

SMART AIR SUPPLY UNIT

ADU 2600 (Digital Version)

Data Center Raised-Floor Air Supply Unit (Model ADU-2600)

Product Structure



Variable-Air-Volume Raised-Floor Unit

The unit provides a simple and effective way to eliminate localized hot spots caused by high-density rack deployments. Compared with other countermeasures, it offers lower cost and better budget control for data center construction or retrofit projects. Its standard raised-floor dimensions and straightforward installation make it suitable for both new-build and retrofit applications.

Requires no additional data center floor space and effectively eliminates localized hot spots.

Flexible deployment allows individual units to be installed for newly added high-density servers or specific hot-spot areas.

Scalable design supports phased deployment as the data center expands.

Improves airflow targeting and delivery efficiency, providing significant energy savings.

Uneven heat loads across server racks can create localized hot spots.

The increasing use of high-density servers makes hot spots more severe and can cause excessive local temperatures.

CRAC placement and airflow distribution may create hot spots at remote locations and room corners.

Site constraints may prevent the installation of additional CRAC units.

Site constraints may also prevent an increase in raised-floor height.

Precision Air Delivery

An integrated control module automatically regulates airflow based on the exhaust-air temperature of the associated rack, ensuring that server cooling demand is met with precisely targeted air delivery.

The unit combines an airflow grille, a high-static-pressure EC brushless fan, and a temperature-control system. It is purpose-built for cooling-air distribution in data centers.

High-Efficiency, Energy-Saving Fan

Sine-wave DC variable-speed fan control provides higher efficiency, lower noise, and more stable operation.

Dual power inputs provide redundancy and fault tolerance to meet operational requirements.

Airflow Grille

Integrated directional airflow; free area greater than 65%; uniformly distributed load $\geq$ 1,000 kg.

Slimline Design

Only 200 mm thick; suitable for raised-floor data centers with a minimum underfloor height of 300 mm.

Communication Interface

An integrated RS-485 interface and Modbus protocol support centralized multi-unit control, remote communication, and status polling.

ADU-2600 Technical Specifications

No.	Component	Specification	Remarks
1	Grille Floor Panel	Steel grille; 300 kg concentrated load; compatible panel dimensions: 600 × 600 × 200~55 mm	Vertical air discharge or custom angled directional discharge available
2	Fan	High-static-pressure EC brushless fan with soft-start function	One fan assembly per floor panel
3	Airflow	800-3,600 m ³ /h	Maximum airflow: 3,600 m ³ /h
4	Equivalent Cooling Capacity	12 kW	Meets requirement
5	Power Input	220 V AC, 50/60 Hz, 165 W	Maximum power: 180 W
6	Power Supply	Dual-input power supply: one utility feed and one UPS feed; automatic transfer to UPS upon utility power failure	Optional dual-power input interface
7	Temperature Control System	LCD temperature-control module, fan, and floor panel integrated as one assembly. Automatic sensing and stepless speed control respond to temperature changes. Startup, upper-limit operating, and alarm temperatures are configurable	Supports automatic or manual operation. After a power interruption, automatic mode resumes when power is restored and interface settings are retained
8	Temperature Sensor Probe	One or three probes; install at the server exhaust or floor air outlet; temperature accuracy ±0.1°C	Control logic is based on configured temperature parameters
9	Overall Dimensions	600 × 600 × 190 mm	Minimum installation clearance: 300 mm
10	Communication Interface	Modbus protocol for remote control, multi-unit control, status polling, and parameter adjustment	RS-485 over RJ45; supports remote communication and control

Controller Interface Operating Instructions

Installation and Instructions

1. Compatible with raised-access floor panels in various sizes; panel dimensions can be customized.

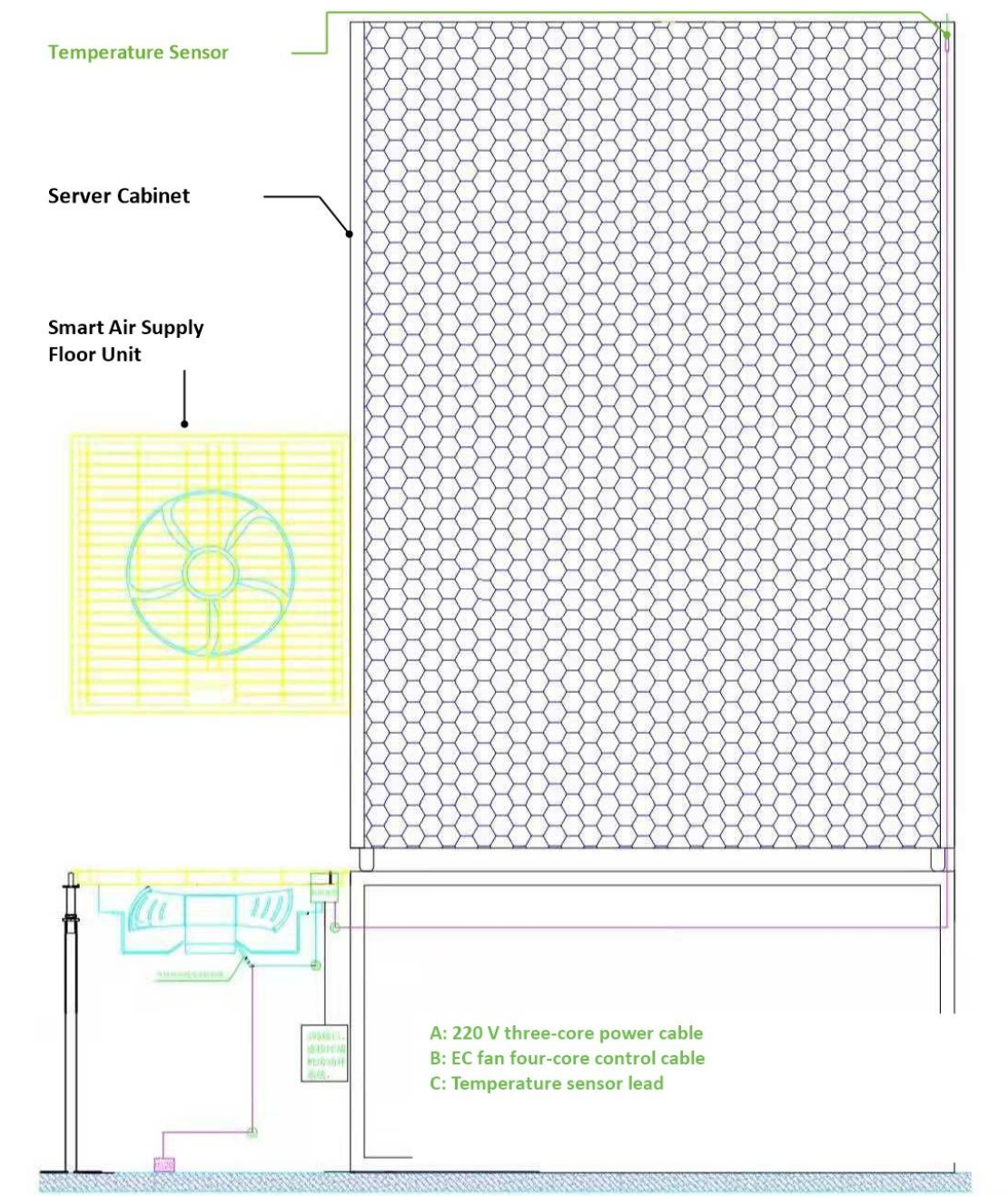
If an angled directional outlet panel is selected, orient the outlet toward the target rack.

2. Secure the temperature-sensor probe at the server exhaust or at a cold-aisle air outlet.

3. Power supply: utility power and UPS, 220 V AC, 50/60 Hz.

4. Remote communication and control require an RS-485 converter using the Modbus protocol.

Installation Diagram



1. Main Screen Display and Button Functions

SMART TEMPERATURE CONTROLLER				
	Status:	Normal	Power Off	
	Fan Speed:	1258	Mode	
		rpm	Increase	
	Mode:	Automatic	Decrease	
		T1: 23.5 °C		
	Speed Level:	Medium		
		T2: 24.2 °C		
	Address:	1		
		T3: 23.6 °C		

- Status: Off, Normal, or Fault.
- Fan Speed: Displays the fan rotational speed.
- Mode: Displays the current operating mode: Automatic or Manual.
- Speed Level: Displays the current speed level: High, Medium, Low, or Automatic.
- Address: Displays the RS-485 communication address.
- T1/T2/T3 Temperature: Displays three temperature channels. When a digital temperature sensor is selected, its reading is shown at T1; unused channels may be ignored.
- Power Off, Mode, Increase, and Decrease correspond to the physical keys.

2. Parameter Settings Screen and Button Functions

PARAMETER SETTINGS		
Modbus Address:	1	Back
Lower Temp. Limit:	18	
Upper Temp. Limit:	24	Select
Minimum VSP:	30	
Maximum VSP:	80	Increase
Fan Pulses:	1	
Firmware Version:	1.01	Decrease
	Save	

- From the main screen, press and hold the Power key to open the Parameter Settings screen.
- Use Select to move between parameter fields.
- Use Increase and Decrease to change the selected parameter.
- After completing the settings, move the selection box to Save and press Back to save the parameters and return to the main screen.
- Back, Select, Increase, and Decrease correspond to the physical keys.

3. Factory Settings Screen and Buttons

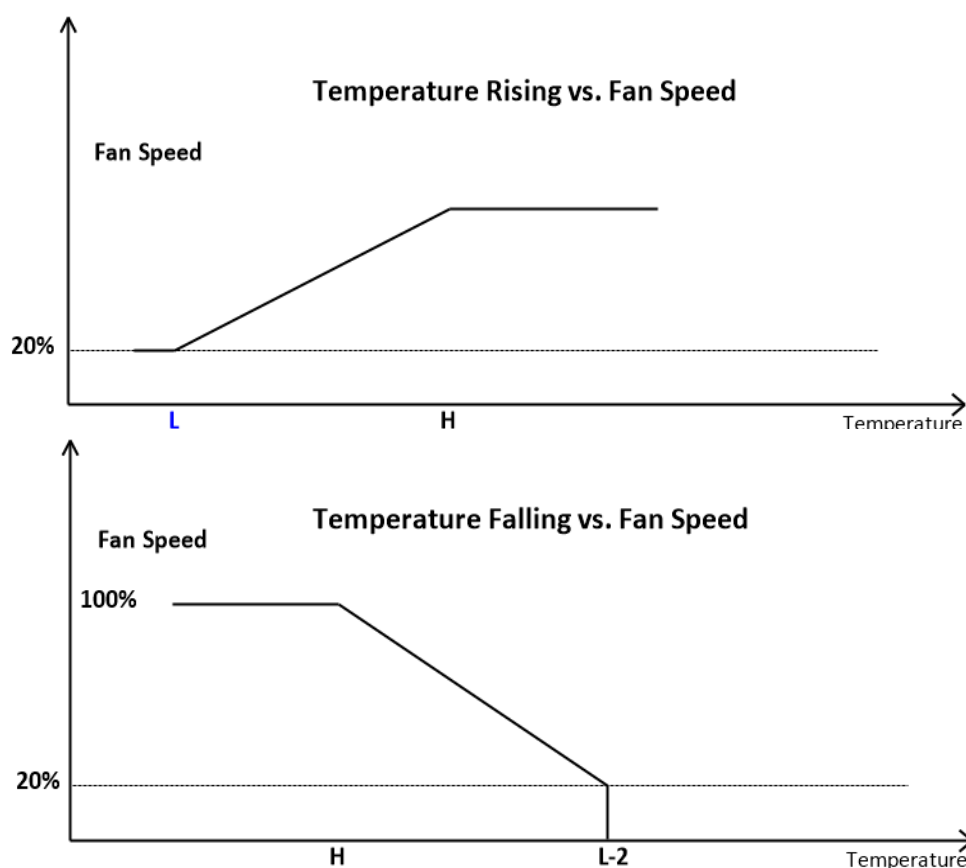
FACTORY SETTINGS		
Sensor T1:	☒ Enabled	Back
Sensor T2:	☒ Enabled	Select
Sensor T3:	☒ Enabled	Enable
Digital T1:	☐ Disabled	Disable
Save on Power Loss:	☒ Enabled	

From the main screen, press and hold Increase to open the Factory Settings screen.

- Use Select to choose the item to configure.
- Use Enable and Disable to set the selected item.
- Press Back to save and return to the main screen.

4. Functional Description

- Automatic Mode: The controller uses the highest reading from the enabled temperature sensors and automatically adjusts airflow accordingly.
- Manual Mode: The airflow level can be set manually to Low, Medium, or High. The default VSP outputs are the lower-limit VSP, upper-limit VSP / 2, and upper-limit VSP, respectively.
- Industrial RS-485 control with the standard Modbus protocol.
- The controller supports either three temperature probes or one digital temperature sensor. The highest active temperature reading is used as the control reference.
- Automatic-Mode Setup: Factory defaults are $L = 18^{\circ}\text{C}$ and $H = 24^{\circ}\text{C}$. When the measured temperature reaches 18°C , the controller begins increasing fan speed linearly. As temperature rises, fan speed increases; above 24°C , the fan operates at full speed. When the temperature falls to 18°C , the fan runs at its minimum speed. The operating curves are shown below.



5. Communication Protocol

● The controller uses the standard Modbus RTU protocol with Function Code 03 (Read Holding Registers) and Function Code 06 (Write Single Holding Register). The interval between messages must exceed 500 ms. Serial settings are fixed at 9,600 baud, no parity, 8 data bits, and 1 stop bit.

● The communication register map is shown below:

Register Address	Description	Value / Notes	Access
40000	Power	Off = 0x0000; On = 0x0001	R/W
40001	Operating Mode	Manual = 0x0001; Automatic = 0x0002	R/W
40002	Speed Level	1, 2, 3, and 4 represent Low, Medium, High, and Automatic	R/W
40003	Current Operating Temperature	Maximum of T1-T3; automatic mode uses this value; one decimal place	R
40004	Current Fan Speed	Unsigned two-byte value; for example, 0x0258 represents 600 rpm	R
40005	Auto-Start Configuration	Bits 0-2: sensors T1-T3; bit 3: digital temperature sensor; bit 4: save on power loss. 1 = enabled; 0 = disabled	R/W
40006	Slave Address	1-247	R/W
40007	Minimum Temperature Setpoint	Range 10-60; default 18	R/W
40008	Maximum Temperature Setpoint	Range 10-60; default 24	R/W
40009	Fan Pulse Count	1-12; default 1	R/W
40010	Minimum VSP	Default 30	R/W
40011	Maximum VSP	Default 80	R/W
40012	Temperature Sensor T1	One decimal place	R
40013	Temperature Sensor T2	One decimal place	R
40014	Temperature Sensor T3	One decimal place	R

Register Address	Description	Value / Notes	Access
40015	Digital Temperature Sensor T1	One decimal place	R
40016	Reserved		R
40017	Alarm Status	1 = alarm; 0 = no alarm	R

Protocol Examples

Writing Data (Function Code 06)

Slave Address + Function Code + Register Address High Byte + Register Address Low Byte + Data High Byte + Data Low Byte + CRC Low Byte + CRC High Byte

1 byte 1 byte 1 byte 1 byte 1 byte 1 byte 1 byte
1 byte

Example frame for slave address 1:

Example - Power-off command: 01 06 9C 40 00 00 A6 4E

Power-on command: 01 06 9C 40 00 01 67 8E

Response Frame:

Slave Address + Function Code + Register Address High Byte + Register Address Low Byte + Data High Byte + Data Low Byte + CRC Low Byte + CRC High Byte

1 byte 1 byte 1 byte 1 byte 1 byte 1 byte 1 byte
1 byte

Reading Data (Function Code 03)

Slave Address + Function Code + Starting Register Address + Register Quantity (N*) + CRC Low Byte + CRC High Byte

1 byte 1 byte 2 bytes 2 bytes 1 byte 1 byte

Example frame for slave address 1:

Example - Read parameters: 01 03 9C 40 00 05 AA 4D

Response Frame:

Slave Address + Function Code + Byte Count (2N*) + Register Data (2N*) + CRC Low Byte + CRC High Byte

1 byte 1 byte 1 byte 2*N bytes 1 byte 1 byte

* 1 ≤ N ≤ 6

Examples:

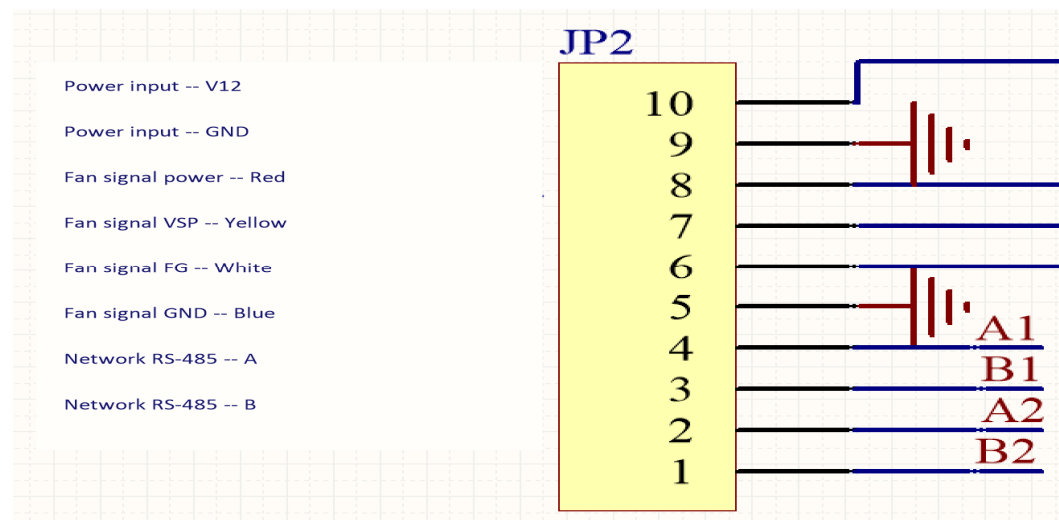
Power-on command: TX: 01 06 9C 40 00 01 67 8E RX: 01 06 9C 40 00 01 67 8E

Power-off command: TX: 01 06 9C 40 00 00 A6 4E RX: 01 06 9C 40 00 00 A6 4E

Manual Mode:	TX: 01 06 9C 41 00 01 36 4E	RX: 01 06 9C 41 00 01 36 4E
Automatic Mode:	TX: 01 06 9C 41 00 02 76 4F	RX: 01 06 9C 41 00 02 76 4F
Speed Level 1:	TX: 01 06 9C 42 00 01 C6 4E	RX: 01 06 9C 42 00 01 C6 4E
Speed Level 2:	TX: 01 06 9C 42 00 02 86 4F	RX: 01 06 9C 42 00 02 86 4F
Speed Level 3:	TX: 01 06 9C 42 00 03 47 8F	RX: 01 06 9C 42 00 03 47 8F
Read Temperature:	TX: 01 03 9C 43 00 01 5B 8E	RX: 01 03 02 00 1A 39 8F (0x001A represents 26°C)
Read Fan Speed:	TX: 01 03 9C 44 00 01 EA 4F	RX: 01 03 02 03 29 79 6A (0x0329 represents 809 rpm)
Read Overall Status:	TX: 01 03 9C 40 00 05 AA 4D	
Power-off response: RX: 01 03 0A 00 00 00 00 00 00 00 1C 00 00 E5 70 (Only the temperature field is valid; 0x001C represents 2.8°C.)		
Power-on response: RX: 01 03 0A 00 01 00 02 00 01 00 1A 03 25 D7 CA		
Byte Count	Power On	Automatic Mode
		Speed Level 1
		Temperature 2.6°C

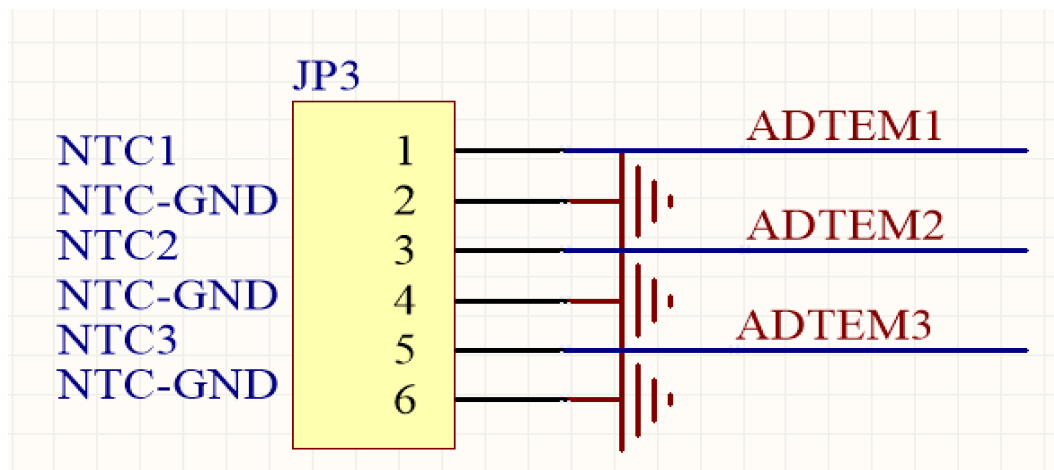
6. Wiring Instructions

1. Fan and RS-485 wiring: the power connector is reserved. If the module power supply is sufficient, a separate power connection is not required.



7. Three-Channel Temperature Sensor Wiring

(Two-Wire Interface)



8. Single Digital Temperature Sensor Wiring

(Four-Wire Interface)

