

Application Guide

Airzone Aidoo Pro

Smart Thermostat Integration



AIRSTAGE **H**-Series

AIRSTAGE **J**-Series

AIRSTAGE **V**-Series

FUJITSU

AIRSTAGE

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1. Introduction

1.1. Introduction

This application guide describes the integration of Fujitsu AIRSTAGE indoor units with compatible smart thermostats using the Airzone Aidoo Pro as a smart control and communication interface. In addition to enabling standard smart thermostat control, this integration supports utility demand response (DR) programs when used with demand-response-compliant thermostats such as Google Nest and ecobee.

1.2. What is Demand Response

Demand response is a grid management strategy used by electric utilities and system operators to temporarily reduce or shift electrical load during periods of peak demand, grid congestion, or system stress. In residential and light commercial buildings, demand response is most commonly implemented through smart thermostats that can automatically adjust HVAC operations such as modifying temperature setpoints, limiting compressor operation, or staging equipment—when a demand response event is initiated by the utility or an authorized program administrator.

Participation in demand response programs helps:

- Reduce peak electrical demand
- Improve grid reliability and resilience
- Enable higher penetration of renewable energy
- Provide financial incentives or rebates to building owners

For demand response to function correctly, the thermostat must be capable of receiving utility signals (typically via cloud-based communication) and enforcing temporary control changes at the HVAC system level while maintaining occupant safety and equipment protection.

1.3. Demand Response–Compliant Smart Thermostats

Google Nest and ecobee smart thermostats are widely recognized as demand-response-capable devices. Both platforms support utility DR programs through cloud-to-cloud integrations, allowing authorized demand response providers to issue control commands during events. These commands typically result in controlled adjustments such as:

- Temporary setpoint offsets
- Cycling or load shedding strategies
- Event reporting and verification

Because these actions originate at the thermostat level, the thermostat must function as the primary user interface and control authority for the HVAC system during a demand response event.

1.4. Challenge with Variable-Capacity Fujitsu AIRSTAGE Systems

Fujitsu AIRSTAGE variable-capacity and inverter-based indoor units do not natively operate using conventional 24 VAC thermostat control logic. Instead, they rely on a proprietary digital communication protocol that enables precise modulation, fault protection, and optimized performance. Traditional smart thermostats—including demand-response-enabled devices—cannot directly communicate using this protocol.

While basic 24 VAC interfaces can provide limited on/off control, they are insufficient for demand response participation because they:

- Do not preserve native inverter modulation
- Do not provide reliable operational feedback
- May conflict with manufacturer control logic and protections

1.5. How the Aidoo Pro Enables Demand Response Compliance

The Airzone Aidoo Pro resolves this incompatibility by acting as an intelligent protocol gateway between the smart thermostat ecosystem and the Fujitsu AIRSTAGE indoor unit. When paired with a demand-response-compliant thermostat such as Google Nest or ecobee, the Aidoo Pro allows the thermostat's demand signals—including those generated during a utility demand response event—to be translated into native Fujitsu AIRSTAGE digital commands.

This architecture enables demand response compliance by:

- Allowing the smart thermostat to remain the controlling endpoint required by utilities and DR program administrators
- Translating thermostat-driven demand adjustments into Fujitsu AIRSTAGE-approved operating commands
- Preserving inverter modulation, safety logic, and fault handling during DR events
- Avoiding simple relay-based or forced shutdown strategies that can negatively impact comfort, efficiency, and equipment longevity

As a result, Fujitsu AIRSTAGE indoor units connected through the Aidoo Pro can participate in demand response programs indirectly but effectively, using approved smart thermostat platforms without compromising system performance or design intent.

1.6. Purpose of This Guide

This guide is intended for HVAC professionals, system integrators, and controls engineers designing or installing Fujitsu AIRSTAGE systems that must support modern smart thermostat functionality, including demand response participation. It outlines compatibility requirements, system architecture, operational behavior, and best practices for deploying the Airzone Aidoo Pro as a compliant interface between Fujitsu AIRSTAGE indoor units and demand-response-enabled smart thermostats.

This document does not replace Fujitsu AIRSTAGE or Airzone installation manuals. It should be used in conjunction with official manufacturer documentation to ensure proper application, commissioning, and long-term system reliability.

2. Airzone Aidoo Pro - System Overview

2.1. What is the Aidoo Pro?

Airzone Aidoo Pro is a cloud-enabled protocol gateway that connects directly to an indoor unit and exposes full-featured, smart control without reducing the equipment to simple dry-contact behavior. It supports control via Airzone Cloud, home automation/BMS standards, and third-party smart thermostats while preserving native inverter functions and protections.

2.2. Interface

- **Indoor Unit Bus:** Aidoo Pro wires to the unit's communication terminal using a model-specific cable; status, setpoints, modes, fan speeds, louvers* and unit errors are exchanged bidirectionally. (*Louvers availability depends on the unit.)
- **Smart thermostats (3PTI):** Rather than directly switching compressor stages, the smart thermostat issues heating/cooling demand signals that Aidoo Pro translates into dynamic indoor unit setpoint adjustments. This allows the inverter system to operate natively—maintaining modulation, protections, and diagnostics—while the thermostat provides familiar scheduling, occupancy, and user interaction.
- **Cloud-to-Cloud:** Link the thermostat account with Airzone Cloud for demand translation to native unit commands.
- **Wired:** G-Y-W demand lines plus 24 VAC power (Rh/Rc/C) can be used; Aidoo iteratively adjusts the indoor unit setpoint to satisfy the thermostat's demand.

2.3. Key Functions

Unit Control & Feedback	On/Off, mode, fan speed, setpoint, room temperature, and error readout.
Refrigerant Leak Detection	Detects via protocol error read or via a configured digital input; on active leak Aidoo releases control to the HVAC system and surfaces alarms in Airzone Cloud.
Operating Modes	Auto Mode (automatic changeover), Basic Mode (limited UI), Simulation Mode (test without a unit), and optional Gateway Mode to act as a communication gateway in an Airzone zoned system.
Scheduling	Status, temperature, mode, and fan speed time programs.

2.4. Connectivity & Integration

Commissioning & network: Bluetooth setup via the Airzone Cloud app; dual-band Wi-Fi (2.4/5 GHz).

Open interfaces: RS-485 port for Modbus RTU / BACnet MS/TP and Airzone accessories; IP services include Modbus TCP/IP, BACnet/IP, Local API, Cloud API, MQTT, mDNS, and voice/driver integrations.

2.5. Operation Notes

- One device per indoor unit: Each unit requires its own Aidoo Pro for full, independent control.
- Power: 12VDC power adapter (included). Diagnostic LEDs indicate Wi-Fi, server, power, and data activity.

2.6. Fallback Algorithm

The Airzone Aidoo Pro incorporates an internal fallback algorithm designed to maintain safe and continuous HVAC operation in the event of cloud connectivity loss or smart-thermostat communication interruption. This algorithm ensures the Fujitsu AIRSTAGE indoor unit can continue operating predictably based on wired thermostat demand signals, even when cloud-to-cloud services are unavailable.

Purpose and Trigger Conditions

The fallback algorithm is activated when one or more of the following conditions occur:

- Loss of internet connectivity at the Aidoo Pro
- Loss of cloud communication between the Aidoo Pro and Airzone Cloud
- Loss or degradation of cloud-to-cloud communication with a smart thermostat platform (ecobee or Google Nest)
- Normal operation using a 24VAC wired thermostat without cloud dependency

Importantly, fallback operation does not represent a fault state. It is a normal operating mode intended to preserve comfort and protect equipment during network outages.

Core Operating Principle

Under fallback operation, the Aidoo Pro transitions from cloud-assisted setpoint interpretation to a local, time-based static adjustment routine driven exclusively by:

- Wired thermostat demand signals (Y, W, G)
- Duration of active heating or cooling demand
- Internal algorithmic setpoint approximation

The Aidoo Pro continues to translate thermostat calls into native Fujitsu AIRSTAGE commands using UART communication, without relying on cloud-derived setpoint updates.

Setpoint Approximation Behavior

When operating in fallback mode:

1. **Initial Demand Recognition**
 - A heating or cooling call from the thermostat is detected (Y or W energized).
 - The Aidoo Pro assigns an initial internal target temperature based on default mappings.
2. **Time-Based Adjustment**
 - As demand continues, the Aidoo Pro incrementally adjusts the internal operating setpoint over time.
 - Adjustments occur in discrete steps rather than continuous modulation.
 - The goal is to approximate the thermostat's intended temperature trajectory without direct cloud updates.
3. **Demand Termination**
 - When the thermostat demand signal is removed, the Aidoo Pro terminates the request and returns the indoor unit to idle or fan operation as appropriate.

Functional Capabilities in Fallback Mode

The following functions remain fully supported during fallback operation:

- Heating and cooling mode switching
- Auto changeover (based on thermostat demand)
- Fan on/off operation
- Equipment protection and safety logic (retained by Fujitsu AIRSTAGE)
- Native defrost, compressor protection, and error handling

The following functions are not available or limited during fallback operation:

- Cloud-based scheduling updates
- Learning or adaptive thermostat algorithms
- Real-time cloud-to-cloud setpoint synchronization
- App-based temperature visualization accuracy

Relationship with Fujitsu AIRSTAGE Equipment Logic

The fallback algorithm does not override Fujitsu AIRSTAGE system intelligence. During fallback:

- Fujitsu AIRSTAGE indoor and outdoor units retain full authority over:
 - Compressor modulation
 - Defrost cycles
 - Safety lockouts
 - Temperature limit enforcement
- The Aidoo Pro continues functioning solely as a command translator and coordinator.

At no point does fallback operation defeat or bypass Fujitsu AIRSTAGE-native protection logic.

Recovery to Normal Operation

When cloud connectivity is restored:

1. The Aidoo Pro automatically resumes cloud-assisted operation.
2. Cloud-based setpoints and schedules re-synchronize.
3. No manual reset or user action is required.
4. Any active thermostat learning or scheduling resumes normally.

Transient setpoint offsets may occur during the transition back to cloud operation but resolve automatically.

Design and Application Considerations

Best-practice considerations when relying on the fallback algorithm:

- Always use a wired thermostat connection for critical heating or cooling applications.
- Do not design systems assuming continuous cloud availability.
- Avoid aggressive or tight temperature tolerances in spaces where fallback operation may be frequent.
- Clearly communicate to end users that:
 - Cloud outages may temporarily affect setpoint precision
 - Comfort and equipment safety will be maintained

Summary

The Airzone Aidoo Pro fallback algorithm provides a robust safety net that ensures continued HVAC operation during cloud or network disruptions. By relying on wired demand signals and a time-based internal setpoint routine, the Aidoo Pro maintains predictable behavior while deferring all equipment protection and modulation decisions to the Fujitsu AIRSTAGE system. This design supports reliability-focused deployments and prevents comfort loss during connectivity interruptions.

3. Fujitsu AIRSTAGE Indoor Unit Compatibility/Selection

3.1. Supported Fujitsu AIRSTAGE Indoor Unit Types

Fujitsu AIRSTAGE indoor units that are equipped with a UART port (typically CN65) are compatible with the Aidoo Pro. The Airzone Aidoo Pro communicates with Fujitsu AIRSTAGE indoor units through the unit's UART communication port because this port provides direct access to Fujitsu AIRSTAGE's native digital control protocol. Unlike relay-based or 24VAC interfaces, the UART connection supports bidirectional communication, allowing detailed commands, real-time status feedback, fault reporting, and precise inverter control. By using the UART port, the Aidoo Pro can issue native Fujitsu AIRSTAGE commands rather than simple demand signals, preserving full system functionality, operational protections, and performance characteristics while enabling integration with third-party smart thermostats.

H-Series:

R32 Models:

Indoor Unit Model Number	Capacity (BTU)	Description	Single/Multi Zone
ABUH18KUAS	18,000	Ceiling Mount	S
ABUH24KUAS	24,000		S
ABUH30KUAS	30,000		S
ABUH36KUAS	36,000		S
AUUH18KUAS	18,000	Circular Flow Cassette	S
AUUH24KUAS	24,000		S
AUUH30KUAS	30,000		S
AUUH36KUAS	36,000		S
AUUH42KUAS	42,000		S
AUUH48KUAS	48,000		S
ACUH07KUAS	7,000	Compact Cassette	M
ACUH09KUAS	9,000		S / M
ACUH12KUAS	12,000		S / M
ACUH18KUAS	18,000		S / M
ASUH09KZAS	9,000	High-Tier Wall Mount (XLTH)	S
ASUH12KZAS	12,000		S
ASUH15KZAS	15,000		S
ASUH18KZAS	18,000		S
ASUH24KZAS	24,000		S
ASUH09KTAB	9,000	High-Tier+ Wall Mount (XLTH+)	S
ASUH09KTAS	9,000		S
ASUH12KTAB	12,000		S
ASUH12KTAS	12,000		S
ASUH15KTAB	15,000		S
ASUH15KTAS	15,000		S
ARUH12KUAS	12,000	Mid Static Ducted	S / M
ARUH18KUAS	18,000		S / M
ARUH24KUAS	24,000		S / M
ARUH30KUAS	30,000		S
ARUH36KUAS	36,000		S
ARUH42KUAS	42,000		S
ARUH48KUAS	48,000		S
ASUH09KMAS	9,000	Mid-Tier Wall Mount	S
ASUH12KMAS	12,000		S
AMUH12KUAS	12,000	Multi-Position AHU	S / M
AMUH18KUAS	18,000		S / M

AMUH24KUAS	24,000	Multi-Position AHU	S / M
AMUH36KUAS	36,000		S
AMUH48KUAS	48,000		S
ADUH07KUAS	7,000	Slim Duct	M
ADUH09KUAS	9,000		M
ADUH12KUAS	12,000		M
ADUH18KUAS	18,000		M
ADUH24KUAS	24,000		M
ASUH07KPAS	7,000	Standard-Tier Wall Mount	M
ASUH09KPAS	9,000		S / M
ASUH12KPAS	12,000		S / M
ASUH15KPAS	15,000		M
ASUH18KPAS	18,000		S / M
ASUH24KPAS	24,000		S / M
ASUH30KPAS	30,000		S
ASUH36KPAS	36,000		S

R410A Models:

Indoor Unit Model Number	Capacity (BTU)	Description	Single/Multi Zone
ABUH18LUAS	18,000	Ceiling Mount	S
ABUH24LUAS	24,000		S
ABUH30LUAS	30,000		S
ABUH36LUAS	36,000		S
AUUH18LUAS	18,000	Circular Flow Cassette	S
AUUH24LUAS	24,000		S
AUUH30LUAS	30,000		S
AUUH36LUAS	36,000		S
ACUH07LUAS1	7,000	Compact Cassette	M
ACUH09LUAS1	9,000		S / M
ACUH12LUAS1	12,000		S / M
ACUH18LUAS1	18,000		S / M
ADUH07LUAS1	7,000	Duct AHU, Slim, Horiz/Vert	M
ADUH09LUAS1	9,000		S / M
ADUH12LUAS1	12,000		S / M
ADUH18LUAS1	18,000		S / M
ADUH24LUAS1	24,000		M
ASUH07LPAS	7,000	Entry-Tier Wall Mount	M
ASUH09LPAS	9,000		S / M
ASUH12LPAS	12,000		S / M
ASUH15LPAS	15,000		M
ASUH18LPAS	18,000		S / M
ASUH24LPAS	24,000		S / M
ASUH30LPAS	30,000		S
ASUH36LPAS	36,000		S
ASUG09LZAS	9,000	High-Tier Wall Mount	S
ASUG09LZBS	9,000		S
ASUG12LZAS	12,000		S
ASUG12LZBS	12,000		S
ASUG15LZAS	15,000		S
ASUG15LZBS	15,000		S
ARU12RGLX	12,000	Mid Static Ducted	S
ARU18RGLX	18,000		S
ARU24RGLX	24,000		S

ARU30RGLX	30,000	Mid Static Ducted	S
ARU36RGLX	36,000		S
ARU42RGLX	42,000		S
ARU48RGLX	48,000		S
ARUH12LUAS	12,000		S
ARUH18LUAS	18,000		S
ARUH24LUAS	24,000		S
ARUH30LUAS	30,000		S
ARUH36LUAS	36,000		S
ASU9RLS3Y	9,000	Mid-Tier Wall Mount	S
ASUG09LMAS	9,000		S
ASUG12LMAS	12,000		S
ASUH09LMAS	9,000		S
ASUH12LMAS	12,000		S
ASUH18LMAS	18,000		S
ASUH24LMAS	24,000		S
ASU12RLS3Y	12,000	Mid-Tier Wall Mount, Wi-Fi	S
ASU15RLS3Y	15,000		S
AMUG24LMAS	24,000	Multi-Position AHU	S
AMUG30LMAS	30,000		S
AMUG36LMAS	36,000		S
AMUG48LMAS	48,000		S

J-Series:**R32 Models:**

Indoor Unit Model Number	Capacity (BTU)	Description
AUUA004KSA1	4,000	Compact Cassette
AUUA007KSA1	7,000	
AUUA009KSA1	9,000	
AUUA012KSA1	12,000	
AUUA014KSA1	14,000	
AUUA018KSA1	18,000	
ASUA004KSA1	4,000	Compact Wall Mount
ASUA007KSA1	7,000	
ASUA009KSA1	9,000	
ASUA012KSA1	12,000	
ASUA014KSA1	14,000	
ARUX012KSA1	12,000	Multi-Position AHU
ARUX018KSA1	18,000	
ARUX024KSA1	24,000	
ARUX030KSA1	30,000	
ARUX036KSA1	36,000	
ARUX048KSA1	48,000	
ARUL004KSA1	4,000	Slim Duct
ARUL007KSA1	7,000	
ARUL009KSA1	9,000	
ARUL012KSA1	12,000	
ARUL014KSA1	14,000	
ARUL018KSA1	18,000	

R410A Models:

Indoor Unit Model Number	Capacity (BTU)	Description
AGUA4TLAV1	4,000	Compact Floor Mount
AGUA7TLAV1	7,000	
AGUA9TLAV1	9,000	
AGUA12TLAV1	12,000	
AGUA14TLAV1	14,000	
ASUA4TLAV1	4,000	Compact Wall Mount
ASUA7TLAV1	7,000	
ASUA9TLAV1	9,000	
ASUA12TLAV1	12,000	
ASUA14TLAV1	14,000	
ASUB30TLAV1	30,000	
ASUB36TLAV1	36,000	

V-Series:

R32 Models:

Indoor Unit Model Number	Capacity (BTU)	Description
ABUA012KSA2	12,000	Ceiling Mount
ABUA014KSA2	14,000	
ABUA018KSA2	18,000	
ABUA024KSA2	24,000	
ABUA030KSA2	30,000	
ABUA036KSA2	36,000	
AUUB012KSA2	12,000	Circular Flow Cassette
AUUB014KSA2	14,000	
AUUB018KSA2	18,000	
AUUB024KSA2	24,000	
AUUB030KSA2	30,000	
AUUB036KSA2	36,000	
AUUB048KSA2	48,000	
AUUA004KSA2	4,000	Compact Cassette
AUUA007KSA2	7,000	
AUUA009KSA2	9,000	
AUUA012KSA2	12,000	
AUUA014KSA2	14,000	
AUUA018KSA2	18,000	
ASUA004KSA2	4,000	Compact Wall Mount
ASUA007KSA2	7,000	
ASUA009KSA2	9,000	

ASUA012KSA2	12,000	Compact Wall Mount
ASUA014KSA2	14,000	
ASUA018KSA2	18,000	
ARUE036KSA2	36,000	High Static Duct
ARUE048KSA2	48,000	
ARUE060KSA2	60,000	
ARUE072KSA2	72,000	
ARUE096KSA2	96,000	
ARUM012KSA2	12,000	Mid Static Ducted
ARUM014KSA2	14,000	
ARUM018KSA2	18,000	
ARUM024KSA2	24,000	
ARUM030KSA2	30,000	
ARUM036KSA2	36,000	
ARUL004KSA2	4,000	Slim Duct
ARUL007KSA2	7,000	
ARUL009KSA2	9,000	
ARUL012KSA2	12,000	
ARUL014KSA2	14,000	
ARUL018KSA2	18,000	
ASUB018KSA2	18,000	Wall Mount
ASUB024KSA2	24,000	
ASUB030KSA2	30,000	
ASUB036KSA2	36,000	

R410A Models:

Indoor Unit Model Number	Capacity (BTU)	Description
ABUA12TLAV2	12,000	Universal Mount, Floor/Ceiling
ABUA14TLAV2	14,000	
ABUA18TLAV2	18,000	
ABUA24TLAV2	24,000	
ABUA30TLAV2	30,000	
ABUA36TLAV2	36,000	
AGUA12TLAV2	12,000	Compact Floor Mount
AGUA14TLAV2	14,000	
AGUA4TLAV2	4,000	
AGUA7TLAV2	7,000	
AGUA9TLAV2	9,000	
ARUH36TLAV2	36,000	High Static Duct
ARUH48TLAV2	48,000	
ARUH60TLAV2	60,000	
ARUH72TLAV2	72,000	
ARUH96TLAV2	96,000	

<u>ARUL12TLAV2</u>	12,000	Slim Duct
<u>ARUL14TLAV2</u>	14,000	
<u>ARUL18TLAV2</u>	18,000	
<u>ARUL4TLAV2</u>	4,000	
<u>ARUL7TLAV2</u>	7,000	
<u>ARUL9TLAV2</u>	9,000	
<u>ARUM24TLAV2</u>	24,000	Mid Static Ducted
<u>ARUM30TLAV2</u>	30,000	
<u>ARUM36TLAV2</u>	36,000	
<u>ARUX12TLAV2</u>	12,000	Multi-Position AHU
<u>ARUX18TLAV2</u>	18,000	
<u>ARUX24TLAV2</u>	24,000	
<u>ARUX30TLAV2</u>	30,000	
<u>ARUX36TLAV2</u>	36,000	
<u>ARUX48TLAV2</u>	48,000	
<u>ARUX60TLAV2</u>	60,000	
<u>ASUA12TLAV2</u>	12,000	Wall Mount
<u>ASUA14TLAV2</u>	14,000	
<u>ASUA30TLAV2</u>	30,000	
<u>ASUA36TLAV2</u>	36,000	
<u>ASUA4TLAV2</u>	4,000	
<u>ASUA7TLAV2</u>	7,000	
<u>ASUA9TLAV2</u>	9,000	
<u>ASUB18TLAV2</u>	18,000	
<u>ASUB24TLAV2</u>	24,000	
<u>AUUA12TLAV2</u>	12,000	Compact Cassette
<u>AUUA14TLAV2</u>	14,000	
<u>AUUA18TLAV2</u>	18,000	
<u>AUUA24TLAV2</u>	24,000	
<u>AUUA4TLAV2</u>	4,000	
<u>AUUA7TLAV2</u>	7,000	
<u>AUUA9TLAV2</u>	9,000	
<u>AUUB18TLAV2</u>	18,000	Circular Flow Cassette
<u>AUUB24TLAV2</u>	24,000	
<u>AUUB30TLAV2</u>	30,000	
<u>AUUB36TLAV2</u>	36,000	
<u>AUUB48TLAV2</u>	48,000	

3.2. Fujitsu AIRSTAGE Communication Protocols

Fujitsu AIRSTAGE indoor units use a proprietary digital communication protocol over a dedicated low-voltage communication port (commonly the CN65), rather than conventional 24 VAC thermostat signaling. This protocol allows the indoor unit to exchange detailed operational data—such as mode, setpoint, fan speed, fault status, and inverter control commands—while preserving Fujitsu AIRSTAGE's native capacity modulation, safety logic, and system protections. Because smart thermostats are designed to operate using simple 24 VAC on/off demand signals (Y, W, G, O/B), they cannot communicate directly with Fujitsu AIRSTAGE equipment. Although Fujitsu AIRSTAGE systems can accept basic 24 VAC demand signals through optional interface modules, these signals provide limited control and minimal operational feedback. The Airzone Aidoo Pro bridges this gap by translating standard thermostat demands into native Fujitsu AIRSTAGE protocol commands, allowing smart thermostats to be used as the primary user interface while preserving full system functionality, inverter operation, and manufacturer control logic.

3.3. Aidoo Pro Model Selection

Aidoo Pro Wi-Fi Fujitsu AIRSTAGE GEN2 - AZAI6WSPFU2

Device to manage and integrate units remotely from the Cloud. Online control with the "Airzone Cloud" App (available for iOS and Android). Wireless Dual Wi-Fi connection (2.4/5 GHz). Self-powered by external power supply provided.

Features:

- Unit control and error detection.
- Configurable digital input for open window detection, occupancy presence or ECO function.
- Third party auxiliary heat control option.
- Automatic change of the operation mode with the adjustment of two set-point temperatures.
- Temperature limitation for cooling and heating modes.
- Status, temperature, mode and speed time schedules.
- Cloud and/or wired integration with third-party smart thermostats (3PI).
- Integration: Modbus RTU/TCP or BACnet MS-TP/IP, Airzone thermostat, Lutron Palladiom thermostat, AirQ Box and AirQ Sensor. (AirQ available by region, check your Product Range here: support.airzonecontrol.com)
- Local API and Cloud API integration services, mDNS multicast.



4. Smart Thermostat Compatibility

The Airzone Aidoo Pro is designed to integrate with smart thermostats that utilize standard 24 VAC control terminals, specifically Rc, Rh, W, Y, G, and C. These terminals represent the de facto control interface used by modern smart thermostats to express heating, cooling, and fan demand, as well as to power the thermostat electronics.

While Fujitsu AIRSTAGE indoor units do not natively operate using 24 VAC thermostat logic, the Aidoo Pro internally interprets these conventional thermostat signals and converts them into native Fujitsu AIRSTAGE digital protocol commands. This allows the smart thermostat to function as the primary control interface while preserving the full operational integrity of the Fujitsu AIRSTAGE system.

4.1. Function of Supported Thermostat Terminals

The following terminals are required for compatibility with the Aidoo Pro:

- **Rc / Rh (24 VAC Power):** Supply operating power to the smart thermostat. The Aidoo Pro distributes 24 VAC from an external transformer, enabling compatibility with both single-transformer and dual-transformer thermostat designs.
- **C (Common):** Required for continuous power to smart thermostats with advanced features such as Wi-Fi connectivity, sensors, learning algorithms, and demand response participation.
- **Y (Cooling Demand):** Indicates a call for cooling. When energized, the Aidoo Pro interprets this input and issues a corresponding Fujitsu AIRSTAGE cooling-mode command, dynamically adjusting the indoor unit setpoint to satisfy thermostat demand.
- **W (Heating Demand):** Indicates a call for heating. The Aidoo Pro translates this input into native Fujitsu AIRSTAGE heating commands while maintaining inverter modulation and built-in safety logic.
- **G (Fan Demand):** Indicates a call for indoor fan operation. The Aidoo Pro maps this signal to Fujitsu AIRSTAGE fan speed commands, subject to system and mode constraints.

This terminal-based compatibility allows the Aidoo Pro to support both wired thermostat demand control and cloud-initiated thermostat actions, including scheduling, occupancy logic, learning behavior, and demand response events.

4.2. Why Smart Thermostats Require These Terminals

Smart thermostats such as Google Nest and ecobee are engineered around conventional HVAC signaling. Even though their internal control decisions are cloud-based or software-driven, their physical interface relies on standard 24 VAC terminals to:

- Express heating and cooling demand
- Coordinate fan operation
- Remain continuously powered
- Enable advanced features such as utility demand response participation

Because the Aidoo Pro fully supports and interprets these terminals, it allows these thermostats to operate exactly as intended by their manufacturers—despite the underlying HVAC equipment using a native digital protocol rather than analog control logic.

4.3. Compatible Smart Thermostats

Based on the supported terminal set, the following smart thermostats are compatible with the Airzone Aidoo Pro:

Google Nest Learning Thermostat (4th Generation)

The Google Nest Learning Thermostat (4th Gen) provides terminals for **Rc, Rh, C, Y, W, and G**, making it electrically and functionally compatible with the Aidoo Pro. When connected, the Nest thermostat issues standard heating, cooling, and fan demands, which the Aidoo Pro translates into Fujitsu AIRSTAGE-native commands.

This compatibility allows the Nest thermostat to retain its full feature set, including:

- Scheduling and learning behavior
- Remote control via Google Home
- Utility and third-party demand response participation

ecobee Smart Thermostat Premium

The ecobee Smart Thermostat Premium also supports **Rc, Rh, C, Y, W, and G** terminals and is fully compatible with the Aidoo Pro. The Aidoo Pro transfers and conditions 24 VAC power from an external transformer for use by the ecobee thermostat while interpreting the thermostat's demand signals in real time.

This enables full ecobee functionality, including:

- Advanced scheduling and occupancy sensing
- Integration with utility demand response programs
- Cloud-based optimization and monitoring

By supporting standard 24 VAC thermostat terminals and converting those inputs into native Fujitsu AIRSTAGE digital protocol commands, the Airzone Aidoo Pro allows modern smart thermostats to be used as the primary control interface for Fujitsu AIRSTAGE indoor units. This approach preserves inverter performance, safety logic, and manufacturer control intent while enabling compatibility with leading smart thermostat platforms such as Google Nest and ecobee.

Google Nest Learning Thermostat 4 th Gen	Ecobee Smart Thermostat Premium
	

5. System Architecture

5.1 Logical Architecture Overview

The system architecture consists of three primary control layers: the smart thermostat layer, the protocol translation and integration layer, and the Fujitsu AIRSTAGE equipment layer. The smart thermostat—such as a Google Nest Learning Thermostat (4th Gen) or ecobee Smart Thermostat Premium—serves as the primary user interface and demand-generation device. It determines heating, cooling, and fan demand based on user settings, scheduling, sensors, learning behavior, and cloud-based logic, including demand response events.

The Airzone Aidoo Pro occupies the intermediate layer and functions as an intelligent gateway between the thermostat and the Fujitsu AIRSTAGE indoor unit. At this layer, the Aidoo Pro interprets standard 24 VAC thermostat signals (Rc/Rh, C, Y, W, G), as well as cloud-initiated control actions when applicable, and converts them into native Fujitsu AIRSTAGE digital protocol commands. This translation allows the system to preserve inverter modulation, safety protections, fault handling, and manufacturer control intent while still allowing the thermostat to act as the controlling device.

At the equipment layer, the Fujitsu AIRSTAGE indoor unit communicates directly with the Aidoo Pro via its native communication bus (UART). The indoor unit receives operating mode, setpoint, and fan commands from the Aidoo Pro and provides real-time feedback, including operational status and fault conditions. The outdoor unit is managed by the Fujitsu AIRSTAGE system as designed and is not directly controlled by the thermostat or the Aidoo Pro.

5.2 Architecture Diagram

The architecture diagram illustrates the relationship between the thermostat, Aidoo Pro, and Fujitsu AIRSTAGE equipment, as well as optional cloud and network connections. The smart thermostat is shown connected to the Aidoo Pro via standard 24 VAC thermostat wiring, including power and demand terminals. For cloud-enabled thermostats, an internet connection allows the thermostat to communicate with its respective cloud platform for remote access, learning algorithms, and demand response signaling.

The Aidoo Pro is depicted as a central translation node. On one side, it interfaces with the thermostat through low-voltage thermostat wiring. On the other side, it connects directly to the Fujitsu AIRSTAGE indoor unit using the manufacturer's digital communication port. Optional network connections from the Aidoo Pro to Airzone Cloud, building automation systems (BMS), or local IP-based integrations may also be shown, depending on the model and configuration.

5.3 Communication Paths

Several distinct communication paths exist within the system, each serving a specific function. The primary control path runs from the smart thermostat to the Aidoo Pro via standard 24 VAC wiring. In this path, the thermostat communicates heating, cooling, and fan demand using conventional control signals that are continuously monitored by the Aidoo Pro.

A second communication path exists between the Aidoo Pro and the Fujitsu AIRSTAGE indoor unit via the native digital communication bus. This bidirectional path allows the Aidoo Pro to send native operational commands to the indoor unit and receive feedback such as current mode, fan status, temperature data, and fault codes. This feedback is used internally by the Aidoo Pro to manage demand translation accurately and may also be exposed to cloud platforms or diagnostic tools.

When cloud features are enabled, an additional communication path links the smart thermostat to its manufacturer's cloud platform and, optionally, links the Aidoo Pro to Airzone Cloud. These cloud paths support remote user control, scheduling, analytics, firmware updates, and utility demand response events. Importantly, during a demand response event initiated through the thermostat's cloud platform, control actions still follow the same local communication path: cloud signal to thermostat, thermostat demand to Aidoo Pro, and native command to the Fujitsu AIRSTAGE indoor unit.

Together, these communication paths ensure that the system remains responsive, compliant with smart thermostat and utility requirements, and aligned with Fujitsu AIRSTAGE's native equipment operation under all normal, remote, and demand response operating conditions.

6. Installation Instructions

This section describes the recommended installation process for integrating the Airzone Aidoo Pro with a Fujitsu AIRSTAGE indoor unit and a compatible smart thermostat. All installation work must be performed by qualified HVAC and electrical personnel in accordance with applicable local codes, manufacturer instructions, and job-site safety requirements.

6.1 Pre-Installation Requirements

Before installing the Airzone Aidoo Pro, verify that the Fujitsu AIRSTAGE indoor unit is compatible and properly installed in accordance with Fujitsu AIRSTAGE installation manuals. The indoor unit must be powered off before making any control or communication connections.

Confirm the following requirements prior to installation:

- A compatible Fujitsu AIRSTAGE indoor unit equipped with a native communication port (typically CN65 or manufacturer-designated UART connection).
- One Airzone Aidoo Pro per indoor unit.
- A compatible smart thermostat with Rc, Rh (or single R), C, Y, W, and G terminals.
- A suitable location to mount the Aidoo Pro and smart thermostat near the indoor unit. Industry standard allowable cable length is 100ft (30m) when using 18 AWG wire.
- Access to a 120–240 VAC power source for the external 24VAC power supply.
- A reliable Wi-Fi network (2.4 GHz or 5 GHz) for commissioning and cloud connectivity.
- Separation of low-voltage communications wiring from high-voltage conductors.
- Thermostat Cable: 18 AWG Solid Copper Wire

6.2 Aidoo Pro Physical Installation

The Aidoo Pro should be mounted in a dry, accessible location near the Fujitsu AIRSTAGE indoor unit, typically within the indoor unit cabinet or immediately adjacent to it. The device should be secured to a stable surface using appropriate fasteners.

Adequate clearance must be maintained to allow access to wiring terminals, diagnostic LEDs, and the reset button. Do not install the device in areas subject to condensation, excessive heat, or vibration.

Operating Temperatures:

Storage	-4 – 158 °F (-20 – 70 °C)
Operation	32 – 113 °F (0 – 45 °C)
Operating Humidity Range	5 – 90 %rH (non-condensing)

6.3 Connection to the Fujitsu AIRSTAGE Indoor Unit

The Aidoo Pro communicates with the Fujitsu AIRSTAGE indoor unit using the unit's native digital communication port. The connection is made using the manufacturer-specific cable supplied with or specified for the Aidoo Pro model.

Connect the Aidoo Pro communication cable to the designated communication terminal on the Fujitsu AIRSTAGE indoor unit. Confirm proper polarity and seating of the connector. This connection enables bidirectional digital communication, allowing the Aidoo Pro to issue native Fujitsu AIRSTAGE commands and receive operational feedback and fault information.

6.4 Power Supply Connection

The Aidoo Pro is powered by a 12 VDC power adapter, which is supplied with the device. Connect the low-voltage output of the power supply to the Aidoo Pro power input terminals.

The low-voltage, 24 VAC power to the thermostat is supplied by an independent transformer.

Once powered, verify that the power LED on the Aidoo Pro is illuminated, indicating that the device is receiving power.

6.5 Smart Thermostat Wiring

The smart thermostat is wired directly to the Aidoo Pro using standard low-voltage thermostat wiring. The following terminals are supported:

- **Rc / Rh (24 VAC):** Thermostat power supply
- **C (Common):** Continuous power return
- **Y:** Cooling demand
- **W:** Heating demand
- **G:** Fan demand*

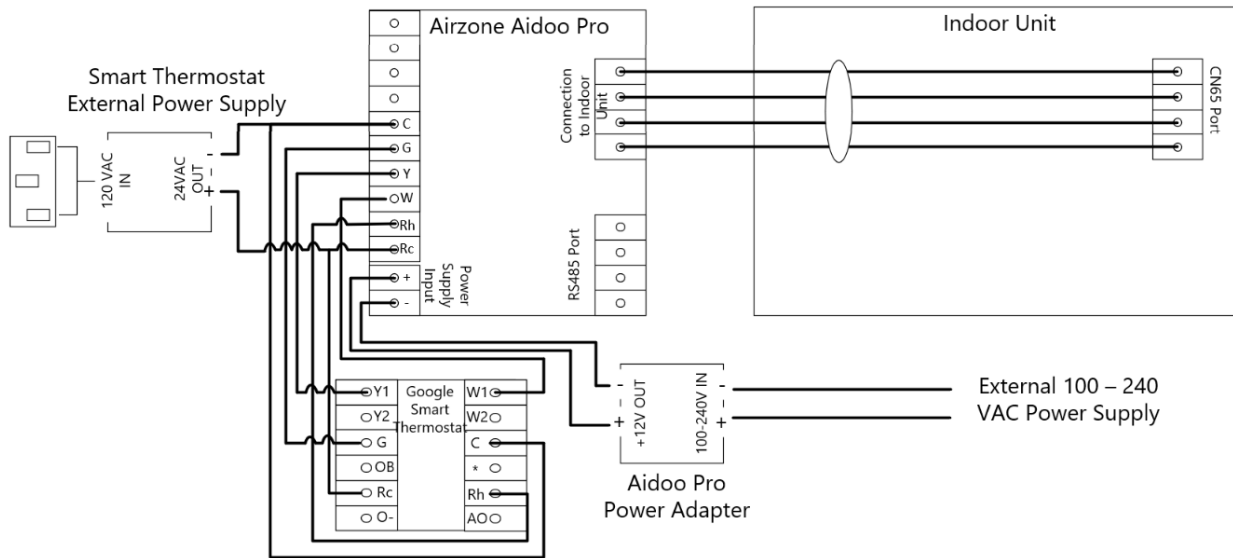
*Fan mode availability depends upon the system type

Connect each thermostat terminal to the corresponding terminal on the Aidoo Pro. The 24 VAC power to the thermostat is a field provided external power supply. If the thermostat uses a single R terminal, follow the thermostat manufacturer's instructions for Rc/Rh configuration or jumper placement.

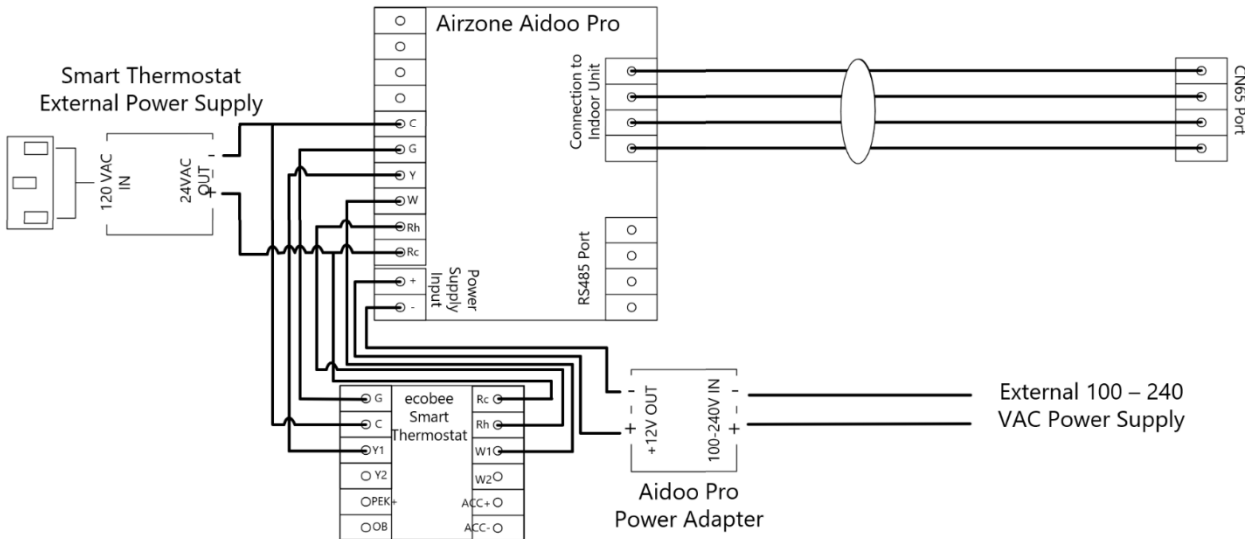
No thermostat wiring is connected directly to the Fujitsu AIRSTAGE indoor unit.

Wiring Diagrams:

Google Nest Learning Thermostat (4th Gen):



Ecobee Smart Thermostat:



6.6 Network Connection and Commissioning

Initial commissioning of the Aidoo Pro is performed using the Airzone Cloud mobile application via Bluetooth. With the device powered, use the Airzone Cloud app to discover the Aidoo Pro and perform initial setup.

During commissioning, configure the following:

- Wi-Fi network connection
- Indoor unit manufacturer and model confirmation
- Control method selection (smart thermostat control enabled)
- Optional modes such as Basic Mode, Auto Mode, or temperature limits if required by the application

Once connected to the network, the Aidoo Pro will communicate with Airzone Cloud and, if configured, with third-party smart thermostat cloud services.

6.7 Optional Connections and Settings

If required by the application, the Aidoo Pro may also be configured with optional features:

- **Digital Input:** A voltage-free contact for remote on/off control, occupancy detection, window sensors, or refrigerant leak detection. Digital input wiring should be routed in a separate conduit.
- **Auxiliary Heat Relay Output:** A third party 12 VDC relay output may be used to control auxiliary heating equipment where permitted by system design.
- **RS-485 Port:** Used for integration with Airzone accessories or building automation systems using Modbus or BACnet.

Configuration of these features is performed through Airtools in Airzone Cloud.

6.8 Final Checks and Power-Up

After all wiring and configuration steps are complete:

1. Restore power to the Fujitsu AIRSTAGE indoor unit.
2. Verify that the Aidoo Pro diagnostic LEDs indicate normal operation and data communication with the indoor unit.
3. Confirm that the smart thermostat powers on and displays room temperature.
4. Initiate heating and cooling demands from the thermostat and verify correct system response.
5. Confirm proper fan operation, mode switching, and setpoint control.

If demand response features are enabled through the smart thermostat, verify that the thermostat is properly enrolled in the applicable utility program.

7. Smart Thermostat Integration

7.1. Google Nest Learning Thermostat (4th Gen)

This section describes how to integrate the Google Nest Learning Thermostat (4th Generation) with a Fujitsu AIRSTAGE system using the Airzone Aidoo Pro. Integration consists of three primary steps: physical thermostat installation, wired integration with the Aidoo Pro, and software commissioning through the Google Home app.

7.1.1 Thermostat Installation and Wiring

The Google Nest Learning Thermostat (4th Gen) is installed as a conventional 24 VAC wired thermostat and uses standard low-voltage thermostat wiring. The thermostat base should be wall-mounted in a representative living space, following Google's placement guidelines for height, airflow, and avoidance of direct sunlight or heat sources. Thermostat wiring is run from the Nest base directly to the smart thermostat terminal block on the Aidoo Pro. No wiring is connected from the Nest thermostat to the Fujitsu AIRSTAGE indoor unit.

The following terminals must be connected:

- **Rc and/or Rh:** 24 VAC power supplied by the Aidoo Pro
- **C:** Common wire supplied by the Aidoo Pro
- **Y:** Cooling demand signal to the Aidoo Pro
- **W:** Heating demand signal to the Aidoo Pro
- **G:** Fan demand signal to the Aidoo Pro

Jumper wires between Rc and Rh are not required, as the Nest thermostat internally manages single-transformer or dual-transformer configurations. The Aidoo Pro provides a single, stable 24 VAC power source suitable for Nest operation. After wiring is complete, the Nest display is attached to the base, but the system should remain powered off until all Aidoo Pro connections are finalized.

7.1.2 Integration with the Airzone Aidoo Pro

The Aidoo Pro acts as the sole interface between the Nest thermostat and the Fujitsu AIRSTAGE indoor unit. Once thermostat wiring is completed:

1. Verify that the Aidoo Pro is connected to the Fujitsu AIRSTAGE indoor unit's native communication port using the manufacturer-specific cable.
2. Confirm that the Aidoo Pro 12 VDC power supply is connected and energized.
3. Ensure no thermostat wiring is connected directly to the Fujitsu AIRSTAGE equipment.

With power applied, the Aidoo Pro will energize the 24 VAC thermostat terminals, allowing the Nest thermostat to power immediately without relying on internal battery charging.

No additional hardware configuration is required on the Aidoo Pro beyond enabling third-party thermostat control during commissioning.

7.1.3 Google Home App Setup and Commissioning

Initial configuration of the Google Nest Learning Thermostat (4th Gen) is performed using the **Google Home app**, which guides the installer through setup and system detection.

Using the Google Home app:

1. Add the Nest thermostat as a new device and follow the on-screen installation steps.
2. When prompted to identify the HVAC system type, select a **conventional heating and cooling system**.
3. Allow the Nest thermostat to automatically detect connected wires (Rc/Rh, C, Y, W, G).
4. Confirm heating and cooling operation during guided system testing.
5. Complete Wi-Fi setup and link the thermostat to the homeowner's Google account.

7.1.4 Integration with Airzone Cloud

If Airzone Cloud integration is enabled, the Aidoo Pro can be commissioned using the Airzone Cloud app. During setup:

- Confirm that control authority is assigned to the **third-party thermostat**.
- Verify that the Aidoo Pro is operating in wired smart thermostat control mode.
- Optional features such as temperature limits or Basic Mode may be configured if required for the application.

Cloud-to-cloud linking between Google Home and Airzone Cloud is optional and not required for normal operation when using a wired thermostat connection.

7.1.5 Final Verification

After setup is complete:

1. Initiate a heating demand from the Nest thermostat and verify indoor unit operation.
2. Initiate a cooling demand and confirm correct mode change.
3. Test fan operation using the Nest fan controls.
4. Confirm remote access and scheduling functionality through the Google Home app.

Once verified, the thermostat is ready for normal operation, learning behavior, and participation in utility demand response programs where applicable.

7.1.6 Summary

Integration of the Google Nest Learning Thermostat (4th Gen) with the Airzone Aidoo Pro follows standard smart thermostat installation practices. The Nest thermostat is installed and commissioned using the Google Home app, while the Aidoo Pro provides physical wiring termination, power, and protocol translation to the Fujitsu AIRSTAGE system. This approach allows full use of Google Nest smart features while maintaining native Fujitsu AIRSTAGE equipment control.

7.2. ecobee Smart Thermostat Premium

This section describes how to integrate the ecobee Smart Thermostat Premium with a Fujitsu AIRSTAGE system using the Airzone Aidoo Pro. Integration consists of physical thermostat installation, wired connection to the Aidoo Pro, and commissioning through the ecobee mobile application.

7.2.1 Thermostat Installation and Wiring

The ecobee Smart Thermostat Premium is installed as a conventional 24 VAC wired thermostat. The thermostat should be wall-mounted in a representative living space in accordance with ecobee installation guidelines, avoiding direct sunlight, drafts, and heat sources.

Thermostat wiring is routed directly from the ecobee base to the smart thermostat terminal block on the Aidoo Pro.

No thermostat wiring is connected directly to the Fujitsu AIRSTAGE indoor unit.

The following terminals are required:

- **Rc / Rh:** 24 VAC power supplied by the Aidoo Pro
- **C:** Common wire supplied by the Aidoo Pro
- **Y:** Cooling demand signal to the Aidoo Pro
- **W:** Heating demand signal to the Aidoo Pro
- **G:** *Fan demand signal to the Aidoo Pro

*Fan mode availability depends upon system type.

The Aidoo Pro provides a stable 24 VAC power source, allowing the ecobee thermostat to operate without external transformers or power-stealing behavior. The ecobee Power Extender Kit (PEK) is **not required** and should not be used when the C wire from the Aidoo Pro is connected.

Once wiring is complete, attach the ecobee thermostat display to the base, but do not begin system testing until the Aidoo Pro is fully powered and commissioned.

7.2.2 Integration with the Airzone Aidoo Pro

The Aidoo Pro serves as the sole interface between the ecobee thermostat and the Fujitsu AIRSTAGE indoor unit. To complete integration:

1. Verify that the Aidoo Pro is connected to the Fujitsu AIRSTAGE indoor unit via the manufacturer-specific native communication cable.
2. Confirm that the Aidoo Pro is powered using the supplied 12 VDC power adapter.
3. Ensure that third-party thermostat control is enabled during Aidoo Pro commissioning.

Once powered, the Aidoo Pro energizes the thermostat terminals and the ecobee thermostat will power immediately. No additional hardware configuration or relay modules are required.

7.2.3 ecobee App Setup and Commissioning

Initial configuration of the ecobee Smart Thermostat Premium is performed using the ecobee mobile app, which guides the installer through system identification and testing.

Using the ecobee app:

1. Add a new thermostat and scan the QR code displayed on the thermostat.
2. When prompted to identify the HVAC system type, select a conventional heating and cooling system.
3. Confirm detected wiring (Rc/Rh, C, Y, W, G).
4. Complete guided heating, cooling, and fan tests.
5. Connect the thermostat to Wi-Fi and link it to the homeowner's ecobee account.

Advanced configuration (such as staging, fan behavior, or temperature limits) is not required for standard Aidoo Pro installations.

7.2.4 Optional Integration with Smart Home Platforms

The ecobee Smart Thermostat Premium may optionally be integrated with third-party platforms such as Amazon Alexa, Apple HomeKit, and Google Assistant. These integrations are configured through the ecobee app and corresponding smart home platforms.

Cloud-based features, including scheduling, occupancy detection, and demand response participation, remain fully functional when the thermostat is used with the Aidoo Pro.

7.2.5 Final Verification

After setup is complete:

1. Initiate a heating call from the ecobee thermostat and verify indoor unit operation.
2. Initiate a cooling call and confirm correct mode change.
3. Test fan operation using ecobee fan controls.
4. Confirm remote access and scheduling functionality through the ecobee app.

Once verified, the thermostat is ready for normal operation and utility program participation where applicable.

7.2.6 Summary

When paired with the Airzone Aidoo Pro, the ecobee Smart Thermostat Premium integrates using standard 24 VAC thermostat wiring and is commissioned through the ecobee mobile app. The Aidoo Pro provides power, wiring termination, and native protocol translation, allowing the ecobee thermostat to function as the primary user interface without direct interaction with the Fujitsu AIRSTAGE indoor unit.

8. Operation

This section describes how the Fujitsu AIRSTAGE indoor unit, Airzone Aidoo Pro, and supported smart thermostats operate together under normal conditions. It defines expected operating sequences, documents supported control functions verified through testing and clarifies which device owns each function in the integrated system.

8.1. Normal Operation Sequences

8.1.1 System Idle to Active Operation

1. The Fujitsu AIRSTAGE indoor unit must be powered and available for control.
2. The Aidoo Pro establishes UART communication with the indoor unit.
3. The smart thermostat (ecobee or Google Nest) sends a heating, cooling, or fan demand.
4. The Aidoo Pro interprets the thermostat demand and issues compatible native commands to the Fujitsu AIRSTAGE indoor unit.
5. The indoor unit transitions to the requested operating mode.

8.1.2 Heating Operation

- A heating demand is issued when the thermostat temperature falls below its heating setpoint.
- The Aidoo Pro relays the heating request to the indoor unit via native protocol.
- The indoor unit operates in heating mode until the thermostat demand is satisfied.

Minimum Heat / Freeze Protection

- Both ecobee and Google Nest successfully simulated minimum heat operation (~50 °F range).
- Smart thermostat safety or low-temperature features trigger heating even if the thermostat is set to OFF.
- Alerts are thermostat-dependent:
 - ecobee provides low-temperature alerts.
 - Nest enforces safety temperatures without explicit alerts.

8.1.3 Cooling Operation

- A cooling demand is issued when space temperature exceeds the cooling setpoint.
- The Aidoo Pro issues a cooling command using the indoor unit's native control interface.
- Cooling operation continues until the thermostat demand ends.

8.1.4 Auto Changeover

- Auto mode is fully supported and validated for both ecobee and Google Nest.
- The thermostat determines whether heating or cooling demand is required.
- The Aidoo Pro follows the thermostat's active demand and switches indoor unit modes accordingly.

8.1.5 Fan Operation

- Fan ON/OFF commands from the thermostat are supported.
- Discrete fan speeds (Auto, High, Medium, Low) are:
 - Not selectable from ecobee or Nest
 - Selectable and viewable in the Airzone Cloud app
- Quiet mode is not supported by Aidoo Pro.

8.1.6 Economy / Energy-Saving Operation

- Energy-saving features originate from the smart thermostat platform:
 - ecobee:** Eco+, Smart Home & Away, humidity-based adjustment
 - Nest:** Eco Hold, Smart Schedule, Safety Temperatures
- The Aidoo Pro responds to the resulting setpoint changes.
- Some Nest auto-Eco behaviors were observed to be inconsistent during testing.

8.2 Supported Control Functions

8.2.1 Function Support Matrix

Function	Supported	Notes
Start / Stop (On / Off)	✓ Yes	Commanded via thermostat; indoor unit responds
Heating Mode	✓ Yes	Fully validated
Cooling Mode	✓ Yes	Fully validated
Auto Changeover	✓ Yes	Thermostat-driven
Dry Mode	✓ Yes	Triggered automatically by thermostat under certain conditions
Fan On / Off	✓ Yes	On/Off only
Fan Speed Selection	⚠ Partial	Only via Airzone Cloud (not thermostat)
Quiet Mode	✗ No	Not supported by Aidoo Pro
Temperature Setpoint Control	✓ Yes	Offsets generally $\leq 4^{\circ}\text{F}$ (uncontrolled space limitations)
Minimum Heat / Freeze Protection	✓ Yes	Simulated and validated
Eco / Energy-Saving Operation	✓ Yes	Thermostat-dependent behavior
Scheduling	✓ Yes	Via thermostat comfort schedules
Explicit Timers (On/Off)	✗ No	Thermostats use schedules, not timers
Swing / Louver Position	✗ No	Not exposed to smart thermostats
Error Code Display (Indoor Unit)	⚠ Partial	Visible in Airzone Cloud only

8.2.2 Notes on Unsupported or Limited Functions

- Powerful Mode:** Not available through smart thermostats.
- Louver control:** Not available through smart thermostats or Aidoo Pro.
- Error codes:**
 - Fujitsu AIRSTAGE error codes are **not displayed** in ecobee or Nest apps.
 - Error codes are visible in the Airzone Cloud app.
- Temperature sensing:**
 - ecobee: Aidoo uses the **main thermostat temperature**, not SmartSensor or averaged values.
 - Nest: Aidoo uses indoor unit reference; averaging may cause offsets.

8.3 Function Ownership

8.3.1 Function Ownership Matrix

Function Category	Owned By
User Interface (App / Wall Control)	Smart Thermostat (ecobee / Nest)
Scheduling / Comfort Profiles	Smart Thermostat
Occupancy Detection	Smart Thermostat
Eco / Energy Logic	Smart Thermostat
Demand Generation (Heat / Cool / Fan)	Smart Thermostat
Protocol Translation	Aidoo Pro
Equipment Protection Logic	Fujitsu AIRSTAGE Indoor Unit
Fan Speed Control	Aidoo Pro (via Airzone Cloud)
Louver / Swing Control	Fujitsu AIRSTAGE (native only)
Error Detection & Reporting	Fujitsu AIRSTAGE / Aidoo Pro
Error Code Visualization	Airzone Cloud
Temperature Modulation / Inverter Control	Fujitsu AIRSTAGE Indoor Unit

8.3.2 Key Integration Principles

- Smart thermostats **do not directly control** Fujitsu AIRSTAGE equipment.
- The Aidoo Pro serves as:
 - A protocol translator
 - A control gatekeeper
- Fujitsu AIRSTAGE equipment always retains authority over:
 - Compressor modulation
 - Defrost logic
 - Safety protections

9. Design Considerations & Best Practices

This section provides recommended design practices for deploying Fujitsu AIRSTAGE systems with the Airzone Aidoo Pro and third-party smart thermostats. These guidelines focus on system sizing and zoning, control strategy selection, and network reliability to ensure stable operation, accurate temperature control, and positive end-user experience.

9.1 System Sizing and Zoning

9.1.1 Equipment Sizing Considerations

When using smart thermostats with Aidoo Pro, traditional Fujitsu AIRSTAGE system sizing principles still apply. Smart thermostats do not modify or extend the operating envelope of the indoor or outdoor equipment.

Best practices include:

- Size indoor and outdoor units according to Fujitsu AIRSTAGE engineering guidelines.
- Avoid oversizing systems in single-zone applications, as aggressive cycling reduces comfort and exacerbates setpoint offsets.
- Account for inverter behavior: modulation is managed internally by the Fujitsu AIRSTAGE system, not by the thermostat.

Important: External thermostat temperature readings are not used as the system's operating temperature. Fujitsu AIRSTAGE equipment continues to rely on internal sensors and native logic.

9.1.2 Single-Zone vs Multi-Zone Applications

Single-zone applications are strongly recommended when using smart thermostats via Aidoo Pro.

- One thermostat per indoor unit
- One Aidoo Pro per indoor unit
- No shared thermostats across zones

Multi-zone or simultaneous multi-split systems introduce complexity and are not well-suited to third-party thermostat control due to:

- Conflicting zone demands
- Fan and mode coordination limitations
- Error visibility constraints

For multi-zone systems requiring granular control (fan, louver, group logic), Fujitsu AIRSTAGE wired controllers or Airzone zoning solutions are preferable.

9.1.3 Sensor Strategy and Thermostat Placement

Smart thermostat temperature sensors should be:

- Located in thermally representative spaces
- Installed away from supply air discharge
- Installed away from external heat sources or solar gain

Smart sensors (e.g., ecobee SmartSensor) should be used cautiously:

- Aidoo Pro uses the **main thermostat temperature**, not averaged or remote sensor temperatures
- Large temperature deltas between the thermostat and auxiliary sensors can create perceived inconsistencies

Avoid placing sensors in extreme environments (closets, exterior walls, garages) unless explicitly designing for freeze protection.

9.2 Control Strategy Recommendations

9.2.1 Recommended Control Model

The most reliable and predictable control strategy is:

Smart thermostat generates demand → Aidoo Pro translates → Fujitsu AIRSTAGE executes

Designers should assume:

- Thermostats issue binary demand signals (heat, cool, fan)
- Aidoo Pro does not expose full Fujitsu AIRSTAGE feature parity to the thermostat
- Fujitsu AIRSTAGE retains authority over safety, capacity modulation, and equipment protection

9.2.2 Thermostat Feature Selection

Recommended when selecting or configuring smart thermostat features:

- Scheduling using comfort profiles (Home / Away / Sleep)
- Auto changeover
- Minimum heat / freeze protection
- Manual Eco or Eco+ modes

Not supported

- Powerful Mode
- Discrete fan speed control
- Louver / swing positioning
- Explicit on/off timers

Thermostat settings should be tuned conservatively during commissioning, with learning features enabled only after stable baseline operation is verified.

9.2.3 Default Configuration Recommendations

For best results:

- Use Auto Mode with defined heating and cooling limits
- Configure realistic minimum and maximum setpoints matching Fujitsu AIRSTAGE operating ranges
- Disable unnecessary alerts during initial validation to reduce noise
- Document which platform (thermostat, Airzone Cloud, Fujitsu AIRSTAGE remote) is authoritative for each function

Installer Tip: Smart thermostats provide *convenience and scheduling*, not total control of all equipment features.

9.3 Network and Reliability Considerations

9.3.1 Network Dependency Overview

System behavior depends on the following communication paths:

- Thermostat ↔ Cloud (ecobee or Google)
- Aidoo Pro ↔ Airzone Cloud
- Aidoo Pro ↔ Fujitsu AIRSTAGE indoor unit (UART, local)

Local thermostat-to-Aidoo-to-Fujitsu AIRSTAGE communication continues during internet outages; however, cloud-to-cloud setpoint synchronization may be delayed or unavailable.

9.3.2 Wi-Fi and Connectivity Best Practices

To minimize latency and reliability issues:

- Use a stable, private Wi-Fi network (avoid guest networks)
- Ensure strong signal strength at thermostat and Aidoo Pro locations
- Avoid frequent SSID changes after commissioning
- Confirm router supports standard 2.4 GHz connectivity

Responses may be delayed when network quality has degraded, particularly during start/stop transitions.

9.3.3 Cloud Dependency and Fallback Behavior

If cloud connectivity is lost:

- Existing setpoints remain active
- Thermostat local scheduling continues
- Aidoo Pro maintains last known operating state
- Native Fujitsu AIRSTAGE protection logic remains fully active

Error codes generated by the indoor unit continue to be available only in the Airzone Cloud app once cloud connectivity is restored.

9.3.4 Commissioning and Maintenance Considerations

Best practices for long-term reliability:

- Complete full functional testing before enabling advanced features
- Validate behavior after firmware or app updates
- Document installer settings and ownership boundaries
- Advise customers that only one user can log into the Airzone Cloud zone at a time

Routine review of app permissions and network stability reduces service callbacks and perceived system issues.

10. Troubleshooting & Support

This section provides guidance for identifying and resolving common system issues associated with the integration of Fujitsu AIRSTAGE indoor units, Airzone Aidoo Pro, and supported smart thermostats (ecobee and Google Nest Learning Thermostat, 4th Gen). It also identifies diagnostic tools and official technical support resources.

10.1 Common Issues and Symptoms

10.1.1 Thermostat Commands Do Not Start the Indoor Unit

Symptoms

- Thermostat shows active heating/cooling demand
- Fujitsu AIRSTAGE indoor unit does not respond
- No fault displayed on thermostat

Likely Causes

- Indoor unit is powered off or in standby state
- Aidoo Pro not fully initialized
- UART communication is not established

Recommended Actions

1. Verify indoor unit power and breaker status.
2. Confirm Aidoo Pro status LEDs indicate normal operation.
3. Power-cycle the indoor unit and Aidoo Pro.
4. Verify UART cable connection at the indoor unit control board.

10.1.2 Delayed Start or Stop Behavior

Symptoms

- Long delay between thermostat command and equipment response
- Slow temperature changes reflected in apps

Likely Causes

- Poor Wi-Fi signal quality
- Cloud-to-cloud latency (thermostat ↔ Airzone Cloud)
- Network congestion or guest network usage

Recommended Actions

- Connect devices to a stable private Wi-Fi network
- Improve signal strength at thermostat and Aidoo Pro locations
- Avoid guest or isolated VLAN networks

Tip: Improved responsiveness may occur after switching from a guest Wi-Fi network to a private LAN

10.1.3 Temperature Setpoint Differences Between Apps

Symptoms

- Temperature mismatch between thermostat app and Airzone Cloud
- Perceived over- or under-conditioning

Likely Causes

- Different temperature sensors in use
- Averaging behavior in smart thermostats
- Uncontrolled test environment

Notes

- ecobee: Aidoo Pro reads the main thermostat temperature, not SmartSensor averages.
- Nest: Temperature may be averaged internally, while Fujitsu AIRSTAGE operates off internal references.

Recommended Actions

- Confirm which thermostat sensor is active
- Avoid placing sensors in extreme or isolated spaces

10.1.4 Fan Speed, Swing, or Quiet Mode Not Available

Symptoms

- Fan speed cannot be adjusted from thermostat
- No louver or swing control exposure

Explanation

- Smart thermostats do not support these functions
- Aidoo Pro does not support Quiet mode
- Fan speeds can only be adjusted via Airzone Cloud

Recommended Actions

- Use the Airzone Cloud app for fan speed adjustments
- Use Fujitsu AIRSTAGE remote controllers for full native control if required

10.1.5 Error Codes Not Visible on Thermostat

Symptoms

- Thermostat appears normal during a fault condition
- Indoor unit is not operating

Explanation

- Smart thermostats do not display Fujitsu AIRSTAGE equipment error codes
- Error codes are visible only in Airzone Cloud

Recommended Actions

- Check Airzone Cloud app for detailed fault codes
- Reference Fujitsu AIRSTAGE service documentation for code interpretation

10.2 Diagnostic Tools and Resources

10.2.1 Diagnostic Tools

Recommended tools for troubleshooting include:

- **Airzone Cloud mobile app**
 - View operating mode, setpoint, fan speed
 - Display indoor unit error codes
- **Fujitsu AIRSTAGE Service Monitor / Service Tools**
 - Verify operating states and UART communication
- **Smart thermostat apps (ecobee / Google Home)**
 - Confirm user-side commands and schedules
- **Basic electrical tools**
 - Multimeter for power and continuity checks
- **Router diagnostics**
 - Signal strength and network stability verification

When troubleshooting, always isolate whether the issue originates at the thermostat layer, Aidoo Pro translation layer, or Fujitsu AIRSTAGE equipment layer.

10.2.2 Technical Documentation

Airzone

- Product manuals and technical data sheets:
<https://support.airzonecontrol.com>
- Airzone Cloud documentation and FAQs:
<https://doc.airzonecloud.com>

Fujitsu AIRSTAGE

- Resources and manuals:
<https://connect.fujitsugeneral.com>

10.3 Technical Support Contacts

10.3.1 Airzone Technical Support (North America)

Phone: +1 (866) 521-026

Email:

techsupport_na@airzonecontrol.com

Web Support Portal:

<https://www.airzonecontrol.com/na/en/contact/>

Support Capabilities:

- Aidoo Pro commissioning assistance
- Airzone Cloud troubleshooting
- Compatibility verification
- Warranty and returns

10.3.2 Fujitsu AIRSTAGE – HVAC Technical Support

Support Capabilities:

- Diagnosis and support for Fujitsu AIRSTAGE indoor and outdoor units **only**
- Troubleshooting of Fujitsu AIRSTAGE unit error codes displayed on Fujitsu AIRSTAGE controllers or service tools
- Assistance with equipment operation, installation requirements, and wiring related to Fujitsu AIRSTAGE products
- Product specifications, manuals, service bulletins, and warranty support for Fujitsu AIRSTAGE equipment

Support Limitations:

- Fujitsu AIRSTAGE cannot assist with Airzone products, including Aidoo Pro hardware, configuration, or behavior.
- Fujitsu AIRSTAGE does not support Airzone Cloud, Airzone error messages, or Airzone system operation.
- Fujitsu AIRSTAGE cannot troubleshoot errors shown in Airzone Cloud or in third-party smart thermostats.
- Any issues involving setpoint translation, demand logic, thermostat integration, or cloud connectivity must be directed to Airzone Technical Support.

For systems using Airzone Aidoo Pro, Fujitsu AIRSTAGE support is limited strictly to confirming the status and fault conditions of the Fujitsu AIRSTAGE HVAC unit itself. **All integration-related questions must be handled by Airzone.**

Phone:

Toll Free: +1 (888) 888-3424

Local (NJ): +1 (973) 575-0380

Toll Free Service Hotline: +1 (866) 952-8324

Local Service Hotline: +1 (973) 575-0381

Email:

Product Information: fghvac2@fujitsugeneral.com

Service: servicehvac@fujitsugeneral.com

Address:

342 Changebridge Road, Floor 3

Pine Brook, NJ 07058, USA

Official Contact Page:

<https://www.fujitsugeneral.com/us/contact/>

AIRSTAGE Mini-Splits Frequently Asked Questions (FAQs):

<https://www.fujitsugeneral.com/us/support/faq/halcyon/index.html>

10.4 Support Escalation Best Practices

For efficient resolution:

1. Identify whether the issue is:
 - Thermostat-side
 - Aidoo Pro / Airzone Cloud
 - Fujitsu AIRSTAGE equipment
2. Capture screenshots or error codes from the Airzone Cloud app.
3. Document recent changes (firmware updates, network changes, power events).
4. Contact the appropriate technical support group with system model numbers and serial numbers.

Most issues encountered during smart thermostat integration stem from:

- Network reliability
- Sensor placement expectations
- Feature limitations inherent to third-party thermostats

Following the troubleshooting steps and escalation paths outlined above will resolve the majority of field-reported issues without requiring equipment replacement.