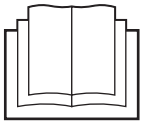
Branch Box

Installation and Operation Manual



Thank you for choosing our products. Please read this manual carefully before operating this product, and retain it for future reference.

Note: Figures in this manual are for illustrative reference purposes only.

Contents

Safety Precautions

Safety Instructions

The safety labels in this manual comply with standards both inside and outside of China. These safety labels are given different definitions and used to mark different levels of danger. Please thoroughly read and fully understand the following safety marks (the description of signs and text) and follow the relevant precautions to avoid damage to the health or property of the users and others.

WARNING	Indicates a medium-risk danger. If not avoided, death or serious injury may occur.
CAUTION	Indicates a low-risk danger. If not avoided, minor or moderate injuries may occur.
PROHIBITED	Indicates that the stated measure is forbidden or the stated action must be stopped.
NOTE	Indicates a tip with a danger level that is lower than the aforesaid danger levels and which, if not avoided, may cause a reduced device performance, malfunctioning, or damage to the device or property.
INFORMATION	Indicates useful operation and maintenance information.

Ensure Proper Earthing

NOTE

- After installation is complete, test the unit to check for installation errors, and provide the user with comprehensive instructions on the operation and cleaning of the unit, as outlined in the user manual.

WARNING

- Do not attempt to install the device yourself; it must be installed by a qualified professional. (Improper installation may result in water leakage, electric shock, or fire.)
- Install the device on a sturdy foundation capable of supporting its weight. (An unstable foundation may cause the device to fall and result in damage.)
- Do not attempt to repair the device yourself or move it to another location. If any errors occur, immediately disconnect the power supply and contact your local dealer or technical support.
- The electrical installation work should follow the requirements of the installation manual and local regulations. (Insufficient power capacity or non-compliant electrical installation may result in electric shock or fire.)
- After installation, check for refrigerant leakage. If any leakage is detected, immediately cut the power supply.
- Electrical connections must be properly earthed. Do not connect the device's earth wire to common pipes, lightning rods, or telephone earthing. (Improper earthing may cause electric shock or fire; high surge currents from lightning or other energized equipment may damage the devices.)
- A leakage protection device must be installed.

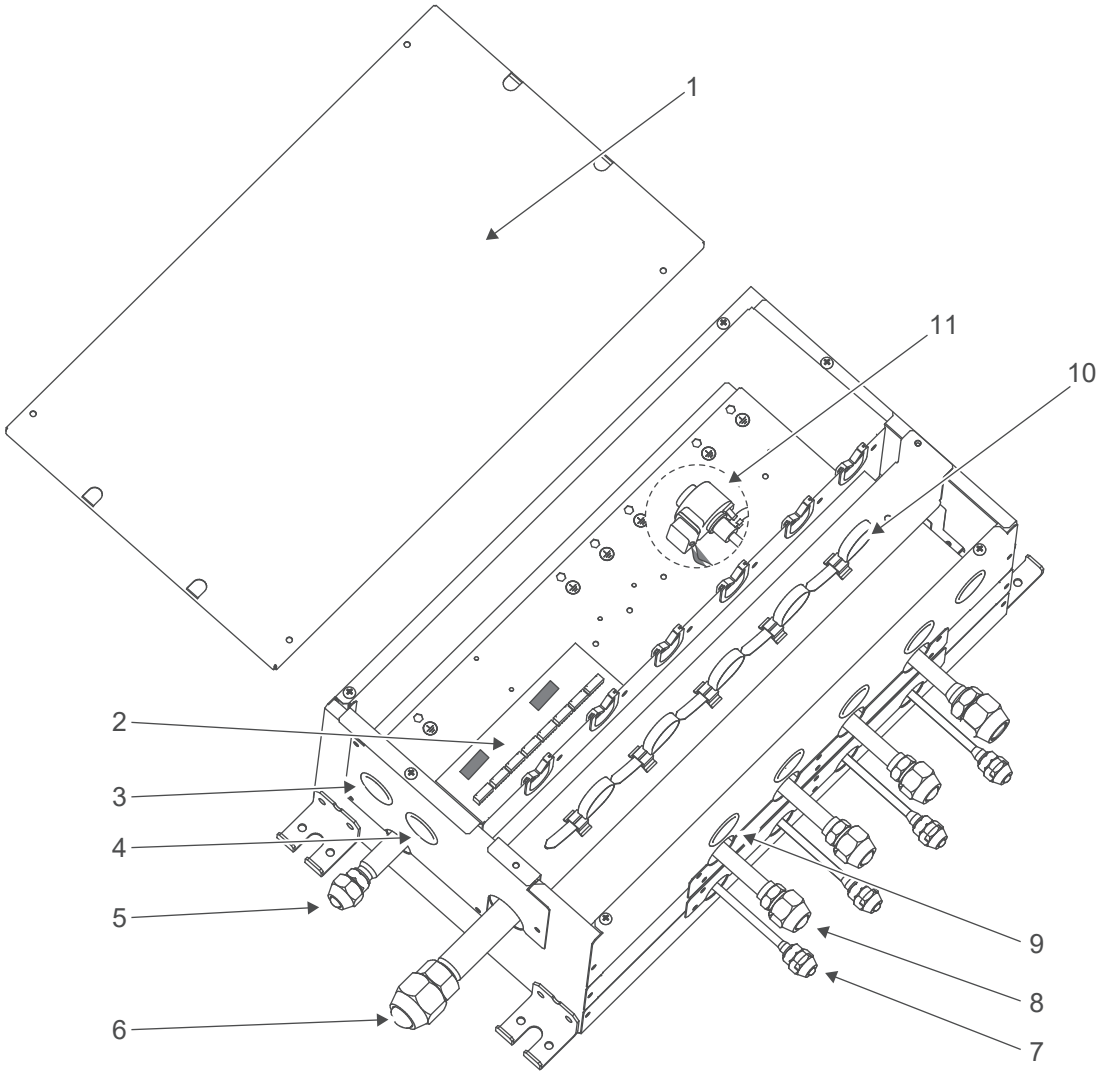
CAUTION

- Use communication wires that meet the specifications required in this manual, and secure the cables with cable clamps or other fasteners to prevent external stress on terminals. (Connecting the cables improperly may lead to communication issues and malfunctions in the air conditioning system.)
- Before starting the ODU compressor, perform nitrogen pressure testing on the refrigerant pipes. After the test is passed, use a vacuum pump to evacuate the system. After the evacuation, perform a negative pressure test on the system. Follow the procedures outlined in the ODU installation manual.

NOTE

- Use special tools and components specified in the installation manual.
- Follow the requirements in this manual for device installation.

Components



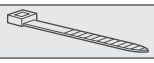
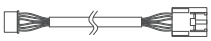
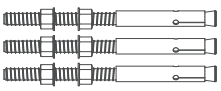
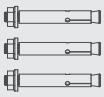
Component List

No.	Name	Description
1	Top cover	Opened for repair
2	PCB	Connecting IDU and ODU communication wires
3	Communication wire knockout hole for ODU	/
4	Communication wire knockout hole for IDU with built-in electronic expansion valve	/
5	Main pipe joint (liquid-side)	Connecting the liquid-side refrigerant pipe of the ODU or branch joint
6	Main pipe joint (gas-side)	Connecting the gas-side refrigerant pipe of the ODU or branch joint
7	Branch pipe joint (liquid-side)	Connecting the liquid-side pipe of the IDU (IDU with external electronic expansion valve)
8	Branch pipe joint (gas-side)	Connecting the gas-side pipe of the IDU (IDU with external electronic expansion valve)
9	Knockout hole for IDU with external electronic expansion valve in the branch box	(1) The signal cable of the IDU side is connected to the PCB port via this hole. (2) The electronic expansion valve coil extension cable is connected to the coil via this hole.
10	Cable tie	Securing the electronic expansion valve coil extension cable or IDU signal cable
11	Electronic expansion valve assembly	IDU (IDU with external electronic expansion valve) throttle and refrigerant flow control

Accessories

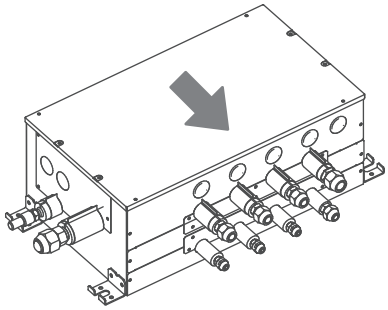
NOTE

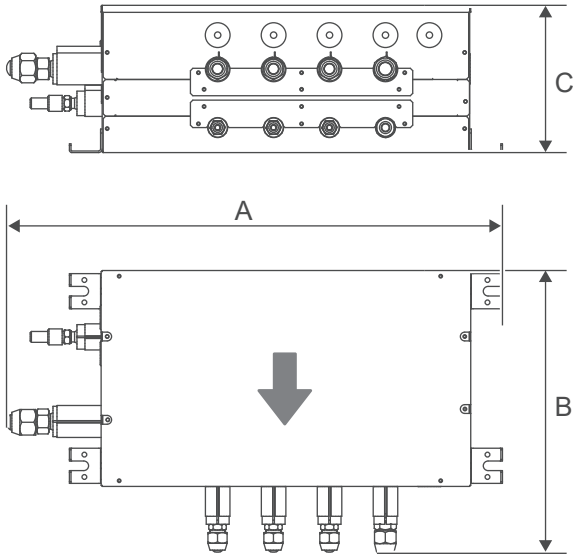
- Check the accessory kit for the following items and contact your local dealer if any items are missing. Note: In the table below, IDU refers to a specially designed unit where the electronic expansion valve is placed inside the branch box.

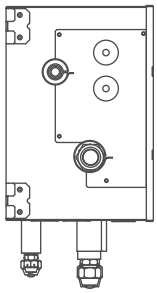
Accessory type	Picture	Name	Quantity	Specifications	Description
Accessory kit		Installation Manual	1	-	Installation/Maintenance manual
		Pipe nut	1	Φ 6.35 mm	Main pipe (liquid-side) nut FQH-02A、FQH-03A
			1	Φ 9.52 mm	
			2	Φ 9.52 mm	Main pipe (liquid-side) nut FQH-04A、FQH-05A、FQH-06A
		Number sticker	1	270 × 75 mm	For numbering the electronic expansion valve coil extension cable or IDU signal cable
		Cable tie	6	4.8 × 300 mm	For fixing cables
Purchased from manufacturer		Extension cable of electronic expansion valve coil	-	Size 1: 4 m Size 2: 10 m Size 3: 20 m	For connecting to the EXV port of the IDU main control board and electronic expansion valve coil in the branch box. Each IDU is configured with one such cable. Its specifications must be determined based on actual needs.
		IDU communication wire	-	5 × 0.5 mm²	IDU communication wire
Purchased on site		Extended anchor bolt	4	M10 × 200 mm	For supporting the branch box when it is mounted on the ceiling
		Anchor bolt	4	M10 × 90 mm	For securing the branch box in place when it is wall mounted or floor standing

Introduction

Diagrams







Specifications

Parameter			Branch box model				
			FQH-02A	FQH-03A	FQH-04A	FQH-05A	FQH-06A
Appearance	Color		SB2403				
	Material		Hot-dip galvanized steel plate				
Dimensions	Length A	mm	480	480	620	620	680
	Width B	mm	352	352	352	352	352
	Height C	mm	184	184	184	184	184
Weight without packaging		kg	6.3	6.9	9.0	9.6	10.8
Weight with packaging		kg	10.4	11.0	13.4	14.0	15.9
Diameter of electronic expansion valve port * Note: 1/2/3/4/5 indicate the number of electronic expansion valves		mm	2-2.0	3-2.0	3-2.0 + 1-2.4	4-2.0 + 1-2.4	5-2.0 + 1-2.4
Drive pulse count of electronic expansion valve		PLS	500 P	500 P	500 P	500 P	500 P
Capacity of connected IDUs with external electronic expansion valves * Note: 1/2/3/4/5 indicate the number of IDUs		kW	2-(1.5 ≤ kW ≤ 5.6)	3-(1.5 ≤ kW ≤ 5.6)	3-(1.5 ≤ kW ≤ 5.6) + 1-(5.6 < kW ≤ 9.0)	4-(1.5 ≤ kW ≤ 5.6) + 1-(5.6 < kW ≤ 9.0)	5-(1.5 ≤ kW ≤ 5.6) + 1-(5.6 < kW ≤ 9.0)
Diameter of pipe connecting to the branch pipe joint (liquid-side) * Note: 3-Φ indicates the number of pipes that have the same size		mm	Φ 6.35	Φ 6.35	3-Φ 6.35 + 1-Φ 9.52	4-Φ 6.35 + 1-Φ 9.52	5-Φ 6.35 + 1-Φ 9.52
Diameter of pipe connecting to the branch pipe joint (gas-side) * Note: 3-Φ indicates the number of pipes that have the same size		mm	Φ 12.7	Φ 12.7	3-Φ 12.7 + 1-Φ 15.9	4-Φ12.7 + 1-Φ 15.9	5-Φ12.7 + 1-Φ 15.9
Max. input current bearable by PCB		A	0.5				
Waterproof grade			IPX2				
Refrigerant type			R410A/R32				

Installation

Installation Location Selection

The branch box integrates multiple electronic expansion valves and connects the refrigerant pipes of multiple IDUs and ODUs. It produces noticeable refrigerant flow noise during operation. Therefore, the branch box must be installed in a concealed location, away from working and living areas. Installation precautions for the branch box:

- The floor or wall that supports the box must be level.
- The length of the refrigerant pipe connecting the branch box to the IDUs and ODU should not exceed the allowable distance.
- If installed in areas with oil contamination or water vapor, such as kitchens or bathrooms, the branch box must be installed in a separate compartment (e.g., a ceiling compartment).
- When installing the branch box, ensure there is sufficient space for maintenance as specified in the manual.
- Do not install in areas with air temperature exceeding 60°C or relative humidity exceeding 85%.
- Avoid installation in dusty, corrosive, or rain-exposed environments.
- Do not install in spaces such as bedrooms, offices, or areas with high foot traffic.
- Do not install the air conditioning unit in areas with a risk of flammable gas leaks.

Installation Methods

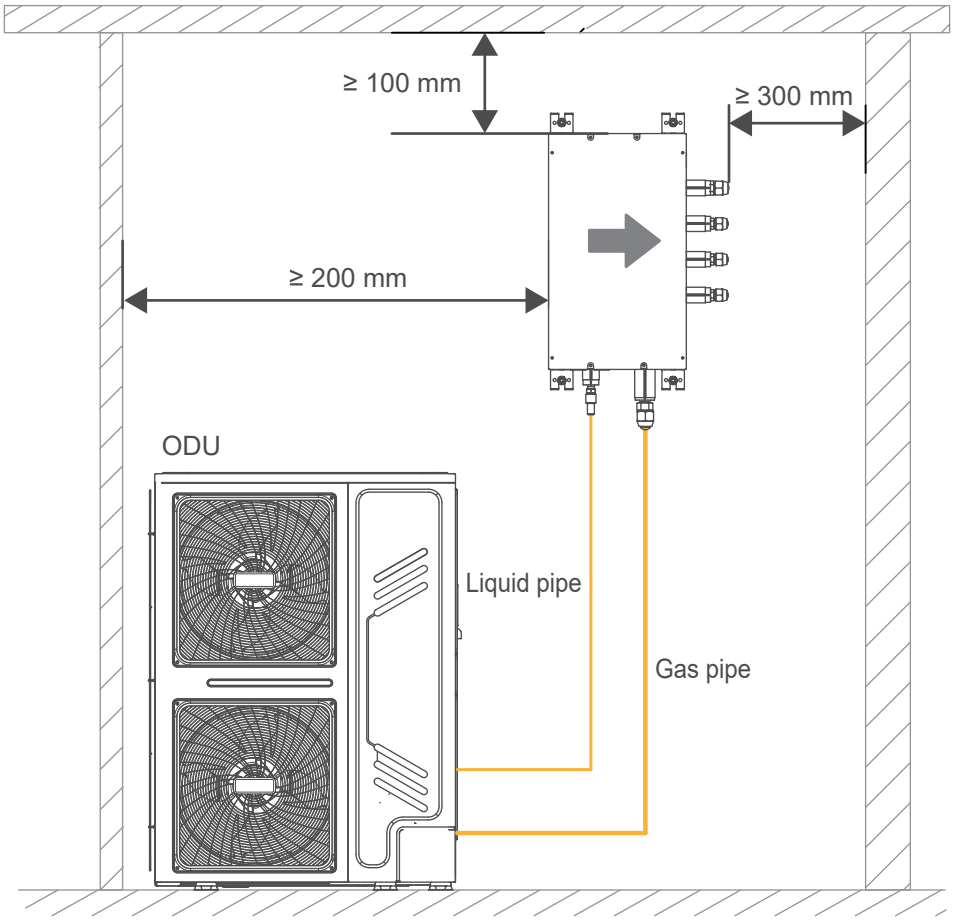
1) Wall mounting

① Attached to the outdoor wall

When the ODU is installed in the reserved balcony space of a floor, the branch box can be attached to the inner wall of the balcony grille.

NOTE

- The branch box must not be installed outdoors; it should be installed in a location that is waterproof, dustproof, and shielded from direct sunlight.

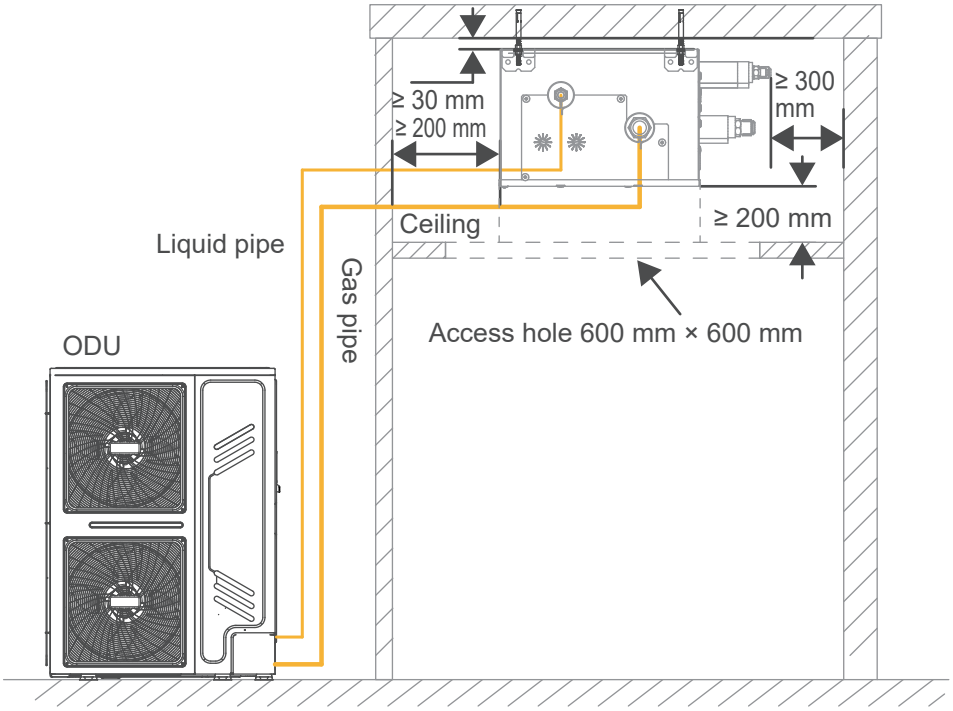


2) Ceiling mounting

The branch box generates refrigerant noise during operation, which can impact comfort. When you choose to install it in an indoor ceiling space, make sure to install it in areas less sensitive to noise, such as hallways or bathrooms.

NOTE

- The branch box should not be installed in bedrooms or areas where people frequently stay.

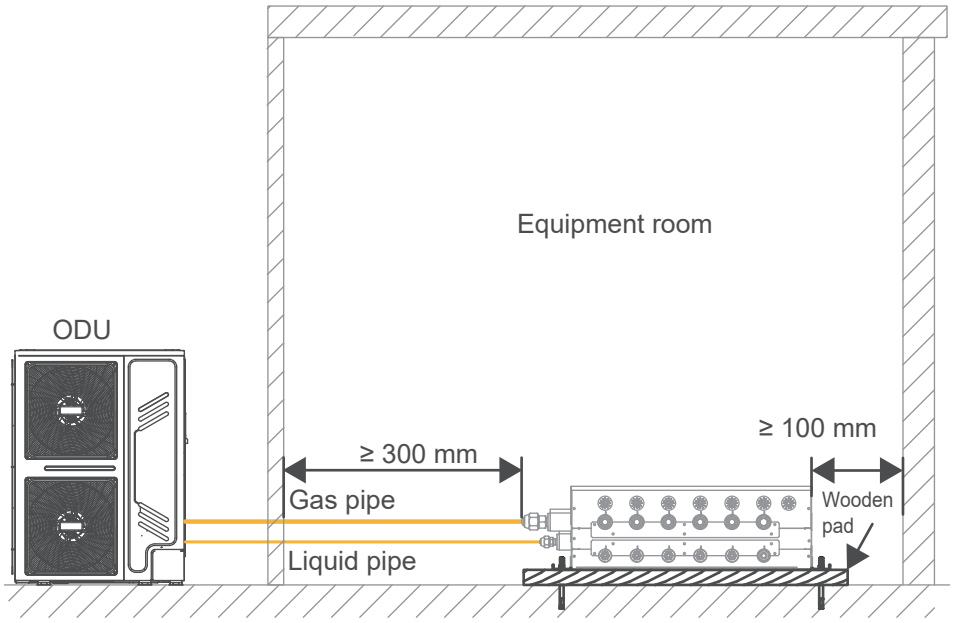


3) Floor standing

The branch box can be secured to the floor of the indoor equipment room, as shown in the figure below.

NOTE

- A vibration-damping and moisture-resistant layer (e.g., a wooden pad with a thickness of at least 10 mm) must be placed between the branch box and the ground.

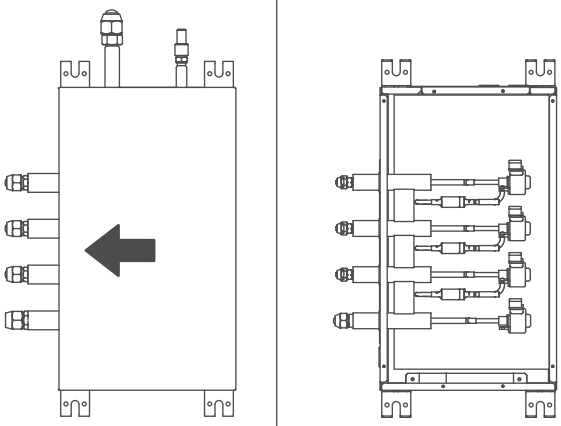


Allowed installation orientations

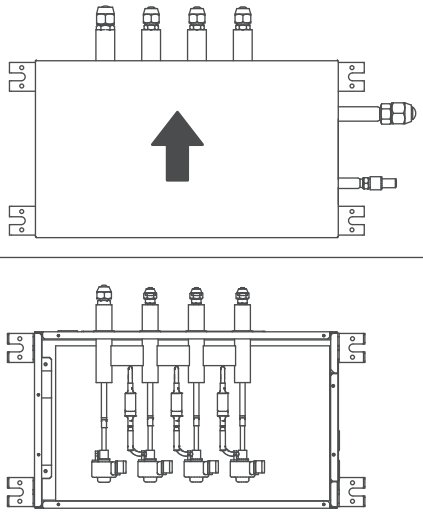
NOTE

- The electronic expansion valve inside the branch box must not be installed upside down (an inverted position results in valve flow regulation or valve closure issues due to gravity).

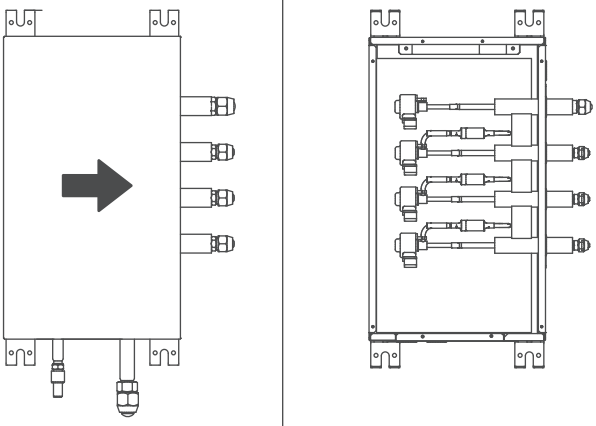
Orientation 1: leftward connection: ✓



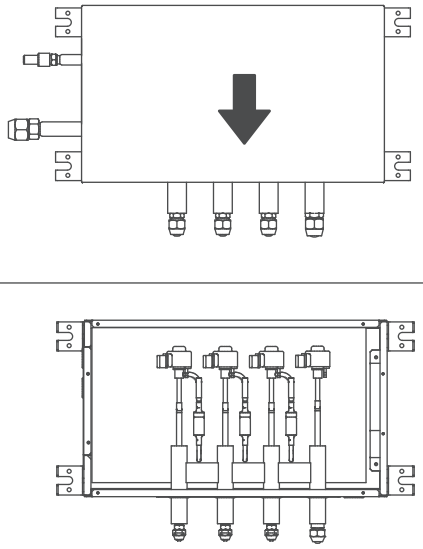
Orientation 2: upward connection: ✗



Orientation 3: rightward connection: ✓



Orientation 4: downward connection: ✓



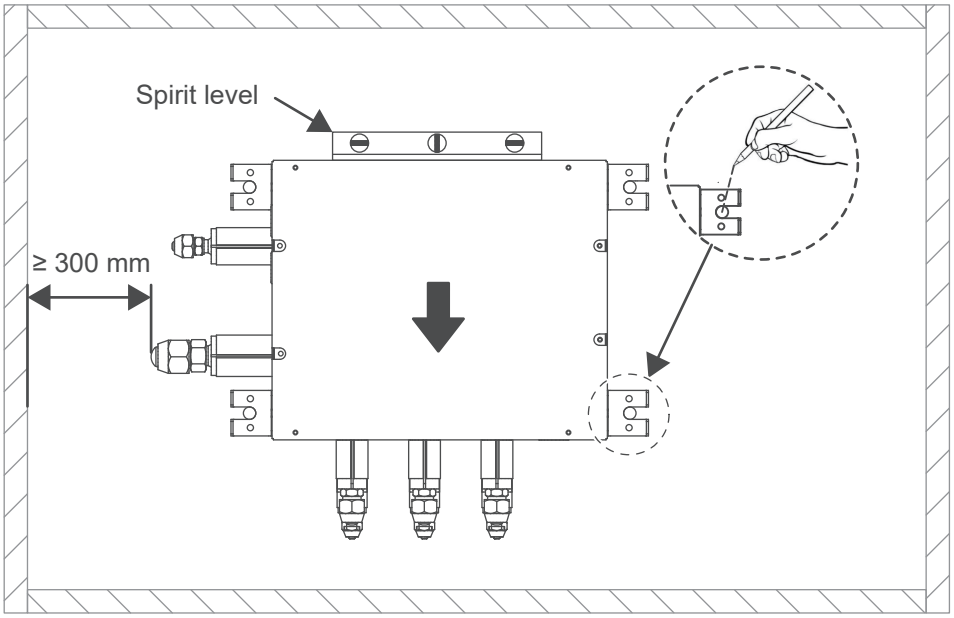
Installation Steps

Step 1: Locate the box

After confirming the installation position of the branch box (front/rear/left/right spacing must meet pipe connection and maintenance requirements), use a marker to mark the positions of the lifting lug holes.

NOTE

- During marking, use a spirit level to ensure that the upper/lower or left/right lifting lug holes are on the same straight line.



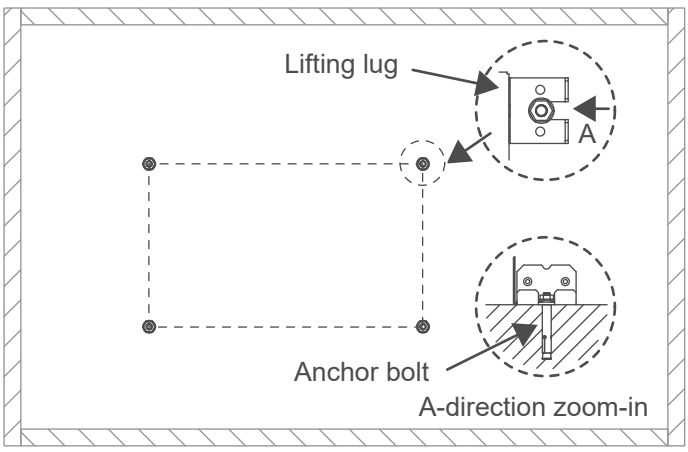
Step 2: Fix the box

1) Wall mounting method

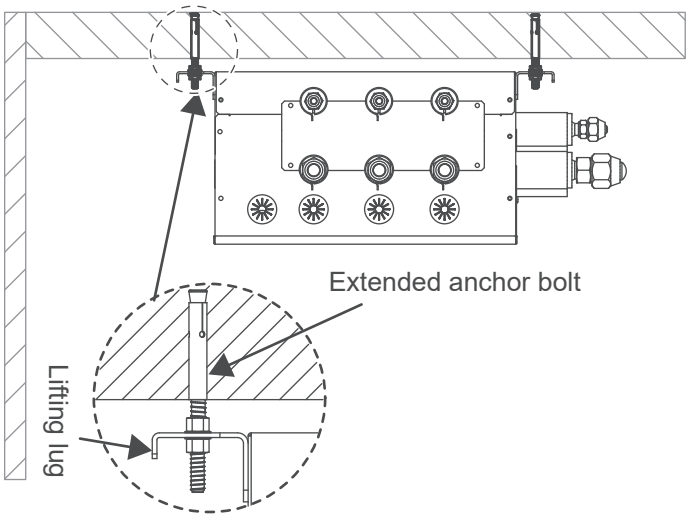
Drill four Φ 14 * 50 mm holes at the marked points, insert M10 anchor bolts into the holes, and then secure the bolts with gaskets and hex nuts.

NOTE

- The four holes must be on the same plane (slightly adjust the nut tightness to keep them on the same plane).



Wall mounting/Floor standing



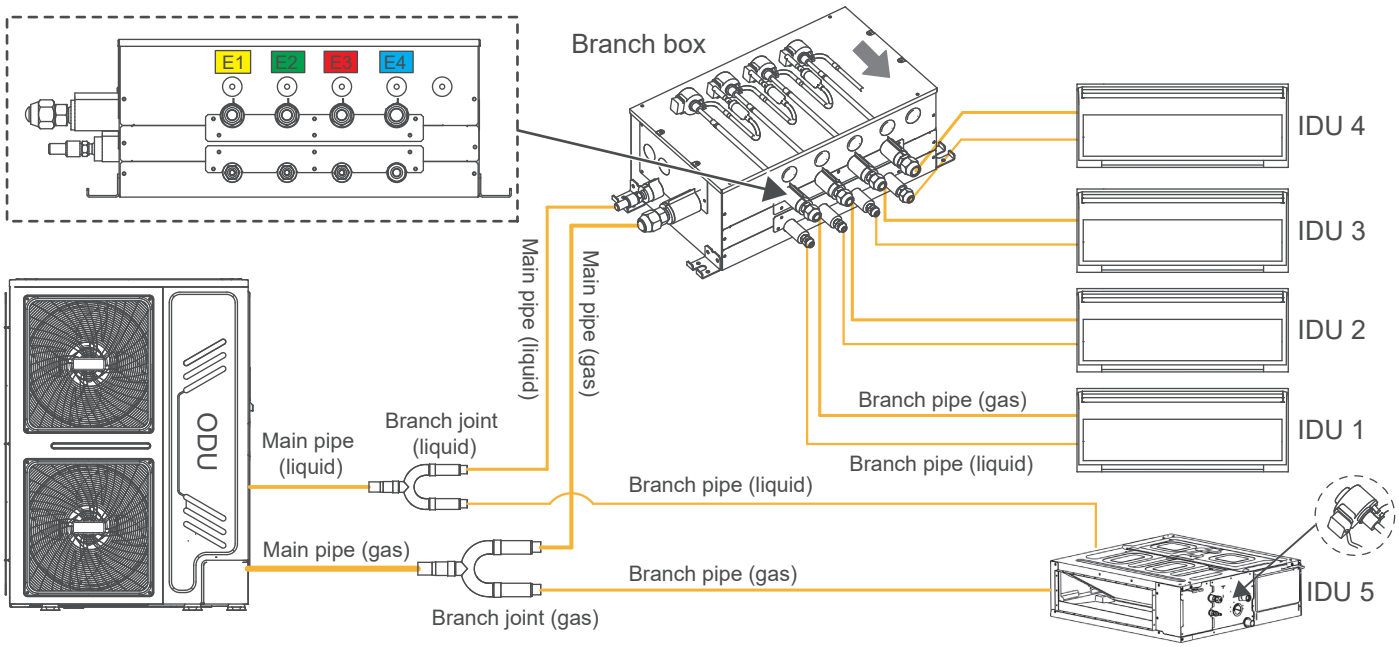
Ceiling mounting

Step 3: Connect refrigerant pipes and calculating additional refrigerant charge

1) Connect the branch pipes of the IDU with the external electronic expansion valve. The IDUs 1/2/3/4 are specially designed IDUs with the electronic expansion valve placed inside the branch box. Therefore, the gas/liquid branch pipes of the IDUs 1/2/3/4 must be connected to the reserved gas/liquid-side screw joints on the branch box.
2) Connect the branch pipes of the IDU with built-in electronic expansion valve. IDU 5 is a conventional model (the electronic expansion valve is placed inside the heat exchanger of the IDU). Therefore, IDU 5 gas/liquid branch pipes must be connected to the gas/liquid branch joints.
3) Connect the main pipes. Connect the branch joint (liquid) to the reserved main pipe joint (liquid-side), and connect the branch joint (gas) to the main pipe joint (gas-side).
4) Connect the main pipes. Following the instructions in the ODU installation manual, and connect the ODU to the branch joint using copper pipes with the proper diameter.

⚠ CAUTION

- The gas/liquid branch pipes of IDUs 1/2/3/4 must correspond to the gas/liquid pipe screw joints marked with E1/E2/E3/E4 on the branch box. Connecting these in an incorrect sequence will cause errors in the electronic expansion valve that controls IDU refrigerant flow, frosting or freezing of the IDU, refrigerant noise, and other errors.

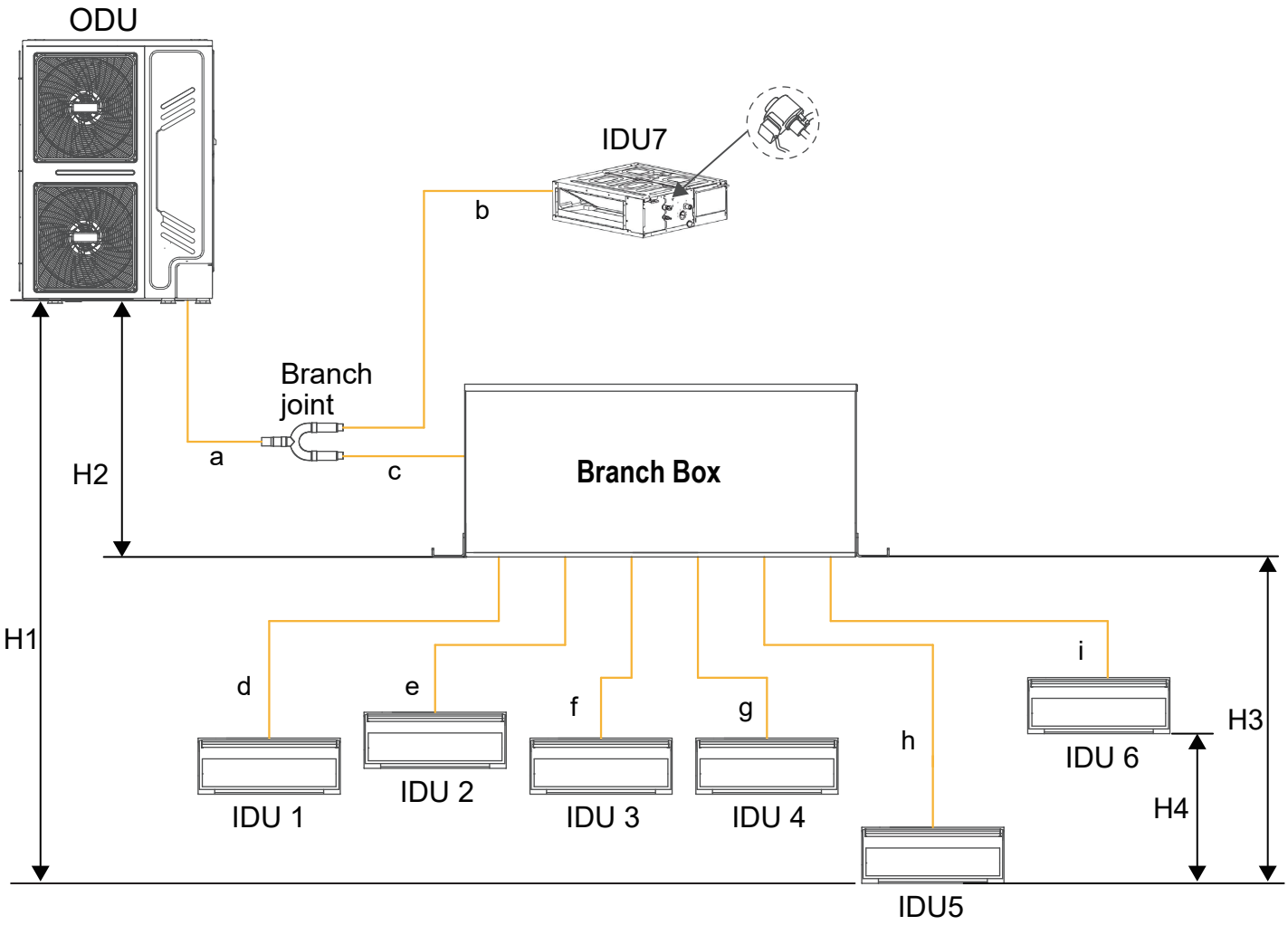


Number sticker	Corresponding branch pipe connector	Pipe connector ODs of branch boxes (mm)				
		FQH-02A	FQH-03A	FQH-04A	FQH-05A	FQH-06A
E1	Branch pipe (liquid/gas side) connector 1	Φ 6.35/Φ 9.52	Φ 6.35/Φ 9.52	Φ 6.35/Φ 9.52	Φ 6.35/Φ 9.52	Φ 6.35/Φ 9.52
E2	Branch pipe (liquid/gas side) connector 2	Φ 6.35/Φ 9.52	Φ 6.35/Φ 9.52	Φ 6.35/Φ 9.52	Φ 6.35/Φ 9.52	Φ 6.35/Φ 9.52
E3	Branch pipe (liquid/gas side) connector 3	-	Φ 6.35/Φ 9.52	Φ 6.35/Φ 9.52	Φ 6.35/Φ 9.52	Φ 6.35/Φ 9.52
E4	Branch pipe (liquid/gas side) connector 4	-	-	Φ 9.52/Φ15.9	Φ 6.35/Φ 9.52	Φ 6.35/Φ 9.52
E5	Branch pipe (liquid/gas side) connector 5	-	-	-	Φ 9.52/Φ15.9	Φ 6.35/Φ 9.52
E6	Branch pipe (liquid/gas side) connector 6	-	-	-	-	Φ 9.52/Φ15.9

⚠ CAUTION

- Capacity range of IDUs (with external EXVs) compatible with Φ 6.35/Φ 9.52 branch pipe connectors: 1.5 ≤ kW ≤ 5.6; Capacity range of IDUs (with external EXVs) compatible with Φ 9.52/Φ 15.9 branch pipe connectors: 5.6 < kW ≤ 9.0.

Allowable length an ence for refrigerant piping



Maximum allowable length (Liquid side or gas side)	Piping length	Between Branch box and IDU 1~IDU 6	d, e, f, g, h, i ≤ 15 m
		Between Branch joint and IDU7	b ≤ 15 m
	Total piping length	Between ODU and Branch box (Branch joint)	a + b + c ≤ 55 m
		Between Branch box and IDU 1~IDU 6	d + e + f + g + h + i ≤ 60 m
Allowable height (Liquid side or gas side)	Difference in height	Between ODU and IDU 1~IDU 7	H1 ≤ 30 m(ODU is above);
			H1 ≤ 20 m(ODU is below)
		Between ODU and Branch box	H2 ≤ 2 0 m
		Between Branch box and IDU 1~IDU 7	H3 ≤ 15 m
		Between IDU 1~IDU 6 and IDU 1~IDU 7	H4 ≤ 8 m

Calculating additional refrigerant charge

1) The additional refrigerant charge required depends on the lengths and diameters of the outdoor and indoor liquid pipes.（a, b, c, d, e, f, g, h, i）

2) Please refer to the outdoor unit Installation and Operation Manual for the calculation method of additional refrigerant charge.

Step 4: Connect the extension cable of the electronic expansion valve coil

1) Take out the ③ number stickers from the accessory kit, and attach the number stickers (E1-E6, indicating connection to IDUs 1-6 of the branch box) to both ends of the ① extension cable of the electronic expansion valve coil.

NOTE

- The adhesive side of the stickers should be pressed firmly onto the cable after both ends are folded.

2) Figure A: Insert the CS terminal (with the E1 number sticker) of the ① extension cable of electronic expansion valve coil to the EXV port of the IDU 1 main control board PCB.

   Figure B: Pass the AMP terminal of the ① extension cable of the electronic expansion valve coil through the knockout hole. Number stickers E1, E2, and E3 indicate that the knockout hole, branch pipe joint (liquid-side), and branch pipe joint (gas-side) correspond to IDUs 1/2/3, respectively.

   Figure C: Connect the AMP terminal (with E1 number sticker) of the ① extension cable of the electronic expansion valve coil to the AMP terminal (with the E1 number sticker) of the ② electronic expansion valve coil.

NOTE

- The ① extension cable of the electronic expansion valve coil comes with three specifications: 4 m, 10 m, and 20 m. On-site construction personnel purchase extension cables of proper specifications from the manufacturer based on the installation distance between the IDUs and branch box.

CAUTION

- The gas/liquid branch pipes of IDUs 1/2/3/4 must correspond to the gas/liquid pipe screw joints marked with E1/E2/E3/E4 on the branch box. Connecting these in an incorrect sequence will cause errors in the electronic expansion valve that controls IDU refrigerant flow, frosting or freezing of the IDU, refrigerant noise, and other errors.

① Extension cable of electronic expansion valve coil
② Electronic expansion valve coil
③ Number sticker (on-site marking)

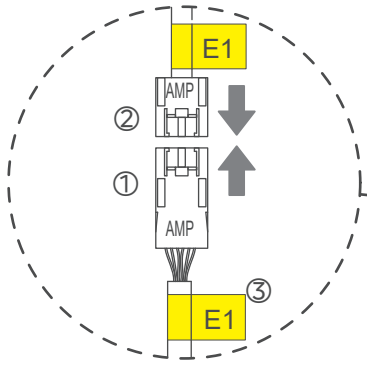


Figure C

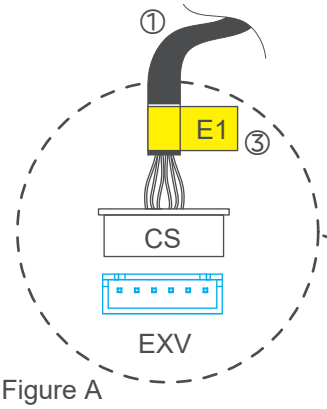
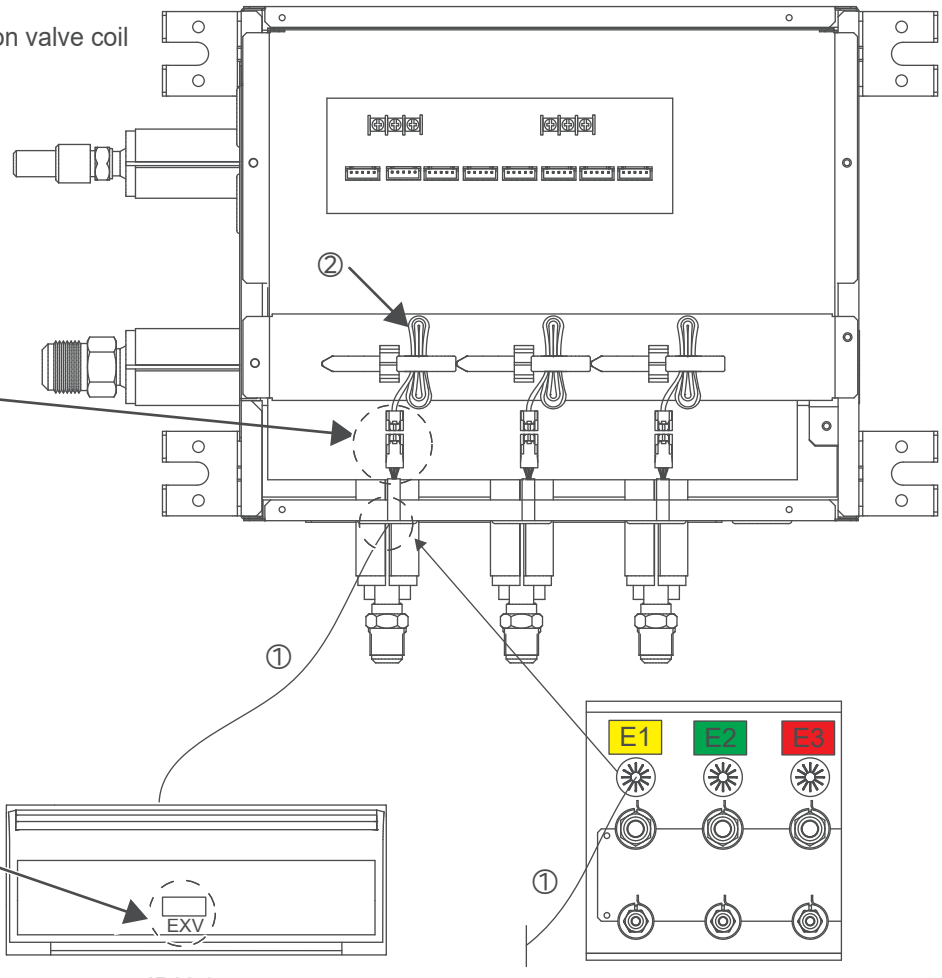


Figure A



IDU 1

Figure B

Step 5: Connect the communication wires

1) Take out the ③ number stickers from the accessory kit, and attach the number stickers (E1-E6, indicating connection to IDUs 1-6 of the branch box) to both ends of the ① IDUs 1/2/3 communication wires.

NOTE

- The adhesive side of the stickers should be pressed firmly onto the cable after both ends are folded.

2) Figure A: Connect the U-shaped plugins of the ① IDUs 1/2/3 communication wires (with number stickers) to the P/Q ports of the IDUs 1/2/3 main control board PCB, and connect the U-shaped plugin of the IDU 4 communication wire to the P/Q port of the ② IDU 4 main control board PCB.

Figure B: Pass the other terminal of the ① IDUs 1/2/3 communication wires through the ⑤ knockout hole. The stickers numbered E1, E2, and E3 indicate that the knockout hole, branch pipe joint (liquid-side), and branch pipe joint (gas-side) correspond to IDUs 1/2/3, respectively.

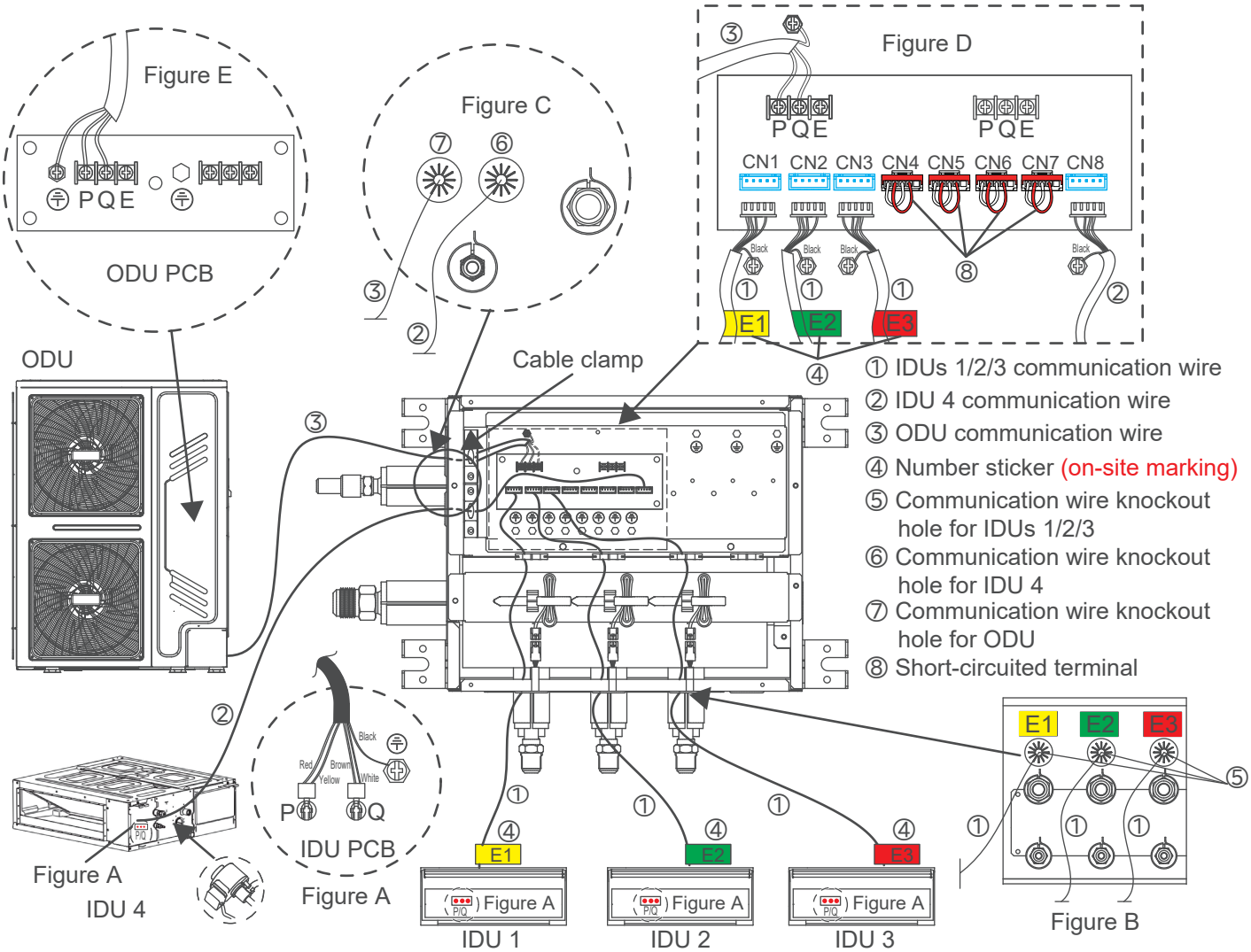
Figure C: Pass the other terminal of the ② IDU 4 communication wire through the ⑥ knockout hole, and the terminal of the ③ ODU communication wire through the ⑦ knockout hole.

Figure D: Insert ① IDUs 1/2/3 communication wires to CN1/CN2/CN3 ports of corresponding PCB and ② IDU 4 communication wire to CN8 port of corresponding PCB, and connect ③ ODU communication terminal to P/Q port of corresponding PCB.

Figure E: Connect the other terminal of the ③ ODU communication wire to the P/Q port of the ODU PCB.

CAUTION

- The IDU and ODU communication wires must have their shielded layer earthed.
- The CN1/CN2/CN3/CN4/CN5/CN6 ports on the PCB shown in Figure D are for connecting the communication wires of the IDUs with external electronic expansion valves in the branch box. The CN7/CN8 ports are for connecting the communication wires of the IDUs with built-in electronic expansion valves. These two types of connections must not be mixed.



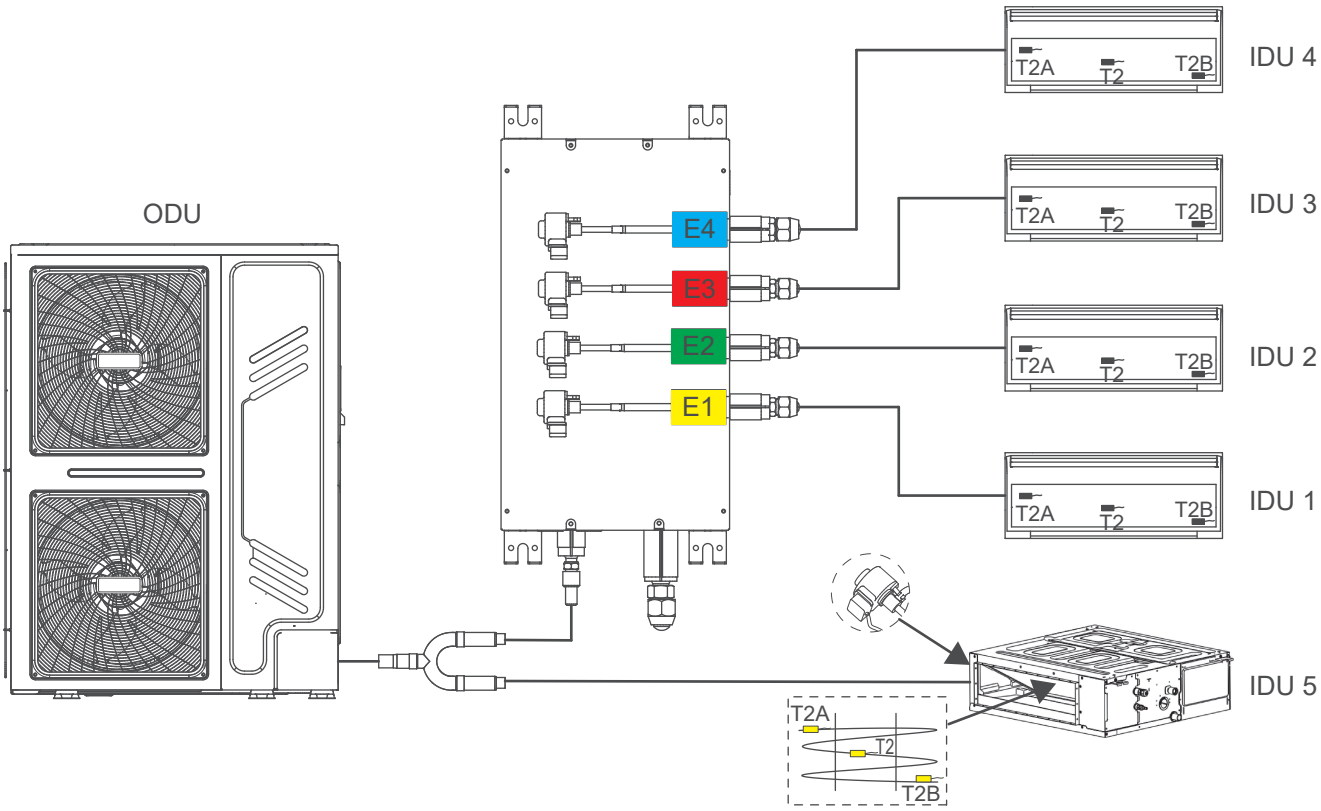
Step 6: Perform test run

After completing refrigerant charging (when calculating the refrigerant amount to be added on site, include the required refrigerant for the IDU liquid side branch pipe connecting to the branch box. For calculation methods, refer to the relevant section in the IDU installation manual), power on the unit for a test run. Inspect each refrigerant pipe, communication wire, and electronic expansion valve coil extension cable connecting the IDUs, ODU, and branch box to avoid crossover connections between the refrigerant pipes and the communication wires and electronic expansion valve coil extension cables.

Test run procedure:

1) Run all the IDUs in cooling mode and set the temperature to the lowest value. Start the compressor and run the IDUs for 15 minutes. Record the T1/T2A/T2/T2B sensor readings for all IDUs upon startup in the sequence of their numbers. First, send a shutdown command to IDU 1. After 5 minutes, record the T1/T2A/T2/T2B sensor readings for IDU 1. Next, send the shutdown command to IDU 2. After 5 minutes, record the T1/T2A/T2/T2B sensor readings for IDU 2. Continue this process for the subsequent IDUs until the last IDU is shut down and the T1/T2A/T2/T2B sensor readings are recorded.
2) Compare the recorded data. If the refrigerant pipes, communication wires, and electronic expansion valve coil extension cables are correctly connected to an IDU, the T2A/T2/T2B sensor readings should be close to the T1 sensor reading after the IDU is shut down. If the T2A/T2/T2B sensor readings are significantly lower than the T1 sensor reading (with a difference > 5°C), the connection sequence is incorrect. In this case, remove the top cover of the branch box and check whether the communication wires, electronic expansion valve coil extension cables, and refrigerant pipes connected to this particular IDU are crossed.

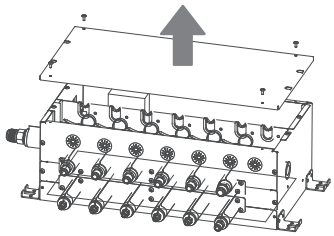
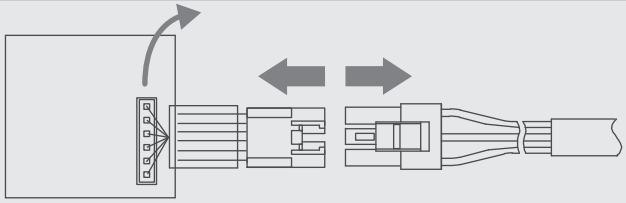
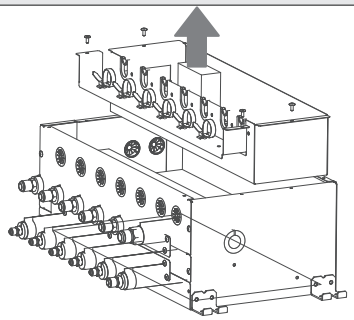
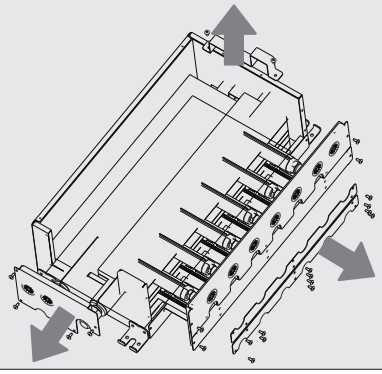
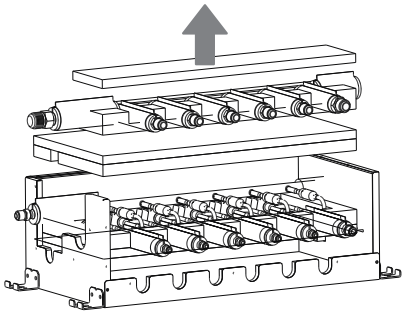
IDU SN	IDU status	T1 (°C)	T2A (°C)	T2 (°C)	T2B (°C)
IDU 1	ON				
	OFF				
IDU 2	ON				
	OFF				
IDU 3	ON				
	OFF				
IDU 4	ON				
	OFF				
IDU 5	ON				
	OFF				

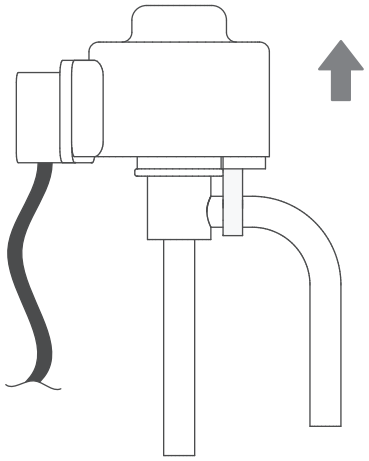


Disassembly

⚠ WARNING

- Please wait 10 minutes after all power supplies are disconnected before beginning disassembly. Do not perform electrical work in an energized state. Otherwise, serious personal injury may occur.

Step	Description	
Step 1	Remove the four screws on the top cover of the branch box.	
Step 2	The electronic expansion valve coil and coil extension cable terminal are connected by buckles. To detach them, press the right coil terminal buckle with your fingers and then detach the other terminal.	
Step 3	Remove the four screws that secure the PCB box to the cable tie sheet metal, as shown in the figure to the right.	
Step 4	Remove the sealing plates of the branch box.	
Step 5	Remove the insulation cotton. Note: The insulation cotton is disposable material. Before reinstallation, request insulation cotton of the same specifications from the manufacturer.	

Step	Description	
Step 6	After the electronic expansion valve coil is removed, if the valve body is damaged, use a welding device to replace the valve body (during welding, make sure to continuously cool the valve body). If the valve body does not need replacement, contact the manufacturer to request assembly replacement.	

Troubleshooting

Troubleshooting

Fault	Possible cause	Troubleshooting
1. The IDU runs poorly (the air supply temperature is approximate to indoor temperature) or frosting or freezing occurs when the IDU runs in cooling mode.	The refrigerant pipes cross over with communication wires and electronic expansion valve coil extension cables.	Refer to the pipe and cable crossover issue troubleshooting method in "Step 6: Perform test run".
2. The IDU display box or wired controller reports the error code "b11".	Refer to the troubleshooting part in the IDU maintenance manual.	Refer to the troubleshooting part in the IDU maintenance manual.
3. The IDU runs improperly or there is refrigerant flow noise in the IDU.	① The electronic expansion valve coil is damaged and unable to drive the valve body. ② The IDU main control board is damaged. ③ The electronic expansion valve needle is stuck or clogged.	Dismantle the branch box by following the guidelines in the chapter "Disassembly". Then, check for errors in the order of electronic expansion valve coil, IDU main control board, and electronic expansion valve needle. Cause ①→Replace the electronic expansion valve coil and power on the unit again. The system now runs properly. Cause ②→Replace the IDU main control board and power it on again. The system now runs properly. Cause ③→Refer to step 6 in the chapter "Disassembly".

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