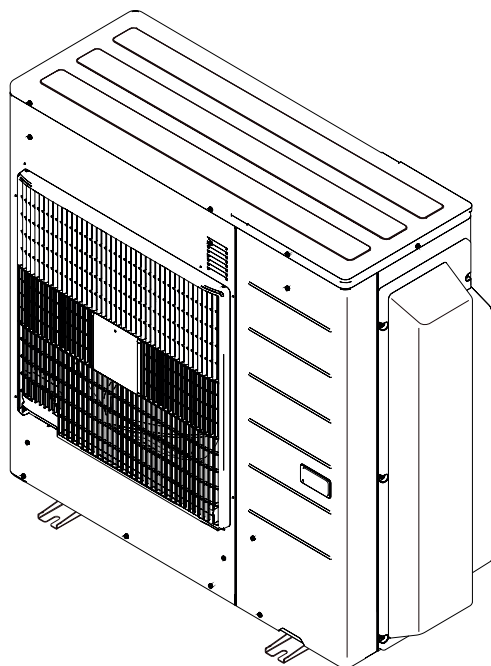


# AIR CONDITIONER



## **INSTALLATION MANUAL**

OUTDOOR UNIT

For authorized service personnel only.

English

## **MANUEL D'INSTALLATION**

APPAREIL EXTÉRIEURE

Seulement pour personnel d'entretien autorisé.

Français

## **MANUAL DE INSTALACIÓN**

UNIDAD EXTERIOR

Únicamente para personal de servicio autorizado.

Español



PART No. 9380545101-06

# INSTALLATION MANUAL

OUTDOOR UNIT  
PART No. 9380545101-06

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## 1. SAFETY PRECAUTIONS

This installation manual describes how to install the outdoor unit only. To install the indoor unit, refer to the installation manual included with the indoor unit.

### IMPORTANT!

#### Please Read Before Starting

This air conditioning system meets strict safety and operating standards.

As the installer or service person, it is an important part of your job to install or service the system so it operates safely and efficiently.

#### For safe installation and trouble-free operation, you must:

- Carefully read this instruction booklet before beginning.
- Follow each installation or repair step exactly as shown.
- Observe all local, state, and national electrical codes.
- Pay close attention to all warning, and caution notices given in this manual.

**WARNING:** This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.

**CAUTION:** This symbol refers to a hazard or unsafe practice which can result in personal injury and the potential for product or property damage.

- Hazard alerting symbols



Electrical



Safety / alert

### If Necessary, Get Help

These instructions are all you need for most installation sites and maintenance conditions. If you require help for a special problem, contact our sales/service outlet or your certified dealer for additional instructions.

### In Case of Improper Installation

The manufacturer shall in no way be responsible for improper installation or maintenance service, including failure to follow the instructions in this document.

## SPECIAL PRECAUTIONS

### When Wiring

**ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. ONLY A QUALIFIED, EXPERIENCED ELECTRICIAN SHOULD ATTEMPT TO WIRE THIS SYSTEM.**

- Do not supply power to the unit until all wiring and tubing are completed or reconnected and checked.
- Highly dangerous electrical voltages are used in this system. Carefully refer to the wiring diagram and these instructions when wiring. Improper connections and inadequate earthing (grounding) can cause accidental injury or death.
- Earth (Ground) the unit following local electrical codes.
- Connect all wiring tightly. Loose wiring may cause overheating at connection points and a possible fire hazard.

### When Transporting

Be careful when picking up and moving the indoor and outdoor units. Get a partner to help, and bend your knees when lifting to reduce strain on your back. Sharp edges or thin aluminum fins on the air conditioner can cut your fingers.

### When Installing...

#### ...In a Ceiling or Wall

Make sure the ceiling/wall is strong enough to hold the unit's weight. It may be necessary to construct a strong wood or metal frame to provide added support.

#### ...In a Room

Properly insulate any tubing run inside a room to prevent "sweating" that can cause dripping and water damage to walls and floors.

#### ...In Moist or Uneven Locations

Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the outdoor unit. This prevents water damage and abnormal vibration.

#### ...In an Area with High Winds

Securely anchor the outdoor unit down with bolts and a metal frame. Provide a suitable air baffle.

#### ...In a Snowy Area (for Heat Pump-type Systems)

Install the outdoor unit on a raised platform that is higher than drifting snow. Provide snow vents.

### When Connecting Refrigerant Tubing

- Keep all tubing runs as short as possible.
- Use the flare method for connecting tubing.
- Apply refrigeration compressor oil (or equivalent) used for the outdoor unit to the matching surfaces of the flare and union tubes before connecting them, then tighten the nut with a torque wrench for a leak-free connection.
- Check carefully for leaks before opening the refrigerant valves.

### NOTE:

Depending on the system type, liquid and gas lines may be either narrow or wide.

Therefore, to avoid confusion the refrigerant tubing for your particular model is specified as either "small" or "large" rather than as "liquid" or "gas".

### When Servicing

- Turn the power OFF at the main circuit breaker panel before opening the unit to check or repair electrical parts and wiring.
- Keep your fingers and clothing away from any moving parts.
- Clean up the site after you finish, remembering to check that no metal scraps or bits of wiring have been left inside the unit being serviced.
- After installation, explain correct operation to the customer, using the operating manual.

- Be sure to read this Manual thoroughly before installation.
- The warnings and precautions indicated in this Manual contain important information pertaining to your safety. Be sure to observe them.
- Hand this Manual, together with the Operating Manual, to the customer. Request the customer to keep them on hand for future use, such as for relocating or repairing the unit.

### ⚠ WARNING

Never touch electrical components immediately after the power supply has been turned off. Electrical shock may occur. After turning off the power, always wait 10 minutes or more before touching electrical components.

If refrigerant leaks while work is being carried out, ventilate the area. If the refrigerant comes in contact with a flame, it produces a toxic gas.

During installation, make sure that the refrigerant pipe is attached firmly before you run the compressor. Do not operate the compressor under the condition of refrigerant piping not attached properly with 2-way or 3-way valve open. This may cause abnormal pressure in the refrigeration cycle that leads to breakage and even injury.

When installing and relocating the air conditioner, do not mix gases other than the specified refrigerant (R410A) to enter the refrigerant cycle. If air or other gas enters the refrigerant cycle, the pressure inside the cycle will rise to an abnormally high value and cause breakage, injury, etc.

Do not modify power cable, use extension cable or branch wiring. Improper use may cause electric shock or fire by poor connection, insufficient insulation or over current.

Do not purge the air with refrigerants but use a vacuum pump to vacuum the installation.

There is not extra refrigerant in the outdoor unit for air purging.

Using the same vacuum pump for different refrigerants may damage the vacuum pump or the unit.

Use a clean gauge manifold, vacuum pump and charging hose for R410A exclusively.

**⚠ WARNING**

During the pump down operation, make sure that the compressor is turned off before you remove the refrigerant piping.  
Do not remove the connection pipe while the compressor is in operation with 2 way or 3 way valve open. This may cause abnormal pressure in the refrigeration cycle that leads to rupture and even injury.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

To avoid danger of suffocation, keep the plastic bag or thin film used as the packaging material away from young children.

When installing this system in high humidity locations, install using ground fault equipment breakers (often referred to in other countries as an ELCB [earth leakage current breaker]) to reduce the risk of leaking current which may result in electric shock or potential fire.

**⚠ CAUTION**

After a long period of disuse in an environment 32 °F (0 °C) or lower, supply power to the unit at least 12 hours before re-starting the unit.

This product is part of a set constituting an air conditioner. The product must not be installed alone or be installed with non-authorized device by the manufacturer.

Always use a separate power supply line protected by a circuit breaker operating on all wires with a distance between contact of 3 mm for this product.

To protect the persons, earth (ground) the product correctly, and use the power cable combined with an Earth Leakage Circuit Breaker (ELCB).

This product is not explosion proof, and therefore should not be installed in explosive atmosphere.

Do not place any other electrical products or household belongings under indoor unit or outdoor unit. Dripping condensation from the unit might get them wet, and may cause damage or malfunction of your property.

- Be careful not to scratch the air conditioner when handling it.
- This product is manufactured to metric units and tolerances. United States customary units are provided for reference only. In cases where exact dimensions and tolerances are required, always refer to metric units.

**2. ABOUT THIS PRODUCT**

**2.1. Precautions for using R410A refrigerant**

**⚠ WARNING**

The basic installation work procedures are the same as conventional refrigerant (R22) models.  
However, pay careful attention to the following points:

Since the working pressure is 1.6 times higher than that of conventional refrigerant (R22) models, some of the piping and installation and service tools are special. (See the table below.)

Especially, when replacing a conventional refrigerant (R22) model with a new refrigerant R410A model, always replace the conventional piping and flare nuts with the R410A piping and flare nuts.

Models that use refrigerant R410A have a different charging port thread diameter to prevent erroneous charging with conventional refrigerant (R22) and for safety. Therefore, check beforehand. [The charging port thread diameter for R410A is 1/2-20 UNF.]

Be careful that foreign matter (oil, water, etc.) does not enter the piping than with refrigerant models. Also, when storing the piping, securely seal the openings by pinching, taping, etc.

When charging the refrigerant, take into account the slight change in the composition of the gas and liquid phases, and always charge from the liquid phase side whose composition is stable.

**2.2. Special tools for R410A refrigerant**

Tool name	Contents of change
Gauge manifold	Pressure is high and cannot be measured with a conventional gauge. To prevent erroneous mixing of other refrigerants, the diameter of each port has been changed. It is recommended the gauge with seals 30 in. Hg to 769 psi (-0.1 to 5.3 MPa) for high pressure. 30 in. Hg to 551 psi (-0.1 to 3.8 MPa) for low pressure.
Charge hose	To increase pressure resistance, the hose material and base size were changed.

Tool name	Contents of change
Vacuum pump	A conventional vacuum pump can be used by installing a vacuum pump adapter. Be sure that the pump oil does not back flow into the system. Use one capable for vacuum suction of -100.7 kPa (5 Ton, -755 mmHg).
Gas leakage detector	Special gas leakage detector for HFC refrigerant R410A.

**Copper pipes**

It is necessary to use seamless copper pipes and it is desirable that the amount of residual oil is less than 40 mg/10 m. Do not use copper pipes having a collapsed, deformed or discolored portion (especially on the interior surface). Otherwise, the expansion valve or capillary tube may become blocked with contaminants.

As an air conditioner using R410A incurs pressure higher than when using conventional refrigerant, it is necessary to choose adequate materials.

Thicknesses of copper pipes used with R410A are as shown in the table. Never use copper pipes thinner than that in the table even when it is available on the market.

**Thicknesses of Annealed Copper Pipes (R410A)**




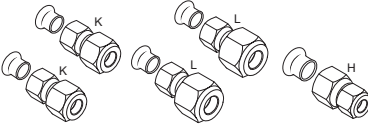
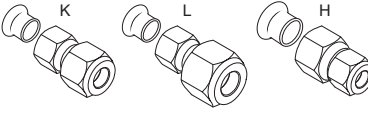


Pipe outside diameter [in. (mm)]	Thickness [in. (mm)]
1/4 (6.35)	0.032 (0.80)
3/8 (9.52)	0.032 (0.80)
1/2 (12.70)	0.032 (0.80)
5/8 (15.88)	0.039 (1.00)
3/4 (19.05)	0.047 (1.20)

**2.3. Accessories**

**⚠ WARNING**

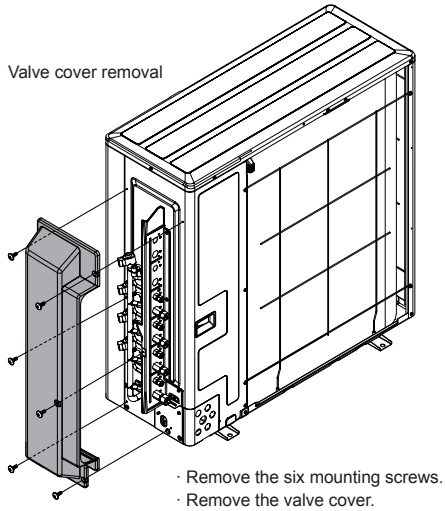
For installation purposes, be sure to use the parts supplied by the manufacturer or other prescribed parts. The use of non-prescribed parts can cause serious accidents such as the unit falling, water leakage, electric shock, or fire.

Do not throw away the connecting parts until the installation has been complete.

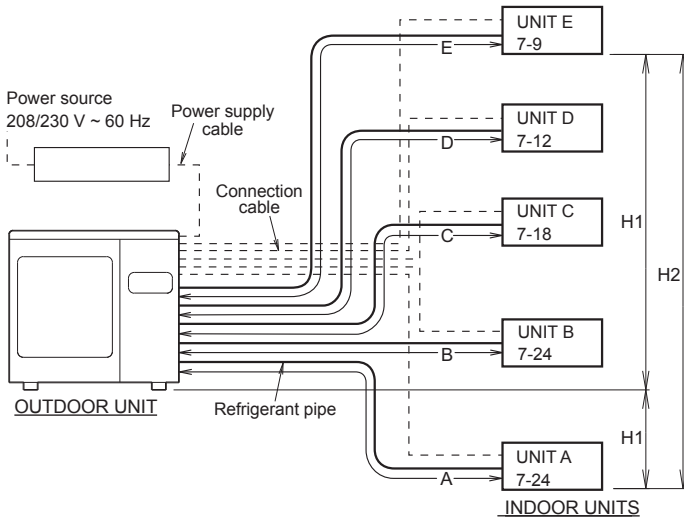
Name and shape	Q'ty	Application
Installation manual 	1	(This book)
Drain cap 	7	For outdoor unit drain piping work [45 model only]
Drain pipe 	1	
Adapter [in. (mm)] K: [1/2 (12.70) → 3/8 (9.52)] × 2 L: [1/2 (12.70) → 5/8 (15.88)] × 2 H: [3/8 (9.52) → 1/2 (12.70)] × 1 	1 set	Adapter is necessary in the connection of the indoor unit. For more information, refer to the installation manual included with the indoor unit. [45 model]
Adapter [in. (mm)] K: [1/2 (12.70) → 3/8 (9.52)] × 1 L: [1/2 (12.70) → 5/8 (15.88)] × 1 H: [3/8 (9.52) → 1/2 (12.70)] × 1 	1 set	Adapter is necessary in the connection of the indoor unit. For more information, refer to the installation manual included with the indoor unit. [36 model]
Cable tie with clip 	Large: 2 Small: 2	For binding wire with connector (For conduit plate)
Cable tie 	1	For binding wire with connector

## 2.4. System configuration

Layout example for the indoor units and outdoor unit



### 2.4.1. Connectable indoor unit capacity type (Outdoor unit: 45 model)



#### ⚠ CAUTION

The total capacity of the indoor units connected must be between 34,000 and 54,000 BTU.

Connection patterns are restricted. Normal operation is not guaranteed if connected pattern in the combination not listed below. The product may be damaged. Surely connect in accordance with the combination in the following connection pattern.

- To install an indoor unit, refer to the installation manual included with the indoor unit.

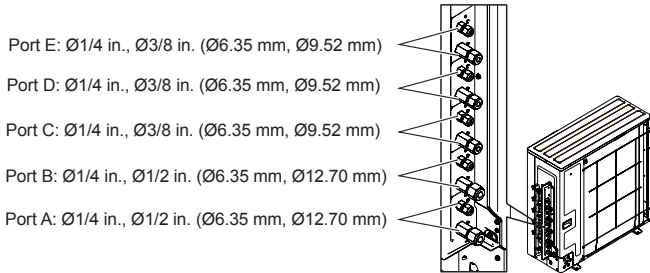
#### Indoor unit connection pattern

	Indoor unit				
	A	B	C	D	E
1	24,000	24,000	—	—	—
2	24,000	18,000	—	—	—
3	24,000	15,000	—	—	—
4	24,000	12,000	—	—	—
5	18,000	18,000	—	—	—
6	24,000	18,000	12,000	—	—
7	24,000	18,000	9,000	—	—
8	24,000	18,000	7,000	—	—
9	24,000	15,000	15,000	—	—
10	24,000	15,000	12,000	—	—
11	24,000	15,000	9,000	—	—
12	24,000	15,000	7,000	—	—
13	24,000	12,000	12,000	—	—
14	24,000	12,000	9,000	—	—
15	24,000	12,000	7,000	—	—
16	24,000	9,000	9,000	—	—
17	24,000	9,000	7,000	—	—
18	24,000	7,000	7,000	—	—
19	18,000	18,000	18,000	—	—
20	18,000	18,000	15,000	—	—

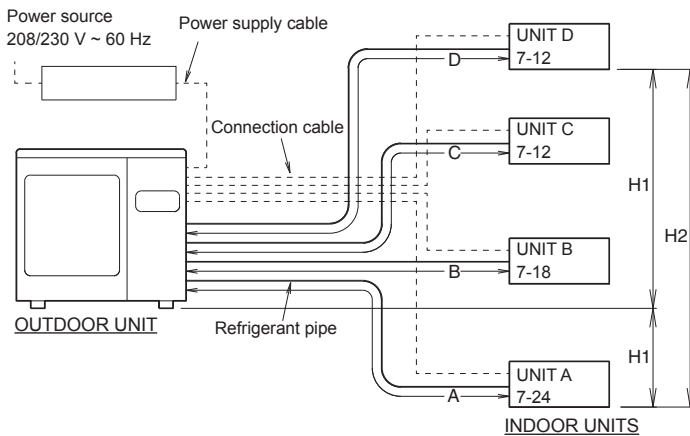
	Indoor unit				
	A	B	C	D	E
21	18,000	18,000	12,000	—	—
22	18,000	18,000	9,000	—	—
23	18,000	18,000	7,000	—	—
24	18,000	15,000	15,000	—	—
25	18,000	15,000	12,000	—	—
26	18,000	15,000	9,000	—	—
27	18,000	15,000	7,000	—	—
28	18,000	12,000	12,000	—	—
29	18,000	12,000	9,000	—	—
30	18,000	12,000	7,000	—	—
31	18,000	9,000	9,000	—	—
32	18,000	9,000	7,000	—	—
33	15,000	15,000	15,000	—	—
34	15,000	15,000	12,000	—	—
35	15,000	15,000	9,000	—	—
36	15,000	15,000	7,000	—	—
37	15,000	12,000	12,000	—	—
38	15,000	12,000	9,000	—	—
39	12,000	12,000	12,000	—	—
40	24,000	15,000	7,000	7,000	—
41	24,000	12,000	9,000	9,000	—
42	24,000	12,000	9,000	7,000	—
43	24,000	12,000	7,000	7,000	—
44	24,000	9,000	9,000	9,000	—
45	24,000	9,000	9,000	7,000	—
46	24,000	9,000	7,000	7,000	—
47	24,000	7,000	7,000	7,000	—
48	18,000	18,000	9,000	9,000	—
49	18,000	18,000	9,000	7,000	—
50	18,000	18,000	7,000	7,000	—
51	18,000	15,000	12,000	9,000	—
52	18,000	15,000	12,000	7,000	—
53	18,000	15,000	9,000	9,000	—
54	18,000	15,000	9,000	7,000	—
55	18,000	15,000	7,000	7,000	—
56	18,000	12,000	12,000	12,000	—
57	18,000	12,000	12,000	9,000	—
58	18,000	12,000	12,000	7,000	—
59	18,000	12,000	9,000	9,000	—
60	18,000	12,000	9,000	7,000	—
61	18,000	12,000	7,000	7,000	—
62	18,000	9,000	9,000	9,000	—
63	18,000	9,000	9,000	7,000	—
64	18,000	9,000	7,000	7,000	—
65	18,000	7,000	7,000	7,000	—
66	15,000	15,000	15,000	9,000	—
67	15,000	15,000	15,000	7,000	—
68	15,000	15,000	12,000	12,000	—
69	15,000	15,000	12,000	9,000	—
70	15,000	15,000	12,000	7,000	—
71	15,000	15,000	9,000	9,000	—
72	15,000	15,000	9,000	7,000	—
73	15,000	15,000	7,000	7,000	—
74	15,000	12,000	12,000	12,000	—
75	15,000	12,000	12,000	9,000	—
76	15,000	12,000	12,000	7,000	—
77	15,000	12,000	9,000	9,000	—
78	15,000	12,000	9,000	7,000	—
79	15,000	12,000	7,000	7,000	—
80	15,000	9,000	9,000	9,000	—
81	15,000	9,000	9,000	7,000	—
82	15,000	9,000	7,000	7,000	—
83	15,000	7,000	7,000	7,000	—
84	12,000	12,000	12,000	12,000	—
85	12,000	12,000	12,000	9,000	—
86	12,000	12,000	12,000	7,000	—
87	12,000	12,000	9,000	9,000	—
88	12,000	12,000	9,000	7,000	—
89	12,000	12,000	7,000	7,000	—
90	12,000	9,000	9,000	9,000	—
91	12,000	9,000	9,000	7,000	—
92	12,000	9,000	7,000	7,000	—
93	9,000	9,000	9,000	9,000	—
94	9,000	9,000	9,000	7,000	—
95	24,000	9,000	7,000	7,000	7,000
96	24,000	7,000	7,000	7,000	7,000
97	18,000	15,000	7,000	7,000	7,000
98	18,000	12,000	9,000	7,000	7,000
99	18,000	12,000	7,000	7,000	7,000
100	18,000	9,000	9,000	9,000	9,000
101	18,000	9,000	9,000	9,000	7,000

	Indoor unit				
	A	B	C	D	E
102	18,000	9,000	9,000	7,000	7,000
103	18,000	9,000	7,000	7,000	7,000
104	18,000	7,000	7,000	7,000	7,000
105	15,000	15,000	9,000	7,000	7,000
106	15,000	15,000	7,000	7,000	7,000
107	15,000	12,000	12,000	7,000	7,000
108	15,000	12,000	9,000	9,000	9,000
109	15,000	12,000	9,000	9,000	7,000
110	15,000	12,000	9,000	7,000	7,000
111	15,000	12,000	7,000	7,000	7,000
112	15,000	9,000	9,000	9,000	9,000
113	15,000	9,000	9,000	9,000	7,000
114	15,000	9,000	9,000	7,000	7,000
115	15,000	9,000	7,000	7,000	7,000
116	15,000	7,000	7,000	7,000	7,000
117	12,000	12,000	12,000	9,000	9,000
118	12,000	12,000	12,000	9,000	7,000
119	12,000	12,000	12,000	7,000	7,000
120	12,000	12,000	9,000	9,000	9,000
121	12,000	12,000	9,000	9,000	7,000
122	12,000	12,000	9,000	7,000	7,000
123	12,000	12,000	7,000	7,000	7,000
124	12,000	9,000	9,000	9,000	9,000
125	12,000	9,000	9,000	9,000	7,000
126	12,000	9,000	9,000	7,000	7,000
127	12,000	9,000	7,000	7,000	7,000
128	12,000	7,000	7,000	7,000	7,000
129	9,000	9,000	9,000	9,000	9,000
130	9,000	9,000	9,000	9,000	7,000
131	9,000	9,000	9,000	7,000	7,000
132	9,000	9,000	7,000	7,000	7,000
133	9,000	7,000	7,000	7,000	7,000
134	7,000	7,000	7,000	7,000	7,000

Outdoor port		Capacity indoor unit
Standard port size [in. (mm)]		
E	1/4 (6.35) / 3/8 (9.52)	7 - 9
D	1/4 (6.35) / 3/8 (9.52)	7 - 12
C	1/4 (6.35) / 3/8 (9.52)	7 - 18
B	1/4 (6.35) / 1/2 (12.70)	7 - 24
A	1/4 (6.35) / 1/2 (12.70)	7 - 24



#### 2.4.2. Connectable indoor unit capacity type (Outdoor unit: 36 model)



### CAUTION

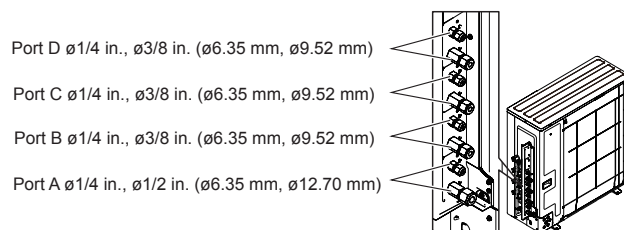
The total capacity of the indoor units connected must be between 27,000 and 39,000 BTU. Connection patterns are restricted. Normal operation is not guaranteed if connected pattern in the combination not listed below. The product may be damaged. Surely connect in accordance with the combination in the following connection pattern.

- To install an indoor unit, refer to the installation manual included with the indoor unit.

#### Indoor unit connection pattern

	Indoor unit			
	A	B	C	D
1	18,000	18,000	-	-
2	24,000	7,000	-	-
3	24,000	9,000	-	-
4	24,000	12,000	-	-
5	24,000	15,000	-	-
6	9,000	9,000	9,000	-
7	12,000	9,000	7,000	-
8	12,000	9,000	9,000	-
9	12,000	12,000	7,000	-
10	12,000	12,000	9,000	-
11	12,000	12,000	12,000	-
12	15,000	7,000	7,000	-
13	15,000	9,000	7,000	-
14	15,000	9,000	9,000	-
15	15,000	12,000	7,000	-
16	15,000	12,000	9,000	-
17	15,000	12,000	12,000	-
18	18,000	7,000	7,000	-
19	18,000	9,000	7,000	-
20	18,000	9,000	9,000	-
21	18,000	12,000	7,000	-
22	18,000	12,000	9,000	-
23	24,000	7,000	7,000	-
24	7,000	7,000	7,000	7,000
25	9,000	7,000	7,000	7,000
26	9,000	9,000	7,000	7,000
27	9,000	9,000	9,000	7,000
28	9,000	9,000	9,000	9,000
29	12,000	7,000	7,000	7,000
30	12,000	9,000	7,000	7,000
31	12,000	9,000	9,000	7,000
32	12,000	9,000	9,000	9,000
33	12,000	12,000	7,000	7,000
34	15,000	7,000	7,000	7,000
35	15,000	9,000	7,000	7,000
36	18,000	7,000	7,000	7,000

Outdoor port		Capacity indoor unit
Standard port size [in. (mm)]		
D	1/4 (6.35) / 3/8 (9.52)	7 - 12
C	1/4 (6.35) / 3/8 (9.52)	7 - 12
B	1/4 (6.35) / 3/8 (9.52)	7 - 18
A	1/4 (6.35) / 1/2 (12.70)	7 - 24



### 2. 4. 3. Limitation of refrigerant piping length

#### ⚠ CAUTION

The total maximum pipe lengths and height difference of this product are shown in the table.  
If the units are further apart than this, correct operation cannot be guaranteed.

Total max. length *1)	45 model (a+b+c+d+e)	262 ft. (80 m)
	36 model (a+b+c+d)	229 ft. (70 m)
Max. length for each indoor unit	45 model (a, b, c, d or e)	82 ft. (25 m)
	36 model (a, b, c or d)	
"Max. height difference between outdoor unit and each indoor unit"	(H1)	49 ft. (15 m)
"Max. height difference between indoor units"	(H2)	32 ft. (10 m)
Min. length for each indoor unit	45 model (a, b, c, d or e)	17 ft. (5 m)
	36 model (a, b, c or d)	
Total min. length	(a+b)	50 ft. (15 m)

\*1) If the total piping is longer than 164 ft. (50 m), additional refrigerant charging is necessary. (For more information, refer to "3.6. Additional charging".)

## 3. GENERAL SPECIFICATIONS

### 3. 1. Power

#### ⚠ WARNING

The rated voltage of this product is 208/230 V A.C. 60 Hz.
Before turning on verify that the voltage is within the 187 V to 264 V range.
Always use a special branch circuit and install a special receptacle to supply power to the air conditioner.
Use a special branch circuit breaker and receptacle matched to the capacity of the air conditioner. (Install in accordance with standard.)
Do not extend the power cord.
Perform wiring work in accordance with standards so that the air conditioner can be operated safely and positively.
Install a leakage special branch circuit breaker in accordance with the related laws and regulations and electric company standards.

#### ⚠ CAUTION

The power source capacity must be the sum of the air conditioner current and the current of other electrical appliances. When the current contracted capacity is insufficient, change the contracted capacity.
When the voltage is low and it is difficult to start the air conditioner, contact the power company to have the voltage raised.

### 3. 2. Selecting circuit breaker and wiring

#### ⚠ CAUTION

Be sure to install a breaker of the specified capacity.
Regulation of cables and breaker differs from each locality, refer in accordance with local rules.

<b>Voltage rating</b>	1ø 208/230V (60Hz)
<b>Operating range</b>	187-264V

Cable	Conduit cable size *1)	Remarks
Power supply cable	45 model: 10 AWG	2 cable + Ground, 1 ø 208/230V
	36 model: 8 AWG	
Connection cable	14AWG	3 cable + Ground, 1 ø 208/230V
Remote controller cable*2)	22AWG (0.33 mm <sup>2</sup> )	Use shield cable in accordance with local rules for cable. (Polar 3 core)

\*1) Selected sample: Select the correct cable type and size according to the country or region's regulations.

Max. wire length: Set a length so that the voltage drop is less than 2%. Increase the wire diameter when the wire length is long.

\*2) The remote controller cable supplied with the Central remote controller is for indoor use. If you require cables for outdoor use, please purchase locally. Material is not specified. However, it should be selected considering the operating environment (temperature, humidity), and regional regulations (ROHS Directive, etc.).

Breaker	Specification *3)
Circuit breaker	45 model Current : 30(A)
	36 model Current : 40(A)
Earth leakage breaker	Leakage current : 30mA 0.1sec or less *4)

\*3) Select the appropriate breaker of the described specification according to the national or regional standards.

\*4) Select the breaker that enough load current can pass through it.

### 3. 3. Selecting the pipe material

#### ⚠ CAUTION

Do not use existing pipes.
Use pipes that have clean external and internal sides without any contamination which may cause trouble during use, such as sulphur, oxide, dust, cutting waste, oil, or water.
It is necessary to use seamless copper pipes. Material: Phosphor deoxidized seamless copper pipes. It is desirable that the amount of residual oil is less than 40 mg/10 m.
Do not use copper pipes that have a collapsed, deformed, or discoloured portion (especially on the interior surface). Otherwise, the expansion valve or capillary tube may become blocked with contaminants.
Improper pipe selection will degrade performance. As an air conditioner using R410A incurs pressure higher than when using conventional refrigerant, it is necessary to choose adequate materials.

The diameters of the connection pipes differ according to the capacity of the indoor unit. Refer to the following table for the proper diameters of the connection pipes between the indoor and outdoor units.

Capacity of indoor unit	Gas pipe size (thickness) in. (in.) [mm (mm)]	Liquid pipe size (thickness) in. (in.) [mm (mm)]
7 – 12	ø3/8 (0.032) [ø9.52 (0.8)]	ø1/4 (0.032) [ø6.35 (0.8)]
15, 18	ø1/2 (0.032) [ø12.70 (0.8)]	ø1/4 (0.032) [ø6.35 (0.8)]
24	ø5/8 (0.039) [ø15.88 (1.0)]	ø1/4 (0.032) [ø6.35 (0.8)]

#### ⚠ CAUTION

Operation cannot be guaranteed if the correct combination of pipes, valves, etc., is not used to connect the indoor and outdoor units.

### 3. 4. Installing insulation

- Determine the thickness of the insulation material by referring to Table A.

**Table A, Selection of insulation**

(Use an insulation material with equal heat transmission rate or below 0.040 W/(m·k))

Relative humidity	Recommended minimum thickness for heat insulating material (mm)				
	≤ 70%	≤ 75%	≤ 80%	≤ 85%	
Pipe diameter [in. (mm)]	1/4 (6.35)	8	10	13	17
	3/8 (9.52)	9	11	14	18
	1/2 (12.70)	10	12	15	19
	5/8 (15.88)	10	12	16	20
	3/4 (19.05)	10	13	16	21

- When an ambient temperature and relative humidity exceed 89.6 °F [(32 °C) DB] and 85% respectively, please strengthen heat insulation for the refrigerant pipes.

### 3. 5. Operating range

Model		Temperature	Indoor air intake	Outdoor air intake
45 model	Cooling	Maximum	90 °F(32.2 °C) DB	115 °F(46.1 °C) DB
		Minimum	65 °F(18.3 °C) DB	14 °F(-10.0 °C) DB
	Heating	Maximum	88 °F(31.1 °C) DB	75 °F(23.8 °C) DB
		Minimum	60 °F(15.5 °C) DB	5 °F(-15.0 °C) DB
36 model	Cooling	Maximum	90 °F(32.2 °C) DB	115 °F(46.1 °C) DB
		Minimum	65 °F(18.3 °C) DB	14 °F(-10.0 °C) DB
	Heating	Maximum	88 °F(31.1 °C) DB	75 °F(23.8 °C) DB
		Minimum	60 °F(15.5 °C) DB	-15 °F(-26.1 °C) DB

Indoor humidity about 80% or less

### 3.6. Additional charging

Refrigerant suitable for a total piping length of 164 ft. (50 m) is charged in the outdoor unit at the factory.

When the piping is longer than 164 ft. (50 m), additional charging is necessary. For the additional amount, see the table below.

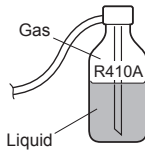
Total piping length [ft. (m)]		164 (50) or less	197 (60)	230 (70)	264 (80)	
Additional refrigerant charge	45 model	None	7 oz. (200 g)	14 oz. (400 g)	1 lbs. 5 oz. (600 g)	0.21 oz./ft. (20 g/m)
	36 model	None	7 oz. (200 g)	14 oz. (400 g)	—	

#### CAUTION

When moving and installing the air conditioner, do not mix gas other than the specified refrigerant (R410A) inside the refrigerant cycle.

When charging the refrigerant R410A, always use an electronic balance for refrigerant charging (to measure the refrigerant by weight).

When charging the refrigerant, take into account the slight change in the composition of the gas and liquid phases, and always charge from the liquid phase side whose composition is stable.



Add refrigerant from the charging valve after the completion of the work.

If the units are further apart than the maximum pipe length, correct operation cannot be guaranteed.

## 4. INSTALLATION WORK

Please obtain the approval of the customer when selecting the location of installation and installing the unit.

### 4.1. Selecting an installation location

#### WARNING

Securely install the outdoor unit at a location that can withstand the weight of the unit. Otherwise, the outdoor unit may fall and cause injury.

Be sure to install the outdoor unit as prescribed, so that it can withstand earthquakes and typhoons or other strong winds. Improper installation can cause the unit to topple or fall, or other accidents.

Do not install the outdoor unit near the edge of a balcony. Otherwise, children may climb onto the outdoor unit and fall off of the balcony.

#### CAUTION

Do not install the outdoor unit in the following areas:

- Area with high salt content, such as at the seaside. It will deteriorate metal parts, causing the parts to fail or the unit to leak water.
- Area filled with mineral oil or containing a large amount of splashed oil or steam, such as a kitchen. It will deteriorate plastic parts, causing the parts to fail or the unit to leak water.
- Area that generates substances that adversely affect the equipment, such as sulfuric gas, chlorine gas, acid, or alkali. It will cause the copper pipes and brazed joints to corrode, which can cause refrigerant leakage.
- Area containing equipment that generates electromagnetic interference. It will cause the control system to malfunction, preventing the unit from operating normally.
- Area that can cause combustible gas to leak, contains suspended carbon fibers or flammable dust, or volatile inflammables such as paint thinner or gasoline. If gas leaks and settles around the unit, it can cause a fire.
- Area that has heat sources, vapors, or the risk of the leakage of flammable gas in the vicinity.
- Area where small animals may live. It may cause failure, smoke or fire if small animals enter and touch internal electrical parts.
- Area where animals may urinate on the unit or ammonia may be generated.

Please install the outdoor unit without slant.

Install the outdoor unit in a well-ventilated location away from rain or direct sunlight.

If the outdoor unit must be installed in an area within easy reach of the general public, install as necessary a protective fence or the like to prevent their access.

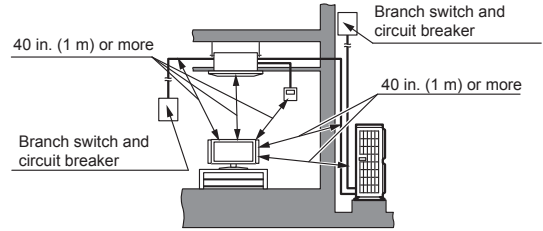
Install the outdoor unit in a location that would not inconvenience your neighbors, as they could be affected by the airflow coming out from the outlet, noise, or vibration. If it must be installed in proximity to your neighbors, be sure to obtain their approval.

If the outdoor unit is installed in a cold region that is affected by snow accumulation, snow fall, or freezing, take appropriate measures to protect it from those elements. To ensure a stable operation, install inlet and outlet ducts.

#### CAUTION

Install the outdoor unit in a location that is away from exhaust or the vent ports that discharge vapor, soot, dust, or debris.

Install the indoor unit, outdoor unit, power supply cable, connection cable, and remote control cable at least 40 in. (1 m) away from a television or radio receivers. The purpose of this is to prevent TV reception interference or radio noise. (Even if they are installed more than 40 in. (1 m) apart, you could still receive noise under some signal conditions.)



If children under 10 years old may approach the unit, take preventive measures so that they cannot reach the unit.

Keep the length of the piping of the indoor and outdoor units within the allowable range.

For maintenance purposes, do not bury the piping.

### 4.2. Installation dimensions

#### CAUTION

Install the unit where it will not be tilted by more than 3°. However, do not install the unit with it tilted towards the side containing the compressor.

When installing the outdoor unit where it may be exposed to strong wind, fasten it securely.

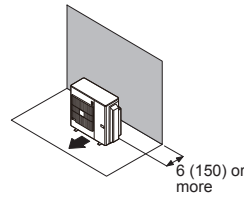
Decide the mounting position with the customer as follows:

- (1) Install the outdoor unit in a location which can withstand the weight of the unit and vibration, and which can install horizontally.
- (2) Provide the indicated space to ensure good airflow.
- (3) 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 airflow.)
- (4) Do not install the unit near a source of heat, steam, or flammable gas.
- (5) During heating operation, drain water flows from the outdoor unit. Therefore, install the outdoor unit in a place where the drain water flow will not be obstructed. (Reverse cycle model only)
- (6) Do not install the unit where strong wind blows or where it is very dusty.
- (7) Do not install the unit where people pass.
- (8) Install the outdoor unit in a place where it will be free from being dirty or getting wet by rain as much as possible.
- (9) Install the unit where connection to the indoor unit is easy.

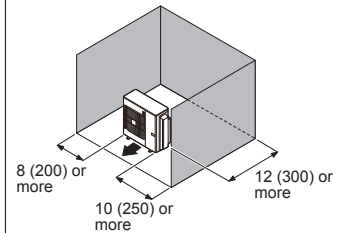
#### 4.2.1. Single outdoor unit installation

When the upper space is open: [Unit: in. (mm)]

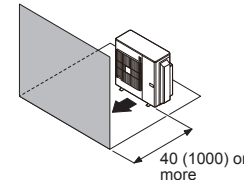
- (1) When there are obstacles at the rear only.



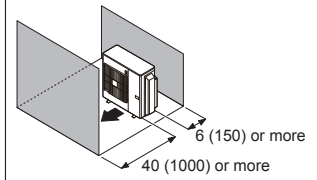
- (2) When there are obstacles at the rear and sides.



- (3) When there are obstacles at the front only.

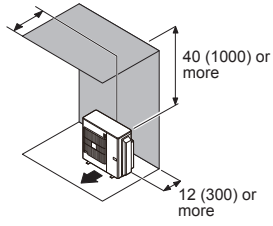


- (4) When there are obstacles at the front and rear.

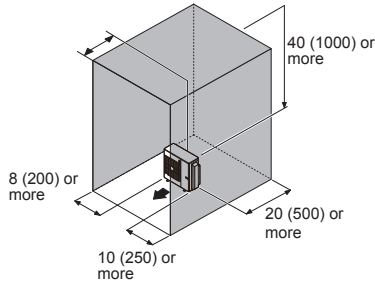


**When there is an obstruction in the upper space:** [Unit: in. (mm)]

(1) When there are obstacles at the rear and above.  
Max. 20 (500)



(2) When there are obstacles at the rear, sides, and above.  
Max. 20 (500)

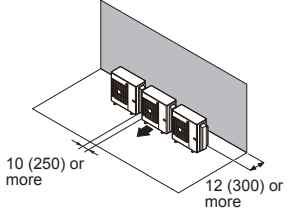


**4. 2. 2. Multiple outdoor unit installation**

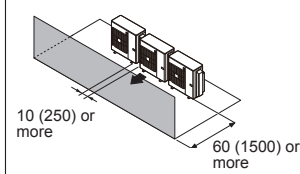
- Provide at least 250 mm of space between the outdoor units if multiple units are installed.
  - When routing the piping from the side of an outdoor unit, provide space for the piping.
  - No more than 3 units must be installed side by side.
- When 3 units or more are arranged in a line, provide the space as shown in the following example when there is an obstruction in the upper space:

**When the upper space is open:** [Unit: in. (mm)]

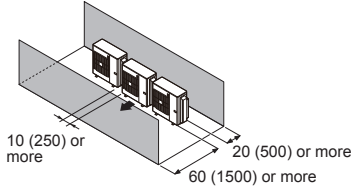
(1) When there are obstacles at the rear only.



(2) When there are obstacles at the front only.

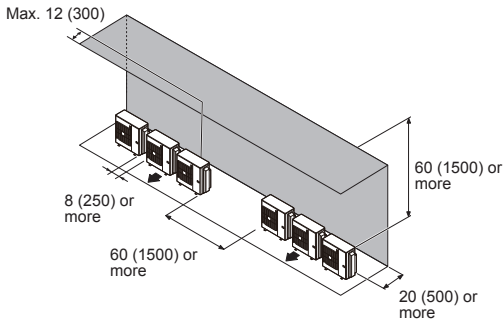


(3) When there are obstacles at the front and rear.



**When there is an obstruction in the upper space:** [Unit: in. (mm)]

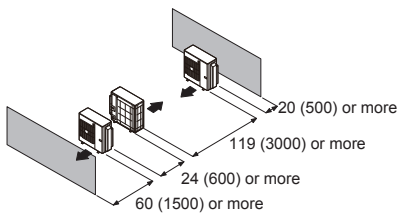
- When there are obstacles at the rear and above.



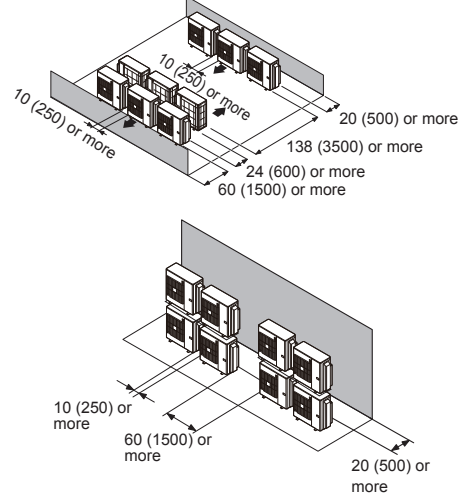
**4. 2. 3. Outdoor units installation in multi row** [Unit: in. (mm)]

\* The following settings are not recommended in case of cooling in a low outside temperature.

(1) Single parallel unit arrangement



(2) Multiple parallel unit arrangement



**4. 3. Transportation of the unit**

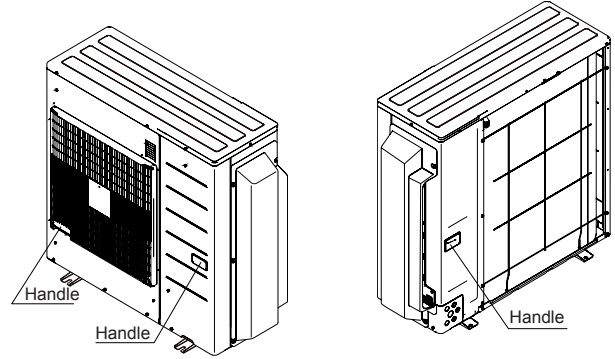
**⚠ WARNING**

Do not touch the fins. Otherwise, personal injury could result.

**⚠ CAUTION**

When carrying the unit, hold the handles on the right and left sides and be careful. If the outdoor unit is carried from the bottom, hands or fingers may be pinched.

- Be sure to hold the handles on the sides of the unit. Otherwise, holding the suction grille on the sides of the unit may cause deformation.

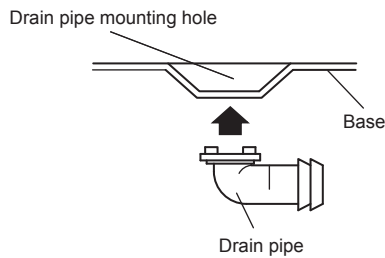
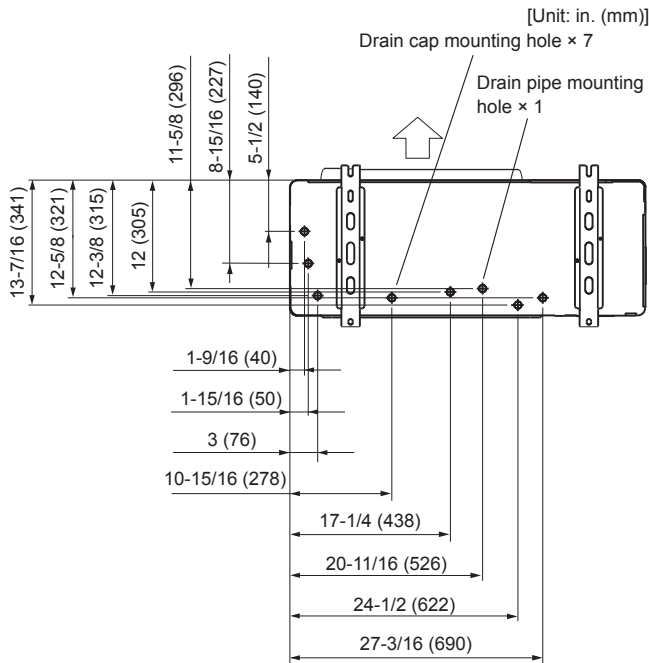


**4. 4. Drain installation**

**⚠ CAUTION**

- Perform drain work in accordance with this Manual, and ensure that the drain water is properly drained. If the drain work is not carried out correctly, water may drip down from the unit, wetting the furniture.
- When the outdoor temperature is 32 °F (0 °C) or less, do not use the accessory drain pipe and drain cap. If the drain pipe and drain cap are used, the drain water in the pipe may freeze in extremely cold weather. (Reverse cycle model only).
- As the drain water flows out of the outdoor unit during heating operation, install the drain pipe and connect it to a commercial 5/8 in. (16 mm) hose. (Reverse cycle model only)
- When installing the drain pipe, plug all the holes other than the drain pipe mounting hole in the bottom of the outdoor unit with putty so there is no water leakage. (Reverse cycle model only)



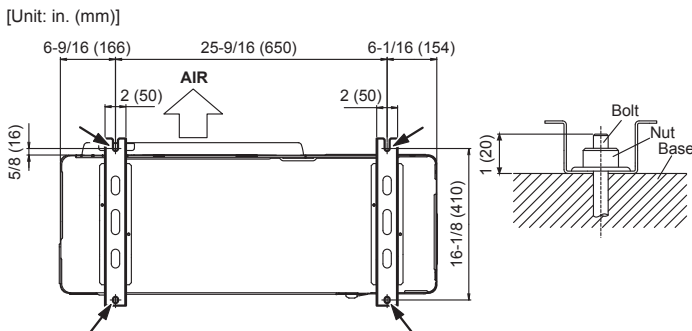


#### 4.5. Secure the unit

##### ⚠ WARNING

When installing the outdoor unit where it may be exposed to strong wind, fasten it securely.

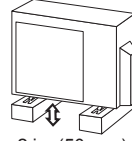
- Please install the outdoor unit without slant. (within 3 degrees)
- Install 4 anchor bolts at the locations indicated with arrows in the figure.
- To reduce vibration, do not install the unit directly on the ground. Install it on a secure base (such as concrete blocks).
- The foundation shall support the legs of the unit and have a width of 2 in. (50 mm) or more.
- Depending on the installation conditions, the outdoor unit may spread its vibration during operation, which may cause noise and vibration. Therefore, attach damping materials (such as damping pads) to the outdoor unit during installation.
- Install the foundation, making sure that there is enough space for installing the connection pipes.
- Secure the unit to a solid block using foundation bolts. (Use 4 sets of commercially available M10 bolts, nuts, and washers.)
- The bolts should protrude 1 in. (20 mm). (Refer to the figure.)
- If overturning prevention is required, purchase the necessary commercially available items.



##### ⚠ CAUTION

Do not install directly on the ground, this may result in equipment failure. Make sure the height of the base is 2 in. (50 mm) from the ground. Otherwise, there is a risk that the drainage water will freeze between the device and the surface, disabling drainage.

In places where the outdoor temperature drops to 32 °F (0 °C) or lower, the drain water may freeze and may stop up the drain or cause other outdoor unit trouble. Therefore take measures so that the drain water will not freeze and clog the drain.

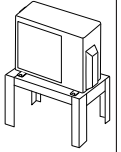


2 in. (50 mm)  
or more

Please set up the outdoor unit in a high place and please do not arrange the frame of installed stand under the drain port, because the water dropped from the drain port repeats freezing and accumulating, and may block the drain port.

In areas with heavy snowfall, where intake and outlet of the outdoor unit can become blocked by snow. It is recommended that unit be installed under a canopy or elevated on a high stand.

Failure to do so will result in poor heating performance and/or premature failure of equipment.



## 5. PIPE INSTALLATION

### 5.1. Flare connection (pipe connection)

##### ⚠ CAUTION

Do not use mineral oil on a flared part. Prevent mineral oil from getting into the system as this would reduce the lifetime of the units.

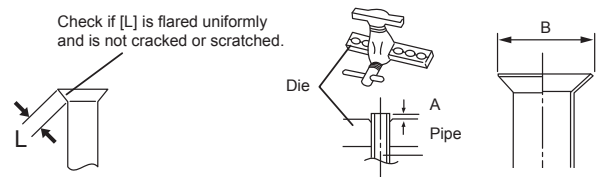
While welding the pipes, be sure to blow dry nitrogen gas through them.

The maximum lengths of this product are shown in the table. If the units are further apart than this, correct operation cannot be guaranteed.

#### 5.1.1. Flaring

- Use special pipe cutter and flare tool exclusive for R410A.

- (1) Cut the connection pipe to the necessary length with a pipe cutter.
- (2) Hold the pipe downward so that the cuttings will not enter the pipe and remove any burrs.
- (3) Insert the flare nut (always use the flare nut attached to the indoor and outdoor units respectively) onto the pipe and perform the flare processing with a flare tool. Leakage of refrigerant may result if other flare nuts are used.
- (4) Protect the pipes by pinching them or with tape to prevent dust, dirt, or water from entering the pipes.



Pipe outside diameter [in. (mm)]	Dimension A [in. (mm)]	Dimension B <sup>0</sup> / <sub>0.4</sub> [in. (mm)]
	Flare tool for R410A, clutch type	
1/4 (6.35)	0 to 0.020 (0 to 0.5)	3/8 (9.1)
3/8 (9.52)		1/2 (13.2)
1/2 (12.70)		5/8 (16.6)
5/8 (15.88)		3/4 (19.7)
3/4 (19.05)		15/16 (24.0)

- When using conventional flare tools to flare R410A pipes, the dimension A should be approximately 0.020 in. (0.5 mm) more than indicated in the table (for flaring with R410A flare tools) to achieve the specified flaring. Use a thickness gauge to measure the dimension A.

Width across flats



Pipe outside diameter [in. (mm)]	Width across flats of Flare nut [in. (mm)]
1/4 (6.35)	11/16 (17)
3/8 (9.52)	7/8 (22)
1/2 (12.70)	1 (26)
5/8 (15.88)	1-1/8 (29)
3/4 (19.05)	1-7/16 (36)

#### 5.1.2. Bending pipes

##### ⚠ CAUTION

To prevent breaking of the pipe, avoid sharp bends. Bend the pipe with a radius of curvature of 4 in. (100 mm) or more.

If the pipe is bent repeatedly at the same place, it will break.

- If pipes are shaped by hand, be careful not to collapse them.
- Do not bend the pipes at an angle of more than 90°.

- When pipes are repeatedly bent or stretched, the material will harden, making it difficult to bend or stretch them any more.
- Do not bend or stretch the pipes more than 3 times.

### 5. 1. 3. Connecting pipes

#### ⚠ CAUTION

Be sure to install the pipe against the port on the indoor unit and the outdoor unit correctly. If the centering is improper, the flare nut cannot be tightened smoothly. If the flare nut is forced to turn, the threads will be damaged.

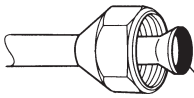
Do not remove the flare nut from the outdoor unit pipe until immediately before connecting the connection pipe.

After installing the piping, make sure that the connection pipes do not touch the compressor or outer panel. If the pipes touch the compressor or outer panel, they will vibrate and produce noise.

If there are a large number of flare connections due to the number of indoor units connected, please confirm that the valves that are not connected are closed. Not doing so may cause a refrigerant leak.

When connecting the indoor unit, it should be connected in the order of port A, B, C, and so on. Please be sure to close remaining unconnected ports so that they do not leak refrigerant.

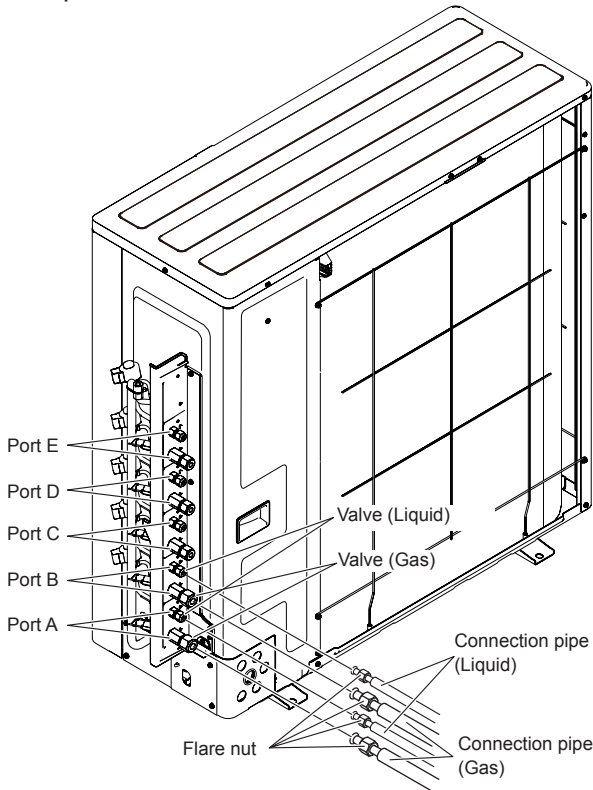
- (1) Detach the caps and plugs from the pipes.
- (2) Center the pipe against the port on the outdoor unit, and then turn the flare nut by hand.



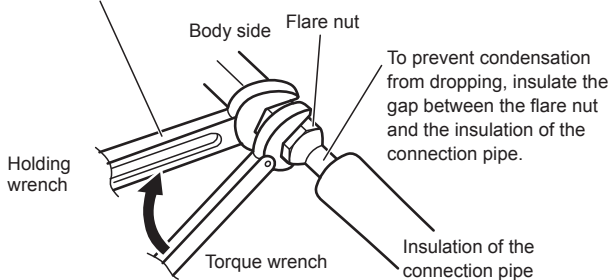
To prevent gas leakage, coat the flare surface with alkylbenzene oil (HAB). Do not use mineral oil.

- (3) Attach the connection pipe.

**Example: 45 model**



With this model, the Holding wrench can only be inserted horizontally.



- (4) When the flare nut is tightened properly by your hand, use a torque wrench to finally tighten it

#### ⚠ CAUTION

Hold the torque wrench at its grip, keeping it in a right angle with the pipe, in order to tighten the flare nut correctly.

- Outer panel may be distorted if fastened only with a wrench. Be sure to fix the elementary part with a holding wrench and fasten with a torque wrench (refer to below diagram). Do not apply force to the blank cap of the valve or hang a wrench, etc., on the cap. If blank cap is broken, it may cause leakage of refrigerant.

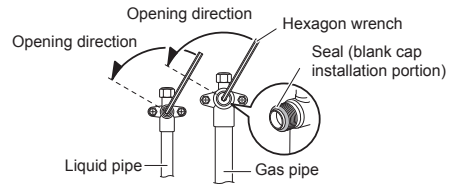
Flare nut [in. (mm)]	Tightening torque [lbf-ft. (N·m)]
1/4 (6.35) dia.	11.8 to 13.3 (16 to 18)
3/8 (9.52) dia.	23.6 to 31.0 (32 to 42)
1/2 (12.70) dia.	36.1 to 45.0 (49 to 61)
5/8 (15.88) dia.	46.5 to 55.3 (63 to 75)
3/4 (19.05) dia.	66.4 to 81.1 (90 to 110)

### 5. 1. 4. Handling precautions for the valves

- Mounted part of Blank cap is sealed for protection.
- Fasten blank cap tightly after opening valves.

#### Operating the valves

- Use a hexagon wrench [size: 3/16 in. (4 mm)].
- Opening
  - (1) Insert the hexagon wrench into the valve shaft, and turn it counterclockwise.
  - (2) Stop turning when the valve shaft can no longer be turned. (Open position)
- Closing
  - (1) Insert the hexagon wrench into the valve shaft, and turn it clockwise.
  - (2) Stop turning when the valve shaft can no longer be turned. (Closed position)



### 5. 1. 5. How to use adapter (Connection ports of outdoor unit)

- When using the ADAPTER, be careful not to overtighten the nut, or the smaller pipe may be damaged.
- Apply a coat of refrigeration oil to the threaded connection port of the outdoor unit where the flare nut comes in.
- Use appropriate wrenches to avoid damaging the connection thread by overtightening the flare nut.
- Apply wrenches on both of flare nut (local part), and ADAPTER to tighten them.

#### Adapter tightening torque

Adapter type [in. (mm)]	Tightening torque [lbf-ft. (N·m)]
ø1/2 (ø12.70) → ø3/8 (ø9.52)	36.1 to 45.0 (49 to 61)
ø1/2 (ø12.70) → ø5/8 (ø15.88)	36.1 to 45.0 (49 to 61)

### 5. 2. Sealing test

#### ⚠ CAUTION

Use only nitrogen gas. Never use refrigerant gas, oxygen, in flammable gas or poisonous gas to pressurize the system. (If oxygen is used, there is the danger of an explosion.)

Do not apply shock during sealing test. It can rupture the pipes and cause serious injury.

Do not turn on the power unless all operations are complete.

Do not block the walls and the ceiling until the sealing test and the charging of the refrigerant gas have been completed.

After connecting the pipes, perform a sealing test. Recheck that the 3-way valve are closed before performing a sealing test. (Fig. B)

Pour nitrogen gas through both the liquid pipe and the gas pipe. Pressurize nitrogen gas to 4.2 MPa to perform the sealing test.

Check all flare connection areas and brazed areas.

Then, check that the pressure has not decreased.

Compare the pressures after pressurizing and letting it stand for 24 hours, and check that the pressure has not decreased.

\* When the outdoor temperature changes 5 °C, the test pressure changes 0.05 MPa. If the pressure has dropped, the pipe joints may be leaking.

If a leakage is found, immediately repair it and perform a sealing test again.

\* Decrease the pressure of nitrogen gas before blazing

After completing the sealing test, release the nitrogen gas from both valves.  
Release the nitrogen gas slowly.

### 5.3. Vacuum process

#### CAUTION

- Do not turn on the power unless all operations are complete.
  - If the system is not evacuated sufficiently, its performance will drop.
  - Be sure to evacuate the refrigerant system using a vacuum pump.
  - The refrigerant pressure may sometimes not rise when a closed valve is opened after the system is evacuated using a vacuum pump. This is caused by the closure of the refrigerant system of the outdoor unit by the electronic expansion valve. This will not affect the operation of the unit.
  - Use a clean gauge manifold and charging hose that were designed specifically for use with R410A. Using the same vacuum equipment for different refrigerants may damage the vacuum pump or the unit.
  - Do not purge the air with refrigerants, but use a vacuum pump to evacuate the system.
  - If moisture might enter the piping, follow below. (i.e., if doing work during the rainy season, if the actual work takes long enough that condensation may form on the inside of the pipes, if rain might enter the pipes during work, etc.)
  - After operating the vacuum pump for 2 hours, pressurize to 0.05 MPa (i.e., vacuum breakdown) with nitrogen gas, then depressurize down to -100.7kPa (-755mmHg) for an hour using the vacuum pump (vacuum process).
  - If the pressure does not reach -100.7kPa (-755mmHg) even after depressurizing for at least 2 hours, repeat the vacuum breakdown - vacuum process.
- After vacuum process, maintain the vacuum for an hour and make sure the pressure does not rise by monitoring with a vacuum gauge.

#### Evacuation procedure

- (1) Remove the blank caps of the gas pipe and liquid pipe and check that the valves are closed.
- (2) Remove the charging port cap.
- (3) Connect a vacuum pump and a pressure gauge to a charging hose and connect it to the charging port.
- (4) Activate the vacuum pump and vacuum the indoor unit and connection piping until the pressure gauge becomes -100.7kPa (-755mmHg).  
Evacuate from both the gas pipe and the liquid pipe.
- (5) Continue evacuating the system for 1 hour after the pressure gauge reads -100.7kPa (-755mmHg).
- (6) Remove the charging hose and reinstall the charging port cap.

Table.A

Pipe	3-way valve	Blank cap	Charging port cap
Liquid valve	7.0 to 9.0 N·m (70 to 90 kgf·cm)	20.0 to 25.0 N·m (200 to 250 kgf·cm)	12.5 to 16.0 N·m (125 to 160 kgf·cm)
Gas valve	11.0 to 13.0 N·m (110 to 130 kgf·cm)	30.0 to 35.0 N·m (300 to 350 kgf·cm)	12.5 to 16.0 N·m (125 to 160 kgf·cm)

Fig. A Connection system

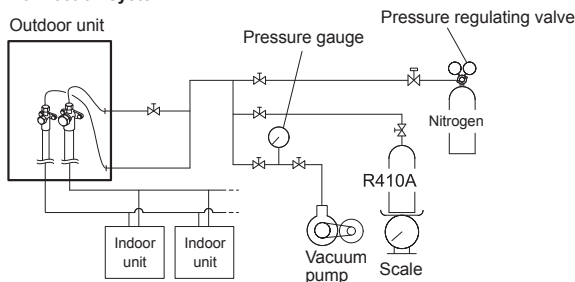
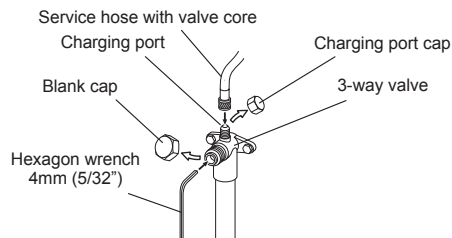


Fig. B



## 6. ELECTRICAL WIRING

#### WARNING

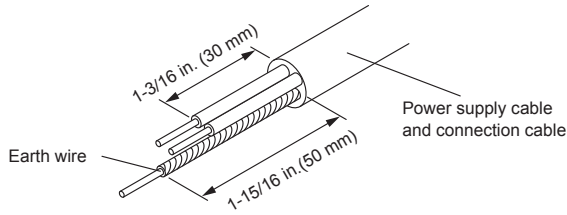
- Wiring connections must be performed by a qualified person in accordance with specifications.
- The rated supply of this product is 60Hz, 208/230V. Use a voltage within the range of 187-253V.
- Before connecting the wires, make sure the power supply is OFF.
- When installing this system in high humidity locations, install using ground fault equipment breakers (often referred to in other countries as an ELCB [earth leakage current breaker]) to reduce the risk of leaking current which may result in electric shock or potential fire.
- Be sure to install a breaker of the specified capacity.
- When selecting breaker, please comply with the laws and the regulations of each country.
- One breaker must be installed on the power supply of the outdoor unit.
- Wrong selection and setup of the breaker will cause electric shock or fire.
- Do not connect AC power supply to the transmission line terminal board.
- Improper wiring can damage the entire system.
- Connect the connector cord securely to the terminal.
- Faulty installation can cause a fire.
- Make sure to secure the insulation portion of the connector cable with the cord clamp.
- A damaged insulation can cause a short circuit.
- Never install a power factor improvement condenser. Instead of improving the power factor, the condenser may overheat.
- CAUTION-Risk of Electric Shock
- Before servicing the unit, turn the power supply switch OFF. Then, do not touch electric parts for 10 minutes due to the risk of electric shock.
- Make sure to perform grounding work. Improper grounding work can cause electric shocks.

#### CAUTION

- The primary power supply capacity is for the air conditioner itself, and does not include the concurrent use of other devices.
- Do not use crossover power supply wiring for the outdoor unit.
- If the electrical power is inadequate, contact your electric power company.
- Install a breaker in a location that is not exposed to high temperatures.
- If the temperature surrounding the breaker is too high, the amperage at which the breaker cuts out may decrease.
- We suggest installing ELCB [Earth Leakage Circuit Breaker] or follow local electrical code.
- This system uses an inverter, which means that when used with a ground fault breaker you must use breakers that can handle harmonics such as a ELCB (30 mA or greater) in order to prevent malfunctioning of ground fault device.
- When the electrical switchboard is installed outdoors, place it under lock and key so that it is not easily accessible.
- Do not fasten the power supply cable and connection cable together.
- Always keep to the maximum length of the connection cable. Exceeding the maximum length may lead to erroneous operation.
- The static electricity that is charged to the human body can damage the control PC Board when handling the control PC Board for address setting, etc.
- Please keep caution to the following points.
- Provide the grounding of Indoor unit, Outdoor unit and Option equipment.
- Cut off the power supply (breaker).
- Touch the metal section (such as the unpainted control box section) of the indoor or outdoor unit for more than 10 seconds. Discharge the static electricity in your body.
- Never touch the component terminal or pattern on the PC Board.

## 6.1. How to connect the wire to the terminals

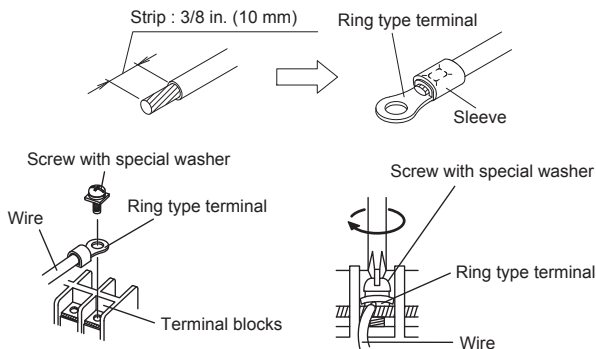
- When stripping off the coating of a lead wire, always use a special tool such as a wire stripper. If there is no special tool available, carefully strip the coating with a knife etc.



How to connect wiring to the terminal

### Caution when wiring cable

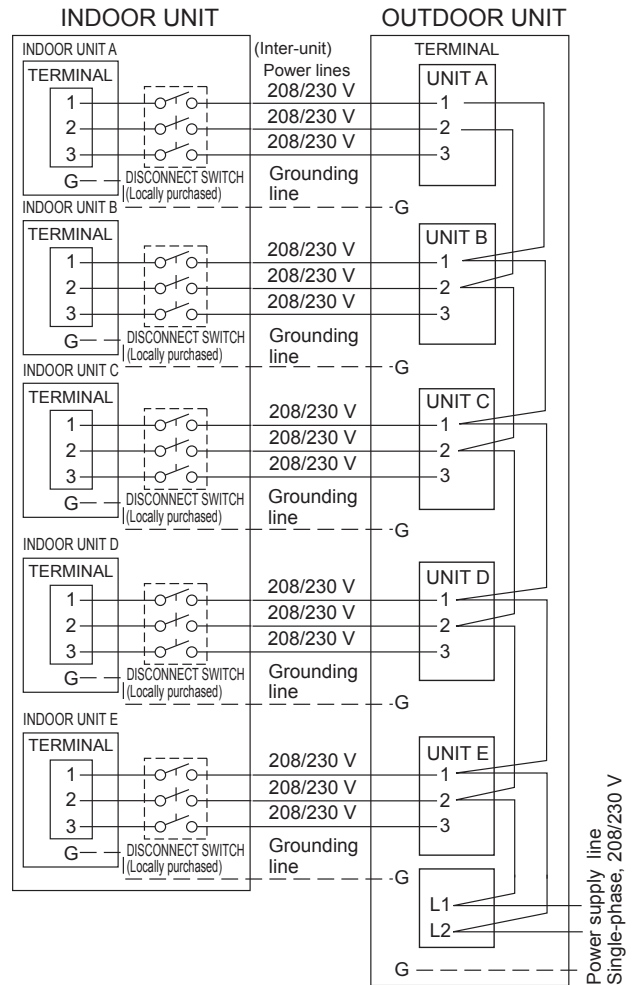
- Use ring type terminals with insulating sleeves as shown in the figure to connect to the terminal block.
- Securely clamp the ring type terminals to the wires using an appropriate tool so that the wires do not come loose.
- Use the specified wires, connect them securely, and fasten them so that there is no stress placed on the terminals.
- Use an appropriate screwdriver to tighten the terminal screws. Do not use a screwdriver that is too small, otherwise, the screw heads may be damaged and prevent the screws from being properly tightened.
- Do not tighten the terminal screws too much, otherwise, the screws may break.
- See the table below for the terminal screw tightening torques.



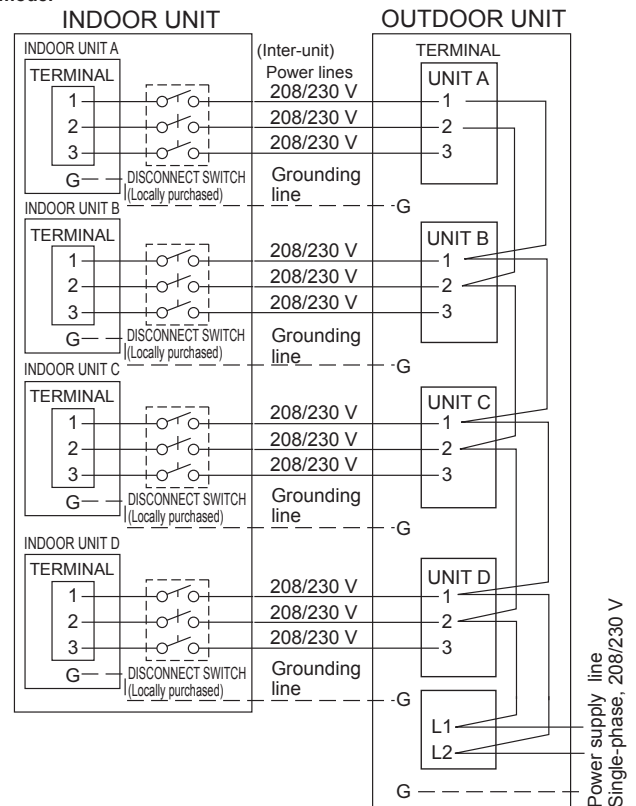
Tightening torque [lbf-in. (N·m)]	
M4 screw	10.6 to 15.9 (1.2 to 1.8)
M5 screw	17.7 to 26.5 (2.0 to 3.0)

## 6.2. Connection diagrams

### 45 model



### 36 model



**⚠ WARNING**

Disconnect switch for over current protection given in the table below is to be installed between the indoor unit and the outdoor unit.

**Disconnect switch**

15A

**⚠ CAUTION**

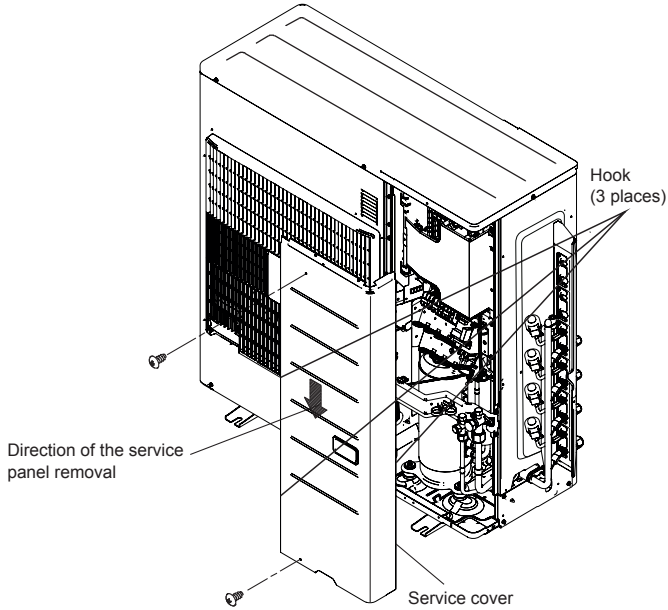
Be sure to refer the preceding diagram and do the correct field wiring. Wrong wiring causes malfunction of the unit.

Check local electrical codes and also any specific wiring instructions or limitation.

**6. 3. Wiring method**

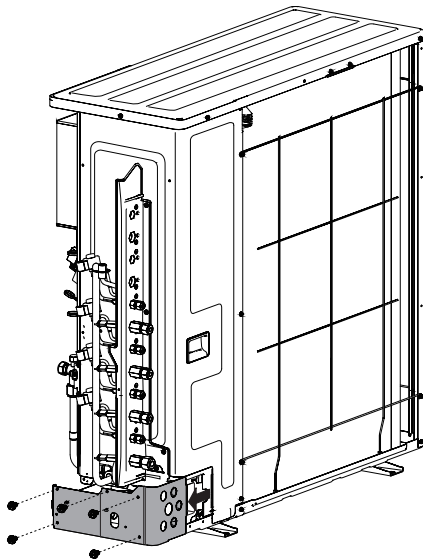
**(1) Service cover removal**

- Remove the two mounting screws.
- Remove the service cover by pushing downwards.

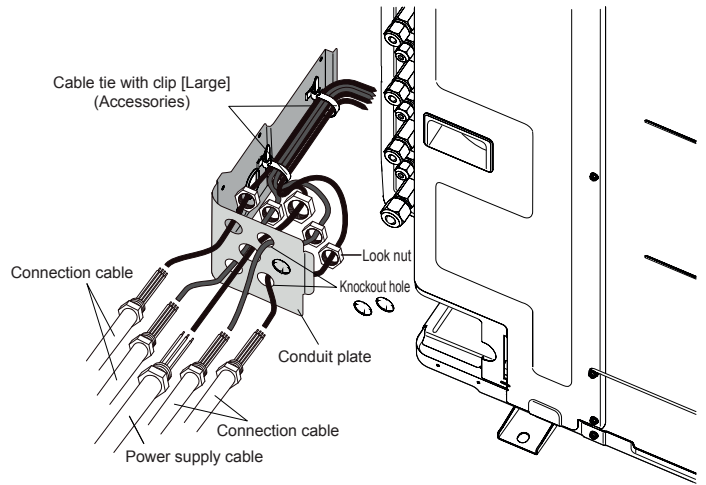


**(2) Conduit plate removal**

- Remove the five mounting screws.
- Remove the conduit plate.

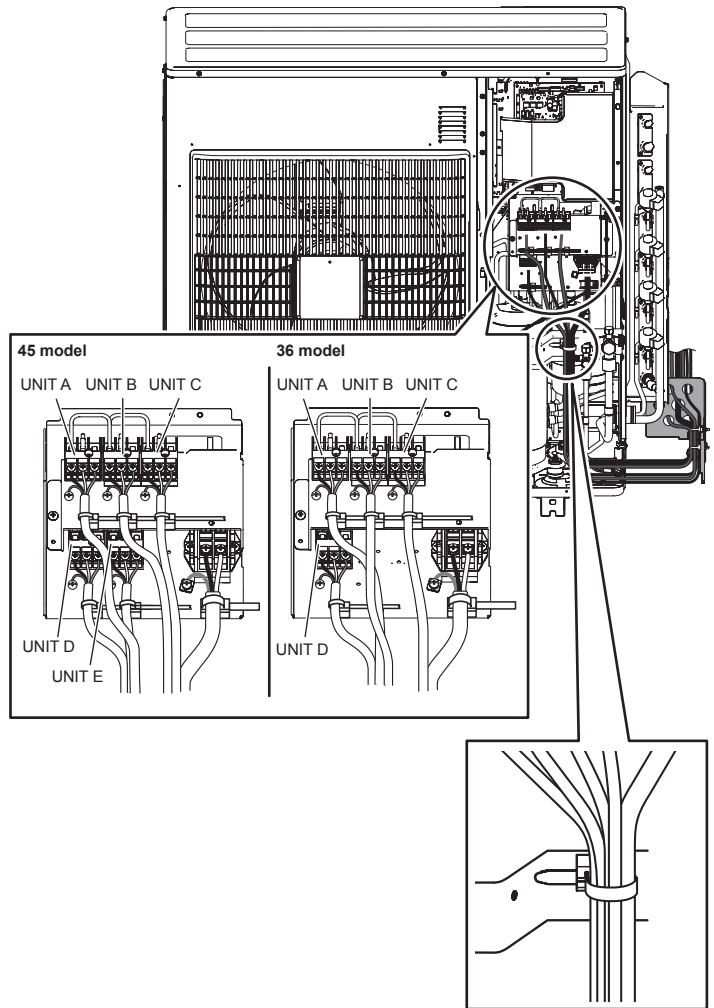


- (3) Fasten the power supply cable and the connection cable to the conduit holder using the lock nut.  
(Open the knock out holes with the tool so as not to transform conduit plate if necessary.)



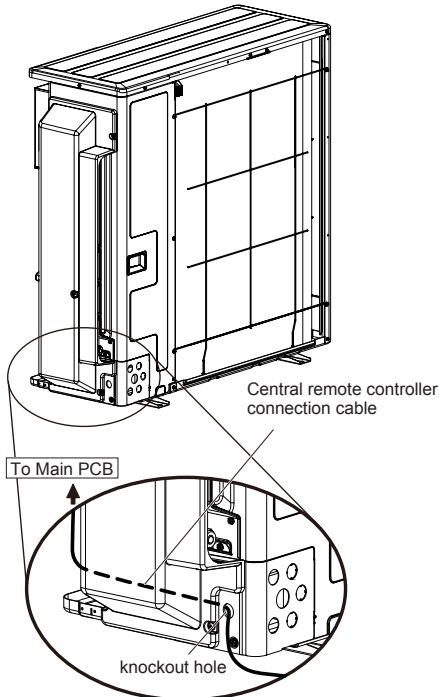
- (4) Connect the power supply cable and the connection cable to terminal.  
(5) Fasten the power supply cable and connection cable with cable clamp.

**45/36 models**

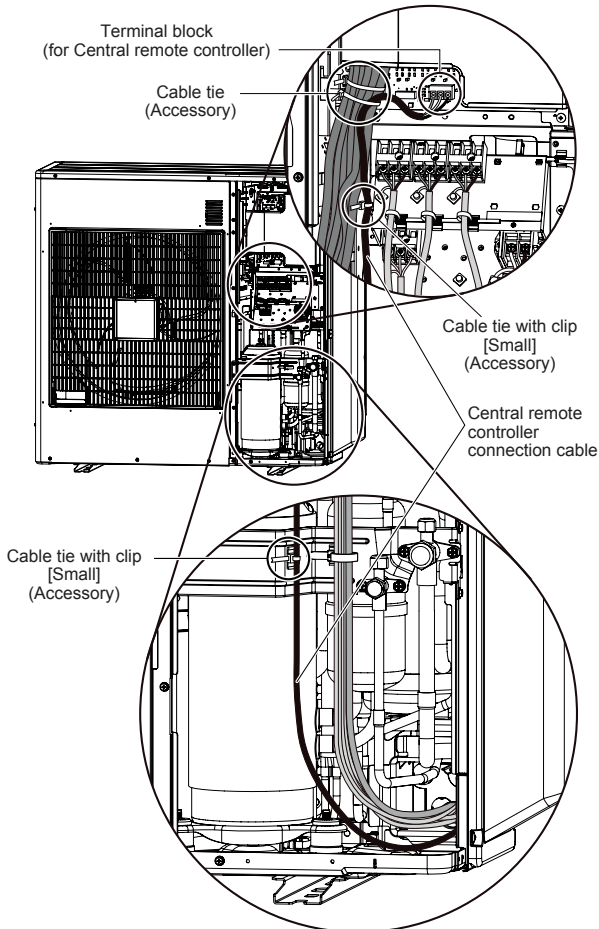


## 6.4. Connecting the Central remote controller (Option)

- When connecting the Central remote controller (Option), please use the outdoor unit side knockout hole (Ø22.2 mm diameter).
  - Please ensure that there are no gaps in the Knockout hole.



- Fix the Connection cable with 2 cable ties with clip and 1 cable tie as shown in the diagram below, and connect it to the prescribed terminal of the Main PCB.
  - Fix the Central remote controller connection cable with Cable tie together with the bundle of wiring.



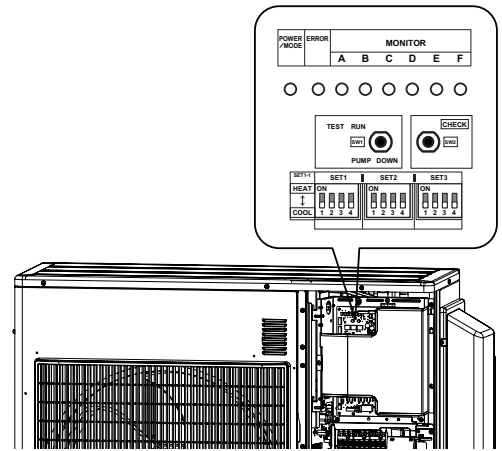
## 7. HOW TO OPERATE DISPLAY UNIT

### 7.1. Various setting methods

**WARNING**  
 Never touch electrical components such as the terminal blocks or reactor except the switch on the display board. It may cause a serious accident such as electric shock.

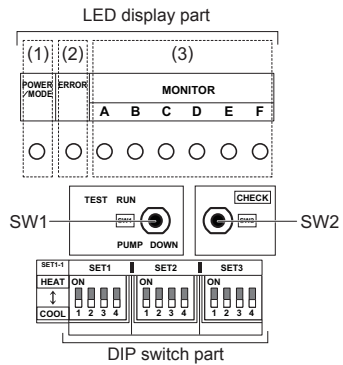
**CAUTION**  
 Once refrigerant charging is completed, be sure to open the valve prior to performing the local settings. Otherwise, the compressor may fail.  
 Discharge any static electricity from your body before touching the push switches. Never touch any terminal or pattern of any parts on the control board.

- The positions of the switches on the outdoor unit control board are shown in the figure below.



#### 7.1.1. Setting method

- Be sure to disconnect the power source or turn off the breaker.
- Change the DIP switch setting according to the required setting.
  - Various settings can be adjusted by changing DIP switches and push switches on the board of the outdoor unit.
  - The printed characters for the LED display are shown below.



#### 7.1.2. Description of display

LED display lamp		Function or operation method	
(1)	POWER/MODE	Green • Turns on when the power supply is ON (Including when error occurs). • Indicate the MODE by the number of flashes when the installation function is active.	
(2)	ERROR	Red • Flashes at high-speed when there is an error.	
(3)	MONITOR	• Displays the location and contents of errors when there is an error. (Refer to 10. ERROR CODE for details.) • Displays when check run is activated. (Refer to 8. CHECK RUN for details.)	
	A		Red
	B		Red
	C		Red
	D		Red
	E		Red

Switch		Function or operation method	Factory setting
SW1	Push	<ul style="list-style-type: none"> <li>For the test run start and stop.</li> <li>For the pump down start and stop.</li> </ul>	—
SW2	Push	<ul style="list-style-type: none"> <li>For when check run function is activated.</li> <li>For displaying the check run.</li> <li>For resetting the Automatic wiring correction memory.</li> </ul>	—
SET1-1	DIP	For selecting cooling or heating during test operation.	OFF
SET1-2	DIP	For switching SW1 operation.	OFF
SET1-3	DIP	For switching the base heater. (36 model only)	45 model: OFF (Do not change)
			36 model: ON
SET1-4	DIP	(Setting prohibited)	OFF (Do not change)
SET2-1	DIP	<ul style="list-style-type: none"> <li>For selecting outdoor unit low noise operation function.</li> <li>To use this function, the Central remote controller (option) is necessary.</li> </ul>	OFF
SET2-2	DIP	(Setting prohibited)	OFF (Do not change)
SET2-3	DIP	(Setting prohibited)	OFF (Do not change)
SET2-4	DIP	(Setting prohibited)	OFF (Do not change)
SET3-1	DIP	(Setting prohibited)	OFF (Do not change)
SET3-2	DIP	(Setting prohibited)	OFF (Do not change)
SET3-3	DIP	(Setting prohibited)	OFF (Do not change)
SET3-4	DIP	(Setting prohibited)	OFF (Do not change)

Be sure to disconnect the power source or turn off the breaker when changing the DIP switch.

## 7.2. Base heater forced off function

36 model

The power to the Base heater can be cut off by changing the DIP switch setting.

SET1-3	Setting
ON	
OFF	Forced off setting

## 7.3. Outdoor unit low noise operation function (option)

Change the Outdoor unit low noise operation by using this setting. The Central remote controller (option) is necessary to use this function.

SET2-1	Setting
ON	Lower
OFF	Low

### CAUTION

When the low noise operation function is working, cooling and heating capacity will decrease.

When changing the settings, please explain to the customer beforehand that the capacity decreases.

## 8. CHECK RUN

- The check run is a function to screen and detect any wiring errors.
- After carrying out the check run, you can use the Automatic wiring correction function to correct the wiring.
- \* Normal operation is possible without using the check run. In this case, use the test run or forced cooling function of the indoor unit to confirm any wiring errors.

### 8.1. Things to confirm before starting the check run.

To ensure safety, check that the following work, inspections and operations have been completed.

Check Item	Check Column
① Check that all work on the piping connecting the outdoor unit, indoor units has been completed	
② Check that all work on the wiring connecting the outdoor unit, indoor units has been completed	
③ Is there a gas leakage? [At pipe connections (flange connections and brazed areas)]	
④ Is the system charged with the specified volume of refrigerant?	
⑤ Is a breaker installed at the power supply cable of outdoor unit?	
⑥ Are the wires connected to the terminals without looseness, and in accordance with the specifications?	
⑦ Is the 3-way valve of the outdoor unit open? (Gas pipe and liquid pipe)	
⑧ Is the power supply connected for more than 12 hours?	

### 8.2. Restrictions applicable when performing the check run

- When the check run starts, all indoor units connected to the outdoor unit will start to run automatically. During the check run, you cannot check the operation of the indoor units separately. After the check run, check the operation of the indoor units separately in normal operation.
- The check run can be used when the temperature is within the operable temperature of the air conditioner.
- In the check run, the air conditioner will automatically switch between cooling and heating depending on the external temperature and internal temperature.
- The check run can be completed in about 30 minutes (cooling) or about 1 hour (heating), but may take more depending on the external and internal temperature conditions etc.
- Please do not conduct the check run with all the windows in the room closed. Otherwise the room temperature could get too low or too high.
- Depending on the difference of the room temperature of each room, a judgment may be impossible.
- Check run is a special operation so there may be a noise louder than the normal refrigerant noise or a creaking noise.

### 8. 3. Operating procedure for check run

#### CAUTION

Initiate check run after more than 12 hours after the power source is connected.

#### NOTE:

Be sure that the indoor unit and outdoor unit are not operating before starting the check run.

- (1) Press the "CHECK" switch for 3 seconds or more.



- (2) The number of indoor units (and the places) connected through the communication lines is displayed.
- If the displayed number of units (places) and the installed number of units (places) is the same, proceed to step (3).
  - If the displayed number of units (places) and the installed number of units (places) is not the same, shut off the power and check whether the indoor and outdoor communication lines are properly connected.
  - If there is no operation for 1 minute, the LED will return to the original display. (POWER/MODE LED: ON)

- (3) Press the "CHECK" switch for 3 seconds or more again. Check run is initiated.
- When check run is initiated, all LEDs from A to F will flash. (Preliminary operation)
  - The LED for each indoor unit will switch off in order as check for each unit is completed.

#### NOTE:

To interrupt the check run, press the "CHECK" switch.

Example) When 4 indoor units (A to D) are connected

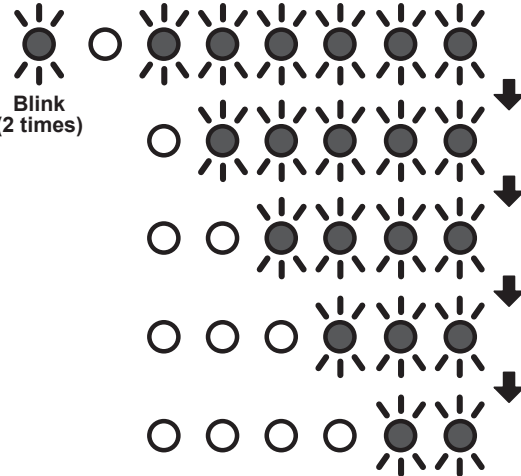
POWER /MODE	ERROR	MONITOR					
		A	B	C	D	E	F



Blink (2 times)

Example) When 4 indoor units (A to D) are connected

POWER /MODE	ERROR	MONITOR					
		A	B	C	D	E	F



Blink (2 times)

- (4) After the check run is complete, results will be displayed. Please fill the displayed results in the result table accordingly.

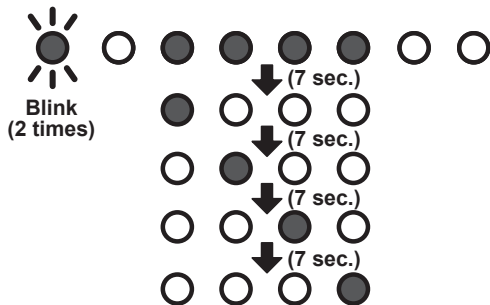
#### NOTE:

- Automatic wiring correction will not be completed if the power is turned off while displaying the results. To confirm the automatic wiring correction, be sure to carry out step (5).
- If frost is formed on the outdoor unit while displaying the results, Automatic defrost function will operate. Proceed to step (5) after the defrost function is finished.

If the connection is correct [(Example) When 4 indoor units are connected]

- After the number of connected units are displayed, the LED for each unit will light up in order from A to D.

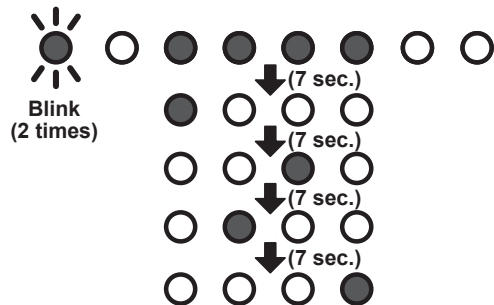
POWER /MODE	ERROR	MONITOR					
		A	B	C	D	E	F



If the connection is incorrect [(Example) When connection of B and C of the 4 units are reversed]

- After the number of connected units are displayed, B and C will light up in reverse.

POWER /MODE	ERROR	MONITOR					
		A	B	C	D	E	F





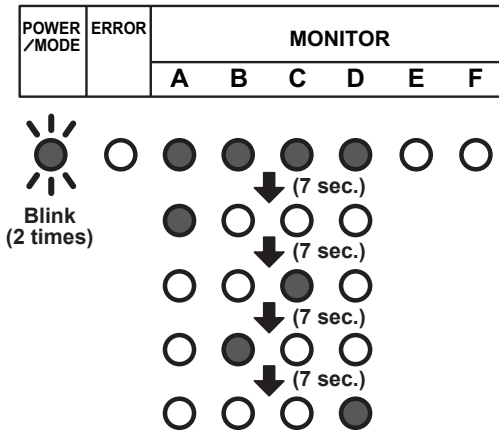
**[How to record the contents]**

- Please fill the displayed results according to the following example.

Example 1) When piping A to D is connected but the wires for B and C are connected in reverse.

<Displayed results>

The LEDs will light up in 7 second intervals in the following order.



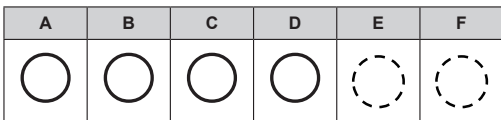
<Example of result table>

(a) Please write a ● where the LEDs light up in the order that they light up.

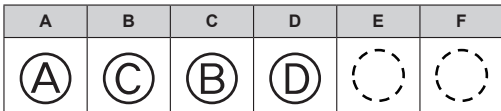
	A	B	C	D	E	F
1	●	●	●	●	○	○
2	●	○	○	○	○	○
3	○	○	●	○	○	○
4	○	●	○	○	○	○
5	○	○	○	●	○	○
6	○	○	○	○	○	○
7	○	○	○	○	○	○

(b) Based on the results of step (a), please record as follows.

- Please trace the dotted circle with a pen if multiple places light up.



- Please write the order from A to D in which the LEDs lit up inside the circle.



(c) Select the correction method.



Use the Automatic wiring correction function.\*1  
Proceed to step (5).

→ Correct the wiring manually.\*2  
Proceed to step (6).

Please write down the same results in the label on the reverse side of the service panel.

The results recorded are needed at the time of servicing.

(5) During results display, press the "CHECK" switch for 3 seconds or more.

- After LEDs A to F have lit in turn, all LEDs will light up indicating that the automatic wiring correction is completed.

(6) Disconnect the power supply or turn off the breaker and wait 10 minutes then turn the power back on and perform test run.

**NOTE:**

- If you do not disconnect the power supply or turn off the breaker, normal operation is not possible.

**Others**

- If an error occurs during check run it will be suspended. Please correct the error and start check run again.
- After the check run, if automatic wiring correction is carried out, the indoor unit's position will be modified to match the piping. (Please note that the display of the optional remote controller changes.)
- If you start check run again after the automatic wiring correction is finished, the modification will be reset.

<Result Table>

	A	B	C	D	E	F
1	○	○	○	○	○	○
2	○	○	○	○	○	○
3	○	○	○	○	○	○
4	○	○	○	○	○	○
5	○	○	○	○	○	○
6	○	○	○	○	○	○
7	○	○	○	○	○	○

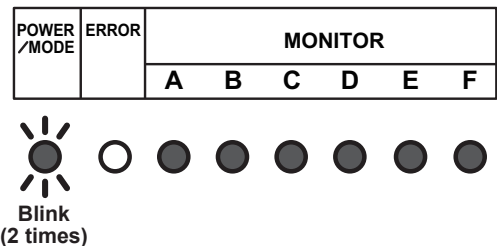
A	B	C	D	E	F
○	○	○	○	○	○

**NOTES:**

\*1: By using this function, the wiring is automatically corrected according to the piping.

\*2: When correcting the wiring manually, please disconnect the power supply or turn off the breaker during results display, and then change the wiring manually according to the obtained test results.

For example, in Example 1, the wirings connected to the terminals B and C is to be exchanged manually.



(6) Disconnect the power supply or turn off the breaker and wait 10 minutes then turn the power back on and perform test run.

**NOTE:**

- If you do not disconnect the power supply or turn off the breaker, normal operation is not possible.

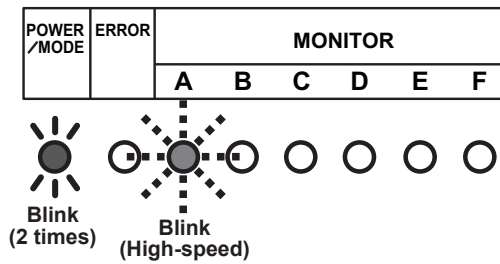
**Others**

- If an error occurs during check run it will be suspended. Please correct the error and start check run again.
- After the check run, if automatic wiring correction is carried out, the indoor unit's position will be modified to match the piping. (Please note that the display of the optional remote controller changes.)
- If you start check run again after the automatic wiring correction is finished, the modification will be reset.

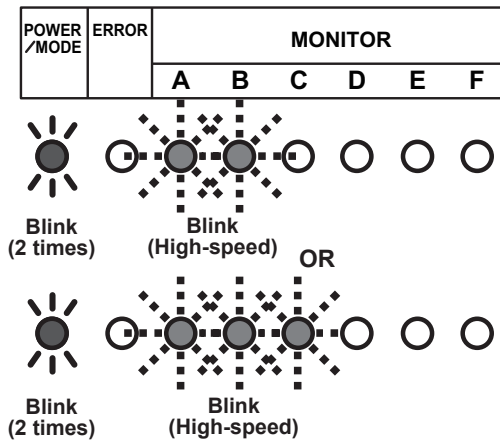
## 8.4. Check run judgment failure display

- If check run cannot be performed, the following is displayed. In this case, the check run will stop. Please check by using the cooling test run of the indoor unit.

### 8.4.1. Temperature out of range judgment



### 8.4.2. Wiring / piping number difference



## 8.5. Re-display check run results

- If you wish to check the automatic wiring correction contents, by briefly pressing the "CHECK" switch, the check run results is displayed. Please check the check run results by referring to the result table in step (4) of "8.3. Operating procedure for check run".
- If the automatic wiring correction contents has not been done, the POWER/MODE LED will blink twice and the MONITOR LED will turn off.

## 8.6. Automatic wiring correction memory reset

### CAUTION

When relocating the unit, reset the memory beforehand, or the unit may not function normally.

- Press the "CHECK" switch.  
The LED will light as shown in "8.5 Re-display check run results".
- Press the "CHECK" switch for more than 3 seconds when the LED is on.
- The LEDs from A to F will light in sequence, and then all LEDs will light to indicate the completion of the Automatic wiring correction memory reset.
- Disconnect the power supply or turn off the breaker.

## 9. TEST RUN

### CAUTION

Always connect the power supply 12 hours prior to the start of the operation in order to protect the compressor.

### (1) Indoor unit

- Is the drain normal?
- Is there any abnormal noise and vibration during operation?

### (2) Outdoor unit

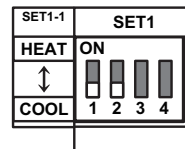
- Is there any abnormal noise and vibration during operation?
- Will noise, wind, or drain water from the unit disturb the neighbors?
- Is there any gas leakage?

- Do not operate the air conditioner in the test running state for a long time.
- For the operation method of the test run for indoor unit and central remote controller, refer to the operating manual and perform operation check.

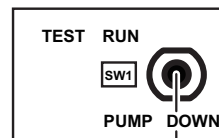
## 9.1. TEST RUN method

Be sure to temporarily disconnect the power supply or turn off the breaker before changing the DIP switch settings.

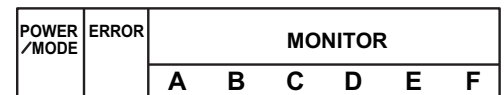
- Check the 3-way valves (both at the liquid side and gas side) are opened. Please confirm that the DIP switch SET1-2 is switched OFF.
- Set the operation mode to "COOL" or "HEAT". If you wish to change the DIP switch SET1-1 to "HEAT", please switch it after temporarily disconnecting the power supply or turning off the breaker switching the power off.



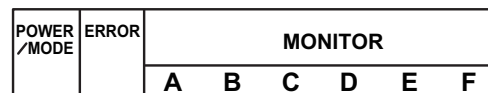
- In the first test run, be sure to set the operation mode to "COOL".
  - The operation mode cannot be switched between "COOL" and "HEAT" during the test run. To switch the operation mode between "COOL" and "HEAT", stop the test run, switch the operation mode, and then start the test run again.
- Press "TEST RUN" switch for more than 3 seconds.  
The POWER / MODE LED flashes once.



SW1



- Confirm operating status.
- Press "TEST RUN" switch for more than 3 seconds.



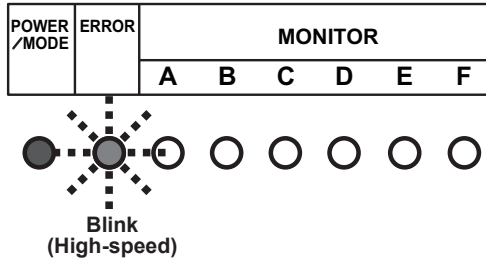
POWER/MODE LED will turn on, and test run stops.

## 10. ERROR CODE

- If an error occurs, the LED will light up to display the error location and the error code.

### 10. 1. In the event of an error

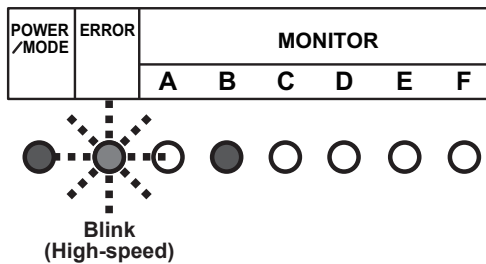
- The error LED flashes quickly.



### 10. 2. Error location display

- LEDs A to F of MONITOR light up and display the error location. In the case of an overall error, LEDs A to F of MONITOR do not light up.

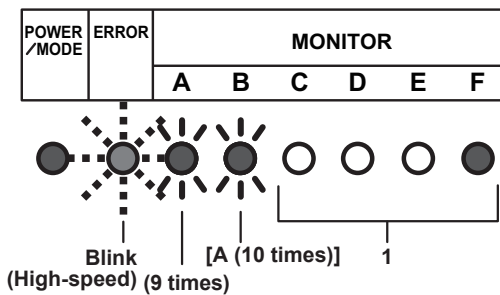
Example) Coil error in indoor unit B



### 10. 3. Error code display

- While the error is occurring, please briefly press SW1. The error code is displayed.

Example) Coil error (Error cord = 9A.1)



Display mode

LED on: ●

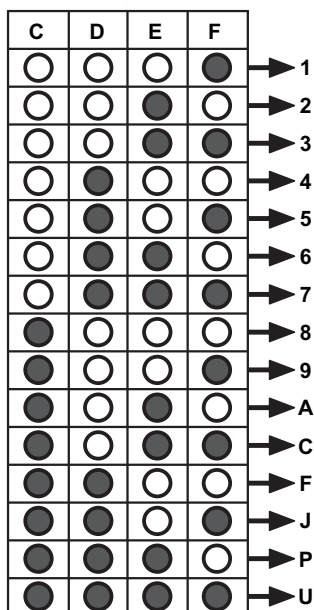
LED off: ○

Blink: (0.5s Light on / 0.5s Light off)

Number of blinking: ( )

For MONITOR (A and B)

- A: 10 times
- C: 11 times
- F: 12 times
- J: 13 times
- P: 14 times
- U: 15 times



Error code	Error type
11.3	Serial communication error
11.4	Serial communication error during operation
16.5	Communication error between controller and outdoor unit
22.1	Indoor unit capacity error
5U.1	Indoor unit error
62.1	PCB model information error
62.3	EEPROM access error
62.8	EEPROM data corruption error
63.1	Inverter error
65.3	IPM error (Trip terminal L error)
71.1	Discharge temp. sensor error
72.1	Compressor temp. sensor error
73.2	Heat ex. middle temp. sensor error
73.3	Heat ex. liquid temp. sensor error
74.1	Outdoor temp. sensor error
75.1	Suction gas temp. sensor error
76.1	Valve sensor error
76.2	
77.1	Heat sink temp. sensor error
84.1	Current sensor 1 error (stoppage permanently)
86.1	Discharge pressure sensor error
86.4	High pressure switch 1 error
94.1	Trip detection
95.1	Compressor motor control error (stoppage permanently)
97.3	Fan motor 1 error (Duty error)
98.3	Fan motor 2 error (Duty error)
99.1	4-way valve error
9A.1	Coil 1 (expansion valve 1) error
A1.1	Discharge temperature 1 error (stoppage permanently)
A3.1	Compressor 1 temperature error

## 11. PUMP DOWN

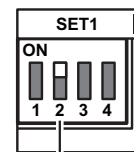
### ⚠ WARNING

During the pump down operation, make sure that compressor is off before you remove the refrigerant piping. Do not remove the connection pipe while the compressor is in operation with valve open. This may cause abnormal pressure in the refrigeration cycle that leads to breakage and even injury.

### PUMP DOWN OPERATION

When moving or discarding the air conditioner, in order to consider the environment and avoid the discharge of refrigerant to the atmosphere, please pump down according to the following procedure.

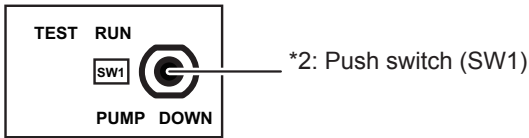
- Connect the pressure gauge to the charging port.
- Change the DIP switch on the board (SET1-2) to ON\*1



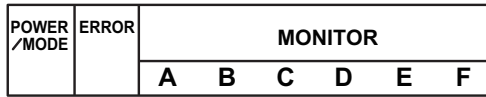
\*1: DIP switch (SET1-2)

\*Be sure the power supply is disconnected on the breaker is turned off when changing the DIP switch.

- (3) To start operation, press the [PUMP DOWN] switch\*2 for 3 seconds or press after the power has been on for 3 min.



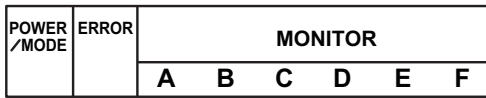
During pump down, the LED (POWER/MODE) will flash 3 times consecutively.



**NOTE:**

If the [PUMP DOWN] switch is pressed during compressor operation, the compressor will stop, and the operation will start after about 3 min.

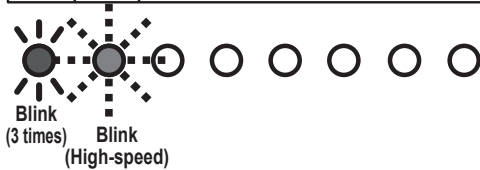
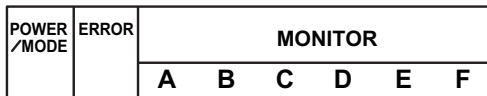
- (4) Close the liquid pipe valve.
  - (5) When 7.3 psi ~ 0 psi (0.05 MPa ~ 0 MPa) is shown, close the gas pipe valve.
  - (6) Stop pump down by pressing the [PUMP DOWN] switch for 3 seconds.
- The LED will light as follows.



- (7) Disconnect the power supply or turn off the breaker.

**NOTE:**

- If the pump down is not stopped by pressing the switch as in step (6), it will stop automatically after 15 min. and the LED will light as follows. If the pump down is complete, disconnect the power supply or turn off the breaker. If not completed open the liquid pipe valve, and then start again from step (3).



- In order to interrupt the pump down operation, press the [PUMP DOWN] switch again. The LED will return to the original display before starting pump down. (POWER/MODE LED: On)
- The pump down may stop before completion due to error. To complete the pump down, correct the error, open the liquid pipe valve and then start from step (1) again. Otherwise, the refrigerant can be recovered from the service port.

**12. CUSTOMER GUIDANCE**

Explain the following to the customer in accordance with the operating manual:

- (1) Starting and stopping method, operation switching, temperature adjustment, timer, air flow adjustment, and other remote control unit operations.
- (2) Air filter removal and cleaning.
- (3) Give the operating manual and installation instruction sheet to the customer.