30000 ms)  
**Max. retry**  (0 - 5)  
**Response timeout**  (10 - 120000 ms)  
**Inter-frame delay**  (10 - 500 ms, 0: default)  
**Inter-character timeout**  (10 - 500 ms, 0: default)

**Modbus Commands**

Index	Name	Slave ID	Function	Address / Quantity	Trigger	Poll Interval	Endian Swap
1	Command1	1	3	Read address 0, Quantity 1	Cyclic	1000	None
2	Command2	1	6	Write address 100, Quantity 1	Data Change	N/A	None
3	Command3	1	16	Write address 200, Quantity 5	Data Change	N/A	None

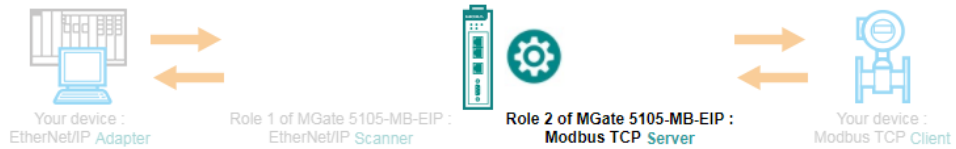
Refer to your Modbus device's datasheet to add Modbus commands.

<b>Name</b>	<input type="text" value="Command4"/>
<b>Slave ID</b>	<input type="text" value="1"/>
<b>Function</b>	16 - Write Multiple Registers ▾
<b>Trigger</b>	Data Change ▾
<b>Endian swap</b>	None ▾
<b>Write starting address</b>	<input type="text" value="0"/> (0 - 65535)
<b>Write quantity</b>	<input type="text" value="0"/>
<b>Fault protection</b>	Keep latest data ▾
<b>Fault timeout</b>	<input type="text" value="60000"/> (100 - 65535 ms)

## Modbus TCP Configuration

The MGate gateway also supports both Modbus TCP Client (i.e. Master) and Server (i.e. Slave) modes. In Modbus TCP Server mode, assign the Unit ID and confirm that your Modbus device on the remote side can send commands via the corresponding TCP port.

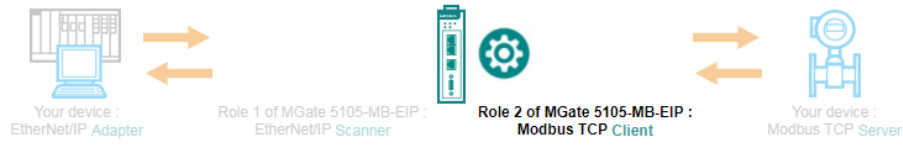
### ⚙️ Modbus TCP Settings



<b>Role</b>	Server
<b>Server Settings</b>	
<b>Unit ID</b>	<input type="text" value="1"/> (1 - 255)
<b>TCP port</b>	<input type="text" value="502"/>

For Modbus TCP Client mode, refer to your Modbus TCP device's datasheet to specify the Modbus command one by one manually.

### ⚙️ Modbus TCP Settings



**Role** Client

**Client Settings**

**Initial delay**  (0 - 30000 ms)

**Max. retry**  (0 - 5)

**Response timeout**  (10 - 120000 ms)

**Modbus Commands**

➕ Add
✎ Edit
📄 Clone
🗑 Delete
↕ Move

Index	Name	Slave IP Address	Slave ID	Function	Address / Quantity	Trigger	Poll Interval	Endian Swap
1	Command1	192.168.1.42 : 502	1	3	Read address 30, Quantity 3	Cyclic	1000	None
2	Command2	192.168.1.42 : 502	1	3	Read address 36, Quantity 3	Cyclic	1000	None
3	Command5	192.168.1.42 : 502	1	3	Read address 54, Quantity 3	Cyclic	1000	None
4	Command7	192.168.1.42 : 502	1	16	Write address 27, Quantity 3	Data Change	N/A	None
5	Command8	192.168.1.42 : 502	1	16	Write address 33, Quantity 3	Data Change	N/A	None
6	Command9	192.168.1.42 : 502	1	16	Write address 39, Quantity 3	Data Change	N/A	None

**Submit**

## I/O Data Mapping

The MGate provides an internal memory for data exchange between Modbus and EtherNet/IP protocols. After finishing the protocol settings, go to the I/O Data Mapping page and check if the data mapping is connected. In some cases, you may need to switch to manual arrangement to adjust the internal address for each command.

### ⚙️ I/O Data Mapping

Data flow direction EtherNet/IP Scanner <-- Modbus RTU/ASCII Slave ▼

**Mapping address arrangement** Automatic ▼

Your device :  
EtherNet/IP Scanner

Your device :  
Modbus RTU/ASCII Slave

Name	Internal Address	Data Size
T → O instance #110	<input type="text" value="0"/> - <input type="text" value="1"/>	2 bytes

Name	Function	Internal Address	Quantity
Command1	3	<input type="text" value="0"/> - <input type="text" value="1"/>	2 bytes

**Submit**

# Communication Analysis

After finishing all configurations, use **Communication Analysis** to confirm that the settings are correct. Click **Start** and wait 10 seconds for the analysis report to appear and describe fail status details, warnings, and hints.

The provided Diagnose pages under the option of Protocol Status can help identify whether any Modbus and EtherNet/IP communication issues happened. (E.g., invalid response or timeout issue)

Auto refresh

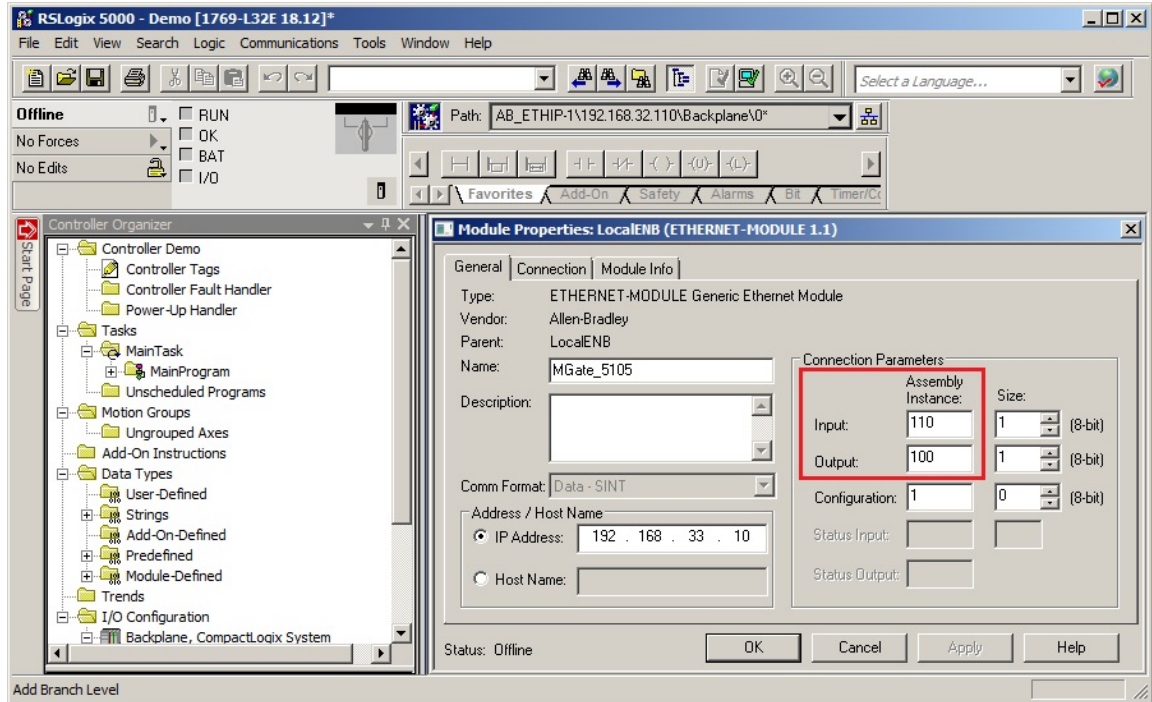
Overview	
Current TCP connections	0
Maximum TCP connections observed	0
Current I/O connections	0
Total TCP transmit packets	0
Total TCP receive packets	0
Total TCP receive invalid packets	0
Total UDP transmit packets	0
Total UDP receive packets	0
Total UDP receive invalid packets	0

I/O Connection List	

Connection1 Parameters	
O → T instance (exclusive owner)	100
O → T instance (input only)	120
T → O instance	110
O → T data size	12
T → O data size	2



**NOTE** When the MGate gateway acts as an EtherNet/IP adapter, the O→T instance is 100 and T→O instance is 110. Your EtherNet/IP scanner (e.g. PLC, SCADA) needs to use these two instances to communicate with the MGate. For example, you should provide an Output (i.e., O→T) instance of 100 and an Input (i.e., T→O) instance of 110 for a Rockwell PLC, as shown below.



## I/O Data View

I/O Data View is designed to check all I/O modules' exchanging data. Select data flow directions to obtain the correct data from Modbus or EtherNet/IP packets.

**Main Menu**

- Quick Setup
- Overview
- Basic Settings
- Network Settings
- Serial Settings
- Protocol Settings
- System Management
- System Monitoring
- System Status
- Protocol Status
- I/O Data View
- Modbus RTU/ASCII Diagnose
- EtherNet/IP Diagnose
- Modbus RTU/ASCII Traffic
- Communication Analysis
- Restart
- Logout

### I/O Data View

Auto refresh

Data flow direction: EtherNet/IP Scanner --> Modbus RTU/ASCII Slave

Start address(Hex) 0 Length 128 Format Hex

Internal Address	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
0000h	00	00	00	00	00	00	00	00	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

# MGate Manager Configuration

---

The following topics are covered in this chapter:

- ❑ **Installing the Software**
- ❑ **Starting MGate Manager**
- ❑ **Connecting to the Unit**
- ❑ **Modifying the Configuration**
  - Configure Device
  - Network Settings
  - Serial Settings
  - Protocol Settings
  - EtherNet/IP Settings
  - Modbus RTU/ASCII Settings
  - Modbus TCP Settings
  - I/O Data Mapping
  - System Settings
- ❑ **Load Default**
- ❑ **Upgrade Firmware**
- ❑ **Import/Export**
  - Export Function
  - Import Function
- ❑ **GSD Management**
- ❑ **Offline Configuration**

# Installing the Software

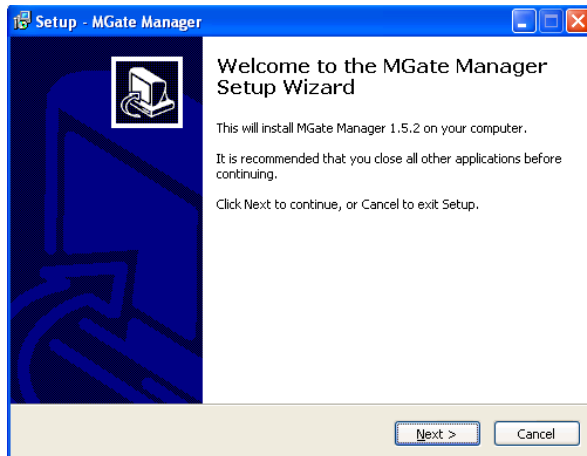
The following instructions explain how to install MGate Manager, a utility for configuring and monitoring MGate 5105-MB-EIP gateways over the network.

1. Insert the Document and Software CD into the CD-ROM drive. Locate and run the following setup program to begin the installation process:

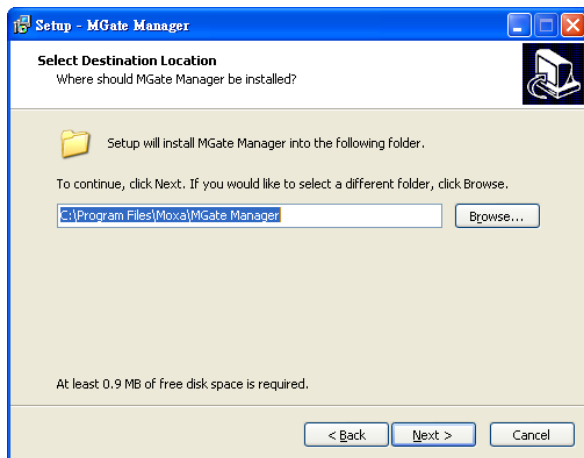
MGM\_Setup\_[Version]\_Build\_[DateTime].exe

The latest version might be named MGM\_Setup\_Verx.x\_Build\_xxxxxxx.exe.

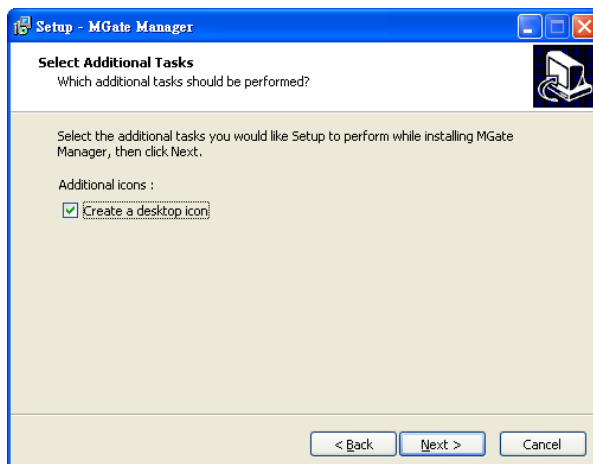
2. You will be greeted by a Welcome window. Click **Next** to continue.



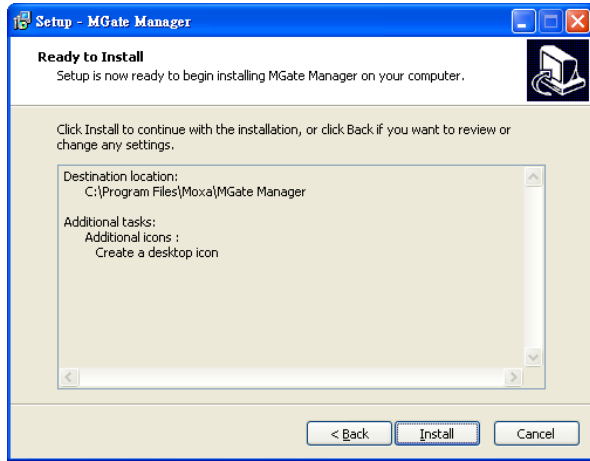
3. When the Select Destination Location window appears, click **Next** to continue. You may change the destination directory by first clicking on **Browse**.



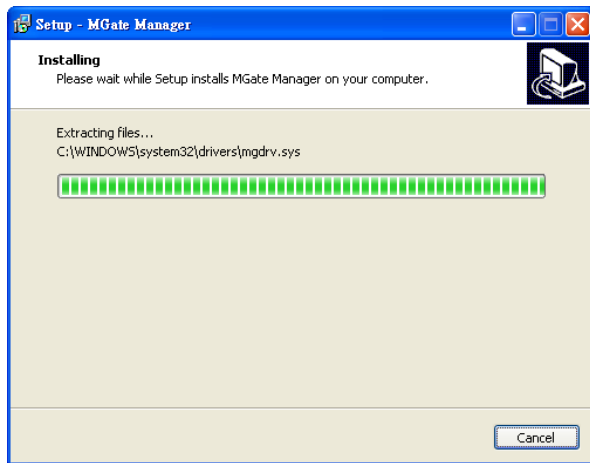
4. When the Select Additional Tasks window appears, click **Next** to continue. You may select **Create** a desktop icon if you would like a shortcut to MGate Manager on your desktop.



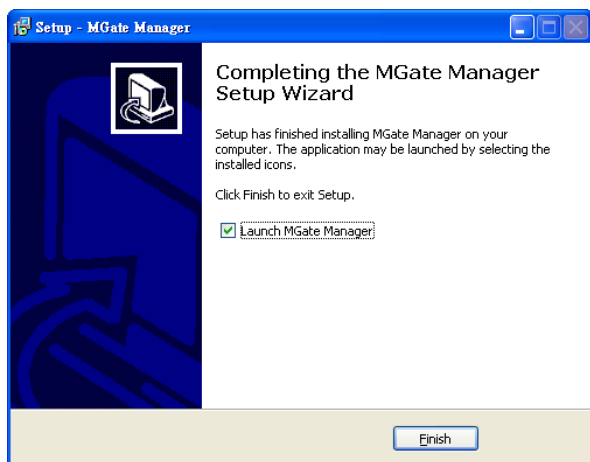
5. Click **Next** to start copying the software files.



6. A progress bar will appear. The procedure should take only a few seconds to complete.



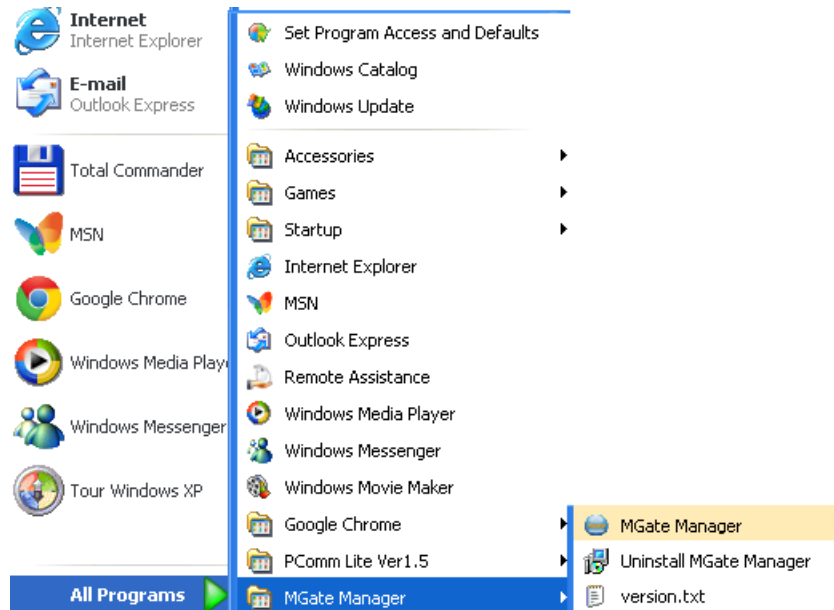
7. A message will indicate that MGate Manager is successfully installed. You may choose to run it immediately by selecting **Launch MGate Manager**.



8. You may also open **MGate Manager** through **Start → Programs → MGate Manager → MGate Manager**, as shown below.

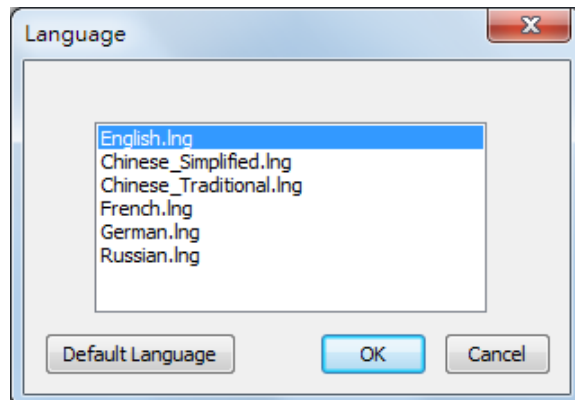
# Starting MGate Manager

MGate Manager is a Windows-based utility that is used to configure the MGate 5105-MB-EIP. Before running MGate Manager, make sure that the MGate 5105-MB-EIP is connected to your PC. You may open MGate Manager from the Windows Start menu by clicking **Start → Programs → MGate Manager → MGate Manager**. The MGate Manager window should appear as shown below.



## Changing the Language Settings

If you want to run MGate Manager in a different language, click **Language** to change the language setting. A dialog box showing the available languages should appear as shown below.



When you click **OK**, MGate Manager will immediately use your chosen language.



### ATTENTION

Set your MGate Manager to **Default Language** before contacting Moxa Technical Support.

With support for multiple languages, MGate Manager is more user-friendly and accessible. However, if you need assistance from Moxa Technical Support, please change the language to **Default Language**. This will prevent any misunderstandings or confusion about MGate Manager menu items and commands while our engineers assist you.

The default language is English and will only be active for the current MGate Manager session. When you open MGate Manager again, the language will revert to your original setting.

## Connecting to the Unit

Prior to configuration, MGate Manager must be connected to its unit. Two methods are available to establish a connection. Broadcast Search locates the MGate Series on the LAN. Search by IP attempts to connect to a specific unit by IP address, which is useful if the unit is located outside the LAN or can only be accessed by going through a router.

### Broadcast Search

**Broadcast Search** is used for MGate Ethernet Gateways, such as the MGate 5000/MB3000/EIP3000 Series, which are discovered via Ethernet by using broadcast IP.

### Specify by IP Address

**Specify by IP Address** is used for MGate Ethernet Gateways, such as the MGate 5000/MB3000/EIP300 Series, which are discovered via Ethernet by using a specific IP address. Click **Specify by IP Address** if you know the IP address of the unit and wish to connect to it directly.



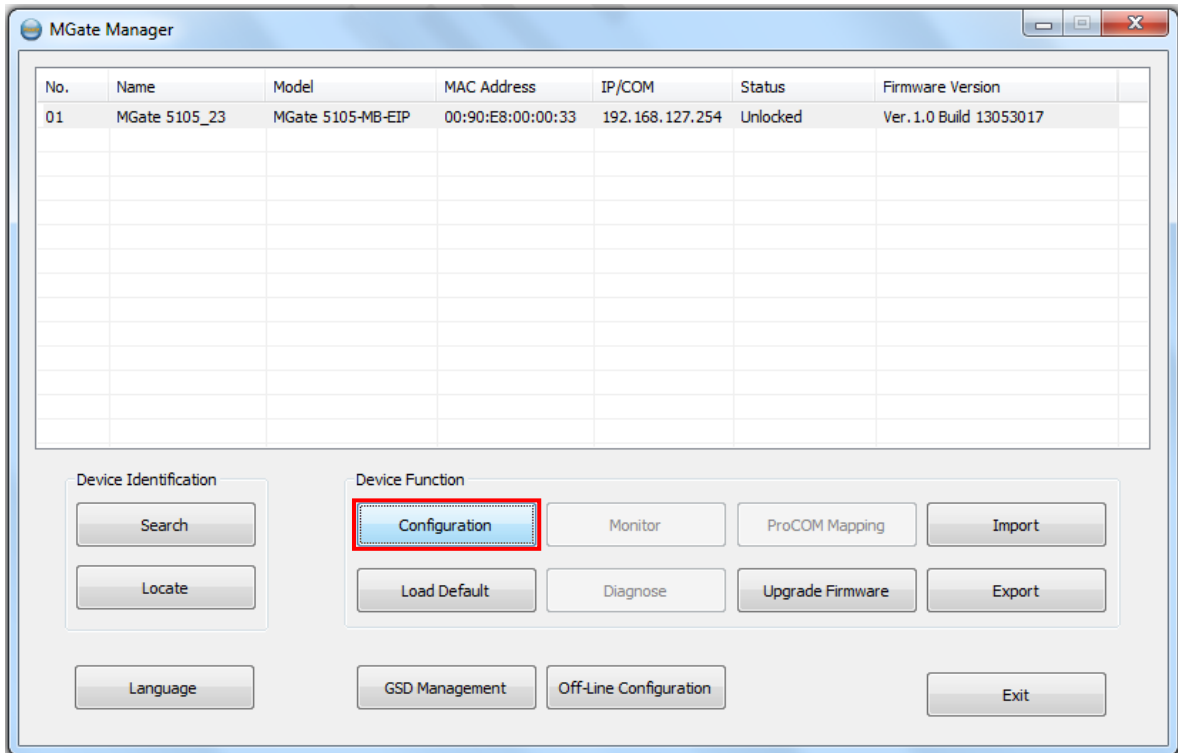
### ATTENTION

If search by IP Address fails to locate the MGate 5000/MB3000/EIP3000 Series, the IP address that you entered might be incorrect. Try doing the search again and re-entering the IP address carefully.

Another possibility is that the MGate 5000/MB3000/EIP300 Series is located on the same LAN as your PC, but on a different subnet. In this case, you can modify your PC's IP address and/or netmask so that it is on the same subnet as the MGate 5000/MB3000/EIP300 Series. After your PC and the MGate 5000/MB3000/EIP300 Series are on the same subnet, MGate Manager should be able to find the unit.

# Modifying the Configuration

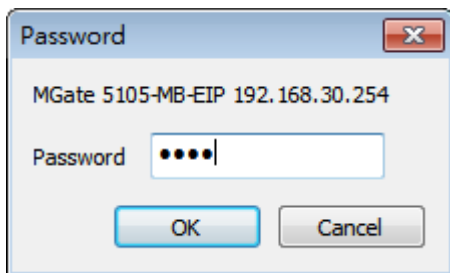
Once your unit is displayed in MGate Manager, select it by clicking on it. The Configuration button will become available. Click **Configuration** to open the configuration window.



### Password Protection

For safety reasons, account/password protection is enabled by default so you must provide the correct password to unlock the device before configuring the device.

The default password is **moxa** in all lowercase letters.



## Configure Device

On the first page, you can change the device name and time zone settings.

Basic	Network	Serial	Protocol	System
Server Settings				
Server name	MGate 5105_23			
Server location				
Time Settings				
Time zone	(GMT)Greenwich Mean Time: Dublin, Edinburgh, Lisbon, L ▼			
Local time	<input type="checkbox"/> Modify	2013	/	5 / 8 9 : 48 : 47
Time server				

### Server Setting

Parameter	Value	Notes
Server Name	(an alphanumeric string)	You can enter a name to help you identify the unit, such as the function, etc.
Server Location	(an alphanumeric string)	You can enter a name to help you identify the unit location. Such as "Cabinet A001."

### Time Settings

The MGate 5105-MB-EIP has a built-in Real-Time Clock for time calibration functions. Functions such as the log function can add real-time information to the message.



### ATTENTION

First-time users should select the time zone first. The console will display the "real time" according to the time zone relative to GMT. If you would like to modify the real-time clock, select **Local time**. MGate's firmware will modify the GMT time according to the Time Zone.

Parameter	Value	Notes
Time Zone	User selectable time zone	This field shows the currently selected time zone and allows you to select a different time zone.
Local Time	User adjustable time. (1900/1/1-2037/12/31)	
Time Server	IP or Domain address (e.g., 192.168.1.1 or time.stdtime.gov.tw)	This optional field specifies your time server's IP address or domain name if a time server is used on your network. The module supports SNTP (RFC-1769) for automatic time calibration. The MGate will request time information from the specified time server every 10 minutes.



### ATTENTION

When modifying the local time, select the time zone first. The time display will be updated to reflect the specified time zone.



## Network Settings

The Network tab is where the unit's network settings are configured. You can modify the Name, Network Configuration, IP Address, Netmask, Default Gateway, and DNS.

**Ethernet Settings**

---

IP configuration: Static ▼

IP address: 192 . 168 . 30 . 254

Netmask: 255 . 255 . 255 . 0

Gateway: 0 . 0 . 0 . 0

---

**DNS Server**

DNS server 1: 0 . 0 . 0 . 0

DNS server 2: 0 . 0 . 0 . 0

### *Ethernet Settings*

Parameter	Value	Notes
IP Configuration	Static IP, DHCP, BOOTP	Select <b>Static IP</b> if you are using a fixed IP address. Select one of the other options if the IP address is set dynamically.
IP Address	192.168.127.254 (or other 32-bit number)	The IP (Internet Protocol) address identifies the server on the TCP/IP network.
Netmask	255.255.255.0 (or other 32-bit number)	This identifies the server as belonging to a Class A, B, or C network.
Gateway	0.0.0.0 (or other 32-bit number)	This is the IP address of the router that provides network access outside the server's LAN.

### *DNS Server*

Parameter	Value	Notes
DNS Server 1	0.0.0.0 (or other 32-bit number)	This is the IP address of the primary domain name server.
DNS Server 2	0.0.0.0 (or other 32-bit number)	This is the IP address of the secondary domain name server.

## Serial Settings

The MGate 5105-MB-EIP's serial interface supports RS-232, 2-wire RS-485, 4-wire RS-485, and RS-422 interfaces. You must configure baudrate, parity, data bits, and stop bits before using the serial interface with Modbus RTS/ASCII protocol. Incorrect settings will result in communication failures.

Port 1

Baud rate: 115200

Parity: Even

Data bit: 8

Stop bit: 1

Flow control: None

FIFO: Enable

Interface: RS232

RTS on delay: 0

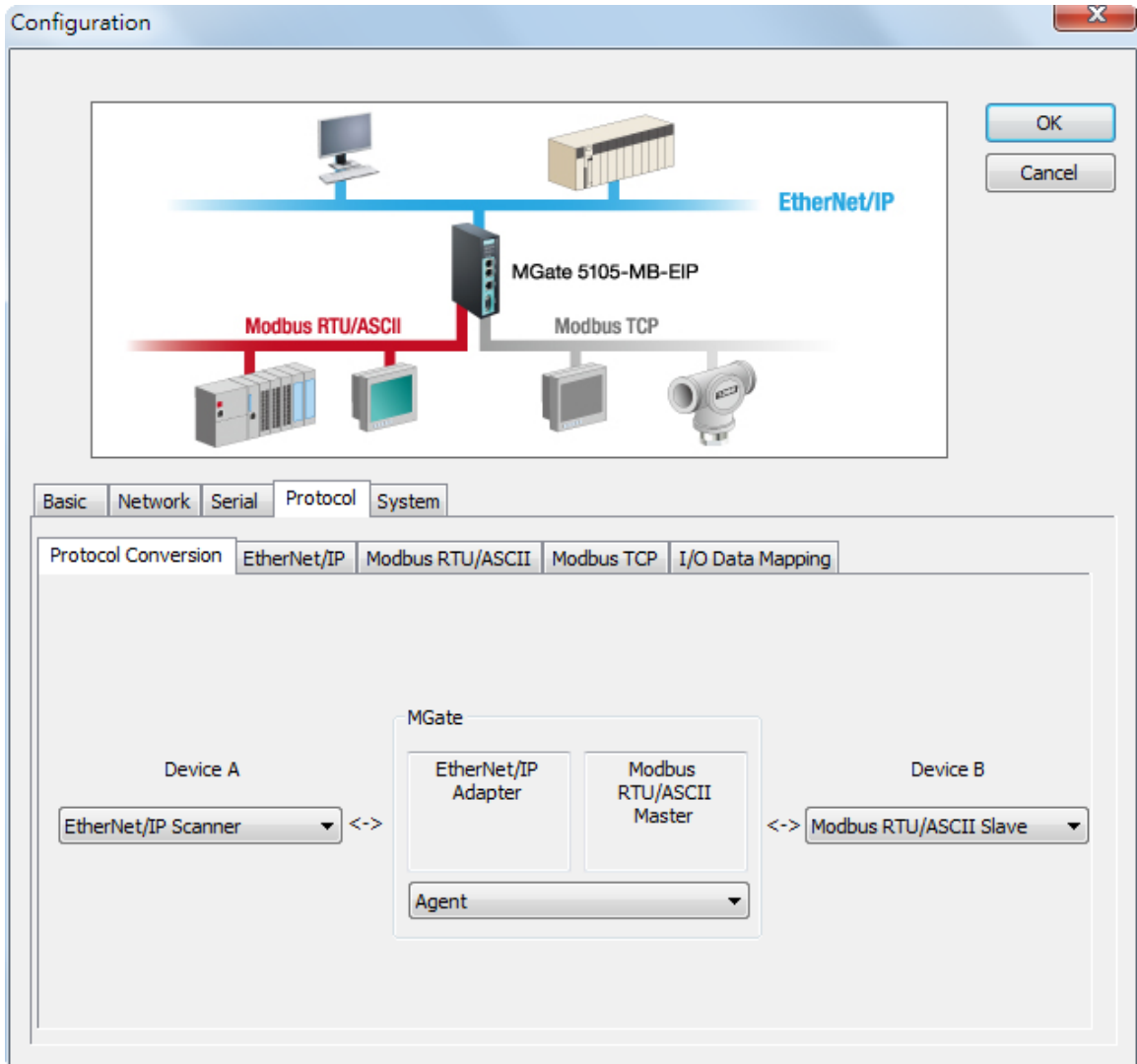
RTS off delay: 0

### Serial settings

Parameter	Value	Notes
Baudrate	50 bps to 921600 bps	
Parity	None, Odd, Even, Mark, Space	
Data bits	8	
Stop bits	1, 2	
Flow control	None, RTS/CTS, RTS Toggle	RTS Toggle will turn off RTS signals when there is no data to be sent. If there is data to be sent, RTS will turn on before data transmission and off after the transmission completes.
FIFO	Enable, Disable	The internal buffer of UART. Disabling FIFO can reduce the latency time when receiving data from serial communications, but this will also slow down the throughput.
Interface	RS-232 RS-422 RS-485 2 wire RS-485 4 wire	
RTS on delay	0-100 ms	Only available for RTS Toggle
RTS off delay	0-100 ms	Only available for RTS Toggle

## Protocol Settings

The MGate gateway supports Modbus RTU/ASCII, Modbus TCP, and EtherNet/IP protocols. The possible combinations are listed in the following table.



Device A and Device B refer to the protocols of their own devices. The MGate will automatically configure to the corresponding roles.

		Device A Protocol			
		EtherNet/IP Scanner	EtherNet/IP Adapter	Modbus TCP Client	Modbus TCP Server
<b>Device B Protocol</b>	Modbus RTU/ASCII Master	✓	✓	✓	✓
	Modbus RTU/ASCII Slave	✓	✓	✓	✓
	Modbus TCP Client	✓	✓	✓	✓
	Modbus TCP Server	✓	✓	✓	✓

## EtherNet/IP Settings

The MGate 5105-MB-EIP supports Adapter and Scanner modes for EtherNet/IP protocol. In Adapter mode, you can select **Automatic** for **I/O data size configuration** to automatically map O->T (Originator to Target) and T->O (Target to Originator) data sizes with Modbus data.

In Scanner mode, all EtherNet/IP connections will be shown in a table. For initial setup, click **Add** to create a new connection.

Parameter	Value	Notes
EIP Encapsulation Inactivity Timeout	0 to 3600, (0 for disable)	Unit: second If there is no data exchange in a period of time, the Ethernet/IP connection will be disconnected.
I/O data size configuration	Automatic, User-defined	
O->T (Output) data size	0 to 496	Unit: byte O->T: Originator to Target
T->O (Input) data size	0 to 496	Unit: byte T->O: Target to Originator

Parameter	Value	Notes
Name	Name	
Connection	Enable, Disable	Enable or Disable this connection.
Adapter IP address and Port	IP address Port: 1 to 65535	Default EtherNet/IP port is 44818
Instance number	1 to 2147483647	
Data size	O->T: 0 to 496 T->O: 0 to 496	
Real-time formats	Modeless, 32-bit Header	Default O->T format is 32-bit Header. Default T->O format is modeless.
Packet rate	0 to 3000 ms	Command polling interval time.
Fault Protection	Keep latest data, clear data to zero, user-defined value	For EtherNet/IP Scanner mode, the opposite side refers to the Modbus side. If the Modbus connection fails, the gateway will not be able to receive the Modbus command, but the gateway will continuously send output data to the EtherNet/IP adapter. To avoid problems in case the Modbus side fails, the MGate 5105 can be configured to react in one of the three ways: keep latest data, clear data to zero, or user-defined value
Fault Timeout	0 to 60000 ms	Define the communication timeout for the Modbus side.

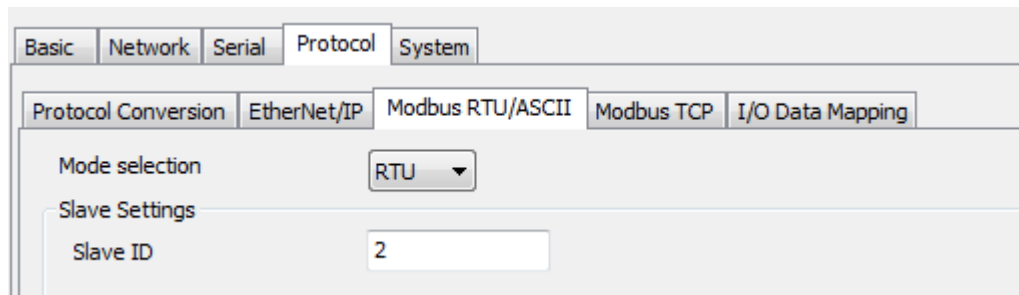
Parameter	Value	Notes
Connection type	Point to Point, Multicast	When using a Multicast connection, Target (i.e., EtherNet/IP Adapter) must reply to the Multicast IP address for the MGate to listen.
Timeout multiplier	x4, x8, x16, x32, x64, x128, x512	Timeout value = packet rate x timeout multiplier (e.g., For packet rate = 100 ms and timeout multiplier = 16, the connection timeout = 1,600 ms).
Instance	1-2147483647	When the MGate is set as <b>Scanner Mode</b> , the user can set the device's Configuration Instance. An EIP adapter device needs to set this value. If the Configuration Instance setting is wrong, it will respond "invalid connection path."

## Modbus RTU/ASCII Settings

According to the Modbus RTU/ASCII settings, the MGate 5105-MB-EIP will act as a Modbus master or Modbus slave in order to communicate with your Modbus RTU/ASCII devices. For slave mode, the MGate acts as a slave and waits for the incoming connection from the Modbus master. In this mode, you only need to specify the slave ID for the MGate gateway. For master mode, the MGate works as a master and will try to send Modbus commands to the Modbus slave devices, so you will need to specify the slave device IDs and the relative Modbus commands.

### Slave Mode Settings

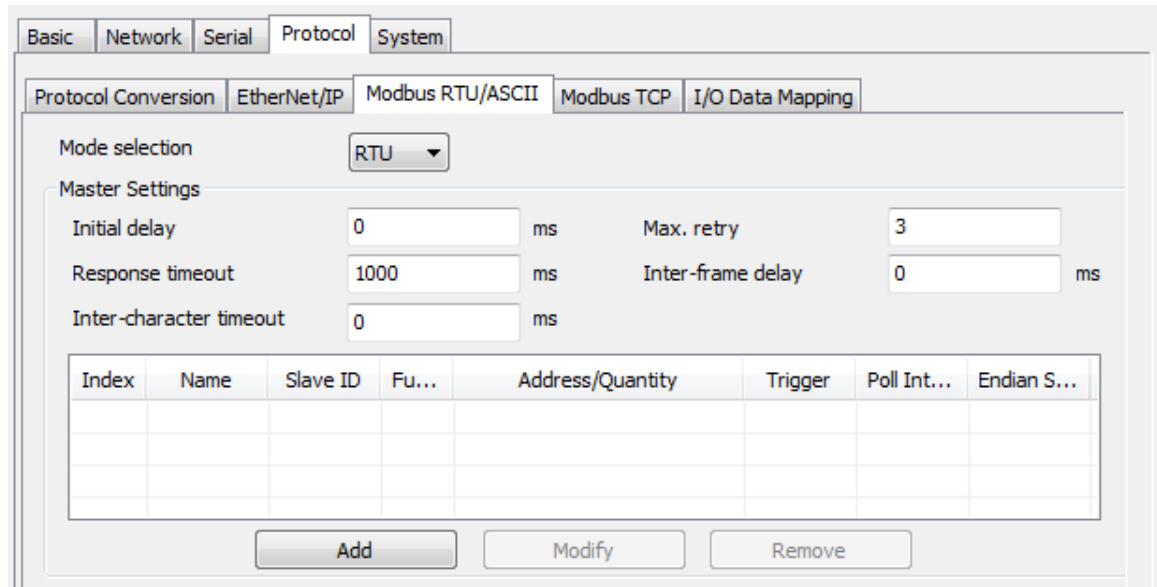
You will need to specify which Modbus protocols will run in slave mode. The MGate 5105-MB-EIP supports Modbus RTU and Modbus ASCII protocols in slave mode.



Parameters	Value	Description
Mode selection	Slave RTU or Slave ASCII	The Modbus protocol.
Slave ID	0 to 255	The Modbus Slave ID that this slave module will accept. 0: Broadcasting 1–255: Device specific.

**Master Mode Settings**

You will need to specify which Modbus protocols will run in master mode. The MGate 5105-MB-EIP supports Modbus RTU and Modbus ASCII protocols in master mode.



The MGate 5105-MB-EIP also provides several advanced settings for specific application requirements. The following settings are optional for most applications. It is suggested to use the default settings to test the MGate 5105-MB-EIP.

Parameters	Description
Initial delay	Some Modbus slaves may take more time to boot up than other devices. In some environments, this may cause the entire system to suffer from repeated exceptions during the initial boot-up. You can force the MGate to wait after booting up before sending the first request with the <b>Initial Delay</b> setting.
Response timeout	According to the Modbus standard, the time it takes for a slave device to respond to a request is defined by the device manufacturer. Based on this response time, a master can be configured to wait a certain amount of time for a slave's response. If no response is received within the specified time, the master will disregard the request and continue operation. This allows the Modbus system to continue operation even if a slave device is disconnected or faulty. On the MGate 5101-MB-EIP, the <b>Response timeout</b> field is used to configure how long the gateway will wait for a response from a Modbus ASCII or RTU slave. Please refer to your device manufacturer's documentation to manually set the response time.
Inter-character timeout (only for Modbus RTU)	Use this function to determine the timeout interval between characters for Modbus devices that cannot receive Rx signals within an expected time interval. If the response is timed out, all received data will be discarded. The MGate 5105-MB-EIP will automatically determine the timeout interval if the timeout value is set to 0.
Max. retry	The number of times the master will retry the same request when the response times out.
Inter-frame delay (only for Modbus RTU)	The users can determine the time delay to transmit the data frame received from the slave device to the upstream. The MGate 5105-MB-EIP will automatically determine the time interval if it is set to 0.

For master mode, you must identify which Modbus requests need to be sent to Modbus slave devices through serial interface. The data will be exchanged between slave devices and the MGate gateway's internal memory. To do this, manually add all Modbus commands that will handle the data exchange.

The **Add**, **Modify**, and **Remove** buttons support the Modbus command arrangement. When you click on the **Add** and **Modify** buttons, the following dialog box will be displayed.

Modify the Modbus command parameters to finish the configuration. You will need to configure each Modbus command through this dialog box.

Parameters	Description
Name	Enter a name to help to identify the command, such as the location, function, etc.
Slave ID	The Modbus slave ID that this slave module will accept. 0: Broadcasting 1–255: Device specific
Function code	When a message is sent from a Client to a Server device, the function code field tells the server what kind of action to perform. We support the following function codes so far: 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
Trigger	Disable: The command is never sent Cyclic: The command is sent cyclically at the interval specified in the <b>Poll Interval</b> parameter Data change: The data area is polled for changes at the time interval defined by Poll Interval. A command is issued when a change in data is detected.
Poll interval	Polling intervals are in milliseconds. Since the module sends all requests in turns, the actual polling interval also depends on the number of requests in the queue and their parameters. The range is from 500 to 1,200,000 ms.



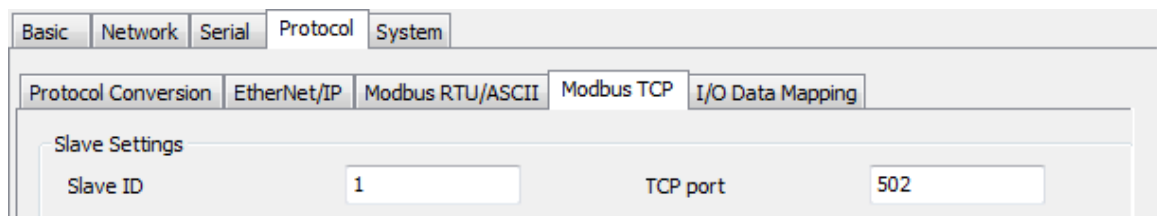
Parameters	Description
Endian swap	Data Byte Swapping <b>None:</b> Don't need to swap <b>Byte:</b> 0x0A, 0x0B, 0x0C, 0x0D becomes 0x0B, 0x0A, 0x0D, 0x0C. <b>Word:</b> 0x0A, 0x0B, 0x0C, 0x0D becomes 0x0C, 0x0D, 0x0A, 0x0B. <b>ByteWord:</b> 0x0A, 0x0B, 0x0C, 0x0D becomes 0x0D, 0x0C, 0x0B, 0x0A. There are two phases in changing ByteWord 1). 0x0A, 0x0B, 0x0C, 0x0D becomes 0x0B, 0x0A, 0x0D, 0x0C. 2). 0x0B, 0x0A, 0x0D, 0x0C becomes 0x0D, 0x0C, 0x0B, 0x0A.
Read starting address	Station Address. The range is from 0 to 65535
Read quantity	Specifying how many quantities to write. There are two kinds of quantity units: 1 bit and 16 bits, which are associated with the function field. The range is from 1 to 125.
Write starting address	Station Address. The range is from 0 to 65535
Write quantity	Specifying how many quantities to write. There are two kinds of quantity units: 1 bit and 16 bits, which are associated with the function field. The range is from 1 to 121.
Fault Protection	For the Modbus RTU master mode, the opposite side refers to EtherNet/IP. The Modbus Write command is sent from the EtherNet/IP side. If the EtherNet/IP connection fails, the gateway will not be able to receive the EtherNet/IP data, but the gateway will continuously send output data to the Modbus RTU slave device. To avoid problems in case the EtherNet/IP side fails, the MGate 5105 can be configured to react in one of the three ways: keep latest data, clear data to zero, or user-defined value.
Fault Timeout	Defines the communication timeout for the EtherNet/IP side. The range is from 0 to 60000 ms.

## Modbus TCP Settings

The MGate 5105-MB-EIP supports Modbus TCP function with slave and master mode. For slave mode, MGate works as a server and waits for incoming connection from Modbus TCP client. And for client mode, MGate works as a client and will try to build a TCP connection with a remote Modbus TCP server device. In this mode, users have to specify the IP address of the remote device and the relative Modbus command.

### Slave Mode Settings

The MGate 5105-MB-EIP supports Modbus TCP server mode, which means the MGate will work as a server and wait for incoming connection requests. The default TCP listen port is 502. In this mode, the MGate will wait for incoming Modbus TCP requests and use the internal memory as the slave register to respond.

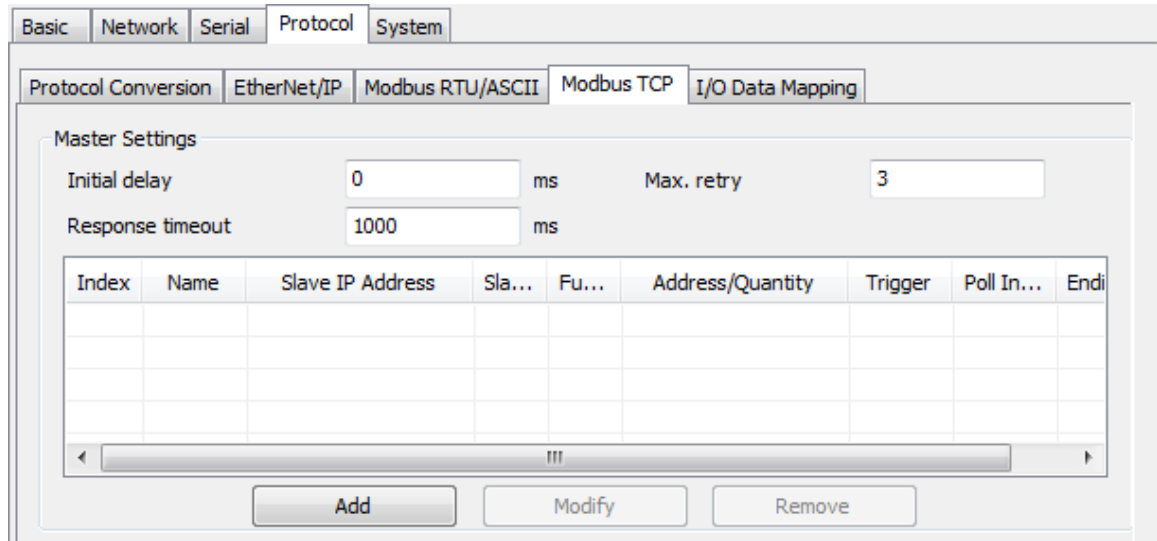


Modify the Slave ID settings to match the system requirements. The default TCP port for Modbus TCP is 502, so you may need to modify if there is a firewall in place.

Parameters	Value	Description
Slave ID	1 to 247	The Modbus address of the MGate.
TCP Port	1 to 65535	The local TCP port for the MGate.

**Master Mode Settings**

The MGate 5105-MB-EIP supports Modbus TCP Client (Master) mode, which means the MGate will work as a client and send the Modbus command request to the slave device actively. You will need to configure each Modbus command manually. On this page, users can see all the commands listed in the table.



Parameters	Value	Description
Initial Delay	0 to 65535 ms	Some Modbus slaves may take more time to boot up than other devices. In some environments, this may cause the entire system to suffer from repeated exceptions during the initial boot-up. You can force the MGate to wait after booting up before sending the first request with the <b>Initial Delay</b> setting.
Response Timeout	10 to 12000 ms	This is used to configure how long the MGate will wait for a response from a Modbus slave.
Max. retry	0 to 99	This is used to configure how many times the MGate will try to communicate with the Modbus slave.

To add a new command or modify the existing one, click the **Add** button or **Modify** button and a new dialog box will appear. To remove Modbus commands, select the specific command and then click the **Remove** button.

To communicate with remote Modbus TCP server devices, specify the Modbus command for each device. For each Modbus read/write command, specify the internal memory address for data exchange. For the read command, the information received from remote devices will be updated to the specified internal memory address. For the write command, the data in the specified internal memory address will be sent to the remote device. The data will be used to update the remote device register.

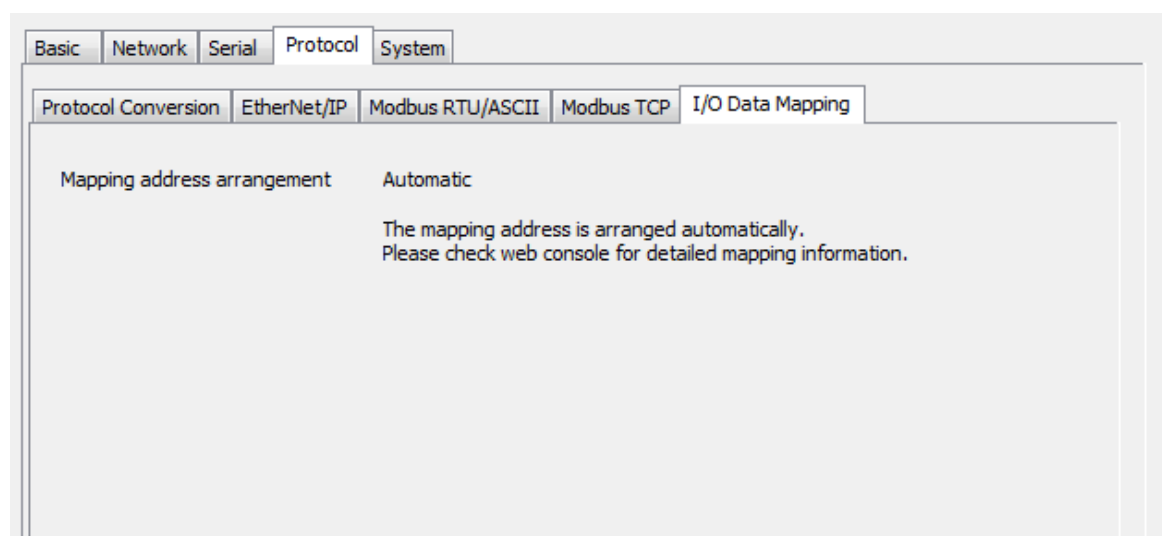
Each remote device may need more than one command for communication, so you will need to input all the commands manually.

Parameters	Description
Name	Enter a name to help identify the command, such as the location, function, etc.
Slave IP address	The IP address of remote slave device.
Port	The TCP port number of remote slave devices. 0 to 65535
Slave ID	The Modbus slave id that this slave module will accept. 0: Broadcasting 1–255: Device specific.
Function	When a message is sent from a Client to a Server device, the function code field tells the server what kind of action to perform. We support the following function codes so far: 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
Trigger	Disable: The command is never sent Cyclic: The command is sent cyclically at the interval specified in the <b>Poll Interval</b> parameter. Data change: The data area is polled for changes at the time interval defined by Poll Interval. A command is issued when a change in data is detected.

Parameters	Description
Poll interval	Polling intervals are in milliseconds. Since the module sends all requests in turns, the actual polling interval also depends on the number of requests in the queue and their parameters. The range is from 500 to 1,200,000 ms.
Endian swap	Data Byte Swapping <b>None:</b> Don't need to swap <b>Byte:</b> 0x0A, 0x0B, 0x0C, 0x0D becomes 0x0D, 0x0C, 0x0B, 0x0A. <b>Word:</b> 0x0A, 0x0B, 0x0C, 0x0D becomes 0x0C, 0x0D, 0x0A, 0x0B. <b>ByteWord:</b> 0x0A, 0x0B, 0x0C, 0x0D becomes 0x0D, 0x0C, 0x0B, 0x0A. There are two phases in changing ByteWord: 1) 0x0A, 0x0B, 0x0C, 0x0D becomes 0x0B, 0x0A, 0x0D, 0x0C 2) 0x0B, 0x0A, 0x0D, 0x0C becomes 0x0D, 0x0C, 0x0B, 0x0A
Read starting address	Station Address. The range is from 0 to 65535
Read quantity	Specifying how many quantities to write. There are two kinds of quantity units: bit and 16bits, which are associated with function field. The range is from 1 to 125.
Write starting address	Station Address. The range is from 0 to 65535
Write quantity	Specifying how many quantities to write. There are two kinds of quantity units: bit and 16bits, which are associated with function field. The range is from 1 to 121.
Fault Protection	For the Modbus TCP client mode, the opposite side refers to EtherNet/IP. The Modbus Write command is sent from the EtherNet/IP side. If the EtherNet/IP connection fails, the gateway will not be able to receive the EtherNet/IP data, but the gateway will continuously send output data to the Modbus TCP server device. To avoid problems in case the EtherNet/IP side fails, the MGate 5105 can be configured to react in one of the three ways: keep latest data, clear data to zero, or user-defined value.
Fault Timeout	Defines the communication timeout for the EtherNet/IP side. The range is from 0 to 60000 ms.

## I/O Data Mapping

To confirm or adjust the internal memory data mapping for both sides, use the web console.



# System Settings

This configuration tab includes several system level settings, such as security, alarm, and information log. Most of these settings are optional.

## Accessible IP Settings

These settings are used to restrict access to the module by IP address. Only IP addresses on the list will be allowed access to the device. You may add a specific address or range of addresses by using a combination of an IP address and a netmask, as follows:

**To allow access to a specific IP address**

Enter the IP address in the corresponding field; enter 255.255.255.255 for the netmask.

**To allow access to hosts on a specific subnet**

For both the IP address and netmask, use 0 for the last digit (e.g., "192.168.1.0" and "255.255.255.0").

**To allow access to all IP addresses**

Make sure that **Enable** the accessible IP list is not checked.

Additional configuration examples are shown in the following table:

Desired IP Range	IP Address Field	Netmask Field
Any host	Disable	Enable
192.168.1.120	192.168.1.120	255.255.255.255
192.168.1.1 to 192.168.1.254	192.168.1.0	255.255.255.0
192.168.1.1 to 192.168.255.254	192.168.0.0	255.255.0.0
192.168.1.1 to 192.168.1.126	192.168.1.0	255.255.255.128
192.168.1.129 to 192.168.1.254	192.168.1.128	255.255.255.128

**DoS Defense**

**System Log Settings**

These settings enable the MGate firmware to record important events for future verification. The recorded information can only be displayed in the web console.

The available information that can be recorded includes the following events:

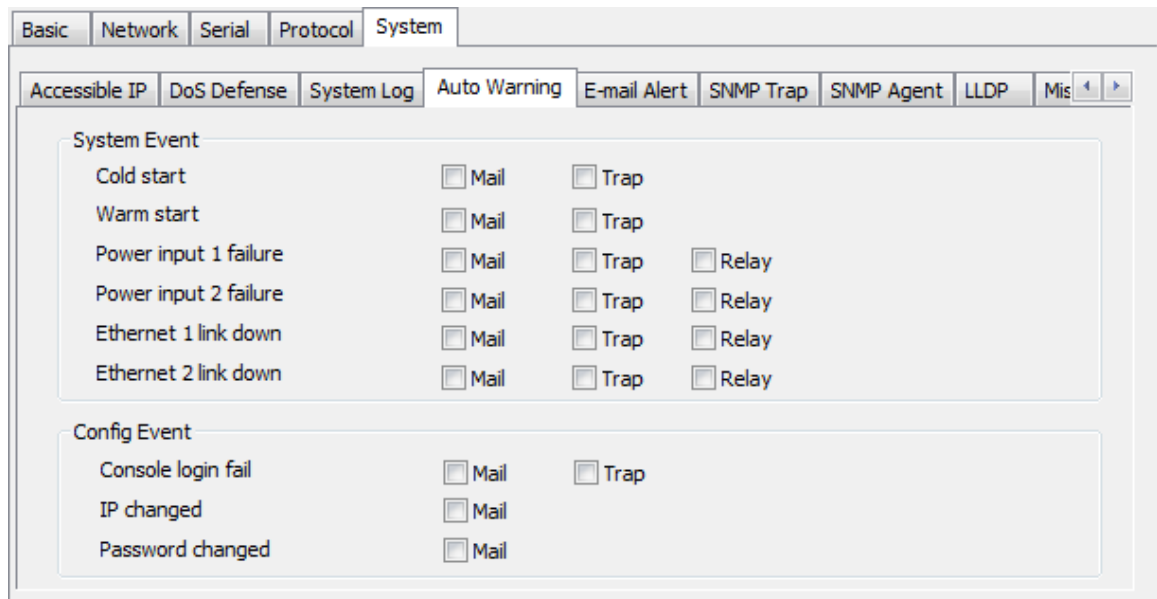
Event Group	Description
System	System Cold Start, System Warm Start
Network	DHCP/BOOTP Get IP/Renew, NTP Connect Fail, IP Conflict, Network Link Down
Configuration	Login Fail, IP Changed, Password Changed, Firmware Upgrade, SSL Certificate Import, Configuration Import/Export
EtherNet/IP	EtherNet/IP Communication logs
Modbus TCP	Modbus TCP Communication logs

Local Log Settings	Description
Enable Log Capacity Warning (%)	When the log amount exceeds the warning percentage, it will trigger an event to SNMP Trap or Email
Warning by	SNMP Trap Email
Event log oversize action	Overwrites the oldest event log Stops recording event log

Syslog Settings	Description
Syslog server IP	IP address of the server that will record the log data
Syslog server Port	514

Users can view the recorded information from the web console or text mode console.

**Auto Warning Settings**



Auto Warning is triggered by different events. When a checked trigger condition occurs, the MGate can send e-mail alters, SNMP Trap messages, or open/close the circuit of the relay output and trigger the Fault LED to start blinking. To enable an e-mail alert, configure the e-mail address on the **E-mail Alert** page. Likewise, to enable SNMP Trap alerts, configure SNMP trap server on the SNMP Trap page.

**E-mail Alert Settings**

Parameters	Description
Mail server	The mail server's domain name or IP address.
User name	This field is for your mail server's user name, if required.
Password	This field is for your mail server's password, if required.
From e-mail address	This is the e-mail address from which automatic e-mail warnings will be sent.
To e-mail address 1 to 4	This is the e-mail address or addresses to which the automatic e-mail warnings will be sent.

**SNMP Trap Settings**

Parameters	Description
SNMP trap server IP	Use this field to indicate the IP address to use for receiving SNMP traps.
Trap version	Use this field to select the SNMP trap version.
Trap community	Use this field to designate the SNMP trap community.



**SNMP Agent Settings**

Parameters	Description
SNMP	To enable the SNMP Agent function, select the <b>Enable</b> option, and enter a community name (e.g., public).
Contact name	The optional SNMP contact information usually includes an emergency contact name and telephone number.
Read community string	This is a text password mechanism that is used to weakly authenticate queries to agents of managed network devices.
Write community string	This is a text password mechanism that is used to weakly authenticate changes to agents of managed network devices.
SNMP agent version	The MGate 5105-MB-EIP supports SNMP V1, V2c, and V3.

**Read-only and Read/write access control**

The following fields allow you to define user names, passwords, and authentication parameters for two levels of access: read-only and read/write. The name of the field will indicate which level of access it refers to. For example, **Read-only** authentication mode allows you to configure the authentication mode for read-only access, whereas **Read/write** authentication mode allows you to configure the authentication mode for read/write access. For each level of access, you may configure the following:

Parameters	Description
User name	Use this optional field to identify the user name for the specified level of access.
Authentication mode	Use this field to select MD5 or SHA as the method of password encryption for the specified level of access, or to disable authentication.
Privacy mode	Use this field to enable or disable DES_CBC data encryption for the specified level of access.
Password	Use this field to set the password for the specified level of access.
Privacy	Use this field to define the encryption key for the specified level of access.

**LLDP Settings**

Parameters	Description
Message transmit interval	Default is 30 seconds. The allowable range is between 5 and 32,768 seconds.

**Misc. Settings**

This page includes console settings, password and relay output.

**Console Settings**

Configuration	Value	Description
HTTP/HTTPS	Enable/Disable	This setting is to enable/disable the web console. For security issues, users can only enable the HTTPS or just disable all settings.
Telnet/SSH	Enable/Disable	The MGate Telnet/SSH function can be enabled or disabled.
Serial Console	Enable/Disable	The MGate serial console function can be enabled or disabled.
Reset button protect	Disable after 60 sec, Always enable	The MGate provides the reset button to clear password or load factory default settings. But for security issues, users can disable this function. In disabled mode, the MGate will still enable this function within 60 seconds after boot-up, just in case users really need to reset this function.
Moxa command	Enable/Disable	The MGate can be searched by the Device Search Utility (DSU). If you have any security concerns, you can choose Disable to deny the DSU right to access.

Session Settings	Value	Description
Maximum Login User for HTTP + HTTPS	1-10	The number of users that can access the MGate at the same time.
Auto Logout Setting	0-1440 min	Sets the auto logout time period

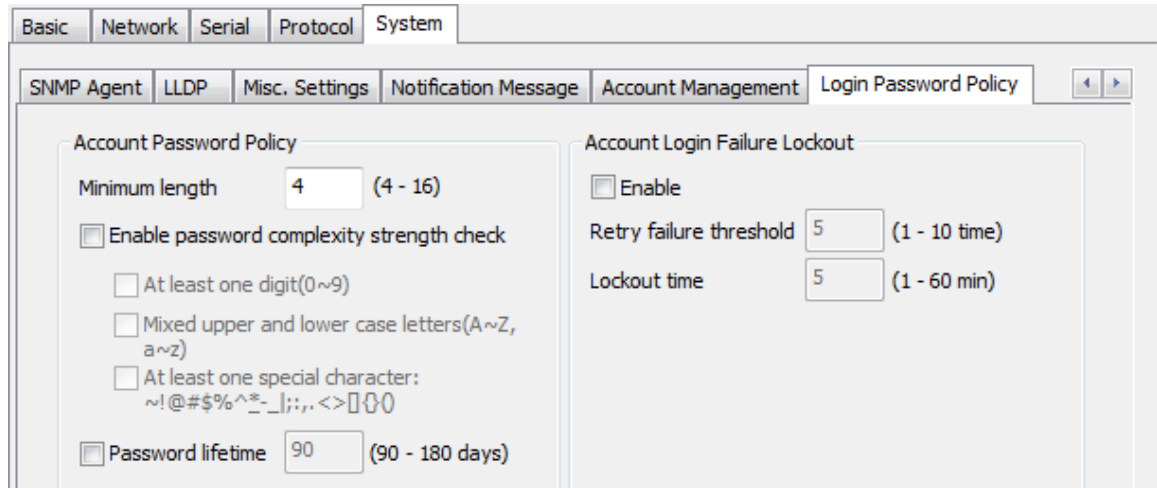
**Notification Message**

**Account Management**

Account Name	Group
admin	admin

Parameters	Value	Description
Account	Admin, user	Users can change the password for different accounts. The MGate provides two different level accounts: <b>admin</b> and <b>user</b> . The admin account can access and modify all the settings through the web console. The user account can only view the settings and cannot change anything.

**Login Password Policy**

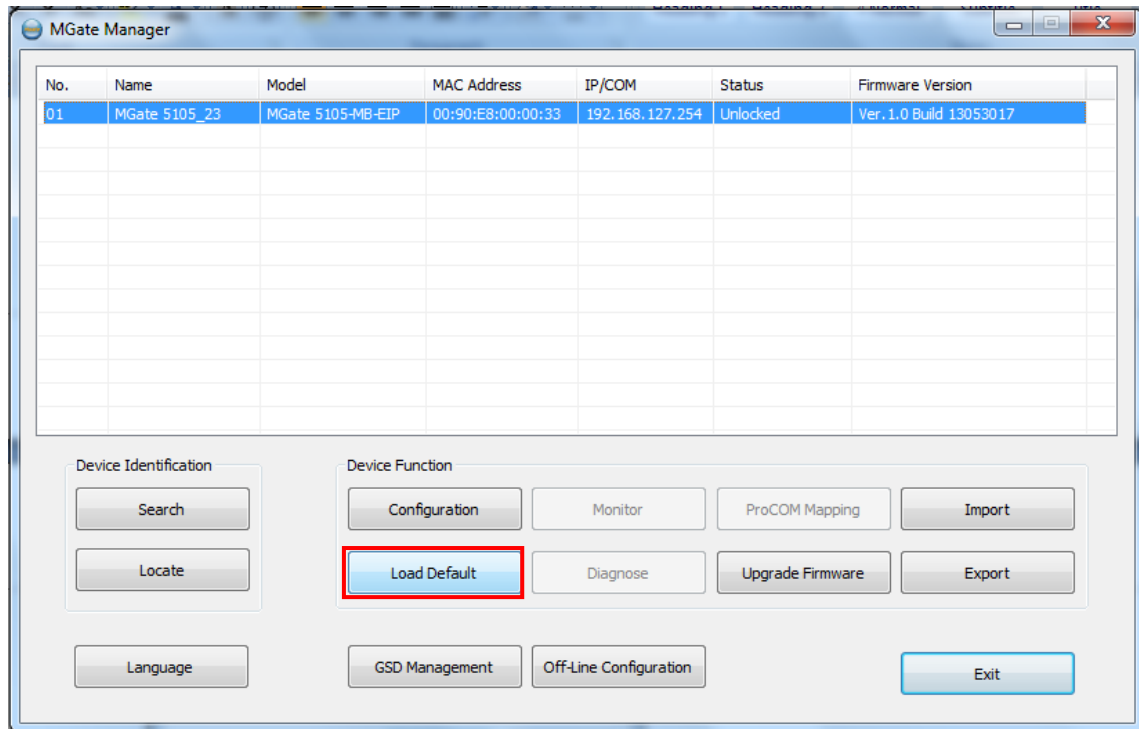


Account Password Policy	Value	Description
Minimum length	4-16	
Enable password complexity strength check		Select how the MGate checks the password strength
Password lifetime	90-180 days	Set the password lifetime period

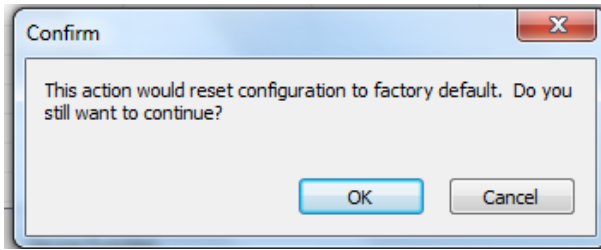
Account Login Failure Logout	Value	Description
Retry failure threshold	1-10 time(s)	
Lockout time	1-60 min	

## Load Default

To clear all the settings on the unit, use the **Load Default** button to reset the unit to its initial factory default values.



Click **Load Default** and review the confirmation message. If you are sure you would like to reset the configuration to factory defaults, click the **OK** button. If not, click **Cancel**.



After the MGate Manager resets completely, MGate Manager will automatically execute a Broadcast Search for all MGate units on the LAN. Your MGate should reappear in the list of units.

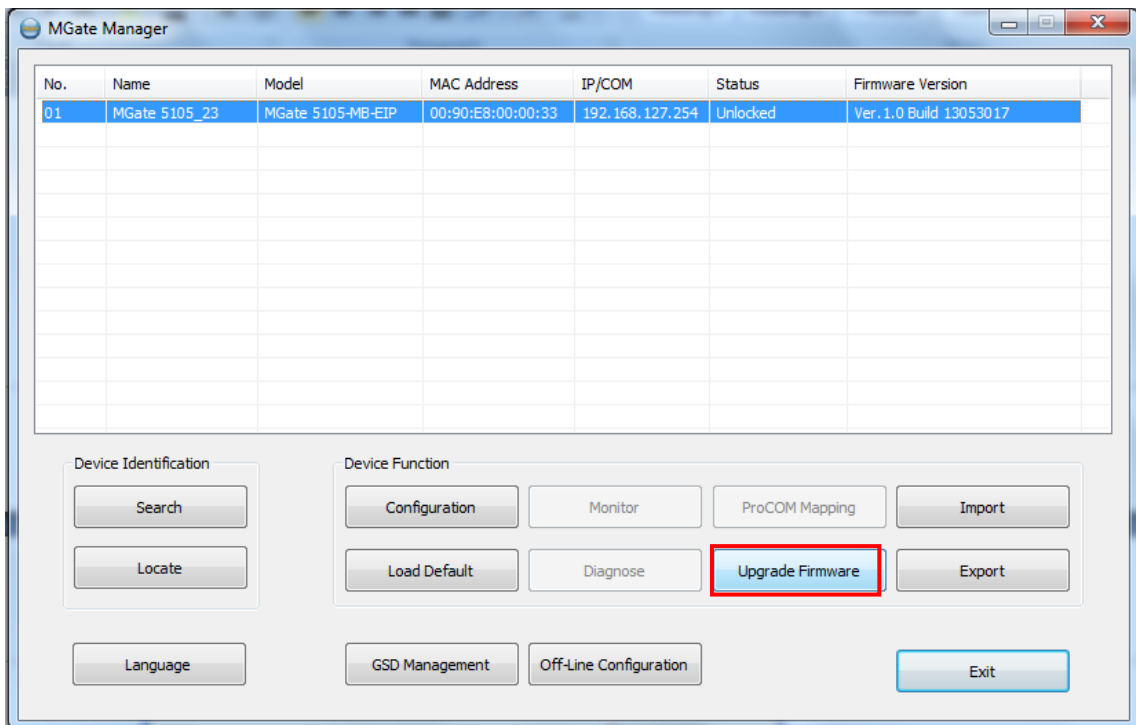


**ATTENTION**

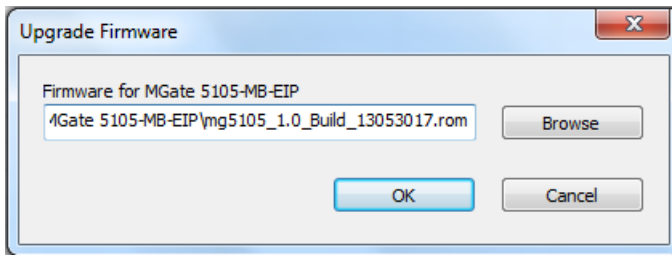
**Load Default** will completely reset the configuration of the unit, and all of the parameters you have saved will be discarded. Do not use this function unless you are sure you want to completely reset your unit.

## Upgrade Firmware

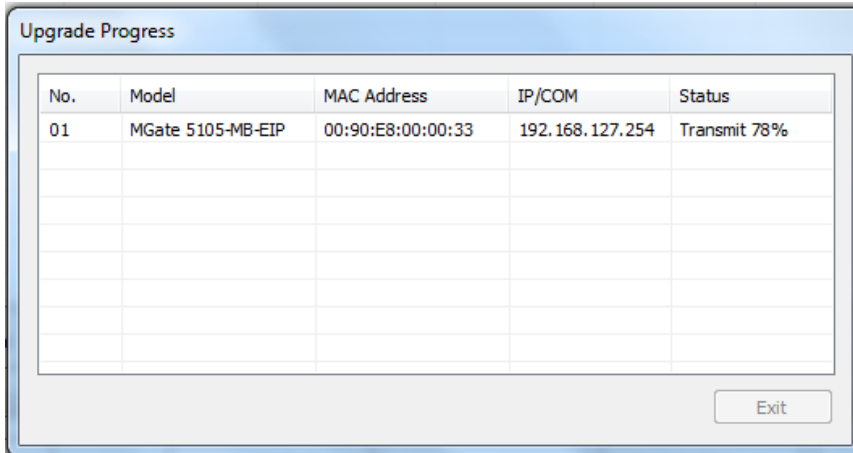
Firmware updates for the MGate 5105-MB-EIP are located at [www.moxa.com](http://www.moxa.com). After you have downloaded the new firmware onto your PC, you can use MGate Manager to write it onto your MGate 5105-MB-EIP. Select the desired unit from the list in MGate Manager and click **Upgrade Firmware** to begin the process.



The dialog boxes will guide you through the process. You will need to browse your PC for the firmware file. Make sure it matches your model.



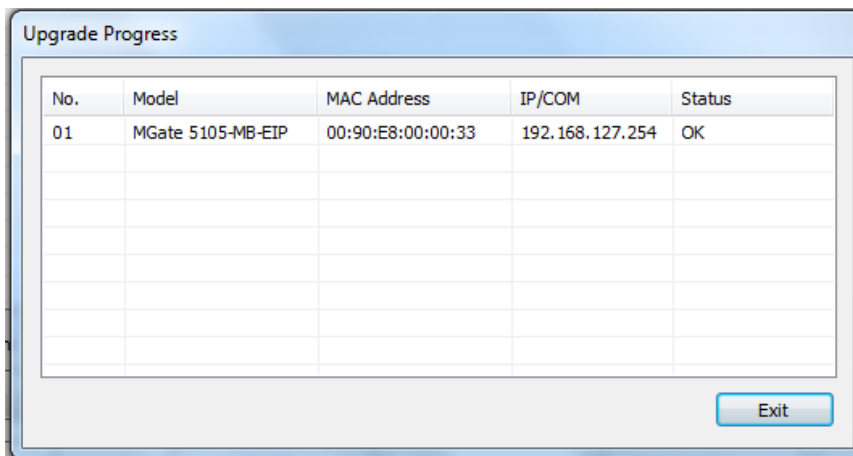
As the firmware is written to the unit, progress is displayed in the window.



**ATTENTION**

DO NOT turn off the MGate power before the firmware upgrade process is completed. The MGate will be erasing the old firmware to make room for the new firmware to flash memory. If you power off the MGate and terminate the progress, the flash memory will contain corrupted firmware and the MGate will fail to boot. If this happens, call Moxa RMA services.

Once the firmware has been successfully written onto the unit, click **Exit** to close the Upgrade Firmware window. MGate Manager will automatically execute a Broadcast Search for all MGate units on the LAN. Your MGate should reappear in the list of units.



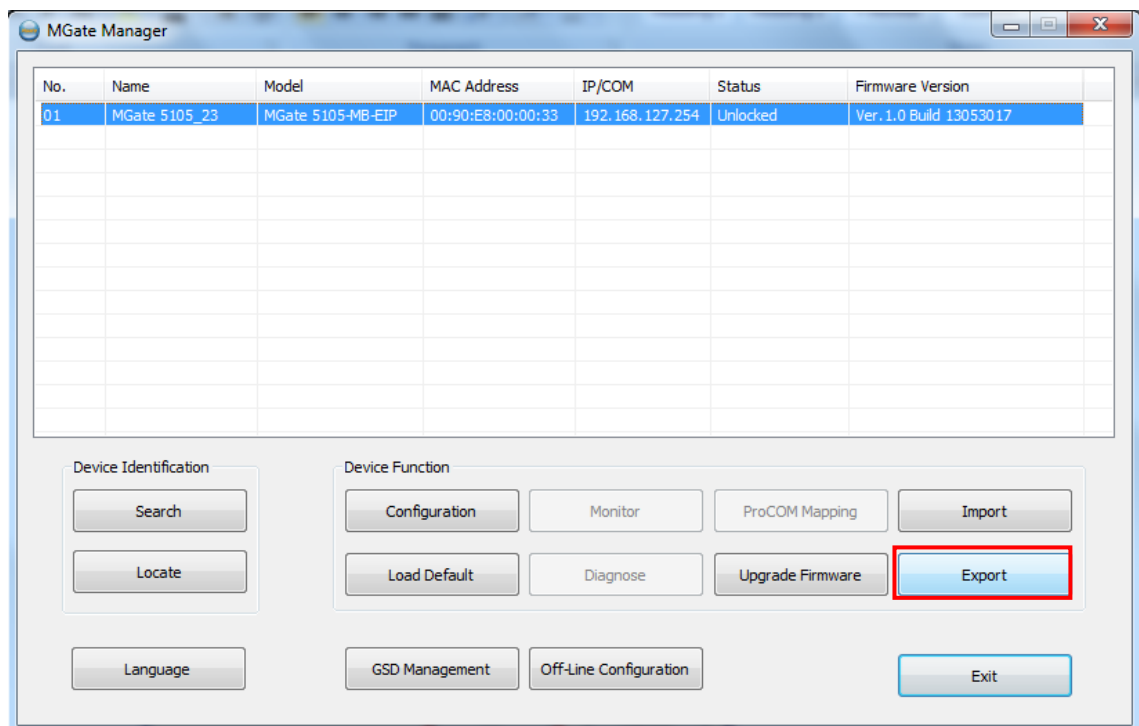
# Import/Export

There are three main reasons for using the Import and Export functions.

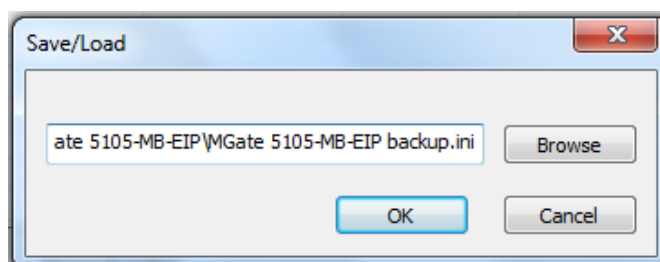
- Applying the same configuration to multiple units**  
 The Import/Export configuration function is a convenient way to apply the same settings to units located in different sites. You can export the configuration as a file and then import the configuration file onto other units at any time.
- Backing up configurations for system recovery**  
 The export function allows you to export configuration files that can be imported onto other gateways to restore malfunctioning systems within minutes.
- Troubleshooting**  
 Exported configuration files can help administrators to identify system problems that provide useful information for Moxa's Technical Service Team when maintenance visits are requested.

## Export Function

The export function saves all the configuration settings and parameters of the MGate 5105-MB-EIP in a \*.ini file. To begin, click the **Export** button.



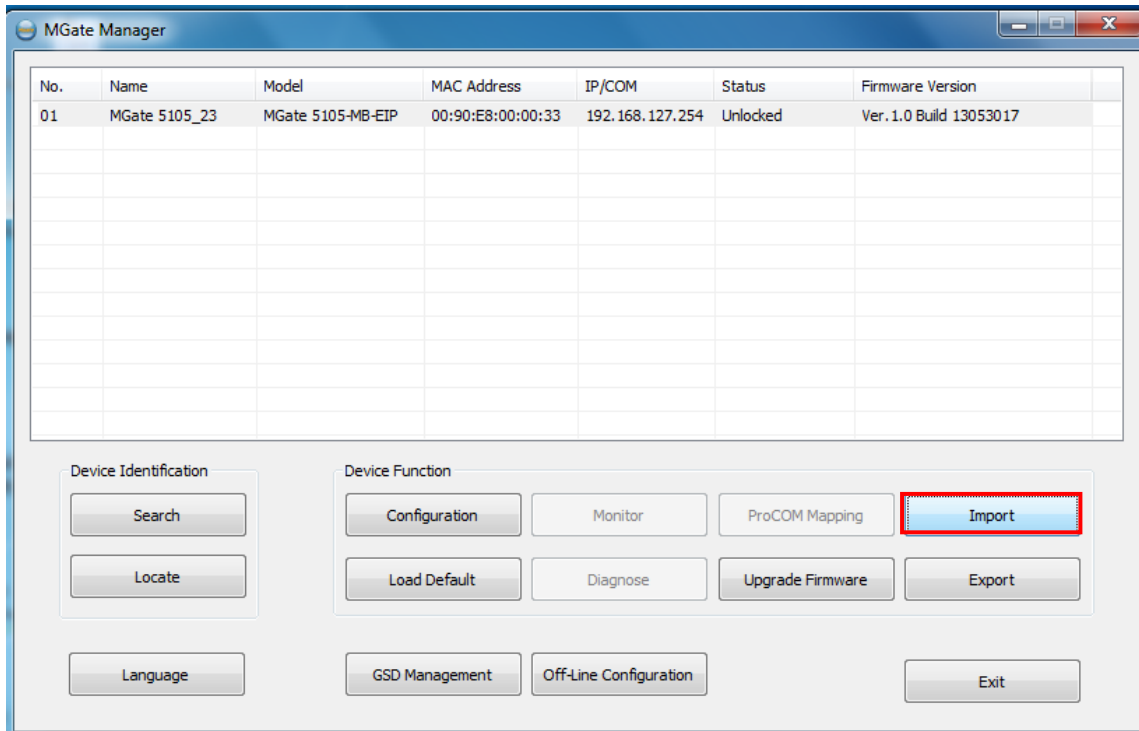
Enter a file name and use the **Browse** button to save the file to a specific path. Then, click the **OK** button.



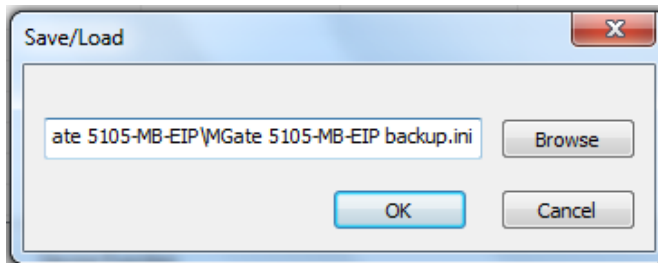
If you export the configuration file successfully, a confirmation message will pop up and the configuration file will be saved as a \*.ini file

## Import Function

Once the file is saved, it can be imported into your target unit to duplicate the same settings. Select the target unit first and click the **Import** button to import.



Select the file you want to import, and then click the **OK** button



Wait for the MGate Manager to finish configuring the target device. If you import the configuration file successfully, a confirmation message will pop up. After closing the message dialog, the MGate Manager will automatically execute a Broadcast Search for all MGate units on the LAN. Your MGate should reappear in the list of units.



### ATTENTION

DO NOT turn off the MGate power before the firmware upgrade process is completed. The MGate will be erasing the old firmware to make room for the new firmware to flash memory. If you power off the MGate and terminate the process, all settings will disappear and the MGate gateway will revert to factory defaults. If this happens, import the settings from the file again.

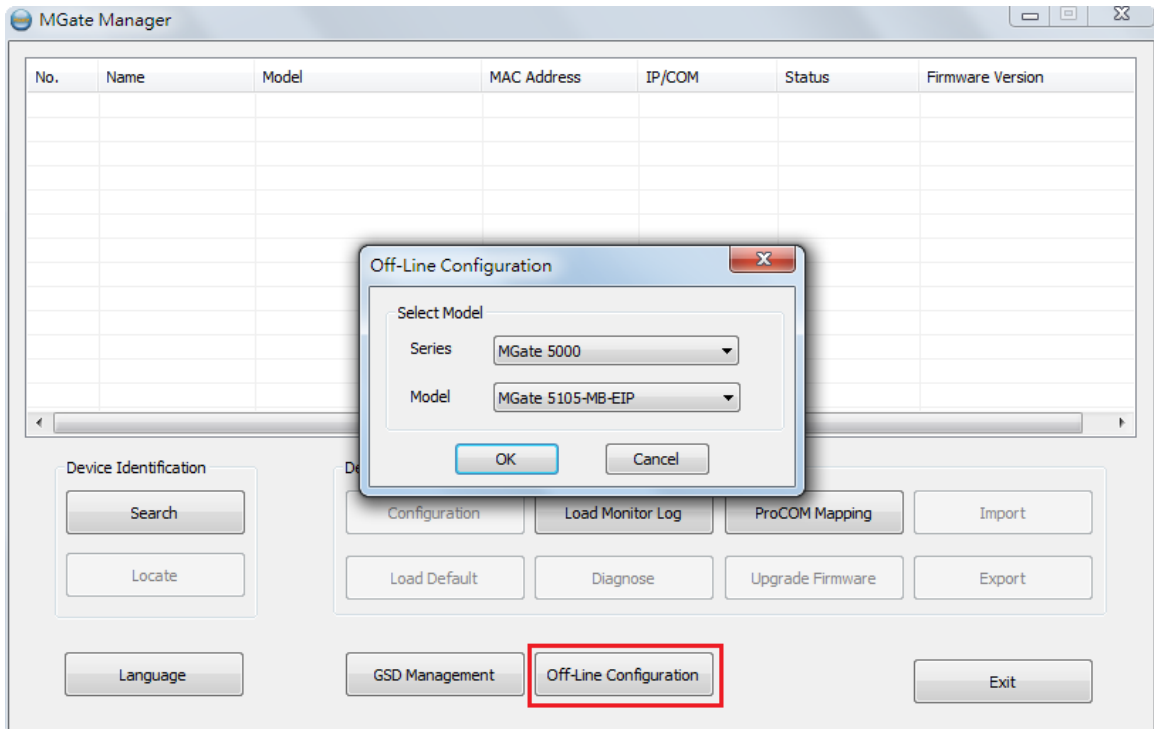
## GSD Management

GSD Management is designed for PROFIBUS gateways (e.g., the MGate 5102-PBM-PN), so it cannot be used for the MGate 5105-MB-EIP.

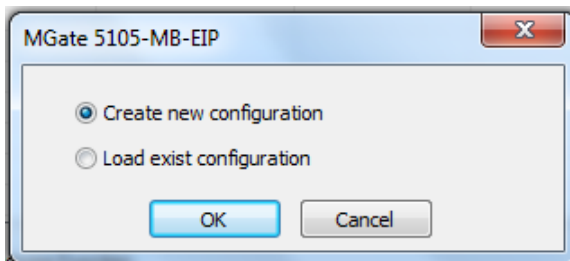


# Offline Configuration

Create or modify the configuration file manually through MGate Manager by first generating the configuration file with the **Export** function. The file generated by this function can also be used for the **Import** function. To use this function, click the **Off-Line Configuration** button to load the configuration window.



Choose either **Create new configuration** or **Load exist configuration** to edit the configuration.



For more details, refer to **Chapter 3: Modifying the Configuration** above. When all configuration settings are finished, click **OK** to save the updates to the configuration file.

# 4

## Web Console Configuration and Troubleshooting

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The following topics are covered in this chapter:

- ❑ **Overview**
- ❑ **Common Settings**
- ❑ **Protocol Settings**
- ❑ **System Management**
- ❑ **System Monitoring**
- ❑ **Fault Protection and Status Monitoring**
  - Fault Protection
  - Status Monitoring

# Overview

The MGate 5105-MB-EIP supports configuration and troubleshooting by web console. This chapter will focus only on the settings that can be configured by web console. These include monitoring and troubleshooting functions, such as how to check I/O data transmission, troubleshoot configurations, run diagnostics, etc. More detailed information about other configuration settings can be found in Chapter 3.

To connect to the MGate web console, open a web browser and enter the MGate gateway’s IP address.

http://<MGate IP address>

or

https://<MGate IP address>

On the first page, specify the account type and enter the password. Only two types of accounts are supported: admin and user. The **admin** account can modify all the settings, whereas the **user** account only can view settings and cannot modify any configurations. The default password is **moxa**.

The screenshot shows a login form with the following elements:

- Account:** A dropdown menu with 'admin' selected.
- Password:** An empty text input field.
- Login:** A green button with white text.

All available configuration items are listed in left panel tree. Click on an item to view detailed options in the panel area on the right. To activate changes, click the **Submit** button before leaving the current page. If necessary, the MGate gateway will restart to activate the settings.

The screenshot displays the MGate 5105-MB-EIP web console interface. At the top, the MOXA logo is on the left, 'MGate 5105-MB-EIP' is in the center, and 'www.moxa.com' is on the right. Below this is a status bar with the following information:

Model	- MGate 5105-MB-EIP	IP	- 192.168.127.254	MAC Address	- 00:90:E8:00:00:33
Name	- MGate 5105_23	Serial No.	- 23	Firmware	- 1.0 Build 13053017

Below the status bar is a 'Welcome to MGate 5105-MB-EIP' section with a table of system information:

Model name	MGate 5105-MB-EIP
Serial No.	23
Firmware version	1.0 Build 13053017
Ethernet IP address	192.168.127.254
Ethernet MAC address	00:90:E8:00:00:33
Up time	0 days 07h 27m 27s
Power 1	On
Power 2	Off
microSD	Not Detected

On the left side, there is a 'Main Menu' with the following items:

- Overview
- Basic Settings
- Network Settings
- Serial Settings
- Protocol Settings
- System Management
- System Monitoring
- Restart

At the bottom left of the main menu area is the 'goahead WEB SERVER' logo.

# Common Settings

Refer to the appropriate reference section in **Chapter 3: MGate Manager Configuration** of this user’s manual for each MGate Manager settings page.

MGate Manager Settings Page	Reference Section in Chapter 3
Basic Settings	See <b>Configure Device</b> section
Network Settings	See <b>Network Settings</b> section
Serial Settings	See <b>Serial Settings</b> section
Protocol Settings - Protocol Conversion	See <b>Protocol Conversion</b> section
Protocol Settings - EtherNet/IP	See <b>EtherNet/IP Settings</b> section
Protocol Settings - Modbus RTU/ASCII	See <b>Modbus RTU/ASCII Settings</b> section
Protocol Settings - Modbus TCP	See <b>Modbus TCP Settings</b> section
System Management – Accessible IP List	See <b>Accessible IP Settings</b> section
System Management – System Log Settings	See <b>Log Settings</b> section
System Management – Auto Warning Settings	See <b>Auto Warning</b> section
System Management – E-mail Alert	See <b>E-mail Alert</b> section
System Management – SNMP Trap	See <b>SNMP Trap</b> section
System Management – SNMP Agent	See <b>SNMP Agent</b> section
System Management – LLDP Settings	See <b>LLDP Settings</b> section
System Management – Misc. Settings	See <b>Misc. Settings</b> section
System Management – Maintenance - Firmware Upgrade	See <b>Upgrade Firmware</b> section
System Management – Maintenance - Configuration Import/Export	See <b>Import/Export</b> section
System Management – Maintenance - Load Factory Default	See <b>Load Default</b> section

In addition to the common settings above, the following functions mentioned in this chapter are only available in the web console.

# Protocol Settings


## Protocol Settings – I/O Data Mapping


Here, you could click left on EtherNet/IP I/O connection, for example, click on O-> T Instance #100, which will show what Modbus commands are included in the table on the right.


### I/O Data Mapping


Data flow direction    EtherNet/IP Scanner --> Modbus RTU/ASCII Slave ▾


Mapping address arrangement    Automatic ▾

  
 Your device :  
EtherNet/IP Scanner

  
**O → T**

  
 Role 1 of MGate 5105-MB-EIP :  
EtherNet/IP Adapter

  
**write**

  
 Role 2 of MGate 5105-MB-EIP :  
Modbus RTU/ASCII Master

Your device :  
Modbus RTU/ASCII Slave

Name	Internal Address	Data Size
O → T instance #100	0 .. 11	12 bytes

Name	Function	Internal Address	Quantity
Command2	6	0 .. 1	2 bytes
Command3	16	2 .. 11	10 bytes

**Submit**

# System Management

## System Management – Maintenance – Ping

This network testing function is available only in the web console. The MGate gateway will send an ICMP packet through the network to a specified host, and the result can be viewed in the web console immediately.

- Serial Settings
- Protocol Settings
- System Management
  - Accessible IP List
  - System Log Settings
  - Auto Warning Settings
  - E-mail Alert
  - SNMP Trap
  - SNMP Agent
  - LLDP Settings
  - Misc. Settings
  - Maintenance
    - Ping**
    - Firmware Upgrade
    - Configuration Import/Export
    - Load Factory Default
  - Certificate
- System Monitoring
- Restart

## Ping Test

Ping Destination

Destination

**Activate**

**System Management – Certificate**

Use this function to load the Ethernet SSL certificate. Select or browse for the certificate file in the **Select SSL certificate/key file** field. This function is only available in the web console.

# System Monitoring

**System Monitoring – System Status – Network Connections**

Go to **Network Connections** under **System Status** to view network connection information.

Protocol	Recv-Q	Send-Q	Local Address	Foreign Address	State
TCP	0	0	*:4900	*:0	LISTEN
TCP	0	0	*:80	*:0	LISTEN
TCP	0	0	*:44818	*:0	LISTEN
TCP	0	0	*:443	*:0	LISTEN
TCP	0	0	192.168.127.254:80	169.254.9.171:1920	TIME_WAIT
TCP	0	0	192.168.127.254:80	169.254.9.171:1928	TIME_WAIT
TCP	0	0	192.168.127.254:80	169.254.9.171:1930	TIME_WAIT
TCP	0	0	192.168.127.254:80	169.254.9.171:1923	TIME_WAIT
TCP	0	0	192.168.127.254:80	169.254.9.171:1913	TIME_WAIT
TCP	0	0	192.168.127.254:80	169.254.9.171:1911	TIME_WAIT
TCP	0	0	192.168.127.254:80	169.254.9.171:1910	TIME_WAIT
TCP	0	0	192.168.127.254:80	169.254.9.171:1906	TIME_WAIT
TCP	0	0	192.168.127.254:80	169.254.9.171:1921	TIME_WAIT
TCP	0	1362	192.168.127.254:80	169.254.9.171:1935	ESTABLISHED
TCP	0	0	192.168.127.254:80	169.254.9.171:1931	TIME_WAIT
TCP	0	0	192.168.127.254:80	169.254.9.171:1915	TIME_WAIT
TCP	0	0	192.168.127.254:80	169.254.9.171:1933	TIME_WAIT

**System Monitoring – System Status – System Log**

**- Main Menu**

- Overview
- Basic Settings
- Network Settings
- Serial Settings
- Protocol Settings
- System Management
- System Monitoring
  - System Status
    - Network Connections
    - System Log**
    - Relay State
    - LLDP Table
- Protocol Status
- Communication Analysis
- Restart

### System Log

System Log

2013/06/02 14:48:34 [Config] Firmware upgrade

2013/06/02 14:48:43 [System] System warm start

2013/06/02 14:48:43 [Network] Ethernet port 1 link down

Clear log
Refresh

**System Monitoring – System Status – Relay Status**

The MGate gateway includes a built-in relay circuit that is triggered in the event of a power failure or if the Ethernet link is down. You can view the relay status on this page.

**- Main Menu**

- Overview
- Basic Settings
- Network Settings
- Serial Settings
- Protocol Settings
- System Management
- System Monitoring
  - System Status
    - Network Connections
    - System Log
    - Relay State**
    - LLDP Table
- Protocol Status

### Relay State

Auto refresh

Power input 1 failure	N/A	<a href="#">Acknowledge Event</a>
Power input 2 failure	N/A	<a href="#">Acknowledge Event</a>
Ethernet 1 link down	N/A	<a href="#">Acknowledge Event</a>
Ethernet 2 link down	N/A	<a href="#">Acknowledge Event</a>

**System Monitoring – System Status – LLDP Tables**

You can see LLDP related information, including Port, Neighbor ID, Neighbor Port, Neighbor Port Description, and Neighbor System.

**- Main Menu**

- Overview
- Basic Settings
- Network Settings
- Serial Settings
- Protocol Settings
- System Management
- System Monitoring
  - System Status
    - Network Connections
    - System Log
    - Relay State
    - LLDP Table**
- Protocol Status
- Communication Analysis
- Restart

### LLDP Table

Port	Neighbor ID	Neighbor Port	Neighbor Port Description	Neighbor System

**System Monitoring – Protocol Status – I/O Data View**

This page displays the internal memory information for input and output data transfers. View updated values for communication verification here. This function is only available in the web console and text-mode console.

**I/O Data View**

Auto refresh

Data flow direction: Modbus RTU/ASCII -> EtherNet/IP Start address(Hex):  Length:  Format:

Internal Address	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
0000h	12	34	56	78	AB	CD	EE	FF	00	00	00	00	00	00	00	00
0010h	00	00	00	00	AA	AA	BB	BB	CC	CC	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

**System Monitoring – Protocol Status – Diagnose**

The MGate provides status information for EtherNet/IP, Modbus RUB/ASCII, and Modbus TCP troubleshooting. Verify data or packet counters to make sure the communications are running smoothly.

**EtherNet/IP Diagnose**

Auto refresh

**Connection Parameters**

O → T instance (exclusive owner)	100
O → T instance (input only)	120
T → O instance	110
O → T data size	0
T → O data size	40

**I/O Connection List**

192.168.127.38
----------------

**Overview**

Current TCP connections	1
Maximum TCP connections observed	1
Current I/O connections	1
Total TCP transmit packets	36
Total TCP receive packets	36
Total TCP receive invalid packets	0
Total UDP transmit packets	22182
Total UDP receive packets	21916
Total UDP receive invalid packets	0

**Connection Information**

Up time	00h:33m:42s
Target	192.168.127.254
Originator	192.168.127.38
Multicast address	239.192.32.161
Tx packets	20211
Rx packets	20216
Rx invalid packets	0
CIP transport class	1
O → T connection ID	0x0001d#88
O → T RPI	100 ms
O → T connection size	6 byte

**Modbus RTU/ASCII Diagnose**

Auto refresh

Category	Item	Value
Modbus	Mode	RTU Master
	Sent request	3294
	Received valid response	3294
	Received invalid response	0
	Received CRC/LRC Error	0
	Received exception	0
	Timeout	0
Serial Port	Port number	1
	Break	0
	Frame error	0
	Parity error	0
	Overrun error	0



- Network Settings
- Serial Settings
- Protocol Settings
  - Protocol Conversion
  - EtherNet/IP
  - Modbus RTU/ASCII
  - Modbus TCP
  - I/O Data Mapping
- System Management
- System Monitoring
  - System Status
  - Protocol Status
    - I/O Data View
    - EtherNet/IP Diagnose
    - Modbus RTU/ASCII Diagnos
    - Modbus TCP Diagnose
    - Modbus RTU/ASCII Traffic
    - Communication Analysis
- Restart

## Modbus TCP Diagnose

Auto refresh

Category	Item	Value
Modbus	Mode	Master
	Number of connection	0
	Sent request	0
	Received valid response	0
	Received invalid response	0
	Received exception	0
	Timeout	0

### Connections

### System Monitoring – Protocol Status – Modbus RTU/ASCII Traffic

For troubleshooting or management purposes, you can monitor the Modbus RTU/ASCII data passing through the MGate 5105-MB-EIP on the network. Rather than simply echoing the data, MGate Manager presents the data in an intelligent, easy-to-understand format with clearly designated fields, including source, type, destination, contents, and more. Events can be filtered in different ways, and the complete log can be saved to a file for later analysis.

- Network Settings
- Serial Settings
- Protocol Settings
  - Protocol Conversion
  - EtherNet/IP
  - Modbus RTU/ASCII
  - Modbus TCP
  - I/O Data Mapping
- System Management
- System Monitoring
  - System Status
  - Protocol Status
    - I/O Data View
    - EtherNet/IP Diagnose
    - Modbus RTU/ASCII Diagnos
    - Modbus TCP Diagnose
    - Modbus RTU/ASCII Traffic
    - Communication Analysis
- Restart

## Modbus RTU/ASCII Traffic

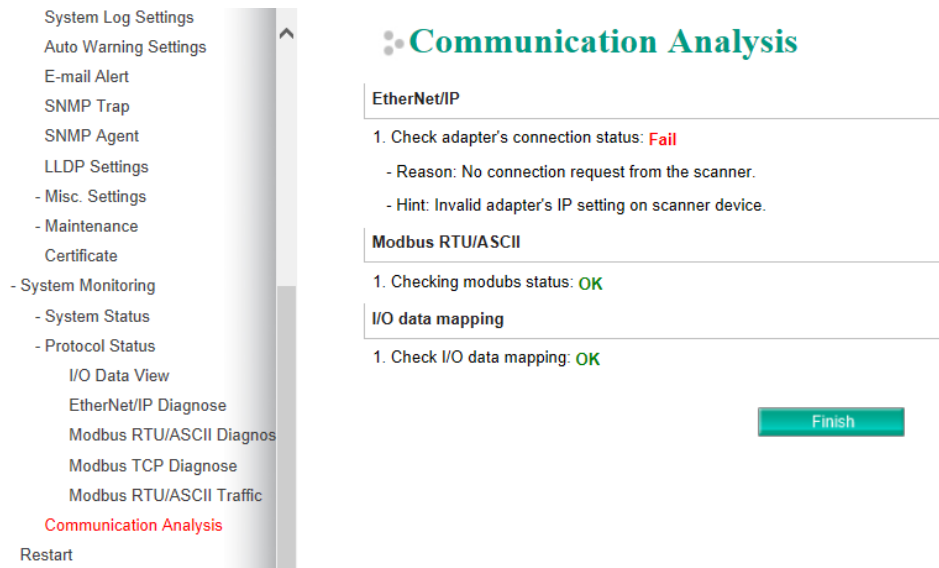
Auto scroll

Start Stop Export Capturing ...

No.	Time	Send/Receive	Slave ID	Function Code	Data
40	9.536	Receive	1	3	01 03 14 00 00 1B 4E 00 00 1B 55 00 00 1B 42 AB CD FF 11 CF 10
41	10.278	Send	1	3	01 03 00 00 00 0A C5 CD
42	10.326	Receive	1	3	01 03 14 AB CD 67 89 00 00 00 00 1B 3F 00 00 1B 30 00 00 1B 51 00 00 58 70
43	10.348	Send	1	3	01 03 00 0A 00 0A E5 CF
44	10.396	Receive	1	3	01 03 14 00 00 1B 4C 00 00 1B 37 00 00 1B 55 00 00 1B 44 AB CD FF FF 80 53
45	11.278	Send	1	3	01 03 00 00 00 0A C5 CD
46	11.326	Receive	1	3	01 03 14 AB CD 67 89 00 00 00 00 1B 41 00 00 1B 32 00 00 1B 53 00 00 44 59
47	11.348	Send	1	3	01 03 00 0A 00 0A E5 CF
48	11.396	Receive	1	3	01 03 14 00 00 1B 4E 00 00 1B 39 00 00 1B 57 00 00 1B 46 AB CD FF FF 57 1D
49	12.278	Send	1	3	01 03 00 00 00 0A C5 CD
50	12.326	Receive	1	3	01 03 14 AB CD 67 89 00 00 00 00 1B 43 00 00 1B 34 00 00 1B 55 00 00 C9 E0
51	12.348	Send	1	3	01 03 00 0A 00 0A E5 CF
52	12.396	Receive	1	3	01 03 14 00 00 1B 50 00 00 1B 3B 00 00 1B 59 00 00 1B 48 AB CD FF FF 1C 58
53	13.278	Send	1	3	01 03 00 00 00 0A C5 CD
54	13.326	Receive	1	3	01 03 14 AB CD 67 89 00 00 00 00 1B 45 00 00 1B 36 00 00 1B 57 00 00 55 68

**System Monitoring –Communication Analysis**

After finishing all configurations, you can use **Communication Analysis** to confirm whether the settings are correct. Click **Start** and wait for 10 seconds, and an analysis report will appear with detailed fail statuses, warnings, and hints.



# Fault Protection and Status Monitoring

## Fault Protection

The Fault Protection function sends a predefined setting to field devices to prevent incorrect actions when the upstream connection is lost. The MGate 5105 supports a Fault Protection function when in agent mode. You can configure the criteria to determine what to do when the write command is no longer received from the master side. For example, when a communication cable comes loose accidentally, the most up-to-date write command from the master side will not be received by the gateway. Hence, the slave device will use the latest command from the gateway, which is now out of date, creating an inconsistency between the master and slave devices. To avoid this problem, the MGate 5105 supports options to determine which actions should be taken when the master’s side is disconnected from the gateway.

Options	Description
Keep latest data	The gateway will write the same data to the slave device.
Clear data to zero	The gateway will write the zero values to the slave device.
User-define value	A user-defined value will be written to the slave device.

## Status Monitoring

The Status Monitoring function provides status information of field devices when the MGate is being used as a master/client. If a slave device fails or a cable comes loose, generally the gateway won't be able to receive up-to-date data from the slave device. The out-of-date data will be stored in the gateway's memory and will be retrieved by the master device (e.g., PLC), which will not be aware that the slave device is not providing up-to-date data. The MGate supports the Status Monitoring function, which provides a warning mechanism to report the list of slave devices that are still "alive."

The MGate 5105 allocates one bit of the gateway's specified memory address to indicate the status of each Modbus command as being normal or abnormal. If a command has run successfully, the status value will continuously be 1. On the contrary, if a command has failed, the status will be set to 0. In this case, the master device will be aware of the failure status of the slave device.

	Modbus RTU/ASCII/TCP	EtherNet/IP
Method	Modbus function code: 0x03 or 0x04	Through UCMM with Class ID 0x405, Instance ID 1, Attribute 0.
Data address	60000	
Data unit	word byte	