Jakin ID

ACTA208 IoT Controller – Demo Panel Operation Manual (Version 1.3, December 2025)

Table of Contents

1. Introduction

About This Manual

This Operation Manual provides comprehensive instructions for operating the ACTA208 IoT Controller Demo Panel and its connected devices. It is designed for end-users, facility managers, and building operators who need to understand and control the smart energy management system on a daily basis.

What is the ACTA208 System?

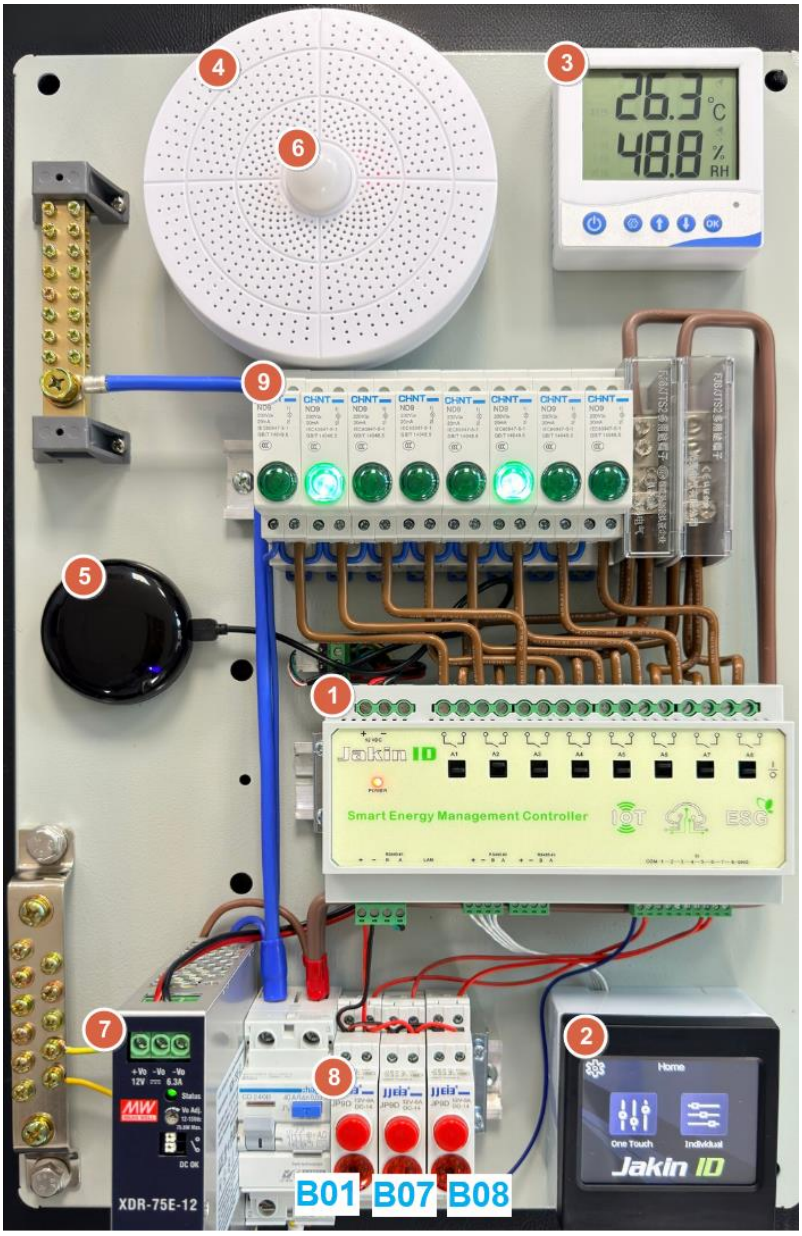
The ACTA208 is an intelligent IoT controller that automates and manages lighting, HVAC (heating, ventilation, and air conditioning), ventilation, and other building systems based on environmental conditions, schedules, and user preferences. The system can:

- Monitor temperature, humidity, air quality, and light levels
- Control up to 8 electrical loads (lights, fans, AC units, etc.)

- Operate autonomously based on pre-programmed rules(edge IoT control)
- AMS software enables automation driven by occupancy insights derived from ACTAtek devices' IN/OUT data.
- Control IR-based appliances (AC units, TVs, etc.)
- Respond to manual commands via touchscreen

2. System Overview

2.1 Main Components



No.1 IoT Controller (ACTA208)

- The "brain" of the system
- Processes sensor data and executes automation rules
- Controls 8 relay outputs (K1-K8)
- Connects to the network for remote access and work with AMS

Sensors

- **No.3 Temperature & Humidity Sensor:** Monitors ambient conditions
- **No.4 AQI Sensor:** Measures air quality (CO_2, PM2.5, VOCs, etc.)
- **No.6 Lux Sensor:** Detects light intensity
- **No.8 Optional Sensors(B01.B07.B08.):** Rain sensor, presence detector, smoke sensor (simulate by button1,2,3)

Control Devices

- **No.2 Touchscreen Wall Switch:** Manual control interface
- **No.5 IR Blaster:** Controls IR-remote appliances
- **AMS Software:** Remote monitoring and configuration

Outputs

1. **No.9 8x Circuit Indicators (K1-K8):** – show the status of each circuit. In real installations, they are not required; included only for demonstration purposes only.Not Relays

- **Virtual Relays (A25-A27):** Trigger IR commands

2.2 System Capabilities

Autonomous Operation: The system continues to operate even without internet or network connectivity, following programmed automation rules stored in the controller.

Manual Override: Users can manually control any relay or scene at any time using the touchscreen wall switch or AMS software, overriding automatic operations.

Remote Access: When connected to a network, the system can be monitored and controlled from anywhere using AMS software .

Energy Efficiency: By automating lighting, HVAC, and ventilation based on occupancy and environmental conditions, the system reduces energy waste and operating costs.

3. Getting Started

3.1 System Status Indicators

IoT Controller LEDs:

- **Power LED (RED):** Solid = System powered and operating normally
- **Network LED (Green/Amber):** Blinking = Network activity
- **Relay LEDs (K1-K8):** Illuminated = Relay is energized/ON

Sensor Status:

- Sensors with displays show real-time readings
- Check that all sensors display reasonable values

3.2 Understanding System Modes

Automatic Mode: The system operates according to programmed automation rules. For example:

- AC turns on when temperature exceeds 27°C during business hours
- Corridor lights activate when motion is detected in low light
- Ventilation runs for 30 minutes when CO_2 exceeds 600ppm

Manual Mode: Users can manually activate or deactivate any relay using the touchscreen or AMS software. Manual commands temporarily override automation until the next automation trigger.

3.3 First Time Use

1. **Verify System is Powered:**
    - Check that the power LED on the IoT controller is lit
    - Verify sensor displays are active
2. **Check Sensor Readings:**
    - Temperature should show ambient room temperature
    - Humidity should be between 30-70% typically
    - CO_2 should be below 1000ppm in ventilated spaces
    - Lux reading varies with lighting conditions
3. **Test Manual Control:**
    - Use the touchscreen wall switch to toggle a relay
    - Observe the corresponding load turning on/off
    - Verify relay LED on controller illuminates
4. **Observe Automation:**
    - Allow the system to run for several hours
    - Note when automation rules trigger
    - Verify system responds to environmental changes

4. Manual Control Operations

4.1 Using the Touchscreen Wall Switch

Basic Button Functions:

Individual Relay Control:

- Press button labeled K1-K8 to toggle corresponding relay
- Button illuminates when relay is ON
- Press again to turn OFF

Scene Controls:

- **"All On" Button:** Activates all 8 relays simultaneously
- **"All Off" Button:** Deactivates all 8 relays simultaneously
- **"Next Scene" Button:** Cycles through pre-programmed scenes

Status Display:

- The touchscreen shows current status of all relays
- Active relays are highlighted or shown in green
- Inactive relays are grayed out

4.2 Manual Control Best Practices

When to Use Manual Control:

- During cleaning or maintenance activities
- To override automation temporarily
- For testing or demonstration purposes
- When environmental conditions require immediate adjustment

Manual Control Notes:

- Manual activation remains until next automation trigger or manual deactivation
- Some automation rules may reactivate relays if conditions persist
- System will resume normal automation after manual commands

4.3 Controlling Individual Loads

Default Relay Assignments :

- **A01 (K1):** Close Window
- **A02 (K2):** Corridor Lighting
- **A03 (K3):** Ventilation Fan
- **A04-A07 (K4-K7):** Additional loads (as configured)
- **A08 (K8):** Smoke Alarm/Emergency

IR-Controlled Appliances (Virtual Relays):

- **A26:** Turn Off AC
- **A27:** Turn On AC (Cool mode, 16°C)

To control IR appliances, use AMS software to trigger virtual relays A26 or A27.

5. Understanding Sensor Readings

5.1 Temperature Sensor (C11)

Normal Ranges:

- Comfort zone: 20°C - 26°C (68°F - 79°F)
- Below 20°C: May feel cold, heating may activate
- Above 27°C: May feel warm, cooling typically activates

What to Watch For:

- Sudden temperature drops may indicate AC overcooling
- Gradual temperature rise may indicate insufficient cooling or external heat gain
- Very low readings (<10°C) may indicate sensor error

Automation Triggers :

- Temperature > 27°C: AC turns on (during business hours)
- Temperature < 23°C: AC turns off (to avoid overcooling)

5.2 Humidity Sensor (C12)

Normal Ranges:

- Comfortable humidity: 40% - 60% RH
- Below 30%: Air is dry, may cause discomfort
- Above 70%: Air feels damp, may promote mold growth

What to Watch For:

- High humidity combined with high temperature feels especially uncomfortable
- Very low humidity can cause static electricity and respiratory discomfort

5.3 CO_2 Sensor (C17)

Air Quality Levels:

- **< 400ppm:** Outdoor air quality (baseline)
- **400-600ppm:** Excellent indoor air quality
- **600-1000ppm:** Good air quality, acceptable
- **1000-1500ppm:** Moderate, ventilation recommended
- **> 1500ppm:** Poor air quality, increased ventilation needed

Automation Trigger:

- CO_2 > 600ppm: Ventilation activates for 30 minutes

Health Effects: High CO_2 levels can cause drowsiness, reduced concentration, and headaches. Proper ventilation is essential for maintaining healthy indoor air.

5.4 PM2.5 Sensor (C14)

Air Quality Index (PM2.5):

- **0-12 µg/m³:** Good
- **12-35 µg/m³:** Moderate
- **35-55 µg/m³:** Unhealthy for sensitive groups
- **> 55 µg/m³:** Unhealthy

Sources of PM2.5:

- Outdoor pollution entering building
- Cooking, smoking, or combustion indoors
- Dust and particles in ventilation systems

Action: If PM2.5 is high, increase ventilation or use air purifiers.

5.5 TVOC Sensor (C15)

Total Volatile Organic Compounds:

- **< 0.3 mg/m³:** Low concentration, acceptable
- **0.3-0.5 mg/m³:** Moderate concentration
- **> 0.5 mg/m³:** High concentration, ventilation needed

Sources of VOCs:

- Paints, adhesives, cleaning products
- Furniture and building materials
- Air fresheners and personal care products

5.6 Lux Sensor (C20)

Light Intensity Levels:

- **< 100 lux:** Dark, nighttime lighting levels
- **100-300 lux:** Ambient lighting, corridors
- **300-500 lux:** Office work lighting
- **> 500 lux:** Bright lighting, task-specific areas

Automation Trigger:

- Lux < 100 AND motion detected: Corridor lights activate

Use Cases:

- Automatic lighting based on natural daylight
- Energy saving by reducing artificial light when sufficient daylight
- Security lighting activation at dusk

5.7 Reading Sensor Data

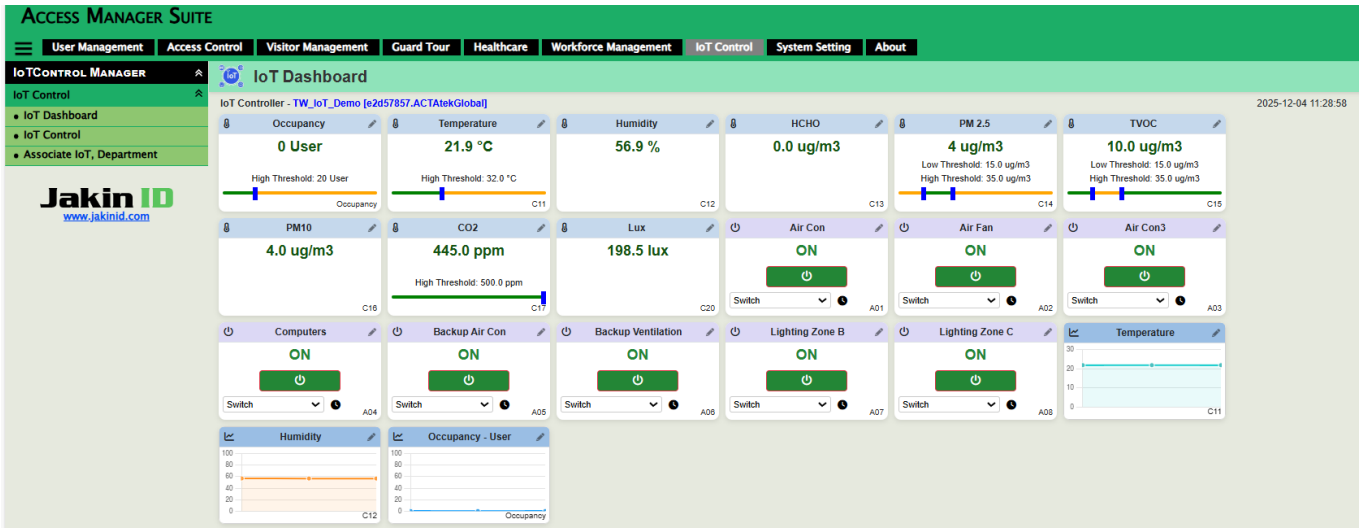
Via Touchscreen: If equipped with sensor displays, simply read values directly.

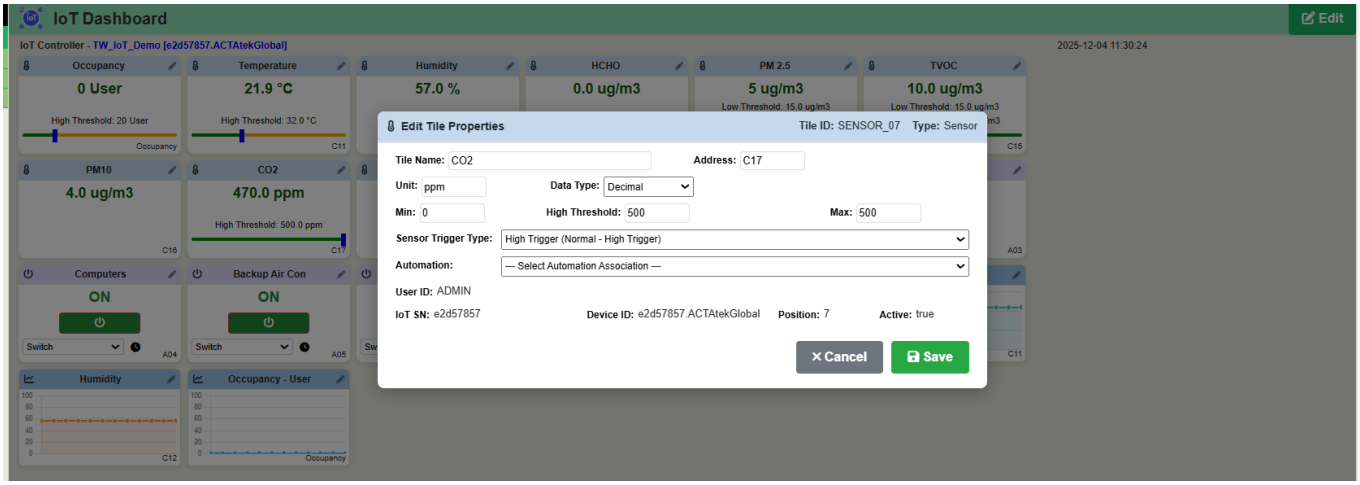
Via AMS Software:

1. Navigate to IoT Controller Dashboard page ([IoT Control]->[IoT Dashboard])

   http://[AMS Server IP]/AccessManager/IoTControl/frmIoTDashboard.aspx

2. View real-time sensor readings in data table
3. Click [Edit] to change the tile properties to correct sesnor tile name,unit etc..





4. Refresh page for updated values

6. Automated Operations

6.1 Understanding Automation Rules

The ACTA208 operates based on pre-programmed automation rules. Each rule consists of:

- **Time Schedule(Optional):** When the rule is active (e.g., weekdays 08:30-19:30)
- **Condition:** What triggers the rule (e.g., temperature > 27°C)
- **Action:** What happens when triggered (e.g., turn on AC)

6.2 Pre-Configured Automation Examples

Automation 1: Cooling Control

- **Time (Active):** Weekdays, 08:30 – 19:30
- **Trigger (Condition):** Temperature(C11) > 27°C
- **Actions:**

    1. Turn on AC in cooling mode, set to 26°C (A27)
    2. Close windows to retain cool air (A01)

- **Purpose:** Maintain comfortable temperature during occupied hours

Automation 2: Energy Saving - AC Shutdown

- **Time (Active):** Weekdays, 08:30 – 19:30
- **Trigger (Condition):** Temperature(C11) < 23°C
- **Action:** Turn off AC (A26)
- **Purpose:** Prevent overcooling and save energy

Automation 3: Evening AC Shutdown

- **Time (Active) :** Every day
- **Trigger (Condition) :** Time reaches 20:00 (8:00 PM)
- **Action:** Turn off AC (A26)
- **Purpose:** Ensure AC doesn't run overnight, save energy

Automation 4: CO_2 Ventilation Control

- **Time (Active) :** Always
- **Trigger (Condition):** CO_2 level exceeds 600ppm
- **Action:** Turn on ventilation fan (A03) for 30 minutes
- **Purpose:** Improve air quality by introducing fresh air

Automation 5: Motion-Activated Corridor Lighting

- **Time (Active):** Always
- **Trigger (Condition):** Lux (C20) < 100 AND presence detected (B07 Button 2 =″1″)
- **Action:** Turn on corridor lights (A02) for 30 seconds
- **Purpose:** Provide lighting only when needed, save energy

Automation 6: Rain Protection

- **Time (Active):** Always
- **Trigger (Condition) :** Rain detected (B01 Button 1 =″1″)
- **Action:** Close windows (A01) for 10 seconds
- **Purpose:** Prevent water damage during rain

Automation 7: Fire/Smoke Emergency

- **Time (Active):** Always
- **Trigger (Condition):** Smoke detected (B08 =″1″)
- **Action:** Activate smoke alarm and unlock emergency exits (A08)
- **Purpose:** Life safety, emergency egress

6.3 How Automation Affects Daily Use Examples

During Normal Operation:

- You may notice AC, fans, and lights turning on/off automatically
- This is normal and indicates the system is working correctly
- Manual overrides are always available if needed

Energy Savings:

- Automation prevents unnecessary operation of equipment
- Loads run only when environmental conditions require them
- Schedules ensure equipment turns off during unoccupied hours

Comfort Optimization:

- System maintains temperature within comfortable range
- Air quality remains healthy through automatic ventilation
- Lighting adjusts to occupancy and daylight levels

7. Touchscreen Wall Switch Operation

7.1 Interface Layout

The touchscreen wall switch provides an intuitive interface for controlling the system:

Main Screen Elements:

- **Relay Status Icons (K1-K8):** Show current state of each relay
- **Scene Buttons:** Quick access to pre-programmed scenes
- **Settings Icon:** Access to configuration (if enabled)

7.2 Operating the Touchscreen

To Control a Single Relay:

1. Tap the corresponding relay button (K1-K8)
2. Icon changes color to indicate ON state
3. Listen for relay click sound
4. Tap again to turn OFF

To Activate a Scene:

1. Tap "All On" to energize all relays
2. Tap "All Off" to de-energize all relays
3. Tap "Next Scene" to cycle through pre-programmed scenarios

Screen Sensitivity:

- Use finger or stylus (if required)
- Apply firm but gentle pressure
- Clean screen regularly for best touch response

7.3 Common Touchscreen Operations Examples

Morning Routine:

- Arrive at office
- Tap "All On" to activate lighting and HVAC
- System will adjust automatically based on conditions

Departure Routine:

- Before leaving
- Tap "All Off" to shut down all systems

- Verify all loads are OFF via status icons

Selective Control:

- Need only lighting? Tap K2 (Corridor Lighting)
- Need ventilation? Tap K3 (Ventilation)
- Other relays remain in their current state

8. Remote Control via AMS

8.1 Accessing AMS Software

Login to AMS:

1. Open web browser (Chrome, Firefox, or Edge)
2. Navigate to: http://[Server IP]/AccessManager
3. Enter username and password
4. Click "Login"

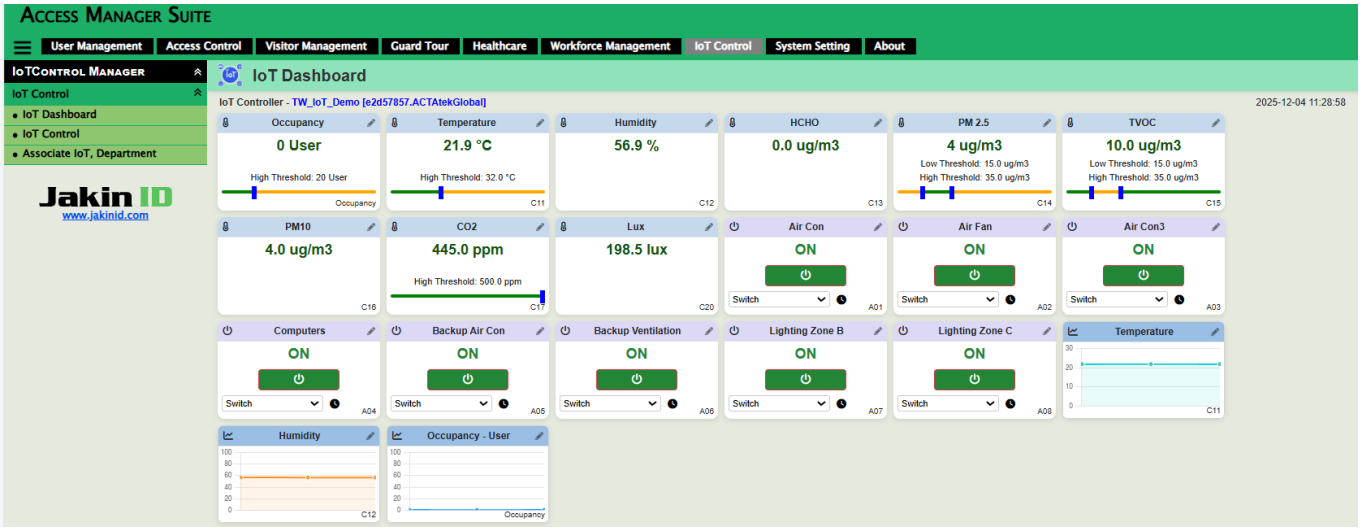
8.2 Monitoring System Status

View Real-Time Status:

1. Navigate to IoT Control Dashboard page
2. View current sensor readings:
    - Temperature, humidity, CO_2, PM2.5, TVOC, Lux
3. View relay states (ON/OFF)
4. Monitor automation activity

Status Refresh:

- Auto-refresh interval (30 seconds)
- Or manually refresh for latest data



8.3 Remote Control Operations Eexamples

Manual Relay Control:

1. Navigate to IoT Control page
2. Select controller from device list
3. Click relay buttons at IoT Control Dashboard to toggle ON/OFF
4. Confirm action in status display

8.4 Remote Monitoring Benefits Examples

Energy Management:

- Review energy consumption patterns
- Identify opportunities for optimization
- Verify equipment is not running unnecessarily

Preventive Maintenance:

- Monitor for unusual sensor readings
- Detect equipment malfunctions early
- Schedule maintenance proactively

Multi-Site Management:

- Control multiple locations from single interface
- Compare performance across sites
- Standardize operations

9. Energy Management Features

9.1 Energy-Saving Strategies Examples

Automated Scheduling: The system automatically turns off equipment during unoccupied hours, preventing energy waste. Example: AC shuts off at 20:00 every evening.

Demand-Based Operation: Equipment runs only when environmental conditions require it. Example: Ventilation activates only when CO_2 exceeds 600ppm, not continuously.

Occupancy-Based Lighting: Corridor lights activate only when someone is present and light levels are low, eliminating wasted lighting energy.

Temperature Setback: During cooling, the AC maintains 16°C setpoint only when temperature exceeds 27°C, preventing excessive cooling.

9.2 Optimizing Performance

Adjust Automation Thresholds:

- If AC runs too frequently, increase cooling threshold (e.g., from 27°C to 28°C)
- If air quality is poor, decrease CO_2 threshold (e.g., from 600ppm to 500ppm)

Refine Schedules:

- Extend or shorten operating hours based on actual occupancy
- Add weekend schedules if building is used on weekends

Prioritize High-Impact Changes:

- Focus on HVAC systems (typically 40-60% of building energy)
- Optimize lighting in high-use areas
- Reduce standby power consumption

10. Maintenance and Care

10.1 Regular Maintenance Tasks

Daily:

- Visual inspection of touchscreen and controller
- Verify sensor displays are active
- Check for any unusual odors or sounds

Weekly:

- Clean touchscreen with soft, dry cloth
- Wipe sensor housings to remove dust
- Verify all loads are operating correctly

Monthly:

- Review sensor readings for accuracy
- Test manual relay control
- Verify automation rules are functioning
- Check network connectivity

Quarterly:

- Deep clean all sensors and equipment
- Calibrate sensors if drift is suspected
- Test emergency functions (smoke alarm, etc.)
- Review energy consumption data

Annually:

- Professional inspection by certified technician
- Firmware updates (if available)
- Comprehensive system testing
- Update automation rules for seasonal changes

10.2 Cleaning and Care

Touchscreen:

- Use soft, lint-free cloth
- Apply gentle pressure only
- Do NOT use harsh chemicals or abrasive cleaners
- Do NOT spray liquid directly on screen

Sensors:

- Dust sensors gently with soft brush or cloth
- Do NOT obstruct sensor openings
- Keep sensors clear of obstructions (furniture, curtains, etc.)

IoT Controller:

- Keep controller enclosure closed
- Do NOT open unless qualified technician
- Ensure adequate ventilation around controller

Electrical Components:

- Do NOT touch relay terminals or electrical connections
- All electrical work must be performed by licensed electrician

11. Safety Guidelines

11.1 Electrical Safety

WARNING:

- High voltage (up to 277VAC) is present in relay circuits
- Only qualified electricians should service electrical components
- Do NOT open controller enclosure
- Do NOT touch relay terminals

Safe Operation:

- Keep liquids away from electrical equipment
- Do not operate with wet hands
- Report any exposed wiring immediately

11.2 Fire Safety

Fire Prevention:

- Do not overload relays beyond rated capacity
- Ensure proper ventilation around controller
- Keep flammable materials away from equipment

11.3 General Safety

Child Safety:

- Keep children away from electrical equipment
- Touchscreen should be mounted out of reach of young children
- Educate older children on proper system use

Accessibility:

- Ensure touchscreen and controls are accessible to all authorized users
- Provide alternative control methods via AMS software

Emergency Preparedness:

- Know location of "All Off" button for emergency shutdown
- Understand emergency automation rules (smoke, fire, etc.)
- Post emergency contact information near controller

11.4 Environmental Considerations

Operating Conditions:

- Temperature: 0°C to 50°C (32°F to 122°F)
- Humidity: 10% to 90% RH (non-condensing)
- Keep equipment dry and protected from weather

Sustainability:

- Use energy-saving automation to reduce environmental impact
- Optimize settings to minimize waste
- Recycle equipment according to local regulations when decommissioning

Appendix A: Quick Reference Guide

Sensor Data Addresses

Address	Sensor	Normal Range
C11	Temperature	20-26°C
C12	Humidity	40-60% RH
C13	Formaldehyde	< 0.1 mg/m³
C14	PM2.5	< 35 µg/m³
C15	TVOC	< 0.3 mg/m³
C16	PM10	< 50 µg/m³
C17	CO_2	400-1000 ppm
C20	Lux	Varies

Relay Addresses

Address	Function
A01	Close Window
A02	Corridor Lighting
A03	Ventilation
A08	Smoke Alarm
A26(Virtual Relay)	Turn Off AC
A27(Virtual Relay)	Turn On AC (26°C)

Common Operations

Turn on all lights:

- Press "All On" on touchscreen

Turn off all systems:

- Press "All Off" on touchscreen

Override automation temporarily:

- Manually control any relay via touchscreen
- System will resume automation at next trigger

Check sensor readings:

- View sensor displays OR
- Login to AMS and view status page

Appendix B: Energy Saving Tips

1. **Set reasonable temperature thresholds:** Don't cool below 24°C
2. **Use occupancy-based controls:** Turn off when building is empty
3. **Leverage natural light:** Reduce artificial lighting during daylight hours
4. **Maintain equipment:** Clean sensors and equipment regularly
5. **Review automation rules:** Adjust for seasonal changes
6. **Monitor consumption:** Track trends and identify waste
7. **Train users:** Ensure everyone understands system operation
8. **Optimize schedules:** Match operating hours to actual occupancy

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Appendix C: Glossary

Automation Rule: A programmed condition that triggers an action automatically

DI (Digital Input): A sensor or switch providing on/off signal

Edge Control: Automation logic running inside the IoT controller (no cloud needed)

IoT (Internet of Things): Network of connected devices sharing data

Lux: Unit of light intensity measurement

MQTT: Communication protocol for IoT devices

PM2.5: Particulate matter measuring 2.5 micrometers or smaller

PPM: Parts per million (unit of concentration)

Relay: Electrical switch controlled by the IoT controller

RS485: Serial communication standard used for sensors

Scene: Pre-programmed combination of relay states

TVOC: Total Volatile Organic Compounds (air quality measure)

Virtual Relay: Software-based relay that triggers IR commands instead of electrical loads

Appendix D: Contact Information

Technical Support

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