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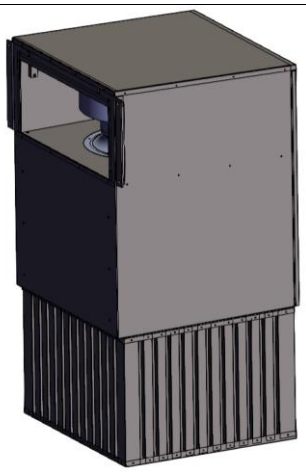
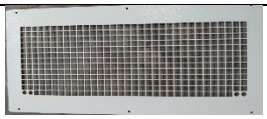
INSTRUCTIONS FOR USING DUST FILTER VENTILATION

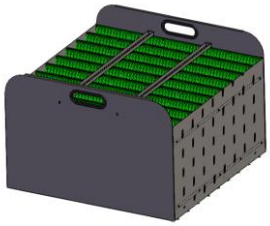
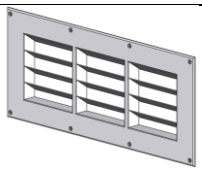
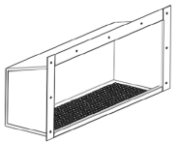
1. PURPOSE

Instructions for installation, configuration, operation and exploitation of large capacity dust filter ventilation system (FAC) on Viettel network.

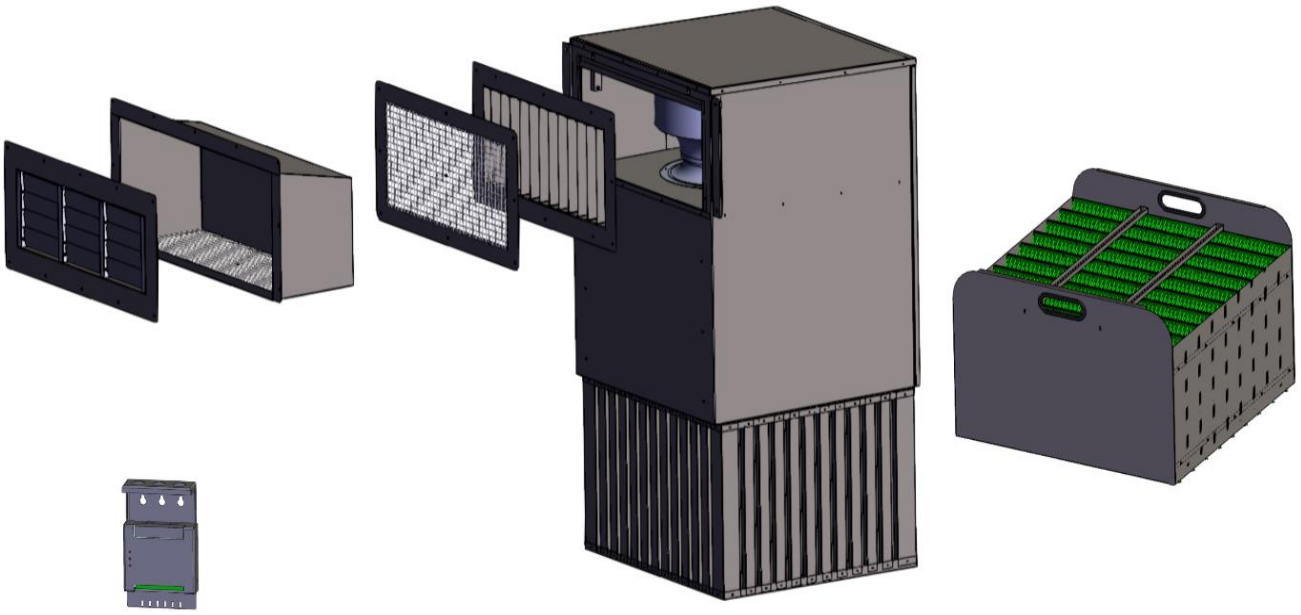
2. INSTALLATION INSTRUCTIONS

a. Information about the ventilation system

No.	Name component	Picture	Note
1	**Air intake cluster**		
1.1	Whole FAC		
1.2	Wind deflector		
1.3	Protective mesh		
2	FAN		

No.	Name component	Picture	Note
3	Artificial grass filter		Installed inside the fine filter chamber
4	Coarse filter cluster		Installed below the fine filter compartment
4	**Air outlet cluster**		
4.1	Shutters		Installed inside the station
4.2	Take the wind out		Installed outside the station
5	Controller		Installation inside the station
6	Accessory	01 RJ45 LAN cable	
		02 : 2x2.5mm power cords for fan	

No.	Name component	Picture	Note
		01: 2x2.5mm power cord to supply power to the controller	
		02 temperature sensors (01 sensor inside the station, 01 sensor outside the station)	
		04 bolts M10x300 mm	
		01 package of screws and plastic expansion joints, terminals, and straps	
		01 bottle of A100 silicone glue or equivalent	



a. Prepare conditions to ensure

TT	Equipment name	Unit	Quantity	Function
1	Laptops have manufacturer's software installed, download the software at:	Pcs	01	Used to set parameters and monitor the operating status of the FAC unit.
2	Cable RS485 – USB	Pcs	01	
3	The cutting machine has the function of cutting sheet metal and concrete.	Pcs	01	- Cut to determine position before punching holes in built houses and renovated houses. - Cut container house walls.
4	Drill with concrete drilling function	Pcs	01	Concrete chiseling for built houses and renovated houses
5	Mini vacuum cleaner	Pcs	01	Vacuuming after house excavation

TT	Equipment name	Unit	Quantity	Function
6	Ampe meter	Pcs	01	Measure current and voltage
7	Network cable crimping pliers	Pcs	01	Crimp the RJ45 network terminal for the LAN cable connecting the FAC unit to the DAQ-V2
8	Livo	Pcs	01	Balance the suspension points
9	Tool set, tools, electromechanical supplies (crimping pliers, electrical pliers, 4-sided screwdriver, hexagon socket, electrical tester, box cutter, flexible tube, electrical tape, tie)	Set	01	Power and signal wiring
10	Aluminum ladder > 3 meters long	Pcs	01	stand and cut out the air vent position.
11	Protective clothing (gloves, helmet, safety belt, eye protection)	set	01	Ensure labor safety
12	Canvas or cardboard (reuse the cardboard cover of the FAC kit)	m^2	02	Covering inside the machine room when drilling the station wall
13	Silicone glue	pcs	01	Ensure the tightness of the contact point between the edge of the FAC unit and the station wall (for large capacity FAC units that have been supplied with the equipment, small capacity units need to be purchased additionally with the rate of 1 tank/3 stations).

Ghi chú: For stations built or renovated with walls > 150mm thick, the solution to fix the dust filter ventilation system to the wall and materials to re-plaster the wall includes:

- Use the M10x300 mm bolt set included for installation in the house.

- Prepare at least 05 kg of cement and 12 kg of sand to re-plaster the air inlet and air outlet locations (container stations do not need to be plastered).

b. Installation instructions

Step 1: Check equipment and materials before installation

- Check the physical condition of the FAC: Ensure that all materials and installation accessories are complete according to the warehouse receipt (contract).
- Check the fan by hand to ensure that the fan is not entangled with the electrical wire or stuck during transportation.
- Assemble the separate components into a complete FAC block.
- Test screw the M10 x 300mm bolts into the screw positions on the FAC system's ears (to reduce friction and check the bolt thread compatibility), screw at least 3cm deep.

Fan and filter compartment

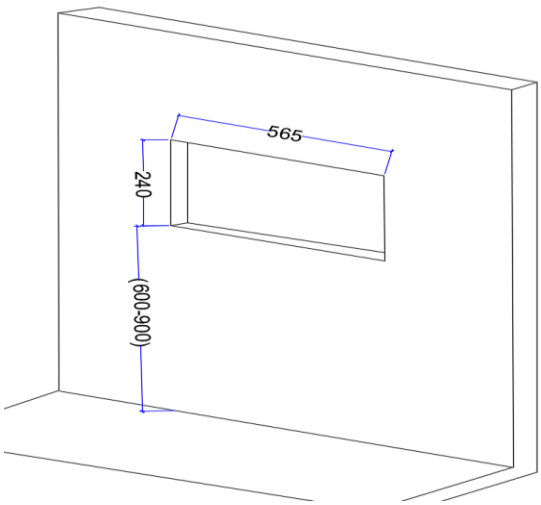
Rough filter compartment

Fine filter (grass filter) support plate and accessories

Complete assembly of FAC block

Step 2: Install the FAC on the back wall, outside the station

Chisel the air inlet location

- The location of the hole is in the middle of the back wall of the machine room (between the corridors on both sides of the equipment). - Priority is given to utilizing and adjusting from the existing hole of the station that used the old FAC (if any). - The size of the hole after completion is 565x240mm (just enough for the series of wind direction panels) - The distance from the floor (where the equipment is placed) to the bottom edge of the hole is ~600mm. - The distance from the ground to the bottom of the coarse filter, recommended ≥ 200mm (for the floor surface that is smoothed cleanly with cement or tiled... the distance can be reduced to ≥ 50mm)	

Note:

- In case of force majeure, the distance from the floor of the machine room to the bottom edge of the hole is allowed to fluctuate from 600÷900mm (to ensure the distance from the bottom to the ground).
- Use a leveling level (Livo) to balance when marking the hole location.
- Cover the indoor equipment with canvas or cardboard before drilling.
- For houses built or renovated, use a concrete cutting blade to shape the hole before using a drill bit and a concrete chisel to chisel the wall. Vacuum and clean the hole location. Cement the hole location to ensure it is square and of the correct size (including the air outlet hole mentioned in the following section)..

Mark the location and install the FAC (outside the station)

*** Mark and screw in the locating screws**

Use the wind direction plate frame to install into the newly drilled air inlet (outside the station) and mark at the 2 tops of the teardrop to drill as shown in the drawing. Then drill and fix 02 screws to the positioning position..	
*** Fixed mounting of the system on the station wall.**	
+ Hang the FAC unit on 02 screws at the predetermined position and mark 04 points on the hanging ears of the system and 06 points in the fine filter compartment to drill and screw the system. + After marking, remove the system from the 2 positioning screws to drill holes on the wall of the station. + Drill 04 holes (Φ12÷14mm) corresponding to the hanging ears through the wall of the station into the machine room to bolt the system. **** For houses built and renovated:*** + Drill 06 holes (corresponding to the supplied expansion screws) and insert plastic expansion screws into the marked positions in the fine filter compartment to further secure the system. - Re-hang the system on the wall and in turn screw the bolts and screws to secure the system on the station wall. **** For Container Houses*** + Fix 4 bolts to hang the ear from inside the house. + Use self-drilling screws to fix the system to the wall at 06 available hole positions in the fine filter compartment. **** Note:*** + After drilling 04 holes through the bolts, the peeling surface needs to be finished with cement mortar (for built houses).	 Container

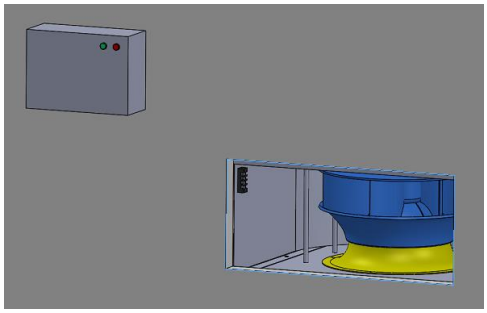
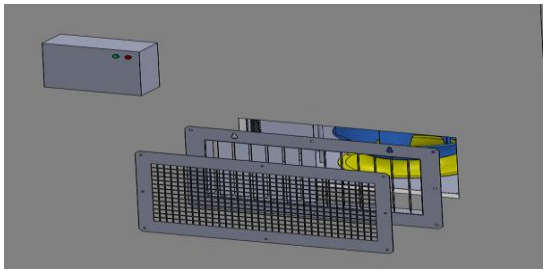
+ Apply silicone glue at the edge of the FAC (positions adjacent to the station wall) to prevent water from entering inside.	 House Builder

*** Install an outdoor temperature sensor and fine filter into the system.**

- The outdoor temperature sensor is located in the middle of the rough filter compartment..
- **Note: The thermal sensor must not touch the ventilation housing..**

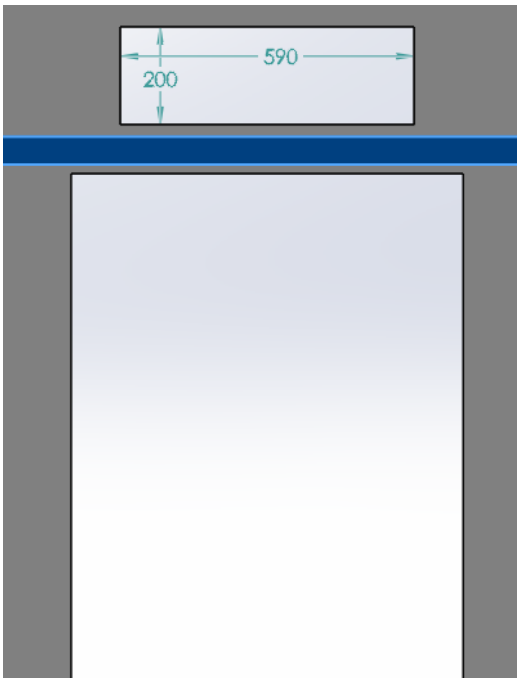
+ Thread the sensor wire along the hanging bar in the rough filter compartment up the wall of the system into the station to wait for connection to the controller. + Fix the temperature sensor wire with a strap on the horizontal bar and the wall of the system, ensuring that the sensor head is hung between the rough filter compartment and does not touch the wall of the system (the excess wire is neatly rolled up in the rough filter compartment) + Install the grass filter into the filter compartment. + Cover and secure the bolts.	 

Step 3: Install the controller, wind deflector and fan protection net inside the station.

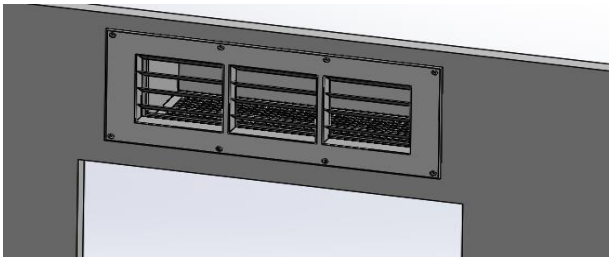
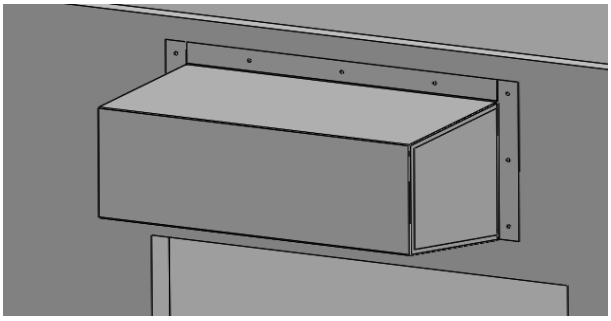
Install the controller.	
-Installation location on the wall inside the station, 50÷200mm from the fan protection net, Priority is given to the 19-inch rack where transmission equipment and radio BBU are installed. -Ensure the wiring distance (DC power source, temperature sensor in the station) from the FAC unit to the 19-inch Rack is the closest.	
Air deflector and fan guard	
- Mark and drill self-drilling screws or plastic expansion screws (depending on the type of house or container) to install the wind deflector into the drilled hole and the protective mesh on the inside of the station as shown in the picture (note to thread the outside temperature sensor wire and the power cord for the fan through the hole on the plate to connect to the controller).. - ***Adjust the wind vane to both sides towards the device.***	  
Use plastic straps to tie the external temperature sensor between the hanging bars in the rough filter compartment, and roll up the excess wire of the sensor in the rough filter compartment	

Step 4: Install shutters and air vents

Punch holes to let hot air out

- Drill 01 air outlet location. The drilling location is at the front and right above the entrance door of the station. * Prioritize using the available hole location (where FAC has been installed) of the station to install shutters and air covers – ***For some new container houses, there are already standard-sized holes, just remove the shield and install.*** - The finished hole size is 590 x 200 mm (note to take the shutter as the standard). - The lower edge of the hole is preferably located above the cable ladder as shown in the picture below.. ***Note:*** • Cover indoor equipment with tarpaulin or cardboard before drilling.	

Install shutters and outside air vents

- Mount the shutter and the air outlet cover into the hole that has just been drilled to mark the hole for the expansion screw (for houses built or renovated) - Install the shutter and the air outlet cover into the hole that has been drilled on the inside of the station as shown in the picture. - Use expansion screws or self-drilling screws (depending on the type of house) to fix the air outlet and the air outlet cover to the wall of the station. - Use silicone glue to seal the air outlet cover to the wall of the station. - **Note:** The air outlet shutter can be installed outside the station with the air outlet cover (if the inside is blocked by the cable ladder), however, the air flaps must be reversed to ensure that the air flap opens to the outside of the station when the fan is running - install the air outlet cover to cover the outside of the air outlet shutter position.	 Shutters - installed inside the station  Air outlet - installed outside the station

Actual installation image at the station.	 

Note: For houses built or renovated, use a concrete cutter to shape the hole before using a concrete drill to chisel the wall. Vacuum and clean the hole. Cement the hole to ensure it is square and the correct size..

Connect the system to the controller

Prepare materials and connection equipment

Observe the symbols on the circuit board to connect the system..	

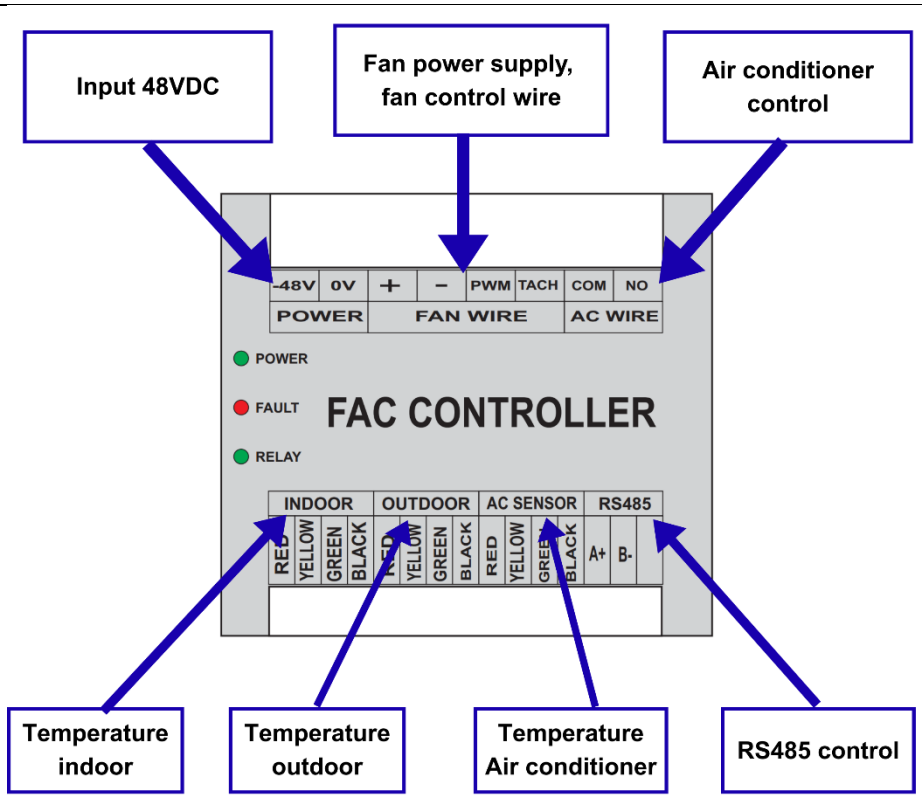
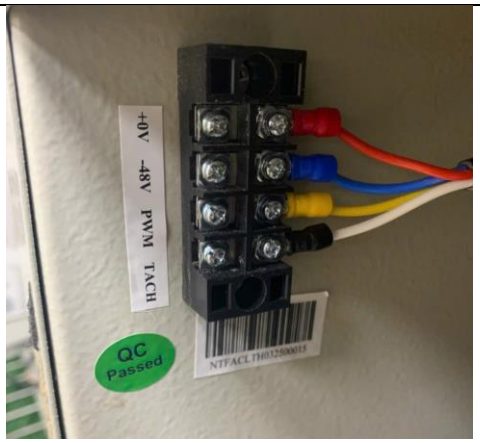
<table>
<tr>
<td></td>
<td> 

Image of connection location on controller</td>
</tr>
<tr>
<td>- Red wire: 0 VDC
- Green wire: -48 VDC
- Yellow wire: Fan speed control signal.
- White wire: Fan speed feedback signal.</td>
<td> 

Fan connection image inside the fan compartment of the FAC unit</td>
</tr>
<tr>
<td>2 x 2.5mm2 power cables 2m long used to connect from the controller to the fan</td>
<td>  </td>
</tr>
</table>

	2x2.5mm2 power cable 2m long
1 x 2.5mm2 power cable 8m long	 *2x2.5mm2 power cable from DCDU to power FAC controller*
02 Temperature sensors inside and outside the station are the same	 Temperature sensor

Connect temperature sensors inside and outside the station

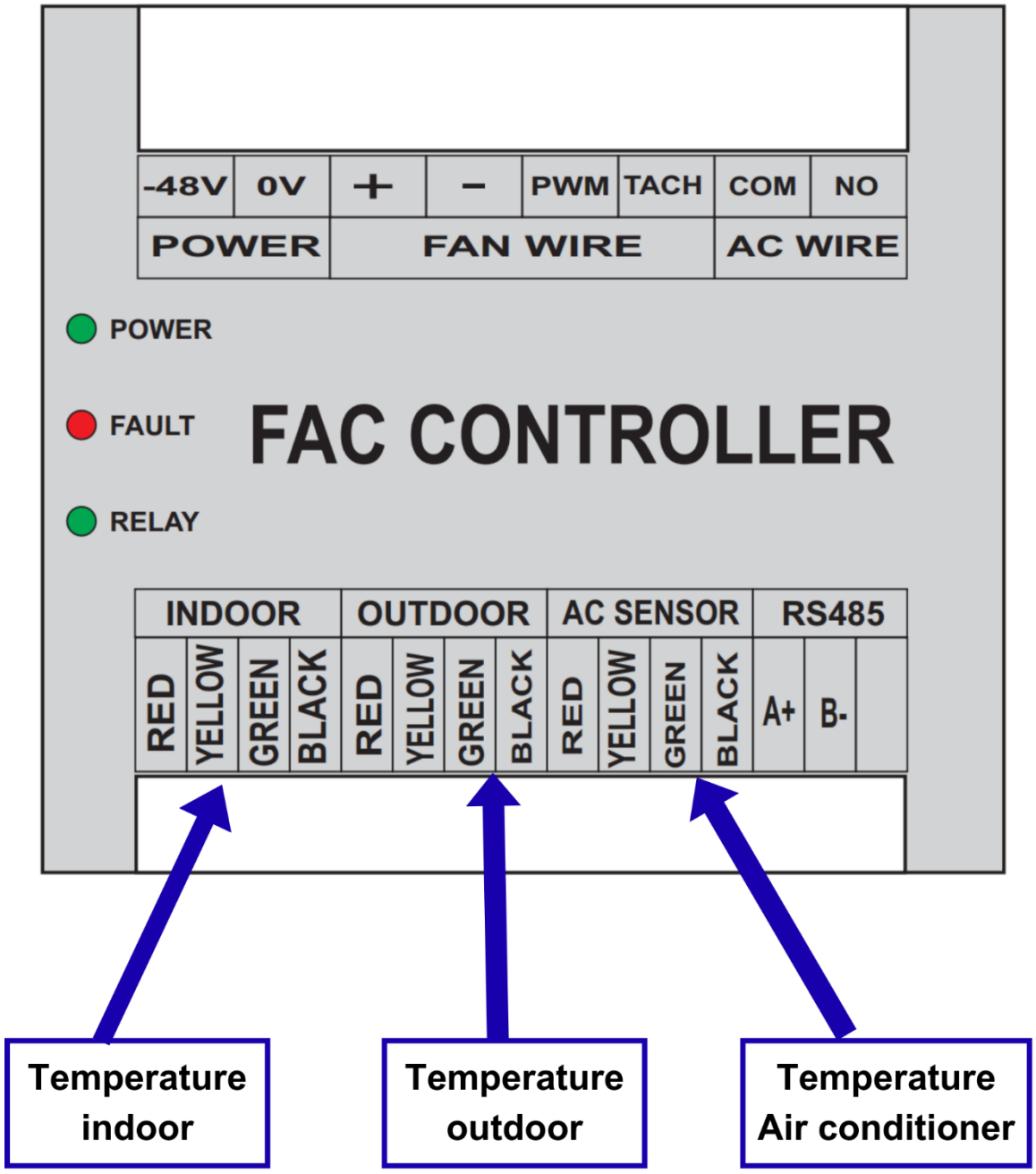
Connect:

INDOOR (indoor sensor)

OUTDOOR (outdoor sensor)

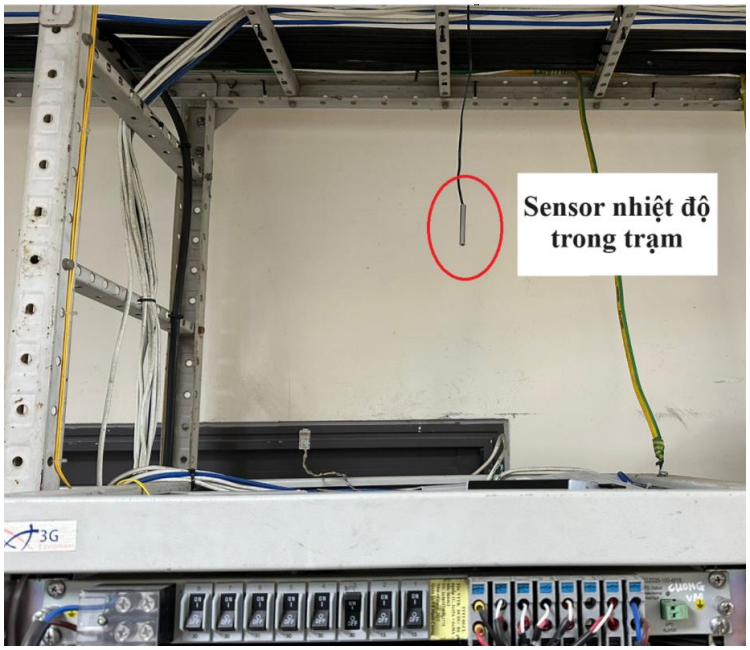
AC SENSOR (sensor at air conditioner vent):

- Red wire connects RED label (VCC power wire).
- Yellow wire connects YELLOW label (SCL signal wire).
- Blue wire connects GREEN label (SDA signal wire).
- Black wire connects BLACK label (GND power wire).



Connect temperature sensor

Location of the temperature sensor: The temperature sensor in the station is hung on the cable ladder, the sensor head is hung in the space between the cable ladder and the top of Rack 19 where the transmission equipment is installed. Note: Do not attach the temperature sensor head in the station to touch the surface of the equipment, cable ladder or the station shell.



Temperature sensor inside the room.

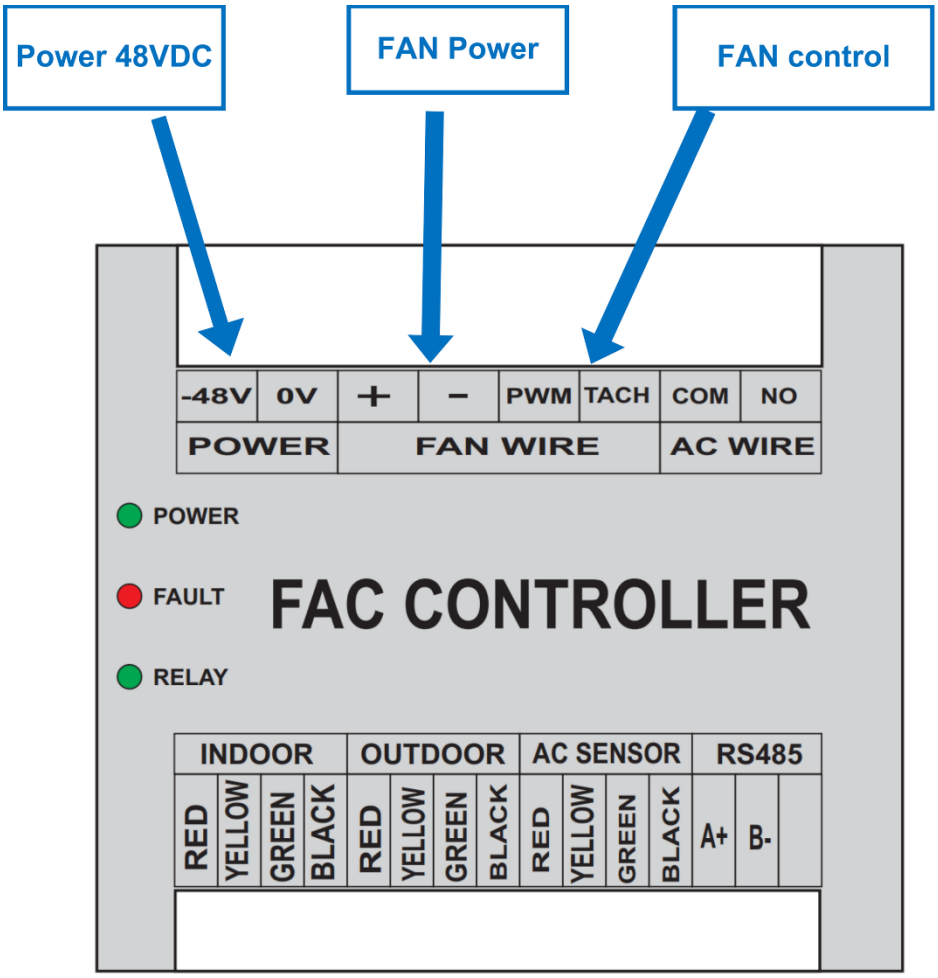
❖ **Connect power and signal to fan**

- Connect power from DCDU to controller

- The positive power cord (VCC) is connected to the terminal marked (0V).
- The negative power cord (GND) is connected to the terminal marked (-48V).
- Correct polarity is required for the device to operate.

- Connection from controller to fan.

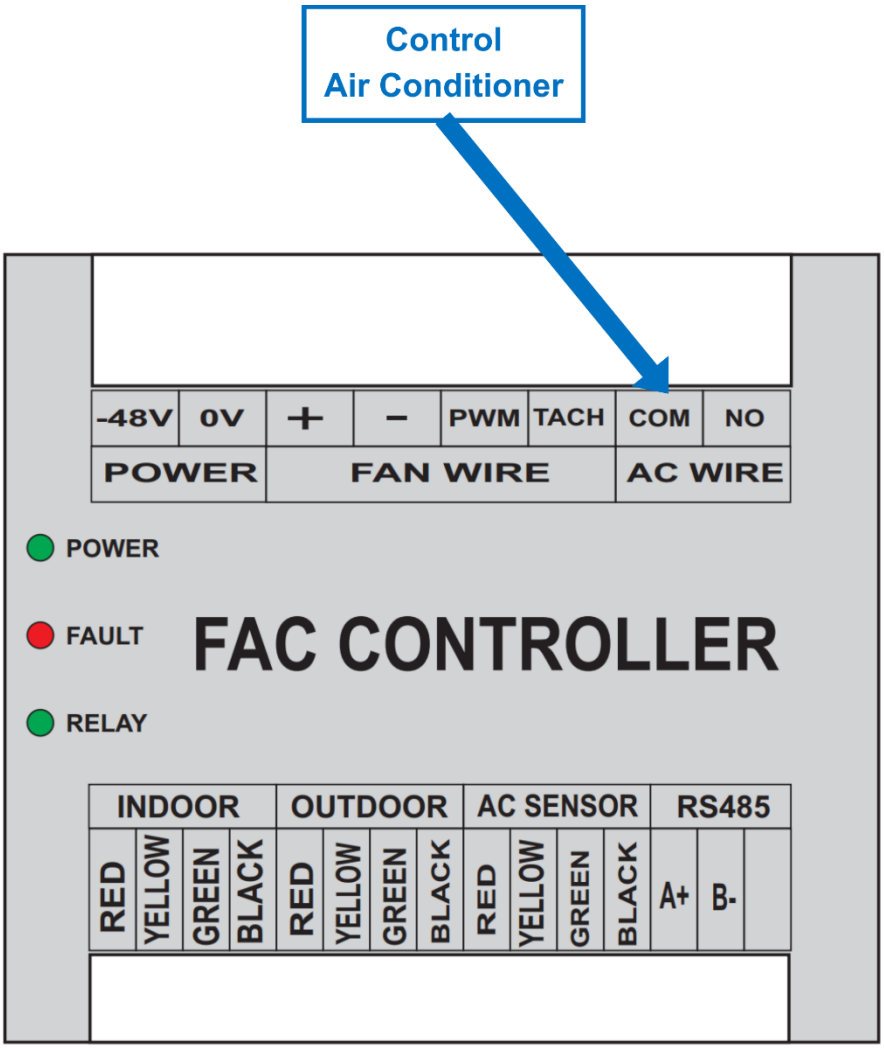
- Fan positive power wire (Red wire) with connector marked (+).
- Fan negative power wire (Blue wire) with connector marked (-).
- PWM signal wire (Yellow wire) with connector marked (PWM).
- Tachometer speed feedback wire (White wire) with connector marked (TACH).



Power and signal connection for fan.

❖ ***AC WIRE connection – NO contact pair turns the air conditioner on/off***

- Connect 2 wires corresponding to the air conditioner control contact pair.



NO contact pair turns air conditioner on/off

❖ **RS485 communication connection:**

- RS485 uses two wires: A (+) and B (-)
- Connect the A and B ports correctly between the devices.

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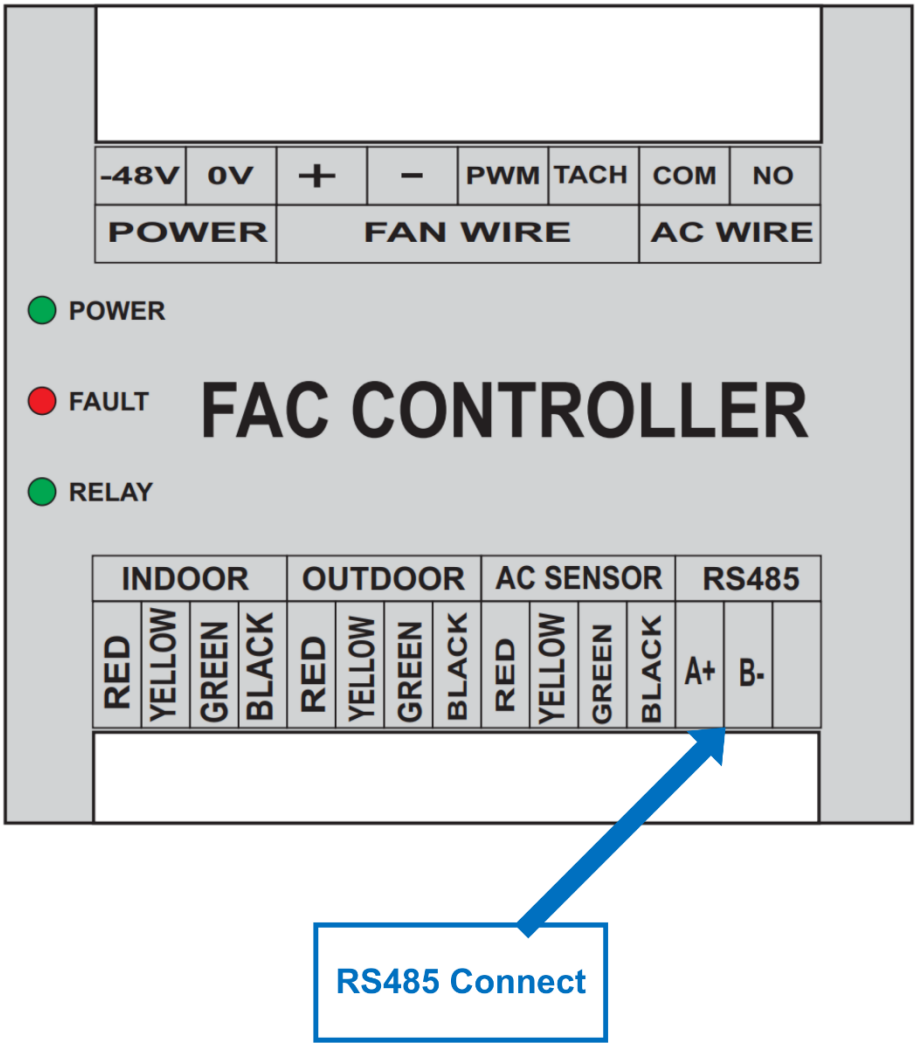


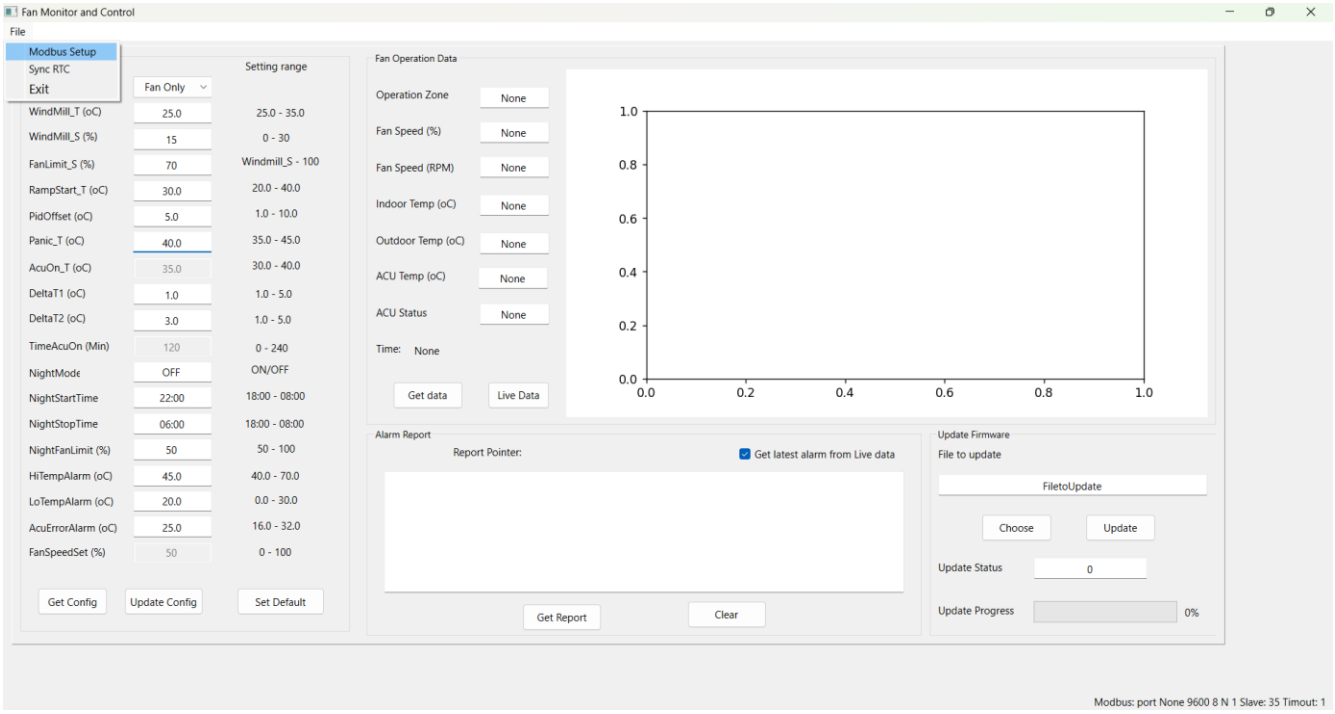
Kết nối giao tiếp RS485 .

Step 6: Configure and set controller parameters.

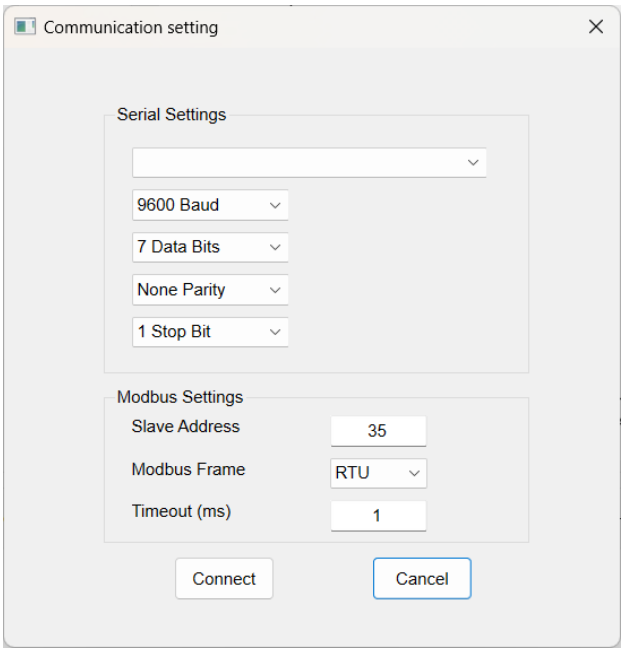
❖ **Connect the controller to the computer.**

Supply DC power to the controller

- Connect the controller to the computer via RS485 protocol
- On the software interface, select File -> Modbus Setup.



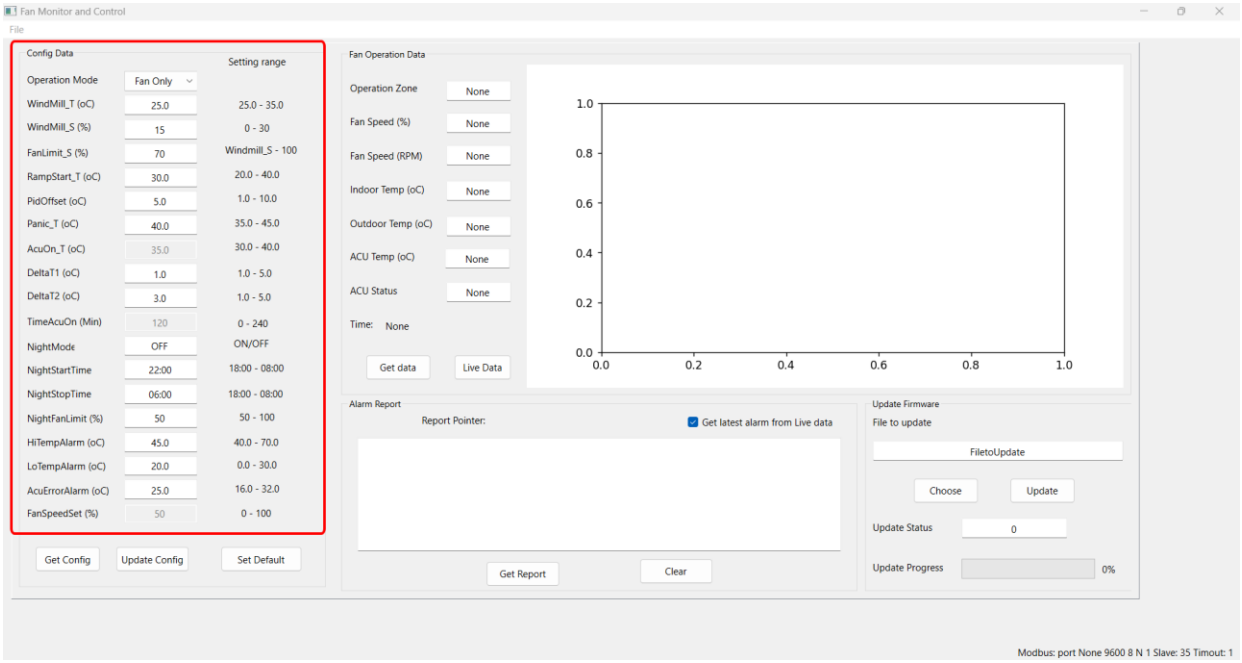
In the Modbus Setup window, select the correct COM port and Address:



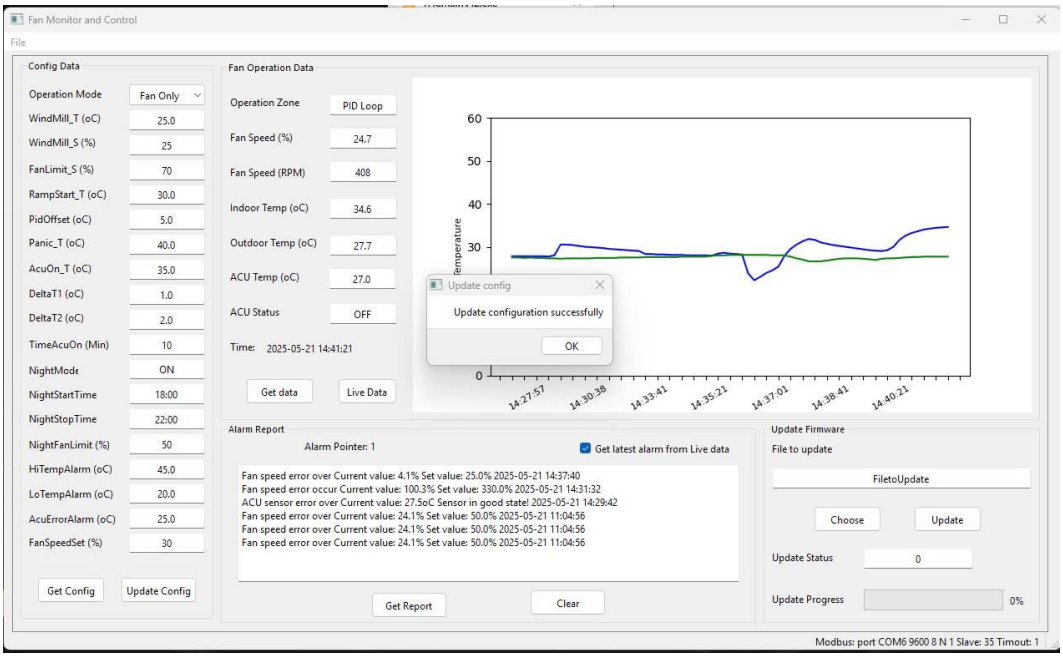
The Slave Address of the device is: 35.

- The software default parameters have been set correctly as required.

❖ **Setting parameters on the controller.**



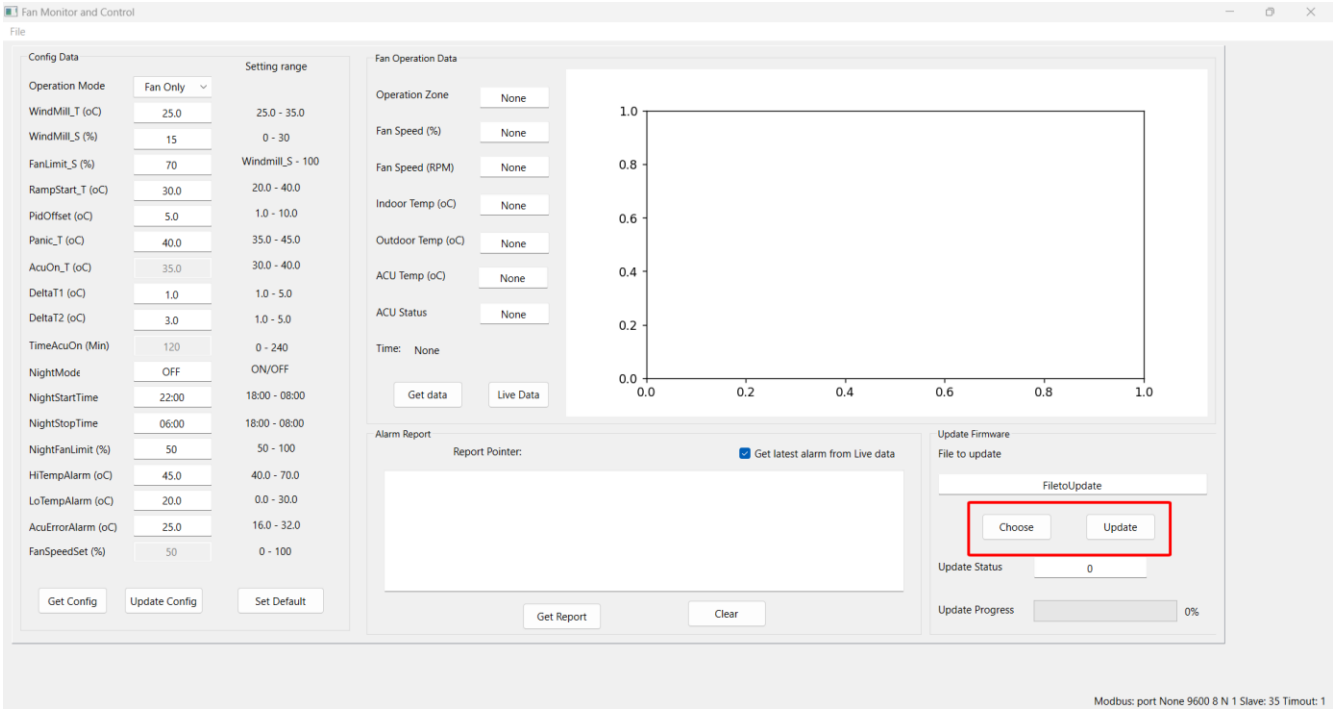
Set up the information in the items on the left side of the software interface. After setting up the parameters, click **"Update Config"**, if successful, the message will appear: **"Update configuration successfully".**



After completing the connection and installation, press **"Live Data"** to monitor the actual operating parameters of the system..

❖ Update Controller Firmware via Software.

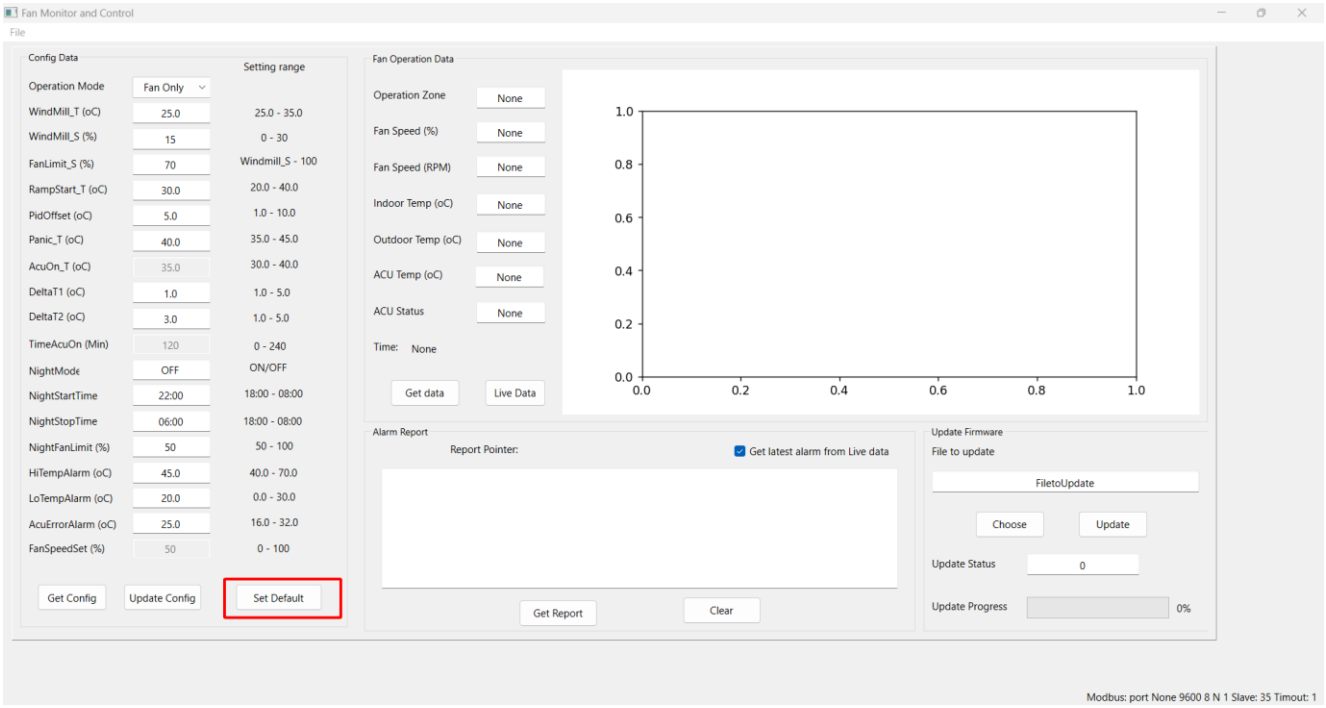
- At the software interface, select “Choose”, then select the firmware file to update, then select “Update” to update the software..



- NOTE: DO NOT UPDATE THE SOFTWARE WITHOUT CONSULTING THE MANUFACTURER.

- **Default parameter setting feature.**

- Select **"Set Default"** to set the parameters as default.



❖ **Check after installation:**

- After successful installation, the fan speed changes when the measured temperature of the thermal sensor in the station changes (Increase the temperature of the thermal sensor in the station by placing it on the surface of the transmission equipment. Decrease the temperature of the sensor by placing it close to the fan's air vent).

2.3.7. Step 7: Connect the FAC monitor.

Use RS485 cable supplied with FAC to connect controller to DAQ.

b. Some common errors and how to fix them.

❖ Controller not working: Check power connection, is terminal tightened, is polarity reversed.

❖ Fan not running:
- Check the power supply wire and control wire for the fan, make sure they are not broken, loose and the power supply polarity is not reversed.
- In AC zone, the fan will not run, check the zone operating threshold settings again..
- Check if the temperature of the measuring channels is correct.

❖ The device does not control the air conditioner..
- Check the power supply to the air conditioner
- Check if the operating area is the air conditioner running area

Unable to set device parameters:

- Check RS485/USB conversion cable
- Check RS485 connection from DAQ to controller.

Note: The controller parameters have been set by default, do not change without consulting the manufacturer. After the operator sets the parameters, if the system does not run, select “Set default” to return to the default parameters..