

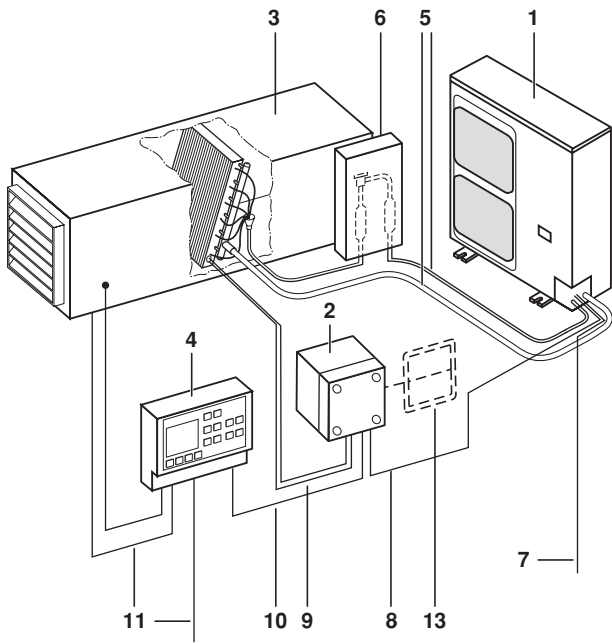
DAIKIN



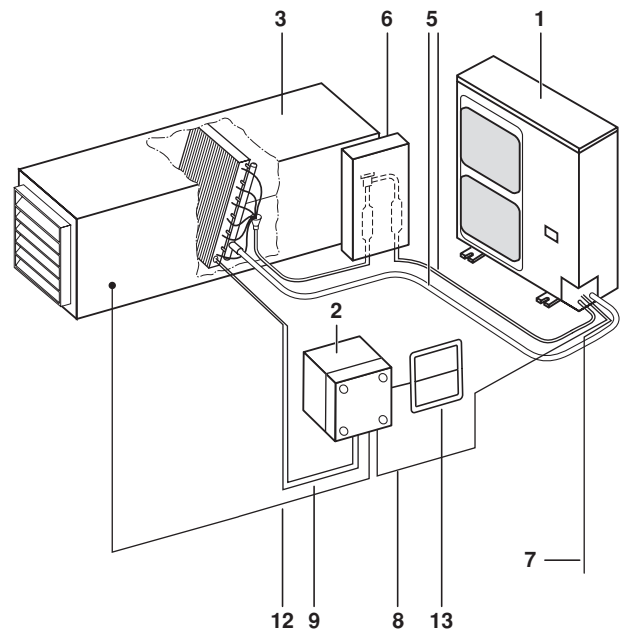
INSTALLATION AND OPERATION MANUAL

**Option kit for combination of Daikin
condensing units with field supplied
evaporators**

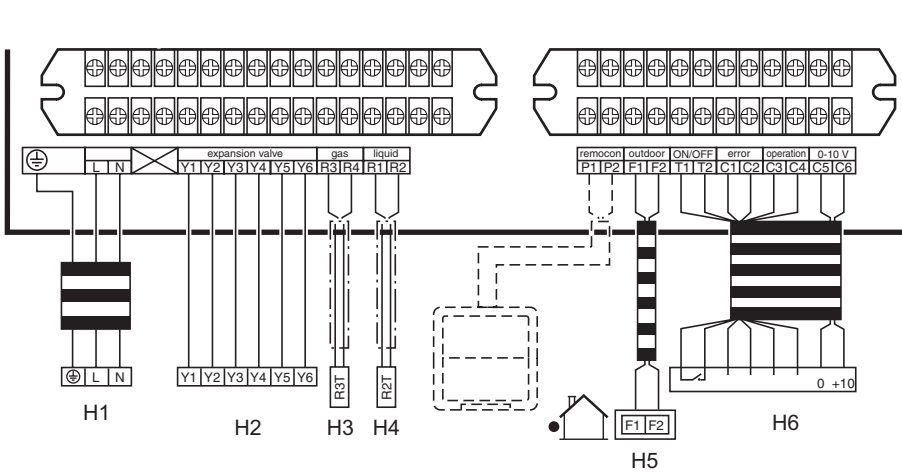
EKEXFCBAV3
EKEXDCBAV3



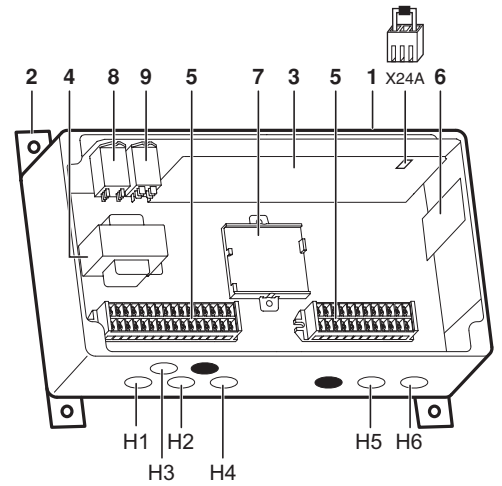
1 EKEXFCBAV3



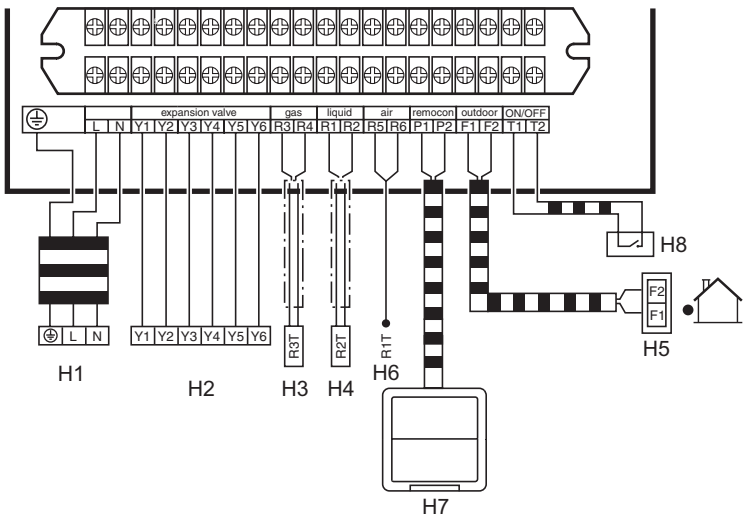
2 EKEXDCBAV3



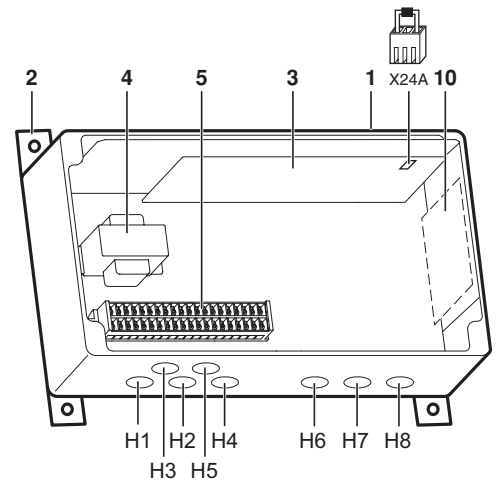
3 EKEXFCBAV3



4 EKEXFCBAV3



5 EKEXDCBAV3



6 EKEXDCBAV3

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Daikin Europe N.V.

- 01 (GB) declares under its sole responsibility that the air conditioning equipment to which this declaration relates;
- 02 (E) erklärt auf seine alleinige Verantwortung dass die Ausüstung der Klimaanlage für die diese Erklärung bestimmt ist;
- 03 (F) déclare sous sa seule responsabilité que l'équipement d'air conditionné visé par la présente déclaration;
- 04 (NL) verklaart hierbij op eigen exclusieve verantwoordelijkheid dat de airconditioningapparatuur waaraan deze verklaring betrekking heeft;
- 05 (E) declara bajo su única responsabilidad que el equipo de aire acondicionado al que hace referencia la declaración;
- 06 (I) dichiara sotto la propria responsabilità che gli apparecchi di condizionamento a cui le riferita questa dichiarazione;
- 07 (GR) δηλώνει με αποκλειστική της ευθύνη ότι ο εξοπλισμός των κλιματιστικών συσκευών στο οποίο αναφέρεται, η παρούσα δήλωση;
- 08 (P) declara sob sua exclusiva responsabilidade que os equipamentos de ar condicionado a que esta declaração se refere;

EKEXDCBAY3, EKEXFCBAY3,

- 01 are in conformity with the following standard(s) or other normative document(s), provided that these are used in accordance with our instructions;
 - 02 der/den folgenden Norm(en) oder einem anderen Normdokument oder -dokumenten entsprechend entsprechen, unter der Voraussetzung, dass sie gemäß unserer Anweisungen eingesetzt werden;
 - 03 sont conformes à laux normes(s) ou autre(s) document(s) normatifs), pour autant qu'ils soient utilisés conformément à nos instructions;
 - 04 conform de volgen de norm(en) of één of meer andere bindende documenten zijn, op voorwaarde dat ze worden gebruikt overeenkomstig onze instructies;
 - 05 están en conformidad con las(s) siguiente(s) norma(s) u otro(s) documento(s) normativos), siempre que sean utilizados de acuerdo con nuestras instrucciones;
 - 06 sono conformi alle(s) seguente(s) standardi(s) o altro(i) documento(i) canonizzati), a patto che vengano usati in conformità alle nostre istruzioni;
 - 07 είναι σύμφωνα με τις οδηγίες μας, με το(α) ακόλουθο(α) πρότυπο(α) ή άλλο(α) έγγραφο(α) κανονισμών, υπό την προϋπόθεση ότι χρησιμοποιείται σύμφωνα με τις οδηγίες μας;
- EN60335-2-40,
- 01 following the provisions of:
 - 02 gemäß den Vorschriften der:
 - 03 conformément aux stipulations des:
 - 04 overeenkomstig de bepalingen van:
 - 05 siguiendo las disposiciones de:
 - 06 secondo le prescrizioni per:
 - 07 με τη/την/των διατάξεων/των:
 - 08 de acordo com o previsto em:
 - 09 в соответствии с положениями:
- 10 under käyttöä ja/tai muuta teknistä dokumentia, jota on käytetty tämän laitteiston kanssa;
 - 11 enligt villkoren i:
 - 12 gemäß den Vorschriften der:
 - 13 noudattamalla määräyksiä:
 - 14 za doobreni ustanoveni predpisu:
 - 15 prema odredbama:
 - 16 követeli a(z):
 - 17 zgodnie z postanowieniami Dyrektywy:
 - 18 in urma prevederilor:
- 19 obo upoštevanju dobič:
 - 20 v skladu s navodili:
 - 21 с предпазливостта на:
 - 22 laikantis nuostatų, patikslinamų:
 - 23 enerģoti prasības, kas noteiktas:
 - 24 održivačulic uslan ovienia:
 - 25 bunun koşullarına uygun olarak:

- 09 (GB) warrant, accepting full responsibility for any damage to the air conditioning system;
- 10 (E) verklaart onder entousar, al udslyret til klimareglering, som denne deklaration vedrører;
- 11 (S) deklarerer äggaransvar för luftkonditioneringssystemen som berörs av denna deklaration inbördes till:
- 12 (N) erklærer et fuldt ud ansvar for at det luftkonditioneringssystem som berøres af denne deklaration, innebræver at:
- 13 (NL) imhoeden yksimman omalla vastuullaan, että läänin imokulusen tarkoituksena on varmistaa laitteiston toiminta:
- 14 (E) prohlašuje ve své plné odpovědnosti, že klimatizační zařízení, k nimž se tato prohlášení vztahuje;
- 15 (GR) δηλώνει υπό πλήρη αποκλειστική της ευθύνη ότι η κλιματιστική συσκευή, η οποία αναφέρεται, η παρούσα ανακοίνωση;
- 16 (P) își asumă întreaga răspundere pentru orice deteriorare a sistemului de condiționare aer condiționat;

- 17 (PL) deklaruje na własną odpowiedzialność, że klimatyzatory, których dotyczy niniejsza deklaracja;
- 18 (GB) declare that we accept full responsibility for any damage to the air conditioning system;
- 19 (S) deklarerer äggaransvar för luftkonditioneringssystemen som berörs av denna deklaration inbördes till:
- 20 (E) deklaruje na svoje odgovornost, da obopredava za klimatizacijsko napravo, za katero se nanaša ta deklaracija;
- 21 (NL) verklaart onder entousar, al udslyret til klimareglering, som denne deklaration vedrører;
- 22 (N) erklærer et fuldt ud ansvar for at det luftkonditioneringssystem som berøres af denne deklaration, innebræver at:
- 23 (E) prohlašuje ve své plné odpovědnosti, že klimatizační zařízení, k nimž se tato prohlášení vztahuje;
- 24 (GR) δηλώνει υπό πλήρη αποκλειστική της ευθύνη ότι η κλιματιστική συσκευή, η οποία αναφέρεται, η παρούσα ανακοίνωση;
- 25 (P) își asumă întreaga răspundere pentru orice deteriorare a sistemului de condiționare aer condiționat;

- 16 megfelelnek az alábbi szabvány(ok)nak vagy egyéb irányadó dokumentum(ok)nak, ha azokat előírás szerint használják;
- 17 megfelelnek az alábbi szabvány(ok)nak vagy egyéb irányadó dokumentum(ok)nak, ha azokat előírás szerint használják;
- 18 sunt în conformitate cu următorul (următoarele) standard(e) sau alte (documente) normative), cu condiția ca acestea să fie utilizate în conformitate cu instrucțiunile noastre;
- 19 skilnads i nästämnda standarder i andra dokument, på förutsättning att de används enligt våra instruktioner;
- 20 i skladu s našimi navodili, pri čemer se uporabljajo tudi drugi dokumenti, pod pogojem, da se uporabljajo v skladu z našimi navodili;
- 21 съответстват на следните стандарти или други нормативни документи, при условие, че се използват съгласно нашите инструкции;
- 22 atitinka žemiau nurodytus standartus ir (arba) kitus norminius dokumentus su sąlyga, kad yra naudojami pagal mūsų nurodymus;
- 23 i sllad s našimi navodili, pri čemer se uporabljajo tudi drugi dokumenti, pod pogojem, da se uporabljajo v skladu z našimi navodili;
- 24 i skladu s našimi navodili, pri čemer se uporabljajo tudi drugi dokumenti, pod pogojem, da se uporabljajo v skladu z našimi navodili;
- 25 i sllad s našimi navodili, pri čemer se uporabljajo tudi drugi dokumenti, pod pogojem, da se uporabljajo v skladu z našimi navodili;

EN60335-2-40,

- 01 Note
- 02 Hinweis
- 03 Remarque
- 04 Bemerk
- 05 Nota
- 06 Nota
- 07 Znamka
- 08 Nota
- 09 Примечание
- 10 Bemerk

- 11 Information
- 12 Merk
- 13 Huom
- 14 Pozornia
- 15 Napomena
- 16 Megetyzas
- 17 Uwaga
- 18 Noi
- 19 Opomba
- 20 Märkus

DAIKIN

Jiro Tomita
Director Quality Assurance
Ostend, 3rd of March 2008

DAIKIN EUROPE N.V.
Zandvoordestraat 300, B-8400 Oostende, Belgium

- 08 estão em conformidade com a(s) seguinte(s) norma(s) ou outro(s) documento(s) normativo(s), desde que estes sejam utilizados de acordo com as nossas instruções;
- 09 соответствуют следующим стандартам или другим нормативным документам, при условии их использования согласно нашим инструкциям;
- 10 overholder følgende standard(er) eller andre/andre retningsgivende dokument(er), brudt at disse anvendes i henhold til vores instrukser;
- 11 respektive utrustning är utformad i överensstämmelse med och följer följande standard(er) eller andra normgivande dokument, under förutsättning att användning sker i överensstämmelse med våra instruktioner;
- 12 respektive utsty er i overensstemmelse med følgende standard(er) eller andre normgivende dokument(er), under forudsætning at disse bruges i henhold til våre instruksjoner;
- 13 nastaaat seuraavaan standardin ja muiden ohjeellisten dokumenttien vastauksissa edellytään, että niitä käytetään ohjeidemme mukaisesti;
- 14 za predloklad, že sova v skladu s našimi navodili, odgovorilji naslednjim normam in/ali drugim normativnim dokumentom;
- 15 u skladu sa slijedećim standardom(i)ma ili drugim normativnim dokumentom(i)ma), uz uvjet da se oni koriste u skladu s našim uputama;

Low Voltage 2006/95/EC Machinery 98/37/EC Electromagnetic Compatibility 2004/108/EC *

- 01 Directives, as amended.
 - 02 Direktiven, gemäß Änderung.
 - 03 Directives, telles que modifiées.
 - 04 Richtlijnen, zoals gewijzigd.
 - 05 Directivas, según lo emmendado.
 - 06 Direktive, come da modifica.
 - 07 Обнови, отку, ё/уот пономови.
 - 08 Directivas, conforme alteração em.
 - 09 Директиве, со всеми поправками.
- 10 Direktiver, med senere ændringer.
 - 11 Direktiv, med foretagne ændringer.
 - 12 Direktiver, с тексаре измененир.
 - 13 Direktiveja, seilasinä kun te ovat muutettuna.
 - 14 v pätemis zneni.
 - 15 Smerice, kako je izmjenjeno.
 - 16 irányelvek és módosítások rendelkezéseit.
 - 17 pöžnjejszymi poprawkami.
 - 18 Direktivelor, cu amendamentele respective.
- 19 Direktiver, med senere ændringer.
 - 20 Direktivdi koss muudatuslega.
 - 21 Директиври, с тексаре измененир.
 - 22 Direktivose su paplytimais.
 - 23 Direktives u to paplaidinajumos.
 - 24 Smerice, v platnom zneni.
 - 25 Degjstirnimis halerlye Yonetmeliker.
- 21 Zabezpeka
 - 22 Pastaba
 - 23 Poznamus
 - 24 Pozorniaha
 - 25 Not

- 21 Zabezpeka
- 22 Pastaba
- 23 Poznamus
- 24 Pozorniaha
- 25 Not

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! READ THESE INSTRUCTIONS CAREFULLY BEFORE INSTALLATION AND OPERATION.

IMPROPER INSTALLATION OR ATTACHMENT OF EQUIPMENT OR ACCESSORIES COULD RESULT IN ELECTRIC SHOCK, SHORT-CIRCUIT, LEAKS, FIRE OR OTHER DAMAGE TO THE EQUIPMENT. BE SURE ONLY TO USE ACCESSORIES MADE BY DAIKIN WHICH ARE SPECIFICALLY DESIGNED FOR USE WITH THE EQUIPMENT AND HAVE THEM INSTALLED BY A PROFESSIONAL.

IF UNSURE OF INSTALLATION PROCEDURES OR USE, ALWAYS CONTACT YOUR DAIKIN DEALER FOR ADVICE AND INFORMATION.

INTRODUCTION








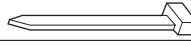


- !** Do only use this system in combination with a field supplied air handling unit. Do not connect this system to other indoor units.
- Only optional controls as listed in the optional accessories list can be used.

We distinguish 2 different control boxes, each with its own application and installation requirements.

- EKEXFCB control box (2 possible operation modes)
 - Operation with 0–10 V input to control the capacity
An external controller is needed to control the capacity. For details of the necessary functions of the external controller refer to paragraph "Operation with 0–10 V capacity control" on page 8. It can be used to control the room temperature or air discharge temperature.
 - Operation with fixed T_e temperature control
This system operates on a fixed evaporating temperature.
- EKEXDCB control box
The system will operate as a standard indoor unit to control the room temperature. This system does not require a specific external controller.

INSTALLATION

ACCESSORIES

		EKEXFCB	EKEXDCB
Thermistor (R1T)		—	1
Thermistor (R3T/R2T) (2.5 m cable)		2	
Insulation sheet		2	
Rubber sheet		2	
Wire to wire splice		4	6
Installation and operation manual		1	
Screw nut		6	8
Tie wrap		6	
Capacity setting adaptor		7	
Stopper (closing cup)		2	—

Obligatory accessory

	EKEXFCB	EKEXDCB
Expansion valve kit	EKEXV	

Refer to chapter "Valve kit installation" on page 3 for installation instructions.

Optional accessories

		EKEXFCB	EKEXDCB
Remote controller		1 ^(*)	1

(*) Not required for operation, only useful accessory tool for service and installation.

NAME AND FUNCTION OF PARTS (See figure 1 and figure 2)

Parts and components

- 1 Outdoor unit
- 2 Control box (EKEXFCB / EKEXDCB)
- 3 Air handling unit (field supply)
- 4 Controller (field supply)
- 5 Field piping (field supply)
- 6 Expansion valve kit

Wiring connections

- 7 Outdoor unit power supply
- 8 Control box wiring (Power supply and communication between control box and outdoor unit)
- 9 Evaporator thermistors
- 10 Communication between controller and control box
- 11 Power supply and control wiring for evaporator (air handling unit) and controller (power supply is separate from the outdoor unit)
- 12 Air thermistor control for evaporator (air handling unit)
- 13 Remote controller (----- = for service only)

BEFORE INSTALLATION

Cautions for selection of the evaporator (air handling unit)

See table below for applicable units.

Select the evaporator (field supply) according to the technical data and limitations mentioned below.

Lifetime of the outdoor unit, operation range or operation reliability may be influenced if you neglect these limitations.

Limits for outdoor unit (expansion valve kit)

Outdoor unit (class)	EKEXV kit
100	EKEXV63~125
125	EKEXV63~140
140	EKEXV80~140

Outdoor unit (class)	EKEXV kit
200	EKEXV100~250
250	EKEXV125~250

Depending on the heat exchanger, a connectable EKEXV (expansion valve kit) must be selected to these limitations.

EKEXV class	Allowed heat exchanger volume (dm ³)		Allowed heat exchanger capacity (kW)	
	Minimum	Maximum	Minimum	Maximum
63	0.96	1.22	6.4	7.8
80	1.22	1.53	8.1	9.9
100	1.53	1.91	10.1	12.3
125	1.91	2.14	12.6	15.4
140	2.14	2.67	14.4	17.6
200	3.06	3.82	20.2	24.6
250	3.82	4.78	25.2	30.8

Saturated suction temperature (SST) = 6°C, SH (superheat) = 5 K, air temperature = 27°C DB / 19°C WB.

1 Selecting the condensing unit

Depending on necessary capacity of the combination an outdoor unit needs to be selected (see "Engineering databook" for capacity).

- Each outdoor unit can be connected to a range of evaporators (air handling units).
- The range is determined by the allowed expansion valve kits.

2 Selecting the expansion valve

The corresponding expansion valve needs to be selected for your evaporator. Select the expansion valve according to the above limitations.

NOTE



- If conflicting result, volume selection has priority over capacity.
- The expansion valve is an electronic type, it is controlled by the thermistors that are added in the circuit. Each expansion valve can control a range of evaporators (air handling units) sizes.
- The selected evaporator unit must be designed for R410A.
- Extraneous substances (including mineral oils or moisture) must be prevented from getting mixed into the system.
- SST: saturated suction temperature at exit of evaporator.

3 Selecting the capacity setting adaptor (see accessories)

- The corresponding capacity setting adaptor needs to be selected depending on the expansion valve.
- Connect the correct selected capacity setting adaptor to X24A (A1P). (See figure 4 and figure 6)

EKEXV kit	Capacity setting adaptor label (indication)
63	J71
80	J90
100	J112
125	J140

EKEXV kit	Capacity setting adaptor label (indication)
140	J160
200	J224
250	J280

For the following items, take special care during construction and check after installation is finished

Tick ✓ when checked	
<input type="checkbox"/>	Are the thermistors fixed firmly? Thermistor may come loose.
<input type="checkbox"/>	Is the freeze-up setting done correctly? The evaporator (air handling unit) may freeze up.
<input type="checkbox"/>	Is the control box fixed firmly? The unit may drop, vibrate or make noise.
<input type="checkbox"/>	Do electrical connections comply with specifications? The unit may malfunction or components may burn out.
<input type="checkbox"/>	Are wiring and piping correct? The unit may malfunction or components may burn out.
<input type="checkbox"/>	Is the unit safely grounded? Dangerous at electric leakage.



Compliance to directive 97/23/EEC (Pressure Equipment Directive): only connect an evaporator of category I or less.

SELECTING THE INSTALLATION SITE

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

Select an installation site where the following conditions are fulfilled and that meets your customer's approval.

- The option boxes (expansion valve and electrical control box) can be installed inside and outside).
- Do not install the option boxes in or on the outdoor unit.
- Do not put the option boxes in direct sunlight. Direct sunlight will increase the temperature inside the option boxes and may reduce its lifetime and influence its operation.
- Choose a flat and strong mounting surface.

- Keep the space in front of the boxes free for future maintenance.
- Keep evaporator (air handling unit), power supply wiring and transmission wiring at least 1 m away from televisions and radios. This is to prevent image interference and noise in those electrical appliances. (Noise may be generated depending on the conditions under which the electric wave is generated, even if 1 m is kept.)

Precautions

Do not install or operate the unit in rooms mentioned below.

- Where mineral oil, like cutting oil is present.
- Where the air contains high levels of salt such as air near the ocean.
- Where sulphurous gas is present such as that in areas of hot spring.
- In vehicles or vessels.
- Where voltage fluctuates a lot such as that 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.
- The option boxes must be installed with entrances downward.

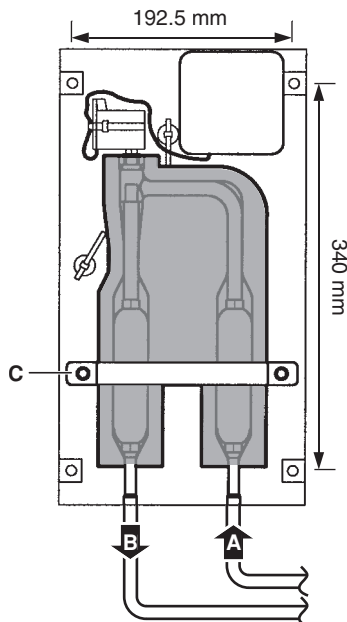
VALVE KIT INSTALLATION

Mechanical installation

- 1 Remove the valve kit box cover by unscrewing 4x M5.
- 2 Drill 4 holes on correct position (measurements as indicated in figure below) and fix the valve kit box securely with 4 screws through the provided holes Ø9 mm.

Brazing work

- 3 Prepare the inlet/outlet field piping just in front of the connection (do **not** braze yet).



- A Inlet coming from the outdoor unit
- B Outlet to evaporator
- C Pipe fixing clamp

- 4 Remove the pipe fixing clamp (C) by unscrewing 2x M5.
- 5 Remove the upper and lower pipe insulations.
- 6 Braze the field piping.

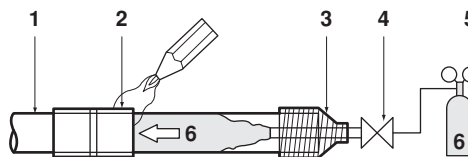


- Make sure to cool the filters and valve body with a wet cloth and make sure the body temperature does not exceed 120°C during brazing.
- Make sure that the other parts such as electrical box, tie wraps and wires are protected from direct brazing flames during brazing.

- 7 After brazing, put the lower pipe insulation back in place and close it with the upper insulation cover (after peeling off the liner).
- 8 Secure the pipe fixing clamp (C) in place again (2x M5).
- 9 Make sure that field pipes are fully insulated.
Field pipe insulation must reach up to the insulation you have put back in place as per procedure step 7. Make sure that there is no gap between both ends in order to avoid condensation dripping (finish the connection with tape eventually).

Cautions for brazing

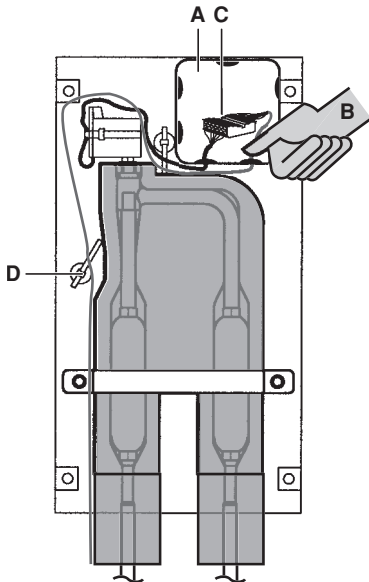
- Be sure to carry out a nitrogen blow when brazing. Brazing without carrying out nitrogen replacement or releasing nitrogen into the piping will create large quantities of oxidized film on the inside of the pipes, adversely affecting valves and compressors in the refrigerating system and preventing normal operation.
- When brazing while inserting nitrogen into the piping, nitrogen must be set to 0.02 MPa with a pressure-reducing valve (=just enough so that it can be felt on the skin).



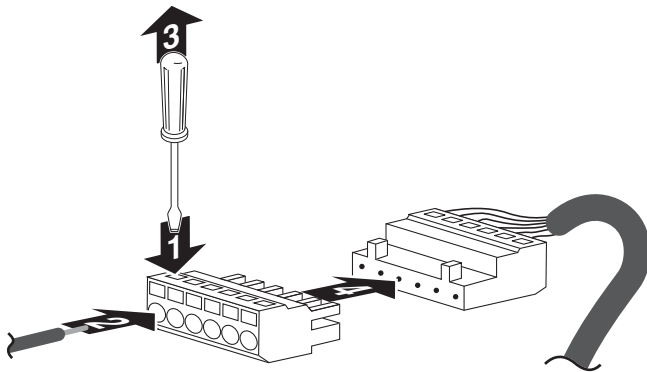
- 1 Refrigerant piping
- 2 Part to be brazed
- 3 Taping
- 4 Hands valve
- 5 Pressure-reducing valve
- 6 Nitrogen

- For details, see manual of the outdoor unit.

- 1 Open the electrical box cover (A).
- 2 Push out **ONLY** the second lower wire intake hole (B) from inside to outside. Do not damage the membrane.
- 3 Pass valve cable (with wires Y1 ... Y6) from the control box through that membrane wire intake hole 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 the tie wrap (D). See "Electric wiring work" on page 4 for more details.



- 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 (4x M5).

INSTALLATION OF THE ELECTRICAL CONTROL

BOX (See figure 4 and figure 6)

- 1 Control box
- 2 Hanger brackets
- 3 Main PCB
- 4 Transformer
- 5 Terminal
- 6 PCB (for voltage conversion)
- 7 PCB (power supply)
- 8 Magnetic relay (operation / compressor ON/OFF)
- 9 Magnetic relay (error status)
- 10 Optional PCB (KRP4)

Mechanical installation

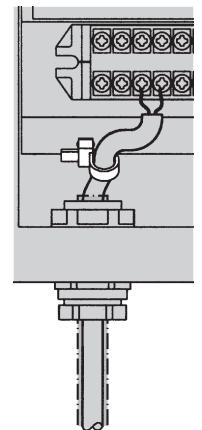
- 1 Fix the control box with its hanger brackets to the mounting surface.
Use 4 screws (for holes of Ø6 mm).
- 2 Open the lid of the control box.
- 3 For electrical wiring: refer to paragraph "Electric wiring work" on page 4.
- 4 Install the screw nuts.
- 5 Close the unnecessary openings with stoppers (closing cups).
- 6 Close the lid securely after installation to ensure that the control box is watertight.

ELECTRIC WIRING WORK

- All field supplied parts and materials and electric works must be conform to local codes.
- Use copper wire only.
- All wiring must be performed by an authorized electrician.
- A main switch or other means for disconnection, having a contact separation in all poles, must be incorporated in the fixed wiring in accordance with relevant local and national legislation.
- Refer to the installation manual attached to the outdoor unit for the size of power supply electric wire connected to the outdoor unit, the capacity of the circuit breaker and switch, wiring and wiring instructions.

Connection of the wires inside the control box

- 1 For connection to outdoor unit and to controller (field supply):
Pull the wires inside through the screw nut and close the nut firmly in order to ensure a good pull relieve and water protection.
- 2 The cables require an additional pull-relief. Strap the cable with the installed tie wrap.



Precautions

- Thermistor cable and remote controller wire should be located at least 50 mm away from power supply wires and from wires to the controller. Not following this guideline may result in malfunction due to electrical noise.
- 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 worse case electric shock or fire.

Connecting the wiring: EKEXFCBAV3

- Connect the wires to the terminal board according to the wiring diagram in figure 3. See figure 4 for wiring intake in the control box. The wiring intake hole indication H1 refers to the H1 cable of the corresponding wiring diagram.
- Connect cables according to specifications of the next table.



Take special precaution for connection to the controller (field supply). Do not miswire the output signals (operation or error) nor the input signal (ON/OFF). This mistake could damage the entire system.

Table connection and application

	Description	Connect to	Type of cable	Cross section (mm ²) ^(*)	Maximum length (m)	Specifications
L, N, earth	Power supply	Power supply	H05VV-F3G2.5	2.5	—	Power supply 230 V 1~50 Hz
Y1~Y6	Expansion valve connection	Expansion valve kit	LIYCY3 x 2 x 0.75	0.75	20	Digital output 12 V DC
R1,R2	Thermistor R2T (liquid pipe)	—	H05VV-F2 x 0.75		Standard 2.5 Maximum 20	Analog input 16 V DC
R3,R4	Thermistor R3T (gas pipe)					
P1,P2	Remote controller (optional)					
F1,F2	Communication to outdoor unit	Outdoor unit			100	Communication line 16 V DC
T1,T2	ON/OFF	Controller field supply	LIYCY4 x 2 x 0.75		(†)	Digital input 16 V DC
C1,C2	Error signal			Digital output: voltage free. Maximum 230 V, maximum 0,5 A		
C3,C4	Operation signal ^(‡)					
C5,C6	Capacity step ^(**)			Analog input: 0~10 V		

(*) Recommended size (all wiring must comply with local codes).

(†) The maximum length depends on the external device that is connected (controller/relay,...)

(‡) Operation signal: indicates compressor operation.

(**) Only necessary for capacity controlled system.

Wiring diagram

A1P	Printed circuit board
A2P	Printed circuit board (for voltage conversion)
A3P	Printed circuit board (power supply)
F1U	Fuse (250 V, F5A)(A1P)
F2U	Fuse (250 V, T1A)(A3P)
F3U	Field fuse
HAP	Light emitting diode (service monitor-green)
K1R	Magnetic relay (operation / compressor ON/OFF)
K2R	Magnetic relay (error status)
KAR, KPR	Magnetic relay
Q1DI	Earth leakage breaker
R2T	Thermistor (liquid)
R3T	Thermistor (gas)
T1R	Transformer (220 V/21.8 V)
X1M,X2M,X3M	Terminal block
Y1E	Electronic expansion valve
X1M-R1/R2	Thermistor liquid
X1M-R3/R4	Thermistor gas
X1M-Y1~6	Expansion valve
X2M-P1/P2	Communication remote controller
X2M-C1/C2	Output: error status
X2M-C3/C4	Output: operation / compressor ON/OFF
X2M-T1/T2	Input: ON/OFF
X2M-F1/F2	Communication outdoor unit
X2M-C5/C6	Input: 0~10 V DC capacity control

	Field wiring
L	Live
N	Neutral
	Connector
	Wire clamp
	Protective earth (screw)
—	Separate component
==	Optional accessory
BLK	Black
BLU	Blue
BRN	Brown
GRN	Green
GRY	Gray
ORG	Orange
PNK	Pink
RED	Red
WHT	White
YLW	Yellow

Connecting the wiring: EKEXDCBAV3

- Connect the wires to the terminal board according to the wiring diagram in figure 5. See figure 6 for wiring intake in the control box. The wiring intake hole indication H1 refers to the H1 cable of the corresponding wiring diagram.
- Connect cables according to specifications of the next table.

Table connection and application

	Description	Connect to	Type of cable	Cross section (mm ²) ^(*)	Maximum length (m)	Specifications
L, N, earth	Power supply	Power supply	H05VV-F3G2.5	2.5	—	Power supply 230 V 1~50 Hz
Y1~Y6	Expansion valve connection	Expansion valve kit	LIYCY3 x 2 x 0.75	0.75	20	Digital output 12 V DC
R1,R2	Thermistor R2T (liquid pipe)	—	H05VV-F2 x 0.75		Standard: 2.5 Max.: 20	Analog input 16 V DC
R3,R4	Thermistor R3T (gas pipe)					
R5,R6	Thermistor R1T (air)					
P1,P2	Remote controller					
F1,F2	Communication to outdoor unit	Outdoor unit	100		Communication line 16 V DC	
T1,T2	ON/OFF	Controller field supply	LIYCY4 x 2 x 0.75		—	Digital input 16 V DC
—	Capacity step			Optional connection: when the function of the switch box needs to be extended: see KRP4A51 for details of settings and instructions.		
—	Error signal					
—	Operation signal					

(*) Recommended size (all wiring must comply with local codes).

Wiring diagram

A1P.....	Printed circuit board	BRN.....	Brown
F1U.....	Fuse (250 V, F5A)(A1P)	GRN.....	Green
F3U.....	Field fuse	GRY.....	Gray
HAP.....	Light emitting diode (service monitor-green)	ORG.....	Orange
KRP4.....	Optional connection PCB	PNK.....	Pink
Q1DI.....	Earth leakage breaker	RED.....	Red
R1T.....	Thermistor (air)	WHT.....	White
R2T.....	Thermistor (liquid)	YLW.....	Yellow
R3T.....	Thermistor (gas)		
T1R.....	Transformer (220 V/21.8 V)		
X1M,X3M.....	Terminal block		
Y1E.....	Electronic expansion valve		
X1M-R1/R2.....	Thermistor liquid		
X1M-R3/R4.....	Thermistor gas		
X1M-R5/R6.....	Thermistor air		
X1M-Y1~6.....	Expansion valve		
X1M-P1/P2.....	Communication remote controller		
X1M-T1/T2.....	Input: ON/OFF		
X1M-F1/F2.....	Communication outdoor unit		

⏏.....	Field wiring
L.....	Live
N.....	Neutral
☐, —▶.....	Connector
○.....	Wire clamp
⊕.....	Protective earth (screw)
—.....	Separate component
—:—.....	Optional accessory
BLK.....	Black
BLU.....	Blue

INSTALLATION OF THERMISTORS

Refrigerant thermistors

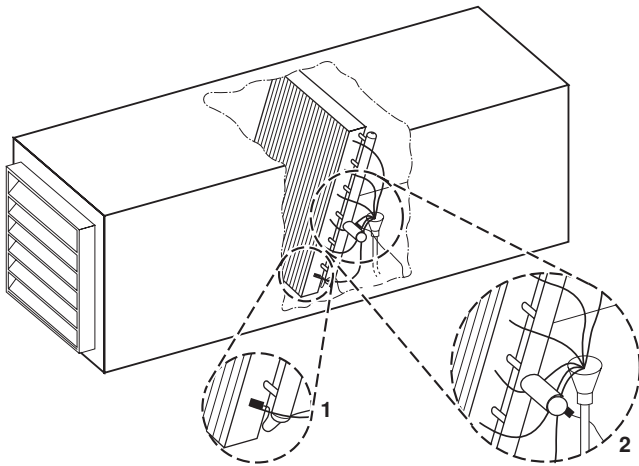
Location of the thermistor

A correct installation of the thermistors is required to ensure a good operation:

1. Liquid (R2T)
Install the thermistor behind the distributor on the coldest pass of the heat exchanger (contact your heat exchanger dealer).
2. Gas (R3T)
Install the thermistor at the outlet of the heat exchanger as close as possible to the heat exchanger.

Evaluation must be done to check if the evaporator is protected against freeze-up.

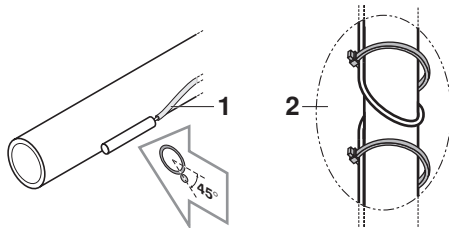
Execute test operation and check for freeze-up.



- 1 Liquid R2T
- 2 Gas R3T

Installation of the thermistor cable

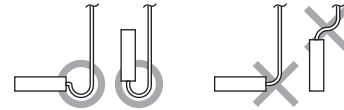
- 1 Put the thermistor cable in a separate protective tube.
- 2 Always add a pull-relief to the thermistor cable to avoid strain on the thermistor cable and loosening of the thermistor. Strain on the thermistor cable or loosening of the thermistor may result in bad contact and incorrect temperature measurement.



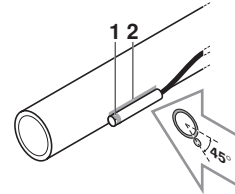
Fixation of the thermistor



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

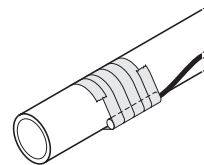


- Make good contact between thermistor and evaporator. Put the top of the thermistors on the evaporator, this is the most sensitive point of the thermistor.

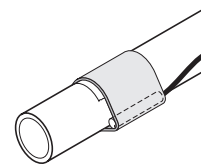


- 1 Most sensitive point of the thermistor
- 2 Maximize the contact

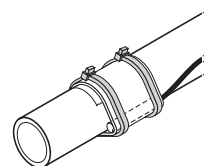
- 1 Fix the thermistor with insulating aluminum tape (field supply) in order to ensure a good heat transference.



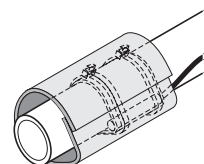
- 2 Put the supplied piece of rubber around the thermistor (R2T/R3T) in order to avoid loosening of the thermistor after some years.



- 3 Fasten the thermistor with 2 tie wraps.



- 4 Insulate the thermistor with the supplied insulation sheet.



Air thermistor (only for EKEXDCB)

The air thermistor (R1T) can be installed either in the room that needs temperature control or in the suction area of the evaporator.



NOTE For room temperature control the delivered thermistor (R1T) can be replaced by an optional remote sensor kit KRCS01-1(A) (to be ordered separately).

Installation of longer thermistor cable (R1T/R2T/R3T)

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

Install the longer thermistor cable with the delivered wire to wire splices

- 1 Cut the wire or bundle the remainder of the thermistor cable.
Keep at least 1 m of the original thermistor cable.
Do not bundle the cable inside the control box.
- 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 water tight connection.
- 5 Wrap electrical insulation tape around the connection.
- 6 Put a pull-relief in front of and behind the connection.



- 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 should be located at least 50 mm away from power supply wire. Not following this guideline may result in malfunction due to electrical noise.

REFRIGERANT PIPING WORK



All field piping must be provided by a licensed refrigeration technician and must comply with the relevant local and national codes.

- For refrigerant piping of outdoor unit, refer to the installation manual supplied with the outdoor unit.
- Follow the outdoor unit specifications for additional charging, piping diameter and installation.
- The maximum allowed piping length depends on the connected outdoor model.

TEST OPERATION

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

- Put the evaporator fan on minimum airflow.
- Refer to the section of "[For the following items, take special care during construction and check after installation is finished](#)" on page 2.
- After finishing the construction of refrigerant piping, drain piping and electric wiring, conduct test operation accordingly to protect the unit.
- Open the gas side stop valve.
- Open the liquid side stop valve.

Executing the test operation

- 1 Start the evaporator fan operation.
- 2 Close the contact T1/T2 (ON/OFF).
- 3 Confirm function of the unit according to the manual and check if the evaporator has collected ice (freeze-up).
 - If the unit collects ice: see "[Troubleshooting](#)" on page 9.



- In case of poor distribution in the evaporator, 1 or more passes of the evaporator may freeze-up (collect ice) → put the thermistor (R2T) on this position.
- Make sure that the evaporator fan keeps operating, even when the outdoor unit compressor stopped operating (only at the moment of "anti-freeze-up" control).
- Depending on operation conditions (e.g.: outdoor ambient temperature) it is possible that the settings must be changed after commissioning.

OPERATION AND MAINTENANCE

WHAT TO DO BEFORE OPERATION



- Before initiating operation, contact your dealer to get the operation manual that corresponds to your system.
- Refer to the dedicated manual of the controller (field supply) and evaporator (field supply).
- Make sure that the air handling unit fan is ON when the outdoor unit is operating.

Field settings for EKEXDCB

Refer to the installation manuals of both the outdoor unit and the remote controller.

Field settings for EKEXFCB

When changing the settings:

1. Make the required settings.
2. Turn power OFF.
3. Remove the remote controller after servicing and checking the system in cooling mode. Operating the remote controller may disturb the normal operation of the system.
4. Do not change T1/T2 operation signal during power failure.
5. Put power of indoor and outdoor unit ON.

Setting the temperature control system

Mode No.	Code No.	Description of setting
13(23)-0	01	Operation with 0–10 V capacity control (= factory setting)
	02	Operation with fixed T _e temperature control

T_e or SST = evaporating temperature or saturated suction temperature.

Operation with 0–10 V capacity control

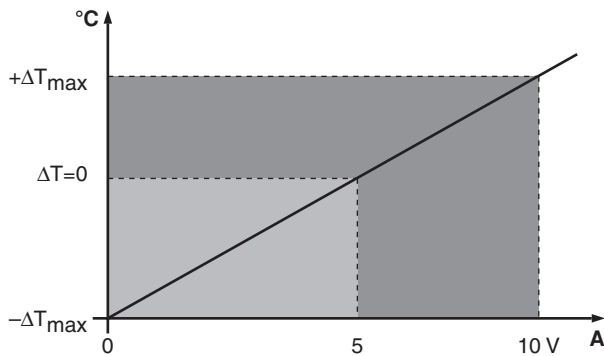
The 0–10 V input is only used for this system of operation and is the base of the capacity control.

This system needs a field supplied controller with a temperature sensor. The temperature sensor can be used to control any temperature:

- Suction air of the evaporator
- Room air
- Discharge air of the evaporator

Program the field supplied controller to generate a 0–10 V signal within conditions as listed. Also refer to the graphic and further data in this paragraph for more details.

- When target temperature is reached: 5 V
- When more capacity is needed: 5–10 V
- When less capacity is needed: 0–5 V



- A** Controller voltage output to EKEXFCB
- Capacity increase area
- Capacity decrease area
- Voltage output = linear function with ΔT
- ΔT = [actual measured temperature] – [target temperature]
When $\Delta T=0$, the target temperature is reached.
- ΔT_{max} = maximum temperature variation as defined by installation
Recommended value for $\Delta T_{max}=[1^{\circ}\text{C}\sim 5^{\circ}\text{C}]$.

ΔT (°C)	$-\Delta T_{max}$	0	$+\Delta T_{max}$
Voltage output from controller (field supply)	0 V	5 V	10 V

Operation with fixed T_e temperature control

The evaporating temperature (T_e) at which the application has to operate can be set by code numbers as listed below.

Mode No.	Code No.	Description of setting ^(*)
13(23)–1	01	$T_e = 3^{\circ}\text{C}$
	02	$T_e = 4^{\circ}\text{C}$
	03	$T_e = 5^{\circ}\text{C}$
	04	$T_e = 6^{\circ}\text{C}$ (factory setting)
	05	$T_e = 7^{\circ}\text{C}$
	06	$T_e = 8^{\circ}\text{C}$
	07	$T_e = 9^{\circ}\text{C}$
	08	$T_e = 10^{\circ}\text{C}$

(*) Depending on the operating temperature condition or on selection of the evaporating unit, operation or safety activation of the outdoor unit may take priority and actual T_e will be different from the set T_e .

Operation setting in case of power failure



Measures must be taken to ensure that after power failure, the T1/T2 operation signal is according to the setting of your preference. Neglecting this caution will result in improper operation.

Mode No.	Code No.	Description of setting
12(22)–5	01	The T1/T2 operation signal contact must be open at power restore. ^(*)
	02	After power failure, the status of the T1/T2 operation signal contact (operation request) must remain identical to the initial T1/T2 contact status prior to the power failure.

(*) After power failure, the T1/T2 operation signal contact must be changed to open (no cooling requested).

OPERATION AND DISPLAY SIGNALS

Output	C1/C2 error signal	Error: open	Abnormal operation on condenser or control system
		No error: closed (relay activated)	Power failure
C3/C4 operation signal	Open	Open	Normal operation
		Closed	T1/T2 is open: no error detection anymore
Input	C5/C6: capacity step	0–10 V	Only necessary for field setting 13(23)–0 = 01 0–10 V capacity control ^(*)
		T1/T2 operation input ^(†)	Open
		Closed	Cooling requested

(*) Refer to paragraph "Operation with 0–10 V capacity control" on page 8.

(†) See field setting 12(22)–5.



- The fan of the evaporator must operate before cooling operation is required to the outdoor unit.
- When the operation signal is activated, the evaporator and fan must operate. Failure to this will cause a safety to operate or freezing up of the evaporator (air handling unit).

TROUBLESHOOTING

To set up the system and make trouble shooting possible, it is required to connect the remote controller to the option kit.

Not a malfunction of the air conditioner


The system does not operate

- The system does not restart immediately after the cooling is requested.
If the operation lamp lights, the system is in normal operating condition.
It does not restart immediately because one of its safety devices actuates to prevent the system from being overloaded. The system will turn on again automatically after 3 minutes.
- The system does not restart immediately after the power supply is turned on.
Wait 1 minute until the micro computer is prepared for operation.

Trouble shooting

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.

- If a safety device such as a fuse, a breaker, or an earth leakage breaker frequently actuates, or ON/OFF switch does not properly work.
Turn off the main power switch.
- If the display  TEST, the unit number and the operation lamp flash and the malfunction code appears;
Notify your dealer and report the malfunction code.

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



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DAIKIN EUROPE N.V.

Zandvoordestraat 300, B-8400 Oostende, Belgium

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