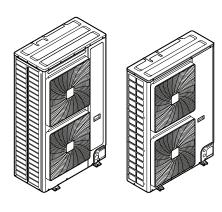


Installer and user reference guide

# Inverter outdoor unit for AHU option kit and air curtains



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# 1 About this document

#### **Target audience**

Authorised installers + end users



#### **INFORMATION**

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

#### **Documentation set**

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

#### General safety precautions:

- Safety instructions that you must read before installing
- Format: paper (in the box of the outdoor unit)

#### Outdoor unit installation and operation manual:

- Installation and operation instructions
- Format: paper (in the box of the outdoor unit)

#### Installer and user reference guide:

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

# 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	
[i]	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> " <b>▲</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 General safety precautions

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#### 2.1 For the installer

#### 2.1.1 General

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



#### DANGER: RISK OF BURNING/SCALDING

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



#### **WARNING**

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



#### **NOTICE**

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

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

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

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

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

#### 2.1.2 Installation site

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

Do NOT install the unit in the following places:

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

#### 2.1.3 Refrigerant — in case of 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: Selfcombustion 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 them 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 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	Charge with the cylinder upright.
(i.e., the cylinder is marked with "Liquid filling siphon attached")	



If	Then
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.

#### 2.1.4 Electrical



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

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



#### **WARNING**

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



#### WARNING

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





#### **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.



#### **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.

Installation site (see "16.1 Preparing the installation site" [▶ 65])



#### **WARNING**

Follow the service space dimensions in this manual to install the unit correctly. See "26.1 Service space: Outdoor unit" [> 141].



#### **WARNING**

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



#### **CAUTION**

Excessive refrigerant concentrations in a closed room can lead to oxygen deficiency.



#### **WARNING**

If the appliance contains R32 refrigerant, the floor area of the room in which the appliance is stored shall be at least 429 m<sup>2</sup>.

Opening and closing the unit (see "16.2 Opening and closing the unit" [▶ 70])



DANGER: RISK OF BURNING/SCALDING



**DANGER: RISK OF ELECTROCUTION** 



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

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

Mounting the outdoor unit (see "16.3 Mounting the outdoor unit" [▶ 71])



#### **WARNING**

Fixing method of the outdoor unit MUST be in accordance with the instructions from this manual. See "16.3 Mounting the outdoor unit" [▶ 71].

Connecting the refrigerant piping (see "17.2 Connecting the refrigerant piping" [▶ 76])



#### **WARNING**

Field piping MUST be in accordance with the instructions from this manual. See "17 Piping installation" [▶ 74].



#### **CAUTION**

Piping MUST be installed according to instructions given in "17 Piping installation" [ 74]. Only mechanical joints (e.g. braze+flare connections) that are compliant with the latest version of ISO14903 can be used.

Low temperature solder alloys shall not be used for pipe connections.





#### **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**

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



#### **WARNING**

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 them directly into the environment. Use a vacuum pump to evacuate the installation.



#### WARNING

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



#### **CAUTION**

Do NOT vent gases into the atmosphere.



#### WARNING

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

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



#### **WARNING**



NEVER remove the pinched piping by brazing.

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



#### Charging refrigerant (see "18 Charging refrigerant" [▶ 89])



#### **WARNING**

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



#### **WARNING**

Charging of refrigerant MUST be in accordance with the instructions from this manual. See "18 Charging refrigerant" [▶ 89].



#### **WARNING**

- Only use R32 as refrigerant. Other substances may cause explosions and
- R32 contains fluorinated greenhouse gases. Its global warming potential (GWP) value is 675. Do NOT vent these gases into the atmosphere.
- When charging refrigerant, ALWAYS use protective gloves and safety glasses.

#### Electrical installation (see "19 Electrical installation" [▶ 96])



#### **WARNING**

Electrical wiring MUST be in accordance with the instructions from:

- This manual. See "19 Electrical installation" [▶96].
- The wiring diagram, which is delivered with the unit, located at the inside of the service cover. For a translation of its legend, see "26.3 Wiring diagram: Outdoor unit" [> 145].



#### **WARNING**

The appliance MUST be installed in accordance with national wiring regulations.



#### **CAUTION**

Do NOT push or place redundant cable length into the unit.



#### **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 use taped wires, extension cords, or connections from a star system. They can cause overheating, electrical shocks or fire.
- 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**

- 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

The electrical components shall only be replaced with parts specified by the appliance manufacturer. Replacement with other parts may result in the ignition of refrigerant in the event of a leak.



#### **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

ALWAYS use multicore cable for power supply cables.



#### **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.

#### Commissioning (see "21 Commissioning" [▶ 123])



#### **WARNING**

Commissioning MUST be in accordance with the instructions from this manual. See "21 Commissioning" [> 123].



#### **CAUTION**

Do NOT perform the test operation while working on the indoor unit(s).

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



#### **CAUTION**

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



#### Troubleshooting (see "24 Troubleshooting" [▶ 132])



#### **WARNING**

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



#### **WARNING**

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

# 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
- in a room with dimensions as specified in "15 Special requirements for R32 units" [> 53].



#### **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.
- ALWAYS support the piping at distances of 1 m and 2 m from the indoor unit.
- 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.



#### **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

4.1	General	19
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**

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.



#### WARNING

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





#### **CAUTION**

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



#### **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**

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



#### 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.

Maintenance and service (see "9 Maintenance and service" [▶ 34])



#### 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 maintenance.



#### 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**

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.





#### **CAUTION**

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



#### **CAUTION:** Pay attention to the fan!

It is dangerous to inspect the unit while the fan is running. Make sure to turn OFF the main switch before executing any maintenance task.



#### CAUTION

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

About the refrigerant (see "9.2 About the refrigerant" [▶ 34])



A2L

#### WARNING: MILDLY FLAMMABLE MATERIAL

The refrigerant inside this unit is mildly flammable.



#### **WARNING**

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



#### **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 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.

After-sales service and warranty (see "9.3 After-sales service" [▶ 35])



#### **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, non-toxic and mildly flammable, but it will generate toxic gas when it accidentally leaks into a room where combustible air from fan heaters, gas cookers, etc. is present. Always have qualified service personnel confirm that the point of leakage has been repaired or corrected before resuming operation.

Troubleshooting (see "10 Troubleshooting" [▶ 37])



#### 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.



#### 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 maintenance.



#### **CAUTION**

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





#### **CAUTION**

Do NOT touch the heat exchanger fins. These fins are sharp and could result in cutting injuries.



# 5 About the system

The ERA uses R32 refrigerant which is rated as A2L and is mildly flammable. For compliance with the requirements for enhanced tightness refrigerating systems and IEC60335-2-40 the installer must take extra measures. For more information, see "3.1 Instructions for equipment using R32 refrigerant" [ > 16].

The ERA unit is intended for outdoor installation and aimed for air to air heat pump applications.

The indoor unit part of this ERA heat pump system can be used for heating/cooling, and fresh air or air curtain applications.



#### **NOTICE**

Only one indoor unit pair application is allowed for the ERA outdoor unit, this means:

- one AHU connection with one EKEA + EKEXVA kit,
- or one compatible air curtain.



#### **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, non-toxic and mildly flammable, but it will generate toxic gas when it accidentally leaks into a room where combustible air from fan heaters, gas cookers, etc. is present. Always have qualified service personnel confirm that the point of leakage has been repaired or corrected before resuming operation.



#### **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.



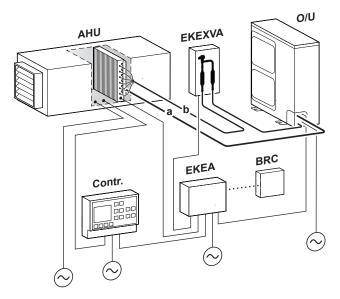
# 5.1 System layout



#### **INFORMATION**

The following figure is an example and may NOT completely match your system

#### **AHU** connection



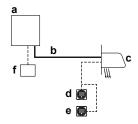
- a Gas piping (field supply)
- **b** Liquid piping (field supply)
- **AHU** Air handling unit (field supply)
- **BRC** Wired remote controller
- **Contr.** Controller (field supply)
- **EKEA** Control box
- **EKEXVA** Expansion valve kit
  - **O/U** Outdoor unit



#### **INFORMATION**

- This equipment is not designed for year-round cooling applications with low indoor humidity conditions, such as Electronic Data Processing rooms.
- Combination of EKEA + EKEXVA + AHU is not a comfort product.

#### Air curtain connection



- a Heat pump outdoor unit
- Refrigerant piping
- Compatible air curtain
- Remote controller in normal mode d
- Remote controller in supervisor mode (mandatory in some situations)
- **f** Centralised controller (optional)



#### **INFORMATION**

An air curtain is a heating-only product designed primarily for providing air separation. Therefore, it cannot be considered a comfort product.



# 6 User interface



#### **CAUTION**

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

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

Detailed information on required actions to achieve certain functions can be found in the dedicated installation and operation manual of the indoor unit.

Refer to the operation manual of the installed user interface.



# 7 Operation

# In this chapter

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# 7.1 Before operation



#### **CAUTION**

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



#### **NOTICE**

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



#### **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.

Operation modes (depending on indoor unit type):

- Heating and cooling (air to air).
- Fan only operation (air to air).

Dedicated functions exist depending on the type of indoor unit, refer to dedicated installation/operation manual for more information.

# 7.2 Operation range

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

	Cooling	Heating
Outdoor temperature	−5~52°C DB	−20~21°C DB
		−20~15.5°C WB
Indoor temperature	21~32°C DB	15~27°C DB
	14~25°C WB	
Indoor humidity	≤80% <sup>(a)</sup>	



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

Above operation range is only valid in case direct expansion indoor units are connected to the ERA system.

Special operation ranges are valid in case of using AHU. They can be found in the installation/operation manual of the dedicated unit. Latest information can be found in the technical engineering data.

# 7.3 Operating the system

#### 7.3.1 About operating the system

- Operation procedure varies according to the combination of outdoor unit and user interface.
- To protect the unit, turn on the main power switch 6 hours before operation.
- If the main power supply is turned off during operation, operation will restart automatically after the power turns back on again.

#### 7.3.2 About cooling, heating, fan only, and automatic operation

- Changeover cannot be made with a user interface whose display shows "changeover under centralised control" (refer to installation and operation manual of the user interface).
- The fan may keep on running for about 1 minute after the heating operation stops.
- The air flow rate may adjust itself depending on the room temperature or the fan may stop immediately. This is not a malfunction.

#### 7.3.3 About the heating operation

It may take longer to reach the set temperature for general heating operation than for cooling operation.

The following operation is performed in order to prevent the heating capacity from dropping or cold air from blowing.

#### **Defrost operation**

In heating operation, freezing of the outdoor unit's air cooled coil increases over time, restricting the energy transfer to the outdoor unit's coil. Heating capability decreases and the system needs to go into defrost operation to be able to remove frost from the outdoor unit's coil. During defrost operation the heating capacity on the indoor unit side will temporarily drop until defrosting is completed. After defrosting, the unit will regain its full heating capacity.

The indoor unit will stop fan operation, the refrigerant cycle will reverse and energy from inside the building will be used to defrost the outdoor unit coil.

The indoor unit will indicate defrost operation on the display 📆 🖰

#### **Hot start**

In order to prevent cold air from blowing out of an indoor unit at the start of heating operation, the indoor fan is automatically stopped. The display of the user interface shows . It may take some time before the fan starts. This is not a malfunction.





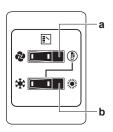
#### **INFORMATION**

- The heating capacity drops when the outside temperature falls. If this happens, use another heating device together with the unit. (When using together with appliances that produce open fire, ventilate the room constantly). Do not place appliances that produce open fire in places exposed to the air flow from the unit or under the unit.
- It takes some time to heat up the room from the time the unit is started since the unit uses a hot-air circulating system to heat the entire room.
- If the hot air rises to the ceiling, leaving the area above the floor cold, we recommend that you use the circulator (the indoor fan for circulating air). Contact your dealer for details.
- 7.3.4 To operate the system (WITHOUT cool/heat changeover remote control switch)
  - 1 Press the operation mode selector button on the user interface several times and select the operation mode of your choice.
    - \* Cooling operation
    - Heating operation
    - Fan only operation
  - **2** Press the ON/OFF button on the user interface.

**Result:** The operation lamp lights up and the system starts operating.

7.3.5 To operate the system (WITH cool/heat changeover remote control switch)

#### Overview of the changeover remote control switch



- FAN ONLY/AIR CONDITIONING SELECTOR **SWITCH** 
  - Set the switch to for fan only operation or to for heating or cooling operation.
- COOL/HEAT CHANGEOVER SWITCH Set the switch to **\*** for cooling or to **\*** for heating

Note: In case a cool/heat changeover remote control switch is used, the position of DIP switch 1 (DS1-1) on the main PCB needs to be switched to the ON position.

#### To start

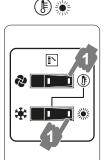
Select operation mode with the cool/heat changeover switch as follows:

Cooling operation





Heating operation



Fan only operation





**2** Press the ON/OFF button on the user interface.

Result: The operation lamp lights up and the system starts operating.

#### To stop

**3** Press the ON/OFF button on the user interface once again.

**Result:** The operation lamp goes out and the system stops operating.



#### **NOTICE**

Do not turn off power immediately after the unit stops, but wait for at least 5 minutes.

#### To adjust

For programming temperature, fan speed and air flow direction refer to the operation manual of the user interface.



# 8 Energy saving and optimum operation

Observe the following precautions to ensure the system operates properly.

- Adjust the air outlet properly and avoid direct air flow to room inhabitants.
- Adjust the room temperature properly for a comfortable environment. Avoid excessive heating or cooling.
- Prevent direct sunlight from entering a room during cooling operation by using curtains or blinds.
- 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.
- When the display shows (time to clean the air filter), ask a qualified service person to clean the filters. (Refer to "Maintenance" in the indoor unit manual.)
- Keep the indoor unit and user interface at least 1 m away from televisions, radios, stereos, and other similar equipment. Failing to do so may cause static or distorted pictures.
- Do NOT place items under the indoor unit, as they may be damaged by water.
- Condensation may form if the humidity is above 80% or if the drain outlet gets blocked.

This heat pump system is equipped with advanced energy saving functionality. Depending on the priority, emphasis can be put on energy saving or comfort level. Several parameters can be selected, resulting in the optimal balance between energy consumption and comfort for the particular application.

Several patterns are available and roughly explained below. Contact your installer or dealer for advice or to modify the parameters to the needs of your building.

Detailed information is given for the installer in the installation manual. He can help you to realize the best balance between energy consumption and comfort.

# In this chapter

3.1	Available main operation methods	33
3.2	Available comfort settings	33



# 8.1 Available main operation methods

#### **Basic**

The refrigerant temperature is fixed independent from the situation.

#### **Automatic**

The refrigerant temperature is set depending on the outdoor ambient conditions. As such adjusting the refrigerant temperature to match the required load (which is also related to the outdoor ambient conditions).

E.g., when your system is operating in cooling, you do not need as much cooling under low outdoor ambient temperatures (e.g., 25°C) as under high outdoor ambient temperatures (e.g., 35°C). Using this idea, the system automatically starts increasing its refrigerant temperature, automatically reducing the delivered capacity and increasing the system's efficiency.

#### Hi-sensible/economic (cooling/heating)

The refrigerant temperature is set higher/lower (cooling/heating) compared to basic operation. The focus under high sensible mode is comfort feeling for the customer.

The selection method of indoor units is important and has to be considered as the available capacity is not the same as under basic operation.

For details concerning to Hi-sensible applications, please contact your installer.

# 8.2 Available comfort settings

For each of above modes a comfort level can be selected. The comfort level is related to the timing and the effort (energy consumption) which is put in achieving a certain room temperature by temporarily changing the refrigerant temperature to different values in order to achieve requested conditions more quickly.

- Powerful
- Quick
- Mild
- Eco



# 9 Maintenance and service

## In this chapter

9.1	Precautions for maintenance and service		
9.2	About the refrigerant		
	9.3.1	Recommended maintenance and inspection	3.
	9.3.2	Recommended maintenance and inspection cycles	3.
	033	Shortened maintenance and replacement cycles	2

#### 9.1 Precautions for maintenance and service



#### **CAUTION**

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



#### NOTICE

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



#### **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.

# 9.2 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.

Refrigerant type: R32

Global warming potential (GWP) value: 675

Periodical inspections for refrigerant leaks may be required depending on the applicable legislation. Contact your installer for more information.



#### **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.



#### 9.3 After-sales service

#### 9.3.1 Recommended maintenance and inspection

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

#### When asking your dealer for an intervention, always state:

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



#### **WARNING**

- Do NOT modify, disassemble, remove, reinstall or repair the unit yourself as incorrect dismantling or installation may cause an 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, non-toxic and mildly flammable, but it will generate toxic gas when it accidentally leaks into a room where combustible air from fan heaters, gas cookers, etc. is present. Always have qualified service personnel confirm that the point of leakage has been repaired or corrected before resuming operation.

#### 9.3.2 Recommended maintenance and inspection cycles

Be aware that the mentioned maintenance and replacement cycles do not relate to the warranty period of the components.

Component	Inspection cycle	Maintenance cycle (replacements and/or repairs)
Electric motor	1 year	20,000 hours
PCB		25,000 hours
Heat exchanger		5 years
Sensor (thermistor, etc.)		5 years
User interface and switches		25,000 hours
Drain pan		8 years
Expansion valve		20,000 hours
Solenoid valve		20,000 hours

The table assumes the following conditions of use:

- Normal use without frequent starting and stopping of the unit. Depending on the model, we recommend not starting and stopping the machine more than 6 times/hour.
- Operation of the unit is assumed to be 10 hours/day and 2,500 hours/year.





#### NOTICE

- The table indicates main components. Refer to your maintenance and inspection contract for more details.
- The table indicates recommended intervals of maintenance cycles. However, in order to keep the unit operational as long as possible, maintenance work may be required sooner. Recommended intervals can be used for appropriate maintenance design in terms of budgeting maintenance and inspection fees. Depending on the content of the maintenance and inspection contract, inspection and maintenance cycles may in reality be shorter than listed.

#### 9.3.3 Shortened maintenance and replacement cycles

Shortening of "maintenance cycle" and "replacement cycle" needs to be considered in following situations:

#### The unit is used in locations where:

- Heat and humidity fluctuate out of the ordinary.
- Power fluctuation is high (voltage, frequency, wave distortion, etc.) (the unit cannot be used if power fluctuation is outside the allowable range).
- Bumps and vibrations are frequent.
- Dust, salt, harmful gas or oil mist such as sulphurous acid and hydrogen sulfide may be present in the air.
- The machine is started and stopped frequently or operation time is long (sites with 24 hour air-conditioning).

#### Recommended replacement cycle of wear parts

Component	Inspection cycle	Maintenance cycle (replacements and/or repairs)
Air filter	1 year	5 years
High efficiency filter		1 year
Fuse		10 years
Crankcase heater		8 years
Pressure containing parts		In case of corrosion, contact your local dealer.



#### **NOTICE**

- The table indicates main components. Refer to your maintenance and inspection contract for more details.
- The table indicates recommended intervals of replacement cycles. However, in order to keep the unit operational as long as possible, maintenance work may be required sooner. Recommended intervals can be used for appropriate maintenance design in terms of budgeting maintenance and inspection fees. Contact your dealer for details.



#### **INFORMATION**

Damage due to taking apart or cleaning interiors of units by anyone other than our authorised dealers may not be included in the warranty.



# 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 breaker or an earth leakage breaker frequently actuates or the ON/OFF switch does NOT properly work.	Turn OFF the main power switch.
The operation switch does NOT work well.	Turn OFF the power supply.
If the user interface display indicates the unit number, the operation lamp flashes and the malfunction code appears.	Notify your installer and report the malfunction code.

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			
If the system does not operate and the error code UR-03 is shown.	Check the type of indoor unit that is currently connected. Make sure that a correct indoor unit (only one EKEA or one compatible air curtain) is connected. If an incorrect type of indoor unit is connected, notify your installer and report the malfunction code.			
If a refrigerant leak occurs in the compatible air curtain (error code #3/E#)	<ul> <li>Actions will be taken by the system. Do NOT turn OFF the power supply.</li> <li>Notify your installer and report the malfunction</li> </ul>			
AHU supply airflow rate below the legal limit (error code <i>U J-3</i> 7) <sup>(a)</sup>	code.			
If the system does not operate at all.	<ul> <li>Check if there is no power failure. Wait until power is restored. If power failure occurs during operation, the system automatically restarts immediately after power is restored.</li> </ul>			
	• Check if no fuse has blown or breaker is activated. Change the fuse or reset the breaker if necessary.			
If the system goes into fan only operation, but as soon as it goes into heating or	<ul> <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> </ul>			
cooling operation, the system stops.	<ul> <li>Check if the user interface display shows</li></ul>			

Malfunction	Measure			
The system operates but cooling or heating is insufficient.	<ul> <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> </ul>			
	<ul> <li>Check if the air filter is not clogged (refer to AHU or air curtain manual).</li> </ul>			
	Check the temperature setting.			
	<ul> <li>Check the fan speed setting on your user interface.</li> </ul>			
	Check for open doors or windows. Close doors and windows to prevent wind from coming in.			
	<ul> <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>			
	<ul> <li>Check if direct sunlight enters the room. Use curtains or blinds.</li> </ul>			
	Check if the air flow angle is proper.			

<sup>(</sup>a) In case the AHU supply airflow rate is above the legal limit for 5 minutes continuously, this error is automatically solved.

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.

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# 10.1 Error codes: Overview

In case a malfunction code appears on the indoor unit user interface display, contact your installer and inform the malfunction code, the unit type, and serial number (you can find this information on the nameplate of the unit).

For your reference, a list with malfunction codes is provided. You can, depending on the level of the malfunction code, reset the code by pushing the ON/OFF button. If not, ask your installer for advice.

Main code	Contents	
80	External protection device was activated	
AO- 1 1	The R32 sensor of the compatible air curtain has detected a refrigerant leak <sup>(a)</sup>	
80/CH	Safety system error (leak detection) <sup>(a)</sup>	
R I	EEPROM failure (indoor)	
<i>R</i> 5	Fan motor malfunction (indoor)	
89	Expansion valve malfunction (indoor)	
RJ	Capacity setting malfunction (indoor)	
Εı	Transmission malfunction between main PCB and sub PCB (indoor)	
ΕЧ	Heat exchanger thermistor malfunction (indoor; liquid)	
£5	Heat exchanger thermistor malfunction (indoor; gas)	
[9	Suction air thermistor malfunction (indoor)	
ЕЯ	Discharge air thermistor malfunction (indoor)	
EH-0 I	R32 sensor malfunction or disconnection (indoor) <sup>(a)</sup>	
CH-02	R32 sensor lifetime exceeded (indoor) <sup>(a)</sup>	
CH-05	R32 sensor end of lifetime<6 months (indoor) <sup>(a)</sup>	
EH- 10	Waiting for indoor unit R32 sensor replacement input <sup>(a)</sup>	
٦٦	User interface thermistor malfunction (indoor)	
ΕI	PCB malfunction (outdoor)	
E2	Current leakage detector was activated (outdoor)	
E3	High pressure switch was activated (outdoor)	
EY	Low pressure malfunction (outdoor)	
E5	Compressor lock detection (outdoor)	
E٦	Fan motor malfunction (outdoor)	
<i>E</i> 9	Electronic expansion valve malfunction (outdoor)	
F3	Discharge temperature malfunction (outdoor)	
FY	Abnormal suction temperature (outdoor)	
нЗ	High pressure switch malfunction	
н٦	Fan motor malfunction (outdoor)	
H9	Ambient temperature sensor malfunction (outdoor)	
J3	Discharge temperature sensor malfunction (outdoor)	

Main code	Contents
J5	Suction temperature sensor malfunction (outdoor)
J5	De-icing temperature sensor malfunction (outdoor) or heat exchanger gas temperature sensor malfunction (outdoor)
דע	Liquid temperature sensor (after subcool HE) malfunction (outdoor)
78	Liquid temperature sensor (coil) malfunction (outdoor)
J9	Gas temperature sensor (after subcool HE) malfunction (outdoor)
JR	High pressure sensor malfunction (S1NPH)
JE	Low pressure sensor malfunction (S1NPL)
LI	INV PCB abnormal
LY	Fin temperature abnormal
L5	INV PCB abnormal
L8	Compressor over current detected
L9	Compressor lock (startup)
LE	Transmission outdoor unit - inverter: INV transmission trouble
PI	INV unbalanced power supply voltage
PY	Fin thermistor malfunction
PJ	Capacity setting malfunction (outdoor)
υО	Abnormal low pressure drop, faulty expansion valve
υι	Reversed power supply phase malfunction
u2	INV voltage power shortage
из	System test run not yet executed
UЧ	Faulty wiring indoor/outdoor
US	Abnormal user interface - indoor communication
UR-03	Connection malfunction over indoor units or type mismatch
UR-55	System lock
UR-57	External ventilation input error
UΕ	Centralised address duplication
UΕ	Malfunction in communication centralised control device - indoor unit
UН	Auto address malfunction (inconsistency)
UJ-37	AHU supply airflow rate below the legal limit <sup>(b)</sup>

 $<sup>^{\</sup>mathrm{(a)}}$  The error code is only shown on the user interface of the compatible air curtain where the error occurs.

# 10.2 Symptoms that are NOT system malfunctions

The following symptoms are NOT system malfunctions:



 $<sup>^{(</sup>b)}$  In case the AHU supply airflow rate is above the legal limit for 5 minutes continuously, this error is automatically solved.

# 10.2.1 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 5 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.
- If "Under Centralised Control" is displayed on the user interface, pressing the operation button causes the display to blink for a few seconds. The blinking display indicates that the user interface cannot be used.
- The system does not start immediately after the power supply is turned on. Wait one minute until the microcomputer is prepared for operation.

# 10.2.2 Symptom: Cool/Heat cannot be changed over

- When the display shows 

  ↑ (changeover under centralised control), it shows that this is a slave user interface.
- When the cool/heat changeover remote control switch is installed, or T3T4 input is used and the display shows (changeover under centralised control), this is because cool/heat changeover is controlled by the cool/ heat changeover remote control switch. Ask your dealer where the remote control switch is installed.
- 10.2.3 Symptom: Fan operation is possible, but cooling and heating do not work

Immediately after the power is turned on. The micro computer is getting ready to operate and is performing a communication check with the indoor unit. Please wait 12 minutes maximally until this process is finished.

10.2.4 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.

10.2.5 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.

- 10.2.6 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 "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.
- 10.2.7 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.

# 10.2.8 Symptom: Noise of air conditioners (Outdoor unit)

When the tone of operating noise changes. This noise is caused by the change of frequency.

# 10.2.9 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.

# 10.2.10 Symptom: The units can give off odours

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

# 10.2.11 Symptom: The outdoor unit fan does not spin

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

# 10.2.12 Symptom: The display shows "88"

This is the case immediately after the main power supply switch is turned on and means that the user interface is in normal condition. This continues for 1 minute.

# 10.2.13 Symptom: The compressor in the outdoor unit does not stop after a short heating operation

This is to prevent refrigerant from remaining in the compressor. The unit will stop after 5 to 10 minutes.

## 10.2.14 Symptom: The inside of an outdoor unit is warm even when the unit has stopped

This is because the crankcase heater is warming the compressor so that the compressor can start smoothly.



# 11 Relocation

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



# 12 Disposal

This unit uses hydrofluorocarbon. Contact your dealer when discarding this unit. It is required by law to collect, transport and discard the refrigerant in accordance with the "hydrofluorocarbon collection and destruction" regulations.



## **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.
- When handling the unit, take into account the following:
  - Fragile.
  - Keep the unit upright in order to avoid compressor damage.

# In this chapter

13.1	To unpack the outdoor unit	46
13.2	To handle the outdoor unit	47
13.3	To remove the accessories from the outdoor unit	48
13.4	To remove the transportation stay	48

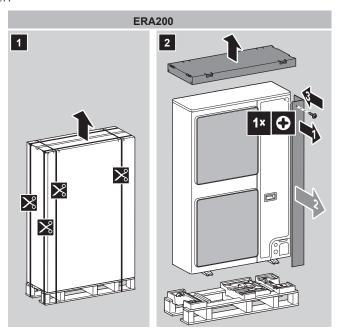
# 13.1 To unpack the outdoor unit



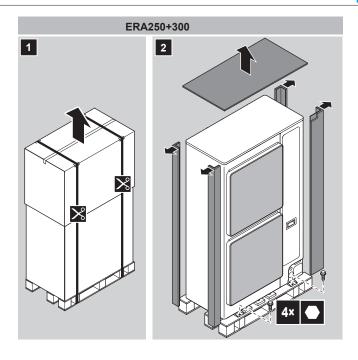
#### **NOTICE**

For ERA200 model: Make sure that the screw removed for the packaging is reinstalled in the front of the unit. This is important because the screw is longer than screws used for the side and back of the unit, where it can damage heat exchanger fins or pipes.

Note: This product is not designed for repacking. In case of repacking, contact your dealer.







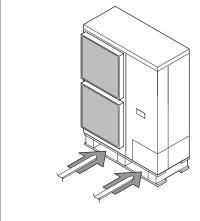
# 13.2 To handle the outdoor unit



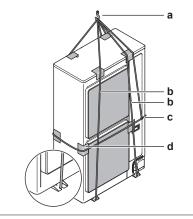
## **CAUTION**

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

**Forklift.** If the unit remains on its pallet, you can also use a forklift.



**Crane.** For ERA250+300 models, you can also use a crane and lift the unit as follows:



- a Lifting hook
- **b** Two vertical ropes (at least 8 m and Ø20 mm) to lift the unit
- **c** One horizontal rope (also fixed to the lifting hook) to prevent the unit from dropping
- **d** Protective material (rags, soft material) between the ropes and the casing to protect the casing

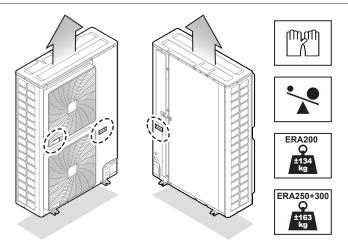


#### **WARNING**

The unit's center of gravity deviates to the right side (compressor side). If you lift the unit using a crane and you do not fix a horizontal rope to the lifting hook as shown, the unit might drop.

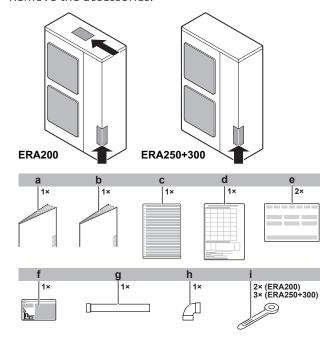
Carry the unit slowly as shown:





# 13.3 To remove the accessories from the outdoor unit

- 1 Remove the service cover. See "16.2.2 To open the outdoor unit" [▶ 70].
- Remove the accessories.



- a General safety precautions
- Outdoor unit installation and operation manual
- c Multilingual fluorinated greenhouse gases label
- **d** Installation information leaflet
- e Declaration of conformity
- Fluorinated greenhouse gases label
- **g** Gas piping accessory 1 (only for ERA250: Ø19.1 mm)
- Gas piping accessory 2 (ERA200: Ø19.1 mm; ERA250+300: Ø22.2 mm)
- i Cable tie (ERA200: 2×; ERA250+300: 3×)

# 13.4 To remove the transportation stay



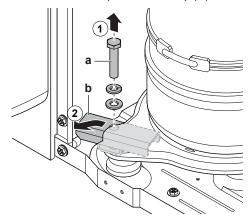
## **NOTICE**

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



The transportation stay for protecting the unit during transport must be removed. Proceed as shown in the figure and procedure below.

- 1 Remove the bolt (a) and washers.
- 2 Remove the transportation stay (b) as shown in the figure below.



- **a** Bolt
- **b** Transportation stay



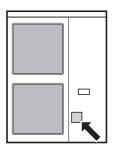
# 14 About the units and options

# In this chapter

14.1	Identific	ation label: Outdoor unit	5
14.2	About tl	ne outdoor unit	50
14.3	System	ayout	5
14.4	Combin	ing units and options	5
	14.4.1	About combining units and options	5.
	14.4.2	Possible options for the outdoor unit	5.

# 14.1 Identification label: Outdoor unit

## Location



## **Model identification**

Example: ER A 200 AM YF B

Code Explanation				
ER	Inverter outdoor unit for AHU option kit and air curtains			
А	Refrigerant R32			
200~300	Capacity class			
AM	Model series			
YF	Power supply: 3N~, 380-415 V, 50 Hz			
	Power supply: 3N~, 400 V, 60 Hz			
В	European market			

# 14.2 About the outdoor unit

This installation manual concerns the ERA, full inverter driven, heat pump system.

These units are intended for outdoor installation and aimed for heating/cooling, and fresh air or air curtain applications.

Specification					
Capacity	Heating	25~37.5 kW			
	Cooling	22.4~33.5 kW			
Ambient design temperature	Heating	−20~21°C DB −20~15.5°C WB			
	Cooling	−5~52°C DB			



# 14.3 System layout



#### **WARNING**

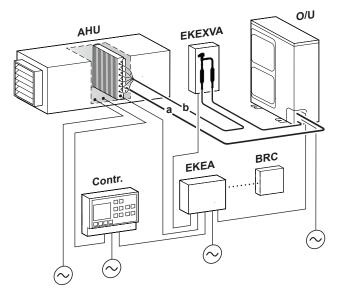
The installation MUST comply with the requirements that apply to this R32 equipment. For more information, see "15 Special requirements for R32 units" [> 53].



#### **INFORMATION**

The following figure is an example and may NOT completely match your system layout.

#### **AHU** connection



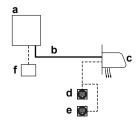
- **a** Gas piping (field supply)
- **b** Liquid piping (field supply)
- **AHU** Air handling unit (field supply)
- **BRC** Wired remote controller
- **Contr.** Controller (field supply)
- **EKEA** Control box
- **EKEXVA** Expansion valve kit
  - **O/U** Outdoor unit



#### **INFORMATION**

- This equipment is not designed for year-round cooling applications with low indoor humidity conditions, such as Electronic Data Processing rooms.
- Combination of EKEA + EKEXVA + AHU is not a comfort product.

#### Air curtain connection



- a Heat pump outdoor unit
- **b** Refrigerant piping
- c Compatible air curtain
- **d** Remote controller in normal mode
- e Remote controller in supervisor mode (mandatory in some situations)



f Centralised controller (optional)



#### **INFORMATION**

An air curtain is a heating-only product designed primarily for providing air separation. Therefore, it cannot be considered a comfort product.

# 14.4 Combining units and options



#### **INFORMATION**

Certain options may NOT be available in your country.

# 14.4.1 About combining units and options



#### **NOTICE**

Only one indoor unit pair application is allowed for the ERA outdoor unit, this means:

- one AHU connection with one EKEA + EKEXVA kit,
- or one compatible air curtain.

This heat pump system can only be combined with the indoor units mentioned

An overview is given indicating the allowed combinations of indoor units and outdoor units. Not all combinations are allowed. They are subject to rules (combination between outdoor units, indoor units and remote controllers, etc.) mentioned in the technical engineering data.

## 14.4.2 Possible options for the outdoor unit



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

#### Cool/heat selector (KRC19-26A)

To control the cooling or heating operation from a central location.

A surface-mounting kit (KJB111A) is available for installing the switch onto a wall.

For connecting the cool/heat selector switch to the outdoor unit, see "19.4 To connect the cool/heat selector switch option" [> 105].



#### **NOTICE**

Do NOT use the cool/heat selector switch in case the T3T4 input is used.

Refer to the EKEA installation and operation manual for more information.

## External control adaptor (DTA104A61/62)

To instruct specific operation with an external input coming from a central control the external control adaptor can be used. Instructions can be provided for low noise operation and power consumption limitation.

The external control adapter has to be installed in the indoor unit.



# 15 Special requirements for R32 units

# In this chapter

15.1	Require	ments for compatible air curtains	5
	15.1.1	Installation space requirements	5
	15.1.2	System layout requirements	5
	15.1.3	To determine the required safety measures	5
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15.2	Require	ments for air handling units	6

# 15.1 Requirements for compatible air curtains



#### **INFORMATION**

In this section, the term "indoor unit" is used for air curtain applications.

# 15.1.1 Installation space requirements



#### **WARNING**

If the appliance contains R32 refrigerant, the floor area of the room in which the appliance is stored shall be at least  $429 \text{ m}^2$ .



#### **NOTICE**

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

# 15.1.2 System layout requirements

The ERA uses R32 refrigerant which is rated as A2L and is mildly flammable.

To comply with the requirements of enhanced tightness refrigerating systems of the IEC 60335-2-40, this system is equipped with an alarm in the remote controller and natural ventilation can be used as a safety measure. Both safety measures are installation specific and can be determined using the requirements mentioned in this manual. In case the requirements of this manual are followed, no additional safety measures are needed.

A big range of charge and room area combinations is allowed thanks to the countermeasures that are implemented in the system by default.

Follow the installation requirements below to ensure that the complete system is compliant to legislation.

#### **Outdoor unit installation**

The outdoor unit must be installed outside. For indoor installation of the outdoor unit, additional measures can be necessary to comply with the applicable legislation.

A terminal for external output is available in the outdoor unit. This SVS output can be used when additional countermeasures are needed. The SVS output is a contact on terminal X2M that closes in case a leak is detected, failure or disconnection of an R32 sensor (located in the air curtain).



For more information about the SVS output, see "19.3 To connect the external outputs" [> 104].

#### Indoor unit installation

For installation of the compatible air curtain, refer to the installation and operation manual delivered with the air curtain. For compatibility of air curtain refer to the latest version of the technical data book of this outdoor unit.

Depending on the room size in which the air curtain is installed and the total amount of refrigerant in the system, other safety measures are necessary for these indoor units. See "15.1.3 To determine the required safety measures" [> 55].

An optional output, if available on a compatible air curtain, can be used for an external device. The output will trigger in case a leak is detected, the R32 sensor fails or when the sensor is disconnected. For more information about this output, refer to the installation manual of the compatible air curtain unit.

#### **Piping requirements**



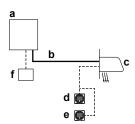
#### **CAUTION**

Piping MUST be installed according to instructions given in "17 Piping installation" [> 74]. Only mechanical joints (e.g. braze+flare connections) that are compliant with the latest version of ISO14903 can be used.

Low temperature solder alloys shall not be used for pipe connections.

For piping installed in the occupied space, make sure that the piping is protected against accidental damage. Piping should be checked according to the procedure as mentioned in "17.3 Checking the refrigerant piping" [ > 84].

# Remote controller requirements for compatible air curtains equipped with R32 sensor



- a Heat pump outdoor unit
- **b** Refrigerant piping
- Compatible air curtain
- **d** Remote controller in normal mode
- e Remote controller in supervisor mode (mandatory in some situations)
- **f** Centralised controller (optional)

For installation of the remote controller, please refer to the installation and operation manual delivered with the remote controller. Any compatible air curtain equipped with a R32 sensor must be connected with a R32 safety system compatible remote controller (e.g. BRC1H52/82\* or later type). In case of air curtains, the remote controllers have implemented safety measures that will warn the user visually and audibly in case of a leak.

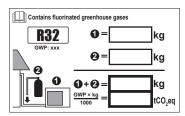
For installation of the remote controller of an air curtain, it is mandatory to follow the requirements:

- 1 Only a safety system compatible remote controller can be used. See technical data sheet for remote controller compatibility (e.g. BRC1H52/82\*).
- The air curtain must be connected to a compatible remote controller.



# 15.1.3 To determine the required safety measures

**Step 1** – Determine the total amount of refrigerant in the system. Use the values on the unit nameplate to determine the total amount of refrigerant in the system.



Total charge=Factory charge **①**<sup>(a)</sup>+additional charge **②**<sup>(b)</sup>

- $^{(a)}$  The factory charge value can be found on the nameplate.
- (b) The R value (additional refrigerant to be charged) is calculated in "18.4 To determine the additional refrigerant amount" [> 91].



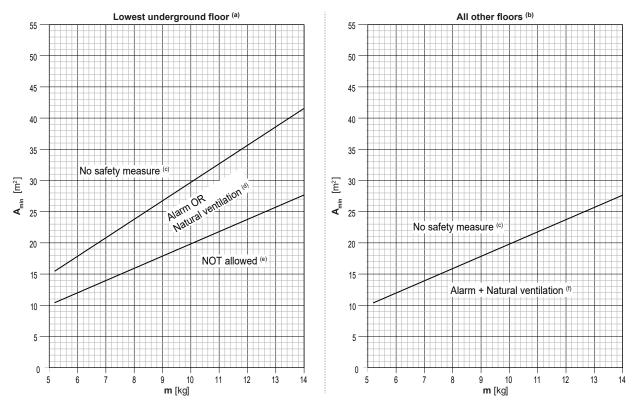
#### **NOTICE**

The total refrigerant charge amount in the system MUST always be lower than 79.8 kg.

**Step 2** – Determine the area of the room (A) where an air curtain is installed/serving.

The room area can be determined by projecting the walls, doors and partitions to the floor and calculating the enclosed area. Spaces connected by only false ceilings, ductwork, or similar connections are not considered a single space.

**Step 3** – Use the graphs or tables below to determine the required safety measures for the air curtain.



	A <sub>min</sub> [m²]				A <sub>min</sub> [m²]			
m [kg]	Lowest underground floor (a)		All other floors (b)	m [kg]	Lowest underground floor (a)		All other floors (b)	
	No safety measure (c)	Alarm OR Natural ventilation <sup>(d)</sup>	No safety measure (c)		No safety measure (c)	Alarm OR Natural ventilation <sup>(d)</sup>	No safety measure (c)	
5.2	15.4	10.3	10.3	9.8	29.0	19.3	19.3	
5.4	16.0	10.7	10.7	10.0	29.6	19.7	19.7	
5.6	16.6	11.1	11.1	10.2	30.2	20.1	20.1	
5.8	17.2	11.5	11.5	10.4	30.8	20.5	20.5	
6.0	17.8	11.8	11.8	10.6	31.4	20.9	20.9	
6.2	18.4	12.2	12.2	10.8	32.0	21.3	21.3	
6.4	19.0	12.6	12.6	11.0	32.6	21.7	21.7	
6.6	19.5	13.0	13.0	11.2	33.2	22.1	22.1	
6.8	20.1	13.4	13.4	11.4	33.8	22.5	22.5	
7.0	20.7	13.8	13.8	11.6	34.4	22.9	22.9	
7.2	21.3	14.2	14.2	11.8	34.9	23.3	23.3	
7.4	21.9	14.6	14.6	12.0	35.5	23.7	23.7	
7.6	22.5	15.0	15.0	12.2	36.1	24.1	24.1	
7.8	23.1	15.4	15.4	12.4	36.7	24.5	24.5	
8.0	23.7	15.8	15.8	12.6	37.3	24.9	24.9	
8.2	24.3	16.2	16.2	12.8	37.9	25.3	25.3	
8.4	24.9	16.6	16.6	13.0	38.5	25.7	25.7	
8.6	25.5	17.0	17.0	13.2	39.1	26.1	26.1	
8.8	26.1	17.4	17.4	13.4	39.7	26.5	26.5	
9.0	26.7	17.8	17.8	13.6	40.3	26.8	26.8	
9.2	27.2	18.2	18.2	13.8	40.9	27.2	27.2	
9.4	27.8	18.6	18.6	14.0	41.5	27.6	27.6	
9.6	28.4	19.0	19.0					

**m** Total refrigerant charge in the system [kg]

Minimum room area limit [m<sup>2</sup>]

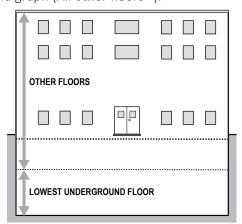
- (a) Lowest underground floor (=Lowest underground floor)
- **(b)** All other floors (=All other floors)
- (c) No safety measure (=No safety measure)
- (d) Alarm OR Natural ventilation (=Alarm OR Natural ventilation)
- (e) NOT allowed (=NOT allowed)
- (f) Alarm + Natural ventilation (=Alarm + Natural ventilation)

Use the total amount of refrigerant in the system and the area of the room in which the air curtain is installed/serving, to check which safety measure is required.

Note: When "No safety measure" is required, it is still allowed to apply natural ventilation or alarm) if wanted. Follow the respective instructions as described further below.

Note: When natural ventilation is required, it is still allowed to apply alarm) if wanted. Follow the respective instructions as described further below.

Use the first graph (Lowest underground floor<sup>(a)</sup>) in case the air curtain is installed/ serving in the lowest underground floor of a building. For other floors, use the second graph (All other floors<sup>(b)</sup>).



The graphs and table are based on an installation height of the air curtain between 1.8 m and 2.2 m (bottom of the air curtain). See "16.1.1 Installation site requirements of the outdoor unit" [> 65].

If the installation height is more than 2.2 m, different boundaries for the applicable safety measures can apply. To know which safety measure is required in case the installation height is more than 2.2 m, refer to the online tool (VRV Xpress).



# **NOTICE**

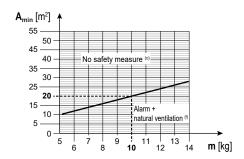
A compatible air curtain cannot be installed lower than  $1.8\ m$  from the lowest point of the floor.

## **Example**

The total amount of refrigerant in the ERA system is 10 kg. The air curtain is installed in spaces that do NOT belong to the lowest underground floor of the building. The space in which the air curtain is installed has a room area of  $50 \text{ m}^2$ .

- Based on the graph for "All other floors" (All other floors), the room area limit is
   19.7 m² (approx. 20 m²) for "No safety measure" (No safety measures).
- This means that the following safety measures are required:

Room area	Required safety measure
A=50 m²≥20 m²	No safety measures



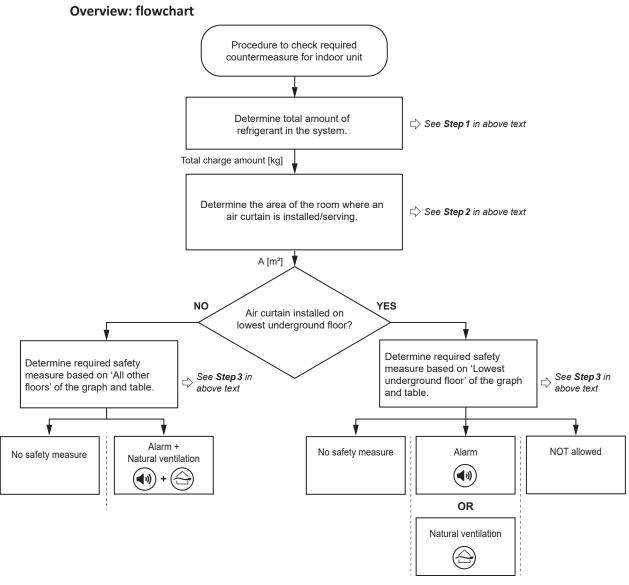
m Total refrigerant charge in the system [kg]

**A**<sub>min</sub> Minimum room area limit [m²]

(c) No safety measure (=No safety measure)

(f) Alarm + Natural ventilation (=Alarm + Natural ventilation)





Note: The flowchart is an overview. Always refer to the full text mentioned in this manual for clear understanding and detailed explanation.

# 15.1.4 Safety measures

# No safety measure

When the room area is sufficiently large, no safety measures are required. This also includes an indoor unit installed in the lowest underground floor.

Therefore the R32 safety system in the indoor unit in a sufficiently large room can be deactivated (active by default) by changing the setting in the user interface as shown below:

#### **Field settings**

No safety measure				
Setting	1 <sup>st</sup> code	Function	2 <sup>nd</sup> code	Description
15/25	13	R32 leak safety system setting	01	Disabled

**Note:** For more information, see "20.1.8 Indoor unit field setting" [▶ 117].

#### **Alarm**



#### **WARNING**

Do NOT use 'Alarm' as the ONLY safety measure in case the indoor unit is installed in an occupied space where people are restricted in their movement. Combine or use another safety measure.

R32 safety system compatible remote controllers (e.g. BRC1H52/82\* or later type) used with the air curtain have a built-in alarm as a safety measure. For installation of the remote controller, please refer to the installation and operation manual delivered with the remote controller.

The compatible air curtain must be connected with a R32 safety system compatible remote controller (e.g. BRC1H52/82\* or later type). These remote controllers have implemented safety measures that will warn the user visually and audibly in case of a leak.

For installation of the remote controller, it is mandatory to follow the requirements.

- 1 Only a safety system compatible remote controller can be used. See technical data sheet for remote controller compatibility (e.g. BRC1H52/82\*).
- 2 The remote controller put in the room served by the air curtain must be in 'fully functional' or 'alarm only' mode. For details about the different remote controller modes and how to set up, please refer to the installation and operation manual delivered with the remote controller.
- **3** For buildings where sleeping facilities are offered (e.g. hotel), where persons are restricted in their movements (e.g. hospitals), an uncontrolled number of persons is present or buildings where people are not aware of the safety precautions it is mandatory to install one of the following devices at a location with 24-hour monitoring:
  - a supervisor remote controller
  - or a centralised controller. E.g., iTM with external alarm via WAGO module, iTM with built-in alarm, ...



Note: The remote controllers with built-in alarm will generate a visible and audible warning. E.g. the BRC1H52/82\* remote controllers can generate an alarm of 65 dB (sound pressure, measured at 1 m distance of the alarm). Sound data is available in the technical data sheet of the remote controller. The alarm should always be 15 dB louder than the background noise of the room.

A field supply external alarm with a sound output 15 dB louder than the background noise of the room MUST be installed in the following cases:

- The sound output of the remote controller is not sufficient to guarantee the 15 dB difference. This alarm can be connected to the SVS output channel of the outdoor unit, or to the optional output of the air curtain, if available. The outdoor SVS will trigger when a R32 leak is detected. For more information on the SVS output signal, see "19.3 To connect the external outputs" [▶ 104].
- A centralised controller without built-in alarm is used, or the sound output of the centralised controller with built-in alarm is not sufficient to guarantee the 15 dB difference. Please refer to the installation manual of the centralised controller for the correct procedure to install the external alarm.

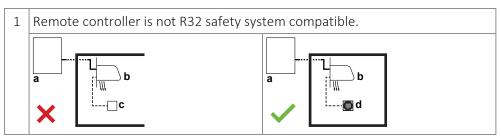
Note: Depending on configuration, the remote controller is operable in three possible modes. Each mode offers different controller functionality. For detailed information about setting the operation mode of the remote controller and its function, please refer to the installer and user reference guide of the remote controller.

Mode	Function
Fully functional	The controller is fully functional. All normal functionality is available.
Alarm only	The controller only acts as leak detection alarm (for a single indoor unit). No functionality is available. The remote controller should always be put in the same room as the indoor unit.
Supervisor	The controller only acts as leak detection alarm. No other functionality is available. The remote controller should be placed at a supervised location.
	<b>Note:</b> In order to add a supervisor remote controller to the system, a field setting must be set on remote controller and outdoor unit. The air curtain needs to be assigned an address number.

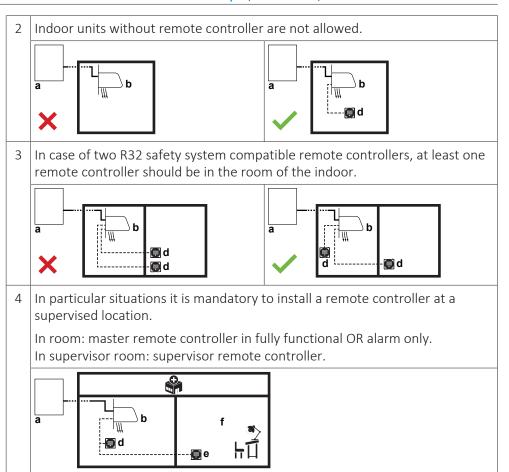
Note: Incorrect use of remote controllers can result in occurrence of error codes, non-operating system or system that is not compliant to applicable legislation.

Note: Some centralised controllers can also be used as supervisor remote controller. For further details on installation, please refer to the installation manual of the centralised controllers.

## **Examples**







- a Outdoor unit
- **b** Compatible air curtain
- **c** Remote controller NOT compatible with R32 safety system
- **d** Remote controller compatible with R32 safety system
- e Remote controller in supervisor mode
- **f** Supervisor room
- NOT allowed
- Allowed

# **Natural ventilation**

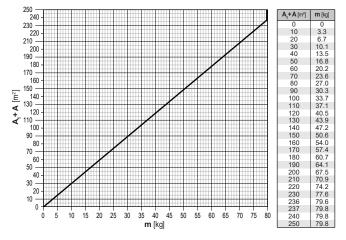
Natural ventilation is a safety measure where ventilation is made to a place where sufficient air is available to dilute the leaked refrigerant such as a large space.

The natural ventilation safety measure can be applied by following the steps below:

**Step 1** – Determine total room area, which is the total area of the space that has natural ventilation **and** the space in which the air curtain is installed/serving:

The respective room area can be determined by projecting the walls, doors and partitions to the floor and calculating the enclosed area. Spaces connected only through false ceilings, ductwork, or similar connections are not considered a single space.

**Step 2** – Use the graph or table below to determine the total refrigerant charge limit:



- m Total refrigerant charge limit in the system [kg]
- Area of the room with natural ventilation [m<sup>2</sup>]
- Area of the room where an air curtain is installed/serving [m<sup>2</sup>]

**Note:** Round down the derived values.

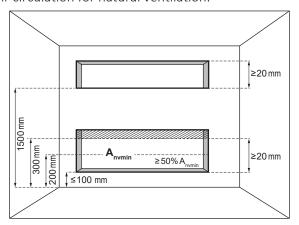
The graphs and table are based on an installation height of the air curtain between 1.8 m and 2.2 m (bottom of air curtain or bottom of duct openings).

If the installation height is more than 2.2 m, higher total refrigerant charge limit of the system can apply. To know the total refrigerant charge limit of the system in case the installation height is more than 2.2 m, refer to the online tool (VRV Xpress).

Step 3 – The total amount of refrigerant in the system MUST be less than the refrigerant charge limit derived from the graph above. If NOT, natural ventilation safety measure is not allowed.

Step 4 – The partition between two rooms on the same floor MUST meet one of the following two requirements for natural ventilation.

- 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.
- 2 Rooms on the same floor connected with permanent openings that fulfil the requirements listed below. The openings must consist out of two parts to allow air circulation for natural ventilation.



Minimal natural ventilation area

For the lower opening:

- It is not an opening to the outside
- The opening cannot be closed
- The opening must be ≥0.012 m<sup>2</sup> (A<sub>nymin</sub>)



- ${}^{\bullet}$  The area of any openings above 300 mm from the floor does not count when determining  $A_{\mbox{\tiny nvmin}}$
- At least 50% of A<sub>nvmin</sub> is less than 200 mm above the floor
- The bottom of the lower opening is ≤100 mm from the floor
- The height of the opening is ≥20 mm

For the upper opening:

- It is not an opening to the outside
- The opening cannot be closed
- The opening must be  $\geq 0.006 \text{ m}^2$  (50% of A<sub>nvmin</sub>)
- The bottom of the upper opening must be ≥1500 mm above the floor
- The height of the opening is ≥20 mm

**Note:** The requirement for the upper opening can be met by false ceilings, ventilation ducts or similar arrangements that provide an airflow path between the connected rooms.

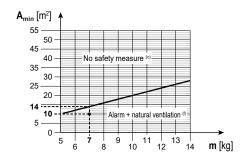
#### **Example**

The total amount of refrigerant in the ERA system is 7 kg. The ERA system has an air curtain which is installed in a space that does not belong to the lowest underground floor of the building. The space in which the air curtain is installed has a room area of 10 m². An adjacent room has a room area of 40 m² to which air circulation is possible through a partition that meets one of the two requirements in the above text. The available safety measure is *Alarm + Natural ventilation* (based on the total amount of refrigerant and room area from the graph for "All other floors").

- 1 To apply the *Alarm* safety measure, see "Alarm" [▶ 59].
- 2 In addition, apply the *Natural ventilation* safety measure: total room areas of installed room and adjacent room where natural ventilation can be made:  $A+A_1=10 \text{ m}^2+40 \text{ m}^2=50 \text{ m}^2$

**Result:** Total refrigerant charge limit for the system determined using the graph for natural ventilation is **16.8 kg**.

Total amount of refrigerant in the system (7 kg) < Total refrigerant charge limit (16.8 kg), which means that the *Natural ventilation* safety measure can be applied.

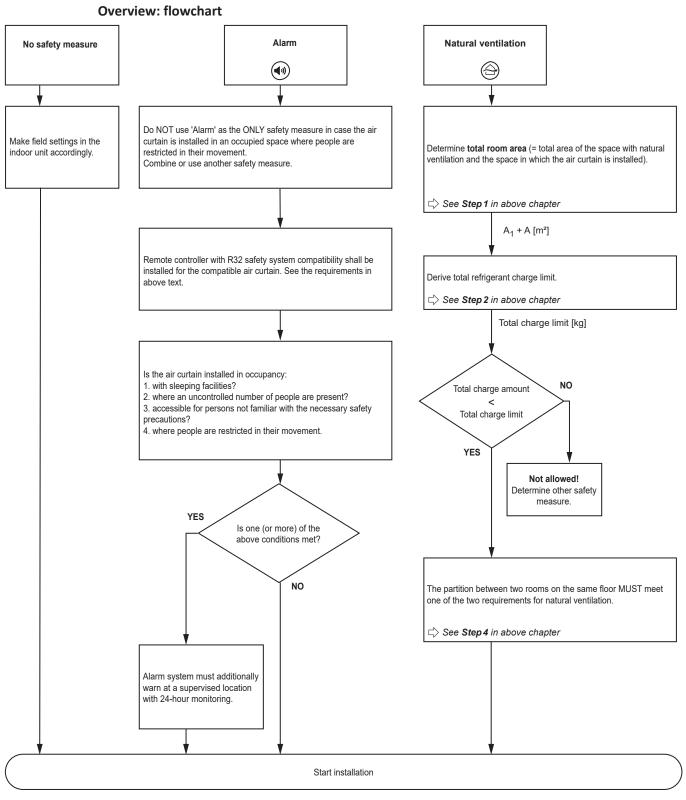


m Total refrigerant charge in the system [kg]

**A**<sub>min</sub> Minimum room area limit [m<sup>2</sup>]

- (c) No safety measure (=No safety measure)
- (f) Alarm + Natural ventilation (=Alarm + Natural ventilation)





Note: The flowchart is an overview. Always refer to the full text mentioned in this manual for clear understanding and detailed explanation.

# 15.2 Requirements for air handling units

For special R32 requirements in case of an AHU connection, refer to the EKEA installation and operation manual.



# 16 Unit installation



#### **WARNING**

The installation MUST comply with the requirements that apply to this R32 equipment. For more information, see "15 Special requirements for R32 units" [▶ 53].

# In this chapter

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# 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" [▶ 53].

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

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

# 16.1.1 Installation site requirements of the outdoor unit



#### **INFORMATION**

Also read the following requirements:

- General installation site requirements. See "2 General safety precautions" [▶ 7].
- Service space requirements. See "26 Technical data" [▶ 140].
- Refrigerant piping requirements (length, height difference). See
   "17.1.1 Refrigerant piping requirements" [▶ 74].





#### **INFORMATION**

Equipment meets the requirement for commercial and light-industrial location when professionally installed and maintained.

 The outdoor unit is designed for outdoor installation only, and for the following ambient temperatures:

Heating	−20~21°C DB −20~15.5°C WB
Cooling	−5~52°C DB

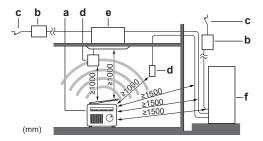
**Note:** For indoor installation of the outdoor unit, check the applicable legislation.



#### **NOTICE**

The equipment described in this manual may cause electronic noise generated from radio-frequency energy. The equipment complies with 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.



- Personal computer or radio а
- Fuse
- Earth leakage protector
- User interface
- Indoor unit (for illustrative purposes only)
- Outdoor unit
- In places with weak reception, keep distances of 3 m or more to avoid electromagnetic disturbance of other equipment and use conduit tubes for power and transmission lines.
- 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.
- Select a place where rain can be avoided as much as possible.
- Ensure that in the event of a water leak, no damage occurs to the installation space or its surroundings.
- Be sure that the air inlet of the unit is not positioned towards the main wind direction. Frontal wind will disturb the operation of the unit. If necessary, use a screen to block the wind.
- Ensure that water cannot cause any damage to the location by adding water drains to the foundation and by preventing water traps in the construction.
- 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.



• Heat exchanger fins are sharp and injury is possible. Choose an installation location where there is no risk for injury (especially in areas where children play).

Do NOT install the unit in the following places:

- 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.
- 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.
- Sound sensitive areas (e.g. near a bedroom), so that the operation noise will cause no trouble.

**Note:** If the sound is measured under actual installation conditions, the measured value might be higher than the sound pressure level mentioned in Sound spectrum in the data book due to environmental noise and sound reflections.



#### **INFORMATION**

The sound pressure level is less than 70 dBA.

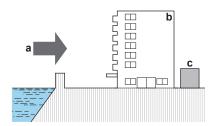
It is NOT recommended to install the unit in the following places because it may shorten the life of the unit:

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

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

Install the outdoor unit away from direct sea winds.

**Example:** Behind the building.

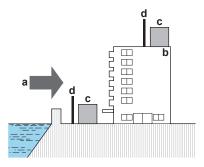


- a Sea wind
- **b** Building
- c Outdoor unit

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

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





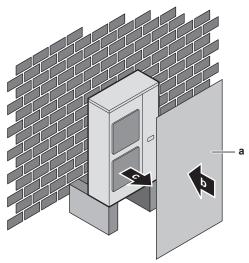
- Sea wind
- Building
- Outdoor unit
- Windbreaker

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

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

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

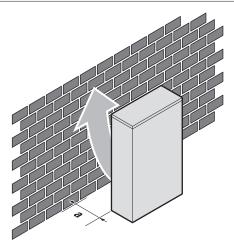
It is recommended to install the outdoor unit with the air inlet facing the wall and NOT directly exposed to the wind.



- Baffle plate
- Prevailing wind direction
- c Air outlet

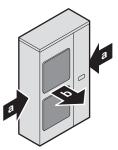
Turn the air outlet side towards the building's wall, fence or screen.





a Make sure there is enough installation space

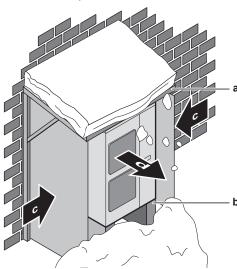
Set the air outlet side at a right angle to the direction of the wind.



- a Prevailing wind direction
- **b** Air outlet

# 16.1.2 Additional installation site requirements of the outdoor unit in cold climates

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



- a Snow cover or shed
- **b** Pedestal (minimum height=150 mm)
- c Prevailing wind direction
- **d** Air outlet

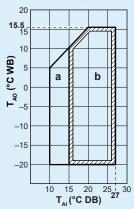
Snow might build up and freeze between the heat exchanger and the casing of the unit. This might decrease the operating efficiency. For instructions on how to prevent this (after mounting of the unit), see "16.3.3 To provide drainage" [> 72].





#### **NOTICE**

When operating the unit in heating in a low outdoor ambient temperature with high humidity conditions, make sure to take precautions to keep the drain holes of the unit free by using proper equipment.



 ${f a}$ : Warming up operation range;  ${f b}$ : Heating operation range;  ${f T}_{Al}$ : Ambient indoor temperature;  $T_{AO}$ : Ambient outdoor temperature

If the unit is selected to operate at ambient temperatures lower than -5°C for 5 days or longer, with relative humidity levels exceeding 95%, we recommend to apply a Daikin range specifically designed for such application and/or to contact your dealer for further advice.

# 16.2 Opening and closing the unit

# 16.2.1 About opening the units

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

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



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

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

# 16.2.2 To open the outdoor unit

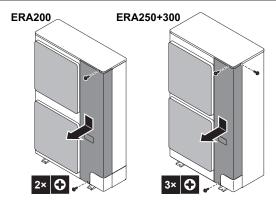


**DANGER: RISK OF ELECTROCUTION** 



DANGER: RISK OF BURNING/SCALDING



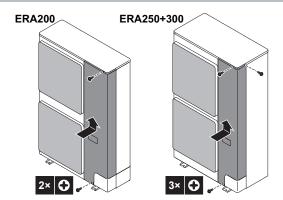


# 16.2.3 To close the outdoor unit



# **NOTICE**

When closing the outdoor unit cover, make sure that the tightening torque does NOT exceed  $4.1~\text{N}\,\text{-m}$ .



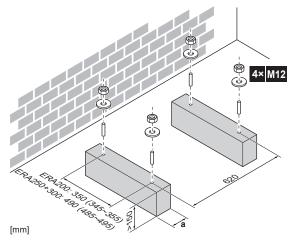
# 16.3 Mounting the outdoor unit

# 16.3.1 To provide the installation structure

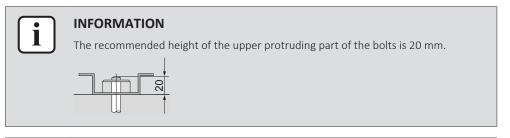
Check the strength and level of the installation ground so that the unit will not cause any operating vibration or noise.

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

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



a Make sure not to cover the drain holes of the bottom plate of the unit.



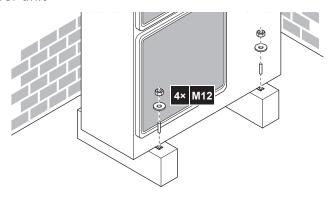


## **NOTICE**

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



# 16.3.2 To install the outdoor unit



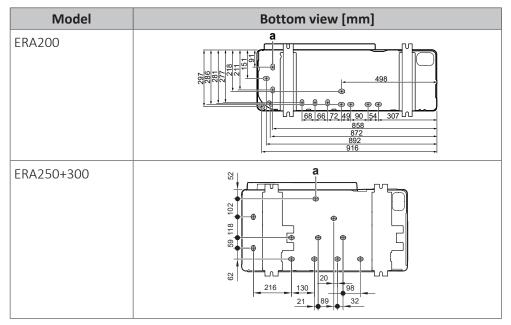
# 16.3.3 To provide drainage

- Make sure that condensation water can be evacuated properly.
- Install the unit on a base to make sure that there is proper drainage in order to avoid ice accumulation.
- Prepare a water drainage channel around the foundation to drain waste water away from the unit.
- Avoid drain water flowing over the footpath, so that it does NOT become slippery in case of ambient freezing temperatures.
- If you install the unit on a frame, install a waterproof plate within 150 mm of the bottom side of the unit in order to prevent water from getting into the unit and to avoid drain water dripping (see the following figure).





# Drain holes (dimensions in mm)



**a** Drain holes

# 16.3.4 To prevent the outdoor unit from falling over

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

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





# 17 Piping installation



### **CAUTION**

See "3 Specific installer safety instructions" [> 12] to make sure this installation complies with all safety regulations.

# In this chapter

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# 17.1 Preparing refrigerant piping

# 17.1.1 Refrigerant piping requirements



# **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" [▶7].

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

# 17.1.2 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>	
9.5 mm (3/8")	Annealed (O)	≥0.80 mm	Ø
12.7 mm (1/2")			
15.9 mm (5/8")	Annealed (O)	≥0.99 mm	
19.1 mm (3/4")	Half hard (1/2H)	≥0.80 mm	
22.2 mm (7/8")			

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

### 17.1.3 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:

Ambient temperature	Humidity	Minimum thickness
≤30°C	75% to 80% RH	15 mm
>30°C	≥80% RH	20 mm

# 17.1.4 Combination table and heat exchanger volume limitations

The ERA outdoor unit can only be combined with one expansion valve kit EKEXVA according to the combination table shown below:

	Expansion valve kit EKEXVA			
	140 200		250	300
ERA200	Р	Р	_	_
	(2.94-4.62)	(3.02-6.60)		
ERA250	_	Р	Р	_
		(3.02-6.60)	(3.97-8.25)	
ERA300	_	Р	Р	Р
		(3.49-6.60)	(3.97-8.25)	(4.53-9.90)

<sup>-</sup> Not allowed

# 17.1.5 To select the piping size

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

- Select the pipe size nearest to the required size.
- Use the suitable adapters for the changeover from inch to mm pipes (field supply).
- The additional refrigerant calculation has to be adjusted as mentioned in "18.4 To determine the additional refrigerant amount" [▶ 91].

Choose from the following table in accordance with the outdoor unit capacity type:

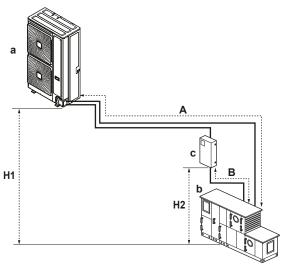


P() Pair AHU layout (value for minimum - maximum AHU heat exchanger volume [dm³])

Outdoor unit capacity	Piping outer diameter [mm]		
type	Gas pipe	Liquid pipe	
ERA200	19.1	9.5	
ERA250			
ERA300	22.2	12.7	

# 17.1.6 Refrigerant piping length and height difference

The piping length and height difference must comply with the following requirements:



- a Outdoor unit
- **b** Air handling unit (AHU)
- c EKEXVA-kit

Term	Definition	Value [m]
А	Maximum pipe length from indoor unit to outdoor unit (actual/equivalent)	50 <sup>(a)</sup> /55
В	B Maximum pipe length from EKEXVA to AHU unit	
H1	Maximum height difference between outdoor and indoor unit (outdoor above indoor / indoor above outdoor)	40/40
H2	Maximum height difference between EKEXVA—kits and AHU units	5

 $<sup>^{(</sup>a)}$  The allowable minimum length is 5 m.

Note: compatible air curtains are considered air handling units, following air handling unit limitations.

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

# 17.2.2 Precautions when connecting the refrigerant piping



### **INFORMATION**

Also read the precautions and requirements in the following chapters:

- "2 General safety precautions" [▶ 7]
- "17.1 Preparing refrigerant piping" [▶ 74]



### DANGER: RISK OF BURNING/SCALDING



#### NOTICE

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 when adding refrigerant.
- Only use installation tools (e.g. manifold gauge set) that are exclusively used for R32 installations to withstand the pressure and to prevent foreign materials (e.g. mineral oils and moisture) from mixing into the system.
- Protect the piping as described in the following table to prevent dirt, liquid or dust from entering the piping.
- Use caution when passing copper tubes through walls.

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



### 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 Pipe bending guidelines

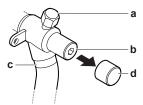
Use a pipe bender for bending. All pipe bends should be as gentle as possible (bending radius should be 30~40 mm or larger).

# 17.2.4 Using the stop valve and service port

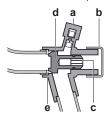
# To handle the stop valve

Take the following guidelines into account:

- The gas and liquid stop valves are factory closed.
- Make sure to keep all stop valves open during operation.
- The figures below show the name of each part required in handling the stop valve.



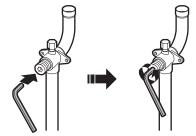
- Service port and service port cover
- Stop valve
- c Field piping connection
- **d** Dust cap



- Service port
- Dust cap
- Hexagon hole
- Shaft
- Seal
- Do NOT apply excessive force to the stop valve. Doing so may break the valve

### To open the stop valve

- 1 Remove the dust cap.
- Insert a hexagon wrench into the stop valve.
- FULLY turn the stop valve counterclockwise and tighten until the correct tightening torque value is achieved (see "Tightening torques" [▶ 79]).





### **NOTICE**

Stop valves need to be opened on torque specified in this manual. It is not allowed to turn valve "a quarter turn" back when opening it.



4 Install the dust cap.

Result: The valve is now open.

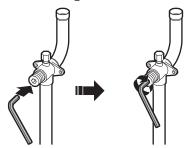


#### **NOTICE**

Reinstall dust cap to prevent aging of O-ring and risk of leakage.

### To close the stop valve

- **1** Remove the stop valve cover.
- 2 Insert a hexagon wrench into the stop valve and turn the stop valve clockwise.



- **3** When the stop valve cannot be turned any further, stop turning.
- 4 Install the stop valve cover.

**Result:** The valve is now closed.

### To handle the service port

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

# **Tightening torques**

Stop valve size	Ti	ightening torque [N•m	] <sup>(a)</sup>
[mm]	Valve body	Hexagonal wrench	Service port
Ø9.5	5~7	4 mm	10.7~14.7
Ø12.7	8~10		
Ø15.9	14~16	6 mm	
Ø19.1	19~21	8 mm	
Ø25.4			

<sup>(</sup>a) When opening or closing.

# 17.2.5 To remove the pinched pipes



### **WARNING**

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

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

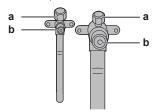
Use the following procedure to remove the pinched piping:

**1** Make sure that the stop valves are fully closed.





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



- Service port
- **b** Stop valve
- Recover gas and oil from the pinched piping by using a recovery unit.



### **CAUTION**

Do NOT vent gases into the atmosphere.

- When all gas and oil is recovered from the pinched piping, disconnect the charge hose and close the service ports.
- Cut off the lower part of the gas and liquid stop valve pipes along the black line. Use an appropriate tool (e.g. a pipe cutter).





### **WARNING**

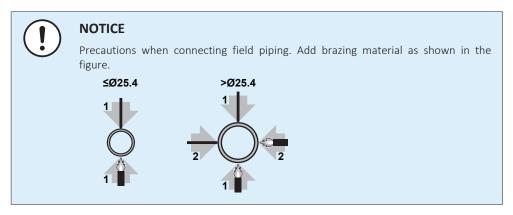


NEVER remove the pinched piping by brazing.

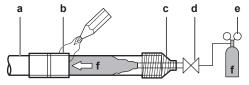
Any gas or oil remaining inside the stop valve may blow off the pinched piping.

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





- When brazing, blow through with nitrogen to prevent creation of large quantities of oxidised film on the inside of the piping. This film adversely affects valves and compressors in the refrigerating system and prevents proper operation.
- Set the nitrogen pressure to 20 kPa (0.2 bar) (just enough so it can be felt on the skin) with a pressure-reducing valve.



- a Refrigerant piping
- **b** Part to be brazed
- c Taping
- **d** Manual valve
- e Pressure-reducing valve
- f Nitrogen
- Do NOT use anti-oxidants when brazing pipe joints. Residue can clog pipes and break equipment.
- Do NOT use flux when brazing copper-to-copper refrigerant piping. Use phosphor copper brazing filler alloy (BCuP), which does NOT require flux.
  - Flux has an extremely harmful influence on refrigerant piping systems. For instance, if chlorine based flux is used, it will cause pipe corrosion or, in particular, if the flux contains fluorine, it will deteriorate the refrigerant oil.
- ALWAYS protect the surrounding surfaces (e.g. insulation foam) from heat when brazing.

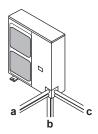
### 17.2.7 To connect the refrigerant piping to the outdoor unit

- Piping length. Keep field piping as short as possible.
- **Piping protection.** Protect the field piping against physical damage.
- **1** Do the following:
  - Remove the service cover. See "16.2.2 To open the outdoor unit" [▶ 70].
  - Remove the piping intake plate (a) with screw (b).



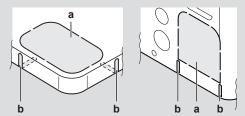
**2** Choose a piping route (a, b or c).







### **INFORMATION**



- Punch out the knockout (a) in the bottom plate or cover plate by tapping on the attachment points with a flat head screwdriver and a hammer.
- Optionally, cut out the slits (b) with a metal saw.



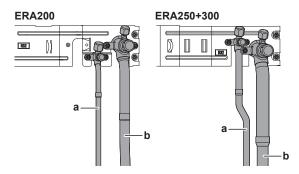
### **NOTICE**

Precautions when making knockout holes:

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

# **3** Do the following:

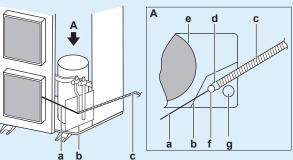
- Connect the liquid pipe (a) to the liquid stop valve. (brazing)
- Connect the gas pipe (b) to the gas stop valve. (brazing)



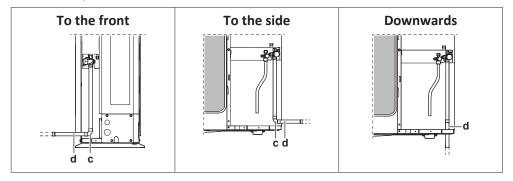


### **NOTICE**

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



- **a** Electrode
- **b** Burning-resistant plate
- **c** Welding torch
- **d** Flames
- e Compressor sound insulation
- **f** Liquid side piping
- **g** Gas side piping
- Connect the gas piping accessories c and d (d: only for ERA250 ). There are three possibilities:





### **WARNING**

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



### **NOTICE**

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



# **NOTICE**

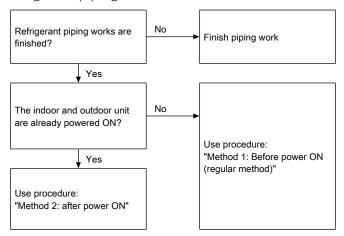
- Be sure to use the supplied accessory pipes when carrying out piping work in the field.
- Be sure that the field installed piping does not touch other pipes, the bottom panel or side panel. Especially for the bottom and side connection, be sure to protect the piping with suitable insulation, to prevent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



The connections to the branch kits are the responsibility of the installer (field piping).

# 17.3 Checking the refrigerant piping

# 17.3.1 About checking the refrigerant piping



It is very important that all refrigerant piping work is done before the units (outdoor or indoor) are powered on. When the units are powered on, the expansion valves will initialise. This means that the valves will close.



### **NOTICE**

Leak test and vacuum drying of field piping and indoor units is impossible when field expansion valves are closed.

# **Method 1: Before power ON**

If the system has not yet been powered on, no special action is required to perform the leak test and the vacuum drying.

### **Method 2: After power ON**

If the system has already been powered on, activate setting [2-21] (refer to "20.1.3 To access mode 1 or 2" [▶ 108]). This setting will open field expansion valves to guarantee a refrigerant piping pathway and make it possible to perform the leak test and the vacuum drying.



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



#### **NOTICE**

Make sure that the indoor unit connected to the outdoor unit is powered on.



### **NOTICE**

Wait to apply setting [2-21] until the outdoor unit has finished the initialisation.

### Leak test and vacuum drying

Checking the refrigerant piping involves:

Checking for any leakages in the refrigerant piping.



 Performing vacuum drying to remove all moisture, air or nitrogen in the refrigerant piping.

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

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

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



#### NOTICE

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

For more information on the state of the valves, refer to "17.3.3 Checking refrigerant piping: Setup" [> 85].

# 17.3.2 Checking refrigerant piping: General guidelines

Connect the vacuum pump through a manifold to the service port of all stop valves to increase efficiency (refer to "17.3.3 Checking refrigerant piping: Setup" [> 85]).



#### **NOTICE**

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



### **NOTICE**

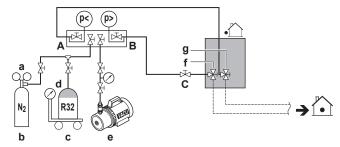
Make sure the pump oil does not flow oppositely into the system while the pump is not working.



# NOTICE

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

# 17.3.3 Checking refrigerant piping: Setup



- a Pressure reducing valve
- **b** Nitrogen
- c Weighing scales
- d Refrigerant R32 tank (siphon system)
- e Vacuum pump
- f Liquid line stop valve
- **g** Gas line stop valve
- A Valve A
- **B** Valve B
- C Valve C



Valve	Status
Valve A	Open
Valve B	Open
Valve C	Open
Liquid line stop valve	Close
Gas line stop valve	Close



#### **NOTICE**

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

# 17.3.4 To perform a leak test

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

### Vacuum leak test

- Evacuate the system from the liquid and gas piping to a gauge pressure of -100.7 kPa (-1.007 bar) for more than 2 hours.
- 2 Once reached, turn off the vacuum pump and check that the pressure does not rise for at least 1 minute.
- 3 Should the pressure rise, the system may either contain moisture (see vacuum drying below) or have leaks.

#### Pressure leak test

- Break the vacuum by pressurising with nitrogen gas to a minimum gauge pressure of 0.2 MPa (2 bar). Never set the gauge pressure higher than the maximum operation pressure of the unit, i.e. 4.0 MPa (40 bar).
- **2** Test for leaks by applying a bubble test solution to all piping connections.
- **3** Discharge all nitrogen gas.



### NOTICE

ALWAYS use a recommended bubble test solution from your wholesaler.

NEVER use soap water:

- Soap water may cause cracking of components, such as flare nuts or stop valve
- Soap water may contain salt, which absorbs moisture that will freeze when the piping gets cold.
- Soap water contains ammonia which may lead to corrosion of flared joints (between the brass flare nut and the copper flare).

# 17.3.5 To perform vacuum drying



# **NOTICE**

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

Leak test and vacuum drying should be done before the power supply is set to the unit. If not, see "17.3.1 About checking the refrigerant piping" [▶ 84] for more information.



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

- 1 Evacuate the system for at least 2 hours to a target vacuum of -100.7 kPa (-1.007 bar)(5 Torr absolute).
- **2** Check that, with the vacuum pump turned off, the target vacuum is maintained for at least 1 hour.
- 3 Should you fail to reach the target vacuum within 2 hours or maintain the vacuum for 1 hour, the system may contain too much moisture. In that case, break the vacuum by pressurising with nitrogen gas to a gauge pressure of 0.05 MPa (0.5 bar) and repeat steps 1 to 3 until all moisture has been removed.
- 4 Depending on whether you want to immediately charge refrigerant through the refrigerant charge port or first pre-charge a portion of refrigerant through the liquid line, either open the outdoor unit stop valves, or keep them closed. See "18.5 To charge refrigerant" [▶ 92] for more information.



# **INFORMATION**

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

# 17.3.6 To insulate the refrigerant piping

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

- Make sure to insulate the connection piping entirely.
- Be sure to insulate the liquid and gas piping.
- Use heat resistant polyethylene foam which can withstand a temperature of 70°C for liquid piping and polyethylene foam which can withstand a temperature of 120°C for gas piping.
- Reinforce the insulation on the refrigerant piping according to the installation environment.

Ambient temperature	Humidity	Minimum thickness
≤30°C	75% to 80% RH	15 mm
>30°C	≥80% RH	20 mm

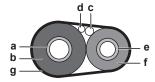
### Between outdoor and indoor unit



### NOTICE

It is recommended that the refrigerant piping between indoor and outdoor unit is installed in a ducting or the refrigerant piping is wrapped with finishing tape.

1 Insulate and fix the refrigerant piping and cables as follows:



- a Gas pipe
- **b** Gas pipe insulation
- c Interconnection cable
- **d** Field wiring (if applicable)
- e Liquid pipe



- **f** Liquid pipe insulation
- **g** Finishing tape
- 2 Install the service cover.

#### Inside the outdoor unit

To insulate the refrigerant piping, proceed as follows:



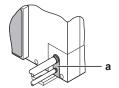
- Insulation material
- Caulking etc.
- 1 Insulate the liquid and gas piping.
- 2 Wind heat insulation around the curves, and then cover it with vinyl tape.
- **3** Make sure the field piping does not touch any compressor components.
- Seal the insulation ends (sealant etc.) (b, see above).
- 5 Where necessary, wrap the field piping with vinyl tape to protect the insulation against sharp edges.
- If the outdoor unit is installed above the indoor unit, cover the stop valves with sealing material to prevent condensed water on the stop valves from moving to the indoor unit.



### **NOTICE**

Any exposed piping can cause condensation.

- Reattach the service cover and the piping intake plate.
- Seal all gaps to prevent snow and small animals from entering the system.



a Seal



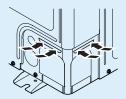
#### **WARNING**

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



### **NOTICE**

Do not block the air vents. This could affect air circulation inside the unit.



# 17.3.7 To check for leaks after charging refrigerant

After charging refrigerant in the system an additional leak test must be performed. Refer to "18.8 To check refrigerant piping joints for leaks after charging refrigerant" [▶ 95].



# 18 Charging refrigerant

# In this chapter

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# 18.1 Precautions when charging refrigerant



### **INFORMATION**

Also read the precautions and requirements in the following chapters:

- General safety precautions
- Preparation



### **WARNING**

- Only use R32 as refrigerant. Other substances may cause explosions and accidents.
- R32 contains fluorinated greenhouse gases. Its global warming potential (GWP) value is 675. Do NOT vent these gases into the atmosphere.
- When charging refrigerant, ALWAYS use protective gloves and safety glasses.



### **NOTICE**

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



#### **NOTICE**

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



#### **NOTICE**

If operation is performed within 12 minutes after the indoor and outdoor unit(s) are powered on, the compressor will not operate before the communication is established in a correct way between outdoor unit(s) and indoor unit(s).



# **NOTICE**

Before starting charging procedures, check if the 7-segment display indication of the outdoor unit A1P PCB is as normal (see "20.1.3 To access mode 1 or 2" [▶ 108]). If a malfunction code is present, see "24.3 Solving problems based on error codes" [▶ 132].



### **NOTICE**

Make sure the connected indoor unit(s) are recognised (see setting [1-10] in "20.1.6 Mode 1: monitoring settings" [ $\triangleright$  111]).





### NOTICE

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



### **NOTICE**

- Ensure that contamination of different refrigerants does not occur when using charging equipment.
- Charging hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the refrigerating system is earthed prior to charging the system with refrigerant. See "19.2 To connect the electrical wiring to the outdoor unit" [> 102].
- Label the system when charging is complete.
- Extreme care shall be taken not to overfill the refrigerating system.



### **NOTICE**

Prior to charging the system, it shall be pressure tested with the appropriate purging gas. The system shall be leak tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

# 18.2 About charging refrigerant

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

# Before charging refrigerant

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

### **Typical workflow**

Charging additional refrigerant typically consists of the following stages:

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

# 18.3 About the refrigerant



### **CAUTION**

See "3 Specific installer safety instructions" [▶ 12] to acknowledge all related safety instructions.

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

Refrigerant type: R32

Global warming potential (GWP) value: 675



Periodical inspections for refrigerant leaks may be required depending on the applicable legislation. Contact your installer for more information.



### **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.

# 18.4 To determine the additional refrigerant amount



#### WARNING

In case the system serves the lowest underground floor of a building, there is an extra limit to the maximum allowable total refrigerant amount. This maximum refrigerant amount is determined based on the area of the smallest room on the lowest underground floor.

See "15 Special requirements for R32 units" [▶ 53] to determine the maximum allowable total refrigerant amount.



### **INFORMATION**

For final charge adjustment in the test laboratory, please contact your local dealer.



#### INFORMATION

Note down the amount of additional refrigerant that is calculated here, for later use on the additional refrigerant charge label. See "18.7 To fix the fluorinated greenhouse gases label" [▶94].



# **NOTICE**

The refrigerant charge of the system must be less than 79.8 kg. For factory charge, refer to the unit name plate.

### Formula:

 $R = [(X_1 \times \emptyset 12.7) \times 0.10 + (X_2 \times \emptyset 9.5) \times 0.053]$ 

**R** Additional refrigerant to be charged [kg] (rounded off to one decimal place)

 $\mathbf{X_{1...2}}$  Total length [m] of liquid piping size at  $\mathbf{\emptyset a}$ 

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

Inch p	piping	Metric piping		
Piping	Weight factor	Piping	Weight factor	
Ø9.5 mm	0.053	Ø10 mm	0.058	
Ø12.7 mm	0.10	Ø12 mm	0.088	

For combination table and AHU heat exchanger volume limitations, see "17.1.4 Combination table and heat exchanger volume limitations" [▶ 75].



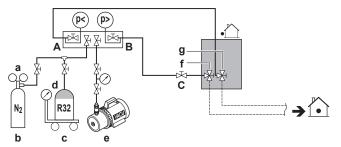
# 18.5 To charge refrigerant

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

### **Pre-charging refrigerant**

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

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



- Pressure reducing valve
- Nitrogen
- Weighing scales
- Refrigerant R32 tank (siphon system)
- Vacuum pump
- Liquid line stop valve
- Gas line stop valve
- Valve A
- Valve B
- C Valve C
- **2** Open valves C and B.
- Pre-charge refrigerant until the determined additional refrigerant amount is reached or pre-charging is not possible anymore, and then close valves C and
- Do one of the following:

If	Then
The determined additional refrigerant amount is <b>reached</b>	Disconnect the manifold from the liquid line.
	You do not have to perform the "Charging refrigerant (in manual additional refrigerant charge mode)" instructions.
Too much refrigerant is charged	Recover refrigerant.
	Disconnect the manifold from the liquid line.
	You do not have to perform the "Charging refrigerant (in manual additional refrigerant charge mode)" instructions.

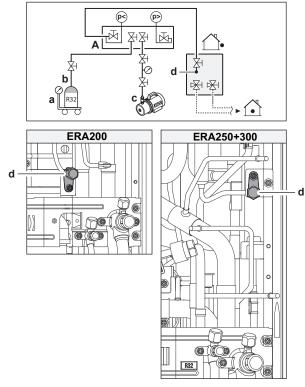


If	Then
The determined additional refrigerant amount is <b>not reached</b> yet	Disconnect the manifold from the liquid line.
	Continue with the "Charging refrigerant (in manual additional refrigerant charge mode)" instructions.

# Charging refrigerant (in manual additional refrigerant charge mode)

The remaining additional refrigerant charge can be charged by operating the outdoor unit by means of the manual additional refrigerant charge mode.

**5** Connect as shown. Make sure valve A is closed.



- **a** Weighing scales
- **b** Refrigerant R32 tank (siphon system)
- c Vacuum pump
- **d** Refrigerant charge port (heat exchanger)
- A Valve A



# **NOTICE**

The refrigerant charging port is connected to the piping inside the unit. The unit's internal piping is already factory charged with refrigerant, so be careful when connecting the charge hose.

- 6 Open all outdoor unit stop valves. At this point, valve A must remain closed!
- 7 Take all the precautions mentioned in "20 Configuration" [▶ 107] and "21 Commissioning" [▶ 123] into account.
- **8** Turn on the power of the indoor unit(s) and outdoor unit.
- 9 Activate setting [2-20] to start the manual additional refrigerant charge mode. For details, see "20.1.7 Mode 2: field settings" [▶ 113].

**Result:** The unit will start operation.





### **INFORMATION**

The manual refrigerant charge operation will automatically stop within 30 minutes. If charging is not completed after 30 minutes, perform the additional refrigerant charging operation again.

- 10 Open valve A.
- 11 Charge refrigerant until the remaining determined additional refrigerant amount is added, and then close valve A.
- **12** Press BS3 to stop the manual additional refrigerant charge mode.



#### **NOTICE**

Make sure to open all stop valves after (pre-) charging the refrigerant. Operating with the stop valves closed will damage the compressor.



#### **NOTICE**

After adding the refrigerant, do not forget to close the lid of the refrigerant charging port. The tightening torque for the lid is 11.5 to 13.9 N•m.

# 18.6 Error codes when charging refrigerant



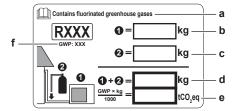
#### **INFORMATION**

If a malfunction occurs, the error code is displayed on the outdoor unit's 7-segments display and on the user interface of the indoor unit.

If a malfunction occurs, close valve A immediately. Confirm the malfunction code and take corresponding action, "24.3 Solving problems based on error codes" [> 132].

# 18.7 To fix the fluorinated greenhouse gases label

Fill in the label as follows:



- If a multilingual fluorinated greenhouse gases label is delivered with the unit (see accessories), peel off the applicable language and stick it on top of a.
- Factory refrigerant charge: see unit name plate
- Additional refrigerant amount charged
- Total refrigerant charge
- Quantity of fluorinated greenhouse gases of the total refrigerant charge expressed as tonnes CO<sub>2</sub> equivalent.
- GWP = Global Warming Potential





### **NOTICE**

Applicable legislation on **fluorinated greenhouse gases** requires that the refrigerant charge of the unit is indicated both in weight and  ${\rm CO_2}$  equivalent.

Formula to calculate the quantity in  $CO_2$  equivalent tonnes: GWP value of the refrigerant × total refrigerant charge [in kg] / 1000

Use the GWP value mentioned on the refrigerant charge label.

**2** Fix the label on the inside of the outdoor unit. There is a dedicated place for it on the wiring diagram label.

# 18.8 To check refrigerant piping joints for leaks after charging refrigerant

# Tightness test of field-made refrigerant joints indoors

1 Use a leakage test method with a minimum sensitivity of 5 g of refrigerant/ year. Test leaks using a pressure of at least 0.25 times the maximum working pressure (see "PS High" on the unit nameplate).

### If a leak is detected

- 1 Recover the refrigerant, repair the joint, and repeat the test.
- 2 Perform the leak tests see "17.3.4 To perform a leak test" [▶ 86].
- **3** Charge refrigerant.
- **4** Check for refrigerant leaks after charging (see above).



# 19 Electrical installation



### **CAUTION**

See "3 Specific installer safety instructions" [> 12] to make sure this installation complies with all safety regulations.

# In this chapter

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	19.1.1	Precautions when connecting the electrical wiring	96
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# 19.1 About connecting the electrical wiring

### **Typical workflow**

Connecting the electrical wiring typically consists of the following stages:

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

# 19.1.1 Precautions when connecting the electrical wiring



# **DANGER: RISK OF ELECTROCUTION**



### **WARNING**

The appliance MUST be installed in accordance with national wiring regulations.



### **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"  $[\triangleright 7]$ .



#### **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 use taped wires, extension cords, or connections from a star system.
   They can cause overheating, electrical shocks or fire.
- 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.



### **CAUTION**

Do NOT push or place redundant cable length into the unit.



### **NOTICE**

The distance between the high voltage and low voltage cables should be at least 50 mm.



### **NOTICE**

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



### **NOTICE**

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



# **NOTICE**

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



### **NOTICE**

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





### **NOTICE**

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

### 19.1.2 About the electrical wiring

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 wiring should always be at least 25 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
- Interconnection wiring and power supply wiring may not touch internal piping (except the inverter PCB cooling pipe) in order to avoid wire damage due to high temperature piping.
- Firmly close the lid and arrange the electrical wires so as to prevent the lid or other parts from coming loose.

The interconnection wiring outside the unit should be wrapped and routed together with the field piping.

Interconnection wiring specification and limits <sup>(a)</sup>		
See "19.1.6 Specifications of standard wiring components" [▶ 101] for wiring requirements		
Maximum wiring length	300 m	
(distance between outdoor and indoor unit)		
Interconnection wiring to cool/heat selector	500 m	

<sup>(</sup>a) If the total interconnection wiring exceeds these limits, communication errors might occur.

### 19.1.3 Guidelines for making knockout holes

Punch out the knockout by tapping on the attachment points with a flat head screwdriver and a hammer.



#### NOTICE

Precautions when making knockout holes:

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



- a Knockout hole
- **b** Burr
- c Remove burrs
- **d** If there are any possibilities that small animals enter the system through the knockout holes, close the holes with packing materials (to be prepared on-site)

# 19.1.4 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

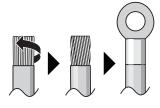
### Method 1: Twisting conductor

- **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	tA C AA'  a a
	<b>a</b> Curled wire (single-core or twisted stranded conductor wire)
	<b>b</b> Screw
	<b>c</b> Flat washer
Stranded conductor wire with round crimp-style terminal	a bc x
	<b>a</b> Terminal
	<b>b</b> Screw
	<b>c</b> Flat washer
	✓ Allowed
	× NOT allowed

For earth connections, use the following method:

Wire type	Installation method	
Single-core wire	B b C	
Or	a de	
Stranded conductor wire twisted to "solid-like"	©	
connection	<b>a</b> Clockwise curled wire (single-core or twisted stranded conductor wire)	
	<b>b</b> Screw	
	<b>c</b> Spring washer	
	<b>d</b> Flat washer	
	<b>e</b> Coupling washer	
	<b>f</b> Sheet metal	

# **Tightening torques**

Wiring	Screw size	Tightening torque [N•m]
Transmission wiring	M3.5	0.8~0.97
Power supply wiring	ERA200 : M5	2.2~2.7
	ERA250+300 : M8	5.5~7.3



### 19.1.5 About electrical compliance

### This equipment complies with:

- **EN/IEC 61000-3-12** provided that the short-circuit power  $S_{sc}$  is greater than or equal to the minimum  $S_{sc}$  value at the interface point between the user's supply and the public system.
  - EN/IEC 61000-3-12 = European/International Technical Standard setting the limits for harmonic currents produced by equipment connected to public low-voltage systems with input current >16 A and ≤75 A per phase.
  - It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected ONLY to a supply with a short-circuit power  $S_{sc}$  greater than or equal to the minimum  $S_{sc}$  value.

Model	Minimum S <sub>sc</sub> value
ERA200	2685 kVA
ERA250	3137 kVA
ERA300	3422 kVA

# 19.1.6 Specifications of standard wiring components

Component		Outdoor unit		
		ERA200	ERA250	ERA300
Power supply	MCA <sup>(a)</sup>	18.5 A	22 A	24 A
cable	Voltage	380-415 / 400 V		
	Phase	3N~		
	Frequency	50/60 Hz		
	Wire size		5 core cable	
		Must comply with national wiring regulation.		
		Wire size based on the current, but not less than:		
		2.5 r	mm²	4 mm²
Interconnection	Voltage	220-240 V		
cable	Wire size	Only use harmonised wire providing double insulation and suitable for applicable voltage.		
		2-core shielded cable		
			0.75-1.5 mm <sup>2</sup>	
Recommended field fuse		25	5 A	32 A
Earth leakage circuit breaker/ residual current circuit breaker		Must comply v	vith national wir	ing regulation.

<sup>(</sup>a) MCA=Minimum circuit ampacity. Stated values are maximum values.

Please use the table above to specify the requirements for the power supply wiring.





### NOTICE

When using residual current operated circuit breakers, be sure to use a high-speed type 300 mA rated residual operating current.

# 19.2 To connect the electrical wiring to the outdoor unit



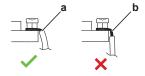
#### **CAUTION**

- 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.

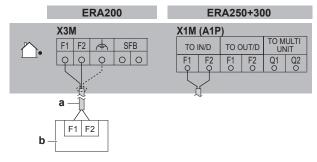


### **NOTICE**

- Follow the wiring diagram (delivered with the unit, located at the inside of the service cover).
- Make sure the electrical wiring does NOT obstruct proper reattachment of the service cover.
- Remove the service cover. See "16.2.2 To open the outdoor unit" [> 70].
- Strip insulation (20 mm) from the wires.



- Strip wire end to this point
- **b** An excessive strip length may cause electrical shock or leakage
- **3** Connect the transmission wiring as follows:



- **a** Use the conductor of sheathed wire (2 wire) (no polarity)
- Terminal board (field supply)

**Note:** The indoor F1/F2 interconnection cable MUST be shielded:

- ERA200 : the shielding is earthed (only at outdoor unit side of the cable) via the middle screw on the terminal X3M.
- ERA250+300: the shielding is earthed (only at outdoor unit side of the cable) via a metal P-clamp. Strip the insulation up to the shielding mesh, to provide full contact of the earth with the shielding. See illustration below:



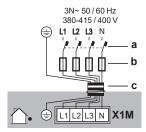


a P-clamp for cable shield earthing

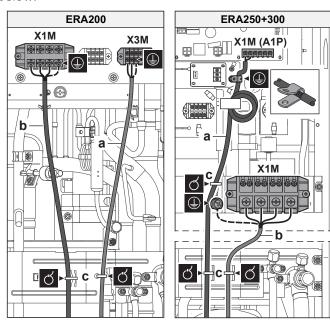
**Note:** For ERA250+300 , the interconnection cable MUST pass through the ferrite core 3 times (3 passes, 2 turns). See illustration below:



- a Interconnection cable
- **b** Ferrite core
- **4** Connect the power supply as follows:



- a Earth leakage circuit breaker
- **b** Fuse
- **c** Power supply cable
- **5** Fix the cables (power supply and interconnection cable) with a cable tie to the stop valve attachment plate and route the wiring according to the illustration below.



- a Interconnection cable
- **b** Power supply cable
- c Cable tie

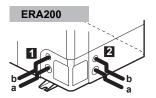


### **WARNING**

Do NOT strip the outer cable jacket lower than the fixation point on the stop valve attachment plate.

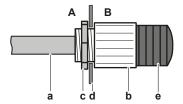
**6** Route the cables through the frame according to the illustration below.

Note: for ERA200, choose one of the two possibilities to route the cables through the frame.





- Interconnection cable
- Power supply cable
- Remove the selected knockout holes by tapping on the attachment points with a flat head screwdriver and a hammer.
- **8** Install a cable protection in the knockout hole:
  - It is recommended to install a PG type cable gland in the knockout hole.
  - When you do not use a cable gland, protect the cables with vinyl tubes to prevent the edge of the knockout hole from cutting the wires:



- Inside of the outdoor unit
- **B** Outside of the outdoor unit
- **a** Cable
- **b** Bush
- c Nut
- d Frame
- e Tube
- Route the cables out of the unit.
- **10** Reattach the service cover. See "16.2.3 To close the outdoor unit" [▶ 71].
- 11 Connect an earth leakage circuit breaker and fuse to the power supply line as specified in "19.1.6 Specifications of standard wiring components" [▶ 101].

# 19.3 To connect the external outputs

### **SVS and SVEO output**

The SVS and SVEO outputs are contacts on terminal X2M.

The SVS output is a contact on terminal X2M that closes in case a leak is detected, failure or disconnection of the R32 sensor (located in the indoor unit).

The SVEO output is a contact on terminal X2M that closes in case of occurrence of general errors. See "10.1 Error codes: Overview" [▶ 39] and "24.3.1 Error codes: Overview" [> 133] for errors that will trigger this output.

Outdoor output connection requirements	
Voltage	220~240 V
Maximum current	0.5 A

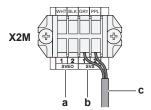


Outdoor output connection requirements	
Wire size	Only use harmonised wiring providing double insulation and suitable for the applicable voltage.
	2-core cable
	Minimum cable section of 0.75 mm <sup>2</sup>



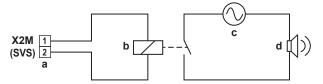
#### **NOTICE**

Do NOT use the outputs as a power source. Instead, use each output to energize a relay that controls the external circuit.



- **a** SVEO output terminals (1 and 2)
- **b** SVS output terminals (1 and 2)
- c Cable to SVS output device (example)

### **Example:**



- a SVS output terminal
- **b** Relay
- c AC power supply 220~240 V AC
- d External alarm



# 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).

# 19.4 To connect the cool/heat selector switch option



### **NOTICE**

Do NOT use the cool/heat selector switch in case the T3T4 input is used.

In order to control the cooling or heating operation from a central location, the following optional cool/heat selector switch (KRC19-26A) can be connected:

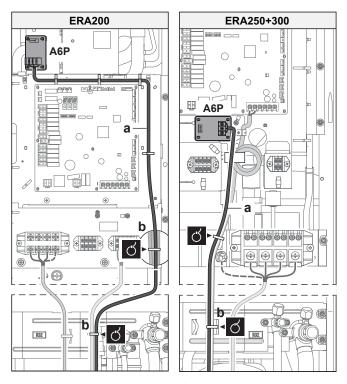
1 Connect the cool/heat selector switch to terminal X1M of the cool/heat selector PCB.



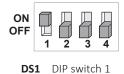
**X1M** Terminal on the PCB **KRC19-26A** Cool/heat selector switch

**2** Route the wires in the switchbox as shown:





- Printed circuit board (cool/heat selector)
  - Cable to cool/heat selector switch (KRC19-26A)
  - Cable tie
- Turn ON the DIP switch (DS1-1). See "20.1.2 Field setting components" [▶ 108] for more information on the DIP switch.



# 19.5 To check the insulation resistance of the compressor



# **NOTICE**

If, after installation, refrigerant accumulates in the compressor, the insulation resistance over the poles can drop, but if it is at least 1 M $\Omega$ , then the unit will not break down.

- Use a 500 V mega-tester when measuring insulation.
- Do NOT use a mega-tester for low voltage circuits.
- Measure the insulation resistance over the poles.

If	Then
≥1 MΩ	Insulation resistance is OK. This procedure is finished.
<1 MΩ	Insulation resistance is not OK. Go to the next step.

**2** Turn ON the power and leave it on for 6 hours.

Result: The compressor will heat up and evaporate any refrigerant in the compressor.

**3** Measure the insulation resistance again.



# 20 Configuration



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



### **INFORMATION**

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

# In this chapter

20.1	Making field settings		
	20.1.1	About making field settings	
	20.1.2	Field setting components	
	20.1.3	To access mode 1 or 2	108
	20.1.4	To use mode 1	109
	20.1.5	To use mode 2	
	20.1.6	Mode 1: monitoring settings	
	20.1.7	Mode 2: field settings	
	20.1.8	Indoor unit field setting	
20.2	Energy saving and optimum operation		
	20.2.1	Available main operation methods	
	20.2.2	Available comfort settings	
	20.2.3	Example: Automatic mode during cooling	121
	20.2.4	Example: Automatic mode during heating	122

# 20.1 Making field settings

# 20.1.1 About making field settings

To continue the configuration of the ERA system, it is required to give some input to the PCB of the unit. This chapter will describe how manual input is possible by operating the push buttons on the PCB and reading the feedback from the 7-segment displays.

Next to making field settings it is also possible to confirm the current operation parameters of the unit.

### **Push buttons and DIP switches**

Item	Description
Push buttons	By operating the push buttons it is possible to:
	<ul> <li>Perform special actions (refrigerant charge, testrun, etc).</li> </ul>
	<ul> <li>Perform field settings (demand operation, low noise, etc).</li> </ul>
DIP switches	By operating the DIP switches it is possible to:
	<ul> <li>DS1 (1): COOL/HEAT selector (refer to the manual of the cool/heat selector switch). OFF=not installed=factory setting</li> </ul>
	<ul> <li>DS1 (2~4): NOT USED. DO NOT CHANGE THE FACTORY SETTING.</li> </ul>
	<ul> <li>DS2 (1~4): NOT USED. DO NOT CHANGE THE FACTORY SETTING.</li> </ul>



### See also:

■ "20.1.2 Field setting components" [ > 108]

### Mode 1 and 2

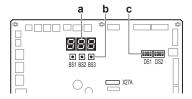
Mode	Description
Mode 1 (monitoring settings)	Mode 1 can be used to monitor the current situation of the outdoor unit. Some field setting contents can be monitored as well.
Mode 2 (field settings)	Mode 2 is used to change the field settings of the system. Consulting the current field setting value and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

### See also:

- "20.1.3 To access mode 1 or 2" [▶ 108]
- "20.1.4 To use mode 1" [▶ 109]
- "20.1.5 To use mode 2" [▶ 110]
- "20.1.6 Mode 1: monitoring settings" [▶ 111]
- "20.1.7 Mode 2: field settings" [▶ 113]

# 20.1.2 Field setting components

Location of the 7-segment displays, buttons and DIP switches:



- **BS1** MODE: for changing the set mode
- **BS2** SET: for field setting
- **BS3** RETURN: for field setting
- **DS1, DS2** DIP switches
  - a 7-segment displays
  - **b** Push buttons
  - c DIP switches

# 20.1.3 To access mode 1 or 2

# Initialisation: default situation



### **NOTICE**

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



Turn ON the power supply of the outdoor unit and indoor unit. When the communication between indoor unit and outdoor unit is established and normal, the 7-segment display indication state will be as below (default situation when shipped from factory).

Stage	Display
When turning on the power supply: blinking as indicated. First checks on power supply are executed (8~10 min).	
When no trouble occurs: lighted as indicated (1~2 min).	
Ready for operation: blank display indication as indicated.	88

Off
Blinking
On

In case of malfunction, the malfunction code is displayed on the indoor unit user interface and the outdoor unit 7-segment display. Solve the malfunction code accordingly. The communication wiring should be checked at first.

### Access

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

Access	Action
Default situation	<b>EE</b>
Mode 1	Push BS1 one time.
	7-segment display indication changes to:
	<b>3. 3. 3.</b>
	• Push BS1 one more time to return to the default situation.
Mode 2	Push BS1 for at least five seconds.
	7-segment display indication changes to:
	• Push BS1 one more time (short) to return to the default situation.



### **INFORMATION**

If you get confused in the middle of the process, push BS1 to return to the default situation (no indication on 7-segment displays: blank, see "20.1.3 To access mode 1 or 2" [\* 108].

### 20.1.4 To use mode 1

Mode 1 is used to set basic settings and to monitor the status of the unit.

What		How
Changing and accessing the	1	Push BS1 one time to select mode 1.
setting in mode 1	2	Push BS2 to select the required setting.
	3	Push BS3 one time to access the selected setting's value.



What	How
To quit and return to the initial status	Push BS1.

### **Example:**

Checking the content of parameter [1-10] (to know how many indoor units are connected to the system).

[Mode-Setting]=Value in this case is defined as: Mode=1; Setting=10; Value=the value we want to know/monitor.

- Make sure the 7-segment display indication is in the default situation (normal operation).
- 2 Push BS1 one time.

**Result:** Mode 1 is accessed:

3 Push BS2 10 times (or press and hold BS2 until the display reaches 10, then release).

**Result:** Mode 1 setting 10 is addressed:

4 Push BS3 one time; the value which is returned (depending on the actual field situation), is the amount of indoor units which are connected to the system.

Result: Mode 1 setting 10 is addressed and selected, return value is the monitored information.

**5** Push BS1 one time to quit mode 1.

### 20.1.5 To use mode 2

Mode 2 is used to set field settings of the outdoor unit and system.

What	How
Changing and accessing the setting in mode 2	• Push BS1 for more than five seconds to select mode 2.
	Push BS2 to select the required setting.
	<ul> <li>Push BS3 one time to access the selected setting's value.</li> </ul>
To quit and return to the initial status	Push BS1.
Changing the value of the selected setting in mode 2	• Push BS1 for more than five seconds to select mode 2.
	Push BS2 to select the required setting.
	<ul> <li>Push BS3 one time to access the selected setting's value.</li> </ul>
	<ul> <li>Push BS2 to select the required value of the selected setting.</li> </ul>
	Push BS3 one time to validate the change.
	<ul> <li>Push BS3 again to start operation with the chosen value.</li> </ul>

### **Example:**

Checking the content of parameter [2-18] (to activate or deactivate the high static pressure setting of the outdoor unit's fan).



[Mode-Setting]=Value in this case is defined as: Mode=2; Setting=18; Value=the value we want to know/change.

- **1** Make sure the 7-segment display indication is in the default situation (normal operation).
- **2** Push BS1 for more than five seconds.

**Result:** Mode 2 is accessed:

**3** Push BS2 18 times (or press and hold BS2 until the display reaches 18, then release).

Result: Mode 2 setting 18 is addressed:

**4** Push BS3 one time. The display shows the status of the setting (depending on the actual field situation). In the case of [2-18], the default value is "0", which means the ventilated enclosure function is deactivated.

**Result:** Mode 2 setting 18 is addressed and selected, return value is the current setting situation.

- **5** To change the value of the setting, push BS2 until the required value appears on the 7-segment display.
- **6** Push BS3 one time to validate the change.
- **7** Push BS3 to start operation according to the chosen setting.
- **8** Push BS1 one time to quit mode 2.

### 20.1.6 Mode 1: monitoring settings

### [1-1]

Shows the status of low noise operation.

Low noise operation reduces the sound generated by the unit compared to nominal operating conditions.

[1-1]	Description
0	Unit is currently not operating under low noise restrictions.
1	Unit is currently operating under low noise restrictions.

Low noise operation can be set in mode 2. There are two methods to activate low noise operation of the outdoor unit system.

- The first method is to enable an automatic low noise operation during night time by field setting. The unit will operate at the selected low noise level during the selected time frames.
- The second method is to enable low noise operation based on an external input.
   For this operation an optional accessory is required.

### [1-2]

Shows the status of power consumption limitation operation.

Power consumption limitation reduces the power consumption of the unit compared to nominal operating conditions.

[1-2]	Description
	Unit is currently not operating under power consumption limitations.



[1-2]	Description
	Unit is currently operating under power consumption limitation.

Power consumption limitation can be set in mode 2. There are two methods to activate power consumption limitation of the outdoor unit system.

- The first method is to enable a forced power consumption limitation by field setting. The unit will always operate at the selected power consumption limitation.
- The second method is to enable power consumption limitation based on an external input. For this operation an optional accessory is required.

### [1-5] [1-6]

Code	Shows
[1-5]	The current $T_e$ target parameter position
[1-6]	The current T <sub>c</sub> target parameter position

For more information and advice about the impact of these settings, see "20.2 Energy saving and optimum operation" [> 118].

### [1-10]

Shows the total number of connected indoor units.

It can be convenient to check if the total number of indoor units which are installed match the total number of indoor units which are recognised by the system. In case there is a mismatch, it is recommended to check the communication wiring path between outdoor and indoor unit(s) (F1/F2 communication line).

### [1-17] [1-18] [1-19]

Code	Shows
[1-17]	The latest malfunction code
[1-18]	The 2nd last malfunction code
[1-19]	The 3rd last malfunction code

When the latest malfunction codes were reset by accident on an indoor unit user interface, they can be checked again through this monitoring settings.

For the content or reason behind the malfunction code see "24.3 Solving problems based on error codes" [ 132], where most relevant malfunction codes are explained. Detailed information about malfunction codes can be consulted in the service manual of this unit.

### [1-40] [1-41]

Code	Shows
[1-40]	The current cooling comfort setting
[1-41]	The current heating comfort setting

See "20.2 Energy saving and optimum operation" [▶ 118] for more details about this setting.



### 20.1.7 Mode 2: field settings

### [2-8]

T<sub>e</sub> target temperature during cooling operation.

[2-8]	T <sub>e</sub> target [°C]
0 (default)	Auto
2	6
3	7
4	8
5	9
6	10
7	11

For more information and advice about the impact of these settings, see "20.2 Energy saving and optimum operation" [▶ 118].

### [2-9]

T<sub>c</sub> target temperature during heating operation.

[2-9]	T <sub>c</sub> target [°C]
0 (default)	Auto
1	41
2	42
3	43
4	44
5	45
6	46

For more information and advice about the impact of these settings, see "20.2 Energy saving and optimum operation" [▶ 118].

### [2-12]

Enable the low noise function and/or power consumption limitation via external control adaptor (DTA104A61/62).

If the system needs to be running under low noise operation or under power consumption limitation conditions when an external signal is sent to the unit, this setting should be changed. This setting will only be effective when the optional external control adaptor (DTA104A61/62) is installed.

[2-12]	Description
0 (default)	Deactivated.
1	Activated.

### [2-18]

Fan high static pressure setting.

In order to increase the static pressure the outdoor unit fan is delivering, this setting should be activated. For details about this setting, see technical specifications.



[2-18]	Description
0 (default)	Deactivated.
1	Activated.

### [2-20]

Manual additional refrigerant charge.

In order to add the additional refrigerant charge amount in a manual way (without automatic refrigerant charging functionality), following setting should be applied. Further instructions regarding the different ways to charge additional refrigerant into your system can be found in chapter "18.2 About charging refrigerant" [> 90].

[2-20]	Description
0 (default)	Deactivated.
1	Activated.
	To stop the manual additional refrigerant charge operation (when the required additional refrigerant amount is charged), push BS3. If this function was not aborted by pushing BS3, the unit will stop its operation after 30 minutes. If 30 minutes was not sufficient to add the needed refrigerant amount, the function can be reactivated by changing the field setting again.

### [2-21]

Refrigerant recovery/vacuuming mode.

In order to achieve a free pathway to reclaim refrigerant out of the system or to remove residual substances or to vacuum the system it is necessary to apply a setting which will open required valves in the refrigerant circuit so the reclaim of refrigerant or vacuuming process can be done properly.

[2-21]	Description
0 (default)	Deactivated.
1	Activated.
	To stop the refrigerant recovery/vacuuming mode, push BS3. If BS3 is not pushed, the system will remain in refrigerant recovery/vacuuming mode.

### [2-22]

Automatic low noise setting and level during night time.

By changing this setting, you activate the automatic low noise operation function of the unit and define the level of operation. Depending on the chosen level, the noise level will be lowered. The start and stop moments for this function are defined under setting [2-26] and [2-27] (see descriptions below).

[2-22]	Description
0 (default)	Deactivated



[2-22]		Description
1	Level 1	Level 5 <level 3<level<="" 4<level="" td=""></level>
2	Level 2	2 <level 1<="" td=""></level>
3	Level 3	
4	Level 4	
5	Level 5	

### [2-25]

Low noise operation level via the external control adaptor.

If the system needs to be running under low noise operation conditions when an external signal is sent to the unit, this setting defines the level of low noise that will be applied.

This setting will only be effective when the optional external control adaptor (DTA104A61/62) is installed and the setting [2-12] was activated.

[2-25]		Description
1	Level 1	Level 5 <level 3<level<="" 4<level="" td=""></level>
2 (default)	Level 2	2 <level 1<="" td=""></level>
3	Level 3	
4	Level 4	
5	Level 5	

### [2-26]

Low noise operation start time.

This setting is used in conjunction with setting [2-22].

[2-26]	Start time automatic low noise operation (approximately)
1	20h00
2 (default)	22h00
3	24h00

### [2-27]

Low noise operation stop time.

This setting is used in conjunction with setting [2-22].

[2-27]	Stop time automatic low noise operation (approximately)
1	6h00
2	7h00
3 (default)	8h00

### [2-30]

Power consumption limitation level (step 1) via the external control adaptor (DTA104A61/62).



If the system needs to be running under power consumption limitation conditions when an external signal is sent to the unit, this setting defines the level power consumption limitation that will be applied for step 1. The level is according to the

[2-30]	Power consumption limitation (approximately)
1	60%
2	65%
3 (default)	70%
4	75%
5	80%
6	85%
7	90%
8	95%

### [2-31]

Power consumption limitation level (step 2) via the external control adaptor (DTA104A61/62).

If the system needs to be running under power consumption limitation conditions when an external signal is sent to the unit, this setting defines the level power consumption limitation that will be applied for step 2. The level is according to the table.

[2-31]	Power consumption limitation (approximately)
1 (default)	40%
2	50%
3	55%

### [2-32]

Forced, all time, power consumption limitation operation (no external control adaptor is required to perform power consumption limitation).

If the system always needs to be running under power consumption limitation conditions, this setting activates and defines the level power consumption limitation that will be applied continuously. The level is according to the table.

[2-32]	Restriction reference
0 (default)	Function not active.
1	Follows [2-30] setting.
2	Follows [2-31] setting.

### [2-35]

Height difference setting.

[2-35]	Description
0	In case the outdoor unit is installed in the lowest position (indoor unit is installed on a higher position than outdoor unit) and the height difference between the indoor unit and the outdoor unit exceeds 40 m, the setting [2-35] should be changed to 0.



[2-35]	Description
1 (default)	_

Other changes/limitations to the circuit apply, for more information see "17.1.6 Refrigerant piping length and height difference" [> 76].

### [2-60]

Supervisor remote controller setting. A power reset is required to save this setting.

For details about the supervisor remote controller, see "15.1.2 System layout requirements" [> 53] or refer to the remote controller installation and user reference guide.

[2-60]	Description
0 (default)	No supervisor remote controller connected to the system
1	Supervisor remote controller connected to system

### [2-81]

Cooling comfort setting.

This setting is used in conjunction with setting [2-8].

[2-81]	Cooling comfort setting
0	Eco
1 (default)	Mild
2	Quick
3	Powerful

For more information and advice about the impact of these settings, see "20.2 Energy saving and optimum operation" [▶ 118].

### [2-82]

Heating comfort setting.

This setting is used in conjunction with setting [2-9].

[2-82]	Heating comfort setting
0	Eco
1 (default)	Mild
2	Quick
3	Powerful

For more information and advice about the impact of these settings, see "20.2 Energy saving and optimum operation" [▶ 118].

### 20.1.8 Indoor unit field setting

### 15(25)-13

Safety system deactivation.

When the room where the indoor unit is installed is big enough that no safety measure is required, the R32 leak safety system in that indoor unit can be deactivated by this setting.



Safety system deactivation				
Setting	1 <sup>st</sup> code	Function	2 <sup>nd</sup> code	Description
15/25	13	R32 leak safety	01	Disabled
		system setting	02	Enabled

### 20.2 Energy saving and optimum operation

This heat pump system is equipped with advanced energy saving functionality. Depending on the priority, emphasis can be put on energy saving or comfort level. Several parameters can be selected, resulting in the optimal balance between energy consumption and comfort for the particular application.

Several patterns are available and explained below. Modify the parameters to the needs of your building and to realize the best balance between energy consumption and comfort.

No matter which control is selected, variations on the behaviour of the system are still possible due to protection controls to keep the unit operating under reliable conditions. The intentional target, however, is fixed and will be used to obtain the best balance between energy consumption and comfort, depending on the application type.

### 20.2.1 Available main operation methods

#### **Basic**

The refrigerant temperature is fixed independent from the situation.

To activate this in	Change
Cooling operation	[2-8]=2
Heating operation	[2-9]=6

### **Automatic**

The refrigerant temperature is set depending on the outdoor ambient conditions. As such adjusting the refrigerant temperature to match the required load (which is also related to the outdoor ambient conditions).

E.g., when your system is operating in cooling, you do not need as much cooling under low outdoor ambient temperatures (e.g., 25°C) as under high outdoor ambient temperatures (e.g., 35°C). Using this idea, the system automatically starts increasing its refrigerant temperature, automatically reducing the delivered capacity and increasing the system's efficiency.

E.g., when your system is operating in heating, you do not need as much heating under high outdoor ambient temperatures (e.g., 15°C) as under low outdoor ambient temperatures (e.g., -5°C). Using this idea, the system automatically starts decreasing its refrigerant temperature, automatically reducing the delivered capacity and increasing the system's efficiency.

To activate this in	Change
Cooling operation	[2-8]=0 (default)
Heating operation	[2-9]=0 (default)



### Hi-sensible/economic (cooling/heating)

The refrigerant temperature is set higher/lower (cooling/heating) compared to basic operation. The focus under high sensible mode is comfort feeling for the customer.

The selection method of indoor units is important and has to be considered as the available capacity is not the same as under basic operation.

For details concerning to Hi-sensible applications, please contact your dealer.

To activate this in	Change
Cooling operation	[2-8] to the appropriate value, matching the requirements of the pre-designed system containing a high sensible solution.
Heating operation	[2-9] to the appropriate value, matching the requirements of the pre-designed system containing a high sensible solution.

[2-8]	T <sub>e</sub> target (°C)
3	7
4	8
5	9
6	10
7	11

[2-9]	T <sub>c</sub> target (°C)
1	41
3	43

### 20.2.2 Available comfort settings

For each of above modes a comfort level can be selected. The comfort level is related to the timing and the effort (energy consumption) which is put in achieving a certain room temperature by temporarily changing the refrigerant temperature to different values in order to achieve requested conditions more quickly.

### **Powerful**

Overshoot (during heating operation) or undershoot (during cooling operation) is allowed compared to the requested refrigerant temperature, in order to achieve the required room temperature very fast. The overshoot is allowed from the start up moment.

When the request from the indoor units becomes more moderate, the system will eventually go to the steady state condition which is defined by the operation method above.

To activate this in	Change
Cooling operation	[2-81]=3
	This setting is used in conjunction with setting [2-8].



To activate this in	Change
Heating operation	[2-82]=3
	This setting is used in conjunction with setting [2-9]

### Quick

Overshoot (during heating operation) or undershoot (during cooling operation) is allowed compared to the requested refrigerant temperature, in order to achieve the required room temperature very fast. The overshoot is allowed from the start up moment.

When the request from the indoor units becomes more moderate, the system will eventually go to the steady state condition which is defined by the operation method above.

To activate this in	Change
Cooling operation	[2-81]=2
	This setting is used in conjunction with setting [2-8].
Heating operation	[2-82]=2
	This setting is used in conjunction with setting [2-9].

### Mild

Overshoot (during heating operation) or undershoot (during cooling operation) is allowed compared to the requested refrigerant temperature, in order to achieve the required room temperature very fast. The overshoot is not allowed from the start up moment. The start up occurs under the condition which is defined by the operation mode above.

When the request from the indoor units becomes more moderate, the system will eventually go to the steady state condition which is defined by the operation method above.

Note: The start up condition is different from the powerful and quick comfort setting.

To activate this in	Change
Cooling operation	[2-81]=1
	This setting is used in conjunction with setting [2-8].
Heating operation	[2-82]=1
	This setting is used in conjunction with setting [2-9].

### **Eco**

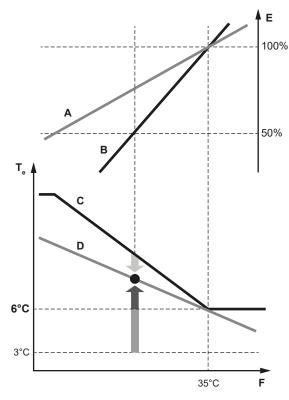
The original refrigerant temperature target, which is defined by the operation method (see above) is kept without any correction, unless for protection control.

To activate this in	Change
Cooling operation	[2-81]=0
	This setting is used in conjunction with setting [2-8].



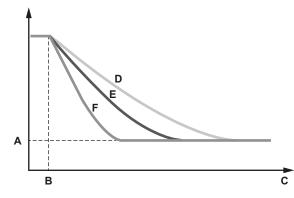
To activate this in	Change
Heating operation	[2-82]=0
	This setting is used in conjunction with setting [2-9].

### 20.2.3 Example: Automatic mode during cooling



- A Actual load curve
- **B** Virtual load curve (initial capacity automatic mode)
- **C** Virtual target value (initial evaporation temperature value automatic mode)
- **D** Required evaporation temperature value
- **E** Load factor
- **F** Outside air temperature
- **T**<sub>e</sub> Evaporating temperature
- Quick
  - Quick
     Powerful
- Mild
- IVIII

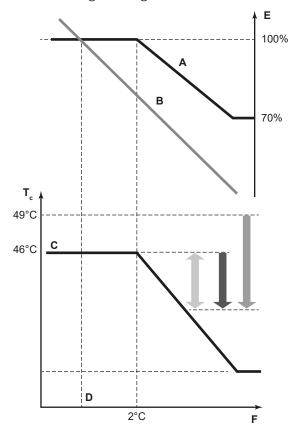
### **Room temperature evolution:**



- A Indoor unit set temperature
- **B** Operation start
- **C** Operating time
- **D** Mild
- **E** Quick
- **F** Powerful



### 20.2.4 Example: Automatic mode during heating



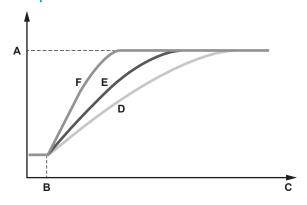
- Virtual load curve (default automatic mode peak capacity)
- Load curve
- Virtual target value (initial condensation temperature value automatic mode)
- Design temperature
- Load factor
- Outside air temperature
- Condensing temperature

Quick

Powerful

Mild

### **Room temperature evolution:**



- A Indoor unit set temperature
- Operation start
- Operating time
- Mild
- Quick
- Powerful

## 21 Commissioning



### **CAUTION**

See "3 Specific installer safety instructions" [▶ 12] to make sure commissioning complies with all safety regulations.



### **NOTICE**

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

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

## In this chapter

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## 21.1 Overview: Commissioning

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

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

Commissioning typically consists of the following stages:

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

## 21.2 Precautions when commissioning



**DANGER: RISK OF ELECTROCUTION** 



DANGER: RISK OF BURNING/SCALDING





### **CAUTION**

Do NOT perform the test operation while working on the indoor unit(s).

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



### **CAUTION**

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



### **NOTICE**

Test run is possible for ambient temperatures between −10°C and 50°C.



### **INFORMATION**

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



### NOTICE

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

During test operation, the outdoor unit and the indoor unit will start up. Make sure that the preparation of the indoor unit is finished (field piping, electrical wiring, air purge, ...). See installation manual of the indoor unit for details.

## 21.3 Checklist before commissioning

- **1** After the installation of the unit, check the items listed below.
- Close the unit.
- Power up the unit.

	You have read the complete installation and operation instructions described in the <b>installer and user reference guide</b> .
	Installation
	Check that the unit is properly installed, to avoid abnormal noises and vibrations when starting up the unit.
	Transportation stay
	Check that the outdoor unit's transportation stay is removed.
Field wiring	
	Check that the field wiring has been carried out according to the instructions described in the chapter "19 Electrical installation" [> 96], according to the wiring diagrams and according to the applicable national wiring regulation.
	Power supply voltage
	Check the power supply voltage on the local supply panel. The voltage MUST correspond to the voltage on the nameplate of the unit.
	Earth wiring
	Be sure that the earth wires have been connected properly and that the earth terminals are tightened.



Insulation test of the main power circuit
Using a megatester for 500 V, check that the insulation resistance of 2 M $\Omega$ or more is attained by applying a voltage of 500 V DC between power terminals and earth. NEVER use the megatester for the interconnection wiring.
Fuses, circuit breakers, or protection devices
Check that the fuses, circuit breakers, or the locally installed protection devices are of the size and type specified in the chapter "19.1.6 Specifications of standard wiring components" [> 101]. Be sure that neither a fuse nor a protection device has been bypassed.
Internal wiring
Visually check the switch box and the inside of the unit for loose connections or damaged electrical components.
Pipe size and pipe insulation
Be sure that correct pipe sizes are installed and that the insulation work is properly executed.
Stop valves
Be sure that the stop valves are open on both liquid and gas side.
Damaged equipment
Check the inside of the unit for damaged components or squeezed pipes.
Refrigerant leak
Check the inside of the unit on refrigerant leakage. If there is a refrigerant leak, try to repair the leak. If the repair is unsuccessful, call your local dealer. Do not touch any refrigerant which has leaked out from refrigerant piping connections. This may result in frostbite.
Oil leak
Check the compressor for oil leakage. If there is an oil leak, try to repair the leak. If the repairing is unsuccessful, call your local dealer.
Air inlet/outlet
Check that the air inlet and outlet of the unit is NOT obstructed by paper sheets, cardboard, or any other material.
Additional refrigerant charge
The amount of refrigerant to be added to the unit shall be written on the included "Added refrigerant" plate and attached to the rear side of the front cover.
Requirements for R32 equipment
Make sure the system meets all requirements that are described in the following chapter: "3.1 Instructions for equipment using R32 refrigerant" [▶ 16].
Field settings
Make sure all field settings you want are set. See "20.1 Making field settings" [▶ 107].
Installation date and field setting
Be sure to keep record of the installation date on the sticker on the rear of the upper front panel according to EN60335-2-40 and keep record of the contents of the field setting(s).

## 21.4 Checklist during commissioning

To perform a <b>test run</b> .



### 21.5 About the system test run



### **NOTICE**

Make sure to carry out the test run after the first installation. Otherwise, the malfunction code  $\mathcal{U}\mathcal{I}$  will be displayed on the user interface and normal operation or individual indoor unit test run cannot be carried out.

The procedure below describes the test operation of the complete system. This operation checks and judges following items:

- Check for incorrect wiring (communication check with indoor unit(s)).
- Check of the stop valves opening.
- Judgement of piping length.
- Abnormalities on the indoor unit cannot be checked. After the test operation is finished, check the indoor unit by performing a normal operation using the user interface. Refer to the indoor unit installation manual for more details concerning the individual test run.



### **INFORMATION**

- It may take 10 minutes to achieve a uniform refrigerant state before the compressor starts.
- During the test operation, the refrigerant running sound or the magnetic sound of a solenoid valve may become loud and the display indication may change. These are not malfunctions.

### 21.5.1 To perform a test run

- 1 Close all front panels to prevent misjudgement.
- Make sure all field settings you want are set; see "20.1 Making field settings" [▶ 107].
- Turn ON the power to the outdoor unit and the connected indoor unit(s).



### NOTICE

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

Make sure the default (idle) situation is existing; see "20.1.3 To access mode 1 or 2" [> 108]. Push BS2 for 5 seconds or more. The unit will start test operation.

Result: The test operation is automatically carried out, the outdoor unit display will indicate "LO I" and the indication "Test operation" and "Under centralised control" will display on the user interface of the indoor unit(s).

Steps during the automatic system test run procedure:

Step	Description
EO I	Control before start up (pressure equalisation)
F05	Cooling start up control
£03	Cooling stable condition
FOA	Communication check and stop valve check
£05	Pipe length check
£09	Pump down operation



Step	Description
E 10	Unit stop



### **INFORMATION**

During the test operation, it is not possible to stop the unit operation from a user interface. To abort the operation, press BS3. The unit will stop after ±30 seconds.

**5** Check the test operation results on the outdoor unit 7-segment display.

Completion	Description
Normal completion	No indication on the 7-segment display (idle).
Abnormal completion	Indication of malfunction code on the 7-segment display.
	Refer to "21.5.2 Correcting after abnormal completion of the test run" [ > 127] to take actions for correcting the abnormality. When the test operation is fully completed, normal operation will be possible after 5 minutes.

### 21.5.2 Correcting after abnormal completion of the test run

The test operation is only completed if there is no malfunction code displayed on the user interface or outdoor unit 7-segment display. In case of a displayed malfunction code, perform correcting actions as explained in the malfunction code table. Carry out the test operation again and confirm that the abnormality is properly corrected.



### **INFORMATION**

Refer to the installation manual of the indoor unit for detailed malfunction codes related to indoor units.

## 21.6 Operating the unit

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

For operating the indoor unit, the user interface of the indoor unit should be switched ON. Refer to the indoor unit operation manual for more details.



## 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 can find the complete documentation at the URL mentioned earlier in this manual.
- Explain the user how to properly operate the system and what to do in case of problems.
- Show the user what to do for the maintenance of the unit.



## 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  $CO_2$  equivalent.

Formula to calculate the quantity in  ${\rm CO}_2$  equivalent tonnes: GWP value of the refrigerant × total refrigerant charge [in kg] / 1000

### In this chapter

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### 23.1 Maintenance safety precautions



**DANGER: RISK OF ELECTROCUTION** 



DANGER: RISK OF BURNING/SCALDING



### **WARNING**

Prior to start working on systems containing flammable refrigerant, safety checks are necessary to ensure that the risk of ignition is minimised. Therefore, some instructions should be followed.

Please refer to the service manual for more information.



### **NOTICE:** Risk of electrostatic discharge

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

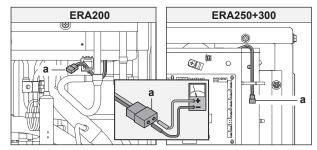
### 23.1.1 To prevent electrical hazards

When performing service to inverter equipment:

- 1 Do NOT perform electrical work for 10 minutes after turning off the power supply.
- 2 Measure the voltage between terminals on the terminal block for power supply with a tester and confirm that the power supply is shut off. In addition, measure points as shown in the figure, with a tester and confirm that the voltage of the capacitor in the main circuit is less than 50 V DC. If the voltage



measured is still higher than 50 V DC, discharge the capacitors in a safe manner by using a dedicated capacitor discharge pen to avoid possibility of sparking.



- Connector for capacitor voltage check
- **3** Pull out junction connectors X1A, X2A for the fan motors in the outdoor unit before starting service operation on the inverter equipment. Be careful NOT to touch the live parts. (If a fan rotates due to strong wind, it may store electricity in the capacitor or in the main circuit and cause electrical shock.)
- After the service is finished, plug the junction connector back in. Otherwise the malfunction code E7 will be displayed on the user interface or on the outdoor unit 7-segment display and normal operation will NOT be performed.

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

Pay attention to the fan. It is dangerous to inspect the unit while the fan is running. Make sure to turn off the main switch and to remove the fuses from the control circuit located in the outdoor unit.

### 23.2 Checklist for yearly maintenance of the outdoor unit

Check the following at least once a year:

Heat exchanger

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

## 23.3 About service mode operation

Refrigerant recovery operation/vacuuming operation is possible by applying setting [2-21]. Refer to "20.1 Making field settings" [> 107] for details how to set mode 2.

When vacuuming/recovery mode is used, check very carefully what should be vacuumed/recovered before starting. See installation manual of the indoor unit for more information about vacuuming and recovery.

### 23.3.1 To use vacuum mode

**1** When the unit is at standstill, set the unit in [2-21]=1.

Result: When confirmed, the indoor and outdoor unit expansion valves will interface of the indoor unit indicate TEST (test operation) and [SA] (external control) and the operation will be prohibited.

Evacuate the system with a vacuum pump.



**3** Press BS3 to stop vacuuming mode.

### 23.3.2 To recover refrigerant

This should be done with a refrigerant recovery unit. Follow the same procedure as for vacuuming method.



### **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: Selfcombustion 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.



### **NOTICE**

Make sure to NOT recover any oil while recovering refrigerant. **Example:** By using an oil separator.



## 24 Troubleshooting



See "3 Specific installer safety instructions" [> 12] to make sure troubleshooting complies with all safety regulations.

## In this chapter

24.1	Overview: Troubleshooting	132
24.2	Precautions when troubleshooting	132
24.3	Solving problems based on error codes	132
	24.3.1 Error codes: Overview	133
24.4	Refrigerant leak detection system	137

### 24.1 Overview: Troubleshooting

### **Before troubleshooting**

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

## 24.2 Precautions when troubleshooting



### DANGER: RISK OF ELECTROCUTION



### DANGER: RISK OF BURNING/SCALDING



### **WARNING**

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



### WARNING

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

## 24.3 Solving problems based on error codes

In case of a displayed malfunction code, perform correcting actions as explained in the malfunction code table.

After correcting the abnormality, press BS3 to reset the malfunction code and retry operation.



### **Example:**

Code	Example
Main code	EB
Sub code	- [] {

With an interval of 1 second, the display will switch between main code and sub code.



### **INFORMATION**

See the service manual for:

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

### 24.3.1 Error codes: Overview

Main code	Sub code	Cause	Solution	SVEO <sup>(a)</sup>	SVS <sup>(b)</sup>
A0	- 11	The R32 sensor of the compatible air curtain has detected a refrigerant leak <sup>(c)</sup>	Possible R32 leak. The compressor will shut down and the unit will stop operating. Service is needed to repair the leak and activate the system. Refer to the service manual for more information.		<b>*</b>
	/EH	Safety system error (leak detection) <sup>(c)</sup>	An error related to the safety system occurred.		
			Refer to the service manual for more information.		
ЕН	-0 1	R32 sensor malfunction or	Check connection on PCB or actuator.		✓
		disconnection (indoor) <sup>(c)</sup>	The system will stop operating, together with the indoor unit. Refer to the service manual for more information.		
	-02	R32 sensor lifetime exceeded (indoor)	The sensor is at the end of lifetime and must be replaced.		
			Refer to the service manual for more information.		
	-05	R32 sensor end of lifetime<6 months (indoor) <sup>(c)</sup>	The sensor is almost at the end of lifetime and must be replaced.		
			Refer to the service manual for more information.		
	- 10	Waiting for indoor unit R32 sensor replacement input <sup>(c)</sup>	Refer to the service manual for more information.		

Main	Sub	Cause	Solution	SVEO <sup>(a)</sup>	SVS <sup>(b)</sup>
code	code	Earth leakage detector activated	Postart the unit of the problem		
E2	-01	Earth leakage detector activated	Restart the unit. If the problem reoccurs, contact your dealer.		
	-05	Earth leakage detector malfunction (open circuit) - A1P (X101A)	Check connection on PCB or actuator.		
E3	-0 1	High pressure switch was activated (S1PH) – main PCB (X2A)	Check stop valve situation or abnormalities in (field) piping or airflow over air cooled coil.		
	-02	Refrigerant overcharge	Check refrigerant amount+recharge		
		Stop valve closed	unit.		
			Open stop valves		
	- 13	Stop valve closed (liquid)	Open liquid stop valve.		
	- 18	<ul><li>Refrigerant overcharge</li><li>Stop valve closed</li></ul>	Check refrigerant amount+recharge unit.		
		- Stop valve closed	Open stop valves.		
EY	-0 1	Low pressure malfunction:	Open stop valves.		
		Stop valve closed	• Check refrigerant amount+recharge		
		Refrigerant shortage	unit.		
		Indoor unit malfunction	<ul> <li>Check the user interface's display or interconnection wiring between the outdoor unit and the indoor unit.</li> </ul>		
E9	-0 1	Electronic expansion valve malfunction (heat exchanger) (Y1E) – main PCB (X21A)	Check connection on PCB or actuator.		
	-04	Electronic expansion valve malfunction (inverter cooling) (Y3E) – main PCB (X23A)	Check connection on PCB or actuator.		
	-26	Electronic expansion valve malfunction (liquid injection) (Y4E) – main PCB (X25A)	Check connection on PCB or actuator.		
	-29	Electronic expansion valve malfunction (subcool heat exchanger) (Y2E) – main PCB (X26A)	Check connection on PCB or actuator.		
F3	-0 1	Discharge temperature too high (R21T)  – main PCB (X33A):	<ul><li>Open stop valves.</li><li>Check refrigerant amount+recharge</li></ul>		
		Stop valve closed	unit.		
		Refrigerant shortage			
	-20	Compressor casing temperature too	Open stop valves.		
		high (R8T) – main PCB (X33A):	• Check refrigerant amount+recharge		
		Stop valve closed	unit.		
		Refrigerant shortage			
H9	-01	Ambient temperature sensor malfunction (R1T) – main PCB (X18A)	Check connection on PCB or actuator.		



Main	Sub	Cause	Solution	SVEO <sup>(a)</sup>	SVS <sup>(b)</sup>
code	code				
J3	- 15	Discharge temperature sensor malfunction (R21T): open circuit – main PCB (X33A)	Check connection on PCB or actuator.		
	- 17	Discharge temperature sensor malfunction (R21T): short circuit - main PCB (X33A)	Check connection on PCB or actuator.		
	-47	Compressor casing temperature sensor malfunction (R8T): open circuit - main PCB (X33A)	Check connection on PCB or actuator.		
	-48	Compressor casing temperature sensor malfunction (R8T): short circuit - main PCB (X33A)	Check connection on PCB or actuator.		
J5	- 18	Suction temperature sensor (R3T) – main PCB (X30A)	Check connections on PCB or actuator.		
JS	-0 1	Heat exchanger deicer temperature sensor (R7T) – main PCB (X30A)	Check connection on PCB or actuator		
דנ	-05	Subcool heat exchanger — liquid - temperature sensor (R5T) - main PCB (X30A)	Check connection on PCB or actuator.		
J8	-0 !	Heat exchanger — liquid -temperature sensor (R4T ) - main PCB (X30A)	Check connection on PCB or actuator.		
<i>P</i> L	-0 1	Subcool heat exchanger – gas - temperature sensor (R6T) – main PCB (X3OA)	Check connection on PCB or actuator.		
JR	-05	High pressure sensor malfunction (S1NPH): open circuit - main PCB (X32A)	Check connection on PCB or actuator.		
	-07	High pressure sensor malfunction (S1NPH): short circuit - main PCB (X32A)	Check connection on PCB or actuator.		
JE	-05	Low pressure sensor malfunction (S1NPL): open circuit - main PCB (X31A)	Check connection on PCB or actuator.		
	-07	Low pressure sensor malfunction (S1NPL): short circuit - main PCB (X31A)	Check connection on PCB or actuator.		
LE	- 14	Transmission outdoor unit - inverter: INV1 transmission trouble - main PCB (X20A, X28A, X40A)	Check connection.		
	- 19	Transmission outdoor unit - inverter: FAN1 transmission trouble - main PCB (X20A, X28A, X40A)	Check connection.		
	-24	Transmission outdoor unit - inverter: FAN2 transmission trouble - main PCB (X20A, X28A, X40A)	Check connection.		



Main code	Sub code						
PI	-01	INV1 unbalanced power supply voltage	Check if power supply is within range.				
ЦΙ	-0 /	Reversed power supply phase malfunction	Correct phase order.				
	-04	Reversed power supply phase malfunction	Correct phase order.				
U2	-0 1	INV1 voltage power shortage	Check if power supply is within range.				
	-02	INV1 power phase loss	Check if power supply is within range.				
ЦЗ	-03	Malfunction code: system test run not yet executed (system operation not possible)	Execute system test run.				
	-04	An error occurred during the test run	Re-execute the test run.				
	-05, -05	Test run aborted	Re-execute the test run.				
	-07, -08	Test run aborted due to communication issues	Check the communication wires and re-execute the test run.				
ЦΥ	-03	Indoor unit communication error	Check user interface connection.				
υЯ	-01	Warning because there is an error on another indoor unit	Check if other indoor units have a malfunction and confirm if indoor unit mix is allowed.				
UA	-03	Connection malfunction over indoor units or type mismatch	Check the type of indoor unit that is currently connected. Make sure that a correct indoor unit (only one EKEA or one compatible air curtain) is connected. If an incorrect type of indoor unit is connected, replace it with the correct one. After the correct indoor unit is connected long-press BS3 to complete the identification of indoor unit.				
	- 18	Connection malfunction over indoor units or type mismatch	Check if other indoor units have a malfunction and confirm if indoor unit mix is allowed.				
	-20	Wrong outdoor unit connected	Disconnect the outdoor unit.				
ШΗ	-01	Auto address malfunction (inconsistency)	Check if interconnected unit amount matches with powered unit amount (by monitor mode) or wait until initialisation is finished.				
רח	-37	AHU supply airflow rate below the legal limit <sup>(d)</sup>	Make sure the T5T6 digital input is set correctly, refer to EKEA installation and operation manual.	1			

 $<sup>^{(</sup>a)}$  The SVEO terminal provides an electrical contact that closes in case the indicated error occurs.

<sup>(</sup>d) In case the AHU supply airflow rate is above the legal limit for 5 minutes continuously, this error is automatically solved.



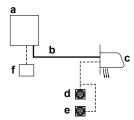
 $<sup>^{(</sup>b)}$  The SVS terminal provides an electrical contact that closes in case the indicated error occurs.

 $<sup>^{(</sup>c)}$  The error code is only shown on the user interface of the compatible air curtain where the error occurs.

### 24.4 Refrigerant leak detection system

### **Normal operation**

During normal operation, the alarm only and supervisor remote controller have no functionality. The screen of the remote controller in alarm only and supervisor mode will be off. Operation of the remote controller can be checked by pushing the D button to open the installer menu.



- a Heat pump outdoor unit
- **b** Refrigerant piping
- c Compatible air curtain
- d Remote controller in normal mode
- e Remote controller in supervisor mode (mandatory in some situations)
- f Centralised controller (optional)

**Note:** During start-up of the system, the mode of the remote control can be verified from the screen.

### **Leak detection operation**

If the R32 sensor in the air curtain unit detects a refrigerant leak, the user will be warned by both audible and visible signals of the remote controller of the leaking indoor unit (and the supervisor remote controller, if applicable). At the same time the compressor will be shut down and the system cannot operate anymore. Service is needed to repair the leak and activate the system. Refer to the service manual for more information.

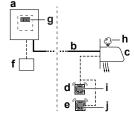
Feedback of the remote controller after leak detection operation will depend on its mode.



### 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 maintenance.



- a Heat pump outdoor unit
- **b** Refrigerant piping
- **c** Compatible air curtain
- **d** Remote controller in normal mode and alarm only mode
- e Remote controller in supervisor mode (mandatory in some situations)
- f Centralised controller (optional)
- **g** Outdoor unit error code on 7-segment display
- h Refrigerant leak
- i Error code 'A0–11' and audible alarm and red warning signal is generated from this remote controller.



i Error code 'A0–11' and audible alarm and red warning signal is generated from this supervisor remote controller. The unit address is displayed on this remote

Note: It is possible to stop the leak detection alarm from the remote controller and from the app. To stop the alarm from the remote controller, press 🖶 for

Note: Leak detection will trigger SVS output. For more information, see "19.3 To connect the external outputs" [▶ 104].

Note: An optional output, if available on a compatible air curtain, can be used for an external device. This output will trigger in case a leak is detected. For more information about this output, refer to the installation manual of the compatible air curtain unit.

Note: Some centralised controllers can also be used as supervisor remote controller. For further details on installation, please refer to the installation manual of the centralised controllers.



### 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 indoor unit because this may cause misdetection by the R32 refrigerant leakage sensor.



# 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).

## In this chapter

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6.2	Piping diagram: Outdoor unit	143
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## 26.1 Service space: Outdoor unit

When mounting units side by side, the piping route must be to the front or downwards. In this case the piping route to the side is not possible.

Single unit (□) | Single row of units (□

	A~E H <sub>B</sub> H <sub>D</sub> H <sub>U</sub>			[IIIII]							
	A~E	,	I <sub>B</sub> II <sub>D</sub> II <sub>U</sub>	а	b	С	d	е	ев	<b>e</b> <sub>D</sub>	
	В	_			≥100						
e <sub>B</sub>	A, B, C	_		≥100	≥100	≥100					
a tE	B, E	_			≥100			≥1000		≤500	
e <sub>D</sub> e	A, B, C, E	_		≥150	≥150	≥150		≥1000		≤500	
	D	_					≥500				
	D, E	_					≥1000	≥1000	≤500		
C H <sub>u</sub> B	B, D	_			≥100		≥1000				
C B H <sub>B</sub>	B, D, E	H <sub>B</sub> <h<sub>D</h<sub>	H <sub>B</sub> ≤½H <sub>U</sub>		≥250		≥1000	≥1000	≤500		
			½H <sub>U</sub> <h<sub>B≤H<sub>U</sub></h<sub>		≥250		≥1250	≥1000	≤500		
d			H <sub>B</sub> >H <sub>U</sub>				0				1
D a A		H <sub>B</sub> >H <sub>D</sub>	H <sub>D</sub> ≤½H <sub>U</sub>		≥100		≥1000	≥1000		≤500	ľ
H <sub>D</sub>			½H <sub>U</sub> <h<sub>D≤H<sub>U</sub></h<sub>		≥200		≥1000	≥1000		≤500	
			H <sub>D</sub> >H <sub>U</sub>		≥200		≥1700	≥1000		≤500	
	A, B, C	_		≥200	≥300	≥1000					
	A, B, C, E	_		≥200	≥300	≥1000		≥1000		≤500	
e <sub>D</sub> E	D	_					≥1000				
e e	D, E	_					≥1000	≥1000	≤500		
≥100	B, D	H <sub>D</sub> >H <sub>U</sub>			≥300		≥1000				
≥100 B		H <sub>D</sub> ≤½H <sub>U</sub>	ı		≥250		≥1500				
b H <sub>B</sub>		1/2H <sub>∪</sub> <h<sub>□</h<sub>	≤H <sub>∪</sub>		≥300		≥1500				
	B, D, E	H <sub>B</sub> <h<sub>D</h<sub>	H <sub>B</sub> ≤½H <sub>U</sub>		≥300		≥1000	≥1000	≤500		
			½H <sub>U</sub> <h<sub>B≤H<sub>U</sub></h<sub>		≥300		≥1250	≥1000	≤500		
D a			H <sub>B</sub> >H <sub>U</sub>				0				1+2
H <sub>D</sub> a A		H <sub>B</sub> >H <sub>D</sub>	H <sub>D</sub> ≤½H <sub>U</sub>		≥250		≥1500	≥1000		≤500	
			½H <sub>U</sub> <h<sub>D≤H<sub>U</sub></h<sub>		≥300		≥1500	≥1000		≤500	
			H <sub>D</sub> >H <sub>U</sub>		≥300		≥2200	≥1000		≤500	

**A,B,C,D** Obstacles (walls/baffle plates)

**E** Obstacle (roof)

**a,b,c,d,e** Minimum service space between the unit and obstacles A, B, C, D and E

- $\mathbf{e_{B}}$  Maximum distance between the unit and the edge of obstacle E, in the direction of obstacle B
- $\mathbf{e}_{\mathbf{D}}$  Maximum distance between the unit and the edge of obstacle E, in the direction of obstacle D
- $\mathbf{H}_{\mathbf{U}}$  Height of the unit

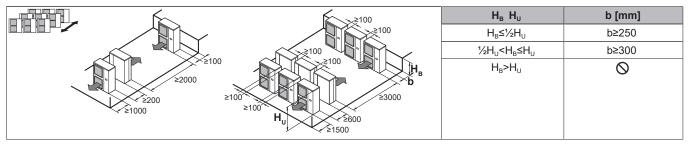
 $\mathbf{H_{B}}, \mathbf{H_{D}}$  Height of obstacles B and D

- Seal the bottom of the installation frame to prevent discharged air from flowing back to the suction side through the bottom of the unit.
- 2 Maximum two units can be installed.
- igorplus Not allowed

**Note:** For better serviceability, use a distance ≥250 mm for all dimensions marked with 'a'.

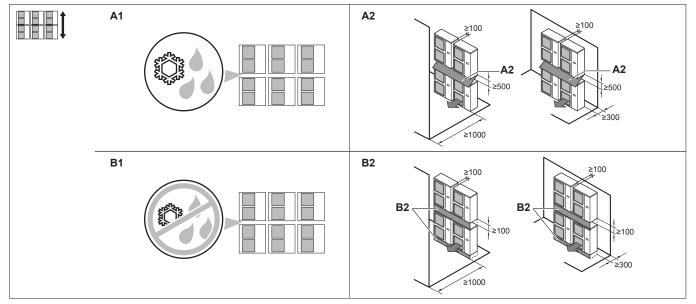






Note: For better serviceability, use a side by side distance ≥250 mm (instead of ≥100 mm as shown on the figures above).





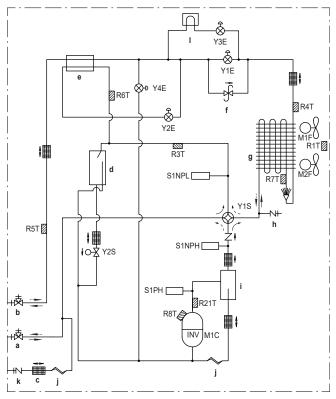
- A1=>A2 (A1) If there is danger of drainage dripping and freezing between the upper and lower units...
  - (A2) Then install a **roof** between the upper and lower units. Install the upper unit high enough above the lower unit to prevent ice buildup at the upper unit's bottom
- B1=>B2 (B1) If there is no danger of drainage dripping and freezing between the upper and
  - (B2) Then it is not required to install a roof, but seal the gap between the upper and lower units to prevent discharged air from flowing back to the suction side through the bottom of the unit.

Note: For better serviceability, use a side by side distance ≥250 mm (instead of ≥100 mm as shown on the figures above).

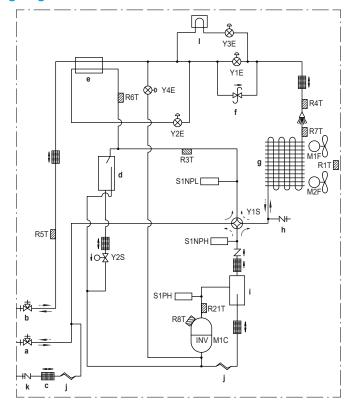


## 26.2 Piping diagram: Outdoor unit

### Piping diagram: ERA200



### Piping diagram: ERA250+300



### Legend:

- Stop valve (gas) Stop valve (liquid) b
- Filter (6×) С
- Accumulator
- e Subcool tube heat exchanger



- f Pressure regulating valve
- g Heat exchanger
- **h** Service port
- i Oil separator
- j Capillary tube (2×)
- **k** Charge port
- I Heat sink
- M1C Compressor
- M1F-M2F Fan motor

  - R1T Thermistor (air)
    R3T Thermistor (suction accumulator)
  - R4T Thermistor (heat exchanger, liquid)
  - **R5T** Thermistor (liquid)
  - **R6T** Thermistor (subcool heat exchanger, gas)
  - R7T Thermistor (de-icer)
  - **R8T** Thermistor (M1C body)
  - **R21T** Thermistor (M1C discharge pipe)
  - **S1NPH** High pressure sensor **S1NPL** Low pressure sensor

    - **S1PH** High pressure switch
    - Y1E Electronic expansion valve (main)
    - Y2E Electronic expansion valve (subcool heat exchanger)
    - Y3E Electronic expansion valve (inverter cooling)
    - **Y4E** Electronic expansion valve (liquid injection)
    - Y1S Solenoid valve (4-way valve)
    - Y2S Solenoid valve (accumulator oil return)
    - Cooling
    - --- Heating



## 26.3 Wiring diagram: Outdoor unit

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

### **Notes:**

- 1 Symbols (see below).
- 2 Refer to the installation or service manual on how to use the BS1~BS3 push buttons and DS1~DS2 switches.
- 3 Do not operate the unit by short-circuiting protection device S1PH.
- 4 Refer to the installation manual for indoor-outdoor transmission F1-F2 wiring.
- When using the central control system, connect outdoor-outdoor transmission F1-F2.
- The capacity of the contact is  $220^240 \text{ VAC} 0.5 \text{ A}$ . (Rush current needs 3 A or less)
- 7 Use dry contact for micro-current (1 mA or less 12VDC).

### **Symbols:**

X1M	Main terminal
	Earth wiring
15	Wire number 15
	Field wire
	Field cable
→> <b>**</b> /12.2	Connection ** continues on page 12 column 2
1	Several wiring possibilities
①	Several wiring possibilities Option
	<b>.</b>
	Option
	Option  Not mounted in switch box

### **Colours:**

BLK	Black
BLU	Blue
BRN	Brown
GRN	Green
ORG	Orange
RED	Red
WHT	White
YLW	Yellow



### **Legend for wiring diagram:**

Printed circuit board (main) A1P A2P Printed circuit board (noise filter) Printed circuit board (inverter) A3P A4P Printed circuit board (fan 1) A5P Printed circuit board (fan 2)

A6P Printed circuit board (cool/heat selector)

BS\* (A1P) Push button switch

DIP switch DS\* (A1P)

E1HC Crankcase heater F1U (A1P) Fuse (T 10 A / 250 V) F1U, F2U Fuse (T 1 A / 250 V) F3U Field fuse (field supply)

HAP (A1P) Light-emitting diode (service monitor is green)

K\*R (A\*P) Relay on PCB

L1R Reactor

M<sub>1</sub>C Motor (compressor)

M1F, M2F Motor (upper and lower fan)

Earth leakage circuit breaker (field supply) Q1DI

R1T Thermistor (air)

R3T Thermistor (suction accumulator) Thermistor (heat exchanger liquid) R4T

Thermistor (liquid) R5T

R6T Thermistor (subcool heat exchanger gas)

Thermistor (de-icer) R7T

Thermistor (M1C body) R8T

R21T Thermistor (M1C discharge pipe)

S1NPH High pressure sensor S1NPL Low pressure sensor S1PH High pressure switch

S1S Air control switch (optional) S2S Cool/heat switch (optional)

SEG\* (A1P) 7-segment display

SFB Mechanical ventilation error input (field supply)

T1A Current sensor X\*AConnector X\*MTerminal strip

Y1E Electronic expansion valve (heat exchanger)



Y2E	Electronic expansion valve (subcool heat exchanger)
Y3E	Electronic expansion valve (inverter cooling)
Y4E	Electronic expansion valve (liquid injection)
Y1S	Solenoid valve (4-way valve)
Y2S	Solenoid valve (accumulator oil return)
Y3S	Error operation output (SVEO)(field supply)
Y4S	Leak sensor output (SVS)(field supply)
Z*C	Noise filter (ferrite core)



## 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.













