KOSMOS

Modbus TCP PLC Setup Guide

What will this guide teach me?

🕐 25 minutes

This guide contains step-by-step instructions on how to set up any **Modbus TCP PLC** (or other Modbus TCP device) to connect to the Kosmos industrial IoT platform.

Once you've finished these steps, you'll be ready to start gaining valuable insights from your sensors & actuators using Kosmos' dashboards, alerts, controls, and more.

For questions about setting up your Kosmos IoT System, please email support@temboo.com and we'll get back to you as soon as possible.

What You'll Need

**Kosmos Gateway
(Raspberry Pi Model 3 B+)**

2 x Ethernet Cable

USB Flash Drive

**Raspberry Pi 5V 2.5A
Power Adapter**

**USB Micro SD
Card Reader**

**Micro SD Card
(8+GB, U3 Speed)**

**Modbus TCP PLC
(or other Modbus TCP device)**

Before You Get Started

Before moving on to the next steps in this guide, please make sure that you've created your Temboo account and generated your Kosmos application files for your chosen hardware. If you haven't, head to temboo.com and complete those steps now!

Know what's up before things go down

Introducing

KOSMOS

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GET STARTED

Gateway Application Setup

1 First, install Etcher so that you can copy the Kosmos gateway application to your micro SD card: https://www.etcher.io

2 Insert your micro SD card into your USB SD card reader and connect the card reader to your computer.

3 Open Etcher and flash the Kosmos gateway `.xz` file onto your micro SD card (you previously downloaded this file while creating your Kosmos application).

Prepare Gateway for WiFi Connectivity

1   To prepare your Kosmos gateway for WiFi connectivity, first plug your USB thumb drive into your computer.
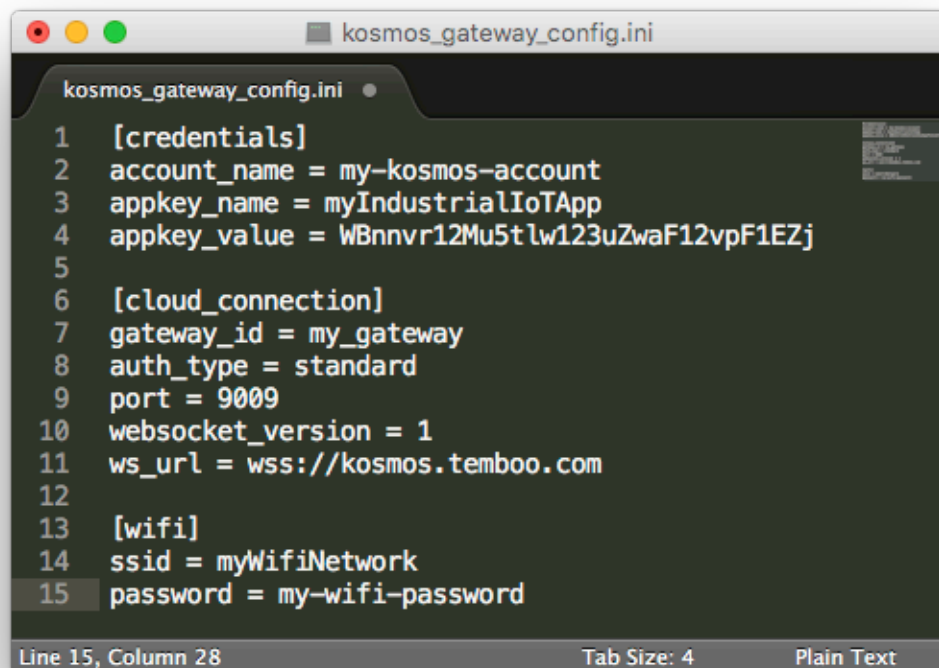
2   Locate the **temboo_kosmos_config.ini** file downloaded during Kosmos application creation and open it with your favorite text editor.

3   Add the details of the WiFi network that you want your Kosmos gateway to connect to (see lines 14 & 15 in the screenshot below), and then save your config file.

4   Copy the config file to your USB thumb drive and then eject the the thumb drive from your computer.

```
kosmos_gateway_config.ini

kosmos_gateway_config.ini
1    [credentials]
2    account_name = my-kosmos-account
3    appkey_name = myIndustrialIoTApp
4    appkey_value = WBnnvr12Mu5tlw123uZwaF12vpF1EZj
5
6    [cloud_connection]
7    gateway_id = my_gateway
8    auth_type = standard
9    port = 9009
10   websocket_version = 1
11   ws_url = wss://kosmos.temboo.com
12
13   [wifi]
14   ssid = myWifiNetwork
15   password = my-wifi-password

Line 15, Column 28                    Tab Size: 4        Plain Text
```
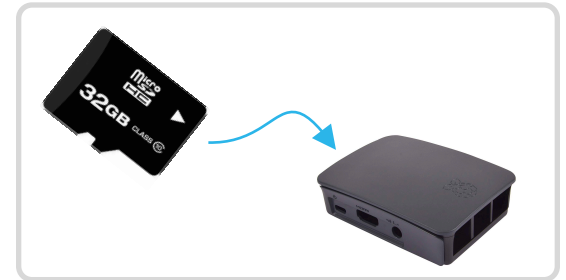
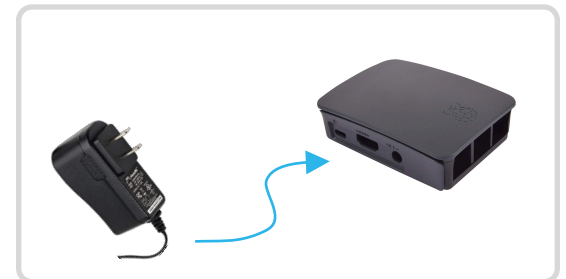# Kosmos Gateway Hardware Setup

1 Insert SD Card

Insert the micro SD card into the underside of the gateway (the metal contacts slide in face up).
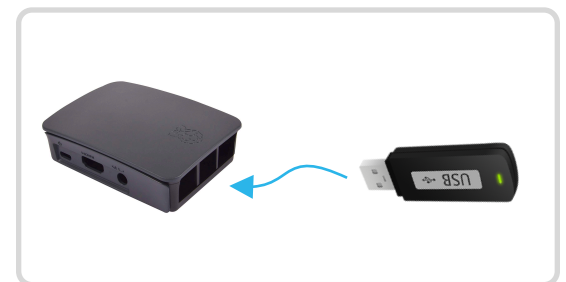

2 Power Up The Gateway

Connect the 5V 2.5A power adapter to your Kosmos gateway. Then, plug the adapter into a power outlet.
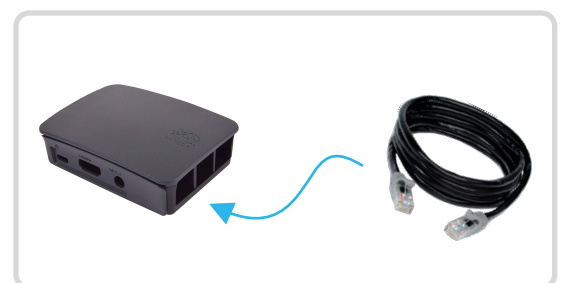

3 Insert USB Drive

Insert the USB thumb drive into any available USB port on your Kosmos gateway.

4 Connect Ethernet Cable

Use an ethernet cable to connect your Kosmos gateway to the same local area network as your PLC(s).
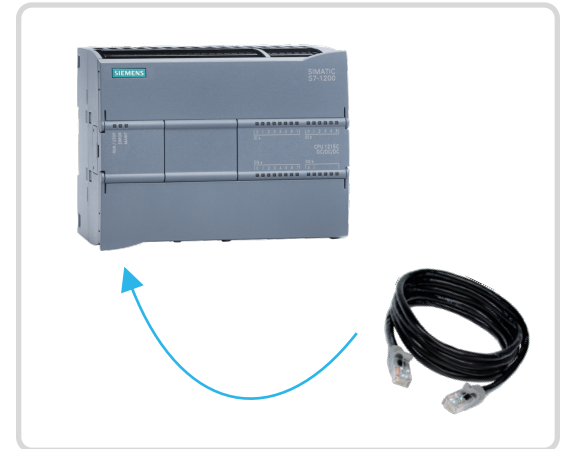
Network your Modbus TCP PLC

1   Network your PLC

Use an ethernet cable to connect your PLC to the same Local Area Network as your Kosmos gateway.
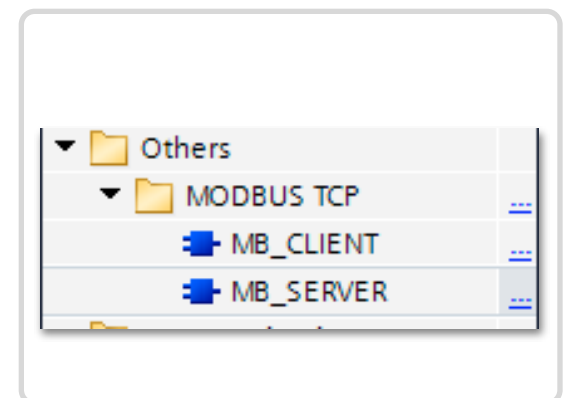
For security reasons, we recommend connecting your Kosmos gateway to the internet via a separate Wifi network as described earlier.

2   Enable Modbus Server

Make sure that the Modbus server on your Modbus TCP PLC (or other Modbus TCP device) is enabled. This will allow the Kosmos gateway to act as a Modbus client.
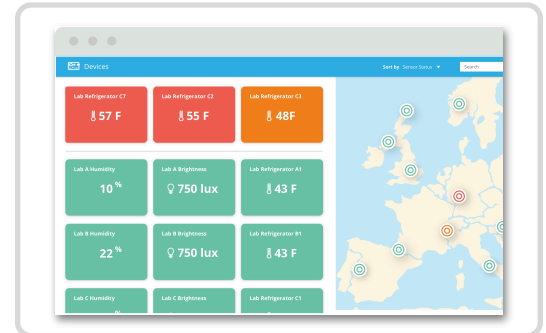
View Your Kosmos Sensor Data

1

Visit Your Dashboard

Log into your Kosmos account and navigate to the dashboard:
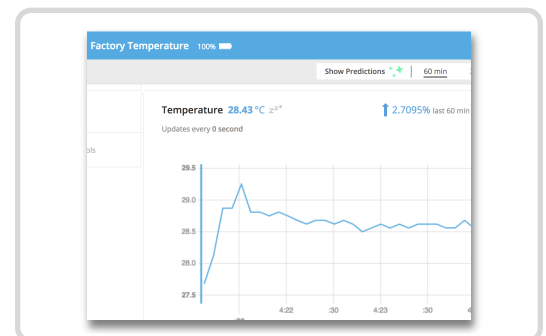
https://temboo.com/devices

2

Monitor Gateway Status

When the gateway connects, a green dot will appear beside the name of your Kosmos application. The gateway takes ~90 seconds to connect.

3

View Modbus Data

Click into your application and then click on your Modbus TCP device. You should see the first data points for any sensors that you have set up.

PLC Networking Options

As described earlier, we recommend creating a Local Area Network to connect your PLC(s) to the Kosmos gateway, and using a separate WiFi network to connect the Kosmos gateway to the internet.

✓ Fast setup time   ✓ Secure network separation

Alternate Networking Approaches

A Connect your PLC(s) and Kosmos gateway via ethernet to the same internet-connected network. This enables you to use an ethernet connection to connect your Kosmos gateway to the internet. We recommend that you disable all port forwarding on your router to prevent external access to your PLC(s). We also recommend adding a physical Modbus TCP firewall between your PLC(s) and the network.

B An alternate networking option is to place a general purpose firewall in front of your network and configure it to only allow outbound connections. This will not impact the performance of the Kosmos gateway since it will issue outbound commands in order to establish communication with Kosmos platform.

⚠️ Troubleshooting Tips

Problem	Solution
Gateway isn't powering up.	When your gateway is powered on you'll see a red LED (solid) and green LED (blinking) inside the case. If you don't see those lights, check that the power supply is securely attached at both ends, and that the wall outlet you are using is active.
Your gateway doesn't appear online in your Kosmos dashboard.	Make sure that you wait 10 minutes after powering the gateway on, and that all gateway attachments are connected as described in this guide. If the gateway is still offline after 10 minutes, try restarting the gateway by removing and reinserting the power supply.
Your graphs have no data.	Check that you have created a Modbus table with at least one input row, and that you have explicitly opted to graph this row in the Kosmos dashboard. Wait for at least 10 minutes after powering up your gateway for data to arrive in your graphs. If you still don't see sensor data, confirm that your Modbus devices and Kosmos gateway are on the same network.

Questions?
support@temboo.com