

**GRAHA SUMBER
PRIMA ELEKTRONIK**



Gateway Monitoring System

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Excellence in Power
Infrastructure for Indonesia
Since 1996

Gateway Monitoring System

I. Introducing

Gateway Monitoring System

In today's modern industrial and data center landscapes, data efficiency is key. Our Gateway Monitoring System is engineered to bridge communication gaps, converting data from Modbus TCP, Modbus RTU, and SNMP devices into the efficient MQTT format. This enables real-time data flow to your SCADA and IoT Dashboards, giving you instant insights and full control over your operations.

Key Features:

- Flexible Protocol Conversion: Supports **Modbus TCP, Modbus RTU, and SNMP to MQTT**.
- Comprehensive Monitoring & Control: Bi-directional monitoring and control functionalities.
- Modular Input/Output: Equipped with **Digital Inputs, Digital Outputs, and Relay Outputs** for enhanced flexibility.
- Seamless Dashboard Integration: Smooth connectivity with SCADA and IoT Dashboards.
- Real-time Data: Facilitates quick and proactive decision-making.

Typical Applications:

- Data Center Management:** Monitoring of temperature, humidity, power, and UPS status.
- Industrial Automation:** Supervision of machinery, production lines, and factory sensors.
- Smart Buildings:** Control of lighting, HVAC systems, and security.
- Energy Management:** Power consumption monitoring and efficiency optimization.
- Smart Agriculture:** Environmental condition monitoring and irrigation system control.

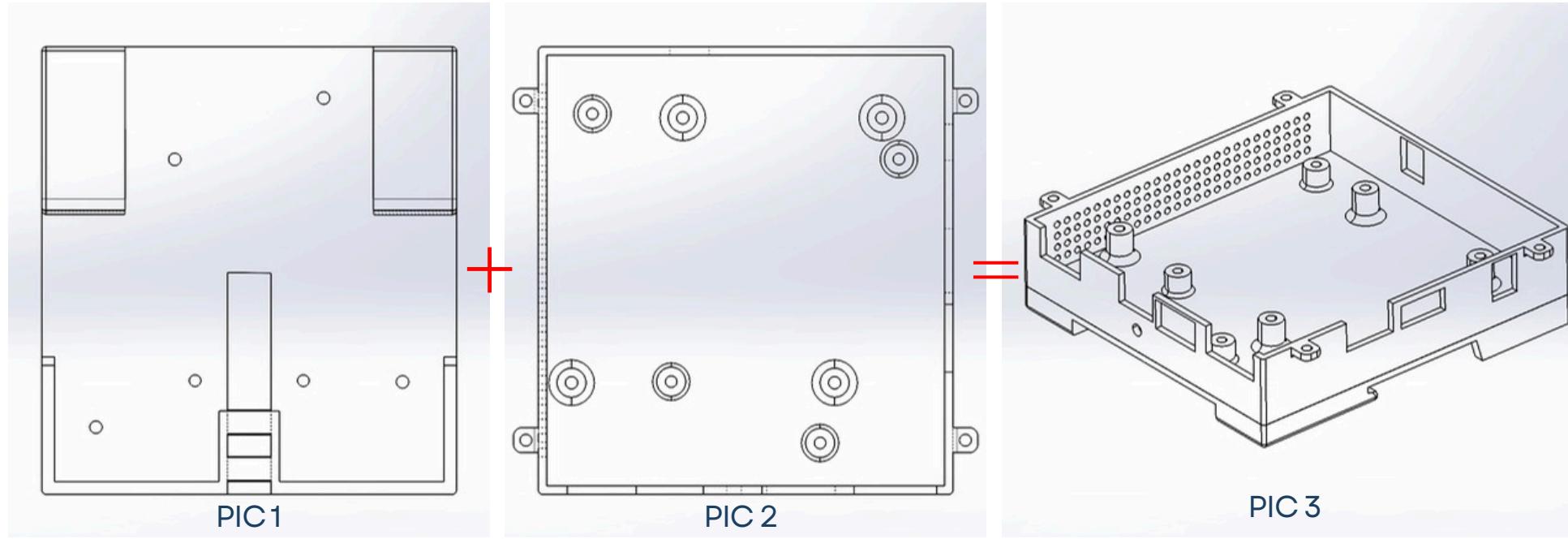
Empower your facility with smart data connectivity. Our Gateway Monitoring System can revolutionize your operational oversight and drive better decisions.



II. Gateway Monitoring System CASE INSTALLATION

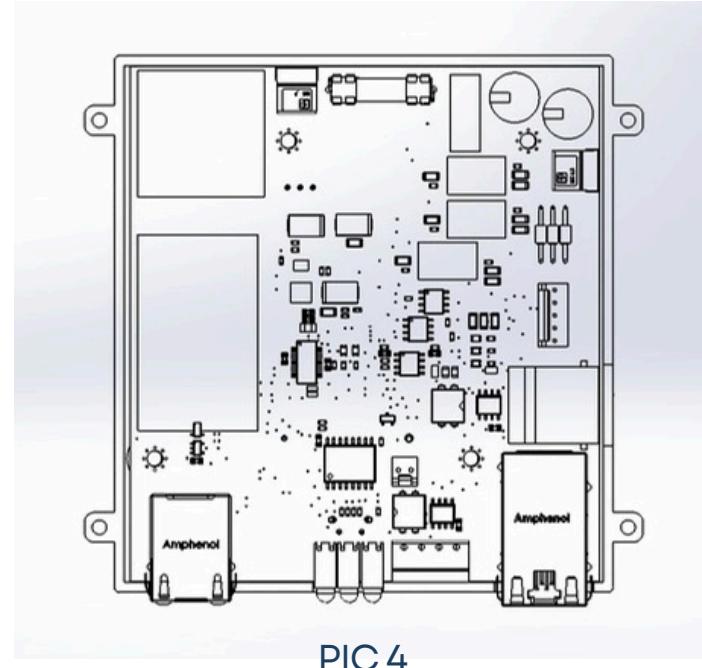
1. Prepare the Bottom Part of the Casing

- Letakkan PIC 1 di atas PIC 2, atau sebaliknya, sesuai dengan orientasi yang benar untuk perakitan.
- Prepare 6 Pcs of JF M3 x 25mm screws to secure the components PIC 1 & PIC 2



2. Place the PCB onto the Spacers

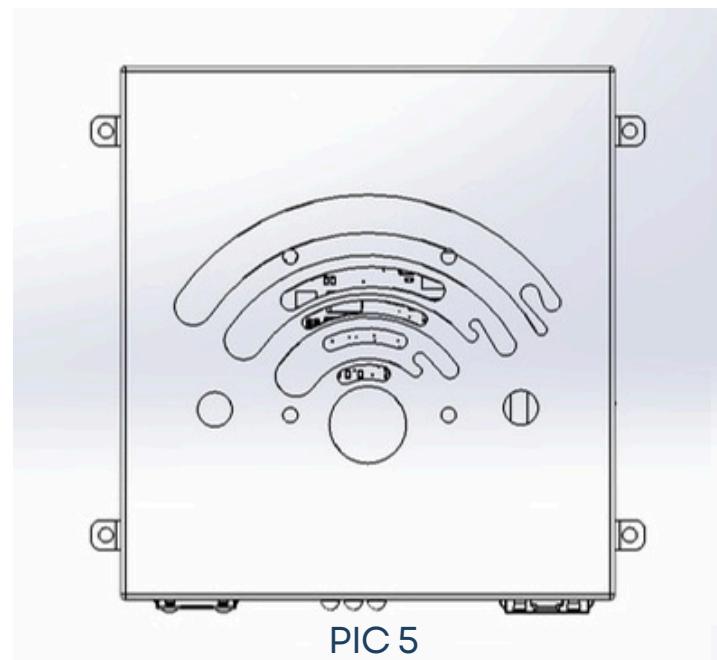
- Position the PCB and align it with the mounting spacer holes on the bottom casing
- Ensure all ports (USB, LAN, etc.) are properly aligned with the openings in the casing.



3. Secure the PCB

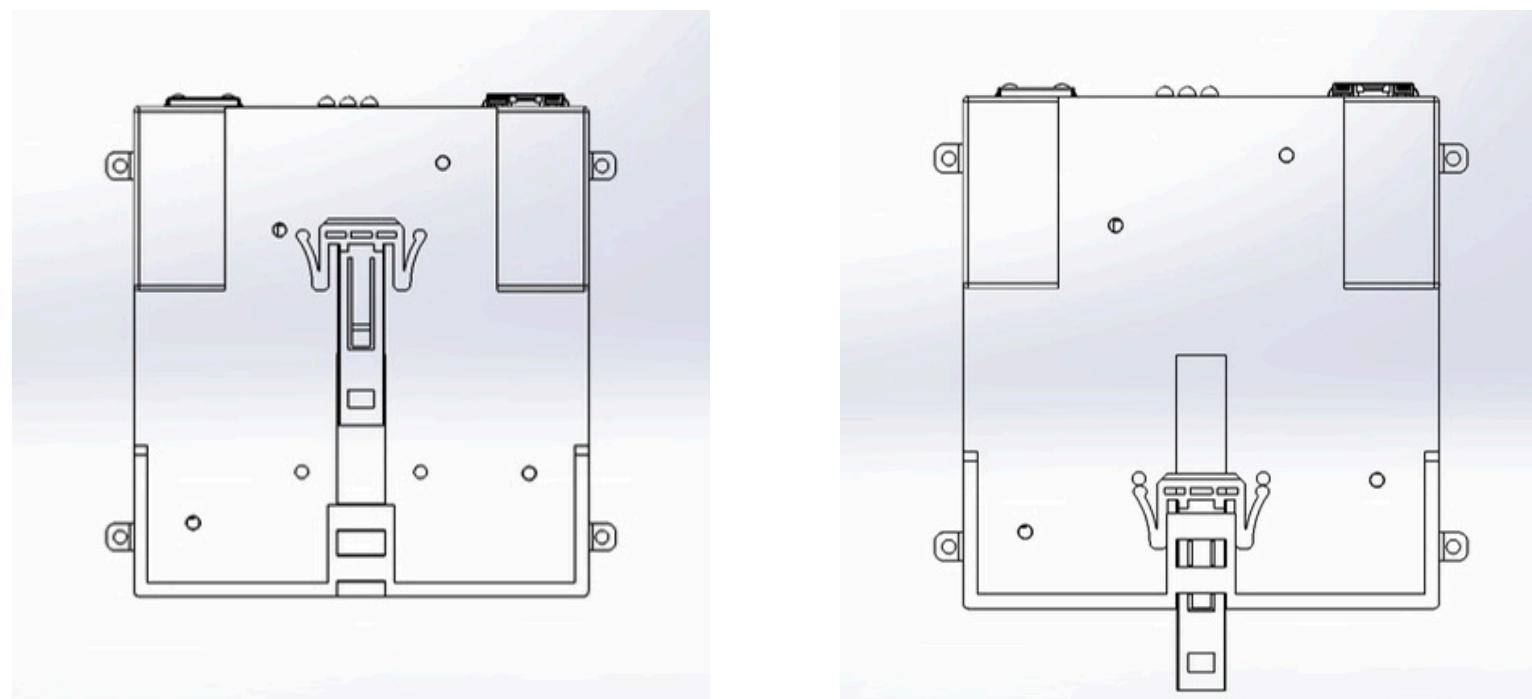
- Insert M3 screws into each of the PCB's mounting holes, then tighten them into the spacers attached underneath.
- Use a small Phillips (+) screwdriver and avoid over-tightening to prevent the casing from cracking.

II. GATEWAY CASE INSTALLATION



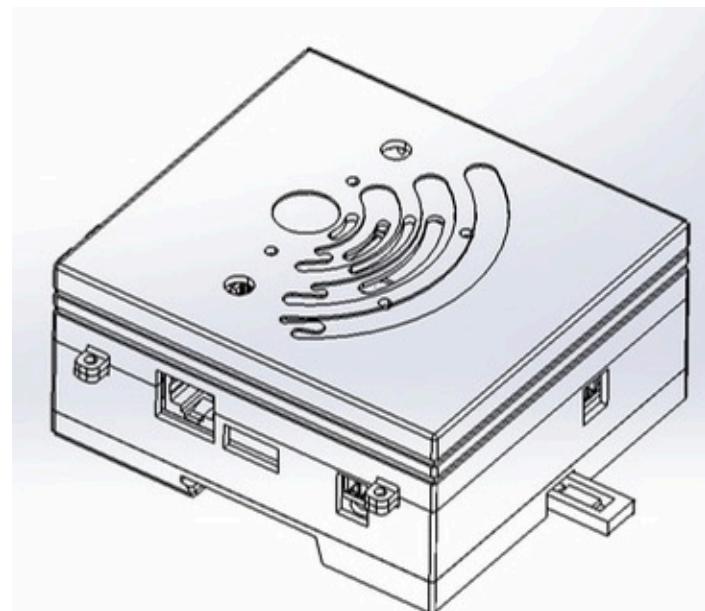
4. Attach the Cover (Top Part of the Casing)

- Take the top part of the casing and align it with the bottom section
- Make sure that:
 - USB, HDMI, and other ports are not obstructed.
- Tighten the M4 screws to secure it to the plate/panel surface.



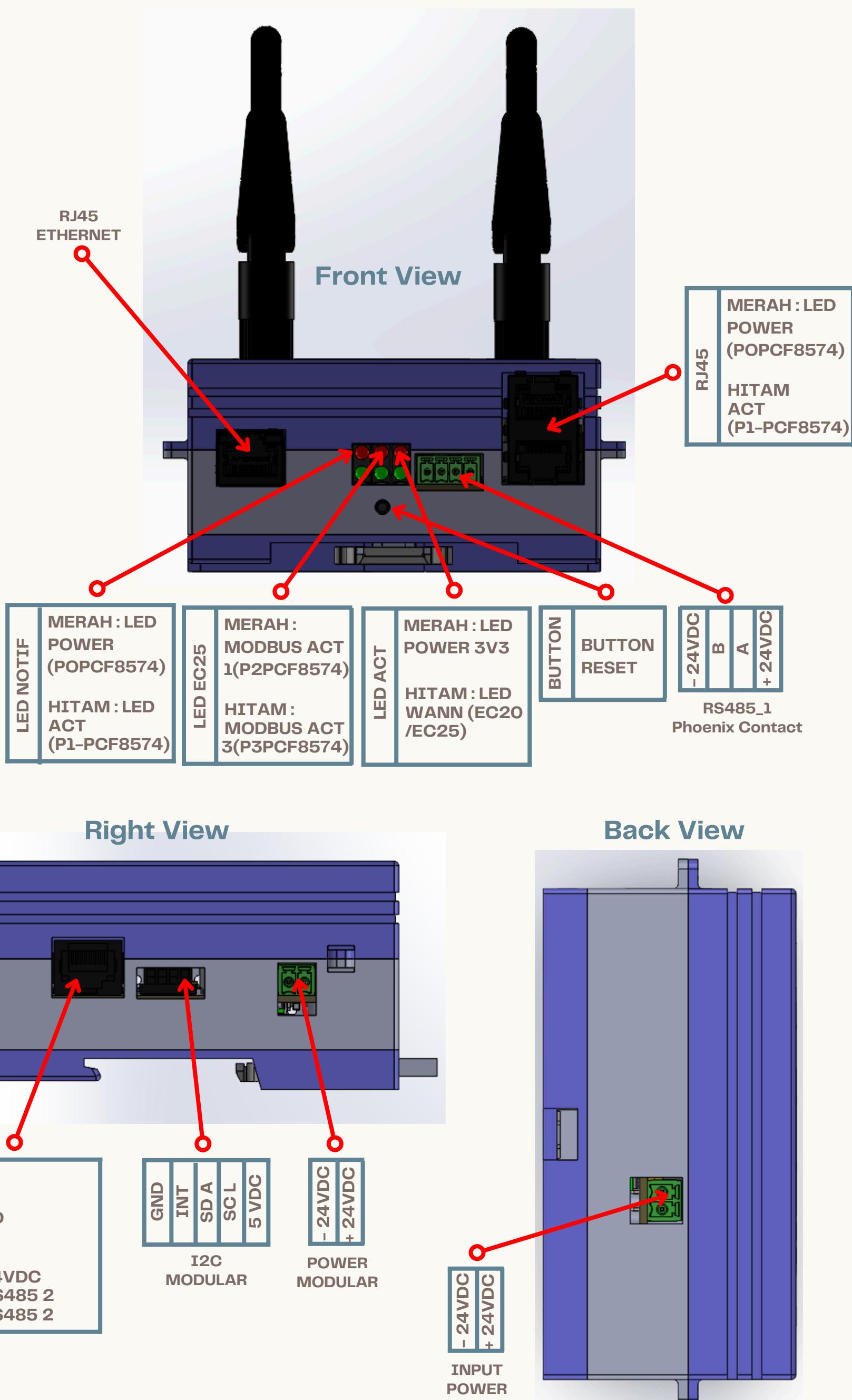
5. Install the PIN CLIP

- use pin clips so that the components can hang on the dinrail



III. SPECIFICATION Gateway Monitoring System

A. PIN OUT



III. SPECIFICATION Gateway Monitoring System

B. FUNCTION PIN OUT

Category	Specification
POWER SUPPLY	24 VDC with 2 way 3.81 Pluggable Terminal Block
Protection	Overcurrent, Overvoltage, Isolation PSU
Communication poller	MODBUS RTU, MODBUS TCP & SNMP
Communication Modular	I2C
Communication Push	MQTT
Dimensions	107,61 x 99,88 x 48,53
Connectivity	Ethernet : 10/100M Ethernet Wifi : 802.11b/g/n Bluetooth: Bluetooth V4.0 MODEM Quectel EC25
SOFTWARE	GSPE Monitoring System
Serial Port	2x RS485, 1 on Pluggable Terminal Block
SIM CARD	Micro sim card slot
Button Interfaces	1 x Button Reset
LED Interfaces	1 x LED Power Indicator 1 x LED MODEM Indicator 4 x Custom LED Indicator
MECHANICAL FIXING	DIN Rail Mountage
Operating System	Linux -4 14-LTS
Antenna	1 x Wifi Antenna 1 x GSM Antenna
RAM	512MB DDR3
ROM	32GB
CPU	Model : Allwinner H3 Number of Cores : Quad- Core Frequency : 4x Cortex- A7 Up to 1.2 GHz
Working Temperature	-20 °C to 70 °C

Relay Output

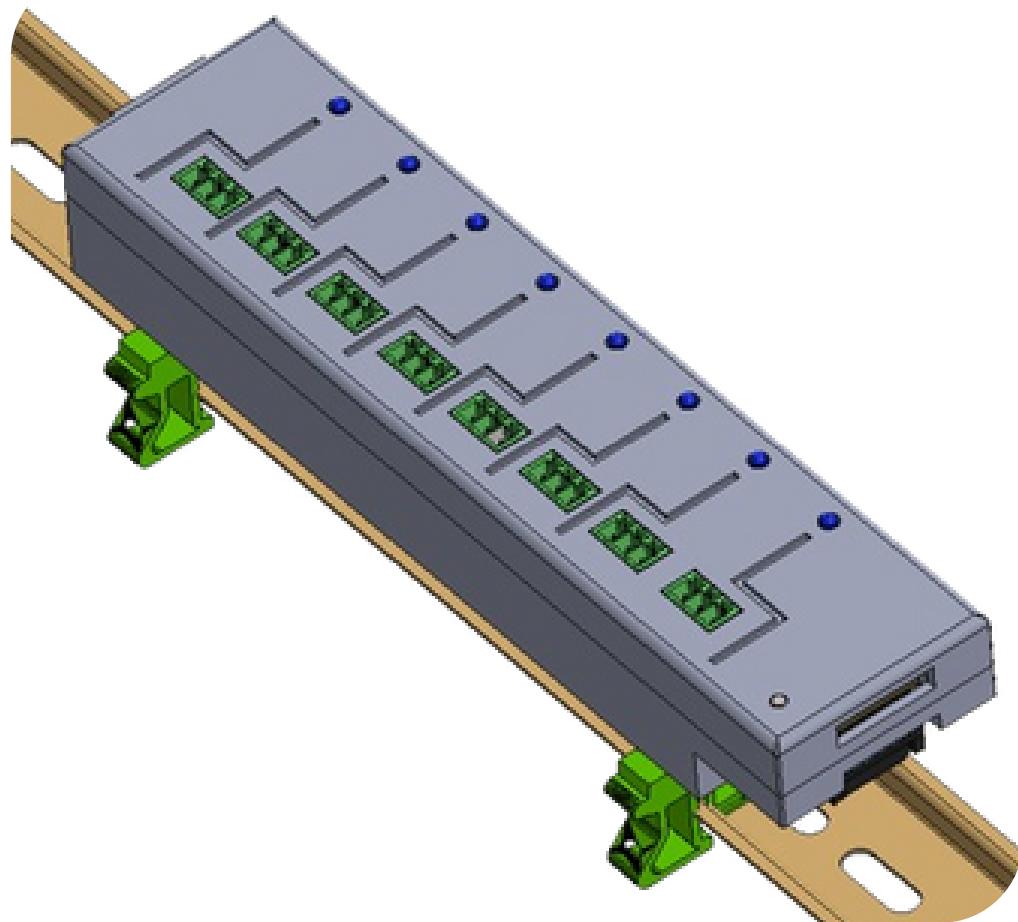
I. Introducing

24V 8-Channel I2C IO Expander Relay Module

To complement the control capabilities of your Gateway Monitoring System, we're introducing our innovative Relay Output Module. Designed as an **IO Expander with 8 relay channels**, this module provides precise on/off control functionality for various external devices maximum contact rating at **16A at 250VAC**.

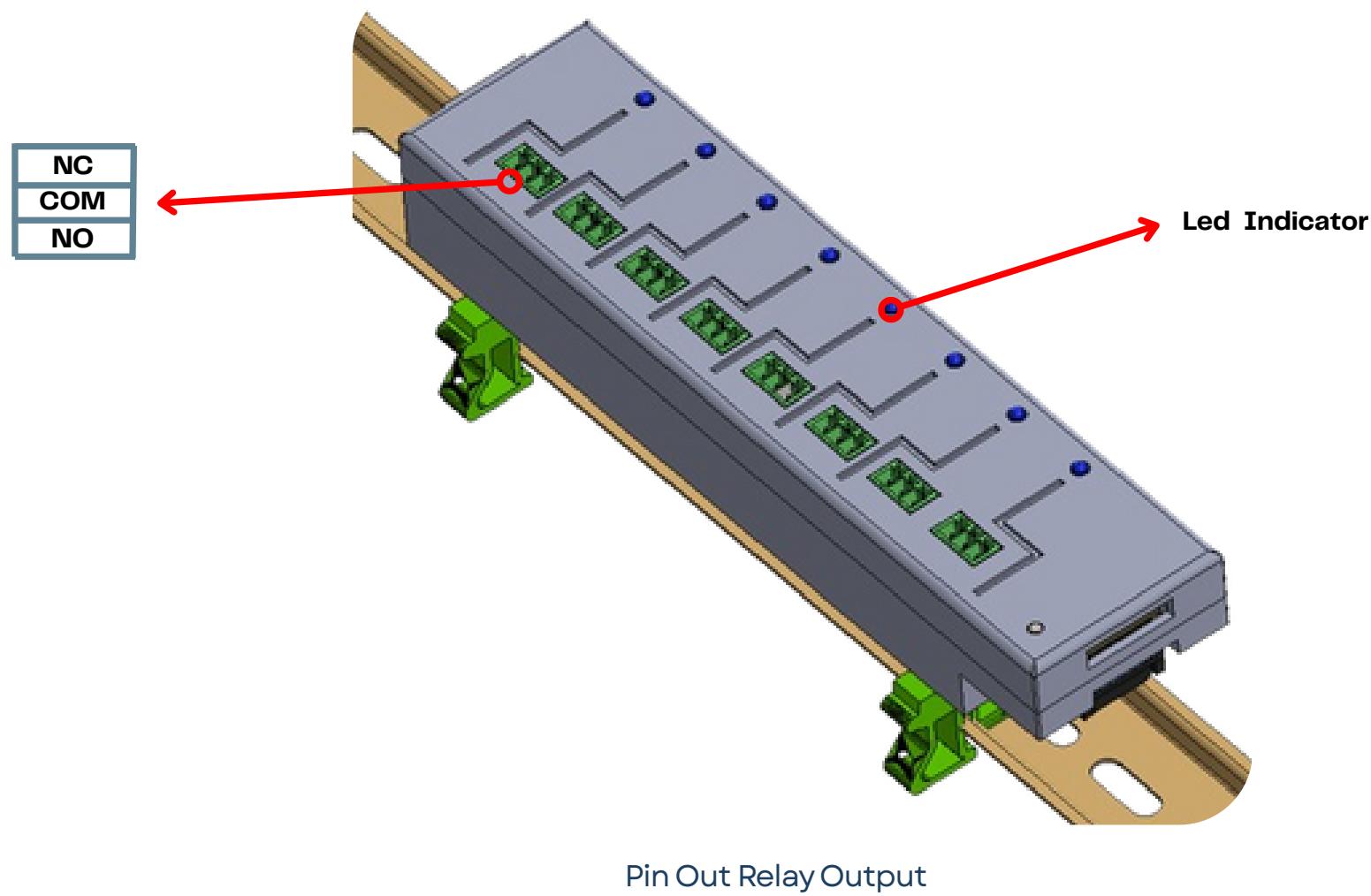
This module communicates via the **I2C protocol**, ensuring seamless and efficient integration with your system. A key feature of this module is its **configurable I2C address**, offering high flexibility in system configuration and allowing the use of multiple modules simultaneously **without address conflicts**.

With this **Relay Output**, you can significantly expand your remote control capabilities, enabling your **Gateway Monitoring System** to not just monitor, but also actively manage and automate operations in your **industrial environment, data center, or IoT applications**. It's an ideal solution for controlling lights, motors, valves, or other 24V devices directly from your **SCADA or IoT dashboard**.



III. SPECIFICATION RELAY OUTPUT

A. PIN OUT



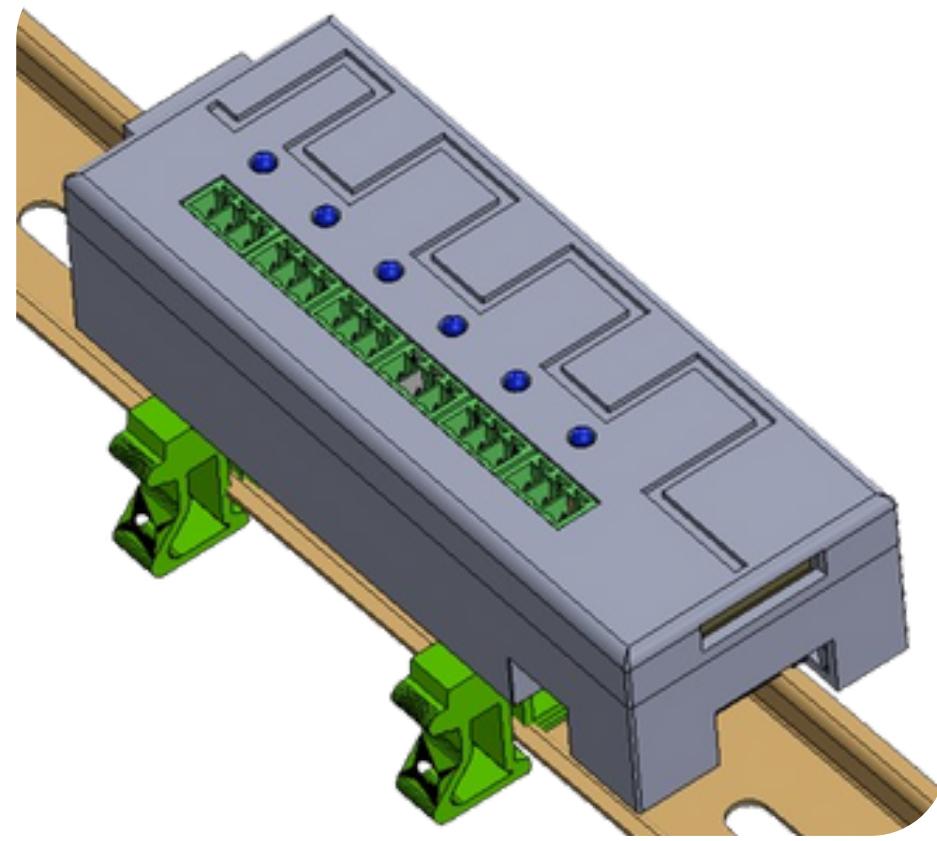
Relay Mini Output

I. Introducing

Mini Relay Output: 6-Channel 10A Relay Module

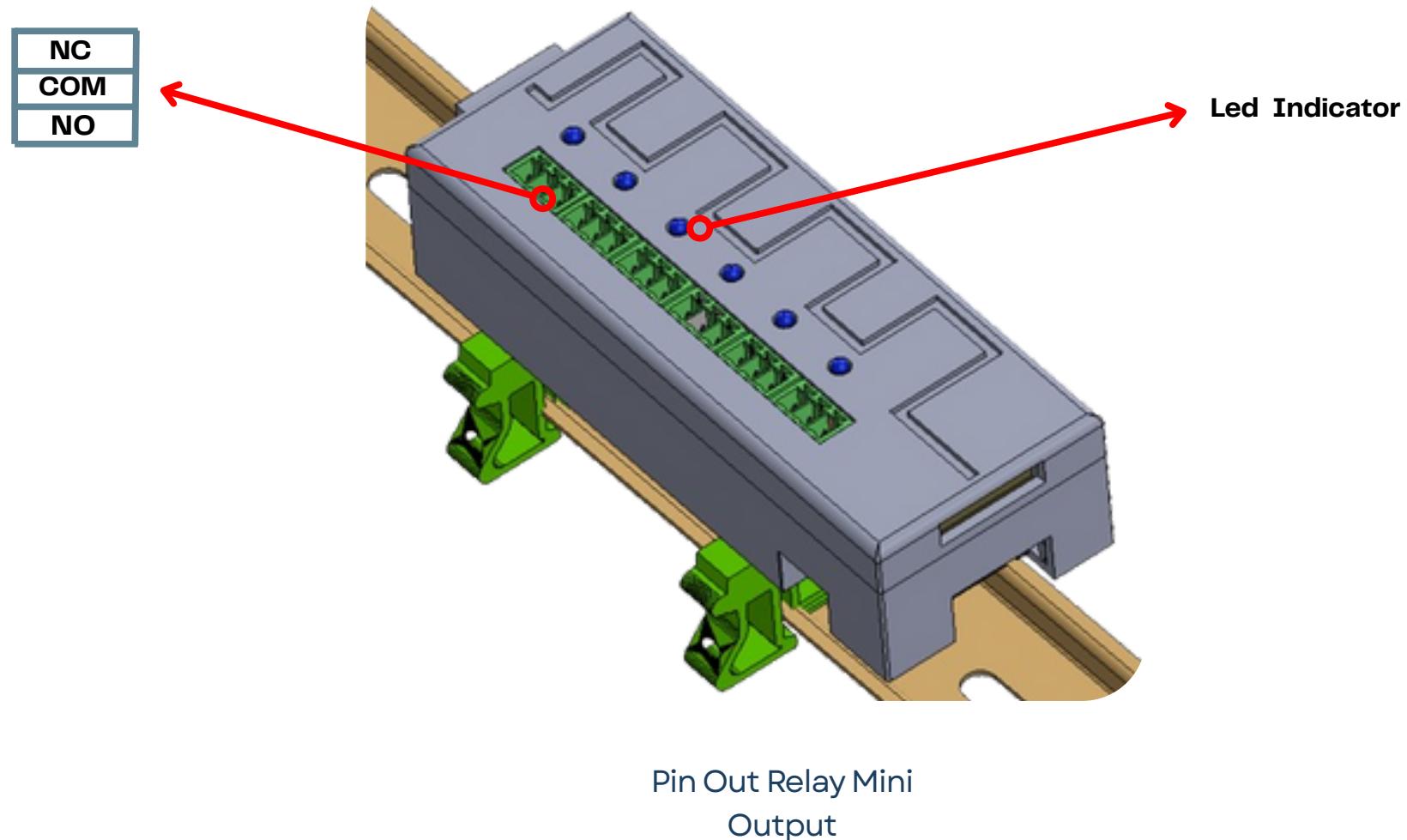
Introducing our **Mini Relay Output Module**, a compact yet powerful solution for your control needs. Designed with **6 independent relay channels**, this module is maximum contact rating of handling loads up to **5 A 25VAC/30DC per channel**, making it ideal for controlling various devices with higher power requirements.

Despite its minimalist size, this module offers maximum performance for **automating and integrating your equipment**. It's a perfect addition to your **Gateway Monitoring Monitoring System** or any other **IoT project**, allowing you to control higher-power devices such as **industrial lighting, motors, heaters, or any other equipment** requiring significant current switching. With this Mini Relay Output Module, you gain both flexibility and reliability for your control systems.



III. SPECIFICATION RELAY MINI OUTPUT

A. PIN OUT



Digital Input Output

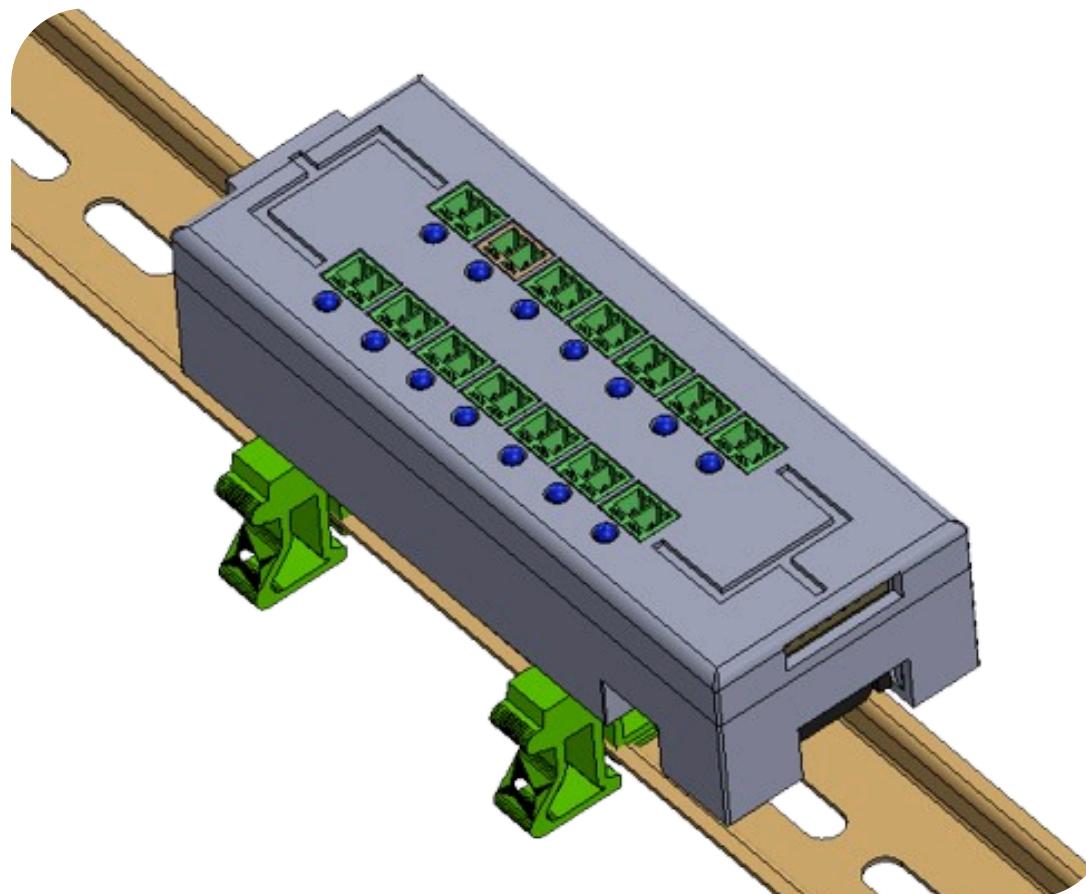
I. Introducing

Digital Input/Output Module: 7 Digital Inputs, 7 Digital Outputs

Introducing our versatile **Digital Input/Output Module**, engineered to expand your system's capabilities with maximum efficiency. This module features **7 independent Digital Input channels** and **7 independent Digital Output channels**, offering a compact yet robust solution for a wide range of monitoring and control needs.

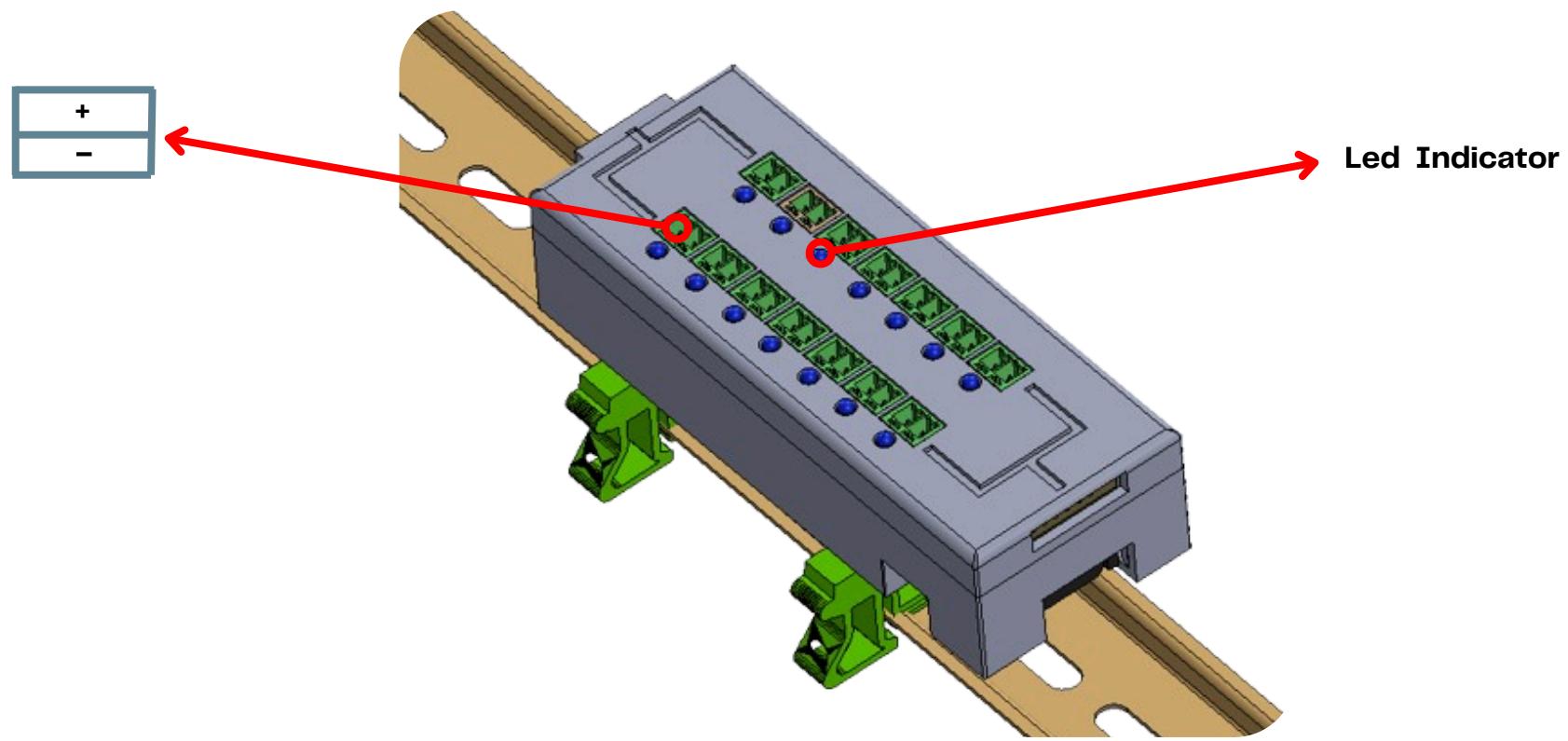
For inputs, the module accepts **dry contact signals**, making it perfectly suited for monitoring the status of devices like **switches, door sensors, or water level sensors**. This ensures broad compatibility with various types of passive sensors in your industrial environment or automation applications.

On the output side, each **Digital Output channel provides a 24V DC voltage 200mA**, which is ideal for **controlling actuators, LED indicators, or other external relays operating at this industry-standard voltage**. This module is an excellent addition to your Gateway Monitoring System, providing added flexibility in collecting status data and performing control actions based on that information.



III. SPECIFICATION DIGITAL INPUT OUTPUT

A. PIN OUT



Pin Out Digital Input
Output

Digital Input Output 5v

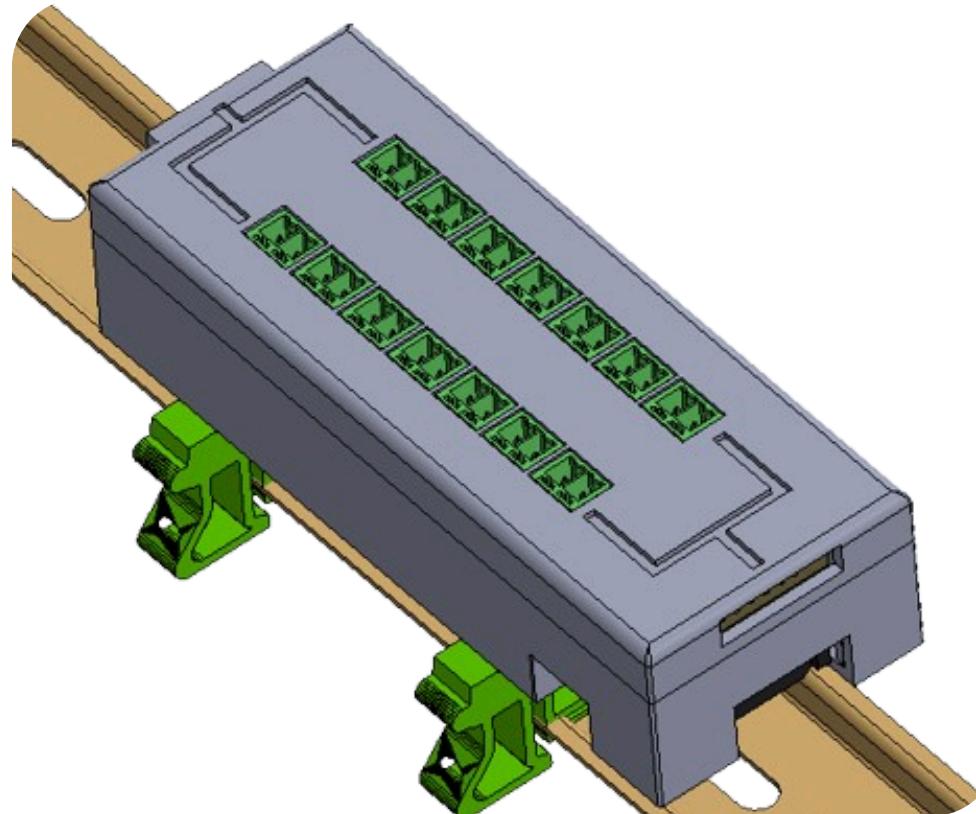
I. Introducing

Digital Input/Output Module: 7 Digital Inputs, 7 Digital Outputs

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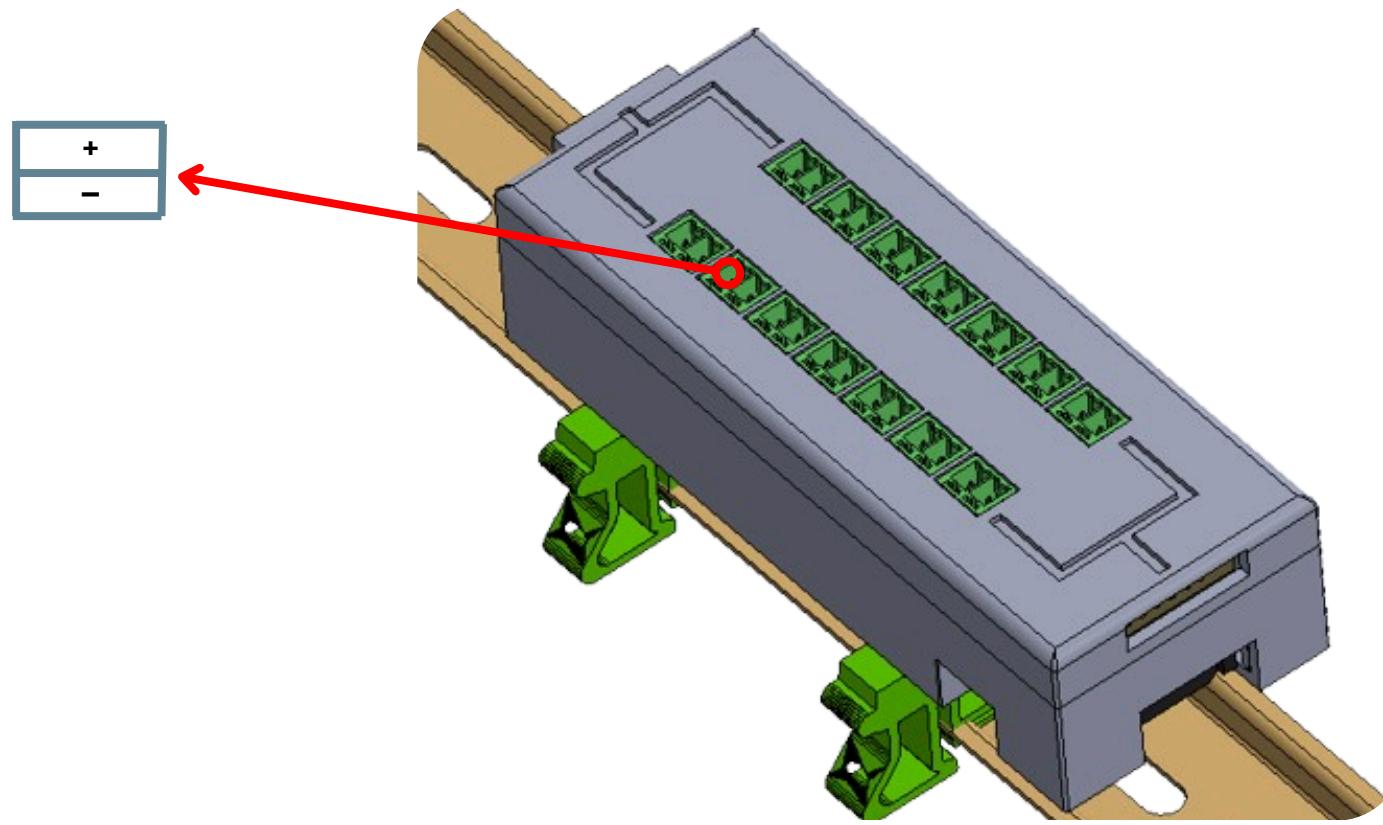
For inputs, the module accepts **dry contact signals**, making it perfectly suited for monitoring the status of devices like **switches, door sensors, or water level sensors**. This ensures broad compatibility with various types of passive sensors in your industrial environment or automation applications.

On the output side, each **Digital Output channel provides a 5V DC voltage**, which is ideal for **controlling actuators, LED indicators, or other external relays operating at this industry-standard voltage**. This module is an excellent addition to your Gateway Monitoring System, providing added flexibility in collecting status data and performing control actions based on that information.



III. SPECIFICATION DIGITAL INPUT OUTPUT 5 V

A. PIN OUT



Pin Out Digital Input
Output 5V

Drycontact

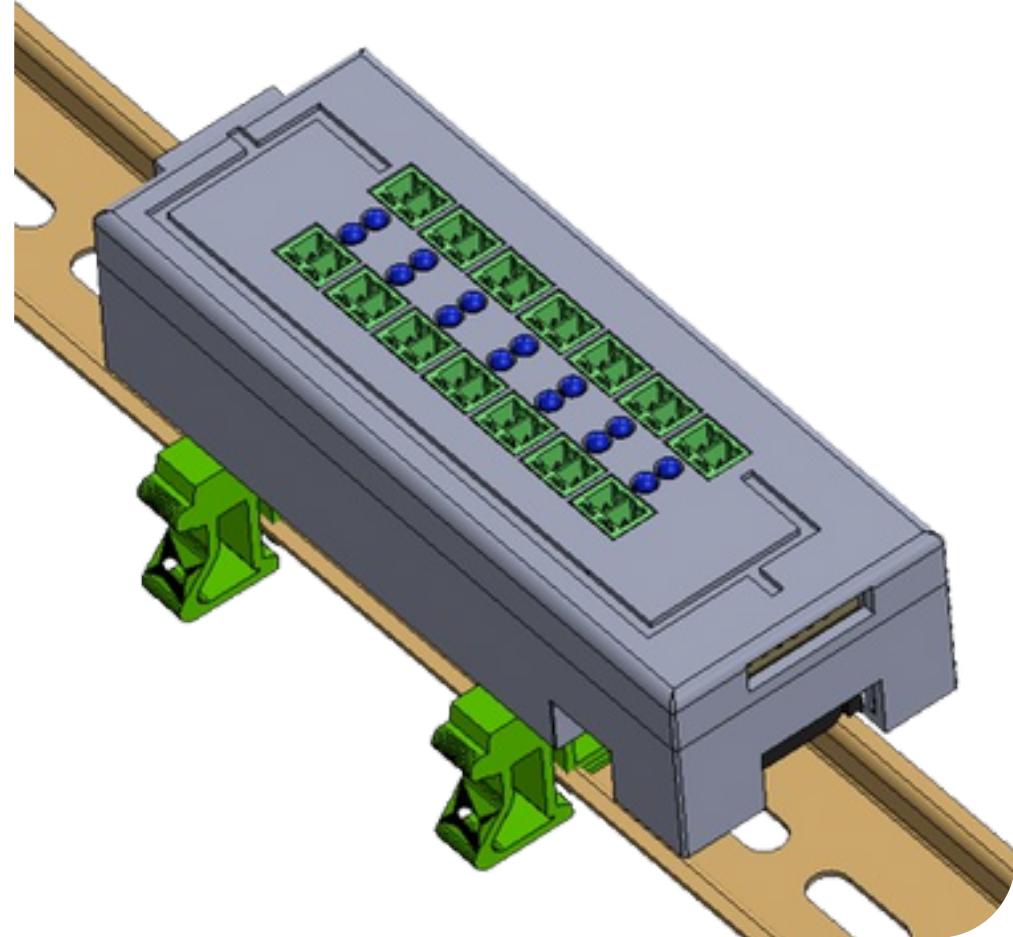
I. Introducing

Digital Input Module: 14 Dry Contact Inputs

Introducing our high-capacity **Digital Input Module**, specifically designed to monitor a wide array of devices and systems. **This module features 14 independent dry contact input channels**, making it an ideal solution for gathering status data from various sources.

Each channel is engineered to **accept signals from dry contacts**, meaning it's perfectly suited for monitoring the status of **switches, position sensors, emergency buttons, passive smoke detectors, liquid level sensors, or relay contacts from other equipment**. This capability ensures broad compatibility with existing infrastructure in your industrial environment, smart building, or IoT applications.

With **14 Dry Contact Inputs**, you can easily integrate and centralize the monitoring of critical information, providing enhanced visibility into your operations. This is a valuable addition to your **Gateway Monitoring System**, enabling you to capture more crucial data for timely analysis and response.



Analog Input

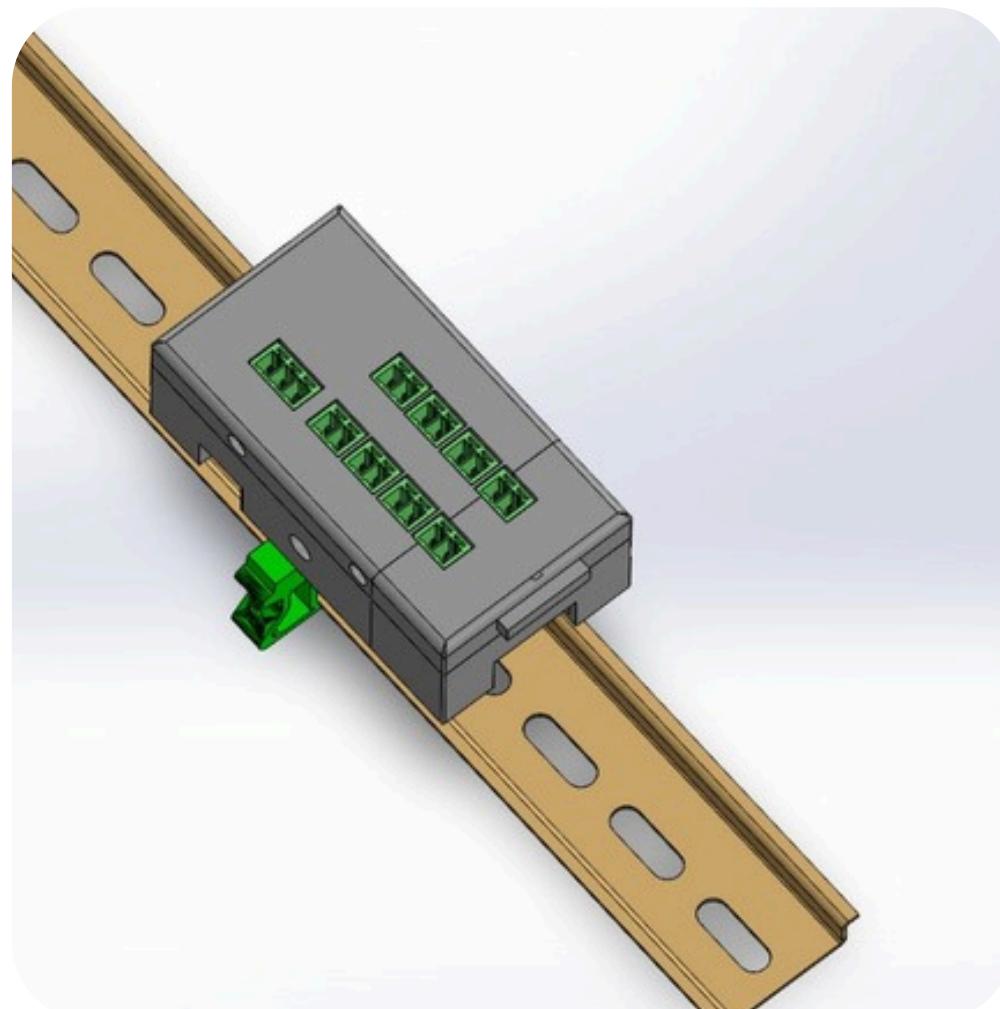
I. Introducing

Analog Input Module: 7-Channel Analog Data Acquisition

Introducing our high-precision **Analog Input Module**, a robust solution designed to capture and digitize real-world analog signals. This module is equipped with **7 independent analog input channels**, making it ideal for accurately monitoring continuous variables across various points in your environment or industrial processes.

Each of the **7 channels** is capable of accepting a wide range of standard analog signals, such as **0-10V**, **4-20mA**, or other configurable ranges. This ensures broad compatibility with a vast array of industrial sensors, including those **for temperature, pressure, humidity, flow, and level**. The module features **high-resolution analog-to-digital conversion**, providing precise and reliable data essential for critical analysis and informed decision-making.

This **Analog Input Module** seamlessly integrates with your **Gateway Monitoring System**, allowing you to centralize the acquisition of crucial analog data. By converting these physical measurements into digital information, you can gain deeper insights into your operational performance, enable proactive maintenance, and optimize control strategies directly from your **SCADA** or **IoT dashboard**.



IV. Software Manual User

1. Overview

The screenshot shows the GSPE MQTT Dashboard interface. On the left is a sidebar with navigation links like Main, Dashboard Overview, Device Management, Modular Devices, Modbus Devices, Battery Threshold, Control Center, Manual Control, Scheduled Control, Logic Control, Voice Control, Value-Based Control, Payload Configuration, Dynamic Payloads, and Static Payloads. The main area is titled 'MQTT Gateway Monitoring System' and shows 'Total Devices' (3), 'Online Devices' (0), and 'Offline Devices' (3). It also displays a 'Device Modbus/SNMP' section with a table for 'dummy' (Lux_Sensor) showing address 3, topic IOT/Temperature_Sensor/1, and live data: { "Lux": 500 }. A green 'Connected' button is visible.

Gateway Monitoring System

The **Gateway Monitoring Dashboard** is a robust software solution designed for efficient monitoring and management of industrial devices communicating via **Modbus RTU, SNMP, and Modular I2C protocols**, leveraging the power of MQTT communication. This intuitive dashboard provides real-time visibility and seamless control over your device infrastructure, ensuring optimal performance and informed decision-making. It acts as a crucial bridge, collecting data from diverse hardware sources (**such as PLCs, sensors, and network devices**) and publishing it to an MQTT broker. The dashboard then subscribes to these MQTT topics, displaying live device status, operational data, and providing tools for configuration and troubleshooting in a user-friendly interface.

Application Purpose

- **Centralized Control & Efficiency:** To provide a unified platform for efficiently monitoring, managing, and retrieving real-time data from various industrial devices (Modbus RTU, SNMP, Modular I2C) via MQTT.
- **Enhanced Operational Visibility:** To improve insight into device status (online/offline) and operational data, enabling rapid issue identification and data-driven decision-making.
- **Flexible Integration:** To serve as a versatile gateway, seamlessly integrating disparate or legacy hardware with modern MQTT-based IoT ecosystems.

Target Audience

- **Industrial Engineers & Technicians:** Responsible for monitoring, configuring, and maintaining devices in manufacturing, factory, or facility environments.
- **Operations Managers:** Requiring an at-a-glance overview of device status to ensure smooth operations and minimize downtime.
- **IoT Developers & Integrators:** Seeking a ready-to-use solution for connecting and managing various field devices with MQTT platforms.
- **Manufacturing & Automation Companies:** Aiming to optimize asset monitoring processes and enhance overall operational efficiency.

IV. Software Manual User

Key Features

- **Multi-Protocol Device Monitoring:** Supports seamless integration and monitoring of devices using Modbus RTU, SNMP, and Modular I2C protocols.
- **Real-time MQTT Connectivity:** Utilizes lightweight MQTT protocol for instant data transmission and reliable device status updates.
- **Intuitive Dashboard Interface:** Provides a clean, user-friendly interface for at-a-glance overview of device counts, online/offline status, and live data feeds.
- **Comprehensive Device Management:** Features easy-to-use tools to add, edit, and delete devices, including detailed profile configuration (name, part number, topic) and protocol-specific settings (address/IP, device bus).
- **Dynamic Status Monitoring:** Offers real-time online/offline status updates for quick identification of operational issues.
- **Advanced Data Filtering & Sorting:** Quickly search and sort device lists by various criteria for efficient data navigation.
- **Live Data Visualization:** Displays raw MQTT payload data directly from device topics, invaluable for debugging and data analysis.

System Requirements

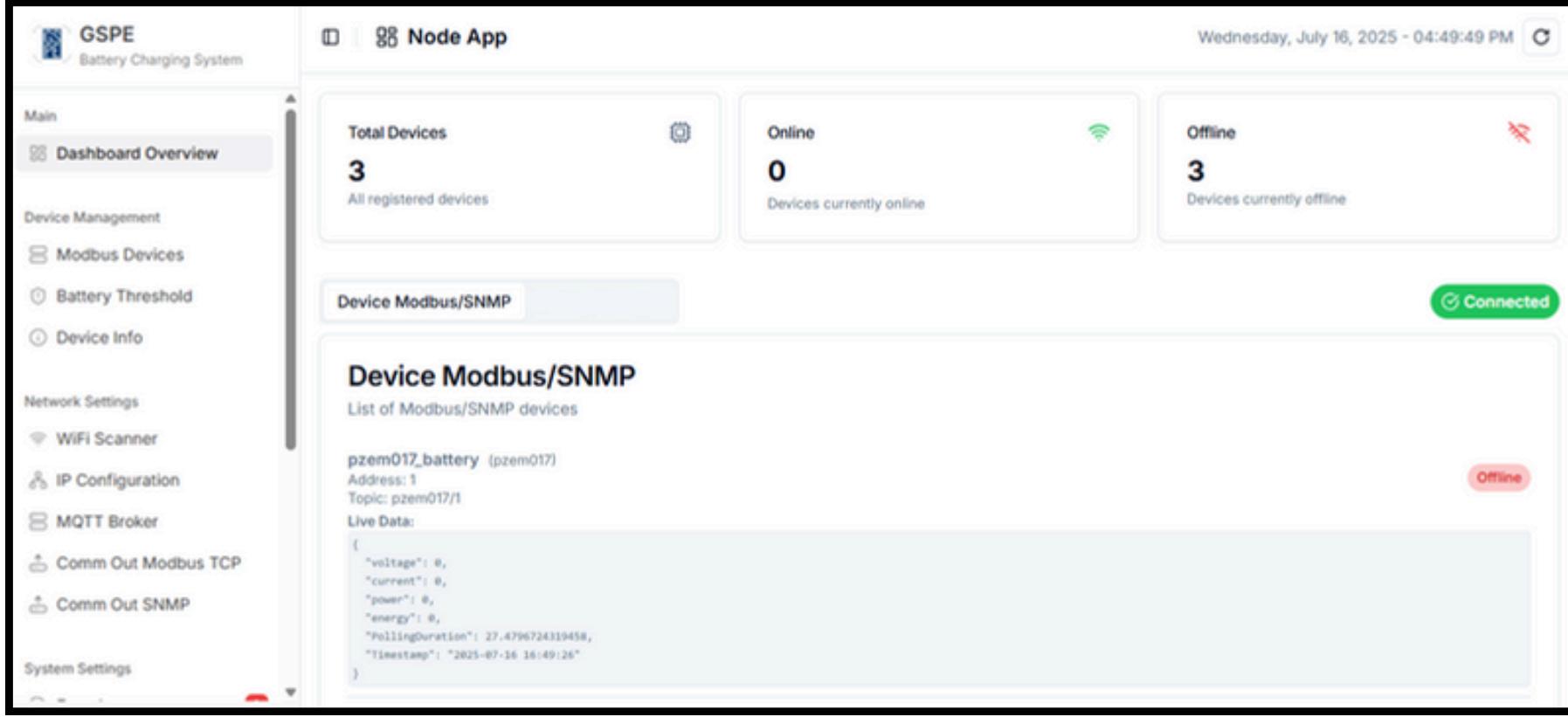
To ensure optimal performance and compatibility, the Gateway Monitoring Dashboard requires the following:

- **Network:** Stable internet connection for MQTT broker communication.
- **Web Browser:** Latest versions of Google Chrome, Mozilla Firefox, Microsoft Edge, or Safari.

IV DASHBOARD

DASHBOARD SOFTWARE

The software dashboard is the primary window for real-time monitoring of your entire battery charging system. Designed to provide full visibility, this dashboard displays crucial data and device statuses live, ensuring you always have the latest information for quick and accurate decision-making.



Real-time Device Data Monitoring

Get an immediate overview of each device's performance with a comprehensive live data display:

Device and Connectivity Status

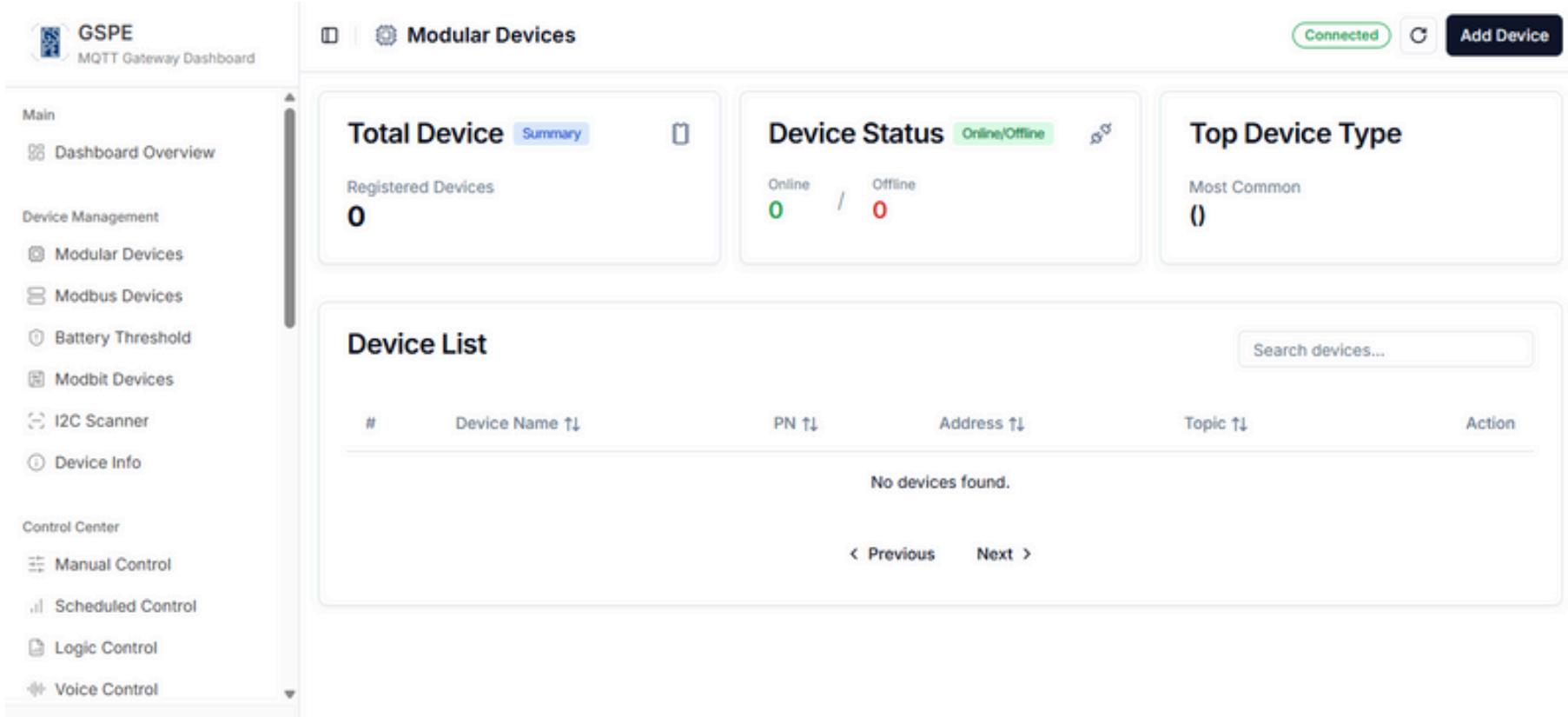
The dashboard provides essential information regarding the status of every device in your system:

- Device Online/Offline Status:** Clearly indicates whether each device is connected and communicating with the controller. A device is considered online if it's successfully detected and sending data, and offline if it's not.
- Total Devices:** Shows the overall count of devices registered in the system.
- Online Status:** Displays the number of devices currently active and transmitting data.
- Offline Status:** Indicates the number of devices currently disconnected or not sending data.
- MQTT Connection Status:** Provides an indication of the MQTT connectivity status, ensuring a smooth flow of IoT/automation data.

IV. MODULAR DEVICES

I Modular Device Management and Configuration

Modular Devices page is your central hub for managing all devices with **I2C Protocols** connected to and installed on your controller. This dedicated section provides comprehensive tools for lifecycle management and configuration of your devices, ensuring optimal performance and seamless integration.



Key Features :

- **Device Management:**
 - **Read:** View detailed information about each installed device.
 - **Add:** Creating or register new devices>
 - **Update:** Change the configruations your device
 - **Delete:** Remove device from data install device.
- **Auto-Configuration:** Streamline the setup process with automated configuration options, reducing manual effort and potential errors.

Device Information Display:

For each installed device, the page provides critical details for quick identification and monitoring:

- **Total Devices:** A clear count of all devices currently managed by the controller.
- **Protocol Used:** Specifies the communication protocol employed by the device (e.g., **Modular I2C, SNMP, MQTT**).
- **Address:** Displays the unique network address or ID of the device.
- **Topic:** Shows the MQTT topic associated with the device for IoT communication (if applicable).
- **Part Number:** Identifies the specific model or part number of the device.

This page empowers you to maintain an organized and efficient control over your entire fleet of battery charging devices.

IV. MODBUS/SNMP DEVICES

Installed Devices: Device Management and Configuration

The **Installed Devices** page is your central hub for managing all battery charging devices connected to and installed on your controller. This dedicated section provides comprehensive tools for lifecycle management and configuration of your devices, ensuring optimal performance and seamless integration.

The screenshot shows the 'Modbus SNMP Management' section of the GSPE MQTT Gateway Dashboard. On the left, a sidebar lists various monitoring and control features: Main, Device Management (Modular Devices, Modbus Devices, Battery Threshold), Modbit Devices, I2C Scanner, Device Info, Control Center, and Manual Control. The main area displays three key metrics: 'Total Devices' (0, All connected devices), 'Protocol Breakdown' (Modbus RTU: 0, SNMP: 0), and 'Most Used Protocol' (N/A, Most common protocol). Below these is a 'Device List' table with columns: #, Device Name, PN, Address/IP, and Topic. A message at the bottom of the list says 'No devices found. Please add a new device or refresh the list.' A search bar labeled 'Search devices...' is located above the table. At the top right, there is a green 'Connected' button with a circular icon.

Key Features :

- **Device Management:**
 - **Read:** View detailed information about each installed device.
- **Auto-Configuration:** Streamline the setup process with automated configuration options, reducing manual effort and potential errors.

Device Information Display:

For each installed device, the page provides critical details for quick identification and monitoring:

- **Total Devices:** A clear count of all devices currently managed by the controller.
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- **Part Number:** Identifies the specific model or part number of the device.

This page empowers you to maintain an organized and efficient control over your entire fleet of battery charging devices.

IV. I2C SCANNER DEVICES

I2C Scanner & Address Converter

The **I2C Scanner** is an essential tool seamlessly integrated into your dashboard, designed to simplify the discovery and identification of devices connected via the I2C bus. This feature allows you to automatically scan for I2C device addresses and presents the results in an easily understandable format, while also providing the capability to convert hexadecimal addresses to decimal.



Key Capabilities:

- Automatic I2C Address Scanning: With a single click, scan the entire I2C address range (**0x00 to 0x7F**) to detect devices actively connected to the bus. This is invaluable for identifying new devices or verifying the connectivity of existing ones.
- Rapid Device Detection:** Scan results are displayed instantly, showing the hexadecimal addresses of each discovered I2C device. This significantly speeds up the setup and troubleshooting processes.
- Hexadecimal to Decimal Conversion:** A built-in utility allows you to view discovered device addresses not only in standard hexadecimal format but also convert them to their equivalent decimal format. This aids in software or firmware configuration that might require addresses in a decimal base.
- Connectivity Verification:** Helps to verify that your I2C devices are correctly wired and can communicate with the gateway system.
- Intuitive User Interface:** Designed for ease of use, ensuring that even non-technical users can quickly scan and comprehend I2C device address information.

With the I2C Scanner feature, you can ensure a smooth installation of your I2C devices and troubleshoot connectivity issues rapidly, enhancing efficiency in your modular deployments.

IV. MANUAL CONTROL

Manual Control for I2C Devices

Manual Control provides a direct and interactive interface for users to manage **I2C modular devices in real-time**, specifically those of **Relay** and **Mini Relay** types. This feature enables operators to directly control the **ON/OFF** status of connected relays, offering flexibility and the ability for quick intervention without the need for complex firmware modifications or scripting.

The screenshot shows the GSPE MQTT Gateway Dashboard with the 'Modular Devices Monitoring' tab selected. On the left, there's a sidebar with 'Main' and 'Device Management' sections. Under 'Device Management', 'Modular Devices' is expanded, showing 'Connected Devices'. Two devices are listed: 'dummy_Drycontact1' and 'dummy_Drycontact2'. Each device card displays its Product Name (PN), Address, Bus, and Topic. Below this, a 'Live Data' section shows a timestamp and a table of 14 inputs. Each input has an 'ON' or 'OFF' button. For 'dummy_Drycontact1', Input 9 is 'ON'. For 'dummy_Drycontact2', Input 1 is 'ON' and Input 9 is also 'ON'. Other inputs for both devices are 'OFF'.

Key Capabilities:

- Automatic Device Detection & Integration:** The system automatically detects all connected I2C Modular devices (**Relay/Mini Relay**) and integrates them into the control interface. The dashboard will display the real-time status of each relay, ensuring you always have the most up-to-date information.
- Direct Control via Virtual Buttons:** Users can activate or deactivate each individual relay by pressing intuitive virtual buttons available on the dashboard. This provides an easy "**click-and-control**" experience.
- Instant Status Feedback:** Any change in relay status made through the dashboard or occurring on the physical device will be immediately updated and displayed on the interface, providing quick and accurate visual feedback.
- Operational Flexibility:** Perfect for testing, troubleshooting, or situations where direct control over I2C modular device outputs is required, such as switching on/off lights, motors, or other actuators connected to relays.
- Enhanced Safety & Efficiency:** With the ability to remotely control devices through a centralized interface, this feature can reduce the need for physical intervention and improve operational efficiency.

The Manual Control feature is designed to put full control at your fingertips, ensuring efficient and responsive management of your modular I2C devices.

IV. SCHEDULE CONTROL

Schedule Control

Schedule Control is an advanced feature that allows users to **automate** the operation of **I2C modular relay devices** based on predefined time schedules. This provides unparalleled flexibility in managing your devices, saving energy, and optimizing workflows without constant manual intervention.

#	Custom Name	Address	Device Bus	Days	Controls	Actions
1	Lighting 1	37	0	Active Days: -	Name: - Pin: 1 Name: - Pin: 2 Turn On: 08:00 - Turn Off: 20:00 Turn On: 09:00 - Turn Off: 21:00	<button>Edit</button> <button>Delete</button>
2	Lighting 2	38	1	Active Days: -	Name: - Pin: 1 Turn On: 06:00 - Turn Off: 18:00	<button>Edit</button> <button>Delete</button>

Key Capabilities:

- **Time-Based Scheduling:** Set your relay devices to **turn ON or OFF** at specific times each day. For example, switch on lights at 6:00 AM and turn them off at 6:00 PM.
- **Flexible Day Selection:** Choose specific days of the week (**e.g., Monday-Friday, every day, or only weekends**) for when the schedule should be applied. This is ideal for scenarios that vary based on weekdays or holidays.
- **Automated Energy Management:** Automate energy savings by powering down devices when not needed, or only activating them during operational hours.
- **Unsupervised Operation:** Once a schedule is set, the system will manage the relay devices automatically, freeing up your time and resources.
- **Intuitive Scheduling Interface:** An easy-to-use design allows users to quickly **create, edit, or delete schedules**, even for complex configurations.
- **Real-time Synchronization:** Schedule changes will be immediately synchronized with the devices, and the device status on the dashboard will reflect the scheduled operations.

With Schedule Control, you can transform your modular I2C devices into a smart and efficient automated system, optimizing operations and significantly reducing costs.

IV. LOGIC CONTROL

Logic Control

Logic Control is a revolutionary feature that empowers you to create intelligent **automation rules**, linking inputs from I2C modular devices (**such as Digital Input**) with outputs from other I2C modular devices (**like Relay or Digital Output**). This feature allows you to build responsive and adaptive automated systems without the need for complex coding.

ID	Input Name	Address	Bus	Pin	Expected Value	Control Relays	Actions														
1	Emergency Button	34	0	10	TRUE	<table border="1"><tr><td>Custom Name:</td><td>Door Data Hall</td></tr><tr><td>Control Type:</td><td>Auto</td></tr><tr><td>Address:</td><td>36</td></tr><tr><td>Pin:</td><td>1</td></tr><tr><td>Set Value:</td><td>TRUE</td></tr><tr><td>Delay (s):</td><td>0</td></tr><tr><td>Latching:</td><td>No</td></tr></table>	Custom Name:	Door Data Hall	Control Type:	Auto	Address:	36	Pin:	1	Set Value:	TRUE	Delay (s):	0	Latching:	No	<button>Edit</button> <button>Delete</button>
Custom Name:	Door Data Hall																				
Control Type:	Auto																				
Address:	36																				
Pin:	1																				
Set Value:	TRUE																				
Delay (s):	0																				
Latching:	No																				

Key Capabilities:

- **Rule-Based Automation:** Create simple yet powerful logic rules (**e.g., "IF sensor A input is TRUE, THEN Relay B is ON"**) to automate your device actions.
- **Versatile Inputs & Outputs:** Supports various types of I2C modular devices:
 - **Inputs:** Utilize signals from Digital Input modules (**e.g., switches, motion sensors, door/window sensors**) as triggers for your rules.
 - **Outputs:** Control Relay or Digital Output modules to activate or deactivate physical devices (**e.g., lights, fans, electronic door locks**).
- **Flexible Conditional Logic:** Configure "TRUE" or "FALSE" conditions on digital inputs to determine when outputs should be activated or deactivated.
- **Visual Configuration Interface:** An intuitive design allows you to easily define relationships between inputs and outputs, often with requiring no programming expertise.
- **Instant Response:** Because the logic is executed directly on the gateway, you get fast and reliable responses between input conditions and output actions.
- **Scalability:** Build complex automation systems by combining multiple logic rules, enabling sophisticated control over your environment.

With Logic Control, you can transform your modular I2C devices into a smart system capable of reacting to changes in the **physical environment**, significantly enhancing efficiency, security, and convenience.

IV. VOICE-COMMAND CONTROL

Voice Command Control

Voice Command Control introduces a new level of convenience in device management, allowing you to operate your **I2C modular relay devices** simply by using your voice. This feature enables users to register devices and custom **voice commands**, providing an intuitive and hands-free interaction with your system.

The screenshot shows the GSPE MQTT Gateway Dashboard. On the left, a sidebar lists various device management options like Dashboard Overview, Device Management, Modular Devices, Modbus Devices, and Battery Threshold. Under Control Center, it includes Manual Control, Scheduled Control, Logic Control, Voice Control, and Value-Based Control. The main panel is titled 'MQTT Dashboard & Voice Control' and shows 'Connected'. It has sections for 'MQTT Broker Server Info' (MAC: 9b:4e:59:fe:f7:9f, Broker Address: localhost, Broker Username: -, Broker Port: 1883, Broker Password: -) and 'Voice Control Devices'. A table lists a single device: # 1, Keyword: Lampu, Target Device: Relay.1 Modular, Pin: 1, Address: 32, Bus: 0. Buttons for '+ Add Voice Control' and 'Start Voice Command' are visible.

Key Capabilities:

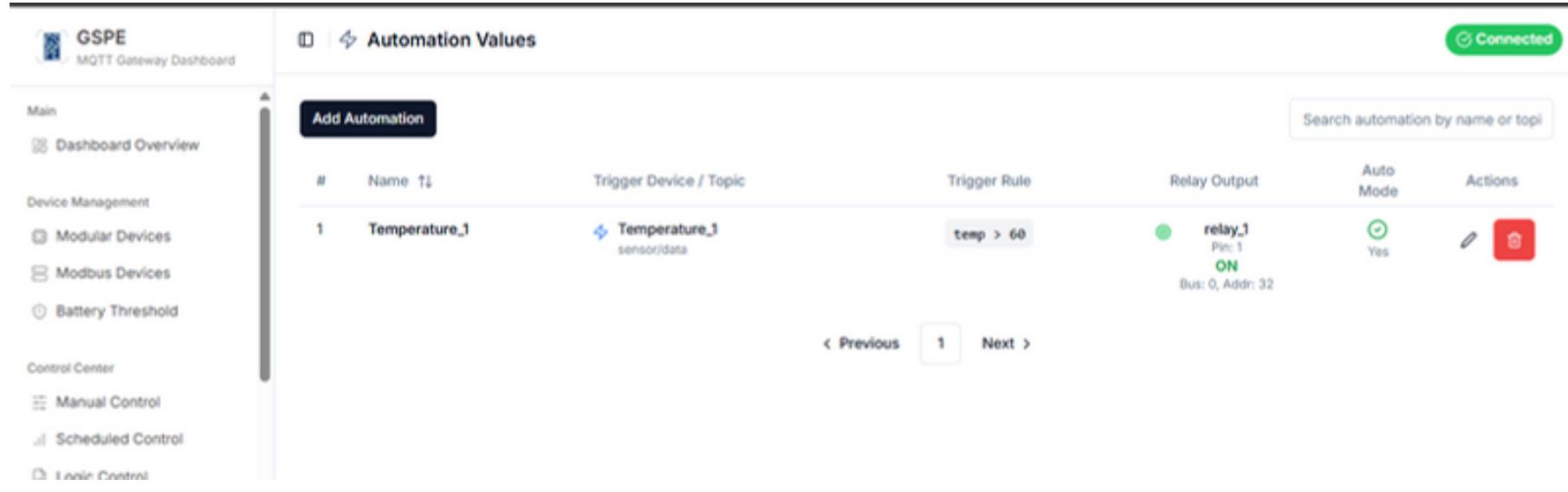
- Custom Device & Command Registration:** Register your specific relay devices and define unique voice commands for each action (e.g., "Turn on Living Room Light", "Turn off Bedroom Fan").
- Hands-Free Control:** Instantly activate or deactivate your I2C modular relay devices just by speaking the registered commands. This is particularly useful in situations where your hands are busy or you're not near a computer.
- Enhanced Accessibility:** Provides an alternative control method that is highly beneficial for users with limited mobility or those seeking a more natural interaction method.
- Fast & Accurate Response:** The system is designed to quickly recognize voice commands and translate them into corresponding device actions, ensuring reliable responsiveness.
- Simplified Device Management:** Once voice commands are registered, controlling devices becomes more intuitive and efficient compared to manual navigation within the interface.

With **Voice Command Control**, you can transform the way you interact with your modular I2C devices, creating a more modern, convenient, and efficient experience.

IV. VALUE-BASED CONTROL

Value-Based Control

Value-Based Control is an intelligent automation feature that allows you to **control I2C modular relay devices based on readings from analog inputs or sensors**. This empowers you to create systems that are responsive to real-world environmental conditions, such as **temperature, humidity, light levels, or pressure, and automate actions based on these values**.



#	Name ↑↓	Trigger Device / Topic	Trigger Rule	Relay Output	Auto Mode	Actions
1	Temperature_1	Temperature_1 sensor/data	temp > 60	relay_1 Pin: 1 ON Bus: 0, Addr: 32	<input checked="" type="checkbox"/> Yes	 

Key Capabilities:

- **Sensor-Driven Automation:** Define rules where relay outputs will be activated or deactivated when a value from an analog sensor reaches a specific threshold (e.g., "IF Temperature > 28°C, THEN Fan ON").
- **Analog/Sensor Input Support:** Integrate various types of sensors that provide value outputs (e.g., **temperature sensors, humidity sensors, light sensors, pressure sensors, water level sensors**) as triggers for your automation rules.
- **Configurable Threshold Conditions:** Set upper and/or lower thresholds that trigger actions. You can specify whether the relay should react when the **value is above, below, equal to, or within a certain range**.
- **Relay Output Control:** Link your value-based logic to relay outputs to control physical devices such as **fans, heaters, pumps, or lighting systems**, automatically maintaining desired environmental conditions.
- **Integrated Monitoring and Automation:** The dashboard not only displays sensor values in real-time but also actively manages outputs based on your **defined rules**, creating an efficient closed-loop control system.
- **Enhanced Efficiency & Convenience:** Automate repetitive tasks and ensure optimal conditions without constant manual intervention, saving energy and resources.

With Value-Based Control, you can build sophisticated and adaptive environmental automation systems, maximizing operational efficiency and creating smarter environments.

IV. DYNAMIC PAYLOAD

Dynamic Payload

Dynamic Payload is an advanced feature that allows you to modify the structure of **JSON** data sent from the gateway to clients (**e.g., dashboard, third-party applications**). Based on the data previously read from devices (**Modbus, SNMP, Modular I2C**), this feature can transform the **JSON format** and arrangement according to your needs, without altering the data values themselves. This is incredibly useful for integration with other systems that may require specific data structures.

Key Capabilities:

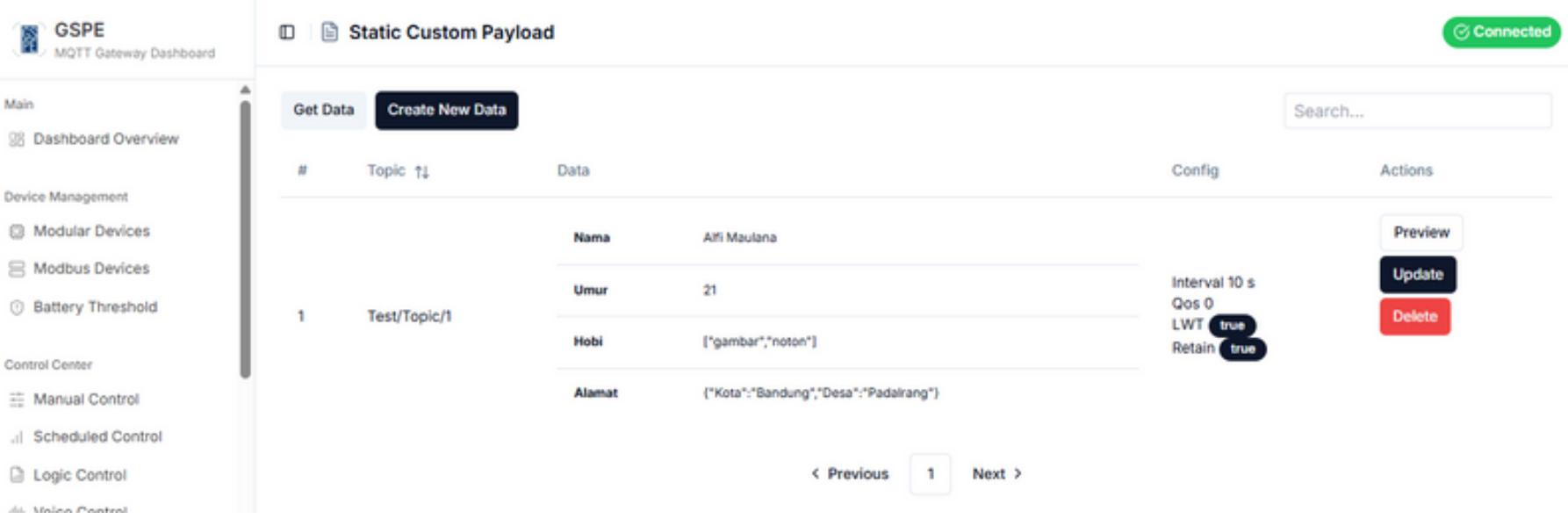
- **JSON Structure Transformation:** Automatically changes the layout or "shape" of the JSON object containing device data. For instance, flattening nested structures, renaming keys, or combining data from multiple readings into a single JSON object.
- **Input Data-Based Adaptation:** Configuration for transformation can be triggered or adjusted based on the values or characteristics of the data just read from the devices.
- **Seamless System Integration:** Facilitates the integration of the **Gateway Monitoring Dashboard** with third-party platforms or systems (**e.g., cloud analytics, SCADA, ERP**) that may have strict or different data format requirements.
- **Boundless Flexibility:** Provides full control over how device data is presented to downstream consumers, allowing for extensive customization without needing modifications to device firmware.
- **Development Efficiency:** Reduces the need to develop data parsers or transformers on the client side, as data is already formatted as desired upon reception.

With the Dynamic Payload feature, your Gateway Monitoring Dashboard becomes more than just a data collector; it evolves into an intelligent data orchestrator, ensuring data is presented in the most relevant and usable format for any application.

IV. STATIC PAYLOAD

Static Payload

Static Payload is a powerful complementary feature for flexible data communication. It allows you to configure and send **JSON data** with a predefined (**static**) format and values directly via **MQTT** to brokers and subscribing clients. Unlike **dynamic payloads** which adapt, **static payloads** are ideal for transmitting configuration information, default statuses, or heartbeats without needing to read data directly from devices.



The screenshot shows the GSPE MQTT Gateway Dashboard with the 'Static Custom Payload' section selected. The interface includes a sidebar with navigation links like Main, Dashboard Overview, Device Management, Control Center, and Logic Control. The main area has tabs for 'Get Data' and 'Create New Data'. A table displays a single static payload entry with columns for #, Topic, Data, Config, and Actions. The data row contains fields: Nama (Alfi Maulana), Umur (21), Hobi ([{"gambar": "noton"}]), and Alamat (["Kota": "Bandung", "Desa": "Padalarang"]). The config row shows Interval 10 s, Qos 0, LWT true, and Retain true. Action buttons include Preview, Update (highlighted in blue), and Delete.

Key Capabilities:

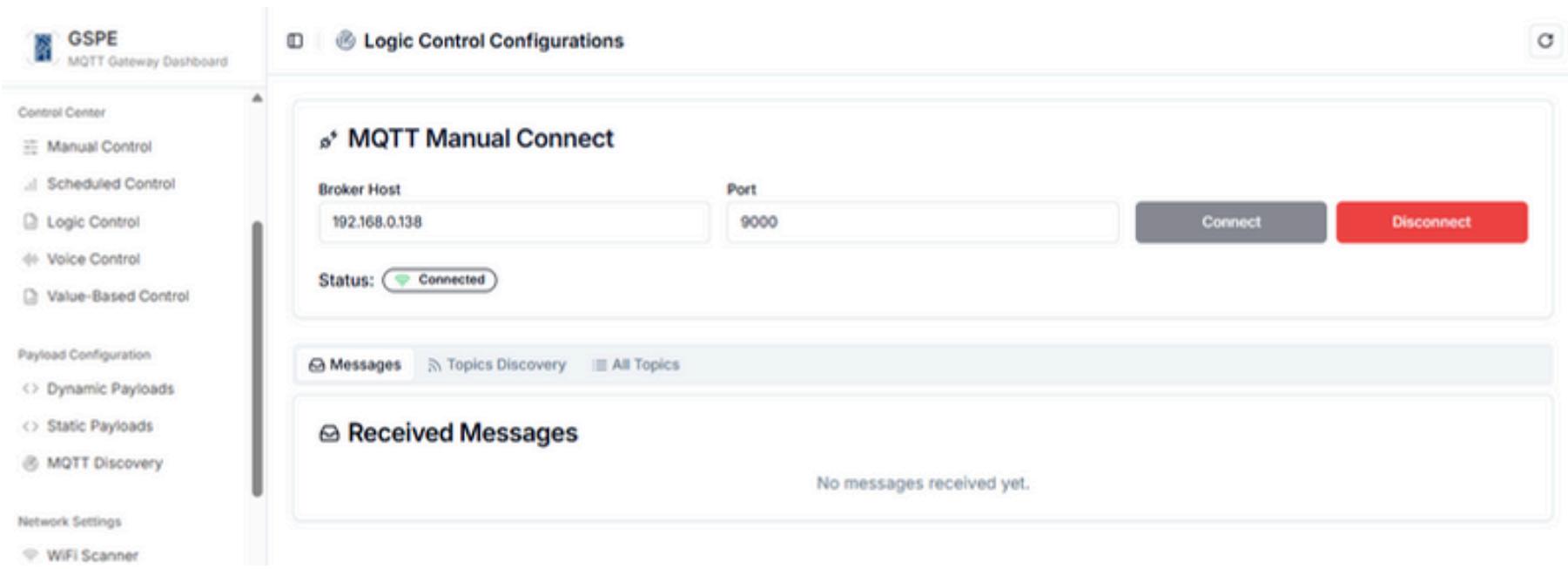
- **Custom JSON Data Transmission:** Create JSON objects with a structure and data that you fully define. This enables you to send highly specific and custom-tailored messages to your MQTT clients.
- **Static Format & Content:** The JSON data sent will always be exactly as you define it, making it perfect for information that is unchanging or requires default values.
- **Versatile Use Cases: Useful for:**
 - Sending heartbeat messages to indicate that the gateway is active.
 - Providing default configuration parameters to new clients.
 - Transmitting general status information not directly tied to sensor readings.
 - Consistent data testing or simulation.
- **Easy Configuration:** An intuitive interface for defining the JSON structure and values to be sent.
- **On-Demand or Scheduled Delivery:** Static payloads can be sent manually by the user, or set to be transmitted at specific time intervals, adding flexibility in communication management.

With the Static Payload feature, you have complete control over the messages you **send via MQTT**, enabling consistent and clearly defined communication for various system needs.

IV. MQTT DISCOVER

MQTT Topic Discovery

MQTT Topic Discovery is an intelligent feature that simplifies the integration and monitoring process by **automatically detecting active MQTT topics on your broker**. Instead of manually knowing and entering each topic, this feature provides a real-time view of what data is **available, enhancing configuration efficiency and troubleshooting**.



Key Capabilities:

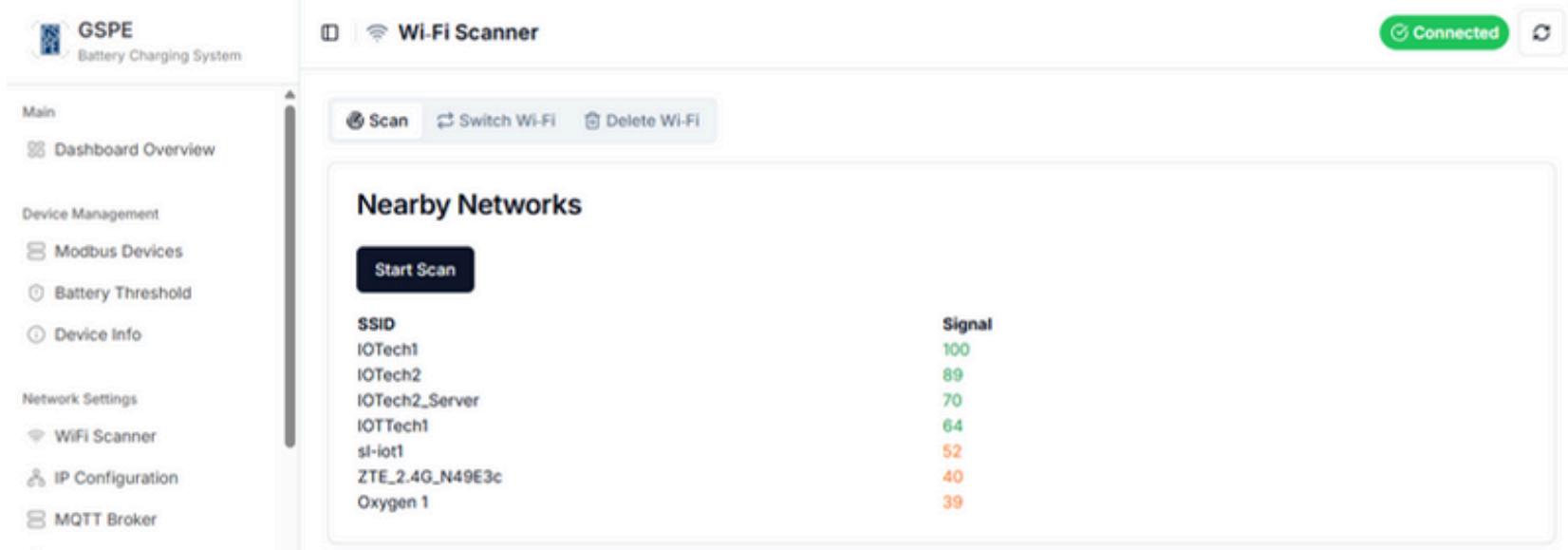
- **Automatic Topic Detection:** Proactively scans the connected MQTT broker to identify topics that are currently being published to or have recently become active. This helps in quickly finding relevant data streams.
- **Real-time Topic List:** The dashboard dynamically displays a list of **discovered MQTT topics**, allowing you to instantly see the data flowing through your system.
- **Simplified Configuration:** Reduces the manual effort required to configure devices and data displays, as relevant topics are already found and presented to the user.
- **Effortless Data Exploration:** Enables users to explore the data available in their MQTT system without needing to access external tools or perform manual debugging.
- **Accelerated Troubleshooting:** If communication issues arise, this feature can quickly indicate whether data is being published to the correct topic, or if unexpected topics are present, aiding in the diagnostic process.
- **Topic & Message Visualization (optional):** Can also display a sample of the last message published to a discovered topic (if desired for feature depth).

With the **MQTT Topic Discovery** feature, your **Gateway Monitoring Dashboard** becomes smarter and more adaptive, significantly reducing configuration complexity and accelerating deployment time for all your devices and data streams.

IV. NETWORK [WIFI, IP STATIC]

Network Settings: Network Configuration for Optimal Connectivity

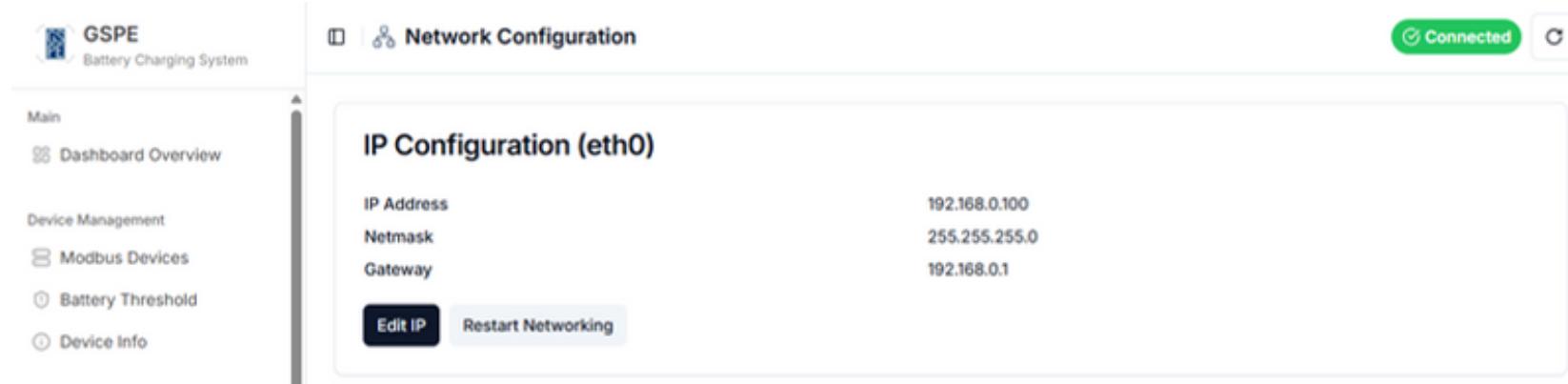
The "Network Settings" section allows you to configure the device's network settings to ensure stable and efficient connectivity.



The screenshot shows the WiFi Scanner interface. At the top, there are buttons for 'Scan', 'Switch Wi-Fi', and 'Delete Wi-Fi'. Below this is a table titled 'Nearby Networks' with columns for 'SSID' and 'Signal'. The signal strength is indicated by a color scale from green (strong) to red (weak). The data is as follows:

SSID	Signal
IOTech1	100
IOTech2	89
IOTech2_Server	70
IOTTech1	64
si-iot1	52
ZTE_2.4G_N49E3c	40
Oxygen 1	39

WiFi Scanner: Used to scan for available WiFi networks in the vicinity, and select or change the WiFi network that the device will use.



The screenshot shows the Network Configuration interface. It displays the IP Configuration for the interface 'eth0'. The table shows the following settings:

Setting	Value
IP Address	192.168.0.100
Netmask	255.255.255.0
Gateway	192.168.0.1

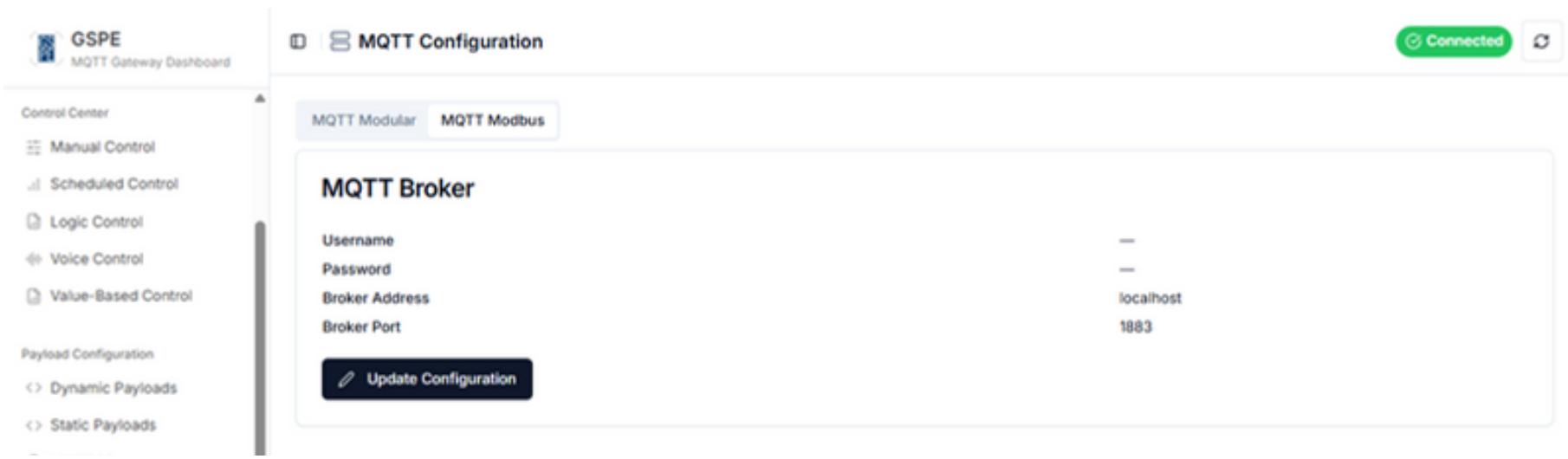
At the bottom, there are buttons for 'Edit IP' and 'Restart Networking'.

IP Configuration: Provides options to manage IP address settings, including static IP configuration for the Ethernet interface (eth0) and other network settings.

IV. NETWORK MQTT BROKER

MQTT Broker Configuration

MQTT Broker Configuration is a core feature that gives you full control over your gateway's connectivity to the **MQTT broker**. It allows you to easily set up and manage broker connection details, including address, port, and security credentials, ensuring secure and reliable communication for all your device data.



Key Capabilities:

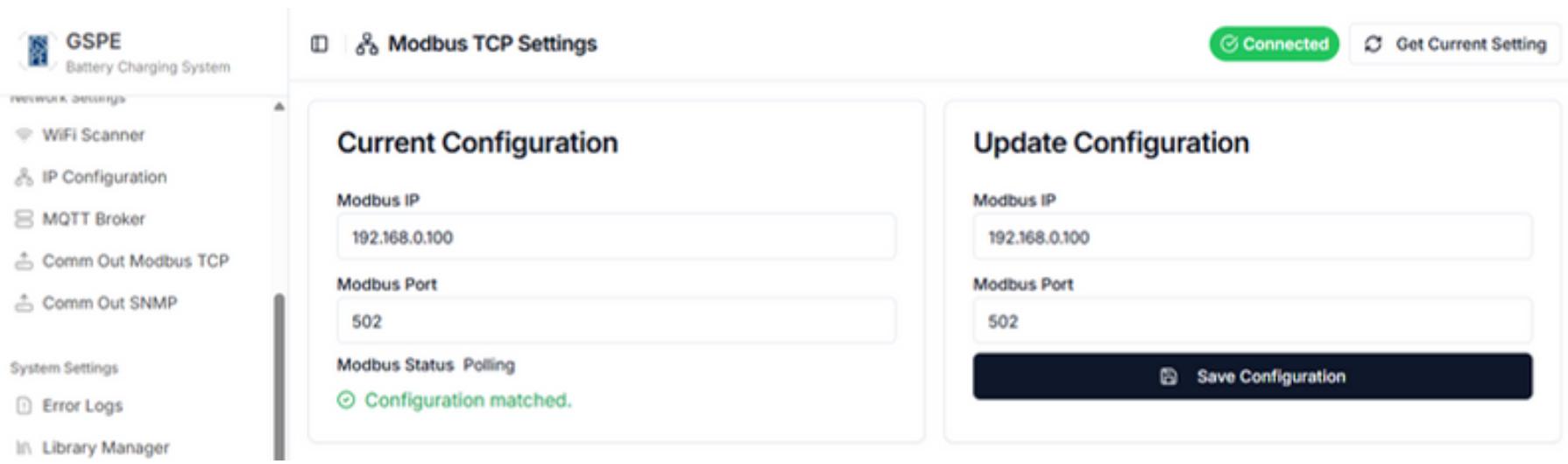
- **Comprehensive Connection Settings:** Configure all essential parameters to connect to your MQTT broker, including:
 - **Broker Address:** Specify the IP address or hostname of the MQTT broker.
 - **Port:** Set the port number used for MQTT communication.
 - **Client ID:** Customize the unique ID the gateway uses to identify itself to the broker.
- **Secured Connection (Username & Password):** Secure your connection by enabling authentication using the username and password you provide. This ensures that only authorized devices can connect and exchange data with the broker.
- **Reliable Connectivity:** The system is designed to maintain a stable connection to the broker, with automatic reconnection mechanisms in case of network interruptions.
- **Instant Connection Testing:** After configuration, you can quickly test the connection to the broker to verify that all settings are correct and communication is successful.
- **Centralized Management:** All broker connection settings are managed from a single location within the dashboard, simplifying setup and maintenance.

With the **MQTT Broker Configuration** feature, you have complete control and ease in managing your data connectivity, guaranteeing a secure and efficient flow of information between your devices and your MQTT platform.

IV. PROTOCOL OUT via MODBUS TCP and SNMP

Communication Protocol Out : External Data Integration

Communication Protocol Out section allows you to configure how data from your system can be sent out and read by other external controllers or servers. This ensures seamless interoperability and the ability to integrate your battery data into larger management systems.



Comm Out Modbus TCP : Configures parameters for sending data out via the Modbus TCP protocol. This enables other controllers or servers supporting **Modbus TCP** to read and monitor data from your BCS/BMS system.

Comm Out Modbus TCP

This configures parameters for sending data out via the Modbus TCP protocol.

- Users can input the IP Address and port number of the target Modbus TCP server.
- You can read the current active Modbus TCP settings.
- The feature to update the configuration with new settings is available.
- Monitor the connection status which indicates whether communication is polling, running, or not running. This enables other controllers or servers supporting Modbus TCP to read and monitor data from your BCS/BMS system.

IV. PROTOCOL OUT via MODBUS TCP and SNMP

Communication Protocol Out : External Data Integration

Communication Protocol Out section allows you to configure how data from your system can be sent out and read by other external controllers or servers. This ensures seamless interoperability and the ability to integrate your battery data into larger management systems.

The screenshot shows the 'SNMP Communication' configuration page. On the left sidebar, under 'Comm Out' options, 'Comm Out Modbus TCP' and 'Comm Out SNMP' are listed. The main panel displays the following configuration parameters:

SNMP Service Status: Unknown	
Snmp IP Address	192.168.0.100
Snmp Netmask	255.255.255.0
Snmp Gateway	10.20.1.1
Snmp Version	2
Auth Key	authkey1
Priv Key	privkey1
Security Name	usr-md5-des
Security Level	authPriv
Snmp Community	public
Snmp Port	161
Sys OID	.1.3.6.1.4.1.10000.11
Device Name	BMS Battery Charger
Site	JKT
Snmp Trap Enabled	True

At the top right, there are three buttons: 'Connected' (green), 'Get Config', and 'Check Status'.

Comm Out SNMP : Sets parameters for sending notifications and data out using the **SNMP (Simple Network Management Protocol)**. This is ideal for integration into existing network management systems, allowing SNMP servers to monitor the status and critical metrics of your devices.

Comm Out SNMP

This sets parameters for sending notifications and data out using the **SNMP (Simple Network Management Protocol)**.

- Users can read the current active SNMP settings.
- The feature to update the configuration with new SNMP settings is available.
- Monitor the connection status which indicates whether communication is polling, running, or not running. This is ideal for integration into existing network management systems, allowing SNMP servers to monitor the status and critical metrics of your devices.

IV. ERROR LOGS

Error Log Viewer: Monitoring and Management of System Errors

The Error Log Viewer menu is an essential tool for monitoring, identifying, and managing any errors or anomalies that occur within your controller. This page is designed to provide full visibility into technical issues, aiding in the troubleshooting process and proactive maintenance.

The screenshot shows the GSPE MQTT Gateway Dashboard with the Error Log Viewer module selected. The top navigation bar includes 'GSPE' and 'Connected'. The left sidebar lists various system settings and logs, including 'Static Payloads', 'MQTT Discovery', 'Network Settings', 'WiFi Scanner', 'IP Configuration', 'MQTT Broker', 'Comm Out Modbus TCP', 'Comm Out SNMP', 'System Settings', 'Error Logs' (which is currently selected), 'Library Manager', and 'General Settings'. The main content area has three summary cards: 'Total Active Errors' (0, Currently unresolved system issues), 'Active By Type' (No active errors, Unresolved errors categorized), and 'Most Common Active' (No active errors, Most frequent unresolved error type). Below these is a table titled 'Error Logs' with columns: #, Source, Data, Type, Timestamp, Status, and Actions. A message indicates 'No logs available.' and provides instructions: 'Error logs from your devices. Export, clear, or manage as needed.'

Error Overview

The top section of the dashboard provides a quick overview of the system's error status:

- Total Errors:** Displays the total count of errors recorded in the system logs.
- By Type:** Provides a summary of errors based on their severity level or category (e.g., Major, Minor, Critical), helping you identify patterns or specific problem areas (e.g., communication errors, hardware faults, etc.).
- Most Common:** Highlights the most frequently occurring error types, allowing you to focus on recurring issues that may require more attention.

Error Logs List

The main part of the page displays a comprehensive list of error logs with important details:

- Data:** Detailed information about the error that occurred.
- Type:** The specific category or type of the error, including its severity.
- Timestamp:** The time and date when the error occurred, crucial for tracking when problems emerge.

Error Log Management

To help you manage log data efficiently, several options are available:

- Delete All:** This button allows you to clear all recorded error logs from the system, useful for tidying up old logs or after issues have been resolved.
- Export to Excel:** This feature enables you to download all error logs into an **Excel file (.xlsx)** format, facilitating offline analysis or reporting.

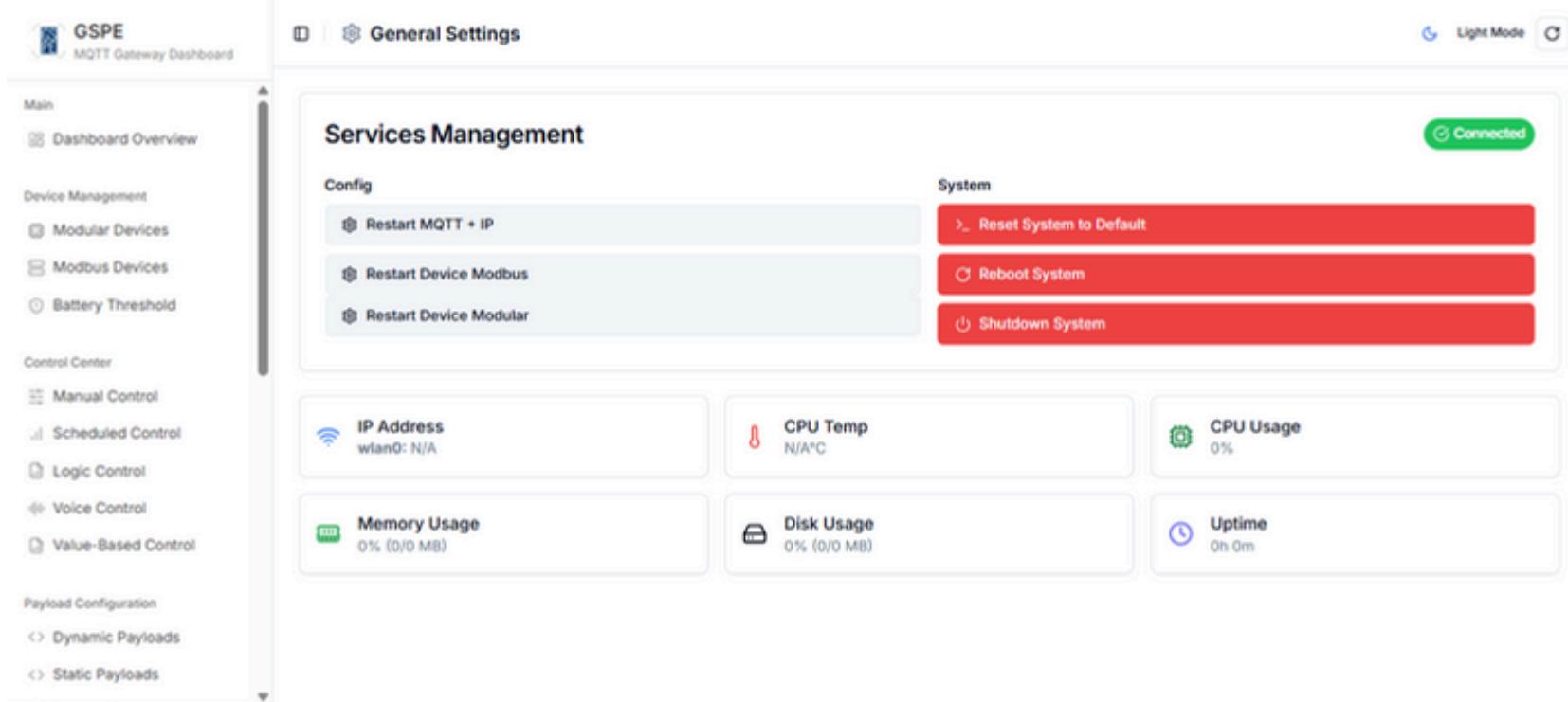
Note: "No logs available" indicates that currently no errors are recorded.

With the "Error Log Viewer," you can quickly detect problems, understand their causes, and take corrective actions to ensure your controller operates smoothly and reliably.

IV. GENERAL SETTINGS

General Settings: Overall Configuration and System Management

The **General Settings** menu is the control center for managing fundamental aspects of the software's operation and viewing vital system information. This page provides options to customize the user experience, manage essential services, and monitor the health and performance of your controller.



Dark/Light Mode

- In the top right corner, you can find the "**Light Mode**" toggle. This feature allows users to switch between a light theme and a dark theme for the software interface. This option provides visual flexibility and ease of use, especially in different lighting conditions.

Services Management

Services Management section allows you to manage and restart various services running on your controller. This is crucial for troubleshooting or applying configuration changes.

- Config:**
 - Restart MQTT + IP:** To restart MQTT services and IP configuration.
 - Reset Energy Counters:** To reset data energy counters.
 - Restart Device Modbus:** To restart Modbus device services.
- System:**
 - Reset System:** To reset the system to default settings (**use with caution**).
 - Reboot System:** To restart the entire controller.
 - Shutdown System:** To safely power off the controller.

System Info

System Info section provides a real-time overview of your controller's resources and operational status.

- IP Address (wlan0):** Displays the IP address currently used by the wireless (**Wi-Fi**) interface.
- CPU Temp:** Shows the temperature of your controller's CPU, helping to monitor potential overheating.
- CPU Usage:** Displays the current CPU utilization percentage.
- Memory Usage:** Shows the percentage and amount of memory currently in use/available.
- Disk Usage:** Displays the percentage and amount of disk space currently in use/available.
- Uptime:** Indicates how long the controller has been running since its last restart.

These features collectively provide comprehensive control and in-depth insights into your system's performance.

V. Flow Chart And Workflow

User Workflow: From Registration to Dashboard

Here is the recommended general workflow for new users to get the most out of the platform.

1. Registration and Login

- If you don't have an account:
- Click the '**Register**' or '**Create Account**' button on the home page.
- Fill in the required details (**username, password, etc.**) and complete the registration process.
- If you already have an account:
- Enter your username and password on the Login page.
- Click 'Login' to enter the Main Dashboard.

2. Registering a Device (Required Step)

- Before you can monitor anything, you must register your physical device in the system.
- Navigate to **Devices -> Devices External**.
- Click '**Add Data**' and fill in your device's information (**e.g., name, protocol, IP address**).
- Save the device. The system now recognizes your device and is ready to receive data from it.

3. Enabling Logging for Charts (Important for Charts)

- If you want to create a chart widget that displays historical data, you must enable logging for that data point first.
- Navigate to **Devices -> Devices for Logging**.
- Click '**Add Data**'.
- Select the device (**Topic**) and the specific data (**Key**) you want to record.
- Save. The system will now begin storing all incoming data for that key.

4. Creating and Customizing the Dashboard

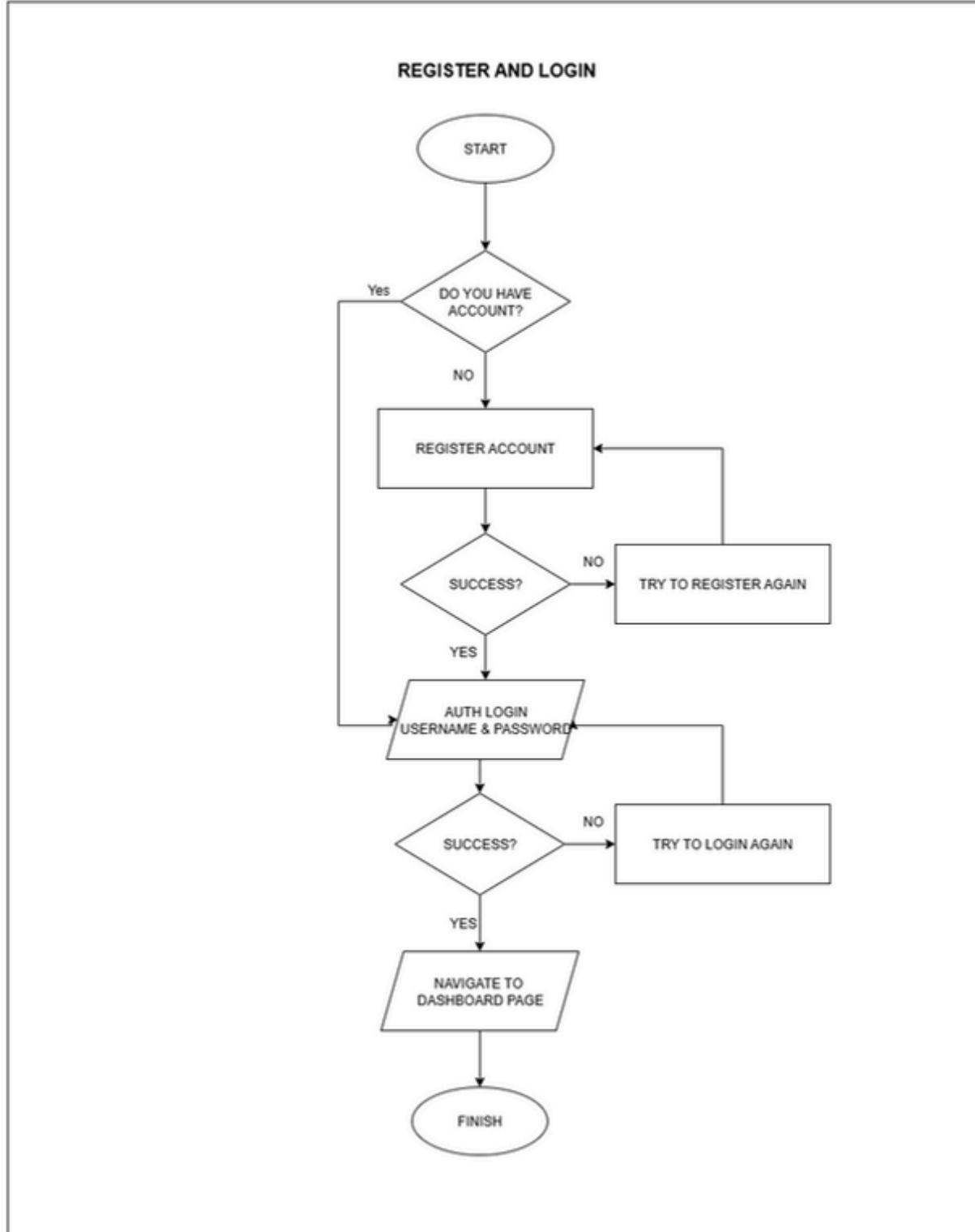
- Once your device is registered and logging is **enabled (if needed)**, you're ready to visualize your data.
- Go to the Manage Dashboard page (**usually from a button on the Main Dashboard**).
- Create a new dashboard by clicking '**Create Dashboard**'.
- Click '**Set Widget**' on the dashboard you want to edit.
- Use the '**Add Widget**' button to select your desired widgets (**e.g., Chart Line, Gauge, Indicator**).
- Configure each widget by selecting its data source (**the Topic and Key from the device you registered in Step 2**).
- Arrange your widget layout, then click '**Save Changes**'.
- Return to the Manage Dashboard page and activate your new dashboard by checking the '**In Use**' box.

5. Advanced Configuration (Optional)

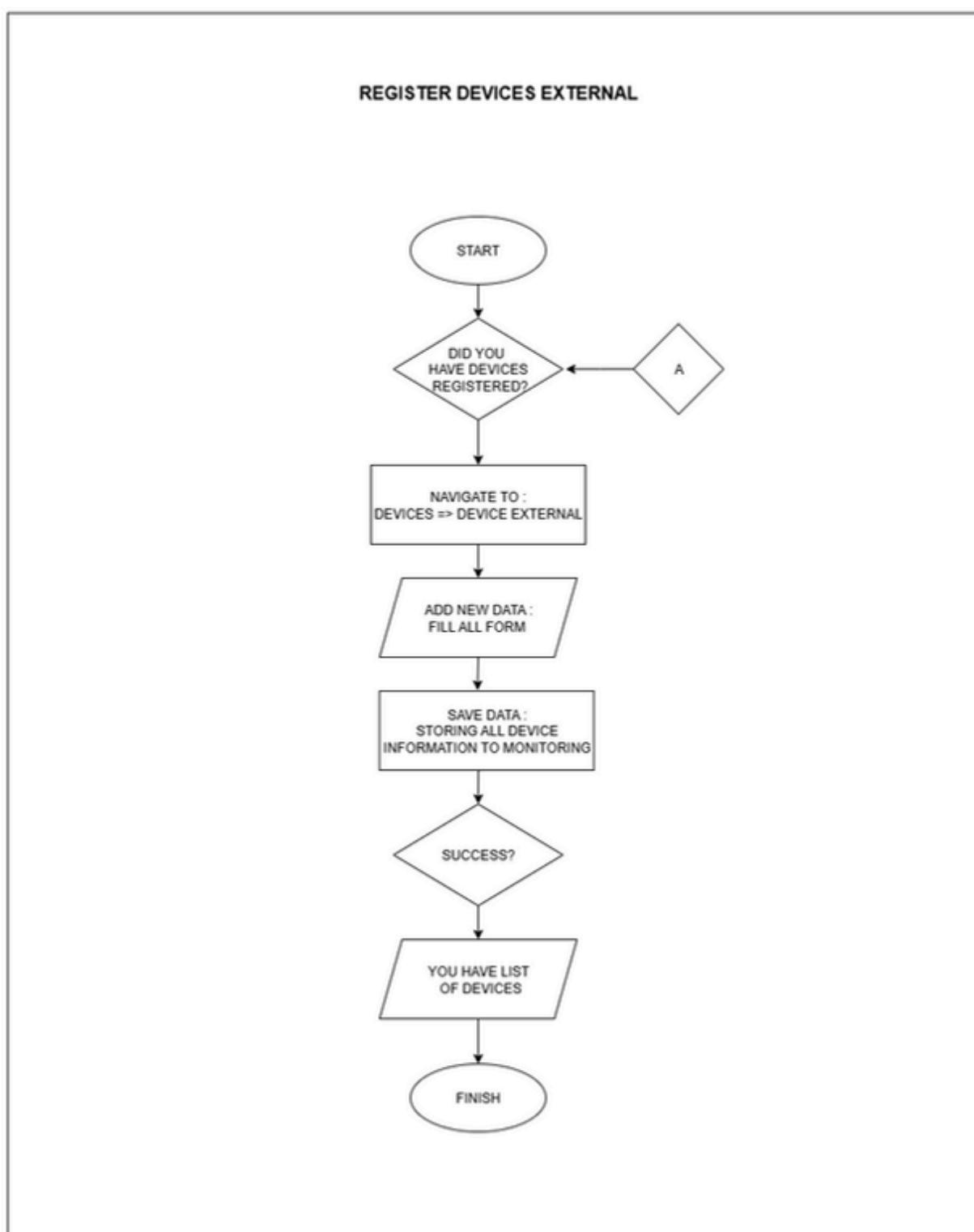
- Once your main dashboard is ready, you can explore other advanced features like:
- Automation: To create automated rules (**e.g., if temperature > 27°C, turn on the AC**).
- Alarms: To set up notifications for critical conditions.
- Analytics: To view reports and analyze your collected log data.

V. Flow Chart And Workflow

1. Login And Register

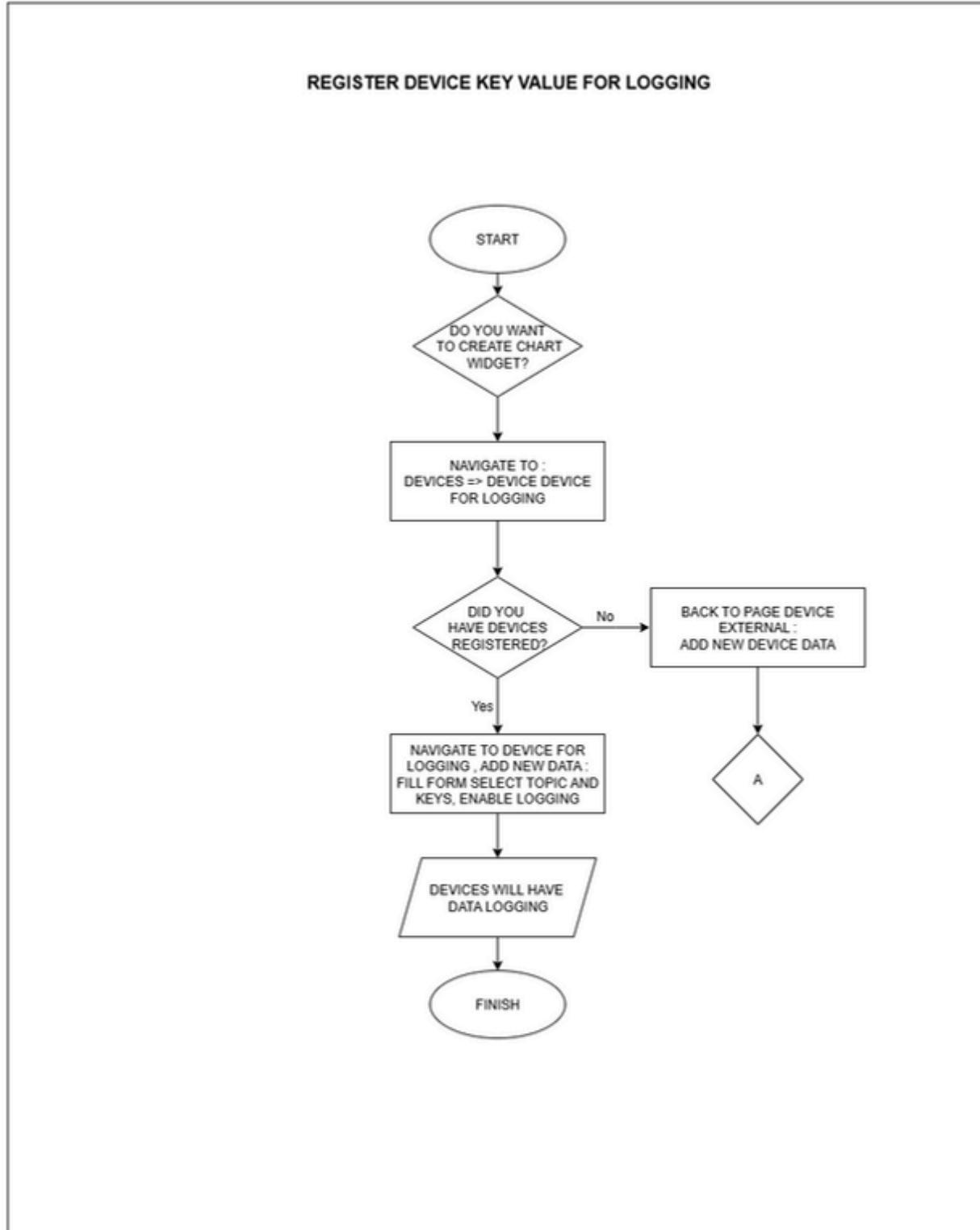


2. Register Device External

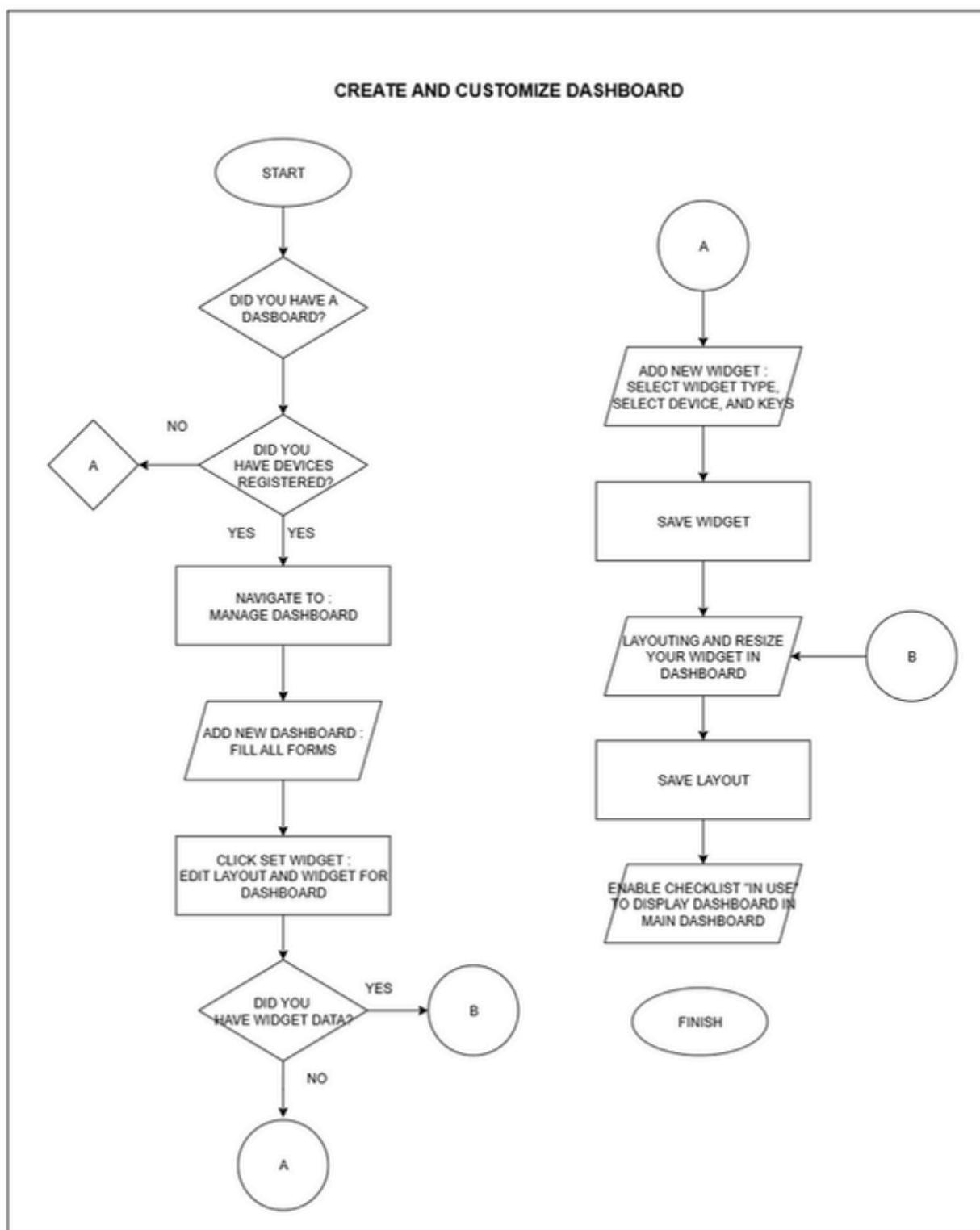


V. Flow Chart And Workflow

3. Register Device Keys Value for Logging

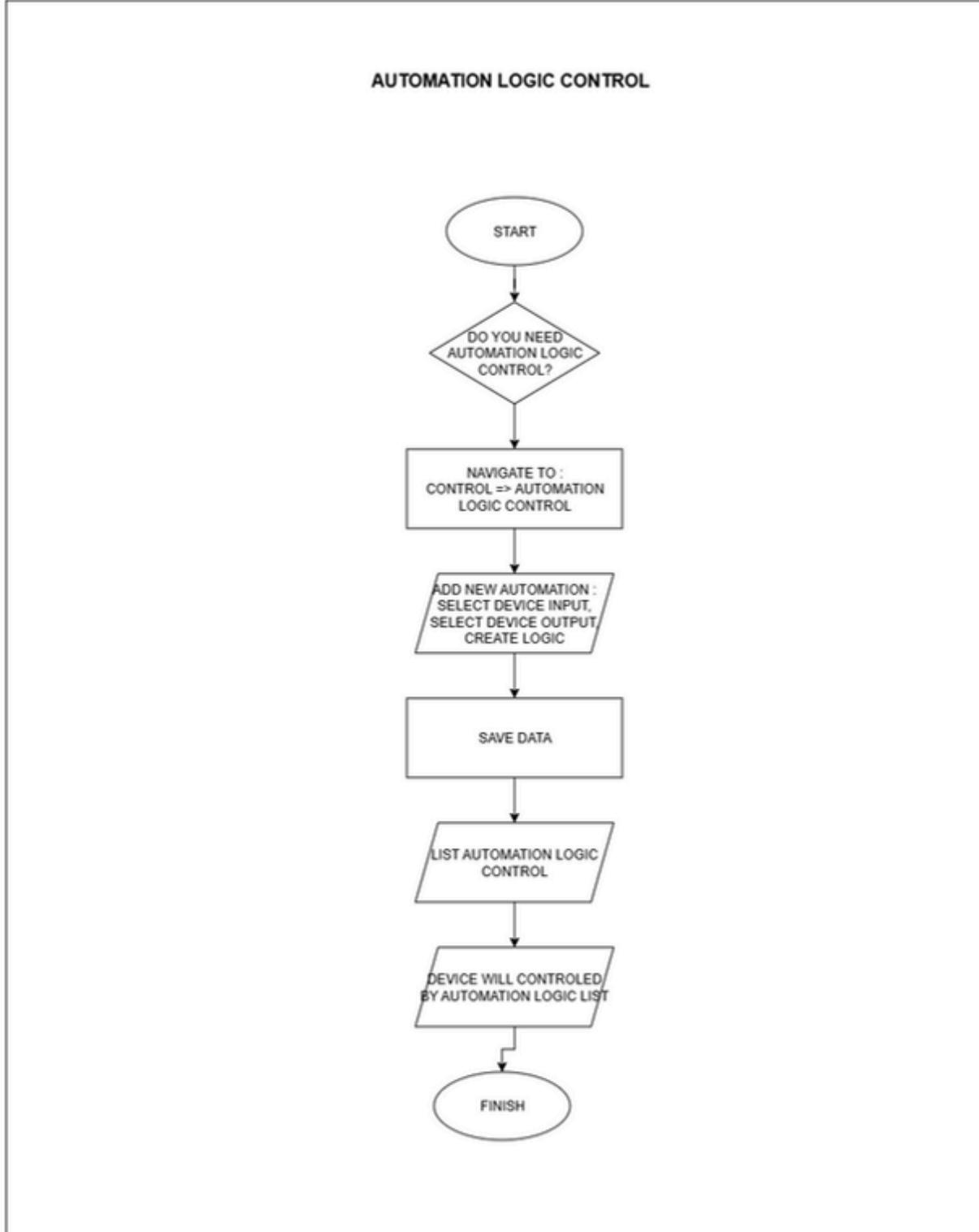


4. Create Dashboard And Set Widget

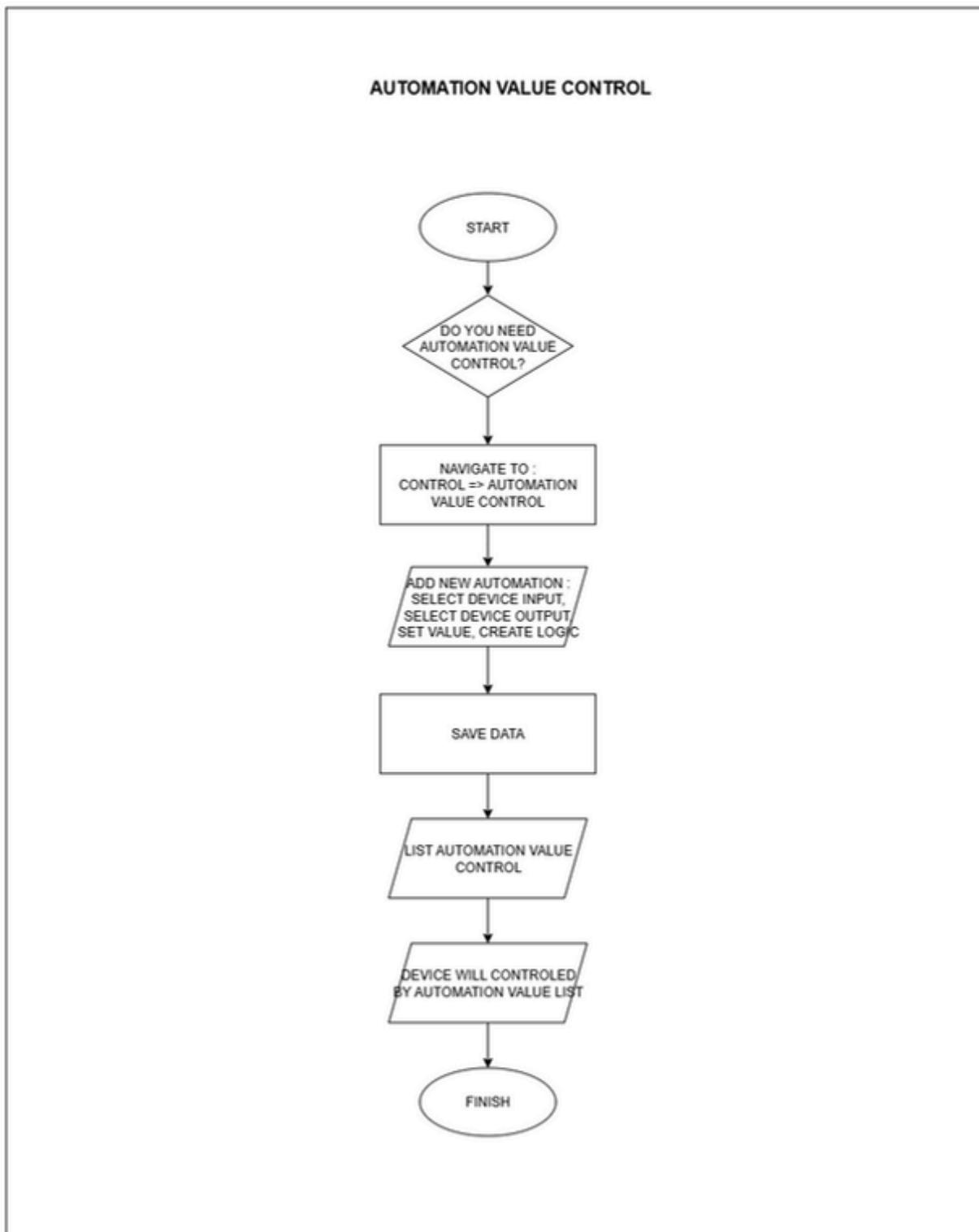


V. Flow Chart And Workflow

5. Automation : Logic Control

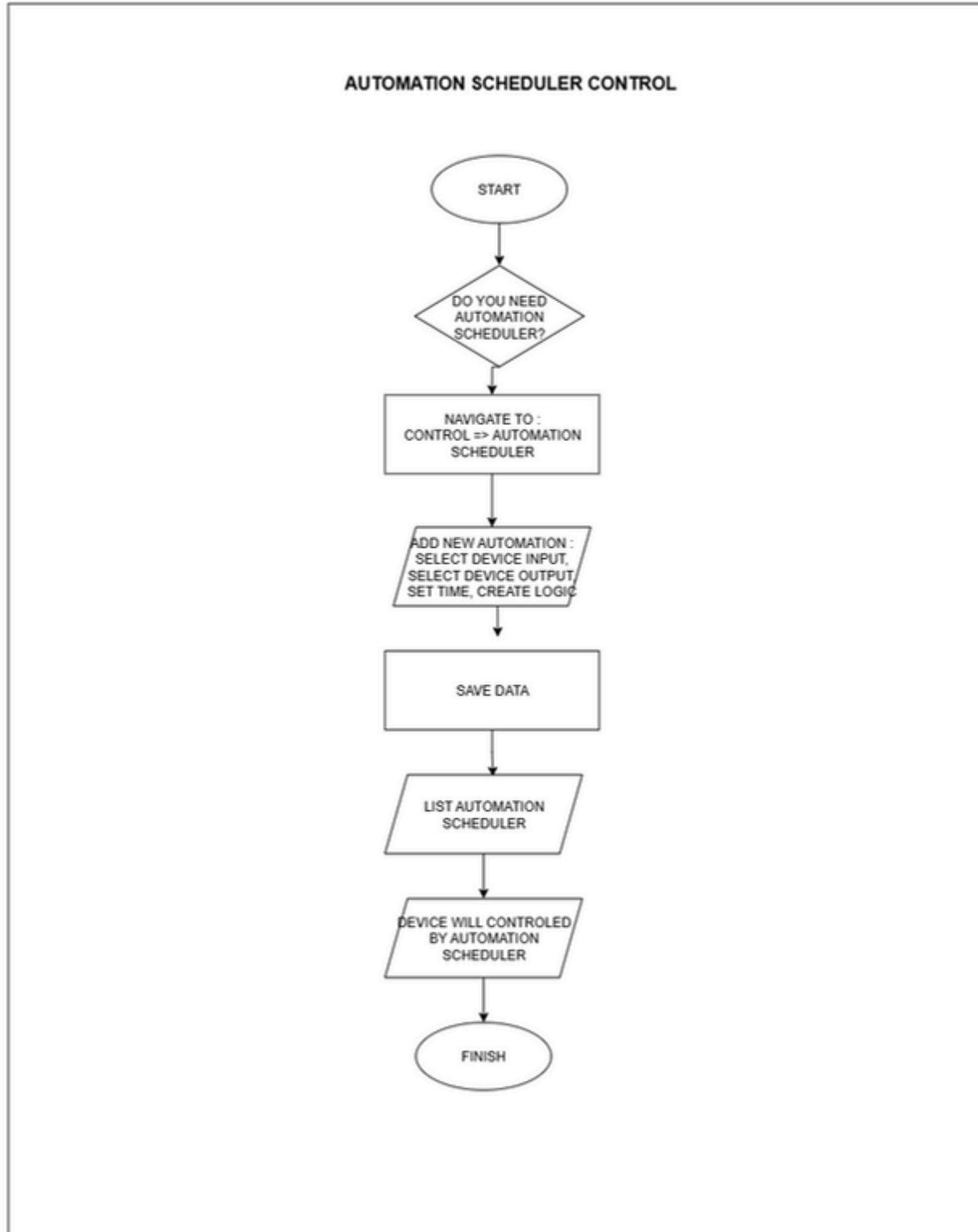


6. Automation : Value Control



V. Flow Chart And Workflow

7. Automation: Scheduler



8. Automation: Voice Control

