



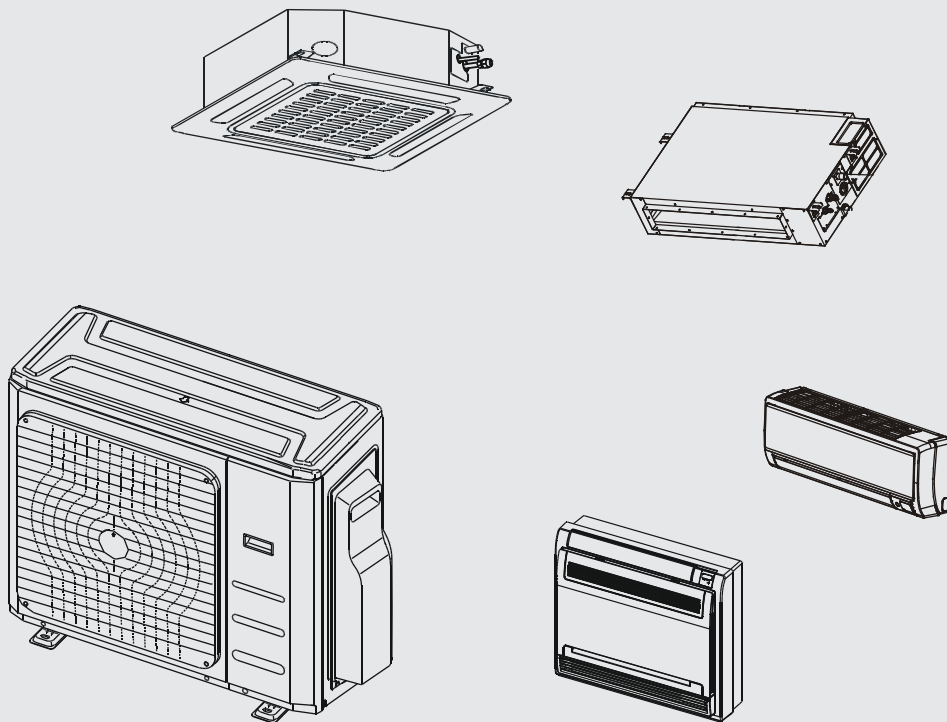
BOSCH

Installation Manual

INVERTER ONE-TWIN/ONE-THREE/ONE-FOUR/ONE-FIVE SPLIT-TYPE AIR CONDITIONER

Climate 5000 MS

18/27/36/42 OU- OUE



IMPORTANT NOTE:

- Read this manual carefully before installing or operating your new air conditioning unit. Make sure to save this manual for future reference.
- This manual only describes the installation of outdoor units. When installing an indoor unit, refer to the installation manual of the indoor unit.

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**CAUTION**

Risk of fire (for R32 refrigerant only).

1 Accessories

The air conditioning system comes with the following accessories. Use all of the installation parts and accessories to install the air conditioner. Improper installation may result in water leakage, electrical shock and fire, or equipment failure.



Name		Shape	Quantity
Installation plate			1
Plastic expansion sheath			5-8 (depending on model)
Self-tapping screw A ST3.9X25			5-8 (depending on model)
Drain joint (some models)			1
Seal ring (some models)			1
Connecting pipe assembly	Liquid side	Ø1/4 in	Parts you must purchase. Consult a technician for the proper size.
		Ø3/8 in	
	Gas side	Ø3/8 in	
		Ø1/2 in	
		Ø3/4 in	
Owner's manual			1
Installation manual			1
Transfer connector (packed with the indoor or outdoor unit, depending on models) NOTE: Pipe size may differ from appliance to appliance. To meet different pipe size requirements, sometimes the pipe connections need a transfer connector installed on the outdoor unit.			1 (one piece/one indoor unit) 1-5 (1-5 pieces for outdoor unit, depending on models)
Magnetic ring (Fit the connective cable between the indoor unit and outdoor unit after installation.)			1 (one piece/one cable)

Table 1.

Optional Accessories

There are two types of remote controls: wired and wireless.

Select a remote controller based on customer preferences and requirements and install in an appropriate place.

Refer to catalogues and technical literature for guidance on selecting a suitable remote controller.

2 Safety Precautions

Read Safety Precautions Before Installation

Incorrect installation due to ignoring instructions can cause serious damage or injury.

The seriousness of potential damage or injuries is classified as either a **WARNING** or **CAUTION**.



WARNING

Failure to observe a warning may result in serious injury. The appliance must be installed in accordance with national regulations.



CAUTION

Failure to observe a caution may result in injury or equipment damage.



WARNING

- **Carefully read the Safety Precautions before installation.**
- In certain functional environments, such as kitchens, server rooms, etc., the use of specially designed air-conditioning units is highly recommended.
- **Only qualified personnel should install, repair and service this air conditioning unit.**
- Improper installation may result in electrical shock, short circuit, leaks, fire or other damage to the equipment and personal property.
- **Strictly follow the installation instructions given in this manual.**
- Improper installation may result in electrical shock, short circuit, leaks, fire or other damage to the equipment.
- After installation, ensure there are no refrigerant leaks and that the unit is operating properly. Refrigerant is both toxic and flammable and poses a serious health and safety risk.
- Do not use means to accelerate the defrosting process or for cleaning, other than those recommended by the manufacturer.



WARNING

- The appliance disconnection must be incorporated with an all-pole disconnection device in the fixed wiring in accordance with the wiring rules.
- Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorises their competence to handle refrigerants safely in accordance with an industry-recognised assessment specification.
- Servicing shall only be performed as recommended by the equipment manufacturer. Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the qualified personnel in the use of flammable refrigerants.
- The appliance shall be stored so as to prevent mechanical damage from occurring.
- Keep ventilation openings clear of obstruction.

NOTE:

The following information is required for units using R32 refrigerant.

- The appliance shall be stored in a room without continuously operating heat source (for example: open flames, an operating gas appliance or an operating electric heater).
- Do not pierce or burn the unit.
- Be aware that the refrigerants may not contain an odour.
- Compliance with national gas regulations shall be observed.
- The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.
- The appliance shall be installed, operated and stored in a room with a floor area larger than X m² (see the following form). The appliance shall not be installed in an unventilated space, if that space is smaller than X m² (see the following form).



Model (KW)	Amount of refrigerant to be charged (kg)	Maximum installation height (m)	Minimum room area (m ²)
8.5KW	≤2.048	2.2m	4
8.5KW	≤2.048	1.8m	4
8.5KW	≤2.048	0.6m	35
9KW - 14KW	2.048-3.0	2.2m	4
9KW - 14KW	2.048-3.0	1.8m	8
9KW - 14KW	2.048-3.0	0.6m	80
above 14KW	>3.0	2.2m	5
above 14KW	>3.0	1.8m	9
above 14KW	>3.0	0.6m	80




Table 2.

Note on fluorinated gases

1. This air-conditioning unit contains fluorinated gases. For specific information on the type of gas and the amount, refer to the relevant label on the unit itself.
2. Installation, service, maintenance and repair of this unit must be performed by Qualified Personnel.
3. Product uninstallation and recycling must be performed by Qualified Personnel.
4. If the system has a leak-detection system installed, it must be checked for leaks at least every 12 months.
5. When the unit is checked for leaks, proper record-keeping of all checks is strongly recommended.

Explanation of symbols displayed on the indoor unit or outdoor unit (applicable to units R32 refrigerant only):

	WARNING	This symbol shows that this appliance uses a flammable refrigerant. If there are refrigerant leaks or if the refrigerant is exposed to an external ignition source, there is a risk of fire.
	CAUTION	This symbol shows that the operation manual should be read carefully.

	CAUTION	This symbol shows that service personnel should be handling this equipment with reference to the installation manual.
	CAUTION	
	CAUTION	This symbol shows that information is available such as the operating manual or installation manual.

3 Installation Overview

INSTALLATION ORDER

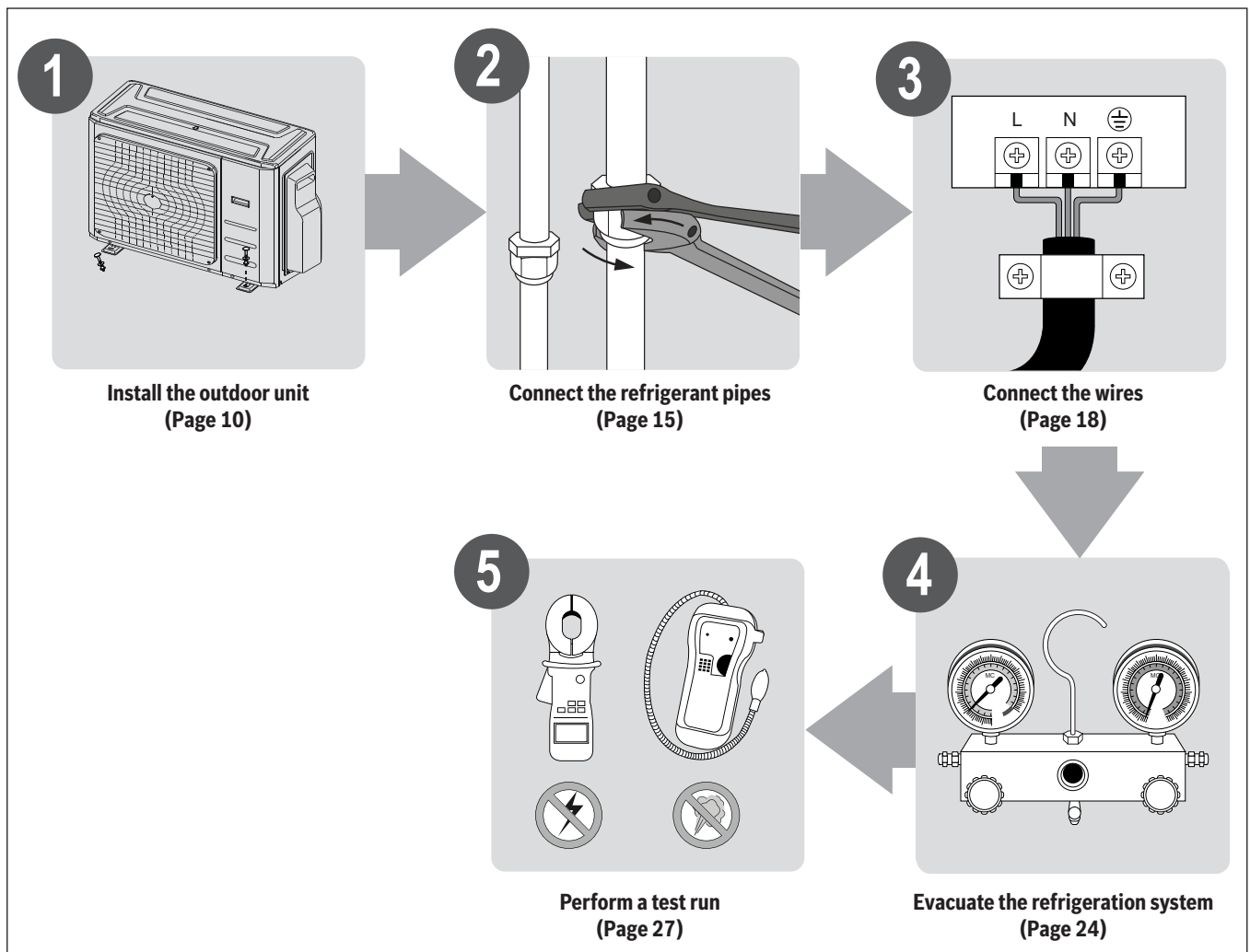
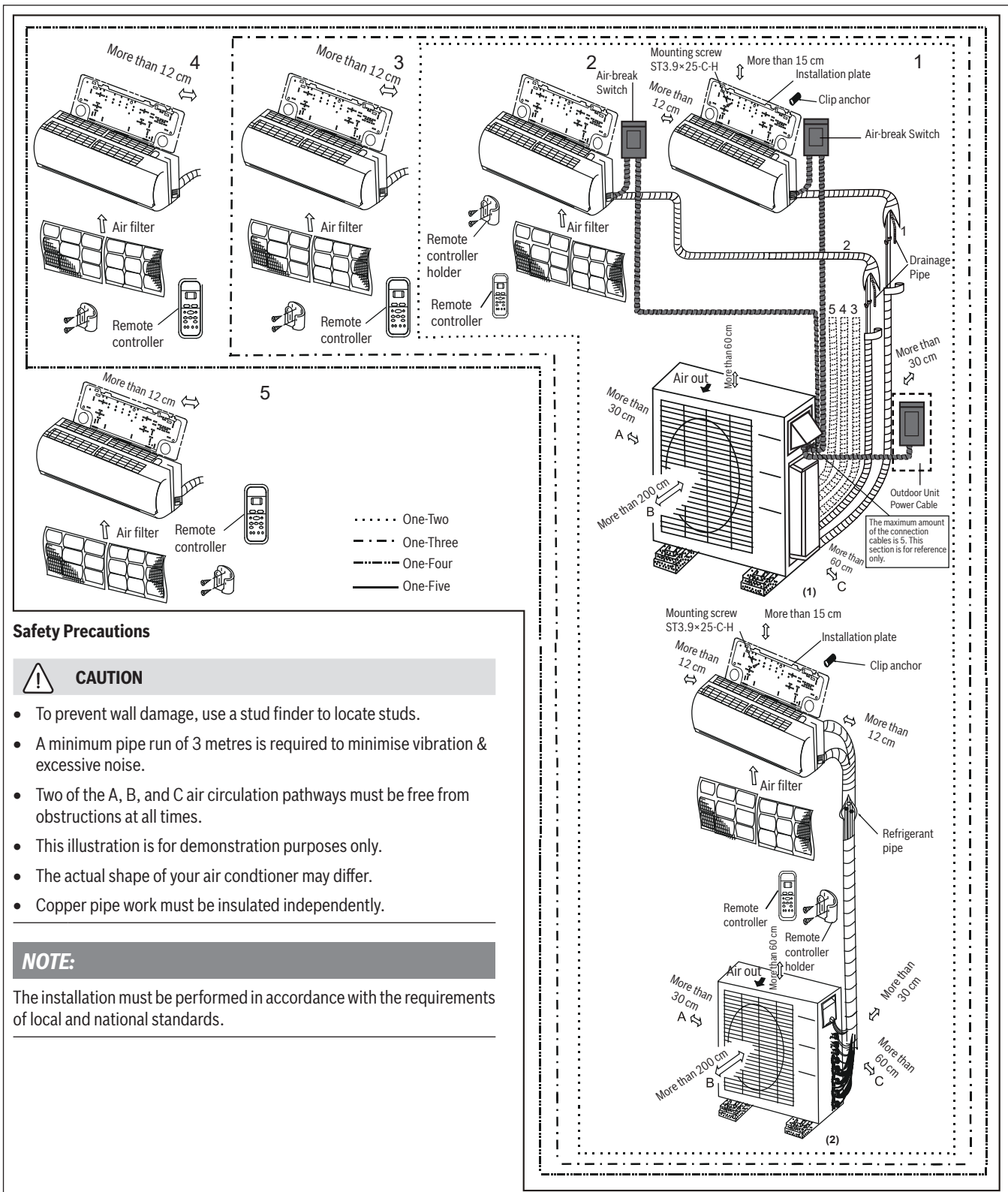


Fig. 1.

4 Installation Diagram

Installation Diagram



Safety Precautions

CAUTION

- To prevent wall damage, use a stud finder to locate studs.
- A minimum pipe run of 3 metres is required to minimise vibration & excessive noise.
- Two of the A, B, and C air circulation pathways must be free from obstructions at all times.
- This illustration is for demonstration purposes only.
- The actual shape of your air conditioner may differ.
- Copper pipe work must be insulated independently.

NOTE:

The installation must be performed in accordance with the requirements of local and national standards.

Fig. 2.

5 Specifications

Number of units that can be used together	Connected units	1-5 units
Compressor stop/start frequency	Stop time	3 min or more
Power source voltage	Voltage fluctuation	within $\pm 10\%$ of rated voltage
	Voltage drop during start	within $\pm 15\%$ of rated voltage
	Interval unbalance	within $\pm 3\%$ of rated voltage

Table 3.

Unit: m

	1 drive 2	1 drive 3	1 drive 4	1 drive 5
Max. length for all rooms	40	60	80	80
Max. length for one indoor unit	25	30	35	35
Max. height different between indoor and outdoor unit	15	15	15	15
Max. height different between indoor units	10	10	10	10

Table 4.

When installing multiple indoor units with a single outdoor unit, ensure that the length of the refrigerant pipe and the drop height between the indoor and outdoor units meets the requirements illustrated in the following diagram:

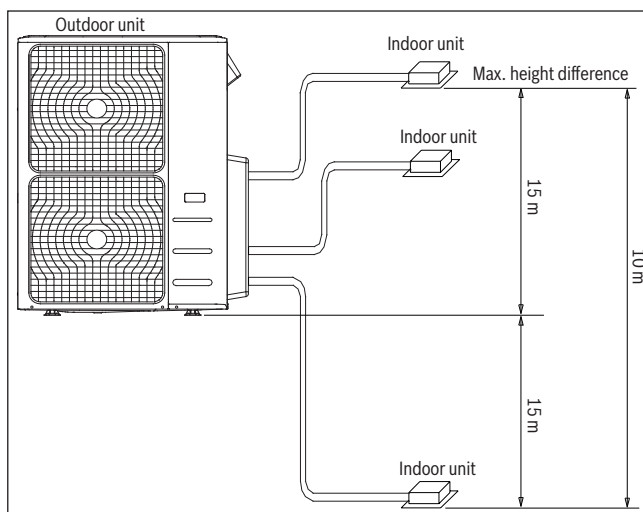


Fig. 3.

6 Outdoor Unit Installation

6.1 Outdoor Unit Installation Instructions

Step 1: Select installation location.

The outdoor unit should be installed in the location that meets the following requirements:

- ▶ Place the outdoor unit as close to the indoor unit as possible.
- ▶ Ensure that there is enough room for installation and maintenance.
- ▶ The air inlet and outlet must not be obstructed or exposed to strong wind.
- ▶ Ensure the location of the unit will not be subject to snowdrifts, accumulation of leaves or other seasonal debris.
- ▶ The installation area must be dry and well ventilated.
- ▶ There must be enough room to install the connecting pipes and cables and to access them for maintenance.

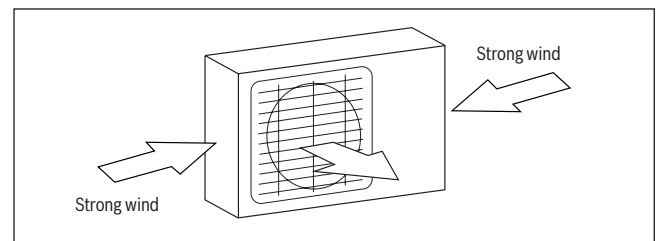


Fig. 4.

- ▶ The area must be free of combustible gases and chemicals.
- ▶ The pipe length between the outdoor and indoor unit may not exceed the maximum allowable pipe length.
- ▶ If possible, **DO NOT** install the unit where it is exposed to direct sunlight.
- ▶ If possible, make sure the unit is located far away from your neighbours property so that the noise from the unit will not disturb them.
- ▶ If the location is exposed to strong winds (for example: near a seaside), the unit must be placed against the wall to shelter it from the wind. If necessary, use an awning. (See Fig. 4 & 5)
- ▶ Install the indoor and outdoor units, cables and wires at least 1 metre from televisions or radios to prevent static or image distortion. Depending on the radio waves, a 1 metre distance may not be enough to eliminate all interference.

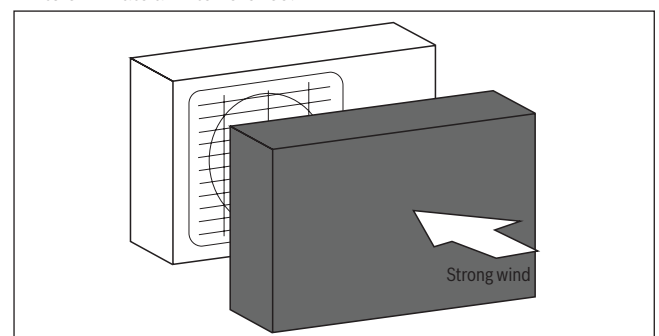


Fig. 5.

Step 2: Install outdoor unit.

Fix the outdoor unit with anchor bolts (M10).

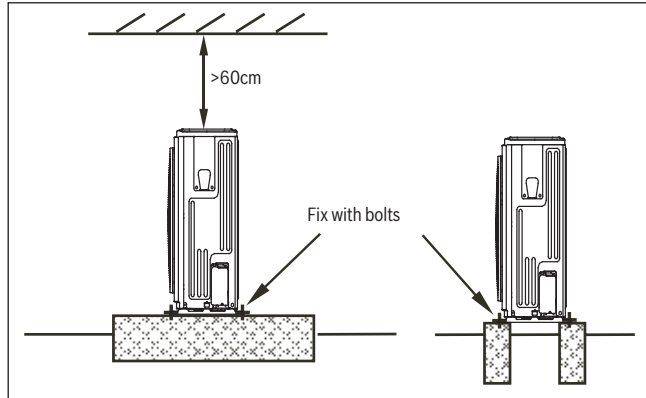


Fig. 6.



CAUTION

- Ensure to remove any obstacles that may block air circulation.
- Ensure you refer to **Length Specifications** to ensure there is enough room for installation and maintenance.

Split Type Outdoor Unit

(Refer to Fig 7, 8, 9, 12 and Table 5)

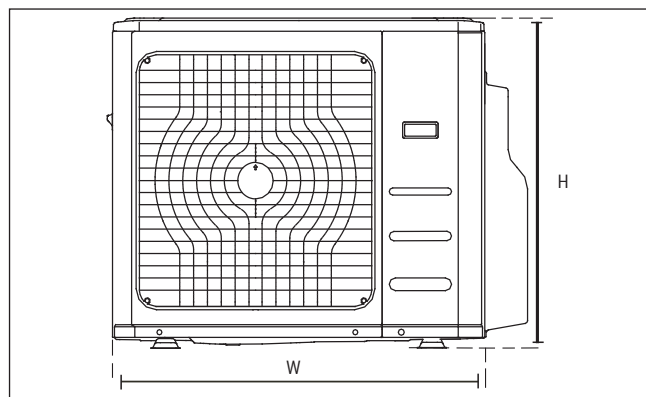


Fig. 7.

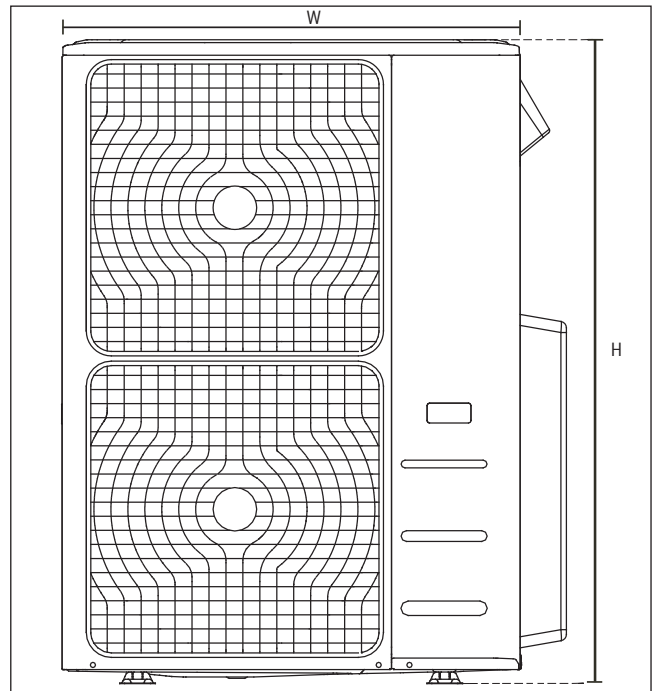


Fig. 8.

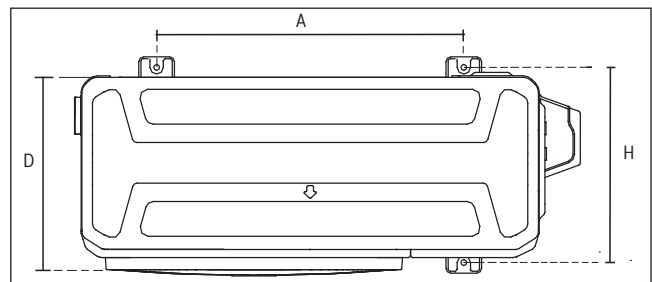


Fig. 9.

Outdoor Unit Dimensions W x H x D	Mounting Dimensions	
	Distance A	Distance B
760x590x285	530	290
810x558x310	549	325
845x700x320	560	335
900x860x315	590	333
945x810x395	640	405
990x965x345	624	366
938x1369x392	634	404
900x1170x350	590	378
800x554x333	514	340
845x702x363	540	350
946x810x420	673	403
946x810x410	673	403
952x1333x410	634	404
952x1333x415	634	404

Table 5. Length Specifications of Split Type Outdoor Unit (unit: mm)

Rows of series installation

	L	A
L ≤ H	L ≤ 1/2H	25 cm or more
	1/2H < L ≤ H	30 cm or more
L > H	Cannot be installed	

Table 6. The relations between H, A and L are as follows

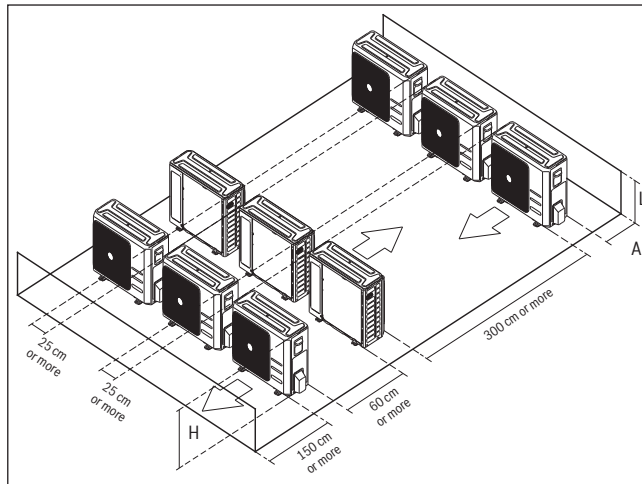


Fig. 10.

NOTE:

The minimum distance between the outdoor unit and the walls described in the installation guide does not apply to airtight rooms. Ensure to keep the unit unobstructed in at least two of the three directions (M, N, P) (See Fig. 11).

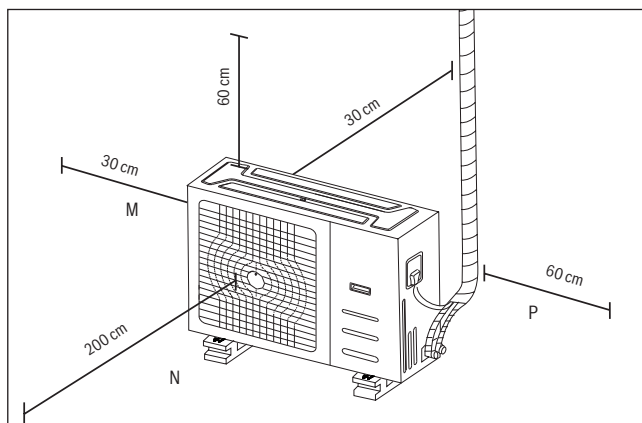


Fig. 11.

6.2 Drain Joint Installation

If the drain joint comes with a rubber seal (see Fig. 12 - A), do the following:

1. Fit the rubber seal on the end of the drain joint that will connect to the outdoor unit.
2. Insert the drain joint into the hole in the base pan of the unit.
3. Rotate the drain joint 90° until it clicks in place facing the front of the unit.
4. Connect a drain hose extension (not included) to the drain joint to redirect water from the unit during heating mode.

If the drain joint doesn't come with a rubber seal (see Fig. 12 - B), do the following:

1. Insert the drain joint into the hole in the base pan of the unit. The drain joint will click in place.
2. Connect a drain hose extension (not included) to the drain joint to redirect water from the unit during heating mode.

NOTE:

Ensure the water drains to a safe location where it will not cause water damage or become a slipping hazard.

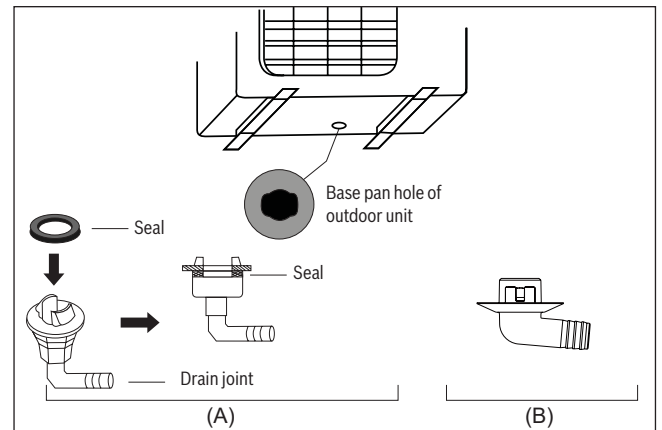


Fig. 12.

6.3 Notes on Drilling Hole in Wall

You must drill a hole in the wall for the refrigerant piping and the signal cable that will connect the indoor and outdoor units.

1. Determine the location of the wall hole based on the location of the outdoor unit.
2. Using a 65-mm core drill, drill a hole in the wall.

NOTE:

When drilling the wall hole, ensure to avoid wires, plumbing, and other sensitive components.

3. Place the protective wall cuff in the hole. This protects the edges of the hole and helps seal it when you finish the installation process.

6.4 When Selecting 7.1KW units

When selecting 7.1KW units, the 7.1KW unit must be connected to ports A on the condenser. When selecting two 7.1KW indoor units use ports A & B. (See Fig. 13)

Indoor Unit Capacity (KW)	Liquid	Gas
2KW/2.6KW/3.5KW	1/4	3/8
5.3KW	1/4	1/2
7.1KW	3/8	5/8

Table 7. Connective pipe size of an A and B system (unit: inch)

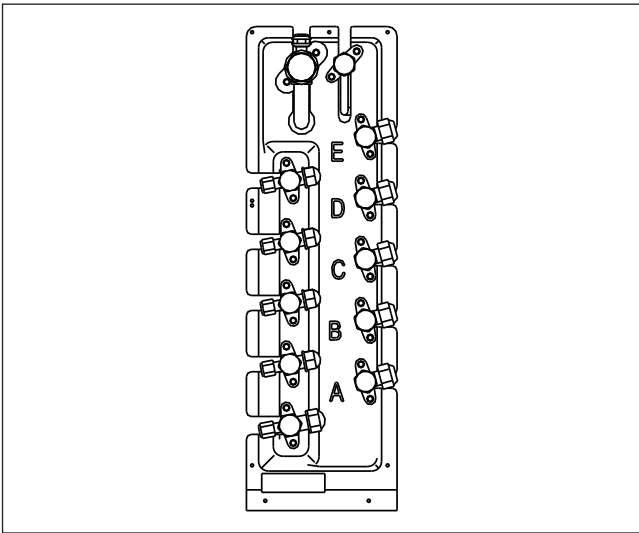


Fig. 13.

7 Refrigerant Piping Connection

Safety Precautions

WARNING

- All installation piping must be completed by Qualified Personnel and must comply with the local and national regulations.
- When the air conditioner is installed in a small room, measures must be taken to prevent the refrigerant concentration in the room from exceeding the safety limit in the event of refrigerant leakage. If the refrigerant leaks and its concentration exceeds its proper limit, hazards due to lack of oxygen may result.
- When installing the refrigeration system, ensure that air, dust, moisture or foreign substances do not enter the refrigerant circuit. Contamination in the system may cause poor operating capacity, high pressure in the refrigeration cycle, explosion or injury.
- Ventilate the area immediately if there is refrigerant leakage during the installation. Leaked refrigerant gas is both toxic and flammable. Ensure there is no refrigerant leakage after completing the installation work.

Refrigerant Piping Connection Instructions

CAUTION

- The branching pipe must be installed horizontally. An angle of more than 10° may cause malfunction.
- **DO NOT** install the connecting pipe until both indoor and outdoor units have been installed.
- Insulate both the gas and liquid piping to prevent water leakage.

Step 1: Cut pipes

When preparing refrigerant pipes, take extra care to cut and flare them properly. This will ensure efficient operation and minimize the need for future maintenance. **For R32 refrigerant models, the pipe connection points must be placed outside of the room.**

1. Measure the distance between the indoor and outdoor units.
2. Using a pipe cutter, cut the pipe a little longer than the measured distance.

CAUTION

DO NOT deform the pipe while cutting. Be extra careful not to damage, dent, or deform the pipe while cutting. This will drastically reduce the heating efficiency of the unit.

1. Ensure that the pipe is cut at a perfect 90° angle. Refer to Fig. 14 for examples of bad cuts

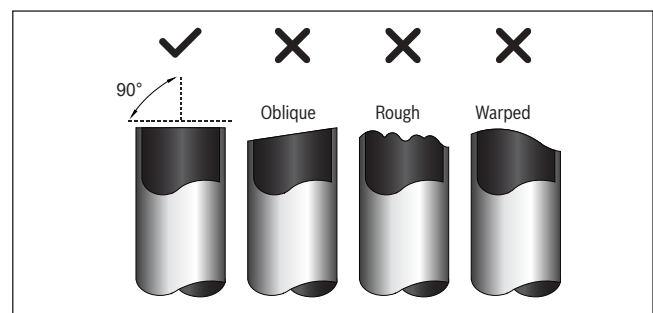


Fig. 14.

Step 2: Remove burrs

Burrs can affect the air-tight seal of the refrigerant piping connection. They must be completely removed.

1. Hold the pipe at a downward angle to prevent burrs from falling into the pipe.
2. Using a reamer or deburring tool for removing all burrs from the cut section of the pipe.

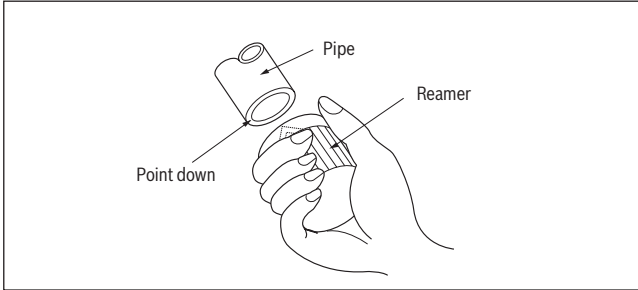


Fig. 15.

Step 3: Flare pipe ends

Proper flaring is essential to achieve an airtight seal.

1. After removing burrs from the cut pipe, seal the ends with PVC tape to prevent foreign materials from entering the pipe.
2. Sheath the pipe with insulating material.
3. Place flare nuts on both pipe ends. Ensure they are facing in the right direction, because you can't put them on or change their direction after flaring. See Fig. 16.

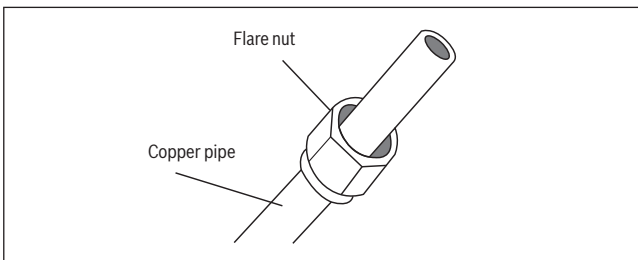


Fig. 16.

4. Remove PVC tape from the pipe ends when you are ready to perform flaring work.
5. Clamp flare form on pipe end. The pipe end must extend beyond the flare form.

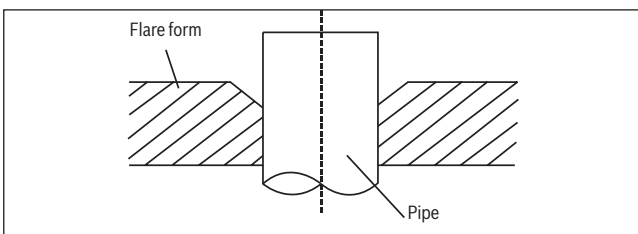


Fig. 17.

6. Place flaring tool onto the form.
7. Turn the handle of the flaring tool clockwise until the pipe is fully flared. Flare the pipe in accordance with the dimensions shown in table 8.

Pipe gauge	Tightening torque	Flare dimension (A) (Unit: mm/Inch)		Flare shape
		Min.	Max.	
Ø 6.4	18-20 N.m (183-204 kgf.cm)	8.4	8.7	<p>Fig. 18.</p>
Ø 9.5	25-26 N.m (255-265 kgf.cm)	13.2	13.5	
Ø 12.7	35-36 N.m (357-367 kgf.cm)	16.2	16.5	
Ø 15.9	45-47 N.m (459-480 kgf.cm)	19.2	19.7	
Ø 19.1	65-67 N.m (663-683 kgf.cm)	23.2	23.7	
Ø 22	75-85 N.m (765-867 kgf.cm)	26.4	26.9	

Table 8.

8. Remove the flaring tool and flare form, then inspect the pipe end for cracks and even flaring.

Step 4: Connect pipes

Connect the copper pipes to the indoor unit first, then connect them to the outdoor unit. You should first connect the low-pressure pipe, then the high-pressure pipe.

1. When connecting the flare nuts, apply a thin coat of refrigeration oil to the flared pipe ends.
2. Align the centre of the two pipes that you will connect.

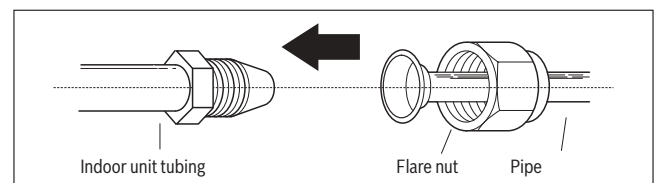


Fig. 19.

3. Tighten the flare nut as tightly as possible by hand.
4. Using a spanner, grip the nut on the unit tubing.
5. While firmly gripping the nut, use a torque wrench to tighten the flare nut according to the torque values in table 8.

NOTE:

Use both a spanner and a torque wrench when connecting or disconnecting pipes to/from the unit.

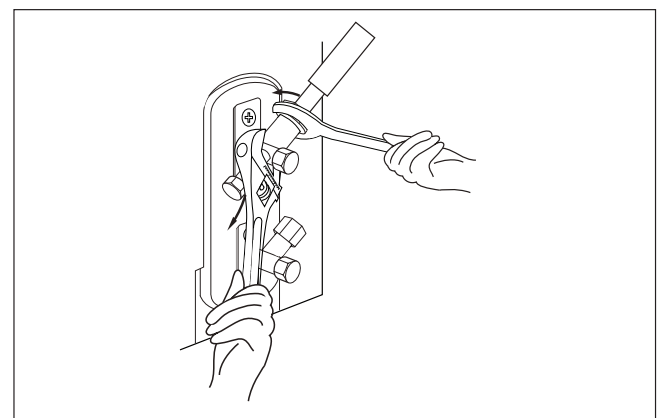


Fig. 20.

CAUTION

- Ensure to wrap insulation around the piping. Direct contact with the bare piping may result in burns or frostbite.
- Make sure the pipe is properly connected. Overtightening may damage the bell mouth and undertightening may lead to leakage.

NOTE ON MINIMUM BEND RADIUS

Carefully bend the tubing in the middle according to the diagram below. **DO NOT** bend the tubing more than 90° or more than 3 times.

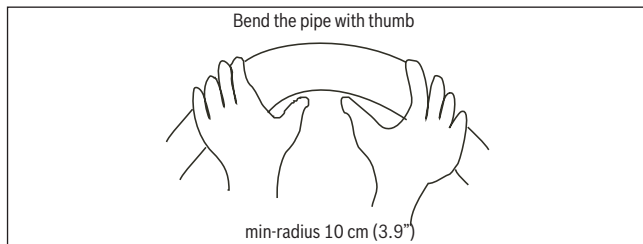


Fig. 21.

6. After connecting the copper pipes to the indoor unit, wrap the power cable, signal cable and the piping together with binding tape.

NOTE:

DO NOT intertwine signal cable with other wires. While bundling these items together, do not intertwine or cross the signal cable with any other wiring.

7. Thread this pipeline through the wall and connect it to the outdoor unit.
8. Insulate all the piping, including the valves of the outdoor unit.
9. Open the stop valves of the outdoor unit to start the flow of the refrigerant between the indoor and outdoor unit.

CAUTION

Check to ensure there is no refrigerant leak after completing the installation work. If there is a refrigerant leak, ventilate the area immediately and evacuate the system (refer to the **Air Evacuation section** of this manual).

8 Wiring

Safety Precautions
WARNING

- Ensure to disconnect the power supply before working on the unit.
- All electrical wiring must be done according to local and national regulations.
- Electrical wiring must be done by a qualified personnel. Improper connections may cause electrical malfunction, injury and fire.
- An independent circuit and single outlet must be used for this unit. **DO NOT** plug another appliance or charger into the same outlet. If the electrical circuit capacity is not enough or there is a defect in the electrical work, it can lead to shock, fire, unit and property damage.
- Connect the power cable to the terminals and fasten it with a clamp. An insecure connection may cause fire.
- Ensure that all wiring is done correctly and the control board cover is properly installed. Failure to do so can cause overheating at the connection points, fire, and electrical shock.
- Ensure that the main supply connection is made through a switch that disconnects all poles, with contact gap of a least 3 mm.
- **DO NOT** modify the length of the power cable or use an extension cord.

CAUTION

- Connect the outdoor wires before connecting the indoor wires.
- Ensure you earth the unit. The earthing wire should be away from gas pipes, water pipes, lightning rods, telephone or other earthing wires. Incorrect earthing may cause electrical shock.
- **DO NOT** connect the unit with the power source until all wiring and piping is completed.
- Ensure that you do not cross your electrical wiring with your signal wiring, as this can cause distortion and interference.

Follow these instructions to prevent distortion when the compressor starts:

- The unit must be connected to the main outlet. Normally, the power supply must have a low output impedance of 32 ohms.
- No other equipment should be connected to the same power circuit.
- The unit's power information can be found on the rating sticker on the product.

TAKE NOTE OF FUSE SPECIFICATIONS

The air conditioner's circuit board (PCB) is designed with a fuse to provide overcurrent protection. The specifications of the fuse are printed on the circuit board, such as:

Outdoor unit:

- For 7.1KW models and under 20amp fuse, 240V
- For models 8KW and above use 30amp Fuse, 240V

NOTE:

The fuse is made of ceramic.

8.1 Outdoor Unit Wiring

WARNING

Before performing any electrical or wiring work, isolate the main power to the system.

1. Prepare the cable for connection.
 - a. You must first choose the correct cable size before preparing it for connection. Only use H07RN-F cables.

Rated Current of Appliance (A)	Nominal Cross-Sectional Area (mm ²)
≤6	0.75
6 - 10	1
10 - 16	1.5
16 - 25	2.5
25 - 32	4
32 - 45	6

Table 9. Other Regions

- b. Using wire strippers, strip the rubber jacket from both ends of signal cable to reveal about 15cm of the wires inside.
- c. Strip the insulation from the ends of the wires.
- d. Using a wire crimper, crimp u-lugs on the ends of the wires.

NOTE:

While connecting the wires, strictly follow the wiring diagram (found inside the electrical box cover).

2. Remove the electric cover of the outdoor unit. If there is no cover on the outdoor unit, disassemble the bolts from the maintenance board and remove the protection board. (See Fig. 22)

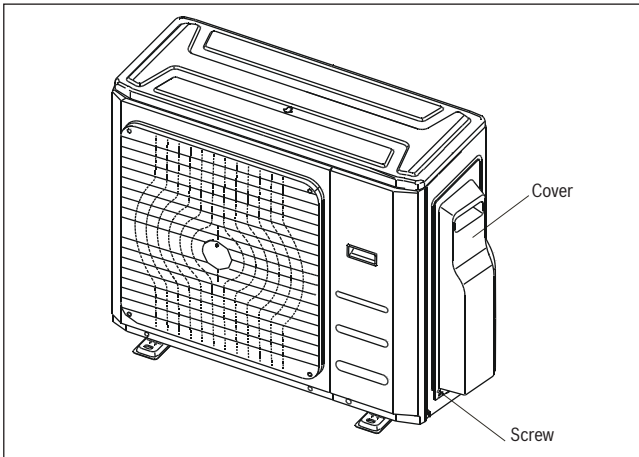


Fig. 22.

3. Connect the u-lugs to the terminals. Match the wire colours/labels with the labels on the terminal block, and firmly screw the u-lug of each wire to its corresponding terminal.
4. Clamp down the cable with designated cable clamp.
5. Insulate unused wires with electrical tape. Keep them away from any electrical or metal parts.
6. Reinstall the cover of the electric control box.

Harmonic Declaration

“The equipment M40B-36HFN8-Q complies with IEC 61000-3-12 provided that the short-circuit power S_{sc} is greater than or equal to 4787737.5 at the interface point between the user’s supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a short-circuit power S_{sc} greater than or equal to 4787737.5.”

“The equipment M50D-42HFN8-Q complies with IEC 61000-3-12 provided that the short-circuit power S_{sc} is greater than or equal to 3190042.5 at the interface point between the user’s supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a short-circuit power S_{sc} greater than or equal to 3190042.5.”

8.2 Wiring Figure



CAUTION

Connect the connective cables to the terminals, as identified, with their matching numbers on the terminal block of the indoor and outdoor units. Terminal L1(A) of the outdoor unit must connect with terminal L1 on the indoor unit.

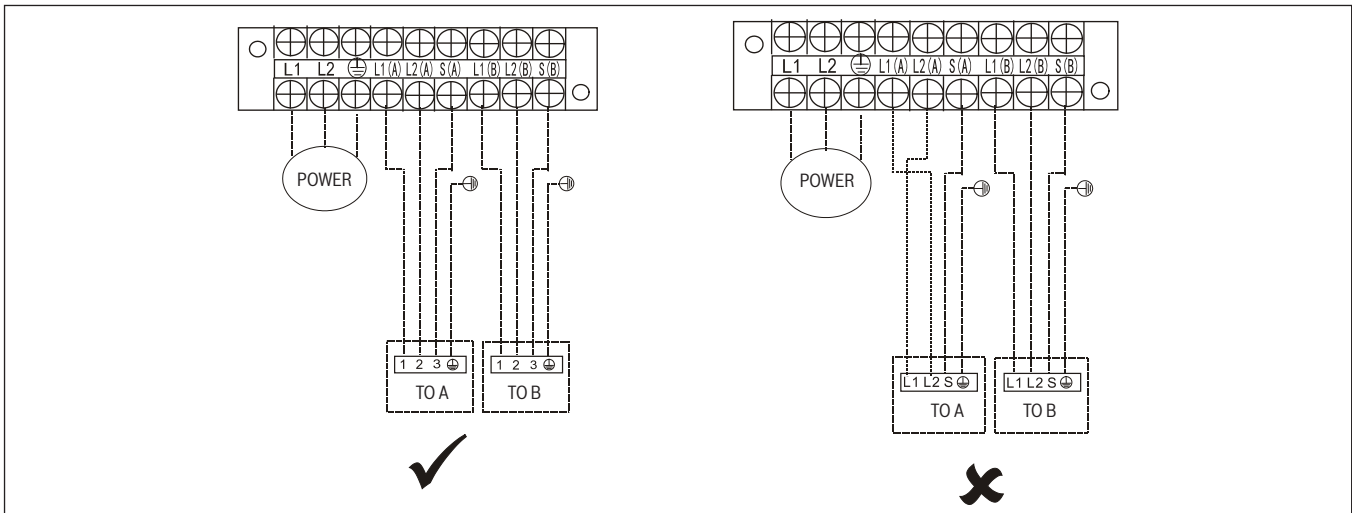


Fig. 23.

NOTE:

Refer to the following figures if end-users wish to perform their own wiring. Run the main power cord through the lower line-outlet of the cord clamp.

One-twin models:

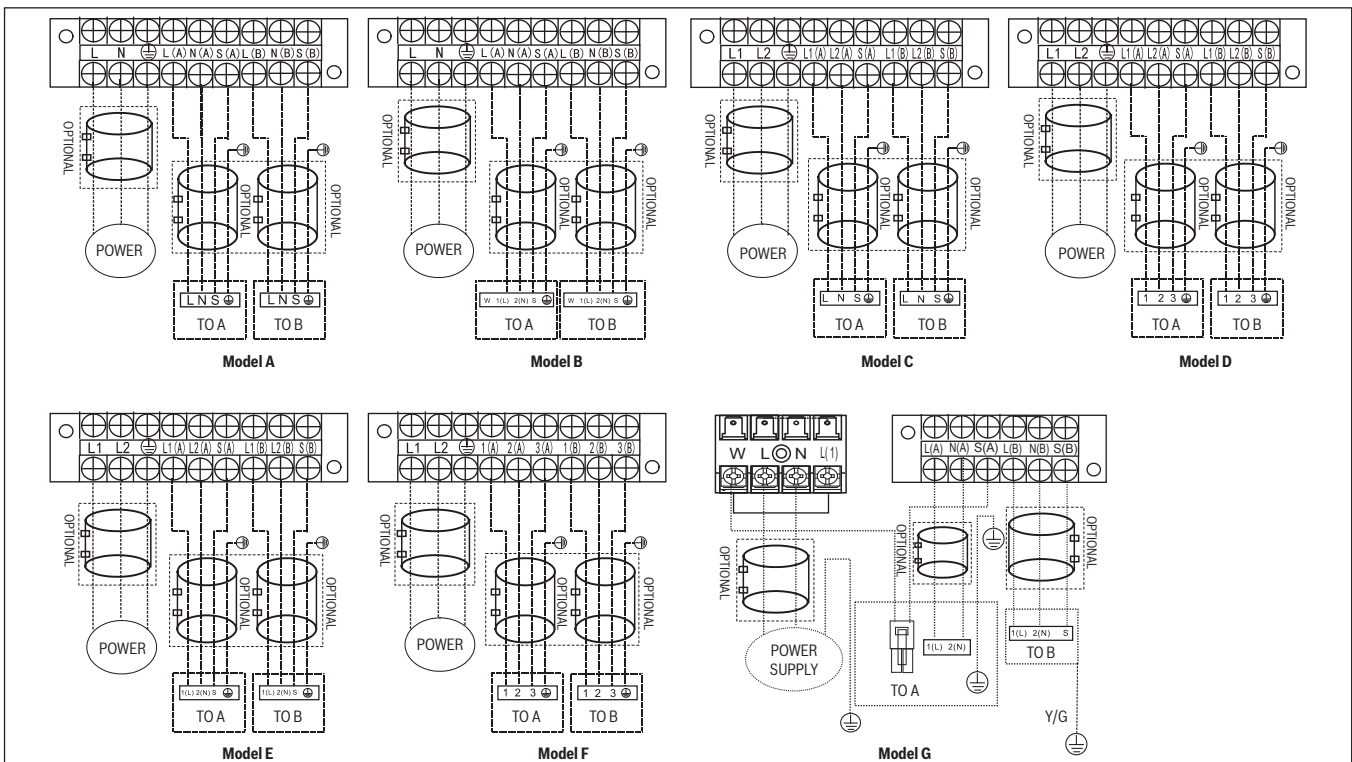
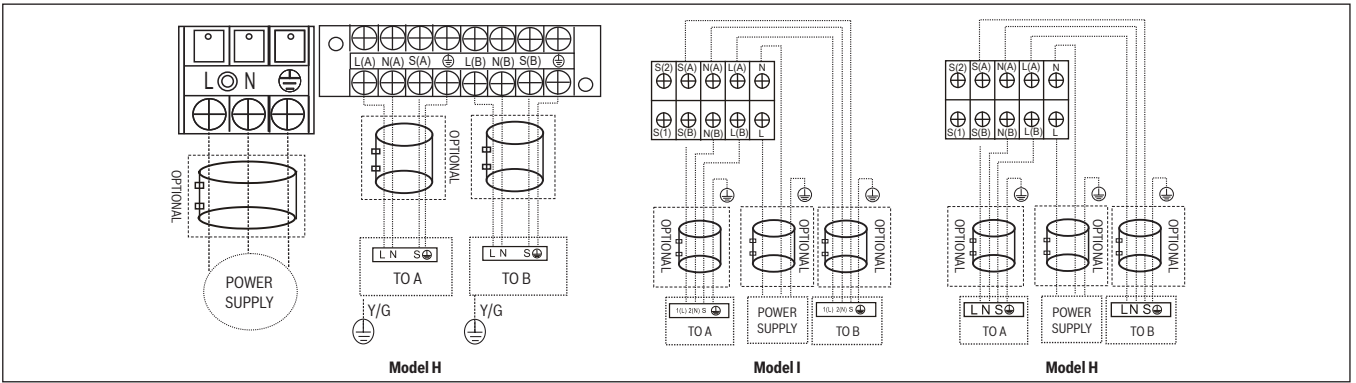


Fig. 24.

NOTE:

Use the magnetic ring (not supplied, optional part) to attach the connective cable of indoor and outdoor units after installation. One magnetic ring is used for one cable.



NOTE:

Refer to the following figures if end-users wish to perform their own wiring.

One-three models:

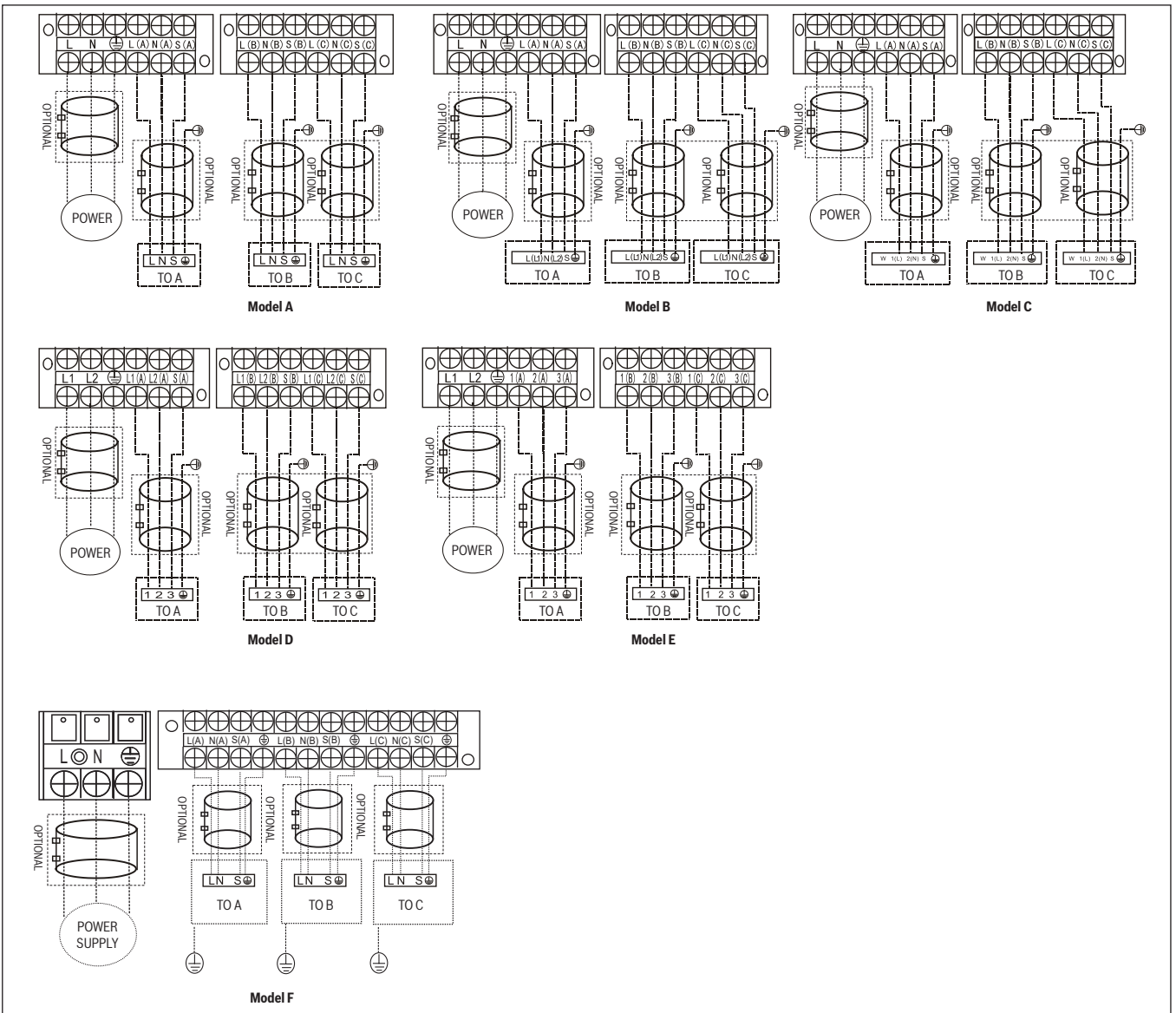


Fig. 25.

One-four models:

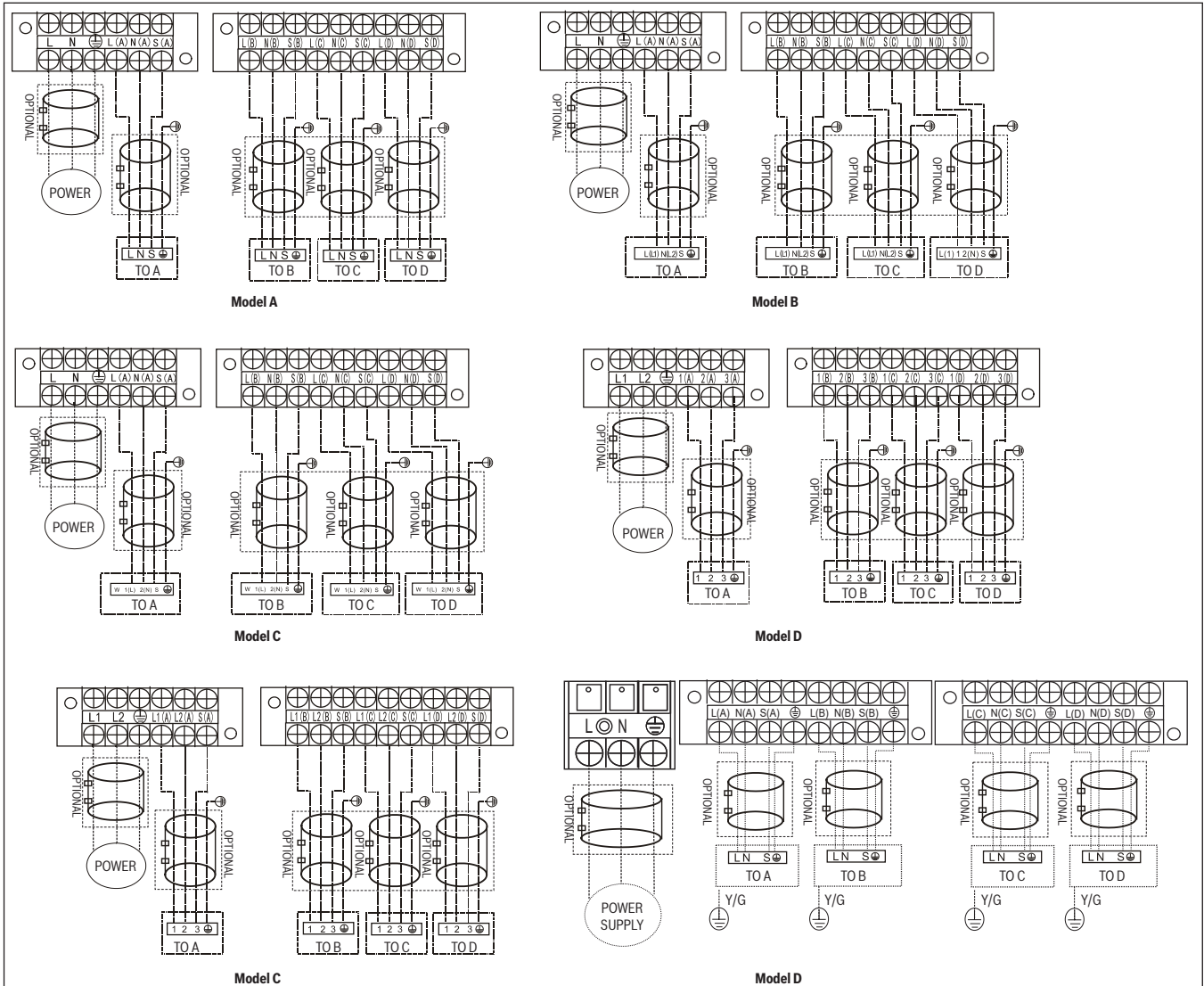


Fig. 26.

One-five models:

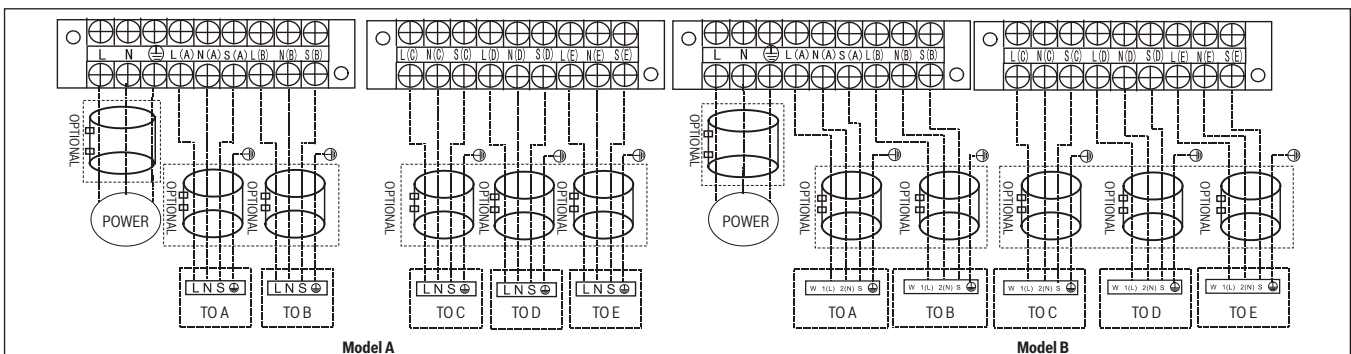


Fig. 27.

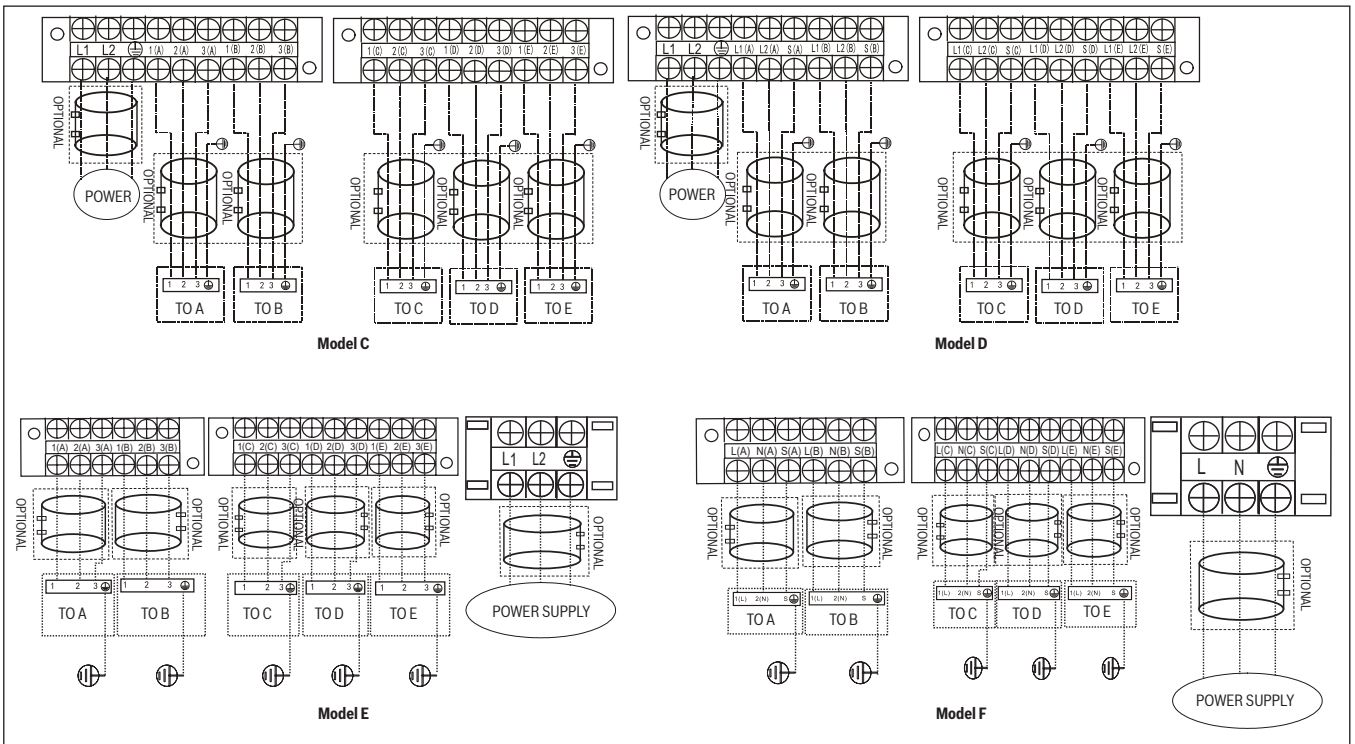


Fig. 28.



CAUTION

After confirmation of the above conditions, follow these guidelines when performing wiring:

- Always have an individual power circuit specifically for the air conditioner. Always follow the circuit diagram posted on the inside of the control cover.
- Screws fastening the wiring in the casing of electrical fittings may come loose during transportation. Because loose screws may cause wire burnout, check that the screws are tightly fastened.
- Check the specifications for the power source.
- Confirm that electrical capacity is sufficient.
- Confirm that starting voltage is maintained at more than 90 percent of the rated voltage marked on the name plate.
- Confirm that the cable thickness is as specified in the power source specifications.
- Always install an earth leakage circuit breaker in wet or moist areas.
- The following can be caused by a drop in voltage: vibration of a magnetic switch, damaging the contact point, broken fuses, and disturbance of normal functioning.
- Disconnection from a power supply must be incorporated into the fixed wiring. It must have an air gap contact separation of at least 3 mm in each active (phase) conductors.
- Before accessing terminals, all supply circuits must be disconnected.

NOTE:

To satisfy the EMC compulsory regulations, which is required by the international standard CISPR 14-1:2005/A2:2011 in specific countries or districts, make sure you apply the correct magnetic rings on your equipment according to the wiring diagram that adhere to the your equipment.

Contact your distributor or installer to get further information and purchase magnetic rings (the supplier of magnetic rings is TDK (model ZCAT3035-1330) or similar).

9 Air Evacuation

Safety Precautions

CAUTION

- Use a vacuum pump with a gauge reading lower than -0.1MPa and an air discharge capacity above 40L/min.
- The outdoor unit does not need vacuuming. **DO NOT** open the outdoor unit's gas and liquid stop valves.
- Ensure that the compound meter reads -0.1MPa or below after 2 hours. If after three hours of operation, the gauge reading is still above -0.1MPa, check if there is a gas leak or water inside the pipe. If there is no leakage, perform another evacuation for 1 or 2 hours.
- **DO NOT** use refrigerant gas to evacuate the system.

9.1 Evacuate Instructions

Before using a manifold gauge and a vacuum pump, read their operation manuals to make sure you know how to use them properly.

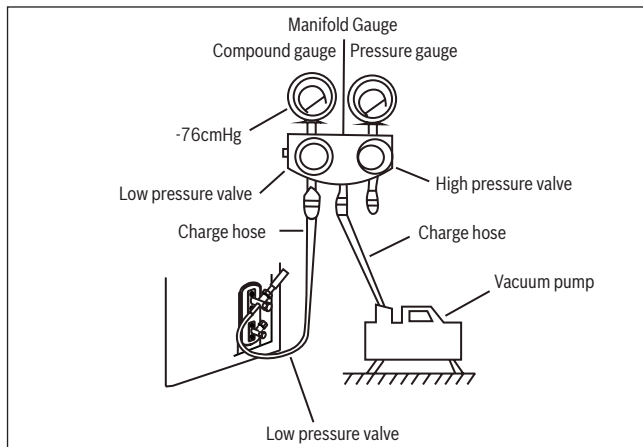


Fig. 29.

1. Connect the manifold gauge's charge hose to the service port on the outdoor unit's low pressure valve.
2. Connect the manifold gauge's charge hose from the to the vacuum pump.
3. Open the low pressure side of the manifold gauge. Keep the high pressure side closed.
4. Turn on the vacuum pump to evacuate the system.
5. Run the vacuum for at least 15 minutes, or until the compound meter reads -76 cmHG (-1x10⁵ Pa).
6. Close the manifold gauge's low pressure valve and turn off the vacuum pump.
7. Wait for 5 minutes, then check that there has been no change in system pressure.

NOTE:

If there is no change in system pressure, unscrew the cap from the packed valve (high pressure valve). If there is a change in system pressure, there may be a gas leak.

8. Insert a hexagonal wrench into the packed valve (high pressure valve) and open the valve by turning the wrench 1/4 counterclockwise. Listen for the gas to exit the system, then close the valve after 5 seconds.

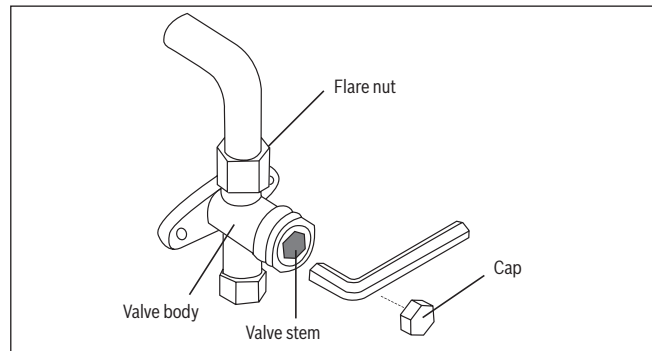


Fig. 30.

9. Watch the pressure gauge for one minute to make sure that there is no change in pressure. It should read slightly higher than the atmospheric pressure.
10. Remove the charge hose from the service port.
11. Using a hexagonal wrench, fully open both the high pressure and low pressure valves.

OPEN VALVE STEMS GENTLY

When opening valve stems, turn the hexagonal wrench until it hits against the stopper. **DO NOT** try to force the valve to open further.

12. Tighten valve caps by hand, then tighten them using the proper tool.
13. If the outdoor unit uses all vacuum valves, and the vacuum position is at the main valve, the system is not connected with the indoor unit. The valve must be tightened with a screw nut. Check for gas leaks before operation to prevent leakage.

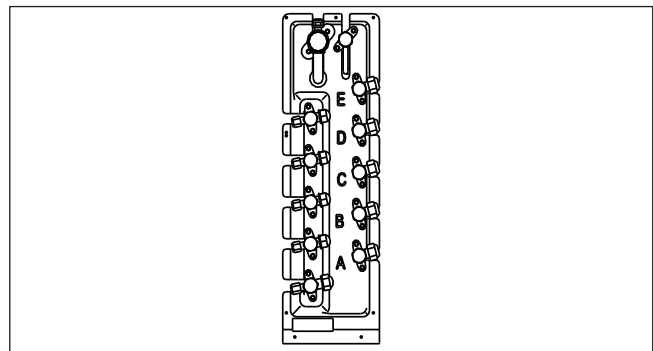


Fig. 31.

9.2 Note on Adding Refrigerant

CAUTION

- Refrigerant charging must be performed after wiring, vacuuming, and leak testing.
- **DO NOT** exceed the maximum allowable quantity of refrigerant or overcharge the system. Doing so can damage the unit or impact its functioning.
- Charging with unsuitable substances may cause explosions or accidents. Ensure that the appropriate refrigerant is used.
- Refrigerant containers must be opened slowly. Always use a protective gear when charging the system.
- **DO NOT** mix refrigerants types.
- For the R32 refrigerant model, make sure the conditions within the area have been made safe by control of flammable material when the air conditioner is charged with refrigerant.
- The maximum refrigerant charge amount of R32 is 305 grams.

N=2 (one-twin models), N=3 (one-three models), N=4 (one-four models), N=5 (one-five models). Depending on the length of connective

pipings or the pressure of the evacuated system, you may need to add refrigerant. Refer to table below for refrigerant amounts to be added:

ADDITIONAL REFRIGERANT PER PIPE LENGTH

Connective Pipe Length (m)	Air Purging Method	Additional Refrigerant	
Pre-charge pipe length (ft/m) (Standard pipe length x N)	Vacuum Pump	N/A	
More than (Standard pipe length x N) ft/m	Vacuum Pump	Liquid Side: Ø 6.35 (Ø 1/4") R32: (Pipe length – standard length) x 12g/m (Pipe length – standard length) x 0.13oz/ft R410A: (Pipe length – standard length) x 15g/m (Pipe length – standard length) x 0.16oz/ft	Liquid Side: Ø 9.52 (Ø 3/8") R32: (Pipe length – standard length) x 24g/m (Pipe length – standard length) x 0.26oz/ft R410A: (Pipe length – standard length) x 30g/m (Pipe length – standard length) x 0.32oz/ft

Table 10.

NOTE:

The standard pipe length is 7.5m.

9.3 Safety and Leakage Check

Electrical Safety Check

Perform the electrical safety check after completing installation.

Cover the following areas:

1. Insulated resistance
The insulated resistance must be more than 2MΩ.
2. Earthing work
After finishing earthing work, measure the earthing resistance by visual detection using the earthing resistance tester. Make sure the earthing resistance is less than 4Ω.
3. Electrical leakage check (perform test while unit is on)
During a test operation after completed installation, the use the electroprobe and multimeter to perform an electrical leakage check. Turn off the unit immediately if leakage occurs. Try and evaluate different solutions until the unit operates properly.

Gas Leak Check

1. Soap water method:
Apply a soap-water solution or a liquid neutral detergent on the indoor unit connections or outdoor unit connections with a soft brush to check for leakage of the connecting points of the piping. If bubbles emerge, the pipes are experiencing leakage.
2. Leak detector
Use the leak detector to check for leakage.

NOTE:

The illustration is for example purposes only. The actual order of A, B, C, D and E on the machine may be slightly different from the unit you purchased but the general shape will remain the same.

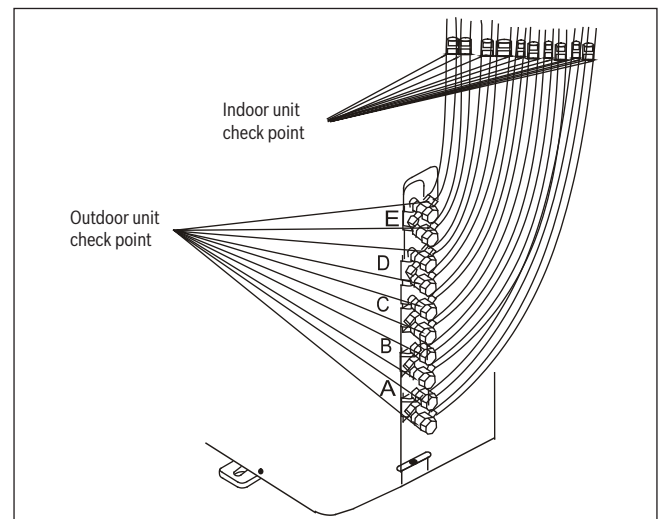


Fig. 32.

A, B, C, D are points for one-four type.

A, B, C, D and E are points for the one-five type.

10 Test Run

Before Test Run

A test run must be performed after the entire system has been completely installed. Confirm the following points before performing the test:

- The indoor and outdoor units are properly installed.
- Piping and wiring are properly connected.
- There are obstacles near the inlet and outlet of the unit that might cause poor performance or product malfunction.
- The refrigeration system does not leak.
- Drainage system is unimpeded and drains to a safe location.
- The heating insulation is properly installed.
- The earthing wires are properly connected.
- Length of the piping and additional refrigerant stow capacity have been recorded.
- The power voltage is the correct voltage for the air conditioner.



CAUTION

Failure to perform the test run may result in unit damage, property damage or personal injury.

Test Run Instructions

- Open both the liquid and gas stop valves.
- Turn on the main power switch and allow the unit to warm up.
- Set the air conditioner to COOL mode.
- For the **Indoor Unit**
 - Ensure the remote control and its buttons work properly.
 - Ensure the louvres move properly and can be changed using the remote control.
 - Double check to see if the room temperature is being registered correctly.
 - Ensure the indicators on the remote control and the display panel on the indoor unit work properly.
 - Ensure the manual buttons on the indoor unit work properly.
 - Check to see if the drainage system is unimpeded and draining smoothly.
 - Ensure there is no vibration or abnormal noise during operation.
- For the **Outdoor Unit**
 - Check to see if the refrigeration system is leaking.
 - Ensure there is no vibration or abnormal noise during operation.
 - Ensure the wind, noise, and water generated by the unit do not disturb the surrounding area or pose a safety hazard.

NOTE:

If the unit malfunctions or does not operate according to your expectations, refer to the **Troubleshooting section** of the Owner's Manual before calling customer service.

11 Function of Automatic Wiring/Piping Correction

Automatic Wiring/Piping Correction Function

More recent models now feature automatic correction of wiring/piping errors. Press the "check switch" on the outdoor unit PCB board for 5 seconds until the LED displays "CE", indicating that this function is working. Approximately 5-10 minutes after the switch is pressed, the "CE" disappears, meaning that the wiring/piping error is corrected and that all wiring/piping is properly connected.

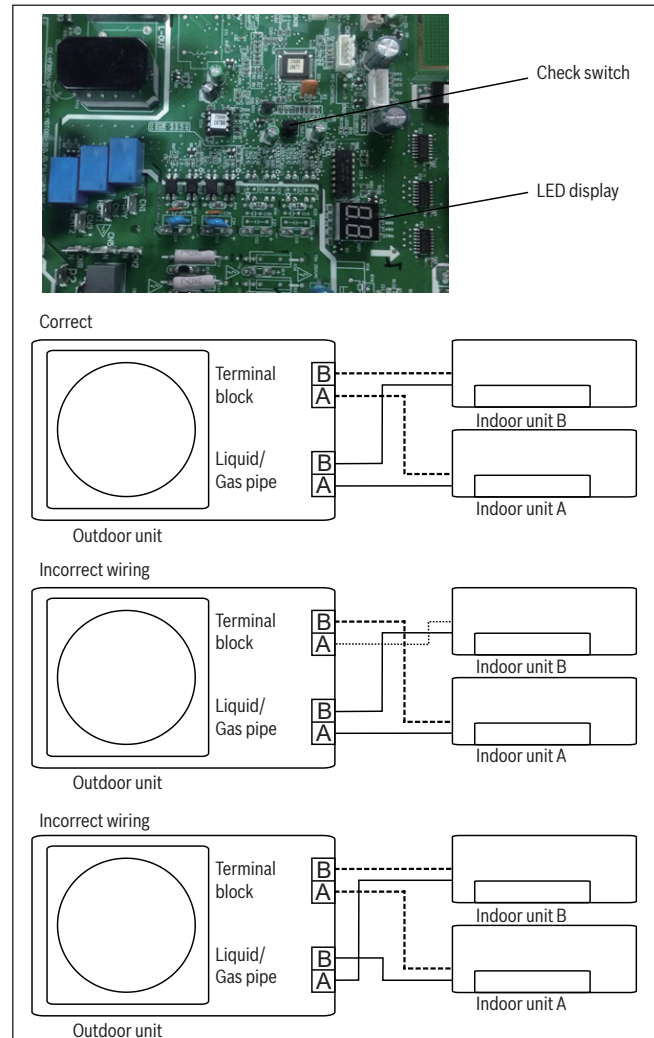


Fig. 33.

How to Activate This Function

- Check that outside temperature is above 5°C.
(This function does not work when outside temperature is not above 5°C)
- Check that the stop valves of the liquid pipe and gas pipe are open.
- Turn on the breaker and wait at least 2 minutes.
- Press the check switch on the outdoor PCB board until the LED displays "CE".

12 European Disposal Guidelines

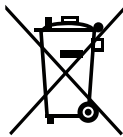
Users in European Countries may be required to properly dispose of this unit. This appliance contains refrigerant and other potentially hazardous materials. When disposing of this appliance, the law requires special collection and treatment. **DO NOT** dispose of this product as household waste or unsorted municipal waste.

When disposing of this appliance, you have the following options:

- Dispose of the appliance at a designated municipal electronic waste collection facility.

NOTE:

Disposing of this appliance in the forest or other natural surroundings endangers your health and is bad for the environment. Hazardous substances may leak into the ground water and enter the food chain.



13 Information on Servicing

(Required for the units adopting R32 refrigerant only)

1. Checks to the area

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimised. For repairs on the refrigerating system, the following precautions shall be complied with prior to conducting work on the system.

2. Work procedure

Works shall be undertaken in a controlled procedure so as to minimise the risk of flammable gas or vapour being present while the work is being performed.

3. General work area

All maintenance staff and other personnel working in the local area shall be instructed on the nature of work to be carried out. Work in confined spaces shall be avoided. The area around the work space shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

4. Checking for presence of refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with flammable refrigerants, i.e. no sparking, that it is adequately sealed and intrinsically safe.

5. Presence of fire extinguisher

If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available. Have a dry power or CO₂ fire extinguisher next to the charging area.

6. No ignition sources

No person carrying out work on a refrigeration system, which involves exposing any pipe work that contains or has contained flammable refrigerant, shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation. Repairing, removing and disposal, during which flammable refrigerant can possibly be released to the surrounding space shall be avoided. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "NO SMOKING" signs shall be displayed.

7. Ventilated area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue while the work is in process. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

8. Checks to the refrigeration equipment

Where electrical components are being changed, they shall be fit for the purpose and for the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance. The following checks shall be applied to installations using flammable refrigerants:

- the charge size is in accordance with the room size where the refrigerant containing parts are installed;
- the ventilation machinery and outlets are operating adequately and are not obstructed;
- if an indirect refrigerating circuit is being used, the secondary circuits shall be checked for the presence of refrigerant; labelling on the equipment continues to be visible and legible.

- labelling and signs that are illegible shall be corrected;
- refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being corroded.

9. Checks to electrical devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately and it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so that all parties are advised.

Initial safety checks shall include:

- that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking
- that there no live electrical components and that wiring is not exposed while charging, recovering or purging the system;
- that there is continuity of earth bonding.

10. Repairs to sealed components

10.1 During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.

10.2 Particular attention shall be paid to the following to ensure that when working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

- Ensure that the apparatus is mounted securely.
- Ensure that seals or sealing materials have not degraded such that they no longer serve the purpose of preventing the ingress of, flammable atmospheres. Replacement parts shall be in accordance with the manufacturer s specifications.

NOTE:

The use of silicon sealant may inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

11. Repair to intrinsically safe components

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use. Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.

Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

12. Cabling

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, cutting by sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

13. Detection of flammable refrigerants

Under no circumstances shall potential sources of ignition be used in the search for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) may not be used.

14. Leak detection methods

The following leak detection methods are deemed acceptable for systems containing flammable refrigerants. Electronic leak detectors shall be used to detect flammable refrigerants, but their sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (25% maximum). Leak detection fluids are suitable for use with most refrigerants, but the use of detergents containing chlorine shall be avoided. Chlorine may react with the refrigerant and corrode the copper pipe-work.

If a leak is suspected, all naked flames shall be removed or extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Oxygen-free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

15. Removal and evacuation

When breaking into the refrigerant circuit to make repairs for any other purpose, conventional procedures shall be used. However, it is important that best practice is followed since flammability needs to be considered. The following procedure shall be adhered to:

- 1) remove refrigerant;
- 2) purge the circuit with inert gas;
- 3) evacuate;
- 4) purge again with inert gas;
- 5) open the circuit by cutting or brazing.

The refrigerant charge shall be recovered into the correct recovery cylinders. The system shall be flushed with OFN to render the unit safe. You may have to repeat this process several times. Compressed air or oxygen shall not be used for this task.

Flushing shall be achieved by breaking the vacuum in the system with OFN and by continuing to fill until the working pressure is achieved. Then vent to atmosphere, and finally pull down to a vacuum. This process shall be repeated until no refrigerant is within the system anymore.

When the final OFN charge is used, the system shall be vented down to atmospheric pressure so that work can take place. This operation is absolutely vital if brazing operation on the pipe-work is to take place.

Ensure that the outlet for the vacuum pump is not closed to any ignition sources and that ventilation is available.

16. Charging procedures

In addition to conventional charging procedures, the following requirements shall be adhered to:

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
- Cylinders shall be kept upright.
- Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigeration system.

- Prior to recharging the system it shall be pressure-tested with OFN. The system shall be leak-tested on completion of charging and prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

17. Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its details. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken.

A case analysis is required prior to the re-use of reclaimed refrigerant. It is essential that electrical power is available before the task is commenced.

- 1) Become familiar with the equipment and its operation.
- 2) Isolate the system electrically.
- 3) Before attempting the procedure ensure that:
 - mechanical handling equipment is available, if required, for handling refrigerant cylinders;
 - all personal protective equipment is available and being used correctly;
 - the recovery process is supervised at all times by a competent person;
 - recovery equipment and cylinders conform to the appropriate standards.
- 4) Pump down refrigeration system, if possible.
- 5) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- 6) Make sure that the cylinder is situated on the scales before recovery takes place.
- 7) Start the recovery machine and operate in accordance with the manufacturer's instructions.
- 8) Do not overfill cylinders. (No more than 80% volume liquid charge).
- 9) Do not exceed the maximum working pressure of the cylinder, even temporarily.
- 10) When the cylinders have been filled correctly and the process is completed, make sure that the cylinders and the equipment are removed from the site promptly and that all isolation valves on the equipment are closed.
- 11) Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

18. Labelling

Equipment shall be labelled stating that it has been decommissioned and emptied of refrigerant. The label shall be dated and signed. Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

19. Recovery

- When removing refrigerant from a system, either for service or decommissioning, it is recommended good practice that all refrigerants are removed safely.
- When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct numbers of cylinders for holding the total system charge are available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e special cylinders for the recovery of refrigerant). Cylinders shall be completed with pressure relief valves and associated shut-off valves in good working order.

- Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs. The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order.
- Hoses shall be completed with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.
- The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant Waste Transfer Note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.
- If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the supplier. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

20. Transportation, labelling and storage for units

1. Transport of equipment containing flammable refrigerants
Compliance with the transport regulations
2. Labelling of equipment using signs
Compliance with local regulations
3. Disposal of equipment using flammable refrigerants
Compliance with national regulations
4. Storage of equipment/appliances
The storage of equipment should be in accordance with the manufacturer's instructions.
5. Storage of packed (unsold) equipment
Storage package protection should be constructed such that mechanical damage to the equipment inside the package will not cause a leak of the refrigerant charge.
The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations.

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