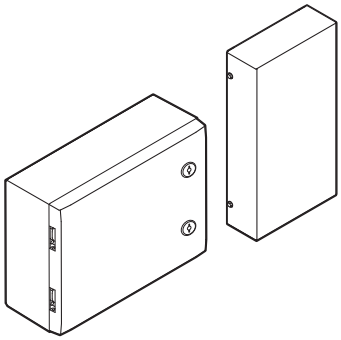
Installation and operation manual

Option kit for combination of Daikin outdoor units with field-supplied air handling units

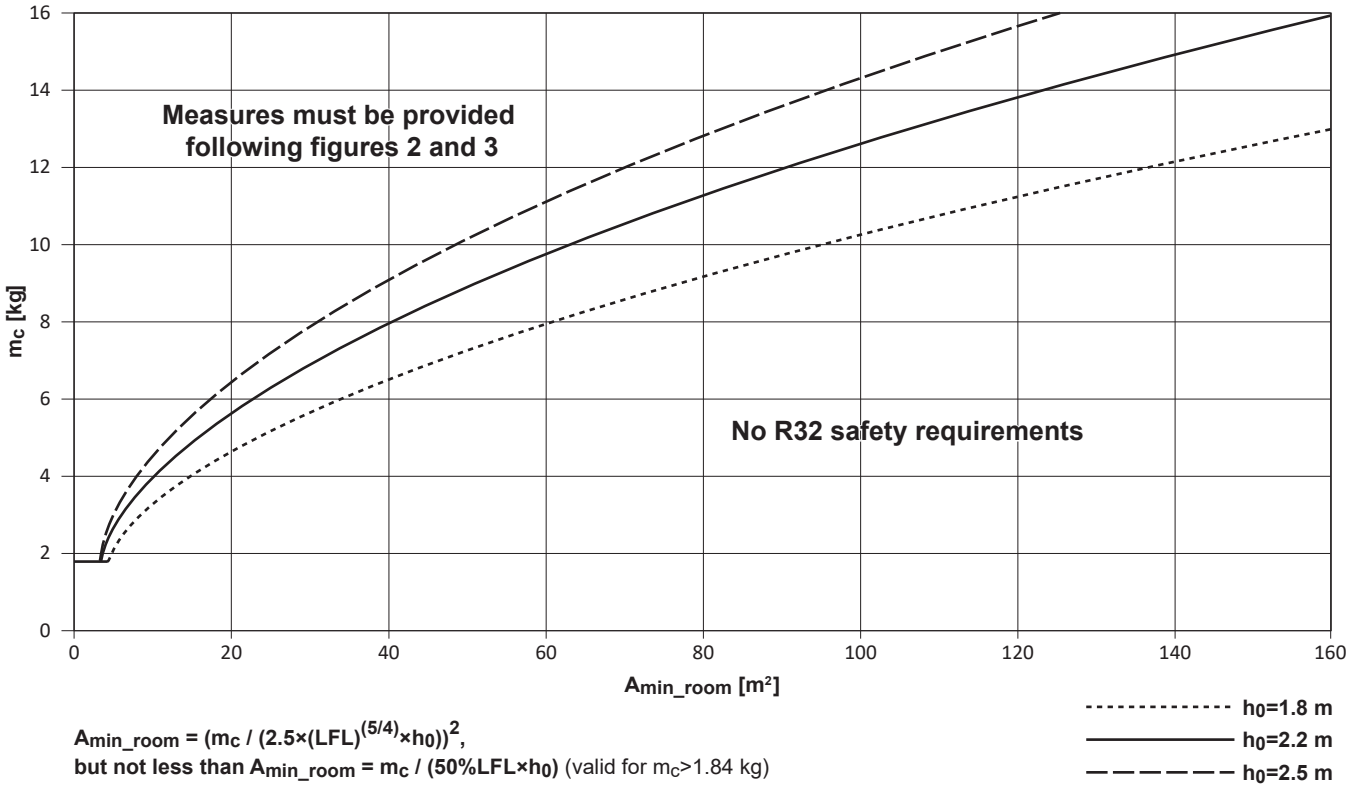


EKEACBVE
EKEXVA50~500

Installation and operation manual
Option kit for combination of Daikin outdoor units with field-supplied air handling units

English

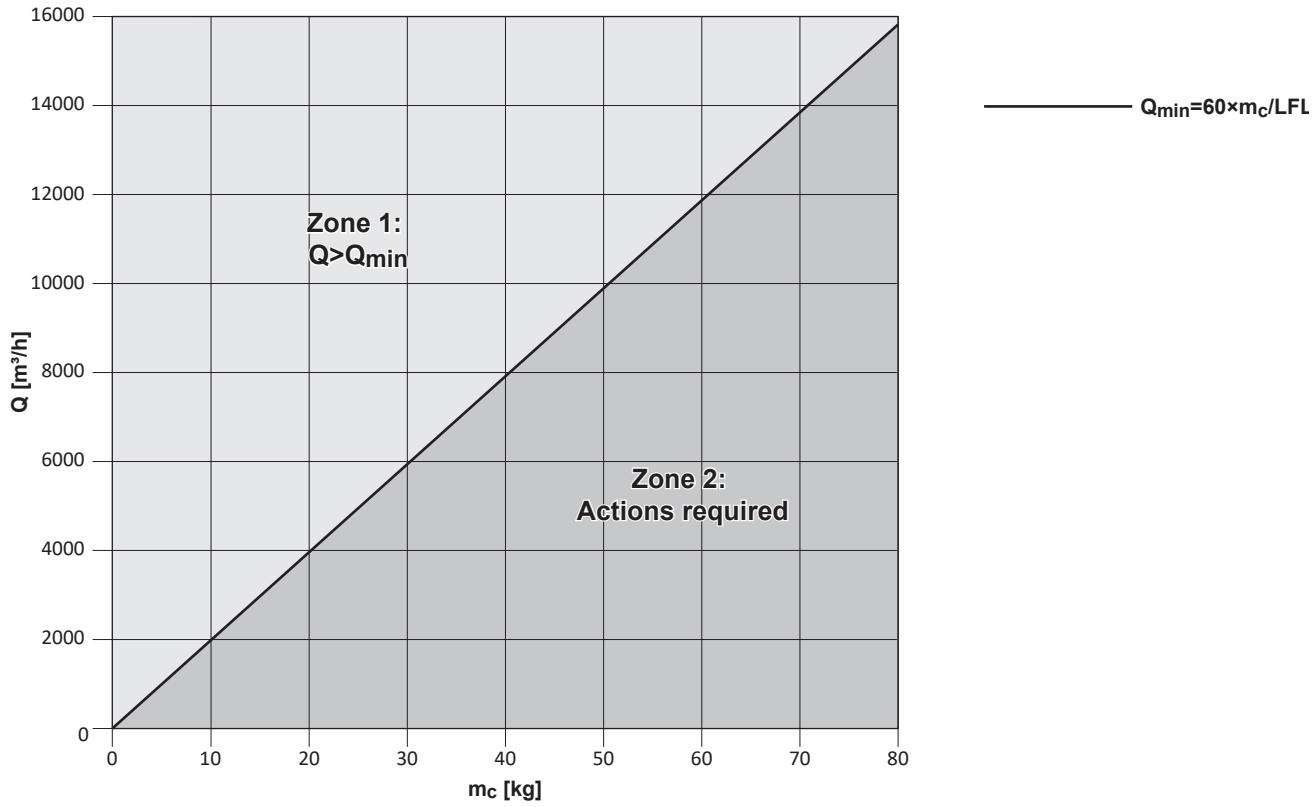
1: Requirements for spaces served by AHU (m_c ≤16 kg)



$A_{min\_room} = (m_c / (2.5 \times (LFL)^{(5/4)} \times h_0))^2$,
but not less than $A_{min\_room} = m_c / (50\%LFL \times h_0)$ (valid for m_c>1.84 kg)

m_c [kg]	A_{min_room} [m²] (h_0=1.8 m)	A_{min_room} [m²] (h_0=2.2 m)	A_{min_room} [m²] (h_0=2.5 m)
2	4.9	4.0	3.5
2.5	6.1	5.0	4.4
3	8.6	6.0	5.3
3.5	11.6	7.8	6.1
4	15.2	10.2	7.9
4.5	19.2	12.9	10.0
5	23.7	15.9	12.3
5.5	28.7	19.2	14.9
6	34.1	22.8	17.7
6.5	40.0	26.8	20.8
7	46.4	31.1	24.1
7.5	53.2	35.7	27.6
8	60.6	40.6	31.4
8.5	68.4	45.8	35.5
9	76.6	51.3	39.8
9.5	85.4	57.2	44.3
10	94.6	63.4	49.1
10.5	104.3	69.8	54.1
11	114.5	76.6	59.4
11.5	125.1	83.8	64.9
12	136.2	91.2	70.6
12.5	147.8	99.0	76.6
13	159.9	107.0	82.9
13.5	172.4	115.4	89.4
14	185.4	124.1	96.1
14.5	198.9	133.1	103.1
15	212.8	142.5	110.4
15.5	227.2	152.1	117.8
16	242.1	162.1	125.5

2: Minimum circulation airflow



m_c [kg]	Q_{min} [m³/h]
0	0.0
0.5	97.7
1	195.4
1.5	293.2
2	390.9
2.5	488.6
3	586.3
3.5	684.0
4	781.8
4.5	879.5
5	977.2
5.5	1074.9
6	1172.6
6.5	1270.4
7	1368.1
7.5	1465.8
8	1563.5
8.5	1661.2
9	1759.0
9.5	1856.7
10	1954.4
10.5	2052.1
11	2149.8
11.5	2247.6
12	2345.3
12.5	2443.0
13	2540.7
13.5	2638.4
14	2736.2
14.5	2833.9
15	2931.6
15.5	3029.3
16	3127.0
16.5	3224.8
17	3322.5
17.5	3420.2
18	3517.9
18.5	3615.6
19	3713.4
19.5	3811.1

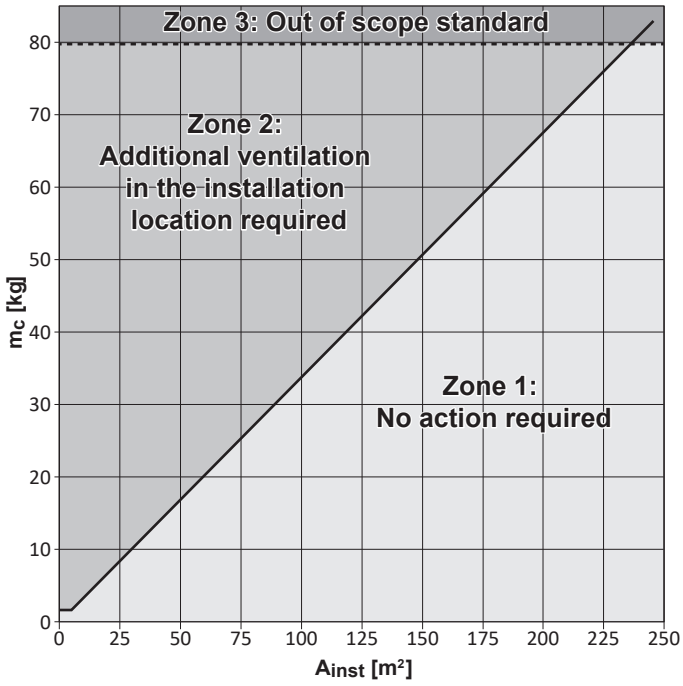
m_c [kg]	Q_{min} [m³/h]
20	3908.8
20.5	4006.5
21	4104.2
21.5	4202.0
22	4299.7
22.5	4397.4
23	4495.1
23.5	4592.8
24	4690.6
24.5	4788.3
25	4886.0
25.5	4983.7
26	5081.4
26.5	5179.2
27	5276.9
27.5	5374.6
28	5472.3
28.5	5570.0
29	5667.8
29.5	5765.5
30	5863.2
30.5	5960.9
31	6058.6
31.5	6156.4
32	6254.1
32.5	6351.8
33	6449.5
33.5	6547.2
34	6645.0
34.5	6742.7
35	6840.4
35.5	6938.1
36	7035.8
36.5	7133.6
37	7231.3
37.5	7329.0
38	7426.7
38.5	7524.4
39	7622.1
39.5	7719.9

m_c [kg]	Q_{min} [m³/h]
40	7817.6
40.5	7915.3
41	8013.0
41.5	8110.7
42	8208.5
42.5	8306.2
43	8403.9
43.5	8501.6
44	8599.3
44.5	8697.1
45	8794.8
45.5	8892.5
46	8990.2
46.5	9087.9
47	9185.7
47.5	9283.4
48	9381.1
48.5	9478.8
49	9576.5
49.5	9674.3
50	9772.0
50.5	9869.7
51	9967.4
51.5	10065.1
52	10162.9
52.5	10260.6
53	10358.3
53.5	10456.0
54	10553.7
54.5	10651.5
55	10749.2
55.5	10846.9
56	10944.6
56.5	11042.3
57	11140.1
57.5	11237.8
58	11335.5
58.5	11433.2
59	11530.9
59.5	11628.7

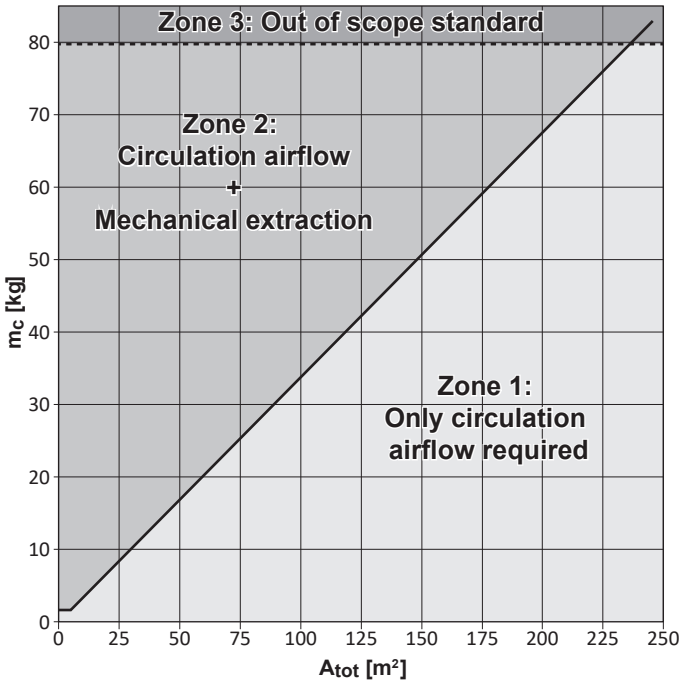
m_c [kg]	Q_{min} [m³/h]
60	11726.4
60.5	11824.1
61	11921.8
61.5	12019.5
62	12117.3
62.5	12215.0
63	12312.7
63.5	12410.4
64	12508.1
64.5	12605.9
65	12703.6
65.5	12801.3
66	12899.0
66.5	12996.7
67	13094.5
67.5	13192.2
68	13289.9
68.5	13387.6
69	13485.3
69.5	13583.1
70	13680.8
70.5	13778.5
71	13876.2
71.5	13973.9
72	14071.7
72.5	14169.4
73	14267.1
73.5	14364.8
74	14462.5
74.5	14560.3
75	14658.0
75.5	14755.7
76	14853.4
76.5	14951.1
77	15048.9
77.5	15146.6
78	15244.3
78.5	15342.0
79	15439.7
79.82	15600.0

3a: Requirements for AHU installation location

(only applicable for indoor installations)



3b: Requirements for spaces served by AHU



50%LFL×H×(A_{tot} or A_{inst}) (valid for m_c>1.84 kg)

260LFL

A_{tot} or A_{inst} [m²]	m_c [kg]
6	2.0
10	3.4
15	5.1
20	6.8
25	8.4
30	10.1
35	11.8
40	13.5
45	15.2
50	16.9
55	18.6
60	20.3
65	22.0
70	23.6
75	25.3
80	27.0
85	28.7
90	30.4
95	32.1
100	33.8
105	35.5
110	37.1
115	38.8
120	40.5

A_{tot} or A_{inst} [m²]	m_c [kg]
125	42.2
130	43.9
135	45.6
140	47.3
145	49.0
150	50.7
155	52.3
160	54.0
165	55.7
170	57.4
175	59.1
180	60.8
185	62.5
190	64.2
195	65.9
200	67.5
205	69.2
210	70.9
215	72.6
220	74.3
225	76.0
230	77.7
235	79.4
236	79.7

Table of contents

1 About this document

WARNING

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

INFORMATION

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

Target audience

Authorised installers + end users

INFORMATION

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

Documentation set

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

- **Installation and operation manual:**
  - Installation and operation instructions for the control box
  - Installation instructions for the expansion valve kit
  - Format: paper (in the box of the control box)

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

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

Technical engineering data

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

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

A2L **WARNING: MILDLY FLAMMABLE MATERIAL**

The refrigerant inside this unit is mildly flammable.

CAUTION

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

NOTICE

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

INFORMATION

Indicates useful tips or additional information.

Symbols used on the unit:

Symbol	Explanation
	Before installation, read the installation and operation manual, and the wiring instruction sheet.
	Before performing maintenance and service tasks, read the service manual.

2 Specific installer safety instructions

Always observe the following safety instructions and regulations.

General

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.

Unit installation (see "13 Unit installation" [▶ 21])

WARNING

The fixing method MUST be in accordance with the instructions from this manual. See "13 Unit installation" [▶ 21].

Refrigerant piping installation (see "14 Piping installation" [▶ 23])

WARNING

Field piping MUST be in accordance with the instructions from this manual. See "14 Piping installation" [▶ 23].

WARNING

Only systems using R32 or R410A refrigerant can be used with the control box (EKEA) and the expansion valve kit (EKEXVA).

CAUTION

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

Electrical installation (see "15 Electrical installation" [▶ 25])

WARNING

Electrical wiring MUST be in accordance with the instructions from this manual. See "15 Electrical installation" [▶ 25].

DANGER: RISK OF ELECTROCUTION

WARNING

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

WARNING

ALWAYS use multicore cable for power supply cables.

WARNING

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

WARNING

- 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.
- Do NOT use taped wires, extension cords, or connections from a star system. They can cause overheating, electrical shocks or 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.

Commissioning (see "17 Commissioning" [▶ 32])

WARNING

Commissioning MUST be in accordance with the instructions from this manual. See "17 Commissioning" [▶ 32].

2.1 Instructions for equipment using R32 refrigerant

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 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).

WARNING

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

WARNING

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

WARNING

For the determination of the total conditioned space area, only consider spaces that are continuously served. Spaces where the airflow rate can be limited by zoning dampers must NOT be included in the determination of the total area. Only exceptions are zoning dampers used specifically for fire safety.

CAUTION

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

NOTICE

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

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

3 User safety instructions

Always observe the following safety instructions and regulations.

3.1 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.

3.2 Instructions for safe operation

CAUTION

Do NOT leave the front door of the EKEA control box open. Some parts inside are dangerous to touch and appliance problems may occur. For checking and adjusting the internal parts, contact your dealer.

4 About the system

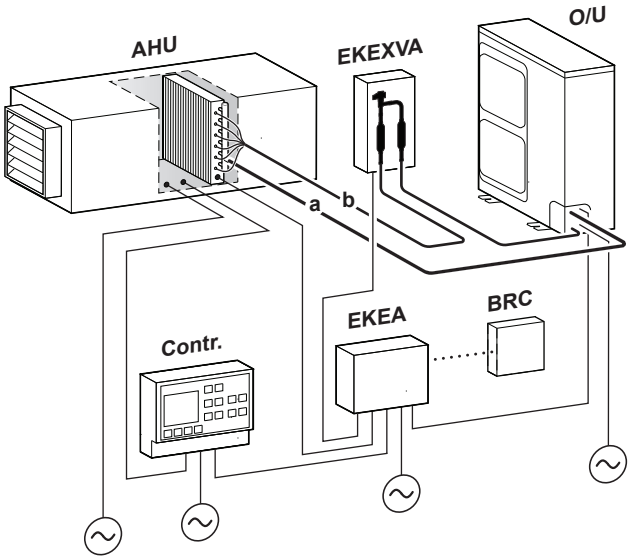
A2L **WARNING: MILDLY FLAMMABLE MATERIAL**

The R32 refrigerant (if applicable) in this unit is mildly flammable. Refer to the outdoor unit specifications for the type of refrigerant to be used.

4.1 System layout

INFORMATION

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



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.

5 Operation

The operating temperature of the control box and the expansion valve kit is between –20°C and 52°C.

6 Maintenance and service

WARNING

- Only qualified service persons are allowed to perform maintenance.
- Before obtaining access to terminal devices, all power supply circuits must be interrupted.
- Water or detergent may deteriorate the insulation of electronic components and result in burn-out of these components.

7 Troubleshooting

To set up the system and make troubleshooting possible, it is required to connect the remote controller to the control box.

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

The system MUST be repaired by a qualified service person.

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

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

Malfunction	Measure
The system does not operate at all.	▪ Check if there is a power failure. Wait until power is restored. If power failure occurs during operation, the system automatically restarts immediately after power is restored. ▪ Check if a fuse has blown or circuit breaker is activated. Change the fuse or reset the breaker if necessary.
The system stops immediately after starting operation	▪ Check if the air inlet or outlet of the air handling unit or outdoor unit is blocked by obstacles. Remove any obstacles and make sure the air can flow freely. ▪ Check if the air filter is clogged. Contact your dealer to clean the air filter. ▪ The error signal is given and the system stops. If the error resets after 5-10 minutes, the unit safety device was activated but the unit restarted after evaluation time. If the error persists, contact your dealer.
The system operates but cooling or heating is insufficient.	▪ Check if the air inlet or outlet of the air handling unit or outdoor unit is blocked by obstacles. Remove any obstacles and make sure the air can flow freely. ▪ Check if the air filter is clogged. Contact your dealer to clean the air filter.

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.

8 Relocation

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

9 Disposal

NOTICE

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

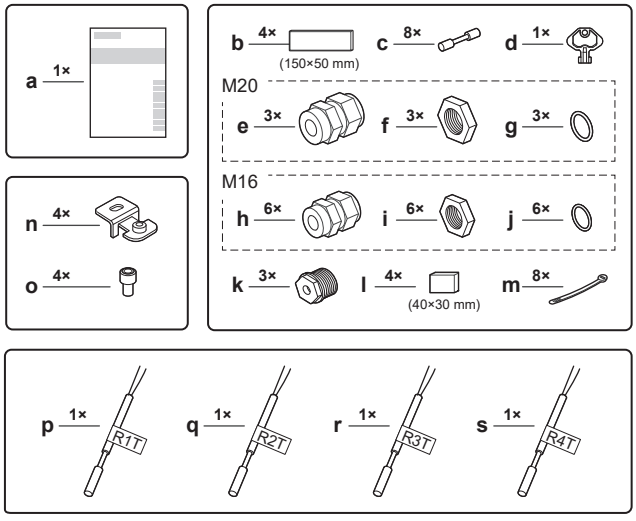
For the installer

10 About the box

10.1 Control box

10.1.1 To remove the accessories from the control box

Make sure that all accessories are available in the control box.



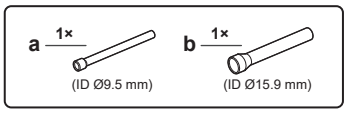
a Installation and operational manual
b Insulation tape for thermistors

c Wire-to-wire splice
d Box opening key
e Cable gland (M20)
f Nut (M20)
g O-ring (Ø20 mm)
h Cable gland (M16)
i Nut (M16)
j O-ring (Ø16 mm)
k Stopper for unused cable opening
l Insulation rubber for thermistors
m Cable tie
n Hanger bracket
o Screw for hanger bracket
p R1T: Thermistor (suction air)
q R2T: Thermistor (liquid pipe)
r R3T: Thermistor (gas pipe)
s R4T: Thermistor (discharge air)

10.2 Expansion valve kit

10.2.1 To remove the accessories from the expansion valve kit

Make sure that all accessories are available in the expansion valve kit.



a Transition pipe (inside diameter 9.5 mm)
b Transition pipe (inside diameter 15.9 mm)

You only need to use a transition pipe for certain expansion valve kits in case of R410A. See "Refrigerant piping diameter" [▸ 24].

11 About the system

A2L WARNING: MILDLY FLAMMABLE MATERIAL

The R32 refrigerant (if applicable) in this unit is mildly flammable. Refer to the outdoor unit specifications for the type of refrigerant to be used.

11.1 System layout

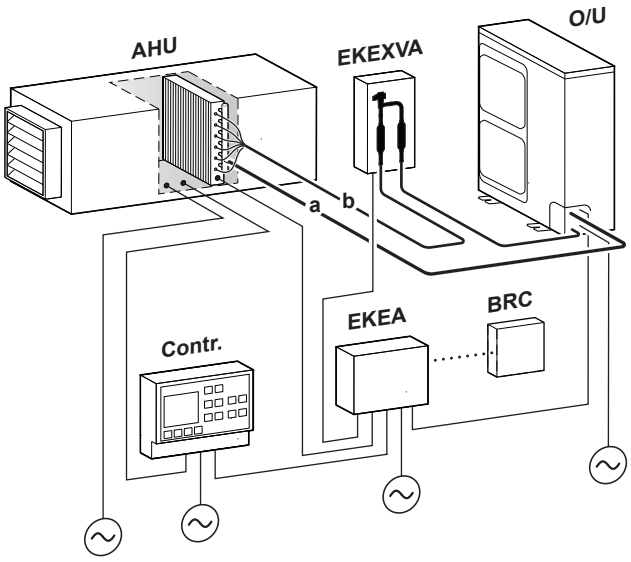
WARNING

In case of R32 refrigerant, the installation MUST comply with the requirements that apply to this R32 equipment. For more information, see:

- "2.1 Instructions for equipment using R32 refrigerant" [▸ 7]
- "12 Special requirements for R32 units" [▸ 17]

INFORMATION

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



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.

11.1.1 Pair AHU layout

In a pair AHU layout, there is one air handling unit, one or more expansion valve kits, and one or more outdoor units. There are 3 possible pair AHU layouts.

Pair AHU layout 1

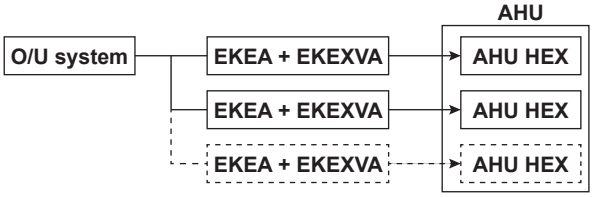
One air handling unit, one expansion valve kit, and one outdoor unit.

AHU Air handling unit
AHU HEX Heat exchanger of the air handling unit
EKEA Control box
EKEXVA Expansion valve kit
O/U Outdoor unit

Pair AHU layout 2

One air handling unit with an interlaced heat exchanger, two or three expansion valve kits, and one outdoor unit system (meaning one or more outdoor units that are connected to the same refrigerant circuit).

Note: In case of interlaced heat exchangers, the number of field wires can be reduced by using a master-slave configuration. See "11.9 Master-slave configuration" [▸ 15].



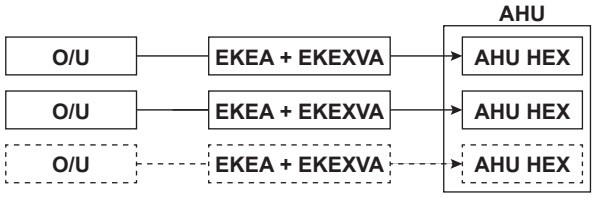
AHU Air handling unit
AHU HEX Heat exchanger of the air handling unit
EKEA Control box

EKEXVA Expansion valve kit
O/U system Outdoor unit system

Pair AHU layout 3

One air handling unit with an interlaced heat exchanger, two or more expansion valve kits, each individually connected to separate outdoor units. There is no refrigerant connection between the outdoor units.

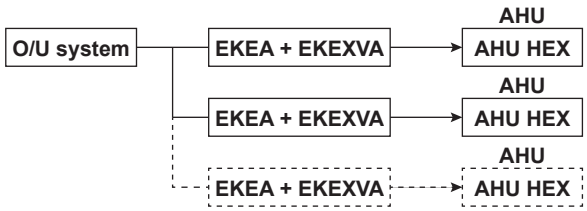
Note: In case of interlaced heat exchangers, the number of field wires can be reduced by using a master-slave configuration. See "11.9 Master-slave configuration" [▸ 15].



AHU Air handling unit
AHU HEX Heat exchanger of the air handling unit
EKEA Control box
EKEXVA Expansion valve kit
O/U Outdoor unit

11.1.2 Multi AHU layout

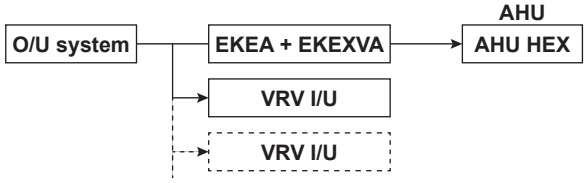
In a multi AHU layout, there are several air handling units, each with a separate expansion valve kit, connected to one outdoor unit system (meaning one or more outdoor units that are connected to the same refrigerant circuit).



AHU Air handling unit
AHU HEX Heat exchanger of the air handling unit
EKEA Control box
EKEXVA Expansion valve kit
O/U system Outdoor unit system

11.1.3 Mixed AHU layout

In a mixed AHU layout, there are one or more air handling units, each with a separate expansion valve kit, connected to one outdoor unit system (meaning one or more outdoor units that are connected to the same refrigerant circuit). Next to the expansion valve kits, also normal VRV indoor units are connected to the same outdoor unit system.



AHU Air handling unit
AHU HEX Heat exchanger of the air handling unit
EKEA Control box
EKEXVA Expansion valve kit
O/U system Outdoor unit system
VRV I/U VRV indoor unit

11.2 Possible control types

Field-supplied air handling units can be connected with a Daikin VRV outdoor unit via a control box and expansion valve kit. Each air handling unit must be connected with at least 1 control box and 1 expansion valve kit (in case of interlaced heat exchanger applications, multiple control boxes per air handling unit are possible, see "11.9 Master-slave configuration" [▸ 15]).

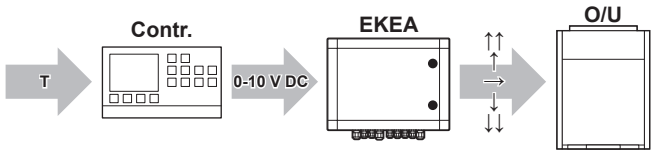
The control box allows regulating the capacity of the air handling unit in cooling and heating, using 5 possible control types:

Control type	AHU Layout	
	Pair	Multi/mix
X control	●	—
Y control	●	—
W control	●	—
Z control	●	●
Z' control	●	●

● Applicable
— Not applicable

11.2.1 X control: Operation with 0-10 V DC capacity control

For X control, a controller (field supply) needs to be connected to the EKEA control box. The controller will generate a 0–10 V DC signal that will be used by the EKEA control box for the capacity control of the system.

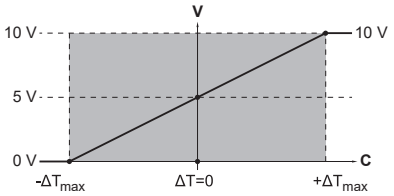


Contr. Controller (field supply)
EKEA Control box
O/U Outdoor unit
↑↑, ↑, →, ↓, ↓↓ Capacity request sent to the outdoor unit via F1F2
0-10 V DC Voltage signal
T Temperature

The system needs a controller (field supply) with a temperature sensor. The temperature sensor can be used to control the following temperatures:

- Suction air temperature of the air handling unit
- Room air temperature
- Discharge air temperature of the air handling unit

Program the controller (field supply) so that it outputs a 0–10 V DC signal based on the temperature difference between the actual measured temperature and the target temperature.



V Controller (field supply) voltage output to EKEA
ΔT [actual measured temperature]–[target temperature]
When ΔT=0, the target temperature is reached.
ΔT_{max} Maximum temperature variation as defined by the installation
Recommended value for ΔT_{max}=[2°C~5°C].

The voltage output of the controller (field supply) is a linear function with ΔT:

$$V=\frac{5\Delta T}{+\Delta T_{max}}+5$$

- If $\Delta T \leq -\Delta T_{max}$, the output must be 0 V.
- If $\Delta T \geq +\Delta T_{max}$, the output must be 10 V.

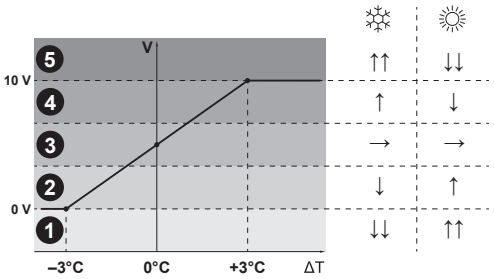
The capacity level of EKEA is updated while EKEA is stopped. So if T1T2 is used to start or stop EKEA, it is recommended to program the controller (field power supply) to output 5 V DC when EKEA is stopped.

Example

Below an example for cooling and heating operation is given.

- ΔT_{max} is selected at 3°C.
- The target room temperature is 24°C.

T	ΔT	V	Capacity level	Capacity request	
				❄	☼
20°C	–4°C	0 V	❶	↓↓	↑↑
21°C	–3°C	0 V			
22.5°C	–1.5°C	2.5 V	❷	↓	↑
24°C	0°C	5 V	❸	→	→
25.5°C	1.5°C	7.5 V	❹	↑	↓
27°C	3°C	10 V	❺	↑↑	↓↓
28°C	4°C	10 V			



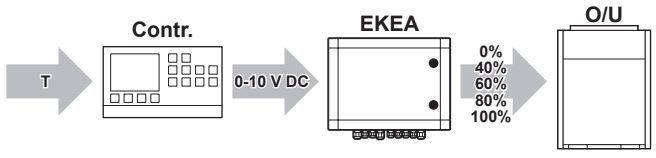
T Actual measured temperature
ΔT [Actual measured temperature]–[Target room temperature]
V Voltage output of controller (field supply).
❄ Cooling capacity request
☼ Heating capacity request
❶~❺ Capacity level
↑↑ Cooling/heating capacity strongly increases
↑ Cooling/heating capacity increases
→ Unit keeps operating at same capacity level
↓ Cooling/heating capacity decreases
↓↓ Cooling/heating capacity strongly decreases

11.2.2 Y control: Operation with fixed Te/Tc temperature control

A fixed target evaporating temperature (T_e) / condensing temperature (T_c) can be set by the customer via the field settings of the control box: see 13(23)–14 and 13(23)–15 in "16.2 Field settings" [▶ 31]. This system does not require a specific external controller.

11.2.3 W control: Operation with 0-10 V DC capacity control

For W control, a controller (field supply) needs to be connected to the EKEA control box. The controller will generate a 0–10 V DC signal that will be used by the EKEA control box for the capacity control of the system.



Contr. Controller (field supply)
EKEA Control box
O/U Outdoor unit
0%~100% Capacity control level sent to the outdoor unit via F1F2
0-10 V DC Voltage signal
T Temperature

The system needs a controller (field supply) with a temperature sensor. The temperature sensor can be used to control the following temperatures:

- Suction air temperature of the air handling unit
- Room air temperature
- Discharge air temperature of the air handling unit

The EKEA control box will interpret the 0–10 V DC signal according to 5 steps. The correlation between the voltage input and the system capacity is as follows:

Step	Voltage input[a]	System capacity[b]	T_e during cooling operation	T_c during heating operation
1	0.8 V	0% (OFF)	—	—
2	2.5 V	40%	13.5°C	31°C
3	5 V	60%	11°C	36°C
4	7.5 V	80%	8.5°C	41°C
5	9.2 V	100%	6°C	46°C

[a] Voltages shown are the centre points of each step range.
[b] The capacities mentioned in the table are not exact. The compressor frequency can vary and will have an impact on the system capacity.

- The system response to the 0–10 V DC output from the controller (field supply) is the same in cooling and heating operation. 10 V means 100% system capacity in cooling and heating operation. The controller will output a 0–10 V DC signal based on ΔT (for the definition of ΔT, see "11.2.1 X control: Operation with 0-10 V DC capacity control" [▶ 11]).
- In the table below an example is given.
  - ΔTmax is selected at 3°C.
  - A ΔT of 4°C in cooling operation means that the controller (field supply) needs to output 10 V, so that the cooling capacity will be 100%.
  - A ΔT of 4°C in heating operation means that the controller (field supply) needs to output 0 V, so that the heating capacity will be 0% (OFF).

Operation	Target temperature	Actual measured temperature	ΔT	Required system response
Cooling	24°C	28°C	+4°C	High capacity (10 V)
Heating	24°C	28°C	+4°C	No capacity (0 V)

The response of the controller (field supply) must therefore be inverted for cooling or heating operation.

11.2.4 Z control: Suction air control

This control method corresponds with standard Daikin suction air control, as for normal VRV indoor units. The cooling/heating load is determined based on the difference between the suction air temperature and the setpoint.

The setpoint can be set in two different ways (see 11(21)–12 in "16.2 Field settings" [▶ 31]):

- Using a Daikin remote controller
- Using a 0-10 V DC voltage signal on C1C2, according to the table below:

Output from controller [V] (field supply)	Output capacity level	T_{set} [°C]
<1.5	Level 1	16

Output from controller [V] (field supply)	Output capacity level	T_{set} [°C]
1.5≤x<3.5	Level 2	20
3.5≤x<6.5	Level 3	24
6.5≤x<8.5	Level 4	28
≥8.5	Level 5	32

11.2.5 Z' control: Discharge air control

Discharge air control is similar to suction air control, but the cooling/heating load is estimated by the difference between the discharge air temperature and the setpoint.

The setpoint can be set via field settings on the Daikin remote controller (see 14(24)–10 and 14(24)–11 in "16.2 Field settings" [▸ 31]).

INFORMATION

Changing the setpoint directly on the Daikin remote controller will not have effect on the discharge air temperature setpoint. The only way to change the setpoint for discharge air control, is using the field setting.

11.3 Operation signals

Input signals:

Signal	Description
C1C2: 0-10 V DC voltage signal	This signal has a different purpose based on the selected control type. See the explanation of the control types and the description of the field settings. This signal is used for X and W control, and it is optional for Z control.
T1T2: Operation ON/OFF	Open: Operation OFF
	Closed: Operation ON
T3T4: Cooling/heating	Open: Cooling
	Closed: Heating
T5T6: ▪ R410A application: AHU fan malfunction ▪ R32 application: Supply airflow rate below the legal limit (unsafe scenario)	Open: Malfunction
	Closed: No malfunction

Output signals:

Signal	Description
K1K2: Error status EKEA	Open: Error
	Closed: No error
K3K4: AHU fan instruction	Open: No fan instruction
	Closed: Fan instruction
K5K6: Compressor operation	Open: Compressor is not operating
	Closed: Compressor is operating
K7K8: Defrost operation	Open: Not in defrost or oil return operation
	Closed: In defrost or oil return operation
K9K10: R32 alarm	Open: No alarm
	Closed: Alarm

T1T2

The reaction of EKEA on the T1T2 input signal can be configured with field setting 12(22)–1 (see "16.2 Field settings" [▸ 31]).

T3T4

To use the T3T4 input signal:

- See 11(21)–13 in "16.2 Field settings" [▸ 31].
- See "16.1 To configure the control box" [▸ 29].
- When you want to use T3T4 on the EKEA master, this EKEA master must be set as the cooling/heating master first. See the user reference guide of the remote controller.

T5T6

In case of R410A applications or R32 applications where no safety measures are required, the T5T6 input can be short-circuited with a physical short-circuit bridge, in case the AHU is not predisposed to use this input.

Note: It is recommended to always use this input to inform the EKEA control box about AHU fan malfunctions. This increases the reliability of the entire system.

In case of R32 applications where safety measures are required, the following applies:

To send the T5T6 safety signal from the AHU controller to the EKEA control box, a normally open relay must be used.

The AHU controller must be programmed to send the T5T6 safety signal within a few seconds (maximum 2 seconds) to the EKEA control box as follows:

- Conditions for which the T5T6 input must be opened:
  - During a failure or a malfunction of the supply air fan.
  - During a failure or a malfunction of the supply air or return air isolation dampers.

    For the requirement of isolation dampers, see "11.7 Air handling unit" [▸ 15].
  - When the supplied air flow rate is below the minimum required air flow rate while K3K4 is closed (there is a fan instruction by EKEA) and during steady operation.

    To determine the minimum required air flow rate, see "12 Special requirements for R32 units" [▸ 17].
  - During power failure of the AHU.

    A normally open relay is used, so during power failure of the AHU, the T5T6 input of EKEA will automatically open.

NOTICE

If the AHU and the EKEA have a different power supply, a long-term power-off of the AHU for service or maintenance (while EKEA is powered ON) may cause a UJ-37 error. After restoring the power supply, the error will disappear after 5 minutes and normal operation of the AHU will start.

- Conditions for which the T5T6 input can be closed:
  - When the AHU is not operating.

    When the AHU stops operating, the fans will be stopped and the dampers will be closed. Therefore, the T5T6 input signal can remain closed.
  - During transient operation.

    When the fans are starting, the airflow rate is allowed to be below the minimum required limit.

K3K4

There are several ways to configure the AHU fan instruction sent by EKEA. See 12(22)-3, 12(22)-6, 12(22)-11, 13(23)-2 in "16.2 Field settings" [▸ 31].

NOTICE

When the AHU fan instruction signal is activated, the air handling unit and fan must operate.

K9K10

To use the K9K10 output signal, see 15(25)-15 in "16.2 Field settings" [▶ 31].

11.4 Remote controller for EKEA

Compatible remote controller

BRC1H or newer.

When is a remote controller needed?

In general, for EKEA a remote controller does not need to be connected during normal operation. During configuration and servicing, it is required to connect a remote controller.

There are two exceptions for which a remote controller is needed during normal operation:

- In case of Z control, when the C1C2 signal is not used to set the setpoint.
- In case of EKEAs in remote controller group control (i.e. when multiple EKEAs are connected to one remote controller):
  - Master-slave configuration (i.e. multiple EKEAs for a single air handling unit) ⇒ interlaced heat exchanger
  - Multiple air handling units with one EKEA per air handling unit

NOTICE

In case of X, Y, W, Z' control, changing the setpoint of the remote controller, will have no effect on the capacity control.

In cases where a remote controller is not required during normal operation, it may be decided to disconnect the remote controller. Keep the following items in mind:

- To disconnect the remote controller, follow the steps explained in "16.1 To configure the control box" [▶ 29].
- It is advised to use the following optional input signals in this situation:
  - T1T2: To start or stop EKEA
  - T3T4: To set cooling/heating (if EKEA is the cooling/heating master of the system)

Remote controller group control

Follow the instructions from the manual of the remote controller to use remote controller group control on EKEA. For normal indoor units, the unit number can be verified by checking fan operation visually. For EKEA, this can be done by checking the fan instruction signal K3K4.

11.5 Selection of the expansion valve kit

Use the following table to select the expansion valve based on the cooling and the heating capacity of the AHU heat exchanger:

EKEXVA capacity class	Allowed heat exchanger capacity (kW)			
	Cooling[a]		Heating[b]	
	Min.	Max.	Min.	Max.
50	5	6.2	5.6	7
63	6.3	7.8	7.1	8.8
80	7.9	9.9	8.9	11.1
100	10	13.1	11.2	14.7
125	13.2	15.4	14.8	17.3
140	15.5	21.0	17.4	23.6
200	21.1	24.6	23.7	27.7
250	24.7	30.8	27.8	34.7
300	30.9	36.9	34.8	41.5
350	37.0	44.0	41.6	49.5
400	44.1	49.5	49.6	55.7
450	49.6	55.4	55.8	62.4
500	55.5	61.6	62.5	69.3

[a] Cooling:
- Saturated suction temperature (SST) = 6°C
- Air temperature = 27°C DB/19°C WB
- Superheat (SH) = 5 K

[b] Heating:
- Saturated suction temperature (SST) = 46°C
- Air temperature = 20°C DB
- Subcool (SC) = 3 K

NOTICE

- The expansion valve (electronic type) is controlled by the thermistors that are added in the refrigerant circuit. Each expansion valve can control a range of air handling unit sizes.
- Extraneous substances (including mineral oils or moisture) must be prevented from getting mixed into the system.
- SST: Saturated suction temperature at exit of air handling unit.

11.6 Outdoor unit

11.6.1 Possible outdoor units

Outdoor unit	AHU Layout		
	Pair	Multi	Mix
ERQ (HP)	●	—	—
VRV HP	●	●	●
VRV HR	N/A	●[a]	●

[a]
- Only possible in case of Z and Z' control.
- VRV HR is not possible with master-slave configuration.

● Allowed
— Not allowed
N/A Not applicable
HP Heat pump
HR Heat recovery

11.6.2 ERQ outdoor units

The control box can only be connected to an ERQ outdoor unit in pair AHU layout. Only one expansion valve kit EKEXVA63~250 can be used per control box and per air handling unit.

ERQ	EKEXVA
100	63~125
125	63~140
140	80~140
200	100~250
250	125~250

11.6.3 VRV outdoor units

The control box can be connected to some types of VRV outdoor units (see the Engineering Data Book for outdoor units that are in scope) with a maximum number of 3 connectable control boxes to one outdoor system in case of X,Y,W control. In case of Z and Z'-control, the number of boxes depends on connection ratio and capacity of the outdoor unit. A single control box can only be combined with one expansion valve kit.

11.7 Air handling unit

NOTICE

- For R410A: The design pressure of the connected air handling unit MUST be minimum 4.0 MPa (40 bar).
- For R32: The design pressure of the connected air handling unit MUST be minimum 4.17 MPa (41.7 bar).

NOTICE

The connected air handling unit MUST comply with the requirements of the International Standard IEC 60335-2-40:2022.

NOTICE

The supply and extract air shall be directly ducted to the conditioned space. Open areas such as false ceilings shall NOT be used as a return air duct.

NOTICE

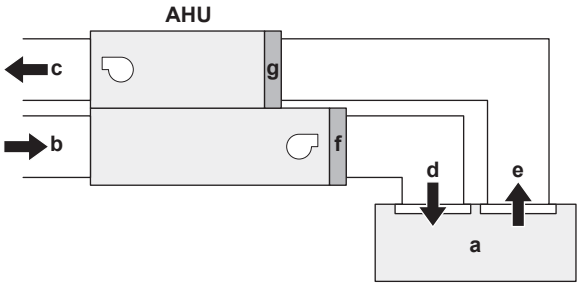
EKEA and EKEXVA are only parts of an air handling unit system, complying with partial unit requirements of the International Standard IEC 60335-2-40:2022. As such, they must ONLY be connected to other units that have been confirmed as complying to corresponding partial unit requirements of this International Standard.

For installation of the air handling unit, see the air handling unit installation manual.

The connected air handling unit must be designed for R410A or R32 applications.

In case of R32 systems that require safety measures, take the following safety requirements into account:

- The air handling unit must be capable of supplying a minimum airflow rate (Q_{min}) for R32 safety. See "Figure 2" [▶ 3]. Based on the conditioned space and the refrigerant amount, the air handling unit should make sure it operates only in the circulation airflow region (zone 1 in "Figure 2" [▶ 3]). Continuous monitoring of the supply air flow rate is essential to ensure the safety of conditioned spaces, and preventing the potential dangers associated with high refrigerant concentrations
- The air handling unit must be equipped with supply and return air isolation dampers.



AHU Air handling unit
a Conditioned space
b Outdoor air
c Exhaust air
d Supply air
e Extract air
f Supply damper
g Return damper

- The presence of dampers will allow to:
  - Block the mixture of air and refrigerant going inside the building, in the case of a leak;
  - Establish a safe situation even though the compressor of the VRV system would continue operating (e.g. defrost operation)
- The air handling unit should be able to output an additional signal to T5T6 (R32 safety related), in case the airflow rate supplied by the air handling unit would drop below legal requirements. The air handling unit must be able to check the current airflow rate and compare it to the minimum airflow rate (Q_{min}). See T5T6 specifications in "11.3 Operation signals" [▶ 13].
- When the fans of the air handling unit are stopped, the supply and return isolation dampers need to close.

11.8 Connection ratio and heat exchanger volume limitations

Connection ratio and heat exchanger volume limitations for pair and multi AHU layouts

The connection ratio limit depends on the AHU layout.

For pair and multi AHU layouts, the lower limit of the connection ratio is 75% in general. However, if more strict requirements for the heat exchanger volume are satisfied, the lower limit of the connection ratio is 65%.

See the manual of the outdoor unit for more detailed information.

For ERQ, these connection ratio limitations are NOT applicable. Follow the combination table in "11.6.2 ERQ outdoor units" [▶ 14] instead.

Heat exchanger volume limitations

The limitations for the volume of the AHU heat exchanger are shown in the table below. In case of pair and multi AHU layouts, for connection ratios between 65% and 75%, more strict limitations are applicable.

In case of ERQ, follow the general limits in the table below to get the minimum heat exchanger volume.

Capacity class	Minimum heat exchanger volume [dm³]	
	General limits	(65%≤CR<75%) Only for pair and multi AHU layouts
50	0.95	1.09
63	1.02	1.18
80	1.42	1.64
100	1.51	1.74
125	1.98	2.29
140	2.54	2.94
200	3.02	3.49
250	3.97	4.58
300	4.53	5.23
350	5.48	6.32
400	6.04	6.97
450	6.99	8.07
500	7.55	8.72

CR Connection ratio

11.9 Master-slave configuration

In case of interlaced heat exchanger applications, a master-slave configuration of EKEA can be used to reduce the number of cables installed in the field. This is achieved by having a unique master

control box, which has all the external inputs/outputs (I/O), and several slaves with a limited number of external I/O.

In case it is decided not to use the master-slave configuration, all wiring connections must be performed.

The master-slave function is activated via a field setting and can only be used with X, Y and W control (all connected EKEAs must be set to the same control type). Only one EKEA can be set as master, the rest of the connected EKEAs must be set to slaves (for more information see the field setting 14(24)-3 in "16.2 Field settings" [▸ 31]). The maximum number of EKEAs that can be connected together is limited to 10 (including the master EKEA).

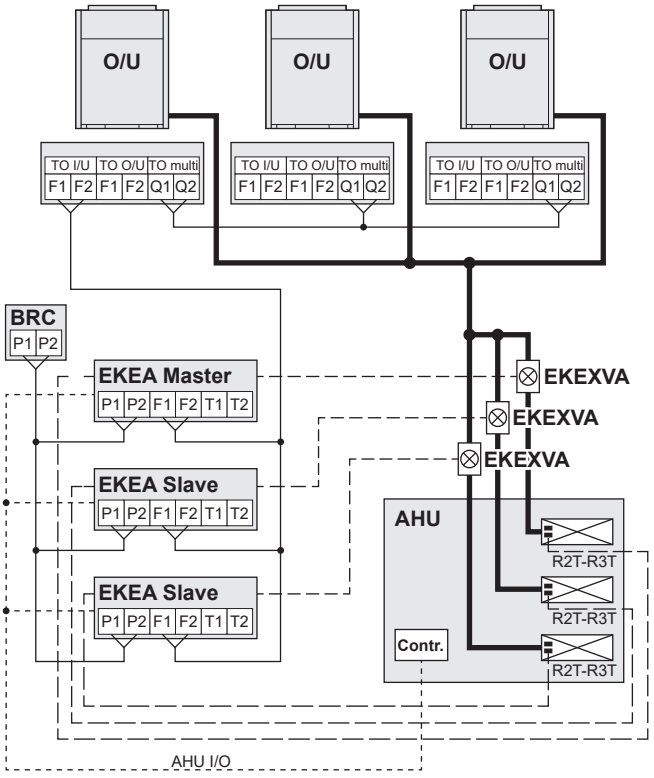
The communication between the master and the slave EKEA control boxes is achieved in part via P1P2 and in part via additional physical wires. Therefore, to be able to use this functionality, a remote controller must always be connected (see "11.4 Remote controller for EKEA" [▸ 14]). The number of signals shared over the physical cable depends on the system layout.

There are two main system layouts in case of interlaced heat exchanger applications:

- Separate refrigerant circuits system
- Combined refrigerant circuit system

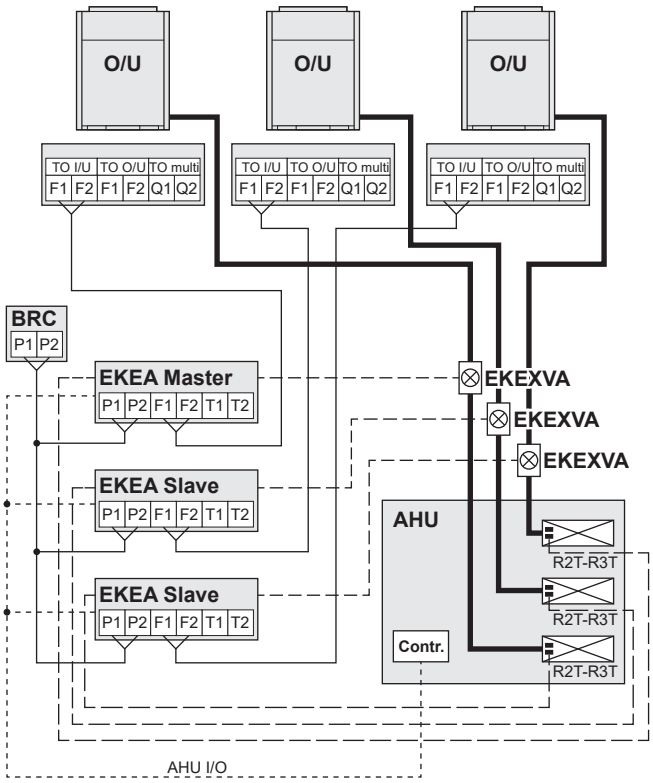
The figures below show examples of both systems. The systems that are shown in the examples each have three outdoor units, but this is just for illustrative purposes.

Example combined refrigerant circuit system:



——/— — —/- - -	Electrical wiring
———	Refrigerant piping
AHU	Air handling unit
AHU I/O	Air handling unit input/output signals
BRC	Remote controller
Contr.	Controller (field supply)
EKEA	Control box
EKEXVA	Expansion valve kit
Master	Master
O/U	Outdoor unit
Slave	Slave
TO I/U	Interconnecting wiring to indoor units (and EKEAs)
TO multi	Interconnecting wiring between the outdoor units in the same piping system
TO O/U	Interconnecting wiring to other systems

Example separate refrigerant circuits system:



For the combined refrigerant circuit, there can be one or more outdoor units that are connected to the same refrigerant circuit.

For the separate refrigerant circuits, there is always more than one outdoor unit, so the number of outdoor units for this system is two or more.

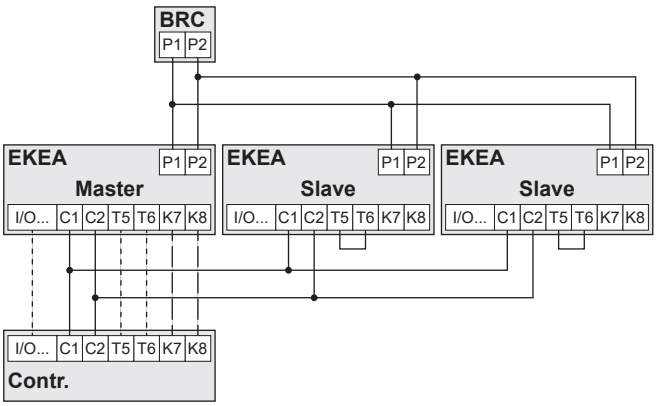
Additionally, there may be other electrical connections in reality that are not shown in these examples. These are left out to make the figure more clear. See other parts of the manual to find out which electrical connections are required, and see the manual of the outdoor unit for more information about the system.

Note:

- The remote controller is used to share signals between the master and the slave EKEAs. To ensure proper functioning, the master EKEA must have the lowest unit number of the remote controller group. See the user reference guide of the remote controller for instructions on how to change the unit number.
- When you want to use T3T4 on the EKEA master, this EKEA master must be set as the cooling/heating master first. See:
  - User reference guide of the remote controller
  - "16.1 To configure the control box" [▸ 29]

11.9.1 Combined refrigerant circuit system

The figure below shows how the inputs and outputs must be connected in case of a combined refrigerant circuit system. This means that the expansion valve kits of the EKEAs configured as master and slave, are connected to the same refrigerant circuit.



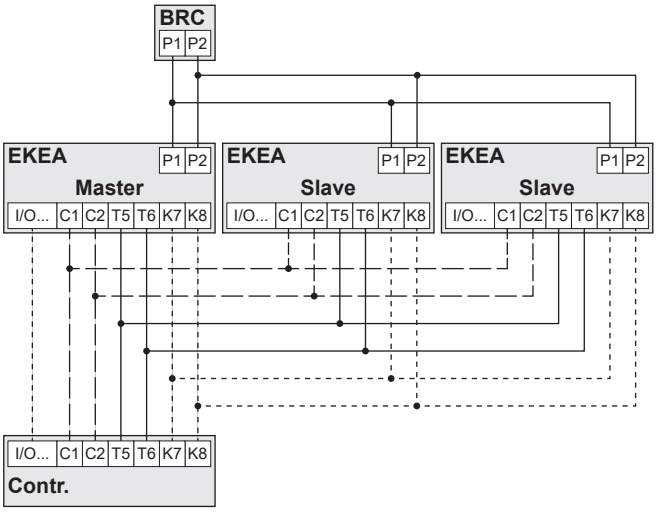
BRC Remote controller
Contr. Controller (field supply)
EKEA Control box
I/O... Other input/output signals
Master Master
Slave Slave

Notes:

- The P1P2 connection between the remote controller, the EKEA master and the EKEA slaves is always required.
- All other connections are optional depending on the situation:
  - In general, all inputs and outputs only need to be connected to the EKEA master.
  - If C1C2 is used, it needs to be connected to the EKEA master and to all EKEA slaves.
  - If T5T6 is used, it only needs to be connected to the EKEA master, the connection can be short-circuited on the EKEA slaves.
  - If T5T6 is not used, the connection needs to be short-circuited on the EKEA master and on all EKEA slaves, see "11.3 Operation signals" [▸ 13].
  - If K7K8 is used, it only needs to be connected to the EKEA master.
- There are other electrical connections to the EKEA control box that are not shown in the figure, these are left out for the clarity of the figure.

11.9.2 Separate refrigerant circuits system

The figure below shows how the inputs and outputs must be connected in case of a separate refrigerant circuit system. This means that the expansion valve kits of the EKEAs configured as master and slave, are connected to different refrigerant circuits.



BRC Remote controller
Contr. Controller (field supply)
EKEA Control box
I/O... Other input/output signals
Master Master
Slave Slave

Notes:

- The P1P2 connection between the remote controller, the EKEA master and the EKEA slaves is always required.
- All other connections are optional depending on the situation
  - In general, all inputs and outputs only need to be connected to the EKEA master.
  - If C1C2 is used, it needs to be connected to the EKEA master and to all EKEA slaves.
  - If T5T6 is used, it needs to be connected to the EKEA master and to all EKEA slaves.
  - If T5T6 is not used, the connection needs to be short-circuited on the EKEA master and on all EKEA slaves, see "11.3 Operation signals" [▸ 13].
  - If K7K8 is used, it needs to be connected to the EKEA master and to all EKEA slaves.
- There are other electrical connections to the EKEA control box that are not shown in the figure, these are left out for the clarity of the figure.

12 Special requirements for R32 units

INFORMATION

Also read the precautions and requirements in "2.1 Instructions for equipment using R32 refrigerant" [▸ 7].

For the safe operation of systems containing R32, make sure to meet the requirements as shown in the graphs and tables at the beginning of this manual:

"Figure 1" [▸ 2]:

English	Translation / description
1: Requirements for spaces served by AHU (m_c≤16 kg)	1: Requirements for spaces served by air handling unit (m_c≤16 kg)
A_{min_room}	Required minimum room area
but not less than	but not less than
h_0	h_0 ≥0.6 m Release height, which is the vertical distance in meters from the floor to the point of release
LFL	Lower flammability limit = 0.307 kg/m³ for R32
m_c	Total system charge of the larger refrigerant circuit
Measures must be provided following figures 2 and 3	Measures must be provided following figures 2 and 3
No R32 safety requirements	No R32 safety requirements
valid for m_c>1.84 kg	valid for m_c>1.84 kg

"Figure 2" [▸ 3]:

English	Translation / description
2: Minimum circulation airflow	2: Minimum circulation airflow
LFL	Lower flammability limit = 0.307 kg/m³ for R32
m_c	Total system charge of the larger refrigerant circuit
Q [m³/h]	Circulation airflow rate

English	Translation / description
$Q_{min}=60\times m_c/LFL$	Minimum required supply airflow rate
Zone 1: $Q>Q_{min}$	Zone 1: $Q>Q_{min}$
Zone 2: Actions required	Zone 2: Actions required (IEC 60335-2-40:2022 Annex GG.9.2)

"Figure 3" [▶ 4]:

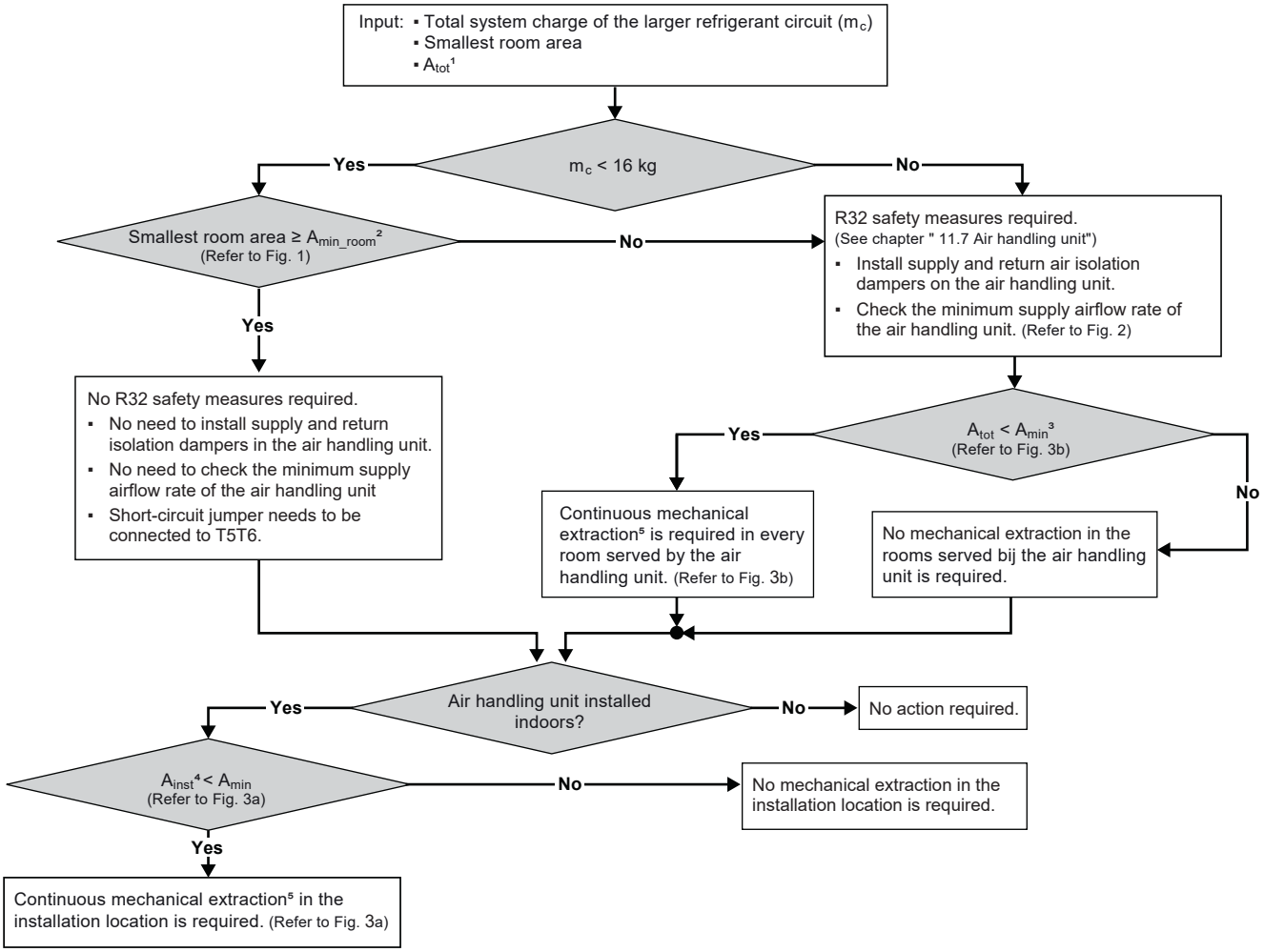
English	Translation / description
260LFL	Absolute maximum for the total refrigerant charge in the system
$50\%LFL\times H\times(A_{tot}$ or $A_{inst})$ (valid for $m_c>1.84$ kg)	Maximum refrigerant charge to prevent mechanical extraction $50\%LFL\times H\times(A_{tot}$ or $A_{inst})$ (valid for $m_c>1.84$ kg)
A_{inst}	Installation space area
A_{min}	Minimum A_{tot} or A_{inst} (based on total refrigerant charge) to prevent mechanical extraction
A_{tot}	Total conditioned space area A_{tot} is the sum of the floor areas of all the spaces connected by ducts to the air handling unit. Spaces where the airflow can be limited by zoning dampers, must NOT be included in the determination of A_{tot}.
H	Height of the room = 2.2 m
LFL	Lower flammability limit = 0.307 kg/m³ for R32
m_c	Total system charge of the larger refrigerant circuit
3a: Requirements for AHU installation location (only applicable for indoor installations)	3a: Requirements for air handling unit installation location (only applicable for indoor installations)
Zone 1: No action required	Zone 1: No action required
Zone 2: Additional ventilation in the installation location required	Zone 2: Additional ventilation in the installation location required
Zone 3: Out of scope standard	Zone 3: Out of scope standard (IEC 60335-2-40:2022)
3b: Requirements for spaces served by AHU	3b: Requirements for spaces served by air handling unit
Zone 1: Only circulation airflow required	Zone 1: Only circulation airflow required
Zone 2: Circulation airflow + Mechanical extraction	Zone 2: Circulation airflow + Mechanical extraction
Zone 3: Out of scope standard	Zone 3: Out of scope standard (IEC 60335-2-40:2022)

12.1 Conditioned space requirements

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

12.2 Determination of the safety requirements

Once the total refrigerant in the system has been determined, use the flowchart below to establish the R32 safety requirements.
The flowchart shows the different scenarios from a safety point of view, considering the total system charge of the larger refrigerant circuit (m_c), the smallest room area, the total conditioned space area (A_{tot}), and the area of installation location (A_{inst}) in case of indoor installations.



1 A_{tot} = Total conditioned space area
A_{tot} is the sum of the floor areas of all the spaces connected by ducts to the air handling unit. Spaces where the airflow can be limited by zoning dampers, must NOT be included in the determination of A_{tot}.

2 A_{min_room}
Required minimum room area (A_{min_room} is directly related to the total system charge and is determined according to figure 1)

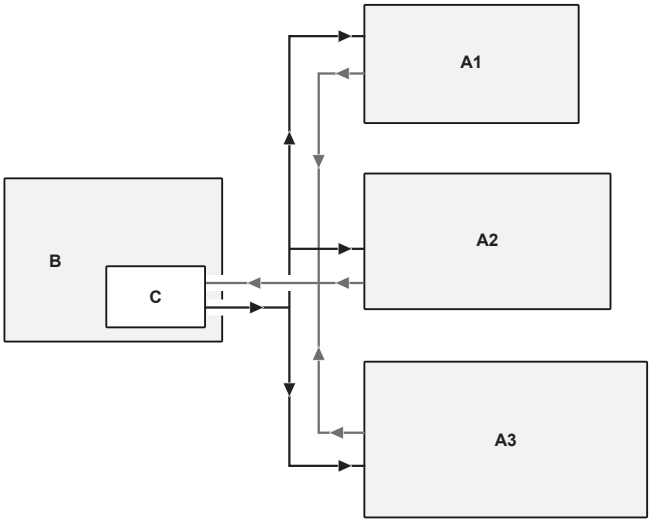
3 A_{min}
Minimum A_{tot} or A_{inst} to prevent mechanical extraction
(A_{tot} and A_{inst} are directly related to the total system refrigerant charge and are determined according to Figures 3b or 3a respectively)

4 A_{inst}
Installation space area

5 The lower edge of the openings extracting air from the room cannot be more than 100 mm above the floor.

Note: In case the air handling unit is installed indoors, see figure 3a to determine if additional ventilation in the installation space is required.
Note: In case of air handling units consisting of multiple modules, the space with a ventilation module connected to a DX module in such a way that potential leakage could flow into the space served by the ventilation module must meet the same R32 safety requirements as the space served by the DX module.

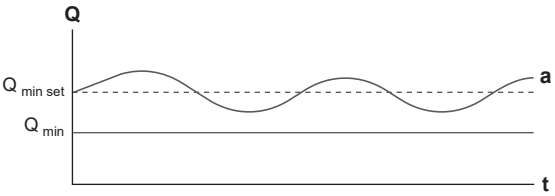
Clarification figure of the smallest room area, the total conditioned space area, and the area of installation location.



A1 Floor area of conditioned room 1 and smallest room area
A2 Floor area of conditioned room 2
A3 Floor area of conditioned room 3
A_{tot} = A1 +A2 + A3
B Floor area of the installation location
C Air handling unit (AHU)

For R32 applications requiring a minimum airflow (Q_{min}) as a safety measure, the AHU manufacturer must ensure that the AHU supply air flow rate is set in such a way that its potential fluctuation during normal operation cannot make its value go below Q_{min} , triggering the air flow rate malfunction error on the EKEA.

Example: Q_{min_set} = Q_{min} + 10% Q_{min}



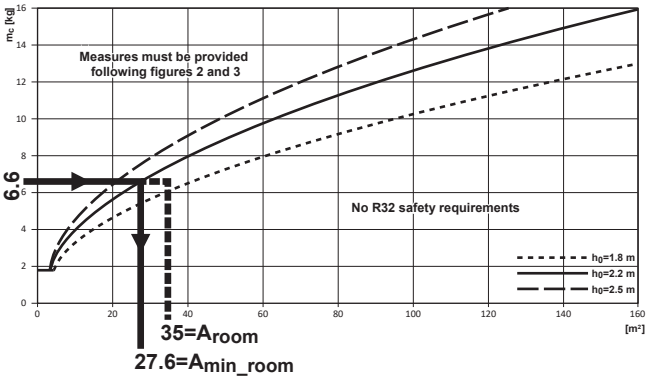
Q_{min} Minimum required supply airflow rate
Q_{min_set} Minimum air flow rate set on the AHU
a Actual air flow rate

12.2.1 Example 1

Installation of 6 HP R32 system:

- Total conditioned space area: 100 m²
- Smallest room area: 35 m²
- Release height (h_0): 2.2 m
- Total refrigerant charge: 6.6 kg
- Outdoor installation of air handling unit

1: Requirements for spaces served by AHU (m_c ≤16 kg)



Based on figure 1, no R32 safety measures are required (A_{room}>A_{min_room}).

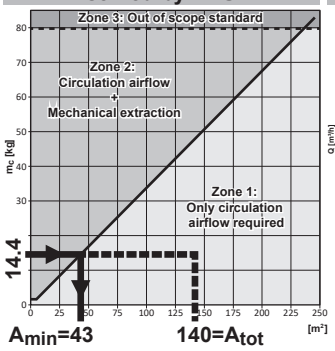
12.2.2 Example 2

Installation of 8 HP R32 system:

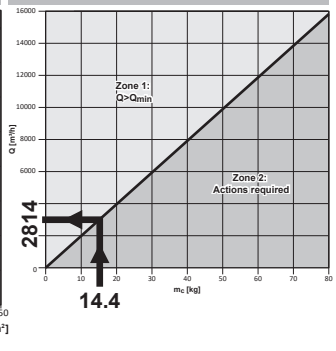
- Total conditioned space area: 140 m²
- Smallest room area: 50 m²
- Release height (h_0): 2.2 m
- Total refrigerant charge: 14.4 kg
- Outdoor installation of air handling unit

Based on the smallest room area, "Figure 1" [▸ 2] indicates to follow the requirements in figures 2 and 3.

3b: Requirements for spaces served by AHU



2: Minimum circulation airflow



- Based on figure 3b, only circulation airflow is required (A_{tot}>A_{min}).
- Based on figure 2, the minimum circulation airflow needs to remain above 2814 m³/h.

Conclusion: As long as the supplied airflow rate is above the minimum legal requirement (2814 m³/h), no additional limitations apply to this VRV R32 system.

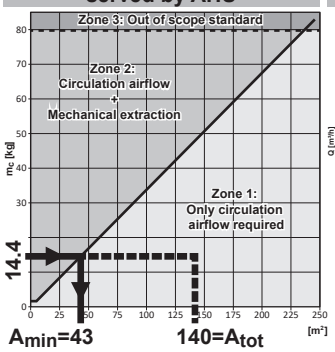
12.2.3 Example 3

Installation of 8 HP R32 system:

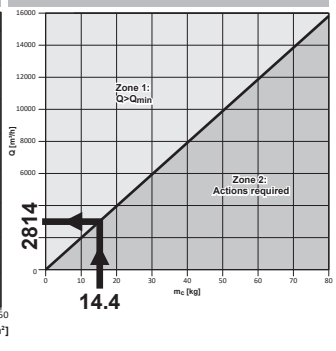
- Total conditioned space area: 140 m²
- Smallest room area: 50 m²
- Release height (h_0): 2.2 m
- Total refrigerant charge: 14.4 kg
- Indoor installation of air handling unit in a space of 20 m²

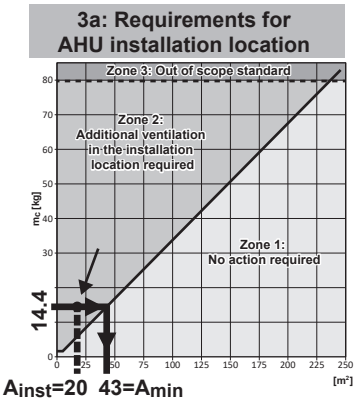
Based on the smallest room area, "Figure 1" [▸ 2] indicates to follow the requirements in figures 2 and 3.

3b: Requirements for spaces served by AHU



2: Minimum circulation airflow





- Based on figure 3b, only circulation airflow is required ($A_{tot}>A_{min}$).
- Based on figure 2, the minimum circulation airflow needs to remain above 2814 m³/h.
- Based on figure 3a, additional ventilation in the installation location is required ($A_{inst}<A_{min}$).

  Note: Figure 3a is only applicable if the air handling unit is installed indoors.

Calculation of the minimum additional ventilation airflow rate (Q_{min_vent}) in the installation location:

$$Q_{min\_vent} = \frac{m_C - m_{max}}{4 \times LFL} \times 2 \times 60 = 747\ m^3/h$$

Where the allowable maximum refrigerant charge m_{max} is:

$m_{max} = 50\% \times LFL \times H \times A_{inst} = 50\% \times 0.307 \times 2.2 \times 20 = 6.75$ kg

If mechanical extraction is required, the mechanical extraction must take place to the outdoor or indoor space when the room area is larger than the minimum room area (EAmin), using the calculation formula:

$$EA_{min} = \frac{m_C - m_{max}}{CF \times LFL \times H} = \frac{m_C - m_{max}}{25\% \times 0.307 \times 2.2}$$

Note: In case of additional ventilation, the lower edge of the openings extracting air from the room cannot be more than 100 mm above the floor.

13 Unit installation

WARNING

In case of R32 refrigerant, the installation MUST comply with the requirements that apply to this R32 equipment. For more information, see:

- "2.1 Instructions for equipment using R32 refrigerant" [▶ 7]
- "12 Special requirements for R32 units" [▶ 17]

For the control box and the expansion valve kit:

- The unit can be installed indoors and outdoors, but do NOT install it in direct sunlight. Direct sunlight will increase the temperature inside the unit and may reduce its lifetime and influence its operation.
- Choose a flat and strong mounting surface.
- The operating temperature of the unit is between –20°C and 52°C.
- Do NOT install the unit in or on the outdoor unit.
- Do NOT install or operate the unit in rooms:
  - Where mineral oil, like cutting oil is present.
  - Where the air contains high levels of salt, e.g. air near the ocean.
  - Where sulphurous gas is present, e.g. in areas of hot springs.
  - In vehicles or vessels.
  - Where voltage fluctuates a lot, e.g. in factories.
  - Where high concentration of vapor or spray are present.
  - Where machines generating electromagnetic waves are present.
  - Where acidic or alkaline vapor is present.

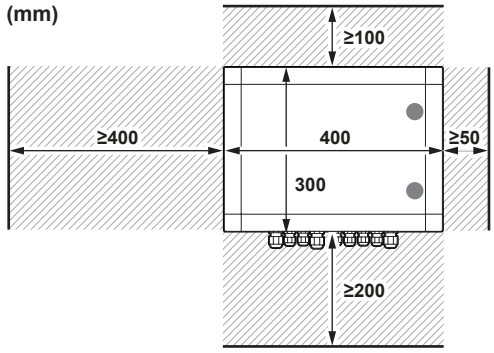
13.1 Control box

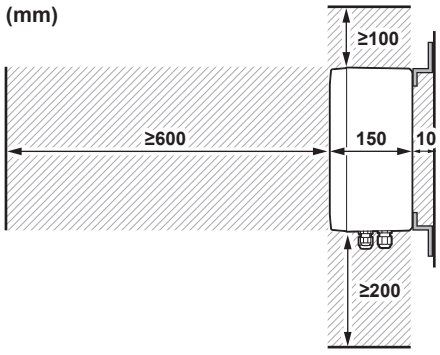
13.1.1 Installation site requirements of the control box

INFORMATION

The sound pressure level is less than 70 dBA.

Mind the following spacing installation guidelines:

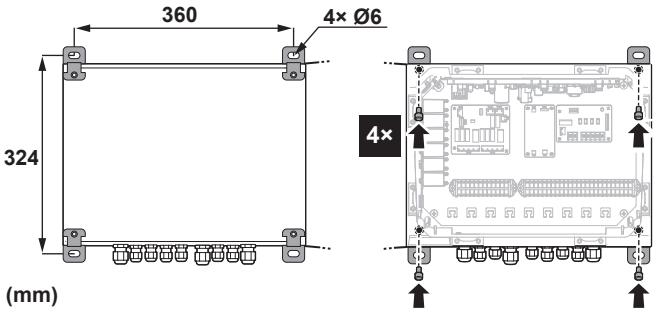




13.1.2 To install the control box

1. Open the cover with the key (delivered as accessory).
2. Attach the hanger brackets with their screws (delivered as accessory) to the control box.
3. Fix the control box with its hanger brackets to the mounting surface.

   Use 4 screws (for holes of Ø6 mm).



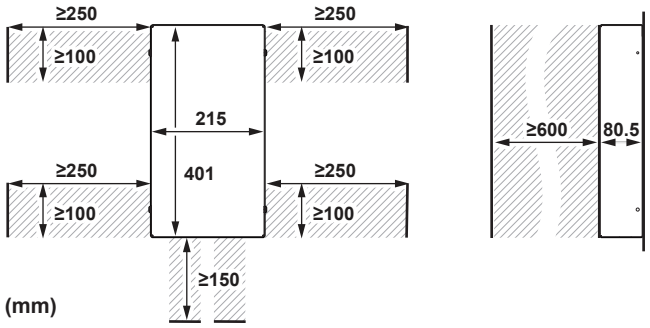
4 For electrical wiring: see "15.1.1 To connect the electrical wiring to the control box" [▸ 25].

5 Close and lock the cover after installation to ensure that the control box is watertight.

13.2 Expansion valve kit

13.2.1 Installation site requirements of the expansion valve kit

Mind the following spacing installation guidelines:

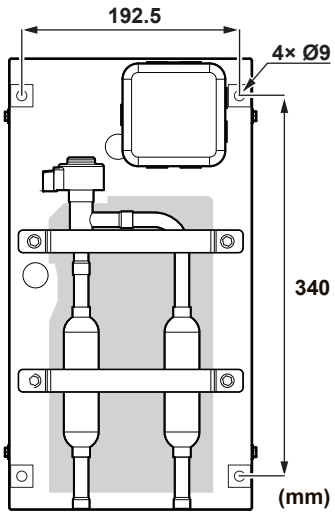


13.2.2 To install the expansion valve kit

1 Make sure that the expansion valve kit is installed vertically.

2 Remove the cover by unscrewing 4× M5.

3 Drill 4 holes on the correct position (measurements as indicated in figure below) and fix the expansion valve kit securely with 4 screws through the provided holes Ø9 mm.



13.3 Thermistors

13.3.1 Location of the thermistors

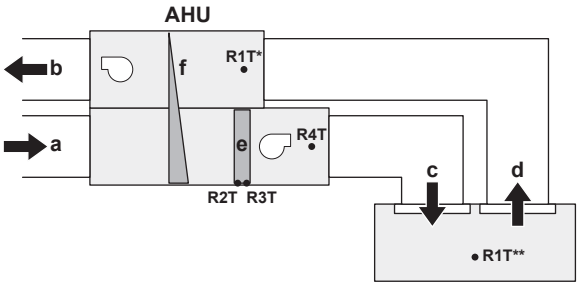
Different thermistors need to be installed depending on the control type. Follow the table below for this.

Thermistor	Control type				
	X	Y	W	Z	Z'
R1T: Suction air	—	—	—	•	•
R2T: Liquid pipe	•	•	•	•	•
R3T: Gas pipe	•	•	•	•	•
R4T: Discharge air	—	—	—	—	•

• Required
— Not required

Correct installation of the thermistors is required to ensure good operation.

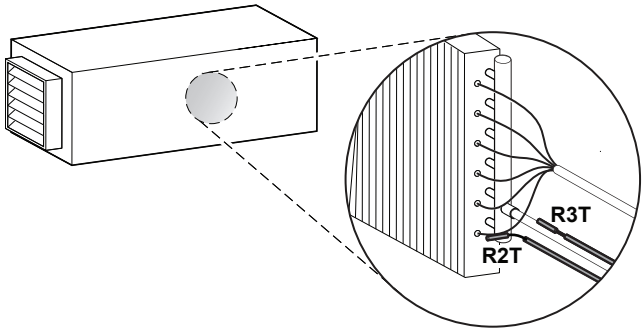
R1T	Thermistor (suction air) Install the thermistor either in the room that needs temperature control or in the suction area of the air handling unit. **Note:** For room temperature control the delivered thermistor (R1T) can be replaced by an optional remote sensor kit (see the technical engineering data).
R2T	Thermistor (liquid pipe) Install the thermistor behind the distributor on the coldest pass of the heat exchanger (contact your heat exchanger dealer).
R3T	Thermistor (gas pipe) Install the thermistor at the gas pipe of the heat exchanger as close as possible to the heat exchanger.
R4T	Thermistor (discharge air) Install the thermistor in the discharge area of the air handling unit.



AHU Air handling unit
/* Location of R1T can be chosen.
a Outdoor air
b Exhaust air
c Supply air
d Extract air
e Heat exchanger
f Heat recovery

Evaluation must be done to check if the air handling unit is protected against freeze-up. This must be done during test operation.

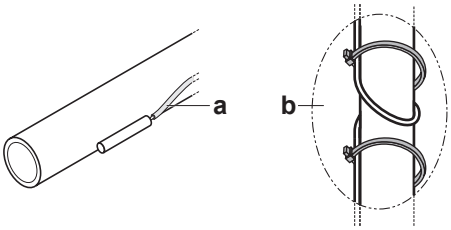
The thermistor needs to be installed in an enclosed area. Install it inside the air handling unit, or shield it to prevent it from getting touched.



13.3.2 To install the thermistor cable

1 Put the thermistor cable in a separate protective tube.

2 Always add a pull-relief to the thermistor cable to avoid strain on the thermistor cable and loosening of the thermistor. Strain on the thermistor cable or loosening of the thermistor may result in bad contact and incorrect temperature measurement.



NOTICE

- The connection must be made on an accessible location.
- To make the connection waterproof, the connection can also be made in a switch box or connector box.
- The thermistor cable must be located at least 50 mm away from power supply wire. Not following this guideline may result in malfunction due to electrical noise.

13.3.3 To install a longer thermistor cable

The thermistor is supplied with a standard cable of 2.5 m. This cable can be made longer up to 20 m.

1 Cut the wire or bundle the remainder of the thermistor cable. Keep at least 1 m of the original thermistor cable.

2 Strip the wire ±7 mm at both ends and insert these ends into the wire-to-wire splice.

3 Pinch the splice with the correct crimp tool (pliers).

4 After connection, heat up the shrink-insulation of the wire-to-wire splice with a shrink heater to make a watertight connection.

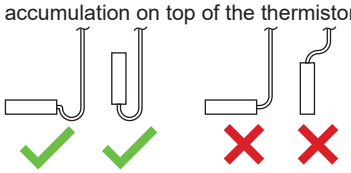
5 Wrap electrical insulation tape around the connection.

6 Put a pull-relief in front of and behind the connection.

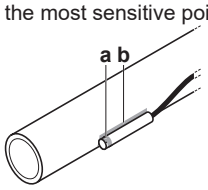
13.3.4 To fix the thermistor

1 Make sure to install as follows:

- Put the thermistor wire slightly down to prevent water accumulation on top of the thermistor.

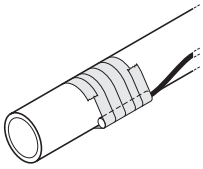


- Make good contact between thermistor and air handling unit. Put the top of the thermistors on the air handling unit, this is the most sensitive point of the thermistor.

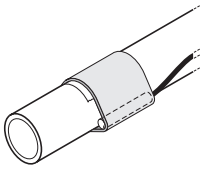


a Most sensitive point of the thermistor
b Maximise the contact

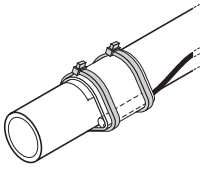
2 Fix the thermistor with insulating aluminum tape (field supply) to ensure a good heat transference.



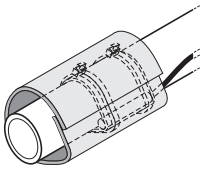
3 Put an insulation rubber (delivered as accessory) around the thermistor (R2T/R3T) to prevent loosening of the thermistor after some years.



4 Fasten the thermistor with 2 cable ties (delivered as accessory).



5 Insulate the thermistor with insulation tape (delivered as accessory).



14 Piping installation

CAUTION

See "2 Specific installer safety instructions" [▶ 6] to make sure this installation complies with all safety regulations.

14.1 Preparing refrigerant piping

14.1.1 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.

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

Refrigerant piping material

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

Outer diameter (Ø)	Temper grade	Thickness (t)[a]	
6.4 mm (1/4") 9.5 mm (3/8") 12.7 mm (1/2")	Annealed (O)	≥0.80 mm	
15.9 mm (5/8")	Annealed (O)	≥0.99 mm	
19.1 mm (3/4") 22.2 mm (7/8")	Half hard (1/2H)	≥0.80 mm	
28.6 mm (1 1/8")	Half hard (1/2H)	≥0.99 mm	

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

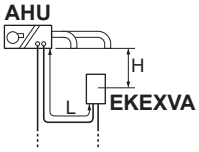
Refrigerant piping diameter

Make sure to install liquid pipe diameters in function of the expansion valve kit capacity class.

EKEXVA	Liquid pipe (mm)	
	R410A	R32
50	Ø6.4	Ø6.4
63	**Ø9.5**[a]	Ø6.4
80	**Ø9.5**[a]	Ø6.4
100	Ø9.5	Ø9.5
125	Ø9.5	Ø9.5
140	Ø9.5	Ø9.5
200	Ø9.5	Ø9.5
250	Ø9.5	Ø9.5
300	Ø12.7	Ø12.7
350	Ø12.7	Ø12.7
400	Ø12.7	Ø12.7
450	**Ø15.9**[b]	Ø12.7
500	**Ø15.9**[b]	Ø12.7

[a] Use transition pipe ID Ø9.5 mm (delivered as accessory).
[b] Use transition pipe ID Ø15.9 mm (delivered as accessory).

Refrigerant piping length and height difference



AHU Air handling unit
EKEXVA Expansion valve kit

	Requirement	Limit
H	Maximum height difference between AHU and EKEXVA	–5/+5 m (below or above the valve kit)
L	Maximum piping length between AHU and EKEXVA L is to be considered as a part of the total maximum piping length. See installation manual of the outdoor unit for piping installation.	5 m

14.1.2 Refrigerant piping insulation

- Use polyethylene foam as insulation material:
  - with a heat transfer rate between 0.041 and 0.052 W/mK (0.035 and 0.045 kcal/mh°C)
  - with a heat resistance of at least 120°C
- Insulation thickness:
  - Piping insulation must have a minimum thickness of 13 mm.
  - 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

14.2 Connecting the refrigerant piping

DANGER: RISK OF BURNING/SCALDING

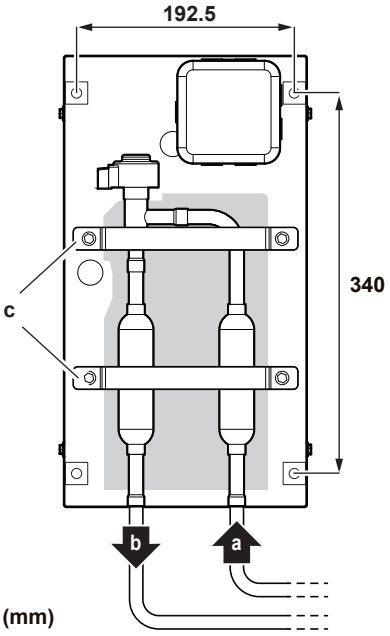
WARNING

Only brazed connections are allowed.

14.2.1 To connect the refrigerant piping

For details, see manual of the outdoor unit.

1 Prepare the inlet/outlet field piping just in front of the connection (do NOT braze yet).



a Liquid piping from outdoor unit
b Liquid piping to air handling unit
c Pipe fixing clamps

2 Remove the pipe fixing clamps (c) by unscrewing 4× M5.

3 Remove the upper and lower pipe insulations.

4 Braze the field piping.

WARNING

- Make sure to cool the filters and valve body with a wet cloth and make sure the body temperature does not exceed 120°C during brazing.
- Make sure that the other parts such as electrical box, cable ties and wires are protected from direct brazing flames during brazing.

5 After brazing, put the lower pipe insulation back in place and close it with the upper insulation cover (after peeling off the liner).

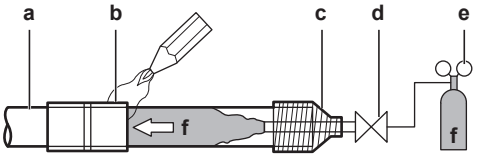
6 Secure the pipe fixing clamps (c) in place again (4x M5).

7 Make sure that field pipes are fully insulated.

Field pipe insulation must reach up to the insulation you have put back in place in step 5. Make sure that there is no gap between both ends in order to avoid condensation dripping (finish the connection with tape).

14.2.2 To braze the pipe end

- 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.

15 Electrical installation

CAUTION

See "2 Specific installer safety instructions" [▶ 6] to make sure this installation complies with all safety regulations.

15.1 Control box

15.1.1 To connect the electrical wiring to the control box

WARNING

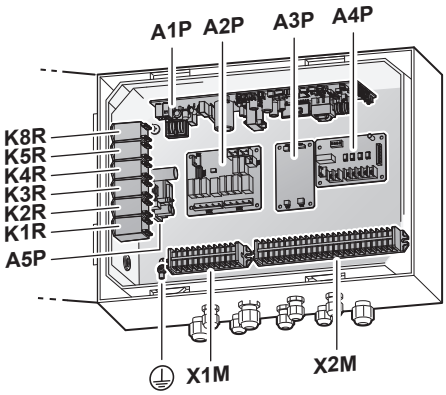
Use only specified wires, and tightly connect wires to the terminals. Keep wiring in neat order so that it does not obstruct other equipment. Incomplete connections could result in overheating, and in worst case, electric shock or fire.

WARNING

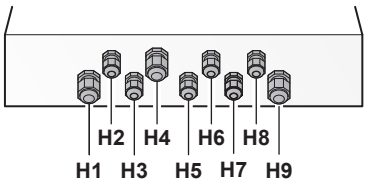
The signals on the wires connected to the control box and the expansion valve kit are NOT safety extra-low voltages and are NOT safe to touch. The wires used for the connection of the control box and the expansion valve kit MUST therefore provide double insulation.

NOTICE

Thermistor cables and remote controller wires must be kept at least 50 mm away from power supply wires and from wires to the AHU controller. Not following this guideline may result in malfunction due to electrical noise.



A1P PCB (main)
A2P PCB (relay)
A3P PCB (converter)
A4P PCB (demand)
A5P PCB (power supply)
K1R Magnetic relay (error state)
K2R Magnetic relay (fan ON/OFF)
K3R Magnetic relay (inverter operation)
K4R Magnetic relay (defrost)
K5R Magnetic relay (R32 alarm)
K8R Magnetic relay (feedback connection relay PCB to main PCB)
X1M Terminal block
X2M Terminal block



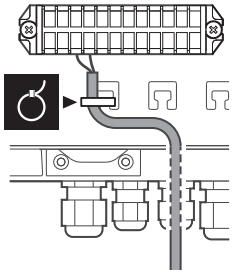
H1~H9 Cable openings / cable glands. If not used, close with stoppers (delivered as accessory). H5 is used if the master-slave function is implemented. See "11.9 Master-slave configuration" [▶ 15].

1 For all used cable openings: install cable glands (with screw nuts and O-rings)(delivered as accessory).

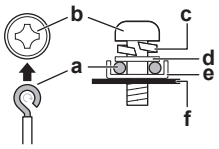
2 For all unused cable openings: close the openings with stoppers (delivered as accessory).

3 Pull the cables inside the control box through their dedicated cable glands (as shown below: H1~H9) and close the screw nut firmly in order to ensure good pull relief and water protection.

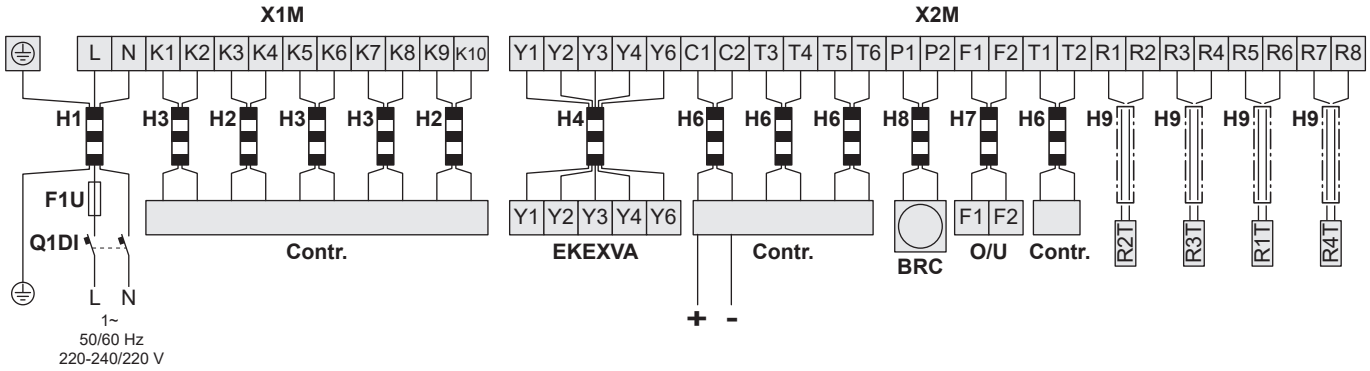
4 For all cables, provide an additional pull relief inside the control box. The figure below shows one example.



5 Connect the earth wire of the power supply to the sheet metal inside the EKEA as shown below to make sure that the earth connection is rigidly fixed.

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

6 Connect as shown in the following figure and table.



F1U	Recommended field fuse	6 A
	MCA[a]	0.22 A
Q1DI	Earth leakage circuit breaker / residual current device	MUST comply with national wiring regulation
BRC	Remote controller	
Contr.	Controller (field supply)	
EKEXVA	Expansion valve kit	
O/U	Outdoor unit	

[a] MCA=Minimum circuit ampacity. Stated values are maximum values.

Terminal	Description	Connect to	Specifications	Cable[a]		
				Cores (+ entry)	Size (mm²)[b]	Max. length (m)
L, N, earth	Power supply		220-240 V / 220 V 1~ 50/60 Hz	3 core (H1)	2.5	—
K1, K2	Error status EKEA	Controller (field supply)	Digital output (voltage free) 0-230 V AC Max. 0.5 A	6 core (H3)	0.75	[c]
K5, K6	Compressor operation					
K7, K8	Defrost operation					
K3, K4	AHU fan instruction	Controller (field supply)	Digital output (voltage free) 0-230 V AC Max. 2 A.	4 core (H2)	0.75	[c]
K9, K10	R32 alarm		Digital output (voltage free) 0-230 V AC Max. 0.5 A			
Y1~Y6	Expansion valve kit		Digital output 12 V DC	5 core (H4)	0.75	20
C1, C2[d]	0-10 V DC voltage signal[e]	Controller (field supply)	Analogue input 0-10 V DC	8 core (H6)	0.75	20[f]
T1, T2	Operation ON/OFF		Digital input 16 V DC			
T3, T4	Cooling/heating					
T5, T6	Malfunction[g]					
F1, F2	Outdoor unit		Communication line 16 V DC	2 core (H7)	0.75	100
P1, P2	BRC Wired remote controller		Communication line 16 V DC	2 core (H8)	0.75	100
R1, R2	R2T Thermistor (liquid pipe)		Analogue input 16 V DC	8 core (H9)	0.75	20
R3, R4	R3T Thermistor (gas pipe)					
R5, R6	R1T Thermistor (suction air)					
R7, R8	R4T Thermistor (discharge air)					

[a] Only use harmonised wire providing double insulation and suitable for the applicable voltage.

(b) Recommended size (all wiring MUST comply with the applicable national wiring regulation).
(c) The maximum length depends on the connected external device (controller, relay, ...).
(d) Polarity of the capacity step connection:
- C1 = plus pole
- C2 = minus pole

(e) This signal has a different purpose based on the selected control type. See the explanation of the control types and the description of the field settings. This signal is used for X and W control, and it is optional for Z control.
(f) The same limit applies to the T5T6 total length in case of master-slave configuration.
(g)
- R410A application: AHU fan malfunction
- R32 application: Circulation airflow malfunction (unsafe scenario)

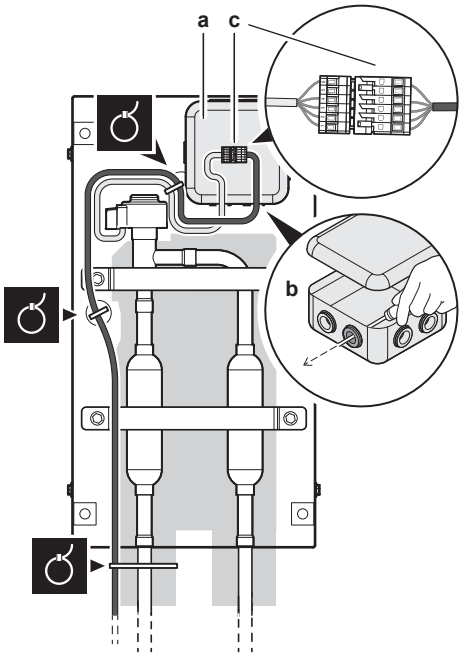
15.2 Expansion valve kit

15.2.1 To connect the electrical wiring to the expansion valve kit

1 Open the electrical box cover (a).

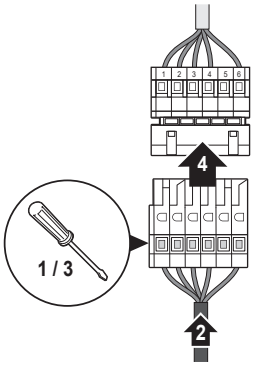
2 Push out ONLY the second lower wire intake opening (b) from inside to outside. Do NOT damage the membrane.

3 Pass the valve cable (with wires Y1~Y6) from the control box through that membrane wire intake opening and connect the cable wires into the terminal connector (c) following instructions as described in step 4. Route the cable out of the valve kit box according to figure below and fix with cable ties.



a Electrical box cover
b Second lower wire intake opening
c Terminal connector

4 Use a small screwdriver and follow indicated instructions for connecting cable wires into the terminal connector according to the wiring diagram.



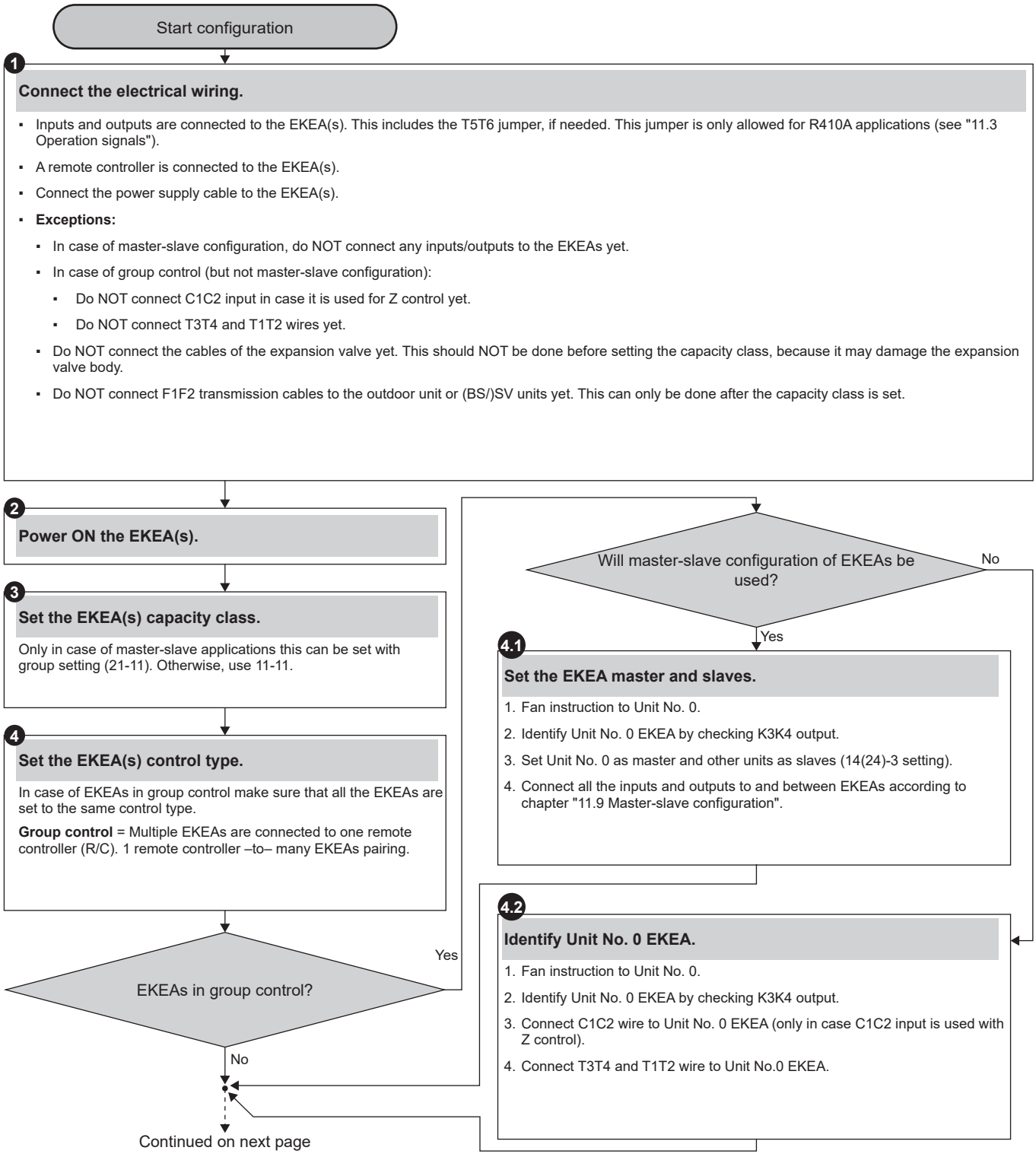
5 Make sure that field wiring and insulation is not squeezed when closing the valve kit box cover.

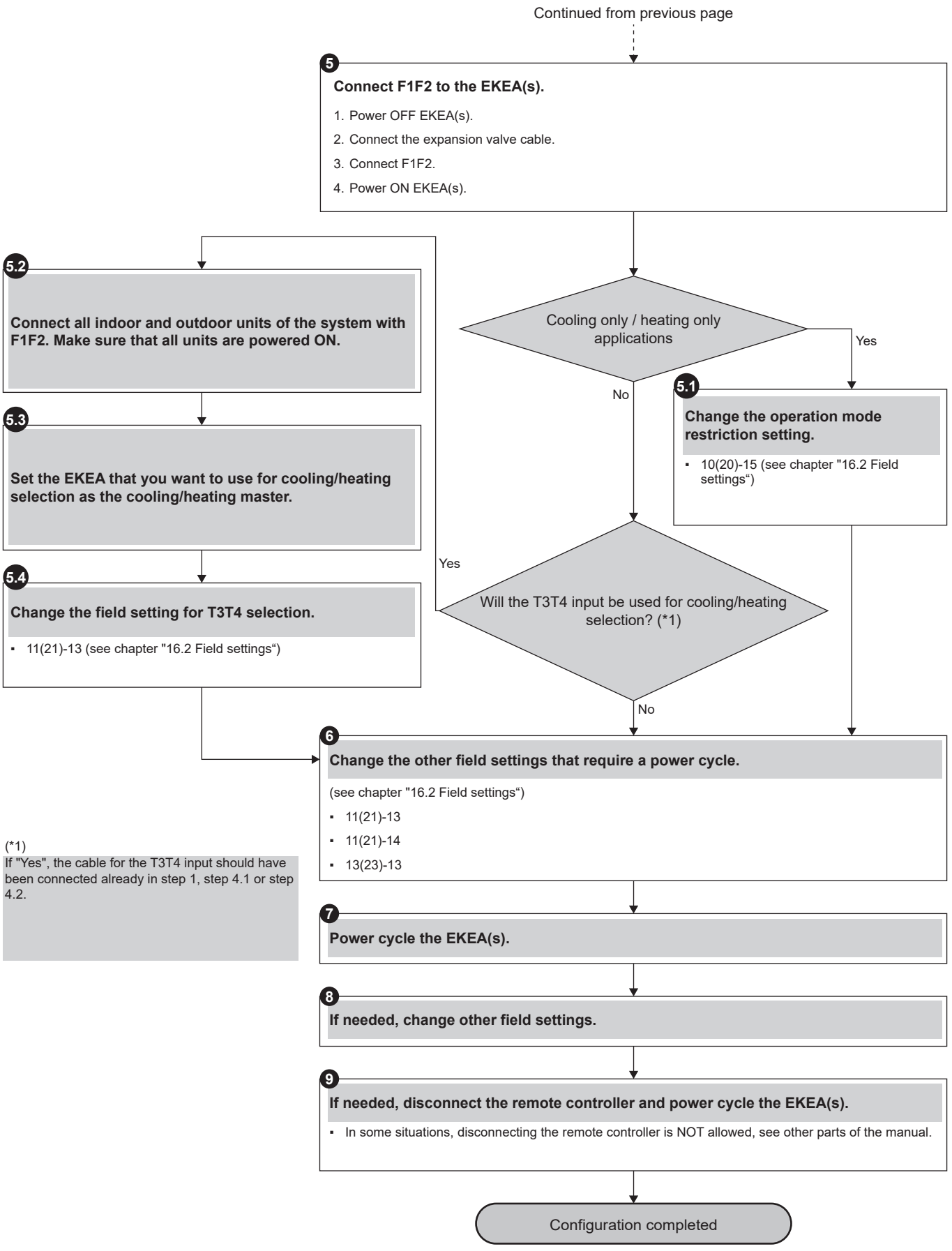
6 Close the valve kit box cover (4× M5).

16 Configuration

16.1 To configure the control box

Follow the steps below to configure EKEA. For the configuration of other parts of the system (example: outdoor unit, (BS/)SV unit, other indoor units, … ; see the corresponding manuals). Do NOT start the operation of EKEA before the configuration steps have been completed. If EKEA is started while the configuration is not completed, the system could be damaged.





(*1)
If "Yes", the cable for the T3T4 input should have been connected already in step 1, step 4.1 or step 4.2.

16.2 Field settings

Setting	Value (bold = default setting)	
10(20)–2 Control temperature selection for room air thermistor	1	Use both the unit sensor (or remote sensor if installed) and the remote controller sensor.
	2	**Use the suction air sensor only (or the remote sensor if installed).**
	3	Use remote controller sensor only.
10(20)–13 Target superheat for X, Y and W control	**1**	**5°C**
	2	10°C
	3	15°C
10(20)–14 Target subcool for X, Y and W control	**1**	**3°C**
	2	5°C
	3	10°C
10(20)–15 Operation mode restriction[a]	**1**	**Cooling and heating**
	2	Cooling only
	3	Heating only
11(21)–9 Target evaporating temperature (T_eS) correction for W control	**1**	**0°C**
	2	–1°C
	3	–2°C
	4	+1°C
11(21)–10 Target condensing temperature (T_cS) correction for W control	**1**	**0°C**
	2	+1°C
	3	+2°C
	4	–1°C
11(21)–11 Expansion valve kit capacity class[a]	**1**	**0**
	2	50
	3	63
	4	80
	5	100
	6	125
	7	140
	8	200
	9	250
	10	300
	11	350
	12	400
	13	450
	14	500
11(21)–12 Setpoint selection for Z control[b]	**1**	**Remote controller**
	2	C1C2 input
11(21)–13 Cooling/heating selection method[a] To change this setting, see "16.1 To configure the control box" [▶ 29].	**1**	**Remote controller**
	2	T3T4 input
11(21)–14 Use of the centralised controller[a]	1	Enabled
	2	**Disabled**
12(22)–1 External operation ON/OFF input (T1T2 input)	1	Forced OFF
	2	**Operation ON/OFF**
	3	Protective device
12(22)–2 Thermostat differential changeover (if remote sensor is used)	**1**	**1°C**
	2	0.5°C
12(22)–3 Fan operation at thermostat off (heating)	1	ON
	2	**ON**
	3	OFF[c]
12(22)–6 Fan operation at thermostat off (cooling)	1	ON
	2	**ON**
	3	OFF
12(22)–11 Hot start maximum duration time	1	0 minutes
	2	3 minutes
	3	**5 minutes**
	4	10 minutes
13(23)–2 Fan operation during defrost and oil return	**1**	**OFF**
	2	ON
13(23)–13 Temperature control type[a]	**1**	**X control**
	2	Y control
	3	W control
	4	Z control
	5	Z' control
13(23)–14 Target evaporating temperature for Y control (cooling)[d]	1	5°C
	2	6°C
	3	7°C
	4	**8°C**
	5	9°C
	6	10°C
	7	11°C
	8	12°C
13(23)–15 Target condensing temperature for Y control (heating)[e]	1	43°C
	2	44°C
	3	45°C
	4	**46°C**
	5	47°C
	6	48°C
	7	49°C
14(24)–2 Discharge air temperature correction factor	**1**	**0°C**
	2	0.5°C
	3	1°C
	4	1.5°C
	5	2°C
	6	2.5°C
	7	3°C
	8	3.5°C
	9	4°C
	10	4.5°C
	11	5°C
	12	5.5°C
	13	6°C
	14	6.5°C
	15	7°C
14(24)–3 Master-slave function[f]	**1**	**Not active**
	2	Master
	3	Slave

Setting	Value (bold = default setting)	
14(24)–10 Cooling discharge air temperature setpoint	**1**	**13°C**
	2	15°C
	3	16°C
	4	17°C
	5	18°C
	6	19°C
	7	20°C
	8	21°C
	9	22°C
	10	23°C
	11	24°C
	12	25°C
	13	26°C
	14	28°C
	15	30°C
14(24)–11 Heating discharge air temperature setpoint	1	24°C
	2	26°C
	3	27°C
	4	28°C
	5	29°C
	6	30°C
	7	31°C
	8	32°C
	9	33°C
	10	35°C
	11	37°C
	12	**39°C**
	13	41°C
	14	43°C
	15	45°C
15(25)–15 External R32 safety output (K9K10 output)	**1**	**Disabled**
	2	Enabled

[a] After changing this setting, a power cycle is required.
[b] When the C1C2 input is used during Z control, in the case of remote controller grouping, the indoor unit to which C1C2 is connected must have the lowest unit number.
[c] Recommended setting for W control, to avoid cold draft during heating start up after standstill.
[d] Depending on the operating temperature condition or on selection of the air handling unit, operation or safety activation of the outdoor unit may take priority and actual T_e will be different from the set T_e.
[e] Depending on the operating temperature condition or on selection of the air handling unit, operation or safety activation of the outdoor unit may take priority and actual T_c will be different from the set T_c.
[f] For the master-slave function, remote controller grouping is used. The master indoor unit needs to have the lowest unit number.

17 Commissioning

17.1 Checklist before commissioning

After installation and once the field settings are defined, the installer is obliged to verify correct operation by performing a test run. See the installation manual of the outdoor unit.

NOTICE

The test run should be performed with AHU operating in ventilation mode, without requiring capacity to EKEA(s). Otherwise this will cause an incomplete test run error on the outdoor unit. If the AHU has no ventilation mode, then disconnect T1T2 only for the duration of the test run.

Before executing "test run" as well as before operating the unit, you must check the following:

☐	**Installation – Control box** Check that the control box is properly installed to prevent abnormal noises and vibrations when starting up the unit.
☐	**Installation – Expansion valve kit** Check that the expansion valve kit is properly installed to prevent abnormal noises and vibrations when starting up the unit.
☐	**Installation – Thermistors** Check that the thermistors are properly installed so that they do not come loose.
☐	**Freeze-up prevention** Make sure thermistor R2T (liquid pipe) is installed on the correct location to prevent freeze-up of the heat exchanger of the air handling unit.
☐	**Field wiring** Check that the field wiring has been carried out according to the instructions described in the chapter "15 Electrical installation" [▸ 25], according to the wiring diagrams and according to the applicable national wiring regulation.
☐	**Earth wiring** Be sure that the earth wires have been connected properly and that the earth terminals are tightened.
☐	**Pipe size and pipe insulation** Be sure that correct pipe sizes are installed and that the insulation work is properly executed.

17.2 To check during normal operation

When the test run was successful, an additional check needs to be carried out during normal operation.

1 Close the contact T1T2 (ON/OFF) or start operation with a remote controller.

2 Confirm functioning of the unit according to the manual and check if the air handling unit has collected ice (freeze-up).

If the unit collects ice: see "18.2 Symptom: The AHU heat exchanger is freezing up" [▸ 33].

3 Confirm that the fan of the air handling unit is ON.

NOTICE

- In case of poor distribution in the air handling unit, one or more passes of the air handling unit may freeze-up (collect ice). Put the thermistor (R2T) on this location.
- Depending on operation conditions (e.g. outdoor ambient temperature) it is possible that the settings must be changed after commissioning.

18 Troubleshooting

18.1 Solving problems based on error codes

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

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

INFORMATION

See the service manual for:

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

18.1.1 Error codes: Overview

Code	Description
A0	External protection device activated
A1	Malfunction of EKEA main PCB A1P
A9	Malfunction of electronic expansion valve
AJ	Capacity setting error
C1	Failure of transmission (between indoor unit PCB and sub PCB)
C4	Malfunction of liquid pipe thermistor for heat exchanger
C5	Malfunction of gas pipe thermistor for heat exchanger
C9	Malfunction of suction air thermistor
CA	Malfunction of discharge air thermistor
CJ	Room temperature thermistor in remote controller abnormality
UJ-37	Supply airflow rate below the legal limit[a]

[a] In case the supply air handling unit airflow rate is above the legal limit for 5 minutes continuously, this error is automatically solved. Make sure the T5T6 digital input is set correctly, see "11.3 Operation signals" [▶ 13].

18.2 Symptom: The AHU heat exchanger is freezing up

- Check if the liquid thermistor (R2T) is put on the correct location. The thermistor must be put on the coldest location.
- Check if the thermistor has come loose. The thermistor must be fixed.
- The air handling unit fan is not operating continuously.

  When the outdoor unit stops operating, the air handling unit fan must continue operation to melt the ice that was accumulated during outdoor unit operation.

  Ensure that the air handling unit fan keeps operating.

For other issues, see the service manual.

19 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).

19.1 Wiring diagram

The wiring diagram is delivered with the control box, located at the inside of the cover.

Legend

Part	Description
A1P	PCB (main)
A2P	PCB (relay)
A3P	PCB (converter)
A4P	PCB (demand)
A5P	PCB (power supply)
F1U	Field fuse
F1U (A1P)	Fuse T 3.15 A 250 V
F1U (A2P)	Fuse T 6.3 A 250 V
K1R	Magnetic relay (error state)
K2R	Magnetic relay (fan ON/OFF)
K3R	Magnetic relay (inverter operation)
K4R	Magnetic relay (defrost)
K5R	Magnetic relay (R32 alarm)
K8R	Magnetic relay (feedback connection relay PCB to main PCB)
Q1DI	Earth leakage circuit breaker
R1T	Thermistor (suction air)
R2T	Thermistor (liquid)
R3T	Thermistor (gas)
R4T	Thermistor (discharge air)
X1M	Terminal block
X2M	Terminal block
X3M	Terminal block
Y1E	Electronic expansion valve
Z*C	Noise filter (ferrite core)

Notes

1	Use copper conductors only.	
2	Colours:	
	BLK	Black
	BLU	Blue
	BRN	Brown
	GRN	Green
	GRY	Grey
	ORG	Orange
	PNK	Pink
	RED	Red
	WHT	White
	YLW	Yellow
3	Mandatory for R32 applications, short-circuited if not used for R410A applications.	

4	Symbols:	
	L	Live
	N	Neutral
		Connector
		Wire clamp
		Protective earth (screw)
		Separate component
		Optional accessory
		Wiring depending on control type
		Field wiring

Position in switch box

English	Translation
Position in switch box	Position in switch box

Translation of text on wiring diagram

English	Translation
0-10 V DC input signal	0-10 V DC input signal
16 V DC digital input AHU error (NO)	16 V DC digital input AHU error (normally open)
16 V DC digital input cooling/ heating (NC)	16 V DC digital input cooling/ heating (normally closed)
16 V DC digital input ON/OFF (NO)	16 V DC digital input ON/OFF (normally open)
BRC wired remote controller	BRC wired remote controller
Only for X and W control (optional for Z control)	Only for X and W control (optional for Z control)
Only for Z and Z' control	Only for Z and Z' control
Only for Z' control	Only for Z' control
Outdoor	Outdoor unit
See note ***	See note ***
Voltage free contacts	Voltage free contacts

20 Glossary

Dealer

Sales distributor for the product.

Authorised installer

Technical skilled person who is qualified to install the product.

User

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

Applicable legislation

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

Service company

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

Installation manual

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

Operation manual

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

Maintenance instructions

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

Accessories

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

Optional equipment

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

Field supply

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

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