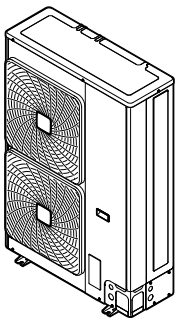
Installer and user reference guide

Air-cooled refrigeration condensing unit



LRMEQ3BY1
LRMEQ4BY1

LRLEQ3BY1
LRLEQ4BY1

Installer and user reference guide
Air-cooled refrigeration condensing unit

English

Table of contents

1 General safety precautions

1.1 About the documentation

- The original documentation is written in English. All other languages are translations.
- The precautions described in this document cover very important topics, follow them carefully.
- The installation of the system, and all activities described in the installation manual and the installer reference guide MUST be performed by an authorised installer.

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
Indicates a situation that could result in burning 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.

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.

1.2 For the user

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

NOTICE
- 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 authorized installer and must comply with applicable legislation.
Units must be treated at a specialized 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 specialized 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.

1.3 For the installer

1.3.1 General

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

NOTICE

Improper installation or attachment of equipment or accessories could result in electric 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.

DANGER: RISK OF BURNING

- 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

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.

NOTICE

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

NOTICE

Works executed on the outdoor unit are best done under dry weather conditions to avoid water ingress.

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.

1.3.2 Installation site

- Provide sufficient space around the unit for servicing and air circulation.
- Make sure the installation site withstands the unit's weight and vibration.
- 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.

1.3.3 Refrigerant

If applicable. 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 pressurize 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:

- Excessive refrigerant concentrations in a closed room can lead to oxygen deficiency.
- Toxic gas may be produced if refrigerant gas comes into contact with fire.

DANGER: RISK OF EXPLOSION

Pump down – Refrigerant leakage. If you want to pump down the system, and there is a leak in the refrigerant circuit:

- Do NOT use the unit's automatic pump down function, with which you can collect all refrigerant from the system into the outdoor unit. **Possible consequence:** Self-combustion and explosion of the compressor because of air going into the operating compressor.
- Use a separate recovery system so that the unit's compressor does NOT have to operate.

WARNING

ALWAYS recover the refrigerant. Do NOT release them directly into the environment. Use a vacuum pump to evacuate the installation.

NOTICE

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

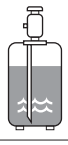
NOTICE

- 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.

- In case re-charge is required, refer to 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 tools exclusively for the refrigerant type used in the system, this to ensure pressure resistance and prevent foreign materials from entering into the system.
- Charge the liquid refrigerant as follows:

If	Then
A siphon tube is present (i.e., the cylinder is marked with "Liquid filling siphon attached")	Charge with the cylinder upright. 
A siphon tube is NOT present	Charge with the cylinder upside down. 

- Open refrigerant cylinders slowly.
- Charge the refrigerant in liquid form. Adding it in gas form may prevent normal operation.

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.

1.3.4 Brine

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

WARNING

The selection of the brine MUST be in accordance with the applicable legislation.

WARNING

Take sufficient precautions in case of brine leakage. If brine leaks, ventilate the area immediately and contact your local dealer.

WARNING

The ambient temperature inside the unit can get much higher than that of the room, e.g. 70°C. In case of a brine leak, hot parts inside the unit can create a hazardous situation.

WARNING

The use and installation of the application MUST comply with the safety and environmental precautions specified in the applicable legislation.

1.3.5 Water

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

NOTICE

Make sure water quality complies with EU directive 98/83 EC.

1.3.6 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 1 minute, 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 electric 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, the earth connection must be made before the current-carrying connections are established. When disconnecting the power supply, the current-carrying connections must be separated before the earth connection is. 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.

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.

2 About the documentation

2.1 About this document

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.

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 outdoor unit)
- **Outdoor unit installation and operation manual:**
  - Installation and operation instructions
  - Format: Paper (in the box of the outdoor unit)
- **Installer and user reference guide:**
  - Preparation of the installation, 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 extranet (authentication required).

For the installer

3 About the box

3.1 Overview: About the box

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

- Removing the transportation stay

Keep the following in mind:

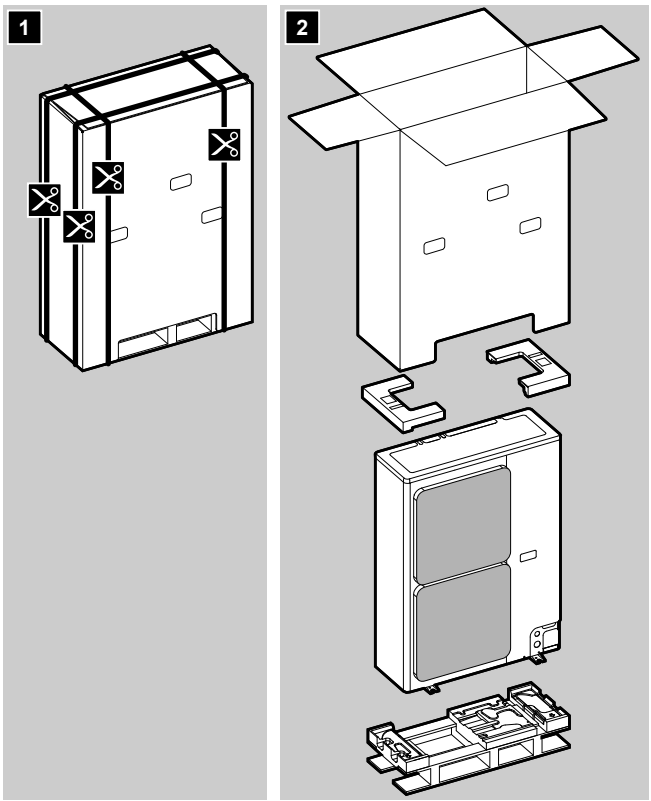
- At delivery, the unit MUST be checked for damage. Any damage MUST be reported immediately to the carrier's claims agent.
- Bring the packed unit as close as possible to its final installation position to prevent damage during transport.
- Prepare the path along which you want to bring the unit inside in advance.
- When handling the unit, take into account the following:

  Fragile, handle the unit with care.

  Keep the unit upright in order to avoid compressor damage.

3.2 Outdoor unit

3.2.1 To unpack the outdoor unit

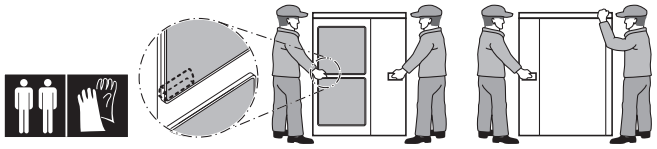


3.2.2 To handle the outdoor unit

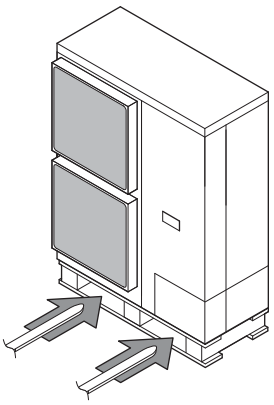
CAUTION

To avoid injury, do NOT touch the air inlet or aluminium fins of the unit.

Carry the unit slowly as shown:



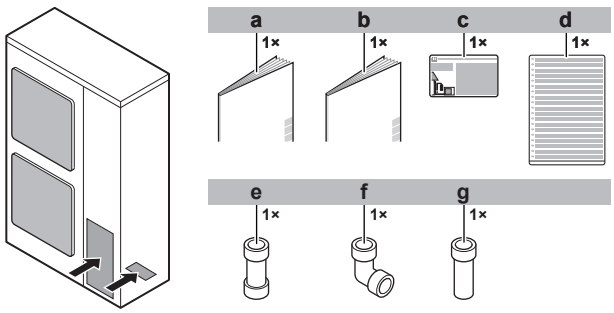
Forklift. As long as the unit remains on its pallet, you can also use a forklift.



3.2.3 To remove the accessories from the outdoor unit

1 Remove the service cover. See "6.2.2 To open the outdoor unit" on page 14.

2 Remove the accessories.



a General safety precautions
b Outdoor unit installation and operation manual
c Fluorinated greenhouse gases label
d Multilingual fluorinated greenhouse gases label
e Gas piping accessory 1 (Ø15.9 mm to 19.1 mm)
f Gas piping accessory 2 (Ø19.1 mm)
g Gas piping accessory 3 (Ø19.1 mm)

3.2.4 To remove the transportation stay

NOTICE

If the unit is operated with the transportation stay attached, abnormal vibration or noise may be generated.

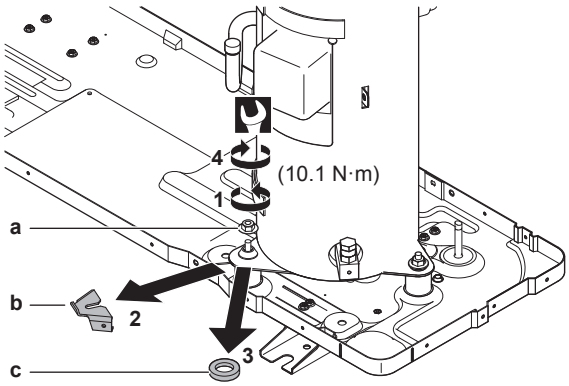
The compressor transportation stay must be removed. It is installed under the compressor leg in order to protect the unit during transport. Proceed as shown in the figure and procedure below.

1 Remove the nut (a) of the compressor mounting bolt.

2 Remove and discard the transportation stay (b).

3 Remove and discard the washer (c).

4 Re-install the nut (a) of the compressor mounting bolt and tighten to 10.1 N•m of torque.



4 About the units

4.1 Overview: About the units

This chapter contains information about:

- Identification of the outdoor unit.
- Where the outdoor unit fits in the system layout.
- Possible options for the outdoor unit.
- With which indoor units you can combine the outdoor units.

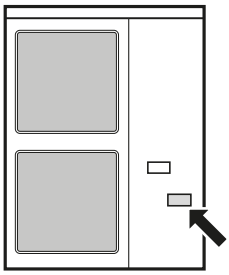
4.2 Identification

NOTICE

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

4.2.1 Identification label: Outdoor unit

Location



Model identification

Example: LR ME Q 4 B Y1 [*]

Code	Explanation
LR	ZEAS condensing unit
ME/LE	Medium temperature refrigeration / Low temperature refrigeration
Q	Refrigerant R410A
3+4	Capacity class
B	Model series
Y1	Power supply
[*]	Minor model change indication

4.3 About the outdoor unit

This installation manual concerns the ZEAS condensing unit.

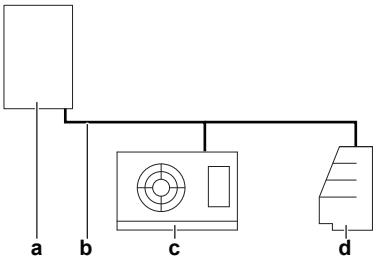
This unit is intended for outdoor installation and aimed for air to air cooling applications.

Specification	LRMEQ3	LRMEQ4	LRLEQ3	LRLEQ4
Capacity (cooling)	5.90 kW(a)	8.40 kW(a)	2.78 kW(b)	3.62 kW(b)
Ambient design temperature (cooling)	–20~43°C DB			

(a) Capacity measured at the following conditions: ambient temperature 32°C, evaporating temperature –10°C, superheat 10 K.

(b) Capacity measured at the following conditions: ambient temperature 32°C, evaporating temperature –35°C, superheat 10 K.

4.4 System layout



a Outdoor unit (ZEAS condensing unit)
b Refrigerant piping
c Indoor unit (Blower coil)
d Indoor unit (Showcase)

4.5 Combining units and options

4.5.1 Possible options for the outdoor unit

INFORMATION

Refer to the technical engineering data for the latest option names.

Refrigerant branching kit

Description	Model name
Refnet header	KHRQ22M29H
Refnet joint	KHRQ22M20T
	KHRQ22M29T9

Modbus communication box (BRR9A1V1)

Interface that provides a two-way communication possibility with third-party monitoring systems (BMS), via Modbus. Allows remote access to all operating parameters, while at the same time provides the possibility to control the refrigeration units from a distance: setting the target evaporating temperature, resetting error codes, …

PC configurator cable (EKPCCAB)

You can make several commissioning field settings through a personal computer interface. For this option EKPCCAB is required which is a dedicated cable to communicate with the outdoor unit. The user interface software is available on http://www.daikineurope.com/support-and-manuals/software-downloads/.

4.5.2 About the indoor units

NOTICE

To be sure your system setup (outdoor unit+indoor unit(s)) will work, you have to consult the latest technical engineering data for ZEAS condensing unit.

The ZEAS condensing unit can be combined with several types of third party indoor units and is intended for R410A use only.

When installing indoor units, mind the following:

- **Expansion valve**. Install an R410A expansion valve on each indoor unit. Insulate the feeler block of the expansion valve.

INFORMATION

- Install either a mechanical thermostatic expansion valve, or an electronic expansion valve (proportional or pulse type).
- When installing a pulse-type electronic expansion valve, make sure to protect the piping from pressure waves caused by the opening and closing of the valve. The installation of a pulse type expansion valve is the responsibility of the installer.

For more information, see "5.3.7 To select the expansion valve" on page 13.

- **Solenoid valve**. Install an R410A solenoid valve (with an operating differential pressure of 3.5 MPa [35 bar] or more) on the primary side of the expansion valve for each indoor unit.
- **Filter**. Install a filter on the primary side of the solenoid valve for each indoor unit. Determine the filter mesh count based on the size specified by the solenoid valve and the expansion valve being used.
- **Refrigerant flow**. Route the path to the indoor unit heat exchanger so that the refrigerant flow is from top to bottom.
- **Defrosting type**. Use either off-cycle defrosting or electric heater defrosting models. Do NOT use hot-gas defrosting models.

About reusing existing indoor heat exchangers

In some cases you may reuse existing indoor heat exchangers, in other cases not.

Reuse NOT allowed

You may not reuse existing indoor heat exchangers in the following cases:

- When the design pressure is insufficient. Minimum design pressure = 2.5 MPa or 25 bar
- When the path to the heat exchanger has been routed so that the flow of refrigerant is from bottom to top.
- When the copper piping or fan is corroded.
- When the heat exchanger is contaminated. Foreign materials (including oils for fabrication) must be ≤30 mg/10 m.

Reuse allowed

In other cases than above, you may reuse existing indoor heat exchangers. However, if the old condensing unit did NOT use the same refrigerant (R410A) and the same oil (FVC68D) as the new one, you must clean the heat exchanger tubes to remove any residue.

If the old condensing unit did NOT use the same refrigerant (R410A) as the new one, make sure the expansion valve is compatible with R410A.

5 Preparation

5.1 Overview: Preparation

This chapter describes what you have to do and know before going on-site.

It contains information about:

- Preparing the installation site
- Preparing the refrigerant piping
- Preparing the electrical wiring

5.2 Preparing the installation 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.

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

5.2.1 Installation site requirements of the outdoor unit

INFORMATION

Also read the following requirements:

- General installation site requirements. See the "General safety precautions" chapter.
- Service space requirements. See the "Technical data" chapter.
- Refrigerant piping requirements (length, height difference). See further in this "Preparation" 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.

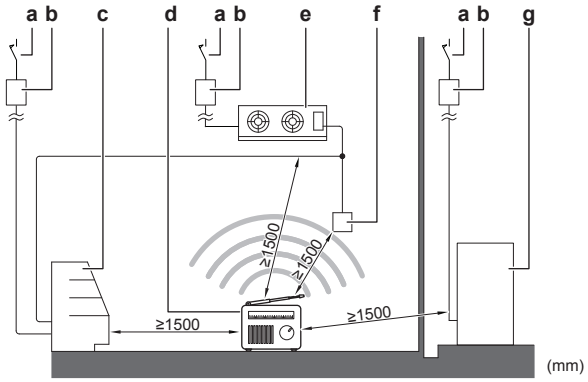
NOTICE

This equipment is compliant with Class A of EN55032/ CISPR 32. In a residential environment this equipment may cause radio interference.

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 keeping proper distances away from stereo equipment, personal computers, etc.



a Earth leakage protector
b Fuse
c Indoor unit (Showcase)
d Personal computer or radio
e Indoor unit (Blower coil)
f User interface
g Outdoor unit

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.

- Select a place where rain can be avoided as much as possible.
- 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 hot/cold air discharged from the unit or the operation noise, will NOT disturb anyone.
- Heat exchanger fins are sharp and injury is possible. Choose an installation location where there is no risk for injury (especially in areas where children play).

Do NOT install the unit in the following places:

- Sound sensitive areas (e.g. near a bedroom), so that the operation noise will cause no trouble.
  Note: If the sound is measured under actual installation conditions, the measured value might be higher than the sound pressure level mentioned in Sound spectrum in the data book due to environmental noise and sound reflections.
- 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.

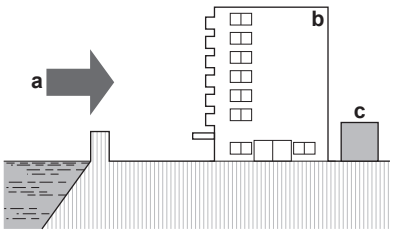
It is NOT recommended to install the unit in the following places because it may shorten the life of the unit:

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

Seaside installation. Make sure the outdoor unit is NOT directly exposed to sea winds. This is to prevent corrosion caused by high levels of salt in the air, which might shorten the life of the unit.

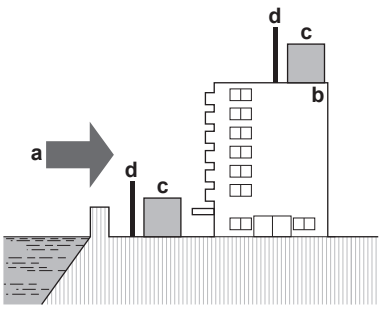
Install the outdoor unit away from direct sea winds.

Example: Behind the building.



If the outdoor unit is exposed to direct sea winds, install a windbreaker.

- Height of windbreaker≥1.5×height of outdoor unit
- Mind the service space requirements when installing the windbreaker.



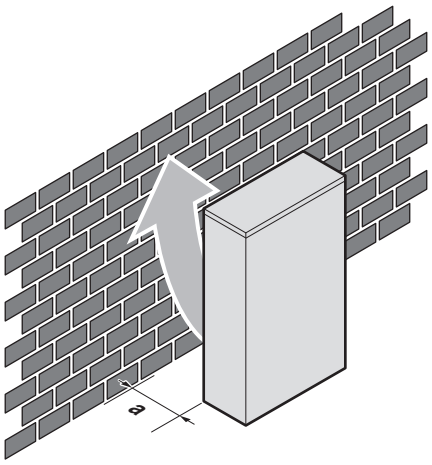
a Sea wind
b Building
c Outdoor unit
d Windbreaker

Strong winds (≥18 km/h) blowing against the outdoor unit's air outlet causes short circuit (suction of discharge air). This may result in:

- deterioration of the operational capacity;
- disruption of operation due to decrease of low pressure or increase of high pressure;
- a broken fan (if a strong wind blows continuously on the fan, it may start rotating very fast, until it breaks).

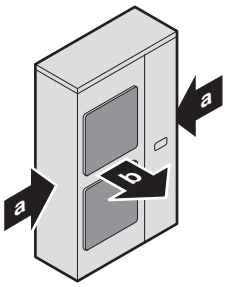
It is recommended to install a baffle plate when the air outlet is exposed to wind.

Turn the air outlet side towards the building's wall, fence or screen.



a Make sure there is enough installation space

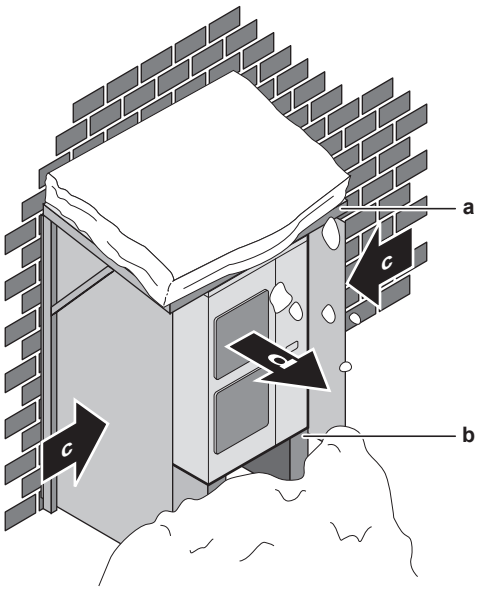
Set the air outlet side at a right angle to the direction of the wind.



a Prevailing wind direction
b Air outlet

5.2.2 Additional installation site requirements of the outdoor unit in cold climates

Protect the outdoor unit against direct snowfall and take care that the outdoor unit is NEVER snowed up.



a Snow cover or shed
b Pedestal (minimum height = 150 mm)

c Prevailing wind direction
d Air outlet

5.2.3 Securing safety against refrigerant leaks

About safety against refrigerant leaks

The installer and system specialist shall secure safety against leakage according to local regulations or standards. The following standards may be applicable if local regulations are not available.

This system uses R410A as refrigerant. R410A itself is an entirely safe non-toxic, non-combustible refrigerant. Nevertheless care must be taken to ensure that the system is installed in a room which is sufficiently large. This assures that the maximum concentration level of refrigerant gas is not exceeded, in the unlikely event of major leak in the system and this in accordance to the local applicable regulations and standards.

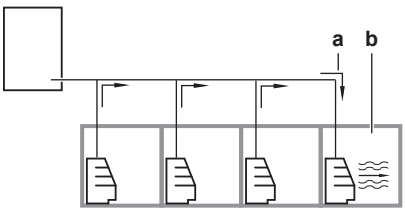
About the maximum concentration level

The maximum charge of refrigerant and the calculation of the maximum concentration of refrigerant is directly related to the humanly occupied space in to which it could leak.

The unit of measurement of the concentration is kg/m^3 (the weight in kg of the refrigerant gas in 1 m^3 volume of the occupied space).

Compliance to the local applicable regulations and standards for the maximum allowable concentration level is required.

According to the appropriate European Standard, the maximum allowed concentration level of refrigerant to a humanly space for R410A is limited to 0.44 kg/m^3.



a Direction of the refrigerant flow
b Room where refrigerant leak has occurred (outflow of all the refrigerant from the system)

Pay special attention to places, such as basements etc., where refrigerant can stay, since refrigerant is heavier than air.

To check the maximum concentration level

Check the maximum concentration level in accordance with steps 1 to 4 below and take whatever action is necessary to comply.

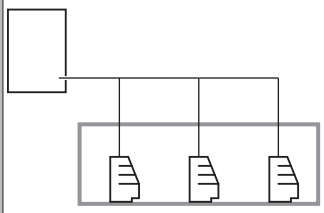
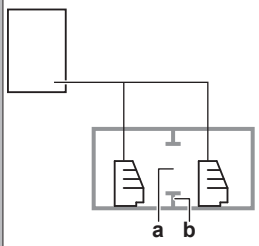
1 Calculate the amount of refrigerant (kg) charged to each system separately.

Formula	A+B=C
A	Amount of refrigerant in a single unit system (amount of refrigerant with which the system is charged before leaving the factory)
B	Additional charging amount (amount of refrigerant added locally)
C	Total amount of refrigerant (kg) in the system

NOTICE

Where a single refrigerant facility is divided into 2 entirely independent refrigerant systems, use the amount of refrigerant with which each separate system is charged.

2 Calculate the volume of the room (m^3) where the indoor unit is installed. In a case such as the following, calculate the volume of (D), (E) as a single room or as the smallest room.

D	When there are no smaller room divisions: 
E	When there is a room division that has an opening sufficiently large to permit free air flow.  **a** Opening between the rooms. In case there is a door the openings above and below the door each must be equivalent in size to 0.15% or more of the floor area. **b** Room division

3 Calculate the refrigerant density using the results of the calculations in steps 1 and 2 above. If the result of the above calculation exceeds the maximum concentration level, a ventilation opening to the adjacent room shall be made.

Formula	F/G≤H
F	Total volume of refrigerant in the refrigerant system
G	Size (m^3) of smallest room in which there is an indoor unit installed
H	Maximum concentration level (kg/m^3)

4 Calculate the refrigerant density taking the volume of the room where the indoor unit is installed and the adjacent room. Install ventilation openings in the door of adjacent rooms until the refrigerant density is smaller than the maximum concentration level.

5.3 Preparing refrigerant piping

5.3.1 About reusing existing piping

In some cases you may reuse existing piping, in other cases not.

Reuse not allowed

You may not reuse existing piping in the following cases:

- When the compressor in the old installation had problems (example: breakdown). **Possible consequence:** oxidised coolant oil, scale residue and other adverse effects.
- When the indoor and outdoor units were disconnected from the piping for a long time. **Possible consequence:** water and dirt in the piping.
- When the copper piping is corroded.

Reuse allowed

In other cases than above, you may reuse existing piping but keep the following in mind:

Item	Description
Piping diameter	Must comply with requirements. See "5.3.2 Refrigerant piping requirements" on page 12.
Piping material	
Piping length and height difference	
Piping insulation	If deteriorated, must be replaced. Must comply with requirements. See "6.6 To insulate the refrigerant piping" on page 21.
Welded connections	Must be checked for gas leaks.
Cleaning piping	If the old condensing unit did NOT use the same refrigerant (R410A) and the same oil (FVC68D) as the new one, you must clean the piping to remove any residue.

5.3.2 Refrigerant piping requirements

INFORMATION

Also read the precautions and requirements in the "General safety precautions" chapter.

NOTICE

The refrigerant R410A 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: R410A does not contain any chlorine, does not destroy the ozone layer, and does not reduce earth's protection against harmful ultraviolet radiation. R410A can contribute slightly 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. Use phosphoric acid deoxidised seamless copper for refrigerant.

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

5.3.3 Refrigerant piping material

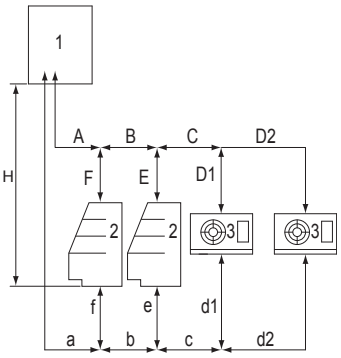
- **Piping material:** Phosphoric acid deoxidised seamless copper.
- **Piping temper grade and thickness:**

Outer diameter (Ø)	Temper grade	Thickness (t)[a]	
6.4 mm (1/4") 9.5 mm (3/8") 12.7 mm (1/2")	Annealed (O)	≥0.80 mm	
15.9 mm (5/8")	Annealed (O)	≥0.99 mm	
19.1 mm (3/4")	Half hard (1/2H)	≥0.80 mm	

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

5.3.4 To select the piping size

Determine the proper size using the following tables and reference figure (only for indication).



1 Outdoor unit
2 Indoor unit (Showcase)
3 Indoor unit (Blower coil)
A~F Liquid piping
a~f Gas piping
H Height difference outdoor-indoor

In case the required pipe sizes (inch sizes) are not available, it is also allowed to use other diameters (mm sizes), taken the following into account:

- Select the pipe size nearest to the required size.
- Use the suitable adapters for the change-over from inch to mm pipes (field supply).
- The additional refrigerant calculation has to be adjusted as mentioned in "6.7.3 To determine the additional refrigerant amount" on page 22.

A/a: Piping between outdoor unit and piping branching

Liquid piping	Ø9.5 mm[a]
Gas piping	Ø19.1 mm[b]

(a) Same diameter as the connection on the outdoor unit.
(b) Use the accessory piping to adapt the diameter of the outdoor unit stop valve (Ø15.9 mm) to that of the field piping (Ø19.1 mm).

B+C/b+c: Piping between piping branching

Use diameters depending on the total capacity of the indoor units connected downstream.

LRMEQ3+4	Capacity[a]	Piping outer diameter
Liquid piping	<4.0 kW	Ø6.4 mm
	4.0≤x<8.4 kW	Ø9.5 mm
Gas piping	<1.0 kW	Ø9.5 mm
	1.0≤x<6.0 kW	Ø12.7 mm
	6.0≤x<8.4 kW	Ø15.9 mm

(a) For showcases, capacity is calculated at evaporating temperature –10°C. For blower coils, capacity is calculated at temperature difference (= evaporating temperature – room temperature) of 10°C.

LRLEQ3+4	Capacity[a]	Piping outer diameter
Liquid piping	—	Ø6.4 mm
Gas piping	<2.3 kW	Ø12.7 mm
	2.3≤x<3.62 kW	Ø15.9 mm

(a) For showcases, capacity is calculated at evaporating temperature –35°C. For blower coils, capacity is calculated at temperature difference (= evaporating temperature – room temperature) of 10°C.

D~F/d~f: Piping between piping branching and indoor unit

Use the same diameters as the connections (liquid, gas) on the indoor units.

NOTICE

If only 1 indoor unit is connected to the outdoor unit, and the connections on the outdoor unit are different from those on the indoor unit, then use the same piping diameter as the connections on the outdoor unit, and install suitable adapters as near to the indoor unit as possible.

5.3.5 To select refrigerant branch kits

For refrigerant piping branching, it is allowed to use T-joints, Y-joints, refnet joints, and refnet headers. It is possible to use a refrigerant branching option kit from the table below.

Description	Model name
Refnet header[(a)]	KHRQ22M29H
Refnet joint[(b)]	KHRQ22M20T
	KHRQ22M29T9

(a) Do NOT connect 2 or more headers in series. For the gas side choose the refnet header so that the diameter of the header is equal to the main piping diameter or equal to one size-up of the main piping diameter.

(b) Choose the refnet joint so that the incoming and outgoing piping diameters match with one of the available diameters of the refnet joint. For more information, see "5.3.3 Refrigerant piping material" on page 12 and "5.3.4 To select the piping size" on page 12.

INFORMATION

Maximum 8 branches can be connected to a header.

5.3.6 Refrigerant piping length and height difference

The piping lengths and height differences must comply with the following requirements.

(see example in "5.3.4 To select the piping size" on page 12)

Requirement		Limit
Maximum actual piping length ▪ Example: a+b+c+d2≤Limit		50 m
Maximum total piping length ▪ Example: a+b+c+d1+d2+e+f≤Limit		80 m
Maximum length first branch kit-indoor unit ▪ Example: b+c+d2≤Limit		30 m
Maximum height difference outdoor-indoor	Outdoor higher than indoor ▪ Example: H≤Limit	20 m
	Outdoor lower than indoor	10 m
Maximum height difference indoor-indoor		5 m

5.3.7 To select the expansion valve

This unit has a larger subcooling ratio for the liquid refrigerant compared to units without a subcooling mechanism, as the liquid refrigerant is being cooled by a double tube heat exchanger (subcooling ratio = condensing temperature–liquid refrigerant temperature at outdoor unit outlet).

When selecting an expansion valve for the load according to the technical information of the expansion valve manufacturer, take into account the subcooling ratio (K) for the liquid refrigerant in the table below.

For LRMEQ3+4

Subcooling ratio (K)						
Te / Tc	–20°C	–15°C	–10°C	–5°C	0°C	5°C
20°C	10	9	8	7	6	5
25°C	11	10	9	8	7	6
30°C	12	11	10	9	8	7
35°C	13	12	11	10	9	8
40°C	14	13	12	11	10	9
45°C	15	14	13	12	11	10
50°C	16	15	14	13	12	11
55°C	16	15	14	13	12	11

For LRLEQ3+4

Subcooling ratio (K)						
Te / Tc	–45°C	–40°C	–35°C	–30°C	–25°C	–20°C
20°C	19	18	17	16	15	14
25°C	20	19	18	17	16	15
30°C	21	20	19	18	17	16
35°C	22	21	20	19	18	17
40°C	23	22	21	20	19	18
45°C	24	23	22	21	20	19
50°C	25	24	23	22	21	20
55°C	25	24	23	22	21	20

5.4 Preparing electrical wiring

5.4.1 Safety device requirements

Power supply

The power supply must be protected with the required safety devices, i.e. a main switch, a slow blow fuse on each phase and an earth leakage protector in accordance with the applicable legislation.

Selection and sizing of the wiring should be done in accordance with the applicable legislation based on the information mentioned in the table below.

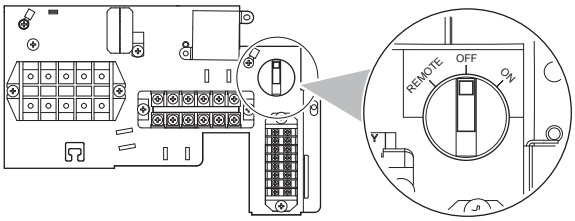
Model	Minimum circuit ampacity	Recommended fuses	Power supply
LRMEQ3 + LRLEQ3	6.5 A	16 A	3N~ 50 Hz 380-415 V
LRMEQ4 + LRLEQ4	9.1 A		

Remote operation switch, low-noise switch and output signals wiring

NOTICE

Remote operation switch. The unit is factory-equipped with an operation switch with which you can turn unit operation ON/OFF. If you want to remotely turn outdoor unit operation ON/OFF, a remote operation switch is required. Use a voltage-free contact for microcurrent (≤1 mA, 12 V DC). Connect to X2M/C+D, and set to "Remote ".

The operation switch is located in the switchbox (see illustration below).



The operation switch can be set to the following three positions:

Operation switch setting	Function
OFF	Unit operation turned OFF
ON	Unit operation turned ON
Remote	Unit controlled (ON/OFF) with remote operation switch

NOTICE

Low-noise switch. If you want to remotely turn ON/OFF low-noise operation (see setting [2-18]), you must install a low-noise switch. Use a voltage-free contact for microcurrent (≤1 mA, 12 V DC). Connect to X2M/A+B.

NOTICE

Output signals. The outdoor unit is provided with a terminal (X3M) that can output 4 different signals. The signal is 220~240 V AC. The maximum load for all signals is 0.5 A. The unit outputs a signal in the following situations:

- C/C1: **caution** signal – connection recommended – when an error occurs that does not stop unit operation.
- C/W1: **warning** signal – connection recommended – when an error occurs that causes unit operation to stop.
- R/P2: **run** signal – connection optional – when the compressor is running.
- P1/P2: **operation** signal – connection mandatory – when the indoor unit solenoid valve is being controlled.

Wiring	Sheathed cable (2 wires) Vinyl cords 0.75~1.25 mm²
Maximum wiring length	130 m

6 Installation

6.1 Overview: Installation

This chapter describes what you have to do and know on-site to install the system.

Typical workflow

Installation typically consists of the following stages:

- Mounting the outdoor unit.
- Mounting the indoor units.
- Connecting the refrigerant piping.
- Checking the refrigerant piping.
- Charging refrigerant.
- Connecting the electrical wiring.
- Finishing the outdoor installation.
- Finishing the indoor installation.

INFORMATION

For installation of the indoor unit (mounting the indoor unit, connecting the refrigerant piping to the indoor unit, connecting the electrical wiring to the indoor unit …), see the installation manual of the indoor unit.

6.2 Opening the units

6.2.1 About opening the units

At certain times, you have to open the unit. **Example:**

- When connecting the refrigerant piping
- When connecting the electrical wiring
- When maintaining or servicing the unit

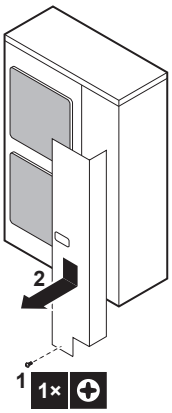
DANGER: RISK OF ELECTROCUTION

Do NOT leave the unit unattended when the service cover is removed.

6.2.2 To open the outdoor unit

DANGER: RISK OF ELECTROCUTION

DANGER: RISK OF BURNING



6.3 Mounting the outdoor unit

6.3.1 About mounting the outdoor unit

Typical workflow

Mounting the outdoor unit typically consists of the following stages:

1 Providing the installation structure.
2 Installing the outdoor unit.
3 Preventing the unit from falling over.
4 Protecting the unit against snow and wind by installing a snow cover and baffle plates. See "Preparing installation site" in "5 Preparation" on page 9.

6.3.2 Precautions when mounting the outdoor unit

INFORMATION

Also read the precautions and requirements in the following chapters:

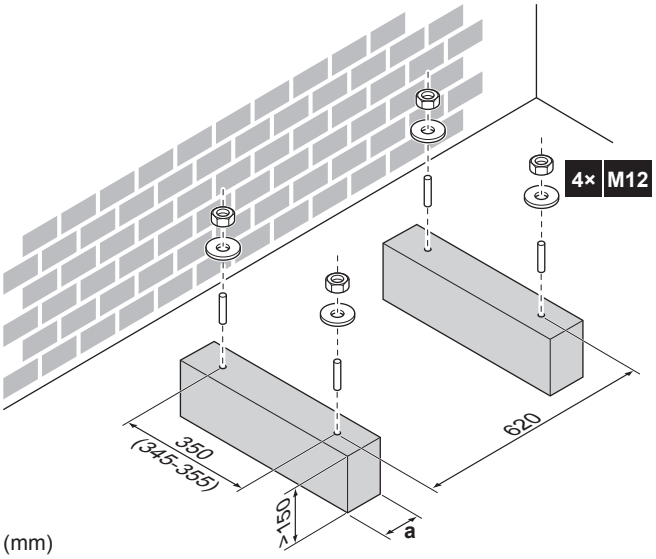
- General safety precautions
- Preparation

6.3.3 To provide the installation structure

Check the strength and level of the installation ground so that the unit will not cause any operating vibration or noise.

Fix the unit securely by means of foundation bolts in accordance with the foundation drawing.

Prepare 4 sets of anchor bolts, nuts and washers (field supply) as follows:

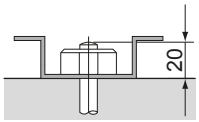


(mm)

a Make sure not to cover the drain holes.

INFORMATION

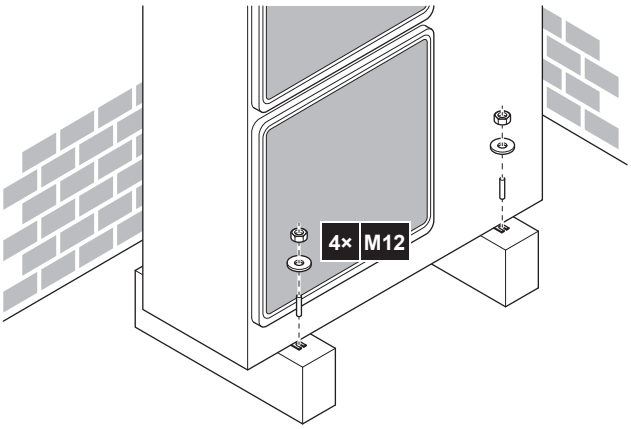
The recommended height of the upper protruding part of the bolts is 20 mm.



NOTICE

Fix the outdoor unit to the foundation bolts using nuts with resin washers (a). If the coating on the fastening area is stripped off, the nuts rust easily.

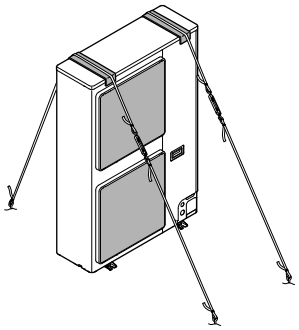
6.3.4 To install the outdoor unit



6.3.5 To prevent the outdoor unit from falling over

In case the unit is installed in places where strong wind can tilt the unit, take following measure:

1. Prepare 2 cables as indicated in the following illustration (field supply).
2. Place the 2 cables over the outdoor unit.
3. Insert a rubber sheet between the cables and the outdoor unit to prevent the cables from scratching the paint (field supply).
4. Attach the ends of the cables and tighten them.



6.4 Connecting the refrigerant piping

6.4.1 About connecting the refrigerant piping

Before connecting the refrigerant piping

Make sure the outdoor and indoor units are mounted.

Typical workflow

Connecting the refrigerant piping involves:

- Connecting the refrigerant piping to the outdoor unit
- Connecting the dryer and sight glass
- Connecting refrigerant piping branching
- Connecting the refrigerant piping to the indoor units (see the installation manual of the indoor units)
- Insulating the refrigerant piping
- Keeping in mind the guidelines for:
  - Pipe bending
  - Brazing
  - Using the stop valves
  - Removing pinched pipes

6.4.2 Precautions when connecting the refrigerant piping

INFORMATION

Also read the precautions and requirements in the following chapters:

- General safety precautions
- Preparation

DANGER: RISK OF BURNING

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 R410A when adding refrigerant.
- Only use installation tools (e.g. manifold gauge set) that are exclusively used for R410A installations to withstand the pressure and to prevent foreign materials (e.g. mineral oils and moisture) from mixing into the system.
- Protect the piping as described in the following table to prevent dirt, liquid or dust from entering the piping.
- Use caution when passing copper tubes through walls.

Unit	Installation period	Protection method
Outdoor unit	>1 month	Pinch the pipe
	<1 month	Pinch or tape the pipe
Indoor unit	Regardless of the period	

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.

6.4.3 Pipe bending guidelines

Use a pipe bender for bending. All pipe bends should be as gentle as possible (bending radius should be 30~40 mm or larger).

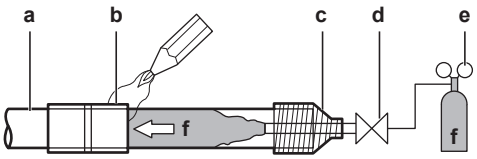
6.4.4 To braze the pipe end

NOTICE

Precautions when connecting field piping. Add brazing material as shown in the figure.

≤Ø25.4

- When brazing, blow through with nitrogen to prevent creation of large quantities of oxidised 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.



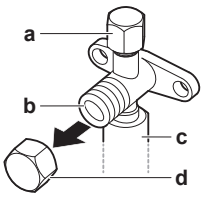
a Refrigerant piping
b Part to be brazed
c Taping
d Manual valve
e Pressure-reducing valve
f Nitrogen

- 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 (BCuP), which does not require flux.
  Flux has an extremely harmful influence on refrigerant piping systems. For instance, if chlorine based flux is used, it will cause pipe corrosion or, in particular, if the flux contains fluorine, it will deteriorate the refrigerant oil.

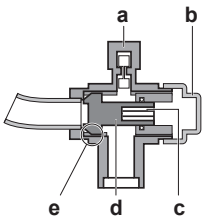
6.4.5 Using the stop valve and service port

To handle the stop valve

- Make sure to keep all stop valves open during operation.
- The stop valves are factory closed.
- The figure below shows the name of each part required in handling the stop valve.



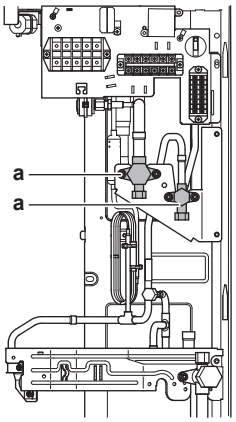
a Service port and service port cover
b Stop valve
c Field piping connection
d Stop valve cover



a Service port
b Stop valve cover
c Hexagon hole
d Shaft
e Seal

NOTICE

In addition to a gas and liquid stop valve, the outdoor unit has two maintenance stop valves. When connecting the refrigerant piping to the outdoor unit, do NOT operate the maintenance stop valves. The factory setting for these valves is "open". When operating the unit, always leave these valves in the open position. Operating the unit with the valves in the closed position may cause the compressor to fail.

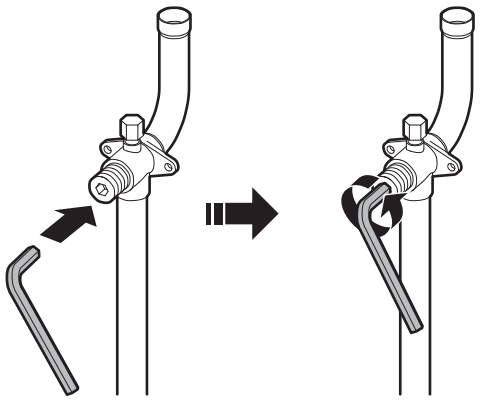


a Maintenance stop valve

To open the stop valve

1 Remove the stop valve cover.

2 Insert a hexagon wrench into the stop valve and turn the stop valve counterclockwise.



3 When the stop valve cannot be turned any further, stop turning.

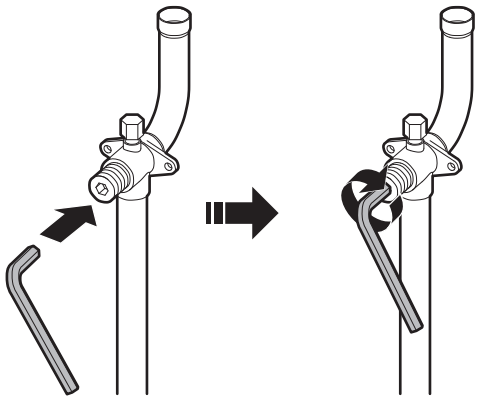
4 Install the stop valve cover.

Result: The valve is now open.

To close the stop valve

1 Remove the stop valve cover.

2 Insert a hexagon wrench into the stop valve and turn the stop valve clockwise.



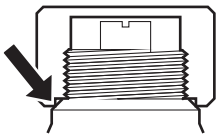
3 When the stop valve cannot be turned any further, stop turning.

4 Install the stop valve cover.

Result: The valve is now closed.

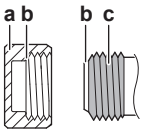
To handle the stop valve cover

- The stop valve cover is sealed where indicated by the arrow. Do NOT damage it.
- After handling the stop valve, tighten the stop valve cover securely, and check for refrigerant leaks. For the tightening torque, refer to the table below.



NOTICE

Thread-locking fluid. Before reattaching the stop valve cover, apply thread-locking fluid to the screw thread (NOT to the cover or sealing part). Otherwise, condensation water might enter and freeze. **Possible consequence:** Deformation, refrigerant leakage and compressor malfunction.



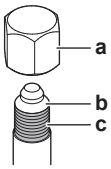
a Cover (do NOT apply thread-locking fluid)
b Sealing part (do NOT apply thread-locking fluid)
c Screw thread with thread-locking fluid

To handle the service port

- Always use a charge hose equipped with a valve depressor pin, since the service port is a Schrader type valve.
- After handling the service port, make sure to tighten the service port cover securely. For the tightening torque, refer to the table below.
- Check for refrigerant leaks after tightening the service port cover.

NOTICE

Thread-locking fluid. Before reattaching the service port cover, apply thread-locking fluid to the screw thread (NOT to the cover or sealing part). Otherwise, condensation water might enter and freeze. **Possible consequence:** Deformation, refrigerant leakage and compressor malfunction.



a Cover (do NOT apply thread-locking fluid)
b Sealing part (do NOT apply thread-locking fluid)
c Screw thread with thread-locking fluid

Tightening torques

Stop valve size (mm)	Tightening torque N•m (turn clockwise to close)			
	Shaft			
	Valve body	Hexagonal wrench	Cap (valve lid)	Service port
Ø9.5	5.4~6.6	4 mm	13.5~16.5	11.5~13.9
Ø15.9	13.5~16.5	6 mm	22.5~27.5	

6.4.6 To remove the pinched pipes

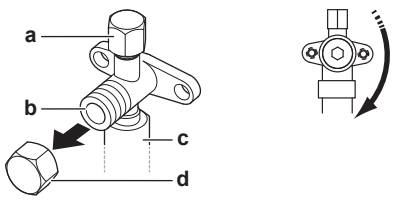
WARNING

Any gas or oil remaining inside the stop valve may blow off the pinched piping.

Failure to observe the instructions in procedure below properly may result in property damage or personal injury, which may be serious depending on the circumstances.

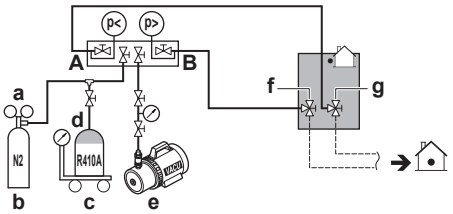
Use the following procedure to remove the pinched piping:

1 Remove the valve cover and make sure that the stop valves are fully closed.



a Service port and service port cover
b Stop valve
c Field piping connection
d Stop valve cover

2 Connect the vacuuming/recovery unit through a manifold to the service port of all stop valves.



a Pressure reducing valve
b Nitrogen
c Weighing scales
d Refrigerant R410A tank (siphon system)
e Vacuum pump
f Liquid line stop valve
g Gas line stop valve
A Valve A
B Valve B

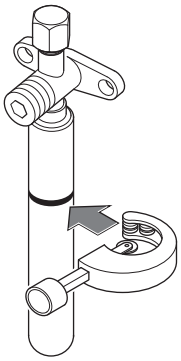
3 Recover gas and oil from the pinched piping by using a recovery unit.

CAUTION

Do not vent gases into the atmosphere.

4 When all gas and oil is recovered from the pinched piping, disconnect the charge hose and close the service ports

5 Cut off the lower part of the gas and liquid stop valve pipes along the black line. Use an appropriate tool (e.g. a pipe cutter, a pair of nippers).



WARNING

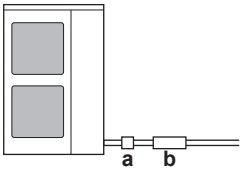
Never remove the pinched piping by brazing.

Any gas or oil remaining inside the stop valve may blow off the pinched piping.

6 Wait until all oil has dripped out before continuing with the connection of the field piping in case the recovery was not complete.

6.4.7 Guidelines when installing a sight glass

Install a sight glass on the liquid piping:

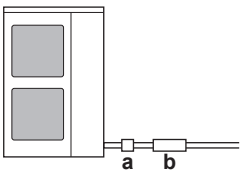
Diameter	9.5 mm
Where/how	Install the sight glass before the dryer, as near to the outdoor unit as possible. Install horizontally.  **a** Sight glass **b** Dryer
When brazing	Follow the brazing instructions in the sight glass manual.

6.4.8 Guidelines when installing a dryer

NOTICE

Do NOT operate the unit without a dryer installed. **Possible consequence:** Equipment malfunction.

Install a dryer on the liquid piping:

Dryer type	80 g (100% molecular sieve equivalent) (DML083/DML083S: Danfoss made)
Where/how	Install the dryer after the sight glass, as near to the outdoor unit as possible. Install horizontally.  **a** Sight glass **b** Dryer
When brazing	Follow the brazing instructions in the dryer manual. Remove the dryer cap immediately before brazing (to prevent absorption of airborne moisture). If dryer paint burnt during brazing, repair it. For repair paint details, contact the manufacturer.
Flow direction	If the dryer specifies a flow direction, install accordingly.

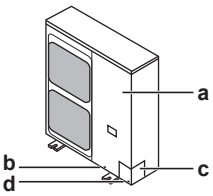
6.4.9 To connect the refrigerant piping to the outdoor unit

NOTICE

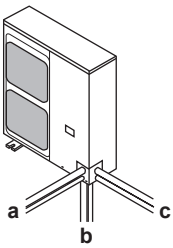
- Be sure to use the supplied accessory pipes when carrying out piping work in the field.
- Be sure that the field installed piping does not touch other pipes, the bottom panel or side panel. Especially for the bottom and side connection, be sure to protect the piping with suitable insulation, to prevent it from coming into contact with the casing.

1 Do the following:

- Remove the service cover (a) with screw (b).
- Remove the piping intake plate (c) with screw (d).

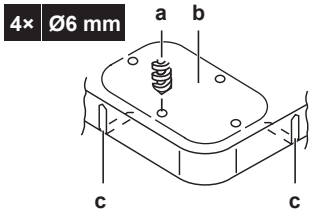


2 Choose a piping route (a, b, or c).



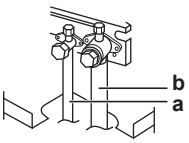
3 If you have chosen the downwards piping route:

- Drill (a, 4×) and remove the knockout hole (b).
- Cut out the slits (c) with a metal saw.



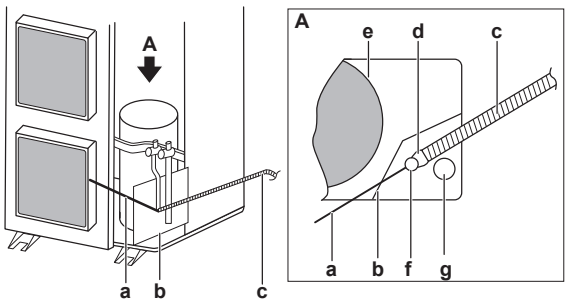
4 Do the following:

- Connect the liquid pipe (a) to the liquid stop valve.
- Connect the gas pipe (b) to the gas stop valve.



NOTICE

When brazing: First braze the liquid side piping, then the gas side piping. Enter the electrode from the front of the unit and the welding torch from the right side to braze with the flames facing outside and avoid the compressor sound insulation and other piping.



a Electrode

b Burning-resistant plate

c Welding torch

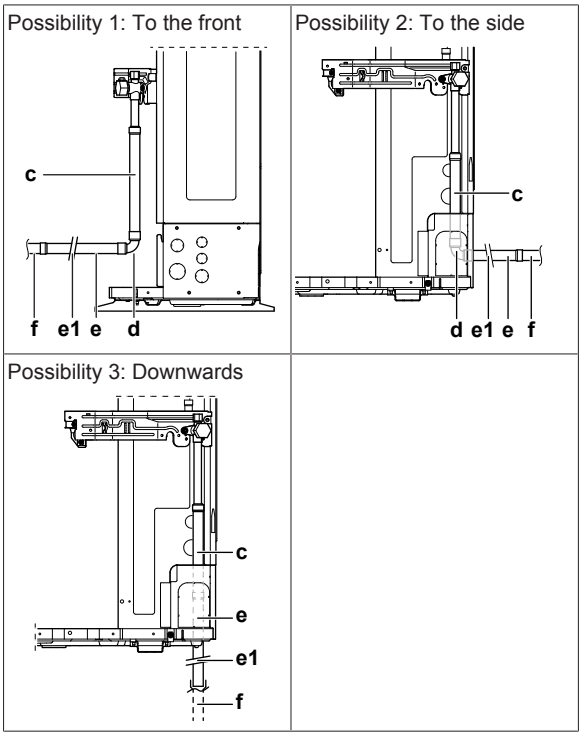
d Flames

e Compressor sound insulation

f Liquid side piping

g Gas side piping

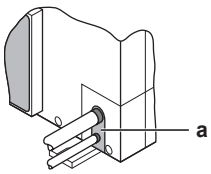
- Connect the gas piping accessories (c, d, e), and cut them to the required length (e1). This is necessary because the size of the gas stop valve is Ø15.9 while the piping between outdoor unit and first refrigerant branch kit is Ø19.1.



c Gas piping accessory 1
d Gas piping accessory 2
e, e1 Gas piping accessory 3 (cut it to the required length)
f Field supply

5 Reattach the service cover and the piping intake plate.

6 Seal all gaps (example: a) to prevent snow and small animals from entering the system.



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.

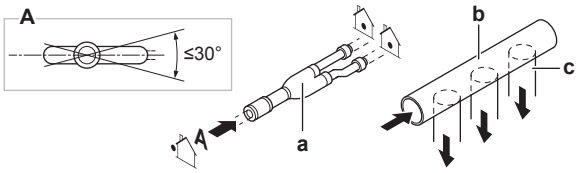
NOTICE

Make sure to open the stop valves after installing the refrigerant piping and performing vacuum drying. Running the system with the stop valves closed may break the compressor.

6.4.10 Guidelines when connecting piping branching

Liquid piping branching

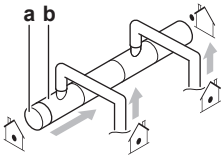
- Install liquid piping joints horizontally. This will prevent an uneven flow of refrigerant.
- Install liquid piping headers downwards.



a Joint for branching
b Header
c Downward piping

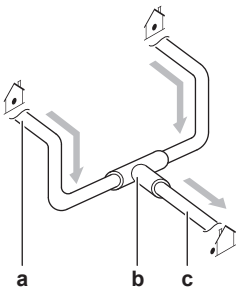
Gas piping branching

- Install branched piping above main piping. This will prevent refrigerant oil from flowing back to non-operating indoor units.

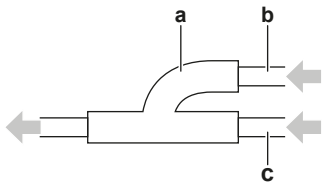


a Main piping
b Joint for branching

- Make sure the "horizontal" gas piping (and refnet header) slopes down to the outdoor unit.



a Gas piping sloping down from indoor units to branching
b T-joint for branching
c Gas piping sloping down from branching to outdoor unit



a Joint
b Branch pipe
c Main pipe

- If the outdoor unit is located higher than the indoor units, include oil traps in the piping at 5 m intervals from the outdoor unit. This will ensure the smooth returning of oil in the piping slanting upward.

Liquid and gas piping

- Insulate the refrigerant branching. Make sure the thickness of the refrigerant branching insulation equals that of the refrigerant piping insulation.

6.5 Checking the refrigerant piping

6.5.1 About checking the refrigerant piping

Checking the refrigerant piping involves:

- Checking for any leakages in the refrigerant piping.
- Performing vacuum drying to remove all moisture, air or nitrogen in the refrigerant piping.

If there is a possibility of moisture being present in the refrigerant piping (for example, water may have entered the piping), first carry out the vacuum drying procedure below until all moisture has been removed.

All piping inside the unit has been factory tested for leaks.

Only field installed refrigerant piping needs to be checked. Therefore, make sure that all the outdoor unit stop valves are firmly closed before performing leak test or vacuum drying.

NOTICE

Make sure that all (field supplied) field piping valves are OPEN (not outdoor unit stop valves!) before you start leak test and vacuuming.

For more information on the state of the valves, refer to "6.5.3 Checking refrigerant piping: Setup" on page 20.

6.5.2 Checking refrigerant piping: General guidelines

Connect the vacuum pump through a manifold to the service port of all stop valves to increase efficiency (refer to "6.5.3 Checking refrigerant piping: Setup" on page 20).

NOTICE

Use a 2-stage vacuum pump with a non-return valve or a solenoid valve that can evacuate to a gauge pressure of –100.7 kPa (−1.007 bar)(5 Torr absolute).

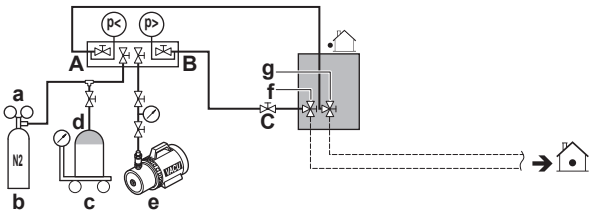
NOTICE

Make sure the pump oil does not flow oppositely into the system while the pump is not working.

NOTICE

Do not purge the air with refrigerants. Use a vacuum pump to evacuate the installation.

6.5.3 Checking refrigerant piping: Setup



a Pressure reducing valve
b Nitrogen
c Weighing scales
d Refrigerant R410A tank (siphon system)
e Vacuum pump
f Liquid line stop valve
g Gas line stop valve
A Valve A
B Valve B
C Valve C

Valve	State of valve
Valve A	Open
Valve B	Open
Valve C	Open
Liquid line stop valve	Close
Gas line stop valve	Close

NOTICE

Indoor units should also be leak and vacuum tested. Keep any possible (field supplied) field piping valves open as well.

6.5.4 To perform a leak test

The leak test must satisfy the specifications of EN378-2.

To check for leaks: Vacuum leak test

1 Evacuate the system from the liquid and gas piping to –100.7 kPa (–1.007 bar)(5 Torr absolute) for more than 2 hours.

2 Once reached, turn off the vacuum pump and check that the pressure does not rise for at least 1 minute.

3 Should the pressure rise, the system may either contain moisture (see vacuum drying below) or have leaks.

To check for leaks: Pressure leak test

1 Break the vacuum by pressurising with nitrogen gas to a minimum gauge pressure of 0.2 MPa (2 bar).

- Never set the gauge pressure of the **high pressure section** of the system higher than the maximum operation pressure of 4.0 MPa (40 bar).
- Never set the gauge pressure of the **low pressure section** of the system higher than the design pressure of the indoor unit.

2 Test for leaks by applying a bubble test solution to all piping connections.

3 Discharge all nitrogen gas.

NOTICE

Make sure to use a recommended bubble test solution from your wholesaler. Do not use soap water, which may cause cracking of flare nuts (soap water may contain salt, which absorbs moisture that will freeze when the piping gets cold), and/or lead to corrosion of flared joints (soap water may contain ammonia which causes a corrosive effect between the brass flare nut and the copper flare).

6.5.5 To perform vacuum drying

NOTICE

The connections to the indoor units and all indoor units should also be leak and vacuum tested. Keep, if existing, all (field supplied) field valves to the indoor units open as well.

To remove all moisture from the system, proceed as follows:

1 Evacuate the system for at least 2 hours to a target vacuum of –100.7 kPa (–1.007 bar)(5 Torr absolute).

2 Check that, with the vacuum pump turned off, the target vacuum is maintained for at least 1 hour.

3 Should you fail to reach the target vacuum within 2 hours or maintain the vacuum for 1 hour, the system may contain too much moisture. In that case, break the vacuum by pressurising with nitrogen gas to a gauge pressure of 0.05 MPa (0.5 bar) and repeat steps 1 to 3 until all moisture has been removed.

4 Depending on whether you want to immediately charge refrigerant through the service port of the liquid stop valve, or first pre-charge a portion of refrigerant through the liquid line, either open the outdoor unit stop valves, or keep them closed. See "6.7.4 To charge refrigerant" on page 22 for more information.

INFORMATION

After opening the stop valve, it is possible that the pressure in the refrigerant piping does NOT increase. This might be caused by e.g. the closed state of the expansion valve in the outdoor unit circuit, but does NOT present any problem for correct operation of the unit.

6.6 To insulate the refrigerant piping

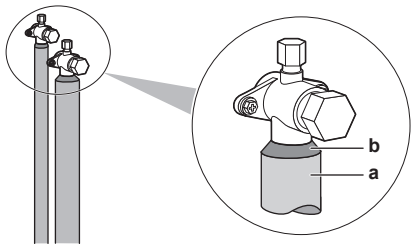
After finishing the leak test and vacuum drying, the piping must be insulated. Take into account the following points:

- Make sure to insulate the connection piping and refrigerant piping branching entirely.
- Be sure to insulate the liquid and gas piping (for all units).
- Take the following into account when determining the insulation thickness:

	LRMEQ*	LRLEQ*
Liquid pipe minimum temperature	5°C	0°C
Gas pipe minimum temperature	–20°C	–45°C

Condensation might form on the surface of the insulation.

- If there is a possibility that condensation on the stop valve might drip down into the indoor unit through gaps in the insulation and piping because the outdoor unit is located higher than the indoor unit, this must be prevented by sealing up the connections. See below figure.



a Insulation material
b Caulking etc.

6.7 Charging refrigerant

6.7.1 About charging refrigerant

The outdoor unit is factory charged with refrigerant, but depending on the field piping you have to charge additional refrigerant.

Before charging refrigerant

Make sure the outdoor unit's **external** refrigerant piping is checked (leak test, vacuum drying).

Typical workflow

Charging additional refrigerant typically consists of the following stages:

1 Determining how much you have to charge additionally.
2 Charging additional refrigerant (pre-charging and/or charging).
3 Filling in the fluorinated greenhouse gases label, and fixing it to the inside of the outdoor unit.

6.7.2 Precautions when charging refrigerant

INFORMATION

Also read the precautions and requirements in the following chapters:

- General safety precautions
- Preparation

WARNING

- Only use R410A as refrigerant. Other substances may cause explosions and accidents.
- R410A contains fluorinated greenhouse gases. Its global warming potential (GWP) value is 2087.5. Do NOT vent these gases into the atmosphere.
- When charging refrigerant, always use protective gloves and safety glasses.

NOTICE

If the power of some units is turned off, the charging procedure cannot be finished properly.

NOTICE

Before starting charging procedures, check if the 7-LEDs display is as normal (see "7.2.4 To access mode 1 or 2" on page 29). If a malfunction code is present, see "11.3 Solving problems based on error codes" on page 34.

NOTICE

In case of maintenance and the system (outdoor unit+field piping+indoor units) does not contain any refrigerant any more (e.g., after refrigerant reclaim operation), the unit has to be charged with its original amount of refrigerant (refer to the nameplate on the unit) and the determined additional refrigerant amount.

6.7.3 To determine the additional refrigerant amount

INFORMATION

For final charge adjustment in a test laboratory, contact your dealer.

INFORMATION

If only showcase units are used, parameter **B=0**. If only blower coils will be used, parameter **A=0**.

INFORMATION

If **R≤0**, there is no need to charge/recover additional refrigerant.

Formula for LRMEQ3+4

$R=[(X_1\times\mathbf{Ø9.5})\times0.06+(X_2\times\mathbf{Ø6.4})\times0.02]+A+B$

R Additional refrigerant to be charged [in kg and rounded off to 1 decimal place]
$\mathbf{X_{1...2}}$ Total length [m] of liquid piping size at **Øa**
A+B Parameters A (for showcases) and B (for blower coils). See tables below.

Parameter A	
If the total capacity[(a)] of showcases is...	**Then A is...**
<5.0 kW	1.1 kg
5.0≤x<8.4 kW	2.3 kg

(a) Capacity at evaporating temperature of –10°C

Parameter B	
If the total capacity[(a)] of blower coils is...	**Then B is...**
<5.0 kW	0.6 kg
5.0≤x<8.4 kW	1.2 kg

(a) Capacity at temperature difference (= evaporating temperature – room temperature) of 10°C

Formula for LRLEQ3+4

$R=[(X_1\times\mathbf{Ø9.5})\times0.06+(X_2\times\mathbf{Ø6.4})\times0.02]+A+B-2.4$

R Additional refrigerant to be charged [in kg and rounded off to 1 decimal place]
$\mathbf{X_{1...2}}$ Total length [m] of liquid piping size at **Øa**
A Parameter A (in case showcases are used)=**1.4 kg**
B Parameter B (in case blower coils are used)=**0.6 kg**

Metric piping. When using metric piping, replace the weight factors in the formula by the ones from the following table:

Inch piping		Metric piping	
Piping	**Weight factor**	**Piping**	**Weight factor**
Ø6.4 mm	0.02	Ø6 mm	0.018
Ø9.5 mm	0.06	Ø10 mm	0.066

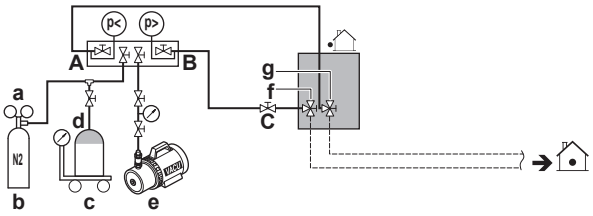
6.7.4 To charge refrigerant

To speed up the refrigerant charging process, it is recommended to first pre-charge a portion of refrigerant through the liquid line before proceeding with the charging via the refrigerant charging port. It can be skipped, but charging will take longer then.

Pre-charging refrigerant

Pre-charging can be done without compressor operation, by connecting the refrigerant bottle to the service port of the liquid stop valve.

1 Connect as shown. Make sure that all outdoor unit stop valves, as well as valve A are closed.



a Pressure reducing valve
b Nitrogen
c Weighing scales
d Refrigerant R410A tank (siphon system)
e Vacuum pump
f Liquid line stop valve
g Gas line stop valve
A Valve A
B Valve B
C Valve C

2 Open valves B and C.

3 Pre-charge refrigerant until the determined additional refrigerant amount is reached or pre-charging is not possible anymore, and then close valves B and C.

4 Do one of the following:

If	Then
The determined additional refrigerant amount is **reached**	Disconnect the manifold from the liquid line. Continue with the **"Checking the sight glass"** instructions.
Too much refrigerant is charged	Recover refrigerant. Disconnect the manifold from the liquid line. Continue with the **"Checking the sight glass"** instructions.
The determined additional refrigerant amount is **not reached** yet	Continue with the **"Charging refrigerant (with the compressor running)"** instructions.

Checking the sight glass

If the determined additional refrigerant amount is **reached by the "Pre-charging refrigerant" instructions**, continue as follows:

5 Open all outdoor unit stop valves.

6 Take all the precautions mentioned in "7 Configuration" on page 28 and "8 Commissioning" on page 31 into account.

7 Turn on the power of the outdoor unit, but leave the operation switch turned off (see "6.8.6 To connect the electrical wiring on the outdoor unit" on page 26).

8 Set the target evaporating temperature with settings [2-0] and [2-1] (see "7.2.8 Mode 2: Field settings" on page 30).

9 Turn on the power of the indoor units.

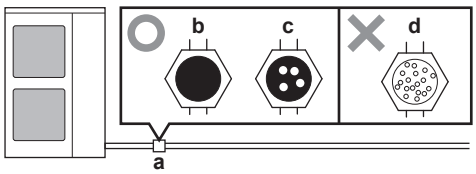
10 Turn on the operation switch.

Result: The unit will start operation.

INFORMATION

- When a malfunction is detected during the procedure (e.g., in case of closed stop valve), a malfunction code will be displayed. In that case, refer to "6.7.5 Error codes when charging refrigerant" on page 24 and solve the malfunction accordingly.
- Aborting the manual refrigerant charge is possible by turning OFF the operation switch. The unit will stop and return to idle condition.

11 Check the sight glass of the outdoor unit. If the refrigerant is NOT in sealing state, charge extra refrigerant as described in the **"Charging refrigerant (with the compressor running)"** instructions, but do NOT exceed 25% of the determined additional refrigerant amount (see "6.7.3 To determine the additional refrigerant amount" on page 22).



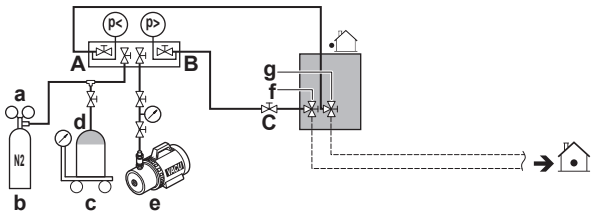
O Sealing state (= sufficient refrigerant)
X Insufficient refrigerant
a Sight glass
b Full of liquid
c A little foam in the liquid
d A lot of foam in the liquid

12 Turn off the operation switch.

Charging refrigerant (with the compressor running)

The remaining additional refrigerant charge can be charged by operating the outdoor unit.

13 Connect as shown. Make sure valve A is closed.



a Pressure reducing valve
b Nitrogen
c Weighing scales
d Refrigerant R410A tank (siphon system)
e Vacuum pump
f Liquid line stop valve
g Gas line stop valve
A Valve A
B Valve B
C Valve C

14 Open the gas line stop valve all the way and adjust the opening of the liquid line stop valve.

15 Take all the precautions mentioned in "7 Configuration" on page 28 and "8 Commissioning" on page 31 into account.

16 Turn on the power of the outdoor unit, but leave the operation switch turned off (see "6.8.6 To connect the electrical wiring on the outdoor unit" on page 26).

17 Set the target evaporating temperature with settings [2-0] and [2-1] (see "7.2.8 Mode 2: Field settings" on page 30).

18 Turn on the power of the indoor units.

19 Turn on the operation switch.

Result: The unit will start operation.

INFORMATION

- When a malfunction is detected during the procedure (e.g., in case of closed stop valve), a malfunction code will be displayed. In that case, refer to "6.7.5 Error codes when charging refrigerant" on page 24 and solve the malfunction accordingly.
- Aborting the manual refrigerant charge is possible by turning OFF the operation switch. The unit will stop and return to idle condition.

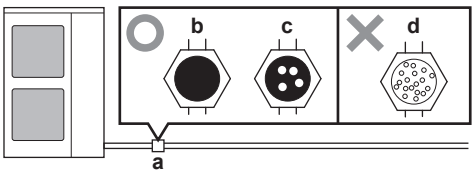
20 Open valves B and C.

21 Charge refrigerant until the remaining determined additional refrigerant amount is added (see "6.7.3 To determine the additional refrigerant amount" on page 22), and then close valves C and B.

INFORMATION

- When there is little refrigerant remaining in the cylinder, the cylinder's internal pressure will drop, making it impossible to charge the unit, even if the opening of the liquid line stop valve is adjusted. If this is the case, replace the cylinder with one that has more refrigerant remaining.
- If the piping length is long, replenishing while the liquid line stop valve is fully closed may lead to activation of the protection system, causing the unit to stop operation.

22 Check the sight glass of the outdoor unit. If the refrigerant is NOT in sealing state, charge extra refrigerant, but do NOT exceed 25% of the determined additional refrigerant amount (see "6.7.3 To determine the additional refrigerant amount" on page 22)



O Sealing state (= sufficient refrigerant)
X Insufficient refrigerant
a Sight glass
b Full of liquid
c A little foam in the liquid
d A lot of foam in the liquid

23 Turn off the operation switch.

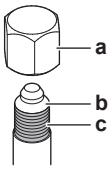
NOTICE

Make sure to open all stop valves after (pre-) charging the refrigerant.

Operating with the stop valves closed will damage the compressor.

NOTICE

Thread-locking fluid. Before reattaching the service port cover, apply thread-locking fluid to the screw thread (NOT to the cover or sealing part). Otherwise, condensation water might enter and freeze. **Possible consequence:** Deformation, refrigerant leakage and compressor malfunction.



a Cover (do NOT apply thread-locking fluid)
b Sealing part (do NOT apply thread-locking fluid)

c Screw thread with thread-locking fluid

6.7.5 Error codes when charging refrigerant

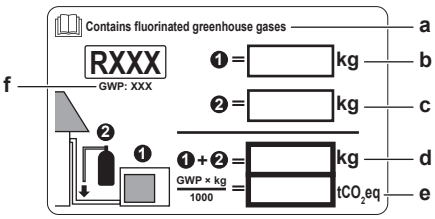
INFORMATION

When a malfunction occurs, X3M outputs a caution (C/C1) or warning (C/W1) signal, and the H2P LED on the main PCB lights up.

If a malfunction occurs, close valve B and C immediately. Confirm the malfunction code and take corresponding action, "11.3 Solving problems based on error codes" on page 34.

6.7.6 To fix the fluorinated greenhouse gases label

1 Fill in the label as follows:



a If a multilingual fluorinated greenhouse gases label is delivered with the unit (see accessories), peel off the applicable language and stick it on top of **a**.
b Factory refrigerant charge: see unit name plate
c Additional refrigerant amount charged
d Total refrigerant charge
e **Greenhouse gas emissions** of the total refrigerant charge expressed as tonnes CO_2 equivalent
f GWP = Global warming potential

NOTICE

In Europe, the **greenhouse gas emissions** of the total refrigerant charge in the system (expressed as tonnes CO_2 equivalent) is used to determine the maintenance intervals. Follow the applicable legislation.

Formula to calculate the greenhouse gas emissions: GWP value of the refrigerant × Total refrigerant charge [in kg] / 1000

2 Fix the label on the inside of the outdoor unit near the gas and liquid stop valves.

6.8 Connecting the electrical wiring

6.8.1 About connecting the electrical wiring

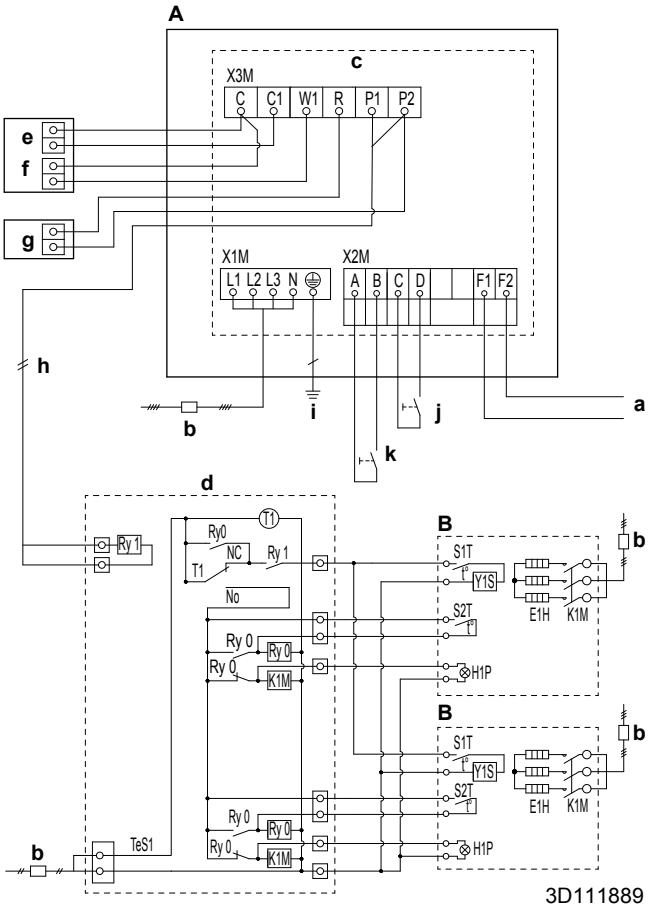
Typical workflow

Connecting the electrical wiring typically consists of the following stages:

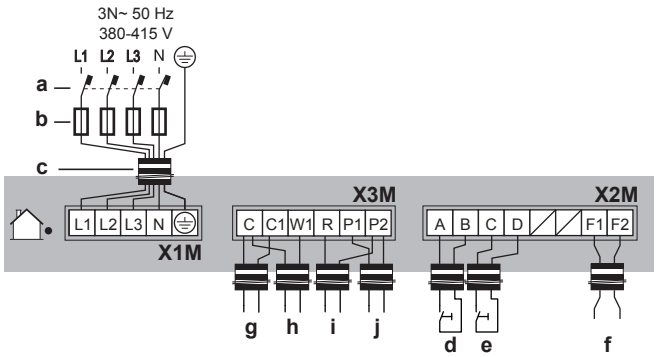
1 Making sure the power supply system complies with the electrical specifications of the units.
2 Connecting the electrical wiring to the outdoor unit (power supply, remote operation switch, low-noise switch, output signals, and options).
3 Connecting the main power supply.

6.8.2 Field wiring: Overview

Field wiring consists of the following:



A Outdoor unit
B Indoor unit
a To outdoor unit
b Earth leakage circuit breaker
c High voltage wiring intake
d Control board (field supply)
e Caution signal
f Warning signal
g Run signal
h Operation signal
i Earth
j Remote operation switch
k OFF: normal mode
ON: low-noise mode
T1 Timer
RY0, RY1 Relay
H1P Defrost indicator
K1M Contactor defrost heater
E1H Defrost heater
S1T Inner temperature adjustment thermostat
S2T Defrost completion thermostat
Y1S Solenoid valve



a Earth leakage circuit breaker
b Fuse
c Power supply (including earth) (sheathed cable)
d Low-noise switch
e Remote operation switch
f Transmission
g Caution signal
h Warning signal

i Run signal
j Operation signal

NOTICE

The operation output P1/P2 of the outdoor unit must be connected to all solenoid valves that are installed upstream of the expansion valves at the indoor unit. This connection is required because the outdoor unit must be able to control the solenoid valves during startup (to prevent liquid refrigerant from entering the compressor) and oil return operation.

NOTICE

Remote operation switch. The unit is factory-equipped with an operation switch with which you can turn unit operation ON/OFF. If you want to remotely turn outdoor unit operation ON/OFF, a remote operation switch is required. Use a voltage-free contact for microcurrent (≤1 mA, 12 V DC). Connect to X2M/C+D, and set to "Remote ".

NOTICE

Low-noise switch. If you want to remotely turn ON/OFF low-noise operation (see setting [2-18]), you must install a low-noise switch. Use a voltage-free contact for microcurrent (≤1 mA, 12 V DC). Connect to X2M/A+B.

NOTICE

Output signals. The outdoor unit is provided with a terminal (X3M) that can output 4 different signals. The signal is 220~240 V AC. The maximum load for all signals is 0.5 A. The unit outputs a signal in the following situations:

- C/C1: **caution** signal – connection recommended – when an error occurs that does not stop unit operation.
- C/W1: **warning** signal – connection recommended – when an error occurs that causes unit operation to stop.
- R/P2: **run** signal – connection optional – when the compressor is running.
- P1/P2: **operation** signal – connection mandatory – when the indoor unit solenoid valve is being controlled.

NOTICE

- Field wiring may not touch internal piping in order to avoid wire damage due to high temperature piping.
- Firmly close the lid and arrange the electrical wires so as to prevent the lid or other parts from coming loose.

6.8.3 Precautions when connecting the electrical wiring

DANGER: RISK OF ELECTROCUTION

WARNING

All field wiring and components MUST be installed by a licensed electrician and MUST comply with the applicable legislation.

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 electric 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.

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

Do NOT operate the unit until the refrigerant piping is complete. Running the unit before the piping is ready will break the compressor.

NOTICE

If the power supply has a missing or wrong N-phase, equipment will break down.

NOTICE

Do NOT install a phase advancing capacitor, because this unit is equipped with an inverter. A phase advancing capacitor will reduce performance and may cause accidents.

NOTICE

NEVER remove a thermistor, sensor, etc., when connecting power wiring and transmission wiring. (If operated without thermistor, sensor, etc., the compressor may break down.)

NOTICE

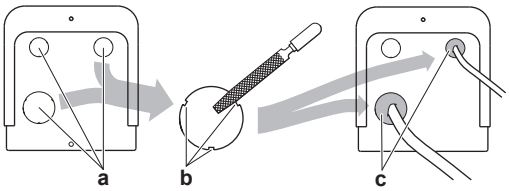
- The reversed phase protection detector of this product only functions when the product starts up. Consequently reversed phase detection is not performed during normal operation of the product.
- The reversed phase protection detector is designed to stop the product in the event of an abnormality when the product is started up.
- Replace 2 of the 3 phases (L1, L2, and L3) during reverse-phase protection abnormality.

6.8.4 Guidelines when knocking out knockout holes

NOTICE

Precautions when making knockout holes:

- Avoid damaging the casing.
- After making the knockout holes, we recommend you remove the burrs and paint the edges and areas around the edges using repair paint to prevent rusting.
- When passing electrical wiring through the knockout holes, wrap the wiring with protective tape to prevent damage.

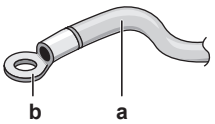


a Knockout hole
b Burr
c Sealant etc.

6.8.5 Guidelines when connecting the electrical wiring

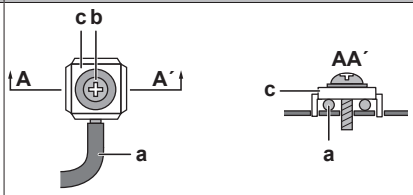
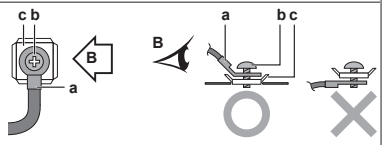
Keep the following in mind:

- 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
Stranded conductor wire with round crimp-style terminal	 **a** Terminal **b** Screw **c** Flat washer **O** Allowed **X** NOT allowed

Tightening torques

Wiring	Screw size	Tightening torque (N•m)
X1M: power supply wiring (power supply + shielded ground)	M5	2.2~2.7
X2M: remote operation switch, low-noise switch and transmission output	M3.5	0.8~0.97
X3M: output signals	M4	2.39~2.91

6.8.6 To connect the electrical wiring on the outdoor unit

NOTICE

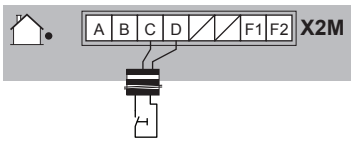
- Follow the wiring diagram (delivered with the unit, located at the inside of the service cover).
- Make sure the electrical wiring does NOT obstruct proper reattachment of the service cover.

1 Remove the service cover. See "6.2.2 To open the outdoor unit" on page 14.

2 Strip insulation (20 mm) from the wires.

a Strip wire end to this point
b Excessive strip length may cause electrical shock or leakage.

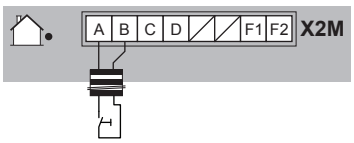
3 Connect the **remote operation switch** as follows:



NOTICE

Remote operation switch. The unit is factory-equipped with an operation switch with which you can turn unit operation ON/OFF. If you want to remotely turn outdoor unit operation ON/OFF, a remote operation switch is required. Use a voltage-free contact for microcurrent (≤1 mA, 12 V DC). Connect to X2M/C+D, and set to "Remote ".

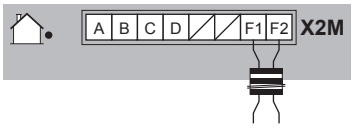
4 Connect the **low-noise switch** as follows:



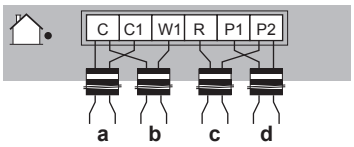
NOTICE

Low-noise switch. If you want to remotely turn ON/OFF low-noise operation (see setting [2-18]), you must install a low-noise switch. Use a voltage-free contact for microcurrent (≤1 mA, 12 V DC). Connect to X2M/A+B.

5 If you want to connect the **modbus communication box**, connect the transmission wiring as follows:



6 Connect the wiring to the **output signals** terminal (X3M) as follows:



a Caution signal
b Warning signal
c Run signal
d Operation signal

- Respect the following guidelines:

Output signal	Guideline
Caution and **Warning** signal	Connection recommended when system malfunctions are likely to occur.
Run signal	Connection optional.
Operation signal	Connection mandatory. Connect the operation signal to the solenoid valves that are installed upstream of the expansion valves of the indoor unit. The outdoor unit controls the solenoid valve opening: ▪ During start-up, to prevent liquid refrigerant from entering the compressor. ▪ During oil return operation. See "6.8.2 Field wiring: Overview" on page 24 for more details.

CAUTION

When connecting the power supply, the earth connection must be made before the current-carrying connections are established. When disconnecting the power supply, the current-carrying connections must be separated before the earth connection is. 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

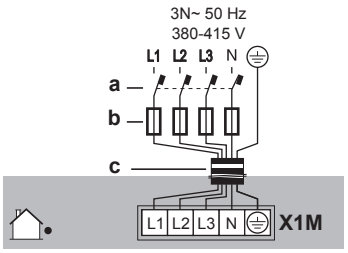
Never connect the power supply to terminal blocks X2M or X3M. Otherwise the entire system may break down.

NOTICE

Output signals. The outdoor unit is provided with a terminal (X3M) that can output 4 different signals. The signal is 220~240 V AC. The maximum load for all signals is 0.5 A. The unit outputs a signal in the following situations:

- C/C1: **caution** signal – connection recommended – when an error occurs that does not stop unit operation.
- C/W1: **warning** signal – connection recommended – when an error occurs that causes unit operation to stop.
- R/P2: **run** signal – connection optional – when the compressor is running.
- P1/P2: **operation** signal – connection mandatory – when the indoor unit solenoid valve is being controlled.

7 Connect the **power supply** as follows:

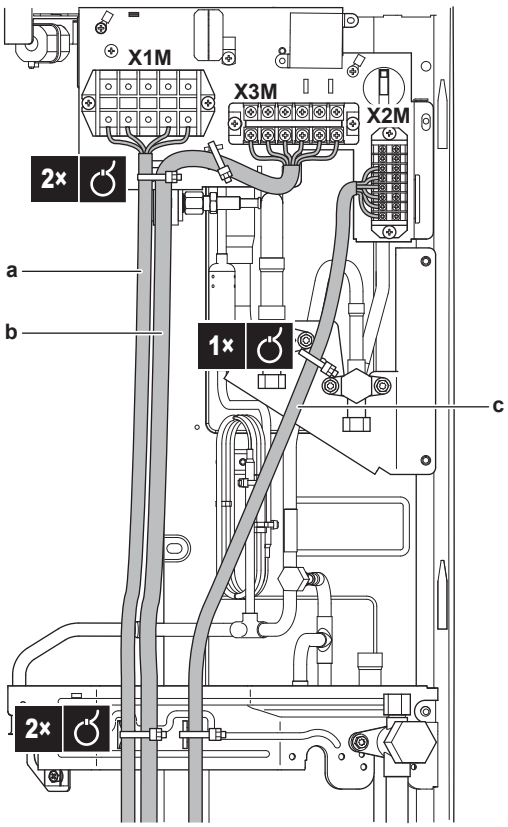


a Earth leakage circuit breaker
b Fuse
c Power supply cable

NOTICE

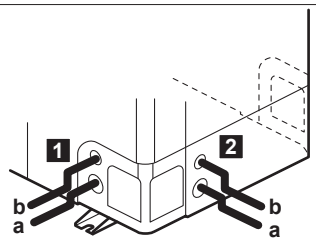
Keep cables away from the left maintenance stop valve and piping. The valve and piping can get very hot and damage the cables.

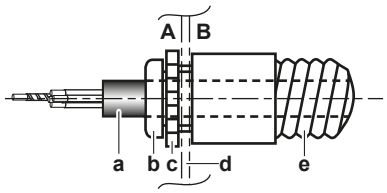
8 Fix the cables with cable ties.



a Power supply (including earth)
b Output signals
c Remote operation switch, low-noise switch, transmission

9 Route the wiring through the frame and connect it to it.

Routing through the frame	 **a** Power supply cable and output signal cables **b** Remote operation switch cable, low-noise switch cable, and transmission cable

Connecting to the frame	When cables are routed from the unit, a protection sleeve for the conduits (PG insertions) can be inserted at the knockout hole. When you do not use a wire conduit, protect the wires with vinyl tubes to prevent the edge of the knockout hole from cutting the wires.  **A** Inside of the outdoor unit **B** Outside of the outdoor unit **a** Wire **b** Bush **c** Nut **d** Frame **e** Hose

10 Reattach the service cover. See "6.9.1 To close the outdoor unit" on page 28.

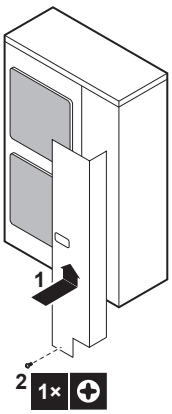
11 Connect an earth leakage circuit breaker and fuse to the power supply line.

6.9 Finishing the outdoor unit installation

6.9.1 To close the outdoor unit

NOTICE

When closing the outdoor unit cover, make sure that the tightening torque does NOT exceed 4.1 N•m.



7 Configuration

7.1 Overview: Configuration

This chapter describes what you have to do and know to configure the system after it is installed.

It contains information about:

- Making field settings

INFORMATION

It is important that all information in this chapter is read sequentially by the installer and that the system is configured as applicable.

DANGER: RISK OF ELECTROCUTION

7.2 Making field settings

7.2.1 About making field settings

INFORMATION

The LEDs and buttons are located in the outdoor module (not in the hydro module).

To configure the condensing unit, you must give input to the outdoor unit's main PCB (A1P). This involves the following field setting components:

- Push buttons to give input to the PCB
- A display to read feedback from the PCB

Field settings are defined by their mode, setting and value. Example: [2-1]=2.

PC configurator

It is alternatively possible to make several commissioning field settings through a personal computer interface (for this, option EKPCCAB is required). The installer can prepare the configuration (off-site) on PC and afterwards upload the configuration to the system.

See also: "7.2.9 To connect the PC configurator to the outdoor unit" on page 31.

Mode 1 and 2

Mode	Description
Mode 1 (monitoring settings)	Mode 1 can be used to monitor the current situation of the outdoor unit. Some field setting contents can be monitored as well.
Mode 2 (field settings)	Mode 2 is used to change the field settings of the system. Consulting the current field setting value and changing the current field setting value is possible. In general, normal operation can be resumed without special intervention after changing field settings. Some field settings are used for special operation. In such a case, it is required to abort the special operation before normal operation can restart. It will be indicated in below explanations.

7.2.2 To access the field setting components

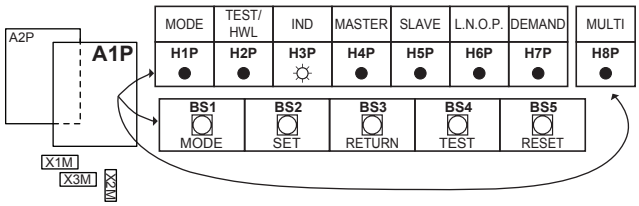
See "6.2.2 To open the outdoor unit" on page 14.

7.2.3 Field setting components

NOTICE

The DIP switch (DS1 on A1P) is not used. Do NOT change the factory setting.

The components to make field settings are as follows:



BS1~BS5 Push buttons
H1P~H7P 7-LEDs display
H8P NOT used for field settings
ON (☼) OFF (●) Flashing (☀)

Push buttons

Use the push buttons to make the field settings. Operate the push buttons with an insulated stick (such as a closed ball-point pen) to avoid touching of live parts.

BS1 MODE: For changing the set mode
BS2 SET: For field setting
BS3 RETURN: For field setting
BS4 Not used
BS5 Not used

7-LEDs display

The display gives feedback about the field settings, which are defined as [Mode-Setting]=Value.

H1P Shows the mode
H2P~H7P Shows the settings and values, represented in binary code
H8P NOT used for field settings

Example:

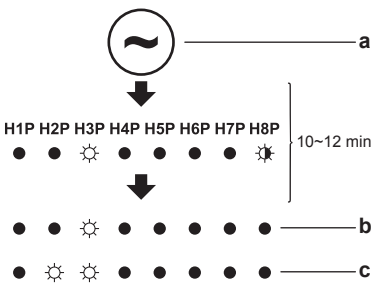
[H1P- 32 + 16 + 8 + 4 + 2 + 1] H1P H2P H3P H4P H5P H6P H7P	Description
● ● ☼ ● ● ● ● (H1P OFF)	Default situation
☀ ● ☼ ● ● ● ● (H1P flashing)	Mode 1
☼ ● ● ● ● ● ● (H1P ON)	Mode 2
☼ ● ● ● ● ● ☼ 0 + 0 + 0 + 0 + 0 + 0 + 1 (H2P~H7P = binary 1)	Setting 1 (in mode 2)
☼ ● ● ☀ ● ● ● 0 + 0 + 8 + 0 + 0 + 0 (H2P~H7P = binary 8)	Value 8 (in mode 2)

7.2.4 To access mode 1 or 2

After the units are turned ON, the display goes to its default situation. From there, you can access mode 1 and mode 2.

Initialisation: default situation

Turn on the power supply of the outdoor unit. After initialisation, the display indication state will be as below (default situation when shipped from factory).

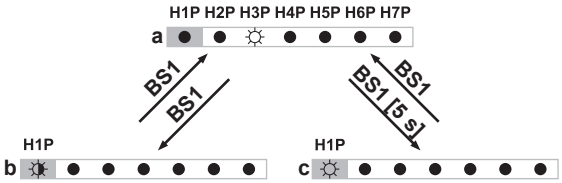


a Power ON
b Default situation
c LED indication when there is a malfunction

If the default situation is not displayed after 10~12 minutes, check the malfunction code. Solve the malfunction code accordingly.

Switching between modes

Use BS1 to switch between the default situation, mode 1 and mode 2.



a Default situation (H1P OFF)
b Mode 1 (H1P flashing)
c Mode 2 (H1P ON)
BS1 Press BS1.
BS1 [5 s] Press BS1 for at least 5 s.

INFORMATION

If you get confused in the middle of the process, press BS1 to return to the default situation.

7.2.5 To use mode 1

In mode 1 (and in default situation) you can read out some information.

See "7.2.7 Mode 1 (and default situation): Monitoring settings" on page 30.

Example: 7-LEDs display – Mode 1

See "11.3.1 To display the error codes of the latest malfunctions" on page 34.

7.2.6 To use mode 2

In mode 2 you can make field settings to configure the system.

Example: 7-LEDs display – Mode 2 (example for LRMEQ*)

You can fine-tune the value of setting [2-1] (=T_e target evaporating temperature) to 8 (=+3°C) as follows:

#	Action	Button/display
1	Start from the default situation.	H1P H2P H3P H4P H5P H6P H7P ● ● ☼ ● ● ● ●
2	Select mode 2.	BS1 [5 s] ☼ ● ● ● ● ● ●
3	Select setting 1. ("X×" depends on the setting that you want to select.)	☼ ● ● ● ● ● ☼ (= binary 1)
4	Select value 8 (=+3°C). **a**: Display the current value. **b**: Change until the LED indication corresponds with the LEDs in "7.2.8 Mode 2: Field settings" on page 30. ("X×" depends on the current value, and the value that you want to select.) **c**: Enter the value in the system. **d**: Confirm. The system starts operating according to the setting.	**a** BS3 [1×] ☼ ● ● ● ● ● ● **b** BS2 [X×] ☼ ● ● ☀ ☀ ● ● **c** BS3 [1×] ☼ ● ● ☼ ☀ ● ● **d** BS3 [1×] ☼ ● ● ● ● ● ●
5	Quit mode 2.	BS1 [1×] ● ● ☼ ● ● ● ●

7.2.7 Mode 1 (and default situation): Monitoring settings

In mode 1 (and in default situation) you can read out some information.

7-LEDs display – Default situation (H1P OFF)

You can read out the error code status:

Situation	LED indication
Default	● ● ☼ ● ● ● ●
Error	● ☼ ☼ ● ● ● ●

7-LEDs display – Mode 1 (H1P flashing)

You can read out the following information:

Setting (H1P H2P H3P H4P H5P H6P H7P)	Value / Description
[1-14] ☼ ● ● ☼ ☼ ☼ ● Shows the latest malfunction code.	For more information, see "11.3 Solving problems based on error codes" on page 34.
[1-15] ☼ ● ● ☼ ☼ ☼ ☼ Shows the 2nd last malfunction code.	
[1-16] ☼ ● ☼ ● ● ● ● Shows the 3rd last malfunction code.	

7.2.8 Mode 2: Field settings

In mode 2 you can make field settings to configure the system. The LEDs give a binary representation of the setting/value number.

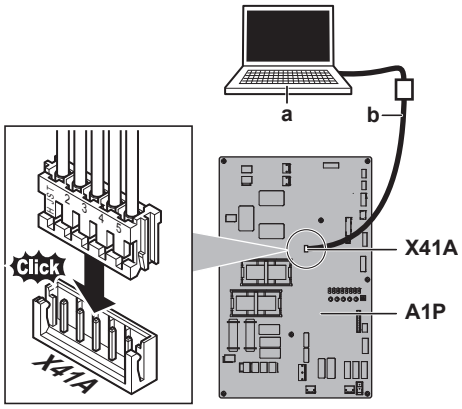
Setting H1P H2P H3P H4P H5P H6P H7P (= binary)	Value H1P H2P H3P H4P H5P H6P H7P	Description LRMEQ*	Description LRLEQ*
[2-0] ☼ ● ● ● ● ● ● T_e target evaporating temperature. With this setting the target evaporating temperature can be set in increments of 5 K.	☼ ● ● ● ● ● ☼ (default)	–10°C	–35°C
	☼ ● ● ● ● ☼ ●	–20°C	–45°C
	☼ ● ● ● ☼ ● ●	–15°C	–40°C
	☼ ● ● ☼ ● ● ●	–5°C	–30°C
	☼ ● ☼ ● ● ● ●	0°C	–25°C
	☼ ☼ ● ● ● ● ●	5°C	–20°C
[2-1] ☼ ● ● ● ● ● ☼ T_e fine-tuning of evaporating temperature. With this setting the target evaporating temperature set by [2-0] can be fine-tuned in increments of 1 K.	☼ ● ● ● ● ● ☼ (default)	+0°C	
	☼ ● ● ● ● ☼ ●	+1°C	
	☼ ● ● ● ☼ ● ●	+2°C	
	☼ ● ● ☼ ● ● ●	+3°C	
	☼ ● ☼ ● ● ● ●	+4°C	
[2-6] ☼ ● ● ● ☼ ☼ ● Address of the outdoor unit for communication with the Modbus communication box (BRR9A1V1). For more information, see the installation manual of the Modbus communication box.	☼ ● ● ● ● ● ●	Address not set	
	☼ ● ● ● ● ● ☼	Address 1	
	☼ ● ● ● ● ☼ ●	Address 2	
	☼ ● ● ● ● ☼ ☼	Address 3	
	☼ ● ● ● ☼ ● ●	Address 4	
	☼ ● ● ● ☼ ● ☼	Address 5	
	...	...	
	☼ ☼ ☼ ☼ ☼ ☼ ☼	Address 63	
[2-13] ☼ ● ● ☼ ☼ ● ☼ Correction of evaporating temperature during low-noise operation. With this setting the target evaporating temperature set with settings [2-0] and [2-1] can be corrected for low-noise operation (see setting [2-18])	☼ ● ● ● ● ● ● (default)	+1°C	
	☼ ● ● ● ● ● ☼	+2°C	
	☼ ● ● ● ● ☼ ●	+3°C	
	☼ ● ● ● ● ☼ ☼	+4°C	
	☼ ● ● ● ☼ ● ●	+5°C	
	☼ ● ● ● ☼ ● ☼	+10°C	
	☼ ● ● ● ☼ ☼ ●	+15°C	
	☼ ● ● ● ☼ ☼ ☼	+20°C	
	☼ ● ● ☼ ● ● ●	+0°C	
	☼ ● ● ☼ ● ● ☼	+25°C	
[2-17] ☼ ● ☼ ● ● ● ☼ Adjustment of fan and compressor speed during low-noise operation. With this setting the maximum fan and compressor speed can be set for low noise operation (see setting [2-18]).	☼ ● ● ● ● ● ☼ (default)	Low noise step 1	
	☼ ● ● ● ● ☼ ●	Low noise step 2	
	☼ ● ● ● ☼ ● ●	Low noise step 3	
	☼ ● ● ☼ ● ● ●	Low noise step 4	
	☼ ● ☼ ● ● ● ●	Low noise step 5	

Setting H1P H2P H3P H4P H5P H6P H7P (= binary)	Value H1P H2P H3P H4P H5P H6P H7P	Description LRMEQ*	Description LRLEQ*
[2-18] ☼ ● ☼ ● ● ☼ ● Low noise operation With this setting one of three low-noise operation modes can be selected. Low-noise mode can be activated by turning ON the contact between terminals X2M/A and X2M/B. Refer to settings [2-13] and [2-17] to set parameters for the low-noise levels.	☼ ● ● ● ● ● ☼ (default)	Correction of evaporating temperature (only setting [2-13] applies)	
	☼ ● ● ● ● ☼ ●	Adjustment of fan and compressor speed (only setting [2-17] applies)	
	☼ ● ● ● ☼ ● ●	Correction of evaporating temperature and adjustment of fan and compressor speed (both settings [2-13] and [2-17] apply)	

INFORMATION

For LRMEQ3/LRLEQ3 outdoor units, low noise steps 2, 3, and 4 have the same sound reducing effect.

7.2.9 To connect the PC configurator to the outdoor unit



a PC
b Cable (EKPCCAB)
X41A Connector
A1P Outdoor unit main PCB

8 Commissioning

8.1 Overview: Commissioning

After installation and once the field settings are defined, the installer is obliged to verify correct operation. Therefore a test run MUST be performed according to the procedures described below.

This chapter describes what you have to do and know to commission the system after it is configured.

Commissioning typically consists of the following stages:

1 Checking the "Checklist before commissioning".
2 Performing a test run.
3 If necessary, correcting errors after abnormal completion of the test run.
4 Operating the system.

8.2 Precautions when commissioning

DANGER: RISK OF ELECTROCUTION

DANGER: RISK OF BURNING

CAUTION

Do NOT perform the test operation while working on the indoor units.

When performing the test operation, NOT only the outdoor unit, but the connected indoor unit will operate as well. Working on an indoor unit while performing a test operation is dangerous.

CAUTION

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

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.

8.3 Checklist before commissioning

After the installation of the unit, first check the following items. Once all below checks are fulfilled, the unit MUST be closed, ONLY then can the unit be powered up.

☐	You read the complete installation and operation instructions, as described in the **installer and user reference guide**.
☐	**Installation** Check that the unit is properly installed, to avoid abnormal noises and vibrations when starting up the unit.
☐	**Field wiring** Be sure that the field wiring has been carried out according to the instructions described in the chapter "6.8 Connecting the electrical wiring" on page 24, according to the wiring diagrams and according to the applicable legislation.
☐	**Power supply voltage** Check the power supply voltage on the local supply panel. The voltage MUST correspond to the voltage on the identification label of the unit.
☐	**Earth wiring** Be sure that the earth wires have been connected properly and that the earth terminals are tightened.
☐	**Insulation test of the main power circuit** Using a megatester for 500 V, check that the insulation resistance of 2 MΩ or more is attained by applying a voltage of 500 V DC between power terminals and earth. NEVER use the megatester for the transmission wiring.

☐	**Fuses, circuit breakers, or protection devices** Check that the fuses, circuit breakers, or the locally installed protection devices are of the size and type specified in the chapter "5.4.1 Safety device requirements" on page 13. Be sure that neither a fuse nor a protection device has been bypassed.
☐	**Internal wiring** Visually check the electrical component box and the inside of the unit for loose connections or damaged electrical components.
☐	**Pipe size and pipe insulation** Be sure that correct pipe sizes are installed and that the insulation work is properly executed.
☐	**Stop valves** Be sure that the stop valves are open on both liquid and gas side.
☐	**Damaged equipment** Check the inside of the unit on damaged components or squeezed pipes.
☐	**Refrigerant leak** Check the inside of the unit on refrigerant leakage. If there is a refrigerant leak, try to repair the leak. If the repair is unsuccessful, call your local dealer. Do not touch any refrigerant which has leaked out from refrigerant piping connections. This may result in frostbite.
☐	**Oil leak** Check the compressor for oil leakage. If there is an oil leak, try to repair the leak. If the repairing is unsuccessful, call your local dealer.
☐	**Air inlet/outlet** Check that the air inlet and outlet of the unit is NOT obstructed by paper sheets, cardboard, or any other material.
☐	**Additional refrigerant charge** The amount of refrigerant to be added to the unit shall be written on the included "Added refrigerant" plate and attached to the rear side of the front cover.
☐	**Installation date and field setting** Be sure to keep record of the installation date on the rear of the front panel according to EN60335-2-40 and keep record of the contents of the field setting(s).

8.4 Checklist during commissioning

☐	To perform a **test run**.

8.4.1 About the test run

Make sure to carry out the system test operation after the first installation.

The procedure below describes the test operation of the complete system.

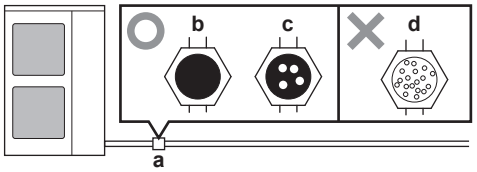
8.4.2 To perform a test run (7-LEDs display)

1 Make sure all field settings you want are set; see "7.2 Making field settings" on page 28.

2 Turn ON the power to the outdoor unit and the connected indoor units.

3 Turn ON the (remote) operation switch of the outdoor unit.

4 Check the sight glass of the outdoor unit. If the refrigerant is NOT in sealing state, charge extra refrigerant, but do NOT exceed 25% of the determined additional refrigerant amount (see "6.7.3 To determine the additional refrigerant amount" on page 22)



O Sealing state (= sufficient refrigerant)
X Insufficient refrigerant
a Sight glass
b Full of liquid
c A little foam in the liquid
d A lot of foam in the liquid

5 Check if the indoor unit blows cold air, and the room/showcase temperature decreases.

6 Turn OFF the (remote) operation switch of the outdoor unit.

CAUTION

Do NOT turn OFF power by disconnecting the power supply directly. **Possible consequence:**

- The auto restart function of the unit might automatically resume operation after the power supply is reconnected.
- Compressor malfunction.

7 Check the test operation results on the outdoor unit 7-LEDs display.

Completion	Description
Normal completion	● ● ☼ ● ● ● ●
Abnormal completion	● ☼ ☼ ● ● ● ● Refer to "8.4.3 Correcting after abnormal completion of the test run" on page 32 to take actions for correcting the abnormality. When the test operation is fully completed, normal operation is possible.

8.4.3 Correcting after abnormal completion of the test run

The test operation is only completed if no malfunction occurs. In case of a malfunction, perform correcting actions as explained in the error code table (see "11.3.2 Error codes: Overview" on page 34). Carry out the test operation again and confirm that the abnormality is properly corrected.

INFORMATION

When a malfunction occurs, X3M outputs a caution (C/C1) or warning (C/W1) signal, and the H2P LED on the main PCB lights up.

8.4.4 Operating the unit

Once the unit is installed and test operation of outdoor unit and indoor units is finished, the operation of the system can start.

9 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.

10 Maintenance and service

NOTICE

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

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

NOTICE

In Europe, the **greenhouse gas emissions** of the total refrigerant charge in the system (expressed as tonnes CO_2 equivalent) is used to determine the maintenance intervals. Follow the applicable legislation.

Formula to calculate the greenhouse gas emissions: GWP value of the refrigerant × Total refrigerant charge [in kg] / 1000

10.1 Overview: Maintenance and service

This chapter contains information about:

- Preventing electrical hazards when maintaining and servicing the system
- The refrigerant recovery operation

10.2 Maintenance safety precautions

DANGER: RISK OF ELECTROCUTION

DANGER: RISK OF BURNING

NOTICE: Risk of electrostatic discharge

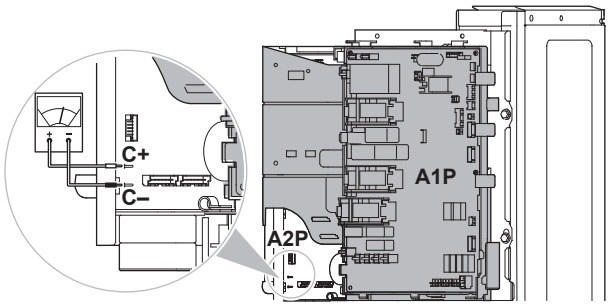
Before performing any maintenance or service work, touch a metal part of the unit in order to eliminate static electricity and to protect the PCB.

10.2.1 To prevent electrical hazards

When performing service to inverter equipment:

1 Do NOT open the electrical component box cover for 10 minutes after turning off the power supply.

2 Measure the voltage between terminals on the terminal block for power supply with a tester and confirm that the power supply is shut off. In addition, measure points as shown in the figure, with a tester and confirm that the voltage of the capacitor in the main circuit is less than 50 V DC.



3 To prevent damaging the PCB, touch a non-coated metal part to eliminate static electricity before pulling out or plugging in connectors.

4 Pull out junction connectors for the fan motors in the outdoor unit before starting service operation on the inverter equipment. Be careful not to touch the live parts. (If a fan rotates due to strong wind, it may store electricity in the capacitor or in the main circuit and cause electric shock.)

Junction connectors	X106A for M1F
	X107A for M2F

5 After the service is finished, plug the junction connector back in. Otherwise the malfunction code E7 will be displayed and normal operation will not be performed.

For details refer to the wiring diagram labelled on the back of the service cover.

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 and to remove the fuses from the control circuit located in the outdoor unit.

10.3 Checklist for yearly maintenance of the outdoor unit

Check the following at least once a year:

- Heat exchanger
  The heat exchanger of the outdoor unit can get blocked up due to dust, dirt, leaves, etc. It is recommended to clean the heat exchanger yearly. A blocked heat exchanger can lead to too low pressure or too high pressure leading to worse performance.

11 Troubleshooting

11.1 Overview: Troubleshooting

Before troubleshooting

Carry out a thorough visual inspection of the unit and look for obvious defects such as loose connections or defective wiring.

11.2 Precautions when troubleshooting

WARNING

- When carrying out an inspection on the switch box of the unit, ALWAYS make sure that the unit is disconnected from the mains. Turn off the respective circuit breaker.
- When a safety device was activated, stop the unit and find out why the safety device was activated before resetting it. NEVER shunt safety devices or change their values to a value other than the factory default setting. If you are unable to find the cause of the problem, call your dealer.

DANGER: RISK OF ELECTROCUTION

WARNING

Prevent hazards due to inadvertent resetting of the thermal cut-out: power to this appliance MUST NOT be supplied through an external switching device, such as a timer, or connected to a circuit that is regularly turned ON and OFF by the utility.

DANGER: RISK OF BURNING

11.3 Solving problems based on error codes

INFORMATION

When a malfunction occurs, X3M outputs a caution (C/C1) or warning (C/W1) signal, and the H2P LED on the main PCB lights up.

You can display the error codes of the 3 latest malfunctions by using the push buttons and 7-LEDs display (see "7.2.3 Field setting components" on page 28). Error codes consist of 2 characters (example: E3).

After solving the problem, reset the malfunction by turning OFF and ON the operation switch, and retry operation.

11.3.1 To display the error codes of the latest malfunctions

#	Action		Display
1	Start from the default situation.		H1P H2P H3P H4P H5P H6P H7P ● ● ☼ ● ● ● ●
2	Select mode 1.	BS1 [1×]	◑ ● ● ● ● ● ●
3	Select a malfunction. ("X×" depends on the setting that you want to select.)	BS2 [X×]	**Possible malfunctions:** [1-14] Latest malfunction: ◑ ● ● ☼ ☼ ☼ ● [1-15] 2nd last malfunction: ◑ ● ● ☼ ☼ ☼ ☼ [1-16] 3rd last malfunction: ◑ ● ☼ ● ● ● ●
4	Display the **first character** of the error code.	BS3 [1×]	**Possible characters:** E: ◑ ● ● ● ● ◑ ◑ H: ◑ ● ● ● ◑ ● ● F: ◑ ● ● ● ◑ ● ◑ J: ◑ ● ● ● ◑ ◑ ● L: ◑ ● ● ● ◑ ◑ ◑ P: ◑ ● ● ◑ ● ● ● U: ◑ ● ● ◑ ● ● ◑
5	Display the **second character** of the error code.	BS2 [1×]	**Possible characters:** 1: ◑ ● ● ● ● ● ◑ 2: ◑ ● ● ● ● ◑ ● 3: ◑ ● ● ● ● ◑ ◑ 4: ◑ ● ● ● ◑ ● ● 5: ◑ ● ● ● ◑ ● ◑ 6: ◑ ● ● ● ◑ ◑ ● 7: ◑ ● ● ● ◑ ◑ ◑ 8: ◑ ● ● ◑ ● ● ● 9: ◑ ● ● ◑ ● ● ◑ A: ◑ ● ● ◑ ● ◑ ● C: ◑ ● ● ◑ ◑ ● ●
6	Quit mode 1.	BS1 [1×]	● ● ☼ ● ● ● ●

11.3.2 Error codes: Overview

Code	Description	Criteria	Times of retry	Output signal	Cause	Solution
E3	Abnormally high pressure level	High pressure switch ≥4.0 MPa (40 bar)	0	Warning	▪ The stop valves are closed ▪ Excessive refrigerant charge	▪ Open the gas and liquid stop valves ▪ Recalculate the additional refrigerant charge and recover any excessive refrigerant with a refrigerant recovery machine
		High pressure sensor ≥3.55 MPa (35.5 bar)	3	Warning		
E5	Inverter compressor motor lock	Position signal error	4	Warning	▪ The stop valves are closed ▪ Incorrect wiring	▪ Open the gas and liquid stop valves ▪ Ensure correct ▪ Phase order ▪ Wiring
E7	Outdoor unit fan motor malfunction	Irregular revolution of 1 fan motor	4	Caution	Fan motor malfunction: ▪ M1F - A2P (X106A) ▪ M2F - A2P (X107A)	Check actuator, or connection on PCB
		Irregular revolution of 2 fan motors	4	Warning		
E9	Electronic expansion valve abnormality	No continuity of electronic expansion valve coil	0	Warning	Electronic expansion valve malfunction: Y1E - A1P (X21A)	Check actuator, or connection on PCB
F3	Abnormal discharge pipe temperature	Discharge pipe temperature >150°C	0	Warning	▪ Refrigerant shortage ▪ Defective discharge thermistor or outdoor unit PCB ▪ Clogging of expansion valve for injection	▪ Charge additional refrigerant ▪ Replace defective component ▪ Repair clogging
		▪ Discharge pipe temperature >120°C continuously for 70 seconds or more ▪ Discharge pipe temperature >125°C continuously for 30 seconds or more ▪ Discharge pipe temperature >130°C	14	Warning		
		Discharge pipe temperature >110°C AND Y1E ≥450 pls, continuously for 60 seconds	1	Caution		
			3	Warning		
F4	Wet operation from refrigeration suction pipe	Suction superheat <5 K AND discharge superheat <15 K AND discharge temperature <60°C, continuously for 10 minutes	0	Caution	▪ Excessive frost formation on indoor side ▪ Wrong selection of expansion valves	▪ Adjust defrost cycle ▪ Select the correct type of expansion valve
		In addition to above conditions (for caution): discharge superheat <15 K for 6 hours	0	Warning		
F5	Wet operation from injection pipe	Suction superheat ≥5 K AND discharge superheat <15 K AND discharge temperature <60°C, continuously for 90 minutes	0	Caution	▪ Defective expansion valve, suction pipe thermistor, or subcool heat exchanger outlet thermistor ▪ Refrigerant overcharge	▪ Replace defective component ▪ Adjust refrigerant charge
		In addition to above conditions (for caution): discharge superheat <15 K for 6 hours	0	Warning		

Code	Description	Criteria	Times of retry	Output signal	Cause	Solution
H0	3-sensor error	When 3 or more sensors detect abnormality	0	Warning	▪ Faulty connection of sensor ▪ Defective sensor or outdoor unit PCB	▪ Connect the sensor properly ▪ Replace defective component
H3	High pressure switch failure	No continuity of high pressure switch	0	Warning	▪ Faulty connection of switch ▪ Defective swith or outdoor unit PCB	▪ Connect the switch properly ▪ Replace defective component
H7	Outdoor fan motor signal failure	Abnormal position of signal of 1 fan motor	4	Caution	▪ Abnormal fan motor signal (circuit error) ▪ Broken, short, or disconnected connector of fan motor connection cable ▪ Defective inverter PCB	▪ Ensure correct connection ▪ Replace the fan motor ▪ Replace the inverter PCB
		Abnormal position of signal of 2 fan motors	4	Warning		
H9	Outdoor air thermistor failure	Open circuit or shortcircuit	0	Caution	▪ Faulty connection of sensor ▪ Defective sensor	▪ Connect the sensor properly ▪ Replace defective component
J3	Discharge thermistor failure	Open circuit or shortcircuit	0	Warning	▪ Faulty connection of sensor ▪ Defective sensor	▪ Connect the sensor properly ▪ Replace defective component
J5	Suction thermistor failure	Open circuit or shortcircuit	0	Caution	▪ Faulty connection of sensor ▪ Defective sensor	▪ Connect the sensor properly ▪ Replace defective component
J8	Heat exchanger inlet thermistor failure	Open circuit or shortcircuit	0	Warning	▪ Faulty connection of sensor ▪ Defective sensor	▪ Connect the sensor properly ▪ Replace defective component
J9	Heat exchanger outlet thermistor failure	Open circuit or shortcircuit	0	Warning	▪ Faulty connection of sensor ▪ Defective sensor	▪ Connect the sensor properly ▪ Replace defective component
JA	High pressure sensor failure	Open circuit or shortcircuit	0	Caution	▪ Faulty connection of sensor ▪ Defective sensor	▪ Connect the sensor properly ▪ Replace defective component
JC	Low pressure sensor failure	Open circuit or shortcircuit	0	Warning	▪ Faulty connection of sensor ▪ Defective sensor	▪ Connect the sensor properly ▪ Replace defective component
L1	Inverter PCB malfunction	IGBT error	0	Warning	▪ Defective inverter PCB	▪ Check for external causes (e.g. EMI noise), or replace the inverter PCB.
L4	Radiation fin temperature rise	93°C	9	Warning	▪ Fin temperature rise because of inverter malfunction ▪ Fin temperature rise because of short circuit ▪ Fin thermistor malfunction	▪ Remove any obstacles that block the passage of air to the outdoor unit ▪ Check connection on PCB ▪ Replace defective component
L5	Inverter compressor instantaneous overcurrent	—	9	Warning	—	—
L8	Inverter compressor overcurrent	≥16.1 A	9	Warning	—	—
L9	Defective inverter compressor startup failure	—	4	Warning	—	—
LC	Transmission error between control PCB and inverter PCB	Transmission failure between main PCB and inverter PCB	No limit	Caution	Defective connection between main and inverter PCB	Replace defective component
P1	Inverter compressor power voltage imbalance	—	9	Warning	Unbalanced power supply voltage	Check if power supply is within range
P4	Radiation fin thermistor	Radiation fin thermistor open circuit or short circuit	No limit	Caution	Defective radiation fin thermistor, inverter PCB, inverter compressor, or fan motor	Replace defective component
U1	Reversed phase / Open phase	Reversed phase or open phase	0	Warning	Faulty connection of phase order to power supply terminal X1M	Make sure the phase order to X1M is ok
U2	Inverter compressor abnormal power voltage	—	9	Warning	Insufficient power supply voltage	Make sure there is sufficient power supply voltage

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.

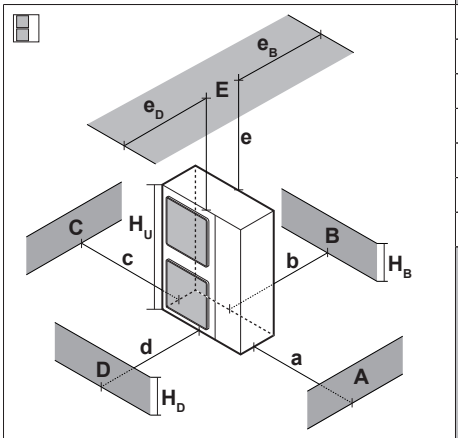
13 Technical data

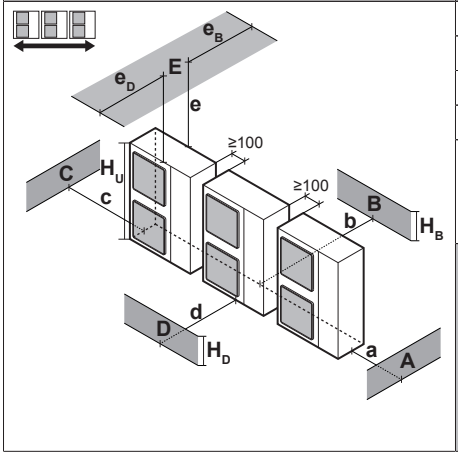
A **subset** of the latest technical data is available on the regional Daikin website (publicly accessible). The **full set** of latest technical data is available on the Daikin extranet (authentication required).

13.1 Service space: Outdoor unit

When mounting units side by side, the piping route must be to the front, to the back or downwards. In this case the piping route to the side is not possible.
When mounting the units side by side and routing the piping to the back, you must keep a distance of ≥250 mm between the units (instead of ≥100 mm as shown on the figures below).

Single unit ( ) | Single row of units ( )

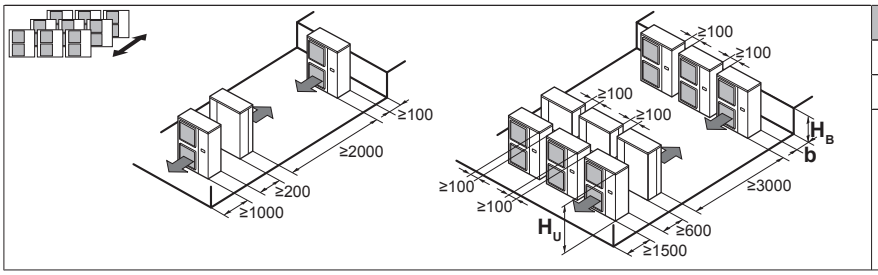




A~E	H_B H_D H_U		(mm)							
			a	b	c	d	e	e_B	e_D	
B	—			≥100						
A, B, C	—		≥100	≥100	≥100					
B, E	—			≥100			≥1000		≤500	
A, B, C, E	—		≥150	≥150	≥150		≥1000		≤500	
D	—					≥500				
D, E	—					≥1000	≥1000	≤500		
B, D	—			≥100		≥500				
B, D, E	$H_B<H_D$	$H_B≤½H_U$		≥250		≥750	≥1000	≤500		1
		$½H_U<H_B≤H_U$		≥250		≥1000	≥1000	≤500		
		$H_B>H_U$	⊘							
	$H_B>H_D$	$H_D≤½H_U$		≥100		≥1000	≥1000		≤500	
		$½H_U<H_D≤H_U$		≥200		≥1000	≥1000		≤500	
		$H_D>H_U$		≥200		≥1700	≥1000		≤500	
A, B, C	—		≥200	≥300	≥1000					
A, B, C, E	—		≥200	≥300	≥1000		≥1000		≤500	
D	—					≥1000				
D, E	—					≥1000	≥1000	≤500		
B, D	$H_D>H_U$			≥300		≥1000				
	$H_D≤½H_U$			≥250		≥1500				
	$½H_U<H_D≤H_U$			≥300		≥1500				
B, D, E	$H_B<H_D$	$H_B≤½H_U$		≥300		≥1000	≥1000	≤500		1+2
		$½H_U<H_B≤H_U$		≥300		≥1250	≥1000	≤500		
		$H_B>H_U$	⊘							
	$H_B>H_D$	$H_D≤½H_U$		≥250		≥1500	≥1000		≤500	
		$½H_U<H_D≤H_U$		≥300		≥1500	≥1000		≤500	
		$H_D>H_U$		≥300		≥2200	≥1000		≤500	

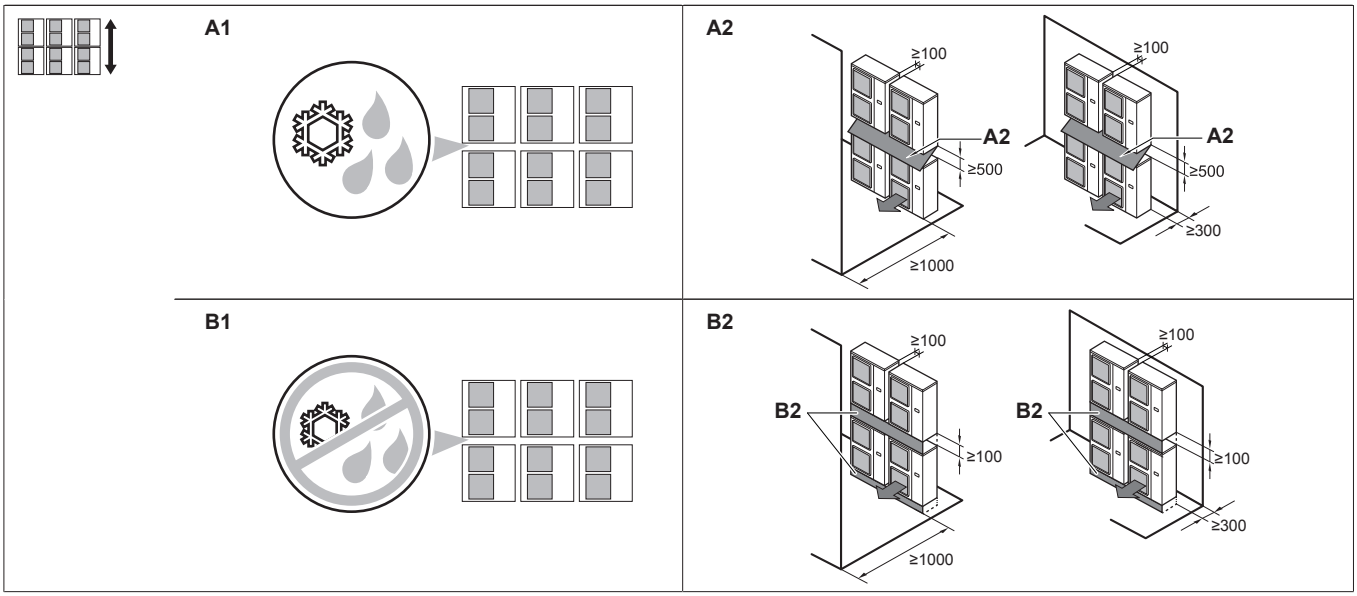
A,B,C,D Obstacles (walls/baffle plates)
E Obstacle (roof)
a,b,c,d,e Minimum service space between the unit and obstacles A, B, C, D and E
e_B Maximum distance between the unit and the edge of obstacle E, in the direction of obstacle B
e_D Maximum distance between the unit and the edge of obstacle E, in the direction of obstacle D
H_U Height of the unit
H_B,H_D Height of obstacles B and D
1 Seal the bottom of the installation frame to prevent discharged air from flowing back to the suction side through the bottom of the unit.
2 Maximum two units can be installed.
⊘ Not allowed

Multiple rows of units ( )



H_B H_U	b (mm)
$H_B \leq ½H_U$	b≥250
$½H_U < H_B \leq H_U$	b≥300
$H_B > H_U$	⊘

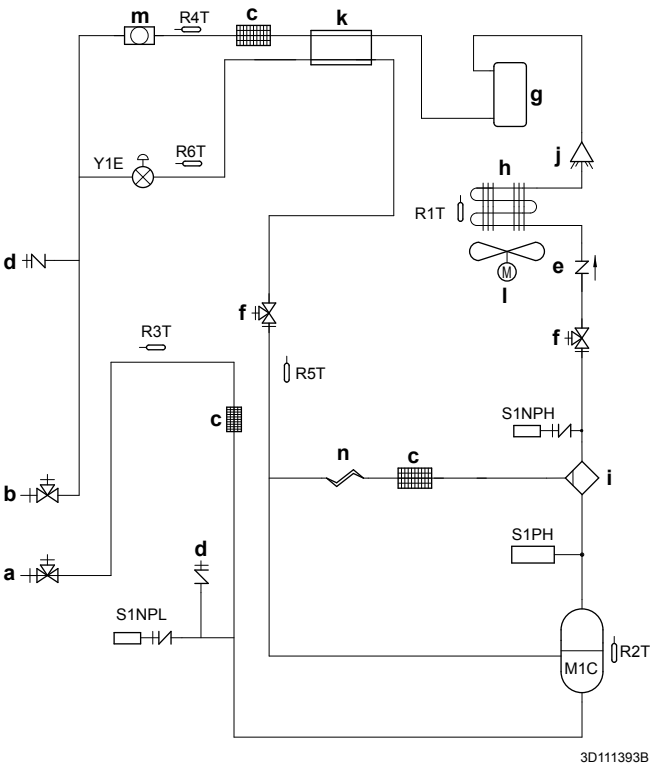
Stacked units (max. 2 levels) ( )



A1=>A2 (A1) If there is danger of drainage dripping and freezing between the upper and lower units…
(A2) Then install a **roof** between the upper and lower units. Install the upper unit high enough above the lower unit to prevent ice buildup at the upper unit's bottom plate.

B1=>B2 (B1) If there is no danger of drainage dripping and freezing between the upper and lower units…
(B2) Then it is not required to install a roof, but **seal the gap** between the upper and lower units to prevent discharged air from flowing back to the suction side through the bottom of the unit.

13.2 Piping diagram: Outdoor unit



a Stop valve (gas)
b Stop valve (liquid)
c Filter
d Service port
e Check valve
f Maintenance stop valve
g Liquid receiver
h Heat exchanger
i Oil separator
j Distributor
k Double tube heat exchanger
l Propeller fan
m Sight glass
n Capillary tube
M1C Compressor
R1T Thermistor (air)
R2T Thermistor (discharge)
R3T Thermistor (suction)
R4T Thermistor (Liquid pipe)
R5T Thermistor (Subcool heat exchanger outlet)
R6T Thermistor (Subcool heat exchanger inlet)
S1NPH High pressure sensor
S1NPL Low pressure sensor
S1PH High pressure switch
Y1E Electronic expansion valve (Subcooling)

13.3 Wiring diagram: Outdoor unit

The wiring diagram is delivered with the unit, located at the inside of the service cover.

Symbols:

English	Translation
Symbols	Symbols
X1M	Main terminal
—·—·—·—	Earth wiring
15	Wire number 15
– – – – – – –	Field wire
▪▪▪	Field cable
—> **/12.2	Connection ** continues on page 12 column 2
①	Several wiring possibilities
	Option
	Not mounted in switch box
	Wiring depending on model
	PCB

Notes:

1 Symbols: see above.

2 Refer to the installation or service manual on how to use BS1~BS4 push buttons and DS1-1~DS1-2 switches.

3 Do not operate the unit by short-circuiting protection device S1PH.

4 The capacity of this contact is 220~240 V AC – 0.5 A (total of caution output, warning output, run output, and operation output).

5 The initial setting is "0" (OFF). To operate, set to "1" (REMOTE) or "2" (ON).

6 To use the remote switch, use a voltage-free contact for microcurrent (<1 mA - 12 V DC). For instructions on how to use the remote switch, refer to the technical engineering data.

7 The initial state of SW1 is "open" (normal mode). To activate low-noise mode, close the contact.

Legend for wiring diagram LRMEQ3+4:

A1P	Printed circuit board (main)
A2P	Printed circuit board (inverter)
BS* (A1P)	Push buttons (MODE, SET, RETURN, TEST, RESET)
C* (A2P)	Capacitor
DS1 (A1P)	DIP switch
E, E1 (A1P)	Connector
F1U (A1P)	Fuse (T 31.5 A / 500 V)
F1U (A2P)	Fuse (T 5 A / 250 V)
F2U (A1P)	Fuse (T 31.5 A / 500 V)
F3U	Fuse (T 1.0 A / 250 V)
F3U (A1P)	Fuse (T 6.3 A / 250 V)
F4U	Fuse (T 1.0 A / 250 V)
F4U (A1P)	Fuse (T 6.3 A / 250 V)
F5U (A1P)	Fuse (T 6.3 A / 250 V)
HAP (A*P)	Running LED (service monitor is green)
H*P (A1P)	LED (service monitor is orange)
K1M (A2P)	Magnetic contactor
K*R (A*P)	Magnetic relay
L1R	Reactor
L*A	Connector
M1C	Motor (compressor)
M1F	Motor (fan) (upper)
M2F	Motor (fan) (lower)
NA (A1P)	Connector
P1, P2 (A2P)	Connector
PS (A2P)	Power supply
Q1DI	Earth leakage circuit breaker (field supply)
R1T	Thermistor (air)
R2T	Thermistor (M1C discharge)
R3T	Thermistor (suction)
R4T	Thermistor (liquid pipe)
R5T	Thermistor (subcool heat exchanger outlet)
R6T	Thermistor (subcool heat exchanger inlet)
R10T	Thermistor (fin)
R* (A2P)	Resistor
S1NPH	Pressure sensor (high)
S1NPL	Pressure sensor (low)
S1PH	Pressure switch (high)
S1S	Operation switch (REMOTE/OFF/ON)
SW1	Low-noise mode switch
SW2	External operation switch
U, V, W (A2P)	Connector
V1R (A2P)	IGBT power module
V2R, V3R (A2P)	Diode module
X*A	PCB connector
X*M	Terminal strip
X*Y	Connector
Y1E	Electronic expansion valve (subcool)
Z*C	Noise filter (ferrite core)
Z*F (A1P)	Noise filter

For the user

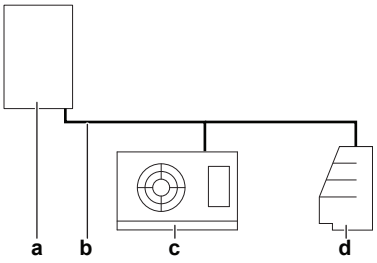
14 About the system

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.

14.1 System layout



a Outdoor unit (ZEAS condensing unit)
b Refrigerant piping
c Indoor unit (Blower coil)
d Indoor unit (Showcase)

15 Before operation

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.

NOTICE

Never inspect or service the unit by yourself. Ask a qualified service person to perform this work.

CAUTION

It is not good for your health 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.

NOTICE

Be sure to turn on the power 6 hours before operation in order to have power running to the crankcase heater and to protect the compressor.

16 Operation

16.1 Operation range

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

	LRMEQ*	LRLEQ*
Outdoor temperature	–20~43°C DB	
Evaporating temperature	–20~5°C	–45~–20°C

16.2 Operating the system

16.2.1 About operating the system

- To start and stop operation of the outdoor unit, use the external operation switch.
- If the main power supply is turned off during operation, operation will restart automatically after the power turns back on again.

17 Energy saving and optimum 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.

18 Maintenance and service

NOTICE

Never inspect or service the unit by yourself. Ask a qualified service person to perform this work.

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

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

CAUTION: Pay attention to the fan!

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

Be sure to turn off the main switch before executing any maintenance task.

CAUTION

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

18.1 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 the outdoor unit.

18.2 About the refrigerant

This product contains fluorinated greenhouse gases. Do NOT vent gases into the atmosphere.

Refrigerant type: R410A

Global warming potential (GWP) value: 2087.5

NOTICE

In Europe, the **greenhouse gas emissions** of the total refrigerant charge in the system (expressed as tonnes CO_2 equivalent) is used to determine the maintenance intervals. Follow the applicable legislation.

Formula to calculate the greenhouse gas emissions: GWP value of the refrigerant × Total refrigerant charge [in kg] / 1000

Please contact your installer for more information.

WARNING

The refrigerant in the system is safe and normally does not leak. If the refrigerant leaks in the room, contact with a fire of a burner, a heater or a cooker may result in a harmful gas.

Turn off any combustible heating devices, ventilate the room and contact the dealer where you purchased the unit.

Do not use the system until a service person confirms that the portion where the refrigerant leaks is repaired.

18.3 After-sales service and warranty

18.3.1 Warranty period

- This product includes a warranty card that was filled in by the dealer at the time of installation. The completed card has to be checked by the customer and stored carefully.
- If repairs to the product are necessary within the warranty period, contact your dealer and keep the warranty card at hand.

18.3.2 Recommended maintenance and inspection

Since dust collects when using the unit for several years, performance of the unit will deteriorate to some extent. As taking apart and cleaning interiors of units requires technical expertise and in order to ensure the best possible maintenance of your units, we recommend to enter into a maintenance and inspection contract on top of normal maintenance activities. Our network of dealers has access to a permanent stock of essential components in order to keep your unit in operation as long as possible. Contact your dealer for more information.

When asking your dealer for an intervention, always state:

- The complete model name of the unit.
- The manufacturing number (stated on the nameplate of the unit).
- The installation date.
- The symptoms or malfunction, and details of the defect.

WARNING

- Do not modify, disassemble, remove, reinstall or repair the unit yourself as incorrect dismantling or installation may cause an electric shock or fire. Contact your dealer.
- In case of accidental refrigerant leaks, make sure there are no naked flames. The refrigerant itself is entirely safe, non-toxic and non-combustible, but it will generate toxic gas when it accidentally leaks into a room where combustible air from fan heaters, gas cookers, etc. is present. Always have qualified service personnel confirm that the point of leakage has been repaired or corrected before resuming operation.

19 Troubleshooting

If system malfunctions are likely to degrade the articles in the room/showcase, you can ask your installer to install an alarm (example: lamp). For more information, contact your installer.

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, electric 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 properly work.	Turn off the main power switch.
If water leaks from the unit.	Stop the operation.
The operation switch does not work well.	Turn off the power.

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

Malfunction	Measure
If the system does not operate at all.	▪ Check if there is no power failure. Wait until power is restored. If 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.

Malfunction	Measure
The system operates but cooling 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 indoor unit is not frosted up. Defrost the unit manually, or shorten the defrost operation cycle. ▪ Check if there are not too many articles inside the room/showcase. Remove a couple of articles. ▪ Check if there is smooth air circulation inside the room/showcase. Reorganise the articles inside the room/showcase. ▪ Check if there is not too much dust on the outdoor unit heat exchanger. Remove the dust with a brush or vacuum cleaner, without using water. If necessary, consult your dealer. ▪ Check if there is cold air leaking outside of the room/showcase. Stop the air from leaking outside. ▪ Check if you did not set the indoor unit setpoint temperature too high. Set the setpoint appropriately. ▪ Check if there are no high-temperature articles stored in the room/showcase. Always store articles after they have cooled down. ▪ Check if the door is not opened too long. Reduce the opening time of the door.

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).

19.1 Symptoms that are NOT system malfunctions

The following symptoms are NOT system malfunctions:

19.1.1 Symptom: The system does not operate

- The system does not start immediately after it is turned ON again. If the operation lamp lights, the system is in normal condition. To prevent overloading of the compressor motor, the system starts 5 minutes after it is turned ON again in case it was turned OFF just before.
- The system does not start immediately after the power supply is turned on. Wait one minute until the micro computer is prepared for operation.

19.1.2 Symptom: The unit does not stop immediately when operation is stopped

This is to prevent components from being damaged. The unit will stop in a little while.

19.1.3 Symptom: Noise (Outdoor unit)

- A continuous low hissing sound is heard when the system is in cooling operation. This is the sound of refrigerant gas flowing through both indoor and outdoor units.
- A hissing sound which is heard at the start or immediately after stopping operation. This is the noise of refrigerant caused by flow stop or flow change.
- When the tone of operating noise changes. This noise is caused by the change of frequency.

19.1.4 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.

19.1.5 Symptom: The outdoor unit fan does not spin

During operation. The speed of the fan is controlled in order to optimise product operation.

20 Relocation

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

21 Disposal

This unit uses hydrofluorocarbon. Contact your dealer when discarding this unit.

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.

22 Glossary

Dealer
Sales distributor for the product.

Authorized 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.

Maintenance instructions
Instruction manual specified for a certain product or application, which explains (if relevant) how to install, configure, operate and/or maintain the product or application.

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.

EAC

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