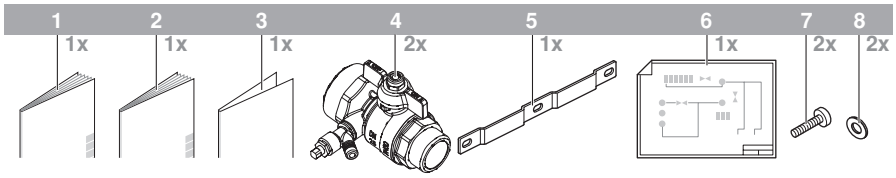
altherma by DAIKIN

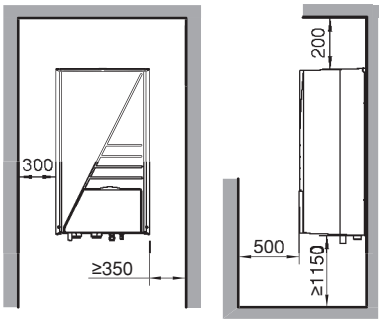
INSTALLATION MANUAL

Indoor unit for air to water heat pump system

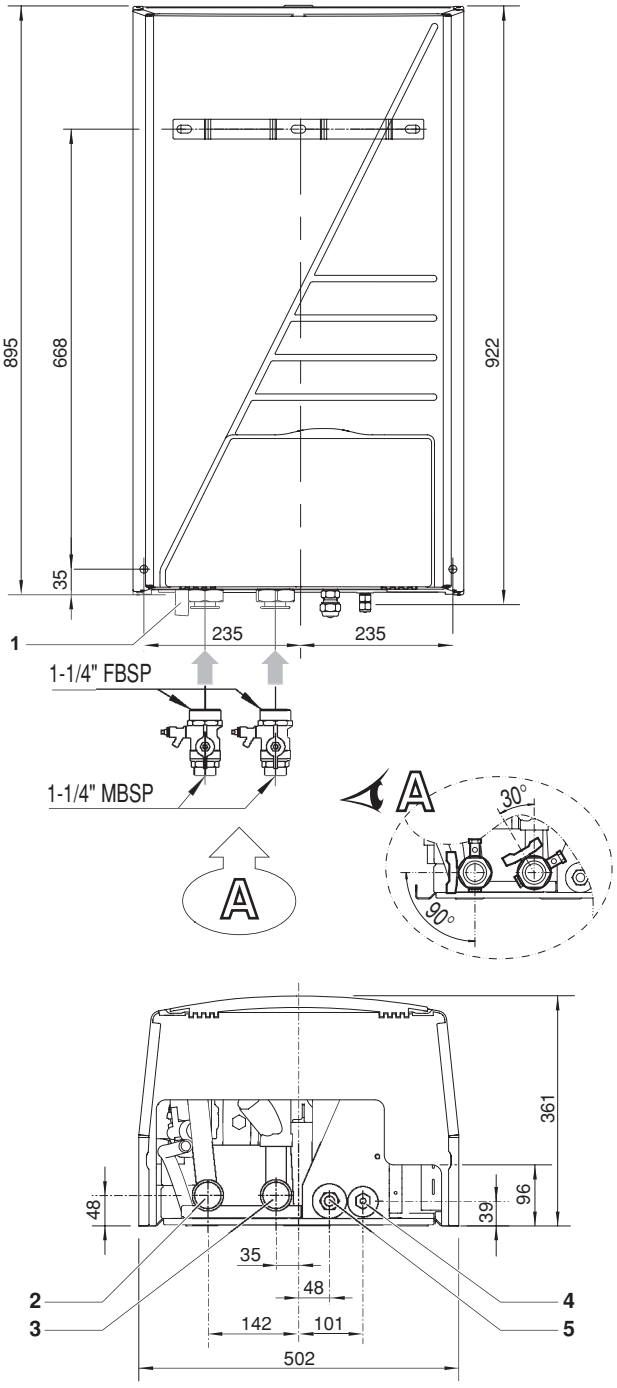
EKHBH016AB
EKHBX016AB


1
1x
2
1x
3
1x
4
2x
5
1x
6
1x
7
2x
8
2x

1


300
≥350
200
500
≥1150

2


895
668
35
922
1
235
235
1-1/4" FBSP
1-1/4" MBSP
A
A
30°
90°
361
48
39
96
35
48
142
101
502
2
3
4
5

3

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:

EKHBH016AB*, EKHBX016AB***,**
EKHWS150A3V3, EKHWS200A3V3, EKHWS300A3V3, EKHWS200A3Z2, EKHWS300A3Z2, EKHWSU150A3V3, EKHWSU200A3V3, EKHWSU300A3V3,
EKSOLHWAV1,

* = , , -, 1, 2, 3, ..., 9, 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 koşullanna uygun olarak:

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

01 Directives, as amended.
02 Direktiven, gemäß Änderung.
03 Directives, telles que modifiées.
04 Richtlijnen, zoals 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 Direktivejä, 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>**.	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.025C2/09-2007**
<B>	**KEMA**
<C>	**2082543.0551-QUA/EMC**

3PW33141-6D

DAIKIN

Jiro Tomita
Director Quality Assurance
Ostend, 19th of November 2007

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

CONTENTS

READ THESE INSTRUCTIONS CAREFULLY BEFORE INSTALLATION. KEEP THIS MANUAL IN A HANDY PLACE FOR FUTURE REFERENCE.

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

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

THE UNIT DESCRIBED IN THIS MANUAL IS DESIGNED FOR INDOOR INSTALLATION ONLY AND FOR AMBIENT TEMPERATURES RANGING 0°C~35°C.

INTRODUCTION

General information

Thank you for purchasing this altherma by DAIKIN indoor unit.

The altherma by DAIKIN indoor unit is the indoor part of the reversible air to water Daikin ERHQ heat pumps. These units are designed for wall mounted indoor installation and used for both heating and cooling applications. The units can be combined with Daikin fan coil units, floor heating applications, low temperature radiators, domestic water heating applications and solar kit for domestic hot water applications.

Heating/cooling units and heating only units

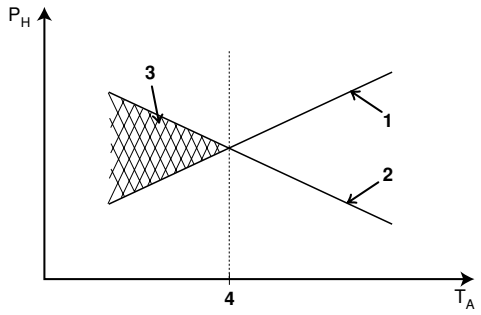
The altherma by DAIKIN indoor unit range consists of two main versions: a heating/cooling (EKHBX) version and a heating only (EKHBH) version.

Both versions can optionally be delivered with an integrated backup heater for additional heating capacity during cold outdoor temperatures. The backup heater also serves as a backup in case of malfunctioning of the outdoor unit. The backup heater models are available for a heating capacity of 3, 6 and 9 kW, and – depending on the heating capacity – for three different power supply specifications.

Indoor unit model	Backup heater capacity	Backup heater nominal voltage
EKHB*016AB3V3	3 kW	1x 230 V
EKHB*016AB6V3	6 kW	1x 230 V
EKHB*016AB6WN	6 kW	3x 400 V
EKHB*016AB9WN	9 kW	3x 400 V
EKHB*016AB6T1	6 kW	3x 230 V
EKHB*016AB9T1	9 kW	3x 230 V

NOTE

An EKHBH/X016**AB** indoor unit can only be connected to an outdoor ERHQ0***AA**-series.



1	Heat pump capacity
2	Required heating capacity (site dependent)
3	Additional heating capacity provided by the backup heater
4	Equilibriumtemperature (can be set through the user interface, refer to "Field settings" on page 16)
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.

Drain pan kit (option)

For heating/cooling versions (EKHBX), it is necessary to install the EKHBDP drain pan kit.
For more information concerning the drain pan kit, refer to "Installation of the EKHBDP drain pan kit (only for EKHBX models)" on page 9.

Solar kit for domestic hot water tank (option)

For information concerning the EKSOLHW solar kit, refer to the installation manual of that kit.

Remote alarm kit (option)

For information concerning the EKRP1HB remote alarm, refer to the installation manual of that kit.

Scope of this manual

This installation manual describes the procedures for unpacking, installing and connecting all EKHBH/X indoor unit models.

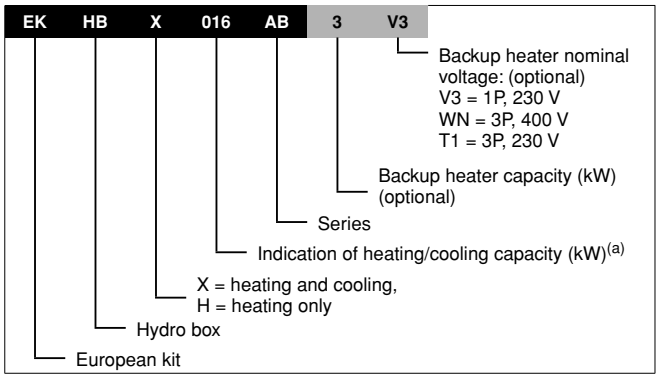
NOTE

Installation of the ERHQ heat pump outdoor is described in the outdoor unit installation manual.

Operation of the indoor unit is described in the indoor unit operation manual.

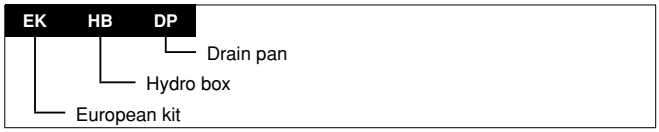
Model identification

Indoor unit



(a) For exact values, refer to "Technical specifications" on page 25.

Drain pan kit (optional)



ACCESSORIES

Accessories supplied with the indoor unit

See figure 1

1	Installation manual
2	Operation manual
3	Unpacking instruction sheet
4	Shut-off valve
5	Wall mounting bracket
6	Wiring diagram sticker (inside indoor unit cover)
7	Indoor unit cover fixing screw
8	Nylon washer

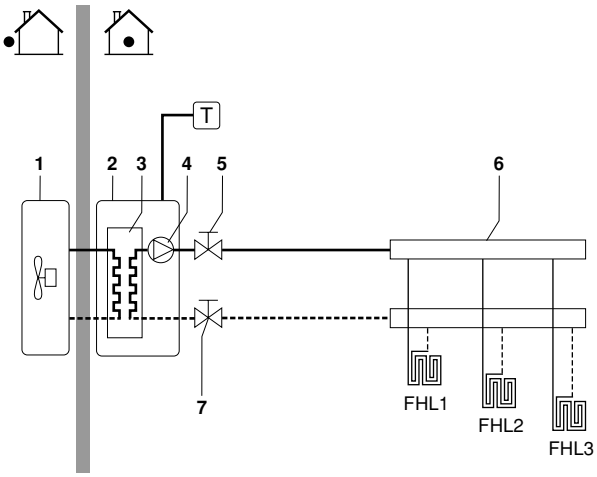
TYPICAL APPLICATION EXAMPLES

When the altherma by DAIKIN system is used in series with another heat source (e.g. gas boiler), it shall be made sure that the return water temperature to the heat exchanger does not exceed 55°C. Daikin shall not be held liable for any damage resulting from not observing this rule.

The application examples given below are for illustration purposes only.

Application 1

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



1	Outdoor unit	**6**	Collector (field supply)
2	Indoor unit	**7**	Shut-off valve
3	Heat exchanger	**FHL1..3**	Floor heating loop (field supply)
4	Pump		
5	Shut-off valve	**T**	Room thermostat (field supply)

Pump operation and space heating

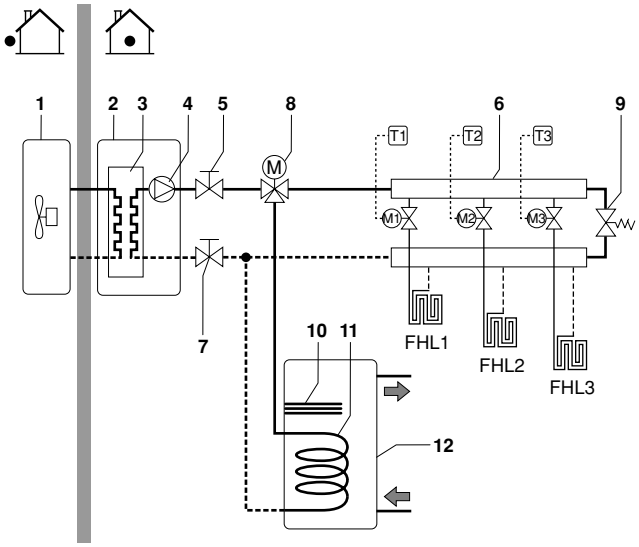
When a room thermostat (T) is connected to the indoor unit, the pump (4) will operate when there is a heating request from the room thermostat, and the outdoor unit will start operating to achieve the target leaving water temperature as set on the user interface.

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

Make sure to connect the thermostat wires to the correct terminals (see "Connection of the thermostat cable" on page 13) and to configure the DIP switch toggle switches correctly (see "Room thermostat installation configuration" on page 14).

Application 2

Space heating only application without room thermostat connected to the indoor 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 indoor unit.



1	Outdoor unit	**10**	Booster heater
2	Indoor unit	**11**	Heat exchanger coil
3	Heat exchanger	**12**	Domestic hot water tank
4	Pump	**FHL1..3**	Floor heating loop (field supply)
5	Shut-off valve		
6	Collector (field supply)	**T1..3**	Individual room thermostat (field supply)
7	Shut-off valve		
8	Motorised 3-way valve (field supply)	**M1..3**	Individual motorised valve to control loop FHL1 (field supply)
9	By-pass valve (field supply)		

Pump operation

With no thermostat connected to the indoor unit (2), the pump (4) can be configured to operate either as long as the indoor unit is on, or until the required water temperature is reached.

NOTE Details on pump configuration can be found under "Pump operation configuration" on page 14.

Space heating

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

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 (9) 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 "Water pipework" on page 9 is guaranteed.

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 (10) can provide auxiliary heating.

It is possible to connect either a 2-wire or a 3-wire 3-way valve (8). Make sure to fit the 3-way valve correctly. For more details, refer to "Wiring the 3-way valve" on page 13.

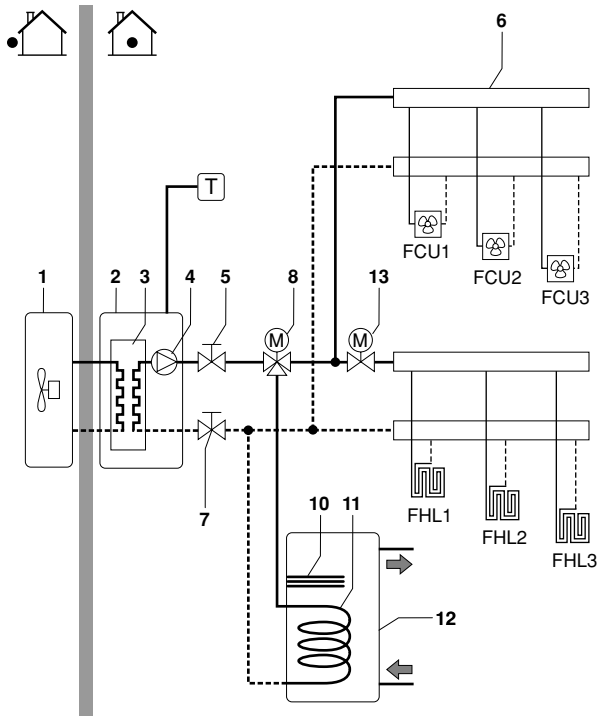
NOTE

The indoor 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 "Field settings" on page 16, field settings [5-02] to [5-04].

Application 3

Space cooling and heating application with a ***room thermostat suitable for cooling/heating changeover*** *connected to the indoor 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 indoor unit.



1	Outdoor unit	**10**	Booster heater
2	Indoor unit	**11**	Heat exchanger coil
3	Heat exchanger	**12**	Domestic hot water tank
4	Pump	**13**	Motorised 2-way valve (field supply)
5	Shut-off valve		
6	Collector (field supply)	**FCU1..3**	Fan coil unit (field supply)
7	Shut-off valve	**FHL1..3**	Floor heating loop (field supply)
8	Motorised 3-way valve (field supply)	**T**	Room thermostat with cooling/heating switch (field supply)

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 cooling/heating is requested by the room thermostat (T), the pump will start operating and the indoor unit (2) will switch to "cooling mode"/"heating mode". The outdoor unit (1) will start operating to achieve the target leaving cold/hot water temperature.

In case of cooling mode, the motorised 2-way valve (13) will close as to prevent cold water running through the floor heating loops (FHL).

Make sure to connect the thermostat wires to the correct terminals (see "Connection of the thermostat cable" on page 13) and to configure the DIP switch toggle switches correctly (see "Room thermostat installation configuration" on page 14).

Wiring of the 2-way valve (13) 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.

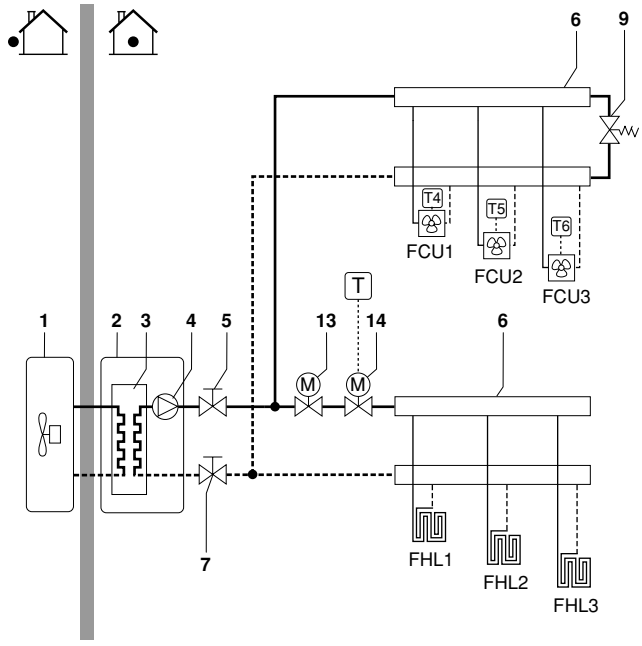
The ON/OFF setting of the heating/cooling operation is done by the room thermostat and cannot be done by the user interface on the indoor unit.

Domestic water heating

Domestic water heating is as described under "Application 2" on page 3.

Application 4

Space cooling and heating application ***without a room thermostat connected to the indoor unit****, but with a heating only room thermostat controlling the floor heating and a cooling/heating 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	**14**	Motorised 2-way valve for activation of the room thermostat (field supply)
2	Indoor unit		
3	Heat exchanger		
4	Pump	**FCU1..3**	Fan coil unit with thermostat (field supply)
5	Shut-off valve		
6	Collector (field supply)	**FHL1..3**	Floor heating loop (field supply)
7	Shut-off valve		
9	By-pass valve (field supply)	**T**	Heating only room thermostat (field supply)
13	Motorised 2-way valve to shut off the floor heating loops during cooling operation (field supply)	**T4..6**	Individual room thermostat for fan coil heated/cooled room (field supply)

Pump operation

With no thermostat connected to the indoor unit (2), the pump (4) can be configured to operate either as long as the indoor unit is on, or until the required water temperature is reached.

NOTE Details on pump configuration can be found under "Pump operation configuration" on page 14.

Space heating and cooling

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

The outdoor 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 (13) 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 (13) is closed to prevent cold water running through the floor heating loops (FHL).

When closing several loops in the system by remotely controlled valves, it might be required to install a by-pass valve (9) to avoid the flow switch safety device from being activated. See also "Application 2" on page 3.

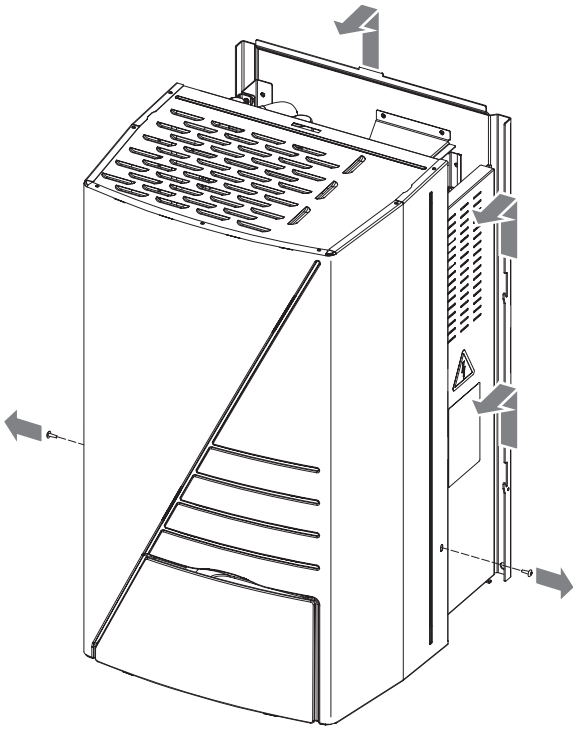
Wiring of the 2-way valve (13) is different for a NC (normal closed) valve and a NO (normal open) valve! Make sure to connect to the correct terminal numbers as detailed on the wiring diagram.

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

Overview of the indoor unit

Opening the indoor unit

- The front flap on the indoor unit cover gives access to the manometer and user interface.
- The indoor unit cover can be removed by removing the 2 side screws and unhitching the cover.

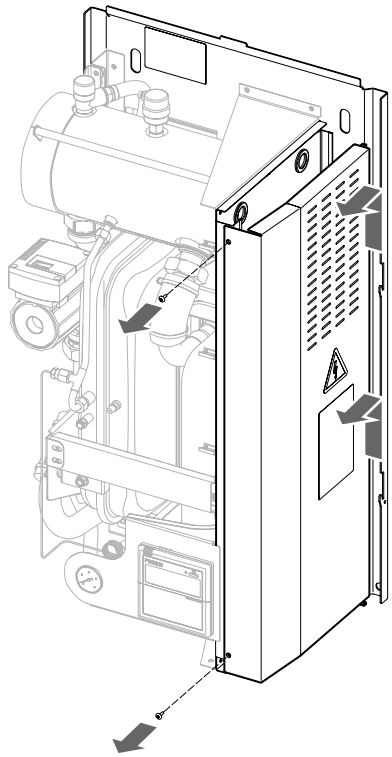


Make sure to fix the cover with the screws and nylon washers when installing the cover (screws and nylon washers are delivered as accessory).

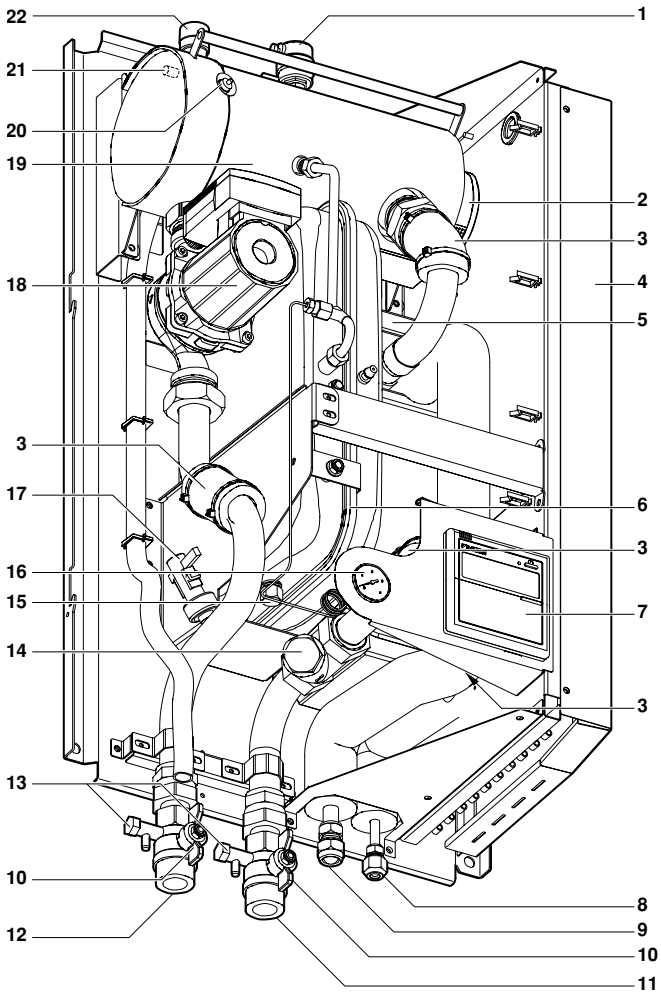
Parts inside the unit can be hot.

- To gain access to the switch box components – e.g. to connect the field wiring – the switch box service panel can be removed. Thereto, loosen the front screws and unhitch the switch box service panel.

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.



Main components



1 Air purge valve
Remaining air in the water circuit will be automatically removed via the air purge valve.

2 Backup heater
The backup heater consists of an electrical heating element that will provide additional heating capacity to the water circuit if the heating capacity of the outdoor unit is insufficient due to low outdoor temperatures.

3 Temperature sensors
Four temperature sensors determine the water and refrigerant temperature at various points in the water circuit.

4 Switch box
The switch box contains the main electronic and electrical parts of the indoor unit.

5 Heat exchanger

6 Expansion vessel (10 l)

7 User interface
The user interface allows the installer and user to set up, use and maintain the unit.

8 Refrigerant liquid connection

9 Refrigerant gas connection

10 Shut-off valves (accessory)
The shut-off valves on the water inlet connection and water outlet connection allow isolation of the indoor unit water circuit side from the residential water circuit side. This facilitates draining and filter replacement of the indoor unit.

11 Water inlet connection

12 Water outlet connection

13 Drain and fill valves

14 Water filter
The water filter removes dirt from the water to prevent damage to the pump or blockage of the evaporator. The water filter must be cleaned on a regular base. See "Maintenance" on page 21.

15 Expansion vessel drain valve
The drain valve of the expansion vessel allows draining the remaining water in the expansion vessel after draining with the drain and fill valves.

16 Manometer
The manometer allows readout of the water pressure in the water circuit.

17 Flow switch
The flow switch checks the flow in the water circuit and protects the heat exchanger against freezing and the pump against damage.

18 Pump
The pump circulates the water in the water circuit.

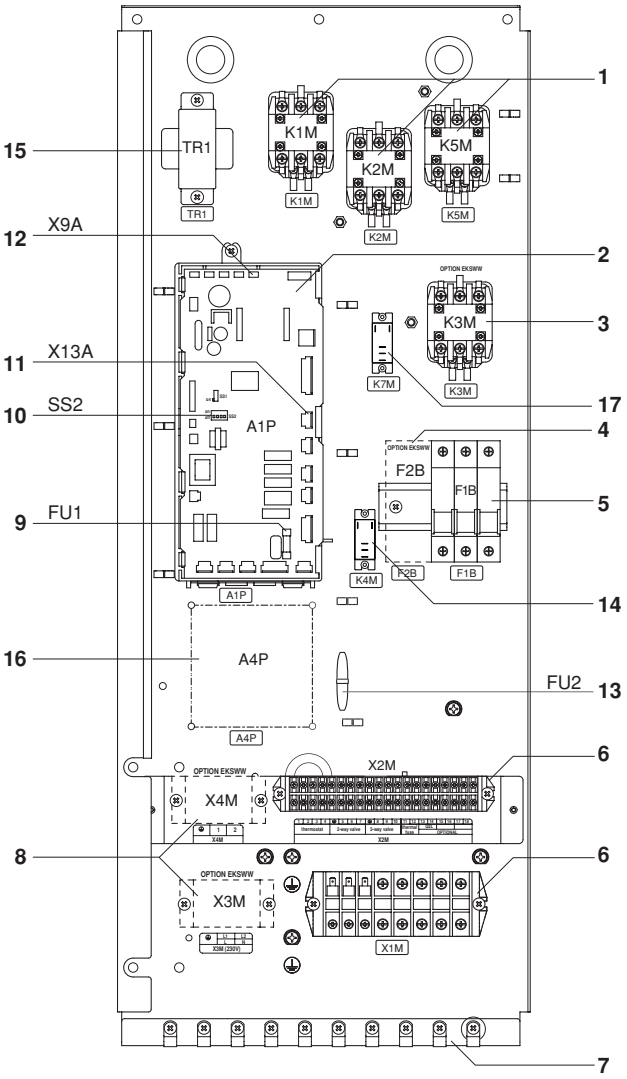
19 Backup heater vessel
The backup heater heats the water in the backup heater vessel.

20 Backup heater thermal protector
The backup heater is equipped with a thermal protector. The thermal protector is activated when the temperature becomes too high.

21 Backup heater thermal fuse
The backup heater is equipped with a thermal fuse. The thermal fuse is blown when the temperature becomes too high (higher than the backup heater thermal protector temperature).

22 Pressure relief valve
The pressure relief valve prevents excessive water pressure in the water circuit by opening at 3 bar and discharging some water.

Switch box main components



1 Backup heater contactors K1M, K2M and K5M (optional)

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

3 Booster heater contactor K3M (only for installations with domestic hot water tank)

4 Booster heater circuit breaker F2B (only for installations with domestic hot water tank)
The circuit breaker protects the booster heater in the domestic hot water tank against overload or short circuit.

5 Backup heater circuit breaker F1B (optional)
The circuit breaker protects the backup heater electrical circuit against overload or short circuit.

6 Terminal blocks
The terminal blocks allow easy connection of field wiring.

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

8 Terminal blocks X3M, X4M (only for installations with domestic hot water tank)

9 PCB fuse FU1

10 DIP switch SS2
The DIP switch SS2 provides 4 toggle switches to configure certain installation parameters. See "DIP switch settings overview" on page 14.

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

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

13 Pump fuse FU2 (in line fuse)

14 Pump relay K4M

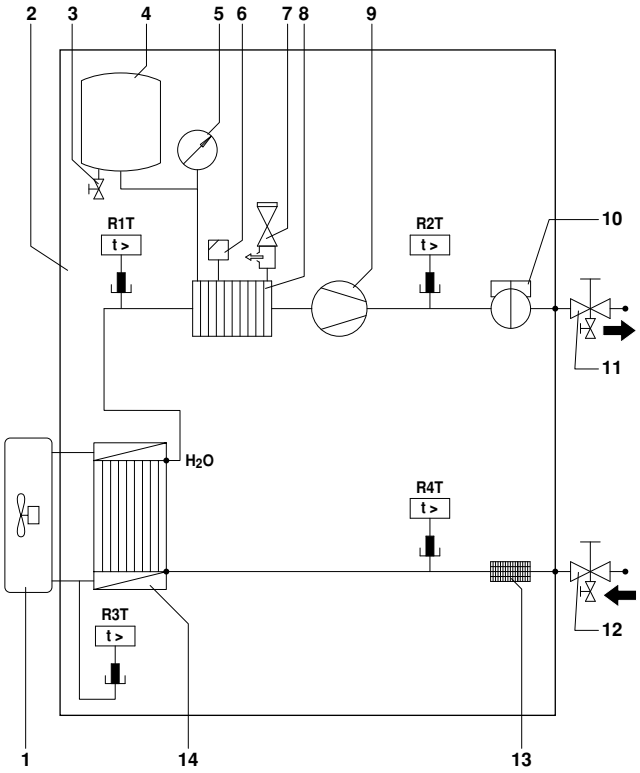
15 Transformer TR1

16 A4P
Solar/remote alarm address card (only for installations with solar kit or remote alarm kit)

17 K7M relay for solar pump (optional)
This relay and its output on X2M can be activated when the solar input on A4P becomes active.

NOTE The electrical wiring diagram can be found on the inside of the switch box cover.

Functional diagram



1	Outdoor unit	**10**	Flow switch
2	Indoor unit	**11**	Shut-off valve water outlet with drain valve (field installation)
3	Expansion vessel drain valve		
4	Expansion vessel	**12**	Shut-off valve water inlet with drain valve (field installation)
5	Manometer		
6	Air purge valve	**13**	Filter
7	Pressure relief valve	**14**	Heat exchanger
8	Backup heater vessel with backup heater	**R1T** **R2T** **R3T** **R4T**	Temperature sensors
9	Pump		

INSTALLATION OF THE INDOOR UNIT

Selecting an installation location

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

- The installation location is frost-free.
- The space around the unit is adequate for servicing. (See figure 2).
- The space around the unit allows for sufficient air circulation.
- There is a provision for condensate drain (only for EKHBX models with drain pan kit EKHBDP) and pressure relief valve blow-off.
- The installation surface is a flat and vertical non-combustible wall, capable of supporting the operation weight of the unit (see "Technical specifications" on page 25).
- There is no danger of fire due to leakage of inflammable gas.
- All piping lengths and distances have been taken into consideration.

Requirement	Value
Maximum allowable refrigerant piping length between outdoor unit and indoor unit	75 m
Minimum required refrigerant piping length between outdoor unit and indoor unit	3 m(a)
Maximum allowable height difference between outdoor unit and indoor unit	30 m
Maximum allowable distance between the 3-way valve and the indoor unit (only for installations with domestic hot water tank).	3 m
Maximum allowable distance between the domestic hot water tank and the indoor unit (only for installations with domestic hot water tank). The thermistor cable supplied with the domestic hot water tank is 12 m in length.	10 m

(a) When <5 m, recharging of the outdoor unit is required. Refer to the installation manual of the outdoor unit.

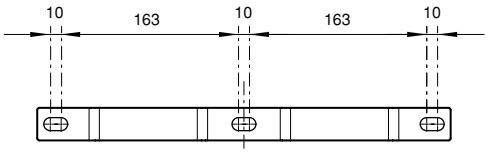
NOTE

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

Dimensions and service space

Unit of measurement: mm

Dimensions of the wall bracket



Dimensions of the unit, see figure 3

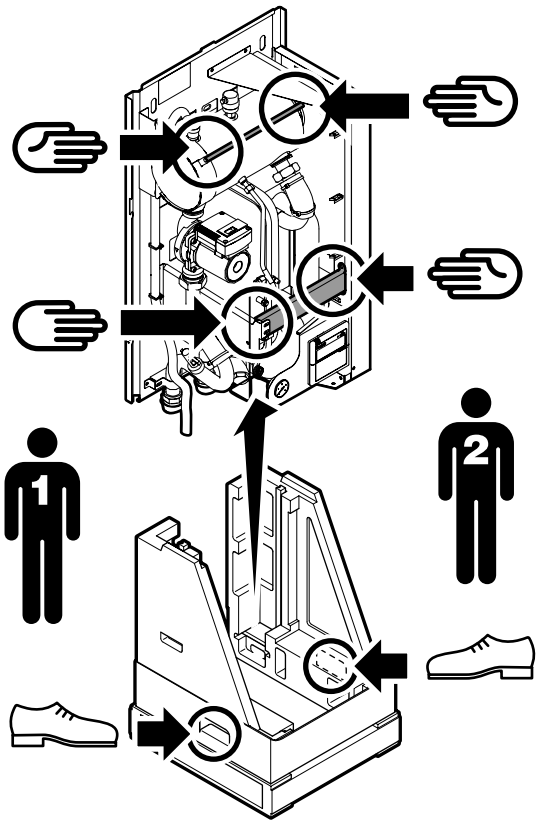
1	Flexible drain hose	**5**	Refrigerant gas connection
2	Water outlet connection		
3	Water inlet connection	**FBSP**	Female British Standard Pipe
4	Refrigerant liquid connection	**MBSP**	Male British Standard Pipe

Required service space, see figure 2

Inspecting, handling and unpacking the unit

- The indoor unit is packed in a cardboard box, fixed by straps on a wooden pallet.
- At delivery, the unit must be checked and any damage must be reported immediately to the carrier claims agent.
- Check if all indoor unit accessories (see "Accessories" on page 2) are enclosed.
- Bring the unit as close as possible to its final installation position in its original package in order to prevent damage during transport.
- The indoor unit weighs approximately 55 kg and should be lifted by two persons using the two lifting bars provided.

Do not grasp the switch box or piping to lift the unit! Two lifting bars are provided to lift the unit.



Mounting the indoor unit

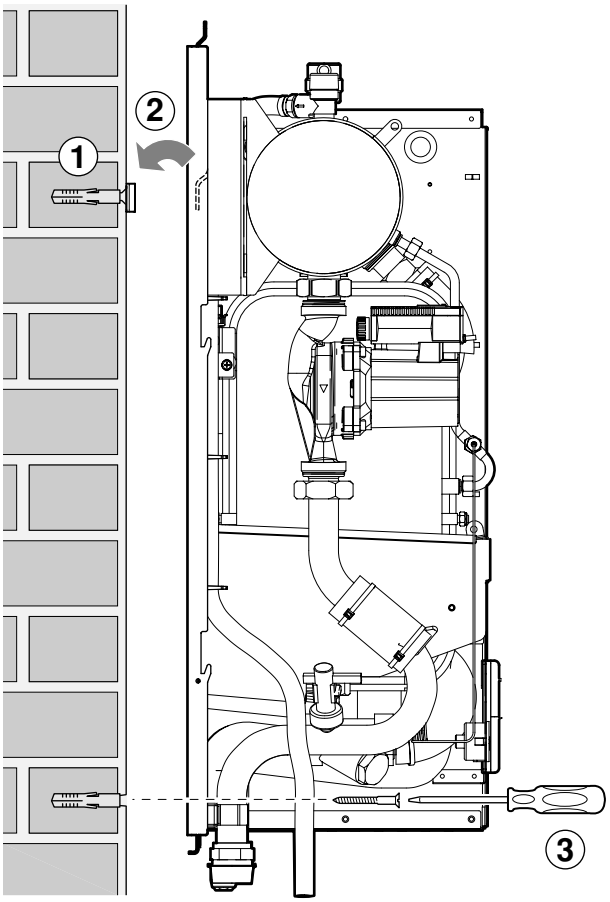
The weight of the indoor unit is approximately 55 kg. Two persons are required to mount the unit.

1 Fix the wall mounting bracket to the wall using appropriate plugs and screws.

Make sure the wall mounting bracket is completely level. When the unit is not installed level, air might get trapped in the water circuit resulting in malfunctioning of the unit.
Pay special attention to this when installing an EKHBX model to prevent overflow of the drain pan.

2 Hang the indoor unit on the wall mounting bracket.

3 Fix the indoor unit at the bottom side using appropriate plugs and screws. To do so, the unit is equipped with 2 holes at the bottom outer edges of the frame.



Installation of the EKHBDP drain pan kit (only for EKHBX models)

For heating/cooling models, it is necessary to install the drain pan kit (see "Accessories" on page 2).

During cooling operation, water vapour (humidity) in the air might condense to liquid and collect on the cold refrigerant and water pipes. This water is collected in the drain pan, which must be connected to a drain.

For installation instructions, refer to the instruction sheet delivered with the drain pan kit.

Make sure to position the pressure relief valve hose end in the drain pan. Failure to do so might lead to water coming into contact with electrical parts, resulting in electrical shocks or short-circuit of the electrical system.

Refrigerant pipework

For all guidelines, instructions and specifications regarding refrigerant pipework between the indoor unit and the outdoor unit, please refer to the outdoor unit installation manual.

The location of the gas pipe and liquid pipe on the indoor unit is shown under "Main components" on page 6.

Refrigerant piping specifications	Indoor unit	Outdoor unit
Gas pipe outer diameter	15.9 mm (5/8 inch)	15.9 mm (5/8 inch)
Liquid pipe outer diameter	9.5 mm (3/8 inch)	9,5 mm (3/8 inch)

When connecting the refrigerant pipes, always use two wrenches/spanners for tightening or loosening nuts! Failure to do so can result in damaged piping connections and leaks.

Water pipework

Checking the water circuit

The units are equipped with 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, check the following points:

- The maximum water pressure is 3 bar.
- 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 indoor unit. Mind position of the shut-off valves. Orientation of the integrated drain and fill valves is important for servicing. See figure 3.
- Drain taps must be provided at all low points of the system to permit complete drainage of the circuit during maintenance.
  Two drain valves integrated in the shut-off valves, and a drain valve on the expansion vessel are provided to drain the water from the indoor unit water system.
- Make sure to provide a proper drain for the pressure relief valve to avoid any water coming into contact with electrical parts.
- 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 indoor 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.

Checking the water volume and expansion vessel pre-pressure

The unit is equipped with an expansion vessel of 10 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 20 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 pre-pressure 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	
	≤280 l	>280 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 indoor unit. If the indoor 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

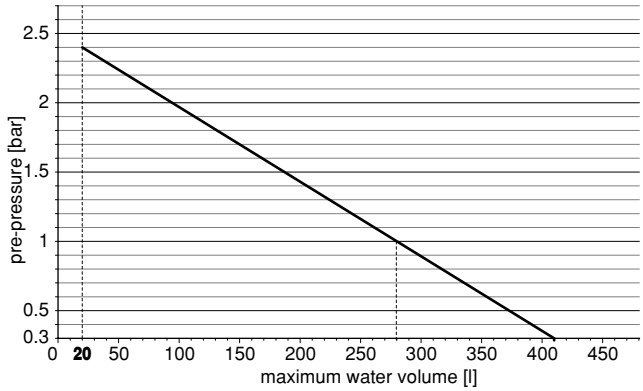
Checking the maximum allowed water volume

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 indoor unit is too small for the installation.



pre-pressure = pre-pressure

maximum water volume = maximum water volume

Example 1

The indoor 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 indoor unit is installed at the highest point in the water circuit. The total water volume in the water circuit is 350 l.

Result:

- Since 350 l is higher than 280 l, the pre-pressure must be decreased (see table above).
- The required pre-pressure is:
  Pg = (H/10 + 0.3) bar = (0/10 + 0.3) bar = 0.3 bar
- The corresponding maximum water volume can be read from the graph: approximately 410 l.
- Since the total water volume (350 l) is below the maximum water volume (410 l), the expansion vessel suffices for the installation.

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.

Connecting the water circuit

Water connections must be made in accordance with the outlook diagram delivered with the unit, respecting the water in- and outlet.

Be careful not to deform the unit piping by using excessive force when connecting the piping. Deformation of the piping can cause the unit to malfunction.

If air, moisture or dust 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.
- 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.

- 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.

NOTE

- 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.

Charging water

1 Connect the water supply to a drain and fill valve (see "Main components" 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 optional backup heater.

4 For units with optional backup heater:
Check that the backup heater vessel is filled with water by opening the pressure relief valve. Water must flow out of the valve.

NOTE

- 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 0.3 bar to avoid air entering the circuit.
- The unit might dispose some excessive water through the pressure relief valve.
- Water quality must be according to EN directive 98/83 EC.

Piping insulation

The complete water circuit, inclusive all piping, must be insulated to prevent condensation during cooling operation and reduction of the cooling and heating capacity.

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.

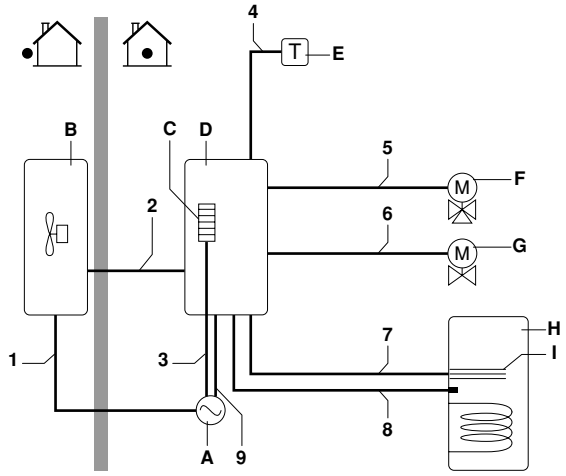
Field wiring

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 relevant local and national legislation.
- Switch off the power supply before making any connections.
- All field wiring and components must be installed by a licensed electrician and must comply with relevant European and national regulations.
- The field wiring must be carried out in accordance with the wiring diagram supplied with the unit and the instructions given below.
- Be sure to use a dedicated power supply. Never use a power supply shared by another appliance.
- 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 (30 mA). Failure to do so may cause electrical shock.

Overview

The illustration below gives an overview of the required field wiring between several parts of the installation. Refer also to "Typical application examples" on page 3.



A	Single power supply for outdoor unit, backup heater and booster heater (optional)	**F**	3-way valve for domestic hot water tank (field supply, optional)
B	Outdoor unit	**G**	2-way valve for cooling mode (field supply, optional)
C	Backup heater	**H**	Domestic hot water tank (optional)
D	Indoor unit		
E	Room thermostat (field supply, optional)	**I**	Booster heater (optional)

Item	Description	Required number of conductors	Maximum running current
1	Power supply cable for outdoor unit	2+GND	(a)
2	Indoor unit power supply and communication cable	3+GND	(b)
3	Power supply cable for backup heater	2+GND or 3+GND	(c)
4	Room thermostat cable	3 or 4	100 mA(d)
5	3-way valve control cable	2+GND	100 mA(d)
6	2-way valve control cable	2+GND	100 mA(d)
7	Booster heater power supply and thermal protection cable	4+GND	(b)
8	Thermistor cable	2	(e)
9	Booster heater power supply cable	2+GND	13 A

(a) Refer to nameplate on outdoor unit
(b) Cable section 2.5 mm^2
(c) See table under "Connection of the backup heater power supply" on page 12.
(d) Minimum cable section 0.75 mm^2
(e) The thermistor and connection wire (12 m) are delivered with the domestic hot water tank.

Internal wiring - Parts table

Refer to the internal wiring diagram supplied with the unit (on the inside of the indoor unit switch box cover). The abbreviations used are listed below.

A1P .....Main PCB
A2P .....Remote controller PCB (user interface)
A3P .....Thermostat (field supply, PC= internal Power Circuit)
A4P .....*.....Solar/remote alarm address card
E1H.....*.....Backup heater element 1
E2H.....*.....Backup heater element 2
E3H.....*.....Backup heater element 3
E4H..... #.....Booster heater
F1B .....*.....Fuse backup heater
F2B ..... #.....Fuse booster heater
F1T .....Thermal fuse (250 V, 94°C)
FU1 .....Fuse 3.15 A T 250 V
FU2 .....Fuse 5 A T 250 V
FuR,FuS .....Fuse 5 A 250 V for solar/remote alarm PCB
K1M .....*.....Contactor backup heater step 1
K2M .....*.....Contactor backup heater step 2
K3M ..... #.....Contactor booster heater
K5M .....*.....Contactor for backup heater all pole disconnection
K7M .....*.....Relay for solar pump
M1P .....Pump
M2S ..... ##.....2-way valve for cooling mode
M3S ..... #.....3-way valve: floor heating/domestic hot water
PHC1 .....Optocoupler input circuit
Q1DI .....Earth leakage protector
Q1L.....*.....Thermal protector backup heater
Q2L,Q3L . #.....Thermal protector booster heater
R1T.....Outlet water heat exchanger thermistor
R2T.....*.....Outlet water backup heater thermistor
R3T.....Refrigerant liquid side thermistor
R4T.....Inlet water thermistor
R5T..... #.....Domestic hot water thermistor
S1L .....Flow switch
S1S.....*.....Solar pumpstation relay
SS1 .....DIP switch
TR1 .....Transformer 24 V for PCB
V1S.....Spark suppression 1
V2S.....Spark suppression 2
X1M-X4M.....Terminal blocks

*	Optional
#	Applications with domestic hot water tank only
##	Heating/cooling applications only

Field wiring guidelines

- Most field wiring on the indoor unit side is to be made on the terminal block inside the switch box. To gain access to the terminal block, remove the indoor unit cover and switch box service panel, see "Opening the indoor unit" on page 5.
- Cable tie mountings are provided at the bottom of the switch box. Fix all cables using cable ties (field supply).
- A dedicated power circuit is required for the backup heater (optional).
- Installations equipped with a domestic hot water tank (optional), require a dedicated power circuit for the **booster heater**.

  Please refer to the domestic hot water tank installation manual.

Connection of the indoor unit power supply and communication cable

Power circuit and cable requirements

Power supply for the indoor unit is to be provided through the outdoor unit. Data communication with the outdoor unit is provided through the same cable.

For all guidelines and specifications regarding field wiring between the indoor unit and the outdoor unit, please refer to the outdoor unit installation manual.

Procedure

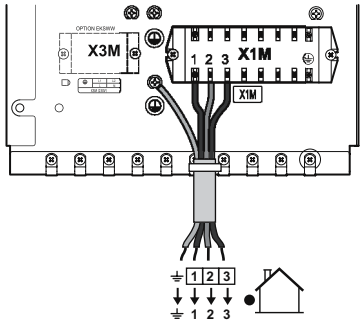
1 Using the appropriate cable, connect the power circuit to the appropriate terminals as shown on the wiring diagram and the illustration below.

2 Connect the earth conductor (yellow/green) to the earthing screw on the switch box mounting plate.

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

4 When routing out cables, make sure that these do not obstruct mounting of the indoor unit cover, see figure 3.

Note: only relevant field wiring is shown.



Connection of the backup heater power supply

Power circuit and cable requirements

- Be sure to use a dedicated power circuit for the backup heater. Never use a power circuit shared by another appliance.
- Use one and same dedicated power supply for the outdoor unit, indoor unit, backup heater and booster heater (domestic hot water tank).

This power circuit must be protected with the required safety devices according to local and national regulations.

Select the power cable in accordance with relevant local and national regulations. For the maximum running current of the backup heater, refer to the table below.

Indoor unit model	Backup heater capacity	Backup heater nominal voltage	Maximum running current
EKHB*016AB3V3	3 kW	1x 230 V	13 A
EKHB*016AB6V3	6 kW	1x 230 V	26 A
EKHB*016AB6WN	6 kW	3x 400 V	8.6 A
EKHB*016AB9WN	9 kW	3x 400 V	13 A
EKHB*016AB6T1	6 kW	3x 230 V	15 A
EKHB*016AB9T1	9 kW	3x 230 V	23 A

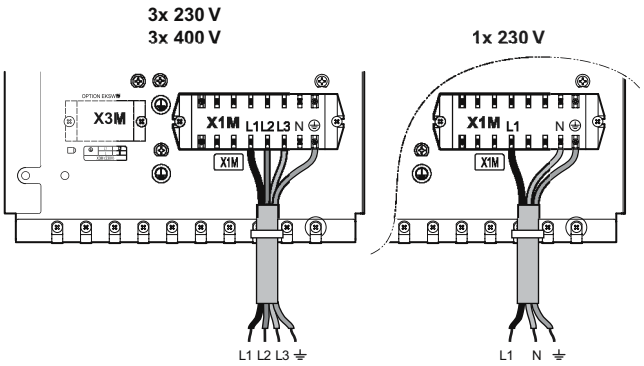
Procedure

1 Using the appropriate cable, connect the power circuit to the main circuit breaker as shown on the wiring diagram and the illustration below.

2 Connect the earth conductor (yellow/green) to the earthing screw on the X1M terminal.

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

Note: only relevant field wiring is shown.



Connection of the thermostat cable

Connection of the thermostat cable depends on the application.

See also "Typical application examples" on page 3 and "Room thermostat installation configuration" on page 14 for more information and configuration options on pump operation in combination with a room thermostat.

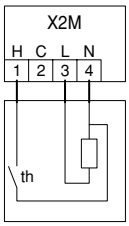
Thermostat requirements

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

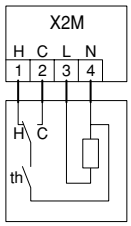
Procedure

1 Connect the thermostat cable to the appropriate terminals as shown on the wiring diagram.

Heating only thermostat



Heating/cooling thermostat



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 "Room thermostat installation configuration" on page 14 for more information.

Connection of the valve control cables

Valve requirements

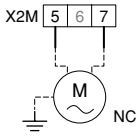
- Power supply: 230 V AC
- Maximum running current: 100 mA

Wiring the 2-way valve

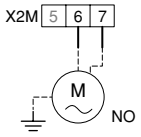
1 Using the appropriate cable, connect the valve control cable to the X2M terminal as shown on the wiring diagram.

NOTE 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.

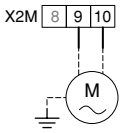
Two types of 3-way valves can be connected. Wiring is different for each type:

- "Spring return 2-wire" type 3-way valve

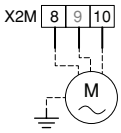
  The 3-way valve should be fitted as such that when the 3-way valve is idle (not activated), the space heating circuit is selected.
- "SPST 3-wire" type 3-way valve

  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.

START-UP AND CONFIGURATION

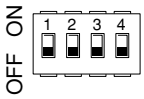
The indoor unit should be configured by the installer to match the installation environment (outdoor climate, installed options, etc.) and user expertise.

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

DIP switch settings overview

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

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

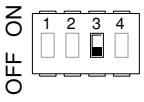


DIP switch SS2	Description	ON	OFF
1	Not applicable for installer	—	(Default)
2	Domestic hot water tank installation (see "Domestic hot water tank installation configuration" on page 15)	Installed	Not installed (Default)
3	Room thermostat connection (see "Room thermostat installation configuration" on page 14)	Room thermostat connected	No room thermostat connected (Default)
4	This setting(a) decides the operation mode when there is a simultaneous demand for more space heating/cooling and domestic water heating.	Heating/cooling priority	No priority (Default)

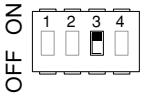
(a) only applicable in case DIP switch 2 = ON

Room thermostat installation configuration

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



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



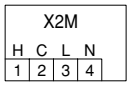
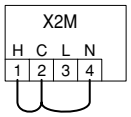
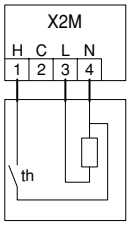
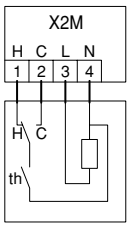
- On the room thermostat, set the hysteresis appropriately to prevent the pump from repeatedly turning on and off (i.e. chattering), and thereby impacting the lifetime of the pump.

NOTE

- When a 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 a 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 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 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: 	on when heating request by room thermostat	T	—	—
Thermostat with heating/cooling switch	• SS2-3 = ON • wiring: 	on when heating request or cooling request by room thermostat	T	T	—

th = Thermostat contact
C = Cooling contact
H = Heating contact
L, N = 230 V AC

(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.

Pump operation configuration

NOTE

To set the pump speed, refer to "Setting the pump speed" on page 16.

Without room thermostat

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:

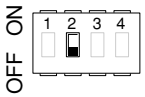
- set toggle switch SS2-3 to ON,
- short-circuit the terminal numbers 1-2-4 on the terminal block in the switch box.

With room thermostat

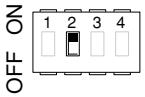
When a thermostat is connected to the indoor unit, the pump will operate continuously whenever there is heating or cooling demand requested by the thermostat.

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**.



Initial start-up at low outdoor ambient temperatures

Unit *without* optional backup heater

NOTE

To ensure that the unit operates within its operation 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 switching off the fans of the fan coil units until the water temperature has increased to 30°C.

OR

For floor heating applications: start up circuit by circuit using a (automatic) by-pass valve guaranteeing that water returning to the unit is more than 20°C.

Unit *with* optional backup heater

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 "Field settings" on page 16.

NOTE

Heating between 15°C and 25°C is performed by the backup heater only. This feature is not available on units without a backup heater.

Pre-operation checks

Checks before initial start-up

Switch off the 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 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 "Field wiring" on page 11, 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 25. Make sure that neither a fuse nor a protection device has been bypassed.

3 Booster heater circuit breaker F2B

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

4 Earth wiring

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

5 Internal wiring

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

6 Fixation

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

7 Damaged equipment

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

8 Refrigerant leak

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

9 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.

10 Air purge valve

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

11 Pressure relief valve

Check if the backup heater vessel is completely filled with water by operating the pressure relief valve. It should purge water instead of air (applies only to units with optional backup heater installed).

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

12 Shut-off valves

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

Operating the system with closed valves will damage the pump!

Powering up the indoor unit

When power supply to the indoor unit is turned on, "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.

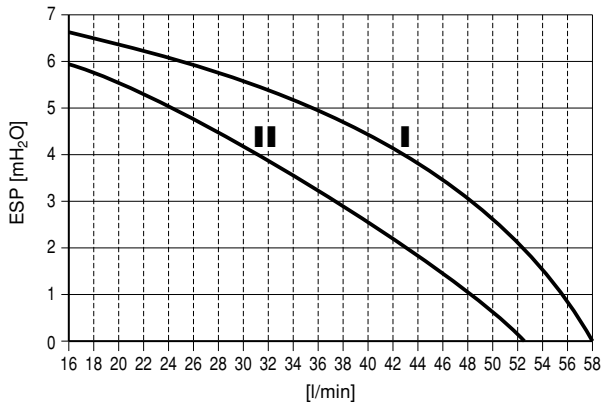
Setting the pump speed

The pump speed can be selected on the pump (see "Main components" on page 6).

The default setting is high speed (**I**). 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 low speed (**II**).

NOTE The speed dial on the pump indicates 3 speed settings. However, only 2 speed settings exist: low speed and high speed. The indicated medium speed setting on the speed dial is equal to low speed.

The available external static pressure (ESP, expressed in mH_2O) in function of the water flow (l/min) is shown in the graph below.



Field settings

The indoor unit should 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.

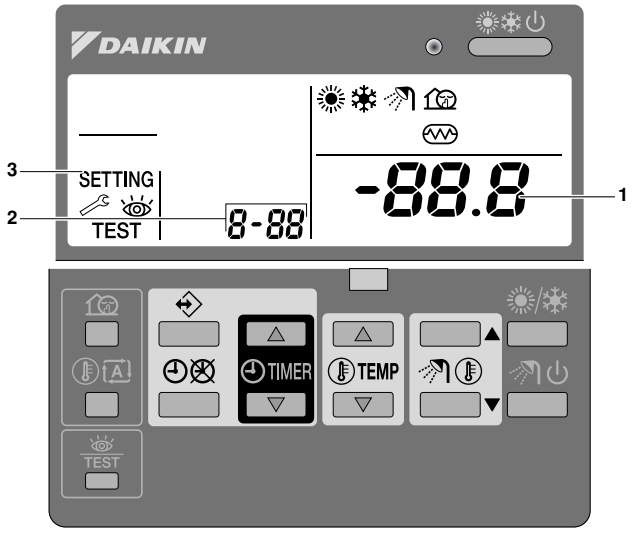
Each field setting is assigned a 3-digit number or code, for example [5-03], which is indicated on the user interface display. The first digit [5] indicates the 'first code' or field setting group. The second and third digit [03] together indicate the 'second code'.

A list of all field settings and default values is given under "Field settings table" on page 20. 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 16.

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.

NOTE 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.

NOTE
- Before shipping, the set values have been set as shown under "Field settings table" on page 20.
- 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].

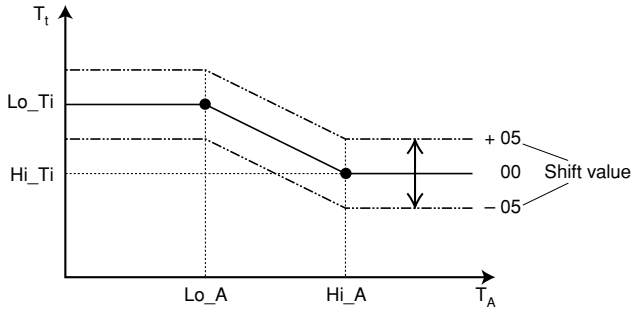
		Permission level		
Button		**1**	**2**	**3**
Quiet mode button		operable	—	—
Weather dependent set point button		operable	—	—
Schedule timer enable/disable button		operable	operable	—
Programming button		operable	—	—
Time adjust buttons	TIMER ▲ TIMER ▼	operable	—	—
Inspection/test operation button	TEST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

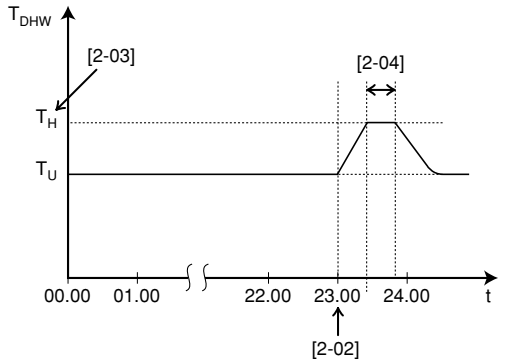
[2] Disinfection function

Applies only to installations with a domestic hot water tank.

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

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

- [2-00] Operation interval: day(s) of the week at which the domestic 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 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

[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.

NOTE 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)**.

[4] Backup heater operation and space heating off temperature

Backup heater operation — Applies only to units with optional backup heater installed.
The operation of the backup heater 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).
- [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).

NOTE 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 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.

[5] Equilibrium temperature and space heating priority temperature

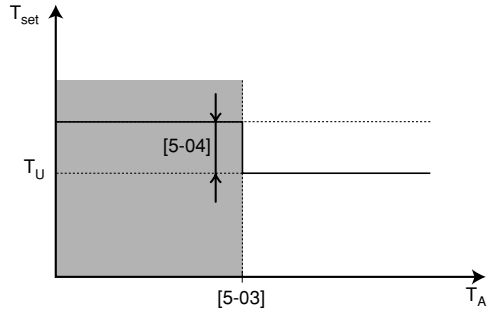
Equilibrium temperature — The 'equilibrium temperature' field settings apply to operation of the **optional backup heater**.
When the equilibrium temperature function is enabled, operation of the backup heater is restricted to low outdoor temperatures, i.e. when the outdoor temperature equals or drops 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 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 water will be heated by the booster heater only, i.e. low outdoor temperature.
- [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

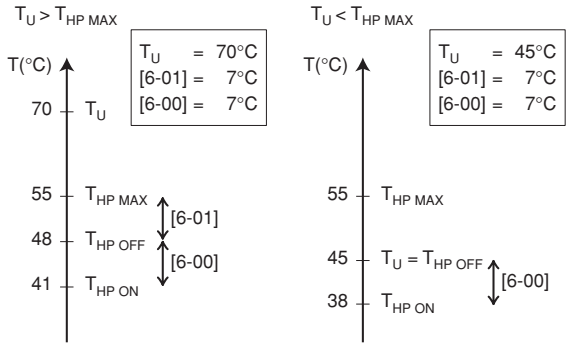
[6] DT for domestic water heating

Applies only to installations with a domestic hot water tank.

The 'DT (delta temperature) for domestic water heating' field settings determine the temperatures at which heating of the domestic 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 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 (55°C)
$T_{HP\ OFF}$	Heat pump OFF temperature
$T_{HP\ ON}$	Heat pump ON temperature

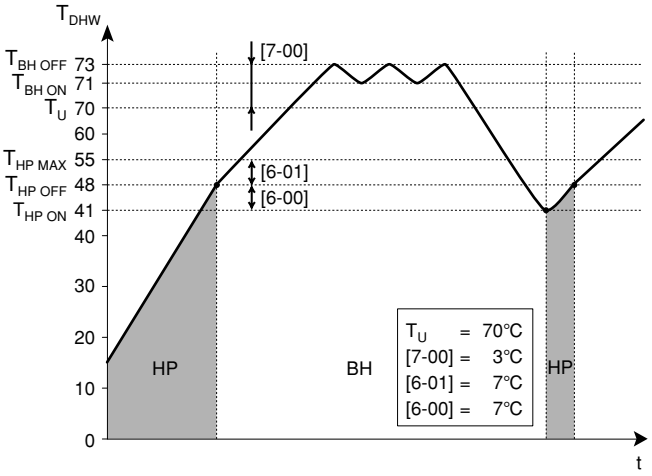
[7] Domestic hot water step length

Applies only to installations with a domestic hot water tank.

When the domestic 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 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 2°C (fixed value) below the booster heater OFF temperature.

NOTE 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.



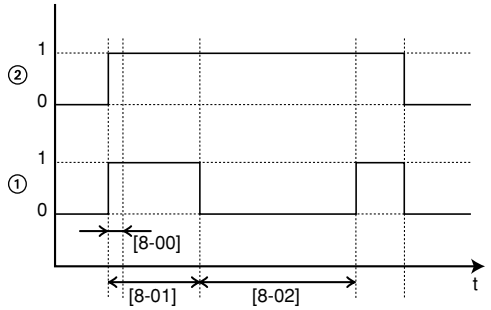
BH	Booster heater
HP	Heat pump. If heating up time by the heat pump takes too long, auxiliary heating by the booster heater can take place
$T_{BH\ OFF}$	Booster heater OFF temperature (T_U + [7-00])
$T_{BH\ ON}$	Booster heater ON temperature ($T_{BH\ OFF}$ – 2°C)
$T_{HP\ MAX}$	Maximum heat pump temperature 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

[8] Domestic water heating mode timer

Applies only to installations with a domestic hot water tank.

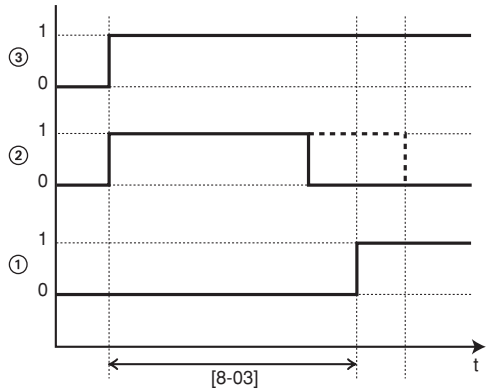
The 'domestic water heating mode timer' field settings defines the minimum and maximum domestic water heating times, and minimum time between two domestic water heating cycli.

- [8-00] Minimum running time: specifies the minimum time period during which domestic water heating should be activated, even when the target domestic water temperature has already been reached.
- [8-01] Maximum running time: specifies the maximum time period during which domestic water heating can be activated, even when the target domestic hot water temperature has not yet been reached.
  Note that when the unit is configured to work with a room thermostat (refer to "Room thermostat installation configuration" on page 14), the maximum running timer will only be taken into account when there is a request for space cooling or space heating. When there is no request for room cooling or room heating, domestic water heating by the heat pump will continue until the 'heat pump OFF temperature' (see field settings [5]) 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 domestic water heating cycli.



1 Domestic water heating (1 = active, 0 = not active)
2 Hot water request (1 = request, 0 = no request)
t Time

- [8-03] Booster heater delay time: specifies the start-up time delay of the booster heater operation after start of the heat pump domestic water heating operation.



1 Booster heater operation (1 = active, 0 = not active)
2 Heat pump domestic hot water operation (1 = request, 0 = no request)
3 Hot water request (1 = request, 0 = no request)
t Time

NOTE

- Take care that [8-03] is always smaller than the maximum running time [8-01].
- 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.

Example

	Energy saving settings	Quick heating settings (default)
[8-01]	20~95 min	30 min
[8-03]	20~95 min	20 min

[9] Cooling and heating set points

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.

- 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 to 16°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.

[A] Quiet mode

This field setting allows to select the desired quiet mode. Two quiet modes are available: quiet mode A and quiet mode B.

In quiet mode A, priority is given to the outdoor unit operating quietly under **all** circumstances. Fan and compressor speed (and thus performance) will be limited to a certain percentage of the speed at normal operation. In certain cases, this might result in reduced performance.

In quiet mode B, quiet operation might be overridden when higher performance is required. In certain cases, this might result in less quiet operation of the outdoor unit to meet the requested performance.

- [A-00] Quiet mode type: defines whether quiet mode A (0) or quiet mode B (2) is selected.
- [A-01] Parameter 01: do not change this setting. Leave it set to its default value.

Do not set other values than the ones mentioned.

[C] Solar priority mode

For information concerning the EKSOLHW solar kit, refer to the installation manual of that kit.

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 heater operation and space heating off temperature**									
	00	Status					1 (ON)	0/1	—	—
	01	Priority					0 (OFF)	0/1	—	—
	02	Space heating off temperature					35	14~35	1	°C
5	**Equilibrium temperature and space heating priority temperature**									
	00	Equilibrium temperature status					1 (ON)	0/1	—	—
	01	Equilibrium temperature					0	–15~20	1	°C
	02	Space heating priority status					0 (OFF)	0/1	—	—
	03	Space heating priority temperatures					0	–15~20	1	°C
	04	Set point correction for domestic hot water temperature					10	0~20	1	°C
6	**DT for domestic water heating**									
	00	Start					5	1~20	1	°C
	01	Stop					2	2~10	1	°C
7	**Domestic hot water step length**									
	00	Domestic hot water step length					3	2~4	1	°C
8	**Domestic water heating mode timer**									
	00	Minimum running time					5	0~20	1	min
	01	Maximum running time					30	5~95	5	min
	02	Anti-recycling time					3	0~10	0.5	hour
	03	Booster heater delay time					20	20~95	5	min
9	**Cooling and heating set point ranges**									
	00	Heating set point upper limit					55	37~55	1	°C
	01	Heating set point lower limit					15/25[(a)]	15~37	1	°C
	02	Cooling set point upper limit					20	18~22	1	°C
	03	Cooling set point lower limit					5	5~18	1	°C
A	**Quiet mode**									
	00	Quiet mode type					0	0/2	—	—
	01	Parameter 01					3	—	—	—
C	**Solar priority mode**									
	00	Solar priority mode setting					0	0~2	1	—

(a) With optional backup heater installed: 15°C. Without optional backup heater installed: 25°C

TEST RUN AND FINAL CHECK

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

Automatic test run

When the unit is put into operation (by pressing the button) for the first time, the system will automatically perform a test run in cooling mode. The test run will take up to 3 minutes, during which no specific indication is given on the user interface.

During the automatic test run, it is important to ensure that the water temperature does not drop below 10°C, which might activate the freeze-up protection and thereby prevent the test run to finish.
Should the water temperature drop below 10°C, press the ☀/❄ button so the ☀ icon is displayed. This will activate the backup heater during the automatic test run and raise the water temperature sufficiently.

If the automatic test run has ended successfully, the system will automatically resume normal operation.

If there are misconnections or malfunctions, an error code will be displayed on the user interface. To resolve the error codes, see "Error codes" on page 23.

NOTE When the outdoor unit is put into pump down operation (see the outdoor unit installation manual), the automatic test run flag will be cleared. The next time the system is put into operation, the automatic test run will be executed again.

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 "Error codes" on page 23.

NOTE 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.

NOTE 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.

Final check

Before switching on the unit, read following recommendations:

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

MAINTENANCE

In order to ensure optimal availability of the unit, a number of checks and inspections on the unit and the field wiring have to be carried out at regular intervals.

- 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.

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

1 Water pressure

Check if the water pressure is above 0.3 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 Pressure relief valve hose

Check that the pressure relief valve hose is positioned appropriately to drain the water.
If the (optional) drain pan kit is installed, make sure that the pressure relief valve hose end is positioned in the drain pan.

5 Backup heater vessel insulation cover

Check that the backup heater insulation cover is fastened tightly around the backup heater vessel.

6 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.

7 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.

8 Indoor unit switch box

- Carry out a thorough visual inspection of the switch box 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.

TROUBLESHOOTING

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

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.

Before contacting your local dealer, read this chapter carefully, it will save you time and money.

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

When a safety device was activated, stop the unit and find out why the safety device 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 cannot be found, call your local dealer.

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!

NOTE

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

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 >0.3 bar (water is cold), >>0.3 bar (water is hot). • 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 "Setting the pump speed" on page 16).
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 "Checking the water volume and expansion vessel pre-pressure" on page 10).

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.

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 >0.3 bar (water is cold), >>0.3 bar (water is hot). • 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 "Setting the pre-pressure of the expansion vessel" on page 10).

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 "Checking the water volume and expansion vessel pre-pressure" on page 10).

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 "Field settings" on page 16.

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 "Field settings" on page 16. Check whether or not the thermal protector of the backup heater has been activated (refer to Main components, "Backup heater thermal protector" on page 6 for location of the reset button). Check if booster heater and backup heater are configured to operate simultaneously (field setting [4-01], see "Field settings" on page 16) Check whether or not the thermal fuse of the backup heater is blown (refer to "Main components", "Backup heater thermal fuse" on page 6 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.

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**	—	—

In case this procedure for resetting the safety is not successful, contact your local dealer.

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 16 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 25). • Also refer to "Charging water" on page 11. • 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 >0.3 bar (water is cold), >>0.3 bar (water is hot). • 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 "Setting the pump speed" on page 16). • 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). • Check that the pump fuse (FU2) and PCB fuse (FU1) are not blown.
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 R3T)	Contact your local dealer.

Error code	Failure cause	Corrective action
AA	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
	Backup heater thermal protector is open	Reset the thermal protector by pressing the reset button (refer to "Main components" 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.
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 25). 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 25). 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 25). 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.

Error code	Failure cause	Corrective action
P1	PCB failure	Contact your local dealer.
P4	Electric component failure	Contact your local dealer.
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.
U8	Communication failure	Contact your local dealer.

General

	Heating/cooling models (EKHBX)	Heating only models (EKHBH)
Nominal capacity		
• cooling	Refer to the Technical Data	
• heating	Refer to the Technical Data	
Dimensions H x W x D	922 x 502 x 361	922 x 502 x 361
Weight		
• machine weight	55 kg	55 kg
• operation weight	70 kg	70 kg
Connections		
• water inlet/outlet	1-1/4" MBSP(a)	1-1/4" MBSP(a)
• water drain	hose nipple	hose nipple
• refrigerant liquid side	Ø9.5 mm (3/8 inch)	Ø9.5 mm (3/8 inch)
• refrigerant gas side	Ø15.9 mm (5/8 inch)	Ø15.9 mm (5/8 inch)
Expansion vessel		
• volume	10 l	10 l
• maximum working pressure (MWP)	3 bar	3 bar
Pump		
• type	water cooled	water cooled
• no. of speed	2	2
Sound pressure level(b)	28 dBA	28 dBA
Internal water volume	5.5 l	5.5 l
Pressure relief valve water circuit	3 bar	3 bar
Operation range - water side		
• heating	+15~+55°C	+15~+55°C
• cooling	+5~+22°C	—
Operation range - air side		
• heating	–20~+35°C	–20~+35°C
• cooling	+10~+46°C	—
• domestic hot water by heat pump	–20~+35°C	–20~+35°C

(a) MBSP = Male British Standard Pipe
(b) At 1 m in front of the unit (free field condition)

Electrical specifications

	Heating/cooling models (EKHBX)	Heating only models (EKHBH)
Standard unit (power supply via outdoor unit)		
• power supply	230 V 50 Hz 1P	
• nominal running current	See outdoor unit installation manual	
Backup heater		
• power supply	See "Connection of the backup heater power supply" on page 12	
• maximum running current	See "Connection of the backup heater power supply" on page 12	

NOTES

4PW42457-1 00000009

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

4PW42457-1