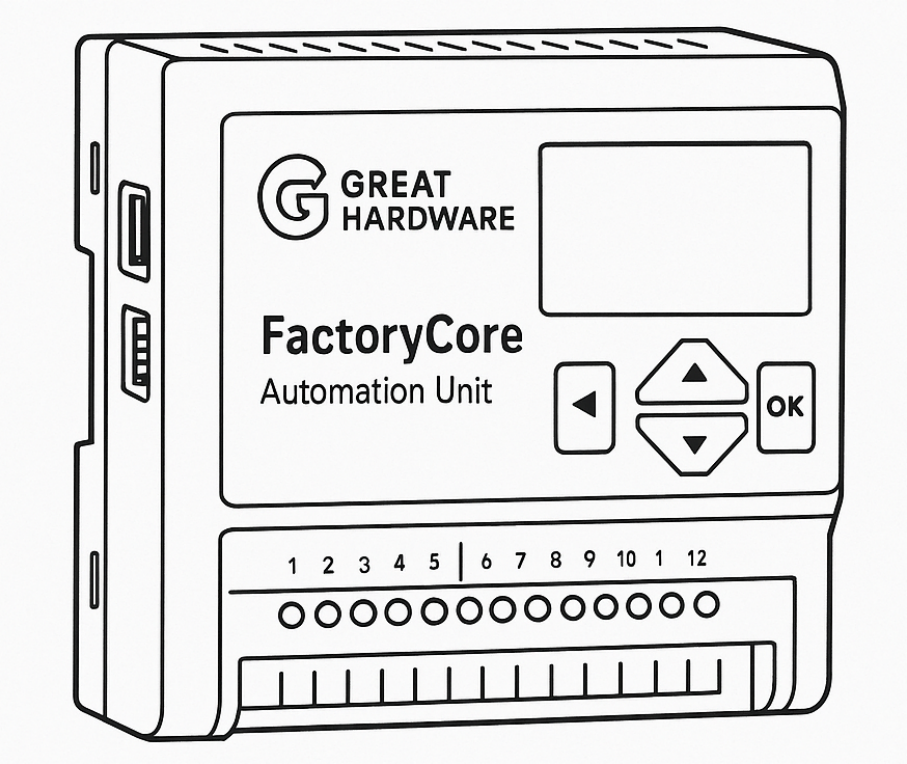
GH-123-321A

FactoryCore™ Automation Unit

User Manual



www.great-hardware.com

Model identification number: GH-123-321A

Warranty: 2-year limited warranty

For support with your product contact:
support@greathardware.com

Symbols and Icons Explanation

The following icons are used throughout this manual to highlight important information. Familiarize yourself with their meanings before proceeding with installation or commissioning.

Icon	Explanation
	Information: Provides general information or context to help you understand a feature, step, or specification. This information is not safety-critical but may enhance your understanding.
	Warning: Indicates a potential hazard that could result in personal injury, equipment damage, or process interruption if not followed correctly. Follow all instructions carefully when this icon appears.
	Error: Highlights a condition, action, or result that is incorrect and must be avoided. May also indicate an operational fault or diagnostic code that requires attention.
	Tip: Offers helpful suggestions, shortcuts, or best practices to improve efficiency, safety, or installation quality.
	Note: Calls attention to specific details, exceptions, or references that are relevant to the task or procedure being performed.

Table of Contents

1. Welcome

Welcome to the installation and commissioning manual for the **FactoryCore™ Automation Unit** by **Great Hardware**. This guide is intended for system integrators, field engineers, and technicians involved in installing and configuring FactoryCore in an industrial environment.

It provides:

- **Detailed installation instructions** for mechanical, electrical, and network connections.
- **Configuration procedures** to ensure optimal integration with your automation systems.
- **Safety guidelines** to protect personnel, equipment, and the surrounding work area.
- **Commissioning and testing steps** to confirm that the unit operates according to specifications.

This manual is structured to guide you through the process from **pre-installation preparation** to **final system handover**. Following the recommended procedures will help reduce setup time, avoid common issues, and ensure long-term reliability of the FactoryCore unit.

> ⚠ **Safety Notice:** Always read and understand the safety instructions before beginning any installation work. Compliance with local regulations and Great Hardware's recommended procedures is essential for safe and effective operation.

2. General Overview

Product Summary

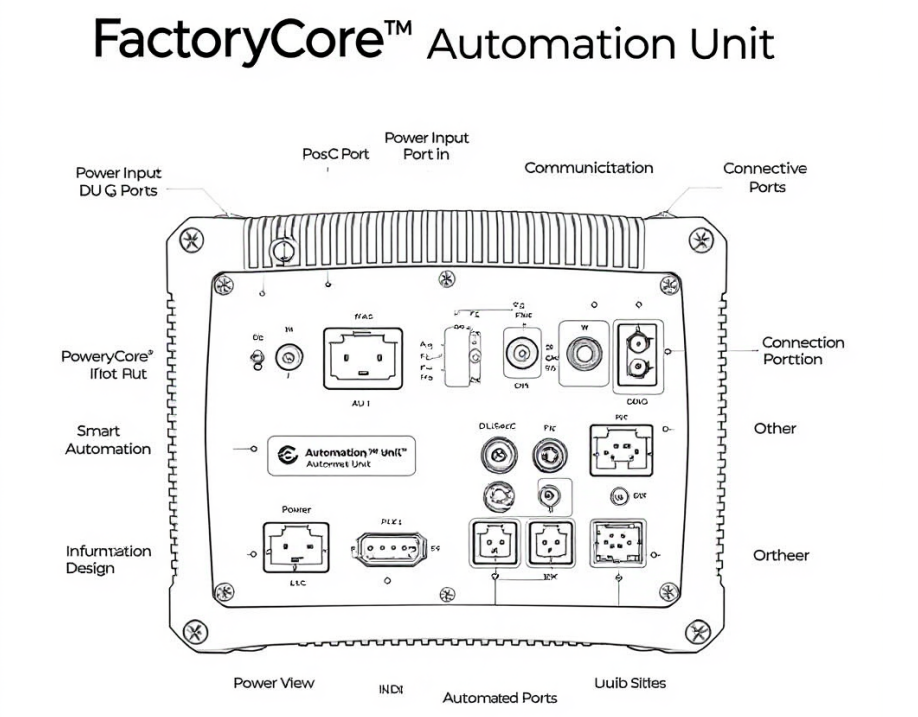
FactoryCore™ is an all-in-one PLC, HMI, and SCADA platform designed for smart industrial automation.

Intended Use

- Control and monitor factory machinery
- Integrate with Modbus, OPC UA, or MQTT systems
- Designed for use in industrial control cabinets (IP20 rated)

Technical Specifications

Feature	Specification
Power Supply	24V DC (±10%)
CPU	ARM Cortex-A72 Dual Core
I/O Ports	16 Digital, 8 Analog
Interfaces	Ethernet, USB, RS485
Operating Temp	-20°C to 60°C



FactoryCore™ Automation Unit — Detailed Front and Rear Views with Labeled Ports for PLC, HMI, and SCADA Integration in Smart Industrial Automation

3. Safety Information

General Safety Instructions

Before installation or maintenance, **read all safety information carefully**. Failure to follow these instructions can result in serious injury or equipment damage.

- Only qualified personnel trained in electrical and industrial equipment should install or service FactoryCore™.
- Keep the manual accessible near the device for quick reference.
- Always follow local regulations and standards for industrial electrical installations.

Warning Callouts

> ⚠ **WARNING: Electrical Shock Hazard**
>
> Disconnect all power sources before opening the device or performing wiring to avoid electrical shock.
>
> Ensure the device is properly grounded.

> ⚠ **WARNING: Risk of Equipment Damage**
>
> Do not connect power supply voltages exceeding 24V DC ±10%. Overvoltage can cause permanent damage.
>
> Use recommended fuses and circuit protection devices.

> ⚠ **WARNING: Heat Dissipation Required**
>
> Maintain at least 50 mm clearance on all sides of the unit for proper ventilation. Avoid installation near heat sources or in enclosed spaces without airflow.

> ⚠ **WARNING: Static Electricity Sensitivity**
>
> Handle the device with anti-static precautions to prevent ESD damage. Use wrist straps and grounded mats during installation.

Personal Protective Equipment (PPE)

- Wear insulated gloves when handling live wiring.
- Use safety glasses to protect eyes during mechanical installation or wire stripping.
- Wear safety shoes in the installation environment.

Environmental Safety

- The FactoryCore™ is rated IP20; it is **not waterproof**. Do not install in wet or dusty environments.
- Ambient temperature range: **-20°C to 60°C**; avoid exposure to extreme temperatures.
- Avoid exposure to corrosive gases or chemicals.

Emergency Procedures

- In case of electrical fire, use a Class C or CO2 fire extinguisher—**do not use water**.
- If a fault causes smoke or unusual smells, disconnect power immediately and contact support.

Additional Best Practices

- Label all wiring clearly to prevent confusion during maintenance.
- Use cable management systems to prevent strain on connectors.
- Keep the installation area clean and free of obstructions.

Industrial safety symbols in our product

4. Tools & Equipment Required

Required Tools

- Screwdrivers (Phillips and flathead)
- Crimping tool
- Multimeter
- Torque wrench (for mounting screws)

Optional

- Laptop with FactoryCore Config Tool (via USB or Ethernet)
- Industrial PC for HMI deployment

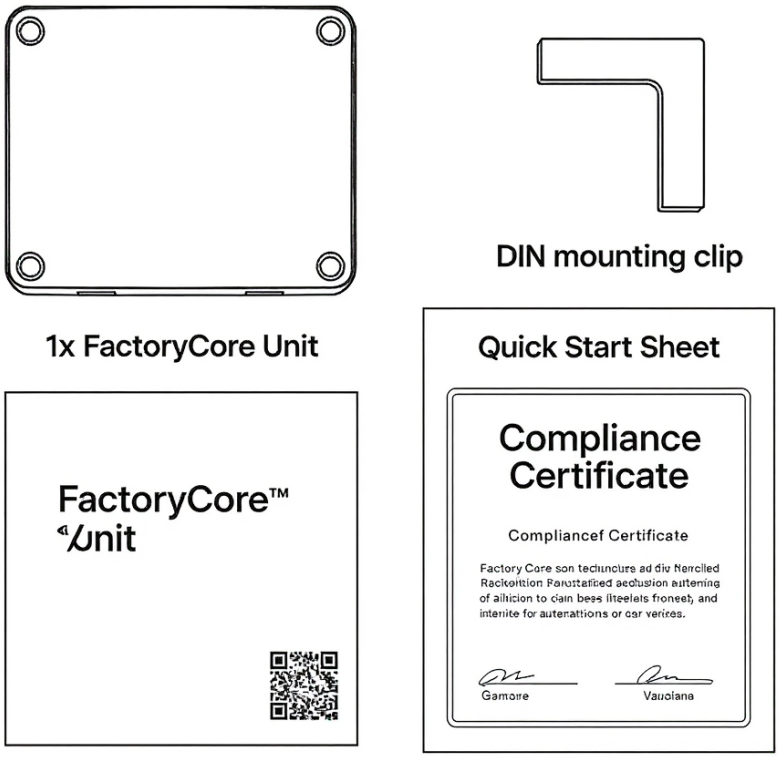
5. Unpacking & Inspection

Unboxing Checklist

- 1x FactoryCore Unit
- 1x DIN rail mounting clip
- 1x Quick Start Sheet
- 1x Compliance Certificate

Inspection Steps

- Check for physical damage
- Confirm serial number matches delivery note
- Inspect connector pins



Factory Core components

6. Mechanical Installation

Mounting Instructions

1. **Attach the DIN rail mounting clip** securely to the back of the FactoryCore unit.
2. **Mount the unit on a standard 35 mm DIN rail** inside the control cabinet or panel.
3. Maintain a minimum clearance of **50 mm (2 inches)** on all sides of the unit for ventilation and heat dissipation.
4. Avoid mounting near high-vibration equipment to prevent mechanical stress on connectors and internal components.

> **Tip:** Ensure the clip is fully snapped in place before mounting to prevent the unit from loosening.

Panel Layout and Environmental Considerations

- Install the unit in a dry, dust-free environment within the control panel.
- Position FactoryCore away from direct sunlight or heat sources such as transformers or power supplies.
- If multiple units are installed side-by-side, ensure at least 20 mm spacing between units to maintain airflow.
- Use cable ducts or trays to organize wiring and avoid strain on connectors.

Mounting Weight and Handling

- FactoryCore unit weight: approximately **1.8 kg (4 lbs)**.
- Use appropriate lifting techniques when handling multiple units or heavy control panels.
- Avoid dropping or striking the device during installation.

7. Electrical Installation

Power Supply Wiring

- Connect a **24 V DC ±10% power supply** to the power terminals (marked + and -) using copper wire sized according to local electrical codes.
- Recommended wire gauge: **16 AWG (1.5 mm²)** minimum for runs up to 10 meters.
- Use an **external 3 A fast-blow fuse** or circuit breaker on the positive line to protect against overload.

> ⚠ **Warning:** Never connect AC voltage to the DC power terminals; this will cause irreversible damage.

Grounding

- Connect the chassis ground terminal to a reliable earth ground to reduce electromagnetic interference (EMI) and ensure operator safety.
- Use a low-resistance grounding conductor, preferably copper wire sized per local regulations (typically 14 AWG or larger).
- Avoid using the neutral line as a ground.

Digital and Analog I/O Wiring

- Digital inputs/outputs operate at **24 V DC logic level**. Ensure sensors and actuators are compatible with this voltage.
- Analog inputs accept **0–10 V or 4–20 mA signals** (configurable via the FactoryCore Config Tool).
- Shielded twisted-pair cable is recommended for analog signals to reduce noise.

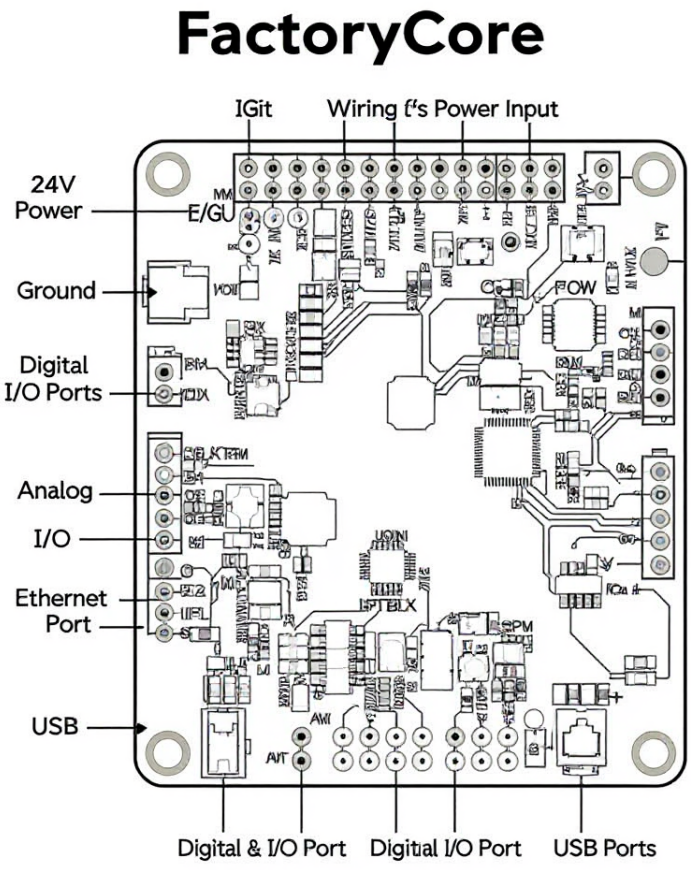
> ✔ **Tip:** Label all input/output wiring clearly at both ends for easy troubleshooting.

Communication Ports

- Ethernet port supports 10/100 Mbps connections; use shielded CAT5e or better cable.
- USB ports for device configuration or firmware updates should use standard USB 2.0 cables.
- RS485 port uses a 2-wire differential bus; maintain proper termination resistors at bus ends.

Cable Management and Strain Relief

- Use cable ties or cable ducts to bundle wires neatly and prevent strain on connectors.
- Leave service loops near connectors to facilitate maintenance and replacement.
- Avoid running signal cables parallel and close to high-power lines to minimize interference.



Electrical wiring diagram

8. Initial Configuration

Steps for Initial Configuration

1. **Power On the Unit**
   - Connect power and verify the status LEDs light up as specified in the User Guide.
2. **Connect to the Configuration Interface**
   - Use a USB cable or Ethernet connection to link your PC with the FactoryCore.
   - Launch the FactoryCore Config Tool software (available on the official website or USB provided).
3. **Firmware Verification**
   - Check the firmware version in the Config Tool’s info panel.
   - If outdated, follow the update procedure (see Appendix A).
4. **Set Network Parameters**
   - Assign a static IP or enable DHCP according to your network policy.
   - Configure subnet mask, gateway, and DNS if needed.
5. **Configure I/O Settings**
   - Define digital inputs and outputs according to connected sensors and actuators.
   - Configure analog input types (0-10 V or 4-20 mA) per sensor specs.
6. **Set Communication Protocols**
   - Enable protocols required for your system, such as Modbus TCP, PROFINET, or custom APIs.
7. **Save and Apply Configuration**
   - Validate all settings and save configuration to the device.
   - Restart the device if prompted.

> **Note:** Always back up the configuration file externally after saving.

9. Commissioning Procedures

Step-by-Step Commissioning

1. **Pre-Commissioning Checks**
    - Verify installation quality (mechanical and electrical).
    - Ensure initial configuration is complete.
2. **Power-Up Test**
    - Confirm all LEDs indicate normal operation.
    - Check for error codes on the Config Tool.
3. **Functional Tests**
    - Activate inputs and verify corresponding outputs.
    - Test communication with connected PLC or SCADA system.
4. **Load Test**
    - Simulate operational loads to confirm stable performance.
5. **Safety Systems Verification**
    - Test emergency stop signals and safety interlocks.
6. **Final Configuration Validation**
    - Verify all settings and operational parameters are correct.

Commissioning Checklist (To Be Filled by Technician)

Item	Status (Pass/Fail)	Comments	Technician Initials	Date
Mechanical Installation Check				
Electrical Wiring Verification				
Power-On Status LEDs				
Firmware Version Verified				
Network Settings Configured				
I/O Configuration Verified				
Communication Protocols Tested				
Functional Input/Output Test				
Load Test Performed				
Safety System Checks				
Final Validation Completed				

Tip: Keep the completed checklist as part of the installation documentation for audit and support purposes.

10. Troubleshooting

Common Issues and Solutions

Issue	Possible Cause	Suggested Action
Device does not power on	Power supply disconnected or faulty	Check power wiring and fuse; verify voltage
Status LEDs do not light up	Faulty device or no power	Verify power; reset device; contact support
Network communication failure	Incorrect IP or cabling issue	Check network settings and cables
Inputs not responding	Wiring issue or configuration error	Verify wiring; check input config in software
Outputs do not activate	Load issue or configuration problem	Check output wiring; verify output config
Firmware update fails	Interrupted update or incompatible version	Retry update; ensure correct firmware file
Device overheating	Insufficient ventilation	Check clearance and cooling

Diagnostic Tools

- **FactoryCore Config Tool**: Provides live status, error logs, and configuration validation.
- **LED Indicators**: Refer to the LED status table in the User Guide for error diagnostics.
- **Multimeter**: For verifying voltage and continuity on power and signal lines.

When to Contact Support

- Persistent hardware faults after restart.
- Firmware update issues not resolved by retrying.
- Complex network integration problems.
- Safety system malfunctions.

> **Note:** When contacting support, provide device serial number, firmware version, and a description of the issue with troubleshooting steps already taken.

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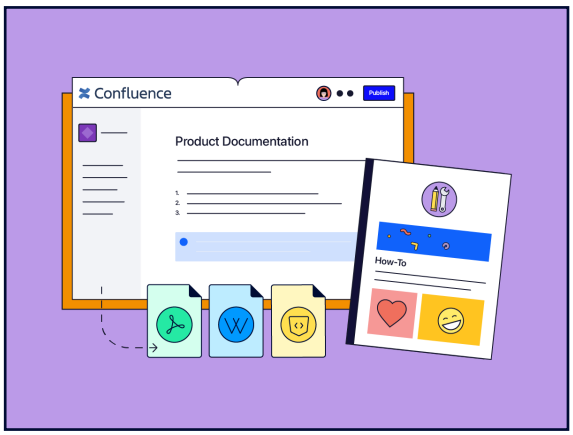

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