

# Nortek Global HVAC, LLC

## DC Inverter U-match Series Cassette Type Unit

### Owner's Manual

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#### Heat Pump

##### Indoor Unit

GKU18(5.3)USV2FL  
GKU24(7.0)USV2FL  
GKU30(8.8)USV2FL  
GKU36(10.6)USV2FL  
GKU42(12.3)USG2FL  
GKU48(14.1)USG2FL

##### Outdoor Unit

GXH18(5.3)USV4DH  
GXH24(7.0)USV4DH  
GXH30(8.8)USV4DH  
GXH36(10.6)USV4DH  
GXH42(12.3)USV4DH  
GXH48(14.1)USV4DH

- Please read this owner's manual carefully before operation and retain it for future reference
- Specifications & illustrations subject to change without notice or incurring obligations

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# 1 Safety Precautions

<b>▲WARNING</b>	WARNING NOTICE: Failure to comply with warning notice could result in property damage, serious personal injury or death.
<b>▲CAUTION</b>	CAUTION NOTICE: Failure to comply with caution notice could result in property damage or personal injury.
<b>NOTICE</b>	NOTICE: Failure to comply with notice could result in property damage.

<b>▲WARNING</b>	
(1).	Instructions for installation and use of this product are provided by the manufacturer.
(2).	Installation must be performed by qualified personnel only.
(3).	Improper installation may cause water leakage, electrical shock, or fire.
(4).	Install the air conditioner according to the instructions given in this manual. Incomplete installation may cause water leakage, electrical shock, or fire.
(5).	Be sure to use the supplied or specified installation parts. Use of other parts may cause the unit to come to lose, water leakage, electrical shock, or fire.
(6).	Install the air conditioner on a solid base that can support the weight of the unit. An inadequate base or incomplete installation may cause injury in the event the unit falls off the base.
(7).	Electrical work should be carried out in accordance with the installation manual and the national electrical wiring rules or code of practice. Insufficient capacity or incomplete electrical work may cause electrical shock or fire.
(8).	Be sure to use a dedicated power circuit. Never use a power supply shared by another appliance.
(9).	For wiring, use a single length of cable with no connections. Do not use an extension cord. Do not put other loads on the power supply, use a dedicated power circuit. (Failure to do so may cause terminal overheating, electric shock or fire.)
(10).	Use the specified types of wires for electrical connections between the indoor and outdoor units. Firmly clamp the interconnecting wires so their terminals receive no external stresses. Improper connections or clamping may cause terminal overheating or fire.
(11).	After connecting interconnecting and supply wiring be sure to shape the cables so that they do not put undue force on the electrical covers or panels. Install covers over the wires. Improper cover installation may cause terminal overheating, electrical shock, or fire.
(12).	If any refrigerant has leaked out during the installation work, ventilate the room. (The refrigerant produces a toxic gas if exposed to flames.)
(13).	After all installation is complete, check to make sure that no refrigerant is leaking out. (The refrigerant produces a toxic gas if exposed to flames.)
(14).	When installing the system, be sure to keep the refrigerant circuit free from substances other than the specified refrigerant (R410A), such as air. (Any presence of air or other foreign substance in the refrigerant circuit causes an abnormal pressure rise or rupture, resulting in injury.)

## DC Inverter U-match Series Cassette Type Unit

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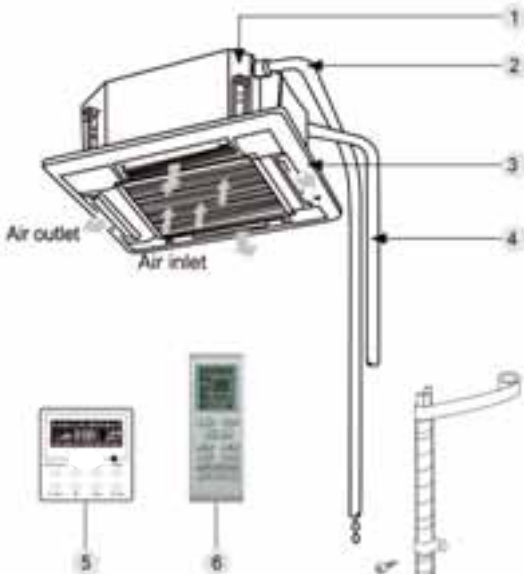
- |   |
|---|
| (15). During pump-down, stop the compressor before removing the refrigerant piping. If the compressor is still running and the stop valve is open during pump-down, air will be sucked in when the refrigerant piping is removed, causing abnormal pressure in the freezer cycle which will lead to breakage and even injury. |
| (16). During installation, attach the refrigerant piping securely before running the compressor. If the compressor is not attached and the stop valve is open during pump-down, air will be sucked in when the compressor is run, causing abnormal pressure in the freezer cycle which will lead to breakage and even injury. |
| (17). Be sure to ground equipment. Do not ground the unit to a utility pipe, arrester, or telephone conduit. Incomplete grounding may cause electrical shock, or fire. A high surge current from lightning or other sources may cause damage to the air conditioner.  |
| (18). Be sure to install ground fault interrupter. Failure to install a ground fault interrupter may result in electric shocks, or fire.  |
| (19). This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge,  |
| (20). Children should be supervised to ensure that they do not play with the appliance.   |
| (21). If the supply cord is damaged, it must be replaced with an appropriate size cord-   |

### **⚠ CAUTION**

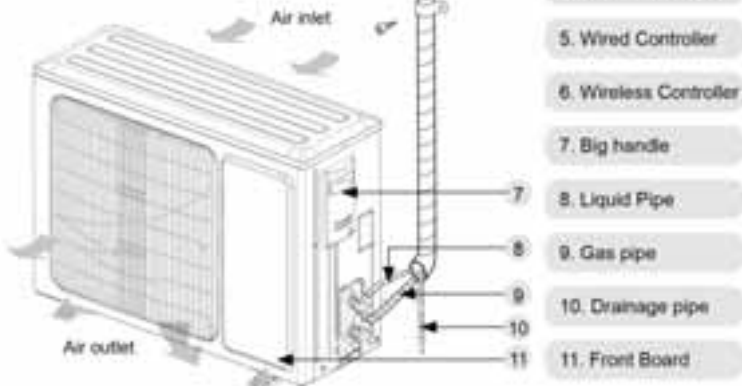
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|---|
| (1). Do not install the air conditioner in a place where there is danger of exposure to inflammable gas leakage. If the gas leaks and builds up around the unit, it may catch fire.       |
| (2). Establish drain piping according to the instructions of this manual. Inadequate piping may cause flooding.   |
| (3). Tighten the flare nut according to the specified method such as with a torque wrench. If the flare nut is tightened too much, the flare nut may crack and cause refrigerant leakage. |

## 2 Outline of the Unit and Main Parts

Indoor



Outdoor



1. Drainage device
2. Drainage pipe
3. Air flow flap
4. Connection pipe
5. Wired Controller
6. Wireless Controller
7. Big handle
8. Liquid Pipe
9. Gas pipe
10. Drainage pipe
11. Front Board

Fig. 2.1

### **NOTICE**

The connection pipe, drain pipe, power cord, and duct for this unit should be prepared by a qualified technician.

## 3 Preparation for Installation

### 3.1 Standard Accessory Parts

The standard accessory parts listed below are furnished and should be used as required.

Table 3.1
















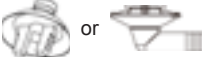
Indoor Unit Accessories				
No.	Name	Appearance	Q'ty	Usage
1	Drain Hose		1	To connect with the hard PVC drain pipe
2	Nut with Washer		4	To fix the hook on the cabinet of the unit (for 24k~48k units)
3	Washer		10	To be used together with the hanger bolt for installing the unit (for 24k~48k units)
4	installation template		1	Used for ceiling drilling
5	Gasket mounting board		4	Used to prevent gasket from falling off
6	Wireless Controller +Battery		1+2	To control the indoor unit
7	sealing plaster		1	
8	Fastener		4	To fasten the sponge
9	Insulation		1	To insulate the gas pipe
10	Insulation		1	To insulate the liquid pipe
11	Sponge		3	To insulate the drain pipe
12	Nut		1	To connect gas pipe
13	Nut		1	To connect liquid pipe
14	Enswathement		2	

Table 3.2

Outdoor Unit Accessories				
No.	Name	Appearance	Q'ty	Usage
1	Drain Plug		1 or 3	To plug the unused drain hole
2	Drainage Connector		1	To connect with the hard PVC drain pipe

## 3.2 Selection of the Installation Location

<b>⚠WARNING</b>	
①.	Check the support structure to verify that it has sufficient load-carrying capacity to support the weight of the unit, and it can be securely mounted.
②.	Do not install where there is a danger of combustible gas leakage.
③.	Do not install the unit near heat source, steam, or flammable gas.
④.	Children should be kept away from unit.

Decide the installation location with the customer as follows:

### 3.2.1 Indoor Unit

Select an installation site where the following conditions are fulfilled and that meets your customer's approval.

- (1). No obstruction should block the air inlet or outlet vents.
- (2). Make sure that the installation meets the requirement of the schematic diagram of installation spaces.
- (3). Check the support structure to verify that it has sufficient load carrying capacity to support 4 times the weight of the indoor unit. Mount the unit securely to reduce vibration noise.
- (4). Unit should be mounted level.
- (5). Select a location with easy access to outdoor unit and convenient condensate drain connection.
- (6). Be sure to leave sufficient space around the unit for service and maintenance. Unit should be mounted a minimum of 1.8M (6 feet) above the floor.
- (7). When installing the suspension bolt, check if the structure can withstand 4 times of the weight of the unit. If not, reinforce it before installation.

**Note:** If the unit is mounted in a kitchen or dining room, there may be build-up of greasy dirt on the fan, heat exchanger and water pump. This will reduce the effectiveness of the system and may cause it to malfunction.

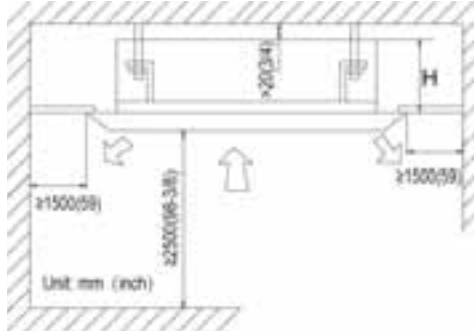


Fig. 3.1

Table 3.3

Models	H mm (inch)
GKU18(5.3)USV2FL	255(10)
GKU24(7.0)USV2FL	260(10-1/4)
GKU30(8.8)USV2FL	340(13-3/8)
GKU36(10.6)USV2FL	340(13-3/8)
GKU42(12.3)USG2FL	340(13-3/8)
GKU48(14.1)USG2FL	320(12-5/8)

### 3.2.2 Outdoor Unit

#### ⚠WARNING

- ①. Install the unit where it will not be tilted by more than 5°.
- ②. The outdoor unit should be securely mounted to withstand high wind.

If possible, do not install the unit where it will be exposed to direct sunlight. (If necessary, install a blind that does not interfere with the air flow.)

- (1). Install the outdoor unit in a place where it will be free from dirt or rain as much as possible.
- (2). Install the outdoor unit where it is convenient to connect with the indoor unit.
- (3). Install the outdoor unit where the condensate water can be drained out



freely during heating operation.

- (4). Do not place animals and plants in the path of the warm air.
- (5). Check the support structure to verify that it has sufficient load-carrying capacity to support the weight of the unit. Mount the unit securely to reduce vibration noise.
- (6). Provide the space shown in Fig. 3.2, so that the air flow is not blocked. Also for efficient operation, leave three of four directions of peripheral constructions open.

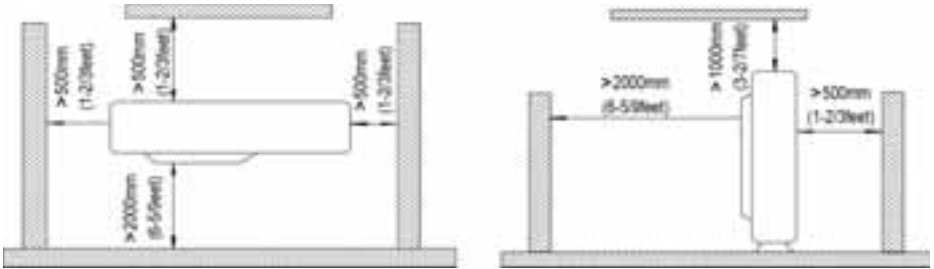


Fig. 3.2

### 3.3 Connection Pipe Requirement

<b>⚠ CAUTION</b>	
The maximum length of the connection pipe is listed in the Table below..	

Table 3.4

Model \ Item	Size of Fitting Pipe mm (inch)		Max. Pipe Length m (feet)	Max. Height Difference between Indoor Unit and Outdoor Unit m (feet)	Drainage pipe(Outer Diameter × wall thickness) mm (inch)
	Liquid	Gas			
GKU18(5.3)USV2FL GXH18(5.3)USV4DH	6(1/4)	12.7(1/2)	20(655)	15(49-1/5)	φ25×1.5 (Φ1 X 0.06)
GKU24(7.0)USV2FL GXH24(7.0)USV4DH	9.5(3/8)	16(5/8)	30(98)	15(49-1/5)	φ25×1.5 (Φ1 X 0.06)
GKU30(8.8)USV2FL GXH30(8.8)USV4DH	9.5(3/8)	16(5/8)	30(98-2/5)	15(49-1/5)	φ25×1.5 (Φ1 X 3/50)
GKU36(10.6)USV2FL GXH36(10.6)USV4DH	9.5(3/8)	16(5/8)	30(98)	15(49-1/5)	φ25×1.5 (Φ1 X 0.06)
GKU42(12.3)USG2FL GXH42(12.3)USV4DH	9.5(3/8)	16(5/8)	50(164)	30(98-2/5)	φ25×1.5 (Φ1 X 3/50)

GKU48(14.1)USG2FL GXH48(14.1)USV4DH	9.5(3/8)	16(5/8)	50(164)	30(98-2/5)	φ25×1.5 (Φ1 X 0.06)
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**Notes:**

- ①. The connection pipe should be insulated with proper water-proof material.
- ②. The pipe wall thickness shall be 0.5~1.0mm (0.02~0.04 inch) and the pipe wall shall be able to withstand the pressure of 6.0MPa (870psig). The shorter the connecting pipe, the better the cooling and heating effect.

### 3.4 Electrical Requirement

Electric Wire Size and Fuse Capacity.

Table 3.5

Indoor Units	Power Supply	Fuse Capacity	Minimum Circuit Ampacity	Maximum Overcurrent Protection
	V/Ph/Hz	A	A	A
GKU18(5.3)USV2FL	208/230V ~ 60Hz	5	1	15
GKU24(7.0)USV2FL	208/230V ~ 60Hz	5	1	15
GKU30(8.8)USV2FL	208/230V ~ 60Hz	5	1.5	15
GKU36(10.6)USV2FL	208/230V ~ 60Hz	5	1.5	15
GKU42(12.3)USG2FL	208/230V ~ 60Hz	5	1.5	15
GKU48(14.1)USG2FL	208/230V ~ 60Hz	5	2	15

Table 3.6

Outdoor Units	Power Supply	Fuse Capacity	Minimum Circuit Ampacity	Maximum Overcurrent Protection
	V/Ph/Hz	A	A	A
GXH18(5.3)USV4DH	208/230V ~ 60Hz	5	17	25
GXH24(7.0)USV4DH	208/230V ~ 60Hz	5	24	40
GXH30(8.8)USV4DH	208/230V ~ 60Hz	5	24	40
GXH36(10.6)USV4DH	208/230V ~ 60Hz	5	29	45
GXH42(12.3)USV4DH	208/230V ~ 60Hz	5	31	50
GXH48(14.1)USV4DH	208/230V ~ 60Hz	5	45	70

**Notes:**

- ①. The fuse is located on the main board.
- ②. Install the disconnect device with a contact gap of at least 3mm (1/8inch) in all poles nearby the units (Both indoor unit and outdoor unit).The appliance must be positioned so that the plug is accessible.

- ③. Use 2 pieces of power cord of  $0.75\text{mm}^2$  (AWG18) as the communication lines between indoor and outdoor unit, with their longest lengths of 50m (164feet). Please select the appropriate line length per the actual installation conditions. The communication lines can not be twisted together. For the unit ( $\leq 30\text{k}$ ), it's recommended to use 8m (26feet) long communication line.
- ④. Take 2 pieces of power cord of  $0.75\text{mm}^2$  (AWG18) as the communication lines between the wired controller and the indoor unit, with their longest lengths of 30m (98-  $\frac{1}{2}$  feet). Please select the appropriate line length as per the actual installation conditions. The communication lines can not be twisted together. It's recommended to use 8m (26feet) long communication line.
- ⑤. The wire size of the communication line should be no less than  $0.75\text{mm}^2$  (AWG18). It's recommended to take  $0.75\text{mm}^2$  (AWG18) power cords as the communication line.

## 4 Installation of the Unit

### 4.1 Installation of the Indoor Unit

#### 4.1.1 Indoor unit dimension

For the units: GKU18(5.3)USV2FL

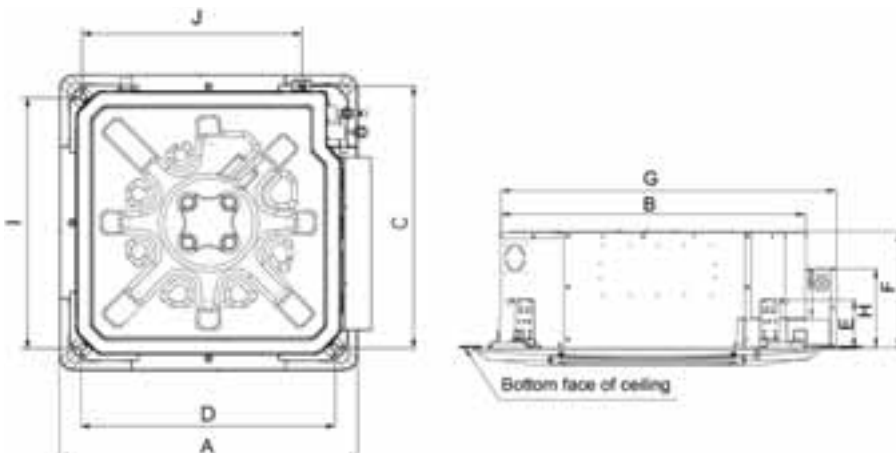


Table 4.1

Unit: mm (inch)

Item Model	A	B	C	D	E	F	G	H	I	J
GKU18(5.3) USV2FL	670 (26-3/8)	596 (23-1/2)	592 (23-1/4)	575 (22-5/8)	145 (5-3/4)	240 (9-1/2)	665 (26-1/8)	236 (9-1/4)	575 (22-5/8)	505 (19-7/8)

For the units: GKU24(7.0)USV2FL ~ GKU42(12.3)USG2FL

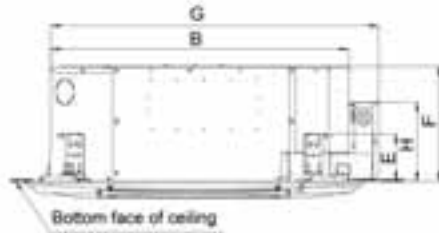
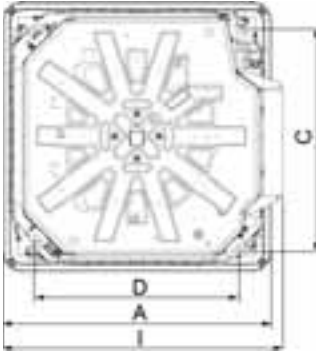


Table 4.2

Unit: mm (inch)

Item Model	A	B	C	D	E	F	G	H	I
GKU24(7.0)USV2FL	950 (37-3/8)	840 (33-1/8)	780 (30-3/4)	680 (26-3/4)	160 (6-1/4)	240 (9-1/2)	917 (36-1/8)	215 (8-1/2)	993 (39-1/8)
GKU30(8.8)USV2FL	950 (37-3/8)	840 (33-1/8)	780 (30-3/4)	680 (26-3/4)	160 (6-1/4)	320 (12-5/8)	917 (36-1/8)	215 (8-1/2)	993 (39-1/8)
GKU36(10.6)USV2FL	950 (37-3/8)	840 (33-1/8)	780 (30-3/4)	680 (26-3/4)	160 (6-1/4)	320 (12-5/8)	917 (36-1/8)	215 (8-1/2)	993 (39-1/8)
GKU42(12.3)USG2FL	950 (37-3/8)	840 (33-1/8)	780 (30-3/4)	680 (26-3/4)	160 (6-1/4)	320 (12-5/8)	917 (36-1/8)	215 (8-1/2)	993 (39-1/8)

For the units: GKU48(14.1)USG2FL

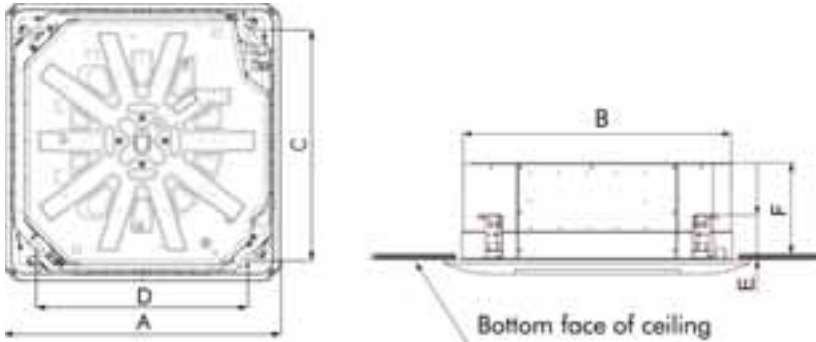


Fig. 4.1

Table 4.3

Unit: mm (inch)

Item	A	B	C	D	E	F
GKU48(14.1) USG2FL	1040(41)	910(35-7/8)	842(33-1/8)	788(31)	170(6-3/4)	290(11-3/8)

### 4.1.2 Installing the Main Body Unit

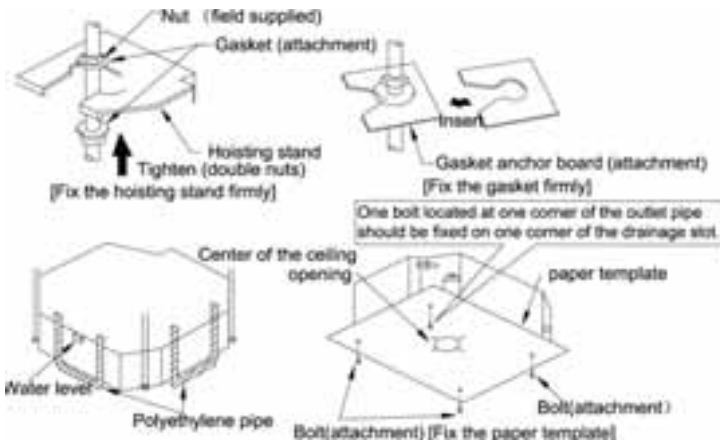


Fig. 4.2

- (1). Install the hoisting stand on the hoisting screw by using nuts and gaskets at both the upper and lower sides of the hoisting stand. To prevent the gasket from breaking off, a gasket anchor board should be used.
- (2). Install the paper template on the unit, and fix the drain pipe at the outlet

vent.

- (3). Adjust the unit to the best position.
- (4). Check if the unit is installed level in four directions. If not, the water pump and the float switch will malfunction and may cause leakage.
- (5). Remove the gasket anchor board and tighten the nut.
- (6). Remove the paper template.

### 4.1.3 Installing the Suspension Bolts

- (1). Using the installation template, drill holes for bolts (four holes) (Fig. 4.3).
- (2). Install the bolts to the ceiling at a place strong enough to hang the unit. Mark the bolt positions from the installation template. With a concrete drill, drill four 12.7mm (1/2inch) diameter holes (Fig. 4.4).
- (3). Insert the anchor bolts into the drilled holes, and drive the pins completely into the anchor bolts with a hammer (Fig. 4.5).



Fig. 4.3

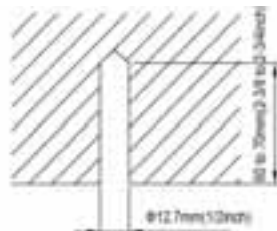


Fig. 4.4

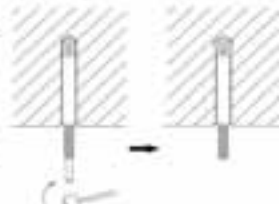


Fig. 4.5

### 4.1.4 Leveling

The water level test must be done after installing the indoor unit to make the unit is level, as shown below.

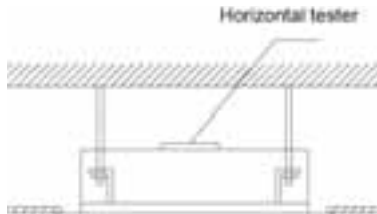


Fig. 4.6

## 4.2 Installation of the Outdoor Unit

### ▲WARNING

- ①. Install the unit where it will not be tilted by more than 5°.
- ②. During installation, if the outdoor unit has to be exposed to strong wind, it must be fixed securely.

### 4.2.1 Outdoor unit dimension

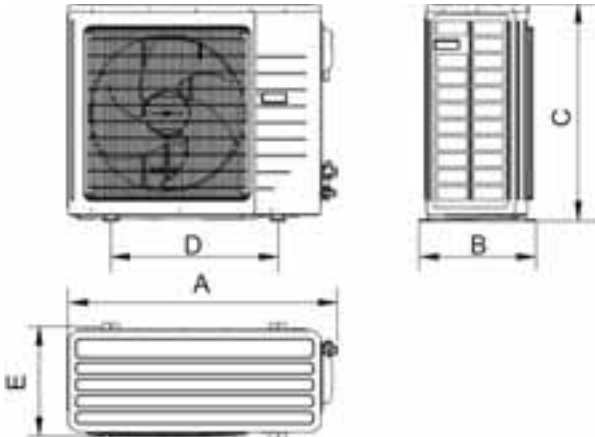


Fig. 4.7

Table 4.4

Unit: mm (inch)

Item Model	A	B	C	D	E
GXH18(5.3)USV4DH	955(37-5/8)	396(15-5/8)	700(27-1/2)	560(22)	360(14-1/8)
GXH24(7.0)USV4DH	980(38-5/8)	427(16-3/4)	790(31-1/8)	610(24)	395(15-1/2)
GXH30(8.8)USV4DH					
GXH36(10.6)USV4DH	1107(43-5/8)	440(17-3/8)	1100(43-1/4)	631(24-7/8)	400(15-3/4)
GXH42(12.3)USV4DH	958(37-3/4)	412(16-1/4)	1349(53-1/8)	572(22-1/2)	376(14-3/4)
GXH48(14.1)USV4DH					

### 4.2.2 Condensate Drainage of the Outdoor Unit (for the heat pump unit only) (Fig. 4.8)

- (1). It is required to install a drain pipe for the outdoor unit to drain condensate water during heating operation (only for the heat pump unit).
- (2). All holes, with the exception of the drain pipe hole, should be plugged so as to avoid water leakage (only for the heat pump unit).
- (3). Installation Method: Insert the pipe joint into the  $\phi 25\text{mm}$  (1inch) hole

located at the base plate of the unit and then connect the drain pipe to the pipe joint.

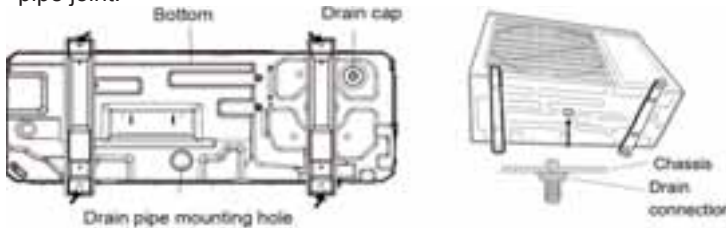


Fig. 4.8

## 4.3 Installation of the Connection Pipe

### 4.3.1 Flare Proces

- (1). Cut the connection pipe with pipe cutter and remove the burrs.
- (2). Hold the pipe downward to prevent cuttings from entering the pipe.
- (3). Remove the flare nut from the stop valve on the outdoor unit. Get another flare nut from the accessory bag for the indoor unit. Insert pipe through flare nuts. Flare the connection with a flaring tool
- (4). Check if the flare part is spread evenly and there are no cracks (see Fig. 4.9).

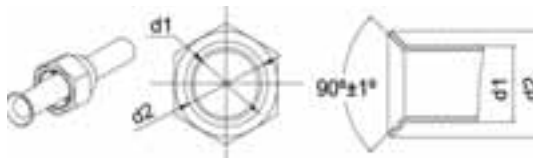


Fig. 4.9

### 4.3.2 Bending Pipes

- (1). Extend the pipe by hand. Be careful not to crimp it.

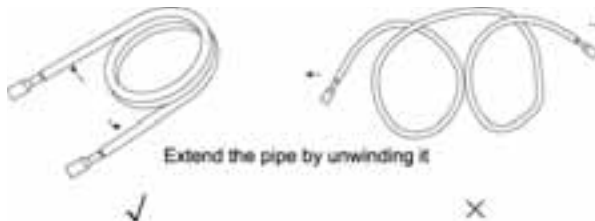


Fig. 4.10



- (2). Do not bend the pipes in an angle more than 90°.
- (3). When pipes are repeatedly bent or stretched, the material will weaken making it more likely to break. Do not bend or stretch the pipes more than three times.
- (4). For best results, cut insulation before bending, as shown in fig. 4.12. Bend pipe as needed and secure insulation with tape.

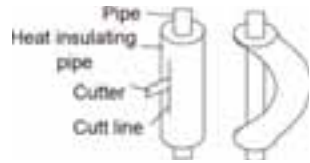


Fig. 4.11

### ⚠ CAUTION

- ①. To prevent breaking of the pipe, avoid sharp bends. Bend the pipe with a radius of curvature of 150mm (5-7/8inch) or more.
- ②. If the pipe is bent repeatedly at the same place, it will break.

### 4.3.3 Connecting the Pipe at the Indoor Unit Side

Detach the caps and plugs from the pipes.

### ⚠ CAUTION

- ①. Be sure to attach the pipe on the indoor unit correctly. Center the flare nut on the fitting before tightening. Do not force the nut to turn or the threads will be damaged and the system will leak.
- ②. Do not remove the flare nut until the connection pipe is to be connected so as to prevent dust and impurities from coming into the pipe system.

When connecting the pipe to the unit or removing it from the unit, please use a torque wrench (Fig. 4.12).

When connecting, smear both inside and outside of the flare nut with lubricant, screw it hand tight and then tighten it with the torque wrench.

Refer to Table 4.5 to check if the wrench has been tightened properly (too tight would mangle the nut and lead to leakage).

Examine the connection pipe to see if it leaks, then apply heat insulation sheath, as shown in the Fig. 4.12.

Use the medium-sized sponge to insulate the coupler of the gas pipe.

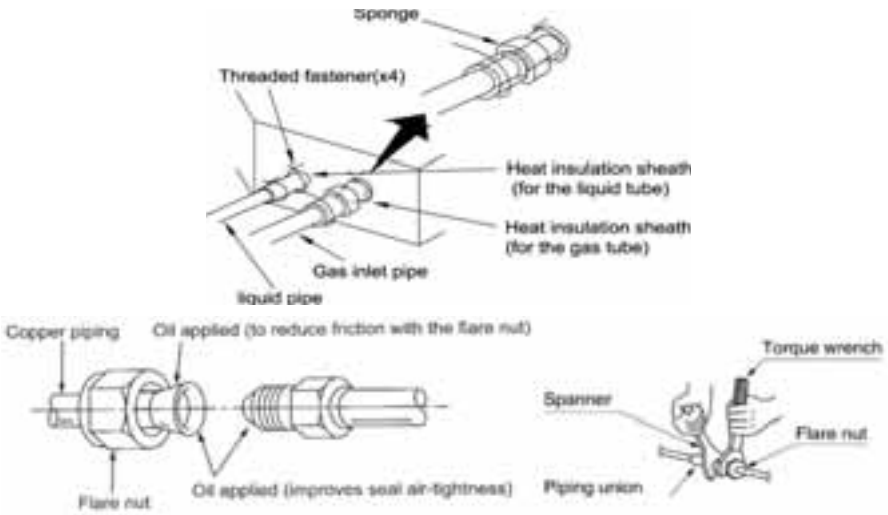


Fig. 4.12

Table 4.5 Flare nut tightening torque

Pipe Diameter	Tightening Torque
6mm (1/4inch)	15~30N·m (11~22ft.-lb.)
9.5mm (3/8inch)	35~40N·m (26~29ft.-lb.)
12.7mm (1/2inch)	45~50N·m (33~37ft.-lb.)
16mm (5/8inch)	60~65N·m (44~48ft.-lb.)

**CAUTION**

Be sure to connect the gas pipe after connecting the liquid pipe completely.

### 4.3.4 Connecting the Pipe at the Outdoor Side Unit

Tighten the flare nut of the connection pipe at the outdoor unit valve connector. The tightening method is the same as that as at the indoor side.

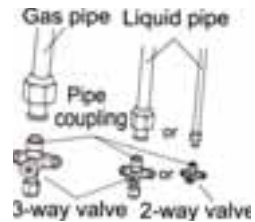


Fig. 4.13

### 4.3.5 Checking the Pipe Connections for Gas Leaks

For both indoor and outdoor unit, be sure to check the joints for gas leaks with a

gas leakage detector.

### 4.3.6 Heat Insulation on the Pipe Joints (Indoor Side Only)

Attach coupler heat insulation (large and small) to the pipe connections.

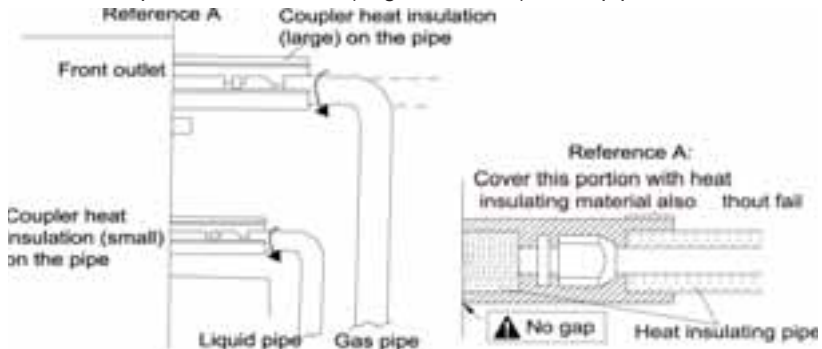


Fig. 4.14

### 4.3.7 Liquid Pipe and Drain Pipe

- (1). If the outdoor unit is installed lower than the indoor unit (See Fig. 4.15)
  - 1). A drain pipe should terminate above ground level without being submersed into water. All pipes must be attached to the wall with clamps.
  - 2). Wrap tape around pipe starting at the bottom and working up.
  - 3). All pipes must be bound together by tape and attached to wall with clamps.

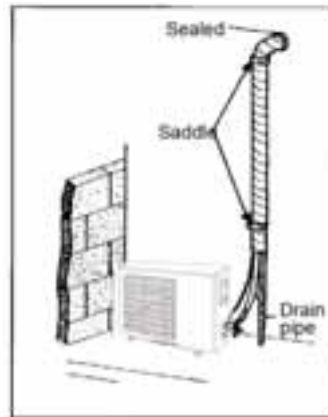


Fig. 4.15

- (2). If the outdoor unit is installed higher than the indoor unit (See Fig. 4.16)
  - 1). Wrap tape from the lower end working up.
  - 2). All pipes must be bound and taped together. A trap must be installed to prevent water from returning to the room.
  - 3). Attach all pipes to the wall with clamps.

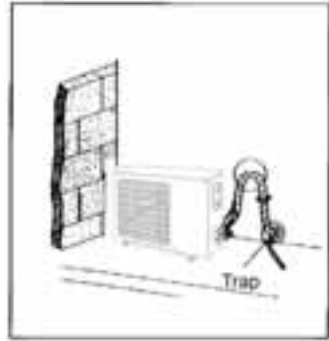


Fig. 4.16

## 4.4 Vacuum and Gas Leakage Inspection

### **CAUTION**

Do not purge the air with refrigerants but use a vacuum pump to vacuum the installation! There is no extra refrigerant in the outdoor unit for air purging!

### 4.4.1 Vacuum

- (1). Remove the caps of the liquid valve, gas valve and also the service port.
- (2). Connect the hose at the low pressure side of the manifold valve assembly to the service port of the unit's gas valve. The gas and liquid valves should be kept closed in case of refrigerant leak.
- (3). Connect the hose used for evacuation to the vacuum pump.
- (4). Open the switch at the lower pressure side of the manifold valve assembly and start the vacuum pump. The switch at the high pressure side of the manifold valve assembly should be kept closed, otherwise evacuation would fail.
- (5). The evacuation duration depends on the unit's capacity, generally, 20 minutes for the 18k units, 30 minutes for the 24k/30k/36k units, 45 minutes for the 42k/48k units. Verify that the pressure gauge at the low pressure side of the manifold valve assembly reads  $-1.0\text{MPa}$  (145psig). If it doesn't, it indicates there is leak somewhere. If that is the case, close the switch fully and stop the vacuum pump.
- (6). Wait for some time to see if the system pressure can remain unchanged, 3 minutes for the 18k/24k units, 10 minutes for the 30k/36k/42k/48k units. During this time, the reading of the pressure gauge at the low pressure side

can not be larger than 0.005MPa (0.72psig).

- (7). Slightly open the liquid valve and let some refrigerant into the connection pipe to balance the pressure inside and outside of the connection pipe, so that air will not come into the connection pipe when removing the hose. Note that the gas and liquid valve can be opened fully only after the manifold valve assembly is removed.
- (8). Replace the caps of the liquid valve, gas valve and service port.

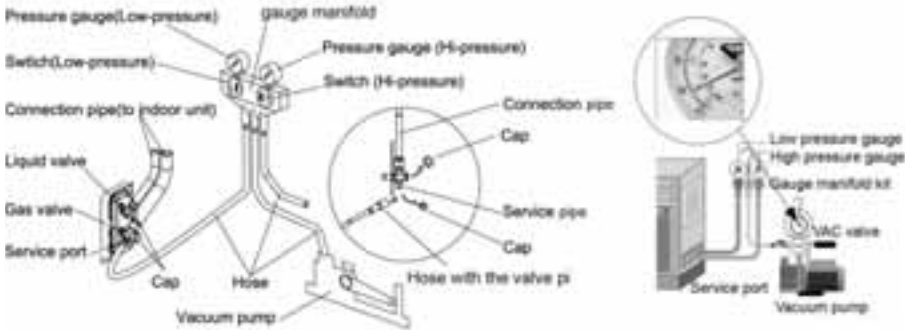


Fig. 4.17

**Note:** For the large-sized unit, it has the service port for both the gas valve and the liquid valve. During evacuation, it is possible to connect two hoses of the manifold valve assembly to two service ports to quicken the evacuating speed.

#### 4.4.2 Additional Charge

Refrigerant suitable for a piping length of 7.6m (25feet) is charged in the outdoor unit at the factory. When the piping is longer than 7.6m (25feet), additional charging is necessary.

For the additional amount, see Table 4.6.

Table 4.6

Item Model	Additional Refrigerant Amount for Extra Pipe
18k	45g per 1.5m (1.6 ounce per 5 feet )
24k~48k	90g per 1.5m (3.2 ounce per 5 feet )

When the height difference between the indoor unit and outdoor unit is more than 10m (33 feet), an oil bend should be employed for every 6m (20 feet).

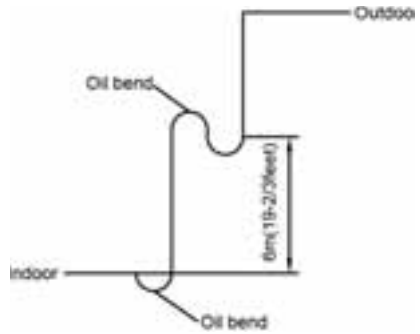


Fig. 4.18

## 4.5 Installation of the Drain Hose

### 4.5.1 Installation of Drain Piping

- (1). Keep piping as short as possible and slope it downwards at a gradient of at least 1/100 so that air may not remain trapped inside the pipe.
- (2). Keep pipe size equal to or greater than that of the connecting pipe.
- (3). Install the drain piping as shown to avoid condensation. Improperly rigged piping could lead to.

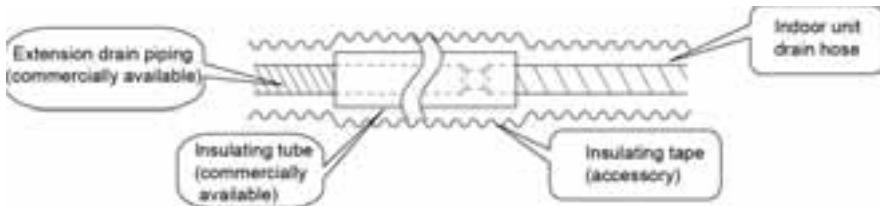
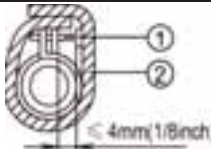
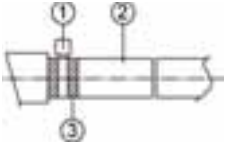


Fig. 4.19

### 4.5.2 Installing the Drain Pipes

- (1). Insert the drain pipe to the drain outlet of the unit and then secure the clamp with tape.
- (2). Connect the extension drain pipe to the drain pipe and then secure the clamp with tape

	
<p>Tighten the clamp until the screw head is less than 4mm (1/8inch) from the hose.</p> <p>①. Metal clamp (accessory) ②. Insulation sponge (accessory)</p>	<p>Insulate the pipe clamp and the drain hose using heat insulation sponge.</p> <p>①. Metal clamp ②. Drain hose (accessory) ③. Grey tape (accessory)</p>

- (3). When multiple drain hoses are used, they should be installed as shown in Fig. 4.20. Select converging drain pipes whose gauge is suitable for the operating capacity of the unit (take the cassette type unit for example).

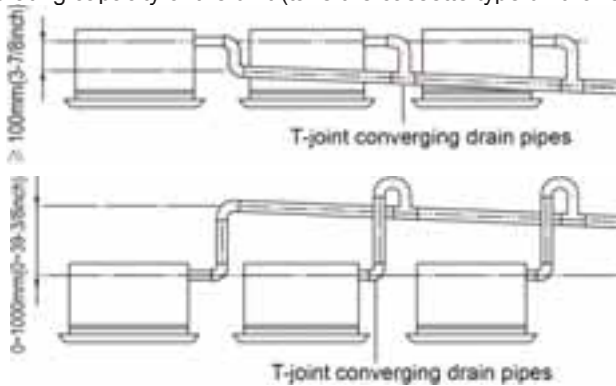


Fig. 4.20

- (4). When the drain hose cannot keep a sufficient gradient, it is necessary to fit a riser pipe (field supplied) to it.
- (5). If the air flow of indoor unit is high, this might cause negative pressure and result in return suction of outdoor air. Therefore, U-type water trap shall be designed on the drainage side of each indoor unit (Fig. 4.21).
- (6). Install one water trap for each unit.
- (7). Install the water trap so that it will be easy to access for future cleaning.

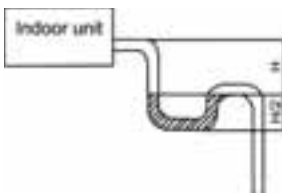


Fig. 4.21

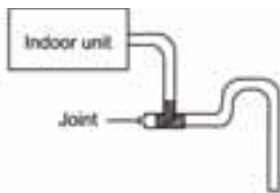


Fig. 4.22

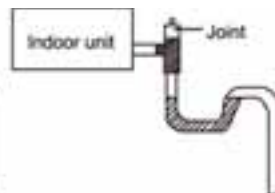


Fig. 4.23

- (8). Connect the drainage branch pipe to the standpipe or horizontal pipe of drainage main pipe. The horizontal pipe cannot be connected to the vertical pipe at a same height. It must be connected in a manner as shown below:
- NO.1: Attach the 3-way connection of the drainage pipe joint as shown in Fig. 4.24.
- NO.2: Attach the drain elbow as shown in Fig. 4.25.
- NO.3: Attach the horizontal pipe as shown in Fig. 4.26.

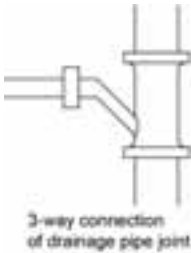


Fig. 4.24

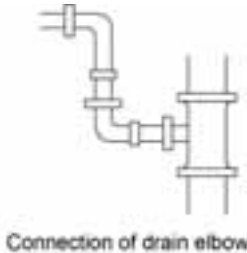


Fig. 4.25

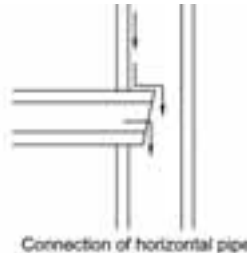


Fig. 4.26

### 4.5.3 Precautions When Doing Riser Piping Work

- (1). Make sure that heat insulation is applied as shown below to prevent any possible water leakage due to condensation.
  - 1). Connect the drain hose to the drain lift pipe, and insulate them.
  - 2). Connect the drain hose to the drain outlet on the indoor unit, and secure it with the clamp.

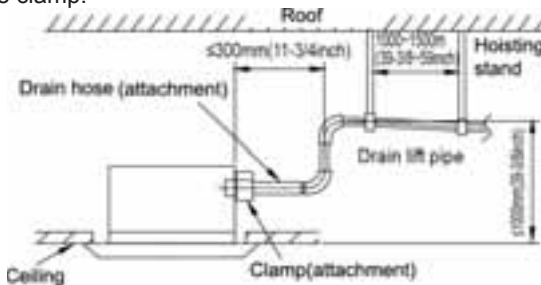


Fig. 4.27

- (2). Make sure the lift pipe is less than 280mm (11inch).
- (3). Stand the lift pipe vertically, and make sure it is not more than 300mm (12 inch) from the base of the drain outlet.
- (4). Secure a downward gradient of 1/100 or more for the drain pipe. To accomplish this, mount supporting brackets at an interval of 1~1.5m (3~5feet).



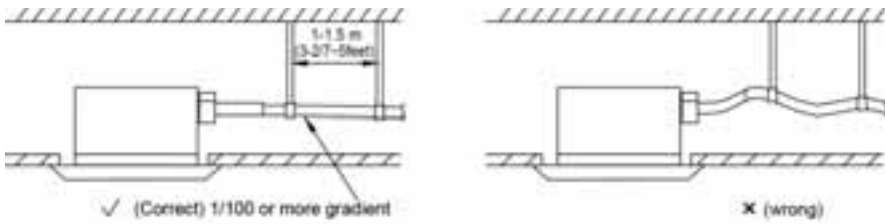


Fig. 4.28

- (5). The incline of attached drain hose should be 75mm (3inch) or less so that the drain outlet does not have to withstand additional pressure.

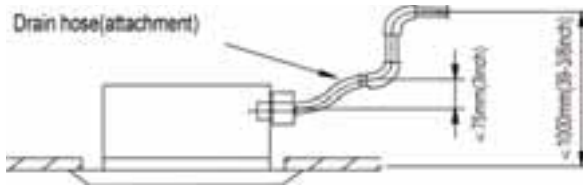


Fig. 4.29

#### 4.5.4 Testing of Drain Piping

After piping work is finished, check if drainage flows smoothly.

Shown in the Fig. 4.30, Add approximately 1liter/quart of water slowly into the drain pan and check drainage flow during COOL running.

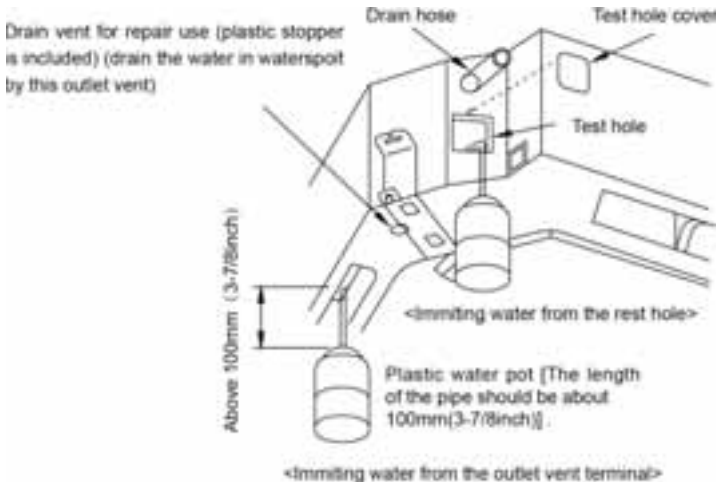


Fig. 4.30

## 4.6 The Panel Installation

### 4.6.1 Precautions

- (1). See the Figure below for the relationship of the front panel and the connecting pipe.

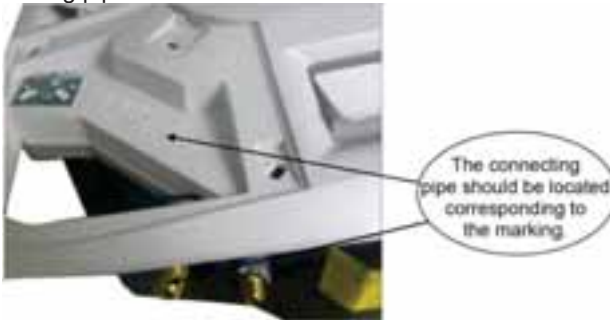


Fig. 4.31

- (2). Panel must be securely fastened or condensate could leak from the unit as shown in Fig. 4.32.

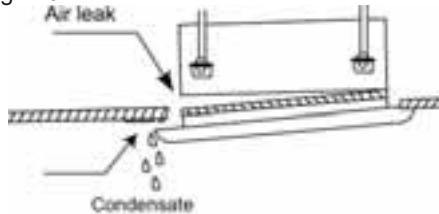


Fig. 4.32

- (3). If gap still exists between ceiling and decorative panel after tightening the screws, readjust the height of the indoor unit (Fig. 4.33).

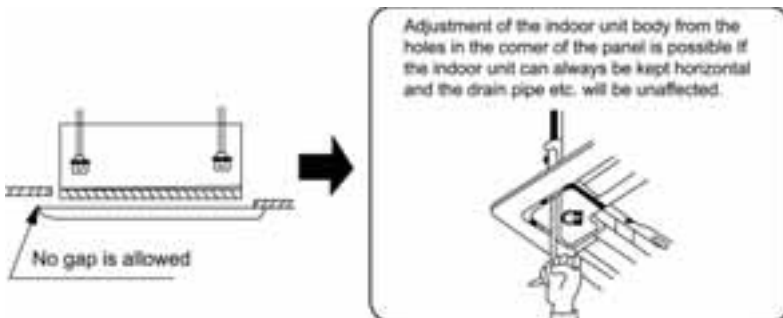


Fig. 4.33

- (4). Wire the swing flap motor and lamps to the main body according to the size of Terminals and the connection cord color as shown in Fig.4.34.

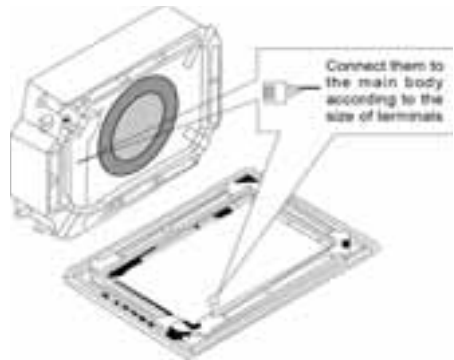


Fig. 4.34

## 4.6.2 Installing the Panel

- (1). Place the panel at the unit, and latch the hooks beside and opposite the swing flap motor.
- (2). Latch other two hooks.
- (3). Tighten four hexagonal screws under the latches about 15mm (5/8inch).
- (4). Adjust the panel along the direction indicated by the arrow as shown in Fig. 4.35.
- (5). Tighten the screws until the thickness of the sealing material between the panel and the indoor unit reduces to 5~8mm (1/4~3/8inch).

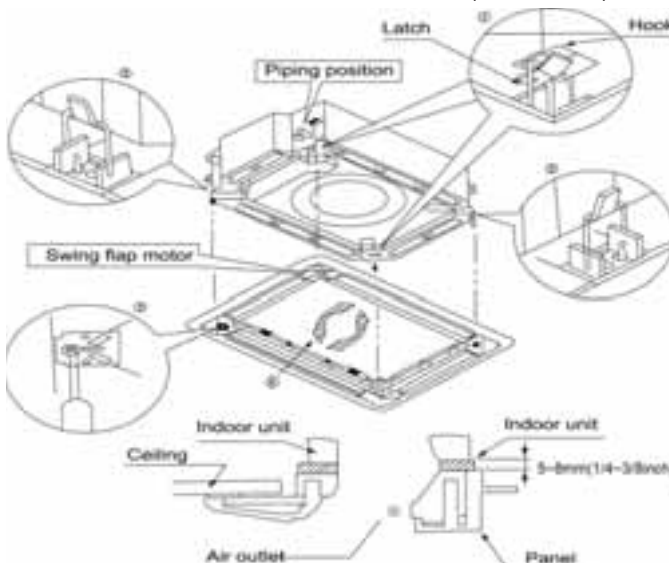


Fig. 4.35

## 4.7 Electrical Wiring

### 4.7.1 Wiring Precautions

<b>⚠WARNING</b>	
①.	Before obtaining access to terminals, all supply circuits must be disconnected.
②.	The rated voltage of the unit is as shown as Table 3.5 and Table 3.6.
③.	Before turning on, verify that the voltage is within the 187~252V range (for single phase units).
④.	Always use a dedicated branch circuit and install a dedicated receptacle to supply power to the air conditioner.
⑤.	Use a dedicated branch circuit breaker and receptacle matched to the capacity of the air conditioner.
⑥.	The dedicated branch circuit breaker is installed in the permanent wiring. Always use a circuit that can trip all the poles of the wiring and has an isolation distance of at least 3mm (1/8inch) between the contacts of each pole.
⑦.	Perform wiring work in accordance with standards so that the air conditioner can be operated safely.
⑧.	Install a dedicated circuit breaker in accordance with the related laws and regulations and standards.

<b>⚠CAUTION</b>	
①.	The power source capacity must be the sum of the air conditioner current and the current of other electrical appliances.
②.	When the voltage is low, the air conditioner will not run properly. Supply voltage will need to be adjusted..

### 4.7.2 Electrical Wiring

(1). For solid core wiring (Fig. 4.36)

- 1). Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation about 25mm (1inch).
- 2). Using a screwdriver, remove the terminal screw(s) on the terminal board.
- 3). Using pliers, bend the solid wire to form a loop suitable for the terminal screw.
- 4). Shape the loop wire properly, place it on the terminal board and tighten securely with the terminal screw using a screwdriver.

(2). For strand wiring (Fig. 4.36)

- 1). Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation about 10mm (3/8inch).

- 2). Using a screwdriver, remove the terminal screw (s) on the terminal board.
- 3). Using a round terminal fastener or pliers, securely clamp a round terminal to each stripped wire end.
- 4). Position the round terminal wire, and replace and tighten the terminal screw with a screwdriver (Fig. 4.37).

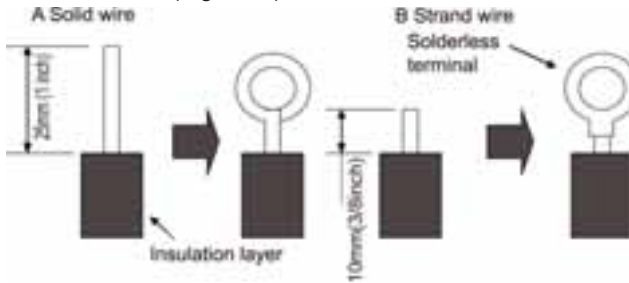


Fig. 4.36

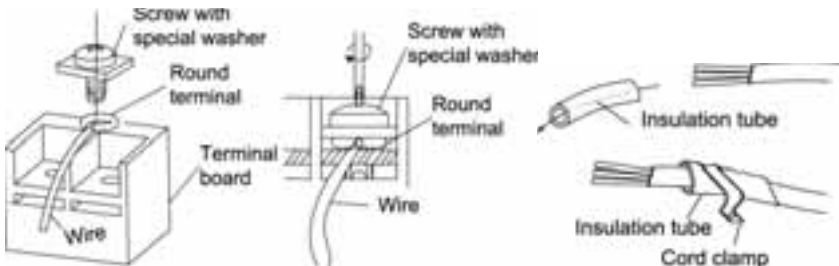


Fig. 4.37

Fig. 4.38

(3). How to fix connection cord and power cord with cord clamp

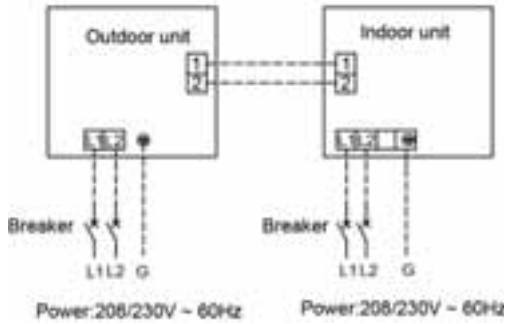
After passing the connection cord and power cord through the insulation tube, fasten it with the cord clamp (Fig. 4.38).

**⚠ WARNING**

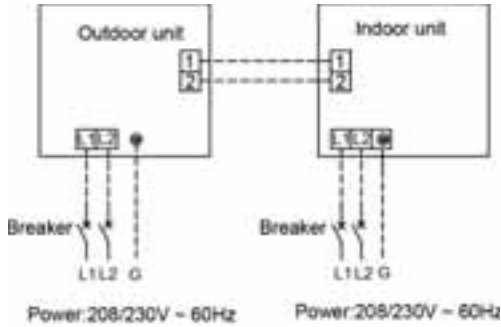
- ①. Before starting work, check that power is not being supplied to the indoor unit and outdoor unit.
- ②. Match the terminal block numbers and connection cord colors with those of the indoor unit side. Improper wiring may damage the electric parts.
- ③. Connect the connection cords firmly to the terminal block. Improper installation may cause a fire.
- ④. Always fasten the outside covering of the connection cord with cord clamps. (If the insulator is not clamped, electric short may occur.)
- ⑤. Always connect the ground wire.

(4). Electric wiring between the indoor and outdoor units

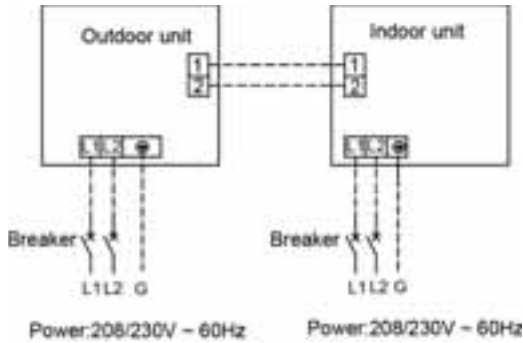
Single-phase units: 18k



Single-phase units: 24k~30k



Single-phase units: 36k~42k



Single-phase units: 48k

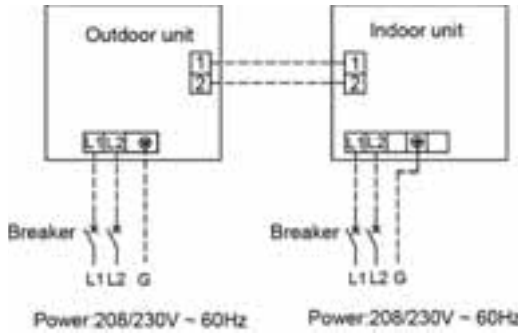
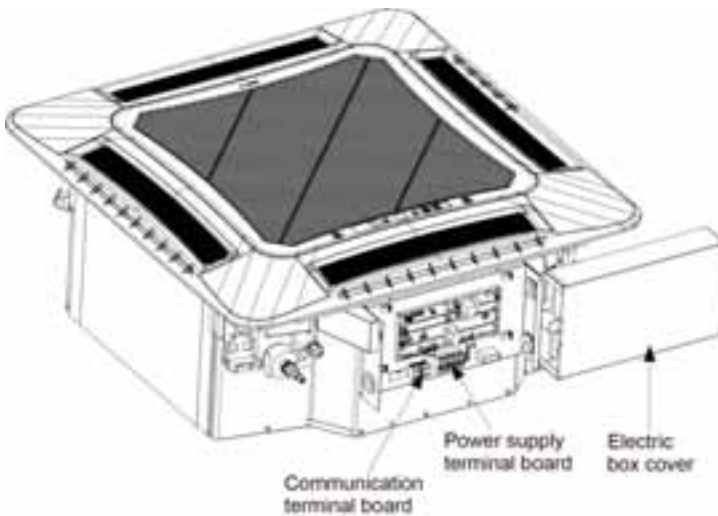


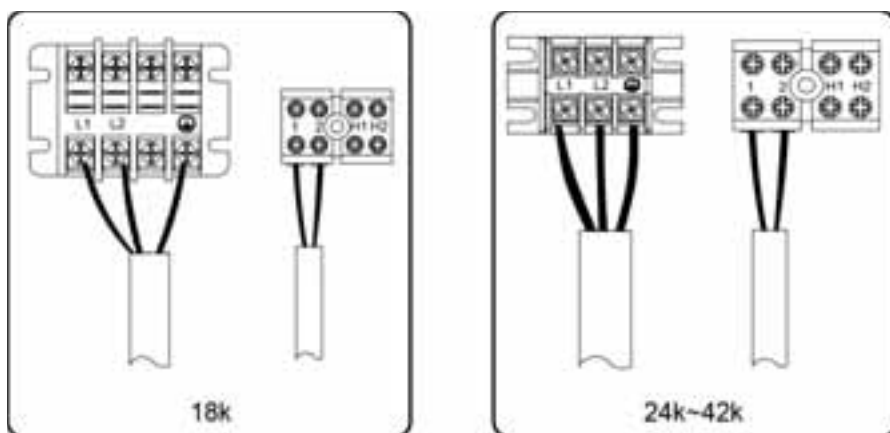
Fig. 4.39

(5). Electric wiring of indoor unit

Remove the cover from the electric box sub-assy and then connect the wire.

For the units: 18k~42k





For the units: 48k

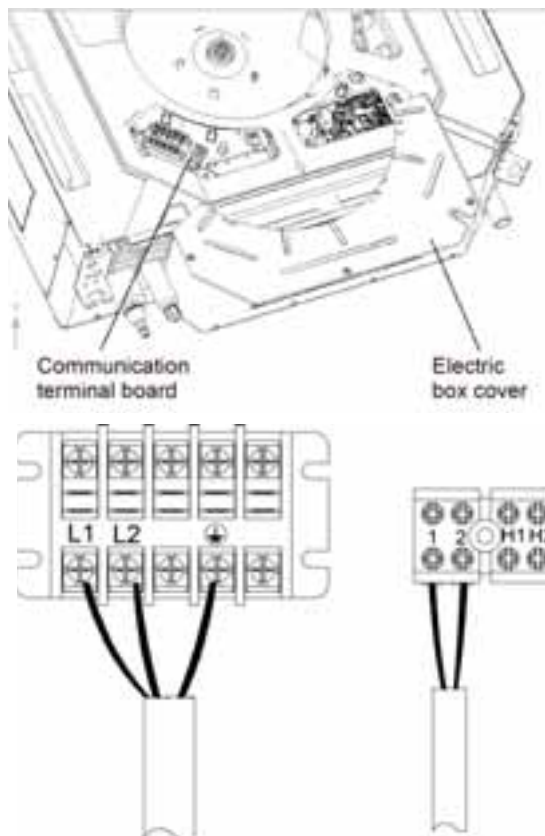


Fig. 4.40



**CAUTION**

- ①. The power cord and the wire of the fresh air valve are high-voltage, while the communication cord and connection wire of the wired controller are low-voltage. They should run separately to protect against electromagnetic interference.
- ②. The high-voltage and low-voltage lines should pass through the rubber rings at different electric box covers.
- ③. Do not bundle the connection wire of the wired controller and the communication cord together, or arrange them in parallel, otherwise improper operation would occur.
- ④. The high-voltage and low-voltage lines should be fixed separately and securely, with internal big clamps for the former and small clamps for the latter.
- ⑤. Tighten the indoor/outdoor connection cord and power cord respectively on the terminal boards with screws. Faulty connection may cause a fire.
- ⑥. If the indoor unit connection cord (to the outdoor unit) and power supply are wired incorrectly, the air conditioner may be damaged.
- ⑦. Connect the indoor unit connection cord properly based on the corresponding marks as shown in Fig. 4.39.
- ⑧. Ground both the indoor and outdoor units by attaching a ground wire.
- ⑨. Unit shall be grounded in compliance with the applicable local and national codes.

## (6). Electric wiring of outdoor unit side

**NOTICE!** When connecting the power supply cord, make sure that the phase of the power supply matches with the exact terminal board. If not, the compressor will rotate backward and be damaged.

Remove the big handle (18k~30k) /front board (36k~48k) of the outdoor unit and insert the end of the communication cord and the power cable into the terminal board.

Single phase:

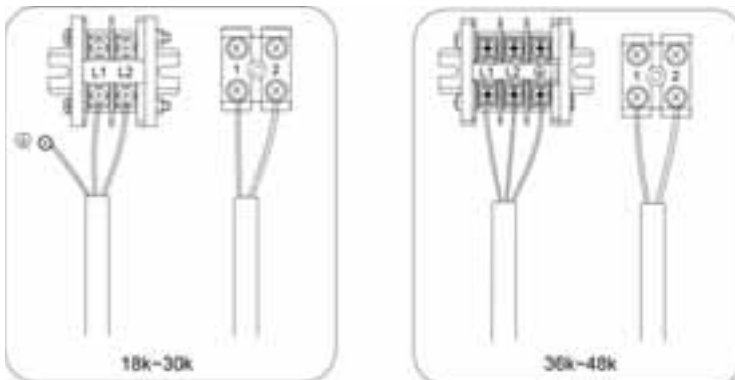


Fig. 4.41

## 5 Installation of Controllers

Refer to the Installation Manual of the controller for more details.

## 6 Testing

### 6.1 Trial Operation and Testing

(1). The meaning of error codes as shown below:

Table 6.1

Number	Error code	Error	Remarks
1	E1	Compressor high pressure protection	
2	E2	Indoor anti-freeze protection	
3	E3	Compressor low pressure protection, refrigerant lack protection and refrigerant collecting mode	
4	E4	Compressor high discharge temperature protection	
5	E6	Communication error	
6	E8	Indoor fan motor error	
7	E9	Full water protection	
8	F0	Indoor ambient temperature sensor error	
9	F1	Evaporator temperature sensor error	
10	F2	Condenser temperature sensor error	
11	F3	Outdoor ambient temperature sensor error	
12	F4	Discharge temperature sensor error	
13	F5	Temperature sensor error of wired controller	
14	C5	Capacity code error	
15	EE	Outdoor memory chip error	
16	PF	Electric box sensor error	
17	H3	Compressor overload protection	
18	H4	Overloading	
19	H5	IPM protection	
20	H6	DC fan motor error	
21	H7	Drive desynchronizing protection	
22	HC	PFC protection	
23	Lc	Activation failure	

24	Ld	Compressor phase sequence protection	
25	LE	Compressor stalling protection	
26	LF	Power protection	
27	Lp	Indoor and outdoor mismatch	
28	U7	4-way valve direction changing protection	
29	P0	Drive reset protection	
30	P5	Over-current protection	
31	P6	Communication error between main control and drive	
32	P7	Drive module sensor error	
33	P8	Drive module over temperature protection	
34	P9	Zero passage protection	
35	PA	AC current protection	
36	Pc	Drive current error	
37	Pd	Sensor connecting protection	
38	PE	Temperature drift protection	
39	PL	Bus low voltage protection	
40	PH	Bus high voltage protection	
41	PU	Charge loop error	
42	PP	Input voltage abnormality	
43	ee	Drive memory chip error	

**NOTICE!** When the unit is connected with the wired controller, the error code will be simultaneously shown on it.

(2). Error Indicating Lamps on the Panel of the Cassette Type Unit.

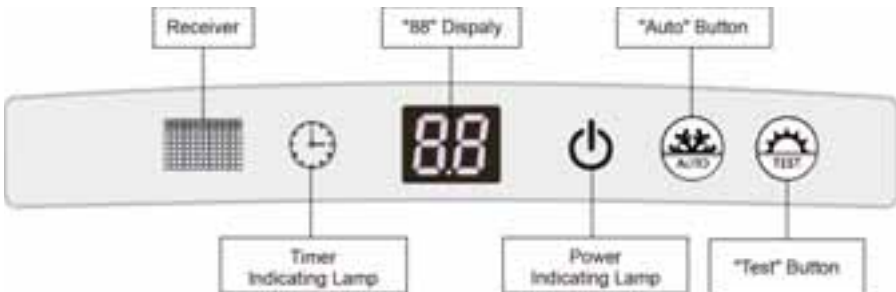


Fig.6.1

◆ **Power and ON/OFF Indicating Lamp:**

A red light indicates the unit has power running to it. A white light indicates the unit is running.

◆ **Timer Indicating Lamp:**

A yellow light indicates the timer has been set. No light is shown when no timer setting has been selected.

◆ **“88” Display:**

If there is an error code, it will display. If there is more than one error code, they will alternately display.

Once there is a valid signal from the remote control, and there are no other error codes, the temp setup will display for 5s. After 5s the indoor temp will display..

If the grille of the front panel is opened, the panel can still call for the following functions by pressing the “Auto” button and the nearby “Test” button simultaneously for five seconds when the unit is “Off”.

## 6.2 Working Temperature Range

Table 6.2

Test Condition	Indoor Side		Outdoor Side	
	DB(°C/°F)	WB(°C/°F)	DB(°C/°F)	WB(°C/°F)
Nominal Cooling	26.7(80.0)	19.4(67.0)	35.0(95.0)	23.9(75.0)
Nominal Heating	21.1(70.0)	15.6(60.0)	8.33(47.0)	6.11(43.0)
Rated Cooling	26.7(80.0)	19.4(67.0)	46.1(115.0)	23.9(75.0)
Low Temp. Cooling	19.4(67.0)	13.9(57.0)	-18.0(0)	-
Rated Heating	26.7(80.0)	-	23.9(75.0)	18.3(65.0)
Low Temp. Heating	20.0(68.0)	-	-18.0(0)	-

**Notes:**

- ①. The design of this unit conforms to the requirements of ARI 210/240-2008 standard.
- ②. The air volume is measured at the relevant standard external static pressure.
- ③. Cooling (heating) capacity stated above is measured under nominal working conditions corresponding to standard external static pressure. The parameters are subject to change with the improvement of products, in which case the values on nameplate shall prevail.

## 7 Troubleshooting and Maintenance

### 7.1 Troubleshooting

If your unit malfunctions or has an operation failure, please first check the following points before repair:

Table 7.1

Failure	Possible Reasons
The unit cannot be started.	<ul style="list-style-type: none"> <li>①. The power supply is not connected.</li> <li>②. Electrical short of air-conditioning unit causes tripping of the circuit breaker.</li> <li>③. The operating keys are locked.</li> <li>④. The control loop has failed.</li> </ul>
The unit operates for a while and then stops.	<ul style="list-style-type: none"> <li>①. The condenser air flow is blocked.</li> <li>②. The control loop experienced a failure.</li> <li>③. Cooling operation is selected when the outdoor ambient temperature is above 46.1°C (115°F).</li> </ul>
Poor cooling effect.	<ul style="list-style-type: none"> <li>①. The air filter is dirty or blocked.</li> <li>②. There is heat source or too many people inside the room.</li> <li>③. The door or window is open.</li> <li>④. There is obstacle at the air intake or outlet.</li> <li>⑤. The set temperature is too high.</li> <li>⑥. There is refrigerant leakage.</li> <li>⑦. The room sensor has malfunctioned.</li> </ul>
Poor heating effect.	<ul style="list-style-type: none"> <li>①. The air filter is dirty or blocked.</li> <li>②. The door or window is not firmly closed.</li> <li>③. The set room temperature is too low.</li> <li>④. There is refrigerant leakage.</li> <li>⑤. The outdoor ambient temperature is lower than -5°C (23°F).</li> <li>⑥. Control loop has failed.</li> </ul>

**Note:** Once the above listed possible reasons have been eliminated, please turn off the air conditioner and call for a qualified service technician. Only qualified service techs should repair the unit.

### 7.2 Routine Maintenance

Only a qualified service person is allowed to perform maintenance.

Disconnect power supply before servicing the unit.

Do not use hot water above of 50°C (122°F) for cleaning air filters and outside panels.

**NOTICE**

- ①. Do not operate the air conditioner without the filter; otherwise dust would enter the unit.
- ②. Do not remove the air filter except for cleaning. Unnecessary handling may damage the filter.
- ③. Do not clean the unit with gasoline, benzene, paint thinner, polishing powder or liquid insecticide, otherwise it would cause discoloration and deformation of the unit.

**WARNING! Clean indoor unit with damp (not wet) cloth. Do not get indoor unit wet due to the risk of electrical shock or fire.**

Increase the frequency of cleaning if the unit is installed in a room where the air is extremely dirty. (You can begin by cleaning the filter every six months, then increase frequency as necessary.)

If filter becomes too clogged to be cleaned, change the air filter.

How to clean the air filter

1. Open the air inlet grille  
(1). How to open the panel grille of the 24k~42k cassette type unit

- ①. Push the buckle as shown in the Figure.
- ②. Release the screws under buckles with a screwdriver.
- ③. Push the fastener and open the panel grille.



Remove the screw






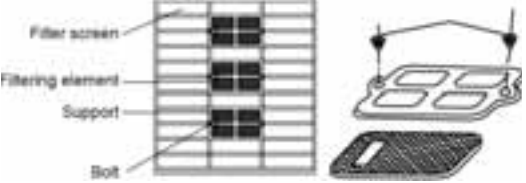

Push the fastener

(2). How to open the panel grille of the 18k/48k cassette type unit

- ①. Remove the screws with a screwdriver as shown in the picture.



Remove the screw

<p>②. Push those two fasteners and open the panel grille.</p>	 <p>Push the fastener</p>
<p>2. Disassemble the air inlet grille Open the air inlet grille to a 45° angle, raise it and remove the grille.</p>	
<p>3. Disassemble the filter screen Draw out the filter screen and remove it.</p>	
<p>4. Disassemble the air purifier Remove the air purifier after removing the fixed screws on it.</p>	 <p>Filter screen Filtering element Support Bot</p>
<p>5. Clean the filter screen Clean the filter screen with a vacuum cleaner or wash it with cool water. Clean the filter using warm water with mild detergent. Dry the filter in the shadow. Notes: ①. Never use hot water over 45°C (113°F) in case of color fading or turning yellow. ②. Do not dry filter over open flame or direct sunlight or filter may become deformed..</p>	
<p>6. Reset the filter</p>	<p>Reverse of step 3</p>
<p>7. Install the grille well</p>	<p>Reverse of steps 1 and 2</p>





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notice or incurring obligations.  
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