

VRF Controller AcmeLink_GW Product Manual

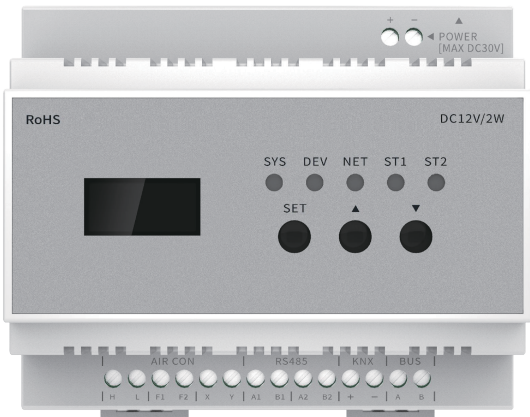
Centralized Control Gateway for Central Air Conditioning, Fresh Air, and Underfloor Heating Systems

1. PRODUCT OVERVIEW

VRF controller **AcmeLink_GW** is an HVAC controller based on Zigbee wireless protocol. It can integrate multi-connected air conditioning systems, fresh air systems, and underfloor heating systems into the Aqara smart home system.

With Aqara devices equipped with gateway functions, it can control the on/off, temperature adjustment, mode switching, and wind speed adjustment of multi-connected air conditioning/fresh air/underfloor heating through a mobile app, and achieve scene linkage with other Aqara smart devices. The interface modes that the device can provide are **RS485, KNX, or Zigbee**.

Supported Brands: Multi-split air conditioning systems from brands such as Daikin, Hitachi, Toshiba, Mitsubishi Electric, Hisense, Haier, Panasonic, York, Mitsubishi Heavy Industries, Midea, LG, AUX, Bosch, Gree, Tianjia, Samsung, Zhigao, Trane, Carrier, and McQuay. Floor heating and fresh air systems support select brands.



2. KEY FEATURES

• HVAC Devices Group Control

Supports up to 64 air conditioners, 16 fresh air units, and 16 underfloor heating devices connected to the group control system.

• Compatible with Multiple Brands

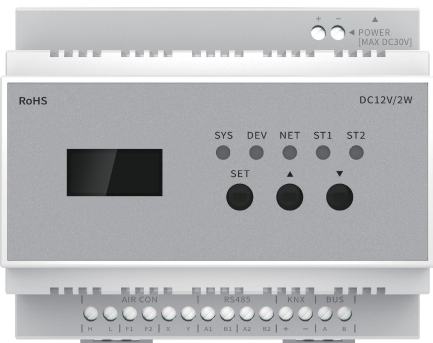
Broad compatibility across major VRF/HVAC manufacturers; select support for fresh air and floor heating.

• Online OTA & Mini-Program Support

Device firmware can be upgraded via APP or WeChat mini program, enabling hassle-free installation and on-site debugging.

• Zigbee Automation & Smart Home Linkage

Seamless connectivity through Aqara platform, HomeKit support (manage via Home app), and Siri Voice Control.

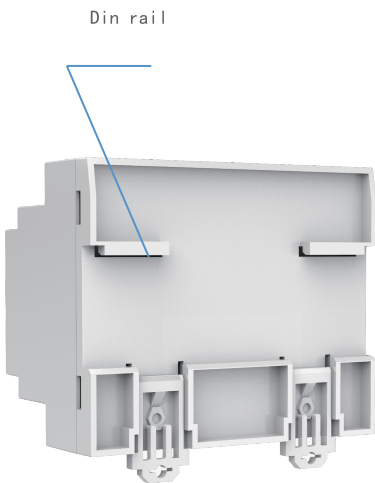


3. PRODUCT SPECIFICATIONS & SYSTEM OVERVIEW

Product Model	AcmeLink_GW
Dimension	106 * 96 * 57 mm
Color	White
Input Power Supply	DC 12V (MAX DC 30V)
Power Consumption	2.0 W
Working Temperature / Humidity	0 ~ 40°C / 0 ~ 90% RH
Configuration & Firmware Upgrade	Device: Upgrade via Bluetooth & Wi-Fi + mini program / official account / Aqara Home APP. Module: Zigbee upgrade.
Smart Device Interfaces	ZigBee / BLE / Wi-Fi / RS485, etc.
Buttons & Indicators	3 Buttons (SET, UP ▲, DOWN ▼) 5 LED Indicators (SYS, DEV, NET, ST1, ST2)
Installation Method	DIN rail or hidden mounting (e.g., inside ceiling / control box)
What's in the Box	VRF Controller *1, Manual *1, Power Adapter (DC12V) *1

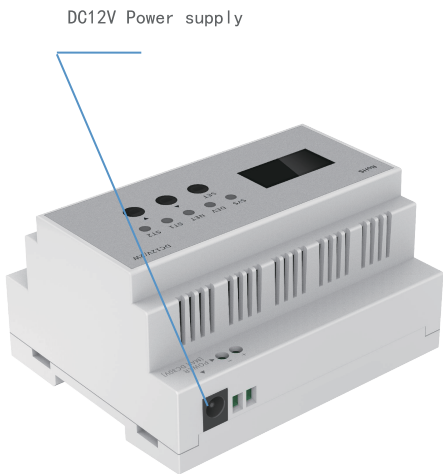
Central Air Conditioning System Integration Overview

Parameter	Description
Use Case Scenario	Central air-conditioning (VRF / Multi-split system)
Structure	One outdoor unit connected to multiple indoor units (fan coil units)
Working Principle	Relies on indoor fan coil units to deliver warm/cold air with uniform temperature diffusion. VRF controller achieves 1-to-many control over all indoor units on the communication bus.
Installation Position	Connected to indoor unit communication line (indoor/outdoor bus) or outdoor unit line. Placed indoors in control boxes or ceiling inspection ports.



This product needs to be installed indoors and can be installed in smart home control boxes or ceiling inspection ports.

The back supports Din rail installation and can also be fixed with Din rail.

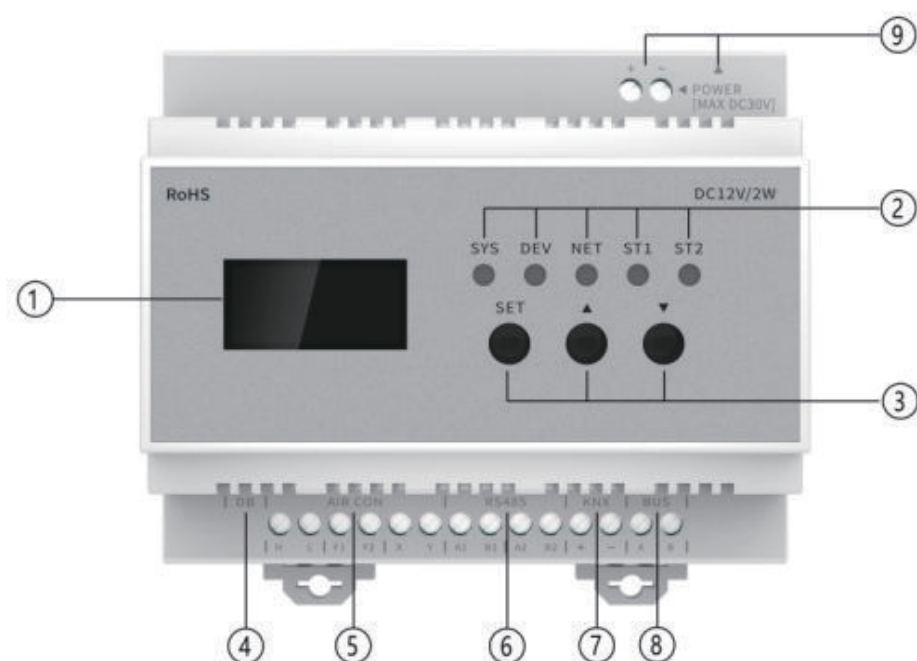


This product comes standard with a DC12V power adapter by default

4. HARDWARE INTERFACE DEFINITIONS

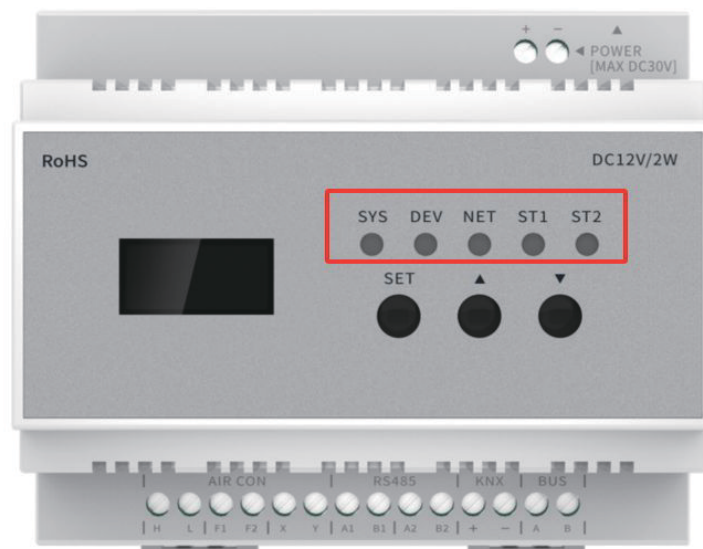
Terminal #	Interface Name	Description & Usage
1	LCD Screen	Displays communication status, controlled AC brand/quantity, discovered fresh air count, and product parameters.
2	LED Indicators	5 Status indicators: SYS, DEV, NET, ST1, ST2.
3	Buttons	SET, UP (▲), DOWN (▼) for page flipping, parameter settings, and key combinations.
4	DB Interface	For debugging and downloading programs.
5 (1-6)	AIR CON Terminal	Connects to AC system communication line (H/L, F1/F2, X/Y) for brands like Daikin, Hitachi, Toshiba, Midea, Gree, etc.
6 (7-10)	RS485 Interface	RS485 protocol interface for fresh air and environmental control systems (A1/B1, A2/B2).
7 (11-12)	KNX Interface	KNX smart home system interface (+, -).
8 (13-14)	BUS Interface	485-based bus interface for fresh air and underfloor heating systems (A, B).
9	POWER Interface	DC12V power input port (DC socket and screw terminals available).

Attention: Power supply specification is **DC12V**. Using an incompatible power supply may cause permanent damage to the product.



5. INDICATOR LIGHT DEFINITIONS

Indicator	Target	Status / Behavior	Description
SYS	VRF Device System	Yellow light on for 2s	Power-on initialization (first 2 seconds)
		Green light flashes slowly	VRF system running normally
		Yellow light stays on	VRF system abnormal
		Green light stays on	VRF system initializing
DEV	Device Bus Side	Green light stays on	Searching for air conditioning units
		Green light flashes	Found units. Slow flash = normal operation; Rapid flash = data active
		Red light stays on	Fault code present on AC bus or no data detected on bus
NET	Smart Module (Zigbee)	Red light stays on	Module malfunction (communication timeout or hardware failure)
		Yellow light stays on	Module detached / offline
		Green light stays on	Successfully bound to network
		Green light flashes	Searching for network
		Light off	Not connected or unconfigured
ST1	Bluetooth (BLE)	Light off	Mobile Bluetooth not connected
		Green light stays on	Mobile Bluetooth connected
ST2	Wi-Fi Status	Light off	Wi-Fi not connected
		Green light stays on	Wi-Fi connected



6. BUTTON OPERATIONS & BUZZER LOGIC

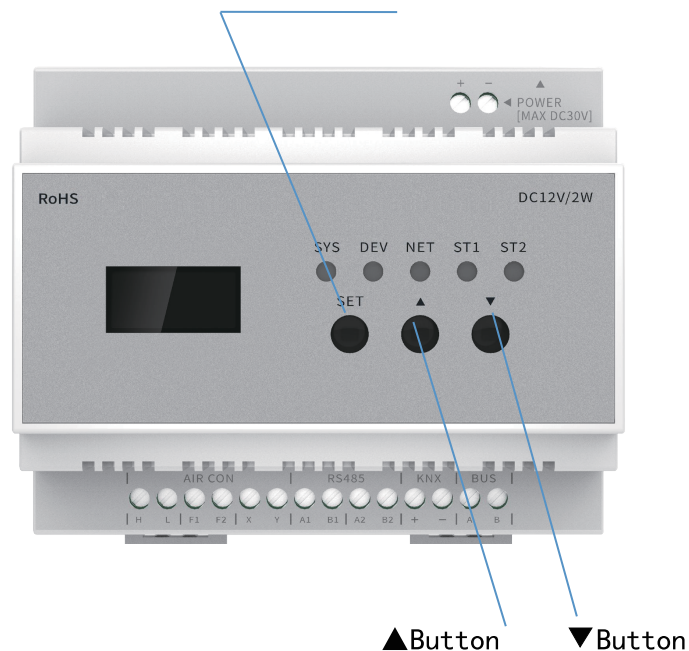
Button Functions

Button	Condition	Action & Function Description
SET	Power-on window	Press and hold for 5s to reset network/enable binding (Buzzer beeps 4s). Factory reset available in window.
SET	After binding	Single click: Aqara hub sends "link confirmed" prompt sound.
▲ (UP)	After finding AC	Short press to page up on LCD screen.
▼ (DOWN)	After finding AC	Short press to page down on LCD screen.
SET + ▲	After finding AC	Press and hold for 5s to turn ON all air conditioners.
SET + ▼	After finding AC	Press and hold for 5s to turn OFF all air conditioners.

Buzzer Logic

Status / Action	Trigger Operation	Buzzer Behavior
Configuring / Resetting Network	Press and hold SET for 5s	Buzzer beeps for 3 seconds
App searching for device	Click "Identify Accessories" in HomeKit / APP	Beeps briefly 3 times

SET Button



7. WIRING METHODS & TECHNICAL PRECAUTIONS

Wiring Guidelines

The communication line between the indoor and outdoor units of the air conditioner is installed by the HVAC contractor. The VRF controller connects to the outdoor or indoor unit communication line via a **2-core shielded twisted pair cable**, enabling monitoring and control of all indoor units across the system.

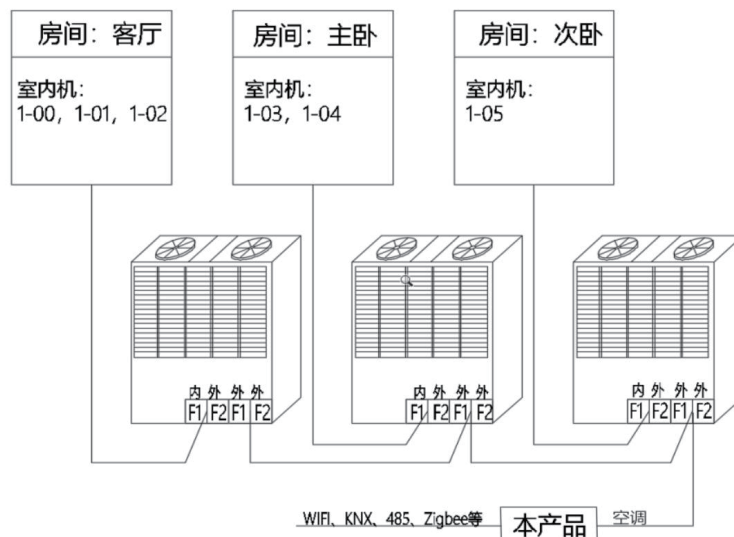
- **Cable Requirement:** Shielded twisted pair with wire diameter $\geq 0.75 \text{ mm}^2$, max total length ≤ 1000 meters.
- **System Connection:** Connection to weak current/smart home integration systems uses twisted pair or Ethernet cables based on installation layout.

Wiring Safety Precautions

1. **Power Cutoff:** Always cut off power to both the gateway and the air conditioning system before performing wiring operations to prevent product damage or failure.
2. **Interference Protection:** Keep communication lines away from and parallel to power lines. Maintain at least 15 cm distance from AC communication lines and 30 cm from power mains. Alternatively, run cables inside an iron protective pipe with Type-D grounding on one end.
3. **Polarity & Voltage Warning:** Never connect power wires to signal terminals! Incorrect wiring will burn internal components. If this occurs, contact technical support immediately; unauthorized disassembly is prohibited.
4. **Power Source:** Use the default DC12V power adapter or a high-quality certified power supply.

Post-Wiring Verification Checks

1. Confirm all indoor and outdoor AC units connected to centralized control are powered on.
2. Confirm the AC system has been debugged by manufacturer technicians with zero fault alarms.
3. Power on the VRF controller (DC12V). Initialization and unit searching take ~2–5 minutes. LCD will display brand and found unit count. SYS green light flashes slowly; DEV green light flashes slowly (idle) or rapidly (data active). If count is 0, DEV light stays solid green.



Taking Daikin Central Air Conditioning as an Example

8. PORT SELECTION & BRAND COMMUNICATION MATCHING

Refer to the table below to select terminals and verify polarity rules based on the HVAC brand:

ACMELEC TECHNICAL REFERENCE

VRF Gateway Wiring Compatibility Matrix

Part 1 of 2

Brand / system	VRF-side wiring port	AC-side wiring port	Wiring polarity	External device required	Centralized control address
Daikin Multi External Unit	F1, F2	F1, F2 (External–Internal)	✗	✓	✓
Daikin – Single External Unit	F1, F2	F1, F2 (Internal–External)	✗	✗	✓
Mitsubishi Electric – Multi External Unit (2)	F1, F2	M1, M2 (TB7)	✗	✓	✗
Mitsubishi Electric – Single External Unit	F1, F2	M1, M2 (TB3)	✗	✗	✗
Mitsubishi Electric – Power Multi Lingyao	F1, F2	M1, M2 (External Unit) M1, M2 (Cable distribution cabinets)	✗	✗	✗
Hitachi	F1, F2	1, 2	✗	✗	✗
Toshiba	F1, F2	U1, U2	✗	✗	✓
Panasonic	F1, F2	U1, U2	✗	✗	✗
Hisense	F1, F2	1, 2	✗	✗	✗
Haier	F1, F2	P, Q	✗	✗	✗
York – Qingdao	F1, F2	1, 2	✗	✗	✗
York – Guangzhou	X, Y	A2, B2	✓	✓	✗
GREE	H, L	G1, G2	✓	✓	✗
GREE	H, L	D1, D2	✓	✗	✗
TCL	H, L	F1, F2	✓	✗	✗
Mitsubishi Heavy Industries	X, Y	A1, B1	✗	✗	✗
Mitsubishi Heavy Industries	X, Y	A2, B2	✗	✗	✗

Compatibility is model- and system-specific. Confirm the exact indoor-unit model, terminal labels and project architecture before ordering.

✓ Yes ✗ No

VRF Gateway Wiring Compatibility Matrix

Brand / system	VRF-side wiring port	AC-side wiring port	Wiring polarity	External device required	Centralized control address
Midea, Bosch, Carrier	X, Y	X, Y	✓	✓	✗
Midea, Bosch, Carrier	X, Y	P, Q	✓	✗	✗
Midea – Cool Style	X, Y	A, B (External)	✓	✓	✗
Oaks	X, Y	A, B	✓	✗	✗
Samsung	X, Y	F1, F2	✗	✗	✗
LG	X, Y	A, B (CEN)	✓	✗	✗
McVeil	X, Y	Apc, Bpc	✓	✓	✗
Tianjia	X, Y	A3, B3	✓	✗	✗
Chigo	X, Y	P, Q	✓	✗	✗
Trang	X, Y	A, B	✓	✓	✗
York household water machine	X, Y	A, B	✓	✓	✗
York household water machine	X, Y	A2, B2	✓	✓	✗
McQuay household water machine	X, Y	Apc, Bpc	✓	✓	✗
Carrier household water machine	X, Y	A, B	✓	✓	✗
Trang household water machine	X, Y	CN29 (A, B)	✓	✓	✗

Compatibility is model- and system-specific. Confirm the exact indoor-unit model, terminal labels and project architecture before ordering.

✓ Yes ✗ No

* Note for Mitsubishi Electric Multi Outdoor: Connect line to TB7 (M1, M2) and move jumper cap CN41 on outdoor PCB to CN40.

* Note for Fresh Air / Floor Heating: Connect fresh air to A1/B1 and floor heating to A2/B2.

9. HARDWARE CONFIGURATION & DATABASE UPDATE

1. Preparation & Initial Configuration

1. Verify air conditioning system power supply across all indoor and outdoor units.
2. Ensure AC system has been debugged with no alarms.
3. Record indoor unit addresses and corresponding outdoor unit wiring mapping.
4. Connect wires following brand matching rules.
5. **Network Binding:** Power on device. Press Aqara gateway button 3 times, then press & hold SET button on VRF controller for 5+ seconds until buzzer beeps to enter network binding state. Alternatively, complete configuration via Aqara Home App.



2. Model Database Update (First-Time Setup)

Factory default firmware supports Daikin. Update the database via Aqara Home App to support other brands:

1. In Aqara Home App, open VRF controller page → Click "..." (top right) → **More Settings** → **Connect Wi-Fi**.
2. Return to **More Settings** → Select **Update Database**.
3. Select target Air Conditioning, Fresh Air, and Floor Heating brands, then tap **Update**.
4. The device automatically restarts; LCD screen displays "Upgrade in progress" (~5 minutes).
5. Upon completion, LCD displays "Upgrade Successfully". Device reboots automatically and is ready for use.



10. DEVICE USAGE & APP OPERATIONS

LCD Display Page Navigation

1. **Bootup:** Displays QR code for device ID (used for remote upgrades / product info).
2. **Reset Prompt:** Displays "Long press SET 5 seconds to reset". Hold SET for 5s to complete reset.
3. **Information Pages (Switch via ▲ / ▼ buttons):**
 - Page 1:** AC Brand, Protocols (TCP/485/KNX), Status, Controlled AC Count.
 - Page 2:** Local IP Address, Firmware Version.
 - Page 3:** Remote control status, Fresh Air brand, Floor Heating brand.
 - Page 4:** Local fault code, Module fault code.
 - Page 5:** Wi-Fi status, RSSI signal, Bluetooth status, Bluetooth MAC address.



Figure ①

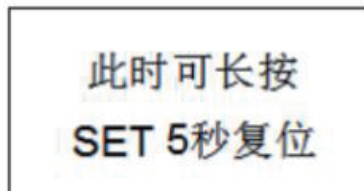


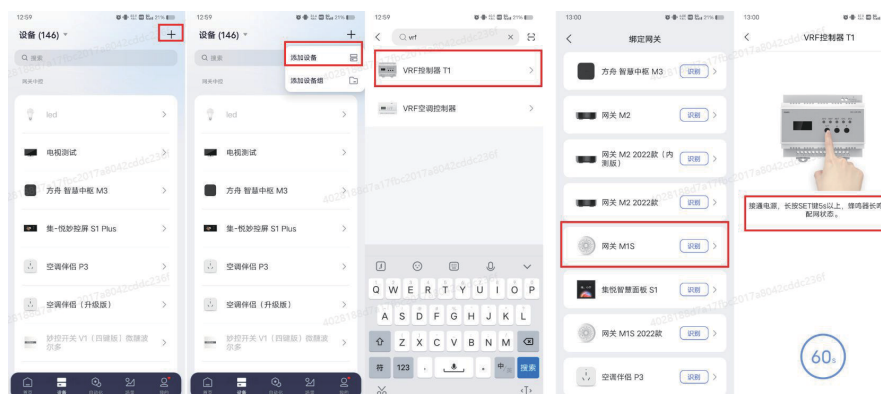
Figure ②



Figure ③

Binding to Aqara Home App

1. Download Aqara Home App and ensure a compatible Zigbee 3.0 gateway/hub is added.
2. Tap "+" (top right) → **Add Device** → Search for "VRF Controller".
3. **Quick Binding Method:** Press gateway button 3 times (voice: "Please add child device"), hold VRF SET button for 5s until beep, then wait for binding success.



Renaming Indoor Units

- 1. Open VRF Controller in Aqara Home App.
- 2. Select device category (Air Conditioner, Floor Heating, Fresh Air).
- 3. Select specific unit (e.g., Indoor Unit 01) → Tap "... " (top right) → Edit Name.



Bluetooth Mini Program Debugging

- 1. Power on VRF controller and enable mobile phone Bluetooth.
- 2. Search mini program: "Gateway Bluetooth Configuration" (网关蓝牙配网).
- 3. Connect to VRF controller from device list. Test HVAC control functions or set HVAC brands.



11. SMART LINKAGE & AUTOMATION RULES

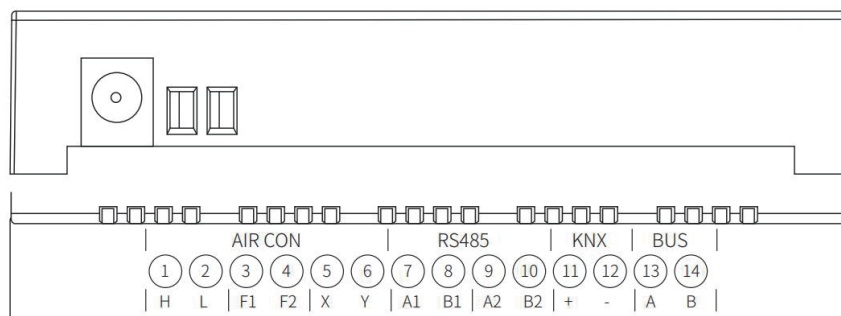
Smart Scene Examples

- **Smart Climate Adjustment:** VRF Controller + Hub M2 + Temp/Humidity Sensor. Turns on AC/Floor Heating when temperature exceeds target threshold.
- **Air Quality Purification:** VRF Controller + Hub M2 + Air Quality Monitor. Automatically turns on Fresh Air system when air quality drops.
- **Geofencing (Arrive/Leave Home):** Phone Location + Hub M2 + VRF Controller. Pre-cools home upon approaching; turns off HVAC upon leaving.
- **Scene Modes (Dining, Movie, Nap):** VRF Controller + Cube Pro + Hub M2. Wave Cube Pro to switch HVAC modes for different activities.

Automation Trigger & Action Matrix

Category	Device	IF (Trigger Condition)	THEN (Action Command)
Automation	Air Conditioning	Unit is ON / OFF	Turn ON / OFF designated unit or ALL units

Category	Device	IF (Trigger Condition)	THEN (Action Command)
	Fresh Air / Floor Heating	Unit state changes	Set state / Raise temp to X°C / Lower temp to X°C
		Unit is ON / OFF	Turn ON / OFF designated unit or ALL units
		Unit state changes	Set target temperature / operating state



12. FREQUENTLY ASKED QUESTIONS (FAQ)

Q1: What is the VRF Air Conditioning Controller?

A: It is a Zigbee-based HVAC controller integrating VRF systems into smart home platforms (Aqara/Lumi). Paired with a hub, it enables app control over power, mode, temperature, fan speed, and smart automation.

Q2: What platforms does it support?

A: Controlled via Aqara Home App, Apple HomeKit, and Siri Voice Control.

Q3: How to wire the VRF Controller?

A: Connect DC12V power supply to POWER terminals. Connect AIR CON terminals to indoor or outdoor unit communication bus.

Q4: Should AIR CON connect to indoor unit or outdoor unit?

A: Most brands connect to indoor unit terminals; specific brands (e.g., select Mitsubishi Electric models) require outdoor unit bus connection.

Q5: Why does control function work abnormally?

A: 1. AC unit has error alarms or lost power. 2. Wired controller is set to Auto mode/Auto wind (change to manual mode). 3. Address mismatch between indoor unit and app command.

Q6: How many indoor/outdoor units are supported?

A: Supports up to 64 air conditioners, 16 fresh air units, and 16 floor heating units.

Q7: Indoor units found, but app displays "Network failure"?

A: Reboot VRF controller. If issue persists, contact customer service.

Q8–Q10: Tutorial Video Links:

- Reset Tutorial: <https://yunpan.aqara.com/link/AAC4495B95AC6D43A49F691D639C62B804>
- Firmware Update: <https://yunpan.aqara.com/link/AAF82DB54877184305B5E4EF0585F3D016>
- First-time Setup: <https://yunpan.aqara.com/link/AAB9765578880841CA8E6C618E9C0F6A59>