GoodLinker Industrial Edge Gateway User Manual

Chapter 1 | Overview

1.1 Device Name and Applicable Versions

- Device name: **GoodLinker Industrial Edge Gateway** (hereinafter referred to as the **Gateway**)
- Applicable model: `BCS-MX`
- System version: Device `v2.18.25` / Workmode `v2.14.2`

1.2 Device Positioning and Functional Overview

The **GoodLinker Industrial Edge Gateway** is an **IIoT gateway device** for cloud data uploading and visualized monitoring. It rapidly integrates **PLCs (Programmable Logic Controllers)**, **industrial sensors**, and **process equipment**, helping manufacturers adopt data-driven management.

The device supports the following:

- **MODBUS RTU** and **MODBUS TCP** industrial communication protocols
- **RS485** and **RJ45** communication interfaces
- 40 cloud-uploaded sensor data points by default, upgradable to 100 points via the `LIC-MX-100` license

Users configure the device and lay out data through the **Web UI** in a browser. Once connected, the Gateway integrates with the **GoodLinker Cloud Field View** (GoodLinker cloud platform, hereinafter referred to as **Cloud Field View**), where the **GenAIoT analytics module** can monitor trends, alarms, and reports in real time.

1.3 System Highlights

- **Guided setup flow**: suitable for engineers with an automation control background
- **Industrial installation ready**: DIN-rail mounting, fanless design, suitable for distribution cabinets
- **No software installation required**: browser-based operation, supporting LAN and intranet direct connection
- **Modular communication setup**: supports **MODBUS** device chaining and format configuration

- **Real-time dashboard integration**: synchronizes the on-premise **SCADA** board with **Cloud Field View** data

1.4 Application Scenarios

- **Automation control engineers**: integrate **PLCs** and sensors to accelerate project deployment
- **System integrators (SI)**: provide on-premise data linking and cloud integration services
- **Machine builders**: embed the device in machinery to add data value
- **Manufacturing IT / facilities departments**: drive energy monitoring and ESG data inventory

1.5 Technical Background Required for Operation and Setup

User type	Technical competency
PLC / automation control engineer	Familiar with register structures and **MODBUS** communication setup
System integrator (SI)	Capable of data point planning and cloud linking
IT administrator (supporting)	Handles LAN, whitelisting, firewall, and **API** integration settings

> **NOTE:** Operating this device **does not require programming**, but users should have a basic understanding of network communication to facilitate setup and troubleshooting.

1.6 Quick Start Overview

1. Power on and enter Engineering Mode (**Web UI**) via **Ethernet 1** (default IP: `192.168.6.21`)
2. Configure the IP of **Ethernet 2** (used for the cloud connection)
3. Connect field controllers and sensors (supports **MODBUS RTU/TCP**)
4. Complete the following settings: `Reception Setting`, `Rule Setting`, `Sensor Groups`
5. Once configured, the data can be applied to:
    - Real-time monitoring on the **on-premise SCADA** board
    - Data synchronization to the **Cloud Field View** platform

1.7 Device Capability Summary

Item	Description
Max. cloud upload count	40 points, upgradable to a 100-point license
Communication protocols	**MODBUS RTU**, **MODBUS TCP**
Communication interfaces	**RS485**, **RJ45** (**Ethernet 1**, **Ethernet 2**)
Operation method	Browser-based **Web UI**, supporting Chinese / English
Installation method	DIN-rail mounting

Chapter 2 | System Login & Initial Setup

2.1 Login Methods (Two Options)

A. Ethernet 1 (Intranet Login)

1. Connect a computer to **Ethernet 1** with a network cable
2. Manually set the computer IP to `192.168.6.xxx` (e.g., `192.168.6.100`)
3. Open `https://192.168.6.21` in a browser to reach the login screen

B. Ethernet 2 (LAN Dynamic IP Login)

1. Connect **Ethernet 2** to the company LAN or router
2. Use an IP scanning tool to find the IP automatically obtained by the device
3. Enter that IP address in a browser to log in

> **TIP:** After setup, set the **Ethernet 2** IP to a fixed address to improve system stability and ease of future maintenance.

2.2 Recommended Settings for the Two Network Ports

Port	Default setting	Function
Ethernet 1	Fixed IP: `192.168.6.21`	Used for **MODBUS TCP** communication and initial setup
Ethernet 2	DHCP (changeable to fixed IP)	Used for **LAN / cloud connection** and **third-party API** integration

> **NOTE:** Do not set **Ethernet 1** and **Ethernet 2** to the same IP subnet (e.g., both `192.168.6.x`) to avoid communication conflicts or data transmission failures.

2.3 Common Login Troubleshooting

- **Cannot open the login screen** Use **Chrome** or **Edge**, and confirm the URL starts with `https://` (`http://` is not supported).
- **Cannot find the device IP** Use an IP scanning tool (e.g., Advanced IP Scanner) to confirm whether the device obtained an IP via DHCP.
- **Cannot connect to the cloud platform** Confirm that **Ethernet 2** is connected to a LAN with internet access and can browse the internet normally.

2.4 Default Account and Password

Item	Default value
Account	`goodlinker`
Password	`goodlinker666`

> **TIP:** Change the password immediately after the first login to strengthen security and prevent unauthorized access.

Chapter 3 | Device Info Home & User Roles Overview

3.1 Home Screen Overview

After logging in to **Cloud Field View (Web)**, the system enters the **Device Info page** by default, where device status and network parameters can be checked quickly. The screen is divided into the following six areas:

A. Main Menu (Left Vertical Menu)

Menu item	Function
`Device Info`	Shows device status and IP settings
`Reception Setting`	Sets sensor communication and data reception parameters
`Group Setting`	Manages sensor group classification
`System Management`	Backup / restore settings, perform system reset
`Connection Map`	Shows the communication connection status between the cloud and controllers
`Dashboard`	Real-time monitoring of sensor data changes
`Account Management`	Adds and edits login accounts and passwords
`Logout`	Logs out of the Web UI

B. Device Information Area (Device ID and Status)

- **Factory Code (ThingName)**: the device's unique identifier (e.g., `15912xxxxxxxxPI199`)
- **Custom Name**: can be displayed in Cloud Field View and on-premise screens; supports custom naming
- **Time Zone Setting**: the device's operating time (e.g., `GMT+8`)
- **Sync to Cloud**: manually synchronizes the current settings to the **Cloud Field View** backup

C. QR Code Area (Device Identification)

- Provides the device **QR Code**, scannable to quickly map to the device factory code
- Commonly used for on-site asset inventory, labeling, and asset identification

D. Ethernet Port Configuration Area

Port	Default setting	Function
Ethernet 1	IP: `192.168.6.21`	Used for intranet and **MODBUS TCP** device linking
Ethernet 2	DHCP or fixed IP	Used to connect to the **cloud platform** and LAN services; supports **third-party API** integration

> **NOTE:** If using a fixed IP, ensure the subnet is not duplicated and that it is included in the corporate intranet whitelist to avoid blocking.

E. Modbus Connection Status Area

- Shows real-time communication status with field controllers and the last connection time
- Indicator light status:
  - **Green**: connection normal
  - **Red**: communication interrupted, or no response from the controller

> **NOTE:** This area is useful for quickly judging communication status and troubleshooting on site.

F. Language Switching (Top Right)

The system supports three interface languages, switchable from the top-right corner:

- **Chinese**
- **English**
- **Vietnamese**

3.2 Accounts and Permissions

The system provides two account roles by default, each with different operating permissions and access scope:

Account type	Permission
Administrator account	Can set communication parameters, system settings, account and password management, etc. (full functionality)
General account	Can only perform sensor settings and data queries; cannot modify system parameters or account settings

> **TIP:** If multiple users share the system, create accounts with different roles as needed to avoid misoperation and to support operation logging and tiered permission control.

3.3 Account Management Interface

On the `Account Management` page, you can view and manage the system's account information and password settings.

#	Role	Account	Password	Display name
1	Administrator	`goodlinker`	`goodlinker666`	Administrator account
2	User	`user1`	`user123`	User One
3	User	`user2`	`user223`	User Two

> **NOTE:** After editing an account or password, be sure to click `Write Settings` to ensure changes are saved. **NOTICE:** The system displays passwords in plain text; confirm a secure operating environment to avoid leaking sensitive information.

Chapter 4 | Sensor Reception Setting

This chapter explains how to connect field controllers (such as **PLCs**) through the **GoodLinker Industrial Edge Gateway (hereinafter the Gateway)** to complete the key configuration flow for sensor data collection and pre-cloud uploading.

4.1 Introduction to Reception Setting

In most manufacturing sites, automation equipment already has built-in **PLCs** or other controllers with multiple sensor input signals.

To simplify integration, the **Gateway** has built-in support for **MODBUS RTU / MODBUS TCP** protocols, allowing it to connect directly to controllers and read register data **without modifying the original control logic or code**.

> **TIP:** After entering the `Reception Setting` function in the side menu, the screen shows two sub-items:

- `Hardware Setting` : configures communication parameters (protocol type, IP, port, ID, data format, sensor type, etc.)
- `Rule Setting` : configures data naming, alert conditions, cloud upload conditions, and sensor group classification (see Chapter 5)

NOTE: This chapter focuses on **Hardware Setting**, divided by communication mode into:

- **A. MODBUS RTU (RS485 physical wiring)**
- **B. MODBUS TCP (Ethernet network interface)**

4.2 Hardware Setting Flow — MODBUS RTU (RS485)

Communication method: point-to-point or daisy-chained data transmission via **RS485** physical wiring, common in integration scenarios with controllers and **PLCs** that have serial communication interfaces.

A. Setup Flow

1. Click `Reception Setting → Hardware Setting` in the side menu
2. Select the `RTU` tab at the top to enter the RTU setup screen
3. Click `Communication Setting` at the top right and fill in the following fields based on the controller's actual parameters:

Communication parameter	Example setting
Baud rate	`1.2K ~ 115.2K`
Parity	`None` , `Odd` , `Even`
Data bits	`7` , `8`
Stop bits	`1` , `2`
Scan interval (ms)	`50`
Timeout (ms)	`20`

TIP: After configuring, click `Write Settings` to save and apply.

4. Return to the main screen, click `Add Sensor` , and fill in the following based on the actual application:

Sensor setting item	Description
`Slave ID`	The controller's slave address (e.g., `1`)
`Function Code`	Function code (e.g., `3 holding`, meaning read holding registers)
`Address`	Register address; must match the **PLC** actual configuration
`Sensor Type`	Sensor use category (e.g., `Lamp`, `Detector`)
`Data Size`	Data format (e.g., `uint16`, `float_be`)
`Polling`	Whether to scan at a fixed interval; check to enable
`Scan interval`	Polling frequency, in milliseconds (ms)
`Timeout`	Maximum wait for a response, in milliseconds (ms)

> **TIP:** When done, click `Write Settings` again to save all changes.

> **NOTE:** If using a **32-bit data format** (e.g., `float_be`), the system automatically occupies two consecutive 16-bit registers. Ensure the corresponding register segment does not overlap and that **this segment is cleared in the PLC program** to avoid read errors or data anomalies.

4.3 Hardware Setting Flow — MODBUS TCP (RJ45)

Communication method: connect the **Gateway** and controller to the same IP subnet via the **RJ45** network interface (**Ethernet**), then read register data using the **MODBUS TCP** protocol. This mode suits industrial environments with **fixed IP** and **short-distance connections**.

A. Setup Flow

1. Click `Reception Setting → Hardware Setting` in the side menu
2. Switch the right tab to `TCP`
3. Enter the controller communication parameters per the table below:

Field	Description
`IP`	The controller's IP address (e.g., `192.168.1.130`)
`Port`	Communication port; MODBUS default is `502`
`ID`	Device identifier; default is `1`
`Polling`	Recommended to check, to poll data at a fixed rate
`Alias`	A custom name to help identify the data source
`Timeout`	Maximum seconds to wait for a response
`Connection tolerance`	Maximum retry count (e.g., `5`)
`Scan interval`	Scan frequency, in milliseconds (ms)

> **TIP:** After the above settings, click `Write Settings` to save and apply.

4. Click `Add Function` and fill in the following parameters in the sensor setting area:

Field	Description
`Function Code`	Usually `3 holding` (read holding registers)
`Address`	Register address, per PLC setting (e.g., `0`, `16`)
`Sensor Type`	Data type category (e.g., `Lamp`, `Analog`, `Detector`)
`Data Size`	Data format (e.g., `uint16`, `uint32_le`, `float_be`)
`Value`	The actual received data value
`Sensor ID`	The unique sensor identifier auto-generated by the system (for queries)

> **TIP:** When done, click `Write Settings` again to save all changes.

> **NOTE:** If selecting a **32-bit format** (e.g., `float_be`), the system automatically occupies two or more 16-bit registers. Ensure the corresponding register range does not overlap and that **the PLC program has cleared this address segment** to avoid data conflicts or display errors.

4.4 Calendar Sync

The **Calendar Sync function** writes the **Gateway**'s system time into the controller, ensuring field equipment time stays consistent with the main system. This is often used in applications with higher time-accuracy requirements, such as **event logging, data comparison, and equipment interlock triggering**.

A. Setup Flow

1. Click `Set Calendar Sync` (located below the sensor setting area)
2. Enter the following fields:

Field	Description
`IP`	The controller's IP address (e.g., `192.168.1.130`)
`Port`	Communication port; **MODBUS** default is `502`
`Hour / Minute`	The target time to write (24-hour format, e.g., `08:30`)
`Address`	The controller's internal register address, per the actual device setting

3. Click `Confirm Write to Hardware` to complete the time sync.

> **NOTE:** If the field controller itself **does not support time writing**, this function can be skipped.
> **NOTICE:** After all settings are complete, be sure to click `Write to Hardware`, or the system will not sync the content to the controller and the settings will not take effect or will be lost.

4.5 Sensor Reception Limit

The top of the current page shows the total number of configured sensors, e.g., `Sensor count: 77 / 300` (meaning 77 used, 223 remaining). This reception count represents the function of receiving sensors and converting them to API; it is counted separately from the cloud-upload sensor count.

Device and license	Max. sensor reception count
`BCS-MX`	100 points
`BCS-MX + LIC-MX-100`	300 points

Chapter 5 | Rule Setting

5.1 Introduction to Rule Setting

This chapter explains how to perform the following advanced settings for each sensor data point:

- **Cloud upload condition control**
- **Sensor naming** and **alias management**
- **Alert rules** and **anomaly condition configuration**

These settings further enhance system flexibility and apply to **anomaly monitoring**, **alarm notification**, and **cloud data management**.

> **TIP:** When done, be sure to click `Upload Settings` at the top right to sync the rules to the Gateway, or the settings will not take effect.

5.2 Cloud Switch and Naming Setting

A. Cloud Upload Setting

Each sensor can **independently control whether the cloud upload function is enabled**. The top right shows the current enabled cloud count, e.g., `Cloud count: 79 / 100`, meaning 79 sensors are set to sync to the cloud platform with 21 of the quota remaining.

Device and license version	Max. cloud upload count
`BCS-MX`	40 points
`BCS-MX + LIC-MX-100`	100 points

> **TIP:** If some sensors are for on-premise monitoring only and do not need cloud sync, turn off their **cloud upload** function.

B. Naming and Display Alias

- **Sensor ID**: a unique identifier auto-generated by the system (e.g., `m401`, `pi01`); cannot be modified.
- **Alias**: customizable by the user; recommended to name by equipment number, purpose, location, etc. For example: `204-m401`, `Humidity-Normal`, `Cooling Water Pressure`.

> **NOTE:** A sensor's **alias** is synced and displayed in:
>
> - The `Web UI` sensor management interface
> - The **Cloud Field View** real-time monitoring dashboard

> **TIP:** Standardize naming rules to facilitate later comparison, querying, and management.

5.3 Alert Rules & Threshold Triggers

Each sensor can have custom **alert values** and **pre-alert values**, combined with conditions to detect anomalies. This function is commonly used in:

- Equipment anomaly monitoring
- Automatic reminders and light triggering
- Anomaly logging and audit tracking

A. Field Descriptions

Item	Description
`rule name`	Alert condition name, user-defined; recommended to name by purpose (e.g., High Temperature Alert)
`@` address	Controls whether the condition is enabled: an external PLC writes `1` to enable, `0` to disable
Alert value	Triggers an alert when the reading exceeds this value (e.g., temperature > 80°C)
Pre-alert value	Provides an early prompt as the value approaches the alert value, for preventive handling
Duration (seconds)	The time (in seconds) the condition must hold continuously, to avoid false triggers from brief fluctuations
`input value filter`	Filters spike/anomaly readings to avoid false alarms or signal jitter from brief anomalies

> **NOTE:** If the sensor **does not have the "cloud upload" function enabled**, then even if the alert condition is triggered, it **will not sync to the cloud platform**; it applies only to on-premise logic processing and prompts.

5.4 Sensor Type Mapping & Rule Logic

In **Engineering Mode** (**Web UI**), users can select among **five major types** based on sensor purpose, and apply the corresponding **data format**, **alert conditions**, and **anomaly logic** per type.

A. `Lamp` (Indicator-Light Status Type)

Applicable scenario: The **Lamp** type is used to **monitor machine running status** and **five-color tower-light signals** (e.g., running, standby, fault).

Data format and light mapping (5-bit binary encoding)

Light status	Binary	Decimal value
No light	`00000`	`0`
White	`00001`	1
Blue	`00010`	2
Green	`00100`	4
Yellow	`01000`	8
Red	`10000`	16

Example: If the machine shows a green light, write the value `4` to the PLC memory location, and the Web UI will display it in real time and automatically count it toward the utilization statistics.

Utilization rate formula: `Utilization (%) = green-light seconds ÷ total seconds of all light colors × 100%`

Setting items:

Setting item	Description
Status value mapping	The system maps register values to red / yellow / green / blue / white lights
Alert condition	A light can be designated as an anomaly (red) or pre-alert (yellow)
Reset time	Statistics are automatically cleared at a designated time each day (e.g., 08:00, 13:00)

B. `Detector` (Switch Status Type)

Applicable scenario: The **Detector** type is used to **detect equipment ON / OFF status**, such as **switch control**, **contact input**, and **photoelectric triggering**.

Data format: This type uses the **16-bit** (`uint16`) data format and only allows the following two values:

- `0` : OFF
- `1` : ON

Setting recommendations:

- Use the "alert value" to trigger an anomaly when the value is `0`
- Combine with "duration (seconds)" to avoid brief false triggers

Notes:

- Recommended for use with **DI (Digital Input)** modules
- To record **trigger counts**, use the `Counter` type

C. `Counter` (Counter Type)

Applicable scenario: The **Counter** type suits counting applications such as **cumulative action counts** and **production line trigger counts**.

Data format:

Format	Value range
`uint16`	0 ~ 65,535
`uint32`	0 ~ 4,294,967,295

Trigger modes:

Mode	Description
`raw COUNT`	Reads the raw memory value directly
`RISING trigger`	Adds `1` on a `0` -to- `1` transition
`FALLING trigger`	Adds `1` on a `1` -to- `0` transition

Setting items:

- **Upper limit**: triggers an alert when this count is reached.
- `@` **memory location**: specifies the source register address of the sensor data.

> **TIP:** If the **PLC** already accumulates the value, use the `raw COUNT` mode. **TIP:** To detect **edge triggers** in real time (e.g., each button press or each object passing the sensor), use the `RISING trigger` or `FALLING trigger` mode.

D. `Timer` (Timer Type)

Applicable scenario: The **Timer** type is used to monitor time data such as **motor running duration**, **Cycle Time**, or **cumulative operating seconds**.

Data format:

Format	Time range (seconds)
`uint16`	`0 ~ 65,535`
`uint32`	`0 ~ 4,294,967,295`

Trigger modes:

Mode	Description
`ON_OFF`	Accumulates from `ON` to `OFF`
`OFF_ON`	Accumulates from `OFF` to `ON`
`ON_ON` / `OFF_OFF`	Accumulates **while in a continuous state**
`raw TIME`	Reads the **PLC** internal cumulative seconds directly

> **TIP:** To count just one cycle time, use the `ON_OFF` or `OFF_ON` mode. **TIP:** If the **PLC** has already calculated the seconds, use the `raw TIME` mode. **TIP:** Combined with an "upper limit," the **Timer** can detect anomalies such as **overtime** or **failure to stop**.

E. `Analog` (Analog/Numeric Type)

Applicable scenario: The **Analog** type suits measuring various **physical** or **chemical** quantities, such as **temperature/humidity**, **voltage/current**, **pressure**, **PH** value, **flow rate**, and **power consumption**.

Supported data formats:

Format	Range
`uint16`	`0 ~ 65,535`
`uint32`	`0 ~ 4,294,967,295`
`float`	$\pm 1.8\times10^{38} \sim 3.4\times10^{38}$

Setting items:

Item	Description
Data format selection	Supports `uint` / `float_le` / `float_be`, etc.
Upper / lower limit	Sets the alert threshold conditions
Unit display	Can set °C, %RH, ppm, A, V, etc.
Gain setting	E.g., `x * 0.1` to convert the raw value's unit
Mode selection	**Analog** (real-time display) / **Meter** (daily cumulative reset)

> **NOTE:** For **real-time monitoring**, choose the "**Analog**" mode. **NOTE:** To accumulate **meter data** (e.g., `kWh`), choose the "**Meter**" mode. **NOTE:** The **Analog** type can be combined with **upper/lower** limit conditions to set anomaly thresholds and alert time conditions. An alert is triggered when the reading exceeds the "**alert value**" or approaches the "**pre-alert value**".

5.5 `@` Memory Location and External Control

The `@ memory location` function provides a mechanism that allows users to **dynamically control whether alert rules are enabled, or to change condition parameters**, through external devices such as a **PLC**, **HMI (Human-Machine Interface)**, or **physical switch**. This lets users **perform advanced operations without entering the Web UI**.

A. Purpose and Application Scenarios

This function has two main application types:

- **Enable control**: lets an external device enable or disable the alert logic. For example, alerts can be **dynamically enabled** based on shift or machine status.
- **External parameter write-back**: lets an external system (such as a **PLC** or **HMI**) **write in real time** parameters such as the alert upper limit, lower limit, or duration seconds.

> **TIP:** This function is specially designed for OT field personnel, allowing **quick on-site adjustments to improve flexibility and responsiveness**.

B. Two Control Methods of the `@` Memory Location

Through the `@ memory location`, there are two main ways to control the alert logic:

1. Enable / Disable Control (External Switch)

Control source: a **PLC** or **HMI** writes a value to the designated memory address.

- `@` value `1`: when the written value is `1`, the **alert condition is enabled** and begins evaluating and triggering the related logic.
- `@` value `0`: when the written value is `0`, the **alert rule is disabled**, pausing data evaluation and alarm reporting.

2. Alert Condition Parameter Write-back (External Adjustment)

This method lets an external system modify alert rule parameters in real time. Items that can be written back include:

- **Enable / disable**: control whether the rule is enabled via a variable.
- **Duration (seconds)**: used to define a condition delay time.
- **Upper / lower limit values**: an external system can write anomaly thresholds, such as a value output after **PLC** calculation.

> **NOTE:** When writing back, **the data format of the written value (e.g., integer or float) must match the setting in the Web UI**, or it may cause incorrect evaluation.

C. `@` Field Setting Notes (Varies by Trigger Type)

Whether the `@` field setting is **required** depends on the sensor's `Trigger` type:

Trigger type	Function	Is `@` field required
`raw COUNT`	Reads the memory count value	✅ Required
`raw TIME`	Based on cumulative seconds	✅ Required
`raw VALUE`	Analog value upper/lower limit evaluation	✅ Required
`RISING / FALLING`	Logic edge change evaluation	❌ Not required
`ON-OFF / OFF-ON`	ON/OFF timing logic	❌ Not required

> **NOTE:** If using a `raw` series mode (such as `raw COUNT`, `raw TIME`, `raw VALUE`) **and** the `@` field is not configured, that rule will be invalid.

D. Practical Application Suggestions

In practice, the `@ memory location` function can be integrated as follows:

- **HMI control screen**: lets field personnel **manually enable / disable alert conditions**, or directly adjust the alert upper limit and gain parameters on the screen.

- **PLC display register**: a register inside the **PLC** can **show whether the Gateway has received the external setting**, helping field personnel debug.
- **Buzzer / alarm light integration**: through **I/O output** functions, perform real-time audio-visual prompts to further improve on-site responsiveness.

E. Note: Memory Mapping

The `@ memory location` function is essentially a **memory mapping strategy**. By **sharing a variable address**, it integrates multiple system functions, including the **PLC controller**, **HMI operation panel**, and **Web management interface**. This mechanism **effectively reduces the burden of OT/IT system integration** while improving setting consistency and on-site operational flexibility.

The advantages of this strategy include:

- **Unified settings**: all systems share the same variable, **reducing redundant configuration work**.
- **Easier maintenance**: change a setting **once**, and it updates synchronously across multiple platforms, simplifying maintenance.
- **Lower error rate**: avoids errors caused by version inconsistency or manual setting mistakes.

5.6 `input value filter`

The `input value filter` function effectively **removes spike interference and brief anomaly data from field sensors**, preventing the system from misjudging these transient fluctuations and improving data evaluation accuracy. It is especially suitable for applications **prone to noise interference**, such as **Analog sensors**, **Counters**, and **Timers**.

A. Filter Parameters

The filter function defines an acceptable data range through two parameters:

- `filter max` : the **maximum acceptable** sensor reading. Any data above this upper limit is ignored.
- `filter min` : the **minimum acceptable** sensor reading. Any data below this lower limit is ignored.

> **NOTE:** When received data exceeds the `filter max` or `filter min` range, **that data is automatically skipped, not stored, and not used for alert evaluation**, ensuring data stability and reliability.

This function is **recommended** for:

- **High-frequency fluctuating sensors**: e.g., flow, voltage, current, and other frequently changing readings.

- **Digital conversion devices prone to spikes or noise**: such devices may introduce unexpected values during conversion.
- **Applications requiring high-precision statistics or anomaly detection**: where even small error values can affect the result; the filter helps maintain data quality.

5.7 Setup Example: `Analog` Sensor (Humidity Sensor)

The following uses a humidity sensor to illustrate the `Analog` sensor setting parameters and the application of the filter function:

A. Example Parameters

Setting item	Parameter value
Unit display	`%`
Gain setting	`x * 1.00`
Mode selection	`Analog`
Upper / lower limit	`90 / 20`
Anomaly duration	`3 seconds`
`@` memory location	`0` (specifies the data source address)
Filter range	`min = 0`, `max = 100`

B. Application Notes

With the above settings, the humidity sensor operates as follows:

- **Alert trigger condition**: an alert event is triggered only when the humidity reading stays above `90` or below `20` continuously for **3 seconds**.
- **Filter effect**: if the sensor momentarily returns an abnormal value (e.g., `999` or `-1`), since these exceed the set filter range `0~100`, **the system automatically ignores this data** and does not include it in alert evaluation or storage.
- **Improved reliability**: combining `input value filter` with `anomaly duration` effectively **prevents brief error values from interfering with the evaluation logic**, significantly improving alert reliability. This is especially important for OT (Operation Technology) field personnel making quick adjustments and responses.

The combined use of the `input value filter` and `duration (seconds)` settings forms a powerful strategy that filters out transient noise and ensures alarms are triggered only under **genuine and**

sustained anomalies, avoiding unnecessary false alarms and improving the overall stability of the monitoring system and on-site responsiveness.

Chapter 6 | Group Setting

This chapter explains how to create and manage sensor groups in the **Gateway**. Group classification enables data organization, dashboard display, and cloud reporting, serving as an important classification bridge between on-premise devices and the cloud platform.

6.1 Function Overview

A. Basic Group Concept

- Each sensor data point can be added to one or more **Groups**
- Groups can have custom names and members (sensors)
- Group settings sync to the cloud platform and integrate with the cloud `Tag` mechanism
- Cross-classification is supported, facilitating multi-angle data analysis and visualization

> **TIP:** A sensor can simultaneously belong to groups such as "Freezer Machine," "Warehouse B2," and "Compressor Area," for classification by site, equipment, or purpose.

6.2 Group Setup Procedure

A. Create a Group

1. Enter the side menu and click `Group Setting`
2. Click the `Add Group` button at the bottom of the screen
3. The system creates a new group named `Group N` by default; click to rename it

> **TIP:** Use recognizable names such as `Machine #204` or `1F Cooling Tower` for easier later identification and management.

B. Add Sensors to a Group

1. Click the `Set Group` button to the right of the target group
2. The screen shows a sensor list with fields such as `ID`, `Type`, `Alias`, and `Real-time value`

3. Check the sensors to add, then click `Done` at the bottom right to save

> **NOTE:** A single sensor can be added to multiple groups and applied to the dashboard and cloud reports.

6.3 Group Application Scenarios

Scenario	Naming and composition logic
Area classification (e.g., floor, storage area)	E.g., `1F Sensors`, `Cold Storage`, classified by site
Machine / equipment classification	E.g., `Machine #204`, including all sensors of that equipment
Equipment type classification	E.g., `Power Equipment`, managing all meters, transformers, etc. together
Maintenance tracking	E.g., `Sensors Needing Repair`, a temporary set of recently abnormal items for tracking

> **TIP:** Group classification synchronously affects the Cloud Field View dashboard display and report output; plan the classification logic reasonably.

6.4 Group Setting Notes

A. Features and Limitations

- Group settings only affect data classification and front-end display; they **do not affect the sensor's own operation or alert conditions**
- A single sensor can belong to multiple groups, but **excessive subdivision is not recommended** to avoid complex later maintenance

B. Group Deletion Behavior

- Deleting a group only removes the sensors' classification association; it **does not affect the sensors' own settings or data**
- A deleted group cannot be recovered; confirm in advance whether it is still needed

C. Naming Convention Suggestions

- Use **recognizable and consistent** naming logic (e.g., `Floor-Equipment`, `Area-Purpose`)

- Refer to internal naming conventions to facilitate cross-department collaboration and report standardization

> **NOTE:** If data needs to sync to the cloud platform, clear and consistent naming greatly improves cross-department usability and management efficiency.

Chapter 7 | System Management

This chapter explains how to back up and restore the **Gateway**'s configuration files, including sensor settings, communication parameters, and group classifications.

This function applies to common scenarios such as:

- Creating a settings backup for quick recovery after misoperation
- Copying settings to other devices for off-site deployment
- Reapplying after bulk field editing, to improve setup efficiency

7.1 Configuration File Management: TXT Format

A. Export Configuration File (TXT)

- Click `Export Config (txt)` to output the device's complete settings as a `.txt` file
- The file content is in standard **JSON structure**, readable and verifiable with online tools (such as Json Parser Online)

> **Use cases:** settings backup, cross-device deployment, technical support, troubleshooting, etc.

B. Import Configuration File (TXT)

- Click `Import Config (txt)` and select the `.txt` file to upload
- The system automatically loads it and **overwrites all current settings**, quickly restoring to the specified state

> **TIP:** identical device models, or standardized sites with repeated deployment. **CAUTION:** Confirm in advance that communication parameters and hardware structure are consistent, to avoid setting conflicts.

7.2 Configuration File Management: CSV Format

A. Export Configuration File (CSV)

- Click `Export Config (csv)` to export all sensor settings in tabular form
- The export includes fields such as `Alias`, `Unit`, `Threshold`, and `Gain`
- Suitable for bulk field fine-tuning and **batch modification**

> **TIP:** Open and edit with Excel or Google Sheets, then save as a `.csv` file for later import.

B. Import Configuration File (CSV)

- Click `Import Config (csv)` and select the edited `.csv` file
- The system compares fields and automatically applies the setting updates

> **NOTE:**
>
> - The `name` field is the sensor identifier auto-generated by the system; do not modify it manually
> - For **cross-device deployment**, clear the `name` field first; the system will automatically assign new identifiers on import to avoid duplication and conflicts

7.3 System Reset

To restore the Gateway to factory defaults, use the "System Reset" function.

A. Operation Flow

1. Enter the keyword `reset me` at the bottom of the screen (as a security confirmation)
2. Click the `System Reset` button
3. The system **clears all setting data** and restarts the device

> **NOTICE:** This operation is irreversible.Be sure to export a `.txt` settings backup beforehand to avoid losing setting data.

Chapter 8 | Connection Map

This chapter introduces the **Gateway**'s "**Connection Map visualization**," which helps users quickly understand the linking relationships and data flow status between sensors and communication sources (such as PLCs and third-party systems).

8.1 Connection Map Overview

- The system provides a graphical **Connection Map** showing the **connection topology and real-time status** between the Gateway and each communication source
- Three communication source types are supported:

Source type	Description
`Modbus RTU`	Connects to controllers via RS-485 serial communication
`Modbus TCP`	Connects to controllers via Ethernet
`API Input`	An external system writes data to the Gateway via HTTP API

A. Connection Status Icons

Icon	Status
🟢 `Connected`	Connection normal, data being received continuously
🔴 `Not Connected`	Connection abnormal; check the controller power, communication line, and parameter settings

B. Sensor Node Details

Each communication controller node (Slave) can be expanded to view its subordinate sensors, including:

- **Sensor alias**: a user-defined name to help identify the source and function
- **Real-time status value**: shows the currently received value, with a color block (e.g., yellow for alert) marking the data status

> **TIP:** This screen is often used for on-site debugging, setting verification, and communication monitoring.

8.2 Usage Scenarios

Scenario	Application
Quickly confirm connection status	View each controller's communication light in real time to judge whether the connection is normal
Determine sensor source	Identify a sensor's source controller from the tree structure, aiding equipment management and setup
Check communication architecture setup	Compare RTU / TCP source settings to avoid mixing or misconfiguring sensor sources
On-site maintenance troubleshooting	Provides a visual architecture diagram as a frontline maintenance and debugging reference, speeding up handling

8.3 Advanced Notes

- If a 🔴 `Not Connected` status appears, return to `Reception Setting → Hardware Setting` and check the following:
  - Whether the `Modbus` controller `ID` (station number) is correct
  - Whether communication parameters match (e.g., Baudrate, Parity, Stop Bit)
  - Correctness of IP / PORT settings (for `Modbus TCP`)
- The `API Input` type is often used to receive data from external platforms (e.g., MES, SCADA, environmental monitoring); note:
  - The data source must support `HTTP API POST`
  - The API Token and route settings must be correct

> **TIP:** If multiple sensors show as not connected at the same time, also check the network connection environment and connector contact.

Chapter 9 | Dashboard Operation (SCADA)

This chapter introduces the **Gateway**'s built-in SCADA dashboard. The dashboard provides a real-time on-site monitoring screen, supporting second-level data updates and visualization. The system offers two display modes, "**Functional View**" and "**Group View**," and can dynamically color and flash based on alert rules to help quickly identify anomalies.

9.1 Functional View

In "Functional View," the system automatically classifies by sensor type, letting users quickly grasp the real-time data status of different types.

Type	Display description
`Lamp`	Shows light status, supporting utilization rate (%) display
`Timer`	Shows `Cycle Time` and cumulative seconds timing
`Counter`	Shows hourly trigger counts or cumulative values
`Detector`	Shows ON / OFF status, for contact signal monitoring
`Analog`	Shows real-time analog values, such as temperature/humidity, pressure, current, etc.

> **TIP:** Suitable for a function-classified overview, preliminary inspection, and real-time anomaly judgment.

9.2 Group View

Group View displays based on the classifications created in `Group Setting`. Each group forms an independent monitoring block, convenient for focused display of a specific site, equipment, or production line.

Scenario	Group naming example
Centralized management of a single machine	`Machine #204` : shows all sensors of that machine
Integrated area data monitoring	`Freezer Area` : shows temperature/humidity and power sensors of that site
Production line monitoring	`Packaging Line` : shows counting and anomaly-detection sensors

> **TIP:** Group View suits on-site electronic boards, shift-scheduling blocks, or dedicated screens for external display.

9.3 Alert Display Logic

When a sensor triggers an alert condition set in Chapter 5, the dashboard provides an immediate visual prompt:

Status	Screen reaction
Alarm triggered	The sensor background block turns red and flashes to indicate an anomaly
Pre-alert triggered	The sensor background block turns yellow and flashes to indicate an anomaly
Normal status	Keeps the default color, no flashing

A. Supported Alert Condition Types

- Alarm triggered
- Device disconnection (Timeout / Disconnection)

> **NOTE:** After the alert condition is cleared, the screen automatically returns to normal, with no manual operation needed.

9.4 Best Practices

Site type	Configuration recommendation
Production line	Fixed large-screen display, monitoring real-time status and anomaly prompts
Maintenance control center	Used as a SCADA monitoring wall, quickly judging communication and sensor status
Area inspection board	Combined with group classification, creating a guided real-time monitoring screen

> **TIP:** Use consistent group naming logic (by area / machine / equipment type) to improve overall SCADA panel readability and usability.

Chapter 10 | Logout

This chapter explains how to properly end **Engineering Mode** operation to prevent unauthorized system changes and ensure setting and information security.

10.1 Why Log Out?

After completing settings, always **log out actively** to prevent the following risks:

- Others accidentally touching or changing settings, causing data errors or equipment anomalies
- Increased security risk, such as unauthorized personnel entering the operation screen
- Incomplete operation logs, making later accountability unclear

> **TIP:** When multiple users share the same device, each should log in and out according to their responsibilities, ensuring clear and traceable account operation logs.

10.2 Logout Steps

1. Click the `Logout` button at the bottom of the left function bar
2. The system automatically redirects to the login screen, indicating the session has formally ended

> **NOTE:** After a long period of inactivity, the system also **logs out automatically**, requiring re-entry of the account and password to continue.

Chapter 11 | External API Integration

This chapter explains how to read the **Gateway**'s sensor data through standardized RESTful APIs, to support third-party system integration and cross-platform applications.

Common application scenarios include:

- MES (Manufacturing Execution System)
- ERP (inventory/sales management system)
- EMS (Energy Management System)
- Carbon inventory and ESG aggregation systems
- AI data analysis platforms

11.1 Basic API Structure

The **Gateway** provides three `GET`-type APIs to query current sensor data:

Type	API path	Description
Sensor values	`https://{IP_ADDRESS}/api/sensors/values`	Gets all sensor real-time values
Sensor groups	`https://{IP_ADDRESS}/api/sensors/groups`	Gets sensor grouping and classification info
Sensor configs	`https://{IP_ADDRESS}/api/sensors/configs`	Gets detailed sensor settings (e.g., ID, type, unit)

> **NOTE:** Replace `{IP_ADDRESS}` with the device's actual IP address, e.g., `192.168.1.204` .

11.2 API Response Field Descriptions

The following describes the API response field structure:

Field	Description
`apiType`	Response data type (e.g., `values`, `configs`)
`apiVersion`	API version number
`id`	Sensor ID (corresponds to the device's internal Sensor ID)
`status`	Sensor status: `0` = disconnected, `1` = normal, `2` = abnormal
`updateTime`	Value update time (standard time UTC+0)
`values`	Real-time sensor value data
`localTime`	Device local time (Taiwan time UTC+8)
`responseCode`	Response status code: `00` means success
`responseMsg`	Response message text (e.g., `success`)
`responseTime`	API response time (UTC+0)
`thingAlias`	Device alias (user-defined)
`thingName`	Device original ID name
`sortingId`	The sensor's sort number within the group
`displayname`	Sensor display name (alias)
`type`	Sensor type (e.g., `Lamp`, `Analog`, `Detector`, etc.)
`unit`	Value unit (e.g., `%`, `℃`, `PPM`)

11.3 Usage Limits and Notes

- All APIs are open only in the local network (intranet / VPN) environment, with **no authorization mechanism by default**. It is recommended to combine firewall settings and subnet isolation to strengthen access security.
- Write-type APIs (e.g., `POST`, `PUT`) are advanced development functions and are not open by default. If needed, contact the technical support team to set up authorization and the verification process.
- Keep API call intervals **no less than 1 second** to avoid the following:
  - Device response delays
  - The system automatically starting blocking / flow-control mechanisms

Chapter 12 | Troubleshooting

This chapter compiles common operating questions and field troubleshooting methods to help resolve issues quickly.

Q1. How many sensor data points can this device receive and upload to the cloud?

Model	Receivable sensor total	Cloud-uploadable count
`BCS-M40`	100 points	40 points
`BCS-M100`	300 points	100 points

> **Note:** The cloud-upload count is the number of sensors that can be pushed to the **GoodLinker Cloud Field View** at the same time. Data exceeding the limit is shown only on the **on-premise dashboard** and cannot be sent to the cloud.

Q2. How do I enable the sensor cloud upload function?

Follow these steps:

1. Log in to `Engineering Mode`
2. Click `Rule Setting` in the left menu
3. Find the target sensor and click `Edit`
4. Set the "cloud switch" to "On"

> ✅ Once configured, you can view that sensor's data in real time in **Cloud Field View**.

Q3. The cloud board or APP shows "device offline." What do I do?

Check the following flow:

Step 1: Confirm the Gateway light status

Light	Description
`POW`	Power indicator (should be steady on)
`COM` / `LINK` / `RUN`	Should flash continuously in normal status
`LINKERR` / `ERR`	If steady on, indicates a communication anomaly

Step 2: Handle by light status

Situation	Recommended troubleshooting
All lights normal	Check whether Modbus communication parameters (baud rate, IP / PORT, station number) are set correctly
`LINKERR` or `ERR` on	Check whether the network cable is securely connected; test the connection by opening Google on a phone → if the network is normal but the issue persists, restart the Gateway

Q4. Cannot log in to Engineering Mode?

Check the following:

1. **Whether the login URL is in HTTPS encrypted format** ✅ Correct: `https://192.168.6.21` ❌ Wrong: `http://192.168.6.21` (unencrypted)
2. **Whether there is an IP conflict (intranet / external)** After logging in, go to `Network Setting` and set the intranet IP to a unique address to avoid duplication with other devices or routers.

Chapter 13 | Hardware Specification

This chapter describes the **Gateway**'s core hardware specifications, communication interfaces, power requirements, and indicator-light definitions. It applies to installation, setup, repair, and field troubleshooting; engineering personnel should work accordingly.

13.1 Device Specification Overview

Category	Specification
Network	2 x RJ45 ports, supporting 10/100 Mbps auto-negotiation
Communication protocols	Modbus RTU (RS-485), Modbus TCP (Ethernet)
Power	DC 24V, independent power supply
Operating temperature	0°C ~ 50°C (environmental temperature control recommended)

13.2 Device Core Hardware (Computer)

- **CPU**: Cortex-A53, 64-bit SoC @ 1.2GHz
- **RAM**: 1GB LPDDR2 (ELPIDA B8132B4PB-8D-F)
- **Storage**: 32GB eMMC Flash
- **OS**: ArchLinux (Linux Kernel 4.19.xx)

13.3 Device I/O (Computer I/O)

Category	Specification
USB ports	1 x USB 2.0
Ethernet	2 x RJ45 (SMSC LAN9514-JZX)
Communication port	1 x RS-485
System indicator lights	6 LED indicators: POW, COMM, LINK, RUN, LINK ERR, ERR

13.4 Serial Port (RS-485) Communication Parameters

- **Data Bits**: 7 or 8
- **Parity**: None / Even / Odd
- **Stop Bits**: 1 or 2
- **Baud Rate**: supports multiple options from 1.2K ~ 115.2K
- **Communication pins**: Data+, Data-, GND (RS-485 two-wire)

13.5 Installation and Wiring Specifications

- **Enclosure material**: Polycarbonate

- **Dimensions**: 40mm (W) × 100mm (D) × 97mm (H)
- **Weight**: 160g
- **Installation**: DIN-rail mounting
- **Wire gauge range**: 0.2mm² ~ 1.5mm² (AWG 28~16)
- **Wiring terminals**: DN00510D, DN00710D

13.6 Power Input

- **Voltage requirement**: DC 24V

13.7 Environmental and Tolerance Conditions

Condition	Specification
Operating temperature	0°C ~ +50°C (32°F ~ 122°F)
Storage temperature	-20°C ~ +75°C (-4°F ~ 167°F)
Storage humidity	RH 95%, non-condensing

13.8 LED Indicator Function Reference

Light	Description
POW	Steady on: power normal; off: no power
COMM	Slow flash (4Hz): Modbus normal Fast flash (20Hz): searching Off: communication anomaly
LINK	Slow flash (4Hz): packet and data transmission normal; off: packet anomaly
RUN	Slow flash (4Hz): system running; off: system error
LINK ERR	Slow flash (4Hz): data transmission anomaly Fast flash (20Hz): external network connection anomaly Off: transmission normal
ERR	Slow flash (4Hz): Modbus error Fast flash (20Hz): communication anomaly Off: operating normally

13.9 Wiring Description (Component Functions)

The following describes the rear-panel ports, from top to bottom:

1. **Status lights**
    - Show system status, such as power, communication, error, etc.
2. **Intranet port (Ethernet 1)**
    - Used for Engineering Mode login, MODBUS TCP setup, and API integration
3. **External network port (Ethernet 2)**
    - Connects to external networks and the cloud
4. **Power input terminal (DC 24V)**
    - Independent power supply terminal
5. **RS485 communication port**
    - For Modbus RTU physical communication; confirm the positive/negative wiring direction (A/B/G)

> **TIP:** When installing, ensure the red arrow on the module aligns with the rail direction; when removing, use a Phillips screwdriver to press down the locking slot to release the device.

Chapter 14 | Related Documents

This chapter lists other operation guides related to this manual, recommended for reference to fully understand the overall system architecture and operation logic.

- **GoodLinker Industrial Edge Gateway User Manual**
    - For detailed setup and functional description of the Gateway hardware (Device Configuration Manual)
- **GoodLinker Cloud Field View (Web) User Manual**
    - For the back-end cloud management platform, including dashboard, alarm, and reporting operations (Cloud Dashboard Web Manual)
- **GoodLinker Cloud Field View (Mobile APP) User Manual**
    - For phone and tablet operation, supporting real-time queries and anomaly notifications (Mobile App Operation Guide)

Chapter 15 | History of Specification

This chapter lists the version evolution of this device's user manual and related functions, helping users understand the product update history.

Version	Release date	Author / Reviewer	Update notes
v1.0.0	2019/11/20	Bruce King	Initial release
v2.0.0	2020/11/16	Jumbo Jiang	Added hardware installation and Engineering Mode setup descriptions
v3.0.0	2025/06/13	Bruce King	Full revision: new user manual, chapter restructuring
v4.0.0	2026/06/01	Bruce King	Hardware revision: DC 24V power input, HDMI removed, single USB port, mechanical and DIN-rail adjustments

Chapter 16 | Manufacturer Information

This product is designed and manufactured by GoodLinker Co., LTD. If you encounter any issues during installation, setup, or use, please contact us through the following:

Item	Information
Company	GoodLinker Co., LTD.
Website	https://goodlinker.io/
Product page	https://www.goodlinker.io/product/bcs-m100
Email	info@goodlinker.io
Phone	+886-2-2599-7987
Address	GoodLinker Co., Ltd. No. 40, Sec. 3, Zhongshan N. Rd., Zhongshan Dist., Taipei City 104327, Taiwan (R.O.C.)

> **TIP:** For more detailed operation instructions, return to the corresponding chapter of this manual, or contact our technical support team for assistance.