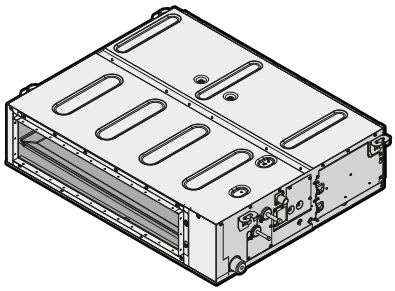
Installer and user reference guide

CO_2 Conveni-Pack: indoor unit



FXSN50A2VEB
FXSN71A2VEB

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1 About the documentation

1.1 About this document

INFORMATION

Make sure that the user has the printed documentation and ask him/her to keep it for future reference.

Target audience

Authorised installers + end users

INFORMATION

This appliance is intended to be used by expert or trained users in shops, in light industry and on farms, or for commercial use by lay persons.

WARNING

Make sure installation, servicing, maintenance, repair and applied materials follow the instructions from Daikin and, in addition, comply with applicable legislation and are performed by qualified persons only. In Europe and areas where IEC standards apply, EN/IEC 60335-2-40 is the applicable standard.

Documentation set

This document is part of a documentation set. The complete set consists of:

- **General safety precautions:**
  - Safety instructions that you must read before installing
  - Format: Paper (in the box of the indoor unit)
- **Indoor unit installation and operation manual:**
  - Installation and operation instructions
  - Format: Paper (in the box of the indoor unit)
- **Installer and user reference guide:**
  - Preparation of the installation, good practices, reference data,...
  - Detailed step-by-step instructions and background information for basic and advanced usage
  - Format: Digital files on http://www.daikineurope.com/support-and-manuals/product-information/

Latest revisions of the supplied documentation may be available on the regional Daikin website or via your dealer.

The original documentation is written in English. All other languages are translations.

Technical engineering data

- A **subset** of the latest technical data is available on the regional Daikin website (publicly accessible).
- The **full set** of latest technical data is available on the Daikin Business Portal (authentication required).

1.1.1 Meaning of warnings and symbols

DANGER

Indicates a situation that results in death or serious injury.

DANGER: RISK OF ELECTROCUTION

Indicates a situation that could result in electrocution.

DANGER: RISK OF BURNING/SCALDING

Indicates a situation that could result in burning/scalding because of extreme hot or cold temperatures.

DANGER: RISK OF EXPLOSION

Indicates a situation that could result in explosion.

WARNING

Indicates a situation that could result in death or serious injury.

WARNING: FLAMMABLE MATERIAL

CAUTION

Indicates a situation that could result in minor or moderate injury.

NOTICE

Indicates a situation that could result in equipment or property damage.

INFORMATION

Indicates useful tips or additional information.

Symbols used on the unit:

Symbol	Explanation
	Before installation, read the installation and operation manual, and the wiring instruction sheet.
	Before performing maintenance and service tasks, read the service manual.
	For more information, see the installer and user reference guide.
	The unit contains rotating parts. Be careful when servicing or inspecting the unit.

Symbols used in the documentation:

Symbol	Explanation
	Indicates a figure title or a reference to it. **Example:** "1–3 Figure title" means "Figure 3 in chapter 1".

Symbol	Explanation
	Indicates a table title or a reference to it. **Example:** "▦ 1–3 Table title" means "Table 3 in chapter 1".

2 General safety precautions

2.1 For the installer

2.1.1 General

If you are NOT sure how to install or operate the unit, contact your dealer.

DANGER: RISK OF BURNING/SCALDING

- Do NOT touch the refrigerant piping, water piping or internal parts during and immediately after operation. It could be too hot or too cold. Give it time to return to normal temperature. If you MUST touch it, wear protective gloves.
- Do NOT touch any accidental leaking refrigerant.

WARNING

Improper installation or attachment of equipment or accessories could result in electrical shock, short-circuit, leaks, fire or other damage to the equipment. ONLY use accessories, optional equipment and spare parts made or approved by Daikin.

WARNING

Make sure installation, testing and applied materials comply with applicable legislation (on top of the instructions described in the Daikin documentation).

CAUTION

Wear adequate personal protective equipment (protective gloves, safety glasses,...) when installing, maintaining or servicing the system.

WARNING

Tear apart and throw away plastic packaging bags so that nobody, especially children, can play with them. Possible risk: suffocation.

WARNING

Provide adequate measures to prevent that the unit can be used as a shelter by small animals. Small animals that make contact with electrical parts can cause malfunctions, smoke or fire.

CAUTION

Do NOT touch the air inlet or aluminium fins of the unit.

CAUTION

- Do NOT place any objects or equipment on top of the unit.
- Do NOT sit, climb or stand on the unit.

In accordance with the applicable legislation, it might be necessary to provide a logbook with the product containing at least: information on maintenance, repair work, results of tests, stand-by periods,...

Also, at least, following information MUST be provided at an accessible place at the product:

- Instructions for shutting down the system in case of an emergency
- Name and address of fire department, police and hospital
- Name, address and day and night telephone numbers for obtaining service

In Europe, EN378 provides the necessary guidance for this logbook.

2.1.2 Installation site

- Provide sufficient space around the unit for servicing and air circulation.
- Make sure the installation site withstands the weight and vibration of the unit.
- Make sure the area is well ventilated. Do NOT block any ventilation openings.
- Make sure the unit is level.

Do NOT install the unit in the following places:

- In potentially explosive atmospheres.
- In places where there is machinery that emits electromagnetic waves. Electromagnetic waves may disturb the control system, and cause malfunction of the equipment.
- In places where there is a risk of fire due to the leakage of flammable gases (example: thinner or gasoline), carbon fibre, ignitable dust.
- In places where corrosive gas (example: sulphurous acid gas) is produced. Corrosion of copper pipes or soldered parts may cause the refrigerant to leak.

2.1.3 Refrigerant — in case of R744

See the installation manual or installer reference guide of your application for more information.

NOTICE

Make sure refrigerant piping installation complies with applicable legislation. In Europe, EN378 is the applicable standard.

NOTICE

Make sure the field piping and connections are NOT subjected to stress.

WARNING

During tests, NEVER pressurise the product with a pressure higher than the maximum allowable pressure (as indicated on the nameplate of the unit).

WARNING

Take sufficient precautions in case of refrigerant leakage. If refrigerant gas leaks, ventilate the area immediately. Possible risks:

- Carbon dioxide poisoning
- Asphyxiation

NOTICE

After all the piping has been connected, make sure there is no gas leak. Use nitrogen to perform a gas leak detection.

NOTICE

- To avoid compressor breakdown, do NOT charge more than the specified amount of refrigerant.
- When the refrigerant system is to be opened, refrigerant MUST be treated according to the applicable legislation.

WARNING

Make sure there is no oxygen in the system. Refrigerant may ONLY be charged after performing the leak test and the vacuum drying.

Possible consequence: Self-combustion and explosion of the compressor because of oxygen going into the operating compressor.

CAUTION

A vacuumed system will be under triple point. To avoid solid ice, ALWAYS start charging with R744 in vapour state. When the triple point is reached (5.2 bar absolute pressure or 4.2 bar gauge pressure), you may continue charging with R744 in liquid state.

- In case recharge is required, see the nameplate of the unit. It states the type of refrigerant and necessary amount.
- The unit is factory charged with refrigerant and depending on pipe sizes and pipe lengths some systems require additional charging of refrigerant.
- Only use R744 (CO_2) as refrigerant. Other substances may cause explosions and accidents.
- Do NOT charge liquid refrigerant directly from a gas line. Liquid compression could cause compressor operation failure.
- Only use tools exclusively for the refrigerant type used in the system, this to ensure pressure resistance and prevent foreign materials from entering into the system.
- Open refrigerant cylinders slowly.

CAUTION

When the refrigerant charging procedure is done or when pausing, close the valve of the refrigerant tank immediately. If the valve is NOT closed immediately, remaining pressure might charge additional refrigerant. **Possible consequence:** Incorrect refrigerant amount.

2.1.4 Electrical

DANGER: RISK OF ELECTROCUTION

- Turn OFF all power supply before removing the switch box cover, connecting electrical wiring or touching electrical parts.
- Disconnect the power supply for more than 10 minutes, and measure the voltage at the terminals of main circuit capacitors or electrical components before servicing. The voltage MUST be less than 50 V DC before you can touch electrical components. For the location of the terminals, see the wiring diagram.
- Do NOT touch electrical components with wet hands.
- Do NOT leave the unit unattended when the service cover is removed.

WARNING

If NOT factory installed, a main switch or other means for disconnection, having a contact separation in all poles providing full disconnection under overvoltage category III condition, MUST be installed in the fixed wiring.

WARNING

- ONLY use copper wires.
- Make sure the field wiring complies with the applicable legislation.
- All field wiring MUST be performed in accordance with the wiring diagram supplied with the product.
- NEVER squeeze bundled cables and make sure they do NOT come in contact with the piping and sharp edges. Make sure no external pressure is applied to the terminal connections.
- Make sure to install earth wiring. Do NOT earth the unit to a utility pipe, surge absorber, or telephone earth. Incomplete earth may cause electrical shock.
- Make sure to use a dedicated power circuit. NEVER use a power supply shared by another appliance.
- Make sure to install the required fuses or circuit breakers.
- Make sure to install an earth leakage protector. Failure to do so may cause electrical shock or fire.
- When installing the earth leakage protector, make sure it is compatible with the inverter (resistant to high frequency electric noise) to avoid unnecessary opening of the earth leakage protector.

CAUTION

- When connecting the power supply: connect the earth cable first, before making the current-carrying connections.
- When disconnecting the power supply: disconnect the current-carrying cables first, before separating the earth connection.
- The length of the conductors between the power supply stress relief and the terminal block itself MUST be as such that the current-carrying wires are tautened before the earth wire is in case the power supply is pulled loose from the stress relief.

NOTICE

Precautions when laying power wiring:

- Do NOT connect wiring of different thicknesses to the power terminal block (slack in the power wiring may cause abnormal heat).
- When connecting wiring which is the same thickness, do as shown in the figure above.
- For wiring, use the designated power wire and connect firmly, then secure to prevent outside pressure being exerted on the terminal board.
- Use an appropriate screwdriver for tightening the terminal screws. A screwdriver with a small head will damage the head and make proper tightening impossible.
- Over-tightening the terminal screws may break them.

Install power cables at least 1 meter away from televisions or radios to prevent interference. Depending on the radio waves, a distance of 1 meter may NOT be sufficient.

WARNING

- After finishing the electrical work, confirm that each electrical component and terminal inside the electrical components box is connected securely.
- Make sure all covers are closed before starting up the unit.

NOTICE

ONLY applicable if the power supply is three-phase, and the compressor has an ON/OFF starting method.

If there exists the possibility of reversed phase after a momentary black out and the power goes ON and OFF while the product is operating, attach a reversed phase protection circuit locally. Running the product in reversed phase can break the compressor and other parts.

3 Specific installer safety instructions

Always observe the following safety instructions and regulations.

CAUTION

Do NOT insert fingers, rods or other objects into the air inlet or outlet. When the fan is rotating at high speed, it will cause injury.

General installation requirements

WARNING

Installation shall be done by an installer, the choice of materials and installation shall comply with the applicable legislation. In Europe, EN378 is the applicable standard.

WARNING

- Make sure to install all necessary countermeasures in case of refrigerant leakage according to standard EN378 (see "15.1.2 Additional installation site requirements for CO_2 refrigerant" [▸ 47]).
- Make sure to install a CO_2 leak detector (field supply) and enable the function for refrigerant leak detection (see "19.1 Field setting" [▸ 72]).

WARNING

Make sure installation, servicing, maintenance, repair and applied materials follow the instructions from Daikin and, in addition, comply with applicable legislation and are performed by qualified persons only. In Europe and areas where IEC standards apply, EN/IEC 60335-2-40 is the applicable standard.

Installation site (see "15.1 Preparing the installation site" [▸ 44])

CAUTION

Appliance NOT accessible to the general public, install it in a secured area, protected from easy access.

This unit, both indoor and outdoor, is suitable for installation in a commercial and light industrial environment.

CAUTION

Excessive concentrations of refrigerant R744 (CO_2) in a closed room can lead to unconsciousness and oxygen deficiency. Take appropriate measures.

See "To determine the minimum number of appropriate measures" [▸ 49].

WARNING

In case of mechanical ventilation, take care the ventilated air is exhausted to the outdoor space and NOT into another closed area.

WARNING

Install the unit ONLY in locations where the doors of the occupied space are NOT tight fitting.

WARNING

When using safety shut-off valves, make sure to install measures such as a bypassing piping with a pressure relief valve (from liquid pipe to gas pipe). When the safety shut-off valves close and no measures are installed, increased pressure may damage the liquid piping.

Installing the ducting (see "15.2.2 Guidelines when installing the ducting" [▶ 53])

CAUTION

- Make sure the installation of the duct does NOT exceed the setting range of the external static pressure for the unit. Refer to the technical datasheet of your model for the setting range.
- Make sure to install the canvas duct so vibrations are NOT transmitted to the duct or ceiling. Use a sound-absorbing material (insulation material) for the lining of the duct and apply vibration insulation rubber to the hanging bolts.
- When welding, make sure NOT to spatter onto the drain pan or the air filter.
- If the metal duct passes through a metal lath, wire lath or metal plate of the wooden structure, separate the duct and wall electrically.
- Install the outlet grille in a position where the airflow will not come into direct contact with people.
- Do NOT use booster fans in the duct. Use the function to adjust the fan rate setting automatically (see "19.1 Field setting" [▶ 72]).

Refrigerant piping installation (see "16 Piping installation" [▶ 59])

CAUTION

Do NOT reuse piping from previous installations.

CAUTION

Install the refrigerant piping or components in a position where they are unlikely to be exposed to any substance which may corrode components containing refrigerant, unless the components are constructed of materials that are inherently resistant to corrosion or are suitably protected against corrosion.

WARNING

- Use K65 piping for high-pressure applications with a working pressure of 120 bar or 90 bar, depending on its location in the system.
- Use K65 unions and fittings approved for a working pressure of 120 bar or 90 bar, depending on its location in the system.
- ONLY brazing is allowed for connection of pipes. No other types of connections are allowed.
- Expanding of pipes is NOT allowed.

Electrical installation (see "17 Electrical installation" [▶ 64])

WARNING

ALWAYS use multicore cable for power supply cables.

WARNING

- All wiring MUST be performed by an authorised electrician and MUST comply with the applicable legislation.
- Make electrical connections to the fixed wiring.
- All components procured on-site and all electrical construction MUST comply with the applicable legislation.

WARNING

- If the power supply has a missing or wrong N-phase, equipment might break down.
- Establish proper earthing. Do NOT earth the unit to a utility pipe, surge absorber, or telephone earth. Incomplete earthing may cause electrical shock.
- Install the required fuses or circuit breakers.
- Secure the electrical wiring with cable ties so that the cables do NOT come into contact with sharp edges or piping, particularly on the high-pressure side.
- Do NOT use taped wires, stranded conductor wires, extension cords, or connections from a star system. They can cause overheating, electrical shock or fire.

WARNING

Use an all-pole disconnection type breaker with at least 3 mm between the contact point gaps that provide full disconnection under overvoltage category III.

WARNING

If the supply cord is damaged, it MUST be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

For the user

4 User safety instructions

Always observe the following safety instructions and regulations.

4.1 General

WARNING

If you are NOT sure how to operate the unit, contact your installer.

WARNING

This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.

Children SHALL NOT play with the appliance.

Cleaning and user maintenance SHALL NOT be made by children without supervision.

WARNING

To prevent electrical shocks or fire:

- Do NOT rinse the unit.
- Do NOT operate the unit with wet hands.
- Do NOT place any objects containing water on the unit.

CAUTION

- Do NOT place any objects or equipment on top of the unit.
- Do NOT sit, climb or stand on the unit.

- Units are marked with the following symbol:

This means that electrical and electronic products may NOT be mixed with unsorted household waste. Do NOT try to dismantle the system yourself: the dismantling of the system, treatment of the refrigerant, of oil and of other parts MUST be done by an authorised installer and MUST comply with applicable legislation.

Units MUST be treated at a specialised treatment facility for reuse, recycling and recovery. By ensuring this product is disposed of correctly, you will help to prevent potential negative consequences for the environment and human health. For more information, contact your installer or local authority.

- Batteries are marked with the following symbol:

This means that the batteries may NOT be mixed with unsorted household waste. If a chemical symbol is printed beneath the symbol, this chemical symbol means that the battery contains a heavy metal above a certain concentration.

Possible chemical symbols are: Pb: lead (>0.004%).

Waste batteries MUST be treated at a specialised treatment facility for reuse. By ensuring waste batteries are disposed of correctly, you will help to prevent potential negative consequences for the environment and human health.

4.2 Instructions for safe operation

WARNING

Do NOT modify, disassemble, remove, reinstall or repair the unit yourself as incorrect dismantling or installation may cause an electrical shock or fire. Contact your dealer.

CAUTION

If this unit is equipped with an electrically powered safety measure, such as a CO_2 refrigerant leak detector (field supply), in order to be effective, the unit must be electrically powered at all times after installation, except for short service periods.

CAUTION

- NEVER touch the internal parts of the controller.
- Do NOT remove the front panel. Some parts inside are dangerous to touch and appliance problems may happen. For checking and adjusting the internal parts, contact your dealer.

WARNING

This unit contains electrical and hot parts.

WARNING

Before operating the unit, be sure the installation has been carried out correctly by an installer.

CAUTION

It is unhealthy to expose your body to the air flow for a long time.

CAUTION

To avoid oxygen deficiency, ventilate the room sufficiently if equipment with burner is used together with the system.

CAUTION

Do NOT operate the system when using a room fumigation-type insecticide. Chemicals could collect in the unit, and endanger the health of people who are hypersensitive to chemicals.

CAUTION

NEVER expose little children, plants or animals directly to the airflow.

WARNING

Do NOT place a flammable spray bottle near the air conditioner and do NOT use sprays near the unit. Doing so may result in a fire.

Maintenance and service (see "10 Maintenance and service" [▸ 29])

WARNING: ⇨•⇦ System contains refrigerant under very high pressure.

The system MUST be serviced by qualified persons ONLY.

CAUTION: Pay attention to the fan!

It is dangerous to inspect the unit while the fan is running.

Make sure to turn OFF the main switch before executing any maintenance task.

CAUTION

Do NOT insert fingers, rods or other objects into the air inlet or outlet. When the fan is rotating at high speed, it will cause injury.

WARNING

NEVER replace a fuse with a fuse of a wrong ampere ratings or other wires when a fuse blows out. Use of wire or copper wire may cause the unit to break down or cause a fire.

CAUTION

After a long use, check the unit stand and fitting for damage. If damaged, the unit may fall and result in injury.

CAUTION

Before accessing terminal devices, make sure to interrupt all power supply.

DANGER: RISK OF ELECTROCUTION

To clean the air conditioner or air filter, be sure to stop operation and turn all power supplies OFF. Otherwise, an electrical shock and injury may result.

WARNING

Be careful with ladders when working in high places.

WARNING

Do NOT let the indoor unit get wet. **Possible consequence:** Electrical shock or fire.

About the refrigerant (see "10.5 About the refrigerant" [▸ 32])

WARNING

- Do NOT pierce or burn refrigerant cycle parts.
- Be aware that the refrigerant inside the system is odourless.

WARNING

The R744 refrigerant (CO_2) inside the unit is odourless, non-flammable and normally does NOT leak.

ALWAYS install a CO_2 detector according to the specifications of standard EN378.

If the refrigerant leaks in high concentrations in the room, it may have negative effects on its occupants such as asphyxiation and carbon dioxide poisoning. Ventilate the room and contact the dealer where you purchased the unit (see "10.5.1 About refrigerant leak detection" [▸ 32]).

Do NOT use the unit until a service person confirms that the part from which the refrigerant leaked has been repaired.

Troubleshooting (see "11 Troubleshooting" [▸ 34])

WARNING

Stop operation and shut OFF the power if anything unusual occurs (burning smells etc.).

Leaving the unit running under such circumstances may cause breakage, electrical shock or fire. Contact your dealer.

5 About the system

NOTICE

The appliance shall be stored so as to prevent mechanical damage.

The indoor units can be used for heating/cooling applications.

WARNING

Do NOT modify, disassemble, remove, reinstall or repair the unit yourself as incorrect dismantling or installation may cause an electrical shock or fire. Contact your dealer.

NOTICE

Do NOT use the system for other purposes. In order to avoid any quality deterioration, do NOT use the unit for cooling precision instruments, food, plants, animals, or works of art.

NOTICE

For future modifications or expansions of your system:

A full overview of allowable combinations (for future system extensions) is available in technical engineering data and should be consulted. Contact your installer to receive more information and professional advice.

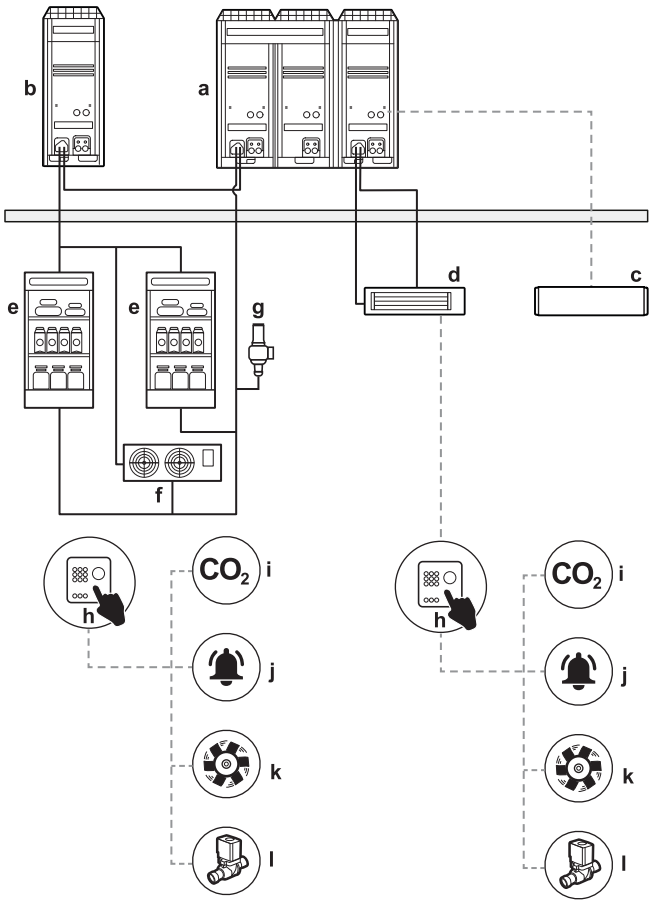
CAUTION

If this unit is equipped with an electrically powered safety measure, such as a CO_2 refrigerant leak detector (field supply), in order to be effective, the unit must be electrically powered at all times after installation, except for short service periods.

5.1 System layout

INFORMATION

The following illustration is an example and might NOT match your system layout.



a Main outdoor unit (LRYEN10*)
b Capacity up unit (LRNUN5*)
c Communication box (BRR9B1V1)
d Indoor unit for air conditioning
e Indoor unit for refrigeration (showcase)
f Indoor unit for refrigeration (blower coil)
g Safety valve
h CO_2 control panel
i CO_2 detector
j CO_2 alarm
k CO_2 ventilator
l Shut off valve

5.2 Information requirements for fan coil units

Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	A	kW
Cooling capacity (latent)	$P_{rated,c}$	B	kW
Heating capacity	$P_{rated,h}$	C	kW
Total electric power input	P_{elec}	D	kW
Sound power level (per speed setting, if applicable)	L_{WA}	E	dB
Contact details: DAIKIN INDUSTRIES CZECH REPUBLIC s.r.o. U Nové Hospody 1/1155, 301 00 Plzeň Skvrňany, Czech Republic			

	A	B	C	D	E
FXSN50	4.1	1.5	6.3	0.186	61

	A	B	C	D	E
FXSN71	5.8	2.2	9.0	0.258	63
FXSN112	9.2	3.3	14.0	0.388	66

6 User interface

CAUTION

- NEVER touch the internal parts of the controller.
- Do NOT remove the front panel. Some parts inside are dangerous to touch and appliance problems may happen. For checking and adjusting the internal parts, contact your dealer.

This operation manual offers a non-exhaustive overview of the main functions of the system.

For more information about the user interface, see the operation manual of the installed user interface.

7 Before operation

WARNING

This unit contains electrical parts.

WARNING

Before operating the unit, be sure the installation has been carried out correctly by an installer.

CAUTION

It is unhealthy to expose your body to the air flow for a long time.

CAUTION

To avoid oxygen deficiency, ventilate the room sufficiently if equipment with burner is used together with the system.

CAUTION

Do NOT operate the system when using a room fumigation-type insecticide. Chemicals could collect in the unit, and endanger the health of people who are hypersensitive to chemicals.

This operation manual is for the following systems with standard control. Before initiating operation, contact your dealer for the operation that corresponds to your system type and mark. If your installation has a customised control system, ask your dealer for the operation that corresponds to your system.

8 Operation

8.1 Operation range

Use the system in the following temperature and humidity ranges for safe and effective operation.

	Cooling and drying	Heating
Outdoor unit	–5~43°C DB	–20~16°C WB
Indoor unit	14~24°C WB	15~27°C DB
Indoor humidity	≤80%[a]	—

[a] To avoid condensation and water dripping out of the unit. If the temperature or the humidity is beyond these conditions, safety devices may be put in action and the air conditioner may not operate.

8.2 About operation modes

INFORMATION

Depending on the installed system, some operation modes will not be available.

- The air flow rate may adjust itself depending on the room temperature or the fan may stop immediately. This is not a malfunction.
- If the main power supply is turned off during operation, operation will restart automatically after the power turns back on again.
- **Setpoint.** Target temperature for the Cooling, Heating, and Auto operation modes.
- **Setback.** A function that keeps the room temperature in a specific range when the system is turned off (by the user, the schedule function, or the OFF timer).

8.2.1 Basic operation modes

The indoor unit can operate in various operation modes.

Icon	Operation mode
	Cooling. In this mode, cooling will be activated as required by the setpoint, or by Setback operation.
	Heating. In this mode, heating will be activated as required by the setpoint, or by Setback operation.
	Fan only. In this mode, air circulates without heating or cooling.
	Dry. In this mode, the air humidity will be lowered with a minimal temperature decrease. The temperature and fan speed are controlled automatically and cannot be controlled by the controller. Dry operation will not function if the room temperature is too low.

Icon	Operation mode
	**Auto.** In Auto mode, the indoor unit automatically switches between heating and cooling mode, as required by the setpoint.

8.2.2 Special heating operation modes

Operation	Description
Defrost	To prevent a loss of heating capacity due to frost accumulation in the outdoor unit, the system will automatically switch to defrost operation. During defrost operation, the indoor unit fan will stop operation, and the following icon will appear on the home screen:  In order to protect the system, cold air may come from the indoor unit when the defrost operation starts on the outdoor unit side. The system will resume normal operation after approximately 6 to 8 minutes.
Hot start	During hot start, the indoor unit fan will stop operation, and the following icon will appear on the home screen: 

8.3 To operate the system

INFORMATION

For setting of the operation mode or other settings, see the reference guide or operation manual of the user interface.

9 Energy saving and optimum operation

CAUTION

NEVER expose little children, plants or animals directly to the airflow.

WARNING

Do NOT place a flammable spray bottle near the air conditioner and do NOT use sprays near the unit. Doing so may result in a fire.

Observe the following precautions to ensure the system operates properly.

- Prevent direct sunlight from entering a room during cooling operation by using curtains or blinds.
- Make sure the area is well ventilated. Do NOT block any ventilation openings.
- Ventilate often. Extended use requires special attention to ventilation.
- Keep doors and windows closed. If the doors and windows remain open, air will flow out of your room causing a decrease in the cooling or heating effect.
- Be careful NOT to cool or heat too much. To save energy, keep the temperature setting at a moderate level.
- NEVER place objects near the air inlet or the air outlet of the unit. Doing so may cause a reduced heating/cooling effect or stop operation.
- Turn off the main power supply switch to the unit when the unit is NOT used for longer periods of time. If the main power supply switch is on, the unit consumes electricity. Before restarting the unit, turn on the main power supply switch 6 hours before operation to ensure smooth running.
- When the display shows  (time to clean the air filter), clean the filters (see "10.2.2 To clean the air filter" [▸ 30]).
- Condensation may form if the humidity is above 80% or if the drain outlet gets blocked.
- Adjust the room temperature properly for a comfortable environment. Avoid excessive heating or cooling. Notice that it may take some time for the room temperature to reach the set temperature. Consider using the timer setting options.
- Adjust the air flow direction to avoid cool air from gathering on the floor or warm air against the ceiling. (Up during cooling or dry operation to the ceiling and down during heating operation.)
- Avoid direct air flow to room inhabitants.
- Adjust the air outlet properly and avoid direct air flow to room inhabitants.

10 Maintenance and service

10.1 Precautions for maintenance and service

WARNING: System contains refrigerant under very high pressure.

The system MUST be serviced by qualified persons ONLY.

NOTICE

Maintenance MUST be done by an authorised installer or service agent.

We recommend performing maintenance at least once a year. However, applicable legislation might require shorter maintenance intervals.

CAUTION

Do NOT insert fingers, rods or other objects into the air inlet or outlet. When the fan is rotating at high speed, it will cause injury.

NOTICE

NEVER inspect or service the unit by yourself. Ask a qualified service person to perform this work. However, as end user, you may clean the air filter, suction grille, air outlet and outside panels.

WARNING

NEVER replace a fuse with a fuse of a wrong ampere ratings or other wires when a fuse blows out. Use of wire or copper wire may cause the unit to break down or cause a fire.

CAUTION

After a long use, check the unit stand and fitting for damage. If damaged, the unit may fall and result in injury.

CAUTION

Before accessing terminal devices, make sure to interrupt all power supply.

DANGER: RISK OF ELECTROCUTION

To clean the air conditioner or air filter, be sure to stop operation and turn all power supplies OFF. Otherwise, an electrical shock and injury may result.

WARNING

Be careful with ladders when working in high places.

10.2 Cleaning the air filter and air outlet

10.2.1 To clean the air outlet

WARNING

Do NOT let the indoor unit get wet. **Possible consequence:** Electrical shock or fire.

NOTICE

- Do NOT use gasoline, benzene, thinner polishing powder or liquid insecticide. **Possible consequence:** Discoloration and deformation.
- Do NOT use water or air of 50°C or higher. **Possible consequence:** Discoloration and deformation.

Clean with a soft cloth. If it is difficult to remove stains, use water or a neutral detergent.

10.2.2 To clean the air filter

When to clean the air filter:

- Rule of thumb: Clean every 6 months. If the air in the room is extremely contaminated, increase the cleaning frequency.
- Depending on the settings, the user interface can display the **"Time to clean filter"** notification. Clean the air filter when the notification is displayed.
- If the dirt becomes impossible to clean, change the air filter (= optional equipment).

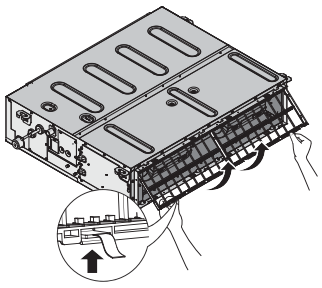
How to clean the air filter:

NOTICE

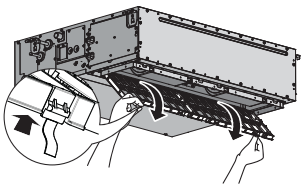
Do NOT use water of 50°C or higher. **Possible consequence:** Discoloration and deformation.

1 **Remove the air filter.** Pull its cloth upward (in case of rear suction) or backward (in case of bottom suction).

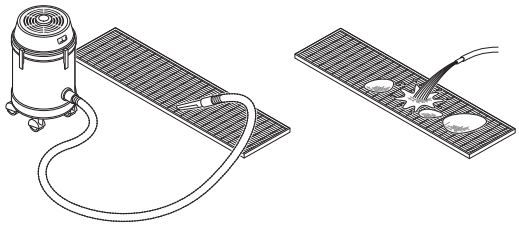
rear suction



bottom suction



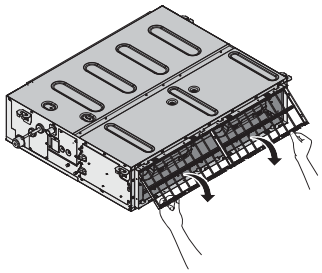
2 **Clean the air filter.** Use a vacuum cleaner or wash with water. If the air filter is very dirty, use a soft brush and neutral detergent.



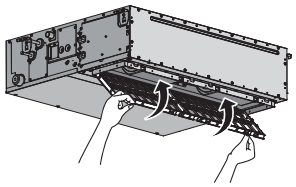
3 **Dry the air filter in the shadow.**

4 **Re-attach the air filter.** Align the 2 hanger brackets and push the 2 clips in their place and pull the cloth if necessary.

rear suction



bottom suction



5 Confirm that all hangers are fixed.

6 In case of bottom suction, close the air inlet grille. In case of rear suction, close service duct opening.

7 Turn ON the power.

8 To remove warning screens, see the reference guide of the user interface.

10.3 Maintenance before a long stop period

E.g., at the end of the season.

- Let the indoor units run in fan only operation for about half a day in order to dry the interior of the units.
- Turn off the power. The user interface display disappears. When the main power is turned on, the air conditioner will use some power, even if it is not operating.
- Clean the air filter and the casing of the indoor unit (see "10.2 Cleaning the air filter and air outlet" [▸ 30]). Make sure to install cleaned air filters back in the same position.
- Remove the batteries from the user interface (if applicable).

10.4 Maintenance after a long stop period

E.g., at the beginning of the season.

- Check and remove everything that might be blocking inlet and outlet vents of indoor units and outdoor units.
- Check if the earth is connected properly.
- Check if there is somewhere a broken wire. Contact your dealer in case of problems.
- Clean the air filter and the casing of the indoor unit (see "10.2 Cleaning the air filter and air outlet" [▸ 30]). Make sure to install cleaned air filters back in the same position.
- Turn on the power at least 6 hours before operating the unit in order to ensure smoother operation. As soon as the power is turned on, the user interface display appears.
- Insert batteries in the user interface (if applicable).

10.5 About the refrigerant

This product contains refrigerant gases.

Refrigerant type: R744 (CO_2)

WARNING

- Do NOT pierce or burn refrigerant cycle parts.
- Be aware that the refrigerant inside the system is odourless.

WARNING

The R744 refrigerant (CO_2) inside the unit is odourless, non-flammable and normally does NOT leak.

ALWAYS install a CO_2 detector according to the specifications of standard EN378.

If the refrigerant leaks in high concentrations in the room, it may have negative effects on its occupants such as asphyxiation and carbon dioxide poisoning. Ventilate the room and contact the dealer where you purchased the unit (see "10.5.1 About refrigerant leak detection" [▶ 32]).

Do NOT use the unit until a service person confirms that the part from which the refrigerant leaked has been repaired.

10.5.1 About refrigerant leak detection

In order to detect refrigerant leaks, a CO_2 refrigerant leak detector (field supply) MUST be installed. The CO_2 refrigerant leak detector may require annual tests. For more details, see the documentation of the installed device.

In case a CO_2 refrigerant leak is detected

- the fan of the indoor unit is stopped to prevent the refrigerant from being spread,
- the user interface displays error code A0 or U9 (⚠ for the Madoka; to display error codes, refer to the reference guide of the Madoka),
- a warning sound will come from the user interface (only for Madoka with buzzer, see option list) or from another safety alarm in combination with a CO_2 refrigerant leak detector (field supply).

Actions required by the user

1 Ventilate the room and immediately contact the dealer where you purchased the unit. Do NOT use the unit before the fault is fixed.

Actions required by the installer or the service person

INFORMATION

During detection of the refrigerant leakage, the contact between terminals T1 and T2 disconnects. During normal operation, the contact between terminals T1 and T2 is closed (acting as a short circuit).

1 If field supplied stop-valves are NOT installed: Close the stop valves of the gas and liquid pipe on the outdoor unit.

2 If field supplied shut-off valves are installed: If the refrigerant leak to the room has stopped, you can use the air conditioner for other rooms where the refrigerant leak did NOT occur.

3 Locate and repair the cause of the refrigerant leak. If necessary, replace the indoor unit.

4 Refill the refrigerant if needed.

5 Perform manual power reset and resume operation.

NOTICE

After the refrigerant leakage is detected, the unit will send a signal at regular intervals to confirm if the CO_2 concentration is at a safe level. Even when the CO_2 concentration is at a safe level, do NOT resume operation before the fault is fixed and the refrigerant is refilled.

11 Troubleshooting

If one of the following malfunctions occur, take the measures shown below and contact your dealer.

WARNING

Stop operation and shut OFF the power if anything unusual occurs (burning smells etc.).

Leaving the unit running under such circumstances may cause breakage, electrical shock or fire. Contact your dealer.

The system MUST be repaired by a qualified service person.

Malfunction	Measure
If a safety device such as a fuse, a breaker or an earth leakage breaker frequently actuates or the ON/OFF switch does NOT function properly.	Turn OFF all main power supply switches to the unit.
If water leaks from the unit.	Stop operation.
The operation switch does NOT function properly.	Turn OFF the power supply.
If the user interface displays ⚠ or an error code.	Notify your installer and report the error code. To display error codes, see the reference guide of the user interface.
The user interface displays error code A0 or U9 (or ⚠), the fan stops and you can hear a warning sound from the user interface (in case of Madoka) or from another safety alarm in combination with a gas detection device (if installed).	A refrigerant leak may be detected (see "10.5.1 About refrigerant leak detection" [▸ 32]).

If the system does NOT operate properly except for the above mentioned cases and none of the above mentioned malfunctions is evident, investigate the system in accordance with the following procedures.

If after checking all above items, it is impossible to fix the problem yourself, contact your installer and state the symptoms, the complete model name of the unit (with manufacturing number if possible) and the installation date (possibly listed on the warranty card).

Malfunction	Measure
If the system does not operate at all.	▪ Check if there is no power failure. Wait until power is restored. If a power failure occurs during operation, the system automatically restarts immediately after power is restored. ▪ Check if no fuse has blown or breaker is activated. Change the fuse or reset the breaker if necessary.
The system stops immediately after starting operation.	▪ Check if air inlet or outlet of outdoor or indoor unit is not blocked by obstacles. Remove any obstacles and make sure the air can flow freely. ▪ Check if the air filter is clogged (see "10.2.2 To clean the air filter" [▸ 30]).

Malfunction	Measure
The system operates but cooling or heating is insufficient.	▪ Check if air inlet or outlet of outdoor or indoor unit is not blocked by obstacles. Remove any obstacles and make sure the air can flow freely. ▪ Check if the air filter is clogged (see "10.2.2 To clean the air filter" [▶ 30]). ▪ Check the temperature setting. Refer to the manual of the user interface. ▪ Check if the fan speed setting is set to low speed. Refer to the manual of the user interface. ▪ Check if the air flow angle is proper. Refer to the manual of the user interface. ▪ Check for open doors or windows. Close doors and windows to prevent wind from coming in. ▪ Check if direct sunlight enters the room. Use curtains or blinds. ▪ Check if there are too many occupants in the room during cooling operation. Check if the heat source of the room is excessive. ▪ If the heat source of the room is excessive (when cooling). Cooling effect decreases if heat gain of the room is too large.
Operation stops suddenly. (user interface operation lamp or display blinks)	▪ Check if the air filter is clogged (see "10.2.2 To clean the air filter" [▶ 30]). ▪ Check if air inlet or outlet of outdoor or indoor unit is not blocked by obstacles. Remove any obstacles, turn the breaker OFF and back ON. If the lamp or display still blinks, contact your dealer.
An abnormal function happens during operation.	▪ The air conditioner may malfunction because of lightning or radio waves. Turn the breaker OFF and back ON.

11.1 Symptoms that are NOT system malfunctions

The following symptoms are NOT system malfunctions:

11.1.1 Symptom: The system does not operate

- The air conditioner does not start immediately after the ON/OFF button on the user interface is pressed. If the operation lamp lights, the air conditioner is in normal condition. It does not restart immediately because one of its safety devices actuates to prevent the air conditioner from being overloaded. The air conditioner will turn on again automatically after 3 minutes.
- The air conditioner does not start immediately after the power supply is turned on. Wait 1 minute until the microcomputer is prepared for operation.

- The air conditioner does not restart immediately when the temperature setting button is returned to its former position after pushing. It does not restart immediately because one of its safety devices actuates to prevent the air conditioner from being overloaded. The air conditioner will turn on again automatically after 3 minutes.
- The outdoor unit has stopped air conditioning (refrigeration continues). This is because the room temperature has reached the set temperature. The unit switches to fan operation. The actual operation is different from the user interface setting.
- The fan speed is different from the setting. Pressing the fan speed control button does not change the fan speed. When the room temperature reaches the set temperature in heating mode or the unit's maximum capacity is reached, the outdoor unit will stop air conditioning (refrigeration continues) and the indoor unit will operate in fan only mode (low fan speed). This is to prevent cool air from being blown directly onto anyone present in the room.

11.1.2 Symptom: Dust comes out of the unit

When the unit is used for the first time in a long time. This is because dust has gotten into the unit.

11.1.3 Symptom: The units can give off odours

The unit can absorb the smell of rooms, furniture, cigarettes, etc., and then emit it again.

12 Disposal

NOTICE

Do NOT try to dismantle the system yourself: dismantling of the system, treatment of the refrigerant, oil and other parts MUST comply with applicable legislation. Units MUST be treated at a specialised treatment facility for reuse, recycling and recovery.

For the installer

13 About the box

13.1 Overview: About the box

This chapter describes what you have to do after the box with the indoor unit is delivered on-site.

It contains information about:

- Unpacking and handling the unit
- Removing the accessories from the unit

Keep the following in mind:

- At delivery, the unit MUST be checked for damage. Any damage MUST be reported immediately to the claims agent of the carrier.
- Bring the packed unit as close as possible to its final installation position to prevent damage during transport.
- When handling the unit, take into account the following:

  Fragile, handle the unit with care.

  Keep the unit upright in order to avoid damage.

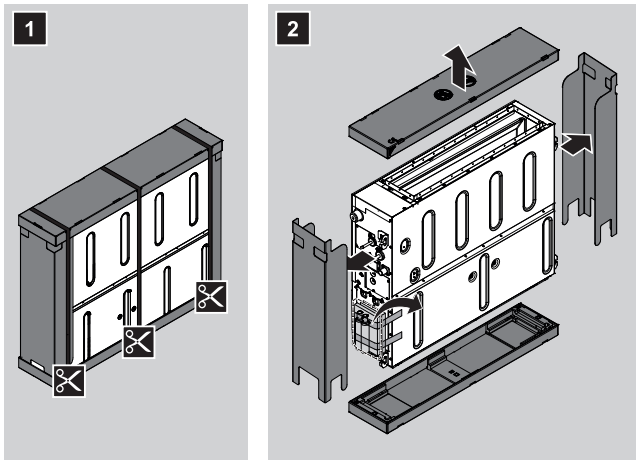
- Prepare the path along which you want to bring the unit inside in advance.

13.2 Indoor unit

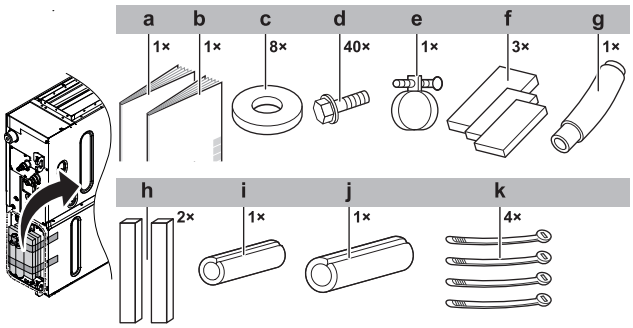
13.2.1 To unpack and handle the unit

Use a sling of soft material or protective plates together with a rope when lifting the unit. This to avoid damage or scratches to the unit.

1 Lift the unit by holding on to the hanger brackets without exerting any pressure on other parts, especially on refrigerant piping, drain piping and other resin parts.



13.2.2 To remove the accessories from the indoor unit



a Installation and operation manual
b General safety precautions
c Washers for hanger bracket
d Screws for duct flanges
e Metal clamp
f Sealing pads: Large (drain pipe), medium 1 (gas pipe), medium 2 (liquid pipe)
g Drain hose
h Small sealing
i Insulation piece: Small (liquid pipe)
j Insulation piece: Large (gas pipe)
k Tie wraps

14 About the units and options

In this chapter

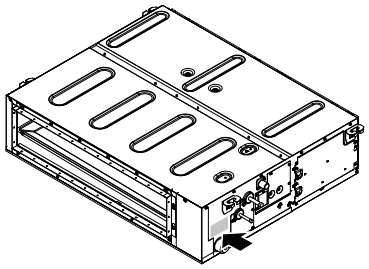
14.1 Identification

NOTICE

When installing or servicing several units at the same time, make sure NOT to switch the service panels between different models.

14.1.1 Identification label: Indoor unit

Location



14.2 About the indoor unit

Use the system in the following temperature and humidity ranges for safe and effective operation.

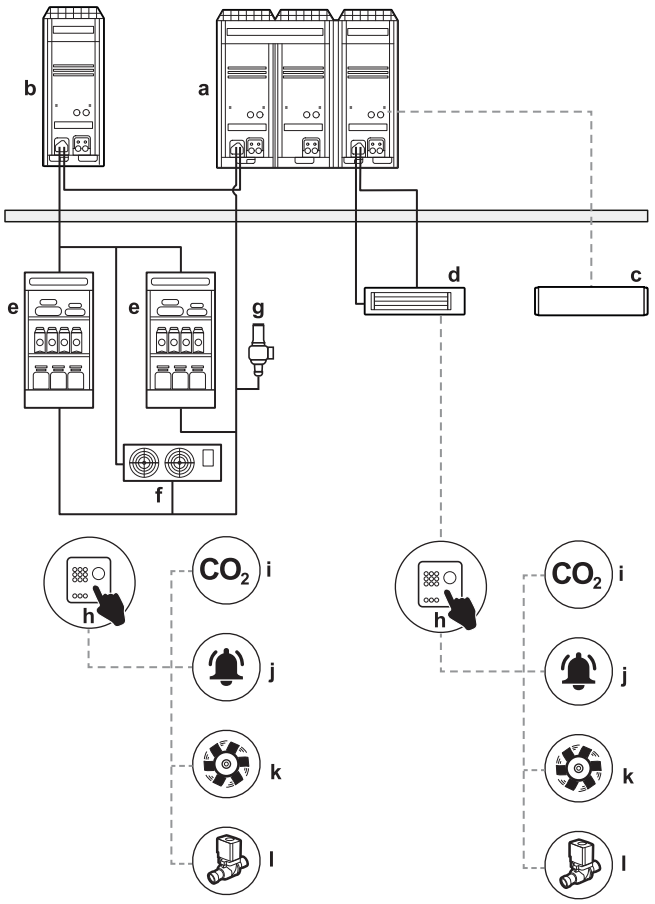
	Cooling and drying	Heating
Outdoor unit	–5~43°C DB	–20~16°C WB
Indoor unit	14~24°C WB	15~27°C DB
Indoor humidity	≤80%[a]	—

[a] To avoid condensation and water dripping out of the unit. If the temperature or the humidity is beyond these conditions, safety devices may be put in action and the air conditioner may not operate.

14.3 System layout

INFORMATION

The following illustration is an example and might NOT match your system layout.



a Main outdoor unit (LRYEN10*)
b Capacity up unit (LRNUN5*)
c Communication box (BRR9B1V1)
d Indoor unit for air conditioning
e Indoor unit for refrigeration (showcase)
f Indoor unit for refrigeration (blower coil)
g Safety valve
h CO_2 control panel
i CO_2 detector
j CO_2 alarm
k CO_2 ventilator
l Shut off valve

14.4 Combining units and options

INFORMATION

Certain options might NOT be available in your country.

14.4.1 Possible options for the indoor unit

Make sure you have the following mandatory options:

- User interface: Wired or wireless (refer to catalogues and technical literature to select a suitable user interface)

INFORMATION

Madoka with buzzer is a recommended option. In case you use another user interface, an additional safety alarm in combination with a gas detection device (field supply) may be required; see "15.1.2 Additional installation site requirements for CO_2 refrigerant" [▶ 47].

15 Unit installation

WARNING

Installation shall be done by an installer, the choice of materials and installation shall comply with the applicable legislation. In Europe, EN378 is the applicable standard.

WARNING

- Make sure to install all necessary countermeasures in case of refrigerant leakage according to standard EN378 (see "15.1.2 Additional installation site requirements for CO_2 refrigerant" [▸ 47]).
- Make sure to install a CO_2 leak detector (field supply) and enable the function for refrigerant leak detection (see "19.1 Field setting" [▸ 72]).

In this chapter

15.1 Preparing the installation site

Choose an installation location with sufficient space for carrying the unit in and out of the site.

Do NOT install the unit in places often used as work place. In case of construction works (e.g. grinding works) where a lot of dust is created, the unit MUST be covered.

15.1.1 Installation site requirements of the indoor unit

INFORMATION

Also read the general installation site requirements. See the ""2 General safety precautions" [▸ 7]" chapter.

INFORMATION

The sound pressure level is less than 70 dBA.

CAUTION

Appliance NOT accessible to the general public, install it in a secured area, protected from easy access.

This unit, both indoor and outdoor, is suitable for installation in a commercial and light industrial environment.

Do NOT install the unit in the following places:

- In places where a mineral oil mist, spray or vapour may be present in the atmosphere. Plastic parts may deteriorate and fall off or cause water leakage.

It is NOT recommended to install the unit in the following places because it may shorten the life of the unit:

- Where the voltage fluctuates a lot
- In vehicles or vessels
- Where acidic or alkaline vapour is present

NOTICE

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

NOTICE

The equipment described in this manual may cause electronic noise generated from radio-frequency energy. The equipment complies to specifications that are designed to provide reasonable protection against such interference. However, there is no guarantee that interference will not occur in a particular installation.

It is therefore recommended to install the equipment and electric wires in such a way that they keep a proper distance from stereo equipment, personal computers, etc.

- In places with weak reception, keep distances of 3 m or more to avoid electromagnetic disturbance of other equipment and use conduit tubes for power and transmission lines.
- **Fluorescent lights**. When installing a wireless user interface in a room with fluorescent lights, mind the following to avoid interference:
  - Install the wireless user interface as close as possible to the indoor unit.
  - Install the indoor unit as far as possible from the fluorescent lights.
- Take care that in the event of a water leak, water cannot cause any damage to the installation space and surroundings.
- Choose a location where the operation noise or the hot/cold air discharged from the unit will not disturb anyone.
- When installing the unit in a small room, take measures in order to keep the refrigerant concentration from exceeding allowable safety limits in the event of a refrigerant leak.

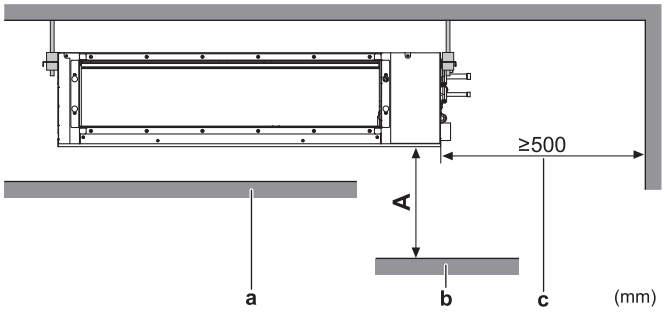
  See "15.1.2 Additional installation site requirements for CO_2 refrigerant" [▸ 47].

CAUTION

Excessive concentrations of refrigerant R744 (CO_2) in a closed room can lead to unconsciousness and oxygen deficiency. Take appropriate measures.

See "To determine the minimum number of appropriate measures" [▸ 49].

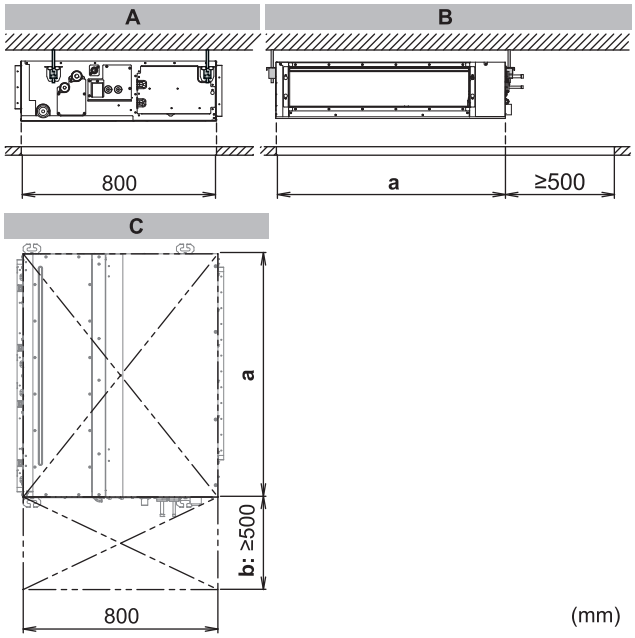
- **Air flow.** Make sure nothing blocks the air flow.
- **Drainage.** Make sure condensation water can be evacuated properly.
- **Ceiling insulation**. When conditions in the ceiling exceed 30°C and a relative humidity of 80%, or when fresh air is inducted into the ceiling, then additional insulation is required (minimum 10 mm thickness, polyethylene foam).
- **Spacing**. Mind the following requirements:



A **Minimum distance to the floor**
2.7 m to avoid accidental touching
2.5 m in case the fan is covered (e.g. false ceiling, grille, ...)
a Ceiling
b Floor surface
c Maintenance space

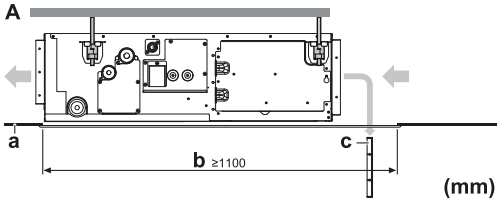
Service space and ceiling opening size

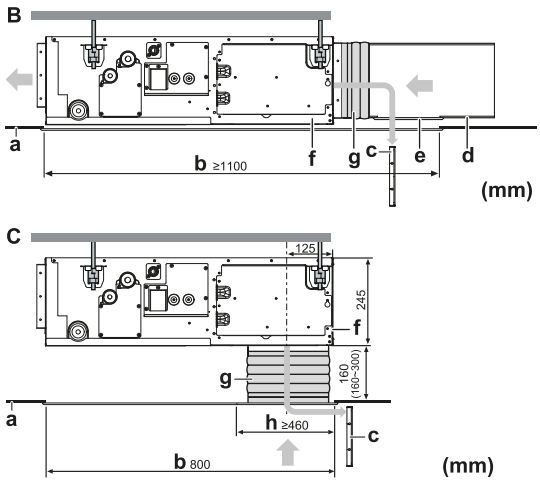
Make sure ceiling opening is big enough to ensure a sufficient clearance for maintenance and service.



A Side view: refrigerant piping, drain piping, control box
B Side view: air inlet
C Top view
a Ceiling opening
Class 50: 700 mm
Class 71: 1000 mm
Class 112: 1400 mm
b Service space

Installation options





A Standard rear suction
B Installation with rear canvas duct and duct service opening
C Installation with bottom canvas duct and air inlet grill
a Ceiling surface
b Ceiling opening
c Air filter removal route for air filter maintenance
d Air inlet filter
e Duct service opening
f Interchangeable plate
g Canvas connection for air inlet panel (field supply)
h Air inlet panel (field supply) opening

INFORMATION

Some options may require additional service space. Refer to the installation manual of the used option before installation.

15.1.2 Additional installation site requirements for CO_2 refrigerant

WARNING

In case of mechanical ventilation, take care the ventilated air is exhausted to the outdoor space and NOT into another closed area.

Refrigerant basic characteristics	
Refrigerant	R744
RCL (refrigerant concentration limit)	0.072 kg/m^3
QLMV (quantity limit with minimum ventilation)	0.074 kg/m^3
QLAV (quantity limit with additional ventilation)	0.18 kg/m^3
Toxicity limit	0.1 kg/m^3
Safety class	A1

Allowable refrigerant charge

The calculation of the allowable refrigerant charge depends on the combination of the "access category" and the "location classification" as described in the following table.

INFORMATION

Where the possibility exists of more than one access category, the more stringent requirements apply. If occupied spaces are isolated, e.g. by sealed partitions, floors and ceilings, the requirements of the individual access category apply.

Access category		Location classification			
		I	II	III	IV
General		Toxicity limit × Room volume **or** "Appropriate measures" [48]		No charge restriction	The charge shall be assessed according to location I, II or III, depending on the location of the ventilated enclosure
Supervised	Upper floors without emergency exits	Toxicity limit × Room volume **or** "Appropriate measures" [48]	No charge restriction		
	Below ground floor level				
	Other	No charge restriction			
Authorized	Upper floors without emergency exits	Toxicity limit × Room volume **or** "Appropriate measures" [48]			
	Below ground floor level				
	Other	No charge restriction			

15–1 Description of access categories

Access category	Description	Examples
General access	Rooms, parts of buildings, buildings where: ▪ sleeping facilities are provided; ▪ people are restricted in their movements; ▪ an uncontrolled number of people are present; ▪ any person has access without being personally acquainted with the necessary safety precautions.	Hospitals, courts or prisons, theatres, supermarkets, schools, lecture halls, public transport terminals, hotels, restaurants.
Supervised access	Rooms, parts of buildings, buildings where only a limited number of people may be assembled, some being necessarily acquainted with the general safety precautions of the location.	Business or professional offices, laboratories, places for general manufacturing and where people work.
Authorized access	Rooms, parts of buildings, buildings where only authorized persons have access, who are acquainted with general and special safety precautions of the location and where manufacturing, processing or storage of material or products take place.	Manufacturing facilities, e.g. for chemicals, food, beverage, ice, ice cream, refineries, cold stores, dairies, abattoirs, non-public areas in supermarkets.

15–2 Description of location classification

Location classification		Description
Class I	Mechanical equipment located within the occupied space	If the refrigerating system or refrigerant-containing parts are located in the occupied space, the system is considered to be of class I, unless the system complies with the requirements of class II.
Class II	Compressors in machinery room or open air	If all compressors and pressure vessels are either located in a machinery room or in the open air, the requirements for a class II location shall apply, unless the system complies with the requirements of class III. Coils and pipework including valves may be located in an occupied space.
Class III	Machinery room or open air	If all refrigerant-containing parts are located in a machinery room or in the open air, the requirements for a class III location shall apply. The machinery room shall fulfil the requirements of EN 378-3.
Class IV	Ventilated enclosure	If all refrigerant-containing parts are located in a ventilated enclosure, the requirements for a class IV location shall apply. The ventilated enclosure shall fulfil the requirements of EN 378-2 and EN 378-3.

Appropriate measures

INFORMATION

Appropriate measures are field supply. Choose and install all required appropriate measures in accordance with EN 378-3:2016.

- (natural or mechanical) ventilation
- safety shut-off valves
- safety alarm, in combination with a CO_2 refrigerant leak detector (a safety alarm alone is NOT considered an appropriate measure where occupants are restricted in their movements)
- CO_2 refrigerant leak detector

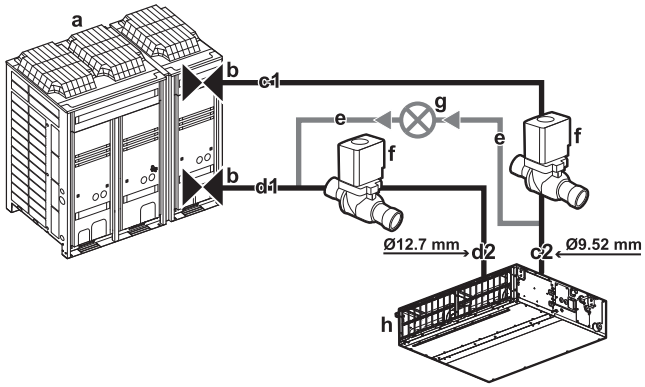
WARNING

Install the unit ONLY in locations where the doors of the occupied space are NOT tight fitting.

WARNING

When using safety shut-off valves, make sure to install measures such as a bypassing piping with a pressure relief valve (from liquid pipe to gas pipe). When the safety shut-off valves close and no measures are installed, increased pressure may damage the liquid piping.

Example: Install the bypass piping (**e**) with a pressure relief valve (**g**) leading from the liquid piping between indoor unit and the shut off valve (**c2**) to the gas piping between outdoor unit and the shut off valve (**d1**).



15–1 Installation layout example

- **a** Outdoor unit
- **b** Stop valve on the outdoor unit
- **c1** Liquid piping between outdoor unit and the shut off valve
- **c2** Liquid piping between indoor unit and the shut off valve
- **d1** Gas piping between outdoor unit and the shut off valve
- **d2** Gas piping between indoor unit and the shut off valve
- **e** Bypassing piping
- **f** Safety shut off valve
- **g** Pressure relief valve
- **h** Indoor unit

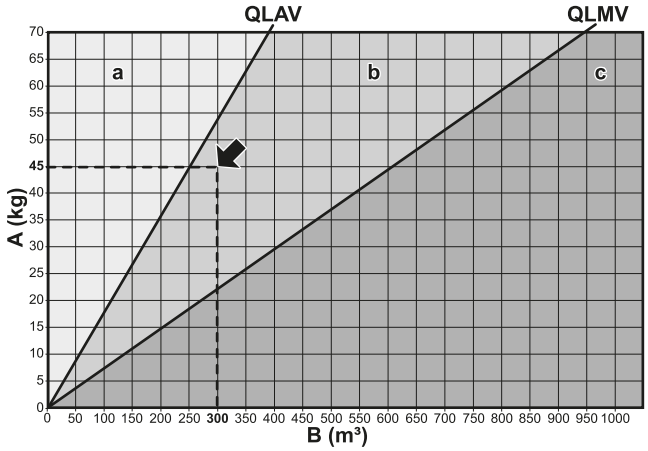
To determine the minimum number of appropriate measures

For occupancies other than on the lowest underground floor of the building

If the total refrigerant charge (kg) divided by the room volume[(a)] (m^3) is…	…the number of appropriate measures must be at least…
<QLMV	0
>QLMV and <QLAV	1
>QLAV	2

[(a)] For occupied spaces with a floor area exceeding 250 m^2, use 250 m^2 as the floor area for determination of the room volume (**Example:** even if the room area is 300 m^2 and the room height is 2.5 m, calculate the room volume as 250 m^2×2.5 m=625 m^3)

Example: Total refrigerant charge in the system is 45 kg and room volume is 300 m^3. 45/300=0.15, which is >QLMV (0.074) and <QLAV (0.18), therefore install at least 1 appropriate measure in the room.



15–2 Example graph for calculation

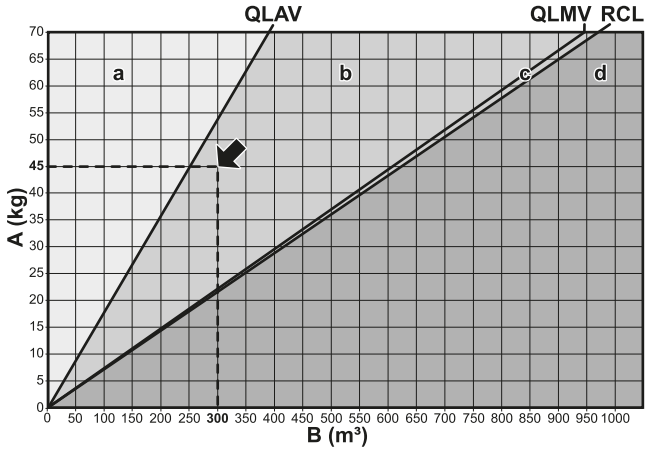
A Refrigerant charge
B Room volume
a 2 appropriate measures required
b 1 appropriate measure required
c No measure required

For occupancies on the lowest underground floor of the building

If the total refrigerant charge (kg) divided by the room volume[(a)] (m^3) is…	…the number of appropriate measures must be at least…
<RCL	0
>RCL and ≤QLMV	1
>QLMV and <QLAV	2
>QLAV	Value CANNOT be exceeded!

[(a)] For occupied spaces with a floor area exceeding 250 m^2, use 250 m^2 as the floor area for determination of the room volume (**Example:** even if the room area is 300 m^2 and the room height is 2.5 m, calculate the room volume as 250 m^2×2.5 m=625 m^3)

Example: Total refrigerant change in the system is 45 kg and room volume is 300 m^3. 45/300=0.15, which is >RCL (0.072) and <QLAV (0.18), therefore install at least 2 appropriate measures in the room.



15–3 Example graph for calculation

A Refrigerant charge limit
B Room volume
a Installation is not allowed
b 2 appropriate measures required
c 1 appropriate measure required
d No measure required

INFORMATION

Even if there is no refrigerating system on the lowest floor, where the largest system charge (kg) in the building divided by total volume of the lowest floor (m^3) exceed the value for QLMV, provide a mechanical ventilation in accordance with EN 378-3:2016.

Space volume calculation

Take into account following requirements for the space volume calculation:

- The space considered is any space that contains refrigerant-containing parts or into which refrigerant can be released.
- Use the room volume of the smallest, enclosed, occupied space to determine the refrigerant quantity limits.
- Multiple spaces that have appropriate openings (which cannot be closed) between the individual spaces or are connected with a common ventilation supply, return or exhaust system not containing the evaporator or the condenser shall be treated as a single space.
- Where the evaporator or condenser is located in an air supply duct system serving multiple spaces, the volume of the smallest single space shall be used.
- If the airflow to a space cannot be reduced to less than 10% of the maximum airflow using an airflow reducer, then that space shall be included in the volume of the smallest human occupied space.
- For refrigerants of safety class A1, the total volume of all the rooms cooled or heated by air from one system is used as the volume for calculation, if the air supply to each room cannot be restricted below 25% of its full supply.
- For refrigerants of safety class A1, the effect of the air changes may be considered in calculating the volume if the space has a mechanical ventilation system which will be operating during the occupation of the space.
- Where the evaporator or condenser is located in an air supply duct system and the system serves a non-partitioned multi-storey building, the occupied volume of the smallest occupied storey of the building shall be used.
- Include the space above a false ceiling or partition in the volume calculation unless the false ceiling is airtight.
- Where an indoor unit, or any related refrigerant-containing pipework, is located in a space where the total charge exceeds the allowable charge, make special provisions to ensure at least an equivalent level of safety.

15.2 Mounting the indoor unit

15.2.1 Guidelines when installing the indoor unit

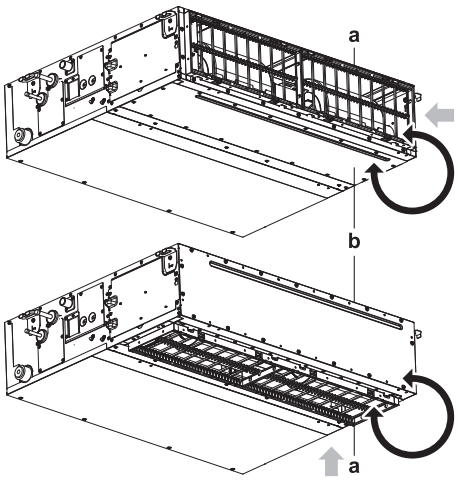
INFORMATION

Optional equipment. When installing optional equipment, also read the installation manual of the optional equipment. Depending on the field conditions, it might be easier to install the optional equipment first.

Installation options

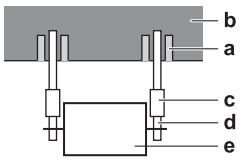
INFORMATION

The unit can be used with bottom suction by replacing the interchangeable plate by the air filter holding plate.



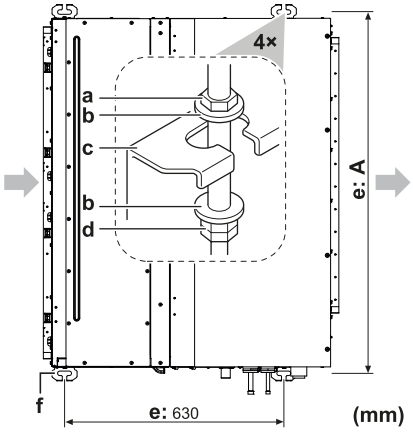
a Air filter holding plate with air filter(s)
b Interchangeable plate

- **Ceiling strength.** Check whether the ceiling is strong enough to support the weight of the unit. If there is a risk, reinforce the ceiling before installing the unit.
  - For existing ceilings, use anchors.
  - For new ceilings, use sunken inserts, sunken anchors or other field supplied parts.



a Anchor
b Ceiling slab
c Long nut or turn-buckle
d Suspension bolt
e Indoor unit

- **Suspension bolts.** Use M10 suspension bolts for installation. Attach the hanger bracket to the suspension bolt. Fix it securely using a nut and washer from the upper and lower sides of the hanger bracket.

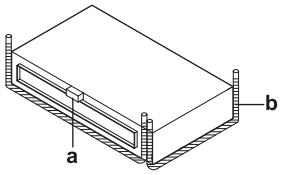


a Nut (field supply)
b Washer (accessories)
c Hanger bracket
d Double nut (field supply)
e Suspension bolt spacing
f Suspension bolt

15–3 Suspension bolt spacing (A)

Class	A (mm)
50	738
71	1038
112	1438

- **Level.** Make sure the unit is level at all four corners using a level or a water-filled vinyl tube.



a Water level
b Vinyl tube

NOTICE

Do NOT install the unit tilted. **Possible consequence:** If the unit is tilted against the direction of the condensate flow (the drain piping side is raised), the float switch might malfunction and cause water to drip.

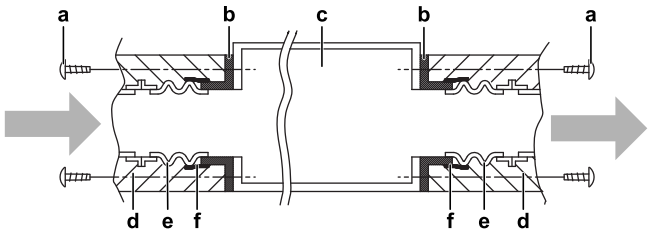
15.2.2 Guidelines when installing the ducting

CAUTION

- Make sure the installation of the duct does NOT exceed the setting range of the external static pressure for the unit. Refer to the technical datasheet of your model for the setting range.
- Make sure to install the canvas duct so vibrations are NOT transmitted to the duct or ceiling. Use a sound-absorbing material (insulation material) for the lining of the duct and apply vibration insulation rubber to the hanging bolts.
- When welding, make sure NOT to spatter onto the drain pan or the air filter.
- If the metal duct passes through a metal lath, wire lath or metal plate of the wooden structure, separate the duct and wall electrically.
- Install the outlet grille in a position where the airflow will not come into direct contact with people.
- Do NOT use booster fans in the duct. Use the function to adjust the fan rate setting automatically (see "19.1 Field setting" [▸ 72]).

The ducting is to be field supplied.

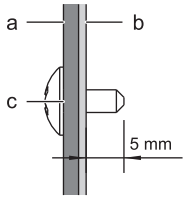
1. Connect the canvas duct to the inside of the flange on both inlet and outlet sides. Connect the canvas duct using the accessory screws.
2. Connect the duct to the canvas duct.



a Screws for duct flanges (accessory)

b Flange (located on the unit)
c Main unit
d Insulation (field supply)
e Canvas duct (field supply)
f Aluminium tape (field supply)

- **Fixing screws**. When installing an air inlet duct, select fixing screws that stick out 5 mm on the inside of the flange to protect the air filter from damage during maintenance of the filter.



a Air inlet duct
b Inside of the flange
c Fixing screw

3 Wind aluminium tape around the flange and duct connection. Make sure there are no air leaks at any other connection.

4 Insulate the duct to prevent condensation from forming. Use glass wool or polyethylene foam 25 mm thick.

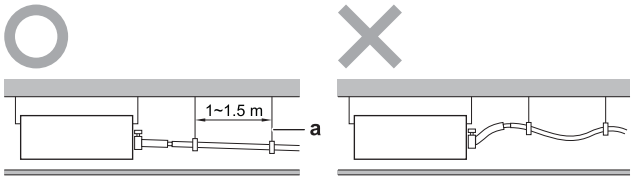
15.2.3 Guidelines when installing the drain piping

Make sure condensation water can be evacuated properly. This involves:

- General guidelines
- Connecting the drain piping to the indoor unit
- Checking for water leaks

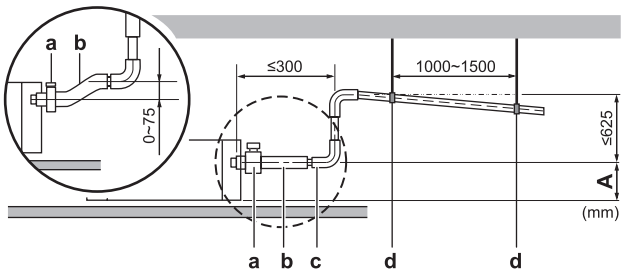
General guidelines

- **Pipe length.** Keep drain piping as short as possible.
- **Pipe size.** Keep the pipe size equal to or greater than that of the connecting pipe (vinyl pipe of 20 mm nominal diameter and 26 mm outer diameter).
- **Slope.** Make sure the drain piping slopes down (at least 1/100) to prevent air from being trapped in the piping. Use hanging bars as shown.



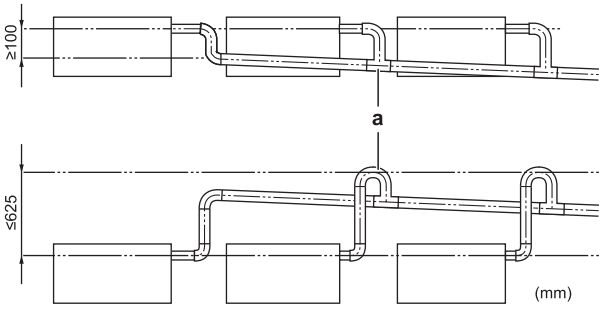
a Hanging bar
O Allowed
X Not allowed

- **Condensation.** Take measures against condensation. Insulate the complete drain piping in the building.
- **Rising piping**. If necessary to make the slope possible, you can install rising piping.
  - Drain hose inclination: 0~75 mm to avoid stress on the piping and to avoid air bubbles.
  - Rising piping: ≤300 mm from the unit, ≤625 mm perpendicular to the unit.



A In case of rear suction installation 231 mm
In case of installation with canvas duct (field supply) 350~530 mm
a Metal clamp (accessory)
b Drain hose (accessory)
c Rising drain piping (vinyl pipe of 25 mm nominal diameter and 32 mm outer diameter) (field supply)
d Hanging bars (field supply)

- **Combining drain pipes.** You can combine drain pipes. Make sure to use drain pipes and T-joints with the correct gauge for the operating capacity of the units.

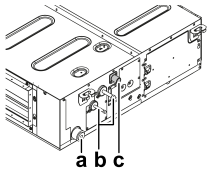


a T-joint

To connect the drain piping to the indoor unit

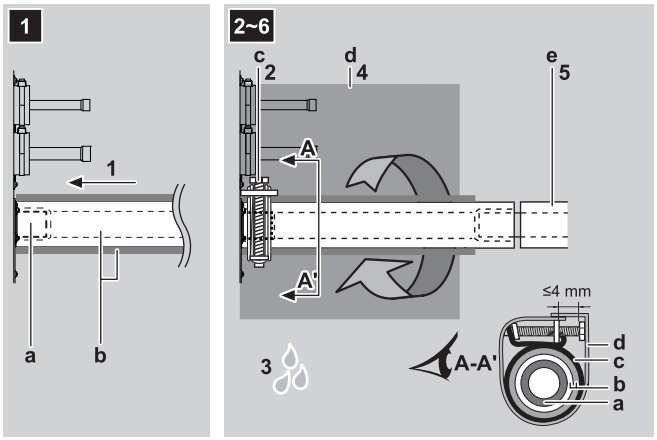
NOTICE

Incorrect connection of the drain hose might cause leaks, and damage the installation space and surroundings.



a Drain outlet for maintenance
b Refrigerant pipes
c Drain pipe connection

1. Push the drain hose as far as possible over the drain pipe connection.
2. Tighten the metal clamp until the screw head is less than 4 mm from the metal clamp part.
3. Check for water leaks (see "To check for water leaks" [▸ 56]).
4. Wind the large sealing pad (= insulation) around the metal clamp and drain hose, and fix it with tie wraps (accessory).
5. Connect the drain piping to the drain hose.



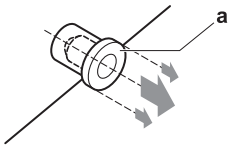
a Drain pipe connection (attached to the unit)
b Drain hose (accessory)
c Metal clamp (accessory)
d Large sealing pad (accessory)
e Drain piping (field supply)

NOTICE

- Do NOT remove the drain pipe plug. Water might leak out.
- Use the drain outlet only to discharge the water before maintenance.
- Insert and remove the drain plug gently. Excessive force may deform the drain socket of the drain pan.

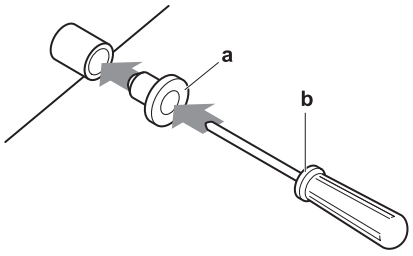
Pull out the plug.

- Do NOT wiggle the plug up and down.



Push in the plug.

- Set the plug and push it in using a Phillips screwdriver.



a Drain plug
b Phillips screwdriver

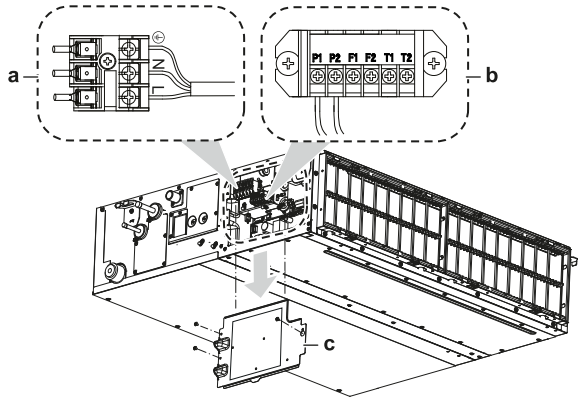
To check for water leaks

The procedure differs depending on whether installation of the system is already completed. When installation of the system is not yet completed, temporarily connect the user interface and power supply to the unit.

When installation of the system is not yet completed

1 Temporarily connect electrical wiring.

- Remove the service cover (c).
- Connect the power supply (a).
- Connect the user interface (b).
- Reattach the service cover.



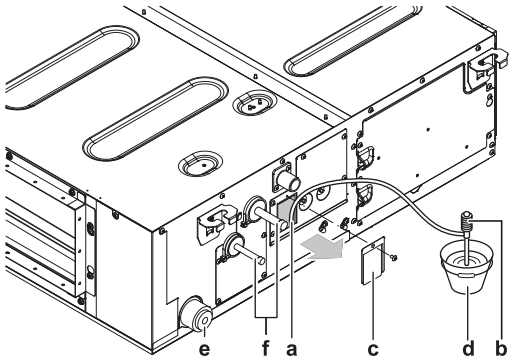
a Power supply terminal block
b User interface terminal block
c Service cover with wiring diagram

2 Turn ON the power supply.

3 Start fan only operation (see the reference guide or the service manual of the user interface).

4 Remove the water inlet cover (1 screw).

5 Gradually pour approximately 1 l of water through the water inlet, and check for leaks.



a Water inlet
b Portable pump
c Water inlet cover
d Bucket (adding water through water inlet)
e Drain outlet for maintenance
f Refrigerant pipes

6 Turn OFF the power.

7 Disconnect the electrical wiring.

- Remove the service cover.
- Disconnect the power supply.
- Disconnect the user interface.
- Reattach the service cover.

When installation of the system is already completed

1 Start cooling operation (see the reference guide or the service manual of the user interface).

2 Gradually pour approximately 1 l of water through the water inlet, and check for leaks (see "When installation of the system is not yet completed" [▸ 56]).

15.3 Relocation

Contact your dealer for removing and reinstalling the total unit. Moving units requires technical expertise.

16 Piping installation

In this chapter

16.1 Preparing refrigerant piping

16.1.1 Refrigerant piping requirements

INFORMATION

Also read the precautions and requirements in the "2 General safety precautions" [▶ 7].

NOTICE

The refrigerant R744 requires strict cautions for keeping the system clean, dry and tight.

- Clean and dry: foreign materials (including mineral oils or moisture) should be prevented from getting mixed into the system.
- Tight: R744 does not contain any chlorine, does not destroy the ozone layer, and does not reduce earth's protection against harmful ultraviolet radiation. R744 can contribute to the greenhouse effect if it is released. Therefore pay special attention to check the tightness of the installation.

NOTICE

The piping and other pressure-containing parts shall be suitable for refrigerant and oil. Use K65 copper-iron alloy tube system for high-pressure applications with a working pressure of 120 bar at the air conditioner side and 90 bar at the refrigeration side.

- Foreign materials inside pipes (including oils for fabrication) must be ≤30 mg/10 m.

NOTICE

If the ability to close the stop valves for field piping is wanted, the installer MUST install a pressure relief valve on the following piping:

- Outdoor unit to refrigeration indoor units: on liquid piping
- Outdoor unit to air conditioning indoor units: on liquid piping AND gas piping

Refrigerant piping diameter

Liquid piping	Gas piping
Ø9.5 mm	Ø12.7 mm

Refrigerant piping material

- **Piping material:** K65 copper-iron alloy (CuFe2P), maximum operating pressure = 120 bar
- **Piping temper grade and thickness:**

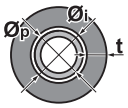
Outer diameter (Ø)	Temper grade	Thickness (t)[(a)]	
9.5 mm (3/8")	R420 (drawn)	≥0.65 mm	
12.7 mm (1/2")		≥0.85 mm	

[(a)] Depending on the applicable legislation and the maximum working pressure of the unit (see "PS High" on the unit name plate), larger piping thickness might be required.

16.1.2 Refrigerant piping insulation

- Use polyethylene foam as insulation material:
  - with a heat transfer rate between 0.041 and 0.052 W/mK (0.035 and 0.045 kcal/mh°C)
  - with a heat resistance of at least 120°C
- Insulation thickness

Pipe outer diameter ($Ø_p$)	Insulation inner diameter ($Ø_i$)	Insulation thickness (t)
9.5 mm (3/8")	10~14 mm	≥10 mm
12.7 mm (1/2")	14~16 mm	≥10 mm



If the temperature is higher than 30°C and the humidity is higher than RH 80%, the thickness of the insulation materials should be at least 20 mm to prevent condensation on the surface of the insulation.

16.2 Connecting the refrigerant piping

16.2.1 About connecting the refrigerant piping

Before connecting the refrigerant piping

Make sure the outdoor and indoor unit are mounted.

Typical workflow

Connecting the refrigerant piping involves:

- Connecting the refrigerant piping to the indoor unit
- Connecting the refrigerant piping to the outdoor unit
- Insulating the refrigerant piping
- Keeping in mind the guidelines for:
  - Pipe bending
  - Brazing
  - Using the stop valves

16.2.2 Precautions when connecting the refrigerant piping

INFORMATION

Also read the precautions and requirements in the following chapters:

- "2 General safety precautions" [▶ 7]
- "16.1 Preparing refrigerant piping" [▶ 59]

DANGER: RISK OF BURNING/SCALDING

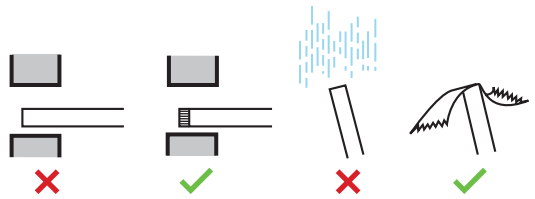
CAUTION

Do NOT reuse piping from previous installations.

NOTICE

Take the following precautions on refrigerant piping into account:

- Avoid anything but the designated refrigerant to get mixed into the refrigerant cycle (e.g. air).
- Only use R744 (CO_2) when adding refrigerant.
- Only use installation tools (e.g. manifold gauge set) that are exclusively used for R744 (CO_2) installations to withstand the pressure and to prevent foreign materials (e.g. mineral oils and moisture) from entering the system.
- Do NOT leave pipes unattended at the site. If you will finish the work in less than 1 month, tape the pipe ends or pinch the pipe (see figure below). Pipes that are installed outdoors must be pinched, regardless of the duration of the works.
- Use caution when passing copper tubes through walls (see figure below).



INFORMATION

Do NOT open the refrigerant stop valve before checking the refrigerant piping. When you need to charge additional refrigerant it is recommended to open the refrigerant stop valve after charging.

16.2.3 Pipe bending guidelines

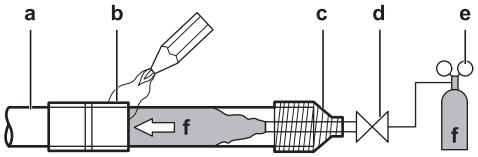
Use a pipe bender for bending. All pipe bends should be as gentle as possible.

Pipe outer diameter (Ø)	Bending radius
9.5 mm (3/8")	≥43 mm
12.7 mm (1/2")	≥52 mm

16.2.4 Guidelines when connecting the refrigerant piping

- When brazing, blow through with nitrogen to prevent creation of large quantities of oxidized film on the inside of the piping. This film adversely affects valves and compressors in the refrigerating system and prevents proper operation.

- Set the nitrogen pressure to 20 kPa (0.2 bar) (just enough so it can be felt on the skin) with a pressure-reducing valve.



a Refrigerant piping
b Part to be brazed
c Taping
d Manual valve
e Pressure-reducing valve
f Nitrogen

- Do NOT use anti-oxidants when brazing pipe joints.

  Residue can clog pipes and break equipment.

- Do NOT use flux when brazing copper-to-copper refrigerant piping. Use phosphor copper brazing filler alloy (CuP279, CuP281, or CuP284:DIN EN ISO 17672), which does not require flux.

  Flux has an extremely harmful influence on refrigerant piping systems. E.g., if a chlorine-based flux is used, it will cause pipe corrosion or, in particular, if the flux contains fluorine, it will deteriorate the refrigerant oil.

- Always protect the surrounding surfaces (e.g. using insulation foam) against heat when brazing.

16.2.5 To connect the refrigerant piping to the indoor unit

CAUTION

Install the refrigerant piping or components in a position where they are unlikely to be exposed to any substance which may corrode components containing refrigerant, unless the components are constructed of materials that are inherently resistant to corrosion or are suitably protected against corrosion.

- **Pipe length**. Keep refrigerant piping as short as possible.

WARNING

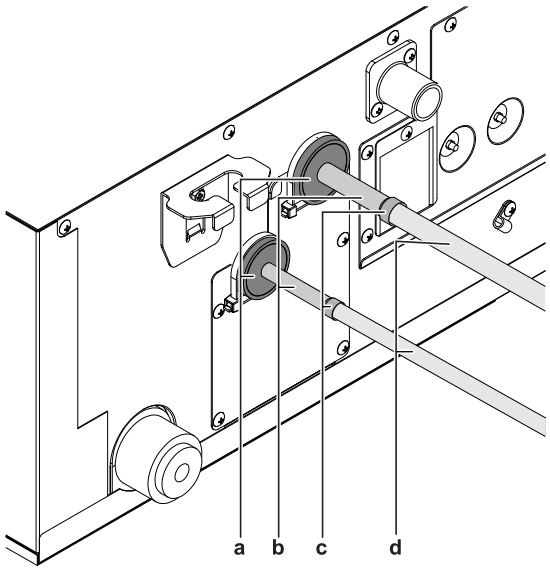
- Use K65 piping for high-pressure applications with a working pressure of 120 bar or 90 bar, depending on its location in the system.
- Use K65 unions and fittings approved for a working pressure of 120 bar or 90 bar, depending on its location in the system.
- ONLY brazing is allowed for connection of pipes. No other types of connections are allowed.
- Expanding of pipes is NOT allowed.

1 Insert the field pipe into the piping on the indoor unit side.

2 Connect refrigerant piping to the unit using only **brazed connections**.

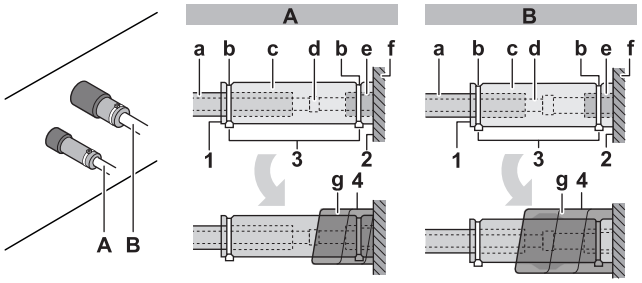
NOTICE

When brazing, place a wet cloth on the insulation attached on the unit (**a**) and make sure the temperature does not exceed 200°C.



a Insulation attached on the unit
b Piping on the indoor unit side
c Brazed connection
d Field piping

3 **Insulate** the refrigerant piping on the indoor unit as follows:



A Liquid piping
B Gas piping

a Insulation material (field supply)
b Tie wraps (accessory)
c Insulation pieces: Large (gas pipe), small (liquid pipe) (accessory)
d Brazed connection
e Refrigerant pipe connection (attached to the unit)
f Unit
g Sealing pads: Medium 1 (gas pipe), medium 2 (liquid pipe) (accessories)

1 Turn up the seams of the insulation pieces.
2 Attach to the base of the unit.
3 Tighten the tie wrap on the insulation pieces.
4 Wrap the sealing pad from the base of the unit to the top of the brazed connection.

NOTICE

Make sure to insulate all refrigerant piping. Any exposed piping might cause condensation.

17 Electrical installation

In this chapter

17.1 About connecting the electrical wiring

Typical workflow

Connecting the electrical wiring typically consists of the following stages:

1. Making sure the power supply system complies with the electrical specifications of the units.
2. Connecting the electrical wiring to the outdoor unit.
3. Connecting the electrical wiring to the indoor unit.
4. Connecting the main power supply.

17.1.1 Precautions when connecting the electrical wiring

DANGER: RISK OF ELECTROCUTION

WARNING

ALWAYS use multicore cable for power supply cables.

INFORMATION

Also read the precautions and requirements in the "2 General safety precautions" [▶ 7].

WARNING

- All wiring MUST be performed by an authorised electrician and MUST comply with the applicable legislation.
- Make electrical connections to the fixed wiring.
- All components procured on-site and all electrical construction MUST comply with the applicable legislation.

WARNING

- If the power supply has a missing or wrong N-phase, equipment might break down.
- Establish proper earthing. Do NOT earth the unit to a utility pipe, surge absorber, or telephone earth. Incomplete earthing may cause electrical shock.
- Install the required fuses or circuit breakers.
- Secure the electrical wiring with cable ties so that the cables do NOT come into contact with sharp edges or piping, particularly on the high-pressure side.
- Do NOT use taped wires, stranded conductor wires, extension cords, or connections from a star system. They can cause overheating, electrical shock or fire.

WARNING

Use an all-pole disconnection type breaker with at least 3 mm between the contact point gaps that provide full disconnection under overvoltage category III.

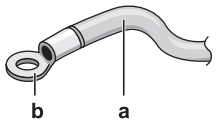
WARNING

If the supply cord is damaged, it MUST be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

17.1.2 Guidelines when connecting the electrical wiring

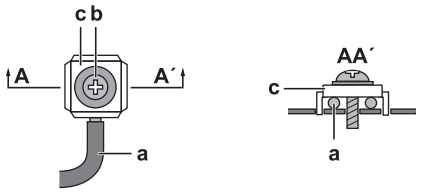
Keep the following in mind:

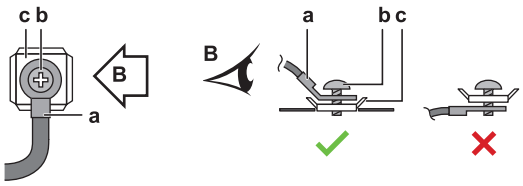
- If stranded conductor wires are used, install a round crimp-style terminal on the end of the wire. Place the round crimp-style terminal on the wire up to the covered part and fasten the terminal with the appropriate tool.



a Stranded conductor wire
b Round crimp-style terminal

- Use the following methods for installing wires:

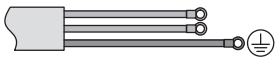
Wire type	Installation method
Single-core wire	 **a** Curled single-core wire **b** Screw **c** Flat washer

Wire type	Installation method
Stranded conductor wire with round crimp-style terminal	 **a** Terminal **b** Screw **c** Flat washer ✓ Allowed ✕ NOT allowed

Tightening torques

Wiring	Screw size	Tightening torque (N•m)
Power supply cable	M4	1.2~1.4
Transmission cable (F1, F2)	M3.5	0.8~0.9
User interface cable		

- The earth wire between the wire retainer and the terminal must be longer than the other wires.



17.1.3 Specifications of standard wiring components

Component		Class		
		50	71	112
Power supply cable	MCA[a]	1.4 A	2.0 A	2.9 A
	Voltage	220~240 V		
	Phase	1~		
	Frequency	50/60 Hz		
	Wire sizes	2.5 mm² (3-core wire) H07RN-F (60245 IEC 66)		
Transmission wiring		0.75 to 1.25 mm² (2-core wire) H05RN-F (60245 IEC 57) indoor↔outdoor - maximum 1000 m (total wiring length 2000 m) indoor↔user interface - maximum 500 m		
User interface cable				
Recommended field fuse		16 A		
Residual current circuit breaker		Must comply with applicable legislation		

[a] MCA=Minimum circuit ampacity. Stated values are maximum values (see electrical data of combination with indoor units for exact values).

17.2 To connect the electrical wiring to the indoor unit

NOTICE

- Follow the wiring diagram (delivered with the unit, located at the inside of the service cover).
- For instructions on how to connect the optional equipment, see the installation manual delivered with the optional equipment.
- Make sure the electrical wiring does NOT obstruct proper reattachment of the service cover.

It is important to keep the power supply and the transmission wiring separated from each other. In order to avoid any electrical interference the distance between both wirings should ALWAYS be at least 50 mm.

NOTICE

Be sure to keep the power line and transmission line apart from each other. Transmission wiring and power supply wiring may cross, but may NOT run parallel.

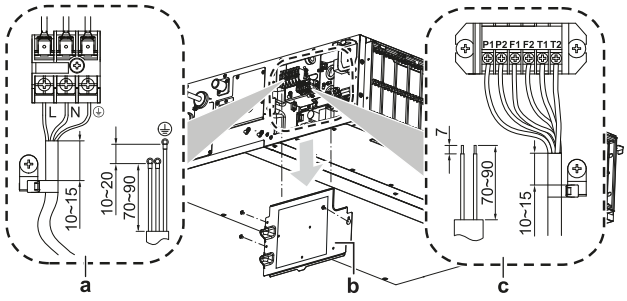
1 Remove the service cover.

2 **User interface cable**: Route the cable through the frame, connect the cable to the terminal block (symbols P1, P2) and fix the cable with a tie wrap.

3 **Transmission cable**: Route the cable through the frame, connect the cable to the terminal block (make sure the symbols F1, F2 match with the symbols on the outdoor unit), and fix the cable with a tie wrap.

4 **Appropriate measures (field supply):** If installation is required in accordance with "15.1.2 Additional installation site requirements for CO_2 refrigerant" [▸ 47], connect them to the terminal block (symbols T1, T2). See "17.3 To connect appropriate measures for appliances filled with CO_2" [▸ 69].

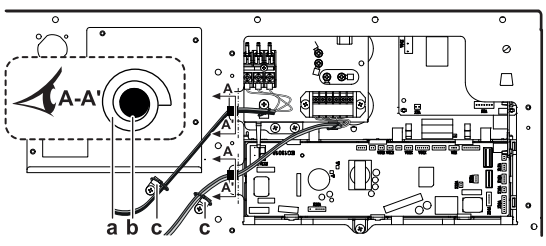
5 **Power supply cable**: Route the cable through the frame and connect the cable to the terminal block (L, N, earth).



a Power supply and earth wiring
b Service cover with wiring diagram
c Transmission and user interface wiring

6 Fix the cables with a tie wrap.

7 **Plastic clamp for tie wrap:** Pass tie wraps through the plastic clamps and fasten to fix the cables.



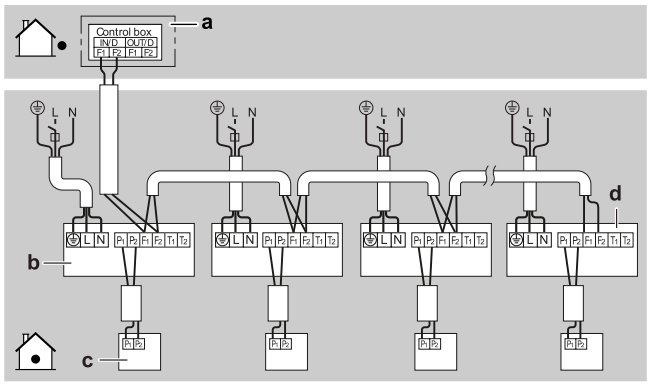
a Small sealing (accessory)
b Wiring
c Plastic clamp for tie wrap

8 Divide the small sealing (accessory) and wrap it around the cables to prevent water from entering the unit. Seal all gaps to prevent small animals from entering the system.

9 Reattach the service cover.

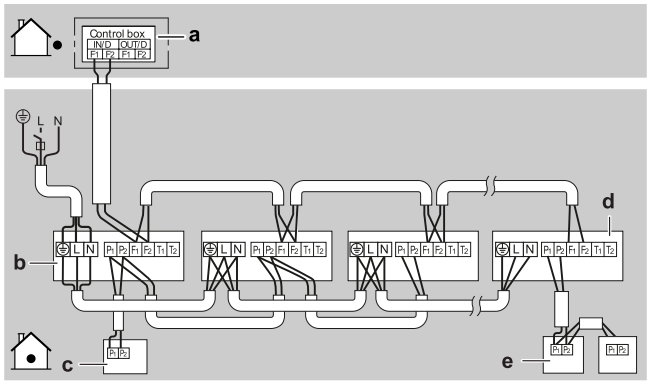
Complete system example

- **Example:** 1 user interface controls 1 indoor unit.



a Outdoor unit
b Indoor unit
c User interface
d Most downstream indoor unit

- **Example:** Group control or use with 2 user interfaces.



a Outdoor unit
b Indoor unit
c User interface (controls 3 indoor units)
d Most downstream indoor unit
e For use with 2 user interfaces

- **Setting master unit (Cooling/Heating masterhood).** In case of group control, connect the user interface wiring directly to the master unit. Do not connect user interfaces directly to slave units. Slave units are restricted in their operation by the master unit (e.g. 1 outdoor unit does not allow for 1 indoor unit to run in cooling operation while another runs in heating operation). For setting using the user interface, refer to the manual or reference guide of the user interface.

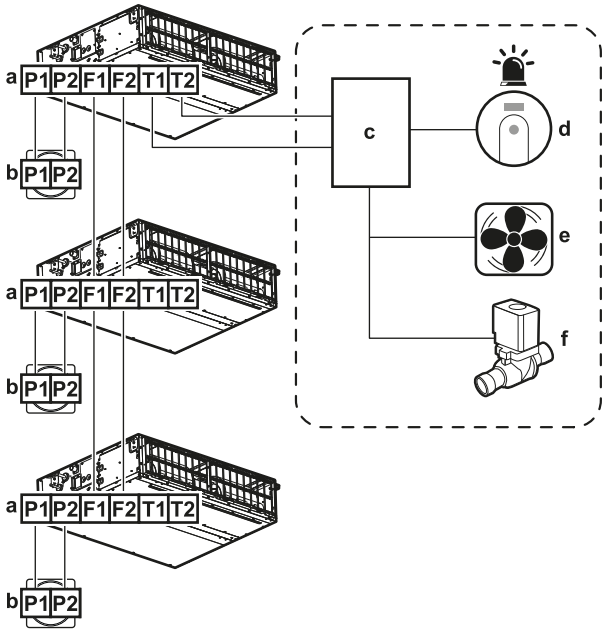
INFORMATION

In case of group control, it is not necessary to assign a group address to the indoor unit. The group address is automatically set when the power is turned on.

17.3 To connect appropriate measures for appliances filled with CO_2

Appropriate measures are field supplied. For details on how to connect wiring to the appropriate measures, refer to the documentation of the used appropriate measures.

1. Determine the minimum number of appropriate measures for the room in accordance with "15.1.2 Additional installation site requirements for CO_2 refrigerant" [▸ 47].
2. Connect the appropriate measures to the indoor unit terminal block, symbols T1, T2.
3. If the CO_2 refrigerant leak detector is installed, **enable the function for refrigerant leak detection** as described in "19.1 Field setting" [▸ 72].



17–1 Example of appropriate measures connection layout for one room

- **a** Terminal strip on the indoor unit
- **b** Terminal P1/P2 on the user interface
- **c** Control panel (field supply)
- **d** CO_2 refrigerant leak detector (field supply) in combination with a safety alarm (field supply)
- **e** Ventilation (natural or mechanical) (field supply)
- **f** Shut-off valves (field supply)

18 Commissioning

NOTICE

General commissioning checklist. Next to the commissioning instructions in this chapter, a general commissioning checklist is also available on the Daikin Business Portal (authentication required).

The general commissioning checklist is complementary to the instructions in this chapter and can be used as a guideline and reporting template during the commissioning and hand-over to the user.

In this chapter

18.1 Precautions when commissioning

INFORMATION

During the first running period of the unit, the required power may be higher than stated on the nameplate of the unit. This phenomenon is caused by the compressor, that needs a continuous run time of 50 hours before reaching smooth operation and stable power consumption.

NOTICE

ALWAYS operate the unit with thermistors and/or pressure sensors/switches. If NOT, burning of the compressor might be the result.

18.2 Checklist before commissioning

After the installation of the unit, first check the items listed below. Once all checks are fulfilled, the unit MUST be closed. Power-up the unit after it is closed.

☐	You read the complete installation and operation instructions, as described in the **installer and user reference guide**.
☐	The **indoor unit** is properly mounted.
☐	The **outdoor unit** is properly mounted.
☐	Make sure **drain piping** is properly installed, insulated and drainage flows smoothly. Check for water leaks. **Possible consequence:** Condensate water might drip.
☐	The **ducting** is properly installed and insulated.
☐	The **refrigerant pipes** (gas and liquid) are installed correctly and thermally insulated.
☐	There are NO **refrigerant leaks**.
☐	There are NO **missing phases** or **reversed phases**.
☐	The system is properly **earthed** and the earth terminals are tightened.

☐	The **fuses** or locally installed protection devices are installed according to this document, and have NOT been bypassed.
☐	The **power supply voltage** matches the voltage on the identification label of the unit.
☐	There are NO **loose connections** or damaged electrical components in the switch box.
☐	There are NO **damaged components** or **squeezed pipes** on the inside of the indoor and outdoor units.
☐	The **stop valves** (gas and liquid) on the outdoor unit are fully open.

18.3 To perform a test run

INFORMATION

- Perform the test run according to the instructions in the outdoor unit manual.
- The test run is only completed if there is no malfunction code displayed on the user interface or the outdoor unit 7-segment display.
- See the service manual for the complete list of error codes and a detailed troubleshooting guideline for each error.

NOTICE

Do NOT interrupt the test run.

19 Configuration

19.1 Field setting

Make the following field settings so that they correspond with the actual installation setup and with the needs of the user:

- Bottom suction or rear suction installation setting
- External static pressure setting using:
  - Automatic airflow adjustment setting
  - User interface
- Time to clean air filter
- Function for refrigerant leak detection

To set bottom suction or rear suction installation

If you have an installation with...	Then[1]		
	M	SW/C1	—/C2
Rear suction	13(23)	11	01
Bottom suction			02

To set automatic airflow adjustment

The automatic airflow adjustment function measures the air volume and static pressure and adjusts it towards the nominal air flow, whatever the length of duct.

- When the air conditioning unit is running in fan operation mode:

1 Stop the air conditioning unit.

2 Set —/C2 to 03.

Setting content:	Then[1]		
	M	SW/C1	—/C2
Airflow adjustment is OFF	11(21)	7	01
Press ON/OFF to return to normal operating mode. **Possible consequence:** The user interface operation lamp will light up and the unit will start the fan operation for automatic airflow adjustment.			03
Operation stops after 1 to 8 minutes. **Possible consequence:** Setting is finished and the user interface operation lamp will be off.			02

If there is no change after airflow adjustment, perform the setting again.

[1] Field settings are defined as follows:
- **M**: Mode number – **First number**: for group of units – **Number between brackets**: for individual unit
- **SW**: Setting number / **C1**: First code number
- —: Value number / **C2**: Second code number
- ▒: Default

INFORMATION

- The fan speed of the indoor unit is preset to ensure the standard external static pressure.
- To set a higher or lower external static pressure, reset the initial setting with the user interface.

User interface

Check the indoor unit setting:—/C2 of mode 11(21) must be set to 01.

Change—/C2 according to the external static pressure of the duct to be connected as in the table below.

External static pressure[1]					
M	SW/C1	—/C2	Class		
			50	71	112
13(23)	6	01	30	40	50
		02	—	—	—
		03	30	—	—
		04	40	40	—
		05	50	50	50
		06	60	60	60
		07	70	70	70
		08	80	80	80
		09	90	90	90
		10	100	100	100
		11	110	110	110
		12	120	120	120
		13	130	130	130
		14	140	140	140
		15	150	150	150

Time to clean air filter

This setting must correspond with the air contamination in the room. It determines the interval at which the **TIME TO CLEAN AIR FILTER** notification is displayed on the user interface. When using a wireless user interface, you must also set the address (see the installation manual of the user interface).

If you want an interval of… (air contamination)	Then[1]		
	M	SW/C1	—/C2
±2500 h (light)	10(20)	0	01
±1250 h (heavy)			02
No notification		3	02

[1] Field settings are defined as follows:
- **M**: Mode number – **First number**: for group of units – **Number between brackets**: for individual unit
- **SW**: Setting number / **C1**: First code number
- —: Value number / **C2**: Second code number
- : Default

Function for refrigerant leak detection

If the CO_2 refrigerant leak detector (field supply) is connected to the indoor unit (symbols T1, T2), setting —/C2 of mode 12(22) must be changed to 08. See "10.5.1 About refrigerant leak detection" [▸ 32].

If the CO_2 refrigerant leak detector (field supply) is…	Then[1]		
	M	SW/C1	—/C2
NOT installed	12(22)	1	01
Installed			08

- **2 or more user interfaces:** When using 2 or more user interfaces, one must be set to "MAIN" and the other to "SUB". For setting procedure see the installation and operation manual of the used user interface.

[1] Field settings are defined as follows:
- **M**: Mode number – **First number**: for group of units – **Number between brackets**: for individual unit
- **SW**: Setting number / **C1**: First code number
- —: Value number / **C2**: Second code number
- ▓: Default

20 Hand-over to the user

Once the test run is finished and the unit operates properly, please make sure the following is clear for the user:

- Make sure that the user has the printed documentation and ask him/her to keep it for future reference. Inform the user that he can find the complete documentation at the URL mentioned earlier in this manual.
- Explain the user how to properly operate the system and what to do in case of problems.
- Show the user what to do for the maintenance of the unit.

21 Troubleshooting

21.1 Solving problems based on error codes

If the unit runs into a problem, the user interface displays an error code. It is important to understand the problem and to take measures before resetting an error code. This should be done by a licensed installer or by your local dealer.

This chapter gives you an overview of most possible error codes and their descriptions as they appear on the user interface.

INFORMATION

See the service manual for:

- The complete list of error codes
- A more detailed troubleshooting guideline for each error

21.1.1 Error codes: Overview

In case other error codes appear, contact your dealer.

Code	Description
A0	External protection device activated (reeefrigerant leak detection)
A1	Malfunction of indoor unit PCB
A3	Drain level control system abnormality
A4	Malfunction of freezing protection
A5	High pressure control in heating, freeze-up protection control in cooling
A6	Malfunction of fan motor
A7	Malfunction of swing flap motor
A8	Malfunction of power supply or AC input overcurrent
A9	Malfunction of electronic expansion valve
AF	Malfunction of a humidifier system
AH	Malfunction of dust collector of air cleaner
AJ	Malfunction of capacity setting (Indoor unit PCB)
C1	Failure of transmission (between indoor unit PCB and sub PCB)
C4	Malfunction of liquid pipe thermistor for heat exchanger
C5	Malfunction of gas pipe thermistor for heat exchanger
C6	Malfunction of gas pipe thermistor for heat exchanger
C9	Malfunction of suction air thermistor
CA	Malfunction of discharge air thermistor
CJ	Room temperature thermistor in remote controller abnormality
U9	Malfunction of transmission (other system) or refrigerant leak detection

22 Disposal

NOTICE

Do NOT try to dismantle the system yourself: dismantling of the system, treatment of the refrigerant, oil and other parts MUST comply with applicable legislation. Units MUST be treated at a specialised treatment facility for reuse, recycling and recovery.

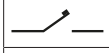
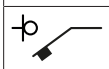
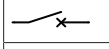
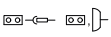
23 Technical data

- A **subset** of the latest technical data is available on the regional Daikin website (publicly accessible).
- The **full set** of latest technical data is available on the Daikin Business Portal (authentication required).

23.1 Wiring diagram

23.1.1 Unified wiring diagram legend

For applied parts and numbering, refer to the wiring diagram on the unit. Part numbering is by Arabic numbers in ascending order for each part and is represented in the overview below by "*" in the part code.

Symbol	Meaning	Symbol	Meaning
	Circuit breaker		Protective earth
			
			
	Connection		Protective earth (screw)
	Connector		Rectifier
	Earth		Relay connector
	Field wiring		Short-circuit connector
	Fuse		Terminal
	Indoor unit		Terminal strip
	Outdoor unit		Wire clamp
	Residual current device		

Symbol	Colour	Symbol	Colour
BLK	Black	ORG	Orange
BLU	Blue	PNK	Pink
BRN	Brown	PRP, PPL	Purple
GRN	Green	RED	Red
GRY	Grey	WHT	White
		YLW	Yellow

Symbol	Meaning
A*P	Printed circuit board
BS*	Pushbutton ON/OFF, operation switch
BZ, H*O	Buzzer
C*	Capacitor

Symbol	Meaning
AC*, CN*, E*, HA*, HE*, HL*, HN*, HR*, MR*_A, MR*_B, S*, U, V, W, X*A, K*R_*, NE	Connection, connector
D*, V*D	Diode
DB*	Diode bridge
DS*	DIP switch
E*H	Heater
FU*, F*U, (for characteristics, refer to PCB inside your unit)	Fuse
FG*	Connector (frame ground)
H*	Harness
H*P, LED*, V*L	Pilot lamp, light emitting diode
HAP	Light emitting diode (service monitor green)
HIGH VOLTAGE	High voltage
IES	Intelligent eye sensor
IPM*	Intelligent power module
K*R, KCR, KFR, KHuR, K*M	Magnetic relay
L	Live
L*	Coil
L*R	Reactor
M*	Stepper motor
M*C	Compressor motor
M*F	Fan motor
M*P	Drain pump motor
M*S	Swing motor
MR*, MRCW*, MRM*, MRN*	Magnetic relay
N	Neutral
n=*, N=*	Number of passes through ferrite core
PAM	Pulse-amplitude modulation
PCB*	Printed circuit board
PM*	Power module
PS	Switching power supply
PTC*	PTC thermistor
Q*	Insulated gate bipolar transistor (IGBT)
Q*C	Circuit breaker
Q*DI, KLM	Earth leak circuit breaker
Q*L	Overload protector

Symbol	Meaning
Q*M	Thermo switch
Q*R	Residual current device
R*	Resistor
R*T	Thermistor
RC	Receiver
S*C	Limit switch
S*L	Float switch
S*NG	Refrigerant leak detector
S*NPH	Pressure sensor (high)
S*NPL	Pressure sensor (low)
S*PH, HPS*	Pressure switch (high)
S*PL	Pressure switch (low)
S*T	Thermostat
S*RH	Humidity sensor
S*W, SW*	Operation switch
SA*, F1S	Surge arrester
SR*, WLU	Signal receiver
SS*	Selector switch
SHEET METAL	Terminal strip fixed plate
T*R	Transformer
TC, TRC	Transmitter
V*, R*V	Varistor
V*R	Diode bridge, Insulated-gate bipolar transistor (IGBT) power module
WRC	Wireless remote controller
X*	Terminal
X*M	Terminal strip (block)
Y*E	Electronic expansion valve coil
Y*R, Y*S	Reversing solenoid valve coil
Z*C	Ferrite core
ZF, Z*F	Noise filter

24 Glossary

Dealer
Sales distributor for the product.

Authorised installer
Technical skilled person who is qualified to install the product.

User
Person who is owner of the product and/or operates the product.

Applicable legislation
All international, European, national and local directives, laws, regulations and/or codes that are relevant and applicable for a certain product or domain.

Service company
Qualified company which can perform or coordinate the required service to the product.

Installation manual
Instruction manual specified for a certain product or application, explaining how to install, configure and maintain it.

Operation manual
Instruction manual specified for a certain product or application, explaining how to operate it.

Accessories
Labels, manuals, information sheets and equipment that are delivered with the product and that need to be installed according to the instructions in the accompanying documentation.

Optional equipment
Equipment made or approved by Daikin that can be combined with the product according to the instructions in the accompanying documentation.

Field supply
Equipment NOT made by Daikin that can be combined with the product according to the instructions in the accompanying documentation.

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