AIG-301 Series User Manual

Version 2.0, July 2023

www.moxa.com/products

AIG-301 Series User Manual

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Technical Support Contact Information

www.moxa.com/support

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1. Introduction

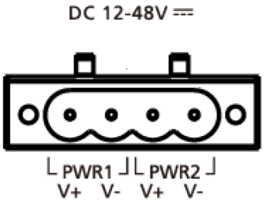
Overview

The AIG-301 Series advanced IIoT gateways are designed for Industrial IoT applications, especially for distributed and unmanned sites in harsh operating environments. AIG-301 series has implemented Modbus RTU/TCP master/client protocols which can help you to collect Modbus devices. Moreover, Azure IoT Edge software is preloaded and seamlessly integrated with the AIG-301 Series to enable easy, reliable, yet secure sensor-to-cloud connectivity for data acquisition and device management using the Azure Cloud solution. With the use of the ThingsPro Proxy utility, the device provisioning process is easier than ever. Thanks to the robust OTA function, you never have to worry about system failure during software upgrades. With the Secure Boot function enabled, you can prevent malicious software injection during the bootup process.

2. Getting Started

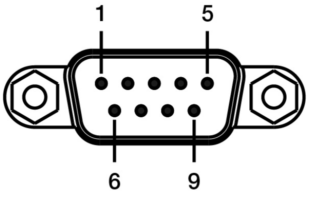
Connecting the Power

Connect the power jack (in the package) to the DC terminal block (located on the top panel), and then connect to a power line with range 12 to 48 VDC. It takes about 3 minutes for the system to boot up. Once the system is ready, the Power LED will light up. All models support dual power inputs for redundancy.



Connecting Serial Devices

The AIG device supports connecting to Modbus serial devices. The serial port uses the DB9 male connector and can be configured by software for the RS-232, RS-422, or RS-485 mode. The pin assignment of the port is shown below:



Pin	RS-232	RS-422	RS-485
1	–	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–
9	–	–	–

Connecting to a Network

Connect one end of the Ethernet cable to the AIG’s 10/100/1000M Ethernet port and the other end of the cable to the Ethernet network. The AIG will show a valid connection to the Ethernet by LAN1/LAN2 maintaining solid green/yellow color. For details on the behavior of the LEDs, refer to the *AIG-301 Series Quick Installation Guide*.

Access to the Web Console

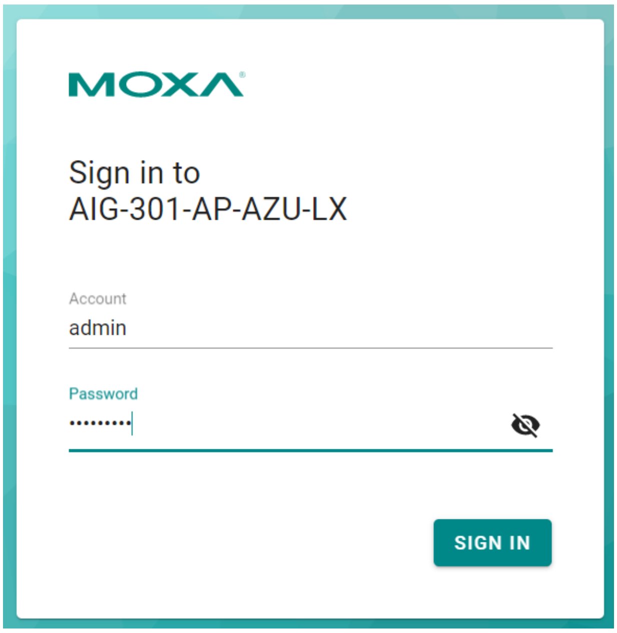
The default LAN2 IP address to access the web console of the AIG is 192.168.4.127.

When you use the default IP address to access the AIG, do the following:

1. Ensure your host and the AIG are in the same subnet (AIG's default subnet mask is 255.255.255.0). Connect to LAN2 and enter `https://192.168.4.127:8443` in your web browser.
2. Enter the account and password information.

   Default account: **admin**

   Password: **admin@123**

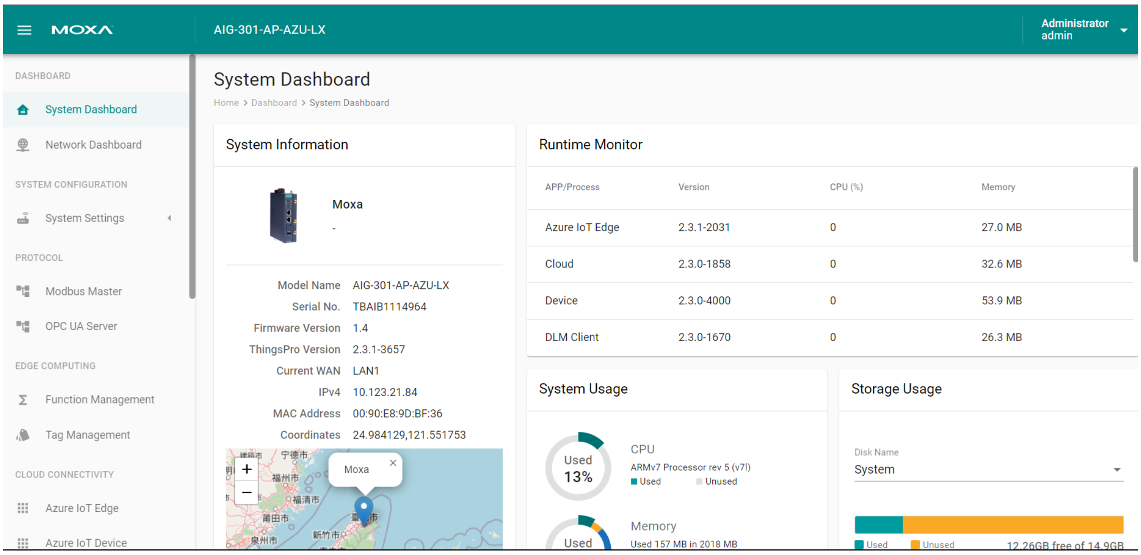


Sign in to
AIG-301-AP-AZU-LX

Account: admin

Password: •••••••••

You will see the following home page after logging in successfully.



System Dashboard

System Information

Moxa
-

Model Name	AIG-301-AP-AZU-LX
Serial No.	TBAIB1114964
Firmware Version	1.4
ThingsPro Version	2.3.1-3657
Current WAN	LAN1
IPv4	10.123.21.84
MAC Address	00:90:E8:9D:BF:36
Coordinates	24.984129,121.551753

Runtime Monitor

APP/Process	Version	CPU (%)	Memory
Azure IoT Edge	2.3.1-2031	0	27.0 MB
Cloud	2.3.0-1858	0	32.6 MB
Device	2.3.0-4000	0	53.9 MB
DLM Client	2.3.0-1670	0	26.3 MB

System Usage

CPU: Used 13%
ARMv7 Processor rev 5 (v7l)
■ Used ■ Unused

Memory: Used
Used 157 MB in 2018 MB

Storage Usage

Disk Name: System

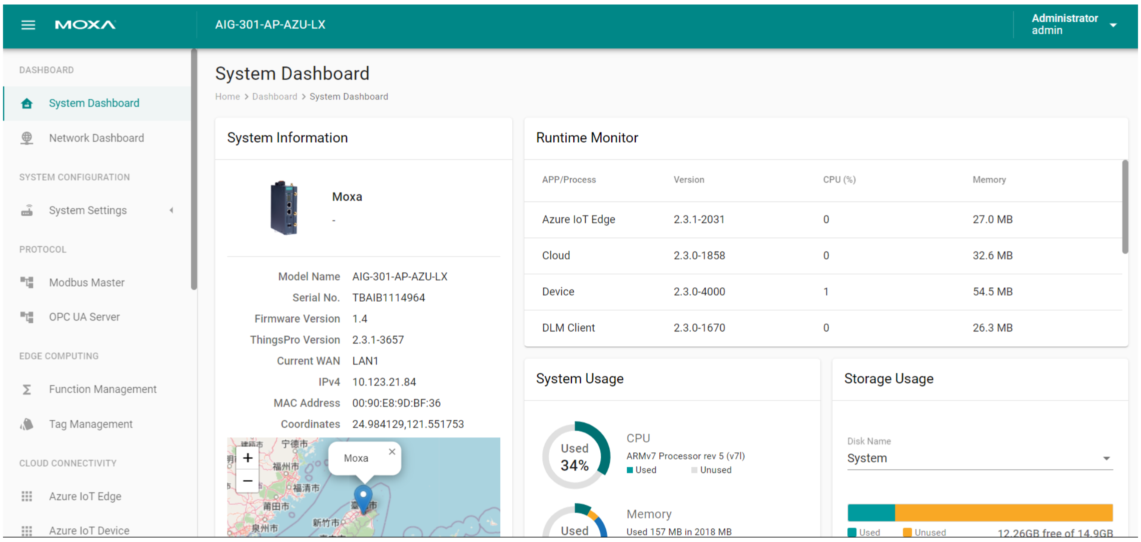
■ Used ■ Unused 12.26GB free of 14.9GB

3. Web Console

Dashboard

System Dashboard

This page gives you an overview of the gateway's system status. Basic system information such as model name, serial No., and firmware version are displayed. In addition, Storage Usage provides information on the unused storage on the system or on the SD card. Ensure that you provide accurate information when entering data so that it is useful during troubleshooting system issues.



System Dashboard

System Information

Moxa

-

Model Name	AIG-301-AP-AZU-LX
Serial No.	TBAIB1114964
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ThingsPro Version	2.3.1-3657
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Runtime Monitor

APP/Process	Version	CPU (%)	Memory
Azure IoT Edge	2.3.1-2031	0	27.0 MB
Cloud	2.3.0-1858	0	32.6 MB
Device	2.3.0-4000	1	54.5 MB
DLM Client	2.3.0-1670	0	26.3 MB

System Usage

CPU: Used 34%
ARMv7 Processor rev 5 (v7l)
Used Unused

Memory: Used
Used 157 MB in 2018 MB

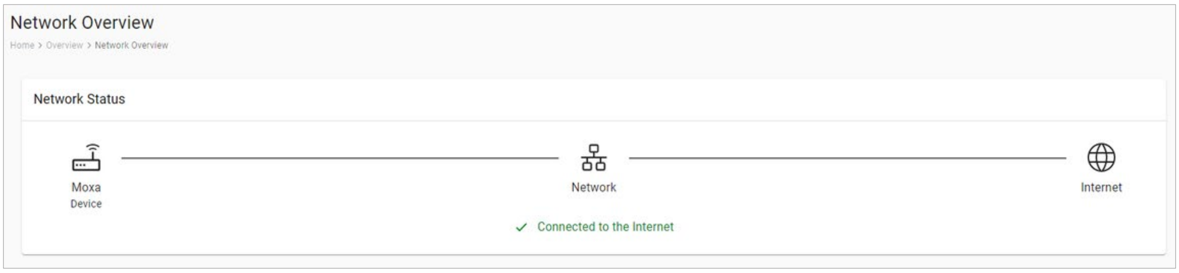
Storage Usage

Disk Name: System

Used Unused 12.26GB free of 14.9GB

Network Dashboard

This dashboard displays information on the WAN and LAN interfaces and the network traffic passing through the interfaces. Network Status shows whether the gateway can connect to the Internet.



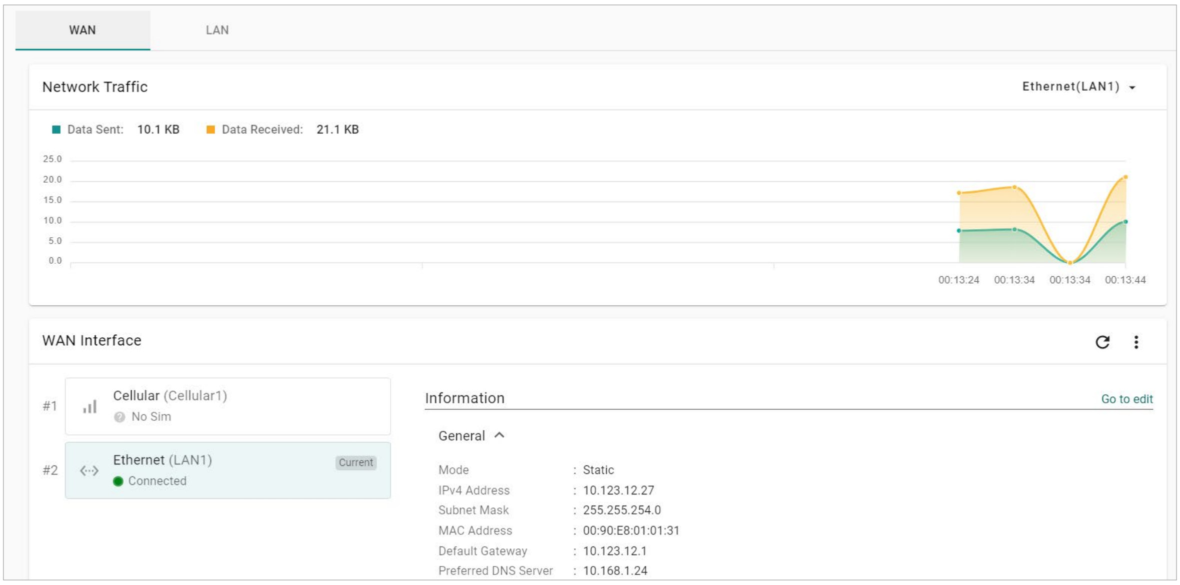
Network Overview

Network Status

✓ Connected to the Internet

WAN

WAN displays information of the data sent and received through the WAN interfaces. You can select the interface that you want to monitor. In addition, other details on the usage of the WAN interfaces are displayed on the page. The information is refreshed every 10 seconds.



■ Data Sent: 10.1 KB ■ Data Received: 21.1 KB

Cellular (Cellular1)
No Sim

Ethernet (LAN1)
● Connected

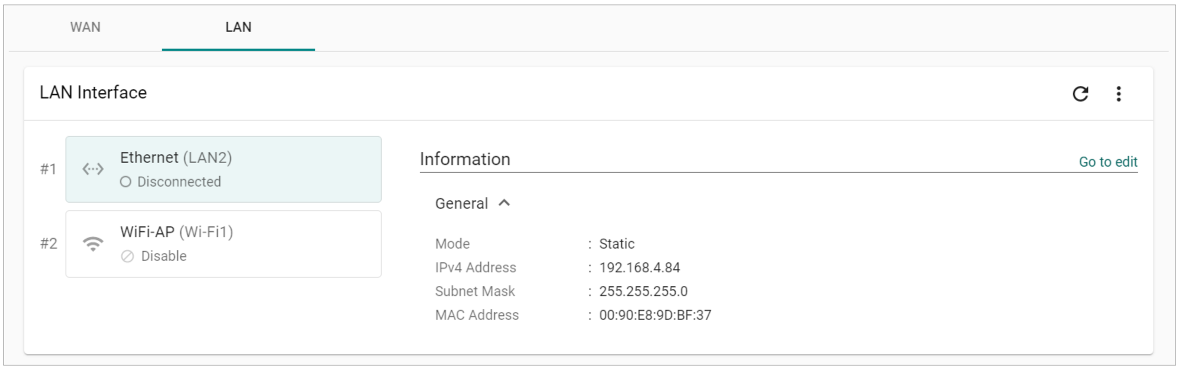
Information

General

Mode : Static
IPv4 Address : 10.123.12.27
Subnet Mask : 255.255.254.0
MAC Address : 00:90:E8:01:01:31
Default Gateway : 10.123.12.1
Preferred DNS Server : 10.168.1.24

LAN

Information on the LAN interfaces is organized under the **LAN** tab and includes information on the usage of the interfaces and the traffic passing through them.



Ethernet (LAN2)
○ Disconnected

WiFi-AP (Wi-Fi1)
⊘ Disable

Information

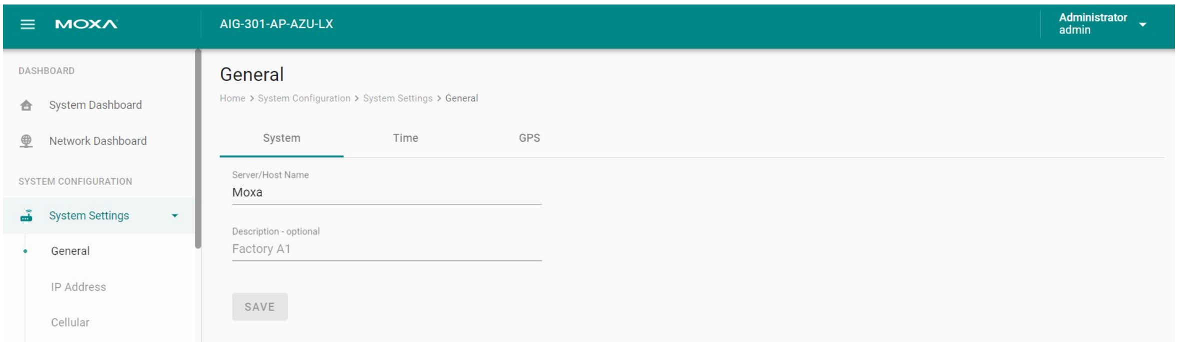
General

Mode : Static
IPv4 Address : 192.168.4.84
Subnet Mask : 255.255.255.0
MAC Address : 00:90:E8:9D:BF:37

System Configuration

System Settings—General

Go to **System Settings > General > System** to specify a new server/host name and enter a description for the device.

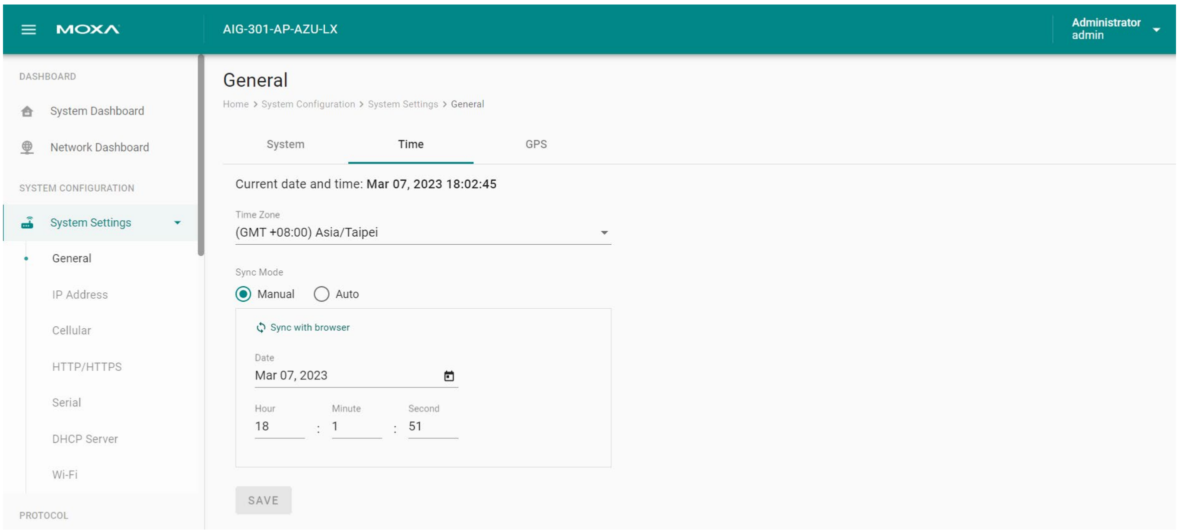


Server/Host Name: Moxa

Description - optional: Factory A1

Parameter	Value	Description
Server/Host Name	Alphanumeric string	You can enter a name to identify the unit, such as the function, etc.
Description - optional	Alphanumeric string	You can enter a description to help identify the unit location such as “Cabinet A001.”

Go to **System Settings > General > Time** to select a time zone. Choose between the Manual or Auto option to update the system time.



Current date and time: Mar 07, 2023 18:02:45

Time Zone: (GMT +08:00) Asia/Taipei

Sync Mode: ● Manual ○ Auto

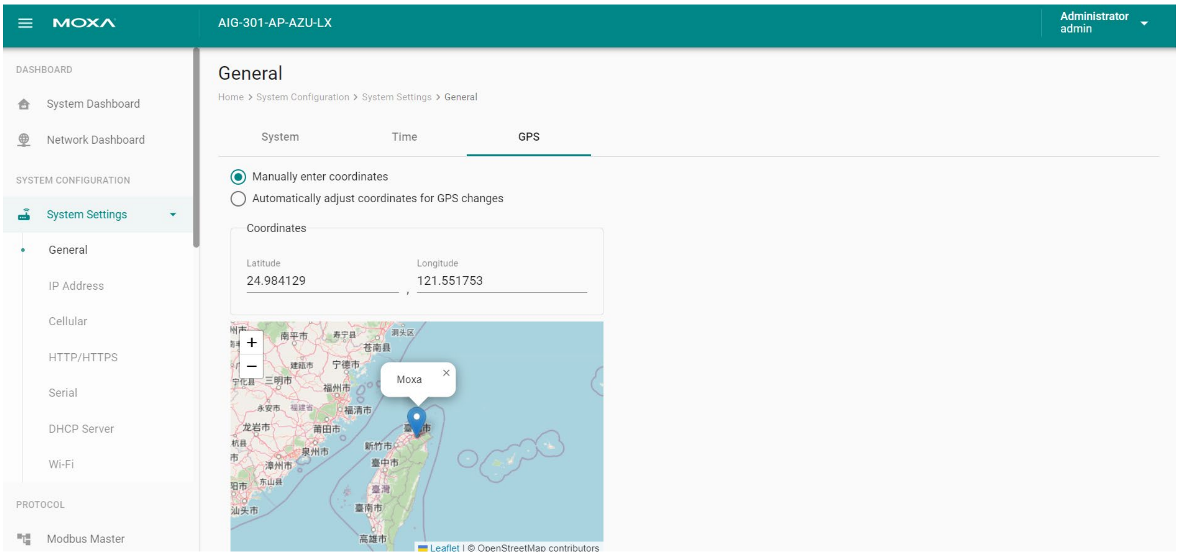
Date: Mar 07, 2023

Hour: 18 : Minute: 1 : Second: 51

Parameter	Value	Description
Time Zone	User’s selectable time zone	The field allows you to select a different time zone.
Sync Mode	Manual Auto	Manual: input the time parameters by yourself Auto: it will automatically sync with time source. NTP and GPS can be selected. NOTE: When the Auto mode is selected, in general, it takes 2 to 4 minutes. If the satellite search is slower, it could take up to 12 minutes (worst-case scenario)
Interval (sec)	60 to 2592000	The time interval to sync the time source
Source	NTP Server GPS	The way to sync the time clock
Time Sever	IP or Domain address (e.g., 192.168.1.1 or pool.ntp.org)	This field is required to specify your time server's IP or domain name if you choose the NTP server as the source

Go to **System Settings > General > GPS** to view the GPS location of the device on a map. There are two options:

- Input latitude and longitude in **manual**.
- check the **Automatically adjust coordinates for GPS changes** option if you want the system to automatically update the device coordinates.



● Manually enter coordinates
○ Automatically adjust coordinates for GPS changes

Coordinates

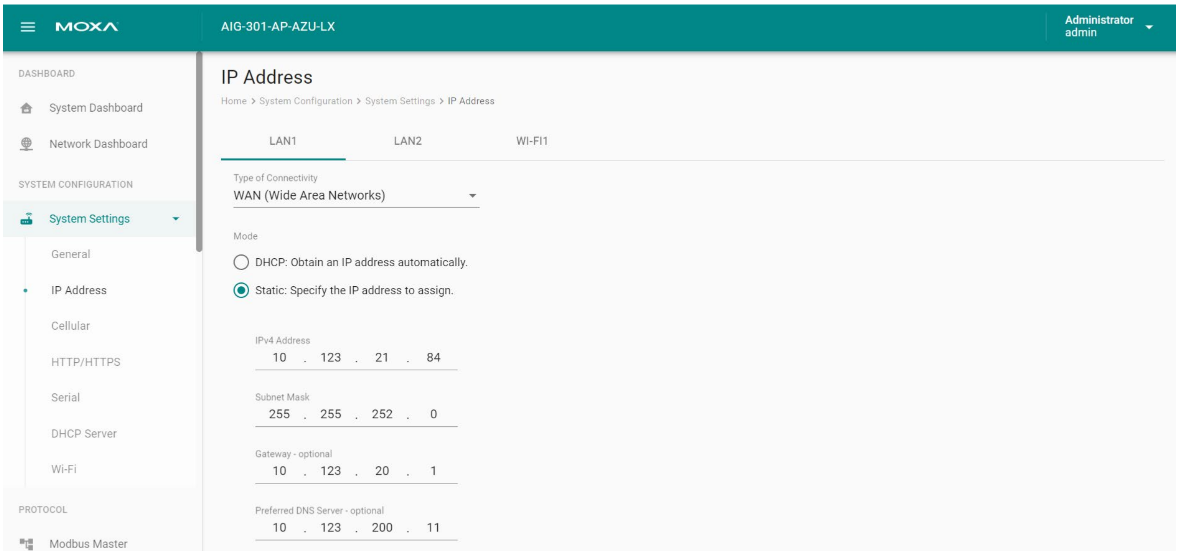
Latitude: 24.984129
Longitude: 121.551753

System Settings—IP Address

Go to **System Settings > IP Address** to view and configure LAN1 and LAN2 network settings.

To configure the network, do the following:

1. Choose **LAN1** or **LAN2** for configuration.
2. Select the **WAN (Wide Area Networks)** or **LAN (Local Area Networks)**.
3. Select **DHCP** or **Static** mode.
4. Configure **IP address, Subnet mask, Gateway,** and **DNS**.



Type of Connectivity: WAN (Wide Area Networks)

Mode

○ DHCP: Obtain an IP address automatically.
● Static: Specify the IP address to assign.

IPv4 Address: 10 . 123 . 21 . 84

Subnet Mask: 255 . 255 . 252 . 0

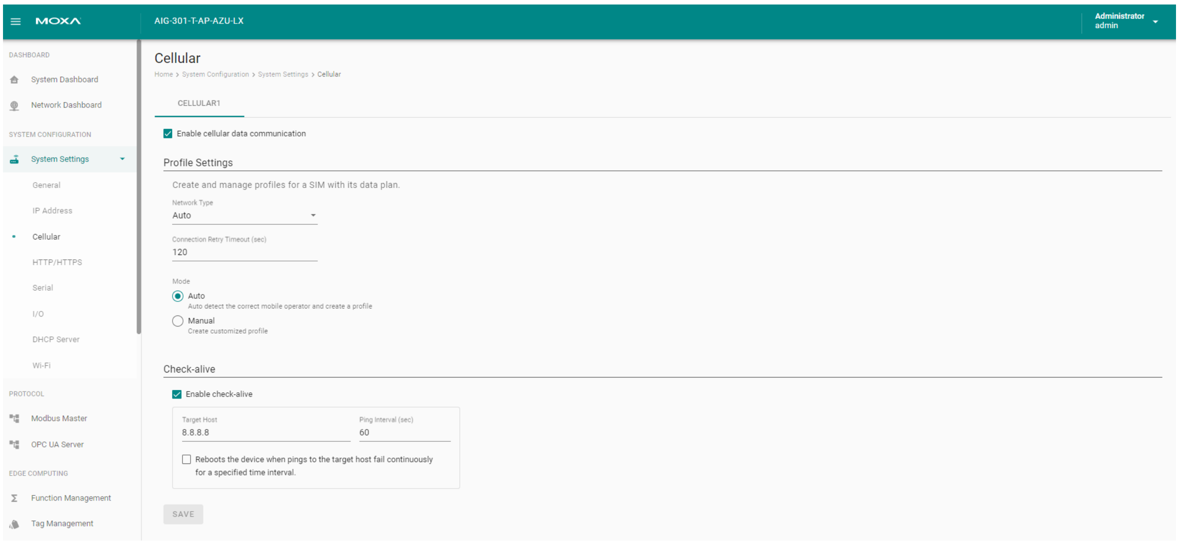
Gateway - optional: 10 . 123 . 20 . 1

Preferred DNS Server - optional: 10 . 123 . 200 . 11

Parameter	Value	Description
Types of connectivity	WAN LAN NOTE: LAN2 does not support WAN.	WAN: Wide Area Networks LAN: Local Area Networks
Mode	DHCP Static	DHCP: Gets the IP address automatically. Static: Specify the IP address
IPv4 Address	LAN1 default: DHCP LAN2 default: 192.168.4.127 (or other 32-bit number)	The IP (Internet Protocol) address identifies the server on the TCP/IP network
Subnet Mask	Default: 255.255.255.0 (or other 32-bit number)	Identifies the server as belonging to a Class A, B, or C network.
Gateway—optional	0.0.0.0 (or other 32-bit number)	The IP address of the router that provides network access outside the server's LAN.
Preferred DNS Server —optional	0.0.0.0 (or other 32-bit number)	The IP address of the primary domain name server.
Alternate DNS Server— optional	0.0.0.0 (or other 32-bit number)	The IP address of the secondary domain name server.

System Settings—Cellular

Go to **System Settings > Cellular** to view the current cellular settings. You can enable or disable cellular connectivity on your device, create profiles, manage **Profile Settings**, and enable or disable the connection **Check-alive** function to optimize the cellular connection.



Cellular

Home > System Configuration > System Settings > Cellular

☑ Enable cellular data communication

Profile Settings

Create and manage profiles for a SIM with its data plan.

Network Type: Auto

Connection Retry Timeout (sec): 120

Mode

● Auto
Auto detect the correct mobile operator and create a profile

○ Manual
Create customized profile

Check-alive

☑ Enable check-alive

Target Host: 8.8.8.8

Ping Interval (sec): 60

□ Reboots the device when pings to the target host fail continuously for a specified time interval.

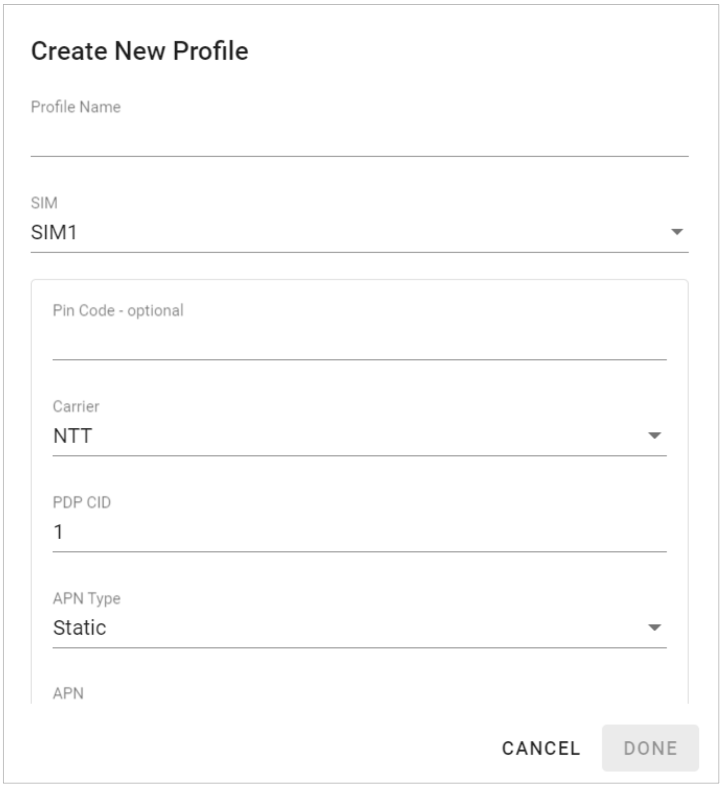
You can select **Auto** mode to create a customized profile automatically.

You also can create customized cellular profiles by choosing the **Manual** option in the **Profile Settings** section. A list of all the profiles in the system is displayed. **Create**, **Edit**, or **Delete** cellular profiles here.

To create a new cellular connection profile, do the following:

1. Click **+ CREATE**.
2. Specify a unique **Profile Name**.
3. Specify the target **SIM** card.
4. Enter the **PIN Code** if your SIM card requires it. (**NOTE:** Three wrong attempts will lock the SIM card.)
5. Choose a **Carrier**. (**NOTE:** This option is displayed only if the cellular module supports carrier switching.)

6. Refer to instructions from your cellular carrier to select **Static** or **Dynamic** APN and configure the corresponding settings.



Create New Profile

Profile Name

SIM
SIM1

Pin Code - optional

Carrier
NTT

PDP CID
1

APN Type
Static

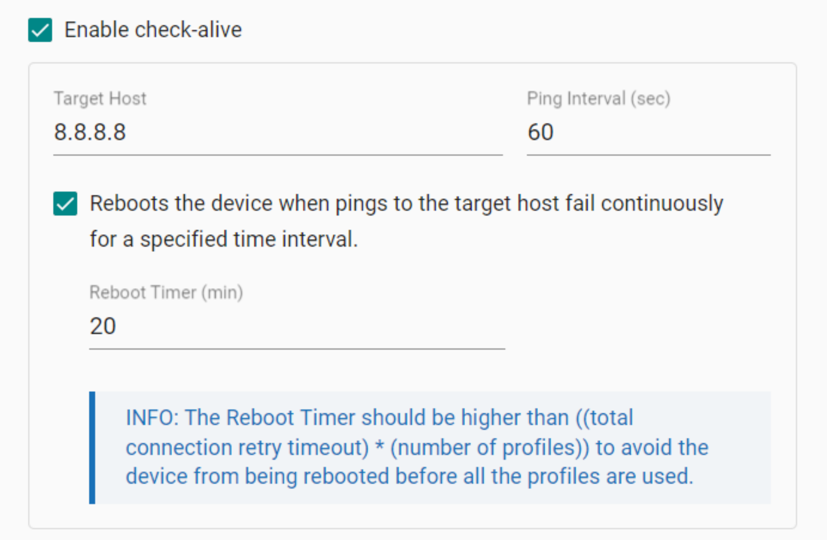
APN

7. Click **DONE**.
8. On the **Cellular** setting page, click **SAVE**.

When you click **SAVE** on the Cellular section, the module restarts to apply the changes. The settings will take effect after the cellular module is successfully initialized.

The **Check-alive** function will help you maintain the connection between your device and the carrier service by pinging a specific host on the Internet at periodic intervals.

In some circumstances, a system reboot might bring an unstable or malfunctioning device back to a normal state. To enable automatic system reboot, select the **Reboot the device when pings to the target host failed continuously for a certain amount of time** option and specify a reboot interval.



☑ Enable check-alive

Target Host
8.8.8.8

Ping Interval (sec)
60

☑ Reboots the device when pings to the target host fail continuously for a specified time interval.

Reboot Timer (min)
20

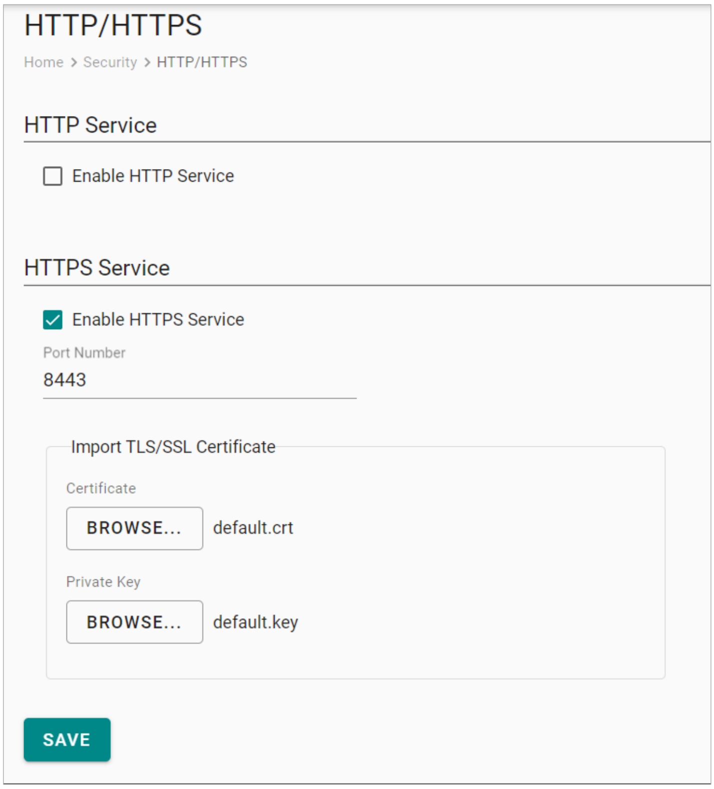
INFO: The Reboot Timer should be higher than ((total connection retry timeout) * (number of profiles)) to avoid the device from being rebooted before all the profiles are used.

Go to **Network Overview > WAN** if you want to check the cellular network's connection status afterwards.

System Settings—HTTP/HTTPS

To ensure the securely access web console of the device, we strongly recommend disabling HTTP and enabling HTTPS. To do this, go to **System Settings > HTTP/HTTPS.**

To use the HTTPS console without a certificate warning appearing, you need to import a trusted certificate issued by a third-party certificate authority. If there are no imported certificates, the AIG Series can generate the "AIG Series Root CA for HTTPS" certificate instead.



HTTP/HTTPS

Home > Security > HTTP/HTTPS

HTTP Service

□ Enable HTTP Service

HTTPS Service

☑ Enable HTTPS Service

Port Number: 8443

Import TLS/SSL Certificate

Certificate: default.crt

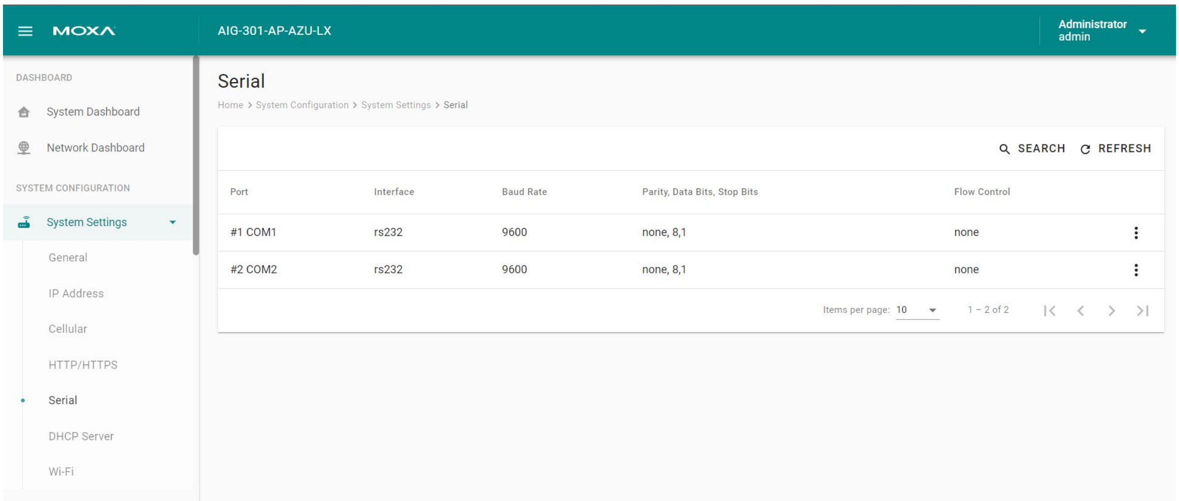
Private Key: default.key

System Settings—Serial

Go to **System Settings > Serial** to view and configure serial parameters.

To configure serial setting, do the following:

1. **Click** the COM port.
2. **Configure** the baudrate, parity, data bits, and stop bits when enabling Modbus RTU/ASCII mode. (Incorrect settings will cause communication failures.)
3. Click **Save** for the settings to take effect.

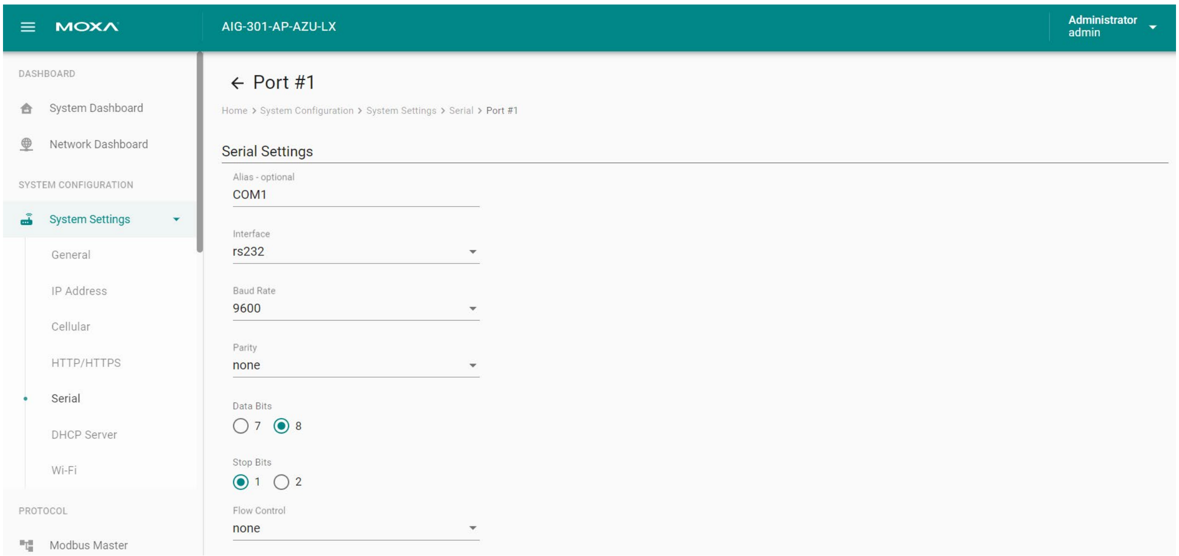


Serial

Home > System Configuration > System Settings > Serial

Port	Interface	Baud Rate	Parity, Data Bits, Stop Bits	Flow Control
#1 COM1	rs232	9600	none, 8,1	none
#2 COM2	rs232	9600	none, 8,1	none

Items per page: 10 1 – 2 of 2



← Port #1

Home > System Configuration > System Settings > Serial > Port #1

Serial Settings

Alias - optional: COM1

Interface: rs232

Baud Rate: 9600

Parity: none

Data Bits: ○ 7 ● 8

Stop Bits: ● 1 ○ 2

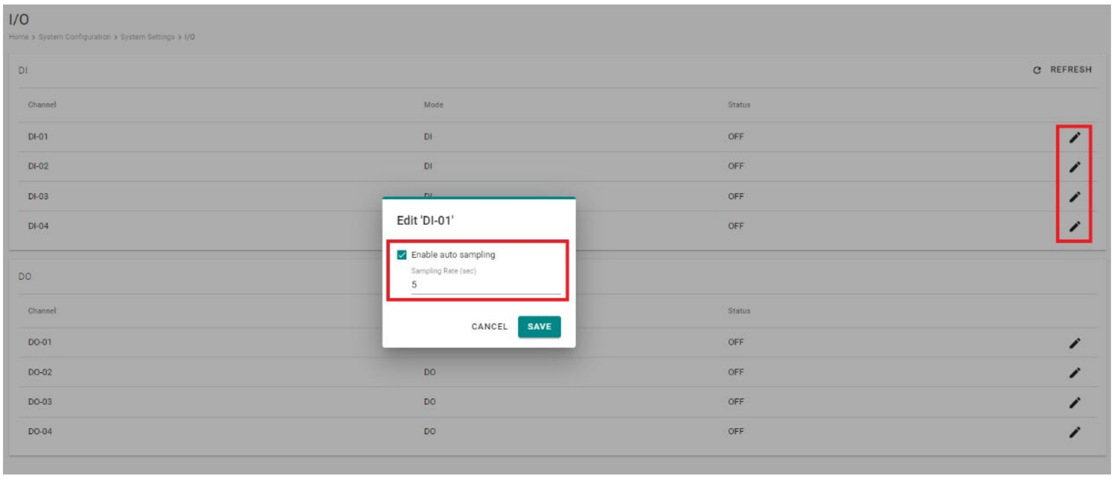
Flow Control: none

Parameter	Value	Description
Interface	rs232 rs422 rs485-2w rs-485 4w	
Baud Rate	300 to 921600	
Parity	none, odd, even, space, mark	
Data Bits	7, 8	
Stop Bits	1, 2	
Flow Control	none hardware	Hardware: flow control by RTS/CTS signal

System Settings—I/O

The AIG-301 comes with 4 digital inputs (DIs) and 4 digital outputs(DOs). Tags are generated for all DI/DO interfaces which can be accessed through the tag hub.

To activate a DI, just click on the edit icon and enable auto sampling and input sampling rates according to your requirements.



I/O

Home > System Configuration > System Settings > I/O

Channel	Mode	Status
DI-01	DI	OFF
DI-02	DI	OFF
DI-03	DI	OFF
DI-04		OFF

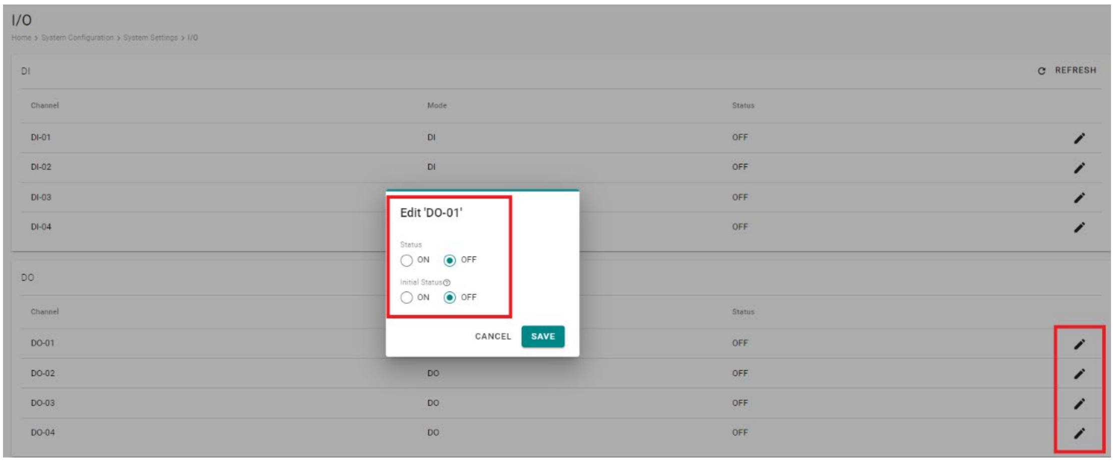
Channel	Mode	Status
DO-01		OFF
DO-02	DO	OFF
DO-03	DO	OFF
DO-04	DO	OFF

Edit 'DI-01'

☑ Enable auto sampling

Sampling Rate (sec): 5

For DOs, clicking on the edit icon allows you to configure the status and initial status settings.



I/O

Home > System Configuration > System Settings > I/O

Channel	Mode	Status
DI-01	DI	OFF
DI-02	DI	OFF
DI-03		OFF
DI-04		OFF

Channel	Mode	Status
DO-01		OFF
DO-02	DO	OFF
DO-03	DO	OFF
DO-04	DO	OFF

Edit 'DO-01'

Status: ○ ON ● OFF

Initial Status: ○ ON ● OFF

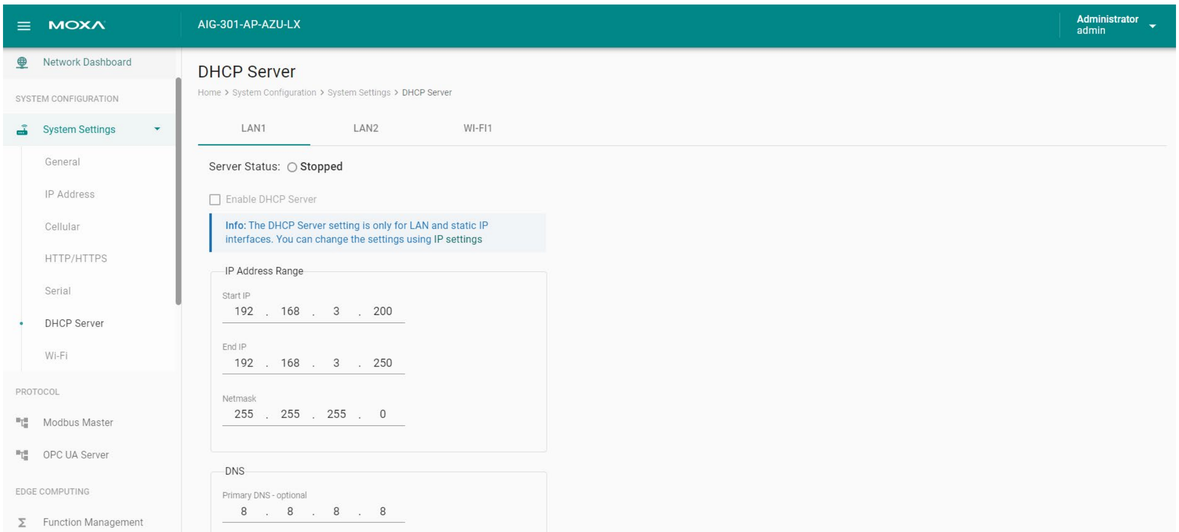
Parameter	Value	Description
Status	ON OFF	High voltage Low voltage

System Settings—DHCP Server

Go to **System Settings > DHCP Server** to view the DHCP settings.

To configure DHCP server settings, do the following:

1. Check **Enable DHCP Server**.
2. Input **IP Address Range** parameters.
3. (Optional) Input DNS.
4. Specify **Lease Time**.
5. Click **SAVE**.
6. (Optional) input Domain Name.



DHCP Server

Home > System Configuration > System Settings > DHCP Server

Server Status: ○ Stopped

□ Enable DHCP Server

Info: The DHCP Server setting is only for LAN and static IP interfaces. You can change the settings using IP settings

IP Address Range

Start IP: 192 . 168 . 3 . 200

End IP: 192 . 168 . 3 . 250

Netmask: 255 . 255 . 255 . 0

DNS

Primary DNS - optional: 8 . 8 . 8 . 8

NOTE

The DHCP server service is only available on LAN and static IP interfaces.

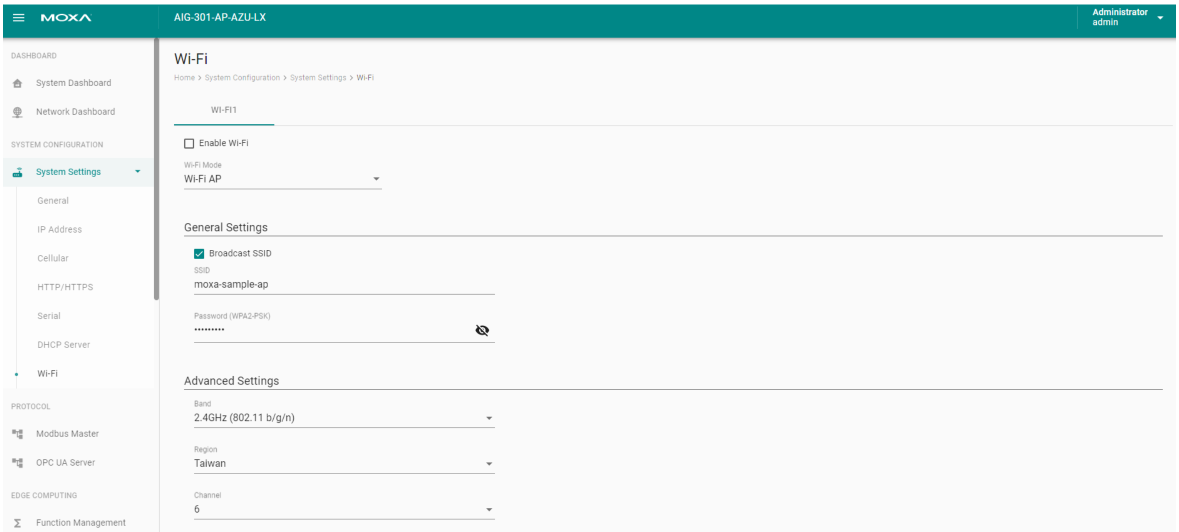
System Settings—Wi-Fi

Go to **System Settings > Wi-Fi** to view the Wi-Fi settings.

To configure Wi-Fi settings, check **Enable Wi-Fi** and select the **Wi-Fi Mode** (Wi-Fi AP / Wi-Fi Client), then do the following:

If the Wi-Fi AP is Selected

1. Disable/enable **Broadcast SSID**.
2. Input the **SSID** and **Password** for the Wi-Fi AP.
3. Specify the **Region, Channel** in the advanced settings.
4. Click **SAVE**.



Wi-Fi

□ Enable Wi-Fi

Wi-Fi Mode: Wi-Fi AP

General Settings

☑ Broadcast SSID

SSID: moxa-sample-ap

Password (WPA2-PSK): ••••••••••

Advanced Settings

Band: 2.4GHz (802.11 b/g/n)

Region: Taiwan

Channel: 6

NOTE

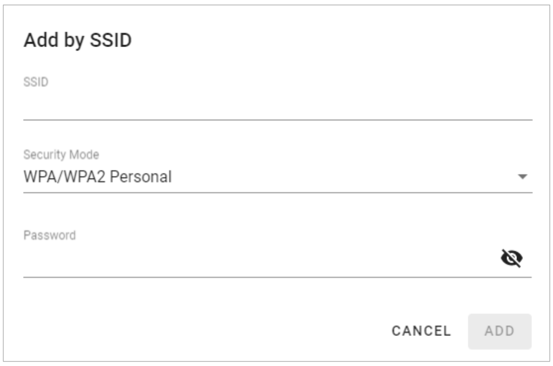
The maximum number of Wi-Fi clients allowed is 2.

NOTE

The Wi-Fi AP mode serves as a dedicated troubleshooting feature, enabling users to conveniently access the web console or SSH for diagnostic purposes.

If the Wi-Fi Client is Selected

1. Click **+CREATE** to manually **Create by SSID** or be **Created by Scan Results**.

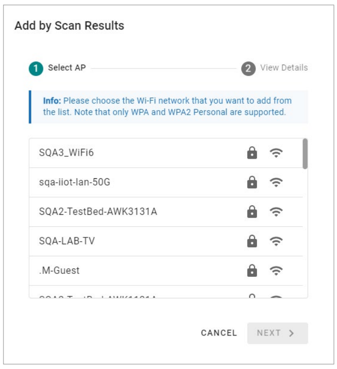


Add by SSID

SSID:

Security Mode: WPA/WPA2 Personal

Password:

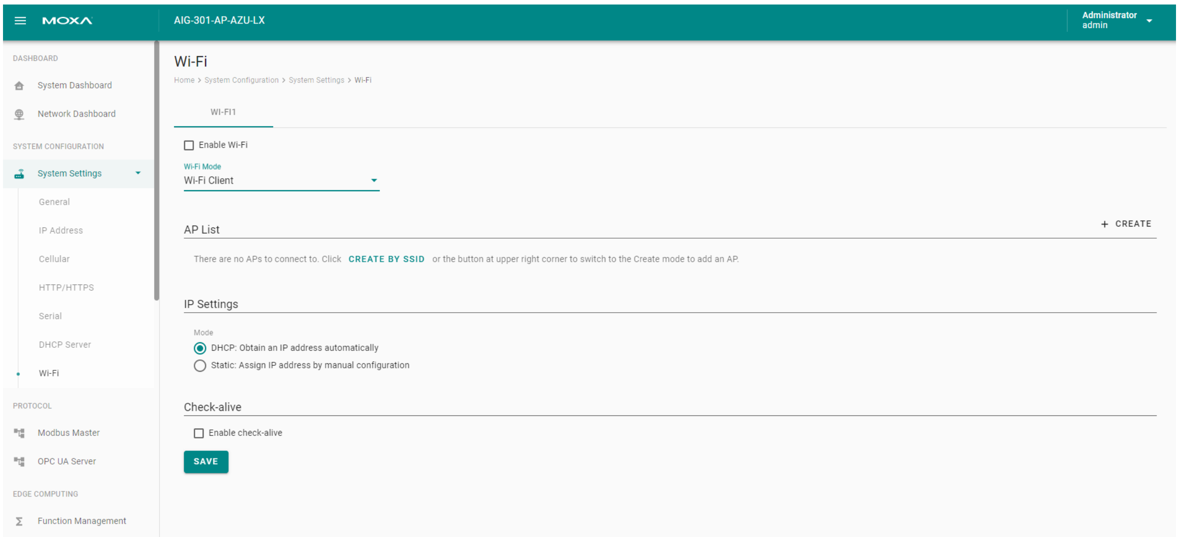


Add by Scan Results

Info: Please choose the Wi-Fi network that you want to add from the list. Note that only WPA and WPA2 Personal are supported.

SQA3_WiFi6
sqa-iiot-lan-50G
SQA2-TestBed-AWK3131A
SQA-LAB-TV
.M-Guest

2. Select **DHCP** or **Static mode**.
3. Check **Check-alive** function which can be used to ensure Internet connectivity.
4. Click **SAVE**.



Wi-Fi

□ Enable Wi-Fi

Wi-Fi Mode: Wi-Fi Client

AP List

There are no APs to connect to. Click CREATE BY SSID or the button at upper right corner to switch to the Create mode to add an AP.

IP Settings

Mode
● DHCP: Obtain an IP address automatically
○ Static: Assign IP address by manual configuration

Check-alive

□ Enable check-alive

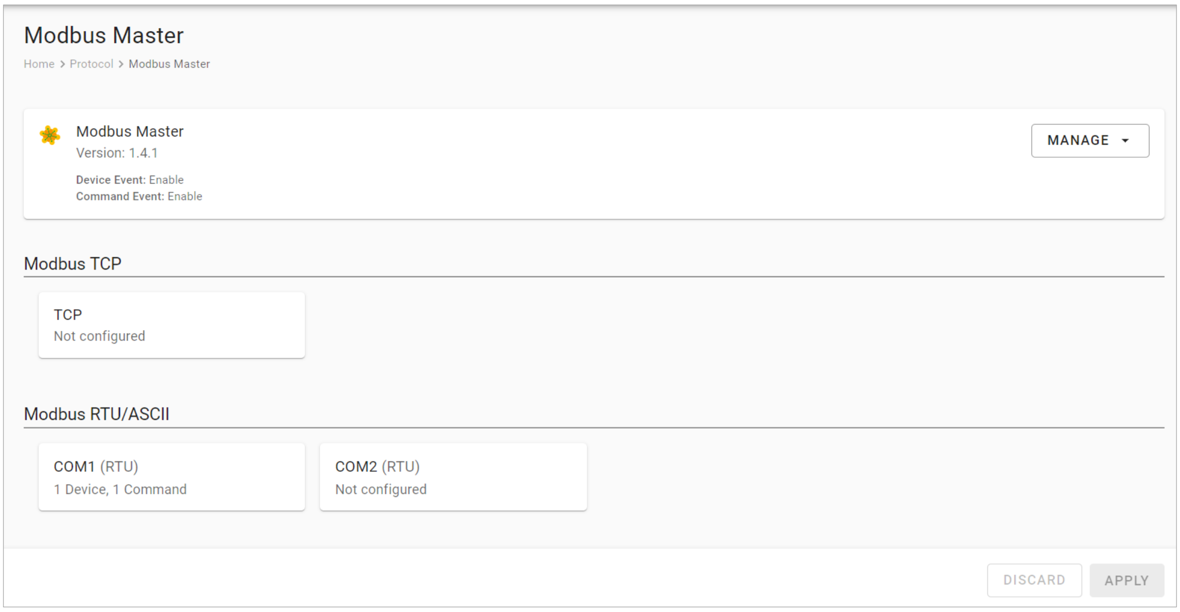
Protocol

Modbus Master

Go to **Modbus Master** to configure Modbus commands to collect the data from Modbus TCP, Modbus RTU, Modbus ASCII devices.

To create a new Modbus Master to collect data, do the following:

1. Click **TCP** under Modbus TCP or **COMx** under Modbus RTU/ASCII.
2. Click **ADD DEVICE** and go to the 3-step wizard page.
3. Input **device name**, **slave ID, IP Address,** and **TCP port**, then press **NEXT.**
4. Click **+ ADD COMMAND** to add Modbus commands to collect the data, then press **NEXT.**
5. Click **DONE** if you have confirmed the settings are correct.
6. Click **GO TO APPLY SETTINGS** and **APPLY** for the settings to take effect.



Modbus Master

Modbus Master
Version: 1.4.1
Device Event: Enable
Command Event: Enable

Modbus TCP

TCP
Not configured

Modbus RTU/ASCII

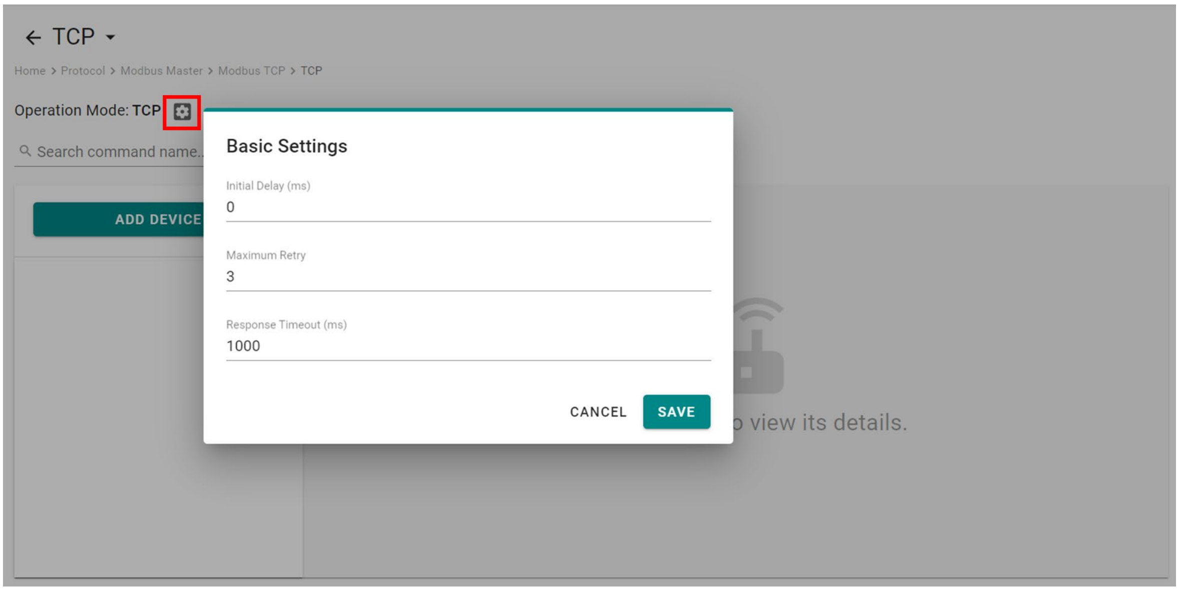
COM1 (RTU)
1 Device, 1 Command

COM2 (RTU)
Not configured

Modbus TCP

Basic Settings

When you access the Modbus TCP setting page, you will first need to configure the basic settings.



Basic Settings

Initial Delay (ms): 0

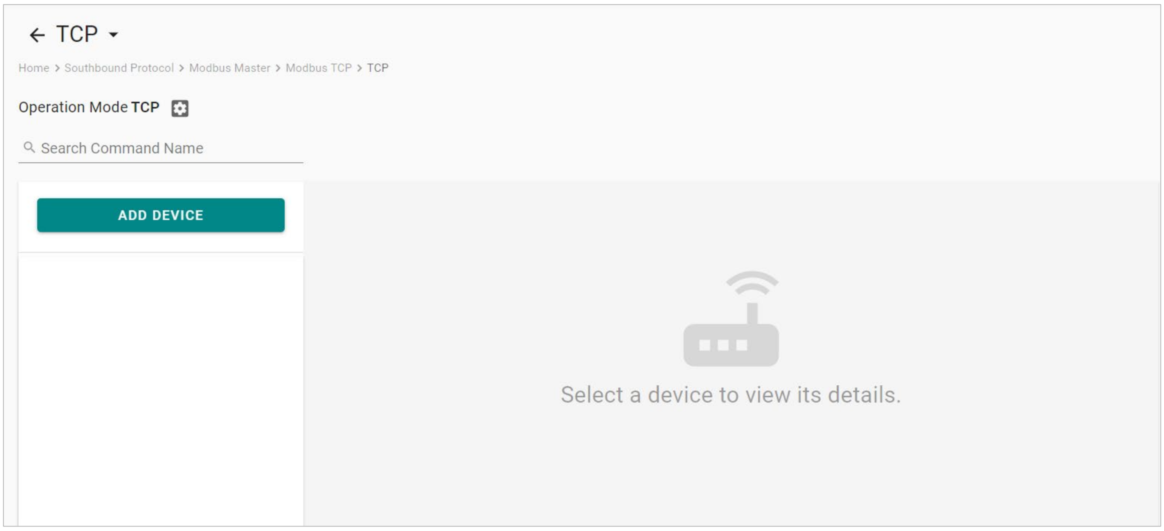
Maximum Retry: 3

Response Timeout (ms): 1000

Parameter	Value	Default	Description
Initial Delay (ms)	0 to 30000	0	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 bootup. After booting up, you can force the AIG to wait some time before sending the first request by setting a value for this parameter.
Maximum Retry	0 to 5	3	This is used to configure how many times AIG will retry to communicate with the Modbus slave when the Modbus command times out.
Response Timeout (ms)	10 to 120000	1000	You can configure a Modbus master to wait a certain amount of time for a slave’s response. If no response is received within the configured time, the AIG will disregard the request and continue operation.

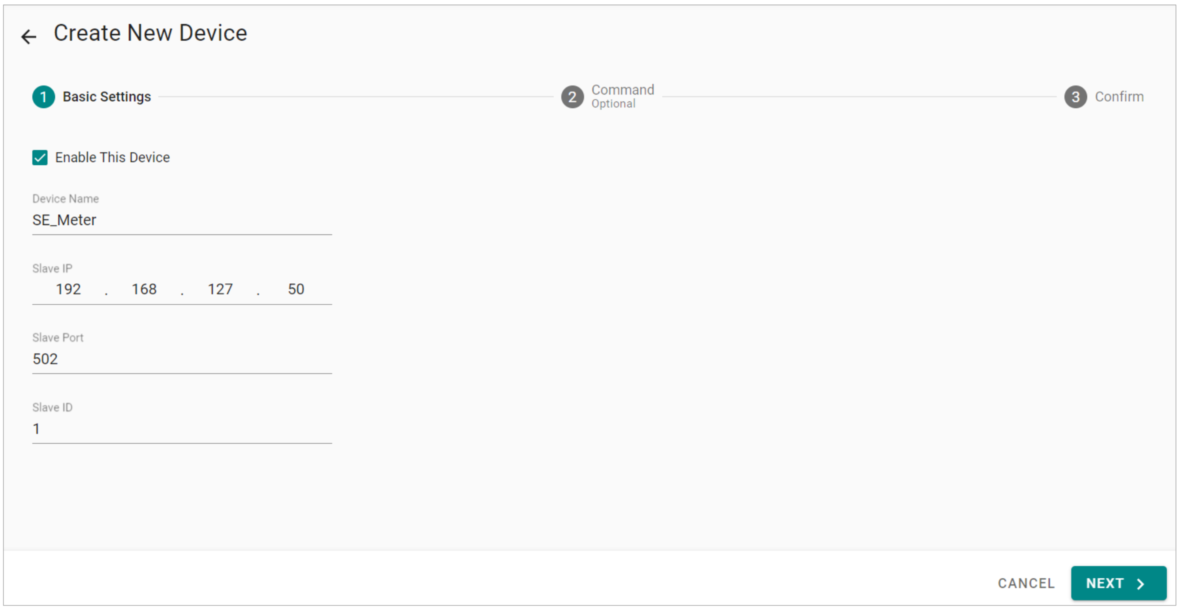
Modbus Device Settings

After configuring the basic settings, configure related parameters to retrieve data from the Modbus device. In the beginning, press **ADD DEVICE** and go to the wizard to guide you through the configuration step by step.


← TCP ▾
Home > Southbound Protocol > Modbus Master > Modbus TCP > TCP
Operation Mode TCP
Search Command Name
ADD DEVICE
Select a device to view its details.

Step 1. Basic Settings

Enter in the basic parameters for the Modbus TCP device.



Create New Device

☑ Enable This Device

Device Name: SE_Meter

Slave IP: 192 . 168 . 127 . 50

Slave Port: 502

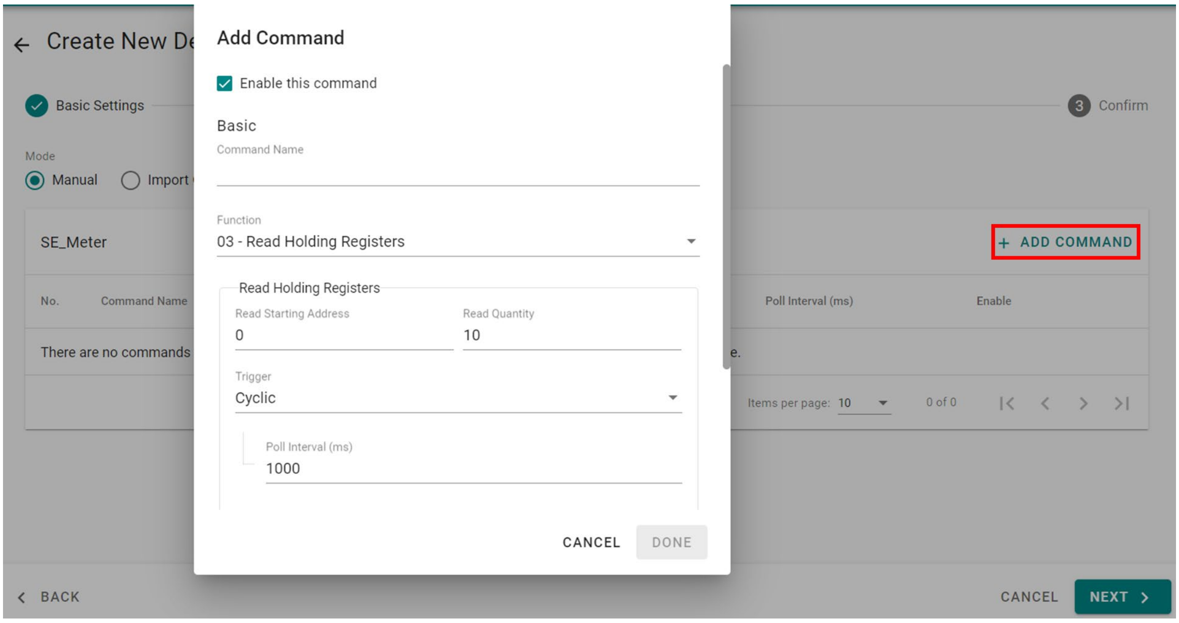
Slave ID: 1

Parameter	Value	Default	Description
Device Name	Alphanumeric string and characters (~ . _ -) are allowed	–	Name your Modbus device
IP Address	0.0.0.0 to 255.255.255.255	–	The IP address of a remote slave device.
Slave Port	1 to 65535	502	The TCP port number of a remote slave device.
Slave ID	1 to 255	–	The slave ID of a remote slave device.

Step 2. Command

When you configure the device for the first time, select **Manual** mode and press **ADD COMMAND.**

The command settings will pop up.



Create New De

Add Command

☑ Enable this command

Basic

Command Name:

Function: 03 - Read Holding Registers

Read Holding Registers

Read Starting Address: 0

Read Quantity: 10

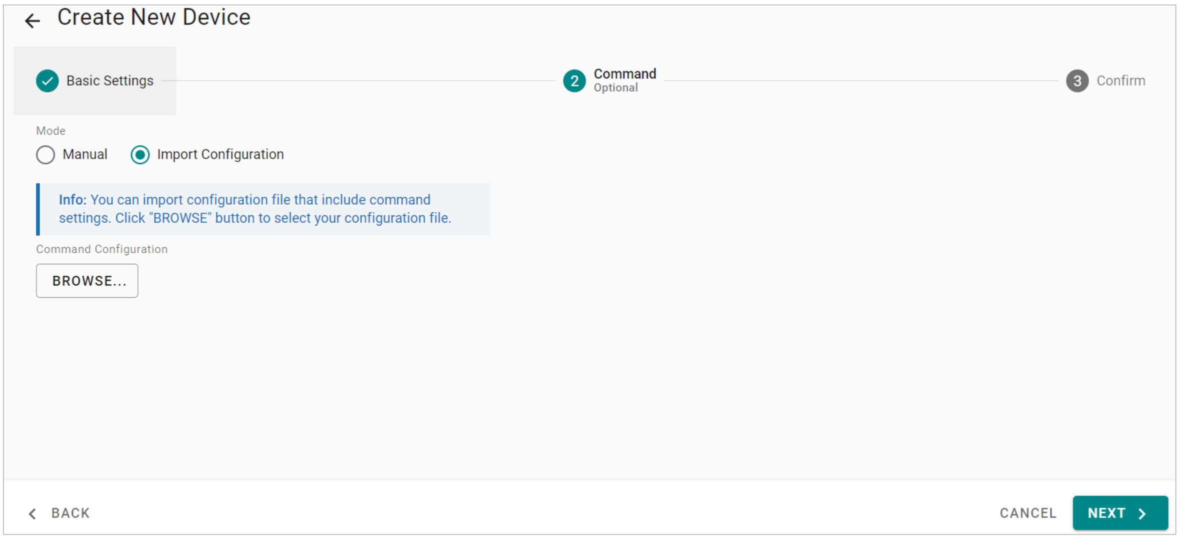
Trigger: Cyclic

Poll Interval (ms): 1000

Parameter	Value	Default	Description
Command Name	Alphanumeric string	–	Name the command
Function	01 – Read Coils 02 – Read Discrete Inputs 03 – Read Holding Registers 04 – Read Inputs Registers 05 – Write Single Coil 06 – Write Single Register 15 – Write Multiple Coils 16 – Write Multiple Registers 23 – Read/Write Multiple Registers	03 – Read Holding Registers	How to collect data from the Modbus device
Read Starting Address	0 to 65535	0	Modbus registers the address for the collected data
Read quantity	Read Coils: 1 to 2000 Read Discrete Inputs: 1 to 2000 Read Inputs Registers: 1 to 125 Read Holding Registers: 1 to 125 Read/Write Multiple Registers: 1 to 125	10	Specifying how much data to read
Write start address	0 to 65535	0	Modbus registers the address for the written data
Write quantity	Write Multiple Coils: 1 to 1968 Write Multiple Registers: 1 to 123 Read/Write Multiple Registers: 1to 123	1	Specifying how much data to write.
Trigger	Cyclic Data Change	–	Cyclic: The command is sent cyclically at the interval specified in the Poll Interval parameter. Data change: The data area is polled for changes at the time interval defined by Poll Interval. A command is issued when a change in data is detected.
Poll interval (ms)	100 to 1200000	1000	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 100 to 1,200,000 ms.
Endian swap	None Byte Word Byte and Word	None	**None:** not to swap **Byte:** 0x0A, 0x0B, 0x0C, 0x0D becomes 0x0B, 0x0A, 0x0D, 0x0C **Word:** 0x0A, 0x0B, 0x0C, 0x0D becomes 0x0C, 0x0D, 0x0A, 0x0B. **Byte and Word:** 0x0A, 0x0B, 0x0C, 0x0D becomes 0x0D, 0x0C, 0x0B, 0x0A.

Parameter	Value	Default	Description
Status Term	Pause Proceed - Clear data to zero Proceed - Set to User-defined value	pause	The defined value of the Status Term will be effective when a read command encounters an error or times out.
Tag Type	boolean int16 int32 int64 uint16 uint32 uint64 float double string	–	The command will be generated into a meaningful tag by tag type and stored in tag hub.

If you already have a Modbus command file, select **Import Configuration** mode. Importing a configuration file will help you reduce configuration time.



Mode

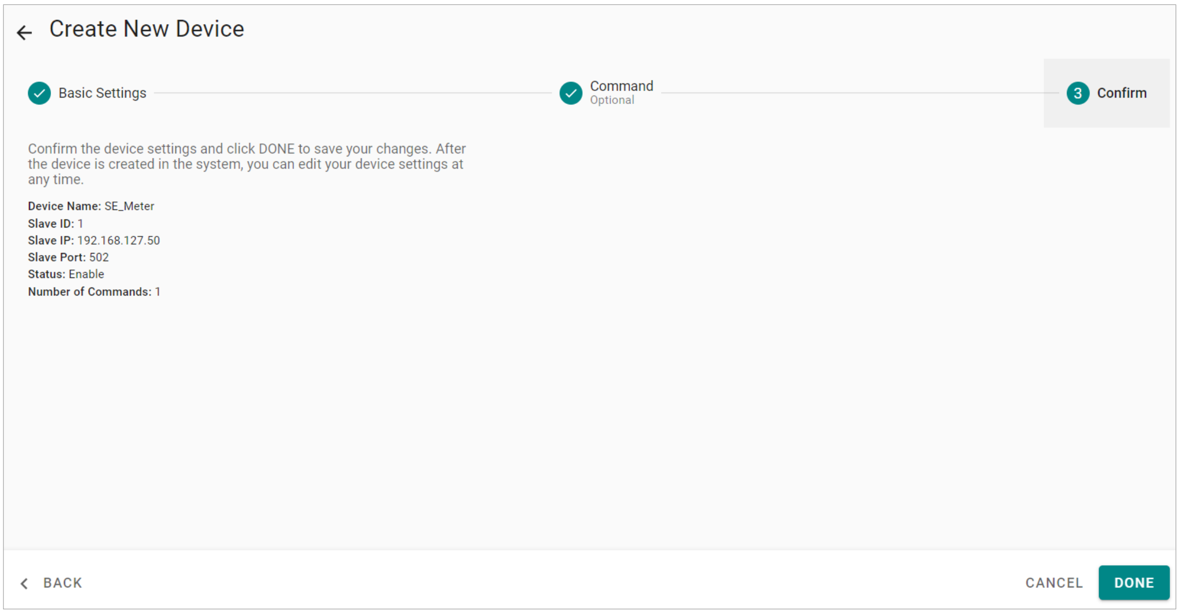
○ Manual ● Import Configuration

Info: You can import configuration file that include command settings. Click "BROWSE" button to select your configuration file.

Command Configuration

Step 3. Confirm

Review whether the information of the settings is correct.

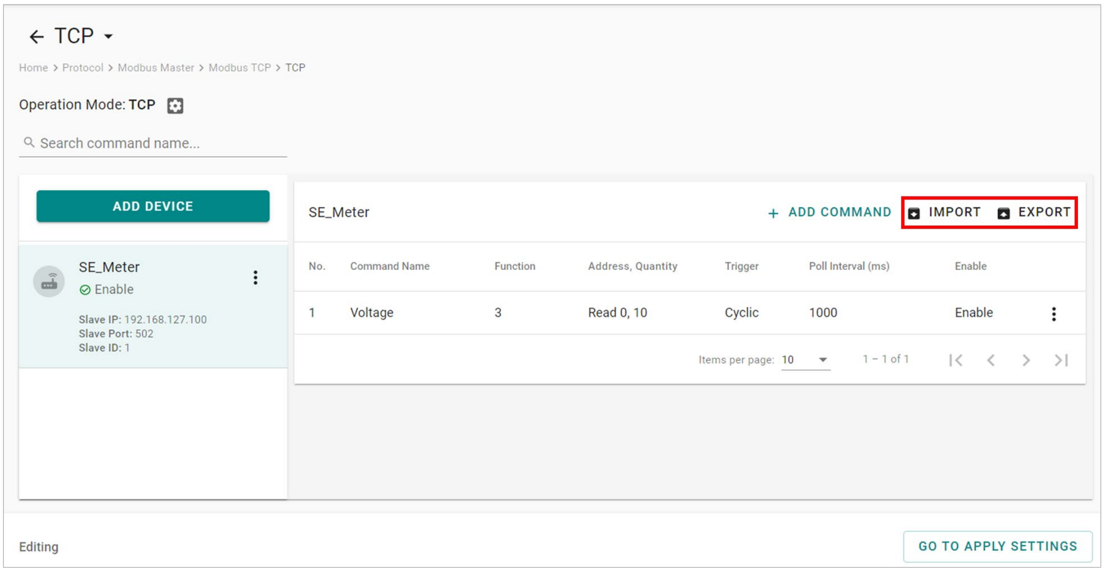


Confirm the device settings and click DONE to save your changes. After the device is created in the system, you can edit your device settings at any time.

Device Name: SE_Meter
Slave ID: 1
Slave IP: 192.168.127.50
Slave Port: 502
Status: Enable
Number of Commands: 1

Then, you will see the setting results.

The product provides an easier way for installation and maintenance. You can **EXPORT** all the Modbus commands into a file for backup purposes, or you can **IMPORT** a file (golden sample) to reduce configuration time.



← TCP ▾

Home > Protocol > Modbus Master > Modbus TCP > TCP

Operation Mode: TCP

Search command name...

ADD DEVICE

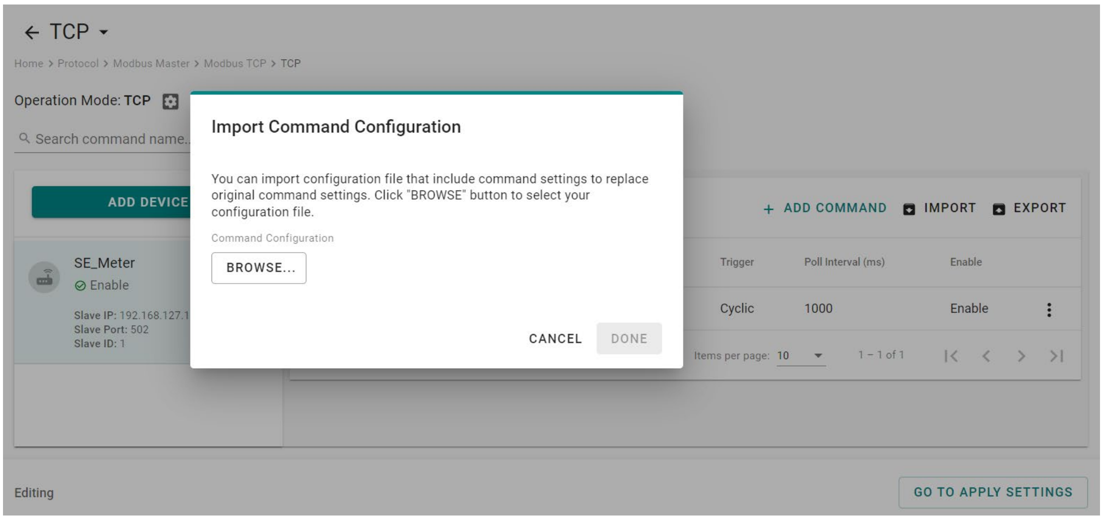
SE_Meter
Enable
Slave IP: 192.168.127.100
Slave Port: 502
Slave ID: 1

SE_Meter   + ADD COMMAND   IMPORT   EXPORT

No.	Command Name	Function	Address, Quantity	Trigger	Poll Interval (ms)	Enable
1	Voltage	3	Read 0, 10	Cyclic	1000	Enable

Items per page: 10   1 – 1 of 1

Editing   GO TO APPLY SETTINGS



Import Command Configuration

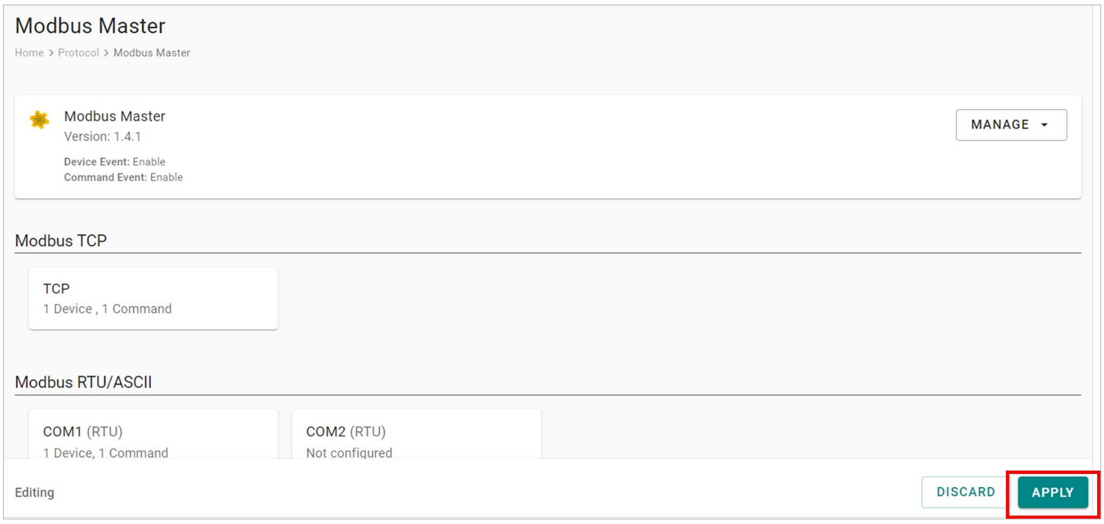
You can import configuration file that include command settings to replace original command settings. Click "BROWSE" button to select your configuration file.

Command Configuration

BROWSE...

CANCEL   DONE

After finishing all the settings, press **GO TO APPLY SETTINGS** and click **APPLY** for the settings take effect.



Modbus Master

Home > Protocol > Modbus Master

Modbus Master
Version: 1.4.1
Device Event: Enable
Command Event: Enable

MANAGE ▾

Modbus TCP

TCP
1 Device , 1 Command

Modbus RTU/ASCII

COM1 (RTU)
1 Device, 1 Command

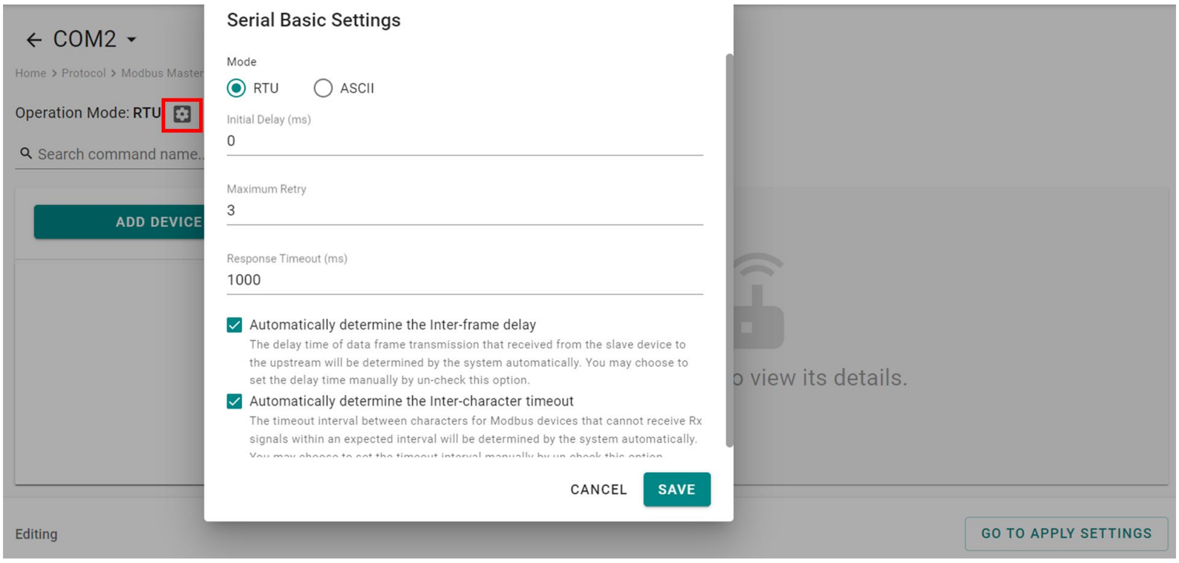
COM2 (RTU)
Not configured

Editing   DISCARD   APPLY

Modbus RTU/ASCII

Basic Settings

When you access the Modbus RTU/ASCII settings page, you will first need to configure the basic settings.



Operation Mode: RTU

Serial Basic Settings

Mode

● RTU ○ ASCII

Initial Delay (ms): 0

Maximum Retry: 3

Response Timeout (ms): 1000

☑ Automatically determine the Inter-frame delay

The delay time of data frame transmission that received from the slave device to the upstream will be determined by the system automatically. You may choose to set the delay time manually by un-check this option.

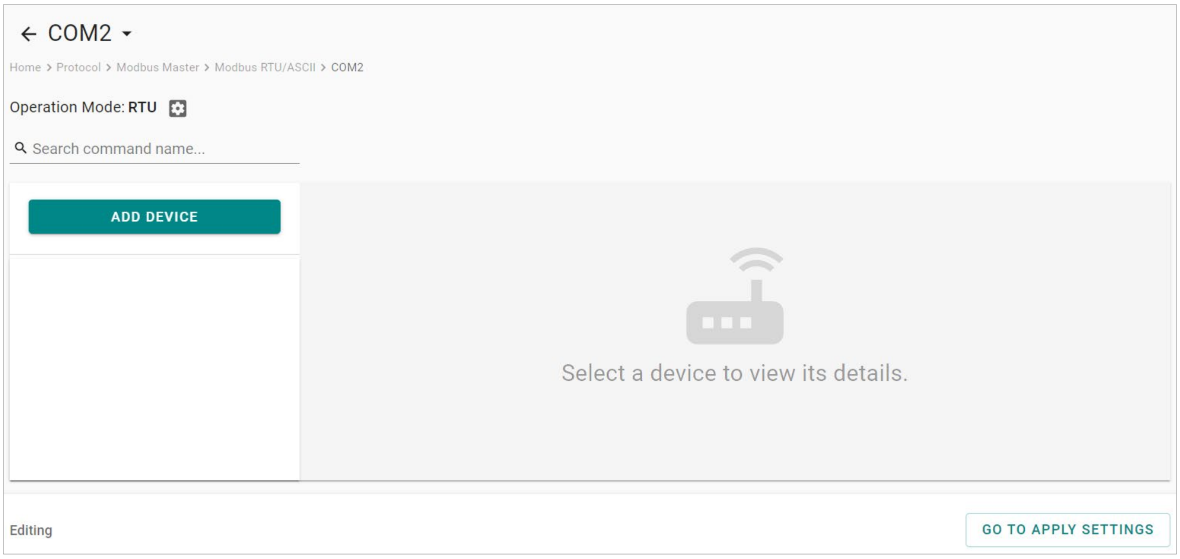
☑ Automatically determine the Inter-character timeout

The timeout interval between characters for Modbus devices that cannot receive Rx signals within an expected interval will be determined by the system automatically. You may choose to set the timeout interval manually by un-check this option.

Parameter	Value	Default	Description
Mode	RTU/ASCII	RTU	
Initial Delay (ms)	0 to 30000	0	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 bootup. After booting up, you can force the AIG to wait some time before sending the first request by setting a value for this parameter.
Maximum Retry	0 to 5	3	Use this to configure how many times AIG will retry to communicate with the Modbus slave when the Modbus command times out.
Response Timeout (ms)	10 to 120000	1000	You can configure a Modbus master to wait a certain amount of time for a slave's response. If no response is received within the configured time, the AIG will disregard the request and continue operation.
Automatically determine the inter-frame delay (ms)	Check uncheck: 10 to 500	check	Inter-frame delay is the time between the response and the next request. This is to ensure a legacy Modbus slave device can handle packets in a short time. **Check:** The AIG will automatically determine the time interval. **Uncheck:** You can input a time interval.
Automatically determines the intercharacter timeout (ms)	Check uncheck: 10 to 500	check	Use this function to determine the timeout interval between characters for receiving Modbus responses. If AIG can't receive Rx signals within an expected time interval, all received data will be discarded. **Check:** The AIG will automatically determine the time out. **Uncheck:** You can input a specific timeout value.

Modbus Device Settings

After basic settings, you must configure related parameters to retrieve data from the Modbus device. In the beginning, press **ADD DEVICE** and go to the wizard that guides step-by-step through the configuration process.



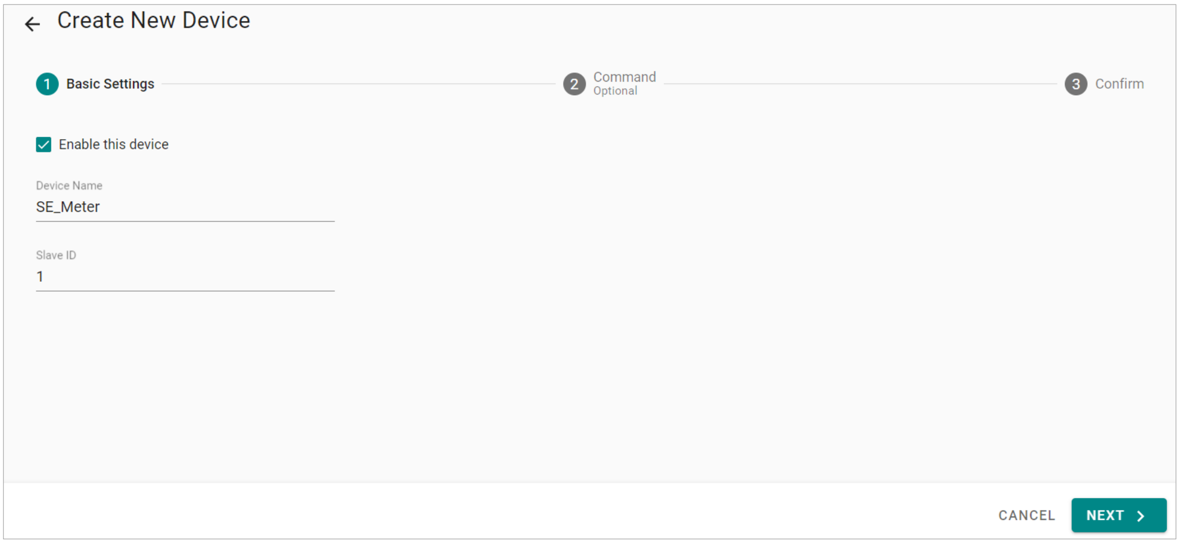
COM2

Home > Protocol > Modbus Master > Modbus RTU/ASCII > COM2

Operation Mode: RTU

Step 1. Basic Settings

Fill in the basic parameters for the Modbus RTU/ASCII device.



Create New Device

☑ Enable this device

Device Name: SE_Meter

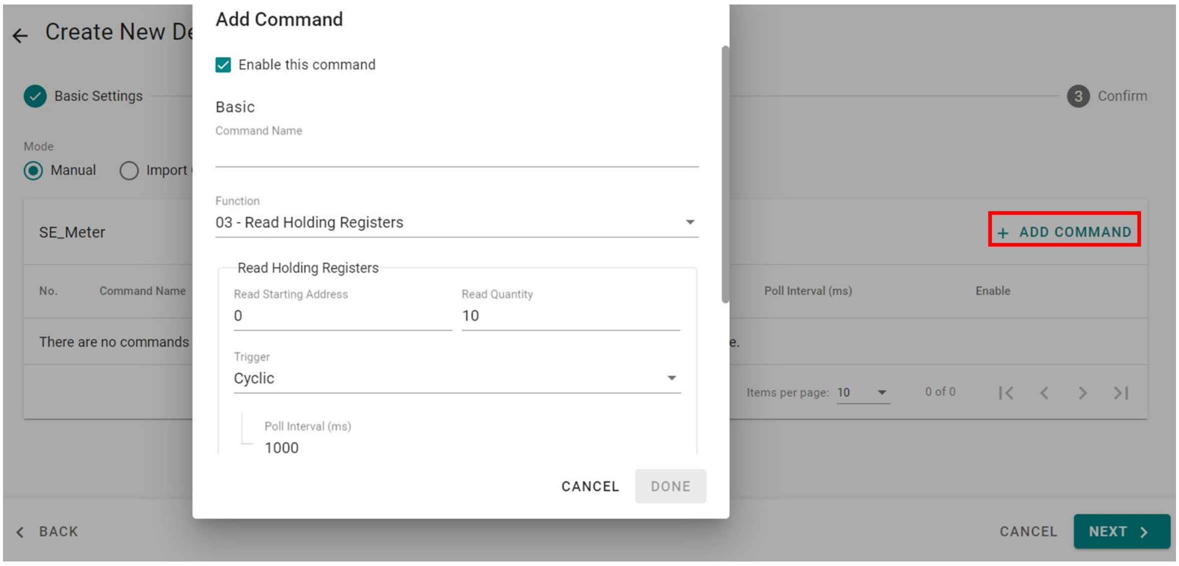
Slave ID: 1

Parameter	Value	Default	Description
Device Name	Alphanumeric string and characters (~ . _ -) are allowed	–	Name your Modbus device
Slave ID	1 to 255	–	The slave ID of a remote slave device.

Step 2. Command

If you are configuring the device for the first time, select the **Manual** and press **ADD COMMAND.**

The command settings will pop up.



Add Command

☑ Enable this command

Basic

Command Name

Function: 03 - Read Holding Registers

Read Holding Registers

Read Starting Address: 0

Read Quantity: 10

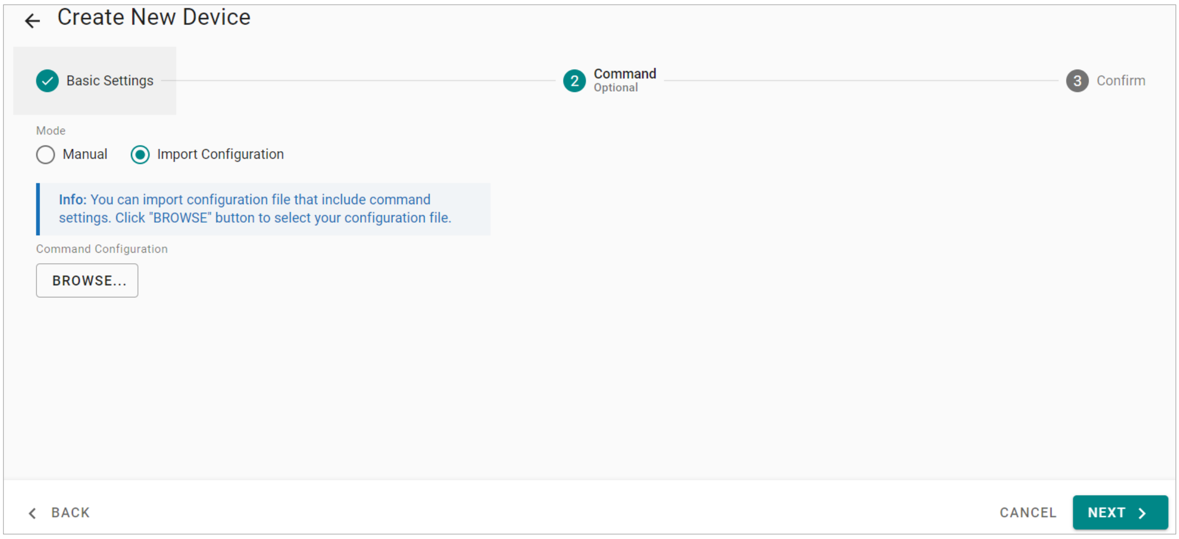
Trigger: Cyclic

Poll Interval (ms): 1000

Parameter	Value	Default	Description
Command Name	Alphanumeric string and characters (~ . _ -) are allowed	–	Name the command
Function	01 – Read Coils 02 – Read Discrete Inputs 03 – Read Holding Registers 04 – Read Inputs Registers 05 – Write Single Coil 06 – Write Single Register 15 – Write Multiple Coils 16 – Write Multiple Registers 23 – Read/Write Multiple Registers	03 – Read Holding Registers	How to collect data from the Modbus device
Read Starting Address	0 to 65535	0	Modbus registers the address for the collected data
Read quantity	Read Coils: 1 to 2000 Read Discrete Inputs: 1 to 2000 Read Inputs Registers: 1 to 125 Read Holding Registers: 1 to 125 Read/Write Multiple Registers: 1 to 125	10	Specifying how much data to read

Parameter	Value	Default	Description
Write starting address	0 to 65535	0	Modbus registers the address for the written data
Write quantity	Write Multiple Coils: 1 to 1968 Write Multiple Registers: 1 to 123 Read/Write Multiple Registers: 1 to 123	1	Specifying how much data to write.
Trigger	Cyclic Data Change	–	Cyclic: The command is sent cyclically at the interval specified in the Poll Interval parameter. Data change: The data area is polled for changes at the time interval defined by Poll Interval. A command is issued when a change in data is detected.
Poll interval (ms)	100 to 1200000	1000	Polling intervals are in milliseconds. Since the module sends requests in turns, the actual polling interval also depends on the number of requests in the queue and their parameters. The range is from 100 to 1,200,000 ms.
Endian swap	None Byte Word Byte and Word	None	**None:** not to swap **Byte:** 0x0A, 0x0B, 0x0C, 0x0D becomes 0x0B, 0x0A, 0x0D, 0x0C **Word:** 0x0A, 0x0B, 0x0C, 0x0D becomes 0x0C, 0x0D, 0x0A, 0x0B. **Byte and Word:** 0x0A, 0x0B, 0x0C, 0x0D becomes 0x0D, 0x0C, 0x0B, 0x0A.
Status Term	Pause Proceed - Clear data to zero Proceed - Set to User-defined value	pause	The defined value of the Status Term will be effective when the read command encounters an error or times out.
Tag Type	boolean int16 int32 int64 uint16 uint32 uint64 float double string	–	The command will be generated into a meaningful tag by tag type and stored in the tag hub.

If you already have a Modbus command file on hand, select the **Import Configuration** mode. Importing a configuration file will help you reduce configuration time.



Create New Device

Mode

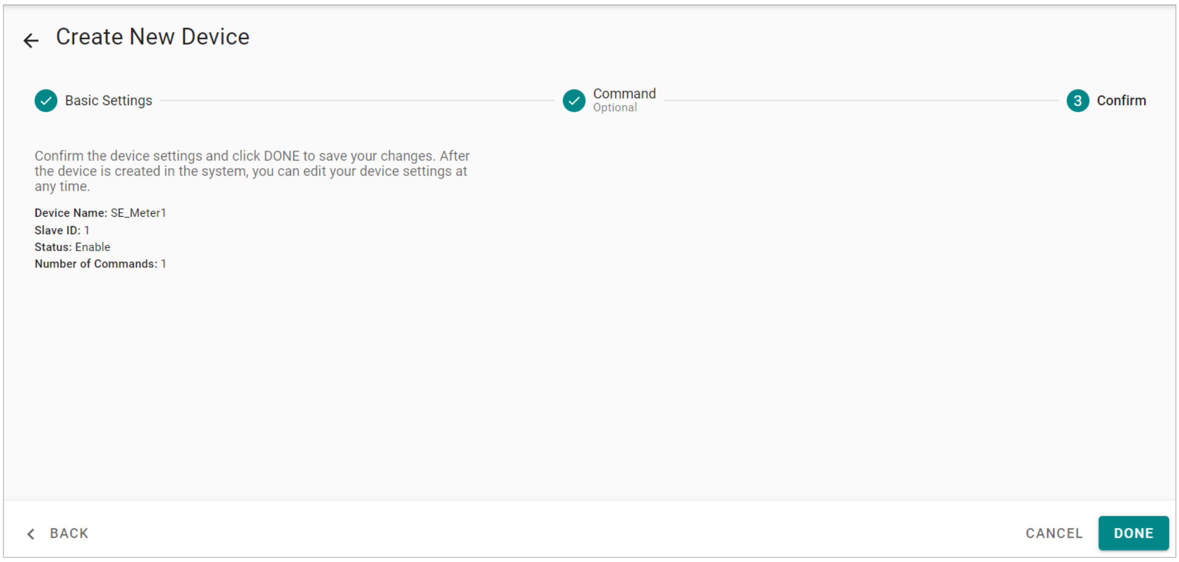
○ Manual ● Import Configuration

Info: You can import configuration file that include command settings. Click "BROWSE" button to select your configuration file.

Command Configuration

Step 3. Confirm

Review whether the information of the settings is correct.



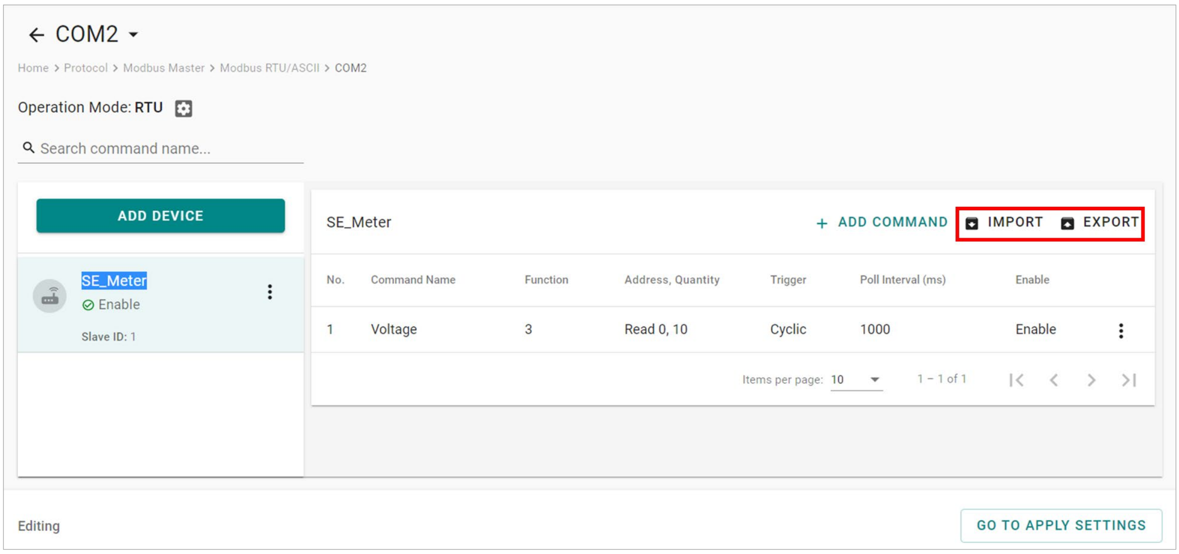
Create New Device

Confirm the device settings and click DONE to save your changes. After the device is created in the system, you can edit your device settings at any time.

Device Name: SE_Meter1
Slave ID: 1
Status: Enable
Number of Commands: 1

Then, you will see the setting results.

Moreover, the product provides an easier way for installation and maintenance. You can **EXPORT** all the Modbus commands into a file for backup purposes; or you can **IMPORT** a file (golden sample) to reduce configuration time.



COM2

Home > Protocol > Modbus Master > Modbus RTU/ASCII > COM2

Operation Mode: RTU

Search command name...

SE_Meter
Enable
Slave ID: 1

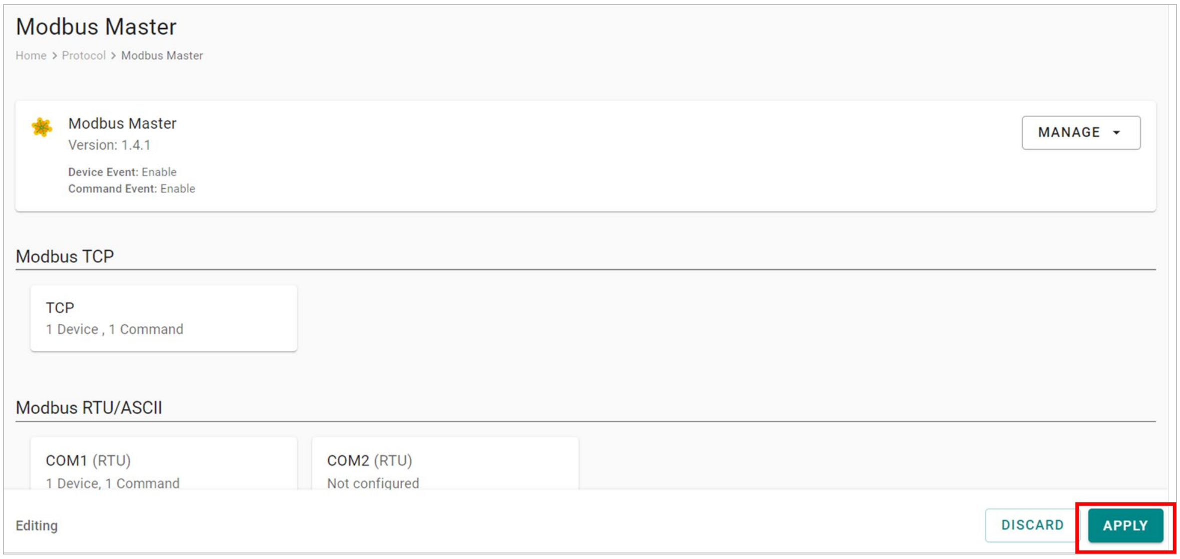
SE_Meter

No.	Command Name	Function	Address, Quantity	Trigger	Poll Interval (ms)	Enable
1	Voltage	3	Read 0, 10	Cyclic	1000	Enable

Items per page: 10 1 – 1 of 1

Editing

After finishing all the settings, press **GO TO APPLY SETTINGS** and click **APPLY** for the settings to take effect.



Modbus Master

Home > Protocol > Modbus Master

Modbus Master
Version: 1.4.1
Device Event: Enable
Command Event: Enable

Modbus TCP

TCP
1 Device , 1 Command

Modbus RTU/ASCII

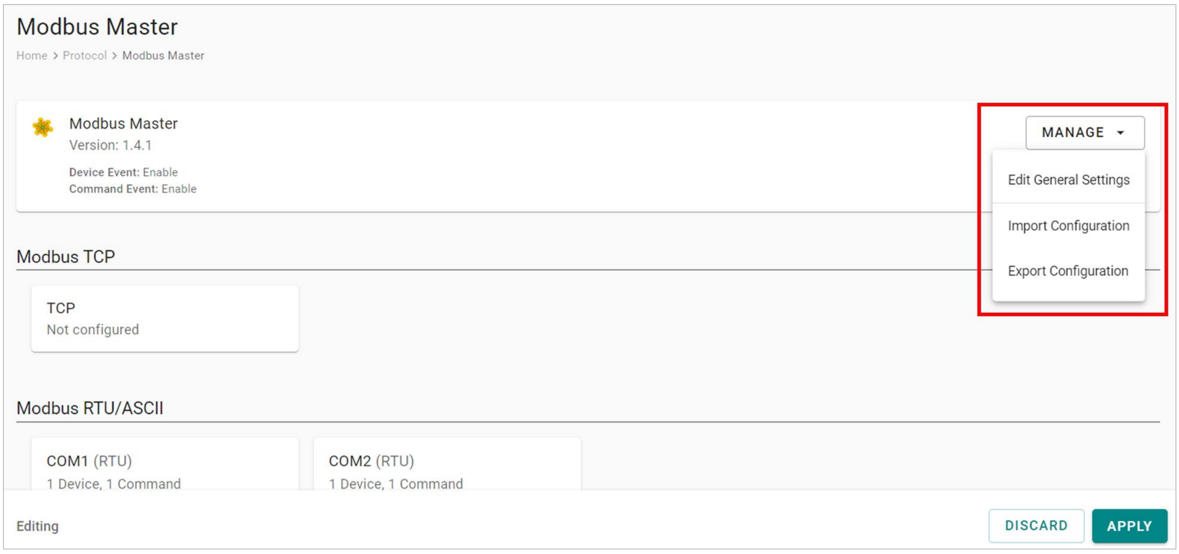
COM1 (RTU)
1 Device, 1 Command

COM2 (RTU)
Not configured

Editing

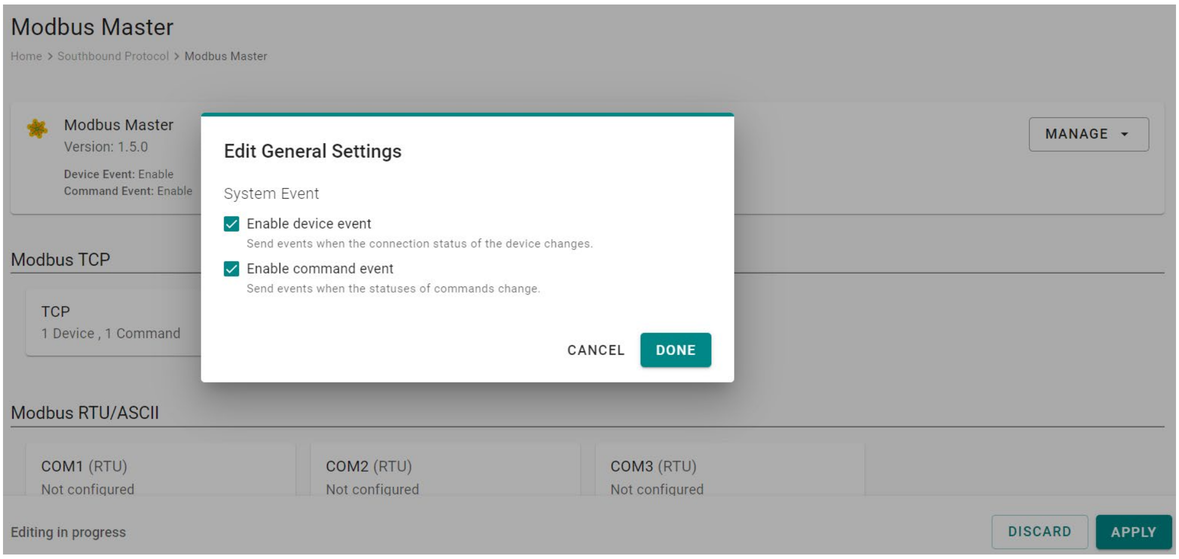
Manage

The AIG provides advanced features that help you save installation time and maintenance effort.



Edit General Settings

Once your northbound main system wants to monitor the Modbus communication status, you can enable this function.



Edit General Settings

System Event

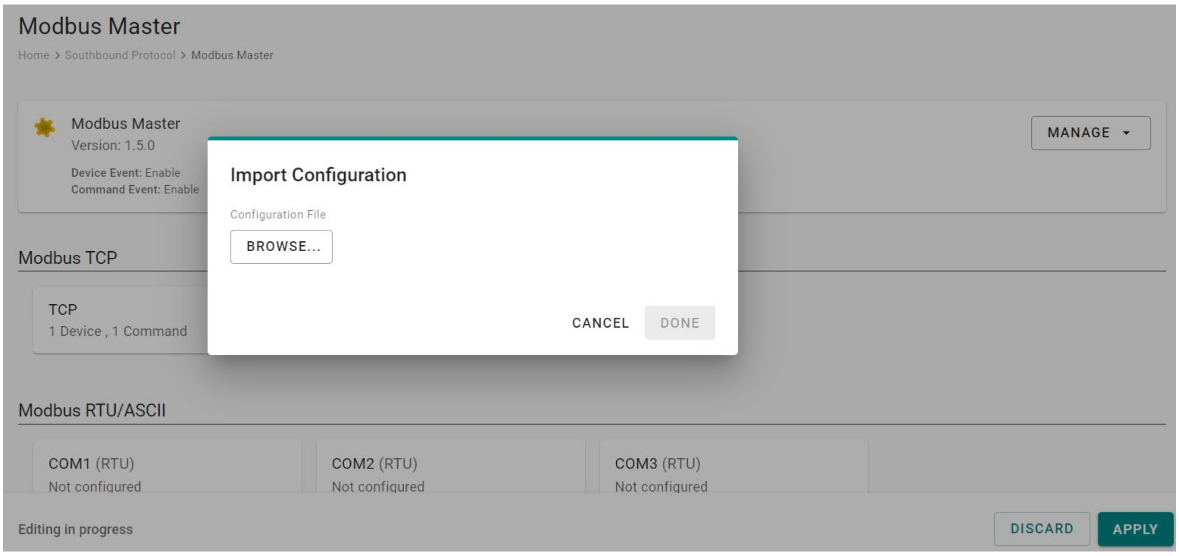
☑ Enable device event
Send events when the connection status of the device changes.

☑ Enable command event
Send events when the statuses of commands change.

Parameter	Value	Default	Description
Enable device event	Check uncheck	Check	**Check:** If the Modbus communication fails, e.g., Modbus exception code is received The Modbus response timeout and the value of the status tag in the tag hub will change to 1. **Uncheck:** Disable the function
Enable command event	Check uncheck	Check	**Check:** If the Modbus command fails, e.g., Modbus exception code is received or Modbus response times out, the value of the status tag in the tag hub will change to 1. **Uncheck:** Disable the function.

Import/Export Configuration

You can Import/Export the **Modbus Master settings,** which will be stored in XML format.


Modbus Master

Home > Southbound Protocol > Modbus Master

Modbus Master
Version: 1.5.0
Device Event: Enable
Command Event: Enable

Modbus TCP

TCP
1 Device , 1 Command

Modbus RTU/ASCII

COM1 (RTU) Not configured

COM2 (RTU) Not configured

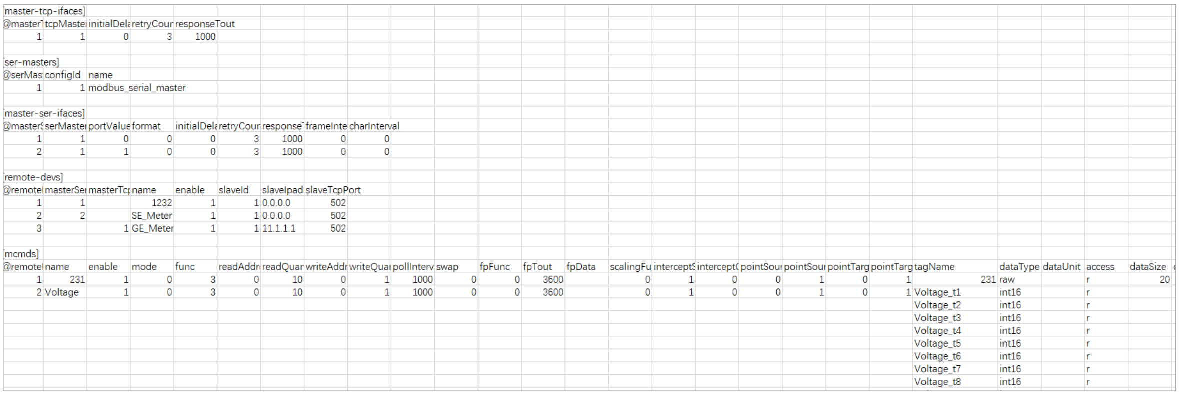
COM3 (RTU) Not configured

Editing in progress

Import Configuration

Configuration File

An example of an exported file that can be viewed/edited by EXCEL.


[master-tcp-ifaces]

@master	tcpMaste	initialDela	retryCour	responseTout
1	1	0	3	1000

[ser-masters]

@serMas	configId	name
1	1	modbus_serial_master

[master-ser-ifaces]

@master	serMaste	portValue	format	initialDela	retryCour	response	frameInte	charInterval
1	1	0	0	0	3	1000	0	0
2	1	1	0	0	3	1000	0	0

[remote-devs]

@remote	masterSe	masterTc	name	enable	slaveId	slaveIpad	slaveTcpPort
1	1		1232	1	1	0.0.0.0	502
2	2		SE_Meter	1	1	0.0.0.0	502
3		1	GE_Meter	1	1	11.1.1.1	502

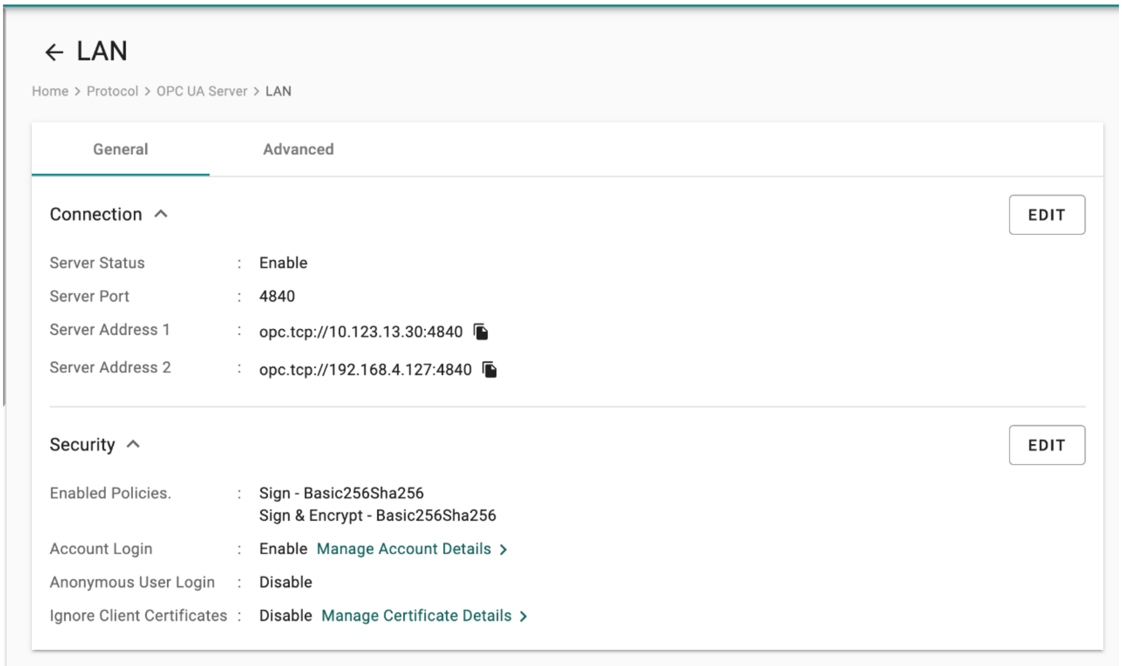
[mcmds]

@remote	name	enable	mode	func	readAddr	readQuar	writeAddr	writeQua	pollInterv	swap	fpFunc	fpTout	fpData	scalingFu	interceptS	interceptC	pointSou	pointSou	pointTarg	pointTarg	tagName	dataType	dataUnit	access	dataSize
1	231	1	0	3	0	10	0	1	1000	0	0	3600		0	1	0	0	1	0	1	231	raw		r	20
2	Voltage	1	0	3	0	10	0	1	1000	0	0	3600		0	1	0	0	1	0	1	Voltage_t1	int16		r	
																					Voltage_t2	int16		r	
																					Voltage_t3	int16		r	
																					Voltage_t4	int16		r	
																					Voltage_t5	int16		r	
																					Voltage_t6	int16		r	
																					Voltage_t7	int16		r	
																					Voltage_t8	int16		r	

OPC UA Server

Go to **OPC UA Server** to configure the corresponding settings.

To enable the OPC UA Server, click **LAN** and do the following:



← LAN

Home > Protocol > OPC UA Server > LAN

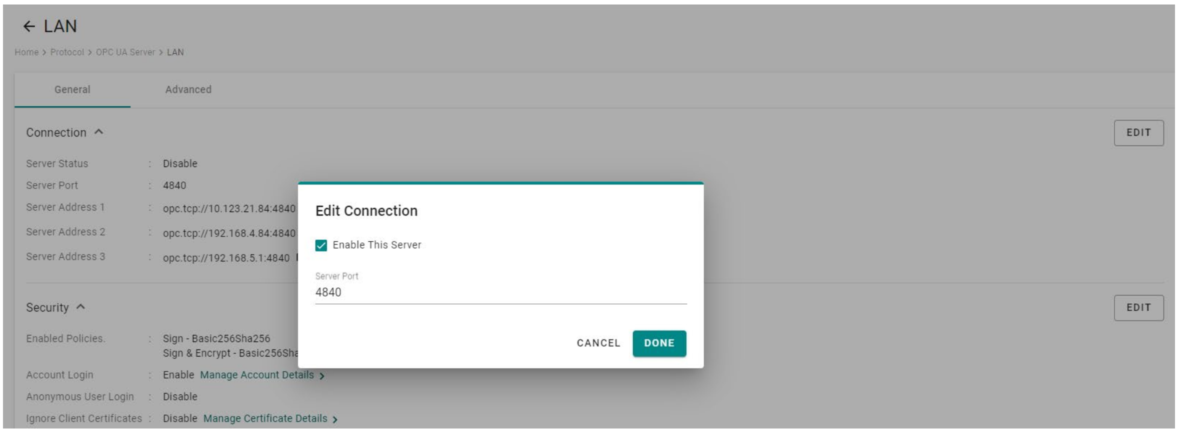
Connection ^ EDIT

Server Status	Enable
Server Port	4840
Server Address 1	opc.tcp://10.123.13.30:4840
Server Address 2	opc.tcp://192.168.4.127:4840

Security ^ EDIT

Enabled Policies.	Sign - Basic256Sha256 Sign & Encrypt - Basic256Sha256
Account Login	Enable Manage Account Details >
Anonymous User Login	Disable
Ignore Client Certificates	Disable Manage Certificate Details >

1. Click Connection **EDIT**, select **Enable This Server**, and click **DONE.**
   The service is enabled by default on port 4840.



← LAN

Home > Protocol > OPC UA Server > LAN

Connection ^ EDIT

Server Status	Disable
Server Port	4840
Server Address 1	opc.tcp://10.123.21.84:4840
Server Address 2	opc.tcp://192.168.4.84:4840
Server Address 3	opc.tcp://192.168.5.1:4840

Security ^ EDIT

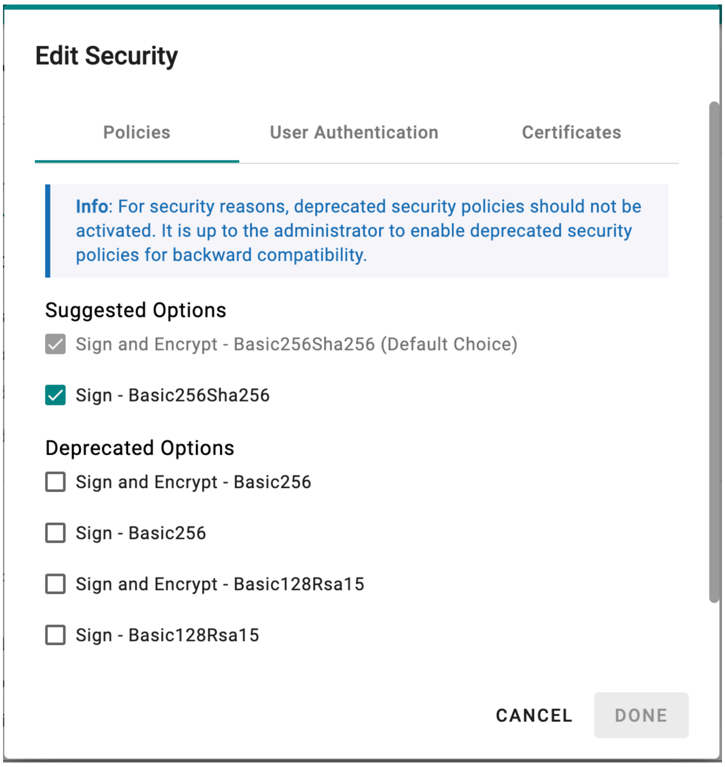
Enabled Policies.	Sign - Basic256Sha256 Sign & Encrypt - Basic256Sha
Account Login	Enable Manage Account Details >
Anonymous User Login	Disable
Ignore Client Certificates	Disable Manage Certificate Details >

Edit Connection

☑ Enable This Server

Server Port: 4840

2. (Optional) Click Security **EDIT** to edit Policies, User Authentication, and Certificates.



Edit Security

Info: For security reasons, deprecated security policies should not be activated. It is up to the administrator to enable deprecated security policies for backward compatibility.

Suggested Options

☑ Sign and Encrypt - Basic256Sha256 (Default Choice)

☑ Sign - Basic256Sha256

Deprecated Options

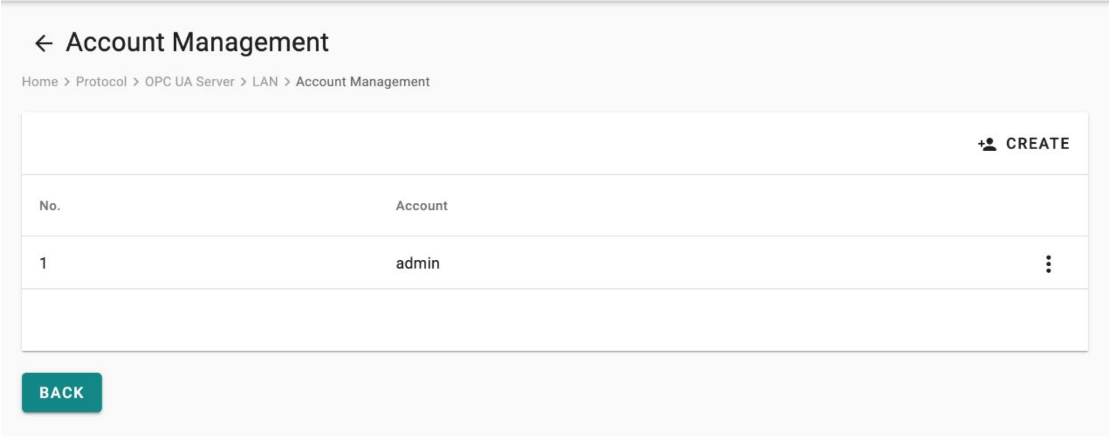
☐ Sign and Encrypt - Basic256

☐ Sign - Basic256

☐ Sign and Encrypt - Basic128Rsa15

☐ Sign - Basic128Rsa15

3. (Optional) Click **Manage Account Details** to **CREATE** new accounts.
   The default account/ password is **admin/moxa**.

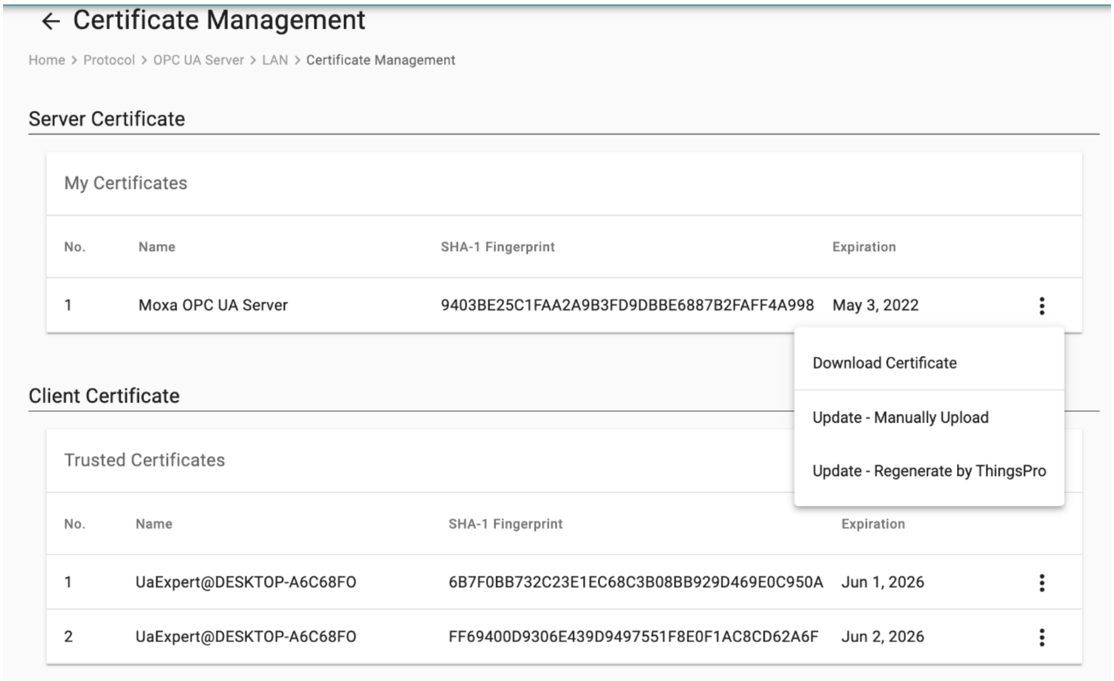


Account Management

Home > Protocol > OPC UA Server > LAN > Account Management

No.	Account
1	admin

4. (Optional) Click **Manage Certificate Details** to download the server certificate or upload a client certificate.



← Certificate Management

Home > Protocol > OPC UA Server > LAN > Certificate Management

Server Certificate

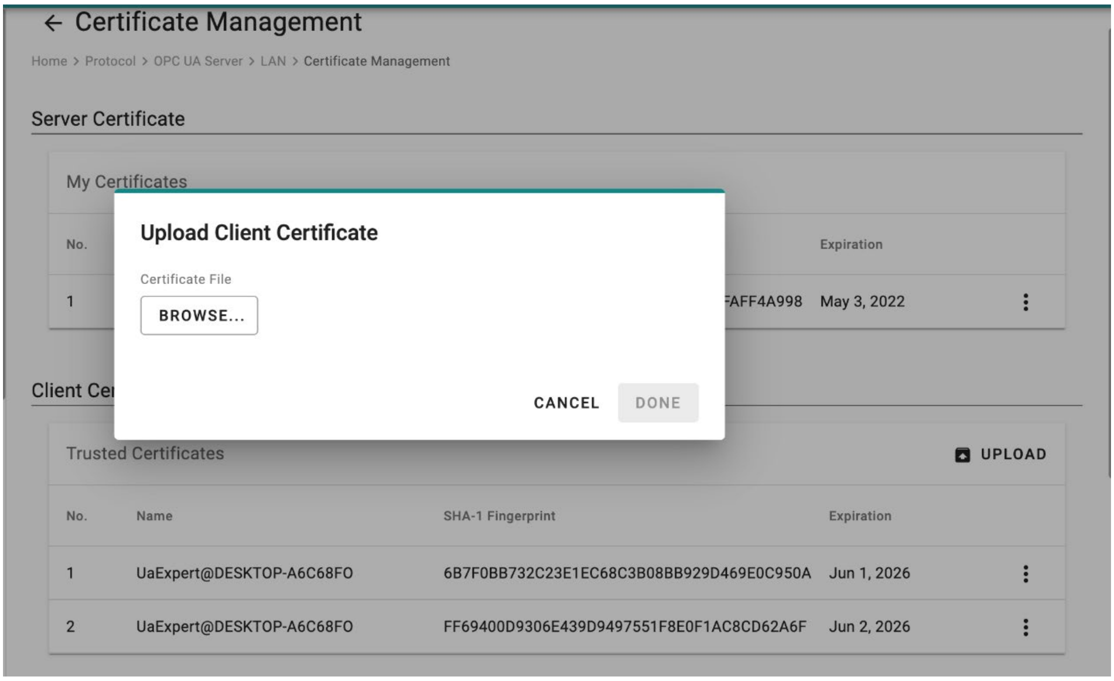
My Certificates

No.	Name	SHA-1 Fingerprint	Expiration	
1	Moxa OPC UA Server	9403BE25C1FAA2A9B3FD9DBBE6887B2FAFF4A998	May 3, 2022	⋮

Client Certificate

Trusted Certificates

No.	Name	SHA-1 Fingerprint	Expiration	
1	UaExpert@DESKTOP-A6C68FO	6B7F0BB732C23E1EC68C3B08BB929D469E0C950A	Jun 1, 2026	⋮
2	UaExpert@DESKTOP-A6C68FO	FF69400D9306E439D9497551F8E0F1AC8CD62A6F	Jun 2, 2026	⋮



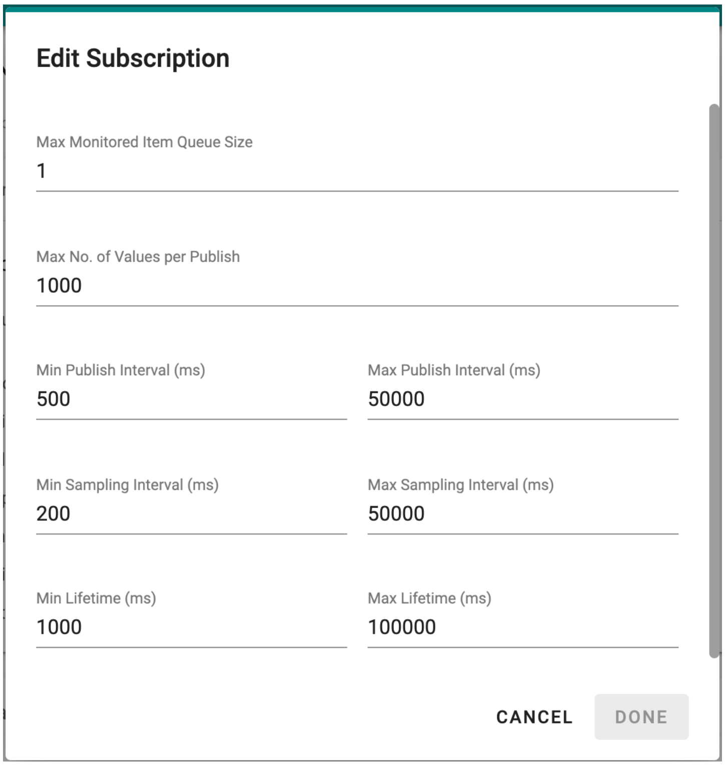
← Certificate Management

Home > Protocol > OPC UA Server > LAN > Certificate Management

Upload Client Certificate

Certificate File

5. (Optional) Click **Advanced > EDIT** to configure the subscription settings here.



Edit Subscription

Max Monitored Item Queue Size: 1

Max No. of Values per Publish: 1000

Min Publish Interval (ms): 500

Max Publish Interval (ms): 50000

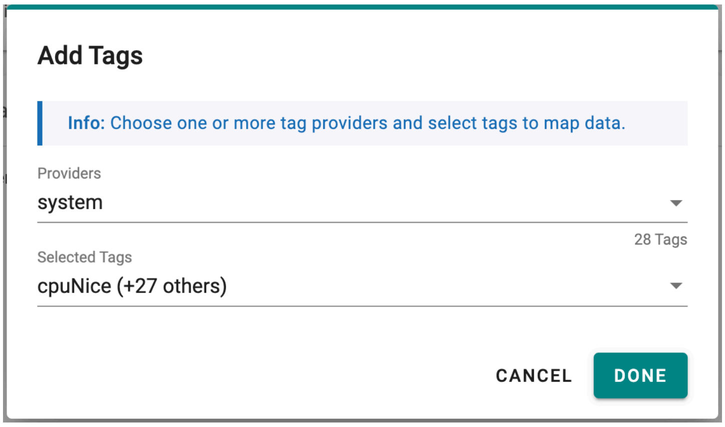
Min Sampling Interval (ms): 200

Max Sampling Interval (ms): 50000

Min Lifetime (ms): 1000

Max Lifetime (ms): 100000

6. Click **ADD TAGS** and select providers and tags.



Add Tags

Info: Choose one or more tag providers and select tags to map data.

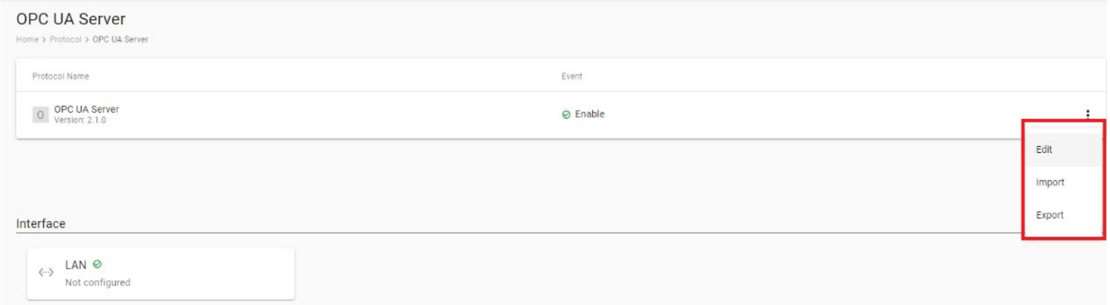
Providers: system

28 Tags

Selected Tags: cpuNice (+27 others)

7. Click **DONE**.
8. Click **GO TO APPLE SETTINGS**.
9. Click **APPLY**.

You can also **disable/enable system event** of the OPC UA services or **Import/Export** configuration here.



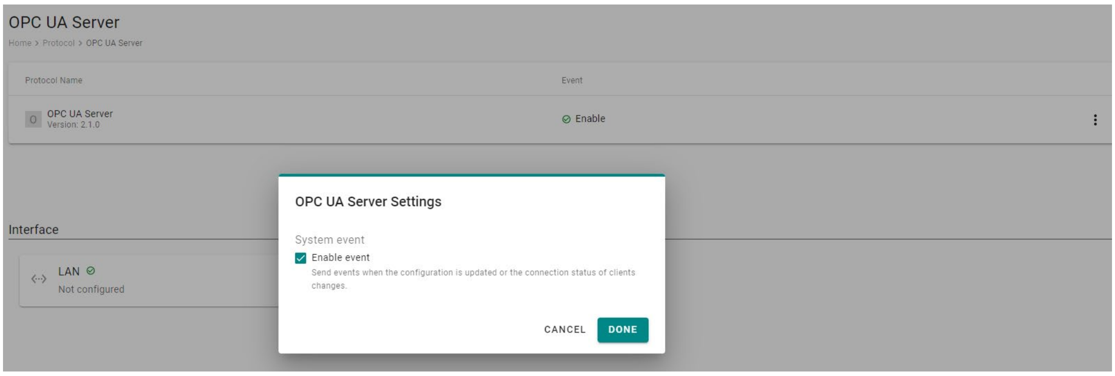
OPC UA Server

Home > Protocol > OPC UA Server

Protocol Name	Event
OPC UA Server Version: 2.1.0	Enable

Interface

LAN
Not configured



OPC UA Server

Home > Protocol > OPC UA Server

Protocol Name	Event
OPC UA Server Version: 2.1.0	Enable

Interface

LAN
Not configured

OPC UA Server Settings

System event

☑ Enable event

Send events when the configuration is updated or the connection status of clients changes.

Edge Computing

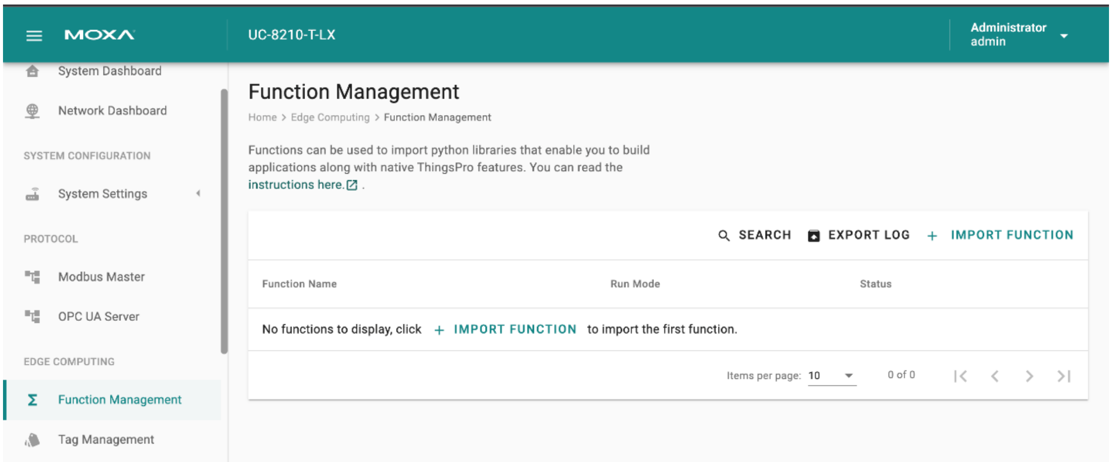
Function Management

AIG-301 Series provides a functionality to trigger actions based on specific data or time frame. For example, you can create a function that implements a defined action such as a device reboot or a **cron** job triggered by a specified change in a tag value or newly generated tags/events.

Go to **Edge Computing > Function Management** to import and manage functions. For additional information, see build your own functions.

To import functions, do the following:

1. Click **IMPORT FUNCTION**.



Function Management

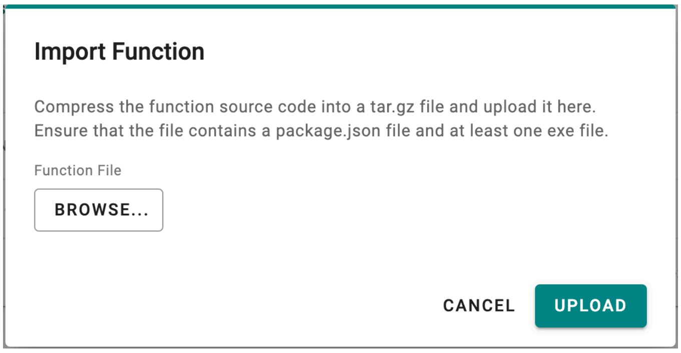
Home > Edge Computing > Function Management

Functions can be used to import python libraries that enable you to build applications along with native ThingsPro features. You can read the instructions here.

Function Name	Run Mode	Status
No functions to display, click + IMPORT FUNCTION to import the first function.		

Items per page: 10 0 of 0

2. Click **BROWSE** to select the application/file (*.tar.gz file) and click **UPLOAD**.

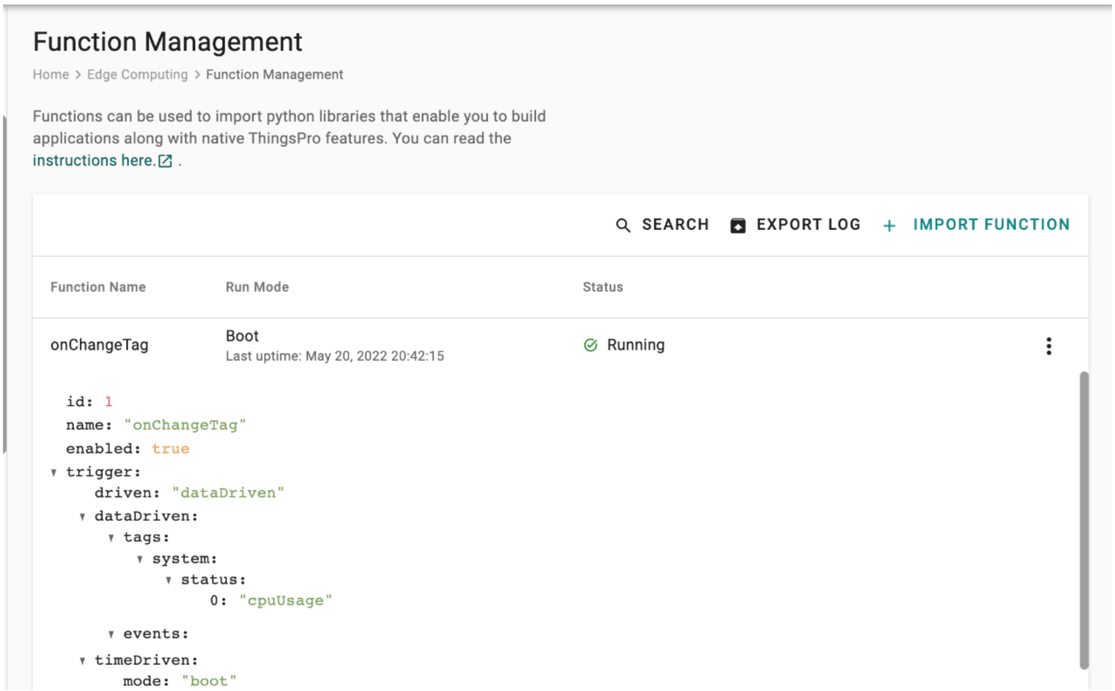


Import Function

Compress the function source code into a tar.gz file and upload it here.
Ensure that the file contains a package.json file and at least one exe file.

Function File

The function is displayed in the list along with the run mode and status of the function. You can click the function to check the **package.json** file.



Function Management

Home > Edge Computing > Function Management

Functions can be used to import python libraries that enable you to build applications along with native ThingsPro features. You can read the instructions here. .

Function Name	Run Mode	Status
onChangeTag	Boot Last uptime: May 20, 2022 20:42:15	Running

```
  id: 1
  name: "onChangeTag"
  enabled: true
▾ trigger:
      driven: "dataDriven"
    ▾ dataDriven:
        ▾ tags:
            ▾ system:
                ▾ status:
                      0: "cpuUsage"

        ▾ events:
    ▾ timeDriven:
          mode: "boot"
```

	Run Mode
1	Boot
2	Cron job

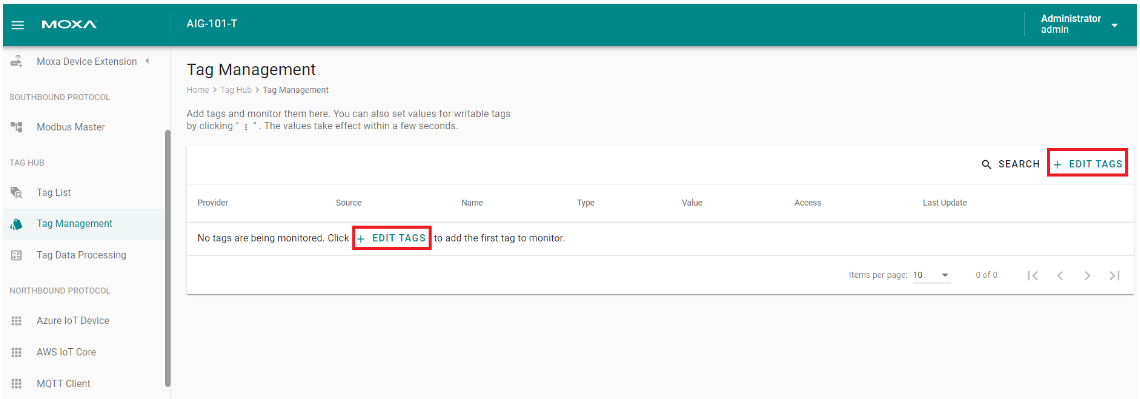
Status	Description
Running	The function is running
Retrying	Retrying a failed function every 5 seconds (unlimited tries)
Failure	The function failed during a retry. The correspondent error message will be displayed in the table. You can click **EXPORT LOG** to check the logs.
Inactive	The function is disabled.

Tag Management

Go to **Tag Management,** where you can create and monitor the real-time tag value for troubleshooting purposes.

To see the tag's real-time value, do the following:

1. Click **+ EDIT TAGS**.



Tag Management

Home > Tag Hub > Tag Management

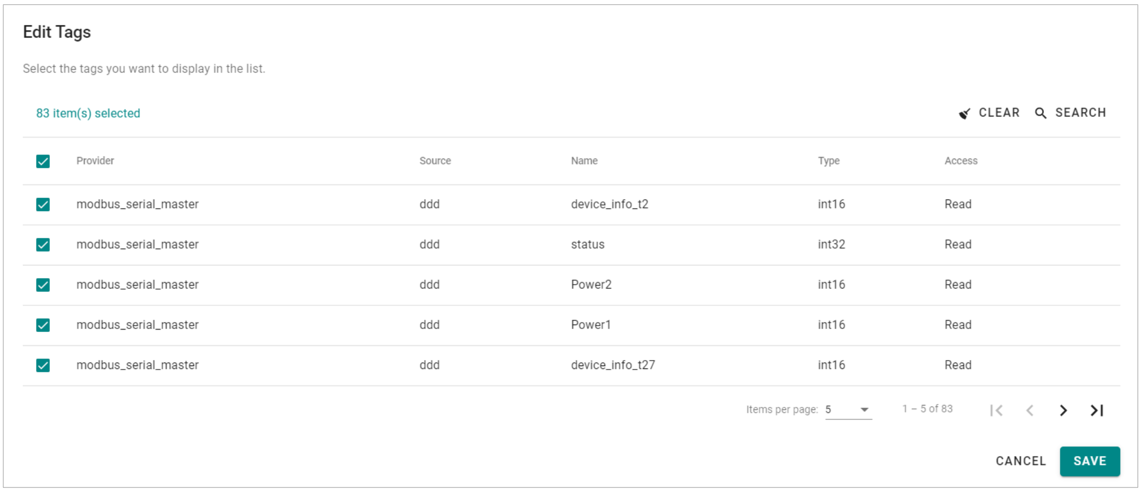
Add tags and monitor them here. You can also set values for writable tags by clicking " ⋮ ". The values take effect within a few seconds.

Provider	Source	Name	Type	Value	Access	Last Update

No tags are being monitored. Click + EDIT TAGS to add the first tag to monitor.

Items per page: 10   0 of 0

2. Select the **tags** to monitor in the list.



Edit Tags

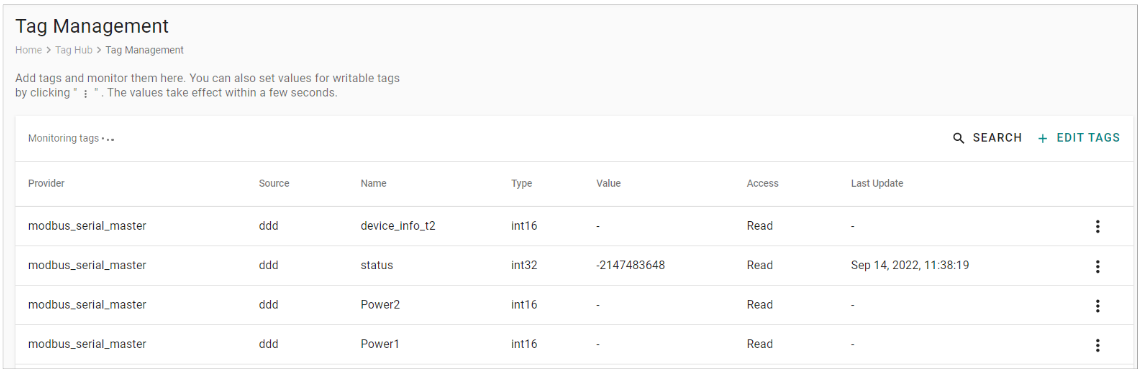
Select the tags you want to display in the list.

83 item(s) selected

☑	Provider	Source	Name	Type	Access
☑	modbus_serial_master	ddd	device_info_t2	int16	Read
☑	modbus_serial_master	ddd	status	int32	Read
☑	modbus_serial_master	ddd	Power2	int16	Read
☑	modbus_serial_master	ddd	Power1	int16	Read
☑	modbus_serial_master	ddd	device_info_t27	int16	Read

Items per page: 5   1 – 5 of 83

3. (Optional) use **SEARCH** to find the tags quickly.



Tag Management

Home > Tag Hub > Tag Management

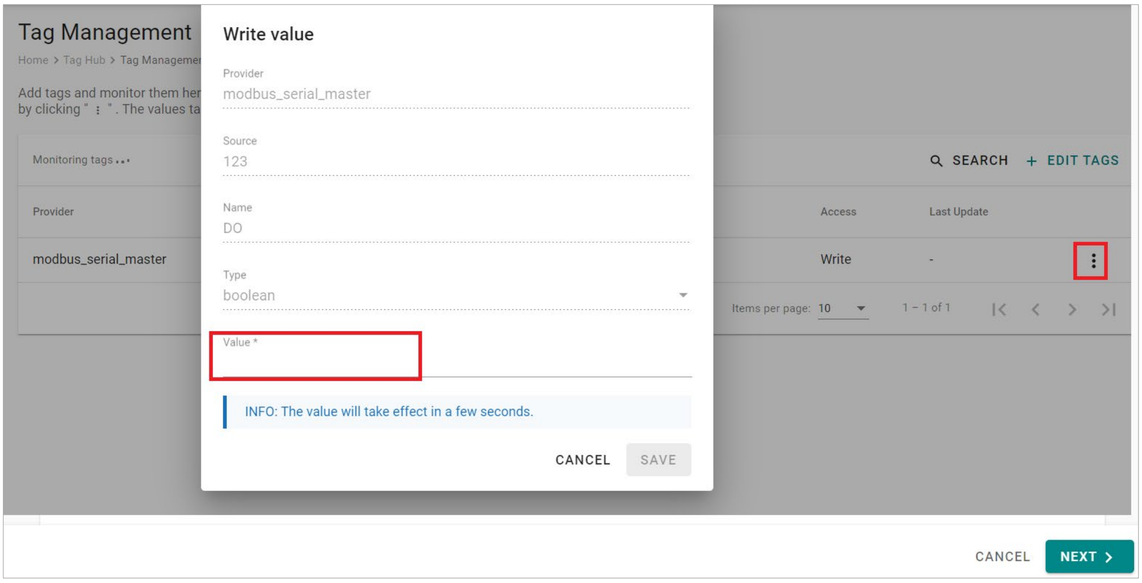
Add tags and monitor them here. You can also set values for writable tags by clicking " ⋮ ". The values take effect within a few seconds.

Monitoring tags • • •

Provider	Source	Name	Type	Value	Access	Last Update	
modbus_serial_master	ddd	device_info_t2	int16	-	Read	-	⋮
modbus_serial_master	ddd	status	int32	-2147483648	Read	Sep 14, 2022, 11:38:19	⋮
modbus_serial_master	ddd	Power2	int16	-	Read	-	⋮
modbus_serial_master	ddd	Power1	int16	-	Read	-	⋮

4. Click **SAVE**.
5. (Optional) Press the icon to deactivate the monitoring tags.

6. (Optional) Press the icon to write value for test purposes.



Provider: modbus_serial_master

Source: 123

Name: DO

Type: boolean

Value *

INFO: The value will take effect in a few seconds.

Provider	Access	Last Update
modbus_serial_master	Write	-

NOTE

The name of provider is "system" indicating system status whose update time is 10 seconds.

Cloud Connectivity

Azure IoT Edge

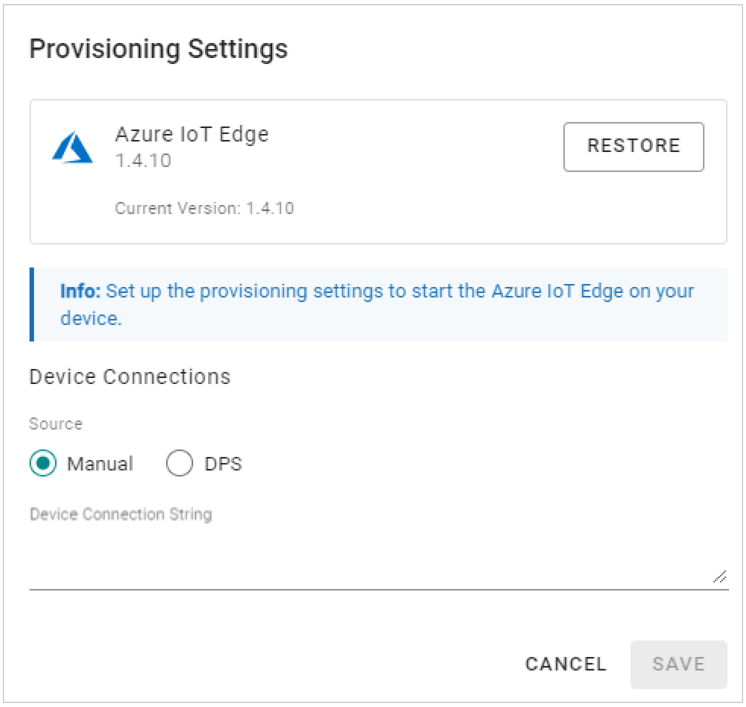
Go to **Cloud Connectivity > Azure IoT Edge** to configure the Azure IoT Edge settings. You can enable/disable the Azure IoT Edge service and enroll the device via manual setting or DPS (Device Provisioning Service) here.

NOTE

A registered Azure account is needed to manage the Azure IoT Edge service for your IoT application.

To manually create an Azure IoT Edge connection for your device, do the following:

1. Enable the Azure IoT Edge service and click on ⚙.
2. Select **Manual**.
3. Enter the **Device Connection String**.
   Copy and paste the string from the Azure IoT Hub.
4. Click **SAVE**.



Provisioning Settings

Azure IoT Edge
1.4.10
Current Version: 1.4.10

Info: Set up the provisioning settings to start the Azure IoT Edge on your device.

Device Connections

Source

● Manual ○ DPS

Device Connection String

To create an Azure IoT Edge connection for your device via DPS, do the following:

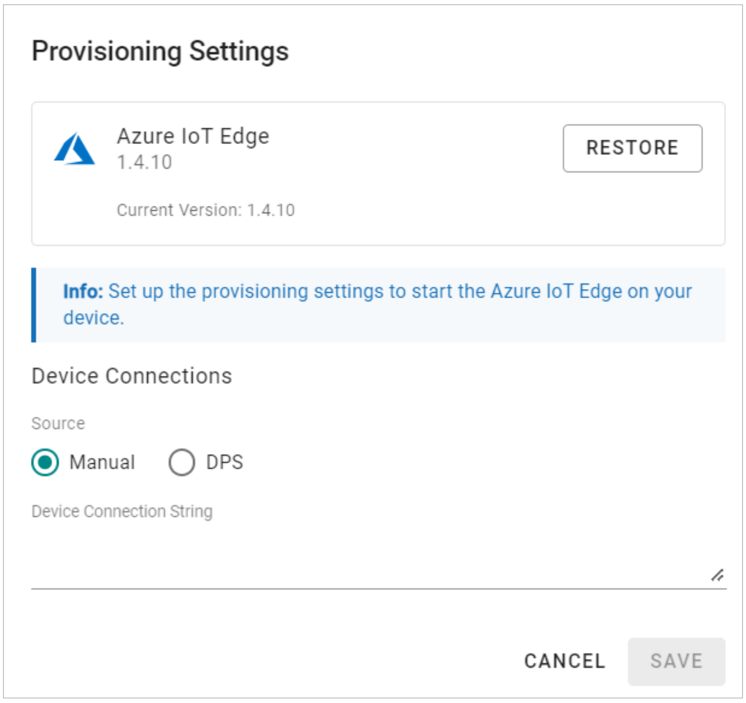
1. Enable the Azure IoT Edge service and click on ⚙.
2. Select **DPS**.
3. Select **TPM**, **Symmetric encryption**, or **X.509** certificate.
   Select an option based on your device registered with the Azure IoT Hub.

NOTE

TPM attestation is only available for devices with a built-in TPM module.

- For the Azure IoT Hub device provisioning service and Symmetric encryption. enter the **Registration ID** and **Endorsement Key**.
- For X.509, upload the **X.509 Certificate** and **Private Key**.

4. Click **SAVE**.



Provisioning Settings

Azure IoT Edge
1.4.10

Current Version: 1.4.10

Info: Set up the provisioning settings to start the Azure IoT Edge on your device.

Device Connections

Source

● Manual ○ DPS

Device Connection String

More information about the Azure DPS configuration in the Azure IoT Hub at Set up a DPS.

If you want to check the Azure IoT Edge configuration and connectivity for common issues, go to **Azure IoT Edge > AIE Checks** and click **CHECK** to see the results of the checks.

For additional information on AIE Checks, see https://github.com/Azure/iotedge/blob/master/doc/troubleshoot-checks.md.

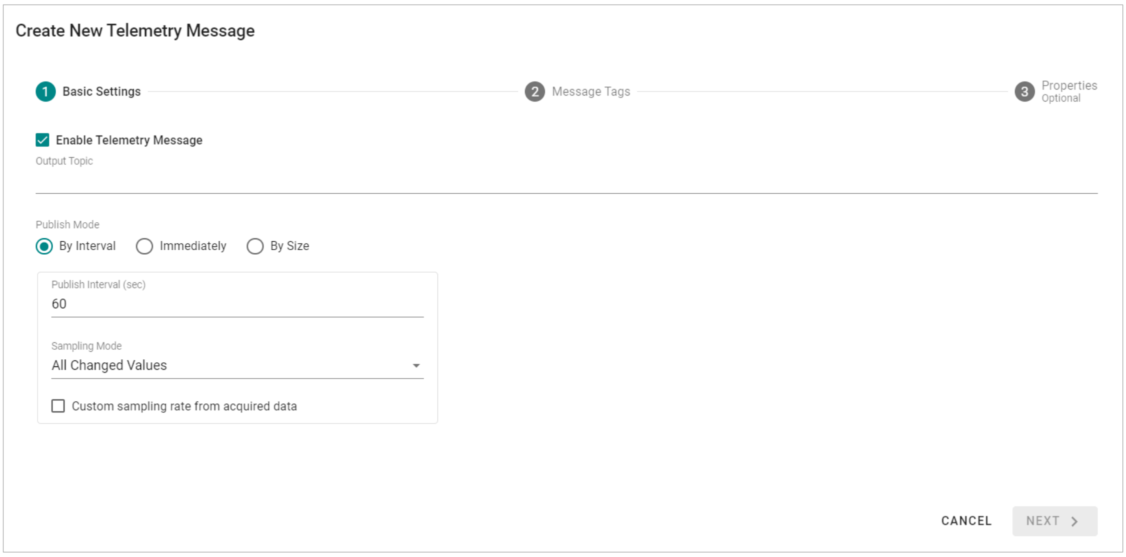
If an unexpected situation occurs when you upgrade/downgrade to a certain version of Azure IoT Edge, you can restore Azure IoT Edge by clicking **RESTORE** in the Provisioning Settings. Using the restore function will remove existing settings including Message Group, Store and Forward, Device Management, and Downstream/Upstream credentials.

Telemetry Message Settings

The simplest message type for sending IoT device data to your IIoT applications is a telemetry message. To create a telemetry message, do the following:

1. Click **+ MESSAGE** to create a new telemetry message.
2. Specify an **Output Topic** name.
3. Select a **Publish Mode**.

   For details, see Publish Mode.



Create New Telemetry Message

1 Basic Settings — 2 Message Tags — 3 Properties Optional

☑ Enable Telemetry Message

Output Topic

Publish Mode

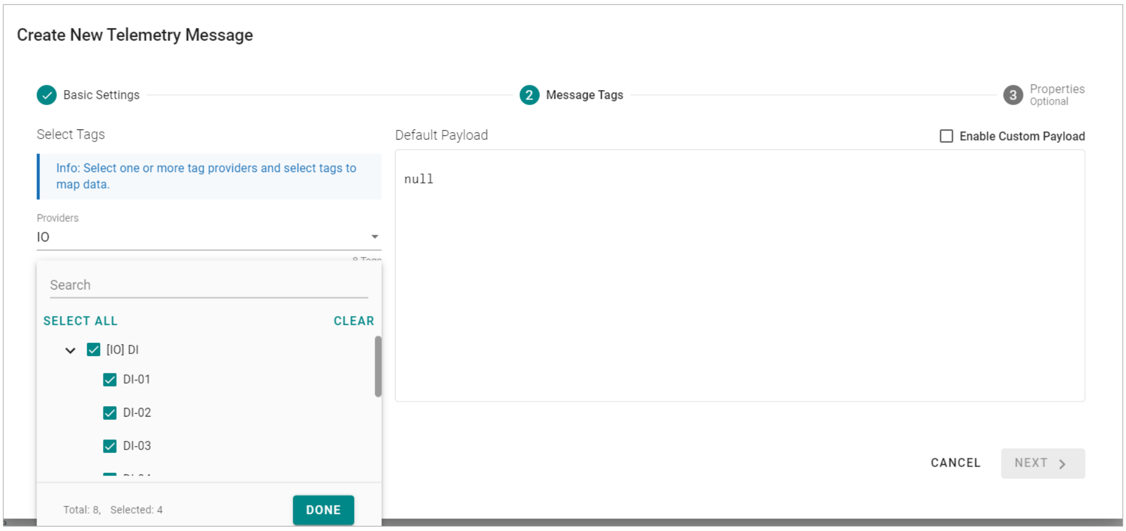
● By Interval ○ Immediately ○ By Size

Publish Interval (sec): 60

Sampling Mode: All Changed Values

□ Custom sampling rate from acquired data

4. Input corresponding parameters such as publish interval, sampling mode, and publish size.
5. Click **NEXT**.
6. Select tags (e.g., Modbus Master).



Create New Telemetry Message

✓ Basic Settings — 2 Message Tags — 3 Properties Optional

Select Tags

Info: Select one or more tag providers and select tags to map data.

Providers: IO

Search

SELECT ALL CLEAR

☑ [IO] DI

☑ DI-01

☑ DI-02

☑ DI-03

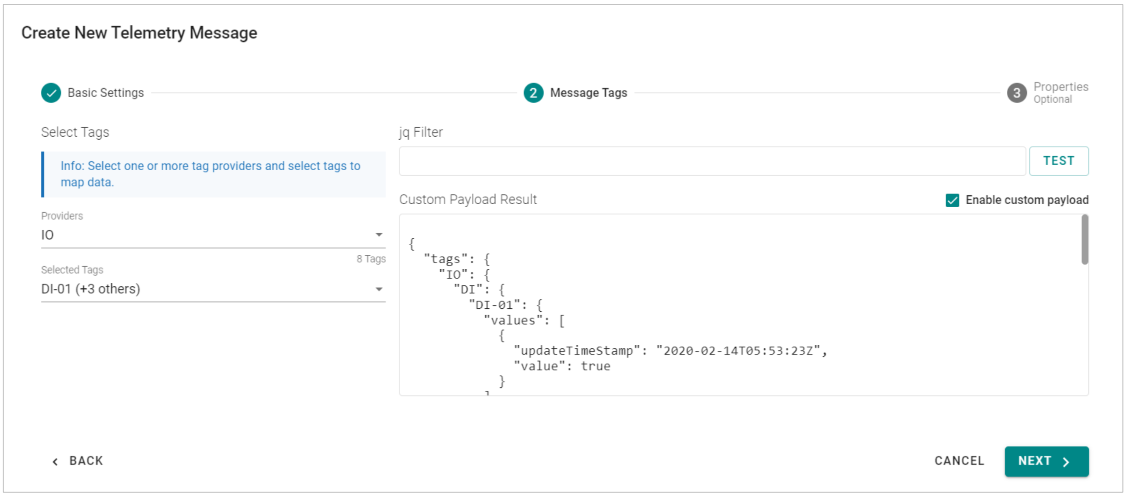
Total: 8, Selected: 4

Default Payload

□ Enable Custom Payload

```
null
```

7. (Optional) Enable custom payload by using the **jq** filter.
   The device-to-cloud (D2C) message policy allows you to transform default payload to your desired payload schema via the **jq** filter. For additional information, refer to the jq website (https://stedolan.github.io/jq/manual/).



Select Tags

Info: Select one or more tag providers and select tags to map data.

Providers: IO

8 Tags

Selected Tags: DI-01 (+3 others)

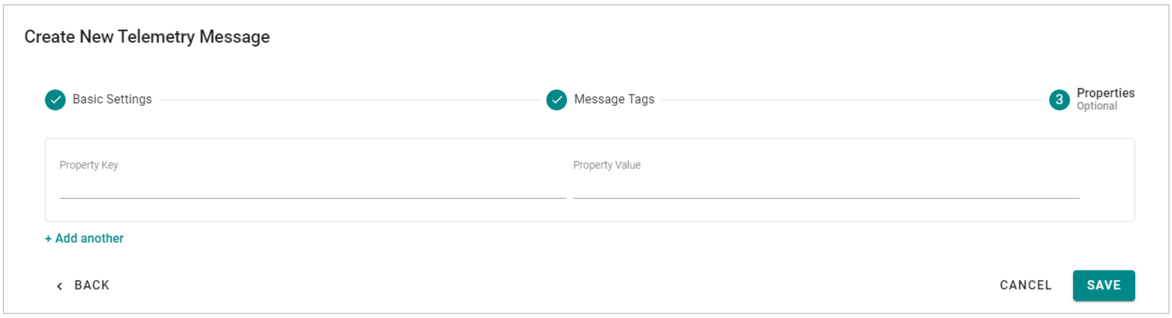
jq Filter

Custom Payload Result

☑ Enable custom payload

```
{
  "tags": {
    "IO": {
      "DI": {
        "DI-01": {
          "values": [
            {
              "updateTimeStamp": "2020-02-14T05:53:23Z",
              "value": true
            }
```

8. Click **NEXT**.
9. (Optional) Enter **Property Key** and **Value**.
10. Click **SAVE**.

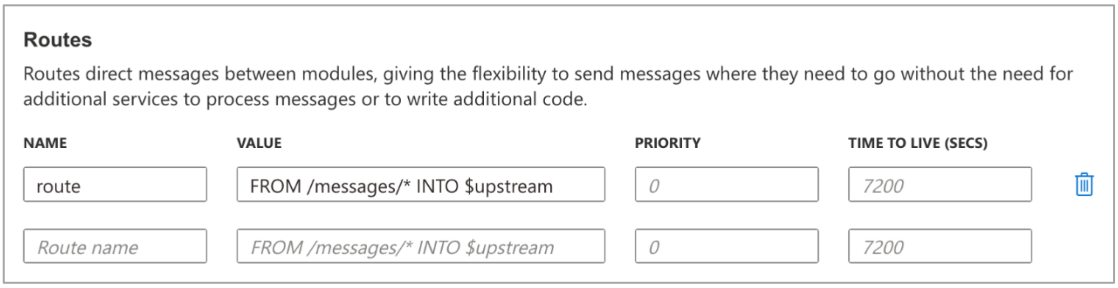


NOTE

If you want to use the direct method to write tags from the cloud, refer to https://docs.moxa.online/tpe/openapi/taghub/#tag/access

NOTE

If you cannot receive D2C messages, check and ensure that a default route of the modules is added. You can add routes in Azure IoT Hub. Log in your **IoT Hub** > **IoT Edge** > choose a device > **Set Modules** > **Routes**.



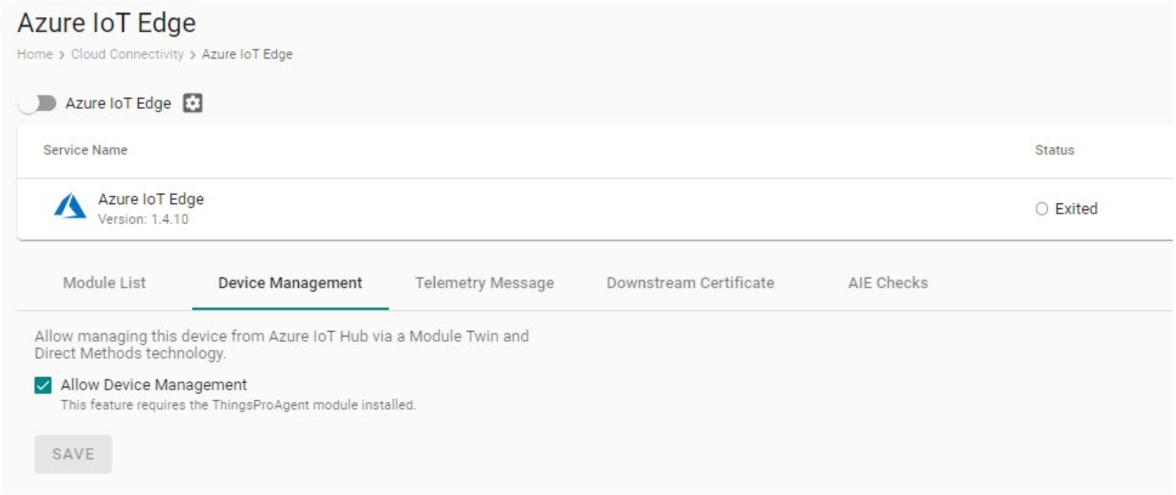
Routes

Routes direct messages between modules, giving the flexibility to send messages where they need to go without the need for additional services to process messages or to write additional code.

NAME	VALUE	PRIORITY	TIME TO LIVE (SECS)
route	FROM /messages/* INTO $upstream	0	7200
Route name	FROM /messages/* INTO $upstream	0	7200

Device Management Settings

Go to **Cloud Connectivity > Azure IoT Edge** and click on the **Device Management** tab. Enabling this feature allows cloud service providers to manage IoT devices remotely using Device Twin and Direct Method technologies.



Azure IoT Edge

Home > Cloud Connectivity > Azure IoT Edge

Azure IoT Edge

Service Name	Status
Azure IoT Edge Version: 1.4.10	○ Exited

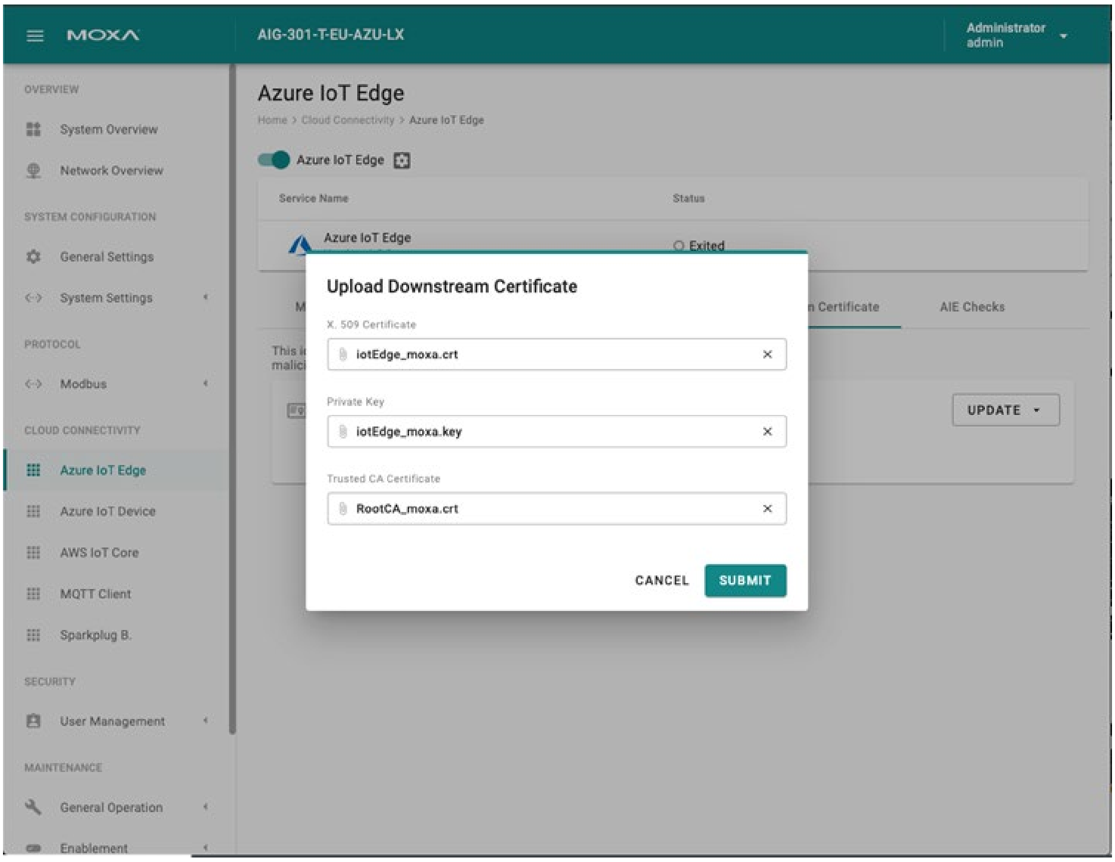
Allow managing this device from Azure IoT Hub via a Module Twin and Direct Methods technology.

☑ Allow Device Management

This feature requires the ThingsProAgent module installed.

Downstream Certificate

To prevent your device from connecting to potentially malicious gateways (Azure IoT Edge inside), you can upload **X.509 certificate**, **Private Key**, or **Trusted CA Certificate**. You can generate the certificates and the private key using ThingsPro Edge. For additional information, see Downstream Certificate.



Upload Downstream Certificate

X. 509 Certificate: iotEdge_moxa.crt

Private Key: iotEdge_moxa.key

Trusted CA Certificate: RootCA_moxa.crt

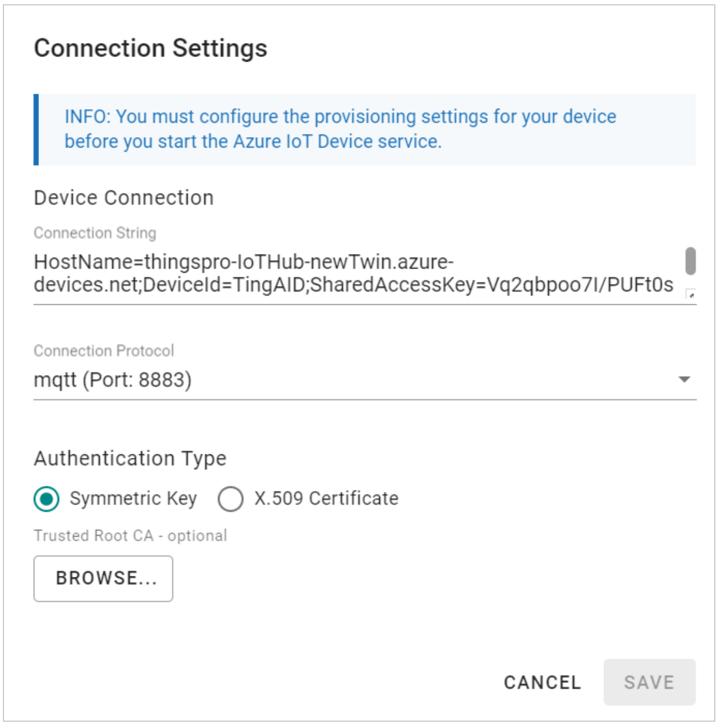
Azure IoT Device

Go to **Cloud Connectivity > Azure IoT Device**. You can enable or disable the Azure IoT Device.

(Note that you will need to register an Azure account to manage the Azure IoT Device service for your IIoT application.)

To create the Azure IoT Device connectivity, follow the steps below:

1. Click ⚙ to set connection.
2. Enter **Connection String.**
3. Select a **Connection Protocol.**
4. Select an **Authentication Type.**
5. (Optional) Upload X.509 Certificate and Private Key.
6. Click **SUBMIT**.



Connection Settings

INFO: You must configure the provisioning settings for your device before you start the Azure IoT Device service.

Device Connection

Connection String
HostName=thingspro-IoTHub-newTwin.azure-devices.net;DeviceId=TingAID;SharedAccessKey=Vq2qbpoo7I/PUFt0s

Connection Protocol
mqtt (Port: 8883)

Authentication Type

● Symmetric Key ○ X.509 Certificate

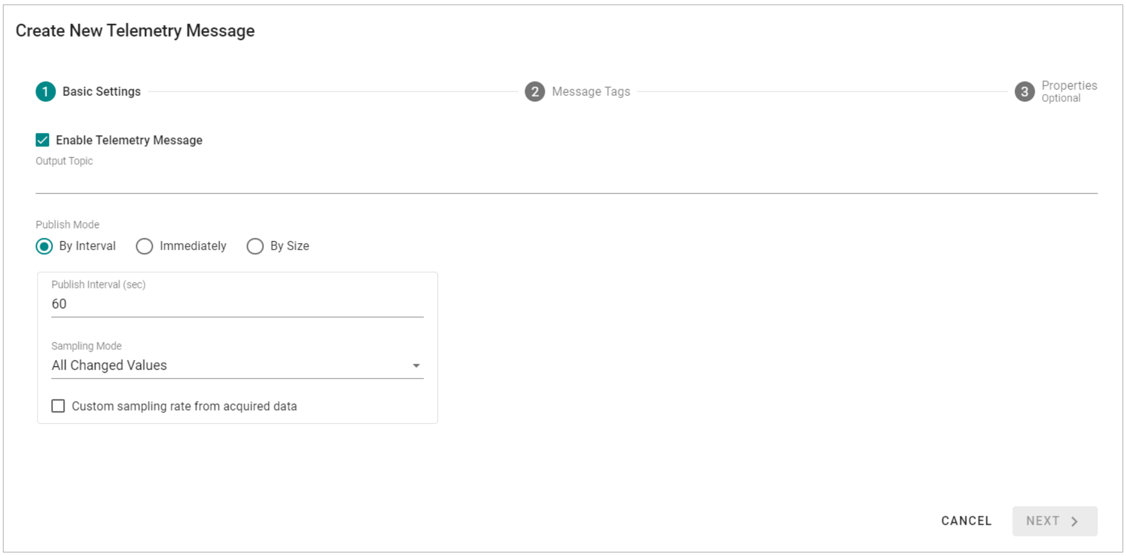
Trusted Root CA - optional

Telemetry Message

The simplest message type for sending IoT device data to your IIoT applications is a telemetry message. To create a telemetry message, do the following:

1. Click **+ MESSAGE** to create a new telemetry message.
2. Specify an **Output Topic** name.
3. Select a **Publish Mode**.

   For details, see Publish Mode.



Create New Telemetry Message

1 Basic Settings — 2 Message Tags — 3 Properties Optional

☑ Enable Telemetry Message

Output Topic

Publish Mode

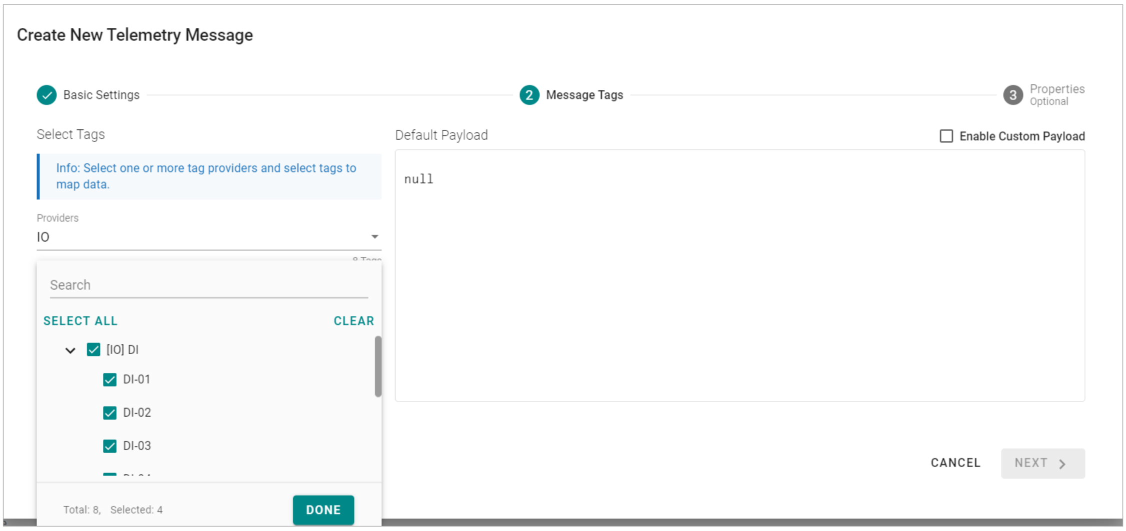
● By Interval ○ Immediately ○ By Size

Publish Interval (sec)
60

Sampling Mode
All Changed Values

□ Custom sampling rate from acquired data

4. Input corresponding parameters such as publish interval, sampling mode, and publish.
5. Click **NEXT**.
6. Select tags (e.g., Modbus Master).



Create New Telemetry Message

✓ Basic Settings — 2 Message Tags — 3 Properties Optional

Select Tags

Info: Select one or more tag providers and select tags to map data.

Providers
IO

Search

☑ [IO] DI
☑ DI-01
☑ DI-02
☑ DI-03

Total: 8, Selected: 4

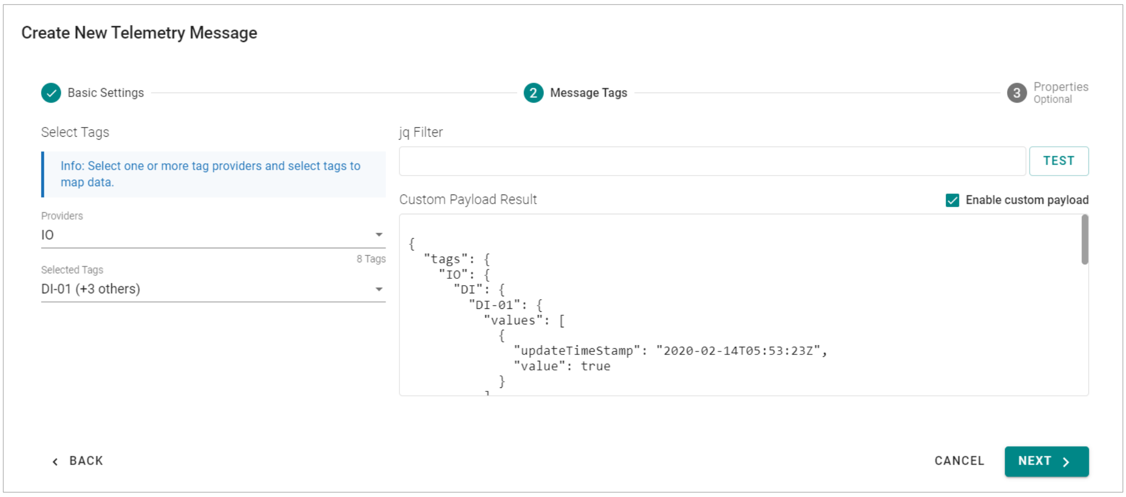
Default Payload

□ Enable Custom Payload

```
null
```

7. (Optional) Enable custom payload by using the **jq** filter.

   The device-to-cloud (D2C) message policy allows you to transform default payload to your desired payload schema via the **jq** filter. For additional information, refer to the jq website (https://stedolan.github.io/jq/manual/).



Create New Telemetry Message

Select Tags

Info: Select one or more tag providers and select tags to map data.

Providers: IO

8 Tags

Selected Tags: DI-01 (+3 others)

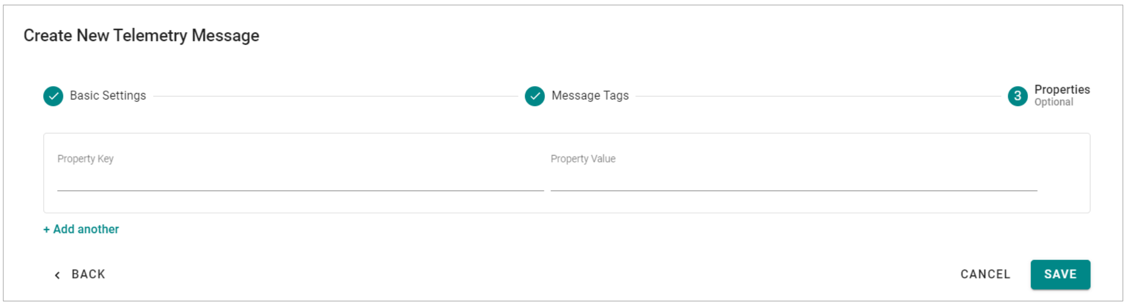
jq Filter

Custom Payload Result

☑ Enable custom payload

```
{
  "tags": {
    "IO": {
      "DI": {
        "DI-01": {
          "values": [
            {
              "updateTimeStamp": "2020-02-14T05:53:23Z",
              "value": true
            }
```

8. Click **NEXT**.
9. (Optional) Enter Property Key and Value.



Create New Telemetry Message

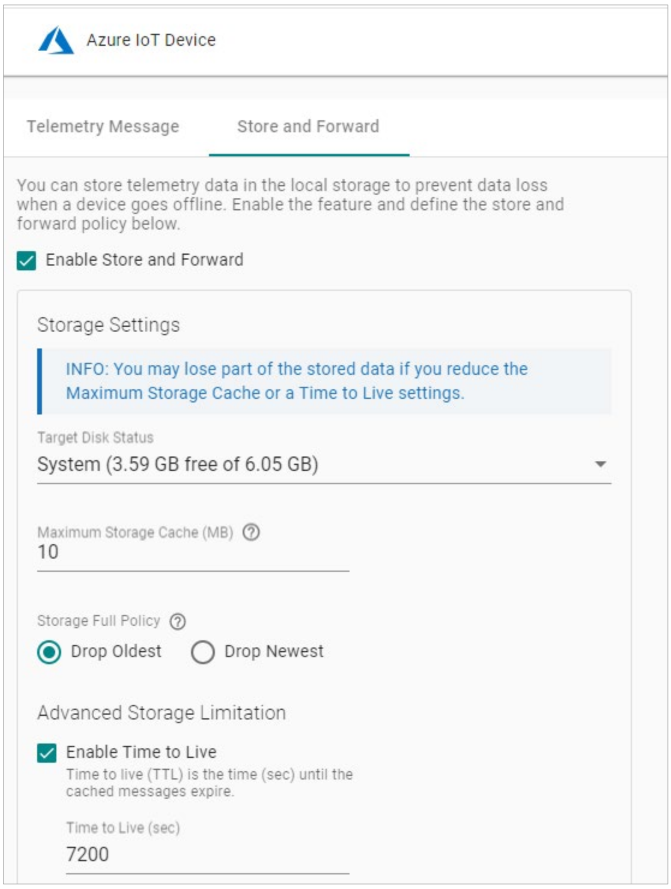
Property Key

Property Value

10. Click **SAVE**.

Store and Forward

D2C messages can be cached in a specified location and sent to the cloud later. This feature helps you keep the acquired data temporarily in a queue when the network between your IIoT Gateway and the cloud is disconnected. It will transmit the data to its destination once the network reconnects. To enable the function, click **Store and Forward** and select **Enable Store and Forward**. Select a target disk and a maximum storage cache, a retention policy, and a TTL (Time to Live) value for the messages.



You can store telemetry data in the local storage to prevent data loss when a device goes offline. Enable the feature and define the store and forward policy below.

☑ Enable Store and Forward

Storage Settings

INFO: You may lose part of the stored data if you reduce the Maximum Storage Cache or a Time to Live settings.

Target Disk Status: System (3.59 GB free of 6.05 GB)

Maximum Storage Cache (MB): 10

Storage Full Policy: ● Drop Oldest ○ Drop Newest

Advanced Storage Limitation

☑ Enable Time to Live

Time to live (TTL) is the time (sec) until the cached messages expire.

Time to Live (sec): 7200

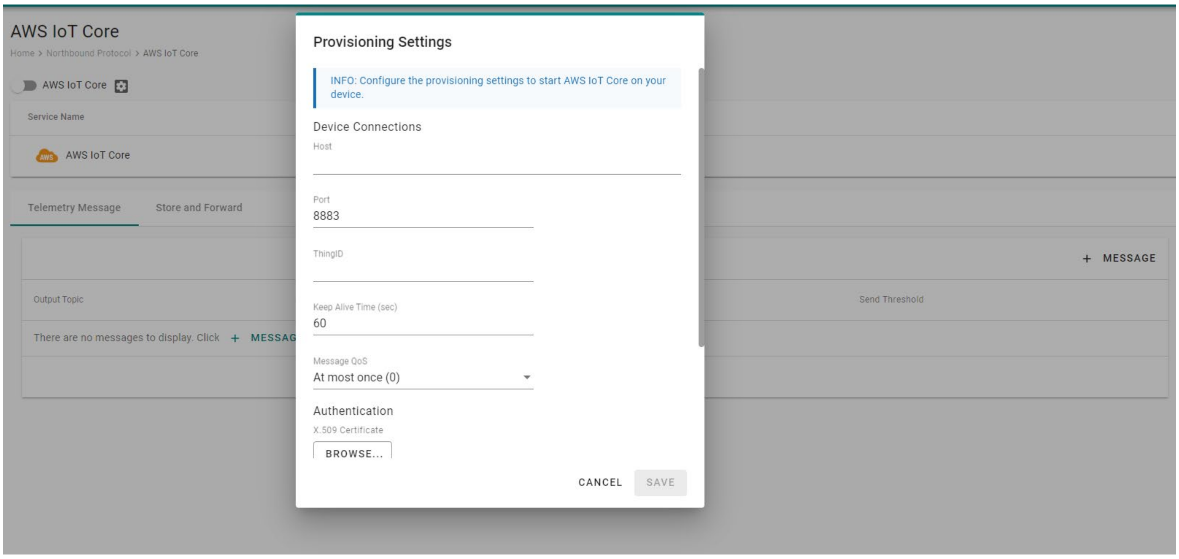
NOTE

if you want to use the direct method to write tags from the cloud, refer to https://docs.moxa.online/tpe/openapi/taghub/#tag/access

AWS IoT Core

Go to **Cloud Connectivity > AWS IoT Core** and enable or disable the AWS IoT Core. To create the AWS IoT Core connectivity, follow the steps below:

1. Click ⚙ to set connection.
2. Enter **Host (Endpoint)**. **Port** (default: 8883).
3. Enter **ThingID**.
4. Input **Keep Alive Time** (sec)
5. Select a way of message **QoS**.
6. Upload X.509 Certificate, Private Key, and (optional) Trusted Root CA.
7. Click **SAVE**.



AWS IoT Core

Home > Northbound Protocol > AWS IoT Core

Provisioning Settings

INFO: Configure the provisioning settings to start AWS IoT Core on your device.

Device Connections

Host:

Port: 8883

ThingID:

Keep Alive Time (sec): 60

Message QoS: At most once (0)

Authentication

X.509 Certificate

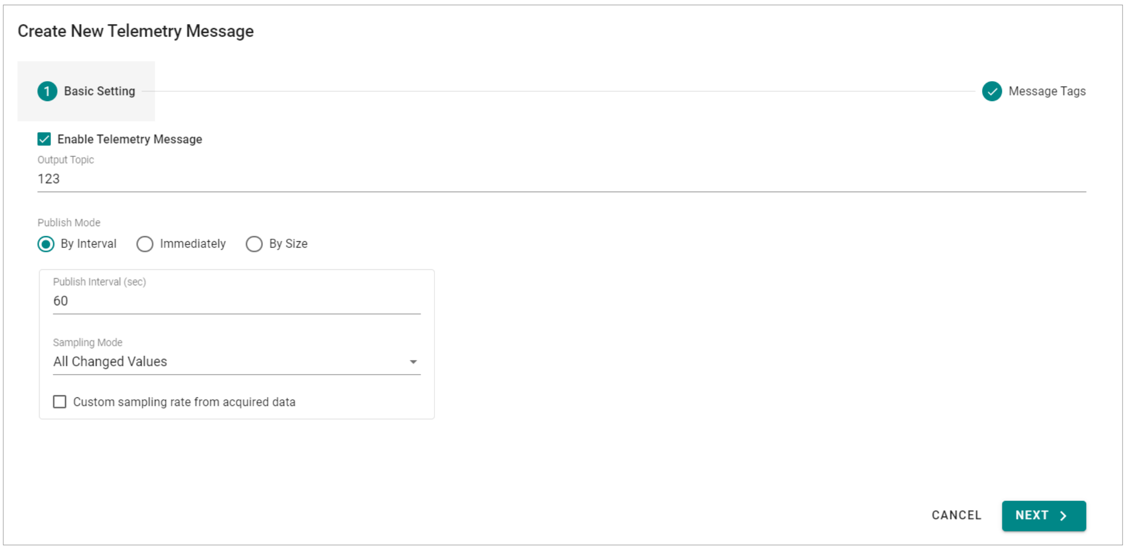
There are no messages to display. Click + MESSAG

Telemetry Message

The simplest message type for sending IoT device data to your IIoT applications is a telemetry message. To create a telemetry message, do the following:

1. Click **+ MESSAGE** to create a new telemetry message.
2. Specify an **Output Topic** name.
3. Select a **Publish Mode**.

   For details, see Publish Mode.
4. Input corresponding parameters such as publish interval, sampling mode, and publish size.
5. Click **NEXT**.



Create New Telemetry Message

☑ Enable Telemetry Message

Output Topic: 123

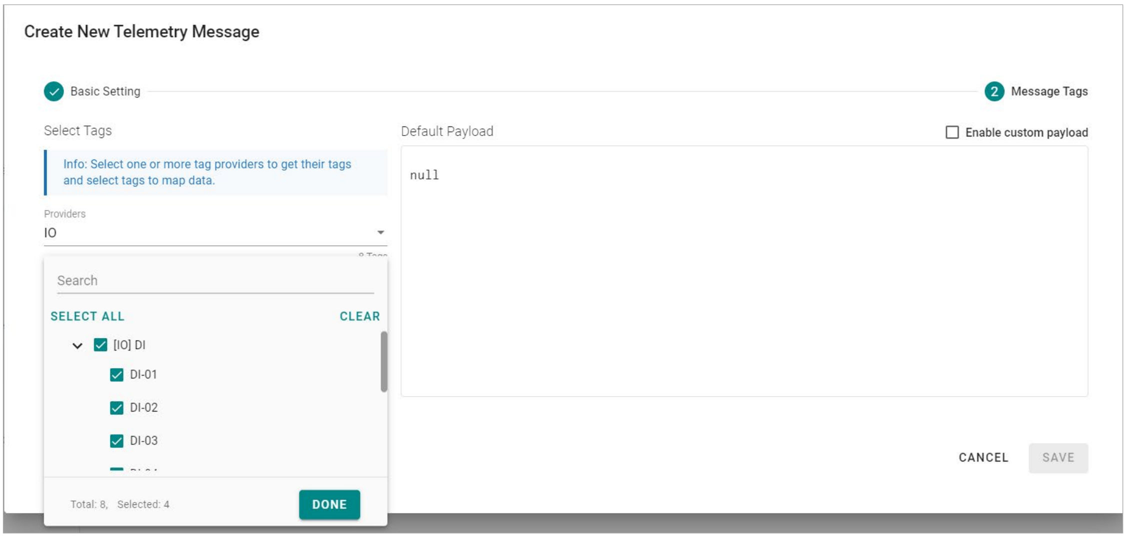
Publish Mode: ● By Interval ○ Immediately ○ By Size

Publish Interval (sec): 60

Sampling Mode: All Changed Values

☐ Custom sampling rate from acquired data

6. Select tags (e.g., Modbus Master).



Create New Telemetry Message

Select Tags

Info: Select one or more tag providers to get their tags and select tags to map data.

Providers: IO

Default Payload

☐ Enable custom payload

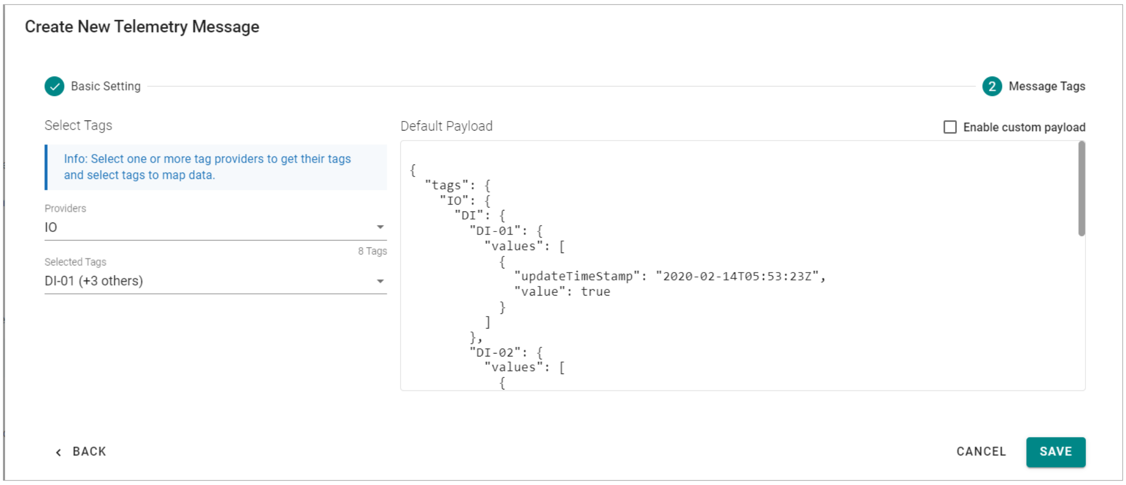
```
null
```

☑ [IO] DI
- ☑ DI-01
- ☑ DI-02
- ☑ DI-03

Total: 8, Selected: 4

7. (Optional) Enable custom payload by using the **jq** filter.

   The device-to-cloud (D2C) message policy allows you to transform default payload to your desired payload schema via the **jq** filter. For additional information, refer to the jq website (https://stedolan.github.io/jq/manual/).



Create New Telemetry Message

✓ Basic Setting ― 2 Message Tags

Select Tags

Info: Select one or more tag providers to get their tags and select tags to map data.

Providers: IO

8 Tags

Selected Tags: DI-01 (+3 others)

Default Payload

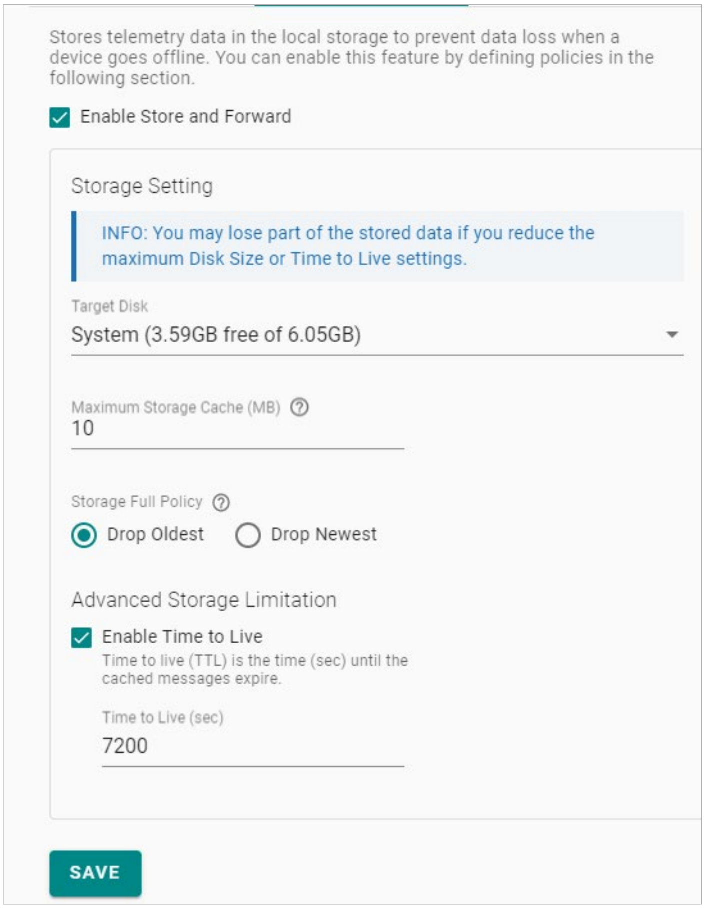
☐ Enable custom payload

```
{
  "tags": {
    "IO": {
      "DI": {
        "DI-01": {
          "values": [
            {
              "updateTimeStamp": "2020-02-14T05:53:23Z",
              "value": true
            }
          ]
        },
        "DI-02": {
          "values": [
            {
```

8. Click **SAVE.**

Store and Forward

D2C messages can be cached in a specified location and sent to the cloud later. This feature helps you keep the acquired data temporarily in a queue when the network between your IIoT Gateway and the cloud is disconnected. It will transmit the data to its destination once the network reconnects. To enable the function, click **Store and Forward** and select **Enable Store and Forward**. Select a target disk and a maximum storage cache, a retention policy, and a TTL (Time to Live) value for the messages.



Stores telemetry data in the local storage to prevent data loss when a device goes offline. You can enable this feature by defining policies in the following section.

☑ Enable Store and Forward

Storage Setting

INFO: You may lose part of the stored data if you reduce the maximum Disk Size or Time to Live settings.

Target Disk: System (3.59GB free of 6.05GB)

Maximum Storage Cache (MB): 10

Storage Full Policy: ● Drop Oldest ○ Drop Newest

Advanced Storage Limitation

☑ Enable Time to Live

Time to live (TTL) is the time (sec) until the cached messages expire.

Time to Live (sec): 7200

NOTE

if you want to use the direct method to write tags from the cloud, refer to https://docs.moxa.online/tpe/openapi/taghub/#tag/access

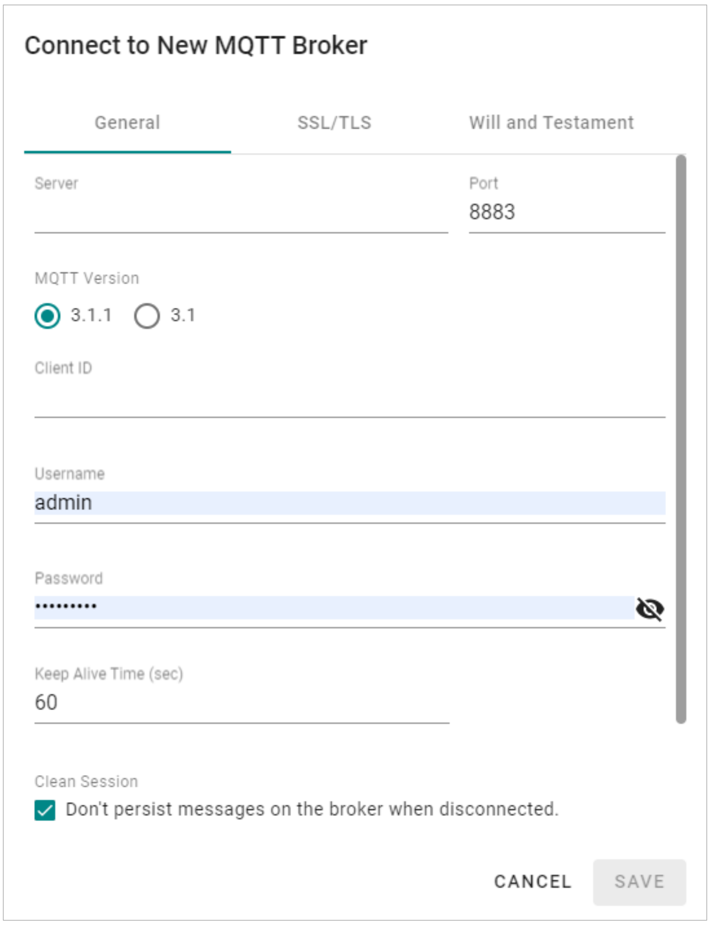
Generic MQTT Client

Go to **Cloud Connectivity > MQTT Client**, and you can add many connections to MQTT Broker.

Note that you need to create a connection first and select D2C telemetry messages to an MQTT broker.

To create an MQTT Client, follow the steps below:

1. Click **ADD CONNECTION**.
2. Specify a **Server** (default port: 8883).



Connect to New MQTT Broker

Server

Port: 8883

MQTT Version: ● 3.1.1 ○ 3.1

Client ID

Username: admin

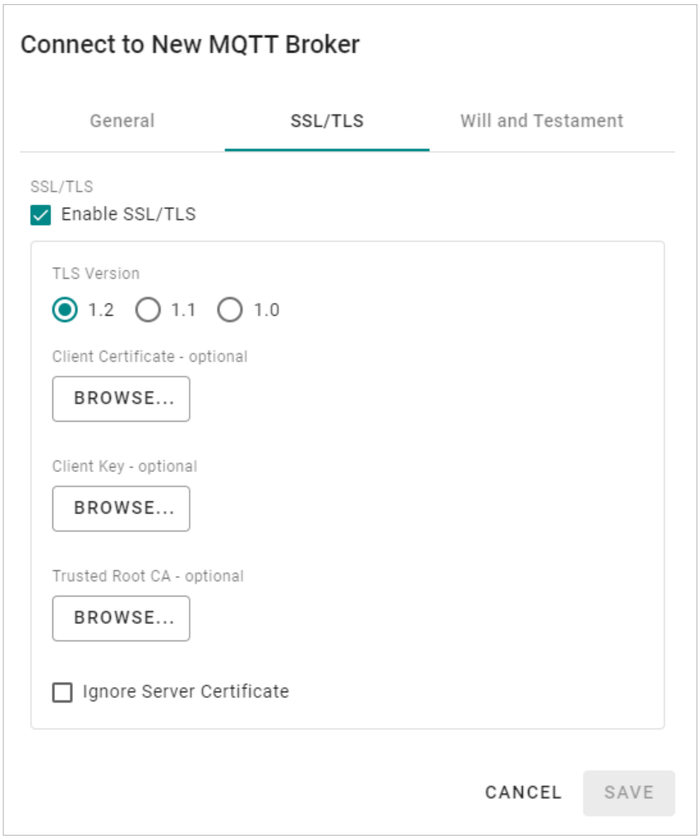
Password: •••••••••

Keep Alive Time (sec): 60

Clean Session: ☑ Don't persist messages on the broker when disconnected.

3. Select an **MQTT Version**.
4. (Optional) If the broker requires, enter **Client ID**, **Username**, and **Password**.
5. (Optional) Enable persistent session.
6. Select a type of **QoS** and **retain function on/off**.

7. (Optional) Enable SSL/TLS, and upload Client Certificate, Client Key, Trusted Root CA.



Connect to New MQTT Broker

SSL/TLS
☑ Enable SSL/TLS

TLS Version
● 1.2 ○ 1.1 ○ 1.0

Client Certificate - optional

Client Key - optional

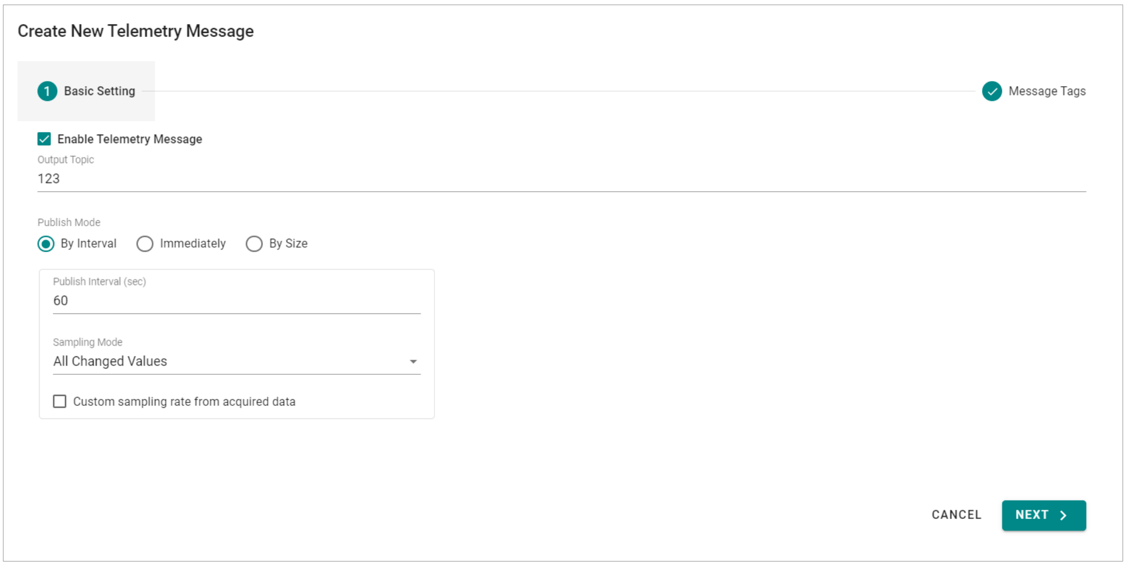
Trusted Root CA - optional

□ Ignore Server Certificate

8. (Optional) Enable Will flag.
9. (Optional) Select type of QoS and retain function for Will flag.

Once an MQTT Broker has been created, create a new telemetry message by following the steps below:

1. Click **+ MESSAGE**.
2. Specify an **output topic.**



Create New Telemetry Message

☑ Enable Telemetry Message

Output Topic
123

Publish Mode
● By Interval ○ Immediately ○ By Size

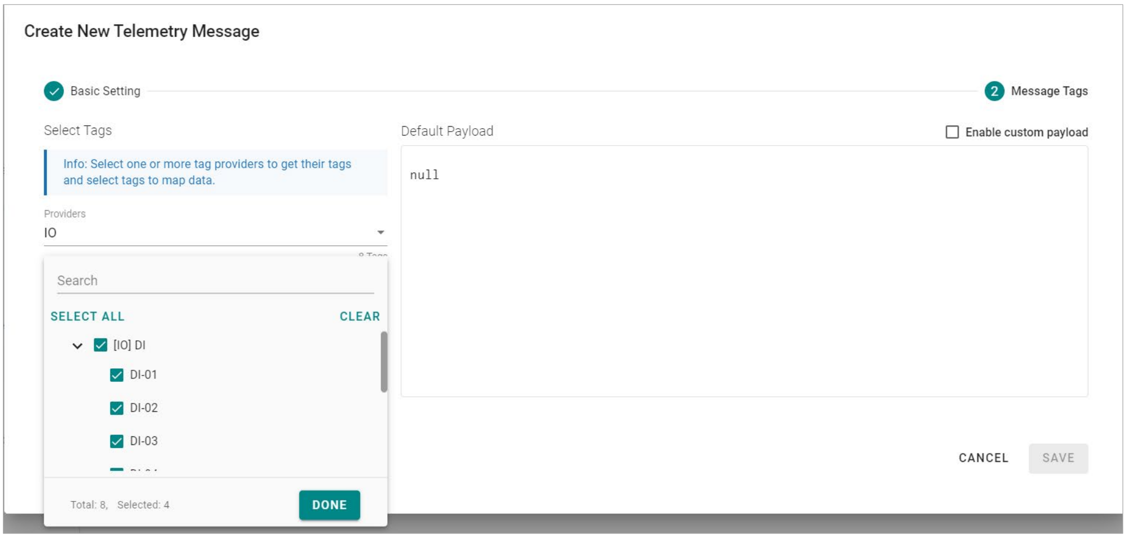
Publish Interval (sec)
60

Sampling Mode
All Changed Values

□ Custom sampling rate from acquired data

3. Select a **Publish Mode**.
   For details, see Publish Mode.

4. Input corresponding parameters such as publish interval, sampling mode, and publish size.
5. Click **NEXT**.
6. **Select tags** from providers (e.g., Modbus Master).



Create New Telemetry Message

✓ Basic Setting — 2 Message Tags

Select Tags

Info: Select one or more tag providers to get their tags and select tags to map data.

Providers: IO

Search

SELECT ALL CLEAR

☑ [IO] DI
- ☑ DI-01
- ☑ DI-02
- ☑ DI-03

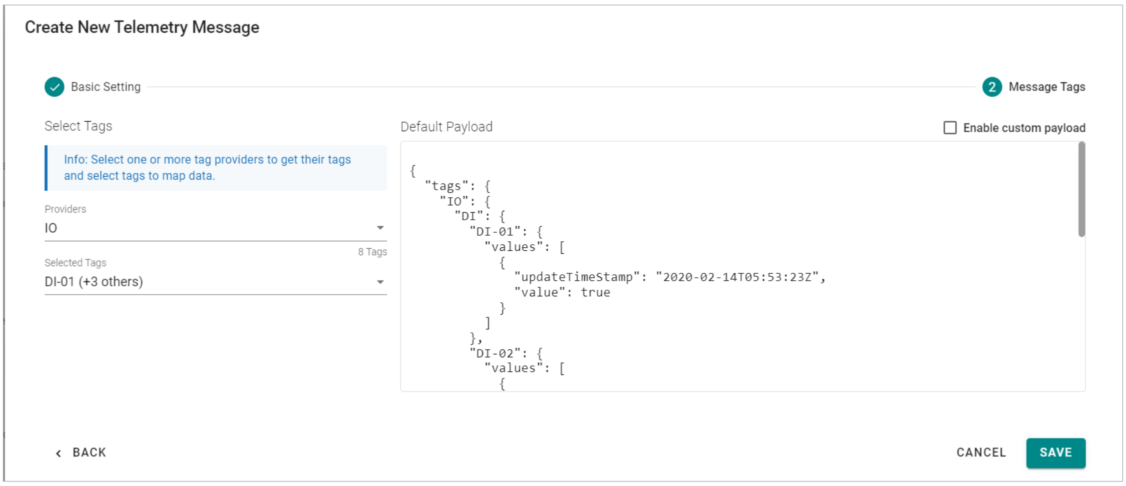
Total: 8, Selected: 4 DONE

Default Payload ☐ Enable custom payload

```
null
```

CANCEL SAVE

7. (Optional) Enable custom payload by using the **jq** filter.



Create New Telemetry Message

✓ Basic Setting — 2 Message Tags

Select Tags

Info: Select one or more tag providers to get their tags and select tags to map data.

Providers: IO

8 Tags

Selected Tags: DI-01 (+3 others)

Default Payload ☐ Enable custom payload

```
{
  "tags": {
    "IO": {
      "DI": {
        "DI-01": {
          "values": [
            {
              "updateTimeStamp": "2020-02-14T05:53:23Z",
              "value": true
            }
          ]
        },
        "DI-02": {
          "values": [
            {
```

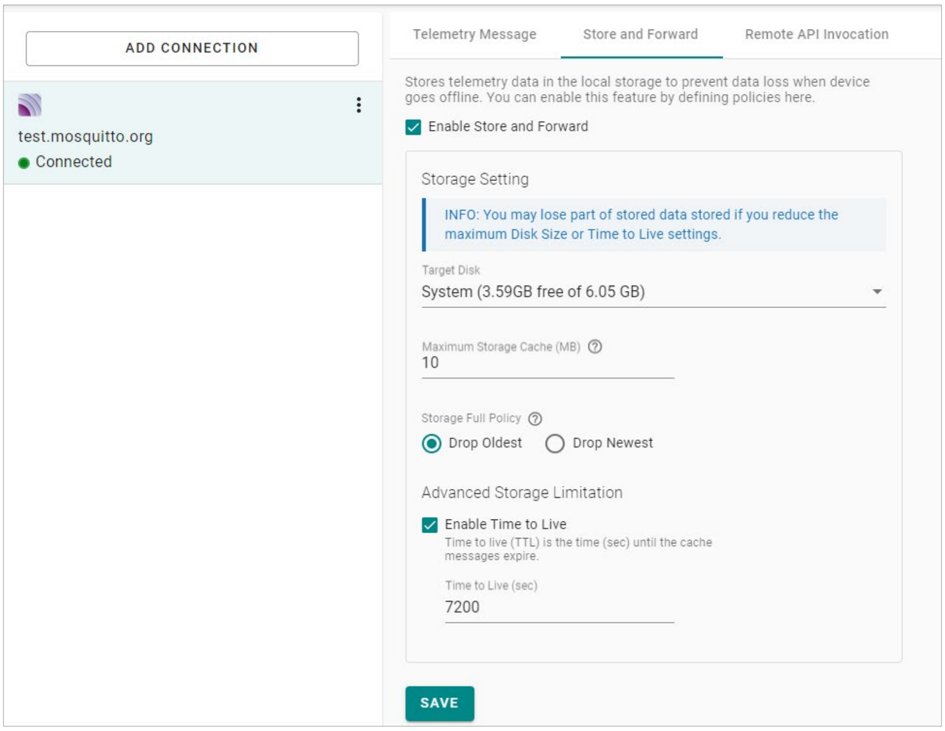
‹ BACK CANCEL SAVE

8. Click **SAVE**.

The device-to-cloud (D2C) message policy allows you to transform the default payload to your desired payload schema via the **jq** filter. For additional information, refer to the jq website (https://stedolan.github.io/jq/manual/).

Store and Forward

D2C messages can be cached in a specified location and sent to the cloud later. This feature helps you keep the acquired data temporarily in a queue when the network between your IIoT Gateway and the cloud is disconnected. It will transmit the data to its destination once the network reconnects. To enable the function, click **Store and Forward** and select **Enable Store and Forward**. Select a target disk and a maximum storage cache, a retention policy, and a TTL (Time to Live) value for the messages.



Stores telemetry data in the local storage to prevent data loss when device goes offline. You can enable this feature by defining policies here.

☑ Enable Store and Forward

Storage Setting

INFO: You may lose part of stored data stored if you reduce the maximum Disk Size or Time to Live settings.

Target Disk: System (3.59GB free of 6.05 GB)

Maximum Storage Cache (MB): 10

Storage Full Policy: ● Drop Oldest ○ Drop Newest

Advanced Storage Limitation

☑ Enable Time to Live

Time to live (TTL) is the time (sec) until the cache messages expire.

Time to Live (sec): 7200

NOTE

if you want to use the direct method to write tags from the cloud, refer to https://docs.moxa.online/tpe/openapi/taghub/#tag/access

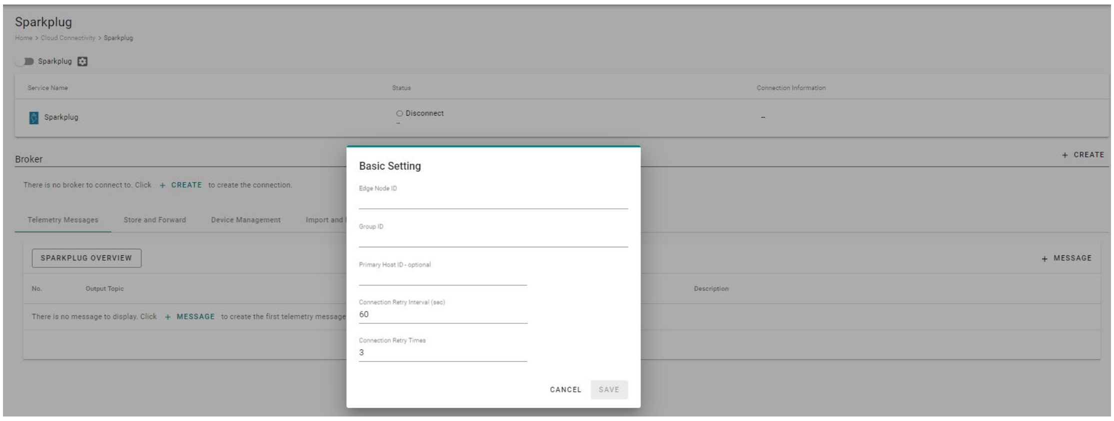
Sparkplug

Sparkplug B is a specification designed specifically for IoT applications so that MQTT devices and applications can send and receive messages in a stateful way. Go to **Cloud Connectivity > Sparkplug** to enable Sparkplug B and communication. The configuration process consists of the following:

- Enabling Sparkplug
- Configuring a Broker
- Configuring a Telemetry Message

Enabling Sparkplug

1. Click on the **Sparkplug B.** link and use the scroll bar to enable Sparkplug B.
2. Specify an Edge Node ID.
3. Specify a Group ID.
4. (optional) Specify a Primary Host ID.



Service Name	Status	Connection Information
Sparkplug	○ Disconnect --	--

There is no broker to connect to. Click + CREATE to create the connection.

No.	Output Topic	Description

There is no message to display. Click + MESSAGE to create the first telemetry message

Edge Node ID:

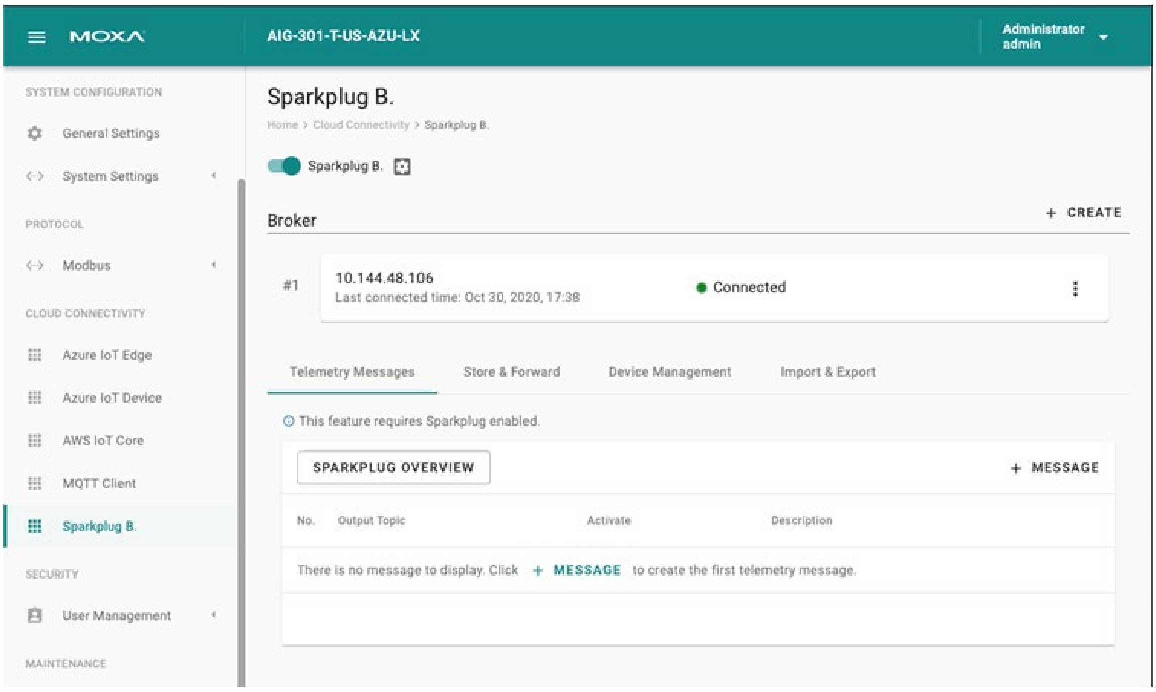
Group ID:

Primary Host ID - optional:

Connection Retry Interval (sec): 60

Connection Retry Times: 3

5. Click **SAVE**.



#1 10.144.48.106
Last connected time: Oct 30, 2020, 17:38
● Connected

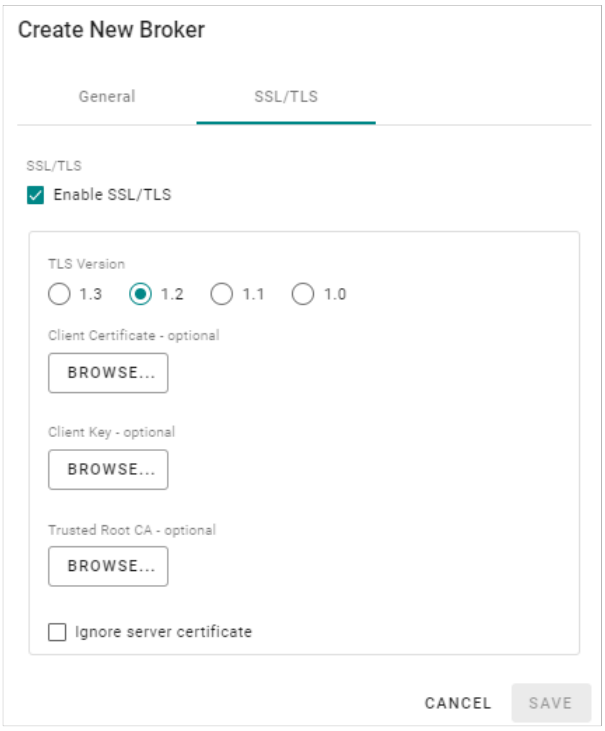
This feature requires Sparkplug enabled.

No.	Output Topic	Activate	Description

There is no message to display. Click + MESSAGE to create the first telemetry message.

Configuring a Broker

1. Click on the **+ CREATE** link to create a broker for Sparkplug B.
2. Specify a **Server** (default port: 8883).
3. (optional) Enter **Client ID**, **Username**, and **Password**.
4. Specify an interval of Keep Alive Time (default 60 seconds)
5. (optional) **Enable SSL/TLS** and upload **Client Certificate**, **Key**, and **Trusted Root CA**.



Create New Broker

SSL/TLS

☑ Enable SSL/TLS

TLS Version

○ 1.3 ● 1.2 ○ 1.1 ○ 1.0

Client Certificate - optional

Client Key - optional

Trusted Root CA - optional

□ Ignore server certificate

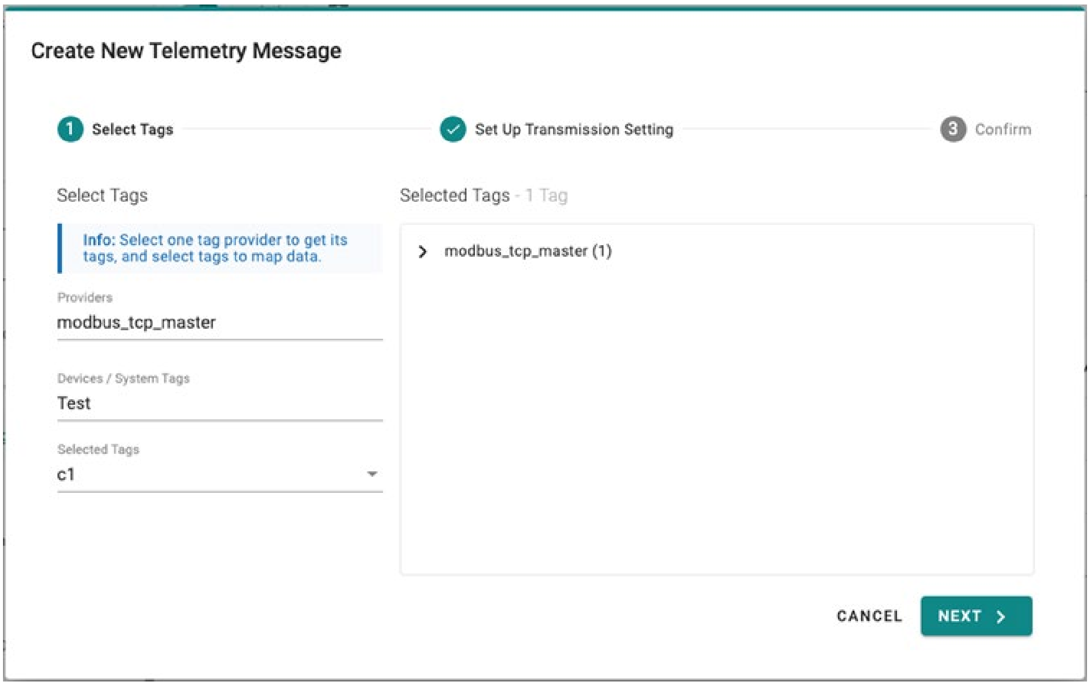
6. Click **SAVE**.

NOTE

Data loss might occur during the period of connection interval prior to network connection check (Keep Alive Time). We suggest setting a shorter interval of Keep Alive Time (e.g., 10 seconds)

Configuring a Telemetry Message

1. Click on the **+ MESSAGE** link.
2. Select tags from providers (e.g., Modbus Master).
3. Select devices or system tags.
4. Click **NEXT**.



Create New Telemetry Message

Select Tags

Info: Select one tag provider to get its tags, and select tags to map data.

Providers: modbus_tcp_master

Devices / System Tags: Test

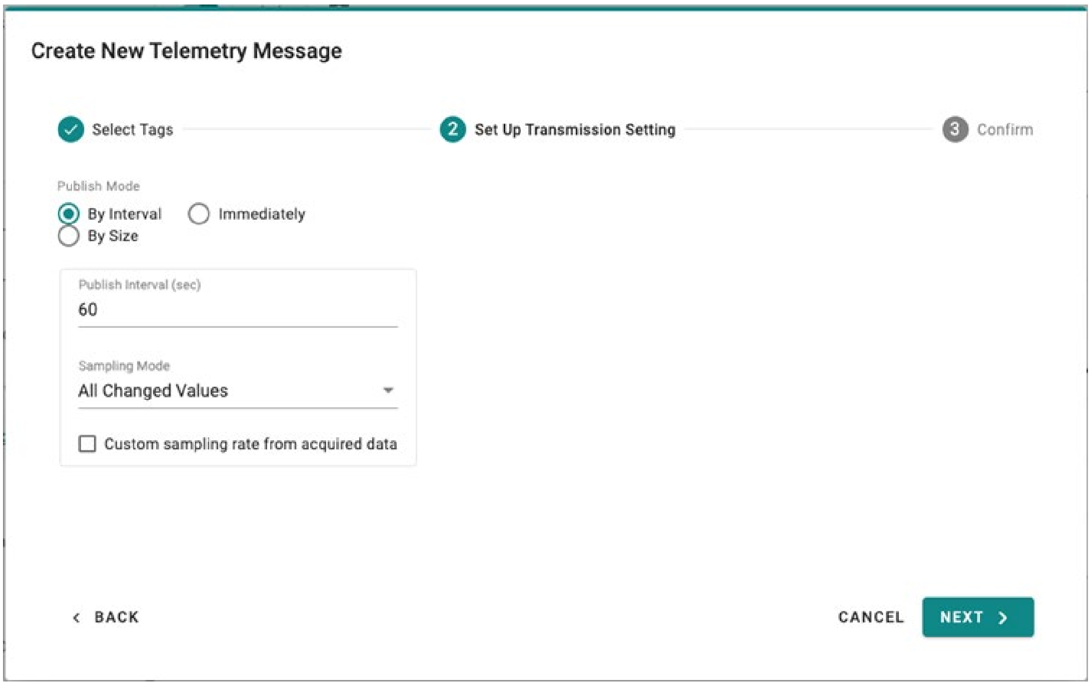
Selected Tags: c1

Selected Tags - 1 Tag

modbus_tcp_master (1)

5. Select a publish mode.

   For details, see Publish Mode.
6. Select a sampling mode.
7. Click **NEXT**.



Create New Telemetry Message

Publish Mode

● By Interval ○ Immediately
○ By Size

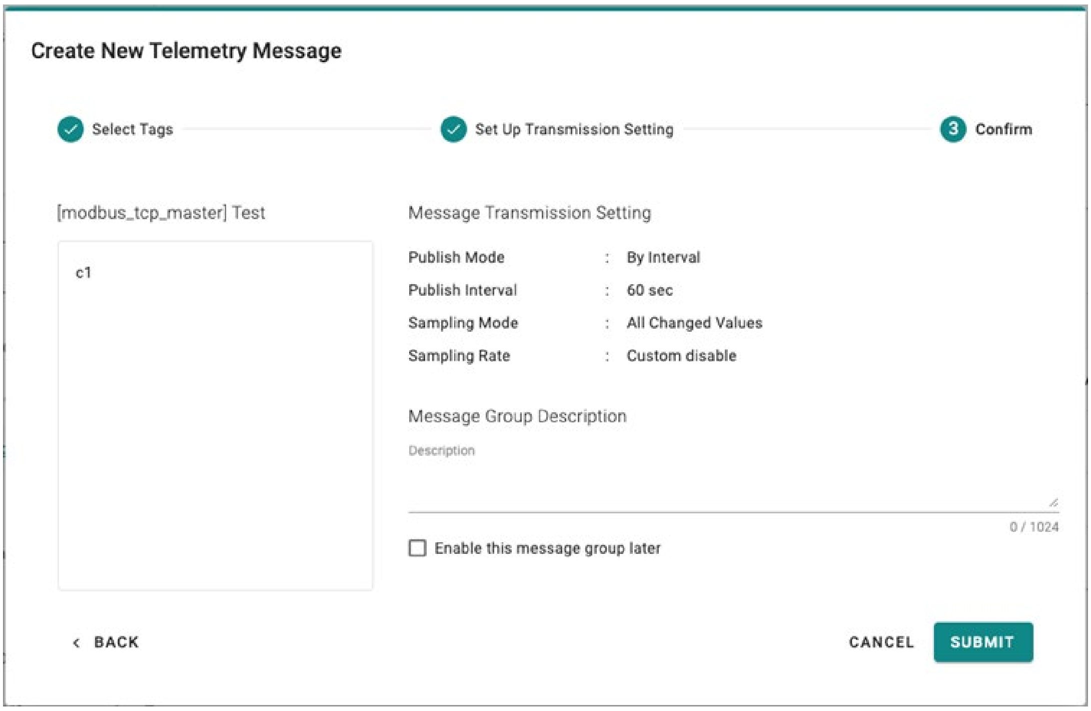
Publish Interval (sec): 60

Sampling Mode: All Changed Values

□ Custom sampling rate from acquired data

8. (optional) Specify a description.

9. Click **SUBMIT**.



Create New Telemetry Message

✓ Select Tags — ✓ Set Up Transmission Setting — 3 Confirm

[modbus_tcp_master] Test

c1

Message Transmission Setting

Publish Mode : By Interval
Publish Interval : 60 sec
Sampling Mode : All Changed Values
Sampling Rate : Custom disable

Message Group Description

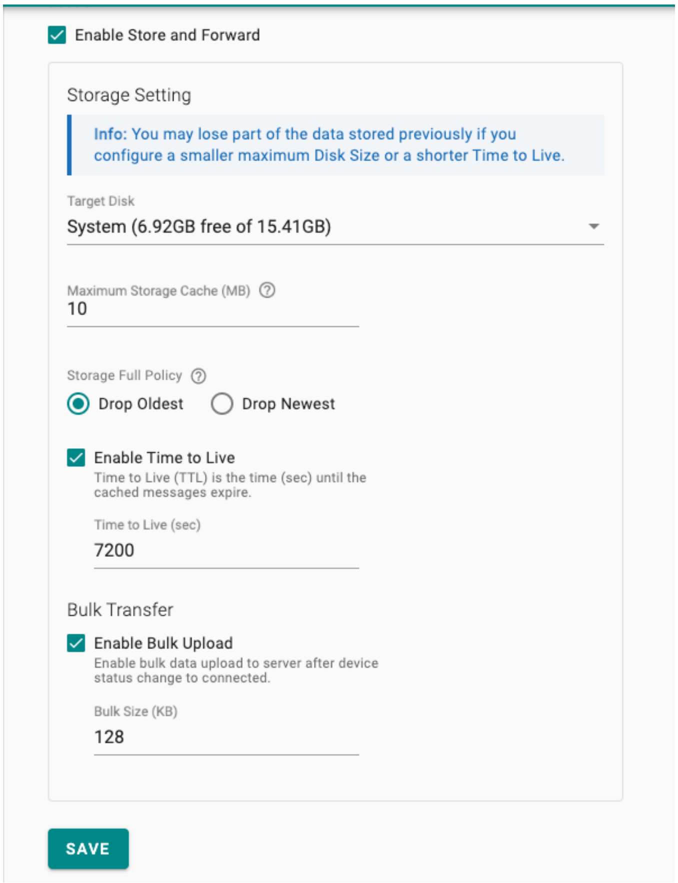
Description

0 / 1024

□ Enable this message group later

Store and Forward

D2C messages can be cached in a specified location and sent to the cloud later. This feature helps you keep the acquired data in a queue temporarily when the network between your IIoT Gateway and the cloud is disconnected and transmit it to its destination after a reconnection. To enable the function, click on **Store and Forward** and select **Enable Store and Forward**. You can select a target disk and set a maximum storage cache, a retention policy, a TTL (Time to Live) value for the messages and a size of bulk transfer.



☑ Enable Store and Forward

Storage Setting

Info: You may lose part of the data stored previously if you configure a smaller maximum Disk Size or a shorter Time to Live.

Target Disk: System (6.92GB free of 15.41GB)

Maximum Storage Cache (MB): 10

Storage Full Policy: ● Drop Oldest ○ Drop Newest

☑ Enable Time to Live
Time to Live (TTL) is the time (sec) until the cached messages expire.

Time to Live (sec): 7200

Bulk Transfer

☑ Enable Bulk Upload
Enable bulk data upload to server after device status change to connected.

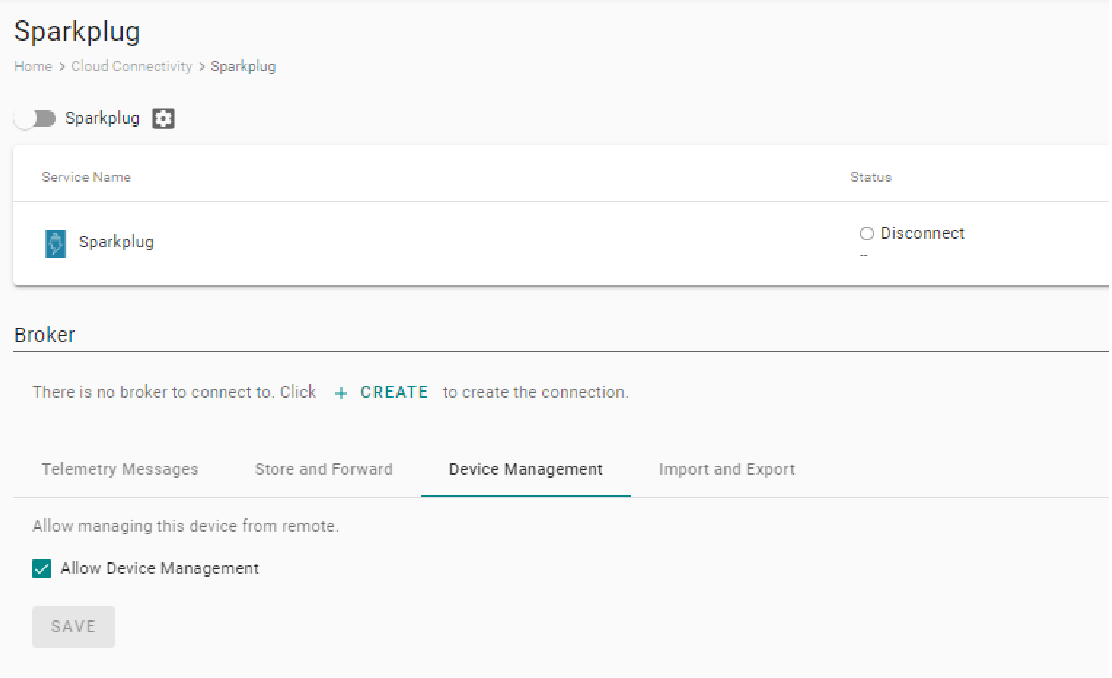
Bulk Size (KB): 128

NOTE

if you want to use the direct method to write tags from the cloud, refer to https://docs.moxa.online/tpe/openapi/taghub/#tag/access

Device Management

Enabling this feature allows cloud service providers to manage IoT devices remotely through Device Twin and Direct Method technology.



Sparkplug

Home > Cloud Connectivity > Sparkplug

Sparkplug

Service Name	Status
Sparkplug	○ Disconnect --

Broker

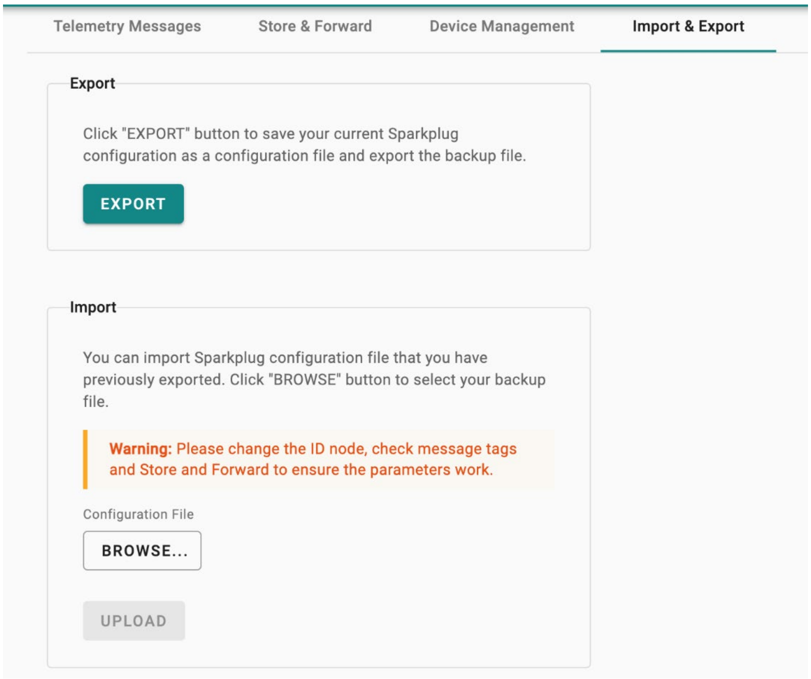
There is no broker to connect to. Click + CREATE to create the connection.

Allow managing this device from remote.

☑ Allow Device Management

Import & Export

To back up the configuration of Sparkplug, you can export the configuration as a backup file.



Export

Click "EXPORT" button to save your current Sparkplug configuration as a configuration file and export the backup file.

Import

You can import Sparkplug configuration file that you have previously exported. Click "BROWSE" button to select your backup file.

Warning: Please change the ID node, check message tags and Store and Forward to ensure the parameters work.

Configuration File

NOTE

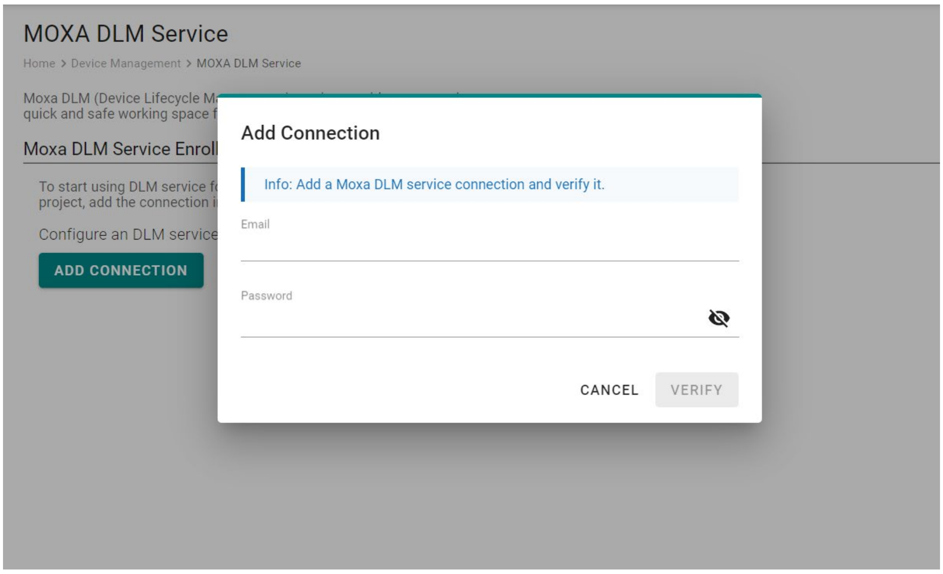
The exported configuration includes credentials, client ID, and policies of D2C messages. You can modify these parameters after the configuration file is imported to other gateways.

Moxa DLM Service

Moxa DLM (device lifecycle management) service is used for managing the AIG devices. Imagine sitting in your office and using this service to remotely manage numerous devices distributed around the world. You can monitor the device's health status, upgrade firmware, import/export configuration, and remotely log into the device's web console. If you want to apply for this service, contact the product manager, Joshua Lin, at joshua.lin@moxa.com.

Once you have access to the service, go the **Moxa DLM Service** to register the product online as follows.

10. Input DLM **email** and **password**, and press **VERIFY**.



MOXA DLM Service

Home > Device Management > MOXA DLM Service

Moxa DLM (Device Lifecycle M
quick and safe working space f

Moxa DLM Service Enroll

To start using DLM service f
project, add the connection i

Configure an DLM service

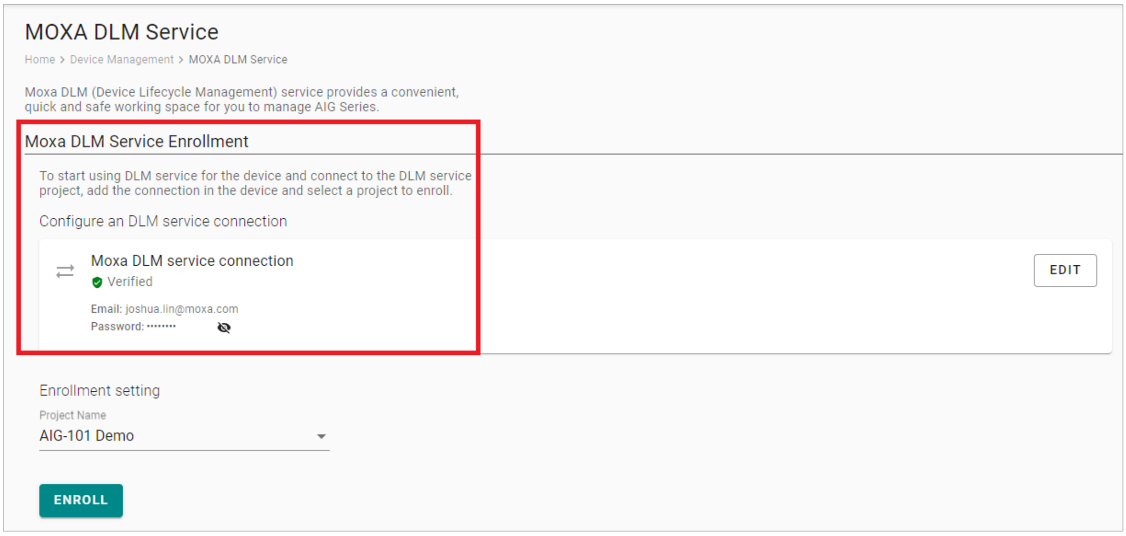
Add Connection

Info: Add a Moxa DLM service connection and verify it.

Email

Password

11. If the input information is correct, you will see the connection has been verified.



MOXA DLM Service

Home > Device Management > MOXA DLM Service

Moxa DLM (Device Lifecycle Management) service provides a convenient, quick and safe working space for you to manage AIG Series.

Moxa DLM Service Enrollment

To start using DLM service for the device and connect to the DLM service project, add the connection in the device and select a project to enroll.

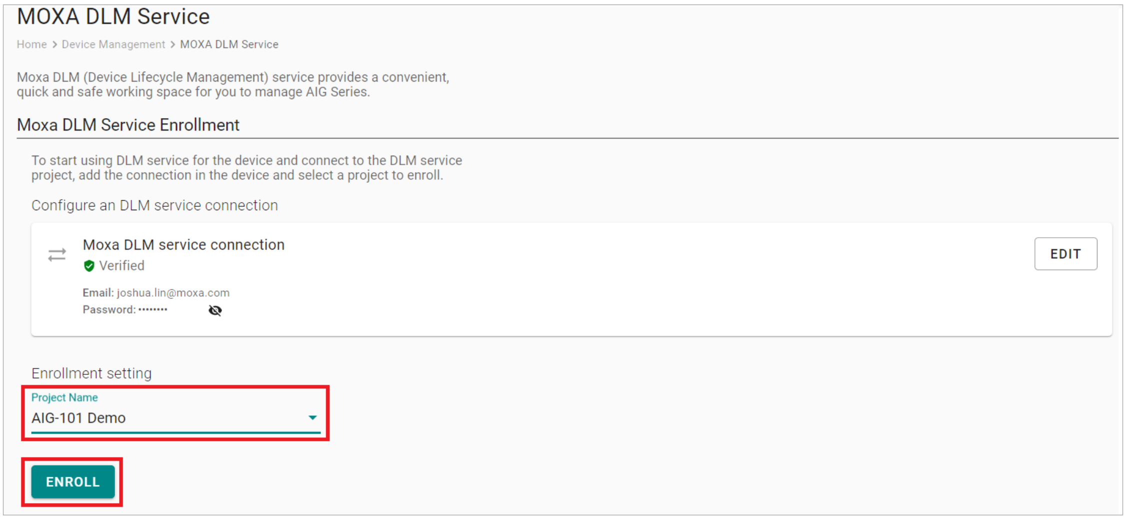
Configure an DLM service connection

Moxa DLM service connection
✓ Verified
Email: joshua.lin@moxa.com
Password: ••••••••

Enrollment setting

Project Name
AIG-101 Demo

12. Choose the **Project** and Press **ENROLL** to enroll.



MOXA DLM Service

Home > Device Management > MOXA DLM Service

Moxa DLM (Device Lifecycle Management) service provides a convenient, quick and safe working space for you to manage AIG Series.

Moxa DLM Service Enrollment

To start using DLM service for the device and connect to the DLM service project, add the connection in the device and select a project to enroll.

Configure an DLM service connection

Moxa DLM service connection
✓ Verified

Email: joshua.lin@moxa.com
Password: ••••••••

EDIT

Enrollment setting

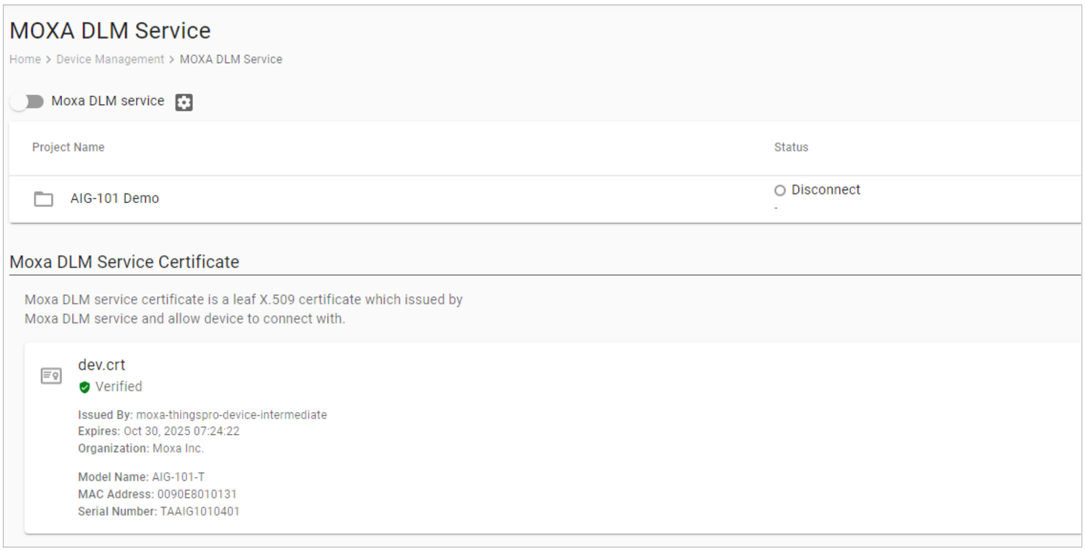
Project Name: AIG-101 Demo

ENROLL

13. Once the enrollment is successful, you will see the following information:

NOTE

Ensure the Moxa DLM service is enabled at the top left corner.



MOXA DLM Service

Home > Device Management > MOXA DLM Service

Moxa DLM service

Project Name	Status
AIG-101 Demo	○ Disconnect -

Moxa DLM Service Certificate

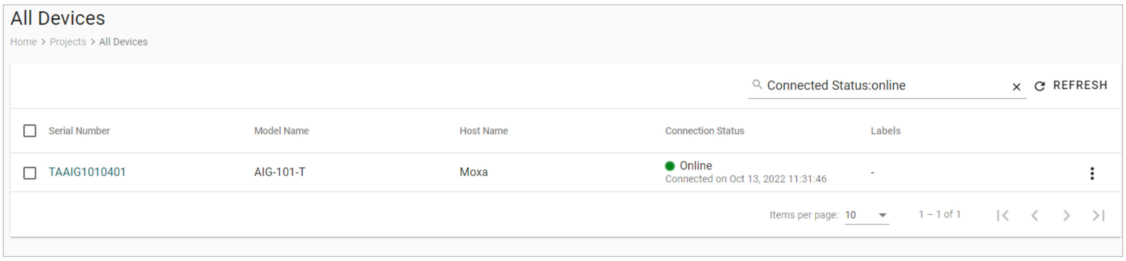
Moxa DLM service certificate is a leaf X.509 certificate which issued by Moxa DLM service and allow device to connect with.

dev.crt
✓ Verified

Issued By: moxa-thingspro-device-intermediate
Expires: Oct 30, 2025 07:24:22
Organization: Moxa Inc.

Model Name: AIG-101-T
MAC Address: 0090E8010131
Serial Number: TAAIG1010401

14. Log in to the Moxa DLM Service.
You will see your AIG device online and you can manage it.



All Devices

Home > Projects > All Devices

Connected Status:online × REFRESH

□ Serial Number	Model Name	Host Name	Connection Status	Labels
□ TAAIG1010401	AIG-101-T	Moxa	● Online Connected on Oct 13, 2022 11:31:46	-

Items per page: 10   1 – 1 of 1

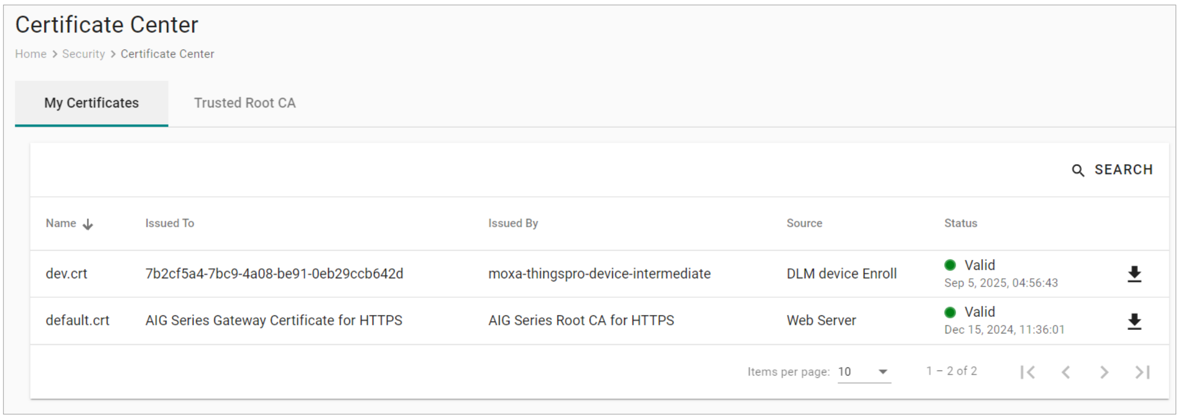
Security

Certificate Center

To check what certificates have been used on the devices, go to **Security > Certificate Center** to view all of them. On this page, you can search, view the status, and download the certificate for backup purpose.

The **rootCA.cer** certificate is used to sign the HTTP SSL X.509 certificate, default.crt. You can download this root CA and import it to your client devices to trust the HTTPs connection between clients and AIG. To import to Google Chrome, you can refer to the below link:

https://docs.moxa.online/tpe/users-manual/security/certificate_center/#import-rootcacer-to-google-chrome



Certificate Center

Home > Security > Certificate Center

Name ↓	Issued To	Issued By	Source	Status
dev.crt	7b2cf5a4-7bc9-4a08-be91-0eb29ccb642d	moxa-thingspro-device-intermediate	DLM device Enroll	● Valid Sep 5, 2025, 04:56:43
default.crt	AIG Series Gateway Certificate for HTTPS	AIG Series Root CA for HTTPS	Web Server	● Valid Dec 15, 2024, 11:36:01

Items per page: 10   1 – 2 of 2

Firewall

AIG provides a firewall that allows you to create rules for inbound Internet network traffic to protect your IIoT gateway.

Inbound

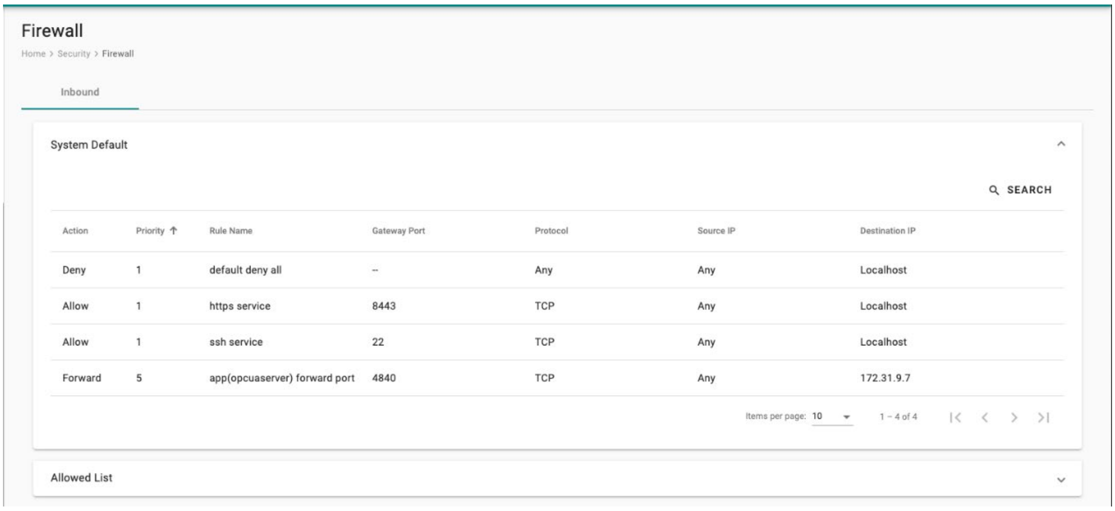
System Default

AIG reserves ports for the services below.

No.	Rule	Priority	Service	Port
1	Allow	1	HTTP	80
2	Allow	1	HTTPS	8443
3	Allow	1	SSH	22
4	Allow	1	Device discovery	40404
5	Forward	5	OPCUA Server	4840

NOTE

The AIG disables all ports by default excluding the reserved ports mentioned above. To add service ports, add them to the **Allowed List**.



Firewall

Home > Security > Firewall

Inbound

System Default

Action	Priority ↑	Rule Name	Gateway Port	Protocol	Source IP	Destination IP
Deny	1	default deny all	--	Any	Any	Localhost
Allow	1	https service	8443	TCP	Any	Localhost
Allow	1	ssh service	22	TCP	Any	Localhost
Forward	5	app(opcuaserver) forward port	4840	TCP	Any	172.31.9.7

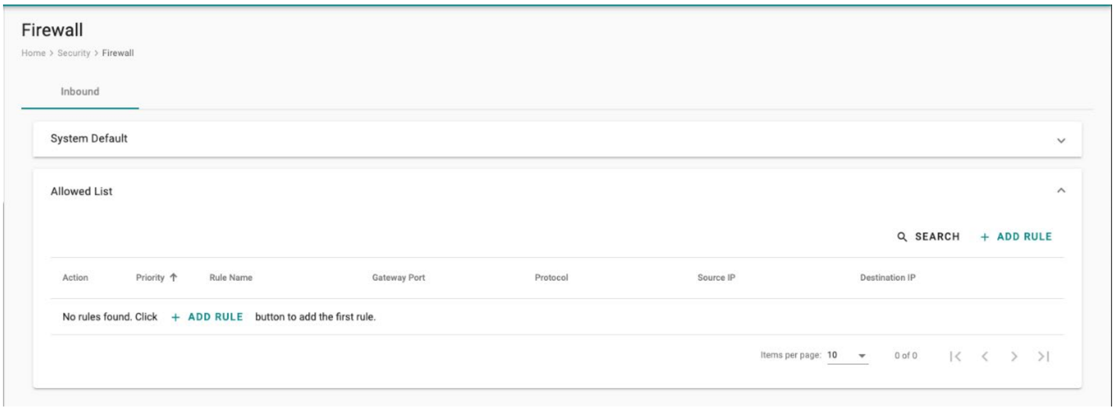
Items per page: 10

1 – 4 of 4

Allowed List

Allowed List

AIG provides an allowed list for creating firewall rules. You can create, edit, and delete firewall rules here.



Firewall

Home > Security > Firewall

Inbound

System Default

Allowed List

Action	Priority ↑	Rule Name	Gateway Port	Protocol	Source IP	Destination IP

No rules found. Click + ADD RULE button to add the first rule.

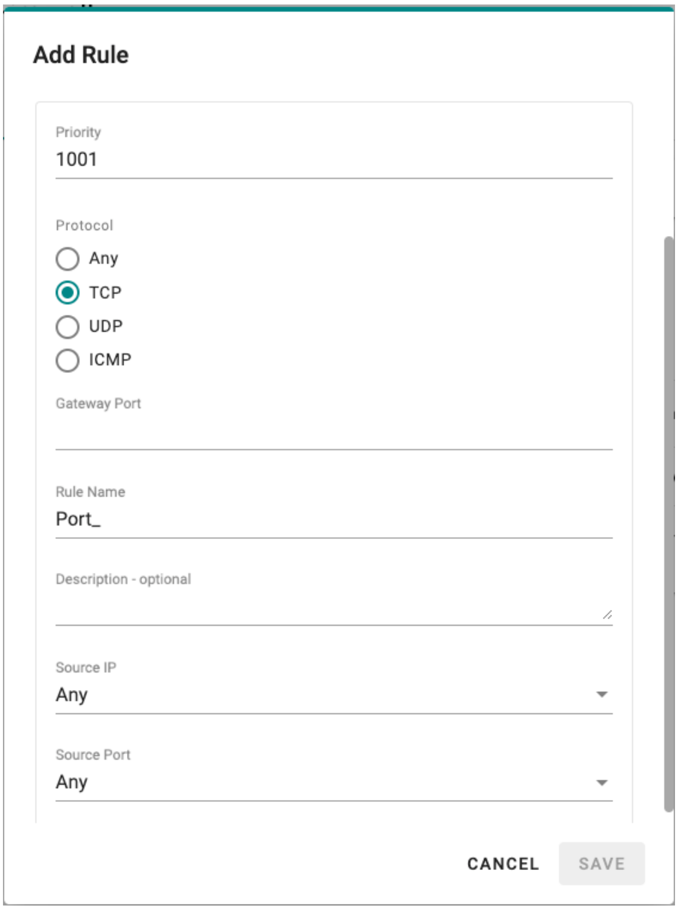
Items per page: 10

0 of 0

To create firewall rules, do the following:

Create Allow Rule:

1. Click **+ ADD RULE.**
2. Select action **Allow.**
3. Specify the priority, protocol, gateway port, rule name, and description (optional).
4. Specify a source IP or a subnet.
5. Specify a source port or a range of ports.
6. Click **SAVE**.



Add Rule

Priority: 1001

Protocol
○ Any
● TCP
○ UDP
○ ICMP

Gateway Port

Rule Name: Port_

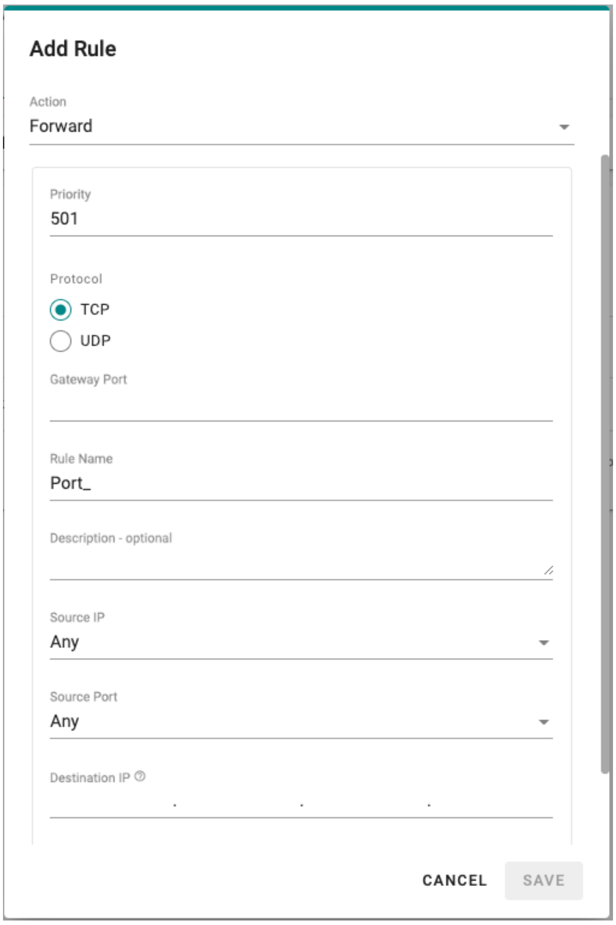
Description - optional

Source IP: Any

Source Port: Any

Create Forward Rule:

1. Click **+ ADD RULE.**
2. Select action **Forward.**
3. Specify a value of priority, protocol, gateway port, rule name, and description (optional).
4. Specify a source IP or a subnet.
5. Specify a destination IP and port.



Add Rule

Action: Forward

Priority: 501

Protocol

● TCP

○ UDP

Gateway Port:

Rule Name: Port_

Description - optional:

Source IP: Any

Source Port: Any

Destination IP: . . .

6. Click **SAVE.**

NOTE

AIG Edge reserves priority 1 to 500 for system default rules. The priority range 501 to1000 is for **Forward** action rules; while the range 1001 to 1500 is for **Allow** action rules.

OpenVPN Client

OpenVPN allows you to create secure connections over the internet. It provides encryption and authentication to ensure confidentiality and integrity of your data. OpenVPN uses a client-server architecture where the server acts as the VPN endpoint and the client connects to the server to establish a secure connection. To enable the function, go to **Security > OpenVPN Client** and do the following:

1. Download the OpenVPN profile template.
2. Revise the profile by inputting the necessary information provided by your VPN service provider.

   This information includes:

   a. Remote server IP: This is the address of the VPN server you want to connect to.

   b. Port number: The port through which the VPN connection will be established. The default is usually 1194.

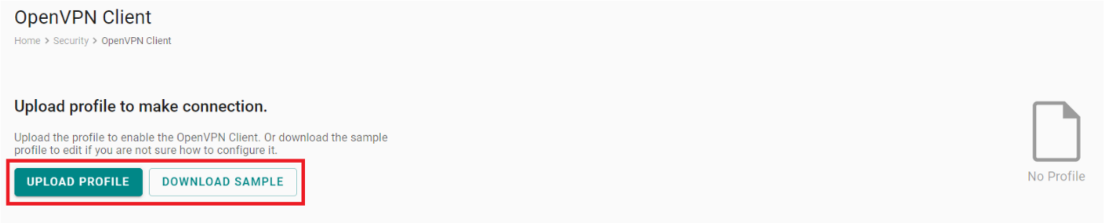
   c. Protocol: The protocol to be used for the VPN connection, such as UDP or TCP.

   d. Authentication method: The method used to authenticate your connection.

   e. Encryption settings: The encryption algorithm to be used for securing the VPN connection.
3. Import the OpenVPN profile.

   You should see it listed in the OpenVPN client.
4. Click the button to enable OpenVPN client to connect.

If the connection is successful, you will be connected to the VPN network, and your internet traffic will be encrypted and routed through the VPN server.

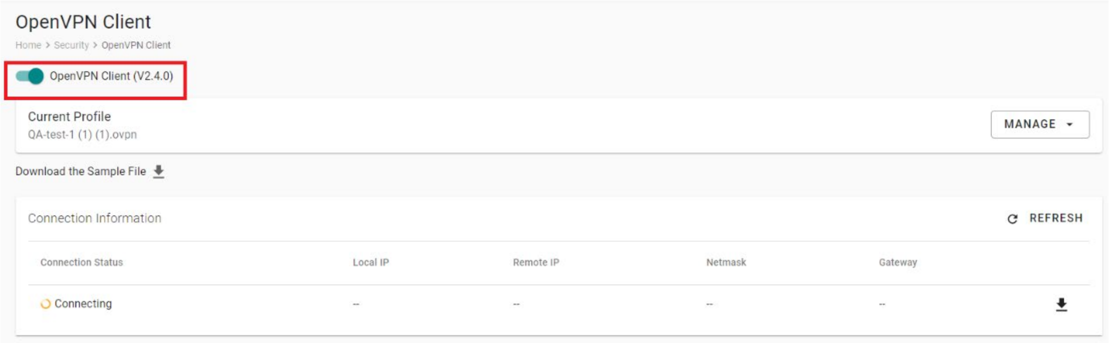


OpenVPN Client

Home > Security > OpenVPN Client

Upload profile to make connection.

Upload the profile to enable the OpenVPN Client. Or download the sample profile to edit if you are not sure how to configure it.



OpenVPN Client

Home > Security > OpenVPN Client

OpenVPN Client (V2.4.0)

Current Profile
QA-test-1 (1) (1).ovpn

Download the Sample File

Connection Information

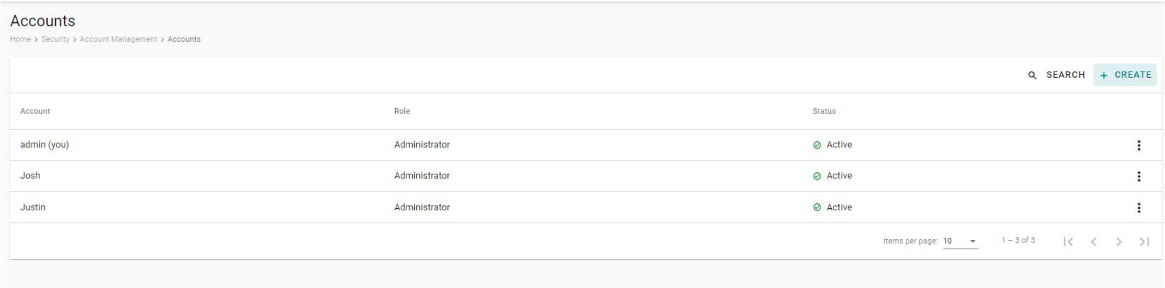
Connection Status	Local IP	Remote IP	Netmask	Gateway
Connecting	--	--	--	--

Account Management

You can maintain user accounts and assign a role with specific permissions to each account. These functions allow you to track and control who accesses this device.

Accounts

You can **View**, **Create**, **Edit**, **Deactivate**, and **Delete** user accounts. In the main menu, go to **Security > Account Management > Accounts** to manage user accounts.



Accounts

Home > Security > Account Management > Accounts

Account	Role	Status
admin (you)	Administrator	✓ Active
Josh	Administrator	✓ Active
Justin	Administrator	✓ Active

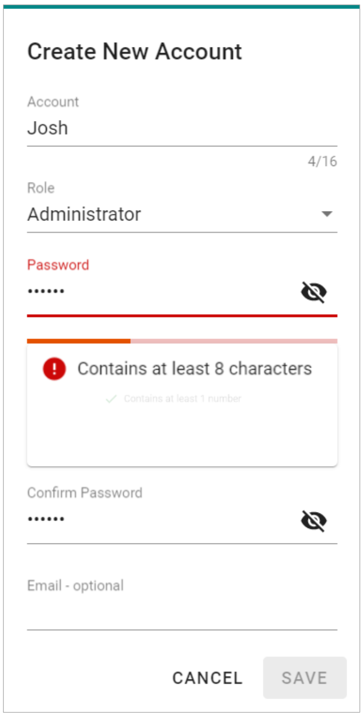
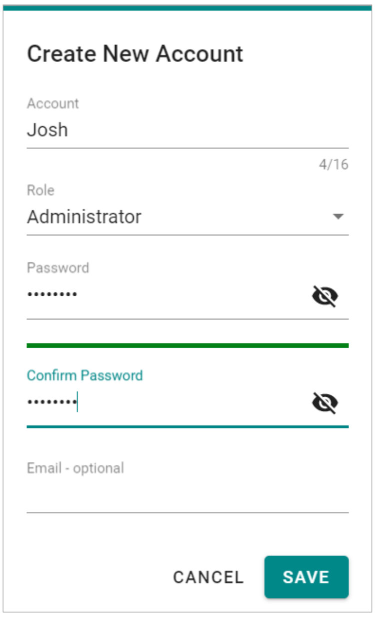
Items per page: 10 1 – 3 of 3

Creating a New User Account

Click on **+ CREATE** to create a new user account. In the dialogue box that is displayed, fill up the fields and click **SAVE**.

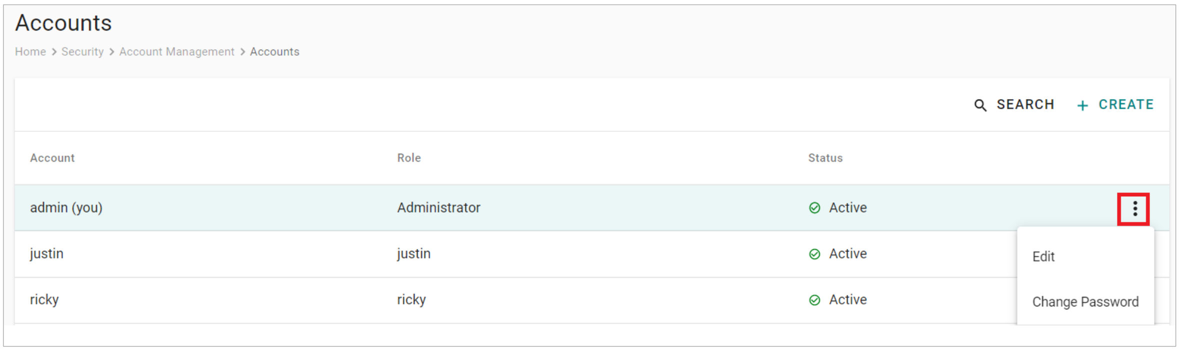
NOTE

We recommend that you specify a strong password that is at least eight characters long, consisting of at least one number and at least one special character.

Password Policy	Valid Password
 Create New Account Account: Josh 4/16 Role: Administrator Password: •••••• Contains at least 8 characters ✓ Contains at least 1 number Confirm Password: •••••• Email - optional CANCEL SAVE	 Create New Account Account: Josh 4/16 Role: Administrator Password: •••••••• Confirm Password: •••••••• Email - optional CANCEL SAVE

Managing Existing User Accounts

To manage an account, click on the pop-up menu icon for the account.



Accounts

Home > Security > Account Management > Accounts

Account	Role	Status
admin (you)	Administrator	✓ Active
justin	justin	✓ Active
ricky	ricky	✓ Active

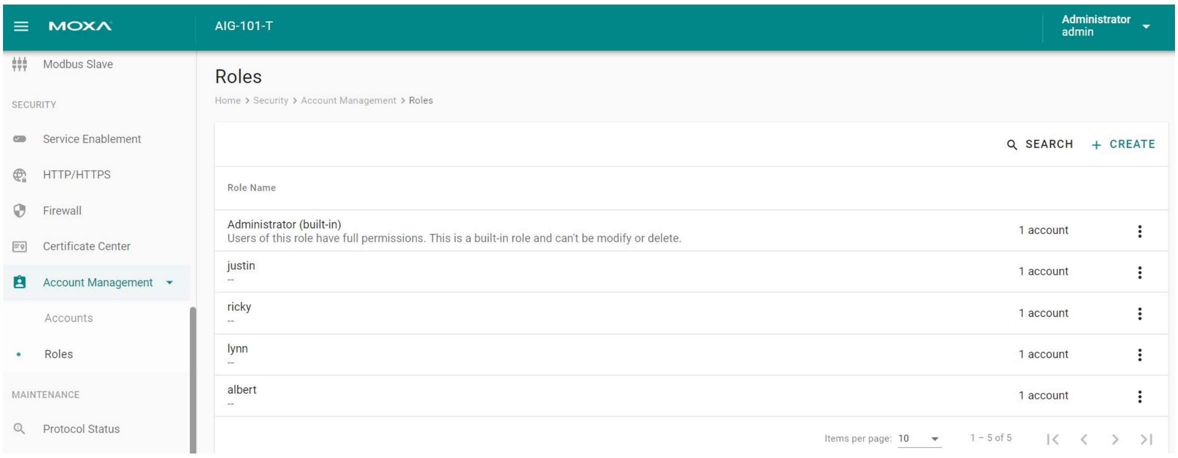
Function	Description
Edit	Change the role, email, or password of an existing account.
Deactivate	Does not allow the user to log in to this device.
Delete	Delete the user account. **NOTE:** This operation is irreversible.

NOTE

You cannot **Deactivate** or **Delete** the last remaining account with an Administrator role. This is to prevent an unauthorized account from fully managing this system. When the system detects only one active account when the Administrator role is selected, all items in the pop-up menu will be grayed out.

Roles

You can **View**, **Create**, **Edit**, and **Delete** user roles in ThingsPro Edge. In the main menu, go to **Security > Account Management > Roles** to manage the user roles.



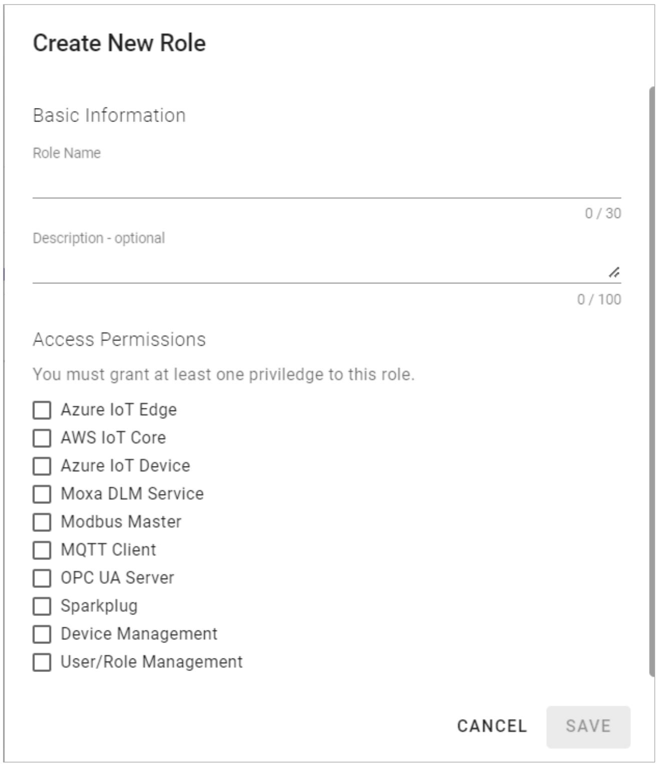
Roles

Home > Security > Account Management > Roles

Role Name	
Administrator (built-in) Users of this role have full permissions. This is a built-in role and can't be modify or delete.	1 account
justin --	1 account
ricky --	1 account
lynn --	1 account
albert --	1 account

Items per page: 10 1 – 5 of 5

Click **+ CREATE** to set up a new user role. Specify a unique name for the role and assign the appropriate permissions. When you are done, click on the button **"SAVE"** to create the role in the system.



Create New Role

Basic Information

Role Name

0 / 30

Description - optional

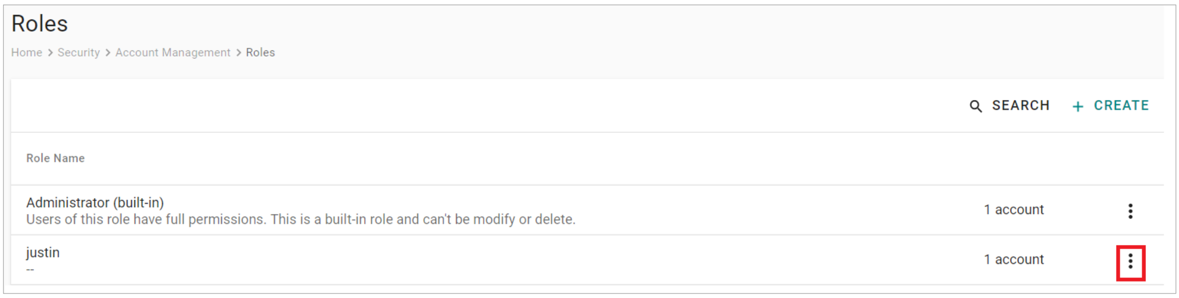
0 / 100

Access Permissions

You must grant at least one priviledge to this role.

□ Azure IoT Edge
□ AWS IoT Core
□ Azure IoT Device
□ Moxa DLM Service
□ Modbus Master
□ MQTT Client
□ OPC UA Server
□ Sparkplug
□ Device Management
□ User/Role Management

You can **edit** the settings or **delete** an existing role by clicking on the pop-up menu icon next to the role.



Roles

Home > Security > Account Management > Roles

Role Name		
Administrator (built-in) Users of this role have full permissions. This is a built-in role and can't be modify or delete.	1 account	⋮
justin --	1 account	⋮

Maintenance

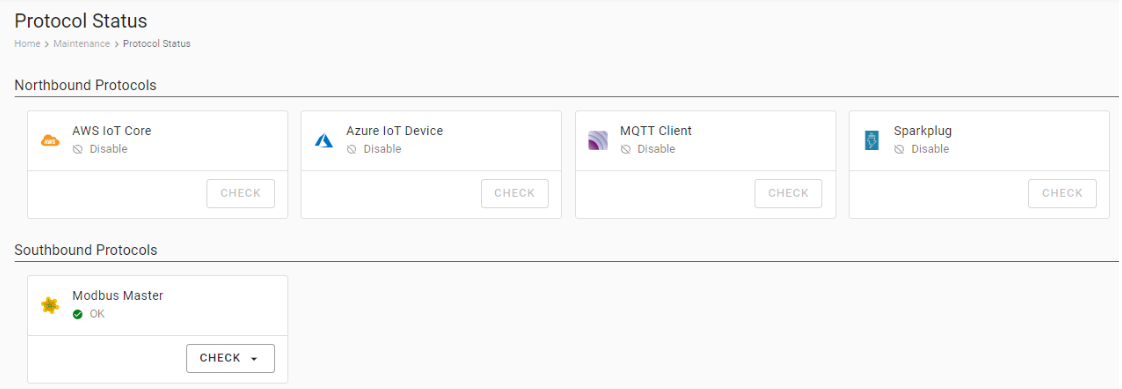
Protocol Status

In case of A communication issue, go to **Maintenance > Protocol Status**. The device provides comprehensive troubleshooting tools to help you identify the issue easily.

When you access the page, you can see an overview of the status for Northbound Protocols and Southbound Protocols.

For AWS, Azure, Sparkplug, MQTT Client troubleshooting, do the following:

1. Click **CHECK**.



Protocol Status

Home > Maintenance > Protocol Status

Northbound Protocols

AWS IoT Core
Disable
CHECK

Azure IoT Device
Disable
CHECK

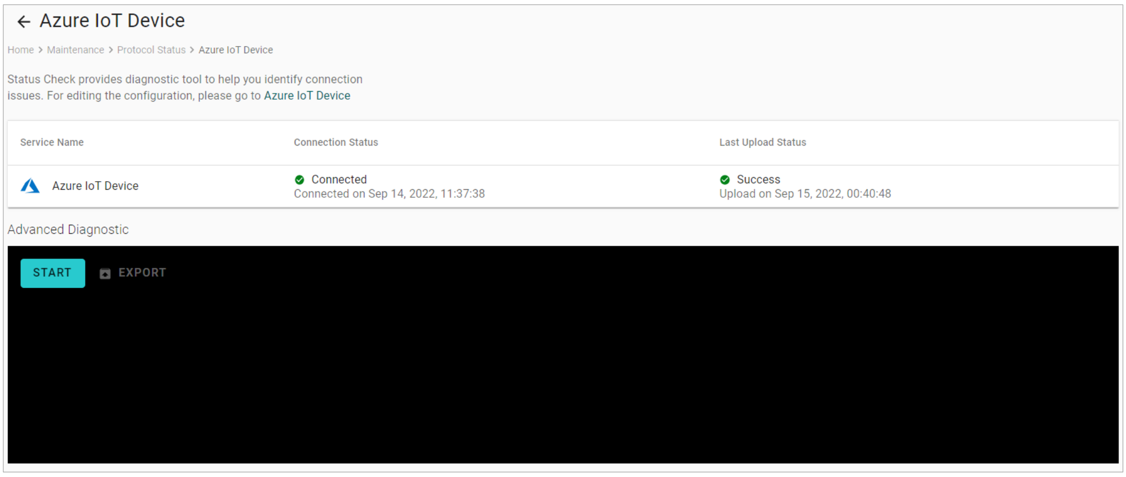
MQTT Client
Disable
CHECK

Sparkplug
Disable
CHECK

Southbound Protocols

Modbus Master
OK
CHECK ▾

2. Click **START.** (The example below selects Azure IoT Device. The steps may vary depending on the protocol you choose.)



← Azure IoT Device

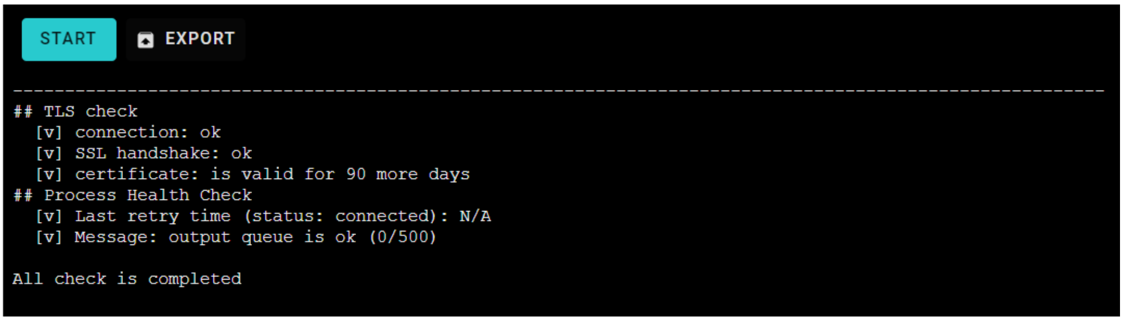
Home > Maintenance > Protocol Status > Azure IoT Device

Status Check provides diagnostic tool to help you identify connection issues. For editing the configuration, please go to Azure IoT Device

Service Name	Connection Status	Last Upload Status
Azure IoT Device	✓ Connected Connected on Sep 14, 2022, 11:37:38	✓ Success Upload on Sep 15, 2022, 00:40:48

Advanced Diagnostic

3. View the logs to identify the issue.



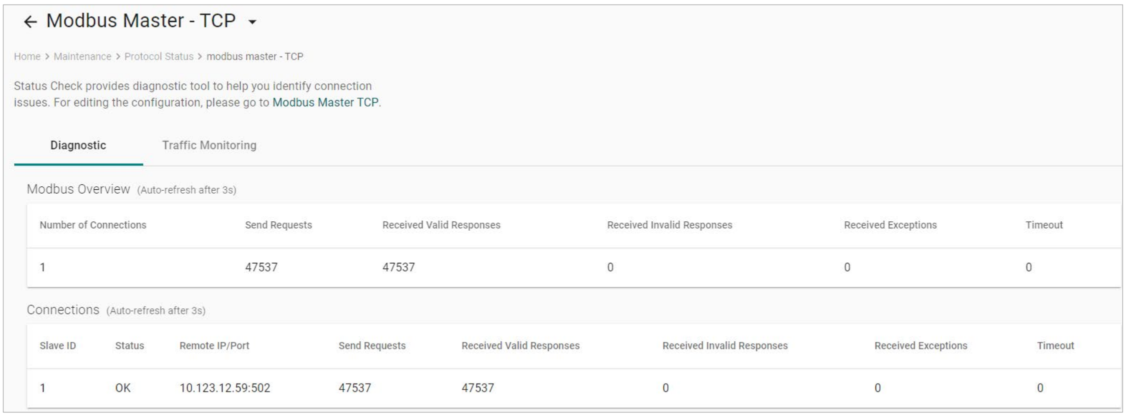
```
------------------------------------------------------------------------------------------------------------
## TLS check
  [v] connection: ok
  [v] SSL handshake: ok
  [v] certificate: is valid for 90 more days
## Process Health Check
  [v] Last retry time (status: connected): N/A
  [v] Message: output queue is ok (0/500)

All check is completed
```

4. (Optional) **Export** the logs.

For Modbus troubleshooting, do the following:

1. Click **CHECK**.
2. Choose **TCP** or **COMx**.
3. View the diagnostic information.



← Modbus Master - TCP ▾

Home > Maintenance > Protocol Status > modbus master - TCP

Status Check provides diagnostic tool to help you identify connection issues. For editing the configuration, please go to Modbus Master TCP.

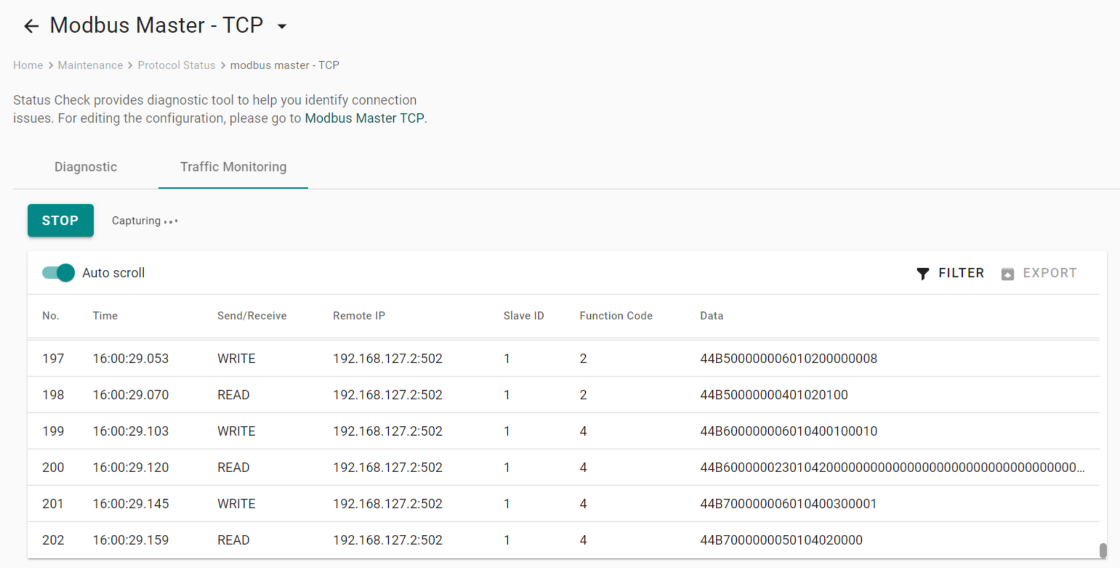
Modbus Overview (Auto-refresh after 3s)

Number of Connections	Send Requests	Received Valid Responses	Received Invalid Responses	Received Exceptions	Timeout
1	47537	47537	0	0	0

Connections (Auto-refresh after 3s)

Slave ID	Status	Remote IP/Port	Send Requests	Received Valid Responses	Received Invalid Responses	Received Exceptions	Timeout
1	OK	10.123.12.59:502	47537	47537	0	0	0

4. Click the Traffic Monitoring tab to capture the traffic logs.



← Modbus Master - TCP ▾

Home > Maintenance > Protocol Status > modbus master - TCP

Status Check provides diagnostic tool to help you identify connection issues. For editing the configuration, please go to Modbus Master TCP.

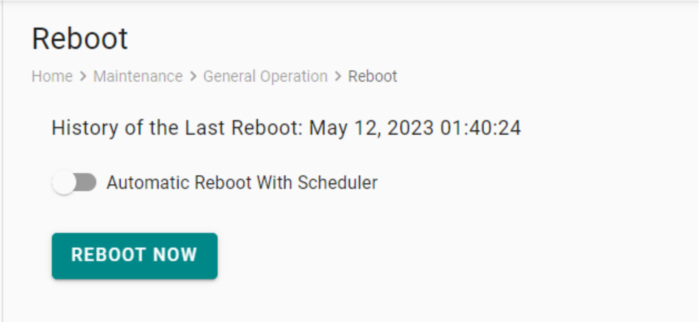
No.	Time	Send/Receive	Remote IP	Slave ID	Function Code	Data
197	16:00:29.053	WRITE	192.168.127.2:502	1	2	44B500000006010200000008
198	16:00:29.070	READ	192.168.127.2:502	1	2	44B50000000401020100
199	16:00:29.103	WRITE	192.168.127.2:502	1	4	44B600000006010400100010
200	16:00:29.120	READ	192.168.127.2:502	1	4	44B600000023010420000000000000000000000000000000000…
201	16:00:29.145	WRITE	192.168.127.2:502	1	4	44B700000006010400300001
202	16:00:29.159	READ	192.168.127.2:502	1	4	44B70000000501040200000

5. (Optional) **Export** the traffic logs to send to experienced engineer for further analysis.

General Operation

Reboot

If you want to reboot the device, go to **General Operation > Reboot** and click **REBOOT NOW**. If you want to arrange a specific time to reboot, you can enable **Automatic Reboot With Scheduler** and enter the date, hour, and minutes.



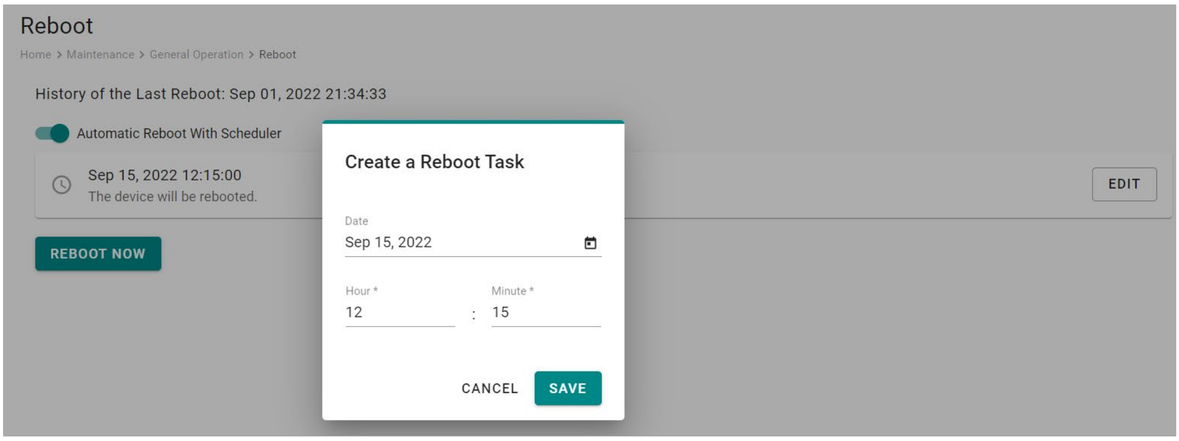
Reboot

Home > Maintenance > General Operation > Reboot

History of the Last Reboot: May 12, 2023 01:40:24

Automatic Reboot With Scheduler

REBOOT NOW



Reboot

Home > Maintenance > General Operation > Reboot

History of the Last Reboot: Sep 01, 2022 21:34:33

Automatic Reboot With Scheduler

Sep 15, 2022 12:15:00
The device will be rebooted.

EDIT

REBOOT NOW

Create a Reboot Task

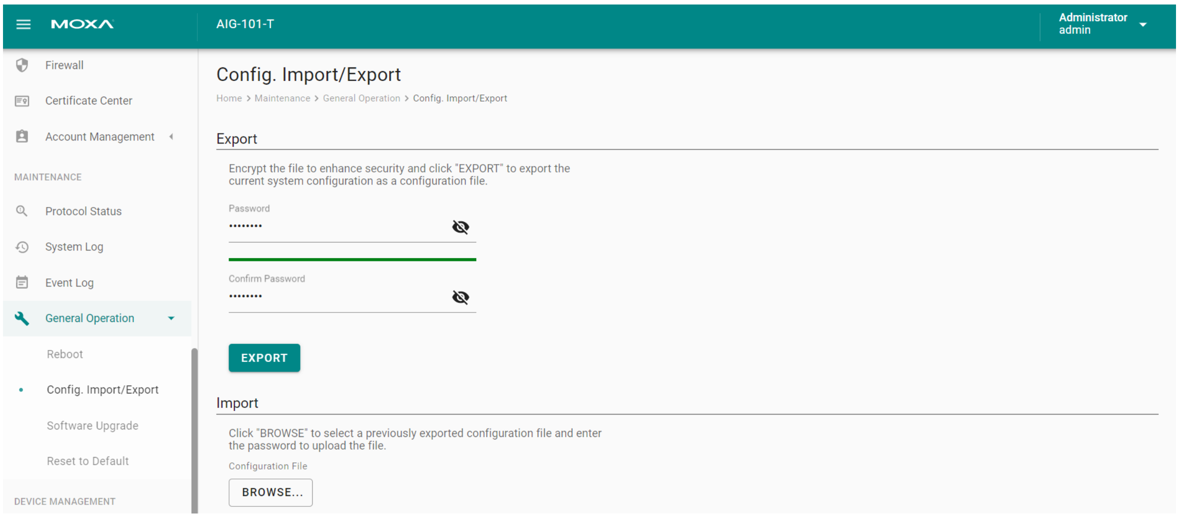
Date: Sep 15, 2022

Hour *: 12 : Minute *: 15

CANCEL SAVE

Config. Import/Export

Go to **General Operation > Config. Import/Export,** where you can import or export the gateway configuration file with a given password. The exported configuration file will be compressed to the **tar.gz** format and downloaded on your computer.



Config. Import/Export

Home > Maintenance > General Operation > Config. Import/Export

Export

Encrypt the file to enhance security and click "EXPORT" to export the current system configuration as a configuration file.

Password: ••••••••

Confirm Password: ••••••••

EXPORT

Import

Click "BROWSE" to select a previously exported configuration file and enter the password to upload the file.

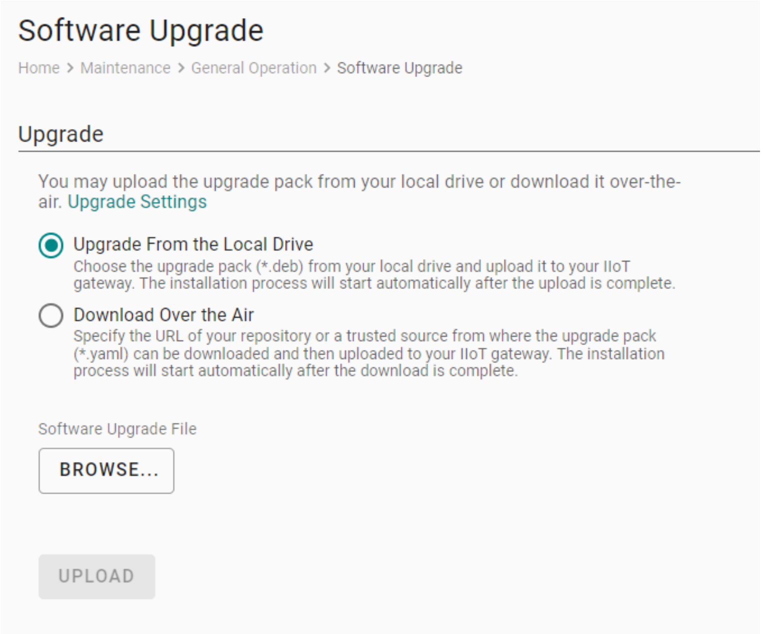
Configuration File

BROWSE...

Firmware Upgrade

Go to **General Operation > Firmware Upgrade** to upgrade this device with Moxa's software packages. There are two approaches to upgrading AIG: **Upgrade From the Local Drive** and **Download Over the Air**.

Upgrade From the Local Drive: click **BROWSER** and select the software package file in *.deb file format on your computer, then click **UPLOAD.**



Software Upgrade

Home > Maintenance > General Operation > Software Upgrade

Upgrade

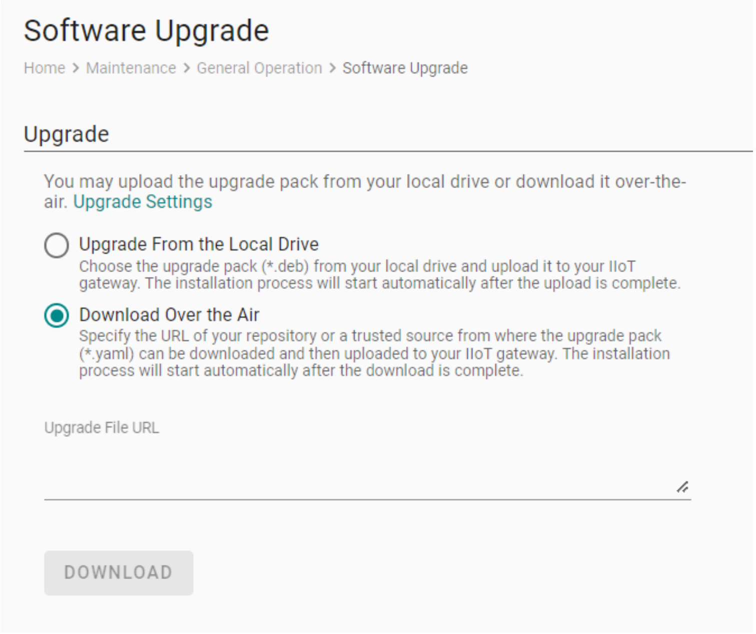
You may upload the upgrade pack from your local drive or download it over-the-air. Upgrade Settings

● Upgrade From the Local Drive
Choose the upgrade pack (*.deb) from your local drive and upload it to your IIoT gateway. The installation process will start automatically after the upload is complete.

○ Download Over the Air
Specify the URL of your repository or a trusted source from where the upgrade pack (*.yaml) can be downloaded and then uploaded to your IIoT gateway. The installation process will start automatically after the download is complete.

Software Upgrade File

Download Over the Air: Enter the file URL. For additional details, see https://github.com/TPE-TIGER/AIG301-501-Technical-Document/blob/main/documents/AIG%20Software%20Upgrade.md



Software Upgrade

Home > Maintenance > General Operation > Software Upgrade

Upgrade

You may upload the upgrade pack from your local drive or download it over-the-air. Upgrade Settings

○ Upgrade From the Local Drive
Choose the upgrade pack (*.deb) from your local drive and upload it to your IIoT gateway. The installation process will start automatically after the upload is complete.

● Download Over the Air
Specify the URL of your repository or a trusted source from where the upgrade pack (*.yaml) can be downloaded and then uploaded to your IIoT gateway. The installation process will start automatically after the download is complete.

Upgrade File URL

Reset to Default

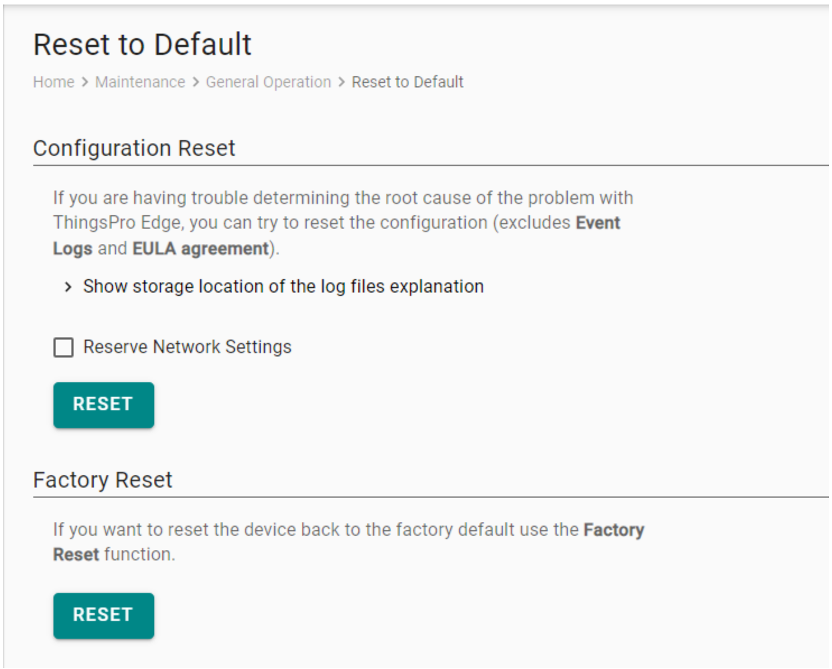
To clear all the settings to configuration default:

Go to **General Operation > Reset to Default >** press **RESET** under Configuration Reset. If you want to keep the network settings, enable **Reserve Network Settings** before clicking **RESET**.

If you want to reset to Factory default, go to **General Operation > Reset to Default >** press **RESET** under Factory Reset.

NOTE

The configurations and firmware will be reset back to factory default.



Reset to Default

Home > Maintenance > General Operation > Reset to Default

Configuration Reset

If you are having trouble determining the root cause of the problem with ThingsPro Edge, you can try to reset the configuration (excludes **Event Logs** and **EULA agreement**).

› Show storage location of the log files explanation

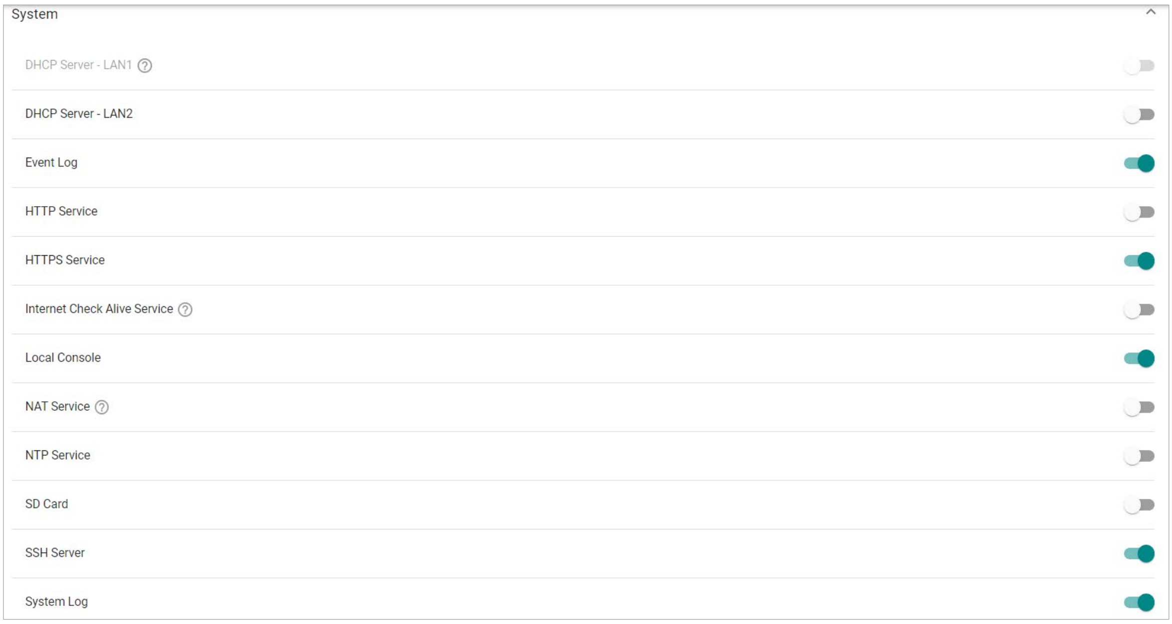
□ Reserve Network Settings

Factory Reset

If you want to reset the device back to the factory default use the **Factory Reset** function.

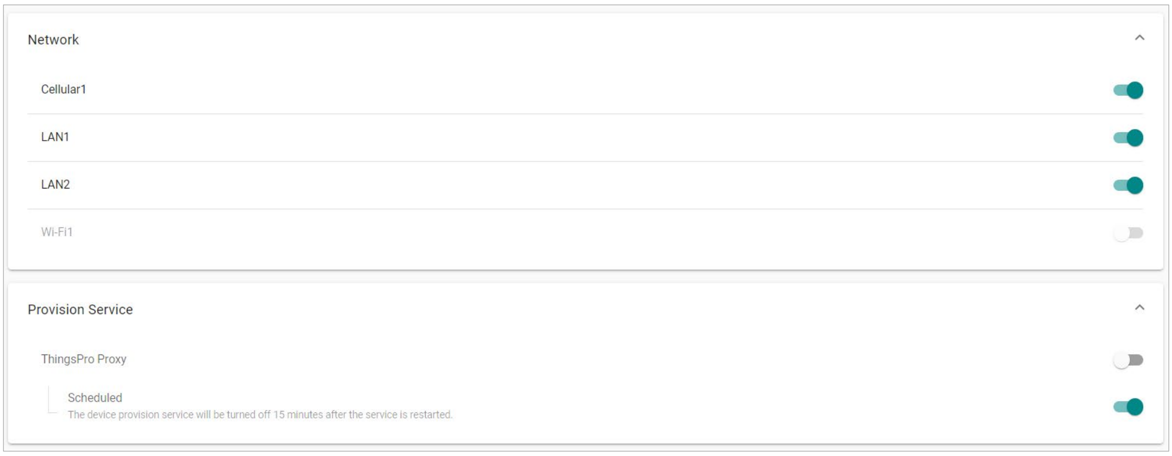
Enablement

For security reasons, disable all unused services. Go to **Maintenance > Enablement > Service** to disable or enable the system services by just toggling the buttons.



System

DHCP Server - LAN1 ⓘ	○
DHCP Server - LAN2	○
Event Log	●
HTTP Service	○
HTTPS Service	●
Internet Check Alive Service ⓘ	○
Local Console	●
NAT Service ⓘ	○
NTP Service	○
SD Card	○
SSH Server	●
System Log	●



Network

Cellular1	●
LAN1	●
LAN2	●
Wi-Fi1	○

Provision Service

ThingsPro Proxy	○
Scheduled The device provision service will be turned off 15 minutes after the service is restarted.	●

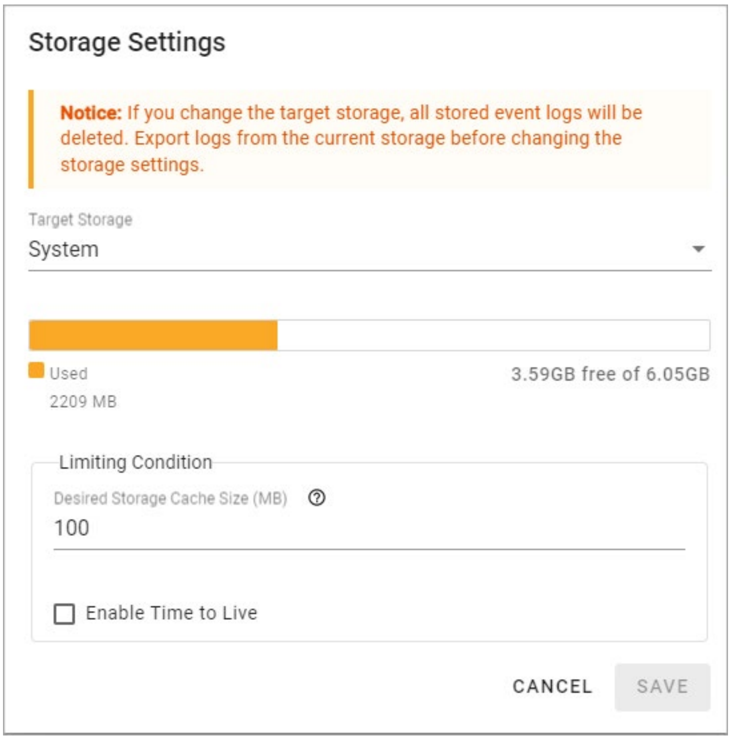
Diagnostic

System Log

The main purpose of system log is to help Moxa engineers with troubleshooting. When you encounter an issue that you are not able to solve by yourself, export the log file and send it to Moxa TS for analysis.

Go to **Diagnostic** > **System Log** to export the system log file and specify the location to save the system logs.

Click ⚙ to specify the location to store the event logs. To optimize the use of storage space on your AIG, you can check the Enable **Time to Live** option and specify the maximum storage space for the system logs. Click **SAVE** to confirm your settings.



Storage Settings

Notice: If you change the target storage, all stored event logs will be deleted. Export logs from the current storage before changing the storage settings.

Target Storage
System

🟧 Used
2209 MB

3.59GB free of 6.05GB

Limiting Condition

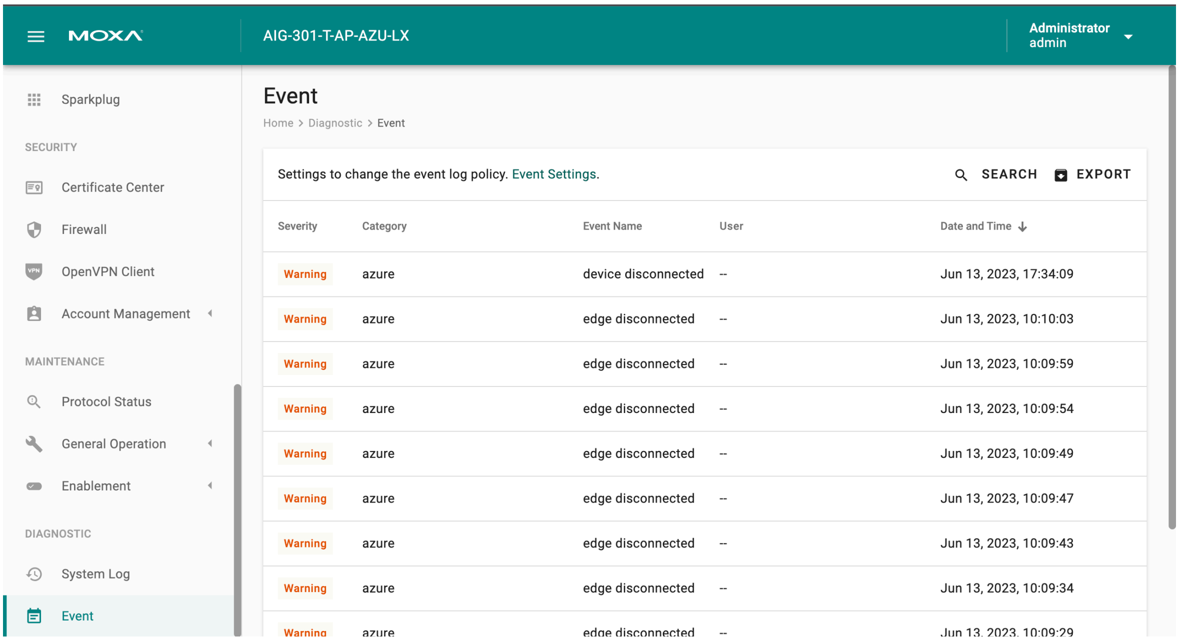
Desired Storage Cache Size (MB)
100

□ Enable Time to Live

Events

When you face issues, you can go to **Diagnostic** > **Event** check the event logs which record historical events that help you to narrow down the problems. If there are plenty of event logs, you can export the log to read easily.

Go to **Event Logs** to view all event logs categorized by **Severity**, **Event Name**, and **Category**. You can use the **SEARCH** function to filter the Event logs to find a specific event. The Event Logs can be exported as a *.zip file and downloaded on to your computer.



Event

Home > Diagnostic > Event

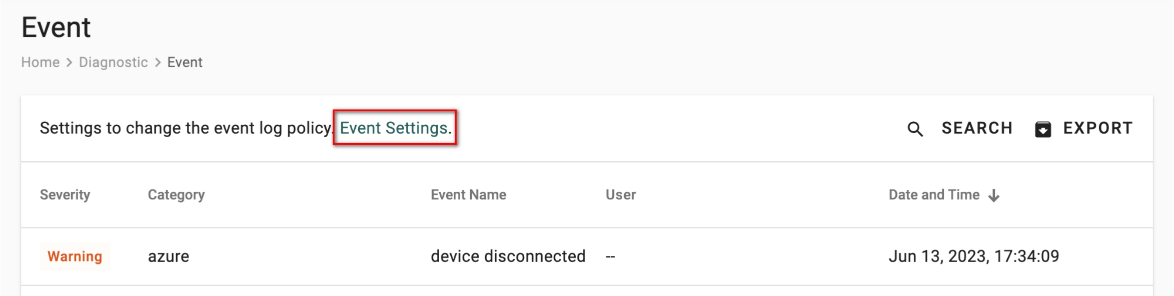
Settings to change the event log policy. Event Settings.

SEARCH EXPORT

Severity	Category	Event Name	User	Date and Time ↓
Warning	azure	device disconnected	--	Jun 13, 2023, 17:34:09
Warning	azure	edge disconnected	--	Jun 13, 2023, 10:10:03
Warning	azure	edge disconnected	--	Jun 13, 2023, 10:09:59
Warning	azure	edge disconnected	--	Jun 13, 2023, 10:09:54
Warning	azure	edge disconnected	--	Jun 13, 2023, 10:09:49
Warning	azure	edge disconnected	--	Jun 13, 2023, 10:09:47
Warning	azure	edge disconnected	--	Jun 13, 2023, 10:09:43
Warning	azure	edge disconnected	--	Jun 13, 2023, 10:09:34
Warning	azure	edge disconnected	--	Jun 13, 2023, 10:09:29

Configuring Event Log Settings

Choose the type of events to be stored, specify where to keep the logs, and the maximum storage size to use. Click the **Event Settings** to access these settings.



Event

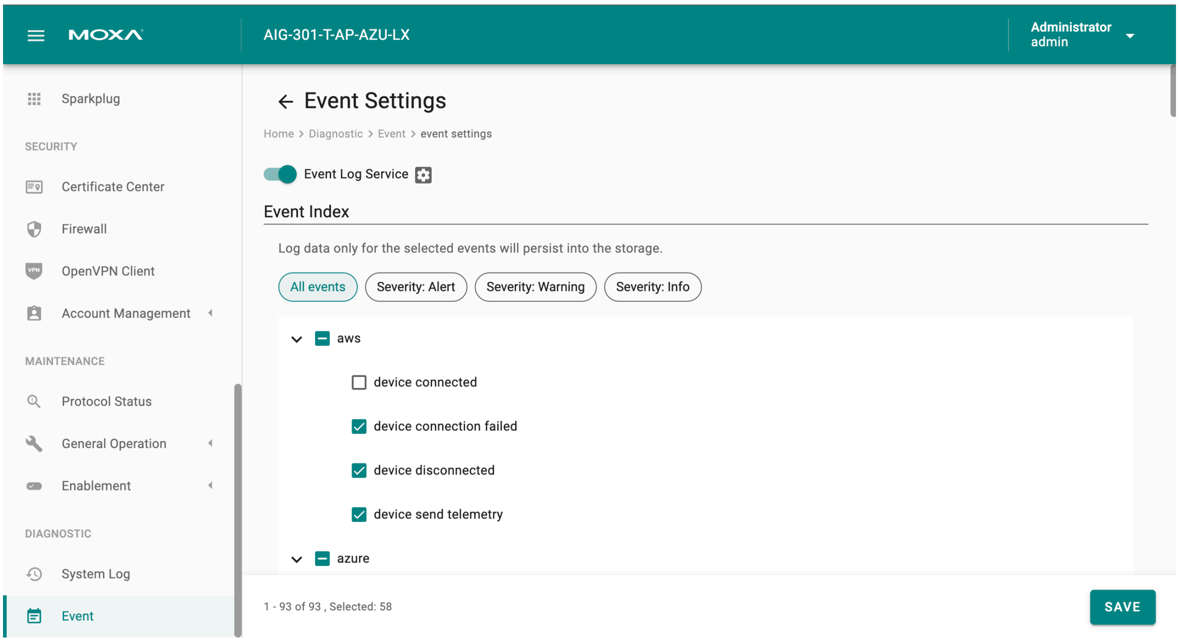
Home > Diagnostic > Event

Settings to change the event log policy. Event Settings.

SEARCH EXPORT

Severity	Category	Event Name	User	Date and Time ↓
Warning	azure	device disconnected	--	Jun 13, 2023, 17:34:09

You can select the type of events to be stored by clicking on the different levels of the Severity: **Alert**, **Warning**, or **Info**. You can also select the individual event that you want to keep.



Event Settings

Home > Diagnostic > Event > event settings

Event Log Service

Event Index

Log data only for the selected events will persist into the storage.

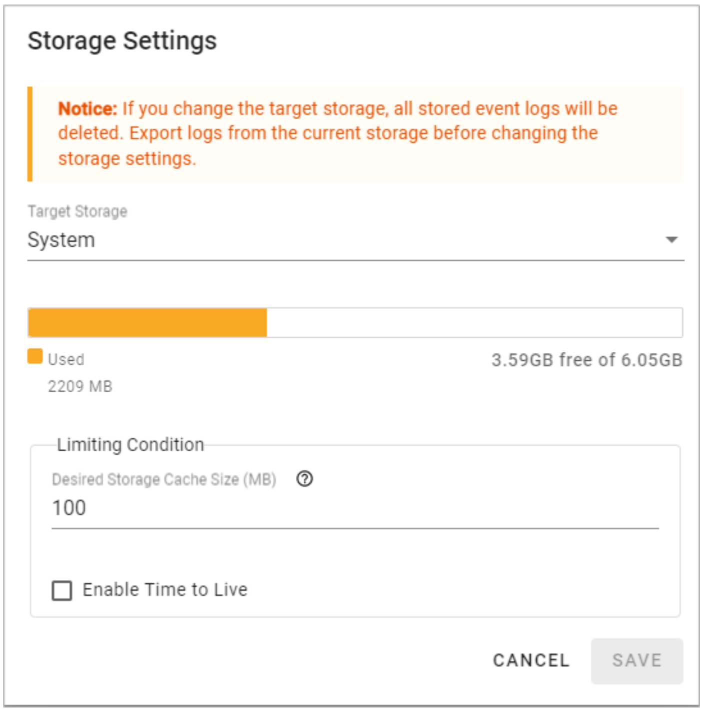
All events | Severity: Alert | Severity: Warning | Severity: Info

- aws
  - □ device connected
  - ☑ device connection failed
  - ☑ device disconnected
  - ☑ device send telemetry
- azure

1 - 93 of 93 , Selected: 58

SAVE

Click ⚙ to specify the location to store the event logs. To optimize the use of storage space on your AIG, you can check the Enable **Time to Live** option and specify the maximum storage space for the system logs. Click **SAVE** to confirm your settings.



Storage Settings

Notice: If you change the target storage, all stored event logs will be deleted. Export logs from the current storage before changing the storage settings.

Target Storage: System

Used 2209 MB

3.59GB free of 6.05GB

Limiting Condition

Desired Storage Cache Size (MB): 100

□ Enable Time to Live

CANCEL SAVE

A. Appendix

Publish Mode

Publish Mode	Parameters	Value	Description
By Interval	Publish Intervals (sec)	0 - 86400	The frequency to upload the data to the cloud.
	Sampling Mode	All Values Latest Values All Changed Values Latest Changed Values	All Values: All values recorded within a specified interval will be sent to the cloud. Latest Values: Only the most recent value will be sent to the cloud. All Changed Values: All values that have changed within the configured interval will be sent to the cloud. Latest Changed Values: Only the most recent value that has changed will be sent to the cloud.
	Custom Sampling rate from acquired data (sec)	0 - 86400	The frequency to synchronize the tag value with tag hub.
Immediately	Sampling Mode	Enable/disable	Enable: Only publish the changed values to the cloud immediately. Disable: Publish all data to the cloud immediately once one of data item changes in the topic.
	Minimal Publish Interval (sec)	0 – 60	To avoid transmitting a large amount of data to the cloud in a short period, it is possible to set a time interval that ensures a delay between each data transmission.
By Size	Publish Size (bytes)	0 -262144	Once the data size reaches the specified threshold, the data will be transmitted to the cloud.
	Sampling Mode	All Values All Changed Values	All Values: All values recorded within the specified size will be sent to the cloud. All Changed Values: All values that have changed within the configured size will be sent to the cloud.
	Custom Sampling rate from acquired data (sec)	0 - 86400	The frequency to synchronize the tag value with tag hub.
	Idle Timer (sec)	0 – 86400	To avoid situations where the data takes a long time to reach the desired size, a threshold value can be set to ensure that the data is sent out as soon as it reaches the specified timer setting.