DAIKIN

altherma

INSTALLATION MANUAL

Unit for air to water heat pump system

EBHQ006BAV3
EBHQ008BAV3

EKCBX008BAV3
EKCBH008BAV3

CE - DECLARATION-OF-CONFORMITY
CE - KONFORMITÄTSERKLÄRUNG
CE - DECLARATION-DE-CONFORMITE
CE - CONFORMITEITSVERKLARING

CE - DECLARACION-DE-CONFORMIDAD
CE - DICHIARAZIONE-DI-CONFORMITA
CE - ΔΗΛΩΣΗ ΣΥΜΜΟΡΦΩΣΗΣ

CE - DECLARAÇÃO-DE-CONFORMIDADE
CE - ЗАЯВЛЕНИЕ-О-СООТВЕТСТВИИ
CE - OPFYLDELSESERKLÆRING
CE - FÖRSÄKRAN-OM-ÖVERENSTÄMMELSE

CE - ERKLÆRING OM-SAMSVAR
CE - ILMOITUS-YHDENMUKAISUUDESTA
CE - PROHLÁŠENÍ-O-SHODĚ

CE - IZJAVA-O-USKLAĐENOSTI
CE - MEGFELELŐSÉGI-NYILATKOZAT
CE - DEKLARACJA-ZGODNOŚCI
CE - DECLARAŢIE-DE-CONFORMITATE

CE - IZJAVA O SKLADNOSTI
CE - VASTAVUSDEKLARATSIOON
CE - ДЕКЛАРАЦИЯ-ЗА-СЪОТВЕТСТВИЕ

CE - ATITIKTIES-DEKLARACIJA
CE - ATBILSTĪBAS-DEKLARĀCIJA
CE - VYHLÁSENIE-ZHODY
CE - UYUMLULUK-BİLDİRİSİ

Daikin Europe N.V.

01 (GB) declares under its sole responsibility that the equipment to which this declaration relates:
02 (D) erklärt auf seine alleinige Verantwortung, dass die Ausrüstung für die diese Erklärung bestimmt ist:
03 (F) déclare sous sa seule responsabilité que l'équipement visé par la présente déclaration:
04 (NL) verklaart hierbij op eigen exclusieve verantwoordelijkheid dat de apparatuur waarop deze verklaring betrekking heeft:
05 (E) declara bajo su única responsabilidad que el equipo al que hace referencia la declaración:
06 (I) dichiara sotto la propria responsabilità che gli apparecchi a cui è riferita questa dichiarazione:
07 (GR) δηλώνει με αποκλειστική της ευθύνη ότι ο εξοπλισμός στον οποίο αναφέρεται η παρούσα δήλωση:
08 (P) declara sob sua exclusiva responsabilidade que os equipamentos a que esta declaração se refere:
09 (RUS) заявляет, исключительно под свою ответственность, что оборудование, к которому относится настоящее заявление:
10 (DK) erklærer som eneansvarlig, at udstyret, som er omfattet af denne erklæring:
11 (S) deklarerar i egenskap av huvudansvarig, att utrustningen som berörs av denna deklaration innebär att:
12 (N) erklærer et fullstendig ansvar for at det utstyr som berøres av denne deklarasjon, innebærer at:
13 (FIN) ilmoittaa yksinomaan omalla vastuullaan, että tämän ilmoituksen tarkoittamat laitteet:
14 (CZ) prohlašuje ve své plné odpovědnosti, že zařízení, k němuž se toto prohlášení vztahuje:
15 (HR) izjavljuje pod isključivo vlastitom odgovornošću da oprema na koju se ova izjava odnosi:
16 (H) teljes felelőssége tudatában kijelenti, hogy a berendezések, melyekre e nyilatkozat vonatkozik:
17 (PL) deklaruje na własną wyłączną odpowiedzialność, że urządzenia, których ta deklaracja dotyczy:
18 (RO) declară pe proprie răspundere că echipamentele la care se referă această declaraţie:
19 (SLO) z vso odgovornostjo izjavlja, da je oprema naprav, na katero se izjava nanaša:
20 (EST) kinnitab oma täielikul vastutusel, et käesoleva deklaratsiooni alla kuuluv varustus:
21 (BG) декларира на своя отговорност, че оборудването, за което се отнася тази декларация:
22 (LT) visiška savo atsakomybe skelbia, kad įranga, kuriai taikoma ši deklaracija:
23 (LV) ar pilnu atbildību apliecina, ka tālāk aprakstītās iekārtas, uz kurām attiecas šī deklarācija:
24 (SK) vyhlasuje na vlastnú zodpovednosť, že zariadenie, na ktoré sa vzťahuje toto vyhlásenie:
25 (TR) tamamen kendi sorumluluğunda olmak üzere bu bildirinin ilgili olduğu donanımının aşağıdaki gibi olduğunu beyan eder:

EBHQ006BAV3 + EKCBH008BAV3, EBHQ006BAV3 + EKCBX008BAV3,
EBHQ008BAV3 + EKCBH008BAV3, EBHQ008BAV3 + EKCBX008BAV3,

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 entspricht/entsprechen, unter der Voraussetzung, daß sie gemäß unseren Anweisungen eingesetzt werden:
03 sont conformes à la/aux norme(s) ou autre(s) document(s) normatif(s), pour autant qu'ils soient utilisés conformément à nos instructions:
04 conform de volgende norm(en) of één of meer andere bindende documenten zijn, op voorwaarde dat ze worden gebruikt overeenkomstig onze instructies:
05 están en conformidad con la(s) siguiente(s) norma(s) u otro(s) documento(s) normativo(s), siempre que sean utilizados de acuerdo con nuestras instrucciones:
06 sono conformi al(i) seguente(i) standard(s) o altro(i) documento(i) a carattere normativo, a patto che vengano usati in conformità alle nostre istruzioni:
07 είναι σύμφωνα με το(α) ακόλουθο(α) πρότυπο(α) ή άλλο έγγραφο(α) κανονισμών, υπό την προϋπόθεση ότι χρησιμοποιούνται σύμφωνα με τις οδηγίες μας:
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 andet/andre retningsgivende dokument(er), forudsat at disse anvendes i henhold til vore instrukser:
11 respektive utrustning är utförd i överensstämmelse med och följer följande standard(er) eller andra normgivande dokument, under förutsättning att användning sker i överensstämmelse med våra instruktioner:
12 respektive utstyr er i overensstemmelse med følgende standard(er) eller andre normgivende dokument(er), under forutssetning av at disse brukes i henhold til våre instrukser:
13 vastaavat seuraavien standardien ja muiden ohjeellisten dokumenttien vaatimuksia edellyttäen, että niitä käytetään ohjeidemme mukaisesti:
14 za předpokladu, že jsou využívány v souladu s našimi pokyny, odpovídají následujícím normám nebo normativním dokumentům:
15 u skladu sa slijedećim standardom(ima) ili drugim normativnim dokumentom(ima), uz uvjet da se oni koriste u skladu s našim uputama:
16 megfelelnek az alábbi szabvány(ok)nak vagy egyéb irányadó dokumentum(ok)nak, ha azokat előírás szerint használják:
17 spełniają wymogi następujących norm i innych dokumentów normalizacyjnych, pod warunkiem że używane są zgodnie z naszymi instrukcjami:
18 sunt în conformitate cu următorul (următoarele) standard(e) sau alt(e) document(e) normativ(e), cu condiţia ca acestea să fie utilizate în conformitate cu instrucţiunile noastre
19 skladni z naslednjimi standardi in drugimi normativi, pod pogojem, da se uporabljajo v skladu z našimi navodili:
20 on vastavuses järgmis(t)e standardi(te)ga või teiste normatiivsete dokumentidega, kui neid kasutatakse vastavalt meie juhenditele:
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 tad, ja lietoti atbilstoši ražotāja norādījumiem, atbilst sekojošiem standartiem un citiem normatīviem dokumentiem:
24 sú v zhode s nasledovnou(ými) normou(ami) alebo iným(i) normatívnym(i) dokumentom(ami), za predpokladu, že sa používajú v súlade s našim návodom:
25 ürünün, talimatlarımıza göre kullanılması koşuluyla aşağıdaki standartlar ve norm belirten belgelerle uyumludur:

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 τήρηση των διατάξεων των:
08 de acordo com o previsto em:
09 в соответствии с положениями:
10 under iagttagelse af bestemmelserne i:
11 enligt villkoren i:
12 gitt i henhold til bestemmelsene i:
13 noudattaen määräyksiä:
14 za dodržení ustanovení předpisu:
15 prema odredbama:
16 követi a(z):
17 zgodnie z postanowieniami Dyrektyw:
18 în urma prevederilor:
19 ob upoštevanju določb:
20 vastavalt nõuetele:
21 следвайки клаузите на:
22 laikantis nuostatų, pateikiamų:
23 ievērojot prasības, kas noteiktas:
24 održiavajúc ustanovenia:
25 bunun koşullarına uygun olarak:

Low Voltage 2006/95/EC
Electromagnetic Compatibility 2004/108/EC *

01 Directives, as amended.
02 Direktiven, gemäß Änderung.
03 Directives, telles que modifiées.
04 Richtlijnen, zoals geamendeerd.
05 Directivas, según lo enmendado.
06 Direttive, come da modifica.
07 Οδηγιών, όπως έχουν τροποποιηθεί.
08 Directivas, conforme alteração em.
09 Директив со всеми поправками.
10 Direktiver, med senere ændringer.
11 Direktiv, med företagna ändringar.
12 Direktiver, med foretatte endringer.
13 Direktiivejä, sellaisina kuin ne ovat muutettuina.
14 v platném znění.
15 Smjernice, kako je izmijenjeno.
16 irányelv(ek) és módosításaik rendelkezéseit.
17 z późniejszymi poprawkami.
18 Directivelor, cu amendamentele respective.
19 Direktive z vsemi spremembami.
20 Direktiivid koos muudatustega.
21 Директиви, с техните изменения.
22 Direktyvose su papildymais.
23 Direktīvās un to papildinājumos.
24 Smernice, v platnom znení.
25 Değiştirilmiş halleriyle Yönetmelikler.

01 **Note** * as set out in **<A>** and judged positively by **<B>** according to the **Certificate <C>**.
02 **Hinweis** * wie in der **<A>** aufgeführt und von **<B>** positiv beurteilt gemäß **Zertifikat <C>**.
03 **Remarque** * tel que défini dans **<A>** et évalué positivement par **<B>** conformément au **Certificat <C>**.
04 **Bemerk** * zoals vermeld in **<A>** en positief beoordeeld door **<B>** overeenkomstig **Certificaat <C>**.
05 **Nota** * como se establece en **<A>** y es valorado positivamente por **<B>** de acuerdo con el **Certificado <C>**.
06 **Nota** * delineato nel **<A>** e giudicato positivamente da **<B>** secondo il **Certificato <C>**.
07 **Σημείωση** * όπως καθορίζεται στο **<A>** και κρίνεται θετικά από το **<B>** σύμφωνα με το **Πιστοποιητικό <C>**.
08 **Nota** * tal como estabelecido em **<A>** e com o parecer positivo de **<B>** de acordo com o **Certificado <C>**.
09 **Примечание** * как указано в **<A>** и в соответствии с положительным решением **<B>** согласно **Свидетельству <C>**.
10 **Bemærk** * som anført i **<A>** og positivt vurderet af **<B>** i henhold til **Certifikat <C>**.
11 **Information** * enligt **<A>** och godkänts av **<B>** enligt **Certifikatet <C>**.
12 **Merk** * som det fremkommer i **<A>** og gjennom positiv bedømmelse av **<B>** ifølge **Sertifikat <C>**.
13 **Huom** * jotka on esitetty asiakirjassa **<A>** ja jotka **<B>** on hyväksynyt **Sertifikaatin <C>** mukaisesti.
14 **Poznámka** * jak bylo uvedeno v **<A>** a pozitivně zjištěno **<B>** v souladu s **osvědčením <C>**.
15 **Napomena** * kako je izloženo u **<A>** i pozitivno ocijenjeno od strane **<B>** prema **Certifikatu <C>**.
16 **Megjegyzés** * a(z) **<A>** alapján, a(z) **<B>** igazolta a megfelelést, a(z) **<C>** **tanúsítvány** szerint.
17 **Uwaga** * zgodnie z dokumentacją **<A>**, pozytywną opinią **<B>** i **Świadectwem <C>**.
18 **Notă** * aşa cum este stabilit în **<A>** şi apreciat pozitiv de **<B>** în conformitate cu **Certificatul <C>**.
19 **Opomba** * kot je določeno v **<A>** in odobreno s strani **<B>** v skladu s **certifikatom <C>**.
20 **Märkus** * nagu on näidatud dokumendis **<A>** ja heaks kiidetud **<B>** järgi vastavalt **sertifikaadile <C>**.
21 **Забележка** * както е изложено в **<A>** и оценено положително от **<B>** съгласно **Сертификата <C>**.
22 **Pastaba** * kaip nustatyta **<A>** ir kaip teigiamai nuspręsta **<B>** pagal **Sertifikatą <C>**.
23 **Piezīmes** * kā norādīts **<A>** un atbilstoši **<B>** pozitīvajam vērtējumam saskaņā ar **sertifikātu <C>**.
24 **Poznámka** * ako bolo uvedené v **<A>** a pozitívne zistené **<B>** v súlade s **osvedčením <C>**.
25 **Not** * **<A>**'da belirtildiği gibi ve **<C>** **Sertifikasına** göre **<B>** tarafından olumlu olarak değerlendirildiği gibi.

<A>	**DAIKIN.TCF.025D6/08-2010**
<B>	**KEMA (NB0344)**
<C>	**2082543.0551-QUA/EMC**

3PW33163-7H

DAIKIN

Jean-Pierre Beuselinck
General Manager
Ostend, 1st of September 2010

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

CONTENTS

Thank you for purchasing this product.

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

⚠ CAREFULLY READ THESE INSTRUCTIONS BEFORE INSTALLATION. THEY WILL TELL YOU HOW TO INSTALL AND HOW TO CONFIGURE THE UNIT PROPERLY. KEEP THIS MANUAL IN A HANDY PLACE FOR FUTURE REFERENCE.

1. Definitions

1.1. Meaning of warnings and symbols

Warnings in this manual are classified according to their severity and probability of occurrence.

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

NOTICE

Indicates situations that may result in equipment or property-damage accidents only.

This symbol identifies useful tips or additional information.

Some types of danger are represented by special symbols:

Electric current.

Danger of burning and scalding.

1.2. Meaning of used terms

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.

Dealer:

Sales distributor for products as per the subject of this manual.

Installer:

Technical skilled person who is qualified to install products as per the subject of this manual.

User:

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

Service company:

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

Applicable legislation:

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

Accessories:

Equipment which is delivered with the unit and which needs to be installed according to instructions in the documentation.

Optional equipment:

Equipment which can optionally be combined to the products as per the subject of this manual.

Field supply:

Equipment which needs to be installed according to instructions in this manual, but which are not supplied by Daikin.

2. General Safety precautions

All activities described in this manual shall be carried out by an installer.

Be sure to wear adequate personal protection equipment (protection gloves, safety glasses, …) when performing installation, maintenance or service to the unit.

If not sure of installation procedures or operation of the unit, always contact your local dealer for advice and information.

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 and optional equipment made by Daikin which are specially designed for use with the products as of subject in this manual and have them installed by an installer.

The precautions listed here are divided into the following four types. They all cover very important topics, so be sure to follow them carefully.

DANGER: ELECTRICAL SHOCK

Switch off all power supply before removing the switch box service panel or before making any connections or touching electrical parts.

Do not touch any switch with wet fingers. Touching a switch with wet fingers can cause electrical shock. Before touching electrical parts, turn off all applicable power supply.

To avoid electric shock, be sure to disconnect the power supply 1 minute or more before servicing the electrical parts. Even after 1 minute, always measure the voltage at the terminals of main circuit capacitors or electrical parts and, before touching, be sure that those voltages are 50 V DC or less.

When service panels are removed, live parts can easily be touched by accident. Never leave the unit unattended during installation or servicing when the service panel is removed.

DANGER: DO NOT TOUCH PIPING AND INTERNAL PARTS

Do not touch the refrigerant piping, water piping or internal parts during and immediately after operation. The piping and internal parts may be hot or cold depending on the working condition of the unit.

Your hand may suffer burns or frostbite if you touch the piping or internal parts. To avoid injury, give the piping and internal parts time to return to normal temperature or, if you must touch them, be sure to wear protective gloves.

WARNING

- Tear apart and throw away plastic packaging bags so that children will not play with them.
  Children playing with plastic bags face danger of death by suffocation.
- Safely dispose of packing materials. Packing materials, such as nails and other metal or wooden parts, may cause stabs or other injuries.

- Ask your dealer or qualified personnel to carry out installation work.
  Do not install the machine by yourself.
  Improper installation may result in water leakage, electric shocks or fire.
- Perform installation work in accordance with this installation manual.
  Improper installation may lead to water leakage, electric shocks or fire.
- Be sure to use only the specified accessories and parts for installation work.
  Failure to use the specified parts may result in water leakage, electric shocks, fire, or the unit falling.
- Install the unit on a foundation that can withstand its weight.
- Insufficient strength may result in the fall of equipment and causing injury.
- Carry out the specified installation work in consideration of strong winds, hurricanes, or earthquakes.
  Improper installation work may result in accidents due to fall of equipment.
- Make certain that all electrical work is carried out by qualified personnel according to the local laws and regulations and this installation manual, using a separate circuit.
  Insufficient capacity of the power supply circuit or improper electrical construction may lead to electric shocks or fire.
- Be sure to install an earth leakage circuit breaker in accordance with relevant local and national regulations. Failure to do so may cause electrical shock and fire.
- Make sure that all wiring is secure, using the specified wires and ensuring that external forces do not act on the terminal connections or wires.
  Incomplete connection or fixing may cause a fire.
- When wiring between the indoor and the outdoor units and wiring the power supply, form the wires so that the panels can be securely fastened.
  If the panels are not in place, overheat of the terminals, electric shocks or a fire may be caused.
- After completing the installation work, check to make sure that there is no leakage of refrigerant gas.
- Never directly touch any accidental leaking refrigerant. This could result in severe wounds caused by frostbite.
- Electrical work must be carried out in accordance with the installation manual and the national electrical wiring rules or code of practice.
  Insufficient capacity or incomplete electrical work may cause electrical shock or fire.
- Be sure to use a dedicated power circuit. Never use a power circuit shared by another appliance.
- For wiring, use a cable long enough to cover the entire distance with no connection. Do not use an extension cord. Do not put other loads on the power supply, use a dedicated power circuit.
  Failure to do so may cause abnormal heat, electric shock, or fire.
- Do not touch the refrigerant pipes during and immediately after operation as the refrigerant pipes may be hot or cold, depending on the condition of the refrigerant flowing through the refrigerant piping, compressor and other refrigerant cycle parts. Your hands may suffer burns or frostbite if you touch the refrigerant pipes. To avoid injury, give the pipes time to return to normal temperature or, if you must touch them, be sure to wear proper gloves.

CAUTION

- For use of units in applications with temperature alarm settings it is advised to foresee a delay of 10 minutes for signalling the alarm in case the alarm temperature is exceeded. The unit may stop for several minutes during normal operation for "defrosting of the unit" or when in "thermostat-stop" operation.
- Earth the unit.
  Earth resistance should be according to local laws and regulations.
  Do not connect the earth wire to gas or water pipes, lightning conductor or telephone earth wire.
  Incomplete earthing may cause electric shocks.
  - Gas pipe.
    Ignition or explosion may occur if the gas leaks.
  - Water pipe.
    Hard vinyl tubes are not effective earths.
  - Lightning conductor or telephone earth wire.
    Electric potential may rise abnormally if struck by a lightning bolt.
- Install the indoor and outdoor units, power wire and connecting wire at least 1 meter away from televisions or radios to prevent image interference or noise.
  (Depending on the radio waves, a distance of 1 meter may not be sufficient to eliminate the noise.)
- Do not rinse the unit. This may cause electric shocks or fire.
- Do not install the unit in places such as the following:
  - Where there is mist of mineral oil, oil spray or vapour. Plastic parts may deteriorate, and cause them to fall out or water to leak.
  - Where corrosive gas, such as sulphurous acid gas, is produced.
    Corrosion of copper pipes or soldered parts may cause the refrigerant to leak.
  - Where there is machinery which emits electromagnetic waves.
    Electromagnetic waves may disturb the control system, and cause malfunction of the equipment.
  - Where flammable gases may leak, where carbon fibre or ignitable dust is suspended in the air or where volatile flammables, such as thinner or gasoline, are handled. Such gases may cause a fire.
  - Where the air contains high levels of salt such as that near the ocean.
  - Where voltage fluctuates a lot, such as that in factories.
  - In vehicles or vessels.
  - Where acidic or alkaline vapour is present.

3. INTRODUCTION

3.1. General information

This installation manual concerns Monoblock units of the GBS Altherma series.

The Monoblock units exist out of an outdoor installed unit (EBHQ) and an indoor installed (wall mounted) unit (EKCB).

These units are used for both heating and cooling applications. The units can be combined with Daikin fan coil units, floor heating applications, low temperature radiators, domestic hot water tank (option) and solar kit (option).

A user interface is standard supplied with the unit to control your installation.

Heating/cooling units and heating only units

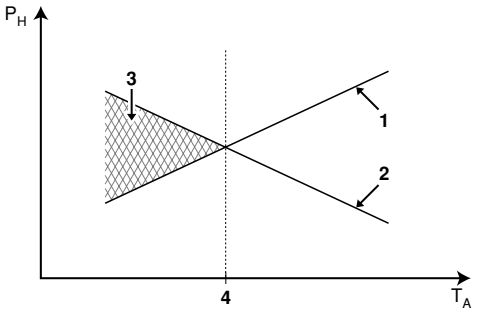
The monoblock unit range consists of two main versions: a heating/cooling version (uses EKCBX indoor unit) and a heating only version (uses EKCBH indoor unit), both available in 2 capacity sizes: 6 kW (EBHQ006) or 8 kW (EBHQ008).

3.2. Combination and options

Possible combinations

	Indoor units	
Outdoor units	EKCBX008BAV3	EKCBH008BAV3
EBHQ006BAV3	Possible	Possible
EBHQ008BAV3	Possible	Possible

Both versions (heating only and heating/cooling) are standard delivered with a backup heater kit (EKMBUH) for additional heating capacity during cold outdoor temperatures. The backup heater also serves as a backup in case of malfunctioning of the unit and for freeze protection of the outside water piping during winter time. The backup heater factory set capacity is 6 kW, however, depending on the installation, the installer can limit the backup heater capacity to 3 kW. The backup heater capacity decision is a mode based on the equilibrium temperature, see scheme below.



1	Heat pump capacity
2	Required heating capacity (site dependent)
3	Additional heating capacity provided by the backup heater
4	Equilibrium temperature (can be set through the user interface. refer to "Equilibrium temperature and space heating priority temperature" on page 33
T_A	Ambient (outdoor) temperature
P_H	Heating capacity

NOTICE

The EKCB* and EBHQ*006/008 units **can not** be operated without the EKMBUH heater kit.

- Domestic hot water tank (option)
  An optional EKHW* domestic hot water tank with integrated 3 kW electrical booster heater can be connected to the indoor unit. The domestic hot water tank is available in three sizes: 150, 200 and 300 litre. Refer to the domestic hot water tank installation manual for further details.
- Solar kit for domestic hot water tank (option)
  For information concerning the EKSOLHW solar kit, refer to the installation manual of that kit.
- Digital I/O PCB kit (option)
  An optional EKRP1HB digital I/O PCB can be connected to the indoor unit and allows:
  - remote alarm output
  - heating/cooling ON/OFF output
  - bivalent operation (permission signal for the auxiliary boiler)

  Refer to the operation manual and to the installation manual of the digital I/O PCB for more information.

  Refer to the wiring diagram or connection diagram for connecting this PCB to the unit.
- Bottom plate heater EKBPHT08BA (option)
- Remote thermostat kit (option)
  An optional room thermostat EKRTWA, EKRTR or EKRTETS can be connected to the indoor unit. Refer to the installation manual of the room thermostat for more information.
  To obtain more information concerning these option kits, please refer to dedicated installation manuals of the kits.

Connection to a benefit kWh rate power supply

NOTICE

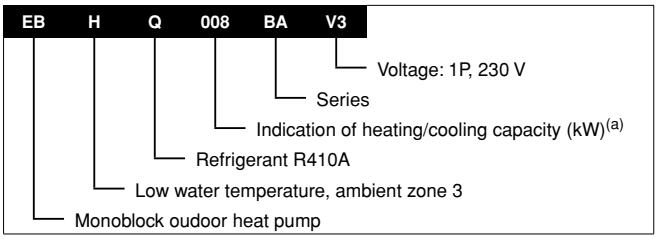
This equipment allows for connection to benefit kWh rate power supply delivery systems. Full control of the unit will remain possible only in case the benefit kWh rate power supply is of the type that power supply is not interrupted. Refer to "[D] Benefit kWh rate power supply/Local shift value weather dependent" on page 38 for more details.

3.3. Scope of the manual

This manual describes the procedures for handling, installing and connecting the EBHQ and EKCB units. This manual has been prepared to ensure adequate maintenance of the unit, and it will provide help if problems occur.

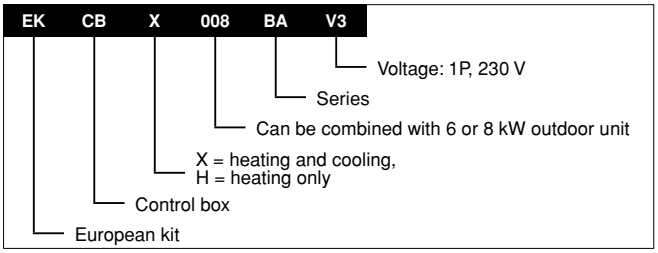
3.4. Model identification

Outdoor unit



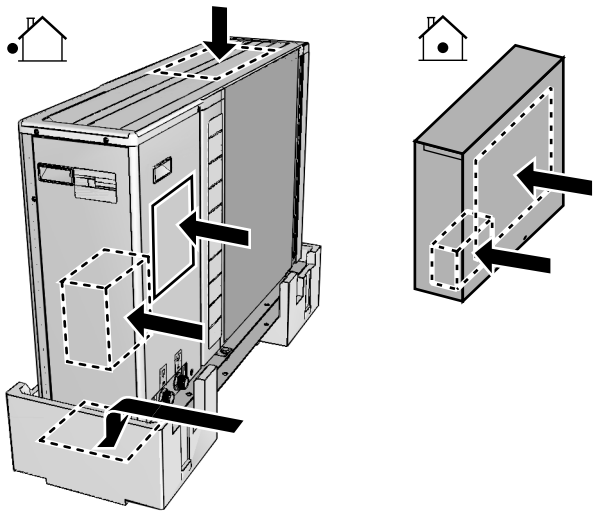
(a) For exact values, refer to "Technical specifications" on page 47.

Indoor unit

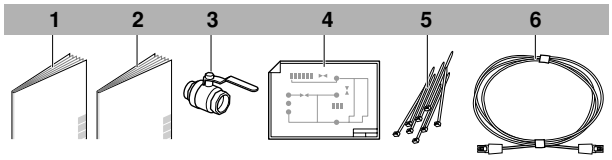


4. Accessories

4.1. Location of the accessories

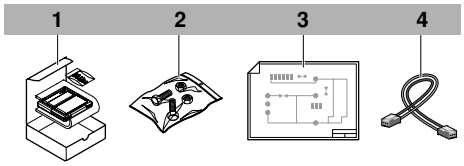


4.2. Accessories supplied with the outdoor unit



1 Installation manual
2 Operation manual
3 Shut-off valve (2x)
4 Wiring diagram sticker (inside top unit cover)
5 Cable Ties (15x)
6 Thermistor connection cable

4.3. Accessories supplied with the indoor unit

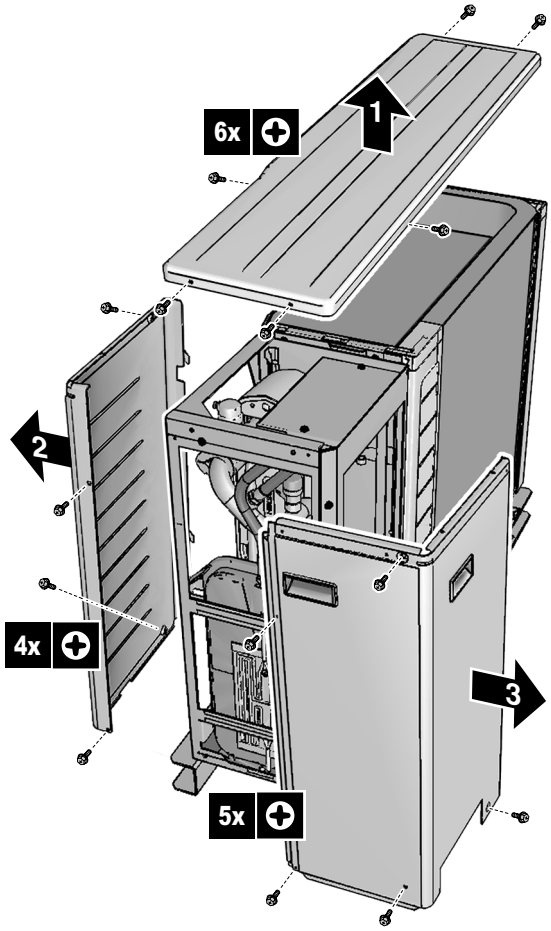


1 user interface kit
(user interface, 4 fixing screws and 2 plugs)
2 Accessory bag
(2 mounting bolts and 2 nuts for user interface)
3 Wiring diagram sticker (inside unit cover)
4 Booster heater extension cable

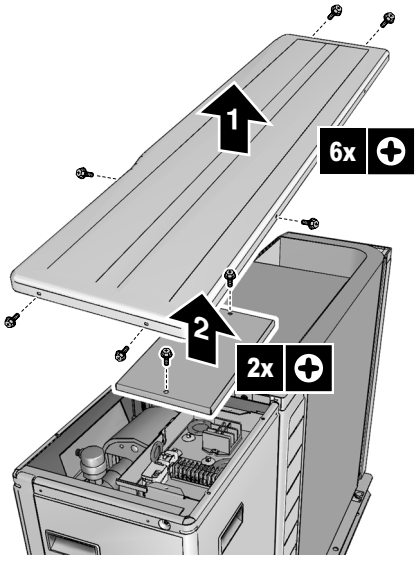
5. Overview of unit

5.1. Opening of the outdoor and indoor unit

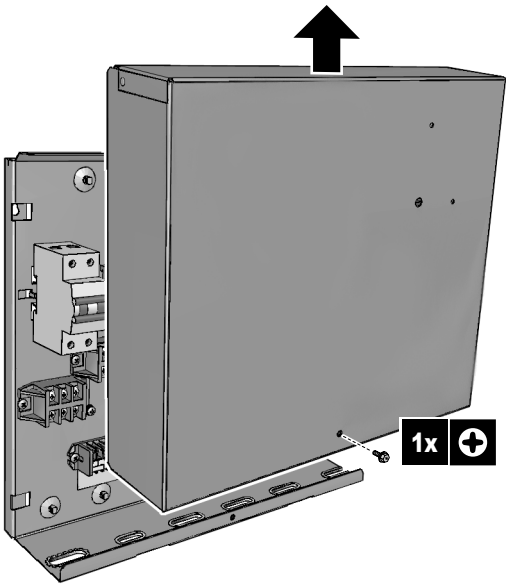
■ Opening of the outdoor unit
To gain access to the unit, the service panels need to be opened as shown in the figure below



For access to the terminals, following panels have to be removed as shown in the figure below



- Opening of the indoor unit
  To gain access to the unit, the front cover needs to be opened as shown in the figure below



WARNING

- Switch off all power supply – i.e. outdoor unit power supply and backup heater and domestic hot water tank power supply (if applicable) – before removing the switch box service panel (outdoor unit and indoor unit).
- Do not touch the refrigerant pipes during and immediately after operation as the refrigerant pipes may be hot or cold, depending on the condition of the refrigerant flowing through the refrigerant piping, compressor, and other refrigerant cycle parts. Your hands may suffer burns or frostbite if you touch the refrigerant pipes. To avoid injury, give the pipes time to return to normal temperature or, if you must touch them, be sure to wear proper gloves.
- Do not touch the internal parts (pump, backup heater, etc.) during and immediately after operation.

  Your hands may suffer burns if you touch the internal parts. To avoid injury, give the internal parts time to return to normal temperature or, if you must touch them, be sure to wear proper gloves.

DANGER

- Do not touch water pipes during and immediately after operation as the pipes may be hot. Your hand may suffer burns. To avoid injury, give the piping time to return to normal temperature or be sure to wear proper gloves.
- When service panels are removed, live parts can be easily touched by accident.
  Never leave the unit unattended during installation or servicing when the service panel is removed.

DANGER: ELECTRICAL SHOCK

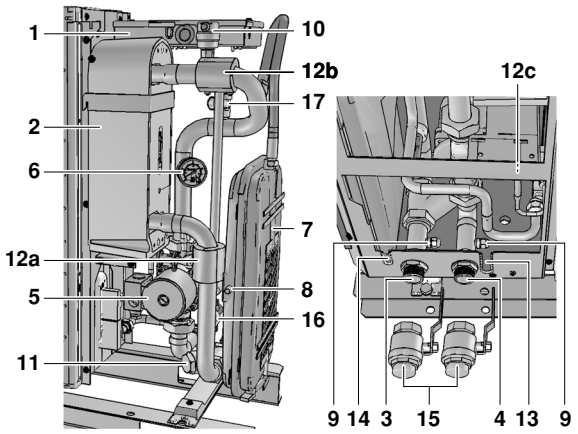
See "2. General Safety precautions" on page 2.

DANGER: DO NOT TOUCH PIPING AND INTERNAL PARTS

See "2. General Safety precautions" on page 2.

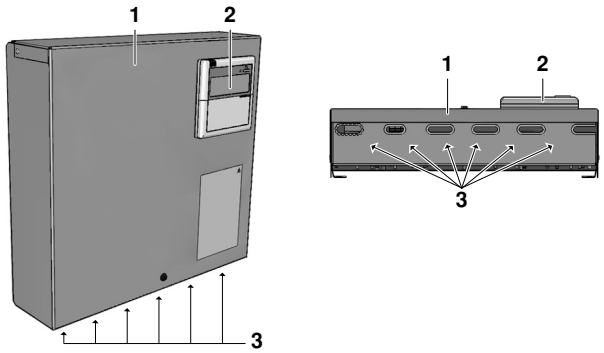
5.2. Main components of the outdoor unit and the indoor unit

Outdoor unit watersystem



1. Switch box
   The switch box contains connection terminals for the power supply and a connection point for the thermistor interconnection cable.
2. Heat exchanger
3. Water inlet connection (1" MBSP)
4. Water outlet connection (1" MBSP)
5. Pump
   The pump circulates the water in the water circuit.
6. Manometer
   The manometer allows readout of the water pressure in the system.
7. Expansion vessel (6 litre)
   The water in the water circuit expands with rising temperatures. The expansion vessel stabilises the pressure changes with changing water temperatures by giving free space to the changing water volume.
8. Expansion vessel service point
   The service point allows connection of a dry nitrogen cylinder to adjust the expansion vessel pre-pressure if necessary.
9. Drain and fill valve (2x)
10. Air purge valve
    Remaining air in the water circuit will be automatically removed via the air purge valve.
11. Water filter
    The water filter removes dirt from the water to prevent damage to the pump or blockage of the heat exchanger. The water filter should be cleaned on a regular base. See "16. Maintenance and service" on page 43.
12. Temperature sensors (thermistors)
    Two temperature sensors determine the water inlet temperature (12a) and water outlet temperature (12b). A third thermistor (12c) measures the refrigerant temperature.
13. Power supply intake
14. Thermistor interconnection cable intake
15. Shut-off valves (accessory)
    The shut-off valves on the water inlet connection and water outlet connection allow isolation of the outdoor unit water circuit side from the residential water circuit side. This facilitates draining and filter replacement of the outdoor unit.
16. Flow switch
    The flow switch checks the flow in the water circuit and protects the heat exchanger against freezing and the pump against damage. In case the minimum required flow is not achieved, the unit will be shut down.
17. Pressure relief valve
    The pressure relief valve prevents excessive water pressure in the water circuit (≥3 bar).

Indoor unit



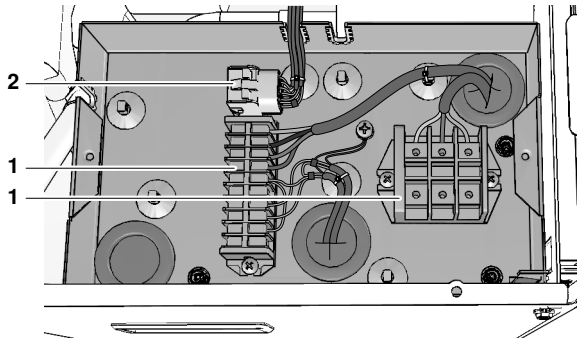
1 Indoor unit
2 User interface mounted on the indoor front panel
3 Field wiring intake

1. The user interface must be mounted on the EKCB front panel and allows the installer and user to set up, use and maintain the unit.

2. Field wiring intake is foreseen to allow mounting and connecting the field wiring to the terminals inside the EKCB.

5.3. Main components of the outdoor unit switch box and indoor unit switch box

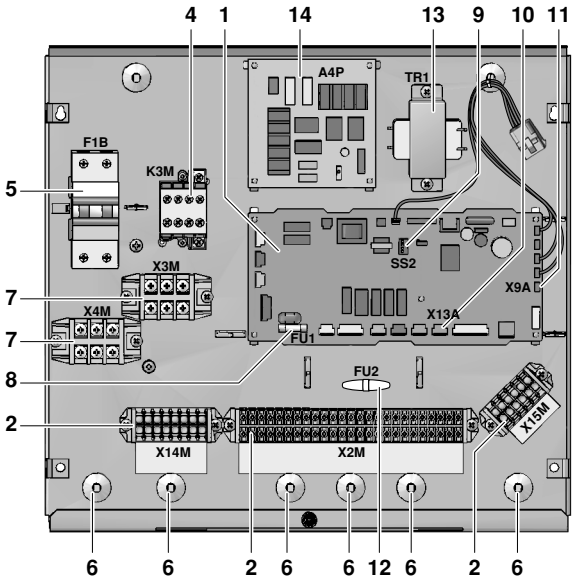
Outdoor unit switch box



1 Terminal blocks
The terminal blocks allow easy connection of field wiring.
2 Thermistor interconnection cable connector

The electric wiring diagram can be found on the inside of the outdoor unit top panel.

Indoor unit switch box



1. Main PCB
The main PCB (Printed Circuit Board) controls the functioning of the unit.

2. Terminal blocks X2M, X14M, X15M
The terminal blocks allow easy connection of field wiring.

3. Thermistor interconnection cable connector

4. Booster heater contactor K3M (only for installations with a domestic hot water tank installed)

5. Booster heater circuit breaker F1B (only for installations with a domestic hot water tank installed)
The circuit breaker protects the booster heater in the domestic hot water tank against overload or short circuit.

6. Cable tie mountings
The cable tie mountings allow to fix the field wiring with cable ties to the switch box to ensure strain relief.

7. Terminal blocks X3M, X4M (only for installations with a domestic hot water tank installed)

8. PCB fuse FU1

9. DIP switch SS2
The DIP switch SS2 provides 4 toggle switches to configure certain installation parameters. See "13.1. DIP switch settings overview" on page 28.

10. X13A socket
The X13A socket receives the K3M connector (only for installations with a domestic hot water tank installed).

11. X9A socket
The X9A socket receives the thermistor connector (only for installations with a domestic hot water tank installed).

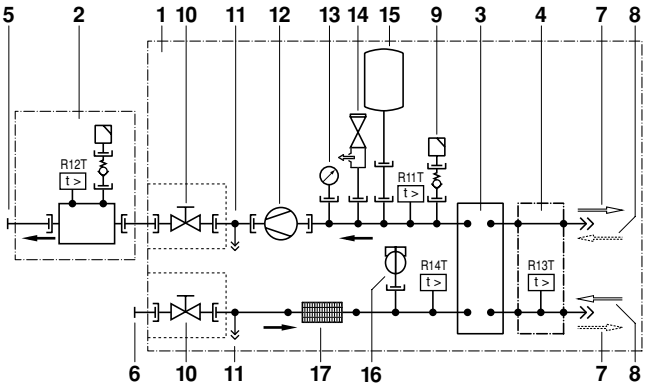
12. Fuse FU2 (in line fuse)

13. Transformer TR1

14. A4P
Digital I/O PCB (only for installations with a solar kit or a digital I/O PCB kit installed).

The electric wiring diagram can be found on the inside of the indoor unit front panel

5.4. Functional diagram of outdoor hydraulic compartment



1 Outdoor unit EBHQ*BAV3
2 Backup heater EKMBUH*6V3
3 Heat exchanger
4 Heat exchanger refrigerant side
5 Water outlet
6 Water inlet
7 Refrigerant outlet
8 Refrigerant intlet
9 Air purge valve
10 Shut-off valve water (accessory)
11 Drain and fill valve
12 Pump
13 Manometer
14 Pressure relief valve
15 Expansion vessel
16 Flow switch
17 Water filter
R11T Water outlet temperature sensor
R12T Backup heater temperature sensor
R13T Refrigerant temperature thermistor
R14T Water inlet temperature sensor
Waterflow direction
Refrigerant flow direction in cooling mode
Refrigerant flow direction in heating mode

6. SELECTING AN INSTALLATION LOCATION

WARNING

Be sure to provide for adequate measures in order to prevent that the EBHQ outdoor unit be used as a shelter by small animals.

Small animals making contact with electrical parts can cause malfunctions, smoke or fire. Please instruct the customer to keep the area around the EBHQ outdoor unit clean and clear.

CAUTION

Appliance not accessible to the general public, install it in a secured area, protected from easy access.

This unit, both indoor and outdoor, is suitable for installation in a commercial and light industrial environment.

General precautions on outdoor installation location

Select an installation site that meets the following requirements and that meets with your customer's approval.

- The unit is designed to be installed in an outdoor location.
- The space around the unit is adequate for maintenance and servicing (refer to "7.3. Service space" on page 10).
- The space around the unit allows for sufficient air circulation. There must be sufficient space for air passage and no obstructions around the air intake and the air exhaust (see "Installing near a wall or obstacle" on page 9).
- There must be sufficient space for carrying the unit into and out of the site.
- There is no danger of fire due to leakage of inflammable gas. The site must be free from the possibility of flammable gas leakage in a nearby place.
- The equipment is not intended for use in a potentially explosive atmosphere.
- Choose a place solid enough to bear the weight and vibration of the unit, where the operation noise will not be amplified.
- All piping lengths and distances have been taken into consideration.

Requirement	Value
Maximum allowable distance between the domestic hot water tank and the outdoor unit (only for installations with a domestic hot water tank installed). The thermistor cable supplied with the domestic hot water tank is 12 m in length (to be connected to the indoor unit EKCB).	10 m
Maximum allowable distance between the 3-way valve and the outdoor unit (only for installations with a domestic hot water tank installed)	10 m (try to keep as close to the outdoor unit as possible)

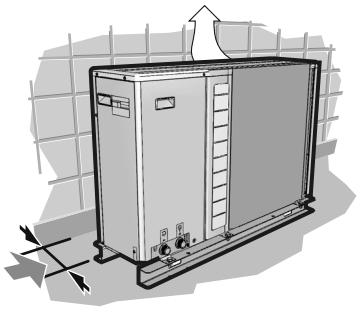
- Since drain flows out of the unit, do not place anything under the unit which must be kept away from moisture.
- Take care that in the event of a water leak, water cannot cause any damage to the installation space and surroundings (e.g. in case of a blocked drain pipe).
- Install the unit and power cords at least 3 m away from television and radio sets. This is to prevent interference to images and sounds.
  Depending on radio wave conditions, electromagnetic interference may still occur even if installed more than 3 m away.

- Select the location of the unit in such a way that the sound generated by the unit does not disturb anyone, and the location is selected according the applicable legislation.
  Although the noise produced by the unit during operation is low, avoid installation near to places where even low noise levels can be disturbing (e.g., bedroom windows, terraces, next-door neighbours).
- Do not install the unit in places often used as workplace.
  In case of construction works (e.g. grinding works) where a lot of dust is created, the unit must be covered.
- Be sure that sufficient precautions are taken, in accordance with relevant local laws and regulations, in case of refrigerant leakage.

Wheater dependent precautions

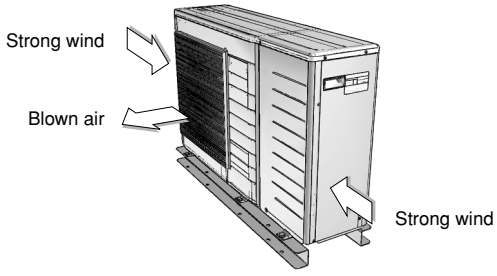
- Select a place where the rain can be avoided as much as possible.
- In heavy snowfall areas, it is very important to select an installation site where the snow will not affect the unit. If lateral snowfall is possible, Be sure that the heat exchanger coil is not affected by the snow (if necessary construct a lateral canopy).
- Ensure that water cannot cause any damage to the location by adding water drains to the foundation and prevent water traps in the construction.
- Do not install the unit in areas where the air contains high levels of salt such as that near the ocean, corrosion may shorten the life of the unit.
- Prevent direct exposure to winds coming from the sea.
- Be sure that the air inlet and outlet of the unit are not positioned towards the main wind direction. frontal wind will disturb the operation of the unit. If necessary, use a screen to block the wind.
- When installing the unit in a place exposed to strong wind, pay special attention to the following.
  Strong winds of 5 m/sec or more blowing against the unit's air outlet cause short circuit (suction of discharge air), and this may have the following consequences:
  - deterioration of the operational capacity,
  - frequent frost acceleration in heating operation,
  - disruption of operation due to rise of high pressure,
  - when a strong wind blows continuously on the face of the unit, the fan can start rotating very fast until it breaks.

  Refer to the figures for installation of this unit in a place where the wind direction can be foreseen.
  - Turn the air outlet side toward the building's wall, fence or screen.



Make sure there is enough room to do the installation

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

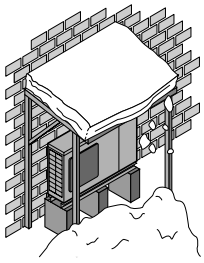


Selecting an outdoor location in cold climates

NOTICE

When operating the unit in a low outdoor ambient temperature, be sure to follow the instructions described below.

- To prevent exposure to wind, install the unit with its suction side facing the wall.
- Never install the unit at a site where the suction side may be exposed directly to wind.
- To prevent exposure to wind, install a baffle plate on the air discharge side of the outdoor unit.
- When installing the unit in a place frequently exposed to snow, pay special attention to the following:
  - Elevate the foundation as high as possible.
  - Select an installation site where the snow will not affect the unit. If lateral snowfall is possible, make sure that the heat exchanger coil is not affected by the snow (if necessary construct a lateral canopy).

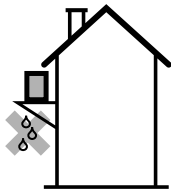


Construct a large canopy.

Construct a pedestal.
Install the unit high enough off the ground to prevent burying in snow.

Place of installation

- Prepare a water drainage channel around the outdoor unit, to drain waste water from around the unit.
- If the water drainage of the unit is not easy, please build up the unit on a foundation of concrete blocks, etc. (the height of the foundation should be maximum 150 mm).
- If you install the unit on a frame, please install a waterproof plate within 150 mm of the underside of the unit in order to prevent the invasion of water from the lower direction.
- If you install the unit on a building frame, please install a waterproof plate (field supply)(within 150 mm of the underside of the unit) in order to avoid the drainwater dripping. (See figure).



NOTICE

Units cannot be installed hanging from the ceiling or stacked.

- Installing near a wall or obstacle
  - Where a wall or other obstacle is in the path of the unit's air intake or exhaust airflow, the distances as indicated on the figures below need to be respected.
  - The wall height on the exhaust side should be 1200 mm or less.
- Do not sit or stand on top of the unit.
- Do not place any objects or equipment on top of the unit.

General precautions on indoor installation location

The EKCB unit is to be wall mounted in an indoor location that meets the following requirements:

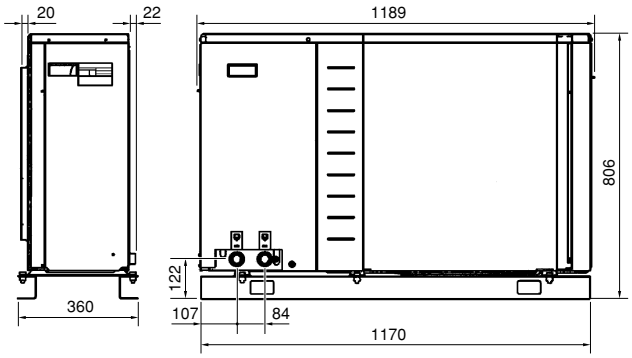
- The space around the unit is adequate for servicing. Refer to "7.3. Service space" on page 10.
- The space around the unit allows for sufficient air circulation.
- The installation surface is a flat and vertical non-combustible wall, capable of supporting the operation weight of the unit (refer to the "Technical specifications" on page 47).
- During normal operation the control box may produce sound which could be observed as noise. The sound origin can be contactor activation. Therefore it is advisable to install the control box on a firm wall and not in nor close to a sound sensitive environment (e.g. bedroom).
- Do not install the unit in places with high humidity (e.g. bathroom).
- The equipment is not intended for use in a potentially explosive atmosphere.
- Do not install the unit in places often used as work place.
  In case of construction works (e.g. grinding works) where a lot of dust is created, the unit must be covered.
- Do not place any objects or equipment on top of the unit.

CAUTION

If the installation is equipped with a domestic hot water tank (optional), please refer to the domestic hot water tank installation manual.

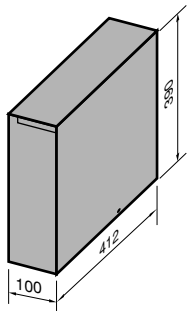
7. Dimensions and service space

7.1. Dimensions of outdoor unit



Unit of measurement: mm

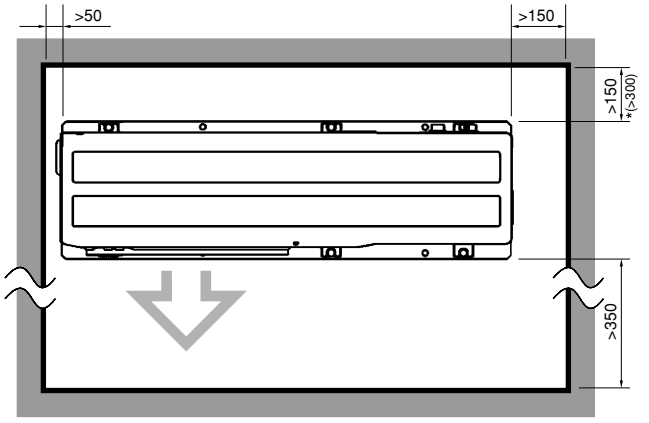
7.2. Dimensions of indoor unit



Unit of measurement: mm

7.3. Service space

The space around the unit is adequate for servicing and the minimum space for air inlet and air outlet is available. (Refer to the figure below).



Unit of measurement: mm

NOTICE

The wall height on the air outlet side (marked with grey arrow in the figure above) must be less than 1200 mm.

The installation space required on this drawing is for full load heating operation without considering possible ice accumulation.

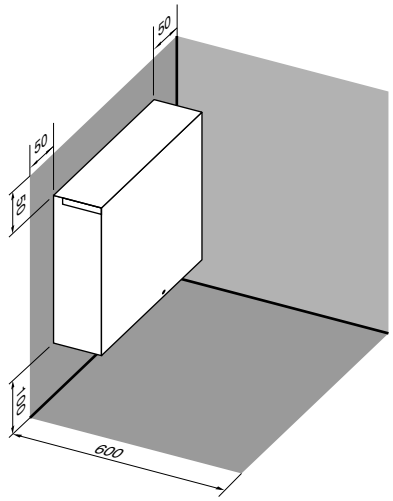
If the location of the installation is in a cold climate, then all dimensions above should be >500 mm to avoid accumulation of ice in between the outdoor unit and the nearest walls.

- The connection piping outlet direction in the installation shown in the figure is frontward or downward.
- When routing the piping backward, secure space of ≥250 mm on the right side of the unit.

NOTICE

(*) If shut off valves are directly installed on the water inlet and outlet, increase installation space at the rear of the unit to a minimum of 300 mm.

7.4. Service space of indoor unit



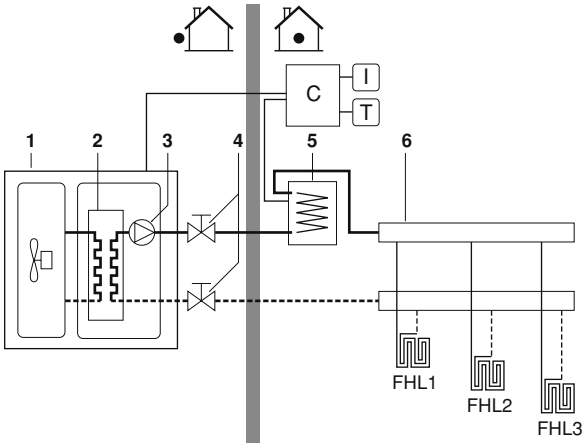
Unit of measurement: mm

8. TYPICAL APPLICATION EXAMPLES

The application examples given below are for illustration purposes only.

8.1. Application 1

Space heating only application with a room thermostat connected to the unit.



1	Outdoor unit
2	Heat exchanger
3	Pump
4	Shut-off valve
5	Heater kit
6	Collector (field supply)
FHL1...3	Floor heating loop (field supply)
C	Control box
T	Room thermostat
I	User interface

Unit operation and space heating

When a room thermostat (T) is connected to the unit and when there is a heating request from the room thermostat, the unit will start operating to achieve the target leaving water temperature as set on the user interface.

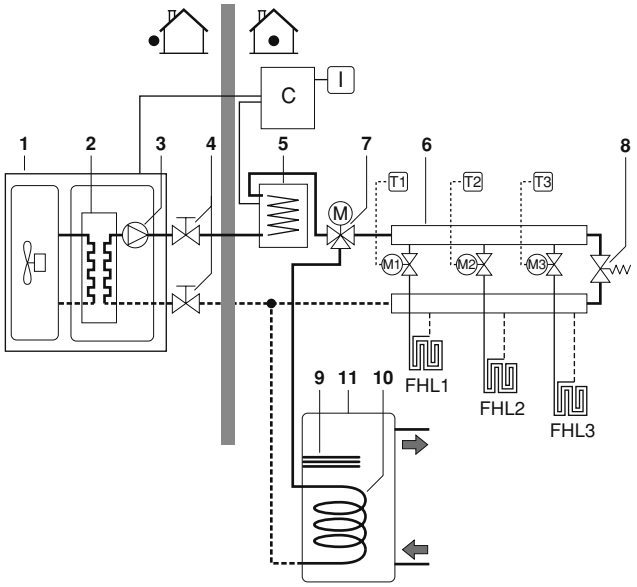
When the room temperature is above the thermostat set point, the unit will stop operating.

CAUTION

Make sure to connect the thermostat wires to the correct terminals (see "Connection of the thermostat cable" on page 27) and to configure the DIP switch toggle switches correctly (see "13.2. Room thermostat installation configuration" on page 28).

8.2. Application 2

Space heating only application without room thermostat connected to the unit. The temperature in each room is controlled by a valve on each water circuit. Domestic hot water is provided through the domestic hot water tank which is connected to the unit.



1	Outdoor unit
2	Heat exchanger
3	Pump
4	Shut-off valve
5	Heater kit
6	Collector (field supply)
7	Motorized 3-way valve (optional)
8	By-pass valve (field supply)
9	Booster heater
10	Heat exchanger coil
11	Domestic hot water tank (optional)
FHL1...3	Floor heating loop (field supply)
T1...3	Individual room thermostat (field supply)
M1..3	Individual motorised valve to control loop FHL1...3 (field supply)
C	Control box
I	User interface

Pump operation

With no thermostat connected to the unit (1), the pump (3) can be configured to operate either as long as the unit is on, or until the required water temperature is reached.

Details on pump configuration can be found under "13.3. Pump operation configuration" on page 29.

Space heating

The unit (1) will operate to achieve the target leaving water temperature as set on the user interface.

CAUTION

When circulation in each space heating loop (FHL1..3) is controlled by remotely controlled valves (M1..3), it is important to provide a by-pass valve (7) to avoid the flow switch safety device from being activated.

The by-pass valve should be selected as such that at all time the minimum water flow as mentioned under "10. Piping connection work" on page 18 is guaranteed.

It is recommended to select a pressure difference controlled by-pass valve.

Domestic water heating

When domestic water heating mode is enabled (either manually by the user, or automatically through a schedule timer) the target domestic hot water temperature will be achieved by a combination of the heat exchanger coil and the electrical booster heater.

When the domestic hot water temperature is below the user configured set point, the 3-way valve will be activated to heat the domestic water by means of the heat pump. In case of large domestic hot water demand or a high domestic hot water temperature setting, the booster heater (9) can provide auxiliary heating.

CAUTION

It is possible to connect either a 2-wire or a 3-wire 3-way valve (7). Make sure to fit the 3-way valve correctly. For more details, refer to "Wiring the 3-way valve" on page 28.

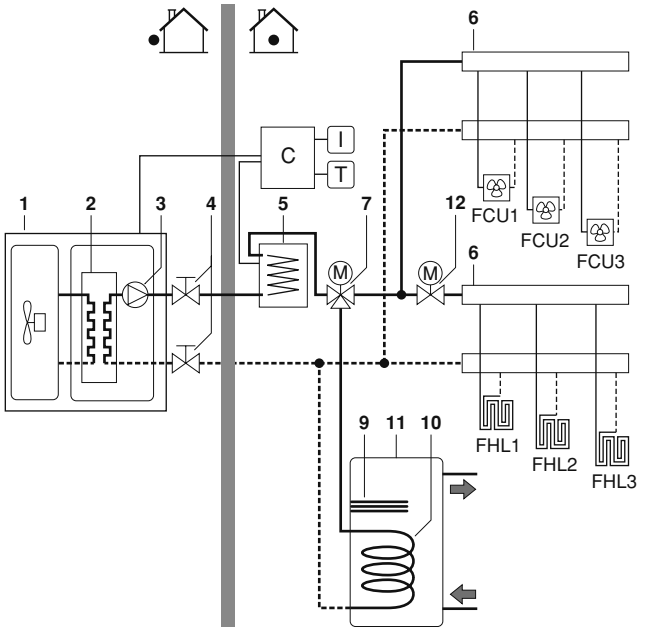
The unit can be configured so that at low outdoor temperatures the domestic water is exclusively heated by the booster heater. This assures that the full capacity of the heat pump is available for space heating.

Details on domestic hot water tank configuration for low outdoor temperatures can be found under "13.9. Field settings" on page 31, field settings [5-02] to [5-04].

8.3. Application 3

*Space cooling and heating application with a **room thermostat suitable for heating/cooling changeover** connected to the unit. Heating is provided through floor heating loops and fan coil units. Cooling is provided through the fan coil units only.*

Domestic hot water is provided through the domestic hot water tank which is connected to the unit.



1 Outdoor unit
2 Heat exchanger
3 Pump
4 Shut-off valve
5 Heater kit
6 Collector (field supply)
7 Motorised 3-way valve (optional)
9 Booster heater
10 Heat exchanger coil
11 Domestic hot water tank
12 Motorised 2-way valve (field supply)
FCU1...3 Fan coil unit (field supply)
FHL1...3 Floor heating loop (field supply)
C Control box
T Room thermostat with heating/cooling switch (optional)
I User interface

Pump operation and space heating and cooling

According to the season, the customer will select cooling or heating on the room thermostat (T). This selection is not possible by operating the user interface.

When space heating/cooling is requested by the room thermostat (T), the pump will start operating and the unit (1) will switch to "heating mode"/"cooling mode". The unit (1) will start operating to achieve the target leaving cold/hot water temperature.

In case of cooling mode, the motorised 2-way valve (12) will close as to prevent cold water running through the floor heating loops (FHL).

CAUTION

Make sure to connect the thermostat wires to the correct terminals (see "Connection of the thermostat cable" on page 27) and to configure the DIP switch toggle switches correctly (see "13.2. Room thermostat installation configuration" on page 28).

CAUTION

Wiring of the 2-way valve (12) is different for a NC (normal closed) valve and a NO (normal open) valve! Make sure to connect to the correct terminal numbers as detailed on the wiring diagram.

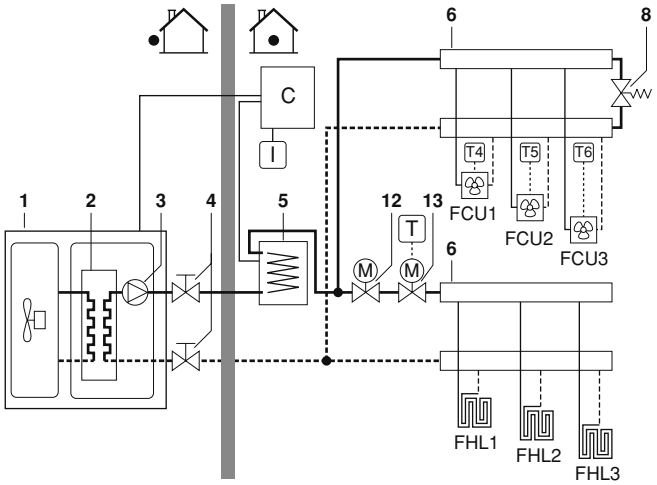
The ON/OFF setting of the heating/cooling operation is done by the room thermostat and cannot be done by the user interface.

Domestic water heating

Domestic water heating is as described under "8.2. Application 2" on page 11.

8.4. Application 4

*Space cooling and heating application **without a room thermostat connected to the unit**, but with a* heating only room thermostat controlling the floor heating *and a heating/cooling thermostat controlling the fan coil units. Heating is provided through floor heating loops and fan coil units. Cooling is provided through the fan coil units only.*



1 Outdoor unit
2 Heat exchanger
3 Pump
4 Shut-off valve
5 Heater kit
6 Collector (field supply)
8 By-pass valve (field supply)
12 Motorised 2-way valve to shut off the floor heating loops during cooling operation (field supply)
13 Motorised 2-way valve for activation of the room thermostat (field supply)
FCU1...3 Fan coil unit with thermostat (field supply)
FHL1...3 Floor heating loop (field supply)
T4...6 Individual room thermostat for fan coil heated/cooled room (optional)
T Heating only room thermostat (optional)
C Control box
I User interface

Pump operation

With no thermostat connected to the unit (1), the pump (3) can be configured to operate either as long as the unit is on, or until the required water temperature is reached.

Details on pump configuration can be found under "13.3. Pump operation configuration" on page 29.

Space heating and cooling

According to the season, the customer will select cooling or heating through the user interface.

The unit (1) will operate in cooling mode or heating mode to achieve the target leaving water temperature.

With the unit in heating mode, the 2-way valve (12) is open. Hot water is provided to both the fan coil units and the floor heating loops.

With the unit in cooling mode, the motorised 2-way valve (12) is closed to prevent cold water running through the floor heating loops (FHL).

CAUTION

When closing several loops in the system by remotely controlled valves, it might be required to install a by-pass valve (8) to avoid the flow switch safety device from being activated. See also "8.2. Application 2" on page 11.

CAUTION

Wiring of the 2-way valve (12) is different for a NC (normal closed) valve and a NO (normal open) valve! Make sure to connect to the correct terminal numbers as detailed on the wiring diagram.

The ON/OFF setting of the heating/cooling operation is done by the user interface.

8.5. Application 5

Space heating with an auxiliary boiler (alternating operation)

Space heating application by either the Daikin unit or by an auxiliary boiler connected in the system. The decision whether either the EBHQ unit or the boiler will operate can be achieved by an auxiliary contact or an EKCB* indoor controlled contact.*

The auxiliary contact can e.g. be an outdoor temperature thermostat, an electricity tariff contact, a manually operated contact, etc. See "Field wiring configuration A" on page 14.

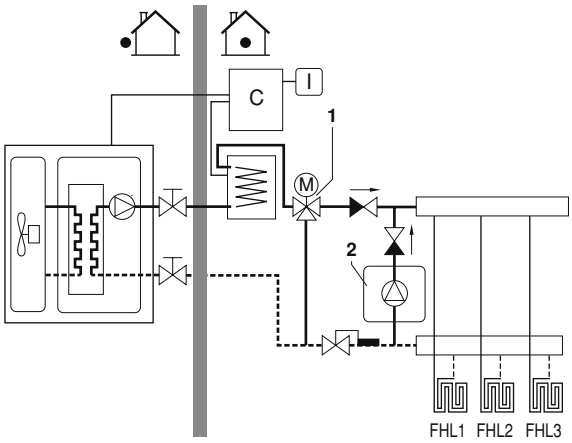
The EKCB unit controlled contact (also called 'permission signal for the auxiliary boiler") is determined by the outdoor temperature (thermistor located at the outdoor unit). See "Field wiring configuration B" on page 14.*

Bivalent operation is only possible for space heating operation, **not** for the domestic water heating operation. Domestic hot water in such an application is always provided by the domestic hot water tank which is connected to the Daikin unit.

The auxiliary boiler must be integrated in the piping work and in the field wiring according to the illustrations below.

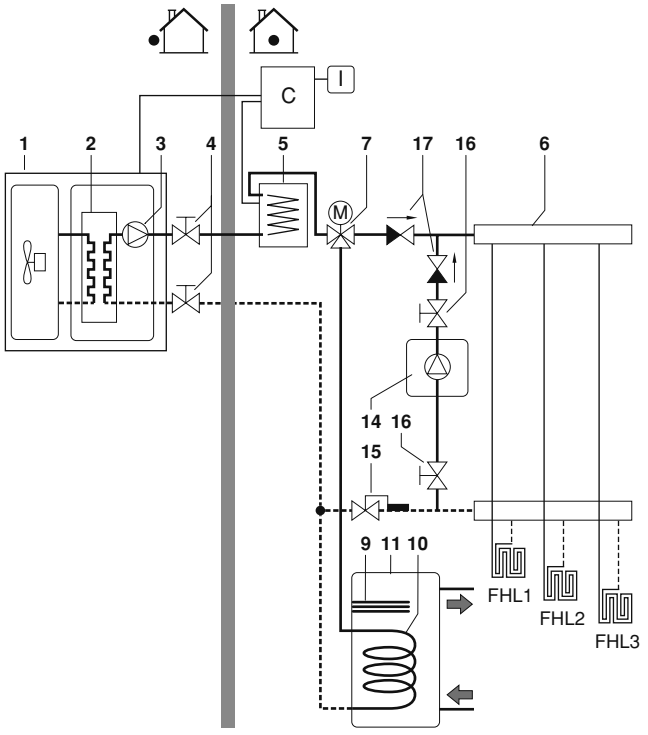
CAUTION

- Be sure that the boiler and the integration of the boiler in the system is in accordance with relevant local laws and regulations.
- Always install a 3-way valve, even if no domestic hot water tank is installed. This to ensure that the freeze protection function (see "[4-04] Freeze protection function" on page 33) can operate when the boiler is active.



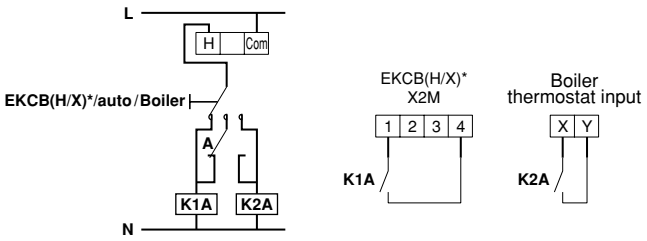
1 Motorised 3-way valve
2 Boiler

- Daikin can not be put responsible for incorrect or unsafe situations in the boiler system.



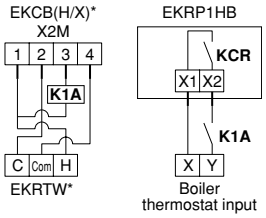
1 Outdoor unit
2 Heat exchanger
3 Pump
4 Shut-off valve
5 Heater kit
6 Collector (field supply)
7 Motorised 3-way valve (delivered with the domestic hot water tank)
9 Booster heater
10 Heat exchanger coil
11 Domestic hot water tank (optional)
14 Boiler (field supply)
15 Aquastat valve (field supply)
16 Shut-off valve (field supply)
17 Non-return valve (field supply)
FHL1...3 Floor heating loop (field supply)
C Control box
I User interface

Field wiring configuration A



Boiler thermostat input	Boiler thermostat input
A	Auxiliary contact (normal closed)
H	Heating demand room thermostat (optional)
K1A	Auxiliary relay for activation of EBHQ* unit (field supply)
K2A	Auxiliary relay for activation of boiler (field supply)

Field wiring configuration B



Boiler thermostat input	Boiler thermostat input
C	Cooling demand room thermostat (optional)
H	Heating demand room thermostat (optional)
Com	Common room thermostat (optional)
K1A	Auxiliary relay for activation of boiler unit (field supply)
KCR	Permission signal for the auxiliary boiler

Operation

- **Configuration A**
  When the room thermostat requests heating, either the EBHQ* unit or the boiler starts operating, depending on the position of the auxiliary contact (A).
- **Configuration B**
  When the room thermostat requests heating, either the EBHQ* unit or the boiler starts operating, depending on the outdoor temperature (status of "permission signal for the auxiliary boiler").
  When the permission is given towards the boiler, the space heating operation by the EBHQ* unit will be automatically switched off.
  For more details see field setting [C-02~C-04].

NOTICE

- **Configuration A**
  Make sure that auxiliary contact (A) has sufficient differential or time delay so as to avoid frequent changeover between the EBHQ* unit and the boiler. If the auxiliary contact (A) is an outdoor temperature thermostat, make sure to install the thermostat in the shade, so that it is not influenced or turned ON/OFF by the sun.
  Configuration B
  Make sure that the bivalent hysteresis [C-04] has sufficient differential to avoid frequent changeover between the EBHQ* unit and the boiler. As the outdoor temperature is measured via the outdoor unit's air thermistor, make sure to install the outdoor unit in the shade, so that it is not influenced by the sun.
  Frequent switching may cause corrosion of the boiler in an early stage. Contact the manufacturer of the boiler.
- During heating operation of the EBHQ* unit, the unit will operate so as to achieve the target leaving water temperature as set on the user interface. When weather dependent operation is active, the water temperature is determined automatically depending on the outdoor temperature.
  During heating operation of the boiler, the boiler will operate so as to achieve the target leaving water temperature as set on the boiler controller.
  Never set the target leaving water temperature set point on the boiler controller above 55°C.
- Make sure to only have 1 expansion vessel in the water circuit. An expansion vessel is already premounted in the unit.

NOTICE

Make sure to configure the DIP switch SS2-3 on the PCB of the EKCB(H/X)* switch box correctly. Refer to "13.2. Room thermostat installation configuration" on page 28.

For configuration B: Make sure to configure the field settings [C-02, C-03 and C-04] correctly. Refer to "Bivalent operation" on page 37.

CAUTION

Make sure that return water to the EBHQ* heat exchanger never exceeds 55°C.

For this reason, never put the target leaving water temperature set point on the boiler controller above 55°C and install an aquastat[(a)] valve in the return water flow of the EBHQ* unit.

Make sure that the non-return valves (field supply) are correctly installed in the system.

Make sure that the room thermostat (th) is not frequently turned ON/OFF.

Daikin shall not be held liable for any damage resulting from failure to observe this rule.

(a) The aquastat valve must be set for 55°C and must operate to close the return water flow to the unit when the measured temperature exceeds 55°C. When the temperature drops to a lower level, the aquastat valve must operate to open the return water flow to the EBHQ* unit again.

CAUTION

Manual permission towards the EBHQ* unit on the boiler.

In case only the EBHQ* unit should operate in space heating mode, disable the bivalent operation via setting [C-02].

In case only the boiler should operate in space heating mode, increase the bivalent ON temperature [C-03] to 25°C.

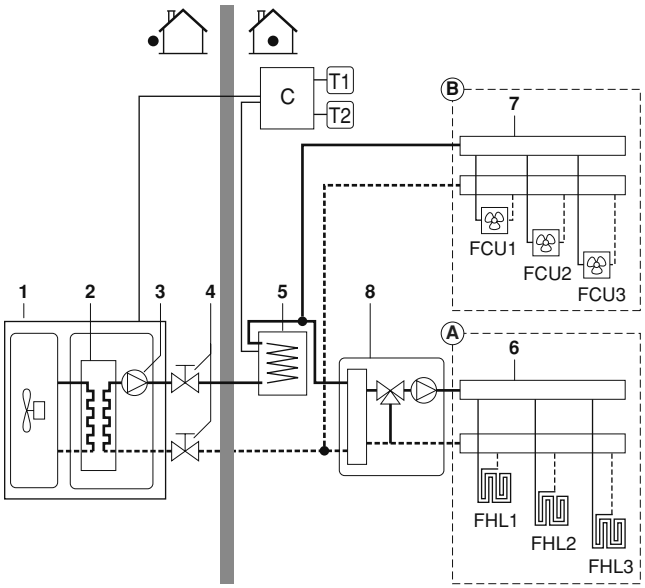
8.6. Application 6

Space heating with room thermostat application through floor heating loops and fan coil units. The floor heating loops and fan coil units require different operating water temperatures.

The floor heating loops require a lower water temperature in heating mode compared to fan coil units. To achive these two set points, a mixing station is used to adapt the water temperature according to requirements of the floor heating loops. The fan coil units are directly connected to the unit water circuit and the floor heating loops after the mixing station. The control of this mixing station is not done by the unit.

The operation and configuration of the field water circuit is the responsibility of the installer.

Daikin only offers a dual set point control function. By this function two set points can be generated. Depending on the required water temperature (floor heating loops and/or fan coil units are required) first set point or second set point can be activated.



1 Outdoor unit
2 Heat exchanger
3 Pump
4 Shut-off valve
5 Heater kit
6 Collector zone A (field supply)
7 Collector zone B (field supply)
8 Mixing station (field supply)
FCU1...3 Fan coil unit (optional)
FHL1...3 Floor heating loop (field supply)
C Control box
T1 Room thermostat for zone A (optional)
T2 Room thermostat for zone B (optional)

The advantage of the dual set point control is that the heat pump will/can operate at the lowest required leaving water temperature when only floor heating is required. Higher leaving water temperatures are only required in case fan coil units are operating.
This results in a better performance of the heat pump.

Pump operation and space heating

When the room thermostat for the floor heating loop (T1) and the fan coil units (T2) are connected to the indoor unit, the pump (3) will operate when there is a request for heating from T1 and/or T2. The outdoor unit will start operating to achieve the target leaving water temperature. The target leaving water temperature depends on which room thermostat is requesting heating.

	Set point	Field setting	Thermo status			
Zone A	First	UI	ON	OFF	ON	OFF
Zone B	Second	[7-03]	OFF	ON	ON	OFF
Resulting water temperature			UI	[7-03]	[7-03]	—
Result pump operation			ON	ON	ON	OFF

When the room temperature of both zones is above the thermostat set point, the outdoor unit and pump will stop operating.

NOTICE

- Make sure to connect the thermostat wires to the correct terminals (see "5. Overview of unit" on page 5).
- Make sure to configure the field settings [7-02], [7-03] and [7-04] correctly. Refer to "Dual set point control" on page 35.
- Make sure to configure the DIP switch SS2-3 on the PCB of the EBHQ* switch box correctly. Refer to "13.2. Room thermostat installation configuration" on page 28.

NOTICE

- The request signals for space heating can be implemented in two different ways (installer choice).
  - Thermo ON/OFF signal from room thermostat
  - Status signal (active/not active) from the mixing station
- It is the installers responsibility to make sure no unwanted situations can occur (e.g. too high water temperatures towards floor heating loops, etc.)
- Daikin does not offer any type of mixing station. Dual set point control only provides the possibility to use two set points.
- When only zone A requests heating, zone B will be fed with water at a temperature equal to the first set point.
  This can lead to unwanted heating of zone B.
- When only zone B requests heating, the mixing station will be fed with water at a temperature equal to the second set point.
  Depending on the control of the mixing station, the floor heating loop can still receive water at a temperature equal to set point of the mixing station.

CAUTION

Be aware that the actual water temperature through the floor heating loops depends on the control and setting of the mixing station.

9. INSPECTING, HANDLING AND UNPACKING THE UNIT

9.1. Inspection

At delivery, the unit must be checked and any damage must be reported immediately to the carrier's claims agent.

9.2. Handling

Outdoor unit

- The unit is packed in a cardboard box fixed by straps.
- When handling the unit, take into account the following:

1 Fragile, handle the unit with care

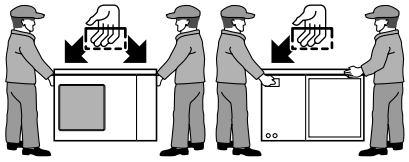
Keep the unit upright in order to avoid compressor damage.

2 Choose on before hand the path along which the unit is to be brought in

3 Bring the unit as close as possible to its final installation position in its original package to prevent damage during transport.

4 After unpacking, the unit can be positioned correctly using the handles provided at both ends of the unit.

As shown in the figure below, slowly move the unit by grabbing the left and right grips. Position your hands on the corner instead of grabbing the suction grill, otherwise the casing could be deformed.



CAUTION

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

Indoor unit

- The unit is packed in a cardboard box.
- When handling the unit, take into account the following:

Fragile, handle the unit with care

Keep the unit upright in order to avoid compressor damage.

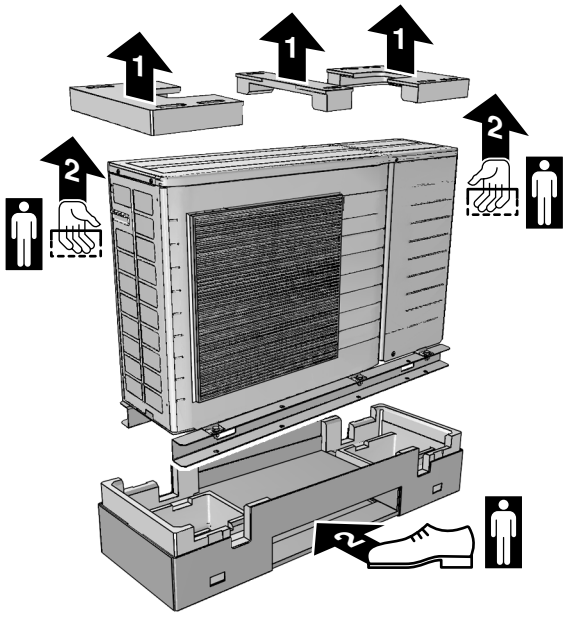
9.3. Unpacking

Outdoor unit

CAUTION

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

- Relief the unit from its packing material:
  Unpack the unit completely according to the instructions mentioned.



WARNING

Tear apart and throw away plastic packaging bags so that children will not play with them. Children playing with plastic bags face danger of death by suffocation.

- Make sure that all accessories as mentioned in "4.2. Accessories supplied with the outdoor unit" on page 5 are available in the unit.

Indoor unit

WARNING

Tear apart and throw away plastic packaging bags so that children will not play with them. Children playing with plastic bags face danger of death by suffocation.

Make sure that all accessories as mentioned in "4.3. Accessories supplied with the indoor unit" on page 5 are available in the unit.

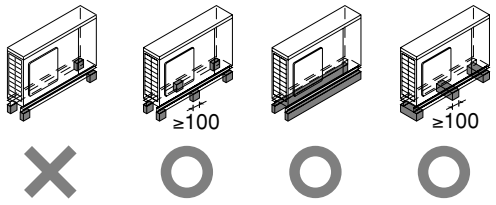
9.4. Installing the unit

Outdoor unit installation

- When installing the outdoor unit, please refer to "6. Selecting an installation location" on page 8 to select an appropriate location.
- Check the strength and level of the installation ground so that the unit will not cause any operating vibration or noise after installation.
- Make sure that the unit is installed level.

NOTICE

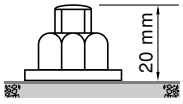
When the installation height of the unit needs to be increased, do not use stands to only support the corners:



X Not allowed

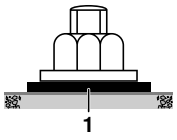
O Allowed (units: mm)

- The height of the foundation must at least be 150 mm from the floor.
  In heavy snowfall areas, this height should be increased dependant on the installation place and condition.
- Prepare 4 sets of M8 or M10 foundation bolts, nuts and washers each (field supply).
- Fasten the unit in place using four foundation bolts M8 or M10 in accordance with the installation drawing. It is best to screw in the foundation bolts until their length remains 20 mm above the foundation surface.



NOTICE

- Prepare a water drainage channel to drain waste water from around the unit.
  During heating operation and when the outdoor temperatures are negative, the drained water from the outdoor unit will freeze up. If the water drainage is not taken care of, the area around the unit might be very slippery.
- When installed in a corrosive environment, use a nut with plastic washer (1) to protect the nut tightening part from rust.



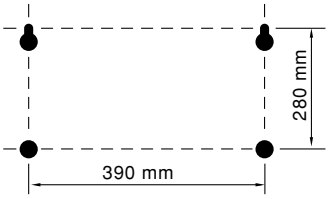
Indoor unit installation

When installing the indoor unit, please refer to "6. Selecting an installation location" on page 8 to select an appropriate location.

Mounting the indoor unit

1 Remove the front plate of the unit.

2 Hold the back plate against the wall and mark the fixation points (2 on the top and 2 on the bottom).
Make sure that the marks (2 by 2) are completely level and the dimensions of the marks are corresponding to the figure below.



3 Drill 4 holes and install 4 plugs (suitable for M5).

4 Put the screws in the top plugs and hang the indoor unit on the screws.

5 Put the screws in the bottom plugs.

6 Fix the 4 screws firmly.

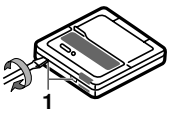
User interface installation

NOTICE

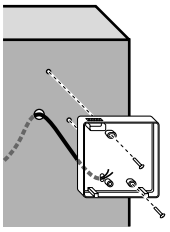
The user interface has to be mounted indoors.

The user interface must be mounted on the front panel of the indoor unit.

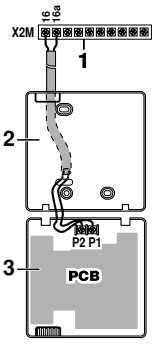
1 Remove the front part of the user interface.
Insert a slotted screwdriver into the slots (1) in the rear part of the user interface, and remove the front part of the user interface.



2 Fasten the user interface rear panel to the front panel of the indoor unit using the 2 screws and nuts delivered with the indoor unit as shown in the figure.



3 Wire the user interface.



1 Terminal block inside the indoor unit
2 Rear part of the user interface
3 Front part of the user interface

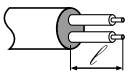
NOTICE

A user interface wire of 600 mm is included with the control box and pre-wired to X2M terminals 16 and 16a.

Connect 16 of the X2M to P1 of the user interface terminal control box terminal and connect 16a to P2.

NOTICE

- The user interface can only be wired from the back. Use the user interface wire delivered with the control box and route it through the pre-drilled hole in the front panel of the indoor unit.
- When wiring, run the wiring away from the power supply wiring in order to avoid receiving electric noise (external noise).
- Peel the shield for the part that has to pass through the inside of the user interface case (ℓ).

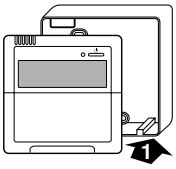


4 Reattach the upper part of the user interface.

CAUTION

Be careful not to pinch the wiring when attaching.

First begin fitting from the clips at the bottom.



Heater kit installation

WARNING

The EBHQ outdoor unit and EKCB indoor unit **can not** be operated without installed EKMBUH heater kit.

Refer to the installation manual of the EKMBUH heater kit for more details.

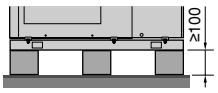
9.5. Drain work of the outdoor unit

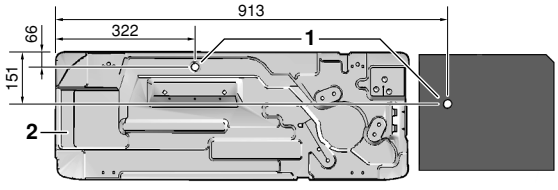
In case drain work on your outdoor unit is neccessary, follow the guidelines below.

- Two drain outlets are provided in the bottom plate of unit (drain plug and drain hose are field supply).
- In cold areas, do not use a drain hose with the unit. Otherwise, drain water may freeze and block the drain. In case the use of a drain hose is unavoidable for one reason or another, it is recommended to install a heater tape in order to protect drain from freezing.
- Make sure the drain works properly.

NOTICE

If drain holes of the outdoor unit are covered by a mounting base or by floor surface, raise the unit in order to provide a free space of more than 100 mm under the outdoor unit.





1 Drain water holes
2 Bottom frame

10. Piping connection work

10.1. Checking the water circuit

The units have a water inlet and water outlet for connection to a water circuit. This circuit must be provided by a licensed technician and must comply with all relevant European and national regulations.

The unit is only to be used in a closed water system. Application in an open water circuit can lead to excessive corrosion of the water piping.

Before continuing the installation of the unit, beware of the following points:

- Two shut-off valves are delivered with the unit. To facilitate service and maintenance, install one at the water inlet and one at the water outlet of the unit.
- Drain taps must be provided at all low points of the system to permit complete drainage of the circuit. Two drain valves are provided inside the unit.
- Air vents must be provided at all high points of the system. The vents should be located at points which are easily accessible for servicing. An automatic air purge is provided inside the outdoor unit. Check that this air purge valve is not tightened too much so that automatic release of air in the water circuit remains possible.
- Take care that the components installed in the field piping can withstand the water pressure (maximum 3 bar + static pressure of the pump).
- The maximum waterpiping temperature is 65°C according to safety device setting.
- Always use materials which are compatible with the water used in the system and with the materials used in the unit.
- Select piping diameter in relation to required water flow and available external static pressure (ESP) of the pump. The recommended water piping diameter is 1".
- The minimum required water flow for the unit operation is 12 l/min. When the water flow is lower than this minimum value, flow error ⌐H will be displayed and the operation of the unit will be stopped.

10.2. Checking the water volume and expansion vessel pre-pressure

The unit is equipped with an expansion vessel of 6 litre which has a default pre-pressure of 1 bar.

To assure proper operation of the unit, the pre-pressure of the expansion vessel might need to be adjusted and the minimum and maximum water volume must be checked.

1 Check that the total water volume in the installation is 10 l minimum:

In most air conditioning applications this minimum water volume will have a satisfying result. In critical processes or in rooms with a high heat load though, extra water volume might be required.

2 Using the table below, determine if the expansion vessel prepressure requires adjustment.

3 Using the table and instructions below, determine if the total water volume in the installation is below the maximum allowed water volume.

Installation height difference[(a)]	Water volume	
	≤170 l	>170 l
≤7 m	No pre-pressure adjustment required.	Actions required: • pre-pressure must be decreased, calculate according to "Calculating the pre-pressure of the expansion vessel" • check if the water volume is lower than maximum allowed water volume (use graph below)
>7 m	Actions required: • pre-pressure must be increased, calculate according to "Calculating the pre-pressure of the expansion vessel" • check if the water volume is lower than maximum allowed water volume (use graph below)	Expansion vessel of the unit too small for the installation.

(a) Installation height difference: height difference (m) between the highest point of the water circuit and the unit. If the unit is located at the highest point of the installation, the installation height is considered 0 m.

Calculating the pre-pressure of the expansion vessel

The pre-pressure (Pg) to be set depends on the maximum installation height difference (H) and is calculated as below:

Pg=(H/10+0.3) bar

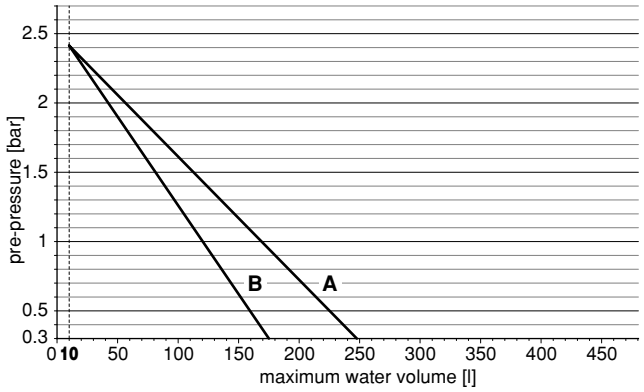
Checking the maximum allowed water volume

To determine the maximum allowed water volume in the entire circuit, proceed as follows:

1 Determine for the calculated pre-pressure (Pg) the corresponding maximum water volume using the graph below.

2 Check that the total water volume in the entire water circuit is lower than this value.

If this is not the case, the expansion vessel inside the unit is too small for the installation.



pre-pressure	=	pre-pressure
maximum water volume	=	maximum water volume
A	=	System without glycol
B	=	System with 25% propyleen glycol

Example 1

The outdoor unit is installed 5 m below the highest point in the water circuit. The total water volume in the water circuit is 100 l

In this example, no action or adjustment is required.

Example 2

The outdoor unit is installed 4 m below the highest point in the water circuit. The total water volume in the water circuit is 190 l.

Result:

- Since 190 l is higher than 170 l, the pre-pressure must be decreased (see table above).
- The required pre-pressure is:
  Pg = (H/10 + 0.3) bar = (4/10 + 0.3) bar = 0.7 bar
- The corresponding maximum water volume can be read from the graph: approximately 200 l.
- Since the total water volume (190 l) is below the maximum water volume (200 l), the expansion vessel suffices for the installation.

10.3. Setting the pre-pressure of the expansion vessel

When it is required to change the default pre-pressure of the expansion vessel (1 bar), keep in mind the following guidelines:

- Use only dry nitrogen to set the expansion vessel pre-pressure.
- Inappropriate setting of the expansion vessel pre-pressure will lead to malfunction of the system. Therefore, the pre-pressure should only be adjusted by a licensed installer.

10.4. Connecting the water circuit

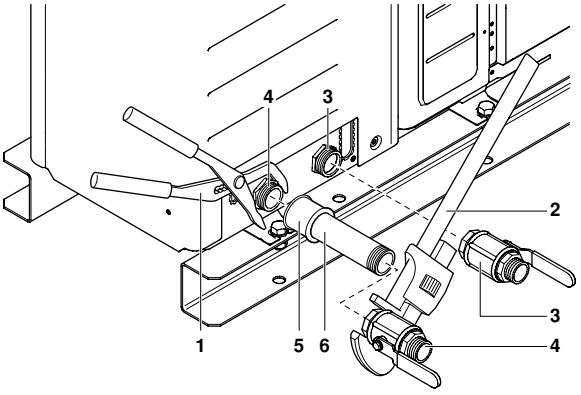
Water connections must be made in accordance with local and national regulations and the outlook drawing delivered with the unit, respecting the water in- and outlet.

WARNING

Be careful not to deform the unit piping by using excessive force when connecting the piping.

If dirt gets in the water circuit, problems may occur. Therefore, always take into account the following when connecting the water circuit:

- Use clean pipes only.
- Hold the pipe end downwards when removing burrs.
- Cover the pipe end when inserting it through a wall so that no dust and dirt enter.
- Use a good thread sealant for the sealing of the connections. The sealing must be able to withstand the pressures and temperatures of the system, it must also be resistant to the used glycol in the water.
- When using non-brass metallic piping, make sure to insulate both materials from each other to prevent galvanic corrosion.
- Because brass is a soft material, use appropriate tooling for connecting the water circuit. Inappropriate tooling will cause damage to the pipes.
- Increasing the distance between shut-off valves is necessary for ease of installation.
  Installation example



1 To secure the piping of the unit
2 To connect the shut-off valve
3 Water inlet
4 Water outlet
5 Round socket 2x 1" FBSP (field supply)
6 1" MBSP pipe end (field supply)

NOTICE

- The unit is only to be used in a closed water system. Application in an open water circuit can lead to excessive corrosion of the water piping.
- Never use Zn-coated parts in the water circuit. Excessive corrosion of these parts may occur as copper piping is used in the unit's internal water circuit.
- When using a 3-way valve in the water circuit. Preferably choose a ball type 3-way valve to guarantee full separation between domestic hot water and floor heating water circuit.
- When using a 3-way valve or a 2-way valve in the water circuit. The recommended maximum changeover time of the valve should be less than 60 seconds.

10.5. Protecting the water circuit against freezing

Frost can damage the unit. As this unit is installed outdoors and thus the hydraulic system is exposed to freezing temperatures, care must be taken to prevent freezing of the system. All hydraulic parts are insulated to reduce heat loss. Insulation must be foreseen on the field piping.

The unit is already equipped with several features to prevent freezing.

- The software contains special functions using pump and back up heater to protect the complete system against freezing. This function will only be active when the unit is off.
  However in case of power failure, above mentioned features can not protect the unit from freezing.
  If power failure can happen at times the unit is unattended, Daikin recommends adding glycol to the water system. Refer to Caution: "Corrosion of the system due to presence of glycol" on page 20
  Refer to "[4-04] Freeze protection function" on page 33.
  Depending on the expected lowest outdoor temperature, make sure the water system is filled with a weight concentration of glycol as mentioned in the table below.

Minimum outdoor temperature	Glycol (a)(b)(c)
–5°C	10%
–10°C	15%
–15°C	20%
–20°C	25%
–25°C	30%

WARNING

(a) **ETHYLENE GLYCOL IS TOXIC**

(b) The concentrations mentioned in the table above will not prevent the medium from freezing, but prevent the hydraulics from bursting.

(c) The maximum allowed water volume is then reduced according to the figure "Checking the maximum allowed water volume" on page 19

CAUTION

- For installations with a domestic hot water tank, the use of propylene glycol, including necessary inhibitors, is only allowed if classified as Category 3 according to EN1717 or equivalent based on national regulations.
- In case of over-pressure when using glycol, be sure to connect the safety valve to a drain pan in order to recover the glycol.
  Connecting a drain pipe is not required if no glycol is used. The discharged water is then drained via the bottom of the unit.

CAUTION

Corrosion of the system due to presence of glycol

Uninhibited glycol will turn acidic under the influence of oxygen. This process is accelerated by presence of copper and at higher temperatures. The acidic uninhibited glycol attacks metal surfaces and forms galvanic corrosion cells that cause severe damage to the system.

It is therefore of extreme importance:

- that the water treatment is correctly executed by a qualified water specialist;
- that a glycol with corrosion inhibitors is selected to counteract acids formed by the oxidation of glycols;
- that in case of an installation with a domestic hot water tank, only the use of propylene glycol, including necessary inhibitors classified as Category 3 according to EN1717 or equivalent based on the applicable legislation is allowed. In other installations the use of ethylene glycol is permitted as well;
- that no automotive glycol is used because their corrosion inhibitors have a limited lifetime and contain silicates which can foul or plug the system;
- that galvanized piping is not used in glycol systems since its presence may lead to the precipitation of certain components in the glycolís corrosion inhibitor;
- that it has to be made sure the glycol is compatible with the used materials in the system.

NOTICE

Be aware of the hygroscopic property of glycol: it absorbs moisture from its environment.
Leaving the cap off the glycol container causes the concentration of water to increase. The glycol concentration is then lower than assumed. And in consequence, freezing can happen after all.
Preventive actions must be taken to ensure minimal exposure of the glycol to air.

Also refer to "Pre-run checks" on page 42.

10.6. Charging water

1 Connect the water supply to a drain and fill valve (see "5.2. Main components of the outdoor unit and the indoor unit" on page 6).

2 Make sure the automatic air purge valve is open (at least 2 turns).

3 Fill with water until the manometer indicates a pressure of approximately 2.0 bar. Remove air in the circuit as much as possible using the air purge valves. Air present in the water circuit might cause malfunctioning of the backup heater.

4 Check that the backup heater vessel (EKMBUH) is filled with water by opening the pressure relief valve. Water must flow out of the valve.

NOTICE

- During filling, it might not be possible to remove all air in the system. Remaining air will be removed through the automatic air purge valves during first operating hours of the system. Additional filling with water afterwards might be required.
- The water pressure indicated on the manometer will vary depending on the water temperature (higher pressure at higher water temperature).
  However, at all times water pressure should remain above 1 bar to avoid air entering the circuit.
- The unit might dispose some excessive water through the pressure relief valve.
- Water quality must be according EN directive 98/83 EC.

If no glycol is in the system in case of a power supply failure or pump operating failure, drain the system.

When water is at standstill inside the system, freezing is very likely to happen and damaging the system in the process.

Piping insulation

The complete water circuit, inclusive all piping, must be insulated to prevent condensation during cooling operation and reduction of the heating and cooling capacity as well as prevention of freezing of the outside water piping during winter time. The thickness of the sealing materials must be at least 13 mm with λ=0.039 W/mK in order to prevent freezing on the outside water piping.

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

Water piping freezing prevention

Protect the water piping against water freezing during the winter period (e.g. by using an external field supplied heater tape or glycol solution).

11. IMPORTANT INFORMATION REGARDING THE REFRIGERANT USED

This product contains fluorinated greenhouse gases covered by the Kyoto Protocol. Do not vent gases into the atmosphere.

Refrigerant type: R410A

GWP(1) value: 1975

(1) GWP = global warming potential

12. ELECTRICAL WIRING WORK

12.1. Precautions on electrical wiring work

WARNING: Electrical installation

All field wiring and components must be installed by an installer and must comply with the applicable legislation

DANGER: ELECTRICAL SHOCK

See "2. General Safety precautions" on page 2.

WARNING

- 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 the applicable legislation.
- Use only copper wires.
- All field wiring must be carried out in accordance with the wiring diagram supplied with the unit and the instructions given below.
- Never squeeze bundled cables and be sure that it does not come in contact with the non-insulated piping and sharp edges. Be sure no external pressure is applied to the terminal connections.
- Power supply wires must be attached securely.
- If the power supply has a missing or wrong N-phase, equipment will break down.
- Be sure to establish an earth. Do not earth the unit to a utility pipe, surge absorber, or telephone earth. Incomplete earth may cause electrical shock.
- Be sure to install an earth leakage protector in accordance with the applicable legislation. Failure to do so may cause electric shock or fire.
- Be sure to use a dedicated power circuit, never use a power supply shared by another appliance.
- When installing the earth leakage protector be sure that it is compatible with the inverter (resistant to high frequency electric noise) to avoid unnecessary opening of the earth leakage protector.
- Be sure to install the required fuses or circuit breakers.

CAUTION: Radio frequency interference

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

It is therefore recommended to install the equipment and electric wires keeping proper distances away from stereo equipment, personal computers, etc....

In extreme circumstances you shall keep distances of 3 m or more and use conduit tubes for power and transmission lines.

For more details, refer to the "Electrical specifications" on page 47

12.2. Outdoor unit – Internal wiring – Parts table

Refer to the wiring diagram sticker on the top plate of the outdoor unit. The abbreviations used are listed below:

A3P,A4P ..... Printed circuit board
E1,E2 ..... Connector
E1H ..... Expansion vessel heater
E2H ..... Bottom plate heater (option)
FU1 ..... Fuse (30 A, 250 V)
FU2,FU3..... Fuse (F, 3.15 A, 250 V)
FU4,FU5..... Fuse (F, 1.0 A, 250 V)
HR1,HR2..... Connector
L1R..... Reactor
LED A..... Pilot lamp
M1C..... Motor (compressor)
M1P..... Pump
M2F..... Motor (fan)
MRC/W..... Magnetic relay
MRM10,MRM20 ..... Magnetic relay
PM1 ..... Power module
Q1L ..... Overload protector
R1T~R3T..... Thermistor
R11T ..... Outlet water heat exchanger thermistor
R13T ..... Refrigerant liquid side thermistor
R14T ..... Inlet water heat exchanger thermistor
S1L..... Flowswitch
S1T..... Thermostat expansion vessel heater
S2~S102 ..... Connector
SA2 ..... Surge arrester
SW1 ..... Forced operation ON/OFF SW (SW1)
SW4 ..... Local setting SW (SW4)
U..... Connector
V..... Connector
V2,V3,V5,V9,V100 ... Varistor
W..... Connector
X1M~X4M ..... Terminal strip
X1Y~X4Y..... Connector
X11A,X12A..... Connector
X13Y ..... Connector (indoor unit)
X14M..... Terminal strip (indoor unit)
Y1E ..... Electronic expansion valve coil
Y1R ..... Reversing solenoid valve coil
Z1C~Z7C..... Ferrite core
Z1F..... Noise filter (with surge absorber)
L ..... Live
N..... Neutral
SHEET METAL..... Terminal strip fixed plate
..... Field wiring
..... Terminal strip
..... Connector
..... Terminal
..... Protective earth
BLK ..... Black
BLU ..... Blue
BRN..... Brown
GRN ..... Green
GRY..... Grey
ORG ..... Orange
PNK..... Pink
RED..... Red
VIO ..... Violet
WHT ..... White
YLW..... Yellow

NOTES

1 THIS WIRING DIAGRAM ONLY APPLIES TO THE OUTDOOR UNIT
4 DO NOT OPERATE THE UNIT BY SHORT-CIRCUITING ANY PROTECTION DEVICE

OUTDOOR UNIT.....Outdoor unit
INDOOR UNIT.....Indoor unit
HYDRO MODULE .....Hydro module
COMPRESSOR MODULE ....Compressor module
OPTION.....Option
FIELD WIRING .....Field wiring
PCB .....PCB
WIRE COLOUR.....Wire colour
FIELD SUPPLY.....Field supply
POWER SUPPLY .....Power supply
(OUTDOOR).....(Outdoor)
(DISCHARGE).....(Discharge)
(CONDENSOR).....(Condensor)
ONLY FOR *** OPTION.....Only for *** option

NOTICE

The wiring diagram on the outdoor unit is only for the outdoor unit.

For the indoor unit or optional electrical components, refer to the wiring diagram of the indoor unit.

12.3. Overview of field wiring

Field wiring consists out of power supply (always including earth) and indoor-outdoor communication (=transmission) wiring.

12.4. Requirements

The power supply must be protected with the required safety devices, i.e. a main switch or other means for disconnections, a slow blow fuse on each phase and an earth leakage protector.

Selection and sizing of the wiring should be done in accordance with relevant local and national regulations based on the information mentioned in the table below:

Table: Selection and sizing of wiring

Item	Cable bundle[(a)]	Description	Required number of conductors	Maximum running current
1	PS	Power supply	2 + GND	18 A
2	HV	Indoor unit control signals	3 + GND	Minimum cable section 2.5 mm^2
3	HV	Indoor unit pump and heater control signals	4	Minimum cable section 0.75 mm^2
4	LV	Thermistor interconnection cable (supplied with the outdoor unit)	8	Supplied with the outdoor unit

(a) PS = Power supply
HV = High voltage
LV = Low voltage

Table: Power cable selection

Model	Nominal volatage	Maximum running current	Z_{max}
EBHQ+EKCB[(a) (b)]	1x 203 V	18 A	0.42 Ω

(a) Equipment complying with EN/IEC 61000-3-12(1)
(b) This equipment complies with EN/IEC 61000-3-11(2) provided that the system impedance Z_{sys} is less than or equal to Z_{max} at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a system impedance Z_{sys} less than or equal to Z_{max}.

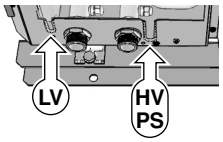
(1) European/International Technical Standard setting the limits for harmonic currents produced by equipment connected to public low-voltage systems with input current >16 A and ≤75 A per phase.
(2) European/International Technical Standard setting the limits for voltage changes, voltage fluctuations and flicker in public low-voltage supply systems for equipment with rated current ≤75 A.

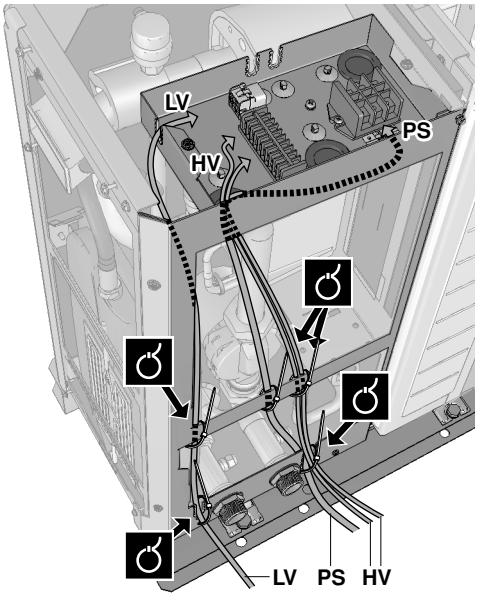
12.5. Routing

WARNING

- It is important to keep the high voltage, low voltage and power supply wiring separated from each other. In order to avoid any electrical interference the distance between both wiring should always be at least 25 mm.
- Make sure to secure the field wiring so it never comes in contact with any piping.

The outdoor unit has 2 openings at the backside for field wiring intake. Use the appropriate hole to route the power supply, high voltage wiring and low voltage wiring as shown in the figure.





Power supply routing (PS)

1. Enter the power supply wire through the high voltage/power supply (HV/PS) opening at the back of the outdoor unit.
2. Route the power supply wire towards the switch box located at the top of the outdoor unit.
3. Secure the power supply wire with a cable tie around the frame to keep it away from piping as shown in the figure above.

Control signal routing (HV)

1. Enter the control signal wires through the high voltage/power supply (HV/PS) opening at the back of the outdoor unit.
2. Route the control signal wires towards the switch box located at the top of the outdoor unit.
3. Secure the control signal wires with a cable tie around the frame to keep it away from piping as shown in the figure above. Keep a distance of minimum 25 mm from the power supply wire.

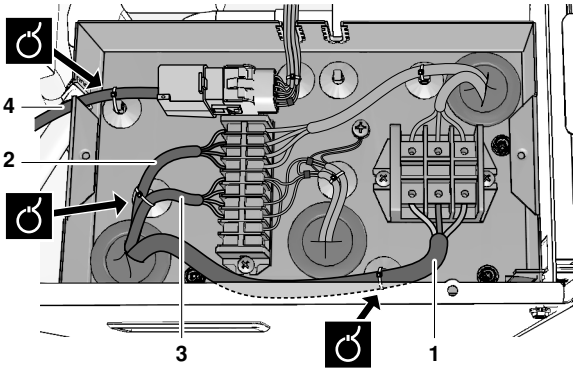
Thermistor interconnection cable routing (LV)

WARNING

A cable tray or other means of protecting electrical wiring must be used between indoor and outdoor unit to protect the thermistor interconnection cable from mechanical damage or weather influence such as drirect sunlight.

1. Enter the thermistor interconnection cable through the low voltage (LV) opening at the back of the outdoor unit.
2. Route the thermistor interconnection cable towards the switch box located at the top of the outdoor unit.
3. Secure the thermistor interconnection cable with a cable tie around the frame to keep it away from piping as shown in the figure above. Keep a distance of minimum 25 mm from the power supply wire and the control signal wires.

12.6. Outdoor switch box connections



1 Power supply
2 Indoor unit control signals
3 Indoor unit pump and heater control signals
4 Thermistor interconnection cable

Procedure

1 Open the switch box cover.

2 Using the appropriate cables, route and connect the power supply cable and control cables to the appropriate terminals as shown on the wiring diagram supplied with the outdoor unit and according to the figure above.

3 Route and connect the thermistor interconnection cable as shown in the figure above. Be sure not to force the connectors. The connectors lock in one position only. Check both connector sides for correct matching.

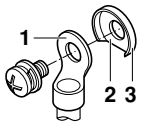
4 Secure the cables to the cable tie mountings with cable ties as shown in the figure above.

WARNING

When connecting the power supply, the earth connection must be made before the current-carrying connections are established. When disconnecting the power supply, the current-carrying connections must be separated before the earth connection is. The length of the conductors between the power supply stress relief and the terminal block itself must be such that the current-carrying wires are tautened before the earth wire is in case the power supply is pulled loose from the stress relief.

Precautions on wiring of power supply and inter-unit wiring

- Use a round crimp-style terminal for connection to the power supply terminal board. In case it cannot be used due to unavoidable reasons, be sure to observe the following instruction.



1 Round pressure terminal
2 Cut out section
3 Cup washer

  - Do not connect wires of different gauge to the same power supply terminal. (Looseness in the connection may cause overheating.)
  - When connecting wires of the same gauge, connect them according to the below figure.

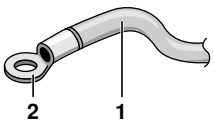
- Use the correct screwdriver to tighten the terminal screws. Small screwdrivers can damage the screw head and prevent appropriate tightening.
- Over-tightening the terminal screws can damage the screws.
- See the table below for tightening torques for the terminal screws.

Tightening torque (N•m)	
M5 (X3M)	2.0~3.0

- In wiring, make certain that prescribed wires are used, carry out complete connections, and fix the wires so that outside forces are not applied to the terminals.

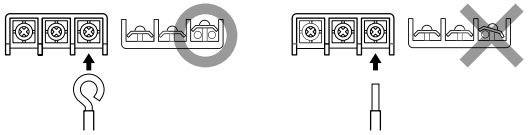
CAUTION

1. In case the use of stranded conductor wires is unavoidable for one reason or another, make sure to install round crimp-style terminals on the tip.
Place the round crimp-style terminal on the wire up to the covered part and fasten the terminal with the appropriate tool.



1 Stranded conductor wire
2 Round crimp-style terminal

2. When connecting the connection wires to the terminal board using a single core wire, be sure to perform curling.



Not executing the connections properly may cause heat and fire.
Strip the wire at terminal block:

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

Connection to a benefit kWh rate power supply

Electricity companies throughout the world work hard to provide reliable electric service at competitive prices and are often authorized to bill clients at benefit rates. E.g. time-of-use rates, seasonal rates, Wärmepumpentarif in Germany and Austria, ...

This equipment allows for connection to such benefit rate power supply delivery systems.

Consult with the electricity company acting as provider at the site where this equipment is to be installed to know whether it is appropriate to connect the equipment in one of the benefit kWh rate power supply delivery systems available, if any.

When the equipment is connected to such benefit kWh rate power supply, the electricity company is allowed to:

- interrupt power supply to the equipment for certain periods of time;
- demand that the equipment only consumes a limited amount of electricity during certain periods of time.

The unit is designed to receive an input signal by which the unit switches into forced off mode. At that moment, the outdoor unit compressors will not operate.

WARNING

for a benefit kWh rate power supply like illustrated below as type 1

- If the benefit kWh rate power supply is of the type that power supply is not interrupted, then control of the heaters is still possible.

  For the different possibilities of controlling heaters at moments that benefit kWh rate is active, refer to "[D] Benefit kWh rate power supply/Local shift value weather dependent" on page 38.

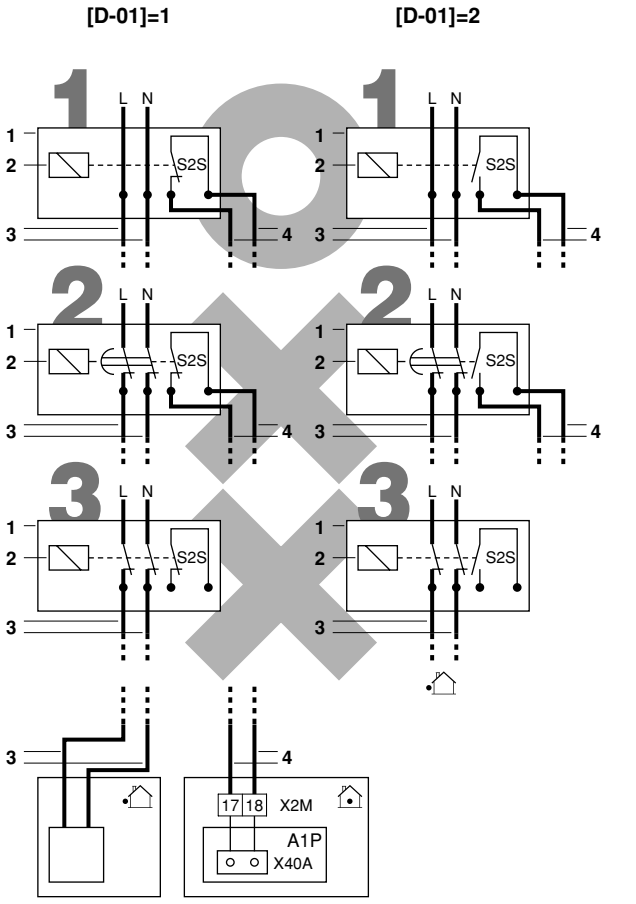
  If heaters must be controlled at moments that the benefit kWh rate power supply is off, then these heaters shall be connected to a separate power supply.
- During the period that the benefit kWh rate is active and power supply is continuous, then stand-by power consumption is possible (PCB, controller, pump, ...).

for a benefit kWh rate power supply like illustrated below as types 2 or 3

Benefit kWh rate power supplies that completely shut power supply are not allowed for this application because of the water freeze prevention that would not be powered.

Possible types of benefit kWh rate power supply

Possible connections and requirements to connect the equipment to such power supply are illustrated in the figures below:



1 Benefit kWh rate power supply box
2 Receiver controlling the signal of the electricity company
3 Power supply to outdoor unit
4 Voltage free contact
O Allowed
X Not allowed

CAUTION

In case of benefit kWh rate power supply installation, remove the wiring bridges on X2M before installing the normal kWh rate power supply.

When the outdoor unit is connected to a benefit kWh rate power supply, the voltage free contact of the receiver controlling the benefit kWh rate signal of the electricity company must be connected to clamps 17 and 18 of X2M (as illustrated in the figure above).
When parameter [D-01]=1 at the moment that the benefit kWh rate signal is sent by the electricity company, that contact will open and the unit will go in forced off mode(1).
When parameter [D-01]=2 at the moment that the benefit kWh rate signal is sent by the electricity company, that contact will close and the unit will go in forced off mode(2).

type 1
The benefit kWh rate power supply is of the type that power supply is not interrupted.

type 2 and 3
The benefit kWh rate power supply is of the type that power supply will be interrupted after elapse of time or is interrupted immediately.

(1) When the signal is released again, the voltage free contact will close and the unit will restart operation. It is therefore important to leave the auto restart function enabled. Refer to "[3] Auto restart" on page 32.
(2) When the signal is released again, the voltage free contact will open and the unit will restart operation. It is therefore important to leave the auto restart function enabled. Refer to "[3] Auto restart" on page 32.

CAUTION

- Benefit kWh rate power supplies that completely shut power supply like illustrated above as types 2 and 3 are not allowed for this application because of the water freeze prevention that would not be powered.
- When connecting the equipment to a benefit kWh rate power supply, change field settings [D-01] and both [D-01] and [D-00] in case the benefit kWh rate power supply is of the type that power supply is not interrupted (like illustrated above as type 1). Refer to "[D] Benefit kWh rate power supply/Local shift value weather dependent" on page 38 of chapter "Field settings".

NOTICE

If the benefit kWh rate power supply is of the type that power supply is not interrupted, the unit will be forced to off. Controlling the solar pump is still possible.

12.7. Indoor unit – Internal wiring – Parts table

Refer to the wiring diagram sticker on the top plate of the indoor unit.
The abbreviations used are listed below:

A1P ..... Main PCB
A2P ..... User interface PCB
A3P (EKRTW/R) ..... Thermostat (PC = power circuit)
A3P (EKSR3PA)..... Solar pumpstation PCB
A4P (EKRPB1HB).... Digital input/output PCB
A4P (EKRTR)..... Receiver PCB
BSK (EKSR3PA) ..... Solar pumpstation relay
E4H ..... Booster heater
F2B ..... Fuse booster heater
FU1 ..... Fuse (T, 3.15 A, 250 V) for PCB
FU2 ..... Fuse (T, 5 A, 250 V)
Fus,FuR ..... Fuse (5 A, 250 V) for digital input/output PCB
K3M..... Booster heater contactor
M2S..... 2-way valve for cooling mode
M3S..... 3-way valve floor heating/domestic hot water
PHC1 ..... Optocoupler input circuit
Q1DI..... Earth leakage circuit breaker
Q2L ..... Thermostat protector booster heater
R1H (EKRTR) ..... Humidity sensor
R1T (EKRTW)..... Ambient sensor
R2T (EKRTETS) ..... External sensor (floor or ambient)
R5T ..... Domestic hot water thermistor
S2S ..... Benefit kWh rate power supply contact
S3S ..... Dual setpoint 2 contact
S4S ..... Dual setpoint 1 contact
SS1 ..... DIP switch
TR1 ..... Transformer 24 V for PCB
V1S,V2S ..... Spark surpression 1, 2
X1M~X15M ..... Terminal strips
X3Y,X6Y,X13Y..... Connector
..... Field wiring
..... Terminal strip
, ... Connector
..... Terminal
..... Protective earth
BLK ..... Black
BLU ..... Blue
BRN ..... Brown
GRN..... Green
GRY ..... Grey
ORG..... Orange

PNK..... Pink
RED..... Red
VIO..... Violet
WHT..... White
YLW..... Yellow

NOTES

1 THIS WIRING DIAGRAM ONLY APPLIES TO THE INDOOR UNIT

2 USE A DEDICATED POWER CIRCUIT FOR THE BOOSTER HEATER.
NEVER USE A POWER CIRCUIT SHARED BY OTHER APPLIANCE.

3 NO/NC: NORMAL OPEN/NORMAL CLOSED

4 DO NOT OPERATE THE UNIT BY SHORT-CIRCUITING ANY PROTECTION DEVICE

7 FOR EKHWSU*V3, REFER TO OPTION MANUAL.

8 FOR EKSOLHWAV1, REFER TO OPTION MANUAL.

9 MAXIMUM LOAD: 0.3 A - 250 V AC
MINIMUM LOAD: 20 mA - 5 V DC

10 230 VAC OUTPUT
MAXIMUM LOAD: 0.3 A

⊗ SEVERAL WIRING POSSIBILITIES

WIRING DEPENDING ON MODEL
.....Wiring depending on model

OPTION .....Option

PCB.....PCB

FIELD WIRING.....Field wiring

FIELD SUPPLY .....Field supply

WIRE COLOUR .....Wire colour

POWER SUPPLY .....Power supply

OUTDOOR UNIT .....Outdoor unit

ONLY FOR *** OPTION .....Only for *** option

POSITION OF PARTS.....Position of parts

BACKUP HEATER KIT.....Backup heater kit

See note.....See note

Domestic hot water tank.....Domestic hot water tank

User interface.....User interface

Dual setpoint application (refer to installation manual)
.....Dual setpoint application (refer to installation manual)

3 wire type (SPST) .....3 wire type (SPST)

NO valve.....Normal open (NO) valve

NC valve.....Normal closed (NC) valve

Change over to boiler output
.....Change over to boiler output

Alarm output.....Alarm output

Cooling/heating on/off output
.....Cooling/heating on/off output

Solar input.....Solar input

See note ***.....See note ***

12.8. Requirements for indoor unit field wiring

Selection and sizing should be done in accordance with relevant local and national regulations based on the information in the table below:

Item	Cable bundle[a]	Desciption	Required number of conductors	Maximum running current
1	HV	Indoor unit control signals	3 + GND	Minimum cable section 2.5 mm^2
2	HV	Indoor unit pump and heater control signals	4	1.25 A[b]
3	LV	Thermistor interconnection cable (supplied with unit)	8	Supplied with the unit
4	HV	Heater kit control signals	5	[b]
5	LV	Heater kit R12T thermistor	2	[b]
6	HV	Alarm output (only for EKRP1HB* and EKSOLWAV1 option)	2	[b]
7	HV	Cooling/heating on/off output (only for EKRP1HB* and EKSOLWAV1 option)	2	[b]
8	HV	Solar input (only for EKRP1HB*and EKSOLWAV1 option)	2	[b]
9	LV	Changeover to boiler output (only for EKRP1HB* and EKSOLWAV1 option)	2	[b]
10	HV	2-way valve (only for EKBCX* units)	2	[b]
11	HV	Room thermostat (only for EKRTW, EKRTR or EKRTETS option)	1, 3, 4 or 5	[b]
12	LV	user interface	–	[b]
13	HV	3-way valve (only for EKHW option)	3	[b]
14	HV	Solar pump and thermal protector (only for EKSOLHWAV1 option)	2	[b]
15	LV	R5T Tank thermistor (only for EKHW option)	2	
16	HV	Booster heater power supply and thermal protector (only for EKHW option)	4 + GND	[c]
17	HV	Domestic hot water tank thermal protector (only for EKHWSU option)	2	[b]
18	PS	Booster heater power supply (only for EKHW option)	2 + GND	[c]

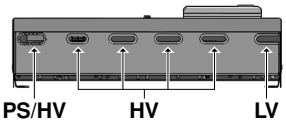
(a) PS = Power supply
HV = High voltage
LV = Low voltage
(b) Minimum cable section = 0.75 mm^2
(c) Refer to the nameplate of the domestic hot water tank

12.9. Routing

WARNING

It is important to keep the high voltage, low voltage and power supply wiring separated from each other. In order to avoid any electrical interference the distance between both wiring should always be at least 25 mm.

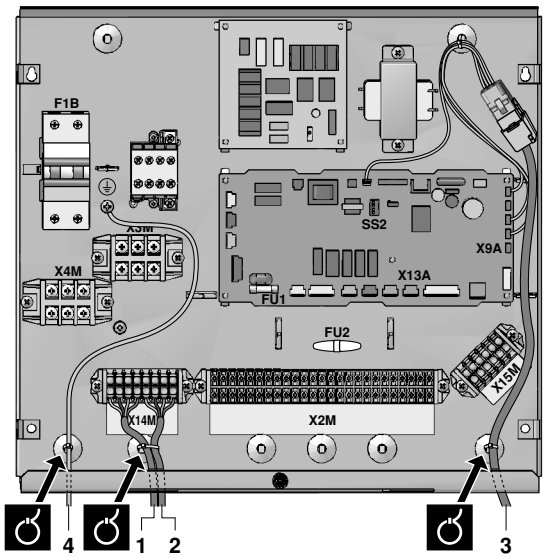
The indoor unit has several openings on the bottom side for field wiring. Use the appropriate opening to route the high voltage, low voltage and power supply wires as shown in the figure below.



PS Power supply
HV High voltage
LV Low voltage

12.10.Indoor switch box connections

Connection of control signals and thermistor cable



1 Indoor unit control signals
2 Indoor unit pump and heater control signals
3 Thermistor interconnection cable
4 In case no EKHW* option with booster heater is installed, connect an extra ground wire to the ground terminal.

1 Remove the control box cover.

2 Using the appropriate cables, route and connect the control cables to the appropriate terminals as shown on the wiring diagram supplied with the unit and according to the figure above.

3 Route and connect the thermistor interconnection cable as shown in the figure above.

Be sure not to force the connectors. The connectors lock in one position only. Check both connector sides for correct matching.

4 Route the cables through the cable holders and secure the cables to the cable tie mountings with cable ties as shown in the figure above.

5 Close the control box cover. Take care not to pinch any wires.

Connection heater kit signals

Refer to the installation manual of the EKMBUH heater kit.

Connection of the thermostat cable

Connection of the thermostat cable depends on the application.

See also "8. Typical application examples" on page 11 and "13.2. Room thermostat installation configuration" on page 28 for more information and configuration options on pump operation in combination with a room thermostat.

Thermostat requirements

- Power supply: 230 V AC or battery operated
- Contact voltage: 230 V.

Procedure

1 Connect the thermostat cable to the appropriate terminals as shown on the wiring diagram and installation manual of the room thermostat kit.

2 Fix the cable with cable ties to the cable tie mountings to ensure strain relief.

3 Set DIP switch SS2-3 on the PCB to ON. See "13.2. Room thermostat installation configuration" on page 28 for more information.

Connection of the first set point and second set point contacts

The connection of the set point contact is only relevant in case dual set point contact is enabled.

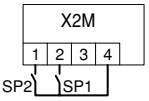
See also "8. Typical application examples" on page 11 and "Dual set point control" on page 35.

Contact requirements

The contact shall be a voltage free contact that ensure 230 V (100 mA).

Procedure

1 Connect the contact of first set point and second set point to the appropriate terminals as shown in the figure below



SP1 First set point contact
SP2 Second set point contact

2 Fix the cables with cable ties to the cable tie mountings to ensure strain relief.

3 Depending on the required pump operation set DIP switch SS2-3 and field setting [F-00]. See "13.3. Pump operation configuration" on page 29 and field setting [F-00] in "[F] Option setup" on page 39.

Connection of the valve control cables

Valve requirements

- Power supply: 230 V AC
- Maximum running current: 100 mA

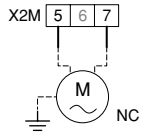
Wiring the 2-way valve

1 Using the appropriate cable, connect the valve control cable to the X2M terminal as shown on the wiring diagram.

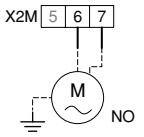
NOTICE

Wiring is different for a NC (normal closed) valve and a NO (normal open) valve. Make sure to connect to the correct terminal numbers as detailed on the wiring diagram and illustrations below.

Normal closed (NC) 2-way valve



Normal open (NO) 2-way valve



2 Fix the cable(s) with cable ties to the cable tie mountings to ensure strain relief.

Wiring the 3-way valve

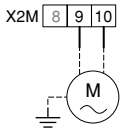
1 Using the appropriate cable, connect the valve control cable to the appropriate terminals as shown on the wiring diagram.

NOTICE

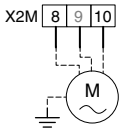
Two types of 3-way valves can be connected. Wiring is different for each type:

- "Spring return 2-wire" type 3-way valve
  The 3-way valve should be fitted as such that when the 3-way valve is idle (not activated), the space heating circuit is selected.
- "SPST 3-wire" type 3-way valve
  The 3-way valve should be fitted as such that when terminal ports 9 and 10 are electrified, the domestic hot water circuit is selected.

"Spring return 2-wire" valve



"SPST 3-wire" valve



2 Fix the cable(s) with cable ties to the cable tie mountings to ensure strain relief.

13. START-UP AND CONFIGURATION

The outdoor unit and indoor unit should be configured by the installer to match the installation environment (outdoor climate, installed options, etc.) and user expertise.

DANGER

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

DANGER: ELECTRICAL SHOCK

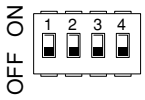
See "2. General Safety precautions" on page 2.

13.1. DIP switch settings overview

DIP switch SS2 is located on the control box PCB (see "Indoor unit switch box" on page 7) and allows configuration of domestic hot water tank installation, room thermostat connection and pump operation.

WARNING

Switch off the power supply before opening the control box service panel and making any changes to the DIP switch settings.

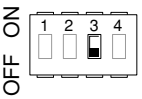


DIP switch SS2	Description	ON	OFF
1	Not applicable for installer	—	(Default)
2	Domestic hot water tank installation (see "13.4. Domestic hot water tank installation configuration" on page 30)	Installed	Not installed (Default)
3	Room thermostat connection (see "13.2. Room thermostat installation configuration" on page 28)	Room thermostat connected	No room thermostat connected (Default)
4	This setting(a) decides the operation mode of the heat pump when there is a simultaneous demand for more space heating/cooling and domestic water heating.	Heating/cooling priority	Priority to highest demand side(b)

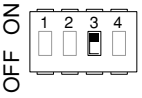
(a) Only applicable in case DIP switch 2 = ON.
(b) Heating/cooling or domestic water heating mode can be restricted by schedule timer and/or field settings (4, 5, 8).

13.2. Room thermostat installation configuration

- When **no room thermostat** is connected to the indoor unit, toggle switch SS2-3 should be set to **OFF**.



- When the **room thermostat** is connected to the indoor unit, toggle switch SS2-3 should be set to **ON**.



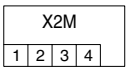
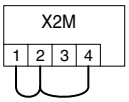
- On the room thermostat, confirm the correct settings (6r02=yes, 6r05=9, 6r06=5) to prevent the pump from repeatedly turning on and off (i.e. chattering), and thereby impacting the lifetime of the pump.

CAUTION

- When the room thermostat is connected to the indoor unit, the heating and cooling schedule timers are never available. Other schedule timers are not affected. For more information on the schedule timers, refer to the operation manual.
- When the room thermostat is connected to the indoor unit, and the ☀/❄ button or ⏻ button is pressed, the centralised control indicator will flash to indicate that the room thermostat has priority and controls on/off operation and change over operation.

The following table summarizes the required configuration and thermostat wiring at the terminal block (X2M: 1, 2, 3, 4) in the control box. Pump operation is listed in the third column. The three last columns indicate whether the following functionality is available on the user interface (UI) or handled by the thermostat (T):

- space heating or cooling on/off (⏻)
- heating/cooling changeover (☀/❄)
- heating and cooling schedule timers (🕘⊗)

Thermostat	Configuration	Pump operation	⏻	☀/❄	🕘⊗
No thermostat	• SS2-3 = OFF • wiring: (non) 	determined by leaving water temperature(a)	UI	UI	UI
	• SS2-3 = ON • wiring: 	on when space heating or cooling is on (⏻)	UI	UI	UI
Heating only thermostat	• SS2-3 = ON • wiring: (see installation manual of the room thermostat kit)	on when heating request by room thermostat	T	—	—
Thermostat with heating/cooling switch	• SS2-3 = ON • wiring: (see installation manual of the room thermostat kit)	on when heating request or cooling request by room thermostat	T	T	—

(a) The pump will stop when space heating/cooling is turned off or when the water reaches the desired water temperature as set on the user interface. With space heating/cooling turned on, the pump will then run every 5 minutes during 3 minutes to check the water temperature.

13.3. Pump operation configuration

NOTICE

To set the pump speed, refer to "13.8. Setting the pump speed" on page 30.

Without room thermostat: DIP switch SS2-3 = OFF

When no thermostat is connected to the indoor unit, pump operation will be determined by the leaving water temperature.

To force continuous pump operation when no room thermostat is connected do the following:

- set toggle switch SS2-3 to ON,
- short-circuit the terminal numbers 1-2-4 on the terminal block in the switch box.

With room thermostat DIP switch: SS2-3 = ON

When the thermostat is connected to the indoor unit, the pump will operate continuously whenever there is heating or cooling demand requested by the thermostat.

Dual set point

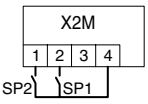
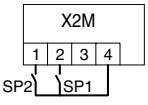
When dual set point is enabled, the pump operation will be determined depending on the status of the DIP switch SS2-3 and set point selection contacts. Refer to the pump operation configurations when the thermostat is connected or not as described above.

CAUTION

When dual set point is enabled, the "forced continuous pump operation" is not possible. When SS2-3 is ON while SP1 and SP2 are both closed, the pump operation will be the same operation as "with room thermostat" and the second set point will be the applicable set point. Refer to "Dual set point control" on page 35.

The following table summarizes the required configuration and wiring at the terminal block (X2M: 1, 2, 4) in the switch box. Pump operation is listed in the third column. The three last columns indicate whether the following functionality is available on the user interface (UI) or handled by the set point selection contacts SP1 and SP2:

- space heating or cooling on/off (⏻)
- heating/cooling changeover (☀/❄)
- heating and cooling schedule timers (🕘⊗)

Dual set point				
Configuration	Pump operation	⏻	☀/❄	🕘⊗
• [7-02]=1 • SS2-3 = OFF • wiring: 	determined by leaving water temperature(a)	UI	UI	UI
• [7-02]=1 • SS2-3 = ON • wiring: 	on when main or/and sub set point is requested	SP2/SP1	UI	—

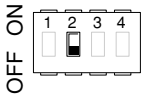
SP1 = First set point contact

SP2 = Second set point contact

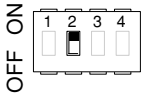
(a) The pump will stop when space heating/cooling is turned off or when the water reaches the desired water temperature as set on the user interface. With space heating/cooling turned on, the pump will then run every 5 minutes during 3 minutes to check the water temperature.

13.4. Domestic hot water tank installation configuration

- When **no domestic hot water tank** is installed, toggle switch SS2-2 should be set to **OFF** (default).



- When a **domestic hot water tank** is installed, toggle switch SS2-2 should be set to **ON**.



CAUTION

When SS2-3 was set to ON without all necessary and correct wiring connections between indoor unit and switch box of the domestic hot water tank, the error code RC will be displayed on the user interface.

13.5. Initial start-up at low outdoor ambient temperatures

During initial start-up and when water temperature is low, it is important that the water is heated gradually. Failure to do so may result in cracking of concrete floors due to rapid temperature change. Please contact the responsible cast concrete building contractor for further details.

To do so, the lowest leaving water set temperature can be decreased to a value between 15°C and 25°C by adjusting the field setting [9-01] (heating set point lower limit). Refer to "13.9. Field settings" on page 31.

CAUTION

Heating between 15°C and 25°C is performed by the backup heater only (EKMBUH unit).

13.6. Pre-operation checks

Checks before initial start-up

DANGER

Switch off all relevant power supply before making any connections.

After the installation of the unit, check the following before switching on the circuit breaker:

1 Field wiring

Make sure that the field wiring between local supply panel and indoor unit, outdoor unit and indoor unit, indoor unit and backup heater kit, indoor unit and valves (when applicable), indoor unit and room thermostat (when applicable), and indoor unit and domestic hot water tank has been carried out according to the instructions described in the chapter "12. Electrical wiring work" on page 21, according to the wiring diagrams and according to European and national regulations.

2 Fuses or protection devices

Check that the fuses or the locally installed protection devices are of the size and type specified in the chapter "Technical specifications" on page 47. Make sure that neither a fuse nor a protection device has been bypassed.

3 Backup heater circuit breaker F1B/F3B

Do not forget to turn on the backup heater circuit breaker F2B in the switch box (F1B/F3B depends on the backup heater type) of EKMBUH. Refer to the wiring diagram.

4 Booster heater circuit breaker F2B

Do not forget to turn on the booster heater circuit breaker F2B in the control box (applies only to units with optional domestic hot water tank installed).

5 Earth wiring

Make sure that the earth wires have been connected properly and that the earth terminals are tightened.

6 Internal wiring

Visually check the switch box on loose connections or damaged electrical components.

7 Fixation

Check that the unit is properly fixed, to avoid abnormal noises and vibrations when starting up the unit.

8 Damaged equipment

Check the inside of the unit on damaged components or squeezed pipes.

9 Refrigerant leak

Check the inside of the unit on refrigerant leakage. If there is a refrigerant leak, call your local dealer.

10 Power supply voltage

Check the power supply voltage on the local supply panel. The voltage must correspond to the voltage on the identification label of the unit.

11 Air purge valve

Make sure the air purge valve is open (at least 2 turns).

12 Pressure relief valve

Check if the backup heater is completely filled with water by operating the pressure relief valve. It should purge water instead of air.

NOTICE

Operating the system with the backup heater not completely filled with water will damage the backup heater!

13 Shut-off valves

Make sure that the shut-off valves are correctly installed and fully open.

NOTICE

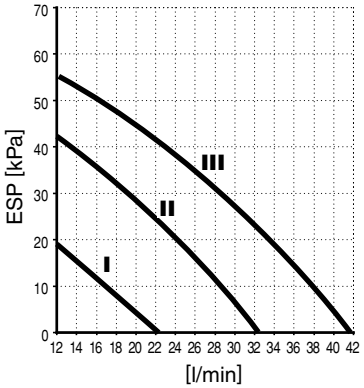
Operating the system with closed valves will damage the pump!

13.7. Powering up the indoor unit

When power supply to the outdoor unit is turned on (provided power supply via the outdoor unit) , "88" is displayed on the user interface during its initialisation, which might take up to 30 seconds. During this process the user interface cannot be operated.

13.8. Setting the pump speed

The pump speed can be selected on the pump (see "5.2. Main components of the outdoor unit and the indoor unit" on page 6).
The default setting is high speed (**III**). If the water flow in the system is too high (e.g., noise of running water in the installation) the speed can be set to medium speed (**II**) or low speed (**I**).
The available external static pressure (ESP, expressed in kPa) in function of the water flow (l/min) is shown in the graph below.



13.9. Field settings

The unit shall be configured by the installer to match the installation environment (outdoor climate, installed options, etc.) and user demand. Thereto, a number of so called field settings are available. These field settings are accessible and programmable through the user interface on the indoor unit.

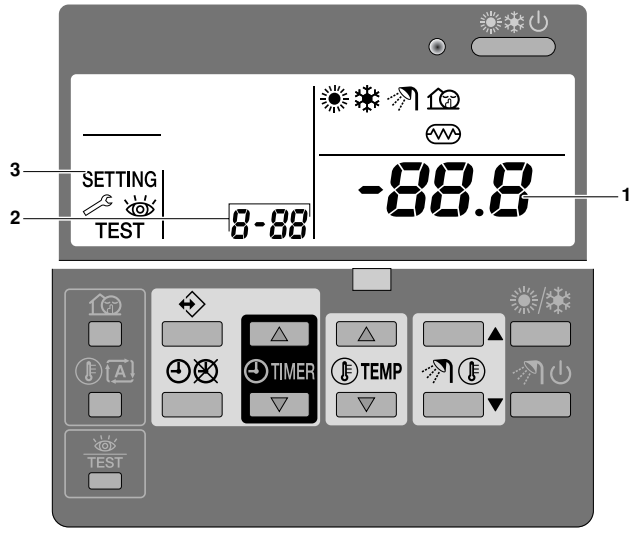
Each field setting is assigned a 3-digit number or code, for example [1-03], which is indicated on the user interface display. The first digit [1] indicates the 'first code' or field setting group. The second and third digit [03] together indicate the 'second code'.

A list of all field settings and default values is given under "13.10. Field settings table" on page 40. In this same list, we provided for 2 columns to register the date and value of altered field settings at variance with the default value.

A detailed description of each field setting is given under "Detailed description" on page 31.

Procedure

To change one or more field settings, proceed as follows.



1. Press the TEST button for a minimum of 5 seconds to enter FIELD SET MODE.
   The **SETTING** icon (3) will be displayed. The current selected field setting code is indicated *8-88* (2), with the set value displayed to the right *-88.8* (1).
2. Press the TEMP▲ button to select the appropriate field setting first code.
3. Press the TEMP▼ button to select the appropriate field setting second code.
4. Press the TIMER▲ button and TIMER▼ button to change the set value of the select field setting.
5. Save the new value by pressing the ⊗ button.
6. Repeat step 2 through 4 to change other field settings as required.
7. When finished, press the TEST button to exit FIELD SET MODE.

Changes made to a specific field setting are only stored when the ⊗ button is pressed. Navigating to a new field setting code or pressing the TEST button will discard the change made.

NOTICE

- Before shipping, the set values have been set as shown under "13.10. Field settings table" on page 40.
- When exiting FIELD SET MODE, "88" may be displayed on the user interface LCD while the unit initialises itself.

Detailed description

[0] User permission level

If required, certain user interface buttons can be made unavailable for the user.

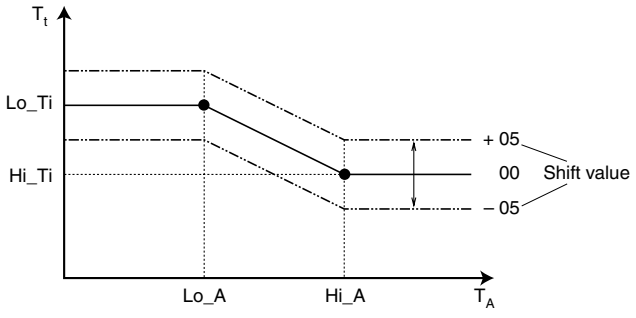
Three permission levels are defined (see the table below). Switching between level 1 and level 2/3 is done by simultaneously pressing buttons TIMER▲ and TIMER▼ immediately followed by simultaneously pressing buttons and , and keeping all 4 buttons pressed for at least 5 seconds (in normal mode). Note that no indication on the user interface is given. When level 2/3 is selected, the actual permission level – either level 2 or level 3 – is determined by the field setting [0-00].

		Permission level		
Button		**1**	**2**	**3**
Quiet mode button		operable	—	—
Weather dependent set point button		operable	—	—
Schedule timer enable/disable button		operable	operable	—
Programming button		operable	—	—
Time adjust buttons	TIMER▲ TIMER▼	operable	—	—
Inspection/test operation button	TEST	operable	—	—

[1] Weather dependent set point (heating operation only)

The weather dependent set point field settings define the parameters for the weather dependent operation of the unit. When weather dependent operation is active the water temperature is determined automatically depending on the outdoor temperature: colder outdoor temperatures will result in warmer water and vice versa. During weather dependent operation, the user has the possibility to shift up or down the target water temperature by a maximum of 5°C. See the operation manual for more details on weather dependent operation.

- [1-00] Low ambient temperature (Lo_A): low outdoor temperature.
- [1-01] High ambient temperature (Hi_A): high outdoor temperature.
- [1-02] Set point at low ambient temperature (Lo_Ti): the target outgoing water temperature when the outdoor temperature equals or drops below the low ambient temperature (Lo_A).
  Note that the Lo_Ti value should be higher than Hi_Ti, as for colder outdoor temperatures (i.e. Lo_A) warmer water is required.
- [1-03] Set point at high ambient temperature (Hi_Ti): the target outgoing water temperature when the outdoor temperature equals or rises above the high ambient temperature (Hi_A).
  Note that the Hi_Ti value should be *lower* than Lo_Ti, as for warmer outdoor temperatures (i.e. Hi_A) less warm water suffices.



T_t	Target water temperature
T_A	Ambient (outdoor) temperature
Shift value	= Shift value

[2] Disinfection function

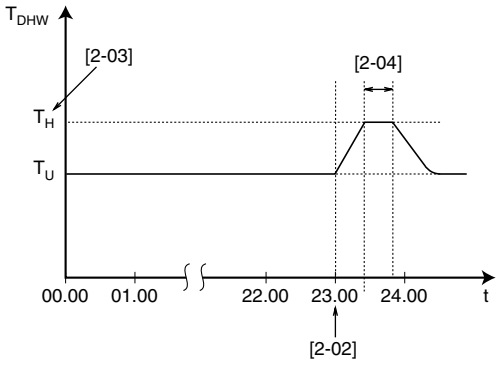
Applies only to installations with a domestic hot water tank.

The disinfection function disinfects the domestic hot water tank by periodically heating the domestic hot water to a specific temperature.

CAUTION

The disinfection function field settings must be configured by the installer according to local and national regulations.

- [2-00] Operation interval: day(s) of the week at which the domestic hot water should be heated.
- [2-01] Status: defines whether the disinfection function is turned on (1) or off (0).
- [2-02] Start time: time of the day at which the domestic hot water should be heated.
- [2-03] Set point: high water temperature to be reached.
- [2-04] Interval: time period defining how long the set point temperature should be maintained.



T_{DHW}	Domestic hot water temperature
T_U	User set point temperature (as set on the user interface)
T_H	High set point temperature [2-03]
t	Time

WARNING

Be aware that the domestic hot water temperature at the hot water tap will be equal to the value selected in field setting [2-03] after a disinfection operation.

If this high domestic hot water temperature can be a potential risk for human injuries, a mixing valve (field supply) shall be installed at the hot water outlet connection of the domestic hot water tank. This mixing valve shall secure that the hot water temperature at the hot water tap never rise above a set maximum value. This maximum allowable hot water temperature shall be selected according to local and national regulations.

[3] Auto restart

When power returns after a power supply failure, the auto restart function reapplies the user interface settings at the time of the power supply failure.

NOTICE

It is therefore recommended to leave the auto restart function enabled.

Note that with the function disabled the schedule timer will not be activated when power returns to the unit after a power supply failure. Press the ⏲⊗ button to enable the schedule timer again.

- [3-00] Status: defines whether the auto restart function is turned **ON (0)** or **OFF (1)**.

NOTICE

If the benefit kWh rate power supply is of the type that power supply is interrupted, then always allow the auto restart function.

[4] Backup/booster heater operation and space heating off temperature

Backup heater operation

The operation of the backup heater (EKMBUH unit) can altogether be enabled or disabled, or it can be disabled depending on operation of the booster heater.

- [4-00] Status: defines whether backup heater operation is enabled (1) or disabled (0).

NOTICE

Even in case the backup heater operation status field setting [4-00] is disabled (0), the backup heater can operate during start-up and defrost operation.

- [4-01] Priority: defines whether backup heater and booster heater can operate simultaneously (0), or if the booster heater operation has priority over the backup heater operation (1), or if the backup heater operation has priority over the booster heater operation (2).

NOTICE

When the priority field setting is set to ON (1), space heating performance of the system might be decreased at low outdoor temperatures, since in case of domestic water heating demand the backup heater will not be available for space heating (space heating will still be provided by the heat pump).

When the priority field setting is set to ON (2), domestic water heating performance of the system might be decreased at low outdoor temperatures, since in case of space heating demand the booster heater will not be available for domestic water heating. However domestic water heating by heat pump will still be available.

When the priority field setting is set to OFF (0), make sure that electrical power consumption does not exceed supply limits.

Space heating off temperature

- [4-02] Space heating off temperature: outdoor temperature above which space heating is turned off, to avoid overheating.

Booster heater operation

Applies only to installations with a domestic hot water tank.

The operation of the booster heater can be enabled or limited depending on outdoor temperature (T_A), domestic hot water temperature (T_{DHW}) or operation mode of the heat pump.

- [4-03] Booster heater operation: defines whether the optional booster heater operation is enabled (1) or has certain limitations (0/2/3).

Explanation of settings of [4-03]
Booster heater will/can only operate if domestic hot water mode is activated (🚿).

- [4-03]=0, then booster heater operation is only allowed during "[2] Disinfection function" and "Powerful domestic water heating" (see operation manual).
  This setting is only recommended in case the capacity of the heat pump can cover the heating requirements of the house and domestic hot water over the complete heating season.
  The result of this setting is that the domestic hot water will never be heated by the booster heater except for "[2] Disinfection function" and "Powerful domestic water heating" (see operation manual).

NOTICE

If the booster heater operation is limited ([4-03]=0) and the ambient outdoor temperature T_A is lower than the field setting to which parameter [5-03] is set and [5-02]=1, then the domestic hot water will not be heated.

The consequence of this setting is that the domestic hot water temperature (T_{DHW}) can be maximum the heat pump OFF temperature ($T_{HP\ OFF}$). Refer to setting of [6-00] and [6-01] in "[6]" on page 34.

- [4-03]=1, then booster heater heater operation is only determined by booster heater OFF temperature ($T_{BH\ OFF}$), booster heater ON temperature ($T_{BH\ ON}$) and/or schedule timer. Refer to setting "[7-00]" on page 34 and "[7-01]" on page 35.
- [4-03]=2, then booster heater operation is only allowed if heat pump is out of "operation range" of heat pump domestic water heating mode (T_A<[5-03] or T_A>35°C) or domestic hot water temperature is 2°C lower then the heat pump OFF temperature ($T_{HP\ OFF}$) for domestic hot water mode (T_{DHW}>$T_{HP\ OFF}$–2°C). (Refer to setting [5-03] on page 33, [6-00] on page 34 and [6-01] on page 34).
  Results in the most optimum coverage of domestic hot water heated by the pump.
- [4-03]=3, then booster heater operation is the same as setting 1, except that booster heater is OFF when the heat pump is active in domestic hot water mode. The consequence of this functionality is that setting [8-03] is not relevant.
  Results in optimum coverage of domestic hot water heated by heat pump in relation with [8-04].

NOTICE

- When setting [4-03]=1/2/3, the booster heater operation can still be restricted by the schedule timer as well. I.e., when booster heater operation is preferred during certain period of the day. (See operation manual)
- When setting [4-03]=2, the booster heater will be allowed to operate when T_A<[5-03] independent of the status of [5-02]. If bivalent operation is enabled and permission signal for auxiliary boiler is ON, the booster heater will be restricted even when T_A<[5-03]. (See "[C-02]" on page 37).
- Booster heater is always allowed during powerful and disinfection function, except for the period that the backup heater operation is required for safety reasons and [4-02]=1.

- [4-04] Freeze protection function: avoids freezing of the water piping between home and unit. In case of low ambient temperatures it will activate the pump and in case of low water temperatures it will additionally activate the backup heater.
  Default freeze protection function takes into account freezing of water piping which is insufficiently insulated.
  Basically it means that the pump is activated whenever ambient temperatures become close to freezing, independently of the working temperature.

[5] Equilibrium temperature and space heating priority temperature

Equilibrium temperature — The 'equilibrium temperature' field settings apply to operation of the **backup heater**.

When the equilibrium temperature function is enabled, operation of the backup heater is restricted to low outdoor temperatures, i.e. when the outdoor temperature equals or drops below the specified equilibrium temperature. When the function is disabled, operation of the backup heater is possible at all outdoor temperatures. Enabling this function reduces the working time of the backup heater.

- [5-00] Equilibrium temperature status: specifies whether the equilibrium temperature function is enabled (1) or disabled (0).
- [5-01] Equilibrium temperature: outdoor temperature below which operation of the backup heater is allowed.

Space heating priority temperature — Applies only to installations with a domestic hot water tank. — The 'space heating priority temperature' field settings apply to operation of the 3-way valve and the **booster heater** in the domestic hot water tank.

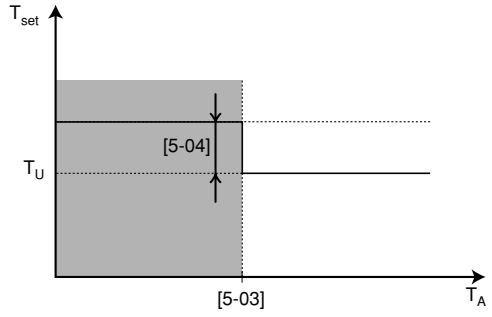
When the space heating priority function is enabled, it is assured that the full capacity of the heat pump is used for space heating only when the outdoor temperature equals or drops below the specified space heating priority temperature, i.e. low outdoor temperature. In this case the domestic hot water will only be heated by the booster heater.

- [5-02] Space heating priority status: specifies whether space heating priority is enabled (1) or disabled (0).
- [5-03] Space heating priority temperature: outdoor temperature below which the domestic hot water will be heated by the booster heater only, i.e. low outdoor temperature.

NOTICE

If the booster heater operation is limited ([4-03]=0) and the ambient outdoor temperature T_A is lower than the field setting to which parameter [5-03] is set and [5-02]=1, then the domestic hot water will not be heated.

- [5-04] Set point correction for domestic hot water temperature: set point correction for the desired domestic hot water temperature, to be applied at low outdoor temperature when space heating priority is enabled. The corrected (higher) set point will make sure that the *total* heat capacity of the water in the tank remains approximately unchanged, by compensating for the colder bottom water layer of the tank (because the heat exchanger coil is not operational) with a warmer top layer.



T_{set}	Domestic hot water set point temperature
T_U	User set point (as set on the user interface)
T_A	Ambient (outdoor) temperature
	Space heating priority

WARNING

Be aware that the domestic hot water temperature will be automatically increased with the value selected in field setting [5-04] (if the outdoor temperature drops below field setting [5-03]) compare to the user set point for domestic hot water (T_U). Refer to field setting [5-03], [7-00] and the operation manual to select preferable set point.

If this high domestic hot water temperature can be a potential risk for human injuries, a mixing valve (field supply) shall be installed at the hot water outlet connection of the domestic hot water tank. This mixing valve shall secure that the hot water temperature at the hot water tap never rise above a set maximum value. This maximum allowable hot water temperature shall be selected according to local and national regulations.

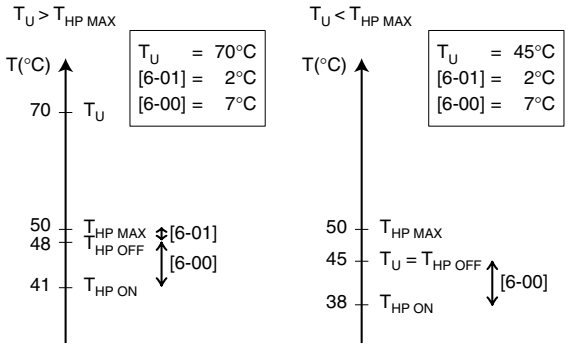
[6] DT for heat pump domestic water heating mode

Applies only to installations with a domestic hot water tank.

The 'DT (temperature difference) for heat pump domestic water heating mode' field settings determine the temperatures at which heating of the domestic hot water by the heat pump will be started (i.e., the heat pump ON temperature) and stopped (i.e., the heat pump OFF temperature).
When the domestic hot water temperature drops below the heat pump ON temperature ($T_{HP\ ON}$), heating of the domestic hot water by the heat pump will be started. As soon as the domestic hot water temperature reaches the heat pump OFF temperature ($T_{HP\ OFF}$) or the user set point temperature (T_U), heating of the domestic hot water by the heat pump will be stopped (by switching the 3-way valve).

The heat pump OFF temperature, and the heat pump ON temperature, and its relation with field settings [6-00] and [6-01] are explained in the illustration below.

- [6-00] Start: temperature difference determining the heat pump ON temperature ($T_{HP\ ON}$). See illustration.
- [6-01] Stop: temperature difference determining the heat pump OFF temperature ($T_{HP\ OFF}$). See illustration.



T_U	User set point temperature (as set on the user interface)
$T_{HP\ MAX}$	Maximum heat pump temperature at sensor in domestic hot water tank (50°C)(depending on T_A)(a)
$T_{HP\ OFF}$	Heat pump OFF temperature
$T_{HP\ ON}$	Heat pump ON temperature

(a) 45°C = $T_{HP\ MAX}$ at T_A>25°C.
50°C = $T_{HP\ MAX}$ at 5°C≤T_A≤25°C.
48°C = $T_{HP\ MAX}$ at T_A<5°C.

NOTICE

The maximum domestic hot water temperature that can be reached with the heat pump is 50°C. It is advised to select $T_{HP\ OFF}$ not higher than 48°C in order to improve performance of the heat pump during domestic water heating mode.

When setting [4-03]=0 or 2 special attention to setting [6-00] is recommended. A good balance between the required domestic hot water temperature and heat pump ON temperature ($T_{HP\ ON}$) is a must.

[7] DT for booster heater and dual set point control

DT for booster heater

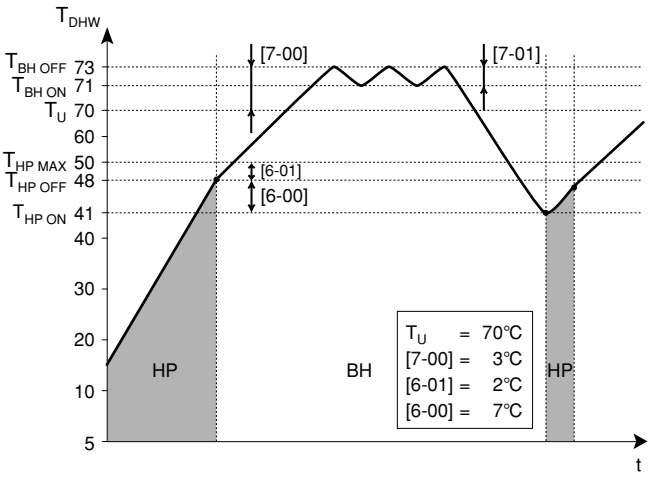
Applies only to installations with a domestic hot water tank.

When the domestic hot water is heated and the domestic hot water set point temperature (as set by the user) has been reached, the booster heater will continue to heat the domestic hot water to a temperature a few degrees above the set point temperature, i.e. the booster heater OFF temperature. These extra degrees are specified by the domestic hot water step length field setting. Correct setting prevents the booster heater from repeatedly turning on and off (i.e. chattering) to maintain the domestic hot water set point temperature. Note: the booster heater will turn back on when the domestic hot water temperature drops [7-01] (field setting) below the booster heater OFF temperature.

NOTICE

If the schedule timer for booster heater (see the operation manual) is active, the booster heater will only operate if allowed by this schedule timer.

- [7-00] Domestic hot water step length: temperature difference above the domestic hot water set point temperature before the booster heater is turned off.



BH	Booster heater
HP	Heat pump. If heating up time by the heat pump takes too long, auxiliary heating by the booster heater can take place
$T_{BH\ OFF}$	Booster heater OFF temperature (T_U + [7-00])
$T_{BH\ ON}$	Booster heater ON temperature ($T_{BH\ OFF}$ – [7-01])
$T_{HP\ MAX}$	Maximum heat pump temperature at sensor in domestic hot water tank
$T_{HP\ OFF}$	Heat pump OFF temperature ($T_{HP\ MAX}$ – [6-01])
$T_{HP\ ON}$	Heat pump ON temperature ($T_{HP\ OFF}$ – [6-00])
T_{DHW}	Domestic hot water temperature
T_U	User set point temperature (as set on the user interface)
t	Time

WARNING

Be aware that the domestic hot water temperature will be automatically increased (always) with the value selected in field setting [7-00] compare to the user set point for domestic hot water (T_U). Refer to field setting [7-00] and the operation manual to select preferable set point.

If this high water temperature can be a potential risk for human injuries, a mixing valve (field supply) shall be installed at the hot water outlet connection of the domestic hot water tank. This mixing valve shall secure that the hot water temperature at the hot water tap never rise above a set maximum value. This maximum allowable hot water temperature shall be selected according to local and national regulations.

NOTICE

If the booster heater operation is limited ([4-03]=0), then set point of field setting parameter [7-00] has only meaning for powerful domestic water heating.

- [7-01] Hysteresis value booster heater: temperature difference determining the booster heater ON temperature ($T_{BH\ ON}$). $T_{BH\ ON} = T_{HP\ OFF} - [7\text{-}01]$

NOTICE

The minimum value for booster heater ON temperature ($T_{BH\ ON}$) is 2°C (fixed) below heat pump OFF temperature ($T_{HP\ OFF}$).

Dual set point control

Applies only to installations with different heat emitter which require different set points.

Dual set point control makes it possible to generate 2 different set points.

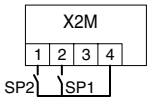
NOTICE

There is no indication available which set point is active!

- [7-02] Dual set point control status: defines whether the dual set point control is enabled (1) or disabled (0).
- [7-03] Second set point heating: specifies the second set point temperature in heating operation.
- [7-04] Second set point cooling: specifies the second set point temperature in cooling operation.

NOTICE

- The first set point heating/cooling is the set point selected on the user interface.
  - In heating mode the first set point can be a fixed value or weather dependent.
  - In cooling mode the first set point is always a fixed value.
- The second set point heating [7-03] should be linked to the heat emitters which requires the highest set point in heating mode. Example: fan coil unit.
- The second set point cooling [7-04] should be linked to the heat emitters which requires the lowest set point in cooling mode. Example: fan coil unit.
- The actual second set point heating value depends on the selected value of setting [7-03].
  - In case [7-03]=1~24, the actual second set point will be first set point heating increased with [7-03] (the maximum is 55°C).
    In this way the second set point heating is linked to the first set point heating.
  - In case [7-03]=25~55, the actual second set point heating is equal to [7-03].
- The selection of second set point or first set point is determined by the terminals (X2M: 1, 2, 4).
  The second set point has always priority on the first set point.



SP1 First set point contact

SP2 Second set point contact

NOTICE

When dual set point control is enabled, heating/cooling selection always has to be done on the user interface.

NOTICE

It is the responsibility of the installer to make sure no unwanted situations can occur.

It is very important that the water temperature to the floor heating loops never becomes too high in heating mode or never too cold in cooling mode. Failure to observe this rule can result in construction damage or discomfort. For example in cooling mode condensation on the floor can occur when water towards the floor heating loops is too cold (dew point).

[8] Domestic water heating mode timer

Applies only to installations with a domestic hot water tank.

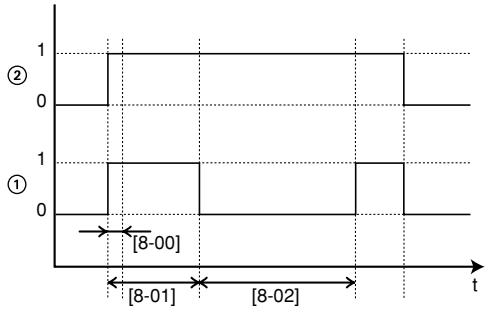
The 'domestic water heating mode timer' field settings defines the minimum and maximum domestic water heating times, minimum time between two domestic water heating cycles by heat pump, and booster heater delay time.

- [8-00] Minimum running time: specifies the minimum time period during which heat pump domestic water heating mode should be activated, even when the target domestic hot water temperature for heat pump ($T_{HP\ OFF}$) has already been reached.
- [8-01] Maximum running time: specifies the maximum time period during which heat pump domestic water heating mode can be activated, even when the target domestic hot water temperature for heat pump ($T_{HP\ OFF}$) has not yet been reached.
  The actual maximum running time will automatically variate between [8-01] and [8-01]+[8-04] depending on the outdoor temperature. See figure in chapter "[8-04]" on page 36.

NOTICE

Note that when the unit is configured to work with a room thermostat (refer to "13.2. Room thermostat installation configuration" on page 28), the maximum running timer will only be taken into account when there is a request for space heating or space cooling. When there is no request for space heating or space cooling, domestic water heating by the heat pump will continue until the 'heat pump OFF temperature' (see field settings [6] on page 34) is reached. When no room thermostat is installed, the timer is always taken into account.

- [8-02] Anti-recycling time: specifies the minimum required interval between two heat pump domestic water heating mode cycles.
  The actual anti-recycling time will automatically variate between [8-02] and 0 depending on the outdoor temperature. See figure in chapter "[8-04]" on page 36.



1 Heat pump domestic water heating mode (1 = active, 0 = not active)

2 Hot water request for heat pump (1 = request, 0 = no request)

t Time

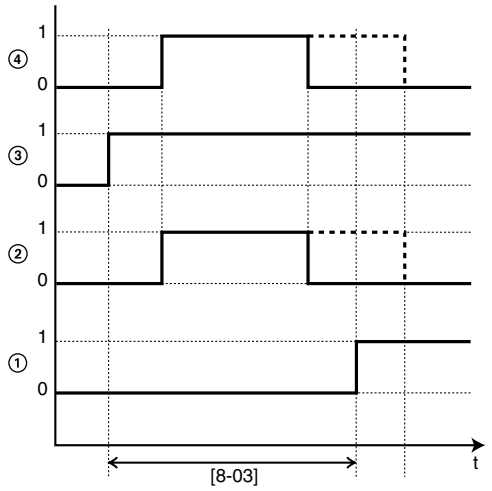
NOTICE

If the outdoor temperature is higher than the field setting to which parameter [4-02] is set, then field settings of parameters [8-01], [8-02], and [8-04] are not considered.

■ [8-03] Booster heater delay time: specifies the start-up time delay of the booster heater operation when heat pump domestic water heating mode is active.

NOTICE

- When heat pump is active in domestic water heating mode, the delay time of booster heater is [8-03].
- When heat pump is not active in domestic water heating mode, the delay time is 20 min.
- The delay timer starts from booster heater ON temperature ($T_{BH\ ON}$)



1 Booster heater operation (1 = active, 0 = not active)
2 Heat pump domestic water heating mode (1 = active, 0 = not active)
3 Hot water request for booster heater (1 = request, 0 = no request)
4 Hot water request for heat pump (1 = request, 0 = no request)
t Time

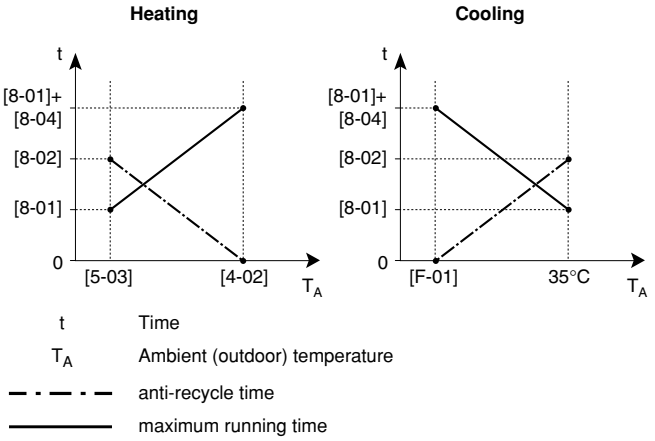
NOTICE

- By adapting the booster heater delay time versus the maximum running time, an optional balance can be found between the energy efficiency and the heat up time.
- However, if the booster heater delay time is set too high, it might take a long time before the domestic hot water reaches its set temperature upon domestic hot water mode request.
- The purpose of [8-03] is to delay the booster heater in relation with the heat pump operation time in domestic water heating mode.
- The setting [8-03] has only meaning if setting [4-03]=1. Setting [4-03]=0/2/3 limits the booster heater automatically in relation to heat pump operation time in domestic water heating mode.
- Take care that [8-03] is always in relation with the maximum running time [8-01].

Example: [4-03]=1

	Energy saving settings	Quick heating settings (default)
[8-01]	20~60 min	30 min
[8-03]	[8-01] + 20 min	20 min

■ [8-04] Additional running time at [4-02]/[F-01]: specifies the additional running time on the maximum running time at outdoor temperature [4-02] or [F-01]. See figure below.



t Time
T_A Ambient (outdoor) temperature
anti-recycle time
maximum running time

NOTICE

The full advantage of [8-04] will be applicable if setting [4-03] is not 1.

[9] Heating and cooling set point ranges

The purpose of this field setting is to prevent the user from selecting a wrong (i.e., too hot or too cold) leaving water temperature. Thereto the heating temperature set point range and the cooling temperature set point range available to the user can be configured.

CAUTION

- In case of a floor heating application, it is important to limit the maximum leaving water temperature at heating operation according to the specifications of the floor heating installation.
- In case of a floor cooling application, it is important to limit the minimum leaving water temperature at cooling operation (field setting of parameter [9-03]) to 16~18°C to prevent condensation on the floor.

- [9-00] Heating set point upper limit: maximum leaving water temperature for heating operation.
- [9-01] Heating set point lower limit: minimum leaving water temperature for heating operation.
- [9-02] Cooling set point upper limit: maximum leaving water temperature for cooling operation.
- [9-03] Cooling set point lower limit: minimum leaving water temperature for cooling operation.
- [9-04] Overshoot setting: defines how much the water temperature may rise above the set point before the compressor stops. This function is only applicable in heating mode.

[C] Setup on EKRP1HB digital I/O PCB

Solar priority mode

- [C-00] Solar priority mode setting: for information concerning the EKSOLHW solar kit, refer to the installation manual of that kit.

Alarm output logic

- [C-01] Alarm output logic: defines the logic of the alarm output on the EKRP1HB digital I/O PCB.
  [C-01]=0, the alarm output will be powered when an alarm occurs (default).
  [C-01]=1, the alarm output will not be powered when an alarm occurs. This field setting allows for distinction between detection of an alarm and detection of a power failure to the unit.

[C-01]	Alarm	No alarm	No power supply to unit
0 (default)	Closed output	Open output	Open output
1	Open output	Closed output	Open output

Bivalent operation

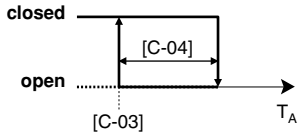
Applies only to installations with an auxiliary boiler (alternating operation, parallel connected). The purpose of this function is to determine —based on the outdoor temperature— which heating source can/will provide the space heating, either the Daikin indoor unit or an auxiliary boiler.

The field setting "bivalent operation" apply only the indoor unit space heating operation and the permission signal for the auxiliary boiler.

When the "bivalent operation" function is enabled, the indoor unit will stop automatically in space heating operation when the outdoor temperature drops below "bivalent ON temperature" and the permission signal for the auxiliary boiler becomes active.

When the bivalent operation function is disabled, the space heating by indoor unit is possible at all outdoor temperatures (see operation ranges) and permission signal for auxiliary boiler is always disactivated.

- [C-02] Bivalent operation status: defines whether bivalent operation is enabled (1) or disabled (0).
- [C-03] Bivalent ON temperature: defines the outdoor temperature below which the permission signal for the auxiliary boiler will be active (closed, KCR on EKRP1HB) and space heating by indoor unit will be stopped.
- [C-04] Bivalent hysteresis: defines the temperature difference between bivalent ON temperature and bivalent OFF temperature.
  Permission signal X1–X2 (EKRP1HB)



T_A Outdoor temperature

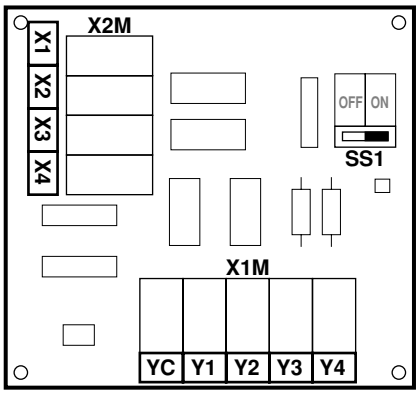
CAUTION

Make sure to observe all rules mentioned in "8.5. Application 5" on page 13 when bivalent operation function is enabled.

Daikin shall not be held liable for any damage resulting from failure to observe this rule.

NOTICE

- The combination of setting [4-03]=0/2 with bivalent operation at low outdoor temperature can result in domestic hot water shortage.
- The bivalent operation function has no impact on the domestic water heating mode. The domestic hot water is still and only heated by the indoor unit.
- The permission signal for the auxiliary boiler is located on the EKRP1HB (digital I/O PCB). When it is activated, the contact X1, X2 is closed and open when it is disactivated. See figure for the schematic location of this contact.



[D] Benefit kWh rate power supply/Local shift value weather dependent

Benefit kWh rate power supply

■ [D-00] Switching off heaters: Defines which heaters are switched off when the benefit kWh rate signal of the electricity company is received.

If [D-01]=1 or 2 and the benefit kWh rate signal of the electricity company is received, following devices will be switched off:

[D-00]	Compressor	Back up heater	Booster heater
0 (default)	Forced off	Forced off	Forced off
1	Forced off	Forced off	Permitted
2	Forced off	Permitted	Forced off
3	Forced off	Permitted	Permitted

NOTICE

[D-00] settings 1, 2 and 3 are only meaningful if the benefit kWh rate power supply is of the type that power supply is not interrupted,

■ [D-01] Unit connection to benefit kWh rate power supply: Defines whether or not the outdoor unit is connected to a benefit kWh rate power supply.

If [D-01]=0, the unit is connected to a normal power supply (default value).

If [D-01]=1 or 2, the unit is connected to a benefit kWh rate power supply. In this case the wiring requires specific installation like explained in "Connection to a benefit kWh rate power supply" on page 24.

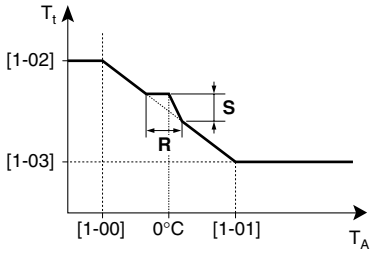
When parameter [D-01]=1 at the moment that the benefit kWh rate signal is sent by the electricity company, that contact will open and the unit will go in forced off mode(1).

When parameter [D-01]=2 at the moment that the benefit kWh rate signal is sent by the electricity company, that contact will close and the unit will go in forced off mode(2).

Local shift value weather dependent

The local shift value weather dependent field setting is only relevant in case weather dependent set point (see field setting "[1] Weather dependent set point (heating operation only)" on page 31) is selected.

■ [D-03] Local shift value weather dependent: determines the shift value of the weather dependent set point around outdoor temperature of 0°C.



T_t	Target water temperature
T_A	Outdoor temperature
R	Range
S	Local shift value
[1-00], [1-01], [1-02], [1-03]	Applicable field setting of the weather dependent set point [1]

[D-03]	Outdoor temperature range (T_A)	Local shift value
0	—	—
1	–2°C~2°C	2
2		4
3	–4°C~4°C	2
4		4

[E] Unit information readout

■ [E-00] Readout of the software version (example: 23)

■ [E-01] Readout of the EEPROM version (example: 23)

■ [E-02] Readout of the unit model identification (example: 11)

■ [E-03] Readout of the liquid refrigerant temperature

■ [E-04] Readout of the inlet water temperature

NOTICE

[E-03] and [E-04] readouts are not permanently refreshed. Temperature readouts are updated after looping through the field setting first codes again only.

(1) When the signal is released again, the voltage free contact will close and the unit will restart operation. It is therefore important to leave the auto restart function enabled. Refer to "[3] Auto restart" on page 32.

(2) When the signal is released again, the voltage free contact will open and the unit will restart operation. It is therefore important to leave the auto restart function enabled. Refer to "[3] Auto restart" on page 32.

[F] Option setup

Pump operation

The pump operation field setting apply to the pump operation logic only when DIP switch SS2-3 is OFF.

When the pump operation function is disabled the pump will stop if the outdoor temperature is higher than the value set by [4-02] or if the outdoor temperature drops below the value set by [F-01]. When the pump operation is enabled, the pump operation is possible at all outdoor temperatures. Refer to "13.3. Pump operation configuration" on page 29.

- [F-00] Pump operation: specifies wether the pump operation function is enabled (1) or disabled (0).

Space cooling permission

- [F-01] Space cooling permission temperature: defines the outdoor temperature below which space cooling is turned off.

NOTICE

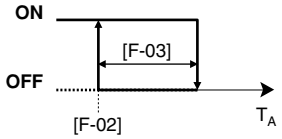
This function is only valid for EKCBX when space cooling is selected.

Bottom plate heater control

Applies only in case the option bottom plate heater kit is installed.

- [F-02] Bottom plate heater ON temperature: defines the outdoor temperature below which the bottom plate heater will be activated by indoor unit in order to prevent ice build-up in the bottom plate of the outdoor unit at lower outdoor temperatures.
- [F-03] Bottom plate heater hysteresis: defines the temperature difference between bottom plate heater ON temperature and the bottom plate heater OFF temperature.

Bottom plate heater



T_A Outdoor temperature

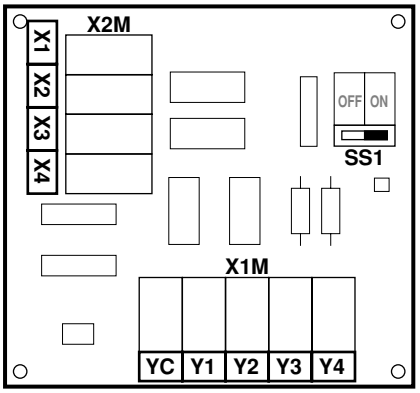
CAUTION

The bottom plate heater is controlled via X14A. Make sure [F-04] is correctly set.

Functionality of X14A

- [F-04] Functionality of X14A: specifies if the logic of X14A follows the output signal for the solar kit model (EKSOLHW) EKHBH/X_AA/AB (0) or if the logic of X14A follows the output for the bottom plate heater (1).

Independent from field setting [F-04], the contact X3-X4 (EKRP1HB) follows the logic of the output signal for the solar kit model (EKSOLHW). See figure below for the schematic location of this contact.



13.10.Field settings table

First code	Second code	Setting name	Installer setting at variance with default value				Default value	Range	Step	Unit
			Date	Value	Date	Value				
0	**User permission level**									
	00	User permission level					3	2/3	1	—
1	**Weather dependent set point**									
	00	Low ambient temperature (Lo_A)					–10	–20~5	1	°C
	01	High ambient temperature (Hi_A)					15	10~20	1	°C
	02	Set point at low ambient temperature (Lo_Ti)					40	25~55	1	°C
	03	Set point at high ambient temperature (Hi_Ti)					25	25~55	1	°C
2	**Disinfection function**									
	00	Operation interval					Fri	Mon~Sun, All	—	—
	01	Status					1 (ON)	0/1	—	—
	02	Start time					23:00	0:00~23:00	1:00	hour
	03	Set point					70	40~80	5	°C
	04	Interval					10	5~60	5	min
3	**Auto restart**									
	00	Status					0 (ON)	0/1	—	—
4	**Backup/booster heater operation and space heating off temperature**									
	00	Status					1 (ON)	0/1	—	—
	01	Priority					0 (OFF)	0/1/2	—	—
	02	Space heating off temperature					25	14~25	1	°C
	03	Booster heater operation					3	0/1/2/3	—	—
	04	Freeze-up protection function					0 (active) Read only	—	—	—
5	**Equilibrium temperature and space heating priority temperature**									
	00	Equilibrium temperature status					1 (ON)	0/1	—	—
	01	Equilibrium temperature					0	–15~35	1	°C
	02	Space heating priority status					0 (OFF)	0/1	—	—
	03	Space heating priority temperature					0	–15~20	1	°C
	04	Set point correction for domestic hot water temperature					10	0~20	1	°C
6	**DT for heat pump domestic water heating mode**									
	00	Start					2	2~20	1	°C
	01	Stop					2	0~10	1	°C
	02	Not applicable					0	Read only	—	—
7	**DT for booster heater and dual set point control**									
	00	Domestic hot water step length					0	0~4	1	°C
	01	Hysteresis value booster heater					2	2~40	1	°C
	02	Dual set point control status					0	0/1	—	—
	03	Second set point heating					10	1~24 / 25~55	1	°C
	04	Second set point cooling					7	5~22	1	°C
8	**Domestic water heating mode timer**									
	00	Minimum running time					5	0~20	1	min
	01	Maximum running time					30	5~60	5	min
	02	Anti-recycling time					3	0~10	0.5	hour
	03	Booster heater delay time					50	20~95	5	min
	04	Additional running time at [4-02]/[F-01]					95	0~95	5	min

First code	Second code	Setting name	Installer setting at variance with default value				Default value	Range	Step	Unit
			Date	Value	Date	Value				
9	**Heating and cooling set point ranges**									
	00	Heating set point upper limit					55	37~55	1	°C
	01	Heating set point lower limit					25	15~37	1	°C
	02	Cooling set point upper limit					22	18~22	1	°C
	03	Cooling set point lower limit					5	5~18	1	°C
	04	Overshoot setting[(a)]					1	1~4	1	°C
C	**Setup on EKRP1HB digital I/O PCB**									
	00	Solar priority mode setting					0	0/1	1	—
	01	Alarm output logic					0	0/1	—	—
	02	Bivalent operation status					0	0/1	—	—
	03	Bivalent ON temperature					0	–25~25	1	°C
	04	Bivalent hysteresis					3	2~10	1	°C
D	**Benefit kWh rate power supply/local shift value weather dependent**									
	00	Switching off heaters					0	0/1/2/3	—	—
	01	Unit connection to benefit kWh rate power supply					0 (OFF)	0/1/2	—	—
	02	Not applicable. Do not change the default value.					0	—	—	—
	03	Local shift value weather dependent					0	0/1/2/3/4	—	—
E	**Unit information readout**									
	00	Software version					Read only	—	—	—
	01	EEPROM version					Read only	—	—	—
	02	Unit model identification					Read only	—	—	—
	03	Liquid refrigerant temperature					Read only	—	—	°C
	04	Inlet water temperature					Read only	—	—	°C
F	**Option setup**									
	00	Pump operation					0	0/1	—	—
	01	Space cooling permission temperature					20	10~35	1	°C
	02	Bottom plate heater ON temperature					3	3~10	1	°C
	03	Bottom plate heater hysteresis					5	2~5	1	°C
	04	Functionality of X14A.					1	0/1	—	—

(a) Only possible to modify the first 3 minutes after power ON.

14. Test run and final check

The installer is obliged to verify correct operation of the indoor and outdoor unit after installation.

14.1. Final check

Before switching on the unit, read following recommendations:

- When the complete installation and all necessary settings have been carried out, close all panels of the outdoor unit and the indoor unit.
- The service panel of the outdoor unit switch box and front panel of the indoor unit may only be opened by a licensed electrician for maintenance purposes.

DANGER

Never leave the unit unattended during installation or servicing. When the service panel is removed live parts can be easily touched by accident..

NOTICE

Note that during the first running period of the unit, required power input may be higher than stated on the nameplate of the unit. This phenomenon originates from the compressor that needs elapse of a 50 hours run in period before reaching smooth operation and stable power consumption.

Pre-run checks

Items to check	
Electrical wiring Inter-unit wiring Earth wire	■ Is the wiring as mentioned on the wiring diagram? ■ Make sure no wiring has been forgotten and that there are no missing phases or reverse phases. ■ Is the unit properly earthed? ■ Is the wiring between units connected in series correct? ■ Are any of the wiring attachment screws loose? ■ Is the insulation resistance at least 1 MΩ? - Use a 500 V mega-tester when measuring insulation. - Do not use a mega-tester for low-voltage circuits.

14.2. Test run operation (manual)

If required, the installer can perform a manual test run operation at any time to check correct operation of cooling, heating and domestic water heating.

Procedure

1 Push the TEST button 4 times so the **TEST** icon will be displayed.

2 Depending on the indoor unit model, heating operation, cooling operation or both must be tested as follows (when no action is performed, the user interface will return to normal mode after 10 seconds or by pressing the TEST button once):
   - To test the heating operation push the ☀/❄ button so the ☀ icon is displayed. To start the test run operation press the button.
   - To test the cooling operation push the ☀/❄ button so the ❄ icon is displayed. To start the test run operation press the button.
   - To test the domestic water heating operation push the button. The test run operation will start without pressing the button.

3 The test run operation will end automatically after 30 minutes or when reaching the set temperature. The test run operation can be stopped manually by pressing the TEST button once. If there are misconnections or malfunctions, an error code will be displayed on the user interface. Otherwise, the user interface will return to normal operation.

4 To resolve the error codes, see "17.3. Error codes" on page 45.

To display the last resolved error code, push the TEST button 1 time. Push the TEST button again 4 times to return to normal mode.

NOTICE

It is not possible to perform a test run if a forced operation from the outdoor unit is in progress. Should forced operation be started during a test run, the test run will be aborted.

DANGER

Never leave the unit unattended with an open front panel during test run.

CAUTION

To protect the compressor, make sure to turn on the power supply 6 hours before starting operation.

15. Operation of the unit

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

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

16. Maintenance and service

16.1. Maintenance introduction

In order to ensure optimal operation of the unit, a number of checks and inspections should be carried out on the unit at regular intervals, preferably yearly.

This maintenance must be carried out by your local Daikin technician.

To execute the maintenance activities as mentioned below, it is required to open the outdoor unit covers. See "Opening the outdoor unit" on page 9, as well as the indoor unit front panel, See "Opening the indoor unit" on page 9.

16.2. Maintenance activities

Service precautions

DANGER: ELECTRICAL SHOCK

See "2. General Safety precautions" on page 2.

- Before carrying out any maintenance or repair activity, always switch off the circuit breaker on the supply panel, remove the fuses or open the protection devices of the unit.
- Make sure that before starting any maintenance or repair activity, also the power supply to the outdoor unit is switched off.
- Do not touch live parts for 10 minutes after the power supply is turned off because of high voltage risk.
- The heater of the compressor may operate even in stop mode.
- Please note that some sections of the electric component box are hot.
- Make sure you do not touch a conductive section.
- Do not rinse the indoor unit. This may cause electric shocks or fire.
- When service panels are removed, live parts can be easily touched by accident.
  Never leave the unit unattended during installation or servicing when service panel is removed.

CAUTION: Play it safe!

Touch a metal part by hand (such as the stop valve) in order to eliminate static electricity and to protect the PCB before performing service.

DANGER: DO NOT TOUCH PIPING AND INTERNAL PARTS

See "2. General Safety precautions" on page 2.

Do not touch water pipes during and immediately after operation as the pipes may be hot. Your hand may suffer burns. To avoid injury, give the piping time to return to normal temperature or be sure to wear proper gloves.

WARNING

- Do not touch the refrigerant pipes during and immediately after operation as the refrigerant pipes may be hot or cold, depending on the condition of the refrigerant flowing through the refrigerant piping, compressor, and other refrigerant cycle parts. Your hands may suffer burns or frostbite if you touch the refrigerant pipes. To avoid injury, give the pipes time to return to normal temperature or, if you must touch them, be sure to wear proper gloves.
- Do not touch the internal parts (pump, backup heater, etc.) during and immediately after operation. Your hands may suffer burns if you touch the internal parts. To avoid injury, give the internal parts time to return to normal temperature or, if you must touch them, be sure to wear proper gloves.

Checks

The described checks must be executed at least once a year.

1. Water pressure
   Check if the water pressure is above 1 bar. If necessary add water.
2. Water filter
   Clean the water filter.
3. Water pressure relief valve
   Check for correct operation of the pressure relief valve by turning the red knob on the valve counter-clockwise:
   - If you do not hear a clacking sound, contact your local dealer.
   - In case the water keeps running out of the unit, close both the water inlet and outlet shut-off valves first and then contact your local dealer.
4. Domestic hot water tank pressure relief valve (field supply)
   Applies only to installations with a domestic hot water tank.
   Check for correct operation of the pressure relief valve on the domestic hot water tank.
5. Domestic hot water tank pressure relief valve (field supply)
   Applies only to installations with a domestic hot water tank.
   Check for correct operation of the pressure relief valve on the domestic hot water tank.
6. Domestic hot water tank booster heater
   Applies only to installations with a domestic hot water tank.
   It is advisable to remove lime buildup on the booster heater to extend its life span, especially in regions with hard water. To do so, drain the domestic hot water tank, remove the booster heater from the domestic hot water tank and immerse in a bucket (or similar) with lime-removing product for 24 hours.
7. Outdoor unit and indoor unit switch box
   - Carry out a thorough visual inspection of the switch box (in- and outdoor unit) and look for obvious defects such as loose connections or defective wiring.
   - Check for correct operation of contactors K1M, K2M, K3M, K5M (applications with domestic hot water tank only) and K4M by use of an ohmmeter. All contacts of these contactors must be in open position.
8. In case of use of glycol
   (Refer to the caution at "10.5. Protecting the water circuit against freezing" on page 20)
   Document the glycol concentration and the pH-value in the system at least once a year.
   - A pH-value below 8.0 indicates that a significant portion of the inhibitor has been depleted and that more inhibitor needs to be added.
   - When the pH-value is below 7.0 then oxidation of the glycol occurred, the system should be drained and flushed thoroughly before severe damage occurs.

   Make sure that the disposal of the glycol solution is done in accordance with relevant local laws and regulations.

16.3. Service mode operation

Refer to the service manual to carry out any service mode operation.

17. TROUBLESHOOTING

This section provides useful information for diagnosing and correcting certain problems which may occur with the unit.

This troubleshooting and related corrective actions may only be carried out by the installer or service agent.

17.1. General guidelines

Before starting the troubleshooting procedure, carry out a thorough visual inspection of the unit and look for obvious defects such as loose connections or defective wiring.

DANGER: ELECTRICAL SHOCK

See "2. General Safety precautions" on page 2.

DANGER: DO NOT TOUCH PIPING AND INTERNAL PARTS

See "2. General Safety precautions" on page 2.

When a safety device was activated, stop the unit and find out why the safety was activated before resetting it. Under no circumstances safety devices may be bridged or changed to a value other than the factory setting. If the cause of the problem can not be found, call your local dealer.

DANGER

When carrying out an inspection on the control box of the unit, always make sure that the main switch of the unit is switched off.

If the pressure relief valve is not working correctly and is to be replaced, always reconnect the flexible hose attached to the pressure relief valve, to avoid water dripping out of the unit!

For problems related to the optional solar kit for domestic water heating, refer to the troubleshooting in the installation manual of that kit.

DANGER

Do not touch water pipes during and immediately after operation as the pipes may be hot. Your hand may suffer burns. To avoid injury, give the piping time to return to normal temperature or be sure to wear proper gloves.

WARNING

- Do not touch the refrigerant pipes during and immediately after operation as the refrigerant pipes may be hot or cold, depending on the condition of the refrigerant flowing through the refrigerant piping, compressor, and other refrigerant cycle parts. Your hands may suffer burns or frostbite if you touch the refrigerant pipes. To avoid injury, give the pipes time to return to normal temperature or, if you must touch them, be sure to wear proper gloves.
- Do not touch the internal parts (pump, backup heater, etc.) during and immediately after operation.
  Your hands may suffer burns if you touch the internal parts. To avoid injury, give the internal parts time to return to normal temperature or, if you must touch them, be sure to wear proper gloves.

17.2. General symptoms

Symptom 1: The unit is turned on (LED is lit) but the unit is not heating or cooling as expected

POSSIBLE CAUSES	CORRECTIVE ACTION
The temperature setting is not correct.	Check the controller set point.
The water flow is too low.	• Check that all shut off valves of the water circuit are completely open. • Check if the water filter needs cleaning. • Make sure there is no air in the system (purge air). • Check on the manometer that there is sufficient water pressure. The water pressure must be >1 bar (water is cold) • Check that the pump speed setting is on the highest speed. • Make sure that the expansion vessel is not broken. • Check that the resistance in the water circuit is not too high for the pump (refer to "13.8. Setting the pump speed" on page 30).
The water volume in the installation is too low.	Make sure that the water volume in the installation is above the minimum required value (refer to "10.2. Checking the water volume and expansion vessel pre-pressure" on page 18).

Symptom 2: The unit is turned on but the compressor is not starting (space heating or domestic water heating)

POSSIBLE CAUSES	CORRECTIVE ACTION
The unit must start up out of its operation range (the water temperature is too low).	In case of low water temperature, the system utilizes the backup heater to reach the minimum water temperature first (15°C). • Check that the backup heater power supply is correct. • Check that the backup heater thermal fuse is closed. • Check that the backup heater thermal protector is not activated. • Check that the backup heater contactors are not broken.
The benefit kWh rate power supply settings and electrical connections do not match.	If [D-01]=1 or 2, the wiring requires specific installation like illustrated in "Connection to a benefit kWh rate power supply" on page 24. Other correctly installed configurations are possible, but are to be specific for the type of benefit kWh rate power supply type at this specific site.
The benefit kWh rate signal was sent by the electricity company.	Wait for the power to return.

Symptom 3: Pump is making noise (cavitation)

POSSIBLE CAUSES	CORRECTIVE ACTION
There is air in the system.	Purge air.
Water pressure at pump inlet is too low.	• Check on the manometer that there is sufficient water pressure. The water pressure must be >1 bar (water is cold). • Check that the manometer is not broken. • Check that the expansion vessel is not broken. • Check that the setting of the pre-pressure of the expansion vessel is correct (refer to "10.3. Setting the pre-pressure of the expansion vessel" on page 19).

Symptom 4: The water pressure relief valve opens

POSSIBLE CAUSES	CORRECTIVE ACTION
The expansion vessel is broken.	Replace the expansion vessel.
The water volume in the installation is too high.	Make sure that the water volume in the installation is under the maximum allowed value (refer to "10.2. Checking the water volume and expansion vessel pre-pressure" on page 18).

Symptom 5: The water pressure relief valve leaks

POSSIBLE CAUSES	CORRECTIVE ACTION
Dirt is blocking the water pressure relief valve outlet.	Check for correct operation of the pressure relief valve by turning the red knob on the valve counter clockwise: • If you do not hear a clacking sound, contact your local dealer. • In case the water keeps running out of the unit, close both the water inlet and outlet shut-off valves first and then contact your local dealer.

Symptom 6: The user interface displays "NOT AVAILABLE" when pressing certain buttons

POSSIBLE CAUSES	CORRECTIVE ACTION
The current permission level is set to a level that prevents using the pressed button.	Change the "user permission level" field setting [0-00], see "13.9. Field settings" on page 31.

Symptom 7: Space heating capacity shortage at low outdoor temperatures

POSSIBLE CAUSES	CORRECTIVE ACTION
Backup heater operation is not activated.	Check that the "backup heater operation status" field setting [4-00] is turned on, see "13.9. Field settings" on page 31. Check whether or not the thermal protector of the backup heater has been activated (refer to "5.2. Main components of the outdoor unit and the indoor unit" on page 6, "Backup heater thermal protector" in the installation manual of the EKMBUH for location of the reset button). Check if booster heater and backup heater are configured to operate simultaneously (field setting [4-01], see "13.9. Field settings" on page 31) Check whether or not the thermal fuse of the backup heater is blown (refer to "5.2. Main components of the outdoor unit and the indoor unit" on page 6, "Backup heater thermal fuse" in the installation manual of the EKMBUH for location of the reset button).
The backup heater equilibrium temperature has not been configured correctly.	Raise the 'equilibrium temperature' field setting [5-01] to activate backup heater operation at a higher outdoor temperature.
Too much heat pump capacity is used for heating domestic hot water (applies only to installations with a domestic hot water tank).	Check that the 'space heating priority temperature' field settings are configured appropriately: Make sure that the 'space heating priority status' field setting [5-02] is enabled. Raise the 'space heating priority temperature' field setting [5-03] to activate booster heater operation at a higher outdoor temperature.

17.3. Error codes

When a safety device is activated, the user interface LED will be flashing, and an error code will be displayed.

A list of all errors and corrective actions can be found in the table below.

Reset the safety by turning the unit OFF and back ON.

Instruction to turn the unit OFF			
User interface mode (heating/cooling ☀/❄)	**Domestic water heating mode (🚿)**	**Push the button**	**Push the 🚿 ⏻ button**
ON	**ON**	1 time	1 time
ON	**OFF**	1 time	—
OFF	**ON**	—	1 time
OFF	**OFF**	—	—

A list of all errors and corrective actions can be found in the table below.

Error code	Failure cause	Corrective action
80	Inlet water temperature thermistor failure (inlet water thermistor broken)	Contact your local dealer.
81	Outlet water temperature thermistor failure (outlet water temperature sensor broken)	Contact your local dealer.
89	Water heat exchanger freeze-up failure (due to water flow too low)	Refer to error code 7H.
	Water heat exchanger freeze-up failure (due to refrigerant shortage)	Contact your local dealer.
7H	Flow failure (water flow too low or no water flow at all, minimum required water flow is 12 l/min)	• Check that all shut off valves of the water circuit are completely open. • Check if the water filter needs cleaning. • Check that the unit is operating within its operating range (refer to "Technical specifications" on page 47). • Also refer to "10.6. Charging water" on page 21. • Make sure there is no air in the system (purge air). • Check on the manometer that there is sufficient water pressure. The water pressure must be >1 bar (water is cold). • Check that the pump speed setting is on the highest speed. • Make sure that the expansion vessel is not broken. • Check that the resistance in the water circuit is not too high for the pump (refer to "13.8. Setting the pump speed" on page 30). • If this error occurs at defrost operation (during space heating or domestic water heating), make sure that the backup heater power supply is wired correctly and that fuses are not blown. • If EKHWSU version of domestic hot water tank is installed, check if the setting of the additional thermostat in the tank switch box is correct (≥50°C).
8H	Outlet water temperature of indoor unit too high (>65°C)	• Check that the contactor of the electric backup heater is not short circuited. • Check that the outlet water thermistor is giving the correct read out.
A1	Indoor unit PCB defective	Contact your local dealer.
A5	Too low (during cooling operation) or too high (during heating operation) refrigerant temperature (measured by R13T)	Contact your local dealer.

Error code	Failure cause	Corrective action
AA	Backup heater thermal protector is open	Reset the thermal protector by pressing the reset button (refer to "5.2. Main components of the outdoor unit and the indoor unit" on page 6 for location of the reset button)
	Check the reset button of the thermal protector. If both the thermal protector and the controller are reset, but the AA error code persists, the backup heater thermal fuse has blown.	Contact your local dealer.
AC	Booster heater thermal protector is open (applies only to installations with a domestic hot water tank)	Reset the thermal protector
	Secondary thermal protector is open (applies only to units with a EKHWSU domestic hot water tank installed)	Reset the thermal protector
C0	Flow switch failure (flow switch remains closed while pump is stopped)	Check that the flow switch is not clogged with dirt.
C4	Heat exchanger thermistor failure (heat exchanger temperature sensor broken)	Contact your local dealer.
E1	Outdoor unit PCB defective	Contact your local dealer.
E3	Abnormal high pressure	Check that the unit is operating within its operating range (refer to "Technical specifications" on page 47). Contact your local dealer.
E4	Actuation of low pressure sensor	Check that the unit is operating within its operating range (refer to "Technical specifications" on page 47). Contact your local dealer.
E5	Overload activation of compressor	Check that the unit is operating within its operating range (refer to "Technical specifications" on page 47). Contact your local dealer.
E7	Fan lock failure (fan is locked)	Check if the fan is not obstructed by dirt. If the fan is not obstructed, contact your local dealer.
E9	Malfunction of electronic expansion valve	Contact your local dealer.
EC	Domestic hot water temperature too high (>89°C)	• Check that the contactor of the electric booster heater is not short circuited. • Check that the domestic hot water thermistor is giving the correct read out.
F3	Too high discharge temperature (e.g. due to outdoor coil blockage)	Clean the outdoor coil. If the coil is clean, contact your local dealer.
H3	Malfunctioning HPS system	Contact your local dealer.
H9	Outdoor temperature thermistor failure (outdoor thermistor is broken)	Contact your local dealer.
HC	Domestic hot water tank thermistor failure	Contact your local dealer.
J1	Malfunction of pressure sensor	Contact your local dealer.
J3	Discharge pipe thermistor failure	Contact your local dealer.
J5	Suction pipe outdoor unit thermistor failure	Contact your local dealer.
J6	Aircoil thermistor frost detection failure	Contact your local dealer.
J7	Aircoil thermistor mean temperature failure	Contact your local dealer.
J8	Liquid pipe outdoor unit thermistor failure	Contact your local dealer.
L4	Electric component failure	Contact your local dealer.
L5	Electric component failure	Contact your local dealer.
L8	Electric component failure	Contact your local dealer.
L9	Electric component failure	Contact your local dealer.
LC	Electric component failure	Contact your local dealer.
P1	PCB failure	Contact your local dealer.
P4	Electric component failure	Contact your local dealer.

Error code	Failure cause	Corrective action
PJ	Failure of capacity setting	Contact your local dealer.
U0	Refrigerant failure (due to refrigerant leak)	Contact your local dealer.
U2	Main circuit voltage failure	Contact your local dealer.
U4	Communication failure	Contact your local dealer.
U5	Communication failure	Contact your local dealer.
U7	Communication failure	Contact your local dealer.
UA	Communication failure	Contact your local dealer.

18. Disposal requirements

Dismantling of the unit, treatment of the refrigerant, of oil and of other parts must be done in accordance with relevant local and national legislation.

19. UNIT SPECIFICATIONS

Technical specifications

Outdoor unit		EBHQ006BAV3	EBHQ008BAV3
Nominal capacity			
• Cooling[a]		Refer to the Technical Data	
• Heating		Refer to the Technical Data	
Dimensions H x W x D	(mm)	805 x 1190 x 360	
Weight			
• Machine weight	(kg)	95	
• Operation weight	(kg)	99	
Connections			
• water inlet/outlet		1" MBSP[b]	
Field installed waterpiping			
• Minimum pressure resistance	(bar)	4	
• Minimim temperature resistance	(°C)	65	
• Recommended diameter	(inch)	1	
Refrigerant			
• Type		R410A	
• Charge	(kg)	1.7	
Expansion vessel			
• Volume	(l)	6	
• Pre-pressure	(bar)	1	
• Maximum working pressure (MWP)	(bar)	3.0	
Pump			
• Type		water cooled	
• No. of speed		3	
• Nominal ESP			
• Cooling[a]	(kPa)	49.7	45.8
• Heating	(kPa)	47.2	34.0
Sound level			
• Sound power cooling[a]	(dBA)	63	63
• Sound pressure cooling[a]	(dBA)	48	50
• Sound power heating	(dBA)	61	62
• Sound pressure heating	(dBA)	48	49
Internal water volume	(l)	5.5	
Pressure relief valve water circuit	(bar)	3	
Operation range - water side			
• Heating	(°C)	+15~+50	
• Cooling[a]	(°C)	+5~+22	
• Domestic hot water by heat pump	(°C)	+25~+80	
Operation range - air side			
• Heating	(°C)	–15~+25	
• Cooling[a]	(°C)	+10~+43	
• Domestic hot water by heat pump	(°C)	–15~+35	

(a) Only if connected to EKCBX008BAV3
(b) MBSP = Male British Standard Pipe

Indoor unit		EKCBX008BAV3	EKCBH008BAV3
Dimensions H x W x D	(mm)	390 x 412 x 100	
Weight	(kg)	6	

Electrical specifications

Outdoor unit		EBHQ006BAV3	EBHQ008BAV3
Power circuit			
• Phase		1~	
• Frequency	(Hz)	50	
• Voltage	(V)	230 (±10%)	
Maximum running current[a]			
• Cooling[b]	(A)	16.25	
• Heating	(A)	18	

(a) Equipment complying with EN/IEC 61000-3-12 (**)
(b) Only if connected to EKCBX008BAV3

Indoor unit		EKCBX008BAV3	EKCBH008BAV3
Power supply[a]			
• Phase		1~	
• Frequency	(Hz)	50	
• Voltage	(V)	230 (±10%)	
• Running current (heater kit)	(A)	26	
• Z_{max} (heater kit + booster heater (EKHWS* models))	(Ohm)	0.29	
• Running current (heater kit + booster heater (EKHWS* models)			
• EK*V3	(A)	39 (26 + 13)	
• EK*Z2	(A)	33.5	
• Minimum S_{SC} value[b]			
• EK*V3	(kVA)	(c)	
• EK*Z2	(kVA)	(c)	
Operation range			
• Ambient temperature	(°C)	5~35	

(a) Above mentioned power supply is for the booster heater (EKW* option) and backup heater kit (EKMBUH).
The switch box of the EKCB indoor unit is supplied via the outdoor unit.
The EKMBUH heater kit can be installed as a single step 3 kW heater or a 2 step 6 kW heater, for detailed information, refer to the heater kit installation manual.
(b) In accordance with EN/IEC 61000-3-11 (*), it may be necessary to consult the distribution network operator to ensure that the equipment is connected only to a supply with Z_{sys} (***) ≤Z_{max}
(c) Equipment complying with EN/IEC 61000-3-12 (**)

(*) European/International Technical Standard setting the limits for voltage changes, voltage fluctuations and flicker in public low-voltage supply systems for equipment with rated current ≤75 A.
(**) European/International Technical Standard setting the limits for harmonic currents by equipment connected to public low-voltage systems with input current >16 A and ≤75 A per phase
(***) System independence

NOTES

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