DAIKIN

altherma

# INSTALLATION MANUAL

## Unit for air to water heat pump system

**EBHQ006BAV3**
**EBHQ008BAV3**

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 + EKCBH008B*V3, EBHQ006BAV3 + EKCBX008B*V3,**
**EBHQ008BAV3 + EKCBH008B*V3, EBHQ008BAV3 + EKCBX008B*V3,**
* = A, B, C, ..., Z

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 Direktivid 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>**. | 06 | **Nota** * | delineato nel **<A>** e giudicato positivamente da **<B>** secondo il **Certificato <C>**. | 11 | **Information** * | enligt **<A>** och godkänts av **<B>** enligt **Certifikatet <C>**. | 16 | **Megjegyzés** * | a(z) **<A>** alapján, a(z) **<B>** igazolta a megfelelést, a(z) **<C>** **tanúsítvány** szerint. | 21 | **Забележка** * | както е изложено в **<A>** и оценено положително от **<B>** съгласно **Сертификата <C>**. |
| 02 | **Hinweis** * | wie in der **<A>** aufgeführt und von **<B>** positiv beurteilt gemäß **Zertifikat <C>**. | 07 | **Σημείωση** * | όπως καθορίζεται στο **<A>** και κρίνεται θετικά από το **<B>** σύμφωνα με το **Πιστοποιητικό <C>**. | 12 | **Merk** * | som det fremkommer i **<A>** og gjennom positiv bedømmelse av **<B>** ifølge **Sertifikat <C>**. | 17 | **Uwaga** * | zgodnie z dokumentacją **<A>**, pozytywną opinią **<B>** i **Świadectwem <C>**. | 22 | **Pastaba** * | kaip nustatyta **<A>** ir kaip teigiamai nuspręsta **<B>** pagal **Sertifikatą <C>**. |
| 03 | **Remarque** * | tel que défini dans **<A>** et évalué positivement par **<B>** conformément au **Certificat <C>**. | 08 | **Nota** * | tal como estabelecido em **<A>** e com o parecer positivo de **<B>** de acordo com o **Certificado <C>**. | 13 | **Huom** * | jotka on esitetty asiakirjassa **<A>** ja jotka **<B>** on hyväksynyt **Sertifikaatin <C>** mukaisesti. | 18 | **Notă** * | aşa cum este stabilit în **<A>** şi apreciat pozitiv de **<B>** în conformitate cu **Certificatul <C>**. | 23 | **Piezīmes** * | kā norādīts **<A>** un atbilstoši **<B>** pozitīvajam vērtējumam saskaņā ar **sertifikātu <C>**. |
| 04 | **Bemerk** * | zoals vermeld in **<A>** en positief beoordeeld door **<B>** overeenkomstig **Certificaat <C>**. | 09 | **Примечание** * | как указано в **<A>** и в соответствии с положительным решением **<B>** согласно **Свидетельству <C>**. | 14 | **Poznámka** * | jak bylo uvedeno v **<A>** a pozitivně zjištěno **<B>** v souladu s **osvědčením <C>**. | 19 | **Opomba** * | kot je določeno v **<A>** in odobreno s strani **<B>** v skladu s **certifikatom <C>**. | 24 | **Poznámka** * | ako bolo uvedené v **<A>** a pozitívne zistené **<B>** v súlade s **osvedčením <C>**. |
| 05 | **Nota** * | como se establece en **<A>** y es valorado positivamente por **<B>** de acuerdo con el **Certificado <C>**. | 10 | **Bemærk** * | som anført i **<A>** og positivt vurderet af **<B>** i henhold til **Certifikat <C>**. | 15 | **Napomena** * | kako je izloženo u **<A>** i pozitivno ocijenjeno od strane **<B>** prema **Certifikatu <C>**. | 20 | **Märkus** * | nagu on näidatud dokumendis **<A>** ja heaks kiidetud **<B>** järgi vastavalt **sertifikaadile <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** |

3PW33163-7J

DAIKIN

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General Manager
Ostend, 1st of September 2010

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## 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.

**INFORMATION**

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 applicable legislations 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 the applicable legislations. 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 the applicable legislations.
  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 the outdoor EBHQ006BAV3 and EBHQ008BAV3 of the Monoblock units of the GBS Altherma series.

The Monoblock units exist out of an outdoor installed unit (EBHQ (this manual)) 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

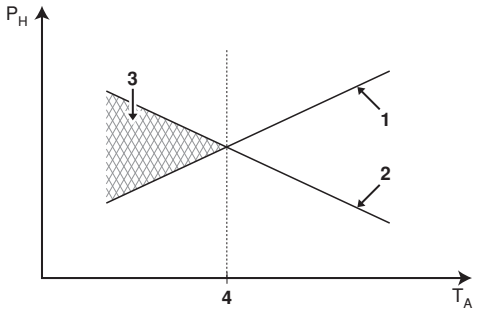
The monoblock unit range consists of two main versions: a heating/cooling version (uses EKCBX indoor unit) and a heating only version (uses EKCBH indoor unit), both available in 2 capacity sizes: 6 kW (EBHQ006) or 8 kW (EBHQ008).

## 3.2. Combination and options

Possible combinations

| | Indoor units | |
|---|---|---|
| **Outdoor units** | EKCBX008BBV3 | EKCBH008BBV3 |
| EBHQ006BAV3 | Possible | Possible |
| EBHQ008BAV3 | Possible | Possible |

Both versions (heating only and heating/cooling) are optionally 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 the chapter "Equilibrium temperature and space heating priority temperature" in the EKCB installation manual. |
| **$T_A$** | Ambient (outdoor) temperature |
| **$P_H$** | Heating capacity |

- 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

Refer to the EKCB installation manual.

## 3.3. Scope of the manual

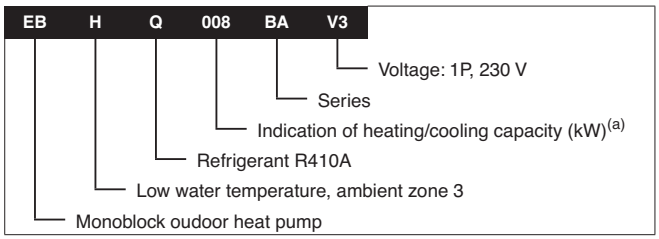
This manual describes the procedures for handling, installing and connecting the EBHQ units. This manual has been prepared to ensure adequate maintenance of the unit, and it will provide help if problems occur.

**INFORMATION**

Refer to the installation manual of the indoor unit for items not described in this manual.

The operation of the outdoor unit is described in the outdoor unit operation manual.

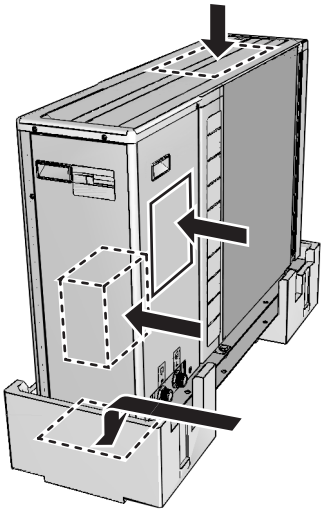
## 3.4. Model identification



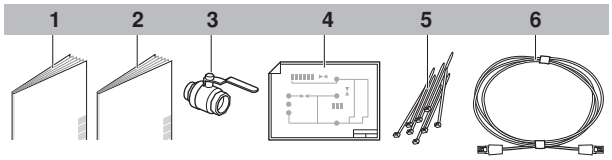

(a) For exact values, refer to "Technical specifications" on page 18.

# 4. Accessories

## 4.1. Location of the accessories



## 4.2. Accessories supplied with the outdoor unit

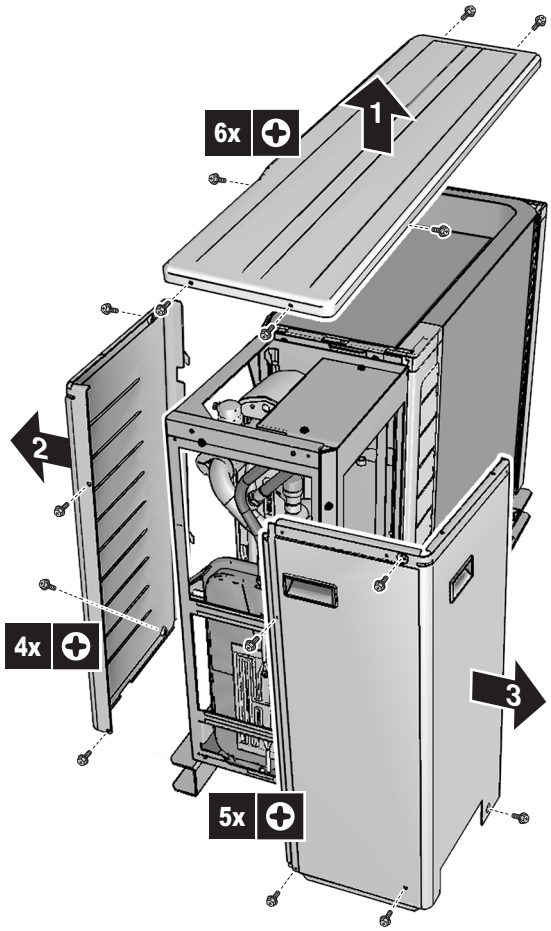



**1** Installation manual
**2** Operation manual
**3** Shut-off valve (2x)
**4** Wiring diagram sticker (inside top unit cover)
**5** Cable Ties (15x)
**6** Thermistor connection cable

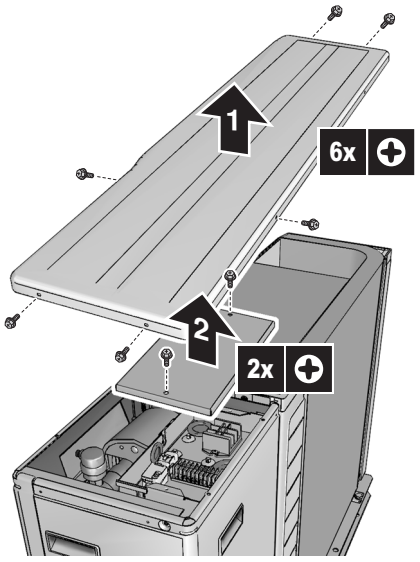
# 5. Overview of unit

## 5.1. Opening of the outdoor 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



**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.

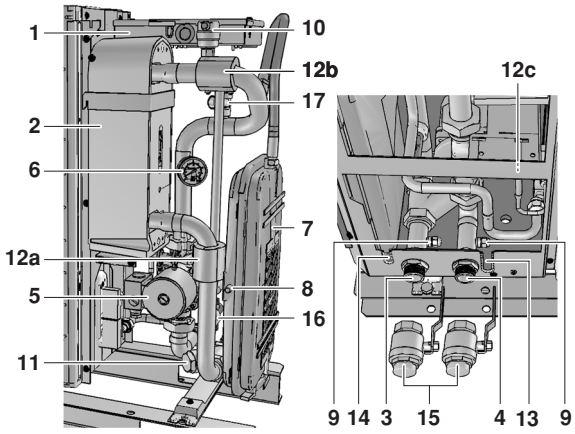
**DANGER: ELECTRICAL SHOCK**

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

**DANGER: DO NOT TOUCH PIPING AND INTERNAL PARTS**

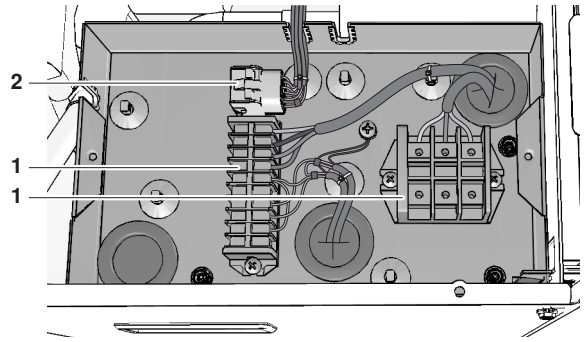
See "2. General Safety precautions" on page 2.

## 5.2. Main components of the outdoor unit




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 16.
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).

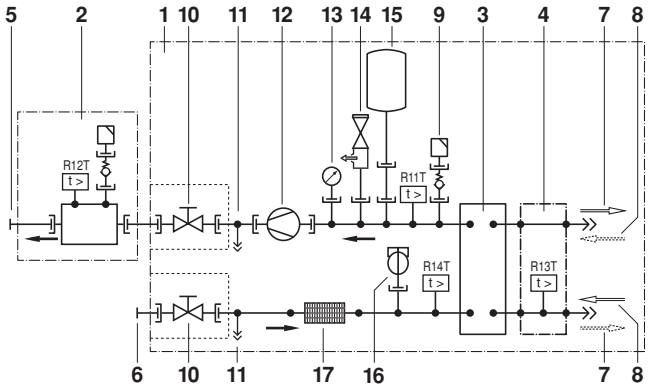
### 5.3. Main components of the outdoor unit switch box




**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.

### 5.4. Functional diagram of outdoor hydraulic compartment




**1** Outdoor unit EBHQ*BAV3
**2** Backup heater EKMBUH*6V3 (optionally)
**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 is suitable for installation in a commercial and light industrial environment.

### General precautions on outdoor installation location

Refer to "2. General Safety precautions" on page 2.

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 "7.2. Service space of the outdoor unit" on page 9).
- 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 8).
- 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) |

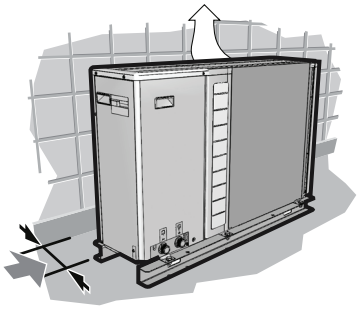
- Since drain flows out of the unit, do not place anything under the unit which must be kept away from moisture.
- Take care that in the event of a water leak, water cannot cause any damage to the installation space and surroundings (e.g. in case of a blocked drain pipe).
- Install the unit and power 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 the applicable legislations, in case of refrigerant leakage.

## Wheater dependent precautions

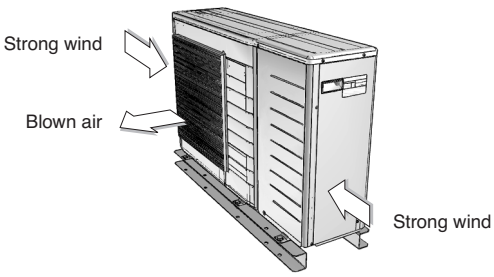
- Select a place where the rain can be avoided as much as possible.
- In heavy snowfall areas, it is very important to select an installation site where the snow will not affect the unit. If lateral snowfall is possible, Be sure that the heat exchanger coil is not affected by the snow (if necessary construct 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.

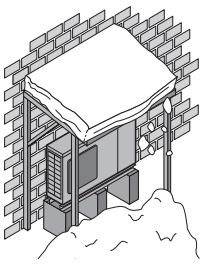



## Selecting an outdoor location in cold climates

**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).

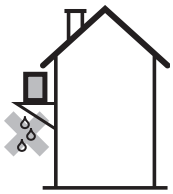


Construct a large canopy.

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).



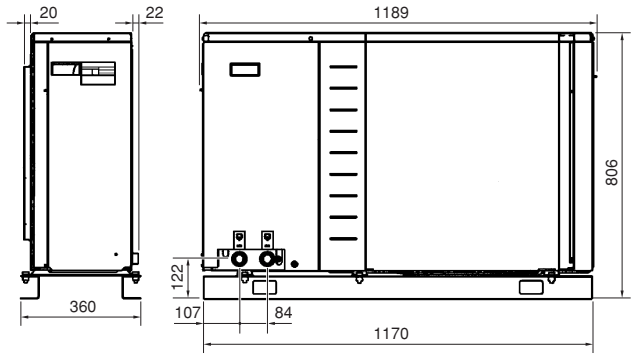
**NOTICE**

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.

# 7. Dimensions and service space

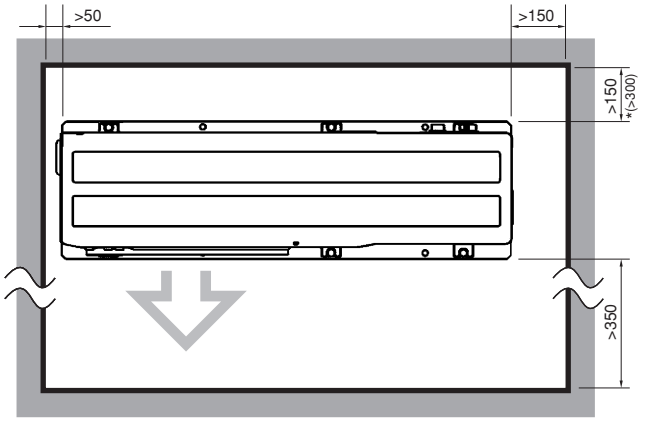
## 7.1. Dimensions of the outdoor unit




Unit of measurement: mm

## 7.2. Service space of the outdoor unit

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.

# 8. Typical application examples

Refer to the installation manual of the EKCB(X/H) indoor unit.

# 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

- 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

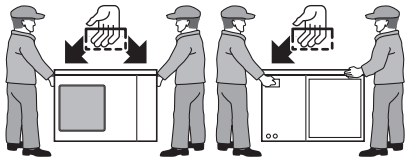
Keep the unit upright in order to avoid compressor damage.

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**

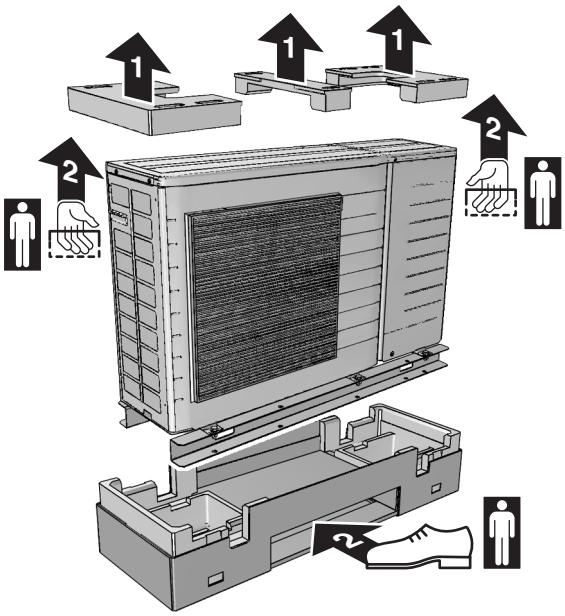
To avoid injury, do not touch the air inlet or aluminium fins of the unit.

## 9.3. Unpacking

**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.

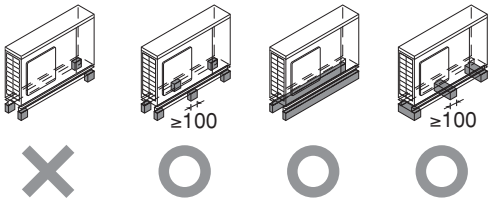
- Make sure that all accessories as mentioned in "4.2. Accessories supplied with the outdoor unit" on page 5 are available in the unit.

## 9.4. Installing the unit

- When installing the outdoor unit, please refer to "6. Selecting an installation location" on page 7 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**

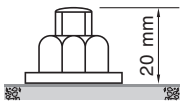
When the installation height of the unit needs to be increased, do not use stands to only support the corners:




**X** Not allowed

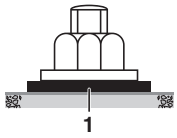
**O** Allowed (units: mm)

- 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.




### Heater kit installation (optional)

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

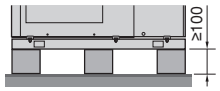
## 9.5. Drain work of the outdoor unit

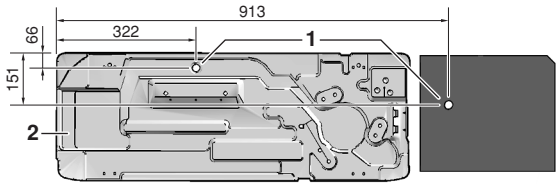
In case drain work on your outdoor unit is neccessary, follow the guidelines below.

- 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 applicable legislations.

**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.

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 7H will be displayed and the operation of the unit will be stopped.

**NOTICE**

It is strongly recommended to install an additional filter on the heating water circuit. Especially to remove metallic particles from the field heating piping, it is advised to use a magnetic or cyclone filter which can remove small particles. Small particles can damage the unit and will not be removed by the standard filter of the heat pump unit.

## 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, excluding the internal water volume of the outdoor unit, is 10 l minimum. Refer to "Technical specifications" on page 18 to know the internal water volume of the outdoor unit.

**INFORMATION**

In most 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.

**NOTICE**

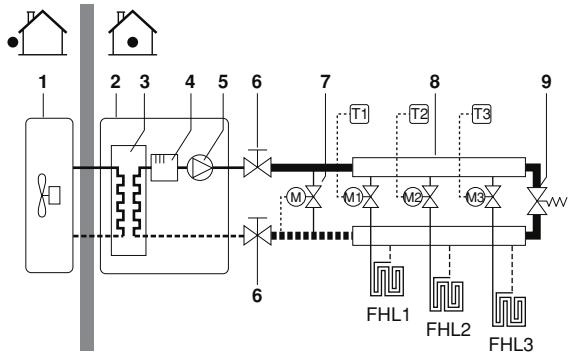
When circulation in each space heating loop is controlled by remotely controlled valves, it is important that this minimum water volume is kept even if all the valves are closed. See example below.

The maximum allowed water volume is 250 l (if no glycol is used). This is reduced to 175 l if 25% of propyleen glycol is used.

In case no EKMBUHBA6V3 backup heater kit is installed, the maximum allowed water volume is restricted to 150 l. In such case we recommend the use of a thermostatic by-pass valve (see example below).

As soon as the water circuit with the outdoor unit is in normal operation range, this by-pass valve will gradually open, so the entire circuit is than gradually heated.

**Example**




**1** Outdoor unit
**2** Indoor unit
**3** Heat exchanger
**4** Backup heater
**5** Pump
**6** Shut-off valve
**7** Motorised thermostatic by-pass valve
**8** Collector (field supply)
**9** By-pass valve (field supply)
**FHL1...3** Floor heating loop
**T1...3** Individual room thermostat (optional)
**M1...3** Individual motorised valve to control the floor heating loop (field supply)

**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 (with EKMBUH unit installed)<br>≤150 l (no EKMBUH unit installed) | >170 l (with EKMBUH unit installed) |
| ≤7 m | No pre-pressure adjustment required. | Actions required:<br>• pre-pressure must be decreased, calculate according to "Calculating the pre-pressure of the expansion vessel"<br>• check if the water volume is lower than maximum allowed water volume (use graph below) |
| >7 m | Actions required:<br>• pre-pressure must be increased, calculate according to "Calculating the pre-pressure of the expansion vessel"<br>• 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

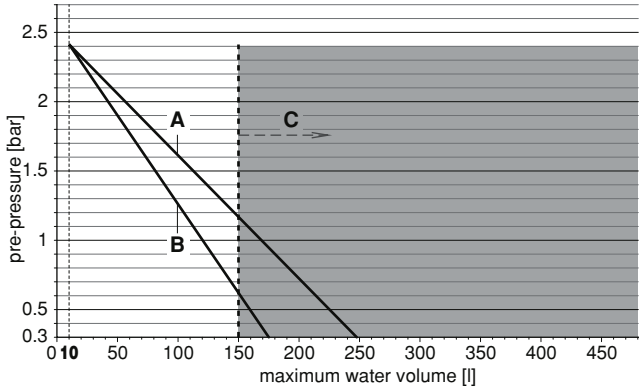
**Checking the maximum allowed water volume**

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 |
| **C** | = | With EKMBUH unit only |

**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

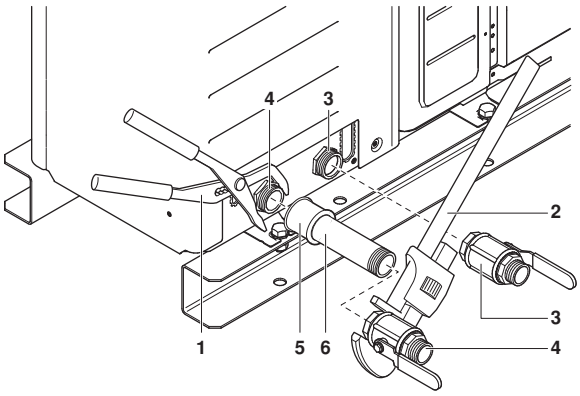
Water connections must be made in accordance with all applicable legislations and the outlook drawing delivered with the unit, respecting the water in- and outlet.

**NOTICE**

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 outlet
**4** Water intlet
**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 (optionally) 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 13
  Refer to "[4-04] Freeze protection function" in the EKCB installation manual.
  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% |

**CAUTION**

Units without backup heater kit installed are obligatory always to use glycol.

**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 12

**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 the applicable legislations.
- 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 legislations 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 15.

### 10.6. Initial start-up at low ambient temperatures

**NOTICE**

To ensure that the unit operates within its operating range as soon as possible (water temperature >30°C), the load during start-up must be reduced as much as possible.
For example you can do this by putting off fans of the fan coil unit until the water temperature has increased to 30°C.

If no backup heater (EKMBUHBA6C3) is installed within the unit we recommend to start-up the unit with a minimum water temperature of 5°C.

For floor heating applications without a backup heater installed, start-up circuit by circuit by using an (thermostatic) bypass valve, make sure that the temperature of the water returning to the unit is more than 20°C.

### 10.7. Charging water

1 Connect the water supply to a drain and fill valve (see "5.2. Main components of the outdoor 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 (if applicable).

4 Check that the backup heater vessel (EKMBUH) (if applicable) 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 $\lambda$=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

Refer to the installation manual of the EKCB indoor unit.

## 13. Start-up and configuration

Refer to the installation manual of the EKCB indoor unit.

# 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<br>Inter-unit wiring<br>Earth wire | ■ Is the wiring as mentioned on the wiring diagram?<br>■ Make sure no wiring has been forgotten and that there are no missing phases or reverse phases.<br>■ Is the unit properly earthed?<br>■ Is the wiring between units connected in series correct?<br>■ Are any of the wiring attachment screws loose?<br>■ Is the insulation resistance at least 1 MΩ?<br>- Use a 500 V mega-tester when measuring insulation.<br>- 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 18.

**INFORMATION**

- 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.
- 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.

## 14.3. Underfloor heating screed dry-out program

Refer to the EKCB indoor unit installation manual.

# 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 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.
6. 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.
7. In case of use of glycol
   (Refer to the caution at "10.5. Protecting the water circuit against freezing" on page 13)
   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 all applicable legislations.

### 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!

**INFORMATION**

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.<br>• Check if the water filter needs cleaning.<br>• Make sure there is no air in the system (purge air).<br>• Check on the manometer that there is sufficient water pressure. The water pressure must be >1 bar (water is cold)<br>• Check that the pump speed setting is on the highest speed.<br>• Make sure that the expansion vessel is not broken.<br>• Check that the resistance in the water circuit is not too high for the pump (refer to the chapter "Setting the pump speed" in the EKCB installation manual). |
| 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 11). |

**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).<br>• Check that the backup heater power supply is correct.<br>• Check that the backup heater thermal fuse is closed.<br>• Check that the backup heater thermal protector is not activated.<br>• 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 the chapter "Connection to a benefit kWh rate power supply" in the EKCB installation manual. 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).<br>• Check that the manometer is not broken.<br>• Check that the expansion vessel is not broken.<br>• 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 12). |

**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 11). |

**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:<br>• If you do not hear a clacking sound, contact your local dealer.<br>• 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], refer to the chapter "Field settings" in the EKCB installation manual. |

**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, refer to the chapter "Field settings" in the EKCB installation manual.<br>Check whether or not the thermal protector of the backup heater has been activated (refer to "5.2. Main components of the outdoor unit" on page 6, "Backup heater thermal protector" in the installation manual of the EKMBUH for location of the reset button).<br>Check if booster heater and backup heater are configured to operate simultaneously (field setting [4-01], refer to the chapter "Field settings" in the EKCB installation manual).<br>Check whether or not the thermal fuse of the backup heater is blown (refer to "5.2. Main components of the outdoor 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:<br>Make sure that the 'space heating priority status' field setting [5-02] is enabled.<br>Raise the 'space heating priority temperature' field setting [5-03] to activate booster heater operation at a higher outdoor temperature. |

**Symptom 8: Temperature values displayed on the remote controller (user interface) are displayed in °F instead of °C**

| POSSIBLE CAUSES | CORRECTIVE ACTIONS |
|---|---|
| You accidentally changed the setting to view the temperature values in °F by pushing the ▲ and ▼ buttons simultaneously. | To change the display back to °C, push ▲ and ▼ buttons simultaneously for 5 seconds. Execute same procedure to change back to the °F display. The default temperature display is in °C. |

## 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 installation manual of the EKCB indoor manual.

# 18. Disposal requirements

Dismantling of the unit, treatment of the refrigerant, of oil and of other parts must be done in accordance with the applicable legislations.

# 19. Unit specifications

## Technical specifications

| | | 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

## Electrical specifications

| | | 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

(*) 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

## NOTES

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