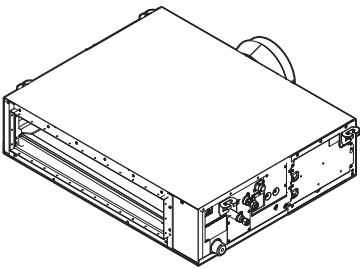




Installer and user reference guide  
VRV system air conditioner



EKVDX32A2VEB  
EKVDX50A2VEB  
EKVDX80A2VEB  
EKVDX100A2VEB

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# 1 About the documentation

## 1.1 About this document



### WARNING

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



### INFORMATION

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

### Target audience

Authorised installers + end users



### INFORMATION

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

### 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)

- **Installation and operation manual:**

- Installation and operation instructions
- Format: Paper (in the box of the indoor unit)

- **Installer and user reference guide:**

- Preparation of the installation, reference data,...
- Detailed step-by-step instructions and background information for basic and advanced usage
- Format: Digital files on <https://www.daikin.eu>. Use the search function 🔍 to find your model.

The latest revision of the supplied documentation is published on the regional Daikin website and is available via your dealer.

The original instructions are written in English. All other languages are translations of the original instructions.

### Technical engineering data

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

## 2 General safety precautions

### In this chapter

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### 2.1 About the documentation

- The original instructions are written in English. All other languages are translations of the original.
- 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 in the installer reference guide **MUST** be performed by an authorised installer.

#### 2.1.1 Meaning of warnings and symbols



#### **DANGER**

Indicates a situation that results in death or serious injury.



#### **DANGER: RISK OF ELECTROCUTION**

Indicates a situation that could result in electrocution.



#### **DANGER: RISK OF BURNING/SCALDING**

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



#### **DANGER: RISK OF EXPLOSION**

Indicates a situation that could result in explosion.



#### **WARNING**

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



#### **WARNING: FLAMMABLE MATERIAL**



#### **CAUTION**

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



#### **NOTICE**

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

**INFORMATION**

Indicates useful tips or additional information.

Symbols used on the unit:

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

Symbols used in the documentation:

Symbol	Explanation
	Indicates a figure title or a reference to it. <b>Example:</b> "▲ 1-3 Figure title" means "Figure 3 in chapter 1".
	Indicates a table title or a reference to it. <b>Example:</b> "■ 1-3 Table title" means "Table 3 in chapter 1".

## 2.2 For the installer

### 2.2.1 General

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

**DANGER: RISK OF BURNING/SCALDING**

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

**WARNING**

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

**WARNING**

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

**WARNING**

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



### WARNING

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



### CAUTION

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



### CAUTION

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



### CAUTION

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

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

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

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

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

### 2.2.2 Installation site

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

Do NOT install the unit in the following places:

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

### 2.2.3 Refrigerant — in case of R410A or R32

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

**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**

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

**WARNING**

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

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

**WARNING**

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

**WARNING**

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

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

**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.

**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.

**NOTICE**

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

- In case recharge is required, see the nameplate or the refrigerant charge label of the unit. It states the type of refrigerant and necessary amount.

- Whether the unit is factory charged with refrigerant or non-charged, in both cases you might need to charge additional refrigerant, depending on the pipe sizes and pipe lengths of the system.
- 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.

### 2.2.4 Electrical



### DANGER: RISK OF ELECTROCUTION

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



### WARNING

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

**WARNING**

- ONLY use copper wires.
- Make sure the field wiring complies with the national wiring regulations.
- 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 or incorrect earthing may cause electrical shock.
- Make sure to use a dedicated power circuit. NEVER use a power supply shared by another appliance.
- Make sure to install the required fuses or circuit breakers.
- Make sure to install an earth leakage protector. Failure to do so may cause electrical shock or fire.
- When installing the earth leakage protector, make sure it is compatible with the inverter (resistant to high frequency electric noise) to avoid unnecessary opening of the earth leakage protector.

**WARNING**

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

**CAUTION**

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

**NOTICE**

Precautions when laying power wiring:



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

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

**NOTICE**

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

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

## 3 Specific installer safety instructions

Always observe the following safety instructions and regulations.

### General



#### WARNING

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

### Unit installation (see "16 Unit installation" [▶ 53])



#### WARNING

Fixing method of the indoor unit MUST be in accordance with the instructions from this manual. See "16.2 Mounting the indoor unit" [▶ 55].



#### WARNING

The appliance shall be stored in a room without continuously operating ignition sources (example: open flames, an operating gas appliance or an operating electric heater).



#### WARNING

Do NOT install operating ignition sources (example: open flames, an operating gas appliance or an operating electric heater) in the ductwork.



#### CAUTION

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



#### 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.

### Refrigerant piping installation (see "17 Piping installation" [▶ 61])



#### WARNING

Field piping MUST be in accordance with the instructions from this manual. See "17 Piping installation" [▶ 61].



#### CAUTION

- Do NOT use mineral oil on flared part.
- Do NOT reuse piping from previous installations.
- NEVER install a drier to this unit to guarantee its lifetime. The drying material may dissolve and damage the system.



#### CAUTION

- Incomplete flaring may cause refrigerant gas leakage.
- Do NOT re-use flares. Use new flares to prevent refrigerant gas leakage.
- Use flare nuts that are included with the unit. Using different flare nuts may cause refrigerant gas leakage.



#### CAUTION

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

#### Electrical installation (see "18 Electrical installation" [▶ 67])



#### WARNING

Electrical wiring MUST be in accordance with the instructions from this manual. See "18 Electrical installation" [▶ 67].



#### DANGER: RISK OF ELECTROCUTION



#### WARNING

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



#### WARNING

ALWAYS use multicore cable for power supply cables.



#### WARNING

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



#### WARNING

The VAM and the EKVDX indoor unit MUST share the same electrical safety devices and power supply.

**WARNING**

- If the power supply has a missing or wrong N-phase, equipment might break down.
- Establish proper earthing. Do NOT earth the unit to a utility pipe, surge absorber, or telephone earth. Incomplete earthing may cause electrical shocks.
- Install the required fuses or circuit breakers.
- Secure the electrical wiring with cable ties so that the cables do NOT come in contact with sharp edges or piping, particularly on the high-pressure side.
- 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.

**WARNING**

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

**WARNING**

Do NOT extend the power supply or the interconnection cable by using wire connectors, wire connection clamps, taped wires, extension cords. These can cause overheating, electric shock or fire.

**CAUTION**

- Each VAM unit is connected to only ONE EKVDX unit (via duct and electrical connection).
- When connected to an EKVDX unit, there is NO connection of the VAM to any other indoor unit, linkage or multiple EKVDX units.
- Each EKVDX unit **MUST** have ONLY ONE user interface. Only a safety system compatible remote controller can be used as the user interface. See technical data sheet for remote controller compatibility (e.g. H-type user interface like BRC1H52/82\*).
- Supervising and/or slave user interfaces are NOT allowed for EKVDX units.
- R32 refrigerant: the user interface **MUST** be installed in one of the rooms the EKVDX unit is discharging into.
- R410A refrigerant: the user interface can also be installed in e.g. the hallway.

**Commissioning (see "21 Commissioning" [▶ 83])****WARNING**

Commissioning **MUST** be in accordance with the instructions from this manual. See "21 Commissioning" [▶ 83].

### 3.1 Instructions for equipment using R32 refrigerant

**A2L****WARNING: MILDLY FLAMMABLE MATERIAL**

The refrigerant inside this unit is mildly flammable.



#### WARNING

- Do NOT pierce or burn refrigerant cycle parts.
- Do NOT use cleaning materials or means to accelerate the defrosting process other than those recommended by the manufacturer.
- Be aware that the refrigerant inside the system is odourless.



#### WARNING

The appliance shall be stored/installed as follows:

- in such a way as to prevent mechanical damage.
- in a well-ventilated room without continuously operating ignition sources (example: open flames, an operating gas appliance or an operating electric heater).
- in a room with dimensions as specified in "[15 Special requirements for R32 units](#)" [▶ 47].



#### WARNING

Make sure installation, servicing, maintenance and repair comply with instructions from Daikin and with applicable legislation (for example national gas regulation) and are executed ONLY by authorised persons.



#### WARNING

- Take precautions to avoid excessive vibration or pulsation to refrigeration piping.
- Protect the protection devices, piping and fittings as much as possible against adverse environmental effects.
- Provide space for expansion and contraction of long runs of piping.
- Design and install piping in refrigerating systems such as to minimise the likelihood of hydraulic shock damaging the system.
- Mount the indoor equipment and pipes securely and protect them to avoid accidental rupture of equipment or pipes in case of events such as moving furniture or reconstruction activities.



#### WARNING

If one or more rooms are connected to the unit using a duct system, make sure:

- the rooms have NO operating ignition sources (example: open flames, an operating gas appliance or an operating electric heater), in case the floor area is less than the minimum floor area  $A_{\min}$  (m<sup>2</sup>) of the rooms that are served.
- NO auxiliary devices, which may be a potential ignition source, are installed in the duct work (example: hot surfaces with a temperature exceeding 700°C and electric switching device);
- only auxiliary devices approved by the manufacturer are used in the duct work;
- the air outlet can be connected directly to multiple rooms by ducting. Do NOT use spaces such as a false ceiling as a duct for the air outlet.
- the height of the air extraction opening from the room MUST be equal or below the refrigerant release point.



#### CAUTION

Do NOT use potential sources of ignition in searching for or detection of refrigerant leaks.

**NOTICE**

- Do NOT re-use joints and copper gaskets which have been used already.
- Joints made in the installation between parts of the refrigerant system shall be accessible for maintenance purposes.

For the user

# 4 User safety instructions

Always observe the following safety instructions and regulations.

## In this chapter

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4.2	Instructions for safe operation.....	20

## 4.1 General



### WARNING

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



### WARNING

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

Children SHALL NOT play with the appliance.

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



### WARNING

To prevent electrical shocks or fire:

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



### CAUTION

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

- Units are marked with the following symbol:



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

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

- Batteries are marked with the following symbol:



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

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

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

### 4.2 Instructions for safe operation



#### WARNING

- Do NOT modify, disassemble, remove, reinstall or repair the unit yourself as incorrect dismantling or installation may cause an electrical shock or fire. Contact your dealer.
- In case of accidental refrigerant leaks, make sure there are no naked flames. The refrigerant itself is entirely safe and non-toxic. R410A is a non-combustible refrigerant, and R32 is a mildly flammable refrigerant, but they will generate a toxic gas when they accidentally leak 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.



#### 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.



#### WARNING

Do NOT place objects below the indoor and/or outdoor unit that may get wet. Otherwise condensation on the unit or refrigerant pipes, dirt or drain blockage may cause dripping, and objects under the unit may get dirty or damaged.



#### WARNING

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



#### CAUTION

This unit is equipped with electrically powered safety measures, such as a refrigerant leak detector. In order to be effective, the unit must be electrically powered at all times after installation, except for short service periods.



#### CAUTION

NEVER touch the internal parts of the controller.

**CAUTION**

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

**CAUTION**

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

**CAUTION**

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

**CAUTION**

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

**Maintenance and service (see "9 Maintenance and service" [▶ 31])****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.

**WARNING**

Be careful with ladders when working in high places.

**WARNING**

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

**CAUTION**

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

**CAUTION**

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

**CAUTION**

Turn off the unit before cleaning the air outlet.

**About the refrigerant (see "9.4 About the refrigerant" [▶ 31])**

A2L

**WARNING: MILDLY FLAMMABLE MATERIAL**

The refrigerant inside this unit is mildly flammable.

**WARNING**

The appliance using R32 refrigerant shall be stored so as to prevent mechanical damage and in a well-ventilated room without continuously operating ignition sources (e.g. open flames, an operating gas appliance, or an operating electric heater). The room size shall be as specified in the General safety precaution.



### WARNING

- Do NOT pierce or burn refrigerant cycle parts.
- Do NOT use cleaning materials or means to accelerate the defrosting process other than those recommended by the manufacturer.
- Be aware that the refrigerant inside the system is odourless.



### WARNING

- R410A is a non-combustible refrigerant, and R32 is a mildly flammable refrigerant; they normally do NOT leak. If the refrigerant leaks in the room and comes into contact with fire from a burner, a heater, or a cooker, this may result in a fire (in case of R32), or the formation of a harmful gas.
- Turn OFF any combustible heating devices, ventilate the room, and contact the dealer from where you purchased the unit.
- Do NOT use the unit until a service person confirms that the part from which the refrigerant leaked has been repaired.



### WARNING

The R32 refrigerant leakage sensor must be replaced after every detection or at the end of its lifetime. ONLY authorised persons may replace the sensor.



### WARNING

The heat reclaim ventilation unit filters MUST be cleaned after a drop in airflow rate has been detected. ONLY authorised personnel can execute this.

### Troubleshooting (see "10 Troubleshooting" [▶ 34])



### DANGER: RISK OF ELECTROCUTION

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



### WARNING

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

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

## 5 About the system



### WARNING

- Do NOT modify, disassemble, remove, reinstall or repair the unit yourself as incorrect dismantling or installation may cause an electrical shock or fire. Contact your dealer.
- In case of accidental refrigerant leaks, make sure there are no naked flames. The refrigerant itself is entirely safe and non-toxic. R410A is a non-combustible refrigerant, and R32 is a mildly flammable refrigerant, but they will generate a toxic gas when they accidentally leak 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.



### WARNING

The unit is equipped with a refrigerant leak detection system for safety.

To be effective, the unit MUST be electrically powered at all times after installation, except for short service periods.



### NOTICE

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



### NOTICE

For future modifications or expansions of your system:

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

### In this chapter

5.1	System layout.....	23
5.2	Compatibility with VAM models.....	25

## 5.1 System layout



### WARNING

In case of R32 refrigerant, the installation MUST comply with the requirements that apply to this R32 equipment. For more information, see "[3.1 Instructions for equipment using R32 refrigerant](#)" [▶ 15].



### NOTICE

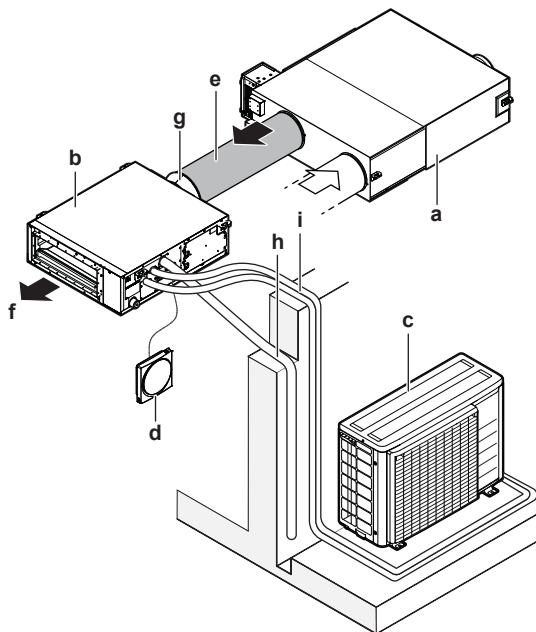
The EKVDX unit is an airconditioning unit for pretreatment of incoming supply air from a VAM heat reclaim ventilation unit. For comfort temperature control, it is still required to install a normal indoor unit.

Do not place the EKVDX unit before the heat reclaim ventilation unit.

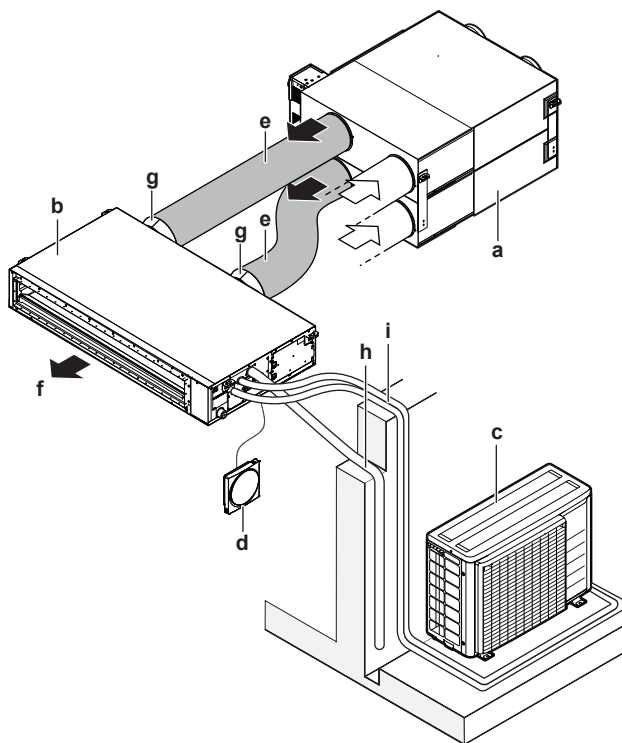


### INFORMATION

The following figures are examples and may NOT completely match your system layout.



▲ 5-1 For VAM500~1000 and EKVDX32~80



▲ 5-2 For VAM1500+2000 and EKVDX100

- a Heat reclaim ventilation unit (VAM)
- b EKVDX indoor unit
- c Outdoor unit
- d User interface
- e Air inlet duct for EKVDX indoor unit
- f Discharge air
- g Duct flange(s)
- h Drain pipe
- i Refrigerant piping + interconnection cable

## 5.2 Compatibility with VAM models

	EKVDX32	EKVDX50	EKVDX80	EKVDX100
VAM500J*	●	—	—	—
VAM650J*	—	●	—	—
VAM800J*	—	●	—	—
VAM1000J*	—	—	●	—
VAM1500J*	—	—	—	●
VAM2000J*	—	—	—	●

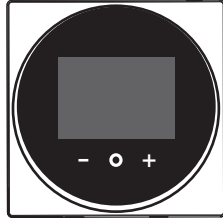
- Not compatible
- Compatible in pair

The EKVDX option is not available for VAM350J\*.

## 6 User interface

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

Each EKVDX unit **MUST** be connected to a separate user interface. The user interface BRC1H\* (or a compatible H-type user interface) **MUST** be used.



### NOTICE

Do NOT wipe the controller operation panel with benzine, thinner, chemical dust cloth, etc. The panel may get discoloured or the coating peeled off. If it is heavily dirty, soak a cloth in water-diluted neutral detergent, squeeze it well and wipe the panel clean. Wipe it with another dry cloth.

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

# 7 Operation

## In this chapter

7.1	Before operation .....	27
7.2	Operation range.....	27
7.3	About operation modes .....	28
7.3.1	Basic operation modes.....	28
7.3.2	Special heating operation modes .....	29
7.4	To operate the system.....	29

## 7.1 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.



### 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

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



### CAUTION

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



### CAUTION

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



### NOTICE

Turn ON the power 6 hours before operation in order to have power running to the crankcase heater and to protect the compressor.

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

## 7.2 Operation range

For safe and effective operation:

- In case an EKVDX unit is connected, the maximum allowed outdoor unit temperature is 46°C (even if the outdoor unit is capable to go higher if no EKVDX is connected).
- The supply air coming from the heat reclaim ventilation unit should correspond to the following temperature and humidity ranges.

	Cooling	Heating
Air supply temperature	11~35°C DB	
Indoor humidity <sup>(a)</sup>	≤80%	
Setting temperature range	13~30°C	24~45°C

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



**INFORMATION**

The EKVDX is a pretreatment unit. Therefore, the temperature setpoints:

- are not displayed on the user interface.
- can only be modified with field settings (see "20.5 Field settings" [▶ 81] for the appropriate field settings).

### 7.3 About operation modes



**INFORMATION**

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

- If the main power supply is turned off during operation, operation will restart automatically after the power turns back on again.
- **Setpoint.** Target temperature for the Cooling, Heating, and Auto operation modes.
- **Setback.** A function that keeps the room temperature in a specific range when the system is turned off (by the user, the schedule function, or the OFF timer).



For more information, refer to the user interface manual.

#### 7.3.1 Basic operation modes

The indoor unit can operate in various operation modes.

Icon	Operation mode
	<b>Cooling.</b> In this mode, cooling will be activated as required by the setpoint, or by Setback operation.
	<b>Heating.</b> In this mode, heating will be activated as required by the setpoint, or by Setback operation.
	<b>Fan only / Ventilation only.</b> In this mode, air circulates without heating or cooling.

## 7.3.2 Special heating operation modes

Operation	Description
<b>Defrost<sup>(a)</sup></b>	<p>To prevent a loss of heating capacity due to frost accumulation in the outdoor unit, the system will automatically switch to defrost operation.</p> <p>The supply air fan will stop operation while the exhaust air fan will resume operation as before defrost operation started.</p> <p>The following icon will appear on the home screen:</p>  <p>The system will resume normal operation after approximately 6 to 8 minutes.</p>
<b>Hot start<sup>(a)</sup></b>	<p>The supply air fan will stop operation while the exhaust air fan will resume operation as before hot start operation started.</p> <p>The following icon will appear on the home screen:</p> 

<sup>(a)</sup> The operation of the supply and exhaust fans depends on the VAM field setting 17(27)-5.

## 7.4 To operate the system

**INFORMATION**

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

## 8 Energy saving and optimum operation



### CAUTION

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



### NOTICE

Do NOT place objects that should NOT get wet below the unit. Condensation on the unit or refrigerant pipes, or drain blockage may cause dripping. **Possible consequence:** Objects under the unit can get dirty or damaged.



### WARNING

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

Observe the following precautions to ensure the system operates properly.

- Prevent direct sunlight from entering a room during cooling operation by using curtains or blinds.
- Make sure the area is well ventilated. Do NOT block any ventilation openings.
- Ventilate often. Extended use requires special attention to ventilation.
- Keep doors and windows closed. If the doors and windows remain open, air will flow out of your room causing a decrease in the cooling or heating effect.
- Be careful NOT to cool or heat too much. To save energy, keep the temperature setting at a moderate level.
- NEVER place objects near the air inlet or the air outlet of the unit. Doing so may cause a reduced heating/cooling effect or stop operation.
- Condensation may form if the humidity is above 80% or if the drain outlet gets blocked.
- Adjust the air outlet properly and avoid direct air flow to room inhabitants.

# 9 Maintenance and service

## In this chapter

9.1	Cleaning the air outlet .....	31
9.1.1	To clean the air outlet.....	31
9.2	Maintenance before a long stop period .....	31
9.3	Maintenance after a long stop period .....	31
9.4	About the refrigerant .....	31
9.4.1	About R32 refrigerant leakage safety.....	32

## 9.1 Cleaning the air outlet



### CAUTION

Turn off the unit before cleaning the air outlet.

### 9.1.1 To clean the air outlet



### WARNING

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

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

## 9.2 Maintenance before a long stop period

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

- Let the indoor units run in fan only operation for about half a day in order to dry the interior of the units.
- Clean casings of indoor units (see "9.1 Cleaning the air outlet" [▶ 31]).
- Remove the batteries from the user interface (if applicable).

## 9.3 Maintenance after a long stop period

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

- Check and remove everything that might be blocking inlet and outlet vents of indoor units and outdoor units.
- Clean casings of indoor units (see "9.1 Cleaning the air outlet" [▶ 31]).
- Insert batteries in the user interface (if applicable).

## 9.4 About the refrigerant



### CAUTION


See "4 User safety instructions" [▶ 19] to acknowledge all related safety instructions.

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


The EKVDX contains either R32 or R410A refrigerant.


The EKVDX has an automatic refrigerant detection function. You do not need to identify the refrigerant via a field setting.


	Refrigerant type	
	R32	R410A
Global warming potential (GWP)	675	2087.5


 **NOTICE**  
 Applicable legislation on **fluorinated greenhouse gases** requires that the refrigerant charge of the unit is indicated both in weight and CO<sub>2</sub> equivalent.  
**Formula to calculate the quantity in CO<sub>2</sub> equivalent tonnes:** GWP value of the refrigerant × total refrigerant charge [in kg]/1000  
 Contact your installer for more information.


### 9.4.1 About R32 refrigerant leakage safety

 **NOTICE**  
 Functionality of the safety measures are periodically automatically checked. In case of malfunction, an error code will be displayed on the user interface.

 **NOTICE**  
 The R32 refrigerant leakage sensor is a semiconductor detector which may incorrectly detect substances other than R32 refrigerant. Avoid using chemical substances (e.g. organic solvents, hair spray, paint) in high concentrations, in the close proximity of the EKVDX because this may cause misdetection by the R32 refrigerant leakage sensor.

 **INFORMATION**  
 The sensor has a lifetime of 10 years. The user interface displays error "**CH-05**" 6 months before the end of the sensor lifetime and error "**CH-02**" after the end of the sensor lifetime. For more information, refer to the reference guide of the user interface and contact your dealer.

 **INFORMATION**  
 To stop the alarm of the user interface, see the reference guide of the user interface.

 **INFORMATION**  
 The minimum airflow during normal operation or during the refrigerant leakage detection is always >240 m<sup>3</sup>/h.

In case detection occurs when the unit is on standby:

- User interface displays error "**A0-11**", emits alarm sound and status indicator is blinking.
- The fan of the heat reclaim ventilation unit begins rotating at ultra high speed.
- Contact your dealer immediately. For more information, see the installation manual of the outdoor unit.

#### Airflow rate threshold levels

Airflow rates too low imply a safety concern in case there is R32 leakage. Therefore, when the R32 safety settings are active, three airflow rate threshold levels are taken into account.

Level	Airflow rate	System response	Action required
1	Lower than normal	User interface displays error " <b>A6-30</b> ".	Auto recovery: no action required. The error disappears.  If not, contact your dealer to check for a dirty air filter, leakage in ducting, ...
2	Too low	<ul style="list-style-type: none"> <li>▪ User interface displays error "<b>A6-29</b>" or "<b>UJ-38</b>".</li> <li>▪ VAM and EKVDX both shut down.</li> </ul>	Contact your dealer to: <ul style="list-style-type: none"> <li>▪ clean the filter.</li> <li>▪ check the installation for loose ducting, closed dampers,...</li> <li>▪ reset the user interface (also possible by user).</li> </ul>
3	Below critical airflow threshold	<ul style="list-style-type: none"> <li>▪ User interface displays error "<b>A6-28</b>" or "<b>UJ-37</b>".</li> <li>▪ In case there is a leak, it will be detected but because airflow is below the legal limit, the system will automatically start refrigerant recovery operation to store all refrigerant into the outdoor unit. When recovery is finished, the system unit goes in locked status. Service is needed to repair and re-activate the system. Refer to the service manual for more information.</li> </ul>	Contact your dealer to repair and re-activate the system. Refer to the service manual for more information.

# 10 Troubleshooting

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




## WARNING

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

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

The system **MUST** be repaired by a qualified service person.

Malfunction	Measure
If a safety device such as a fuse, a circuit breaker or a residual current device frequently actuates or the ON/OFF switch does NOT function properly.	Turn OFF all main power supply switches to the unit.
If water leaks from the unit.	Stop operation.
The operation switch does NOT function properly.	Turn OFF the power supply.
If the user interface displays  .	Notify your installer and report the error code. To display an error code see the reference guide of the user interface.

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

Malfunction	Measure
The system does not operate.	<ul style="list-style-type: none"> <li>▪ Check if there is no power failure. Wait until power is restored. If a power failure occurs during operation, the system automatically restarts immediately after power is restored.</li> <li>▪ Check if no fuse has blown or breaker is activated. Change the fuse or reset the breaker if necessary.</li> </ul>
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 or heating is insufficient.	<ul style="list-style-type: none"> <li>▪ 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.</li> <li>▪ Check if the fan speed setting is set to low speed and increase to high speed. Refer to the manual of the user interface.</li> <li>▪ Check for open doors or windows. Close doors and windows to prevent wind from coming in.</li> <li>▪ Check if direct sunlight enters the room. Use curtains or blinds.</li> <li>▪ Check if there are too many occupants in the room during cooling operation. Check if the heat source of the room is excessive.</li> <li>▪ If the heat source of the room is excessive (when cooling). Cooling effect decreases if heat gain of the room is too large.</li> <li>▪ Contact your dealer to check the field settings on the EKVDX unit.</li> <li>▪ Check the location of the remote controller. It should be installed in the served room with correct target room temperature setting. If that is not the case, contact your dealer to disable the target room temperature setting.</li> </ul>
Operation stops suddenly (operation lamp blinks.)	Check if air inlet or outlet of outdoor or indoor unit is not blocked by obstacles. Remove any obstacles, turn the breaker OFF and back ON. If the lamp still blinks, contact your dealer.
An abnormal function happens during operation.	The air conditioner may malfunction because of lightning or radio waves. Turn the breaker OFF and back ON.

After checking all the items above, if 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.

## 10.1 Symptoms that are NOT system malfunctions

The following symptoms are NOT system malfunctions:

### 10.1.1 Symptom: The system does not operate

- The air conditioner does not start immediately after the ON/OFF button on the user interface is pressed. If the operation lamp lights, the system is in normal condition. To prevent overloading of the compressor motor, the air conditioner starts five minutes after it is turned ON again in case it was turned OFF just before. The same starting delay occurs after the operation mode selector button was used.
- The system does not start immediately after the power supply is turned on. Wait one minute until the microcomputer is prepared for operation.

### 10.1.2 Symptom: White mist comes out of a unit (Indoor unit)

- When humidity is high during cooling operation (in oily and dusty places). If the interior of an indoor unit is extremely contaminated, the temperature distribution inside a room becomes uneven. It is necessary to clean the interior of the indoor unit. Ask your dealer for details on cleaning the unit. This operation requires a qualified service person.
- When the air conditioner is changed over to heating operation after defrost operation. Moisture generated by defrost becomes steam and exits.
- Clean the VAM filters.

### 10.1.3 Symptom: White mist comes out of a unit (Indoor unit, outdoor unit)

When the system is changed over to heating operation after defrost operation. Moisture generated by defrost becomes steam and is exhausted.

### 10.1.4 Symptom: The user interface reads "U4" or "U5" and stops, but then restarts after a few minutes

This is because the user interface is intercepting noise from electric appliances other than the air conditioner. The noise prevents communication between the units, causing them to stop. Operation automatically restarts when the noise ceases. A power reset may help to remove this error.

### 10.1.5 Symptom: Noise of air conditioners (Indoor unit)

- A "zeen" sound is heard immediately after the power supply is turned on. The electronic expansion valve inside an indoor unit starts working and makes the noise. Its volume will reduce in about one minute.
- A continuous low "shah" sound is heard when the system is in cooling operation or at a stop. When the drain pump is in operation, this noise is heard.
- A "pishi-pishi" squeaking sound is heard when the system stops after heating operation. Expansion and contraction of plastic parts caused by temperature change make this noise.

### 10.1.6 Symptom: Noise of air conditioners (Indoor unit, outdoor unit)

- A continuous low hissing sound is heard when the system is in cooling or defrost 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 or defrost operation. This is the noise of refrigerant caused by flow stop or flow change.

### 10.1.7 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.

### 10.1.8 Symptom: The units can give off odours

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

# 11 Relocation

Contact your dealer to remove and reinstall the entire unit. Moving units requires technical expertise.

## 12 Disposal



### **NOTICE**

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

For the installer

# 13 About the box

Keep the following in mind:

- At delivery, the unit **MUST** be checked for damage and completeness. Any damage or missing parts **MUST** be reported immediately to the claims agent of the carrier.
- Bring the packed unit as close as possible to its final installation position to prevent damage during transport.
- Prepare in advance the path along which you want to bring the unit to its final installation position.

## In this chapter

13.1	Overview: About the box.....	40
13.2	Indoor unit.....	40
13.2.1	To unpack and handle the unit.....	40
13.2.2	To remove the accessories from the indoor unit.....	41
13.2.3	To remove the duct flanges from the indoor unit.....	42

## 13.1 Overview: About the box

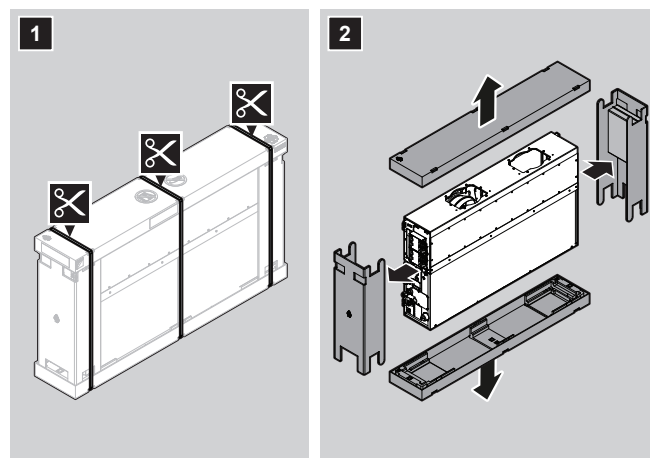
This chapter describes what you have to do after the box with the indoor unit is delivered on-site.

Keep the following in mind:

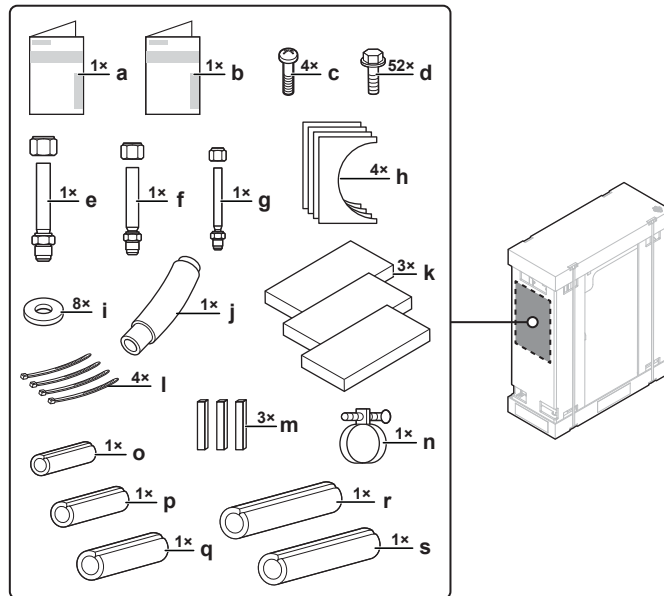
- At delivery, the unit **MUST** be checked for damage and completeness. Any damage or missing parts **MUST** be reported immediately to the claims agent of the carrier.
- Bring the packed unit as close as possible to its final installation position to prevent damage during transport.
- Prepare in advance the path along which you want to bring the unit to its final installation position.

## 13.2 Indoor unit

### 13.2.1 To unpack and handle the unit



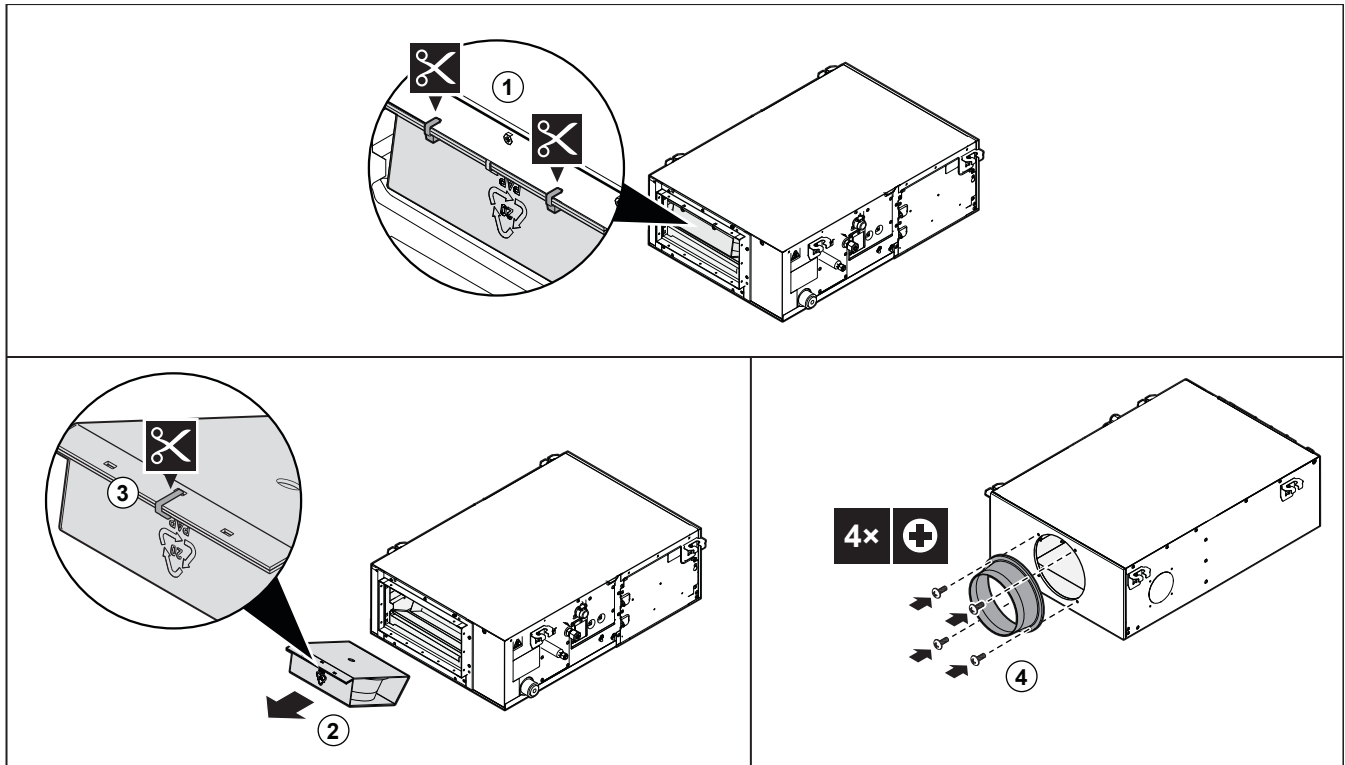
## 13.2.2 To remove the accessories from the indoor unit



- a** Installation and operation manual
- b** General safety precautions
- c** Screws for duct flanges (EKVDX32A2)
- d** Screws for duct flanges (EKVDX50~100A2)
- e** Auxiliary pipe (gas) (Ø15.9 mm)
- f** Auxiliary pipe (gas) (Ø12.7 mm)
- g** Auxiliary pipe (liquid) (Ø9.5 mm)
- h** Sealing for duct flanges (EKVDX50~100A2)
- i** Washers for hanger bracket
- j** Drain hose
- k** Sealing pads: drain pipe, gas pipe and liquid pipe
- l** Tie wraps
- m** Sealing strips for cables (switchbox and option box cable entry)
- n** Metal clamp
- o** Insulation tube (Ø10-26 mm, length 65 mm)
- p** Insulation tube (Ø13-29 mm, length 65 mm)
- q** Insulation tube (Ø15-31 mm, length 70 mm)
- r** Insulation tube (Ø26-42 mm, length 250 mm)
- s** Insulation tube (Ø32-52 mm, length 250 mm)

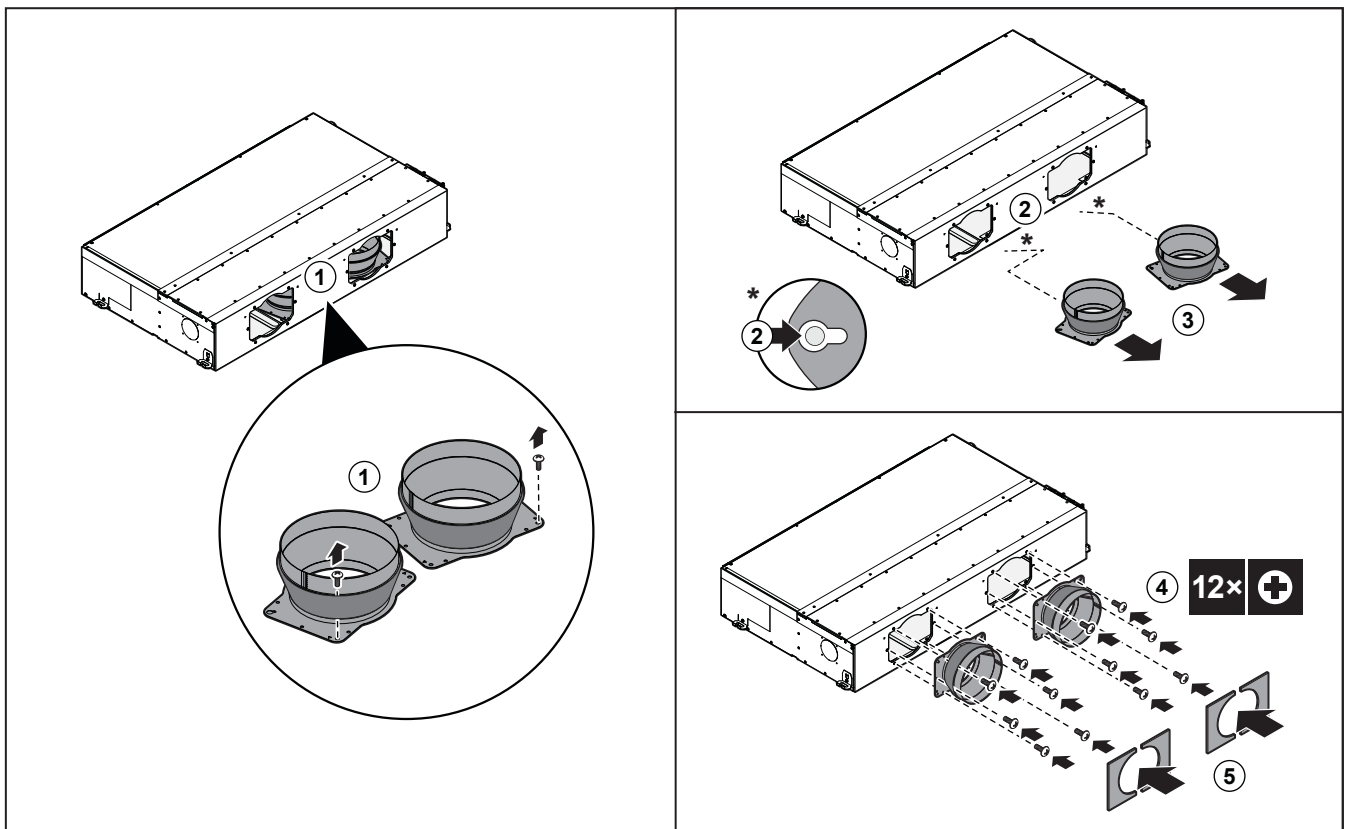
13.2.3 To remove the duct flanges from the indoor unit

**Duct flange for EKVDX32A2**



**Duct flange(s) for EKVDX50~100A2**

The procedure below shows the EKVDX100A2 but is similar for the EKVDX50-80A2 that only have 1 duct flange (reducer).



# 14 About the units and options

## In this chapter

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14.2	About the indoor unit.....	43
14.3	System layout.....	44
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## 14.1 Identification

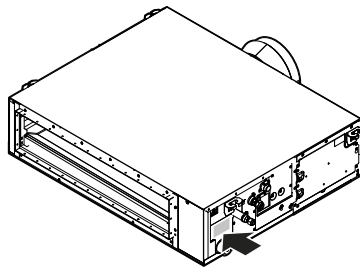


### NOTICE

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

### 14.1.1 Identification label: Indoor unit

#### Location



## 14.2 About the indoor unit

For safe and effective operation:

- In case an EKVDX unit is connected, the maximum allowed outdoor unit temperature is 46°C (even if the outdoor unit is capable to go higher if no EKVDX is connected).
- The supply air coming from the heat reclaim ventilation unit should correspond to the following temperature and humidity ranges.

	Cooling	Heating
Air supply temperature	11~35°C DB	
Indoor humidity <sup>(a)</sup>	≤80%	
Setting temperature range	13~30°C	24~45°C

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

**INFORMATION**

The EKVDX is a pretreatment unit. Therefore, the temperature setpoints:

- are not displayed on the user interface.
- can only be modified with field settings (see "[20.5 Field settings](#)" [▶ 81] for the appropriate field settings).

## 14.3 System layout

**WARNING**

In case of R32 refrigerant, the installation **MUST** comply with the requirements that apply to this R32 equipment. For more information, see "[3.1 Instructions for equipment using R32 refrigerant](#)" [▶ 15].

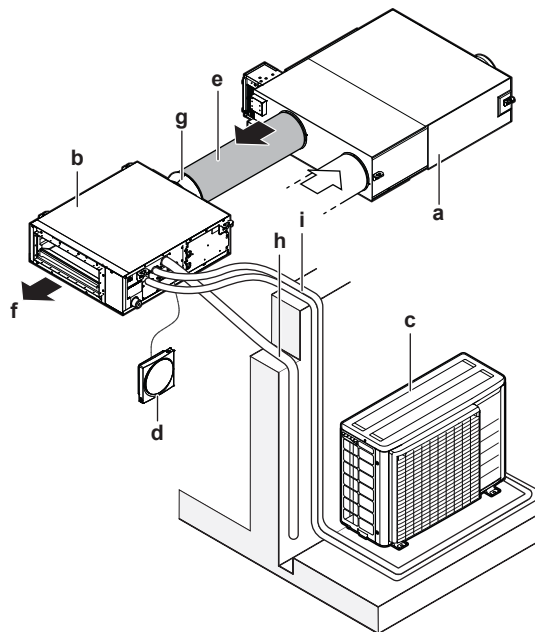
**NOTICE**

The EKVDX unit is an airconditioning unit for pretreatment of incoming supply air from a VAM heat reclaim ventilation unit. For comfort temperature control, it is still required to install a normal indoor unit.

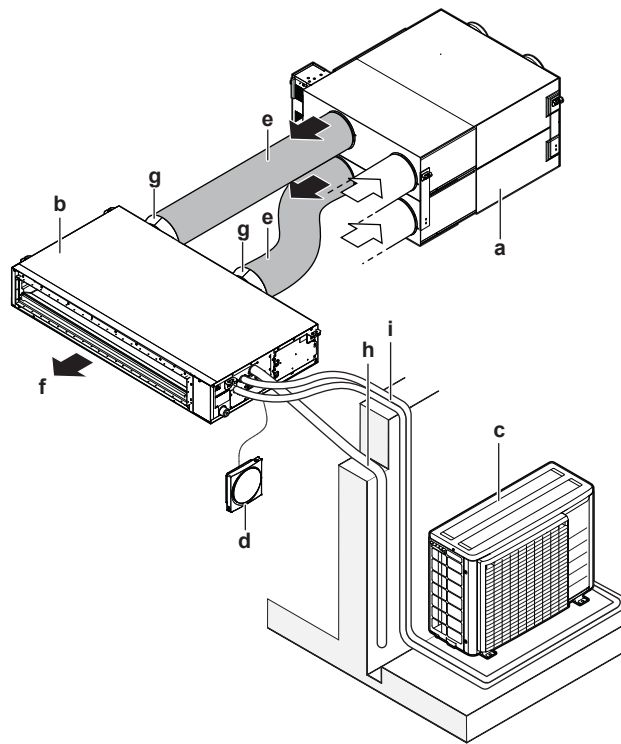
Do not place the EKVDX unit before the heat reclaim ventilation unit.

**INFORMATION**

The following figures are examples and may **NOT** completely match your system layout.



▲ 14-1 For VAM500~1000 and EKVDX32~80



14-2 For VAM1500+2000 and EKV DX100

- a Heat reclaim ventilation unit (VAM)
- b EKV DX indoor unit
- c Outdoor unit
- d User interface
- e Air inlet duct for EKV DX indoor unit
- f Discharge air
- g Duct flange(s)
- h Drain pipe
- i Refrigerant piping + interconnection cable

## 14.4 Combining units and options



### INFORMATION

Certain options may NOT be available in your country.

### 14.4.1 Possible options for the indoor unit



### CAUTION

- Each VAM unit is connected to only ONE EKV DX unit (via duct and electrical connection).
- When connected to an EKV DX unit, there is NO connection of the VAM to any other indoor unit, linkage or multiple EKV DX units.
- Each EKV DX unit MUST have ONLY ONE user interface. Only a safety system compatible remote controller can be used as the user interface. See technical data sheet for remote controller compatibility (e.g. H-type user interface like BRC1H52/82\*).
- Supervising and/or slave user interfaces are NOT allowed for EKV DX units.
- R32 refrigerant: the user interface MUST be installed in one of the rooms the EKV DX unit is discharging into.
- R410A refrigerant: the user interface can also be installed in e.g. the hallway.



**INFORMATION**

All possible options are mentioned in the option list of the indoor unit. For more information about an option, refer to the installation and operation manual of the option.

14.4.2 Compatibility with outdoor unit

Refrigerant	Unit	EKVDX
R410A	All VRV – III	NO
	All VRV-IV	YES
	ERQ	NO
R32	All VRV-V	YES

14.4.3 Compatibility with VAM models

	EKVDX32	EKVDX50	EKVDX80	EKVDX100
VAM500J*	●	—	—	—
VAM650J*	—	●	—	—
VAM800J*	—	●	—	—
VAM1000J*	—	—	●	—
VAM1500J*	—	—	—	●
VAM2000J*	—	—	—	●

- Not compatible
- Compatible in pair

The EKVDX option is not available for VAM350J\*.

# 15 Special requirements for R32 units

In this chapter

15.1	Installation space requirements.....	47
15.2	To determine the charge limitations.....	48
15.3	To determine the floor area.....	51

## 15.1 Installation space requirements

If the system uses R32 refrigerant, extra safety measures are required because R32 refrigerant is mildly flammable. This means that the system is restricted with respect to the total refrigerant charge and/or the floor area that is served.



### WARNING

In case the appliance contains R32 refrigerant, refer to "[15.2 To determine the charge limitations](#)" [▶48].

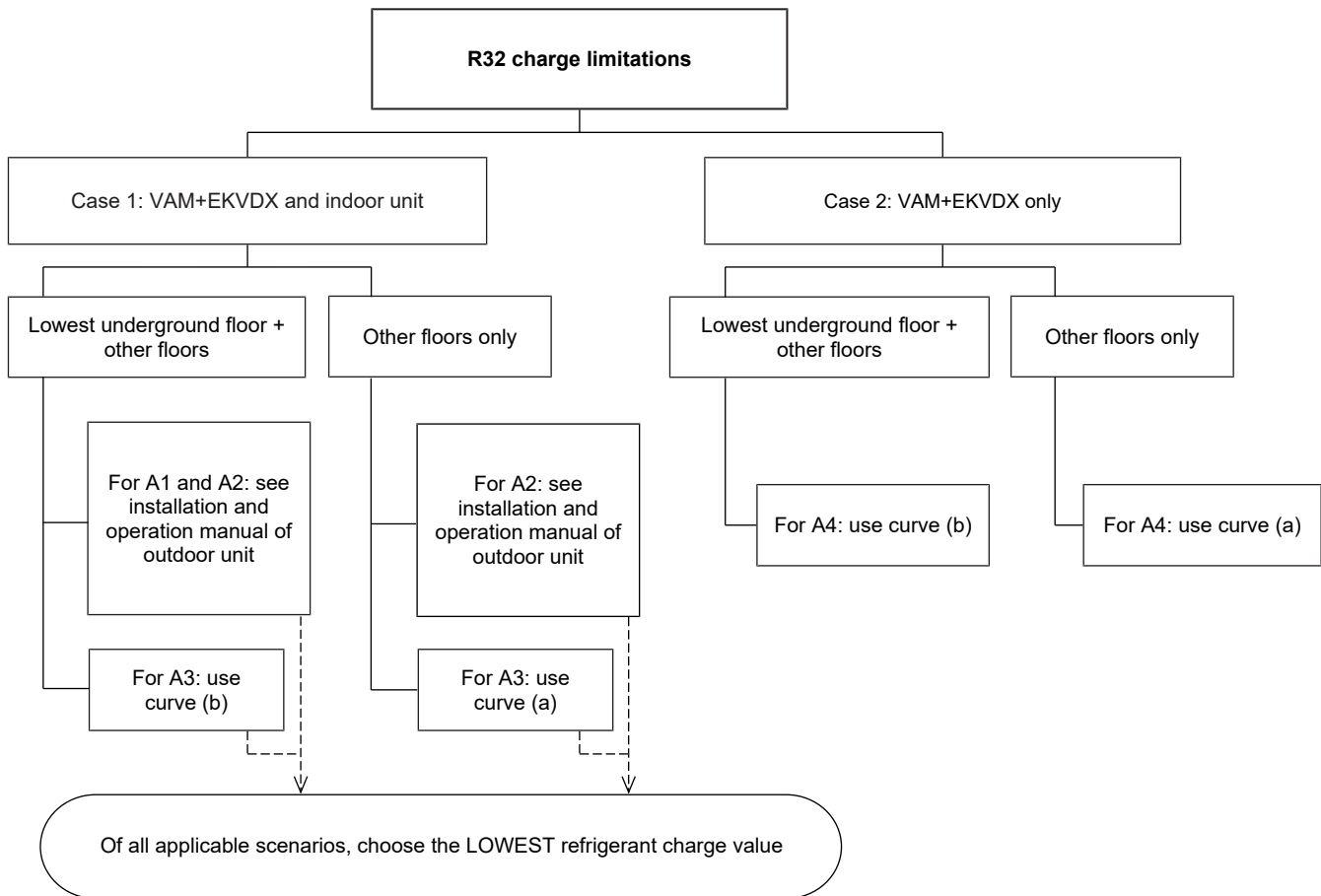


### NOTICE

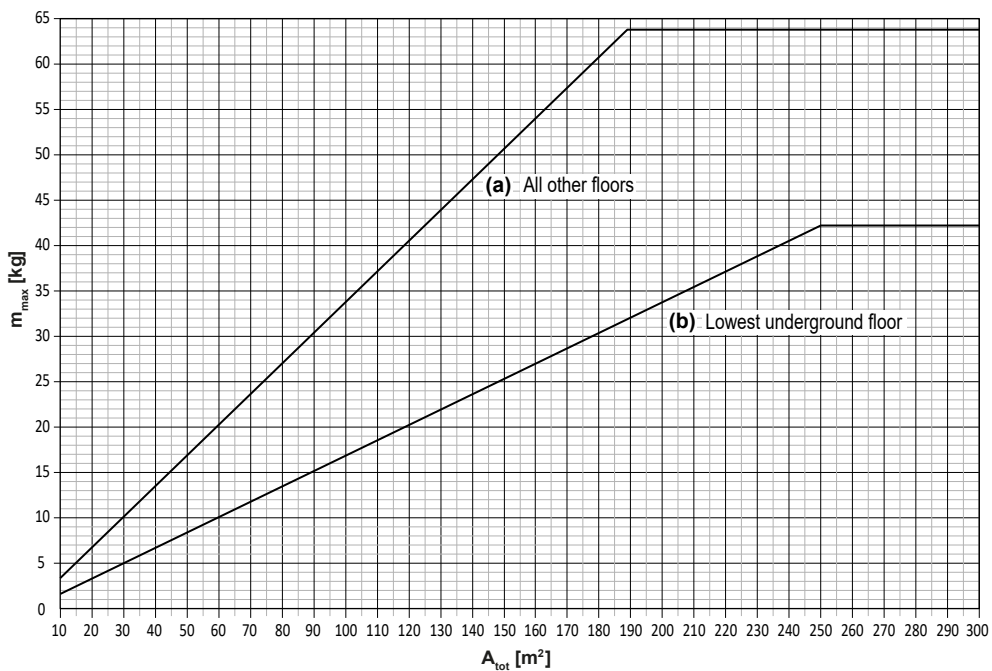
- The pipework shall be securely mounted and guarded protected from physical damage.
- Keep the pipework installation to a minimum.

## 15.2 To determine the charge limitations

### Overview



### Graph and table for EKVDX



$A_{tot}$ [m <sup>2</sup> ]	m [kg]	$A_{tot}$ [m <sup>2</sup> ]	m [kg]	$A_{tot}$ [m <sup>2</sup> ]	m [kg]
5	—	105	35.4 <sup>(a)</sup> / 17.7 <sup>(b)</sup>	205	63.8 <sup>(a)</sup> / 34.6 <sup>(b)</sup>
10	3.3 <sup>(a)</sup> / 1.6 <sup>(b)</sup>	110	37.1 <sup>(a)</sup> / 18.5 <sup>(b)</sup>	210	63.8 <sup>(a)</sup> / 35.4 <sup>(b)</sup>
15	5.0 <sup>(a)</sup> / 2.5 <sup>(b)</sup>	115	38.8 <sup>(a)</sup> / 19.4 <sup>(b)</sup>	215	63.8 <sup>(a)</sup> / 36.3 <sup>(b)</sup>
20	6.7 <sup>(a)</sup> / 3.3 <sup>(b)</sup>	120	40.5 <sup>(a)</sup> / 20.2 <sup>(b)</sup>	220	63.8 <sup>(a)</sup> / 37.1 <sup>(b)</sup>
25	8.4 <sup>(a)</sup> / 4.2 <sup>(b)</sup>	125	42.2 <sup>(a)</sup> / 21.1 <sup>(b)</sup>	225	63.8 <sup>(a)</sup> / 37.9 <sup>(b)</sup>
30	10.1 <sup>(a)</sup> / 5.0 <sup>(b)</sup>	130	43.9 <sup>(a)</sup> / 21.9 <sup>(b)</sup>	230	63.8 <sup>(a)</sup> / 38.8 <sup>(b)</sup>
35	11.8 <sup>(a)</sup> / 5.9 <sup>(b)</sup>	135	45.5 <sup>(a)</sup> / 22.7 <sup>(b)</sup>	235	63.8 <sup>(a)</sup> / 39.6 <sup>(b)</sup>
40	13.5 <sup>(a)</sup> / 6.7 <sup>(b)</sup>	140	47.2 <sup>(a)</sup> / 23.6 <sup>(b)</sup>	240	63.8 <sup>(a)</sup> / 40.5 <sup>(b)</sup>
45	15.1 <sup>(a)</sup> / 7.5 <sup>(b)</sup>	145	48.9 <sup>(a)</sup> / 24.4 <sup>(b)</sup>	245	63.8 <sup>(a)</sup> / 41.3 <sup>(b)</sup>
50	16.8 <sup>(a)</sup> / 8.4 <sup>(b)</sup>	150	50.6 <sup>(a)</sup> / 25.3 <sup>(b)</sup>	250	63.8 <sup>(a)</sup> / 42.2 <sup>(b)</sup>
55	18.5 <sup>(a)</sup> / 9.2 <sup>(b)</sup>	155	52.3 <sup>(a)</sup> / 26.1 <sup>(b)</sup>	255	63.8 <sup>(a)</sup> / 42.2 <sup>(b)</sup>
60	20.2 <sup>(a)</sup> / 10.1 <sup>(b)</sup>	160	54.0 <sup>(a)</sup> / 27.0 <sup>(b)</sup>	260	63.8 <sup>(a)</sup> / 42.2 <sup>(b)</sup>
65	21.9 <sup>(a)</sup> / 10.9 <sup>(b)</sup>	165	55.7 <sup>(a)</sup> / 27.8 <sup>(b)</sup>	265	63.8 <sup>(a)</sup> / 42.2 <sup>(b)</sup>
70	23.6 <sup>(a)</sup> / 11.8 <sup>(b)</sup>	170	57.4 <sup>(a)</sup> / 28.7 <sup>(b)</sup>	270	63.8 <sup>(a)</sup> / 42.2 <sup>(b)</sup>
75	25.3 <sup>(a)</sup> / 12.6 <sup>(b)</sup>	175	59.0 <sup>(a)</sup> / 29.5 <sup>(b)</sup>	275	63.8 <sup>(a)</sup> / 42.2 <sup>(b)</sup>
80	27.0 <sup>(a)</sup> / 13.5 <sup>(b)</sup>	180	60.7 <sup>(a)</sup> / 30.3 <sup>(b)</sup>	280	63.8 <sup>(a)</sup> / 42.2 <sup>(b)</sup>
85	28.7 <sup>(a)</sup> / 14.3 <sup>(b)</sup>	185	62.4 <sup>(a)</sup> / 31.2 <sup>(b)</sup>	285	63.8 <sup>(a)</sup> / 42.2 <sup>(b)</sup>
90	30.3 <sup>(a)</sup> / 15.1 <sup>(b)</sup>	190	63.8 <sup>(a)</sup> / 32.0 <sup>(b)</sup>	290	63.8 <sup>(a)</sup> / 42.2 <sup>(b)</sup>
95	32.0 <sup>(a)</sup> / 16.0 <sup>(b)</sup>	195	63.8 <sup>(a)</sup> / 32.9 <sup>(b)</sup>	295	63.8 <sup>(a)</sup> / 42.2 <sup>(b)</sup>
100	33.7 <sup>(a)</sup> / 16.8 <sup>(b)</sup>	200	63.8 <sup>(a)</sup> / 33.7 <sup>(b)</sup>	300	63.8 <sup>(a)</sup> / 42.2 <sup>(b)</sup>

<sup>(a)</sup> All other floors  
<sup>(b)</sup> Lowest underground floor

- m** Total refrigerant charge limit in the system  
**A<sub>tot</sub>** Total room area  
**(a)** All other floors (=All other floors)  
**(b)** Lowest underground floor (=Lowest underground floor)

When total floor area  $A_3$  is determined, use the graph or table above to determine the total refrigerant charge limit in the system. For  $A_1$  and  $A_2$ , use the graph or table from the outdoor unit installation manual.

#### Notes:

- When multiple outdoor units are serving the same space, calculate the room area based on the outdoor unit with the largest refrigerant charge.
- The factory charge depends on the outdoor unit in the system. The examples used below consider a VRV 5-S R32 outdoor unit.
- Make sure the total refrigerant charge amount is lower than:
  - 15.96 kg x the total number of connected indoor units and EKVDX units.
  - 63.8 kg in case there is NO underground floor.
  - 42.2 kg in case the VAM+EKVDX system contains at least one room in the lowest underground floor.

#### Case 1: VAM+EKVDX and indoor unit(s) combined

**Step 1** – determine:

- $A_1$  – the area of the smallest room in the lowest underground floor in which an indoor unit is present (if applicable). See outdoor unit installation manual.
- $A_2$  – the area of the smallest room not in the lowest underground floor, in which an indoor unit is present. See outdoor unit installation manual.
- $A_3$  – the total area of all the rooms which the EKVDX is discharging air into. See "15.3 To determine the floor area" [▶ 51].

**Note:** The EKVDX can be discharging into the same room as a normal indoor unit. The area of this room must also be taken into account for  $A_3$ .



#### WARNING

For VAM+EKVDX, only consider rooms that are continuously served. E.g. In case of zonal dampers in the duct between EKVDX and a room, this room cannot be considered as part of the total room area. Only exception are zonal dampers only used for fire safety.

Use  $A_1$ ,  $A_2$  and  $A_3$  in the following steps to determine the maximum allowable total charge of the system.

**Step 2** – see the installation manual of the outdoor unit for choosing the correct curve depending on the installation height of the indoor unit. For EKVDX units, installation height should always be  $\geq 2.2$  m.

**Step 3** – in case there are underground floors, determine the maximum allowable charge limit in the system for each area ( $A_1$ ,  $A_2$  and  $A_3$ ):

- For the room with the smallest area containing an indoor unit not on the lowest underground floor/on the lowest underground floor: see the outdoor unit installation manual on R32 charge limitations.
- For the total room area for the VAM+EKVDX system when it contains:
  - no room in the lowest underground floor, refer to curve (a).
  - at least one room in the lowest underground floor, refer to curve (b).

Once the maximum allowable charge has been calculated for all applicable scenarios, use the lowest value as the upper limit.

**Step 4** – determine the total amount of allowable refrigerant charge in the system based on the above curves.

**Step 5** – the total refrigerant charge in the system must be less than the maximum allowable total refrigerant charge value derived from step 4. If not:

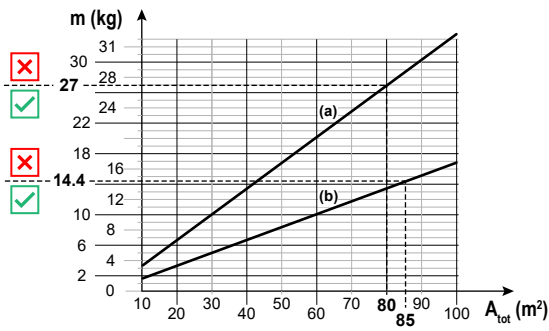
- 1 Change the installation. Do one of the following:
  - Increase the area of smallest room.
  - Decrease the piping length by changing the system layout (if practical).
  - Increase the total floor area of the VAM+EKVDX system.
  - Add additional countermeasures as described in the applicable legislation.
- 2 Repeat all of the above steps.

**Example**

VRV system with an EKVDX and ceiling mounted indoor units serving 4 rooms. The total room area of all 4 rooms is 80 m<sup>2</sup>, the smallest room with an indoor unit has an area of 16 m<sup>2</sup>. No underground floor in the building.

- To check the maximum allowable charge for the total room area of 80 m<sup>2</sup> with an EKVDX unit in the system, use curve (a) (see "[15-1 Example](#)" [▶ 51]). **Result:** 27 kg.
- To check the maximum allowable charge, for a room of 16 m<sup>2</sup> with a ceiling mounted unit, see the outdoor unit manual section on charge limitations. **Result:** 10.4 kg.

Charge in system	10.4 kg
Factory charge	3.4 kg
<b>Maximum field piping charge</b>	<b>7.0 kg</b>



15-1 Example

**Case 2: VAM+ EKVDX only**

**Step 1** – determine  $A_4$ : the total area of all the rooms which the EKVDX unit is discharging air into. See "15.3 To determine the floor area" [▶ 51].

**Step 2** – (see step 2 of case 1)

**Step 3** – in case the EKVDX:

- is not discharging into any room in the lowest underground floor, refer to curve (a).
- can discharge to a combination of rooms in the lowest underground floor and other floors, refer to curve (b).

**Step 4** – (see step 4 of case 1)

**Step 5** – (see step 5 of case 1)

**Example**

VRV system with an EKVDX serving 5 rooms. The total room area is 85 m<sup>2</sup>, the smallest room with a ceiling mounted indoor unit on other floors has an area of 14 m<sup>2</sup>. There are multiple underground floors in the building and the smallest room with an indoor unit in the lowest underground floor has an area of 24 m<sup>2</sup>.

- To check the maximum allowable charge for a total room area of 85 m<sup>2</sup> with an EKVDX unit in the system, use curve (b) (see "15-1 Example" [▶ 51]). **Result:** 14.4 kg.
- To check the maximum allowable charge, see the outdoor unit manual for the following calculations:
  - for a room of 14 m<sup>2</sup> with a ceiling mounted unit not in the lowest underground floor. **Result:** 9.7 kg.
  - for the smallest room of 24m<sup>2</sup> of the lowest underground floor with a wall mounted indoor unit. **Result:** 8.1 kg.

8.1 < 9.7 < 14.4 kg, therefore the maximum allowable refrigerant charge is 8.1 kg (smallest value).

Charge in system	8.1 kg
Factory charge	3.4 kg
<b>Maximum field piping charge</b>	<b>4.7 kg</b>

15.3 To determine the floor area

Follow these rules to determine the room area:

- Determine the room area by projecting the walls, doors and partitions to the floor and calculating the enclosed area.

- Do not consider spaces connected by only false ceilings, ductwork or similar connections as a single space.
- If the partition between 2 rooms on the same floor meets certain requirements, the rooms are considered as one room and the areas of the rooms may be added up. This way it is possible to increase the room area value used to calculate the maximum allowed charge.

When considering the smallest single room (for other indoor units only, NOT for EKVDX), one of the following 2 requirements MUST be followed:

- Rooms on the same floor that are connected with a permanent opening that extends to the floor and is intended for people to walk through can be considered as one room.
- Rooms on the same floor connected with openings that fulfil certain requirements (see the installation and operation manual of the outdoor unit) can be considered as a single room. The opening must consist out of at least 2 parts to allow for air circulation.

# 16 Unit installation



## WARNING

In case of R32 refrigerant, the installation MUST comply with the requirements that apply to this R32 equipment. For more information, see "[3.1 Instructions for equipment using R32 refrigerant](#)" [▶ 15].

## In this chapter

16.1	Preparing the installation site .....	53
16.1.1	Installation site requirements of the indoor unit .....	53
16.2	Mounting the indoor unit .....	55
16.2.1	Guidelines when installing the indoor unit .....	55
16.2.2	Guidelines when installing the ducting .....	56
16.2.3	Guidelines when installing the drain piping .....	57
16.2.4	To connect the drain piping to the indoor unit .....	58

## 16.1 Preparing the installation site



## WARNING

The appliance shall be stored in a room without continuously operating ignition sources (example: open flames, an operating gas appliance or an operating electric heater).



## WARNING

The appliance shall be stored/installed as follows:

- in such a way as to prevent mechanical damage.
- in a well-ventilated room without continuously operating ignition sources (example: open flames, an operating gas appliance or an operating electric heater).
- in a room with dimensions as specified in "[15 Special requirements for R32 units](#)" [▶ 47].

Choose an installation location with sufficient space to transport the unit in and out of the site.

Avoid installation in an environment with a lot of organic solvents such as ink and siloxane.

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.

Avoid direct sunlight on the unit (e.g. false ceiling exposed to natural light).

### 16.1.1 Installation site requirements of the indoor unit



## INFORMATION

Also read the general installation site requirements. See the "[2 General safety precautions](#)" [▶ 6] chapter.



## INFORMATION

The sound pressure level is less than 70 dBA.

**WARNING**

Keep any required ventilation openings clear of obstructions.

**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**

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

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

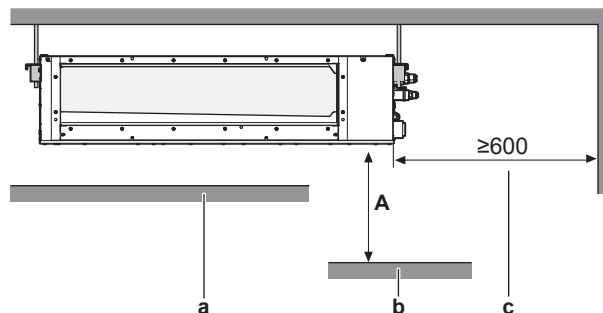
In places with weak reception, keep distances of 3 m or more to avoid electromagnetic interference of other equipment and use conduit tubes for power and interconnection lines.

Do NOT install the unit in the following places:

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

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

- Where the voltage fluctuates a lot
- In vehicles or vessels
- Where acidic or alkaline vapour is present
- Ensure that in the event of a water leak, no damage occurs to the installation space or its surroundings.
- Choose a location where the operation noise or the hot/cold air discharged from the unit will not disturb anyone and the location is selected according the applicable legislation.
- **Drainage.** Make sure condensation water can be evacuated properly.
- **Ceiling insulation.** When conditions in the ceiling exceed 30°C and a relative humidity of 80%, or when fresh air is inducted into the ceiling, then additional insulation is required (minimum 10 mm thickness, polyethylene foam).
- **Spacing.** Mind the following requirements:

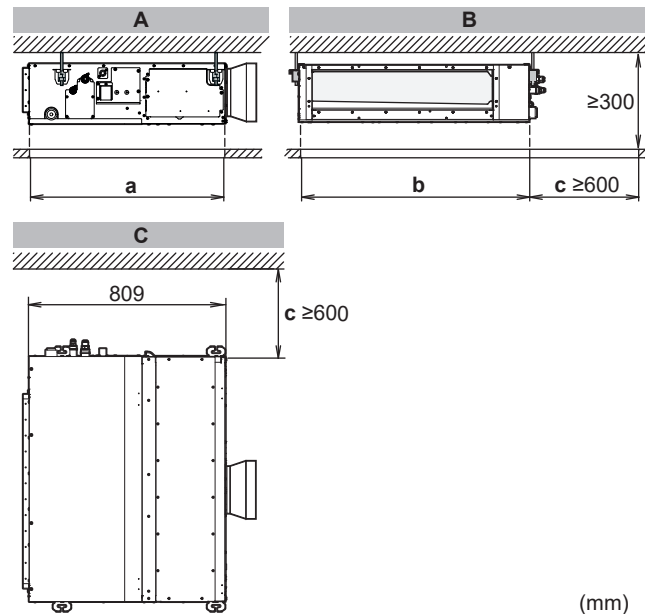


- A 2.7 m minimum distance to the floor (to avoid accidental touching)
- a Ceiling
- b Floor surface
- c Service space

- **Discharge grille.** Minimum requirement installation height of discharge grille  $\geq 1.8$  m.

### Service space and ceiling opening size

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



- (mm)
- A Side view: refrigerant piping, drain piping, control box
  - B Side view: air outlet
  - C Bottom view
  - a Ceiling opening – width:  
900 mm (EKVDX32)  
950 mm (EKVDX50~100)
  - b Ceiling opening – length:  
550 mm (EKVDX32)  
700 mm (EKVDX50)  
1000 mm (EKVDX80)  
1400 mm (EKVDX100)
  - c Service space

### Total floor area requirements



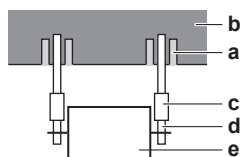
#### CAUTION

The total R32 refrigerant charge in the system MUST comply with the calculations in chapter "15.2 To determine the charge limitations" [▶ 48].

## 16.2 Mounting the indoor unit

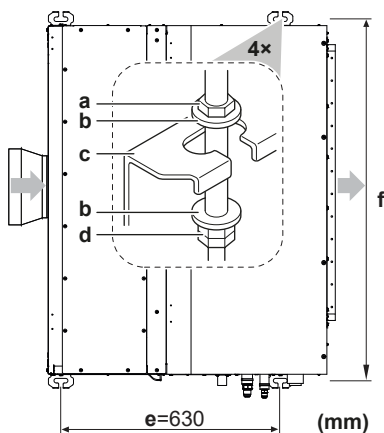
### 16.2.1 Guidelines when installing the indoor unit

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



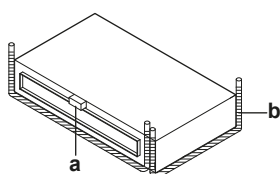
- a Anchor
- b Ceiling slab
- c Long nut or turnbuckle
- d Suspension bolt
- e Indoor unit

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



- a Nut (field supply)
- b Washer (accessories)
- c Hanger bracket
- d Double nut (field supply)
- e Suspension bolt pitch (width)
- f Suspension bolt pitch (length):  
 588 mm (EKVDX32)  
 738 mm (EKVDX50)  
 1038 mm (EKVDX80)  
 1438 mm (EKVDX100)

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



- a Water level
- b Vinyl tube



**NOTICE**

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

16.2.2 Guidelines when installing the ducting



**CAUTION**

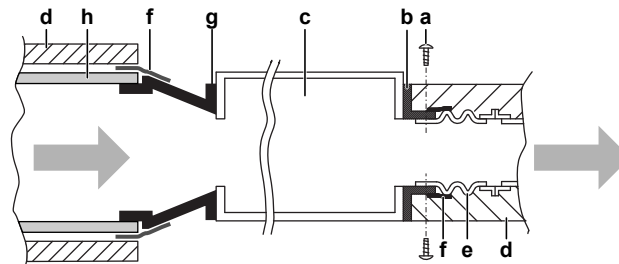
See "[3 Specific installer safety instructions](#)" [▶ 13] to make sure this installation complies with all safety regulations.

Minimum duct lengths:

- Supply air duct between VAM and EKVDX:
  - for VAM500+EKVDX32:  $\geq 500$  mm
  - for all other combinations:  $\geq 750$  mm
- Minimum outdoor air, return air and exhaust air duct length:  $\geq 1.5$  m
- Ducting after EKVDX: no minimum length limit

The ducting must be field supplied.

- 1 Connect the canvas duct to the inside of the flange on the outlet side. For connecting the canvas duct, use accessory screws.
- 2 Connect the duct to the canvas duct.

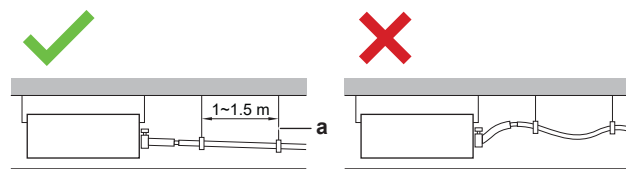


- a Screws for duct flanges (accessory)
- b Duct flange, rectangular (installed on the unit)
- c Indoor unit
- d Insulation (field supply)
- e Canvas duct (field supply)
- f Aluminium tape (field supply)
- g Duct flange, round reducer (installed on the unit)
- h Round duct

- 3 Wind aluminium tape around the flange and duct connections. Make sure there are no air leaks at any other connection.
- 4 Insulate the inlet and outlet ducts to prevent condensation. Use glass wool or polyethylene foam 25 mm thick.

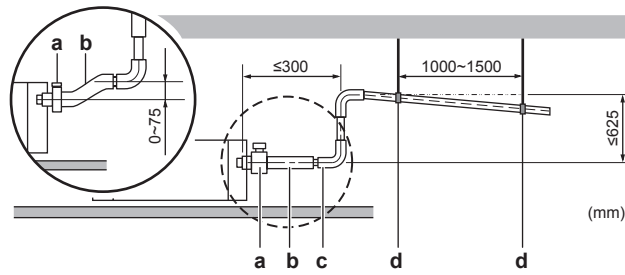
### 16.2.3 Guidelines when installing the drain piping

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



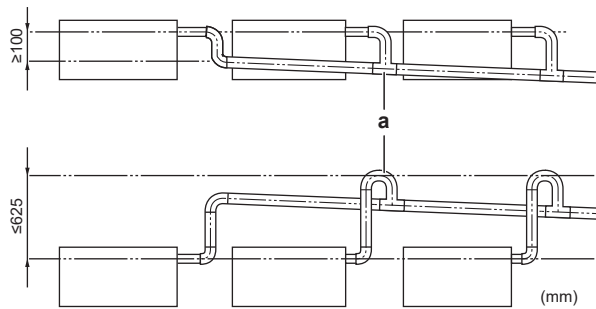
- a Hanging bar
- ✓ Allowed
- ✗ Not allowed

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



- a Metal clamp (accessory)
- b Drain hose (accessory)
- c Rising drain piping (vinyl pipe of nominal  $\varnothing 20$  mm and outer  $\varnothing 26$  mm) (field supply)
- d Hanging bars (field supply)

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



a T-joint

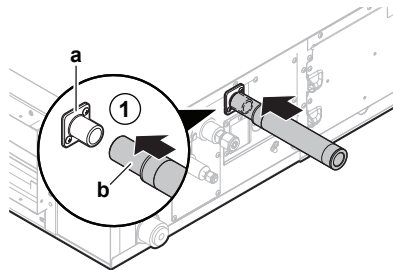
#### 16.2.4 To connect the drain piping to the indoor unit



**NOTICE**

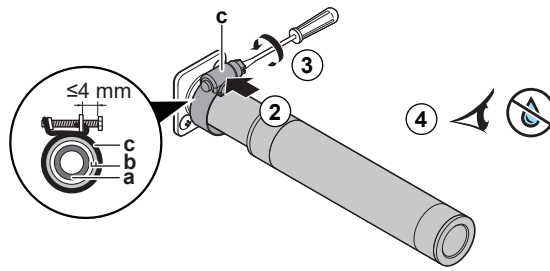
Incorrect connection of the drain hose might cause leaks, and damage the installation space and surroundings.

- 1 Push the drain hose as far as possible over the drain pipe connection.



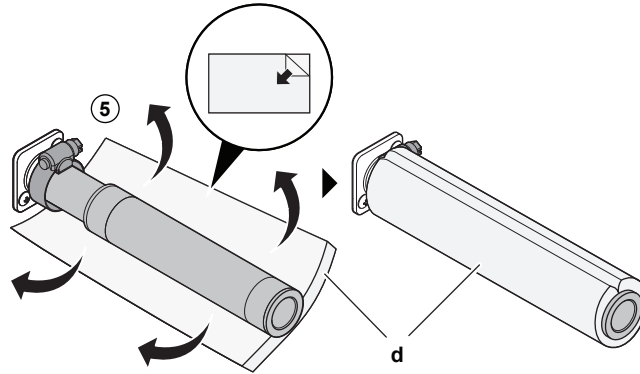
- a Drain pipe connection (attached to the unit)
- b Drain hose (accessory)

- 2 Install the metal clamp.
- 3 Tighten the metal clamp until the screw head is less than 4 mm from the metal clamp part.
- 4 Gradually put approximately 1 l of water in the drain pan, and check for water leaks.



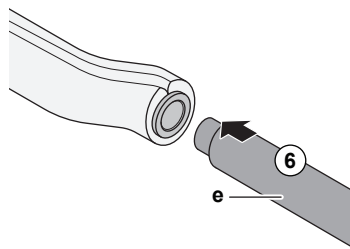
- a Drain pipe connection (attached to the unit)
- b Drain hose (accessory)
- c Metal clamp (accessory)

- 5 Wind the self-adhesive sealing pad (accessory) around the metal clamp and drain hose.



- d Sealing pad (accessory)

- 6 Connect the drain piping to the drain hose.



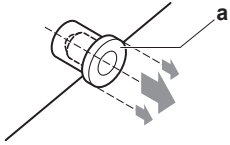
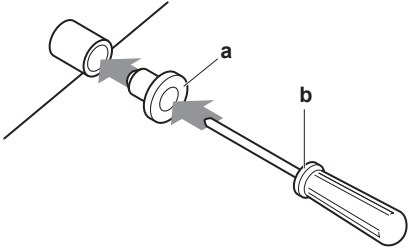
- e Drain piping (field supply)



#### NOTICE

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

**Drain pipe plug**

<b>Plug removal</b>	<b>Plug installation</b>
<p>Pull out the plug, but do NOT wiggle the plug up and down.</p> 	<p>Set the plug and push it in using a Phillips screwdriver.</p> 

- a** Drain pipe plug
- b** Philips screwdriver

# 17 Piping installation



## CAUTION

See "3 Specific installer safety instructions" [▶ 13] to make sure this installation complies with all safety regulations.

## In this chapter

17.1	Preparing refrigerant piping .....	61
17.1.1	Refrigerant piping requirements .....	61
17.1.2	Refrigerant piping insulation .....	62
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17.2.1	About connecting the refrigerant piping .....	62
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17.2.3	Guidelines when connecting the refrigerant piping .....	64
17.2.4	Pipe bending guidelines .....	64
17.2.5	To flare the pipe end .....	64
17.2.6	To connect the refrigerant piping to the indoor unit .....	65

## 17.1 Preparing refrigerant piping

### 17.1.1 Refrigerant piping requirements



## CAUTION

Piping **MUST** be installed according to instructions given in "17 Piping installation" [▶ 61]. Only mechanical joints (e.g. braze+flare connections) that are compliant with the latest version of ISO14903 can be used.



## NOTICE

The piping and other pressure-containing parts shall be suitable for refrigerant. Use phosphoric acid deoxidised seamless copper for refrigerant piping.



## INFORMATION

Also read the precautions and requirements in the "2 General safety precautions" [▶ 6].

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

### Refrigerant piping diameter

For piping connections of the indoor unit use the following piping diameters.

Model	Pipe outer diameter (mm)			
	R410A		R32 <sup>(a)</sup>	
	Gas	Liquid	Gas	Liquid
EKVDX32	Ø12.70	Ø6.35	Ø9.52	Ø6.35
EKVDX50	Ø12.70	Ø6.35	Ø12.70	Ø6.35
EKVDX80	Ø15.90	Ø9.52	Ø12.70	Ø6.35
EKVDX100	Ø15.90	Ø9.52	Ø15.90	Ø9.52

<sup>(a)</sup> For R32 refrigerant, accessory pipes may be required for certain units. Accessory pipes are supplied with the unit.

### Refrigerant piping material


#### Piping material

Phosphoric acid deoxidised seamless copper

#### Flare connections

Only use annealed material.

#### Piping temper grade and thickness

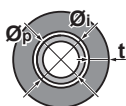
Outer diameter (Ø)	Temper grade	Thickness (t) <sup>(a)</sup>	
6.4 mm (1/4")	Annealed (O)	≥0.8 mm	
9.5 mm (3/8")			
12.7 mm (1/2")			
15.9 mm (5/8")			

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

#### 17.1.2 Refrigerant piping insulation

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

Pipe outer diameter (Ø <sub>p</sub> )	Insulation inner diameter (Ø <sub>i</sub> )	Insulation thickness (t)
6.4 mm (1/4")	8~10 mm	≥10 mm
9.5 mm (3/8")	10~14 mm	≥13 mm
12.7 mm (1/2")	14~16 mm	≥13 mm
15.9 mm (5/8")	16~20 mm	≥13 mm



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

## 17.2 Connecting the refrigerant piping

### 17.2.1 About connecting the refrigerant piping

#### Before connecting the refrigerant piping

Make sure the outdoor and indoor unit are mounted.


#### Typical workflow


Connecting the refrigerant piping involves:

- Connecting the refrigerant piping to the indoor unit


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

17.2.2 Precautions when connecting the refrigerant piping

 **DANGER: RISK OF BURNING/SCALDING**

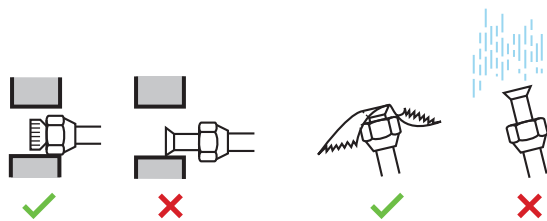
 **CAUTION**

- Do NOT use mineral oil on flared part.
- Do NOT reuse piping from previous installations.
- NEVER install a drier to this unit to guarantee its lifetime. The drying material may dissolve and damage the system.


 **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 R32 or R410A when adding refrigerant. Refer to the outdoor unit specifications for the type of refrigerant to be used.
- Only use installation tools (e.g. manifold gauge set) that are exclusively used for R32 or R410A installations to withstand the pressure and to prevent foreign materials (e.g. mineral oils and moisture) from mixing into the system.
- Install the piping so that the flare is NOT subjected to mechanical stress.
- Do NOT leave pipes unattended at the site. If the installation is NOT done within 1 day, 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 (see figure below).



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	

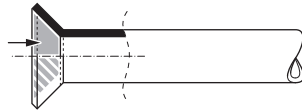
 **NOTICE**

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.

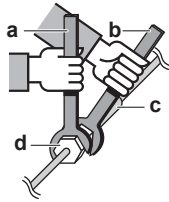
17.2.3 Guidelines when connecting the refrigerant piping

Take the following guidelines into account when connecting pipes:

- Coat the flare inner surface with ether oil or ester oil when connecting a flare nut. Tighten 3 or 4 turns by hand, before tightening firmly.



- ALWAYS use 2 wrenches together when loosening a flare nut.
- ALWAYS use a spanner and torque wrench together to tighten the flare nut when connecting the piping. This to prevent nut cracking and leaks.



- a Torque wrench
- b Spanner
- c Piping union
- d Flare nut

Piping size (mm)	Tightening torque (N•m)	Flare dimensions (A) (mm)	Flare shape (mm)
∅6.4	15~17	8.7~9.1	
∅9.5	33~39	12.8~13.2	
∅12.7	50~60	16.2~16.6	
∅15.9	62~75	19.3~19.7	

17.2.4 Pipe bending guidelines

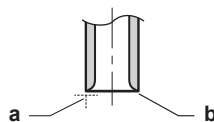
Use a pipe bender for bending. All pipe bends should be as gentle as possible (bending radius should be 30~40 mm or larger).

17.2.5 To flare the pipe end

**CAUTION**

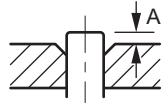
- Incomplete flaring may cause refrigerant gas leakage.
- Do NOT re-use flares. Use new flares to prevent refrigerant gas leakage.
- Use flare nuts that are included with the unit. Using different flare nuts may cause refrigerant gas leakage.

- 1 Cut the pipe end with a pipe cutter.
- 2 Remove burrs with the cut surface facing down so that the chips do NOT enter the pipe.



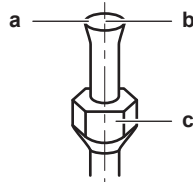
- a Cut exactly at right angles.
- b Remove burrs.

- 3 Remove the flare nut from the stop valve and put the flare nut on the pipe.
- 4 Flare the pipe. Set exactly at the position as shown in the following figure.



	Flare tool for R32 (clutch type)	Conventional flare tool	
		Clutch type (Ridgid-type)	Wing nut type (Imperial-type)
A	0~0.5 mm	1.0~1.5 mm	1.5~2.0 mm

5 Check that the flaring is properly made.



- a Flare's inner surface MUST be flawless.
- b The pipe end MUST be evenly flared in a perfect circle.
- c Make sure the flare nut is fitted.

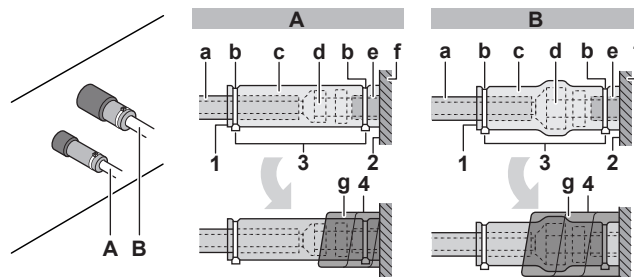
### 17.2.6 To connect the refrigerant piping to the indoor unit



#### CAUTION

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

- **Pipe length.** Keep refrigerant piping as short as possible.
- **Flare connections.** Connect refrigerant piping to the unit using flare connections.
- **Insulation.** Insulate the refrigerant piping on the indoor unit as follows:



- A Liquid piping
- B Gas piping

- a Insulation material (field supply)
- b Tie wrap (field supply)
- c Insulation tubes: large (gas pipe), small (liquid pipe) (accessories)
- d Flare nut (attached to the unit)
- e Refrigerant pipe connection (attached to the unit)
- f Unit
- g Sealing pads: gas pipe, liquid pipe (accessories)

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

In case of R32 refrigerant, for some connections an auxiliary pipe (accessory) must be installed and insulated using the correct insulation tube (accessory):

Model	Auxiliary pipe / insulation tube (mm)	
	Gas	Liquid
EKVDX32	∅12.7/∅13-29 (L65)	—
EKVDX50	—	—
EKVDX80	∅15.9/∅15-31 (L70)	∅9.5/∅10-26 (L65)
EKVDX100	—	—

**NOTICE**

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

# 18 Electrical installation



## CAUTION

See "[3 Specific installer safety instructions](#)" [▶ 13] to make sure this installation complies with all safety regulations.

## In this chapter

18.1	About connecting the electrical wiring .....	67
18.1.1	Precautions when connecting the electrical wiring .....	67
18.1.2	Guidelines when connecting the electrical wiring .....	68
18.1.3	Specifications of standard wiring components .....	70
18.2	To connect the electrical wiring to the indoor unit .....	70
18.3	To connect the external outputs .....	72
18.4	To connect the external input .....	73

## 18.1 About connecting the electrical wiring

### 18.1.1 Precautions when connecting the electrical wiring



## DANGER: RISK OF ELECTROCUTION



## WARNING

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



## WARNING

ALWAYS use multicore cable for power supply cables.



## INFORMATION

Also read the precautions and requirements in the "[2 General safety precautions](#)" [▶ 6].



## INFORMATION

Also read "[18.1.3 Specifications of standard wiring components](#)" [▶ 70].

**WARNING**

- If the power supply has a missing or wrong N-phase, equipment might break down.
- Establish proper earthing. Do NOT earth the unit to a utility pipe, surge absorber, or telephone earth. Incomplete earthing may cause electrical shocks.
- Install the required fuses or circuit breakers.
- Secure the electrical wiring with cable ties so that the cables do NOT come in contact with sharp edges or piping, particularly on the high-pressure side.
- 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.

**WARNING**

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

**WARNING**

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

**WARNING**

Do NOT extend the power supply or the interconnection cable by using wire connectors, wire connection clamps, taped wires, extension cords. These can cause overheating, electric shock or fire.

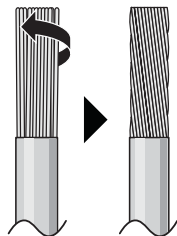
## 18.1.2 Guidelines when connecting the electrical wiring

**NOTICE**

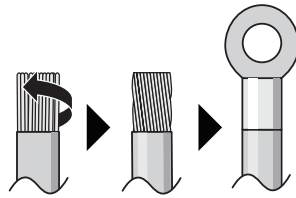
We recommend using solid (single-core) wires. If stranded wires are used, slightly twist the strands to consolidate the end of the conductor for either direct use in the terminal clamp or insertion in a round crimp-style terminal.

**To prepare stranded conductor wire for installation****Method 1: Twisting conductor**

- 1 Strip insulation (20 mm) from the wires.
- 2 Slightly twist the end of the conductor to create a "solid-like" connection.

**Method 2: Using round crimp-style terminal (recommended)**

- 1 Strip insulation from wires and slightly twist the end of each wire.
- 2 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.



**Use the following methods for installing wires:**

Wire type	Installation method
Single-core wire Or Stranded conductor wire twisted to "solid-like" connection	<p><b>a</b> Curled wire (single-core or twisted stranded conductor wire)  <b>b</b> Screw  <b>c</b> Flat washer</p>
Stranded conductor wire with round crimp-style terminal	<p><b>a</b> Terminal  <b>b</b> Screw  <b>c</b> Flat washer  ✓ Allowed  ✗ NOT allowed</p>

**Tightening torques**

Wiring	Screw size	Tightening torque (N•m)
Power supply cable	M4	1.2~1.4
Transmission cable (indoor↔outdoor)	M3.5	0.79~0.97
User interface cable		

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





18.1.3 Specifications of standard wiring components

Power supply cable	MCA <sup>(a)</sup>	0.22 A	
	Voltage	220~240 V	
	Phase	1~	
	Frequency	50/60 Hz	
	Wire sizes	1.5 mm <sup>2</sup> (3-core wire) H07RN-F (60245 IEC 66)	
Interconnection wiring (indoor ↔ outdoor)		For specification refer to the installation manual of the outdoor unit	
User interface cable		0.75 to 1.25 mm <sup>2</sup> (2-core wire) H05RN-F (60245 IEC 57) Length ≤300 m	
Cable between VAM and EKVDX		Length ≤100 m	
Recommended field fuse		EKVDX32~80A2	6 A
		EKVDX100A2	16 A
Earth leakage circuit breaker / residual current device		In the power supply line, ALWAYS install a residual current device (RCD) with an instantaneous action. The installed RCD MUST comply with the national wiring regulation.	

<sup>(a)</sup> MCA=Minimum circuit ampacity. Stated values are maximum values (see electrical data of indoor unit for exact values).


18.2 To connect the electrical wiring to the indoor unit

 **CAUTION**  
See "3 Specific installer safety instructions" ▶ 13] to make sure this installation complies with all safety regulations.

 **NOTICE**

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

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

 **NOTICE**  
Be sure to keep the power line and interconnection line apart from each other. Interconnection wiring and power supply wiring may cross, but may NOT run parallel.

- 1 Remove the service cover.

- 2 **User interface cable (≤300 m):** Route the cable through the frame, connect the wires to the terminal block (symbols P1, P2).
- 3 **Transmission cable connection with VAM (≤100 m):** Route the cable through the frame, connect the wires to the terminal block (symbols P1, P2).
- 4 **Transmission cable connection with outdoor unit and/or other EKVDX units:** Route the cable through the frame, connect the wires to the terminal block (symbols F1, F2).

**NOTICE**

For wire shielding requirements, see the installation manual of the outdoor unit.

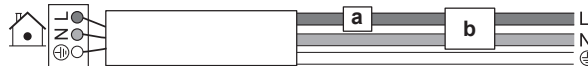
**NOTICE**

Group control connection is NOT allowed.

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

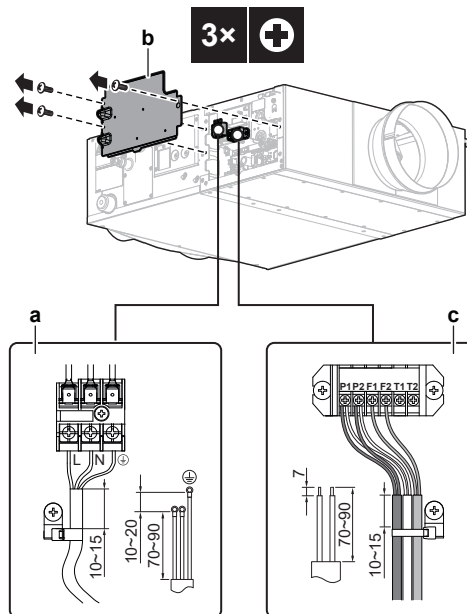
**WARNING**

The VAM and the EKVDX indoor unit MUST share the same electrical safety devices and power supply.



a Circuit breaker

b Residual current device



a Power supply and earth wiring

b Service cover with wiring diagram

c Transmission wiring

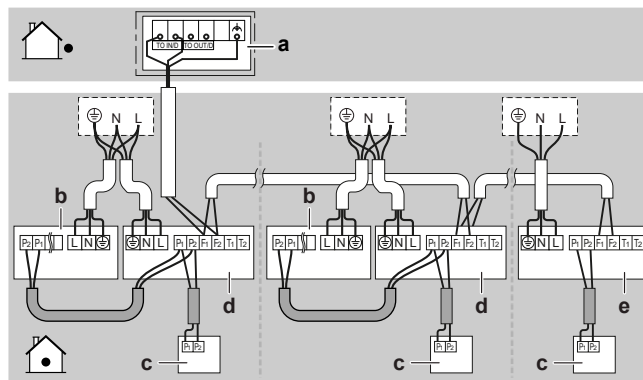
- 6 **Fix the cables** with tie wraps (see accessory bag) to the plastic clamps. **Note:** One of the remaining two tie wraps from the accessory bag is for the relay PCB wiring and one is a spare tie wrap.

**WARNING**

If a gap is present at the cable entry, wrap the cable (or cables) with the sealing material from the accessory bag. This will prevent small objects (such as children's fingers, ... etc.) as well as fluid droplets from entering the unit.

7 Reattach the service cover.

**System example**

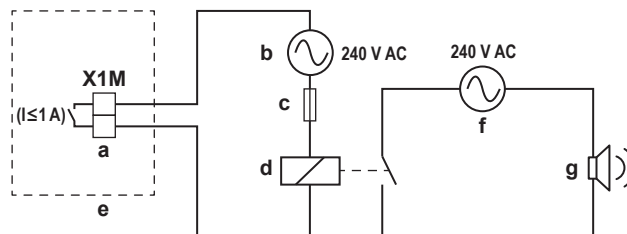


- a Outdoor unit
- b Heat reclaim ventilation unit (VAM)
- c User interface
- d EKVDX indoor unit
- e Normal VRV indoor unit

### 18.3 To connect the external outputs

The applied current of the external device MUST be less or equal than 1 A. Install a fuse  $\leq 1$  A to protect the internal PCB contact.

If the applied current of the external device is more than 1 A, the use of a field supplied external relay is mandatory to limit the current in the internal PCB contact. See the example diagram below:



- a Relay PCB output terminal
- b AC power supply for relay
- c Fuse  $\leq 1$  A
- d Relay (field supply)
- e Relay PCB
- f AC power supply for external device
- g External device (e.g. external alarm)

In case of R32 refrigerant, the user interface built-in alarm MUST be 15 dB louder than the background noise of the room. If this is not the case:

- 1 Mount an external alarm (field supply) in every EKVDX.
- 2 Connect the external alarm to the relay PCB of each EKVDX or to the SVS output channel of the outdoor unit.
- 3 Turn off the user interface built-in alarm if the external alarm is installed in the same space as the user interface.

**Note:** The refrigerant leakage alarm MUST be set to ON. The user interface will generate a visible and audible warning sign in case of R32 refrigerant leakage detection or sensor failure/disconnection.



#### INFORMATION

Sound data about the refrigerant leakage alarm are available in the technical data sheet of the user interface. E.g. the BRC1H52\* controller generates an alarm of 65 dB (sound pressure, measured at 1 m distance from the alarm).

## 18.4 To connect the external input



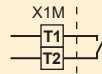
#### INFORMATION

For details about the different user interface modes and how to set up, refer to the installation and operation manual delivered with the user interface.



#### WARNING

In case of R32 refrigerant, terminal connections T1/T2 are for fire alarm input ONLY. Fire alarm has a higher priority than R32 safety and shuts the entire system down.



**a** Fire alarm input signal (potential free contact)



#### NOTICE

The user interface has to be in fully functional mode or in alarm only mode.

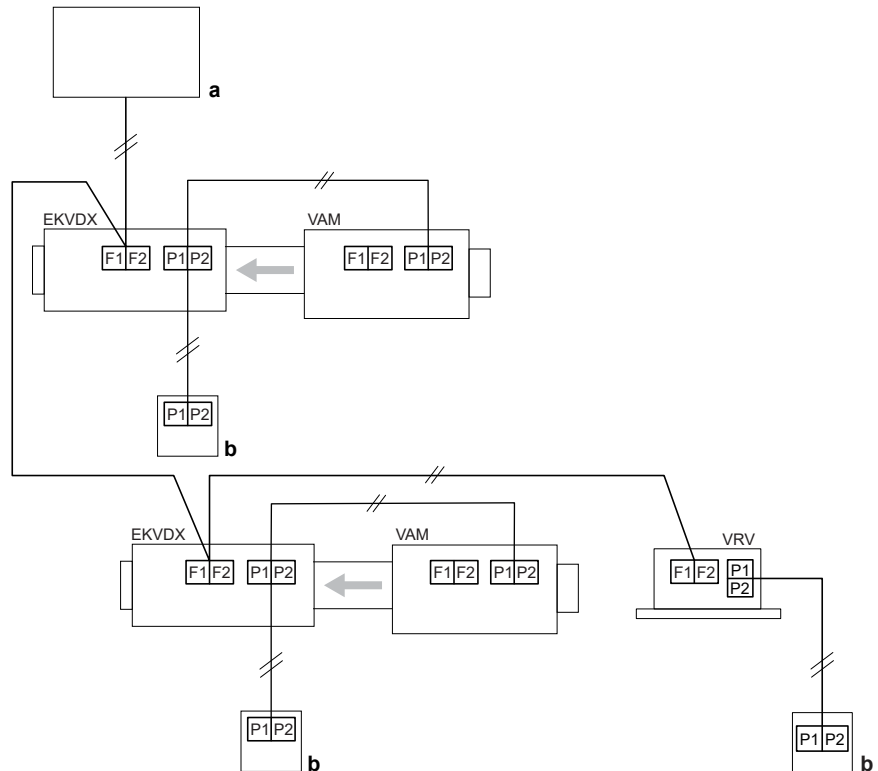
For more information about T1/T2 functionality, see "[20.4 About external input switching \(T1/T2\)](#)" [▶ 80].

# 19 System configuration

In this chapter

19.1	Independent system .....	74
19.2	Central control system .....	75

## 19.1 Independent system



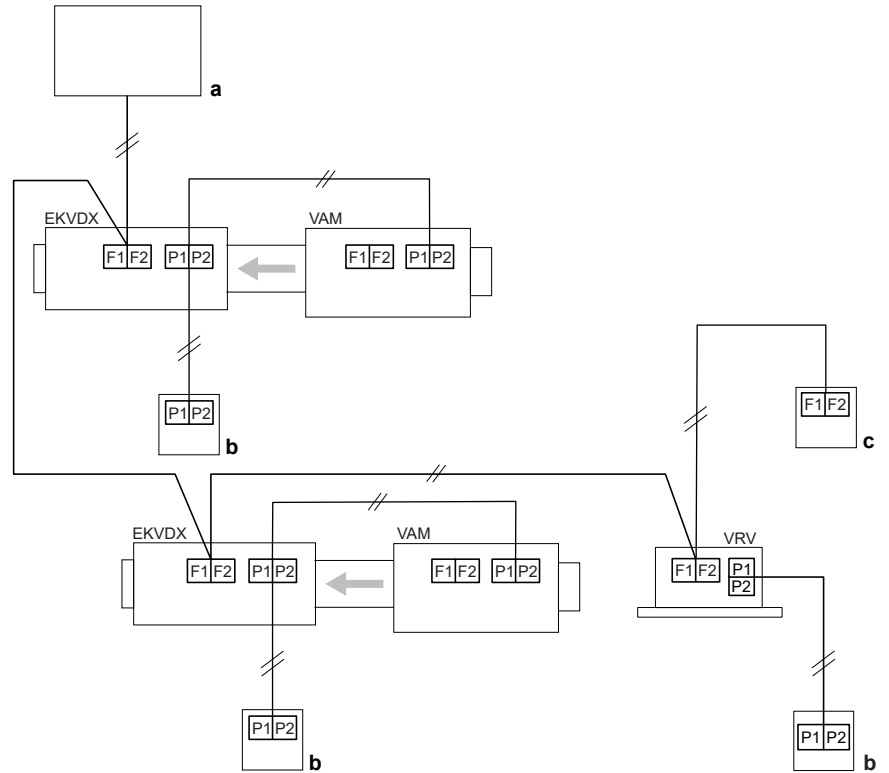
- a** Outdoor unit
- b** Controller
- VRV** VRV indoor unit
- EKVDX** EKVDX indoor unit
- VAM** VAM heat reclaim ventilation unit

!

**NOTICE**

Group control connection is NOT allowed.

## 19.2 Central control system



- a** Outdoor unit
- b** Controller
- c** Central controller for all units
- VRV** VRV indoor unit
- EKVDX** EKVDX indoor unit
- VAM** VAM heat reclaim ventilation unit

# 20 Configuration



## INFORMATION

Refer to the installer and user reference guide of the user interface for more information on how to change field settings.



## NOTICE

In case an EKVDX indoor unit is installed, extreme setpoints can result in constant thermostat ON behaviour. To prevent this, slightly increase (decrease) the respective cooling (heating) setpoint.



## INFORMATION

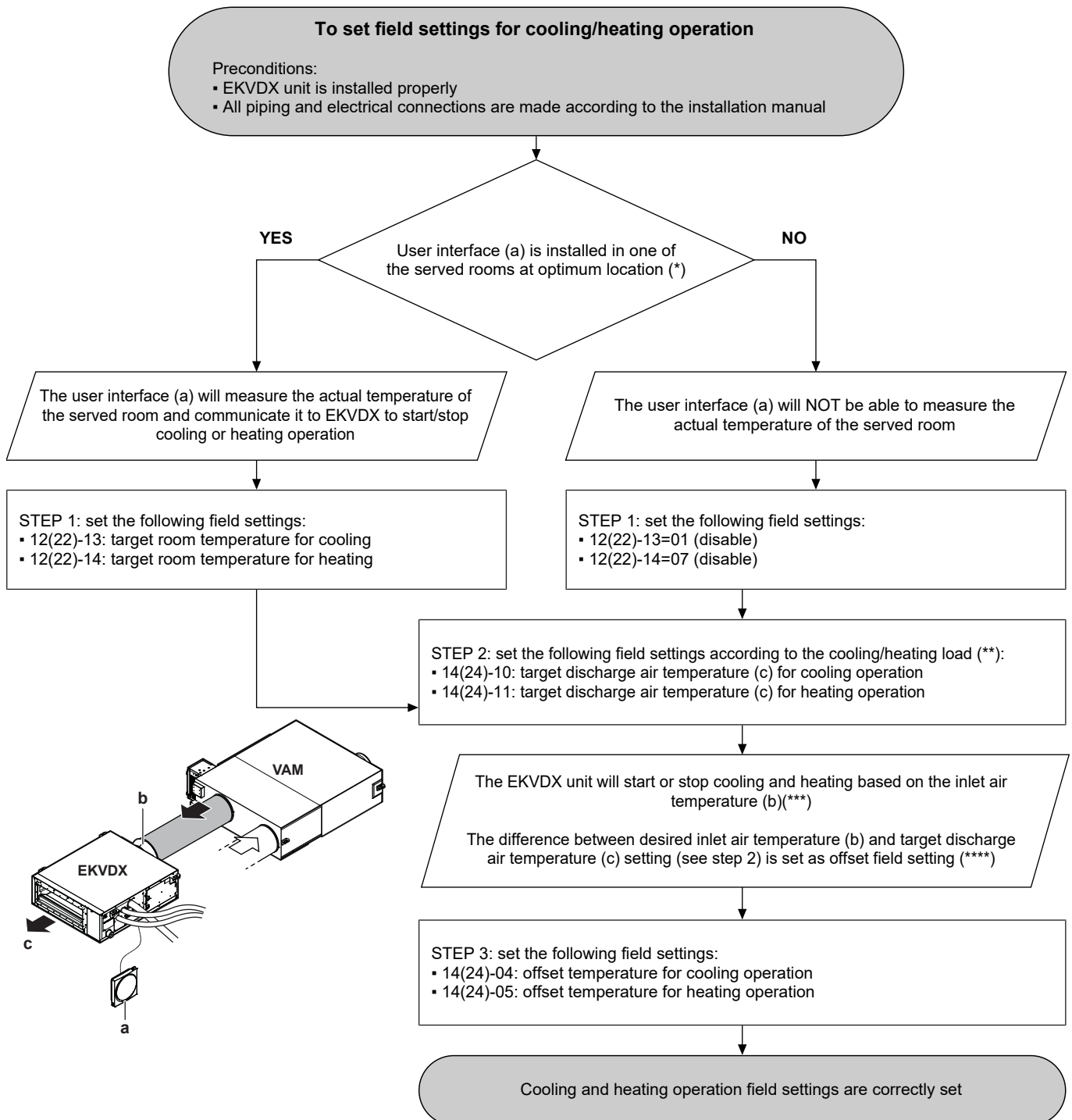
In case combined with EKVDX, on VAM, mode numbers **17**, **18** and **19** CANNOT be used. Use **27**, **28**, **29**.

Field settings via user interface: check the unit number (the numbers are automatically assigned as **0** or **1**) before making the field settings on EKVDX or VAM unit.

## In this chapter

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## 20.1 To set correct cooling/heating operation field settings



\* Not under direct sunlight, not near other sources radiating heat or cold, etc ...

\*\* To avoid cold draft (in heating) and to condition the room quickly, set a value much lower (in cooling) or much higher (in heating) than the target room temperature. To gradually and uniformly condition the room, set a value closer to the target room temperature.

\*\*\*

- Inlet air temperature (b) is the temperature of the airstream coming from VAM unit to EKVDX unit
- EKVDX will start cooling when the temperature (b) is more than the required value
- EKVDX will start heating when the temperature (b) is less than the required value

\*\*\*\* Input via the field setting: offset temperature = (c) temperature setting – (b) temperature

**NOTICE**

The EKVDX unit is an airconditioning unit for pretreatment of incoming supply air from a VAM heat reclaim ventilation unit. For comfort temperature control, it is still required to install a normal indoor unit.

Do not place the EKVDX unit before the heat reclaim ventilation unit.

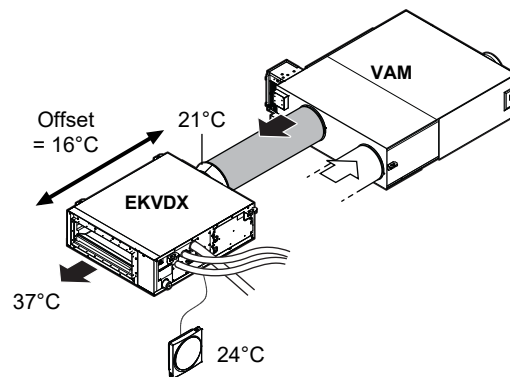
**INFORMATION**

In certain conditions, the discharge air temperature may not reach the target value.

This is not a malfunction and can occur as part of normal system operation.

**Example 1**

The EKVDX unit is performing heating operation during the winter season. The remote controller is installed in the served room away from direct sunlight and the radiator. The target room temperature is required to be 24°C. The required target discharge air temperature according to the heating load to warm up the room and to avoid cold draft is 37°C. The heating operation is required to stop when inlet air temperature to the EKVDX unit is 21°C or above to save energy.

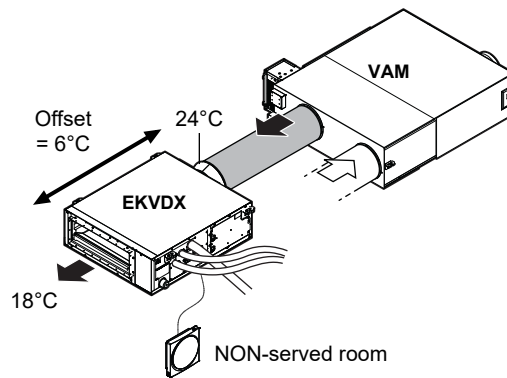


To correctly set the EKVDX unit for the heating operation in the above example, the following field settings are required:

- Target room temperature setting  $12(22) - 14 = 05$ . This setting will confirm that the heating operation is stopped when the room temperature has reached the target value of 24°C.
- Target discharge air temperature setting  $14(24) - 11 = 11$ .
- Offset temperature setting  $14(24) - 05 = 09$ . Difference between target discharge air temperature (37°C) and the required value of inlet air temperature (21°C) is used as field setting value.

**Example 2**

The EKVDX unit is performing cooling operation during the summer season. The remote controller is installed in the guard house and not in the served room. The target discharge air temperature required according to the cooling load to gradually cool down the served room is 18°C. The cooling operation is required to start when inlet air temperature to EKVDX unit is 24°C or above to save energy.



To correctly set the EKVDX unit for the cooling operation in the above example, the following field settings are required:

- Target room temperature setting **12(22)-13 = 01** (disabled). The remote controller is not installed in the served room. Hence, there will be no measurement of the served room temperature. To avoid false start/stop of the cooling operation due to temperature measurement of some another room, this setting is put to 'disable'.
- Target discharge air temperature setting **14(24)-10 = 05**.
- Offset temperature setting **14(24)-04 = 04**. Difference between target discharge air temperature (18°C) and the required value of inlet air temperature (24°C) is used as field setting value.

## 20.2 To set the discharge temperature correction factor

The measured temperature of the air at the outlet of the EKVDX unit is not an accurate representation of the discharge air temperature supplied to the served rooms. A correction factor 'c' is used to compensate for the heat loss in the duct length between EKVDX unit and the served room.

Therefore, use field setting **10(20)-13** to set the discharge air temperature correction factor. The discharge air temperature measured by the EKVDX unit will be reduced (in heating) and increased (in cooling) by the set amount.

**Formula:** for a given duct length between EKVDX and the room,  $c = \text{length} \times 0.10^\circ\text{C}$

**Example:** For 10 m of duct:  $c = 1^\circ\text{C}$ . Set field setting **10(20)-13 = 03**.

## 20.3 To deactivate the R32 safety system

During a test run of the system and during maintenance, deactivate the R32 safety system (active by default):

- 1 Set VAM setting **19(29)-15-01**
- 2 Set one of the two EKVDX settings: **15(25)-13-3** (=OFF for 24 hours) OR **15(25)-13-1** (=OFF)

After completion of test run or maintenance, activate the R32 safety system again:

- 3 Set VAM setting **19(29)-15-02**
- 4 Set EKVDX setting **15(25)-13-02**

## 20.4 About external input switching (T1/T2)

The following table shows the T1/T2 functionality.

Mode	SW	Setting position	Description
12(22)	1	01	Forced Stop 
		02	External input (ON/OFF operation) 
		03	Protective device input 
		04	Forced Stop B 

- T1/T2** External input terminals
- Closed** Closed
- Open** Open
- ON** ON
- OFF** OFF
- a** Operation indoor
- b** User interface
- c** Error A0

## 20.5 Field settings

### EKVDX field settings (user interface: indoor unit 0)

Mode	SW	SW description	SW position <sup>(a)</sup>														
			01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
10(20) <sup>(b)</sup>	13	Discharge temperature correction factor (°C)	0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7
12(22) <sup>(c)</sup>	1	External input switching (T1 T2)	Forced stop (default)	External Input (ON:OFF operation)	Protective device input	Forced stop B (multi-tenant setting)	—	—	—	—	—	—	—	—	—	—	—
12(22)	13	Target room temperature in cooling	Disable	16°C	18°C	20°C	22°C	24°C	26°C	—	—	—	—	—	—	—	—
12(22)	14	Target room temperature in heating	16°C	18°C	20°C	22°C	24°C	26°C	Disable	—	—	—	—	—	—	—	—
14(24)	4	Offset temperature in cooling	0°C	2°C	4°C	6°C	8°C	10°C	12°C	14°C	16°C	18°C	20°C	—	—	—	—
14(24)	5	Offset temperature in heating	0°C	2°C	4°C	6°C	8°C	10°C	12°C	14°C	16°C	18°C	20°C	—	—	—	—
14(24) <sup>(d)</sup>	10	Target discharge air temperature in cooling	13°C	15°C	16°C	17°C	18°C	19°C	20°C	21°C	22°C	23°C	24°C	25°C	26°C	28°C	30°C
14(24) <sup>(d)</sup>	11	Target discharge air temperature in heating	24°C	26°C	27°C	28°C	29°C	30°C	31°C	32°C	33°C	35°C	37°C	39°C	41°C	43°C	45°C
15(25)	13	R32 safety system <sup>(e)</sup>	OFF	ON	OFF for 24 hours	—	—	—	—	—	—	—	—	—	—	—	—
	15	External contact output settings <sup>(f)</sup>	Disable	Enable	—	—	—	—	—	—	—	—	—	—	—	—	—

<sup>(a)</sup> Factory settings are marked with a grey background.

<sup>(b)</sup> This field setting cannot be modified via the remote controller menu.

<sup>(c)</sup> In case of R32 refrigerant, terminal connections T1 T2 are for fire alarm input ONLY.

<sup>(d)</sup> The VAM field setting **18(28) - 13/ - 14** (see table below) MUST be identical to the EKVDX field setting. Set the EKVDX first (EKVDX=primary, VAM=secondary)

<sup>(e)</sup> In case R410A is used, set to **15(25) - 13 - 1**.

<sup>(f)</sup> **15(25) - 15 - 2** is required when R32 refrigerant is used.

VAM field settings (user interface: indoor unit 1)

Mode	SW	SW description	SW position															
			01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	
17(27)	4	Initial fan speed <sup>(a)</sup>	High	Ultra-high	—	—	—	—	—	—	—	—	—	—	—	—	—	
	5 <sup>(b)</sup>	Yes/No setting for duct connection with VRV system	Without duct	With duct	Without duct	—	—	—	—	With duct	Without duct	—	—	—	—	—	—	
		Fan setting for cold areas <sup>(c)</sup>	—	—	Stop/Stop	Low/Low	Stop/stop	Low/Low	Stop/stop	Low/Low	—	—	—	—	—	—	—	—
18(28)	6	Fan operation when defrost/oil return/hot start <sup>(c)</sup>	—	—	Stop/Stop	Stop/Stop	Stop/Stop	Stop/Stop	Stop/Stop	Stop/Stop	Stop/—	Stop/Stop	Stop/Stop	Stop/—	Stop/—	—	—	—
		Nighttime free cooling (fan settings) <sup>(d)</sup>	High	Ultra-high	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0	External signal <sup>(e)</sup> J/C/J2	Last command	Priority on external input	Priority on operation	Disable nighttime free cooling / Perform forced stop	—	—	—	24 hours ventilation ON/OFF	Disable J/C/J2	—	—	—	—	—	—	—
19(29)	1	Direct power ON <sup>(f)</sup>	OFF	ON	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2	Auto restart <sup>(f)</sup>	OFF	ON	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	8	External input terminal function selection <sup>(g)</sup> (J/C/J1)	Fresh-up	Error output	Error output and stop operation	Forced off	Fan forced off	Air-flow up	—	—	—	—	—	—	—	—	—	—
	10	EKVDX connected? <sup>(h)</sup>	No	Yes	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	13	Cooling set point (with EKVDX)	13°C	15°C	16°C	17°C	18°C	19°C	20°C	21°C	22°C	23°C	24°C	25°C	26°C	28°C	30°C	—
	14	Heating set point (with EKVDX)	24°C	26°C	27°C	28°C	29°C	30°C	31°C	32°C	33°C	35°C	37°C	39°C	41°C	43°C	45°C	—
	15	R32 safety system <sup>(i)</sup>	OFF	ON	—	—	—	—	—	—	—	—	—	—	—	—	—	—

<sup>(a)</sup> When connected to an EKVDX, set to 2 or 4.

<sup>(b)</sup> When connected to an EKVDX, 17(27) - 5 can be set to 1, 3, 4, 7 or 8.

<sup>(c)</sup> Fan operation when heater thermostat is OFF. Supply air/Exhaust air, e.g. Low/Low means: Supply air low/Exhaust air low.

<sup>(d)</sup> In case VAM and EKVDX are combined and the R32 safety system of the VAM is active, the nighttime free cooling is disabled.

<sup>(e)</sup> When connected to an EKVDX, J/C/J2 cannot be used. Set to 18(28) - 0-7. Instead, use T1 T2 of the EKVDX. See the EKVDX installation and operation manual.

<sup>(f)</sup> When connected to an EKVDX, do not change the default settings.

<sup>(g)</sup> When connected to an EKVDX, J/C/J1 cannot be used. Instead, use T1 T2 of the EKVDX. See the EKVDX installation and operation manual.

<sup>(h)</sup> When connected to an EKVDX, set to 18(28) - 10-2.

<sup>(i)</sup> When connected to an EKVDX, setting 2 (safety ON) is required in case R32 refrigerant is used. Setting 1 (safety OFF) is required in case R410A refrigerant is used.

# 21 Commissioning

## In this chapter

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21.2	Precautions when commissioning.....	83
21.3	Checklist before commissioning.....	83
21.4	To perform a test run .....	85

## 21.1 Overview: Commissioning

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

### Typical workflow

Commissioning typically consists of the following stages:

- 1 Checking the "Checklist before commissioning".
- 2 Performing a test run for the system.

## 21.2 Precautions when commissioning



### NOTICE

Turn ON the power 6 hours before operation in order to have power running to the crankcase heater and to protect the compressor.



### NOTICE

Before starting up the system, the unit **MUST** be energised for at least 6 hours to avoid compressor breakdown during startup.



### NOTICE

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



### NOTICE

**Cooling operation mode.** Perform the test run in cooling operation mode so that stop valves failing to open can be detected. Even if the user interface was set to heating operation mode, the unit will run in cooling operation mode during 2-3 minutes (although the user interface will display the heating icon), and then automatically switch to heating operation mode.



### 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.

## 21.3 Checklist before commissioning

- 1 After the installation of the unit, check the items listed below.
- 2 Close the unit.

**3** Power up the unit.**General**

<input type="checkbox"/>	You have read the complete installation and operation instructions described in the <b>installer and user reference guide</b> .
<input type="checkbox"/>	The <b>indoor unit</b> is properly mounted.
<input type="checkbox"/>	The <b>outdoor unit</b> is properly mounted.
<input type="checkbox"/>	The <b>drain piping</b> is properly installed and insulated, and drainage flows smoothly. Check for water leaks. <b>Possible consequence:</b> condensate water might drip.
<input type="checkbox"/>	The <b>ducting</b> is properly installed and insulated.
<input type="checkbox"/>	The <b>reducer(s)</b> is (are) properly installed and insulated.
<input type="checkbox"/>	The <b>refrigerant pipes</b> (gas and liquid) are installed correctly and thermally insulated.
<input type="checkbox"/>	There are <b>NO refrigerant leaks</b> .
<input type="checkbox"/>	There are <b>NO missing phases</b> or <b>reversed phases</b> .
<input type="checkbox"/>	The system is properly <b>earthed</b> and the earth terminals are tightened.
<input type="checkbox"/>	<b>Fuses, circuit breakers, or protection devices</b> Check that the fuses, circuit breakers, or the locally installed protection devices are of the size and type specified in the chapter " <a href="#">18.1.3 Specifications of standard wiring components</a> " [▶ 70]. Be sure that neither a fuse nor a protection device has been bypassed.
<input type="checkbox"/>	The <b>power supply voltage</b> matches the voltage on the identification label of the unit.
<input type="checkbox"/>	There are <b>NO loose connections</b> or damaged electrical components in the switch box.
<input type="checkbox"/>	There are <b>NO damaged components</b> or <b>squeezed pipes</b> on the inside of the indoor and outdoor units.
<input type="checkbox"/>	The <b>stop valves</b> (gas and liquid) on the outdoor unit are fully open.

**VAM and EKVDX combination**

<input type="checkbox"/>	ALL field settings related to VAM and EKVDX combination are set correctly. See " <a href="#">20.5 Field settings</a> " [▶ 81] for an overview of the required settings.
<input type="checkbox"/>	User interface connected to EKVDX (not VAM).
<input type="checkbox"/>	P1/P2 connection between HRV-EKVDX is <100 m.
<input type="checkbox"/>	NO F1/F2 connection between VAM and EKVDX (only P1/P2 connection allowed).
<input type="checkbox"/>	NO group control.
<input type="checkbox"/>	Power supply and electrical safety devices are shared between VAM and EKVDX.
<input type="checkbox"/>	Each VAM unit is connected to only ONE EKVDX unit (via duct and electrical connection). There is NO connection of the VAM to any other indoor unit, linkage or multiple EKVDX units.
<input type="checkbox"/>	ALL ducting is insulated on the side of VAM and EKVDX.

## 21.4 To perform a test run



### INFORMATION

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



### NOTICE

Do NOT interrupt the test run.



### INFORMATION

During a test run of the system or during maintenance, the R32 safety needs to be deactivated. Refer to "[20.3 To deactivate the R32 safety system](#)" [▶ 79].

Set the relevant field settings on EKVDX, then on VAM, before performing the test run. See "[20.5 Field settings](#)" [▶ 81].

## 22 Hand-over to the user

Once the test run is finished and the unit operates properly, 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/she can find the complete documentation at the URL mentioned earlier in this manual.
- Explain to 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.

## 23 Maintenance and service



### NOTICE

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

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



### NOTICE

Applicable legislation on **fluorinated greenhouse gases** requires that the refrigerant charge of the unit is indicated both in weight and CO<sub>2</sub> equivalent.

**Formula to calculate the quantity in CO<sub>2</sub> equivalent tonnes:** GWP value of the refrigerant × total refrigerant charge [in kg] / 1000



### INFORMATION

During a test run of the system or during maintenance, the R32 safety needs to be deactivated. Refer to "[20.3 To deactivate the R32 safety system](#)" [▶ 79].

### 23.1 Checklist for yearly maintenance of the indoor unit

Check the following at least once a year:

- Heat exchanger
- Drain pan

#### Instructions

The heat exchanger and drain pan of the indoor unit can get contaminated and blocked up. It is recommended to clean the heat exchanger and drain pan yearly. A blocked heat exchanger can lead to too low pressure or too high pressure leading to worse performance.

When cleaning the indoor unit heat exchanger and drain pan make sure to:

- Use proper field supply cleaning agent which is suitable for cleaning heat exchangers and drain pans.
- Clearly follow the instructions of local supply cleaning agent and to **NOT** use household cleaning agents.
- Rinse the heat exchanger and drain pan with water after the cleaning process.



### CAUTION

Rinse out the cleaning agent until there is **NO** cleaning agent left. Otherwise, the corrosion of heat exchanger and drain pan may occur. Pay attention to the cleaning agent that may also corrode other materials of the indoor unit (Aluminium, copper, plastic, ABS, ...).

## 24 Troubleshooting

### 24.1 Solving problems based on symptoms

#### 24.1.1 Symptom: The unit is NOT heating or cooling as expected

Possible causes	Corrective action
The temperature setting is NOT correct	Check the temperature setting on the remote controller. Refer to the operation manual.
Air inlet or outlet is blocked	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.
Fan speed is too low	Check if the fan speed setting is set to low speed and increase to high speed. Refer to the manual of the user interface.
Field settings are not correctly set	<ul style="list-style-type: none"> <li>▪ On the EKVDX unit, check:               <ul style="list-style-type: none"> <li>- target discharge temperature setting <b>14(24)-10</b> and <b>14(24)-11</b></li> <li>- and/or inlet air offset temperature setting <b>14(24)-4</b> and <b>14(24)-5</b>.</li> </ul> </li> <li>▪ Check the location of the remote controller. It should be installed in the served room with correct target room temperature setting <b>12(22)-13</b> and <b>12(22)-14</b>. If that is not the case, disable the target room temperature setting.</li> </ul>
Room condition is not optimal	<ul style="list-style-type: none"> <li>▪ Check for open doors or windows. Close doors and windows to prevent wind from coming in.</li> <li>▪ Check if direct sunlight enters the room. Use curtains or blinds.</li> <li>▪ Check if there are too many occupants in the room during cooling operation. Check if the heat source of the room is excessive.</li> </ul> <p>If the heat source of the room is excessive (when cooling). Cooling effect decreases if heat gain of the room is too large.</p>

### 24.2 Solving problems based on error codes

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

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

**INFORMATION**

See the service manual for:

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

## 24.2.1 Error codes: Overview

In case other error codes appear, contact your dealer.

Code	Description
<i>RD-11</i>	The R32 sensor has detected a refrigerant leak
<i>RD/CH</i>	Safety system error (leak detection)
<i>RE-28</i>	VAM air flow rate dropped below the legal threshold limit (for R32 application)
<i>RE-29</i>	VAM air flow approaches legal threshold limit (for R32 application)
<i>RE-30</i>	VAM warning for air flow rate drop (for R32 application)
<i>CH-01</i>	R32 sensor malfunction
<i>CH-02</i>	R32 sensor end of lifetime
<i>CH-05</i>	6 months before the R32 sensor end of lifetime
<i>R1</i>	Malfunction of indoor unit PCB
<i>R3</i>	Drain level control system abnormality
<i>RA</i>	Malfunction of electronic expansion valve
<i>RF</i>	Malfunction of a humidifier system
<i>RJ</i>	Malfunction of capacity setting (Indoor unit PCB)
<i>C4</i>	Malfunction of liquid pipe thermistor for heat exchanger
<i>C5</i>	Malfunction of gas pipe thermistor for heat exchanger
<i>C9</i>	Malfunction of suction air thermistor
<i>CA</i>	Malfunction of discharge air thermistor
<i>CJ</i>	Room temperature thermistor in remote controller abnormality
<i>US-04</i>	Non H-type remote control is connected
<i>U9-01</i>	An error has occurred on another indoor on the same F1 F2 line, but EKVDX /indoor can still operate
<i>U9-02</i>	An error has occurred on another indoor on the same F1 F2 line, EKVDX /indoor cannot operate anymore
<i>UJ-34</i>	Capacity mismatch between VAM and EKVDX
<i>UJ-35</i>	VAM abnormality. There are four possible causes: <ul style="list-style-type: none"> <li>▪ The VAM has an error. Find the cause in the error history.</li> <li>▪ Communication loss between VAM and EKVDX .</li> <li>▪ The local VAM setting does not identify with the EKVDX connection: <b>18(28)-10</b> is not <b>-02</b>.</li> <li>▪ Remote controller firmware is not up to date. Please install the latest available software version.</li> </ul>

Code	Description
<i>UJ-37</i>	VAM: A6-28 error (for R32 application) occurred
<i>UJ-38</i>	VAM: A6-29 error (for R32 application) occurred

## 25 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.

## 26 Technical data




















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

### 26.1 Wiring diagram

See the internal wiring diagram supplied with the unit (on the inside of the indoor unit switch box cover). The abbreviations used are listed below.

#### Unified legend

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

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

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

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

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

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

#### Translation of text on wiring diagram

English	Translation
Notes	Notes
X35A is connected when optional accessories are being used, see wiring diagram of this accessory	X35A is connected when optional accessories are being used, see wiring diagram of this accessory

English	Translation
An EKVDX unit and its corresponding VAM-J* unit should be connected to a common power supply. Refer to the installation manual of the EKVDX unit for further details.	An EKVDX unit and its corresponding VAM-J* unit should be connected to a common power supply. Refer to the installation manual of the EKVDX unit for further details.
Transmission wiring	Transmission wiring
Ext. output - error state	External output - error state
Ext. output - R32 alarm	External output – R32 alarm
Gas sensor circuit	Gas sensor circuit
Wired remote controller	Wired remote controller
Control box layout	Control box layout

## 27 Glossary

**Dealer**

Sales distributor for the product.

**Authorised installer**

Technical skilled person who is qualified to install the product.

**User**

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

**Applicable legislation**

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

**Service company**

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

**Installation manual**

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

**Operation manual**

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

**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**

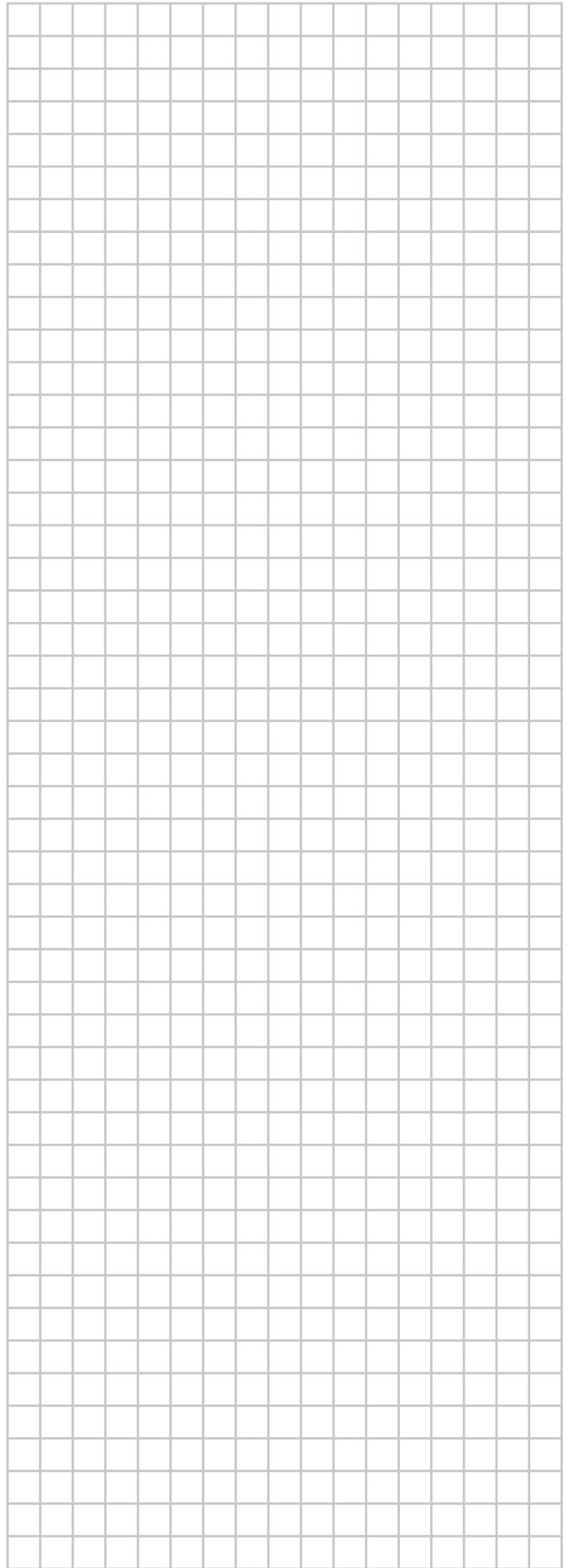
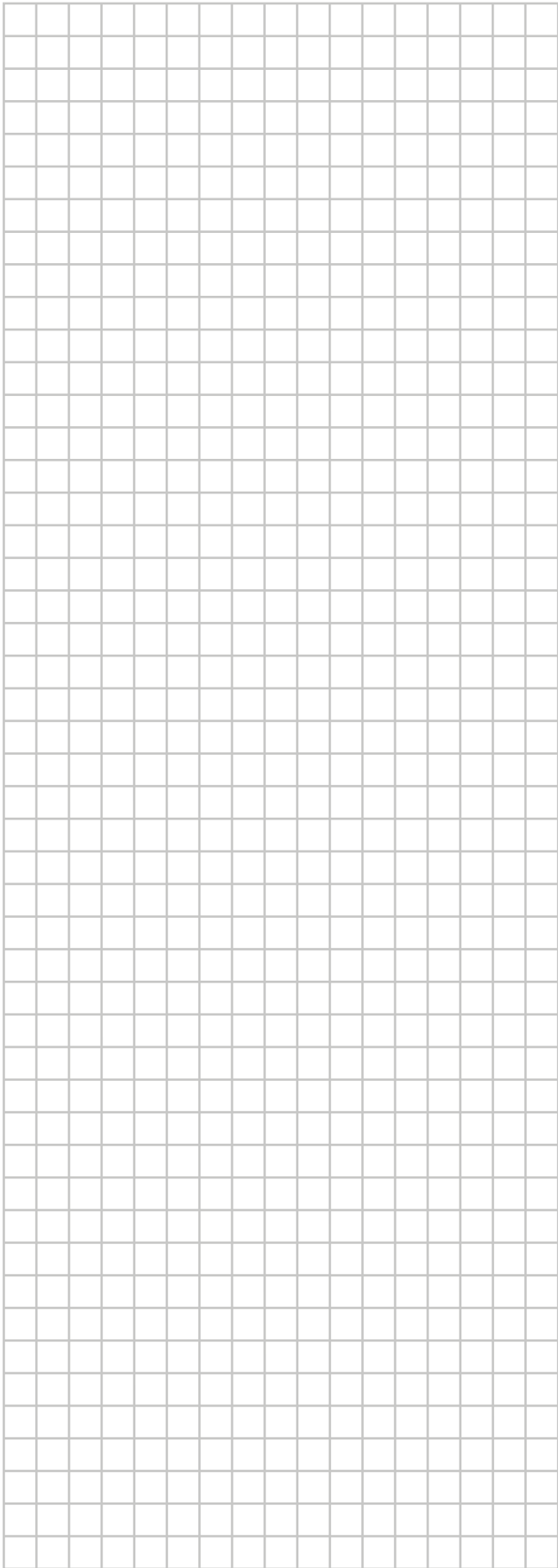
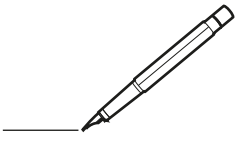
Labels, manuals, information sheets and equipment that are delivered with the product and that need to be installed according to the instructions in the accompanying documentation.

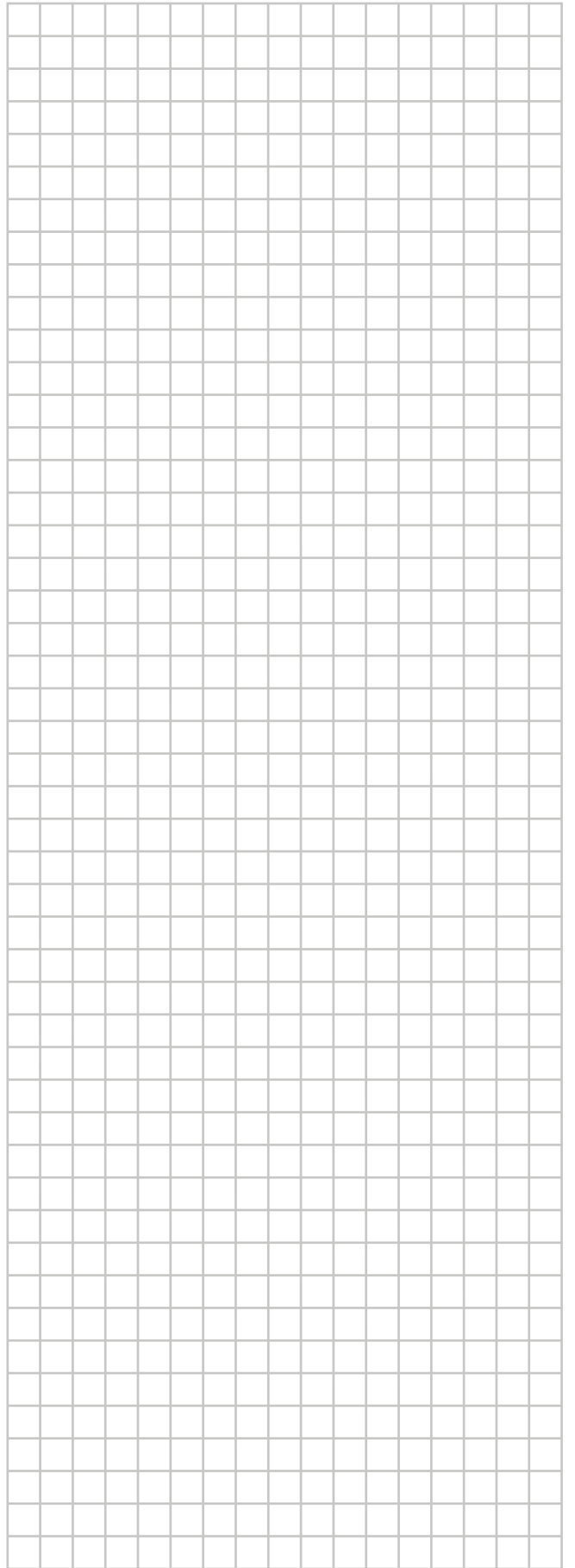
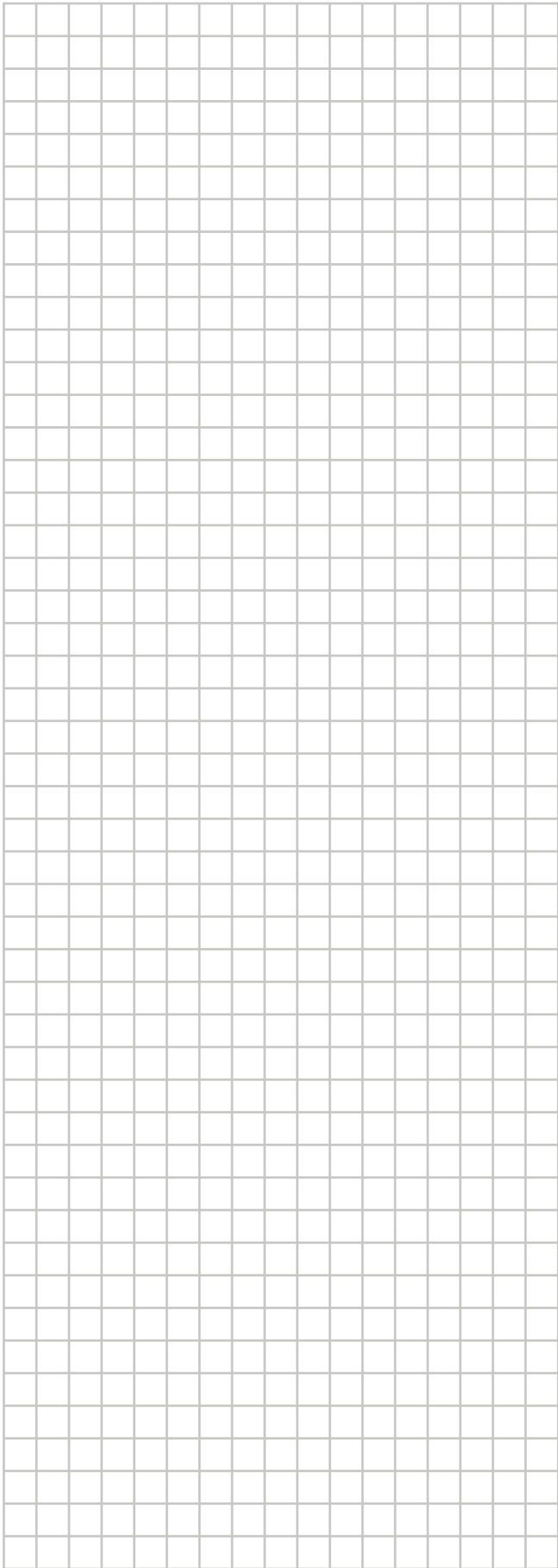
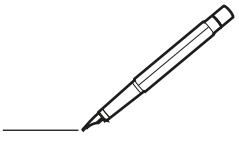
**Optional equipment**

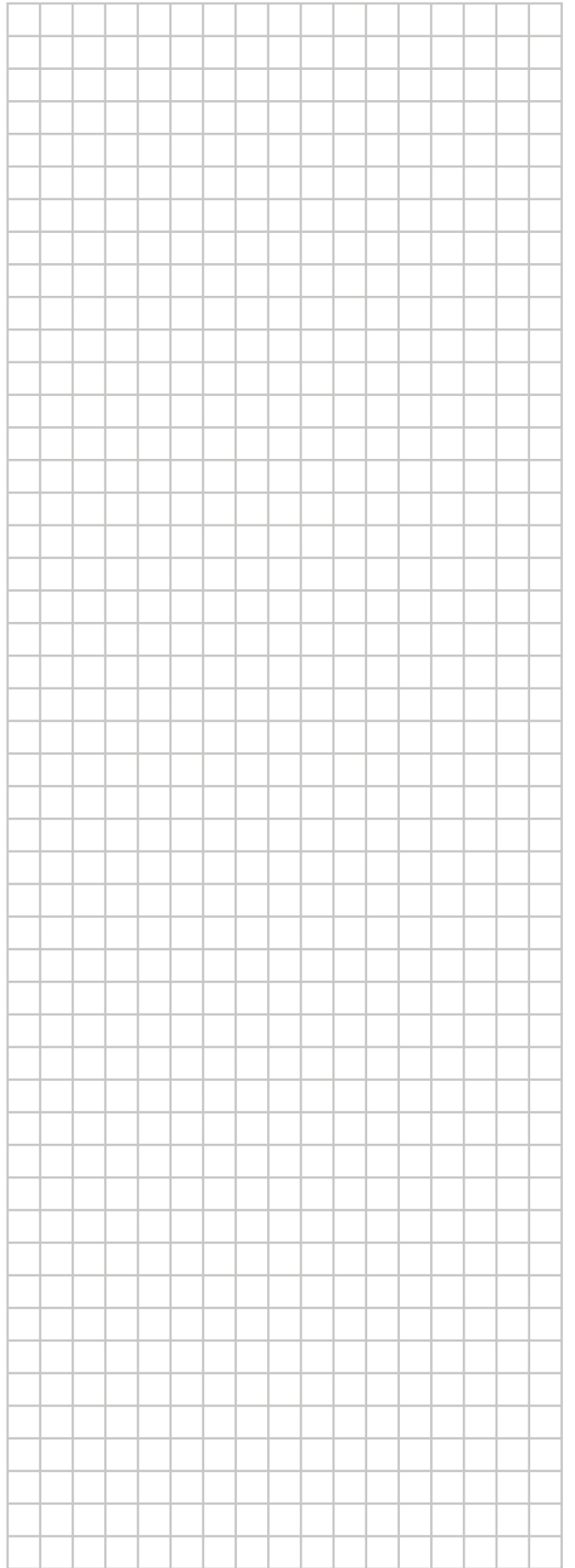
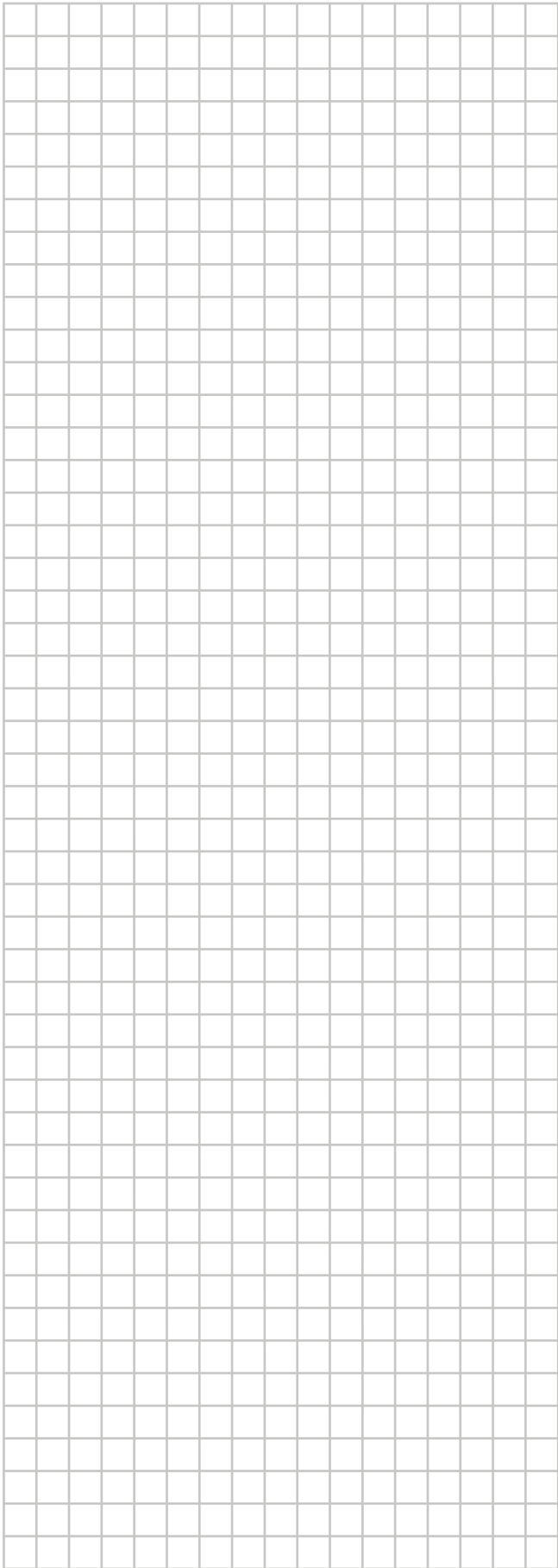
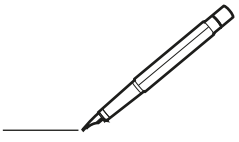
Equipment made or approved by Daikin that can be combined with the product according to the instructions in the accompanying documentation.

**Field supply**

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







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